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AUSTRALIAN PV MARKET INSIGHTS

-Track Trends - Out Smart Competitors - Know Your Market

SunWiz: putting solar insights into the palm of your hand

January 2018: YEAR IN REVIEW 2017

Monthly Subscription

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2017 – a record year for Australian PV

2017 was a year that smashed records in Australian PV:

1. Record volume installed in the market overall (1.26GW)
2. Record volume installed in the sub-100kW market (1.08GW)
3. Record volume of PV rooftop commercial (10-1,000kW) commissioned (over 300MW)
4. Record volume of sub-100kW solar registered in a month (November)
5. Record volume of PV registered in NSW in any month (30MW)
6. Record average system size in the sub-100kW market (7kW)
7. Record proportion of system volume in the 75-100kW range (October, 10%)
8. Record proportion of the STC market that is commercial (June, 32%)
9. Record volume in every commercial system size sub-range

For a full description and illustration of these records, see http://www.sunwiz.com.au/index.php/2012-06-26-00-47-40/73-newsletter/426-2017-australia-s-record-breaking-year-for-solar-power-1gw-already-commissioned.html

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2017: Highlight in Trends

- A year of substantial growth – 50% more volume was registered in 2017 in the sub-100kW market than in 2016, and over 23% more volume in the >100kW market
- The fact that every major state had a highly successful year, rather than the national total being overly reliant on one state. NSW finished 61% ahead of last year; QLD 57%; SA 51%; VIC 38%; WA 47%. This robust outcome points to a good year ahead.
- A cumulative total of 7 GW of PV is now installed in Australia.
- Significant growth in system size, off the back of
    a) larger residential systems, which are now commonly 6kW (often on 5kW inverters) or even larger in preparation for batteries.
    b) Increasing volume of commercial systems as commercial electricity prices skyrocketed
    c) Higher proportion of volume that is commercial, as the market gained experience selling to businesses – illustrated in particular in Queensland
- Australia's growing experience with selling commercial PV, with an increasing number of businesses successfully specialising in this sector
- Major volumes of solar farms under development. Though many are under construction and far more have got a DA, only Genex, Sunshine Coast, and Gullen were commissioned in 2017
- The competitiveness of the solar industry, to which the 80/20 rule doesn't apply. Indeed the top 20% of companies have only 30% market share. This also contributes to a robust solar sector that isn't reliant upon the success (or otherwise) of a small number of leading companies.
- System prices that continue to fall

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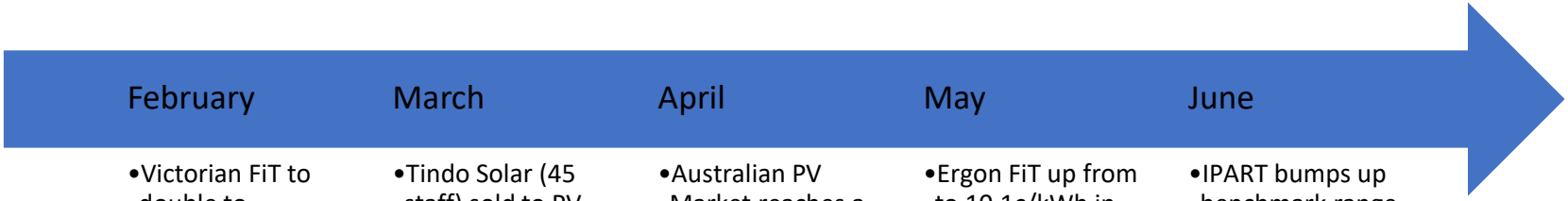
2017 Highlights in News: General H1



February	March	April	May	June
•Victorian FiT to double to 11.3c/kWh, now it accounts for pollution's social & health costs •Victorian government offers Latrobe Valley Households $4,500 towards PV, SHW, and energy efficient lighting. •South Australia's $15 million solar schools boom will cut pollution & save money	•Tindo Solar (45 staff) sold to PV retailer Cool or Cosy / Solar Rental Company which has 45 staff	•Australian PV Market reaches a cumulative 6GW •Regulator reduces small-scale renewables target while solar sales take off	•Ergon FiT up from to 10.1c/kWh in July (from 7.5c), due to QLD wholesale electricity prices.	•IPART bumps up benchmark range for NSW solar tariffs to 12.8c/kWh (AGL offering 11.1c)

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2017 Highlights in News: General H2

- CER finally rules that Solar Panel Replacements are ineligible for STCs
- VRET has passed both houses of parliament: 40% RE by 2025. How will it interplay with a "NEG"? https://t.co/PU1ob4CxHs

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2017 Highlights in News: Commercial H1

February

- Mugga Lane solar farm opens, bringing ACT to 35 per cent renewable energy
- Today's ground-breaking of the Kidston Solar Project highlights bright future for Aussie solar

April

- Ross River Solar Farm near Townsville starts construction. Congrats to ESCO Pacific and Palisade Investment Partners
- Riverland SA by Lyon group: 330MW PV +100MW/400MWh, ready to build, complete end 2017, world's largest

May

- Telstra signs deal for 70MW tracking solar farm in QLD from RES Australia, commisioning 2018

June

- Collinsville 42.5MW solar farm underway as site works begin : congrats Ratch & UGL!

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2017 Highlights in News: Commercial H2

July

- 220MW Bungala Solar Farm stage 2 under construction. Reach Energy to sell the farm to 2 European investors
- Sunshine Coast's 15MW solar farm opens, built by Downer, offtake by Diamond Energy

August

- Tender to supply VIC trams with solar energy won by Syncline 100MW Bannerton and Neoen's 38MW Numurkah solar farms.

September

- Adani to commence first 65MW of Rugby Run Solar Farm; further stages to grow to 170MW; 12 month completion https://t.co/13tyhtfn6i

October

- 10MW Gullen Range Solar Farm (adjacent to 165MW wind farm) has begun generation. Built by Decmil https://t.co/nONn4Xdf9J
- another 15MW of PV under construction in Queensland: Kennedy Energy Park https://t.co/ZfVuXB6xiq

November

- Goldwind's 20MW White Rock Solar Farm has its first solar panels installed. ow.ly/L1gA30gR88A
- 50MW Kidston Solar Farm to be operational in days. Stage 2 will add 270MW of PV and pumped Hydro storage of 2000MWh by 2021 ow.ly/vzHP30gR7Yz
- VRET Tender released: 1500MW by 2020; 5400 by 2025. 1st auction 650MW of which 100MW set-aside for PV. Hybrid Price: Contract For Difference for $53-57/MWh plus competitive auction on $/MW/year ow.ly/Fkjn30gDr0I

December

- Great start to 2018: RET met by underway projects https://t.co/FxuEAMUOxr
- NSW government meets 15.6% of government's RET obligations through LGC off-take agreement with Dubbo Solar Farm (Neoen) https://t.co/j0Ze98vxLR
- Beautiful images of Genex's first 50MW stage of Kidston, which powered up this week. https://t.co/INZw7ALGe9

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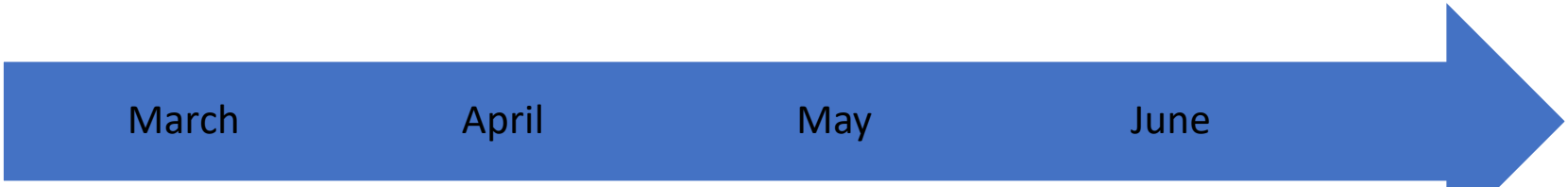
2017 Highlights in News: Battery H1



March	April	May	June
• AGL's 'World's largest virtual power plant' switched on' - though still over 1000 more installations until complete	• Victoria seeks 2x20MW batteries (total 100MWh) in West Victoria, to be installed by January. NT looking at 5MW	• Australia's biggest battery system (2.6MWh/1.6MW) delivered to WA astronomy hub MRO by Carnegie/EMC	• Lyon plans 250MW PV +80MW/160MWh for VIC, 330MW PV + 100MW/400MWh for SA, 55MW PV + 20MW/80MWh QLD project:2017start

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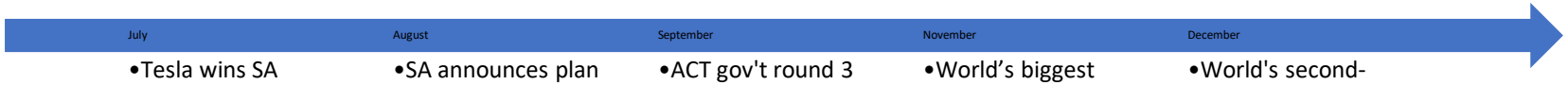
2017 Highlights in News: Battery H2



July

- Tesla wins SA battery tender: 100MW/129MWh at Neoen's Horsdale wind farm

August

- SA announces plan for next generation renewables: incl firming, bulk energy storage. $130m available

September

- ACT gov't round 3 of storage grants has opened. so far 200 batteries installed at 24% discount https://t.co/PylYy179vn

November

- World's biggest Tesla battery built in record time and switched on Friday reneweconomy.com.au/tesla-big-batt…

December

- World's second-most powerful battery after Tesla mooted for Top End https://t.co/fVvyIw4ThT
- NT solar grants worth 50% of the cost (up to $1k) of new or extended PV system, or battery, or more https://t.co/LG7tp7JUtK
- ICYMI: Switched ON: Canberra's 1MW big battery, made up of 280 Reposit customers in the ACT https://t.co/g6udOkTzAS

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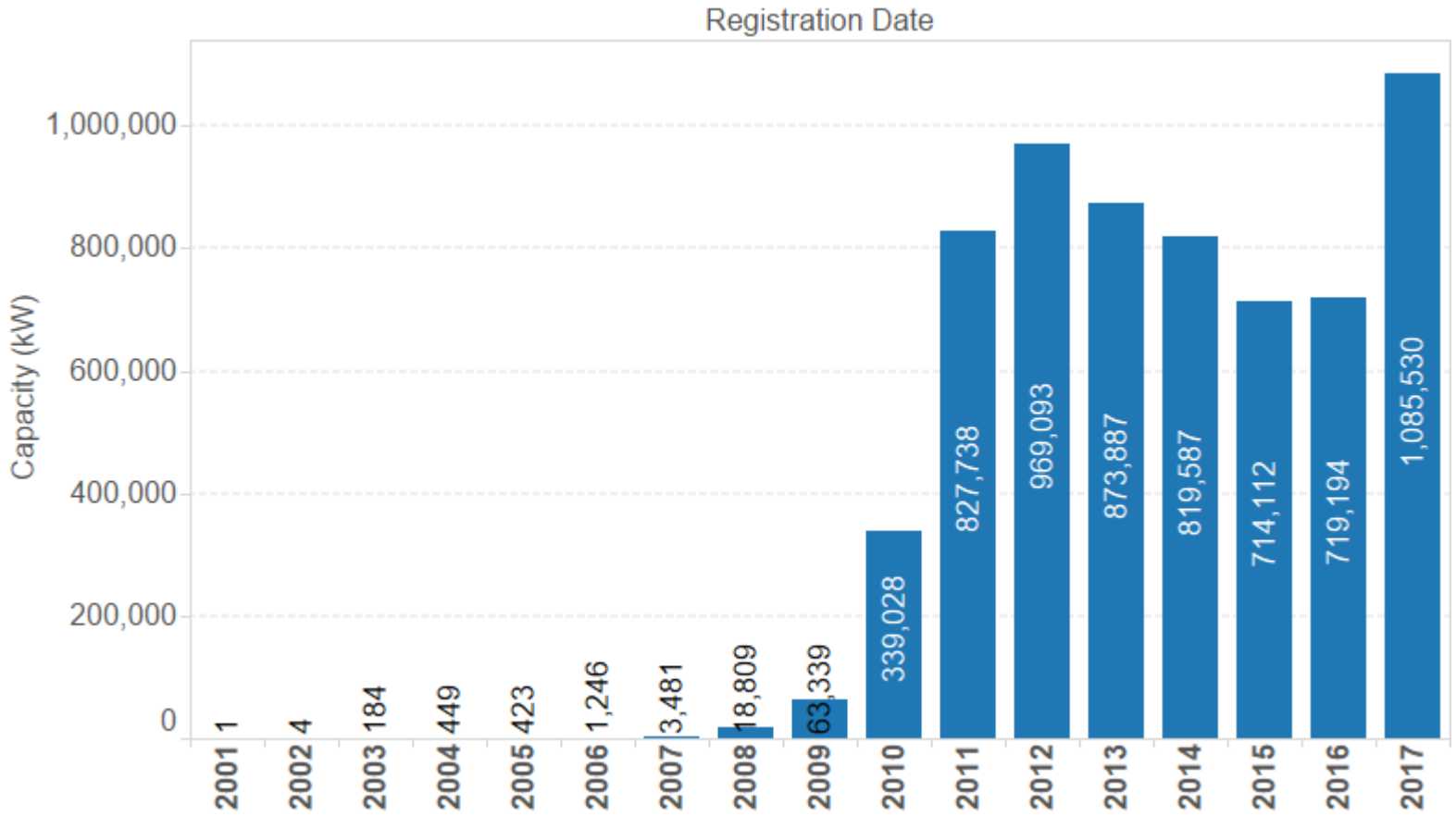
2017 End of Year Tally (STC)



1.085 GW of sub-100kW PV was registered in 2017. This is a record level, eclipsing past records by 12%, and beating last year's volume by 51%. Note that the CER audit process will wind the 2017 tally back slightly.

The growth was driven off the back of a significant increase in electricity prices across residential, commercial, and industrial, which also flowed through to feed-in tariffs. This drove system paybacks to below three years in many cases.

Analysis is of STC systems (sub-100kW)

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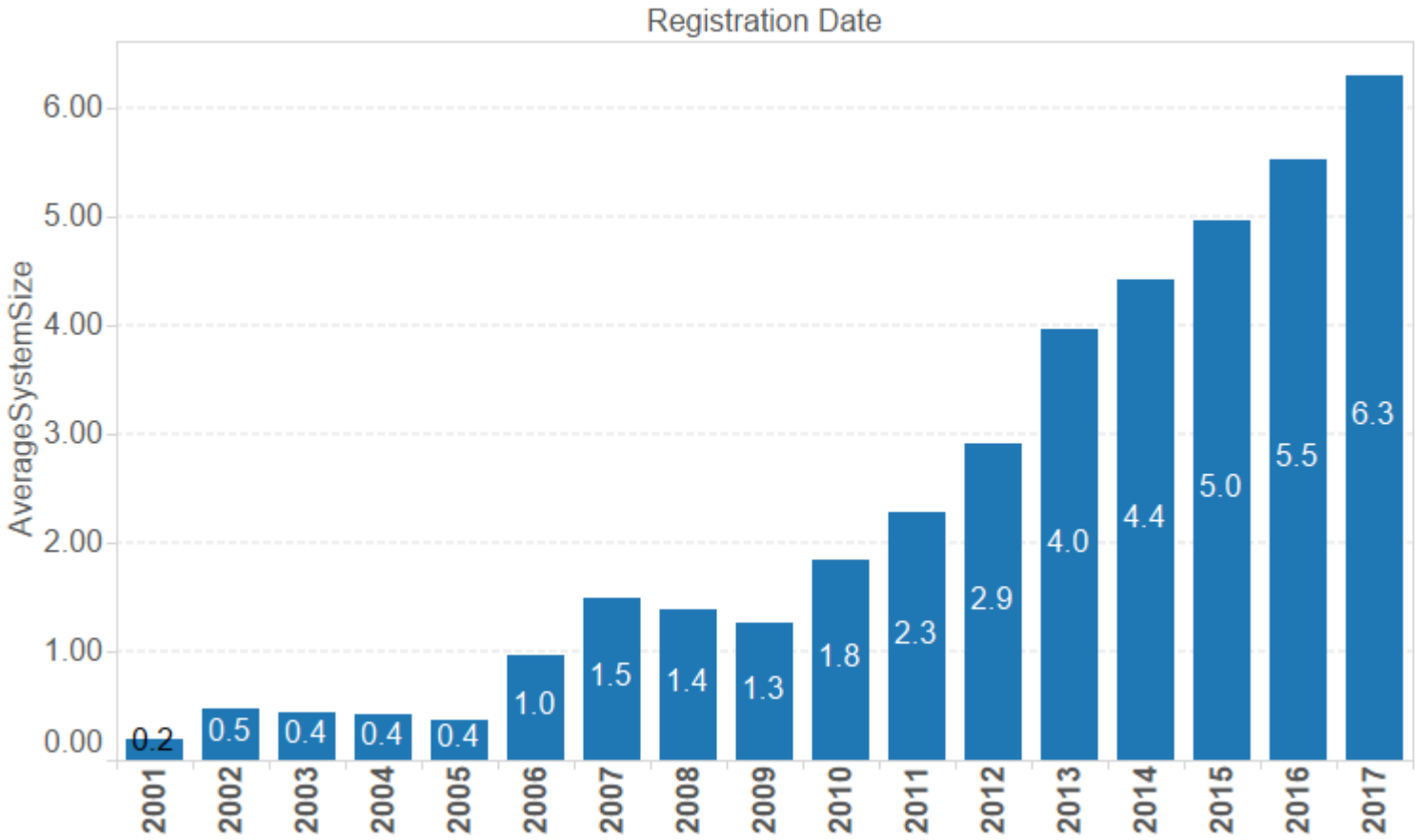
Average System Size (STC)



The average size of solar array grew to 6.3kW/system in 2017, a new record. This occurred as economies of scale meant that a large residential PV system paid for itself as quickly as a small PV system, combined with many residential customers installing systems large enough to achieve energy independence once batteries fall in price. The volume of commercial installations also grew faster than the residential sector, driving up system sizes.

Analysis is of STC systems (sub-100kW)

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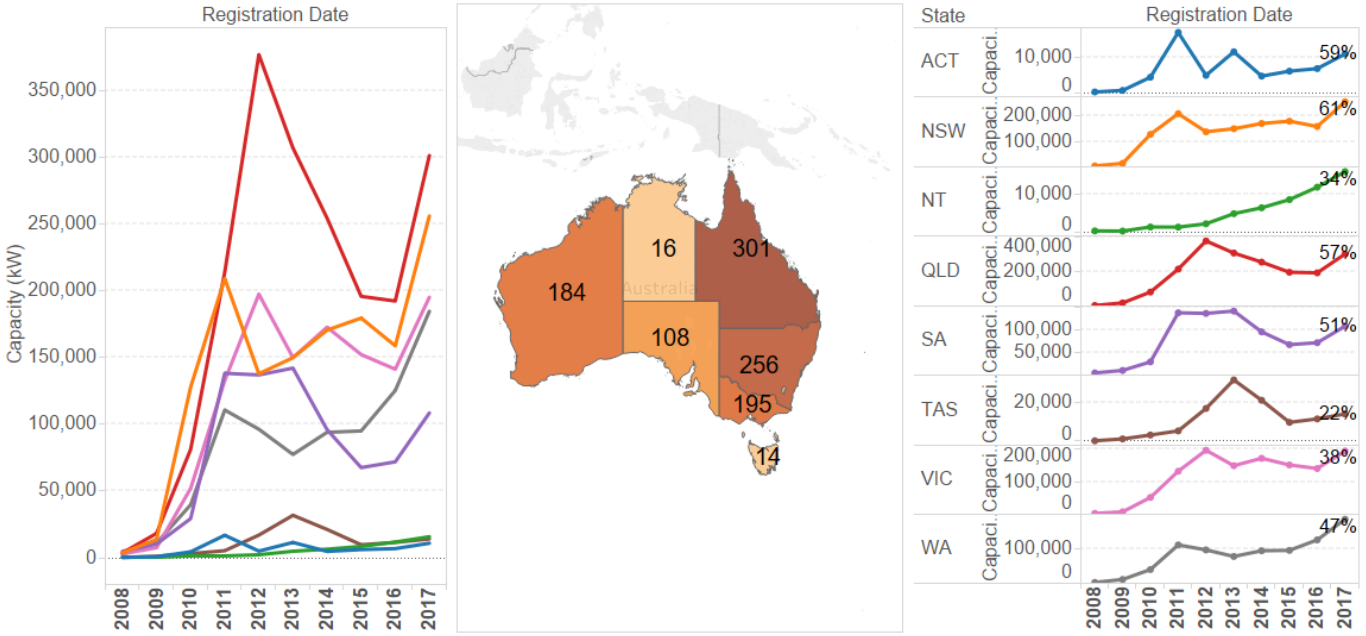
States (STC)

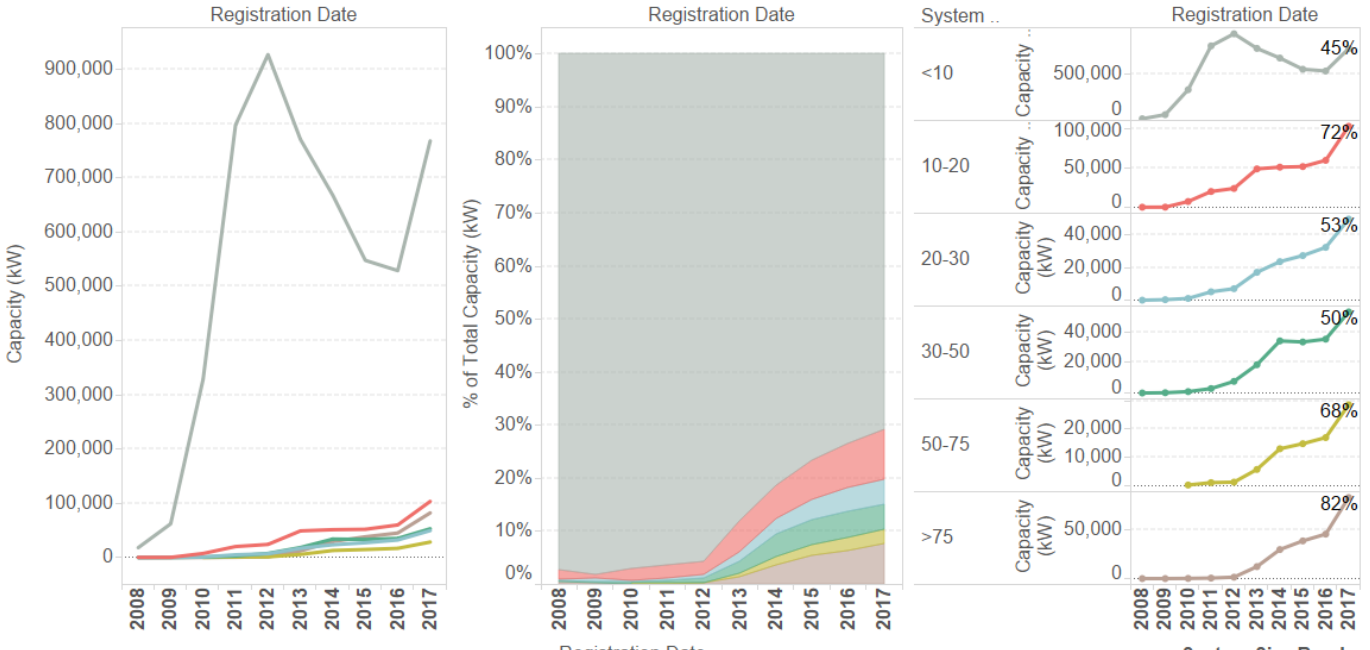


State	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ACT	403	826	4,479	16,879	5,002	11,513	4,786	6,156	6,868	10,908
NSW	3,752	13,770	127,786	208,973	137,728	149,786	170,399	179,437	158,658	255,791
NT	443	397	1,444	1,420	2,282	4,898	6,425	8,538	11,760	15,781
QLD	3,684	18,261	81,158	213,720	376,635	306,702	254,292	195,669	192,181	301,063
SA	4,813	10,338	29,326	138,110	136,883	141,992	95,932	67,500	71,817	108,408
TAS	174	1,149	3,163	5,307	16,984	31,801	21,240	9,753	11,549	14,092
VIC	2,939	7,557	51,959	132,696	197,348	149,823	172,605	152,126	141,152	194,989
WA	2,602	11,040	39,711	110,633	96,230	77,372	93,909	94,934	125,207	184,498

Every state increased in volume on 2016, with NSW exceeding last year's volume by 61% and setting a new annual record. WA also set a record and was up 47% on 2016's figures.

Analysis is of STC systems (sub-100kW)

Sizes (STC)



System ..	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<10	18,284	62,269	328,801	797,513	927,203	770,930	667,663	547,873	528,990	768,066
10-20	350	415	7,597	20,356	24,283	49,216	51,442	52,153	60,143	103,550
20-30	41	351	1,119	5,174	7,095	17,118	23,663	27,373	32,425	49,734
30-50	35	203	934	2,936	7,674	18,573	34,180	33,474	35,333	53,170
50-75			304	1,152	1,324	5,811	13,089	14,891	17,050	28,641
>75	99	100	273	608	1,516	12,238	29,551	38,348	45,253	82,368

Residential volume was up 45% in 2017. The next highest system size group was the 10-20kW range, which was up 72% on last year. The 75-100kW range grew by 82%.

Commercial volume grew faster than residential volume overall, to the point where systems 10kW-100kW in size made up 29% of total sub-100kW volume.

Analysis is of STC systems (sub-100kW)

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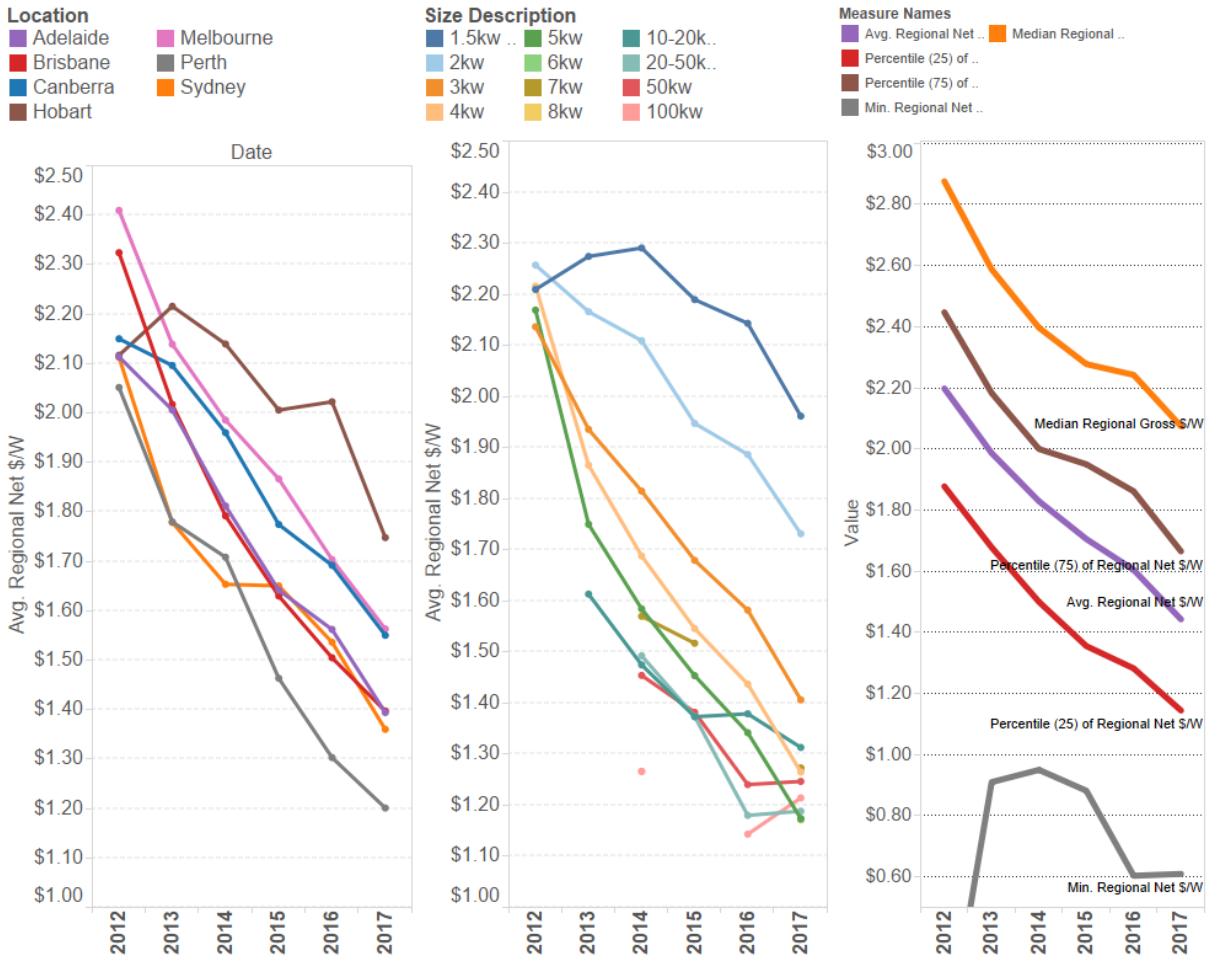
Prices



PV System prices fell to new lows in 2017. The average price across the year was $1.44/W after STC discount, though system prices were as low as $0.60/W at times, and an interquartile range of $1.14/W - $1.67/W. Perth is the cheapest place to buy a system, and Hobart the dearest. Economies of scale apply up to a 6kW system, after which commercial system prices are bespoke designs that often encounter network connection charges.

Based upon SolarChoice dataset

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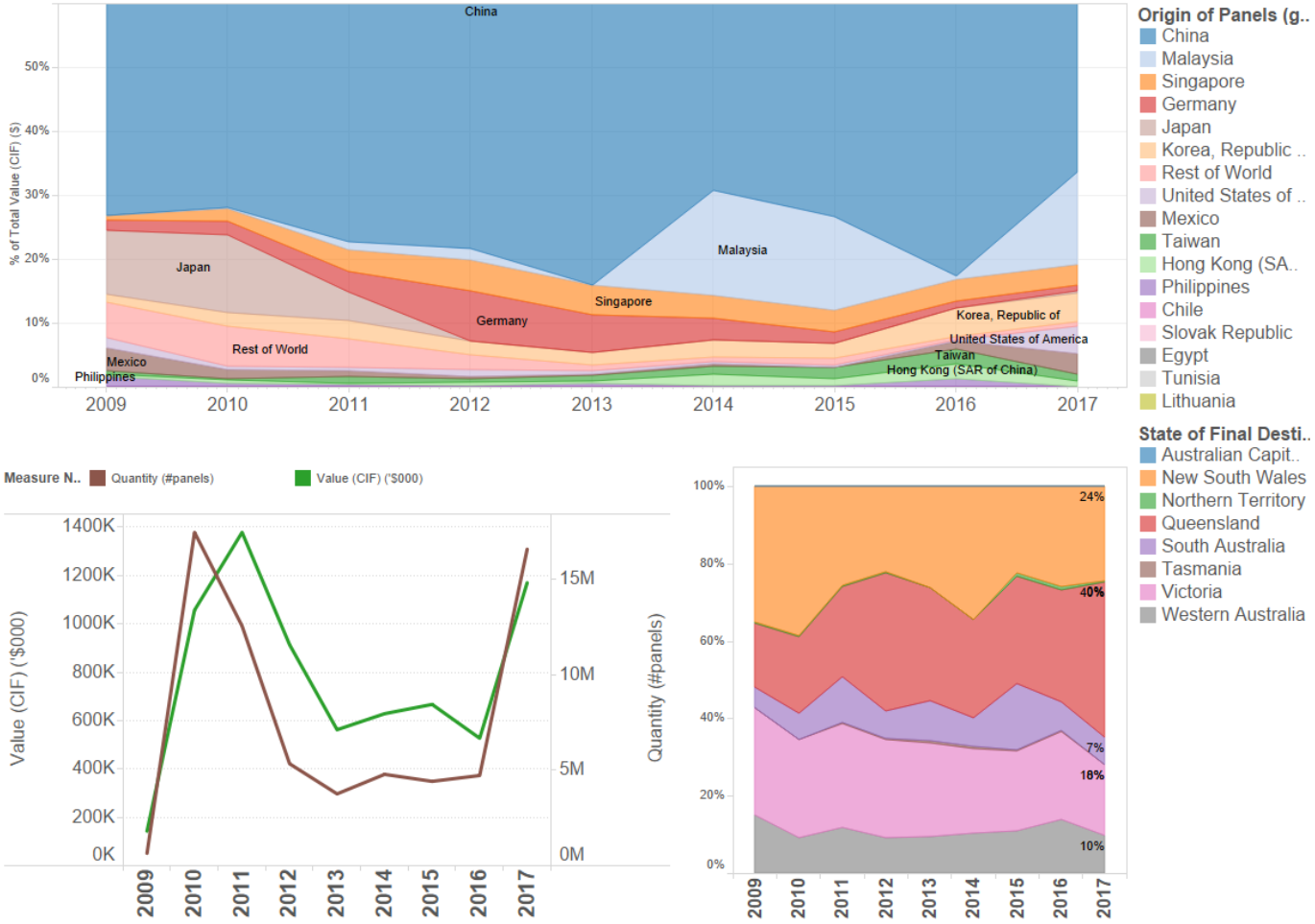
Imports



The volume and value of solar panels imported into Australia skyrocketed in 2017, but the growth wasn't explained solely by the sub-100kW market. 16 solar farms are currently under construction and 3 were commissioned in 2017. Most of Australia's volume originates in China, but a large amount in 2017 came from Malaysia, Korea, and Singapore – with Mexico and the USA being new entrants. Most of the volume lands into Queensland, which also expanded its market share off the back of the large number of solar farms based there.

Source: ABS

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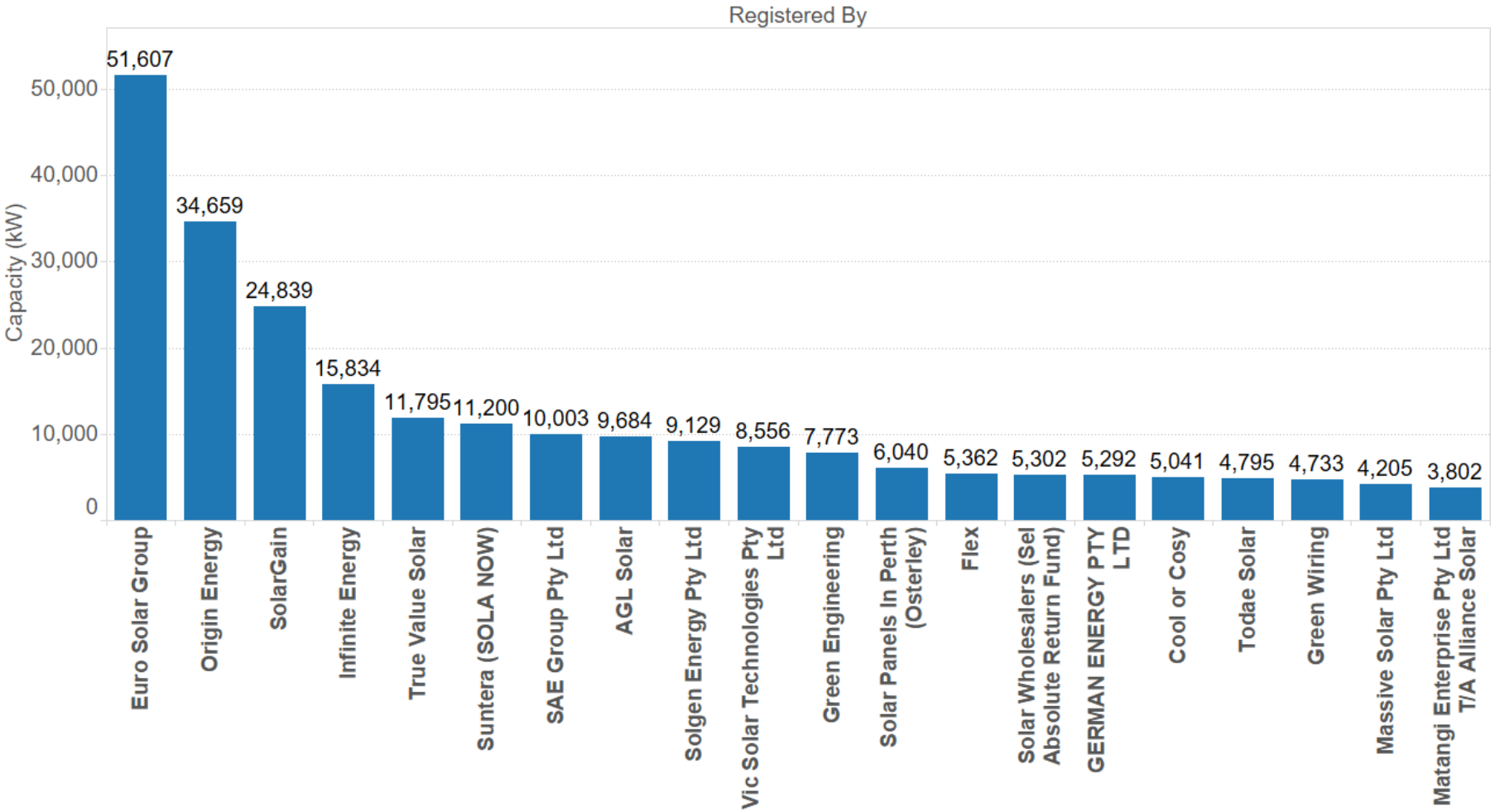
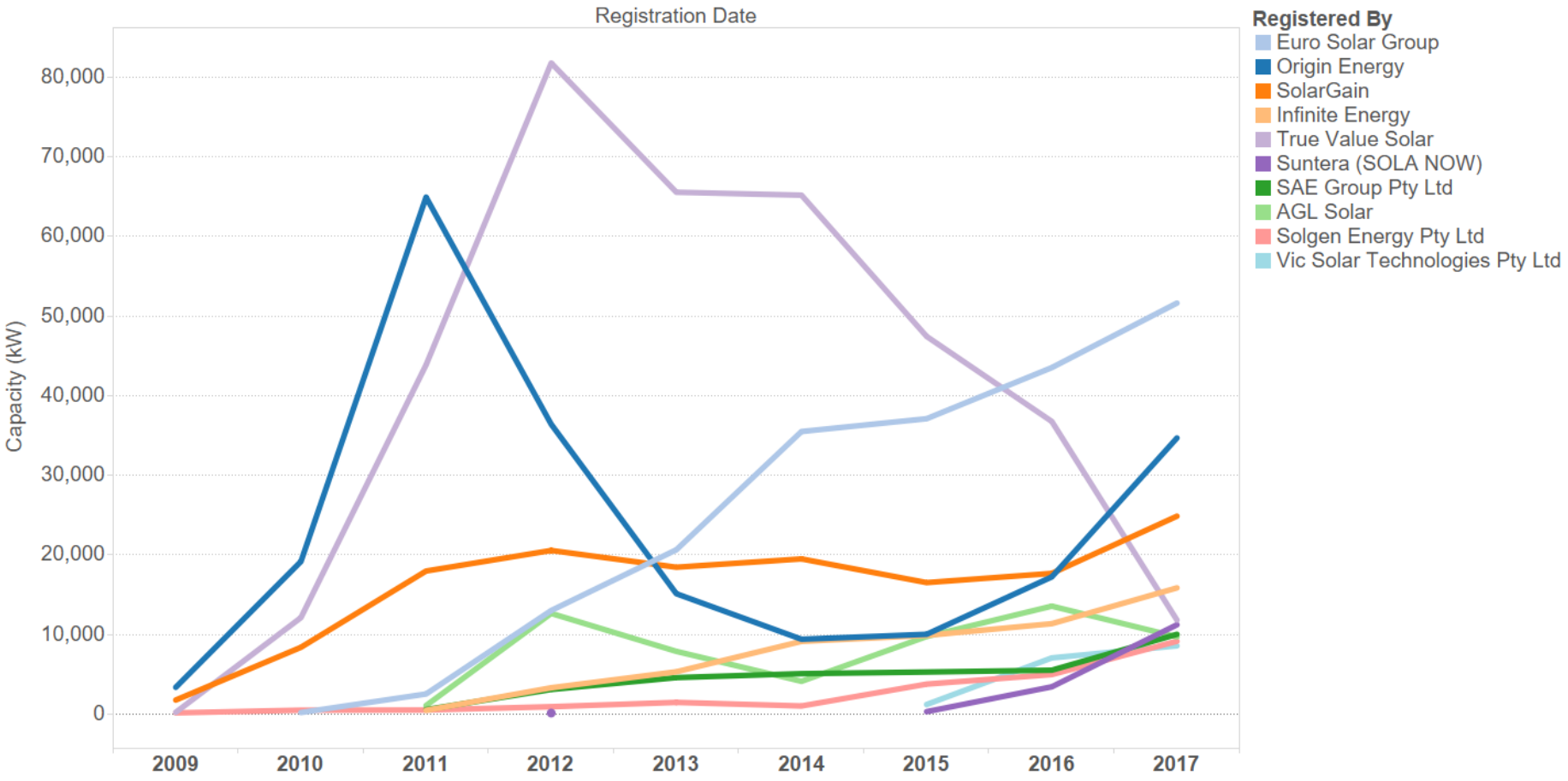
Top PV Retailers (STC)



EuroSolar held onto #1 position in 2017, ahead of Origin Energy #2, Solar Gain #3, Infinite Energy #5, True Value Solar #5, Sola Now #6, SAE Group #7, AGL #8, Solgen #9, and Vic Solar Technologies #10

Top PV Retailers' History



The ever-shifting sands of the solar industry. Euro Solar finished well ahead of their 2016 haul, with record volumes for them – but still a long way from the historic peak of True Value Solar – who has slid a long way since then. Origin doubled its volume but is about half way to its historic peak volume. SolarGain and Infinite Energy showed a steady hand and grew to record volume. Sola Now grew in a big way, as did SAE. AGL were down on their peak but still respectable volumes. Commercial specialist Solgen posted record volumes, and Vic Solar Technologies grew too.

National STC Registry

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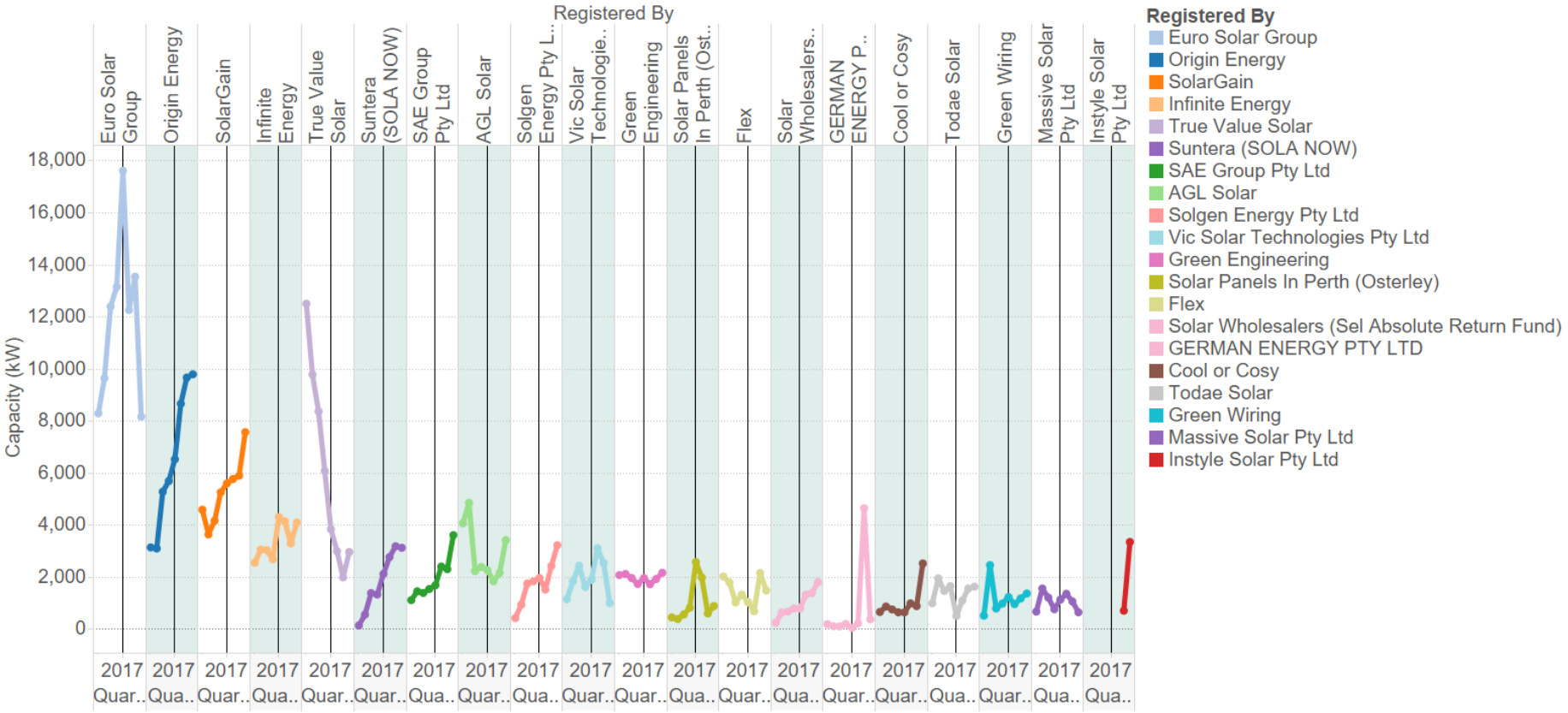
Top PV Retailers – Recent Evolution



Euro Solar's volume trended down over the year. True Value Solar also trended downwards but showed a turnaround in Q4. Origin trended upwards; SolarGain, SAE, and Cool or Cosy finished well. Solgen also trended upwards. Green Engineering was remarkably steady. German Energy had one massive quarter. Instyle Solar are the newcomers to the national top 20.

National STC Registry

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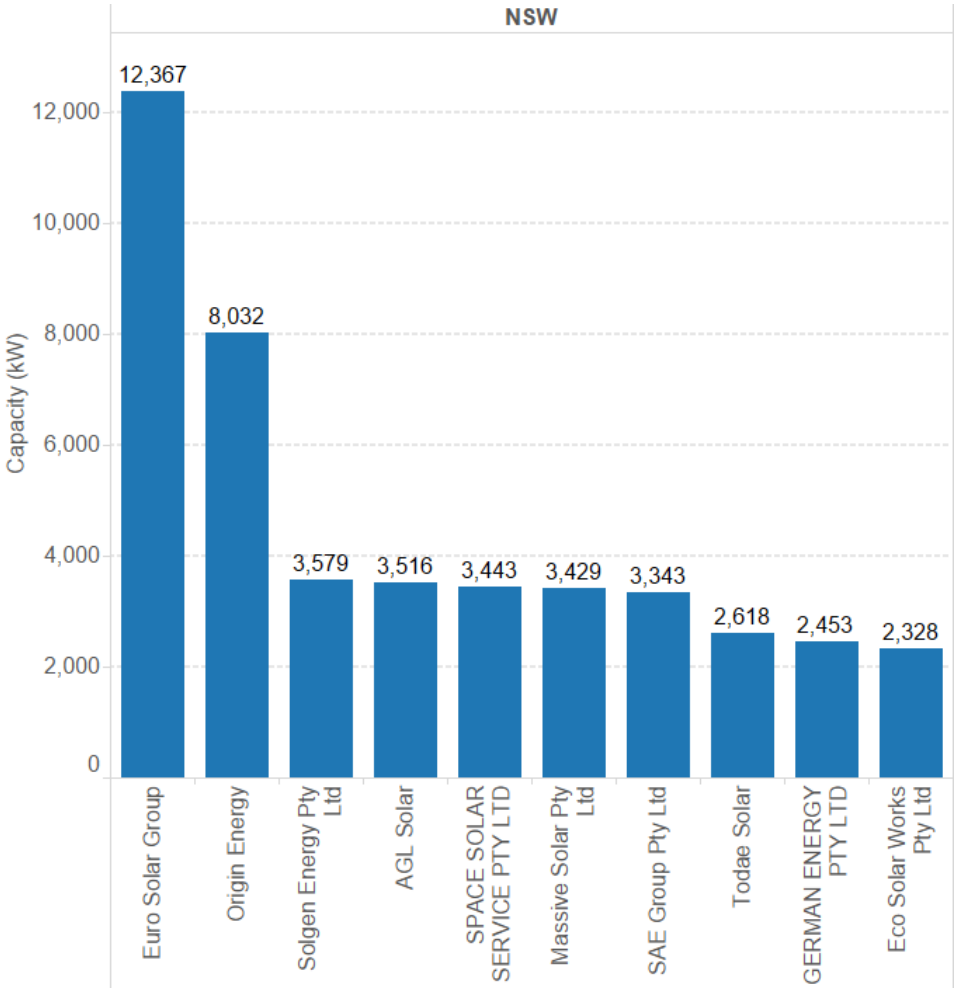
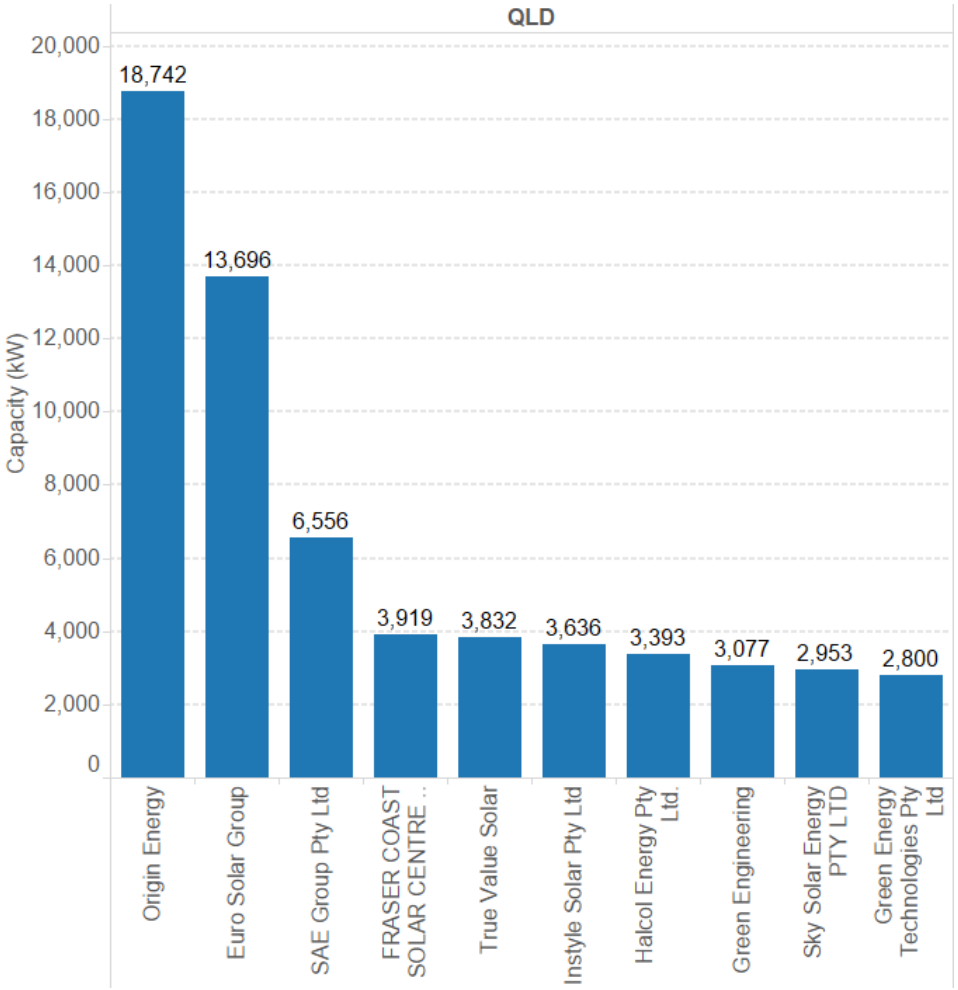
Top NSW Retailers 2017



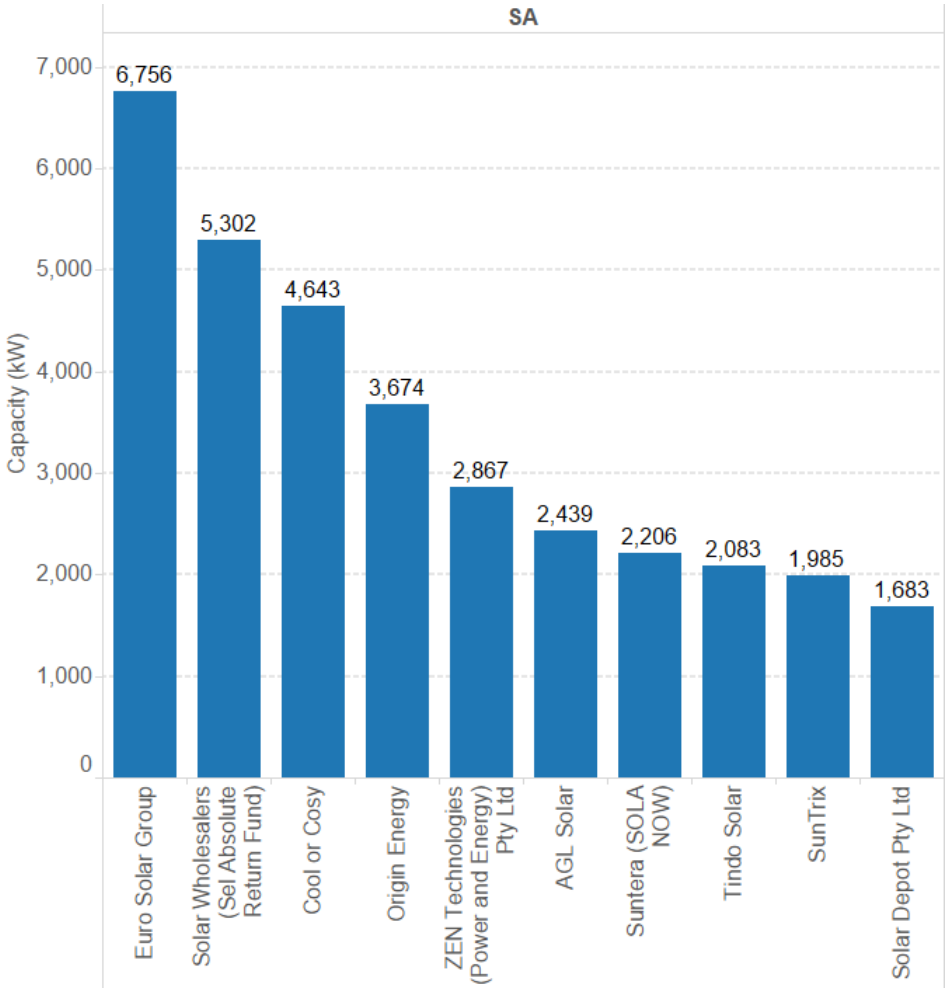
The #1 Retailer in NSW in 2017 was EuroSolar. Origin was #2, Solgen #3, AGL #4, Space Solar Service #5.

Top QLD Retailers 2017



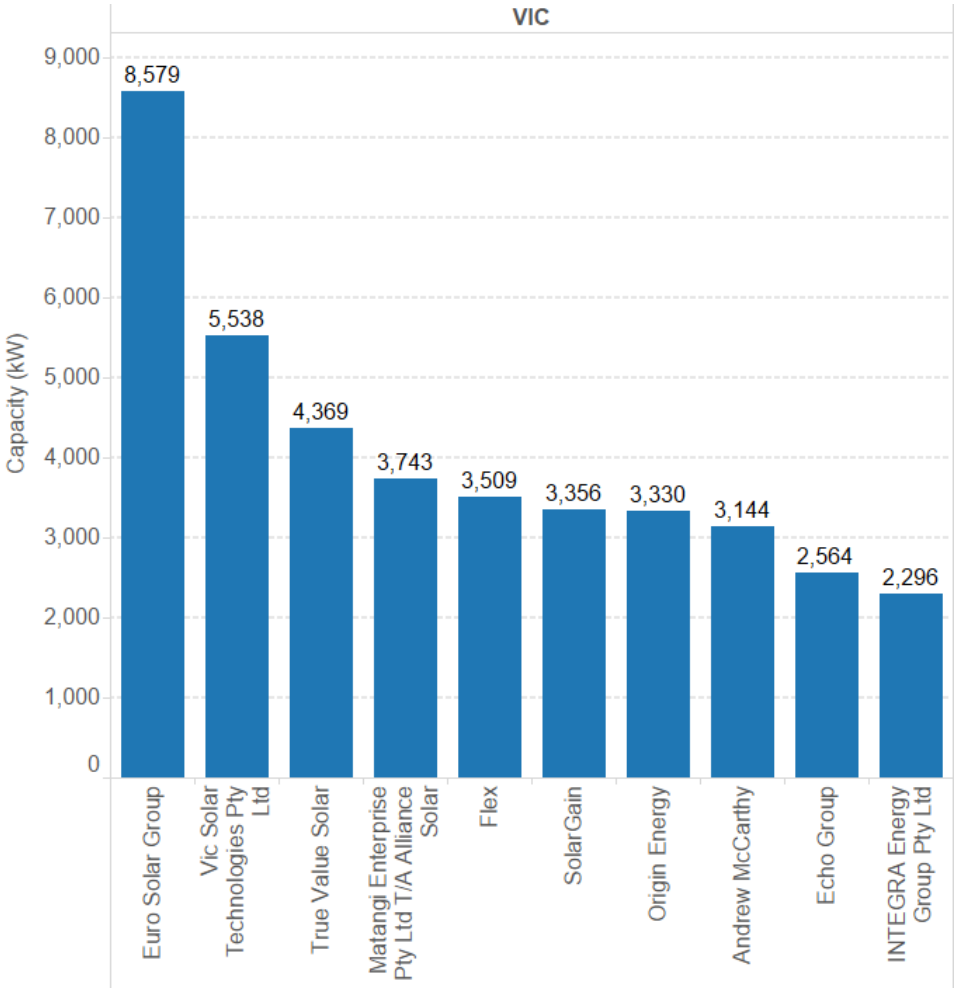
The #1 Retailer in Queensland in 2017 was Origin, though #2 Euro Solar appeared to have used an STC aggregator in Q4. SAE were third, Fraser Coast Solar Centre #4, and True Value Solar #5.

Top SA Retailers 2017



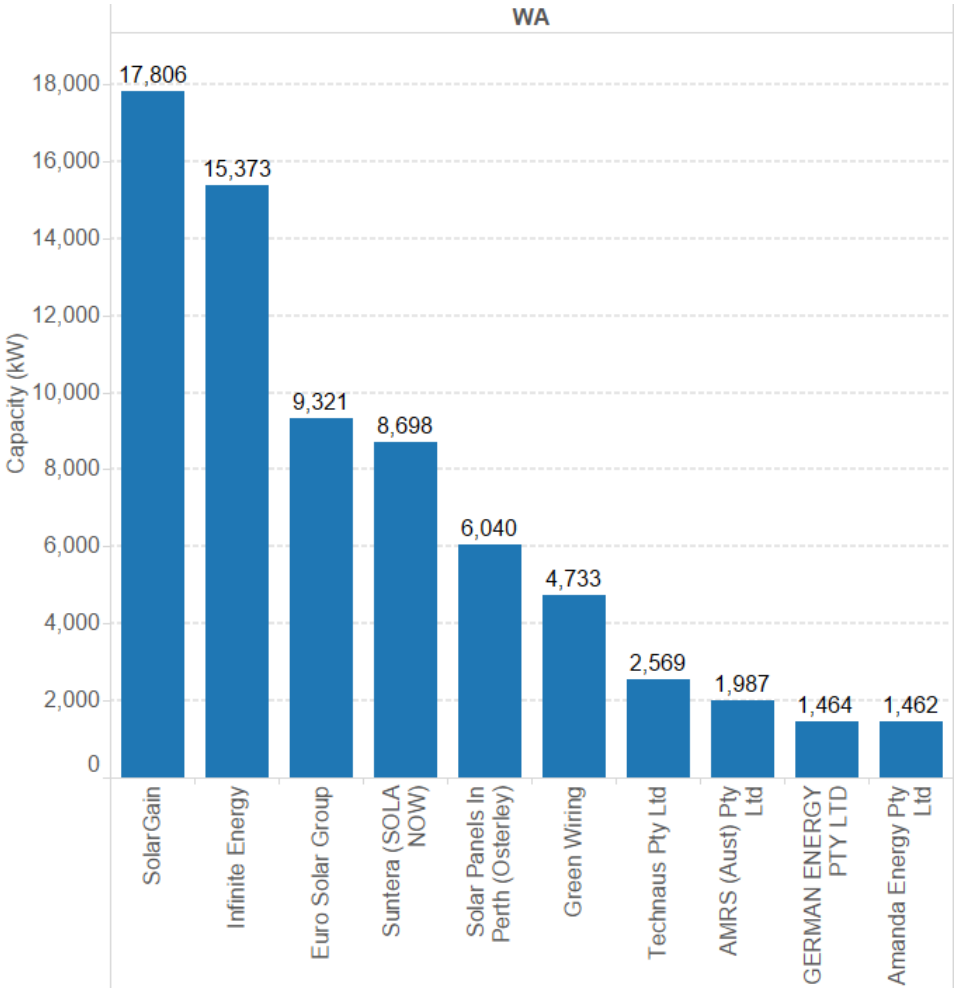
The #1 Retailer in SA in 2017 was EuroSolar, followed by Solar Wholesalers, #2, Cool or Cosy #3 (following their purchase of Tindo), Origin #4, and Zen #5.

Top VIC Retailers 2017



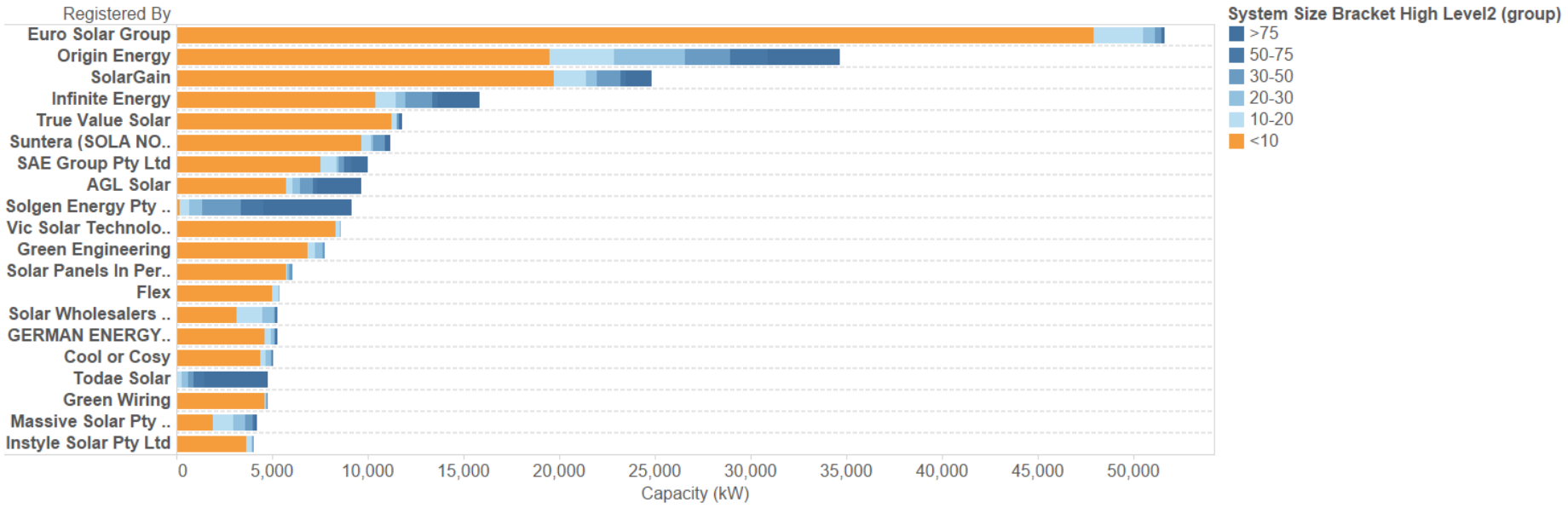
The #1 Retailer in Victoria in 2017 was EuroSolar, followed by Vic Solar Technologies then True Value Solar #3, Alliance Solar #4, and Flex #5

Top WA Retailers 2017



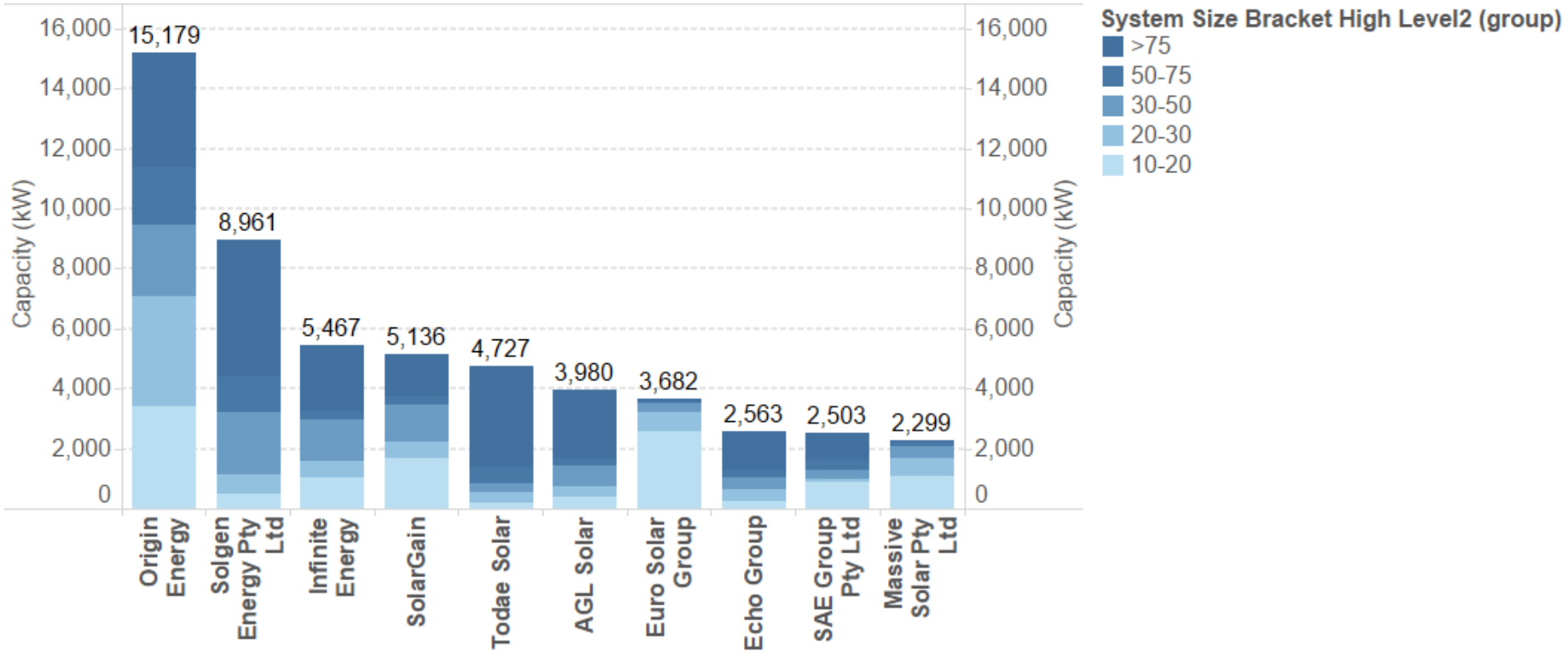
The #1 Retailer in WA in 2017 was SolarGain, followed by Infinite Energy, Euro Solar, Sola Now, and Solar Panels in Perth.

Top Retailers breakdown of volume (STC)



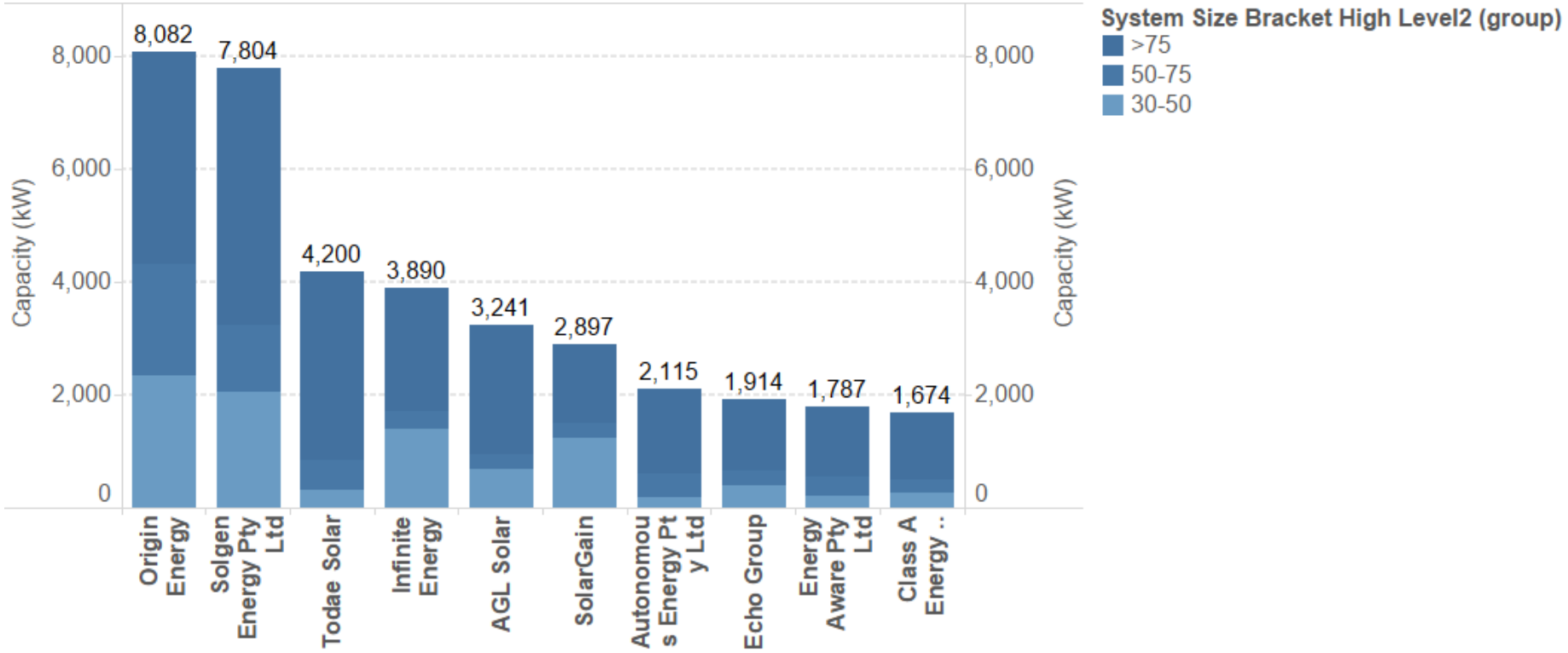
For the top 20 nationally in 2017, you can see that there are some the are entirely commercial (Solgen, Todae), and most that do very little commercial. Considering the importance of the commercial segment, we next pull out the top commercial players for your interest.

Top Commercial Retailers 10-100kW



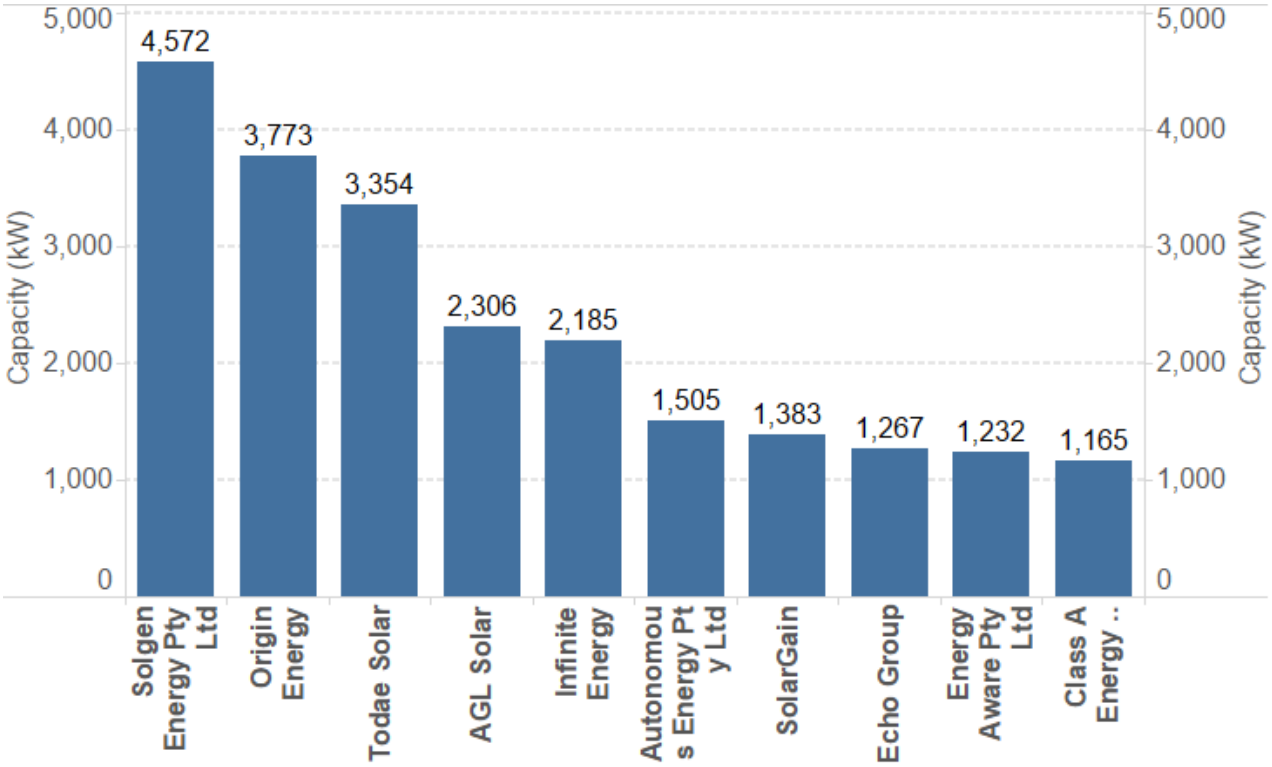
The #1 retailer of commercial PV systems in the 10-100kW range was Origin. They were followed by Solgen in #2, Infinite Energy in #3, SolarGain in #4, and Todae Solar in #5.

Top Commercial Retailers 30-100kW



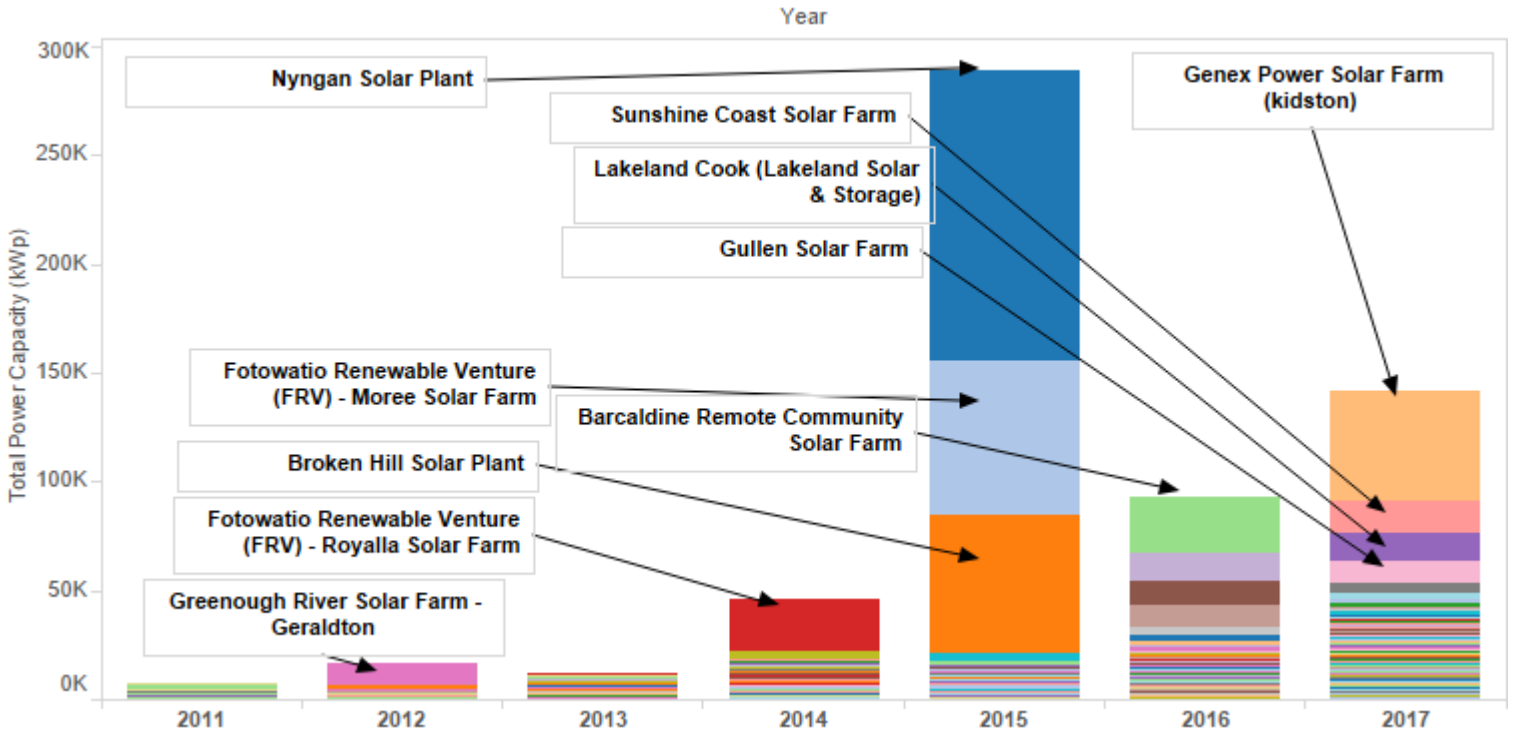
The #1 retailer of commercial PV systems in the 30-100kW range was Origin. They were followed by Solgen in #2, Todae Solar in #3, Infinite Energy in #4, AGL in #5.

Top Commercial Retailers 75-100kW



The #1 retailer of commercial PV systems in the 75-100kW range was Solgen. Origin was #2, Todae Solar #3, AGL Solar #4, and Infinite Energy #5.

Large Scale Systems over time (LGC)



Though 2017 fell short of 2015's Flagships-fuelled large-scale system volume, it was a healthy increase over the capacity of projects exceeding 100kW that was installed in 2016 – thanks largely to the commissioning of Kidston. The major projects in 2017 were Kidston, Sunshine Coast, Lakeland, and Gullen solar farms

SunWiz analysis of REC Registry, Nearmaps, public announcements; Dates based upon year of commissioning

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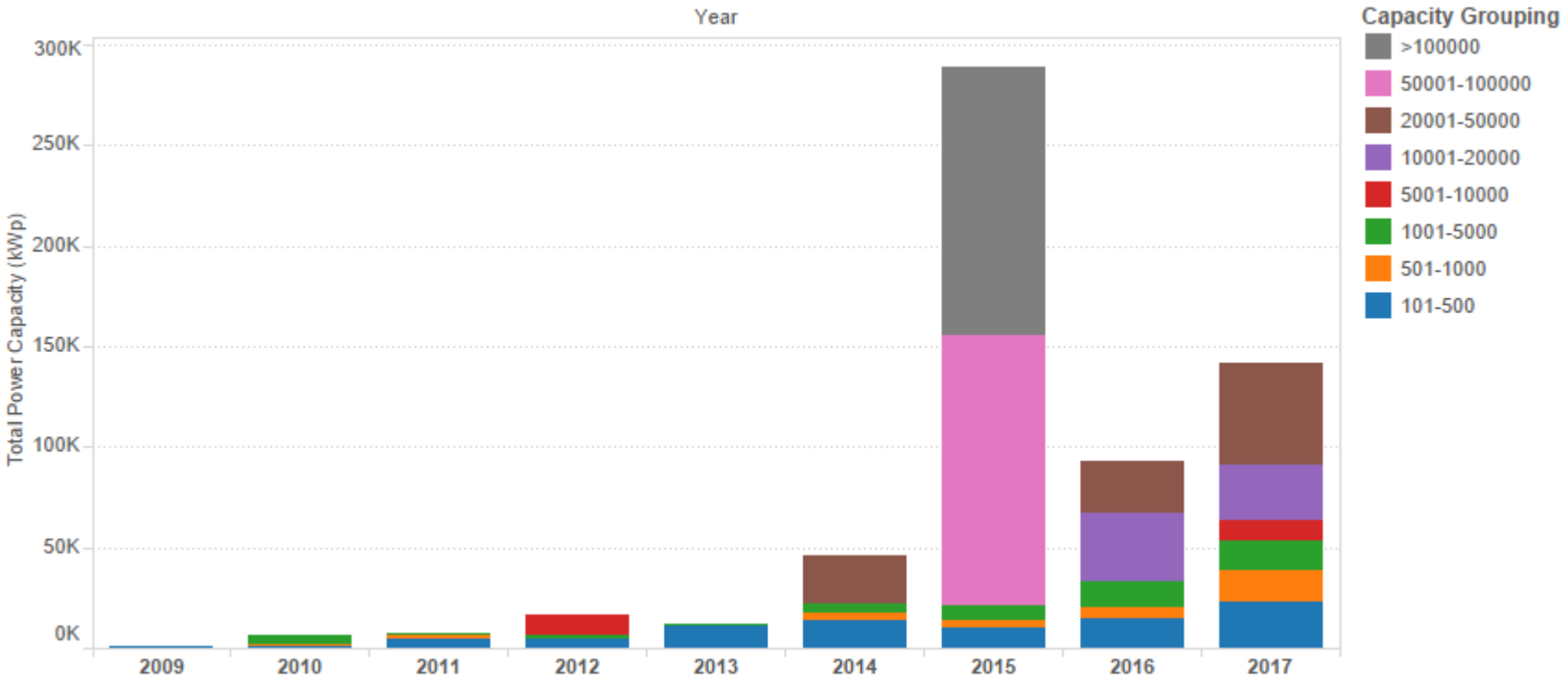
Shifting Classes of Commercial PV (LGC)



In 2017 there was substantial growth in most large-scale system size categories. There was 54% growth in the 101-500kW range, 193% growth in the 501-1000kW range, the first systems in the 5-10MW range since 2012, and a doubling of volume in the 20-50MW range. There was 19% less volume in the 10-20MW range where last year there was Degrussa, Mugga Lane, and Williamstown in 2017 it was just Lakeland and Sunshine Coast.

SunWiz analysis of REC Registry, Nearmaps, public announcements; Dates based upon year of commissioning

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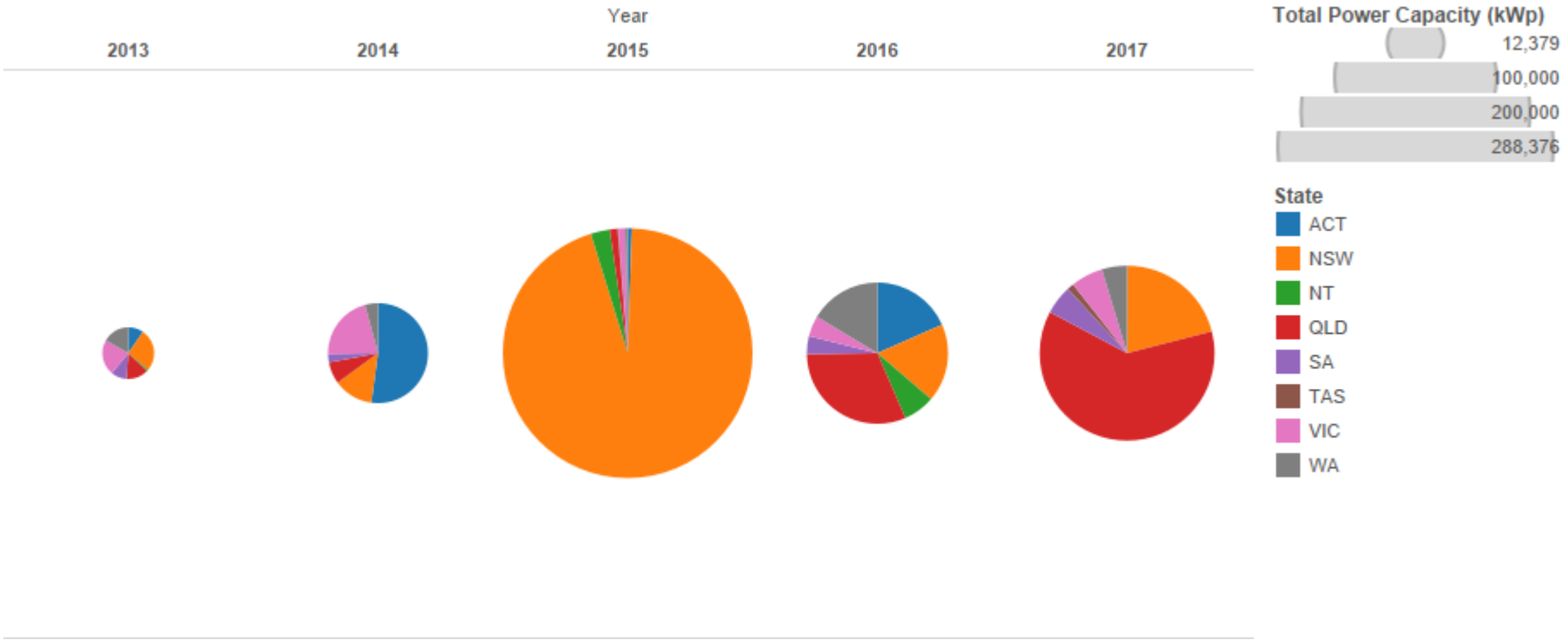
Changing States of >100kW Market



Whereas in 2015 practically all large-scale volume was installed in NSW , we've seen the market shift its attention to Queensland in 2017. The ACT was absent from 2017's data, having completed their major solar farms. WA also saw less volume in 2017 than in 2016.

SunWiz analysis of REC Registry, Nearmaps, public announcements; Dates based upon year of commissioning

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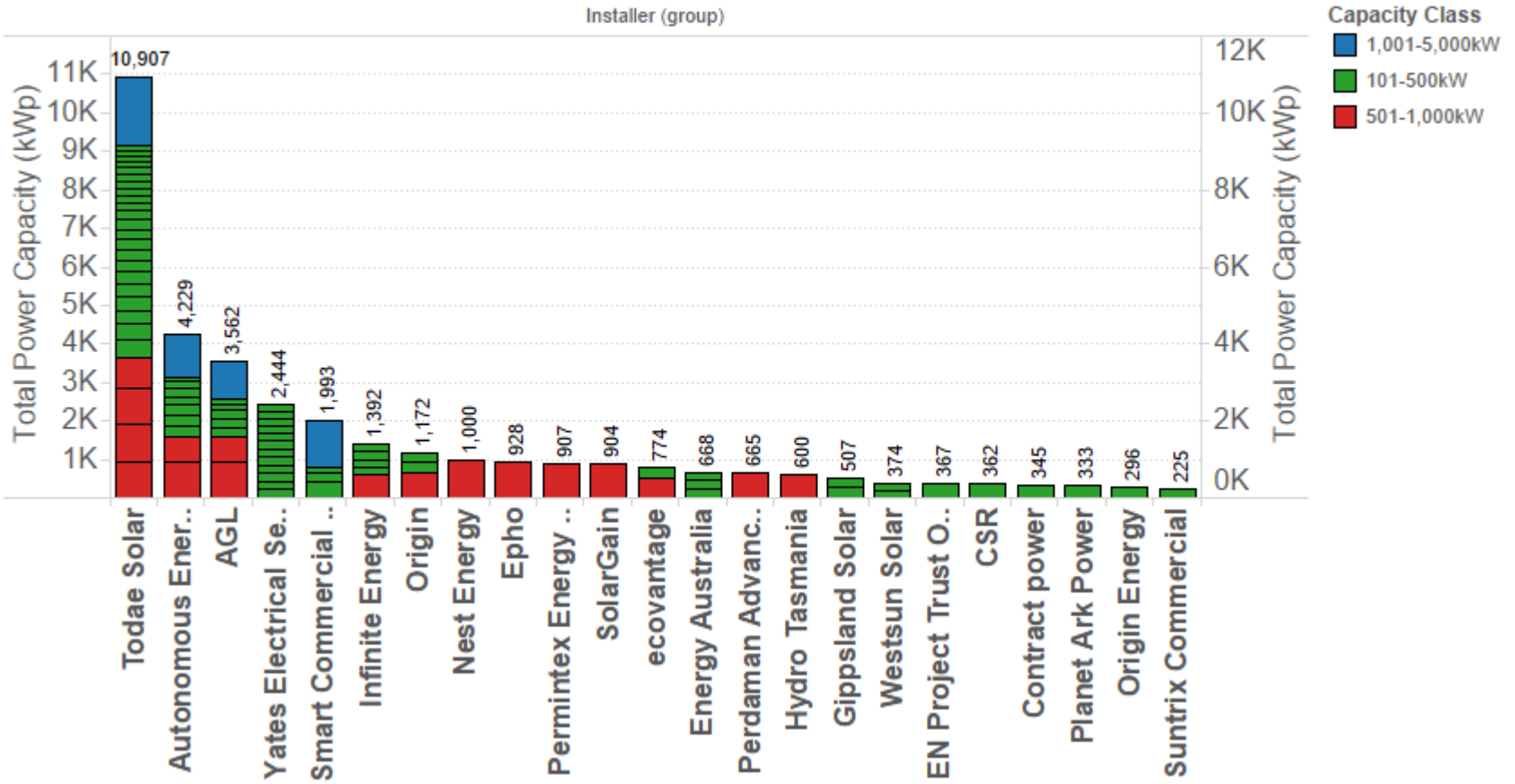
Top Players of >100kW Market



In many cases we are able to identify the installer of systems >100kW. Here we present the top players for 2017 installations, to the best of our awareness. Todae Solar is clearly the #1 player in the >100kW segment, both by number of installations and also by total capacity. Adding together the LGC and commercial STC databases shows that Origin is #1 by volume in the 10+kW bracket on 16.3MW. But with a total of 15MW of installs in the >30kW range in 2017 Todae Solar are the #1 company in the 30+kW bracket.

SunWiz analysis of REC Registry, Nearmaps, public announcements; Dates based upon year of commissioning

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Top Players Combined

Rank	Player	STC Volume	LGC Volume	Total Volume
1	Euro Solar	51,607	0	**51,607**
2	Origin	34,659	1,172	**35,831**
3	SolarGain	24,839	904	**25,743**
4	Infinite Energy	15,834	1,392	**17,226**
5	Todae Solar	4,795	10,907	**15,702**

Increasingly, analysis of the STC registry isn't painting a clear picture of the top companies by overall volume. Todae Solar has long been a commercial trailblazer, and though they topped the 2016 list of commercial STC systems, they fell to fifth-ranked STC commercial installer of 10-100kW systems in 2017. However, Todae Solar had a clear 2017 strategy to focus upon the LGC market that they clearly executed sufficiently well to lead that LGC market, but also to install sufficient volume to rank #1 for commercial in the 30kW+ market (STC & LGC combined) AND rank fifth nationally for total volume, in the process installing more than most companies that were primarily focussed on residential PV.

Sum of STC registration volume in 2017 and sum of known projects over 100kW commissioned in 2017

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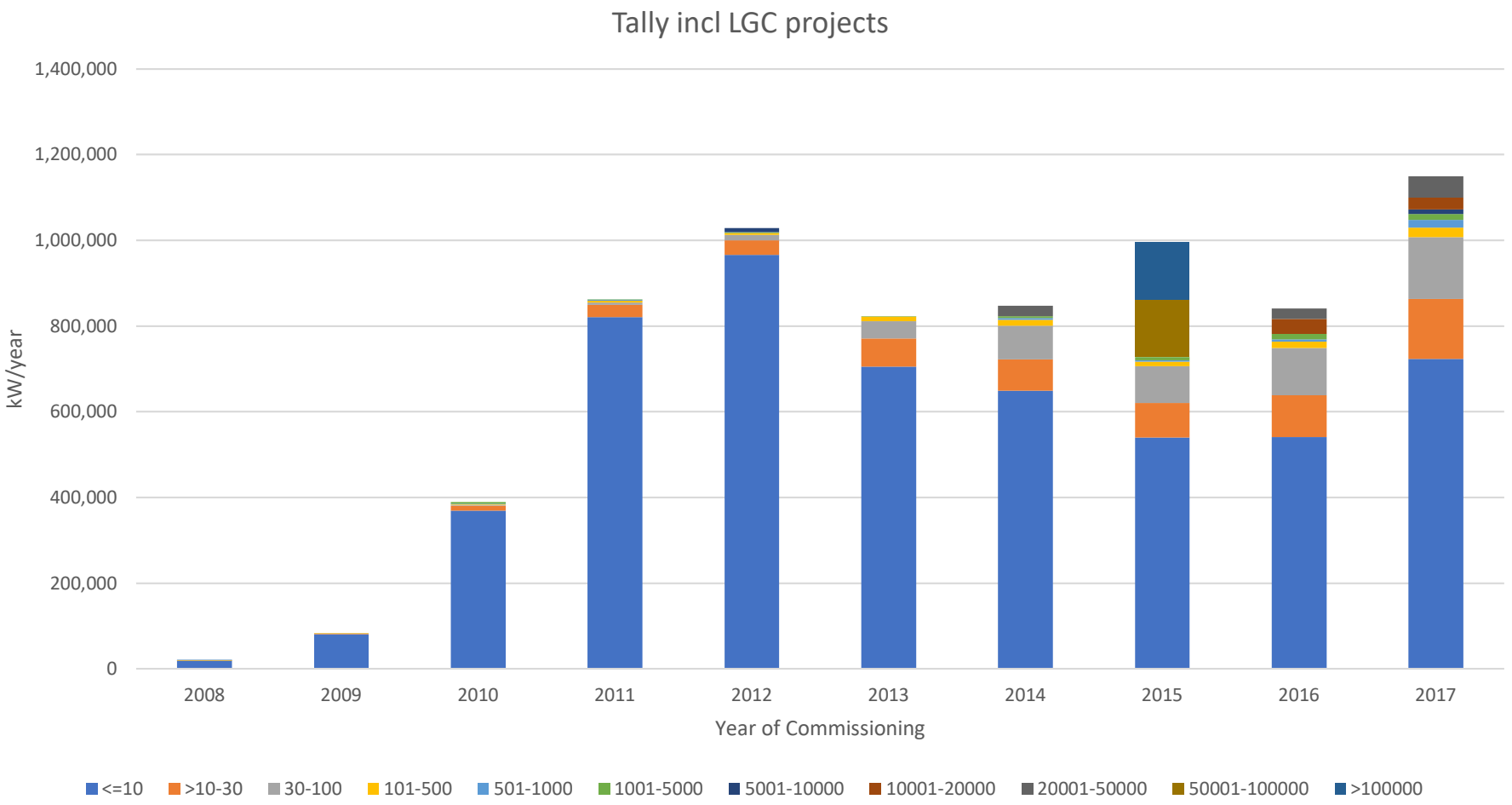
Putting it together



When we adjust for lag in STC registration, we predict that 2017 will 'true up' to over 1.1GW of sub-100kW PV. Adding to this LGC systems known at the time of publication sees us reach over 1.25GW of PV installations in 2017.

Date shown is based upon installation/commissioning date. 2017 STC figures are projections based upon incomplete data

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