

**Title: AUSTRALIA'S RENEWABLE ENERGY CERTIFICATE SYSTEM**

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**Abstract**

Concern about climate change and concerted international action to reduce greenhouse gas emissions are powerful new drivers for renewable energy.

Australia has progressively adopted a series of policies relating to the climate change issue with the initial *National Greenhouse Response Strategy* of 1992 being added to in 1997 by a suite of policies under the banner *Safeguarding the Future* and developing into the *National Greenhouse Strategy* in 1998. A further policy package was announced in 1999 under the heading *Measures for a Better Environment*. Together with State and Territory policies Australia now has over 100 policies aimed at the issue of climate change and backed by over A\$1 billion of committed funds.

Australia has developed a national tradeable renewable energy certificate system to encourage additional renewable energy in electricity supplies. The paper outlines the objectives of the Renewable Energy (Electricity) Act, its legal framework, describes the tradeable certificate mechanism and summarises the experience of the first year of operation of the Act.

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<sup>1</sup> The authors wish to gratefully acknowledge assistance in writing this paper from other members of the Office of the Renewable Energy Regulator. Karla Wass manages the office of the Renewable Energy Regulator and David Rossiter is the Regulator

## Australia's Renewable Energy Certificate System

### 1. Background and Introduction

On 20 November 1997 the Prime Minister of Australia in his statement "*Safeguarding the Future: Australia's Response to Climate Change*" announced a A\$180 million package of measures designed to improve the greenhouse performance of Australia's highly competitive energy-dependent sectors. The package was designed to stimulate the uptake of renewable energy by encouraging increased support to both supply of and demand for renewable energy. Measures included supporting renewable energy industries to encourage development and creating a market demand for renewable energy.

The package of measures was released immediately prior to the Kyoto negotiations of 1-10 December 1997 at which greenhouse emission reduction targets were to be negotiated by participants. It was stated at that time "that Australia will implement [this package] even if the international community fails to reach agreement at Kyoto."

The package contained twenty four measures and under one of those measures the Australian Government undertook to provide mandatory targets for the uptake of renewable energy in power supplies. The measure was summarised at that time as "The Government will work with States and Territories to set a mandatory target for electricity retailers to source an additional two percent of their electricity from renewable sources by 2010." The measure became known as the Mandatory Renewable Energy Target (MRET).

In 1998 the *National Greenhouse Strategy* was signed by the Commonwealth and all States and Territories and it lays out an integrated package of 86 measures to reduce Australia's greenhouse gas emissions. It builds on the earlier 1992 *National Greenhouse Response Strategy* and incorporates the measures from *Safeguarding the Future*. The strategy coordinates activity at all levels of government and within industry. MRET is part of that strategy.

On 31 May 1999, as part of its revised tax package, the Australian Government announced an additional package called "*Measures for a Better Environment*" and committed a further sum of about A\$800 million to support greenhouse abatement programs. These measures are designed to assist Australia in playing its part towards meeting its Kyoto commitments including through increasing the use of renewable energy.

These packages together with previous commitments form a comprehensive and complementary range of measures which now provide strong support for renewable energy and its development within Australia through market mechanisms, grants and other programs. On 27 February 2002 the new Environment Minister the Hon Dr David Kemp said with reference to the Kyoto agreement that "Australia remains committed to working to meet its Kyoto targets, regardless of whether the Protocol comes into effect internationally."

As part of the process of implementation of MRET a major consultation process with stakeholders was commenced in April 1998 by the Australian Greenhouse Office and completed in May 1999. Cabinet approved the proposals from the Final Working Group Report in late 1999 and a Bill was drafted in early 2000. The Bill was submitted to Parliament in the first half of 2000 and following a Senate

Inquiry and extensive debate was passed on 8 December 2000. The Renewable Energy (Electricity) Act 2000 created a new statutory agency the Office of the Renewable Energy Regulator and created the position of Regulator. The first Regulator was appointed on 12 February 2001 and the Act came into full operation from 1 April 2001.

This paper outlines the objectives of the Renewable Energy (Electricity) Act, its legal framework, describes the tradeable certificate mechanism and summarises the experience of the first year of operation of the Act.

## 2. Objectives and Outline of Act

There are three objectives stated within the Act. They are:

- encourage the additional generation of electricity from renewable energy sources;
- reduce greenhouse gas emissions; and,
- ensure energy sources are ecologically sustainable.

The Act sets up a liability for persons making relevant acquisitions of electricity, generically called liable entities. Relevant acquisitions are typically those purchases of electricity by large buyers who did not generate the electricity themselves, for example electricity retailers.

Liable entities are required to discharge their liability by surrendering Renewable Energy Certificates to the Regulator or pay a shortfall charge. This creates a demand for certificates and provides one side of the market.

Renewable energy certificates can only be created by eligible accredited renewable energy generators. This creates the supply side of the market. Through the market, liable entities can trade directly or indirectly with certificate producers to acquire certificates to meet their liability.

Large buyers of electricity such as wholesaler purchasers and retailers are collectively required to source an additional 9500 GWh of their electricity from renewable energy sources by 2010 relative to 1997. This takes Australia from around 16,000 GWh per annum of renewable energy in electricity in 1997 to about 25,500 GWh per annum in 2010, or an increase of about 60% in that period.

This market mechanism reverses the decline in renewable content of electricity that has been occurring in recent years and will raise the renewable energy content of electricity to about 12.5 per cent by 2010.

The rate of liability is set annually in the Regulations as a percentage of the sum of the relevant acquisitions of electricity. In 2001 the renewable power percentage was 0.24% and for 2002 it is 0.62% of relevant acquisitions. For example a wholesale buyer of electricity acquiring 100,000 MWh of electricity in 2002 would be required to surrender 620 renewable energy certificates to the Regulator to discharge their liability without penalty. The penalty is A\$40/MWh.

The rate of liability is determined by the Regulations and it takes into account annual targets specified in the Act and the anticipated quantity of liable electricity for a given period. The target specified for 2002 is 1,100,000MWh of renewable energy certificates.

**Table 2.1 Annual Additional Renewable Energy Targets for Electricity Supplies  
Renewable Energy Target (MWh)**

Year	Renewable Energy Target (MWh)
2001	300,000
2002	1,100,000
2003	1,800,000
2004	2,600,000
2005	3,400,000
2006	4,500,000
2007	5,600,000
2008	6,800,000
2009	8,100,000
2010	9,500,000
2011 - 2020	9,500,000

**Note:** Target for 2001 is for nine month period from 1 April 2001 to 31 December 2001.  
All other targets are for full calendar years.

The certificate system gives additional value to renewable electricity produced by eligible renewable energy generators. This encourages increased demand for renewable energy generation and results in a reduction in greenhouse gas emissions. The accreditation system for renewable energy generators ensures energy sources are ecologically sustainable.

### 3. Legal Framework

The mandatory renewable energy target is supported through two Acts. They are:

- The Renewable Energy (Electricity) Act 2000; and,
- The Renewable Energy (Electricity) Charge Act 2000.

The former Act (about 100 pages plus about 50 pages of Regulations) details the requirements and provisions to enable the liability and certificate system to operate and the latter Act (about 4 pages) sets the penalty of A\$40/MWh for shortfalls in certificate surrender. Both Acts are available at [www.orer.gov.au](http://www.orer.gov.au).

The legislation covers matters such as registration of generators, accreditation of power stations, creation of certificates, acquisition of electricity, renewable energy shortfall charge, statements, assessments, objections, reviews, appeals, penalties, audits, registers and the set up of the Office of the Renewable Energy Regulator.

### 4. Tradeable Certificates

Renewable energy certificates can only be created by registered persons generating electricity above their 1997 baseline. Generally, these persons have to register under the Act, apply for accreditation and

successfully achieve accreditation before they are eligible to create certificates. However for solar water heaters and small generation units (under 10 kW and under 25 MWh per year) registered persons can be deemed to be eligible for a fixed number of certificates for certain types of equipment.

Upon accreditation eligible renewable energy generators are given a unique access code and a password to a central internet based renewable energy certificate registry ([www.rec-registry.com](http://www.rec-registry.com)) run by the Regulator's office. When eligible generators have exceeded their baseline they may then enter the registry and create certificates any time after they have generated sufficient electricity to cover the certificates they wish to create. No forward creation of certificates is permitted – generation must occur first.

Renewable energy certificates are marked with a code that indicates amongst other things who created them, what eligible renewable energy source was used and when the certificate was created.

Certificates are known by the year in which they were generated as 2001 or 2002 etc. While certificates can only be created after electricity is generated and they are referenced by the year of generation, they are recorded as a particular 'vintage' based on the time of the creation event. For example electricity may be generated above baseline in 2001 but the certificate might not be created until 2002 – the certificate is then displayed as a certificate for 2001 generation but is a 2002 vintage, having been created in 2002. A 2002 vintage certificate can only be surrendered against a 2002 or later liability whereas a 2001 certificate can be surrendered against a 2001 or any later year of liability.

## **5. Experience of First year's Operation**

The Act started full operation on 1 April 2001 about six weeks after the Regulator was appointed and just over three months after the Act was passed by Parliament. The following sections describe the first year of operation from 1 April 2001 to 31 December 2001.

### **5.1 Registered Persons**

In 2001 the ORER processed 124 applications for registration as a registered person under the legislation. Not all these persons have applied to have power plants accredited at this stage but some have applied for multiple power plants to be accredited. Registration is a simple process requiring little checking before acceptance but is a prerequisite to apply for accreditation.

Applications for accreditation of a power station must be made by a registered person and in practice the registration and the application may be received simultaneously. Both of these actions attract fees – A\$20 for registration and a sliding scale fee for an application for accreditation depending on the size and complexity of the power plant. The accreditation fees vary from A\$20 to A\$3,000.

### **5.2 Applications for Accreditation**

In 2001 the ORER received 152 applications for accreditation of power stations. The majority of these applications were received prior to the 1 April 2001 start date, although applications continued to be submitted throughout the year.

While some of the applications were clearly from eligible renewable energy sources, insufficient detail of historic performance often slowed the process of approval. This difficulty was recognised by backdating accreditations to the date of receipt of applications where the application was substantially complete at the time of application. Table 5.1 shows how those 152 applications were disposed at the end of 2001.

**Table 5.1 Status of Applications for Accreditation at End of 2001**

STATUS OF APPLICATION	NUMBER OF APPLICATIONS
Accredited	124
Pending accreditation	21
Rejected	3
Withdrawn	1
Awaiting payment of fees	3
Total number of applications for 2001	152

**Notes.**

1. Pending accreditation includes recent applications being processed and those still requiring additional information.
2. Rejected includes applications that were combined with other applications. All three rejected applications were combined with other applications and accredited.

### 5.3 Accreditations of Power Stations

During the 2001 year 124 power plants were accredited. They represented ten eligible renewable energy sources of the twenty three described in clause 17 of the Act. Table 5.2 lists the eligible renewable energy sources and the number of accreditations for each source.

**Table 5.2 Accredited Power Stations by Eligible Renewable Energy Source at End of 2001**

ELIGIBLE RENEWABLE ENERGY SOURCE	NUMBER OF ACCREDITATIONS
Hydro	55
Solar	23
Landfill gas	18
Wind	10
Bagasse	7
Sewage Gas	4
Wood waste	4
Black liquor	1
Food and agricultural waste	1
Municipal solid waste	1
Total number of accreditations for 2001	124

**Notes.**

1. Three landfill gas projects were combined with other landfill gas applications.
2. Wood waste projects used cofiring technology.
3. Some projects were hybrid i.e. wind/solar – they have been counted only under the dominant eligible renewable energy source.

## 5.4 Small Generators and Solar Water Heaters

Due to the structure of the Act and in order to encourage participation of small generators not all producers of certificates have to become accredited as power stations. Small generators are typically hydro, wind or solar generators who produce under twenty five certificates per year and are also under 10kW in capacity.

Additionally solar water heaters that pass specified conditions can be recognised for the electricity generation they displace. All other eligible renewable energy generators have to produce electricity to receive certificates. Amongst other conditions solar water heaters need to be designed to a certain standard and be listed in the Regulations to the Act. Typically solar water heaters listed in the Act receive between 10 and 35 renewable energy certificates over their life. All the certificates are awarded upon installation of the equipment.

Both small generation units and solar water heaters are entitled to claim deemed numbers of renewable energy certificates to simplify their applications. To further simplify their applications they can also assign their right to create certificates to an agent who may act on their behalf and further reduce the net transaction time and costs.

## 5.5 Renewable Energy Certificates Created

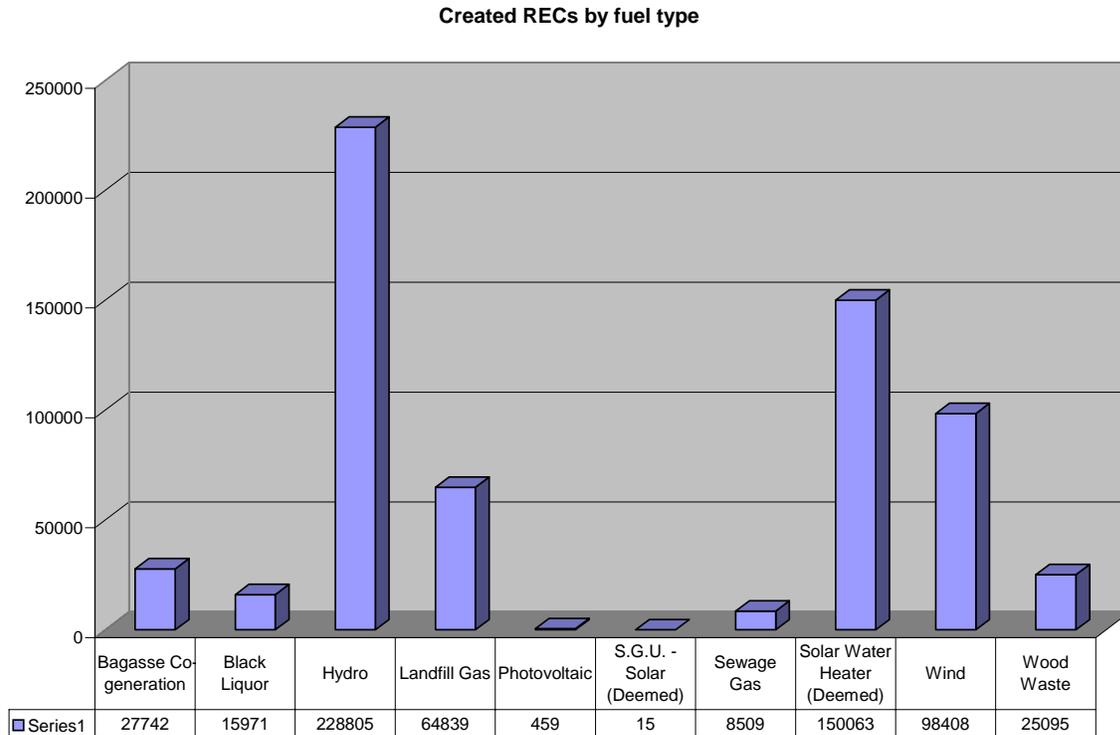
In 2001 619,609 certificates were created and validated. Table 5.3 lists the eligible renewable energy sources from which the certificates were created.

**Table 5.3 Renewable Energy Certificates Validated by Eligible Renewable Energy Source at End of 2001**

ELIGIBLE RENEWABLE ENERGY SOURCE	NUMBER OF CERTIFICATES
Hydro	228,805
Solar Water Heaters	150,063
Landfill gas	64,839
Wind	98,408
Bagasse	27,742
Sewage Gas	8,509
Wood waste	25,095
Black liquor	15,971
Photovoltaic	474
Total number of certificates for 2001	619,906

**Notes.**

As at 31 December 2001.



## 5.6 Surrender of Certificates

For 2001 a target is stipulated in the legislation of 300,000 certificates and a renewable power percentage of 0.24% was promulgated for 2001 to raise that number of certificates from the estimated quantity of liable electricity for 2001.

Surrender of certificates is a separate module in the registry software and the 2001 surrender module was turned on up until 3am Australian Eastern Standard Time on 15 February 2002. The Act states the certificates must be surrendered by 14 February and due to the time zones in Australia the module was left on until all time zones had reached midnight local time.

The surrender module received 314,863 certificates for 2001 liabilities and reconciliation of liabilities and assessment liabilities, and the certificates surrendered against them, is still being conducted. However it would appear that sufficient certificates have been surrendered to closely meet the 2001 target. The legislation allows adjustment of the renewable power percentage in future years to take account of any 'overs' and 'unders' in the target achievement. The target for 2002 is 1,100,000 certificates and the renewable power percentage for 2002 has already been set at 0.62% of liable electricity. Any adjustment for 'overs' or 'unders' in the 2001 target achievement will be done in the renewable power percentage set for 2003. The renewable power percentage for 2003 must be set by 31 March 2003 or a default mechanism in the Act operates to set the renewable power percentage. The default renewable power percentage for 2003 if invoked would be 1.01%.

**Table 5.4 Renewable Energy Certificates Surrendered by Eligible Renewable Energy Source at End of 2001**

ELIGIBLE RENEWABLE ENERGY SOURCE	NUMBER OF CERTIFICATES
Hydro	154,746
Solar Water Heaters	45,105
Landfill gas	38,912
Wind	49,676
Bagasse	0
Sewage Gas	1,052
Wood waste	17,587
Black liquor	7,785
Photovoltaic	0
Total number of certificates for 2001	314,863

**Notes.**

1. As of 28 February 2002.

**5.7 Acquisition and Returns for 2001**

The Office of the Renewable Energy Regulator has received annual Energy Acquisition and Shortfall Statements from liable entities for 2001. The office has also received annual Electricity Generation Returns from eligible parties for 2001. The Statements and Returns are currently being analysed and verified. This process is expected to take at least three months.

**6. Discussion**

This has been the first year of operation of the first national renewable energy certificate trading scheme in the world. Preliminary analysis of the year's performance indicates that the scheme is operating well and compliance seems to be being achieved.

Several issues have arisen during the year such as the process of accreditation of power plants (particularly setting baselines) and interpretation of the Regulations for some eligible renewable energy sources (particularly wood waste). The issues surrounding wood waste are perhaps peculiar to the Australian situation and the specific wording of the Regulations that resulted from an intensive negotiation process during the Parliamentary debates surrounding the passage of the legislation. However the issues that arose around the accreditation process and the setting of baselines are perhaps of wider interest as they show the level of detail that needs to sit behind the framework legislation at all levels for it to function effectively.

**Baselines**

Baselines are required for all power plants under the legislation but they are typically zero for all power plants that first generated electricity after 31 December 1996. Less than half the power plants accredited for 2001 had zero baselines.

Baselines were calculated for many hydro, landfill gas and bagasse (sugar mill waste) power plants. Two solar power plants had base lines and no wind, municipal solid waste, sewage gas, black liquor or

food and agricultural waste powered electricity plants required baselines (from the applications submitted). The processes to work out how baselines might be set were commenced by field visits in 2000 to selected plants. The most complex processes were for setting baselines for hydro power plants and bagasse power plants due to the inherent variability of their renewable energy sources. An internal office procedure has been compiled to set baselines in a consistent, replicable and equitable manner for any class of eligible renewable energy source.

A sugar mill is a good example of how a baseline is derived. The methodology used was negotiated at workshops with the industry and with independent technical consultants.

The methodology takes into account the annual variability of sugar cane harvest area, crop, yield and fibre content to establish the sugar mill production for a typical 1997 year configured as it was at that time. The methodology is further complicated by the sharing of auxiliary loads between electricity generation plant and sugar processing equipment, the age of the sugar mills (many are around 100 years old and have been incrementally modified), the lack of internal and external metering and the switching of cane between mills to meet peaks in production. Careful attention to the detail of the legislation and the practical operation of the mills has led to a robust and repeatable methodology that is widely accepted within the sugar industry and by other eligible renewable energy source categories as equitable.

### **Expected Investment**

MRET is expected to liberate A\$2 to A\$3 billion of additional investment in renewables and will accelerate the uptake of renewable energy in grid-based electricity and provide a larger base for the development of commercially competitive renewable energy. This investment is in addition to a diversion of energy sector investment of about \$4 billion from non-renewable to renewable energy. The total expected investment in renewable energy over the twenty year life of the measure is about A\$6 billion.

Due to the nature of investments needed to create renewable energy certificates it is anticipated that investors will tend to enter the market in the first five or so years of the measure. This will enable investors to amortise these investments over more than ten years.

At this early stage it is difficult to estimate how much investment has been triggered by the Act since projects often proceed for multiple reasons. However approximately \$200 million of investment appears to have already occurred and over \$600 million further investment appears to be firmly committed.

Many other project proposals have also been mooted representing considerably more investment but not all can proceed. For example one State alone has enough wind farm prospects to exceed the target for 2010 though not all projects could proceed without major power system stability issues arising.

### **Trading in the Market**

The creation of certificates throughout the year and the date for creation and compliance are not uniform events. Certificates can be created any time after electricity has been generated. The first year

of MRET saw companies understanding the Act and setting up systems to handle RECs. As a consequence only about 150,000 RECs had been created by early December 2001 – yet several times that number could have been created by them. However in the following two weeks about 450,000 RECs were created as generators realised supply was short to a market need of 300,000 certificates by 31 December 2001.

Though many projects have forward sold their output of RECs some spot market activity has occurred. As early December approached the very limited spot market showed prices were rising and thus tended to stimulate the wider production of RECs. Spot prices in the range of \$32 to \$36.50 MWh have been reported by third parties for the 2001 period. But most RECs appear to be bought and sold under forward agreements and price disclosure is not normally available on these trades. However it is generally believed these forward trade prices are lower than spot.

## **7. Conclusion**

The Renewable Energy (Electricity) Act 2000 is operating well with over 126 accredited power plants and many small generation units contributing towards the operation of the measure.

For the year 2001 the certificate target was 300,000 MWh of additional renewable energy and over 650,000 MWh appears to have been generated and claimed to date. The surrender of over 314,000 MWh of those renewable energy certificates for the year is very close to the target and forebodes well for the achievement of the expectations of the Act. This data is still being processed at present and final results are not expected to be available until mid 2002. The Act provides for future annual renewable power percentages to be adjusted to accommodate any annual under or over achievement.

The tradeable renewable energy certificate approach used in the Act is novel in Australia and internationally as a mandated national target. The Act represents a major change in how additional renewable energy electricity generation is valued in Australia. The industry has responded rapidly and effectively to this change and appears to be well positioned to assist Australia in meeting this greenhouse emission reduction measure.

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