Smart Energy
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The energy transition creates huge opportunities for investors, Mike Cannon-Brookes (right) told Simon Holmes à Court at the National Smart Energy Summit

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Smart Energy was first published in 1980 as *Solar Progress*. The magazine aims to provide readers with an in-depth review of technologies, policies and progress towards a society which sources energy from the sun rather than fossil fuels.

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Simon Holmes à Court with Atlassian's Mike Cannon-Brookes at the National Smart Energy Summit. IMAGE: Andrew Burn

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Welcome

SMART ENERGY COUNCIL
SOLAR, STORAGE, SMART ENERGY

John Grimes, Chief Executive Smart Energy Council

PICTURE AN AUSTRALIA that finally sees the light of day. That wakes up to its potential and exploits its endless solar and wind resources to build a sustainable and reliable energy market. A market that also enables Australia to establish itself as an energy export powerhouse.

It all lies ahead of us, but first we need to develop the building blocks and create a new genetic blueprint for energy.

AEMO's Integrated System Plan has already set the wheels in motion by identifying a series of potential Renewable Energy Zones, regions rich in solar and wind resources and within striking distance of the National Energy Market,

The potential is staggering, together 34 REZs housing large-scale solar and wind power plants could deliver 38GW of renewable energy.

They would also attract billions of dollars in investment. Three REZs alone that are already planned for NSW could unlock billions of dollars in private sector investment.

Key to the success of the proposed network of REZs is a well-functioning grid, one that allows greater transparency of, and access to the electricity grid to facilitate the flow of electricity to areas of demand.

It's no secret our electricity transmission infrastructure is strained, and proposals by the market regulator for an overhaul of the rules that favour lumbering, faltering coal plants will only stymie 'new' renewable generation. We will remain in a logjam until this critical issue is addressed.

Other hurdles? We need to bat away detractors who question the reliability of 'intermittent energy' while we clear the way for 21st century technology and pivotal to that is storage.

We have the wherewithal to develop electricity 'reservoirs', supersized storage facilities strategically positioned within REZs that can dispense the electricity after dark, or when the wind dies down, and provide 24/7 electricity.

We have proven battery storage technology as well as an abundance of the raw materials necessary to manufacture lithium ion batteries for electricity storage at scale.

At our disposal are all the ingredients for sustainable reliable energy: sunshine, wind and advanced storage technologies.

That means jobs. Economic prosperity. Unlimited affordable power.

In my view

Towards a decentralised and democratised energy future

AS THE LARGE-SCALE renewable energy market must grow, it is also critical to look at how cities can better play their part in achieving the energy transition and emissions reductions needed. After all, almost 90 per cent of Australians live in urban areas.

We should be mainstreaming highly energy-efficient buildings, encouraging building renovations that ensure low carbon and high efficiency performance, and driving the installation on all buildings of photovoltaics as well as individual or precinct storage infrastructure.

In 2019, the Australian Energy Market Commission (AEMC) said we need to prepare for a 'completely new' two-sided energy market, in which electricity networks become trading platforms where consumers are rewarded for buying and selling energy in real-time.

The growth in residential generation and storage assets has already started to drive a more decentralised generation and distribution model of electricity, with the advent of Virtual Power Plants – a network of home solar photovoltaic and battery systems, which allows connected households to pool their stored energy and feed it into the grid.

Energy companies can offer standard payments or incentives when they foresee a spike in demand, but these don't take into account the actual energy contribution customers are making or likely to make.

And, currently, if the energy company was going to use a customer's battery storage, it can only operate in one mode. That is, it can only be used for frequency control or network control or demand response.

Quite literally giving the power to the people, blockchain technology allows energy companies to measure the energy contribution their customers are making in near real-time. That means customers are more actively involved and will receive returns quicker, while energy companies have energy and capacity more readily available when they need it.

As well, blockchain smart contracts automatically decide what the most beneficial service is for that battery, at that time, and allows customers to provide all three services – frequency control, network control and demand response.

Urban environments as virtual power plants deliver a decentralised and democratised energy system, similar to what we've seen happen to the taxi industry with rideshare apps like Uber and Ola.

To my mind, enabling precinct virtual power plants is an important part of Australia's energy future and regulation should unlock the enormous potential.

Maria Atkinson AM is Advisor to Power Ledger and a renewable energy advocate

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LOCAL and GLOBAL NEWS

1.5 GW PUMPED HYDRO-ELECTRIC PLANT AND HYDROGEN EXPORTS Renewable Energy Partners has received $2 million from the federal government for a feasibility study on a 1.5GW pumped hydro-electric plant in North Queensland. The Urannah Renewable Energy Hub will feature up to 1.3GW of solar, 500MW wind, seven hours storage capacity, and a 200MW hydrogen electrolyser. Dubbed the 'battery of the north', it is earmarked for hydrogen production and exports. The proposed 1,500GL dam is yet to be developed.

THREE RENEWABLE ENERGY ZONES are planned for New South Wales. The first of these will be in the central-west region located between Orange, Nyngan and Tamworth. The NSW government predicts it could unlock $4.4 billion of private sector investment. Construction of the 3000MW renewable energy zone is slated for 2022.

Read more about the potential for REZs on pages 15 and 16.

ELECTRICITY TRANSMISSION LINES AT CAPACITY

Difficulties gaining approval to connect new projects to the grid, transmission losses, and congestion are now rife and preventing the flow of energy from new solar farms to the grid. During 2019 investment in new renewable energy projects slumped by 60 per cent, in part to limited network connections. ARENA has engaged consultants to explore the challenge for renewables in constrained zones and present solutions to manage them.

Meantime Victoria which is bearing the brunt of transmission constraints in the state's north-west is taking matters into its own hands.

ENERGISING THE MARKET Solar farms in Victoria have been plagued by connection issues, now the state government wants to bypass complex and outdated national rules and progress grid upgrades to enable more large-scale renewables and big batteries. "The existing national energy laws have let us down – they have failed to drive investment in our electricity system or provide a 21st century grid for all Victorians," says Victorian energy minister Lily D'Ambrosio, adding changes would be made in close consultation with the Australian Energy Market Operator. "Our nation's reliability standard fails to recognise changes in climate, our energy network, the way Australians consumer power and ageing and less reliable coal generators."

PROJECT SLUMP Just 2,000MW of new large-scale wind and solar projects reached financial close in 2019, less than half the 4,400MW of 2018, says the Clean Energy Regulator. However the CER anticipates renewable electricity generation from projects will rise to 37,000GWh in 2020, higher than the legislated target of 33,000GWh.

The CER also anticipates a recovery in the large-scale sector from a "second wave of renewables investment" following grid improvements combined with changes at distribution level to enable high levels of annual rooftop solar capacity additions to continue. The CER predicts rooftop solar installations in 2020 will exceed 300,000 and set a new record by surpassing 2,250MW.

LOOKING TOWARDS RECOVERY As the largest producer of solar modules globally, the vital role of China in the smart energy industry cannot be over-stated. Economies of scale from mass production have delivered lower prices and mass uptake with significant reduction in emissions from fossil fuel powered energy. A slowdown in production of solar panel and battery components caused by the new virus will have widespread ramifications for Australian industry. During these difficult times we would like to convey our very best wishes to all our colleagues in China, their businesses and their factories across the land.

John Grimes, Chief Executive
Smart Energy Council

武汉加油

RECORD HIGH AUSTRALIAN INDUSTRY EMISSIONS

RepuTex Carbon Quarterly reports that while electricity emissions have fallen from 2005-19, industry emissions (excluding electricity) have risen to 60 per cent above 2005 levels behind increases in oil and gas (621% up), road transport (122% up), aviation (54%) and mining (41% rise) sectors. The industrial sector is projected to surpass electricity as Australia's largest emitting segment in 2023-24, growing to 110 per cent above 2005 levels by 2030.

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LOCAL and GLOBAL NEWS

STAMPING OUT BUSHFIRES AND ADDRESSING THE CLIMATE CRISIS All of the bushfires, smoke, heat stress, floods and other climate disruptions experienced in the past year have occurred at just one degree Celsius above pre-industrial global temperatures, says ANU Climate Change Institute Director Mark Howden. "Many of the solutions we need are available, affordable and scalable [and] by developing new, low-emission industries and effectively adapting to ongoing climate changes, Australia could address climate change and turbo-charge the economy."

ELECTRIC VEHICLES Queensland has flagged two more sites for the $2.5 million Queensland Electric Super Highway, the longest state charging network in the world. With 31 charging points it runs from Cairns to Coolangatta and is powered predominantly from renewable resources.

The NSW government has allocated $3 million to install DC fast chargers in strategic regional areas and another $2 million for EV charging points at commuter car parks. In a recent development a western Sydney train station car park is gaining a solar roof, with 10 EV chargers installed by JET Charge on the Chargefox network.

Victoria has earmarked $3 million in funding and launched Victoria's Zero Emissions Vehicle Roadmap listing the existing 403 vehicle charging stations and 31 planned for construction.

Visit energy.vic.gov.au/renewable-energy

READY RECKONER SolarQuotes has launched an industry first solar and battery calculator for Australian homeowners considering investing in solar and/or battery installation. The calculator predicts the next four energy bills and enables prospective purchasers to determine future savings. SolarQuotes teamed with Solar Analytics to source seasonal electricity usage patterns for each state/territory in Australia, then factored in solar irradiance data. "I'm at the coalface of consumer behaviour in relation to solar, and know that the key driver for people considering solar is the number on the bill," Finn Peacock of SolarQuotes said.

THE AMAZING RACE TO RENEWABLES South Australia which now generates more than half its electricity from wind and solar and is aiming for net 100% renewable energy by 2030 was crowned winner in the 2019 Climate Council's report *State of Play: Renewable Energy Leaders and Losers*. SA was closely followed by the ACT and Tasmania with Victoria and Queensland both receiving special commendation.

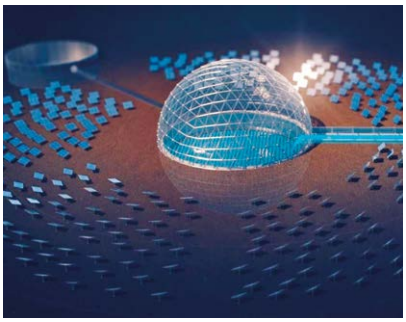
UK DOING OK Renewable energy has overtaken fossil fuels to become Britain's largest source of electricity. During 2019 coal represented just 2.1 per cent of Britain's overall electricity output, and this heralds the path for coal production across Europe, which recorded a fall by one-fifth in the first half of 2019, the balance equally replaced by wind and solar, and gas.

Here in Australia coal plants still provide about 74 per cent of our energy mix.

BRITAIN'S CONSERVATIVE PM Boris Johnson recently declared "There's no point in the UK reducing the amount of coal we burn if we then trundle over to Africa and line our pockets by encouraging African states to use more of it. We will breathe the same air, we live beneath the same sky, we all suffer when carbon emissions rise and the planet warms. The British government will no longer provide any new direct official development assistance [ie, overseas aid], investment, export, credit or trade promotion for thermal coal mining coal or coal power plants overseas."

Britain's recently published Decarbonisation Action Plan builds a system supporting the growth of renewables and ten million electric vehicles on UK roads by 2030; an offshore grid to enable a four-fold increase in offshore wind generation by 2030, and innovation fund focused on unlocking investment in innovative solutions to tackle climate change.

WORK HAS STARTED on a world first solar dome desalination plant at the planned smart city of Neom on the Red Sea in northern Saudi Arabia. The plant will be powered by large scale Concentrating Solar Power technology and process pumped seawater into a hydrological 'solar dome' made from glass and steel, before it is superheated, evaporated and eventually precipitated as fresh water. Saudi Arabia aims to complete the first section of Neom, which will be totally powered by renewable energy, by 2025.



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CHARTING A NEW COURSE FOR ENERGY

The business community's march toward a decarbonised economy shows not only their resolve but also that you don't always need political edicts to elicit rational and responsible actions. Just a smattering of prudence.

IMAGE BY NEUFAL54 FROM PIXABAY

PEOPLE AND BUSINESSES from all walks of life are stepping up their interest and their activities in a low-carbon energy future, and while political leaders are resisting the trend and instead supporting incumbent power sources, a series of independent reports are drawing the similar conclusion: the community is heading in a new and smarter direction.

Take advisory company Aurecon's *Future Energy Ready* that found that 50 per cent of big energy consumers aspire to move to a low-carbon energy future by drawing on renewable energy of some sort.

In a similar vein recent research by Deloitte revealed 81 per cent of Australian business leaders believe climate change will negatively affect their company, highlighting a monumental shift from the 7 per cent recorded just two years ago.

And a Carbon Market Institute survey of more than 200 businesses – including mining, oil and gas, and manufacturing industries, investors, and carbon project developers – found 96 per cent of those surveyed believe Australia should not delay the transition to a decarbonised economy. There was broad support for a target of net zero emissions by 2050.

The tide is already turning, with mining giant BHP announcing its exit from thermal coal (used to generate electricity) and a ramp up in activities in minerals used in green technologies such as nickel which is needed to make lithium-ion batteries and copper used in wind turbines.

Their shareholders are among those driving the impetus. Almost one-third called on BHP to cut links with the Minerals Council of Australia and the conservative Business Council of Australia due to their ongoing support for coal and gas.

Signalling a shift among miners is BHP counterpart Rio Tinto which has already removed all exposure to thermal coal, and Anglo-American with its plans to offload its assets in thermal coal in coming years

Cementing the trend are the actions of Blackrock which headlined news bulletins the world over after announcing an exit in thermal coal investments.

Praise be. If the world's largest investment manager with its AU$10 trillion global portfolio and army of astute analysts, advisors and actuaries can see what's coming, others will surely follow. (But maybe not a handful of regressives holed up on the hill in Canberra.)

Major corporations, big steps

It's not just miners contemplating a cleaner future. Microsoft is turning back the clock by working to remove its 45-year carbon footprint since the company's founding in 1975 to become carbon neutral by 2030 and carbon negative by 2050.

Staying in the tech space, Google has announced a series of significant solar energy agreements 'taking their draw on renewables to 1.6GW – double the existing – and dial up its renewable energy portfolio to 5.5GW.

And still on big names, online retailer Amazon plans to source 80 per cent renewables by 2024, 100 per cent by 2030, and become net zero carbon by 2040.

These and other moves by stratospherically successful corporations and a host of others are proving pivotal to the energy mix.

Bloomberg New Energy Finance reports a sharp rise in levels of renewable energy bought by corporations the world over, with a 40 per cent increase on the previous year, much of it facilitated through Power Purchase Agreements. Here in Australia food giant Mars entered

a 20-year PPA in 2018 and has pledged to source 100 per cent of its electricity from renewable energy by 2020.

Telstra is also leading the field with a series of PPAs that facilitate almost one-third renewables consumption of 1.7TWh, a process that takes lots of skill, constructive risks, and complex and detailed documents, Ben Burge told *Smart Energy*. "By joining a syndicate they all benefit from scale and gain a good price … and as corporate businesses we have to tackle this," he said.

A tilt in the balance

"We are living in a world of enormous change, both in the impact of an increasingly hostile climate and our response to it," John Grimes said. "And all of this is not before its time. But it is also timely given the relatively recent advances in renewable energy technologies accompanied by the notable reduction in costs.

"Now there's a marked shift in thinking, and in actions, by corporations. Businesses are increasingly aware of the risk of inaction, and their important role in reducing their carbon footprint by adopting green technologies, and the economic and social benefits that arise from this."

Guardians of the future

PwC's report *The Future of Energy* declared a power generation mix dominated by renewables by 2040 can deliver reliable and affordable electricity, as well as drive an increase in Australia's economic welfare.

Companies have already acknowledged such, and this was on show at the National Smart Energy Summit which focused on corporate leadership.

"The low cost of renewables is enhancing the economic and environmental advantages," Brian Morris of investment bank Macquarie Capital told the Summit. The RE100 member has been carbon neutral since 2010 and has a commitment to purchase all its electricity from renewable sources by 2025.

Also speaking at the Summit was Ikea's Melissa Miller who outlined the retail giant's "People, plant and positive strategy" and the company's aim to achieve 100 per cent renewable energy in all buildings and suppliers/service operations by 2025.

The popular Swedish retail giant which is party to RE100 has taken a stake in two large solar power plants in the US and a wind farm in Romania, actions that enable the company to surpass its goal of 100 per cent renewables a year ahead of schedule.

Investment in renewable energy infrastructure opportunities by CBUS which boasts one of Australia's largest superannuation funds have increased two per cent over the past two years.

The progressive path of the Construction and Building Unions Superannuation fund was outlined by chief investment officer Kristian Fok who is on a mission to exercise the $54 billion investment portfolio for the best outcomes.

"This means taking into account long-term risks and sustainability, and our fiduciary duties to provide the best returns. That of course means we need to consider climate risks and opportunities, and support moves to a low carbon economy," he told the Summit.

And Kristian Fok had a warning: in the absence of federal government action in the climate and energy sector, capital may flow offshore.

Risk and return

Globally, the number of extreme weather events has tripled since the 1980s, which does not bode well for insurers. The Bank of England warns climate change could wipe out $20 trillion of assets.

Australia's second largest insurer QBE Insurance Group supports the global initiative to contain global warming below two degrees.

"We need to understand the risks of weather events to develop an acute understanding of the economic and social consequences," chief executive Pat Regan told the Summit, outlining QBE's intention to source all its energy from renewables by 2025. The insurer is already half way there at around 50 per cent.

QBE holds a $23 billion investment portfolio and plans to invest in renewables projects up to $1 billion. The energy policy established in early 2019 includes no support for the thermal coal industry by 2030 at the latest. Further boosting its environmental credentials, QBE has introduced a "Premiums for good" program that focuses on economic and social outcomes. This is what we as a responsible entity are driven by as we move toward a lower risk environment," Regan said at the Summit in early December.

Bushfires increased in intensity in the intervening weeks, resulting in QBE exhausting its first-quarter catastrophe allowance by February. It's part of an ominous trend, with costs from natural disasters exceeding the 30-year average for seven of the past 10 years.

RE100

QBE is party to RE100, the global movement whereby corporations commit to source 100 per cent renewable energy. More than 220 Australian companies have signed up to RE100 and momentum continues, says Jon Dee, with Real Estate Investment Trust Dexus recently joining the ranks. With a property portfolio valued at $31.8 billion, Dexus invests only in Australian businesses.

The Commonwealth Bank, ANZ, NAB, Westpac, Bank of Australia and Macquarie Capital, and Atlassian are among RE100 signatories who join a long list of household names including Mars, Google, Lego, Sony, Microsoft, Adobe, Kellogg's and HP.

Speaking at last year's RE100 gathering in Canberra, John Grimes commented that although Australian businesses have been left exposed by a distinct lack of federal guidance on energy policy, they are nevertheless committing to 100 per cent renewables "because Australia has reached a tipping point in favour of wind and solar installations".

"Companies now know clean energy is good for business as well as the environment. Committing to renewables will also help them to be globally competitive in the long term," he said.

"It's not just large companies that are committing to a cleaner future, smaller entities are also steering toward more sustainable, less carbon intensive practices. And in many cases consumers are now voting with their feet – and wallets – in their choice of retailer based on these credentials.

"Age is no barrier, as Greta Thunberg has shown the young are among some of the most actively involved in the crusade toward a sustainable future that hinges in large part on a speedy and major shift toward renewable energy."

Even if some of our political leaders don't quite get it.

IMAGE BY BECQUEL ENERGIA SOLAR FROM PIXABAY

Smart ideas at Smart Energy Summit

It was no small irony that on the day of the National Smart Energy Summit, Sydney was smothered in smoke from bushfires caused by extreme weather events, high temperatures, and the worst drought in living memory. But that did not prevent the delivery of clear messages about a brighter and smarter future that forward-thinking individuals and corporations are already putting in motion.

NSW ENVIRONMENT AND ENERGY MINISTER Matt Kean set the tone for the Summit with a powerful message: "It's not time to end the climate wars … it's time to win the climate wars," winning a round of applause from the 300 delegates sitting in the air conditioned – yet smoke filled – conference room of the five-star hotel.

His vision involves unlocking Australia's enormous potential for renewable energy.

"Taking action to reduce our emissions today is not about a cost that we are morally obliged to pay, it's about taking an economic opportunity that we would be negligent to miss," he declared.

"Renewables today are the cheapest form of new generation, but more importantly they can produce electricity at close to zero marginal cost."

The Minister went on to describe the huge opportunity awaiting Australia across every part of the economy, from cars to steel manufacturing, cement production and more. He also highlighted the findings of Chief Scientist Dr Alan Finkel on the opportunity for hydrogen to add between $11 and $26 billion per year in additional GDP by 2050, and produce up to 50 per cent of the world's hydrogen needs.

"This isn't just an opportunity to be the Saudi Arabia of solar. It's an opportunity to be the Middle East of energy," he astutely observed. "We need to take advantage of the huge economic opportunities that zero emissions will bring.

"No other country is better placed with wind and solar resources to produce hydrogen and it is not just about protecting our environment, we can help other countries meet their carbon emissions goals."

Referencing the political impasse at federal level he said "Doing nothing is not an option and for too long Australia has been mired in debate but we are missing the big picture – the opportunity to create export markets for greater prosperity.

"It is the right thing to do for our economy and our environment – it also provides jobs and growth. We are setting up our own kids for future generations. It is too big an opportunity to miss.

"This is about creating a 'new global energy order'" he said. "This is how to win the climate wars."

Matt Kean's powerful messages were emblazoned across national newspapers and dominated TV news for the rest of the week.

View the speech in full at https://vimeo.com/378922153

Matt Kean commented on the enormous contributions and leadership of former Prime Minister Malcolm Turnbull in relation to climate change and building a more sustainable energy system.

Malcolm Turnbull was at the Summit to reinforce his viewpoint, telling the assembly that "Responding to climate change should be about physics and heeding the IPCC report which states with 95 per cent probability that humans have caused climate warming.

NSW Environment and Energy Minister Matt Kean made headline news following the National Smart Energy Summit

Former Prime Minister Malcolm Turnbull told the Summit "There are enormous economic opportunities for Australia to become a powerhouse … politics is the only thing holding us back."

SMART ENERGY COUNCIL

The DNA of energy needs to change to 100 per cent and beyond renewables to allow exports, says Mike Cannon-Brookes

"This is an issue that should be recognised as fact and we need to consider risk assessment rather get mired in politics, beliefs, values and religion," Turnbull said.

"The marginal cost of renewable generation is what's important – and it is zero given there is no fuel cost which is why we need to plan for storage.

"There are enormous economic opportunities for Australia to become a powerhouse … politics is the only thing holding us back."

Malcolm Turnbull's speech can be viewed at https://vimeo.com/379193066

Summit organiser Wayne Smith remarked: "This National Smart Energy Summit has had a more profound impact in shifting the climate debate than any held before. It is unprecedented in its significance. We now have more politicians speaking up and calling for action."

Meantime, individuals are taking action.

The voice of a visionary

Mike Cannon-Brookes captivated the assembly with his words and actions about his investment arm Grok Ventures which is focusing on energy, transport and agriculture, the three sectors that together pump 75 per cent of emissions into the atmosphere.

The Atlassian billionaire took the stage with Simon Holmes à Court to share the extent of his involvement in game-changing projects.

Declaring the energy sector is going through enormous disruption and transition, he said that for an investor that creates a huge opportunity. After delving deep into the complexities of the electricity market, he believed he could help drive it forward.

He is now, along with mining billionaire Twiggy Forrest, a cornerstone investor in the 20GW Sun Cable farm that on completion in 2027 will be the largest power plant in the world, and export electricity to Asia.

"Nothing in engineering says it can't be built, theoretically it is all possible. On paper it is a viable project, and economic modelling shows it can be very profitable for the Northern Territory and shareholders.

"People who can put in tens of millions of dollars can turn it from a napkin plan to a real plan."

The energy sector needs to transition its DNA, Cannon-Brookes said. To think about itself as an exporter, like the resources sector has, whether it's 500 or 800 per cent.

"People are starting to get renewable energy… they once thought references to 200 per cent were crazy, now there are routine conversations about 500 or 800 per cent.

"And we have a natural competitive advantage against the entire planet. We need to focus on the economic wins to move forward," he told the National Smart Energy Summit. "The DNA of energy needs to change to exports, we need to unlock the mental models to try and think big."

That thinking extends to transportation of the relatively near future which will see self-driving vehicles move people around cities.

Robo-taxis: the (near) future of transportation?

Hailed not by a wave of an arm but at the click of a smart phone, the Zoox 'vehicles' or 'robo-taxis' available on command could become mainstream in the future, says Cannon-Brookes who is backing the technology already being trialled in the US.

"The concept of Zoox is finding the limitations of human thinking but will have massive outcomes. The 'what if we are right' is far more powerful than 'what if we are wrong'.

"I'm a great believer in thinking small is a self-fulfilling prophecy," Cannon-Brookes told Simon Holmes à Court at the Summit. "We are trying to do the opposite."

There is a saying "If the dream is sufficiently big you will attract the people who will make it real and have a bigger chance of success."

Atlassian is signatory to RE100 and has ambitions to become carbon negative by 2050.

View Simon's discussion with Mike Cannon-Brookes at https://vimeo.com/379184886

Energy market operations

At the Summit AEMO chief executive Audrey Zibelman focused on the market drivers of change: the impending coal plant retirement of 11500MW and the rise of solar, storage and other renewables that are the cheapest form of electricity.

"We now need targeted investment in renewable energy and transmission networks to move the energy. We need to first build the networks to connect the system," she said.

"You cannot take a market designed in the 1900s when the primary source of power was coal and gas and think it will work for a system where we need to value storage and speed and the ability of consumers to respond to price.

"We have to put the 'smart' in energy, the digitalisation of energy to make sure we use it better and put intelligence into the networks," she said. "We need the computing capability with artificial intelligence to provide mass data for a much more productive system."

She ended her Summit address with the forceful statement: "Not addressing the market change will be catastrophic."

John Grimes at the National Smart Energy Summit that showcased the actions and ambitions of corporations leading the way in decarbonisation and influencing the broader debate

More Summit highlights

The Summit contained many more highpoints, with presentations from Sydney Lord Mayor Clover Moore, Alex Hewitt of the Asian Renewable Energy Hub, Roger Price of Windlab, and Vincent Dwyer of Energy Estate pointing to a cleaner greener and smarter future.

Former Liberal party leader John Hewson echoed the words of Malcolm Turnbull, calling recent decades "a period of lost opportunity" on the basis of prejudice and prayers. Hewson took to the stage alongside Anna Rose of Farmers for Climate Action and student climate activists Jean Hinchcliffe and Estelle Dee, who in a chillingly accurate portrayal of the widespread bushfires said "it's beginning to feel apocalyptic".

The panel presentation can be viewed at https://vimeo.com/smartenergycouncil

King of scientific solar breakthroughs Professor Martin Green who has devoted a lifetime to the industry was described by Smart Energy Council chief executive John Grimes as having a significant impact in mitigating climate change by bringing PV to the masses.

"Together with Professor Martin Green, Dr Zhengrong Shi has shown us how solar PV alone increasing at a rate of 20 per cent per annum compounded could single handedly bring down global temperatures by two degrees. What an amazing thing.

"And Martin Green talked of efficiency breakthroughs that his lab is working on today that have the capacity to reduce the cost of solar PV by 50 per cent overnight.

"No Australians have done more than Professor Martin Green and Dr Zhengrong Shi to the effort of global climate action," John Grimes said.

"The theme across these and other presentations is that we can do it, it is easier than it looks, and we have the engineering and economics that makes sense.

"My dream is this: we need to convince all Australians of the merit of this idea and the imperative to act. We need to provide that strong positive vision of the future … one that people can buy into and get hope from."

The work we need to do is to put pressure on our political parties first and foremost is essential, he said, commending the vital work of the Coalition 4 Conservation working inside the National and Liberal parties.

"Let's build the constituency to make change."

Anna Rose of FCA at the National Smart Energy Summit

Big business, technical innovators, scientists and others are committed to a smarter and brighter future. Spearheading changes are Dr Renate Egan, Dr Zhengrong Shi and Professor Martin Green

Toward 500 per cent renewable energy

People with foresight, a calculator and a vision can foresee abundant use of renewables in Australia's energy market and beyond, with Australia developing into a global energy superpower.

THE PROSPECT OF DIALLING UP renewable energy in Australia to meet the needs of the entire nation and well beyond was the focus of the Smart Energy Council webinar *500 per cent Renewables.*

The figure of fivefold renewables is a long way from today's market which sits at about 23 per cent renewables within the energy market, however it is eminently achievable and furthermore, necessary.

It just means thinking bigger and better, and acting smarter by moving beyond stationary energy toward renewable energy electrification in other sectors of the economy, says John Grimes.

Harness even just a fraction of our abundant solar and wind resources and the nation can become an exporter of essential commodities, he says, goods that are all derived from renewable energy, and in the process create wealth and economic security for Australia.

"This would establish Australia as an energy powerhouse," John Grimes said.

His views were echoed by Oliver Yates of Bronze Boar Investments.

"No longer is Australia headed for 100 per cent renewable energy, we will vastly overshoot it," says the former CEFC chief who has long advocated Australia transition to 500 per cent renewable energy, and notes other parties including the Chief Scientist and ARENA are now talking upwards of 800 per cent.

"There are long term opportunities for growth, and it's not about coal closures and job losses but job creation and reindustrialisation of Australia," he says, citing the case for greater inroads within heavy industrial sectors that presently rely on fossil fuels to power machinery.

"The long-term cost advantage of renewable energy is clear. Under this scenario we see improved energy price points between $35 to $40MWh.

"Australia has a nation-making opportunity ahead of us and is now the best place in the world to undertake heavy industrial activity using renewable energy."

Oliver Yates reiterated that renewable energy is the only acceptable way forward and countries including Australia will

"One hundred per cent renewable energy is nothing, just a speed bump in the road ahead."

move faster to renewable power. Other countries will be compelled to either move heavy industry to the source of power or forced to import clean renewable energy.

But he says it is more efficient to export products rather than energy from Australia, especially those that are energy intensive.

Doing the maths

This is where the calculator comes out: to export one million tonnes of hydrogen Australia would require 23GW of additional renewables capacity.

The government's Hydrogen Strategy singled out ammonia production as the main use of hydrogen. Each year Australia produces or imports 2.8 million tonnes of ammonia (which is about 20 per cent hydrogen by weight) so Australia would need half a million tonnes of hydrogen.

Replacing fossil fuels would require another 11GW.

Global demand for ammonia is heading toward 200 million tonnes, and that is all generated from fossil fuel energy that can be replaced with renewable energy, Oliver Yates says.

About 800GW of renewable energy is required to replace the global ammonia market that is currently powered predominantly by fossil fuels, with half the world's ammonia being made in Asia. It is an area that's poor in renewables resources.

"If Australia gained 25 per cent of that one market sector we would need to build renewables at the same rate that we did over the past year for the next ten years, and we would not have even started to replace the coal fleet," Yates said.

Replacement of LNG exports would require another 800 per cent of renewable energy, and beyond that Australia needs to look at 'green' steel by powering furnaces with renewables.

Steel giant Thyssenkrupp in Germany recently demonstrated success in heating a steel blast furnace using hydrogen, a process that would replace coal powered furnaces.

During 2017-2018 the company emitted around 24 million tons of CO_2 and was responsible for nearly 3 per cent of Germany's total emissions. Now Thyssenkrupp aims to cut greenhouse gas emissions by almost one third by 2030 and has set a target of zero-emissions by 2050.

Carbon industry divestment

Vanessa Petrie from Beyond Zero Emissions told the webinar "Investors here and right across the world want to get out of (high risk) carbon and the use of renewable energy is very compelling in any industrial heat process from melting steel and all manufacturing processes involving food, chemicals, paper and pulp."

According to Michael Lord from the University of Melbourne's Energy Transition Hub emission-intensive steel production causes 7 per cent of global emissions.

He proposes a move to zero emissions metals, stating "We need a better way, that is to use Australian renewable energy in the production process. We have metallic ores and are the number one exporter of bauxite, lithium, manganese, zinc, gold, titanium, rare earths and more.

"But what we do now is export rocks! Goods at the lowest point of their value chain. Steel increases in value five times and we can use hydrogen generated from renewable energy to process it and add significant value." Today's global imperative to combat climate change and lower emissions is increasing the demand for low carbon metals, there will be an avalanche of demand, he said.

Already 600 publicly listed companies have set emissions reductions targets, including car makers VW and Toyota which have aspirations to reach zero emissions both before and after production.

Other big companies including Apple, said Michael Lord, want to source lower emissions metals and aluminium products and would be able to charge more as a consequence.

The pathway to ramping up renewables

On the following pages Simon Corbell spells out how Australia can multiply renewable energy generation through a series of Renewable Energy Zones as proposed in AEMO's Integrated System Plan. From there, Power Purchase Agreements can be used to lock in power contracts with major industrial users.

Adding renewables, commodities and value to the mix

The opportunities to extend up to and well beyond 100 per cent renewable energy become clearer once the scope of participation in the metal industry, hydrogen and ammonia production as well as other industries are assessed. And we have not even touched on electrification of the transport and agriculture sectors.

"One hundred per cent renewable energy is nothing, just a speed bump in the road ahead," Oliver Yates says. "We are talking about a vastly different energy system."

Australia can and should be thinking about the need to reindustrialise, we need to bring the production of these heavy commodities back into Australia, he says.

"Australia has an incredible opportunity in front of us we cannot miss out on. Five hundred per cent renewable energy is a walk in the prosperous park for Australians, we cannot let others slow us down.

"It's all in front of us – and an exciting time with it."

John Grimes added "Renewable energy is cheaper to develop than new fossil fuel plants, and can build and sustain a stronger economy in the future. We can develop more prosperous and better times than we live in today."

>> Read more about the large-scale market on page 34 which looks at the difficulties facing the market and the scaling back of developments.

>>> Read how Australia could lead the world with a zero carbon cement industry in 10 years, in the Beyond Zero Emissions report Rethinking Cement.

Other BZE reports include *Renewable Energy Exporting superpower; NT 10GW vision Electrifying industry;* and the *Beyond Zero Emissions' Stationary Energy Plan (2010)*. *Zero Carbon Factory* is currently in development. *www.bze.org.au*

IMAGE BY UDO SCHROETER FROM PIXABAY

IMAGE BY ANNA BENG FROM PIXABAY

renewable Boosting plant growth

Former ACT Deputy Chief Minister Simon Corbell is on a mission to accelerate state and territory renewable energy policies and programs.

AUSTRALIA'S RENEWABLE ENERGY INDUSTRY holds enormous potential that would deliver substantial economic and environmental benefits. What are we waiting for?

To help unlock some of that potential and drive what many regard as the inevitable transition to 100 per cent and more renewable energy, the Smart Energy Council has engaged the services of Simon Corbell.

His work will focus on the critical states of NSW, Queensland and Victoria. Working in conjunction with the Council's John Grimes and Wayne Smith, it will involve meetings with Ministers and their staff, government agencies and key stakeholders including the Australian Energy Market Operator (AEMO) and the Energy Security Board.

Discussions will be aimed at enhancing awareness of reverse auctions and government procurement as well as Renewable Energy Zones and Power Purchase Agreements.

"We are keen to further the ambitions at state and territory level to support further renewable energy development," the former ACT Energy Minister told *Smart Energy*.

Simon Corbell has already made a substantial contribution to change the course of Australia's energy mix and reduce emissions, having laid the groundwork for the ACT to run on 100 per cent renewables by 2020 (actually achieved in 2019), and more recently guiding Victoria in a series of utility-scale developments.

He has long stressed the importance of strong leadership by industry, cities and states in the transition to the renewable energy future and repeated that message during the National Smart Energy Summit held late last year in Sydney.

"Nowhere is this [leadership] more important than in the renewable energy zones identified by AEMO in its Integrated System Plan," he said. "The 15 to 20 sites across the country represent an enormous area of untapped renewable energy and resource potential that needs to be fully realised if we are to achieve a safe climate future that we all want for our children."

The right connections in all the right places

The challenge is the capacity to connect the energy generated in these zones to areas of demand, particularly the urban sprawl along the eastern seaboard which sits within the NEM, he explained.

Corbell referenced the continued growth of renewable energy in Australia with around 18,000MW of generation and a further 7000MW committed and an additional 57,000MW proposed at various stages of development.

The New South Wales government has developed a roadmap for a sustainable future which sets the scene for Australia's first REZ of 3000MW. It takes into account $8 billion of private sector funding and creates thousands of jobs. New generators and establishment of capacity targets are all part of the plan.

"An enormous pipeline is available, but how does it align with the REZ proposition? If you look at what the zones could deliver in terms of total available generation capacity there are some extraordinary numbers: combined, the zones could achieve 115,000MW of solar and wind; 315TWh of clean energy generation if fully developed.

"That is more than enough to achieve the 100 per cent or 200 per cent renewable energy aspirations that have been extensively debated in recent years."

To reach 100 per cent Australia needs to generate 196TWh and for 200 per cent 396TWh, which would enable the capacity for hydrogen exports.

Ramping up to 500 per cent renewable energy involves finding further resources including those beyond the eastern seaboard, he said, with comprehensive REZ development up to 892TWh.

"What is critically important, however, is we have the capacity and the identified areas. We can realise high levels of renewable energy in the future but we need to unlock it, not enough is being done to unlock capacity as comprehensively or as rapidly as we need to – or to even achieve the 100 per cent renewables in our electricity sector alone by the end of this decade."

The key issues to address, he said, include more effective shared transmission and distribution infrastructure and mitigation of capacity constraints and congestion.

"We also need to ensure the REZs directly align with development of heavy industry and repowering requirements of major industrial zones of areas such as Gladstone in North Queensland, the Hunter Valley, Geelong and other key industrial areas along the eastern seaboard that need to be repowered entirely by clean electricity."

There is also a need to build renewable energy hubs that share infrastructure and reduce the impact on host communities and potential impact on social licences in order to share benefits.

Corbell cited the Uralla Hub which is critical to the proposed 4GW Walcha Plant that has been well managed from the outset and earned the support of the local community.

With so much to gain through an orderly, well managed transition to renewables and all the benefits that flow, it is never too early to lay the groundwork.

And with so many runs on the board, who better than Simon Corbell to take things to the next level in discussions with key stakeholders aimed at paving the way for a new and smarter energy future.

The proposed Uralla RE Hub: a model of 'best for system' outcomes

The proposed Uralla 330kV substation to be located 30 kilometres south of Armidale would operate as a new grid 'hub' to support the development of the New England REZ and deliver electricity system strength and flexibility for NSW.

Over the coming years thousands of MWs of new generation will be needed to replace the Hunter Valley coal-fired power stations, and the Uralla substation represents an opportunity to drive significant economic development for the New England region.

According to the Energy Estate website the Uralla RE Hub would enable new transmission lines stretching from Armidale to the Hunter Valley and serve as the connection point for the first stage of the Walcha Energy Project.

Importantly, the Uralla RE Hub would be available as a connection point for other developers in this part of the New England REZ and help reduce system costs and the number of connection points at this critical point in NSW's transmission network.

It will help ease congestion on existing 330kV transmission lines and substations in Armidale and Tamworth and sets the stage for the development of a second NSW-Queensland interconnector.

The wind resource in New England is extensive and the project covers most of the plateau that surrounds Walcha. The northern section of the plateau, closer to Uralla, has large areas of relatively flat and dry land currently used for sheep grazing. This area would be suitable for utility scale solar farms with a capacity of 350 to 650MW. Deep gorges to the east and south of the Walcha plateau provide the right topography for pumped storage hydro. *Images courtesy Energy Estate*

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NUMBERS AND DOLLARS

= average amount Australians are willing to contribute to tackle CLIMATE CHANGE

= **$4bn** pa in total

Options:

= 1 million rooftop PV systems pa

= 10 million in a decade.

Or

$10,000 electric cars subsidy

= $20 billion of electric vehicles

= 400,000 fewer petrol-powered cars

Source: ABC's Australia Talks National Survey

Taxpayer funded FOSSIL FUEL SUBSIDIES

$1,728pp pa = $41.6bn pa

$1.5bn pa currently collected through $1 per tonne levy of emissions from all Australian mined coal, oil and gas

Source: The Australia Institute

<5% IN 10 YEARS reduction in Australia's emissions*

*Based on coalition government data

= 230 years to reach net zero emissions

30 years = timeline scientists say reaching zero emissions is necessary

Source: Shadow Climate Change and Energy Minister Mark Butler

Renewable Energy Zones

34 REZs across the NEM

Could deliver **38GW** large scale wind and solar renewable energy by **2040** and, supported by **17GW** new and existing storage capacity, replace **15GW** of coal and gas fired power

- $10bn REZ transmission funding requirement

- Unlocking c.$60bn generation investment opportunities

AEMO's Integrated System Plan 2018

$13 billion EXTRA GDP over two decades

Would result from investments in renewable energy projects and grid upgrades to facilitate wind, solar and hydro electricity transmission

Source: PwC and Jacobs

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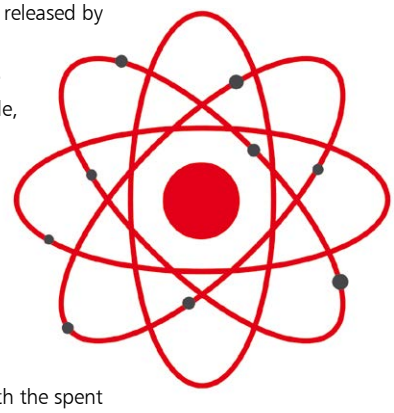
ADVANCES in RENEWABLE HYDROGEN

Plans for developing the hydrogen industry are evolving at a rapid rate. Here we round up some significant advances.

Hydrogen exports

Curtin University has received $580,000 in Australian Research Council (ARC) grant funding to develop a new method for exporting hydrogen. The project uses a closed-energy loop cycle using green hydrogen and renewable energy sources and the hydrogen can be transported in a powder and released by adding water.



The project will investigate exporting sodium borohydride, produced from borax using renewable energy, to countries that are seeking hydrogen from renewable sources rather than fossil fuels.

By adding water to the sodium borohydride, green hydrogen will be released with the spent material then shipped back to Australia for recycling back to sodium borohydride, creating a closed-loop energy cycle.

Professor Moran of Curtin University said "The ARC Linkage Program supports research that encourages the transfer of skills, knowledge and ideas as a basis for securing real-world and commercial benefits [and] the team's research has the potential to support the creation of a new export industry."

Gas networks transformation

The Australian Gas Network (AGN) has been granted $1.28m in ARENA funding in a $4.15m project that will focus on the feasibility of blending renewable hydrogen into gas distribution networks in Victoria and South Australia.

The Australian Hydrogen Centre will assess both near- and long-term feasibility of blending in the gas market which has a vision to be near zero carbon by 2050.

The project is seen as the next step to AGN's power-to-gas demonstration facility at the Tonsley Innovation District in Adelaide (Hydrogen Park SA) which was co-funded by the South Australian Government's Renewable Technology Fund. This project will demonstrate a five per cent hydrogen blend in gas distribution to 710 properties in Adelaide when it begins in mid-2020.

ARENA CEO Darren Miller said: "The development of a local hydrogen sector will underpin the investment in technology and skills to support the long term export opportunity. These studies will go a long way to identifying the possibility of using and storing hydrogen in local gas networks."

The feasibility studies are expected to be completed in January 2022.

Yara Pilbara Renewable Ammonia Feasibility Study

Ammonia and fertiliser production company Yara Pilbara, which commands about one fifth of the global ammonia market share, has been granted $995,000 to conduct a feasibility study to supplement their current ammonia production with green ammonia produced on-site.

The funds will be used for a demonstration-scale renewable hydrogen and renewable ammonia production and export facility at Yara's Burrup WA Peninsula facility. Currently it produces ammonia by using natural gas as a feedstock for its steam methane reforming process, which produces fossil-fuel based hydrogen.

The study will investigate the production of renewable hydrogen via electrolysis powered by onsite solar PV. Yara's objective is that approximately three per cent of the hydrogen blend will be renewable hydrogen. The blended hydrogen will subsequently be converted to ammonia and sold for further processing into domestic and international markets. The feasibility study will also investigate using seawater for the electrolyser.

The renewable hydrogen produced will displace 30,000 tonnes per year of hydrogen that Yara currently generates from fossil fuels. In the long term, Yara aims to produce hydrogen and ammonia entirely through renewable energy.

cefc

The CEFC has allocated $300 million for hydrogen investment based on the enormous interest from industrial businesses and at the innovation and technology end of the economy.

The shipping news

Chief Scientist Alan Finkel says Australia can become a leader in the new industry by 'shipping sunshine', with the addition of hydrogen exports to other energy exports.

He delivered the upbeat statement on the National Hydrogen Strategy – which identifies 57 joint actions – at the COAG Energy Council meeting held late last year. Under the Strategy, hydrogen hubs would be developed in the form of clusters of large-scale demand at ports, in cities, or in regional or remote areas, and provide the industry with its cost effective "springboard to scale".

These will be complemented and enhanced by other steps to use hydrogen in transport, industry and gas distribution networks, and integrate hydrogen technologies into our electricity systems in a way that enhances reliability.

News of the inaugural 'National Hydrogen Infrastructure Assessment' that is to be completed by 2022 was welcomed by John Grimes of Hydrogen Australia.

"This strategy marks a step forward for the clean hydrogen industry and gets us closer to the goal of establishing Australia as a major global player in renewable hydrogen by 2030," he said.

He does, however, question Australia's commitment, given the lack of mandatory national targets and lack of market constraints or changes to taxation, levies or other fees.

These and other aspects will be thrashed out at the Hydrogen Australia 2020 conference in early April.

Hydrogen 2020 Conference and Exhibition

Wednesday April 8, Darling Harbour, Sydney

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Keynote speaker ACT Minister for Climate Change Shane Rattenbury will elaborate on the ACT's first public renewable hydrogen refuelling station.

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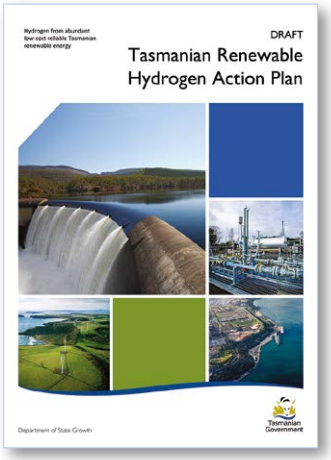
States of play



Tasmania has declared its vision to be a significant global supplier of renewable hydrogen by 2030. Timelines laid out in the Tasmanian Renewable Hydrogen Action Plan include the production of renewable hydrogen by 2022 followed three years later by the first export.

Meantime the Western Australian government has allocated $1.68 million to fund seven renewable hydrogen feasibility studies across the state through the Renewable Hydrogen Fund.

The projects include an assessment of solar hydrogen created for waste collection and light vehicle fleets, a hydrogen refuelling hub and the potential for an electrolysis hydrogen production plant.

Also on the drawing board is a standalone power system for an indigenous community in the Pilbara using 100 per cent renewable energy; a hydrogen production facility using existing hydro generation; examining the compatibility of a natural gas transmission pipeline with blended hydrogen; and examining integration of renewable hydrogen with isolated power stations.

Small steps, smaller footprint

The tourist town of Denham in Western Australia has been earmarked to trial a hydrogen powered micro grid powered by a 60kW solar energy plant.

The hydrogen plant will produce enough energy to power about 100 homes and will supplement the four existing wind turbines that produce more than half the town's electricity.

The next step is to ramp up and develop a 500kW solar farm to generate electricity to power an electrolyser, to split water into hydrogen and oxygen and store hydrogen in fuel cells to generate electricity for local homes and businesses.

If successful, the model could provide a blueprint for hydrogen power in other regional towns.

A MATTER OF IMBALANCE? Producing hydrogen using electricity from a coal-fired power station actually uses more energy than is created from the hydrogen.

Enough ambition (and hydrogen) could get Australia to 200 per cent renewable energy

THE POSSIBILITIES PRESENTED by hydrogen are the subject of excited discussion across the world – and across Australia's political divide, notoriously at war over energy policy.

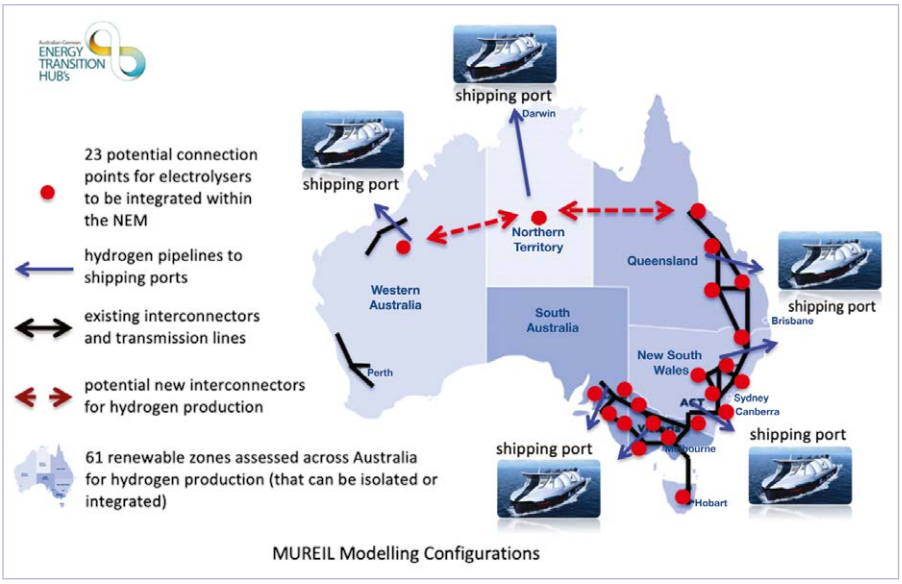
Late last year, Australia's chief scientist Alan Finkel presented a national strategy on hydrogen to state, territory and federal energy ministers, outlining a plan that prioritises hydrogen exports as a profitable way to reduce emissions.

Ambition is key in lowering the cost of energy. Australia would do better aiming for 200 per cent renewable energy or more.

Australia needs to feature demonstration projects to test the feasibility of new technology, reduce costs, and find ways to share the risk of infrastructure investment between government and industry.

There are still a number of barriers. Existing gas pipelines could be used to transport hydrogen to end-users, but current laws are prohibitive, mechanisms like "certificates of origin" are required, and there are still key technology issues, particularly the cost of electrolysis.

These issues raise questions of what a major hydrogen economy really looks like. It may prompt suspicions this is just the latest energy pipe dream. But our research at the Australian-German Energy Transition Hub argues that an ambitious approach is better than a cautious one.



Australian hydrogen export locations

Aggressively pursuing hydrogen exports will reduce costs of domestic energy supply and provide a basis for new export industries, such as greens steel, in a carbon-constrained world.

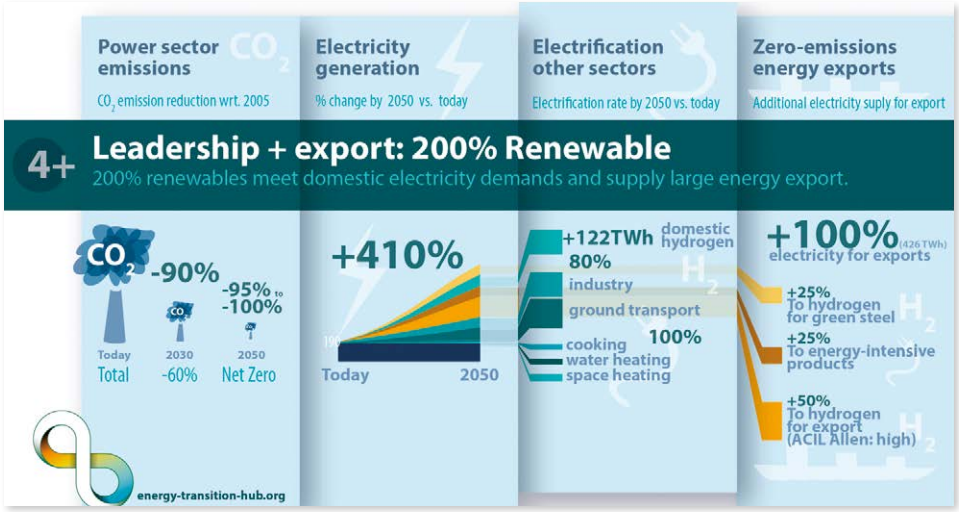
Optimal systems cost less

We used optimisation modelling to examine how a major hydrogen industry might roll out in Australia. We wanted to identify where major plants for electrolysis could be built, asked whether the existing national electricity market should supply the power, and looked at the effect on the cost of the system and, ultimately, energy affordability.

Our results show the locations for future hydrogen infrastructure investment will be mainly determined by their capital costs, the share of wind and solar generation and the capacity of electrolysers to responsively generate hydrogen to the system, and the magnitude of hydrogen production.

We also identified potential demonstration projects across Australia, such as:

- large-scale production of liquid hydrogen and export from the Pilbara in Western Australia
- hydrogen to support steel manufacturing in South Australia
- injecting hydrogen into the gas networks in Victoria and support industry and electricity generation
- hydrogen to supply transport fuel for major users such as trucks, buses and ferries in New South Wales, and
- hydrogen to produce ammonia at an existing plant in Queensland.



200 per cent renewables scenario

An export-oriented economy

If we assume electrolysers remain expensive, around A$1,800 per kilowatt, and need to run at close to full-load capacity all the time, the result is large hydrogen exporting hubs across the country, built near high quality solar and

wind power resources. Ideal locations tend to be remote from the national energy grid, such as in Western Australia and Northern Territory, or at relatively small-scale in South Australia or Tasmania.

There is much debate around the current cost of electrolysis, but consensus holds that economies of scale will substantially reduce these costs - by as much as an order of magnitude. This is akin to the cost reductions we have seen in solar power and batteries.

This infrastructure requires some major investment. However, our modelling shows that if Australia produces 200 per cent of our energy needs by 2050, exporting the surplus, we see major drops in system costs and lower costs of energy for all Australia.

If Australia can produce 400 Terrawatt-hours of hydrogen energy for export, modelling results show the average energy cost could be reduced by more than 30 per cent.

The driving factor is our level of ambition. The more we lean into decarbonising our economy with green energy, the further the costs fall. The savings from the integrated and optimised use of electrolysers in a renewable-heavy national electricity market outweigh the cost of building large renewable resources in remote locations.

A large hydrogen export industry could generate both substantial export revenue and substantial benefits to the domestic economy.

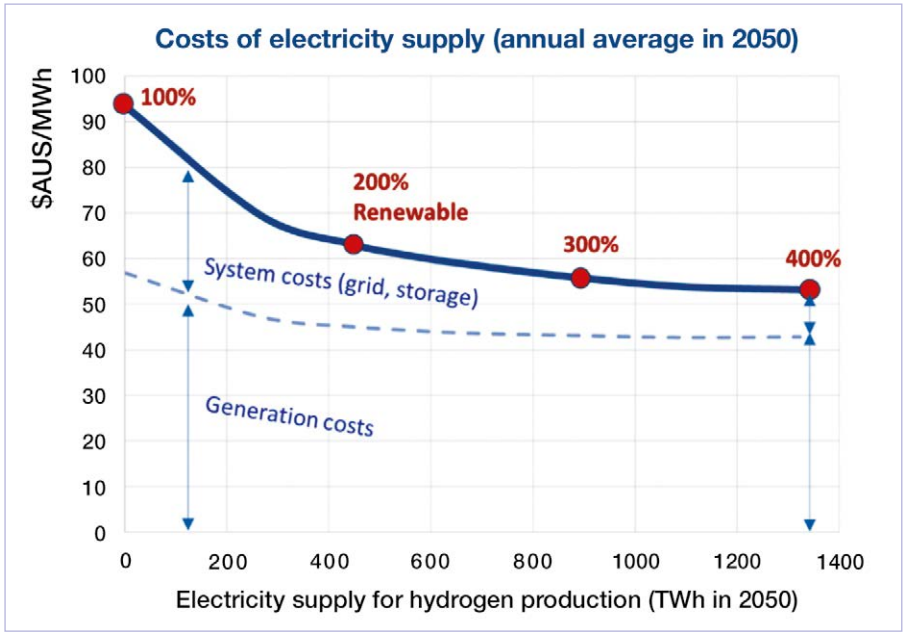
To sum up, the picture below shows two possible hydrogen futures for Australia.

In the first, Australia lacks climate actions and electrolyser costs remain high with limited economies of scale, and we export from key remote hubs such as the Pilbara.

In the other, ambition increases and costs drop, and the hydrogen export industry connects to the national grid, providing both renewable exports and benefits to the grid. This also promotes the use of hydrogen in the domestic market.

Australia embraces a true renewable economy and a new chapter of major energy exports begins.

Either way, Australia is primed to become a hydrogen exporting superpower.

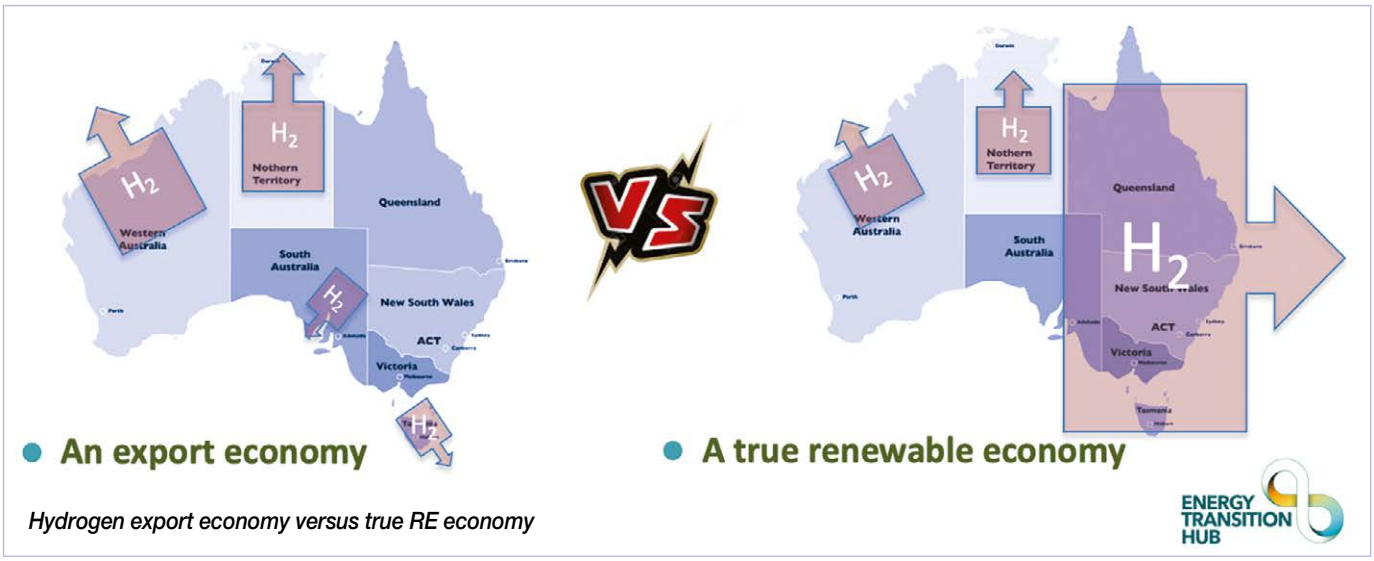


Hydrogen ambition reduces costs of electricity supply

Authors

Scott Hamilton, Strategic Advisory Panel Member, Australian-German Energy Transition Hub, University of Melbourne; **Changlong Wang**, Researcher, The Energy Transition Hub, University of Melbourne; **Falko Ueckerdt**, Potsdam Institute for Climate Impact Research; and **Roger Dargaville**, Senior lecturer, Monash University.

This article first appeared in The Conversation *and is reprinted with the permission of the authors.*



Hydrogen export economy versus true RE economy

How green are the valleys

Farmers are uniting in their action to become 'climate smart' by building resilience into farming systems, and helping them is Farmers for Climate Action which is calling for 100 per cent renewables. Several board members are actively facilitating the transition.

FOUNDED FIVE YEARS AGO by climate campaigner Anna Rose, Farmers for Climate Action currently represents more than 5000 farmers across Australia. Farmers who are well aware of the fragility of ecosystems and the need to maintain sustainable systems in what is becoming an increasingly challenging climate.

Many farmers have already taken action by installing renewable energy systems on their properties or entering into agreements in large scale community-sharing wind projects.

However an idea of some of the hurdles they face can be found in the Farmers for Climate Action's strategic plan which, as stated, 'includes mobilising farmers to have the courage to stand up in the face of withering criticism about renewables and to take evidence and science out to the regional communities across eastern Australia'.

The FCA facilitates this by providing farmers with data that details the probability of weather events ahead and offering opportunities to be 'climate smart' through systems that present them with the 'best possible opportunity to survive the climate that is coming or already here'.

Underpinning the FCA's actions is the call for a transition to 100 per cent renewable energy and away from fossil fuel energy.

"We are not fiddling around the edges, this will happen over time, it is inevitable that our energy systems will be powered by renewables," said Charlie Prell who is Deputy Chair of Farmers for Climate Action and a renewables champion.

Wind power

His extensive sheep and cattle farm north of Goulburn is one of four in the area that share the benefits of the Crookwell 2 wind farm under a planning and development model. It is a model that Prell promotes to regional communities at every opportunity, citing the benefits of long-term resilience and sustainability.

He had to exercise enormous resilience as well as patience to get what he is today.

Many readers will recall the saga that unfolded in the development of the second stage of the wind farm, and Charlie Prell was a prominent figure in the protracted negotiations that took place.

Developed by Global Power Generation, the 91MW Crookwell 2 wind farm that deploys 28 GE turbines near Goulburn was officially launched in early November 2018 after a near two-decade battle.

The project's engineering and construction work pumped $12.3 million into the local economy.

Generating around 300,000MWh of energy a year, Crookwell 2 contributes a tenth of the ACT's renewables target.

"And the wind farm helps prevent farmers calling on the government for support," said Prell who highlighted the extent of anxiety among farmers in recent months.

"There has been a notable increase in concern over climate change over the past six months due mostly to the drought and more recently exacerbated by the catastrophic fires," he said.

He commented on the amount of scientific and educational material about shifting climate patterns now circulated by the Bureau of Meteorology, CSIRO, the Climate Council, NASA and most universities such as the ANU and RMIT.

"Knowledgeable, intelligent people, scientists and independent entities are presenting complex information about the weather in ways that are very clear and understandable and this has increased the knowledge base of farmers," said Prell.

"I believe too that the public mood is changing, with more politicians and the media coming around," said the well-travelled farmer who commented too on the extent of existing support for renewables among farmers, saying "Nearly every farmer I have met has wind turbines or solar panels on their land."

The power of inclusion

The only farmers who are yet to install renewable energy systems on their property are those who are sceptical or ideologically opposed to the whole energy transition, accordingly to Prell.

"And in my experience farmers also tend to resist development or are disturbed if they are not part of a project or wind or solar infrastructure…

Sheep farmer Charlie Prell hosts wind turbines of the Crookwell 2 Wind farm on the outskirts of Goulburn in NSW

"...it is inevitable that our energy systems will be powered by renewables"

"...communities are creating change from the ground up"

they become envious and nervous if the renewables power is developed for neighbours only."

This, he says, highlights the need to develop plans for sharing the benefits from wind and solar panels equitably across communities. "You have to involve the whole community and that means also employing as many local workers as possible during construction. This community model is something Simon Corbell also feels strongly about," he said.

Although the transition to renewables is inevitable, says the farmer whose property sits in the heart of Energy Minister Angus Taylor's jurisdiction, there is still a fear campaign and a concerted campaign against renewables is being waged by the fossil fuel industry, so there is still a long way to go.

But the seeds have been sown and change is already firmly planted in all the right places.

Commenting on an energy market that has long lacked organised national leadership, Prell observes that in its place communities are creating change from the ground up, "and that means it will be much more sustainable than had it been a top down approach," he said. "This country is great in spite of its politicians, not because of them."

Climate smart actions

Chief executive officer of Farmers for Climate Action Wendy Cohen told *Smart Energy* that without exception farmers are good stewards of the land who want sustainability for themselves, the community and families over the coming decades.

"Farmers are an important part of the solution and I am optimistic they will take on an increasingly active and important role," she said, outlining FCA's solutions-based approach.

"We need to look at the economic models in the move to renewables and we are committed to influencing that shift. It cannot just be theoretical and political, it has to be pragmatic and it has to engage the entire business community."

She emphasised the importance of developing investment strategies to enable the transition and the discussions around it.

"It is about surety and the future, and we need an integrated plan for use in the agriculture sector and others. Plans that are based on sound social and economic outcomes."

Power to paddocks in Tasmania

Smart Energy also caught up with farmer-turned-entrepreneur Mark Barnett who is enhancing both the popularity and uptake of small-scale solar farms across Tasmania.

The prominent member of Farmers for Climate Action has for many years been designing and installing 50-100kW ground-mounted solar arrays primarily for dairy farmers and others with many crop irrigators – farmers with big pivots and big pumps – in a bid to develop a sustainable solution to reduce their power costs.

By his estimates, around 800 of Tasmania's approximately 1000 farmers are paying more than $80,000 in annual power bills and 200 would be stumping up north of $150,000 each year.

Farmers' investment decisions are based on prioritisation of capital and what sort of returns they will get on investments, he said, and if payback on a solar system is too lengthy they won't go down that path.

So, taking things one step further, Mark Barnett developed a simple yet effective solar optimisation tool, a technological solution to get the most out of solar systems on farms that would otherwise be forced to pay a premium for grid generated power during the daytime.

"The tool manages the variability of the loads amongst pumps to maximise the use of the solar," he explained. "It's a simple tool that doubles the use of solar power and the more variability in the pump, the better it works, and the more pumps the better, as not all are turned on 24 hours a day.

"One of the biggest problems with solar systems in the agriculture sector is getting the most out of it; the utilisation rate has been typically too low to make it a no brainer investment. But our technology facilitates that process," he said.

According to Barnett demand for small wind turbines of around 15kW are ideal for use in complementary circumstances where issues such as flood zones prevent development of solar arrays, but they have to compete with off-peak tariffs, and that is the challenge for wind. Solar competes with daytime peak prices. He went on to explain the complexity of Tasmania's electricity tariffs with its differing seasonal prices and split tariffs.

Power sharing

Mark Barnett and his colleagues have proposed an amendment to Tasmania's power rules through a system they call 'power to paddock' that would allow a sharing of the solar generated power from one meter to another meter on the farm, for example between the wool shed and workshop.

"However the [Tasmanian] government has so far blocked this as the business entity which is the GBE has a monopoly on power and is unwilling to take a revenue cut," he explained.

"What they don't understand is the power to paddock concept would distribute the power during peak periods and bring down their peak load so there is a significant advantage for GBE."

He congratulated Victorian Energy Minister Lily D'Ambrosio for her bold move to independently address grid issues, saying he would like other states to follow her lead.

"If electricity sharing among Tasmanian farms were available it would increase investment in renewable energy easily by $200 million in three years as well as increase the value of the investment."

And there is no reason, he said, why you cannot extrapolate that out across other states and save the community billions of dollars if the restructure was appropriate and allowed cross sharing of meters on farms. The solar and wind systems are disrupting the power model and the state government is dragging the chain on this.

"So you have a lot of frustrated farmers out there."

Leaders in renewable energy...

acciona

ACCIONA is a global leader in creating sustainable solutions for infrastructure and renewable energy projects.

Since establishing a presence in Australia in 2002, ACCIONA has invested more than AUD $1 billion through local investment opportunities and project development.

Globally, ACCIONA is one of the main renewable energy operators in the world, with more than 10,000 MW installed for the company in five clean technologies including wind, solar PV, solar thermal, hydro and biomass.





ACCIONA in Australia has a total installed capacity of 402 MW owned by ACCIONA and is currently building a fifth wind farm in Mortlake, Victoria. Once operational, this will bring the total installed capacity to 590 MW, which is enough clean energy to power 422,000 homes.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SO MUCH POTENTIAL, SO LITTLE TIME

"Per person, Australia has natural resources for renewable energy superior to any other developed country and far superior to our customers in northeast Asia. Australia's 2030 emissions reductions target is the weakest of the developed countries and that makes us a drag on the global effort."

Professor Ross Garnaut

"The government is again failing by suggesting that our primary focus should be on adapting to climate change, rather than upping our efforts to tackle the root cause: the burning of fossil fuels. Continuing to burn coal, oil and gas is sending us down a pathway to an even hotter, drier Australia where conditions will get worse and worse. I wish that as Australians we could again act with moral authority on this global issue."

Greg Mullins, former commissioner of Fire and Rescue NSW and a climate councillor

"I find the Australian energy debate far too emotional, far too nervous and far too hot. It is hotter than the climate change itself… may I suggest a bit more calm, result-oriented discussion? There is a system needed in Australia which brings emissions down, and secures electricity supply. This is very important and I hope the discussions do not become victim to political ambitions."

International Energy Agency executive director Dr Fatih Birol, economist and energy expert

"We have to urgently stop burning coal and other fossil fuels… we have formidable wind and solar resources that can enable us to generate all of our energy from renewable sources and at the same time enjoy cheaper electricity. New developments in storage technologies are making renewables reliable 24/7. Australians no longer need to sacrifice economic growth to reduce emissions. Australia and the world need a Green New Deal now. ***We have the technology now to have zero emission affordable reliable energy. The one thing we don't have is time****."*

Former Prime Minister Malcolm Turnbull

"The federal government has repeatedly derided the Victorian and Queensland Labor governments for what it argues is their excessive ambition on renewables and emissions reduction. [NSW Energy Minister] Kean has flagged NSW plans to strengthen its stand. The federal government is clearly exposed as the odd player out."

Michelle Grattan, The Conversation

"While states are doing the heavy lifting with ambitious net zero emissions and renewable energy targets, the Federal Government is still clinging to questionable accounting using Kyoto credits … physics doesn't respond to buzzwords … We need the government to deliver a plan to transition away from fossil fuels and reduce our emissions—and then put that plan into action."

Wendy Cohen, Farmers for Climate Action

"Renewable Energy Zones can unlock Australia's potential, creating clean energy and jobs. Australia's grid is still largely a set of wires out to coal mines. Government now needs to build the grid out to where the sun shines and the wind blows. The grid should be built and run for the public good, not for profit."

Greens leader Adam Bandt

Commenting on the Coalition's $4 million support for a feasibility study for a 1GW "high efficiency, low emissions" coal plant at Collinsville, "For that amount of cash they could instead build a 4MW solar farm and get 30 years of value and guaranteed emissions reductions."

Smart Energy Council President Steve Blume

"I'm committing $500 million to launch Beyond Carbon, a campaign aimed at closing the remaining coal-powered plants in the US by 2030 and slowing the construction of new gas plants."

Former New York Mayor Michael Bloomberg

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Problems on a **LARGE SCALE**

Large-scale renewable energy projects are stalling and developers exiting the industry due to market operator constraints coupled with the lack of plans and policies.

CATASTROPHIC EVENTS over the past few months have shaken Australia: the long running drought, ferocious bushfires blazing from late winter wreaking extensive damage, and more recently the threat of a pandemic. These are spreading anxiety, uncertainty and causing enormous losses. The renewable energy sector is battling its own demons, with issues over grid connection, congestion and stability stalling the development of large-scale projects and creating an industry downturn at a critical time in a world beset by rising emissions.

During a recent Smart Energy Council webinar John Grimes traced today's downturn to the reaction following the storm that swept through South Australia in late September 2016 and led to a change in rules for the energy market operator through a zero-risk tolerance and approach.

"Combine that with the fact the federal government has no renewable energy target and the large scale RET has been exhausted, with no pathway for or additional framework for growth, or policies for climate action, and there is nothing to support the transition to renewables," he said.

"The AEMC is bringing in rule changes like COGATI [with transmission cost penalties for new entrants] which mean the risk profile for large-scale renewables in Australia's wind solar projects is now intolerable.

"The outlook is bleak. Large-scale renewables are now fundamentally at risk. The systemic failure we're seeing is damaging industry."

Smart Energy Council Government Relations Manager Wayne Smith who has spoken to several major renewable energy developers and investors reported "They are saying they are basically done… the sovereign risk in Australia is so great why bother doing business here. We are seeing significant announcements from companies leaving the industry and this is a terrible situation. As one insider declared it is harder to get approvals and this has made people withdraw from the market… we are seeing this more and more."

EPC contractor Downer has announced a withdrawal from the market. "We now have a zero per cent renewable energy target and that is disastrous. The system is broken and needs to be fixed."

Oliver Yates explained how the level of risk that project developers are now facing has significantly ramped up.

"They understood there were political risks and some market risks but this is now compounded by connection and transmission restraints with COGATI rules creating an environment that cannot be invested in.

"This is a crisis," said the former chief executive of the CEFC. "In any project you need to tell investors about the risks involved and how they will be managed and impact the performance of the investment [but] now they cannot build an investment case… capital will dry up… it will cause huge issues."

He spelt out all the ramifications for risk premiums, insurance and capital costs, and higher electricity prices.

"Everything I see in the market is trying to ration the transition and delay construction. Everything points to constraints."

The output of wind and solar projects in Victoria and New South Wales continues to be constrained while developers sit in lengthy queues waiting for connection.

"Generators cannot get product to market and this is a failure of regulators who could see the projects coming and the demand for new generation but failed to do anything. The transmission and connection arrangements need to be in place," Oliver Yates said.

Staging a ruthless and pointed political campaign

The situation demands an emergency response and it is time to roll out a ruthless campaign, says John Grimes.

The Smart Energy Council has a strong track record in running successful campaigns and is poised to build a strong campaign that uses traditional and social media, with petitions, phone calls, briefs for key journalists, and staging public meetings in key electorates and private meetings with regulators and politicians.

The campaign will first target the COAG Energy Ministers meeting of March 20, declaring the situation is unacceptable and that people are not willing to put up with job losses and businesses leaving Australia and that COAG must develop a plan to fix the crisis with a clear proposal for a rule change.

The success of the campaign relies on the strength of resources, and as John Grimes stated "Money powers the campaign. I am confident we can win."

Contact Wayne Smith on wayne@smartenergy.org.au or call 0417 141 812.

IMAGE BY LAWRA V FROM PIXABAY

SMART ENERGY COUNCIL

Commercial energy storage battery solutions for Australian business

Commercial battery storage will have a major impact on how businesses manage their electricity costs in the years ahead. With its full power range systems covering most of the energy storage demands, AlphaESS is poised to provide standard as well as customised system designs.

Alpha·ESS

Solar power as a starting point

Households paying more than 15c per kWh for electricity (daytime rates) and have a suitable roof space should see solar as a no brainer, says Alpha ESS. That's because they should be able to get their money back within three years following installation.

Batteries can be an add-on to the solar system for those who like to be independent from the grid, are tired of listening to the noise of a generator or just want to enjoy the freedom of using extra electricity without worrying about the size of the power bill.

How commercial batteries benefit business

Alpha ESS encourages households to maximise their self-consumption and be independent. Also if a business is operating from 9am to 5pm Monday to Friday, there are periods in which solar PV generated electricity isn't used.

The excess electricity then feeds to the grid for just a few cents per kWh.

Worse, in some parts of Australia, surplus electricity is prevented from being fed into the grid and essentially goes to waste.

That's energy that could be stored in batteries and usable whenever needed.

Reduce the demand charge

For a significant number of commercial customers, demand charges can be up to 45-50 per cent of electricity total costs. With proper engineering, that is by programming the battery to charge and discharge before and during the peak hours, that demand charge can be wiped away.

Commercial battery solutions available in Australia

Commercial-scale battery storage is a serious investment, and for that reason company longevity is important.

Information, views and technical details on this page supplied by Smart Energy Conference & Exhibition Partner

AlphaESS which has been operating in Australia for more than six years and specialises in energy storage systems at all scales currently commands a 30 per cent share of the Australian energy storage market.

"AlphaESS's residential energy storage system collection is perfect for small businesses and home offices," the Company says. Medium-sized businesses could benefit from a system such as the AlphaESS T30 System. For large commercial and industrial businesses, T50/T100 may be a suitable solution.

An AlphaESS battery expert is available to provide advice to those with requirements for larger capacity, or for those uncertain about which category they fall into. A customised solution can be drawn up.

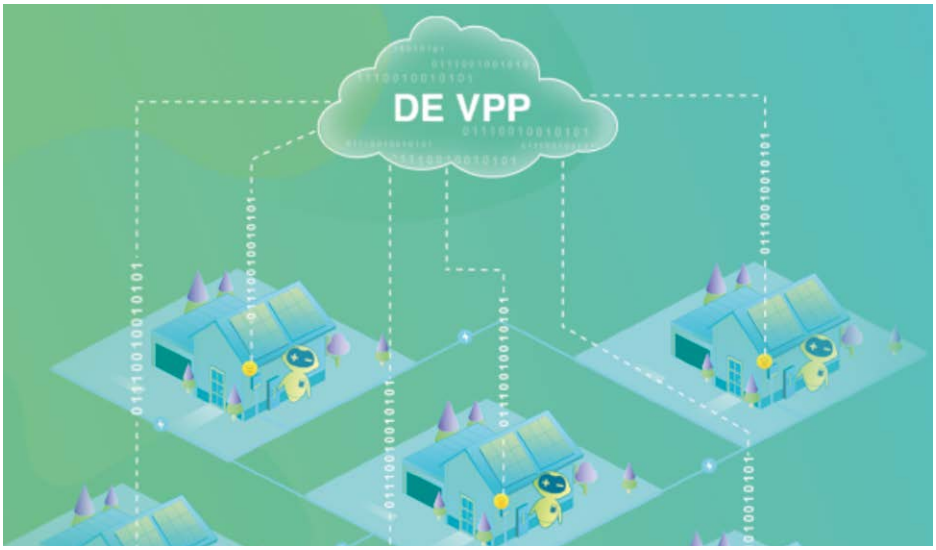
Contact business development manager, Victor Chen via 0402 500 520 or email victor.chen@alpha-ess.com. A response is guaranteed within 24 hours. Visit the AlphaESS team on Stand 53 at the Smart Energy Conference and Exhibition in April.

Breakthrough in solar battery technology will lead to a sales boom

It's widely acknowledged that the capital cost of storage batteries and longer return-on-investment is one of the largest hurdles facing solar retailers, but will a newly emerging plan propel storage into a mass market?

AS WE ENTER 2020, batteries are at a similar stage in the marketplace to where solar PV was in 2009, before the industry boomed. With an aging coal fired fleet gradually coming offline over the next decade, the capacity will be taken by renewables and storage.

Smart solar businesses can capitalise on the market transition by joining dynamic Australian power retailer Discover Energy with what it touts as a world-leading home battery storage technology and power retailing platform that comes with many advantages.



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A LOOK AT SOME OF THE PARTNERS AND EXHIBITORS AT THIS YEAR'S SMART ENERGY SHOW

NSW based Discover Energy has developed an energy trading technology platform for batteries and solar which will significantly boost the return-on-investment (ROI) for batteries. With its newly developed Virtual Power Plant (VPP), consumers with solar and batteries and a reliable internet connection have the opportunity to gain a feed-in-tariff (FiT) of 25 cents per kWh.

That is more than double most of the existing feed-in tariffs.

Discover Energy's Virtual Power Plant platform has changed the market with its innovative software-based API technologies (Application Programming Interface that allows software solutions to communicate with each other) where access to hybrid solar inverters allows energy trading without the need for expensive and unnecessary hardware.

How it operates

The Discover Energy VPP will allow cloud-based sharing of stored battery energy at times of high spot prices in the energy market.

By using the Discover Energy App and platform DE Insight, consumers can monitor electricity spot prices, and decide to sell stored energy back to the grid when prices are high.

The advanced algorithm using artificial intelligence (AI) predicts spot prices, and consumers can then choose to discharge their batteries to maximise their returns. In addition to the 25 cents per kWh feed-in-tariff, consumers will receive 50 per cent of the profit on all energy discharged from the battery and distributed through the Discover Energy VPP.

This means that during times of high demand, the potential for financial returns to the household can be quite large – in most cases, the savings for installing batteries with the Discover Energy VPP platform has been calculated at around $1,000 per annum – and that is the aim: to save consumers money and relieve stress on the grid.

Several state government incentives for batteries, such as interest free loans and rebates, are believed to require VPP-ready battery systems.

Revenue streams

The advancement in VPPs, energy trading and electricity retailing has allowed batteries to become an additional revenue stream not just for consumers but also for solar businesses.

The introduction of the trading technology paves the way for an increase in battery sales for solar companies and a new revenue stream by becoming a Channel partner with Discover Energy.

For battery customers, Discover Energy has offered Channel partners an exclusive access to the Discover Energy VPP platform.

Partners would have a competitive advantage in the market with a competitive VPP plan, and the 25 cent FiT.

For enquiries on becoming a Discover Energy Channel partner, contact the VPP team on 1300 946 898 or email sales_vpp@discoverenergy.com.au
Visit the OSW Stand 53 for more information.

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Pylontech's forward moves

Pylontech, a high-tech company founded 10 years ago in Shanghai, officially launched its energy storage system (ESS) business in Australia in 2014. At that time, many were unaware of the key role of ESS or deterred by the ultra-expensive Li-Ion battery prices. But things have changed.

NOW IN ITS SIXTH YEAR in Australia, Pylontech is bringing some new products to the market.

"We are lucky to be in a revolutionary epoch," said Geoffrey Song, International VP of Pylontech.

"Global energy consumption is changing undoubtedly from fossil fuels to renewables and the grid is evolving from a centralised one to a distributed one. This creates huge opportunities for energy storage, with lithium ion and especially LFP playing an important role in the coming decade."

Several international analysts and think-tanks are predicting that the compound annual growth rate (CAGR) of ESS volume will be no less than 65 per cent from 2017 to 2025, he said.

Pylontech's rate of growth has been high. Since 2014 Pylontech has deployed 2GWh of ESS worldwide. In Europe, Song said, Pylontech rates in the top three ESS suppliers in all main countries with both the brand and OEM brands.

"Pylontech prefers to remain low profile as we believe in simultaneous actions are gold while sayings are rust", Geoffrey Song remarked. "I attribute our success to the focused strategy. Unlike some of our competitors we only focus on one direction, which is reliable ESS.

"I attribute our success to the focused strategy. Unlike some of our competitors we only focus on one direction, which is reliable ESS."

"People always ignore or tend to forget the fundamental requirements of ESS and EV cells are different; while the latter requires much higher cycle performance than the former, nobody can hunt two rabbits at the same time.

"Pylontech has consolidated its expertise in electrochemistry, power electronics and system integration, to develop safe, reliable and affordable ESS products," he said.

"We were steadily focused on ESS Pylontech becoming the world's first energy storage product with [worldwide certificate processes] VDE, UL and JET certifications and every year we release a new product or solution with a clear direction."

The first-generation low voltage residential module experienced no operational issues in the three-year performance test conducted at ITP Canberra's testing laboratory, in which 18 batteries were tested, Song said.

"In August 2019 we extended the warranty periods of our second-generation US series residential module for the entire Australian region. The series includes high voltage residential, commercial and industrial solution, containerised solution, and a higher C rate solution."

Product launches during 2020

Pylontech's latest Residential Product the Force series will be officially launched in Australia in the first three months of 2020. Tech specs: 7.10~24.86kWh, widest compatibility, flexible configuration, Plug & Play, IP55 and 15+ year design life.

A LOOK AT SOME OF THE PARTNERS AND EXHIBITORS AT THIS YEAR'S SMART ENERGY SHOW

PYLONTECH

Pylontech's forward strategy

"Australia is an interesting and important market for any renewable energy company with global ambition, and Pylontech is definitely strengthening the Australia market," said Ned Yu, country manager for Pylontech in Australia.

"Our market strategy is to work closely with our local partners to strengthen our offering. We are flexible in offering our products for local partners who want to integrate by themselves, or we can bring our integrated solutions to meet end-customer requirements, especially for commercial and industrial customers.

"At the same time with our strong shareholder and finance platform we are also seeking all kinds of opportunities besides the pure offering of product, and we plan to expand our commercial and industrial energy storage business to more large-scale wind and solar projects in Australia and New Zealand."

Pylontech is teaming up with Redback Technologies to offer an ESS solution to the residential and commercial market and will be closely cooperating to combine company expertise to enable more households and businesses to be powered by low cost renewable energy all day, every day.

Rita Ping, global sales director of Pylontech said "We do expect to see the Australian market growth rate steadily increase by more than 40 per cent each year and we will grasp the sunshine here and work in all aspects to help individual people, commercial partners and governments to achieve their goals.

"Our philosophy is to smile with people."

Visit Pylontech at Stand 59 at the Smart Energy Conference and Exhibition in Sydney.
www.pylontech.com.cn

Pylontech C&I Solution: Powercube Series. Tech specs: From 100kWh to MWh scale, for on-grid and off-grid application, highly scalable modular design, high charge and discharge rate, 15+ year design life.

Information, views and technical details on this page supplied by Smart Energy Conference & Exhibition Partner

The LONGi story

Why is the LONGi Hi-MO 4 module favoured by the PV market?

LONGi Solar says the solar market in general has shown a growing preference for the LONGi Hi-MO 4 module with M6 wafer (166mm), but there are still some in the PV industry who have an ambiguous attitude towards the product. In this article, LONGi has assembled a Q&A on the LONGi Hi-MO 4 and trusts that this will provide a more systematic and in-depth understanding of its background and benefits.

LONGi Solar

Why has LONGi chosen the M6 wafer (166mm) specification for the Hi-MO 4 module?

The cost saving and compatibility advantages of the M6 wafer (166mm) are achieved at both the manufacturing end of the industrial chain and the application end of the system. For the cost saving on the system side, the fundamental reason is that the increase of current basically makes use of the margin of the current commercial inverter and increases the capacity of a single string for unchanged Voc (the string length is unchanged).

Since M6 bifacial modules fully utilise the current margin of the inverter, any wafer larger than M6 will limit the inverter's current and lead to a loss in power generation. Although new module circuit design can reduce current, the benefit in balance of system (BOS) cost will disappear when compared with M6 modules.

How has the LONGi Hi-MO 4 module evolved?

LONGi optimised the design size of the Hi-MO 4 module earlier this year. The size of the 72 cell module changed to 2094 * 1038mm. The efficiency of mass-produced modules exceeded 20% across the board, and that of the 450W module reached 20.7%. The improvement in efficiency brings further BOS cost savings, and the land area occupied by a power station is also significantly reduced.

What is the difference in BOS cost between the LONGi Hi-MO 4 module and modules of other specifications?

With a 72 cell module with a 158.75mm silicon wafer, at a power station adopting a centralised inverter and fixed bracket configuration, the BOS cost of the Hi-MO 4 can be reduced by 0.65 US cents/W. Although the power of a 78 cell

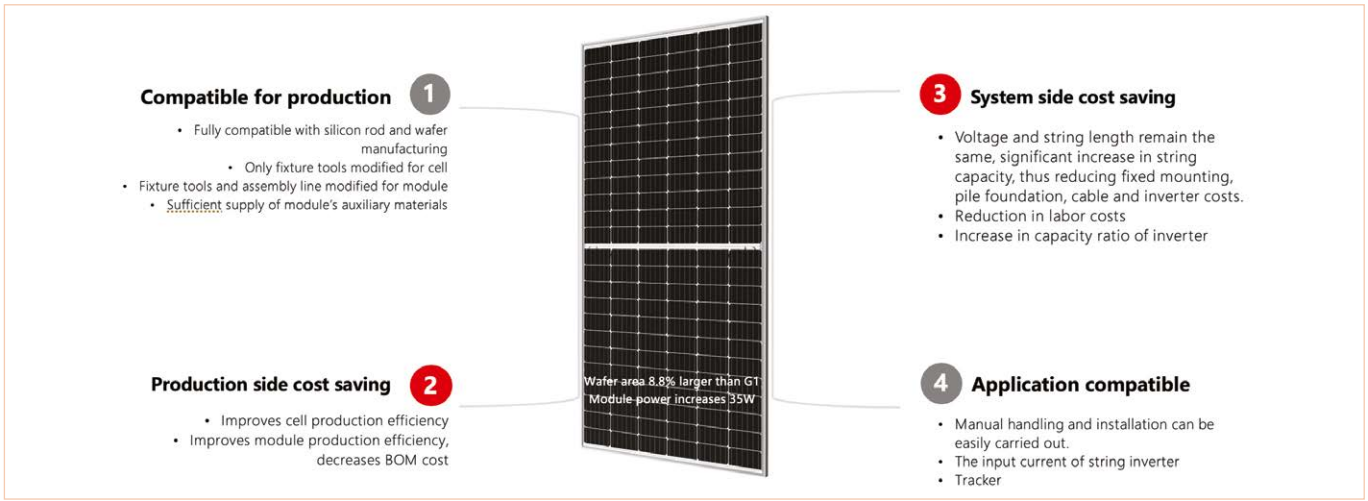


Figure 1: The reasons for choosing the M6 wafer (166mm) for Hi-MO4

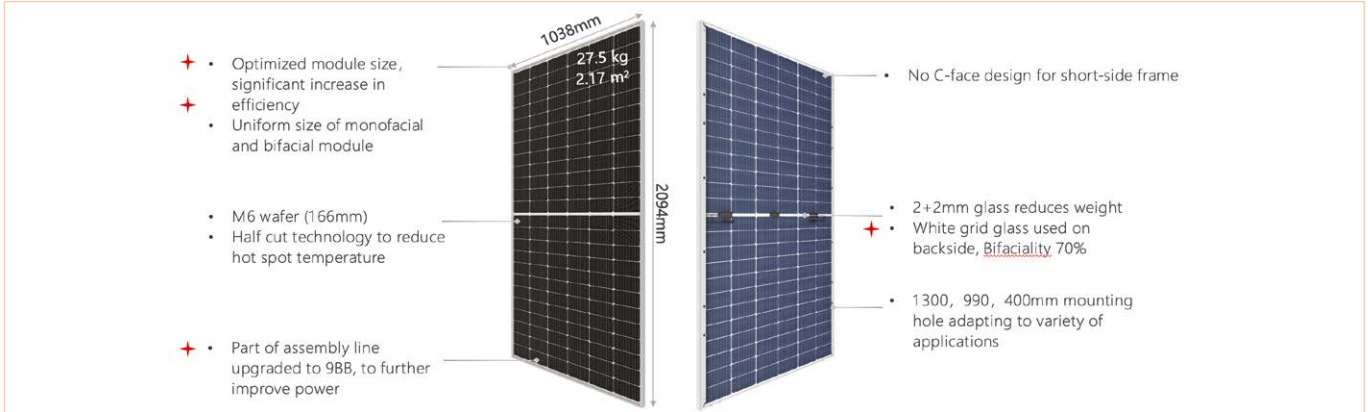


Figure 2: Upgraded Hi-MO4

module is equal to that of the Hi-MO 4, the reduction in the number of series connections leads to a significant gap between the cost saving of its BOS and that of Hi-MO 4.

At a power station adopting string inverters, the BOS cost of Hi-MO 4 can be reduced by 0.86 US cents/W due to the increase of capacity ratio.

LONGi's Hi-MO 4 module is obviously larger. Can it really reduce installation costs?

Obviously, a high power module with an M6 wafer (166mm) brings higher power generation gains and lower BOS costs in practical application. But will the increase in module size and weight make the actual installation more difficult? Will it add more installation costs?

According to detailed research, there is no obvious difference between a Hi-MO 4 module and a conventional module in terms of handling, upper bracket and installation work. However, due to the increase in power of a single Hi-MO 4 module, the number of modules required is lower, meaning that installation effort is reduced, efficiency improved, and the overall construction period shortened, significantly lowering overall installation costs.

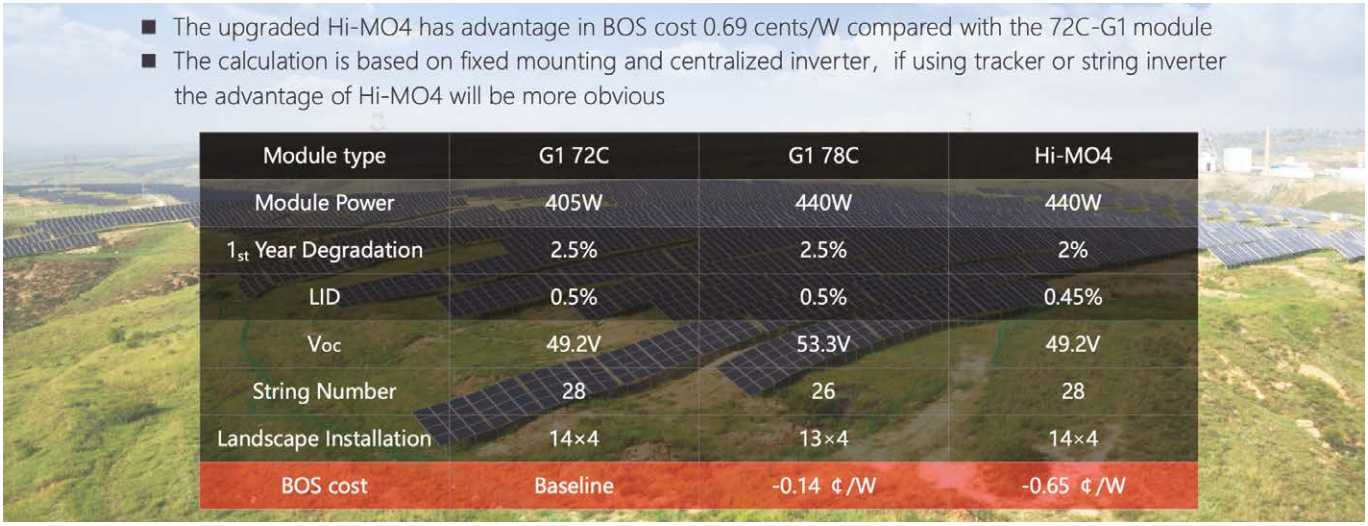
What is the market performance of the LONGi Hi-MO 4 module?

LONGi's Hi-MO 4 module has been in a state of relatively short supply since it was launched, with more than 10GW of cumulative orders and letters of intent. Shipments in 2019 reached 1.5GW. Projects where the Hi-MO 4 module has already been deployed cover, among other territories, all regions of China, Bangladesh and Vietnam. Feedback from customers and EPCs has generally been that of significant savings in most aspects of the construction process.

The market response to Hi-MO 4 has been extremely positive. In 2020, the capacity of the module will exceed 20GW, ensuring stable global supply.

After continuous optimisation, the Hi-MO 4 module has an impressive mass production version, with a further reduction in weight. With the addition of bifacial technology, BOS and LCOE costs have also been lowered. The LONGi Hi-MO 4 module has quickly become the preferred choice for global clients, especially for large-scale PV power plant investors, and has demonstrated huge investment value worldwide.

LONGi is a platinum partner at this year's Smart Energy Conference and Exhibition. Meet the team from LONGi on Stand 57. https://en.longi-solar.com



Module type	G1 72C	G1 78C	Hi-MO4
Module Power	405W	440W	440W
1st Year Degradation	2.5%	2.5%	2%
LID	0.5%	0.5%	0.45%
Voc	49.2V	53.3V	49.2V
String Number	28	26	28
Landscape Installation	14×4	13×4	14×4
BOS cost	Baseline	-0.14 ¢/W	-0.65 ¢/W

Figure 3: Comparison of main products in market (Bifacial Module)

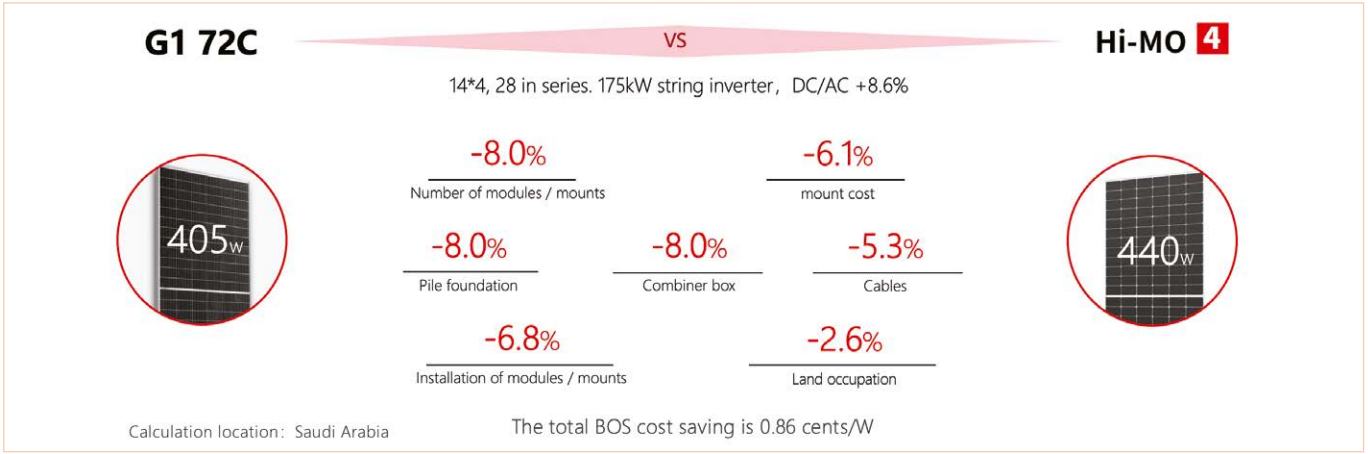


Figure 4: BOS cost comparison (Using string inverter)

Delta Electronics powering Australia's green energy transformation

Prominent power supply provider Delta Electronics draws on its core competencies in power conversion and energy efficiency to develop PV inverters and electric vehicle (EV) charger solutions that empower Australia's green energy community.

SINCE 1971, Delta Electronics has supported everyday lives by providing what every electric device or equipment needs: a safe and efficient power supply.

Laptop adaptors, phone chargers, LED drivers and EV chargers (on-board and off-board) are just some of Delta's many types of power supply products.

And with its R&D, manufacturing and sales networks spanning the globe, Delta builds on its expertise in power conversion and efficiency to drive innovations that accelerate the journey to electrification.

Australians looking to tap into green energy opportunities can look forward to Delta's portfolio of PV inverters and EV charging solutions at the Smart Energy Conference & Exhibition 2020 in Sydney April 7-8.

Bringing the best in Delta innovation

The massive potential in Australia's solar energy and EV sectors make it a key market for Delta to introduce its latest and best offerings.

- **New H5A Home PV Inverter:** This versatile model has a 35vDC start-up which can run on just two panels, making it a flexible choice for difficult roofs. Other features include over-the-air (OTA) firmware updates, built-in Var settings for easy commissioning selection and the possibility for OTA grid protection settings.
- **DC City Charger:** A flexible EV charger featuring 50kW/100kW simultaneous charging, dynamic load distribution and optimising charging service. This DC fast charger is suitable for fleets, commercial applications and charging networks. The 100kW DC charger is expected to be a popular segue between the 50kW and 150kW in the market.
- **AC MAX:** A powerful AC 7kW/11kW/22kW charger with Open Charge Point Protocol (OCPP) compliance enabling back-end system integration. Its compact size, IP55 weather resistant and wall mount/ stand installation makes it adaptable to all sorts of installations. From residential through to commercial buildings, Delta's AC MAX charger suits many applications and a destination charger for EV owners.

Delta technology supporting home-grown green solutions

Besides introducing new products and solutions, Delta Australia is continually innovating in projects in Australia, such as the joint research project on solar power EV charging conducted with Nissan Australia and the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

"The aim of the project is to enhance the environmental advantages, and cost savings, which come with owning an EV by maximising the use of renewable energies," said Reece Davis, Delta Australia E-Mobility Business Development Manager.

"Once the full study is complete, it paves the way to install solar power chargers without requiring updates to grid connections, and in areas that don't have access to grid power. Funded by the Victorian Government, this local project aims to increase the uptake of renewable energy generation, reduce greenhouse gas emissions and drive innovation in new energy technologies," he explained.

Delta developed the project's solar-powered chargers which integrate Delta's residential RPI Series Photovoltaic (PV) E5 inverter, BX 6.0 battery and AC Mini Plus EV charger in a single system.

Upon completing initial performance tests at the CSIRO Monash facility's temperature control chambers, the system began a 200-day field trial using multiple Nissan LEAF EVs at Nissan Australia's national headquarters.

A global powerhouse with a passion for smart green energy

With more exciting products and solutions on the horizon, Delta works with its global network and local partners to deliver innovation and service that support Australian businesses and homeowners to go greener and operate smarter every day.

Delta's passion for intelligent and energy-efficient solutions that benefit stakeholders underpins the company brand promise: Smarter. Greener. Together.

www.deltaelectronics.com.au
Visit the Delta crew on Stand 61 at the Smart Energy Show.

Huawei's solutions-based technology

Huawei is a global provider of information and communications technology infrastructure and smart devices across telecom networks, IT, smart devices, and cloud services. Here, Solar Product & Solutions Manager Haider Khan explains the company's involvement in the Australian PV market.

HUAWEI BOASTS some impressive figures. It is ranked 61 among Fortune 500 companies; has been rated by data and information analyst IHS Markit the No1 inverter manufacturer for global shipments for four consecutive years; employs 194,000 and of that more than 9,600 in R&D, spending 15 per cent of its revenue in that sector. Worldwide Huawei is ranked No 5 for R&D spend, up there with Amazon, Alphabet, Volkswagen, Samsung, and a step ahead of Apple.

The heavy investment in research and development is key to the success of operations, says Haider Khan. That's because technological breakthroughs drive the world forward and everyone welcomes superior technology and greater efficiencies.

Haider Khan listed the Huawei inverters currently on the market, saying "Our offerings have been unique, whether it has been the utility scale string solution, which optimises the entire process from power plant design and construction to operations and maintenance; the higher Yields and Smart O&M focused commercial and industrial (C&I) solution; or the multi-featured solution for the residential market, the SUN2000L series.

"The AI boost Arc Fault Circuit Interrupter (AFCI) which mitigates fire risk is a key feature of the new models, the 3ph inverters released in the latter half of 2019, and nearly all new models being released in 2020. Being battery ready they are future proof."

The AFCI is an important feature, he says. "The DC arc fault has been identified as the major cause of fire especially in commercial and residential PV systems and is a hot topic in Australia these days. It may occur due to a poorly welded PV module junction box, broken PV cables, loose or incompatible PV connectors, by way of example. The Huawei inverter keeps self-learning new arc features collected from global operating PV sites to accurately protect systems from an arc fault, and with this AI algorithm, distinguishing false alarms with actual arcs."

Market traction

The utility solution is making inroads and is the first string inverter to gain connection approvals under the new electricity rules, reflecting the response times and compliance to one of the toughest grid requirements in the world.

"Within the C&I sector we have been building some very good case studies thanks to our technology such as its MultiMPPT feature, optional IV curve diagnosis, as well as higher availability, as these are the same inverter platforms used for our utility scale solutions," Khan explained.

Gaining traction

Huawei launched its solar business in Australia relatively recently, in the second half of 2017, but last year more than doubled the number of shipments to Australia.

The numbers are heading in the right direction, Khan said. "Working in our favour is that the brand name Huawei is well recognised as a high quality and reliable solution due to the 15 years of telecom operations in Australia."

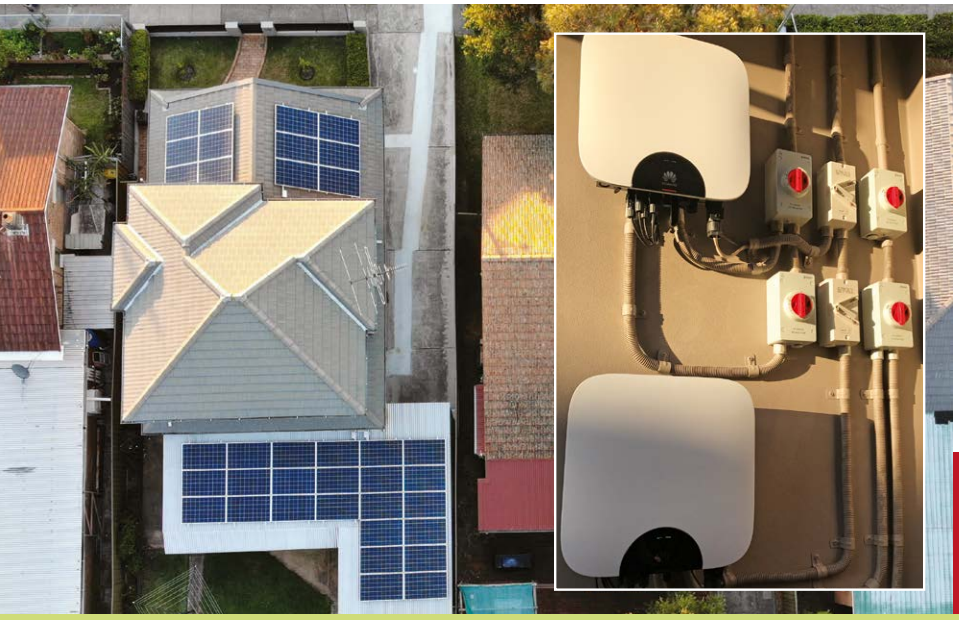
New products

Huawei anticipates success for the new 3-phase products for residential and small commercial applications that were launched in the latter half of 2019 and gained accolade by winning the InterSolar award in Europe. Responding to Australian market requirements, last year Huawei released its 29.9kTL inverter for the sub-30kVA threshold that comes with 4MPPT to allow higher yields and design flexibility.

The next generation of single-phase residential inverters is planned for launch in the second quarter of this year, with a design that also takes into account feedback from Australian installers.

Huawei provides 10 years comprehensive warranty which is extendable to 20 years, and local support backed by a 24/7 hotline handled by expert service engineers.

solar.huawei.com/au
Visit the Huawei booth at the Smart Energy Show in April at Stand 26.



"The Huawei inverter keeps self-learning new arc features collected from global operating PV sites to accurately protect systems from an arc fault, and with this AI algorithm, distinguishing false alarms with actual arcs."

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Enphase Energy and rooftop PV safety

Soaring utility prices combined with generous government incentives led to a boom in the uptake of solar power systems by Australian homeowners last year.

INSTALLATIONS OF SMALL-SCALE rooftop solar reached 2.13GW in calendar 2019, a jump of 35 per cent over the previous year, according to solar analyst SunWiz. and the renewable energy revolution marches on.

"2019 was a record growth year for rooftop solar installations in Australia, and the trend is set to continue this year," said Dave Ranhoff, chief commercial officer at Enphase Energy.

"With industry sales at an all-time high, it is now time to raise the bar on safety, and Enphase fully supports initiatives focused on bringing Australian PV installation standards in line with global best practices."

He was referring to the cloud of doubt that looms over the fire safety efficacy of the regulations that guide the Australian solar power system installation and equipment standards, particularly concerning DC isolators.

According to the Safer Solar website, each week two fires caused by DC-related faults in solar power systems are reported in Australia, and the number is expected to rise as the rate of installations increase and systems age.

Consequently, Enphase Energy, together with Solaray Energy and AC Solar Warehouse, is backing the PV industry's calls to bring installation and equipment standards in line with global best practices.

"Evidence suggests that nearly 65 per cent of conventional DC solar system failures occur at the rooftop DC isolator," said Grant Behrendorff, managing director of AC Solar Warehouse.

"There is widespread industry support to address the issue as international standards are in place along with newer technologies that eliminate the need for rooftop DC isolators. Arc fault detection and rapid shutdown compliant equipment, such as Enphase IQ™ microinverters, are readily available in the market."

DC isolators versus rapid shutdown

During 2010, in response to growing consumer demand for rooftop solar systems, emergency services teams responsible for responding to house fires decided that a safe emergency access solution was required.

Steps were taken in parallel by Australian and US authorities to address the issue. In Australia, a rooftop DC isolator was mandated in 2012, whereas the US introduced rapid shutdown requirements in the 2014 National Electrical Code (NEC).

Rapid shutdown provides a quick and easy method to de-energise solar panels to ensure complete safety for first responders and eliminate the risk of electrocution. By comparison, to operate the rooftop DC isolators used in Australia, emergency services personnel must climb onto a roof that may already be dangerous to access. Additionally, even with a switched isolator, the cabling under the panels remains fully energised up to 600 volts DC.

Safe AC solar is available in Australia now

Unlike traditional DC solar power inverters, the Enphase IQ microinverter system provides a complete AC solution that uses no high voltage DC, ensuring a safe solar solution for homeowners. Rapid shutdown capability is built-in, with no additional equipment necessary.

Enphase IQ microinverters meet or exceed regulatory requirements set by the US National Electrical Code, which currently represents the international solar safety benchmark the Australian PV industry is working to achieve.

"It is no surprise that smart solar systems such as Enphase dominate the market in countries like the United States, where safer solar regulations have been adopted quicker than here in Australia," said Jonathan Fisk, director at Solaray Energy.

"Of course, front of mind is the increase in panel-level output delivered by Enphase microinverters, but for many customers it is the story around safety that really gets their attention."

Visit Enphase at Stand 62 at the Smart Energy Show in April.

www.enphaseenergy.com

ENPHASE

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evergen

Are you an Installer or Reseller of solar & battery storage?

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Solar broker rockets into the market

A look at fast-growing solar broker Your Energy Partner which launched into the market during a business downturn. Fortunately the gamble paid off with YEP proving there is always room for a new form of business. It's also paying dividends for installers.

IF SOLAR BROKER Your Energy Partner was a car it would be a Porsche, given its speed of acceleration.

The rise from launch in May 2019 to present day has been nothing less than phenomenal, with Your Energy Partner turning over $8 million in just nine months of operations.

So what's the magic?

We spoke to co-founder Jamie Marciniak about the meteoric rise of the business that currently employs more than 46 staff to keep up with booming demand for rooftop PV installations, and continues to expand.

And it turns out the success of the business owes much to social media.

Each week Your Energy Partner outlays between $10,000 and $15,000 in marketing costs on Instagram, Facebook, Tik-Tok, Google and LinkedIn.

That, In turn, generates up to 2000 new enquiries each month from prospective customers about rooftop PV installations.

"The business I founded with Cameron Bell, who has an entrepreneurial flair, was designed first and foremost to help homeowners make an informed decision about purchasing solar installations," said Jamie who has run some of Melbourne's largest and most influential solar businesses

"Rooftop PV is a complicated matter, there are many choices and decisions to make and we found consumers were not always getting all the information they needed from solar companies.

"Also some retailers were having a tough time preparing quotes and proposals, so we have stepped in to ease the process.

"We wanted to give customers the choice and freedom to choose the best retailers and as a broker we work with multiple retailers which saves customers money and time normally spent doing the research to find different products.

The 'hand-holding' process involves visiting a prospective customer's property to carry out a full site assessment and energy audit, checks on the roof and switchboard and review of power bills.

From there it's a case of discussing local retailers, prices and products, with YEP providing three options for customers based on their budgets and system preferences. Customers can also weigh up the different warranties from retailers who include Smart Energy Council Master Installers.

YEP makes light work for solar companies, presenting all design configurations and an engineering report or job pack with all necessary information and handles all back-end administration including grid applications and approvals, Jamie explained.

Sharing the benefits

The good news is that despite the heavy focus on ensuring customers get the right advice and system, it's also great for companies involved in rooftop PV installations.

"We are presenting retailers with up to 100 new clients a week and in turn they are relieved of marketing costs, the cost of a sales team, engineering team and also an administration team as we are providing all those services, including all paperwork.

"Retailers can do what they do best which is install rooftop solar PV systems. Customers are paying no more for the installation, so everybody wins," Jamie said. "We are changing the way people buy solar and the way retailers operate with consumers."

Demographics

Unsurprisingly, YEP is gaining more traction in NSW and Victoria and finds the greatest interest lies among homeowners, and in the 21-65 age bracket.

"We want to attract the young to give them the tools to push forward with better environments and we are finding more and more young people are concerned about climate change.

"For those that can, more people under 30 are buying solar systems."

Victoria's first home grants and rural area grants have boosted interest and the rebate for renters enables them to talk to landlords about getting rooftop PV, he explained.

Interest in battery storage is relatively small at around 60 enquiries monthly, and with demand for solar hot water systems on the rise YEP is partnering with SWH companies to extend the product offering.

The bustling business is looking to expand its staff to 80 full-timers to service the burgeoning market in

Chief executive of Your Energy Partner Jamie Marciniak (left) with enterprising co-founder Cameron Bell

Victoria, NSW, South Australia and Queensland. YEP is also now making inroads into Western Australia as well as New Zealand.

Everyone new to YEP, including brokers, engineering, administration and marketing staff spend a day out in the field to gain practical insights into the challenges presented during installations.

Staff also undergo a state-of-the-art solar training program, and manufacturers regularly visit the YEP offices to explain current and new technology.

Self-belief or calculated risk?

Your Energy Partner is very much a story of success, but also one of risk and bravery, with Jamie and co-founder Cameron Bell mortgaging their own homes to fund the business.

At first it appeared that their timing could not have been worse.

"Being based in Melbourne we started Your Energy Partner at a really bad time, Autumn 2019, with many retailers in Victoria badly affected by the solar rebate fiasco and going into liquidation," Jamie said.

"However, as it turned out our timing was not so bad as we kept many businesses afloat by sourcing new customers."

Recognition set in early, just five months in YEP was picking up industry awards including the fastest growing retailer awarded by Delta Electronics, and the coveted WOM – Word of Mouth – Best Service award.

To continue the momentum, Your Energy Partner is now embarking on a mission to spread the word throughout the solar industry by engaging the services of a PR firm.

Your Energy Partner is a Platinum member of the Smart Energy Council. *www.yourenergypartner.com.au*
welcome@yourenergypartner.com.au (03) 8657 5089.

Racking up wins

S-Rack offers solar racking solutions with a high degree of pre-assembly to increase the speed of installation and reduce cost of transport.

SOLAR TRACKING SPECIALIST S-Rack has fast made its presence known in Australia. Founded in June 2018, the company's original operations commenced in Yokohama, Japan before expanding into the Australian market two years ago. In the Japanese market, large utility scale ground mount systems are dominant, which is why the team in Yokohama is focused on that sector. The market is somewhat different here.

Speaking from his offices in Sydney, Stephan Hargasser, Technical Director of S-Rack Australia, told *Smart Energy* about the widespread requirements in Australia, with activities ranging from rooftop solutions to carports and ground-mount systems, fixed-tilt as well as trackers.

His team of eight associates services not just the main markets of Australia and New Zealand, but also Pacific islands including Fiji, Tonga and the Solomon Islands. It's a hands-on proposition.

All-round involvement

"S-Rack staff normally become involved in solar plant projects from the early stage of development, which initially entails geotechnical soil testing and sampling for chemical analysis as well as pile foundation support testing. Based on the results of these tests, we finalise the structural design of our systems and finally provide related components, construction machine and installation services," Hargasser said.

One big advantage is S-Rack's delivery of pre-assembled racks that are ready for installation. Customer support and advice complete the services.

Johannes Salzeder, chief financial officer and Global Business Development added "We believe in creating value not only through our product but also extensive related services.

"For this to be worthwhile it's necessary to have a certain market penetration. So instead of going everywhere at once, we first focus on being dominant in our existing markets. At the end of the day that serves our customers, because what they need is a strong and reliable partner for racking.

"The main question is how we can create value for customers." They are also contemplating additional markets.

Market expansion

Looking further afield, this year's focus will be on the North American market, a move that is in response to customer demand. Activities surrounding entry into the region were undertaken last year, with S-Rack Corporation establishing offices in Irvine, California.

"We really enjoy and take pride in following our existing and new business partners to any locations in our region," said Stephan Hargasser who is also one of the company founders.

"All S-Rack executives are shareholders and have a stake in the long-term success of S-Rack which, in less than two years of

operations, grew to be the largest supplier in Japan." Each company founder had been active in the solar racking industry for 10 or more years before combining their knowledge to launch S-Rack, and the strive for a standard of quality is reflected in the original idea of the firm's name: Standard Rack, he said.

S-Rack's majority shareholder, NWI, is an industrial conglomerate based in Germany. "NWI has activities in diverse industries and a strong financial background, so it is suited in terms of providing stability, project financing and warranties in a traditionally cyclical business sector. We also strive to run an efficient and flexible operation.

"Early on the firm's founders figured that many companies praise their existing products according to the idiom: 'To a man with a hammer only, every problem looks like a nail', whereas S-Rack in contrast looks at each project separately and if it doesn't have an optimal existing solution, we will develop one specifically," Hargasser said.

That's possible, he said, due to running a lean organisation that carries out all its R&D in-house and can quickly react to all requirements, and that is helped through a series of strategic partnerships with companies in related businesses, enabling customers a choice from a large base of qualified installation partners. As a result company growth has been boosted.

One long-standing partner is GAYK, a German company leading in pile driving. JDM, another business partner, provides industrial fences for large scale solar projects and SunBrush provides cleaning equipment for solar sites.

"Because of this network, S-Rack is well suited to provide all-round solutions, not only to EPCs but especially also to large project developers and IPPs who benefit from getting everything from one source, in particular mounting related material and equipment," Hargasser said.

That is what we mean by taking a holistic view.

The Smart Energy Council welcomes S-Rack as a Gold Member.

www.s-rack.com.au

The democratisation of energy

'Ushering in the energy independence future'

Fast moving energy trader Power Ledger has secured more than 20 projects in eight countries. Here we look at just some of the recent achievements, including the company's launch into the east coast National Energy Market. The ramifications are widespread, and include the potential for energy trading to boost the uptake of rooftop PV.

THE YEAR 2019 was a productive for energy trading software company Power Ledger, with 15 new projects spanning Australia as well as parts of Europe, Asia and the United States.

This year also kicked off positively with the signing of a contract with Alperia SpA, one of Italy's largest renewable energy utilities.

Western Australia-based Power Ledger nudged out 230 applications from 37 countries to secure the five-month trial of its suite of energy trading products for new services for Alperia's commercial and residential customers, with potential for an extension within the Alperia customer base.

The move follows Power Ledger's success in securing a partnership to trial its peer-to-peer solar energy trading system with a Japanese solar provider and electricity retailer. Under the scheme in the region that takes in Tokyo, the Power Ledger platform will 'talk to' household smart meters and allow participants to set prices and track energy trading in real time.

The technology is also being trialled by Malaysia's Sustainable Energy Development Authority, which SEDA hopes will act a catalyst for increased uptake of solar PV in the region.

The trial is important for many reasons. A successful outcome will be catalyst for increased uptake of rooftop solar PV in Malaysia and advance the deployment of Distributed Energy Resources.

And that lies at the heart of the company's operations, said Power Ledger co-founder and chairman Dr Jemma Green.

"The Power Ledger platform allows consumers to choose whether they wish to purchase renewable energy or power from fossil fuels to promote and support the uptake of renewable energy."

In India the Power Ledger technology, often referred to as blockchain technology, is being trialled in a gated community for group and virtual net metering as well as EV charging and virtual power plant (VPP) applications. It's not Power Ledger's first move into a VPP.

Co-founder Dr Jemma Green was named Australian EY Fintech Entrepreneur of the Year

Power Ledger has secured its first commercial deployment for its peer-to-peer platform in Canberra in a partnership with EPC Solar Group

Early November marked a milestone when Power Ledger partnered with electricity wholesaler Powerclub in the roll-out of its technology within South Australia's VPP.

The development means South Australian Powerclub members will be able to pool their excess solar and battery storage to a VPP while accessing wholesale electricity prices from the grid and retailer services at cost.

Members benefit not just through lower energy bills, faster settlements, greater control over the times they use their energy, but also faster payback on their investment in rooftop solar which bodes well for the industry.

Power Ledger won the Sir Richard Branson international Extreme Tech Challenge in 2018

"It's a win-win," Jemma Green said, "Power Ledger's VPP technology enables participants to export stored solar energy at peak periods of demand, giving them the highest value for their exports while alleviating pressure on the grid and reducing Australia's carbon footprint from fossil fuels."

The nation's capital

Last November Power Ledger secured its first commercial deployment for its peer-to-peer platform in Canberra in a partnership with EPC Solar Group. The agreement allows the site owner and tenant to trade between them the solar energy generated from the shared rooftop solar PV and battery system.

They can also trade excess solar through the National Energy Market.

"Power Ledger's technology is enabling rooftop solar owners to remain connected to the grid by creating an opportunity to monetise their investment in solar infrastructure," Jemma Green told *Smart Energy*.

Although more households are installing rooftop PV, the company's software will prevent 'defection from the grid' and alleviate peak demand pressure on energy retailers.

"It is all about democratisation of power," she said, with Power Ledger developing the energy model of the future, putting control in the hands of consumers.

"The Australian Energy Market Commission is pushing for a new two-sided energy market and has already flagged the need for grids of the future to become energy trading platforms. The future of the energy industry will be decentralised and democratised... you no longer need to be a massive electricity company to commoditise energy."

"Power Ledger has the technology to facilitate this transition," Jemma Green said.

"Our trials with energy retailers and governments around the world have highlighted the demand for a product that enables autonomous management and settlement of energy generation and consumption."

www.powerledger.io

"The Australian Energy Market Commission has already flagged the need for grids of the future to become energy trading platforms. The future of the energy industry will be decentralised and democratised... you no longer need to be a massive electricity company to commoditise energy."

"Power Ledger's VPP technology enables participants to export stored solar energy at peak periods of demand, giving them the highest value for their exports while alleviating pressure on the grid and reducing Australia's carbon footprint from fossil fuels."

On these pages we take a look at new products and services in the renewable energy industry and the views of some of those at the forefront of developments.

Zenaji AEON Battery

The **Zenaji Aeon Battery** is claiming a leap forward in battery storage with its innovative new renewable energy storage system based on Lithium Titanate, or LTO.

Established by Dawson Johns and Charles Van Dongen, the Victorian based company has evolved into a multi-disciplinary team.

Over the past three years, Zenaji engineers, physicists and marketing sales people have collaborated with LTO battery cell manufacturers on the design, manufacture and marketing of the new long-term energy storage solution, achieving "remarkable results in both increasing energy density and reducing costs" they say.

The Zenaji AEON Battery has a warranted 22,000 cycle life to 80 per cent capacity that they say is at least six times that of NMC (Nickel Manganese Cobalt) and LIPO (Lithium Iron Phosphate) solutions.

The system is described as having the ability to be deep discharged to 100 per cent and scalable to meet varying demands and needs.

The 1.93kW battery is designed for use in domestic, commercial and stand-alone energy storage installations and is available through dealers and installers direct rather than through a distribution network so they reap better rewards.

Cofounders Dawson Johns and Charles Van Dongen decided on "quite an aggressive marketing campaign" to market the name in the field which involves the use of a PR agent and exhibiting at shows including the 2020 Smart Energy Conference & Exhibition.

"We have also priced the battery aggressively," Johns told *Smart Energy.* Margins are tight but in my view the LTO technology is a real winner in the market and the right solution in long term energy storage applications.

"Although the upfront cost can be more expensive than other lithium batteries such as LIPO, the acknowledged problem with them and NMC

is that they cannot be deep discharged and only have a life of around 3000 cycles before they fall below the 70 per cent threshold. They only last about eight to 10 years in a solar system and only if they are not used every day and their level of discharge is limited."

By contrast, he says, the payback on the Zenaji LTO battery is good – most will never have to replace the battery," he said, hence the 20 year warranty but the expectation is that the battery would last up to 100 years. That means recycling is less of a problem given the battery will not need replacing, Johns said.

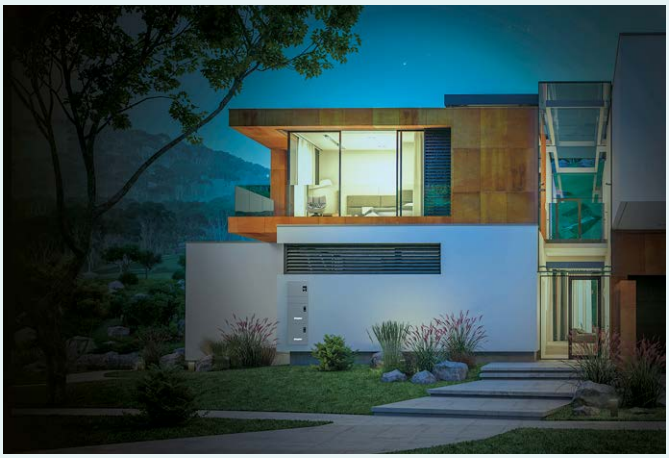
Currently the battery is assembled overseas but given the right incentives they hope to one day be able to transfer operations to Australia.

Already with customers in South Africa and the US, the reach continues to grow, with interest in the UK, Scandinavia and New Zealand.

Energizer selects Evergen as exclusive global provider

Evergen, a fast growing Australian renewable energy systems and software provider, has entered into an exclusive partnership with energy storage solutions manufacturer 8 Star Energy.

8 Star Energy is the sole licensee for Energizer and Eveready branded products in the portable power, containerised and home battery



energy storage system categories. The collaboration brings together complementary interests and capabilities of Evergen and 8 Star Energy to develop paths to market for Energizer distributed storage systems and software in Australia and overseas.

Evergen's intelligent energy management system increases the performance of single dwelling solar and battery systems and enables operation of virtual power plants (VPP) and microgrids, where fleets of systems are orchestrated and optimised together with the energy networks.

As part of the agreement, Evergen will become the default provider of optimisation, VPPs, Microgrid, and other related software for distributed storage assets sold under the Energizer brand.

Evergen chief executive Ben Hutt said "This partnership is aligned with the Evergen global strategy to have our Australian software distributed alongside a household name. As international energy markets evolve, battery storage technologies and the software that enables and controls them will become integral in the energy landscape of the future."

Evergen is a multi-award-winning business that earned the 2018 Optus My Business Awards Energy Business of the Year and debuted on the Financial Review Fast Starters 2018 list.

www.evergen.com.au www.evergen.com.au/energizer

RedEarth Energy Storage

Last year Brisbane based battery storage manufacturer **RedEarth Energy Storage** received a welcome boost when it raised $4.75 million in funding from the Queensland Government.

The funding injection came at a good time: the technology had been extensively tested in the field over the past six years and now the company is poised to accelerate manufacturing.

"We feel the demand for batteries is going to rocket at some point, and we have been getting ready for this," co-founder Charlie Walker told *Smart Energy*. "We plan to get on track to manufacture more than $70 million worth of battery systems over the next four years.

"The funding marks the first step towards growing RedEarth into a sustainable and profitable Australian business in an emerging market that until now has been dominated by foreign companies with foreign products."

Charlie Walker teamed with mining engineer Chris Winter back in 2013 to launch RedEarth which is one of Australia's first owned and operated domestic producers of energy storage systems for residential, commercial and industrial use.

The name Red Earth reflects the early focus on off-grid systems in the red coloured soil of the outback.

"We operate a range of products across the sectors but we started off-grid and that is where the need is greatest – areas you don't have grid-connected energy – it is also where there is least competition, and that sector is growing," Charlie Walker said.

"Now we feel confident to compete in the metro areas."

But it's a crowded market these days, so what differentiates them?

In a nutshell, delivering the full package.

"We source parts from large international companies before engineering everything in the storage system so people have the whole package. The system is upgradeable, and refined to Australian Standards. And we recognise that customers want an easy-to-reach local support service, they just want to pick up the phone and talk to someone and to be reassured that if they have queries they will be quickly dealt with.

He commented on the general level of confusion in the market over who to contact in the event of a system query, saying the process is too fragmented.

"We have a staff of 30 and the team is always in touch with our off-grid operations, we can communicate and control matters from our head office, and take responsibility for the product for its entire life," Charlie explained. "To succeed in the market you have to have a product that is good as or better than anything out there and with good back up support and a strong trust element."

He added the 'Made in Australia' tag is proving very popular with customers.

Asked what happens once the storage market takes off, Charlie said "We can react quickly by taking on unskilled and semi-skilled workers here in Brisbane and continue to do the stress testing and high-level aspects in-house so quality does not fail.

"We can quickly scale up and are ready to do so."

https://redearthenergystorage.com.au/

Red Earth is named after the dirt in the outback which reflects the company's original concentration in the off-grid sector. Systems include the SunRise home, Off-grid and the BlackMax Shed DIY

Q CELLS accolade

Q CELLS has secured EuPD Research 'Top Brand PV' seal accolade for the fifth year in a row in Australia. The 'Top Brand PV' seal is awarded by internationally renowned research institute EuPD Research to companies that receive 'excellent' feedback and ratings in its Global PV InstallerMonitor survey, which compiles the opinions of participating solar installers located across a number of leading solar markets.

As a 'Top Brand PV' company, Q CELLS pays recognition to the recent announcements of the new 25-year product and performance warranties on Q CELLS' top selling modules for the Australian market, Q.PEAK DUO-G5+ and Q.PEAK DUO-G6+.

Q CELLS chief executive Hee Cheul Kim said: "Australia is a key market for Q CELLS. The 2020s will see a massive evolution in the way the world generates, consumes and shares energy, and Q CELLS hopes to play a major role in this transition as we move towards becoming a total renewable energy solutions provider."

www.q-cells.com/au

SENEC appointment

Two years ago German solar battery manufacturer **SENEC** expanded its global operations by moving into the Australian market and setting up a regional head office in Perth.

Now the company is expanding operations to the eastern seaboard and has appointed a new General Manager of Sales & Service, Patrick Duignan, who is based in Sydney.

A priority for Patrick in his new role at SENEC will be to continue to build and grow strong partnerships in the solar and storage industry.

"In SENEC's country of origin Germany, more than half of the PV rooftop purchasers order a battery for energy storage at the same time to achieve a high level of independence," he said.

"However, in Australia the total number of households with solar batteries is just 8 per cent, but the market continues to grow."

And SENEC has an eye on the market.

Last year the company doubled the warranty for its new hybrid battery to 20 years, and this is expected to be a major impetus for homeowners with rooftop solar to take the next step and add a battery.

In late 2019 SENEC also launched its new battery the SENEC Home V3 Hybrid.

https://senec.com/au

Solar systems for the sunny South Pacific

For many years the Its Time Foundation has been installing solar power systems in remote island schools in Fiji and changing the lives of local communities for the better.

Its Time founder Rob Edwards, recently awarded the OAM, explained the benefits of the new 24-hour power systems. Other than the environmental advantages, they give school students the opportunity of a modern, computer-based education, as the money saved on the use of a diesel generator frees up cash flow to buy the computers.

To date, Its Time has installed 22 solar systems on remote Fijian Islands and vastly improved the level of education for hundreds of students.

The most recent were completed in December 2019 with two systems installed in schools on the southern tip of Taveuni Island. Both schools had been completely destroyed in February 2016 by cyclone Winston, the second largest cyclone in the world to make landfall.

Rob Edwards told *Smart Energy* "For the two years following cyclone Winston that flattened the schools, classes were conducted in large plastic UNICEF tents in oppressive tropical conditions. It was very uncomfortable for students and teachers.

"So it was a bit special, that when their new schools were built, we could give them twenty four hour power from a ground mounted solar array. They stepped straight into a modern education." Vuna Primary will save approximately $8,000 a year on energy bills which means they can afford around a dozen new computers or the equivalent each year, said Rob who coordinated the entire operation.

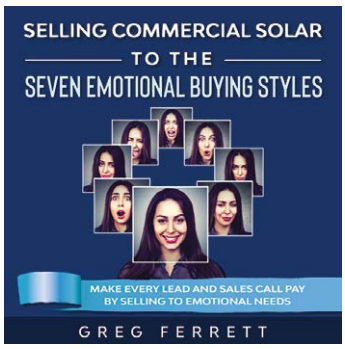
"A big thank you goes out to our key equipment sponsors SimpliPhi, Clenergy, Outback Power and Yingli whose generosity is enabling us to deliver nearly two for one projects compared to retail."

iiitme.org/projects, www.iitime.org

Making every sales lead count

ASM Money is a well-known asset finance broker specialising in renewable energy assets. Company founder Greg Ferrett, who has spent a decade in the solar industry, has long studied the psychology of sales and compiled his observations to help people close a commercial solar sale.

In his newly released book *Selling Commercial Solar to the Seven Emotional Buying Styles* Greg categorises how the seven types of emotions impact on decision making and also spells out how to apply these to influence decisions.



"When a decision is being made emotion runs high, even when a thorough and logical evaluation has been done, but I discovered a simple way to map emotional genes and use this knowledge to influence decisions significantly," Greg said.

"By using the simple tools in this book to push a person's green button and avoid their red button, everyone can do the same."

The book also provides a commercial solar industry market update and vital tools to assist commercial solar salespeople.

Readers can learn more about the seven emotional buying styles: the hustler, artist, normal, engineer, double checker, politician and mover.

"Selling is about emotion … linking your offering to your client's heart. If you are in selling you need to know what your client is thinking, and this will let you know" says Greg who has successfully turned around clients in seconds by recognising and addressing emotional needs.

Selling Commercial Solar to the Seven Emotional Buying Styles is available through Lightning Source, Ingram, from the publisher as well as directly from Amazon.com in paperback and Kindle version.

For more information about Selling Commercial Solar to the Seven Emotional Buying Styles*, visit www.asmmoney.com.au or contact Greg Ferrett directly on (03) 8595 0900.*

Delta Electronic's new appointment

Delta Electronics Australia has appointed Steve Lovelace as National Channel Manager. In this role he will be placing emphasis on specific routes to market including alliance partners, value-add resellers and distributors, service providers and system integrators.

Delta has also launched a new range of Uninterruptible Power Supply (UPS) devices that deliver a high-power-density rack/tower solution in a smaller footprint.

www.deltapowersolutions.com

Battery performance standard aims to boost residential solar + battery storage market

AUSTRALIA HAS ONE OF THE HIGHEST proportions of household solar photovoltaic (PV) systems in the world. However, adoption of small-scale energy storage to support these domestic PV systems has not yet reached the same scale.

This is perhaps a little surprising as energy storage is vital in maximising the benefits of solar power.

Moreover, the market conditions are improving for rapid growth in domestic-scale solar + battery storage installations: electricity prices are at an all-time high and feed-in tariffs for solar PV are comparatively low.

The market for behind-the-meter battery storage applications in Australia (and around the world) is currently being held back, in part, by the difficulty end-customers face in choosing the right battery system for their needs. Different manufacturers report their product specifications in different ways, making it almost impossible for the average end user to compare them.

Helping Australian consumers decide

Two critical aspects of battery systems are safety and performance. The recently released AS/NZS 5139 standard tackles part of this issue by laying out general installation and safety requirements for new battery energy storage systems (BESS). The other side of the question is performance. For example, if one manufacturer reports a lifetime of six thousand cycles under certain test conditions while another claims ten thousand cycles with no explanation of how that was measured, how do you know which battery energy storage system is best for you?

To address this issue, a consortium comprising DNV GL, CSIRO, Deakin University and the Smart Energy Council has undertaken a project to develop a draft Australian Battery Performance Standard (ABPS).

Co-funded by the Australian Renewable Energy Agency (ARENA) and the Victorian State Government (DELWP), the project is defining standardised performance testing protocols and reporting to provide consistency in reported performance.

This will provide consumers with confidence in the reported performance and enable comparisons between different technologies in an easy manner.

The draft standard will be application specific in that it will only consider battery systems intended for domestic and small-scale commercial solar + battery storage installations (up to 100kW power and 200kWh energy).

It will also be specific to Australian climatic conditions and use cases. Beyond that, it aims to be as widely applicable as possible and is technology agnostic. Hence, the standard will make it easier for people to understand how reliable batteries are and how they are expected to perform over their lifetime under Australian operating conditions.

Global landscape

As the part of this project, the consortium has undertaken a standards review and gap analysis in which the project consortium initially compiled a list of 258 documents for review.

This was subsequently, through broad consultation, reduced to a list of 124 covering many regions such as IEEE, IEC, UL and Australian standards.

Based on this comprehensive review, no international or local standard was found which could be directly utilised in the Australian market to fulfil the proposed scope of the ABPS. They either looked at larger scale installations or applied only to specific battery chemistries. And, of course, none considered the Australian environment or typical Australian usage patterns. So, while it was possible – and indeed essential – to align with

Continued over page

IMAGE BY GIOVANNI GARGIULO FROM PIXABAY

A HUB OF RENEWABLE ACTIVITY

The new year brought a fresh new beginning to the ACT Renewables Innovation Hub with the Smart Energy Council commencing an 18-month role as Cluster Manager. The Council now plans to enhance the ACT's already thriving renewable energy industry by forging stronger links between parties involved in cleantech projects.

THE AUSTRALIAN CAPITAL TERRITORY has long been considered a trailblazer in renewable energy, shaping the systems and the networks of the future by delivering energy derived from solar and wind resources to the masses.

The progressive path constructed by the Territory has been recognised across the world, and some of the progress can be traced to the work undertaken by innovative, industrious companies, researchers and policymakers involved in renewable energy pursuits with links to the Hub.

For those not familiar with the Hub, it is an initiative with the ACT Government as part of its industry development strategy to grow the renewable energy ecosystem.

Funded via the $12m Renewable Energy Innovation Fund, the Hub has been in operation since 2016 and since then has helped accelerate several innovative start-ups.

Among them: a solar forecasting company which now has more than 100 users across four continents, development of new hydrogen fuel cells, and improved concentrated solar technology.

Smart Energy Council chief executive John Grimes said "The ACT is a widely recognised as a leader in renewable technologies and the Hub is testament to the Territory's foresight.

"The move to renewable energy is as vital as it is inevitable and we are proud of the ACT Government's remarkable speed and success in reaching 100 per cent renewable electricity by late 2019. This achievement, which was ahead of schedule, has been hailed across the globe and positions ACT at the forefront of developments.

"Many significant collaborative bonds and breakthroughs have been fostered through the Hub," he said. "Now it is the turn of the Smart Energy Council to play a vital role in delivering the new phase

Battery Performance Standard continued from previous page

these documents on definitions for key performance metrics, the draft standard would have to be created from scratch.

Industry buy-in

To do that, the consortium worked closely with a group of around 40 stakeholder organisations including battery manufacturers, distributors, regulators and government agencies. From this group's feedback on the possible battery storage use cases, it became clear that the industry needed a standard that focused on a small number of use cases.

The two most relevant use cases to Australia are: PV Energy Time shift (generate by day, use at early morning and night) and Virtual Power Plant (VPP) mode in which the battery operation combines the PV energy time shift with energy arbitrage use cases.

The PV Energy Time shift use case is currently by far the most common for domestic solar+ battery storage systems in Australia, while the VPP model is becoming increasingly popular within the solar community. By focusing on these two use cases, the standard will meet current consumer needs and support future market evolution.

Standardised testing

Based on these use cases, the draft standard specifies key performance metrics that will make it easier for consumers to compare battery energy storage systems. These are properties such as maximum and sustained power, voltage range, response time and efficiency which are all typical metrics in battery testing, but not always reported by battery system manufacturers or indeed measured in the same manner.

A fundamental part of developing the standard is to define test protocols that would help standardise how these metrics are reported so that consumers could more easily compare like with like. These test protocols are designed specifically to provide battery performance data relevant to Australian conditions and the two use cases selected, so that it suits the range of Australian climates from Darwin to Hobart. The profiles developed are based on analysis of Australian temperatures and how Australian houses generate electricity from PV panels and use electricity to power our homes.

These test protocols have been developed and are currently being validated by carrying out a vast number of tests on battery technologies in the present market.

Streamlining adoption

The draft standard is due to be submitted to Standards Australia in June 2020. With the large amount of work and industry liaison already put in by the consortium behind the draft, it is hoped that the adoption process will proceed relatively quickly.

As well as defining the performance metrics, testing procedures and temperature profiles mentioned above, the draft standard will include requirements on how test results should be reported. It is also expected to include guidelines to standardise the way that battery system warranties are described. As a result, consumers should be able to compare not just the technical performance of the different battery systems but also the protection they can expect from the warranty.

To support the draft standard, the consortium will also be releasing an interim best practice guide which is intended to be used until such time as the Standard is released. This best practice guide will contain the same information as the draft Standard, including a step-by-step description of how to carry out the necessary testing, as well as background information on how to apply for and claim compliance until the Standard is released.

For more information, visit www.dnvgl.com/ABPS.

This article first appeared in RenewEconomy.

"The ACT is widely recognised as a leader in renewable technologies and the Hub is testament to the Territory's foresight."

of Hub development by building ever stronger links between local, national and international partners.

"Renewable energy is smart energy. It comes in many forms and involves vastly different skills. But what really sets the industry apart is the passion that people bring to the sector as they help refine, and redefine, energy dynamics."

Managing the Hub

The Smart Energy Council has appointed Alethia Barceinas as Manager of the Renewables Innovation Hub. With a background in business innovation within the private and public sectors and strong commitment to a sustainable environment, Alethia is already well known in the industry.

Alethia will be the primary link, the main liaison, between the Smart Energy Council and the ACT Government and will seek to strengthen the renewables network in the ACT while continuing to lead projects.

She said "The new phase of Hub development is an exciting one. We will be ramping up our focus on support for innovation and ecosystem activities and start-up connections among medium and large companies, academia and international businesses.

"In the coming weeks we will be presenting an active program of cleantech innovation events through a series of interesting networking, mentoring and information sharing events." In her words "Innovation is simply looking at problems as opportunities of improvement from a different perspective."

Recent events

- The ACT Smart Energy Hub Collaboration Workshop held on 20 February helped pinpoint key ideas that will contribute to the Hub's success and value to the community
- The Parliament House Smart Energy Summit on 27 February was an important, invitation-only event, addressing three critical current issues around renewables
- Smart Energy Council's Board *Meet and Greet* of 28 February presented the ideal opportunity for the Smart Energy Council Board to meet with the ACT renewables industry

Want to know more or be included on the database for upcoming events and news?

Contact Alethia Barceinas on 0452 414 070 or email alethia@smartenergy.org.au

The Minister for ACT-ion

Minister for Climate Change and Sustainability Shane Rattenbury commented that the Hub has helped position ACT at the forefront in renewables innovation through the development of a strong renewable energy ecosystem.

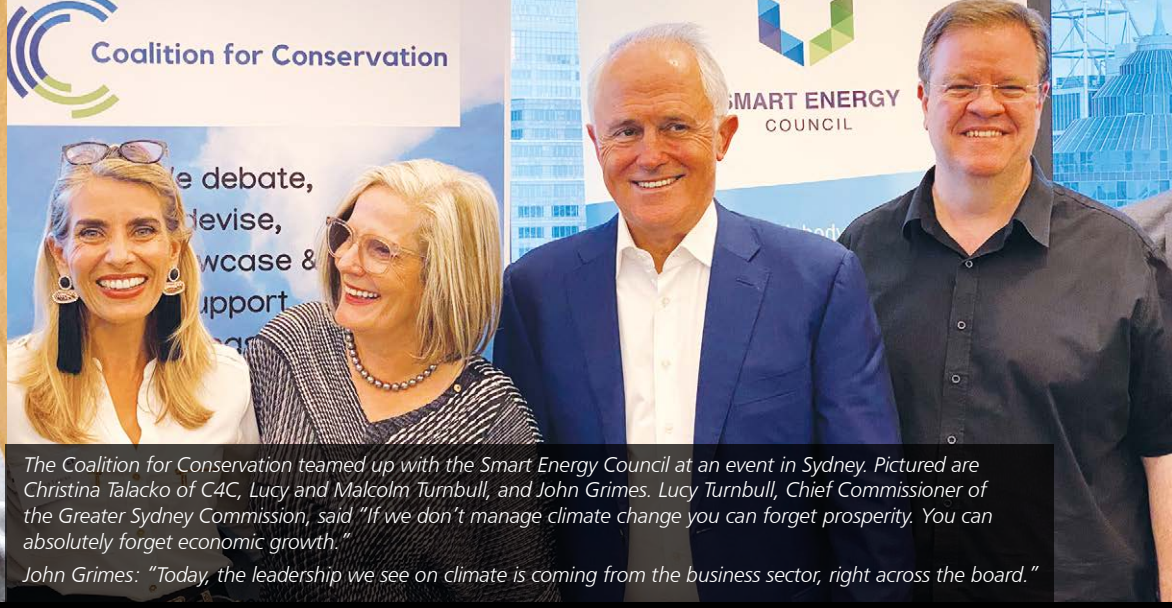
"Forward thinking companies from across Australia – and the world – have been able to set up their businesses at the Hub, allowing them to connect with renewable energy industry leaders through workshops, seminars and briefings by industry and research leaders," he said.

It is believed that close to 8,000 megawatts of renewables around the world are managed in Canberra's renewables precinct.

Mr Rattenbury said the Hub has evolved into the focal point for the renewables community, which continues to attract interest from major renewable energy investors and that "This is through innovation and the development of new clean technology industries in a sector worth an estimated $20 trillion by 2050."

The Minister addressed *What next in the ACT beyond 100 per cent renewable electricity?* during a recent Eco Discussions presentation. Earlier, Professor Ken Baldwin of the ANU had enlightened listeners on the topic: *Energy futures: where are we heading?*

Zali Steggall MP,
Member for Warringah

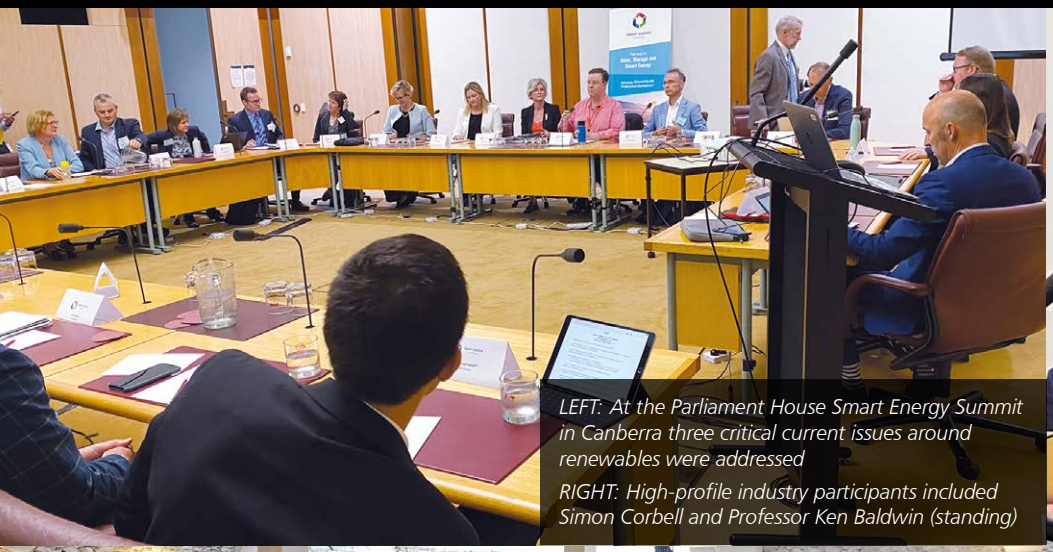


The Coalition for Conservation teamed up with the Smart Energy Council at an event in Sydney. Pictured are Christina Talacko of C4C, Lucy and Malcolm Turnbull, and John Grimes. Lucy Turnbull, Chief Commissioner of the Greater Sydney Commission, said "If we don't manage climate change you can forget prosperity. You can absolutely forget economic growth."

John Grimes: "Today, the leadership we see on climate is coming from the business sector, right across the board."

OUT AND ABOUT WITH THE

SMART ENERGY COUNCIL
SOLAR, STORAGE, SMART ENERGY



LEFT: At the Parliament House Smart Energy Summit in Canberra three critical current issues around renewables were addressed

RIGHT: High-profile industry participants included Simon Corbell and Professor Ken Baldwin (standing)

ABOVE: Smart Energy Council' Meet up in Adelaide. Our thanks to partners SolarQuotes, NRG Solar, Motherson, Eguana Technologies and Enzen

BELOW: The Smart Energy Council's Installer Roadshow in Melbourne attracted more than 60 participants

Smarter distributed generation here.

For a more flexible future here.

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se.com/au/microgrids

Life Is On | Schneider Electric

Warm Welcome

The Smart Energy Council would like to welcome the following new members:

SMART ENERGY COUNCIL
SOLAR, STORAGE, SMART ENERGY

PLATINUM MEMBERS

your energy partner	yourenergypartner.com.au
STIEBEL ELTRON	stiebel-eltron.com.au/
cbus	cbussuper.com.au
S-5! The Right Way!	s-5.com
echo	echo.co
KPMG	kpmg.com.au
LMS ENERGY	lms.com.au
mondo	mondo.com.au

GOLD MEMBERS

s-rack SOLAR MOUNTING SYSTEMS	s-rack.com
krannich global solar distribution	krannich.com.au
SOFAR SOLAR	sofarsolar.com.au

TITANIUM PARTNERS

Alpha·ESS	alpha-ess.com
GreenDeal	greendeal.com.au
powering tomorrow Growatt	growatt.com

If you would like to speak to any of these companies or find out more about membership with the Smart Energy Council please contact Luke Shavak, Membership Sales Manager on 0499 345 013 or email luke@smartenergy.org.au

SMART ENERGY COUNCIL
SOLAR, STORAGE, SMART ENERGY

About us

The Smart Energy Council is the peak body of the smart energy sector in Australia. We are a not for profit, membership-based organisation with over 1,200 members nationwide, consisting of companies and individuals operating in this rapidly expanding industry.

HYDROGEN AUSTRALIA
A DIVISION OF THE SMART ENERGY COUNCIL

We are passionate and independent. Our deep understanding of and connections with our members and industry ensures that we deliver results for the smart energy industry and the community.

Support the driving force of Smart Energy

The Smart Energy Council:

- Fights hard for smart energy policy
- Provides actionable market intelligence
- Creates valuable networking and introductions
- Delivers high quality training and professional development
- Promotes your business and brand

We represent companies across the Smart Energy spectrum including: solar, solar hot water, storage, energy management, electric vehicles, hydro, wind energy, hydro, bioenergy, ocean energy, geothermal, hydrogen, co- and tri-generation and hybrid and enabling technologies.

We also represent smart energy customers and consumers and provide expert advice to governments and the public.

As the national voice for smart energy the Council is committed to high-quality, long-term smart energy solutions for all Australians.

"The Smart Energy Council has the key people, experience, demonstrated effectiveness, and industry and government network and relationships, to rate as one of the top industry bodies in Australia and globally."

– John Hewson, Former Liberal Party leader, financial and economic expert

Become a Member Today

Don't sit on the sidelines. Become a Member and play an active role in driving industry quality, safety, and smart national energy policy.

For further information please contact:

Luke Shavak, Membership Sales
Email: luke@smartenergy.org.au
T: 0499 345 013

Learn more **smartenergy.org.au**

Smart Energy Council Corporate Members

For full listing of Smart Energy Council Members see **www.smartenergy.org.au**

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TGOOD Energy, Fast! · Selectronic · LG Chem · LONGi Solar · Enphase · brighte

Law Quarter · Metropolis Metering · SGB-SMIT Group · VDE Renewables · Harvey Norman Commercial Division Solar · Eguana Technologies

CenturyYuasa · Solplanet · CaptainGreen Solar · Edge Electrons · your energy partner · acciona

Munich RE · evergen · Solar Service Group Keeping Solar Safe · Stiebel Eltron · Fronius · Delta

Flexigroup · EISS Super · cbus · Solar Cutters · SolaX Power · S-5! The Right Way! · echo · KPMG

YES Yates Electrical Services · LMS Energy · sonnen · Huawei · windlab · infigen · Schneider Electric · mondo

Gold Members

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Kehua Tech · PowerArk Solar · Fluence · SUNMAN · OutBack Power · risen solar technology · NRG Solar

SolarWatt power to the people · GCL · redflow · LEAD 先导 · Trinasolar · invt · Sungrow Clean power for all

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SMART ENERGY COUNCIL CALENDAR OF EVENTS 2020

SMART ENERGY COUNCIL

APRIL

7-8 — SMART ENERGY CONFERENCE & EXHIBITION 2020
Sydney, NSW
Free to attend

8 — HYDROGEN 2020 CONFERENCE & EXHIBITION
Sydney, NSW
Free to attend

TBC — SMART ENERGY WEBINAR SERIES
Free to attend. Online

MAY

TBC — SMART ENERGY WEBINAR SERIES
Free to attend. Online

JUNE

5 DAYS TBC — INSTALLER ROADSHOW 2020
5 Cities, Australia

JULY

8 — SMART ENERGY BRISBANE MEETUP
Brisbane, QLD
Free to attend

TBC — SMART ENERGY WEBINAR SERIES
Free to attend. Online

AUGUST

18 — QUEENSLAND SMART ENERGY CONFERENCE & EXHIBITION 2020
Brisbane, QLD
Free to attend

TBC — SMART ENERGY WEBINAR SERIES
Free to attend. Online

SEPTEMBER

2-3 — SOLAR ASSET MANAGEMENT AUSTRALIA CONFERENCE 2020
Sydney, NSW

TBC — SMART ENERGY WEBINAR SERIES
Free to attend. Online

OCTOBER

TBC — SMART ENERGY WEBINAR SERIES
Free to attend. Online

7 TBC — SMART ENERGY MELBOURNE MEETUP
Melbourne, Vic
Free to attend

8 TBC — NATIONAL SMART ENERGY SUMMIT
Melbourne, Vic

NOVEMBER

TBC — SMART ENERGY ADELAIDE MEETUP
Adelaide, SA
Free to attend

TBC — SMART ENERGY WEBINAR SERIES
Free to attend. Online

DECEMBER

TBC — SMART ENERGY WEBINAR SERIES
Free to attend. Online

Explore our webinars:
smartenergy.org.au

SMART ENERGY COUNCIL

HYDROGEN AUSTRALIA

LOCAL AND GLOBAL EVENTS

HANNOVER MESSE 2020
20-24 April
Hannover, Germany
info@messe.de
www.hannovermesse.de

THE SOLAR SHOW PHILIPPINES 2020
18-19 May
Manila, Philippines
andre.laury@terrapinn.com
www.terrapinn.com/exhibition/the-solar-show

6TH SOLAR INDIA 2019 EXPO
20-22 May
New Delhi, India
ravim@eigroup.in
www.solarindiaexpo.com

SNEC 14TH (2020) INTERNATIONAL PHOTOVOLTAIC POWER GENERATION AND SMART ENERGY CONFERENCE & EXHIBITION
25-27 May
Shanghai, China
info@snec.org.cn
www.snec.org.cn

7TH SOLAR AFRICA 2020
4-6 June
Nairobi, Kenya
feedback@expogr.com
www.expogr.com/solarafrica

THE 16TH SOUTH EAST ASIAN RENEWABLE ENERGY TECHNOLOGY EXHIBITION & CONFERENCE
11-13 June
Bangkok, Thailand
info@annexhibition.com
www.asew-expo.com/Home.aspx

EXPO SOLAR 2020
17-19 June
Seoul, Korea
www.exposolar.org

INTERSOLAR EUROPE 2020
17-19 June
Munich, Germany
info@intersolar.de
www.intersolar.de

SOLAR PV WORLD EXPO 2020
16-18 August
Guangzhou, China
www.pvguangzhou.com

SOLAR INDUSTRY Positive Quality™

THE SMART ENERGY COUNCIL'S Positive Quality™ program sets rigorous standards that ensure manufacturers who achieve and maintain high standards are singled out and recognised.

Prominent panel maker **JinkoSolar** meets those high standards and proudly displays the Positive Quality™ logo, a symbol of manufacturing excellence, which sends a signal of confidence to consumers.

Participating manufacturers are fully recognised, consumers enjoy peace of mind and the industry's reputation is strengthened, delivering **Positive Quality™** for all. Australian consumers and businesses can have confidence in the quality of the solar panels they are installing by looking out for the **Positive Quality™**.

The Smart Energy Council developed the program because the generic appearance of panels makes it difficult to determine good from bad, unless an identification mark denotes otherwise. A logo that signifies superior quality.

The **Positive Quality™** program admits and endorses manufacturers that are independently tested and verified through plant visits. The initial assessment consists of a company's entire manufacturing processes undergoing independent and intensive inspection and testing.

This is carried out by the Smart Energy Council's specially appointed **Positive Quality™** specialists in a three step process: Certification check and compliance with IEC and Australian standards; Factory inspection with a 60-point check; and a Product quality check: appearance, IV, EL, Hi-Pot, and leakage current.

Positive Quality™ participants' premises are then inspected at random every 12 weeks to ensure the continuity of those high standards. All solar PV manufacturers of high quality can participate.

Contact Positive Quality™ Manager Brett Thompson on 0402 181 250, email brett@smartenergy.org.au or visit www.smartenergy.org.au

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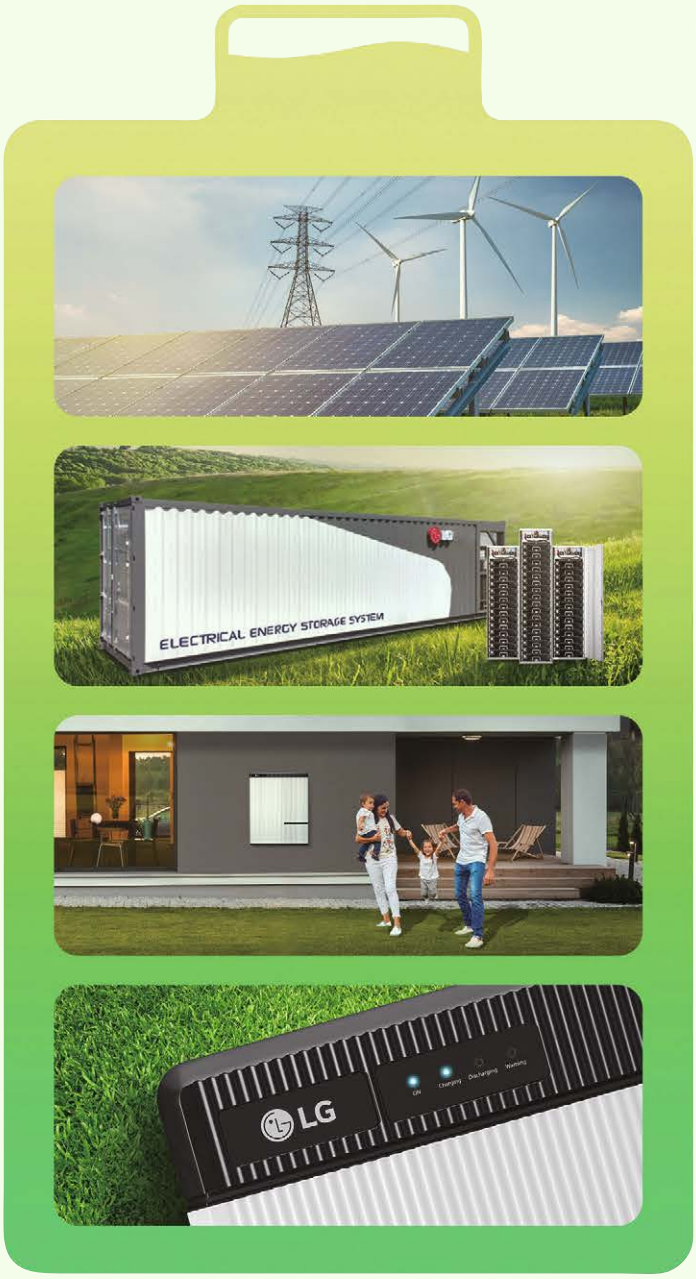

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