Friends of the Earth Australia

Submission to the Productivity Commission Inquiry on Energy Efficiency

Friends of the Earth Australia (FoE) recognises that climate change is an environmental issue with clear implications for human rights and human health. We recognise that climate change is caused by dangerous over production of greenhouse gases and is driven by systemic inequalities in global resource allocation and use. We aim for a global solution to the threat of climate change based on a fair share of sustainable resource use for all people.

(from the FoE Australia position paper on Climate Justice)

Introduction

FoE welcomes the invitation to comment on the Productivity Inquiry into Energy Efficiency. As can be seen in the above policy statement on Climate Justice, we believe the just and sustainable use of natural resources to be a key tenant to national and international responses to climate change.

As FoE is ultimately focused on the need to reduce greenhouse gas emissions, and therefore the organisations primary concern is energy efficiency applications to stationary energy generation and use. In 2002, stationary energy accounts for 48% of Australian annual greenhouse gas emissions, being the greatest single source of greenhouse gas emissions[1]. In particular, FoE further identifies the states of New South Wales, Queensland and Victoria as being responsible for 77% of the national consumption of stationary energy in 2001/02[2], and therefore should be the target of considerable action on energy efficiency. Considering the growing rates of consumption coupled with the grave nature of climate change this should be the primary focus for policy development as the stationary energy sector is recognised as extremely greenhouse emissions intensive.

To reflect FoE's areas of concern, we have focussed our submission on two key areas:

- Section one: assessing economic costs of climate change
- Section two: maximising end-use energy efficiency potential.

[1] National Greenhouse Gas Inventory (2002) Energy: Stationary sources and fugitive emissions. Fact Sheet 1. available from http://www.greenhouse.gov.au/inventory/2002/facts/pubs/01.pdf.

[2] ABARE "Australian Energy Statistics-Australian Consumption of Electricity by State-Gigawatt Hours 1960-61 to 2001-02"

SECTION ONE: Assessing Economic Costs

The terms of reference for the inquiry are "to the economic and environmental potential offered by energy efficiency improvements which are cost-effective for individual producers and consumers" (from the Issues Paper). The issues paper then proceeds to focus on the economic costs of implementing energy efficiency programs and technology. This is a very narrow perception of cost, as there is no recognition of the cost of *not* implementing energy efficiency and the subsequent abatement of greenhouse gas emissions.

Whilst the terms of reference for this inquiry exclude comment on climate change policy, it is no realistic to disassociate energy efficiency as a climate change mitigation strategy. Therefore discussion of climate change is necessary to rationally assess the benefits of energy efficiency.

Globally, trends show that the number of natural disasters in the 1990s has increased threefold since the 1960s, with economic costs of these natural disasters has increased 900% in the same period[3]. In December 2003, one of the world's largest reinsurer, Munich Re, reported a record cost of 13 billion dollars as a result of the extreme heat of the European summer[4].

> Exceptional individual events of the past year like the heat wave again provided strong indications of climate change. They show that new types of weather risks and greater loss potentials must be reckoned with in the future...Dr. Gerhard Berz, Head of Munich Re's Geo Risks Research Department: "We will have to get used to the fact that hot summers like the one we had in Europe this year must be expected more frequently in the future. It is possible that they will have become more or less the norm by the middle of the century. The summer of 2003 was a "summer of the future", so to speak. For many years we have been warning about the elevated danger of heat waves and the associated problems and risks. Warmer summers mean a rise in the intensity and frequency of severe weather events."
>
> (Munich Re Media Release 29 December 2003 http://www.munichre.com/default_e.asp)

In 1998, 700 'large loss' events made it the worst year on record at that time; 240 major wind storms and 170 floods cost $US89 billion in total economic losses[2]. 2002 and 2003 matched this figure of 700 natural hazards, totalling economic losses of $US65 billion in 2003[5].

Here in Australia, a recent briefing paper by the World Wildlife Fund found a trend of increasing intensity and frequency of extreme weather events resulting in an increase in economic losses. We have included below a detailed table from that briefing paper of the costs of natural disasters in a thirty-three year period from 1967 to 1999[6].

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[3] Mercer, D. 2000, A Question of Balance, 3rd edition, Federation Press, Sydney

4 Munich Re (2003) Detailed Munich Re study "Topics geo – Annual Review of Natural Catastrophes 2003" . Media Release 29 December 2003. Available at http://www.munichre.com/default_e.asp.

[5] Munich Re (2003) TOPICS geo. Annual review of natural catastrophes 2003. Available at http://www.munichre.com/pdf/TOPICSgeo_2003_e.pdf.

[6] WWF (2004) Climate Change: extreme weather events and its cost. Available at http://www.wwf.org.au/News_and_information/Features/feature14_extremeweather.pdf.

State	Floods	Severe Storms	Cyclones	Earthquakes	Bushfires	Landslide	Total
NSW	128.4	195.8	0.5	141.2	16.8	1.2	484.1
QLD	111.7	37.3	89.8	0	0.4	0	239.2
NT	8.3	0	134.2	0.3	0	0	142.6
VIC	38.5	22.8	0	0	32.4	0	93.6
WA	2.6	11.1	41.6	3	4.5	0	62.7
SA	18.1	16.2	0	0	11.9	0	46.2
TAS	6.7	1.1	0	0	11.2	0	18.9
ACT	0	0.1	0	0	0	0	0.2
TOTAL (million)	31.4	284.4	266.2	144.5	77.2	1.2	1087.5
Proportion Of total (%)	28.9	26.2	24.5	13.3	7.1	0.1	100

Source: BTE analysis of Emergency Management Australia (EMATrack) database (unpublished)

Climate change is an expensive experience for both economic damage and loss of life. The costs of natural disasters are generally borne by emergency services, humanitarian and health services and the effected community. Taking an international perspective, small island states of the Pacific and particularly atoll nations, are recognised by the Intergovernmental Panel on Climate Change as vulnerable to climate change. Contributing only 0.06% of the world's greenhouse gas emissions the 22 island nations of the Pacific are amongst those at extreme risk of increased frequency and intensity of cyclones and of course sea-level rises.

The case studies below detail the financial impacts of hailstorms in Sydney in 1999 and bush-fires in Canberra in 2002. The two case studies are based on AON disaster analysis of each event. It should also be noted that the AGO publication "Climate Change: An Australian Guide to the Science and Potential Impacts" records the increasing trend of "[e]xplosively developing cyclones" off the NSW coast in the in the period 1979 –99[7].

Case study one: Hailstorms Sydney 1999

(Excerpts from AON paper "Sydney Hailstorm 14 April 1999: Impact on Insurance and Reinsurance"[8])

Insured losses from the hailstorm that struck Sydney on Wednesday 14 April 1999 are projected to reach A$1.5 billion, making it the most damaging event in Australian insurance history easily exceeding the March 1990 Sydney hailstorm which cost the insurance industry an estimated A$385 million at current values. It is expected to become the largest insured loss from a single event in Australian insurance history, a record currently held by the December 1989 Newcastle Earthquake, for which the estimated insured loss in current values is A$1.1 billion.

[7] Pittock, B. (2003) Climate Change: An Australian Guide to the Science and Potential Impacts. Australian Greenhouse Office.

[8] Aon Australia. Reinsurance. Knowledge Index. Disaster Analysis: http://www.aon.com.au/pdf/reinsurance/Aon_Sydney_Hailstorm.pdf

The 14 April 1999 Sydney hailstorm was, in every respect, a rather unusual phenomenon. The maximum hailstone size, the resultant damage, the season and timing of the storm occurrence, as well as other circumstances associated with the storm development made this event exceptional.

The hailstorm occurred within a thunderstorm that formed to the south of Sydney and affected almost the entire eastern seaboard suburbs of Sydney. An area of severe hail, which was the primary cause of damage, extended from the airport to the central business district. Much of this hail was similar in size to tennis balls. One report suggested that the amount of hail that fell on Sydney during the storm was of the order of 500,000 tones. The thunderstorm was accompanied by strong winds and rain, the latter being a major cause of loss due to water damage to internal linings and contents.

At the time of writing (7 May 1999) claims reported to the Insurance Council of Australia total A$940 million, and it is expected that the final cost to the insurance industry will be over a billion Australian dollars. The table below shows the make up of the reported claims to date.

Reported Claims to 7 May 1999

Sector	**Amount**
Home claims/estimated cost*	32,000/$309 million
Motor vehicle claims/estimated cost*	43,000/$300 million
Commercial (retail and industrial)	3,000/$220 million
Aircraft (numbers not recorded)	$109 million

*The average assessed cost of repair of damaged homes appears to be about A$10,000 and of vehicles about A$5,000.

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Case Study Two: Canberra Bushfires January 2003

(Excerpts taken from AON paper "The January 2003 Canberra Bushfires"[9])

The Australian continent, and in particular the more densely populated southeast is in the grips of a severe drought fuelling to a greater extent the normal bushfire season. To date, the 'Canberra bushfires' are the worst ever to strike the Australian Capital Territory (ACT), destroying numerous houses in the western residential areas. Many commercial properties have also been destroyed or damaged. Consequently, the insured losses from this abnormally intense event are sure to be unusually high, with initial estimates of the insured loss suggesting it will be the second largest insured loss from bushfires in Australian history.

[9] Available at http://www.aon.com.au/pdf/reinsurance/canberra_bushfires_jan_2003.pdf

Estimates as at 30 January 2003 put the insured loss in the region of $250 million. This makes it the second worst bushfire insured loss in Australia and ranks this event among the top ten disasters in Australia since 1967. The worst loss occurred during the Ash Wednesday bushfires in 1983 (largely in Victoria and South Australia). An analysis of the region worst hit by the bushfires indicates that the insured values for both buildings and contents are considerably above average.

The Canberra losses include more than A$180m in domestic property losses alone. Commercial losses account for some A$40m including an allowance for business interruption, while motor losses have been evaluated so far as A$2m. Other specific large losses include state buildings, the Mt Stromlo Observatory and Timber plantations. There will also be an unspecified amount of losses to overseas insurers. The current estimate of the overall loss, broken down into the component portfolios, is given in table below of overall losses as at 30 January 2003.

Line of Business	**Estimated Loss (A$million)**
Domestic[a]	188
Commercial[b]	40
Motor	2
Other[c]	20
Total	**250**

a Including buildings, contents and additional living expenses. b Including an allowance for business interruption. c Includes mainly timber forests and farm losses.

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The above two case studies are based on assessments by the insurance industry alone and do not include the public appeals for victims of the Canberra bushfires or Sydney hailstorm. The 2003-2004 Commonwealth budget details $2.5 million in contributions to New South Wales, Victoria and Canberra Bush Fire Recovery Programs[10]. The $0.5 million allocated to Canberra bushfire recovery program was in addition to the pledge by the Commonwealth government to meet 50% of the financial hardship and distress payments made to effected individuals by the ACT government[11]. The ACT government spent nearly $30 million in supporting people, clean-up and rebuilding and additional fire fighting protection costs in the financial year ending 2003[12]. Almost half of this figure was spent on clean-up and rebuilding costs in the 2002-2003 period.

In 2003 the New South Wales Environmental Protection Agency have compared the severity of bush fire seasons from 1994 to 2003. The table below signifies a potential trend of increasing severity of a smaller number of bushfires over this ten year period[13].

	1994	1997	2001-02	2002-03
Number of fires	800	250	454	459
Duration (days)	17	16	30	151
Area burnt (hectares)	800,000	500,000	754,000	1,456,000
Perimeter (kilometres)	NA	NA	4,360	10,350
Number of Local Government Areas	35	20	44	81
Statewide total fire bans (days)	9	3	12	13

[10] see http://www.budget.gov.au/2003-04/bp2/html/expense-17.htm

[11] see http://www.pm.gov.au/news/media_releases/media_Release115.html

[12] see http://www.treasury.act.gov.au/budget/budget_2004/_srcfiles/paper3/18_bushfire_recovery.pdf

[13] see http://www.epa.nsw.gov.au/soe/soe2003/chapter6/chp_6.5.htm

Whilst we are discussing the issue of the cost of climate change it is pertinent to recognise that global assessment of economic loss is likely to be underestimated, as insurance is not a comprehensive measure of loss from natural disasters. Insurance figures can however, provide some indication of the economic cost of climate change, particularly in light of the trend of increasing annual costs. A more comprehensive analysis is out of the scope of this submission, but FoE believes it is possible to combine state, commonwealth, and private sector costs of natural disasters to establish an estimate of the cost of climate change. This is absolutely necessary if the Australian people, private sector and policy makers are to tackle environmental issues such as climate change with a 'triple bottom line' analysis of costs and benefits.

The majority of private property owners and the commercial sector in Australia would have insurance and therefore the security of this financial safeguard in times of natural disaster. There are many people, subsistence workers and farmers, small businesses and social enterprises that do not have the luxury of insurance. Yet the developing world, hosting 80% of the world's population, contribute approximately 36% of the world's carbon emissions. This equates to approximately 0.5 tonnes per capita. In the developed world, a conservative estimate is that we contribute the equivalent of 2 tonnes per capita. Climate change is a clear example of environmental injustice.

Climate Projections

The projected models of climate change present a range of potential scenarios that are dependent upon increasing scientific knowledge of climate sensitivity to CO_2 and other greenhouse gases. As the focus on this submission is on energy efficiency, a more detailed outline of climate projections are observed in Attachment A of this document. However is it extremely important to gain a comprehensive understanding of the benefits of energy efficiency as a strategy to mitigate climate change and therefore reduce the potential of the more socially, economically and environmentally 'costly' climate change scenarios.

In summary, climate change is likely to mean:

- Longer periods of hot dry weather,
- Shorter and more intense periods of rainfall,
- Possibly increasing frequency of extreme weather events,
- Increase in average temperature of between 1 and 7 degrees by 2070 and
- Rise in sea-level, which when combined with coral bleaching means greater storm surges in coastal areas.

All of these projections are likely to bring social, environmental and economic costs to the Australian community that must be considered when assuming a cost-benefit analysis of energy efficiency. The longer we delay and do not adequately address the barriers to uptake of energy efficiency, the greater the cost of climate change is likely to be. A detailed presentation on climate change impacts is also presented in the CANA submission to this Inquiry.

Need for Government intervention

It is essential that governments act on climate change and in this case on effective energy efficiency policy development. In Australia, the Clean Energy Future for Australia report concluded that: "*The barrier to …* [a 50% reduction in carbon dioxide emissions from the stationary energy sector by 2040] *is not that the clean technologies cannot produce enough energy at relatively affordable prices, nor is it that the cleaner fuels are not available. The barrier is a lack of*

achievable policies and strategies for facilitating the transition to new fuels and commitment by decision-makers."[14]

Energy requires government intervention to regulate industry, monitor activities and represent end-users interests to ensure that many negative externalities that arise from trading energy are not neglected. Market-based mechanisms alone will not ensure energy efficiency measures are implement at their full capacity While some commodities are traded in a market environment energy should not be, this is in part due to its abstract nature making it hard to measure and thus difficult to trade and also due to the complex array of negative externalities that society must burden.

Markets also do not prioritise social and environmental protection above economic gain. Conversely, governments have a responsibility to intervene when market activity result in socially and environmentally deleterious outcome. Climate change is obviously socially and environmentally detrimental, and due to the time-lag of greenhouse gas emissions in the atmosphere, our emissions today will greater a pollution legacy for future generations. In embracing the precautionary principle and principle of intergenerational equity as was done at the Rio Earth Summit – governments have a clear obligation to act on energy efficiency.

Australia is significantly behind international standards. According to the International Energy Agency, Australia's energy efficiency has improved at half the rate of the rest of the world since 1973[15]. This is a clear indicator that a technologically advanced nation such as Australia needs government intervention to ensure that our energy efficiency performance is comparable to international standards.

[14] Saddler H, Diesendorf M, Denniss R (2004), **A Clean Energy Future for Australia**. WWF Australia, Sydney. (http://www.wwf.org.au)

[15] Keynote address by Minister John Mickel (Queensland Minister for Energy) at National Appliance and Equipment Energy Efficiency Committee Forum 26 October 2004, Brisbane

SECTION TWO: Maximising End Use Efficiency

Quantifying end use energy efficiency's potential contribution is difficult, as arguably retailers will also pursue supply-side abatement options to maximise cost competitive benefits. Therefore we primarily focus in this section on end-user options due to the poor structure of current policies that target end-users.

Pricing

As a member of the Climate Action Network Australia, FoE is equally concerned with the simplistic view in the Issues Paper that "other things being equal, an increase in the price of energy can be expected to lead to a decrease in consumption, particularly over the medium to long term". This is because it:

- Doesn't address the difference in price elasticity per customer class. For instance, households with higher levels of discretionary income may simply absorb a price increase.
- Doesn't take into account the barriers to demand management that needs to be overcome to avoid paying higher prices. For instance, a business may not be able to afford the upfront costs of replacing a major energy-using piece of equipment.
- Doesn't take into account tariff structures, where energy consumed is only one part of a bill. Currently low consuming energy users are disadvantaged in the market place by high set charges that are not based on consumption levels, such as service to property charges.
- Doesn't take into account issues of social equity. Low-income households are typically locked into energy inefficient housing with limited control over their major appliances. They frequently respond to price by rationing of energy, leading to loss of lifestyle and poor health.

In terms of pricing, FoE supports the CANA position: To increase the cost of energy so that it includes or more closely represents negative externalities. The extra revenue directed to a demand management fund and to socially beneficial programs to reduce the costs of energy for low income and disadvantaged households.

FoE also calls for a review of tariff structures to identify and eradicate built in biases towards higher consumption, such as declining block tariffs and high set service to property charges. These structures undermine energy efficiency measures by enabling those who use more energy to pay less. To allow energy efficiency markets to develop quickly to their full potential this tariff structure must be reversed.

Energy conservation needs to be more clearly addressed. Primary or secondary energy conservation should not be seen in a negative light by the Productivity Commission, as there are many positive externalities that arise: Firstly, reduced direct energy usage can and would often be subsidised quite efficiently by added labour. Secondly, energy conservation potentially offsets (temporarily or possibly permanently) the need for infrastructure investment and maintenance. Thirdly, society benefits from the conservation of greenhouse gas polluting fuels, including the reduce disruption by extractive industries to the direct environment. Considering significant issues of impacts on cultural heritage conservation, this is an additional advantage for indigenous and non-indigenous communities.

Levies and Taxes

FoE recognises that Australia is moving towards a service base economy, and thus reducing energy consumption as we more away from energy intensive industrial processes. However, there still remain perverse state and federal subsidies in place that compromise Australia's transition to an energy efficient country and economy. Supporting energy intensive industries that offer minimal environmental, economic and social benefits should not be a priority for Australia.

> "Growth in energy consumption in Australia closely follows trends in aggregate economic growth and out-put from key energy intensive manufacturing and minerals processing sectors such as iron and steel, cement, paper and pulp, aluminium, alumina and LNG."[16]

For example, the Aluminium smelting industry consumes almost 15% of Australia's electricity generation, yet contributes a measly 0.15% of the GDP or around $1 billion. Subsidies that encourage this type of activity are estimated at $210 to over $250 million a year.[17] Further concern is the fact that the manufacturing sector is changing its fuel mix from liquid fuels to electricity a 4.3% per year or 5% per year for aluminium.[18]

FoE recommends all perverse subsidies to energy intensive industries are directed into a demand management and energy efficiency fund immediately. This fund should leverage support for industry to implement energy efficient actions reported by auditing. Failing this a review should evaluate the cost and environmental and social effectiveness of energy intensive industries.

Demand Management

To date energy supply has been viewed as the economy engine, this is apparent in energy consumption per capita between OECD countries where Australia ranks 9th[19]. The non-transport energy sectors demonstrate high environmental impact and relatively small contribution to employment and the economy, with Australia the highest greenhouse gas emitter of Annex I nations[20]. Many countries, notably China have demonstrated a move away from 'energy engine' approach by implementing various strategies to break the link between energy and the economy.[21] FoE recognises demand management is a key tool in a smooth and progressive change towards a low carbon intensive economy by means of energy efficiency.

Role of Energy Efficiency in Responding to Peak Demand

FoE acknowledges the change from winter peaking to summer peaking in states that participate in the National Energy Market, primarily due to the position of energy suppliers as energy sales agents who advocate air conditioning recklessly.

Furthering this problem is tariff structures that hide the 'time of day' cost of electricity transmission and distribution. FoE's concerns are that analysis of economic potential of energy efficient and peak energy efficiency measures based on current tariff structures and payback periods will

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[16] ABARE (2004) *Energy in Australia 2004*.

[17] See the AGO *Submission to the CoAG Energy Market Review,* 2002 and the Australia Institute *The Aluminium Smelting Industry - Structure, market power, subsidies and greenhouse gas emissions,* 2002.

[18] ABARE : Trends in Australian Energy Intensity 1973-74 to 2000-01

[19] Globalis (2004) http://globalis.gvu.unu.edu/

[20] Turton, H (2004) *Greenhouse gas emissions in industrialised countries: Where does Australia stand?.* The Australia Institute. www.tai.org.au.

[21] Pears, A. Green, D. (2003) *Policy Options for Energy Efficiency in Australia.* ACRE

significantly under estimate potential. FoE advocates that setting tariffs that maximise energy efficiency potential should be a priority. Analysis also need to account for costs that are shared through the whole community as a result of higher prices for electricity that low peak customers have to meet. FoE recognises the necessary support for demand side measures, priority should be given to energy efficient measures that reduce consumption overall, not just at peak times. Due to the competitive nature of the large-scale supply industry it is recognised that minimal financial assistance is needed, as their interests are already over-represented relative to the demand side management.

Furthermore FoE recognises the uniformity of tariffs hides the cost of electricity from consumers during peak times. This information asymmetry has skewed economic analysis negating the possibility of lowest cost evaluation at all levels. Furthermore FoE is concerned that externalities have not been included in costs to date due to the difficulty of quantifying these externalities, however this difficulty is unacceptable as a reason to neglect costs.

Demand management actions must include:

- Programs to encourage the increased take up of passive cooling measures, increasing the efficiency of air conditioning systems through MEPs, interval metering with time of use tariffs,
- Strict building requirements before installation of air conditioners and heaters,
- Correction of information asymmetry arising as a result of tariff structures,
- Regulating the capacity of domestic air conditioners,
- Installation of remote control technology to enable customers to be switched off for a short time each hour at peak times and
- Programs which retrofit existing air conditioning units to increase their efficiency.

Time Of Day Pricing (TOD)

FoE's supports the CANA position, being concerned with social inequality and infrastructure requirements resulting from the shift from winter peak to summer peak demand as detailed above. TOD pricing is a valid tool in elevating distortions in current tariff structures, ensuring those who place peak demand upon the electricity system resulting in higher maintenance and capital expenditure bare the costs. FoE is concerned that too much focus has been placed on peak demand, as peak demand reductions will have minimal effect on net greenhouse emissions. FoE wishes for the issue to be dealt with swiftly addressing social inequalities, to make way for more robust demand management measure that will result in significant energy savings.

FoE strongly supports TOD pricing that occurs over a significant period of time (several months or seasonal) as it has the potential to make significant net greenhouse gas reductions by reducing energy consumption. FoE agrees with CANA in that,

> "TOD pricing reduces market distortions by removing information asymmetries enabling users to make informed decisions on the true costs of their actions. Pricing as an action alone has limitations and TOD pricing could further disadvantage low-income customers. Therefore TOD pricing should be incorporated as part of a package that encompasses information campaigns and mandatory building and appliance standards, and programs to increase energy efficiency for disadvantaged customers."

FoE calls for social obligations to be put in place to ensure people who need to use lots of peak electricity due to health or who live in poor quality housing are not disadvantaged. FoE also suggests that the success of TOD depends on a large roll out of remote control metering technology to make it economically feasible, that meters are user friendly and offer useful

information. In addition, clear information campaigns will be required to demonstrate need for such tariffs and build public support.

Cost Reflective Pricing (CRP)

FoE is concerned that the true costs of electricity are invisible as result of the current tariff system. Not only do tariffs exclude costly externalities, such as impact of polluting fossil fuels on the health system and increased natural disasters as a result of climate change; tariffs also 'smear' pricing across all customers which results in low users subsidising high users, as well as users close to generators subsidising those further away. The tariff system is in need of reform to remove information distortions and offer incentives to implement demand side management and energy efficiency improvements.

Tariff reforms, if implemented correctly to include some qualitative measure of externalities will remove market distortions. However pricing alone has it limits, and thus CRP must be accomplished by larger, comprehensive policy framework that reduces other key barriers and offers incentives to demand management.

CRP should be part of a comprehensive framework to improve energy efficiency provided:

- Lower income customers receive support to identify and implement energy efficient actions
- Tougher and smarter mandatory building and appliance standards are in place
- Support is given to educate and implement energy efficiency actions in all sectors
- In is inclusive of externalities resulting from electricity generation, transmission, distribution and use

FoE strongly endorses the CANA analysis that:

> "CRP/LRP if implemented correctly, would improve reliability to rural sector through local generators become more cost effective options. Cost of electricity to urban areas could be reduced. To ensure that a rebound effect doesn't occur, a scheme could be put in place whereby savings are invested into a demand management fund to further support local generation and energy efficiency as well as support for low-income customers. This would improve the market for distributed/off-grid options either by energy service companies, or consumers and relive strain on the grid system, offsetting new infrastructure while pumping energy back to the grid at the edges – where its most needed, simultaneously boosting emerging industries."

FoE sees cost reflective pricing as a crucial step towards an economical, secure and sustainable energy mix.

Retail Sector

FoE sees one of the largest barriers of energy efficiency to have arisen from the transformation of the electricity sector into a market-based competition. As the front line in electricity sales, retailers have a responsibility to society. Currently their responsibility is being hindered, as they have become profit-maximising agents through an energy sales role as opposed to energy service providers. If energy efficiency potential is to be maximised it is imperative that far greater attention be given to retail design and end-use decision making.

Opportunities should be created for retailers to transform to energy service companies, through use of a demand management fund. This should catalyse realisation of opportunities to receive return for provision of energy services rather than energy sales. Furthermore specific

environmental and social objectivise need to be incorporated into processes of the new Australian Energy Regulator and the Australia Energy Market Commission to ensure that retailers operate to facilitate energy services – not energy sales.

Demand Management Fund

FoE recognises the importance of an innovative fund as a necessary mechanism in creating a long-term market for energy efficiency that is self-sustaining, while also providing good returns on investment in the short term.[22] Investors are usually unfamiliar with generating cash flow from reduced energy consumption. The key to creating a sustainable energy efficient market is to engage lending agents incrementally, overcoming traditional reluctance to new investment projects and building confidence in a new market.

It is anticipated that this fund would intervene via direct intervention (providing equity) and indirect intervention through the establishment and support of energy service companies. The fund should initially provide 100% capital to demonstrate the potential of projects, after which market certainty would be enhanced and investment not be reliant on fund provision. FoE concurs with recommended by World Energy Council[23] that:

- The fund start up time should be clearly defined,
- Government should introduce national banks and specialised investors into market and
- At the first stage lending institutes should be on low financial risk.

Licensing Conditions on Industrial Facilities

Due to the large energy consumption of the industrial sector, FoE requests industrial facilities be required to undertake regular energy audits, provide public reports and implement energy efficiency actions. A national register would be useful to easily identify trends in equipment and processes, while providing a useful tool for estimating and identifying the potential and scope of energy efficiency improvements for investors. This would provide additional information resources as identified by industry as having demonstrated energy efficiency benefits.

Energy Efficiency Targets

FoE recommends the adoption of a strong national target. Recognising the importance of having "specific, quantitative and meaningful targets"[24] to express political will and measure overall progress against. It also provides clear indicators for market, necessary for the successful uptake of a comprehensive energy efficiency program. An overall target must be accompanied by highly sector specific targets that have well designed meaningful physically measurable indicators.

FoE is concerned that:

- Estimates of economic potential based on current cost-effective options greatly under report energy efficiency opportunities. The IEA note that what is cost effective is actually an elastic concept that depends on policy and market environment.[25]

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[22] World Energy Council and ADEME (2004) *Energy Efficiency: A Worldwide Review – Indicators, Policies, Evaluation*.

[23] as above

[24] Harrington (2004) *Energy efficiency – the role of government in an international perspective.* IEA Expert Workshop on Energy Efficiency Frontiers.

[25] Harrington (2004b) *Potentials and Policy*. IEA Workshop on Energy Efficiency: Past Development and Future Potential.

- A national target may be based on economic potential, rather than to drive energy efficient market and opportunities.
- Analysis of what is financially appropriate for individuals has misclassified economic potential by using paybacks of a few years when options offer lower life-cycle costs than BAU. Analysis should be attempting to optimise societal outcome – factoring in all externalities.
- An inadequate target will not reduce energy consumption from present levels.

A national and highly specific sector targets should be designed to meet recommendations by the IPCC to avoid costly climate change impacts that are difficult to quantify and create a favourable environment for energy efficiency investment. In line with the Australian Government's *Energy White Paper* themes of economy, security and sustainability, less reliance on fuel equates to environment increases security and sustainability. Thus strong and sharp targets should be picked that will further decouple the economy from the environment. The IEA states the objective of a target should be to maximise energy efficiency in all sectors and cases while minimising lifecycle-costs for equipment and processes. [26]

Chief Scientist, Dr Robyn Batterham has stated the need for a long-term emissions target of 60% below 1990 levels by 2050. CANA member groups agreed that the medium term goal should be 20% below 1990 levels by 2020. To achieve this, requires proactive target to ensure that emission reduce by 3% per year in each sector including the stationary energy sector. Increasing the renewable energy generation to a minimum of 20% by 2020, and implementing energy efficiency targets to meet the 3% annual requirement in reduction in emissions can achieve these reductions.

FoE advocates maximum take-up of all energy efficient options that deliver least lifecycle cost energy services. While FoE recognised serious limitations of computer modelling due to input assumptions, an energy efficiency target should be based on a minimum of 100% take-up of average eight-year payback period scenarios in NFEE terms.

Education and provision of information

Information was identified through the NFEE consultation process as being a significant barrier to the uptake of energy efficiency. Whilst we will not replicate discussion and recommendations from the NFEE consultation process here, we will draw attention to a few significant issues:

1. Trades people and Retailer Training

As a member organisation of CANA, FoE also recognises a significant barrier to the uptake of energy efficient technologies is the lack of skilled tradespeople to install energy efficient mechanisms (including alternative energy and energy conservation) in the residential sector. Both appliance sales-people and tradespeople are key influence on the homeowners decision to purchase and install energy efficient (or inefficient) technology, however lack of knowledge of energy efficiency options is a barrier to wider uptake of these technologies.

The 'GreenPlumbers' scheme provides a comprehensive training and information dissemination model with proven community outreach outcomes. FoE recommends that expansion of scheme be considered. FoE supports CANA recommendations for a voluntary training scheme be established for registered tradespeople in electrical and plumbing trades, marketing services for residential and commercial sector. In addition, each major electrical retailer should be encouraged to have at least

[26] In Harrington (2004b), life-cycle energy costs are calculated by adding capital and discounted operating costs. The choice of discount rate is an area of major debate. In the view of many policy experts, a societal (low) discount rate is appropriate.

one salesperson complete accredited training on energy efficiency technology and be available to provide customers with quality information on energy efficiency benefits and options.

These programs should be reviewed to assess their effectiveness and consideration to creation of mandatory schemes be made.

2. MEPS needs labelling

MEPS to cover all appliances should be implemented in a timely manner given the rapid rate of growing electricity consumption particularly in urban households and around peak times. Priority **must** be given to appliance based on current and expected share of energy consumption. It is recognised that while MEPS removes poor performing products from the market it does not encourage adoption of the most efficient appliances, and therefore FoE encourages effective labelling and focussed information to maximise energy efficiency improvements.

Labels and mandatory requirements should be reviewed and updated regularly based on best performing appliances to provide a market drive to innovate energy efficient appliances. As recommended by the IEA standards should be based on life-cycle costs analysis as the minimum standard. FoE wishes to draw attention to the fact that the World Energy Council has recognised labelling and performance standards on the basis of the following outcomes:

- Enables authorities to benefit from low-cost energy savings
- Enables customers spend less on electricity
- Encourages manufacturers to improve their products and become more competitive against imported less efficient products.

In addition, labelling was the focus of considerable work in the National Framework for Energy Efficiency as an information tool. Labelling has the additional benefit of encouraging efficiency beyond potential minimum targets by enabling consumers to make informed choices efficiency advantages of appliance and technology efficiency.

Furthermore, financial incentives and information campaigns could accelerate adoption of specific appliances. A fee bate scheme would bridge the initial capital of more efficient appliance, by subsidising more efficient models with capital raised from the sales of lower efficiency appliances. Care should be taken to ensure that environmental and social costs are factored in. For example it is not rational to subsidise electric hot water heaters over solar water heaters. Alternatively support could be given for promotion of energy efficient equipment, promotion could pass through government channels.

Building standards

As buildings are recognised as our second longest-lived infrastructure to transport infrastructure, the energy efficiency of built assets is of the upmost importance. To date energy inefficient buildings have been the norm, and thus there is a huge energy efficient potential. We recognise that this issue was included in the Stakeholders Consultation Report for the National Framework for Energy Efficiency.

In FoE supports a range of measure including:

- The development of a strategic framework through which national standards can be established that increase over time, which reflects environmental need to reduce pollution rather than economic constraints alone.
- Minimum five star energy efficiency standards for all new buildings in commercial and residential sector. These standards should be set on a life-cycle cost benefit estimate.

- Renovations and retrofits over $50,000 should be subject to energy efficiency audit and review, being required to achieve a minimum standard before energy efficiency be implemented.
- Evaluations of buildings for the above must consider the whole building system and integrate building equipment such as heating and air conditioning system, ventilation, water heaters and the embedded energy of particular materials should also be considered.
- Standards need to improve over time to ensure that there are no ceilings on building performance. FoE recommends a revision of standards every 3-5 years.
- Simulated performance needs to be verified, this information should be used to improve the simulated results.
- Energy Efficiency Carbon Trading (EECT) program should be approached with caution when it comes to the energy efficiency ratings of entire buildings, as it is difficult to quantify the energy savings given the number of unknowns. However building materials would be a perfect opportunity for EECT as their embedded energy in quantifiable.
- The government should set an example by obtaining the highest possible energy efficiency owned buildings. Pooling building together and evaluating energy efficiency improvement potential would represent an opportunity for investment of the demand management fund.

In conclusion FoE goes on to recommend:

- Set target required to meet necessary greenhouse gas reduction as recommended by IPCC.
- Acknowledgement of the need to include negative externalities in any economic analysis of energy efficiency.
- Increased funding to R&D of energy efficient and renewable technologies, and rapid deployment of sound solutions.
- Special consideration be given to customers affected by other energy efficiency policy to ensure appropriate support is given to identify and implement energy efficient improvements. Ensuring minimum disruption. Particularly to low-income customers.
- Tough MEPS and building standards in a timely manner, coordinated nationally as imperative measures in energy efficiency supported with information and behaviour awareness campaigns to overcome social barriers.

Appendix ONE: Synopsis of Climate Change Projections

Temperature

Simulated ranges of warming for Australia are shown in Figure 1. By 2030, annual average temperatures will rise between 0.4 to 2.0 °C over most of Australia, with slightly less warming in some coastal areas and Tasmania, and the potential for greater warming in the north-west. By 2070, annual average temperatures are increased by 1.0 to 6.0°C over most of Australia with spatial variation similar to those for 2030. The range of warming is greatest in spring and least in winter. In the north-west, the greatest potential warming occurs in summer. Model results indicate that future increases in daily maximum and minimum temperature will be similar to the changes in average temperature. This contrast with the greater increase in minimum rather than maximum temperatures observed over Australia in the 20th century.

A small change in the average temperature can have a large impact on the frequency of extreme events, such as cold winter days and hot summer days. CSIRO's modelling results for Australia indicate that future changes in variability are relatively small and the increases in average maximum and minimum temperature mainly determine the change in extremes.

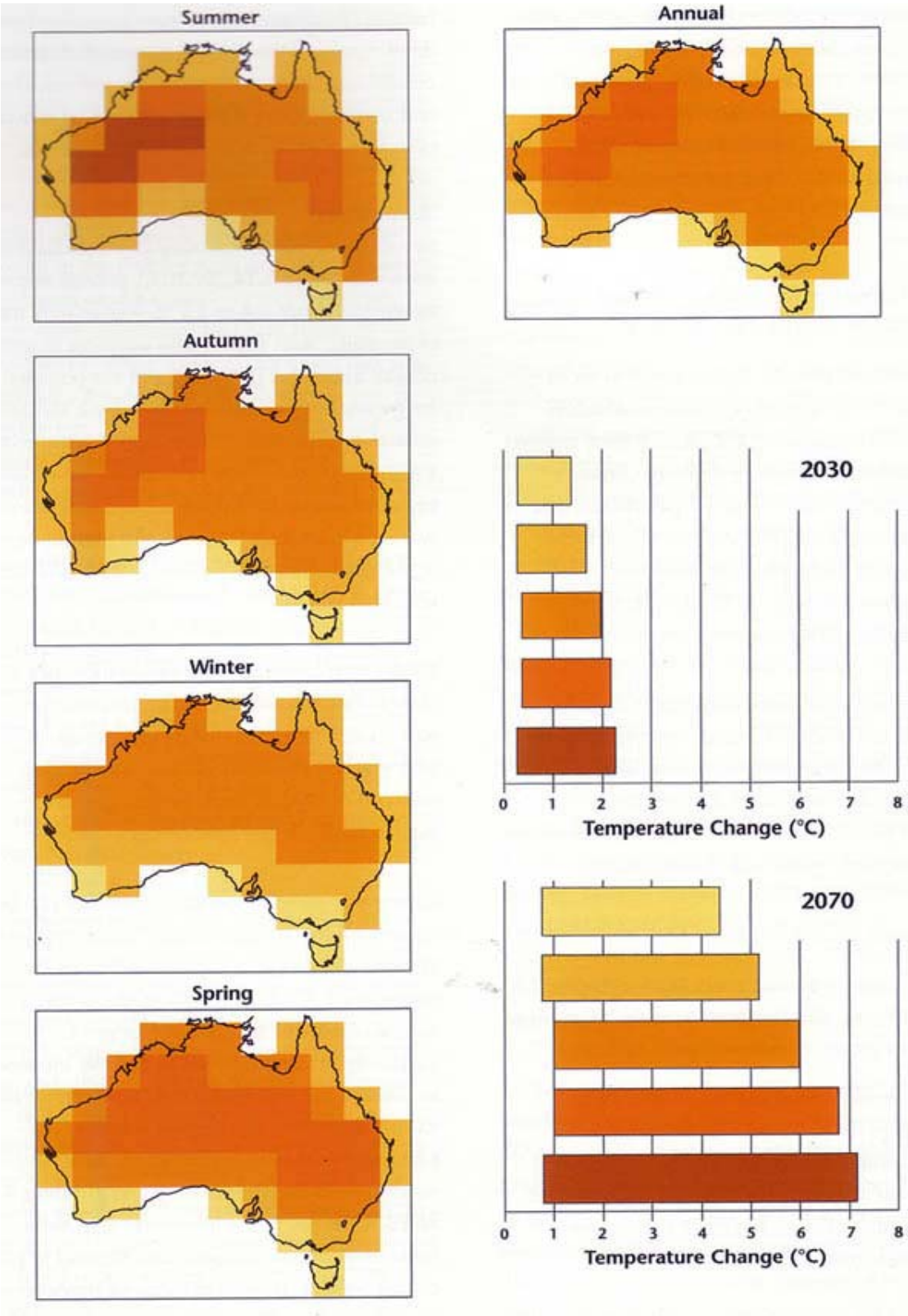
Table1: Summer days over 35°C

	Present	2030	2070
Hobart	**1**	**1-2**	**1-4**
Sydney	**2**	**2-4**	**3-11**
Brisbane	**3**	**2-6**	**4-35**
Canberra	**4**	**6-10**	**7-30**
Melbourne	**8**	**9-12**	**10-20**
Adelaide	**10**	**11-16**	**13-28**
Perth	**15**	**16-22**	**18-39**

Table 2: Winter days below O°C

	Present	2030	2070
Canberra (ACT)	**44**	**31-42**	**6-38**
Orange (NSW)	**38**	**18-32**	**1-27**
Launceston (Tas)	**21**	**10-18**	**0-14**
Tatura (Vic)	**15**	**6-13**	**0-9**
Wandering (WA)	**14**	**5-11**	**0-9**
Dalby (Qld)	**10**	**3-7**	**0-6**
Nuriootpa (SA)	**9**	**2-7**	**0-5**

Figure 1: Average seasonal and annual warming ranges (°C) for around 2030 and 2070 relative to 1990. The coloured bars show ranges of change areas with corresponding colours in the maps.



Rainfall

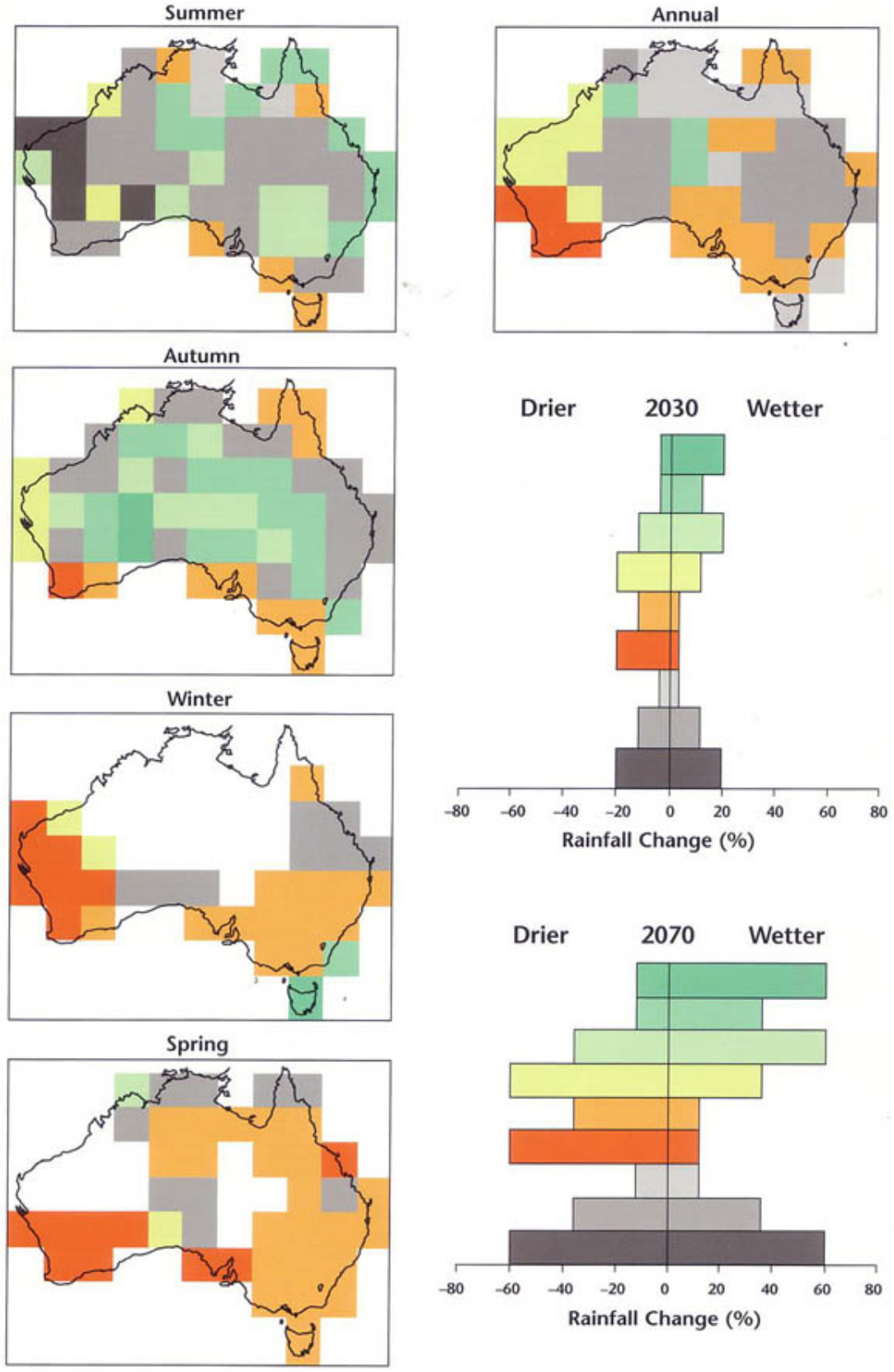
Figure 2 shows ranges of change in Australian rainfall for around 2030 and 2070. Projected annual average ranges tend towards decrease in the south-west (-20%to +5%by 2030, and -60%to +10%by 2070, rounded to the nearest 5%), and in parts of south-east Australia and Queensland (-10%to +5%by 2030, and -35%to +10% by 2070). In some other areas, including much of eastern Australia, projected ranges are –10%to +10% by 2030 and -35%to +35%by 2070.The ranges for the tropical north (-5%to +5% by 2030 and -10% to +10% by 2070) represents little change from current conditions.

In summer and autumn, projected rainfall ranges for most locations are –10% to +10% by 2030 and –35% to +35% by 2070 or tend toward increase (–10% to +20% by 2030 and –35% to +60% by 2070). The latter occur mainly in parts of southern inland Australia in summer and inland areas in autumn. In some parts of northern and eastern Australia in summer, and inland Australia in autumn, the tendency for wetter conditions is -5% to +10% by 2030 and -10% to +35% by 2070. However, for the far south-east of the continent and Tasmania, projected rainfall tends to decrease in both seasons (-10% to +5% by 2030 and -35% to +10% by 2070).

In winter and spring most locations tend toward decreased rainfall (or are seasonally dry). Ranges are typically -10% to +5% by 2030 and -35% to +10% by 2070. Projected decreases are stronger in the south-west (-20% to +5% by 2030 and -60% to +10% by 2070) while Tasmania tends toward increases in winter (-5% to + 20% by 2030 and -10% to +60% by 2070).

Where average rainfall increases, there would be more extremely wet years, and where average rainfall decreases there would be more dry spells (see the example below). Most models simulate an increase in extreme daily rainfall leading to more frequent heavy rainfall events. This can occur even where average rainfall decreases. Reductions in extreme rainfall occur where average rainfall declines significantly. Increases in extreme daily rainfall are likely to be associated with increased flooding.

Figure 2: Ranges of average seasonal and annual rainfall change (%) for around 2030 and 2070 relative to 1999. The coloured bars show ranges of change for areas with corresponding colours in the maps. Ranges are not given for areas with seasonally low rainfall because percentage changes in rainfall cannot be as reliably calculated or applied in such regions.



▪Impacts on bushfires
The calculations done by the experts, such as Malcolm Gill and Michael McCarthy, indicate that the bushfires of 1939 were roughly about a 1 in 2,000 year event, and if these fires we're having now approach the same sort of size, that means that we've had 2 1 in 2,000 year fire events in 70 years

The incidence of wildfire in Australia is expected to increase with global warming, and the number of days of extreme and high fire danger is expected to increase. Forest and grass fires are frequent in summer in Australia, sometimes causing loss of life and major property damage. An increased fire risk due to global warming may increase the associated costs.

▪Impacts on storms
CSIRO indicates that mid-latitude storms may increase in intensity, and their frequency and location may change as a result of changes in the westernlies and ENSO. Recent decades have seen a reduction in the numbers of mid-latitude storms to the south of Australia, but the intensity of these storms has on average increased. Climate models also indicate a future decrease in the number of storm centres over southern Australia but an increase in their intensity. These changes are likely to affect the coasts in the south-east of the continent that are vulnerable to shifts in wave direction and energy. Storm systems such as tropical cyclones and mid-latitude storms and their associated cold fronts are the main cause of storm surges. Storm surges in tropical Australia can be several metres in height due to tropical cyclones and a shallow continental shelf. The height of the storm surge depends on the storm intensity, storm size, forward speed, timing relative to the tides, shape of the coast and slower variations such as those due to ENSO. An increased intensity of storm surges is likely with climate change.

▪ Impacts on floods
A study of flood damage along the Hawkesbury-Nepean corridor of New South Wales has shown that, by about 2070, average annual direct damage could increase from the current value of $6.10 million to $23.2 million for the worst-case scenario. At present, the 1-in-100 year flood would cause failure of about 70 weatherboard dwellings and for the 2070 worst case scenario this rises to 1200 dwellings. These estimates do not include intangible losses such as illness and death, nor do they account for indirect losses including alternative accommodation in the residential sector or loss of trading profit in the commercial sector.

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