

# Appendix 1—Joint Media Release



## Joint Media Release

Commonwealth Minister for the  
Environment and Heritage  
**The Hon. Dr David Kemp**

Commonwealth Minister  
for Industry, Tourism and Resources  
**The Hon. Ian Macfarlane**

K0051

25 March 2003

### MRET REVIEW PANEL ANNOUNCED

The Minister for Environment and Heritage, Dr David Kemp, and the Minister for Industry, Tourism and Resources, Ian Macfarlane today named a high level Panel to review the Commonwealth's Mandatory Renewable Energy Target (MRET) legislation.

The Government's Mandatory Renewable Energy Target commenced in April 2001 and requires the sourcing of 9,500 gigawatt hours of extra renewable electricity per year by 2010, enough power to meet the residential electricity needs of four million people.

The Panel, which comprises a mix of industry, academic and government policy skills and experience, will report later in 2003. The Howard Government will consider its findings in formulating national energy policy and the development of Australia's forward strategy on climate change.

Members of the Review Panel are:

- Hon Grant Tambling, former Parliamentary Secretary and Senator for the Northern Territory (chair);
- Ms Monica Oliphant, an experienced research scientist with expertise in renewable energy, improving energy efficiency and reducing greenhouse emissions;
- Dr Peter Laver, former Vice President of BHP and current Chair of the Australian Building Codes Board; and
- Mr Neville Stevens, former Secretary of the Commonwealth Communications and Industry portfolios.

'Mr Tambling has extensive ministerial and parliamentary experience and will bring a rural and remote Australia perspective to his chairmanship of the Review,' Dr Kemp said.

Minister for Industry, Tourism and Resources, Ian Macfarlane, also welcomed the appointment of the Panel and highlighted the important role renewable energy is playing in Australia's greenhouse response.

'A key objective of MRET is to drive the development of Australia's renewable energy industry and leverage investment in renewable energy technologies,' Mr Macfarlane said.

Terms of Reference for the MRET Review and short biographies for Review Panel members are attached.

**Media contacts:**

Catherine Job (Dr Kemp's Office): 02 6277 7640 or 0408 648 400

Kirsty Boazman (Minister Macfarlane's Office): 02 6277 7580 or 0412 171 444

## Terms of Reference for the Review of the Renewable Energy (Electricity) Act 2000

The *Renewable Energy (Electricity) Act 2000* establishes the Mandatory Renewable Energy Target which requires Australian electricity retailers and other large buyers of electricity to collectively source an additional 9 500 gigawatt hours of electricity per annum from renewable sources by 2010.

The Panel is to review the operation of *Renewable Energy (Electricity) Act 2000*, to determine:

- (a) the extent to which the Act has:
  - (i) contributed to reducing greenhouse gas emissions; and
  - (ii) encouraged additional generation of electricity from renewable energy sources; and
- (b) the extent to which the policy objectives of this Act have been achieved and the need for any alternative approach; and
- (c) the mix of technologies that has resulted from the implementation of the provisions of this Act; and
- (d) the level of penalties provided under this Act; and
- (e) the need for indexation of the renewable energy shortfall charge to the Consumer Price Index to maintain the real value of the charge and the associated penalty charge; and
- (f) other environmental impacts that have resulted from the implementation of the provisions of this Act, including the extent to which non-plantation forestry waste has been utilised; and
- (g) the possible introduction of a portfolio approach, a cap on the contribution of any one source and measures to recognise the relative greenhouse intensities of various technologies; and
- (h) the level of the overall target and interim targets; and
- (i) the appropriateness of the operating environment including the:
  - (i) level of participation in and transparency of the Mandatory Renewable Energy Target measure; and
  - (ii) scheduled end date of 2020; and
  - (iii) baselines for pre-existing generators; and
  - (iv) need for future reviews; and
- (j) the appropriateness of policy settings including the:
  - (i) extent to which this Act has provided an ongoing basis for commercially competitive renewable energy; and

- (ii) relevant economic and social impacts that have resulted from the implementation of the provisions of this Act; and
- (iii) inclusion of renewable energy sources and technologies not specified in the Act or Regulations; and
- (iv) interaction with relevant Commonwealth, State and Territory energy, environment and industry policies.

## MRET Review Panel: Member's Biographies:

The Hon Grant E J Tambling	Former Senator for the Northern Territory, Former Parliamentary Secretary to the Minister for Health and Aged Care, Former Parliamentary Secretary to the Minister for Social Security and Former Parliamentary Secretary to the Minister for Transport and Regional Services.
Monica Oliphant	Research scientist specialising in renewable energy and residential end-use efficiency, Convenor of the 2001 International Solar Energy Society Solar World Congress, Principal Energy Research Scientist Electricity Trust of South Australia Power/Energy, Member of the South Australian Government Research Advisory Committee, Member of the South Australian Government Renewable Energy Working Group.
Peter Laver	Former Group General Manager and Senior Vice President, BHP Minerals Environment, Safety and External Affairs, Chairman of the Australian Building Codes Board, Chairperson of the Victorian Learning and Employment Skills Commission, Council Member of the National Science & Technology Centre (Questacon).
Neville Robert Stevens AO	Former Secretary, Department of Communications and Arts; Former Secretary, Department of Industry; member of the Board of the Information Technology and Communications Research and Development Centre of Excellence; Chairman of the Australian Communications Industry Forum.

## Appendix 2—Submissions Received

1	Herron, Lawry	26	Sustainable Solutions Pty Ltd
2	Powercorp Pty Ltd	27	Bundaberg Sugar Ltd
3	Technology Universal Pty Ltd	28	District Council of Grant
4	Hayward, Chris	29	Eraring Energy
5	Mort, Robert Laidley	30	Westpac Institutional Bank
6	Sola Kleen Pty Ltd	31	Tait, William “Billy”
7	Australian National University	32	CONFIDENTIAL
8	Dyer, Dr Kenneth	33	Rees, Gillian & John
9	Richardson, Jeff	34	Chapple MLC, Robin
10	Australian Consumer’s Association	35	Clarkson, Anne
11	Bowskill, David	36	Ross, Nathan
12	Jarrett, Brendon	37	Grenfell, Beverley
13	Burke, Connell	38	Landfill Management Services
14	Gough Plastics—Australia	39	Clarke, David
15	Breamlea Wind Generator	40	Building Division, Dept of Public Works, Queensland
16	O’Shea, John	41	REnergy
17	Allott, Ian & Trixy	42	Doctors for the Environment Australia
18	Australian Fused Materials Pty Ltd	43	Conochie, Brenda
19	McRae, Yvonne	44	Gulley, Rob
20	Southern Cross Windpower	45	Keppel Prince Engineering Pty Ltd
21	Collingburn, Brian	46	Carter, Holt Harvey
22	Mercer, Dr David	47	Kimberly-Clark Australia
23	Wren Oil	48	Thornborrow, Brian
24	Hurst, Kath & Terry	49	Lawyers for Forests Inc
25	Rheem Australia Pty Ltd		

50	Tarwin Valley Coastal Guardians Inc	78	Woolley, John
51	Rio Tinto	79	Foster, Brian
52	Brown, Thomas	80	Shaw, Michael
53	Shire of Dardanup	81	Le Couteur, Caroline
54	Lucy, Mary	82	Murray, Dennis
55	CONFIDENTIAL	83	Meridian Energy Ltd
56	AlintaGas	84	Insurance Australia Group
57	Australian & New Zealand Solar Energy Society (ANZSES)	85	Meridian Energy Australia Pty Ltd
57a	ANZSES Supplementary Submission	86	Snowy Hydro Ltd
58	Commonwealth Bank of Australia	86a	Snowy Hydro Ltd Supplementary Submission
59	Australian Wood Panel Association	87	Delta Electricity
60	Prom Coast Guardians Inc	88	Environment Business Australia
61	Enertrade	88a	Environment Business Australia Supplementary Submission
62	Ergon Energy	89	Australian Council for Infrastructure Development
63	Eastern Star Gas	90	ANZSES Queensland Branch
64	Australian Paper Industry Council	91	Mirus Wind Pty Ltd
65	Bolwell Group	92	Brobery, Patricia & Norman
66	Jennings, Neil	93	CSIRO Energy Technology
67	Stanford, Richard	94	Gleeson, Trevor
68	Thornborrow, Margaret	95	Haebich, Brian
69	Knot, Kingsley & Rosie	96	Pemberton, Bill
70	Western Power, Sustainable Energy Branch	97	Burfield, Mark
71	Comalco Ltd	98	Peterson, Eric
72	AMP Henderson Global Investors	99	Australian Inland
73	CSR Sugar Ltd	100	CVC REEF Ltd
74	Wind Prospect Ltd	101	Sky Farming Pty Ltd
75	Lee, Suellen	102	AMEC Australia Pty Ltd
76	Banks, Elizabeth	103	Wind Farm Developments Pty Ltd
77	Renewable Energy Systems Ltd		

104	Hydro Tasmania	122	Energy Australia
104a	Hydro Tasmania Supplementary Submission	123	Global Renewable Energy Partners Pty Ltd
105	Renewable & Sustainable Energy Roundtable (Roundtable)	124	Babcock & Brown
105a	Roundtable Supplementary Submission	125	Pacific Solar Pty Ltd
106	Taylor, Garth	126	Green Electricity Market
107	Electricity Supply Association of Australia	127	Australian Council of National Trusts
108	Renewable Energy Generators of Australia (REGA)	128	Enecon Pty Ltd
108a	REGA Supplementary Submission	129	MBAC Consulting
109	Viridis Energy Capital Pty Ltd	130	WA Green Power
110	Oil Mallee Association of WA	131	EarthEnergy Australia Pty Ltd
111	Enstice, Dr A & Prof J Webb	132	Western Power Corporation
112	Macquarie Generation	133	CONFIDENTIAL
113	Melbourne Water	134	Portland Progress Association
114	Male, David	135	CSIRO Bioenergy Business Group
115	Australian Gas Association	136	Coote, Michael J
116	Southern Hydro	137	Whelan, Peter
116a	Southern Hydro Supplementary Submission	138	Bioenergy Australia
117	Econnect Australia Pty Ltd	139	NP Power Pty Ltd
118	Chamber of Commerce & Industry of WA	140	Wind Power Pty Ltd
119	Bunbury Wellington Economic Alliance	141	Elliott, Robert
120	NT Greens	142	Collie Shire Council WA
121	ANZ Infrastructure Services	143	Energy Developments
121a	ANZ Infrastructure Services Supplementary Submission	144	Envirogen Pty Ltd
		145	Joint National Association of Forest Industries and Australian Forest Growers
		146	Stanwell Corporation Ltd
		146a	Stanwell Corporation Ltd Supplementary Submission
		147	Simcoa Operations

148	Gange, Richard	171	Crook, Frederick
149	Forestry Tasmania	172	Institute of Public Affairs
150	Minty, John & Marion	173	Victorian Government
151	Bain, Jim	174	Siddons, John R
152	Australian Aluminium Council, Australian Coal Association, Mineral Council of Australia— Joint Submission	175	Tarong Energy Corporation
153	Connell Wagner PPI	176	Rethman Australia Environmental Services Pty Ltd
154	South Gippsland Shire Council	177	Beasley Industries Pty Ltd
155	Haupt, Marion	178	The Office of the Renewable Energy Regulator
156	Australian Aluminium Council	179	Maryborough Sugar Factory Ltd
157	Quantum Technology	180	Yallourn Energy/AusPower Green Team
158	National Green Power Accreditation Steering Group	181	Beeson, Adam
159	Wilson, Geoff	182	Garrad Hassan Pacific
160	Francis, Leon	183	CONFIDENTIAL
161	Australian Financial Markets Association	184	Brown, Senator Bob & Blakers, Margaret
162	Johnson, Harry	185	Suzlon Energy Ltd
163	Corrs, Chambers, Westgarth	186	Institution of Engineers Australia
164	Outhred, Hugh & MacGill, Iain	187	Tasmanian Conservation Trust Inc
165	Australian Business Council for Sustainable Energy (BCSE)	188	Visy Industries
165a	BCSE Supplementary Submission	189	Scone-Parkville Environment Watch
165b	BCSE Supplementary Submission	190	Maroochy Shire Council
166	CONFIDENTIAL	191	Enviromission Ltd
167	Energex Retail Pty Ltd	192	Plastics & Chemicals Industries Associations Inc
168	Conservation Council of South Australia	193	BP Solar Pty Ltd
169	Macaw, Ross	194	Greenpeace Australia Pacific
170	Origin Energy	195	Environment Victoria
		196	NT Government
		197	Alternative Technology Association

198	Australian Wind Energy Association	221	Simonsen, James
199	OneSteel Ltd	222	Climate Action Network Australia
200	Conservation Council of WA	223	Queensland Conservation Council
201	Energy Users Association of Australia	224	Pacific Hydro Ltd
202	NEG Micon Australia Pty Ltd	225	Bond, Mary & O'Sullivan, Robert
203	Australian Sugar Milling Council	226	Australian Gas Light Company
204	Energy Retailers Association of Australia Inc	227	Poole, Chris
205	Aurora Energy	228	Friends of the Earth Australia
206	Country Energy	229	Tasmanian Government
207	Department of Environmental Protection WA	229a	Tasmanian Government Supplementary Submission
208	The Wilderness Society	230	Glenelg Shire Council
209	International Council for Local Environmental Initiatives	231	Minerals Council of Australia
210	Australian Conservation Foundation	232	Novera Energy Ltd
211	WA Sustainable Energy Association	233	Broadbent, Gail, Tanaka, Mamiko & Mitchell, Stephen
212	Sidebottom MP, Sid	234	State Forests of NSW
213	Next Generation Energy Solutions	235	Australian Industry Greenhouse Network
214	Tasmanian Greens McKim MHA, Nick	236	Woodside Energy Ltd
215	Geodynamics Ltd	237	The Australian Chamber of Commerce & Industry
216	Amcor Ltd	238	WA Government
217	Energy Markets Reform Forum	239	CSR Sugar Ltd, Mackay Sugar Cooperative Association, Bundaberg Sugar Ltd (CSR/MSCA/BSL)
218	TXU	239a	CSR/MSCA/BSL Supplementary Submission A
219	Environmental Defender's Office Ltd (NSW)	239b	CSR/MSCA/BSL Supplementary Submission B
220	Forestry & Forest Products Committee		

- 240 ACT Government
- 241 CONFIDENTIAL
- 242 CONFIDENTIAL
- 243 Freestone & Kumnick
- 244 CONFIDENTIAL
- 245 TransGrid
- 246 South Australian Government
- 246a South Australian Government  
Supplementary Submission
- 247 Australian Democrats
- 248 Queensland Government

*Note: A total of 264 substantive submissions were received including multiple submissions from individual organisations as shown in the above listing.*

## Appendix 3A—Campaign Template A

First name: \_\_\_\_\_

Last name: \_\_\_\_\_

Address: \_\_\_\_\_

Suburb: \_\_\_\_\_

State: \_\_\_\_\_

Postcode: \_\_\_\_\_

Email: \_\_\_\_\_

I hereby request that the Federal Government increase the mandatory renewable energy target to 10% of Australian power generation by 2010.

I have made this submission because I am:

- concerned about climate change
- a parent/guardian
- concerned about renewables future
- desiring more clean energy

My additional concerns are: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Appendix 3B—Campaign Template B

28/4/2003

Dear Mr Tambling,

I write because I am excited by the prospect to catalyse a much stronger clean power industry in Australia through the review of the Mandatory Renewable Energy Target.

Like many Australians I want the Commonwealth to mandate that a much greater amount of our electricity comes from real renewables. I believe a 10 percent MRET by 2010 would not only provide health and environmental benefits possible with a future of cleaner power, this incentive would also stimulate jobs and investment, including in the economically hard-hit rural and regional areas of Australia.

Yet I am concerned the process set out for the legislated review, to be overseen by you, is not sufficient to truly gauge the Australians' support for clean power. Barely a month is given to collect written submissions, and the public hearing process by which you and the other three panelists can witness public support for an expanded MRET is lacking.

We ask you to remedy these flaws in the process by:

- 1/ Extending the period for written submissions for at least another month and to re-advertise the new deadline in a diverse range of media.
- 2/ Rather than hold stakeholder sessions, we urge you to hold instead truly public hearings in each of the state capitals where average citizens can present their opinions on MRET.
- 3/ Ensure that all submissions are made public either on the web or at least made available for review by interested parties during and after the review.

Only a transparent process of true community consultation can deliver a good outcome on this important question. The public needs time and the opportunity to speak to the decision-makers on this critical review. Please accept these suggestions for an improved process and hear us out on the outcome of the review.

Sincerely,

## Appendix 3C—Campaign Template C

Dear Prime Minister Howard,

I call upon the Federal Government to increase the Mandatory Renewable Energy Target to 10% by 2010.

Signature (required): \_\_\_\_\_

Name (required): \_\_\_\_\_

Address (required): \_\_\_\_\_

Email (optional): Optional: \_\_\_\_\_

- I am Concerned about Climate Change
- I am a Parent or Guardian of Children
- I want Australia's Energy to come from Renewable Resources
- I am willing to pay a bit more for electricity if it comes from Renewable Energy

## Appendix 3D—List of 10 x 10 Campaign Supporting Organisations

Alternative Technology Association	Environment Centre of the NT
Angair	Environment Victoria
Australian Conservation Foundation	Ethical Investment Association
Australian Council of National Trusts	Greenpeace Australia Pacific
Australian Environmental Labelling Association	Institution of Engineers Australia
Australian Medical Association	Integral Design Group
Australian and New Zealand Solar Energy Society	J-Track Software
Australian Plants Society of Victoria	Knox Environment Society
Australian Wind Energy Association	Manningham Conservation Society
Birds Australia	Melbourne University Union
Blackburn and District Tree Preservation Society	Moreland Energy Foundation
Cambiar Pty Ltd	National Parks Association of NSW
Conservation Council of South East Region & Canberra	National Union of Students
Centre for Sustainable Energy Systems, ANU	Oxfam Community Aid Abroad
Centre for Education & Research in Environmental Strategies	Pacific Hydro
Charcoalition	Peninsula Field Naturalists Club
Climate Action Network Australia	Planet Ark
Cotter Communications	Queensland Conservation Council
Electrical Trades Union Australia	Queensland Tourism Industry Council
Environment Business Australia	Renewable and Sustainable Energy Roundtable
	South Australian Tourism Alliance
	Southern Peninsula Indigenous Flora and Fauna Association
	Sustainable Business Solutions

Sustainable Technologies Australia  
Trust for Nature  
Victorian Tourism Industry Council  
Warrigal Conservation Society  
Wilderness Society  
Wildlife Victoria  
World Wide Fund

# Appendix 4—List of Consultations

## Tasmania

Aurora Energy  
Forestry Tasmania  
Hydro Tasmania  
Tasmanian Government  
Tasmanian Conservation Trust  
The Wilderness Society  
Vestas

## Queensland

Australian Greenhouse Office  
Australian Sugar Milling Council  
Australian Wind Energy Association  
Comalco  
CSR Sugar Ltd  
Energex  
Enertrade  
Ergon Energy Corporation  
North Queensland Conservation Council  
Queensland Conservation Council  
Stanwell Corporation  
Tarong Energy

## Australia Capital Territory

ACT Government  
Australian Greenhouse Office  
Tasmanian Government  
Department of Agriculture, Fisheries and Forestry  
The Office of the Renewable Energy Regulator  
Department of the Environment and Heritage  
Department of Industry, Tourism and Resources  
Department of Prime Minister and Cabinet, Energy Taskforce  
ActewAGL  
Australian Aluminium Council  
Australian Chamber of Commerce and Industry  
Australian Gas Association  
Australian Paper Industry Council  
Australian Business Council for Sustainable Energy  
Conservation Council of the South East Region & Canberra  
Country Energy  
CVC REEF  
Doctors for the Environment

Environment Business Australia  
National Action Plan on Salinity and  
Water Quality, Market Based Instruments  
Working Group  
National Association of Forest Industries  
National Electricity Market  
Management Company  
Stanwell Corporation

## New South Wales

ABN AMRO  
Alternative Technology Association  
Australia and New Zealand  
Solar Energy Society  
Australian Conservation Foundation  
Australian Financial Markets Association  
Bayard Capital  
Bioenergy Australia  
BP Solar  
Climate Action Network of Australia  
CSIRO Energy Technology and  
Bioenergy Business Group  
Greenpeace Australia  
IEA Bioenergy Group  
Macquarie Bank  
Macquarie Generation  
Mineral Policy Institute  
Minerals Council of Australia  
NSW Nature Conservation Council  
Origin Energy  
Pacific Solar  
Snowy Hydro

Southern Cross Windpower  
The Wilderness Society  
Transgrid  
Visy Industries  
World Wildlife Fund

## Victoria

ANZ Infrastructure Services  
Australian Business Council  
for Sustainable Energy  
Australian Conservation Foundation  
Brightstar  
Electricity Supply Association  
Australia  
Enecon  
Energy Developments Ltd  
Energy Retailers Association Australia  
Energy Users Association Australia  
Environment Victoria  
Glenelg Shire Council  
International Council for Local  
Environmental Initiatives  
Keppel Prince Engineering Pty Ltd  
NEG Micon Australia Pty Ltd  
Pacific Hydro  
Portland Progress Association  
Prom Coast Guardians Inc  
Renewable and Sustainable Energy  
Roundtable  
Renewable Energy Generators Australia  
South Gippsland Shire Council  
Southern Hydro

TXU

Vestas

Victorian Branch of National Trust

Victorian Government

Yallourn Energy (AusPower Green Team)

### **South Australia**

Australian Gas Light Company

Babcock & Brown

Conservation Council of South Australia

Landfill Management Services

South Australian Government

### **Northern Territory**

Environment Centre of the NT

Northern Territory Government

Northern Territory Greens

NT Centre for Energy Research

NT Power and Water Authority

Powercorp

Renewable Remote Power Generation  
(NT) Program

### **Western Australia**

ACMV Design

Carnegie Corporation

Central TAFE

Clearer Sky Pty Ltd

Conservation Council of Western Australia

Edwards Hot Water

Simcoa Operations

Sola Kleen

Rheem Australia Pty Ltd

Sustainable Energy Association  
of Western Australia

Western Australia Government

Western Power Corporation

## Appendix 5—Site Visits

### Tasmania

Forestry Tasmania, forestry operations, Huon District

Hydro Tasmania, Poatina Power Station, Great Western Tiers

Hydro Tasmania, Woolnorth Wind Farm, Woolnorth

Vestas, wind turbine nacelle assembly plant, Wynyard

Haywards, wind turbine tower manufacturing facility, Launceston

### Queensland

CSR Sugar, Invicta Sugar Mill, Giru

Stanwell Corporation, Mt. St. Johns Biogas Plant, Townsville

Swanbank ReOrganic Landfill Methane Project, Swanbank

### New South Wales

BP Solar, PV manufacturing facility, Homebush

Pacific Solar, PV manufacturing facility, Botany

Visy Industries, plantation pine pulp and paper mill, Tumut

Snowy Hydro, Tumut 3 Power Station, Tumut

### Victoria

Pacific Hydro, Codrington Wind Farm, Codrington

Keppel Prince Engineering Pty Ltd, wind tower manufacturing, Portland

### Western Australia

Rheem Australia Pty Ltd, solar water heater manufacturing facility, Welshpool

Western Power Corporation, Integrated Oil Mallee Plant, Narrogin

Western Power Corporation, Albany Wind Farm, Albany

# Appendix 6—Renewable Energy Targets: A comparative study



**Australian Government**  
**Australian Greenhouse Office**

## **Renewable Energy Targets:** A comparative study

September 2003

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## 1.1 Introduction

In recent years there has been a trend across many countries and jurisdictions toward the development of targets that will encourage increased generation of electricity from renewable energy sources. Major drivers of this trend include energy security issues, climate change policy, the Kyoto Protocol rules, uncertainty of future energy prices, and opportunities to develop new energy and energy technology markets.

This paper seeks to provide a comparative analysis, across a number of countries and states, of renewable energy targets that have been adopted, or are being considered. The paper also seeks to describe the component elements of the different targets, in order to allow more accurate comparison between countries and schemes. Other incentives provided to increase renewable electricity generation are also briefly examined. A brief overview is provided of target regimes associated with the European Union (EU), Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, United Kingdom (UK), as well as the United States of America (USA), Japan, and New Zealand. More detailed information for each country or jurisdiction is also included in Table 2.

## 1.2 Australia's Mandatory Renewable Energy Target

Australia was the first country in the world to introduce a nationally mandated renewable energy target. Australia's Mandatory Renewable Energy Target (MRET) was established by the *Renewable Energy (Electricity) Act 2000*, which came into operation early in 2001. This Act mandates an additional 9,500 gigawatt hours (GWh) per annum in renewable energy electricity generation in Australia by 2010. The Australian system has attracted significant attention since its development and inception, and some countries and jurisdictions have modelled their approaches on the Australian measure.

The two renewable energy target regimes that most closely resemble the Australian MRET measure are the Renewables Obligation scheme of the UK, and the Renewable Portfolio Standard (RPS) of Texas, USA. Both schemes include a renewable energy certificate trading mechanism and central registry similar to the MRET approach. While the UK scheme adopts a percentage-based target, the Texan scheme more closely aligns with the MRET measure in presenting its target as additional generation capacity in megawatts. A capacity conversion factor is used to determine the required generation in megawatt-hours under the Texan scheme.

### 1.3 Comparing Targets

Accurate comparison of targets cannot be done on the basis of stated percentages alone. Stated percentage targets can have several different meanings. Renewable energy targets are often reported as a percentage of the total energy demand (absolute target), rather than as an increase in the percentage share of renewable energy (relative target). Under the absolute target arrangement, it is necessary to understand the contribution of renewable energy to a country's energy supply prior to introducing the target, to be able to quantify the impact of the changes.

Australia, for example, has adopted a fixed quantitative renewable energy target of an additional 9,500 GWh per annum, in response to industry concern that a percentage target would create uncertainty about the additional quantity of electricity required and become an impediment to investment. By contrast, the EU has an absolute target of 22%, the UK 10%, and France 21%. Expressed in comparable terms, Australia's target would be approximately 11%, given that Australia's percentage share for renewables in 1997 was around 10%, and 9,500 GWh per annum will represent an increase in share of about 1%.

Percentages can also mask different growth rates in electricity demand. Depending on the underlying growth in energy demand, the actual volume and the total share of generation from renewable sources required by the target will vary in each case. For example, while the UK mandated increase in share of electricity from renewable sources by 2010 (8.5%) is expected to be around eight times larger than the share increase mandated in Australia (1%), the actual increase in output of renewables-sourced electricity will be only about four times as much in the UK due to electricity demand growing twice as fast during that period in Australia. As illustrated in Graph 1, the low base of renewable energy in the UK in 1997 means that the final share of total generation from renewables in 2010 will actually be higher in Australia than in the UK. This is contrary to the picture suggested by the targets alone.

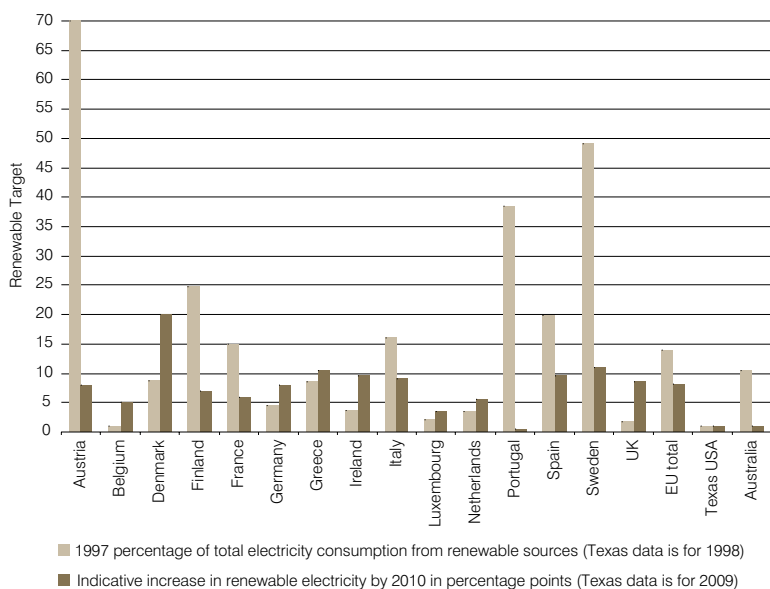
It should also be noted that comparisons of percentages do not indicate likely success in reaching targets, or take into account whether the targets are legally binding.

Table 1, shows the percentage of renewables-based electricity in 1997 as a proportion of total electricity consumption for a range of EU member states, and includes Australia's percentage share for comparison. It also includes the proposed national targets, and what these targets would translate to in terms of the actual volume of electricity generated from renewable energy sources.

**Table 1**—1997 Electricity Consumption and Targets for Renewables-Based Generation: European Union, Australia, and Texas USA

Country	1997 Total Electricity Consumption (GWh) (rounded)	1997 Renewable electricity (GWh) (rounded)	1997 percentage of total electricity consumed	2010 percentage target	Percentage share increase 1997–2010 (rounded to nearest 0.5 %)	Increased renewable electricity production 1997–2010 (GWh)
Austria	55,700	39,000	70	78	8	16,300
Belgium	78,000	860	1.1	6	5	5,440
Denmark	36,800	3,200	8.7	29	20	9,700
Finland	77,000	19,000	24.7	31.5	7	14,700
France	440,000	66,000	15	21	6	46,900
Germany	553,000	24,900	4.5	12.5	8	51,500
Greece	45,400	3,900	8.6	20.1	10.5	10,600
Ireland	23,300	840	3.6	13.2	9.5	3,700
Italy	290,600	46,500	16	25	9	43,100
Luxembourg	6,700	140	2.1	5.7	3.5	360
Netherlands	100,000	3,500	3.5	9	5.5	12,400
Portugal	37,000	14,300	38.5	39	0.5	14,000
Spain	187,000	37,200	19.9	29.4	9.5	39,400
Sweden	147,000	72,000	49.1	60	11	25,500
UK	411,800	7,000	1.7	10	8.5	43,000
<b>EU total</b>	<b>2,489,300</b>	<b>338,000</b>	<b>13.9</b>	<b>22</b>	<b>8.1</b>	<b>336,600</b>
Texas USA	235,000	2,350	1	2	1	3,000
Australia (MRET)	150,000	16,000	10.5	Fixed quantity	1	9,500

**Graph 1:** Electricity from Renewable Sources: European Union, Australia & Texas USA  
 ('Reference values' under EU renewable energy directive 2001/77/EC to guide the setting of national indicative targets. Texas and Australia are added for comparison.)



## 1.4 Design Features

Renewable energy targets can differ in many details of their implementation. The specific design features of each target need also to be taken into account when making comparisons. Table 2 summarises the key design features of the national approaches, the more important of which are set out below:

### Compliance

Many targets are aspirational, rather than mandatory. That is, they are not supported by legislation, nor do they have penalties for non-compliance, and as a result they are not binding. Among the nineteen countries and seventeen states examined in this study, only four countries and seven state jurisdictions have introduced truly mandatory requirements. In general, aspirational targets are more ambitious than mandatory targets. The increases in percentage contribution that underlie aspirational targets, such as those of the EU and most of its Member States, are typically 5 to 10%, whereas target schemes that are mandatory, such as Australia's MRET, and the US States with Renewable Portfolio Standards, are typically less than 5%.

### Baselines

Countries also start from different bases. At 10.5%, Australia has a reasonably high share of existing renewables (mostly large hydro-electric facilities), compared with, for example, the 3% existing share in the UK.

### Price structures

Countries have different price structures for electricity. For example, European electricity prices are generally 50–100% higher than in Australia, making the marginal cost of moving to large-scale renewable generation smaller. For example, in the UK it is estimated that wind is now cost-competitive with traditional generation in a wide range of applications.

### Eligibility of renewable energy sources

Most target schemes allow a wide range of renewable energy sources to qualify towards meeting the targets. Australia is no exception, with additional output from existing renewables (mostly large-scale hydro and bagasse) being eligible as well. It also allows solar water heaters, which do not actually produce electricity, as this provides for cost effective development of new renewable sources. Responding to environmental concerns in relation to forest preservation, the Australian system allows wood only when it is genuine wood waste. Some countries, such as Belgium and the Netherlands, exclude or place restrictions on large hydro and/or waste incineration because of concerns over environmental impacts.

## Rules for trading

Most, though not all, mandated systems allow liable parties to trade with other parties to meet their obligations, with consequent reduced costs. However, systems differ on the degree to which certificates can be banked, or “borrowed” from the future by allowing future over-compliance to make up for lack of compliance in the present. The Australian system is generally flexible in this regard, facilitating an active and liquid market in certificates.

## Penalties

Liable parties not meeting their obligations in Australia are subject to a penalty of \$40 per MWh (this is not tax deductible and is equivalent to a Renewable Energy Certificate (REC) price of around \$57 at 30% tax rate). Other mandatory schemes have higher penalties, including indexation, or make the penalty a function of the REC price.

## Liable Parties

In Australia all large purchasers out of the electricity grid are liable. In most other countries it is mainly the electricity utilities that are the liable parties.

## 1.5 Other support mechanisms for renewable energy

Recognising the emerging nature of the renewable energy industry, most countries provide incentives for renewable energy deployment, in addition to their renewable energy targets. The range of policy instruments available to complement targets is diverse. These include taxes, direct subsidies, quotas, direct price support, and market-based tradeable renewable energy certificate approaches.

In Australia, more than \$A300 million is available in grants to encourage the deployment of existing renewable technologies, the commercialisation of innovative new technologies and industry capacity building. The Government has also drawn up a Renewable Energy Action Agenda, which has an objective of increasing annual turnover of the renewable energy industry to \$A4 billion by 2010.

Many European countries use a system of “feed-in tariffs”, which provide guaranteed prices for renewable generation sold into the grid. Some also provide tax benefits for investment in renewable energy. Tax and tariff assistance provide more certain support than grants programs, but have unknown budgetary consequences. The countries of the EU appear less inclined toward adopting tradeable renewable energy certificates systems in the absence of a clear signal from the European Commission concerning the timing and nature of any EU-wide renewables support framework. This signal is unlikely until at least 2005, when a review of individual member states’ approaches is due. A seven-year transition period is then mandated in the EU Directive to provide certainty for investors.

## 1.6 Conclusions

Larger renewable energy targets, such as those of EU Member States, tend to be absolute and aspirational. Targets that are set in terms of additional generation and backed by penalties for non-compliance tend to be lower, such as those of some US states, and Australia's MRET.

Comparisons between different targets based only on a stated target or percentage can be misleading. More accurate comparison must take into account the nature of the target, the starting basis and to what extent it is binding. Specific circumstances faced by each country must also be considered, including electricity prices, growth in demand for electricity, economic cost and other drivers such as energy security and commitments to international climate change mitigation measures.

While a wide range of policy instruments is employed to stimulate uptake of renewables-based electricity generation, interest is strengthening toward approaches that include tradeable renewable energy certificates. Variations of this approach have now been introduced in the UK, Belgium, Sweden, the Netherlands, Austria, and Japan as well as the US states of Connecticut, Massachusetts, Nevada, New Mexico, Texas and Wisconsin. Tradeable certificate schemes have also been considered in countries such as Italy, Denmark and New Zealand, and other US states.

## Overview of renewable energy targets by region and country

### European Union

On 27 October 2001, directive 2001/77/EC, issued by the European Parliament and the Council of the European Union, came into force. This directive aims to promote an increase in the contribution of renewable energy sources to electricity production in the EU, and requires all Member States to set national indicative targets for consumption of electricity produced from renewable sources.

The Directive builds on the 1997 White Paper on Renewable Energies (COM (97) 599), which confirmed a target for the EU of 12% of gross domestic energy consumption from renewables by 2010, of which electricity would represent 22.1% by 2010. The Directive adopts this target and recognises that increased use of electricity produced from renewable energy sources is an important part of the package of measures needed to comply with the Kyoto Protocol. This target equates to an increase of 8% in the share of total EU-wide electricity use above the figure of 13.9% for 1997.

Whilst the targets will be indicative rather than binding, the Directive provides for possible mandatory targets should it become clear by October 2004 that the level of and progress towards achievement of national indicative targets are not consistent with achieving the 22.1% overall target. Detailed implementation of the national targets is left to the Member States, which currently operate different mechanisms including renewable energy certificates, investment aid, tax exemptions, reductions or refunds, and direct price support schemes.

Direct price support is the most common instrument amongst Member States and can be divided into two categories, quota-based systems and fixed price schemes, also known as 'feed-in' tariffs.

**Quota-based systems** mean the price is set through competition between generators for available support. These systems operate in the UK, Belgium, Ireland and the Netherlands and are being considered in Denmark. Mechanisms include:

- Renewable energy certificates—similar to Australia's MRET, these involve an obligation on consumers to purchase tradeable renewable energy certificates, created by generators, according to a fixed percentage or quota of their total consumption, and acquit them to demonstrate their compliance. The market for these tradeable certificates sets the price, which is often limited by a penalty charge that consumers may pay in lieu of acquittal of certificates.
- Tendering arrangements—the State specifies a certain quota of electricity from renewable energy sources which utility companies or customers must purchase. This quota can increase over time. The State then places tenders for parcels of renewable-based electricity, which is on-sold to the local utility under contract. Surplus costs are passed through to the end-user via a specific levy.

**Fixed price schemes (feed-in tariffs)**—here a specific price or price premium is set, that must be paid by electricity companies to domestic producers. Although no quota is set directly, the price or premium provides a natural limit. These systems operate in several EU countries, including Germany, Denmark and Spain.

The EU Directive also aims to create the basis for a future EU-wide renewables support framework. Its approach is cautious, and aims to avoid negative impacts on mechanisms chosen by individual States. The strategy includes evaluating, in October 2005, the range of State mechanisms and their co-existence, and proposing a simple and cost effective framework that is in harmony with national indicative targets and the principles of the internal electricity market. To maintain investor confidence the strategy provides for at least 7 years' transition from national support mechanisms.

As a result of the 1997 White Paper and the subsequent development in 2000 of the proposal behind the EU Directive on renewables-sourced electricity, as well as intent to ratify the Kyoto Protocol, many EU Member States already have renewable energy policies which include some form of target.

## Austria

An overall objective of 78% has been agreed. Targets are legislated under the Green Electricity Act (2000), which entered into force on 1 January 2003:

- 62% share of total electricity generation by large hydro (greater than 10 MW capacity), which essentially maintains current share.
- 9% share from small hydro (less than 10 MW capacity), marginally increasing current share.
- 4% from wind, biomass and photovoltaics (maximum PV is 15 MW) by 2007 which represents an increase of 3.3% of total electricity consumption compared to the current share of 0.7%.
- 2–3% from other renewable energy sources such as incineration of household waste.

A renewable energy certificate system commenced in January 2002 that obliges electricity traders to prove that 8% of electricity sold is generated by small hydroelectric power plants. A penalty will be imposed for non-compliance, based on the average of penalties at provincial level.

Fixed price feed-in tariffs support the 4% target from non-hydro renewables. These vary among provinces and depend on technology type. The feed-in tariff will involve stepped increases up to 4% total demand by 2007, and will impose an obligation on distribution net operators to source this increased generation at the feed-in price. No support is provided for other renewable energy sources.

## Belgium

Two of Belgium's autonomous regions, Flanders and Wallonia, have independent schemes in place to support renewables. The Flanders scheme, legislated in 2001, applies to wholesale power distributors, and requires that 1% of the power that is distributed come from renewable sources in 2002, increasing to 2% in 2004 and 6% in 2010. Non-compliance is €75/MWh for 2003, and €120/MWh and €125/MWh in 2005. Wallonia also obliges electricity retailers to acquire 3% of their electricity from renewable sources by July 2003, eventually increasing to 12% in 2009–10. These fines contribute to a renewable energy fund.

In addition to the regional schemes, Belgium has a federal scheme that applies to large industrial customers connected directly to the transmission grid. The scheme requires these customers to buy at least 2% of their electricity from renewable sources in 2002, increasing to 6% in 2010. Non-compliance incurs a fine of €75/MWh for 2002, rising to €100/MWh in 2003 and €125/MWh in 2004. The grid operator is obliged to purchase green certificates at set minimum prices for offshore and onshore wind, hydro, solar and biomass power generators.

## Denmark

In 1996, the official Danish long term energy plan, Energy 21, set a target of achieving 20% of electricity consumption (6,800 GWh) from renewables by 2003. Current estimations by the Danish Energy Authority are that by the end of 2003 this target will have been surpassed, with up to 25% of Denmark's electricity supply coming from renewable sources by then.

Support for renewable energy in Denmark was strengthened by a 1999 energy reform package, which established a framework under which the existing system of production subsidies (feed-in tariffs) were to be phased out and gradually substituted with a system based on tradable certificates and a purchase obligation corresponding to a percentage of electricity consumption. In June 2002, however, Denmark decided to postpone the introduction of a tradable certificate market, pending the establishment of a common arrangement for the EU.

Further legislation passed in December 2002 and taking effect from January 2003 has introduced changes in Denmark's wind energy policy, removing subsidies and making wind energy compete in the open market.

## Finland

Finland has an aspirational target to achieve a 40% increase in renewable energy output by 2010, supported by taxation policies, subsidy schemes, grants and information dissemination. The target envisages a 50% increase for biomass, 4% for thermal pumps, 4% for wind/hydro, and 0.5% for solar photovoltaics.

## France

The French Government has agreed to introduce targets for the development of renewable energy whereby 21% of French electricity will be generated from renewable sources by 2010.

Support for this aspirational target includes consumer levies and subsidies to assist hydro and biomass, and to help achieve an additional 500 MW wind generation capacity by 2005, as well as feed-in tariffs at a regional level to support these technologies. France is not active in the area of renewable energy certificates, preferring at this stage to wait until the European Commission adopts common rules.

## Germany

In Germany, legislation fixes the price of electricity from renewable energy as a share of the retail price of electricity. The 1991 Act on Feeding Electricity from Renewable Energies into the Public Grid was recently amended and replaced by the Renewable Energy Sources Act. The new Act has introduced a nation-wide cost-sharing arrangement, expanded the feed-in provision to include all renewable energies and extended the nominal renewables target from the previous limit of 5% to enable the percentage contribution made by renewable energy sources to at least double to 12.5% by 2010.

## Greece

The Greek Government has introduced a number of initiatives to promote the use of renewable energy. A series of legislative changes made between 1994 and 2001 have deregulated the energy market in Greece, liberalised access to transmission and distribution networks, and encouraged increased investment in renewable energy sources. Greece has an indicative 20% target as set out in EU Directive 2001/77/EC.

## Ireland

Since 1994, Ireland has encouraged the development of renewable energy electricity generating capacity through a series of government supported Alternative Energy Requirement (AER) competitions, with tendering based on bid price per unit of electricity. Winning bidders are entitled to a 15 year power purchase agreement whereby the Irish Electricity Supply Board buys the electricity output of the winning facility at the bid price. For each competition, a quota is set for the amount of electricity to be sourced from each renewable technology over a fixed period.

Ireland released a Green Paper in 1999 containing proposals to promote investment in renewables, including increased targets for the generation of electricity from renewable sources to 500 MW in the period 2000–05.

## Italy

The Italian scheme, based on the Bersani Decree (legislative Decree no 79/99), commenced in 2002. It requires as a minimum that an additional 2% of total electricity production should come from renewable sources. A renewable energy certificates trading scheme began in 2002, with market-led certificate prices. Only new plant operating after 1999 is eligible to participate. Italy has chosen to put the obligation on producers and importers of electricity in order to minimise administration cost. There is no penalty for non-compliance and no minimum or maximum price.

## Japan

Japan has set aspirational targets for a number of technologies in terms of increase in renewables generation capacity rather than electricity generated. The targets include photovoltaics (209 MW in 1999 to 4,820 MW in 2010); wind (83 MW in 1999 to 3,000 MW in 2010); and municipal waste (900 MW to 4,170 MW in 2010). As of 1 April 2003, Japan has introduced a Renewable Portfolio Standard measure that includes a mechanism for trading renewable energy certificates.

## Luxembourg

Luxembourg has an indicative target of 5.7% in 2010 as set out in EU Directive 2001/77/EC. In 1994 Luxembourg put in place a Framework Law to promote efficient energy usage and assess opportunities for growth in renewable energy. This legislation encourages projects like wind turbine, hydro-electric, solar photovoltaic, solar thermal and wood chip turbine.

## Netherlands

The Dutch renewable energy certificates scheme was launched July 1, 2001. It is voluntary, and assumes that voluntary demand will be sufficient to ensure a market for certificates. Aspirational targets for individual renewable energy technologies have been agreed. Certificates have a price fixed by the government and are used primarily for validation of renewable energy electricity sales.

## New Zealand

New Zealand has set an aspirational target of an additional 30 Petajoules (equivalent to approximately 8,000 GWh) of renewables-based energy by 2012. The New Zealand government investigated options to implement this aspirational target, including consideration of an MRET type measure for renewables-based electricity. A renewable energy certificate trading scheme has not been adopted at this stage.

## Portugal

While Portugal has endorsed the current EU strategy and is committed to contributing to the EU-wide target of 12% by 2010, to date it has not put in place any target of its own. Renewable energy presently accounts for about 39% of overall energy consumption in Portugal, divided almost equally between hydro power and biomass, with a small amount from wind and geothermal energy.

## Spain

Spain's Electricity Sector Act of 1997 set a national target of 12% of total energy demand by 2010 for the renewables share of primary energy. This represents a doubling in renewables use compared with 1998. The target is backed by a National Renewable Energy Plan along with a Royal Decree issued at the end of 1998, which introduced premium prices for renewables-generated electricity sold to the grid.

Spain's primary form of support for the target is a feed-in tariff type approach where the wholesale price of electricity from renewable energy follows the market price for electricity after which an "environmental bonus" is added on a kWh basis.

## Sweden

The Swedish government has legislated a target of 10 TWh to increase the electricity supply from renewables during 2002–2010. The approach replaces existing support for investment and operations of renewable energy plants. Under the associated system for renewable energy certificates, electricity distributors or users will be obliged to purchase certificates from qualifying renewables for 7.4% of their electricity consumption by 2003, and 16.9% by 2010. Large energy intensive industries are to be exempted. A floor price for certificates has been set from 2003, ramping down to zero in 2008.

A non-compliance penalty of €19.3/MWh has been set for 2003. Distributors are able to pass on the cost incurred from buying certificates to consumers. About half of the increase in renewable energy production is expected to come from expansion of already existing plants, and the other half from new plants.

## United Kingdom

Under the UK Renewables Obligation Order, which came into force in April 2002, all licensed electricity suppliers will have to provide 3% of their electricity sales from renewable sources in the period to March 2003, rising to 10.4% of sales for the year ending March 2011 through to 2027.

Renewable obligation certificates (ROCs) are issued by the Office of Gas and Electricity Markets (Ofgem) to the generator in proportion to their output. The certificates can be traded, which means that a renewable project could receive income from both the energy generated and the ROCs. As an alternative to producing renewable energy, suppliers are able to fulfil their obligation by paying a penalty set at GBP30/MWh (A\$43/kWh) for all or part of it to Ofgem. This was capped until April 2003 and is now adjusted according to the retail price index, the measure of inflation in the UK.

## United States of America

In 1998 renewables generation in the US was 395,000 GWh, or 11% of total generation, with hydro power contributing 9% and other renewables 2%. In 2002, the US Senate announced an aspirational non-hydro renewables target of 12% of total power generation from private utilities by the year 2020.

Twelve US states have adopted, or are in the process of adopting, more specific legislated targets in the form of Renewable Portfolio Standards (RPS). In addition, four states have developed or are in the process of developing other renewable energy target measures. RPS are similar to tradeable Renewable Energy Certificates, in requiring a certain percentage of a utility's overall or new generating capacity or sales to be derived from renewable resources, and setting penalties for non-compliance. This percentage in most cases increases over a period of years to 2010. A number of the RPS schemes don't yet use certificates to track and monitor compliance, but use power purchase contracts instead. Only Texas has a REC registry and allows trade, although Wisconsin has a modest certificate system.

**Table 2**—Summary of Overseas Renewable Energy and Associated Measures at June 2003

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>European Union (See individual country details below)</b>	14% <sup>i</sup>	22.1% total electricity share by 2010. <sup>ii</sup>	Wind, solar, geothermal wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases. <sup>i</sup>	European Commission White Paper on Renewable Energies, COM (97) 599, 26/11/97.  Directive 2001/77/EC promoting renewable sourced electricity in the internal electricity market.  Indicative objective & target for each Member State. Option to mandate targets after October 2004. <sup>i</sup>	Member States required to bring into force laws, regulations and administrative provisions necessary to comply with Directive by 27 October 2003. <sup>i</sup>  If necessary, a EU Community framework may be proposed from 2005 to support renewable energy schemes. <sup>i</sup>  Member States to adopt and regularly report on progress towards national targets. <sup>i</sup>	N/A
<b>Austria</b>	70% <sup>i</sup>	78.1% <sup>iii</sup> by 2008 <sup>iv</sup> Comprising: <ul style="list-style-type: none"> <li>• 62% large hydro;</li> <li>• 9% small hydro;</li> <li>• 4% wind, biomass &amp; PV;</li> <li>• 2–3% other</li> </ul>	Wind, solar, hydro, biomass	Green Electricity Act 2002. Commenced 1 Jan 2003. <sup>iv</sup>	Feed-in tariffs guaranteed for: <sup>v</sup> <ul style="list-style-type: none"> <li>• 10 years of operation for 'old' plants (before 1/1/03);</li> <li>• to 31/12/05 for small hydro;</li> <li>• 13 years of operation for 'new' plants (generating by end 2006)<sup>v</sup></li> </ul>	N/A

**Table 2**—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (*continued*)

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
Belgium	1% <sup>i</sup>	National: 6% in 2010 <sup>i</sup>	Wind (onshore and offshore), solar, hydro, biomass. <sup>iv</sup>	Royal Decree promoting electricity from renewable energy sources adopted July 2002. <sup>iv</sup> Commenced July 2003.	Renewable energy certificates—limited market in certificates for offshore wind.  Feed in tariffs for offshore and onshore wind, hydro, solar energy and biomass. <sup>iv</sup>  Renewable energy certificates.	<i>Liability</i> —large industrial customers and electricity retailers.  <i>Penalty</i> —€75/MWh rising to €125/MWh by 2004, for large industrial customers (National).  <i>Liability</i> —electricity retailers  <i>Penalty</i> —€50/MWh for 2001–03, then €100/MWh in 2004 and €125 in 2005 for (Flanders).  <i>Liability</i> —electricity retailers  <i>Penalty</i> —€75/MWh in 2002–03 then €100 MWh, for (Wallonia).
		Provincial: Flanders: 1% in 2002 rising to 6% in 2010 <sup>v</sup>	Small hydro, onshore and offshore wind, biomass, solar. <sup>v</sup> Waste incineration excluded	Commenced 1 January 2002. <sup>v</sup>		
		Wallonia: 3% in 2003 rising to 12% in 2010. <sup>v</sup>	Small hydro, onshore and offshore wind, biomass, solar & high quality co-generation. <sup>v</sup>	Commenced 1 October 2002. <sup>iv</sup>	Renewable energy certificates. One certificate = 456 kg CO <sub>2</sub> emissions avoided = 1 MWh wind, small hydro, biomass or solar PV.	

Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>Denmark</b>	9% <sup>i</sup>	20% by 2003 29% by 2010 <sup>iv</sup> and 35% by 2030 <sup>vi</sup>	Wind, biomass (municipality solid waste, straw, wood, energy crops, biogas), solar PV, <sup>vii</sup> geothermal, hydro	Act No. 1091 December 2002. Commenced 1 January 2003.	Subsidies, feed-in tariffs. <sup>iv</sup>  Renewable energy certificate market established but optional. Full transition from fixed settlement prices to certificate market postponed June 2002 pending introduction of common EU renewable certificate trading market. <sup>viii</sup>	N/A
<b>Finland</b>	25% <sup>j</sup>	40% increase in renewable energy electricity output by 2010. <sup>ix</sup>  Target comprises an increase by: <sup>iv, x</sup> <ul style="list-style-type: none"> <li>• 50% for biomass;</li> <li>• 4% for thermal pumps;</li> <li>• 4% for wind/hydro;</li> <li>• 0.5% for solar PV.</li> </ul>	Wind, solar PV, solar thermal, hydro, biomass.	Target aspirational.	Taxation policies, subsidy schemes, grants, and information dissemination. <sup>iv</sup>  Incentives aimed at biomass producers, R&D, and RE producers. <sup>ix</sup>	N/A

**Table 2**—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>France</b>	15% <sup>i</sup>	21% by 2010 <sup>vi</sup>	Wind, hydro, combustible waste, biogas from landfill, biomass, methanisation geothermal, solar PV <sup>iv</sup> .	Legislation in place to support renewables but target aspirational.	Levies, feed-in tariffs (<12 MW capacity).	N/A
<b>Germany</b>	5% <sup>i</sup>	12.5% by 2010 <sup>xi</sup>	Solar PV, solar thermal, hydro, wind, geothermal, biomass, landfill gas, sewage and mine biogas. <sup>v</sup>	Renewable Energy Sources Act April 2000.	Feed-in tariffs—utilities required to give priority to renewable electricity at fixed prices. Nationwide cost-sharing arrangement.	N/A
<b>Greece</b>	9% <sup>i</sup>	20% by 2010 <sup>i</sup>		Legislation in place to support renewables but no target. <i>Deregulation Energy Market Law</i> (2773/99), 1999. Law 2601/98.	Subsidies for interest on loans and investments, tax credits. <sup>v</sup> Priority given to grid access of renewable plants up to 50 MW, 10 year power purchase contracts for renewable energy producers, outputs to be sold at a fixed % of the consumer electricity price. <sup>v</sup>	N/A

**Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)**

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>Ireland</b>	4% <sup>i</sup>	500 MW of electricity by 2005 <sup>xii</sup> Comprising up to: <ul style="list-style-type: none"> <li>• 44 MW large wind;</li> <li>• 85 MW small wind;</li> <li>• 50 MW offshore wind;</li> <li>• 8 MW biomass;</li> <li>• 28 MW biomass CHP;</li> <li>• 2 MW biomass AD;</li> <li>• 5 MW hydro</li> </ul>	Wind, biomass, hydro.	Alternative Energy Requirement <sup>3</sup> —target aspirational. Electricity Regulation Act 1999 <sup>3</sup>	Competitive grants, up to 15 year power purchase agreements, feed in tariffs, facilitating purchase of renewable energy by commercial and industrial customers.	N/A
<b>Italy</b>	16% <sup>i</sup>	Additional 2% <sup>iv</sup> (approx. 9000 GWh)	Solar, wind, hydro, geothermal, tidal, wave, biomass. <sup>xiii</sup> (New plants operating after April 1999—eligible for green certificates for up to 8 years of operation). <sup>iv</sup>	Legislative Decree 79/99. Commenced 2002. <sup>iv</sup>	Quotas, priority access to the grid and renewable energy certificates. Certificate prices are market led. <sup>iv</sup>	Liability—producers and importers of electricity. <sup>iv</sup> Penalty—none

**Table 2**—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>Japan</b>	10% <sup>xiv</sup>	From 1.2% in 1999 to 3% in 2010. <sup>xv, xvi</sup> Quantitative increases in capacity 1999 to 2010. <sup>xv, xvii</sup> <ul style="list-style-type: none"> <li>• PV: 209 MW to 4,820 MW.</li> <li>• Wind: 83 MW to 3,000 MW.</li> <li>• Municipal Waste: 900 MW to 4,170 MW.</li> <li>• Biomass: 80 MW to 330 MW.</li> <li>• Fuel cells: 2,200 MW in 2010.</li> </ul>	Solar PV and thermal, wind, waste, temperature difference, biomass, cool energy. <sup>xviii</sup> Includes existing and new. <sup>xix</sup>	An <i>Alternative Energy Law</i> was enacted in 1980, amended 1992, for the development and implementation of alternatives to oil energy. <sup>xx</sup> A <i>New Energy Law</i> was enacted in 1997, amended in January 2002. <sup>xx</sup> Legislated 1 April 2003: <i>Special Law on the Use of New Types of Energy by Electricity Utility Companies</i> . <sup>xxi</sup>	Renewable Portfolio Standard Renewable energy certificates. Cumulative borrowing (up to 20%) and banking available. Upper limit of certificates set. Government to provide support for domestic PV and PV generation, clean energy cars, wind, and waste power. <sup>xx</sup>	<i>Liability</i> —power companies and electricity retailers. <sup>xx</sup>
<b>Luxembourg</b>	2% <sup>i</sup>	5.7 by 2010. <sup>i</sup>	Geothermal, wind, biomass, solar	Legislation in place to support renewables but no target. Framework Law 1994 <sup>xxii</sup>	Feed in tariffs and capital cost subsidies.	N/A

Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>Netherlands</b>	4% <sup>i</sup>	<p>10% by 2020.                      PJs of total energy by 2020.<sup>xxiii</sup></p> <ul style="list-style-type: none"> <li>• Wind 45</li> <li>• Solar PV 10</li> <li>• Solar thermal 10</li> <li>• Geothermal 2</li> <li>• Hydro 3</li> <li>• Biomass and waste 120</li> <li>• Heat pumps 65</li> </ul>	<p>Wind, solar PV and thermal, geothermal, biomass, heat pumps. 1989<sup>xxiv</sup></p> <p>Large hydro and waste incineration excluded.</p>	<p><i>Electricity Act (Electriciteitswet) 1989<sup>xxiv</sup></i></p> <p>Target aspirational.</p>	<p>Renewable energy certificates—voluntary participation, price fixed by Govt &amp; used mainly for validating Greenpower sales.</p> <p>Subsidised loans, solar hot water system subsidies, R&amp;D funding, energy equipment tax deductions, 'green label' pricing, machinery purchase subsidies, accelerated depreciation.<sup>xxv</sup></p> <p>Feed in tariffs legislated from 1 June 2003, revised annually, guaranteed for 10 year for new plant and up to 10 years for existing plants.</p>	<p><i>Liability</i>—voluntary</p> <p><i>Penalty</i>—none.</p>

**Table 2**—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>New Zealand</b>	72% <sup>xiv</sup>	Additional 30 petajoules total renewable energy above 2000 levels by 2012. (extra 2% in share of total energy) <sup>xvi, xvii</sup>	Large and small hydro, geothermal, wind, solar, biomass, marine (tidal/ wave/ current). <sup>xxi</sup> Eligible sources after 2000. <sup>xxii</sup>	Target aspirational. <sup>xxiii</sup> Renewable energy certificate scheme considered but not adopted to date.	Government incentives include: competitive funds for CO <sub>2</sub> mitigation projects; carbon emissions charge capped at NZ\$25/tonne from 2007; Negotiable Greenhouse Agreements (NGAs) for businesses at risk from an emissions charge; education, training, pilots, and market development. <sup>xxiv</sup>	N/A
<b>Portugal</b>	39% <sup>i</sup>	39% by 2010. <sup>i</sup>		Legislation in place to support renewables but no target. Decree-Law 168/99. <sup>5</sup>	Access to the grid for renewables guaranteed, feed in tariffs.	N/A

**Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)**

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>Spain</b>	20% <sup>i</sup>	12% of total energy demand by 2010. Comprising: <sup>xxviii</sup> <ul style="list-style-type: none"> <li>• Solid waste 168 MW;</li> <li>• Solar PV 200 MW;</li> <li>• Small hydro 720 MW;</li> <li>• Hydro 350 MW;</li> <li>• Wind 8 MW;</li> <li>• Biomass 1.7 MW;</li> <li>• Biogas 78 MW.</li> </ul>	Biomass, wind, small hydro, solar PV and solar thermal, biogas, municipal solid waste <sup>xxx</sup>	<i>Electricity Sector Act 54/1997.</i>  <i>Renewable Energy Development Plan, December 1999.</i>  Royal Decrees: 2366/1994, 2818/1998, <sup>xxx</sup> 2066/1999. <sup>xxx</sup>	Feed-in tariffs. <sup>xxx</sup>  R&D funding, finance mediation, collaborative agreements with solar manufacturers and installers, grants, community programs. <sup>xxx</sup>  Priorities grid access to producers under <50 MW, with a 5 year minimum contract. <sup>xxx</sup>	N/A
<b>Sweden</b>	49% <sup>i</sup>	Increase renewable electricity by 10 TWh from 2002 to 2010.	Wind, solar, wave, geothermal, some biofuel and hydro. <sup>xxxi</sup>	<i>Electricity Certificates Bill, 2003.</i> <sup>xxxi</sup>	Renewable energy certificates. One certificate = 1 MWh renewable energy. <sup>xxxi</sup>  Certificates supplied on a quota system: 7.4% in 2003, 16.9% in 2010. <sup>v, xxxi</sup>  Other incentives include investment subsidies, consumer subsidies for heating conversion, and agricultural energy advice subsidies. <sup>v, xxxii</sup>	<i>Liability</i> —electricity suppliers and users.  Energy intensive industry exempt.  <i>Penalty</i> —Current proposals are for 19.3 €/MWh in 2003, <sup>v</sup> 26.5 €/MWh in 2004. <sup>v</sup>

**Table 2**—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
United Kingdom	2% <sup>i</sup>	3% in 2003 rising to 10.4% in 2011 through to 2027. <sup>v</sup> (currently intend to extend the target to 20% by 2020). <sup>xxxiii</sup>	Wind, solar, biomass, hydro installed after 1990. <sup>v</sup> Excludes co-firing with fossil fuels, and some waste-energy options.	<i>Renewables Obligation Order 2002.</i> Applicable to England and Wales only. An equivalent Order for Scotland has been promulgated. <sup>v, xxxiii</sup>	Renewable obligation certificates (ROCs). One certificate per MWh, in-state generation only. <sup>v</sup> Subsidised capital grants for offshore wind projects, and wave and tidal R&D grants. <sup>v, xxxiii</sup>	<i>Liability</i> —electricity retailers <i>Penalty</i> —UK £30/MWh indexed to inflation.

**Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)**

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>USA</b> <sup>xxiv</sup> (see individual State details below)	12% <sup>xiv</sup>				Range of programs and incentives including: <ul style="list-style-type: none"> <li>• corporate tax credits;</li> <li>• production incentives of 1.5 cents/kWh from 1995–2005 (for solar thermal; landfill gas; wind; biomass; geothermal; fuel cells; anaerobic digestion)</li> <li>• federal grants programs;</li> <li>• corporate depreciation;</li> <li>• federal loans programs;</li> <li>• tax deductions for clean-fuel cars and refueling property.</li> </ul>	N/A

**Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)**

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<p><b>Arizona</b><sup>xxxv, xxxvi</sup></p>		<p>Minimum of 0.2% new retail sales by 2001, increasing incrementally to 1.1% in 2007 through to 2010. An annual increase after 2004 will be approved only if the cost has declined to an approved cost/benefit point.</p>	<p>Solar thermal, PV, wind, biomass, landfill gas, small hydro installed on or after January 1997. 60% solar PV &amp; solar thermal and 40% for solar hot water, in-state landfill gas, wind, &amp; biomass by 2007.</p>	<p>Legislated 1999. Effective May 2001 to 2012.</p>	<p>Combination RPS and Systems Benefit Charge. Can use renewables fund for compliance. kWh produced or purchased in excess of entities requirements can be saved or banked for future years. (Credit multipliers are also available).  Review of policy to take place in 2003.</p>	<p><i>Liability</i>—utilities. <i>Penalty</i>—none.</p>
<p><b>California</b><sup>xxxiv, xxxvii, xxxviii</sup></p>		<p>Increase of minimum 1% per year beginning in 2003 to reach 20% of all retail power by 2017.  (Baseline for each electrical corporation is based on actual % of retail sales from eligible renewable sources in 2001).</p>	<p>Solar thermal, wind, biomass, landfill gas, geothermal, ocean wave/thermal/tide, waste tyre and digester gas.  Hydro: 30 MW or less. Facilities operating after 26/9/96 and small facilities operating prior to 26/9/96.</p>	<p>Legislated Sept 2002. Commenced 1 Jan 2003 to 31 December 2017.</p>	<p>RPS with two cost recovery sources for utilities. Shortfall can be made up in future years. California Public Utilities Commission sets market price. Above-market costs of eligible renewables covered by state New Renewable Resources Account. If insufficient Account funds, utilities are exempted.  No REC trading.  Minimum 10 year contracts.</p>	<p><i>Liability</i>—utilities. <i>Penalty</i>—none.</p>

**Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)**

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>Connecticut</b> <sup>xxv, xxxix</sup>		<p>10% of all retail electricity sales by 2010.</p> <p>Comprising 7% Class I &amp; 3% Class II by 2010.</p> <p>Class I or II:                      5.5% by 2000                      6% by 2005                      7% by 2009</p> <p>Class I:                      0.5% by 2000                      1% by 2002                      3% by 2006                      6% by 2009</p>	<p>Class I: ocean thermal/ wave/tidal, low emission conversion tech, and run-of-the-river hydro (not more than 5 MW).</p> <p>Class II: hydro MSW, other biomass.</p>	<p>Legislated April 1998, amended 1999 and 2003.</p> <p>Commencement dates 1/1/00, 29/6/99 and 26/6/03 to 1 July 2009.</p>	<p>Renewable energy certificates trading through the New England Power Pool (NEPOOL) market-priced bid-based power exchange.</p>	<p><i>Liability</i>—investor-owned utilities.</p> <p><i>Penalty</i>—may include license revocation or suspension, or a prohibition from accepting new customers, or civil penalties. The Dept. of Public Utility Control may allow electricity suppliers to comply with the RPS requirement up to 2 yrs later, if the Dept finds the requirements cannot be reasonably met.</p>
<b>Florida</b> <sup>xxvii, xl</sup>		<p>4% by 2007                      7.5% by 2015</p>	<p>Biomass, municipal solid waste, solar PV, landfill gas, wind, methane.</p>	<p>Not legislated.</p>	<p>RPS incentive, not yet adopted, subsidies for solar hot water and PV systems.</p>	<p>N/A.</p>

**Table 2**—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
Hawaii <sup>xxxv, xli</sup>	7%	7% by 2003 8% by 2005 9% by 2010	Wind, solar, geothermal, hydro, landfill gas, ocean thermal/tide/wave, biomass, biofuel. Also, savings from solar and heat pump water heating. Can include existing renewables.	RPS Goal. Enacted June 2001. Commences December 2003.	RPS—Goal	Liability—Utilities. Penalty—None.
Illinois <sup>xxxv, xlii</sup>		5% by 2010 and 15% by 2020.	Wind, solar thermal & PV, energy crops, biomass, run-of-river, hydro.	Legislated June 2001. Commenced July 2001.	RPS—Goal. No implementation schedule, compliance verification or credit trading provisions. US\$500M in State bonds to finance wind, biomass and solar tech.	Liability—Utilities. Penalty—None.

**Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)**

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
Iowa <sup>xxxv, xliii</sup>	Utilities required to purchase a shared total of 105 MW (av.) of capacity each year. This is a fixed total. Approx. 2% of 1999 sales.	PV, wind, waste management, resource recovery (biomass), refuse-derived fuel (methane) agricultural crops or residues & wood burning facilities. Includes existing facilities.	Legislated 1983. Commenced 1997 for an indefinite period.	Alternative Energy Law: RPS-type policy. Interest-free loans available for the construction of facilities.	<i>Liability</i> —investor-owned utilities. <i>Penalty</i> —none.	
Maine <sup>xliv</sup>	Has the highest % of renewables use in the US at 50% of total capacity, from hydro power and biomass.	30% of total retail electricity sales in 2000.	Small power production facilities (<100 MW): Solar PV, wind, biomass, geothermal, hydro, fuel cells, municipal solid waste, tidal power. New and existing renewables eligible.	Legislated September 1999. Commenced November 1999 for a 5 year period, subject to review.	Target can be met using out-of-state generation. Renewable energy certificate trading via participation in NEPOOL (New England Power Pool) is pending.	<i>Liability</i> —utilities & rural electric cooperatives liable. Flexibility to meet target through averages over period of 2 years or more. <i>Penalty</i> —for non-compliance include license revocation, an optional payment into a renewable resource & development fund or other monetary penalties.

**Table 2**—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>Massachusetts</b> <sup>xxxv, xlv</sup>		Additional 1% by 2003 1.5% by 2004 2% by 2005 2.5% by 2006 3% by 2007 3.5% by 2008 4% by 2009.  The decision to cap or not is to be made by no later than 2007 for the period 2010 to 2014.	Solar, wind, ocean thermal, wave, tidal, landfill gas & low emission advanced biomass. Hydro and municipal solid waste qualify as existing.  Eligible facilities operational from 31 Dec 1997.	Legislated 1997. Regulations finalised April 2002.	RPS with credit purchasing system indexed to inflation for non-compliance. Renewable energy certificates traded through market-based, bid-based power exchange pool (New England Power Pool).  Flexibility mechanisms include 'Early Compliance' and 'Banked Compliance'.	<i>Liability</i> —Utilities & rural electric cooperatives.  <i>Penalty</i> —compliance can be met by submitting an 'Alternative Compliance Payment' for 2003, ACP is \$50/MWh or 5¢/kWh).
<b>Minnesota</b> <sup>xxxvi, xlvi</sup>		1% in 2005 increasing by 1% each year to reach at least 10% in 2015.  With at least 0.5% biomass by 2005 and 1% biomass by 2010.	PV, wind, biomass, hydro, solar thermal, landfill gas, hydrogen.	Enacted 2001. Commences 1 July 2005.  May 2003: legislation passed requiring utilities to develop plans on how they will meet the 10% renewables objective.	Non-Mandated Renewable Energy Objective.  Electricity utilities must make a good faith effort to meet generation targets.	<i>Liability</i> —Utilities.  <i>Penalty</i> —None

**Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)**

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
<b>Nevada</b> <sup>xxxv, xlvii</sup>		5% by 2003 7% by 2005 9% by 2007 11% by 2009 13% by 2011 15% by 2013	Solar thermal, PV, wind, biomass, hydro, geothermal, landfill gas, digester gas, and agricultural crops.  (minimum of 5% must be solar).  Existing and new eligible.	Legislated June 2001, temporary regulation adopted November 2002 allowing REC trading.  Commenced January 2003 to 2013 onwards.	RPS with renewable energy certificate trading (temporary regulation). RECs valid for 5 years.  Minimum 10 year contract.	<i>Liability</i> —utilities.  <i>Penalty</i> —Nevada Public Utilities Commission may impose fines for non-compliance.  Not applicable for cooperatives.
<b>New Jersey</b> <sup>xxxv, xlviii</sup>		Total of 3% of retail electricity in 2001 rising to 6.5% by 2012.  Class I or II: 2.5% for all years.  Class I: increase from 0.5% in 2001 to 4% by 2010.	Class I: solar, wind, fuel cells, geothermal, wave, tidal, landfill gas.  Class II: MSW or hydro (maximum of 30 MW capacity) that meets high environmental standards.  New and existing facilities.  Aggregate generation from small renewables 100 kW or less is also eligible.	Legislated 1999.  Commenced 1 September 2001 to 2012 onwards.	RPS with provision for renewable energy certificate trading when system developed.	<i>Liability</i> —utilities.  <i>Penalty</i> —range of financial and other penalties (including license suspension or revocation) for violation of the interim standards.  If non-compliant, utility is required to submit quarterly reports until such time as they meet the target.

**Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)**

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
New Mexico <sup>xxxv, xxxvii, xlix</sup>		5% by 2006, increasing by no less than 1% each year to a standard 10% in 2011.	Solar PV, wind, hydro, landfill gas, fuel cells, biomass and geothermal. Hydro is limited to new facilities (5 MW or less).	Legislated December 2002. Commenced 1 July 2003 for 2006 to 2011 and onwards.	RPS with renewable energy certificates. REC trading, banking and credit multipliers available to help meet target. RECs valid for 4 yrs. (1 credit/kWh for wind & hydro, 3 for solar and 2 for all others). Minimum 10-year procurement contracts. Investor-owned utilities also required to offer voluntary renewable energy tariff (green pricing) to customers and develop educational programs. Preference will be given to in-state generators, but out-of-state generators will not be excluded. Preference for renewable energy should be shown when utilities procure, acquire or construct new generating facilities.	<i>Liability</i> —Investor-owned utilities. Rural cooperatives are exempt. <i>Penalty</i> —enforcement mechanisms for non-compliance are yet to be announced and may include fines.

**Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)**

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
New York <sup>xxxvii, i, ii</sup>		25% retail electricity sales by 2012	Proposed: solar thermal & PV, wind, fuel cells, managed biomass, tidal, geothermal, methane waste.	Governor's Executive Order No. 111 announced 2003.	Details still to be decided, but likely to resemble Texas' RPS. State agencies required to purchase 20% of electricity from renewable sources by 2010.	
Pennsylvania <sup>xxxv, iii</sup>		Requirements vary by individual utility, eg. PECO: 2% generation in 2001, increasing by 0.5% annually.	Solar thermal, PV, landfill gas, wind, biomass, geothermal. Excludes hydro.	Target aspirational. Commenced 2001.	Not an RPS—individual utility restructuring settlement agreements contain portfolio requirements. The settlements provide for a sustainable energy fund to promote renewable energy (\$US83.5M in 2002).	N/A.

**Table 2**—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
Texas		Generation capacity target of additional 400 MW in 2002 rising to 2000 MW in 2009 and maintained until 2019 (equiv to additional 3,000 GWh)	PV, landfill gas, wind, biomass, hydro, solar, geothermal, wave, tidal. Eligible systems are installed after September 1999.	Legislated 1999. Commenced 2002 until 2019.	RPS—tradeable renewable energy credit (RECs) system including a central registry commenced July 2001. Credits can be banked for 3 years & all renewable additions have a minimum of 10 years credits to cover over-market costs. Out-of-State renewable electricity that is sold and metered in-State is eligible.	<i>Liability</i> —Utilities. <i>Penalty</i> —lesser of \$50/MWh or 200% of average cost of credits traded during the year.

**Table 2—Summary of Overseas Renewable Energy and Associated Measures at June 2003 (continued)**

Country	Renewables Electricity share in 1997	Target	Eligible Renewable Energy Sources	Legislation	Policy tools	Penalty and liable parties
Wisconsin <sup>xxxv, liv</sup>		<p>0.5% by 2001 rising to 2.2% by 2011.</p> <p>Changes mix so actual % contribution from renewables would increase.</p>	<p>Biomass, fuel cell, solar PV, geothermal, tidal, wave, wind, hydro (&lt;60 MW).</p> <p>Eligible facilities in service on or after January 1998.</p>	<p>Legislated 1999. Commenced 2001 until 2011.</p>	<p>RPS—tradeable renewable energy certificates (small market). Credits awarded to electric providers for generation in excess of minimum requirement.</p> <p>Wisconsin was the first state to adopt an RPS in advance of retail competition.</p> <p>Out-of-State generation may be used, as long as the electricity is physically delivered to an in-State utility and sold at retail.</p> <p>Annual reporting required.</p>	<p><i>Liability</i>—Utilities.</p> <p><i>Penalty</i>—between US\$5,000 and US\$500,000 on non-compliant electric service providers.</p>

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# Acronyms and Abbreviations

<b>AAC</b>	Australian Aluminium Council
<b>ABARE</b>	Australian Bureau of Agriculture and Resource Economics
<b>ACA</b>	Australian Coal Association
<b>ACCC</b>	Australian Competition and Consumer Commission
<b>ACRE</b>	Australian Cooperative Research Centre for Renewable Energy
<b>ACT</b>	Australian Capital Territory
<b>AFMA</b>	Australian Financial Markets Association
<b>AGL</b>	Australian Gaslight Company
<b>AGO</b>	Australian Greenhouse Office
<b>ANZSES</b>	The Australian & New Zealand Solar Energy Society
<b>ARC</b>	Australian Research Council
<b>AusWEA</b>	Australian Wind Energy Association
<b>BCSE</b>	Australian Business Council for Sustainable Energy
<b>BSL</b>	Bundaberg Sugar Ltd
<b>CO<sub>2</sub>-e</b>	Carbon dioxide equivalent
<b>COAG</b>	Council of Australian Governments
<b>CPI</b>	Consumer Price Index
<b>CSIRO</b>	Commonwealth Scientific and Industrial Research Organisation
<b>CSR</b>	CSR Sugar Ltd
<b>ECITA</b>	Environment, Communications, Information Technology and the Arts Legislation Committee
<b>EPA</b>	Environment Protection Agency
<b>ERDC</b>	Energy Research and Development Corporation
<b>ESAA</b>	Electricity Supply Association of Australia
<b>EUAA</b>	Electricity Users Association of Australia
<b>FTE</b>	Full Time Employees

<b>GDP</b>	Gross Domestic Product
<b>GEC</b>	Gas Electricity Certificate
<b>GWh</b>	Gigawatt hours
<b>IPART</b>	NSW Independent Pricing and Regulatory Tribunal
<b>km</b>	Kilometres
<b>kW</b>	Kilowatt
<b>kWh</b>	Kilowatt hours
<b>LME</b>	London Metal Exchange
<b>LUAC</b>	Large User Abatement Certificate
<b>MCA</b>	Minerals Council of Australia
<b>MMA</b>	McLennan Magasanik Associates
<b>MRET</b>	Mandatory Renewable Energy Target
<b>MSCA</b>	Mackay Sugar Cooperative Association
<b>MSW</b>	Municipal solid waste
<b>Mt</b>	Million tonnes
<b>MW</b>	Megawatt
<b>MWh</b>	Megawatt hours
<b>NAFI</b>	Joint National Association of Forest Industries and Australian Forest Growers
<b>NECA</b>	National Electricity Code Administrator
<b>NEM</b>	National Electricity Market
<b>NEMMCO</b>	National Electricity Market Management Company
<b>NGAC</b>	NSW Greenhouse Abatement Certificate
<b>NPV</b>	Nett Present Value
<b>NSW</b>	New South Wales
<b>NT</b>	Northern Territory
<b>ORER</b>	Office of the Renewable Energy Regulator
<b>PPA</b>	Power Purchase Agreement
<b>PV</b>	Photovoltaic
<b>PVRP</b>	Photovoltaic Rebate Program
<b>QLD</b>	Queensland

<b>R&amp;D</b>	Research and Development
<b>RAPS</b>	Remote Area Power Supply
<b>REC</b>	Renewable Energy Certificate
<b>RECP</b>	Renewable Energy Commercialisation Program
<b>REEF</b>	Renewable Energy Equity Fund
<b>REGA</b>	Renewable Energy Generators Australia Limited
<b>REID</b>	Renewable Energy Industry Development Program
<b>RFA</b>	Regional Forestry Agreement
<b>ROC</b>	Renewable Obligation Certificate
<b>RPS</b>	Renewable Portfolio Standards (Texas)
<b>RRPGP</b>	Renewable Remote Power Generation Program
<b>SGU</b>	Small Generation Unit
<b>SWH</b>	Solar Water Heater
<b>the Act</b>	<i>Renewable Energy (Electricity) Act 2000</i>
<b>the Parer Report</b>	<i>Towards a Truly National and Efficient Energy Market— Council of Australian Governments Energy Market Review Final Report</i>
<b>the Regulations</b>	<i>Renewable Energy (Electricity) Regulations 2001</i>
<b>TWh</b>	Terawatt hours
<b>UK</b>	United Kingdom
<b>USA</b>	United States of America
<b>WA</b>	Western Australia