Equity in Response to Climate Change Roundtable

Melbourne, 26 March 2007

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Foreword

On 26 March this year, two welfare and two environmental NGOs: the Brotherhood of St Laurence, National Welfare Rights Network, the Australian Conservation Foundation and The Climate Institute, held a conference of great significance. The issue, 'Equity in Response to Climate Change', was placed firmly on the national agenda.

There is now growing awareness that significant changes in climate are occurring due to increasing human-generated greenhouse gas emissions. A concentration of greenhouse gases in the atmosphere leads to rising temperatures and more extreme, unstable weather behaviour. In highlighting such physical impacts, however, conversations on climate change to date have overlooked the social impacts – impacts which need to be given equal weight to environmental and economic considerations if there is to be an adequate and effective response to climate change.

There are many expected social costs. These include changes in arable land locations due to changes in rainfall, storm patterns and temperatures, which are likely to lead to displacement of farmers. There may be a loss of culturally significant ecosystems, such as the Kakadu coastal wetlands, which will lead to loss of income potential for Indigenous Australians. Health-related impacts, such as a changed distribution of vector-borne diseases, particularly malaria and dengue fever, are likely to occur. Households will be faced with higher insurance bills due to increased costs of storm and bushfire damage.

Such social costs are direct implications of changes in the weather. Policy responses aimed at slowing these changes are set to target greenhouse gas emissions, especially carbon. A most likely scenario is that a tax will be placed on carbon emissions, or emissions trading regimes will be introduced, so that market forces can come into play to reduce carbon usage. The impact of carbon pricing will be felt hardest by those on low incomes. Without corrective action, both climate change itself and policies to respond to climate change will most disadvantage people with the least capacity to pay, resulting in diminished personal wellbeing and a further-reduced ability to comply with policies designed to reduce greenhouse gas emissions. This is not an argument against taking early and extensive action to reduce pressures for global warming – rather, just the opposite, it is a strong argument for ensuring that the disadvantaged and those on low incomes are given assistance to adapt to policies aimed at reducing greenhouse emissions.

The Equity in Response to Climate Change Roundtable has been instrumental in raising the profile of this issue. Participants heard research papers and later broke into five 'solutions groups', each to discuss a specific challenge and advisable actions. The key conclusions of the five 'solutions groups' were reported by the chairpersons in the final session of the day.

This publication draws together some key papers given at the conference. The original formatting of each paper has been preserved, highlighting the variety of contributions. Also included are links to presentations that could not be included in the (black and white) printed publication due to their use of colour graphics. The presentations can be accessed on the BSL website <www.bsl.org.au>.

The expertise shared at the Equity in Response to Climate Change Roundtable provides essential reading for those interested in climate change policy and equity.

Tony Nicholson
Executive Director
Brotherhood of St Laurence

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1 Introduction

Welcome and introduction

Mr Tony Nicholson

Executive Director
Brotherhood of St Laurence

Tony Nicholson, BA, BSW, is the Executive Director of the Brotherhood of St Laurence and has dedicated almost 25 years to improving conditions of those living on or close to the edges of society. Tony spent 14 years as Chief Executive Officer of Hanover Welfare Services, a Melbourne based organisation regarded as Australia's leading agency in the field of homelessness. He has brought to the task of leadership at the Brotherhood a strong record of service development and innovation, research and policy analysis and compelling advocacy on behalf of those disadvantaged in our community.

Speech by Tony Nicholson, Executive Director of the Brotherhood of St Laurence, introducing the national roundtable "Equity in Response to Climate Change", 26 March 2007

Ladies and Gentlemen,

On behalf of the conveners – the Brotherhood of St Laurence, the Australian Conservation Foundation, the National Welfare Rights Network and the Australian Climate Change Institute – it's my pleasure to welcome you to this National Roundtable entitled "Equity in Response to Climate Change".

In welcoming you, I wish to acknowledge the traditional owners of this land, the Wurundjeri people, and pay respects to their elders and any elders present here today.

At the outset of this collaboration, the potential power of two of Australia's most influential NGO movements coming together was an attractive one. The great unanswered question was: 'Can this be done without compromising the core focus of either or both?'

A quick glance at the program before us today would suggest the early signs are that the objectives align very, very easily.

The more 'my side' – the side represented by social justice organisations – look at climate change the more we see who is most exposed:

Internationally it is impoverished Bangladeshi farmers in the low-lying Bay of Bengal delta, the tribal peoples in drying parts of sub-Saharan Africa and the already disadvantaged Pacific islanders who face the real prospect of inundation.

Closer to home, our Indigenous people live in areas where extreme weather events and drought will exact a savage toll and struggling farmers on marginal farm land will be further squeezed, in regions such as Victoria's Goulburn Valley which, as we meet, is on the precipice of experiencing this state's greatest natural disaster.

In our cities, disadvantaged members of our communities live in homes that offer little protection from the elements and lack the resources to insulate and climate-proof themselves. Their transport solutions are so limited as they often live where public systems of transport barely reach and their vehicles are anything but fuel-efficient at a time when petrol prices will only be travelling one way.

But we are also seeing opportunity. The same drive that pushes 'green' NGOs to fight for climate change abatement can provide opportunities not only to assist the disadvantaged to reduce their environmental footprint, but to overcome much of their disadvantage by increasing their capacities for taking up the employment opportunities that will inevitably emerge out of the new, greener industries.

Because one way or the other, it now seems clear that climate change and our responses to it are going to bring about major changes in our economy. And wherever there is widespread economic change, the vulnerable can be hit hard.

For the sake of the vulnerable, and the sake of sustaining the prosperity most of us have enjoyed for more than a decade, we can't allow the mistakes of the '80s and '90s to be repeated.

The economic reforms of the '80s and '90s laid the foundations for much of that prosperity but, in doing so, threw far too many people on the scrap heap. Our response to that economic revolution was totally inadequate. Our social policy response was abysmal. We didn't plan. Instead, we put a whole generation of middle-aged workers with hopelessly outdated skills onto unemployment benefits and disability pensions. We are still coping with that failure, through high levels of male unemployment, skill shortages in emerging industries and postcodes of poverty in once thriving factory communities.

With the maintenance of workforce participation levels critical to economic performance in the decade ahead, we can't afford to repeat this mistake. Our economy can't endure this level of waste again even if it could do so in decades past.

We need to anticipate these economic changes now, and think through how we can help communities and individuals adjust and to put in place proactive strategies rather than waiting for the inevitable social and economic calamity to hit us.

As our economy adapts to climate change, new industries will be created and existing industries will be transformed. New skills will be needed. Now is the time to be anticipating these opportunities and ensuring we have the right plans in place for reskilling those people in industries most vulnerable, as well as those currently not working.

As the author of the British Government's recent climate change report, Sir Nicholas Stern, has said, climate change is not just an environmental issue, it is an economic issue. This makes it a social issue as well. The essential interdependence between good environmental policy, good economic policy, and good social policy, will never be writ larger than in our response to climate change.

We have tried to bring together people with experience and knowledge and bright ideas and vision and energy to:

- do a stock-take of what is happening with the onset of climate change
- examine what is happening abroad and at home and to determine what our options in this field may be
- remind ourselves that this is not new work and that some pioneers have already been doing important collaborative work
- look more closely at what carbon price increases, regardless of what drives them, will mean to disadvantaged people and then to start the tough work of opening up and sifting through the opportunities that abound.

The conveners have been incredibly ambitious in the program they have put before you today. They have been ambitious in the people they have targeted to come along and help work through these issues and we thank you so much for seeing this to be valuable enough work to devote to it a day of precious time.

In the morning we largely want you to listen to what we have put together, but in the afternoon we are calling on you to work, to help us take slices of Australian society and apply what we have heard in the morning presentations to those slices. Are there really opportunities? Will we really be able to collaborate? What needs to come next?

I'd like to say I have been looking forward to this for some time now; I have a premonition that we are entering very fertile territory together and that is indeed exciting.

Equity in Response to Climate Change Roundtable program

Monday 26 March 2007 – The Green Building – 60 Leicester Street, Carlton

8.45am **Registration**

9.00am **Welcome and introduction**
Tony Nicholson, *Brotherhood of St Laurence, Executive Director*

9.10am **Welcome to Country**

9.15am **Australia's vulnerability to climate change**
Jennifer Cane, *Department of Sustainability and Environment Victoria, Green House Senior Policy Officer*

9.30am **International perspective on dealing with energy poverty and climate change**
Gill Owen, *Centre for Management Under Regulation, Warwick University, Project Director for the Sustainable Regulation Network Initiative*

10.00am **An Australian snapshot**
Justin Sherrard, *Cambiar Pty Ltd, Principal*

Session I. How the Not-for-Profit sector is responding to social equity and climate change

10.15am **Australian Conservation Foundation and Australian Council of Social Service collaboration**
Don Henry, *Australian Conservation Foundation, Executive Director*
David Thompson, *Australian Council of Social Service, Deputy President*

10.35am **Environment groups coming to terms with social issues**
Cam Walker, *Friends of the Earth, National Liaison Officer*
Julie-Anne Richards, *Climate Action Network Australia, Coordinator*

10.45am **Social groups come to terms with environment**
Catherine Smith, *Victorian Council of Social Service, Chief Executive Officer*

11.00am **Morning tea**

Session II. Impact of carbon rises on low income communities

11.20am **Research paper**
Peter Brain, *National Institute of Economic and Industry Research, Executive Director*

11.50am **Australian Conservation Foundation, Australian Council of Social Service and Choice collaboration**
Alex Gordon, *Australian Conservation Foundation, Strategies Director*

12.05pm **Roundtable discussion on key issues and the path forward**
Paul Gilding, *Easy Being Green, Chief Executive Officer*

12.45pm **Lunch**

Session III. Focus on solutions

1.30pm Roundtable participants break into their nominated solutions groups

Low income and disadvantaged people and communities
Speakers: Irina Cattalini, *WA Council of Social Service, Director of Social Policy*
Michael Raper, *National Welfare Rights Network, Director*
Chair: Ian Porter, *Department of Sustainability and Environment, Sustainability Strategy Director*

Rural communities
Speakers: Mark Wootton, *Climate Institute, Chair & Jigsaw Farms, Principal Manager*
Alex Arbuthnot, *VFF Land Management Committee*
Chair: Christine Forster, *Victorian Water Trusts Advisory Council, Deputy Chairperson*

Transport
Speakers: Jim Betts, *Department of Infrastructure, Director of Public Transport*
Chris Loader, *Bus Association Victoria*
Chair: Jim Downey, *Moreland Energy Foundation Ltd, Chief Executive Officer*

Indigenous communities
Speakers: Donna Green, *CSIRO Sharing Knowledge Project*
Olga Havnen, *Northern Land Council, Deputy CEO*
Chair: Simon Batterbury, *University of Melbourne School of Social and Environmental Enquiry*

Opportunities for working Australians
Speakers: Tony Maher, *Construction Forestry Mining Energy Union, National President*
Andrew Rimington, *Victorian Employers' Chamber of Commerce and Industry, Senior Policy Advisor*
Chair: Barbara Pocock, *Adelaide University Centre for Work + Life, Director*

3.00pm Afternoon Tea

Session IV. Reporting back and stepping forward

3.15pm Reporting and examining outcomes
Speakers: Chairs of five breakout groups
Moderated by Alan Tate, *Cambiar Pty Ltd, Principal*

4.15pm The path ahead
Don Henry, *Australian Conservation Foundation, Executive Director*
David Thompson, *Australian Council of Social Service, Deputy President*

4.45pm Close

2 Overview of climate change

Australia's vulnerability to climate change: an overview

Ms Jennifer Cane

Greenhouse Senior Policy Officer
Department of Sustainability and Environment

Jennifer Cane is a senior policy officer in the Greenhouse Policy Unit within the Department of Sustainability and Environment, which is leading action on this challenging new priority for the Government. Her role encompasses working with other areas of government and other stakeholders to identify potential climate change impacts and consideration of appropriate adaptation responses within the Government's broader greenhouse policy objectives.

With a background in science, Jennifer has also previously worked on climate change issues with the City of Melbourne and a broader sustainability program with the Property Council of Australia.

The presentation Jennifer Cane gave at the Equity in Response to Climate Change Roundtable, 'Australia's vulnerability to climate change: an overview', is available via the internet at <http://www.bsl.org.au/pdfs/J_Cane_Aust_vulnerability_to_climate_change.pdf>

3 Research papers

	Presenter	Title of paper
3.1	Dr Gill Owen	International perspective on dealing with energy poverty and climate change
3.2	Justin Sherrard	Equity in response to climate change roundtable: an Australian snapshot
3.3	Dr Peter Brain	The impact of carbon prices on Victorian selected household types: a preliminary analysis

3.1 International perspective on dealing with energy poverty and climate change

Dr Gill Owen

Senior Research Fellow, CMUR, Warwick Business School, UK
Policy and Regulation Adviser, Renewable Energy and Energy Efficiency Partnership

Dr Gill Owen is an energy policy consultant (specialising in sustainable energy issues) and a Senior Fellow of the Centre for Management Under Regulation (CMUR) at Warwick University Business School, where she is Project Director for the Sustainable Energy Regulation Network initiative, being developed under the Renewable Energy and Energy Efficiency Partnership. She regularly provides advice on energy policy and regulatory issues to government departments, regulatory bodies, local authorities, consumer organisations and major energy companies, in the UK and internationally.

She is Chair of the Public Utilities Access Forum, a member of the UK Government's Fuel Poverty Advisory Group and a member of the Department of the Environment, Food and Rural Affairs (DEFRA) Regulation Task Force. She was a Commissioner of the UK's Competition Commission (formerly the Monopolies and Mergers Commission) for ten years until 2002 and has also been a non-executive member of Ofgem's Management Board. She continues as a member of Ofgem's Social Action Plan Review Group and also provides advice to Ofgem on environmental issues. She has been a Specialist Adviser to the UK House of Commons Environment Committee and an Expert Adviser to the Economic and Social Committee of the European Communities on sustainable energy policy issues.

She is a political scientist (PhD from Birkbeck College, University of London) and has written numerous publications and spoken widely at conferences and seminars in the UK and overseas. Since working as an advisor to the State Government of Victoria on energy efficiency in the early 1980s she has since visited Australia and New Zealand regularly to advise and speak at seminars for state government departments, regulators, energy companies, local authorities and consumer organisations.

Equity in Response to Climate Change Round table

Melbourne, 26 March 2007

EQUITY AND CLIMATE CHANGE – UK AND EU EXPERIENCE

DR GILL OWEN
Senior Research Fellow, CMUR, Warwick Business School, UK
Policy and Regulation Adviser, Renewable Energy and Energy Efficiency Partnership

Introduction

Whilst there is scientific consensus that climate change is real and that human activities are a major factor, issues of climate justice or equity are most commonly discussed as a developed versus developing world issue. The developed industrialised nations are seen as responsible for most emissions, but it is developing countries that are likely to experience the worst effects of climate change due to a combination of situation (e.g. in areas most vulnerable to drought or flooding) and lack of economic resources to adapt. (e.g. Claussen and McNeilly, 1998; Christian Aid, 2000; Munasinghe, 2000)

However, there has been growing realisation that within developed countries the effects of climate change may not be equal. (e.g. Meyer and Hildyard, 1997) The Intergovernmental Panel on Climate Change (IPCC) has recognised this: "The impacts of climate change will fall disproportionately upon developing countries and the poor persons within all countries, and thereby exacerbate inequities in health status and access to adequate food, clean water and other resources." (IPCC, 2001) The equity implications are also spelt out in this quote from the UK's Secretary of State for the Environment: "Socially, climate change raises profound questions of justice and equity: between generations, between the developing and developed worlds; between rich and poor within each country. The challenge is to find an equitable distribution of responsibilities and rights." (Miliband, 2006a)

This therefore suggests that policy repsonses to tackle climate change need to take account of equity issues in both the development of domestic policy as well as international policy. Unless they do there is a risk that policies may have undesirable distributional impacts. At the same time, does the imperative to tackle climate change open up new opportunities to better deliver social justice, through policy responses? For example, many problems facing low income and marginal households and communities today are not currently caused by climate change – e.g. fuel poverty (poor housing standards and low incomes); declining incomes for some small farmers (due to economic changes, more imports, agricultural policies etc). Some policies that could help to reduce greenhouse gas emissions (e.g. energy efficiency for the fuel

poor, decentralised energy production on farm land) might provide real short term social justice benefits and not just mitigate medium and long term climate change impacts on these groups.

The key areas covered in this paper are:

1. The effects of climate change in Europe and the UK and the extent to which low income, vulnerable or marginal communities will be more adversely or positively affected than others.
2. Some current and projected policy responses to climate change in the UK and their effects on low income households.

Climate change in Europe

The European Environment Agency has assessed the impacts of climate change within Europe. (EEA, 2004) Global average temperature has increased by about 0.7 °C and the European average temperature by 0.95 °C in the last hundred years. It is estimated that temperatures will further increase by 1.4–5.8 °C globally and 2.0–6.3 °C in Europe by the year 2100. Temperatures in winter have increased more than in summer.

However, changes in climate are not uniform across Europe. The warming has been greatest in northwest Russia and the Iberian Peninsula. Whilst central and northern Europe have received more rain than in the past, southern and south-eastern Europe have become drier. These changes are projected to continue with an impact on water availability. In addition, extreme weather events, such as droughts, heatwaves and floods, have increased while cold extremes (frost days) have decreased.

The effects on agriculture also vary within Europe. Climate change increased the length of the growing season by 10 days between 1962 and 1995, whilst rising temperatures increased water demand. During the heatwave in 2003, many southern European countries suffered drops in yield of up to 30%, while some northern European countries profited from higher temperatures and lower rainfall. Agriculture in mid and northern Europe, could benefit from rising temperatures, but in some parts of southern Europe, agriculture will be threatened due to increased water stress. There could thus be a northward shift of agriculture. Bad harvests could become more common anywhere in Europe however, due to an increase in the frequency of extreme weather events (droughts, floods, storms), pests and diseases.

Some key facts from the EEA's most recent set of indicators are:

- One of the most identifiable visual impacts of climate change in Europe is the retreat of glaciers. From 1850 to 1980, glaciers in the European Alps lost approximately one third of their area and one half of their mass, a trend that is continuing.
- In Europe, the average number of annual disastrous weather and climate related events doubled over the 1990s compared with the previous decade. Economic losses resulting from these events have increased significantly during the past 20 years, from an annual average of less than US$5 billion to

about US$ 11 billion. This is due to increased wealth and more frequent events. Four out of the five years with the largest economic losses have occurred since 1997. Climate change projections show an increasing likelihood of extreme weather events, so an escalation in damage caused is likely.

- More than 20 000 excess deaths attributable to heat, particularly among the elderly population, occurred in western and southern Europe during the summer of 2003. Heatwaves are projected to become more frequent and more intense, hence the number of excess deaths due to heat is projected to increase. On the other hand, fewer cold spells could reduce the number of excess deaths in winter.

- Between 1975 and 2001, the annual number of flood events increased and the number of people affected by floods rose significantly. However, fatal casualties caused per flood event decreased significantly, likely due to improved warning and rescue measures.

- There has been an increase in tick-borne diseases – such as tick-borne encephalitis (TBE) and Lyme disease (in Europe called Lyme borreliosis) – in Europe, that may be attributable to climate change. TBE cases increased in the Baltic region and central Europe between 1980 and 1995 and remain high. However, it is not clear how many of the 85 000 cases of Lyme borreliosis reported annually in Europe are due to temperature increases.

"Climate change in the European Alps" (OECD, 2007) provides an assessment of the impacts of, and adaptation to, climate change in the areas of winter tourism in the European Alps. The years 1994, 2000, 2002, 2003 have been the warmest on record in the Alps in the past 500 years. Under present climate conditions, 609 out of the 666 (91%) Alpine ski areas in Austria, France, Germany, Italy, and Switzerland can be considered as naturally snow-reliable. The number of naturally snow-reliable areas would drop to 500 under 1 °C, to 404 under 2 °C, and to 202 under a 4 °C warming of climate. There will also be "winners" and "losers", both in terms of regions and the ski areas themselves, with low-lying ski areas being considerably more vulnerable than areas with high altitudinal range. Thus "…climate change impacts have significant equity implications." Smaller resorts, which tend to be at low altitudes are both more vulnerable to climate change and have fewer resources for expensive adaptations. Meanwhile, ski conglomerates have lower climate risk (as their ski areas often have greater altitudinal range), better diversification of risk (as they operate a number of resorts), and more resources to make adaptation.

The report summary points out "The implications of this assessment however extend beyond the European Alps. Insights into the costs of adaptation, the roles of the private sector and government agencies, and broader lessons on the synergies and trade-offs between climate change adaptation and other sectoral and development priorities are also likely to be relevant for other mountain systems which face similar climatic and contextual challenges, for example in North America, Australia and New Zealand."

Climate change in the UK

The UK has some data extending back three and a half centuries so this provides a long term picture of changes in climate. Central England's temperature rose by almost 1 ºC during the twentieth century and the 1990s was the warmest decade since records began in the 1660s. This warming of climate over land has been accompanied by warming of UK coastal waters. Analysis of other climate data has revealed the following changes:

- the growing season for plants in central England has lengthened by about one month since 1900;
- heatwaves have become more frequent in summer, while there are now fewer frosts and winter cold spells;
- winters over the last 200 years have become wetter relative to summers throughout the UK;
- a larger proportion of winter precipitation now falls on heavy rainfall days than 50 years ago;
- after adjusting for natural land movements, average sea level around the UK is now about 10 cm higher than it was in 1900.

(UKCIP, 2002)

This Climate Impacts Programme provides four alternative scenarios of how climate change may affect UK climate over the next hundred years. Some of the key results are:

- By the 2080s, annual temperature across the UK may rise by between 2 ºC and 3.5 ºC depending upon scenario. There will be greater warming in the south and east than in the north and west, and there may be greater warming in summer and autumn than in winter and spring. By the 2080s parts of the southeast may be up to 5 ºC warmer in summer. The temperature of UK coastal waters will also increase, although not as rapidly as over land.
- A very hot August, such as experienced in 1995 when temperatures over central England averaged 3.4 ºC above normal, may occur one year in five by the 2050s and three years in five by the 2080s.
- In the High Emissions scenario, in the south and east of the UK, summer precipitation may decrease by 50% or more by the 2080s and winter precipitation may increase by up to 30%.
- Relative sea level will continue to rise around most of the UK's shoreline. By the 2080s, sea level may be between 26 and 86 cm above the current level in southeast England. For some east coast locations, extreme sea levels could occur between 10 and 20 times more frequently by the 2080s than they do now.

A Department of Health (DoH) expert group used the then most recent (1998) UKCIP scenarios as the basis of a national assessment of the potential UK health impacts of climate change. (DoH, 2002) It identified a number of potential health impacts by the 2050s including:

- Heat-related deaths could increase to around 2800 cases per year. However, milder winters could lead to a fall in cold related winter deaths of up to 20 000 cases per year.
- There could be an increased frequency of severe coastal and river floods. Analysis of recent river flooding in the UK shows that mental health problems are the most important health impact among flood victims due to experience of personal and economic loss and stress. (Tapsell, 2002)
- Levels of UV radiation reaching the earth's surface may increase due to sunnier summers, a decline in cloud cover and ozone depletion. Whether this will lead to increased UV exposure depends on people's behaviour. Overall, the DoH assessment predicted an extra 5 000 cases of skin cancer and 2000 cataracts per year by 2050.
- Higher temperatures in summer could cause an estimated 10 000 extra cases of salmonella infection per year.
- Climate change might increase levels of cryptosporidium and campylobacter in water. Secure sanitation systems should safeguard supplies of drinking water, but possible contamination of stormwater outflows could carry disease into basements and rivers, affecting the health of residents and river users.
- A reduction in cold, calm winter weather together with reduced emissions of key pollutants (including particles, oxides of nitrogen and sulphur dioxide) could lead to a reduction (up to 50%) in winter air pollution and its adverse health effects. A small overall increase in the number of summer ozone episodes coupled with a longer-term increase in background levels of ozone could cause a rise in the number of premature deaths.

Heatwaves can cause deaths among the elderly (over 75), the young (under 4) or those who are already ill. The heatwave in August 2003 is estimated to have caused 15 000 extra deaths in Northern France and around 2000 extra deaths in England and Wales, mainly among older people. (POST, 2004) In response to concerns that climate change will increase the frequency of heatwaves, the DoH and NHS published a *Heatwave Plan for England* in July 2004. The plan defines four levels of response that are triggered when threshold temperatures are forecast or exceeded. It also lays down areas of responsibility for the Health Protection Agency, Met Office, DoH, Strategic Health Authorities, Primary Care Trusts, Local Authorities and Regional Directors of Public Health.

The UK national assessment of the likely health impacts of climate change identified areas where more research is needed including:

- research into the vulnerability of individuals and groups;
- assessment of the effectiveness of education campaigns such as Sun Safe in changing people's behaviour;
- assessment of the effectiveness of adaptation policies such as warning schemes;
- better estimates of likely impacts of climate change on human health;
- how best to communicate remaining uncertainties to policy makers and the public.

It is likely that many of the climate change impacts outlined above would affect lower income people more than the better off. For example, better off households are more likely to respond to education campaigns to change behaviour, take up vaccinations, use sun screen (which can be expensive). Evidence for this comes from reviews of access and response to health education, screening and vaccination services – minority groups and those with lower socio-economic status generally have poorer access to these services or do not take them up as much as better off groups. The reasons why this is so are complex but include cost issues (e.g. to travel to access screening), language difficulties (for some minority groups) etc. Low income households are less likely to have comprehensive household insurance to cover them for damage – and this problem is likely to worsen as premiums rise for people living in areas prone to flood damage (for example). There would be a need for special outreach and policies targeted to low income, vulnerable and marginal people.

UK energy policy response to climate change

As the above account shows, climate change is having some short and medium term equity implications within Europe and the UK, but many of its impacts will be felt in the longer term. However, policies that are developed to mitigate climate change may have more of an impact in the short term as the costs and benefits of such policies are likely to be felt much more immediately.

The UK has been developing policy responses to climate change since the early 1990s. The UK's target under the Kyoto protocol is to reduce greenhouse gas emissions by 12.5% below 1990 levels by 2008–12 and it should achieve this. The UK has also set itself the more challenging target of a 20% reduction by 2010 – on current trends it is less likely to achieve this. The longer term aspiration is a 60% reduction by 2050. This aspiration is now likely to be enshrined in legislation under proposals in the draft Climate Change Bill, published for consultation on 13 March.

Climate change policies sit within broader UK energy policy, which has four long-term goals.

- To put the UK on a path to cut carbon dioxide emissions by 60% by 2050, with real progress by 2020
- To maintain reliable energy supplies
- To promote competitive markets in the UK and beyond, helping to raise the rate of sustainable economic growth and to improve productivity
- To ensure that every home is adequately and affordably heated.

(DTI, 2006)

The fourth of those goals arises due to the recognition of the problem of fuel poverty – an equity issue – this will be expanded upon in the next section. In support of its energy policy goals, the Government has developed a range of policies and

programmes, which are particularly designed to have an impact on emissions. The main ones are:

- The European Emissions Trading Scheme (EU ETS) – started on 1 January 2005 and is intended to make a significant contribution towards the reductions in emissions that the EU is required to make under the Kyoto protocol. The first phase runs from 2005–07 and the second from 2008–12. The scheme covers all large industrial emitters of CO_2, including power generation. Each participant starts with a number of allowances based on its assessed level of emissions minus an amount that is its reduction target. To deal with the shortfall in allowances, participants can either reduce their emissions or buy allowances from someone else. Allowances were not auctioned in Phase 1 and will not be auctioned in Phase 2. This has raised concerns about windfall profits being made by the electricity generators as the prices of generation have risen to reflect the value of allowances. It is estimated that the EU ETS will add 3–14% (depending upon the carbon price) to household electricity bills from 2005–2010 (DTI, 2006)

- Climate Change Levy – tax on energy use by industrial, commercial and public sector users of energy, designed to reduce their energy use. The levy is "revenue neutral" with other taxes being reduced to compensate and some of the proceeds are recycled to fund advice and loans for energy saving. Households are exempt from the levy.

- The Government has set a Renewables Target of 10% of electricity generation by 2010 (4% in 2005) and its main mechanism for achieving this is the Renewables Obligation (RO). Under the RO all electricity retailers are required to source a proportion of their electricity from renewable sources or to pay a "buy out" price (the proceeds of which go to those retailers who do meet their targets) if they do not meet their target. The RO in effect provides a subsidy for renewable energy – in 2005 this increased household electricity bills by 3% and this will rise to 6% by 2010 (NAO, 2005)

- Building regulations set minimum standards of energy efficiency for all new housing and other buildings.

- Minimum efficiency standards are set for some household appliances and equipment and other are subject to labelling (these standards are set at EU level).

- The Energy Efficiency Commitment requires all electricity and gas retailers to achieve kWh energy savings through their household customers. EEC started in 2002, although a predecessor scheme started in 1992. Retailers deliver EEC by subsidising energy saving measures (insulation, efficient appliances and lighting) to get their customers to take up the measures. The level of EEC has been rising and by 2010 it is estimated it will be adding 3% to household gas and electricity prices. The equity implications of EEC are recognised through the Priority Group requirement. (see below for more about EEC)

Fuel poverty in the UK

Average household expenditure on energy is around 3% of income but around 2 million households in the UK would need to spend at least 10% of their income on fuel to achieve a warm home. (DEFRA&DTI, 2006) Households who would need to spend at least 10% of their income on energy are defined as being in fuel poverty. Many on low incomes keep their spending below this level because they cannot afford to heat their homes adequately. The causes of fuel poverty are a combination of income levels and the costliness of heating the home (those on lower incomes are less likely to have gas heating, and have homes that are less well insulated). A substantial proportion of households in fuel poverty also have high needs for heating due to age and infirmity. Fuel poverty can damage people's health and quality of life – the prevalence of winter deaths is greater in people living in homes that are poorly heated.

Many on lower incomes also pay their bills by more expensive methods such as prepayment meters. It has been estimated that the median price paid for energy by households in the lowest income decile is 3.29 p/kWh, compared to 2.8 p/kWh for those in the highest income decile – this results from greater use of gas amongst the better off and the different payment methods used. (Ekins and Dresner, 2004)

It is the existence of fuel poverty that led the UK government to reject carbon taxes on households and to reduce VAT on fuel to 5%. As noted above, households have been excluded from the climate change levy.

Fuel or energy poverty is a concept that is almost unique to the English speaking developed world – UK, Ireland, US, Canada, Australia, New Zealand. It is barely recognised at all in the rest of the established EU countries, even in those with much colder climates than the UK. This is largely because heating and insulation standards have tended to be much higher in the colder northern European countries and welfare benefits are often higher in these countries as well. Central heating (often supplied through district heating using waste heat from power stations and industry) has been widespread in urban areas in much of continental Europe since the middle of the twentieth century. Energy poverty is increasingly becoming an issue in some of the eastern European countries however, which have a legacy of inefficient heating systems and poor building standards.

UK Fuel Poverty Strategy

The UK Government's Fuel Poverty Strategy, published in November 2001, has an overall aim of eliminating fuel poverty in England by 2016 and eliminating it within vulnerable groups by 2010 as far as is reasonably practicable. The strategy includes a number of policies including improvements in welfare benefits and opportunities for work. However, energy efficiency is seen as a major part of the solution both because it will help to reduce fuel poverty, but also because it will contribute to the climate change strategy as improved energy efficiency can help to reduce emissions.

It has long been recognised in the UK that to ensure access to energy efficiency programmes by lower income and disadvantaged households, special initiatives are needed. Programmes that are open to every household on the same basis tend to be used disproportionately by the better off. This recognition goes back to the original Home Insulation Scheme established in the late 1970s, originally with a standard

grant of 66% of the costs for all households. Low income and elderly households were much less likely to use the grants than the better off (largely because the required client contribution was unaffordable), so the scheme was changed into a two tier one – 66% grants for any household and 90% grants for low income and elderly households.

When the Energy Efficiency Commitment was introduced in 2002, the Government decided that energy retailers would have to achieve at least 50% of the savings from the Priority Group (households eligible for a range of welfare benefits, including low income elderly and disabled people and low income families). This was because retailers have an incentive to achieve the energy savings at lowest cost and this would drive them towards schemes for better off households who would require lower subsidies. As all households are paying the costs of EEC the scheme would therefore tend to be inequitable (most of the benefits going to better off households) without the Priority Group requirement.

There are three main sources of investment in energy efficiency for low-income households.

- The Warm Front scheme of government (taxpayer funded) grants for new heating systems, improvements to heating systems and insulation. Grants are for up to £2500 per household and available to families, elderly and disabled people who qualify for the main welfare benefits. In 2005/06 the programme was worth £190 million – this will rise to £380 million per annum by 2007/08. From the scheme's introduction in June 2000 to the end of 2006 over 1.3 million households received assistance from this programme. Warm Front applies in England only, but there are similar schemes in Scotland, Wales and Northern Ireland.

- The Energy Efficiency Commitment – obligations on energy retailers. Funds insulation and energy efficient appliances and lighting. About 50% of this is targeted to low income households (Priority Group) – estimated spend of £150 million per annum from 2005–08. About 35% of UK households fall into the priority group and it is estimated that about two thirds of them received some measures through EEC from 2002–05 (mainly low energy light bulbs – CFLs)

- Investments by local authorities and housing associations in their social housing stock to achieve the Decent Homes standard – investment of around £200 million per annum.

Current spending on energy efficiency for low income households is thus around £700 million a year and it has been estimated that this will need to rise to £1 billion a year from 2008–16 if the fuel poverty targets are to be met. (FPAG, 2006) Debates continue about how the increased funding will be found – and indeed whether even more may be needed if energy prices remain high (prices fell from 1999–2004 but have since increased substantially due to a range of factors including world oil prices and EU gas markets). There is a debate during each phase of the EEC about how much of it should be devoted to the Priority Group – discussion are taking place at present about EEC 3 which will run from 2008–11. The equity argument favours keeping the level at least at 50% but energy retailers argue for it to be reduced on the grounds of cost, and within the government there are some who would also like to see

it reduced so that it can contribute more carbon savings. The carbon savings are assumed to be lower from Priority Group households than from the better off as the latter are heavier energy users and thus have more scope to reduce their use.

Renewables and decentralised energy

Most of the new renewables developed under the Renewables Obligation have been built by large developers, particularly the major integrated energy retailers/generators. However, there have been some smaller projects developed by individuals and co-operatives that have had the effect of bringing income to rural areas. Co-operatives like the pioneers Baywind in Cumbria and Cwmni Gwynt Teg in Wales have now been established in a number of locations, enabling local residents to have a financial stake in wind farms. A number of farmers have also become involved in growing energy crops that qualify for RO subsidy or have gained income (in the form of rent) for allowing wind turbines to be sited on their land. One example is WindWorks, an initiative by npower Renewables (part of RWE) to help farmers and landowners develop wind turbines on their land. WindWorks does all the work to get planning approval and finances, builds and owns the turbines. The landowner gets an annual income (typically £2500–4000).

These initiatives might be considered a benefit from an equity perspective, although the majority of individuals involved will tend to be relatively well off, even though they may live in rural areas where incomes are generally lower than average. Perhaps recognising the potential criticisms that they are mainly for the well off (the minimum share is usually about £300) a number of the co-operatives have used some of their income to invest in energy efficiency in the local community. In some other European countries energy co-operatives are more widespread and can bring significant benefits to rural areas. In Denmark, for example, wind turbines are mostly owned by co-operatives or individuals. In Austria, biomass co-operatives, particularly based on wood, have been developed as a means both of providing low cost heating and also to supplement incomes for those involved in forestry.

The other potential for decentralised energy and renewables to contribute to an equity agenda is in the provision of potentially lower running costs for energy – for example, if households can heat their water using solar panels or meet some of their electricity needs from a wind turbine. Such schemes might be developed on a micro (i.e. individual house) or community (from several houses or block of flats to a whole estate or village) level. Community schemes have been developed most extensively in Denmark.

In the UK there is currently growing interest in micro-generation and there have been various schemes to provide subsidies for these technologies over the past few years. The main scheme at present is the Low carbon buildings programme, which started in 2006. This has £50 million (for 2006–08) to fund grants for households, community organisations, schools, public sector and businesses to support small scale and micro-generation. The technologies supported include Solar thermal & PV, wind, hydro, bio-energy and ground source heat pumps. Grants cover 30–50% of costs up to limits. The scheme is currently being vastly over-subscribed, but such schemes inevitably will be relevant mainly to better off consumers who can afford the remainder of the high

costs. However, renewable generation could be beneficial to low income consumers in rural areas that lack access to gas. The Government is therefore developing some pilot schemes to test the potential.

Personal carbon allowances/quotas

In July 2006, Environment Secretary David Miliband said that the Government will look at tradable personal carbon allowances (PCAs) as a means to combat rising emissions from the domestic sector. Miliband said such a scheme would be fairer than tax increases because personal carbon allowances provide free entitlements and only impose financial penalties for those who go above their entitlement. A PCA scheme that covered electricity, gas, petrol and air travel –would address 44% of the economy's total emissions.

Miliband said: "Imagine a country where carbon becomes a new currency. We carry bankcards that store both pounds and carbon points. When we buy electricity, gas and fuel, we use our carbon points, as well as pounds. To help reduce carbon emissions, the Government would set limits on the amount of carbon that could be used. People on low incomes are likely to benefit as they will be able to sell their excess allowances. People on higher incomes tend to have higher carbon emissions due to higher car ownership and usage, air travel and tourism, and larger homes." (Miliband, 2006)

Personal carbon tradable allowances are one of a number of options the Government is examining to encourage individuals to be better informed and personally involved in tackling climate change. Carbon loyalty cards, league tables, the use of carbon offsets at point of purchase for certain sectors, awareness-raising through labelling and carbon calculators are also being investigated as potential long-term measures.

The 2006 Energy Review highlighted that the Government (Department of Communities and Local Government, Defra, Department for Trade and Industry and HM Treasury) will undertake a joint study that will look at the role of "community level" approaches to mobilising individuals, and the role of local authorities in particular in making them work effectively. The study will draw on experience of what initiatives have and have not worked in both the environmental area and other policy areas, such as public health. In the light of this information, the study will examine what new policy options, such as tradable personal carbon allowances, could be deployed to stimulate local action and consider their relative advantages and disadvantages. The pilot will report back to Ministers in the first half of 2007.

Personal carbon allowances (PCAs) – e.g. based on equal per capita allocation of allowances – would theoretically be progressive. This is because, in general, people on low incomes emit less carbon dioxide than average (particularly if personal air travel is included) and the better off emit more than average. The rich will therefore need, on average, to buy allowances from the poor to sustain more carbon-intensive lifestyles. (Dresner and Ekins, 2004).

However, some poor households lose out and some rich households win because there are significant differences in expenditure on energy and travel within income deciles. Thus, while most poorer households emit less than average, many emit more (and vice versa with richer households) However, as the table below (Dresner and Ekins, 2004) shows, even with this taken into account, fewer than 1 in 5 of households in the lowest equivalent income decile would be worse off, and most of those would be worse off by only a small amount (depending on the price of carbon – assumed at £10 per tonne in the table below).

Table 12: Effect of DTQs including aviation with a quota for each adult and half a quota for each child

Deciles	average net change £/year	per cent losers	per cent gainers	per cent losing > £1pw
1	36.31	18	82	3
2	23.55	27	73	2
3	23.10	27	73	4
4	14.48	34	66	7
5	7.32	43	57	8
6	-3.58	47	53	10
7	-7.32	54	46	13
8	-20.23	68	32	21
9	-29.60	75	25	27
10	-42.95	78	22	31
All	0.00	48	52	13
Households with children	+11.14	41	59	13
Households with pensioners	+12.33	32	68	2

(Dresner and Ekins, 2004)

Dresner and Ekins also found that carbon allowances would be more progressive than a carbon tax. Even if the tax revenues were recycled as effectively as possible through targeted increases in benefits to low income households, 30% of households in the lowest decile were still worse off (cf 19% for individual carbon trading)

However, as Roberts and Thumim (2006) point out, the research has not taken into account housing energy performance as it only examined actual expenditure on fuel as opposed to required expenditure on fuel. Some households, in energy inefficient homes will need to spend more on energy (and therefore need more carbon allowances) in order to be warm. Thus the introduction of individual carbon

allowances and trading could exacerbate fuel poverty. In addition, other factors also need to be better understood such as geographical distribution, including rural/urban and north/south. Access to opportunities to reduce emissions (information and advice, services, products and capital) is also relevant since it is unlikely that provision is evenly spread by income or geography.

Roberts and Thumim point out that there has been virtually no research into how people would respond to carbon allowances and that much more of this remains to be done. They also looked at research that might shed light on whether people in general (and different groups) might be able to manage a carbon budget and allowances and take part in trading. Whilst there is no directly relevant research they looked at work on "financial literacy" which has some read across. If findings were similar this would suggest that 20% of the population would not easily manage carbon allowances and a significant proportion of these would be on low incomes (but financial literacy is not directly correlated with income). Those who would manage best would be well off older couples, those who would manage least well would be low income younger women and low income families with children. Further evidence on the equity issues around use of the scheme comes from the introduction of the Child Trust Fund scheme – under which the Government gives the parents of every child born since 2002 a £250 voucher (£500 for low income families) to invest in a savings account on behalf of their child. One year after the scheme's introduction one quarter of the vouchers had not been used, and a number of extra efforts are having to be made particularly to increase take up amongst low income families.

Design issues can also affect distributional impacts – for example should children receive allowances? If they do not then households with children may be disadvantaged relative to those who do not; and vice versa (e.g. pensioner households) if children do receive allowances.

Personal carbon allowances are therefore an interesting idea and there is much debate on them in the UK. They are not Government policy – although the Environment Minister is very keen, others are less keen – and are not likely to become policy in the short term as there are too many issues that still need to be examined and resolved.

Relevance to Australia of UK experience

The problems faced by low income households in terms of affordable energy may be more acute in the UK but they are clearly relevant to Australia, although in some areas it may be difficulties affording adequate cooling in summer that is the bigger problem than winter heating. Thus energy efficiency, which has been found to be an important part of the solution both to fuel poverty and a contribution to tackling climate change, could play a similarly important role in Australia. The need to ensure that policies to promote energy efficiency are suitably adapted to the needs of low income households – so that such schemes do not become only for the well-off – thus applies as much in Australia as it does in the UK.

In the area of renewables and decentralised energy there may be more scope for a contribution to equity in Australia than in the UK, given the remoteness of many rural areas in Australia and the relatively low incomes in rural areas. However, as in the

UK, schemes to promote renewables and decentralised energy, as with energy efficiency, need to be designed effectively to ensure that those on lower incomes can benefit.

Personal carbon allowances are an idea worth investigating, although there are many theoretical and practical issues to resolve. As part of this it will be useful to do some detailed work on equity implications – e.g. like the work done by Dresner and Ekins in the UK. There may be an important difference between Australia and the UK that would be worth investigating. PCAs look particularly good from an equity perspective in the UK if they include transport, because low income households in the UK are less likely to have cars or to use air transport. One suspects that this may not be so true in Australia due to a greater need for car ownership because of lack of public transport in suburbs and rural areas. Similarly, it may that air transport use is also more common amongst lower income groups in Australia than the UK due to the long distances.

Conclusion

Climate change will have impacts on equity but in the short term it is the policy responses to climate change that will have the most impact. Some policies that mitigate climate change can have positive social benefits as well – notably energy efficiency for low income households. Tackling fuel poverty is a key requirement if economic instruments (taxes or trading) are to be used to greater extent in the future and energy efficiency has a major contribution to make in this regard. Policy design needs to take account of equity to avoid conflict between environmental and social goals.

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3.2 Equity in response to climate change roundtable: An Australian snapshot

Justin Sherrard and Alan Tate

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Justin Sherrard has been involved in the national and international climate change agendas for more than 10 years, and is known and recognised nationally for his strategy, policy and campaigning work in this area.

Justin is one of Australia's most experienced professional sustainability consultants recognised for the quality of his strategic and technical advice. He has a detailed understanding of the global politics of climate change, including the campaign perspectives and tactics of the NGO movement.

Justin has a technical background in environmental science and his advice draws on a deep knowledge and almost 20 years of international experience with environmental issues and their solutions, in particular climate change and natural resources, working in Australia, the UK, US and Latin America. He holds a BSc (Hons I) and a MAppSc from the University of NSW, Australia.

Throughout the 1990s, Alan Tate was the National Environment reporter for ABC-TV. Before that he was correspondent for *The Sydney Morning Herald*. He received a wide range of awards for his environmental reporting, including Australia's most prestigious journalism award – the Gold Walkley.

Alan is also a director of the Earthwatch Institute and of Environment Business Australia (EBA).

In 2001, Justin and Alan Tate co-founded Cambiar, as a Sydney-based strategy consultancy that is focused on driving the climate change agenda. Cambiar focuses on climate change policy at the political level, and on business strategy and growth at the corporate level. Cambiar also provides advice and assistance to green NGOs and forms the Secretariat for the International Climate Change Taskforce.

The paper Justin Sherrard gave at the Equity in Response to Climate Change Roundtable, complete with illustrative material, is available via the internet at <http://www.bsl.org.au/pdfs/Cambiar_climate__justice_Australian_snapshot_mar07.pdf>

Below is a text-only version, which omits figures 1, 2 and 3 that could not be reproduced effectively in the black-and-white printed version of this publication.

Equity in response to climate change roundtable
An Australian snapshot

Justin Sherrard and Alan Tate, Cambiar

1. Introduction

Interest in climate change in Australia has grown rapidly over the last 6–12 months. People have started to join the dots between their experience of a changing climate, in the form of prolonged drought and water shortages and extreme events, and what they have been hearing about climate change, from State Governments and in the media, helped along by screenings of the popular Al Gore movie-documentary *An Inconvenient Truth* and the Stern Review on The Economics of Climate Change[1].

Despite this popular interest, the full magnitude of the impacts of climate change, and the extent of policy change required to effectively address these impacts, has not yet been recognised. The impacts we are experiencing have been driven by a 0.7 °C increase in global average temperature. Yet emissions of greenhouse gases (GHG) to date are responsible for a further 0.7 °C increase, which is currently obscured by the inertia in the global climate system. This additional increase will work its way through in coming decades, and much more significant impacts of climate change will follow. And that is just the product of historical emissions; future emissions, which continue to rise, will only compound the situation.

Over recent years the Commonwealth Government has maintained that taking short-term action on climate change would impose costs on the economy by directing jobs and investment to other countries. The Government sought to delay domestic action until the global response is more advanced, and that position has tended to stifle debate and community discussion.

More recently the business community has shifted, recognising the inevitability of a constraint on carbon and seeking certainty on the form and timing of that constraint, to help manage risk and plan long-term investments. Business and economic concerns now dominate the Australian debate and policy processes around climate change.

International discussion and consideration of climate impacts has begun to turn to issues of equity and justice. The impact of climate change on wide areas of central Africa has provided an almost continental example of some of the world's poorest and most disadvantaged community's being made worse off by climate change. International aid organisations, social justice groups, and even environmental organisations have been driven recently to include notions of national and continental climate justice in their agendas.

In contrast, social issues are largely absent in Australia from considerations of climate change adaptation and mitigation, and even concern over the environmental consequences of a changing climate have been taking a back seat.

Yet domestic social issues, and our ability to avoid irreversible changes to our environment, are at least as important as economic considerations in determining the adequacy and effectiveness of our response to climate change.

Social issues include the direct impacts of climate change on people, which in some cases will be acute. Social issues also include the ability of people to install new technologies and adopt behavioural changes that will protect them from climate impacts, or reduce their use of energy.

The capacity to respond to the impacts of climate change and to policies designed to reduce greenhouse gas (GHG) emissions is not evenly distributed within our society. The most disadvantaged people in our society will likely lack access to the financial resources and knowledge required to protect their assets or re-locate away from the direct impacts of climate change, and to reduce their exposure to increased energy costs. Social justice is about ensuring the disadvantaged people in society are recognised in our response to climate change, and that our response does not make life more difficult for them.

This paper outlines the social justice issues relevant to climate change in Australia, and looks at how well we are addressing those issues in our response. It concludes with some thoughts on what is needed to ensure social justice is elevated in the public debate and policy process around climate change.

2. Social justice and climate change in Australia

The scientific evidence of climate change now presents an overwhelming case for action. Climate change presents very serious risks, globally and nationally, to the environment, society and economies. It demands an urgent response that should encompass action that is local, national and global in nature. A summary of the latest climate change science, at the global level and in Australia, is included in Attachment A.

The impacts of climate change on Australian society will be widespread. In all parts of Australia temperatures will rise, rainfall will change, sea level will rise, and extreme events will become more frequent and intense. These changes will inevitably come to affect the way we live, the way we work, our health, our security, and will affect the opportunities afforded to us as individuals.

In some parts of Australia the physical effects will be particularly noticeable. Tropical Australia's exposure to more intense cyclones and the southward extension of the cyclone belt is one example. The exposure of low-lying areas to more frequent flooding from more intense storms, compounded in the coastal fringe by rising sea level, provides another example. In all of these cases the most disadvantaged people in society may struggle to adapt to the changes or to relocate to reduce their exposure to the changes in climate.

The way we respond to climate change will also affect people. The majority of our greenhouse gas emissions come from burning fossil fuels to generate energy, so the focus of our response is on reducing energy use, and shifting energy sources to low carbon alternatives. This could mean the more widespread introduction of minimum energy performance standards, for electrical appliances, cars and buildings, all of which have the potential to increase costs for buyers. Pricing carbon into energy, including petrol and electricity, means unit costs will rise.

As with the impacts of climate change, the most disadvantaged people in society may struggle to withstand increased costs or change their behaviour to avoid price rises.

The aspects of climate change that present the greatest challenges for social justice, are listed below, with a summary provided in Box 1:

- **Health** impacts, including heatwaves and the changed distribution of vector-borne diseases
- Impacts on our everyday **way of life**, including access to public open space for sport and recreation and the protection of our housing stock from extreme events
- Impacts on livelihoods and the continued economic viability of parts of **rural Australia**, including the possibility of forced internal migration
- **Indigenous Australians**, particularly those in remote communities in northern Australia
- Changes in electricity and petrol **prices**, and the availability and **affordability** of alternatives
- Ongoing **employment** in some industries, such as in energy intensive industries and in coal mining
- **Border security**, because climate change will not only affect how we live. The Asia-Pacific region will be badly affected, most likely displacing people and creating climate refugees

Box 1: Social justice dimensions of climate change[2]

Health impacts
Prolonged exposure to high temperatures can cause heat exhaustion, cramps, heart attacks and stroke. Those most vulnerable to heat-related stress include the elderly, the very young, people under intense physical stress and those with cardiovascular disease. Without strong action to reduce GHG emissions, annual heat-related deaths of people aged over 65 years living in capital cities could rise from 1,100 to between 8,000 and 15,000 by the end of the century.

Vector-borne diseases include Dengue Fever, Malaria and Ross River Fever, and their distribution is heavily influenced by climatic conditions. Dengue Fever is not endemic to Australia, although North Queensland currently supports a suitable climate for its establishment and there have been recent infections in the Torres Strait Islands. Strong action to reduce GHG emissions could limit the spread of the dengue transmission zone to Brisbane. But in the absence of strong action the transmission zone could spread south to Sydney by the end of the century.

Other health impacts include water-borne diseases, food-borne diseases, exposure to solar radiation (skin cancer) and respiratory diseases.

Impacts on our everyday way of life
Climate change will cause significant change to the ways of life of Australians generally. These changes will range from the security of our homes and neighbourhoods to the availability of local amenities like beaches and parklands and holiday destinations.

For instance, as a result of the current drought, sport has been banned in some rural towns and suburbs, because of the health and safety risks of playing on dry, hard, bare ground. Because sport is important to Australians, many people will be impacted if such bans become more widespread. The people most heavily affected will be those with little or no access to alternatives to community-based sports and facilities.

Periods of prolonged heat, wind and rainfall, and increased variations in them, can lead to accelerated structural fatigue of the housing stock and of buildings, and greater demands on construction and drainage. These impacts could be exacerbated if extreme weather events like cyclones move into urban areas where houses, buildings and infrastructure are not designed to cope with them. The houses, buildings and infrastructure most at risk are those constructed from cheaper building materials, like fibre cement, and low cost housing such as caravan parks.

As the magnitude and frequency of storm damage goes up, the cost of insuring houses, buildings and infrastructure against extreme events will also increase. In some areas insurance cover may become very expensive or may even be withdrawn, leaving housing assets stranded and the risk that some areas will need to be abandoned.

Some people will retro-fit their houses to cope with these changes, while others move to areas that are less affected. The most disadvantaged people in society may not be able to afford to retro-fit or to move, and will see the value of their home decrease or their rent increase. Similarly the costs of protecting infrastructure and public buildings will fall to tax- and rate-payers, and the most disadvantaged people in society may struggle to afford such cost increases.

Impacts on rural Australia
As the climate changes, it is likely that existing farming practices will become progressively more marginal in some established areas of rural Australia. Farmers will either need to adopt new farming practices that are better suited to the new climate regime, or, where possible, physically relocate to continue farming practices in areas that best suit them.

Neither process will be straight-forward – they will require access to knowledge and to capital. Some farmers will struggle with these changes, and as is happening during the current drought, some farming families will experience financial hardship and chronic social pressures. The abandonment of rural towns is likely to accelerate with the consequent loss of local history and culture.

Indigenous Australians
Indigenous people living in northern Australia will find themselves increasingly exposed to the impacts of climate change, including more extreme events, rising sea levels and increased transmission of infectious diseases. Their capacity to respond to these events is already constrained, and they will struggle to respond to more severe climatic events. Climate impacts are likely to further exacerbate the breakdown of local culture and have a negative impact on efforts to establish new economic foundations in northern Australia.

There is strong evidence that communities in the Torres Strait are already being affected by sea level rise and consideration is being given to the eventual evacuation and relocation of some island communities.

Changes in electricity and petrol prices, and the availability and affordability of alternatives
Mitigation strategies must focus on reducing greenhouse gas emissions from the use of fossil fuels. Most economists favour using financial instruments that put a price on GHG emissions as a way of reducing demand and improving the efficiency of fossil fuel use. This means energy prices – and in particular electricity and petrol – need to rise.

Our cities and towns, and our way of life, are a product of the availability of cheap energy. Urban design and house construction have not been geared to minimising energy use, and human behaviour is a response to this.

Increasing energy prices will affect everyone in society, and a range of responses will follow. Responses for electricity include reducing demand by improving design and construction (eg. insulation), installing more energy efficient lighting and ventilation systems, and more efficient appliances. For transport, responses include using cars less, with more walking and cycling, and making more use of public transport. For both electricity and petrol it is possible that while unit prices will rise, actual use can be reduced, meaning that the net cost to consumers does not change.

The most disadvantaged people in society may struggle to respond to increasing energy prices. Those who can afford to upgrade to more energy efficient living, and have better access to alternatives to using private cars for transport, will do best. Others, particularly those in outer urban areas, will have less access to transport alternatives and have longer distances to travel, and – without relief – will simply have to pay higher energy prices.

There will be associated issues with increases in the cost of water as a drier climate means expensive options, such as water recycling or desalination, are needed to secure and to ration water supplies to towns and cities. The most disadvantaged people in society may struggle to respond to rising prices. Reducing demand (e.g. by installing a rainwater tank) and by installing devices and using appliances that improve the efficiency of their water use (such as water efficient dishwashers), may be beyond their financial resources and outside their knowledge base.

Ongoing employment in some industries
Changes in electricity and petrol prices will impact on industry (as well as households) in two ways. Firstly, the direct cost of energy, or energy-intensive inputs, is likely to rise as carbon pricing is introduced across the economy. Secondly, companies that are manufacturing energy-intensive products or providing energy-intensive services may find demand for those products and services shifting to lower-carbon alternatives.

To remain competitive changes will be required in the way energy is used in production and in service delivery, and some companies will struggle to respond. Their position in the capital investment cycle may mean they cannot afford to invest in more energy efficient plant, and if they can, their access to capital may be constrained by tight margins. Some industries may be directly exposed to overseas competitors who have a rent holiday on carbon pricing, or who already have more energy efficient operations or products by virtue of already being exposed to carbon pricing.

Uncompetitive companies will likely close down or make big changes to their operations, and job losses could follow.

Climate change will also have a largely negative impact on the tourism industry where many unskilled and transient workers are currently employed. Tourism based around the Great Barrier Reef and the NSW/Vic snowfields are examples of tourist attractions that will decline over the next two to three decades.

Border security
The combined effects of rising sea levels and increased storms will result in the inundation of large coastal areas across the Asia-Pacific region, and for island nations like Tuvalu much of the country itself, will become uninhabitable. People who are displaced may seek to re-settle elsewhere in their own country, but alternative settlements are not going to be available in all cases. Those who cannot settle elsewhere will become climate refugees.

Australia is likely to experience a significant increase in regional environmental and economic refugees – borne from climate impacts – seeking assistance and relocation.

3. How are we responding?

The interests of disadvantaged Australians are not being systematically taken into account in climate change policy formulation.

The public debate and policy process around climate change slowed considerably after the Government announced it would not ratify the Kyoto Protocol, back in 2001. As a result, progress in Australia has fallen behind most other countries that have been moving forward under the Kyoto Protocol. Ratification of the Protocol has helped governments elsewhere signal to their communities that climate change is real and that changes are necessary as a result.

The Australian political context has, however, changed dramatically over the last 6–12 months, and the closeness of the federal election is causing policy on the run as the major parties compete for electoral advantage. Policy formulation, particularly around emissions trading, is happening very quickly. The speed with which the public debate, the politics, and policy development are moving is striking. It has been driven by the business community seeking protection from adverse impacts and improved certainty for investment, and by the community's rapidly rising concern.

Sections of the business community have long been engaged in the climate change debate. Until recently business views have been polarised between vocal energy intensive industries seeking to deny climate change and delay action on one side of the debate, and a small faction of progressive companies seeking action on the other side. In the middle, the vast majority of Australian business was not engaged. Over the last year that has changed, and the majority of Australian business now wants to see action.

The environment movement has shifted its focus from forest conservation and protected areas to climate change in the past three years. While many environment groups have run campaigns on climate change over the last decade or more, climate change was not a priority issue in their public advocacy or in negotiations with Governments. That has changed; climate change is now a top priority issue for Australia's green movement.

Australia's social justice movement has not positioned itself as an active participant in the public debate or policy process around climate change. Faced with so many immediate concerns to disadvantaged people across Australia, climate change appears to have been seen as a somewhat remote issue that warrants attention but is not yet a priority. As an example, to date no mainstream social justice group in Australia has contributed a response to the State and Territory Governments' discussion paper on design of a national emissions trading scheme, released in August 2006. Over 130 submissions had been made on the discussion paper.

The social justice movement is increasingly aware of the need to become more active in the public debate and policy process around climate change. However, as a result of not having been engaged, the movement, as a whole, has limited knowledge of the climate change issue; its impacts and the likely response strategies. Further, the movement's capacity to engage meaningfully in the public debate and policy process is also limited.

The general lack of consideration of disadvantaged Australians in climate change policy formulation is and should be a concern to all of us, and in particular to the social justice movement. It is a product of the breadth of social and economic issues arising from climate change, the delay in national debate over its reality and implications, the consequent swiftness of movement in the current debate and policy process, the

dominance of business concerns in that debate, and the lack of capacity within the social justice movement to engage on the issue.

4. Does Australia's response consider social justice?

Climate change mitigation

The introduction of a price on carbon, through an emissions trading scheme, is now very likely. Having rejected emissions trading over the past five years, the Commonwealth Government has changed tack and is now actively examining the broad design parameters for a domestic scheme. State and Territory Governments have announced their intention to introduce a national emissions trading scheme by 2010, in the absence of any movement from the Federal Government.

The discussion on emissions trading, and the potential impact of increases in electricity prices that ultimately will be passed on to consumers, has not addressed social justice in a meaningful way. For example, the recent State and Territory Governments' Discussion Paper on the design of a national emissions trading scheme, a comprehensive 250+ page report on how emissions trading could work in Australia, does not discuss the social justice implications of the proposed scheme[3]. Similarly, the Issues Paper on emissions trading released by the PM's Task Group on Emissions Trading also fails to mention social justice considerations[4].

There are opportunities to ensure a socially equitable outcome. For example, by using revenues raised by auctioning emissions permits or by imposing a levy on permit trades to generate a fund that can be invested in energy efficiency programs for the most disadvantaged members of the community. However, there is as yet no evidence of this sort of discussion.

A number of programs and measures have though been introduced to assist households to improve the efficiency of their energy use, and some of these are directed at low income households. Most of these programs are voluntary in nature and require individuals to opt-in, which may depend on recipients having sufficient knowledge about the issue. While only some programs are specifically targeting disadvantaged members of the community, all are testing mechanisms and approaches to improving energy efficiency at the household level.

Some of the voluntary energy efficiency programs operating today are summarised in Box 2.

Box 2: Household energy efficiency programs and initiatives

ACT Energy Wise program
This program is run by the ACT Government. It is a home energy audit and rebate program, offering professional home energy audits at a subsidised cost of $30, which results in a report on steps that can be taken to reduce household energy use. Homeowners who spend at least $2,000 on energy efficiency improvements identified during the audit are eligible to receive a $500 rebate plus a refund of the $30 audit fee.

Affordable water and energy efficiency program
This program is jointly run by the NSW Council of Social Services and the NSW Dept of Energy, Utilities and Sustainability. It aims to improve the energy and water efficiency of low income households, and of the providers of support and crisis accommodation. Its focus is to improve the information flow and identify how to increase the use of energy and water efficient devices, appliances and practices by these target users.

Energy Efficiency Program for Low Income Households program
This program is overseen by the SA Government's Dept for Transport, Energy and Infrastructure. It is a partnership between Government and community based welfare organisations. It aims to reduce energy costs in low income households by delivering energy efficiency services. This includes providing energy audits, running a fridge buy-back scheme, providing interest-free loans for the purchase of efficient appliances and services (eg insulation), and distributing compact flouro lamps and low flow showerheads

Energy Task Force
This program is run by Sustainability Victoria for the Vic Government. This program is assisting pensioners and other low-income Victorians to retro-fit their homes through insulation and draught stopping to reduce energy costs and improve the comfort and quality of their homes.

"Fridge Buy Back"
This is a private sector initiative driven by the NSW Government's Energy Savings Fund and Greenhouse Gas Abatement Scheme (GGAS), and supported by 20 Councils in metro Sydney. Program participants can have second refrigerators removed and safely disposed of, with metals being recycled and refrigerant gases, which are potent GHGs, safely destroyed. Participants receive a $35 rebate and on average save $160 per year in energy costs.

Home Energy Efficiency Trial (HEET)
This program is run by Country Energy and AMPY Email Metering. It involves trialling 'smart metering' technology that allows participants to better manage energy use and costs. The project involved 150 residential customers, who were provided with a home energy monitor, showing the cost and level of household energy consumption at any moment, as well as daily, weekly and monthly usage patterns. The trial showed that residential energy customers will adjust their energy usage if they are provided with cost and consumption information.

Queensland EnergyWise program
This Queensland Government program is designed to provide user-friendly tools and information to Queenslanders about energy efficiency. The Government has also established an Energy Advisory Service to provide advice on energy efficiency over the phone.

Reach for the Stars program
This WA Government Sustainable Energy Development Office program is run in conjunction with appliance retailers. It is designed to raise consumer awareness about energy efficiency rating labels on appliances.

Small Business and Household Climate Change Action
This Federal Government program aims to help households and small businesses across Australia to become more efficient in their energy use. Under the $50+ million program the Government will post to households information about climate change, becoming more energy efficient, and how to calculate household greenhouse gas emissions.

Mandatory programs that improve household energy efficiency focus on new buildings and major renovations. These include the Victorian Government's 5 Star Houses initiative, the NSW Government's BASIX scheme, and the Queensland Government's Sustainable Housing Code. Regulations specify the energy performance of houses that fall under the programs.

Climate change adaptation
Government climate impacts and adaptation programs tend to focus on providing information and raising awareness, this "softly, softly" approach tends to underscore the magnitude of future climate change impacts. There is little in the way of direct action.

Government programs, such as the $14 million National Climate Change Adaptation Program, are typically designed to:

- Assist all levels of Government to make policy changes and build capacity to respond to climate impacts and adaptation requirements
- Provide tools and information to industry sectors and regions, especially those at high risk
- Integrate climate impacts and adaptation requirements into Government policy and planning and industry strategy

State Governments have focused on improving the spatial and temporal resolution of future climate impacts scenarios, and providing advice to affected regions and sectors.

The insurance industry is most heavily engaged on climate impacts and adaptation, both in terms of its public advocacy and its discussions with Governments. This reflects the insurance industry's concerns that climate change has the potential to make major changes in the way it operates – the way claims are paid, the risks that are insured and the cost of insurance.

Neither Government programs nor insurance industry advocacy is yet focused on upgrading new or retro-fitting existing houses, buildings and infrastructure. If there is any targeting of information or awareness raising in programs to date, it has been directed at geographic regions that are most at risk. There has been little or no consideration of social justice.

The National Farmers Federation (NFF) is working with the Australian Conservation Foundation (ACF) and The Climate Institute to engage rural and regional focused businesses to consider climate impacts and policy options. This work is in its formative stage but it may consider aspects of rural and regional social policy and transition needs.

5. What next?

The signs are clear and becoming clearer. Climate change represents a major challenge to the community, to business and to Governments, one that Australia is just starting to come to terms with after an extended period of inaction.

With the policy process around mitigation developing very quickly, it is increasingly important for the social justice movement to become actively engaged and to advocate for measures to help ensure socially equitable outcomes.

Beyond this, the social justice movement should explore opportunities to actually enhance the lifestyles and household economics of Australia's presently disadvantaged through measures that are likely to be taken. As energy infrastructure is necessarily modernised and probably decentralised, for example, there will be opportunities, for example, to install solar energy panels on rooftops that can convert a house from an energy taker to an energy provider. The installation of water tanks in a home is another example where a resource that has in the past cost money to take can be supplied free of charge to the householder or tenant.

Becoming a more active participant in the public debate will require the social justice movement to quickly acquire knowledge and capacity. And this will likely be most efficient if the movement has effective partnerships with groups and organisations already fully engaged on climate change and intimate with the science, economics, and policy processes.

ATTACHMENT A

Our understanding of climate change

The consensus of the world's climate scientists is that the global atmospheric concentrations of greenhouse gases (principally carbon dioxide, methane and nitrous oxide) "have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values"[5]. The concentration of carbon dioxide, for example, has increased from a pre-industrial value of about 280 parts per million to 379 ppm in 2005, so that it "exceeds by far the natural range over the last 650,000 years (180 to 300 ppm) as determined from ice cores".

These are among the findings of the Intergovernmental Panel on Climate Change's Working Group I, which brings together hundreds of scientists to review the body of evidence, analysis and modelling of the physical science of climate change.

IPPC WGI reports that warming of the global climate system "is unequivocal", and refers to measurements of increasing global average air and ocean temperatures, as well as widespread melting of snow and ice and rising global mean sea level. Global average temperature increased by 0.74 °C during the last century, and could increase by up to 6.4 °C during the 21st century, accompanied by a sea level rise of up to 0.59 m. This warming trend is expected to drive global changes in rainfall, wind patterns and extreme events and ice.

These changes in the global climate system will create change in Australia's climate.

Average temperatures in Australia have already been rising. According to the Bureau of Meteorology, average mean annual temperatures have increased by about 0.9 °C since 1910.

Changes are also expected in the magnitude and frequency of extreme events[8], including:

- More heatwaves and fewer frosts;
- Possibly more frequent El Nino Southern Oscillation (ENSO) events — resulting in a more pronounced cycle of prolonged drought and heavy rains;
- More severe wind speeds in cyclones, associated with storm surges being progressively amplified by rising sea levels;
- An increase in severe weather events — including storms and high bushfire propensity days.

Research from the insurance industry has found that even modest increases in the severity of extreme events, for example of less than a 10% increase, can cause multiple increases in the damages caused by those events[9]. Insurance Australia Group experience is that a 25% increase in peak wind gust strength can generate a 6.5-fold increase in building claims.

Notes:

1 *The Stern Review Report on the Economics of Climate Change*. UK Government HM Treasury, London, UK, October 2006. Available at: http://www.hmtreasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

2 References include: *Climate change risk and vulnerability: Promoting an efficient adaptation response in Australia*. Australian Greenhouse Office report prepared by Allens Consulting, Canberra, March 2005. Available at: http://www.greenhouse.gov.au/impacts/publications/risk-vulnerability.html. *Climate Change Health Impacts In Australia. Effects of dramatic CO2 emission reductions*. Australian Medical Association and the Australian Conservation Foundation report. Available at: http://www.acfonline.org.au/uploads/res_AMA_ACF_Full_Report.pdf

3 Possible Design for a National Greenhouse Gas Emissions Trading Scheme. A Discussion Paper prepared by the National Emissions Trading Taskforce on behalf of Australia's State and Territory Governments, August 2006. Available at: http://www.emissionstrading.nsw.gov.au/key_documents/discussion_paper

4 Issues Paper. Prime Minister's Task Group on Emissions Trading, February, 2007. Available at: http://www.dpmc.gov.au/emissionstrading/issues_paper.cfm

5 *Climate Change 2007: The Physical Science Basis. Summary for Policymakers*. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Approved by IPCC WG1, Paris, February 2007. Available at: http://www.ipcc.ch/SPM2feb07.pdf

6 *Annual Australian Climate Statement 2006*. Issued 3 January 2007, Bureau of Meteorology, Canberra. Available at: http://www.bom.gov.au/announcements/media_releases/climate/change/20070103.shtml

7 http://www.bom.gov.au/cgi-bin/silo/reg/cli_chg/trendmaps.cgi

8 *Climate change risk and vulnerability: Promoting an efficient adaptation response in Australia*. Australian Greenhouse Office report prepared by Allens Consulting, Canberra, March 2005. Available at: http://www.greenhouse.gov.au/impacts/publications/risk-vulnerability.html

9 *Climate Change and the Financial Services Industry*. United Nations Environment Programme Finance Initiatives Climate Change Working Group, Geneva, Switzerland, 2002. Available at: http://www.unepfi.net

10 *The Impact of Climate Change on Insurance against Catastrophes*. Tony Coleman Chief Risk Officer & Group Actuary, Insurance Australia Group, IAG, Sydney, 2003. Available at: http://www.iag.com.au/pub/iag/media/shc/presentation-20021219.pdf

3.3 The impact of carbon prices on Victorian selected household types: A preliminary analysis

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Dr Peter Brain is the co-founder of National Economics. He is one of Australia's best known and widely respected economists. He has taken part in over 150 past and on-going projects in South Africa, Australia and New Zealand. Widely published on matters of concern to regional economies, Dr Brain regularly presents detailed analyses of the economic performance and specific outlook of regions.

The draft paper Peter Brain gave at the Equity in Response to Climate Change Roundtable, 'The impact of carbon prices on Victorian selected household types: a preliminary analysis', is also available via the internet at
<http://www.bsl.org.au/pdfs/NIEIR_impact_of_carbon_prices_prelim_analysis_26mar07draft.pdf>

Below is a black-and-white version of this draft paper.

The impact of carbon prices on Victorian selected household types – A preliminary analysis

A report for the
Brotherhood of St Laurence

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Contents

1. Introduction

The objective of this paper is to assess the consequences of the adoption of a universal carbon pricing scheme as a core instrument in combating global warming. By carbon price is meant either a tax levied on the CO_2 content of any product, e.g. $25 a tonne of carbon, or a cost of carbon that is imposed from the market clearing price of an emissions trading system.

In terms of direct macroeconomic costs, it does not matter whether the carbon price is determined from a tax determined by Governments, or by a market price with Government determining the CO_2 quotas that will drive the carbon price outcomes.

In terms of the effective distribution of the costs of carbon pricing throughout the economy, the mechanism selected for determining the carbon price is important. Under an emissions trading system, efficient energy producers benefit because they can sell CO_2 permits to less efficient producers. However, if Governments gave the initial CO_2 permits away, as is the case with the current European Emissions Trading Scheme, in perpetuity (with a global discount factor applied over time to reduce the stock of permits on issue to reach global CO_2 targets), then there would not be much net additional resources available to Governments to compensate those groups that were disproportionately/inequitably affected by the price of carbon.

If, on the other hand, a tax is the mechanism for pricing carbon, then Governments collect the revenue and will have far greater capacity to compensate those inequitably impacted by the scheme. The disadvantage of this is that Governments will have to make all the decisions in terms of the trade of economic efficiency (helping businesses to adjust to a lower carbon intensive world) and economic equity (helping households adjust to a lower carbon intensive world).

Clearly a compromise is required with the resources more evenly distributed between businesses and Governments with market decisions driving the businesses' efficiency agenda. One way of doing this is to price the initial issuing of permits at near the price that would result from the initial marginal carbon trades. Governments would collect this revenue. This has the drawback of imposing an initial up-front carbon cost on all businesses, which would be maintained by limiting the duration of a permit to a year.

Under a market mechanism, that is, CO_2 emissions trading scheme, solution the willingness of Governments to price the initial issuing of permits will depend, in part, on the estimates of the resources required for social equity.

The objective of this paper is, therefore, one of providing background material so that Governments can start the process of estimating the resources required for social equity objectives.

This will be done by:

(i) estimating the carbon content of different categories of expenditure that constitute household budgets;

(ii) estimating the expenditure patterns of different household types; and

(iii) combining (i) and (ii) to obtain estimates of the carbon consumption of different household types and, therefore, the impact of carbon taxes on different household types.

The study develops the methodology for 42 household types.

2. Estimating the carbon content of expenditures in the Victorian economy

This study takes off from the study NIEIR did for the Victorian Department of Sustainability and Environment, titled "*The total CO_2 emission content of Victorian industries – 2001*". This study used an input-output framework to develop estimates of the carbon content of industry output and expenditures for the Victorian economy. The methodology for doing this is reproduced in Appendix A.

The objective of the analysis was to estimate the direct and indirect carbon content of goods and services produced or sold into Victorian markets. Any good or service will have a direct carbon content from the petroleum, gas, electricity, etc. used in producing the good or service. However, any good or service will use other goods and services in its production. These other goods and services will have a carbon content of production that will be added to the direct carbon content of the good or service. Thus, the total carbon content of a good or service will be greater than the direct carbon content. This means that a carbon price will have a cascading impact through the industrial structure having the well known multiplier impact on final prices.

This study used the methodology of the Department of Sustainability and Environment study to estimate the direct and indirect carbon content of private consumption in Victoria. The resulting estimates are shown in Table 1. The industry classifications in the table are the industries of the input-output framework analysis that are based on the National Australian Bureau of Statistics Input-Output Table.

The bottom line is that in 2001 in Victoria 62 million tones of carbon were consumed by Victorian households via household consumption expenditures. Of this total 40 million tones were sourced from Victorian produced goods and services and 22 million tones from interstate and foreign sourced production.

Almost half, or 28 million tones, of carbon comes from the direct use of petroleum products, gas or electricity. The remaining 32 million tones come from the petroleum products, gas, electricity, coal, etc. embodied in the complete range of goods and services sold into the Victorian consumer household market. In 2001 the average carbon consumption of Victorian Households from private consumption was 35 tonnes per annum.

One issue of interest is, how much of this carbon comes from Victorian sources of carbon. This will not be the 39.8 million tonnes since Victorian produced goods and services will include interstate and foreign sources of carbon. The average rule is that excluding the direct use of petroleum, gas and electricity, approximately two thirds of the carbon in Victorian produced goods comes from Victorian sourced carbon. This would mean that the 39.8 million tonnes is reduced to 34 million tonnes in terms of Victorian sourced carbon. Thus, 55% of the total carbon content of Victorian household consumption expenditure is sourced from Victorian based energy production.

Table 1 Carbon content of Victorian private consumption expenditure ('000 tonnes)				
	Victorian sources of carbon	Interstate and foreign sources of carbon	Total carbon content	CO_2 content in tonnes per $ of consumption expenditure
Sheep	1.1	0.4	1.5	0.00029
Grains	0.0	0.0	0.0	0.00000
Beef cattle	2.4	0.0	2.4	0.00020
Dairy cattle	0.2	0.1	0.3	0.00051
Pigs	0.3	0.2	0.5	0.00038
Poultry	19.3	10.3	29.6	0.00034
Other agriculture	205.5	156.9	362.3	0.00032
Services to agriculture; hunting and trapping	2.2	0.0	2.2	0.00024
Forestry and logging	1.2	0.7	1.9	0.00029
Commercial fishing	49.7	130.2	180.0	0.00058
Coal; oil and gas	0.0	2358.7	2358.7	0.01386
Iron ores	0.0	0.0	0.0	0.00000
Non-ferrous metal ores	0.0	0.0	0.0	0.00000
Other mining	0.4	0.0	0.4	0.00128
Services to mining	0.0	0.0	0.0	0.00000
Meat and meat products	337.5	134.6	472.1	0.00051
Dairy products	471.7	22.8	494.5	0.00064
Fruit and vegetable products	346.9	133.2	480.0	0.00052
Oils and fats	119.9	25.3	145.2	0.00043
Flour mill products and cereal foods	36.8	156.7	193.6	0.00050
Bakery products	150.0	121.2	271.2	0.00038
Confectionery	55.4	35.3	90.7	0.00033
Other food products	140.1	278.3	418.4	0.00044
Soft drinks, cordials and syrups	189.0	222.7	411.8	0.00064
Beer and malt	175.1	23.2	198.3	0.00031
Wine and spirits	3.0	72.8	75.8	0.00024
Tobacco products	111.5	28.0	139.4	0.00031
Textile fibres, yarns and woven fabrics	48.0	26.8	74.8	0.00062
Textile products	141.9	120.5	262.4	0.00069
Knitting mill products	0.2	225.9	226.1	0.00149
Clothing	127.0	566.7	693.8	0.00071
Footwear	1.9	104.4	106.2	0.00041
Leather and leather products	1.1	2.4	3.5	0.00043
Sawmill products	0.2	0.0	0.2	0.00064
Other wood products	0.0	69.5	69.5	0.00000
Pulp, paper and paperboard	43.1	65.4	108.5	0.00218
Paper containers and products	92.5	121.2	213.8	0.00105
Printing and services to printing	118.3	69.9	188.2	0.00085
Publishing; recorded media etc	122.4	111.5	233.9	0.00042
Petroleum and coal products	1482.4	5929.5	7411.8	0.00487
Basic chemicals	34.5	656.0	690.5	0.00223

Table 1	Carbon content of Victorian private consumption expenditure ('000 tonnes) – continued			
	Victorian sources of carbon	Interstate and foreign sources of carbon	Total carbon content	CO_2 content in tonnes per $ of consumption expenditure
Paints	0.5	0.0	0.5	0.00093
Medicinal and pharmaceutical products, pesticides	14.7	226.5	241.2	0.00033
Soap and detergents	29.5	129.0	158.4	0.00071
Cosmetics and toiletry preparations	26.9	275.8	302.7	0.00085
Other chemical products	15.6	3.7	19.3	0.00067
Rubber products	6.0	29.4	35.4	0.00050
Plastic products	75.7	118.8	194.5	0.00095
Glass and glass products	3.6	7.4	11.0	0.00081
Ceramic products	0.0	83.8	83.8	0.00000
Cement, lime and concrete slurry	0.0	0.0	0.0	0.00000
Plaster and other concrete products	0.0	0.0	0.0	0.00000
Other non-metallic mineral products	0.0	0.0	0.0	0.00000
Iron and steel	0.0	0.0	0.0	0.00000
Basic non-ferrous metal and products	11.3	13.9	25.2	0.00347
Structural metal products	0.0	0.0	0.0	0.00000
Sheet metal products	13.3	11.6	24.9	0.00148
Fabricated metal products	0.0	133.2	133.2	0.00000
Motor vehicles and parts; other transport equipment	628.4	949.6	1578.0	0.00036
Ships and boats	0.0	96.5	96.5	0.00000
Railway equipment	0.0	0.0	0.0	0.00000
Aircraft	0.0	15.6	15.6	0.00000
Photographic and scientific equipment	22.3	138.0	160.3	0.00029
Electronic equipment	0.0	471.6	471.6	0.00000
Household appliances	42.9	556.1	599.0	0.00083
Other electrical equipment	1.9	92.9	94.9	0.00111
Agricultural, mining etc. machinery	27.9	27.8	55.7	0.00084
Other machinery and equipment	0.5	3.6	4.0	0.00058
Prefabricated buildings	0.0	0.0	0.0	0.00000
Furniture	99.3	277.6	376.9	0.00046
Other manufacturing	75.2	153.4	228.6	0.00041
Electricity supply	15933.0	0.0	15933.0	0.00869
Gas supply	4244.0	0.0	4244.0	0.02205
Water supply; sewerage and drainage services	492.5	7.5	500.0	0.00044
Residential building	0.0	0.0	0.0	0.00000
Other construction	0.0	0.0	0.0	0.00000
Wholesale trade	698.7	202.2	900.9	0.00030
Retail trade	5015.8	181.0	5196.8	0.00041
Mechanical repairs	296.7	78.7	375.4	0.00019
Other repairs	3.5	133.6	137.1	0.00046

Table 1	Carbon content of Victorian private consumption expenditure ('000 tonnes) – continued			
	Victorian sources of carbon	Interstate and foreign sources of carbon	Total carbon content	CO_2 content in tonnes per $ of consumption expenditure
Accommodation, cafes and restaurants	1225.6	904.0	2129.6	0.00036
Road transport	0.0	3092.7	3092.7	0.00000
Rail, pipeline and other transport	0.0	258.8	258.8	0.00000
Water transport	1057.2	0.0	1057.2	0.00438
Air and space transport	703.7	964.1	1667.8	0.00095
Services to transport; storage	22.7	9.2	31.9	0.00015
Communication services	484.5	9.8	494.3	0.00023
Banking	111.2	1.2	112.4	0.00004
Non-bank finance	39.7	0.1	39.7	0.00006
Insurance	100.1	0.0	100.1	0.00003
Services to finance, investment and insurance	21.1	10.7	31.8	0.00005
Ownership of dwellings	797.5	3.7	801.2	0.00005
Other property services	15.5	11.4	27.0	0.00009
Scientific research, technical and computer services	1.3	0.0	1.3	0.00018
Legal, accounting, marketing and business management services	135.0	2.1	137.1	0.00015
Other business services	45.0	11.0	56.0	0.00019
Government administration	85.1	14.5	99.5	0.00041
Defence	0.0	0.0	0.0	0.00000
Education	457.8	49.0	506.8	0.00019
Health services	393.6	46.8	440.3	0.00012
Community services	212.4	0.5	212.9	0.00031
Motion picture, radio and television services	5.9	0.1	6.0	0.00009
Libraries, museums and the arts	11.2	0.2	11.5	0.00013
Sport, gambling and recreational services	627.6	178.8	806.4	0.00026
Personal services	441.1	20.0	461.1	0.00030
Other services	380.2	112.5	492.7	0.00019
Total	**39787.5**	**22100.9**	**61888.4**	**0.00064**

3. The CO_2 content per dollar of expenditure

The next step is to derive the CO_2 content of household consumption per dollar of expenditure. This is done by dividing the total carbon content by industry by the basic value sales values of the industry into Victorian household consumption. By basic value is meant sales less:

(i) indirect taxes;

(ii) transport margins;

(iii) wholesale margin; and

(iv) retail margin.

The resulting estimates are given in the fourth column of Table 1. On average each dollar of Victorian household consumption expenditure in 2001 contained 0.00064 tonnes of carbon. In 2006 prices this is reduced to 0.00055 tonnes of carbon.

4. Household consumption expenditure by household types

NIEIR's microsimulation household expenditure models are based on the Australian Bureau of Statistics Household Expenditure Surveys used to generate expenditures for 42 household types. The expenditure categories come to 800 and these are aggregated into 42 household types.

However, the household types were overlapping and confusing. Accordingly, for this preliminary paper, 10 of the 42 household types were selected so as to be representative of the distribution of the households. The definition of the household types is given in Table 2.

The average weekly expenditure of the 10 household types across the input-output industries is given in Table 2, and the aggregate expenditure is reproduced in Table 3. The carbon consumption of each household type is obtained by multiplying the data in Table 2 by the coefficients in the last column of Table 1 and summing the result.

The actual and imputed rent component of expenditure is discarded. This distorts the analysis because the imputed rent component of non-rented dwellings is very large.

The definition of the household types is self explanatory. The only household type requiring further explanation is the poor household definition. A poor household is one which experienced at least four of the following from the HES database:

- could not afford to have a night out once a fortnight, or
- could not afford brand new clothes, or
- spends more money than receives, or
- could not afford to pay gas, electricity or telephone bills, or
- pawned or sold something, or
- went without meals, or
- was unable to heat the home due to a shortage of money, or
- had cash flow problems during the past year, and
- the household head is not over 55 and out of the labour force, and
- no other member of the family is in the labour force, or
- the household does not receive Vet Affairs Pension, Age Pension or Overseas Pension or Benefit.

The impact of a carbon price on a household will not only be a function of the expenditure of the household. It will also be a function of the size and composition of the household. Thus, households have to be standardised to an equivalent basis. The scale used to do this for this study was that:

- the first adult counted a 1.0;
- all subsequent adults (that is, people over 14 years of age in the household) counted as 0.73; and
- each child was counted as 0.4 of the first adult.

This scale captures the fact that there are economies of scale in household size and children are less resource intensive than adults.

Thus, from Table 3, the scale means that the average 2 adults and 1.7 children per household, with children where government benefits earned 30% of income, reduces to an equivalent household size of 2.4 members, which compares with a 2.6 member outcome for households where government benefits are less than 30% of total income.

By dividing the total weekly expenditure by the equivalent household size the equivalised weekly expenditure is obtained. Thus, a double income no kids (DINKS) household has an average

equivalised weekly expenditure of $937 compared to the equivalised expenditure of an unemployed household of $226.

The carbon consumption varies from a high of 53 tonnes for a DINKS household to 24 tonnes for a poor household. This is not unexpected. However, what is important here is the carbon content of expenditure. From Table 3 and Figure 1, the carbon content tends to vary inversely with household expenditure. That is, the greater the expenditure (and income) of a household, the less the carbon content. This would imply that relatively high carbon content goods and services are relatively income/expenditure inelastic. The more income/expenditure is inelastic relative to high carbon content goods and services, the more likely that the carbon price impact will be regressive across households. That is, the poorer the household the greater the relative burden (compared to expenditures) of the carbon price.

Figure 1: Carbon content (in tonnes) per dollar of expenditure versus weekly expenditure

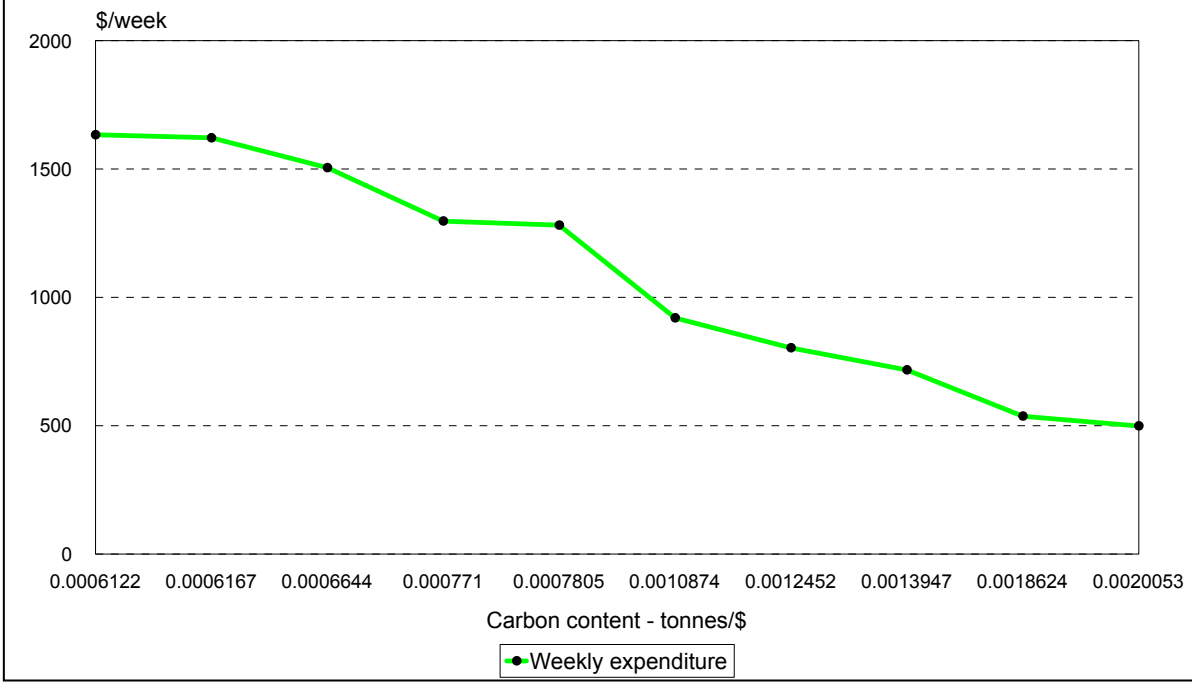


Table 2	Average weekly expenditure by 10 household types (2006 $)									
	Household with children where government benefits exceed 30% of income	Household with children where government benefits is less than 30% of income	Retired age pension households	Employed households	Household with less than $70,000	Household greater than $70,000 income and household head greater than 50	Double income no children	Unemployed households	Poor house-holds	High income tertiary educated
Sheep	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.1
Grains	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Beef cattle	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2
Dairy cattle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pigs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Poultry	0.7	1.0	0.5	1.0	0.7	1.2	1.2	0.5	0.4	1.2
Other agriculture	12.9	17.2	9.9	18.0	12.1	18.0	23.8	14.4	8.6	20.9
Services to agriculture; hunting and trapping	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1
Forestry and logging	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1
Commercial fishing	3.6	4.8	2.7	5.5	2.8	3.7	8.7	7.0	1.4	5.4
Coal; oil and gas	1.3	2.0	0.9	2.0	1.4	2.4	2.3	1.0	0.9	2.3
Iron ores	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-ferrous metal ores	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other mining	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Services to mining	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Meat and meat products	12.6	15.2	11.3	15.6	10.1	15.1	17.1	14.8	10.2	13.2
Dairy products	11.6	13.4	9.9	14.7	7.5	12.6	13.7	12.5	9.4	11.6
Fruit and vegetable products	12.5	15.4	10.3	16.3	9.6	15.2	17.8	12.0	9.9	16.0
Oils and fats	2.5	3.9	1.9	3.9	2.8	4.7	4.6	2.0	1.7	4.6
Flour mill products and cereal foods	6.1	6.5	4.5	7.3	3.5	6.4	6.2	6.6	3.9	5.8
Bakery products	10.2	12.3	8.2	13.2	7.0	12.5	13.8	10.5	7.7	11.6
Confectionery	4.0	5.1	3.3	5.7	2.6	5.4	4.2	3.2	3.3	5.1
Other food products	15.9	15.6	14.9	16.4	10.0	16.7	15.2	15.4	14.2	16.1
Soft drinks, cordials and syrups	8.9	13.3	8.0	12.7	9.0	13.8	12.7	11.3	7.3	9.4
Beer and malt	4.6	12.0	3.2	10.3	10.6	12.6	15.6	2.9	3.0	9.1
Wine and spirits	2.3	6.1	1.1	5.4	5.6	8.0	9.0	0.9	1.3	6.8

Table 2 Average weekly expenditure by 10 household types (2006 $) – continued										
	Household with children where government benefits exceed 30% of income	Household with children where government benefits is less than 30% of income	Retired age pension households	Employed households	Household with less than $70,000	Household greater than $70,000 income and household head greater than 50	Double income no children	Unemployed households	Poor house-holds	High income tertiary educated
Tobacco products	7.6	7.1	8.5	5.8	7.1	6.1	4.1	6.9	8.7	2.1
Textile fibres, yarns and woven fabrics	1.1	1.9	1.2	1.7	1.4	2.1	2.4	2.9	1.2	1.7
Textile products	3.4	7.3	3.3	7.6	5.1	8.3	11.8	2.3	3.5	6.2
Knitting mill products	1.4	3.1	1.1	2.6	2.2	3.9	2.9	2.0	0.8	2.2
Clothing	11.4	19.6	7.9	20.4	11.7	25.4	21.3	12.7	7.9	15.8
Footwear	3.3	5.6	2.2	5.6	3.1	6.8	6.7	5.3	1.7	5.9
Leather and leather products	0.1	0.2	0.0	0.2	0.1	0.2	0.2	0.1	0.0	0.1
Sawmill products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other wood products	0.6	1.4	0.4	1.3	1.2	1.6	1.3	0.5	0.3	0.6
Pulp, paper and paperboard	0.4	0.6	0.3	0.6	0.4	0.7	0.7	0.3	0.3	0.7
Paper containers and products	2.4	3.5	2.0	3.5	2.3	3.3	3.9	3.0	1.9	2.7
Printing and services to printing	2.7	3.5	1.7	3.6	2.6	3.8	5.7	1.9	1.8	7.2
Publishing; recorded media etc	7.7	9.6	5.7	9.3	7.3	10.8	13.5	6.9	5.3	18.0
Petroleum and coal products	20.8	26.9	17.4	26.2	19.6	27.1	31.2	24.8	16.0	22.4
Basic chemicals	2.3	3.6	1.7	3.6	2.6	4.4	4.2	1.8	1.6	4.2
Paints	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medicinal and pharmaceutical products, pesticides	7.1	11.2	5.1	10.1	9.4	10.4	17.0	9.4	4.4	11.4
Soap and detergents	2.7	3.6	2.1	3.8	2.4	3.5	3.6	3.6	2.0	4.4
Cosmetics and toiletry preparations	3.9	6.5	3.1	6.1	5.0	7.5	8.9	4.0	3.0	8.7
Other chemical products	0.1	0.6	0.1	0.5	0.4	0.7	1.1	0.0	0.1	0.1
Rubber products	1.0	1.2	1.0	1.2	0.9	1.2	1.2	0.8	1.1	1.0
Plastic products	2.7	3.9	1.6	4.3	2.4	4.1	6.9	1.9	1.7	4.3
Glass and glass products	0.1	0.2	0.1	0.2	0.2	0.3	0.5	0.0	0.1	0.3
Ceramic products	0.1	0.8	0.0	1.1	0.1	1.0	0.3	0.0	0.0	0.2

Table 2	Average weekly expenditure by 10 household types (2006 $) – continued									
	Household with children where government benefits exceed 30% of income	Household with children where government benefits is less than 30% of income	Retired age pension households	Employed households	Household with less than $70,000	Household greater than $70,000 income and household head greater than 50	Double income no children	Unemployed households	Poor house-holds	High income tertiary educated
Cement, lime and concrete slurry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plaster and other concrete products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other non-metallic mineral products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Iron and steel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Basic non-ferrous metal and products	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1
Structural metal products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sheet metal products	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.2
Fabricated metal products	1.3	2.5	0.9	2.5	2.0	2.5	5.3	0.5	0.8	6.0
Motor vehicles and parts; other transport equipment	48.8	77.5	26.8	78.4	59.3	92.5	100.0	55.2	16.0	11.2
Ships and boats	2.4	1.4	1.4	2.3	1.8	2.2	3.3	0.0	0.0	8.4
Railway equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aircraft	0.1	0.2	0.1	0.2	0.2	0.3	0.2	0.1	0.1	0.2
Photographic and scientific equipment	4.2	8.4	3.3	7.9	7.8	11.0	13.3	5.1	3.5	21.2
Electronic equipment	8.1	11.2	4.1	11.2	9.2	16.1	11.5	11.0	3.2	35.8
Household appliances	6.3	12.1	5.9	11.2	10.3	15.5	16.8	11.3	6.0	14.2
Other electrical equipment	0.6	1.0	0.5	1.0	0.7	1.2	1.2	0.5	0.4	1.2
Agricultural, mining etc. machinery	0.6	0.1	0.3	0.3	0.5	0.3	1.8	0.4	0.1	0.0
Other machinery and equipment	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1
Prefabricated buildings	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Furniture	10.5	14.4	6.6	15.3	11.6	22.7	14.5	7.4	6.7	18.1
Other manufacturing	3.0	11.5	1.9	11.7	5.9	16.4	14.6	3.4	1.8	12.8
Electricity supply	26.2	28.8	23.9	29.4	21.9	27.7	35.8	23.3	24.1	31.5

Table 2 Average weekly expenditure by 10 household types (2006 $) – continued										
	Household with children where government benefits exceed 30% of income	Household with children where government benefits is less than 30% of income	Retired age pension households	Employed households	Household with less than $70,000	Household greater than $70,000 income and household head greater than 50	Double income no children	Unemployed households	Poor house-holds	High income tertiary educated
Gas supply	2.4	3.2	2.1	3.3	2.1	3.0	3.5	3.0	2.0	2.6
Water supply; sewerage and drainage services	10.3	19.0	6.7	19.9	12.7	19.9	27.4	12.6	5.6	22.1
Residential building	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wholesale trade	22.9	35.3	16.8	35.2	25.5	42.7	41.4	17.9	15.8	41.5
Retail trade	94.2	145.4	69.0	145.1	105.0	175.9	170.5	73.7	65.1	170.8
Mechanical repairs	35.9	39.5	9.8	37.9	20.1	48.1	47.7	17.6	9.3	26.0
Other repairs	2.3	5.8	1.4	5.5	4.3	7.5	6.2	1.0	1.4	14.5
Accommodation, cafes and restaurants	34.9	106.8	13.6	93.9	86.9	127.8	201.8	28.4	12.3	221.2
Road transport	11.9	19.4	11.0	17.1	16.6	19.9	23.1	11.3	9.5	21.3
Rail, pipeline and other transport	1.9	6.2	1.4	4.8	5.4	7.6	6.7	2.4	1.2	3.5
Water transport	0.9	4.7	0.2	2.5	5.1	3.1	12.6	0.0	0.1	16.2
Air and space transport	16.1	26.1	6.5	22.8	23.7	41.7	47.6	6.6	5.7	81.8
Services to transport; storage	1.3	4.2	0.6	3.8	3.5	6.3	5.2	3.3	0.3	5.9
Communication services	28.7	35.7	24.4	34.3	28.3	34.2	40.5	32.6	22.3	32.5
Banking	19.8	30.6	14.5	30.6	22.1	37.1	35.9	15.5	13.7	36.0
Non-bank finance	5.4	8.3	4.0	8.3	6.0	10.1	9.8	4.2	3.7	9.8
Insurance	28.4	57.5	15.4	55.5	42.9	64.3	92.5	22.2	13.9	75.1
Services to finance, investment and insurance	4.6	7.1	3.4	7.1	5.1	8.6	8.3	3.6	3.2	8.3
Ownership of dwellings	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other property services	2.3	6.6	1.9	6.8	4.4	10.4	5.4	4.9	1.6	5.4
Scientific research, technical and computer services	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1
Legal, accounting, marketing and business management services	12.6	10.1	2.5	10.1	11.2	17.2	9.8	0.0	2.3	9.1

Table 2 Average weekly expenditure by 10 household types (2006 $) – continued										
	Household with children where government benefits exceed 30% of income	Household with children where government benefits is less than 30% of income	Retired age pension households	Employed households	Household with less than $70,000	Household greater than $70,000 income and household head greater than 50	Double income no children	Unemployed households	Poor house-holds	High income tertiary educated
Other business services	0.5	2.0	0.7	1.9	2.4	2.9	5.1	0.0	0.9	11.1
Government administration	1.8	2.8	1.3	2.8	2.1	3.4	3.3	1.4	1.3	3.3
Defence	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Education	44.7	68.4	10.2	75.7	32.8	75.5	28.3	17.0	20.7	64.1
Health services	32.5	63.5	31.3	60.4	50.7	77.2	67.2	25.0	24.9	80.6
Community services	15.2	20.6	18.8	26.6	1.0	25.7	0.8	18.0	21.6	10.7
Motion picture, radio and television services	0.7	1.4	0.5	1.3	1.1	1.6	1.1	0.5	0.5	1.5
Libraries, museums and the arts	0.9	1.0	0.1	0.9	0.9	1.8	1.8	0.0	0.1	2.2
Sport, gambling and recreational services	30.0	60.3	12.2	57.8	34.3	65.0	81.7	40.7	9.4	126.5
Personal services	12.2	29.5	8.6	28.7	19.2	34.7	38.2	10.5	8.6	49.5
Other services	22.4	39.8	14.9	41.2	29.6	41.3	63.2	18.4	11.7	59.1
Total	**803.0**	**1296.9**	**536.9**	**1281.1**	**919.6**	**1505.1**	**1621.3**	**717.0**	**498.7**	**1633.4**

Table 3	Ten household types – expenditure and carbon consumption						
	Total weekly expenditure $2006	Average number of adults	Average number of children	Equivalence household numbers	Equivalised average weekly expenditure [per capita] $2006	Total annual carbon consumption [per household] tonnes	Carbon consumption per $ of annual expenditure – tonnes
Household with children where government benefits exceed 30% of income	803	2.0	1.7	2.4	335	31	0.00125
Household with children where government benefits is less than 30% of income	1297	2.6	1.1	2.6	494	42	0.00077
Retired age pension households	537	1.8	0.0	1.6	341	25	0.00186
Employed family	1281	2.5	1.5	2.7	474	41	0.00078
Household with less than $70000	920	2.0	0.8	2.0	451	31	0.00109
Household greater than $70000 income and household head greater than 50	1505	3.0	0.2	2.5	596	45	0.00066
Double income no children	1621	2.0	0.0	1.7	937	53	0.00062
Unemployed households	717	3.5	0.9	3.2	226	29	0.00139
Poor households	499	2.6	1.4	2.7	183	24	0.00201
High income tertiary educated	1633	2.4	0.7	2.3	700	49	0.00061

5. The impact of a $25 and $50 carbon price

The impact of a $25 and $50 a tonne carbon price on the 10 household types is shown in Table 4. The additional carbon cost as a per cent of expenditure does tend to be regressive, either in terms of total expenditure or equivalised expenditures (as indicated by Figures 2 and 3).

However, to dig deeper, a utility adjusted approach is required. Poor households clearly had less room for adjustment to the imposition of carbon costs. The United Kingdom HM Treasury's "*The Green Book: Appraisal and Evaluation in Central Government"*, guidelines require that each monetary cost and benefit should be weighted according to the relative prosperity of those receiving the benefit or bearing the cost. The formula they recommend for doing this is:

$$U = log\ C$$

Where:

C = household consumption; and

U = household utility good from consumption.

This implies a marginal utility of consumption of 1/C. Hence, the utility scale derived in Table 4 is relative to the poorest household. It implies the utility cost of the high income tertiary educated households of an extra dollar of carbon cost is only one quarter of the dollar cost imposed on poor households.

This differential is reflected in the utility adjusted carbon costs as a per cent of expenditure estimates given in the last two columns of Table 4.

Figure 2: Carbon cost at $25 as per cent of income versus weekly expenditure

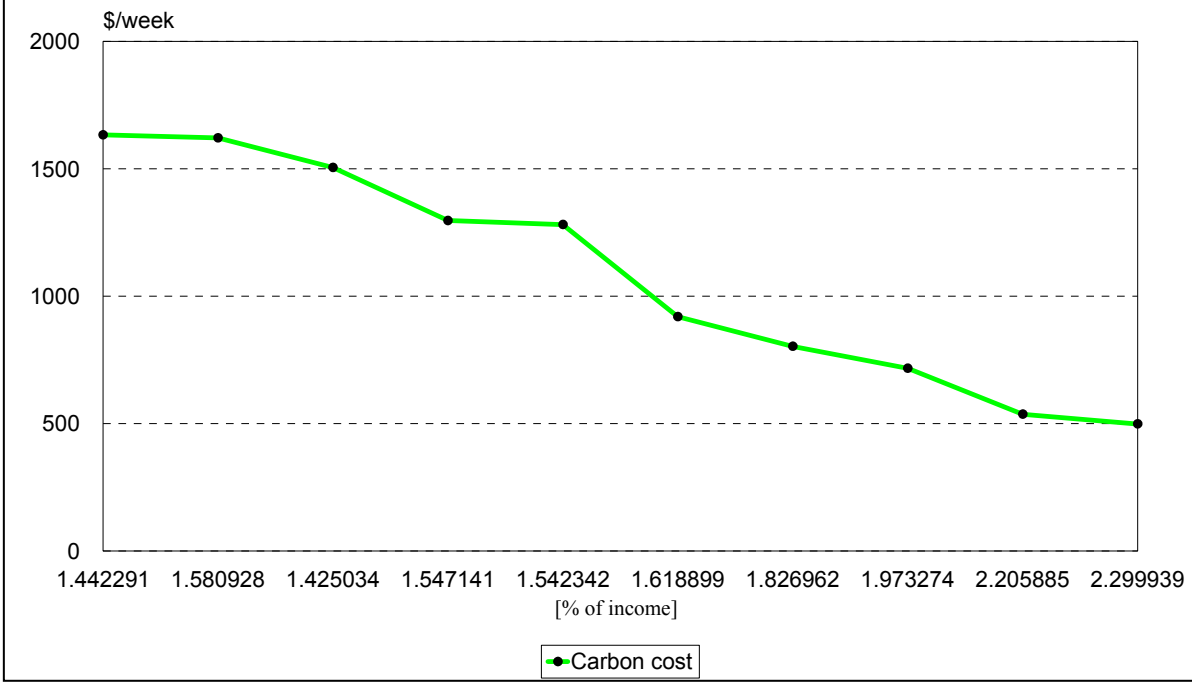


Figure 3: Carbon cost at $25 as per cent of income versus [equivalised] per capita weekly expenditure

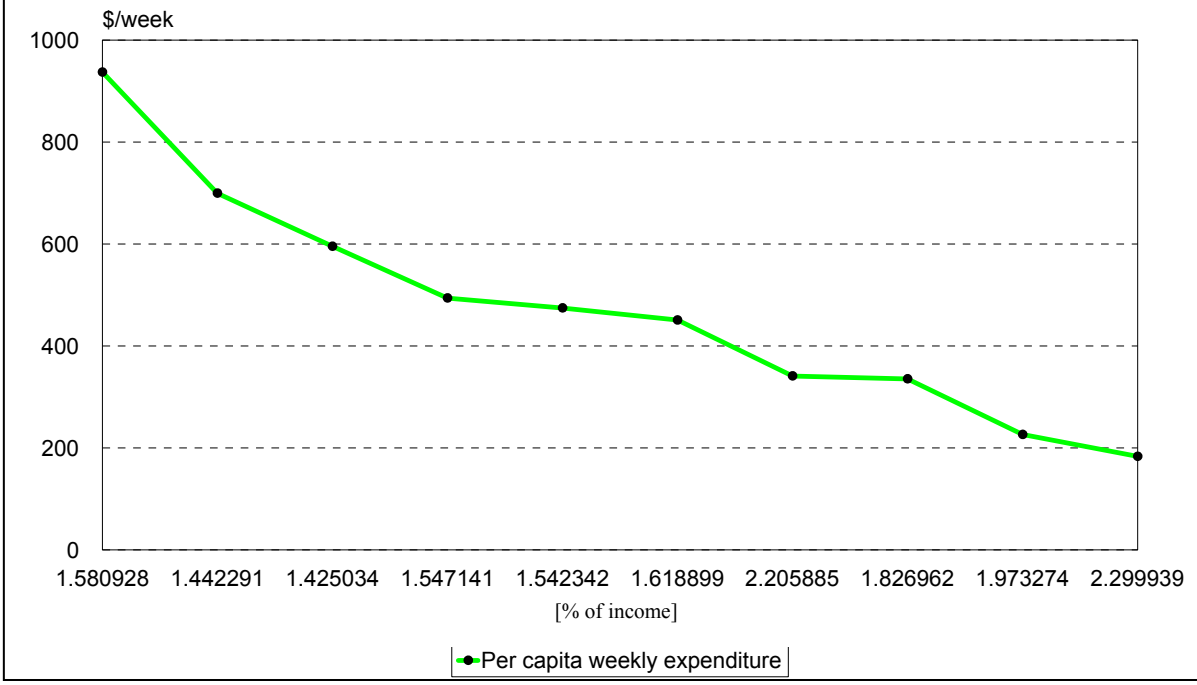


Figure 4: Utility adjusted carbon cost at $25 as per cent of income versus equivalised weekly expenditure

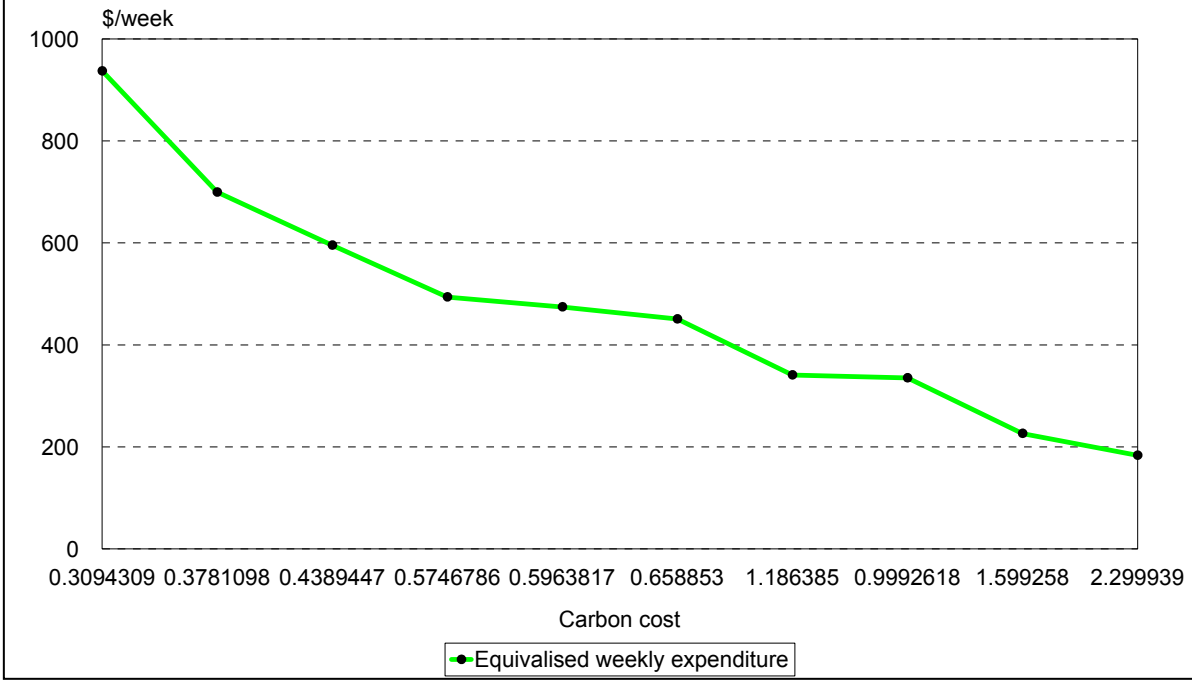


Table 4 Ten household types – Impact of carbon price									
	Utility scale	Carbon cost – $2006		Carbon cost – % of annual expenditure		Utility adjusted carbon costs – $2006		Utility adjusted carbon costs – % of annual expenditure	
		$25	**$50**	**$25**	**$50**	**$25**	$50	**$25**	**$50**
Household with children where government benefits exceed 30% of income	0.5	762.9	1525.8	1.8	3.7	417.3	834.5	1.0	2.0
Household with children where government benefits is less than 30% of income	0.4	1043.4	2086.8	1.5	3.1	387.6	775.1	0.6	1.1
Retired age pension households	0.5	615.9	1231.8	2.2	4.4	331.2	662.5	1.2	2.4
Employed family	0.4	1027.5	2055.0	1.5	3.1	397.3	794.6	0.6	1.2
Household with less than $70000	0.4	774.1	1548.2	1.6	3.2	315.0	630.1	0.7	1.3
Household greater than $70000 income and household head greater than 50	0.3	1115.3	2230.6	1.4	2.9	343.5	687.1	0.4	0.9
Double income no children	0.2	1332.9	2665.7	1.6	3.2	260.9	521.8	0.3	0.6
Unemployed households	0.8	735.7	1471.4	2.0	3.9	596.3	1192.5	1.6	3.2
Poor households	1.0	596.4	1192.8	2.3	4.6	596.4	1192.8	2.3	4.6
High income tertiary educated	0.3	1225.0	2450.0	1.4	2.9	321.1	642.3	0.4	0.8

6. Carbon pricing – implications

If the above results are found to be still valid at the time of the implementation of a full carbon price regime, then the income of poor household support to:

(i) offset the cost of carbon; and

(ii) help adjust to a lower carbon intensive economy,

will be high on the political agenda.

Table 5 gives the estimates of the number of households by income ranges that would be the focus of attention. There are around 600,000 of these households that would have an imposed cost of approximately $400 million for a $25 a tonne carbon price and $800 million for a $50 a tonne carbon price. These estimates should form the foundation of calculations for the resource assistance costs of these households.

Finally, it should be noted that State Governments have already put in place measures (such as renewable energy use) which, in effect, are imposing a carbon price on the economy. The impact of current measures by 2010 is shown in Table 6. Currently in Victoria the measures are equivalent to a carbon price of $0.45 a tonne in 2005, increasing to $2.1 a tonne of CO_2 by 2010.

These measures are to be commended with, at this stage, relatively small distributional impacts. What is required now is a full scale debate on how the much larger costs of the future are to be accommodated in the trade-offs between business efficiency, social equity and macroeconomic costs.

Table 5 Number of poorer Victorian households – by income (2006 $)	
Couple with children and income under $900 per week	135,000
Couple with children and income under $800 per week	170,000
One parent family and income under $700 per week	97,000
Non-family households and income under $600 per week	199,000
Total	**601,000**

Table 6	NIEIR's estimates of the impact of measures on electricity prices in 2005 and 2010	
	2005	**2010**
MRET	$0.60/MWh	$1.23/MWh
New South Wales GGAS	$0.88/MWh	$3.10/MWh
New South Wales ESF	$0.53/MWh	$0.50/MWh (2008)
Queensland CEP	$2.00/MWh	$1.50/MWh
Victoria (VREO)	–	$1.50/MWh
Price impacts of above measures by NEM region		
Queensland	$2.60/MWh	$2.73/MWh
New South Wales	$2.01/MWh	$4.83/MWh
Victoria	$0.60/MWh	$2.73/MWh
South Australia	$0.60/MWh	$1.23/MWh
Tasmania	–	$1.23/MWh

Appendix A: Estimating the carbon content of expenditure in the Victorian economy

The CO_2 content of Victorian production will consist of elements, namely:

(i) the direct CO_2 emissions content of production as measured by the energy consumed by an industry;

(ii) the emission content of goods and services used as inputs into production for a given industry from all other industries in Victoria;

(iii) the emission content of goods and services used as input into production for a given industry purchased from all other industries located interstate; and

(iv) the emission content of goods and services used as inputs into production for a given industry produced from industries located overseas.

It is evident from the description of the four elements that the only way to estimate the emission content of production is via input-output analysis.

A typical input-output table of inter-industry flows is represented by:

Industry	1	2		
	x_{11}	x_{12}	x_{1n}	f_1
	x_{21}	⋮	⋮	
	⋮	⋮	⋮	⋮
	⋮	⋮	⋮	⋮
	⋮	⋮	⋮	⋮
	x_{n1}	⋮	x_{nn}	f_n

Where:

x_{ij} = purchase of goods or services by industry j from industry i, \$ million;

fi = industry i contribution to final demand, \$ million.

Now each x_{ij} will consist of three locations in terms of sources of supply j, that is:

$$x_{ij} = x^{v}_{ij} + x^{i}_{ij} + x^{f}_{ij}$$

Where:

x^{v}_{ij} = that part of the x_{ij} total purchase that represents purchases from other firms in industry i located in Victoria;

x^{i}_{ij} = that part of the x_{ij} that represents goods or services purchased from firms in industry i located interstate; and

x^{f}_{ij} = that part of the x_{ij} total that is purchased from other firms in industry i located overseas.

Tables with only the x^{v}_{ij} in the cells are called input-output tables with direct allocation of imports. Input-output tables with x_{ij} in the cells are called tables with imports allocated indirectly.

The first step is to estimate the direct CO_2 content by Victorian industry. This is given by:

$$CO_2{}^{d}_{i} = C_c \,.\, x_{c,i} + C_g \,.\, x_{g,i} + C_p \,.\, x_{p,i} + C_e \,.\, x_{e,i} \qquad (1)$$

Where:

$CO_2{}^{d}_{i}$ = direct CO_2 content of industry i;

$X_{c,i}$ = direct coal input into industry i measured in \$ million (or petajoules);

C_1 = CO_2 emissions in tonnes for coal and as a primary fuel;

And

c	=	coal
g		gas
p		petroleum
e		electricity

The second step is to calculate the indirect contribution of all Victorian industry to the emission content of any given Victorian industry. This can only be done by the use of input-output techniques.

The equations for the total direct and indirect CO_2 emission content for Victorian industry are given by:

$$CO_2{}^v{}_1 = a_{1,1} . CO_2{}^v{}_1 + a_{2,1} . CO_2{}^v{}_2 + \ldots\ldots + a_{n,1} . CO_2{}^v{}_n + CO_2{}^d{}_1 \quad (2)$$

$$\vdots$$

$$CO_2{}^v{}_n = a_{n,1} . CO_2{}^v{}_n + a_{n,2} . CO_2{}^v{}_2 + \ldots\ldots + a_{n,n} . CO_2{}^v{}_n + CO_2{}^d{}_n$$

Where:

$CO_2{}^v{}_i$ = total emission content of industry *i* from Victorian industry;

$a_{i,j}$ = share of Victorian industry *i*'s output allocated to Victorian industry *j*.

The solution becomes:

$$\boldsymbol{CO_2{}^v = [I - A]^{-1} \; CO_2{}^d} \quad (3)$$

Where:

$\boldsymbol{CO_2{}^v}$ = n * 1 vector of the $CO_2{}^v{}_i$

$\boldsymbol{A}$ = n * n matrix of the $a_{i,j}$

$\boldsymbol{CO_2{}^d}$ = n * 1 vector of the $CO_2{}^d{}_i$

$\boldsymbol{I}$ = n * n unity matrix.

The indirect contribution of Victorian industry to emissions in industry *i* will be given by:

$$CO_2{}^{vi}{}_i = CO_2{}^v{}_i - CO_2{}^d{}_i \quad (4)$$

The total emissions content will be given by:

$$CO_{2i} = CO_2{}^v{}_i + CO_2{}^{is}{}_i + CO_2{}^f{}_i$$

Where:

$CO_2{}^{is}{}_i$ = emission content of industry *i* from goods and services from interstate industries;

$CO_2{}^f{}_i$ = emission content of industry *i* from goods and services sourced from overseas.

In order to estimate the interstate contribution to emissions the following data is required:

$$\begin{matrix} x^i{}_{1,1} & x^i{}_{1,2} & \ldots\ldots\ldots\ldots & x^i{}_{1,n} \\ \vdots & & & \\ x^i{}_{n,1} & & \ldots\ldots\ldots\ldots\ldots & x^i{}_{n,n} \end{matrix}$$

Where:

$x^i{}_{i,j}$ = imports from interstate industry *i* used by Victorian industry *j*.

Therefore:

$$CO^{is}_{2i} = \sum_{j=1}^{n} . \; \overline{CO}^{is}_{2i,j} \; . \; x^{i}_{i,j} \quad (5)$$

Where $\overline{CO}_{2j}$ is the total emission content of interstate industry *j* per dollar of output.

A similar equation to (5) applies for foreign imports.

Appendix B: Definitions

1. Social Security Type 1 Family With Dependent Children

Where total weekly unearned income as a percentage of total gross Income exceeds 30% AND the household has dependent children AND is NOT a (retired Household age>55 where no other family member works OR the household receives Vet Affairs Pension, Age Pension or Overseas Pension or Benefit)

2. Social Security Type 2 Family With Dependent Children

Total weekly household income from Government benefits as a percentage of weekly household employee income exceeds 30% AND the household has dependent children AND is NOT a (retired Household age>55 where no other family member works OR the household receives Vet Affairs Pension, Age Pension or Overseas Pension or Benefit)

3. Social Security Type 3 Family With Dependent Children

Where Principal source of household income is derived from one of the following:

- other private income;
- age and disability support payments;
- unemployment;
- education and sickness benefits;
- other Government pensions and benefits; and
- the person has zero or negative total weekly income.

AND the household has dependent children AND is NOT a (retired Household age>55 where no other family member works OR the household receives Vet Affairs Pension, Age Pension or Overseas Pension or Benefit)

4. Retired Person/Age Pension

These are retired Households age>55 where no other family member works OR the household receives Vet Affairs Pension, Age Pension or Overseas Pension or Benefit

5. Singles/Couples No Child

Households that are either singles or couples without children.

6. Social Security 6 Family With Dependent Children

Satisfies the following criteria:

- NOT a (retired Household age >55 where no other family member works OR the household receives Vet Affairs Pension, Age Pension or Overseas Pension or Benefit) AND
- Family structure with dependent children AND
- Households is not covered by Social Security Type1

OR

- Family structure with dependent children AND is NOT a (retired Household age>55 where no other family member works OR the household receives Vet Affairs Pension, Age Pension or Overseas Pension or Benefit)

7. Social Security Type 7 Family With Dependent Children

Satisfies the following criteria:

- NOT a (retired Household age >55 where no other family member works OR the household receives Vet Affairs Pension, Age Pension or Overseas Pension or Benefit) AND
- Family structure with dependent children AND

- Households is not covered by Social Security Type2

OR

- Family structure with dependent children AND is NOT a (retired Household age>55 where no other family member works OR the household receives Vet Affairs Pension, Age Pension or Overseas Pension or Benefit)

8. Social Security Type 8 Family With Dependent Children

Satisfies the following criteria:

- NOT a (retired Household age >55 where no other family member works OR the household receives Vet Affairs Pension, Age Pension or Overseas Pension or Benefit) AND
- Family structure with dependent children AND
- Households is not covered by Social Security Type3

OR

- Family structure with dependent children AND is NOT a (retired Household age>55 where no other family member works OR the household receives Vet Affairs Pension, Age Pension or Overseas Pension or Benefit)

9. Age Pension

The household receives Vet Affairs Pension, Age Pension or Overseas Pension or Benefit.

10. Employed Families

The household income is from employment.

11. Unemployed Families

Households with:

- dependent children, and
- the spouse of the household head is unemployed or not in the labour force, and
- the household head is not over 55 and out of the labour force, and
- no other member of the family is in the labour force, or
- the household does not receive Vet Affairs Pension, Age Pension or Overseas Pension or Benefit.

12. Other

Not included in categories 9, 10 or 11.

13. Low Income (Working Age) < 60K

Households of working age with annual income less than $60,000.

14. High Income (Working Age) < 50

Households with high income > $60,000 per annum (working age) < 50 years.

15. High Income (Working Age) > 50

Households with high income > $60,000 per annum (working age) > 50 years.

16. DINKS

Dual income households without children.

17. Self Employed

18. Wage and Salary Earners

19. Tertiary Educated

20. No Post School Education

21. Intermediate Qualifications

22. Mortgaged Household

23. Renters

24. Owners

25. House Hold with small Travel Costs

26. Extremely Poor Households

Household experienced at least four of the following:

- could not afford to have a night out once a fortnight, or
- could not afford brand new clothes, or
- spends more money than receives, or
- could not afford to pay gas, electricity or telephone bills, or
- pawned or sold something, or
- went without meals, or
- was unable to heat the home due to a shortage of money, or
- had cash flow problems during the past year, and
- the household head is not over 55 and out of the labour force, and
- no other member of the family is in the labour force, or
- the household does not receive Vet Affairs Pension, Age Pension or Overseas Pension or Benefit.

27. Social Security 1 DSP

Sub group of type 1: Household income from Disability Support Pension.

28. Social Security 1 Unemployed

Sub group of type 1: Household income from Unemployment Benefits.

29. Social Security 1 Poor

Sub group of type 1: Household also meets criteria for poor.

30. Social Security 1 Other

Remaining sub group of type 1.

31. Social Security 2 DSP

Sub group of type 2: Household income from Disability Support Pension.

32. Social Security 2 Unemployed

Sub group of type 2: Household income from Unemployment Benefits.

33. Social Security 2 Poor

Sub group of type 2: Household also meets criteria for poor.

34. Social Security 2 Other

Remaining sub group of type 2.

35. Social Security 3 DSP

Sub group of type 3: Household income from Disability Support Pension.

36. Social Security 3 Unemployed

Sub group of type 3: Household income from Unemployment Benefits.

37. Social Security 3 Poor

Sub group of type 3: Household also meets criteria for poor.

38. Social Security 3 Other

Remaining sub group of type 3.

39. Managers/Professionals

40. Associated/Trades

41. Other Working Household

42. ICONS

Household structure that:

- could not afford to have a holiday once a year, and
- could not afford to have a night out once a fortnight, and
- could not afford to have friends or family over for a meal once a month, and
- could not afford to have a special meal once a week, and
- could not afford brand new clothes, and
- could not afford to spend time on leisure/hobby activities, and
- can afford to pay gas, electricity, telephone bills, registration and insurance on time, and
- did not seek some form of welfare assistance due to a shortage of money, and
- expenditure on recreation, personal care and miscellaneous goods and services exceeds 25% of total expenditure on goods and services, and
- principal source of income is not from unemployment, sickness or other government pension,
- and the household head is aged less than 65.

43. Tertiary Educated High Incomes (>60K)

4 Brief presentations

In Session II of the Equity in Response to Climate Change Roundtable, Alex Gordon gave a presentation on the joint initiative between the Australian Conservation Foundation, Australian Council of Social Service and Choice.

In Session III, 'Focus on solutions', brief presentations were prepared to stimulate group discussion of specific issues so as to identify opportunities and advisable courses of action.

	Presenter	Title of presentation
4.1	Alex Gordon	Ensuring environmental action is economically efficient and socially equitable (Session II)
4.2	Michael Raper	Low income and disadvantaged people (Session III)
4.3	Mark Wootton	Rural communities (Session III)
4.4	Chris Loader	Road transport and climate change (Session III)
4.5	Olga Havnen	Equity in response to climate change: an Indigenous perspective (Session III)

4.1 Ensuring environmental action is economically efficient and socially equitable

Ms Alex Gordon

Director of Sustainability Strategies
Australian Conservation Foundation
Alex Gordon is the Director of Sustainability Strategies at the Australian Conservation Foundation, and has more than a decade of experience working on environmental issues across government, politics and industry.

As the founding Director of the NSW Greenhouse Office she led the establishment of a national taskforce on emissions trading and was responsible for developing a Greenhouse Action Plan for NSW. She has also worked for the Federal Leader of the Opposition, the Federal Shadow Minister for the Environment, the NSW Sustainable Energy Development Authority and as an Environmental Management Consultant. She has a MSc in Environmental Management from Oxford University.

The presentation Alex Gordon gave at the Equity in Response to Climate Change Roundtable, 'Ensuring environmental action is economically efficient and socially equitable', is available via the internet at <http://www.bsl.org.au/pdfs/Gordon_environt_efficiency_equity&climatechange.pdf>

Equity in Response to Climate Change National Roundtable

Melbourne
26 March 2007

Low Income and Disadvantaged People

Michael Raper
President, National Welfare Rights Network

1. What do we mean by "low income and disadvantaged people? Who is included?

ACOSS has recently adopted the following "definitions" or descriptors of "low income" in Australia today.

The income benchmark for a ***low income family*** is the maximum gross household income for the **bottom 40% of households**, currently about **$43,000**[1].

The income benchmark for a ***low income single person without children*** is set at the maximum wage for the bottom 20% of fulltime wage earners, or approximately **$30,000.**

Benchmarks for low and high incomes

	Individual income	**Family income**
Low income benchmark	Bottom 20% of fulltime wage earners (up to $30,000)	Bottom 40% of households (up to $43,000)
High income benchmark	Top 20% of fulltime wages ($70,000+)	Top 20% of households ($100,000+)

ACOSS broadly describe disadvantaged Australians as those who:
"lack what most Australians would regard as the essentials for a decent life" or
"are excluded from participation in important areas of economic and social life, such as employment, decent housing, basic services, and social support".

Generally, this coincides with being a low income earner, but disadvantage can arise from other factors such as chronic illness, disability, homelessness, episodic mental health conditions, living in remote areas, and drought.

The term "low income and disadvantaged people / communities" includes all those in the above descriptions.

[1] Thus includes wages, family payments (ie FTB) and other forms of income. In terms of *individual* income, this is roughly equal to the median (middle) fulltime wage, currently approximately $45,000, but it is a low income for a *family*.

2. How "low income" are pensioners, unemployed people (allowees) and other Social Security recipients? How many are there?

"INCOME SUPPORT" PAYMENTS	Number	Weekly income (single)	Annual income	Cut out point (per week)	% with income or earnings
Age Pension	1,915,793	$262.55	$13,652.60	$727.60	34
Veterans Service Pension	329,641	$262.55	$13,652.60		
Disability Support Pension	712,163	$262.55	$13,652.60		9
Parenting Payment (Single, 1 child)	433,370	$262.55	$13,652.60	$739.92	30
Parenting Payment (Partnered)	159,719	$191.40	$9,952.80		11
Newstart Allowance	438,560	$212.15	$11,031.80	$400.25	16
Youth Allowance (other /at home)	75,811	$114.55	$5,956.60		
Youth Allowance (study/away from home)	265,517	$174.05	$9,050.60		
Carer Payment	105,058	$262.55	$13,652.60		
Wife Pension	15,336	$262.55	$13,652.60		
Austudy Payment	29,864	$174.05	$9,050.60		
ABSTUDY (school - single independent)	17,931	$174.05	$9,050.60		
ABSTUDY (tertiary- single, over 21)	15,975	$212.15	$11,031.80		
Widow Allowance	44,603	$212.15	$11,031.80		10
Mature Age Allowance	12,038	$212.15	$11,031.80		7
Sickness Allowance	7,510	$212.15	$11,031.80		
Special Benefit	9,897	$212.15	$11,031.80	$212.15	
Partner Allowance	60,489	$191.40	$9,952.80		8
Total	**4,649,275**				
ADDITIONAL FAMILY PAYMENTS					
Family Tax Benefit A (child aged 13-15)	1,793,999	$89.88 per child	$4,673.76	$94,718.00 pa	
Family Tax Benefit B (child aged 15-15)	1,360,026	$42.14 per family	$2,511.20	N/A	
Total	**Approx. 2 million**				
ADDITIONAL CARER PAYMENTS					
Carer Allowance (adult)	259,682	$98.50	$2,561.00		
Carer Allowance (child)	110,943	$98.50	$2,561.00		
Total	**370,625**				

3. Australian Government concession cards and energy /utility concessions

Card type	Card holder numbers	Listed dependents	Access to energy /utilities concessions
Pensioner Concession Card	3,157,560	1,072,964	YES
Commonwealth Seniors Health Card	310,633	Not applicable	YES
Health Care Card	1,116,405	855,134	NO
(Low Income) Health Care Card	331,675	20,143	NO
TOTALS	**4,916,273**		**1,951,241**

3.1 *Eligibility* for Australian Government concession cards

- **Pensioner Concession Card** – people in receipt of a pension payment and certain older, long-term recipients of a Social Security allowance payment.
- **Commonwealth Seniors Health Card** – so called "self-funded retirees".
- **Health Care Card** – people in receipt of a Social Security allowance payment, families receiving maximum rate of Family Tax Benefit A and low paid workers

3.2 Concession card *entitlements*

Having an Australian Government concession card entitles the cardholder to a number of concessions provided directly by the Australian Government. However, most concessions are provided by State and Local Governments.

3.3 *Australian Government* concessions

Utilities Allowance – is one of the key concessions provided directly by the Australian Government to income support recipients (see list above) of Age Pension / Veterans Service Pension age to help with utilities bills. It is a non-taxable payment of $26.50 per member of a couple and $53 for single people. The payment is made twice each year (March and September) and is adjusted in line with movements in the CPI. Total cost is approximately $290m in 2005-06.

Other Concessions – include Pharmaceutical Allowance and Telephone Allowance.

3.4 State and Local Government concessions – eg NSW

Rates Concessions – most Local Councils offer pensioners (but not allowees) a concession on land rates.

Water Concessions – All pensioners (but not allowees) in NSW receive a rebate on their water bill provided by the State Government.

Gas & Electricity Concessions – All electricity and gas companies servicing NSW provide an energy rebate on electricity and gas bills of $112 per year (or about $28 per ninety day account) to pensioners on behalf of the NSW Government.

Other Concessions – cover such things as ambulance service, eye examinations, hearing aids, Roads & Traffic Authority and various travel concessions.

4.3 Rural communities

As the Principal Manager of Jigsaw Farms and Chairperson of The Climate Institute, Mark Wootton has witnessed the effects of climate change on his own local community.

Equity in Response to Climate Change National Roundtable

Rural Communities

Mark Wootton

FINDINGS OF THE CLIMATE INSTITUTE RESEARCH IN RURAL COMMUNITIES IN 2006

1. **ECONOMIC IMPACTS**
2. **SOCIAL IMPACTS**
3. **OPPORTUNITIES**

Economic impacts

- Water shortages and the drought have brought concerns about climate change in rural communities to the fore.
- In June last year, before Al Gore's film, before the publicity over the drought, before Stern's report, The Climate Institute asked farmers what they thought was going on.
- Our research was in focus groups so that we could get an understanding of the depth of people's thinking: amongst those who participated, the top four issues were water supply and management, drought, climate change and suicide in the country.
- It was clear that there had been a change in thinking.

A regular comment in the focus groups was:

"With this greenhouse effect, I thought it was a load of rubbish, probably five years ago, or ten years ago. I thought they can't be right, you know. And yet now I'm thinking of that it's here and happening. And so I'd say yes, there is something going on, the temperatures going up and we had hot summers, it's affecting the soil. I've changed my attitude."

- People also spoke about the challenges of farming when the seasons had become so muddled up.

- For example, as the length of days changes from winter to spring, some crops might begin flowering as part of the normal cycle. However, if seasonal rains are delayed, this could have substantial consequences for the survival and quality of the crops.

Another common comment was:

"I think the seasons have changed: the change of seasons have turned around, but the summer is still hot and winters aren't cold. But the seasons have certainly turned."

There's nothing new about young people leaving rural communities to live in the city, but the tougher it becomes because of the drought, the more young people leave.

- More farmers are feeling that they have nothing to leave their kids anyway. There are farmers whose families have had the farm for generations who feel that asking the kids to come back to the farm would be unfair because it's so tough now.

A typical comment was:

"I think it's pretty hard for the kids today because they've usually got a great bill to pay off and they're not making the money. There's no money in the crops, the stocks – they're not getting anything for the stock and no money for the grain. It costs you more to put it in than what you're getting off. You run up a couple of hundred thousand dollar debts and you've got to try and meet payments. It's pretty hard."

- Not surprisingly that doesn't leave people feeling that optimistic about the future:

Another frequent comment was:

"Yes, in the past like when you had a bad year, you almost expected a good one to follow. Well these last five years have been bad for one reason or another and I think the optimism is slipping."

- Some farmers believe that, if the weather changes in a predictable manner, they will be OK – they will adapt their farming practices to suit the changed conditions, maybe by growing different crops or adopting different animal husbandry practices.

- However, if the changes in the weather are unpredictable or too drastic, then some farmers fear they will be at the mercy of the elements rather than in control of them.

- Agriculture and its contribution to the Australian economy:

    - NFF figures show that agriculture contributes 12.1% of GDP and supports 17% of Australian jobs.
    - 60% of Australia's land mass is devoted to agriculture.
    - The Government (ABARE) estimates that the 2002–03 drought reduced Australia's economic growth by 0.9% or $6.6 billion

Social impacts

- This kind of reduction in income isn't just a huge economic blow to rural communities. In our focus group research people talked about family breakdown and suicide as the serious social consequences of this financial pressure.

- Suicide is more common amongst rural men than men in living in cities. For example, the National Depression Initiative, "Beyond Blue" states the following:

Young men living in rural Australia are unlikely to seek help for mental health problems and subsequently face a higher risk of suicide than those living in metropolitan areas. While the rate at which mental disorders occur does not differ greatly between metropolitan, rural and remote populations, the likelihood of professional help being sought is lowest among men living away from big cities.

Young men in non-metropolitan areas therefore should be the urgent target of suicide prevention campaigns. The reluctance of this group to seek professional help also highlights the importance of investigating the appropriateness, accessibility and approachability of current mental health services in rural and remote areas.

The data shows that suicide rates among men in rural and remote areas were higher across almost all age groups, with those aged 20–29 years showing particularly high rates.

- The Climate Institute found that in several focus groups, participants said virtually everyone they knew had in some way been touched by suicide. They said everyone in the bush had known someone either directly or indirectly who had committed suicide.

A common voice was expressed by a focus group participant who stated:

"We've had a very hard month, a very high incidence of it (suicide) in this region, that's probably why people have been touched by that.

And we're getting more used to it. It's getting scary when you know people who are doing this and who … they're awful young, why are they being affected so young?"

- There was also a sense that two groups of men were most at risk. Firstly, younger men who had not really established a solid foundation of a business or career. Secondly, older men who found that, despite their best efforts, they were no longer able to provide for their families and were sliding further and further into debt.

- Farmers who may have been able to survive in normal times are being pushed to the wall by the loss of income and escalating costs from maintaining their farms and farm debt through the drought.

A sobering comment expressed was:

"Farmers might be creeping up in the suicide rates, the more droughts go on. Just after the drought breaks or you have a bit of a break, people say, oh I've held on for so long. But then they say okay now I've got the fallout from the drought, I've got to cope with all that money that I've borrowed. What am I going to do, can't do it, maybe the family will split up because of it and it just spirals."

Opportunities

- Because rural communities have been confronting climate change well ahead of any Government policies to address it, there is very little information available to rural communities and in particular to farmers about how they might be able to deal with it.

- As we (The Climate Institute) visited rural centres in New South Wales and Victoria last year, we were constantly thrown questions about what farmers could do – should they change crops, should they sell up, should they move north?

- Having information to be able to make those decisions is essential. Farmers are living in an information vacuum about climate change which contributes to their sense of a loss of control.

- There are opportunities for rural communities to become a part of the solution.

- Last year the global biofuels market was worth $20.9 billion. Leading producers are Germany, France, Italy, the Czech Republic, Poland and Austria. Even Indonesia has a 10% by 2010 biofuels target.

- Farmers have been denied access to participate in the growing market for carbon offsets through sequestration in forests. There are some programs which are trying to address that exclusion so that farmers can be paid for sequestering carbon in forests, but the global market remains off-limits to Australia as it is only open to countries which have ratified the Kyoto Protocol. The Climate Institute has previously calculated that access to local and global carbon trading markets would be worth around $2.5 billion over five years.

- Green power is also good for regional communities because where renewable energy projects are being built – and this means jobs.
  e.g. In Crookwell, near Goulburn the construction of a 14 turbine wind farm employed about 100 people – most were sourced locally.

Conclusion and Take Home Message

Farming communities are at the frontline in terms of immediate effect of Global Warming. They are resilient, innovative and great adapters. With Climate Change they don't feel in control. What they are asking for is better and more accurate data of the future effects of Global Warming. This will allow them to make decisions that will allow for some degree of adaption. They are also frustrated that they are locked out of the opportunities that a carbon based economy would give them and yet are nervous of the negatives of such an economy. They are also extremely nervous and feel vulnerable about how Australia can or even could be farmed if the effects of Climate Change continue to escalate.

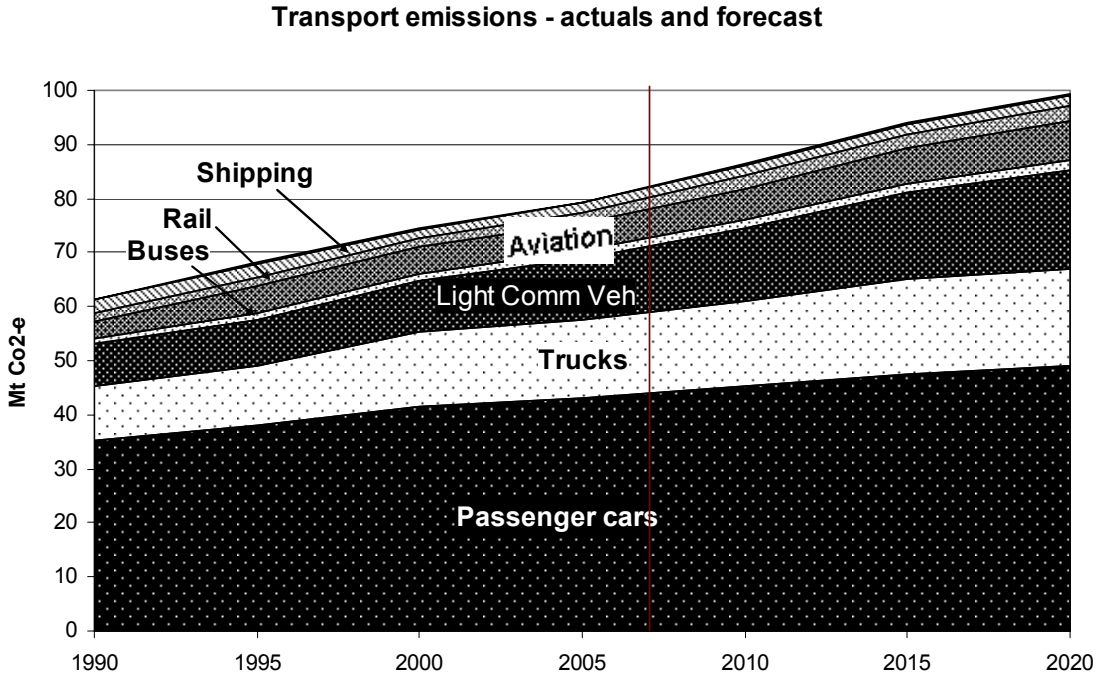
Road Transport and Climate Change[1]

Chris Loader and John Stanley, Bus Association Victoria

Context

Transport is Australia's third largest and second fastest growing source of greenhouse gas emissions, growing by 5% in 2005 alone. Since 1990, transport emissions have risen 29%, and the Australian Greenhouse Office (AGO) projects they will grow to a massive 62% above 1990 levels by 2020, even after allowing for current emission-reducing measures.

The composition of Australia's actual and forecast transport emissions are shown in the chart below.



Source: Australian Greenhouse Office 2006, 'with measures' forecasts

The road transport sector contributes almost 90% of these transport emissions (13.5% of Australia's total emissions). In 2004, passenger cars contributed 7.8% of Australia's GHG emissions, up from 7.0% in 1990. Passenger car emissions grew by 17.8% over this fourteen year period, well above total net emissions growth of 5.2%.

[1] Helpful comments on an early draft of this note have been received from the Bureau of Transport and Resource Economics.

The Australian Greenhouse Office (AGO 2006) projects Australian road transport emissions will grow to about 87.6Mt of CO_2e by 2020, even with a range of emission-reducing measures in place. This emission rate is about 60% above 1990 emission levels.

While there is always uncertainty about any such projections, the AGO work suggests that a major emission reduction program will be needed in the road transport sector.

The recent UK Stern report (Stern 2006, p. i) points out that

> *The scientific evidence is now overwhelming: climate change presents very serious global risks, and it now demands an urgent global response.*

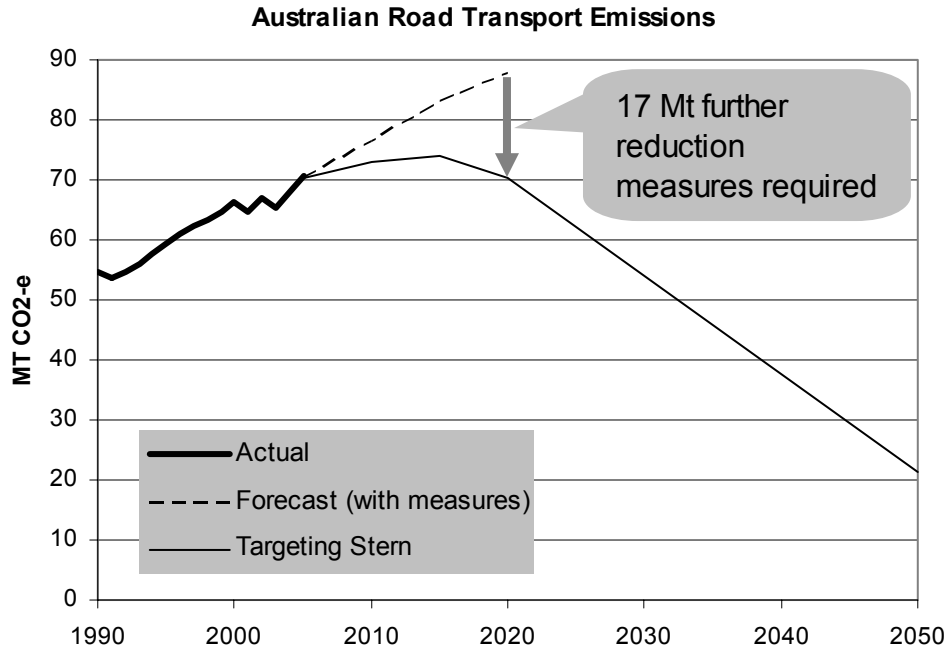
Stern (2006, p. xi) argues that

> *To stabilise at 450ppm CO_2e, without overshooting, global emissions would need to peak in the next 10 years and then fall at more than 5% per year, reaching 70% below current levels by 2050.*

Stabilisation at the higher level of 550 ppm CO_2e is argued by Stern to require global emissions about 25% below current levels by 2050.

When an equitable distribution of emission reductions between developed and developing countries is considered, Stern (2006, p. 475) suggests that the 450 ppm target requires developed countries to reduce emissions by 70–90% from 1990 levels by 2050, or at least 60% by 2050 under the 550 ppm target. He also suggests we have just 10–15 years in which to act decisively, to avoid the tipping point where climate change becomes unstoppable. This paper asks what a target reduction of 70% in GHG emissions might mean for the Australian road transport sector by 2050.

Various paths towards a 70% reduction in GHG emissions from Australian road transport by 2050 are possible but a modest interim target might be that 2020 emission levels are similar to current rates (allowing for some rise then a fall). This suggests that projected 2020 emission levels would need to fall to about 70Mt CO_2e, some 17Mt below the AGO "with measures" projection for that year. This is still significantly higher than the 54.6MT CO_2e figure from 1990. The chart below shows a 70% reduction target for 2050 (against a 2005 base) and the 2020 interim position, compared to the AGO "with measures" projection.



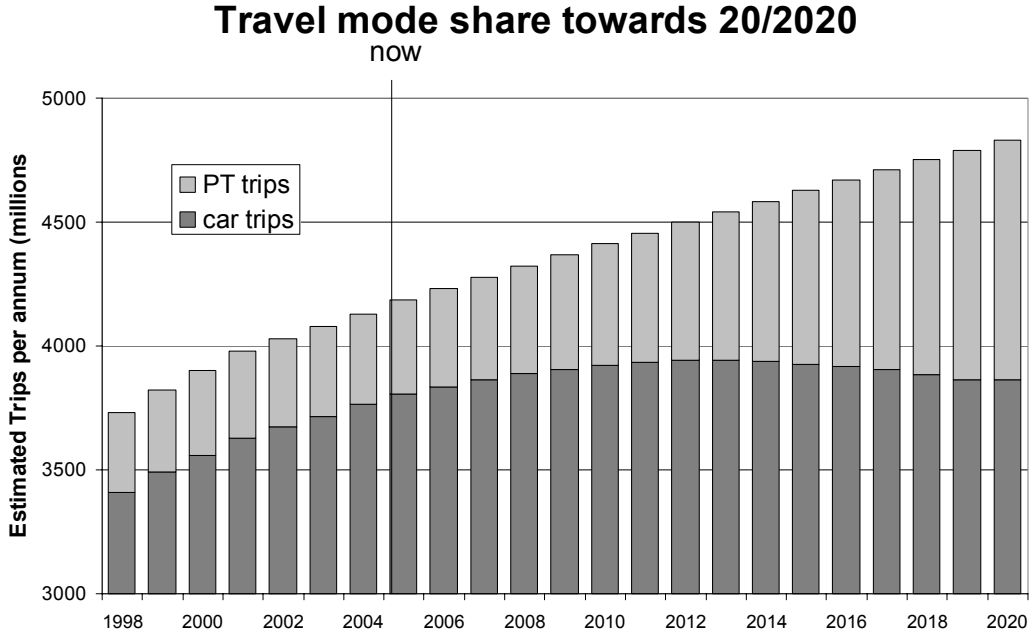
Sources: AGO 2006, BAV projection.

Reducing GHG Emissions from Road Transport

Achieving major reductions in GHG emissions in the road transport sector will require step changes in the conditions underlying personal and freight mode choices and in fuel efficiencies. However, the magnitude of changes that would be required to achieve the reduction of 17Mt CO_2e by 2020 is by no means beyond the realms of possibility, as illustrated below. Four key initiative areas are highlighted.

(1) Increasing Public Transport Mode Share

Private cars account for well over half of Australia's road transport emissions. The Victorian State Government has set a metropolitan target of 20% of motorised trips being made by public transport by 2020. If this was achieved, the number of car trips in 2020 would be about the same as in 2005, allowing for population and economic growth. This is shown in the chart below.



Source: Bus Association Victoria projections.

Applying this net zero growth in car travel to all capital cities would reduce total GHG emissions from cars by about 3.2Mt CO_2e by 2020.

The 20/2020 target for Melbourne requires a tripling of current public transport patronage, a very difficult but not necessarily impossible target. The Victorian State Government's *Meeting our Transport Challenges* policy begins the State's process of pursuing 20% mode share. However, it is an extremely demanding target.

This prospect would be enhanced if a comprehensive road pricing regime was introduced, including externality charging (especially congestion charging). For example, the cordon charge around the central London area, combined with improvements to public transport, has caused a 4% mode shift to public transport and arrested growing car volumes throughout the charging area.

Comprehensive road pricing schemes, complemented by substantial improvements in public transport service levels and on-road priority, mean a 20% mode share target by 2020 is not impossible, particularly if fuel prices remain high.

Political will is central to reform of road pricing arrangements. While this will is not apparent at present, the rapidly growing interest in road pricing internationally suggests that it will figure on the reform agenda within the next 5–10 years.

An increase in public transport mode share is not emission free. Peak period utilisation of public transport is high. To minimise the impact of patronage increase on emissions, peak-spreading strategies would be needed. If doubling public transport mode share required a doubling in service kilometres, this would mean an increase of about 2.3Mt of CO_2e. Conversely, if public

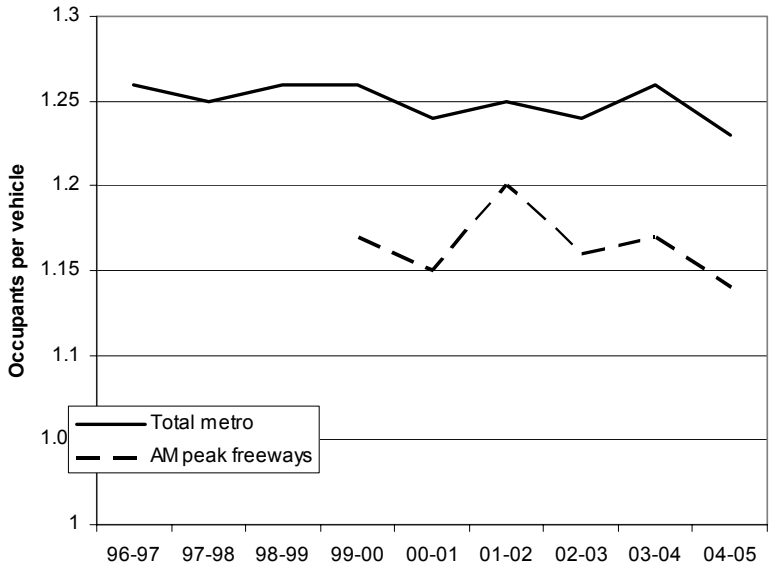
transport mode share doubled and car occupancy rates increased (see *(2)* below), it is reasonable to expect road congestion levels to drop by about 10% in 2020. This would reduce GHG emissions by about 2.9Mt CO_2e.

Overall, then, the achievement of 20/2020 would thus deliver reductions of about 3.8 Mt CO_2e in 2020 (3.2+2.9-2.3 = 3.8).

(2) Increase in Metro Car Occupancy Rates

Car occupancy rates are very low in Australia (averaging only 1.23 persons per car in metro Melbourne, 1.26 in Sydney and Adelaide), a matter that receives scant attention in transport planning or policy discussions. The chart below shows car occupancy rates are certainly not increasing, and may be on a decline in Melbourne.

Melbourne car occupancy rates



Source: VicRoads

This low occupancy rate is partly a function of Australia's low density urban and regional structure but is also influenced by a lack of comprehensive road pricing.

If road users were confronted by the full marginal social costs of their travel choices, car use would drop, with increasing occupancy rates being one outcome. A greater emphasis on providing priority in road access for high occupancy vehicles (HOV lanes), with much stricter enforcement of access compliance conditions, would also encourage higher occupancy rates.

A 10% increase in average car occupancy rates would cut GHG emissions in 2020 by about 3.6Mt CO_2e, a broadly similar impact to the 20% mode shift on car GHG emissions (reflecting the ~90/10 mode shift balance between car/PT at present).

(3) Reduction in Road Freight Mode Share/Improvement in Road Freight Efficiency

Road freight emissions are projected to grow by about 41% by 2020 without further intervention. This increase can be lowered by growing the rail freight mode share and by further improving road freight efficiency.

To improve its modal share, Australia's rail freight network requires significant investment, including the fast tracking of inter-modal hubs around our cities. We also need to invest in inter-city freight rail routes. The following chart shows average greenhouse emission rates for major Australian inter-city freight corridors by inter-modal means (i.e. primarily rail), articulated trucks and B-double trucks.

Average greenhouse emission rates on major Australian freight corridors

Source: Queensland Rail, 2002

We also need to be much smarter in how trucks are utilised. For example, around half the available container slots of trucks travelling through the Port of Melbourne are empty, and three quarters of containers in Melbourne are shuffled unproductively between depots.

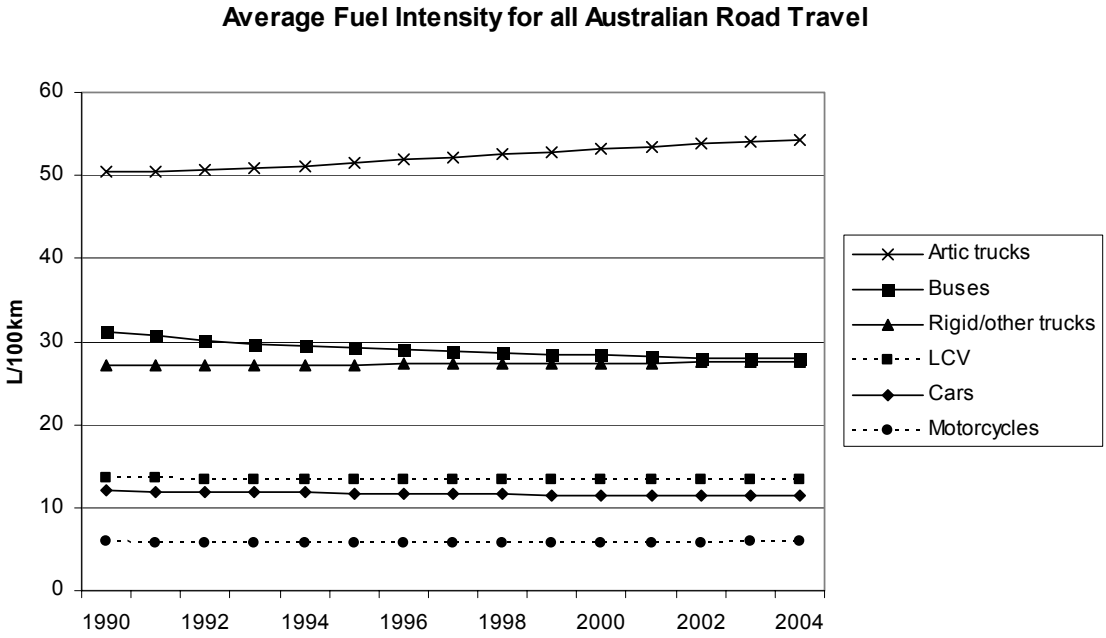
A ten percentage point reduction in the fuel requirement for road freight, either because of an improvement in road freight efficiency or loss in road freight mode share to rail (fuel efficiency improvements are dealt with separately below), would reduce GHG emissions in 2020 by about 3.6Mt.

The implementation of a comprehensive road pricing system in Australia would assist in driving this outcome for freight. Under road charging arrangements introduced by the (then) National Road Transport Commission, trucks are only charged the road damage costs attributed to their road use (via an averaged charging formula). Other external costs of road use are ignored but can be very substantial. Adding these external costs (e.g. air pollution, congestion,

noise) into the charging equation would drive much closer scrutiny of logistics arrangements.

(4) Improved Fuel Efficiency

BTRE (2005) research shows the overall fuel intensity of Australian road transport has not changed much in recent times. The following chart shows average fuel consumption in Australia for various vehicle types.



Source: BTRE 2005, table A14, p 92

Average fuel economy for cars has fallen from 12.02 L/100 km to 11.38 L/100 km over this 14 year period, a reduction of a bare 5.3%. For light commercial vehicles, the reduction was even less, at 1.8% over the 14 year period. Rigid and other trucks actually increased their average fuel intensity from 27.12 L/100 km to 27.54 L/100 km and articulated trucks increased from 50.54 L/100 km to 54.31 L/100 km. Changes in the vehicle mix within individual categories influences this outcome and performance would be slightly better when assessed in terms of MJ per tonne km but aggregate fuel economy performance has made little contribution to lowering the GHG emissions from road freight.

A 10% reduction in average car/truck fuel use per 100 km across the board (beyond those used in the AGO (2006) and BTRE (2005) projections) would lower GHG emissions in 2020 by about 7.5 Mt CO_2e, once allowance is made for the changes already included above. The base case scenarios used in AGO (2006) and BTRE (2005) assume an 8% reduction in average fuel intensity between 2005 and 2020. The further 10% drop proposed in this note would mean a 17% total reduction in fuel intensity between 2005 and 2020, or about 1% per year. This seems quite modest but, in view of the aggregate performance cited above for the 1990 to 2004 period, mandatory fuel efficiency standards may be needed to deliver this outcome.

Overall

Adding the four elements together produces a reduction in GHG emissions of over 18 Mt CO_2e by 2020, as shown in the table.

Possible Road Transport Initiatives for Greenhouse Gas Emission Reductions

Initiative	**GHG Emission Reduction at 2020 (Mt CO_2e)**
Increased PT mode share in capital cities	3.8
Increased car occupancy rates	3.6
Improved freight efficiency/lower truck mode share	3.6
Improved fuel efficiency	7.7
Total	**18.7**

This reduction is a little above the target reduction of 17 Mt. Each individual target is feasible, provided there is the political commitment to drive change (e.g. through implementing initiatives such as comprehensive road pricing, tougher fuel efficiency standards and giving public transport and high-occupancy cars greater on-road priority) and community belief that such change is essential, as is needed to produce significant behaviour change.

Concluding Comment

The Stern Report (Stern 2006, Annex 7.c) has argued that

> *Transport is one of the more expensive sectors to cut emissions from because the low carbon technologies tend to be more expensive and the welfare costs of reducing travel are high.*

This is too pessimistic a view on response possibilities, perhaps focusing too closely on the technological dimension. Implementation of externality charging in road transport, supported by improved travel alternatives, can drive significant behavioural changes. Social change programs in areas like waste recovery/recycling and water conservation have shown that consumers can make substantial changes in behaviour when persuaded of the need. These possibilities provide a source of optimism that transport can respond positively, significantly and at a relatively early stage, reinforced by carefully targeted regulatory pressures (e.g. on fuel efficiency targets).

Technology has not contributed much to transport emission reduction over the period since 1990, as indicated earlier in this note, especially when changing vehicle purchase patterns are recognised. Much greater contributions from the technology front will be needed to drive pursuit of longer term emission targets, to complement the early contribution from behaviour change.

Behaviour change should be the early focus for progress in emission reduction. The time-phasing of strategies to reduce emissions does not mean, however, that technological change can wait another day. Product life cycles are such that early actions on technology are needed to deliver significant medium to long term pay-offs.

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4.5 Indigenous communities

Ms Olga Havnen

Deputy CEO
Northern Land Council

The presentation Olga Havnen gave at the Equity in Response to Climate Change Roundtable, 'Equity in response to climate change: an Indigenous perspective', is available via the internet at <http://www.bsl.org.au/pdfs/Havnen_Indigenous_perspective_equity&climatechange.pdf>

5 Appendix

List of participants

Ms Esther Abram, Sustainability Program Consultant
Mr Richard Anderson, Co-Chair, Natural Resources & Conservation League
Mr Jeff Angel, Total Environment Centre
Dr Hans Baer, University of Melbourne
Ms Rosemary Bissett, Corporate Social Responsibility, National Australia Bank
Dr Peter Christoff, Senior Lecturer in Planning, University of Melbourne
Mr Peter Davidson, Policy Officer, ACOSS
Mr Gavin Dufty, Social Research Policy Officer, St Vincent de Paul
Ms Elissa Freeman, Public Interest Advocacy Centre
Mr Gordon Gregory, CEO, National Rural Health Alliance
Mr Brad Halse, Salvation Army
Ms Liz Hanna, Public Health Association
Mr Mike Hill, WestWyck Pty Ltd
Dr Kumi Kato, University of Queensland
Mr Tom Keenan, Manager Customer Advocacy, Origin Energy
Mr David Keirin, Union Solidarity
Ms Sky Laris, Climate Institute Australia
Mrs Noela MacLeod, President, CWA Victoria
Dr Robyn Mason, Secretary General, Australian Medical Association
Mr Ian McPhail, Commissioner for Environmental Sustainability, SAGES, University of Melbourne
Ms Eleri Morgan-Thomas, Mission Australia
Mr Steve Mullins, ACTU
Ms Kerry O'Connor, Policy Officer, Consumer Utilities Advocacy Centre
Mr Alan Pears, Co-Director, Sustainable Solutions
Dr Russell Peel, Vice President, Health Safety Environment, Fosters Group Limited
Ms Trish Phelan, Environment Victoria
Mr Frank Quinlan, Executive Director, Catholic Welfare Australia
Mr Gordon Renouf, Choice
Ms Monica Richter, Sustainability Manager, Australian Conservation Foundation
Mr Andrew Rimington, Senior Policy Adviser, VECCI
Ms Petria Rowe, Dusseldorp Skills Forum
Mr Jonathan Russell, Manager of Social Marketing and Research, Sustainability Victoria
Mr Michael Spencer, CEO, Forest Stewardship Council Australia
Mr David Spratt, Carbon Equity Project
Dr Janet Stanley, Brotherhood of St Laurence
Mr Roger Taylor
Mr Gerald Thomas, National Welfare Rights Network
Ms Anne Turley, CEO, Melbourne Citymission
Mr Basil Varghese, Brotherhood of St Laurence
Mr Tony Westmore, Policy Officer, ACOSS
Mr Terry White, Central Victorian Greenhouse Alliance
Ms Gabrielle Williams, Advisor, Department of Victorian Communities
Ms Frances Wood, Policy Officer, Energy and Water Industry Ombudsman Victoria
Dr Mark Zirnsak, Social Justice Director, Uniting Church Synod of Victoria and Tasmania

List of speakers and chairpersons

Mr Alex Arbuthnot, VFF Land Management Committee

Dr Simon Batterbury, SAGES, University of Melbourne

Mr Jim Betts, Director of Public Transport, Department of Infrastructure

Dr Peter Brain, Executive Director, National Institute of Economic and Industry Research

Ms Irina Cattalini, Director Social Policy, WACOSS

Mr Jim Downey, CEO, Moreland Energy Foundation Ltd

Ms Christine Forster, Deputy Chairperson, Victorian Water Trusts Advisory Council

Mr Paul Gilding, CEO, Ecocorp; CEO, Easy Being Green

Ms Alex Gordon, Strategies Director, Australian Conservation Foundation

Dr Donna Green, CSIRO Sharing Knowledge Project

Ms Olga Havnen, Deputy CEO, Northern Land Council

Mr Don Henry, Executive Director, Australian Conservation Foundation

Mr Chris Loader, Manager of Transport Planning and Policy, Bus Association Victoria

Mr Tony Maher, National President, CFMEU

Mr Tony Nicholson, Brotherhood of St Laurence

Dr Gill Owen, Senior Research Fellow, CMUR, Warwick Business School, UK; Policy and Regulation Adviser, Renewable Energy and Energy Efficiency Partnership

Professor Barbara Pocock, Director, Centre for Work + Life, University of South Australia

Mr Ian Porter, Sustainability Strategy Director, Department of Sustainability and Environment

Mr Michael Raper, Director, National Welfare Rights Network

Ms Julie-Anne Richards, Coordinator, Climate Action Network Australia

Mr Andrew Rimington, Senior Policy Advisor, VECCI

Mr Justin Sherrard, Principal, Cambiar

Ms Cath Smith, CEO, VCOSS

Dr John Spierings, Dusseldorp Skills Forum

Mr Alan Tate, Principal, Cambiar

Mr Cam Walker, National Liaison Officer, Friends of the Earth

Mr Mark Wootton, Director, Green Building Partnership