



Green Energy
Markets

Small-scale technology certificates data modelling for 2013 to 2015

Report to the Clean Energy Regulator

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Disclaimer

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Executive Summary

The Clean Energy Regulator (CER) has engaged Green Energy Markets Pty Ltd (GEM) to provide a forward estimate of the Small-scale technology certificates (STCs) likely to be created during the 2013 calendar year, and for the 2014 and 2015 calendar years.

Projections have been developed on the basis that no solar credits multiplier will apply for eligible systems installed after 1 January 2013. We have also assumed that current policy settings remain in place and have not incorporated the impact of changes to the Renewable Energy Target that were recommended by the Climate Change Authority. We have also assumed that the STC over-supply from 2012 progressively gets absorbed in 2013 with a resultant increase in the wholesale spot STC price to an average of \$34.40 in 2013 and then to \$38 in 2014 and 2015.

In developing our projections for small generating units (SGUs) and solar water heater (SWH) we utilised our existing models and databases and those of our sub-contractors SunWiz and SolarBusinessServices. We have also made extensive use of the registry data provided by the CER and interviewed a range of solar industry participants.

We have separately assessed and analysed the following market segments:

- SGU PV – Grid-connect residential market
- SGU PV – Grid-connect non-residential (commercial market)
- SGU PV – Grid-connect (upgrade market)
- SGU PV – Off-grid market
- SWH – New dwelling market
- SWH – Existing dwelling (replacement market)

The market drivers for each sector varies and where possible we have analysed the CER data to separately identify the level and size of installations in each segment. This has formed the basis of our projections for the 2013 to 2015 period.

The largest and most variable sector has been the residential grid-connect PV market. This has been the sector that has historically been the most difficult to assess and it is this sector that has led to the blow-out in the level of STCs in 2011 and 2012. We have also assessed in some detail the level of Queensland installations that remain eligible for the attractive feed-in tariff under the Solar Bonus Scheme.

We estimate that a total of 296,000 residential grid-connect PV systems were installed in 2012 and expect that this market will then reduce by 23 per cent to 227,000 systems in 2013. We project that the non-residential (commercial) grid-connect PV market will grow from 36.4 MW in 2012 to 51.7 MW in 2013. Overall we estimate that 992 MW of PV was installed in 2012 and expect that the market will contract by 26 per cent to 739 MW in 2013. Our projections for 2013 incorporate 20,000 Queensland Solar Bonus Scheme systems that will be installed in 2013 and we have assumed that 60 per cent of these will be eligible for the 2 times multiplier as they were committed prior to the announcement of the removal of the solar credits multiplier.

The SWH market has reduced considerably over the last three years and we estimate that 72,500 SWH systems installed in 2012 will create certificates. This is a 31 per cent reduction on the level of installations in 2011. We expect that the SWH market will recover in 2013 growing by 13 per cent to 82,000 systems and then increase slightly in following years. We have assumed that there is no impact in the forecast period of any regulations to phase-out electric resistance water heaters.

STC Modelling 2013

We expect that a total of 17.8 million STCs will eventually be created for small-scale system installations occurring in 2013. Due to the lag in registration of certificates and the expected transfer of some STCs to LGCs we expect that an additional net 2.3 million STCs will be registered in 2013. In total we project that 20.1 million STCs will be registered in 2013. This figure does not include the level of banked or surplus registered STCs remaining at the end of 2012.

There is considerable uncertainty around the estimates in particular around the following factors:

- Variability in international PV system prices and exchange rates
- Extent of the contraction or reduction in the residential PV market
- Extent of the growth in the commercial PV market
- Level of Queensland Solar Bonus Scheme systems yet to be installed
- The extent of the rebound in the SWH replacement market

We believe that the lower bound estimate for STCs registered for 2013 is in the order of 18.6 million and the upper bound estimate is 22.9 million STCs.

STCs expected to be registered in each year are set out in the table below:

	2012	2013	2014	2015
SGU - PV (by install year)	35,032	15,409	13,081	13,087
SGU - Wind (by install year)	0	0	0	0
SWH (by install year)	2,087	2,387	2,612	2,794
	37,119	17,796	15,694	15,882
Add net delay in STC registration		2,470	307	25
Less Transferred to LGCs		-200	0	0
STCs Registered in Year		20,066	16,001	15,907
Upper Bound		22,936	18,355	18,289
Lower Bound		18,649	14,574	14,463

No allowance has been made for any under-surrender for 2012 that may result due to eligible electricity sales by liable parties being less than projected when setting the Small-scale Technology Percentage (STP).

1. Project Scope

The Clean Energy Regulator (CER) has engaged Green Energy Markets Pty Ltd (GEM) to provide a forward estimate of the Small-scale technology certificates (STCs) likely to be created during the 2013 calendar year, and for the 2014 and 2015 calendar years.

Certificates for eligible SWH and small-scale solar PV, wind and hydro systems installed on or after 1 January 2011 will be classified as small-scale technology certificates (STCs) unless they meet the transitional arrangements set out in the amended legislation and regulations. Estimates of the amount of certificates that would otherwise create STCs and will be subject to these transitional arrangements are outside the scope of this report.

Based on its in-depth knowledge of the renewable energy industry and using all the factors that impact the uptake of solar water heaters (SWH) small scale PV, wind and hydro-electricity systems, GEM is to provide a range of qualified projections. These projections will reflect the likely creation of STCs from eligible installations for the calendar year 1 January 2013 to 31 December 2013, and the following two calendar years 2014 and 2015.

Data input into the model to estimate the number of STCs should include (but not be limited to):

- Eligible system REC/STC creation for the last two years. Showing the historical trend in small-scale technology uptake based on data to be provided by the CER.
- State and Commonwealth incentive schemes and any potential changes to these schemes over the timeframe.
- Building codes and regulations including energy efficiency measures which impact the uptake of various technologies (particularly solar water heaters and heat pumps);
- Change in cost of STC eligible systems due to new technological and manufacturing improvements.
- Impact of the price of STCs on creation rates to the extent to which they are applicable to the modelling.
- Global financial conditions and changes to cost of raw materials
- Any other relevant factor

Out of Scope of this consultancy:

- Certificates remaining in the Registry from the previous compliance period (stock of certificates).
- Large Generation Certificates as defined by the amended legislation.

2. Methodology and Assumptions

GEM has developed forward estimates separately for each of the small-scale technologies that are able to produce STCs over the 2013 to 2015 period. Modelling approaches have been tailored to the specific attributes of each technology and market segment.

Modelling solar PV certificates

The demand for and installation of solar photovoltaic (PV) systems in Australia continues to be driven by up-front cost, industry marketing, rising electricity prices, environmental awareness and government incentives through feed-in tariffs, and STCs. System payback periods continue to be a useful proxy for determining the attractiveness of PV and these incorporate the impact of up-front cost, electricity prices and feed-in tariffs and form the basis of our modelling.

We have modelled solar PV STCs by considering four categories or market segments:

- Residential grid-connected systems
- Expansions or upgrades to residential grid-connected systems
- Commercial (or non-residential) grid-connected systems
- Off-grid systems

Grid-connected residential systems

This category will represent the overwhelming majority of both capacity installed and certificates created. The installation of these systems is largely influenced by customers' perceptions of the financial attractiveness or payback of the system. This in turn depends upon a range of factors, some of which differ from state to state. We have modelled the installation of these systems using a payback model feeding into a system demand curve.

These demand curves forecast the proportion of eligible households which will install systems. Then based on this figure, and assessment of average system sizes, STC creation is forecast. Due to major differences in state policies and resulting installation levels, is done at a state/territory level.

Payback period will be modelled using SunWiz's payback model. Explicit assumptions input into the model will include:

- The STC price
- State feed-in tariff rates, eligibility and other factors
- System prices
- Electricity prices

System price forecasts are based on: industry forecasts of module prices; forecast inverter prices, and exchange rates. Changes in the cost of raw materials will be implied in the above. Based on these factors an average payback period for systems will be generated for each state/territory for each of the three years.

Modelling grid-connected non-residential system installations (commercial)

The number of commercial systems being installed is increasing and is becoming a more important part of the market as penetration levels for residential PV in some states increases dramatically. We aim to develop a historical picture of these systems based on CER data where possible and as a fall-back use proxies for this market through use of a typical commercial system size approach.

We make extensive use of SunWiz's experience and knowledge of this market sector to develop a market profile and demand curve based on system payback. The output of the modelling is total system installation and certificate creation figures for each state by year.

Modelling solar water heating certificates

Water heater systems are essential appliances and subject to state regulations which may limit choice in some applications. As such, water heater system choices are based on different factors which include: the existing system type (if being replaced); the relevant state regulations; the type of premises; access to reticulated gas, and also net system up-front costs (after taking incentives into account). Operational costs, such as future electricity and gas prices (particularly in the case of LPG) are also factors that need to be considered.

The solar water heater market (for the purposes of this exercise includes heat pump water heaters) has three sub-markets which are each subject to different incentives and regulations. These are the new building market (residential), the replacement market (for existing water heaters in residences) and the commercial market. The commercial market (with larger systems) had been important up until 2009. With the removal of heat pump systems above 425 litres from the Renewable Energy Scheme this segment is now negligible and as a result we have only analysed the new building and replacement markets.

In developing our projections we have considered the following factors:

- Historical and current market share rates
- State regulations for new/replacement systems
- Access to reticulated gas
- STC price
- System prices (prior to incentives)
- Other state and federal government incentives
- Economic factors including GDP and level of new home commencements

SWH system installation forecasts are combined with average system certificate creation forecasts (based on current and historical data) to estimate total certificate creation in each state and each segment.

Modelling other small generation unit certificates

Certificate creation for small wind and hydro power systems have not been material with less than 500 certificates created for the year to 31 December 2012. We have developed estimates after discussions with the key players in this part of the industry.

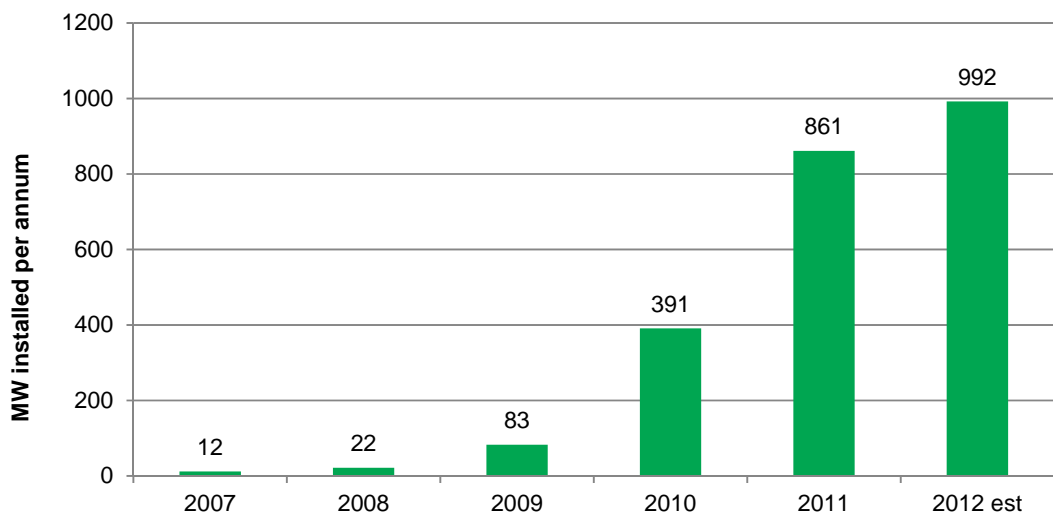
3. Industry and Market Overview

PV market

With the progressive roll-back of solar feed-in tariffs across most states the Small-scale Renewable Energy Scheme (SRES) has become the key support mechanism for solar PV in Australia.

In terms of system installations the PV market peaked in 2011 with 359,000 systems installed and the level of installations in 2012 is estimated to be 6.7 per cent lower at 335,000 systems. As the average system size has increased the overall PV capacity installed has increased by 15.2 per cent to 992 MW. In some respects the small-scale PV industry has peaked in Australia and as policy support has been progressively reduced the level of installed capacity is expected to decline.

Figure 3.1 PV capacity installed (excluding large-scale installations)



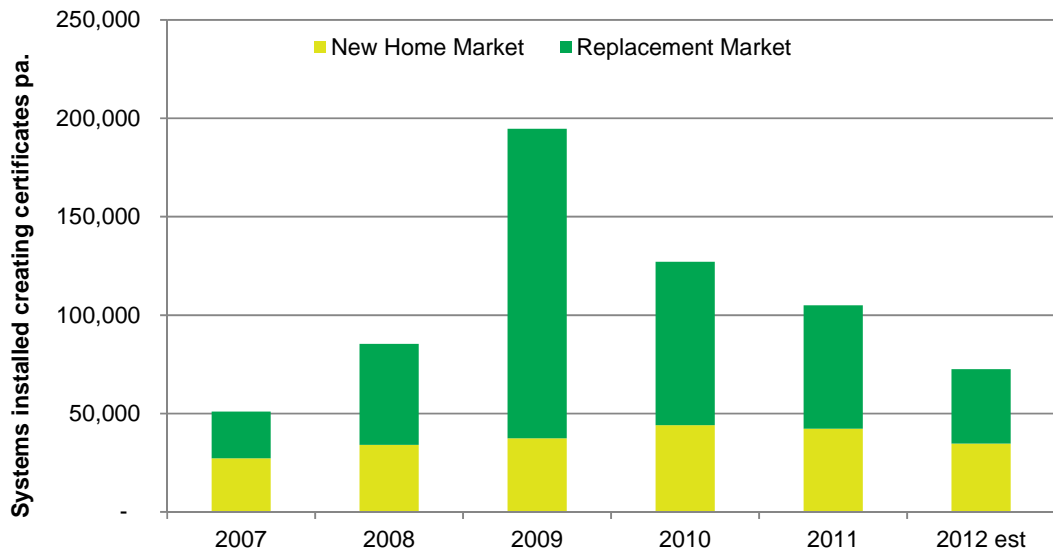
The PV market in Australia is dominated by residential installations with 296,000 systems being installed in 2012 compared to 322,000 in 2011. The average size of installations has increased considerably rising from 2.1 kW per system in 2011 to 2.9 kW per system in 2012. Nearly 890,000 grid connected residential systems were installed at the end of 2012 accounting for 16 per cent of owner-occupied detached and semi-detached homes.

Queensland has been the pre-eminent market for PV in Australia over 2012 accounting for more than 40 per cent of total installations. Whilst the number of installations fell in most other states Queensland increased by more than 30 per cent.

SWH market

The solar hot water market in Australia has continued its decline with 72,500 systems estimated to have been installed in 2012 and claiming certificates. This is 31 per cent lower than in 2011 and nearly a third of the 2009 peak. Not all SWH systems installed create certificates and industry estimates that 10 to 15 per cent of systems, particularly in the new home market do not create certificates.

Figure 3.2 SWH Systems installed by market segment



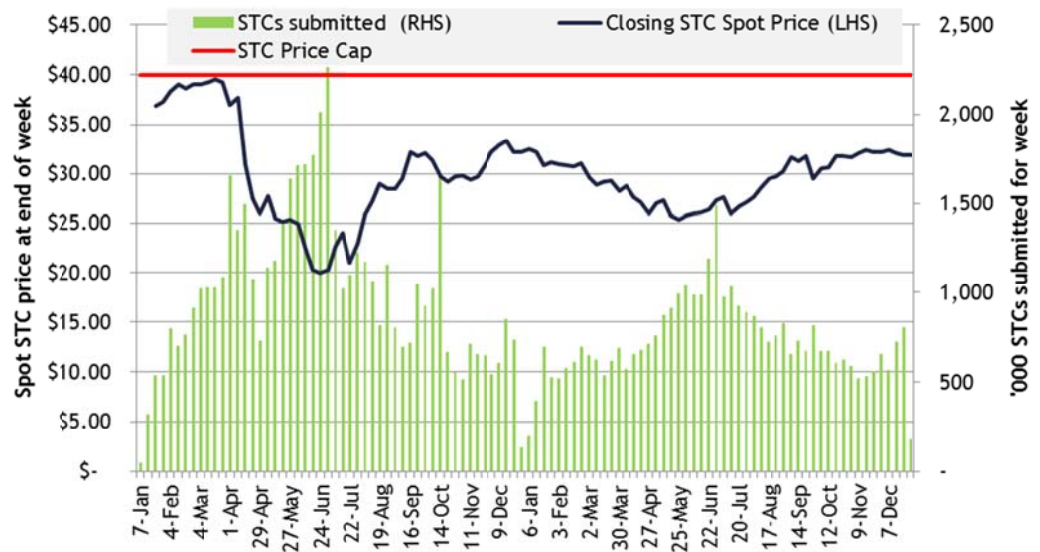
The new home market has remained relatively stable over the last five years although it did experience an 18 per cent decline in 2012. The replacement market has proved to be quite volatile and dropped by 40 per cent in 2012. The removal of the \$1000 commonwealth rebate and competition for household discretionary expenditure with solar PV being the key factors in the decline.

STC market

The wholesale STC price reached \$34 in December 2011 and then progressively fell as the level of STC creation increased due to the surge in PV installations in Queensland. The STC price started to increase again after the end of June 2012 as the level of STC creation reduced and closed 2012 at \$32 (Figure 3.3).

Market expectations are for the price to progressively move towards the \$40 STC Clearing House Price as the oversupply of STCs slowly gets absorbed. The average STC spot price over 2012 was \$29.47. For the purposes of our analysis we have assumed that the average STC price for 2013 is \$34.40 and then increases to \$38 in 2014 and 2015.

Figure 3.3 STC spot price and weekly STCs submitted for registration



Market Survey

As part of the data modelling exercise we interviewed a number of market participants for their views of the solar PV and SWH market over the coming three years. The views of these businesses assisted in the development and refinement of our assumptions.

4. Review of Historical data

The PV market exceeded expectations again in 2012, with nearly 300,000 systems installed during the year for which certificates have been produced to date (31 December 2012). The higher than expected level of installation was the major contributor to the 15 million certificate oversupply for the year.

SWH installations were significantly below market expectations with only 56,000 SHW systems installed in 2012 having created certificates by the end of 2012. This was the lowest number of installations since 2007.

Figure 4.1 Certificates created for PV and SWH (on monthly installed basis)

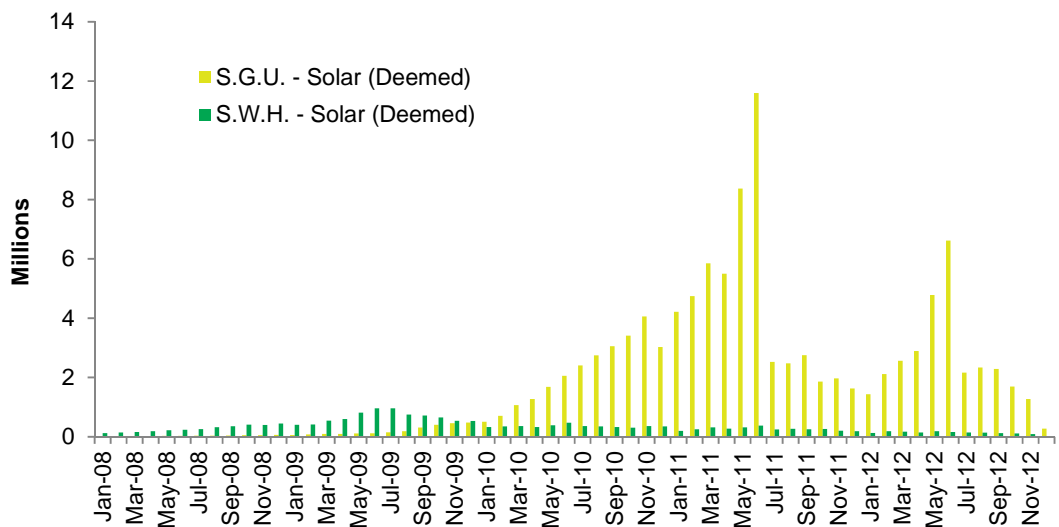
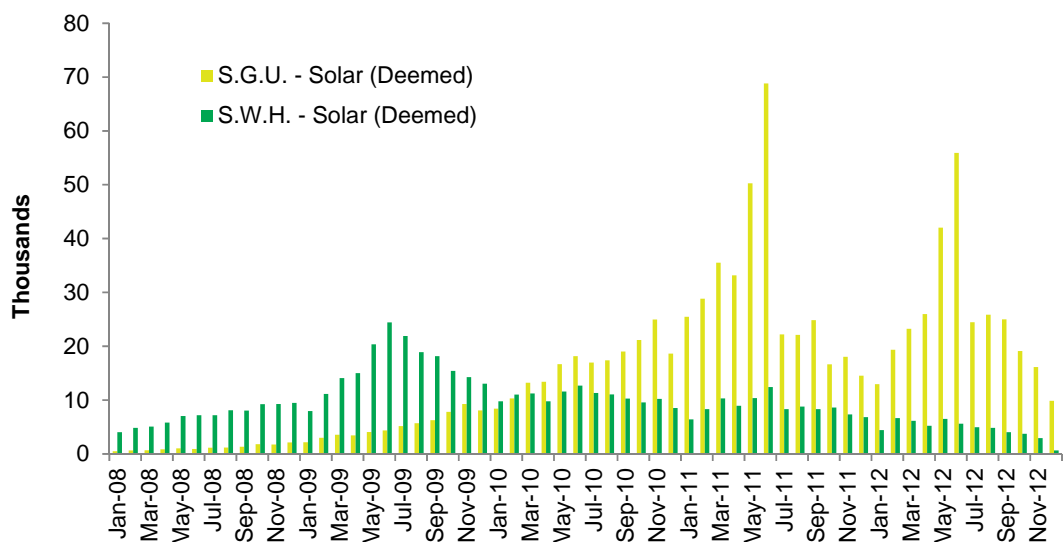


Figure 4.2 PV and SWH systems creating certificates (on monthly installed basis)



Since the start of the renewable energy scheme, 781,000 SWH systems and 945,000 PV systems have been installed and created certificates¹.

Solar PV

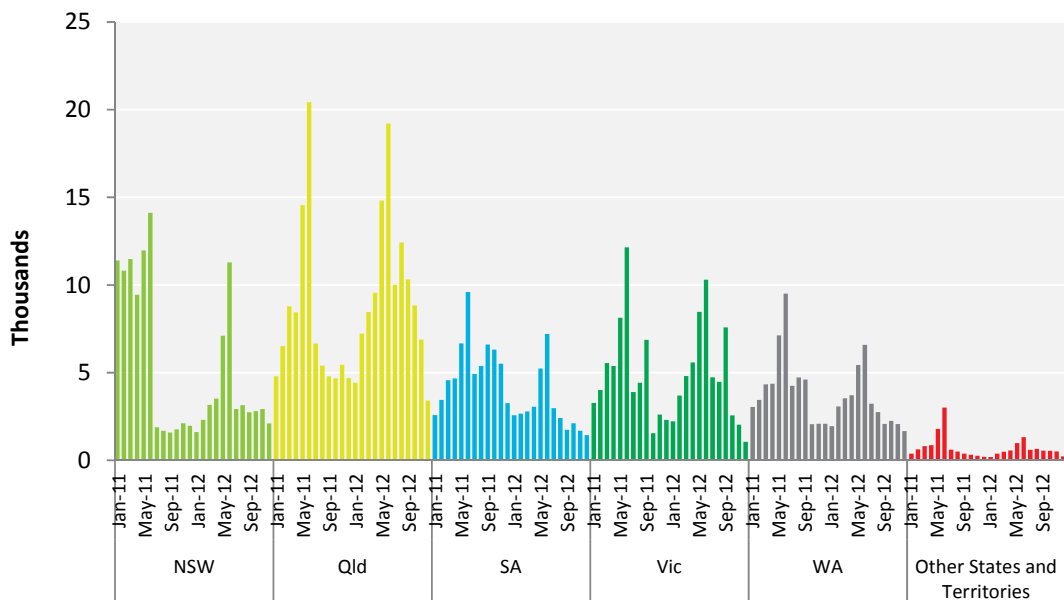
The PV market defied expectations during 2012 maintaining a high number of systems installed. Almost 300,000 PV systems installed during 2012 had created certificates by 31 December 2012. Not all systems installed in 2012 had created certificates and we estimate that 10 per cent of systems will create certificates in 2013.

There was much greater variability between states during 2012 with the greater disparity between feed-in tariff rates. Changes in installations in the larger states were:

- Queensland: up 21 per cent in 2012, with 30 per cent of total systems installed in 2012
- VIC: down 4.4 per cent in 2012. 19.2 per cent of the market
- WA: down 25.8 per cent, 12.8 per cent of the market
- SA: down 43.5 per cent, 12 per cent of the market
- NSW: down 43.2 per cent, 15.2 per cent of the market

This difference was most pronounced in Queensland due to the feed-in tariff of 44 cents / kWh for much of the year. Queensland's feed-in tariff was reduced in early July, but the transition to the lower rate allowed people with pre-approvals to install up to a year later and receive the higher rate. As a result, Queensland had 21 per cent more systems installed in 2012 than in 2011 (approximately 20,000 systems) and had 39 per cent of all systems installed (and for which certificates were created).

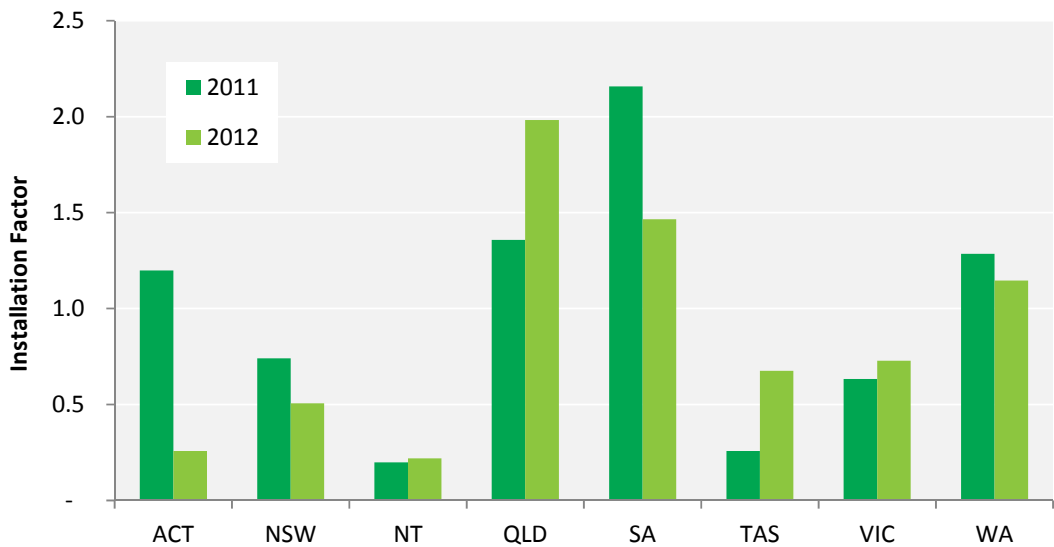
Figure 4.3 PV Systems installed by state between 2011 and 2012



¹ Some of these systems will be expansions to existing systems or replacement systems

The relative strength of installation levels can be measured by Installation Factor (Figure 4.4). The installation factor compares each state's proportion of national installations, with that state's proportion of suitable housing. The measure we have used as suitable housing is owner occupied free standing and semi-detached housing. An installation factor above 1 indicates a higher proportion of installations compared to the proportion of suitable housing.

Figure 4.4 PV installation factors for 2011 and 2012



While feed-in tariffs can be an indicator of installation levels, there are exceptions. WA also had strong installation figures despite generally having a low feed-in tariff. The ACT has a relatively attractive feed-in tariff and weak installation figures during 2012.

- Queensland has the highest installation factor for 2012 with 2.0
- SA's feed-in tariff during 2012 was close to the household retail rate. It had an installation factor of 1.5
- WA: despite the majority of the state being subject to a feed-in tariff below 8.5 cents / kWh, WA had an installation factor of 1.1
- Victoria: despite the attractive feed-in tariff and having almost 20 per cent of national installations for 2012, Victoria's installation factor was 0.7
- Tasmanian households can negotiate a 1 for 1 feed-in tariff with their electricity supplier, yet the state's installation factor was 0.7. Although the total number of installations is not material in the national context (1.2 per cent of installations), installations in Tasmania grew significantly from 2011 which had an installation factor of 0.3
- ACT: the feed-in tariff in the ACT was 45.7 cents / kWh until July 2011 and subsequently fell to 1 for 1. Although this rate is attractive in terms of systems payback, the ACT had the most significant decrease in installation rate falling from 1.2 on 2011 to 0.3 in 2012.

Installed Capacity

Australia reached 2 GW of installed capacity during in August 2012 based on systems claiming certificates. By December 2012, total installed capacity approached 2.3 GW.

During 2012 Queensland doubled its accumulated installed capacity to have the highest in the country of 720 kW.

Table 4.1 Installed capacity by state (kW) – certificates to 31 December 2012

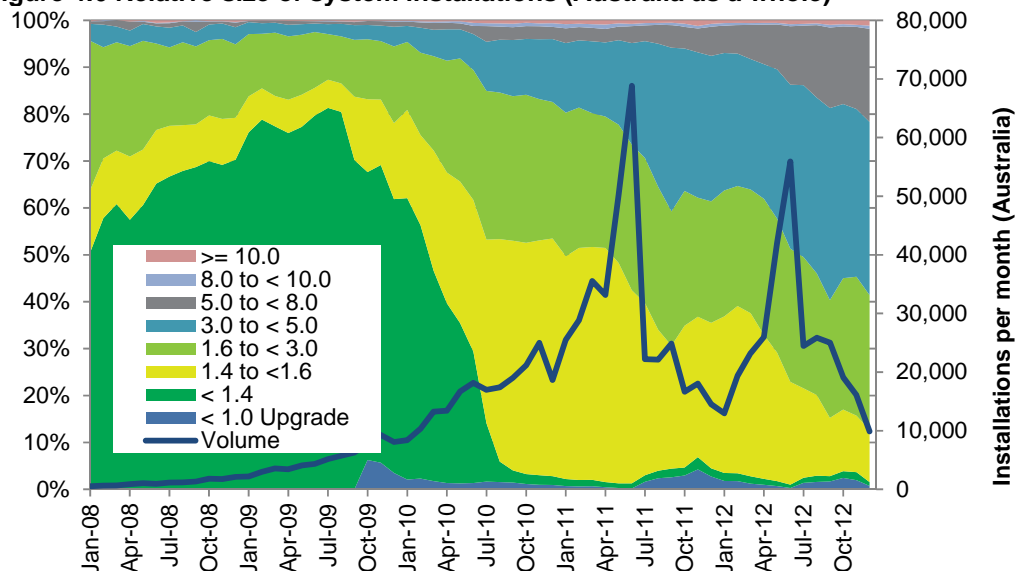
	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	Total
Pre 2011	7,010	180,185	3,110	129,606	56,367	5,056	74,226	60,597	516,158
2011	17,227	195,325	1,803	224,843	163,485	5,912	139,992	122,987	871,575
2012	3,519	118,766	1,591	365,912	115,149	16,604	176,462	87,946	885,949
Total	27,756	494,277	6,504	720,361	335,001	27,573	390,679	271,530	2,273,682

Note: not all systems installed in 2012 had created certificates (as at 31 December 2012)

Average System Size

Average system size continued to grow during 2012, increasing from 2.4 kW in 2011 to 3 kW in 2012. The trend toward increasingly larger systems continued throughout the year with 55 per cent of systems installed from July to December being 3kW or larger.

Figure 4.6 Relative size of system installations (Australia as a whole)



Note: Volume refers to the number of systems installed in the month that had created certificates as at 31 December 2012.

With feed-in tariffs reducing in most states and territories it was assumed that average system capacity would reduce. However, all jurisdictions with the exception of NT and WA had an increase in average system size. The largest increases however, were in those states where the highest feed-in tariffs were available for a large portion of the year:

- Queensland; 34 per cent increase from 2.4 kW to 3.2 kW (44 cent / kWh until 9 July 2012, with transition arrangements to allow further systems to be installed at 44 cents / kWh subsequent to that date)
- Victoria: 32 per cent increase from 2.3 kW to 3.1 kW (25 cents / kWh for systems up to 5 kW, until 30 September 2012; 1 for 1 for systems above 5 kW to 100 kW until 30 September 2012)
- Tasmania: 28 per cent increase from 2.4 kW to 3.1 kW (1 for 1 feed in tariff available on negotiation with distributor)

- South Australia: 25 per cent increase from 2.6 kW to 3.2 kW (25.8 cents / kWh total contribution from retailer and distributor)

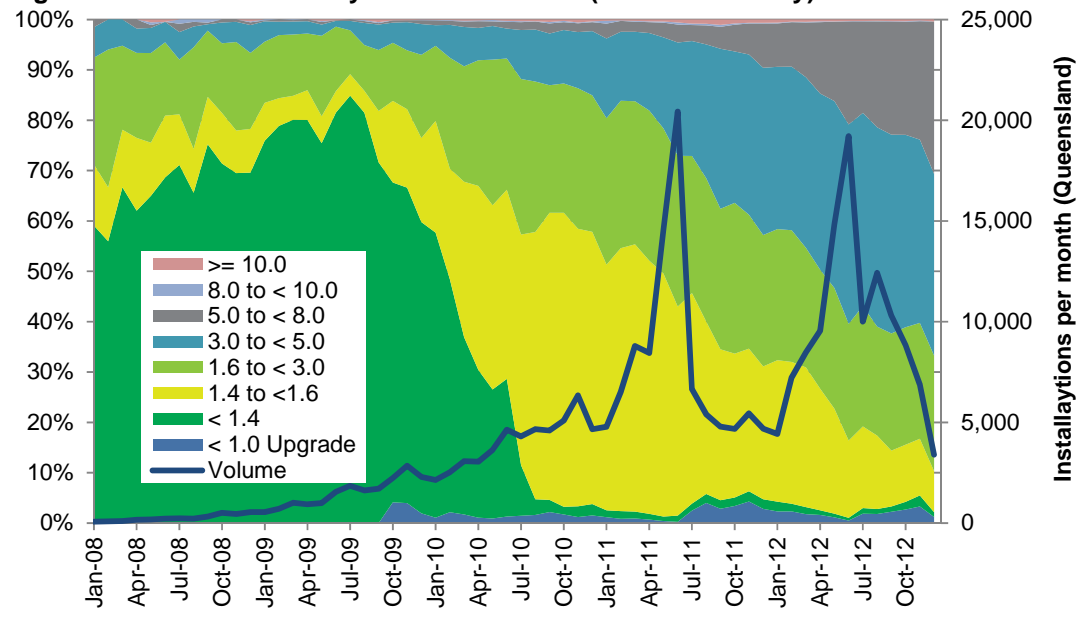
Two states which represent the different effect feed-in tariffs have on system size are NSW and Queensland and we specifically consider each of these markets. While many installations in Queensland are still receiving the high feed-in tariff, NSW's feed-in tariff has been 7 cents / kWh since the end of April 2011.

The movement toward larger systems in Queensland has been quite consistent over the past two years, irrespective of the number of systems being installed (refer to Figure 4.7).

In Queensland:

- 24 per cent of systems installed in 2011 were in the 1.4 to <1.6 bracket
- 18 per cent of systems installed in 2012 were in the 1.4 to <1.6 bracket
- From July to December 2012, 61 per cent of systems were 3 kW or larger
- From July to December 2012, 22 per cent of systems were 5 kW or larger

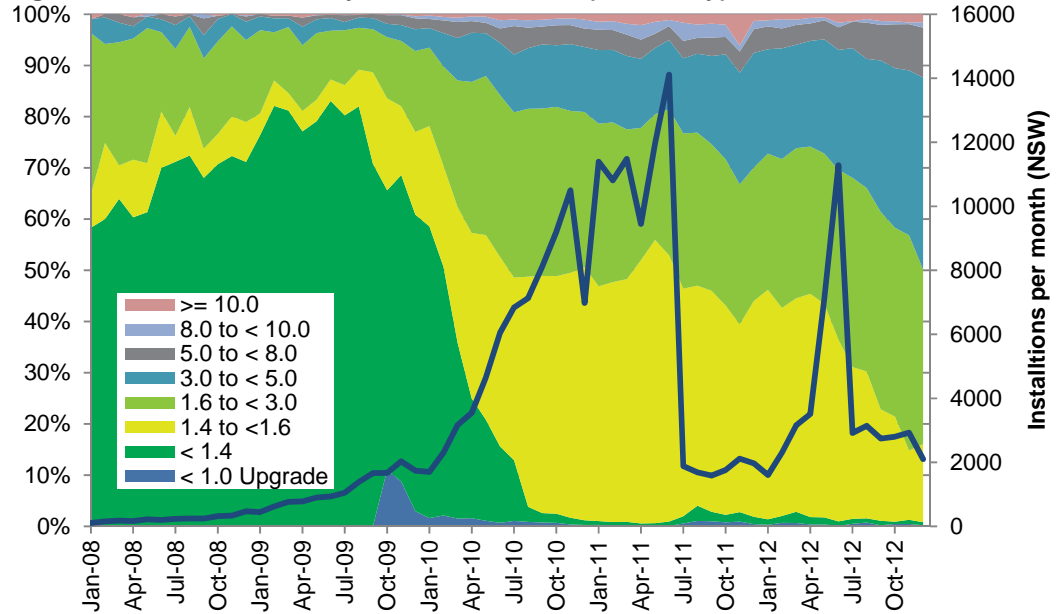
Figure 4.7 Relative size of system installations (Queensland only)



In NSW system sizes in the 1.5 kW range have remained the most popular systems with a movement toward larger systems in the last six months of 2012:

- 49 per cent of systems installed in 2011 were in the 1.4 to <1.6 bracket
- 33 per cent of systems installed in 2012 were in the 1.4 to <1.6 bracket
- From July to December 2012, 39 per cent of systems were 3 kW or larger
- From July to December 2012, 10 per cent of systems were 5 kW or larger

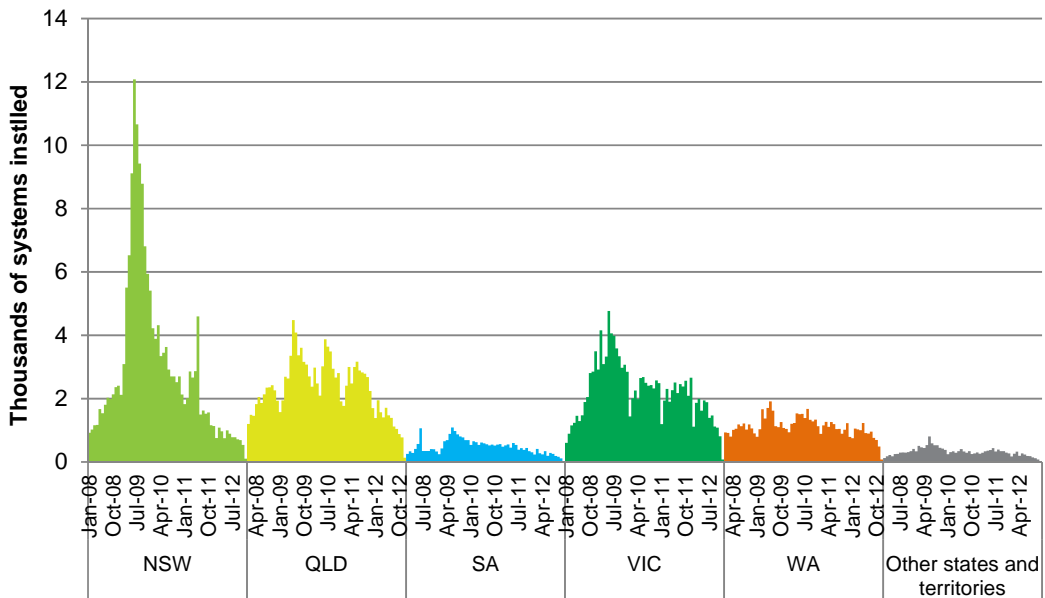
Figure 4.8 Relative size of system installations (NSW Only)



SWH

56,000 SWH systems were installed and created certificates during 2012. The data for 2012 will not be complete until the end of 2013; the more recent the month the less complete the data.

Figure 4.9 SWH systems installed (monthly) created to 31 December 2012

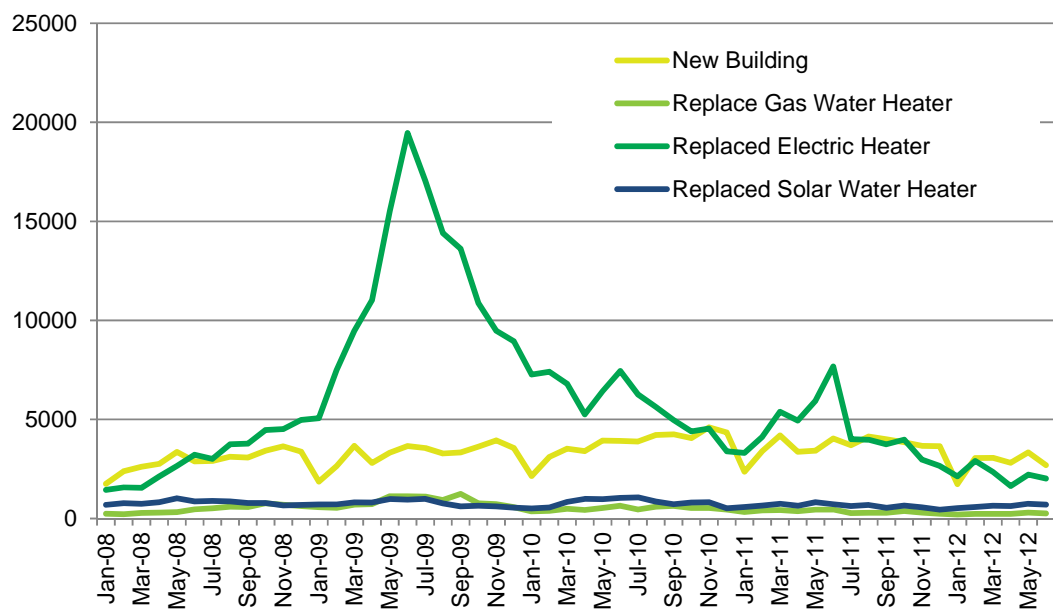


SWH installations have reduced across all states. The most dramatic reductions however, have been in those states that have relatively low penetration of gas and have high proportions of electric water heaters (ie. NSW and Queensland). Commonwealth and state

support programs creating incentives to replace electric water heaters were extremely successful in these states with significant growth in the replacement market (refer to Figure 4.10 and Attachment 8). The removal of rebates has had a dramatic impact on the level of SWH systems installed in NSW and Queensland.

Victoria has remained a key market for SWH over the last two years reflecting high levels of new home installation and support provided by the Energy Saving Incentive Scheme for replacing electric water heaters with SWH.

Figure 4.10 SWH system installations by type (system replacing)



The new building market and the solar replacement market although declining recently has underpinned the SWH industry over the last two years.

Similar to solar PV we have assessed the relative strength of SWH installation levels by considering and Installation Factor (Figure 4.11). The installation factor compares each state's proportion of national installations, with that state's proportion of suitable housing.

NT remains the jurisdiction with by far the highest installation factor of 2.7. This may be in some part be compensating for the very low PV installation factor. Tasmania was the state with the lowest SWH installation factor for 2011 and 2012; 0.6 and 0.5 respectively. This is despite a PV installation factor below 1.

Figure 4.11 SWH Installation factors for 2011 and 2012



As is the case with PV, it is difficult to attribute any single factor to the level of SWH installations in a single state. Two factors that do have a significant influence however are the level of gas reticulation in a state (the less access to gas, the greater the likelihood of installing a SWH) and the solar zone (the solar zones with the better solar radiation get a higher number of STCs for SWH. These systems will also perform better in these conditions). The correlation between the level of installation and these two factors can be seen in Figures 4.12 and 4.13.

Figure 4.12 SWH Installation factors for 2011 and 2012 with level of gas reticulation

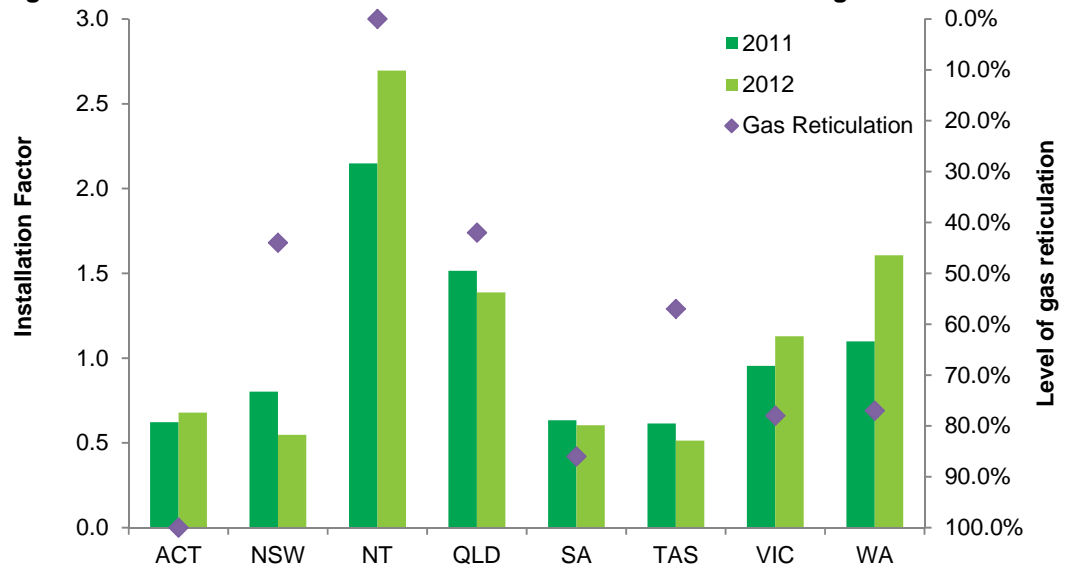


Figure 4.13 SWH Installation factors for 2011 and 2012 with solar zone



Delay in creation of certificates

Registered Agents and their customers have 12 months from the date of installation of a small-scale system to create the certificates. This means that we will only know at the end of December 2013 the number of certificates created from the installation of solar systems in 2012.

The data provided by the CER incorporated details for those systems that had been submitted for certificate creation by 31 December 2012. To get a full picture of likely level of installations during 2012 we need to estimate the number of certificates that are yet to be created for systems installed in 2012.

Our starting point is to consider the delay in certification creation for 2011, the most recent year for which we have complete data. We have analysed 2011 installations by year of creation across the market segments that we are assessing. The results of this analysis are included in Table 4.2.

In the case of Solar PV systems installed in 2011 an additional 8.3 per cent of the systems that had created certificates up until the end of 2011 created certificates the following year. In the case of SWH, 20.6 per cent of systems creating certificates in 2011 created certificates the following year. There is also quite a difference between the market segments for each technology ranging from 7.3 per cent for Off-grid PV to 37.7 per cent for SWH in new buildings.

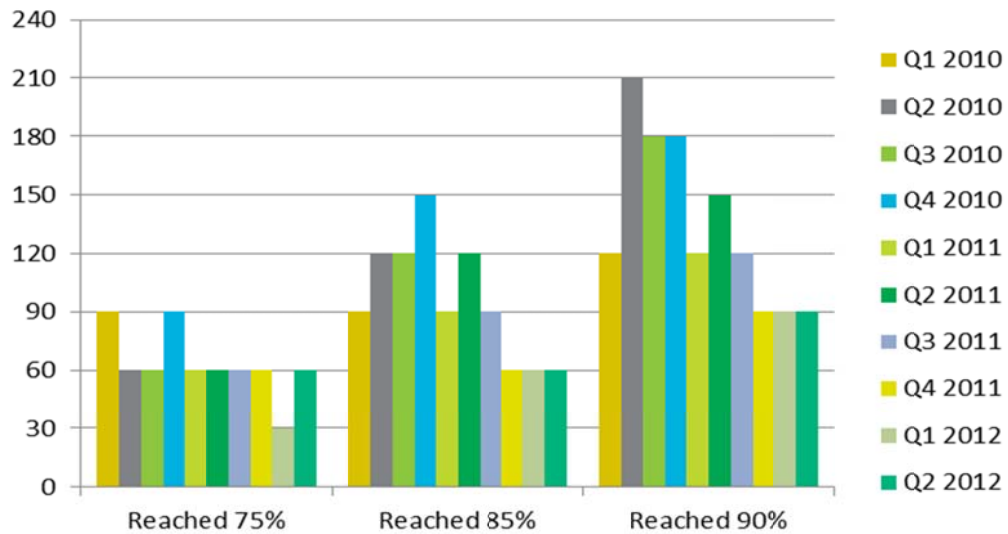
Table 4.2 Certificates created for 2011 Installations by creation year

2011 Installation Year	Creation Year 2011	Creation Year 2012	Total	2012 as Proportion of 2011
Number of PV Systems				
Off-Grid	30,856	2,265	33,121	7.3%
On-Grid Non-Resid	1,790	348	2,138	19.4%
On-Grid Resid	297,388	24,443	321,831	8.2%
On-Grid Upgrade	2,976	700	3,676	23.5%
	333,010	27,756	360,766	8.3%
Number of SWH Systems				
New Building	30,741	11,589	42,330	37.7%
Replacement	55,264	7,459	62,723	13.5%
	86,005	19,048	105,053	22.1%
PV STCs created				
Off-Grid	4,900,404	287,150	5,187,554	5.9%
On-Grid Non-Resid	672,242	139,579	811,821	20.8%
On-Grid Resid	44,361,484	3,121,396	47,482,880	7.0%
On-Grid Upgrade	33,507	7,867	41,374	23.5%
	49,967,637	3,555,992	53,523,629	7.1%
SWH STCs created				
New Building	893,724	304,467	1,198,191	34.1%
Replacement	1,694,195	229,143	1,923,338	13.5%
	2,587,919	533,610	3,121,529	20.6%
Total STCs	52,555,556	4,089,602	56,645,158	7.8%

PV system installation and delay in creation

In the case of solar PV, the delay between installation and certificate creation has been falling over the past three years. We have analysed the length of time it takes to register 75 per cent, 85 per cent and 90 per cent of systems. The analysis has been done by the quarter the system was installed from January 2010 to June 2012 (refer to Figure 4.14)

Figure 4.14 Delay in certificate creation (number of days)



A notable feature of this analysis is that there has not been a significant improvement in certificate creation times for the majority of certificates. Most jurisdictions during the majority of quarters created at least 60 per cent of certificates within 30 days and 75 per cent within 60 days. The greatest improvement in creation times came from the subsequent 15 per cent of certificates. During the last three quarters of 2010 it took 180 to 210 days to create 90 per cent of certificates. In 2011 this improved to no more than 120 days during all but one quarter. In the first two quarters of 2012 90 per cent of certificates were created within 90 days. Refer to Attachment 9 for an assessment by state.

Given that this period saw a significant increase in the volume of certificates created the improvement in creation times for this 15 per cent of certificates is significant. It is interesting to note that there was deterioration in certificate creation times from the first to the second half of 2010. This was the period during which installation of PV started to increase significantly.

By using data taken directly from the REC Registry, we have analysed the delay in certificate creation by the type of certificate creator. As this data does not include installation date, we can only do this analysis on the basis of 2011 generation year certificates which were created in 2012. In total 3.55 million STCs for solar PV were created in 2012 for systems installed in 2011.

The categories we have developed are as follows:

- Aggregators: businesses which offer specialised certificate creation services
- Individuals (system owners) - creators that have created certificates for no more than 2 installations
- Installers: these are smaller electrical contractors who have created certificates with no more than 200 systems in a year (with the exception of aggregators)
- Solar companies: creators who have created certificate for more than 200 systems (with the exception of aggregators)

This analysis showed that the solar companies had the biggest share of the STC creation market with 64 per cent of all certificates created. However solar companies also had the lowest percentage of certificates created in 2012 for systems installed in 2011, with just 3.6 per cent of certificates.

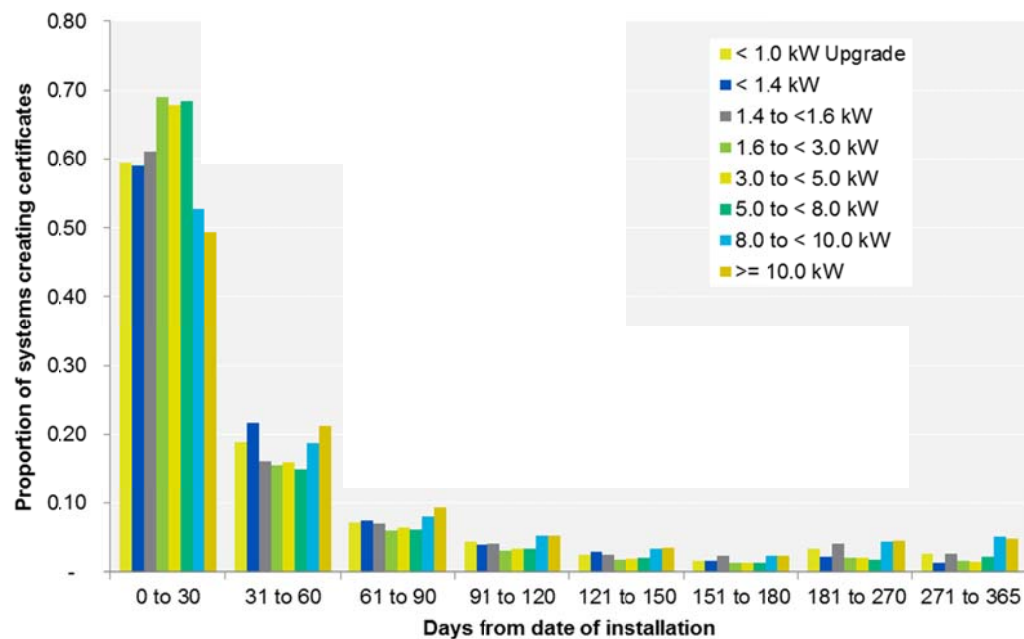
Table 4.3 Certificates created by agent type

National	Per centage held-over	Per centage of Mkt
Aggregator	6.3	29.1
Individual	15.7	0.9
Installer	6.7	6.2
Solar Company	3.6	63.9
Grand Total		100.0

Note: "Percentage held over" refers to the percentage of certificates that were created for 2011 installations that were created in 2012.

We also performed an analysis on the delay in certificate creation by PV system size. We had initially expected that larger systems would have a shorter delay in certificate creation however we found that this was only true to a limited extent (Figure 4.15). Within 30 days of installation, 68 to 69% of systems from 1.6 kW up to 8 kW created certificates. This compared to 59 to 61% of systems less than 1.6 kW. Surprisingly for larger systems 53% or fewer created certificates within 30 days.

Figure 4.15 Delay in certificate creation (systems installed 2010 to 2012)



Projected delay in solar PV and SWH certificate creation

In developing estimates for the number of systems and associated certificates that will eventually be created in 2012 we have generally applied the 2011 proportions with the following changes:

- Increased the On-grid residential proportion from 8.3 per cent to 9.5 per cent to reflect the surge in PV installations in the last few months of 2012 due to the reduction of the solar credits multiplier.
- Increased the Off-grid proportion to 15 per cent to also reflect the expected surge in applications

Table 4.3 Systems creating certificates in the year following installation year

Systems creating certificates	2012 as Proportion of 2011	2013 as Proportion of 2012	2014 as Proportion of 2013	2015 as Proportion of 2014	2016 as Proportion of 2015
	Actual	Estimate	Projection	Projection	Projection
PV Systems					
Off-grid	7.3%	15.0%			
On-grid Non-Resid	19.4%	20.0%			
On-grid Resid	8.2%	9.5%			
On-grid Upgrade	23.5%	15.0%			
Total PV	8.3%	10.2%	9.9%	9.8%	9.8%
SWH Systems					
New Building	37.7%	40.0%			
Replacement	13.5%	15.0%			
Total SWH	22.1%	26.8%	20.0%	18.0%	15.0%

5. Australian PV Industry Overview

As the Australian PV market has grown in volume, the channels to market have evolved and expanded as well. By the end of 2012, there were an estimated 4,200 businesses active in the PV industry in Australia, estimated to employ approximately 16,000 people, including support industries.

Many changes have occurred in the ranking of industry participants and indeed a number of exits, entries, mergers and changes of significance have occurred in the last 12 months alone. The cessation of the majority of feed-in tariff schemes and a winding back of the solar credit multiplier for PV during 2011 and 2012 had significant impacts. In some cases terminally damaging businesses caught unaware or heavily exposed and in others forcing restructures or changes in focus.

However, competitive pressure, excess global inventory, reasonably favourable foreign exchange rates and larger than expected PV price reductions re-invigorated demand and arguably, saved a large number of additional businesses from collapse.

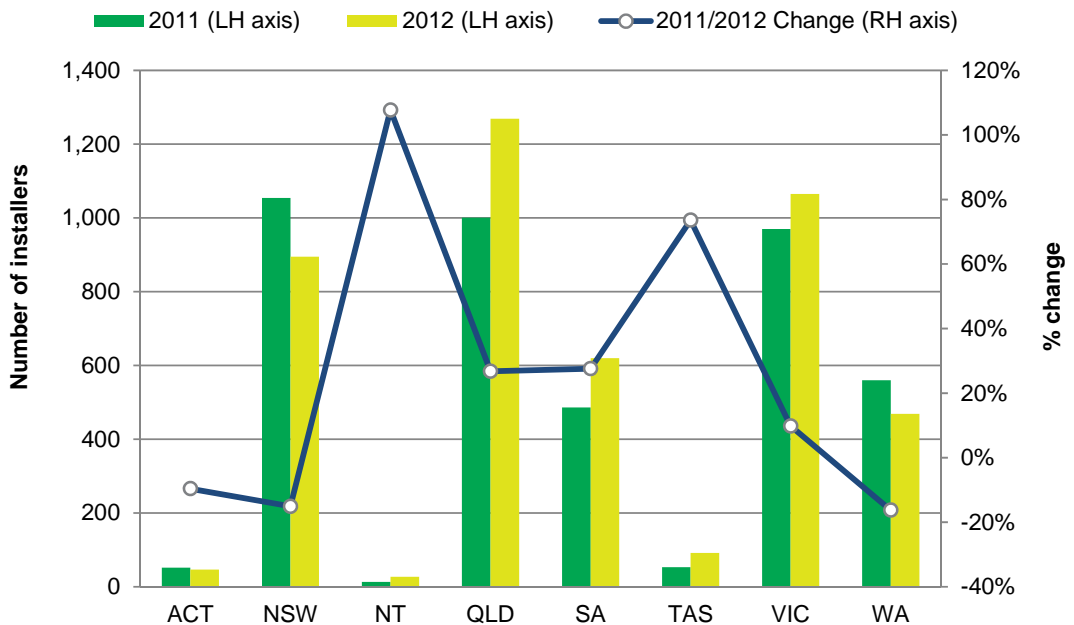
SolarBusinessServices has conducted analysis on industry participants using the following segmentation of primary activity types:

- **PV Wholesalers** - companies engaged primarily in the wholesaling of PV equipment and rarely if ever in the retailing or installation of such equipment (where possible, wholesale and retail volumes have been split and explicitly noted)
- **Large PV retailers** - companies engaged primarily in the retailing of PV equipment, in significant volume or with significant profile. Typically use a mix of in-house and or sub- contracted installers. Typically >1MW p.a. in volume.
- **Medium PV retailers** - companies engaged primarily in the retailing of PV equipment in reasonable volume or with reasonable profile. Typically use a mix of in-house and or sub- contracted installers. Typically 200kW-1MW p.a.
- **Small PV retailers** - companies engaged primarily in the retailing of PV equipment, in small volume or with small profile. Typically installations are handled in-house. Typically <200kW p.a.
- **Utilities** - companies licensed and engaged primarily in the retailing of electricity in the National Electricity Market and Western Australian Power Market who are active in the PV market
- **Electrical contractors** - companies engaged primarily in electrical contracting which includes the installation of PV systems but rarely the retailing of PV
- **Engineering Procurement and Construction (EPC) Specialists** – companies focused primarily on the engineering, construction and procurement of commercial PV systems

The highest number of companies represented is electrical contractors who represent around 70 per cent of the total number of businesses active in the PV industry in 2012 and never lower than 60 per cent as far back as 2009.

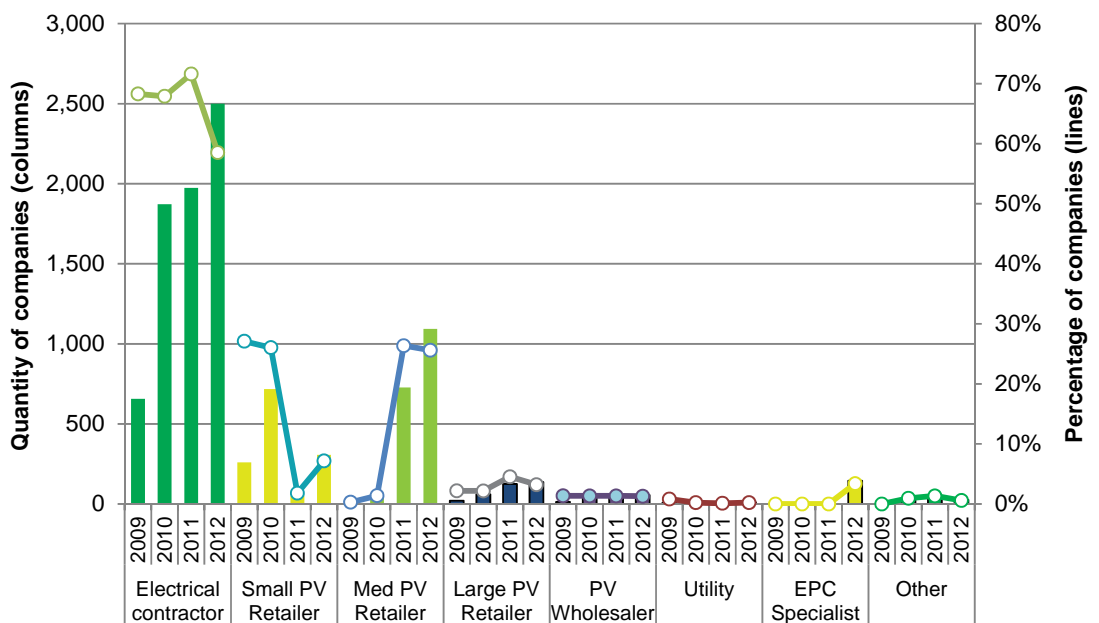
Electrical contractors play a vital role in the installation of PV and their number is a crucial measure of the industry's capacity to install any given volume. However, as these companies have increasingly represented sub-contractors taking advantage of what is now relatively low revenue installation work, their entry and exit from the industry shifts rapidly with demand. It is also arguably the case that this segment of the channel is on the whole far less engaged in the development of or advocacy for the industry. This can be seen in a statistical sense when we analyse the locations of installers relative to the changes in state demand, represented in Figure 5.1.

Figure 5.1 Change in PV installers by state



Of particular interest is the reduction in the number of installers that saw relatively unattractive feed-in tariffs (eg. NSW and WA) and increases in states that still had attractive feed-in tariffs for most of 2012 (Queensland, Victoria and South Australia).

Figure 5.2 Active businesses in the solar PV industry



Based on the categorisations above, the companies currently active in the Australian PV market have been identified by their primary 2012 activity level (Figure 5.2). The industry channels have historically demonstrated an organic reaction to demand. The number of

players have ebbed and flowed with the needs of the market. 2012 is no exception with industry participation levels similar to 2011, in line with similar annual volumes.

Such market volume has created a significant opportunity for industry participants with an extensive array of offers, sales and deployment expertise. As the barriers to entry are low and the opportunity is appealing, the general perception is that the market is oversupplied.

The Commercial PV market's growth continues to attract great interest from all parts of the channels to market. A large proportion of current market players are not yet resourced or adapted to cope with the market demands, long sales pipeline and energy market complexity. Despite this, most solar companies are pursuing significant volume of enquiries and systems are being installed by a variety of company types.

Based on lower market volumes for 2013 and 2014, the number of participating solar businesses is likely to reduce and consolidation to increase. The number of industry participants can be measured in two key ways; firstly through the number of accredited installers and secondly, through the estimated number of active companies. These two metrics differ due to the fact that multiple installers work for the same company in some cases, some installers retain registration despite being non active and a number of companies use subcontractors and thus are not listed as accredited installers.

Data from the Clean Energy Council has been used to measure accredited installers and data from SolarBusinessServices to measure the quantity of companies.

Shown below in Table 5.1, we can see that in terms of the sales channel to market, best measured through the number of companies, on average each company sold an estimated 19 per cent less volume per company than in the previous year, despite an increase in overall sales volume. With lower volumes in 2013 we expect to see declines in both kW per company and kW per installer as well as a lower number of active market participants.

Table 5.1 Accredited Installer Activity

Year	kW p/a	Number of Companies	kW per company	Annual change kW per company	Number of accredited installers	kW per installer	Annual change kW per installer
2009	86,000	961	89		1300	66	
2010	360,000	2732	132	47%	3178	113	71.2%
2011	845,000	2917	290	120%	4189	202	78.1%
2012	993,000	4246	234	-19%	4484	221	9.8%

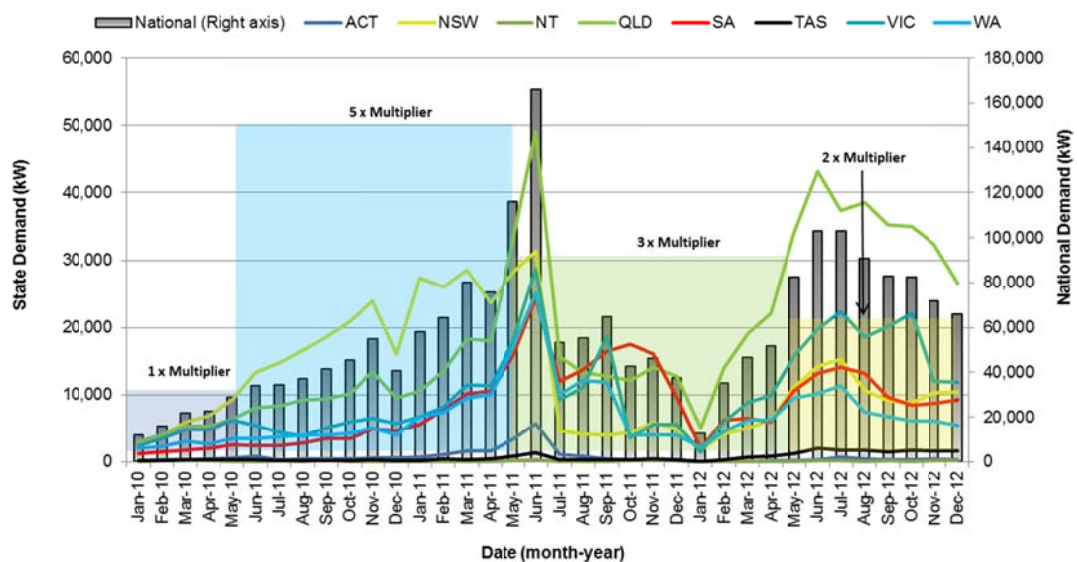
6. Installed PV system cost projections

The best factory gate prices (large volume orders) in the Australian market have fallen dramatically in the last year or so with an average decline of 35 per cent by the end of 2012 compared to the 2011 average price. There was a sense that the Australian price had bottomed out, having had something of an overcorrection, but attractive foreign exchange rates and a soft start to the international market place has resulted in further decreases with record low pricing in Australia at the end of 2012 as a result of the significant recent growth.

Although many local and global factors affect cost, it is increasingly local factors and scale that affect price. Price consists of the build-up of costs, plus the cost of sales and the margin requirement, which are directly proportional to the volume or scale available.

Whilst global cost reductions have contributed to volume growth, changes to the SRES multiplier have had a discernible impact on activity (Figure 6.1). Part of this reaction is marketing driven and based on emotion and part of it is price based. In addition many states were phasing out feed-in tariff programs which lead to surges in activity..

Figure 6.1 Australian state and national demand and SRES changes



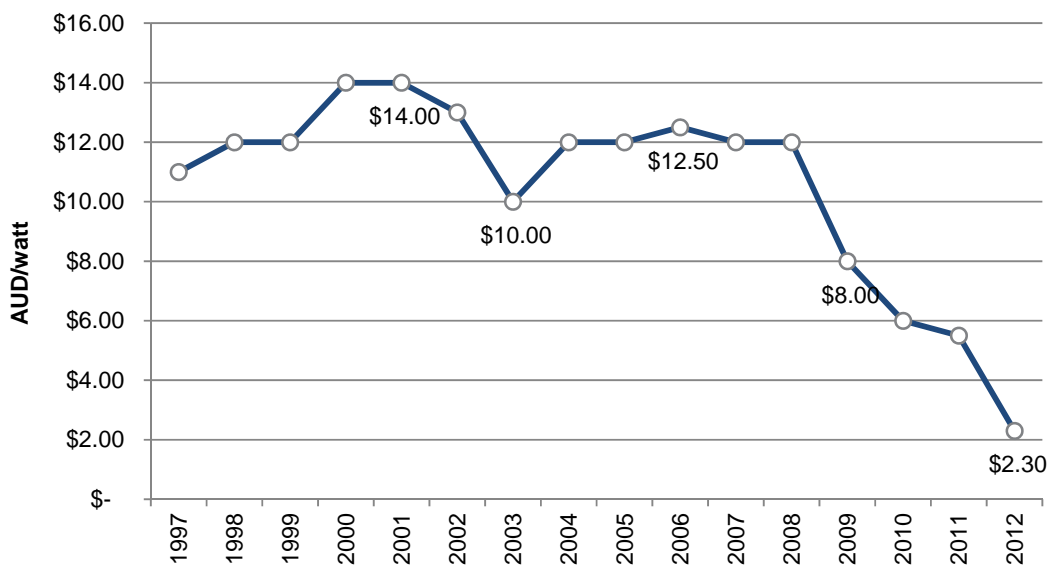
With a proliferation of less well known manufacturers (Tier 2 and Tier 3 brands) in the market and favourable foreign exchange rates, the Australian market has at times experienced prices below world market averages. Price reductions in 2012 have exceeded most analysts' expectations and cost reductions continue to be forecast by major manufacturers.

The extent of any further decreases in Australia depends on a number of critical factors, most notably:

- Foreign exchange rates
- The relative size and attractiveness of the market, compared to other global markets
- The relative size, quantity and attractiveness of the Australian buying channels

System prices in Australia have dropped markedly over the last three years (Figure 6.2). In 2013 we expect imported PV prices to stay flat with possible reductions through low end products. There is a strong likelihood of further consolidation in Asian manufacturers with Australia's attractiveness as a market remaining strong. Although PV module price is decreasing in importance as a component of system prices, reducing/ it remains the largest single component of cost build up.

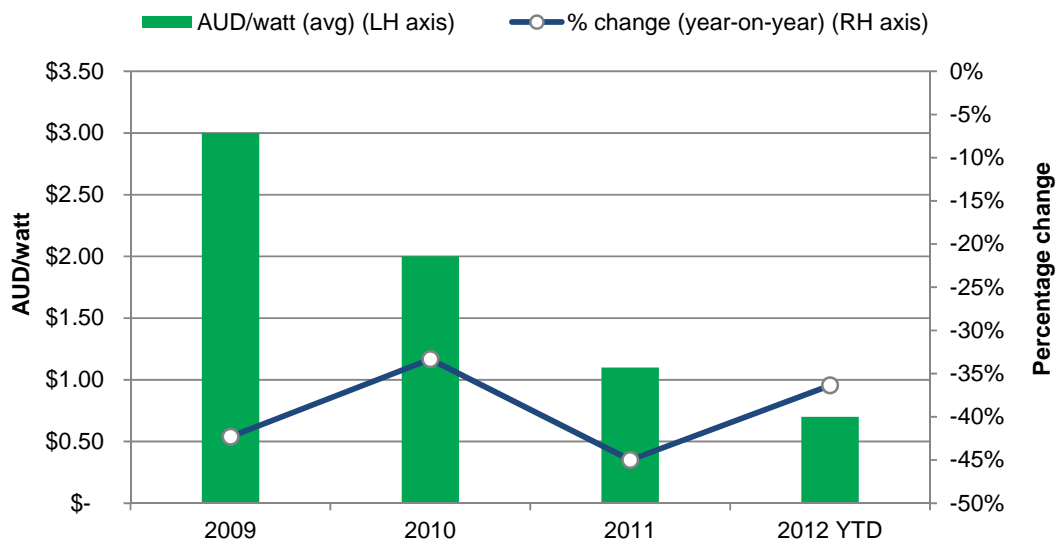
Figure 6.2 PV system price history (sub 5kW system)



Source: SolarBusinessServices and IEA PVPS data

SolarBusinessServices monitors a growing sample of factory gate market prices in the local market. Over the last 4 years the changes have reflected the global trends (Figure 6.3).

Figure 6.3 PV system price history (sub 5kW system)



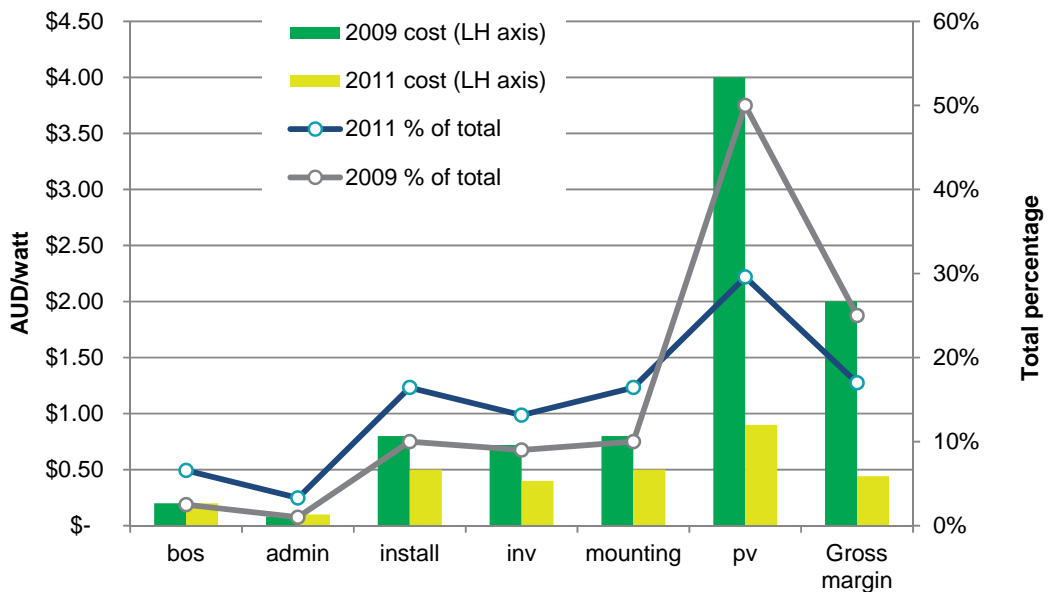
Despite its reasonable size, the Australian market has only a minimal measurable impact on the global price of the majority of components which are predominately manufactured to suit other markets.

In analysing system component prices we have based our analysis on residential system sales which make up more than 95 per cent of the current market and define price build up as consisting of the following:

- PV cost (modules)
- Inverter cost
- Mounting hardware cost
- Installation cost
- Other ancillary hardware cost
- Gross Profit margin (effectively the cost of sales plus net margin)

Figure 6.3 includes sample pricing taken from the Australian market prior to allowing for the value of up-front support from renewable energy certificates. Cost reductions have occurred through all components of a PV system (Figure 6.4).

Figure 6.4 Changes in PV module and balance of system (BOS) price



International PV cost influences

Whilst Australian PV module and balance of system (BOS) pricing generally follow international trends, there are two factors that influence International pricing in the local Australian market.

The first factor is the uniqueness of the Australian market relative to International markets. Australia is a relatively late starter in terms of being a “material” sized market and has comparatively low barriers due to its predominant residential nature (more than 95 per cent of systems). As such, International companies seeking to test new products, clear old models or sell Tier 2 or Tier 3 products have been attracted to Australia. With limited PV brand recognition compared to more mature markets and a favourable exchange rate, prices in Australia could in many cases be categorised as “market entry prices”, “stock clearance prices” and or “non brand-name pricing”.

In its recent anti-dumping trade case, the US Commerce Department found against a number of PV manufacturers, issuing a final ruling in October 2012 that would impose tariffs of 24 to 36 per cent on solar panels imported from China. The department concluded, despite China’s denials, that manufacturers had received government subsidies and had “dumped” solar panels on the U.S. market for less than it cost to manufacture and ship them.

Australia is seen as an attractive market and had one of the highest proportions of Tier 2 and 3 products in 2011 (estimated at 65%)². The result of this has been average PV prices at or below the lowest average world prices.

This pricing strategy was further influenced by significant excess capacity and inventory build-up in 2011 and 2012. In the first half of 2012, global PV manufacturing capacity was estimated at almost 60 GW (modules) versus an expected annual demand of 30 GW. PV inventory was also estimated to be running above and beyond demand at between 10 GW and 15 GW of combined inventory and product under construction. Trina Solar, Suntech

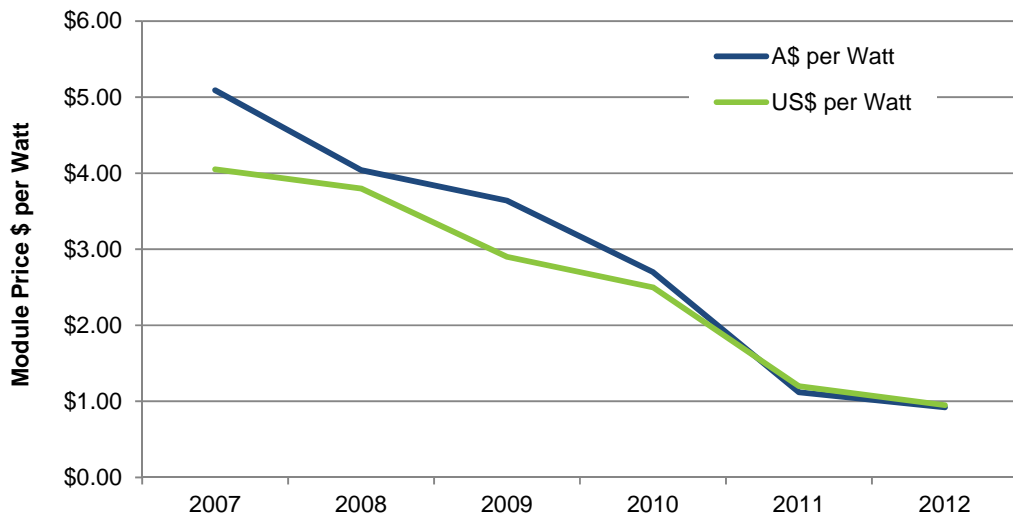
² SolarBusinessServices analysis

and Yingli alone were still holding around 5 GW of stock worth \$4.5 Billion dollars in September 2012, according to HIS Inc., forcing many manufacturers to sell at or below cost to manage inventory costs.

China is particularly influential on world PV market dynamics with an estimated world PV market share of around 60% in 2012. The complex dynamics of Chinese business means that despite the rational expectation that much capacity would come off line to balance demand, this has only happened to a limited degree. Access to low cost capital continues, particularly for the larger companies, although a number of smaller and lesser known PV manufacturers are known to have ceased operating in recent times. Most analysts agree that consolidation is much needed but to date this has been predominantly occurring in European and US based companies.

The second factor is foreign exchange rates which continue to provide a significant end user price advantage in Australia. The graph below demonstrates the price convergence via average international \$/W in average, annualised US and AUD dollars.

Figure 6.5 Module price comparison (US\$ and A\$)



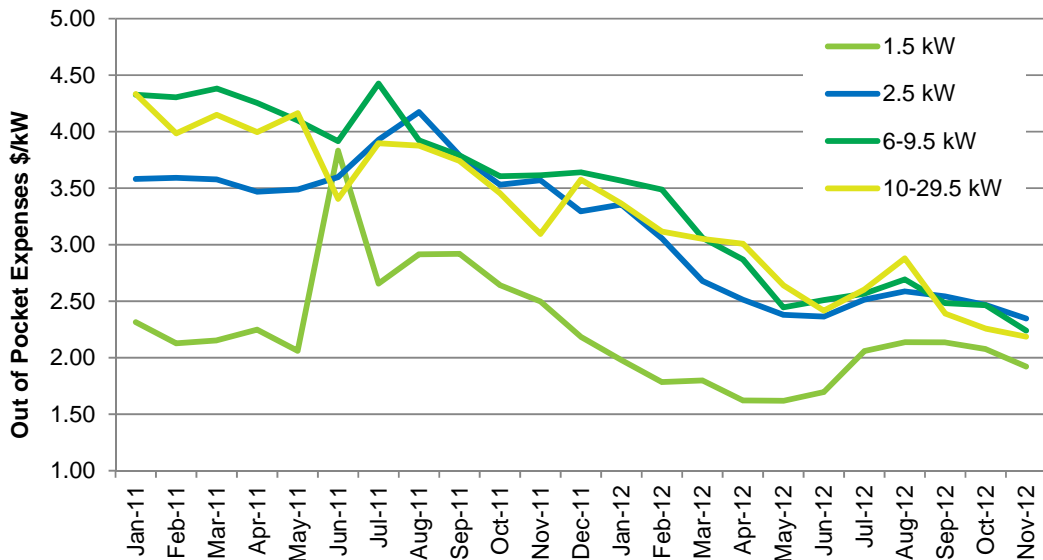
Key factors that will influence module pricing over the near term include:

- A strong Australian dollar (above parity with the US dollar) will mean that PV imports will continue to be favourable in local terms
- While excess inventory remains in place and softer, key European market demand continues, inventory is likely to continue to be re-directed to Australia
- As low barriers to entry will remain in Australia given the continuing high level of residential sales lower Tier ranked product will continue to find favour in the local market
- As consolidation is expected to continue, 2012 will likely be a tumultuous year in upstream PV manufacturing. Although this may cause volatility, it is likely to provide clearance and special pricing opportunities for Australia.

System costs to customers

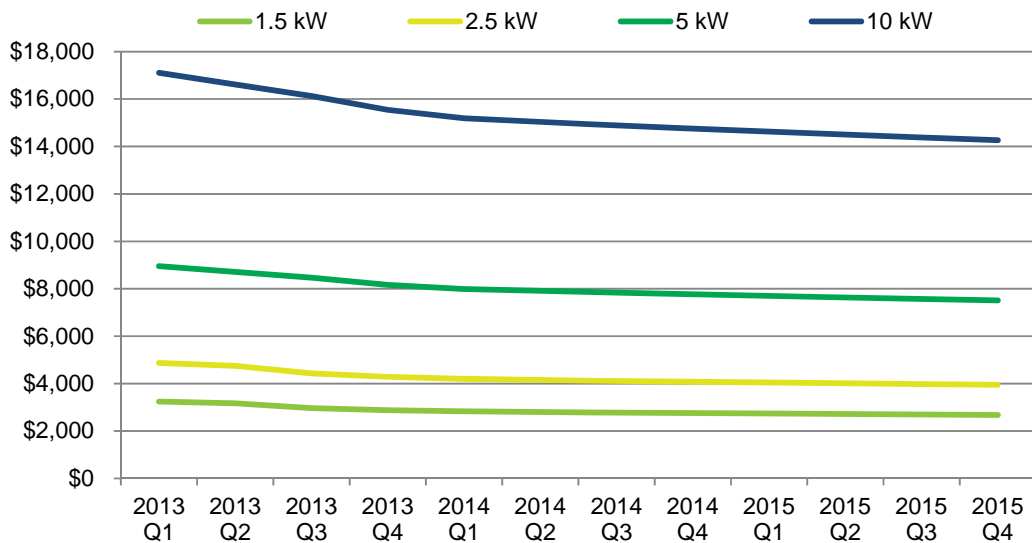
Customers “out of pocket expense” data is collected by the CER and this also clearly shows the progressive decline in the cost of the average system in Australia even after allowing for the reduction in the solar credits multiplier (Figure 6.6). The out of pocket expenses for the 10kW to 29.5 kW system size is the most instructive as the solar credit multiplier has only a small impact on the cost of a system.

Figure 6.6 Out of pocket costs for a range of PV system sizes (source CER)



We expect to see a modest reduction in system cost over 2013 and then expect fairly flat prices over the 2014 to 2015 forecast period. This is illustrated for a range of system sizes in Figure 6.7.

Figure 6.7 Forecast installed cost per system (includes value of STCs)



7. Solar PV Projections – Residential

We have analysed the creation of solar PV STCs on the basis of the following market segments:

- Grid-connect – residential
- Grid-connect – non-residential (commercial);
- Grid-connect – upgrades; and
- Off-grid market

Historical certificate creation data provided by the CER identifies “off-grid” system installations but does not specifically differentiate between the other grid-connect categories. As a result we have assumed that systems with an installed capacity of up to 9.99 kW are residential and that systems with a capacity exceeding 9.99 kW are commercial or non-residential systems. We have also assumed that systems with a capacity of less than 1.0 kW that have not been eligible for a solar credits multiplier are upgrades to existing systems. In some ways these are arbitrary delineations; however they generally reflect market conventions and expectations.

The Australian PV market had developed differently to other international markets where policy support has tended to drive large scale roll-out of residential systems rather than larger commercial or utility sale systems seen in a number of other developed countries. Analysis released by the REC Agents Association showed that in 2011 Australia installed the most residential systems of any country. Whilst Japan had the most residential capacity installed, as their systems were much larger (average of 4 kW per system) Australia has the most systems installed at 2.4 kW per system.

Table 7.1 PV Installations by country

2011 Country	Installed Capacity	Residential Proportion	Residential Capacity
	MW	MW	MW
Italy	9,301	8 %	744
Germany	7,500	9 %	675
China	2,200	27 %	600
US	1,867	37 %	698
France	1,634	16 %	261
Japan	1,296	90 %	1,166
Belgium	958	68 %	651
UK	899	56 %	503
Australia	865	95 %	822
Spain	345	5 %	17

Source: REC Agents Association, August 2012

It is thus not surprising that the largest market segment for PV in Australia is the residential grid-connect market which is estimated to have accounted for 88 per cent of all PV installations in 2012 and 86 per cent of installed capacity. We estimate that more than 890,000 PV systems will have had been installed by the end of 2012 for this market which amounted to around 16 per cent of owner occupied detached or semi-detached dwellings.

Systems into this market are being sold on the basis of financial attractiveness ie. payback. Our projections for the residential sector have been made on a state basis and are derived from our payback model, with the resultant payback period feeding into a state demand

curve. From the state based demand curves the proportion of eligible owner occupied households expected to purchase a solar PV system is determined. Then based on this figure and estimates of the average system size, expected certificate creation is determined.

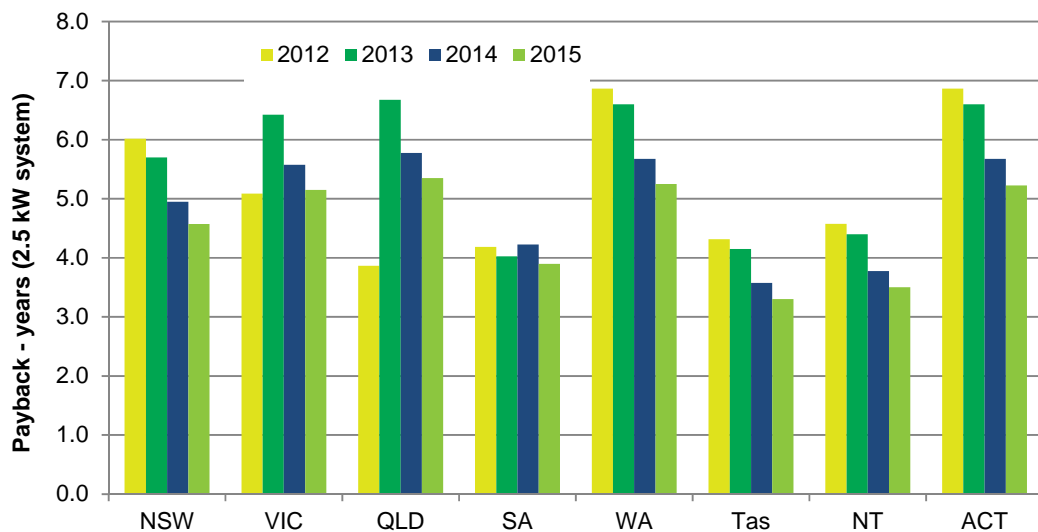
Forecasting payback periods

A simple payback approach has been used to represent the relative financial attractiveness of PV to consumers in each state. The approach to payback used is to divide the installed cost of the system (less the value of STCs) by the value of electricity produced in the year of installation. This generally overstates the real payback as electricity prices are expected to rise considerably over the forecast period.

Payback period has been modelled using SunWiz’s payback model. Explicit assumptions input into the model include:

- The STC price based on a \$34.40 average for 2013 and \$38 thereafter
- The current state based feed-in tariff rates are assumed not to change (other than for already announced changes such as in South Australia)
- The structure of retail electricity prices to remain the same in all states over the forecast period.
- Retail electricity prices rising at 5 per cent per annum over the forecast period
- Average system size of 2.5 kW
- An export rate of 38 per cent for a 2.5 kW system

Figure 7.1 Simple payback for grid-connect residential PV system



Rising power prices, higher STC prices and continued modest reductions in installed system prices in all states tend to counteract the impact of the removal of the solar credits multiplier. Paybacks in most states will improve over the forecast period other than in Victoria and Queensland where attractive feed-in tariffs ended in 2012. Average simple payback rates over the forecast period tend to range between 3.2 to 7 years. A summary of payback periods by state over the 2013 to 2015 period is included in Attachment 2.

Demand for solar PV

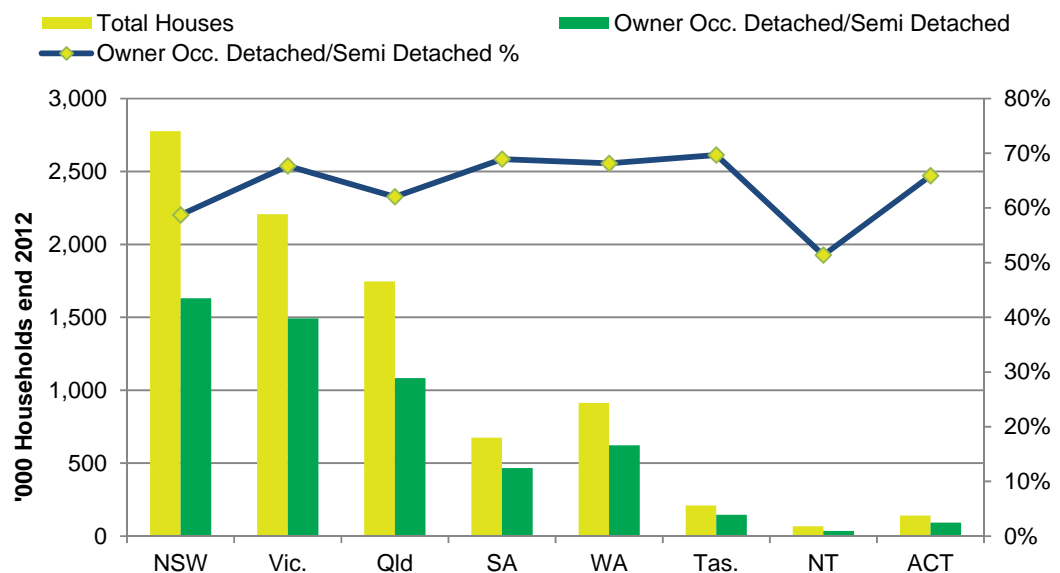
Solar PV is a discretionary purchase so financial attractiveness will be the key determinant of the underlying demand. Like other discretionary purchases uptake will also be

significantly impacted by the level of sales, marketing and promotion. In addition continued concerns regarding the global financial crisis and the prospects for a recession and the forthcoming federal election has led to a slowdown in retail sales, particularly delaying items of a discretionary nature.

As a result we expect that system sales during 2013 are likely to be maintained at levels slightly higher than in 2010, but significantly lower than 2011 and 2012 levels.

Demand curves have been developed on a state basis based on historical monthly REC creation for systems with installed capacity less than 9p.99kW (representing demand). Demand curves are represented as a proportion of owner occupied relevant dwellings (separate and semi-detached houses) for that state (expressed as the average number of systems per month) for a given simple payback level. Based on ABS data we estimate that there were 8.7 million occupied dwellings in Australia at the end of 2012 of which 63.7 per cent (5.6 million) were owner occupied detached or semi-detached.

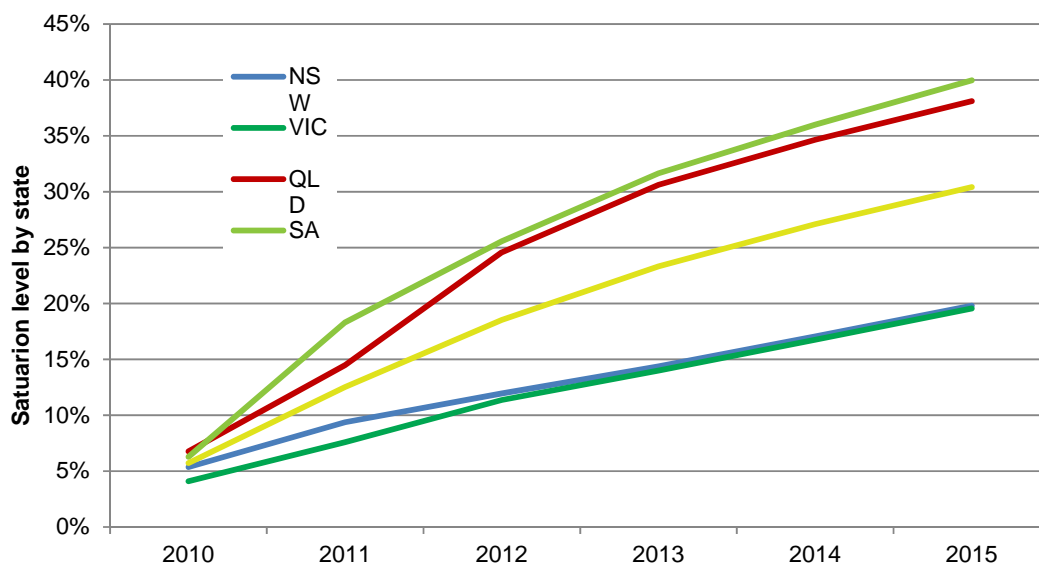
Figure 7.2 Dwellings by state



Demand curves have been further refined to take account of the level of marketing and promotion activity, and the relative attractiveness of the state (that is not picked up through the factors incorporated in the payback model) and covers factors such as state economic conditions, relevant level of retirees, income levels etc.

The demand curves are then further scaled based on the level of saturation in each state. Over the next three years the number of cumulative PV systems installed in each state grows considerably with quite high saturation rates achieved Queensland and South Australia, reaching nearly 40 per cent by 2015.

Figure 7.3 Saturation level by state



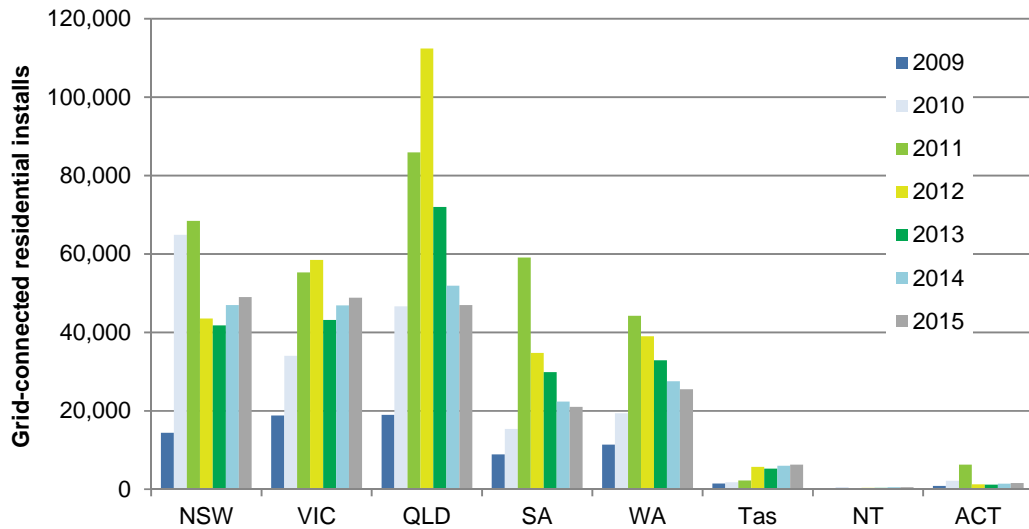
Note: Saturation rate represents the cumulative proportion of systems installed as a proportion of owner occupied houses (separate and semi-detached dwellings).

Projected system installations and saturation levels for each state is included in Attachments 3. An extract of the data is summarised in Table 7.2 and shown diagrammatically as Figure 7.4.

Table 7.2 Systems installed by state

	NSW	VIC	QLD	SA	WA	Tas	NT	ACT	Total
2009	14,424	18,821	18,984	8,892	11,427	1,492	205	833	75,078
2010	64,917	34,040	46,648	15,368	19,375	1,815	560	2,156	184,879
2011	68,433	55,308	85,920	59,132	44,234	2,233	339	6,272	321,871
2012	43,567	58,482	112,379	34,806	39,042	5,751	372	1,292	295,691
2013	41,813	43,178	71,967	29,876	32,894	5,265	389	1,185	226,567
2014	46,995	46,883	51,949	22,364	27,570	5,998	515	1,460	203,736
2015	49,042	48,835	46,965	21,015	25,489	6,282	527	1,623	199,777

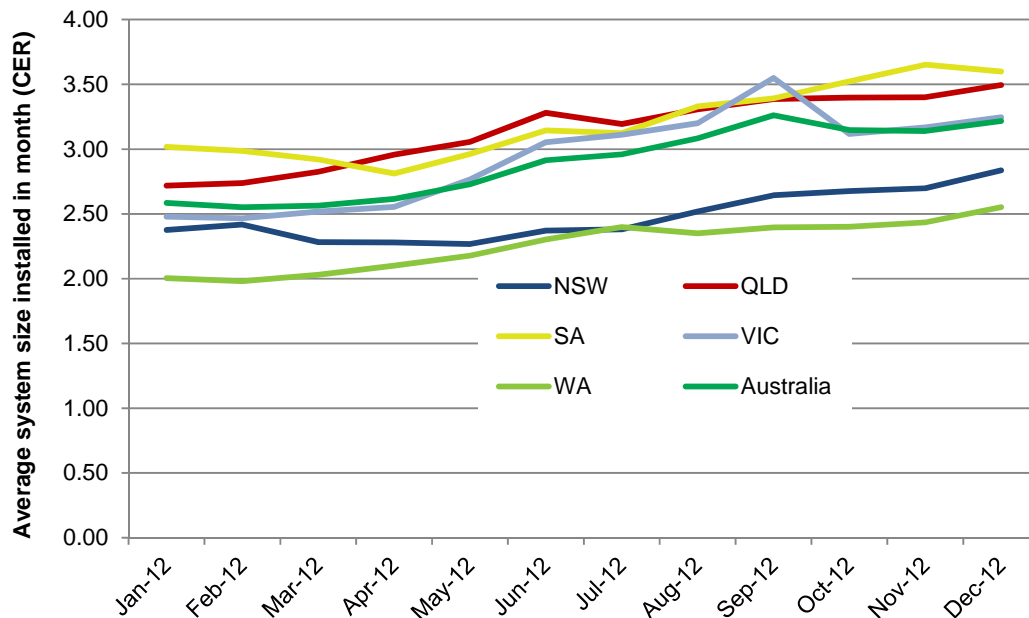
Figure 7.4 Residential PV systems installed by state



Determining the level of certificate creation

The average system size installed has increased significantly over the last three years from 1.77 kW per system in 2010 to 2.95 kW per system in 2012 (refer to Attachment 4 for details). Importantly all states have seen an increase in system size through 2012 (refer to Figure 7.5).

Figure 7.5 Average system size by install month in 2012 (for larger states)



We have generally used the average system size installed in the second half of 2012 as a basis for projections (Table 7.3). This is approximately 8 per cent higher than the average for all of 2012. We expect system sizes to drift lower in most states to reflect less attractive buyback rates for exported electricity.

Table 7.3 Installed capacity per system by state

	2012 Average	2nd Half 2012	2013 Est	2014 Est	2015 Est
ACT	2.82	3.31	3.00	3.00	3.00
NSW	2.44	2.61	2.60	2.60	2.60
NT	3.42	3.96	3.75	3.75	3.75
QLD	3.17	3.34	3.20	3.00	3.00
SA	3.15	3.41	3.20	3.00	3.00
TAS	2.88	3.21	3.00	3.00	3.00
VIC	2.95	3.29	3.00	3.00	3.00
WA	2.24	2.41	2.40	2.40	2.40

The total number of systems installed and associated certificates created for grid-connected residential systems is summarised in Table 7.4.

Table 7.4 Grid-connect system installations and certificates (all states)

	Actual	Actual	Estimate	Forecast	Forecast	Forecast
Year of installation	2010	2011	2012	2013	2014	2015
Number of Systems Installed	184,879	321,871	295,691	226,567	203,736	199,777
Avge systems per mth	15,407	26,823	24,641	18,881	16,978	16,648
Avge kW/system	1.77	2.09	2.88	2.95	2.83	2.83
Avge Certificates/System	129.6	147.5	102.7	61.5	56.4	56.2
MW Installed	352.3	752.4	852.5	667.9	576.3	564.8
Eligible Certificates ('000)	23,953	47,484	30,366	13,933	11,481	11,225

8. Solar PV Projections – Non Residential

The commercial or non-residential sector is seen by many industry participants as an attractive market as installed system costs have fallen and power prices are rising. As a result we separately model and assess this market segment. Data provided by the CER did not specifically identify systems by sector and we have used as a proxy that systems greater than 10kW are likely to be non-residential. In some ways this is an arbitrary delineation however it does generally reflect industry conventions. We have also assumed that an amount equivalent to 20 per cent of 2012 systems that created certificates in 2012 will create certificates in 2013. This level of delay reflects the delay in creation of certificates experienced for 2011 installations.

Installations in 2012 increased by 6 per cent to 2,267 systems. In installed capacity terms the growth in 2012 was 25 per cent. The large increase in capacity installed reflects that twice the amount of larger systems (greater than 30 kW) were installed in 2012 compared to 2011 (refer to Table 8.1).

Table 8.1 Commercial systems installed by kW segment

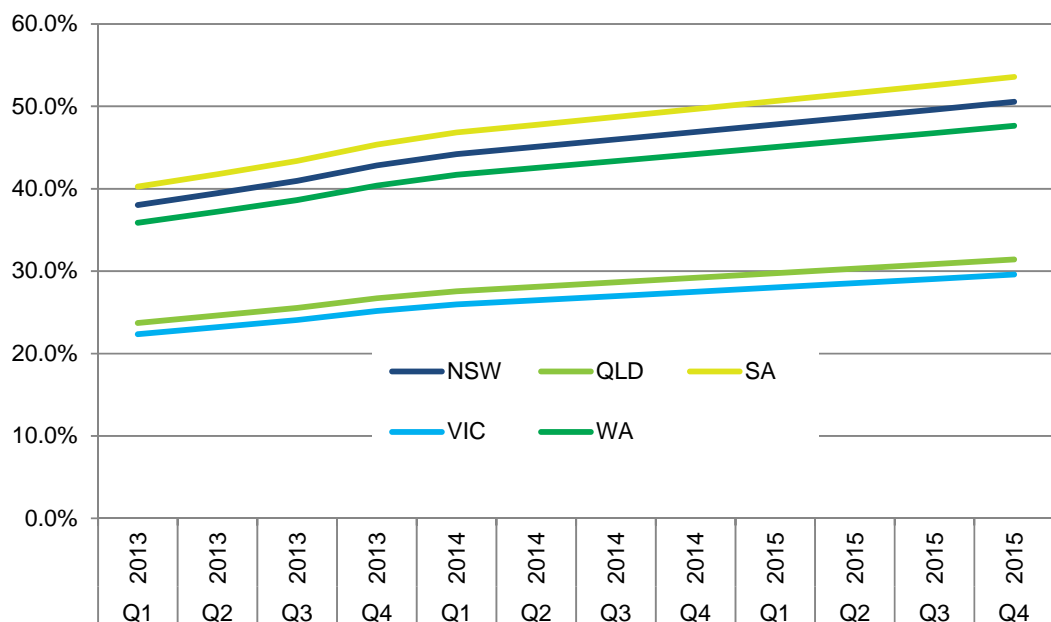
	10-30 kW			>30 kW			Total		
	2010	2011	2012	2010	2011	2012	2010	2011	2012
Systems Installed									
ACT	12	52	7	2	3	1	14	55	8
NSW	590	1,213	551	7	13	67	597	1,226	618
NT	11	12	18	2	8	0	13	20	18
QLD	91	366	296	18	79	134	109	445	431
SA	34	172	404	3	5	18	37	177	422
TAS	2	23	64			2	2	23	66
VIC	14	57	528	1	2	18	15	59	546
WA	29	114	143	6	18	14	35	132	157
Total	783	2,009	2,011	39	128	256	822	2,137	2,267
Capacity (kW)									
ACT	200	900	97	71	96	55	271	996	152
NSW	6,259	12,890	6,926	431	552	3,580	6,689	13,441	10,506
NT	148	170	286	81	324	0	229	494	286
QLD	1,345	5,633	4,101	640	2,531	4,639	1,984	8,164	8,740
SA	539	2,238	5,130	180	158	543	719	2,396	5,673
TAS	37	296	707			159	37	296	866
VIC	200	854	7,084	67	79	713	267	933	7,797
WA	433	1,707	1,977	303	811	435	736	2,518	2,412
Total	9,159	24,687	26,309	1,772	4,550	10,124	10,931	29,237	36,433
kW/system	11.7	12.3	13.1	45.4	35.5	39.6	13.3	13.7	16.1

Expectations that commercial PV would boom in 2012 did not materialise although a 25 per cent increase in installed capacity over the period is material. The shift to larger systems and growth in the South Australian and Victorian markets were notable developments. Importantly however we estimate that the installed capacity of systems not receiving attractive feed-in tariffs increased from 12 MW in 2011 to 18 MW in 2012. This means that half of the capacity installed in 2012 did not benefit from attractive fee-in tariffs.

Financial attractiveness

Many small-to-medium businesses pay electricity tariffs that are higher than residential prices. For these businesses, to the extent that they can avoid export of power, an investment in PV can be highly profitable. The following graph shows the Internal Rate of Return for a commercial system of average size (16kW), installed on a business that attracts the standard offer from Synergy in Western Australia, and Origin Energy in other states.

Figure 8.1 Internal Rate of Return for a 16 kW PV system (small business with bundled price)



Although PV can represent a highly profitable investment, there are many barriers to uptake that have thus far prevented a greater level of installations. These include:

- The split incentive: most small-to-medium businesses lease their premises. Payback may take longer than the lease term, and the building owner does not pay the electricity bill.
- Businesses' preference to invest in their own operations rather than in non-core activities
- The frequency of non-working periods (eg weekends) for such businesses, which leads to power export and a consequent reduction in profitability.
- Electricity represents a relatively small proportion of a business's costs and as such gets little attention from business owners

Once a business accesses an 'unbundled' offer, the economics of PV worsen dramatically. When demand charges are separated from energy charges, the resultant price offset by PV

generation can drop dramatically to anywhere in the range of 8-18c/kWh. The variability and timing of solar output does not necessarily guarantee reduction in demand charges, reducing the financial attractiveness of PV, frequently to levels that imply a greater than 10 year payback.

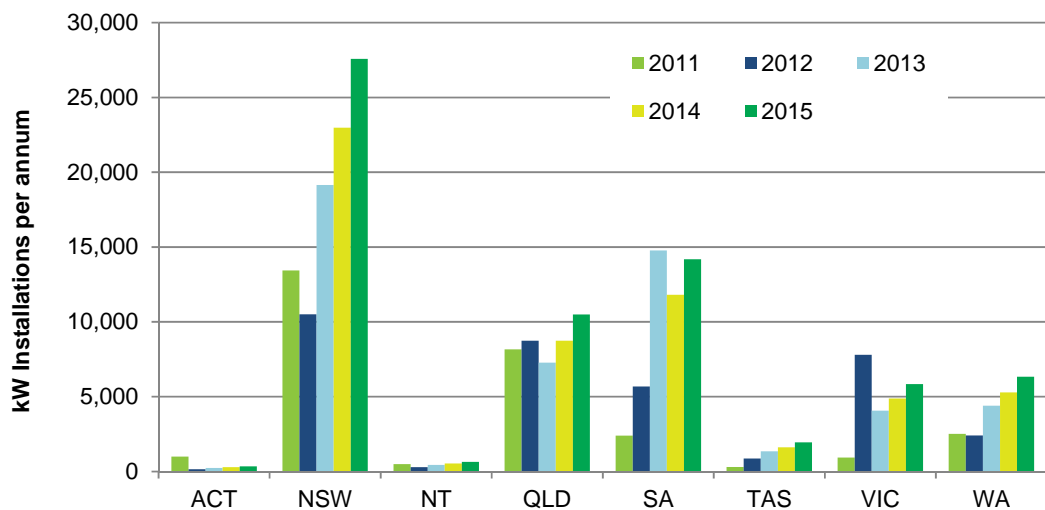
This is one reason why there are comparatively few systems installed that exceed 30kW. Businesses with low consumption cannot typically support more than 15 kW before exporting significant volumes of energy. However, businesses that can host a larger system without exporting have far less financial incentive to proceed.

In developing projections for 2012 to 2015 we have considered the following factors:

- PV retailers' increasing need to sell commercial PV to offset a contracting market for residential systems
- 50 per cent growth in the capacity in 2012 for systems that didn't receive state incentives
- increasing experience and competence of the solar industry in delivering commercial PV with businesses starting to build a pipeline of potential projects
- Government grants available to manufacturers under the Commonwealth Clean Technology Investment Program which saw 22 large scale PV projects announced in 2011 with a capacity of more than 1 MW
- In states that have recently removed feed-in tariffs, a contraction of affected systems could be expected. This principally affects Victoria (10-100kW) and Queensland (10-30kW)
- South Australia's feed-in tariff will end in 2013, which is likely to spur on installations in this state

On this basis we assume that in 2013 we will see 50 per cent reduction in Victoria; 20 per cent reduction in Queensland, 75 per cent growth in NSW and WA; 50 per cent growth in the ACT, Northern Territory, and Tasmania; and 250 per cent growth in South Australia. Overall we expect that the market will grow by over 40 per cent in 2013 to 3,230 systems with a capacity of 52 MW.

Figure 8.2 Commercial PV capacity by state



Though commercial PV still has a comparatively low base, in the absence of specific government incentives, explosive growth is unlikely. We believe that organic growth is more probable. Thus in 2014 organic growth of 20 per cent could be expected in the non-

residential sector in all states other than South Australia. This concurs with the growing profitability of solar investments as PV system prices decline and electricity prices rise. Assuming a similar 20 per cent reduction in South Australia in 2014 and 20 per cent growth in other markets leads us to estimate 2014 non-residential installation volumes at 56 MW. We have then assumed another year of 20 per cent growth nationwide produces 67 MW worth of non-residential volume in 2105.

Table 8.2 Commercial System installations and certificates (all states)

Year of installation	Actual	Actual	Estimate	Forecast	Forecast	Forecast
	2010	2011	2012	2013	2014	2015
Number of Systems Installed	822	2,138	2,268	3,230	3,510	4,210
Average kW/system	13.30	13.68	16.07	16.00	16.00	16.00
Average Certificates/System	387.0	379.7	362.0	331.7	331.7	331.7
MW Installed	10.9	29.2	36.4	51.7	56.2	67.4
Eligible Certificates ('000)	318	812	821	1,071	1,164	1,396

9. Solar PV Projections – Grid-connect Upgrades

With the increase in the number of residential PV systems and rising saturation rates solar resellers and installers are targeting the upgrade market. This market can best be characterised as consumers that may have installed a smaller system than their available roof space and electricity demand might otherwise support. This is likely to have been done due to cost considerations. As system prices have fallen and power prices have continued to rise, it may become more attractive for consumers to upgrade their system.

The average size of system installed has nearly trebled over the last four years from 1.34 kW per system in 2009 to 2.95 kW per system in 2012 (refer to Attachment 7). The \$8000 rebate for 1 kW systems applying in 2009 and the initial 5 times solar credits multiplier applying up to 1.5kW have acted to keep systems smaller up to mid-2011. As a result there are many smaller systems that have been installed that are capable of being upgraded.

A number of larger solar retailers are also selling systems with larger inverters that are capable of being upgraded. We expect considerable growth in this sector over the next few years, albeit from a low base. There is however a constraining factor on this sector with customers unlikely to expand if they were on an attractive feed-in tariff that they might lose.

The data that was provided by the CER did not separately identify systems that were upgrades. As a proxy for these systems we have assumed that any system with a capacity less than 1.0kW that does not receive the solar credits multiplier are upgrades to existing systems. This is a somewhat arbitrary delineation and is likely to understate the level of upgrade systems as many will be above 1 kW.

We have based our projections on the data provided by the CER and we expect that the number of upgrade systems doubles over the next three years from 3,700 in 2012 to 7,500 in 2015. We have also assumed that the average size of the upgrade over the forecast period is 1 kW per system.

Table 9.1 Residential grid-connect upgrade systems and certificates

	Actual	Actual	Estimate	Forecast	Forecast	Forecast
Year of installation	2010	2011	2012	2013	2014	2015
Number of Systems Installed	2,583	3,636	3,712	4,500	6,000	7,500
Avge kW/system	0.57	0.58	0.61	1.00	1.00	1.00
Avge Certificates/System	10.9	11.2	11.9	20.7	20.7	20.7
MW Installed	1.5	2.1	2.2	4.5	6.0	7.5
Eligible Certificates ('000)	28	41	44	93	124	155

10. Solar PV Projections – Off-grid

In assessing the Off-grid market we have only considered the total level of installations and have not sought to separate commercial scale systems or upgrade systems. The historical data provided flagged whether a system was not grid-connected and a summary is included as Attachment 7.

The data needs to be considered with caution as where the “Off-grid multiplier” is applied, Agents were required to submit assignments twice to create the extended number of STCs. This means that the number of systems and installed capacity is overstated. In addition the total number of stated Off-grid systems at approximately 30,000 for 2011 and 2012 seems extremely high. In analysing the data we have observed that many of the postcode locations are in metropolitan areas with easy access to the grid.

To deal with the above shortcomings and to derive what may be considered more reasonable estimates of Off-grid installations we have:

- removed all systems with a multiplier of 1 and assumed that these systems and associated capacity are the second part for the “off-grid multiplier”, and
- only included systems from postcodes that were identified as “Rural” using the Australian Bureau of Statistics definition.

Adopting the above approach results in the following :

Table 10.1 Estimated Off-grid systems (rural only) and no Multiplier
Exclude 1 times Multiplier systems and Capacity but include STC creation

	2011 Systems	2011 STCs	2011 kW Capacity	2012 Systems	2012 STCs	2012 kW Capacity
NSW	1,216	230,325	3,512	792	89,392	2,161
NT	5	5,140	77	3	2,908	67
QLD	1,102	200,237	3,228	1,813	223,555	6,057
SA	607	103,955	1,932	809	104,324	2,740
TAS	88	19,071	294	94	19,587	500
VIC	939	131,376	2,595	958	114,269	3,800
WA	834	152,160	2,057	219	36,967	802
	4,791	842,264	13,694	4,688	591,002	16,126

For our forward projections we have assumed that:

- approximately 15 per cent of certificates for 2012 installations are created in 2013 which means that the base level of deemed Off-grid systems for 2012 is 5,391 (with an average system size of 3.4 kW/system).
- due to the removal of the Off-grid multiplier the relative attractiveness reduced and the average system size is expected to be lower.
- we have assumed that a total of 5,000 Off-grid systems will be installed each year from 2013 to 2015.
- average system size of 3 kW per system installed

The number of systems installed and associated certificates created for off-grid solar credit systems is summarised in Table 10.2.

Table 10.2 Off-grid systems and certificates

Year of installation	Actual 2010	Actual 2011	Estimate 2012	Forecast 2013	Forecast 2014	Forecast 2015
Off-Grid						
Number of Systems Installed	10,119	31,067	33,314	5,000	5,000	5,000
Avge kW/system	2.59	2.49	3.02	3.00	3.00	3.00
Avge Certificates/System	166.8	167.0	114.1	62.2	62.2	62.2
MW Installed	26.2	77.4	100.6	15.0	15.0	15.0
Eligible Certificates ('000)	1,688	5,188	3,801	311	311	311

Note: CER data as provided has been used for the years 2010 to 2012 in the above table

11. SWH and Air Sourced Heat Pump Projections

Water heaters are essential appliances and are subject to regulations which will increasingly limit consumer choices. As such, solar water heaters are subject to very different drivers than solar PV systems.

In the market for water heater systems there are three distinct sub-markets that have traditionally driven the market. These are:

- installations of water heater systems at new dwellings
- replacement of water heater systems at existing dwellings
- installation of water heater systems of commercial size (both at new buildings and replacement at existing buildings)

For the purposes of our analysis, we have combined Solar Water Heaters (SWH) with Air-Sourced Heat Pumps (ASHP) into one category. We refer to this category simply as Solar Water Heaters (SWH).

ASHPs with capacity greater than 425L have not been eligible to create certificates since June 2010. Most systems with a capacity of more than 425L will be commercial systems, and since this system size is no longer able to create certificates, the quantity of commercial sized SWH systems have declined markedly. In the data provided by the CER only 32 commercial sized systems (non-heat pump) were installed and creating STCs in 2011. So far for 2012 (as at 31 December 2012), the number of non-heat pump commercial systems installed has reduced to 12. This compares to 5,600 and 981 systems in 2009 and 2010 respectively. There is no reason to expect market activity for commercial SWH systems to grow in the near to medium term. With little prospect of growth the commercial SWH market will remain an insignificant component of the broader SWH market, therefore it is unnecessary to forecast the commercial market separately.

For the remaining sub-markets (installations of water heater systems at new dwellings and replacement of water heater systems at existing dwellings) it is worth considering the primary drivers that influence consumer behaviour in these sub-markets. The most important drivers influencing choice of water heaters – electric, gas (storage or instantaneous) or solar (including heat pumps), include:

- regulations – i.e. uncertainty of state-based electric water heater (EWH) phase-out regulations
- comparative capital costs of the technologies
- access to reticulated gas
- financial incentives – rebates and REC/STCs
- consumer perceptions of energy prices i.e. electricity, natural gas and LPG

The drivers above play out differently in each of the two market segments. For example, the most important driver influencing the choice of water heating system in the replacement market is the incumbent system the new system will replace. At the time of replacement most systems are replaced with the same or similar type of system. The dynamics of the replacement market, which are often dictated by a rush to replace a broken or failed water heater, mean there is little time and/or financial liquidity to make thoroughly researched decisions. Thus, historically, the majority of water heater replacements have been on a 'like-for-like' basis.

Overall Solar Water Heater market drivers

Within the 2 primary water heater submarkets, there are 6 further 'system type' classifications. These are:

- 1) New building primary submarket
 - New Building
- 2) Replacement primary submarket
 - First Water Heater Installation at Existing Building
 - Other
 - Replace Gas Water Heater
 - Replaced Electric Heater
 - Replaced Solar Water Heater

A breakdown of the number of systems in each of the above classifications that have created certificates is included as Figure 4.11 in section 4 of this report.

At a high-level, forecasts on systems installations were based on the market share of each of these 6 'system types'. Further, and because of varying state-based schemes, incentives and/or regulations, the system type forecast was performed at state level. State and federal rebates no longer impact on the market; and, in particular, there is considerable uncertainty regarding the Electric Water Heater (EWH) phase-out which was to be implemented by all states except Tasmania.

In Victoria the Energy Saver Scheme includes SWH as an eligible activity. For example, a EWH system replaced by a SWH system can generate between 30 to 50 Victorian Energy Efficiency Certificates (VEECs). VEEC prices are not as strong as they have been, yet at circa \$15 to \$20 per certificate, VEECs still provide added financial incentive that helps drive extra SWH system installations in Victoria.

The installed cost of SWH is an obvious driver of SWH purchasing behaviour. The install cost (without considering any support from STCs) will likely remain stable over the next 3 to 5 years according to interviews conducted with industry participants. Due to the expected increase in the STC price the overall installed cost, is predicted to fall in 2013 and beyond.

Water heater market drivers – specific to the new building submarket

The primary drivers behind purchase behaviour in this segment include:

- The number of new dwellings
- Building regulations
- The availability of gas to the new development
- Other factors — such as builder influence, environmental performance and industry marketing, as well as capital and operating costs

SWH sales data, sourced from Industry, seems to suggest the number of SWH that create certificates is between 10 to 15 per cent lower than the number of systems sold. This is not a new trend, and we see no reason for this to change. The SWH systems that do not create certificates is thought to be the result of difficulties that home builders/renovators face when faced with the prospect of creating certificates. The difficulties arise from the confusion and uncertainty as to who has the right to create the certificates, specifically when the future owner of the home/building may not own the system at the time it was installed.

Using the data provided by the CER we have isolated the SWH systems installed in new buildings and analysed historic trends. We used our analysis as the basis for forecasting SWH installations for the new-build submarket. According to the primary CER data, 27,005

SWH systems were installed (and created certificates) into new buildings in 2012 (as at 31 December 2012). If we allow for the traditional lag in STC creation, total systems installed in new buildings is forecast to increase to 37,807 (an extra 10,802 systems installed and creating certificates).

Our forecasts for installation of SHW systems in new buildings (in the period 2013 to 2015) are based on escalating the installation levels in 2012 in line with forecast new dwelling completions from the Housing Industry Association (HIA) Economics Group. Growth rates for new home completions are set out in Table 11.1 below.

Table 11.1 Percentage Growth in New Dwelling Completions

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
2013	15.7	-13.0	11.6	4.3	23.3	6.8	-2.6	-12.5	4.5
2014	6.8	2.1	15.2	12.3	5.1	3.0	3.7	-2.1	7.0
2015	3.0	3.0	5.0	3.0	5.0	5.0	5.0	5.0	3.8

Data based dwelling completion data from the Housing Industry Association Oct 2012 report.

We forecast the number of SWH systems installed in new buildings to decline by 3,006 systems in 2013 (compared to 2012 levels). In total, we forecast 34,801 systems to be installed during 2013. This reduction is driven by lower new building completions in the key Victorian market, and also changes in the Queensland new-build regulations. We forecast SWH installations in new buildings to recover in 2014, this is again driven by a stronger new-build market. In total we forecast SWH installations in 2014 to reach 35,566 or an increase of 2.2 per cent on 2013 levels. Refer to Attachment 7 for a detailed assessment by state.

Water heater market drivers – specific to the replacement submarket

Historically, the replacement market has been driven by the replacement of electric resistance water heaters. In a situation where an electric resistance water heater is due to be replaced, whether the property has access to reticulated gas has traditionally influenced the type of water heater system chosen as a replacement. Therefore, access to reticulated gas is a good predictor of the potential size of a SWH market. In Table 11.2 below we show the share of houses with EWH with no access to reticulated gas. Residents in New South Wales and Queensland have limited access to reticulated gas; therefore we can expect larger growth of SWH installations in these states.

Table 11.2 Share of houses with electric water heaters and no access to ret. gas

State	Per centage of Electric Water Heaters
NSW	56.0%
VIC	22.0%
QLD	58.0%
WA	23.0%
TAS	43.0%
SA	14.0%
ACT	0.0%
NT	100.0%

Data based on Table 17 in Regulation Impact Statement for the EWH Phase-out (Wilkenfeld 2009), includes only houses which are 'not connectable'.

Using the data provided to us by the CER we isolated the SWH systems installed in existing buildings and analysed historic trends. We have used our analysis as the basis for forecasting SWH installations for the replacement submarket. Specifically, we analysed each of the following components of the replacement submarket:

- First Water Heater Installation at Existing Building
- Other
- Replace Gas Water Heater
- Replaced Electric Heater
- Replaced Solar Water Heater

According to the primary CER data a total of 30,168 SWH systems were installed and created certificates in existing buildings in 2012 (as at 31 December 2012). Once we allow for the lag in creation, we forecast 34,693 systems will be installed and creating certificates in 2012.

SWHs installed in existing buildings fell sharply into 2012. The market for replacing water heaters with SWH declined in all the states and territories. However, the decline in New South Wales and Queensland was more substantial than other jurisdictions. The key reasons for the decline were the removal of commonwealth rebates and competition for discretionary household expenditure with PV.

We expect to see the replacement market for SWH to recover in 2013 and beyond, this recovery will be driven by the following:

- slowdown in PV sales reducing competition to SWH for discretionary household expenditure
- rising electricity prices caused predominantly by rising network charges
- Recovery will be hindered by the uncertainty surrounding the phase out of EWH
- Lower install costs driven by a higher STC price

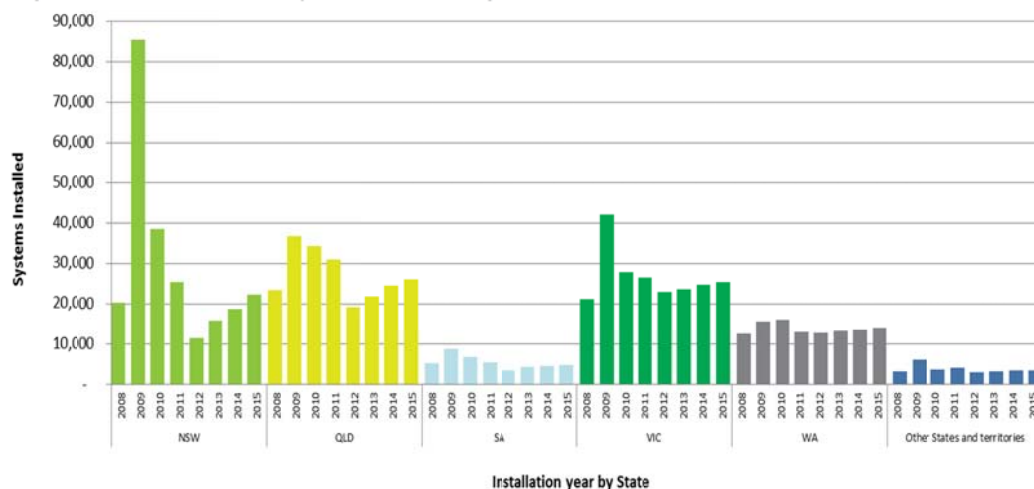
We expect the number of SWH systems installed in existing homes to increase in 2013 to 47,294 units. We expect to see SWH system installations continue to increase by 14.2 per cent in 2014 and a further 11 per cent in 2015. Refer to Attachment 6 for a detailed assessment by state.

Certificates created from the installation of water heater systems

We forecast the total number of certificates created by SWH systems at to be installed in 2012 at 2,087 million. We forecast this to increase by 14.4 per cent (to 2,387 million) in 2013; a further 9.5 per cent (to 2,612 million) by 2014; and a further 7.0 per cent (to 2,794

million) by 2015. In Figure 11.1 (below) we show the historic numbers of SWH installed (and creating certificates) back to 2008, and forecast levels of installations out to 2015.

Figure 11.1 SWH Systems creating Certificates – New and Replacement



In Table 11.3 (below) we show the forecast proportion of 2012-15 SWH installations for each state and territory from 2012 to 2015.

Table 11.3 State and Territory share of SWH installations

State	Per centage share of SWH installations (forecast by state and territory)			
	2012	2013	2014	2015
NSW	15.6	19.4	20.9	23.2
VIC	31.8	28.8	27.7	26.5
QLD	26.3	26.7	27.4	27.2
WA	17.5	15.9	15.1	14.6
TAS	1.3	1.3	1.3	1.2
SA	4.8	5.3	5.1	4.9
ACT	1.1	1.1	1	1
NT	1.6	1.5	1.5	1.4

When forecasting the number of STCs to be created we have estimated the level of STCs per system on a state by state basis. Smaller SWH systems tend to be installed in the new building market as this is largely driven by building regulation. The average certificates per system for the new building market in 2012 was 27.4 and slightly higher at 30.3 for the replacement market (refer to Attachment 8). With the forecast recovery in the replacement market we expect the average number of certificates per system to increase to just above 29.0 over the forecast period.

In total, 2.1 million certificates are expected to be created for SWH installed in 2012. This is expected to grow slightly to 2.4 million in 2013 and 2.6 million in 2014 (refer to Table 11.3).

Table 11.3 Certificate creation from SWH

	Actual	Actual	Estimate	Forecast	Forecast	Forecast
Year of installation	2010	2011	2012	2013	2014	2015
Number of Systems Installed	127,093	105,053	72,500	82,095	89,558	95,610
Avge Certificates/System	33.6	29.7	28.8	29.1	29.2	29.2
Eligible Certificates ('000)	4,274	3,121	2,087	2,387	2,612	2,794

12. Other small generating units

Wind and Hydro SGUs remain a very small part of STC creation. Only 11 Wind systems were installed and created certificates during 2012 (excluding those invalid due to audit). The only Hydro SGU system to be installed and create certificates subsequently had the certificates invalidated due to audit.

The 11 wind systems that created certificates for 2012 generation year created only 474 STCs. Of these systems, only three agents created 85 certificates or more (all others were 28 certificates or fewer).

During 2011, there were two major installer / certificate creators and both of these businesses have withdrawn from the industry.

We have assumed that a similar level of certificates is created over the 2013 to 2015 period as were created in 2012.

13. Other Matters

Green Energy Markets has not considered the amount of STCs that will be carried forward under the Large-scale Target as a result of forward agreements.

No allowance has been made for any under-surrender for 2012 that may result due to eligible electricity sales by liable parties being less than projected when setting the Small-scale Technology Percentage (STP).

14. Resources

Resources to be utilised in the solar PV and SWH modelling will include, but will not be limited to, the following sources, along with other relevant industry reports:

- Clean Energy Regulator data
- ABS publications including: 8750.0 Dwelling Unit Commencements; 1301 Year Book Australia (for current dwelling types); 3236 Household and Family Projections; 4602.0 Environmental Issues (for water heater system and gas usage data)
- Latest information of electric resistance water heater phase-out and state regulations
- GEM and SunWiz solar water heater and solar PV installation models
- GEM and SunWiz solar PV payback model
- Australian PV Association reports
- Relevant legislation
- State and territory building and plumbing regulations
- State and territory government information on feed-in tariffs, SWH rebates and other programs such as the Victorian Energy Efficiency Target
- PV industry analyst module and inverter price forecasts
- Documents from state governments (where applicable) on regulated retail tariff increases
- REC Agents Association, Research Notes and Media Releases
- Housing Industry Association Oct 2012 report.
- Regulation Impact Statement for the EWH Phase-out (Wilkenfeld 2009),

Summary of Results

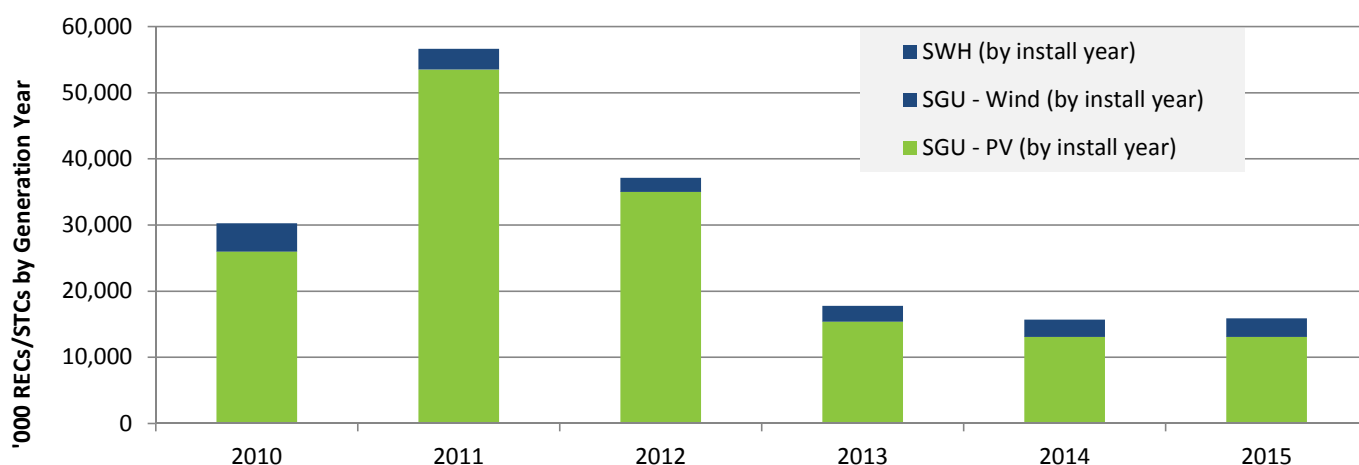
Year of installation	Actual 2010	Actual 2011	Estimate 2012	Forecast 2013	Forecast 2014	Forecast 2015
1. SGUs (PV)						
1.1 Grid-connect - Residential						
Number of Systems Installed	184,879	321,871	295,691	226,567	203,736	199,777
Avg systems per mth	15,407	26,823	24,641	18,881	16,978	16,648
Avg kW/system	1.77	2.09	2.88	2.95	2.83	2.83
Avg Certificates/System	129.6	147.5	102.7	61.5	56.4	56.2
MW Installed	352.3	752.4	852.5	667.9	576.3	564.8
Eligible Certificates ('000)	23,953	47,484	30,366	13,933	11,481	11,225
1.2 Grid-connect - Non Residential						
Number of Systems Installed	822	2,138	2,268	3,230	3,510	4,210
Avg kW/system	13.30	13.68	16.07	16.00	16.00	16.00
Avg Certificates/System	387.0	379.7	362.0	331.7	331.7	331.7
MW Installed	10.9	29.2	36.4	51.7	56.2	67.4
Eligible Certificates ('000)	318	812	821	1,071	1,164	1,396
1.3 Grid-connect - System Upgrades						
Number of Systems Installed	2,583	3,636	3,712	4,500	6,000	7,500
Avg kW/system	0.57	0.58	0.61	1.00	1.00	1.00
Avg Certificates/System	10.9	11.2	11.9	20.7	20.7	20.7
MW Installed	1.5	2.1	2.2	4.5	6.0	7.5
Eligible Certificates ('000)	28	41	44	93	124	155
1.4 Off-grid						
Number of Systems Installed #	10,119	31,067	33,314	5,000	5,000	5,000
Avg kW/system	2.59	2.49	3.02	3.00	3.00	3.00
Avg Certificates/System	166.8	167.0	114.1	62.2	62.2	62.2
MW Installed	26.2	77.4	100.6	15.0	15.0	15.0
Eligible Certificates ('000)	1,688	5,188	3,801	311	311	311
Total PV Systems						
Number of Systems Installed	198,403	358,712	334,985	239,297	218,246	216,487
Avg Systems/Mth	16,534	29,893	27,915	19,941	18,187	18,041
Avg kW/system	1.97	2.40	2.96	3.09	2.99	3.02
Avg Certificates/System	131.0	149.2	104.6	64.4	59.9	60.5
MW Installed	390.8	861.1	991.8	739.1	653.4	654.7
Eligible Certificates ('000)	25,987	53,524	35,032	15,409	13,081	13,087
2. SWH Systems						
Number of Systems Installed	127,093	105,053	72,500	82,095	89,558	95,610
Avg Certificates/System	33.6	29.7	28.8	29.1	29.2	29.2
Eligible Certificates ('000)	4,274	3,121	2,087	2,387	2,612	2,794

Note: Offgrid systems for 2010 to 2012 are based on CER data and includes significant numbers of residential grid-connect systems

Summary of Results

Year of installation	Actual 2010	Actual 2011	Estimate 2012	Forecast 2013	Forecast 2014	Forecast 2015
3. Small Wind Systems						
Number of Systems Installed	140	65	11	10	10	10
Avge Certificates/System	99.7	90.0	45.0	40.0	40.0	40.0
Eligible Certificates ('000)	14	6	0	0	0	0
TOTAL Certificates ('000)	30,275	56,651	37,119	17,796	15,694	15,882
Calculating STC Target						
Eligible Certificates		56,651	37,119	17,796	15,694	15,882
less Pending Registration		-1,823	-2,010	-1,068	-942	-953
less Submitted in following year		-4,086	-3,318	-1,790	-1,609	-1,573
less Transferred to LGCs/Other		-263	-190	-200		
add Created from previous yr installs			5,909	5,328	2,858	2,551
Total Registered for Year		50,479	37,509	20,066	16,001	15,907
less Surplus current year		22,479	15,113			
Surplus carried forward			22,479	15,113		
Effective STC Target		28,000	44,876	35,179	16,001	15,907
Net delay in STC creation			581	2,470	307	25

Note: No allowance has been made for any under-surrender for 2012 that may result due to eligible electricity sales by liable parties being less than projected.



Summary Results ('000 certificates)

	2010	2011	2012	2013	2014	2015
SGU - PV (by install year)	25,987	53,524	35,032	15,409	13,081	13,087
SGU - Wind (by install year)	14	6	0	0	0	0
SWH (by install year)	4,274	3,121	2,087	2,387	2,612	2,794
	30,275	56,651	37,119	17,796	15,694	15,882
Add net delay in STC registration				2,470	307	25
Less Transferred to LGCs				-200	0	0
STCs Registered in Year				20,066	16,001	15,907
Upper Bound				22,936	18,355	18,289
Lower Bound				18,649	14,574	14,463

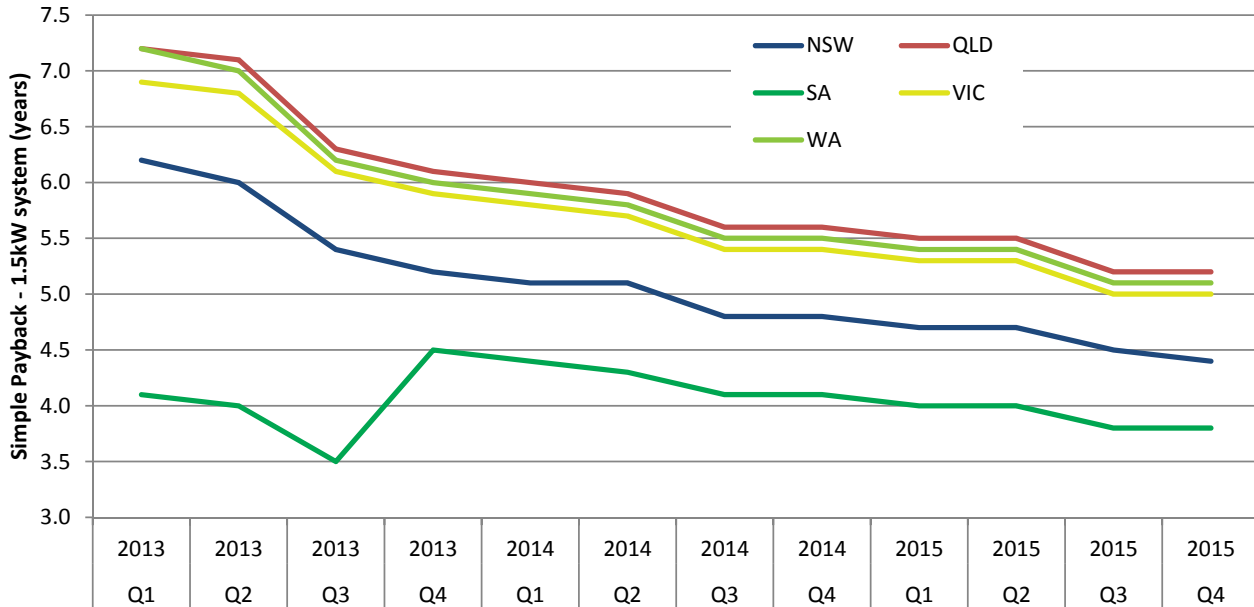
Financial Attractiveness

For Grid Connect Residential PV systems

Extract of Results from SunWiz's Payback Model

Expressed in simple payback terms (no discounting) ie. Net cost to customer divided by annual benefit

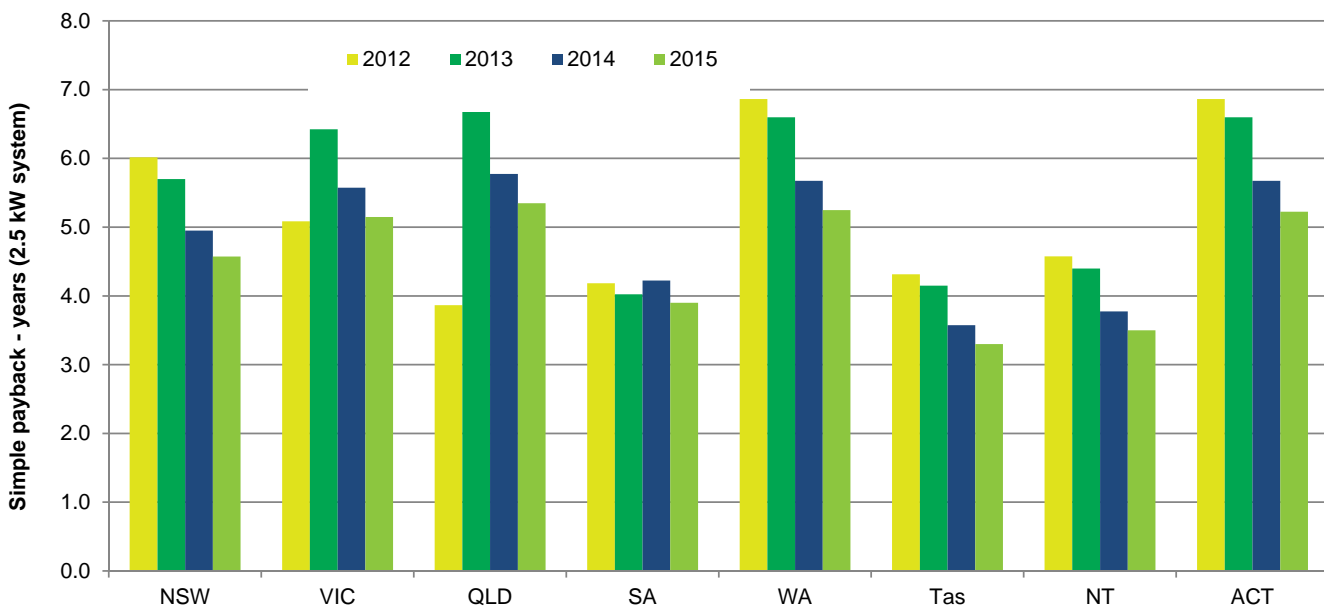
Simple payback on quarterly basis (larger states)



Average Simple Paybacks (annual)

	NSW	VIC	QLD	SA	WA	Tas	NT	ACT
2012	6.0	5.1	3.9	4.2	6.9	4.3	4.6	6.9
2013	5.7	6.4	6.7	4.0	6.6	4.2	4.4	6.6
2014	5.0	5.6	5.8	4.2	5.7	3.6	3.8	5.7
2015	4.6	5.2	5.4	3.9	5.3	3.3	3.5	5.2

Average Simple Paybacks on annual basis



Residential Grid-connect systems by State

	NSW	VIC	QLD	SA	WA	Tas	NT	ACT	Total
Cumulative grid systems installed to end 2011	151,310	111,194	153,793	84,340	76,296	5,851	1,169	9,444	593,397
<i>Market share</i>	25.5%	18.7%	25.9%	14.2%	12.9%	1.0%	0.2%	1.6%	100.0%
Owner Occupied Dwellings end 2011 ('000)	1,615	1,465	1,062	461	609	145	34	91	5,482
Proportion of Owner Occupied Dwellings	9.4%	7.6%	14.5%	18.3%	12.5%	4.0%	3.4%	10.4%	10.8%
Estimates for 2012									
2012 systems - CER Data (created to end 2012)	39,787	53,408	102,629	31,786	35,655	5,252	340	1,180	270,037
Proportion yet to be created	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	
Estimate for Creation in 2013	3,780	5,074	9,750	3,020	3,387	499	32	112	25,654
Total Est 2012 systems	43,567	58,482	112,379	34,806	39,042	5,751	372	1,292	295,691
Cumulative installations	194,877	169,676	266,172	119,145	115,339	11,602	1,541	10,736	889,088
Owner occupied dwelling at year end ('000)	1,631	1,493	1,083	466	622	146	35	92	5,569
Proportion of Owner Occupied Dwellings	11.9%	11.4%	24.6%	25.6%	18.5%	7.9%	4.5%	11.6%	16.0%
Projections for 2013									
Average number of systems installed/mth (derived)	3,484	3,598	5,997	2,490	2,741	439	32	99	18,881
Annulised installations	41,813	43,178	71,967	29,876	32,894	5,265	389	1,185	226,567
Cumulative installations	236,690	212,854	338,139	149,021	148,233	16,867	1,930	11,921	1,115,654
Owner occupied dwelling at year end ('000)	1,647	1,522	1,104	471	635	148	35	94	5,656
Proportion of Owner Occupied Dwellings	14.4%	14.0%	30.6%	31.6%	23.3%	11.4%	5.5%	12.7%	19.7%
Projections for 2014									
Average number of systems installed/mth (derived)	3,916	3,907	4,329	1,864	2,298	500	43	122	16,978
Annulised installations	46,995	46,883	51,949	22,364	27,570	5,998	515	1,460	203,736
Cumulative installations	283,685	259,737	390,088	171,385	175,803	22,866	2,445	13,381	1,319,390
Owner occupied dwelling at year end ('000)	1,663	1,550	1,126	476	649	149	35	95	5,743
Proportion of Owner Occupied Dwellings	17.1%	16.8%	34.7%	36.0%	27.1%	15.4%	7.0%	14.0%	23.0%
Projections for 2015									
Average number of systems installed/mth (derived)	4,087	4,070	3,914	1,751	2,124	523	44	135	16,648
Annulised installations	49,042	48,835	46,965	21,015	25,489	6,282	527	1,623	199,777
Cumulative installations	332,727	308,572	437,053	192,401	201,292	29,147	2,972	15,004	1,519,167
Owner occupied dwelling at year end ('000)	1,680	1,578	1,147	481	662	150	35	97	5,830
Proportion of Owner Occupied Dwellings	19.8%	19.6%	38.1%	40.0%	30.4%	19.5%	8.4%	15.5%	26.1%

Summary by State									
	NSW	VIC	QLD	SA	WA	Tas	NT	ACT	Total
Saturation rates									
	NSW	VIC	QLD	SA	WA	Tas	NT	ACT	Total
2010	5.4%	4.1%	6.8%	6.3%	5.7%	2.6%	2.7%	3.9%	5.3%
2011	9.4%	7.6%	14.5%	18.3%	12.5%	4.0%	3.4%	10.4%	10.8%
2012	11.9%	11.4%	24.6%	25.6%	18.5%	7.9%	4.5%	11.6%	16.0%
2013	14.4%	14.0%	30.6%	31.6%	23.3%	11.4%	5.5%	12.7%	19.7%
2014	17.1%	16.8%	34.7%	36.0%	27.1%	15.4%	7.0%	14.0%	23.0%
2015	19.8%	19.6%	38.1%	40.0%	30.4%	19.5%	8.4%	15.5%	26.1%
Systems installed									
	NSW	VIC	QLD	SA	WA	Tas	NT	ACT	Total
2009	14,424	18,821	18,984	8,892	11,427	1,492	205	833	75,078
2010	64,917	34,040	46,648	15,368	19,375	1,815	560	2,156	184,879
2011	68,433	55,308	85,920	59,132	44,234	2,233	339	6,272	321,871
2012	43,567	58,482	112,379	34,806	39,042	5,751	372	1,292	295,691
2013	41,813	43,178	71,967	29,876	32,894	5,265	389	1,185	226,567
2014	46,995	46,883	51,949	22,364	27,570	5,998	515	1,460	203,736
2015	49,042	48,835	46,965	21,015	25,489	6,282	527	1,623	199,777

Certificate Creation - Grid-connect Residential

	NSW	VIC	QLD	SA	WA	Tas	NT	ACT	Total
Grid-connect Systems installed (No.)									
2010	64,917	34,040	46,648	15,368	19,375	1,815	560	2,156	184,879
2011	68,433	55,308	85,920	59,132	44,234	2,233	339	6,272	321,871
2012	43,567	58,482	112,379	34,806	39,042	5,751	372	1,292	295,691
2013	41,813	43,178	71,967	29,876	32,894	5,265	389	1,185	226,567
2014	46,995	46,883	51,949	22,364	27,570	5,998	515	1,460	203,736
2015	49,042	48,835	46,965	21,015	25,489	6,282	527	1,623	199,777
Average system size (kW/system)									
2010	2.12	1.63	1.84	1.99	1.78	1.50	1.83	2.09	1.77
2011	2.30	2.31	2.29	2.55	2.24	2.16	2.42	2.38	2.09
2012	2.44	2.95	3.16	3.15	2.24	2.88	3.42	2.82	2.88
2013	2.60	3.00	3.20	3.30	2.40	3.20	3.75	3.00	2.95
2014	2.60	3.00	3.00	3.00	2.40	3.00	3.75	3.00	2.83
2015	2.60	3.00	3.00	3.00	2.40	3.00	3.75	3.00	2.83
Installed Capacity (MW)									
2010	137.6	55.5	85.8	30.6	34.5	2.7	1.0	4.5	352.3
2011	157.4	127.8	196.8	150.8	99.1	4.8	0.8	14.9	752.4
2012	106.3	172.5	355.1	109.6	87.5	16.6	1.3	3.6	852.5
2013	108.7	129.5	230.3	98.6	78.9	16.8	1.5	3.6	667.9
2014	122.2	140.6	155.8	67.1	66.2	18.0	1.9	4.4	576.3
2015	127.5	146.5	140.9	63.0	61.2	18.8	2.0	4.9	564.8
Zone Rating	1.382	1.185	1.382	1.382	1.382	1.185	1.536	1.382	
Multiplier (average)									
2012									
2013	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
2014	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
2015	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Average Certificates/System									
2010	149.1	91.3	137.0	132.2	117.4	57.8	131.5	136.0	129.6
2011	163.0	128.5	150.0	144.8	145.3	122.1	174.0	162.4	147.5
2012	98.0	94.6	109.5	112.0	94.0	87.0	132.5	108.6	102.7
2013	53.9	53.3	73.5 #	68.4	49.8	56.9	86.4	62.2	61.5
2014	53.9	53.3	62.2	62.2	49.8	53.3	86.4	62.2	56.4
2015	53.9	53.3	62.2	62.2	49.8	53.3	86.4	62.2	56.2
Calculated Certificates ('000) ##									
2010	9,677	3,107	6,392	2,031	2,274	105	74	293	23,953
2011	11,155	7,104	12,884	8,564	6,426	273	59	1,019	47,484
2012	4,270	5,532	12,305	3,898	3,670	500	49	140	30,366
2013	2,254	2,302	5,290	2,044	1,637	299	34	74	13,933
2014	2,533	2,500	3,231	1,391	1,372	320	45	91	11,481
2015	2,643	2,604	2,921	1,307	1,268	335	46	101	11,225

Notes

Allows for 60% of Qld Solar Bonus Scheme installs in 2013 to be with 2 times multiplier

These are certificates that are eligible to be created on a generation year basis and do not allow for the delay from system installation to certificate approval

Certificate Creation - Other PV Sectors

Year of installation	Actual 2010	Actual 2011	Estimate 2012	Forecast 2013	Forecast 2014	Forecast 2015
1. Grid-connect - Non Residential Systems Installed (Registry Data)			20% to be created in 2013			
ACT	14	55	8			
NSW	597	1,226	618			
NT	13	20	18			
QLD	109	445	431			
SA	37	178	424			
TAS	2	23	66			
VIC	15	59	546			
WA	35	132	157			
	822	2,138	2,268	3,230	3,510	4,210
Average Capacity per System	13.3	13.7	16.1	16.0	16.0	16.0
Average Certificates per System	387.0	379.7	362.0	331.7	331.7	331.7
MW Installed	10.9	29.2	36.4	51.7	56.2	67.4
Certificates Created	318,102	811,821	821,072	1,071,326	1,164,197	1,396,373
2. Grid-connect - Upgrades Systems Installed (Registry Data)			15% to be created in 2013			
ACT	32	25	7			
NSW	559	151	151			
NT	1	3	1			
QLD	679	1,266	2,021			
SA	556	759	202			
TAS	14	31	43			
VIC	359	517	107			
WA	383	884	1,181			
	2,583	3,636	3,712	4,500	6,000	7,500
Average Capacity per System	0.6	0.6	0.6	1.0	1.0	1.0
Average Certificates per System	10.9	11.2	11.9	20.7	20.7	20.7
MW Installed	1.5	2.1	2.2	4.5	6.0	7.5
Certificates Created	28,220	40,595	44,036	93,285	124,380	155,475
3. Off-grid Systems Installed (Registry Data)			15% to be created in 2013			
ACT	121	477	26			
NSW	4,110	9,830	6,835			
NT	63	37	39			
QLD	1,261	7,196	13,818			
SA	744	3,271	5,228			
TAS	58	176	272			
VIC	1,262	4,062	4,863			
WA	2,500	6,019	2,233			
	10,119	31,067	33,314	5,000	5,000	5,000
No of systems with 1 times Multiplier	2037	1747				
Discount for systems with 1 times Multiplier	100.0%	93.8%	94.3%			
Average Capacity per System	2.59	2.49	3.02	3.00	3.00	3.00
Average Certificates per System	166.8	167.0	114.1	62.2	62.2	62.2
MW Installed	26.2	77.4	100.6	15.0	15.0	15.0
Certificates Created	1,687,790	5,187,554	3,801,176	310,950	310,950	310,950

SWH Systems by State

	NSW	VIC	QLD	SA	WA	Tas	NT	ACT	Total
Systems installed 2012 (YTD 31 Dec 2012)									
New building	1,997	13,695	5,974	755	3,642	101	486	355	27,005
Replacement systems	7,429	3,368	9,322	2,106	6,575	680	415	273	30,168
Total	9,426	17,063	15,296	2,861	10,217	781	901	628	57,173
Average number of certificate per system	31.8	27.9	30.8	29.7	30.2	26.2	27.9	31.6	30.2
Certificates still to be created (2012)									
New building	799	5,478	2,390	302	1,457	40	194	142	10,802
Replacement systems	1,114	505	1,398	316	986	102	62	41	4,525
Total	1,913	5,983	3,788	618	2,443	142	257	183	15,327
Projected Systems installed 2012									
New building	2,796	19,173	8,364	1,057	5,099	141	680	497	37,807
Replacement systems	8,543	3,873	10,720	2,422	7,561	782	477	314	34,693
2012 Total systems	11,339	23,046	19,084	3,479	12,660	923	1,158	811	72,500
Expected Growth Rates (2013-2015)									
2013									
New building	10.0%	-5.0%	-30.0%	10.0%	1.0%	10.0%	1.0%	1.0%	-7.9%
Replacement systems	50.0%	40.0%	50.0%	30.0%	5.0%	20.0%	20.0%	20.0%	36.3%
2014									
New building	10.0%	5.0%	-10.0%	5.0%	1.0%	2.0%	2.0%	1.0%	2.2%
Replacement systems	20.0%	5.0%	20.0%	5.0%	5.0%	5.0%	5.0%	5.0%	14.2%
2015									
New building	10.0%	1.0%	-10.0%	1.0%	1.0%	1.0%	1.0%	1.0%	0.2%
Replacement systems	20.0%	5.0%	10.0%	5.0%	5.0%	5.0%	5.0%	5.0%	11.1%
Expected System Installations									
2013									
New building	3,075	18,214	5,855	1,163	5,150	156	687	502	34,801
Replacement systems	12,815	5,422	16,080	3,148	7,939	938	573	377	47,294
Total	15,890	23,637	21,935	4,311	13,089	1,094	1,260	879	82,095
2014									
New building	3,383	19,125	5,269	1,221	5,201	159	701	507	35,566
Replacement systems	15,378	5,694	19,297	3,306	8,336	985	601	396	53,993
Total	18,761	24,819	24,566	4,527	13,538	1,144	1,302	903	89,558
2015									
New building	3,721	19,316	4,742	1,233	5,253	160	708	512	35,646
Replacement systems	18,454	5,978	21,226	3,471	8,753	1,035	631	415	59,964
Total	22,175	25,295	25,968	4,704	14,006	1,195	1,339	927	95,610
Summary of System Installations									
	NSW	VIC	QLD	SA	WA	Tas	NT	ACT	Total
2010	38,525	27,733	34,262	6,812	16,065	1,433	1,303	960	127,093
2011	25,334	26,446	30,937	5,444	12,862	1,725	1,267	1,038	105,053
2012	11,339	23,046	19,084	3,479	12,660	923	1,158	811	72,500
2013	15,890	23,637	21,935	4,311	13,089	1,094	1,260	879	82,095
2014	18,761	24,819	24,566	4,527	13,538	1,144	1,302	903	89,558
2015	22,175	25,295	25,968	4,704	14,006	1,195	1,339	927	95,610
Certificates per system									
	NSW	VIC	QLD	SA	WA	Tas	NT	ACT	Total
2010	34.8	33.6	33.1	33	31	48.9	34.7	31.7	33.6
2011	31.9	27.0	30.5	29.4	29.8	26.3	27.4	31.1	29.7
2012	29.6	27.9	29.0	29.4	29.1	29.9	28.6	28.5	28.8
2013	29.7	28.1	29.5	29.5	29.2	29.9	28.7	28.6	29.1
2014	29.8	28.1	29.7	29.5	29.2	29.9	28.7	28.7	29.2
2015	29.8	28.1	29.8	29.5	29.2	29.9	28.8	28.7	29.2
Certificate Creation ('000)									
	NSW	VIC	QLD	SA	WA	Tas	NT	ACT	Total
2010	1,339	932	1,133	225	499	70	45	31	4,274
2011	808	714	944	160	383	45	35	32	3,121
2012	336	643	553	102	368	28	33	23	2,087
2013	472	664	647	127	382	33	36	25	2,387
2014	559	697	730	134	395	34	37	26	2,612
2015	661	711	774	139	409	36	39	27	2,794

Summary of REC-Registry Data for Solar PV by Segment

Attachment 7

Certificates created as at 31 December 2012 (incl Pending Registration)

Note: 2012 Installation year figures are not complete as certificates will be created in 2013

PV - All Sectors

Residential Grid Connect (non Upgrade)

1. Systems installed

	2009	2010	2011	2012	Grand Total		2009	2010	2011	2012	Grand Total
ACT	803	2,323	6,860	1,217	11,203	ACT	781	2,156	6,272	1,180	10,389
NSW	14,009	70,183	80,290	46,736	211,218	NSW	12,695	64,917	68,433	39,787	185,832
NT	215	637	401	392	1,645	NT	191	560	339	340	1,430
QLD	18,283	48,697	95,303	117,487	279,770	QLD	17,109	46,648	85,920	102,629	252,306
SA	8,572	16,705	63,556	37,136	125,969	SA	7,578	15,368	59,132	31,786	113,864
TAS	1,452	1,889	2,475	5,595	11,411	TAS	1,423	1,815	2,233	5,252	10,723
VIC	8,429	35,676	60,214	58,440	162,759	VIC	7,912	34,040	55,308	53,408	150,668
WA	11,157	22,293	51,667	38,872	123,989	WA	10,127	19,375	44,234	35,655	109,391
Grand Total	62,920	198,403	360,766	305,875	927,964	Grand Total	57,816	184,879	321,871	270,037	834,603

2. Installed Capacity (kW)

	2009	2010	2011	2012	Grand Total		2009	2010	2011	2012	Grand Total
ACT	1,283	5,109	17,236	3,529	27,157	ACT	1,237	4,498	14,901	3,326	23,961
NSW	19,200	154,368	195,483	121,785	490,836	NSW	17,478	137,424	157,093	96,943	408,938
NT	510	1,493	1,803	1,690	5,497	NT	356	1,023	820	1,163	3,362
QLD	24,510	92,365	225,193	372,204	714,273	QLD	23,304	85,858	196,388	324,708	630,256
SA	12,436	33,235	163,533	119,108	328,311	SA	11,325	30,570	151,024	100,092	293,012
TAS	1,722	3,016	5,912	17,232	27,882	TAS	1,705	2,730	4,833	15,121	24,389
VIC	10,513	58,923	140,131	179,478	389,045	VIC	10,046	55,424	127,988	157,312	350,771
WA	14,301	42,147	123,013	88,829	268,290	WA	13,085	34,553	99,079	79,851	226,567
Grand Total	84,475	390,656	872,304	903,855	2,251,291	Grand Total	78,536	352,080	752,124	778,516	1,961,258

3. Certificates Created

	2009	2010	2011	2012	Grand Total		2009	2010	2011	2012	Grand Total
ACT	43,696	322,007	1,132,870	134,432	1,633,005	ACT	42,634	293,168	1,018,737	128,696	1,483,235
NSW	564,903	10,589,367	13,287,320	4,838,843	29,280,433	NSW	529,078	9,676,680	11,154,972	3,979,281	25,340,011
NT	22,578	93,738	87,273	60,358	263,947	NT	18,530	73,645	58,968	45,345	196,488
QLD	777,707	6,679,409	14,287,617	12,963,644	34,708,377	QLD	752,233	6,392,380	12,883,640	11,395,788	31,424,041
SA	342,592	2,177,311	9,149,365	4,296,733	15,966,001	SA	320,146	2,031,423	8,564,348	3,638,523	14,554,440
TAS	38,204	114,780	308,126	513,240	974,350	TAS	37,913	104,909	272,572	467,056	882,450
VIC	337,483	3,297,505	7,691,079	5,677,217	17,003,284	VIC	329,372	3,107,267	7,104,254	5,087,313	15,628,206
WA	378,669	2,713,365	7,579,979	3,674,610	14,346,623	WA	353,435	2,273,898	6,426,168	3,389,186	12,442,687
Grand Total	2,505,832	25,987,482	53,523,629	32,159,077	114,176,020	Grand Total	2,383,341	23,953,370	47,483,659	28,131,188	101,951,558

4. Capacity per System

	2009	2010	2011	2012	Grand Total		2009	2010	2011	2012	Grand Total
ACT	1.60	2.20	2.51	2.90	2.42	ACT	1.58	2.09	2.38	2.82	2.31
NSW	1.37	2.20	2.43	2.61	2.32	NSW	1.38	2.12	2.30	2.44	2.20
NT	2.37	2.34	4.50	4.31	3.34	NT	1.86	1.83	2.42	3.42	2.35
QLD	1.34	1.90	2.36	3.17	2.55	QLD	1.36	1.84	2.29	3.16	2.50
SA	1.45	1.99	2.57	3.21	2.61	SA	1.49	1.99	2.55	3.15	2.57
TAS	1.19	1.60	2.39	3.08	2.44	TAS	1.20	1.50	2.16	2.88	2.27
VIC	1.25	1.65	2.33	3.07	2.39	VIC	1.27	1.63	2.31	2.95	2.33
WA	1.28	1.89	2.38	2.29	2.16	WA	1.29	1.78	2.24	2.24	2.07
Grand Total	1.34	1.97	2.42	2.95	2.43	Grand Total	1.36	1.90	2.34	2.88	2.35

5. Certificates per System

	2009	2010	2011	2012	Grand Total		2009	2010	2011	2012	Grand Total
ACT	54.42	138.62	165.14	110.46	145.76	ACT	54.59	135.98	162.43	109.06	142.77
NSW	40.32	150.88	165.49	103.54	138.63	NSW	41.68	149.06	163.01	100.01	136.36
NT	105.01	147.16	217.64	153.97	160.45	NT	97.02	131.51	173.95	133.37	137.40
QLD	42.54	137.16	149.92	110.34	124.06	QLD	43.97	137.03	149.95	111.04	124.55
SA	39.97	130.34	143.96	115.70	126.75	SA	42.25	132.19	144.83	114.47	127.82
TAS	26.31	60.76	124.50	91.73	85.39	TAS	26.64	57.80	122.07	88.93	82.30
VIC	40.04	92.43	127.73	97.15	104.47	VIC	41.63	91.28	128.45	95.25	103.73
WA	33.94	121.71	146.71	94.53	115.71	WA	34.90	117.36	145.28	95.05	113.75
Grand Total	39.83	130.98	148.36	105.14	123.04	Grand Total	41.22	129.56	147.52	104.18	122.16

Summary of REC-Registry Data for Solar PV by Segment

Certificates created as at 31 December 2012 (incl Pending Registration)

Attachment 7

Note: 2012 Installation year figures are not complete as certificates will be created in 2013

Upgrade Systems (<1.0 kW with No Multiplier)

Grid Connect Commercial (>10 kW)

1. Systems installed

	2009	2010	2011	2012	Grand Total		2009	2010	2011	2012	Grand Total
ACT	21	32	25	6	84	ACT	1	14	55	7	77
NSW	1,290	559	151	131	2,131	NSW	24	597	1,226	515	2,362
NT	15	1	3	1	20	NT	9	13	20	15	57
QLD	1,150	679	1,266	1,757	4,852	QLD	24	109	445	359	937
SA	984	556	759	176	2,475	SA	10	37	178	353	578
TAS	29	14	31	37	111	TAS	2	2	23	55	80
VIC	517	359	517	93	1,486	VIC	15	59	455	529	
WA	1,014	383	884	1,027	3,308	WA	16	35	132	131	314
Grand Total	5,020	2,583	3,636	3,228	14,467	Grand Total	84	822	2,138	1,890	4,934

2. Installed Capacity (kW)

	2009	2010	2011	2012	Grand Total	Row Labels	2009	2010	2011	2012	Grand Total
ACT	16	25	16	4	61	ACT	30	271	996	127	1,424
NSW	1,163	317	84	74	1,638	NSW	558	6,689	13,441	8,755	29,443
NT	10	1	2	1	13	NT	144	229	494	238	1,104
QLD	830	343	693	1,071	2,936	QLD	377	1,984	8,164	7,284	17,809
SA	897	340	443	95	1,774	SA	214	719	2,406	4,738	8,076
TAS	17	9	19	22	67	TAS	37	296	722	1,054	
VIC	467	219	311	60	1,057	VIC	267	933	6,497	7,697	
WA	945	217	543	627	2,332	WA	271	736	2,518	2,010	5,535
Grand Total	4,346	1,470	2,111	1,953	9,880	Grand Total	1,593	10,931	29,247	30,371	72,143

3. Certificates Created

	2009	2010	2011	2012	Grand Total	Row Labels	2009	2010	2011	2012	Grand Total
ACT	322	493	313	81	1,209	ACT	740	7,348	25,939	2,938	36,965
NSW	23,314	6,231	1,655	1,459	32,659	NSW	12,511	208,746	415,950	206,497	843,704
NT	237	15	37	17	306	NT	3,811	6,261	13,189	6,451	29,712
QLD	16,490	6,768	13,597	21,161	58,016	QLD	8,984	52,640	205,615	165,558	432,797
SA	17,968	6,477	8,655	1,846	34,946	SA	4,478	18,984	63,906	112,953	200,321
TAS	291	162	324	369	1,146	TAS	755	7,008	14,216	21,979	
VIC	8,111	3,793	5,340	1,022	18,266	VIC	5,680	20,229	130,840	156,749	
WA	19,020	4,281	10,674	12,337	46,312	WA	6,214	17,688	59,985	44,774	128,661
Grand Total	85,753	28,220	40,595	38,292	192,860	Grand Total	36,738	318,102	811,821	684,227	1,850,888

4. Capacity per System

	2009	2010	2011	2012	Grand Total		2009	2010	2011	2012	Grand Total
ACT	0.77	0.77	0.64	0.68	0.72	ACT	29.70	19.35	18.12	18.12	18.49
NSW	0.90	0.57	0.56	0.57	0.77	NSW	23.25	11.20	10.96	17.00	12.47
NT	0.70	0.66	0.55	0.74	0.67	NT	15.98	17.61	24.68	15.87	19.38
QLD	0.72	0.50	0.55	0.61	0.61	QLD	15.70	18.20	18.35	20.29	19.01
SA	0.91	0.61	0.58	0.54	0.72	SA	21.38	19.44	13.51	13.42	13.97
TAS	0.58	0.67	0.61	0.60	0.61	TAS	18.27	12.86	13.12	13.18	
VIC	0.90	0.61	0.60	0.64	0.71	VIC	17.78	15.81	14.28	14.55	
WA	0.93	0.57	0.61	0.61	0.71	WA	16.96	21.03	19.07	15.34	17.63
Grand Total	0.87	0.57	0.58	0.61	0.68	Grand Total	18.97	13.30	13.68	16.07	14.62

5. Certificates per System

	2009	2010	2011	2012	Grand Total		2009	2010	2011	2012	Grand Total
ACT	15.33	15.41	12.52	13.50	14.39	ACT	740.00	524.86	471.62	419.71	480.06
NSW	18.07	11.15	10.96	11.14	15.33	NSW	521.29	349.66	339.27	400.97	357.20
NT	15.80	15.00	12.33	17.00	15.30	NT	423.44	481.62	659.45	430.07	521.26
QLD	14.34	9.97	10.74	12.04	11.96	QLD	374.33	482.94	462.06	461.16	461.90
SA	18.26	11.65	11.40	10.49	14.12	SA	447.80	513.08	359.02	319.98	346.58
TAS	10.03	11.57	10.45	9.97	10.32	TAS	377.50	304.70	258.47	274.74	
VIC	15.69	10.57	10.33	10.99	12.29	VIC	378.67	342.86	287.56	296.31	
WA	18.76	11.18	12.07	12.01	14.00	WA	388.38	505.37	454.43	341.79	409.75
Grand Total	17.08	10.93	11.16	11.86	13.33	Grand Total	437.36	386.99	379.71	362.02	375.13

Summary of REC-Registry Data for Solar PV by Segment

Certificates created as at 31 December 2012 (incl Pending Registration)

Attachment 7

Note: 2012 Installation year figures are not complete as certificates will be created in 2013

Off-Grid Systems (Designated from 2010)

1. Systems installed

	2009	2010	2011	2012	Grand Total
ACT		121	508	24	653
NSW		4,110	10,480	6,303	20,893
NT		63	39	36	138
QLD		1,261	7,672	12,742	21,675
SA		744	3,487	4,821	9,052
TAS		58	188	251	497
VIC		1,262	4,330	4,484	10,076
WA		2,500	6,417	2,059	10,976
Grand Total		10,119	33,121	30,720	73,960

2. Installed Capacity (kW)

Row Labels	2009	2010	2011	2012	Grand Total
ACT		316	1,323	72	1,711
NSW		9,938	24,865	16,013	50,816
NT		240	488	289	1,017
QLD		4,181	19,948	39,142	63,271
SA		1,605	9,660	14,184	25,448
TAS		240	765	1,366	2,372
VIC		3,012	10,899	15,609	29,520
WA		6,641	20,874	6,340	33,855
Grand Total		26,174	88,821	93,014	208,010

3. Certificates Created

Row Labels	2009	2010	2011	2012	Grand Total
ACT		20,998	87,881	2,717	111,596
NSW		697,710	1,714,743	651,606	3,064,059
NT		13,817	15,079	8,545	37,441
QLD		227,621	1,184,765	1,381,137	2,793,523
SA		120,427	512,456	543,411	1,176,294
TAS		8,954	28,222	31,599	68,775
VIC		180,765	561,256	458,042	1,200,063
WA		417,498	1,083,152	228,313	1,728,963
Grand Total		1,687,790	5,187,554	3,305,370	10,180,714

4. Capacity per System

	2009	2010	2011	2012	Grand Total
ACT		2.61	2.60	3.00	2.62
NSW		2.42	2.37	2.54	2.43
NT		3.81	12.52	8.01	7.37
QLD		3.32	2.60	3.07	2.92
SA		2.16	2.77	2.94	2.81
TAS		4.15	4.07	5.44	4.77
VIC		2.39	2.52	3.48	2.93
WA		2.66	3.25	3.08	3.08
Grand Total		2.59	2.68	3.03	2.81

5. Certificates per System

	2009	2010	2011	2012	Grand Total
ACT		173.54	172.99	113.21	170.90
NSW		169.76	163.62	103.38	146.65
NT		219.32	386.64	237.36	271.31
QLD		180.51	154.43	108.39	128.88
SA		161.86	146.96	112.72	129.95
TAS		154.38	150.12	125.89	138.38
VIC		143.24	129.62	102.15	119.10
WA		167.00	168.79	110.89	157.52
Grand Total		166.79	156.62	107.60	137.65

Summary of REC-Registry Data for Solar Water Heaters (SWH) by Segment**Attachment 8****Certificates created as at 31 December 2012 (incl Pending Registration)**

Note: 2012 Installation year figures are not complete as certificates will be created in 2013

1. SWH Systems installed

Installation Year	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
	New Building					Replacement					Total Market				
ACT	113	507	236	422	355	888	1,467	724	616	273	1,001	1,974	960	1,038	628
NSW	3,675	3,361	5,098	4,522	1,997	16,528	82,095	33,427	20,812	7,429	20,203	85,456	38,525	25,334	9,426
NT	410	346	436	522	486	826	1,385	867	745	415	1,236	1,731	1,303	1,267	901
QLD	12,631	10,652	10,497	9,359	5,974	10,699	26,007	23,765	21,578	9,322	23,330	36,659	34,262	30,937	15,296
SA	1,023	1,126	1,669	1,677	755	4,080	7,668	5,143	3,767	2,106	5,103	8,794	6,812	5,444	2,861
TAS	172	177	266	192	101	734	2,092	1,167	1,533	680	906	2,269	1,433	1,725	781
VIC	12,449	17,124	20,119	20,559	13,695	8,759	24,996	7,614	5,887	3,368	21,208	42,120	27,733	26,446	17,063
WA	3,606	4,123	5,728	5,077	3,642	8,792	11,569	10,337	7,785	6,575	12,398	15,692	16,065	12,862	10,217
Total	34,079	37,416	44,049	42,330	27,005	51,306	157,279	83,044	62,723	30,168	85,385	194,695	127,093	105,053	57,173

2. SWH Certificates Created

Installation Year	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
	New Building					Replacement					Total Market				
ACT	3,641	18,125	7,501	13,138	10,424	28,397	50,169	22,897	19,099	8,416	32,038	68,294	30,398	32,237	18,840
NSW	130,824	131,981	172,125	145,841	64,699	713,696	3,021,137	1,167,325	662,564	236,562	844,520	3,153,118	1,339,450	808,405	301,261
NT	13,851	10,468	13,429	13,929	12,486	26,505	65,827	31,740	20,807	11,887	40,356	76,295	45,169	34,736	24,373
QLD	418,149	374,016	339,788	275,585	175,569	346,445	1,045,900	793,279	666,758	290,889	764,594	1,419,916	1,133,067	942,343	466,458
SA	36,438	38,281	54,845	51,074	21,845	133,496	321,816	170,271	109,047	59,752	169,934	360,097	225,116	160,121	81,597
TAS	8,056	11,377	8,115	4,994	2,981	58,209	143,895	61,940	40,289	20,183	66,265	155,272	70,055	45,283	23,164
VIC	325,693	457,839	533,397	531,095	337,213	578,923	1,652,280	398,889	184,229	103,106	904,616	2,110,119	932,286	715,324	440,319
WA	121,986	142,995	188,152	162,535	115,982	287,502	385,193	310,613	220,545	183,946	409,488	528,188	498,765	383,080	299,928
Total	1,058,638	1,185,082	1,317,352	1,198,191	741,199	2,173,173	6,686,217	2,956,954	1,923,338	914,741	3,231,811	7,871,299	4,274,306	3,121,529	1,655,940

3. Certificates per SWH System

Installation Year	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
	New Building					Replacement					Total Market				
ACT	32.2	35.7	31.8	31.1	29.4	32.0	34.2	31.6	31.0	30.8	32.0	34.6	31.7	31.1	30.0
NSW	35.6	39.3	33.8	32.3	32.4	43.2	36.8	34.9	31.8	31.8	41.8	36.9	34.8	31.9	32.0
NT	33.8	30.3	30.8	26.7	25.7	32.1	47.5	36.6	27.9	28.6	32.7	44.1	34.7	27.4	27.1
QLD	33.1	35.1	32.4	29.4	29.4	32.4	40.2	33.4	30.9	31.2	32.8	38.7	33.1	30.5	30.5
SA	35.6	34.0	32.9	30.5	28.9	32.7	42.0	33.1	28.9	28.4	33.3	40.9	33.0	29.4	28.5
TAS	46.8	64.3	30.5	26.0	29.5	79.3	68.8	53.1	26.3	29.7	73.1	68.4	48.9	26.3	29.7
VIC	26.2	26.7	26.5	25.8	24.6	66.1	66.1	52.4	31.3	30.6	42.7	50.1	33.6	27.0	25.8
WA	33.8	34.7	32.8	32.0	31.8	32.7	33.3	30.0	28.3	28.0	33.0	33.7	31.0	29.8	29.4
Total	31.1	31.7	29.9	28.3	27.4	42.4	42.5	35.6	30.7	30.3	37.8	40.4	33.6	29.7	29.0

Delay in Certificate Creation for PV System Installations

Rows show the quarter in which the system was installed. The columns show the percentage created within the specified number of days

- more than 75% of certificates created
- more than 85% of certificates created
- more than 90% of certificates created

* Not all systems installed in Q1 and Q2 2012 have created certificates yet.

* Based on 2011 experience, 3% of Q1 2012 installations are yet to create certificates and 6% of Q2 installations are yet to create certificates.

Australia	30 days	60 days	90 days	120 days	150 days	180 days	210 days	240 days	270 days	300 days	330 days	365 days
Q1 2010	53%	73%	83%	90%	93%	95%	96%	97%	98%	98%	99%	100%
Q2 2010	62%	77%	83%	85%	87%	89%	94%	96%	97%	97%	99%	100%
Q3 2010	61%	75%	80%	85%	88%	90%	91%	92%	94%	96%	98%	100%
Q4 2010	56%	73%	80%	83%	85%	90%	93%	95%	97%	97%	98%	100%
Q1 2011	65%	81%	88%	91%	93%	95%	96%	97%	97%	98%	99%	100%
Q2 2011	58%	75%	83%	88%	92%	94%	95%	96%	97%	98%	99%	100%
Q3 2011	55%	76%	86%	90%	93%	94%	96%	97%	97%	98%	99%	100%
Q4 2011	66%	83%	90%	93%	95%	96%	97%	97%	98%	99%	99%	100%
Q1 2012 *	77%	89%	92%	94%	96%	97%	98%	99%	100%	100%	100%	100%
Q2 2012 *	71%	86%	92%	96%	98%	99%	100%	100%	100%	100%	100%	100%

NSW	30 days	60 days	90 days	120 days	150 days	180 days	210 days	240 days	270 days	300 days	330 days	365 days
Q1 2010	0.51	0.71	0.83	0.89	0.92	0.93	0.94	0.96	0.97	0.98	0.99	1.00
Q2 2010	0.62	0.77	0.82	0.85	0.86	0.87	0.92	0.96	0.96	0.97	0.99	1.00
Q3 2010	0.62	0.75	0.80	0.85	0.87	0.89	0.90	0.91	0.93	0.96	0.98	1.00
Q4 2010	0.58	0.74	0.81	0.84	0.86	0.90	0.93	0.95	0.96	0.96	0.97	1.00
Q1 2011	0.66	0.83	0.90	0.92	0.94	0.95	0.96	0.97	0.97	0.98	0.99	1.00
Q2 2011	0.64	0.79	0.85	0.90	0.92	0.94	0.95	0.96	0.96	0.97	0.98	1.00
Q3 2011	0.57	0.76	0.84	0.89	0.92	0.93	0.94	0.96	0.97	0.97	0.98	1.00
Q4 2011	0.66	0.83	0.89	0.92	0.94	0.95	0.96	0.97	0.97	0.98	0.99	1.00
Q1 2012 *	0.78	0.87	0.90	0.93	0.95	0.96	0.98	0.99	0.99	100%	100%	100%
Q2 2012 *	0.70	0.85	0.92	0.95	0.98	0.99	100%	100%	100%	100%	100%	100%

Queensland	30 days	60 days	90 days	120 days	150 days	180 days	210 days	240 days	270 days	300 days	330 days	365 days
Q1 2010	0.50	0.73	0.86	0.92	0.94	0.96	0.97	0.98	0.99	0.99	0.99	1.00
Q2 2010	0.52	0.70	0.81	0.91	0.95	0.95	0.96	0.97	0.98	0.99	0.99	1.00
Q3 2010	0.56	0.72	0.78	0.81	0.82	0.88	0.93	0.96	0.97	0.98	0.98	1.00
Q4 2010	0.61	0.72	0.78	0.83	0.87	0.88	0.90	0.91	0.94	0.96	0.98	1.00
Q1 2011	0.61	0.75	0.80	0.83	0.85	0.87	0.94	0.95	0.96	0.97	0.98	1.00
Q2 2011	0.61	0.77	0.84	0.90	0.93	0.95	0.96	0.97	0.98	0.99	0.99	1.00
Q3 2011	0.68	0.83	0.89	0.92	0.94	0.96	0.97	0.97	0.98	0.99	0.99	1.00
Q4 2011	0.70	0.87	0.92	0.95	0.96	0.97	0.98	0.98	0.99	0.99	1.00	1.00
Q1 2012 *	0.75	0.88	0.93	0.96	0.98	0.99	1.00	1.00	1.00	100%	100%	100%
Q2 2012 *	0.76	0.92	0.97	0.99	1.00	1.00	100%	100%	100%	100%	100%	100%

Victoria	30 days	60 days	90 days	120 days	150 days	180 days	210 days	240 days	270 days	300 days	330 days	365 days
Q1 2010	0.40	0.63	0.74	0.82	0.87	0.91	0.93	0.95	0.97	0.98	0.99	1.00
Q2 2010	0.41	0.64	0.76	0.80	0.82	0.89	0.94	0.96	0.97	0.97	0.98	1.00
Q3 2010	0.47	0.72	0.82	0.86	0.88	0.91	0.94	0.96	0.97	0.98	0.99	1.00
Q4 2010	0.48	0.71	0.81	0.87	0.90	0.92	0.94	0.96	0.96	0.97	0.98	1.00
Q1 2011	0.49	0.69	0.77	0.83	0.87	0.89	0.90	0.91	0.94	0.95	0.97	1.00
Q2 2011	0.51	0.74	0.82	0.89	0.93	0.96	0.97	0.97	0.98	0.99	0.99	1.00
Q3 2011	0.56	0.78	0.87	0.91	0.94	0.95	0.97	0.97	0.98	0.98	0.99	1.00
Q4 2011	0.58	0.77	0.83	0.87	0.88	0.90	0.94	0.97	0.97	0.97	0.99	1.00
Q1 2012 *	0.61	0.84	0.91	0.95	0.97	0.99	1.00	1.00	1.00	100%	100%	100%
Q2 2012 *	0.67	0.89	0.96	0.99	1.00	1.00	100%	100%	100%	100%	100%	100%

SA	30 days	60 days	90 days	120 days	150 days	180 days	210 days	240 days	270 days	300 days	330 days	365 days
Q1 2010	0.74	0.74	0.82	0.88	0.92	0.95	0.96	0.97	0.97	0.98	0.98	1.00
Q2 2010	0.56	0.76	0.85	0.92	0.95	0.97	0.97	0.98	0.99	0.99	0.99	1.00
Q3 2010	0.57	0.73	0.79	0.82	0.84	0.91	0.94	0.96	0.97	0.97	0.98	1.00
Q4 2010	0.59	0.79	0.87	0.91	0.93	0.95	0.96	0.96	0.97	0.98	0.99	1.00
Q1 2011	0.59	0.75	0.79	0.83	0.84	0.86	0.95	0.97	0.98	0.98	0.99	1.00
Q2 2011	0.61	0.77	0.84	0.89	0.91	0.93	0.94	0.95	0.96	0.97	0.98	1.00
Q3 2011	0.63	0.82	0.88	0.92	0.93	0.95	0.95	0.96	0.97	0.98	0.99	1.00
Q4 2011	0.64	0.77	0.82	0.86	0.90	0.92	0.92	0.93	0.95	0.97	0.98	1.00
Q1 2012 *	0.66	0.82	0.90	0.95	0.98	0.99	1.00	1.00	1.00	100%	100%	100%
Q2 2012 *	0.70	0.84	0.88	0.90	0.93	0.95	100%	100%	100%	100%	100%	100%

Delay in Certificate Creation for PV System Installations

Rows show the quarter in which the system was installed. The columns show the percentage created within the specified number of days

- more than 75% of certificates created
- more than 85% of certificates created
- more than 90% of certificates created

* Not all systems installed in Q1 and Q2 2012 have created certificates yet.

* Based on 2011 experience, 3% of Q1 2012 installations are yet to create certificates and 6% of Q2 installations are yet to create certificates.

WA	30 days	60 days	90 days	120 days	150 days	180 days	210 days	240 days	270 days	300 days	330 days	365 days
Q1 2010	0.64	0.81	0.89	0.92	0.94	0.96	0.96	0.97	0.98	0.98	0.99	1.00
Q2 2010	0.66	0.84	0.90	0.94	0.96	0.97	0.97	0.98	0.98	0.99	0.99	1.00
Q3 2010	0.68	0.82	0.88	0.91	0.94	0.96	0.98	0.99	0.99	0.99	0.99	1.00
Q4 2010	0.69	0.83	0.88	0.91	0.93	0.95	0.96	0.97	0.98	0.98	0.99	1.00
Q1 2011	0.73	0.88	0.92	0.94	0.96	0.97	0.98	0.99	0.99	0.99	1.00	1.00
Q2 2011	0.73	0.86	0.92	0.95	0.97	0.97	0.98	0.98	0.99	0.99	0.99	1.00
Q3 2011	0.74	0.87	0.91	0.94	0.95	0.96	0.96	0.97	0.98	0.99	0.99	1.00
Q4 2011	0.77	0.88	0.93	0.95	0.96	0.97	0.98	0.98	0.99	0.99	1.00	1.00
Q1 2012 *	0.78	0.89	0.93	0.97	0.99	1.00	1.00	1.00	1.00	100%	100%	100%
Q2 2012 *	0.83	0.94	0.98	1.00	1.00	1.00	100%	100%	100%	100%	100%	100%

Tasmania	30 days	60 days	90 days	120 days	150 days	180 days	210 days	240 days	270 days	300 days	330 days	365 days
Q1 2010	0.41	0.57	0.65	0.71	0.75	0.81	0.90	0.93	0.93	0.94	0.94	1.00
Q2 2010	0.45	0.66	0.73	0.78	0.88	0.92	0.96	0.97	0.98	0.99	0.99	1.00
Q3 2010	0.48	0.73	0.85	0.95	0.97	0.98	0.98	0.99	0.99	0.99	0.99	1.00
Q4 2010	0.57	0.75	0.88	0.91	0.91	0.92	0.93	0.93	0.95	0.96	0.98	1.00
Q1 2011	0.59	0.77	0.83	0.88	0.91	0.94	0.95	0.96	0.97	0.98	0.99	1.00
Q2 2011	0.63	0.80	0.86	0.89	0.90	0.91	0.92	0.94	0.96	0.99	1.00	1.00
Q3 2011	0.70	0.84	0.91	0.96	0.98	0.98	0.99	0.99	1.00	1.00	1.00	1.00
Q4 2011	0.71	0.84	0.89	0.91	0.93	0.96	0.97	0.98	0.98	0.99	0.99	1.00
Q1 2012 *	0.75	0.91	0.96	0.97	0.98	0.99	0.99	1.00	1.00	100%	100%	100%
Q2 2012 *	0.75	0.88	0.93	0.97	0.98	0.99	100%	100%	100%	100%	100%	100%

ACT	30 days	60 days	90 days	120 days	150 days	180 days	210 days	240 days	270 days	300 days	330 days	365 days
Q1 2010	0.41	0.59	0.71	0.78	0.82	0.84	0.86	0.87	0.89	0.97	0.99	1.00
Q2 2010	0.40	0.62	0.78	0.83	0.85	0.91	0.93	0.95	0.96	0.97	0.98	1.00
Q3 2010	0.45	0.63	0.72	0.77	0.81	0.83	0.84	0.88	0.89	0.92	0.95	1.00
Q4 2010	0.38	0.63	0.74	0.80	0.83	0.90	0.93	0.95	0.96	0.97	0.98	1.00
Q1 2011	0.48	0.74	0.84	0.88	0.90	0.94	0.96	0.98	0.99	0.99	0.99	1.00
Q2 2011	0.44	0.66	0.81	0.89	0.93	0.95	0.97	0.98	0.98	0.98	0.99	1.00
Q3 2011	0.49	0.72	0.84	0.91	0.94	0.94	0.96	0.97	0.98	0.99	0.99	1.00
Q4 2011	0.40	0.66	0.79	0.88	0.91	0.91	0.91	0.91	0.92	0.94	0.95	1.00
Q1 2012 *	0.39	0.65	0.75	0.80	0.82	0.86	0.92	0.95	0.97	100%	100%	100%
Q2 2012 *	0.45	0.82	0.91	0.95	0.97	0.99	100%	100%	100%	100%	100%	100%

NT	30 days	60 days	90 days	120 days	150 days	180 days	210 days	240 days	270 days	300 days	330 days	365 days
Q1 2010	0.12	0.25	0.42	0.55	0.61	0.63	0.68	0.71	0.84	0.89	0.90	1.00
Q2 2010	0.41	0.69	0.76	0.82	0.85	0.85	0.89	0.97	0.97	0.97	0.99	1.00
Q3 2010	0.11	0.35	0.56	0.75	0.76	0.78	0.81	0.83	0.86	0.87	0.91	1.00
Q4 2010	0.05	0.33	0.43	0.55	0.56	0.61	0.62	0.67	0.71	0.88	0.92	1.00
Q1 2011	0.48	0.53	0.58	0.65	0.65	0.74	0.88	0.90	0.90	0.90	0.90	1.00
Q2 2011	0.32	0.53	0.73	0.78	0.82	0.87	0.88	0.90	0.93	0.94	0.97	1.00
Q3 2011	0.13	0.39	0.63	0.66	0.72	0.76	0.82	0.83	0.84	0.84	0.95	1.00
Q4 2011	0.34	0.49	0.59	0.65	0.78	0.82	0.89	0.91	0.93	0.96	1.00	1.00
Q1 2012 *	0.26	0.53	0.72	0.80	0.88	0.96	0.98	1.00	1.00	100%	100%	100%
Q2 2012 *	0.30	0.70	0.84	0.91	0.93	0.99	100%	100%	100%	100%	100%	100%