THE AUSTRALIAN NATIONAL UNIVERSITY

SUBMISSION TO SENATE ECONOMICS LEGISLATION COMMITTEE INQUIRY INTO THE RENEWABLE ENERGY (ELECTRICITY) AMENDMENT BILL 2009 AND A RELATED BILL

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Submittor background

Greg Buckman is a PhD student at the ANU's Fenner School of Environment and Society. The title of his thesis is: *Renewable Electricity Policy: The Implications of its Overseas Performance for Australia*. This submission is made in a private capacity and should not be taken as necessarily representing the views of the ANU.

Summary of submission

- reduction of Australia's electricity generation emissions is central to reducing the country's high per capita greenhouse gas emissions;
- a significant increase in Australia's generation of renewable energy electricity is a crucial part of the reduction of its electricity generation emissions;
- Australia has a low renewable energy electricity market share compared to other OECD countries;
- there is a major need for the design of the Renewable Energy Target (RET) to be evaluated against the design of overseas Renewable Portfolio Standard mechanisms;
- to bring Australia into line with the relative increases in renewable energy electricity generation other developed countries are aiming for RET's target should be increased to about 30% by 2020;
- greater than planned increases in national electricity consumption, falling hydro generation and the using up of RECs through RET's 'Solar Credits' multiplier all make it likely RET will not achieve 20% of Australia's electricity generation from renewable sources by 2020;
- to maintain RET's integrity its target should be increased each year by the amount of additional RECs created under the Solar Credits arrangement;
- RET's target should be changed to a market share one;

• Australia's patchwork of generally small scale state and territory net solar photovoltaic feed-in tariffs should be replaced with either a national gross feed-in tariff or ongoing RECs multipliers that can be used at any scale of generation for any type of renewable energy electricity technology;

• RET's exemption for emission intensive customers should be scrapped;

• RET should restrict the ability to bank RECs to four years or less;

• pre MRET generators should lose RECs when their generation levels are below their MRET baselines; and

• RET's shortfall charge should be increased or at least indexed to inflation.

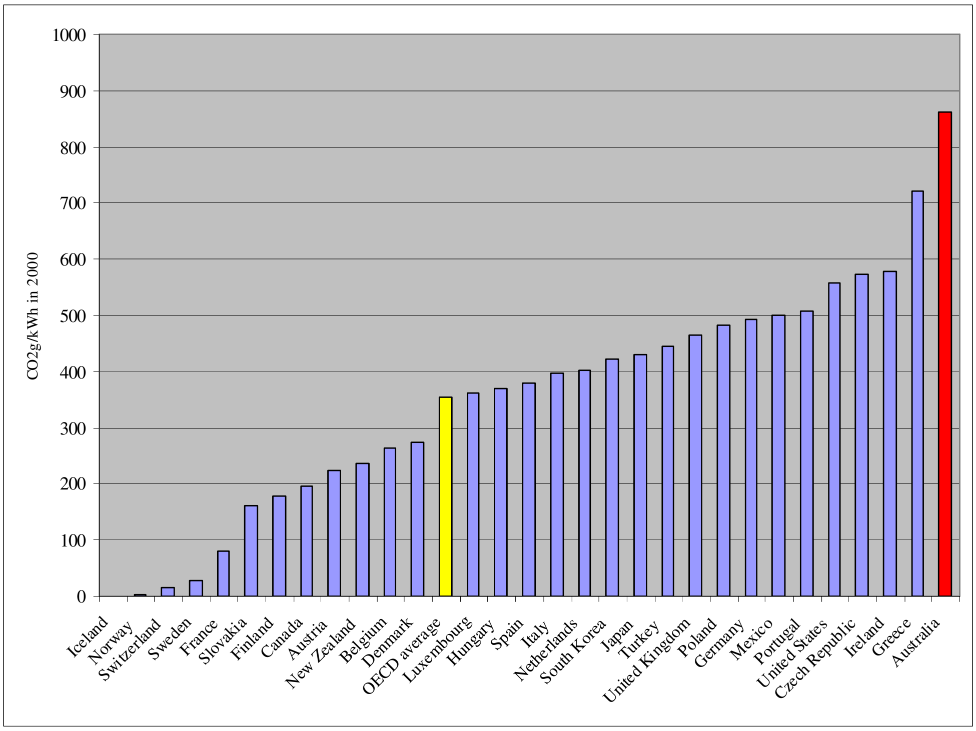
1. Electricity generated by renewable energy is central to reducing Australia's greenhouse gas emissions

In greenhouse gas emission reduction terms, Australia needs to significantly increase its proportion of electricity generated from renewable energy. Australia is responsible for the highest per capita greenhouse gas emissions in the OECD and one of the highest in the world. According to the Garnaut Climate Change Review (2008: 153) in 2006 Australia's per capita greenhouse emissions (including land use, land use change and forestry) were equal to 28.1tC02-e which was nearly twice the OECD average and more than four times the global average. Only five countries had higher per capita emissions in 2006.

Electricity generation is a major contributor to Australia's poor greenhouse gas emissions performance. In 2007 it accounted for 199.5MtCO2-e or 36.9% of the country's net national emissions (excluding land use, land use change and forestry) of 541.2 MtCO2-e (Department of Climate Change 2009: 5) and is one of the country's fastest growing emission sources. In 1990 electricity generation accounted for 129MtCO2-e or 31% of the nation's net greenhouse gas emissions of 416.2.2 MtCO2-e (Department of Climate Change 2008: 2). This means between 1990 and 2007 Australia's net national greenhouse gas emissions increased by 30% while its electricity generation emissions increased by 55%.

As shown in Figure 1, the greenhouse gas emissions intensity of Australia's electricity supply is the highest of any country in the OECD. In 2000 it took 0.863kg of CO2 to generate each MWh of electricity in the country: 2.4 times the OECD average of 0.354kg (World Resources Institute 2009).

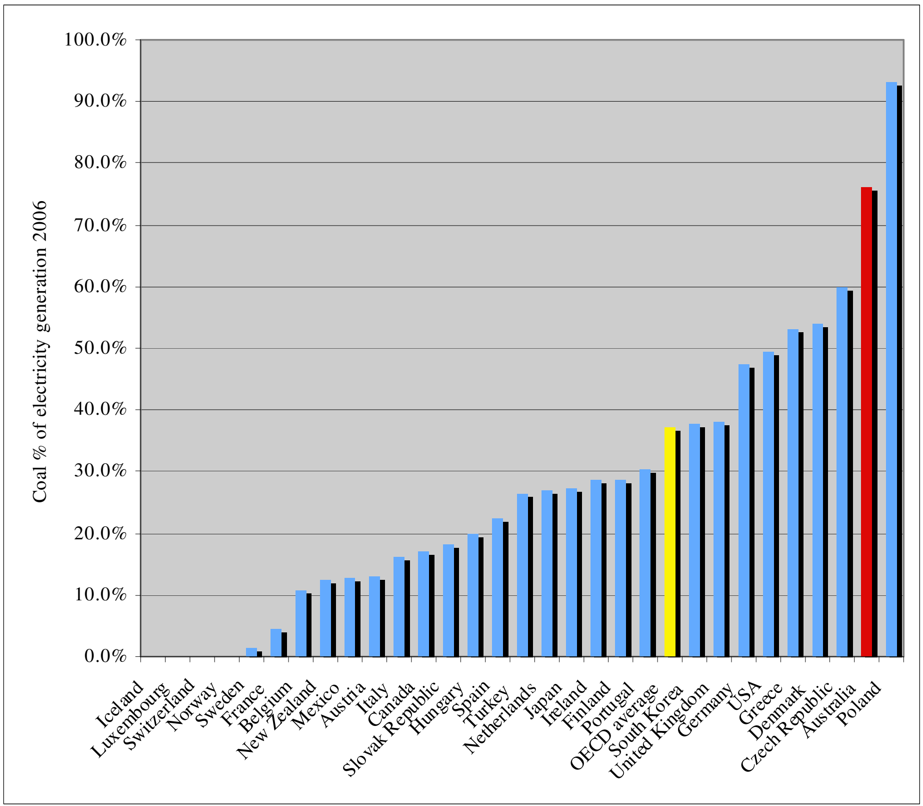
Figure 1: Emissions intensity of electricity supply of OECD countries, 2000



Source: World Resources Institute, 2009.

Two major drivers of Australia's high electricity generation emissions intensity are its dependence on coal and the declining electricity generation market share of renewable energy. As shown in Figure 2, Australia is more dependent on coal for its generation of electricity than all other OECD countries except Poland. In 2006 coal supplied 76% of Australia's electricity generation compared to an OECD average of 37.3% (International Energy Agency 2009).

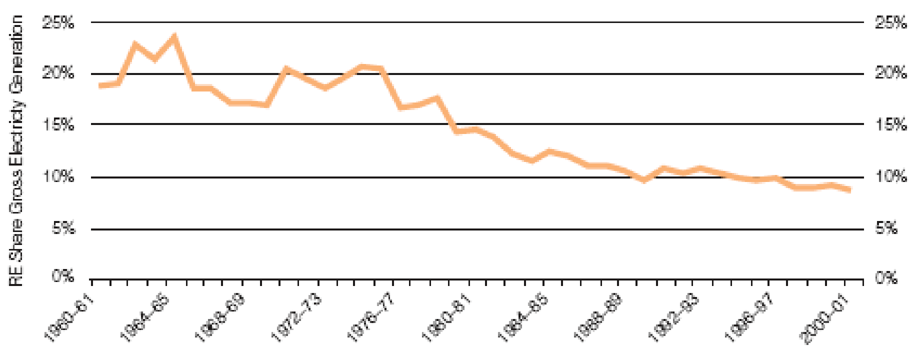
Figure 2: Reliance on coal for electricity generation of OECD countries, 2006.



Source: International Energy Agency, 2009

Since the mid 1960s Australia's electricity generation coal dependency has been accentuated by a decline in the proportion of the country's electricity generated by renewable energy. As shown in Figure 3, this proportion declined from 23% in 1965 to 9% in 2000 (Australian Greenhouse Office 2003: 10). In 2006-07 its market share of grid-connected electricity generation was about 9.5% (author's calculation based on Australian Bureau of Agricultural and Resource Economics 2009: 20, 21, 35).

Figure 3: Proportion of Australia's electricity generation derived from renewable energy, 1960-61 to 2000-01.



Source: Australian Greenhouse Office, 2003: 11.

Electricity generation greenhouse gas emissions are easier to reduce than any other major source of emissions in Australia, especially those from agriculture and transport. *Given that carbon-capture-and-storage technology is a long way from being commercially available and that the Australian government does not support nuclear energy one of the best ways the country can reduce its greenhouse gas* *emissions is through reducing its electricity generation emissions by increasing the share of electricity generated by renewable energy.*

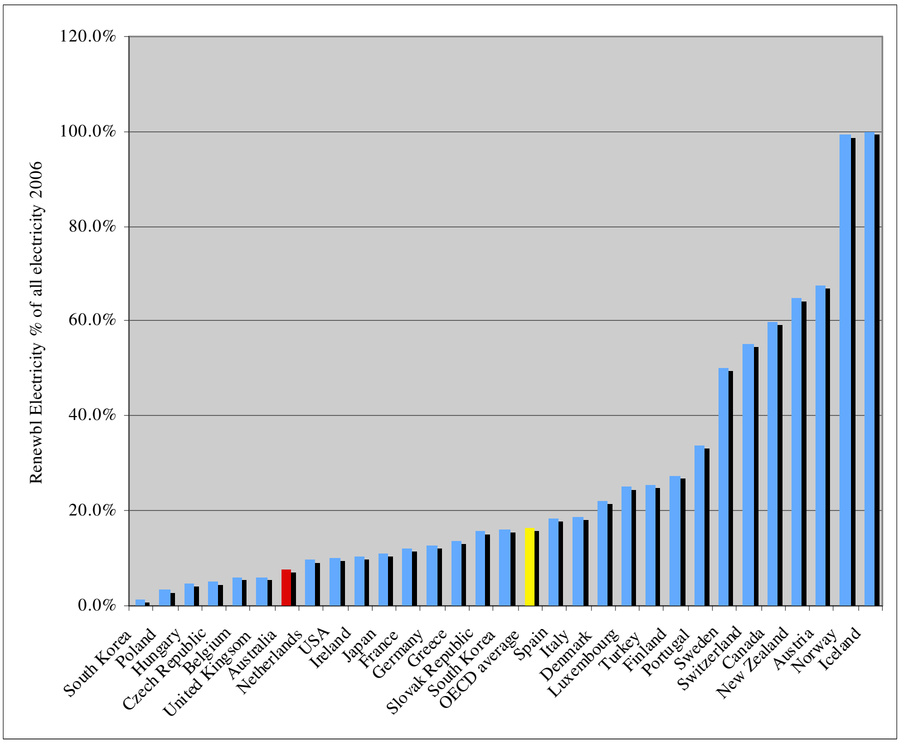
2. The Renewable Energy Target should be given a 'global best practice' review

Both MRET and RET are Renewable Portfolio Standard (RPS) mechanisms where governments mandate percentages of renewable energy electricity that must be bought by electricity retailers (with markets left to determine what price the renewable electricity will be sold at). Overseas RPS mechanisms were rare when MRET began in 2001 so there were few examples to reference when determining its design. However they are relatively common now and there are many overseas examples that can be referenced when determining the design of RET. In the United States 25 states, as well as the District of Columbia, now have compulsory RPS mechanisms and in Europe the United Kingdom, Italy, Sweden, Belgium, Poland and Romania use the mechanism. RPS mechanisms are also used in some Asian countries. Despite its relative popularity there has been no referencing of its overseas use in the design of RET. There has therefore been no 'international best practice' evaluation of RET's architecture. RET has largely perpetuated the design of MRET without re-evaluating it. When RET's design was reviewed by the Council of Australian Government's Working Group on Climate Change and Water through public comment in 2008 there was no reference to any overseas use of the RPS mechanism. However, the federal-state Renewables Target Working Group that originally developed the design of MRET referenced a proposed national US RPS mechanism (1999: 101) and the 2003 federal government review of MRET reviewed the RPS mechanisms of the United Kingdom and Texas and also included a broader analysis of the renewable energy targets of 18 overseas countries (Australian Greenhouse Office 2003: 85, 87, 223). *There is therefore a major need for the design of RET to be evaluated against the design of overseas RPS mechanisms.* It cannot be assumed Australia has necessarily developed the best design of the mechanism and that the design of MRET cannot be improved upon.

3. A low proportion of Australia's electricity is generated by renewable energy: its market share needs to be increased beyond the target of the Renewable Energy Target

Compared to the rest of the OECD a low proportion of Australia's electricity is generated by renewable energy. As shown in Figure 4, in 2006 Australia's renewable energy electricity generation market share of 7.6% was well below the OECD average of 16.4%.

Figure 4: The proportion of electricity generated by renewable energy in OECD countries, 2006.

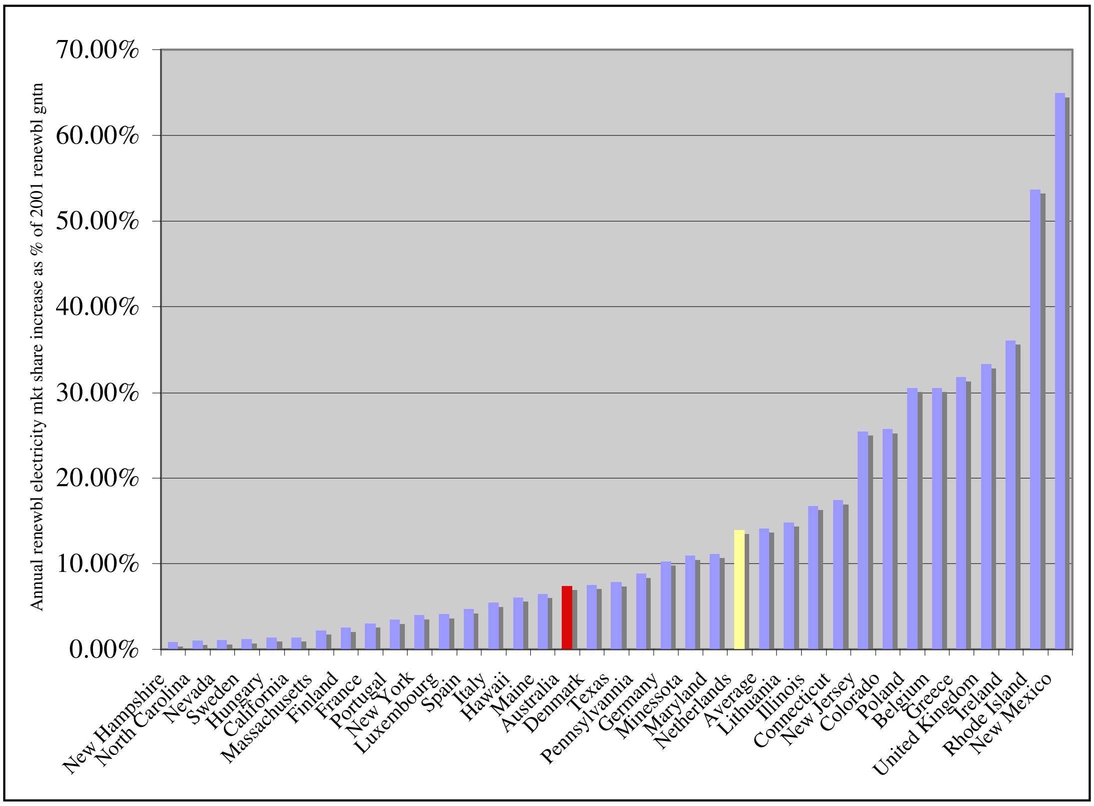


Source: International Energy Agency, 2009.

MRET and RET only apply to grid-connected electricity generation. MRET was intended to lift the renewable energy share of such generation to 12.5% by 2010 (Parliament of the Commonwealth of Australia 2000: 9). However this aspiration was based on a projection that grid-connected generation would reach 209,000GWh pa by 2010: in fact this level was reached in 2003-04 (Australian Bureau of Agricultural and Resource Economics 2009: 19) and by 2009-10 it is likely to be at least 235,000GWh. In addition, the amount of electricity generation from renewable energy that existed before MRET began – 16,614GWh/yr, 94% of which came from hydro electric sources (Australian Bureau of Agricultural and Resource Economics 2009: 35) – is likely to have significantly fallen by 2010 because of lower rainfall due to drought conditions. The combination of faster-than-expected electricity generation and falling hydro generation means that by 2010 renewable energy will not be generating more than 9.5% to 10% of Australia's grid-connected electricity instead of the planned 12.5%. Another influence affecting MRET's low renewable energy market share performance has been the fact that by the time the mechanism started operating in 2001 the renewable energy market share had fallen to 8.9% (author's calculations based on Australian Bureau of Agricultural and Resource Economics 2004: 28,50).

When the Labor Party launched RET during the 2007 federal election campaign it said RET 'will bring Australia into line with other developed nations including in Europe, China and many American states' (Australian Labor Party 2007: 2). This is questionable. Although a lot of publicity is given to the final target percentage of renewable energy electricity mechanisms like RET aim to achieve, equally important when assessing their ambition is the size of the renewable energy generation market share when they commenced and the period of time allowed to reach their final target. Figure 5 compares the renewable energy electricity ambition of mechanisms in 18 US states, 17 western European countries and Australia. It shows the annual increase in renewable energy electricity generation market share needed to reach their market share targets by their planned year as a proportion of their 2001 renewable energy electricity generation market share. It shows Australia is well-and-truly in the lower half of the group. The country's 7.42% increase on 2001 generation levels between 2001 and 2020 is about half the average for the group of 14.1%. This is mainly because even though RET aspires to reach a 20% market share by 2020 it started with a market share of 45% of that amount when MRET commenced and it plans to take 19 years to reach the 20% final target. *To bring Australia into line with the average for the other countries in the group RET's target should be increased to 30% by 2020.*

Figure 5: Average renewable energy electricity market share increase needed to reach final market share target in designated year as a percentage of 2001 renewable energy electricity generation market share for 18 US states, 17 EU countries and Australia.



Sources: Union of Concerned Scientists 2009 and European Commission 2009.

4. The target of Renewable Energy Target needs to be changed to reach 20% of electricity generation by 2020

RET aims to generate 60,000GWh/yr of renewable energy electricity by 2020. The composition of this is detailed in Table 1: it is made up of 15,000GWh/yr from pre MRET generation and 45,000GWh/yr of MRET and RET generation. In July 2008 the Minister for Climate Change and Water, Penny Wong, said 'The expanded renewable energy target will help deliver on the Government's commitment to ensure at least 20 per cent of Australia's electricity supply comes from renewable energy by 2020' (Wong 2008). *There are good reasons for thinking RET will not deliver 20% of Australia's electricity generation by 2020.*

Table 1: Renewable energy electricity generation targets of MRET and RET and pre MRET generation

RElec mechanism	*RElec generation at end of mechanism: GWh/yr*
No mechanism: pre-MRET	15,000 before 2001
MRET	extra 9,500 by 2010
RET	extra 35,500 by 2020
Total	60,000 by 2020

There are three influences that will probably stop the RET reaching a 20% renewable energy electricity market share by 2020, these are:

1. grid connected electricity generation will grow more rapidly than projected;
2. hydro generation will fall below 15,000GWh/yr by 2020; and
3. the RET's 'Solar Credits' will erode RET's target.

In 2006-07 Australia's grid-connected electricity generation was 227,000GWh (Australian Bureau of Agricultural and Resource Economics 2009: 20). RET's 60,000GWh/yr-by-2020 target assumes this will reach 300,000GWh/yr by 2020. This projection implies an average compound rate of generation growth of 2.1% pa between 2007 and 2020. Although this is in line with predictions by the Australian Bureau of Agricultural and Resource Economics there is good reason to think it will end up being higher than this. The growth of Australia's grid-connected electricity generation is shown in Table 2: as can be seen, it grew from 170,000GWh in 1997-98 to 227,000GWh in 2006-07. The average compound rate of growth between these two years was 3.3% pa: it is difficult to believe it will necessarily fall to be about two-thirds that rate, on average, between 2007 and 2020. The Australian Bureau of Agricultural and Resource Economics has a history of increasing its projections of electricity generation growth. In 2003 it predicted combined grid and non-grid connected electricity generation would reach 330,100GWh by 2019-20, in 2006 it revised this projection to 342,000GWh then in 2007 it again increased the projection to 349,400GWh (Australian Bureau of Agricultural and Resource Economics 2003: 29, 2006:29, 2007: 42). If the average annual growth rate for grid-connected generation between 2007 and 2020 ends up being 2.8% pa — 85% of the 1997-98 to 2006-07 average growth rate — grid-connected electricity generation will be 325,000GWh/yr by 2020 and the RET's 60,000GWh/yr target will only equal 18.5% of grid-connected generation.

Table 2: Grid-connected electricity generation in Australia, 1997-98 to 2006-07.

Year	*Grid-connected generation: GWh*	*Increase on previous year*
1997-98	170,000	
1998-99	186,000	9.4%
1999-2000	193,000	3.7%
2000-01	199,000	3.1%
2001-02	201,000	1.0%
2002-03	206,000	2.5%
2003-04	213,000	3.4%
2004-05	217,000	1.9%
2005-06	220,000	1.4%
2006-07	227,000	3.2%

Sources: Australian Bureau of Agricultural and Resource Economics 2005: 39 and 2009: 20

RET's target assumes pre-MRET generation, 94% of which was hydro, will remain at about 15,000GWh pa. As shown in Table 3, hydro generation has fallen from 16,305GWh in 2002-03 to 14,444GWh in 2006-07 (Australian Bureau of Agricultural and Resource Economics 2009: 33). This means in 2006-07 pre MRET generation had fallen to RET's 15,000GWh baseline (assuming about 600GWh in ongoing non hydro pre MRET generation) and there is good reason to think it will keep falling in the long term. Data published by the CSIRO and the Department of Meteorology show a 40% loss of annual rainfall over the Snowy Mountains area over the past 30 years (Beeby 2009). Tasmania's hydro dams are very low and the state in 2007 and 2008 imported about a third of its electricity consumption. If pre MRET generation falls to 13,000GWh/yr by 2020, and grid-connected electricity generation grows by 2.8% on average between 2006-07 and 2019-20, the renewable energy electricity generation market share will be 17.8% by 2020, not 20%.

Table 3: Hydro electricity generation in Australia, 2001-02 to 2006-07

Year	*Hydro generation: GWh*
2001-02	15,972
2002-03	16,305
2003-04	16,111
2004-05	15,611
2005-06	16,028
2006-07	14,444

Source: Australian Bureau of Agricultural and Resource Economics 2009: 33

Between 2009-10 and 2014-15 RET will give extra renewable energy certificates (RECs) to small scaled renewable energy electricity generation from generators of 1.5kW capacity or less. Five times the normal number of RECs will be given in 2009-10, 2010-11 and 2011-12; then four times in 2012-13; then three times in 2013-14 then two times in 2014-15 before the scheme finishes. These RECs 'multipliers' are known as 'Solar Credits'. Although the Solar Credits arrangement is laudable there is no compensation in the RET target for the extra RECs it will create so they ultimately reduce RET's target. *By how much they will reduce the target can only be guessed but to maintain the target's integrity it should be increased each year by the amount of additional RECs created under the Solar Credits arrangement.*

5. The RET target should be changed from a generation target to a market share target

The targets of both MRET and RET are expressed in generation hour terms but as Table 4 makes clear this is unusual when compared to overseas practice. Most jurisdictions in the US and in western Europe that use compulsory RPS mechanisms express their targets in market share terms, not in generation hour terms. Of the 28 jurisdictions that use RPS mechanisms listed in Table 4 only one, Texas, does not use a market share target. *Given the strong possibility that RET will not end up generating 20% of Australia's grid-connected electricity by 2020 its target should be changed to a market share one.*

Table 4: the targets of United States and western European jurisdictions that use compulsory Renewable Portfolio Standard mechanisms

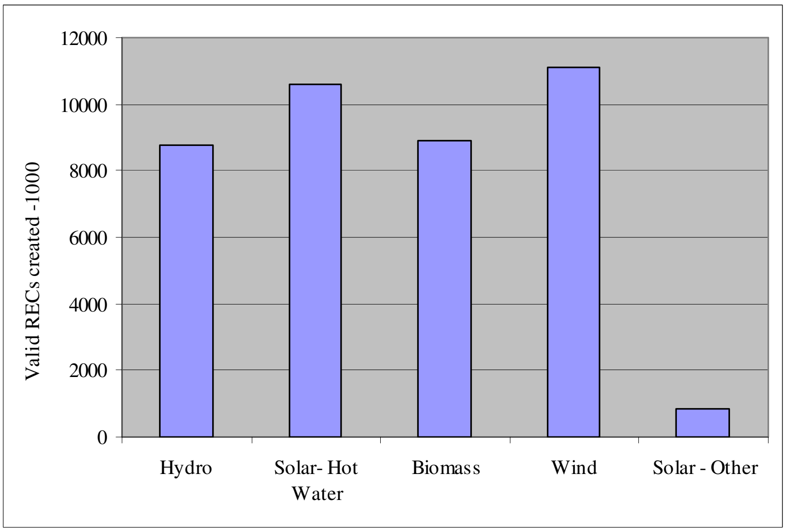
Jurisdiction	*RPS target*
US compulsory RPS states	
Arizona	15% by 2026
California	30% by 2020
Colorado	20% by 2020
Connecticut	10% by 2020
Delaware	20% by 2020
Hawaii	20% by 2020
Illinois	25% by 2025
Maine	30% by 2000
Maryland	20% by 2022
Massachusetts	4% by 2009
Minnesota	25% by 2025
Montana	15% by 2015
Nevada	20% by 2015
New Hampshire	23.8% by 2025
New Jersey	22.5% by 2021
New Mexico	20% by 2020
New York	24% by 2013
North Carolina	10% by 2018
Oregon	25% by 2025
Pennsylvania	18% by 2020
Rhode Island	16% by 2019
Texas	Xtra 10TW by 2025
Washington	15% by 2020
Washington DC	20% by 2020
EU compulsory RPS countries	
Belgium	6% by 2010
Italy	25% by 2010
Sweden	51% by 2010
United Kingdom	15.4% by 2026

Sources: Union of Concerned Scientists, 2009 and Coenraads et al 2008.

6. RET needs to be complemented with either a national feed-in tariff or multipliers usable at large scale

MRET has not stimulated a wide variety of renewable energy electricity types. As shown in Figure 6, solar hot water, wind and biomass (mostly made up of landfill gas and sugar cane waste) are the non-hydro renewable energy electricity types that have been the major beneficiaries of MRET. The big losers to date, in terms of significant RECs creation, have been solar electricity (generated from photovoltaic (PV) panels or solar thermal plants) as well as geothermal electricity. Of the 42 million valid RECs created by 23 May 2009 only 2% had been created by solar power (other than solar hot water) and none had been created by geothermal technology (which is still at pilot stage) (Office of the Renewable Energy Regulator 2009a). This is no surprise: RPS mechanisms like MRET are designed to generate renewable energy electricity from least cost sources and at the moment wind and biomass are the lowest cost types of non-hydro renewable energy electricity there are (in terms of current generation cost).

Figure 6: Valid RECs created under MRET to 23 May 2009



Source: Office of the Renewable Energy Regulator 2009a.

The narrow range of renewable energy electricity stimulated by MRET does not matter much if Australia aspires to reach fairly low renewable energy electricity targets and therefore achieve modest greenhouse gas reduction. However if significant targets and emission reductions are to be reached, particularly from electricity, it matters a lot. Both solar and geothermal electricity have enormous generation potential in Australia: much larger than wind or biomass. A 2006 report published by the Cooperative Research Centre for Coal in Sustainable Development said that an area measuring 35km by 35km located in a region with high solar radiance and low cloud cover could generate enough electricity to meet all of Australia's current electricity consumption needs if covered with a solar thermal electricity generation system (Wibberley et al 2006; appendix 1, p. 24). In 2008 the Minister for Resources said Geoscience Australia thought one per cent of Australia's geothermal energy potential could supply 26,000 times the country's current total annual energy use (Ferguson 2008: 1).

Unlike many other developed countries, however, Australia does not have effective mechanisms to stimulate renewable energy electricity types other than wind, biomass and hydro. As shown in Table 5, all Australian states and territories now have feed-in tariffs which, in theory, could stimulate more expensive renewable energy electricity types like solar and geothermal. In practice, however, they are not expected to provide much stimulation because all, apart from the ACT one, are based on net generation not gross generation. Their subsidy levels are generous but the amount of generation they can be applied to is not. All of them, apart from the ACT's, can only be used for generation from solar photovoltaic panels. None, again apart from the ACT one, are available for use by commercial-scale generators and the commercial scale application of the ACT one has yet to commence. Like most of the state and territory feed-in tariffs, RET's Solar Credits multiplier is limited to small-scale generation from plants of 1.5kW capacity or less and is not expected to give a significant boost to more expensive types of renewable energy electricity.

Table 5: State and territory based feed-in tariff schemes commenced or enacted by June 2009

State/territory	*Commencement date*	*Maximum size*	*Rate/kWh*	*Duration*	*Net or Gross*	*Technology covered*
Victoria	2009	5kW	60c	15 years	Net	Solar PV
South Australia	July 2008	10kW	44c	20 years	Net	Solar PV
ACT	March 2009	10kW for premium price, 30kW for non premium rate	Premium: 50.05c Non-premium: 40.04c	20 years	Gross	All renewable energy types
Tasmania	2009	To be confirmed	20c	To be confirmed	Net	Solar PV
Northern Territory	2008	To be confirmed	Alice Springs: 50.05c up to $5/day then 23.11c Elsewhere in NT: 14.38	To be confirmed	Net	Solar PV
Western Australia	July 2010	Household only: to be confirmed	60c	To be confirmed	Net	Solar PV
Queensland	July 2008	10kW	44c	20 years	Net	Solar PV
New South Wales	January 2010	10kW	60c	20 years	Net	Solar PV

Sources: Australian Parliamentary Library, Energy Matters

As can be seen in Table 6, 14 of the 28 listed jurisdictions that use compulsory RPS mechanisms have some form of complementary mechanism designed to increase generation from more expensive, and less mature, types of renewable energy electricity such as solar electricity. In the United States the complementary mechanism takes the form of 'carve outs': RPS sub-markets whose targets can only be met with specific types of renewable energy electricity, not any type as MRET and the RET allow. In western Europe countries that use RPS mechanisms that have such complementary mechanisms generally use feed-in tariffs or multipliers like the ones to be used in RET's Solar Credits scheme. The United Kingdom introduced large scaled RPS multipliers in April this year the rates for which are detailed in Table 7. The carve outs used in the US are the least attractive such complementary mechanism because they reduce liquidity by dividing up an RPS's market; they also make it harder to adjust the emphasis the mechanism might give to different types of renewable energy electricity. *To ensure increased, significant generation from less mature renewable energy electricity types, especially from Australia's abundant solar energy resource, its patchwork of generally small scale net solar photovoltaic feed-in tariffs should be replaced with either a national gross feed-in tariff or ongoing multipliers either of which should be usable at any scale of generation. If multipliers are used RET's target should be adjusted upwards to compensate for the extra RECs issued through the multipliers.*

Table 6: the use of carve outs, banding or feed-in tariffs in the United States and western European jurisdictions that use compulsory Renewable Portfolio Standard mechanisms

Jurisdiction	*Use of carve outs, multipliers or feed-in tariffs*
US compulsory RPS states	
Arizona	None
California	None
Colorado	None
Connecticut	Carve outs
Delaware	Carve outs
Hawaii	None
Illinois	None
Maine	Carve outs
Maryland	Carve outs
Massachusetts	None
Minnesota	None
Montana	None
Nevada	Carve outs
New Hampshire	Carve outs
New Jersey	Carve outs
New Mexico	Carve outs
New York	None
North Carolina	Carve outs
Oregon	None
Pennsylvania	Carve outs
Rhode Island	None
Texas	None
Washington	None
Washington DC	Carve outs
EU compulsory RPS countries	
Belgium	Feed-in tariff
Italy	Banding and feed-in tariffs
Sweden	None
United Kingdom	Multipliers soon

Sources: Union of Concerned Scientists, 2009 and Coenraads et al 2008.

Table 7: Renewable Energy Certificate multipliers introduced to the United Kingdom's Renewables Obligation (RPS) mechanism in April 2009

Renewable energy technology type	*Certificate multiplier*
Landfill gas	0.25
Sewerage, biomass co-firing	0.5
Onshore wind, hydro, energy crop cofiring, gasification, biomass cofiring with combined-heat-and-power	1.0
Offshore wind*, biomass, energy crops cofiring with combined-heat-and-power	1.5
Wave, tidal, solar PV, geothermal, advanced gasification, microgeneration	2.0

* offshore wind multiplier to be 2.0 in 2009-10 then 1.75 in 2010-11.

Source: Enviros 2009

7. RET's exemption of emission intensive customers should be abandoned

In April 2009 the Council of Australian Governments decided there would be a partial exemption to the additional 35,500GWh/yr by 2020 target component of RET that will apply once it commences. Emissions-intensive, trade-exposed companies that qualify for 90% free permits under the proposed Carbon Pollution Reduction Scheme emissions trading system will get a 90% exemption from the increased target and companies that qualify for 60% free permits will qualify for a 60% exemption. In May 2009 the federal government announced the free permit allocations under the Carbon Pollution Reduction Scheme will increase to 95% and 66% so, presumably, the partial exemptions under the RET will correspondingly increase. *These partial Carbon Pollution Reduction Scheme linked exemptions to the RET should be abandoned.* The exemptions increase the RET compliance burden on other electricity consumers, they give an unjust benefit to companies that may be emissions intensive but not electricity intensive, they create little incentive for the exempted companies to become more efficient users of electricity and are out of step with overseas practice. As shown in Table 8, only seven of the 28 listed jurisdictions grant any sort of customer exemption under their RPS mechanisms and only four grant exemptions to electricity intensive customers.

Table 8: the use of customer exemptions in the United States and western European jurisdictions that use compulsory Renewable Portfolio Standard mechanisms

Jurisdiction	*Customer exemption*
US compulsory RPS states	
Arizona	None
California	None
Colorado	None
Connecticut	None
Delaware	Some: if peak load>1,500kW
Hawaii	None
Illinois	Some: ineligible retail customers
Maine	Some: for pre 2001 contracts
Maryland	Some: if annual sales> 300TWh
Massachusetts	None
Minnesota	None
Montana	None
Nevada	None
New Hampshire	Some: for pre 2007 contracts
New Jersey	None
New Mexico	None
New York	Some
North Carolina	None
Oregon	None
Pennsylvania	None
Rhode Island	None
Texas	Some: large industrial customers
Washington	None
Washington DC	None
EU compulsory RPS countries	
Belgium	None
Italy	None
Sweden	Some: electricity intensive companies
United Kingdom	None

Sources: Union of Concerned Scientists, 2009 and Coenraads et al 2008.

8. RET RECs banking should be restricted

A major design feature of both MRET and RET is their allowance of unlimited banking of RECs. Banking means electricity retailers can buy RECs then retain them for surrender at a later date. As shown in Table 9, by May 2009 32% more valid RECs had been created under MRET than were needed to meet the mechanism's liability up until that time. Even though this proportion was well down on the one at the end of 2003 it was still high and may mean Australia's renewable energy electricity generating capacity never reaches a level capable of generating 20% of its electricity. This is because the 45 million RECs that will need to be surrendered each year by 2020 could be made up of a significant number created well before that year. Indeed, the Council of Australian Governments anticipated this in its 2008 RET design options discussion paper (p. 8).

Table 9: MRET RECs creation and compliance surrender, 2003 to 2009

Period	*Valid cumulative RECs created by period end: 1,000s (A)*	*RECs required to be surrendered to meet cumulative compulsory and voluntary MRET obligation by period end: 1,000s (B)*	*Ratio of A to B*
2003	6,717	3,238	207%
2004	10,010	5,761	174%
2005	14,621	9,026	162%
2006	20,054	13,340	150%
23rd May 2009	40,243	30,279	132%

Sources: Office of the Renewable Energy Regulator, 2004 to 2008 and 2009a.

The ability to bank an unlimited quantity of RECs was justified in the 2008 Council of Australian Governments RET design options discussion paper on the grounds it created a 'strong early-mover incentive for investors' and 'will help reduce the overall cost of the scheme' (p. 8). However, the early mover incentive is only created at the potential cost of creating a disincentive for late movers. This is because unlimited banking may give early movers the ability to create a large number of RECs before there is significant competition from rival newer generators: this could allow their RECs to undercut those of the more recently established generators if the RECs price rises over time. The ability of banking to reduce the overall cost of the mechanism depends on early RECs prices compared to later RECs prices: it cannot be assumed the former is necessarily lower than the latter. The risk that RECs banking can create a disincentive for later renewable energy electricity investors has been a major reason behind many overseas countries limiting the ability to bank RPS tradable certificates. In Table 10, of the 27 jurisdictions listed only two allow banking for an unlimited period of time. Most allow some amount of banking, which can be important in terms of compliance flexibility, but most restrict it to five years or less. Only four jurisdictions in Table 10 allow banking for longer than five years (in addition to the two that allow unlimited banking). *There is therefore a strong case for RET restricting the ability to bank RECs to four years or less.*

Table 10: the treatment of tradable certificate banking in the United States and western European jurisdictions that use compulsory Renewable Portfolio Standard mechanisms

Jurisdiction	*Tradable certificate banking policy*
US compulsory RPS states	
Arizona	Unlimited
California	Unlimited
Colorado	Maximum of 5 years
Connecticut	Maximum of 15months
Delaware	Maximum of 3 years
Illinois	Electricity authority discretion
Maine	Maximum of 1 year
Maryland	Maximum of 3 years
Massachusetts	Maximum of 2 years
Minnesota	Maximum of 4 years
Montana	Maximum of 2 years
Nevada	Maximum of 4yrs
New Hampshire	Maximum of 3 years
New Jersey	Maximum of 15 years
New Mexico	Maximum of 4 years
New York	None
North Carolina	Maximum of 10 years
Oregon	Maximum of 2 years
Pennsylvania	Maximum of 2 years
Rhode Island	30% can be maximum of 2 years
Texas	Maximum of 3 years
Washington	Maximum of 3 years
Washington DC	Maximum of 3 years
EU compulsory RPS countries	
Belgium	Maximum of 10 years
Italy	Maximum of 15 years
Sweden	Maximum of 15months
United Kingdom	25% can be maximum of one year

Sources: Union of Concerned Scientists, 2009 and Coenraads et al 2008.

9. Pre MRET generators should lose RECs if they generate below their baselines

A design feature of both MRET and RET is their inclusion of some of the output from renewable energy electricity generators that existed before MRET commenced, particularly hydro ones. By 19 May 2009 hydro generation, mostly from pre MRET generators, had been responsible for 20% of all the valid RECs that had been created (Office of the Renewable Energy Regulator 2009a). The inclusion of pre MRET generators in MRET was justified on the grounds it gave them an incentive to increase their output and to therefore add to the mechanism's effort. Output from pre MRET generators can only create valid RECs if it exceeds baselines reflective of their average medium term generation levels before the mechanism began. However if their output is below the baselines in any year they do not lose RECs. This gives them an inequitable advantage and it crowds out output from post MRET renewable energy electricity generators. *If pre MRET generators are allowed to create RECs when their generation is above their baselines they should lose them when it is below the baselines.*

In Table 11, of the 28 jurisdictions listed nine allow no output from generators that existed before the RPS mechanisms began to generate tradable certificates. Only seven allow all pre mechanism generation to create tradable certificates and the other

12 allow some amount. Requiring pre MRET generators to surrender RECs if they generate below their baselines would significantly increase the investment incentive for new generators.

Table 11: the treatment of pre RPS generation in US and western European jurisdictions that use compulsory Renewable Portfolio Standard mechanisms

Jurisdiction	*Eligibility of pre RPS generation*
US compulsory RPS states	
Arizona	None: incremental generation only
California	Some: small and geothermal only
Colorado	All
Connecticut	Some
Delaware	Some: only 1%
Hawaii	All
Illinois	All
Maine	Some
Maryland	Some
Massachusetts	Some
Minnesota	All
Montana	None
Nevada	All
New Hampshire	None: incremental generation only
New Jersey	All
New Mexico	Some: not old hydro
New York	Some
North Carolina	Some: only small hydro
Oregon	None: incremental generation only
Pennsylvania	None
Rhode Island	None: incremental generation only
Texas	None
Washington	None
Washington DC	Some
EU compulsory RPS countries	
Belgium	Some: in Flanders
Italy	Some: only post 1999 generators
Sweden	All until 2012
United Kingdom	None

Sources: Union of Concerned Scientists, 2009 and Coenraads et al 2008.

10. The RET shortfall charge should be increased or indexed to inflation

Under MRET the shortfall charge for electricity retailers that do not purchase all the RECs or renewable energy electricity required to discharge their annual liability under the mechanism was $40/MWh: it was not indexed for inflation over time. It was also not tax-deductible. Under RET the shortfall charge will be $65/MWh again not indexed for inflation nor tax-deductible. To date the shortfall charge has rarely been levied because MRET has had a high level of compliance. In 2007 99.45% of the RECs required to be surrendered by electricity retailers had been so (Office of Renewable Energy Regulator 2009b: 24). However as RET's target increases this level of compliance may not continue and there is a risk the shortfall charge will become an alternative compliance mechanism and will therefore effectively become a cap on RECs prices.

Some argue it is important to have a low shortfall charge to give renewable energy electricity generators an incentive to seek cost improvements, others argue that if the charge becomes an alternative compliance mechanism it defeats the purpose of having a renewable energy mechanism like MRET or RET. To avoid the shortfall charge becoming an alternative compliance mechanism it should be set at a level well above maximum expected RECs prices. A 2009 report prepared for the Department of Climate Change by Mc Lennan Magasanik Associates on the benefits and costs of the expanded RET predicted RECs prices would be between $60 and $70 between 2009 and 2012 (Mc Lennan Magasanik Associates 2009: 38). *This means that even after factoring in the fact the shortfall charge is not tax deductible it is clear the RET's shortfall charge has not been set a level well above expected maximum RECs prices early in the RET's life and there is therefore a strong case for increasing the shortfall charge or at least indexing it to inflation.*

As shown in Table 12, in the listed jurisdictions there is a wide variety of shortfall charges: eight have high shortfall charges, ten leave the charge to the discretion of the relevant electricity management authority, three have a charge equal to the tradable certificate price, three have no specific charge and four have low charges. Shortfall charges can make up a large proportion of the compliance within an RPS even when they are high. In Massachusetts, for instance, between 2004 and 2006 'alternative compliance payments' accounted for between 26% and 36% of the discharge of its RPS obligation (Division of Energy Resources 2008: 8). Australia cannot risk allowing its shortfall charge to reach these levels: the only way to ensure it does not is to levy a higher shortfall charge than $65/MWh or at least index it to inflation.

Table 12: the shortfall charges in United States and western Europe jurisdictions that use compulsory Renewable Portfolio Standard mechanisms

Jurisdiction	*Shortfall charge*
US compulsory RPS states	
Arizona	Payment of tradable certificate value
California	US5c/kWh
Colorado	Payment of tradable certificate value
Connecticut	US5.5c/kWh
Delaware	US$25/MWh
Hawaii	Electricity authority discretion
Illinois	Electricity authority discretion
Maine	US$57.12/MWh
Maryland	Unspecified
Massachusetts	US$50/MWh
Minnesota	Payment of tradable certificate value
Montana	US$10/MWh not recoverable
Nevada	Electricity authority discretion
New Hampshire	Between US$28.72 and US$153.84/MWh
New Jersey	Electricity authority discretion
New Mexico	Electricity authority discretion
New York	Not applicable
North Carolina	Electricity authority discretion
Oregon	Electricity authority discretion
Pennsylvania	Electricity authority discretion
Rhode Island	Electricity authority discretion
Texas	US$50/MWh
Washington	US$50/MWh
Washington DC	Alternative compliance mechanism
EU compulsory RPS countries	
Belgium	€75 to €125/MWh
Italy	Electricity authority discretion
Sweden	150% of average RECs value
United Kingdom	UK£30/MWh + inflation

Sources: Union of Concerned Scientists, 2009 and Coenraads et al 2008.

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