

Postcode and income distribution of solar

April 2014

This Report has been prepared by Green Energy Trading for the REC Agents Association and analyses the number of solar systems that have been installed under the Renewable Energy Target (RET). The RET is the key policy measure that assists households with investing in solar. More than 2 million solar systems have been supported by the RET since it commenced in 2001. This amounts to 22 per cent of all dwellings across Australia having solar on their roofs.

This report takes a deeper look at the solar system installation figures produced by the Australian Government's Clean Energy Regulator (CER). System installations are analysed on a postcode basis and cross-referenced with taxable income data provided by the Australian Tax Office and dwellings data provided by the Australian Bureau of Statistics.

Key findings:

- Rural and regional areas are over represented in solar installation statistics:
 - Rural and regional areas have 42 per cent of all solar systems installed; this is despite having only 32 per cent of the housing stock. This translates into rural and regional areas having the highest uptake of solar systems per household at 29 per cent.
 - Capital cities have 45 per cent of all solar systems installed, but 56 per cent of the housing stock. This translates into capital cities having the lowest uptake of solar systems per household at 18 per cent.
- Installation of solar systems in the capital cities were typically characterised by postcodes in the outer metropolitan mortgage belt;
- There is an inverse relationship between average incomes and solar penetration levels (as income levels increased, solar uptake declined);
- The suburbs with the highest penetration of solar systems in each state tended to be either regional or outer metropolitan; and
- The five suburbs in Australia with the largest number of solar systems are:
 - Bundaberg area, QLD
 - Mandurah area, WA
 - Hervey Bay area, QLD
 - Werribee area, VIC
 - Hoppers Crossing area, VIC

Sections covered by this report

This report analyses the following key attributes of solar installations:

1. Solar system penetration and income levels by postcode
2. Urban classification and solar system penetration
3. Top 10 suburbs in each state by total solar PV and solar hot water (SWH) system installations

1. Solar system penetration and income levels by postcode

Our analysis has found an inverse correlation between the income level of a postcode and the level of solar installations in that postcode, with solar uptake declining as income increased. A popular myth is that rich people can afford solar and are being subsidised by people on lower incomes. Our analysis (Figure 1) shows that this is not the case.

Factors driving the uptake of solar on a postcode are likely to be factors such as (i) level of home ownership, (ii) the suitability of buildings (number of detached and semi-detached dwellings), (iii) the relative importance of energy bills (families that spend a higher proportion of their incomes on energy) and (iv) level of new home and renovation activity¹.

Figure 1 – Solar system penetration by postcode compared to income levels

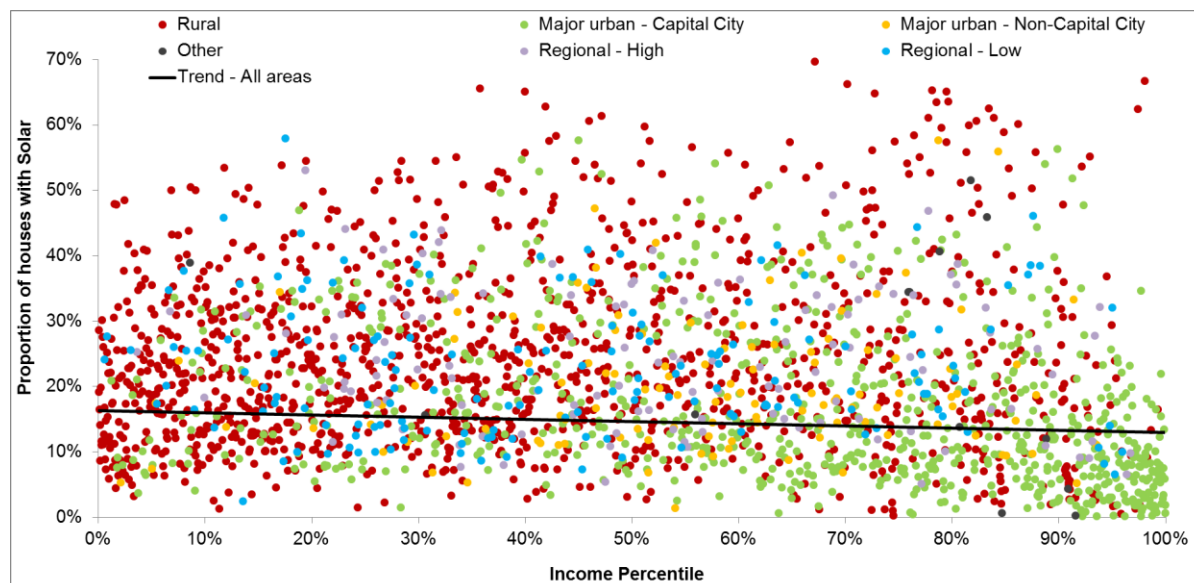


Figure 1 plots each postcode for which there is available data. A postcode's position on the scatter chart is determined by the income percentile and solar system penetration associated with the postcode. A third parameter is the relevant urban classification of each postcode which is represented by the colour of the marker. A relatively rich capital city postcode with low solar penetration will be green and at the bottom right of the graph. A relatively poor rural postcode with high solar penetration will be red and at the top left. The methodology for this analysis is explained below.

Solar penetration

To estimate solar system penetration for each Australian postcode (as used in Figure 1) we used total systems installed at each postcode divided by total number of dwellings at each postcode. Statistics on dwellings were sourced from the Australian Bureau of Statistics (ABS) 2011 census data.

The CER regularly releases installation figures for Small Generation Units (SGUs), Solar Water Heaters (SWHs), and Air Source Heat Pumps (ASHPs). Installation figures are at postcode level and to achieve penetration rates for each postcode we took the total number of installations (solar PV, SWH and ASHP) and divided them by the total number of dwellings at each postcode. Using this approach may in some cases act to overstate penetration levels. This is because we have treated each installation (whether solar PV, SWH or ASHP) as a separate installation. In some cases a dwelling may have both solar PV and solar hot water installed but there is no way of knowing which dwellings have more than one solar installation.

¹ A number of builders offer attractive solar packages and in many states building regulations support a low greenhouse hot water systems to be installed

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Not all solar PV and SWH systems installed will create RECs, a small proportion may either (i) not meet requirements or (ii) the owners may not bother creating certificates due to complexities in creation².

Income measurements

The Australian Tax Office (ATO) releases a summary of tax returns for each financial year; this publication ('Taxation Statistics 2009–10') includes average taxable income for each postcode in each state.

Ordering or ranking average income provides an insight into how a particular postcode fits within the broader average taxable incomes of all postcodes. For each average taxable income we calculated its per centile ranking. The 100th per centile was the suburb with the highest average taxable income which was \$182,254 and the postcode with the lowest average taxable income (\$36,153) had a percentile rank of 0.02%..

2. Solar system penetration and urban classification

Urban classification

The ATO's publication 'Taxation Statistics 2009–10' classifies the urban environment in which each postcode lies. We have adopted, and slightly modified, the urban classification definition used by the ATO. Each postcode, according to specific criteria, falls into one of the six categories outlined in Table 1.

Table 1 - Solar system penetration and income statistics by urban classification

ATO Classification		ATO criteria
1	Major urban (Capital city)	Postcodes in capital city urban centres
2	Other Urban (we have used Major urban – Non-Capital City)	Postcodes in urban centres with population greater than 50,000 persons (excluding capital cities)
3	Regional-high urbanisation (we have used Regional – High)	Postcodes in urban centres with population between 10,000 and 50,000 persons
4	Regional-low urbanisation (we have used Regional – Low)	Postcodes in urban centres with population between 3,000 and 10,000 persons
5	Rural	All other postcodes (includes urban centres with population less than 3,000 persons and all other sparsely settled areas)
6	Other	Postcodes listed by Australia Post as valid but not in use, special PO boxes and other special mailing postcodes

We assigned system installation data to each of the six urban classifications used by the ATO. For each postcode with available system installation data and associated urban classification we aggregated system installation figures up to the level of urban classification.

² Solar systems installed in new homes have more complexity in certificate creation

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Table 2 - Solar system penetration and income statistics by urban classification

Urban Classification	Number of systems	% share of total systems	Number of dwellings	% share of total dwellings	Average penetration	Average Income (per dwelling)
Major urban – Capital City	903,694	45%	5,086,911	56%	18%	\$64,654
Rural	398,293	20%	1,271,293	14%	31%	\$51,892
Regional – High	288,609	14%	1,047,759	11%	28%	\$55,272
Major Urban – Non-Capital City	256,373	13%	1,116,447	12%	23%	\$55,111
Regional – Low	164,516	8%	605,360	7%	27%	\$52,770
Other	2,703	0%	8,533	-	32%	\$62,182
Total Australia	2,014,188	100%	9,136,303	100	22%	\$56,267

Not all income and dwelling data was available for all postcodes for which we had CER solar system installation data. We have excluded 18 per cent of postcodes for which the CER has data (this means we excluded solar installations associated with these postcodes). These postcodes only had a small number of solar system installed and accounted for only 0.4 per cent of total installations. A reconciliation of postcodes analysed is included in Table 3 below.

Table 3 - Solar system and postcode reconciliation (data from CER as per 31 January 2014)

	Published by the CER	Included in this analysis	Excluded	Per centage excluded
Total postcodes	3,009	2,473	536	17.8%
Total SGU installations	1,175,998	1,173,521	2,476	0.2%
Total SWH installations	671,231	840,667	4,614	0.7%
Total ASHP installations	174,051			
<i>Manual adjustments</i>	-	-	2	
Total Solar installations	2,021,280	2,014,188	7,092	0.4%

3. Top 10 suburbs in each state and territory

We have identified the suburbs in each state with the highest level of solar system installations; we have included this analysis as Attachment 1.

Key findings of this analysis were:

- In almost all cases, the top 10 postcodes in each state had an average taxable income lower than the state average
- In the more populated states, the suburbs with the most solar installations tended to be outside the capital cities.
- Of the top 10 postcodes in each state (80 in total across 8 states and territories) 45 per cent were in rural and regional areas; 45 per cent in capital cities; and the remaining 10 per cent in other major urban centres.

Attachment 1 – top 10 solar PV and SWH postcodes by state and territory, and nationwide

NSW									
Postcode	Locality/area	Rooftop solar systems	Solar Hot Water (incl. ASHP)	Total solar installations	Total dwellings	Dwellings with Rooftop Solar + Solar Water	Postcode cf. state average income	Urban classification	
1	2480	LISMORE area	3,864	5,297	9,161	19,297	47%	Below average income	Regional - High
2	2444	PORT MACQUARIE area	2,958	5,264	8,222	20,475	40%	Below average income	Regional - High
3	2540	NOWRA area	2,573	4,502	7,075	23,939	30%	Below average income	Regional - Low
4	2450	COFFS HARBOUR area	2,052	4,616	6,668	17,113	39%	Below average income	Regional - High
5	2430	TAREE area	2,186	3,832	6,018	15,049	40%	Below average income	Regional - High
6	2486	TWEED HEADS SOUTH area	3,116	2,811	5,927	13,675	43%	Below average income	Regional - High
7	2560	CAMBLETOWN area	3,062	2,544	5,606	25,960	22%	Below average income	Major urban - Capital City
8	2259	WYONG area	2,842	2,615	5,457	21,615	25%	Below average income	Major urban - Non-Capital City
9	2478	BALLINA area	2,345	2,984	5,329	12,739	42%	Below average income	Regional - High
10	2830	DUBBO area	4,024	1,264	5,288	15,636	34%	Below average income	Regional - High
		Total Top 10	29,022	35,729	64,751	185,498	35%		
		Total other	225,985	198,809	424,794	2,683,072	16%		
		Total NSW	255,007	234,538	489,545	2,868,570	17%		

VIC									
Postcode	Locality/area	Rooftop solar systems	Solar Hot Water (incl. ASHP)	Total solar installations	Total dwellings	Dwellings with Rooftop Solar + Solar Water	Postcode cf. state average income	Urban classification	
1	3030	WERRIBEE area	3,706	7,464	11,170	29,011	39%	Below average income	Major urban - Capital City
2	3029	HOPPERS CROSSING area	4,185	6,737	10,922	24,212	45%	Below average income	Major urban - Capital City
3	3977	CRANBOURNE NORTH area	3,502	5,465	8,967	24,572	36%	Below average income	Major urban - Capital City
4	3023	CAROLINE SPRINGS area	2,782	3,771	6,553	18,757	35%	Below average income	Major urban - Capital City
5	3754	DOREEN area	949	5,592	6,541	6,545	100%	Below average income	Rural
6	3810	PAKENHAM area	1,660	4,406	6,066	13,740	44%	Below average income	Regional - High
7	3064	CRAIGIEBURN area	2,390	3,658	6,048	16,802	36%	Below average income	Major urban - Capital City
8	3216	BELMONT area	2,267	2,042	4,309	21,927	20%	Below average income	Major urban - Non-Capital City
9	3551	EPSOM area	1,875	2,037	3,912	8,952	44%	Below average income	Rural
10	3337	MELTON area	1,571	2,171	3,742	12,207	31%	Below average income	Regional - High
		Total Top 10	24,887	43,343	68,230	176,725	39%		
		Total other	178,666	132,438	311,104	2,102,111	15%		
		Total VIC	203,553	175,781	379,334	2,278,836	17%		

QLD									
Postcode	Locality/area	Rooftop solar systems	Solar Hot Water (incl. ASHP)	Total solar installations	Total dwellings	Dwellings with Rooftop Solar + Solar Water	Postcode cf. state average income	Urban classification	
1	4670	BUNDABERG area	8,015	5,022	13,037	34,466	38%	<i>Below average income</i>	Regional - High
2	4655	HERVEY BAY area	6,525	4,844	11,369	25,946	44%	<i>Below average income</i>	Regional - High
3	4551	CALOUNDRA area	6,574	3,473	10,047	23,420	43%	<i>Below average income</i>	Major urban - Non-Capital City
4	4350	TOOWOOMBA area	5,928	3,961	9,889	43,573	23%	<i>Below average income</i>	Major urban - Non-Capital City
5	4211	NERANG area	5,039	2,974	8,013	21,714	37%	<i>Below average income</i>	Major urban - Non-Capital City
6	4305	IPSWICH area	5,268	2,660	7,928	23,290	34%	<i>Below average income</i>	Major urban - Capital City
7	4207	BEENLEIGH area	4,703	3,086	7,789	18,247	43%	<i>Below average income</i>	Major urban - Capital City
8	4680	GLADSTONE area	4,002	3,466	7,468	20,750	36%	<i>Above average income</i>	Regional - High
9	4740	MCKAY area	4,172	3,061	7,233	31,697	23%	<i>Above average income</i>	Major urban - Non-Capital City
10	4570	GYMPIE area	4,622	2,534	7,156	17,461	41%	<i>Below average income</i>	Rural
		Total Top 10	54,848	35,081	89,929	260,564	35%		
		Total other	310,195	185,958	496,153	1,570,456	32%		
		Total QLD	365,043	221,039	586,082	1,831,020	32%		

WA									
Postcode	Locality/area	Rooftop solar systems	Solar Hot Water (incl. ASHP)	Total solar installations	Total dwellings	Dwellings with Rooftop Solar + Solar Water	Postcode cf. state average income	Urban classification	
1	6210	MANDURAH area	7,362	4,819	12,181	31,106	39%	<i>Below average income</i>	Regional - High
2	6065	WANGARA area	4,799	3,182	7,981	18,981	42%	<i>Below average income</i>	Major urban - Capital City
3	6155	CANNING VALE area	4,662	2,281	6,943	16,276	43%	<i>Below average income</i>	Major urban - Capital City
4	6164	ATWELL area	4,019	2,912	6,931	17,403	40%	<i>Below average income</i>	Major urban - Capital City
5	6112	ARMADALE area	3,493	2,911	6,404	16,099	40%	<i>Below average income</i>	Major urban - Capital City
6	6163	BIBRA LAKE area	3,398	2,403	5,801	20,228	29%	<i>Below average income</i>	Major urban - Capital City
7	6027	JOONDALUP area	3,073	1,952	5,025	16,549	30%	<i>Below average income</i>	Major urban - Capital City
8	6056	MIDLAND area	2,681	2,316	4,997	15,575	32%	<i>Below average income</i>	Major urban - Capital City
9	6169	WARNBRO area	3,273	1,721	4,994	14,552	34%	<i>Below average income</i>	Major urban - Non-Capital City
10	6530	GERALDTON area	1,926	2,736	4,662	14,203	33%	<i>Below average income</i>	Regional - High
		Total Top 10	38,686	27,233	65,919	180,972	36%		
		Total other	112,135	101,091	213,226	781,059	27%		
		Total WA	150,821	128,324	279,145	962,031	29%		

SA

Postcode	Locality/area	Rooftop solar systems	Solar Hot Water (incl. ASHP)	Total solar installations	Total dwellings	Dwellings with Rooftop Solar + Solar Water	Postcode cf. state average income	Urban classification	
1	5159	ABERFOYLE PARK area	3,928	709	4,637	12,856	36%	<i>Below average income</i>	Major urban - Capital City
2	5162	MORPHETT VALE area	3,968	593	4,561	14,111	32%	<i>Below average income</i>	Major urban - Capital City
3	5211	VICTOR HARBOUR area	2,881	1,271	4,152	8,917	47%	<i>Below average income</i>	Regional - Low
4	5108	SALSBURY area	3,347	655	4,002	15,397	26%	<i>Below average income</i>	Major urban - Capital City
5	5114	CAREY GULLY area	2,979	940	3,919	11,014	36%	<i>Below average income</i>	Major urban - Capital City
6	5158	HALLETT COVE area	3,179	469	3,648	9,177	40%	<i>Below average income</i>	Major urban - Capital City
7	5095	MAWSON LAKES area	1,733	1,755	3,488	7,559	46%	<i>Below average income</i>	Major urban - Capital City
8	5118	GAWLER area	2,063	971	3,034	7,381	41%	<i>Below average income</i>	Regional - High
9	5253	MURRAY BRIDGE area	2,042	631	2,673	7,983	33%	<i>Below average income</i>	Regional - High
10	5173	ALDINGA BEACH area	1,613	1,004	2,617	5,719	46%	<i>Below average income</i>	Regional - Low
		Total Top 10	27,733	8,998	36,731	100,114	37%		
		Total other	135,085	40,441	175,526	628,272	28%		
		Total SA	162,818	49,439	212,257	728,386	29%		

TAS

Postcode	Locality/area	Rooftop solar systems	Solar Hot Water (incl. ASHP)	Total solar installations	Total dwellings	Dwellings with Rooftop Solar + Solar Water	Postcode cf. state average income	Urban classification	
1	7250	LAUNCESTON area	1,701	821	2,522	21,238	12%	<i>Above average income</i>	Major urban - Non-Capital City
2	7310	DEVONPORT area	784	334	1,118	12,105	9%	<i>Below average income</i>	Regional - High
3	7018	BELLERIVE area	761	316	1,077	9,134	12%	<i>Above average income</i>	Major urban - Capital City
4	7315	ULVERSTONE area	505	273	778	6,375	12%	<i>Below average income</i>	Regional - Low
5	7050	KINGSTON area	468	289	757	5,140	15%	<i>Above average income</i>	Regional - High
6	7054	SNUG area	501	253	754	3,110	24%	<i>Above average income</i>	Rural
7	7030	BRIDGEWATER area	596	129	725	8,099	9%	<i>Below average income</i>	Regional - Low
8	7011	CLAREMONT area	526	144	670	6,386	10%	<i>Below average income</i>	Major urban - Capital City
9	7109	HUONVILLE area	437	214	651	3,662	18%	<i>Below average income</i>	Rural
10	7000	HOBART CBD area	395	236	631	6,693	9%	<i>Above average income</i>	Major urban - Capital City
		Total Top 10	6,674	3,009	9,683	81,942	12%		
		Total other	12,745	6,026	18,771	150,920	12%		
		Total TAS	19,419	9,035	28,454	232,862	12%		

NT

Postcode	Locality/area	Rooftop solar systems	Solar Hot Water (incl. ASHP)	Total solar installations	Total dwellings	Dwellings with Rooftop Solar + Solar Water	Postcode cf. state average income	Urban classification	
1	0870	ALICE SPRINGS area	818	2,390	3,208	11,083	29%	<i>Below average income</i>	Regional - High
2	0810	ALAWA area	410	2,026	2,436	12,168	20%	<i>Below average income</i>	Major urban - Capital City
3	0830	PALMERSTON area	285	1,869	2,154	6,792	32%	<i>Below average income</i>	Regional - High
4	0812	MARRARA area	245	1,652	1,897	7,114	27%	<i>Below average income</i>	Major urban - Capital City
5	0832	ROSEBERY area	187	1,189	1,376	3,553	39%	<i>Below average income</i>	Regional - High
6	0820	WINNELLIE area	93	878	971	8,714	11%	<i>Above average income</i>	Major urban - Capital City
7	0822	KAKADU area	104	784	888	6,541	14%	<i>Above average income</i>	Rural
8	0836	HUMPTY DOO area	182	565	747	2,658	28%	<i>Above average income</i>	Regional - Low
9	0872	AHERRENCE area	74	423	497	5,350	9%	<i>Below average income</i>	Rural
10	0835	HOWARD SPRINGS area	102	392	494	2,308	21%	<i>Above average income</i>	Regional - Low
		Total Top 10	2,500	12,168	14,668	66,281	22%		
		Total other	267	1,609	1,876	16,454	11%		
		Total NT	2,767	13,777	16,544	82,735	20%		

ACT

Postcode	Locality/area	Rooftop solar systems	Solar Hot Water (incl. ASHP)	Total solar installations	Total dwellings	Dwellings with Rooftop Solar + Solar Water	Postcode cf. state average income	Urban classification	
1	2615	CHARNWOOD area	1,791	1,963	3,754	17,115	22%	<i>Below average income</i>	Major urban - Capital City
2	2620	QUEANBEYAN area	1,172	1,034	2,206	15,816	14%	<i>Below average income</i>	Regional - High
3	2602	DICKSON area	1,048	917	1,965	12,897	15%	<i>Above average income</i>	Major urban - Capital City
4	2617	BELCONNEN area	1,151	583	1,734	11,672	15%	<i>Below average income</i>	Major urban - Capital City
5	2905	ISABELLA PLAINS area	1,150	553	1,703	10,714	16%	<i>Below average income</i>	Major urban - Capital City
6	2614	MAQUARIE area	848	557	1,405	8,199	17%	<i>Below average income</i>	Major urban - Capital City
7	2913	NGUNNAWAL area	1,133	167	1,300	9,508	14%	<i>Below average income</i>	Major urban - Capital City
8	2902	KAMBAH area	758	435	1,193	6,143	19%	<i>Below average income</i>	Major urban - Capital City
9	2914	BONNER area	714	383	1,097	4,859	23%	<i>Below average income</i>	Major urban - Capital City
10	2904	GOWRIE area	771	290	1,061	4,919	22%	<i>Below average income</i>	Major urban - Capital City
		Total Top 10	10,536	6,882	17,418	101,842	17%		
		Total other	3,557	1,852	5,409	50,021	11%		
		Total ACT	14,093	8,734	22,827	151,863	15%		

Australia									
Postcode	Locality/area	Rooftop solar systems	Solar Hot Water (incl. ASHP)	Total solar installations	Total dwellings	Dwellings with Rooftop Solar + Solar Water	Postcode cf. state average income	Urban classification	
1	4670	QLD - BUNDABERG area	8,015	5,022	13,037	34,466	38%	<i>Below average income</i>	Regional - High
2	6210	WA - MANDURAH area	7,362	4,819	12,181	31,106	39%	<i>Below average income</i>	Regional - High
3	4655	QLD - HERVEY BAY area	6,525	4,844	11,369	25,946	44%	<i>Below average income</i>	Regional - High
4	3030	VIC - WERRIBEE area	3,706	7,464	11,170	29,011	39%	<i>Below average income</i>	Major urban - Capital City
5	3029	VIC - HOPPERS CROSSING area	4,185	6,737	10,922	24,212	45%	<i>Below average income</i>	Major urban - Capital City
6	4551	QLD - CALOUNDRA area	6,574	3,473	10,047	23,420	43%	<i>Below average income</i>	Major urban - Non-Capital City
7	4350	QLD - TOOWOOMBA area	5,928	3,961	9,889	43,573	23%	<i>Below average income</i>	Major urban - Non-Capital City
8	2480	NSW - LISMORE area	3,864	5,297	9,161	19,297	47%	<i>Below average income</i>	Regional - High
9	3977	VIC - CRANBOURNE NORTH area	3,502	5,465	8,967	24,572	36%	<i>Below average income</i>	Major urban - Capital City
10	2444	NSW - PORT MACQUARIE area	2,958	5,264	8,222	20,475	40%	<i>Below average income</i>	Regional - High
Total Top 10		52,619	52,346	104,965	276,078	38%			
Total other		1,120,902	788,321	1,909,223	8,860,225	22%			
Total Australia		1,173,521	840,667	2,014,188	9,136,303	22%			

State and territory totals						
State	Rooftop solar systems	Solar Hot Water (incl. ASHP)	Total solar installations	Total dwellings	Dwellings with Rooftop Solar + Solar Water	
1	NSW	255,007	234,538	489,545	2,868,570	17%
2	VIC	203,553	175,781	379,334	2,278,836	17%
3	QLD	365,043	221,039	586,082	1,831,020	32%
4	WA	150,821	128,324	279,145	962,031	29%
5	SA	162,818	49,439	212,257	728,386	29%
6	TAS	19,419	9,035	28,454	232,862	12%
7	ACT	14,093	8,734	22,827	151,863	15%
8	NT	2,767	13,777	16,544	82,735	20%
Total Australia		1,173,521	840,667	2,014,188	9,136,303	22%