The State of Solar:

Australia's Solar Rooftop Boom







Solar Citizens is an independent, community-based organisation bringing together millions of solar owners and supporters to grow and protect solar in Australia. Together, we take action to protect the rights of millions of Australians with solar to cut bills, create clean power and take energy generation back into our own hands.

Our current flagship campaigns:

The Homegrown Power Plan www.solarcitizens.org.au/hpp

The Solar Scorecard

www.solarscorecard.org.au

Vote 1 Solar

www.solarcitizens.org.au/vote1solar

JOIN US

We are politically independent and non-profit and rely upon the support of generous donations from the public. You can help us grow and protect solar by becoming a free member or donating to us at:

http://solarcitizens.nationbuilder.com/donate

All responsibility for the claims and data in this report lie with Solar Citizens.

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For supplying data and review



solarchoice.net.au



For supplying data



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pv-map.apvi.org.au

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Foreword



Earlier this year, Australia clocked up 23.2 million solar PV panels installed – that's the equivalent of one panel for every man, woman and child in the country. The pace of rooftop solar installation in Australia has been nothing short of phenomenal in recent years. Solar panels are now a regular and normalised part of Australian life. In fact, Australians spend as much on their solar as they do on tea and coffee.

Whilst Australians are forking out over one billion dollars a year to harness clean energy from the sun, our political leaders are failing to follow us. In fact, the politicisation of clean energy has had a huge negative impact and risks us losing investment, jobs and an orderly transition to 100% renewable energy.

This report is designed to remind our political leaders of just how much Australians love their solar and have invested in it. For those who would wish to represent us, it's time they realised that the future is solar-powered.

Shine on,

Claire O'Rourke National Director

Solar Citizens

Introduction

Australia's solar rooftop boom – it's one of the most spectacular changes our electricity system has ever experienced.

In less than a decade, 1.5 million Australian households and small businesses have invested more than \$8 billion of their own money into rooftop solar photovoltaic (PV) electricity generation. This disruption to the traditional electricity sector has created tens of thousands of jobs, saved over \$4.4 billion in household energy bills and averted millions of tonnes of greenhouse gas pollution – setting the stage for a transition to a more democratic and sustainable energy future.

The extraordinary rate of residential solar uptake was never expected to be as rapid – it was certainly not anticipated by governments, regulators or the big power companies. The State-based solar feed-in schemes that propelled Australia's solar rooftop solar boom were introduced just as the price for solar modules started falling rapidly and as electricity prices (caused by network overinvestment, or 'gold-plating') began soaring. And while unexpected, the benefits are substantial. Still today, many of Australia's political leaders continue to underestimate our appetite for solar, its continuing fall in costs and the huge associated benefits it brings from job creation to lower bills and energy democratisation.

This report presents the impact of Australia's solar rooftop boom. It provides a snapshot of the benefits created: the amount of money Australians have invested in solar PV, jobs created, electricity generated, and greenhouse pollution saved. It also demonstrates how solar homeowners are a powerful electoral force with one in five people of voting age living in a solar-powered home. Australian households are leading the way on a transition to a renewable energy future. And solar PV is undeniably part of our future. In any conceivable vision of Australia's energy future, solar PV plays a crucial role.

Renewable energy investment has overtaken all other forms of energy. The UN Environment Program recently reported that 2015 was the first year when new renewable energy installations – excluding large scale hydro – accounted for the majority of generation capacity built (53.6% of generation, US\$285.9 billion invested).¹

It's time for our political leaders and policymakers to catch up with this reality, take notice of a rapidly growing constituency and lead a shift to clean, decentralised power. Rooftop solar is leading an energy revolution that is unstoppable and beneficial.

^{1 &#}x27;Global Trends in Renewable Energy Investment 2016', Frankfurt School-UNEP Collaborating Centre for Climate & Sustainable Energy Finance and Bloomberg New Energy Finance http://fs-unep-centre.org/sites/default/files/publications/globaltrendsinrenewableenergyinvestment2016lowres_0.pdf

THE SUN HAS RISEN

ON AUSTRALIA'S ROOFTOPS

The Australian solar rooftop boom began in 2010 and has seen our country catapulted to the highest level of rooftop solar penetration in the world.

There's now a solar PV generator on 16.5% of all households.² In some postcodes, more than 60% of household roofs are adorned with solar panels.³ Whilst other countries have invested more in renewable energy overall, Australia is unique in the uptake of residential solar PV. Total rooftop solar PV capacity on a hot summer's day (when electricity demand is greatest due to air conditioner use) is capable of producing more output than Australia's largest coal-fired power plant running at full capacity.⁴



- 2 'Fact check: Is Australia the world leader in household solar power?', McGill, I & Bruce, A, http://newsroom.unsw.edu.au/news/science-tech/fact-check-australia-world-leader-household-solar-power_accessed 10 May 2016
- 3 For example, postcode 4516, Elimbah in Queensland has 730 of 1207 households with solar PV. Source http://PV-map.aPVi.org.au/ accessed 2 May 2016
- 4 Total rooftop solar PV (<10kw) is more than 4200MW. Australia's largest coal fired power stations is Loy Yang which has 3200MW capacity and supplies one third of Victoria's electricity. Sources: Australian PV Institute Solar Map (http://pv-map.apvi.org.au/) and Clean Energy Regulator Information Hub: (http://www.cleanenergyregulator.gov.au/Infohub/Pages/default.aspx)

THE SOLAR ROOFTOP BOOM IS CAUSING MAJOR DISRUPTIONS TO THE TRADITIONAL MODEL OF ELECTRICITY SUPPLY WHERE LARGE, CENTRALISED FOSSIL FUEL GENERATORS, TYPICALLY COAL, DELIVER ELECTRICITY ONE-WAY TO PASSIVE CONSUMERS.

Calculations undertaken by Solar Citizens show that by conservative estimates, Australians have saved \$4.4billion in household bills since FY 2007/08.

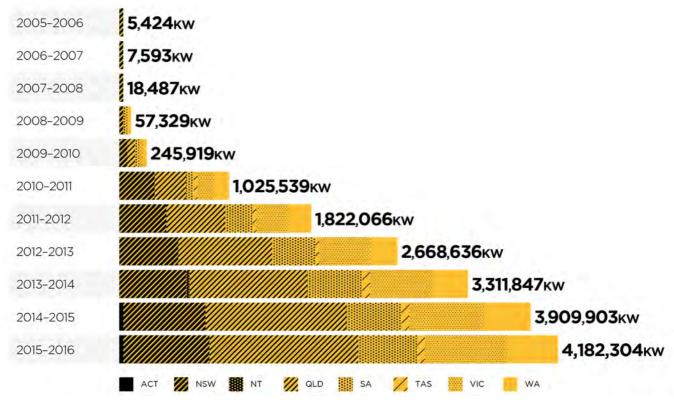
The solar revolution of course isn't over yet.

Australians are continuing to put solar on their roofs.

And under all modelling of renewable energy future

in Australia, solar PV will play a key role. Under the most comprehensive recent modelling undertaken by the Institute for Sustainable Futures at UTS, a 100% renewable electricity scenario will see 53% of electricity demand be satisfied by solar PV.

Figure 1: Installed capacity of solar PV

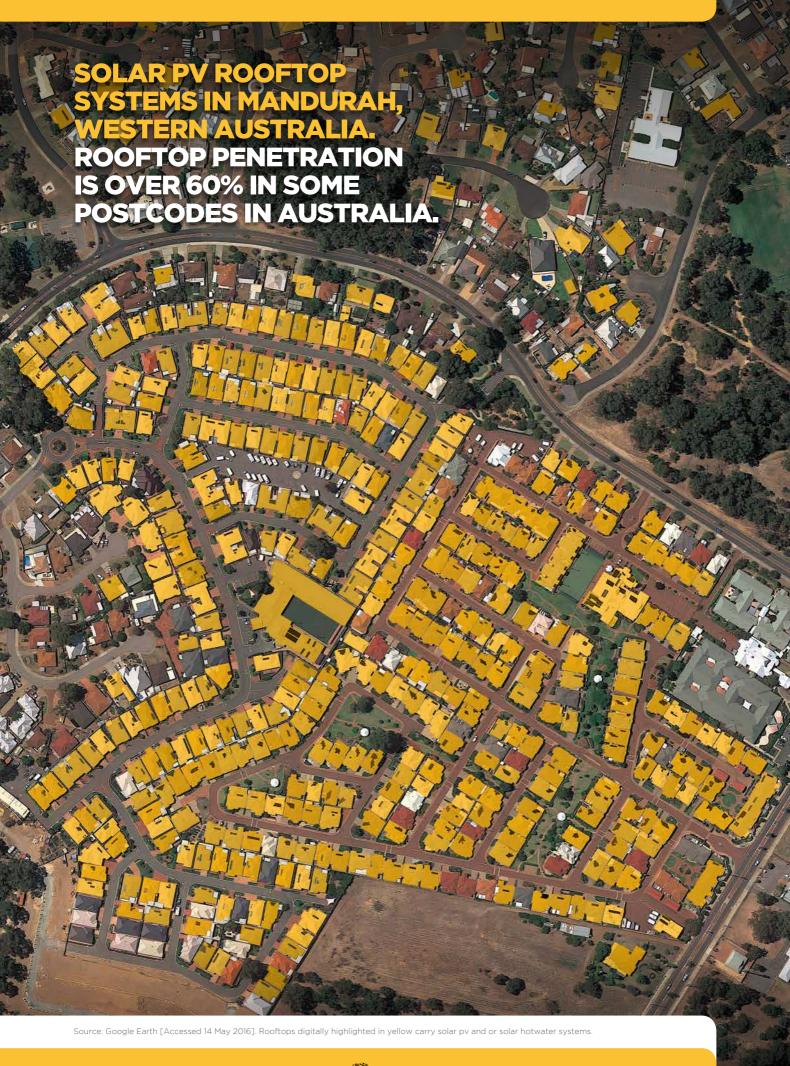


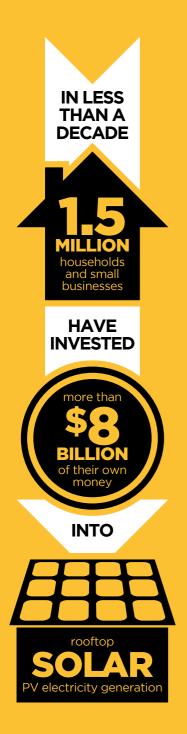
Source: Data supplied by Australian Photovoltaic Institute

⁶ Teske, S., et al 'Renewable Energy for Australia - Decarbonising Australia's Energy Sector within one Generation' Institute for Sustainable Futures, UTS, accesible at https://opus.lib.uts.edu.au/handle/10453/43651 see. P. 26



⁵ Analysis for bill savings is derived on a State/territory and year-by-year basis accounting for various State and Territory feed-in policies. See Methodology section for full analysis.





THIS DISRUPTION TO THE TRADITIONAL ELECTRICITY SECTOR HAS:



Created over 19,000 jobs



Saved \$4.4 billion dollars in household **electricity bills**



Saved 24 million tonnes of carbon pollution



Set the stage for a transition to a more democratic sustainable energy future

WHAT CAUSED THE SOLAR ROOFTOP BOOM?

In the past decade, all Australian State and Territory Governments introduced policies to encourage residential solar PV and other small-scale renewable energy technologies.

These policies were intended to assist in the development of the solar industry and were often seen as a token effort to nurture a small industry that was not viewed as a serious threat to the dominant, coal-based electricity system.

Queensland was the first State to introduce a 'Solar Bonus Scheme' in 2008 which incentivised small-scale solar by offering a feed-in tariff around twice the price for conventional electricity (44c/KwH) for excess energy sent onto the grid. This was guaranteed out to 2028.

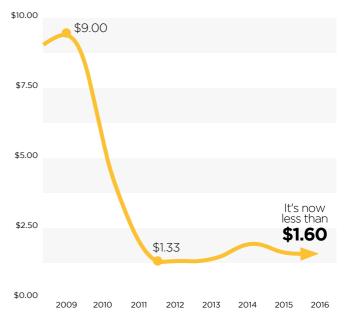
Other States and Territory schemes followed with varying feed-in-tariffs. Victoria and the ACT in 2009, NSW introduced a 60c gross feed-in tariff for all electricity produced in 2010 and Western Australia and South Australia brought in schemes in 2010. Smaller incentives were offered in Tasmania and the Northern Territory in 2012 and 2013.

The roll-out of these policies coincided with a dramatic fall in the cost of solar systems. It also came at the same time as improvements made to Federal renewable energy policies which further reduced the upfront cost of installing solar.



From 2008, electricity prices saw their sharpest increase ever, fueled by over-investment in our network infrastructure (the poles and wires).⁷ Consumers in some states saw a doubling of their electricity bills in just a few years due almost entirely to this 'gold-plating.'⁸ Australian consumers, acutely aware of rising electricity prices and always wise to a good deal, quickly recognised the benefits of solar PV, particularly as word travelled and suburban and rural household roofs began sporting shining PV panels.

Figure 2: Average Australian 'out-of-pocket' cost of rooftop solar (\$/Watt)



Source: Roof Juice historical prices of installed solar pv that deduct all State and Federal up-front rebates and other subsidies averaged and weighted across Australian State and Territories

FROM 2006 TO 2010, THE NUMBER OF SOLAR SYSTEMS INSTALLED EACH YEAR IN AUSTRALIA TREBLED YEAR-ON-YEAR.

From 2011, the growth continued to power on, reaching a milestone of 1 million installations in 2012 and 1.5 million solar rooftops in 2015. The United States has only recently notched up 1 million solar rooftops, and, with a population more than 15 times the size of Australia, it's clear our nation is leading the shift to homegrown power.

Solar PV penetration is now so high in some localities and States that there is a discussion emerging regarding market saturation.⁹
Nevertheless, the latest figures from April 2016 show that a solar PV system is currently installed on a rooftop every 4 minutes.¹⁰ The Australian

Energy Market Operator (AEMO) predicts that solar installations will more than triple over the next decade, leading to capacity equalling 21 per cent of total installed generation in the National Electricity Market (NEM) by 2024-25.¹¹

In 2016, Australia's fleet of solar rooftop generators that are owned by everyday families will generate around 7 million megawatt hours (MWh) of electricity. If that electricity were sold on the wholesale spot market for average prices it would be worth \$423 million.¹²

¹² Based on average wholesale spot market 2015/2016 as published by the AER: http://www.aer.gov.au/wholesale-markets/wholesale-statistics/annual-volume-weighted-average-spot-prices



^{7 &#}x27;Energy prices—the story behind rising costs', Australian Parliamentary Library, accessed at: http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/BriefingBook44p/EnergyPrices on 18 April 2016

^{8 &#}x27;The Price of Power', Jess Hill, Background Briefing ABC Radio, April 2014 http://www.abc.net.au/radionational/programs/backgroundbriefing/2014-04-27/5406022

⁹ Johnston, W. Why the residential solar market is saturated and the commercial untapped, 30 March 2015 http://reneweconomy.com.au/2015/why-the-residential-solar-market-is-saturated-and-commercial-untapped-14231

¹⁰ Clean Energy Regulator published data on monthly installations accessed May 2016 at http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations

^{11 &#}x27;State of the energy market 2015', Australian Energy Regulator', https://www.aer.gov.au/system/files/State%20of%20the%20energy%20market%202015%20 %28A4%20format%29%20%E2%80%93%20last%20updated%204%20February%202016.pdf, p.6

Australians have put their money where the sun is

EVERY YEAR FOR THE LAST FIVE YEARS, AUSTRALIANS HAVE SPENT MORE THAN \$1 BILLION OF THEIR OWN MONEY ON SMALL-SCALE SOLAR PV SYSTEMS (UNDER 10KW).

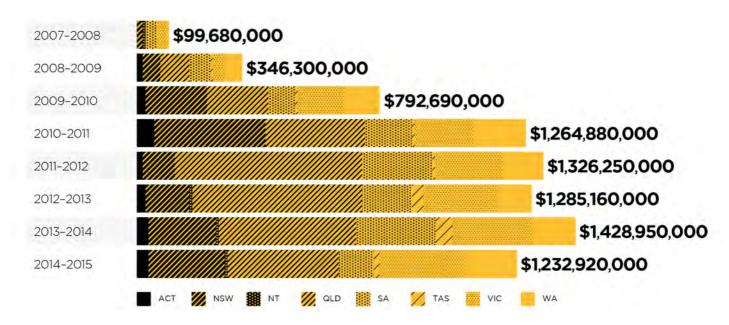
Solar Citizens has calculated these figures excluding subsidies, such as the upfront rebates from the small-scale certificate scheme under Australia's renewable energy target.¹³

In the 2014-15 financial year, Australians invested \$1.23 billion dollars in rooftop solar from their own pocket. By comparison, investment in all large scale solar energy projects in calendar year 2014 was only around \$118 million. Of course 2014 was a terrible year for the large scale renewables industry plagued by the threatened axing of the Renewable Energy Target. But if we look over figures from recent years,

Australians' out-of-pocket investment in rooftop solar is still greater in 3 of the last 5 years (2011, 2012, 2014).¹⁵

Investment in residential solar has experienced dramatic ups and downs in response to State and Federal policies, referred to by some in the industry as the "solar coaster". Today it appears that we are experiencing a relatively stable period, with solar settling to be a normalised household purchase. In fact, Australians now spend as much on solar PV systems as they do on tea and coffee each year.¹⁶

Figure 3: Australian 'out-of-pocket' investment in small-scale PV systems (<10kw) Financial Years 2007/08 to 2014/15



^{16 &#}x27;Australian Spending Habits' Australian Securities and Investments Commission infographic https://www.moneysmart.gov.au/managing-your-money/budgeting/spending/australian-spending-habits



¹³ Analysis for bill savings is derived on a State/territory and year-by-year basis accounting for various State and Territory feed-in policies and calculating against average electricity rates published by the Australian Energy Market Operator. See the methodology section below for more.

¹⁴ Figures supplied by Green Energy Markets http://greenmarkets.com.au

¹⁵ Figures supplied by Green Energy Markets http://greenmarkets.com.au

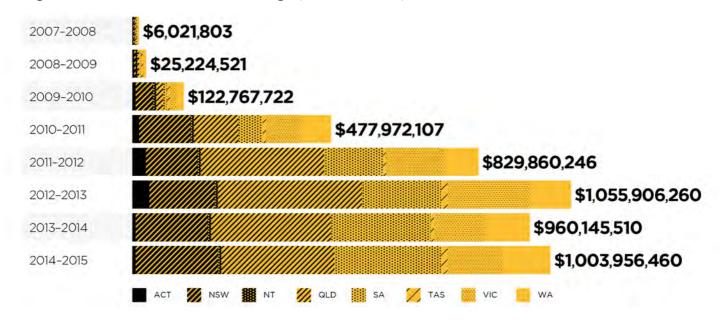
It's no surprise that the Sunshine State leads the way in investment with \$360 million spent by Queenslanders on rooftop solar PV in 2014/2015 FY. Queensland has led installation rates due to its high levels of solar access and thanks to a professional solar industry that now offers the cheapest rate of for solar PV sometimes below \$1/WATT installed.¹⁷

It's easy to forget that early adopters paid four or five times the current prices for solar knowing that their systems would take longer to pay off. In 2010 for example, households forked out on average, \$7,725 for a 1.5kW system¹⁸ whereas, today a system twice that size can be purchased for around half the 2010 price price. The majority of the 230,000 Queenslanders on the state's Solar Bonus Scheme won't pay off their initial investment until 2020, even with a 44c feed-in-tariff paid for the excess power the system feeds back into the network.¹⁹ This is a fact that consecutive Queensland governments who have touted ending the scheme need to be constantly reminded of.

Bill savings for solar owners

For the first time, Solar Citizens has calculated the savings solar owners have made on their electricity bills by analysing average electricity retail rates across all State and Territories over the past 8 financial years. The results reveal that solar households have saved \$4.4 billion on their power bills since FY 2007-2008 and around \$1bn every year for the past three years.

Figure 4: Solar households' bill savings (\$AUD millions)



^{19 &#}x27;Electricity Pricing Inquiry - Draft Report', Queensland Productivity Commission, March 2016 http://www.gpc.gld.gov.au/files/uploads/2016/02/EPI-DRAFT-REPORT-Final.pdf p.xi



¹⁷ See for example Solar Choice monthly install price figures: http://www.solarchoice.net.au/blog/news/residential-solar-PV-system-prices-may-2016-100516

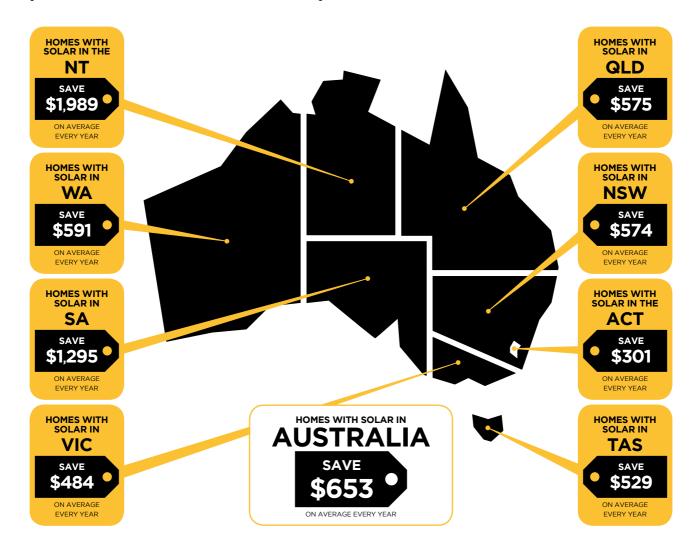
^{18 &#}x27;Small-scale technology certificates data modelling for 2011 to 2013', Green Energy Markets', November 2010, http://www.cleanenergyregulator.gov.au/DocumentAssets/Documents/Green%20Energy%20Markets%20-%20STC%20Modelling%20-%20December%202010.pdf, page.16

AVERAGING THIS ACROSS ALL SOLAR HOUSEHOLDS, IT CAN BE SAID THAT IN FY 2014–2015, THE TYPICAL SOLAR HOUSEHOLD SAVED \$653 ON THEIR ELECTRICITY BILL.

Varying electricity rates and legacy feed-in-tariffs means that solar households in some States and Territories will have saved more in some locations than others. South Australia experiences high electricity rates ensuring that solar households have saved significantly on power bills they have avoided. The Northern Territory is the last jurisdiction with

a sensible solar feed-in-tariff that matches solar exports with the grid price of electricity. It has also experienced electricity rate rises of 30%, average solar systems are larger, and it has excellent sunshine, making the top end the best place to make electricity bill savings from rooftop solar in 2014–2015.

Figure 5: Average savings made by solar owners in financial year 2014-2015 in each State and Territory



Jobs

The rapid expansion of the solar market in Australia from 2010 delivered a huge boost to the small but highly experienced solar sector that had for many years focussed on off-grid connections and also saw a nimble response by the electrical services industry to adapt to the solar market.

The most extensive study of the solar jobs market undertaken in 2014 by Solar Business Services found that employment in the solar industry exploded in the four years up to 2012, increasing by more than 110% to 23,500 jobs. This was at a time when other sectors were contracting.²⁰ During the course of the solar rooftop boom, jobs in the solar industry surpassed those jobs in coal-fired electricity generation.²¹

Updated figures calculated for Solar Citizens show that despite some attrition as solar uptake has slowed and some market consolidation has occurred, there are still more than 19,000 jobs created by the industry.²² Based on these figures and the decline in the resources sector, jobs in the solar industry continue to exceed jobs in coal-fired electricity.

Other recent evidence from the world's largest jobs site shows that solar job postings now exceed those in the coal and oil sector and represent 66 per cent of job openings in the Australian energy sector.²³

BRUCE TUCKER

Upper Mount Gravatt, QLD (Electorate of Bonner)

I grew up in a very much working class family. After 30 plus years as a truck driver, including owning my own truck, I now currently work for a solar panel wholesaler, in Brisbane, as a storeman, forklift operator and truck driver. I wanted to get Solar PV long before I found a lender to finance my system. I started with a 1.5 Kw system and later upgraded to a 2.5 Kw. Since I've installed my solar panels I estimate I've saved \$600 per year on my electricity bills. It's a no-brainer.



^{23 &#}x27;There's a quiet revolution under way in Australian energy sector employment', Business Insider Australia, April 27, 2016 http://www.businessinsider.com.au/theres-a-quiet-revolution-underway-in-australian-energy-sector-employment-2016-4



^{20 &#}x27;Impact of abolishing the Renewable Energy Target on jobs in the Australian solar industry', Report prepared by Solar Business Services, January 2014, http://www.recagents.asn.au/wp-content/uploads/2014/01/140129-solar-jobs-report.pdf

²¹ Will We Let the Sun Shine in?', The Australia Institute, July 2014 http://www.tai.org.au/sites/defualt/files/PB%2065%20Will%20we%20let%20the%20sun%20shine%20in.ndf

²² Figures provided by Nigel Morris based on updates to 'Impact of abolishing the Renewable Energy Target on jobs in the Australian solar industry', Report prepared by Solar Business Services, January 2014, http://www.recagents.asn.au/wp-content/uploads/2014/01/140129-solar-jobs-report.pdf

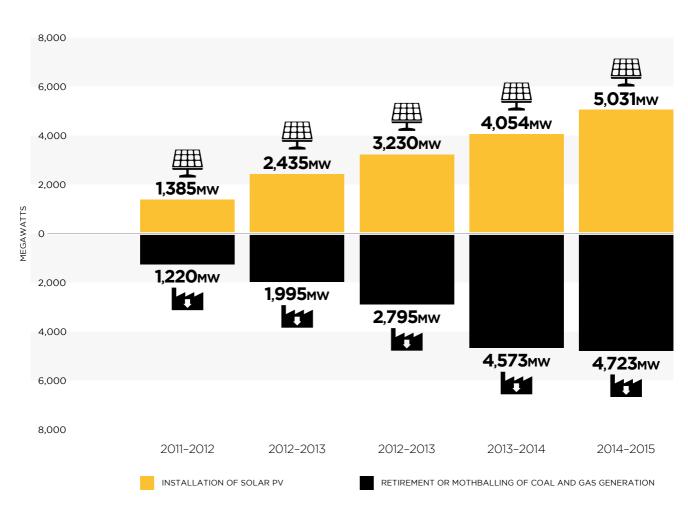
Environmental benefits

Solar Citizens has undertaken research to calculate the total carbon emissions Australian solar owners have saved in the last nine years based on the avoided electricity output from coal and gas fired generation. This analysis shows that since FY 2007-2008 solar owners have saved 24.6 million tonnes of carbon pollution.

In 2016 alone, Australia's rooftop solar generators will generate over 6.5 TWh, preventing around 6,301,000 tonnes of greenhouse gas from polluting our environment. That's the equivalent of taking

one-third of all trucks off Australian roads.²⁴ Since 2011, nine coal-fired and and three gas-fired power stations have either been retired or mothballed. Many others are operating at reduced capacity and no new coal-fired power stations have been built.²⁵ There are other factors at play but it's interesting to note that the capacity of retired or mothballed coal and gas-fired power stations closely follows the installed capacity of solar PV, as the graph below shows.

Figure 6: Installation of solar PV compared to coal and gas generation capacity going offline



Source: AER State of the Energy Market 2015 https://www.aer.gov.au/publications/state-of-the-energy-market-reports/state-of-the-energy-market-2015 and other public sources. Analysis provided by Roof Juice. See also: https://roofjuice.com.au/australias-energy-transformation-happening/

^{25 &#}x27;AGL shuts down Liddell coal fired power station units for repairs', Reneweconomy, 21 March 2016
http://reneweconomy.com.au/2016/agl-shuts-down-liddell-coal-fired-power-station-units-for-repairs-12915 and AER State of the Energy Market 2015
https://www.aer.gov.au/publications/state-of-the-energy-market-reports/state-of-the-energy-market-2015



^{24 &#}x27;Light Vehicles Report', Climate Change Authority, June 2014, http://www.climatechangeauthority.gov.au/files/files/Light%20Vehicle%20Report/Lightvehiclesreport.pdf , p.18

Early adopters of solar PV who purchased their systems prior to 2010 did so with little prospects of a financial return. These pioneers might have been interested in the technology or the positive environmental impacts or might have gone "off-grid" in remote areas. Nowadays, the primary driver for solar PV is to help with the cost of living.

A survey of Solar Citizens supporters undertaken in January 2016 with more than 4,300 respondents revealed that the primary driver for purchasing solar

was financial reasons (60%), over environmental reasons (38%). But tellingly, there are greater satisfaction levels relating to the environmental impact of their solar arrays for these same respondents (95%) over the financial return (88%) and an overwhelming majority expected their solar investment to pay off.

A world-class solar industry

Australia has a proud history in pioneering the technology behind solar PV and now, thanks to the solar rooftop boom, we have a world class installation and service industry that is amongst the best – and most efficient – in the world. In fact, installing residential solar in Australia is nearly half the price of that in the United States.²⁶ The US-based Rocky Mountain Institute has shown that Australian installers were averaging 6.1 labor hours per kW of solar installed, as compared to 9.4 labour hours in the United States,²⁷ an efficiency margin of more than 50%.

Those who are are currently considering installing are able to benefit from the rooftop solar boom that has created this world-class industry. Coupled with electricity prices amongst the highest in the world it's no wonder that there are 157 households who continue to install solar on their roofs every day.

MARTI ELLEN

South Sydney, NSW (Electorate of Cook)

"As a passionate physics teacher I really understand how we can make better use of of the sun's natural energy. Apart from saving money on my electricity bill, I'm excited about sharing the environmental benefits of solar and other renewable energy sources. In fact, I've produced a documentary aimed at school children to teach them more about solar energy and other sustainability topics. The purpose of the dvd is to excite children about what they can DO, and to have fun actually bringing those ideas to reality."



^{27 &#}x27;Will We Let the Sun Shine in?', The Australia Institute, July 2014 http://www.tai.org.au/sites/defualt/files/PB%2065%20Will%20we%20let%20the%20sun%20 shine%20in.pdf



^{26 &#}x27;Tracking the Sun VI An Historical Summary of the Installed Price of Photovoltaics in the United States from 1998 to 2012', Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory, July 2013, Accessible at https://emp.lbl.gov/sites/all/files/lbnl-6350e.pdf, p. 19

A powerful backlash

The savings households have made come at a direct reduction to the profits of incumbent energy giants. The big losers have been the large electricity generators and gentailers (companies that generate and retail electricity like AGL, EnergyAustralia and Origin). Stanwell Corporation, the largest electricity generator in Queensland, has seen its profits plummet in recent years and has blamed residential solar PV as the main cause.²⁸ AGL and Origin, Australia's two largest privately owned gentailers have similarly seen their earnings drop significantly since 2010 and rooftop solar is cited as a major factor.

Analysts are warning that the expected uptake in battery storage will lead to a further \$100m loss in revenue for Origin and AGL even as they now scramble to reinvent their business models and get into solar and battery markets.²⁹

Electricity networks - the companies that own the poles and wires - have also been impacted by the solar rooftop boom. Their regulated business model is based on the amount of electricity they transport. One and half million solar homes are now generating around half of their own electricity needs which doesn't require the poles and wires at all. The added rise of battery storage means that these networks are grappling with a dynamic new model of energy generation and consumption that threatens their entire business model.

The energy giants are not taking this lying down. The large generators and retailers have taken aim at the Renewable Energy Target in spectacular fashion and this ultimately resulted in the target being reduced. Gentailers including AGL and Origin wanted the small scale policy scrapped but a huge upsurge from solar owners led by Solar Citizens and the solar industry saved this important scheme which provides savings of up to one quarter of the price for a new solar system.

More perniciously, network companies are targeting solar owners by increasing fixed connection charges. In the most blatant cases the networks boast how their pricing changes will lead to reduced solar uptake.

State Governments, who often own these companies, regularly act on behalf of the energy incumbents to change regulations or laws in favour of networks and retailers to the detriment of solar owners.

^{29 &#}x27;Morgan Stanley downgrades Origin and AGL due to Tesla Powerwl', Business Spectator, May 20, 2015, https://www.theaustralian.com.au/business/busin



^{28 &#}x27;Stanwell blames solar for decline in fossil fuel baseload' Reneweconomy, October 2013, http://reneweconomy.com.au/2013/stanwell-blames-solar-for-decline-in-fossil-fuel-baseload-54543

DEREK NELSON Bronte, NSW

(Electorate of Wentworth)

It's no surprise Derek was an early adopter of solar power - he moved to Australia for the sunshine!

"In 1959 I emigrated from Ireland as I was fed up being wet and cold. In the 60s I made a few enquiries about using all this lovely sun but I was told that it was not strong enough to make any useful contribution. In the 1980s I got my first solar water heater. And in 2009 I got my 3kw electric system which has - like the hot water systems - paid for itself."



THE POWER OF 3 MILLION VESTED INTERESTS



3 million Australians—or 1 in 5 people of voting age—now live under a sun-powered roof, making them a significant and growing constituency.

As numerous analyses have shown, solar ownership is more prevalent in rural, regional and outer mortgage belt suburbs. These are areas which also often constitute marginal electorates. Higher solar ownership is also more commonly found in areas with lower than average incomes. 32



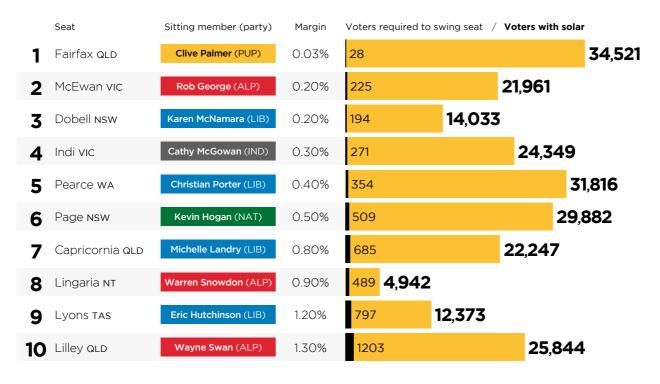
- 30 'SA Networks want solar homes to pay \$100/year more for grid', Reneweconomy 27 May 2015, Accessed at http://reneweconomy.com.au/2015/sa-network-wants-solar-homes-to-pay-100year-more-for-grid-97840 on 1 April 2016
- 31 'Postcode and Income Distribution for Solar', Green Energy Trading, April 2014 http://www.recagents.asn.au/wp-content/uploads/2014/04/GET-Postcode-report-for-RAA-April-2014.pdf accessed 16 April 2016
- 32 'Postcode and Income Distribution for Solar', Green Energy Trading, April 2014 http://www.recagents.asn.au/wp-content/uploads/2014/04/GET-Postcode-report-for-RAA-April-2014.pdf



FRESH ANALYSIS UNDERTAKEN BY SOLAR CITIZENS SHOWS THAT 80% OF FEDERAL ELECTORATES (121 OF 150) CONTAIN MORE VOTERS WITH SOLAR ROOFTOP THAN THE NUMBER OF VOTERS REQUIRED TO CHANGE THE SITTING MEMBER OF PARLIAMENT.

This analysis was undertaken using detailed postcode data published by the Clean Energy Regulator and weighted in accordance with the AEC federal electoral boundary redistribution in 2016.

Figure 7: Most marginal federal electorates showing solar voters

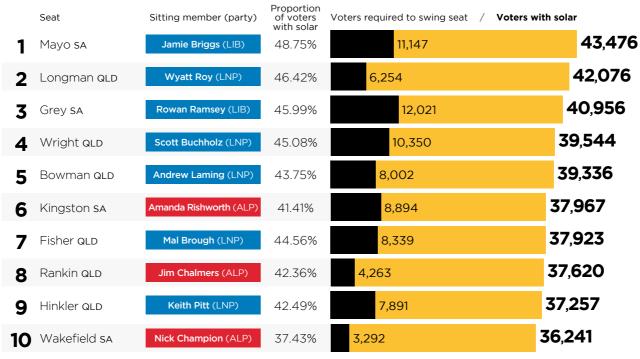


SOLAR HOME OWNERSHIP IS MOST

CONCENTRATED IN THE STATES OF QUEENSLAND AND SOUTH AUSTRALIA.

It's not surprising that of the top 16 solar-dense federal electorates, 12 are in Queensland. Seven of the top 10 solar-dense federal electorates are held by Liberal-National party MPs.





Conservative forecasting for continued uptake of residential solar indicates that by 2019, 346,000 homes will add solar to their homes meaning that if the next federal election is held at this time as expected then nearly one quarter of voters will be solar owners.

A recent survey of Solar Citizens supporters showed that an overwhelming proportion of solar owners want to see Australia transition to 100% renewables by 2030. And in this they are not alone – recent polling shows that 64 per cent of all Australians would be more likely to vote for a party with a policy to transition our economy to 100% renewables in the next 20 years.³³

^{33 &#}x27;Election 2016: Climate change policy a vote winner for majority of Australians' Sydney Morning Herald, May 16 2016 http://www.smh.com.au/federal-politics/federal-election-2016/election-2016-climate-change-policy-a-vote-winner-for-majority-of-australians-20160513-gouwbf.html#ixzz48oRWBwJu accessed on 16 April 2016



THE WRATHRALL FAMILY Seaforth, NSW

(Electorate of Warringah)

"We've only recently decided to go solar installing a 3.6KW system at the end of last year. We've been so happy with it that we were part of an effort to install solar at our local Church.

We love generating sustainable energy and investing in our family's future. Australia's energy market is in flux but it's important that the energy mix comes increasingly from sustainable sources. Solar is one of the most obvious choices for our sun soaked land!"



Conclusion

Warren Buffett has famously claimed that the break-up of energy monopolies in the US represents the "largest transfer of wealth in history."³⁴ Here in Australia, the solar PV rooftop boom represents a similarly seismic shift with millions of Australians now owning their own electricity generators, saving billions of dollars in bills and becoming far more conscious and aware of the power they use and create at home.

The energy giants who for so long have relied on passive consumers and guaranteed revenue are fighting back. And at times these companies have enlisted politicians to help protect their profits.

Australia's politicians now need to make a choice between backing everyday Australians who have invested in a renewable future or supporting the big power companies and networks that are holding back the transition to 100% clean, affordable, renewable power. With solar voters on the rise, our representatives should make the choices to support their constituents – after all, politicians are themselves a renewable resource.

³⁴ Cited in 'Following Warren Buffet's Lead in Energy Deregulation' News USA http://www.newsusa.com/articles/article/following-warren-buffets-lead-in-energy-deregulation.aspx



Data sources and methodology

Data for this report has been collated with the generous assistance of the Australian Photovoltaics Institute, SolarChoice and Roof Juice. Additional thanks to James Martin from SolarChoice, Nigel Morris from Roof Juice, Peter Youll and Ben Raue for advice on methodology and feedback. All responsibility for this report is assumed by Solar Citizens.

Number of Solar Households per Electorate

Analysis was undertaken using Clean Energy Regulator published postcode data on small scale installations available at http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations (accessed February 2016) and AEC spatial data of 2016 Electoral Boundaries as published by the AEC http://www.aec.gov.au/electorates/gis/index.htm (accessed February 2016) Overlapping postcodes were weighted to respective electorates to avoid duplication.

KW installed capacity per Electorate

Analysis was undertaken using Clean Energy Regulator published postcode data on small scale installations available at http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations (accessed February 2016) and AEC spatial data of 2016 Electoral Boundaries as published by the AEC http://www.aec.gov.au/electorates/gis/index.htm (accessed February 2016). Overlapping postcodes were weighted to respective electorates to avoid duplication.

Investment in Rooftop Solar

Analysis was undertaken using figures supplied and updated by Roof Juice and based upon a report commissioned by the REC Agents Association of Australia in August 2014, 'Industry Report: Solar Businesses in Australia'. Available at: http://www.recagents.asn.au/wp-content/uploads/2014/09/Solar-Businesses-in-Australia-Final-2014.pdf. \$/Watt installation rates were adjusted to ensure figures are "out-of-pocket" so State and Govt rebates are removed (GST included).

Bill Savings

Analysis for bill savings is derived on a State/territory and year-by-year basis accounting for various State and Territory feed-in policies. The various feed-in-tariffs in state jurisdictions have been assessed and year-by-year calculations undertaken on the composition of solar owners and their feed in tariffs. Information on the history of feed-in tariffs is derived from numerous sources including Solar Choice: http://www.solarchoice.net.au/blog/when-do-feed-in-tariffs-end-NSW-QLD-VIC-ACT-TAS-SA-WA-NT and data supplied by Roof Juice. Attrition rates for bonus schemes (e.g. NSW) have also been factored in on the basis that Australians move house every 7 years. Credits for solar bonus customers are added as bill "savings". State, year-by-year average retail prices have been assembled from AEMO published data 'Electricity Price Trends Final Report' March 2013 http://www.aemc.gov.au/media/docs/ELECTRICITY-PRICE-TRENDS-FINAL-REPORT-609e9250-31cb-4a22-8a79-60da9348d809-0.PDE, figure 1.

CO₂ pollution averted

Figures for averted carbon dioxide equivalent pollution is based on first calculating the total electricity generated on a State/Territory basis and comparing annual output to average State/Territory emissions. Total kWhr is calculated using APVI installation figures multiplied by irradation levels in capital cities (Solar Choice: http://www.solarchoice.net.au/blog/how-much-energy-will-my-solar-cells-produce/). State and Territory electricity generation emissions are derived from the Australian National Greenhouse Gas Accounts published by the Department of Environment: https://www.environment.gov.au/system/files/resources/3ef30d52-d447-4911-b85c-lad53e55dc39/files/national-greenhouse-accounts-factors-august-2015.pdf.

