

Progress Towards MRET Objectives

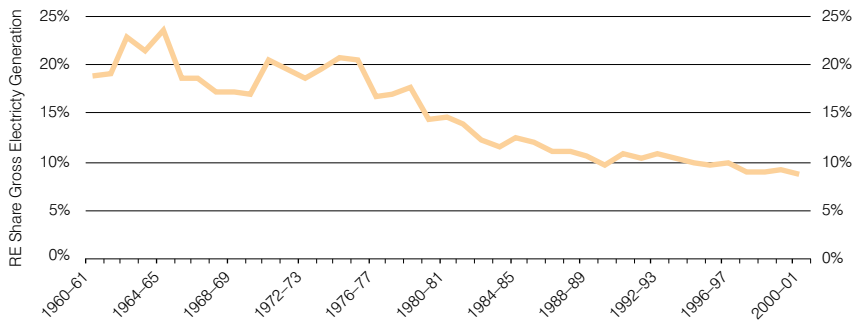
- 2.1 According to the Prime Minister's Safeguarding the Future statement, and the *Renewable Energy (Electricity) Act 2000* (the Act), MRET has multiple objectives. The objects as set out in s.3 of the Act are:
- to encourage the additional generation of electricity from renewable sources
 - to reduce emissions of greenhouse gases
 - to ensure that renewable energy sources are ecologically sustainable.
- 2.2 The Second Reading Speech to the legislation highlighted the industry development objectives underlying the Act, notably, to provide an ongoing base for commercially competitive renewable energy, and to contribute to the development of internationally competitive renewable energy industries.
- 2.3 This chapter addresses the extent to which these policy objectives have been achieved during the first two years of MRET's operation.

Additional generation

- 2.4 The Act specifically states that an objective of the MRET measure is 'to encourage the additional generation of electricity from renewable sources.'⁹
- 2.5 Since the completion of the major stages of the Snowy Mountains Hydro Electric Scheme in the mid 1960s to early 1970s, the proportion of renewable energy in Australia's electricity mix has declined steadily. This has resulted from the combination of strong growth in the fossil fuel based electricity generation sector and a lack of new major renewable electricity over that period.
- 2.6 Figure 7 illustrates the trend in the relative share of renewables in Australian electricity generation, which peaked at around 23 per cent in 1965 and has declined to around 9 per cent in 2000. On current electricity projections for 2010, the MRET measure is expected to reverse this historical decline.

⁹ *Renewable Energy (Electricity) Act 2000* s.3

Figure 7—Relative renewable energy share of electricity generation (1960–2001)¹⁰



- 2.7 In 1997, prior to the announcement of MRET, Australia's renewable energy sector generated around 16 000 GWh of electricity, equating to around 10.5 per cent of Australia's electricity market. The vast majority of this renewable electricity was generated from hydro-electric sources, from Tasmania and the Snowy Mountains scheme. Minor renewable sources contributing to this generation included landfill gas, biomass (bagasse and black liquor), photovoltaic and wind.
- 2.8 To put the level of additional generation mandated by the MRET measure into perspective, the 9500 GWh of additional renewable generation required by 2010 under MRET, represents around a 60 per cent increase in renewable generation above 1997 levels. The Electricity Supply Association of Australia describes it as follows:

By 2010, the measure will deliver 9500 GWh of [renewable] electricity, equivalent to all of Tasmania's hydro electric output and more than twice the output of the iconic Snowy Mountain Scheme. Such large amounts of new renewables-based electricity cannot be dismissed as either trivial or ineffective.¹¹

¹⁰ Figure 7 source; Department of Industry, Tourism and Resources

¹¹ Electricity Supply Association of Australia, submission 107, p3

- 2.9 Term of Reference (a)(ii) requires that the Review Panel determine the extent to which the Act has 'encouraged additional generation of electricity from renewable energy sources'. The level of uptake of the measure by the renewable energy industry can be demonstrated by both the number of renewable energy generators accredited under the MRET measure and the number of RECs created.

Accredited power stations

- 2.10 A significant number of renewable electricity generators have become accredited under the MRET measure, across a wide range of Eligible Renewable Energy Sources. According to ORER as at 18 August 2003, 190 power stations had been accredited for participation in MRET. Of these, 106 existed prior to the announcement of MRET and 84 constituted new developments.
- 2.11 In addition to the new projects, pre-existing generators have increased generation above their 1997 baselines through efficiency improvements, operational changes and plant upgrades.
- 2.12 According to the Australian Business Council for Sustainable Energy (BCSE),¹² there has been 186 megawatts (MW) of new renewable energy capacity commissioned since the Prime Minister's announcement in November 1997, and a further 188 MW committed as at 31 December 2002.
- 2.13 Table 1 provides a breakdown of accredited generators by energy source.

¹² Australian Business Council for Sustainable Energy, submission 165, p25

Table 1—Accredited power stations (as at 18 August 2003)¹³

Eligible Renewable Energy Source	Existing Power Stations	New Power Stations	Total Accredited by 18 August 2003
Bagasse cogeneration	25	1	26
Black Liquor	1	0	1
Black Liquor/Wood Waste	0	1	1
Food and Ag Wet Waste	0	2	2
Hydro	61	10	71
Landfill	14	14	28
Municipal Solid Waste (MSW)	0	1	1
Photovoltaic (PV)	2	26	28
Sewage Gas	1	5	6
Wind	1	17	18
Wind / PV	1	0	1
Wood Waste	0	2	2
Wood Waste / MSW	0	5	5
Total	106	84	190

Solar water heaters and small generation units

2.14 There has also been a significant increase in the uptake of solar water heaters (SWHs) and to a less extent small generation units (SGUs).¹⁴ Special deeming provisions within MRET facilitate the up-front purchase of these small-scale renewable energy units.

2.15 There is evidence that the solar water heater market has recently experienced significant growth, largely due to the introduction of the MRET measure. According to Rheem¹⁵, since the commencement of the MRET, the solar water heater market in Australia has grown by 30 per cent per annum from 19 000 to 33 000 systems. With RECs having been created for around 43 000 solar water heaters, as at 18 August 2003, it is evident that the large majority of eligible solar water heaters installed are creating RECs.¹⁶

¹³ Table 1 source; Office of the Renewable Energy Regulator submission 178, p3, updated to 18 August 2003

¹⁴ Under MRET, a renewable generator is defined as an SGU if its energy source is hydro, solar or wind generation, and it has a generation capacity of less than 10 kW, and it generates up to 25 MWh of electricity each year.

¹⁵ Rheem/Solarhart, submission 25, p5

¹⁶ Office of the Renewable Energy Regulator, supplementary information

- 2.16 There has been a low uptake of SGUs under the measure with only 145 units registered by 18 August 2003, with all but four coming from the Photovoltaic (PV) sector.¹⁷
- 2.17 PV installation figures, assisted by the Australian Government's Photovoltaic Rebate Program and the Renewable Remote Power Generation Program, amounted to around 3000 units from 1 April 2001 to July 2003. However, it is evident that there are many eligible PV units for which RECs have not yet been created.
- 2.18 Several submissions¹⁸ commented that MRET had not been a significant driver in either the small-scale PV or SGU market because the MRET deeming provisions do not provide a sufficient incentive for owners or suppliers to create RECs.

Renewable Energy Certificates created

- 2.19 During the first two years of MRET's operation, nearly twice as many RECs have been created than are required by the 2001 and 2002 interim targets.¹⁹ RECs created in excess of the interim targets have effectively been 'banked' and can be surrendered by liable parties against higher MRET targets in future years.
- 2.20 According to ORER, as at 18 August 2003, a total of 4 003 104 RECs had been registered under the Act, representing around 4000 GWh of additional new renewable electricity. This amount exceeds the cumulative interim targets for 2001 to 2003 of 3200 GWh and allows around 800 000 RECs (equivalent to 800 GWh) to be banked against future MRET targets.
- 2.21 Several submissions²⁰ recognised that the number of RECs registered is not fully representative of the level of additional generation, because there is no time limit on when RECs can be created after the generation occurs.²¹
- 2.22 According to ORER, by the end of 2001 there were around as many eligible RECs 'uncreated' as there were RECs created. A number of factors could have caused this result including: strategic decisions by generators; the need for proponents to become familiar with REC creation processes; delays in accreditations due to data requirements; and smaller market demand in the first compliance year.
- 2.23 By the end of 2002, close to 70 per cent of the total eligible RECs over the two-year period had been created. As demand for RECs continues to grow as a result of the increasing interim targets, it might be expected that this pool of uncreated RECs would diminish over time.

¹⁷ REC Registry.

¹⁸ Australian and New Zealand Solar Energy Society, submission 57; Australian Business Council for Sustainable Energy, submission 165; BP Solar, submission 193

¹⁹ Around 2.7 million RECs (equivalent to 2,700 GWh) were created by the end of 2002 in comparison to 1,400 GWh of additional generation required as a cumulative total of the 2001 and 2002 interim targets.

²⁰ Greenpeace Australia, submission 194, p4; NEG Micon, submission 202, p9. The Panel also notes the evidence presented to the Senate Inquiry into Renewable Energy (Electricity) Amendment Bill 2002, *Environment, Communications, Information Technology and the Arts Legislation Committee Report into the Renewable Energy (Electricity) Amendment Bill 2002*, p19

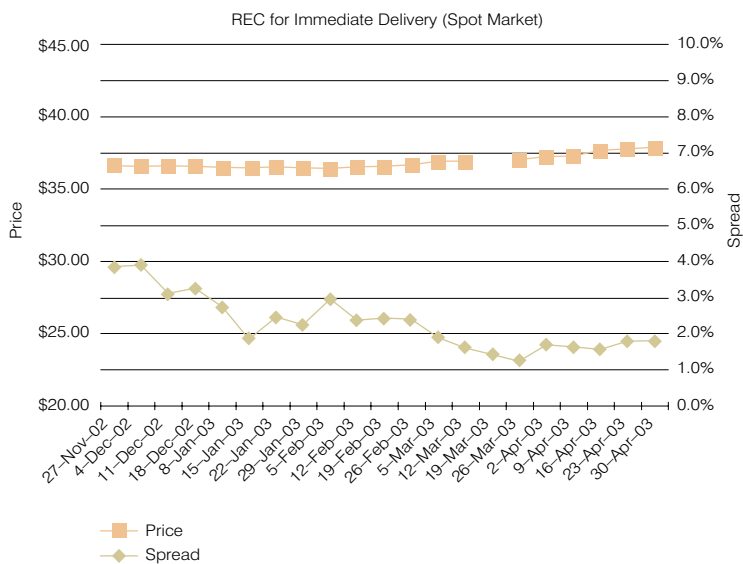
²¹ With the exception of solar water heaters where RECs may be created only within 12 months after installation (Reg 19 (3) (a) (ii)).

Renewable energy certificate market

2.24 There is evidence that the first two years of the MRET measure have seen the emergence of a viable REC market.

2.25 The submission from the Australian Financial Markets Association (AFMA)²² indicates that, while trading volumes have been relatively small (as a result of small interim targets in early years), the renewable energy certificate price has been 'relatively stable over time', while the spread of prices has 'decreased considerably', indicating the emergence of a 'better-informed and more liquid market', as shown over the period since November 2002 in Figure 8.

Figure 8—REC spot market (November 2002 to April 2003)²³



²² Australian Financial Markets Association, submission 161, pp4-5

²³ Figure 8 source; Australian Financial Markets Association submission 161

- 2.26 While formal data was not available prior to November 2002, market analysts and participants²⁴ advised that the REC spot market commenced in 2001 at around \$25 per certificate and steadied in 2003 at between \$36 and \$38 per REC.
- 2.27 There has also been significant trade in the RECs forward market, reflecting the fact that renewable energy projects often require long term contracts to cover large upfront capital costs. AFMA quotes REC forward contracts for 2007 at \$40 to \$42, suggesting that the REC price is likely to remain relatively stable over the near-term.
- 2.28 AFMA also commented there is currently a degree of uncertainty in the forward REC market arising from perceptions of regulatory risk surrounding MRET.
- 2.29 Many submissions and consultations highlighted that the main source of regulatory risk was the Parer Report recommendation that MRET cease immediately, on the announcement of a national emissions trading system. Other less important but still significant sources of perceived regulatory risk include uncertainties about both the outcome of this Review and current Australian Government and State and Territory governments greenhouse policies.
- 2.30 Unless these concerns are adequately addressed by governments, both market participants' willingness to enter into long term REC contracts and investor confidence in the renewable energy industry will be impeded.
- 2.31 Currently, there is a specific lack of investor confidence in RECs emanating from wood waste, principally because of the inclusion of wood waste from native forests²⁵. Evidence relating to market operation illustrates a lower level of demand for wood waste RECs, which typically trade at a 5 to 10 per cent discount.
- 2.32 AFMA commented 'that prices quoted for forward REC deals are for non-wood waste, unless otherwise stated'²⁶ while market trader, Next Generation Energy Solutions commented that liable parties 'will 99 per cent of the time specify non-wood waste as their preferred source.'²⁷
- 2.33 The Review Panel accepts the view put forward in submissions and consultations that the market is differentiating between wood waste and non-wood waste RECs due to community concerns about the eligibility of native forest wood waste for electricity generation. This issue is addressed in Chapter 8 of this Report.

²⁴ Australian Financial Markets Association, submission 161; Next Generation Energy Solutions, submission 213; McLennan Magasanik Associates, Report to the Australian Greenhouse Office, *Economic Impacts of Changes to the Mandatory Renewable Energy Target*; Country Energy, submission 206

²⁵ In this report, the use of the terms 'native forest' and 'plantation' is according to the relevant definitions contained within the s.3 of the *Renewable Energy (Electricity) Regulations 2001*.

²⁶ Australian Financial Markets Association, submission 161, p7

²⁷ Next Generation Energy Solutions, submission 213, p2

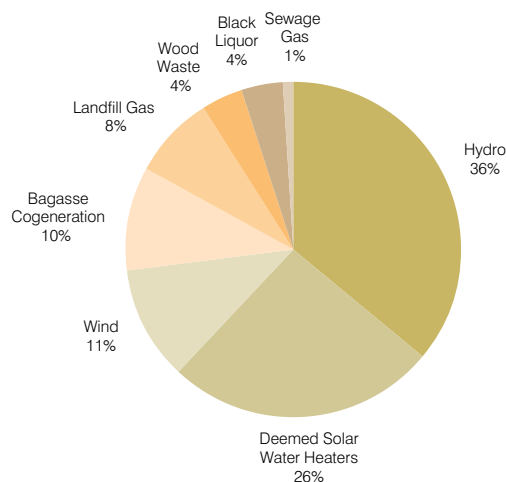
Surrender of Renewable Energy Certificates

- 2.34 For the 2001 compliance period, ORER²⁸ reported that 92 per cent of liable entities met their obligations by surrendering RECs. ORER is currently processing the REC surrender for 2002. However, information received from ORER indicates that many liable entities that had shortfalls in 2001 have now not only fully met their 2002 obligations through REC surrender, but are also redeeming 2001 shortfalls.
- 2.35 This demonstrates that the preferred method for compliance under the Act has been surrender of RECs, rather than payment of the shortfall charge, noting that the REC price is currently below the shortfall charge.
- 2.36 During consultations, most liable parties indicated a willingness to pay a REC price in excess of the shortfall charge, rather than to pay the shortfall charge, in order to avoid public perceptions of non compliance.

Mix of technologies in 2003

- 2.37 Term of Reference (c) states that the Review Panel should determine 'the mix of technologies that has resulted from the implementation of the provisions of this Act'. Figure 9 illustrates the technology mix as a percentage of RECs created as at 18 August 2003.

Figure 9—Mix of technologies (as at 18 August 2003)²⁹



²⁸ Office of the Renewable Energy Regulator, submission 178, p3

²⁹ Figure 9 source; Office of the Renewable Energy Regulator. Note that this figure represents the proportion of RECs created, which is not fully representative of total eligible generation. Sources that contribute less than 1 per cent of RECs created (such as PV and MSW) have been excluded.

2.38 Figure 9 demonstrates that a wide range of renewable technologies have been encouraged into the electricity market. Nearly two-thirds of RECs created during the first two years of operation were from hydro or solar hot water. Biomass wastes accounted for over one-quarter of RECs created, while no RECs were created from dedicated biomass sources. Wind was the other major contributor with just over 10 per cent of RECs created.

2.39 The Australian Industry Greenhouse Network noted that:

This early trend in the mix of renewable energy technology coming forward is not surprising given that these technologies tend to be cheaper and more easily deployed.³⁰

2.40 The evidence also points to a strong contribution from the wind sector from a relatively small base. According to the Australian Wind Energy Association (AusWEA) the wind industry has 'responded strongly to the stimulus of MRET with an average annual growth rate of 118 per cent between 1999 and 2002 and installed capacity increasing from 10 to 104 MW over the same period.'³¹

2.41 Another feature of the energy mix was highlighted in the submission from ORER³² which commented that while 127 338 RECs had been registered from wood waste as at 30 April 2003, non-plantation forestry was not used in respect of any of those RECs.

2.42 Figure 10 presents a disaggregation of the mix of technologies by States and Territories. It is evident that there is marked regional variation in the mix and availability of renewable energy sources across States and Territories.

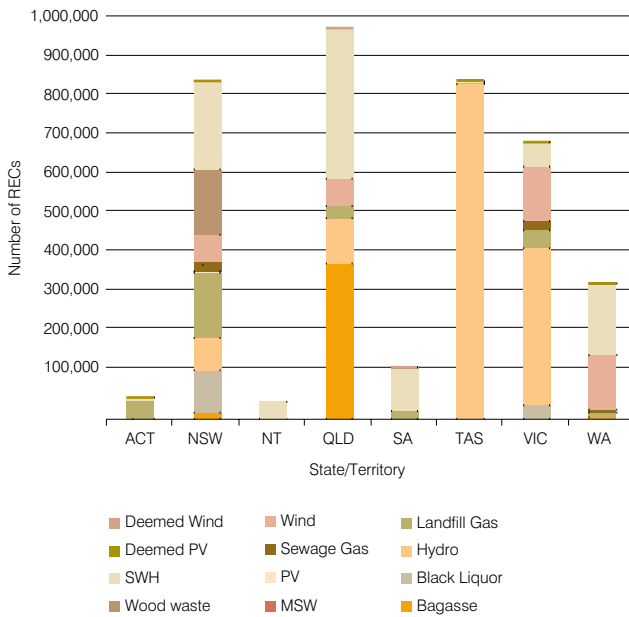
2.43 The low level of RECs created in Western Australia, South Australia, the Northern Territory and the Australian Capital Territory tends to reflect relatively narrow disposition of renewable energy resources, although this may change over time as new resources and projects evolve.

³⁰ Australian Industry Greenhouse Network, submission 235, p10

³¹ Australian Wind Energy Association, submission 198, p17

³² Office of the Renewable Energy Regulator, submission 178, p4

Figure 10—Number of RECs created by jurisdiction (as at 18 August 2003)³³



Industry development

2.44 Section 3 of the Act does not specifically nominate industry development as an object of the Act. However, the Act's first object is 'to encourage the additional generation of electricity from renewable sources.'³⁴ The achievement of this object clearly creates opportunities for the development of the renewable energy industry.

2.45 The Prime Minister identified industry development in *Safeguarding the Future* as a clear objective of the government's original plans for a mandatory renewable energy target. The Second Reading Speech accompanying the bill for the Act set out the industry development objectives of MRET:

- accelerating the uptake of renewable energy in grid based applications so as to reduce greenhouse gas emissions
- providing an ongoing base for commercially competitive renewable energy
- contributing to the development of internationally competitive industries which could participate effectively in overseas energy markets.³⁵

³³ Figure 10 source; Office of the Renewable Energy Regulator. Note these figures represent the number of RECs created, which is not fully representative of total eligible generation.

³⁴ *Renewable Energy (Electricity) Act 2000* s.3(a)

³⁵ *Parliamentary Debates, Senate*, 14 August 2000, p16244

The renewable energy industry

2.46 Australia's renewable energy industry in 2003 is relatively small. Table 2 summarises the most recently available indicators of the state of the renewable energy industry. Projected sales of electricity, equipment and services for 2002–03 are approximately \$1.8 billion, of which 14.5 per cent are expected to be exports.

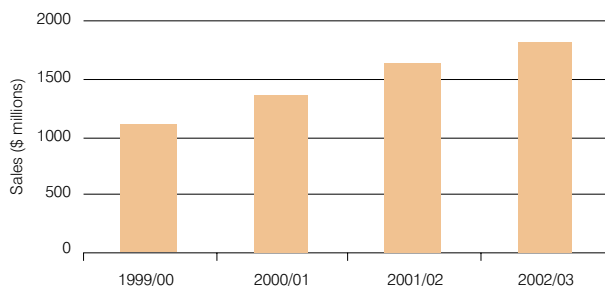
Table 2—Current state of the renewable industry³⁶

Projected Sales (2002–03)	Projected Exports (2002–03)	Projected Employment (2002–03)	MW Capacity: Installed (31 Dec 2002)	MW Capacity Installed less Large Hydro (31 Dec 2002)
\$1 826m	\$226.5m	6189	7616.4	680

Sales

2.47 In recent years, and particularly since the commencement of MRET, sales of renewable energy have grown substantially, as shown in Figure 11.

Figure 11—Sales 1999–00 to 2002–03³⁷



2.48 Sales in 2002–03 totalled just under half of the Renewable Energy Action Agenda target of \$4 billion sales in 2010.

³⁶ Table 2 source; Department of Industry Tourism and Resources, based on figures from Mark Ellis and Associates, Australian Business Council for Sustainable Energy, and Australian Bureau of Agriculture and Resource Economics.

³⁷ Figure 11 source; Department of Industry Tourism and Resources, based on figures from Mark Ellis and Associates. The Review Panel noted reservations expressed about these figures by the Australian Business Council for Sustainable Energy, submission 165a.

Investment

- 2.49 Many interested parties commented in submissions and consultations that MRET has been the principal policy driver in the recent expansion of the renewable energy industry. For example, Western Power suggested that 'most, if not all, of the renewable energy activity on main grids over the past two years and planned for the future, is a direct result of the Act.'³⁸
- 2.50 Supplementary information provided by ORER³⁹ suggests that, by September 2003, around \$900 million of investment in new renewable energy projects had occurred with more than \$1 billion worth of investment committed or planned.
- 2.51 The continued strong uptake of MRET by the renewable energy industry is demonstrated by the level of activity in relation to the construction and project planning of new power stations and efficiency improvements to existing assets. However, in submissions and consultations, many interested parties commented on the recent stalling of investment, principally due to regulatory uncertainty arising from the Parer Report.
- 2.52 Nonetheless, there is evidence of a significant level of development and planning activity in relation to both pre-existing and new generators. Due to constraints that include planning and development approvals and the need to demonstrate financial viability, a proportion of these planned projects may not proceed.
- 2.53 Many companies⁴⁰ indicated in their submissions that they are currently undertaking projects which would not have been feasible without MRET. Moreover, AusWEA and EarthEnergy Australia suggested that in the absence of the MRET, the wind industry would either stall or collapse.
- 2.54 There is strong evidence in relation to pre-existing generators, that major efficiency improvements and plant upgrades have been undertaken, allowing them to generate above their 1997 baselines. According to the Renewable Energy Generators of Australia (REGA)⁴¹:
- Southern Hydro Partnership is investing \$17 million to upgrade the Rubicon scheme and the McKay Creek power station.
 - Hydro Tasmania has developed a \$208 million, ten-year program of upgrades to increase renewable energy from the Poatina, Trevallyn and Gordon power stations.
 - Snowy Hydro Limited has committed to an upgrade program including, \$8 million for the Murray 2 Power Station from 550 MW to 620 MW and \$16.5 million for the construction of the 55 GWh per year Jounama mini hydro project.

³⁸ Western Power, Sustainable Energy Branch, submission 70, p1. Similar views were put by Macquarie Generation, submission 112, p1

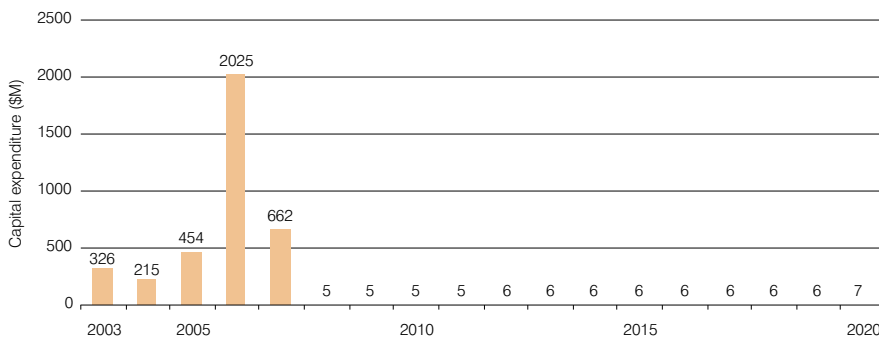
³⁹ Supplementary information from Office of the Renewable Energy Regulator

⁴⁰ Including Australian Wind Energy Association, submission 198; EarthEnergy Australia, submission, 131

⁴¹ Renewable Energy Generators of Australia, submission 108, p14

- 2.55 Many interested parties commented on the significant planning activity in relation to new generation capacity, with BCSE⁴² suggesting that MRET has triggered around 2350 MW of renewable energy projects under development and around 3400 MW under evaluation.
- 2.56 However, a number of interested parties commented that under current arrangements, investment would almost cease after 2007, primarily because the capacity to meet the 2010 target of 9500 GWh will have already been installed.
- 2.57 A further factor inhibiting investment beyond 2007 is that the Act has no provision for a continuation of the target beyond 2020, which has the effect of reducing the payback period for investments, which is typically at least 15 years.
- 2.58 This expectation was confirmed in evidence provided to the Review Panel by the AGO, based on a study undertaken for the AGO by McLennan Magasanik Associates (the AGO/MMA study⁴³) which suggested the current MRET setting would see strong investment in the few early years of the measure, but that this investment would fall away rapidly beyond 2007, as shown in Figure 12.

Figure 12—Expected investment trend for current MRET⁴⁴



- 2.59 Renewable energy generation is likely to exceed the interim targets prior to 2010 and fall short of the 9500 GWh target after 2010. This expectation is premised on the likelihood of generators and liable parties taking advantage of the facility for the banking of RECs for use in later years.

⁴² Australian Business Council for Sustainable Energy, submission 165, p25

⁴³ McLennan Magasanik Associates, *Economic Impacts of Changes to the Mandatory Renewable Energy Target*, 2003

⁴⁴ Figure 12 source; adapted from McLennan Magasanik Associates, *Impact of a 20,000 GWh target for the MRET Scheme*, p31

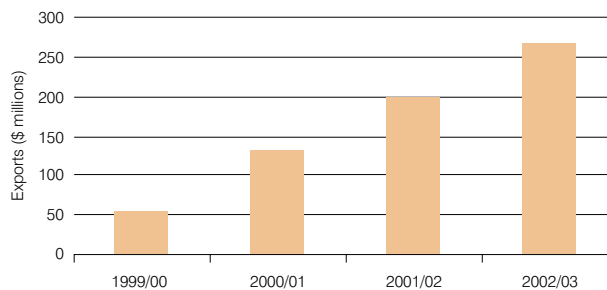
Exports

2.60 The Renewable Energy Action Agenda's (Action Agenda) expectation of industry sales of \$4 billion by 2010, is premised on at least half of the growth in sales coming from exports. The Action Agenda notes:

Expanding the export market for renewable energy products is crucial for the industry. Capability and capacity developed to service the domestic market should help the industry capture global export opportunities.⁴⁵

2.61 Ellis and Associates data indicates that since the implementation of MRET, exports have grown strongly from a low base, as indicated in Figure 13. The majority of these exports appear to have come from the sale of solar cells, consulting services and enabling technologies, such as inverters and power control systems.

Figure 13—Recent growth in exports⁴⁶



2.62 The results of this study should be viewed with some caution as they rely on extrapolation from survey results. Submissions and consultations with interested parties revealed little further detail regarding anticipated export growth.

2.63 A number of submissions made optimistic comments about export potential, particularly in south-east Asia. However, securing and exploiting export markets will remain a major challenge for the industry if the Action Agenda target is to be met.

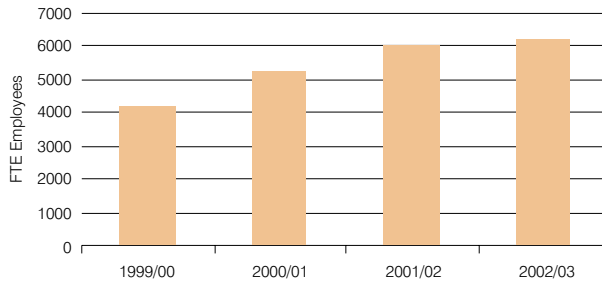
⁴⁵ *New Era, New Energy—Renewable Energy Action Agenda*, p33

⁴⁶ Figure 13 source; Dept of Industry Tourism and Resources, based on figures from Mark Ellis and Associates.

Employment

2.64 Employment in the renewable energy industry has grown as a consequence of increased sales and production levels, although growth in employment appears to have levelled out during 2002–03.

Figure 14—Employment⁴⁷



2.65 A number of interested parties commented that the renewable energy industry is more employment-intensive than the fossil fuel generation sector and highlighted the potential of the industry to contribute to employment growth in regional Australia.

2.66 AusWEA for example, stated in its submission that ‘approximately 6.6 times as many manufacturing and installation jobs are created for wind power as for coal-fired plant.’⁴⁸ However, significant manufacturing jobs will not be created in Australia unless manufacturing plants are developed.

2.67 Once installed, some forms of renewable energy are not labour intensive. AusWEA’s⁴⁹ submission describes a typical 20 MW wind farm which could create 150 to 200 job years in manufacturing and installation that might then provide ongoing employment for only two or three people.

2.68 Over the longer term, it will be necessary for the industry to identify cost savings and productivity improvements if it is to become competitive with coal and gas fired electricity generation.

⁴⁷ Figure 14 source; Dept of Industry Tourism and Resources, based on figures from Mark Ellis and Associates.

⁴⁸ Australian Wind Energy Association, submission 198, p25

⁴⁹ Australian Wind Energy Association, submission 198, p25, Table 8

Research and development

- 2.69 Research and Development (R&D) is central to the development of a commercially competitive renewable energy industry. Worldwide, the renewable energy industry is developing at a rapid rate and unless Australia participates in the worldwide R&D effort, it may fall behind and become entirely dependent on foreign-owned intellectual property that would impede potential export growth. The wind industry seems to be particularly vulnerable in this regard.
- 2.70 In submissions and consultations, evidence was presented that there is little R&D occurring in the renewable energy industry as a whole, although the level of R&D does vary from sector to sector within the industry, and with solar energy recognised as an area in which Australia has a demonstrable competitive advantage.
- 2.71 The evidence suggests that over recent years funding for R&D has declined, partly due to reduced government and industry funding for bodies such as the former Energy Research and Development Corporation (ERDC) and the Australian Cooperative Research Centre for Renewable Energy (ACRE). A number of electricity companies indicated in consultations that the priority accorded to R&D has declined significantly following their corporatisation or privatisation.

Greenhouse gas abatement

- 2.72 The Act specifically states that an object of the MRET measure is 'to reduce emissions of greenhouse gases.'⁵⁰ In development of the legislation, the Renewables Target Working Group noted that:

The [MRET] is primarily a long-term greenhouse response measure achieved through development of industry capacity, although it will generate direct greenhouse emission reductions in the medium term.⁵¹

- 2.73 Term of Reference (a)(i) requires the Review Panel to determine 'the extent to which the Act has contributed to reducing greenhouse gas emissions.'

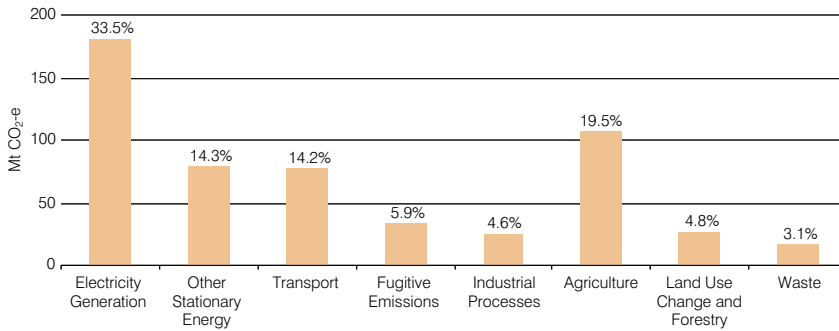
Australia's emission profile

- 2.74 Electricity generation represents the single largest contributor to Australia's total greenhouse emissions. In 2001 electricity generation accounted for 33 per cent or 181 Mt of CO₂-e of Australia's national greenhouse emissions. Australia's total emissions for 2001 were 543 Mt CO₂-e. Figure 15 provides a sectoral breakdown of Australia's greenhouse gas emissions.

⁵⁰ *Renewable Energy (Electricity) Act 2000* s.3

⁵¹ *Final Report of the Renewables Target Working Group*, p6

Figure 15—Emissions by sector in 2001⁵²



- 2.75 Since 1990, emissions from electricity generation have grown at a rate well above the national average. In 2001, emissions from electricity generation were 40.5 per cent higher than in 1990 compared with the national average of 0.1 per cent lower than in 1990.⁵³
- 2.76 Under a business-as-usual scenario—without greenhouse abatement measures such as MRET—emissions from the stationary energy sector are projected to increase by 56 per cent in 2010 and by 91 per cent in 2020 compared to 1990 levels.⁵⁴ MRET was one of a number of measures introduced to help contain this anticipated growth.

Level of abatement

- 2.77 Determining the level of abatement that MRET has achieved is a complicated and often misunderstood matter. There are a number of internationally recognised principles that need to be considered when estimating emissions savings, including the determination of beyond 'business-as-usual' activities.
- 2.78 The Act does not require reporting on the extent to which MRET has contributed to reducing greenhouse gas emissions.⁵⁵

Beyond business-as-usual

- 2.79 Abatement for an individual policy or measure is calculated on the basis of abatement from a business-as-usual condition—that is the difference in abatement between 'with the measure' and 'without the measure'. Abatement for MRET needs to be calculated on that basis to be comparable to other measures and policies in Australia.

⁵² Figure 15 source; Australian Greenhouse Office 2003. *National Greenhouse Gas Inventory 2001* Canberra.

⁵³ According to the *National Greenhouse Gas Inventory 2001*, emissions in the electricity generation sector increased from 129.1 Mt CO₂-e in 1990 to 181.4 Mt CO₂-e in 2001. This compares with total nation emissions which decreased from 543.1 Mt CO₂-e in 1990 to 542.6 Mt CO₂-e in 2001.

⁵⁴ Australian Government Interdepartmental Greenhouse Projections Group, *Stationary Energy Sector Greenhouse Gas Emissions Projections 2003*, August 2003

⁵⁵ Although the Australian Greenhouse Office regularly reports on projected abatement from MRET as part of its international commitments under the United Nations Framework Convention on Climate Change.

- 2.80 There are many power plants contributing to the additional renewable energy generation defined in the Act, but a lesser number of those can be solely attributed to the MRET measure. Identifying which projects are attributable to the 'with MRET' condition is inevitably subjective as there are many driving forces behind project development. For example, a new renewable generator may be developed in response to an incentive from another program such as to meet Green Power needs or to comply with State and Territory regulations.⁵⁶ Further, some investment may have occurred in the absence of MRET because the project's commercial viability is not contingent on MRET eligibility and revenue from REC sales.
- 2.81 It would therefore be simplistic to assume all power plants with a zero baseline (for example, those first generating on or after 1 January 1997) should be included in the 'with MRET' case.

Energy source avoided

- 2.82 Typically, electricity generation from a renewable energy source reduces net greenhouse gas emissions because it avoids electricity generation from more greenhouse intensive sources such as fossil fuels. The type of energy source avoided is important in determining the abatement attributable to MRET because the level of emissions avoided varies significantly depending on the class of fossil fuel displaced.⁵⁷
- 2.83 The average amount of emissions from electricity delivered, varies substantially across Australia, depending on the mix of fossil fuel and renewable generation. For example, it varies from around 1.4 tonnes of CO₂-e per MWh in Victoria and about 0.002 tonne CO₂-e per MWh in Tasmania. The Australian average is about 1 tonne CO₂-e per MWh.
- 2.84 The marginal abatement rate is generally more appropriate for measuring MRET. For example, in dry years the marginal generator in Tasmania has tended to be the Bell Bay thermal (oil and gas) power station. In some years, when demand for energy was lower or when seasons were average or wet, the marginal generator has tended to be hydro, which has no emissions.
- 2.85 In the larger mainland States, the effects of using average and marginal abatement figures have tended to be less sensitive.

Abatement estimates

- 2.86 There are a number of difficulties in estimating abatement from MRET at this stage. A wide range of detailed assumptions needs to be made, including in relation to the operation of each relevant power station. However, based on information provided by ORER, the AGO estimates the contribution of the Act to greenhouse gas abatement on a 'best estimate basis' for 2001 to be around 0.37 Mt of CO₂-e and for 2002 to be around 0.70 Mt of CO₂-e.

⁵⁶ For example some States and Territories require the compulsory collection and flaring of landfill gas, for odour or environmental reasons.

⁵⁷ For instance natural gas, black coal and brown coal typically emit 0.55, 0.95 and 1.40 tonnes of CO₂-e per MWh respectively, source: *National Greenhouse Gas Inventory: Analysis of Trends and Greenhouse Indicators 1990 to 2000*, Australian Greenhouse Office, 2002.

2.87 There is a wide range of uncertainty around this estimate. In particular, the extent to which installation solar water heaters is driven by MRET. Depending on the proportion of solar water heaters that can be assumed to be directly related to MRET, the abatement estimate for 2001 ranges from 0.3 to 0.43 Mt of CO₂-e and for 2002 ranges from 0.52 to 0.89 Mt of CO₂-e.

Ecologically sustainable sources

2.88 Section 3 of the Act defines its objects, including:

(c) To ensure that renewable energy sources are ecologically sustainable

2.89 The Act elaborates on this objective, defining 'ecologically sustainable'⁵⁸ as consistent with the following principles:

- Decision making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations.
- If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- The principle of inter-generational equity, which is that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
- The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.
- Improved valuation, pricing and incentive mechanisms should be promoted.

2.90 Sustainability has a number of dimensions,⁵⁹ including economic, technical, environmental and social. All of these dimensions are relevant to the renewable energy industry in Australia.

2.91 Threats to ecological sustainability can arise either from the characteristics of the renewable energy resource or as a result of the energy conversion process. Most biomass forms part of an ecosystem and its use for energy can disturb that ecosystem; a hydro power station can disturb a river ecosystem even if the water is returned to the same river after use; or wind turbines may affect some migratory birds or bats.

2.92 Without appropriate consideration to ecological sustainability, there may be potential for the legislation to lead to unintended consequences with one set of environmental benefits, for example, greenhouse gas abatement, offset by another set of environmental consequences, for example increased air pollution or land degradation.

⁵⁸ *Renewable Energy (Electricity) Act 2000*, s.5

⁵⁹ Outhred H et al. 2002. *The Sustainability of Renewable Energy Projects: a Discussion Paper for the ACRE Energy Policy Group*. NSW.

2.93 The potential for such outcomes was noted by the Australian Treasury:

*Even though renewable energy is renewable, it does not necessarily mean it is environmentally benign. Like fossil fuels, renewable energy can also impose external costs on the community. ...the large-scale use of wind turbines may adversely affect landscapes, migrating bird species, and pristine wilderness areas. Additionally, it may result in noise and aesthetic pollution.*⁶⁰

2.94 In submissions and consultations, the Review Panel received a wide range of views regarding the ecological sustainability of different renewable energy sources eligible under the MRET. These views were primarily directed towards the use of wood waste from native forests for electricity generation. Other renewable energy sources attracting concern, to a lesser degree, included municipal solid waste combustion, impacts on coastal landscapes from wind farms, and—more from an historical perspective—some impacts from large hydro.

Measures to ensure compliance with legislative objectives

2.95 Regulation 7 'General Requirements' of the *Renewable Energy (Electricity) Regulations 2001* states:

(2) The use of the source must:

- (a) meet the requirements of any relevant Commonwealth, State, Territory or Local government planning and approval process; and
- (b) be ecologically sustainable.

2.96 In efforts to satisfy this legislative objective and its regulations, ORER has established processes and guidelines for proponents to assess whether renewable energy sources are ecologically sustainable.

2.97 The primary tools for assessing ecological sustainability are largely reliant upon a broader package of government legislation, including policies and processes established outside the MRET legislative package. Principal among these tools is a requirement that renewable energy generators demonstrate their compliance with relevant Australian Government and State, Territory and Local government planning and environmental processes and approvals.

2.98 In addition to meeting MRET criteria for accreditation of generators, proponents of biomass generators must collect evidence in each stage of the supply chain for their fuel source. In this regard, ORER has developed a series of guidelines to assist biomass generator proponents to demonstrate their compliance with this objective.

⁶⁰ Federal Treasury. 2002. *Renewable energy—a clean alternative?* in Economic Roundup, edition: Spring 2002. Canberra.

- 2.99 A number of submissions⁶¹ expressed concern about the cohesiveness, consistency and effectiveness of the various tools to assess the ecological sustainability of renewable energy sources, particularly in the context of regional rather than project level evaluations.
- 2.100 On the other hand, a number of submissions and representations⁶² advocated that the MRET should not seek to substitute for legislative requirements, for example planning, land management and environmental protection and management requirements.
- 2.101 There was no evidence brought forward during the Review suggesting a failure of any MRET-accredited generator to not satisfy the objective of ecological sustainability.
- 2.102 The Review Panel supports the principle implicit in the MRET legislation of utilising other relevant legislation and regulatory frameworks established for similar purposes, including for assessing ecological sustainability. This practice has several benefits including that:
- Planning and environmental approvals remain the responsibility of the relevant government authorities with established expertise and authority.
 - A coherent approach to national, regional and local planning and assessments is supported.
 - Duplication and administration associated with MRET is minimised.
- 2.103 It is acknowledged, however, that some interested parties continue to hold reservations in relation to some government policies and approval processes outside the MRET legislative package.

⁶¹ Outhred and MacGill, submission 164; Environmental Defenders Office submission 219; NT Greens submission 120

⁶² National Association of Forest Industries, submission 145; Forestry Tasmania, submission 149; Tasmanian Government, submission 229