



Target 300

How Kevin Rudd managed to turn solar photo voltaics (PV) into Australia's most greenhouse gas intensive form of energy production.

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Abstract

Most people who go to the expense of installing a solar PV system on their home are doing it because they either have no access to the grid or because they want to do something for the environment by using 100% renewable electricity and reduce the amount of greenhouse gas they produce, or both.

However many people who purchase solar PV systems also obtain a subsidy through selling the renewable electricity they produce as renewable energy certificates (RECs). Selling the RECs transfers any environmental benefit away from the original owner of the solar PV system to the new owner of the RECs.

Under the Rudd Labor's *Solar Credits Scheme*, owners of solar PV systems can sell five times the amount of renewable electricity that they create, producing 5 RECs for every 1 megawatt of actual solar electricity. When an owner of a new PV system sells all 5 RECs, they take on the emissions from dirty energy these RECs are brought to replace and create one of the world's most greenhouse gas intense forms of energy production.

This issue is not well promoted by either the Government or the solar industry and an alternative mechanism should be develop to support solar PV installation and small scale renewables.



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Background

In June 2009, the Rudd Labor Government sent shock waves through the Australia solar industry when it cancelled all Government subsidies for the installation of small scale grid connected solar PV systems without notice.

The sudden cancellation of the *Solar Homes and Communities Plan* was made three weeks before the scheme was scheduled to finish. Solar energy providers had just hours to complete complex paper work to make sure people wishing to apply for the scheme were included. Thousands of applicants missed out.

Two weeks later the *Renewable Remote Power Generation Program*, designed to provide 50% funding for rural and remote energy systems, was also cancelled without notice. Western Australia, which at the time was the only state with a Liberal Government, was excluded from the shutting down of the scheme.

In August 2009 Labor replaced these schemes with the *Solar Credit Scheme*, primarily to shift the burden of funding from general tax revenue to electricity users. The Solar Credits Scheme utilises the national Renewable Energy Target (RET), and its Renewable Energy Certificates (RECs) to create a funding mechanism.

Why PV can be the most greenhouse gas intensive source of electricity in Australia

Renewable Energy Certificates (RECs)

A REC records the production of renewable electricity and is equivalent to 1 megawatt hour of electricity. RECs are created under Renewable Energy (Electricity) Act 2000, originally as part of the Mandatory Renewable Energy Target (MRET) to provide a mechanism to manage the sale and acquisition of renewable electricity. The MRET has now been replaced a more ambitious Renewable Energy Target (RET). The REC system is managed through the Office of the Renewable Energy Regulator (ORER).

Under these schemes electricity wholesalers must purchase an amount of renewable electricity, to meet an annual renewable electricity requirement, calculated as a relative proportion of their market share and the national target, which under RET is 20% new renewables by 2020.

As RECs are a government accredited measure of a megawatt of electricity generated by renewable source, they have been used for other purposes outside of the RET. For example on the ORER website they state some people purchase RECs in order to:

- encourage additional generation of electricity from renewable sources; or
- demonstrate their use of additional renewable electricity from a particular renewable energy fuel source accredited under the mandatory renewable energy target. (ORER 2009)



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Many people buy RECs through the Greenpower scheme in order to ensure they are using 100% renewable and emissions free electricity, others buy RECs directly or through an offset provider.

Diagram 1. Purchase of RECs from a solar PV system.



Owner of solar PV system has access to renewable electricity but no finance.

Potential renewable electricity buyer has money but is using the standard power supplied by the local grid.

Owner of solar PV system has lost access to renewable electricity and but gained access to the value of the RECs.

Renewable energy buyer now has access to clean power through purchase of RECs.

Solar Credit Scheme and RECs

Under the Solar Credits Scheme the Federal Government has determined that solar PV systems, up to 1.5 kW, are eligible to claim five RECs for every one megawatt of renewable electricity produced, creating four "phantom" RECs for each real REC created (ORER 2010). The Federal Government has done this to increase the funding available through the RECs and thus to make the scheme attractive to potential solar PV system buyers.

Owners of solar PV systems that have sold all available RECs have accepted responsibility for the emissions from 1 megawatt of dirty electricity for each of the RECs sold (see Diagram 2.). The exact amount of CO₂-e emission the owner has taken on will depend on the grid the RECs were sold into (see Table 1).

The owner can cancel out the emissions of 20% of these RECs by ensuring all of the energy produced by their solar PV system is put into the grid. The emissions for the other 80% of the RECs cannot be cancelled by energy supplied by the solar PV system and are taken on by the owner of the solar PV system.

For example, an owner of a Melbourne 1 kW solar PV system can produce 17 megawatt hours of electricity or 17 RECs over 15 years, the Solar Credit Scheme multiplies the number of RECs by 5, creating 85 RECs. These RECs are then sold in Victoria and the owner of the PV system accepts emissions from 85 megawatts of dirty power, which correlates to 103.7 tonnes of CO₂-e or 6.1 kg CO₂-e/kWh of electricity produced by his solar PV system. This could be reduced by 20.74 tonnes of CO₂-e, if all 17 mega-watts of renewable energy produced by his solar PV system were fed into the grid over the next 15 years.





Diagram 2. Effect of Solar Credits Scheme multiplier on sale of RECs from a solar PV system.



The owner of a solar PV system has access to renewable electricity but no finance. Potential renewable electricity buyers have money but are using the standard power supplied by the local grid.

The owner of a solar PV system has lost access to the renewable electricity and accepted the emission profile for the dirty power the RECs have replaced, but gained access to the dollar value of the RECs.

Renewable electricity buyers now have theoretical access to clean power though only one of the five actually has purchased real renewable electricity, the others purchasing "phantom" RECs representing non-existent renewable electricity.

Table1. Solar PV and comparative emission intensities.

State, Territory or grid description	Standard Emission factor kg CO ₂ -e/kWh*	Emission Factor for 5 RECs kg CO ₂ -e/kWh
Victoria	1.22	6.1
New South Wales	0.89	4.45
Queensland	0.89	4.45
South Australia	0.77	3.85
South West Interconnected System in Western Australia	0.84	4.2
Tasmania	0.23	1.15
Northern Territory	0.68	3.4

* National Greenhouse Accounts Factors 2009

RECs are calculated for either 1, 5 or 15 year periods, however most solar PV systems are sold with of the maximum number of available RECs, calculated over 15 years, already sold and incorporated into a discounted price. An owner of a solar PV system who has sold the maximum RECs will have to wait 15 years before their solar PV system can produce clean energy again for their own use.





The Solar Credits Scheme's REC multiplier effects can be accessed till 2015, with the multiplier reducing over time.

Table2. Solar PV and comparative emission intensities.

Time Period	RECS
9 June 2009 – June 2012	x5
1 July 2012 – 30 June 2013	x4
1 July 2013 – 30 June 2014	x3
1 July 2014 – 30 June 2015	x2
1 July 2015 onwards	x1

RECs and other small scale renewables

RECs can also be sold from other renewable energy sources, such as solar hot water units, small scale wind and hydro electricity systems. Small scale wind and hydro are also eligible for the Solar Credits Scheme and its REC multipliers.

RECs generated from solar hot water units also create non-existent "phantom" RECs as there is no production of electricity in a solar hot water unit only the capture of thermal energy which is then used to heat water. This thermal heat is converted to units of electricity by comparing electricity saved when using a solar hot water system to the energy used by a standard electrical hot water system. The electricity calculated to be saved is given life as non-existent renewable electricity in the form of "phantom" RECs.

Diagram 3. Solar Hot Water systems and "phantom" RECs.

pre sale of RECs



The owner of the solar hot water system has access to clean power but no finance.

Potential renewable electricity buyer has money but is using the standard power supplied by the local grid.

post sale of RECs



The owner of the solar hot water system has lost access to clean power and but gained access to the value of the RECs.

Renewable energy buyer now has theoretical access to clean power though have really purchased "phantom" RECs representing non-existent renewable electricity.





Comparison of Solar Homes and Communities Plan and the Solar Credit System

The diagram below highlights the differences between the former Federal Government Solar Homes and Communities Plan and the current Solar Credits Scheme for a 1kW solar PV system. The Solar Homes and Communities Plan provided a grant of up to \$8000 and still enabled the owner of the solar PV system to have full access to the clean power. The solar credit scheme provides only \$2465 (Jan 2010), and burdens the solar PV owner with high levels of emissions.

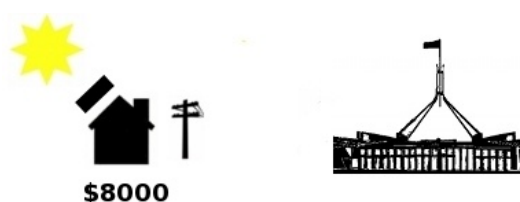
Diagram 4. Comparison of Solar Homes and Communities Plan and Solar Credits Scheme for a 1kW system

Solar Homes and Communities Plan

pre incentive



post incentive



People wanting a solar system apply for an \$8 per watt grant, to a maximum of \$8,000. Originally not means tested, this changed under Rudd's Labor, shortly before the rebate ended.

The owner of solar PV system still access to clean electricity and has \$8,000 from a federal government grant.

Solar Credits Scheme

pre incentive



post incentive



The owner of solar PV system sells their RECs* to an electricity wholesaler or user.

The RECs purchasers have brought 4 phantom RECs for each real REC produced.

*A 1kW system in Melbourne generates 17 RECs over 15 year. This is multiplied by 5 with the Solar Credits Scheme and sold at \$29 each, the January 2010 price for a REC.

By selling their RECs the owner of the solar PV system has responsibility for the emissions their RECs displaced and has only \$2,465.





Solar Credits, CO2 Emissions and the Solar Industry

The issue of the Solar Credit Scheme and its effect on the emission profile of a solar PV system and owner is not well understood or promoted. The Government website of the Office of the Renewable Energy Regulator does not raise this issue, while a survey of ten solar PV companies shows only one company raising this issue. Solar PV companies have little incentive to encourage awareness of the negative aspects of selling RECs as this would potentially discourage customers.

Table 3. Solar PV companies and REC information.

Company	RECs / Solar Credits discussed in relation to solar PV sales	Clean electricity transfer discussed	Phantom credits discussed	Comment
energy matters	yes	yes	yes	Both issues discussed very briefly.
Clear Solar	yes	yes	no	Mainly focuses on financial benefits.
Todaee	no	yes	no	Sells RECs offsetting packages including a Solar RECs package
Origin Energy	yes	no	no	Compares the old subsidy and the new Solar Credits Scheme from a point of view of dollars only.
Environment Shop	implied	no	no	One sentence stating "Generous Government Rebates are now available"
Going Solar	yes	no	no	Short technical and financial definitions only. Refers off site to ORER for more information
Modern Solar	yes	no	no	Only promotes the financial benefit.
Adelaide Solar Systems	yes	no	no	Only promotes the financial benefit. Refers off site to ORER for more information
Solar Quotes	yes	no	no	Detailed look at financial benefits.
Rainbow Power Company	yes	no	no	Technical and financial definitions only. Refers off site to ORER for more information

Sourced from a review of the company internet sites in mid Jan 2010.





Conclusion

Replacing the Solar Homes and Communities Plan with the Solar Credits Scheme was a political decision to avoid directly funding of Solar PV and other small scale renewable systems.

As identified both within and outside of this report the impact of this decision has lead to:

- a reduction in the subsidies available for solar PV systems,
- a collapse in the price of RECs due to large numbers of small scale renewable installations,
- creation of phantom RECs representing non-existent renewable electricity,
- a reduction of large scale renewable installation due to the collapse of the REC price, and
- the creation of some of the most greenhouse gas intense sources of electricity production in the world.

Owners of renewable systems wishing to use clean electricity must refuse to sell the available RECs, however, most do not even realise that selling their RECs will also remove the benefits of clean electricity.

For people who do not own a small scale renewable generator but wish to avail themselves of renewable energy and want to ensure they are buying real renewable energy and not phantom credits, they must insist their Greenpower or RECs are not produced by small scale renewables such solar PV, wind, hydro or solar hot water and instead from large scale renewable power sources.

An alternative way of subsidising the provision of solar PV systems should be found that avoids issues of creating emission intense electricity generation and undermining the renewable energy target through the production of "phantom" RECs. Expanded feed in tariffs or 30 minute market pricing are two options that should be considered and will be looked at in a future report.

Prior to an alternative model being introduced a greater effort should be made to educate potential owners of solar PV systems and other small scale renewables about the negative impacts of sell renewable energy certificates or RECs, by both Government and the renewable industry.





References

National Greenhouse Accounts Factors 2009, Department of Climate Change, Commonwealth of Australia, Canberra.

Office of the Renewable Energy Regulator viewed 12 September 2009,
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