REC Agents Association (RAA)

response

to

Senate Select Committee on Electricity Prices

14 September 2012.

Submission to the Senate Select Committee on Electricity Prices

From RAA

Committee Secretary
Senate Select Committee on Electricity Prices
PO Box 6100
Parliament House
Canberra ACT 2600
Australia

The REC Agents Association (**RAA**) was established in late 2011 and is a national not-for-profit industry association representing agents registered with the Clean Energy Regulator (**CER**) that create Renewable Energy Certificates (**RECs**) and other environmental certificates.

The RAA welcomes the opportunity to participate in the Inquiry and make the following key points:

1. Network investment has been and will continue to be the biggest contributor to rising retail power prices over the coming years;
2. Renewable Energy Schemes, the Small scale Scheme (SRES) in particular has only resulted in a modest cost increase to consumers and is expected to reduce to less than 1% of residential electricity prices over the coming years;
3. Solar Energy and energy efficiency activities have made a material contribution to reducing power consumption in the National Electricity Market (NEM) over the last three years and have accounted for more than 50% of the reduction in consumption;
4. Wholesale electricity prices have fallen significantly over the last 10 years and in 2011 were the lowest they had been for 10 years. This in part has been due to lower electricity consumption due to the roll out of solar and energy efficiency systems;
5. There are a range of activities, products and applications that could effectively reduce peak demand and indeed would be cost effective, that are not implemented due to market failure and other barriers;
6. Policy approaches and reform measures should be focused on the requirement to reduce peak demand, and address market failure and impediments to cost effective demand reduction technologies;
7. We need to move beyond just thinking about providing customers with smart meters and having “time of use pricing” – this is not specifically addressing the key problem of a serious underinvestment in cost effective demand reduction activities. Smart meters and “time of use” pricing are only part of the solution;
8. The key impediment to effective demand reduction is that the electricity supply industry does not have the commercial driver and the end consumer typically does not have the interest or motivation; and
9. It is only when third party suppliers and service providers can access the price signal and monetise it through the re-packaging of solutions with a lower initial cost to the customer that we have seen successful rollout of technologies and activities. This approach works – we need to look no further than the reduction in electricity consumption caused by the rollout of solar and energy efficiency technologies. If this approach were applied to demand

reduction activities and we reduced peak demand by the same rate (5% by 2015)[1] then we could possibly save nearly 60% of the network investment need to meet load growth. This might amount to a saving of nearly $10 billion[2] of investment over a five year period.

We respond specifically to the questions raised in the terms of reference and we provide the following documents in support of our submission:

- Attachment 1 – Commercial Lighting Case Study
- Attachment 2 - RAA Fact Sheet 1 – Solar Systems creating RECs (15 August 2012)
- Attachment 3 - Impact of Market Based Measured on NEM power Consumption (June 2012)
- Attachment 4 - Discussion Paper on how Demand Reduction could be achieved through a market based Scheme

[1] Peak demand across the NEM is expected to be around 40,000 MW over the next few years a 5% reduction amounts to 2,000 MW which is 57% of the expected growth in Peak Demand.
[2] $40 billion of regulated network investment in Australia of which say 50% is to meet load growth and 85% in NEM states – gives around $17 billion.

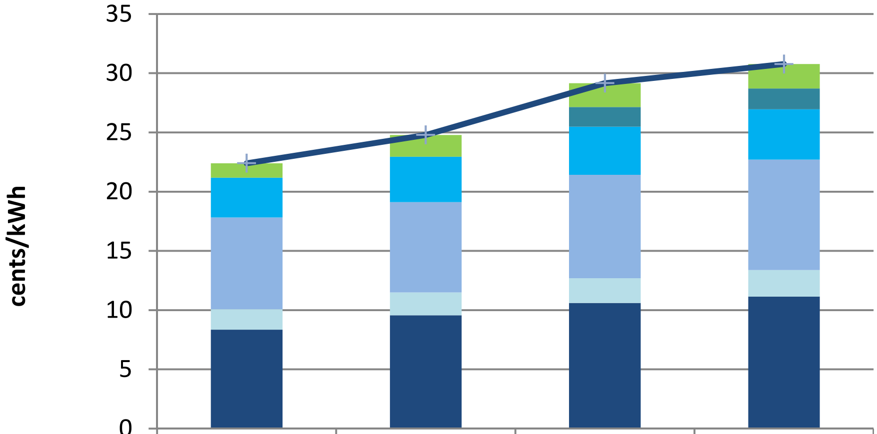
Responding to the Terms of Reference

1. **identification of the key causes of electricity price increases over recent years and those likely in the future;**

   Rising maximum demand and the need to refurbish aging network infrastructure means more than $40 billion of regulated distribution and transmission expenditure has been committed for the current five year regulatory period. This in turn has driven a dramatic increase in retail electricity prices as regulated transmission and distribution charges make up around 45% of the residential power price. The cost of so called ‘green schemes’ which includes the RET, energy efficiency schemes and feed-in tariffs accounts for only 5.4 % of the residential price.

   Residential electricity prices, according to the Australian Energy Market Commission (AEMC) are expected to increase by 37% over the three year period to 2013/14 (refer to Figure 1). The largest contributor to the increase is distribution charges which account for 34% of the increase, the carbon price accounting for 21% and green schemes accounting for only 10%.

Figure 1- Expected residential electricity prices (2010/12 to 2013/14), AEMC



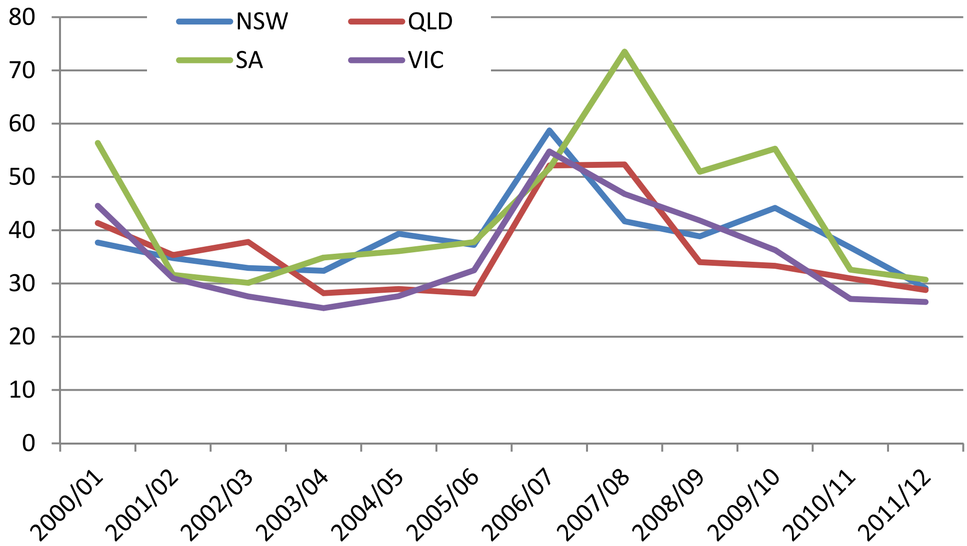
	2010/11	2011/12	2012/13	2013/14
Green Schemes	1.22	1.84	2.02	2.06
Carbon Price			1.65	1.76
Retail	3.36	3.83	4.06	4.24
Wholesale	7.74	7.63	8.74	9.33
Transmission	1.73	1.92	2.08	2.23
Distribution	8.35	9.57	10.61	11.15
Total	22.4	24.79	29.16	30.77

One of the consequences of lower electricity consumption is that there is more competition between generators to be dispatched to supply the available load. Whilst electricity consumption has been falling, new generation has also continued to be commissioned. More than 1,100 MW of renewable projects have been committed over the last three years which will result in an additional 3,500 GWh of generation. There has also been new gas-fired generation projects that have been commissioned, particularly in NSW and Queensland.

Lower demand (most of which was due to the roll-out of solar and energy efficiency activities), combined with additional generation (including new wind projects), has resulted in considerably lower wholesale power prices. The average Regional Reference Price (RRP) for all states, as published by AEMO, has dropped considerably over the last five years to levels not seen for around 10 years. Figure 2 incorporates the average RRP for New South Wales, Victoria, Queensland and South Australia. In real terms prices in 2011/12 are between 52% to 60% of the level over the 2000-2002 period.

The AEMC have assumed that wholesale prices (before the impact of the carbon price) will rise over the next few years due to rising gas prices, higher capital costs and a tighter supply/demand balance. It appears that their estimates have been based on AEMO's earlier projections based on increasing power consumption. Whilst peak demand might increase, lower power consumption due to solar energy and energy efficiency and new large scale renewables coming on line will mean that there will be a surplus of generation capacity which should have a dampening impact on wholesale prices.

Figure 2 - Average Regional Reference price (AEMO)



Power consumption across the eastern states National Electricity Market (NEM) has reduced over the last three years, falling 6,565 GWh (3.2%) from 207,400 GWh in 2008 to 200,800 GWh in 2011[3]. This seems to have caught policy makers and some industry participants by surprise as the accepted wisdom seemed to be that power consumption would keep increasing in Australia with continued population growth and with continued economic growth.

Commonwealth and state market based schemes that have supported distributed energy technologies have under-pinned the large scale rollout of solar energy and energy efficiency technologies such that these can explain a significant part of the reduction in power consumption. Solar energy installations supported by the Commonwealth Renewable Energy Target (RET) and energy efficiency activities supported by the Victorian and NSW Energy Efficiency schemes are estimated to account for 3,500 GWh or 53% of the reduction in power consumption since 2008. These activities currently account for around 1.7% of total power consumption and this is expected to increase to around 5% by 2015 (refer to Table 1).

[3] Refer to Attachment 3 – Impact of Market Based Measures on NEM Power Consumption (June 2012)

Table 1 - Contribution of Solar and Energy Efficiency Schemes

Electricity avoided (GWh per annum)	2011	2015
SWH - RET	1,181	1,839
PV - RET	1,180	3,460
Victorian – Energy Efficiency Scheme	667	3,393
NSW - Energy Efficiency Scheme	427	1,972
Total	**3,455**	**10,664**

In a paper prepared for the RAA (not yet completed at the time of this submission and which will provided separately) the average cost of meeting the SRES scheme has been around $30 per STC, which is significantly less than the $40 Clearing House price. The cost to consumers is expected to peak in 2012 at 2.7% of retail prices then is expected to reduce significantly over the next three years as the solar credits multiplier gets wound back, with the cost falling to less than 1% of retail electricity prices.

All electricity consumers have benefited to date (and will continue to benefit into the future) from lower wholesale electricity prices (the energy component) as the level of electricity consumption has reduced due the roll out of small-scale solar systems. In the three years to the end of 2011 solar systems supported by the RET have been responsible for 2,400 GWh of reduced consumption in the National Electricity Market (NEM). This is equivalent to a 1.2% reduction. The contribution from solar is expected to more than double over the next three years to more than 3% of total electricity consumption.

2. legislative and regulatory arrangements and drivers in relation to network transmission and distribution investment decision making and the consequent impacts on electricity bills, and on the long term interests of consumers;

The RAA has nothing specific to add to this question

3. options to reduce peak demand and improve the productivity of the national electricity system;

There is well documented market failure with regard to energy efficiency and distributed energy options more broadly which leads to an under-investment in these activities. Energy efficiency schemes such as those introduced in Victoria and NSW go some way to address these barriers and we have seen a significant increase in the number of activities that have taken place. Table 2 and 3 summarise the activities that have been supported under these schemes.

Adopting similar approaches to peak demand reduction would be a way to harness cost effective demand reduction activities. We have included as Attachment 4 a Discussion Paper that was prepared earlier this year as a result of a session at the Alliance to Save Energy Conference in March 2012.

This paper identifies the type of activities that could get incentivised and outlines that the best way to achieve this is to ensure that the value of reducing peak demand needs to be accessible to third party suppliers and service providers.

The RAA believes that there are three critical components that need to be incorporated in a policy response and we illustrate this by way of a case study (included as Attachment 1):

(i) **Set a target for demand reduction** – this could be set at a distribution business specific level and might be expressed in terms of 50% or more of the expected growth in peak demand needs to be met through demand reduction activities. At a NEM level this would mean that demand reduction of at least 1,825 MW (50% of 3,650 MW).

(ii) **Set a value for Demand Reduction** – the value of reducing peak demand needs to be determined and then this value needs to be accessible by a range of players – not just the electricity distribution business or the end consumer. Third part suppliers and service providers need to be able to monetise the benefit in providing solutions to consumers.

(iii) **Recovery of cost of Demand Reduction** – Electricity distribution businesses to be able to include the cost of efficient demand reduction activities in their cost base and be able to recover this from customers as they would with network investment. Demand reduction activities should not be treated any differently, in principal, to network augmentation.

4. investigation of mechanisms that could assist households and business to reduce their energy costs, including:

a. **the identification of practical low cost energy efficiency opportunities to assist low income earners reduce their electricity costs,**
b. **the opportunities for improved customer advocacy and representation arrangements bringing together current diffuse consumer representation around the country,**
c. **the opportunities and possible mechanisms for the wider adoption of technologies to provide consumers with greater information to assist in managing their energy use,**
d. **the adequacy of current consumer information, choice, and protection measures, including the benefits to consumers and industry of uniform adoption of the National Energy Customer Framework,**
e. **the arrangements to support and assist low income and vulnerable consumers with electricity pricing, in particular relating to the role and extent of dividend redistribution from electricity infrastructure,**
f. **the arrangements for network businesses to assist their customers to save energy and reduce peak demand as a more cost effective alternative to network infrastructure spending, and**
g. **the improved reporting by electricity businesses of their performance in assisting customers to save energy and reduce bills; and**

There is a broad range of well proven and accepted energy efficiency technologies that have been supported by either the Victorian or NSW energy efficiency schemes. A number of these activities will already have contributed to reducing peak demand (this has only been incidental as it not the key reason for the scheme). The activities that have created certificates under these schemes is included in Table 2 and 3 below.

Table 2 - Certificates created in NSW ESS Scheme (as at 28 Aug 2012)

Activity/Project	Certificates	Share
Commercial Lighting (CLF)	1,041,424	38.4%
Efficienct Showerheads	728,057	26.8%
Process Change/Control Systems	516,437	19.0%
Lighting Project Impact (PIAM)	135,691	5.0%
Compressed Air	66,156	2.4%
HVAC/Chiller	59,451	2.2%
Building Upgrade	55,989	2.1%
Multiple activities	50,935	1.9%
Fans/Pumps	26,651	1.0%
Refrigeration	11,302	0.4%
Refrigerator & freezer removal	10,341	0.4%
Multiple activities	7,717	0.3%
Lighting (DSF)	3,870	0.1%
Whitegoods	1,044	0.0%
Power Factor Correction	228	0.0%
Grand Total	**2,715,293**	**100.0%**

Table 3 - Certificates created in Victorian ESI Scheme (as at 31 Aug 2012)

Activity/Project	Certificates	Share
Standby Power Controller	5,208,886	38.8%
Lighting (revoked from 1 Jan 2011)	5,105,717	38.1%
Solar Hot Water	1,215,318	9.1%
Lighting - GLS	659,406	4.9%
Low Flow Shower Rose	375,988	2.8%
Gas Hot Water	367,004	2.7%
Space Heating	322,318	2.4%
Destruction of Pre-1996 Refrigerator or Freezer	86,224	0.6%
Weather Sealing	14,931	0.1%
High Efficiency Television	1,350	0.0%
Commercial Lighting	887	0.0%
Other	58,014	0.4%
	13,416,043	**100.0%**

5. **investigation of opportunities and barriers to the wider deployment of new and innovative technologies, including:**
   a. **direct load control and pricing incentives,**
   b. **storage technology,**
   c. **energy efficiency, and**
   d. **distributed clean and renewable energy generation.**

The barriers to the uptake of energy efficiency and distributed energy solutions are well documented and we also cover some of these with reference to our case study (Attachment 1). The RAA refers the Inquiry to the National Energy Savings Initiative (NESI) which has documented these barriers quite effectively.

6. any related matter.

Attachment 1

Commercial Lighting Case Study

This case study would apply nearly anywhere in Australia (metropolitan and regional areas)

If we consider a commercial lighting application in say a typical small retail store (or office) that might currently have 150 standard and not very efficient “T8” lighting tubes. These could be replaced with more efficient “T5” tubes at an installed cost of around $4,500 and would save around 11 MWh per annum and reduce peak demand by around 2.25 kW. The customer might be paying around 16 to 22 cents per kWh and so would save between $1,760 and $2,420 per annum. This is equivalent to a simple payback on the investment of between 1.9 to 2.6 years.

As a peak demand reduction initiative the total cost amounts to $2,000 per kW

The regulated electricity transmission and distribution investments that have been committed over the current 5 year regulatory period amount to more than $40 billion. Of this amount perhaps half may be attributed to growing demand and if we assume that 85% relates to the NEM, then $17 billion is being spent to cover growth in peak demand in the NEM. If we consider the expected growth in Peak Demand across the NEM over the next 5 years – it amounts to a total of around 3,650 MW[4] – this is equivalent to $4.7 million per MW or $4,700 per kW.

This amounts to more than 2 times the cost of changing – for free – inefficient light globes for efficient ones. This would not only reduce peak demand (typical “T8” users such as offices and shops are open during the times of system peak – 3.00 pm to 5.00pm in NSW), but also reduce ongoing energy consumption and greenhouse gas emissions.

Very few lighting upgrades have been undertaken to date even though they are cost effective and a much better option than just building more poles and wires. A sub-optimal level of investment thus occurs in demand reduction activities due to:

- electricity supply industry makes money out of supplying electricity and its commercial driver is to increase sales (not reduce them)
- electricity is not normally a big enough cost for most end use customers (particularly building tenants), they typically do not have the time or resources to investigate energy efficiency,
- electricity consumers may not have the available upfront capital and also they may only have a short term lease and so they may not recover the higher up front cost (a subsequent tenant would get the benefit).

There is well documented market failure with regard to energy efficiency and distributed energy options more broadly which leads to an under-investment in these activities. Energy efficiency schemes such as those introduced in Victoria and NSW go some way to address these barriers and we have seen a significant increase (off a small base) in the number of commercial lighting upgrades that have taken place.

Adopting similar schemes to peak demand reduction would be a way to harness these cost effective demand reduction activities.

[4] AEMO 2012 Statement of Opportunities - 1400 MW in Qld, 1000 MW in NSW and VIC, 200 MW in SA and 50 MW in TAS.

Attachment 2

RAA Fact Sheet 1

Solar Systems creating RECs

(15 August 2012)

FACT SHEET No 1

Updated: 15 August 2012

Solar Systems creating RECs

Highlights:
- 1.5 million solar systems installed and creating Renewable Energy Certificates (RECs)
- 1,700 MW of installed PV capacity
- nearly 18% of Australian families have a solar system

Small-scale renewable energy is supported under the Renewable Energy Target (RET) Scheme and many Australian households have embraced renewable energy by purcahasing a solar power or solar hot water system.

The Clean Energy Regulator releases information on the number of systems that have created renewable energy certificates on a quarterly basis. This Fact Sheet will be updated as new information becomes available.

The following figures summarise the number of systems that have created certificates since the RET Scheme came into force on 1 April 2001. Note that not all systems installed will have created certificates so the figures below will understate the level of system installations to date.

Systems creating Certificates	(as at 30 June 2012)	
Small Generation Units		
Solar Panel (Deemed)	753,844 systems	1,671,489 kW
Wind (Deemed)	370 systems	1,326 kW
Hydro (Deemed)	13 systems	21 kW
	754,227 systems	**1,672,836 kW**
Solar Water Heater		
Solar Water Heater (SWH) - Solar	590,311 systems	
SWH - Air Sourced Heat Pump (ASHP)	153,531 systems	
	743,842 systems	

		Market Penetration Rate		
	Number of Dwellings	**Solar PV**	**Solar Water Heater**	**Total**
Number of Systems		753,844	743,842	1,497,686
Housing Type				
Separate or semi-detached (owner occupied)	5,235,300	14.4%	14.2%	28.6%
Separate or semi-detached dwellings	7,479,000	10.1%	9.9%	20.0%
Total Households	8,398,500	9.0%	8.9%	17.8%

Note: Dwelling data from ABS for 2009-10 (2012 Yearbook, 1301.0) and based on 70% of dwellings being owner occupied.

The REC Agents Association represents the interests of Registered Agents under the Renewable Energy Scheme. Please refer to our website: **www.recagents.asn.au**

Attachment 3

RAA Report:

Impact of Market Based Measures on NEM Power Consumption

(June 2012)

Impact of market based measures on NEM power consumption

June 2012

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Report for the REC Agents Association and The Energy Efficiency Certificate Creators group

REC Agents Association (RAA)

The RAA was established in late 2011 to represent and self-regulate the activities of businesses that are "Registered Agents" to create and trade in Renewable Energy Certificates and other environmental credits.
www.recagents.org.au

Energy Efficiency Certificate Creators group (EECC)

The EECC was established in 2009 as a forum to represent the interests of businesses that were registered as "Accredited Parties" under the Victorian Energy Efficiency Scheme.

Disclaimer

1. Summary

Power consumption across the eastern states National Electricity Market (NEM) has reduced over the last three years, falling 6,565 GWh (3.2%) from 207,400 GWh in 2008 to 200,800 GWh in 2011. This seems to have caught policy makers and some industry participants by surprise as the accepted wisdom seemed to be that power consumption would keep increasing in Australia with continued population growth and with continued economic growth.

Commonwealth and state market based schemes that have supported distributed energy technologies have under-pinned the large scale rollout of solar energy and energy efficiency technologies such that these can explain a significant part of the reduction in power consumption. Solar energy installations supported by the Commonwealth Renewable Energy Target (RET) and energy efficiency activities supported by the Victorian and NSW Energy Efficiency schemes are estimated to account for 3,500 GWh or 53% of the reduction in power consumption since 2008. These activities currently account for around 1.7% of total power consumption and this is expected to increase to around 5% by 2015.

Electricity avoided (GWh per annum)	2011	2015
SWH - RET	1,181	1,839
PV - RET	1,180	3,460
Victorian – Energy Efficiency Scheme	667	3,393
NSW - Energy Efficiency Scheme	427	1,972
Total	**3,455**	**10,664**

One of the consequences of the reduction in power consumption is that existing scheduled generators have greater competition for being dispatched and as a result the regional reference price across all states has fallen to the lowest levels seen for more than 10 years. The lower regional reference price will progressively flow through to lower wholesale prices so that all customers benefit from the roll-out of solar and energy efficiency activities under these schemes.

It is a different story however with peak demand as continued roll-out of cheap and inefficient air conditioners has driven higher summer maximum demand with peak demand across NEM states expected to increase at around 800 MW per annum (2.4% per annum).

Rising maximum demand and the need to refurbish aging network infrastructure means more than $40 billion of regulated distribution and transmission expenditure has been committed for the current five year regulatory period. This in turn has driven a dramatic increase in retail electricity prices as regulated transmission and distribution charges make up around 45% of the residential power price. The cost of so called 'green schemes' which includes the RET, energy efficiency schemes and feed-in tariffs accounts for only 5.4 % of the residential price.

Residential electricity prices, according to the Australian Energy Market Commission (AEMC) are expected to increase by 37% over the three year period to 2013/14. The largest contributor to the increase is distribution charges which account for 34% of the increase, the carbon price accounting for 21% and green schemes accounting for only 10%.

2. Introduction

Green Energy Markets (GEM) has been engaged by the REC Agents Association (RAA) and the Energy Efficiency Certificate Creators group (EECC) to assess the impact that market based measures have had on the reduction in power consumption in the National Electricity Market (NEM) over the last three years and to estimate their likely impact over the period to 2015.

In undertaking this assessment GEM has only considered power consumption in the NEM and therefore excluded Western Australia, the Northern Territory and off-grid power consumption.

The market based schemes and activities that we have considered are:

- Solar PV and solar hot water installations supported under the Commonwealth's Renewable Energy Target (RET)
- Energy efficiency activities supported under the Victorian Energy Efficiency Scheme
- Energy efficiency activities supported under the NSW Energy Efficiency Scheme

In this report we have expressly excluded consideration of energy efficiency and distributed generation activities supported by other programs such as:

- Non-scheduled renewable energy projects supported by the Commonwealth's Renewable Energy Target, these are estimated to have accounted for 1,500 to 2,000 GWh in 2011[1].
- Insulation installed under the Commonwealth's insulation program where more than 1 million homes were insulated with possible annual savings in electricity of around 250 to 300 GWh per annum from 2011.
- More efficient appliances installed as part of Minimum Energy Performance standards

Our approach has been to determine the level of activity that has been supported by the three schemes considered and then determine the level of electricity reduction that can be expected on an annual basis. We have only considered and assessed the activities that have claimed certificates under these schemes and as a result this is a conservative estimate of the contribution of the activities as not all solar energy or energy efficiency installations and activities will claim certificates.

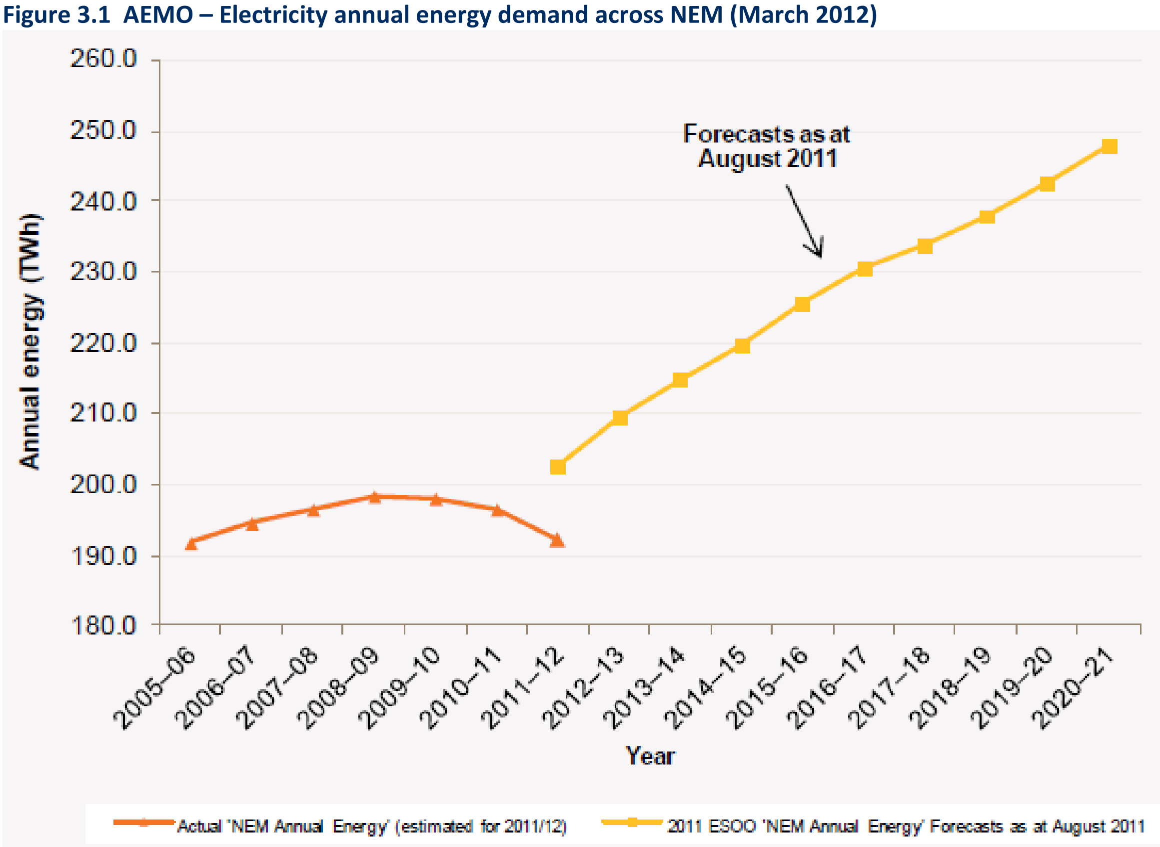
[1] Some of this non-scheduled renewable generation will be included in the Australian Energy Market Operator's power consumption figures.

3. Electricity consumption in the NEM

3.1 Review of AEMO power consumption data

Electricity consumption across the NEM, as measured by Australian Energy Market Operator (AEMO) has been falling for the last four years. AEMO recently published an update to its "Statement of Opportunities" in March 2012 which revised downwards by 5% the expected power consumption for 2011/12. An extract from the report is included as Figure 3.1.

Figure 3.1 AEMO – Electricity annual energy demand across NEM (March 2012)



Forecasts beyond 2011/12 have not been updated although AEMO has advised that it will be changing the way in which it undertakes its projections in future.

> *"AEMO has changed the way it develops and publishes demand forecasts for the electricity industry. AEMO is for the first time developing an independent set of electricity demand forecasts for each of the five NEM regions."*
> In the past – *"AEMO developed demand forecasts for South Australia and Victoria, whilst the regional transmission network service providers (TNSPs) developed demand forecasts for the remaining three regions in the National Electricity Market (NEM), namely Queensland, New South Wales (including the Australian Capital Territory), and Tasmania."*
>
> *AEMO, Economic Outlook Information Paper – National Electricity Forecasting (May 2012)*

Using AEMO data we have analysed electricity consumption across the NEM states on a calendar year basis over the last 10 years (refer to Figure 3.2 and 3.3). Electricity consumption across the NEM had been increasing at around 2% per annum until 2007 and then plateaued and from 2008 has been decreasing. Over the last three years electricity consumption has fallen by an average of 1.1% per annum, with some states such as Victoria reducing by an average of 1.5% per annum. Electricity consumption data by state is included as Attachment 1.

Figure 3.2 Power consumption in NEM states since 2001 (excluding Tasmania)

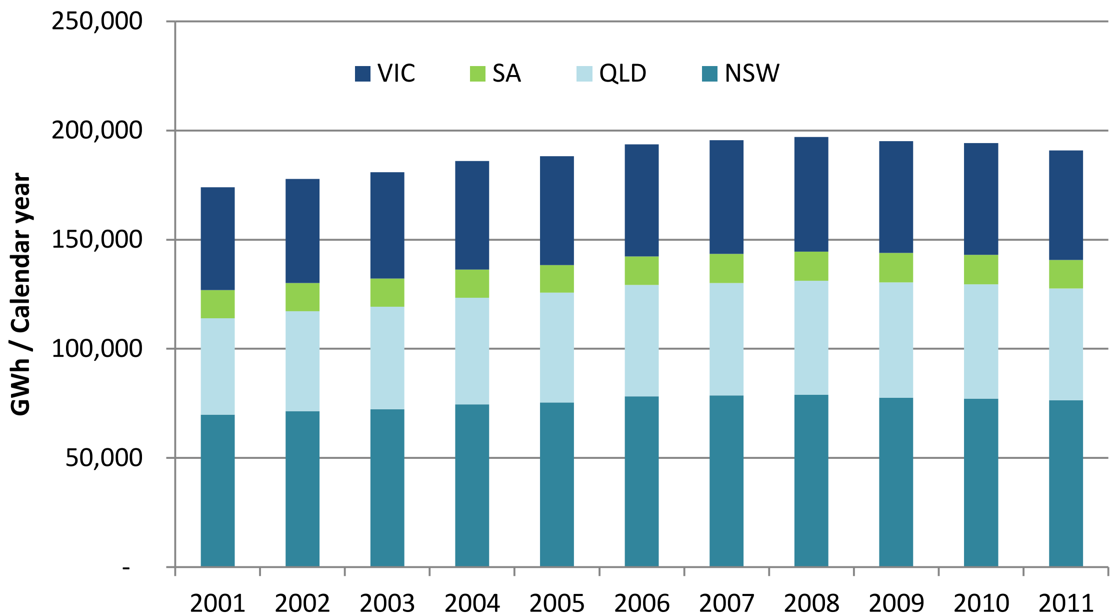
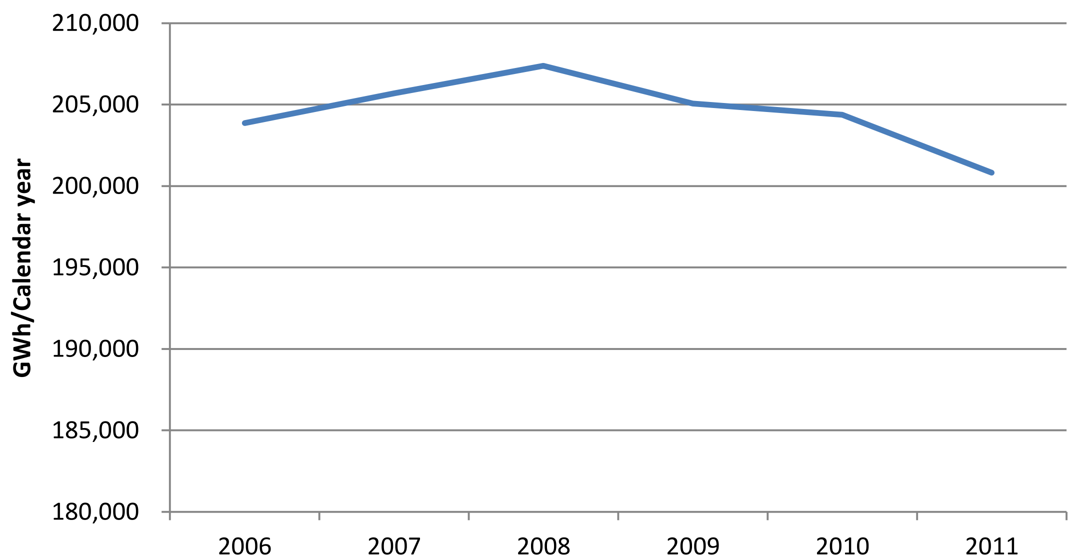


Figure 3.3 Power consumption in NEM states since 2006 (including Tasmania)



The electricity consumption and demand figures published by AEMO essentially represent the level of demand at the transmission system. As such it understates the level of power consumption as the demand figures also include the impact of smaller generation that is connected at the distribution system.

> ***Calculating energy and maximum demand***
> *The energy projections account for the sent-out energy from scheduled, semi-scheduled, and significant non-scheduled generation. Calculating the amount of energy supplied by generation controlled through the NEM dispatch process (scheduled and semi-scheduled generation) requires subtracting the energy supplied from significant non-scheduled generation.*
>
> *The MD [2]projections account for the as-generated demand supplied from scheduled, semi-scheduled, and significant non-scheduled and exempt generation. Calculating the MD supplied by generation controlled through the NEM dispatch process requires subtracting the MD met by significant non-scheduled generation.*
>
> *AEMO – 2011 Electricity Statement of Opportunities, August 2101*

Electricity consumption in 2011 is 6,565 GWh lower than the level three years earlier. There will be a number of reasons to explain this that could include:

- milder weather;
- reduction in industrial energy consumption due to lower manufacturing output[3];
- customer response to higher prices by reducing consumption;
- dramatic increase in the level of solar PV;
- impact of a range government programs outlined in Section 2.

Over this period we have however, seen increased population, increases in real GDP and an increase in the number of dwellings.

3.2 Rises in peak demand

In contrast to falling power consumption, the continued roll-out of cheap and in-efficient air conditioners has meant that peak summer demand continues to increase (refer to Figure 3.4). Peak summer demand has increased by around 600 MW per annum to 2011 and AEMO expect it to increase at around 800 MW per annum over the next 10 years.

As an example of the significant impact that air-conditioners have, it is estimated that the installation of a 2 kilowatt (electrical input) reverse-cycle air conditioner costs a consumer around (on average) $1500 yet imposes costs on the energy system as a whole of up to $7000 when adding to peak demand[4]. The $7000 system-wide cost must then be spread across all other customers."

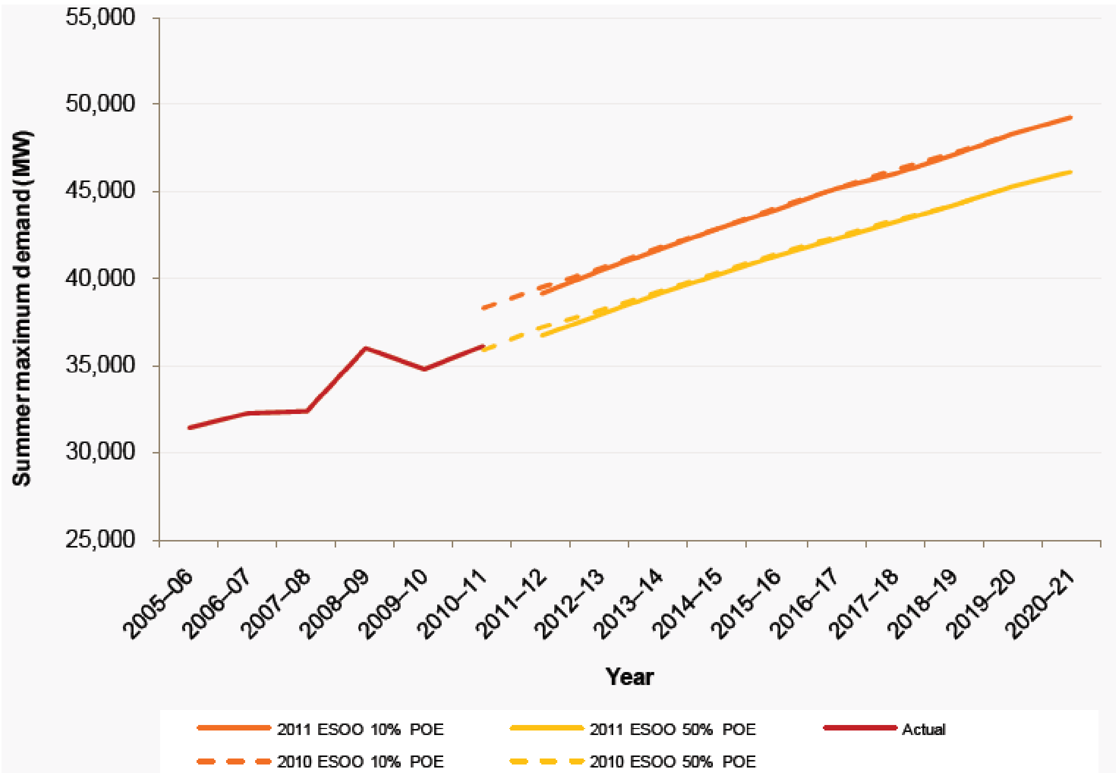
Rising peak demand and the need to replace aging network assets has underpinned more than $40 billion of regulated network investment over a five year period. This in turn has resulted in significant

[2] MD = Maximum Demand
[3] Lower manufacturing output could be the result of the global financial crisis, higher exchange rate our outsourcing manufacturing overseas
[4] Department of Employment, Economic Development and Innovation, *Queensland Energy Management Plan,* Queensland Government, Brisbane, 2011.

increases in residential prices and as a result Australia now has some of the highest residential power prices in the developed world.

The carbon price and green schemes have been blamed by some sectors for significantly higher residential power prices. This however is not the case as rising regulated network charges are responsible for the bulk of the increase in residential prices.

Figure 3.4 AEMO – Peak demand across NEM (Statement of Opportunities, August 2011)



What is clear is that something needs to be done to curtail the growth in peak demand as this will lead to continued spiralling power prices. The need to address rising peak power demand has been under consideration for more than 10 years and efforts to date have largely been inadequate or in-effective. It is also clear that we need to do something different to what has been considered to date.

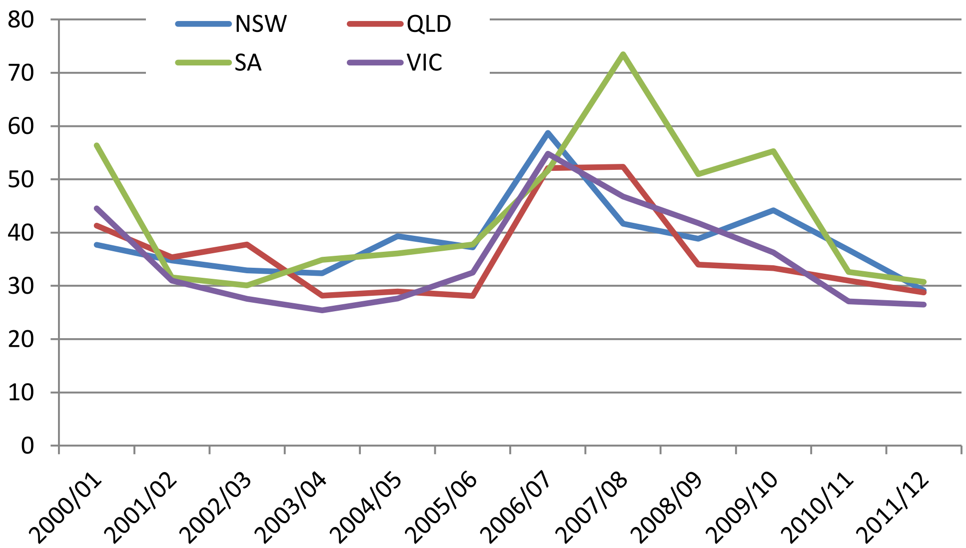
We have seen market based schemes deliver reduction in electricity consumption. These schemes have worked because the incentive or price-signal can be captured by service and equipment providers and as a result energy efficient appliances and distributed generation have been rolled out in significant numbers. There is no reason why this approach would not work for equipment, products and services that reduce peak demand.

3.3 Wholesale prices have been falling

One of the consequences of lower electricity consumption is that there is more competition between generators to be dispatched to supply the available load. Whilst electricity consumption has been falling, new generation has also continued to be commissioned. Focusing on renewables we have seen more than 1,100 MW of renewable projects get committed over the last three years which will result in an additional 3,500 GWh of generation. There has also been additional gas-fired generation projects committed, particularly in NSW and Queensland.

Lower demand, combined with additional generation, has resulted in considerably lower wholesale power prices. The average Regional Reference Price (RRP) for all states, as published by AEMO, has dropped considerably over the last five years to levels not seen for around 10 years. Figure 3.5 incorporates the average RRP for New South Wales, Victoria, Queensland and South Australia. In real terms prices in 2011/12 are between 52% to 60% of the level over the 2000-2002 period (details included in Attachment 2).

Figure 3.5 Average Regional Reference price (AEMO)



The forward contract prices for wholesale electricity according to data published by d-cypha trade[5] are currently trading at between $53/MWh in Victoria to $58/MWh in NSW for a base contract for 2013 calendar year. These figures include impact of the carbon price at $23/tonne from 1 July 2012.

To meet the 41,000 GWh large scale renewables target by 2020 we can expect that an additional 22,000 GWh of renewable generation will come on line by 2020 which will serve to continue to keep downward pressure on wholesale power prices.

3.4 Retail prices have been increasing

Residential electricity prices have increased dramatically in Australia to reach more than 22 cents per kWh in 2010/11 according to the AEMC report 'Possible Future Retail Electricity Price Movements: 1 July 2011 to 30 June 2014' released in November 2011. Residential electricity prices are expected to increase by 37% over the period (refer to Figure 3.6).

[5] http://d-cyphatrade.com.au/ (13 June 2012)

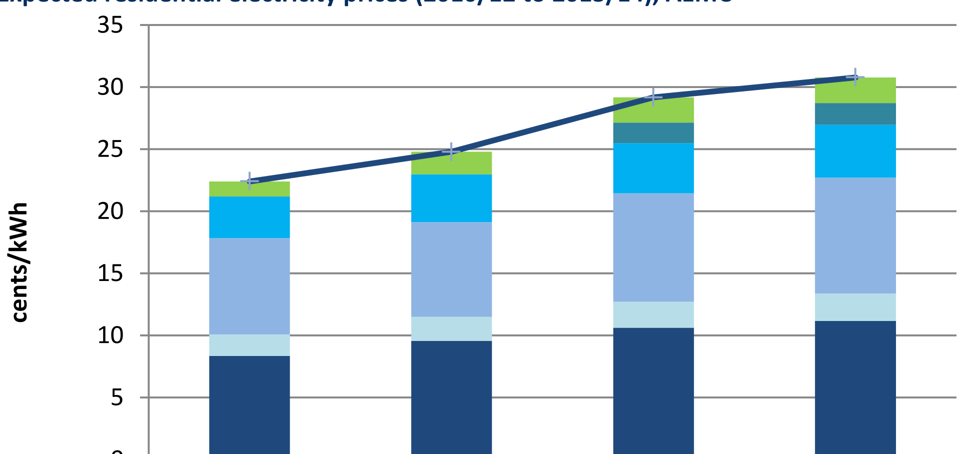
The AEMC have assumed that wholesale prices (before the impact of the carbon price) will rise over the next few years due to rising gas prices, higher capital costs and a tighter supply/demand balance. It appears that their estimates have been based on AEMO's increasing power consumption projections (refer to Figure 3.1). Whilst peak demand might increase, lower power consumption due to solar energy and energy efficiency and new large scale renewables coming on line will mean that there will be a surplus of generation capacity which should have a dampening impact on wholesale prices.

When we consider the components that make up the 8.37 cent/kWh (37%) increase, the largest contributor is distribution charges accounting for 34% of the increase, the carbon price accounting for 21% and green schemes accounting for only 10%.

Table 3.1 . Breakdown in expected electricity price increases (2010/11 to 2013/14), AEMC

	Increase in cost (c/kWh)	% Increase
Green schemes	0.84	10.0%
Carbon price	1.76	21.0%
Transmission	0.5	6.0%
Distribution	2.8	33.5%
Wholesale	1.59	19.0%
Retail	0.88	10.5%
Total	**8.37**	**100.0%**

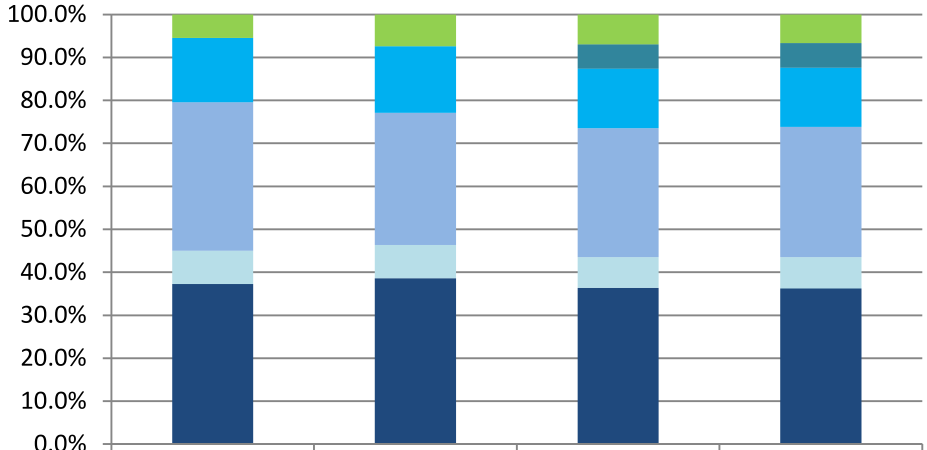
Figure 3.6 Expected residential electricity prices (2010/12 to 2013/14), AEMC



	2010/11	2011/12	2012/13	2013/14
Green Schemes	1.22	1.84	2.02	2.06
Carbon Price			1.65	1.76
Retail	3.36	3.83	4.06	4.24
Wholesale	7.74	7.63	8.74	9.33
Transmission	1.73	1.92	2.08	2.23
Distribution	8.35	9.57	10.61	11.15
Total	22.4	24.79	29.16	30.77

Regulated distribution and transmission costs make up 45% of electricity prices with the cost of green schemes comprising 5 to 7% of the final electricity price.

Figure 3.7 Components of expected residential electricity prices (2010/12 to 2013/14), AEMC



	2010/11	2011/12	2012/13	2013/14
Green Schemes	5.4%	7.4%	6.9%	6.7%
Carbon Price	0.0%	0.0%	5.7%	5.7%
Retail	15.0%	15.4%	13.9%	13.8%
Wholesale	34.6%	30.8%	30.0%	30.3%
Transmission	7.7%	7.7%	7.1%	7.2%
Distribution	37.3%	38.6%	36.4%	36.2%

3.5 International comparison of retail prices

Australia no longer has one of the lowest retail electricity prices in the world. This may have been the case once, but it is not the case anymore with residential electricity prices in Australia now one of the highest in the developed world.

The Energy Users Association of Australia commissioned CME to undertake an international comparison of retail electricity prices and published a report in March 2012[6]. At 2011 exchange rates Australian retail power prices were the highest as can be seen in Figure 3.8 which is an extract from the CME report.

According to the CME report, residential electricity prices in Australia had been stable from 2002 to 2007 but since then have risen around 40% in real terms. This is in contrast to other developed countries where electricity prices had been reasonably stable over the 2002 to 2011 period. Figure 3.9 shows this situation graphically and clearly shows the significance of recent rises in electricity prices.

[6] Electricity Prices in Australia and International Comparison, CME for the Energy Users Association of Australia (March 2012)

Figure 3.8 International comparison of residential electricity prices (2011 exchange rates)
(Extract from the CME report for the Energy Users Association of Australia, March 2012)

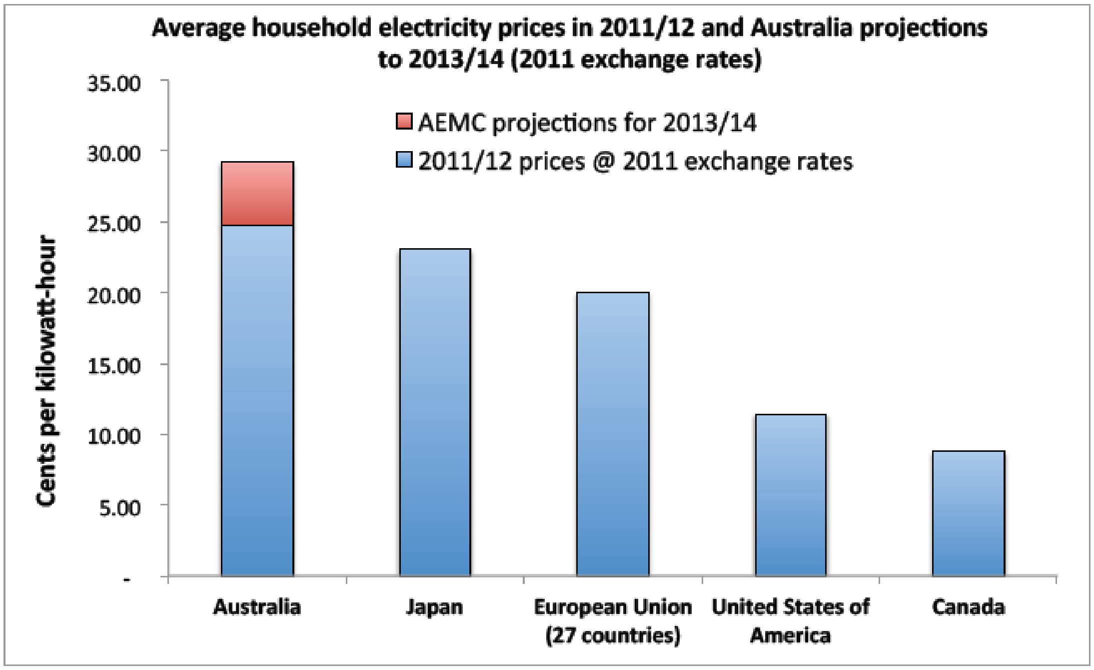
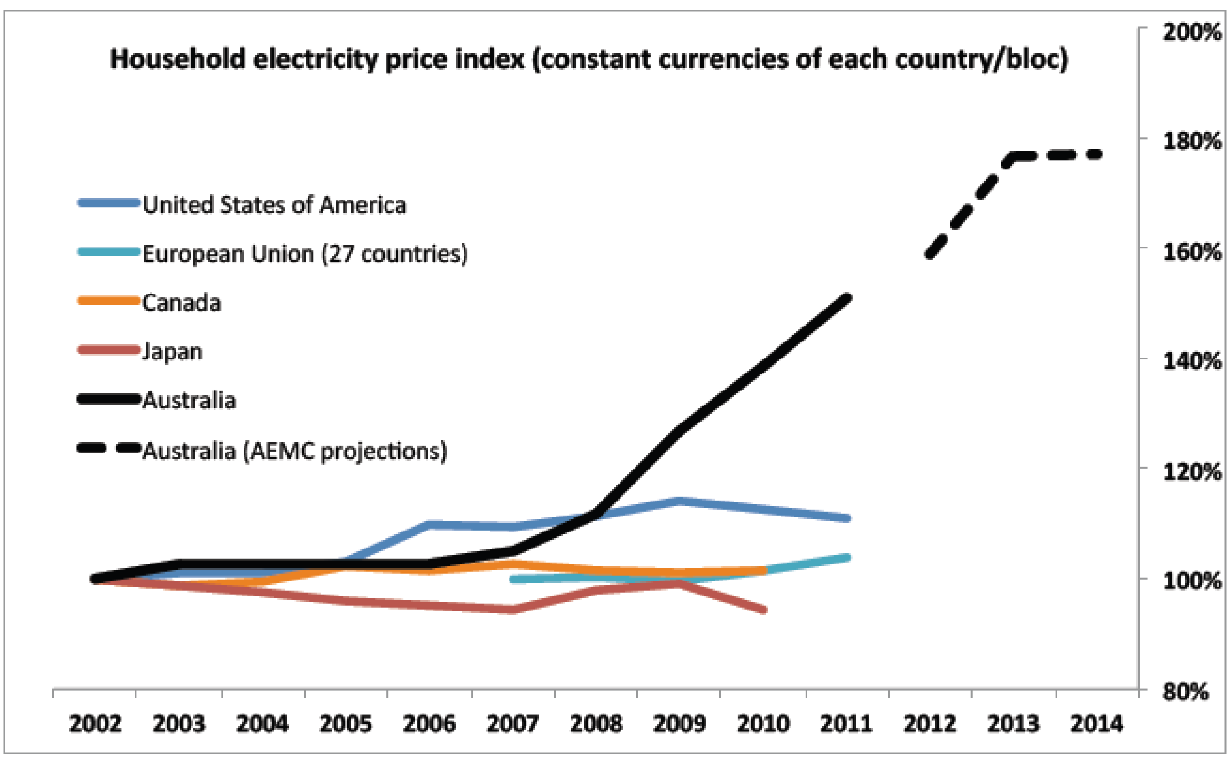
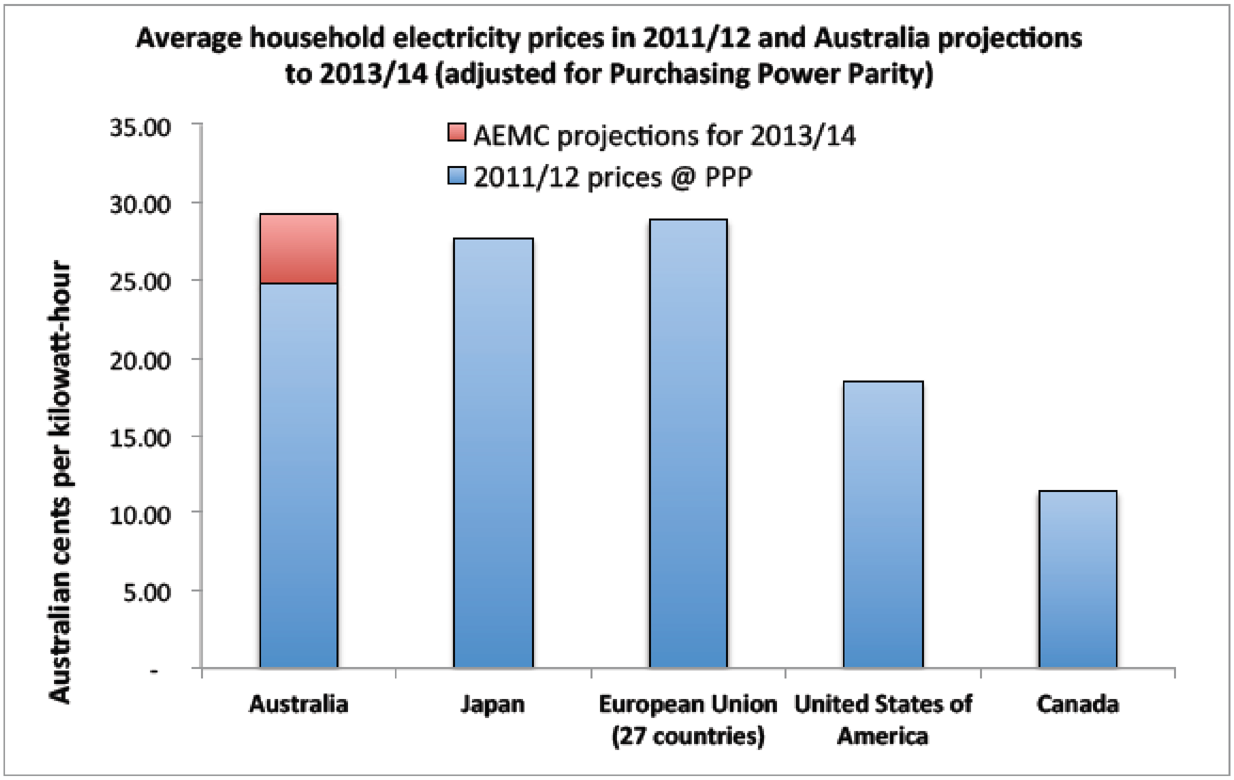


Figure 3.9 Historical electricity price comparison
(Extract from the CME report for the Energy Users Association of Australia, March 2012)



Discounting the impact of exchange rates and using the 'purchasing power parity' approach adopted by the OECD, Australia whilst not the highest, is still higher than other comparable countries and clearly no longer enjoys an electricity price advantage, at least not at the retail level. Australia is likely to have one of the lowest wholesale or generated electricity prices due to the availability of low priced fossil fuels. However due to significantly higher costs for transmission and distribution, our delivered electricity price is quite high.

Figure 3.10 International comparison of residential electricity prices (Purchasing Power Parity) (Extract from the CME report for the Energy Users Association of Australia, March 2012)



4. Contribution of solar installations under the RET

The Renewable Energy Target (RET) came into effect on 1 April 2001 and was the cornerstone greenhouse policy measure of the Howard Government at the time. The key objective of the RET was and remains to increase renewable generation.

From 1 January 2011 the RET was split into two separate schemes, the large-scale scheme was to support larger renewable energy projects and the small-scale scheme is to support smaller renewable system installations.

Solar PV and solar hot water are the key distributed energy technologies that have been supported by the RET. Solar PV and solar hot water are 'deemed technologies' where certificates can be created up-front on the installation of these systems.

4.1 Solar PV under the Renewable Energy Target (RET)

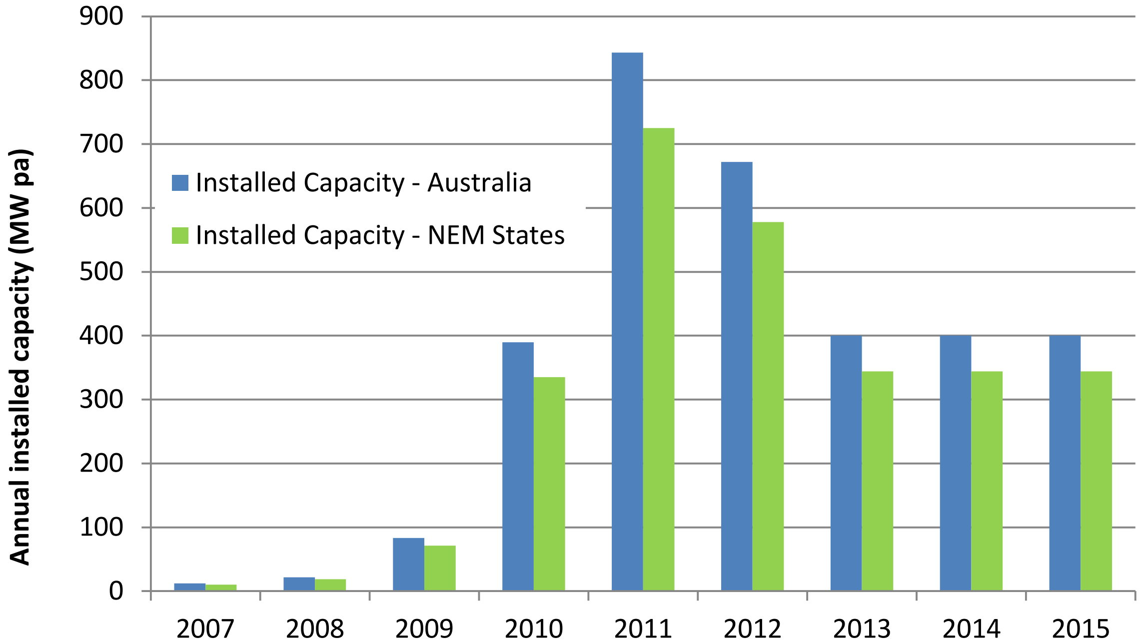
In the case of Solar PV, certificates equivalent to 15 years' worth of electricity generation can be created once the system has been installed. Additional certificates referred to as 'solar credits' can be created for eligible premises. A multiplier of 3 times up to the first 1.5 kW capacity can be claimed for installations until 30 June 2012 and then it reduces to 2 times on 1 July 2013 and then one times on 1 July 2014. In the case of solar hot water certificates, the equivalent of 10 years of avoided electricity consumption can be claimed on system installation.

In determining the level of electricity that has been avoided, we have adopted the following approach:

- The postcode system data for Solar PV released by the Clean Energy Regulator in April 2012 has been used as the key data source. This summarises on a monthly basis, the number of systems and system capacity installed up until 31 March 2012 that have created certificates.
- PV systems installed in Western Australia and Northern Territory have been excluded and these account for 13.6% of total PV installations that had claimed certificates to March 2012.

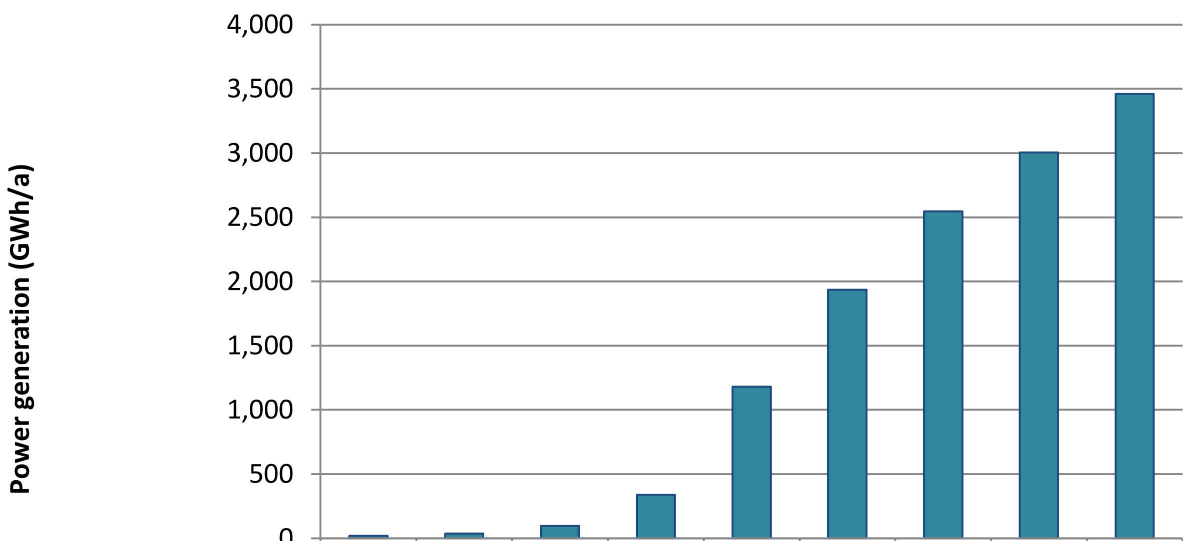
Solar PV installations have grown by an average of 336% per annum from 2008 to 2011. Installations in 2012 are expected to reduce by 20% to 672 MW. We have assumed that ongoing PV installations amount to at an average of 400 MW per annum across Australia. Continued reduction in installed costs and the recovery in the small-scale certificate (STC) price should offset the adverse financial impact of the progressive reduction in the solar credits multiplier.

Figure 4.1 Installed capacity of PV systems submitted for certificate creation



The level of electricity produced by PV has been determined by using the zone rating applied in each state. For Queensland, New South Wales, the ACT, Western Australia and South Australia we have used 1.382 MWh per annum for each kW installed and in Victoria and Tasmania we have used 1.185 MWh per annum per kW. The level of power generated by PV in NEM states amounted to 1,200 GWh in 2011 and is expected to increase to 3,500 GWh by 2015.

Figure 4.2 Electricity generated from PV systems claiming certificates in NEM states



	2007	2008	2009	2010	2011	2012	2013	2014	2015
Generation - NEM States	18	38	95	338	1,180	1,935	2,547	3,004	3,460

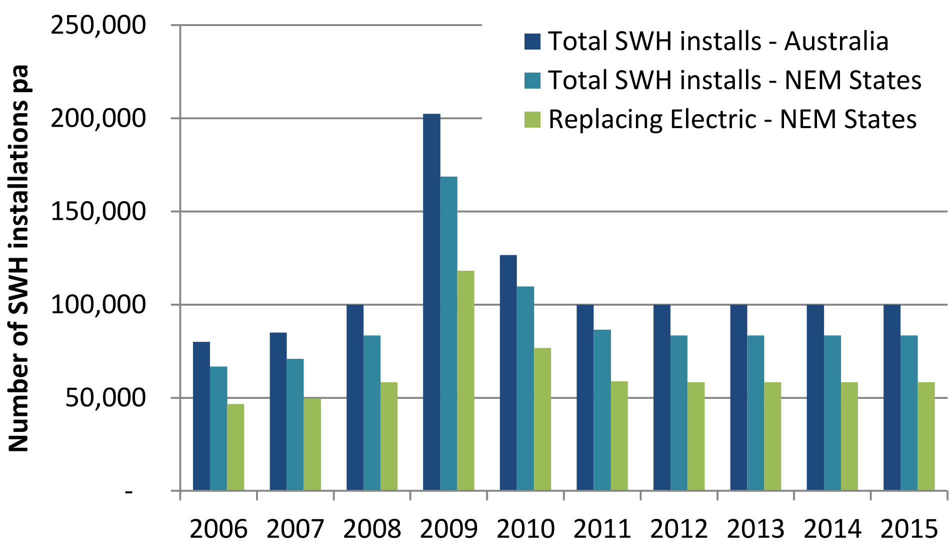
4.2 Solar hot water systems under the Renewable Energy Target (RET)

Solar hot water systems (SWH) can claim certificates up-front on a deemed basis for 10 years of avoided electricity. In determining the level of electricity that has been avoided, we have adopted the following approach:

- The postcode system data for SWH (including air sourced heat pumps) released by the Clean Energy Regulator as at 31 March 2012 has been used. This summarises on a monthly basis, the number of systems installed up until 31 March 2012 that have created certificates.
- SWH systems installed in Western Australia and Northern Territory have been excluded and these account for 16.6% of total SWH installations that had claimed certificates to March 2012.
- We have assumed that 30% of SWH system installations replace gas or solar and have excluded these from our analysis
- Each SWH system is assumed to displace 3 MWh of electricity per annum, this is equivalent to 30 certificates per system, which corresponds to the average over the last two years.

Solar hot water installations in Australia increased dramatically in 2009 with more than 200,000 systems claiming certificates under the RET. The surge in installations was due to additional rebates from both Commonwealth and state governments in response to the global financial crisis. Since 2009 the level of solar hot water systems claiming certificates has fallen with around 100,000 systems expected to claim STCs in 2012. We have maintained this level of installation out to 2015.

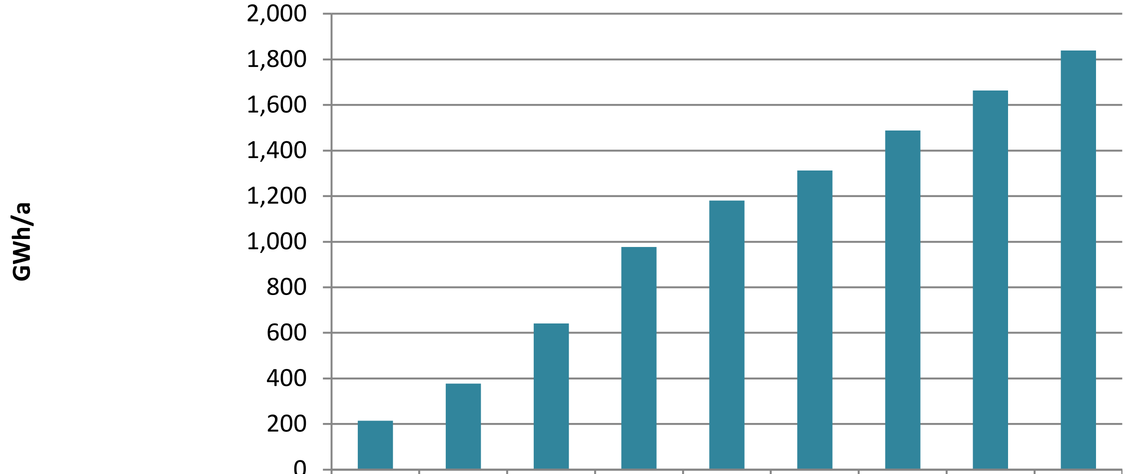
Figure 4.3 Solar hot water installations submitted for certificate creation



The level of electricity avoided has been determined by assuming that 70% of systems are replacing an electric water heater[7] and an average of 3 MWh of electricity avoided per system. The level of power avoided by solar hot water in NEM states amounted to 1,200 GWh in 2011 and is expected to increase to 1,840 GWh by 2015.

[7] Green Energy Markets report for the Renewable Energy Regulator on modelling for the 2012-14 STC Target (November 2011)

Figure 4.4 Electricity avoided from solar hot water systems claiming certificates in NEM states



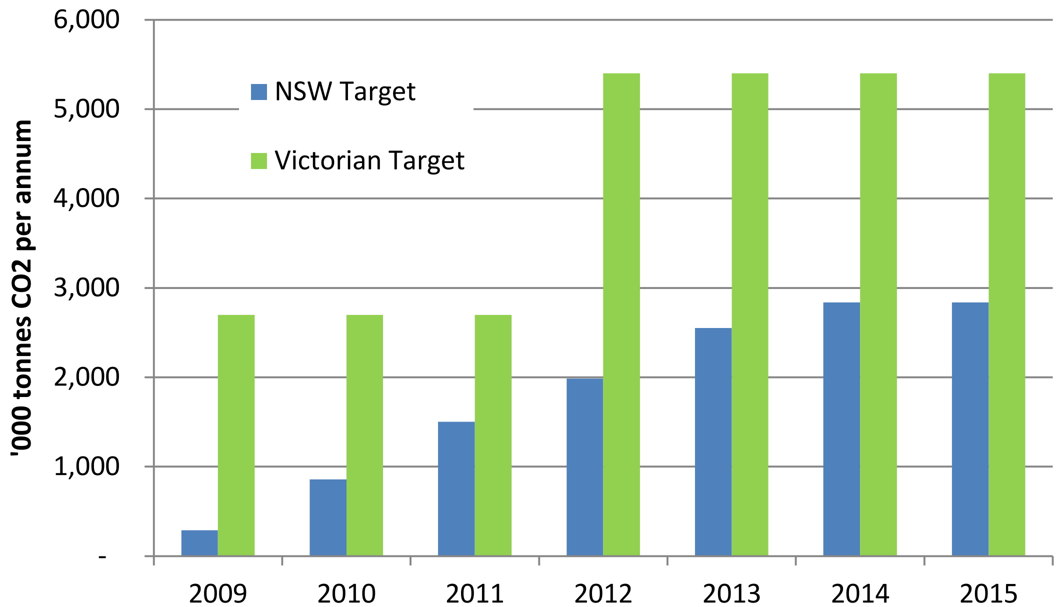
	2007	2008	2009	2010	2011	2012	2013	2014	2015
Avoided power consumption	214.5	376.6	641.3	976.6	1,180.7	1,313.1	1,488.3	1,663.4	1,838.6

5. Contribution of energy efficiency schemes

The Victorian Energy Efficiency Scheme also known as the Energy Saver Incentive, was introduced at the beginning of 2009 and applied to electricity and gas consumption in the residential sector. The scheme was expanded from 2.7 million tonnes to 5.4 million tonnes from the beginning of 2012 and extended to also include commercial and industrial energy consumption. Those larger sites that are covered by the Environmental and Resource Efficiency Plan (EREP) initiative are excluded from participating.

The NSW scheme was introduced from 1 July 2009 and builds up to 5% of eligible electricity consumption and excludes gas. The target build-up under the Victorian and NSW Energy Efficiency Schemes is shown as Figure 5.1. In determining the number of certificates to be created we have assumed that eligible electricity in NSW remains at 2011 levels through to 2015 (ie. no growth in electricity consumption). As a result, the NSW energy efficiency target increases steadily from 2.0 million certificates in 2012 to 2.8 million certificates in 2015.

Figure 5.1 Victorian and NSW energy efficiency targets



The certificates created under both the New South Wales and Victorian Energy Efficiency Schemes are measured in terms of avoided greenhouse gas emissions. Victoria and New South Wales use different conversion methodologies and factors to convert electricity savings into greenhouse gas emissions. Current factors used are 0.963 tonnes/MWh in Victoria and 1.06 tonnes/MWh in New South Wales[8]. We have applied these factors to determine the level of electricity savings to 2015.

[8] We understand that the differences in methodologies relate to Victoria using a marginal abatement factor whereas an average abatement factor is used in New South Wales

5.1 Energy Efficiency activities under the Victorian Energy Efficiency Scheme

Victorian Energy Efficiency Certificates (VEECs) can be created by Accredited Persons (APs) on the installation of approved products. Energy suppliers as liable parties under the scheme are required to surrender certificates representing their share of energy supply or pay a penalty. The number of certificates that may be created is 'deemed', based on the level of energy savings over the life of the particular product appropriately discounted to reflect uncertainty around the savings.

A list of the activities that have created VEECs is included as Table 5.1. In addition to these a range of commercial activities have also been approved on a deemed basis in 2012. These include commercial lighting, efficient motors, refrigeration fans and refrigeration cabinets. The Victorian government plans to roll out a number of other activities and methodologies progressively during 2012. We anticipate that in addition to deemed methodologies, project impact assessment and metered baseline methodologies which have been used in New South Wales, will also be used.

Table 5.1 VEECs created by activity on an installation year basis (as at May 2012)

VEEC Activity	2009	2010	2011
11 - Ceiling Insulation	56,918		
12 - Under Floor Insulation		17	
15 - Weather Sealing	21	152	1,713
16 - Lighting (revoked from 1 Jan 2011)	3,379,443	1,872,157	16,247
17 - Low Flow Shower Rose	154,193	65,812	70,865
18 - Purchasing HE Refrigerator or Freezer	1		
19 - Destruction of Pre-1996 Refrigerator or Freezer	7,047	16,837	30,636
1A - Water Heating - Gas/LPG Storage Replacing Electric	13,103	19,547	29,340
1B - Water Heating - Gas/LPG Instantaneous Replacing Electric	17,512	31,826	104,286
1C - Water Heating - Electric Boosted Solar Replacing Electric	510,459	102,575	107,131
1D - Water Heating - Gas/LPG Boosted Replacing Electric	186,831	80,519	70,809
2 - Water Heating - Solar Retro-Fit Kit	66	89	
20 - HE Ducted Gas Heater		168	461
21A - Lighting - GLS Lamps		544	398,364
22 - HE Refrigerators and Freezers			2
24 - HE Television			840
29 - Standby Power Controller			1,299,399
3 - Water Heating - Solar Replacing Gas/LPG	46,049	21,402	13,496
4 - Water Heating - Solar Pre-Heater	21		
5 - Space Heating - HE Ducted Gas Replacing Ducted Gas	728	868	1,731
6 - Space Heating - HE Ducted Gas Replacing Central Electric Heater	28,089	36,160	122,863
8 - Space Heating - HE Ducted Heat Pump Replacing Cent Elect Heater	171		724
9 - Space Heating - Gas/LPG Space Heater	493	444	1,498
Grand Total	**4,401,145**	**2,249,117**	**2,270,405**

In determining the level of electricity that has been avoided we have adopted the following approach:

i. Excluded those activities that result in a reduction in gas use rather than power use (eg. replacing inefficient ducted gas heating);
ii. Excluded those activities that have already been accounted for under the Renewable Energy Target (eg. solar replacing electric water heater); and
iii. Applied the relevant deeming factor (10 years for most residential activities) to the number of certificates that have been created in that year, to arrive at the level of electricity avoided on an annual basis.

We have developed projections for the breakdown in certificate creation by broad activity types to 2015 (refer to Table 5.2). Standby power controllers (SPCs) dominated the creation of certificates in 2011 and this is expected to continue in 2012. We anticipate that SPCs creating certificates will reduce considerably from 2013 onwards as saturation is achieved. Commercial lighting and a number of other activities were included as eligible activities from May 2012. We anticipate that commercial lighting will produce the largest number of certificates from 2013 onwards. We expect that methodologies other than the deemed ones available at present will be progressively rolled out and we have assumed that project impact (or similar approach) and metered baseline approaches will be available from 2013.

Under a project impact methodology (as applies in New South Wales) savings are discounted and brought forward on the basis of 100% of year 1, 80% of year 2, 60% of year 3, 40% of year 4 and 20% of year 5. This is equivalent to getting 3 years of savings (equivalent certificates) on installation and then claiming the remaining savings after year 5. Under a metered baseline approach, certificates are created annually as the savings are achieved.

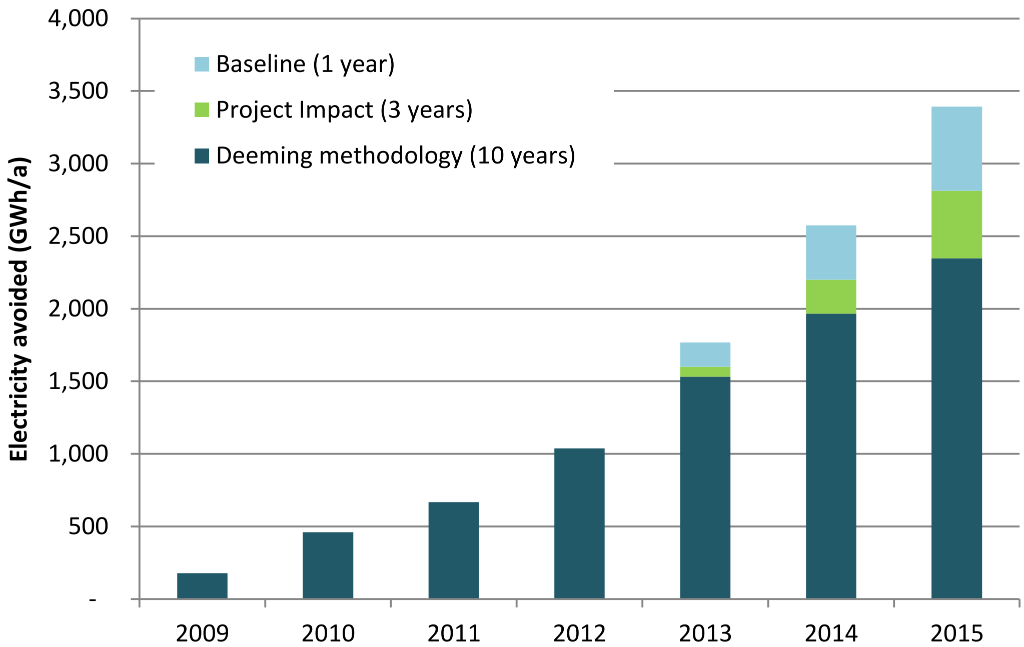
Table 5.2 Projected VEECs to be created by broad activity type

Summary Certificates Created	2009	2010	2011	2012	2013	2014	2015
Residential activities - replacing gas/covered by RET	955,780	272,046	268,546	279,852	292,745	306,282	320,496
Residential activities - replacing electric	3,445,365	1,977,071	2,001,859	4,111,951	1,961,951	1,311,951	1,411,951
Commercial lighting	-	-	-	958,197	2,345,304	2,511,767	1,873,553
Other Deemed Commercial	-	-	-	50,000	100,000	120,000	144,000
Project impact assessment	-	-	-	-	500,000	700,000	950,000
Metered Baseline	-	-	-	-	200,000	450,000	700,000
	4,401,145	**2,249,117**	**2,270,405**	**5,400,000**	**5,400,000**	**5,400,000**	**5,400,000**

In determining the amount of electricity that has been avoided we have assumed that commercial lighting and a range of other deemed technologies have 10 years of savings brought forward. For project impact methodology we have assumed that an average of 3 years of savings have been brought forward. We have also assumed that 80% of the certificates created under the project impact and metered baseline methodologies relate to avoided electricity, with the 20% covering avoided gas consumption being excluded from our analysis[9].

The level of power avoided by energy efficiency activities supported by the VEEC scheme amounted to 667 GWh in 2011 and is expected to increase to 3,393 GWh by 2015.

Figure 5.2 Electricity avoided by activities installed under the Victorian Energy Efficiency Target



5.2 Energy Efficiency activities under the NSW Energy Efficiency Scheme

The NSW scheme only covers avoided electricity consumption but incorporated savings from commercial and industrial activities since the scheme started on 1 July 2009. A range of methodologies were developed including 'deemed' creation for residential activities, commercial lighting and a range of other commercial activities. Project impact assessment and metered baseline methodologies were also available and these had been used extensively for commercial and industrial activities. NSW Energy Saving Certificates (ESCs) created up until May 2012 by methodology are summarised in Table 5.3.

Methodologies used in the NSW scheme are summarised below:

- **Project Impact Assessment Method**
  Certificate creation is based on an engineering assessment of only the equipment, process, or system that is the subject of energy Savings.
- **Metered Baseline Method**

[9] The major gas (and electricity) consuming sites in Victoria are covered by EREP and have been excluded from creating VEECs. As there are less energy reduction options and activities available to reduce gas consumption (compared to electricity) we have assumed that only 20% of certificates created under project impact and metered baseline methodologies are for reducing gas consumption.

Certificate creation is based on the difference in measurements of the electricity consumption before and after the recognised energy saving activity has taken place.

Sub-methodologies: Baseline per unit output, Baseline unaffected by output, normalised baseline, NABERs baseline.

- **Deemed Energy Savings Method**

  Certificate creation is based on common end-user equipment formulas determined by the administrator over a specific period of time.

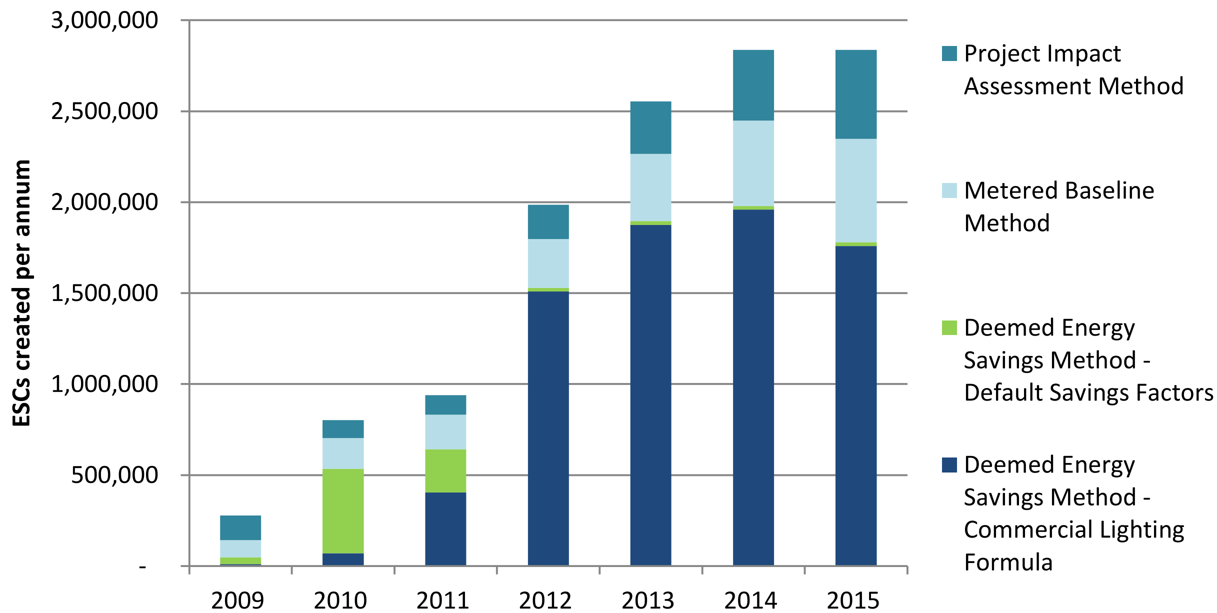
  Sub-methodologies: Default Savings Factor, Commercial Lighting Energy Savings formula, High Efficiency Motors and Power Factor Correction Energy Savings Formulas.

Table 5.3 ESCs created by methodology by installation year (as at May 2012)

	2009	2010	2011
Deemed Energy Savings Method - Commercial Lighting Formula	10,123	70,357	394,897
Deemed Energy Savings Method - Default Savings Factors	37,733	463,389	236,747
Metered Baseline Method - baseline per unit of output	89,497	153,475	144,229
Metered Baseline Method - baseline unaffected by output	730	887	3,054
Metered Baseline Method - normalised by NABERS scheme	4,073	14,339	37,577
Project Impact Assessment Method	134,886	99,390	105,463
	277,042	**801,837**	**921,967**

We have developed projections for certificate creation by broad methodology types to 2015. Most residential deemed activities have been phased out and we expect that commercial lighting will become a very significant creator of ESCs. Project impact assessment and metered baseline are expected to continue to grow.

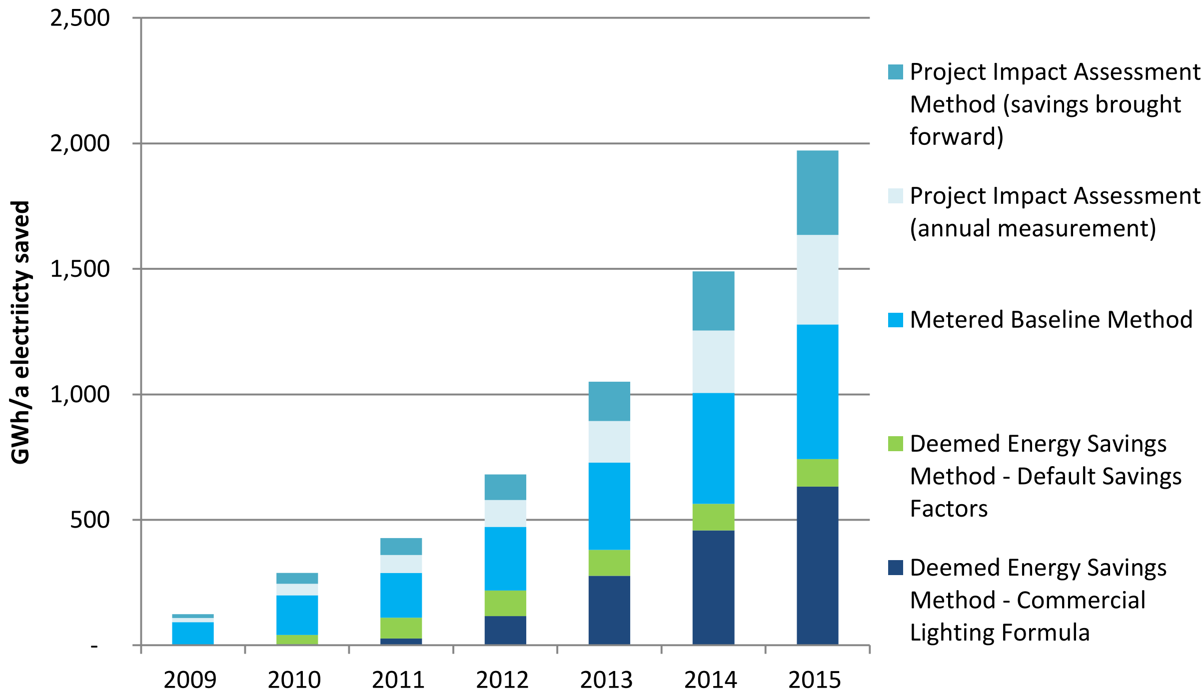
Figure 5.3 Projected ESCs to be created by broad methodology type



Similar to our approach for the Victorian Energy Savings Scheme, in determining the amount of electricity that has been avoided, we have assumed that commercial lighting and other deemed technologies have 10 years of savings brought forward. For project impact methodology, we have assumed that an average of 3 years of savings is brought forward for 74% of the certificates created and only one year brought forward for 26% of certificates[10].

The level of power avoided by energy efficiency activities supported by the NSW Energy Saving scheme amounted to 427 GWh in 2011 and is expected to increase to 1,972 GWh by 2015.

Figure 5.4 Electricity avoided by methodology under the NSW Energy Efficiency Target



[10] The breakdown of 74% /26% has been sourced from IPARTs 2011 annual report

6. Summary of results

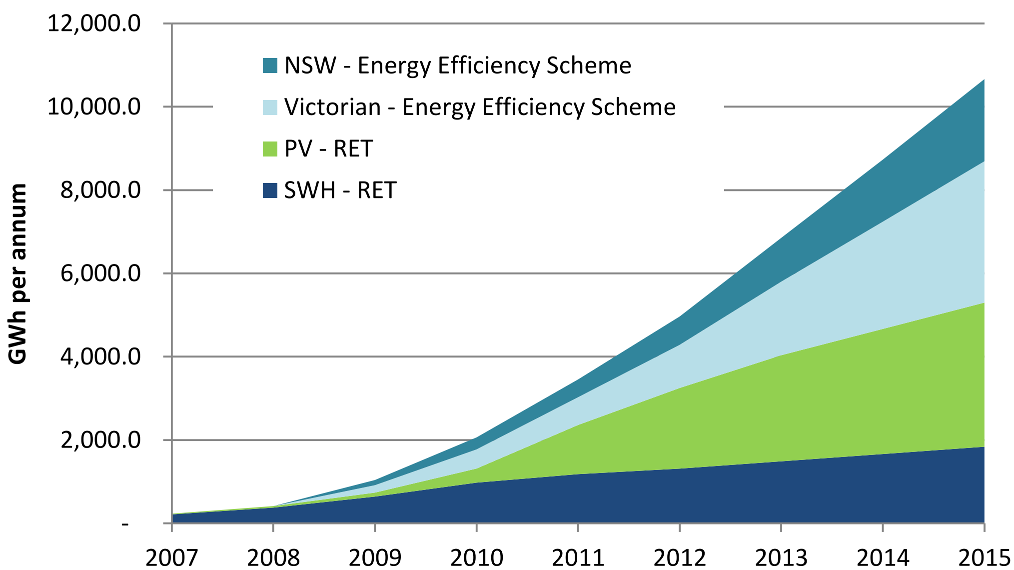
The three market based schemes that we assessed have supported solar and energy efficiency activities which have resulted in nearly 3,500 GWh of avoided electricity in 2011 across the NEM states. This equates to 1.7% of electricity consumption. Importantly however, power consumption across NEM states reduced by 6,600 GWh in the three years from 2008 to 2011. The contribution of solar and energy efficiency activities supported by the market based schemes was material at 53%. By 2015 the contribution of these schemes is expected to more than treble to 10,708 GWh.

A breakdown of the contribution by scheme is summarised in Table 6.1 and Figure 6.1.

Table 6.1 Electricity avoided in NEM States

GWh per annum	2011	2015
SWH - RET	1,181	1,839
PV - RET	1,180	3,460
Victorian – Energy Efficiency Scheme	667	3,393
NSW - Energy Efficiency Scheme	427	1,972
Total	**3,455**	**10,664**

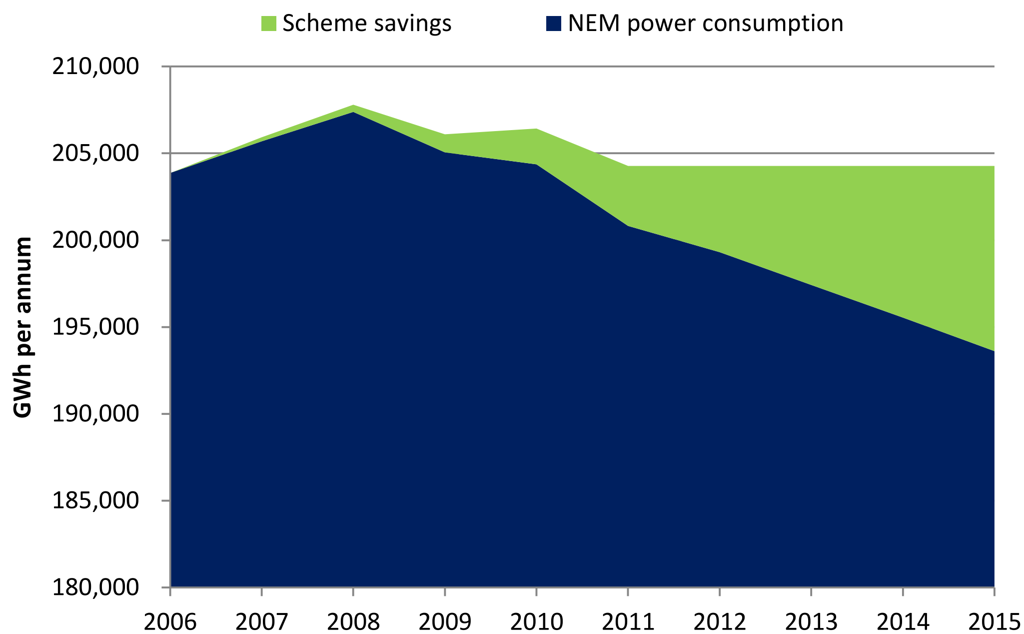
Figure 6.1 Electricity avoided in NEM States by scheme



In considering the impact on NEM power consumption to 2015, we have notionally assumed that gross power consumed prior to the contribution of solar and energy efficiency activities remains the same to 2015. We would normally expect that both continued population growth and economic growth would support increases in power consumption. However, the expected closure of some large electricity consuming facilities (eg. the Point Henry and Kurri Kurri aluminium smelters) and the contribution of other energy efficiency and distributed generation activities not covered by the above schemes, means that continuing gross electricity consumption at 2011 levels, whilst simplistic is likely to be a reasonable estimate.

Based on the above approach, gross electricity consumption was 204,300 GWh in 2011 and after allowing for the contribution of solar and energy efficiency supported by the market based schemes, net consumption amounted to 200,800 GWh. Assuming that gross consumption remains at 2011 levels to 2015 then solar and energy efficiency's contribution, amounts to 5.2% of total consumption (refer to Figure 6.2).

Figure 6.2 Electricity avoided relative to NEM power consumption



Attachment 1

Power Consumption in the NEM

Source: AEMO
GWh per state on a calendar year basis

	NSW	QLD	SA	VIC	TAS	Total NEM	Total Excl TAS
2001	69,898	44,057	12,887	47,128	-	173,970	173,970
2002	71,490	45,798	12,910	47,599	-	177,796	177,796
2003	72,364	46,952	12,821	48,768	-	180,904	180,904
2004	74,531	48,902	12,890	49,724	-	186,046	186,046
2005	75,413	50,378	12,564	49,804	6,399	194,558	188,159
2006	78,162	51,065	13,096	51,379	10,164	203,867	193,703
2007	78,629	51,562	13,351	51,972	10,179	205,693	195,514
2008	78,963	52,183	13,416	52,411	10,412	207,386	196,973
2009	77,664	52,711	13,477	51,305	9,900	205,057	195,157
2010	77,151	52,324	13,554	51,184	10,153	204,366	194,213
2011	76,459	51,107	13,093	50,142	10,019	200,820	190,801

Note: Snowy consumption to 2008 has been allocated one third to Vic and two thirds to NSW

Attachment 2

NEM – Regional Reference Price

Average annual prices (financial year)

Source: AEMO (16 May 2012)

1. Nominal Power Prices ($/MWh)

Year	NSW	QLD	SA	VIC
2000/01	37.69	41.33	56.39	44.57
2001/02	34.76	35.34	31.61	30.97
2002/03	32.91	37.79	30.11	27.56
2003/04	32.37	28.18	34.86	25.38
2004/05	39.33	28.96	36.07	27.62
2005/06	37.24	28.12	37.76	32.47
2006/07	58.72	52.14	51.61	54.8
2007/08	41.66	52.34	73.5	46.79
2008/09	38.85	34.00	50.98	41.82
2009/10	44.19	33.30	55.31	36.28
2010/11	36.74	30.97	32.58	27.09
2011/12	29.14	28.77	30.73	26.51

2. Real Power Prices ($/MWh)

Year	NSW	QLD	SA	VIC	CPI Factor
2000/01	37.69	41.33	56.39	44.57	133.8
2001/02	33.80	34.36	30.74	30.11	137.6
2002/03	31.16	35.78	28.51	26.10	141.3
2003/04	29.91	26.04	32.21	23.45	144.8
2004/05	35.46	26.11	32.52	24.90	148.4
2005/06	32.29	24.38	32.74	28.16	154.3
2006/07	49.88	44.29	43.84	46.55	157.5
2007/08	33.86	42.55	59.75	38.03	164.6
2008/09	31.13	27.24	40.85	33.51	167.0
2009/10	34.36	25.89	43.00	28.21	172.1
2010/11	27.57	23.24	24.45	20.33	178.3
2011/12	21.54	21.27	22.72	19.60	181.0
Change from 00/01-01/2	60.3%	56.2%	52.1%	52.5%	

Attachment 4

Discussion Paper:

Creating a Community Financial Dividend through Managing Peak Electricity Demand: A Discussion Paper

(March 2012)

Discussion Paper

Creating a Community Financial Dividend through Managing Peak Electricity Demand

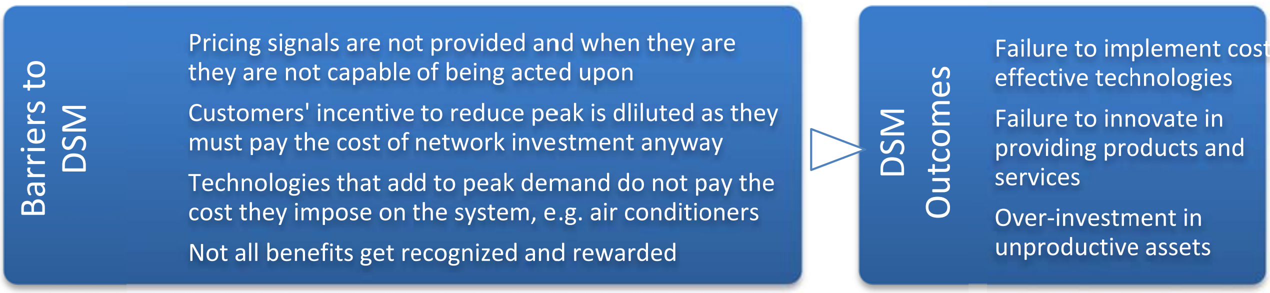
This paper has been prepared by Green Energy Trading following discussion at the Alliance to Save Energy Summer Study Conference (Manly, March 2012).

Maximum demand for electricity in Australia is considerably larger than average demand. This places unique requirements on the electricity supply system, which must have the capacity to cater for this ‘peak’ demand. At times when demand is not at its peak, which is the overwhelming majority of the year, a significant proportion of system capacity remains unused (refer Attachment 1).

Over the last three years, electricity use across the National Electricity Market (NEM) has been in decline (refer Chart 2), due largely to increasing electricity prices and successful State and Commonwealth market based renewable and energy efficiency programs. Although NEM-wide electricity use is falling, peak demand continues to rise (refer Chart 3), driving more than $40 billion of investment in system capacity over the current 5-year regulatory period. Network investment is the primary driver behind recent increases in electricity prices; according to recent research by the Institute for Sustainable Futures, one third of the current investment program is to cater for growth in peak demand. The alternative to network augmentation is Demand Side Management (DSM), which aims to reduce peak demand through demand-side measures and distributed generation. DSM can ensure the NEM remains reliable and competitive for a fraction of the cost of investment in physical infrastructure.

The disaggregation of the NEM into generation, transmission, distribution and retail sectors has facilitated increased competition in generation and retail supply of electricity. Demand Side Management (DSM) provides benefit and value across all the components of the electricity market, however this cannot easily be captured by its proponents and beneficiaries (end consumers) and therefore tends to be subject to systematic under-investment. This market failure has led to inefficient levels of over-investment in system capacity, which appears set to continue.

DSM is widely regarded by many electricity sector stakeholders as an attractive and viable approach to the challenge presented by continued growth in peak demand. However, to date no DSM programs commensurate with DSM’s potential have been implemented by sector stakeholders (refer recent research by the Australian Alliance to Save Energy). Inefficient investment in infrastructure, in light of cheaper alternatives such as DSM, has likely led to a considerable reduction in social welfare. Consumers of electricity have paid the cost of building electricity networks with ever increasing capacity to cater for peak demand - despite viable DSM options being available. If consumers are to have an electricity system at least cost, barriers to the uptake of DSM must be removed.



The creation of the NEM was expressly meant to facilitate DSM, but efforts to date have been largely unsuccessful. Market based approaches have been successfully implemented, such as renewable energy and energy efficiency market based schemes. DSM requires the following conditions:

1. Ensuring that those who impose costs on the electricity system bear the cost of their actions. This can be achieved through fully cost reflective pricing. This is a complex and politically sensitive regulatory change, though there may be several adjustments that can happen quickly (e.g. charges for installing inefficient and excessive air conditioners).

2. Providing targeted financial support to peak demand reduction activities.

Providing incentives for DSM – the benefits of market-based schemes

In Australia, market-based schemes have been successful in stimulating residential and commercial renewable energy and energy efficiency technologies and applications. Providing transparent market pricing for DSM creates incentives for product suppliers, service providers and energy service companies to innovate and deliver cost-effective solutions. Market intermediaries such as these have proven to be well placed to deliver dynamic efficiencies by reacting to price signals, packaging solutions and developing business models. Arguably the market has signalled to distributors and retailers the need to implement DSM, but due to commercial incentives and conflicting priorities the market signal has not manifested itself as market outcome. Consumers on the other hand have failed to overcome demand inelasticity and non-price barriers such as information asymmetries, bounded rationality and simple lack of interest.

> *"The Grattan Institute finds that market driven technology innovation is the key to reducing carbon emissions… Experience shows that markets may not be perfect, but they are consistently effective at identifying lower cost opportunities, promoting innovation, and responding flexibly to changes."*
>
> Markets to Reduce Pollution: Cheaper than Expected, *Dec 2010, J. Daley and T. Edis*

Air-conditioner replacement – an example of market failure

As Minister Ferguson identified in the release of the Energy White Paper in December 2011 (refer Attachment 4), a person installing a $1500 air-conditioner can impose a $7,000 cost on the electricity system that is paid for by other consumers.

If we look at this position in inverse, a person that displaces an inefficient air-conditioner with one that is twice as efficient (say requires half as much power on peak days) should therefore be able to internalise a benefit of $3,500.

Because the benefits of the action cannot be internalised, there is no incentive for anyone to install an efficient air conditioner. It is here that a market-based scheme can work where this activity would be able to attract DSM. Installing a battery system (with or without PV) might be an even cheaper option and would be more competitive under a market-based scheme, which would ensure the lowest cost being borne by consumers.

How might a scheme to reduce peak demand work?

A market-based approach, similar to the current energy efficiency certificate schemes, has considerable potential. For example, accredited participants, using approved and registered methods of peak load management, would be entitled to create Demand Management Certificates (DMCs). The DMCs would account for a fixed amount of demand management capacity and would be expressed as kW$ (reflecting different locational investment values). The network businesses would work with the scheme administrator in determining the value attributable to demand reduction activities at different points in the network. The national target would form a compliance obligation, and networks would be required to surrender a quota of DMCs every year. The cost of DMCs would be subject to the creation and trade of DMCs between scheme participants.

The Clean Energy Regulator (CER), which manages the operation of the renewable energy and carbon farming schemes, would be well suited to administer such a scheme – it would also be ideally placed to ensure compliance obligations are met and could administer a penalty for non-compliance. Such a penalty would be set at a value sufficient to deter non-compliance and ensure DMC quotas are met.

A peak demand reduction scheme would differ to current market based schemes in four key ways:

(i) *the metric used to denominate the certificates* – kW$, rather than kWh or tonnes CO_2e.

(ii) *the activities and technologies that would be eligible for support* – a final determination of activities most likely and best suited to DSM and peak demand reduction would need to be the subject of consultation. Likely activities include distributed generation; energy storage systems and devices; decommissioning of inefficient appliances (e.g. air conditioners) and replacing them with more efficient ones; tracking systems for PV that provide generation at system peaks; and fuel switching away from electric appliances (e.g. gas or solar for cooling systems).

(iii) *the liable party on whom the obligation should fall* - liability for surrendering DMCs would need to rest with the electricity distribution network service providers rather than electricity retailers.

(iv) *measurement methodologies for the reduction in peak demand generated* – peak reduction amount in kW would be based on an assessment of the expected reduction in infrastructure investment (across generation, transmission and distribution) where the eligible activity can be shown to contribute to a reduction in peak demand. Part of the certificate value would need to capture a locational element, based on existing constraints in the network – in other words, additional value will be ascribed to peak demand reduction in a local area that is expected to see load growth or assets needing to be augmented. Similar to the NSW Energy Savings Scheme, a range of deemed, project-based and metered baseline methodologies could be used to determine the number of certificates generated by an activity.

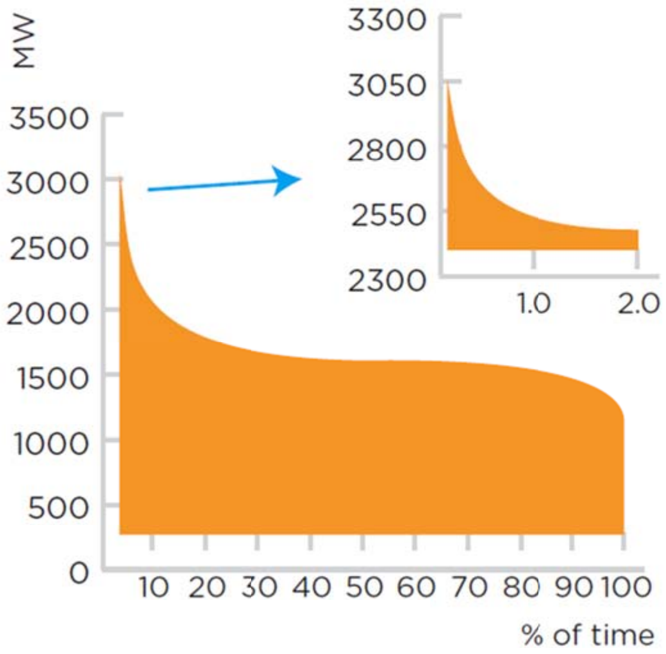
Examples for certificate values over the next 20 years, discounted to NPV

Investor	Location	Peak Metric	Investment	Annual value
Generation	NEM-wide	Coincident region peak	$400/kW	$40/kW
Transmission	Regional	Coincident region peak	Region 1 = $100/kW	$10/kW
	Locational (terminal station)	Local peak	T Location a = $500/kW T Location b = $50/kW	$50/kW $5 kW
Distribution	Regional	Coincident DNSP peak for region	D Region 1 = $600/kW	$60/kW
	Locational (zone sub)	Local peak	D Location a = $1000/kW D Location b = $200/kW	$100/kW $20/kW

As an example, for replacement of an inefficient air conditioner (with a nominal reduction of 1 kW) in Transmission Location 1 and Distribution Location a, the ascribed deemed value would be: ($40 + $10 + $50 + $60 + $100)*10 years = $2,600 (2,600 DMCs) up front, this assumes a deeming period of 10 years. If the activity was project-based and not deemed, and was in Distribution Location b, then the annual value to be paid based on the measured kW contribution to reducing local/coincident peak would be $40+$10+$50+$60+$20 = $180/kW (180 DMCs) per annum. This could be paid up front for a 3 year period ($540/kW), and then re-assessed after three years before being paid for a further three years.

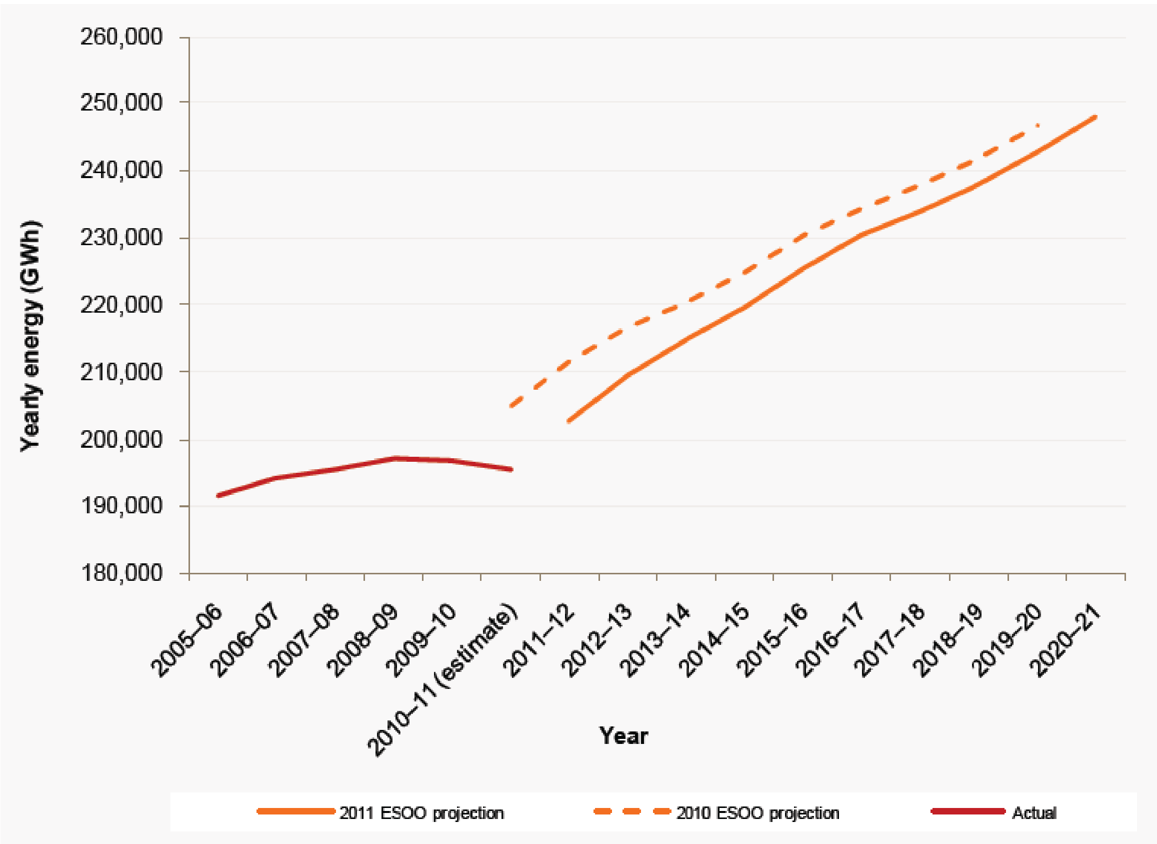
Attachment 1

System utilisation and load duration curve (example for South Australia, 2007/08)



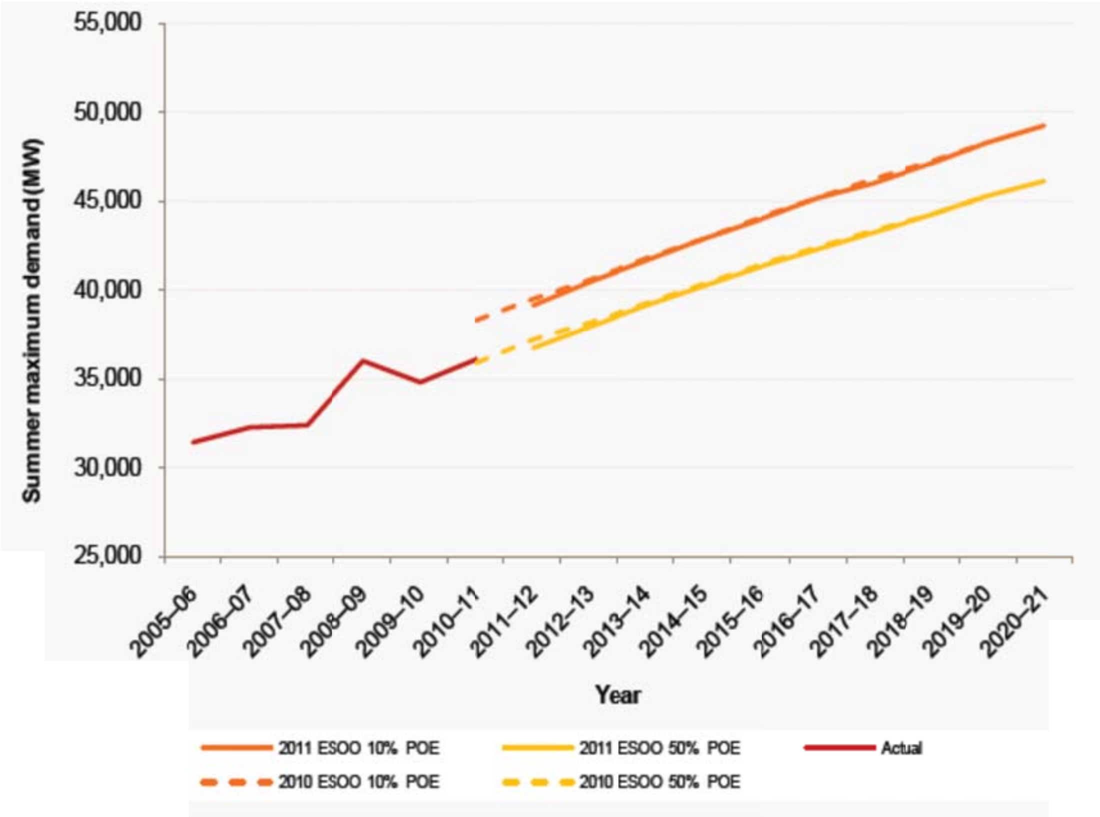
Attachment 2

Comparison of the NEM-wide medium growth energy projection (GWh)



Attachment 3

Comparison of the NEM-wide medium growth summer maximum demand projections (MW)



Attachment 4

Excerpt of Speech by The Hon Martin Ferguson AM MP, Minister for Resources and Energy, in launching the draft *Energy White Paper - Strengthening the foundations for Australia's energy future* - 13 December 2011

"The draft Energy White Paper reaffirms the Government's belief in a market-based approach to energy policy. Well-functioning – and appropriately regulated – energy markets are essential to the delivery of reliable and secure energy. Energy-market reforms over the past decade and a half have served Australia well. But with rising cost pressures and a large investment challenge looming, all governments need to set a clearer path for better functioning energy markets. Improving the competitiveness and efficiency of our energy sector is important to delivering the best outcomes for consumers…

…Peak demand is a particular issue requiring further work. At the moment we are seeing significant deployment of air- conditioners, which place strain on our electricity network – often at peak times. For instance, a $1,500 air-conditioner when used at peak times can impose a cost of $7,000 on the electricity system. These system costs are then cross-subsidised by all other users.

Hence it is important that we undertake further work to examine whether there are energy efficiency measures or demand side measures that can economically reduce peak demand, and ultimately reduce costs to consumers."