8

ENERGY

Introduction

8.1 This chapter is largely concerned with the infrastructure that supports the provision of power for domestic and industrial purposes. It deals with electricity and gas, which are established industries with, until recently, a history of extensive government involvement and often operating as monopolies. The chapter also explores the use of renewable sources of power to provide power in situations in which it is not feasible to use conventional sources, or prudent to do so given national requirements to reduce greenhouse gas emissions.

8.2 The availability of power is a basic requirement for all Australians, both domestically and economically. Power supplies underpin all other services. Low cost, reliable sources of power are essential for the efficient and effective functioning of the economy and the maintenance of Australians' standard of living.

8.3 Australia is richly endowed with energy resources, including non renewable sources of black and brown coal, uranium and natural gas, and possibilities for developing tidal, solar and wind power.[1] In 1997-98, these energy sources accounted for the following proportions of consumption:

- crude oil 34 per cent;
- black coal 29 per cent;
- natural gas 18 per cent;

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1 *Sustainable Energy Policy for Australia,* Green paper, 1996, p. 5.

- brown coal 13 per cent; and
- renewables 6 per cent.[2]

Role of power infrastructure in regional development

8.4 There is undeniable evidence that the development of reliable, adequate, low priced power in a region can contribute significantly to regional development, stimulating the expansion of existing businesses and the establishment of new ones. For example:

- there was significant growth in new and existing food processing industries, as well as activities associated with the gas network, when natural gas was brought to the Riverina in 1993;[3] and
- the Carpentaria pipeline to Mount Isa is estimated to have triggered $4.5 billion of projects in Queensland's North West Minerals Province.[4]

8.5 All three gas pipelines that cross the Mid West Region of Western Australia encouraged exploration and mining activity.[5] The Western Australian Chamber of Commerce and Industry and the Minerals Council of Australia pointed out to the Productivity Commission inquiry that the Goldfields pipeline:

> … cuts through some of the State's most significant mineral production areas, from the iron ore regions in the north west to the nickel and gold belt to the north of Kalgoorlie. Mines in these areas previously generated power on-site using diesel generators. Access to cheaper energy has cut production costs and has been credited by businesses as providing a stimulus to new investment.
>
> Cheaper energy may also help Western Australia to develop major downstream processing industries (to supply major Asian markets) – industries which previously were deterred by relatively high energy costs.[6]

2 S Bush, A Dickson, J Harman & J Anderson, *Australian Energy: Market Developments and Projections to 2014-15*, ABARE Research Report 99.4, Canberra, 1999, p. 26.

3 AGL, Submission no. 179, pp. 2-3.

4 Townsville City Council, Submission no. 176, p. 6; Townsville Enterprise Limited, Submission no. 141, pp. 4-5.

5 Mid West Development Commission, Submission no. 218, p. 3.

6 Productivity Commission, *Impact of Competition Policy Reforms on Rural and Regional Australia*: *Inquiry Report*, Report No. 8, September 1999, p. 128.

In the case of mining developments, cost of power is an important driver, and can be the most important factor considered in decisions about the location of value adding of mine outputs.

8.6 There are also promising indications of further benefits from future developments. For example, forward estimates of the effects of establishing a base load power station in Townsville include the addition of $270 million to the regional economy and $403 million to the Gross State Product. Gas supplies for the power station will also be available for use in downstream activities.[7] Another large project with considerable potential for developing a remote region of Australia is the Derby Tidal Energy scheme, details of which are shown in Box 8.1.

8.7 Based on its experience, the Goldfields-Esperance Development Commission observed that resource projects had created demand and justified greater local power generation. However, 'there is the circular problem that many resource projects will not start unless adequate power is available and power capacity will not be upgraded unless industry creates the necessary demands'.[8] As the Australian Council of Infrastructure Development pointed out, the complex interlinkages of regional development underline the importance of comprehensive, wide ranging planning. As an illustration of this fact, the council observed that:

> Given the high level of interdependence between regional and rural projects, a helicopter view is useful in seeing how various pieces of infrastructure and business projects can coalesce. An example is around Bunbury in the South West of Western Australia, where the economics of a container facility at the port of Bunbury, the expansion of Kemerton Industrial Park, the construction of the Kemerton gas-fired power station, and the advancement of a number of resource value-adding projects is dependent on each progressing.[9]

7 Townsville City Council, Submission no. 176, p. 17; Townsville Enterprise Limited, Submission no. 141, p. 9.

8 Goldfields -Esperance Development Commission, Submission no. 153, p. 5.

9 Australian Council of Infrastructure Development, Submission no. 215, p. 15.

Box 8.1 Derby Tidal Energy Project

The project will make use of the large tidal range on the north west coast of Western Australia and the movement of water from one arm of a creek to another to generate continuous hydroelectric power. During neap tides, other sources of energy will supplement output.

The initial outlay on the project is large, $360 million for 48 MW capacity which is expandable to 72 MW. However, running costs will be low and the anticipated life of the project is 120 years, very much longer than the 30 years of conventional power stations. Finance for the project is expected to be provided jointly by public and private sectors and, if forthcoming soon, the tidal station could be completed in 2002.

Power from the project will feed into a 500 km transmission line serving Broome, Derby, Pillara and Fitzroy Crossing, and bring the benefits of reliable and adequate power which will:

- power irrigation;
- allow expansion of the minerals industry, including currently under exploited or unmined black granite, diamond, coloured stone and bauxite deposits; and
- stimulate other economic development, including in remote aboriginal communities.

The project will also:

- create a platform for aquaculture through the creation of a permanent impoundment;
- permit the development of a safe marina for the Kimberley fishing fleet, which currently has no suitable safe facility, and the subsequent development of fleet support, maintenance and transport activities;
- provide recreational opportunities for local people and tourists; and
- form the basis for research and skills training in tidal power and remote energy management.

The economic benefit of the project to Derby, excluding the effect of the transmission line, is estimated at $2.2 million in the first year, growing in real terms. It is expected to create 280 permanent jobs.

Sources: Information provided during the committee's visit to Derby, November 1999 by the Shire of Derby/West Kimberley and Tidal Energy Australia; Tidal Energy Australia, submission no. 104, p. 2.

Deficiencies in regional power supplies

8.8 A survey of regional firms in New South Wales, Queensland and Victoria was conducted in 1999 by the Australian Industry Group. It showed that about 11 per cent of respondents regarded electricity infrastructure as inadequate; the figure was around 21 per cent for gas infrastructure. There was wide geographic variation in the degree of satisfaction with power infrastructure, with lowest satisfaction reported by firms in north Queensland.

8.9 As the following sections of this chapter record, submissions to the inquiry from different regional areas brought to the committee's attention a variety of problems with power supplies that are impediments to regional development.

Inadequate capacity

8.10 On several occasions the committee was told of the need for more appropriate power supplies if economic development was to occur. Energy NQ told the committee that the lack of a local power station had mitigated against business development in the region. In particular, the region had the potential to be the base metal processing centre for south east Asia, and plans for a zinc refinery had been delayed for many years. The latter point was confirmed by Korea Zinc Sun Metals during a private meeting with the committee; the company indicated that future mining developments in north Queensland were very dependent on the establishment of a local power station.

Access to three phase power

8.11 The committee was told of areas where expansion of existing industry and establishment of new ones were inhibited by having access to only single phase power. This is the situation in several areas in South Australia, for example, in the Coorong District Council area where:

> The availability of adequate power particularly 3-phase supply remains a major impediment to development in the District. With the exception of Tailem Bend which is well serviced in area terms

> there is inadequate power to provide for major horticultural or industrial development in the District.[10]

The same problems are experienced elsewhere according to information received from southern Western Australia and south west Victoria.[11]

8.12 Other deficiencies were outlined in the submission to the inquiry by the South Australian Regional Development Association. The association pointed out that:

- deficiencies in power supplies for aquaculture development on sections of the Eyre and Yorke Peninsulas and the Upper South East region is slowing the development of this new industry;
- inadequate power for viticulture and winemaking in Cape Jaffa and Mount Benson in the south east is limiting investment; and
- dairying requires access to three phase power to support highly mechanised, large scale and efficient dairying operations.[12]

The Municipal Association of Victoria and the Victorian Farmers Federation also commented on the lack of reliable, suitable, cost effective power supplies as a particular impediment to the development of processing industries such as dairying.[13]

8.13 In its submission to the inquiry, the Great Southern ACC, which is based in Albany, also reported that three phase power is not available in all areas. It pointed out that the current power distribution network was established for domestic and light rural use and not for heavy industry. Demand for power from heavy industry is a more recent development. The association saw access to three phase power as 'a fundamental requirement for major industrial development'.[14]

Connection costs

8.14 The cost of connection to three phase power supplies is often very considerable and beyond the resources of regional businesses. The Eyre Regional Development Board reported that it had:

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10 Coorong District Council, Submission no. 291, p. 11.

11 Great Southern Area Consultative Committee, Submission no. 165, p. 8; Warrnambool City Council, Submission no. 274, pp. 3-4.

12 South Australian Regional Development Association, Submission no. 120, pp. 4-5.

13 Municipal Association of Victoria, Submission no. 182, p. 4; Victorian Farmers Federation, Submission 233, pp. 12-13.

14 Great Southern Area Consultative Committee, Submission no. 165, p. 8.

> … been actively trying to develop a cluster of world class aquaculture centres to capitalise on the pristine oceanic waters of the region. However a common impediment to establishing such centres is the cost of delivering 3 phase power. It is common practice for these types of developments to be facing power connection costs in excess of $400,000.[15]

High connection costs in Western Australia were also brought to the committee's attention. The Great Southern ACC indicated that:

> In some instances power can be supplied from the grid on dedicated powerlines, however at $30-35,000 a kilometre, installation cost is stated as being prohibitive, especially if prospective businesses are 50 – 60 kilometres from a substation.[16]

Unreliability

8.15 A reliable supply of power is vital for business viability. Outages and power surges are a danger to consistent business operation, particularly for primary producers who rely on power for irrigation, caring for livestock, or freezing produce.

8.16 A survey of companies in the National Electricity Market found that power disruptions were an ongoing concern.[17] At their worst, they have caused serious outages with significant economic impact, when major failures have occurred, as in the Victorian gas disaster, the recent South Australian power failure, and Queensland supply failure.[18] The Victorian Farmers Federation drew attention to the impact of the Longford gas failure on that state's dairy farmers. As most dairy factories run on gas, 25 million litres of milk were wasted before factories were able to install (more costly) diesel generating alternatives.[19]

8.17 In each of these cases, there were no means by which alternative sources of power could be accessed. Such failures will be avoided once the Queensland and South Australian electricity grids interconnect with those in the other eastern states, and pipelines with adequate capacity are built to bring gas from other states to Victoria and the proposed underground

15 Eyre Regional Development Board, Submission no. 185, p. 4.

16 Great Southern Area Consultative Committee, Submission no. 165, p. 8.

17 The Treasury, http://www.treasury.gov.au/publications/EconomicPublicationsAndPapers/EconomicRoundUp/1999Spring/downloads/round4.rtf, p. 61.

18 Australian Council for Infrastructure Development, Submission no. 215, p. 9.

19 Victorian Farmers Federation, Submission no. 233, p. 9.

storage is constructed. These failures obviously have implications for other states as well as those affected in these recent events.

Use of own generators

8.18 Businesses in areas with unreliable or costly power supplies are obliged to install back up generators. Representatives of the South Australian seafood and mariculture industries, for example, told the committee of those industries' reliance on back up. Other examples of the need for back up generation were brought to the committee's attention: a major abattoir in the south west of Western Australia installed 'expensive generation equipment so that a nearby major regional centre wasn't blacked out when the abattoir started up its machinery'.[20]

8.19 Rather than rely on inadequate grid power, other businesses have installed their own diesel generators. Examples of this practice were quoted to the committee by Coorong District Council in South Australia, for example:

- a major olive development east of Coonalpyn that is setting up to run its pumps by diesel generators; and
- an even larger development east of Tintinara that is planning to generate its own power using diesel-powered generators.

In both cases this is due to the non-availability of sufficient power in those areas and the very high cost of providing the power requirements for those industries.[21] However, all users do not see reliance on diesel generation as a long term solution.[22]

8.20 In very remote areas, local generation is the only option available. Many isolated farms and communities rely on diesel generated power, which is sometimes available only on a part time basis because of the costs incurred when generators run continuously. In discussions with the Burketown Shire Council, the committee was told that 'partial power' causes much hardship, especially for women, and influences people's decisions to remain in the region.

8.21 The hardships for isolated families that rely on generators for power are described graphically in an attachment to the submission from Women for Power.[23] The women from Barcoo Shire recounted dealing with extreme

20 Great Southern Area Consultative Committee, Submission no. 165, p. 7.

21 Coorong District Council, Submission no. 291, p. 11.

22 Private meeting of the committee with South Australia Mariculture.

23 Women for Power, Submission no. 41, attachment.

temperatures when caring for sick and handicapped children, the problems caused when generators fail and food in fridges and freezers is lost, racing to start the generator to receive a fax, and the inconvenience of juggling the use of appliances so that the generator is not overloaded. They were particularly concerned about the educational disadvantage that their children suffer from poor access to the internet and poor radio reception that is at least partly due to their electricity supplies. At present, the cost of running a 240V generator for five hours a day is high; for a family with a disabled son, for whom the generator must run continuously, the annual cost is $35 000, excluding servicing, repairs, and parts.[24]

Reform of the Australian energy market

Electricity

8.22 Electricity supply in Australia since the Second World War has been largely state government-owned, and has included significant local government involvement. Generally the electricity supply industry in each state was a vertically integrated body responsible for generation, transmission, distribution and retailing. The need to improve electricity efficiency to support international trade competitiveness led to extensive restructuring in the industry in the 1990s, comprising:

- the disaggregation of vertically integrated structures;
- the corporatisation of government business enterprises and/or their privatisation (fully in Victoria and by means of a long term lease in South Australia) and the introduction of independent power producers and power retailing businesses;
- the introduction of a competitive wholesale market for the supply purchase of electricity in New South Wales, Victoria, South Australia and the ACT, which Queensland is expected to join when a high voltage link is completed with New South Wales in 2001, and Tasmania in 2002 via Basslink;[25]

24 Diesel prices will fall when the new tax arrangements are introduced in July 2001, and may then be as, if not more competitive than those fired by natural gas (Goldfields-Esperance Development Commission, Submission no. 153, p. 6).

25 There are no plans at present for Western Australia and the Northern Territory to join the National Electricity Market; competition will be supplied by independent power producers.

- the progressive implementation of freedom of choice of supplier for some customers in metropolitan areas; and
- the provision of non discriminatory access for third parties to the transmission grid.[26]

Gas

8.23 The history of the natural gas industry resembles that of the electricity industry. Until recently, gas was supplied by state-based monopolies with highly integrated supply chains. Legislation and regulation discouraged interstate trade and competition, and contributed to reduced growth in the gas industry.

8.24 This situation changed in 1994 when COAG committed to free and fair trade in natural gas. Reform of the gas market has followed a similar course to that of the electricity market.

- The elements of the gas supply chains have been disaggregated.
- Some pipelines have been privatised, and government owned utilities have been corporatised.
- Regional markets have been linked through the construction of new pipelines, such as that between Wagga Wagga and Wodonga which connects the New South Wales and Victorian systems. Queensland, South Australia, New South Wales, the ACT and Victoria are now interconnected. With further interconnections, such as the Eastern Gas Pipeline and that proposed from Papua New Guinea to Queensland, the possibilities for competition between pipelines and gas basins will increase.
- Customer contestability and choice of supplier and pipeline operator are gradually being introduced.
- National third party access to gas pipelines and distribution networks was established following the 1997 intergovernmental Natural Gas Pipelines Agreement. Access regimes must be certified by the National Competition Council (NCC).[27]

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26 Department of Industry, Science and Resources, Submission no. 168, pp. 18-19; The Treasury, http://www.treasury.gov.au/publications/EconomicPublicationsAndPapers/EconomicRoundUp/1999Spring/downloads/round4.rtf, pp. 52-3.

27 S Bush, A Dickson, J Harman & J Anderson, *Australian Energy: Market Developments and Projections to 2014-15*, ABARE Research Report 99.4, Canberra, 1999, pp. 17-20; Department of Industry, Science and Resources, Submission no. 168, p. 23.

The NCC considers that gas reform is now largely complete.[28]

Consequences of energy market reforms for regional Australia

Electricity costs

8.25 Following the establishment of the National Electricity Market, electricity prices in Victoria and New South Wales fell by some 26 percent. They are, in fact, considerably below what is expected to be the long term sustainable level. Further price reductions may occur if electricity retailers expand on their traditional business by packaging electricity with other services, including gas. According to a survey by the Commonwealth Department of Industry, Science and Resources, prices are not expected to rise significantly until 2010.[29] However, another view is that energy prices are climbing again now that the post-deregulation 'scramble for market share' is abating.[30]

8.26 Despite the fact that competition has driven down prices, there is concern among remote customers that this may not be the case for them. They acknowledge that the costs of generation may fall but fear that, when the cost of transmission is added on, prices will in fact rise. For example, the Victorian Farmers Federation predicted that retail electricity prices will fall when the electricity market becomes fully contestable in 2001, but 'network charges could rise significantly for rural consumers as they bear the cost of distribution, causing the overall cost of electricity to increase'.[31] The NSW Farmers Association also referred to 'the likelihood of rising network access charges outweighing any potential drop in retail prices for rural consumers'.[32]

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28 Productivity Commission, *Impact of Competition Policy Reforms on Rural and Regional Australia*: *Inquiry Report*, Report No. 8, September 1999, p. 120.

29 Department of Industry, Science and Resources, Submission no. 168, p. 20; Electricity Supply Association of Australia, Submission no. 210, p. 6; The Treasury, http://www.treasury.gov.au/publications/EconomicPublicationsAndPapers/EconomicRoundUp/1999Spring/downloads/round4.rtf, p. 61.

30 'Energy performance contracting off the ground', *Australian Energy News*, no. 13, September 1999, http://www.isr.gov.au/resources/netenergy/aen/aen13/contracting.html, accessed 14 December 1999.

31 Victorian Farmers Federation, Submission no. 233, pp. 10-11.

32 NSW Farmers' Association, Submission no. 228, p. 7.

8.27 At a private meeting with Townsville Enterprise, it was suggested to the committee that the cost of power for residents and businesses in Townsville would be 23 per cent greater than in places like Gladstone, close to power sources. According to Korea Zinc Sun Metals, transmission losses under the present power supply arrangements amount to up to 45 per cent. The high costs are an argument for installing more generating capacity in North Queensland,[33] for instance, a gas-fired power station associated with the Chevron pipeline from Papua New Guinea.

8.28 The Department of Industry, Science and Resources confirmed that price rises are possible and raised the possibility that assistance may need to be provided to those affected.

> Extension of contestability to some rural and regional communities may result in an increase in electricity costs as the principles of cost reflectivity are applied by the supplying companies.
>
> A challenge over the next few years will be to ensure that small to medium consumers, particularly in rural and regional areas, can benefit from improved electricity market conditions. It will be the responsibility of the States to ensure that there is no adverse impact on remote areas due to greater cost reflective pricing. Ultimately, any price support mechanisms will need to be provided in an open and transparent manner.[34]

Gas costs and availability

8.29 Many of the recently completed and planned pipeline projects, which have been stimulated by reforms to the gas industry, supply regional areas. Examples of these pipelines are the Carpentaria pipeline in Queensland, the Central West pipeline in New South Wales and the Goldfields pipeline in Western Australia. In addition, extensions planned or under construction are being made to existing pipelines in regional areas in several states.[35] According to the Australian Gas Association, new pipeline proposals currently under consideration total 11 000 kilometres and will have 'strongly positive regional effects'. Many towns have already been connected.[36]

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33 North Queensland Electricity Corporation, Submission no. 140, p. 2.

34 Department of Industry, Science and Resources, Submission no. 168, pp. 20-1.

35 Department of Industry, Science and Resources, *op cit*, p. 24.

36 Productivity Commission, *Impact of Competition Policy Reforms on Rural and Regional Australia*: *Inquiry Report*, Report No. 8, September 1999, pp. 123-4, 126.

8.30 Reforms to the market for gas have resulted in lower charges for businesses in regional Australia. The Productivity Commission's inquiry into the impact of competition policy reforms on rural and regional Australia received evidence of price reductions for commercial and industrial users that varied between 25 to 50 per cent. Further price falls are expected.[37]

Private and public sector provision of energy infrastructure

8.31 The increasing presence of the private sector in a market that was once dominated by public sector provision has brought with it the advantages of:

- fiscal gains for the government in the form of releasing funds for investment instead in higher yielding alternative infrastructure, skills upgrading and technology transfer;
- risks borne by the private sector where there are more of the requisite skills than in the public sector;
- efficiency gains because the private sector is quicker to adopt new skills and technology;
- removal of the conflict of interest for the government as both owner and regulator; and
- cost savings.[38]

8.32 In the new energy market, the role adopted by Commonwealth, state and territory governments is more one of setting the framework for, and facilitating, development than direct involvement with provision. Townsville City Council commented:

> Increasingly in Queensland the public sector is seeing its role as encouraging the private sector to fund, develop, construct and operate essential public infrastructure, in the belief that it is saving valuable taxpayers dollars. Major projects such as the Carpentaria Gas Pipeline, the Surat Basin / Dawson Valley Infrastructure

37 Productivity Commission, *op cit.*, pp. 122, 127-8.

38 Australian Council for Infrastructure Development Ltd, '167,000 jobs if NSW electricity assets privatised, says major new report', Media release, 17 March 1998; K Orchison, 'The electricity privatisation debate', *Sydney Morning Herald*, 25 March 1999 reproduced by the Electricity Supply Association, http:/ / www.esaa.com.au, accessed 10 December 1999.

> Development Project, the Papua New Guinea - Queensland Gas Project, and the Townsville Base Load Power Station are all private sector driven projects, with the Government seeing its role as facilitator only.[39]

8.33 A frequently expressed concern during the course of the inquiry was the concentration of both public and private sector power providers on commercial goals, and the consequent danger that investment and maintenance in rural areas would be neglected with disastrous long term implications for regional economic growth. Claims were made, with respect to quality of service, that this is already happening,[40] and fears were expressed for the future. For example, the Municipal Association of Victoria stated that:

> Given privatisation of electricity supply, councils are concerned that private power suppliers will not undertake the capital investment required to provide suitable infrastructure, or if the investment is undertaken, the cost of utilisation on a user pays basis will be prohibitive.[41]

8.34 On a similar note, the NSW Farmers Association claimed that:

> … the focus on financial outcomes imposed by the competition policy reforms combined with dividend requirements will ensure that long term investment is neglected to the detriment of rural communities and the wider economy.[42]

In the case of gas pipelines, the Department of Agriculture, Fisheries and Forestry claimed that the focus of investors on projects that yield the highest rates of return is likely to limit construction to metropolitan areas and those rural and regional areas that:

> …. are fortunate enough to be located near a gas pipeline to a metropolitan area and can attract investment for an affordable branch line from the major pipeline. This is borne out by the example of centres such as Dubbo and Parkes … .[43]

8.35 AusCID pointed out that:

> If infrastructure planning and delivery is increasingly left to market forces to determine, the Australia of 2050 is more likely to

39 Townsville City Council, Submission no. 176, p. 9.

40 NSW Farmers' Association, Submission no. 228, p. 7.

41 Municipal Association of Victoria, Submission no. 182, p. 4.

42 NSW Farmers' Association, Submission no. 228, p. 7.

43 Department of Agriculture, Fisheries and Forests, Submission no. 253, p. 14.

> be largely a series of semi-linked coastal conurbations along the east and south-east coast and in the south-west. Is this in the national interest, socially, economically or environmentally?[44]

The critical question in these circumstances, according to the National Farmers' Federation is:

> … whether investments that are economically valuable will continue to be made, or what form of intervention is needed to ensure such investments are made, given the failure of the market to provide sufficient financial incentives.[45]

8.36 Townsville City Council asserted that:

> If Governments want the private sector to undertake major public infrastructure projects, they may also have to provide increased levels of public sector financial assistance to ensure they occur in a timely manner. Should there be substantial delay in the provision of public infrastructure, economic growth opportunities can quickly go begging in the globally competitive markets.[46]

This view was echoed by the North Queensland Electricity Company, which stated that:

> If infrastructure companies have no option (or incentive) other than to provide for maximum financial returns, then remote rural community benefits, and development of essential infrastructure services in regional areas will suffer and eventually decline. Given the remoteness and vast distances of the Queensland State, it is uneconomic to provide capital intensive services to areas that do not offer, or at best, provide very marginal returns on investment. Government assistance is required to initiate infrastructure development and provide the incentive for private investment. Once this situation develops, the flow on effects will allow for a self-sustaining environment.[47]

8.37 The Australian Constructors Association agreed that, if time from the start of a project to when demand for that project's output is very lengthy, full cost recovery may be impossible and socially unfair. In these cases, establishing a community service obligation with respect to power provides an incentive for infrastructure provision to the private sector.[48]

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44 Australian Council for Infrastructure Development, Submission no. 215, p. 9.

45 National Farmers' Federation, Submission no. 238, pp. 9-10.

46 Townsville City Council, Submission no. 176, p. 10.

47 Townsville City Council, *op cit*, p. 4.

48 Australian Constructors Association, Transcript of Evidence, 23 August 1999, pp. 110-111.

The Northern Territory government indicated that it has provided assistance in circumstances where proponents have looked at a marginally economic project which the government saw as strategically essential for development.[49]

8.38 The Queensland Treasury has issued guidelines for private infrastructure financing; they indicate that the public sector has a role to play when:

- such infrastructure is not capable in the short to medium term of providing an acceptable commercial return;
- it may be commercially viable on a smaller scale at the present time but should be pursued on a larger basis to meet projected long term needs or demands of the economy; and / or
- it will generate economic benefits that are unable to be captured directly by project revenue streams; and
- if left to the private sector or a public sector agency alone to fund, it is likely to result in either a sub-optimal size or deferral.[50]

8.39 The National Farmers' Federation told the committee about the approach being taken to upgrade electricity supplies to new dairy farms in Victoria. It involves sharing of costs between the private sector provider, the farmers, and the government.

> There is an expectation that the electricity company should make some level of contribution to the provision of that infrastructure because they are the ones who are going to get the return for the electricity that is sold. The farmer can well make a contribution because he is going to be able to convert his wool enterprise into a dairy enterprise and perhaps get back into profit mode again. For both of those to get to break-even point on their investment, there is still a fairly large gap in the cost of the provision of that electricity. That is where we believe there is a responsibility for government to pick up some of the cost of providing the infrastructure so that electricity can be delivered and the additional production can be made.[51]

8.40 The Electricity Supply Association agreed that this type of arrangement was 'the only way to proceed':

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49 Northern Territory government, Submission no. 232, p. 19.

50 Townsville City Council, Submission no. 176, p. 10.

51 National Farmers' Federation, Transcript of Evidence, 21 June 1999, p. 38.

> … if there is a benefit to the utility supplier in terms of being able to save maintenance costs or down the road perhaps being able to make more income, then the utility supplier should be meeting a portion of that cost; if it is for a social reason then government should be meeting the cost. If it is another industry that is going to benefit, then it should be meeting a proportion of the cost in terms of how it benefits.[52]

8.41 With large, innovative projects, a combined private-public sector approach may be the only way in which finance can be raised. An example of such a scheme is the Derby Tidal Energy project described in Box 8.1. The proponents of this $360 million project have proposed that the private sector raise $240 million and a $120 million refundable loan be provided by the state and Commonwealth governments. The committee considers that this is the type of project ideally suited to support by such programs as Invest Australia. It supports the view expressed by the then Hon Tim Fischer, Acting Prime Minister, when announcing that funding would be considered for a cogeneration plant at Botany from the Infrastructure Borrowings Offset Scheme: 'for a relatively small outlay, the Commonwealth can foster significant outcomes not achievable by either the public or private sectors in isolation from one another'.[53]

Environment for investment in energy infrastructure

Demand for electricity

8.42 Over the past decade, national production and consumption of electricity have grown by 17 and 20 per cent respectively. The industry has also made substantial productivity gains.[54] The Australian Bureau of Agricultural and Resource Economics predicts that demand for electricity will grow by 1.7 per cent a year to 2014-15, although the Electricity Supply Association of Australia anticipates that it will be higher.[55]

8.43 In 1991, the Industry Commission noted in its report on energy generation and distribution that poor investment decisions in the gas and electricity

52 Electricity Supply Association of Australia, Transcript of Evidence, 27 September 1999, p. 180.

53 The Hon Tim Fischer, Acting Prime Minister, Media release, 7 January 1999.

54 The Treasury, 'Developments in electricity', http://www.treasury.gov.au/publications/EconomicPublicationsAndPapers/EconomicRoundUp/1999Spring/downloads/round4.rtf, accessed 10 December 1999, p.57.

55 Electricity Supply Association of Australia, Submission no. 210, p. 5.

sectors in the 1980s had produced excess capacity of 40-70 per cent, compared with the international benchmark of 20-25 per cent. Demand is not predicted to catch up with supply in Victoria until 2010 and in NSW until 2030.[56] Investment in generation has consequently declined in those states since interstate trading in electricity was introduced in 1997.[57]

8.44 Notwithstanding this, the electricity supply sector plans to invest approximately $20 billion in the next 10 years.[58] Energy has been identified as a critical issue in western Tasmania,[59] because no further extension of the state's hydroelectric capacity is possible. Gas and renewables, as well as the connection via Basslink to the mainland grid have been considered.[60] The committee was told on a number of occasions when visiting Queensland of an urgent need for more generators in that state.

8.45 In the next 10 years, more than $2 billion will be spent on a number of transmission projects, including:

- the NSW / Queensland interconnector, costing $400 million;
- six major transmission projects in Queensland required to meet predicted load growth, including regional lines near Tarong, Cairns and Oakey;
- a proposed $350 million undersea link between Tasmania and the mainland; and
- proposals to link NSW and South Australia via an interconnector.[61]

Demand for gas

8.46 According to the Australian Bureau of Agricultural and Resource Economics, natural gas consumption will grow at almost 4.3 per cent per annum, faster than that of other fuels. By 2014-15, it is expected to account for almost 29 per cent of all consumption, compared with 13 per cent in

56 A Ward, 'Patient GPU 'not crazy about risk' – but ready to pounce', *Electricity Supply Magazine*, no. 53, May 1999, p. 15.

57 The Treasury,. 'Developments in electricity', http://www.treasury.gov.au/publications/EconomicPublicationsAndPapers/EconomicRoundUp/1999Spring/downloads/round4.rtf, accessed 10 December 1999, pp. 51-2.

58 Electricity Supply Association of Australia, Submission no. 210, p. 3.

59 Department of Industry, Science and Resources, Submission no. 168, p. 17.

60 Tasmanian Government, Submission no. 284, p. 10; West and North West Tasmania's Regional Councils, Submission no. 229, p. 22.

61 Electricity Supply Association of Australia, *op cit*, p. 7.

1997-98. Strong demand is expected from the electricity generation, mining, manufacturing and commercial sectors.[62]

8.47 A major study of gas supply and demand undertaken by the Australian Gas Association concluded that eastern Australia would require additional supplies of gas from local sources to meet projected forecast demand between 2000 and 2008. Furthermore, supplies from further afield, such as offshore Western Australia and offshore Northern Territory will be needed to meet forecast demand to 2030.[63]

8.48 Improving the supply of gas will necessitate continuing and extending the construction of pipelines to interconnect existing networks and to connect additional basins. Among the projects soon to be started are:

- the Eastern Gas pipeline from Longford, Victoria to Sydney, passing through or near six regional centres;
- the Papua New Guinea to Gladstone pipeline, and a further line from Gladstone to the Wide Bay area;
- the pipeline linking the Dampier to Bunbury pipeline to Mount Magnet; and
- an extension to Tamworth of the pipeline to Dubbo.

Regulation

8.49 Regulation of energy markets was mentioned as a worrying source of uncertainty for investors. Several bodies are responsible for regulating the electricity industry and, in the opinion of the industry, this has led to a regulatory framework that is 'too crowded'. Furthermore, the effect of regulation has been to influence the level of regional development, which was seen as an inappropriate role for regulators. Electricity suppliers called for a review of regulation and a reduction of the number of jurisdictions with regulatory oversight.[64] **Dealing with the current regulatory bodies, especially with projects that cross state borders, can be very time consuming and costly.**[65]

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62 S Bush, A Dickson, J Harman & J Anderson, *Australian Energy: Market Developments and Projections to 2014-15*, ABARE Research Report 99.4, Canberra, 1999, pp. 41-3.

63 Quoted by M Roarty, *Natural Gas: Energy for the New Millenium*, Research paper 5 1998-99, Parliamentary Library, December 1998, http://www.aph.gov.au/library/pubs/rp/1998-99/99rp05.htm, accessed 4 January 2000.

64 Electricity Supply Association of Australia, Submission no. 210, pp. 12-13.

65 Electricity Supply Association of Australia, Transcript of Evidence, 27 September 1999, pp. 178-9.

8.50 Some of the same issues were raised in relation to the gas industry. The Australian Constructors Association, for example, commented on the impact of access arrangements on investment decisions:

> The potential for an infrastructure service to be subject to an access mandate can undermine an entrepreneur's willingness to invest in the project. It is important Australia's move to third party access to infrastructure services does not unduly increase uncertainty in the market for infrastructure.

8.51 The Northern Territory government made a similar point:

> The prospect of new or third party users being given access at lower prices is a very real issue because of the high up front fixed costs. Such a possibility adds to the higher degree of risk associated with such major developments. The rate of return permitted by regulators in such cases should reflect the risk profile of the project.
>
> An inappropriate approach to the treatment of major infrastructure may lead to detriment in regional areas, because less infrastructure or infrastructure with no spare capacity will be built than would have been the case otherwise.[66]

8.52 The committee's attention was also drawn to the impact that pricing regimes for gas and electricity may have on investment. AGL pointed out that, with distance based pricing:

> … towns at the start of the pipeline would receive a low price and those at the end of the pipeline an unreasonably high price. For the individual towns further along the pipeline, this means that they may be disadvantaged in not being able to attract industry with significant economic consequences.
>
> For the infrastructure investor, it means that natural gas cannot be supplied at a competitive price, therefore decreasing potential load and jeopardising the investment.

Another source of uncertainty is introduced by periodic reviews that can act as a deterrent to investment.[67]

8.53 The Australian Constructors Association also drew attention to the delays that characterise some aspects of the regulatory regimes applying to monopoly infrastructure. The association pointed out that:

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66 Northern Territory government, Submission no. 232, p. 19.

67 AGL, Submission no. 179, pp. 4-5.

> It is also important that potential investments which rely on gaining access to established so called 'essential' infrastructure services can quickly reach agreement on their right to access and the price of that access.[68]

The association gave examples, although not relating to power infrastructure, of delays of several years when decisions by the NCC have been appealed. It suggested that:

> The slow pace of the third party access processes not only increases uncertainty for the parties associated with process but also increases uncertainty for other potential investors in similar infrastructure. As a result investment decisions go on hold, and some potential investors may be deterred altogether.[69]

Other factors influencing investment

8.54 The creation of the national electricity market has introduced flexibility and market discipline into infrastructure planning.[70] This is a departure from the traditional approach, as the North Queensland Electricity Corporation pointed out:

> It has not been industry practice to construct an electricity network where there is no development, on the expectation and anticipation that the industry investment and development will follow. Consequently, it has not been the responsibility of electricity authorities to finance the risk associated with individual projects.[71]

With this change of direction, not only will risk management become an important issue, so too will a new approach to integrated planning of services with other providers.

8.55 Greater attention will also need to be paid to alternative technologies that avoid transmission over long distances. Finding a realistic, cost beneficial, alternative approach to transporting power, other than existing methods of transmitted supply:

> … would eliminate the need to construct capital intensive networks in speculative areas, while adequately matching the expected electricity needs in the area with modular, compact units.

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68 Australian Constructors Association, Submission no. 225, p. 29.

69 Australian Constructors Association, *op cit*, p. 30.

70 Electricity Supply Association of Australia, Submission no. 210, p. 3.

71 North Queensland Electricity Corporation, Submission no. 140, p. 2.

> Asset utilisation is increased, as such technologies can be easily re-located and used in other areas, should the speculative region prove uneconomic.[72]

8.56 As the reform of the gas and electricity markets continues, there will be further opportunities for competition both within and between these markets. It is not yet clear where prices will stabilise and hence what investments will be justified. For example, the managing director of GPU International Australia is reported as suggesting that electricity prices will remain low for a long time and inhibit independent power producers who might be interested in investing in small gas turbine power stations and cogeneration plants in remote locations.[73] Others have made a similar point.[74]

8.57 **Another uncertainty stems from the implications for the energy industry of Australia's commitment to reduce greenhouse gas emissions under obligations imposed by the Kyoto Protocol.** Costing the impact of projects will present difficulties for developers until they know the nature and extent of the requirements that will be imposed on them and how to meet those requirements. Use of emission trading schemes could contribute to resolving these problems and electricity supply businesses are keenly interested in the concept. However, its implementation nationally raises complex, presently unresolved issues and little progress has been made internationally in developing a framework for emission trading between countries. This is an area that would benefit from joint government-business consideration of solutions.[75]

8.58 Other factors that contribute to uncertainty in market planning and consequent delay in the construction of infrastructure were reported to the committee. They include the new business tax arrangements that are currently under consideration. The removal of accelerated depreciation and limited recourse to debt for projects were matters for particular concern.[76] Uncertainties associated with native title are another consideration, particularly in relation to gas exploration.[77]

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72 North Queensland Electricity Corporation, Submission no. 140, p. 2.

73 A Ward, 'Patient GPU 'not crazy about risk' - but ready to pounce', *Electricity Supply Magazine*, no. 53, May 1999, p. 15.

74 P Haynes, 'Boral and ATCO target power assets for growth', *Electricity Supply Magazine*, no. 53, May 1999, p. 23.

75 Electricity Supply Association of Australia, Submission no. 210, p. 3.

76 AGL, Submission no. 179, p. 5; Australian Council of Infrastructure Development, Submission no. 215, p. 8; Electricity Supply Association of Australia, *op cit*, p. 11.

77 Northern Territory government, Submission no. 232, p. 37.

Role of the Commonwealth government

Energy market reform

8.59 While the Commonwealth government has no direct responsibility for these services, it has a broader role in relation to national energy supplies which it discharges by:

- working closely with jurisdictions, industry and market participants to facilitate the process of electricity and energy market reform and ensure that the economic benefits gained by reform are shared amongst all customers;
- seeking to integrate wider energy and environmental objectives into electricity market reform, including accelerating the uptake of renewable energy in grid based power applications and promoting greater convergence of electricity and gas markets over the next few years; and
- maintaining the momentum of the reform process by ensuring that vested or State interests do not override national competition and social objectives and the ongoing reforms are consistent across jurisdictions and with national aspirations.[78]

8.60 **The committee recognises that benefits have flowed from reforms to the gas and electricity markets, both in terms of costs to consumers and the provision of new infrastructure. It considers continued reform to be important, but is concerned that the reforms might fail to deliver benefits to some parts of regional Australia, and might even disadvantage them. The committee considers that the effect of continued reform should be monitored and steps taken to ensure that the benefits accrue to all Australians.**

8.61 In addition, the importance of providing government assistance for certain energy infrastructure projects was brought to the committee's attention on several occasions, as discussed earlier in this chapter. The committee considers that this is a reasonable approach to supporting regional development, especially if finance is provided in the form of loans that help project proponents in the early stages of establishing infrastructure.

78 Department of Industry, Science and Resources, Submission no. 168, pp. 21, 23.

Recommendation 69

8.62 **The committee recommends that the Commonwealth government, in conjunction with state and territory governments:**

- **monitor the impact of energy reforms to ensure that infrastructure is provided that will adequately supply projected demand in the long term; and**
- **identify energy projects that need financial assistance to supply appropriate infrastructure for long term regional development.**

Planning

8.63 The Electricity Supply Association called for a national regional planning strategy to better coordinate infrastructure development in regional areas. In the absence of such an approach, there is confusion and competition between states for large developments outside any sort of investment framework.[79] The association acknowledged that:

> While not preventing investment going ahead, this perceived ad-hoc planning approach represents a source of frustration among electricity supply infrastructure planners.
>
> … a systematic consultative approach should be instituted to expedite the success of major project proposals and to ensure that development and job creation imperatives and community expectations and concerns are appropriately reconciled.[80]

AusCID supported its call for the Commonwealth government to take a strong national infrastructure coordination role in the light of the serious cross border economic impacts of recent power failures in Queensland, Sydney and Victoria.[81]

8.64 The Electricity Supply Association pointed to the joint planning approach under the national electricity code as a useful model for maximising the community benefit through a more coordinated planning effort with other forms of infrastructure.[82] The Regional Minerals Program funded jointly

79 Electricity Supply Association of Australia, Submission no. 210, pp. 3, 10.

80 Electricity Supply Association of Australia, *op cit*, p. 10.

81 Australian Council for Infrastructure Development, Submission no. 215, p. 3.

82 Electricity Supply Association of Australia, Submission no. 210, p. 13.

by industry and the Commonwealth and state governments has provided a coordinated approach to the development of new mines, downstream processing and related infrastructure.[83]

8.65 The national regional planning strategy should be based on a clearly defined direction in industry policy, and comprehensively cover other critical areas, such as water, communications, and education, as well as electricity supply.[84] Efforts should also be made to address the lack of coordination between different levels of government that is hampering the efficient development of infrastructure.[85] Australian Women in Agriculture drew attention to the need to make use of regional databases and social indicators in the course of the planning process with regional and industry bodies.[86]

8.66 The committee considers that the Commonwealth government has a role to play in encouraging regional planning of gas and electricity infrastructure. Relying on the market alone to plan infrastructure will not necessarily serve the wider interests of consumers and the economy. The committee is aware that access to gas across the country is less than that for electricity and the gas market less sophisticated. As a result, it believes that planning for the gas pipeline requires particular attention.

Recommendation 70

8.67 **The committee recommends that the Commonwealth government work with the state and territory governments to develop coordinated planning of energy infrastructure and the integration of these plans with those for infrastructure for other services.**

Particular attention should be paid to planning for a national gas pipeline network.

8.68 The basis of planning must be an objective assessment of costs and benefits that takes account of the wider economic effects of each project or groups of projects. The need to take a broad view of the impact of

83 Department of Industry, Science and Resources, Submission no. 168, p. 15.

84 Electricity Supply Association of Australia, *op cit*, p. 14.

85 Electricity Supply Association of Australia, *op cit*, p. 3.

86 Australian Women in Agriculture, Submission no. 205, p. 2.

proposed projects was stressed in several submissions to the inquiry.[87] Such an assessment makes clear the extent to which it is feasible for the private sector to undertake particular projects and how justifiable any government or user involvement might be.

8.69 An area that presents particular difficulty is the costing of the environmental impact of infrastructure projects. The Electricity Supply Association of Australia proposed this as a topic on which governments and business should work together to develop solutions.[88]

Regulation

8.70 The impact of multiple regulators and regulatory delays on the efficiency with which energy infrastructure is provided was discussed earlier in this chapter. The committee is concerned at these impediments to the industry's efficient operation. The committee's view is that a review of the impact of regulation on the energy industry should be conducted with a view to improving regulatory efficiency. The committee also supports the speeding up of regulatory procedures by, as suggested by the Australian Constructors, making more resources available to the regulators and introducing a legislative deadline for appeals.

Recommendation 71

8.71 **The committee recommends that the Commonwealth government, in conjunction with state and territory governments, review and streamline the regulatory regime that applies to the energy market and recommend improvements to its efficiency, including:**

- **simplifying the regulation; and**
- **expediting regulatory decisions by, among other measures, providing additional resources for the Australian Competition and Consumer Commission, the National Competition Council and the Australian Competition Tribunal to improve the speed at which appeals are heard.**

87 For example, Mid West Development Commission, Submission no. 218, p. 8.

88 Electricity Supply Association of Australia, Submission no. 210, p. 12.

Environmental policy

8.72 There are marked inconsistencies between the states and territories in the area of environmental law. The Electricity Supply Association of Australia suggested that:

> States should be encouraged to develop uniform environmental policy approaches to development, and the Federal Government should investigate the possibility of a more uniform national environmental framework for development.[89]

The committee recognises that projects that cross state borders can be considered by a single environmental assessment process agreed between jurisdictions involved. The *Environment Protection and Biodiversity Conservation Act 1999* maintains this streamlined approach to environmental assessment. However, it is clear that further improvements would accrue from a more uniform approach, and the Commonwealth government could assist in achieving this goal.

Recommendation 72

8.73 **The committee recommends that the Commonwealth government work with state and territory governments to develop national uniform requirements in relation to the environmental impacts of infrastructure development.** (see also recommendations 5 and 7)

8.74 As indicated earlier in this chapter, investment decisions will be difficult until the details of international and national requirements flowing from the Kyoto Protocol are determined. Recognising these problems, the Australian Greenhouse Office is investigating how government policy can be made more consistent during the period of transition to binding emissions constraints, which will be imposed in 2008.[90]

8.75 The introduction of emissions trading will establish a price for emissions and provide a known value for inclusion in the costing of proposed projects. However, the framework for an international emissions trading scheme has not yet been established, although informal trades are already occurring. The committee is aware that the Australian Greenhouse Office is working to establish the parameters for a national emissions trading

89 Electricity Supply Association of Australia, Submission no. 210, p. 3.

90 Australian Greenhouse Office, *Annual Report 1998-99*, p. 16.

scheme, and considers that this work should be pursued vigorously and as much pressure as possible be brought to bear on the international community to institute a formal world wide trading scheme as soon as possible.[91]

Recommendation 73

8.76 **The committee recommends that the Commonwealth government develop measures that reduce the uncertainty due to international environmental obligations to reduce greenhouse gas emissions, including:**

- **the early establishment of an emissions trading scheme; and**
- **early indication to industry of future requirements for emissions reductions.**

8.77 The question is how targets for economic growth are to be achieved in the face of the higher energy costs that will follow the imposition of ceilings on greenhouse gas emissions. It will be necessary, according to the Electricity Supply Association of Australia:

> … to reconcile goals that included meeting the Kyoto commitment, growing the economy at an average of 4 percent a year, and increasing downstream processing of Australian raw materials (which involves the need to provide energy priced more cheaply than in competing countries).[92]

Part of the answer involves balancing competing environmental benefits. For example, building a dam on the Tully Millstream or at Hells Gate would have direct environmental impacts downstream. It would also allow the local generation of hydroelectric power and eliminate the greenhouse gas emissions produced by Queensland's coal-fired power stations and exacerbated by transmission losses over long distances.

91 Australian Greenhouse Office, *op cit*, p. 15.

92 K Orchison, 'Resolution of renewables policy welcomed', media release by the Electricity Supply Association of Australia, 30 November 1999.

Renewable energy

The current state of the industry

8.78 The renewable energy industry covers a broad range of energy sources and technologies. These sources include solar, wind, biomass, tidal, wave, hydropower, geothermal and renewable hydrogen. Among the technologies involved in the production of renewable energy are ceramic and photovoltaic fuel cells, solar thermal collectors, turbines, storage batteries, inverters and systems software.[93]

8.79 In 1997-98, renewables collectively represented six per cent of Australia's total energy consumption, the bulk of which was derived from large hydro projects, such as the Snowy Mountains Scheme and Tasmanian Hydro. Renewables were forecast to grow at 0.7 per cent a year, which is half the rate of growth in total energy consumption. Wind, solar and biomass are estimated to have supplied less than one per cent of electricity demands, and most of this was generated from landfill gas.[94]

8.80 A number of major renewable energy projects are proposed, such as the tidal power facility at Derby, Western Australia (see Box 8.1), and a large wind farm on the north-west coast of Tasmania. The potential for other schemes is also considerable; for example, the Managing Director of Pacific Hydro suggested that there is the potential to build hundreds of megawatts of wind energy along the east coast.[95]

8.81 As CSIRO pointed out:

> In a country which is as vast as Australia decentralised power supplies are essential if people and business in remote areas are to receive an adequate and reliable power supply. [Ceramic fuel cells, wind prospecting, biomass and solar-fossil fuel energy mix] are energy sources that can all be used in regional and remote communities and do not depend on the main power grids.[96]

Environment Australia also consider that such technologies offer development and employment opportunities for rural communities,[97]

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93 Department of Industry, Science and Resources website, http://www.isr.gov.au/agendas/sectors/energy.html, accessed 20 December 1999

94 ABARE, *Australian Energy Markets & Projections to 2014-15*, April 1999, pp 26, 42; Electricity Supply Association of Australia, http://www.esaa.com.au, accessed 23 December 1999

95 'Harding sees huge wind farm potential', *Electricity Supply Magazine*, January 2000, p. 8.

96 CSIRO, Submission no 147, pp. 5-8.

97 Environment Australia, Submission no. 271, pp. 15-16.

especially given that, in such areas, renewable and hybrid energy systems are already competitive with diesel generated electricity.[98] Photovoltaic cells, for example, are often the least expensive means of meeting electricity needs for households not connected to the grid.[99]

Commonwealth programs for renewable energy

8.82 Apart from the usefulness of renewable energy technologies in remote areas, interest in investing in renewable energy infrastructure is being driven by Australian governments' responses to the nation's commitment to limit its greenhouse gas emissions. One of the most significant influences on this investment is the requirement that the Commonwealth government has imposed on electricity retailers and large electricity producers to source an additional two per cent of their output from renewable or specified waste product energy sources by 2010.[100] To meet this obligation, $3-5 billion is expected to be spent in the next 10 years on new renewable generation.[101]

8.83 Critics of the two per cent target have claimed that it is too small a contribution to significantly reduce greenhouse gas emissions. Higher figures have been suggested as more appropriate if Australia is to reach its international reduction commitment.[102] The committee believes that there is already a need for increased investment in renewable energy beyond that currently expended. This situation will become more urgent if these critics are proved correct.

8.84 The Commonwealth government supports the use of renewable energy with programs focused on research, development, commercialisation, and widespread uptake of appropriate technologies.

Australian Cooperative Research Centre for Renewable Energy

8.85 The Australian Cooperative Research Centre for Renewable Energy is a cooperative venture between Australia's leading energy utilities, universities, industry and government agencies in the fields of renewable

98 Department of Industry, Science and Resources, *Emerging and Renewable Energy Industries Action Agenda*, http://www.isr.gov.au/agendas/sectors/energy, accessed on 20 December 1999.

99 C Flavin & M O'Meara 'Solar power markets boom', *World Watch*, September/October 1998, pp. 23-27.

100 'The renewable energy target', *ABARE Current Issue*, no. 98.3, August 1998, p. 1.

101 K Orchison, 'Resolution of renewables policy welcomed', media release by the Electricity Supply Association of Australia, 30 November 1999.

102 J Arlidge, 'Solar PVs long march to success on urban roofs', *Electricity Supply*, February 2000, p. 13.

energy and greenhouse gas abatement. Its core funding of $10.1 million over seven years is received from the Commonwealth government. The centre:

- researches generation, storage, power conditioning, energy efficiency and systems integration;
- demonstrates cost effective systems, based on the research;
- advises government and energy agencies on policy for a viable renewable energy industry in Australia; and
- provides skilled technologists and research information.[103]

Renewable Energy Commercialisation Program

8.86 The Renewable Energy Commercialisation Program is a five year, $30 million competitive grants program that was established by the Commonwealth government to foster the Australian renewable energy industry. The program provides funds for projects that lead to the commercialisation of innovative renewable energy equipment, technologies, systems and processes. Program grants are normally in the range of $100 000 to $1 million. Successful recipients of grants in regional Australia include:

- an integrated wood processing demonstration plant to be led by Western Power Corporation at Narrogin, Western Australia ($1 million);
- a commercial scale biofuel plant to built by Manildra Energy Australia Pty Ltd at Bomaderry, NSW ($1 million); and
- the development of a 3000 square meter solar pond facility by RMIT University, Geo-Eng Australia and Pyramid Salt Pty Ltd for use in salt production and aquaculture ($750 000).[104]

Adequacy of research, development and commercialisation

8.87 According to the Electricity Supply Association of Australia, there is currently debate over the adequacy of funding for R&D and commercialisation of renewable energy technologies, and the balance

103 The Australian Cooperative Research Centre for Renewable Energy, http://www.acre.murdoch.edu.au, accessed on 23 December 1999.

104 G*reenhouse News***,** Vol 2, Issue no. 4, December 1999, pp. 6-7.

between the two. Finding money to fund long term research and development is difficult.[105] Furthermore:

> While there is increasing industry capability to design, manufacture and deliver E&RE [emerging and renewable energy] technology-based products, much of the technology capability and leadership still resides within research institutions.

It is important that these technologies are rolled out to industry, especially given that Australia has capabilities in the majority of emerging and renewable energy technologies and markets, and is a world leader in some of them.[106]

Renewable Energy Equity Fund

8.88 The Renewable Energy Equity Fund has been set up to encourage the development of companies and other incorporated bodies which are commercialising research and development in renewable energy technologies, by addressing capital and management constraints. It will be fully operational in early 2000, and will provide approximately $20 million in venture capital over 10 years for small innovative companies to develop and commercialise renewable energy technology. The fund managers will source at least a further $10 million from elsewhere to match the government funds on a 1:2 basis.[107]

Remote area power supply (RAPS) rebate scheme

8.89 Since 1987 several state governments have operated schemes to encourage the adoption of renewable energy in remote areas. Under these programs, the successful applicants typically receive a rebate for a portion of the cost of renewable energy and related components of a RAPS system, photovoltaic programs or solar hot water systems.[108] Under the Photovoltaic Rebate Program, the Commonwealth government is making

105 Electricity Supply Association of Australia, Transcript of Evidence, 27 September 1999, pp. 181-182.

106 Department of Industry, Science and Resources, *New Era – New Energy: emerging & renewable energy action agenda draft discussion paper*, 7 December 1999, pp. 13, 28.

107 Department of Industry, Science and Resources, *op cit*, p. 48; G*reenhouse News***,** Vol 2, Issue no. 4, December 1999, p. 1.

108 N A Wilmot, and J P Wyder, *The WA Renewable Energy RAPS Rebate Scheme, the RAPS Display and a User Guide and Maintenance Manual for RAPS Systems*, presented at ANZSES Solar 97 conference, Canberra, 1997.

$31 million available over four years to householders who install grid-connected or stand-alone photovoltaic systems.[109]

8.90 These schemes will receive a boost from a Commonwealth initiative that will provide up to $264 million over four years from 1 July 2000 to subsidise a grant scheme for remote (off-grid) electricity users to convert to renewable energy systems. To be eligible for the program, states will have to commit to continue to cross subsidise remote power costs for domestic users and to use the funds to provide cash rebates of up to 50 per cent of the capital value of RAPS systems.[110]

Conclusions

8.91 The renewables industry is in its infancy in Australia, and some technologies represent a more expensive source of power at present than conventional technologies. However, not only will renewables facilitate the supply of power to remote areas, but they also represent a source of export earnings and will help to minimise national greenhouse gas emissions. The committee considers that the Commonwealth government has an important role to play in supporting the development of a vibrant renewables industry through programs such as those described above. The committee's view is that the success of these programs should be monitored and consideration given to extending those that are successful; new approaches should also be funded.

Recommendation 74

8.92 **The committee recommends that the Commonwealth government continue to fund renewables R&D, commercialisation, venture capital, and subsidies to customers beyond the anticipated four years.**

109 The Austalian Greenhouse Office, 'New renewable energy initiatives', http://www.greenhouse.gov.au/renewable/initiatives.html, accessed 22 February 2000.

110 Prime Minister's media release, *Changes to the Goods and Services Tax (GST) 31 May 1999*, http://www.pm.gov.au/media, accessed on 22 December 1999.