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AEMO's Integrated System Plan Energy Ministers gather for Smart Energy Summit The renewables-led economic recovery takes shape Mapping out Australia's green hydrogen potential The incredible PV Market Capital cities turning green LEADERS UNITE AT GLOBAL SUMMIT

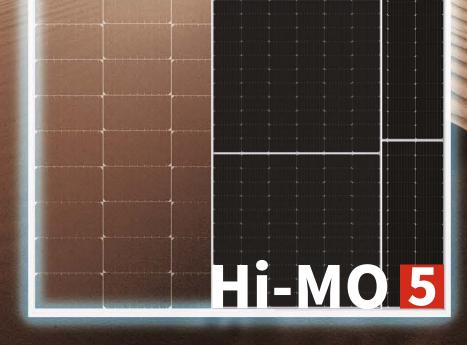
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SMART ENERGY is published by the SMART ENERGY COUNCIL ABN 32 006 824 148 Smart Energy ISSN 2206-1673 www.smartenergy.org.au

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Smart Energy was first published in

1980 as Solar Progress. The magazine aims to provide readers with an indepth review of technologies, policies and progress towards a society which sources energy from the sun rather than fossil fuels.

Except where specifically stated, the opinions and material published in this magazine are not necessarily those of the Smart Energy Council. Although every effort is made to check the authenticity and accuracy of articles, neither the Smart Energy Council nor the editors are responsible for any inaccuracy.

Smart Energy is published quarterly.

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Welcome



The link between COVID-19 and climate change

THE SCIENTISTS TELL US that the propensity for viruses to leap from wildlife populations into humans is accelerating.

They say this is due to increasing deforestation, and therefore closer cohabitation between humans and wildlife, especially in places like south Asia, central Africa, and China.

TITANIUM PARTNERS



In my view

AEMO'S 2020 INTEGRATED SYSTEM PLAN is a blueprint for the nation's future energy system. It responds to the latest technology, economic, policy and system developments in the National Electricity Market (NEM) and is intended to help guide governments, industry and consumers on the investments needed for an affordable, sustainable, secure and reliable energy future.

It recognises that by multiple measures, Australia is experiencing one of the world's fastest energy transitions with record levels of renewable investment, both on the grid and across rooftops throughout the country. With more than 60 per cent of thermal generation expected to retire within the next 20 years, the ISP signals extraordinary opportunity to create a power system that is cost effective, secure and clean.

By 2040, AEMO forecasts that the Australian power sector will need 30GW of grid scale generation and another 20GW of distributed energy resources.

The timely build out of the transmission network and implementation of market and regulatory reform will be the core elements of this. We will be rebuilding our system to take advantage of new technological innovation and address the resiliency concerns, both current and emerging, that are associated with the extremes of our climate.

To do all of this we must recognise that just understanding where the 'hardware' of the power system is taking us is not enough.



Pressure on smaller and smaller areas of wildlife habitat, and humans slashing forests for farms open up new points of contact.

So, just as carbon emissions accelerate the rate and impact of climate change, deforestation accelerates the rate of pandemics.

Population growth and unprecedented human mobility then allow faster spread to all areas of the world.

Using the atmosphere as an open sewer. Cutting down forests and dumping mountains of plastic waste into our oceans each year. It is all part of the same story.

A story of human greed, structural inequality and idiocy.

The urgent and coordinated response the world has put in place to combat COVID-19 is the example we desperately need.

To effectively respond to all of these connected crises.

An urgent transition to a low carbon world, based on science. We must take the pressure off. Because the only people who will get crushed in the end is ourselves.

Urgent and coordinated. Each country taking local action to combat a global problem. All acting for a universal benefit.

Those in the renewables industry should be proud. You are the vaccine to climate change. We just need a hell of a lot more action, and much, much sooner...





We also need the software to work, the visibility, machine-to-machine communications, advanced computational analysis, and AI decision tools required for the modern, data and weather driven power system.

In co-designing our future, together we must also consider how best

to integrate other industries, such as transport, heating and processing that will also see higher degrees of electrification.

That is what a smart energy future looks like. By working in partnership, we will be able to minimise costs and ameliorate the risks, and build one of the world's most efficient and low carbon energy

systems. We look forward to continuing to work handin-hand with you, the industry, government and consumers in making our energy system affordable, secure, reliable and sustainable.

Audrey Zibelman, AEMO Managing Director and Chief Executive Officer



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LOCAL and **GLOBAL NEWS**



AEMO FACTS AND FIGURES How good

does 94 per cent renewables sound? That's the level Australia could harness by 2040 according to AEMO's updated Integrated System Plan which identifies the optimal development path for the National Electricity Market, and that will produce \$11 billion in net market benefits. A 'step-change' would deliver 94.2 per cent renewables by 2040 whereas a business-as-usual scenario delivers a 74 per cent renewables share by 2040. The ISP analysis confirms that as coal plants retire, the least-cost transition of the NEM will be to a highly diverse portfolio of distributed energy resources and variable renewable energy supported by multiple dispatchable resources.



Read more on page 8.

CEFC's 2019-2020 REPORT highlights new investment commitments of more than \$1 billion, supporting 23 clean energy investments with a combined value of \$4.2 billion in the year to 30 June 2020. CEFC finance reached new areas of the economy: Australia's first dedicated green bond fund, the CEFC's first green home loan, and a ramp up in the capacity of Australia's largest battery in South Australia. Total CEFC commitments since inception in 2012 reached \$8 billion by 30 June 2020, attracting \$27.3 billion in investment commitments to clean energy initiatives across the economy.

INVESTMENT IN ROOFTOP PV continues to soar: Australia added a record 1,357MW of new rooftop solar PV photovoltaics in the first half of 2020, 41 per cent higher than the same period in 2019 according to Green Energy Markets. The momentum has to some extent defied the odds in a pandemic year - or has it? Homeowners now working from

home have switched on to the fact solar energy makes more sense than ever

Read more about the booming PV market on pages 52-54.



A \$3 BILLION PROJECT encompassing 1,200MW of wind energy, 600MW of solar PV, and a mighty 900MW/1800MWh of battery storage is destined for development in South Australia by French renewable energy developer Neoen. The battery in the Goyder South project is almost three times larger than Hornsdale's big battery which captured world attention just over three years ago (and is proving somewhat more useful than a big banana tourist attraction). The gargantuan Goyder South plant will be delivered in three stages each representing a third of total capacity: 400MW wind, 200MW solar and 300MW/600MWh of battery storage generating up to 4.8TWh power each year. Putting that in perspective, it's almost doubling the state's current wind and solar output. Tres impressive.

STAYING ON BIG NUMBERS the \$22 billion Sun Cable project in the Northern Territory has been granted Major Project Status. The billion dollar project featuring the world's largest battery, the world's largest solar farm of 10GW, and a 1,500km high voltage transmission system from Darwin to Singapore is slated for completion by the end of 2027.

Sun Cable project backer Mike Cannon-Brookes recently staged an appearance at the Daily Telegraph Bush Summit in Cooma in a bid to "educate" Energy Minister Angus Taylor and shadow resources minister Joel Fitzgibbon about renewables, saying "They tell stories for a living and I deal with facts, technology, science and hard economics... [and] investing in renewables is an unstoppable train. It is the cheapest source of energy that exists today. We should have the cheapest energy on the planet. We have so much wind and sun it is crazy that we don't." And still the emission reductions minister is talking up the prospect of a fossil fuel gas-led economic recovery.

Meantime Research consultancy Wood Mackenzie advises battery storage will turn Europe's gas peakers into stranded assets by 2030 when wind and solar generation dominate the sector.



DIRTY BIG SECRET Fossil fuel companies are rated the worst performing sector in the ASX 300 over the past decade. The financial performance ranking reveals \$100 invested in the fossil fuel-dominated S&P ASX 300 Energy index in 2010 inched up to just \$104 by January 2020, of which COVID shed \$51. By contrast \$100 in the wider market peaked at \$237, falling to \$169 with the virus. Had fossil fuels been excluded from the portfolio of the ASX 300 it would have seen returns increase by 8.6 per cent over the decade.

DOCTORS' ANTIDOTE A group of GPs, emergency doctors, obstetricians and psychiatrists recently wrote to the Prime Minister urging him to make climate change action a part of the COVID-19 economic response. The letter co-ordinated by the Doctors for

IMAGE COURTESY NEON



the Environment Australia notes the COVID-19 pandemic and climate change are two global health emergencies the must be attended to, stating "Like COVID-19, climate change is a public health emergency that must be addressed urgently... The post-COVID recovery offers an unprecedented opportunity to reject developments that are destructive to our environment." The DEA message aligns with an increasing number of business groups and is the focus of the Smart Energy Council's campaign. (See renewables-led recovery on page 16.)





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LOCAL and **GLOBAL** NEWS



THE AUSTRALIAN INDUSTRY ENERGY TRANSITIONS

INITIATIVE marks a move by eight of Australia's biggest mining and industrial polluters to purge their operations and supply chains of greenhouse gas emissions. Signatories BHP, Woodside, BlueScope Steel, BP Australia, Orica, APA Group, Australian Gas Infrastructure Group and Wesfarmers Chemicals, Energy and Fertilisers are reacting to shareholder pressure to achieve net zero emissions by 2050.

NUMBER ONE GREENHOUSE GAS POLLUTER AGL has

become the first major company in Australia to link manager bonuses to reduced emissions. The company's bid to track levels of energy generated from renewable sources - in the notable absence of a federal renewables target - takes effect from July 2021.



THE PIVOT - REBOUND - TRANSFORM report underscores the vital role of an energy and emissions management sector supporting Australian industry and has been welcomed by the Energy Efficiency Council and Australian Industry Group. Innes Willox of AIG said, "Achieving global competitive advantage for Australian industry in a world heading for net zero emissions will be accelerated by a rich relationship with technology and service providers that can support better emissions and energy management." One of the report's key recommendations is the creation of a new peak bodies forum, the Industry Council on Energy and Emissions.

Smart Energy is printed by Camten on 100 per cent recycled paper which is certified Carbon Neutral by the Department of Environment under the National Carbon Offset Standard (NCOS). Made in Australia by an ISO 14001 certified mill. No chlorine bleaching occurs in the recycling process. Camten uses sustainable printing practices - Sustainable Green Print - Lean and Green, and is fully FSC certified SGS COC 004746.



ENERGYAUSTRALIA IS ACQUIRING 100 PER CENT OF

ECHO GROUP, hot on the heels of last year's 49 per cent purchase. The move which is subject to FIRB approval illustrates "EnergyAustralia's commitment to offering customers affordable energy solutions". With a tagline "reimagine sustainable" Echo Group, provider of solar and battery storage solutions among other carbon reducing initiatives, will continue to operate independently under its current brands including Cherry Energy Solutions, eko energy and littil.



WEIR MINERALS AUSTRALIA has signed a landmark agreement with ENGIE Australia & New Zealand to source renewable energy for its operations in New South Wales and Queensland. Weir Minerals' PPA represents an admirable reduction of more than 100,000 tonnes of carbon emissions over the lifetime of the five-year agreement. Weir is targeting a 50 per cent reduction in CO₂ emissions by 2030 and net zero by 2050 globally. For its part ENGIE ANZ boasts 1,200MW of low-carbon generation capacity and more than 800MW of renewable energy under development. Its east coast retail brand Simply Energy customers number 720,000.



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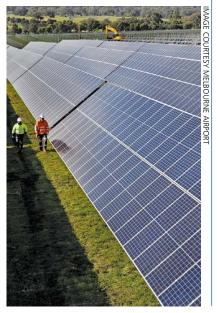


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POPULAR SUPERMARKET ALDI will become Australia's first supermarket to commit to 100 per cent renewable electricity to power its Australian operations from 2021. The grocer is the nation's 64th biggest user of electricity in Australia, powering 555 stores and eight distribution centres. To achieve its 'green' commitment the company has made significant investments in wind energy through two ten-year PPAs and will be responsible for Australia's largest commercial solar rollout to date.

LIFT OFF A new solar

farm at Melbourne Airport will have the capacity to produce enough renewable energy to power all four passenger terminals when it is turned on in January 2021. As a result the airport is set to generate 17GWh of electricity annually, nearly 15 per cent of the airport's annual electricity consumption. What is less certain, however, is just when the airport will resume normal operations. Air travel has plummeted 90 per cent during the pandemic.



JINKOPOWER AND BIDDING PARTNER EDF RENEWABLES

have been awarded the 2GW Al Dhafra Project in UAE. A 30-year PPA has been signed by the Emirates Water and Electricity Company in what will become the world's largest standalone Solar PV plant. The Al Dhafra Solar PV Project eclipses the 1.2GW Noor Abu Dhabi solar plant which also involves the Jinko Consortium and commenced operations in April 2019.



PROTECTION The Smart Energy Council acknowledges the good work of its members who are supplying PPE to industry and the community. Among the providers of personal protective equipment: Sungrow, LONGi, Enphase, Floatpac (masks) and PowerPlus Energy (hand sanitiser with batteries).



AEMO'S ISP 2020 – A CLEAN ELECTRICITY SECTOR BY 2040 AND MUCH, MUCH MORE – IF...

The much-anticipated updated Integrated System Plan has delivered some sound facts and figures that reveal the extent of Australia's renewables potential by 2040. Does 94 per cent sound like a good figure? Read on.

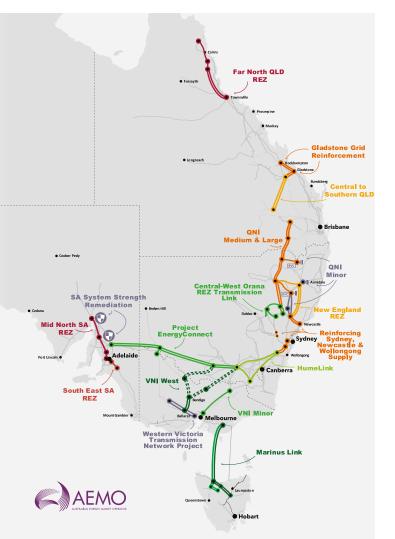
By Simon Holmes à Court and Steve Blume

THE SMART ENERGY COUNCIL welcomed the 30 July 2020 release of the Integrated System Plan (ISP) by the Australian Energy Market Operator (AEMO). The ISP confirms what we already know: Australia is a renewable energy powerhouse.

From the Ross Garnaut reports of 2008 and 2011 to the Finkel Report in 2017, and many other studies, the conclusions have been the same:

- Australia can have an affordable, reliable and low emissions power system;
- fossil fuels are needed for only a small number of applications; and
- a rapid transition to a clean electricity system offers the potential for Australia to be an exporter of energy and energy intensive products at the same scale as we do now, replacing the fossil fuel raw material exports of today.

The Smart Energy Council has presented submissions about governance structures for our energy systems, has been vocal about the barriers to clean energy deployment, and has offered pathways for consideration that, until this second iteration of the ISP, seemed to have been ignored.



This 2020 ISP from AEMO chief executive Audrey Zibelman and her team offers a valuable response to the call from the 2017 Finkel Report *Blueprint for the Future* for a major step-up in system-wide planning. This plan is the most rigorous economic and engineering study ever into our grid's possible futures and offers the potential for a great outcome if the 'step change' scenario is the direction taken.

A key driver for the Smart Energy Council is that our members' products and services are critical components to any effective response to the climate change challenges identified by the IPCC and the 2015 Paris agreement.

The ISP explores five plausible scenarios for the National Electricity Market (NEM) that cover differing rates of economic and population growth, technology development (including electrification of transport) and climate policy ambitions. The updated scientific evidence suggests we need a global reduction of CO_2 emissions of around 8 per cent year-onyear to contain temperature rises to 2°C. The ISP step change scenario is the only path that comes close to complying in our electricity sector, where we have the greatest and lowest cost opportunity for reductions.

The ISP step change scenario delivers energy for only a small incremental cost above 'business as usual scenario' and, like all the scenarios, has been stress-tested to ensure that Australia's energy trilemma of energy security, social impact and environmental sensitivity, discussed by Finkel and others, can be resolved.

Demise of coal and gas, rise of solar and wind

Today coal provides 67 per cent of our power, down from 80 per cent a decade ago. Coal generation tumbles by half over the next decade under the ISP step change scenario. It shows that by 2040 the equivalent of a single coal power station remains in Queensland, providing just 2.5 per cent of the grid's needs. Gas generation contributions fall, eventually comprising just 1.5 per cent of generation – making a nonsense of the current proclamations of a 'gas led recovery'!

The report indicates that by 2042 almost half of all energy comes from solar, 41 per cent from wind and just 6 per cent from hydro so the NEM will then be relying on a zero-emissions quartet of wind, solar, hydro and storage for 96 per cent of its energy. All to supply the same reliability, security and quality of supply as we enjoy now.

To maintain a stable electricity grid, demand and supply must balance and systems are designed to constantly adjust to maintain that equilibrium. This has been predominantly on the supply side, but the direction is towards dynamic operating envelopes – new designs, systems and controls to manage the increasingly distributed energy resources (DER) nature of the technologies and to increase the demand side opportunities too (demand response or DR). It will remain critical that the network includes adequate dispatchable generation, that is, generation that can be directed to operate on demand, and to provide grid support services. "The report indicates that by 2042 almost half of all energy comes from solar, 41 per cent from wind and just six per cent from hydro."

Hydro and fast-start gas are the primary dispatchable sources which currently meet the evening peak demand (when household loads are at their highest) and during extreme heat (due to increased air conditioning) as well as picking up the slack in the event of unexpected generator failures.

In AEMO's model, almost all the dispatchable capacity that's lost as coal power retires is replaced with storage – grid-scale batteries, household batteries and pumped hydro.

The path to emissions reductions

Until recently, gas would have been the choice for new fast flexible generation but, in the new ISP, AEMO makes a strong case that batteries can out-compete gas power generation for peaking and states that they are improving. Just three years ago this claim would have stretched credibility, but increasingly it's clear that gas peakers will only be able to compete if the price of fossil gas remains at prices below the realistic costs of extraction. It's worth noting that methane ('natural' gas) is a finite resource that has reserves of about the same time as the ISP study.

As the Energy Council says: "Australia produces (for domestic consumption and export) approximately five exajoules of gas annually, therefore Australia has over 20 years of supply available without any further exploration and development." Increasing gas exploration is incompatible within a world seeking to decarbonise and reduce emissions. That also implies increasing fuel costs as extraction becomes more difficult; a critical advantage and differentiator of renewables.

Perhaps surprisingly, only about 11 per cent of the generation from the wind and solar mix needs to be stored for later use, the rest being consumed as it is generated. Other studies have placed this at 15 per cent, but these are much lower than many would assume.

The 2020 ISP step change scenario offers its most stunning metrics when looking at emissions reductions. Over the 20-year study period, the generation mix results in (low cost) emissions savings of 720 million tonnes of carbon dioxide compared with business as usual.

At present, producing a kilowatt-hour of electricity results in emissions slightly above 700g CO_2 . Under the step change plan, our emissions intensity would fall to just 30g CO_2 for every kilowatt-hour produced,

lower even than nuclear-powered France, the benchmark for low emissions. The plan calls for quadrupling the amount of wind and solar we built in the last decade, plus 20 gigawatts of storage projects and several large-scale transmission projects. Importantly this is to simply transform and clean the electricity sector for current and planned domestic consumption. What the report does is to show the capability for delivering much, much more: as Professor Ken Baldwin and others have indicated with WA's Asian Renewable Energy Hub, the NT Sun Cable and various other nation building proposals, a 700 per cent and more buildout is entirely plausible.

Smart solutions

Australia's electricity sector is primed to stimulate much-needed jobs and economic activity as we repair the damage wrought by the pandemic.

As Simon Holmes à Court noted in a recent article "It's important to understand that the [ISP] scenario is not a forecast, but rather the least-cost plan to navigate a set of assumptions and constraints. If we fail to carefully manage the coal exits, delay transmission upgrades, deter investment or fail to reform our market structures to suit the changing times, we will pay more, emissions won't fall as far and reliability could easily be threatened. Without coordination and cooperation of both the states and federal government we may well find ourselves back on the horns of the trilemma."

He added "The 2020 ISP is a significant leap forward in our planning, but it's just the most recent in a series. For the 2022 release, AEMO has pledged to closely study the interaction of the grid with the emerging hydrogen economy. New technologies, lower technology costs and opportunities such as the 'flexibilisation' of heavy industry such as smelters will likely open new doors to lower costs and lower emissions."

The success of 2020 ISP and what benefits can be delivered to the electricity sector remain, as always, in the hands of our elected representatives. There is an extraordinary potential for developments to provide community and society benefits well beyond the cleaning of our electricity system.

The Smart Energy Council will continue to work with anyone who aims to achieve those very same, greater goals for the greater good.

STATES OF ADVANCEMENT



Australia's state borders may be closed but that was no barrier to a meeting of minds. One thousand people from all corners of Australia tuned in to the Energy Ministers Summit hosted by the Smart Energy Council and RenewEconomy in August.

All Ministers highlighted their renewable energy pledges, plans and progress, setting the tone for a healthy state of rivalry. **FROM GARGANTUAN PROJECTS** such as Tasmania's sub-sea 1.5GW Marinus Link to the mainland and the 11GW renewable energy zones slated for NSW, as well as South Australia's off-the-scale battery storage aspirations, the states are carving out the future for Australia's renewables rich future.

Each shares a net-zero emissions target by 2050, along with a fierce pride in accomplishments, and as **Shane Rattenbury, ACT Minister for Climate Change and Sustainability** told the Summit "If you look at the last decade it is the state energy ministers who have led in the energy space."

It was a pointed reference to the elephant in the Zoom: the absence of a federal minister for energy and emissions reductions broadcasting their energy and emissions policies and plans, possibly because there is little to say.

But with a virus that's left the economy in tatters, the need has never been more urgent to address the link between COVID-19 and a renewables-led recovery.

"This year has been one of focus on numbers and forecasts and flattening curves, and there is a correlation with climate change and reducing emissions and our response to the virus," Rattenbury said.

"In the ACT we see the economic recovery from COVID as one that is led by renewable energy and this will also address climate change."

Throughout the virus-induced crisis the renewable energy sector has shown remarkable resilience in



Shane Rattenbury, ACT Minister for Climate Change and Sustainability

Victoria, with new capacity coming online and a pipeline that continues to grow, **Victorian Minister for Energy, Environment and Climate Change, Lily D'Ambrosio** said.

"I want to emphasise the role of renewables in the recovery from the crisis and energy system," she said during her video address to the Summit, listing the state's rise in renewables spurred on by targets of 25 per cent renewables by 2020 and 40 per cent by 2025 then 50 per cent by 2030 that "send a clear market signal for investment certainty and driving record growth".

"Victoria is the renewable energy leader and this is driving the state's economic recovery... an economic crisis of this depth requires short-term stimulus as well as a long-term vision."

The state of NSW is likewise well placed to cope during the pandemic-induced economic crisis having "hit the accelerator on a range of smart energy infrastructure measures that are climate friendly and will put the state on the path to incredible progress," said **Energy Minister Matt Kean** in reference to the Renewable Energy Zones.

In the zone(s)

The state's abundant wind and solar resources combined with opportunities for batteries and pumped hydro energy storage are set to shake up the energy mix in NSW, propelling the state to a phenomenal 11GW additional new renewable energy as part of the plan to replace coal-fired energy and meet the state target of net zero emissions by 2050.

AEMO's ISP has endorsed the scheme with plans being fast tracked; the 3GW zone in the Central West has attracted potentially \$38 billion in private capital and project capacity totaling 27GW... it does not take a mathematician to figure out that's nine times greater than available capacity.

The larger 8GW REZ in New England is expected to attract \$12.7 billion and generate 2,000 jobs over a decade.

"We are seizing the opportunity to modernise the grid and deliver clean reliable energy, and establish

"We see it as a renewable energy led economic recovery that will address climate change and rebuild the economy on the other side of the pandemic."



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"We can build renewable energy and roll it out at a pace but we build transmission lines and networks very slowly. The lengthy and complex process is actually a hand brake that holds up progress and costs us reliability... we must streamline and speed up that process." JOHN GRIMES

IMAGE JANEK PIXARAY

ourselves as an energy superpower in the low carbon economy of the future," Minister Kean told the Summit.

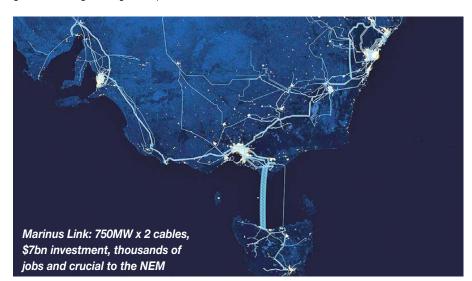
Simon Holmes à Court observed the Minister's plan will result in as much large-scale renewable energy built this decade in NSW as all of Australia built over the past 20 years. And most agree it is eminently doable.

"It's no more just about generation – we know we can create renewable energy very, very well, we have the capacity, we don't need taxpayer funded subsidies – whether it's solar farms or rooftop PV we are already there, it is not new emerging technology," said **Dan van Holst Pellekaan, the South Australian Energy Minister** who is driving grid-scale storage through a 50 per cent increase to the Hornsdale battery, three other grid-scale batteries and the Energy Connect (interconnector) to NSW.

South Australia has, however, fallen victim of its success in rooftop PV and faces the prospect of curtailing day time feed in to avoid net negative demand on the grid.

The wind and water blessed Apple Isle

The meeting heard from an "energised" **Guy Barnett** who proudly reminded the Summit of Tasmania's world class wind and water resources and the Marinus link that "builds on our strengths so we can be the best we can be" while delivering jobs and opportunities.



The Marinus link will result in two sub-sea 750MW cables to traffic low-cost reliable hydroelectric power to the mainland. Receiving the nod from Canberra and AEMO which deems a guaranteed rate of return for the life of asset, the project is being fast tracked and "will see a host of private investors stepping up to provide support to make it happen," the state LNP energy minister Barnett said.

Tasmania also aspires to 200 per cent renewables by 2040 (with the mainland in mind), and Barnett declared "We will legislate for that as it provides certainty for the decades ahead." Yes, good point. Legislated targets. Certainty. Perhaps his party colleagues in Canberra might like to take a leaf out of the book of the energised minister.

Queensland too has notched up big numbers, among them the 6700MW in large scale projects on top of the 39 renewables projects that are financially committed with \$6.6 billion invested in the state.

"The COVID economic recovery remains a challenge but renewable energy will be at the forefront of that recovery," said **Energy Minister Anthony Lynham** who talked up the state's potential for renewable hydrogen industry

"The state Labor government has come a long way in a quick time and needs to maintain growth," said the minister in election mode.

"There is more to come from Queensland, the renewables powerhouse, the states share a vision and commitment for sustainable



renewable energy and we would dearly love to have the federal government come on the journey rather than be a barrier."

Potholes

So, why don't we have a federal mechanism or objective for renewables targets and reduced emissions?

"I can give you a three-word explanation for that: The Federal Government," Shane Rattenbury offered at the Summit. "They do not want to change or include [emissions reductions] in energy objectives. In energy ministers' meetings, if the federal government doesn't want to talk about it, the minister just doesn't let it on the agenda."

Contrast that with the hastily convened and highly effective National Cabinet dealing with COVID matters – duplicate that model and maintain momentum among energy ministers, he said.

"If you look at the last decade, it's been the states that have shown the leadership in the energy space," said the minister whose jurisdiction has attracted more than \$2 billion in investments through wind and solar reverse auctions.

"However, the Integrated System Plan is where we can make progress. We can get around federal government [impasse] by getting the right NEM transmission infrastructure in place along the east coast for interconnectivity between jurisdictions with storage plugged in," Rattenbury said.



"This needs to be driven by engineering and policy that removes the ideological debate to some extent. From a state and territory view that is the best place to focus our efforts."

What's in a NEM?

Not Western Australia, as **Energy Minister Bill Johnston** reminded the Summit. He reeled off a raft of initiatives in the gird-independent west that, despite not having a renewable energy target, has formed a COVID recovery plan involving investment in renewable energy facilities, plans for further stand-alone power systems, and VPPs at community housing and schools.

"New technologies create new challenges which is why WA is delivering its Energy Transformation Strategy," Johnston said, announcing the October release of a foundation

GLOBAL SMART ENERGY SUMMIT 2020

TUESDAY 29TH & WEDNESDAY 30TH SEPTEMBER



regulatory reform package as part of the state's complex energy transformation strategy and imminent release of a DER roadmap and Whole of Systems plan.

That almost completes our wrap of the Energy Ministers Summit convened by the Smart Energy Council and RenewEconomy.

"This is participatory democracy at work hearing first-hand what ministers have to say," John Grimes said at the conclusion of the Summit. "What we are really interested in is how do we present a renewables-led economic recovery in the post pandemic world and decarbonise the economy at the same time and, clearly, there are some fantastic opportunities in this field."

The full Summit recording can be found at www.smartenergy.org.au

Upping the ante on gas

During the Summit John Grimes voiced concern over the federal government's apparent support for the gas industry and suggested the solution lies in "aggressively driving down the cost of renewable hydrogen which helps solve the problem and gives Australia a stronger economic future as an energy exporter".

Shane Rattenbury echoed the apprehension. "There is a window over the next eight years where gas has the potential to be profitable and we



are concerned it appears gas will get a push from government in its post COVID construction committee industry. Gas is a fossil fuel and the more that is pumped into the system the more problematic it becomes, and once people have made the investments they will fight like hell to protect them. There is a risk the embedded investment will become a vested interest that will drive policy in this country," he said.

In late August the matter flared up with Australia's Chief Scientist Dr Alan Finkel defending his position on gas which he says can provide firming when renewable electricity generators can't meet demand.

Leading climate change scientists recently joined forces to voice concern over Finkel's support for gas which dismisses scientific evidence about the need for a rapid abandonment of fossil fuels to thwart further climate change.

One of the 25 signatories to the letter is Professor Will Steffen, who says "Finkel is addressing engineering problems. He is not speaking about the fact that using gas as a transition fuel is not compatible with meeting Paris Agreement climate targets to which Australia is a signatory."

The group has the support of former chief scientist Penny Sackett who said "Fuel switching from coal to gas is policy based on factors that were at play around the turn of the century or before, not in today's world and beyond. The last thing we need is to increase fossil fuel production at a time when coal, gas and oil must all decline starting now in order to stay well below 2°C of global heating."

DER on the rise A summary of projections for the uptake of distributed energy resources of rooftop solar PV and battery storage systems

CSIRO FORECASTS

40% by 2027 the number of Australians using DER

29GW solar PV, and

34GWh (behind the meter) batteries

DER will form 13-22% of total NEM consumption by 2040

and

EVs comprise 20% of light vehicle fleet by 2035

CORNWALL INSIGHT

32GW by 2030 predicted total capacity of small-scale PV and battery storage

24.45GW by 2030 total installed capacity of smallscale solar PV (based on average 4.5kW PV system and assuming 50-75% less installations in next 12-18 months)

7.4GW by 2030 installed capacity for batteries (assuming each battery is minimum 6kW, and installations of ~1GW pa by 2030, based on Clean Energy Regulator assumptions battery storage figures represent ~30% of battery storage installation)



GREEN ENERGY MARKETS PROJECTIONS FOR THE AUSTRALIAN ENERGY MARKET OPERATOR Projections of distributed solar PV and battery uptake to 2050-2051

SOLAR PV CAPACITY TO EOFY 2051

Base EOFY 2018-19 capacity ~9,400MW

75,000MW = upper range

44,000MW = central

33,000MW = lower range/slow change

NATIONAL CUMULATIVE MEGAWATTS OF SOLAR PV TO EOFY 2051

Base EOFY 2019 cumulative number of systems = 2.08 million

- 7.6 million systems = upper range
- 5.2 million systems = central
- 4.5 million system = lower range/slow change

BATTERY ENERGY STORAGE (BEHIND THE METER STATIONARY BATTERY SYSTEMS) TO EOFY 2051

Base EOFY 2019 cumulative battery capacity = 482MWh

48,500MWh = upper range

26,000MWh = central

17,200MWh = lower range/slow change

NATIONAL CUMULATIVE BATTERY CAPACITY TO EOFY 2051

Maximum instantaneous MW output available from projected stock of battery systems

Base EOFY 2019 installed stock of 209MW

30,000MW = upper range

14,500MW = central

10,000MW = lower range/slow change

NUMBER OF BATTERY SYSTEMS TO EOFY 2051

Base EOFY 2019 grid-connected battery systems = 52,420

- 7.1 million = upper range
- 3.4 million = central
- 2.3 million = lower range/slow change







GROUND BREAKING TECI

TECHNOLOGY



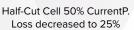
- Tier 1 European Global Giant
- Pmax Temperature Coefficient -0.295%
- Tri Cut Cell Technology (TCC) & Zero Gap Technology
- Minimised risk of Hot Spots
- Higher Yield per Surface Area
- European Engineering
- Warranty up to 30 years
- Superior Design

Tri Cut Technology (TCC) reduces resistive Power Losses.

The Extended Matrix – Interconnection Technology minimizes power loss due to shading effect. The Zero Gap Technology increases the active area and leads to higher efficiency.

Full Cell 100% Current







Half-Cut Cell 33% CurrentP. Loss decreased to 11%



The Tri-Cut technology by splitting cells in three parts (and thus decreasing to 1/3 the current) pushes up the efficiency limit of Half-Cut modules.

Find out more information at: www.prosunsolar.com.au



UNITED VOICES AND FORCES

Support for greater action on renewable energy to tackle the economic crisis and climate change is gathering momentum. Thousands of jobs would be created in the process.

"The National Cabinet shows that our leaders are capable of rising to the challenge: we have a oncein-a-generation opportunity to rethink policies that will shape Australia's future." A RENEWABLES-LED ECONOMIC RECOVERY has garnered widespread support from a variety of sectors across Australia. In one recent and high-profile instance, a coalition of 15 prominent groups including the Business Council of Australia and the Australian Industry Group called for stimulus packages to address the twin issues of economic crisis and climate change.

"We need to look at this as an opportunity, not as a challenge and not as something that we should be afraid of," Australian Industry Group chief executive Innes Willox said.

Several associations have identified the scale and scope of those opportunities: the WWF calculates a renewables-led economic recovery will create almost triple the jobs of a fossil-fuel-led recovery and is calling for a range of incentives, subsidies and regulations in six areas.

"A clean stimulus package can address issues holding back renewables and get the ball rolling on more than 100,000 jobs. We can make both the response to COVID count and we can also transition to the future in a safe and sustainable way, particularly when it comes to energy," WWF Australia energy transition manager Nicky Ison said.

"We can rebuild our economy in a way that sets up Australia for prosperity in a world hungry for a lowcarbon future."

The WWF report commissioned by economic consultancy Ernst and Young states fast-tracking renewable projects already in the pipeline would cost taxpayers very little and create an estimated 58,000 new construction jobs.

A further five measures, costing about \$2 billion would generate nearly \$10 billion in economic benefits and create a further 45,000 jobs while stimulating the economy and moving Australia towards net-zero greenhouse gas emissions by 2050.

Among the proposed measures: investment in manufacturing to reduce use of gas and build new clean-technology export industries; become a leading global battery manufacturer; electrify all buses; subsidise solar for community organisations; and accelerate the renewable hydrogen industry.

Clean jobs, stronger economy

The Climate Council has likewise declared that a high-impact, targeted, and timely clean jobs plan can rebuild the economy and tackle climate change.



In its all-inclusive *Clean Jobs Plan* the Council lists 12 policy opportunities that can put 76,000 Australians to work and help people and industries that have been hit hardest by the COVID crisis – particularly in regional Australia – reboot the economy, and tackle long-term challenges including climate change.

The dozen major opportunities, include:

- 15,000 jobs installing utility-scale renewable energy, including solar and wind farms, transmission infrastructure and adding utility-scale batteries and pilot projects to install and test green hydrogen technology.
- 12,000 jobs in targeted ecosystem restoration, including more than 5,000 in Queensland.
- 12,000 jobs in public and active transport construction, including 7,000-8,000 jobs for New South Wales workers, and
- 37,000 jobs in other projects across Australia including in organic waste, energy efficiency in buildings, urban green spaces, community-scale storage and more.

These projects would attract \$1.10 extra or so in private investment for every public dollar spent, says the Climate Council which urged supporters to email a copy of the *Clean Jobs Plan* to their state or territory member.

The Climate Council believes more than 800,000 jobs have been lost due to COVID.

www.climatecouncil.org.au



Staying on numbers, government advisor Andrew Liveris estimates 200,000 jobs are at risk should Australia overlook the opportunity to ramp up the manufacturing sector.

He says we need to build some manufacturing capability onshore to mitigate against the risk of not being able to get things offshore.

"How about value adding in manufacturing... how about making solar panels wind turbines and even going all the way making batteries... focus on the sectors we can be good at [and] that we can create and scale up for next generations.

"This should be a primary responsibility and COVID has just bought it home, and there's about 200,000 jobs at risk if we don't." He added renewable energy may not provide base power yet - but it will.

Liveris is on record citing Australian business' inability to innovate and develop the things in the way the United States has. "Australia, my wonderful home country, the lucky country, the well-written about happiest country in the world, of course has complacency as its greatest enemy," he says.

A top businessman, Liveris was born in Darwin to a Greek migrant family, studied chemical engineering at the University of Queensland and went on to advise the Obama and Trump administrations about revitalising the energy sector.

During the recent ABC TV series Life after COVID, the jobs of tomorrow Liveris said "I'm a fan of sovereign capability to protect ourselves and also to create next generation jobs, we can either be damaged by the market trend to zero emissions or take advantage of it."

Counting the cost

Mike Cannon-Brookes notes Australia has lost up to 800,000 jobs during the past four months and that the best opportunity facing Australia for large-scale job creation lies in renewable energy. He cites the BZE's One Million Jobs Plan that lists the opportunity for 1.8 million jobs to be created

"We can move forward... there is a whole raft of measures there, this is not about government subsidies... there has never been a more compelling time for Australia to adopt clean energy," he said. Tech billionaire Cannon-Brookes, along with Ross Garnaut, John Grimes and Malcolm Turnbull is one of the names behind the Beyond Zero Emissions' One Million Jobs Plan. (See Winter Smart Energy 'With great threats come choices, very real choices' where Eytan Lenko spells out the plan.)

Cannon-Brookes says masses of large-scale renewable projects are shovel ready and that governments pressured to find means of creating jobs and stimulating economic activity can turn attention to these. By contrast the Government's energy technology roadmap for "low emissions technologies" to strengthen the economy and support jobs and businesses, he says, is "a strategy without a destination".

Shovel ready jobs

.ORD MAYOR'S

We did mention the growing support for a renewable-led recovery, and a gathering of 50 social, property, business, environment, local councils

'Together we will encourage a more hopeful post-carbon vision for HARITABLE Australia' FOUNDATION

The Lord Mayor's Charitable Foundation is on a mission to educate the community about the science and impacts of climate change, and presents regular, accessible, evidence-based information from trusted sources to

allow all sectors of the community to respond effectively. Building on its momentum, the LMCF is staging high profile events* and tapping into traditional media strategies, web-based assets and social media to spread the word while influencing policy makers and key stakeholders.

and research groups are calling on Federal and State Governments to stimulate the economy with an energy efficient and solar PV installation boom in low-income housing.

Doing so would create tens of thousands of shovel ready jobs, cut energy bills for people on low incomes and reduce carbon emissions, according to ACOSS chief executive, Dr Cassandra Goldie.

"In responding to the COVID crisis we need a different kind of economic stimulus that is shovel ready and job-rich, includes a focus on people most at risk, and delivers long-term social, environmental and economic benefits," Goldie said.

Bluish-areen

The recently formed Blueprint Institute has called on the federal government to make investment in renewable energy a key focus of the post-COVID recovery, saying the pandemic highlights the urgent need for "bold new ideas and innovative thinking" and that it is in the national interest to reduce emissions and build resilience.

The Institute, co-founded by former advisors to Julie Bishop and backed by Christopher Pyne, identifies the scale of economic opportunities that exist in embracing the transition to clean energy, through development of an onshore battery industry, refining green steel and aluminium, and a renewable energy and hydrogen export sector.

Think tank co-founder and CEO Harry Guinness says "The National Cabinet shows that our leaders are capable of rising to the challenge: we have a once-in-a-generation opportunity to rethink policies that will shape Australia's future." Opportunities abound here and overseas.

The final words: 'Build Back Better'

"When Donald Trump thinks about climate change, the only word he can muster is 'hoax'... When I think about climate change, the word I think of is 'jobs'." Joe Biden, US Presidential candidate who proposes US\$2tn - that's TWO TRILLION AMERICAN DOLLARS - spending in clean energy infrastructure and other climate solutions within four years under a Democratic term to address the devastated economy and high unemployment caused by the coronavirus pandemic.

Recommended reading

We're out of space but those interested may like to read: The coming recession is the best reason to step up the pace of renewables investment by Frank Jotzo et al. in The Conversation, and refer to the Climate Change Authority report: Prospering in a low-emissions world: An updated climate policy toolkit for Australia, citing economic recovery, resilience and prosperity after coronavirus and the ability for clean energy resources and emerging low-emissions technologies to contribute to a 'triple-win' economic stimulus package, also read about The European Green Deal which lists the contributions renewables can make to help overcome the economic damage caused by COVID-19 and to decarbonise the economy by 2050.

More reports and renewables-led economic recovery reading at www.smartenergy.org.au

"Within our borders, we have some of the best renewable energy resources globally, including solar access, geo-thermal, wind, tidal, battery components and available land," the LMCF writes, "In addition, we have the skills, economic wealth and infrastructure capabilities to exploit them [and] the employment and economic benefits associated with clean technology are benefits that most people can get behind."

*The LMCF has joined forces with Smart Energy Council to present material that supports a renewables-led recovery and is a key supporter of events including the Global Smart Energy Summit of late September.

Visit www.smartenergy.org.au, A Renewables led Economic Recovery for resources on the topic.

GLOBAL SMART ENERGY SUMMIT 2020

TUESDAY 29 & WEDNESDAY 30 SEPTEMBER 2020



Powered by **ZOOM**

"We must revitalise and decarbonise our economies at the same time. A low carbon future is a high jobs future, and a renewables-led recovery means immediate and long-term jobs. That is our vision and that is our mission." - JOHN GRIMES



THE MISSION

To highlight the need to simultaneously revitalise and decarbonise global and State and Territory economies.

THE VENUE

The comfort of your own home or office VIA ZOOM

Lockdowns and border closures will not halt the progress or the resolve of the renewable energy industry.

The Smart Energy Council is pleased to bring you a world-first, world class Global Smart Energy Summit.

PLEASE JOIN US FOR:

- GLOBAL PERSPECTIVES 6pm-8pm Tuesday 29 September 2020 VIA Z00M
- DISCUSSIONS 8am-4pm Wednesday 30 September 2020 VIA Z00M

The Summit will hear from people of influence committed to a better way of energising the world. Topics include: Global Perspectives; Renewable Energy Manufacturing and Exports, Renewables-led Recovery, and Australia's place in the world as a Renewable Energy Superpower.

The Smart Energy Council has assembled **MANY LUMINARIES** from near and far to present at this **GLOBALLY SIGNIFICANT SMART ENERGY AND CLIMATE ACTION EVENT.**

AMONG THE STELLAR LINE UP: Mark Carney, Malcolm Turnbull, Frank Bainimarama, Audrey Zibelman, Hon Kwasi Kwarteng MP, Bill McKibben, Lord Deben, Mike Cannon-Brookes and Emma Herd. We are also joined by Global CEO of Zoom, Eric S. Yuan.

They join 20 more visionaries from Australia and overseas who recognise the need, and are taking action, to simultaneously revitalise and decarbonise economies.

The Global Smart Energy Summit will be a significant FREE ONLINE EVENT. The Summit will highlight the urgent need to tackle the economic crisis and the climate crisis at the same time, and the employment and economic opportunities from doing so. WE ARE EXPECTING SOME 10,000 REGISTRATIONS FOR THE EVENT.

WHAT'S THE IMPERATIVE?

- We need to develop economic opportunities from the decarbonising of Australia's economy, build a renewable energy export industry and take urgent action on climate change, and
- To put a major spotlight on big renewable energy and energy modernisation projects in positioning Australia as a renewable energy superpower.

FOR MORE DETAILS ON THE GLOBAL SUMMIT VISIT WWW.SMARTENERGY.ORG.AU

The Smart Energy Council continues to call on Australian Governments to invest in policies and programs that revitalise and decarbonise the economy while building a renewable energy export industry. **More info at https://www.smartenergy.org.au/a-renewables-led-economic-recovery**

"There are significant global markets for Australia's smart energy products and services. Australia can be a Renewable Energy Superpower and is well placed to prosper in a low carbon world."

THE ROAD AHEAD FOR ELECTRIC VEHICLES

The Electric Vehicle Council has identified Australian drivers' thirst for electric vehicles and the benefits of that transition, but says the community is still waiting to get the 'green light' from government. **THE LATEST NEWS** on electric vehicles is a mixed bag, with the Electric Vehicle Council finding that sales are rapidly accelerating and consumer sentiment as well as choice is growing. But roadblocks persist.

In the recently released *Annual State of Electric Vehicles* the EVC reports that in 2019 EV sales increased by 200 per cent with 6,718 EVs sold, at the same time petrol/diesel vehicle sales fell by 7.8 per cent

Despite the significant uptick, EV sales accounted for just 0.6 per cent of new sales in Australia in 2019, but this is the tip of the iceberg.

During the first half of 2020, 3,226 EVs were sold and as many as 56 per cent of surveyed consumers say they would consider purchasing an electric vehicle as their next car. That's a rise on the 53 per cent in 2019 and 48 per cent in 2018.

But EV travel must be more convenient: more than two-thirds of consumers, 68 per cent, want governments to provide more public charging infrastructure and say government subsidies should be introduced that effectively reduce the cost of buying an EV. Of the now 28 electric vehicle models in Australia, eight are now priced below \$65,000.

A similar amount – 66 per cent – want government subsidies to reduce the cost of installing home charging equipment, and 82 per cent identify public fast charging as 'important'.

Australia currently has 2,307 public charging stations, 357 of which are fast public charging stations. That's a healthy increase of more than 40 per cent in the last 12 months.

Interestingly, eight in ten people mistakenly believe electric vehicles are incapable of travelling more than 400 kilometres on a single charge. On this score, there's room for education, for the average daily drive is just 38 kilometres a day, and people can always charge their car from home overnight.

Nevertheless "Australian enthusiasm for electric vehicles is rising markedly despite the stubborn persistence of myths about range," Electric Vehicle Council chief executive Behyad Jafari said.

Policy vacuum

Policy support for the transition to electric vehicles is somewhat lacking, he said, with minimal investment in EV charging networks, home charging installation subsidies, and few if any EV sales targets.

"Despite the healthy enthusiasm for electric vehicles from the public, Australia's governments are still badly lagging the world when it comes to supportive policy," Jafari commented.

The EVC's new scorecard rates the Federal, state, and territory governments against a range of effective and evidence-backed policies to encourage and support electric vehicle uptake.

Spoiler alert – no one gets top billing. NSW and Queensland both scored C; Victoria, South Australia and Tasmania D; and West Australia, the Northern Territory, and the Federal Government each received an F. Only the ACT scored a respectable B, with EV tax incentives and a government fleet EV target introduced.

(See page 38 for more on ACT's drive to EVs.) "The ACT is commendably leading the way, but we really need the larger jurisdictions to follow if we want the benefits EVs can deliver like cleaner and quieter cities, lower carbon emissions, and national fuel security," Jafari said.

The EVC has an unlikely ally on this matter with coal baron Trevor St Baker who, despite making billions from carbon dioxide-spewing power plants, now says if the government fails to set vehicle emissions targets, more polluting cars will end up in Australia. (Never too late for an epiphany.)

Currently 80 per cent of the world's light vehicle market have mandated emissions standards and targets for new cars. But not Australia, despite the Climate Change Authority calling for a standard to commence in 2018, and demonstrating that mandatory standards are a cost-effective means of reducing Australia's greenhouse gas emissions and light vehicle fuel use thus:

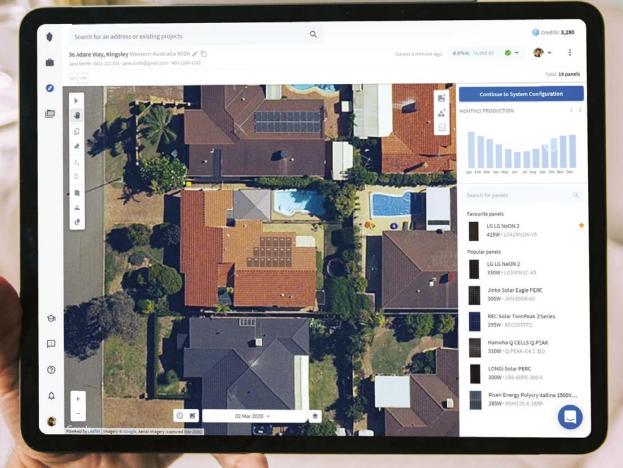
"The benefits of a light vehicle emissions standard substantially outweigh the costs at both private and national levels. A 105g CO₂/km target could increase the average cost of a new car in 2025 by about



IMAGE BY PETER GOTTSCHALK FROM PIXABAY

PYLON

https://pylon.solar/smartenergy



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Australia's most trusted solar design tool

"Despite the healthy enthusiasm for electric vehicles from the public, Australia's governments are still badly lagging the world when it comes to supportive policy."

\$1,500, but this would be more than offset by fuel savings of \$830 in the first year and \$8,500 over the life of the vehicle, leaving motorists better off. A standard would also prevent emissions and save Australia \$580 for each tonne of CO_2 avoided," the CCA writes in www.climatechangeauthority.gov.au/ reviews/light-vehicle-emissions-standards-australia

"The recommendations are an absolutely no regrets position, we could be more aggressive and commit to European Union or California standards," Smart Energy Council President Steve Blume said.

"The push back will be from overseas manufacturers who make more profit from dirty cars, however all of them are exporting to California and EU and meeting those world's highest standards, so asking them to use the same engines and software management for Australia is hardly an imposition."

Untapped potential

The 2020 Electric Vehicle Council report highlights untapped potential in the battery supply chain and, once again, support in the form of policies is necessary to accelerate investment in minerals processing, battery component manufacturing and battery recycling.

Speaking at a recent Smart Energy Council webinar staged in conjunction with the ACT Renewables Hub, Alexandra Kelly of the EVC commented that Australia needs to have a greater awareness of how it can lead the technology globally through a series of industry relevant opportunities from battery manufacturing and repurposing right through to electricity generation and grid upgrades as well as technology software.

Alexandra also remarked on the rise of consumer acceptance of EV technology along with uptake helped along by model availability in Australia but on the flip side, hampered by current costs.

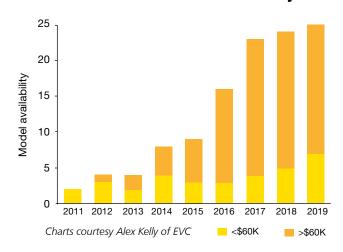
"The li-ion battery pack in electric vehicles currently accounts for 50 per cent of the total cost; however this is projected to fall (see chart) and by 2025 we should reach price parity with combustion engine equivalent," she said.

This makes the choice a no brainer.

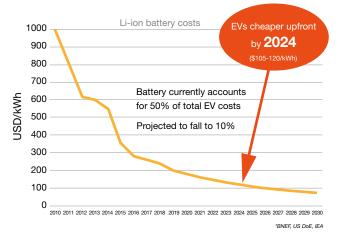
"But that will not be applicable in Australia until we mandate for an increase in uptake through policy incentives – the ACT can play a major role in this and push national dialogue – and get more models to market from manufacturers," she said, reinforcing the position of the Electric Vehicle Council.



EVs: Australia model cost and availability



Falling battery and EV costs



ARENA IS PROVIDING \$838,000 in funding to Origin Energy to undertake a two-year electric vehicle smart charging trial across the National Electricity Market. The \$2.9 million trial includes 150 smart electric car chargers to drive the uptake of electric cars and lessen their impact on the grid.

The wall-mounted AC chargers will be fully subsidised for trial participants and offer 7kw of charging power to residential customers and 22kw for fleet operators.

The smart chargers can be controlled remotely via Origin's Virtual Power Plant which monitors peak periods on the grid and distributes power supply accordingly.

"As the uptake of EVs increases, it will be important to efficiently manage the charging of vehicles, to avoid potentially costly impacts on peak demand, associated network charges and grid security issues," ARENA chief executive Darren Miller said.

"Smart charging enables charging at times when demand is lowest and electricity is cheapest, which reduces the burden on the network and the cost to the customer."

Findings will deliver insights for the broader energy market and help the automotive industry improve the economics of electric cars for Australian buyers.



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The HoneyBadger is a reliable and robust off-grid power system. It is quick to install and is combined with solar panels and a backup generator to keep your power coming.

It comes in two power ratings and it suits customers who require up to 10kWs of power and use up to 40kWh a day of electricity use.

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Continuous monitoring from RedEarth is also available to provide additional piece of mind.



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CREATIVE DESTRUCTION: THE COVID-19 ECONOMIC CRISIS IS ACCELERATING THE DEMISE OF FOSSIL FUELS

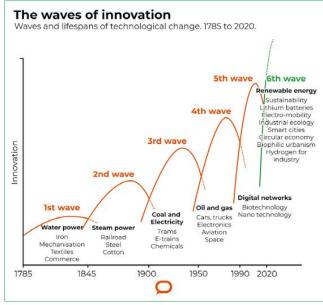
By Peter Newman

CREATIVE DESTRUCTION "is the essential fact about capitalism", wrote the great Austrian economist Joseph Schumpeter in 1942. New technologies and processes continuously revolutionise the economic structure from within, "incessantly destroying the old one, incessantly creating a new one".

Change happens more quickly and creatively during times of economic disruption. Innovations meeting material and cultural needs accelerate. Structures preventing new, more efficient technologies weaken. As the old economy collapses, innovations "cluster" to become the core of the new economy.

Over the past three centuries there have been five great "waves" of economic disruption and clustering. The first was driven by harnessing water power, the second by steam power, the third by coal and electricity, the fourth by oil and gas, and the fifth by digital transformation.

We are now at the start of the sixth great wave, driven by renewable energy combined with electromobility and smart-city technology.



Waves of innovation. The author, CC BY-ND

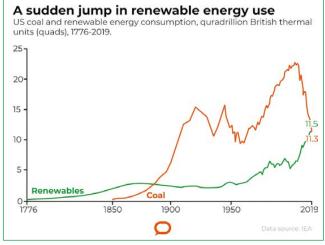
Though 2020 will be a difficult year for the entire economy, these technology trends are faring much better than the old-energy sector. Over the longer run the COVID-19 economic disruption should accelerate the wave.

Renewable energy

In renewable energy, solar photovoltaics and onshore wind are now the most economic new form of electricity generation for at least two-thirds of the global population, according to energy research provider BloombergNEF.

In Australia, the latest analysis of electricity generation costs by the Australian Energy Market Operator and CSIRO shows solar photovoltaics and wind are already cheaper than coal and gas. Solar PV costs are also predicted to fall sharply over the next decade, reducing its generation costs from about A\$50 a megawatt hour to A\$30 by 2030.

The following graph for renewable energy and coal consumption in the United States shows the acceleration towards renewables is well underway.



Coal and renewables use. The author, redrawn from IEA (2020), CC BY-ND

Statistics published in late July by the US Energy Information Administration show in 2019 coal production fell to its lowest level since 1978. In 2020 coal production is projected to fall to 1960s levels.

Across all member nations of the Organisation for Economic Cooperation and Development (including Australia), the International Energy Agency's latest monthly statistics show coal production in April was down 32 per cent on April 2019. Electricity generation from all nonrenewables was down 12 per cent. But generation from renewables was up 3 per cent.

Electromobility

Electromobility encompasses electric vehicles including cars, buses and trackless trams. Globally, BloombergNEF projects electric vehicles to comprise 3 per cent of new passenger car sales in 2020, 10 per cent in 2025, 28 per cent in 2030 and 58 per cent in 2040.

Leading the charge is Europe, where sales of electric vehicles actually increased 7.5 per cent in the first quarter of 2020, bucking the global downturn for electric cars and the industry overall.

The only major car maker to increase sales was Tesla, selling 88,496 cars. Its second-quarter sales of 90,650 cars was just 5 per cent down

"We are now at the start of the sixth great wave, driven by renewable energy combined with electromobility and smart-city technology."



Empowering more solar.

SA Power Networks is excited to be at the heart of changes to South Australia's energy system.

More and more customers are installing solar and thinking about batteries, which will help make it possible to achieve the State's target of net-100% renewable energy by 2030.

We have been working with customers, business partners and industry to develop smart and efficient options that mean we can connect even more solar and other Distributed Energy Resources (DER) to our network. In fact, our goal is to more than double the amount of solar on our network by 2025.

Combined with the future electrification of transport, it will mean an even brighter and cleaner future for our customers and community. It is just one of the ways we are Empowering South Australia.



Empowering South Australia

"In energy grids, smart technology can be used to balance electricity supply and demand, and to create low-cost and localised electricity markets."

IMAGE HANS BRAXMEIER PIXABAY

on a year ago, compared to falls of about 25 per cent for other makers. Tesla's booming share price saw it overtake Toyota in May to become the world's most valuable car maker.

Smart-city technology

Smart-city technology involves using sensors, machine learning, artificial intelligence, block-chain and the "internet of things" to improve infrastructure efficiency. They have been growing in use for transport, energy and housing.

Road sensors can help traffic managers coordinate traffic signals to cut congestion or to guide fast electric buses and trackless trams through traffic. Apps help us navigate through cities, and to know precisely when buses or trains are due.

In energy grids, smart technology can be used to balance electricity supply and demand, and to create low-cost and localised electricity markets.

In housing, smart systems can improve all aspects of a home's energy and environmental performance.

Curtin University has partnered with Western Australia's land development agency to integrate these technologies into the East Village housing project in Fremantle. It will use blockchain technology to leverage photovoltaics, batteries, electric vehicles and water heating in a micro-grid supplying 100 per cent renewable power to a community of 36 homes. This cluster of innovations are modular, so developers can experiment and then scale up.

Brake or accelerate

The economic and cultural benefits of renewable energy generation, electromobility and smart-city technologies are clear. They will lead to a cleaner, greener economy with many more new jobs.

Together I estimate they have the potential to reduce the use of fossil fuel by 80 per cent in a decade.

Eliminating the last 20 per cent – gas and coal used in industrial processes such as steel production and mineral processing, and fossil fuels used for long-haul road, sea and air transport – will be harder.

But hydrogen made with renewable energy can potentially replace fossil fuels in all these applications, though developing and commercialising the technology and needed infrastructure will likely take a decade or more.

Australia is already a global leader in uptake of solar generation and battery storage. We are also doing well in smart city technologies. But we have been slow in electromobility, and we will need to invest more in hydrogen research, development and deployment.

The only thing that will put the brake on these technologies becoming the core of the new economy sooner rather than later are backwardlooking government policies that seek to prop up an obsolete fossil-fuel economy.

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Peter Newman is Professor of Sustainability, Curtin University in Western Australia. He receives funding from Sustainable Built Environment National Research Centre, and is a Coordinating Lead Author on Transport for the IPCC.





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1 Rainmaker Information, Superannuation Fee Review, March 2019.

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A VIRTUAL SETTING, A REAL EXPERIENCE

ON SEPTEMBER 9 AND 10, the Smart Energy Council will stage Australia's first ever 3D Virtual Smart Energy Conference and Exhibition. The concept may be relatively new, but the event is proving enormously popular. At the time of going to print more than 2500 delegates had registered for the event.

There are 10 conference sessions on the following topics: A Time For Action; Market Trends and Forecasts; Australia: Renewable Energy Exporting Superpower; Hydrogen Market Update; VPP & Evolving Technology; Monitoring, Communications and Control; Battery Storage Economics & Product Lifecycle; Solution Selling: How to Avoid Crap Solar; High Grid Voltage & Solutions; and PV Module Innovation & Validation.

Former Liberal party leader John Hewson (consequences of inaction) and Professor Martin Green (forward leaps in PV cells) will lead the top line-up of speakers that includes Eytan Lenko of BZE, Simon Corbell, Gabrielle Kuiper (DER roadmap) and David Spratt (climate restoration). Together with experts from Solar Analytics, thyssenkrupp, Tesla, CWP Renewables, Sungrow, Alpha ESS, ANU, sonnen, SolarQuip, GoodWe, SAPN, ShineHub and others.

The conference will address many of today's pressing issues and reinforce the industry's ability to power on in uncertain times.

"To say it has been a turbulent year is an understatement but the resilience of the renewables industry during the pandemic has been remarkable," John Grimes, chief executive of the Smart Energy Council said. "More and more homeowners are getting on board with solar PV and the industry is thriving. And that means unbroken, ongoing demand for the types of products and services that will be on display at the virtual conference in the 3D booths."

GAMIFICATION – ARE YOU GAME?

Gamification is a new concept to many, essentially involving interaction between participants and exhibitors that allows a fun way of gaining points while performing tasks with fantastic prizes to be won. There are home solar batteries, inverters, solar panels, iPads, business reports and even a professional development course on offer!





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.



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

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HYDROGEN DREAMS REALISED

Claire Johnson explains why Australia is officially on track to reach hydrogen superpower status.

"The staggering momentum has been impressive and quite thrilling as we see Australia realise its renewable energy superpower status." **HYDROGEN IS THE BUZZ WORD** of the moment in Australian energy circles and our governments have got the fever too. After some false starts, the stars are finally aligning for the world's most abundant molecule and hydrogen is being primed to take off worldwide with Australia at the heart of its ascent.

Today, every Australian state and territory has a hydrogen strategy in place (Northern Territory, Queensland, South Australia, Tasmania and Western Australia), is in the process of developing one (New South Wales and Victoria) or is indicating hydrogen will feature as part of its broader energy strategy (Australian Capital Territory). Combined with the national strategy released last year and our governments are truly united in their commitment; a very rare sight to see.

On the industry side, we've hit a total of 36 hydrogen projects across Australia to date, both capital and feasibility, with a combined proposed investment of over \$36 billion. These projects span the entire hydrogen value chain, from mobility to gas network injection, however it's export that takes the prize with a third of all projects ultimately targeting overseas supply of hydrogen or its carriers.

Witnessing this staggering momentum over a relatively short period of time has been impressive, but also quite thrilling as we see Australia realise its renewable energy superpower status, in this instance through the imminent mass scale production and movement of hydrogen across the country and around the world.

My own journey in the hydrogen sector commenced in a much more subdued period. While working for Toyota, one of the lead proponents of hydrogen, we decided in 2015 that it was an opportune time to start talking about hydrogen mobility with Australian governments.



Claire Johnson says Australia is taking the lead in green hydrogen

We imported a single fuel cell car, the Mirai, from Japan to showcase the technology with decision-makers and talk up its potential to decarbonise our transport sector.

That first car to roll off the boat in Melbourne made only a fleeting visit to Australia before returning to Japan. In the space of a couple of weeks we displayed it along the east coast in the hope of generating some excitement for hydrogen and its benefits for our country.

Not only was it a challenging task creating buzz with the uninitiated five years ago – most were unaware hydrogen could be used as a transport fuel – we also had to reach as many stakeholders as possible with only three-quarters of a tank of fuel and nowhere to refill. Every gram of hydrogen was therefore precious, and we carefully planned every kilometre we drove.

We did pull it off without any breakdowns, in part due to the assistance of a car carrier to get us from city to city of course, and included a visit to Canberra with a highlight being taking the Minister for Environment at the time, Greg Hunt for the first spin around parliament house in a hydrogen car.

Senator Kim Carr, who also took a drive that day, commented that hydrogen could be the key to resurrecting Australia's local car manufacturing industry.

Gaining momentum

Five years later and I don't believe anyone could have predicted how rapidly the hydrogen landscape would change. The unprecedented levels of interest from governments and industry, and the general momentum and excitement building backed by some of the country's pre-eminent faces such as the Chief Scientist, Dr Alan Finkel has led to a shift from 'hydrogen hype' to actual projects on the ground.

To focus on mobility for a moment, when you look at refuelling stations, by the end of 2020 that first Mirai shipped from Japan would have five locations to refuel across Australia with a further 22 stations in the pipeline, including the recent announcement from Infinite Blue Energy for 17 stations along the east coast.

Senator Carr was also quite fortuitous with his comments in 2015 with hydrogen in fact spurring a potential reboot of car making in Australia. Automotive startup, H2X recently announced their fuel cell SUV will be produced in Port Kembla, NSW from 2022 creating around 5,000 jobs.

When we consider what has shifted over the past five years in the hydrogen landscape it's clear that Australia's great hydrogen hope has been driven almost in full by factors beyond our shores. Developments in the international hydrogen scene have been the number one catalyst for driving the activity we are seeing in our local hydrogen sector today.

Japan and Korea have been the key instigators of this hydrogen wave but are quickly being followed by others. Both countries are targeting hundreds of thousands



Australian hydrogen project status – August 2020

36

PROJECTS ANNOUNCED (Capital & feasibility projects)

\$36.4B

(Announced & committed)

TOTAL INVESTMENT

>5GW

ELECTROLYSER CAPACITY

>700.000T

HYDROGEN PRODUCTION PER ANNUM



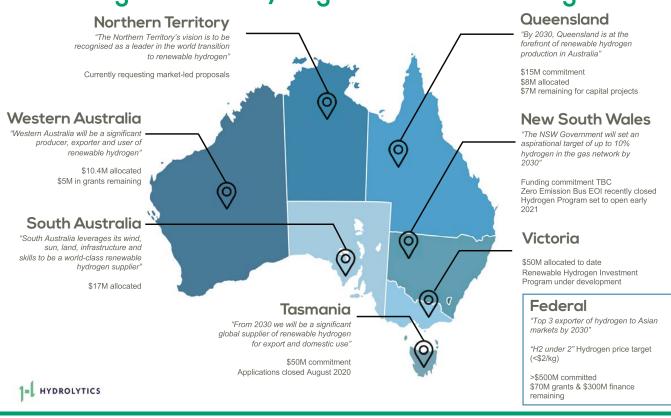
of tonnes of hydrogen imports by 2030 with Japan even dedicating its Olympics to hydrogen. Unfortunately, we will need to wait another year to see the hydrogen flame in action, but it should be quite the site along with hundreds of cars and buses powered by hydrogen.

Back to Australia and today we can comfortably wave the flag for green hydrogen leadership. Consultancy group Wood Mackenzie estimated in March that the pipeline of global electrolyser capacity

was 8.2 gigawatts. As of July 2020, Australia's announced electrolyser capacity was around 5 gigawatts meaning we represent a sizeable portion of hydrogen activity and are clearly in a lead position to capture the global opportunity.

Australia's current electrolyser leadership may soon pale in comparison to Europe however which is targeting a sizeable 40 gigawatts of electrolysis by 2030. Their recently released hydrogen strategy is aimed

Australian government hydrogen commitments – August 2020



at creating the world's leading hydrogen market, in part through a rapid scale-up of green hydrogen production.

This point forward will therefore be critical for Australia. As federal and state governments come to the end of stage one of their funding programs, they must be reminded that multi-decade commitments will be needed to progressively scale Australia's hydrogen footprint to reach our major global player ambitions.

Framework for expansion

Continued financial support and measures to create a domestic market for hydrogen will be essential. Establishing targets and long-term policy signals, demand creation measures, mechanisms to mitigate investment risk and the removal of regulatory barriers will all require equal attention. Each of these aspects must be treated as a priority if we are to reach Minister Taylor's hydrogen economic stretch target of under \$2 per kilogram (a number we far exceed today) and move the needle towards competitiveness.

And competition is already emerging, and it will be fierce. The latest major hydrogen project will see a \$5 billion green hydrogen facility built in Saudi Arabia. Targeting 650 tonnes of hydrogen per day, the project will export ammonia to global markets by 2025.

This facility will be in direct competition with two of our biggest export projects – Western Australia's Asian Renewable Energy Hub and the H2-Hub in Queensland, which are targeting approximately one gigawatt and three gigawatts of electrolysis respectively. "As the world turns to cleaner energy, the rewards from going hydrogen could be substantial and if we get it right, Australia is poised to be a sizeable beneficiary."

With projects of this magnitude on the cards as well as many more smaller scale demonstrations underway, it truly is an incredible time for hydrogen in Australia. As with any new technology however, there are headwinds on the horizon. Government and industry have so far demonstrated they are up to the challenge with some unmatched levels of collaboration seen to date, but this united approach must continue.

As the world turns to cleaner energy, the rewards from going hydrogen could be substantial and if we get it right, Australia is poised to be a sizeable beneficiary.

About Hydrolytics

Hydrolytics is a hydrogen focused consultancy assisting industry and governments to navigate the Australian hydrogen sector through strategy, communications, project management and government relations, and is led by the former CEO of the Australian Hydrogen Council, Claire Johnson. www.hydrolytics.co

Selection of hydrogen sector forecasts and country targets

Hydrogen Council

"Hydrogen is a central pillar of the energy transformation required to limit global warming to two degrees Celsius."

2050 hydrogen forecast

18% of final global energy demand

\$2.5 trillion annual revenues (hydrogen & equipment)

BloombergNEF

"To fully decarbonize the world economy, it's likely a clean molecule will be needed and hydrogen is well placed to play this role."

2050 hydrogen forecast

7-24%

of final global energy demand (dependent on government policy)

187 – 1,370 million metric tonnes hydrogen consumption p.a.



Government of Korea

1.94 million tonnes of hydrogen required in 2030 (sourced domestically and imported)

5.26 million tonnes of hydrogen required in 2040



Government of Japan

300,000 tonnes of hydrogen imports by 2030

5-10 million tonnes of hydrogen imports by 2050



1- HYDROLYTICS



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Having already taken (the much less sunny) UK market by storm and securing their place as the largest specialist energy retailer for homes with solar and connected battery storage², the British based innovator is launching its 40 cent per kWh feed in tariff¹, available to approved partners across Australia. With a range of batteries, including the all new Duracell Energy Bank 2, combined with solar and Social Energy's market leading Feed in Tariff, you can reduce your customers bills by up to 100%³ and deliver a financial proposition that really works for the masses!



(See

Guaranteed minimum customer payment of \$450 a year on a 9.6kWh or larger battery.⁴ Super competitive standard energy plan, to save your customers more.



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¹⁴⁰ cents paid for the first 300 kWh exported to the grid in a calendar quarter. Thereafter, a standard market feed in tariff is paid for all remaining exported units.
 ²Specialist energy retailer refers to creating a network of residential energy storage systems where each one is used for the purposes of Frequency control and creating earnings through payments from Electricity Market Operators. World's loading is based upon units sold for connection to the network and publicly available information and claims from competitors operating residential virtual powerplants from battery assets, with equivalent frequency control functionality.
 ¹Based on a customer with 6,000 kWh consumption and 8,000 kWh generation purchasing a solar and 11.6kWh battery system for a typical price of \$14,000 and being supplied by Social Energy. This customer moves from their standard, import only, market offer, estimated at \$2,131 to a first year net bill with Social Energy of ~\$51.
 ⁴S450 is the Social Energy minimum feed in tariff payment for a battery sized at 9.6kWh or higher in Victoria, South Australia and Tasmania. The minimum feed in tariff payment for a battery and Queensland is \$500.



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THE GREENING OF HYDROGEN

A recent report calculated that global demand for hydrogen exported from Australia could potentially reach almost one million tonnes by 2030, therefore adding up to \$11bn in GDP growth each year by 2050. A welcome panacea to the economic crisis? On these pages we view some of the ground-breaking projects around the nation that are spurring development.

PROJECTS OF INTEREST UNDERWAY

PACIFIC SOLAR HYDROGEN Newly formed Australian renewable energy company Austrom Hydrogen has secured land near the Port of Gladstone, Queensland, for a project that could feature a 3.6GW solar-powered hydrogen facility with battery storage that would produce 200,000 tonnes of hydrogen annually.

The project is undergoing initial environmental impact studies and irradiance monitoring, and developers are liaising with key industry stakeholders to streamline the development process.

WEST AUSTRALIAN RENEWABLE ENERGY COMPANY HAZER

which seeks to build a \$17 million facility has gained \$9.41 million conditional funding from ARENA to demonstrate its proprietary hydrogen production technology which converts biogas from sewage treatment into renewable hydrogen and graphite using an iron ore catalyst. Hazer has signed an MOU



with WA Water Corporation for the supply of biogas. Construction will commence in early 2021 and be completed by mid-2021, after which it is expected to operate as a pilot for three years.

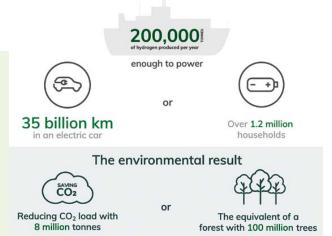


IMAGE COURTESY OF AUSTROM HYDROGEN

THE RECENTLY LAUNCHED SA/VIC AUSTRALIAN

HYDROGEN CENTRE will assess the feasibility of blending renewable hydrogen into gas distribution networks and the transition to 100 per cent hydrogen networks over the long term. Australian Gas Networks is leading the \$4.15 million project, having secured \$1.28 million from ARENA for the feasibility study. Established at the end of 2019, the project will run for two years and produce a draft feasibility report later this year on the selection of regional towns for the different hydrogen blends.



IMAGE COURTESY OF AUSTRALIAN GAS INFRASTRUCTURE GROUP

These and other large-scale hydrogen projects in the pipeline are listed in a report prepared by Hydrogen Australia. Contact Max Hewitt if you are interested in receiving the report, max@smartenergy.org.au

Spotted in mainstream media: AUSTRALIAN GAS NETWORKS

promoting its clean green gas, informing the public "Renewable Gas can be either hydrogen that is separated from water via a process called electrolysis, or bio methane... both gases produce zero additional emissions when you burn them... blending or even substituting natural gas with renewable gases can decarbonise the gas sector."

Carbon-conscious residents dependent on gas for home heating during the long cold winter months will warmly welcome the clean alternative once it, too, becomes mainstream.





36 SPRING 2020

HYDROGEN AUSTRALIA A DIVISION OF THE SMART ENERGY COUNCIL



ARENA'S \$70 MILLION HYDROGEN FUNDING ROUND

Interested parties need to complete applications by January 2021, with ARENA expecting to select preferred projects by mid-2021 with subsequent financial close by late 2021 and construction to commence in 2022. All applicants may also be considered for CEFC financing under the CEFC's A\$300 million Advancing Hydrogen Fund.

www.arena.gov.au, www.cefc.com.au

Anglo American plans producing green hydrogen for hydrogen fuel cells to power its heavy fleet (below) at one of its open-pit coal mines in Queensland and is shortlisted for an ARENA funding grant.



STANDARDS AUSTRALIA eight international standards have been adopted to facilitate the future of hydrogen and support the safety of users with guidance on the storage, transport and refuelling and to foster international trade.

www.standards.org.au

OVERSEAS DEVELOPMENTS

ENERGY TRANSITION (ENERGIEWENDE)

STRATEGY Germany's government aims to achieve 5GW of hydrogen production capacity by 2030, with another 5GW a decade later. As much as €9 billion has been set aside for the plan as part of Germany's stimulus package and to expand the role of green hydrogen to help end the country's reliance on coal and to become carbon neutral by 2050.

Market analytics firm AURORA ENERGY RESEARCH has

published Hydrogen for a Net Zero GB: An integrated energy market perspective highlighting the role of hydrogen as a key enabler to the



decarbonisation of the UK's energy system. A high adoption scenario could lead to hydrogen meeting half of the UK's final energy demand by 2050, providing a total of more than 500TWh of hydrogen.

SPANISH OIL MAJOR REPSOL proposes building one of the largest net zero emissions synthetic fuel production plants in the world, based on green hydrogen generated from renewable energy.



ZERO-EMISSIONS FUEL Hyundai Australia has signed an MOU with Jemena Ltd and Coregas to produce and supply hydrogen generated from solar and wind power to the Hyundai's Sydney hub from early 2021. "A lack of critical refuelling infrastructure is regularly cited as a hand-brake to hydrogen vehicle sales," said Frank Tudor of

Jemena, "this is an opportunity to demonstrate that renewably generated hydrogen gas can be made directly available to the vehicle and transport sectors."





forces to launch **HYDROGEN ENERGY RESEARCH CENTRE** (HERC) in a bid to commercialise hydrogen technologies. The new facilities will be established at UNSW over the next seven years with

the help of an initial \$5 million

UNSW Sydney and Providence

Asset Group (PAG) have joined

IMAGE COURTESY OF UNSW

investment from PAG. The partners believe they can develop hydrogen energy storage and distribution solutions capable of meeting much of Australia's power needs through renewable energy by 2030. The duo has already scored a win: Lavo Hydrogen Storage Technology's residential hydrogen energy storage system can hold up to 60kWh of electricity and is expected to go to market in late 2020.

ANU RESEARCHERS have achieved a new efficiency record for hydrogen cells that can convert water into hydrogen simply using sunlight. The research team used a "tandem" light absorber structure,

placing a perovskite cell on top of a specially made Si electrode. Lead author Dr Siva Karuturi says "To produce hydrogen in the past, solar plants had to produce electricity which is then used to electrolyse water to produce hydrogen. This new method is more direct, making it more efficient."



CAPITAL ADVANCES AND KNOWLEDGE SHARING

The ACT Renewables Hub recently celebrated the launch of its new name during a webinar where members gathered via Zoom. The commitment to renewables puts the territory at the forefront of advances and bodes well for future gains. Here we learn more about the journey to date and forward projections.



Connecting industry, sharing knowledge, and building business opportunities through collaboration.



SPEAKING AT THE OFFICIAL LAUNCH of the Hub's rebranding Minister for Climate Change and Sustainability Shane Rattenbury highlighted the need to "break the fossil fuel addiction" and that the ACT's success in reaching 100 per cent renewables illustrated what was possible; the ACT has a reputation as a centre of excellence and can be an exporter of capability, expertise and experience, he said.

The outcome of the latest reverse auction will soon be announced, and on completion provide 250MW new electricity supply and represent the territory's first investment in large scale batteries.

"But we cannot rest on our laurels," he said, the fuel guzzling transport sector is on the move with the ACT government transitioning its fleet to electric vehicles.

Speaking at the launch former Environment Minister Simon Corbell added "We are here to underpin a renewable energy ecosystem for our community and our city [and along the way] the ACT has influenced other jurisdictions, for example reverse auctions in Queensland and Victoria have created thousands jobs and billions of dollars in investment.

"The ACT chartered the path," he said, lauding the sharing of knowledge and expertise and highlighting the strong legacy and success to date that will only continue. Chief minister Andrew Barr also joined the webinar, announcing a new plan for 250,000 secure jobs in the ACT by 2025 as part of the economic plan for a strong recovery from the pandemic of which there is great potential for renewables.

Other examples of the ACT's leading position were presented by Sylvia Tulloch of the Renewable Energy Innovation Fund and Simon Franklin of ITPower, a global renewables company with its HQ in the ACT.

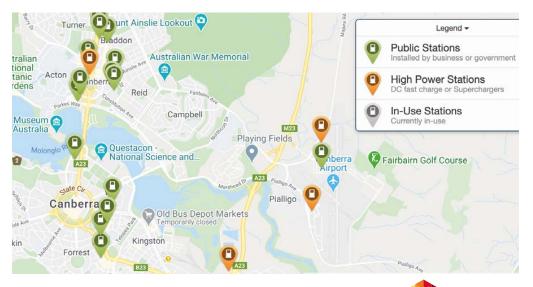
During the launch moderated by Wayne Smith of the Smart Energy Council, Ken Baldwin of ANU Energy Change Institute and the \$10 million ANU Grand Challenge: Zero-Carbon Energy for the Asia-Pacific urged the group to "think big" on issues, including the opportunities that lie in the circular economy.

Driving the future

The territory is supporting the rollout of smart charging stations and grid connected technology to make EV charging as cheap and green as possible. Greater inroads into EVs in public transport

including buses is also on the horizon.

A recent webinar presented by the ACT Renewables Hub focused on the role of electric vehicles where Tim Washington of JET Charge pointed out that the 30 or so public chargers in the





ACT, of which only five are ultra-fast chargers that top up a car battery in just 15-20 minutes, represents just a fraction of the total of EV chargers.

The vast majority of chargers are housed in government and apartment building basements and garages, private homes, he said, and that is where the majority of charging occurs. It also presents a golden opportunity.

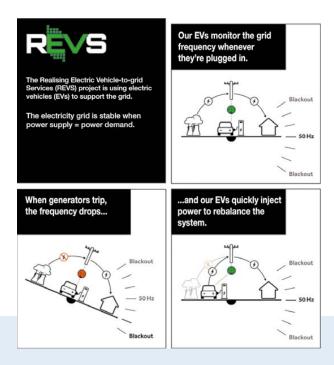
ACT Renewables Hub: Want to know more?

For more information about the range of resources available through the ACT Renewables Hub contact Manager Alethia Barceinas on 0452 414 070 or alethia@smartenergy.org.au and visit www.actrenewableshub.org.au

Electric Vehicle-to-grid Services (REVS) project

The ACT is to be home to the largest vehicle to grid trials in the world. The global first involves frequency control during times of grid power outages and frequency drops.

The ARENA-funded REVS project connects the electricity and transport sectors enabling energy to be discharged from vehicles into the electricity grid.



Charge Fox has teamed with several partners in ACT to integrate the V2G technology. First up 51 Nissan Leaf electric vehicles will be plugged into the grid and act as a reserve, providing a not insignificant 357kW of support.

"This turns an inefficient asset, a parked/stationary EV, to an extremely efficient asset. Every time it is not being driven it is supporting the grid," Tim Washington said. "The ACT is the leader that keeps on leading."



LIGHTWEIGHT PANELS THE ANSWER TO WEIGHTY ISSUES

Thomas Bell says SunMan's lightweight rooftop PV panel can provide solutions to those structures otherwise unable to carry rooftop PV. **THE TIMING OF THE PANDEMIC** has not been particularly kind to SunMan's eArche. It's the same with any relatively new product breaking into the market: people want to physically see it to get a better idea of what's on offer and why it's unique, and what better channel for this than an industry exhibition.

Thomas Bell, Sales Director for SunMan in Australia was all geared up to display the panels at this year's Smart Energy expo. But the spread of the virus scuppered plans for large gatherings where he would otherwise have showcased the super flexible and ultrathin eArche solar panel that can be bonded to surfaces using structural-grade silicon and is ideal for curved or lightweight roofs.

"It's hard to conceptualise the product... the penny does not drop till they touch it which is why the trade shows are so important to us," Thomas said. "Sales are a bit tougher to come by during the pandemic and some of our commercial prospects have been put on hold for a few months."

The pandemic has created a shift in communication strategies, and webinars are today's MO for most businesses. For SunMan the process has been helped along through their new distributor One Stop Warehouse which is facilitating market access.

Currently 15MW of lightweight solar system projects are in the pipeline in Australia, said Thomas Bell who has also identified a swag of potential applications.

"We know that up to 40 per cent of commercial and industrial buildings are unable to proceed with rooftop solar PV due to the uplift and weight issues yet are otherwise ideal candidates for substantial solar arrays to take advantage of the energy savings and other sustainability benefits," he said.

"To save on construction costs many modern factories were built using less steel so spans are larger and wider, however that makes for a weaker structure that cannot always carry the weight of traditional glass panels. Typically buildings fail for two reasons: the weight of panels at 15kgsm or due to uplift forces caused by the 20mm gap on the brackets which in effect creates a sail during high winds. By contrast the 3.8kgsm eArche panels are bonded directly to the roof, preventing wind surging underneath," he explained.

"We can provide the solution in many markets, there is untapped potential and that means jobs too, we can return to existing salespipes and breathe life back into those projects that otherwise fail on traditional panel technologies."

SunMan is in discussions with a utility that is one of the largest commercial installers and has a large number of jobs that can't proceed.

The message is clear: "Installers can now go back and present a workable solution, and during these difficult times of COVID it's important to keep business running," Thomas said.

"It's just a matter of spreading the word in the right places such as speaking to larger EPCs about the solution, as well as construction companies and property groups that have sustainability targets and gaining more traction."

Endorsement

Prominent structural engineering firm Gamcorp which specialises in the solar market and recognises the potential for the panels recently prepared a white paper for SunMan stating that eArche can help solar projects that failed structural uplift issues with glass panels, stating the quick bonding installation method can solve dead load and uplift, the common conventional solar systems problems.

Such characteristics have earned the panels the tick of approval for cyclone-prone wind D regions which includes Cairns, Cape York and Broome, and the nonglass panels also perform better in extreme weather conditions such as hail.





SunMan's lightweight flexible

eArche solar panels provide a snug fit on rooftops

Installation is a breeze.

Redback Smart 3-Phase Hybrid System

 (\square)

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Befitting schools

The eArche is gaining traction in NSW schools' COLAs (covered outdoor learning areas) that cover large spans and typically can't carry the weight of conventional solar systems. Given such structures are built in areas with a lot of sunlight they provide a perfect place to install solar, Thomas explained.

"We have conducted pilot programs to demonstrate how we can turn these into solar systems by installing the panels over shade cloths and the NSW department of education will be monitoring the systems with the intent of rolling out more shade structures across schools.

"In some aspects we are in the iPhone 7 moment, the low hanging fruit market, where we can get sales today, and COLAs fit the bill perfectly."

eArche's global span

Global installations of the lightweight flexible panels stand at 50MW and are proving popular in China and Europe. Thomas Bell cited areas of Germany with high snow loads and building structural limitations of 10kg psm ideal for the thin lightweight panels.

Up to 1MW has been installed in Australia, including the flagship 235kW/800 panel installation on the slender curved roof at Australian National Maritime Museum's Heritage Centre in Sydney, and on Byron Bay's solar train.

Glass-free 'photovoltaic skin'

Weighing just 5.5 kilograms each the 290W modules that are based on standard monocrystalline PERC cells are 70 per cent lighter than conventional glass solar panels which weigh around 20 kilograms. The panels can be bonded to surfaces using structural-grade silicon, which minimises water penetration.

The flexible, light, thin eArche panels are less costly to transport and install, and can be stretched along any exterior.

The innovator behind the technology is Dr Zhengrong Shi, who divides his time between China and Australia. Dr Shi identifies a swag of potential applications for the ultra-light panels from lightweight roofs to walls, mobile generators, to coffee tables, umbrellas and other outdoor objects.

The visionary also foresees widespread building-integrated PV, with solar PV as ubiquitous as wi-fi, air conditioning and optic-fibre systems, and beyond that vehicle mobile roofs and mobile power stations. Dr Shi confidently predicts greater uptake within five to ten years.

His mentor UNSW Professor Martin Green agrees, saying it is "only a matter of time" before the market gains full confidence in non-glass PV modules. www.sunman-energy.com



REACHING THE MASSES THE SMART WAY Through *Smart Energy* magazine

If you want your company details to be seen by the people who matter – PV installers, retailers and wholesalers, project designers and retailers involved in residential, commercial and industrial developments – *give Luke or Marianne a call*.

Both Luke and Marianne are committed to helping companies increase their exposure through the magazine as well as at Smart Energy webinars and conferences.

Despite the difficult time caused by the pandemic, Australia's renewable industry sector continues to thrive and the time has never been better to showcase your products and services to the widest possible and targeted audience.

MAGAZINE REACH: Smart Energy magazine is read by more than 20,000 industry professionals, spanning solar PV designers and installers, large-scale solar project contractors, industry consultants and trainers, manufacturers, suppliers and wholesalers, energy retailers, and thought-leaders.

So, if you want to capitalise on opportunities awaiting you by reaching thousands of people involved in all sectors of the smart energy industry, call Luke or Marianne.

Contact Luke on 0499 345 013 or luke@smartenergy.org.au 智慧能源理事会的杂志广告、会员服务、展会及网络研讨会等工作请 咨询中国企业负责人方媛Marianne Fang电话: +64 21 182 4699 邮件: marianne@smartenergy.org.au 微信: 18896983297





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FLOATOVAIC FARMING SYSTEMS

FloatPac has identified a raft of opportunities for its Australian designed and made floating solar platform.

Australian owned, designed and manufactured, FloatPac's floating arrays are ideally suited for energy and water-intensive industries where land is at a premium **THINK OF A LILY PAD MEETS MECCANO SET** and enlarge the scale – that's where you land at FloatPac Solar pods that form the modular floating platform for solar modules.

FloatPac recently completed a first for Australia, installing a floating farm on a private property, however the day we called chief executive Gavin Hodgins to discuss this, COVID cases in Victoria had skyrocketed and the state government mandated the use of masks.

FloatPac, it turns out, is a diverse operation that also manufactures cotton face masks and, being one of just a handful of domestic suppliers, Gavin was busy ramping up mask production and updating the website to cope with orders and he was also in hot demand by TV media.

Fast forward a few weeks and we managed to hear more about the first privately installed, owned and operated floating solar farm in Australia, a 30kW behind the meter application at a fodder farm in north-eastern Victoria, that supplies electricity for the farm pump systems.

"Floating solar was ideal for the customer who was reluctant to clear a dozen trees to make way for groundmounted solar. He has a large dam which was the ideal setting for a floating solar system, and he recognised the opportunity to use it as the setting for his solar farm.

"The client is forward thinking and progressive and it did not take much to convince him of the merits of a floating system," said Gavin who has installed three of Australia's five floating solar farms.

FloatPac is panel agnostic, but the client in the recent project selected Jinko Solar's 400W solar modules.

Originally designed by Gavin, the floatovaic pods are now in their fifth iteration.

Tech specs

Measuring 900x900mm, the FloatPac Solar modular flotation pods are made from 30 per cent recycled plastics and are UV stabilised, rot and mould resistant, fully OHS compliant and 100 per cent recyclable.

Benefits include reduced water evaporation and embankment erosion and slower algae growth due to shading.

FloatPac prefers to use larger, 72-cell panels, saying the higher wattage the lower the costs. Several manufacturers offer warranties similar to ground or roofmounted systems.

The company maintains the system and provides a 10 to 30 year power purchase agreement, selling the renewable energy generated to the land-owner/business at a rate cheaper than grid-sourced power. FloatPac also takes care of all STC/LGC paperwork and lodges all the necessary permit applications with relevant local authorities, including the grid connection application where applicable, a process that the average consumer would find somewhat daunting.

Demand and opportunities

According to Gavin, floating solar comes into its own in regions where communities lack the available land but also need to meet renewable energy targets.

He foresees a raft of opportunities in energy and water-intensive industries which cannot afford to

"There is a massive economic crisis worldwide and also in our own backyard, and people are looking for jobs. We believe we have a model that can give very good volumes in jobs that are in renewables/manufacturing and help restore economic balance."



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FLOATING SOLAR

waste either land or water, such as wineries, dairy farms, fish farms, mining companies, wastewater treatment plants, irrigation districts and water agencies. Potential also lies in aquaculture projects in ocean environments and elsewhere in the marine world such as boat builders.

Not one to sit still for long, Gavin is engaging with governments and estimates upwards of 1000 manufacturing installation jobs are possible within 10-12 years, providing longterm employment.

"We are actively pushing for several gigawatts of long-term floating solar projects for governments to look at and are framing those discussion around providing cheaper power at the same time as job creation," Gavin said.

"There is a massive economic crisis worldwide and also in our own backyard, and people are looking for jobs. We believe we have a model that can give very good volumes in jobs that are in renewables/manufacturing and help restore economic balance after the COVID crisis.

"We need to find opportunities that create jobs, a good example of which is Hazelwood's retired coal mine in Victoria and the proposed reclaiming of pits," the entrepreneur said. "This could be a cheap and effective way of building large flotovaic systems; all the transmission lines are in place and we would just be replacing coal-fired power with floating solar power."

Among the benefits of floating solar plants is their ability to be located closer to metropolitan areas such as over reservoirs and address concerns about marginal loss factors (MLF) over distance, in contrast to large scale groundmounted solar farms.

Gavin also makes the point that despite the large uptake of rooftop solar PV in Australia there are just five or so Australian manufacturers of panels, inverters and racking.

"People are now realising that when you let all your manufacturing go overseas, jobs also go."

For its part FloatPac is the nation's sole manufacturer of the floating modular systems, and with an annual capacity of 15-16MW (PV module placement) could provide numerous jobs and all the benefits of the 5GW target flows back to job creation, Gavin said.

Facing up to the reality of masks

During March and April Gavin foresaw what was looming as the pandemic took grip. The need for protective gear would



The 2018 World bank report 'Where The Sun Meets The Water' identifies the potential to cover one per cent of bodies of water to generate 5GW of floating solar systems

be at a premium and he already had an e-commerce platform in place: marketing, SEO and media contacts that would help drive product promotion.

When demand for the cotton face masks soared in July, he hired an additional 25 staff and the industrious team is facing up to the prospect of heavy workload for the foreseeable future.

In a spirit of goodwill Gavin is offering members of the Smart Energy Council a special deal on bulk orders for masks. Readers can receive a discount of 15 per cent off the RRP for FloatPac's fitted mask range, which is DHHS and WHO compliant.

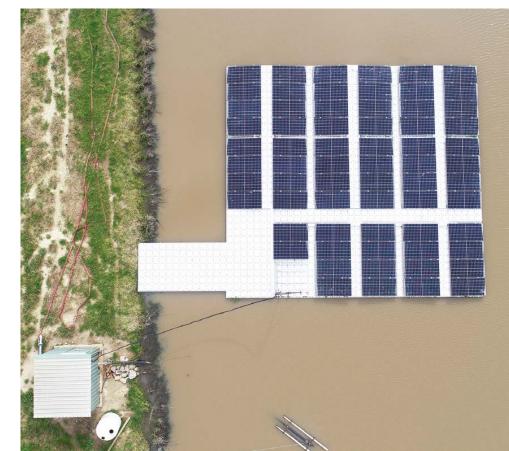
Masks can be found at https://floatpac.com/maskpac/product/ fitted-cotton-face-masks/ – coupon code is 'secmember' (without the quotations). For queries about customised masks email info@maskpac.co

Company history and products

Established 35 years ago, FloatPac's origins lie in manufacturing flotation devices for the marine salvage, oil and gas, and defence industries, and the manufacture of environmental protection products such as plastic bladders, water storage and refracting. The journey has been a bit of a see-saw, with demand in the oil and gas sector declining over the past decade as renewables took off. Other products in the range include:

- FishPac live seafood transport systems
- Flexitank Australia strong flexible tanks, inflatable marker buoys, aquaculture fish farming liners, and lift bags
- RainPac under-house rainwater bladder tanks
- Cotton face masks with two layers of protection
- FloatPac oxygen treatment hood
- Flexitank IsoTent inflatable waterproof medical tents that are easy to inflate and manufactured from strong 650gsm PVC.

https://floatpac.com





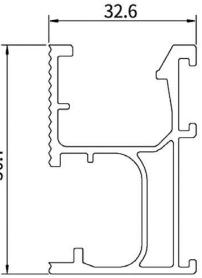
PV-ezRack Australian Made Cutter Rail

R-ECO/4XXX/AUMF



Technical Specifications

Application	Roof Top System	
Dimensions	W32.6mm*H50.7mm	
Standard	Length: 4200 or 4400mm	
Packaging	90 pcs per pack; 4 packs (360 pcs) per pallet	
Weight	0.826kg/m	4
Material	6005CL Alloy Non-Anodised	50.7
Color	Silver (mill finish)	
Standard	AS NZS1170.2-2011	
Corrosion Protection	Up to C5*	<u>+</u>







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UPWARDLY MOBILE BUSINESS

Sean Cochrane has taken his concept out of the office and onto the roads – literally – with his specially kitted-out 'green' mobile franchise that showcases energyefficient appliances. Could his timing be spot on?



Sean Cochrane, SuperGreen Solutions founder and managing director has authored many articles on energy efficiency and renewable energy solutions. Publications include 'City Life', 'Green Times' and 'Our Wonderful World'. His book 'If You Believe, You Can Fly' is a motivational work.

THE ORIGINS OF THIS STORY lie in a near death experience decades ago following a motorcycle accident in South Africa. The healing process and subsequent full recovery set Sean, then a teenager, on a path questioning 'why am I here?'.

"I faced a lifetime in a wheelchair but was given a second chance and since then I have had the opportunity to talk about it and have changed a few people's lives," said the energy expert who doubles as a motivational speaker.

Over the past 25 years he's built a successful energy efficiency/green energy business operating here and in the United States that has placed smart energy at the centre of thousands of homes, but in more recent years he has noticed a shift in consumer buying habits and is now taking business in a slightly new direction.

After a hiatus in Australia people were changing their shopping habits, he said, "I believe they want to see first-hand what energy efficient products are on offer and prefer to do that from the convenience of a van that goes direct to their home or office.

"So that is exactly what SuperGreen Solutions is now doing, we are taking our industry-leading catalogue of products and displaying them in front of clients.

Mobile showroom

"It is literally a mobile showroom, a 'one stop energy efficient solution shop' that advises, supplies and installs household and commercial energy efficient solutions," Sean said.

Although PV modules and storage batteries are the fastest growing products they are "only one piece of the puzzle" of the range that includes heat pumps and SWH, skylights, ventilation and solar-powered

extractor vents for roofs and insulation, LED lighting and atmospheric water filters.

Sean went on to explain the agreements with suppliers – SuperGreen Solutions has the backing of international buying group United Franchise Group (totalling 1400+ stores) – ensures a competitive pricing edge for franchisees who order directly from the supplier/manufacturer and arrange delivery to the team of chosen installers.

For those wondering, costs comes in at about \$85,000 which includes the fully set-up van as well as the franchise fee.

That takes care of training, flights and accommodation during training, shirts, flags, emails, marketing collatoral, Facebook, Instagram and web page set up, and basic legal matters.

On top of that franchisees pay the monthly van lease, insurance and mobile phone lease or plan, and monthly franchise royalties are based on three per cent of turnover. There's also a market fee of one per cent of turnover which is spent directly on marketing for leads within the franchisee's area of operation.

Sean is certain he's on the right track and believes more shopfronts will disappear over time.

"Today you see so many signs with 'for lease' or 'for rent'. Bricks and mortar stores have monthly rents that are north of \$5000 on top of which there's insurance, rates and water bills. By contrast with a SuperGreen van all they need is a wi-fi dongle and a petrol account!"

Back to where it all began

Sean's interest in sustainability was triggered back in 1995 when he was renovating his house on the Gold Coast and keen to install a skylight for natural light as well as extra insulation.





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^Estimated jobs since 2006 to June 2019 based on inductions for completed and committed developments.

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"The tradesmen frustrated me saying just put in a few extra ceiling lights instead of a skylight, and install an air-conditioner rather than more insulation to moderate house temperatures. Back then energy efficiency was neither legislated nor supported," he explained.

"However I recognised the nascent market for more sustainable housing and decided there and then to move into that orbit, establishing the energy efficient retail business [then called] All Safe.'

His intuition was right, and business flourished up and down the Gold Coast as more people sought more sustainable, smarter homes. And as power bills continued to rise so did interest in investment in smart products and appliances.

In 2010 with an eye on bigger markets Sean decided to relocate his family to Florida where an encounter at a franchise convention led to him forming a partnership with industry guru Ray Titus of United Franchise Group to launch SuperGreen Solutions in America.

"Americans did not warm to the name All Safe so we changed it to SuperGreen Solutions... everything in America has to be super!" he quipped.

The first store was opened in Palm Beach and within just three years 26 SuperGreen Solutions stores had been rolled out across the USA, Canada, Brazil and South Africa. Stores in Panama, Canada, the Bahamas, and India followed later.

It was a mighty success.

A few years on and Sean's homesickness drove him back to Queensland, where his business had continued to operate, but in his absence had hit a few hurdles.

The pink batts debacle had set back some of the All Safe franchisees, and an unscrupulous business owner and trader absconded overseas with millions of dollars illegally reaped from rebates, he explained.

The resilient entrepreneur picked himself up in customary fashion and got back to business. He's particularly proud of SuperGreen's leading role in the Harris Crossing super grid solution for a 280 home estate in Townsville in which the local developer took a leap of faith and offered a special deal on rooftop PV and batteries. This resulted in a 97 per cent penetration of PV, and homeowners becoming a net exporter of energy – they love it, Sean said. Reaching more households is looking positive.

Bright outlook

"The mobile franchise is really beginning to take off now," Sean said. "I don't know why I am the first person to do it but combining all the energy efficiency products that go into a home or an office into one package though a mobile showroom on wheels is the way to go.

"Right now I am very excited about the future," he told *Smart Energy*, adding he was on the hunt for talent in locations mapped out in Melbourne, the Gold Coast and the Whitsundays and other regions.

"Many franchisees are ex-electricians, but there is scope too for tradies who've put down the tools but know the energy industry well and want to get more into that space and to present the best solutions to customers, people who want to lead green sustainable lives."

Consumer dynamics

Life during the pandemic is proving interesting, with a sharp uptick in consumer enquiries.

"We have been busier during May to August than ever before and that includes franchise enquiries as a result of people being laid off or looking for alternatives.

"Homeowners are worried about the current situation and a growing number of retirees or near-retirees are contacting us concerned that they will not be able to afford their outgoings for the rest of their lives.

"They understand that if they are equipped with solar power and solar water heaters their energy bills will dramatically reduce and they won't be paying the utility company for life, they want to be more selfsufficient.

"On that score, SuperGreen is here to help."

Other than a string of business and environmental awards Sean has appeared on the speaker circuit and in 2014 was Invited to the White House. The following year he presented at a Google forum in Sydney.

http://supergreensolutions.com.au, Sean can be followed at http://ifyoubelieveyoucanfly.com/ on Facebook, Instagram & Twitter.



"People want to see firsthand what energy efficient products are on offer and we are finding more prefer to do that from the convenience of a van that goes direct to their home or office."



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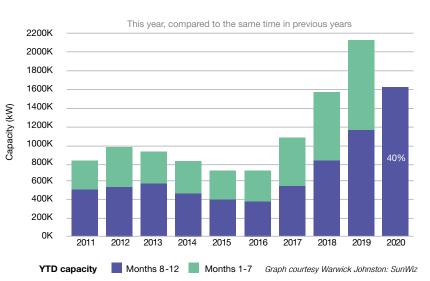
MARKET MOVEMENTS AND TRENDS

Here we present ata-glance insights into the market at work. Defying the odds is how some describe it. But the numbers tell the story of the meteoric rise of PV installations in the year to date.

(A note of caution: disruptions in Victoria's PV market caused by the six-week business lockdown will impact future market results.)

PV market performance

The chart that says it all:



ASTONISHING BUT TRUE: by early August 2020 Australians had installed more rooftop PV than in all of 2019, which itself was a record year.

As illustrated in the chart above, by the end of July the number of PV installations in Australia was a phenomenal 40 per cent greater the same time last year. That's more in just seven months compared to the preceding 12 months.

SunWiz data reveals 275MW of small-scale rooftop solar capacity was installed during July alone, and that the states of NSW, Queensland, Victoria and South Australia struck new highs. The data is supported by Green Energy Markets which reported that July's 17 per cent rise in installations above June represents the highest ever monthly level of installed capacity under the small-scale system: STCs representing 34,260 PV systems were submitted in July. NSW recorded the highest level of residential system registrations (9,622), followed by Queensland and Victoria registering 7,759 and 7,226 respectively, GEM says.

Year-to-date installed capacity at the end July was 1,620MW compared to last year's 1,149MW in the same time period.



IMAGE SOLARIMO PIXABAY

Australia now boasts more than 2.5 million rooftop PV installations with a combined capacity of 11,837MW. That is about the same as six Liddell coal-fired power stations and a fraction of the emissions in the making.

Home energy awareness

Speaking at a recent Smart Energy Council webinar Geoff Bragg of SunMan attributed the soaring uptake of solar PV to families working and schooling from home over the past few months. They are more conscious of their energy use which is on the rise – along with power bills – and rooftop PV which meets daytime energy needs when all are home makes more sense than ever.

"In many cases workers face the prospect of even longer stretches of time in their home office," he said.

And business dynamics are changing. We've heard that one of the big four utilities has quit its fancy CBD offices and workers are proving as productive as ever in their home offices, reverting to bricks and mortar and costly office rents is unlikely in the near future. It's a situation that is being played out in many business sectors. The number of 'for lease' signs in city centres is on the increase and foot traffic is well down.

Geoff Bragg says the decline in module prices is another consumer driver, and market competition has been steep this year.

A look at today's average costs shows some marked differences in state prices.





Solar panel costs across the nation

Perth residents are paying the least for solar panels. By contrast, those in Darwin are paying the highest, according to data collected by Solar Choice, which compiles residential and commercial-scale solar pricing, and product and warranty information from its pre-vetted installer network.

Prices in the table at the right include both the up-front incentive available for small-scale systems through the Renewable Energy Target ('STC discount') and GST, and represent the total retail price of the system to the customer.

According to Solar Choice chief strategist Jeff Sykes, the price of solar systems is expected to continue to decline in the foreseeable future, albeit at a slower pace. Economies of scale and the impact of fluctuations in the Australian dollar on imports will affect pricing as will the winding back of the federal solar rebate STC program until it is phased out completely in 2030.

Solar Battery Price Index – August 2020

The table to the right displays average, indicative battery installation prices from a range of installers around Australia, most of whom are active in the Solar Choice network. Prices include installation and GST.

How much do solar panels cost? (Aug 2020)

	-	•				
	3kW	4kW	5kW	6kW	7kW	10kW
Adelaide	\$3960	\$4300	\$4420	\$4910	\$6610	\$9960
Brisbane	\$3850	\$4520	\$5050	\$5520	\$7000	\$10,310
Canberra	\$3200	\$4090	\$4140	\$4990	\$6110	\$8050
Darwin	\$7360	\$8400	\$9740	\$10,250	\$11,310	\$13,000
Hobart	\$4200	\$4910	\$5610	\$6780	\$7330	\$11,750
Melbourne	\$4060	\$4560	\$4860	\$5270	\$6750	\$9780
Sydney	\$3620	\$4310	\$4650	\$5220	\$6370	\$8930
Perth	\$2890	\$3540	\$3710	\$4240	\$6070	\$9390
All	\$4140	\$4830	\$5270	\$5900	\$7190	\$10150

Table courtesy Solar Choice, www.solarchoice.net.au

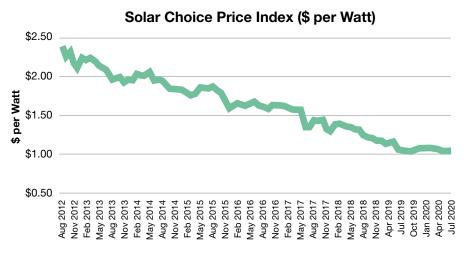
Commercial Solar PV Price Index – average commercial solar panel costs (Aug 2020)

	10kW	30kW	50kW	70kW	100kW
Adelaide	\$12,050	\$32,910	\$55,280	\$75,820	\$97,990
Brisbane	\$11,450	\$31,040	\$54,310	\$75,640	\$98,070
Canberra	\$10,380	\$28,080	\$50,980	\$73,000	\$99,940
Hobart	\$13,620	\$33,920	\$59,390	\$79,920	\$94,220
Melbourne	\$12,460	\$31,890	\$55,190	\$74,190	\$99,010
Sydney	\$10,910	\$28,850	\$52,490	\$70,290	\$95,300
Perth	\$14,170	\$33,730	\$61,040	\$76,440	\$94,150
All	\$12,150	\$31,490	\$55,530	\$75,040	\$96,950

Table courtesy Solar Choice, www.solarchoice.net.au

Market evolution

The chart below tracks changes over the past five years and reflects the dramatic decrease in solar PV prices due to economies of scale for solar panel and inverter manufacturers.



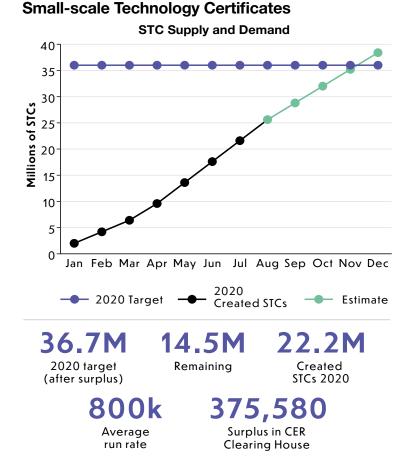
Graph courtesy Solar Choice, www.solarchoice.net.au

Average Solar Battery System Costs (fully installed) as at August 2020

Battery size	Battery only price*	Battery + inverter/charger**
3kWh	\$3420	\$5820
8kWh	\$8480	\$11,840
13kWh	\$13,520	\$15,080
18kWh	\$15,660	\$20,700

* Includes the installation of the battery only. An existing hybrid/battery ready system is assumed

** Includes an additional inverter to manage the battery bank for a DC-coupled battery system



Greenbank STC Indicative Price curve

Settlement dates	Curve
15 Sep 2020	\$38.30
15 Oct 2020	\$38.35
15 Nov 2020	\$38.40
15 Dec 2020	\$38.45
15 Jan 2021	\$38.50
15 Feb 2021	\$38.45

Note: • Forward STC price curve is intended as a guide only.

• Supply and demand is an estimate guide only.

STC data assembled and supplied by Greenbank Environmental, www.green-bank.com.au

REC Registry single sign-on

In September the Clean Energy Regulator is moving the REC Registry to a single sign-on solution, enabling users to access all REC Registry accounts using a single login, an email address instead of different usernames.

Each person must have a unique email address, those sharing an email address with another person/s, will need to update their email address so that each person has a unique email address.

Contact the Clean Energy Regulator on 1300 553 542 or enquiries@cleanenergyregulator.gov.au for more information or advice.

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AN AFFORDABLE, ZERO-CARBON ENERGY FUTURE

The electricity mix of South Australia is evolving at a rapid rate and power network SAPN is facilitating the transition, says **Mark Vincent.**



SOUTH AUSTRALIA IS ON A MISSION to convert its electricity system into a 21st century platform that can support a net-100 per cent renewable energy future by 2030. Already, about a third of the State's customers are

generating their own electricity on their home or business rooftops. Collectively, they can generate almost 1,500MW of power – equivalent to two to three major thermal power stations. Within one to two years, on mild spring days, there will be more than enough generation capacity available on roofs to power the entire State.

"Renewable energy sources are paving the way for an affordable low carbon energy and transport system in South Australia," said SA Power Networks' General Manager Strategy & Transformation, Mark Vincent.

"It is exciting to think that our individual investment in solar energy is helping make energy cheaper as well as better for the planet."

Mr Vincent said the electricity distribution network of substations, poles and wires was central to fully realising the benefits of the changes underway.

"The measures we are undertaking at SA Power Networks create the potential for us to more than double the amount of renewable energy the electricity distribution network can accommodate over the next five years. And we are getting the network ready to accommodate the next step in the transition with energy being fed into it from home batteries and electric vehicles (EVs).

"We aim to give more South Australians access to solar energy as well as significantly reduce the number of customers whose rooftop systems switch off in response to high voltages in parts of the distribution network," Vincent said.

"We also want to be able to give customers the chance to be able to share the energy they generate, whether it is direct from panels in the middle of day or stored in a battery in their home or vehicle for later use. "The reality is these resources will not work for the benefit of customers and the community without the network. In fact, it is only by these resources and the network working together that we can maximise the benefits of cheaper energy and better environmental outcomes for everyone."

To get there requires a number of initiatives to be implemented – some across the national electricity market, and others in the most localised parts of the State's electricity distribution network. These include:

- Introduction in July 2020 of new residential Time-of-Use network tariffs. These 'solar sponge' tariffs provide cheaper daytime network charges to encourage use of more solar-generated energy during the middle of the day. Several retailers are now offering this option to their customers who have smart meters
- A prosumer tariff for customers who want to store and export energy into the grid
- Encouraging more controlled loads, such as water heating, to be shifted to the daytime to soak up extra (and cheaper) solar generation
- Investing in enhanced voltage management to reduce spring-time voltages for solar PV customers
- Developing national technical standards to support introduction of flexible export limits for rooftop solar to be offered in constrained areas of the network, allowing greater exports than traditional fixed export limits, and
- Trials with Virtual Power Plant operators who coordinate the operation of customers' solar and battery systems to provide system and network support services, to ensure they can derive the greatest possible value for their customers, as well as the electricity system as a whole – driving down prices for all customers.

"The pace of change is challenging but we are excited by this journey of transformation. We foresee a future where all Australians will have access to abundant, affordable and zero-carbon energy," Vincent concluded.



THE GREENING OF STATE CAPITALS

The cities of Adelaide, Sydney and Melbourne are bolstering their use of renewable energy. **THE NEW FINANCIAL YEAR** marked advances in energy transformation in three state capitals with the City of Adelaide and City of Sydney moving to 100 per cent renewable energy and a group of prominent Melbourne universities and businesses nudging the city closer to its carbon goals.

First to the city of churches which is switching all operations to run on renewable electricity, taking in corporate and community buildings, council event infrastructure, electric vehicle chargers, park barbecues, water pumps, street lighting and traffic lights.

The switch is facilitated through a power purchase agreement with energy management provider Flow Power, under which electricity will be supplied from Clements Gap wind farm in the state's mid-north, followed by two solar farms.

The move is anticipated to slash emissions by more than 11,000 tonnes and city's power bills by 20 per cent.

In related moves, the city offers support and incentives for ratepayers and property owners including the Sustainability Incentives Scheme, the *CitySwitch Green Office* program and the *Building Upgrade Finance* program.

Visit www.cityofadelaide.com.au/ about-adelaide/our-sustainable-city/ responding-to-climate-change/



The emerald city

The City of Sydney is also capitalising on power purchase agreements and is now powered by renewable electricity generated from wind and solar farms in regional NSW. The green energy deal valued at over \$60 million is touted the biggest of its kind by any council in Australia.

The development means all the city's operations – from street lights to pools and sports fields, depots, buildings and the iconic Sydney Town Hall – will now be run on 100 per cent renewable electricity.

The agreement structured by Flow Power enables the city to source renewable energy from the 120MW Bomen Solar Farm in Wagga Wagga (that features bi-facial panels to absorb sunlight on both sides, and tracking technology), the 3MW Shoalhaven solar farm in Nowra and from the mighty 270MW Sapphire Wind Farm near Inverell, New England.

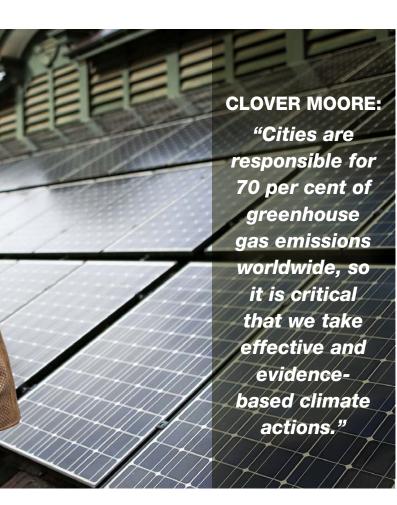
Referencing job generation and the need to support communities impacted by the COVID-19 pandemic and create new opportunities in droughtaffected regional NSW, Lord Mayor Clover Moore said "We are in the middle of a climate emergency. If we are to reduce emissions and grow the green



The City of Adelaide (below) aims







power sector, all levels of government must urgently transition to renewable energy."

The switch is projected to save the city up to half a million dollars a year over the next decade and reduce carbon emissions by around 20,000 tonnes a year. Strategically, the new deal will enable the City of Sydney to reach its 2030 target of reducing emissions by 70 per cent by 2024, six years before schedule.

Lockdown, ramp up: City of Melbourne

The City of Melbourne may be looking a little like a ghost town these days, but the City Council has laid the groundwork for the future, and early last year became the first city in Australia to introduce a renewable energy power purchasing agreement.

The forward-thinking Melbourne Renewable Energy Project (MERP) saw Council lead a consortium to purchase 88GWh of renewable energy which led to the construction of an 80MW wind farm in western Victoria.

Council operations are now powered by 100 per cent renewable energy, and the transition is spreading with 14 shopping centres, nine office buildings, seven educational campuses, and four manufacturing facilities more recently switching to renewable energy.

The multimillion-dollar deal involves a group of prominent Melbourne universities and businesses including RMIT University, Deakin University, Cbus Property, property investor ISPT, infrastructure services provider Fulton Hogan, Citywide Asphalt, and confectionary maker Mondelez International, which are powering their operations using wind energy produced at regional wind farms including Yaloak South Wind Farm.

Tango Energy will provide 110GWh of renewable electricity per year to the purchasing group over 10 years.

"Renewable energy investments can and should play a significant role in supporting our economic recovery from COVID-19," said Deputy Lord Mayor Arron Wood.

"The purchase of renewable energy certainly has a positive environmental impact and also makes economic sense... it also locks in price certainty... it's not only good for our planet, but great for the hip pocket.

"It's also a significant step towards the goal for all of Melbourne to be powered by 100 per cent renewable energy."

The City of Melbourne has set a zero emissions target by 2040.



PRODUCTS and **SERVICES**

TRINA SOLAR HAS LAUNCHED TRINAPRO MEGA, the

ultra-high power smart PV solution featuring modules with power output exceeding 500W that is touted as enhancing the overall system performance and reducing the levelised cost of energy (LCOE). TrinaPro Mega integrates Vertex modules, Trina Solar's

independently developed TCU, smart tracking algorithms and SCADA monitoring systems. In many scenarios such as complicated geography, uneven terrain and wind speeds, TrinaPro Mega provides customised solutions to deliver system reliability and efficiency

Yin Rongfang, vice general manager and vice president of Trina Solar, said: "The PV industry has embraced the 500W-plus power since the beginning of the year. As an industry pioneer, the Vertex module demonstrates Trina Solar's strong ability at innovation and provides the industry with an entirely new technical platform. Moreover, Vertex facilitates the commercialisation of new technologies and paves the way for the next module power upgrade to 600W."

www.trinasolar.com

CONQUERING OVERSEAS MARKETS: POWER LEDGER

recently announced a partnership with Thai energy company TDED to create a blockchain-based digital energy business in Thailand which





Plenti CEO Daniel Foggo

WHAT'S IN A NAME In early August lending company RATESETTER AUSTRALIA CHANGED ITS NAME TO

PLENTI and took the opportunity to explain the company was ramping up its next phase of growth in personal, automotive and renewable lending.

Plenti CEO Daniel Foggo said, "As we grow, we want our identity to reflect our ambitions rather than our origins...

now is the right time to take things to the next level, with a name that reflects our company's future as a champion in consumer finance."

With a move toward renewable energy, Plenti has launched new loan products including award-winning car and green loans, and nurtured strong relationships with new partners including loan brokers and renewable energy installers.

To support its growth through a range of structures Plenti has brought on board a diverse range of new investors. www.plenti.com.au



A Chinese 'Top Runner' PV power project in Tongchuan, Shaanxi, using 30MW TrinaPro smart solution.

aims to source 25 per cent of its power from renewables by 2037. The collaboration will develop P2P energy trading and environmental commodity trading solutions across the country to encourage the sector's growth. "This solidifies our market-leading position across the ASEAN region, and comes just after we announced significant energy trading projects in France and Italy," said Dr Jemma Green and John Bulich.

"As the world begins to recover from COVID-19, new ways of living are being embraced and Power Ledger is at the forefront of this transition. We are building the operating system for the world's new energy marketplace one project at a time and telling our unique story to a global audience."

Indeed. Jemma Green recently introduced Power Ledger's capabilities to an audience of millions when she featured on CNN's *Great Big Story*. *www.powerledger.io*

URBAN SOLAR POWER PLANT TO BE DELIVERED BY HELICOPTER? NOW WE'VE HEARD IT ALL Epho Commercial

Solar has been selected to convert the Woolworths Norwest Support Office in western Sydney to solar energy.

The new solar system will have a capacity of 572kW of solar power and cover 3000 square metres of roof space.

The project is in line with Woolworths' commitment to sustainable energy and reduce carbon emissions.

The assignment comes with more than a few challenges, with the 1,400 solar panels being flown in to the roof by choppers. They reckon 90 trips should do it.

Other hurdles are in the form of the 3,000 people working on site daily and limited crane space at the premises.

But lift-off is planned, and as Epho's Dr Oliver Hartley said "This project reflects Epho's expertise in delivering complex large scale projects and will make a real difference towards a sustainable future for Australia."

www.epho.com.au



Dr Oliver Hartley, Epho Managing Director



GOOD DEAL: AUSTRALIAN BATTERY MANUFACTURER REDFLOW HAS SECURED A NEW PARTNER IN DARWIN-

BASED DELTA ELECTRICS, which believes that zinc-bromine flow batteries are ideally suited to deliver energy storage in the hot, demanding conditions of the Top End.

Delta Electrics General Manager Andrew Boller said the Northern Territory was increasingly seeking the benefits of new-generation batteries and that "Redflow zinc-bromine flow batteries are the ideal energy storage technology for the NT due to their ability to operate in harsh conditions and in warmer temperatures without cooling."

He identifies the potential for Redflow in off-grid and batterysmoothing projects of less than 1MWh, citing the many opportunities in the 200-600kWh range in the pipeline and several in the sub-100kWh range.

The deal is significant for Redflow, given Delta Electrics deals with some of the NT's largest organisations including Power Water, Territory Generation, the Australian Department of Defence, Telstra, McArthur River Mining/Xstrata and Energy Resources Australia.

www.deltaelectrics.com.au, www.redflow.com



BIG NAMES, BIG NUMBERS AES, a Fortune 500 company and leading global energy business has made a strategic investment in **AUSTRALIAN CLEAN TECHNOLOGY INNOVATOR 5B**, developer of the Maverick roll-out ground solar

system.

Under the deal AES will accelerate the global deployment of 5B by funding continued development of the Maverick which is described as "the simplest, fastest, smartest and lowest cost solar solution possible."

5B co-founder and chief executive Chris McGrath said "The potential of the partnership we have formed with AES is hugely exciting and palpable to all involved... our Maverick solution is defining the next generation for solar power and the true potential of how fast, simple, flexible and low cost it should and will be."

AES which boasts more than 35GW of global power generation operation intends to deploy the Maverick solution across projects in its 2 to 3GW of annual renewables growth, kicking off with pioneering solar projects in Panama and in Chile.

Things are looking pretty positive for Maverick which is earmarked for the world's largest solar project, Sun Cable's 10GW Australia-ASEAN Power Link from the Northern Territory.

www.5b.com.au



Delta Electrics General Manager Andrew Boller with a Redflow ZCell battery

FUNDING BOOST, CONFIDENCE BUILDER: AUSTRALIAN OWNED REDEARTH ENERGY STORAGE

has raised \$4.75 million in Series A funding from the Queensland Government Business Development Fund and Australian institutional and family investors.

The Brisbane based company will use the funding to accelerate its manufacturing, sales and marketing efforts to meet Australia's increasing demand for high quality, cost-saving energy battery storage systems for residential, commercial and industrial use.

With an eye on manufacturing more than \$70 million worth of battery systems in the next four years. RedEarth is also launching a new Queensland innovation and production facility in spring.

RedEarth chief executive CEO Charles Walker said: "This 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."

Founded in 2013, RedEarth is one of Australia's first owned and operated domestic producers of energy storage systems. *www.redearth.energy*



RedEarth co-founders Chris Winter and Charles Walker

THE LIFE AND TIMES WE LIVE IN

"We can and must revitalise Australia's economy at the same time as we decarbonise. The smart energy industry is ready right now to deliver screwdriver and shovel ready projects, creating new jobs and investment across the nation."



John Grimes Smart Energy Council

"It doesn't feel like it at times, and the political debate would have us believe it is not happening at all. But the Australian Energy Market Operator says Australia is in the midst of what is likely to be the world's fastest energy transition [with] the shift from coal to a grid dominated by wind, solar and storage."

> Giles Parkinson RenewEconomy

e

"Australia has long been a world leader in energy exports... as technologies change, we can capitalise on our strengths in renewables to continue to lead the world in energy exports."

> Angus Taylor, Federal Minister for Energy and Emissions Reduction (experiencing a temporary epiphany)



"NSW has leapt from the back of the pack... Energy Minister Matt Kean's renewable energy zones will see the state build as much large-scale energy this decade as all of Australia built over the past 20 years... helping to edge out dirty old coal. I reckon NSW will exceed 45% renewables by 2030, significantly on the back of its REZs."

Simon Holmes à Court

"[I'm] very much a liberal trying to take the economically and environmentally rational approach."

Matt Kean NSW Energy Minister



BIDEN: 100 per cent of power zero carbon by 2035

MORRISON: 50 per cent renewables by 2030 economy wrecking

BIDEN: *Revitalise US auto sector via mass electric vehicle roll-out*

MORRISON: 50 per cent electric vehicles will "end the weekend"

Tristan Edis Green Energy Trading



AN EYE ON ECONOMIC RECOVERY

"An economic stimulus package in response to the devastation of the coronavirus pandemic provides Australia

with a unique opportunity to seize the day to grow our economy, increase jobs and reduce our living expenses now and for generations to come." – Climate Change Authority



"If clean energy is to drive Australia's economic recovery, let's keep it local... if we still rely on international supply chains for wind, solar and other projects,

Australian jobs will be foregone. The key to making this happen is to require local content as part of the renewables led recovery."

Simon Corbell of Energy Estate, and former deputy chief minister of the ACT; Smart Energy Council Patron



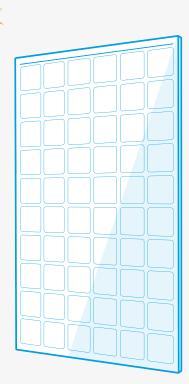


"When the global pandemic hit there was no playbook or framework for us to follow so each country has had to fall back on its own resources to cope. We can draw an analogy with the climate and our response... It is a global challenge [and] we all have a role to play in a sustainable environment ... there is so much individuals can do whether it is embracing solar panels or energy efficient appliances or fuel-efficient cars."

Julie Bishop, Former Liberal Party Deputy Leader

WHO ANI?

I **deliver solar power faster,** needing just one solar panel (35vDC start-up/ 30vDC shutdown)



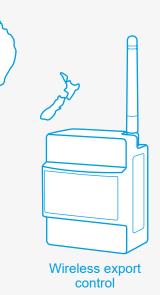


I give you energy usage data/ export control; with **built-in energy meter*** *CT clamp and cable required*

My DC isolator is **compliant AU/ NZ** wide I give you the option of **ultimate convenience** with wireless consumption/ export control

I am more than a solar inverter, I am





https://l.ead.me/inverter

THE POWER OF PLANNING

Energy and solar PV consultancy Enhar is helping local councils, schools. universities, government authorities and large energy users transition to renewable energy. Along the way Enhar has unlocked \$1.5M in federal and state grant funding.

DESPITE THE WIDESPREAD DISRUPTIONS created by the pandemic, Team Enhar has been busier than ever with planning and design services in recent months.

Company director Demian Natakhan attributes the productivity to the underlying trend in the market for increased deployment of renewables, coupled with Enhar's ability to deliver robust feasibility services, energy audits and system designs.

A better educated society and healthy economics also kick in.

"We have emerged from the solar coaster and now renewable energy is more of a need rather than want-based situation, people can see the return on investment," Demian told *Smart Energy*.

"Today people are far more educated, whether they are in the domestic PV or commercial market, council or private sector. At the end of the day it's not just the environmental imperatives, it's about the bottom line.

"With the significant cost reductions in solar PV over the past three years the business case scenario has become a lot stronger... and people want to have control over their fixed energy costs."

Snapshot of a portfolio

In recent years Enhar has advised on a swag of sizeable projects spanning universities, councils and larger energy users, among them a 100kW rooftop solar, 100kWhr/45kW LiON batteries, for Nillumbik Community Bank Stadium in north Victoria, which included 3 x 15kW Selectronic SP-Pro inverter/chargers.

More recently the team oversaw design and development of 2 x 100kW roof top solar PV systems involving 2 x 180kWh/90kW Redflow batteries at a Childcare centre. Staying in Victoria, the team oversaw the City of Whittlesea's Virtual Power Plant incorporating 1MW solar PV and potential for battery storage opportunities and 'smart' energy commercial aggregation.

Enhar also participated in the City of Greater Bendigo's project to deploy a smart embedded network through multiple rooftop PV systems, battery storage and system integration.

And, although details are under wraps, Enhar has been short-listed for a significant project involving a large 4.9MW storage battery only for a utility to provide grid support in times of high-level demand.

The future is likely to involve more battery storage, says Demain who has enjoyed the renewable energy buzz around local councils.

"Each council is different but generally there are many stakeholders to converse with so work moves ahead gradually, but councils are very much ahead of the curve and are early adopters of smart energy technology," he said.

Why so? "Councils' sustainability goals are often ambitious, and they demand a high engagement in renewable and smart energy technologies to achieve their emission reductions targets, net zero emissions and energy efficiency goals.

"The championing of those goals by the sustainability divisions leads to budgetary support for some progressive programs. We have seen this consistently.

"In my experience council dynamics involve a collaborative approach which leads to knowledge sharing, there are no secrets regarding how they achieve their high renewables outcomes," Demian explained.

"It's not such a corporate race to the top, and we hope the entire sector of Local Government Authorities commit to renewable energy as soon as possible."





Education sector

Enhar is currently managing a 4.5MW rooftop solar and carport project at Victoria's La Trobe University that includes a 2MW solar PV system on complex high voltage network with 30 separate low voltage connection points and four separate carport systems with a total capacity of 1.1MW.

Declining costs and increasing 'smarts' are among the biggest drivers in the university sector, which in the current climate is closely monitoring expenditure against funding shortfalls.

"We accept that universities are among the hardest hit during these tough times and that the budget cuts will be significant enough to impact developments; however if rooftop solar systems help reduce the cost of running the facilities it still makes good sense.

"Finding the money to invest during a time of reduced revenue is an issue, but to a lesser extent the planning and preparation phases that have long lead times [for grid permits and planning approvals] are still being prioritised, so at this stage we remain busy in this and other sectors."

For his part, Project Manager Heath Shakespeare has been working closely with the NSW Solar My Schools project to help them determine the most feasible options and optimum solar PV business cases.

To date Heath's visited 100 schools, and says the movement is progressing into other areas such as sporting and community facilities.

"We are all working effectively from home and have had our best financial year to date in our entire company history."

"The renewable energy knowledge held by councils helps speed up the process in schools and other facilities, they work in partnership with the instrumentalities to help them understand the headline goal and figure out just what benefits would flow from this," Heath explained.

"Overall it's been quite a successful program."

On the flip side, however, are longer paybacks (or ROI) for schools and universities against the declining cost of energy.

"The cost of grid energy is falling due to increasing input of, and cheaper, renewables so the business costs are diminishing," Demian said. "It can result in behind-the-meter projects having a tougher time getting a business case that is strong enough to approve.

"Who would have thought cheaper power could hold things back, it's

a rather ironic impact!"

For now, though, the Enhar team is as busy as it's ever been. www.enhar.com.au





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, Australia & International Sales Manager on 0499 345 013 or email luke@smartenergy.org.au

Reliability and Stability are the key point of micro grid ESS

Electricity power occupies more than half of increasing energy consumption in this decade, DER (distributed energy resources) is crucialtoday during the COVID-19 pandemic while the conventional grid is less reliable because of the less manpower available.

The micro grid ESS project could be exemplary for showing the way Forward with the electricity sector with purpose of robust, dynamic and renewable smart future grid.

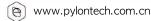
For the past 10 years, Pylontech have been committed to providing valuable users with secure and stable energy storage solutions for residential, C&I and Grid service application.













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New Generation Residential Inverter FusionSolar[®] Residential Smart PV Solution 10-Year Warranty



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Smart Energy Council Corporate Members

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





Take on any challenge A New Era in Solar

Challenges don't intimidate us. They inspire us. They push us to create a better solar future. If you're as fired up by challenges as we are, we've got you covered. The broadest solar portfolio. Responsive service. Everything you need to take your projects to the next level.

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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,



By displaying the Positive Quality[™] logo solar companies convey high standards in panel manufacturing to industry and consumers





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.

** JinkoSolar has been recognised as Top Performer in PVEL/DNV GL 2020 PV Module Reliability Scorecard for the sixth consecutive year.**

Contact Positive Quality[™] Manager Luke Shavak on 0499 345 013, email luke@smartenergy.org.au or visit www.smartenergy.org.au

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Homeowners want flexible, quality and safe solar.



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Safe, smart and tough.



SUNGROW

THE WORLD'S MOST BANKABLE INVERTER BRAND



No.1 supplier in financed projects 100% bankable

Source: BloombergNEF

120 GW⁺ Deployed Worldwide 15%+ Global Market Share Largest PV Inverter R&D Team

120 + Countries with Sungrow Installations 20+

Years in the Solar Industry

