Solar torrent in post-Abbott Australia

Credit ARENA

Utility-scale PV | Since the fall of former prime minister Tony Abbott two years ago, the prospects for large-scale solar in Australia have enjoyed a dramatic turnaround. Tom Kenning reports on the changing fortunes of the industry and how storage looks set to become a key partner technology for utility solar

Investor confidence has rebounded in Australia's utility-scale renewables with more than 20 projects under or about to start construction this year. Despite months of stagnation, big solar has finally broken out and looks set to be an unstoppable force at least until 2020, after which the parameters of the country's renewable energy target (RET) mandate are still uncertain. Kick-started by a major funding programme from the Australian Renewable Energy Agency (ARENA), foreign players are closing in for a piece of the action and large-scale project plans are flying in, often with ground-breaking innovations around energy storage and hybrid technologies (see boxout). While the country has been embroiled in a fierce national debate about energy security and whether renewables are to blame for blackouts – even Tesla chief Elon Musk got involved with a giant energy storage proposal – the solar sector Down Under has swept away the dust of politically driven inertia and looks forward to a golden period of opportunity.

Just in 2017, there were 1,569MW of large-scale (>5MW) solar projects under construction or with financial commitment ready to commence building, according to analysis in February by Australia's Clean Energy Council (CEC). To put that into perspective, at the end of 2016, only 12 large-scale plants were operational in the entire country with a cumulative capacity of just 318MW.

The 52MW Broken Hill project in New South Wales looks set to be joined by a new generation of large-scale PV projects in Australia

Market fundamentals

The political changes that form the background of this solar surge have been well documented. In brief, months of uncertainty around the RET came to an end in 2015, while the former prime minister Tony Abbott, a controversial

Technology	State	Developer	Project (MW)	Investment (AU$ million)
Solar	Queensland	Sun Metals	100	155
Solar	Queensland	ESCO pacific	135	225
Wind/Solar	Queensland	Windlab	40	120
Solar	Queensland	Genex	50	126
Solar	Queensland	FRV	100	190
Solar	Queensland	FRV	100	400
Solar	South Australia	Snowy Hydro	100	200
Solar	New South Wales	Neoen	110	230
Solar	Western Australia	APA	20	50
Wind/Solar	South Australia	EDL	4	37
Solar	Queensland	Sunshine Coast	15	50
Solar	New South Wales	Goldwind	10	26
Solar	Queensland	Conergy	10.8	42.5

Source: Clean Energy Council

Table 1. Australian large-scale solar projects under or about to start construction this year as of February 2017

enemy of renewables, left office last year, bringing instant confidence back to investors. This was against a backdrop of global PV module oversupply, cost reductions in key components, lowered risks and speedier installations – all factors that have driven downstream PV progress across the globe and not just down under.

"The RET decision meant that electricity retailers, who have the largest share of liability under the RET scheme, were also able to forecast their future liabilities under RET more confidently," says Geoff Burns, project director at Canberra-headquartered renewables developer Windlab Systems, which started focusing on large-scale PV in 2015. "This meant medium to long-term power purchase agreements (PPAs) were back on the table for project proponents."

Alongside this there has been more acceptance of solar at individual and community levels, says Burns.

While the RET debacle slowed down investment "terribly", according to Darren Gladman, director of smart energy at CEC, the target is harder to meet in the short-term as a result. This means that the price of large-scale generation certificates (LGCs) – which RET-liable entities can purchase to fulfil their obligations – has become higher than people expected them to be at this stage a few years ago.

In conjunction, the prices of wholesale electricity have also risen recently, partly following the recent closure of one of the largest coal-fired power stations, Hazelwood. This was another factor setting the stage for large-scale solar to prosper.

"The fundamentals are looking pretty good," says Gladman.

The effects of LGC price increases can be seen in Australia's energy retailers flocking back to the PPA market, adds Gloria Chan, director of corporate and project finance at the Clean Energy Finance Corporation (CEFC), which provides low-cost debt financing for Australian clean energy projects. The big retailers such as EnergyAustralia and Origin started signing solar PPAs again and that momentum has also led to movements from second-tier retailers as well. Chan also notes a surge of interest in corporate PPAs at present, a space that will be up and coming in the next six to 12 months.

Beyond grant funding

As a result of PV costs falling dramatically ARENA was able to award AU$92 million grant funding for 482MW of large-scale solar last year in its flagship funding round; more than double the 200MW it had expected. This was complemented by significant debt funding from CEFC.

"Even though that hasn't delivered a completed project yet, it was really quite instrumental in first attracting investment into that sector, but then also in reducing costs," says Gladman. "EPC costs have really come down. It's become a much more competitive space. As we build experience and the supply chain builds in Australia the costs have been coming down progressively."

Franck Woittiez, country manager of French developer Neoen's business in Australia, which has significant projects under construction and in the pipeline, says that until recently projects were unviable without ARENA funding, but now with decreasing costs of technology and higher cost LGCs, projects can go ahead without grants for the first time.

This had to be driven initially by ARENA's large-scale solar funding round, but the amount of grant funding in the capital structure as a percentage of project costs is only 5-10%, which is relatively small, and solar has started to be able to close that gap, adds Chan. Where there is insufficient debt finance, CEFC still has a large role to play, but its facilitation has also helped several projects come to fruition in a highly accelerated period.

"We are at the stage now where we are seeing a lot of projects that don't require any grant funding from ARENA and commercial banks are financing it by themselves where there's a commercial off-taker," she adds. "EPC contractors have sharpened their pencils and become competitive. There's a few EPC contractors coming up now and fighting for those projects, which is great."

Warwick Johnston, managing director at consultancy SunWiz says that people

are now happy to take merchant risk for the first time and this has been partly driven by foreign companies, with experience abroad, entering Australia and demonstrating that the conditions for solar are more than adequate.

"That's using some investment outside of Australia," adds Johnston. "In contrast the Australian major banks don't have a lot of experience with solar and are still pretty cautious. Up till now that's been a dampener, because they've waited for a PPA that's been signed by a major electricity retailer. The difference is that there are now solar projects willing to go merchant and that's going to unlock a large number of projects."

In this case, "going merchant" means taking the wholesale spot market price rather than using a PPA as the route to market.

Finance fortunes change overnight

CEC's main annual conference last July in Sydney made it perfectly clear just how dramatic the change in atmosphere around investing in Australian renewables has been.

"Under Tony Abbott it felt a lot like the industry talking to itself, whereas once there was the change of prime minister, even though there wasn't a significant change in policy, you could really see a shift of confidence and in the attitude of investors," says Gladman. "Going to Malcolm Turnbull we had a lot more international investors and representatives from banks coming to the conference than we ever had before."

The Australian trade commission also noted a significant return of international investor interest, marked almost to the day that the role of prime minister changed hands. "Under the former PM you always felt like the next attack was days away and never knew where from," adds Gladman.

Dangers ahead

All of which is not to say that the industry is now trouble free. Despite the growing competitiveness of EPC costs mentioned earlier, Johnston forecasts a major bottleneck forming in terms of sourcing experienced constructors. At present there are only few local companies with experience, but the anticipated volumes of solar deployment activity are very high.

Mega projects and innovations

The 56MW Moree project, completed in March 2017 in New South Wales by developer FRV, was the first in Australia to use a single-axis tracking system. Technical innovation looks set to be a prominent theme in the next generation of large-scale PV projects in Australia, with a flurry of hybrid solar, wind and energy storage proposals on the table:

Kidston
Renewables and storage firm Genex Power has started building the 50MW first phase of the Kidston Solar project in Northern Queensland, with plans for a 270MW second phase. Once complete, this will be the largest commissioned solar project in Australia. The firm is also developing an accompanying 250MW Kidston pumped storage hydro project, which it found could be connected to the solar plant in a recent study. This would give the projects 24/7 power generation capabilities.

Lower Wonga
Queensland-based developer SolarQ is planning to build a 350MW(AC) solar plant combined with a ground-breaking 4,000MWh of lithium-ion battery storage in the Gympie Region of Queensland. Scott Armstrong, SolarQ managing director, says there are plans to ramp up the Lower Wonga PV project to 800MW(AC) within four years. While the hybrid project is at concept stage, the company put in a council development application and has allocated a lay-down area that can carry up to 4,000MWh of batteries. To complete what would be the most ambitious storage project to date worldwide, the firm expects to capitalise on economies of scale.

Kennedy
Windlab is developing Australia's first large-scale hybrid wind, solar and battery storage project, known as Kennedy Energy Park, in central north Queensland.

"Kennedy Energy park will be able to demonstrate a near base-load generation profile and a potential pathway to overcoming the issues of reliability and intermittency as we move to higher penetration of renewable energy," says Geoff Burns of Windlab.

"There will be some deployment of co-located wind and solar to 2020, expected to be mainly the installation of solar PV at existing wind farm sites. However, the main concentration of wind farms is in the southern states, where the level of solar irradiance is significantly less than that of northern Australia."

The 56MW Moree solar farm was completed in March 2017, the first utility PV plant in Australia to use single-axis tracking

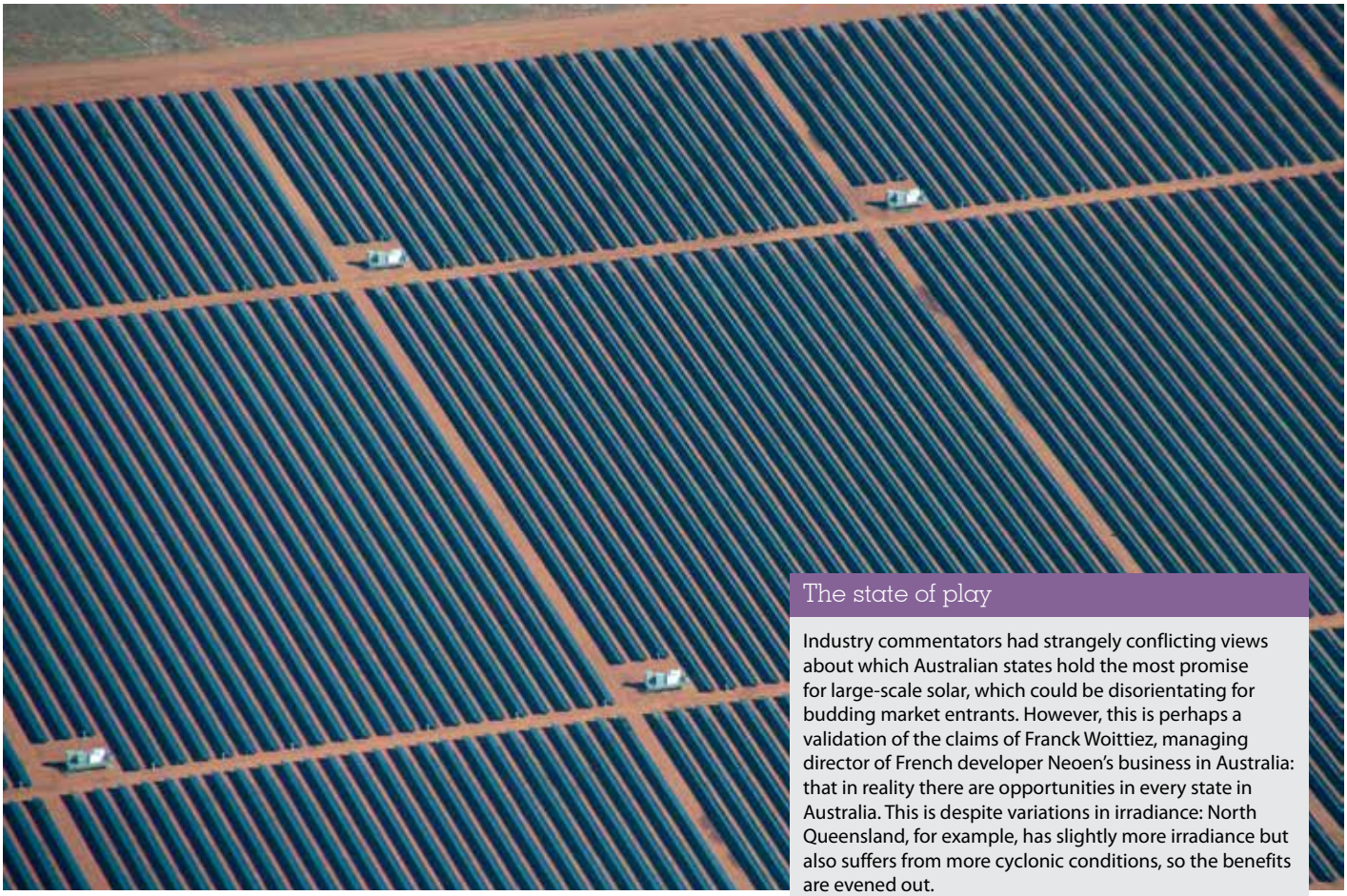
Credit FRV

Two further significant threats to the market relate to the RET.

"The current design of the RET sets an increasing target for renewable energy up until 2020 and beyond that it is fixed," says Burns. "In this regard, as supply of renewable energy increases to meet the demand for large generation certificates (LGCs) under the RET, there is a chance that the market price for future LGCs could approach zero. With this in mind the electricity retailers would be reluctant to enter into anything other than short-term PPAs, which will not support investment in new renewable energy projects."

What happens after the RET, a subject of intense debate at political level, is also key. Without bipartisan political support, regulatory uncertainty could rear its ugly head again, leading some states to go their own way and making investors nervous once more.

Gladman is particularly concerned about the need for clarity post 2020. Some energy bodies cite the Emissions Reduction Fund (ERF) as a key enabler, but Gladman disagrees: "The ERF



Credit: ARENA

A carbon price in conjunction with an extended RET is one of the favoured solutions for keeping Australia's large-scale renewables business going

purchases abatement, but frankly it doesn't operate in the electricity sector anyway. It's not a policy that would be of any support to our industry."

The CEC's preferred policy would be for Australia to adopt a price on carbon in combination with an extension of the RET or some variation of it, with the two policies complementing each other, CEC believes

"There is a lot of confidence in the industry now and people can see a lot of opportunities to build between now and 2020, but once we reach 2020, if there's not some sort of policy in place then there's no direction for investors," says Gladman. "It's unclear whether prices are going to come down sufficiently for people just to invest in renewable energy without any policy support or without any price on carbon."

There are hopes that the emergence of energy storage capabilities will push solar along and Chan says that CEFC is already looking at financing storage. Blackouts in South Australia in 2016 and early 2017 caused a vicious national debate with some seizing the opportunity to blame renewables – particularly wind – for destabilising the grid. Despite the bad press, it was made clear that high gas prices and interconnector issues were part of the problem and it also led Elon Musk to boast that Tesla could solve the state's power crisis in 100 days. Since then both South Australia and Victoria have announced major energy storage tenders. The impetus is clearly there and due to its geography, Australia can tap into both pumped hydro and battery-based projects. Chan also believes that transmission upgrades between states would be a significant driver of investment in the renewables sector.

Ultimately, new market developers are probably fairly confident that the RET will stay almost as it is up till 2030, says Gladman, but that's only 13 years away. "That's not that long to recoup your investment so everyone's piling in because they can see there are opportunities now, but in three to four years it's a bit of an open question."

Nevertheless, the picture has transformed out of all recognition since the demise of Tony Abbott and it seems the time has come for large-scale solar in Australia to thrive. ■

The state of play

Industry commentators had strangely conflicting views about which Australian states hold the most promise for large-scale solar, which could be disorientating for budding market entrants. However, this is perhaps a validation of the claims of Franck Woittiez, managing director of French developer Neoen's business in Australia: that in reality there are opportunities in every state in Australia. This is despite variations in irradiance: North Queensland, for example, has slightly more irradiance but also suffers from more cyclonic conditions, so the benefits are evened out.

"In terms of policies, it's hard to say where to go now and it's changing depending on the political mood," adds Woittiez. "But I would tend to say Victoria is the place to go. There is a clear political will to develop 5.4GW of wind and solar by 2025."

Woittiez thinks Queensland is very attractive but the future policy is yet to be announced.

However, Windlab's Geoff Burns says the Queensland government's offering of long-term off-take contracts for up to 150MW of new large-scale solar projects was instrumental in kick-starting development in the state so that there are now more than 2.5GW of PV projects with development approval in this state alone out of roughly 3GW approved nationally.

South Australia is very supportive of renewables and has launched an ambitious programme for the development of storage, adds Woitiez.

Meanwhile, New South Wales is starting to show more willingness to contract long-term renewable electricity. CEFC's Gloria Chan says that New South Wales and Victoria are also attractive because they are the big load centres where most of the population is concentrated. However, the opportunity for wind energy is slightly stronger than PV in Victoria due to its southern location. Both states are also working hard on reaching their renewable energy targets.

SunWiz's Warwick Johnston also claims that the solar opportunities are slightly smaller in Victoria and Tasmania. He cites Queensland and South Australia as having the obvious opportunities, since they both have high solar irradiation resources and high electricity prices driven by large proportions of gas in their generation mix.

Even Western Australia which has a changing political regulatory environment holds some promise, according to the various commentators.

"There's not a magic state," concludes Woittiez. "I think what an experienced developer will do is hedge their risk by developing projects across all four to six states in the main in the electricity market."