CHAPTER 5

ENERGY USE AND SUPPLY

> *… learning about energy efficiency should be as necessary in our society as the capability to swim, ride a bicycle, drive an automobile or operate an automatic teller machine.*[1]

Introduction

5.1 Emissions from the production and consumption of energy are the primary source of Australia's greenhouse gas emissions and emissions growth.[2] Overall, emissions from the energy sector (including transport) accounted for 79.6 per cent (362.9 Mt) of total national net CO_2-e emissions in 1998. This represents a 62.4 Mt CO_2-e (21.1 per cent) increase between 1990 and 1998, of which a quarter occurred in 1997.[3]

5.2 The energy sector of the NGGI is made up of stationary sources, fugitive emissions and transport. Stationary energy is the focus of this chapter and includes emissions from energy generation, energy used in manufacturing and construction, as well as the commercial and residential use of energy.

5.3 Stationary energy was the major contributor to emissions in 1998, at 56.8 per cent of total national emissions. Between 1990 and 1998, emissions in this sector increased by 24.3 per cent and, in the period 1997 to 1998 alone, increased by 7.6 per cent.[4]

5.4 This increase far exceeds the rate of increase of other sectors. Most of the increase in emissions in stationary energy is attributable to the generation of electricity, which has recorded an increase of 30.6 per cent since 1990 and 10.3 per cent since 1997.[5] This is a disturbing trend, and it is clear that constraining energy emissions will be a difficult task in Australia's abatement effort.

5.5 In 1998, the National Greenhouse Strategy (NGS) predicted that, without abatement action, energy emissions will increase by a further 64 Mt CO_2-e by 2010, and that assuming the effects of all current policies (including market reforms and the Greenhouse Challenge Program), emissions will increase by a further 28 per cent by

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1 Laurie Virr and Paul Hanley, Submission 199, p 1014.

2 'The national inventory accounts for emissions at the point of production, not consumption', Australian Greenhouse Office, *NGGI*, Fact Sheet 2, July 2000, p 4.

3 Australian Greenhouse Office, *NGGI*, Fact Sheet 3, July 2000, p 1.

4 Australian Greenhouse Office, *National Greenhouse Gas Inventory 1998*, p A-3.

5 Australian Greenhouse Office, *NGGI*, Fact Sheet 2, July 2000, p 4.

2010 - 20 per cent more than the overall increase allowed under Australia's Kyoto target.[6]

5.6 Even these predictions, made two years before the 1998 Inventory was completed, may be too conservative. The Electricity Supply Association of Australia has predicted that demand will rise by at least 53 per cent over 1990 levels by 2010, resulting in an emissions increase of 41 per cent by 2010. Pacific Power told the Committee that, if emissions were not constrained, the electricity industry would reach 150 per cent of 1990 emissions levels by 2010.[7]

5.7 Electricity emissions alone are responsible for half the increase predicted by the NGS between 1990 and 1998. Since the introduction of the National Electricity Market the emissions intensity of electricity generation has also increased. Given this and increasing consumption, it is possible that annual increases in the order of 15 Mt a year after 1997 will be the norm until at least 2010. This would see the 64 Mt increase predicted by the NGS exceeded by 2001, and an increase of 135 Mt, or 80 per cent of 1990 levels, by 2010. The only policies currently in place to address this are the mandatory 2 per cent renewables measure, which may reduce emissions by between 4 and 5.5 Mt by 2010, and efficiency standards for fossil fuel generation, which may reduce emissions by 4 Mt by 2010.[8] However, these reductions are small in comparison to projected increases.

5.8 Australia's high energy emissions are a legacy of two main factors: the high dependence on cheap domestic sources of fossil fuel, especially coal, and recent energy market reforms which have seen electricity generation based on the highest carbon-content fuels become the most price-competitive in the new deregulated market.

5.9 Since 1995, national energy markets have been subject to widespread microeconomic reform, which, while primarily designed to create greater competition and reduce costs, was also expected to deliver greenhouse benefits in addition to those flowing to consumers. However, the reforms have had many perverse outcomes including a dramatic increase in greenhouse emissions.

5.10 In theory, micro-economic reform is intended to open energy markets to greater competition, breaking down the market power of incumbents and thus creating opportunities for alternative fuels and technologies. However, the Committee heard much evidence that the new NEM discriminates against gas as a fuel and against the entry of new players and more sustainable technologies. It has also had the perverse

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6 Australian Greenhouse Office, *The National Greenhouse Strategy: Strategic Framework for Advancing Australia's Greenhouse Response*, 1998, pp 98-99.

7 Pacific Power, Submission 98, p 800; and Dr Robert Lang, *Proof Committee Hansard*, 22 March 2000, p 351.

8 Combined Explanatory Memorandum, *Renewable Energy (Electricity) Bill 2000/Renewable Energy (Electricity) (Charge) Bill 2000*, p 20; Mr Philip Harrington, *Proof Committee Hansard*, Canberra, 22 June 2000, p 696.

effect of making the most emissions-intensive fuel source - brown coal - the most price competitive.

5.11 During its inquiry, the Committee canvassed the views of a large range of energy players: consultants, generators, distributors and retailers, cogenerators, renewable energy generators, regulators and government officials. While offering a variety of views, they all agreed on the high emissions outcomes of current energy market changes and the importance of this sector both to the economy and to Australia's ability to meet its current and future commitments under the UNFCCC. Common themes which emerged from evidence were:

- the perverse effect of increasing competition in electricity markets which meant that the highest emissions intensity fuel sources (brown and black coal) were also the cheapest;
- the barriers to entry to less emissions-intensive fuels and forms of generation, particularly renewables such as wind and solar;
- the need for proactive research and development, commercialisation, and tax and investment strategies for renewable energy technologies, both to reduce domestic emissions and take advantage of substantial future export potential;
- problems in the pricing of transmission services, which were perceived to bias large remote generation at the expense of local or distributed sources such as cogeneration or small scale renewables;
- the way that current market conditions were encouraging inappropriate new capital investment, with a number of new coal-fired power stations being planned at the same time as plans for less emissions-intensive alternatives, such as gas, were being shelved;
- the potential impact of market distortions such as long term fixed price supply contracts; and
- the fears of some industries that increases in the cost of energy would undermine their position, particularly in relation to international competitors.

5.12 Witnesses also proposed and discussed a number of solutions and policies, although there was a diversity of opinion on the best options. Suggestions included:

- an expansion of existing voluntary programs such as the Greenhouse Challenge Program to take in more sources and energy players;
- the removal of market distortions such as fixed price contracts, biased transmission pricing, and grid-access problems for small-scale solar and other renewables;
- changes to transmission pricing to remove biases against cogeneration and distributed generation;

- the expansion of New South Wales' 'Green Power' program nationwide, under which consumers can pay a premium for electricity sourced from renewables;
- the introduction of a mandatory target for the sourcing of electricity generated from renewable sources (legislation was introduced in the Parliament in July 2000 to this effect and was being debated in the Senate as this report was tabled);
- the use of the taxation system, and grants for research and development, as a further spur to the development of renewable energy technologies;
- the use of Commonwealth environmental powers to promote wiser investment in power generation, possibly through the establishment of greenhouse emissions as a 'trigger' for Commonwealth environmental impact assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); and
- the introduction of a mechanism to price carbon, either through a carbon tax or a market-based system of tradeable emissions permits ('emissions trading'), which would have the effect of making less emissions-intensive and renewable generation more price competitive.

5.13 A range of existing local, state and Commonwealth programs also received comment, including, efficiency standards for power generation, licence conditions, renewable energy development and commercialisation programs, gas market reform, and energy efficiency and demand management.

Background to the Reform Process

5.14 Energy market reform began after the 1993 Hilmer National Competition Policy Review and a 1991 decision by the Council of Australian Governments (COAG) to improve competition in the energy sector. In 1995 the *Competition Policy Reform Act* established a new Part (IIIA) of the *Trade Practices Act* which provided a right of access to 'essential facilities' including national monopoly infrastructure such as electricity transmission and gas pipelines. In 1991 COAG agreed to replace distinct state electricity markets with a national electricity market (the NEM) and to separate monopoly and contestable elements. While Western Australia could not be interconnected to the NEM it also resolved to pursue reform.

Electricity

5.15 The basic principles underlying electricity market reform were that:

- generators should compete for the right to supply electricity (which it was hoped would reduce prices and accelerate other efficiencies);
- there should be open access to the grid for new generation (which would ideally allow for the introduction of new technologies and forms of power); and
- customers should be free to choose who supplies their electricity (which could also facilitate the take-up of less emissions-intensive power).

5.16 There were four key elements of electricity reform:

- industry restructuring through the separation of generation and retailing (which are to be open to new entrants and competitive pressures) from the 'natural monopolies' of transmission and distribution;
- the introduction of 'competitive neutrality' through the corporatisation of state and territory owned utilities, with the aim of placing them on equal footing with private sector competitors, subject to corporations law and other market constraints;
- price regulation (in advance of full customer choice of supplier) to ensure that legislated monopolies cannot exercise market power to the detriment of consumers; and
- the introduction of the NEM, which began operation in August 1998 with Victoria, NSW and the ACT, and South Australia from May 1999, will broaden to include Queensland in 2000 and Tasmania in 2002. Distance precludes the participation of Western Australia and the Northern Territory.[9]

5.17 The rules for the operation of, and participation in, the NEM are contained in the National Electricity Code (NEC), which is developed, monitored and enforced by the National Electricity Code Administrator (NECA). The National Electricity Market Management Company (NEMMCO) operates the physical market for electricity.[10]

5.18 The NEM incorporates state-owned and private sector utilities alike. Victoria privatised its electricity industry during the early 1990s for approximately $30 billion. Prior to the sale the State Electricity Commission of Victoria (SECV) was broken into ten separate retail, distribution and generation businesses and sold separately. These include the grid operator Powernet Victoria, the distributors CitiPower, Solaris, United Energy, Eastern Energy and Powercor, and the generators Loy Yang Power, Hazelwood Power, Yallourn Energy, Ecogen Energy and Hydro Victoria. In December 1999, South Australia began its privatisation program with the sale of the distribution and retail businesses of ETSA to the Hong Kong-based Hutchison Whampoa for $3.5 billion.[11]

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9 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, pp 8-9; and Ann Rann, *Electricity Energy Restructuring: A Chronology*, Australian Parliamentary Library Background Paper 21, 1997-98.

10 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p 10.

11 Ann Rann, *Electricity Energy Restructuring: A Chronology*, Australian Parliamentary Library Background Paper 21, 1997-8, pp 23-26; and Mark Skulley, 'SA sells power for $3.5 billion', *The Australian Financial Review*, 13 December 1999.

5.19 NSW has not yet privatised its electricity industry but has undertaken extensive corporatisation and industry restructuring along the lines of other states and territories. During the 1990s, the NSW Electricity Commission was restructured into separate transmission, generation and retail businesses. Transgrid operates the wholesale market, transmission and system control; generation is split between Pacific Power, Delta Electricity and Macquarie Generation, and distribution between MetNorth Energy, Integral, Northpower, Advance, Australian Inland and Great Southern Energy.[12]

5.20 In sum, there are now some 12 major generation companies producing electricity for the wholesale market, plus a few smaller independent generators and other producers associated with large minerals projects. Within Victoria and NSW alone there are 43 retailers.[13] This situation, along with the bidding rules for the NEM, has produced intense price competition which has forced very large falls in prices - to below marginal cost in some circumstances. The existence of fixed price (or 'vesting') contracts between some generators and customers/retailers continues to limit the free operation of the NEM and has also kept prices low. These price levels have increased the proportion of electricity produced by the most greenhouse intensive generators (those using brown coal or lignite) and is acting as a barrier to entry for more sustainable energy technologies.

Gas

5.21 The reform of natural gas markets will also bear on the extent to which gas can achieve greater prominence as a fuel for electricity generation. To date this has been very limited, due to both the perverse impact of electricity reform and the higher prices of gas in current markets. While gas reforms are expected to lead to increased competition and lower prices, in the absence of mechanisms which price emissions, its use in electricity generation is likely to remain limited.

5.22 Gas market reform aims to introduce greater competition into a structure in which 'natural monopolies' over pipelines and distribution have historically been in place, and production has been limited to single joint-ventures extracting gas from a single basin controlled by state government. COAG resolved in 1994 to promote retail competition and to develop an integrated national gas market by allowing third party access to pipelines, with the hope that this would stimulate further investment in exploration and development. These principles have been placed into a national access regime, set in state law, although efforts to promote greater competition at the production end are ongoing. Central to this is the development of an interconnected pipeline network. Since 1994 there has also been a substantial disaggregation of gas

12 Ann Rann, *Electricity Energy Restructuring: A Chronology*, Australian Parliamentary Library Background Paper 21, 1997-8, pp 9-11.

13 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p 11.

businesses, and some privatisations, creating competing transmission, distribution and retailing businesses.[14]

The Emissions Impacts of Electricity Reform

Price competition in the NEM

5.23 Pacific Power explained how the electricity market reforms were producing negative greenhouse outcomes:

> The electricity market is unhelpful, because the reforms are based on an electricity market that is scheduled on their marginal costs. It does not directly create an environment where emissions are minimised. It creates an environment where the lowest cost of generation is developed. That ignores the capital cost of the plant and also ignores the emissions… the lowest cost fuel, brown coal, produces the highest emissions. Therefore, there are certainly some challenges there in getting emissions down if the market was left to its own devices.[15]

5.24 The Electricity Supply Association of Australia (ESAA) confirmed this diagnosis:

> The competitive wholesale electricity market drives purchasers of electricity, who in the first place are the retailers of the electricity, to pursue the cheapest available electricity. The cheapest available electricity by and large is coal-fired, and that is why in the recent past in Australia there has been an increase in the use of coal and, therefore, of course, an increase in emissions.[16]

5.25 The Australia Institute's Dr Clive Hamilton suggested that the NEM has created intense competitive pressures which were driving prices down:

> When the competitive electricity market was developed and came into play in the early to mid-1990s, there was a view amongst energy experts that it would release some of the constraints on the development of gas-fired generation and would therefore be positive from a greenhouse point of view. Because of the way the competitive electricity market is operated, along with the process of privatisation of generation and distribution assets, particularly in Victoria, what we have seen is coal-fired generation engaging in an extraordinary price cutting war in order to try and win market share.[17]

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14 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, pp 12-13.

15 Dr Robert Lang, *Proof Committee Hansard*, Sydney, 22 March 2000, p 351.

16 Dr Harry Schaap, *Proof Committee Hansard*, Sydney, 22 March 2000, p 335.

17 *Proof Committee Hansard*, Canberra, 10 March 2000, p 60.

Barriers to gas and renewable sources

5.26 A significant impact of the NEM has been increased barriers to entry for the less emissions-intensive gas-fired generation and renewables. Dr Hamilton explained that:

> It has been more difficult for gas-fired generation to penetrate the market because it is so intensely competitive. Those pressures ought to ease, but there is still a very strong place for policy measures to promote low emission forms of generation, particularly gas, and zero emission forms of energy use, notably renewables and energy efficiency. Of course, there are very good economic arguments for that, given the lower external costs associated with those forms of energy.[18]

5.27 Pacific Power explained that even though the long-run costs of coal-fired and gas-fired generation were similar, market pressures were working against gas:

> The use of gas as a fuel instead of coal has the potential to reduce greenhouse gas emissions, as it has a lower greenhouse gas intensity than coal. The emissions from new gas plant would be around 40 per cent of those from black coal plant and 30 per cent of those from a brown coal plant. Significant emissions savings could also be achieved by burning gas in existing coal-fired plant.
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> In economic terms, the capital costs of gas-fired plant are lower than for coal-fired plant, but the fuel costs are higher. This results in long run costs for both types of plant being similar. However, because the cost of gas could be two to three times that of coal, the marginal price of gas generation is much higher than that from coal. Consequently, the construction of a gas-fired plant without a long term contract for the output is unlikely to occur in the competitive electricity market.[19]

5.28 Pacific Power has had first-hand experience of this market discrimination against gas, having had to defer a major gas investment that was to have been their major initiative in the Greenhouse Challenge Program:

> Pacific Power considered at the start of the [Greenhouse Challenge] Program that a gas-fired combined cycle plant would be commercially viable by around the year 2000. To this end, preliminary design and detailed environmental studies were carried out for a 400MW plant at Wollongong and Development Consent was gained. That particular plant would have produced electricity with approximately 1,300,000 tonnes of carbon dioxide emissions each year less than the equivalent amount of electricity from NSW coal-fired plant. This was the principal initiative in Pacific Power's Greenhouse Challenge agreement.

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18 *Proof Committee Hansard*, Canberra, 10 March 2000, p 60.

19 Pacific Power, Submission 98, p 800.

> Due to current conditions in the electricity market, and the introduction of new coal-fired plant in Queensland, this plant is unlikely to proceed for several years. It could be justified on environmental grounds only if the mix of policies were in place to create the market conditions that would enable the sale of the output.[20]

5.29 The market ascendancy of coal may also be placing large gas augmentation and supply projects, such as the planned PNG pipeline, in some doubt. Chevron Services Australia, which is developing the PNG gas project, has opposed the licence applications for new coal-fired power stations at Millmerran and Kogan Creek in Queensland, and stated in its submission that:

> What Governments have before them is a choice. It is a choice between the new PNG gas project on the one hand and more coal-fired power stations on the other. The Committee should appreciate that the economics of the PNG gas project depend upon what access it secures to power generation markets in Queensland. If that access is pre-empted by licensing of any more coal-fired stations, the project fails.[21]

5.30 AGL, which will build, own and operate the pipeline from PNG, was also concerned about the potential impact of new coal power developments in Queensland on that project:

> We see the coal-fired power stations as being a challenge, certainly a hurdle, to the pipeline's future development. We are not really in a position to… say it will be one or the other. But certainly it does place a lot of pressure on us that was not originally envisaged when the pipeline project was conceptualised a number of years ago. While we are happy to compete commercially with any other fuel - it is part of our role to do that - there is just a sense that these coal-fired projects in Queensland are slipping in under the wire, so to speak, before they can be judged by a new set of rules, because should a new set of rules come in that will assess greenhouse emissions and factor those costs in, we think that they would have a much tougher job in justifying their position. From our point of view, there is almost like an unseemly rush to get these things built.[22]

5.31 The impact of energy market reforms on the greenhouse emissions from the sector has also been the subject of two reports commissioned by the Commonwealth Government: an Allen Consulting study commissioned by the Department of Industry Science and Resources, delivered in March 1999; and a McLennan Maganasik (MMA) study commissioned by the AGO, delivered in June 2000. MMA also carried out modelling for the first Allens Report.

5.32 The Allen study echoed the analysis above, and added that:

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20 Pacific Power, Submission 98, p 804.

21 Chevron Services Australia, Submission 123, p 1188.

22 Mrs Leith Wood, *Proof Committee Hansard*, Sydney, 23 March 2000, p 400.

- an excess of generation capacity over supply was acting as a barrier to new entrants;
- transitional arrangements (such as 'vesting' or fixed-price contracts) favour incumbent generators;
- competitive pressures are increasing the reliance on existing, emissions-intensive plant;
- current network pricing practices disadvantage cleaner fuels; and
- transmission pricing discriminates against cogeneration and embedded (or 'distributed') generation.[23]

5.33 Other witnesses also pointed out the historical legacy of tax biases towards fossil fuels. The renewable energy expert Carrie Sonneborn told the Committee:

> There is also a need - and this came out of the World Bank, because it is not just in Australia; it is happening in many other countries - for a reduction or ceasing of subsidisation of power generation from fossil fuels. Historically in Australia the fossil fuel industry has received very generous subsidies. In fact, one study estimates about $40 billion worth since World War II, which has obviously helped to build up that industry and establish it over many years. Some of the subsidies have actually discriminated in favour of fossil fuels and against the distribution of renewable energy, for example, the cross-subsidisation of rural electricity and more generous tax deductibility for grid connection than for the purchase of remote area power systems. The current continuation of the diesel rebate in remote areas is a major disincentive for remote area power for renewables. Remote areas in Australia are the niche market for renewable energy, and the diesel fuel rebate is directly undermining that one key area.[24]

Oversupply of coal-fired generation

5.34 The 2000 MMA Report listed the current oversupply, which was unlikely to be absorbed before 2005:

> There is a large excess of generating capacity compared to demand in NSW and to a lesser extent a surplus in Victoria. In Victoria, the 500 MW Newport power station has been closed for refurbishment due to an uneconomic rate of utilisation, although it was brought back into service in July 1999. In NSW two units at Liddell Power Station and the four units at Munmorah have been mothballed in response to low pool prices and low utilisation. Based on current predictions of demand growth, it is unlikely

23 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, pp 24-49.

24 *Proof Committee Hansard*, Perth, 17 April 2000, p 538.

> that new base load plants will be required in NSW and Victoria until after 2005.[25]

5.35 This assessment was echoed by the Industry Commission. The construction of much of this excess capacity occurred during the 1980s in the eastern states in anticipation of a surge in demand which did not materialise. Allens estimated that there is 31.6 percent of plant in reserve in NSW.[26] As a result, not only is gas finding it difficult to compete on price terms with coal, but the excess capacity means that new gas-fired capacity would be unable to compete with the recommissioning of mothballed plant. Allens suggested that such plant could also be recommissioned by incumbents to repel new entrants.[27]

5.36 The Industry Commission thought that electricity prices would fall to around $25 MWh after the introduction of competition. However, a range of factors combined to push prices much lower - to under $15 MWh in 1997, and between $20-25 MWh currently. These, say Allens, were 'well below the entry price of gas or coal-fired thermal generation'. Despite much higher prices being achieved during summer periods of very high demand ('needle peaks'), Allens argues that oversupply has reduced the impact this would have on base-load prices:

> Even at high prices, there is insufficient energy sold into the needle peaks at present to sustain all of the existing gas-fired peaking stations. The refurbishment and delayed re-entry of the Newport station in Victoria appears to reflect this situation. It appears likely that there is insufficient demand at prices suitable to sustain new, reasonably large-scale gas-fired stations in Victoria and NSW at present.[28]

5.37 The commissioning of the new coal-fired power stations in Queensland will also delay the absorption of this oversupply - hence the concerns of the gas industry about the viability of the PNG gas project and pipeline. Over the next ten years approximately 2,280 MW of new coal-fired generation will enter the NEM from Queensland, through investments at Callide C (840MW), Millmerran (840MW), Redbank (150MW) and Tarong North (450MW).[29]

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25 McLennan Maganasik Associates, *Greenhouse Gas Emission Projections: Australian Electricity Generation and Natural Gas Combustion*, Report to Australian Greenhouse Office, 5 June 2000, p 16.

26 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, pp 27-28.

27 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p 29.

28 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p 30.

29 Australian EcoGeneration Association, Submission 196, p 2069.

Fixed price contracts - The Aluminium Case

5.38 'Vesting contracts' have also been a factor in the low prices and are acting as a barrier to new entrants. They were implemented by all states with the aim of giving existing generators and retailers some certainty on the price of a portion of energy. Vesting contracts are expected to be wound back as electricity markets become fully contestable, by about 2001, but the AGO fears they could be replaced with bilateral contracts which fix the price of large tranches of supply outside the NEM price pool. Allens also argued that vesting contracts were a significant factor in the dramatic price falls when competition was introduced:

> Vesting contracts are likely to have had a profound impact because the vested contract price was set at a rate that in hindsight was too high - initial tranches were priced at $44.50/MWh in NSW. This is well above generators' marginal costs and probably above average costs… . Thus generators were able to bid low to capture market share at prices close to or below short run marginal cost when market pressures intensified, in the knowledge that a large portion of their dispatch would be topped up through vesting contracts.[30]

5.39 Fixed price contracts that are set very low can also enhance price pressures and may work as a disincentive to industries to reduce emissions. Some of these contracts have been made with large individual electricity consumers as investment incentives. Such contracts are held by a range of industrial users, with one particular large energy-using sector being aluminium. The Australia Institute told the Committee that:

> The prices paid for electricity by aluminium smelters are set in long-term contracts and are a closely kept secret. However, enough information is available to make a good estimate of the extent of subsidies. The general belief in the electricity industry is that smelters pay between 1.5 and 2.5 cents/kWh for delivered electricity compared to around 5-6 c/kWh paid by other large industrial users. The former Victorian Treasurer revealed that other high-voltage customers were paying up to three times the price paid by the two Victorian smelters. The Victorian Auditor-General estimates that in 1997-98 the Victorian Treasury paid $180 million to the State Electricity Commission to subsidise the cost of electricity to the two smelters (Portland and Point Henry), indicating a subsidy of 2 c/kWh. On the basis of all available evidence, the total subsidy to aluminium smelters in Australia amounts to A$410 million per annum.[31]

5.40 Aluminium smelting accounts for 14 per cent of all electricity consumed in Australia and for 16 per cent of the greenhouse emissions from electricity. The

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30 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p 30.

31 The Australia Institute, Submission 79b, p 595.

Australia Institute argued that the subsidisation of electricity prices for smelters 'provides a perverse incentive to consume electricity' and that 'Australia's greenhouse gas emissions are substantially higher than they would be if smelters had to pay the market price'.[32]

5.41 The Australian Aluminium Council denied that its industry was substantially subsidised:

> The industry is not subsidised, as is sometimes wrongly claimed by some commentators. We do not believe that that contention is sustainable on the basis of objective analysis. Electricity prices, which are mentioned in that context, very often are set by an intensive and competitive process.[33]

5.42 While it declined to provide the Committee with the prices paid by smelters, the Council rejected the claims of the Australia Institute:

> I cannot put very specific alternative figures on the table because electricity sold to aluminium smelters is the subject of commercial long-term contracts… With no documented evidence, Australia Institute infers that because Victorian smelters pay a low price for electricity, all other smelters in Australia must receive a similar low price and these low prices must be subsidies. I am not commenting on the Victorian price, but certainly it would not be right to assume that price in one state and one operation was the same price that applied to all operations.
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> For example, the Australia Institute report admits it has no evidence at all of the subsidy to Comalco in relation to the Boyne Island smelter but simply assumes there must be one because of the assumptions they have made in Victoria. Similarly, they assume that there must be one for Point Henry smelter in Victoria when really their thesis is based on the Portland operation as they see it. They ignore the analysis of the Industry Commission in their report in 1998 on the aluminium industry that very specifically found no subsidy for the Tomago and Capra smelters in New South Wales.[34]

5.43 The Council did intimate that smelters had been able to secure highly competitive prices in relation to other users:

> For the electricity market to be efficient and, thereby, generate the greatest wealth for Australia, electricity prices must not be related to cost of production - that is not the way business operates anywhere now - but rather related to what the market will bear by competitive market forces. Obviously, suppliers will differentiate in that environment between the sorts of customers they have. They range from aluminium smelters which sign

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32 The Australia Institute, Submission 79b, pp 605-06, 610.

33 Mr David Coutts, *Proof Committee Hansard*, Canberra, 10 March 2000, p 45.

34 Mr David Coutts, *Proof Committee Hansard*, Canberra, 10 March 2000, p 48.

> 10- to 15-year contracts on a take or pay basis and set up a base load take of electricity that is very advantageous to managing your electricity supply. I do not think that has been taken into account.[35]

5.44 The Aluminium Council said that its metals sector had reduced emissions by 2.4 Mt CO_2-e between 1990 and 1998 and that the Oceania region had the most efficient energy usage per tonne of product. However, it also said that, apart from using electricity efficiently, it had little influence over emissions from electricity generation and strongly opposed mandatory measures to cut emissions, even though it was unlikely that the energy sector could otherwise achieve the reductions needed to meet Australia's obligations under the Kyoto Protocol:

> There also has to be time for the electricity sector to reduce its greenhouse gas intensity. That is one of the key issues for us. We have to buy electricity from the electricity sector. We consider it is obviously a priority for that to happen, but it is going to take some time and it cannot be done. We can make progress, but we believe we are not going to reach the long-term targets by 2010. There is no point in damaging a world competitive valuating industry like aluminium while that process of reducing electricity intensity is going on.[36]

5.45 In view of their large volume of exports, the Committee sympathises with the Council's concerns about remaining competitive with suppliers from non-Annex I countries. The Committee also notes that the industry is also a large employer and contributes to export earnings. However, reducing the greenhouse intensity of supply - a goal the Council supports - requires moving the bulk of electricity generation to lower emissions fuel sources. Actions taken at the industry level will have little impact if outweighed by increasing emissions intensity of generation in the NEM, as has occurred in recent years.

5.46 It is unacceptable for an industry which is such a disproportionately large energy user, with approximately 6 per cent of total national emissions, to be quarantined from an abatement effort that should be spread equitably across the community. In the Committee's view this emphasises the need to develop a least cost approach to abatement that spreads costs efficiently and equitably, while rewarding investment in emissions reduction.

Recommendation 25

The Committee recommends that the Commonwealth and the states and territories seek greater transparency from large electricity consumers about the prices they pay for electricity if those prices are fixed outside the pool.

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35 Mr David Coutts, *Proof Committee Hansard*, Canberra, 10 March 2000, p 48.

36 Mr David Coutts, *Proof Committee Hansard*, Canberra, 10 March 2000, p 46.

Recommendation 26

The Committee recommends that state and Commonwealth governments seek to publicly disclose details of any arrangements under which public monies are effectively subsidising large industrial users through the provision of low electricity prices.

Privatisation

5.47 It was also put to the Committee that privatisation has been a factor discriminating against investment in cleaner technologies. Dr Clive Hamilton clearly believed privatisation was a factor in the increasing greenhouse intensity of the NEM:

> Because of the way the competitive electricity market is operated, along with the process of privatisation of generation and distribution assets, particularly in Victoria, what we have seen is coal-fired generation engaging in an extraordinary price cutting war in order to try and win market share.[37]

5.48 The Allens' Report cited the example of the brown coal-fired Hazelwood power station in Victoria, which 'was a plant that was nearing the end of its operational life in public ownership but which private owners have given a new lease of life and expanded capacity'. Allens argues that this has increased the current oversupply in the NEM, and adds to a context in which operators are being forced to 'squeeze the best out of their plant'.[38]

5.49 The Director of the NGO, Environment Victoria, Ms Esther Abram, told the Committee that the privatisation of the State Electricity Commission of Victoria was accompanied by the imposition of a price cap:

> This means that electricity prices are kept low, and for electricity retailers to increase their profits they have to sell more electricity. This has led to retailers selling airconditioning systems, thereby promoting the sale of goods that are high on consumption of electricity.[39]

5.50 The emissions implications of privatisation are of particular importance when the prices paid for assets are very high. In Victoria for instance, the electricity industry was sold at historically high prices, some $30 billon in total. Commentators have remarked that the $3.5 billion paid by Hutchison Whampoa in the recent sale of South Australia's ETSA Utilities (distribution) and ETSA Power (retail), which

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37 *Proof Committee Hansard*, Canberra, 10 March 2000, p 60.

38 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p 32.

39 *Proof Committee Hansard*, Melbourne, 20 March 2000, p 161.

together form a large section of the State's power business, were much lower than the prices paid in Victoria for similar assets.[40]

5.51 With the bulk of Victorian capacity in brown coal generation and buyers seeking to recover costs in a hyper-competitive market, it is easy to see how privatisation there has worsened the greenhouse emissions outcomes from market reform. It may also be arguable that privatisation misdirects investment from new (potentially cleaner and more efficient) generation capital into old.

Recommendation 27

The Committee recommends that the states ensure that any future privatisation plans are the subject of full and open public debate and take account of the potential greenhouse implications of the sales. Prices should reflect a future market which is likely to be constrained by mandatory pressures to reduce emissions.

Recommendation 28

The Committee recommends that a national strategy be developed to reduce the emission intensity of, and constrain the growth in overall emissions levels, from the electricity generation sector. Such a strategy should include national emission intensity standards for electricity generators.

Recommendation 29

The Committee recommends that the states and territories agree to set mandatory targets to progressively increase the total proportion of electricity generated from efficient power plants and low greenhouse intensity fuels.

The Assumptions Behind Reform

5.52 A number of witnesses commented that the electricity market reform process was based on a narrow economic objective of reducing electricity prices, and had thus failed to take account of the potential environmental costs of reform. The National Competition Council (NCC), which is the national advisory body on competition policy reform, told the Committee that:

> The objectives of the reform process that we are associated with in the electricity and gas industries is utilising and harnessing the benefits of competition where feasible in the supply of those sources of energy to provide benefits to consumers. Those benefits are primarily in terms of

40 Mark Skulley, 'SA sells power for $3.5 billion', *The Australian Financial Review*, 13 December 1999.

> reduced prices and, yes, it is true that that can have some implications for the consumption of those sources of energy.[41]

5.53 The Council told the Committee that there was no reference in its energy reform charter to greenhouse and that their 'roles are tightly constrained and we are also constrained from conducting any work that is not on our work program as agreed by all governments. So yes, we would be constrained from conducting that work [relating to greenhouse]; it would go beyond our current mandate'.[42]

5.54 The NCC has an ongoing role in energy market reform, as part of the broader National Competition Policy (NCP) reform process, through its assessment of 'satisfactory progress against NCP obligations', which must be achieved to release the payment of Commonwealth funds for the implementation of NCP reforms. The NCC states that 'where governments don't invest in reforms in the public interest, reductions in NCP payments may be recommended… The Council only recommends reductions in NCP payments as a last resort where no path to dealing with outstanding issues can be agreed'.[43]

5.55 The constraint on the Council's work in energy reform contrasted with its work on water reform. Its Executive Director, Mr Ed Willett, said that environmental considerations such as dryland salinity were a part of its mandate in that area:

> In water it is part of the competition policy reform agreements and governments have recognised that water reform under NCP is not just a matter of introducing competition and getting the benefits of competition. It is really more about pricing efficiency. And it is when you start getting into pricing efficiency issues that you start having to deal with external costs like dry land salinity for example. Those sorts of issues are not raised in the NCP agreements in relation to gas and electricity.[44]

5.56 The Committee notes the inclusion of crucial environmental considerations in water management and policy reform, and supports the inclusion of similar environmental costs and considerations into the process of energy market reform and the structure and operations of the national energy markets.

Recommendation 30

The Committee recommends that the Council of Australian Governments designate the reduction of harm to the environment as a goal of ongoing energy market reform, with a specific requirement for the reduction of the greenhouse intensity of power generation.

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41 Mr Ed Willett, *Proof Committee Hansard*, Canberra, 23 June 2000, p 834.

42 Mr Ed Willett, *Proof Committee Hansard*, Canberra, 23 June 2000, p 833.

43 National Competition Council, Submission 221, p 2851.

44 Mr Ed Willett, *Proof Committee Hansard*, Canberra, 23 June 2000, p 833.

Recommendation 31

The Committee recommends that the National Competition Council incorporate benchmarks for the reduction of the greenhouse intensity of power generation into its assessment of governments' progress on national competition policy reforms.

Gas - A Transitional Fuel?

5.57 The Australian Gas Association, which commissioned a study on the comparative emissions intensity of gas and coal, told the Committee that:

> When it comes to power generation or applications such as producing hot water or space heating for residential, commercial and industrial purposes, the greenhouse gas emissions of natural gas are much lower than those of black and brown coal. In fact, for power generation it produces about half the emissions of brown coal, and emissions are 40 per cent lower than for black coal. In applications within the residential sector for space heating and hot water systems, you are looking at about 20 per cent of the emissions of black and brown coal.[45]

5.58 The large gas producer, Woodside Energy, asserted that liquefied natural gas (LNG) also has emission benefits if it displaced coal:

> Studies by CSIRO and Energetics on behalf of the Australian Gas Association have shown CO_2 equivalent emission reductions of 40 to 50 per cent when compared with coal. It is estimated that 20 million tonnes of carbon dioxide equivalent emissions would be saved in Japan if the 7.5 million tonnes of LNG from the LNG expansion project were substituted in that country for coal.[46]

5.59 AGL claimed that if the PNG gas project and pipeline were to proceed it would save 88 Mt CO_2 within ten years:

> An ACIL study that was commissioned to look at this factor found that once the pipeline is in operation it will save 88 million tonnes of CO_2 in the first decade of its operation, with savings of about 11 million tonnes a year by the year 2012.[47]

5.60 Woodside Energy asserted that 'a key plank of Australia's greenhouse policy must include measures to advantage penetration of natural gas into key international and domestic markets'.[48] They were echoed by the Australia Institute's Dr Clive

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45 Mr William Nagle, *Proof Committee Hansard*, Sydney, 23 March 2000, p 390.

46 *Proof Committee Hansard*, Perth, 17 April 2000, p 485.

47 Mrs Leith Wood, *Proof Committee Hansard*, Sydney, 23 March 2000, p 390.

48 *Proof Committee Hansard*, Perth, 17 April 2000, p 485.

Hamilton, who argued for long term thinking towards achieving a transformation in Australia's energy economy:

> In Australia we will, over time, burn less coal in order to meet the target in the first commitment period and much more stringent targets in subsequent commitment periods. The issue is: what industries do we develop and promote in order to substitute for the energy we currently get from coal? I think it lies in managing that transition away from coal. Coal is dead. It will take some decades but coal is going out. There is no question about that.[49]

5.61 Dr Hamilton argued that gas would have an important role to play in such a transition:

> I think natural gas is the great winner out of the Kyoto Protocol… natural gas is the transitional fuel for the next perhaps 20 years… we should vigorously pursue both the substitution of natural gas for coal, and we should also pursue renewables and energy efficiency, because in 20 years or so, when we go into the second commitment period and we have much tighter restrictions, even though gas has about half of the emissions per unit of electricity delivered and even less for direct consumption of gas in the homes and so on, it is a fossil fuel after all and it does contribute to global warming. So we must prepare for a world not only beyond coal but beyond fossil fuels.[50]

5.62 Pacific Power, which has investments in coal and renewables, acknowledged the potential contribution of gas but were more sceptical of its value:

> We do not think that gas is the answer… Even if [plants such as our 400MW Wollongong proposal were] to proceed, gas effectively increases emissions. It simply does that at a slower rate than would otherwise be achieved. The only way it can actually cause lower emissions is if it causes other plant to be displaced - in other words, it forces an existing generator to exit the market. That seems extremely unlikely in an industry that is characterised by high capital cost long life assets.
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> The gas itself may not even be available, and there are statistics there about that. But our view is that it could be more effective to combine coal-fired generation - and I mean low emission coal generation - with renewables to achieve a reduction, rather than to rely on gas. That would not only achieve the same emissions result of the end of the day but potentially allow the development of renewable industries in Australia, which could very well be regionally based.[51]

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49 Dr Clive Hamilton, *Proof Committee Hansard*, Canberra, 10 March 2000, pp 62-64.

50 Dr Clive Hamilton, *Proof Committee Hansard*, Canberra, 10 March 2000, p pp 62-64.

51 Dr Robert Lang, *Proof Committee Hansard*, Sydney, 22 March 2000, pp 350-51.

5.63 Pacific Power argued that it is of long term importance to create a market and regulatory climate conducive to the growth of renewables, and that unless gas is able to displace coal generation, it merely reduces the growth in emissions rather than achieving outright reductions. However, with current rates of emissions growth, the Committee supports the use of gas alongside policies to promote the uptake and development of renewables.

Cogeneration and Transmission Pricing

5.64 The Committee also heard that current energy market conditions and rules unfairly disadvantaged lower emissions forms of generation such as cogeneration and embedded generation.

5.65 Cogeneration is achieved through the harnessing of the energy produced by other industrial processes such as sugar milling, chemicals, refining, and pulp and paper, and in 1996-97 made up 4.5 per cent of Australia's electricity generation. Embedded generation is defined in the National Electricity Code (NEC) as that which is connected to an electricity distribution network rather than a transmission network. They are generally located close to their site of consumption and are often linked with industrial processes. They range in size from very small to 250 MW, and can reduce greenhouse emissions through reduced network transmission losses and because embedded generators are often less emissions-intensive than other fossil fuel sources such as coal. The extent of emissions savings depends on the particular plant type, energy source, and location in relation to the site of power consumption.[52]

5.66 According to the Australian EcoGeneration Association (AEA), cogeneration can produce electricity at a much lower greenhouse intensity than conventional fossil fuel generation:

> Typically in gas-fired cogeneration using gas turbines you are still burning a fossil fuel in the gas turbine creating emissions, but you are creating emissions at one-third the amount of black coal and maybe a quarter of the emissions of brown coal.[53]

5.67 Where cogeneration uses renewable sources such as biomass, the output is treated as entirely renewable. Origin Energy, which operates Australia's largest cogeneration facility at Osborne in South Australia, and a total of 375 MW nationwide, claimed that:

> Our eco-efficient plants deliver major reductions in greenhouse gas emissions compared with the industry average - something around one million tonnes a year less CO_2 than the industry average. We have been involved in developing and building three of the four gas-fired cogeneration

52 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p 43.

53 Mr Ric Brazzale, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 219.

> and power generation plants that have been built on the eastern seaboard since the national electricity market commenced operation. Our cogeneration projects are the heart and lungs for major investments by our industrial customers, customers like BP in its $500 million Queensland clean fuels project expansion which today is in the process of commissioning.[54]

5.68 The AEA told the Committee that, in 1998, there were some 130 cogeneration projects in Australia, with a capacity of about 2,100 MWh and a production of 9,500 GWh a year. By 2000, capacity had risen to 2203 MW and accounted for 5.6 per cent of total generation. This compares poorly with international trends, exceeding only Ireland, Greece, Japan, France and the UK, while trailing the US (7 per cent), Germany (10 per cent), the Netherlands (40 per cent) and Denmark (50 per cent).[55]

5.69 They also said that while there was substantial scope for cogeneration to be expanded, current market conditions had effectively stalled progress:

> There is nearly 4,000 megawatts of cogeneration capacity that is under development and evaluation. Our whole sector has been stalled over the last few years, largely for two reasons: firstly, energy market reform and some of the problems that we have in competing in the market; and, secondly, the generally low level of electricity prices. In other words, it is very hard to compete with $30 per megawatt hour coming from a coal-fired generator.[56]

5.70 The AEA said no major cogeneration projects had been committed in the eastern states over the past three years. However, they said that if pool prices moved over $35 MWh, 'you would see quite a lot of movement in our sector. The difficulty is that coal is coming in at $30'.[57]

5.71 As a long term solution to these price imbalances the AEA recommended the early trial of a domestic system of emissions trading. They recommended that it be a 'cap and trade' system with the majority of permits auctioned. Revenues could then be returned to the economy in the form of reduced business taxes on employment and investment.[58]

5.72 Another barrier to cogeneration, said the AEA, was the transmission pricing arrangements in the NEC which unfairly advantage large scale generation that is far

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54 Mr Andrew Stock, *Proof Committee Hansard*, Brisbane, 26 May 2000, p 617.

55 Mr Ric Brazzale, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 217; and *Who's who in Australian Cogeneration 2000*, Melbourne: Australian EcoGeneration Association, 2000, pp 14, 19.

56 Mr Ric Brazzale, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 217.

57 Australian EcoGeneration Association, Submission 196, p 2069; and Mr Ric Brazzale, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 217.

58 Australian EcoGeneration Association, Submission 196, p 2061.

from its site of consumption. They said that 'we feel this is probably the single most important barrier or issue that faces cogeneration':[59]

> Locational pricing and the incidence of transmission costs have a significant impact on the development of new electricity generation capacity. Large coal generators located distant from load centres have an unfair competitive advantage as the costs of transporting their energy to market is paid for by customers.[60]

5.73 Their concerns have been echoed by the Australian Competition and Consumer Commission (ACCC):

> The current proposal whereby the great proportion of network charges will be levied on customers provides little incentive for the efficient allocation of investment and generation options. As it competes on a delivered cost basis, the incidence of network charges disadvantages embedded generation options… the Commission is concerned that these deficiencies in the Code may be contrary to the interests of embedded generators and the wider Australian community.[61]

5.74 The AEA complained that these distortions were also a factor in the viability of large new coal-fired power stations in Queensland at the expense of less emissions-intensive forms of generation:

> In the case of Callide C, Millmerran and Kogan Creek power stations, they are the beneficiaries of significant new transmission investment that has been undertaken by Powerlink, but will be paid for by customers - not the beneficiary. This new coal-fired generation capacity is being effectively subsidised at the expense of low emission cogeneration and renewable generation. This is a perverse outcome that needs to be urgently corrected. It has dire public policy consequences that will lead the community to question the merits of micro-economic reform.[62]

5.75 The Commonwealth Government's submission to the National Electricity Code Administrator (NECA) review of transmission pricing arrangements supported this analysis:

> Current arrangements, which restrict transmission charging to generators to shallow entry costs, while leaving the bulk of costs to be recovered from customers, provide a substantial subsidy to remote, usually coal-fired generation to the competitive disadvantage of more greenhouse friendly

59 Mr Ric Brazzale, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 222.

60 Australian EcoGeneration Association, Submission 196, p 2070.

61 Australian EcoGeneration Association, Submission 196, p 2070.

62 Australian EcoGeneration Association, Submission 196, p 2070.

> natural gas and renewable generation typically located closer to loads. Pursuit of demand management options is also acutely disadvantaged.[63]

5.76 These distortions were also discussed in the report by Allen Consulting on the greenhouse implications of energy market reform. They argued that, while these issues raise enormous technical complexities (for instance truly cost-reflective pricing may require information currently beyond technical capacities), it was accepted that the ways in which the NEC deals with transmission pricing and embedded generation are problematic. The ACCC has found that current transmission pricing practices are inefficient, and the NECA has undertaken to involve the ACCC in an ongoing review of transmission pricing arrangements.[64]

5.77 The AEA was very critical of NECA's efforts to date:

> Unfortunately, the National Electricity Code Administrator that is overseeing the review of transmission pricing has supported the incumbent generators position - and has determined that existing generators should not have to pay for the significant assets they use. This is notwithstanding that nearly all other interested parties (including the Commonwealth) argued the opposite.[65]

5.78 The removal of these distortions in transmission pricing is Commonwealth Government policy. The NGS sets a timetable 'to identify and address any structural, legislative barriers to cogeneration' by June 2000, and to establish 'efficient and equitable locational signals, unbundling of transmission charges, pass through of net benefit/cost embedded projects which deliver network cost reductions/increases' by June 2001.[66]

5.79 The AGO's Philip Harrington stated that:

> The National Electricity Code Administrator has conducted a review of transmission and distribution pricing that sets out this issue. They have made some recommendations as to how it could be addressed. I understand those recommendations are with the ACCC for endorsement but I do not believe the ACCC has handed down its decision at this time.[67]

5.80 NECA's recommendations to the ACCC fell short of the Commonwealth's preferred changes. The Department of Industry, Science and Resources (DISR) argued to NECA in 1999 that:

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63 Australian EcoGeneration Association, Submission 196, p 2070.

64 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p 39.

65 Australian EcoGeneration Association, Submission 196, p 2072.

66 Australian Greenhouse Office, *The National Greenhouse Strategy: Strategic Framework for Advancing Australia's Greenhouse Response*, 1998, pp 42-43.

67 Mr Philip Harrington, *Proof Committee Hansard*, Canberra, 22 June 2000, p 690.

> NECA's draft report offers no clear direction for future market development and does not appear to have taken Government settings on competition policy, and on energy and environmental policy into account. The current draft seems premised more on maintaining the status quo, or at least in arguing from the premise of existing market arrangements to substantiate a change.[68]

Recommendation 32

The Committee recommends that the Government, the National Electricity Code Administrator and the Australian Competition and Consumer Commission work closely with the cogeneration industry to ensure that transmission pricing regimes truly reflect the costs and distance of transmission and contain no biases against embedded generation and cogeneration.

A Greenhouse Trigger?

5.81 In December 1999 the Government published a discussion paper on the possible inclusion of greenhouse as a trigger for environmental impact assessment under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). Public comment was invited and closed in February 2000. There are currently no Government plans to introduce amendments to the EPBC Act to give effect to a greenhouse trigger.[69] The concept of a trigger received much comment during the inquiry, with many witnesses arguing it would provide for oversight of the greenhouse implications of new projects, and others opposing it, arguing that it would unfairly target new projects or could endanger new investment.

5.82 A trigger could potentially apply to a large range of projects and activities, including energy and industrial processes, road construction and land clearing. It is discussed in this chapter because the focus of its discussion during hearings was its application to the energy sector. However, the Committee acknowledges its potential use across the entire range of emitting activities.

5.83 Currently, under the EPBC Act, there are six matters of national environmental significance which could trigger environmental impact assessment: world heritage, wetlands of international importance, listed threatened species and communities, listed migratory species, nuclear actions and marine environment.[70]

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68 Cited in Australian EcoGeneration Association, *Submission to the ACCC on NECA Network Pricing Code Changes,* October 1999, p 5.

69 Mr Mark Tucker, *Proof Committee Hansard*, Canberra, 9 March 2000, p 19.

70 *Environmental Protection and Biodiversity Conservation Act 1999,* No 91, 99, p i.

5.84 The Government's discussion paper canvassed a range of design issues which would govern what kind of activities and projects would be captured for assessment under a greenhouse trigger. These included:

- whether both new projects and new capacity should both be included;
- the range of greenhouse gases to be included;
- whether emissions which are not directly caused by the activity, but are closely related either upstream or downstream from the activity, should be included (projects like aluminium smelting or transmission augmentation may be relevant here);
- whether projects whose emissions effects are diffuse, such as road construction or land clearing, should be included and how; and
- the measure of the project's emissions potential, and the threshold above which activities become liable for assessment.[71]

5.85 A number of witnesses said that the trigger was essential to direct investment in new generation and transmissions capacity away from coal. This would be important both to reduce emissions in the short term and enable Australia to better adjust to a greenhouse constrained world. Dr Clive Hamilton argued that:

> In my view, it is madness to approve new coal-fired power stations in Australia when we know we are facing this constraint. What the Queensland government is doing is saying, 'We will build coal-fired power stations before there are any restrictions on it'. The cost of meeting the emission reductions associated with that, whether they occur in the coal industry or else, will be met by the rest of Australia. It is shifting the cost on to the rest of Australia. It should be stopped, which is why the greenhouse trigger should go into the EPBC Act. The government's task is to manage the transition that is going to happen as a result of Kyoto and changes in the world economy. We can either manage it or be confronted with it in a more costly way later on.[72]

5.86 The conservation group, Environment Victoria, also emphasised the need to meet long term international commitments:

> A greenhouse trigger is an essential component of [the EPBC] Act in order to ensure that the Commonwealth has a reach into the states on something that we have an international commitment on, and that is greenhouse. We have put in submissions that say that, but so far we are not clear about what

71 *Possible Application of a Greenhouse Trigger under the Environmental Protection and Biodiversity Conservation Act 1999: Consultation Paper*, Department of Environment and Heritage, December 1999.

72 *Proof Committee Hansard*, Canberra, 10 March 2000, p 62.

> the process is for resolving having a trigger. We think that is something that needs to be resolved - the trigger needs to be set up as soon as possible.[73]

5.87 Again citing the planned Queensland coal developments, the Australian Conservation Foundation (ACF) argued that the trigger would be in the national interest, given Australia's Kyoto obligations:

> There is a clear national interest that the national Government be involved, at the very least, in the bigger projects which are greenhouse emitting. We have not necessarily been talking about a complete ban here; we are just talking of a concurrence role, if you like. I think it is crucial that the national Government have some intros into those debates about major projects. We have seen Senator Hill, the Environment Minister, being very critical of Queensland with its coal-fired power stations and we welcome those sorts of criticisms. But the Minister is reduced to just crying poor from the sidelines under the current approach which failed to include greenhouse as a matter of national environmental significance.[74]

5.88 The Australasian Railway Association argued that the trigger should capture investment in transport infrastructure which would have a major impact on emissions:

> If there is an analysis of a particular corridor and it is agreed to build a freeway rather than a light rail, or rail line, we believe there should be a study done to look at the greenhouse implications of such projects. It fits in with our overall policy platform that all externalities, all external costs of greenhouse, as well as all the other issues like pollution, congestion and noise ought to be considered in all the infrastructure investments. So, in a sense, yes, we certainly do see the trigger as important, and we would endorse that approach.[75]

5.89 Industry representatives of large carbon emitters and electricity dependent industries were strongly opposed to the trigger, feeling that it would unfairly target new projects or could endanger new investment. For example, the Australian Industry Greenhouse Network commented that:

> We are concerned that incorporation of this as a greenhouse trigger could result in a situation where it would imply that the greenhouse problem and the need to address it rests solely with large and new projects. We have consistently sought a comprehensive approach to the management of this problem, both internationally and domestically.[76]

5.90 The Business Council of Australia (BCA) echoed this concern, saying that: 'our response to international climate change obligations must be managed well and in

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73 Ms Esther Abram, *Proof Committee Hansard*, Melbourne, 20 March 2000, p 168.

74 Mr John Connor, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 197.

75 Mr John Kirk, *Proof Committee Hansard*, Melbourne, 20 March 2000, p 142.

76 *Proof Committee Hansard*, Melbourne, 20 March 2000, p 142.

an holistic and strategic manner, not on an ad hoc project by project basis targeting a limited range of projects and with differential coverage of sectors and emissions growth'. In their view the trigger would not be an 'appropriate or cost-effective approach':

> At risk with the approach proposed is investment certainty and maintenance of conditions which promote a competitive economic environment in which business succeeds and supports national, social, environmental and economic objectives. We do not believe that we are in a position to - or, indeed, need to - subject future investment or the national economy to such risk at this stage. The BCA, therefore, considers that the important issue is not whether to apply greenhouse as a trigger under the EPBC Act but, rather, how to develop an appropriate mechanism to address continued economic growth while reducing the carbon intensity of our energy mix for growth across all sectors.[77]

5.91 The BCA was also strongly opposed to the use of a trigger by the Commonwealth to intervene to prevent the construction of new coal-fired power stations, even if such investment were to put at risk Australia's ability to meet its Kyoto commitments:

> The specific decisions in that case are a matter for the state government that is addressing energy needs in the state. The determination of what the power sources might be and the implications for greenhouse policy is an area in which you do need national coordination of views. Our view would be that we need to be very careful in discounting the significance of coal-based energy generation in a country in which the economics of coal powered energy represents a very important factor in Australia's competitive performance. It is directly relevant to the costs of energy. It is also important that we recognise the contribution that the coal industry is making to the welfare of this country.[78]

5.92 The Committee agrees with the BCA that there needs to be a nationally co-ordinated approach to greenhouse policy. However, the Committee does not agree with the BCA that the Commonwealth has no legitimate role in setting policy directions on Australia's energy mix. Indeed, it is the Commonwealth which has the ultimate responsibility of ensuring that Australia meets its commitments under the Kyoto Protocol.

5.93 The Committee further notes that if Australia has to buy emissions permits from overseas to meet its Kyoto targets, it will be taxpayers, not the responsible polluters, who will be paying for them.[79]

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77 Mr David Buckingham, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 176.

78 Mr David Buckingham, *Proof Committee Hansard*, Melbourne, 21 March 2000, pp 177-78.

79 Dr Clive Hamilton, *Proof Committee Hansard*, Canberra, 10 March 2000, p 58.

5.94 The ACF suggested that the current absence of a trigger was reinforcing distortions in a market which, sooner or later, will have to adjust to a greenhouse constrained economy. The current market, which did not provide the appropriate signals to new investors, was unfairly advantaging irresponsible investment over investment in less emissions-intensive alternatives:

> Having no triggers, and the converse - having nothing there but a voluntary approach - is leading us down the path at the moment where you have various states vying with each other to see who can put up the next coal-fired power station. You will have individual states alone blowing our emissions target without any capability for a coordinated or a national perspective. It is a recipe almost for business as usual except for those progressive companies prepared to take voluntary action. It leaves those progressive companies at a great disadvantage because it means that the laggards or those that are not prepared to do the right thing are free-riding in our economy. My strong view is that the business community should be rejecting such a proposition strongly.[80]

5.95 The NSW Government had a different concern with the trigger, in terms of its policy effectiveness in reducing emissions:

> The introduction of an emissions trading cap would serve a lot of the purpose that this slightly more indirect trigger would attempt to do… it would not actually of itself limit those emissions in any way and would not stop the projects going ahead, unless you made a very specific decision… . It would be, I suspect, more useful if we were to signal that, at some time in the not too distant future, there will be a cap on Australian emissions and people had better start factoring the cost of that into their projections of project costs, rather than us trying to do it in a regulatory manner through greenhouse trigger.[81]

5.96 The Committee agrees that an emissions trading system provides an effective least-cost approach to emissions reduction across a range of sectors. However, it raises very complex design and implementation issues, which may not be resolved in the short term. In order to ensure that Australia has a reasonable chance of meeting its international obligations, it will be necessary for the Commonwealth to introduce other measures in the meantime. Although investors should be planning for the likely introduction of emissions trading, this has made little or no impact on recent decisions for investment in new coal-fired power stations in Queensland. Other measures are required to divert these investments into more sustainable alternatives such as gas.

5.97 Woodside Energy, while ambivalent about the trigger, asked that clear principles for the assessment of projects under greenhouse be established at the same time:

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80 Mr Don Henry, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 197.

81 Mr Peter Stevens, *Proof Committee Hansard*, Sydney, 22 March 2000, p 280.

> The greenhouse trigger is really only half the story. The greenhouse trigger is the entree into the approvals process. How greenhouse is considered in the approvals process is somewhat more of an important point. At the moment, the Government has not seen fit to produce any sort of criteria as to how greenhouse will be considered within the approvals process. There does not seem to be a policy there which we can hang our hat on. To put out the greenhouse trigger for consultation without having the accompanying criteria does seem to be asking us to put the cart before the horse a little bit.[82]

5.98 Their concerns were echoed by Pacific Power, which is otherwise supportive of the trigger:

> The trigger simply means that certain developments get called in under the Commonwealth legislation. It really does not guarantee any particular outcome. So, as well as having the trigger, we need to have guidelines about how the assessment process will be applied once the legislation is triggered. Whether or not that is actually administered by the Commonwealth or the states may be another issue. But one thing that is important is that those guidelines are clear and they are out on the table so that people who are prospectively looking at developments can see them and can factor them into their planning and, at the same time, the people who apply those guidelines in assessing developments can do so quickly so that you do not just create another level of bureaucracy - you actually do something that adds value.[83]

5.99 The Committee concurs with the views of Pacific Power and Woodside in this regard, and agrees that is important for the Government to set out clear principles and policy intentions for the environmental impact assessment of projects under greenhouse. These would have the added benefit of ensuring that greenhouse issues are incorporated into project designs well before an EIS needs to be prepared, and improve investment certainty.

5.100 For example, it may be useful to establish principles that proscribe new electricity investments that will increase the overall greenhouse intensity of generation, or to set out policy objectives that will proscribe new or added capacity investments in coal-fired power, or mandate an emissions coefficient or a renewable component for new generation. Assessment of new road infrastructure projects may be guided by a policy of diverting travellers into more sustainable systems such as rail. International best practice could guide the assessment of available technology.

5.101 The Committee notes the views of those who believe that a trigger would be an ad hoc and limited policy response to the problem of greenhouse. A comprehensive approach is obviously desirable. The AGO acknowledges that it is

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82 Mr Steven Waller, *Proof Committee Hansard*, Perth, 17 April 2000, p 490.

83 Mr Paul Flanagan, *Proof Committee Hansard*, Sydney, 22 March 2000, p 365.

one potential tool of many, but emphasises that it has an important place as part of a comprehensive approach:

> [The greenhouse trigger] is certainly a viable mechanism. It is certainly a mechanism that can be used as one of a range of tools. The point that we would make about it is that it is not a complete response in itself in that it does address new developments. It addresses the incremental increase in emissions from new developments as opposed to being an instrument that addresses the overall emissions picture across the economy.[84]

5.102 While it is necessarily a selective response, there is nothing about the trigger which would be inequitable. It is arguable that a trigger would prevent the cost of irresponsible investment decisions from being unfairly passed to the community and the environment in later years. A trigger would also supply the Government with a more targeted and potentially more effective tool than a (nominally more comprehensive) policy such as emissions trading. Emissions trading would rely on indirect price and cost incentives which may be blunted by other market complexities. In the Committee's view, there is an important place for a trigger in combination with more comprehensive programs and policies.

5.103 The Committee does not support the argument that a trigger should be delayed until more comprehensive policies can be put in place. With more than 2000MW of investment planned for new coal-fired power generation, and escalating national emissions from the electricity sector, there is a strong argument for the immediate introduction of a regulatory tool to assess new investment with greenhouse impacts.

5.104 The Committee supports the insertion of a greenhouse trigger in the EPBC Act, which would mean that large new energy projects would be subject to either state or Commonwealth environmental impact assessment. The Committee recommends that the trigger be designed so as to capture large transmission augmentation projects such as Basslink which could have a substantial impact on emissions from the electricity sector. Whether or not such projects would be included in the trigger is currently unclear.[85]

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84 Ms Gwen Andrews, *Proof Committee Hansard*, Canberra, 22 June 2000, p 727.

85 See *Possible Application of a Greenhouse Trigger under the Environmental Protection and Biodiversity Conservation Act 1999: Consultation Paper*, Department of Environment and Heritage, December 1999.

Recommendation 33

The Committee recommends the immediate introduction of amending legislation that will designate greenhouse gas emissions as matters of national environmental significance under the *Environmental Protection and Biodiversity Conservation Act 1999*, and that it be designed so as to incorporate new projects, capacity expansions and recommissioned plant that would produce large amounts of new emissions sources.

Recommendation 34

The Committee recommends the proposed addition of a greenhouse trigger to the *Environmental Protection and Biodiversity Conservation Act 1999* be designed to ensure that transmission augmentation projects which will have a significant impact on electricity emissions will be subject to environmental impact assessment.

Recommendation 35

The Committee recommends that the introduction of a greenhouse trigger be accompanied by the announcement of general principles or other policy objectives that will guide the assessment of new projects.

Basslink

5.105 A significant issue raised during the inquiry was the greenhouse implications of the proposed new cable linking Tasmania and Victoria, known as 'Basslink'. Basslink will be a 400MW high voltage direct current cable, and has been under consideration since 1990. In 1999 the Tasmanian Government selected four consortia to bid for the rights to develop the project, which was awarded to the National Grid Company in February 2000. The Tasmanian Government requires Basslink to begin commercial operation by 30 December 2002.[86]

5.106 The greenhouse implications of Basslink hinge on the direction of the flow of electricity: if the flow is predominantly north from Tasmania to Victoria, and is thus able to displace brown coal generation with hydro, it will beneficial in greenhouse terms. However, it large amounts of high emissions brown coal-fired power flows south, it could lead to a further increase in the average emissions intensity of power generation at a time when it is already dangerously high. There was considerable disagreement among witnesses as to its overall effect.

5.107 McLennan Maganasik (MMA), in a report to the AGO, suggested that there could be significant flows south:

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86 McLennan Maganasik Associates, *Greenhouse Gas Emission Projections: Australian Electricity Generation and Natural Gas Combustion*, Report to Australian Greenhouse Office, 5 June 2000, p 19.

> The viability of the proposed link (called Basslink) will depend on the level of trading between the states and, therefore, the revenue that the cable owner could earn from the transmission of electricity. It is likely that during off-peak periods low cost electricity would be imported from Victoria to Tasmania. During these periods hydro energy in Tasmania would be conserved for export to Victoria during peak periods.[87]

5.108 The Committee notes that these comments suggest these flows could be balanced or exceeded by northward flows of renewable power.[88] However, there is considerable uncertainty about how this balance would be achieved in practice and about its overall greenhouse implications.

5.109 The owner/operator of the Breamlea Wind Generator in Victoria, Dr Michael Gunter, suggested that the net flow would in fact be south:

> The postulated reason for Basslink, for example, is that Victoria can have power coming in during peak load times. But I believe the net flow will actually be south and that the carbon associated with meeting Tasmania's energy demands will go up because there will be more cheap brown coal heading south than there will be clean hydro coming the other way.[89]

5.110 Dr Gunter explained this result in terms of market forces in the deregulated NEM, which made brown coal price competitive, also because Tasmania may not have enough hydro capacity:

> I would imagine that to make it financially viable to the network owner - obviously the way they recover the cost of putting it in is going to depend on whether it is a regulated asset or a non-regulated asset, and that is something that I am not fully up to speed with either - it is going to have to have energy flowing through it most of the time. I do not think there is enough water in the dams in Tasmania to have energy constantly flowing towards Victoria. It will obviously depend on the pool price differential between Tasmania and here. When energy is more expensive over here, there will be a net flow northwards. I suppose that could be influenced by vesting contracts and other complications, but that is a pretty broad generalisation. Most of the time the cheap brown coal from Victoria will see a better price in Tasmania and so it will flow south, just by market forces. That would be my concern.[90]

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87 McLennan Maganasik Associates, *Greenhouse Gas Emission Projections: Australian Electricity Generation and Natural Gas Combustion*, Report to Australian Greenhouse Office, 5 June 2000, p 19.

88 McLennan Maganasik Associates, *Greenhouse Gas Emission Projections: Australian Electricity Generation and Natural Gas Combustion*, Report to Australian Greenhouse Office, 5 June 2000, p 19.

89 *Proof Committee Hansard*, Melbourne, 21 March 2000, p 260.

90 *Proof Committee Hansard*, Melbourne, 21 March 2000, p 262.

5.111 Professor John Todd, from the Centre for Environmental Studies at the University of Tasmania, suggested that rainfall and water reserves were indeed a concern in Tasmania:

> We have realised that, because of the extended drought in Tasmania, it is likely that the State will have to use its oil-fired thermal power station in order to meet demand this winter. We have heard in the media that the thermal power station has been fired up just recently to get it ready just in case it is needed… . We are faced with a shortage of hydro-electricity.[91]

5.112 However, Professor Todd cautiously supported Basslink as greenhouse positive:

> I think there are both positives and negatives. The introduction of Basslink totally changes the way in which electricity can be managed in Tasmania. At present, for example, the suggestion is that Tasmania might supply hydro-electricity at peak periods into Victoria… . But in terms of the overall environmental benefits, yes, I think Tasmania has the opportunity of supplying hydro-electricity into Victoria, and in terms of the overall management of the south-eastern electricity grid, I think there is potential for savings in greenhouse gas emissions as a result of Basslink.[92]

5.113 Professor Todd did qualify his optimism with a concern that a smaller than anticipated flow would create pressures to sell electricity south:

> My concern with this is that if the use of Basslink cable is not as great as anticipated, there will be very strong pressures to encourage greater electricity use in order to cover the capital cost of the cable. So basically the cable is a significant additional capital cost within the south-eastern grid, and there are two ways to pay for that: either more electricity has to be sold, which ultimately will be more thermal generated electricity, because the hydro system is already operating near its peak; or the prices will have to go up somewhere. The current thinking is that, by selling at a premium into Victoria, it will be possible to achieve an overall increase in revenue, offsetting that by purchasing the baseload back into Tasmania at a higher prices than would be paid for baseload in Victoria; that the system will somehow pay for Basslink.[93]

5.114 The Tasmanian Hydro Electric Corporation (Hydro Tasmania) strongly argued for Basslink to proceed. It argued that the net greenhouse benefit would be substantial given the legislation of the Commonwealth's 2 per cent target for renewable energy, which would increase the mainland market for Tasmanian hydro and potential new windpower developments:

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91 *Proof Committee Hansard*, Hobart, 5 May 2000, p 479.

92 *Proof Committee Hansard*, Hobart, 5 May 2000, p 482.

93 *Proof Committee Hansard*, Hobart, 5 May 2000, p 482.

> We have undertaken modelling over a 25-year period, looking forward, of the market conditions which can be modelled and could be expected to arrive in Victoria, the increases in demand, and the possible increases in supply sources that would be here in Tasmania. For the most part we have conducted that modelling on a balance of net exports being the same as the net imports… .
>
> Since the introduction of the 2 per cent measure in a much more expected form since that measure was approved by the Cabinet of the Commonwealth Government, we have been modelling with considerable net export from Tasmania over a long period because we now expect that that measure could lead to wind developments here in Tasmania faster than the electron growth in the Tasmanian market. The primary modelling was on level flows but the more recent modelling done by us is on net export with Basslink.[94]

5.115 Hydro Tasmania emphasised that without Basslink, new wind development would be much slower, with or without the 2 per cent renewable energy measure:

> Without Basslink we will be limited in Tasmania to the development of wind generation at the rate of growth of the electron usage in Tasmania. Currently that has been running at the level of 0.8 of 1 per cent per annum, so it is a rather low growth market, so called, by national standards, both in GDP growth and then reflected in electricity growth. So without Basslink we are restricting the capability of Tasmania to be part of a national response to the greenhouse issue.[95]

5.116 The Committee agrees that every effort should be made to encourage the development of wind generation, however, concern has been raised that current transmission pricing under the NEM distorts the economics of Basslink and with the NEM reforms outlined in the NGS, the viability of the project would be questionable. Any decision to proceed with Basslink should take into account the impact of the NEM reforms agreed to by Australian governments under the NGS.

5.117 However, substantial uncertainty about Basslink's net greenhouse benefit remains. In the Committee's view, this underlines the need for a comprehensive evaluation of the greenhouse implications before the link proceeds. Dr Gunter endorsed this need:

> I think that if it is going to be a regulated interconnector then a proper EIS should be done and maybe the greenhouse trigger should be looked at. But, again, I do not quite know how it would pan out if it were to be an unregulated interconnector and whether there would any leverage that governments or triggers could have on whether it went ahead. I think that this needs to be looked at fairly closely.[96]

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94 Mr Geoffrey Willis, *Proof Committee Hansard*, Hobart, 5 May 2000, p 503.

95 Mr Geoffrey Willis, *Proof Committee Hansard*, Hobart, 5 May 2000, p 505.

96 *Proof Committee Hansard*, Melbourne, 21 March 2000, p 261.

Recommendation 36

The Committee recommends that a full evaluation be made of the long term greenhouse emission impacts of the Basslink project.

Recommendation 37

The Committee recommends that any decision to proceed with Basslink take into account the impact of the NEM reforms agreed to by the Australian governments under the National Greenhouse Strategy.

Energy Efficiency and Demand Management

5.118 The Committee heard from a number of witnesses that energy efficiency measures provided an enormous untapped potential for low cost greenhouse abatement, and to dramatically reduce energy emissions. At the same time, the Committee also heard that current energy markets were a disincentive to energy efficiency.

5.119 Professor Hugh Outhred told the Committee that, in addition to the negative impacts of reform, electricity consumption was rising both in raw terms and on a per-capita basis:

> The fall in real terms in electricity prices over the last decade has contributed to an increase in electricity consumption but there is also a range of other factors going on. The technical progress means that electricity has become much more widely used than it was previously. Lifestyle factors are also contributing. We see a significant growth in apartment living with smaller family sizes. That means more refrigerators, television sets and water heaters per capita. All of those tend to have parasitic loads, loads that are there all the time, that mean that the per capita consumption of electricity is going up.[97]

5.120 The Committee was told that such trends cause difficulties in encouraging electricity users to moderate their demand. ESAA's Managing Director, Mr Keith Orchison, remarked that:

> Back in 1990-91, my association invested quite a significant sum in looking at the opportunities for demand management in Australia, and the great difficulty in it has always been that where you have relatively cheap electricity you are going to find it hard to get the customers to be efficient in its use… . I believe we have estimated that, at its optimum, something in the order of 30,000 gigawatt hours of electricity per year could be saved through more efficient use in Australia. That represents at the moment

97 *Proof Committee Hansard*, Perth, 17 April 2000, p 495.

> about one-sixth of the electricity sold. Of course it involved to the users of electricity in investing significantly in more efficient equipment.[98]

5.121 ESAA also stated that gains in end use efficiency in Australia over the past 10 years were about half the OECD average, and that there needed to be much greater effort to achieve efficiencies in motor vehicles, appliances, plant and equipment, and industrial, commerical and residential buildings.[99]

The Abatement Potential of Energy Efficiency

5.122 A one sixth reduction in consumption indicates enormous potential - a potential saving of up to 27 Mt per year (using the 1998 electricity emissions figure). Newcastle City Council, which has developed energy efficiency programs for local councils, also suggested that large scale energy efficiencies were possible. They informed the Committee of substantial savings they themselves had made:

> You can take that Newcastle scenario across the country, and I have since learnt that the country does not use $7 billion worth of electricity, but $12 billion. Newcastle council's bill was $1 million. We achieved a 20 per cent reduction through a $400,000 investment, which gave us a two-year payback. Half of that money went to material, which is obviously linked to labour, and the other half went to creating jobs, in fact four jobs.[100]

5.123 They thought that their experience could easily be replicated across Australia, with dramatic results:

> If we can do that - if a silly old council can do that - then, surely, by looking at all of our facilities throughout the whole country systematically, we can do it ourselves. With a 20 per cent efficiency, our bill comes down to $5.6 billion. We have to invest $4.8 billion to get there, $2 billion you pay back, $2.4 billion goes to the material costs and $2.4 billion goes to labour, and that equates to 48000 jobs for one year or 4800 jobs for 10 years. We worked out that, if you were paying 10c a kilowatt hour for that electricity, we would save 14 megatons of greenhouse gas emissions - simply by achieving a 20 per cent energy improvement across the whole country.[101]

5.124 Newcastle City Council was also actively involved in broader energy efficiency programs, including:

- the Green Energy Learning Program;
- developing and making available a computer software program to enable council managers to track their energy use;

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98 *Proof Committee Hansard*, Sydney, 22 March 2000, p 336.

99 Electricity Supply Association of Australia, Submission 83, p 635.

100 Mr Peter Dormand, *Proof Committee Hansard*, Sydney, 22 March 2000, p 286.

101 Mr Peter Dormand, *Proof Committee Hansard*, Sydney, 22 March 2000, p 286.

- mentoring other councils to retrofit for energy efficiencies;
- the Energy Management Efficiency Service; and
- plans for a Residential Energy Monitoring Program across 200 homes for a 12 month period, with the aim of cutting residential energy use by 50 per cent.[102]

5.125 The Council is also involved in the Cities for Climate Protection Program™, but was concerned that there was too much competition for funds:

> It is an international program - 300 cities around the world are involved but 82 of those are now in Australia. At the local level there is a huge growth in enthusiasm, and I believe that if we do not feed that enthusiasm we are going to lose it within a year or two. So the opportunity for Federal Government assistance to local government I think needs to be looked at. At the moment $13 million of the initial funding that was provided for global warming was allocated to local government. We have to compete for that funding with the private sector. I think this is fairly inappropriate given that we are not in this for money; we are in this to help the Federal Government make this thing happen. I spend so much of my time writing grant applications and servicing those grant applications that I am wasting the time that I could be spending on rolling out the projects.[103]

5.126 The former Chief Executive of SEDA and adviser to the Clinton Administration, Cathy Zoi, agreed that there was much untapped potential for energy efficiency in Australia, but stressed that appliance standards were still wanting:

> We can have much more aggressive appliance standards. In the United States there is now legislation that is accelerating the development of energy-efficient appliances. This brings me to the issue of efficiency, which I think has been largely overlooked. It is much sexier to talk about solar and wind farms than about improving efficiency, but in my experience doing this in the United States and in Australia I have not run across a building that could not become 30 to 50 per cent more efficient at reasonable rates of return… . It is not just a local government issue; every sector at every level of operation in Australia, from the home up through factories, could become substantially more efficient if they were either directed or incentivised to do so.[104]

5.127 The Committee notes that much of the building efficiencies described by Newcastle City Council have been typical of 'no regrets' measures, in that a reasonable capital investment has been rewarded in time by cheaper energy bills. The task here may be to further promote and publicise the potential for energy efficiency, and to develop skills and firms that can advise on energy efficiency strategies and choices. Two Canberra-based architects, Laurie Virr and Paul Hanley, put the view

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102 Mr Peter Dormand, *Proof Committee Hansard*, Sydney, 22 March 2000, pp 285-90.

103 Mr Peter Dormand, *Proof Committee Hansard*, Sydney, 22 March 2000, p 289.

104 Ms Cathy Zoi, *Proof Committee Hansard*, Sydney, 22 March 2000, p 300.

that 'learning about energy efficiency should be as necessary in our society as the capability to swim, ride a bicycle, drive an automobile or operate an automatic teller machine'.[105]

5.128 SEDA claims great success for its energy efficiency initiatives, saving NSW companies $50 million, NSW government agencies $30 million, and householders $20 million over the next 10 years. It also claims to have reduced greenhouse emissions by 300,000 tonnes CO_2-e per annum as a result of its energy efficiency and renewable energy projects.[106]

5.129 The sustainable energy consultant, Mr Alan Pears, told the Committee that the greenhouse abatement achieved by energy efficiency was not merely low cost, but produced net financial benefits:

> I do believe we can achieve the Kyoto target at a net economic benefit. As an illustration of that, in the March 2000 *Australian Energy News* we find the effect of minimum energy performance standards being estimated at reducing emissions at a cost of negative $31 per tonne of CO_2. As someone who works a fair bit in the appliance industry, I can say that is right - it is really cost effective and there is a lot to be driven there.[107]

5.130 This was echoed by the Australia Institute:

> The Markel-Mensa model some years ago estimated that energy use in Australia could be cut by 30 per cent at no net cost to the economy by investing in insulation, in energy efficiency equipment and so on and so forth, and the payback periods were to be quite short, a few years. Here we have zero cost, a huge reduction in energy consumption at zero cost. I have actually gone back to some of the people who specialised in this and asked, 'Do you think that 30 per cent would be very different now?' They say, based on anecdotal evidence but these are energy experts who work in this area every day, it is about the same now. In other words, we could cut our emissions and our energy consumption by about 30 per cent at zero cost.[108]

5.131 The ACRE Energy Policy Group and the Australian CRC for Renewable Energy also argued that local government building and energy regulations needed greater coordination to be more effective and consistent:

> What we have is 776 local governments in Australia, all with their own views on how a solar water heater should be installed, whether or not they allow a solar panel on a roof, what level of insulation or other things they either ask for or whether they regard them as useful, whether they have any solar access requirements in their planning processes. What we find now,

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105 Laurie Virr and Paul Hanley, Submission 199, p 1014.

106 Mr Chris Dunstan, *Proof Committee Hansard*, Sydney, 22 March 2000, pp 268-9.

107 *Proof Committee Hansard*, Canberra, 16 August 2000, p 900.

108 Dr Clive Hamilton, *Proof Committee Hansard*, Canberra, 16 August 2000, p 898.

> most worryingly, is a huge conflict between solar access as something that would be critical for energy-efficient development going totally against the policies of trying to increase urban density, which is also there ironically for sustainability reasons, to some extent. It is more driven now by developers getting 10 houses on a block where they would previously only get five. The solar access is being totally lost in that argument.[109]

5.132 ACRE told the Committee that they had recommended to the Commonwealth to create 'a pool of energy officers that local governments can call on for the expertise that they do not have in house. Otherwise, they do not deal with it. It is just a whole new area that they have not thought of before'.[110]

Energy Efficiency in Buildings

5.133 Mr Laurie Virr and Mr Paul Hanley also argued that home and building energy rating ratings systems were currently inadequate. Their submission was very critical of design and implementation of the ACT's energy rating scheme, which, as the only state or territory in which it was mandatory, was supposed to be a testing ground for a national system. They argue that: 'The House Energy Rating Scheme is a concept that originated from the very best of intentions… . The assessment criteria, however, were hurriedly determined, predominantly subjective, and in some cases in serious error'.[111]

5.134 Mr Virr and Mr Hanley are strong advocates of passive solar houses and policies, such as that pursued by Leichhardt Council in Sydney, which mandate solar hot water systems in new housing construction or major renovations. However, they argued that the ACT system was hostile to recognising solar hot water as a measure of efficiency, and said that the scheme:

> Takes no cognisance of specific location, topography, existing or future vegetation, micro-climate, prospect, undesirable views, personal preferences, the reflectivity of roofing materials, and a whole host of other practical and aesthetic considerations that a sensitive designer has to take into account after accepting a commission from a client to develop a passive solar house… . The assessment process is based entirely on an examination of the drawings and specifications, and hence is decidedly theoretical.[112]

5.135 The ACT Government, through its Planning and Land Management Group (PALM), provided the Committee with a response to these criticisms. They assert that the ACT's energy guidelines will result in 'subdivisions, residential construction and commercial buildings which perform in an energy-efficient manner'. They told the Committee that they were developing guidelines for subdivisions, residential

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109 Dr Muriel Watt, *Proof Committee Hansard*, Sydney, 23 March 2000, p 415.

110 Dr Muriel Watt, *Proof Committee Hansard*, Sydney, 23 March 2000, p 415.

111 Laurie Virr and Paul Hanley, Submission 199, p 1017.

112 Laurie Virr and Paul Hanley, Submission 199, p 1022.

buildings and commercial buildings, with the subdivisions being the first 'in the operational policy phase to ensure that developers observe specific rules which result in solar access, setbacks, frontages, slope consideration, building envelope optimisation and plot development capabilities considered to be among the best in Australia'.[113]

5.136 In relation to specific criticisms of Mr Virr and Mr Hanley, the ACT submitted that:

- ACT subdivision guidelines maximise solar access through the siting of houses and design and orientation of blocks, with 80 per cent of subdivisions being 5-star, and the remainder 3- to 4-stars;
- making solar hot water systems mandatory reduces the flexibility available to builders in developing energy efficiency solutions, as would legislating for specific appliances in new residences, or mandatory levels of insulation;
- the ACT's energy rating scheme has been thoroughly measured and tested;
- the 'Firstrate' climate zone software is capable of producing climate sensitive results for 27 different climates within Australia and have been reviewed in close consultation with the developers of the national house energy rate system; and
- the training of assessors in the ACT are consistent with those developed by SEDA in NSW.[114]

5.137 The Sustainable Energy Industry Association (SEIA) was concerned that policies such as emissions trading alone would not provide a spur to energy efficiency, whether in buildings, motor vehicles or appliances. They have proposed a 'reverse carbon tax' in the form of 'emissions reduction credits' in the form of one-off rebates for appliances and systems which can demonstrate life-cycle emissions savings.[115] This scheme is discussed in more detail in chapter 9.

Government energy efficiency programs

5.138 Energy Efficiency is a priority in the Commonwealth's NGS. Existing measures include:

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113 Comments by Planning and Land Management Group (PALM), ACT Department of Urban Services in response to Submission No. 119 on Friday 10 March 2000 by Messrs Paul Hanley and Laurie Virr in private capacity.

114 Comments by Planning and Land Management Group (PALM), ACT Department of Urban Services in response to Submission No. 119 on Friday 10 March 2000 by Messrs Paul Hanley and Laurie Virr in private capacity.

115 Alan Pears, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 229; and Alan Pears, *Proposal: rebate scheme for sustainable energy systems/services that reduce greenhouse gas emissions*, Sustainable Energy Industry Association, Revised Jan 2000.

- compulsory energy labelling for major domestic appliances in most Australian states (although business appliances are voluntary);
- new minimum energy performance standards (MEPS) for domestic electrical appliances, developed in consultation with industry, which took effect from October 1999 (however these are not best international practice);
- demand management initiatives by electricity utilities;
- database development for benchmarking Australian energy efficiency performance against available international comparisons; and
- energy information programs to encourage the adoption of energy-efficient technologies.[116]

5.139 The NGS also listed a range of additional measures under development:

- energy efficiency standards for residential and commercial buildings. This includes developing a minimum energy performance requirement for new houses and major extensions (including using schemes such as the National House Energy Ratings Scheme, which was discussed by Virr and Hanley), and the incorporation of mandatory energy efficiency standards for large buildings through changes to the Building Code of Australia;
- ongoing improvements to the energy efficiency of appliances through broadening Minimum Energy Performance Standards (MEPS), improving various codes of practice and keeping pace with best practice technology;
- a program to improve the efficiency of electric motors;
- possible approaches to providing strategic support to the development of and investment in close-to-commercial energy efficiency technologies and services;
- options for encouraging the consumer uptake of energy-efficient technology, such as rebates, shared savings or credit schemes and energy planning incentives;
- the promotion of low emissions hot water systems and the efficient use of hot water;
- cooperation with industry to promote industrial energy efficiency and best practice; and
- the development of methodologies for life-cycle energy analysis and the identification of emissions abatement opportunities.[117]

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116 Australian Greenhouse Office, *The National Greenhouse Strategy: Strategic Framework for Advancing Australia's Greenhouse Response*, 1998, pp 47-48.

117 Australian Greenhouse Office, *The National Greenhouse Strategy: Strategic Framework for Advancing Australia's Greenhouse Response*, 1998, pp 49-50.

5.140 Minimum Energy Performance Standards (MEPS), established under the national Appliance and Equipment Energy Efficiency Program, have great potential to contribute substantial greenhouse abatement at negative cost. An AGO overview of measures regarding industrial equipment, electric motors, lighting, commercial refrigeration and airconditioning and household appliances suggests that average annual reductions of 7.2 MT CO_2-e could be achieved during the first Kyoto commitment period at a price of -A$31 per tonne of CO_2-e. Despite this, many Australian MEPS are below world's best practice (such as those for household appliances, which are around 30 per cent less stringent than those in the US).[118]

5.141 A 1999 discussion paper also spoke of problems in the pace and scope of implementation:

> The program lacks a consistent, agreed procedure to establish mandatory labelling of MEPS probably because it developed ad hoc from a series of separate state initiatives. The absence of agreed process is most apparent when the program is compared with its US counterpart. The lack of agreed process has meant delays in legislation making processes and reductions in the overall program effectiveness.[119]

5.142 The discussion paper argues for a legislative goal of matching world's best practice MEPS and a timetable for implementation of within three to five years, in order to provide certainty and allow industry notice of new standards. However, they also suggest that in the absence of consensus lower than world's best practice MEPS should be used.[120]

5.143 In Australia, the MEPS levels for refrigerators and hot water systems commenced operation on 1 October 1999. Since then, there has been no indication of any move to tighten the level of standard introduced, although discussion about increasing the scope of MEPS has taken place. Governments and industry have agreed to begin working towards imposing MEPS on a range of additional commercial and industrial equipment. Labelling allows consumers to assess the energy efficiency of appliances. This encourages a competitive appliance market, where purchasers are able to consider whole-of-life costs for the appliance, not just the purchase price.

5.144 The AGO has adopted two different approaches to appliance labelling. The Energy Rating Program for whitegoods is a mandatory scheme, while the Energy Star scheme is a voluntary scheme run in cooperation with industry, originating in the US.

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118 The Australian Greenhouse Office, *National Appliance and Equipment Energy Efficiency Program: Projected Combined Impacts from an Extended and Enhanced Program*, March 2000.

119 *Future Directions for Australia's Appliance and Equipment Energy Efficiency Program*, A discussion paper prepared by the National Appliance and Equipment Energy Efficiency Committee, February 1999, p 19.

120 *Future Directions for Australia's Appliance and Equipment Energy Efficiency Program*, A discussion paper prepared by the National Appliance and Equipment Energy Efficiency Committee, February 1999, pp 19-20.

Energy Star currently applies to office equipment including computers, printers, fax machines and photocopiers.[121] There appears to be no clear rationale to explain why one program is mandatory and the other is voluntary.

5.145 Energy efficiency of residential and commercial buildings is addressed by the Commonwealth Building Energy Efficiency Strategy. Following consultation with the building industry, the Ministerial Council on Greenhouse reached an agreement on 24 March 1999, on a comprehensive strategy aimed to make homes and commercial buildings in Australia more energy-efficient. The two-pronged Strategy balances the introduction of mandatory minimum energy performance requirements through the Building Code of Australia together with encouraging and supporting voluntary best practice initiatives. However, the Committee is concerned that the implementation of such standards is very slow and that voluntary approaches may not be working.

5.146 A strategy exists for expanding the Nationwide House Energy Rating Scheme by including a minimum energy performance requirement for new houses and major extensions, working with the states, territories and industry to develop voluntary minimum energy performance standards for new and substantially refurbished commercial buildings.

5.147 The Australian Building Energy Council (ABEC) has been formed to develop and introduce a voluntary code of practice for energy performance standards in the construction industry to be directed toward commercial and industrial buildings. In 1997 the Prime Minister said that if, after 12 months, the Government assesses that the voluntary approach is not achieving acceptable progress towards higher standards of energy efficiency for housing and commercial buildings, it will work with the states and territories and industry to implement mandatory standards through amendment of the Building Code of Australia.[122]

5.148 Mr Philip Harrington, from the AGO, indicated that progress on the building code was slow and that it still had not been amended. He thus indirectly acknowledged that the voluntary approach was not effective:

> … the code is administered by the states and territories and the Commonwealth and each jurisdiction has been asked to put in writing its agreement to that code change process. We are certainly expecting that to occur now that the Building Codes Board has adopted that framework.[123]

5.149 The Commonwealth Government has also put in place a program of Energy Efficiency Improvement in Commonwealth Operations with a target to reduce energy in Commonwealth occupied buildings by 25 per cent by 2003. One aim of the

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121 greenhouse.gov.au/energyefficiency/appliances/labelling/index.html (07/08/00)

122 Statement by the Prime Minister of Australia, the Hon John Howard, *Safeguarding the Future: Australia's response to climate change*, 20 November 1997, http://www.greenhouse.gov.au/ago/safeguarding.html (17/07/00).

123 *Proof Committee Hansard*, Canberra, 22 June 2000, p 700.

Program is to establish leadership in the community by example through the reduction of energy consumption and greenhouse gas emissions.

5.150 At a broader level than the buildings and appliances industries, the Energy Efficiency Best Practice Program (EEBPP) aims to stimulate energy-efficient good practice in industry leading over time to best practice. Within particular industry sectors the Program will:

- identify current energy use performance and the potential for improved energy efficiency;
- establish energy performance benchmarks;
- motivate economic improvements in energy efficiency and provide information and other support to achieve that end; and
- monitor and report on sectoral progress towards improved energy efficiency.[124]

5.151 The Committee is concerned that the EEBPP may overlap with the AGO's Greenhouse Challenge Program whose agreements are designed to capture the capacity of industry to abate its greenhouse emissions, mainly by improving its efficiency in energy use and processing. It suggests that this issue be addressed in the overall review of the NGS.

5.152 The Committee recognises that achieving energy efficiency requires a diverse range of policy responses across a range of contexts - buildings and households, appliances, motor vehicles - and from a range of actors: business, consumers and all levels of government. On the other hand, as a nation we need to recognise the tremendous low (and often negative cost) abatement opportunities offered by energy efficiency measures.

Recommendation 38

The Committee recommends that Australian governments streamline and coordinate their processes for developing and implementing world's best practice energy efficiency standards for products, manufacturing processes and building design, with a view to the earliest possible adoption of world's best practice standards.

Recommendation 39

The Committee recommends that Australian governments at all levels expand awareness programs for consumers, business and industry and encourage the development of expertise in energy efficiency solutions and programs.

124 http://www.isr.gov.au/resources/netenergy/domestic/bpp/index.html (12/09/00).

Recommendation 40

The Committee recommends that the inclusion of energy efficiency and greenhouse considerations into the Building Code of Australia be given priority for implementation.

The Energy Cycle - Possibilities

5.153 The Committee was also told of research into how different patterns of economic activity, and consumption, affect the energy intensity of the economy as a whole. Researchers from the Physics Department at the University of Sydney stressed that Australia had the highest per capita emissions in the world, but suggested that shifting the proportion of GDP to less energy-intensive industries could produce good results without affecting overall levels of employment.

5.154 They used economic models to compare the emissions intensity of various economic outputs, with the following results:

- beef cattle 10 kg CO_2 per dollar of output;
- iron and steel 3.8 kg CO_2 per dollar; and
- service industries between 0.7-0.8 kg CO_2 per dollar.[125]

5.155 Focusing on the much lower energy intensity of service industries, they speculated that, because labour-intensive industries were less energy intensive, energy could be traded off for labour:

> Those service industries have a much higher level of income associated with them, of course. In general, you can say that they have fewer imports associated with them, and they have a high level of taxation, and they do not necessarily mean that the employment level changes. The production factor way of looking at things is interesting, because you can see that to some degree you can trade off energy for labour, within an industry and between industries and commodities. So in some senses they are interchangeable.[126]

5.156 Other options to reduce emissions included changes in diet and the use of repairs to existing appliances rather than buying new ones. Repairing appliances can reduce emissions by 20 per cent while increasing employment by 35 per cent, and changes in diet could have similar emissions impacts:

> We looked at consumer choices of diet. If you compare the current average diet to a recommended diet, the difference is perhaps that we eat approximately 40 per cent too much and we also eat about twice as much

125 Dr Christopher Dey, *Proof Committee Hansard*, 23 March 2000, p 427.

126 Dr Christopher Dey, *Proof Committee Hansard*, 23 March 2000, p 427.

> meat as is recommended. If you look at the total effects of that change in diet —and this is a personal example; I have other examples—the emissions would go down by 20 per cent, to feed people, and there is no net change in employment, including rebounds.[127]

Promoting Renewable Energy

The potential for renewable energy

5.157 A large number of submissions argued that the development and further uptake of renewable energy was essential, both for Australia to meet its Kyoto commitments and to changing the structure of its energy economy. For example, Pacific Power argued that:

> If there is a fixed cap on emissions, the only way that electricity needs can be fulfilled in the longer term is through generation that does not produce emissions. The development of a renewables industry is, in Pacific Power's view, essential in a greenhouse constrained world.[128]

5.158 The Australia Institute argued that renewable energies were important if Australia was to take advantage of the opportunities opened up by the Kyoto Protocol:

> What Kyoto did was to mark the start of an extraordinary revolution in energy technologies. The more sensible companies around the world, the big companies that can see the future, recognised that, so you now have even the oil majors like BP and Shell investing in a very heavy way in renewable energy technologies.[129]

5.159 However, they feared that complacency would see Australia left behind:

> The Australia clause was a 'get out of jail' card, which the Australian government is going to exploit for all it is worth. If I can mix my metaphors, it is also a poisoned chalice. While the rest of the industrialised world is making a transition to the next generation of energy technologies, Australia is locking itself into fossil fuels. Instead of exporting fossil fuels to Japan as we do now, we will end up importing renewable energy technology.[130]

5.160 Many witnesses emphasised not only the opportunities for abatement opened up by the development of renewable energy, but the commercial opportunities as well. SEIA told the Committee that:

> The sustainable energy industry is one of the future industries of this world. The recent study done by SEDA, the Sustainable Energy Development

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127 Dr Christopher Dey, *Proof Committee Hansard*, 23 March 2000, p 427.

128 Pacific Power, Submission 98, p 801.

129 Dr Clive Hamilton, *Proof Committee Hansard*, Canberra, 10 March 2000, p 61.

130 Dr Clive Hamilton, *Proof Committee Hansard*, Canberra, 10 March 2000, p 58.

> Authority of New South Wales, found that it was the fastest growing industry sector, faster than either IT or tourism, in New South Wales.[131]

5.161 SEIA also emphasised its export potential:

> 75 per cent of BP's Solarex photovoltaic cells are exported. There is great export potential, especially where we are in this world. If you look at our geographical location, you have South Africa and the Indian subcontinent, and around to Asia-Pacific and Latin America and that is where one billion people basically are located who have no energy whatsoever - no electricity. There is an enormous export industry awaiting us if we take advantage of it.[132]

5.162 The Managing Director of Energy Technology Investments and a former adviser to the Clinton Administration, Cathy Zoi, emphasised the industry's enormous global potential:

> I think, fundamentally, we are in an energy transition globally that will take some time. My biggest question when I have all three of those hats on is: will Australia place itself at the cutting edge to capitalise on the explosive market growth as part of this transition? *The Economis*t, which is not famous for its small 'l' liberal views, has characterised sustainable energy as the next trillion dollar global industry. Again, I think that is extremely exciting for us here in Australia.[133]

5.163 In June 1999, the Prime Minister's Science, Engineering and Innovation Council (PMSEIC) published a report, *From Defence to Attack: Australia's Response to the Greenhouse Effect*, which made many similar arguments.[134] They, for example, argued that Australia needed to act before the Kyoto Protocol was ratified:

> If we wait for ratification while other countries act, Australia runs the risk of missing out on global opportunities , and may be left behind in terms of greenhouse compliance. The working group considers this to be a fundamental point… . Australia can now move from a defensive position to one of attack, to take advantage of the opportunities created by new markets, as its trading partners move towards greenhouse emission targets and identify related opportunities enhancing sustainable development.[135]

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131 Mr David Abba, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 234.

132 Mr David Abba, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 234.

133 *Proof Committee Hansard*, Sydney, 22 March 2000, p 298.

134 The paper was prepared by an independent working group for PMSEIC. Its members were Professor Don Nicklin (Chair), Dr Tom Connor (Kinhill Pty Ltd), Dr John White (Systems Engineering Consortium), and Dr John Wright (CSIRO Energy Technology).

135 Prime Minister's Science, Engineering and Innovation Council, *From Defence to Attack: Australia's Response to the Greenhouse Effect*, 25 June 1999, pp 3, 7.

5.164 The PMSEIC estimated that the Australian market in greenhouse abatement was US$7 billion, growing at 4.1 per cent annually, and that globally abatement could be worth US$500 billion with a growth of 3.2 per cent. Many of these opportunities will be in renewable energy. They advocated a national goal to 'capture and maintain at least 5 per cent of the world greenhouse market using the Australian market as a prototype'. This, they argued, was 'unlikely to be achieved without a greater level of commitment to commercialising Australian technology and nurturing the emerging firms which will be the medium through which success is achieved'.[136]

Current renewable energy programs

5.165 The Commonwealth has a small number of programs with the aim of developing renewable energy. They include:

- Renewable Energy Commercialisation Program (RECP) - a five year competitive grants program that funds projects leading to the commercialisation of innovative renewable energy equipment, technologies, systems and processes. RECP grants are normally in the range of $100,000 - $1 million. The total budget is $30 million.[137]
- Renewable Energy Equity Fund (REEF) - provides venture capital for small innovative renewable energy companies. The Commonwealth will provide up to $20 million, which will be supplemented by a private sector fund manager which will arrange for matching funds to be provided on a 2:1 basis. The fund manager will make investments in accordance with guidelines approved by the Industry Research and Development Board.[138]
- Renewable Energy Showcase - this Program supports and promotes a few leading edge and strategically important renewable energy projects that have strong commercial potential, are technically proven, demonstrate the potential for large-scale widespread application, offer the prospect of significant abatement of greenhouse gas emissions over the longer term and make a substantial contribution to building the capacity of Australia's renewable energy industry. The Program, funded to $10 million, is now closed to new applications.[139]
- Ethanol Pilot Plant - the AGO is continuing negotiations with NSW and private sector interests in relation to an ethanol pilot plant to demonstrate new Australian and United States technologies for the production of ethanol from feedstock.[140]

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136 Prime Minister's Science, Engineering and Innovation Council, *From Defence to Attack: Australia's Response to the Greenhouse Effect*, 25 June 1999, p 9.

137 Australian Greenhouse Office, Submission 169, p 1693.

138 Australian Greenhouse Office, Submission 169, p 1694.

139 Australian Greenhouse Office, Submission 169, p 1693.

140 Australian Greenhouse Office, Submission 169, p 1694.

- the 2 per cent mandatory target for the further takeup of renewable energy in electricity supplies, which will require electricity retailers to gradually increase their purchases of renewable energy to a total of 9500 GWh in 2010. Legislation for this measure was introduced into the Parliament in June 2000. It is expected to boost the construction of new renewable energy generation capacity, and provide for a modest emissions reduction of 4-5.5 Mt CO_2 in 2010. The AGO claims this measure will generate at least $2 billion in renewable energy investment in Australia and will be a significant driver of the industry's growth. However, the slower than optimum take up program and marginal penalty rate for non-compliance, cast some doubt on whether this will be the case. It may also be the case that the inclusion of biomass as an eligible renewable energy source results in a dominance of biomass over the more expensive wind and solar energy sources; this would likely result in higher greenhouse emissions. If it is passed, the legislation will not come into effect until January 2001.
- initiatives worth $321 million under the 1999 *Measures For A Better Environment* package - $264 million to support the replacement of diesel-fuelled remote area power systems with renewable systems; a further $26 million for the RECP; and $31 million for rebates for the installation of solar photovoltaic generators (the Photovoltaic Rebate Program, PVRP) in residential and community use buildings. [141]

5.166 The PVRP was introduced on 1 January 2000. Cash rebates are available to householders and owners of community use buildings, such as schools, who install grid-connected photovoltaic systems. The program has already overspent its budget allocation and has had to be redesigned. Concern was raised in previous Senate Estimates hearings regarding the basis for funding allocation and whether it would be sufficient. However, the Government has declined to provide additional or reallocate resources to this program.

5.167 In December 1997, the Government also announced an Action Agenda for the Australian renewable energy industry.[142] The Agenda was approved for implementation on 23 May 2000. Its objective is to develop a policy framework to encourage growth in a commercially viable and internationally competitive Australian renewable energy industry.[143] Under the supervision of the Department of Industry, Science and Resources, an 'Industry Leadership Group' has been formed, supported by a Strategic Planning Working Group, with participants drawn from industry,

141 Australian Greenhouse Office, Submission 169, pp 1694-5.

142 On 23 May 2000, the Government approved implementation of the Renewable Energy Action Agenda (REAA), and established an Industry CEO group to provide high level support, and a Renewable Energy Implementation Group to implement REAA strategies and actions (Industry Science Resources, *New Era, New Energy – Renewable Energy Action Agenda*, Executive Summary, May 2000).

143 Department of Industry, Science and Resources, Action Agendas - Renewable Energy, Website: isr.gov.au/agendas/Sectors/energy.html (19/07/00), p 2.

academia and government.[144] The scope of the Agenda includes sustainable transport fuels, solar, wind, biomass, tidal, wave, hydropower and geo-thermal energy and renewable hydrogen, value-added products, conversion technologies and associated services.

5.168 The Agenda's declared vision is 'to achieve a sustainable and internationally competitive renewable energy industry which has annual sales of A$4 billion'. Five strategies set out to deliver this target are: market development; building community commitment; building industry capability; setting the policy framework; and encouraging a culture of innovation.[145] The Agenda has a complementary overlap with several other programs designed to increase commitment, education and innovation in respect of greenhouse issues.

5.169 The Committee notes that up to now the Agenda has failed to introduce any new initiatives of any note that go beyond measures already underway.

5.170 Among the states, NSW is a leader with the establishment of the Sustainable Energy Development Authority (SEDA) and Green Power programs. Both Victoria and NSW have Energy Smart Business programs and Tasmania, through its power company Hydro Tasmania, is actively developing new renewable energy sources such as wind.

Green Power - Early attempts at market transformation

5.171 An initiative of SEDA, Green Power was an early attempt to build a domestic renewable energy industry. SEDA characterises Green Power as an attempt to stimulate 'market transformation' through the accreditation of renewable energy power suppliers which can sell 'green' electricity to consumers at a premium. This has been able to stimulate demand for renewables, but its impact remains limited. By October 1999, 11 retailers were offering Green Power to approximately 60,000 customers.[146]

5.172 While the bulk of these customers were in NSW, under the NGS, SEDA has also been licensed to accredit green energy sources for retailers around the country. SEDA's guidelines are strict and include consideration of the collateral environmental impact of renewable sources. They are consequently seen as benchmark for the definition of renewable power sources. Biomass from forests is accredited on a case by case basis and non-plantation native forests are not accredited.[147]

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144 Department of Industry, Science and Resources, Action Agendas – Renewable Energy, Website: isr.gov.au/agendas/Sectors/energy.html (19/07/00), p 3.

145 Department of Industry, Science and Resources, Action Agendas - Renewable Energy, Website: isr.gov.au/agendas/Sectors/energy.html (19/07/00), pp 3-4.

146 Mr Chris Dunstan, *Official Committee Hansard,* Sydney, 22 March 2000, p 269.

147 Sustainable Energy Development Authority, *Green Power Briefing: Green Power and Wood Wastes;* Sustainable Energy Development Authority, *National Green Power Accreditation Program: Accreditation Document*, Version 1, January 2000, Appendix A, p 14.

5.173 It is estimated that customers pay a premium of 35 per cent more for Green Power than non-renewable electricity. Currently, only about 1.7 per cent of electricity consumers buy Green Power. SEDA's Mr Chris Dunstan told the Committee that:

> If we look at the rate of growth, we have a long way to go. There is still quite a strong upward trend in the number of subscribers. I would say that the average electricity consumer, certainly from my own experience, does not understand Green Power as an option or I would say in the majority of cases has not even heard of it, despite getting inserts in electricity bills and so on. We get a lot of inserts in electricity bills, and it is easy to miss something like that.
>
> We conducted some surveys prior to establishing the Green Power accreditation program, and in those surveys up to 60 per cent of the population said they were prepared to pay more to source their electricity from renewable sources. We suspect that, when push comes to shove, 60 per cent might be a little high, but we would like to see it get up to at least 5 per cent of consumers over the next few years. Currently, it is about 1 per cent.[148]

5.174 Mr Dunstan claimed that Green Power, in combination with other SEDA programs, has helped to stimulate about $100 million of investment in renewables, and was crucial to projects such as Pacific Power's wind farms at Crookwell and Blayney. The former Chief Executive of SEDA, Cathy Zoi, also told the Committee that Green Power had been able to leverage $70 million of investment for about $2 million in government spending.[149]

5.175 Great Southern Energy was very positive about the role of Green Power in creating a positive context for the development of renewables:

> Green Power is having a significant impact on the Australian electricity market. In a short time power companies have demonstrated a strategic shift in favour of renewable energy and Green Power has carved an important niche for itself in the consumer and business psyche.
>
> As part of their Green Power activities many power companies are promoting renewable energy and greenhouse reduction which is raising the awareness of the community of these issues. There are very significant long term benefits in educating the public on these issues and Governments may find Green Power to be an effective means of focusing the community attention on reducing greenhouse emissions.[150]

5.176 Great Southern Energy hoped that 'under current trends, 2-3 per cent of the total customers base may join a Green Power scheme in the medium term. Take-up

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148 *Official Committee Hansard*,, Sydney, 22 March 2000, p 271.

149 *Official Committee Hansard*,, Sydney, 22 March 2000, pp 269, 299.

150 Great Southern Energy, Submission 150, p 1558.

rates of this level across Australia would result in about 300-400 MW of new capacity and 1,000-1,500 GWh of new renewable generation. This would be a small proportion of the 2 per cent renewable energy targets and achieve about 1.0-1.5 million tonnes of greenhouse gas reduction'.[151]

5.177 The Committee commends NSW and SEDA for their initiative in establishing the Green Power program and its success in raising awareness and demonstrating consumer demand for renewables. However, even with projected increases in consumer uptake of the program, it is likely to remain of limited importance in achieving large scale emissions reductions, partly because it involves consumers choosing to pay a premium (which many may not be in a financial position to do) and partly because the otherwise hostile conditions in the NEM are putting such pressure on renewables.

5.178 For example, the future viability of schemes such as Green Power has been questioned by Integral Energy, an accredited retailer of Green Power. According to the Integral Energy 1997 Annual Report, competition is driving energy prices down, and the viability of potential alternative energy projects with it:

> … the commercial viability of several alternative energy projects diminished due to increased competition dramatically reducing wholesale electricity prices.[152]
>
> While Integral Energy remains committed to developing its alternative energy portfolio, the viability of large and small projects will largely depend upon the future cost of conventional energy sources.[153]

5.179 Commenting on the NSW Green Power program, Great Southern Energy also highlighted the importance of reducing risks and uncertainties associated with alternative energy schemes:

> The NSW experience demonstrates that, to develop major greenhouse initiatives, companies require a certain framework that is enforced in law. Such a framework is necessary to enable sound commercial decisions to be made.
>
> The NSW greenhouse strategy process involves a 5 year program and individual targets that are linked to many market factors such as State sales, imports from other states and performance of individual power stations. The result is that individual targets may vary considerably as a result of factors outside the control of liable parties. It is very hard to manage the

151 Great Southern Energy, Submission 150, p 1558.

152 Integral Energy, *Annual Report*, 1997, p 16.

153 Integral Energy, *Annual Report*, 1997, p 19.

> achievement of annual targets in a framework which introduces a great deal of uncertainty to the implementation of measures.[154]

5.180 It is currently uncertain exactly what effect the introduction of the 2 per cent renewables legislation will have on Green Power. It will stimulate more investment and higher levels of renewable generation. However, the Committee considers Green Power of great value and urges the states and territories, and electricity retailers, to continue and expand their offerings of Green Power products over and above the mandated 2 per cent increase required by the new legislation. In its August 2000 inquiry into the 2 per cent legislation, the Committee recommended that the Commonwealth ensure that retailers cannot count Green Power sales towards their 2 per cent liability.[155]

Research and development

5.181 SEIA told the Committee that current research and development in renewable energy was less than $8 million in 1996-97. They argued 'the ballpark for real R&D in a real, innovative large industry' would need to be at least $200-300 million. Current efforts to stimulate research and development in, and the commercialisation of, renewable energy technology 'is going to have to be ramped up':

> I must say that a lot of people in the sustainable energy sector yearn for the good old days of ERDC, the Energy Research and Development Corporation, which they felt was quite an effective model. I think the other side of it is that, as with many other industries, commercialisation is a bit of a black hole for our industries. From my point of view, I see a real need for stability of funding, particularly when you are looking at tertiary institutions and some research organisations so that we can begin to build up our young people's expertise. We do see a lot of people turned off developing careers in research in this area because it is so difficult to get steady funding.[156]

5.182 Citing cutting edge research at the ANU on solar cells and solar thermochemical energy applications, SEIA argued that government as well as the private sector could play a role in the commercialisation of promising technologies:

> In the case of ANU, I happen to know that they are looking to get some commercial partners. They have a new photovoltaic cell that they have been developing which they believe has a greater capacity than what is on the market elsewhere, and they are looking for commercial partners. I think there is a role for government funding in that too. After all, governments, both state and Federal, have notoriously involved themselves in industry development over the last two or three decades, at least to my

154 Great Southern Energy, Submission 150, p 1560.

155 Senate Environment, Communications, Information Technology and the Arts References Committee, *Report on the Renewable Energy (Electricity) Bill 2000*, August 2000, p 41.

156 Mr Alan Pears, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 234.

> knowledge… . There is a role for both government funding and commercial funding.[157]

5.183 Dr Muriel Watt of the Australian CRC for Renewable Energy, also felt that R&D needed more effective stimulus:

> We do not focus much on R&D in Australia. In fact, the Commonwealth Government no longer has an energy R&D arm like ERDC that it had before. It has the CRCs, but they have their specific tasks. There is not anything generic for R&D. But we need the sorts of R&D that are going to make the renewable energy products more accessible, more easily used as well as cheaper.
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> For instance, almost all the solar water heaters manufactured in Australia are manufactured single handedly, one at a time. There is no automation in the industry. There is no development of new products that are going to capture the public's imagination and get them to use them. We need the development of products that are going to be user friendly. The technology itself is almost there, but we just cannot get it to that next stage. We certainly need the market support in the short term and some of the AGO programs deal with that. Although, as I said, they are very short term so they may not be as successful as we would like them to be.[158]

5.184 Dr Watt argued that longer term market certainty was needed:

> Long term purchase contracts from government agencies and others are an excellent way of providing that sort of level of security that short term subsidy programs do not. For instance, if you look at what happens in other countries, the most successful development of renewable energy industry has been where there have been the options of 20-year purchase contracts. Four-year subsidy schemes have the boom and bust; with long-term, 20-year purchase contracts, you can sell your electricity for 20 years. They are the sorts of things that get industry in.[159]

5.185 The Committee notes that the 2 per cent renewable electricity target could have a beneficial effect in this regard. Given that it will increase the purchase and renewable electricity to 9500 GWh in 2010, and maintain that figure to 2020, it is hoped the long term market certainty provided by the measure will be a significant stimulus to new investment.[160]

5.186 The measure was widely thought to have promising potential to spur the further development of renewable energy in Australia. Although the impact of the

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157 Mr David Abba, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 236.

158 *Proof Committee Hansard*, Sydney, 23 March 2000, p 411.

159 *Proof Committee Hansard*, Sydney, 23 March 2000, p 411.

160 Senate Environment, Communications, Information Technology and the Arts References Committee, *Report on the Renewable Energy (Electricity) Bill 2000*, August 2000, p 34.

measure on Australian greenhouse emissions from energy will be low (4-5.5 MT CO_2 less in 2010), it is hoped it will stimulate some $1.8 billion in investment in the years to 2010.[161]

5.187 The Committee was supportive of the 2 per cent renewables legislation introduced into the Parliament in June 2000 but, in response to concerns that the measure may not stimulate investment in higher-cost renewables such as wind and solar, also recommended a number of small amendments to the legislation, including a steeper phasing path for the takeup of renewables and a tighter system of penalties.[162]

5.188 In its paper on emissions trading and business taxation, the Australia Institute advocated the retention of accelerated depreciation (slated for abolishment under the Ralph proposals) using revenue from the auction of emissions permits. In response to a question from the Committee about this proposal, SEIA said:

> A key point on accelerated depreciation is that where businesses have a culture of fairly short term thinking and they are confronting moving into areas that involve greater capital expenditure and lower rates of return than they are used to, accelerated depreciation would have some value in reducing the size of the barrier to them moving into those areas. Given that sustainable energy is about light manufacturing and services industries to a great extent, they are people who are not used to really big capital investments with very long term returns, so accelerated depreciation may be valuable to them.[163]

5.189 Mr Rob Clarke, the Manager of the wind turbine manufacturer Pheonix Windpower, also argued that accelerated depreciation was important to new investment in renewables:

> Allowing accelerated depreciation of wind equipment (for example, allowing 100 per cent depreciation of a wind turbine in the first year of operation) will significantly lower the amount of income taxes paid during the initial stage of the project. This helps alleviate the extra burden wind developers experience due to the higher initial capital costs of a wind plant.[164]

5.190 Ms Cathy Zoi, whose company Energy Technology Investments (ETI) Limited was seeking to raise venture capital for sustainable energy, told the Committee that there was strong potential in this area but that progress was currently slow:

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161 Combined Explanatory Memorandum, *Renewable Energy (Electricity) Bill 2000/Renewable Energy (Electricity) (Charge) Bill 2000*, pp 20, 45.

162 Senate Environment, Communications, Information Technology and the Arts References Committee, *Report on the Renewable Energy (Electricity) Bill 2000*, August 2000.

163 Mr Alan Pears, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 245.

164 Pheonix Windpower, Submission 226, p 2957.

> What I hear when I go around and talk to institutional investors about prospects of investing in ETI is that they are getting pressure from their members about member choice. It will, over probably the next 12 to 18 months, gradually be introduced in more areas, but it is taking a long time. My guess is that, as soon as it is available, people will take it up. There is an example I heard about of a listed company in the UK that does renewable energy investments. They offer no dividend for the first few years and then only modest returns compared with the stock market average, and they were oversubscribed when they listed. People want to do this. They are interested in putting their money into these areas. Interestingly, though, when we go around and pitch the institutions we do not push the ethical bit first and foremost because, frankly, the financial returns are substantial and quite competitive in normal venture capital terms. There is no financial sacrifice because this happens to be good for the environment.[165]

5.191 SEIA also commented that new government initiatives, such as the Greenhouse Gas Abatement Program (GGAP) and the rebates for household solar electricity systems, were promising. Of the solar rebate scheme they commented:

> The rebate scheme which is being introduced for PV systems has certainly generated an enormous amount of interest. SEIA accredits designers and installers of stand-alone power schemes and so on, and it would be fair to say that basically since early January we have been getting from 12 to 20 calls a day from people seeking accreditation. This indicates that there is some stimulation happening from that rebate system.[166]

5.192 They also thought that the GGAP may have a small impact on changing energy markets for the better:

> What is starting to happen with GGAP and the recognition that a response to greenhouse could drive the agenda more is that these companies are starting to redo their sums. To be quite honest, it looks as though the kind of funding coming from things like GGAP is just enough to tilt the balance for them to think they can make some money.[167]

5.193 The wind turbine manufacturer Pheonix Windpower advocates the establishment of a small electricity levy that could generate revenues which could be applied to stimulate research, development and investment in a domestic renewable energy manufacturing sector:

> Many Government documents issued by the Australian Government purport to a local content in the emerging renewable energy marketplace of up to 85 per cent, it is our belief that this is a totally unrealistic figure as at this present time there are no manufacturers of large scale wind turbines in

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165 *Proof Committee Hansard*, Sydney, 22 March 2000, p 301.

166 Mr David Abba, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 236.

167 Mr Alan Pears, *Proof Committee Hansard*, Melbourne, 21 March 2000, p 235.

> Australia and indeed only a handful of struggling small Wind Generator Manufacturers may be found. It requires significant positive direction and seeding by the Government of Australia in order to achieve its advertised indigenous content in this new renewable energy push.
>
> What figures are being published are largely made up of the labour component with essentially no embedded technology. Without the injection of local technology into the mix a viable Australian industry cannot be created.[168]

5.194 Pheonix suggests that revenues from the levy be applied to R&D funding, testing and accreditation facilities, soft loans, installation grants or tax write-offs such as accelerated depreciation. They also argued that attention needed to be paid to reducing barriers to distributed generation and to establishing net metering programs so that domestic producers of renewable electricity could sell their energy into the grid. In particular, Pheonix emphasise that R&D, particularly in wind, is needed if Australia is not to become a net importer of renewable energy technology:

> Currently nearly all wind turbines used for large scale renewable energy generating come from a mere handful of large (relatively) European and Japanese firms with the Europeans claiming 90 per cent plus of all wind generators currently being sold worldwide. It is interesting to note that America which has the second largest installed generating base has no indigenous manufacturer capable of competing with the European products and this has been a direct result of the lack of any government promoted policies in this regard. …
>
> Australia is an isolated country with geographic and social variations when compared to the European model and coupled with this is significant export potential for equipment which fits the Australian requirement. Asia and many third world countries can be targeted hence the more pressing need for local research and development programs.[169]

5.195 While the Government does have existing programs in place relating to commercialisation and capital markets, such as the Renewable Energy Equity Fund (REEF) and the Renewable Energy Commercialisation Program (RECP), the AGO told the Committee that the venture capital equity fund established under REEF (known as CVC Reef) still had not commenced operation as of June 2000, due to delays in capitalising the fund. The Government has committed $20 million as its share of REEF, with the private sector expected to commit funds on a 2:1 basis. Better progress is being made with the RECP, with $22 million having been committed to date and a total pool of $56 million being available following the

168 Pheonix Windpower, Submission 226, p 2954.

169 Pheonix Windpower, Submission 226, pp 2954-60.

Measures for a Better Environment Package. The $10 million allocated to the Renewable Energy Showcase Program has been fully committed.[170]

5.196 These figures compare to the approximately $300 million which SEIA argues needs to be devoted to R&D alone over the next few years. Another renewable energy firm, Sustainable Technologies Australia Ltd, argued that AGO programs were not substantial enough and were being spread too thinly:

> Australia has no chance of such broad success, (our spend on each area is minuscule compared to our international competitors) and by limiting investment in potential winners, we risk succeeding in none. The current Renewable Energy Commercialisation Program has made offers to a limit of $1 million to projects within the technologies listed above. The cap should be much higher, the projects much larger and the investment targeted to sectors of the industry with a track record and technologies with existing international acclaim.
>
> STA submits that the full current Australian renewable energy commercialisation budget should be applied to the areas where Australia's international leadership is already acknowledged, where we have a manufacturing base and market experience ie in solar photovoltaics. We also propose that a similar but even larger programme be set up for building energy-efficient product commercialisation - where the potential GHG savings are enormous and the export opportunities for tropical areas of Asia unlimited.[171]

5.197 The Committee heard a diversity of opinion in regards to the fundamental problems facing the renewable energy industry - some witnesses argued that commercialisation was a problem, others R&D, and others market certainty and longevity. It may be that these are all significant issues affecting different sources and technologies differently. However, a large number of witnesses emphasised the enormous potential for Australia in the development of renewable energy, in terms both of greenhouse abatement and in the ability to capture a slice of huge potential global markets.

5.198 The Committee notes the recommendation of the Prime Minister's Science Engineering and Innovation Council that Australia seek to capture 5 per cent of a potential US$500 billion market in renewable energy.[172] The Committee recommends that the Government commit to such a target and designate renewable energy as a strategic industry.

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170 Mr Philip Harrington, *Proof Committee Hansard*, Canberra, 22 June 2000, p 694.

171 Sustainable Technologies Australia Ltd, Submission 154, p 1574.

172 Prime Minister's Science, Engineering and Innovation Council, *From Defence to Attack: Australia's Response to the Greenhouse Effect*, 25 June 1999, p 9.

Recommendation 41

The Committee recommends that the Government set a target for the Australian renewable energy industry to capture 5 per cent of the global renewable energy market by 2015, and designate renewable energy as a strategic industry.

Recommendation 42

The Committee recommends that the Commonwealth Government in consultation with the industry develop an aggressive industry development program for the Australian renewable energy industry.

Recommendation 43

The Committee recommends consideration of a range of options for the renewable energy industry including tax incentives, R&D grants, market and regulatory reforms, and continuing assistance with commercialisation.

Australian Democrats Recommendation 4

The Australian Democrats recommend that carbon levy revenues also be considered as a source of funds for renewable energy programs.

Recommendation 44

The Committee recommends that the Commonwealth set up specific programs under Austrade and Ausaid to promote the export and transfer of Australian and sustainable energy technology to developing countries.

Australian Democrats Recommendation 5

The Australian Democrats recommend that the Commonwealth Government conduct studies to identify the full costs of energy supply on a regional and time basis and that, where prices are below those costs, make compensating subsidies available to sustainable energy alternatives in those areas or satisfying loads at those times.

Turning the Ship

Can current energy market structures achieve emissions savings?

Potential reductions

5.199 Current policies which are expected to reduce emissions from energy use and supply, and particularly from electricity generation, are limited. Most do not go substantially beyond a 'no-regrets', low cost approach. It is hoped that energy market reforms will have a beneficial medium-to long-term impact, through the removal of structural barriers to cogeneration and renewables and the reduction of gas prices

(making it more competitive as a fuel for base load power generation). However, new projections estimate these savings as very modest (only 3 Mt by 2010). Other current measures which are expected to produce emissions savings are the 2 per cent renewable energy initiative (the costs of which exceed 'no-regrets' but will be capped), and the Generator Efficiency Standards.

5.200 The Generator Efficiency Standards will apply to fossil fuel generators over 30 MW capacity, with 50 GWh annual output and a capacity factor of 5 per cent over the last 3 years, whether or not they are grid-connected. Their aim is encourage efficiency improvements to the level of best practice performance.[173]

5.201 The AGO estimates savings from the 2 per cent measure of between 4-5.5 Mt CO_2 by 2010, and savings of 4 Mt from the efficiency standards.[174] This would add a saving of up to 10 Mt by 2010.

5.202 The Committee accepts that the 2 per cent measure is primarily aimed at developing the renewable energy industry and that expectations of large short term savings are unrealistic. However, the generator efficiency standards, while encouraging electricity generators to reduce their greenhouse intensity of generation, do not achieve the full potential for efficiency savings in generation. The AGO explained that:

> A key element in the methodology is that the costs that we would ask an individual plant to incur through this measure would be limited to possibly a little beyond a 'no regrets' level or zero dollars per tonne abated, perhaps up to a maximum of $10 per tonne, but on a plant specific basis. Those levels of costs would not be sufficient to put anybody out of business. It is quite likely to be the case that in a certain plant no improvement in efficiency will be possible at all - at least not within that sort of cost envelope, in which case that plant will not be modified as a result of this measure alone.[175]

5.203 While policies such as the Generator Efficiency Standards are obviously worthwhile in themselves, in a context in which policy is reluctant to move beyond no-regrets measures they will also have a limited impact.

Electricity emissions trends - modelling and projections

5.204 Research on the emissions impacts of energy market reform was commissioned by the Department of Industry, Science and Resources as part of a March 1999 Report by Allen Consulting. The model developed by McLennan Maganasik simulated the path of greenhouse emissions assuming the steady

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173 Australian Greenhouse Office, *Fact Sheet: Generator Efficiency Standards - Powering into the New Millennium*, http://www.greenhouse.gov.au/markets/gen_eff/qa.html (14/07/00).

174 Combined Explanatory Memorandum, *Renewable Energy (Electricity) Bill 2000/Renewable Energy (Electricity) (Charge) Bill 2000*, p 20; and Mr Philip Harrington, *Proof Committee Hansard*, Canberra, 22 June 2000, p 696.

175 Mr Philip Harrington, *Proof Committee Hansard*, Canberra, 22 June 2000, p 697.

implementation of current energy reforms and no further policy change, in comparison with a base model that assumed the continuation of the pre-reform industry structure. In their conclusions, Allens stated that delays in reform would cause the greenhouse outlook to deteriorate, as would any failure to establish new gas supplies by pipeline from Papua New Guinea or the Timor Sea.

5.205 In the short-to medium-term, the model predicted that emissions would continue to increase as a result of reform, and be higher by around 6 Mt per annum (almost 50 Mt CO_2-e in total, 20 per cent of 1996 levels) between 1998 and 2005 than under a pre-reform scenario.[176]

5.206 Between 2006 and 2010 the model predicted lower emissions by up to 11 Mt CO_2-e per year. This prediction assumes the absorption of current oversupply and the expiry of transitional arrangements (such as fixed price contracts). This would have the result that less emissions-intensive generation, mainly gas-fired cogeneration and some expansion in renewable energy, can enter the market.[177]

5.207 In total, the model predicted that the net cumulative impact of current reform measures, incorporating both the initial increases and longer run falls in emissions, will be a net *increase* in emissions of around 15 Mt CO_2-e between 1998 and 2010. The Report suggests that: 'current reform measures may not contribute a positive cumulative decrease in GHG emissions until around 2012'.[178]

5.208 These projections are sensitive to the future performance of gas as a replacement fuel for more emissions-intensive fuels such as black and brown coal. The Report argued that if gas prices in a more competitive market remained high, or if the gas pipelines from PNG or the Timor Sea do not eventuate, emissions could be 4-5 Mt CO_2-e higher per annum than projected by 2010.[179]

5.209 The AGO admitted that the annual savings after 2006, predicted by the Allens Report, were unlikely to be fully realised. They told the Committee:

> AGO has commissioned some more recent work than the Allen Report… that has scaled back the projections of savings. For example, the Allen report was, I think, looking at about a 11 million tonnes saving. More

176 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p xiii.

177 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p xiii.

178 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p xiii.

179 Allen Consulting and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emissions Reductions: A Report to the Department of Industry, Science and Resources*, March 1999, p xiii.

> recent work we have commissioned would suggest that something in the order of a three million tonne saving by 2010 is in prospect. The reasons for the change are fairly complex. One of the factors I think you have put your finger on is that the expected penetration of gas into the power generation sector is a key determinant of greenhouse gas emissions. I think there is a general consensus which is reflected in more recent modelling that the extent to which that is expected to occur in the short term is being wound back.[180]

5.210 The analysis commissioned by the AGO was again by McLennan Maganasik (MMA), which modified its reform scenario assumptions by including:

- new coal, petroleum and gas-based power stations in Queensland;
- lower coal prices;
- higher levels of demand; and
- a slower take-up of gas.[181]

5.211 The new MMA study modelled trends in electricity emissions from 1990 to 2020, assuming energy market reforms plus the 2 per cent target and generator efficiency standards ('Reform++').

5.212 It projected emissions levels of 171 Mt in 2000 (the 1998 Inventory figure was 168.6 Mt), 190 Mt in 2010 and 226 Mt in 2020. By 2010, this Reform++ scenario was 12 Mt lower than a no-reform scenario, and 18 Mt lower by 2020. However, until the middle of the decade the no-reform scenario was actually producing lower emissions.[182]

5.213 MMA's 2010 Reform++ projection - that is, in the middle of the first Kyoto commitment period - is still 147 per cent of 1990 levels. They state that even if demand growth were substantially lower than recently recorded, emissions were likely to be at least 130 per cent of 1990 levels. Their projections are also vulnerable to a number of potential adverse developments. These include:

- that lower prices for gas do not eventuate from gas reforms, or are not adequate to ensure the greater takeup of gas as a fuel;
- that the gas pipeline from PNG is not built;
- that low demand growth slows the commissioning of new gas-fired plant, which would increase the proportion of coal-fired generation. If no new

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180 *Proof Committee Hansard*, Canberra, 22 June 2000, p 698.

181 McLennan Maganasik Associates, *Greenhouse Gas Emission Projections: Australian Electricity Generation and Natural Gas Combustion*, Report to Australian Greenhouse Office, 5 June 2000, p 34.

182 McLennan Maganasik Associates, *Greenhouse Gas Emission Projections: Australian Electricity Generation and Natural Gas Combustion*, Report to Australian Greenhouse Office, 5 June 2000, p vi.

gas-fired plants are commissioned, they anticipate emissions will be higher by between 1 Mt in 2006 and 18 Mt by 2020. Conversely, if only new gas-fired plants are commissioned, emissions would be lower by between 1 Mt in 2006 and 25 Mt in 2020; and

- that large new loads enter the market, in particular, a planned new aluminium smelter for NSW and several magnesium smelters. The aluminium smelter alone would add about 6 Mt to annual CO_2 emissions (if supplied with coal-fired power) and 2.6 Mt (if supplied with gas-based power).[183]

5.214 An alternative, perhaps worst case scenario, is that electricity emissions could continue increasing at the rate they did between 1997 and 1998 (15 Mt a year). In such a case we would be facing a phenomenal statistic of 323 Mt in 2010, even after the effect of the 2 per cent target and generator efficiencies (-10 Mt) was taken into account. This would be 250 per cent of 1990 levels.

Making a greater impact

5.215 It is clear to this Committee that, whichever projections are more accurate, trends in the growth and intensity of energy supply and use in Australia have outstripped the ability of current policies to control them. The fast upward trend in energy emissions will make it very difficult for Australia to meet its 108 per cent target for 2008-12, even when considering that the additional flexibility created within the Kyoto Protocol will work to Australia's advantage. The same trend will certainly make it impossible to meet the more stringent targets Australia will be likely to face in the second and subsequent commitment periods. In such an event, Australia will be faced with the very expensive option of buying emissions credits on the world market. Dr Clive Hamilton pointed out the potential absurdities facing Australians if this occurs:

> I note [AGO Chief Executive] Gwen Andrews said yesterday that, if domestic emission measures fail, we can simply purchase credits on the world market. Who will purchase those credits? At the moment the major polluters in Australia have no obligation to do anything. Is she saying that the Australian Government, courtesy of the Australian taxpayer, will purchase those credits in order to bail out the polluters who fail to meet targets?[184]

5.216 Thus, in the event that emissions permits need to be purchased from overseas, this cost will be faced by over-emitting industries (and thus by consumers), or in the case that there are no regulatory obligations placed on emitters, by taxpayers. The message of this is that deferring action will do nothing to reduce or eliminate costs. It

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183 McLennan Maganasik Associates, *Greenhouse Gas Emission Projections: Australian Electricity Generation and Natural Gas Combustion*, Report to Australian Greenhouse Office, 5 June 2000, pp 36-39.

184 *Proof Committee Hansard*, Canberra, 10 March 2000, p 58.

is more likely to increase those costs and see them distributed more inequitably and inefficiently. In the Committee's view, it is preferable to plan how those costs will be borne and distributed, while producing optimum greenhouse, adjustment and industry development outcomes, rather than have them occur in an unplanned, inefficient and inevitably inequitable way.

5.217 The Committee supports the view that the best policy perspective on energy is a long term one. This is the optimum way of achieving sustained greenhouse reductions, while also providing long term market certainty, so that investment decisions will be both sound in greenhouse terms and be rewarded by future market conditions.

5.218 The ability of industries to manage the increased costs associated with action, must be balanced against the imperative to turn energy emissions around and achieve a long term restructuring of the national energy economy. It must be borne in mind that while bringing costs it will also create great opportunities for new industries in energy efficiency and management, and renewable technology and innovation. If the global climate system can be stabilised through international efforts, it will also contribute to reducing the costs and trauma of damage from (and adaptation to) adverse climate change in Australasia.

5.219 The need to pursue early abatement action in order to pursue an 'optimum' path towards reaching our Kyoto targets was a strong theme of the June 1999 report, *Early Greenhouse Action*, prepared for the AGO by the Centre for International Economics. It suggests that:

> Without some abatement taking place before 2008-12, the rapid adjustment that may ultimately be required will impose significant costs on the economy. It would be preferable to have a smooth ' glide path' to the Kyoto Protocol target. Supporters of the Protocol are concerned that, without early action, the adjustments required will ultimately make the Protocol politically and economically infeasible.[185]

5.220 With the long term goal of a sustainable energy economy in mind, the Committee suggests that short-to medium-term policy have the following aims:

- to accelerate energy market reforms to remove derogations, biases and barriers to entry for cogeneration and renewables;
- to make lower emission fuels sources such as gas more price competitive with coal, either through the reform of gas markets or by pricing carbon;
- to increase consumer awareness of the greenhouse implications of their energy use, and to accelerate energy efficiency and demand management measures, through compulsory standards where appropriate;

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185 Centre for International Economics, *Early Greenhouse Action*, Report prepared for the Australian Greenhouse Office, June 1999, p 20.

- to prevent the construction of new coal-fired generation capacity within Australia. Rather new power stations and the augmentation of existing plant should be gas, renewable, or a mandated combination of the two;
- to accelerate the generation and takeup of renewable energy, through the implementation and extension of the 2 per cent renewables measure, possibly with an increase in the annual targets after 2010, along with a strategic approach to developing a strong renewable energy industry with a successful performance in export markets; and
- to introduce a domestic mechanism for pricing carbon, preferably through a capped system of tradeable emissions permits, so that the greenhouse intensity of energy supply is recognised in market signals and increasingly directs market behaviour.

5.221 A large number of witnesses argued that only by pricing carbon, and thus encouraging energy markets to internalise the costs of greenhouse emissions, would serious progress be made on reducing the greenhouse intensity of energy generation in Australia. Mrs Leith Wood, Manager of Government and Public Affairs for AGL, argued that the poor greenhouse performance of energy markets was exacerbated by the fact that the pollution from electricity production was not costed. This was at odds with the situation faced by other polluting industries:

> Things that come at the lowest price usually come at another cost… in an economic sense, one of the reasons that electricity from coal-fired power is very cheap at the moment is because the amount of emissions that are generated in that production are not costed. There is no cost attached to those. Whereas in other industries that need to dispose of waste water from an industrial process or other solid waste in some form have to pay for that waste to be removed or disposed of, these emissions are generated with no cost attached. That, in turn, reflects on the cost of electricity.[186]

Australian Democrats Recommendation 6

The Australian Democrats recommend that Australian governments prepare to set time frames to replace coal-fired power with a mixture of gas and renewables, with the proportion of renewable energy steadily increasing until the Australian economy is predominantly based on renewable sources some time after 2050.

186 *Proof Committee Hansard*, Sydney, 23 March 2000, p 392.