Smart Energy
AN OFFICIAL SMART ENERGY COUNCIL PUBLICATION

SMART TRANSPORT

Australia's next energy revolution

VOLUME 42. ISSUE 167. SPRING 2022

Smart transport, smart move: the road to emissions-free driving
Momentum and direction under Labor's emissions targets
NSW schools transformed under state rooftop PV program
Transmission systems impacting consumer bills
Capral's low-carbon aluminium
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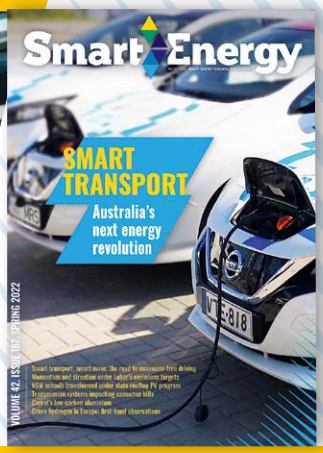

FRONT COVER *Smart transport's missing ingredient: fuel efficiency standards.*
Image: Nerijus Jakimavičius from Pixabay

CHIEF EXECUTIVE
John Grimes
PO Box 231, Mawson ACT 2607
admin@smartenergy.org.au
1300 768 204

ADVERTISING, SUBSCRIPTION & MEMBERSHIP
Alistair McGrath-Kerr
Australia & International
Sales Manager
0499 345 013
alistair@smartenergy.org.au

Marianne Fang
China Sales Manager
智慧能源理事会的杂志广告预定、企业会员服务、展会及网络研讨会等活动请咨询中国企业负责人方媛
电话：+64 21 182 4699
邮件：marianne@smartenergy.org.au
微信：18896983297

SMART ENERGY EDITOR
Nicola Card
editor@smartenergy.org.au
nicola@smartenergy.org.au

CONTRIBUTORS
Stephanie Bashir, Rob Edwards, Max Hewitt, Kellie Moore, Anthony O'Brien, Penny Parle, Mitchell Stephens, *The Conversation's* Chris Briggs and Rusty Langdon of UTS

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Mitzi Mann

The Smart Energy Council acknowledges the Traditional Owners and Custodians of the lands on which we work and pays respect to Indigenous Elders past, present and emerging.

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

Smart Energy is published quarterly.

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WELCOME

John Grimes, Chief Executive Smart Energy Council

ARE YOU LOOKING for a new solar installer sparky? I hear it is an almost impossible task…

At the same time the entire economy is going to be transformed over the next decade, with the electrification of everything, massive uptake of EVs, and renewable hydrogen becoming mainstream.

That is the backdrop to the Jobs and Skills Summit I attended recently in Canberra.

A generation of successive governments have pulled support out of skills and training, and intentionally made long-term skilled migration a difficult process, which has left Australia in a skills and jobs mess.

We have left women and people with disabilities behind. We have not focused on skills in our regions. We have made skilled migration so onerous people simply give up.

That has to change, and fast. If the smart energy industry is going to capitalise on our access to the world's cheapest and cleanest electricity, to attract the world's heavy industry to set up shop here, and to build smart energy IT systems we can sell to the world, we need a plan for urgent action.

The skills required touch almost every part of the economy. From boiler makers to IT engineers and everything in between.

I was pleased with the goodwill brought to the Summit and the genuine determination by the federal government to do more. But whatever we do needs to be done urgently. We must do what we can immediately, and then focus on the things that will deliver in the future as they wash through the system.

In the short term, we have partnered with Electrical Trades Union, Master Electricians and others to call for Powering Australia Skills Clusters to be set up across the country as well as a national Apprentice Support Network.

I know our sector has been heard in Canberra as well as by the state Premiers and Chief Ministers. It is a good start, but you can be assured that the Smart Energy Council is not going to let this go, and will advocate strongly for our sector to get the skilled workers we need to succeed.

IN MY VIEW

Heidi Lee is chief executive of Beyond Zero Emissions

The global transition to zero emissions is Australia's opportunity to shine: We can act now to capture the prosperity that a clean economy can provide us, in our cities and our regional industrial heartlands. Beyond Zero Emissions is unique among thinktanks, with a small team of staff we coordinate hundreds of expert volunteers to co-create climate solutions. We are currently obsessed with the immense potential of regional Australia to thrive in the transition and we're partnering with locals in communities to make this real.

High quality sustainable jobs, green investment and productive capability in places like the Hunter Valley and Central Queensland will benefit people who live there, and will benefit our city and suburb dwellers with cheaper power and Australian-made products.

Heavy industry can be heroes in the transition: Australia's heavy industries, its smelters and refineries, are on a decarbonisation journey. With these major energy users already investing in massive amounts of locally generated renewable energy, the business case for decarbonising adjacent facilities is stronger. With a guarantee of affordable green power, green investment will flow to build out manufacturing precincts, both future-proofing existing industries and accelerating entrepreneurial new businesses that make the materials and equipment needed for a zero-emissions and circular economy.

We need lots of new materials and equipment to transition to zero emissions: We need to deploy hundreds of hydrogen electrolysers, thousands of all-electric heavy vehicles, and millions of heat pumps to replace fossil fuels across Australia. Importantly, with good planning and policy certainty, we can set up local industries to meet domestic demand and capture growing global markets.

Regional and national opportunities are immense: Locally we have calculated more than 34,000 new green jobs in the Hunter region and 11,000 new jobs in Gladstone. Nationally, we could accelerate the transition with a 5-year plan for 1.8m green jobs across all sectors. And Australian renewables can provide us with exports of over $333bn/year, more than three times the value of our current fossil exports.

The upside well justifies the investment in planning and coordination: The support of local communities is fundamental to getting new and upgraded green infrastructure developed and online. We are thrilled by the support of hundreds of people and our success is your success.

www.bze.org.au/research

My thanks to all SEC subscribers who have contributed large and small to Beyond Zero Emissions over the past decade. We wouldn't be where we are without you, and we won't succeed unless we all continue to pull together.

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Next generation PV inverters for next generation PV modules.

The new DNS G3 single phase inverter has been designed for compatibility with high power solar panels, with a high current input of 16A per string and a short circuit current of 23A.

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GoodWe will be debuting the DNS G3 and a number of brand new products at the 2022 All Energy Conference and Exhibition, taking place in Melbourne on the 26th and 27th October!

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Visit www.goodwe.com.au/events for more information.

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GRAND DESIGNS AUSTRALIA MAGAZINE HOUSE OF THE YEAR TRADE PARTNER

INDUSTRY DEVELOPMENTS

AUSNET AND CONSOLIDATED POWER PROJECTS AUSTRALIA have commenced construction of the 218MW Ryan Corner Wind Farm in Victoria's southwest which, on completion in 2023, will connect to the grid and supply 141,000 homes with energy. It will support 300 jobs during construction and eight permanent jobs during operations.

AusNet and CPP will build approximately 19 kilometres of new 132kV transmission line from the wind farm to the Tarrone Terminal Station. AusNet will also install a new 420MVA transformer and build a new substation at the wind farm site. The substation at the Ryan Corner Wind Farm will comprise two 120MVA transformers.

L to R: Edwin Munian from CPP, Camino Cabanillas from GPG and Kaushal Obadage from AusNet

OFFSHORE WIND FARMS ON THE HORIZON The federal government has listed six areas off Gippsland, Wollongong and Newcastle it hopes to declare suitable for offshore wind farms.

"We are way behind the game, way behind the rest of the world in producing wind off our coastline," Energy Minister Chris Bowen said. "We have a lot of catching up to do. Offshore wind is jobs-rich and energy-rich."

Turbine blades will be over 100 metres long and sit 260 metres above sea level. Other industry advances include a single 14MW wind turbine which needs just a single connection to a substation and less maintenance than two of the earlier 7MW turbines.

In a happy symbiosis wind is stronger over water at night and over land during the day, therefore complementing land-based renewables.

THE FOSSILISED ELEPHANT IN THE ROOM Staying offshore, the federal government's recent release of 10 more sites for exploration for new oil and gas projects off the coasts of Victoria, the Northern Territory and Western Australia, 46,758 square kilometres of Commonwealth waters, has taken off much of the gloss over the government's emissions commitments.

Support for such endeavours is explained as a "necessary investment in the nation's petroleum sector, which is vital for the economy and meeting the energy needs of Australians, and central to alleviating future domestic gas shortfalls." All up there are 45 proposed gas projects and 50 coal projects in the wings.

Greens Senator Peter Whish-Wilson says enough is enough, "We already have enough oil and gas in reserves to trigger catastrophic climate change to our planet."

NEOEN HAS SIGNED A 40MW PPA WITH FLOW POWER for South Australia's 412MW Goyder South Stage 1 wind farm. The 100 per cent Neoen-owned farm is anticipated to commence operations in 2024.

The PPA is the second offtake agreement secured for the project, complementing the existing 100MW contract with the ACT Government.

Goyder South Stage 1 is the first stage of Neoen's flagship project known as Goyder Renewables Zone, a hybrid wind, solar and storage project in the state's mid-north. Goyder South has development approval for a total of 1200MW of wind generation, 600MW of solar generation and 900MW of battery storage capacity, making it the state's largest renewable project.

BLACKROCK REAL ASSETS IS COMMITTING $1 BILLION for nine battery-storage projects on Australia's east coast after agreeing to acquire Melbourne-based battery developer Akaysha Energy which has nine battery storage projects in NSW, Victoria, Queensland, South Australia and Tasmania.

"This is the largest investment BlackRock has made into battery storage by some margin," said BlackRock's Charlie Reid, revealing Australia was selected due to the relatively speedy transition from fossil fuels to renewable energy and "fundamental need for battery storage".

"It's a very interesting point in time for the Australian market and the Asia-Pacific market," he said.

"**For Australia to become a renewable energy superpower, battery storage is going to be required at vast scale.**"

POWERING UP In related developments Origin Energy is planning a 700MW battery at the Eraring coal-fired power station and AGL is eyeing a series of 1000MW batteries across several sites. Neoen pips both with the highly successful Victoria Big Battery near Geelong, and South Australia's Hornsdale Power Reserve.

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INDUSTRY DEVELOPMENTS

AEMO'S 30-YEAR ROADMAP reveals that while thermal plant owners suggest about 8GW of the current 23GW of coal-fired generation capacity will withdraw by 2030, it is more likely 14 GW will withdraw, as identified in the Step Change scenario in AEMO's Integrated System Plan.

By 2050 the NEM needs to nearly double to 320TWh annually to serve the electrification of transport, industry, office and homes, replacing gas, petrol and other fuels. That's nine times the utility-scale variable renewable energy (VRE) capacity. By 2050 there will be nearly five times the distributed PV capacity, and substantial growth in distributed storage. By 2032, over half of the homes in the NEM are likely to have rooftop PV, rising to 65 per cent with 69GW capacity by 2050, with most systems complemented by battery energy storage.

Australia will need 46GW/640GWh of dispatchable storage.

By 2050, the ISP modelling recognises that VPPs, vehicle-to-grid services and other emerging technologies will provide approximately 31GW of dispatchable storage capacity, and utility-scale battery and pumped hydro storage 16GW.

By 2050 there will be 10GW of gas-fired generation for peak loads and firming to complement battery and pumped hydro generation.

A summary of the roadmap can be seen on page 12.

AEMO ANTICIPATES A MASSIVE INCREASE in spending on grid-scale batteries to provide back-up for renewable energy as coal-powered plants bow out, stating we need to build more than 45GW additional wind and solar generation, plus 15GW of storage by the end of the decade. That will cost an estimated $115 billion for renewable energy and storage.

Achieving the 82 per cent target means building renewables around five times faster than we have over the past two decades, and building storage at about ten times the rate of the past five years, says energy policy expert Bruce Mountain (pictured) who along with the Smart Energy Council advocates a Renewable Electricity Storage Target to accelerate the storage build.

MASTERCLASS IN GASLIGHTING AND BLISTERING IGNORANCE Far right media outlets in the UK are blaming the energy crisis on 'the insane net zero policy of this current green government'. Average household prices will double to £5,000 ($8,505) next year, but just a tiny bit of fact checking confirms the UK's high reliance on imported gas and eleven-fold rise in wholesale prices are the culprits. Gas costs around nine times that of renewables which in 2022 avoided the need for five times as much imported gas. More renewables, more reasonable prices, less dependency on foreign providers and exposure to malevolent forces. Talking of which it's time UK Sky News reporters spent some time checking facts.

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RECYCLED CONTENT RENEWABLE ENERGY FOREST MANAGEMENT CHLORINE FREE MANAGEMENT SYSTEMS CARBON NEUTRAL CERTIFICATION AUSTRALIAN MADE

THE AUSTRALIAN YOUTH CLIMATE COALITION in early August staged its 'threads of hope' installation on Parliament Lawns with political support from Independent Senator David Pocock and MP Monique Ryan.

The AYCC hung 70 letters from young people around the country calling for climate justice with an end to fossil fuels subsidies and expansion.

"We're here today representing young people from across the country calling on the Albanese Government to stop public subsidies for fossil fuels and end new fossil fuel developments. To tackle the climate crisis we cannot open any new coal mines or gas wells," said AYCC Canberra Volunteer Mirah Larkinm.

BUSINESSES SCORE 'F' ON CLIMATE ACTION TEST Researchers from The University of Queensland, Oxford and Princeton have found that businesses' trajectories to meet Paris Agreement climate action goals are less than promising.

Ten global cement companies and nine Australian utility companies were not complying.

"After developing a new modelling framework, we analysed a total of 20 companies, and we found only one Australian electric company was compliant with the goals of the 2015 Paris Agreement," study lead Dr Rekker said.

"Stakeholders and investors want to know about their business's climate impacts, and we need to have an accurate way of tracking progress, otherwise the globe will fail to meet carbon budgets… it's also very important for companies and investors who need to know their exposure to transition and litigation risk and the devaluation of a company's assets."

CATASTROPHIC FLOODING ACROSS PAKISTAN. WHAT CAN WE SAY.

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IMAGE: MATTHIAS BÖCKER, FROM PIXABAY

The new battle: *tackling emissions*

The Labor party has been at the helm of federal parliament for just three months and how things have changed. Endless conflicts over polluting fossil fuels have been replaced by action to battle emissions. The dynamic shift has delivered a sense of relief mixed with optimism.

SPRING HAS ARRIVED IN AUSTRALIA and brought with it renewed hope for expansion of renewables, and emissions reductions on the back of the new Labor government's raft of policies and targets. It's a much welcome U-turn on the dark days under the Coalition.

The Sydney Energy Forum of early July sent a strong signal when Prime Minister Albanese declared "We will lay a new foundation for sustainable growth and prosperity, [one that] will move us from an era of inaction and delay to one where we create new jobs, new industries and drive down emissions.

In the event co-hosted with the International Energy Agency, Albanese laid out plans to unlock $52 billion of private sector investment in Australian industries on the back of economic reform and economic growth while creating 604,000 extra jobs.

All the right messages

"By the end of this decade, renewable energy will make up 82 per cent of our National Energy Market; we will accelerate the decarbonisation of our electricity grid [through] batteries and energy storage; clean energy component manufacturing; hydrogen electrolysers; and fuel switching," Albanese stated.

"Crucially, we will work with business and industry to drive emissions down in a way that is consistent with reaching net zero emissions by 2050.

SMART ENERGY COUNCIL

"Our grid is not fit for purpose and our *Rewiring the Nation* program will make it so. *Rewiring the Nation* will help us get renewable energy from where it's created to where it's consumed.

"This is a plan to take Australia forward. To create jobs, cut power bills and reduce emissions by boosting renewable energy. Australia has the workers, the resources and the capacity to become a renewable energy superpower.

"And we will be transparent and held accountable as we progress our agenda."

(Now that's not something you often hear from a politician!)

Next the historic signing of a letter notifying the UN of Australia's new 43 per cent emissions reduction target witnessed by a few select and prominent industry and lobby groups including the Smart Energy Council. John Grimes hailed it "a huge day for renewables and smart energy… this is leadership."

The Prime Minister called it "the most dramatic economic transformation our nation has faced in our modern era", saying we have eight years, just over 90 months to do it.

"It really is time for the climate wars to end."

Wheels were put in motion on July 27 to August 4 with the passing of the Climate Bill 89 votes to 55.

Under pressure from the Greens and independent MPs to establish this as a floor rather than a ceiling, Climate Change and Energy Minister Chris Bowen stated "The bill makes it clear that 43 per cent is our minimum commitment – and does not prevent our collective efforts delivering even stronger reductions over the coming decade."

The emission-climate pendulum has swung from one of despair to repair.

Bowen says "We've wasted a decade, now we have not a second to waste. And nor do we intend to.

"It's time to get on with it."

In its submission on the Climate Change Bill 2022 the Smart Energy Council recommended a 'climate trigger' in the *Environment Protection and Biodiversity Conservation Act*, ensuring the impacts of a proposed project on the climate would be thoroughly assessed and considered in determining whether a proposal should be approved.

"Australia has the workers, the resources and the capacity to become a renewable energy superpower."

The SEC called for the timely implementation of the *Rewiring Australia* policy, with a minimum 25 per cent of funds allocated to building a smarter energy grid that uses distributed energy resources, and called for Energy Ministers to commit to including emissions, climate change and the environment to be explicitly added to the National Electricity Objective, the National Gas Objective and the National Electricity Retail Objective.

Scoring another win

Which brings us to another momentous achievement: the National Energy Transformation Partnership of 16 August 2022 during the meeting of energy ministers who agreed to set the vision for Australia's energy sector transformation to net zero.

The Ministers unanimously declared decarbonised electricity systems as critical to the broader energy transformation, and fundamental to supporting Australia's future economic opportunities.

The Partnership aims to provide additional certainty to support investment in renewables, storage and transmission, and ensure the economic opportunities offered by the clean energy transformation are realised for Australian households, businesses and communities.

The nation's Energy Ministers unanimously declared decarbonised electricity systems as critical to the broader energy transformation, and fundamental to supporting Australia's future economic opportunities

Smart Energy Council's John Grimes (standing second from left) joined business and industry leaders to witness the Prime Minister's commitment to lift Australia's emissions target

Much to the relief of renewables advocates, the pro-renewable state energy ministers (name one who isn't) put the kibosh on the Energy Security Board's recommendation to pay coal and gas generators to provide certainly of energy supply. AKA CoalKeeper.

SEC External Affairs Manager Wayne Smith was understandably thrilled. "By far the best Energy Ministers' meeting for a decade from a climate and renewables perspective," he said.

"Fast-tracking an emissions objective into the National Electricity Objectives is a very big win, and the capacity mechanism proposal remains Freddy Friendless, which is very good news."

On message

SEC's John Grimes suggests we pause and reflect just how far we've come in the past 12 weeks, saying the world has changed and we should be justifiably proud of "the huge movement that we have helped deliver.

"For the first time in almost a decade the Commonwealth and the states are working collaboratively together for a common goal and a common future," John Grimes said. "That's so exciting because it's now about how do we realise the rapid transition to a zero-emissions energy future rather than what's the next roadblock going to be.

"Gas will continue to be in the mix for Australia's energy future but we need to make sure that it plays the smallest role possible, and a diminishing role over time so this is all about a planned approach to make the transition to a zero emissions future.

"We build a network that is dependent on Australian sunshine and wind, those things aren't determined by malevolent forces overseas, they are determined by nature and we would be crazy not to transition as quickly as possible for security reasons, economic reasons and for environmental reasons."

He added the critical need to ensure that the 43 per cent target on emissions reductions is a floor in our ambition and not a ceiling, so we collectively need to work hard and fast to massively overshoot that target.

"Any opportunity that we have in the future to ratchet up the target in a formal and legislated sense we should seize that opportunity because this is a process which is really urgent and requires whole-of-economy transition and action."

Around the world's energy supplies

Under the Labor-led government Australia plans to lift the renewables share of the energy market from the present day of around 33 per cent to 82 per cent by 2030.

How do we compare on a global scale?

Today almost 30 per cent of the electricity consumed on the planet comes from renewable energies. Here we look at some at the top of the league board.

Hydropower and geothermal power provide close to 100 per cent of Iceland's electricity needs, while in Norway 98.4 per cent of energy production comes from renewable sources.

Albania and Paraguay obtain all their electricity from hydroelectricity. Last year Uruguay generated 98 per cent of its electricity from renewables; the majority from hydropower, complemented by wind, solar and biofuels.

Scotland produces 98 per cent of its electricity needs from wind and aims for net-zero emissions by 2045.

Brazil boasts 84.1 per cent green energy while in New Zealand 84 per cent of electricity comes from renewables and the country aspires to 100 per cent renewable electricity by 2035 followed by a carbon-neutral economy by 2050.

Costa Rica taps into hydro, geothermal, wind, biomass and solar power to produce 90 per cent of its electricity

In Nicaragua renewable energy sources geothermal, wind, hydro, biomass and a fraction of solar account for more than 75.2 per cent of electricity production. And in what will be music to 'electrify everything' Saul Griffith and David Pocock, 1.23 million homes are electrified.

Sweden is on track to reach 100 per cent renewable energy by 2040, Portugal is almost 60 per cent renewables.

By 2020, renewables were already providing 45.3 per cent of Germany's electricity consumption. Germany has set its target to reach 80 per cent renewables by 2030 on its path to 100 per cent by 2035.

Denmark sources more than half its electricity from wind and solar power.

China aims to generate a third of its energy from renewable sources by 2030 and to reach carbon neutrality by 2060.

In the US in 2020, renewable energy sources comprised 20 per cent of the country's electricity generation, 7.3 per cent hydropower and 8.4 per cent wind power.

Fun facts:

- Fossil fuel energy production in Europe is lower than renewable sources for the first time.
- 1GW/h of electricity generated by wind power releases 4 tonnes of carbon dioxide, significantly less than the 820 tonnes generated in a coal-based power plant.

Climate Change and Energy Minister Chris Bowen says the target of 43 per cent emissions reduction by 2030 is a minimum that could be lifted in due course and 'A roadmap for the transmission revolution the country needs'

John Grimes congratulated the federal government for its great work, and commended the vocal cross-benchers and the Greens for their valuable input.

"We made a decision that we would support and back in those who supported a rapid transition, that we would call out and oppose those who did not, and in that process I think we've been enormously potent advocates," John said. "It is likely that in the future this trend towards climate-minded independent candidates continues and the likelihood of them having a balance of power regardless of what party is elected to government in the future is very significant at the moment.

"Then we might be in the position that we can never have the prospect of a climate denying obstructionist idiotic administration," he said.

Many wins have been notched up but we need to press for more strategic plans to transform the network.

Renewable Energy Storage Targets

The Smart Energy Council has set its sights on a Renewable Energy Storage Target and is spearheading a 12-month campaign with industry partners including the Climate Action Network Australia to unlock substantial investment in household, commercial and large-scale renewable energy storage. The thrust of the campaign, to ensure emissions reductions are a core objective of the National Electricity Market, was spelt out in the SEC's *Climate Act* submission, with a call for relevant government agencies such as the CEFC, ARENA, NAIF to prioritise investment in household, commercial and large-scale renewable energy storage, and to examine options for amending the Renewable Energy (Electricity) Act and Regulations to fast-track investment in renewable energy and renewable energy storage.

The vision is in synch with AEMO's 30-year Roadmap that forecasts nearly five times the distributed PV capacity, and substantial growth in distributed storage in the NEM transformation that will be influenced by the generation and feed-in capability of millions of individual consumer-owned solar PV systems.

By 2032, over half of the homes in the NEM are likely to have rooftop PV, rising to 65 per cent with 69GW capacity by 2050, with most systems complemented by battery energy storage.

BIG SHIFT IN ENERGY

ENERGY TRANSITION – PRESENT DAY TO 2050

30X increase in storage capacity (batteries, VPPs, pumped hydro)
From **2GW** (today) to **61GW**

9X increase in grid-scale wind and solar
(16GW to **141GW)**

5X increase in distributed solar PV
15GW to **69GW**

~ 2X electricity grid usage
180TWH to **320TWH**

BUT
7GW to **10GW** increase in gas-powered peaking plants

GOOD NEWS
0% by 2043 coal generation capacity (stark contrast to today's **60%)**

Source: AEMO's 2022 Integrated System Plan for the National Electricity Market

130m tonnes emissions reduction by 2030 under Labor's 43% target (based on 2005 levels).

Source: Chris Bowen addressing the National Press Club

$1.3 - $1.9bn in direct funding for the gas industry pledged by Coalition between September 2020 and the May 2022 election.

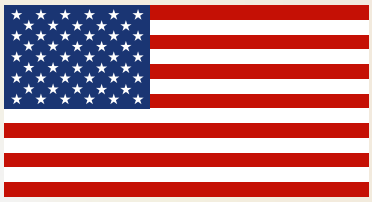
$63m also in indirect funding for federal agencies to support gas expansion.

$130bn in past 7 years pocketed by gas exporters. **$0** income tax.

$20bn Labor's proposed investment in new transmission under *Rewiring Australia* policy.

Smart Energy Council submission on *Climate Change Bill 2022* recommends:
Devote **25%** of the **$20bn** fund (~$5 billion) to develop smart energy grid using distributed energy resources.

The **80/20** rule:
G20 is responsible for 80% of global emissions.



US$370bn (AUS$430bn): Joe Biden's Climate Bill, United States (Passed by the US Senate by a whisker and one week after Australia's Climate Bill)

WITH

US$160bn tax incentives for clean electricity
US$35bn for technologies that reduce vehicle emissions

IMPACT

1bn tonnes reduction in US emissions by 2030 (66% of reduction needed to meet the US climate goal)

BIDEN'S VOW

50 – 52% reduction in emissions by the end of 2030, net zero emissions by 2050.

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IMAGE: NERIJUS JAKIMAVIČIUS FROM PIXABAY

Putting the wheels *in motion*

Big names, big ideas, big announcements: the National Electric Vehicle Summit of mid-August saw a gathering of like-minded industry groups, businesses and politicians with a common interest to develop a thriving electric vehicle industry. Happily, Australia's new government brings fresh perspectives and actions to drive the sector forward.

FROM A SUPERFICIAL STANDPOINT the tripling of electric vehicles sales over twelve months in Australia could be regarded as pretty impressive, could it not? The reality is actually anything but; frustratingly, sales of 20,665 EVs represents a piffling two per cent of Australia's new car sales, and is a shameful five times slower than the global average. This is despite strong demand among customers wanting to ditch their petrol driven vehicles. .

Essentially, demand far outstrips supply. By a long shot. As illustrated by **Behyad Jafari** of the Electric Vehicle Council: "Buying an EV is like winning a lottery, one maker had 16,000 customers lined up for 500 cars. They sold out in just one hour."

Little wonder, with petrol bills averaging over $100 a week which is twice that of the average [and much dreaded] household electricity bill, observed **Mike Cannon-Brookes**.

Despite the enormous cost of even the cheapest EV – $45,000 – a series of consumer surveys reveals a common finding that 55-60 per cent of the population want their next car to be electric. So what's the hold up? Fuel efficiency standards or the lack thereof, which has resulted in Australia becoming the dumping ground for polluting vehicles in a world where EV car makers prioritise other markets with stricter standards. But not Russia, Indonesia, Turkey or Australia.

The Australia Institute Transport researcher **Audrey Quicke** says had fuel efficiency standards been implemented in Australia back in 2016 drivers would have saved substantially on costs and there would be far more EVs in the market. Critically, Australia would not have needed to import foreign oil.

"If we see standards we will start seeing more benefits and more models coming into the market and then we will see more affordable models so it will be a more equitable transition," she told *Smart Energy*.

"Our TAI report found nine million tonnes of emissions would have been avoided if fuel efficiency standards had been introduced in 2016. That's a year's worth of domestic flights."

Paul Samson of VW Group Australia (and EV Council board member) told the assembly that the lack of standards in Australia means we

don't get the best electric or internal combustion engine (ICE) vehicles. The fuel efficiency standards work by requiring fleet averages, it forces ICE to get better fuel consumption and lower emissions too. Eventually the Euro 7 standard in 2024 will make it really hard for car makers who will be unable to meet those standards by selling any ICE vehicles.

As it stands, Australia currently has the world's dirtiest cars. But the National EV Summit of August 19 brought positive news.

Minister Chris Bowen: Driving the nation

Energy Minister Bowen took the podium and set the scene saying "Against the odds, with a very unfriendly [Coalition] federal policy setting, Australians have managed to edge up EV and plug-in car sales to 2% of total sales… [but] we know from overseas experience, that with the right policy settings, EV penetration can increase quickly – Sweden, for example, increased its proportion of EV sales from 18 per cent to 62 per cent in two years.

"So we have a lot of work to do."

In the first of several big announcements Minister Bowen outlined the Albanese Government's EV Strategy with its *Driving the Nation* plan to: establish a national EV charging network with charging stations every 150km on major roads; create a national Hydrogen Highways refuelling network; and set a Low Emissions Vehicle target for the Commonwealth fleet of 75% of new leases and purchases by 2025.

"With thousands of vehicles in the Commonwealth fleet, it is big enough to encourage more EV model introductions to Australia, and to expand a resale market," Bowen said.

The ALP has already removed fringe benefits tax and the five per cent import tariff for eligible electric vehicles.

The Minister also addressed onshore manufacturing opportunities for electric vehicles and the supply chain.

"Value adding to our abundant supply of critical minerals and rare earths is a key element of the industry policy… up to $3 billion of the $15 billion National Reconstruction Fund will be put towards activities including clean energy component manufacturing, and we fully expect participants in the EV industry to be actively pursuing opportunities for co-investment from that fund.

"Right now, we dig up all the minerals needed to make batteries but send most of it offshore for the work to be done elsewhere. It's a lost opportunity for jobs and investment when there are an estimated 35,000 jobs and $7 billion in value to be made in Australia from battery technology and industries across all sectors."

The Government will implement a National Battery Strategy, and establish a Battery Manufacturing Precinct in Queensland, he said.

"We are now committed to the development of Australia's first National Electric Vehicle Strategy with the goal of greater EV affordability, choice, uptake, reduced emissions and fuel, and greater local manufacturing."

Next, the moment the Summit had been hoping and waiting for.

Fuel efficiency standards

Importantly, the consultation paper will include exploring options for the introduction of fuel efficiency standards, Bowen said to rousing applause.

"We believe that now is the time to have a sensible discussion about whether fuel efficiency standards could help improve the supply of electric vehicles into our market, to address the cost-of-living impacts of inefficient cars, and to reduce emissions from the transport sector.

"There are an estimated 35,000 jobs and $7 billion in value to be made in Australia from battery technology and industries across all sectors."

CHRIS BOWEN

"I can now confirm we will release a discussion paper in September to inform the strategy. States have been invited to work together

"The goal is to make more EVs affordable, to drive uptake, reduce emissions and save money on fuel, and take advantage of local manufacturing opportunities."

A new level of optimism

Following Bowen's address an upbeat **Behyad Jafari** spoke of his optimism, telling *Smart Energy* "We have been calling for fuel efficiency standards… and when you provide the evidence to this government they act.

"It is important to be a vocal advocate and provide a platform for these issues but you also need the expert back-up and we have an important job of providing the evidence.

"We have hit a turning point with electric vehicles, this is the line in the sand, the point from which Australia will be a good actor in this space."

BEHYAD JAFARI

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Seizing Australia's opportunity to become a Renewable Energy Superpower

Four big steps governments can take right now to build a thriving, sustainable economy

- Help Australians electrify their homes
- Unleash the electric vehicle revolution
- Build batteries here, and
- Expand Australia's transmission infrastructure.

Pictured (L to R) Eytan Lenko, Robyn Denholm and Mike Cannon-Brookes

"This is clearly a day of national significance addressing an issue that has been bubbling for quite some time and not acted on.

"Now we have hit a turning point, we all want to see more action to decarbonise transport, and that has been recognised by political leaders and industry groups.

"This is the line in the sand, the point from which Australia will be a good actor in this space," Jafari said.

Boundless aspiration and enthusiasm

The National EV Summit was a joint venture between the EVC, TAI, Smart Energy Council that was supported by Mike Cannon-Brookes' philanthropic entity Boundless.

The vision and mission of Boundless is to accelerate climate solutions at the scale and speed required for Australia to do its fair share to avert the climate crisis and help Australia become an energy superpower by 2030.

Mike Cannon-Brookes noted that sales of EVs in New Zealand leapt from 3 to 10 per cent in a year on the back of fuel emission standards.

"We can take optimism from that," he said.

Eytan Lenko reminded the gathering that transport delivers 18 per cent of Australia's emissions, two-thirds of which are passenger vehicles, and delivering EVs is part of the move to decarbonise the world; we are looking at a 2024 tipping point for 10 per cent EVs.

"We won't reach the new government's emissions targets without addressing transport," he said. "And with access to renewable energy Australia has more to gain than most."

Picking up on Bowen's vision, Tesla's **Robyn Denholm** reinforced the bigger picture of the enormous opportunities for the wider economy, declaring EV battery technology as the biggest and best economic opportunity for Australia in a century.

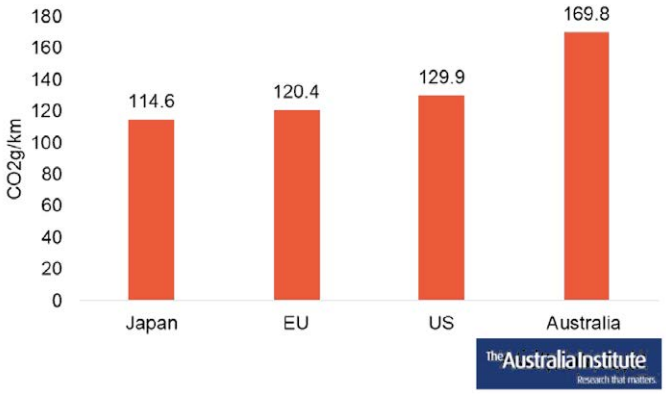
"Look at the materials that go into a battery and Australia has them all, not many others do," she said. "And we have core competency in mining, lithium, copper, manganese know-how."

The disconnect is highlighted by Tesla's purchase of a billion dollars of raw materials in 2021, 70 per cent of which came from Australia.

"We dug the rocks out of the ground and sent them offshore so there was no value add, a fraction of that billion comes back to Australia.

"We need to resolve to go up the food chain in the EV and battery market; the same batteries that firm electricity power electric vehicles. The supply chain will soon be locked in so we need to invest in battery technology, not just government but also within public and private partnerships. We just need the will.

Average emissions intensity (gCO_2/km) of new passenger vehicles, 2018



Source: National Transport Commission (2020) 'Carbon Dioxide Emissions intensity for New Australian Light Vehicles 2019', and International Council on Clean Transportation (2020) Data tables May 2020 Note: measured under or converted to NEDC cycle

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What have we got?

- Very costly EVs
- Not enough EVs to meet burgeoning demand
- No emissions standards
- High/unsustainable tailpipe emissions
- Too few public chargers

What do we want?

- Fuel efficiency standards
- A ready and affordable supply of EVs
- More charging infrastructure in all buildings and on highways
- Whole of transport sector transition to electric powered vehicles (trucks, buses)
- To realise the benefits of distributed energy resources and role of EV batteries
- A robust local manufacturing base for electric vehicles, tapping into all natural resources

More simply: Smart Transport

"There is no reason we cannot produce EVs in Australia, we just need the will and the tenacity.

"We have the capital, we can become an energy superpower," Denholm said to hearty applause.

Alok Sharma COP26 President

In a televised address from the UK **Alok Sharma** emphasised the dire impacts of global warming and the poisons in the air created by fossil fuels.

In a trend that would be worrying in the absence of EVs, he said global car ownership was set to double over the next two decades.

"We must end sales of polluting vehicles, zero emission vehicles must be the new norm by 2030."

"Now is the time for Australia to turbo charge efforts and reduce reliance on coal, and to invest in renewable energy and storage facilities. It's not just about climate change, it's about jobs and growth, and becoming a green export superpower.

"Prominent Australian think-tank Beyond Zero Emissions estimates that by 2050 green exports could be a $330 billion annually opportunity. Delivering prosperity without damaging the planet."

BZE chief executive **Heidi Lee** was understandably chuffed by the reference to the report, reminding *Smart Energy* "Beyond Zero Emissions undertook some of the first work in identifying the upside of a renewable energy-based emissions approach for Australia, so much of the present talk is about the opportunity cost of moving away from our fossil fuel exports."

Pre-pandemic this represented about $128 billion annually in fossil fuel exports.

"There's been a lot of attention on the downside of what we're standing to lose from that, so BZE took a pro-renewables approach that considered the potential upside if we took the same approach to our renewable energy export industry – promotion and support – as we have in the past with iron ore exports and the LNG industry. We track those same curves against renewable exports to explore what we could achieve," she explained. "The value of what we would achieve by promoting those renewables-based exports is three times that of the $128bn we stand to lose.

Reading matter

- Boundless: *Seizing Australia's opportunity to become a Renewable energy superpower*
- Climate Works: *Accelerating EV uptake: Policies to realise Australia's electric vehicle potential*
- The Australia Institute: *Fuelling Efficiency: Introducing fuel efficiency standards for the Australian Vehicle Fleet*
- The Electric Vehicle Council: *State of Electric Vehicles 2022*

"By 2050 we could have an export industry worth $333bn a year all based on fossil fuel free exports which is phenomenal."

States setting the gold standard

Volkswagen Group Australia chief executive **Paul Sansom** commended state governments for taking the lead in EVs and that their priorities could be "harmonised" though coordinating development of fast-charging sites for EVs and road taxes.

Mobility transition

Bank Australia has announced it will cease funding car loans for new fossil fuel vehicles from 2025 as part of the bank's pledge to achieve net zero emissions by 2035

The news delivered by chief impact officer **Dr Sasha Courville** drew universal applause. "We have been thinking about the climate impact of vehicles since 2004 when we launched our first carbon offset car loan and have been offering discount rates for low emission vehicles since 2018," she told the Summit.

"We think the responsible next step is to ensure customers are not locking in high emissions vehicles; car choices matter, we don't need to and cannot wait another decade."

However to ensure the transition happens smoothly and equitably the bank will continue to provide loans for second-hand fossil fuel vehicles until there is a thriving EV market.

Speaking later to *Smart Energy* Courville said Bank Australia's clean money positioning in the market is what attracts its customers. "Our customers come to us to ensure that we're using their money for good, they join us because of a values alignment," she said. "They are socially aware Australians who, like us, think about money as a tool for driving positive change in the world."

"A vision of where we power our vehicle fleet across mining agriculture and drive it on Australian sunshine and wind – how wonderful would that be! Time is of the essence, and we are pleased the new government is prioritising the electric vehicle sector."
JOHN GRIMES

NSW Energy minister **Matt Kean** outlined the "tectonic shift underway among car owners and makers across the globe in EVs" stating many governments support this and have set targets. NSW is not to be outdone, he said.

"I am determined to see NSW as the best place in Australia to buy and drive an EV, it is essential to our emissions-reduction goals. Without action, transport emissions are projected to be a leading source of emissions by 2035. We want to drive sales of EVs to 50 per cent by 2030 by tackling the three big barriers, model availability, cost and range anxiety. I am also determined to seize economic opportunities in rare minerals with a ready workforce and all the renewable resources NSW has to offer."

The NSW Government is investing almost half a billion dollars in tax cuts and incentives to drive uptake and reduce barriers for electric vehicle purchases over the next four years through its wide ranging EV strategy. "I want the benefits of quieter, cheaper, greener cars to be affordable and accessible to everyone. Good for the planet and the economy," Kean told the Summit.

South Australia Transport Minister **Tom Koutsantonis** spelt out his state's EV strategy which includes $3,000 subsidies, stamp duty waivers and registration reductions, then chipped in "We were mocked for our big battery and for dispensing with coal but now these are becoming the norm".

Queensland's **Mark Bailey** was also on hand to note the need to address the "big issue" of HGVs and rail freight.

(Note: Comprehensive listings of all state policies and incentives targets and EV infrastructure can be found in the latest EVC report: *State of Electric Vehicles 2022*.)

ACT Chief Minister **Andrew Barr** reminded delegates of the ACT government's 2022-2030 Zero Emissions Vehicles Strategy which includes a plan on car registration in which fees will be based on emissions rather than weight, and interest free loans for EVs (much to Audrey Quicke's approval who told *Smart Energy* she would "love to see every family in Australia be able to afford an EV, and with its interest free loans the ACT is a great example"). Barr also pre-empted changes to Canberra's Construction Code to make way for charging in multi-dwelling complexes.

Realistically, however, states and territories need to avoid fiscal deficits so EV motorists in common with NSW road user charges will apply in future. Barr concluded saying "The heavy lifting has been done by states and territories over the past decade.

"Now we are all travelling in the same direction with the federal government."

Former TAI chief exec **Ben Oquist** fully agreed.

In his Summit closing remarks Oquist said "We need good clever strategic policies to get good outcomes… and now a new political force is at play."

Snapshot of EVs in Australia

- Sales of plug-in electric vehicles in Australia tripled from 2020 to 20,665 in 2021.
- 5% of sales in the ACT were electric.
- The Tesla Model 3 accounted for nearly 60% of EV sales.
- Top 3 EV sales:
  1. Tesla Model 3: 12,094
  2. MG ZS EV: 1,388
  3. Mitsubishi Outlander PHEV: 592
- There are 291 public fast charging locations around Australia.
- State and federal government funding has been committed to co-fund the deployment of approximately 700 additional fast charging locations over the next five years, each with multiple charging bays.
- 34 EV models are available including 69 variants. There are 30 plug-in hybrid electric variants and 39 battery electric vehicle variants.
- There are 21 models of utility vehicles, vans and trucks.
- There are 8 bus manufacturers with models available in Australia.

Source: The EVC

Eye watering costs: EVs start at $44,990 for the MG ZS and top of the range is the $200,000 Mercedes-Benz EQS, which lands in Australia soon.

More EV Summit highlights and messages

Anna Skarbek drew attention to Climate Works' hot-off-the-press *Accelerating EV uptake: Policies to realise Australia's electric vehicle potential*. Should Australia close the implementation gap to reach 50 per cent of new car sales being EVs by 2030, there will be 1.1 million more EVs on the road compared with reaching 26 per cent.

Given EVs' low running costs, by 2030 there is an opportunity to save as much as $5.5 billion on cumulative vehicle operating expenses for households and businesses. Importantly, closing the gap means Australia avoids an additional 7.1 $MtCO_2e$. Climateworks suggests federal fuel efficiency standards should be in the order of 95g CO_2/km by 2024, with a trajectory of reducing to 0g CO_2/km by 2035, and regular reviews to ensure it is set at the right rate to increase supply and at the pace with global trends.

Raise Australia's ambition to 76 per cent of new vehicles by 2030 and 100 per cent by 2035 to benefit consumers and the climate.

Greens senator Mehreen Faruqi: It's exciting to be building the future we want, we want to drive a manufacturing renaissance and other measures that go beyond the federal government's agenda, to turbo-charge Australian EVs and we need to invest $1.2 billion in EV manufacturing.

Heidi Lee of Beyond Zero Emissions: Electric vehicles are becoming software on wheels and this is Australia's manufacturing opportunity in complex components.

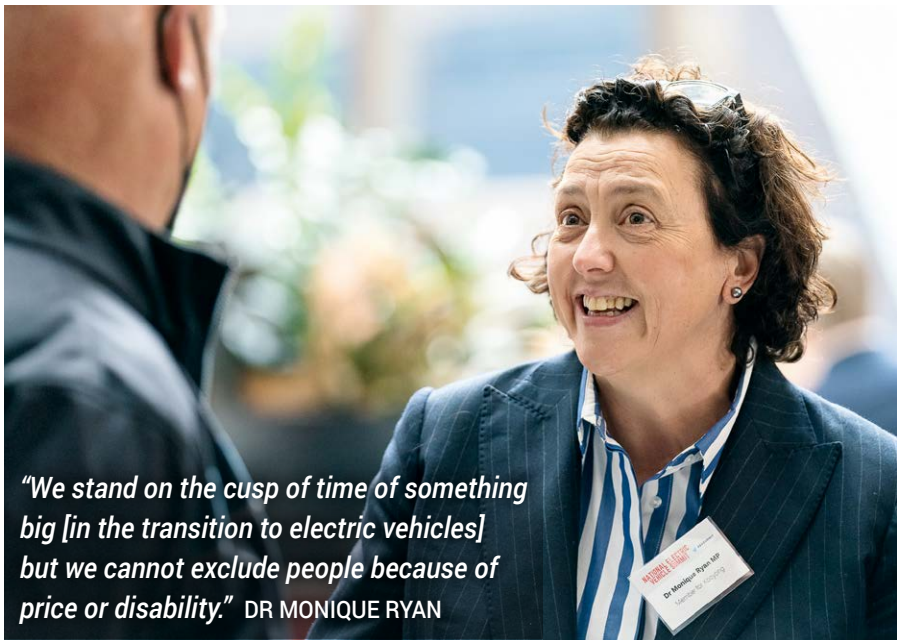
AMWU secretary Steve Murphy: No transition is just without a jobs transition – we need to build cars here again and all the components in the supply chain; we need a jobs policy, and skills and training policy. It's about all working together on climate action and jobs creation.

ANU Professor Lachlan Blackhall: Consider this: if every vehicle in Australia was an EV, the energy storage capacity would be five times that of Snowy 2.0.

Smart Energy Advisor Gabrielle Kuiper: Buy a battery on wheels and you get a free car! But for true sustainability we need more electric bicycles. If all 15 million cars on our roads were converted to EVs that's a lot of embedded carbon; we need to consider electrifying half the fleet and then a choice of walking or electric bikes, public transport and other measures including walking cycling public transport, electric cargo bikes too.

Pragmatist Chris Cormack of Discover Energy: Essentially you do away with the household energy bill if you have an EV battery.

The ever delightful and insightful Independent MP Monique Ryan: We stand on the cusp of time of something big [in the transition to electric vehicles] but we cannot exclude people because of price or disability, it must benefit everybody. People in this room are versatile and innovative and will address these issues.



"We stand on the cusp of time of something big [in the transition to electric vehicles] but we cannot exclude people because of price or disability." DR MONIQUE RYAN

Equally impressive Independent Kylea Tink: We are digging up our valuable resources then shipping them out. Let's not dig and ship but dig and add value. We need to make a move to create goods here in Australia.

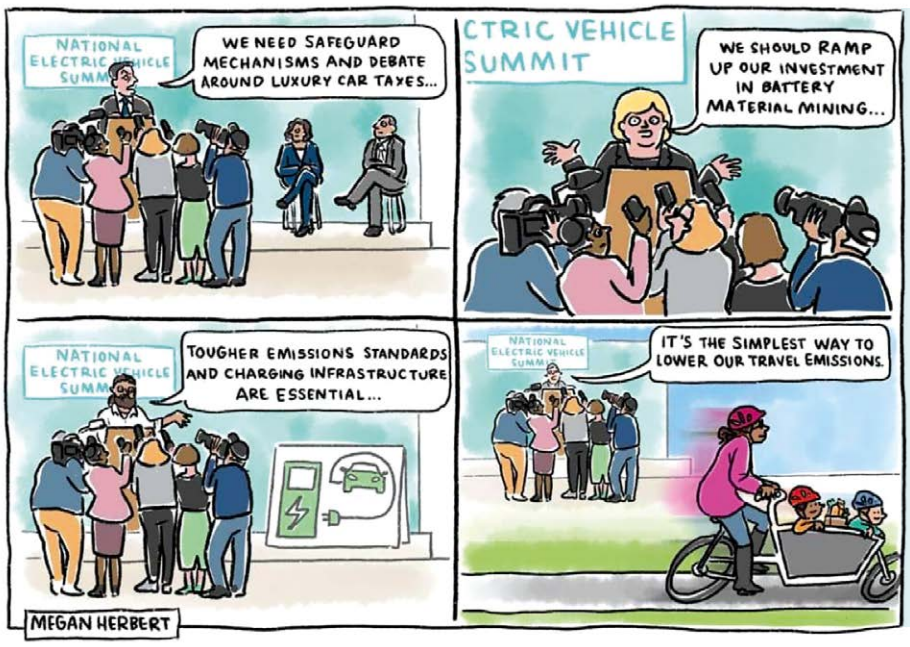
Independent MP Zoe Daniel urges the ALP to set its new EV policies before the end of 2022. Things can change very quickly in politics… they've come in on this climate wave, and the community's largely behind it. Spend the political capital, get it done.

Independent Senator David Pocock: The main problem over the past decade has been the failure of imagination; to collectively imagine how great our future can be if we build together; this has hampered us but now inspiring people are working on and delivering solutions, saying this is how we do it. Now we need policies and incentives to get the transition going.

My message to government is simple: Be really bold. Act with courage and ambition.

What finer or wiser words could there be to end this piece.

The National EV Summit recordings can be found at www.smartenergy.org.au



Talented cartoonist **Megan Herbert** expressed appreciation for the Smart Energy Council's work "moving the conversation about a sustainable transition towards action, especially after the last decade of relative stagnation".

Climate communication has been a central focus of Megan's work for the past decade.

Good work Megan! Your animations and words go a long way, we are on the same page.

"For several years I lived a car-free life in Amsterdam, I never drove in a car thanks to the interconnected mixed-modality transport system… efficient mass transit services, safe cycling infrastructure and plenty of bike parking for school runs, grocery shopping, long distance and cross-border trips," she told *Smart Energy.*

"Here in Australia governments tend to simply add extra lanes to the highways and talk about EVs as the only solution."

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Addressing EV concerns

THE CLIMATE COUNCIL is calling for governments to:

- Allocate 50 per cent of state and territory transport budgets for public transport and 20 per cent of the transport budget for initiatives that boost walking and bike-riding in line with best practice and the community's needs
- Encourage private electric bike uptake through financial assistance at point-of-sale and try-before-you-buy programs, and
- Convert Australia's bus fleets to clean, quiet and zero-emission buses.

In its recent paper *Everything you need to know about how Australia can boost electric vehicle supply* the Climate Council notes personal transport is Australia's fastest growing source of greenhouse gas emissions.

Cars and light commercial vehicles alone make up over 60 per cent of Australia's transport pollution levels due to our petrol-guzzling cars which produce up to 40 per cent more carbon dioxide than their European counterparts.

Fuel efficiency standards are the key to unlocking EV supply in Australia and will help tackle climate change, says the Council which wants EVs to be more affordable; today the cheapest EV in Australia costs almost $45,000, in stark contrast to just $18,000 overseas.

Fuel efficiency standards would incentivise manufacturers to bring their cheaper EVs to the Australian market and reduce fuel costs and reliance, and would be timely given fuel costs have shot up almost 28 per cent this year.

Once affordable and in homes, EVs can of course be powered by rooftop solar, but even if powered by our current energy mix from the grid, an electric vehicle is 50 per cent cheaper to run than a car powered by petrol or diesel.

Health also matters: the Climate Council says air pollution from our fossil fuel powered cars, trucks and buses kills 1,700 Australians every year. Ironically, perhaps, that is larger than the national road toll.

EVs powered by Australian sun and wind do of course reduce dependency on foreign oil which has been particularly volatile this year, exposing Australia's energy vulnerability and dependence on international oil supply.

Importantly too they serve as 'batteries on wheels': When paired with 'vehicle-to-grid' technology via a two-way charger, batteries in parked EVs can export power to the grid during periods of high demand (primarily in the evenings). EV owners can also earn money by selling their excess power to the grid.

Read more at www.climatecouncil.org.au

The lowdown on fuel efficiency standards

AUSTRALIA'S TRANSPORT SECTOR accounts for the third-largest source of greenhouse gas emissions and it is getting dirtier. CO_2 output has risen 48 per cent since 1990, with much of the emissions coming from cars and trucks.

If ever there was a time to address road transport pollution it's now.

That's not how all see it. The peak body for vehicles in Australia, the Federal Chamber of Automotive Industries, has been exposed for pushing for weak fuel efficiency rules, and for a voluntary emissions scheme to be adopted as the national standard.

Until such a time Australia introduces standards, new passenger cars sold would emit 98 grams of CO_2 per kilometre, in contrast with European standards specifying 95 grams CO_2 per kilometre.

Further, the EU is banning almost all new petrol and diesel vehicles including hybrids by 2035. The UK is set to ban the sale of the majority of new petrol and hybrid cars from 2030.

(Aside, Swedish carmaker Volvo has committed to a fully electric car range by 2030, in advance of the EU's ban on fossil-fuel cars from 2035, declaring: "What we do as a sector will play a major role in deciding whether the world has a fighting chance to curb climate change.")

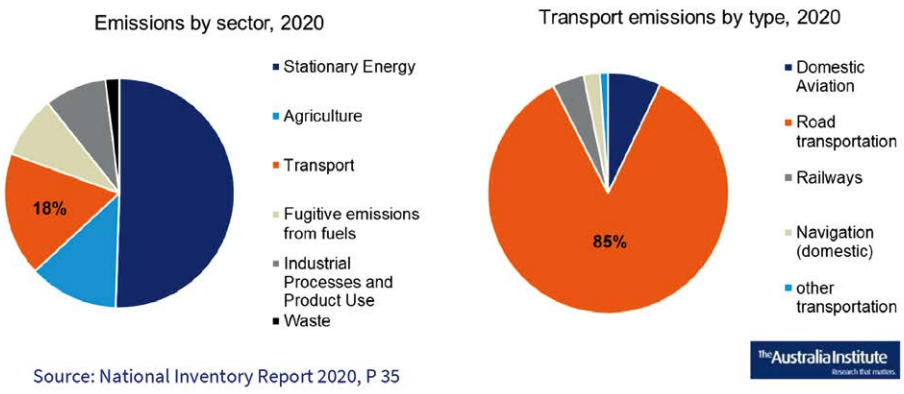
Hence former Greens Leader Christine Milne's observation that the car industry wants motorists to pay more for petrol for decades so they can "flog cars here that they are unable to sell anywhere else in the world because they are too polluting".

And the 'dumping ground' analogy is now widely used in reference to Australia's importation of polluting models.

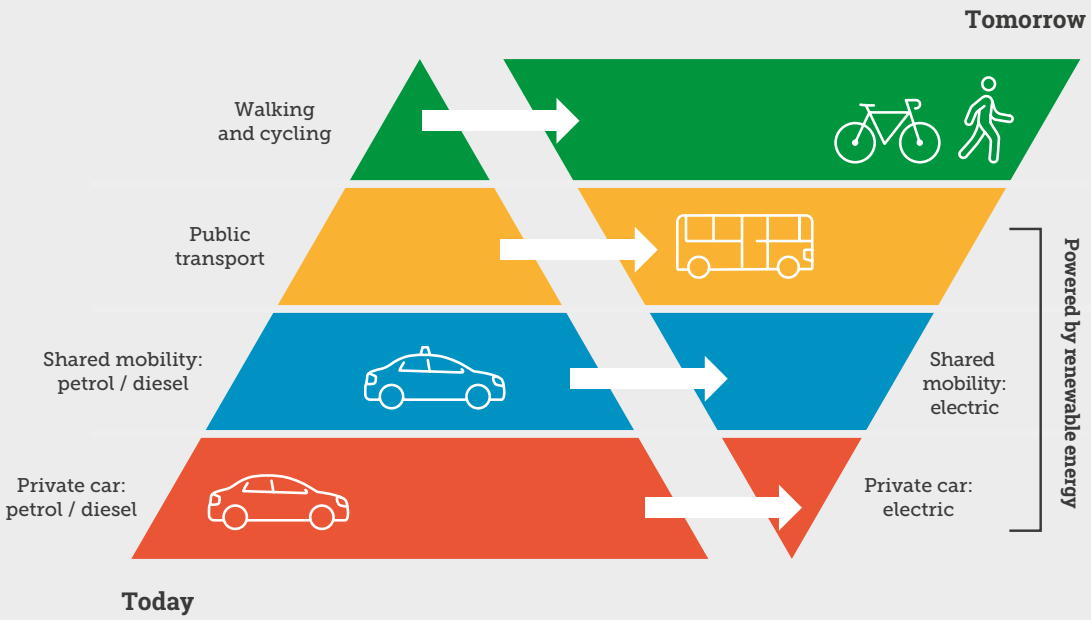
Now that the ALP has announced an EV Strategy and a consultation paper on Fuel Efficiency standards we wait and see how that impacts the FCAI's plans for a targeted media campaign to retain voluntary standards that TAI's Audrey Quicke describes as lax, riddled with loopholes and muddy in emissions performance calculations.

During the National EV Summit, Mike Cannon-Brookes commented voluntary standards is "like getting kids to mark their own homework", but why would they bother given there is no imperative to do so!

Australian greenhouse gas emissions by sector, and transport emissions by type, 2020



Source: National Inventory Report 2020, P 35



Insider insights

ROSS DE RANGO who is Head of Energy and Infrastructure at the EVC says Australia, one of the wealthiest countries per capita in the world, is well placed to lift its game and do better with respect to environmental performance.

Accelerating the uptake of EVs is an important element of improving our performance, Ross De Rango told *Smart Energy*. And despite the costs involved, demand for EVs is simmering.

Impact of COVID and interest rates on household budgets and uptake of cars

Travel restrictions brought on by COVID-19 saw a transfer of spending from people who would have gone out more and taken an overseas holiday but have instead spent the money on a new car, so sales of luxury cars went up rather than down, De Rango explained.

"Again, the core challenge faced by someone who wants to buy an electric car today is not whether they've got the money for it, it's whether they can actually get a car; waiting times for all cars now are typically six months and more for most EV models as stock is not available in the country."

What about raw material and other supply chain shortages?

The key material differences between battery electric cars and traditional petrol engine cars is the amount of lithium that's required in the former.

A significant proportion of the known reserves of lithium are in Australia and much work has been carried out in Western Australia in scaling up mining and refining for lithium to address that issue. There's a host of other materials, rare earth elements and such required for the construction of electric cars, and the federal government has done significant work around critical resources, De Rango said.

"In terms of the bulk of materials we need they're all the same materials that miners in Australia are already extracting and exporting to the global market; the scale up of electric cars is going to do excellent things for the Australian mining industry as well as the global environment."

Any room for ICE retrofits, modifications?

The Australian Electric Vehicle Association and a host of individuals have been doing exactly this kind of work since the 1970s, that's not a new idea at all, but it is typically either a hobbyist or a bespoke kind of operation rather than an option explored and intended for the mass market, according to De Rango.

For mass market vehicles it will be a lower cost for the global automotive manufacturers to build them as electric cars rather than to take existing vehicles and retrofit

"The mining sector has been using modified 4-wheel drive vehicles that have been transitioned from petrol or diesel to electric for underground mining and they're doing it principally for the reason of human health, to remove diesel particulates from underground mining environments, so it's about human safety."

We are at the starting gate of the transition to EV uptake in heavier vehicles, trucks and buses, there's lots of interest and the EVC and Australian Trucking Association have done a piece of work identifying the shared goal to transition the trucking fleet to 100 per cent electric but it is at an earlier stage than the transition to battery electric cars, he said

Turning to micro-mobility like scooters, "You can't walk down a street in the inner suburbs of Melbourne without seeing someone on an electric bike, electric bicycles have become extremely common because the cost of entry is relatively low and the benefit is relatively high.

"They cost virtually nothing to charge so it's no surprise people have adopted that technology by volume. It's cheap and it's useful."

Any road blocks in powering EVs?

A full transition to electric vehicles is going to mean a transition of $50 billion a year worth of petrol to $20 billion a year worth of electricity, which will require a build out of Australia's electrical infrastructure to deliver it. Not just new EV charging stations, but also in the distribution and transmission networks, De Rango said.

"Right now we're going through a period of time where the energy market operator has had to make unprecedented intervention in the market in order to keep the lights on and the system stable so there are many people concerned about encouraging massive new electrical load into the grid in the form of EVs, what will that do to energy reliability?"

The EV Council will be publishing a report on that topic in the next few weeks.

"Essentially the takeaway is that if Australian consumers all choose to charge their cars at the same time as they are running their air conditioners and cooking their dinner that will create problems but in the main Australian consumers are choosing to schedule the charging of their cars to the middle of the day to consume excess solar and the middle of the night in pursuit of cheap electricity pricing."

What we are seeing today is that based on current Australian consumer behaviour there's unlikely to be any negative impact on the grid in the near term out to the next 10 years but rather the opposite will be the case, he said.

EV's are going to be presenting load at times when the network needs extra load to soak up excess solar or they'll be presenting load in the middle of the night where network utilisation is light.

"So one of the things we need to do collectively is ensure that we educate consumers to make sure they understand that the cheapest time to charge the car is that middle of the day or middle of the night and their own finances are serviced by not charging their cars at peak time when everything else is running."

East versus West: little known facts

- The US has 6x the GDP per capita as China, but China has 4x the population.
- China is buying 6x as many EVs as the US annually right now.
- China has built 25,000 miles of high-speed electrified rail since 2007, in sharp contrast to the US which has none.
- China has 500,000 electric buses on its roads. The US is believed to be approaching 1,000.

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IMAGE: TOM FROM PIXABAY

Delays in building new transmission infrastructure will increase consumers' bills

Nexa Advisory's* Stephanie Bashir *presented her findings on the state of electricity transmission within Australia during her address at the June 2022 Victorian Smart Energy Summit.

Nexa Advisory's Stephanie Bashir

NEW TRANSMISSION ELECTRICITY INFRASTRUCTURE is the crucial missing link in Australia's transition to clean energy. A timely roll-out of transmission to connect new electricity generation is critical to ensure energy security and avoid delays that would lead to increased costs for consumers.

The problem: there is broad recognition of both the urgent need to replace ageing coal generators and the benefits of clean and low-cost renewable generation. Australia's ageing coal power stations are withdrawing from the system more quickly than anticipated, leaving a shortfall in generation. Wind and solar technologies are now the cheapest form of generation per unit of energy and can be integrated with storage to provide dispatchable 'firmed' electricity.

To ensure the energy transition succeeds, Australia needs to build the equivalent of 25 per cent of today's entire transmission grid, 10,000km, in less than 10 years. Currently, there are questions about who should pay for the new infrastructure so that the cost is shared by all those that benefit, and lengthy and uncertain approvals processes that do nothing to ensure social license from and compensation of host communities.[1] This means transmission is not being approved and built fast enough.

Lack of transmission is already impacting consumers. States that made early commitments to large-scale renewable generation (in particular South Australia and the ACT) are experiencing some of the lowest electricity bills in the country. However, there is limited opportunity for new renewable generation capacity to enter the market, and cost-effective renewable energy generated in the south cannot be used in the eastern states. This means NSW and Queensland consumers are already being unnecessarily impacted by rising global coal and gas prices, and seeing significant increases in bills and unstable supply because of outages at coal-fired power stations *(AEMO Quarterly Report* April 2022).

The modelling

Nexa Advisory engaged Endgame Economics to provide evidence-based insights into the likely impact on consumers' electricity bills (households and businesses) of delays to the required electricity transmission upgrade and build.[2]

The modelling assumes that renewable energy zones are built as planned, but that there are delays of one to four years, compared with the Australian Electricity Market Operator (AEMO)'s 2022 draft Integrated System Plan (ISP), in connecting that clean, low-cost generation to the wider market.

The modelling shows that:

- nearly all consumers experience the lowest prices if transmission is built according to AEMO's ISP (compared with the delay scenarios)

[1] Solutions to these issues were originally posited in a Discussion Paper by Nexa Advisory in April 2022

[2] Some industry stakeholders have formed the view that investment in transmission will increase power bills and result in overinvestment in transmission. However, these views have not been backed by quantitative analysis.

- a delay of even one year in delivering new transmission results in higher bills for consumers. Business customers are impacted the most
- as delays to the building of transmission get longer, the modelling demonstrates prices are higher and price spikes are more likely to occur more frequently
- Victoria is most severely impacted because of its reliance on energy generation in NSW and Tasmania. The modelling shows a significant spike in prices if the HVNI West and Marinus Link are delayed.
- Tasmania would see a temporary fall in bills if the Marinus Link was delayed, due to over-supply of renewable electricity locally, but prices would rebound to higher levels once the link is constructed
- avoiding the cost of building new transmission does not lower consumers' electricity bills, and
- the increase in the wholesale cost of electricity due to delays far outweighs any 'saving' from not building the transmission, because low-cost renewable electricity cannot then be utilised widely in the National Electricity Market.

The policy solution

The new Federal Government's $20 billion 'Rewiring the Nation' policy package can remove key roadblocks and supercharge the transmission build, empower the state governments to deliver on their plans, ensure an orderly transition, and reduce the upward pressure on and volatility of electricity prices for consumers.

The funding and policy package must:

- expedite ISP priority projects by removing these projects from the out-of-date regulatory RiT-T process
- embed a government/private co-funding arrangement to underpin the financing of new transmission, and
- fund appropriate payments to host landholders and communities (with an associated governance framework), to ensure social licence to build and operate transmission, and thus remove the current approvals 'drag' – this would be similar to that of the state-led renewable energy zones.

The full modelling and report can be found on the website www.nexaadvisory.com.au, Report – Modelling Electricity bill impact due to transmission delay_2022-06-07

Nexa Advisory is committed to supporting the acceleration of the clean energy transition through strategic advisory services, in-depth experience and analysis, political and regulatory astuteness and is challenging the status quo to create a sustainable future for generations to come.

www.nexaadvisory.com.au

IMAGE: DIETMAR WIEDEMANN FROM PIXABAY

WHAT THE... GAS?

Until such a time that Australia is powered by renewable energy and storage, gas is a necessary evil, and a costly one at that due to fundamental policy failures and oversights. Meantime overseas-based gas multinationals are reaping enormous financial benefits and managing to avoid hefty tax bills. Could a market ever be more skewed? And how do we dig ourselves out of this carbonic mess?

SINCE THE SHELLING of Ukraine by Russia earlier this year the price of gas within Australia has skyrocketed and the public has been hoodwinked into thinking the commodity is scarce. This is however far from the truth, Australia has ample gas resources and producers are simply reacting to global market movements. And doing handsomely thank you, with spot prices almost quadrupling to $30/GJ despite relatively stable production costs.

What we are seeing is rampant profiteering.

It's unpalatable for consumers and businesses but what can they do? And do they know what is going on?

"I think if people really understood that it is big companies that we've given licences to exploit Australian gas that are the sole reason that we're paying massive prices for that gas then they would be absolutely outraged because it's profiteering at the expense of the most vulnerable people in our community," John Grimes said.

"What's being shown to the market and the whole world is how volatile gas pricing actually is and how by being dependent on gas we're actually at the mercy of the global market."

We are caught in an interesting position in which Australia has a lot of gas and the fact that we can't access gas or could only access it at huge prices is a real indictment on past governments and their decision-making process, he says.

Flawed fossil thinking and policies

Oliver Yates of Sentient Impact Group agrees, stating the average Australian would believe – with no industry knowledge and just reading the headlines – that Australia isn't producing enough gas. When in reality, it's all been promised to foreign companies.

"Australia is currently staring down the worst policy-created domestic gas mess in its history. The problems that we face today are a result of decisions made almost 30 years ago that have been systematically ignored by governments."

In a piece penned for *RenewEconomy* he writes: "Decisions revolved around placing a national resource in private hands, with little regulation or assurances around safeguarding our national supply, which inevitably led to private companies being tempted by higher prices for gas abroad, sacrificing any notion of keeping local supply for Australia's own energy needs.

"Australia now faces the completely laughable situation of being one of the world's top LNG exporters, but is unable to retain enough supply for its own citizens – a result that is decimating what's left of our manufacturing and chemical industry, and unnecessarily importing inflation.

"Privatising without safeguards back in the mid-1990s was one big mistake, when greater competition and the sale of government-owned gas businesses into private sector was deemed best."

Back in 2009 economic consultants ACIL Tasman calculated the rise from a low of around $4.50/GJ delivered at Gladstone prior to commissioning of the LNG facilities to around $5.30 (real, 2009) by 2030, concluding domestic prices would not be too affected by the massive export projects under consideration [hence no need to reserve 20 per cent for local markets].

Whoa. It's 2022 and the price of gas sits north of $25/GJ.

Put patriotism before profit, Oliver says!

John Grimes believes there should "absolutely" be a domestic preservation order; Australian taxpayers and industry should get a dividend from the land's natural resources, rather than giving away these vital commodities to foreign multinational companies that then ratchet up prices.

Western Australia stands alone as the only state to preserve local supply which is legislated at 15 per cent and has contained gas prices to much more reasonable levels.

Nevertheless even if we had access to domestic gas and that it was available at a lower price it would not change the imperative for us to move away from gas and structurally when we need to be making that move, John said.

Fossil fuel gas is causing consternation on several other fronts.

Pipeline or pipe dreams?

Despite Labor's commitment to emissions targets, the party has declared it will back new fossil fuel projects that 'stack up' economically and environmentally. And we could have a battle on our hands, with federal Labor Resources Minister Madeline King declaring "As we are moving to a decarbonised energy system, coal and gas will continue to heat our homes and keep manufacturing going for many years to come.

"In short, if projects involving these traditional energy sources stack up environmentally, economically and socially, we will support them."

In the pipeline are two major and controversial developments: Woodside's $16bn Scarborough gas reservoir which would add 1.37bn tonnes of carbon dioxide to the atmosphere; and Northern Territory's Beetaloo Basin's fracking plans that would inflict damage on a similar scale.

Pollution generator

Emissions from Australia's gas sector have increased around 33 per cent during the past four years, generating 7.5 per cent of the carbon footprint, according to Bill Hare of Climate Analytics.

The fossil fuel industry likes to point out that when burned, gas releases about 55 per cent the carbon pollution of coal, in reality this fails to consider fugitive emissions in the form of methane (multiple times more polluting) that leak during extraction, and in processing and transportation. Environment Minister Tanya Plibersek, what do you have to say on this?

For their part the Greens will be leveraging their power in the Senate in a bid to prevent future gas projects and are exploring all measures to stop public money going to coal and gas, including reserving the right to amend Labor's first budget to remove any funding for fossil fuels.

Empire Energy's exploration well at its Beetaloo Basin gas site in the Northern Territory. Image courtesy Dept of Industry, Science, Energy and Resources

"The fight to stop new coal and gas is already underway around the country, from the opening of the Beetaloo oil and gas basin, to the Scarborough, Barossa and Narrabri projects, and the Greens will be a big part of those fights," Adam Bandt said.

Development of gas field are at odds with UN secretary general António Guterres who urges a winding back of reliance on fossil fuels.

"We seem trapped in a world where fossil fuel producers and financiers have humanity by the throat," he said. "For decades, the fossil fuel industry has invested heavily in pseudoscience and public relations, with a false narrative to minimise their responsibility for climate change and undermine ambitious climate policies. Nothing could be more clear or present than the danger of fossil fuel expansion."

More than a year ago IEA executive director Fatih Birol likewise said governments serious about the climate crisis would cease new investments in oil, gas and coal.

John Grimes concedes gas will continue to be part of the energy mix in Australia's near term, but we need to ensure it plays the smallest role possible and that this role diminishes over time.

"This is all about a planned approach to make the transition to a zero emissions future while ensuring security supply and prices are maintained in the process," he said.

"When we build a network that is dependent on Australian sunshine and wind, the prices of oil and gas are not determined by self-serving overseas interests.

"Instead they are determined by nature and we would be crazy not to transition as quickly as possible for security reasons, as well as economic reasons and for environmental reasons."

But he warns the transition period needs to be well managed because existing capacity can't be turned off without building ahead new capacity.

"It's a sort of a balancing act but the great news is everybody is now committed to the transition."

Scientist Saul Griffiths and Independent Senator David Pocock are among many promoting the merits of full electrification of households and businesses, equipping them to run heating, cooking and industrial processes on renewable electricity rather than gas.

The Victorian government has similar aspirations in mind. The Gas Substitution Roadmap released in July sets a path to net zero emissions outlining measures for energy efficiency, electrification, hydrogen and biogas to cut carbon emissions.

Not banking on it

Westpac aims to cut financed emissions (lending for oil and gas projects) by 23 per cent by 2030 compared with 2021. However the bank will continue to provide corporate loans to existing oil and gas clients demonstrating evidence of a credible transition plan by 2025.

Further, the bank will consider financing new oil and gas projects deemed necessary for energy security.

There's the catch, and one that NAB has signed up for despite its pledge to cap oil and gas lending at $3.2 billion.

Smart Energy in action *and notching up some big wins*

The Smart Energy Council's mission is to accelerate the transition to a zero emissions economy with smarter renewables policies.

Our campaigns are underpinned by unrelenting advocacy while working collaboratively with governments at state and federal level.

In recent weeks we have scored several significant wins under the new federal Labor administration which is taking strong action on climate by setting policies and targets that lay the path to a decarbonised future.

In three short months, we've turned the corner from battle mode to one of consultation and outcomes, and the results to date are gratifying.

The Council is also committed to updating members on its strategies and conferring on present-day industry challenges.

On these pages we showcase the range of events staged by the Smart Energy Council with and for members.

UPCOMING EVENTS:

- **Smart Energy Queensland, Sept 14, Royal ICC, Brisbane**
- **NSW State Summit, Nov 29, Hilton Hotel, Sydney**
- **National Batteries on Wheels Summit, Nov 30, Hilton Hotel, Sydney**

Sydney Energy Forum

The Smart Energy Council was well represented at the Sydney Energy Forum of early July and took advantage of the high level local and global representation to participate in several side events. These included meetings with The International Solar Alliance, the Indian Energy Minister and ReNew Power India which will lead to closer cooperation between the two nations who share aspirations in the renewables sector.

Smart Energy External Relations Manager Wayne Smith was among those at the invite-only event welcoming Prime Minister Anthony Albanese's announcement to position Australia as a Renewable Energy Superpower.

Momentous moment

Staying on the political front and in one of the biggest wins to date, July 27 marked the historic introduction of the Climate Bill in the House of Representatives. The Bill includes the all-important target of 43 per cent emission reductions by 2030 (as detailed on page 8 of this magazine), a significant move that was hailed by the SEC which has been pressing for stronger emission targets. By the time this magazine hits desks we anticipate the Bill will have passed to an Act.

Sky News filmed the Victorian State Energy Summit and interviewed John Grimes and Independent MPs Monique Ryan and Zoe Daniel for additional comments.

State Energy Summit in Victoria

More than 150 delegates attended the Victorian Energy Summit of June 22 to hear from Johanna Bowyer of IEEFA, Bruce Mountain, Tristan Edis, Stephanie Bashir or Nexa Advisory, Jonathan Upson of Tilt Renewables, Warwick Johnston of SunWiz, Sentient Group's Oliver Yates, prominent industry researcher Darrell McDonnell and more.

The event took place in the aftermath of the Energy Security Board's proposal for the deeply unpopular fossil fuel based energy capacity mechanism.

Every bit of advocacy helps. Pressure from the SEC which was joint signatory to a public letter calling for reason produced the desired effect in light of the Energy Minister's decision of August 12 to overrule the ESB's proposal.

Another big win for the renewables industry.

The SEC repeated the successful **State Energy Summit format in Adelaide** in early August once more in front of a packed auditorium. This time the speaker line up included engineer, scientist and author of Rewiring Australia Saul Griffith whose powerful message: "The macroeconomic argument for electrification is a slam dunk… with lower costs to the consumer by ~2025," went a'flutter in the twittersphere.

Northern neighbours

Early in August Smart Energy Council President Steve Blume addressed the B20 Indonesia-Australia Business Summit in Canberra where he emphasised the strong and enduring ties between the two nations. "With our friends in Indonesia we share a common border, common interests and like-minded goals for shaping a renewable energy future," he said. "Our geographical proximity and shared aspirations for smarter energy and transport systems bode well for this strategic region and we seek to strengthen our ties for mutual benefit."

SEC's Wayne Smith (right) with Neoen and Indonesian Energy Dept representatives

On the road with Geoff Bragg's Roadshows

Between July 21 and August 11 Sunman and Smart Energy Council Director Geoff Bragg reached 500 Installers at Installer Roadshows in Adelaide, Melbourne, Sydney and Brisbane. "The solar industry had been rattled by the real-world application of the introduction of solar array standard AS/NZS 5033:2021 leading to confusion and frustration among designers, installers, manufacturers and suppliers," said Geoff whose talk centred on compliance measures.

SEC acknowledges the support of Roadshow event partners Emerging Energy Solutions, GoodWe, Growatt, Risen Energy, Solar Juice, Solis, and Trina Solar.

Australia's first National Electric Vehicle Summit

Elsewhere in this magazine we unpack the outcomes of the highly successful EV Summit held in mid-August to accelerate EV uptake.

The 250 gathered were first to hear of Labor's commitment to a Consultation Paper On Fuel Efficiency Standards which follows repeated calls backed by submissions by the Smart Energy Council along with business and industry groups. The SEC teamed with the Electric Vehicle Council and The Australia Institute to stage the Summit with support from Boundless (Mike Cannon-Brookes' new philanthropic body).

Such was the success of the event that SEC is busy planning the next: Batteries on Wheels in late November in Sydney.

A driving force! SEC's Wayne Smith and John Grimes with Behyad Jafari of EVC and TAI's Richard Merzian discuss the urgent need for robust fuel efficiency standards as a critical part of climate action

Jobs and Skills Summit

Chief executive John Grimes was one of just 100 industry leaders to attend the Jobs and Skills Summit held in Canberra in early September. There, he represented the renewables sector based on input from SEC members. We eagerly await some positive and pragmatic outcomes from this important event that will shape the future of the skills base as well as the national economy.

Accolade on the world stage

In late August **John Grimes** visited India where he was presented with the Energy and Environment Foundation's **2022 Global Excellence Award in Renewable Energy**. John was recognised for his 'vision, leadership, outstanding contribution and for demonstrating excellence in the renewable energy sector.' Congratulations boss, Team Smart Energy is chuffed!

PUTTING ENERGY INTO ACTION

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SUPPORT THE DRIVING FORCE OF SMART ENERGY

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 around 1,000 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.

"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

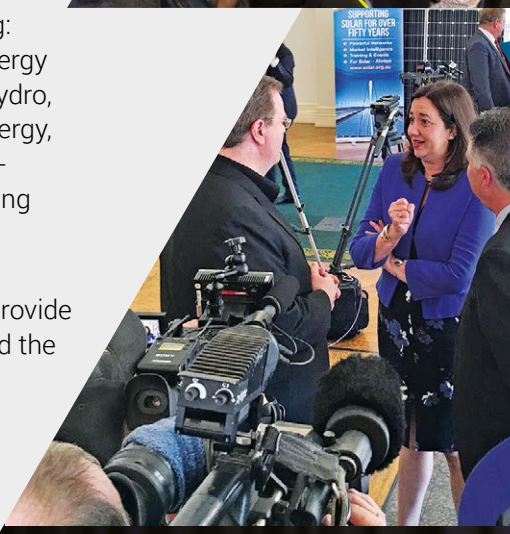
The **SMART ENERGY COUNCIL:**

- 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, 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.



BECOME A MEMBER TODAY

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

For further information please contact:

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Shocking energy bills

In Australia the average annual household electricity bill was $1,645 back in December 2021. ACT residents cop the nation's highest bills, paying $2,004 a year which is 39 per cent more than Queensland residents' $1,226. Victorians pay $1,290 a year, New South Wales residents $1,253 and South Australians $1,742 a year

All year however prices have been rising on the back of unstable geopolitical forces causing widespread discontent among those without rooftop solar PV.

Keep calm and wrap up well

If you think Australians are doing it tough on power prices, consider the poor Brits whose bills are skyrocketing. Winter is just around the corner and energy bills are set to average around £500 ($850) a month, with some paying in excess of £700 ($1,190), more than half the nation's median disposable income of about £31,400 ($53,460). Coppers on the beat in the UK earn as little as £14 ($23) an hour.

The power crisis follow Britain's energy industry regulator confirming an 80 per cent rise in the consumer price cap from October that will take a typical household's gas and electricity bill to £3,549 ($6,036) a year.

The UK's heavy reliance on energy imports in particular gas is partly to blame, and prices are exacerbated by the war in Ukraine.

Although Australia is also facing an energy affordability crisis it's mitigated by our status as a net energy exporter.

Witty words from 'The Punny world' never fail to amuse us. Here's a wee gem:

The reason that aliens have never visited us is because our solar system has received terrible reviews.

We only have one star.

Independent MP Monique Ryan has hit the ground running in federal parliament

During the National EV Summit in Canberra Monique Ryan attended the breakfast where EU Ambassador Michael Pulch called on the Australian government to stop subsiding internal combustion engine cars through the Luxury Car Tax Discount.

"I was very happy to be able to report to the room that I'd the submitted a proposal to the Treasurer on that very issue earlier in the week," she said. "The proposal submitted to Treasurer Jim Chalmers was for an update in the definition of 'fuel efficient' vehicles which would decrease subsidies to ICE vehicles, make EVs more price-competitive and put $450 million back into country's tax coffers over the next three years. We're awaiting his response."

The very vocal and active MP was one of many who, in the build-up to the federal election, called for Fuel Efficiency Standards. She also penned a recent op-ed in the AFR Electric cars: *How the government can unlock the market; they're vital to increasing the supply of EVs to this country.*

Long cold winter

Further increases are slated in the UK from January, with annual forecasts of £5,387 ($9163), up from a previous prediction of £4,650, and rising to an all-time high of £6,616 ($11,233 - ouch) in April 2023. **Based on exchange rate of 58 cents to one pound.*

British resident Shirley Finlay told *Smart Energy* "Electricity is very topical right now here in UK, it's in all our conversations. Everyone, even those in higher income brackets, is thinking about what they can do to reduce ALL bills.

"There are many articles now on what each electrical appliance costs to run and I'm thinking of cutting down the timer on the hot water unit and the time we have the heating on during winter. We already think twice about which lights we do and don't need on.

"One woman I know has stopped using her hair straightener! I heard a person had switched off their fridge freezer, others are batch cooking in the oven rather than an item at a time, and making sure they have full loads in the washing machine. People are rugging up too."

Meantime department stores are fast selling out of big cosy all-in-one blanket wraparounds, the hooded blanket snuggle.

Shirley's local fish and chip shop has had to close its doors after their monthly gas and electricity bill soared from £1,200 ($2037) to around £5,200 when the fixed terms came to an end, and they were looking down the barrel at a further rise to a plainly unaffordable £6,120 ($10,391) monthly electricity bill.

Hopefully most readers of this magazine have an energy bill buffer in the shape of rooftop PV, as does this writer who has invited UK family and friends to swap their miserable UK winter with sunny warm Australia. Just need to stock up on marmite, mushy peas and Twining teas, and subscribe to Brit Box.

IMAGE: MADALIN CALITA FROM PIXABAY

A class act: Smart Solar Schools

Kingswood Public School's new 55 kilowatt solar system

WITH MORE THAN 2,200 SCHOOLS, the NSW public education system is one of the largest in the world.

There are about 21,700 buildings spread across these schools and they draw the same amount of energy as 43,000 Australian homes. It costs tens of millions of dollars each year to keep them powered up.

However, these classrooms, libraries, halls and office blocks are also covered with around eight million square metres of roof space, which adds up to a lot of opportunity in today's energy market.

According to School Infrastructure NSW (SINSW) Chief Executive Anthony Manning, the conservative estimate is that there's more than 145 megawatts of solar energy generating capacity across the NSW public education system.

"That's an enormous opportunity to reduce the state's energy costs and its carbon emissions. But you have to be smart about how to best capture it," Mr Manning said.

SINSW is the agency charged with building and maintaining NSW public schools and it's now looking at the best way to roll out renewable energy solutions across its schools.

Kingswood Public School Vice-Captain Timothy Hammond gets a closer look at the school's new solar array

The agency is installing solar and battery energy storage systems in 60 schools and is about to hook most of those schools into a Virtual Power Plant (VPP) trial.

Almost half of the school have also had new air conditioning units installed with demand response controls, so they can work with the solar and battery energy systems to reduce the impact of the air conditioning on the local power grid.

Smart thinking

The trial program is called the Smart Energy Schools Pilot Project and it's the largest schools-based trial of solar, battery energy storage and VPP technology in the country.

Solar and battery systems have already been installed at 31 schools and the other 29 will soon join them.

"It's a chance for us to test how solar, batteries and demand response technology can be used most effectively in schools. VPPs have been tested with home and businesses, but we want to learn if they can also be effective in our schools," Mr Manning said.

"A lot of the technology supporting these systems is new and so this is our chance to see how well it works in a school setting.

"It enables us to test how well it works on a small scale and then apply that understanding on a larger scale roll out, sometime in the future."

Nimbin Central School in the NSW Northern Rivers region had its solar and battery system installed under an earlier program called the Smart Batteries in Key

On a typical day, Nimbin Central School is now generating more power than it consumes

Government Buildings program. It's now been included in the Smart Energy School Pilot Project.

On a typical day, its 57 kilowatt rooftop solar system produces more energy than the school consumes.

The excess can be stored in its 66 kilowatt hour battery energy storage system and used when it's needed or exported to the grid. SINSW predicts it will save the school around $18,000 a year in energy costs – and that's before any savings are made from participating in a VPP.

Of course, rooftop solar systems are not new in NSW schools. About 1,500 public schools already have solar systems installed, but many of those were installed a decade or more ago, when energy storage technology wasn't as reliable as today.

As part of the project, condition assessments of those systems will be undertaken, alongside a desktop appraisal of the optimal solar and battery storage capacity across all schools.

A market sounding exercise is also planned to test interest and capability from the private sector in deploying renewable energy solutions across public schools. This could include different options around who owns and maintains the systems, how the solar generation is used on site, exported to grid or managed as part of a Virtual Power Plant.

"We've already learnt a lot from the program and we expect to understand a lot more from the VPP in terms of costs, access to new revenue opportunities, and how this might benefit local communities," Mr Manning said.

"The entire program is designed to give us the insight and knowledge that we can apply to future programs so we maximise the benefits to schools and the state."

A key requirement of the program is to make sure future deployments of photovoltaic systems in schools do not exacerbate existing problems from the rapid adoption of rooftop systems across the country.

For more details visit project web page at https://www.schoolinfrastructure.nsw.gov.au/smartenergyschools.html or email SINSW on schoolinfrastructure@det.nsw.edu.au.

Solar and batteries for cooler classrooms

Air conditioning systems are continuing to be installed at hundreds of public schools across NSW, however this can be a costly exercise.

The units can draw down a lot of energy during hot spells and this adds up to high energy costs, but the extra strain on the grid can also create extra costs to upgrade the electricity network.

"If the school is located in a grid constrained area, that can potentially require us to fund costly upgrades to the local electricity network," NSW Cooler Classrooms Program Director Nick Fisher said.

"It makes the air conditioning much more expensive."

As part of the Smart Energy Schools Pilot Project, solar and battery energy storage systems have been installed at 24 grid-constrained schools.

When the air conditioning units are switched on, it's hoped that the solar and battery storage systems will be able to cover the additional demand without having to draw down from the grid.

If they can't provide enough energy, then demand response controls in the air conditioning will automatically cycle down the units to prevent any grid overload.

"We will be testing whether solar and batteries systems are effective in keeping extra load off the grid and whether we need the extra backup from the demand response functions in the school air conditioning," Mr Fisher said.

"We will also look at the costs of the solar, battery and demand response technology and see if it's a cheaper option than powering the air conditioning from the grid."

THE WAY FORWARD

If the world is to reach net zero emissions by 2050, our investment in clean energy must more than triple. Meeting this demand will require a renewable energy supply around six times greater than our region's current annual solar and wind energy generation. The numbers shouldn't daunt us. They should energise us. If we empower businesses, scientists, engineers, workers and the private sector to work together across our region, we can unleash investment and innovation in clean energy at a scale we have never seen before.

Prime Minister ANTHONY ALBANESE addressing the Sydney Energy Forum

As a businessperson, I am concerned about my balance sheet. That's why I'm not investing in oil and gas.

ANDREW FORREST of Fortescue Future Industries at the Sydney Energy Forum

Time for Australian business journalists #auspol to take a keen interest as ClientEarth has written to [mining operations private equity manager] EMR Capital drawing attention to fiduciary duty. Funding coal is high risk to investors. Not to mention the planet!

Global Greens Ambassador and former Leader of the Australian Greens CHRISTINE MILNE

[To meet] the Paris Agreement's 1.5-degree temperature threshold… requires that we halve global emissions by 2030 and achieve net-zero emissions by no later than 2050. Most urgently, it requires that we end our fossil fuel addiction, including coal. That is our ask of Australia… and every other high-emitting country.

Fijian Prime Minister FRANK BAINIMARAMA

Europe is seeing deadly heatwaves, shattered records and devastating fires. It's hotter in Britain than it's ever been before. This isn't normal. We can't keep opening up new coal and gas projects. Delay is the new denial.

Greens Leader ADAM BANDT

Some so-called 'health experts' claim that children should not be sent down coal mines but we need to listen to the needs of businesses too.

Tweeter BEN ELTHAM

The State of the Environment report https://soe.dcceew.gov.au is out and it's a pretty grim document that tells a story of neglect & decline in Australia's environment. We must use this report as motivation to change the way we live on this planet & look after this incredible country.

Farmer and climate activist ANIKA MOLESWORTH

Finally Fran Bailey speaks up! She might have saved Australia from Scott Morrison… and she was at home sick the day that Tony Abbott beat Malcolm Turnbull by one vote. One woman, two sliding doors! Imagine the last 13 years without Abbott or Morrison!

SEC Board member and co-founder of Climate 200 SIMON HOLMES À COURT

IMAGE: KIE-KER FROM PIXABAY

The Solar Battery that Delivers **More**

SolarEdge Home Battery

Scan Me

LOW CARBON ALUMINIUM IN THE MAKING

In an Australian first, Capral Aluminium has teamed with Tomago to pioneer higher recycled aluminium content in logs and billets

Aluminium is lightweight, noncorrosive, strong, and in high demand in electricity-related applications, including conductor alloys, motors, generators, transformers and capacitors. Embodied carbon levels are however, of increasing concern to consumers. Sustainability now sits at the core of Capral Aluminium's undertakings.

Where would we be without aluminium?

In today's society aluminium is ubiquitous. It's used in all forms of transportation from bikes to ships to spacecraft; also in packaging; and building and construction including windows, doors and roofing; it's found in a plethora of electricity-related technologies; and a large range of household items from cooking utensils to furniture. Aluminium too is used in machinery and equipment; portable computer cases as well, in fact we read that material from used beverage cans is fashioned into casing for MacBook Air laptops and Pixel 5 smartphones.

FIRST SOME SALIENT FACTS: Australian aluminium smelters consume a fair whack of the power produced by the predominantly coal-fired national energy grid, somewhere between 10 and 14 per cent.

Such electricity use constitutes up to one-third of the cost of producing aluminium.

The global average carbon footprint for a tonne of aluminium is somewhere in the range of 16t CO_2/tAl. Given our reliance on coal-fired power generation in Australia, locally produced aluminium would typically boast a footprint in this range.

And although scrap aluminium is a valuable commodity, Australia exports 95 per cent or more of its scrap to South Korea, Indonesia, India and beyond for recycling. Just five per cent is recycled onshore. Those numbers are trending upwards; in 2020, Australia exported 119,075 tonnes of aluminium for recycling overseas, a significant increase of 25.13 per cent from the previous year.

Few people may realise it, but aluminium possesses properties that enable it to be recycled almost indefinitely, and as such, it is the gift that keeps on giving. Notably, 95 per cent less energy is required in aluminium recycling processes compared to its production from ore, thus avoiding harmful emissions.

What if some or all these matters could be addressed in one bundle?

Such is the undertaking of Capral Aluminium, Australia's largest producer and distributor of aluminium products. Foremost is an industry-first initiative in which Capral Aluminium has signed an agreement with Australia's largest aluminium smelter, Tomago Aluminium, to supply around 550 tonnes of postproduction scrap annually for remelting.

Production scrap from Capral's Penrith extrusion plant will be baled and sent to Tomago Aluminium in the nearby Hunter Region to be remelted and added to new aluminium billet.

The development is significant for many reasons, not least because Tomago Aluminium uses around 10 per cent of the New South Wales power supply to produce 590,000 tonnes of aluminium per year. In contrast, recycling aluminium alloys requires much less electricity, a tiny fraction needed to make primary aluminium.

In simple terms, because the strength of the chemical bond between aluminium and oxygen is extreme, significant energy is required to split that bond and form the metal. However, with recycled aluminium, the bond has already been broken, thus reducing the energy intensity of the process. In a joint media release on the development

Tomago Aluminium noted global supply chains were experiencing significant disruption and the carbon footprint was an increasing consideration, and that the new arrangement would reduce in part the need for international shipping through already congested ports.

"We are delighted to be able to close the loop for Capral and Tomago in a true 'cradle to grave' aluminium alloy supply and recycle arrangement. Best of all, the product that is made in NSW is now recycled in NSW," read a company statement. The arrangement with Tomago is a

small start, given that Capral generates another 14,450 tons of scrap annually that is destined for export markets.

Michael O'Keefe, Capral's General Manager of Marketing & Technology told Smart Energy "Capral is committed to working with our supply partners to look for opportunities to improve the efficiency of our processes, better manage our postproduction scrap and make procurement decisions to reduce our environmental footprint."

Earlier this year, Capral Launched its Sustainability Roadmap. This program will track and advance key strategies through four focus areas.

Michael explained, "We have identified four initial sustainability pathways within Capral, inclusive of operational considerations. Our teams can adopt or implement changes in their area of our business to make a real and tangible difference. These are Energy, Waste, Paper and Purchasing; however, the business intends to continue and expand the program in future years to encompass key areas aligned with the UN Sustainable Development Goals."

Capral views the rollout of this grassroots program as an opportunity to make a positive impact on its customers, staff, the environment, and the broader society, placing the organisation well on the path to reach Net Zero emissions by 2050, a commitment Capral CEO Tony Dragecivich announced as part of the 2021 Capral Annual Report.

"We are the first Australian aluminium extruder and distributor to set a net zero target, and this is important because we know sustainability matters to Australian manufacturers," he said. "Customers increasingly ask our sales teams for evidence of our sustainability commitments, which we feel is important and want to provide with complete transparency."

"Industry sectors like construction, renewable energy, transport and marine are looking for low carbon options for their products to meet customer expectations. Capral is ready to support these sectors with access to aluminium, almost 50 per cent lower in emissions intensity than they can currently source locally."

Aluminium Stewardship Initiative (ASI)

For those unfamiliar with the Aluminium Stewardship Initiative, it is a global initiative whereby producers, users and stakeholders in the sector commit to maximise the contribution of aluminium to a sustainable society. They do this by demonstrating responsibility and providing independent, credible and verifiable information regarding practices and improvements in ethical, social and environmental performance. That's quite a checklist.

Since its inception in 2012 ASI has become the recognised global authority in aluminium stewardship. ASI currently has 232 members in 47 countries and has issued 128 certifications against the ASI performance standard. Capral is the first Australian aluminium extruder to become a member of ASI.

Capral aims to achieve certification for its operations under the ASI Performance Standard and ASI Chain of Custody Standard by mid-2024 (or sooner if Michael and his team have their way!) as part of an all-encompassing approach to decarbonisation.

"As a member of the ASI we are looking to become certified and credited to those standards, and among a raft of initiatives we have to change our procurement behaviour around aluminium, that is, our primary log or billet, which we will now aim where possible to purchase from ASI certified smelters," O'Keefe explained.

"There is a threshold on carbon emissions for smelters producing ASI-certified billet, and we all need to move in that direction.

"These days architects, designers, engineers, manufacturers and tradespeople want to know where their aluminium has come from and that it has been produced in a responsible manner. Sustainability matters, and sustainable material procurement matters today," O'Keefe emphasised.

"Society is moving to low carbon products, and many wheels are in motion to modify our emissions and manage the responsible procurement of aluminium."

Under ASI's certification process, members must commit to certifying at least one of their operations within two years of joining, but Capral is upping the ante by committing to certifying all six of its manufacturing facilities.

It dovetails neatly with Capral's Sustainability Roadmap and public commitment to reach Net Zero emissions by 2050. Both place the organisation well on the path to ASI certification.

Net zero by 2050

Efforts toward net zero will initially centre on Scope 1 emissions generated from company-owned and controlled resources and operations, and Scope 2 emissions from the generation of purchased energy and released in the atmosphere, O'Keefe said.

"Our focus is very much on eliminating the source of emissions. We intend to do this by improving our plant and equipment, implementing new technologies and embracing more sustainable practices across our organisation.

"Working with our upstream supply partners, we will continue to look for options to incorporate more low carbon aluminium in our value chain."

He highlighted that progress toward net-zero will, in part, be underpinned by options presented by emerging and breakthrough technologies. "We have developed an extensive roadmap that goes beyond increasing renewable energy installations at sites and behavioral changes across all our operations, but much depends on emerging technologies and increased investment in renewables to give us the energy generation we require."

Low carbon aluminium for the Australian Market

Much of Capral's activity in the past 12 months has focused on putting in place a workable roadmap to achieve its ambitious sustainability targets. However, one significant change the business has made during 2022 is to actively procure primary aluminium billet for extrusion with a lower carbon footprint.

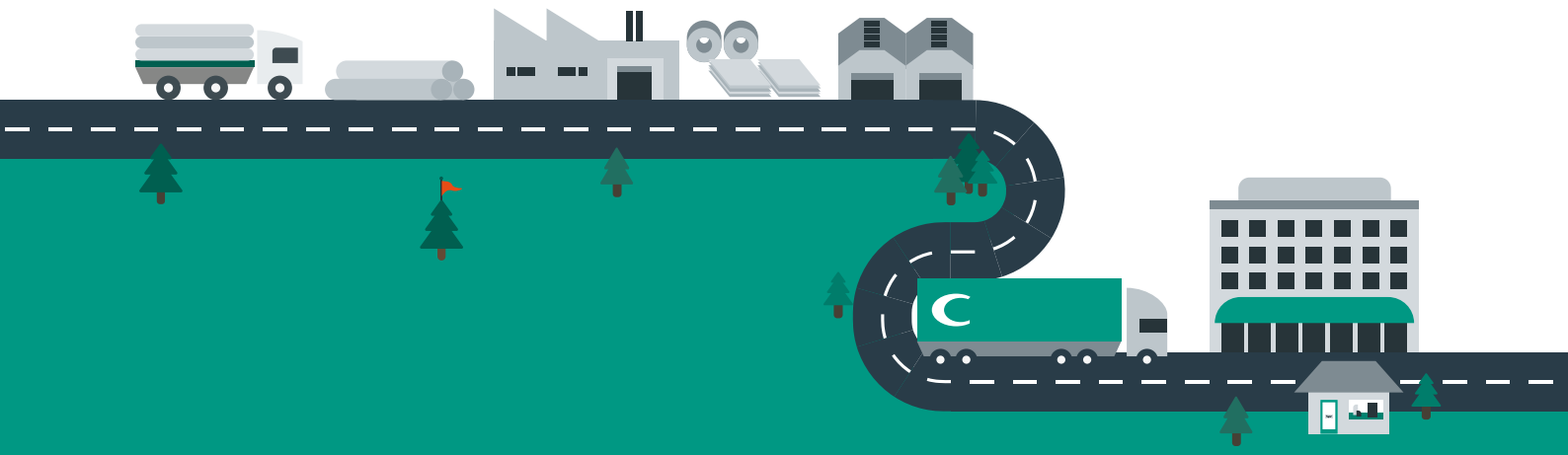
The global average carbon footprint for a tonne of aluminium is somewhere in the range of 16t CO_2/tAl. Given our reliance on coal-fired power generation in Australia, locally produced aluminium would typically boast a footprint in this range.

Yet, aluminium with a lower carbon footprint is increasingly available, and Capral has committed to being ready to meet local market demands for low-carbon aluminium in Australia.

"In 2022, 22 per cent of the primary aluminium billet Capral procures for use in its eight local extrusion presses will have a carbon footprint of less than 8t CO_2/tAl with approximately 300t having a certified carbon content of less than 4t CO_2/t Al," Michael explained.

"Industry sectors like construction, renewable energy, transport and marine are looking for low carbon options for their products to meet customer expectations. Capral is ready to support these sectors with access to aluminium, almost 50 per cent lower in emissions intensity than they can currently source locally."

All of this is excellent news for Australian businesses using extruded aluminium in their products, who can now consciously choose to use low carbon aluminium, literally cutting the carbon footprint of the aluminium in their products in half. A cleaner, greener choice all around.



Cleaner, Greener.
More sustainable aluminium for your projects.

Capral now offers low-carbon aluminium with a certified CO2 content of 8tCO2/tAL or below. Make a responsible choice; choose locally extruded, low carbon aluminium from Capral.

For more information visit: capral.com.au

CAPRAL ALUMINIUM

On the path to a better tomorrow.

BEYOND MODULAR DESIGN

A comprehensive analysis of Huawei's residential LUNA2000 Smart String Energy Storage System

With a growing number of homeowners joining the solar trend and turning their houses into power plants, the home energy storage system (ESS) – a device that stores electricity as chemical energy – plays a vital role in the unprecedented energy transition.

Not only does an ESS increase the self-consumption rate of solar energy but it can also provide critical support during power outages or load shedding. A home energy storage system, equipped with backup power boxes, can keep our internet and household appliances running. From Australia to Italy, from Vietnam to the Netherlands, Huawei's smart string energy storage system LUNA2000 lights up homes with clean energy around the world.

LUNA2000, the flagship product of Huawei FusionSolar Residential Smart PV Solution, is a residential energy storage system (ESS) launched in 2021.

Four reasons to choose LUNA2000

With the energy optimiser, LUNA leverages tried-and-trusted technologies to ensure system-level active safety, easier management and scalable modular layout. This all sounds great but when in practice, what does it do to help professional installers and tech-savvy homeowners alike?

Eye-catching, award-winning design

LUNA2000 has recently been awarded iF Design Award 2021, one of the world's three most prestigious design awards, also known as the 'Design Oscar'. The compact, smooth, sleek, and waterfall-inspired aesthetic design of LUNA2000 is a fabulous addition for homeowners.

Easy and flexible configuration

With the innovative modular design, one single storage system is composed of up to three 5kWh battery units that can be stacked on one another to offer 5, 10, and 15kWh storage options to meet customers' different needs. It allows for another same system to be joined in parallel, sitting side by side, to scale the total capacity of the battery system to up to 30KWh.

With the power modular on top, the high voltage battery is compatible with both single and three phase residential inverters from Huawei.

One-fits-all solution to streamline installation and maintenance processes

LUNA2000 is a plug-and-play home battery system without pre-charging. Once LUNA2000 has been turned on, all components of the system are automatically recognised and configured by the FusionSolar App.

Everything you need to know about the system performance will be displayed on the App whose commissioning takes just five minutes. With the App, O&M staff can easily identify which PV module or battery module underperforms, realising the module-level fault detection and improving efficiency.

Gone are the days of clumsy and piecemeal home storage systems with Huawei's One-Fits-All Residential PV Solution, which includes the inverter, the optimiser, the ESS and the App.

All components are designed and manufactured by one company, so you don't need to deal with different component suppliers, streamlining the maintenance process.

Three layers of safety protection to keep you safe

Maintaining personal and property safety should be a priority when investing in any solar power system. In recent years, a growing number of branded home batteries have been recalled over fire concerns. Some energy storage systems fail to provide enough protection from overcharge, over-discharge and internal short circuit conditions, which can cause fire and explosion hazards.

By treating customers' safety as the number one priority, Huawei has added three layers of protection to achieve active safety, including AI-powered internal cell short circuit diagnosis to avoid fire hazards, cell-level temperature control to detect overheating and optimiser-enabled 0V rapid shutdown for safer installation and maintenance.

The AI-powered internal cell short circuit diagnosis can precisely analyse the charge/discharge voltage curve of each cell, preventing false alarms and missing alarms. A sudden drop in cell voltage will trigger the immediate isolation of the faulty battery module to fend off dangers.

Each battery module of the LUNA2000 home battery has eight sensors to supervise the operating status, enabling temperature control at the cell level. Each sensor works independently and monitors two cells, achieving higher monitoring precision. Each module also has a unique fire extinguishing bag to offer maximum safety.

Besides, LUNA2000 adopts the lithium iron phosphate solution that is the most chemically stable and cannot self-ignite.

www.huawei.com

Information, views and technical details on this page supplied by Smart Energy Council Member

SELECTRONIC has welcomed its newest distributor, DPA Solar, to its successful group of Australian and New Zealand distributors.

Distributed Power Australia (DPA) is a recognised Off-Grid wholesaler of batteries, inverters/chargers, racking, solar panels and accessories, selling exclusively to registered electricians or qualified solar/battery installers. The business has been supplying off-grid and hybrid energy equipment to the Australian renewables industry for over 10 years.

DPA Solar will distribute Selectronic products including the SP PRO and Selectronic Certified solar inverters as a Victorian Regional Distributor.

www.dpasolar.com.au

Pictured from left: David Woodgrove (DPA), Leila Playmore (Selectronic), Richard Barker (DPA)

PROMINENT SOLAR MODULE MANUFACTURER JINKOSOLAR has been named one of the 50 smartest companies in China by MIT Technology Review for its outstanding innovation in solar technology R&D.

Jinko is the first company to have broken solar cell efficiency world records 19 times and the first company than can develop and mass-produce solar cell with an efficiency up to 25%,

Hot on the heels of that announcement was the mid-August naming of JinkoSolar as the top 50 Forbes China Most Innovative Companies 2022.

"We are greatly honoured to be recognised as Most Innovative Company of the Year," said Dany Qian, Vice President of JinkoSolar (pictured). "This award is reflective of the strength of our culture of continuous innovation… despite uncertain times, we researched and developed next-generation N-type TOPCon technologies and products that helped businesses and customers thrive."

JinkoSolar's solar products have served over 3,000 clients in more than 170 countries and regions around the world. The Tiger Neo panel integrates N-Type TOPCon, opening a new horizon for the advancement of solar PV technology.

www.jinkosolar.com

REGISTERED MARKET GENERATOR SOUTH STREET ENERGY WHICH IS A BRANCH OF METROPOLIS METERING has won the coveted 'The Biggest Pitch', the 2022 Victorian iAwards, in the Sustainability and Environmental Solution for the Year category.

Formed in 2017, South Street Energy was recognised for its pioneering Distributed Generation Network, enabling owners of small-scale solar, wind and biogas generation systems to sell renewable electricity to the wholesale electricity market.

These generation systems, too small alone for market registration, are included in South Street Energy's Distributed Generation Network, the national and fast growing network of small scale, renewable generators.

Managing Director Marco Bogaers explained how South Street Energy is helping to bring the National Energy Market into the 21st century by enabling small-scale electricity producers including businesses, farms and local councils to sell their renewable electricity when demand is high while continuing to self-consume at other times.

"This is more than a technical solution, we've pulled together existing industry processes to create an entirely new way to participate in the market," said Melbourne-based Bogaers.

generation@southstreetenergy.com

Managing Director of South Street Energy Marco Bogaers, holding the iAward, with Andrew Randall, Melita Vellucci, Chris Boek and Peter Sertic

Chinese solar module manufacturer **RISEN ENERGY** has announced its 210mm 700W heterojunction (HJT) line up, the Hyper-ion series, has been tested and certified by TÜV SÜD, a global provider of testing, inspection and certification services.

This makes Risen the first company around the world to be granted TÜV SÜD certification for its 210mm high-efficiency HJT product with ultra-thin wafer.

"The introduction of Risen Energy's Hyper-ion series marks another giant stride in the evolution of solar technology," said Zhulin Zhang, Operation Director and Chief Technical Certifier of TÜV SÜD Smart Energy. "The Hyper-ion series provides a solution to meet the rising demand of high efficiency and large wafer PV modules for solar plants."

http://en.risenenergy.com

Information, views and technical details on this page supplied by Smart Energy Council Member

SMART ENERGY COUNCIL

GREEN FINANCE LENDER PLENTI AND ENERGY UTILITY AGL are on a mission to connect Australian households in eligible locations to more affordable solar battery systems and accelerate the renewable energy transition by reducing (subsidising) the upfront cost of home energy storage batteries and offering inclusion in AGL's Virtual Power Plant. Once customers gain finance approval, Plenti's national network of installers can commence the installation of the solar battery system.

In South Australia, the subsidy amounts to $1,500 and in NSW, Victoria and Queensland, it's worth $1,000. Customers can claim the AGL VPP battery subsidy on top of the government subsidy which makes the offering all the more affordable, saving Victorians around $4,500 and South Australians up to $3,500 on battery costs. Customers repay remaining costs through Plenti's simple and easy Zero Interest Payment Plan.

Plenti's Head of Renewable Energy Louis Edwards (pictured) told *Smart Energy* "Plenti's VPP program in partnership with AGL has performed exceptionally well since its launch in May of this year, making the sign-up process for installers simple and easy by seamlessly integrating this into Plenti's finance process and lowering the upfront cost to households by offering up to $1,500 in battery subsidies.

"This partnership is one example of how Plenti is committed to building and delivering innovative energy and finance solutions with energy retailers and aspiring VPP providers."

AGL's recent results presentation revealed the solar and battery bundle sales growth supported by Plenti green finance partnership has grown by 41 per cent over FY21.

Email: greenfinance@plenti.com.au

WEATHERZONE BUSINESS is raising the bar on generation forecasting. The largest onshore wind farm in Australia is under construction, along with Project EnergyConnect's 900km transmission link between SA and NSW; and Victoria's and WA's offshore wind projects are inching closer to production. Wind energy is rapidly expanding. This heightens the critical need for increased accuracy in power generation forecasting to protect wind farms from civil penalties and assist in integrating their supply of energy into networks across the country.

Opticast Renewable Wind: Weatherzone Business has developed Opticast™ Renewable Wind (RW) – a scalable, consolidated system providing customised weather and power generation forecasts to wind farms at any stage in their life cycle.

Generation forecasts are created using a meticulous multi-modal approach, specific to the exact location and assets of each wind farm. Turbine level weather and generation are computed using these key inputs:

- height level NWP data (0-300m)
- met mast or anemometer data
- SCADA wind generation data
- farm layout and individual turbine meta data, and
- historical meteorological and generation data.

The inputs are run through an ensemble of NWP models, 3D weather analogues, an Artificial Neural Network (ANN) model to estimate power curve, and consensus forecast. Statistical error is estimated using machine learning, observational corrections and a QC process that is initiated every five minutes. The result is a comprehensive, site-specific forecast of power generation with a marked increase in accuracy, reducing the wind farm's exposure to AER penalties. Rigorous hub-height forecasting, including temperature, humidity and wind speed/direction, feeds into generation estimates, and identifies periods of adverse weather, underpinning safe and reliable operations and scheduling of maintenance.

Opticast RW's 5-minute forecasting up to 72 hours and hourly forecasting out to 10 days further assist in planning safe turbine maintenance, pinpointing optimal weather windows where generation loss can be minimised. Customisable alerting takes blade icing, temperature, high-speed wind, lightning and humidity into account, further safeguarding site teams and farm assets. *www.weatherzone.com.au*

TRINA SOLAR has launched its 430W Vertex S residential rooftop modules.

The single module power for the upgraded version of Vertex S modules has increased by up to 30W which is achieved by implementing latest 210mm rectangular silicon wafer technology and innovative module design.

The Vertex S series which boasts an advanced design concept, recently won the Red Dot Design Award, beating nearly 10,000 entries from more than 60 countries.

A justifiably proud Todd Li, president of Trina Solar Asia Pacific (pictured), said "Households here are moving towards larger system sizes. A 6.6kW system is no longer sufficient to meet some households' energy needs. Households need more energy for electric vehicle charging and for heating and cooling. "With electricity from the grid becoming more expensive, households want to reduce their dependence on the grid completely. This is now the priority for many Australian households rather than maximising rebates available under the STC scheme."

In other news, Trina Solar recently started building a new PV factory in Xining, provincial capital of the central Chinese province of Qinghai. The factory will cover almost the entire PV manufacturing chain from polysilicon production to modules based on 210 and N-type technology.

The factory will include production lines with an annual output of 300,000 tonnes of industrial silicon, 150,000 tonnes of high-purity polysilicon, 35GW of monosilicon, 10GW of wafer slices, 10GW of cells, 10GW of modules and 15GW of auxiliaries for modules.

Later this year Trina Solar celebrates its 25th anniversary. *www.trinasolar.com*

Information, views and technical details on this page supplied by Smart Energy Council Member

To hit 82 per cent renewables in eight years, we need skilled workers – and labour markets are already overstretched

IN JUST EIGHT YEARS TIME, the Labor government wants Australia to be 82 per cent powered by renewable energy. That means a rapid, historic shift, given only 24 per cent of our power was supplied by renewables as of last year.

To make this happen, we must rapidly scale up our renewable energy construction workforce. The early August energy ministers' meeting calls for assessment of the "workforce, supply chain and community needs" for the energy transition. The government's jobs and skills summit in early September will tackle the issue too. While it's positive the government is focused on these challenges, the reality is we're playing catch-up.

Why? Because Australia is already stretched for workers, and it takes time to give new ones the skills they will need. Our research estimates the renewable energy transition will need up to 30,000 workers in coming years to build enough solar farms, wind farms, batteries, transmission lines and pumped hydro storage to transform our energy system. Most of these jobs will be in regional areas.

In coming decades, Australia will invest around A$66 billion in large-scale renewables and $27 billion in rooftop solar and battery storage. This creates openings for industry development like the $7.4 billion market opportunity for an integrated battery supply chain and manufacturing which builds on our strengths, such as wind towers.

If we get this right, we can create new manufacturing and supply chain jobs and reverse the long drift of these jobs overseas. But if we get it wrong, skill shortages could derail the vision of a new energy system by 2030.

What jobs will we need and where?

Much of the debate on the energy transition to date has focused on technical challenges like integrating renewable energy into the grid.

But as a new report from Construction Skills Queensland points out: "The biggest challenge in delivering the (renewable energy) boom could be the scale of the construction workforce required."

Across the eastern states in the National Energy Market, the construction workforce needs to scale up rapidly to build wind and solar farms, rooftop solar, battery storage and transmission lines throughout the 2020s. As the volume of renewable energy grows, our modelling finds the share of operations and maintenance jobs will increase, making up around 50 per cent of all jobs by 2035 based on the Australian Energy Market Operator's roadmap for the energy system.

Notably, our projections include very few jobs in manufacturing. That's because at present, most renewables manufacturing is done offshore. But as the country which pioneered key solar technologies, we could harness these investments to build local production.

Skill shortages could cripple the renewables boom

While it sounds simple in theory, the hard part is making this a reality. How can we best scale up the construction workforce in regional areas? How can we best leverage public and private clean energy investment to increase local manufacturing jobs?

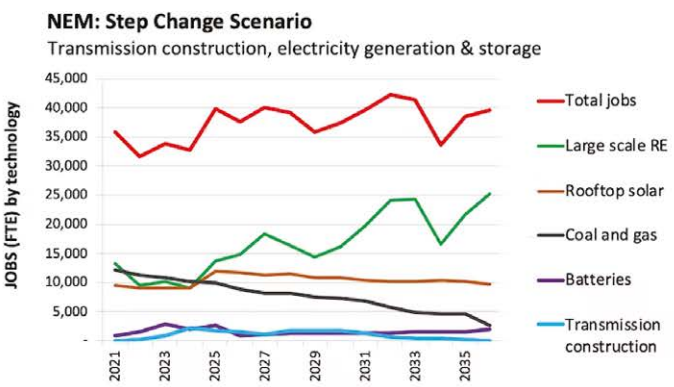
It's going to be a challenge. That's because we are already facing widespread skill shortages in key jobs such as engineers, electricians and transmission lineworkers.

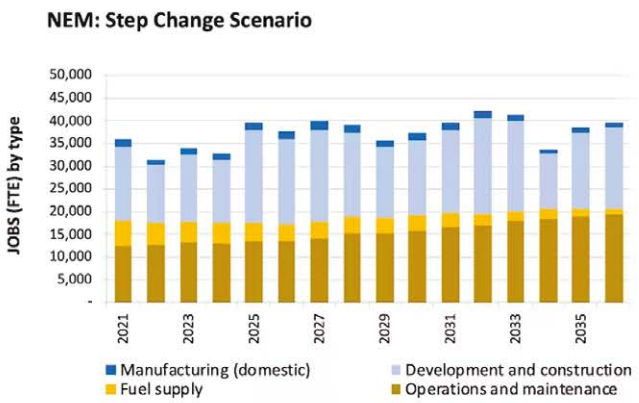
Australia is in the midst of an 'unprecedented' boom in infrastructure. Think of the huge transport projects like inland rail and metro projects in major cities.

Our regions are already struggling to supply workers for these projects. Infrastructure Australia has projected a shortage of 41,000 engineers and 15,000 trades in the next few years. This is a real worry for the renewables industry. Where will the new workforce come from?

As the labour market tightens, there's a risk skill shortages will become a constraint on construction timetables. There are industry reports of bidding wars as companies vie to secure skilled workers by offering higher wages. That's great for the workers with the skills, but it also speaks to the fact that the pool of skilled people is too small – even before we launch this major transition.

People in many regional communities are concerned the renewable boom could follow the mining boom with a reliance on fly-in, fly-out workers. This approach overheats local economies and housing and ultimately leaves little benefit, as towns like Karratha have found.





This figure shows the numbers of jobs needed by technology and type, transmission construction, electricity generation and storage under a 2021-2035 step change scenario (AEMO 2020 Integrated System Plan).

What do we need to do?

Governments will need to roll out regional programs to increase the size of this workforce, by creating direct training pathways to help school leavers get into the renewables sector. This can slow the well known 'youth drain' of country kids to the cities.

Specific programs could also help First Nations people in remote areas into jobs close to their communities such as in best-practice solar farms and transmission projects.

We'll also need urgent investment in regional training facilities, courses and apprenticeships.

While the federal government has committed to fund energy apprentices, we will also need more industry-government partnerships like the pioneering Energising Tasmania initiative to train and redeploy new and existing workers backed by government support.

And we will also need skilled migration as part of the solution. That's because the regions cannot supply the full scale of the workforce required and time is short. But regional communities will want to see programs encouraging workers and businesses to put down roots. If renewables become another FIFO boom, we risk community backlash.

While the government has many other things to juggle, this is a big one. Without skilled workers, we won't reach the goal of transforming our energy system by 2030.

Authors: Chris Briggs Research Director, Institute for Sustainable Futures, UTS and Rusty Langdon, Research Consultant, UTS.

HYDROGEN IN THE EU

Hydrogen Australia's Max Hewitt visited Europe in May to hear first-hand about developments in renewable hydrogen and participate in leading conferences. He concluded his visit saying Australia is not so far behind in hydrogen advances.

IT'S A PIVOTAL TIME within Europe's renewable hydrogen industry, obviously this year's outbreak of war between Russia and the Ukraine has resulted in an unprecedented energy crisis with significant and far-reaching consequences.

There's now a more critical need within Europe to replace fossil gas and also to establish stronger energy security, and simultaneously to decarbonise the electricity system of the EU; these dynamics have created a real sense of immediacy about the climate and energy crisis like never before.

The stark reality was evident in the conferences I attended in Europe where the questions were less about 'is renewable hydrogen a potential decarbonisation solution?' and more 'how fast can you get it to us, what sort of volumes are you talking about, what are the timelines?'

Demand is increasing among European industries and there is discussion around transport solutions providers, from shipping to freight stuff and trucking companies as well as light vehicles, even a couple of aviation fuels companies.

I was surprised by the number of companies coming forward and looking to collaborate and do something really significant but the reality is there are few active and productive green energy green hydrogen plants in Europe today.

Europe and Australia have this in common, up until now ambition has been lacking, projects that are more ambitious are looking to conduct trial or demonstration projects that are nowhere near the size of the scale needed.

There was talk of scaling up from a pilot trial of 10 or 20 megawatts to a gigawatt pilot or a gigawatt trial instead because that's the sort of rapid action necessary.

In general Europe is more advanced in the conversation and more advanced in terms of understanding the issues, and in particular certification and establishing infrastructure and policy programs to help to push this forward.

However, on the actual project development side of things there's no such momentum and I don't think there will be too much production happening in Europe at least in the medium to long term.

Their goal is more to import larger amounts probably from North Africa, potentially from South America and Australia, if we can get our act together.

The EU is talking about scaling up and increasing the production and consumption of renewable hydrogen so changing over industries or sectors that have demand for hydrogen today to change into renewable hydrogen rather than a fossil hydrogen.

One of the more interesting matters to emerge from the trip was the sense that in the medium to long term hydrogen imports will be normal for the EU.

Pictured (L to R) are Alex Hewitt, Founder and Chief Executive, CWP Global; Maria Paz de la Cruz, CEO, H2Chile; Paddy Padmanathan, President and CEO, ACWA Power; Andy Marsh, CEO, Plug Power; and Vineet Mittal, Chairman, Avaada Group

Decarbonising Europe's electricity supplies

There's a really complex issue ahead in Europe in that they have to decarbonise their electricity system, they'll be building new renewables and decarbonising the electricity sector as much as possible while trying to meet the demand of all of these newer applications for hydrogen.

During the Green Hydrogen Assembly in Barcelona we heard about the global green hydrogen organisation launching their Standard that outlines requirements for green hydrogen under their forthcoming certification scheme.

Hydrogen Australia (a division of the Smart Energy Council) is working with the organisation on the development of the scheme and the global uptake and implementation of it.

I think although Australia is seen not as a leader certainly all due credit should be given to the private sector in Australia for taking some risks in green hydrogen with their aspirations to develop some pretty ambitious projects. Australia is certainly at the forefront of green hydrogen developments and there's an expectation that it will in time deliver large quantities of renewable hydrogen to the world market.

GREEN HYDROGEN IN EUROPE

Europeans understood that Australia's Coalition government was not supportive of renewable energy developments which has led to some confusion and maybe some misunderstanding over our position.

Call to action

What was evident during European conferences was the absence of an outcry for government support to make things possible, rather a rallying call to industry to say we need to collaborate and push this ahead faster. That's not to say targets and other policy levers will be useful in that capacity, they will assist.

As to projects, I think Australia might help the EU in terms of trial projects because a lot of their trial projects are end-use such as hydrogen refuelling stations for buses or refilling stations for cars and trucks, or trials of hydrogen used in homes. And much of it is fossil hydrogen, the trials and tests are to help familiarise people with the infrastructure, to get that in place then worry about decarbonisation later.

Fertilisers

The issue of fertilisers was raised many times in Europe, bearing in mind grain supplies to Africa; the expectation is that hydrogen needed for fertilisers will be sourced from low carbon or renewable resources and it's almost a no brainer to build capacity, ditto renewable ammonia.

One interesting point made was that we might actually see a relocation of mass industry as a result of this so there are production facilities dotted around North Africa to make fertilisers, ie position the fertiliser plant either next door or as close to the hydrogen production hub as you can.

We're likely to see the relocation of fertiliser production facilities and even metals production facilities. You'll see steel or fertilisers being made out of North Africa and then shipped in its final form to wherever it needs to go rather than shipping the hydrogen or the ammonia up to a hub in Norway to make into fertiliser to then be distributed.

It certainly makes sense in having the commodities in proximity.

It makes so much sense to press on with green hydrogen in Australia, the economics are just so positive; potentially we can participate and be one of the top three leading suppliers of renewable hydrogen exports.

Sadly in the interim it appears coal use is rising in Europe which isn't surprising given the geopolitical forces at play but it is disappointing. But there is an expectation for a massive scaling up of renewable energy.

This is all very timely and Australia has such a massive advantage, there's a lot more room here and our resources are better.

Reflections on Australia's position

It makes so much sense to press on with green hydrogen in Australia, the economics are just so positive; potentially we can participate and be one of the top three leading suppliers of renewable hydrogen exports.

But we do need to get up to speed on the certification discussion; there's a real understanding now in the EU that a certification scheme for hydrogen needs to assess emissions. It doesn't need to talk about what colour the hydrogen is, it doesn't necessarily need to stay where it comes from, but it does need to focus on the emissions per kilo.

We also need to be cognisant of carbon taxes and border adjustment mechanisms that will impact products when setting up an offtake agreement.

These are some of the critical aspects for the next phase.

In terms of policy clarity and infrastructure responsibilities there has been some movement on each of those sectors in Australia recently, NSW is probably one of the clear leaders in that space given they have outlined a road map for hydrogen uptake in terms of capacity of electrolysers that they want to see deployed and the number of hydrogen-powered vehicles that they want to see on the road.

Beyond that, agreements with the Queensland and Victorian governments to start developing a hydrogen highway on the east coast, infrastructure policy and more.

But we need to come together nationally and raise ambition, we need more clarity from the federal government to take us forward and to integrate systems, clear communication between ministers responsible for portfolios affected by energy such as water, also agriculture which will be more heavily reliant on fertilisers produced using hydrogen.

When I left Europe I was feeling rather frustrated but now I'm hopeful, even reasonably optimistic that we can make up the distance because we have a good green hydrogen industry that's engaged and we can move fast.

IMAGE: ALEXANDER DROEGER FROM PIXABAY

SPEAKING AT THE SYDNEY ENERGY FORUM IN EARLY JULY PRIME MINISTER ANTHONY ALBANESE announced the Labor government would allocate up to $3 billion for existing industries to adapt and new industries to grow, including hydrogen electrolysers; batteries and energy storage; clean energy component manufacturing; and fuel switching.

Albanese said "We see enormous potential in hydrogen, and Australia has all the ingredients needed to become both a major hydrogen producer and a global exporter", citing 70 hydrogen projects in the pipeline of which the vast majority are green hydrogen.

Plans are afoot to establish hydrogen refuelling infrastructure to support the next generation of heavy vehicles.

"Our clean and green transition is bigger than just renewables… since Labor took office, we've heard a lot about our future as a renewables superpower. Often overlooked is the fact this would mean not just generating renewable electricity and green hydrogen at vast scale but also investing in new industries and processes to grasp as many opportunities as we can.

"This would mean investing in upstream industries such as solar array fabrication and electrolyser manufacture, as well as downstream industries such as green steel, green cement and green fertiliser. These new green products would be produced using locally generated supplies of green hydrogen and cheap clean renewable power."

He peddled opportunities to export Australian-made green hydrogen to fuel cars in China and Korea.

"If we get this right, by 2030, Australia will be a major player in the global hydrogen industry. We'll be using our natural resources, including solar, onshore and offshore wind, to generate export quantities of hydrogen, and providing for its use domestically.

Prime Minister Albanese speaks at the Sydney Energy Forum held in July

"We will use hydrogen to progressively decarbonise existing industries, heavy transport links and for chemical production.

"And we won't just be powering Australia with renewable energy – we will be powering the world."

Hear hear, and time to ratchet up the ambitions outlined in the vision.

Andrew Forrest's Fortescue Future Industries is spearheading developments with the $1 billion construction of a green hydrogen manufacturing components, cabling and renewable generation in central Queensland.

In related developments, **FFI AND AGL ENERGY** have raised ambitions for the large green hydrogen facility in the NSW Hunter Valley, eyeing up a 2GW renewable hydrogen facility, transforming AGL's Liddell and Bayswater coal plants region into a green hydrogen precinct with solar, wind, storage and manufacturing operations.

The holy grail? **FRONTIER ENERGY'S BRISTOL SPRINGS GREEN HYDROGEN PROJECT** in SW Western Australia is on track to become one of the first, low-cost green hydrogen projects in Australia. Frontier's pre-feasibility study indicates the Stage One 114MW solar farm would produce approximately 4.4 million kilograms of green hydrogen annually. A study highlight is the low estimated cost (inclusive of capital) of $2.83 per kilogram of hydrogen produced, rendering this project as one of the lowest cost producers of green hydrogen in Australia. Frontier attributes this largely to the project's proximity to major existing infrastructure.

LINE HYDROGEN is delivering one of the first large scale, commercial green H_2 production facilities in 2023. The Great Southern Project at the Bell Bay Solar Farm in Tasmania will be commissioned in early 2023 at 1.49t H_2/day and grow to 14.9t H_2/day over nine years. The island's heavy haulage fleets, light vehicle fleets and mobile power providers are target markets.

LINE Hydrogen's SEQ Project in Toowoomba, Queensland is slated to start commissioning in early 2024 at 1.49t H_2/day and grow to 19.4t H_2/day over 10 years. The project will target delivery of low-cost hydrogen into Queensland's heavy haulage fleets, light vehicle fleets, and mining drill and blast providers.

In other developments, LINE Hydrogen is establishing a fleet of B-double heavy haulage hydrogen-powered trucks and buses that will be fuelled by its own hydrogen production. The first 29 trucks are scheduled to be delivered at the start of 2023.

A company statement read: "Our production strategy sees the delivery of GREEN hydrogen through large-scale production of an initial 1.4 tonnes of GREEN Hydrogen per day, increasing to 4.3 tonnes of GREEN hydrogen by 2024."

GREEN HYDROGEN IN THE NEWS

Queensland Minister for Training and Skills Development Di Farmer recently launched the **HYDROGEN INDUSTRY WORKFORCE DEVELOPMENT ROADMAP 2022-2032.**

The plan is backed by $50 million commitment to renewable infrastructure, including a Hydrogen Training Centre of Excellence; $17 million Renewable Energy Training Facility, $10.6 million Hydrogen and Renewable Energy Training Facility.

"We have already set a strong foundation for the emerging hydrogen industry by investing $50 million in state-of-the-art infrastructure to support training in renewables and hydrogen, providing essential, hands-on experience with new and emerging technologies," she said.

www.desbt.qld.gov.au/hydrogenroadmap

Smart Energy Council advisor Scott Hamilton (pictured with Di Farmer) commended Queensland Ministers for their outstanding leadership on making Queensland a renewable energy superpower

NICE HAUL In a much-publicised move, **HYSATA'S SERIES A** funding hit a high sky $42.5 million. The Hysata electrolyser operates at 95% system efficiency (41.5kWh/kg), believed to be well up on performance and cost over incumbent technologies' operations of 75% or less. "This high efficiency, coupled with the simple approach to mass manufacturing and low supply chain risk puts the company on a path to delivering the world's lowest cost green hydrogen," the company stated.

The Australian company's world-leading hydrogen electrolyser technology has been supported by renowned global investors including the CEFC, Vesta, Hostplus, Bluescope, Kiko Ventures and IP Group. Funding from the Series A round will be used to grow the Hysata team and develop a pilot manufacturing facility.

"Our mission is to redefine the economics of green hydrogen production through our innovative proprietary electrolyser technology. Green hydrogen is a vital energy vector on the world's path to net zero, critical to decarbonising the hard-to-abate, yet vital, sectors of our economy such as steelmaking, heavy transport, and the chemical industry. The extensive end-use cases for green hydrogen translate to a greater than trillion-dollar market opportunity," said Hysata chief executive Paul Barrett.

STAYING IN QUEENSLAND, BP Australia has commenced construction of a green hydrogen refuelling facility at a service station in Brisbane. The facility will dispense green hydrogen produced by a 220kW electrolyser powered by a 100kW solar installation at BOC's Bulwer Island production site.

IMAGE: BOC

Queensland Energy Minister Mick de Brenni tours the Bulwer Island hydrogen plant.

Up to 2,400kg of green hydrogen will be produced monthly, of which 50kg a day will go to the refuelling station where it is anticipated hydrogen cars will be refuelled in 3-5 minutes – those being the state government's five hydrogen-powered Hyundai NEXOs. The move is part one of the east coast hydrogen superhighway. Minister for Energy, Renewables and Hydrogen **MICK DE BRENNI** said "Queensland has taken an early lead in the race to transform the heavy-haulage transport sector to renewable hydrogen. *www.epw.qld.gov.au/about/initiatives/hydrogen*

HYDROGEN HIGHWAYS: THE NSW AND VICTORIAN GOVERNMENTS have each invested $10 million to support the development of at least four hydrogen refuelling stations and approximately 25 hydrogen-powered trucks on the aptly named 'Hume Hydrogen Highway', the 840km stretch between Melbourne and Sydney that is Australia's busiest freight corridor.

NSW PREMIER DOMINIC PERROTTET recently met South Korean Hyundai executives to promote green hydrogen manufactured in NSW. The strategy includes $3 billion in incentives to commercialise supply chains for green hydrogen source.

CHARLES DARWIN UNIVERSITY has invested in a Hydrogen Energy Storage System comprising a 5kW fuel cell with 8kWh of hydrogen storage. Purchased from WA-based Hybrid Systems Australia, CDU will use the HESS to assess integration of hydrogen electrolysers and fuel-cells into a power network at its Grid Testing Facility and allow researchers and others to develop and commercialise green hydrogen as an energy source.

The Northern Territory government website states "Emerging industries such as renewable hydrogen will have a key role in the Northern Territory Government's commitment to net-zero emissions by 2050. Forecasts show that if Australian hydrogen becomes the energy of the future, by 2050 GDP is estimated to be $26 billion higher than a business-as-usual scenario, with an added 16,900 full-time equivalent jobs. If the Territory were to capture a similar proportion of Australia's hydrogen production as it already has for natural gas, this could mean $3.7 billion in growth and 2,500 jobs."

KENNARDS HIRE is first-to-market with zero-emission hydrogen power generator after the family-owned equipment hire company, purchased two new EODEV GEH2® Electro-Hydrogen Generators from Blue Diamond Machinery. The hydrogen power generator is touted as offering close to 80kW of zero-emission electricity, free of pollution, CO_2 emissions, particulate matter and waste. Kennards Hire CEO, Bill Whitehouse said equipment rental products such as the GEH2® hydrogen power generator are now becoming a more viable sustainable solutions option.

The GEH2® Electro-Hydrogen Generator is powered by Toyota's latest generation fuel cell, its compact design is said to suit any environment or sector from mining and construction to events, telecom, EV charging or back-up power. The GEH2® can also be stacked together, complement diesel or gas generators, and connect to the grid.

Em*powering* schools in Fiji with PV systems

The Its Time Foundation continues its noble mission building solar systems for schools in Fiji and aspires to a massive scaling up of operations for the good of one and all.

THE PACIFIC ISLANDS FORUM of early July saw a rallying cry by Islanders for Australia to lift its game on climate action. Prime Minister Anthony Albanese was on hand to agree to the far-reaching *2050 Strategy for the Blue Pacific Continent*, a blueprint for a smarter future. And, in the short time she has been Foreign Affairs Minister, Penny Wong has already staged several trips to the Pacific region to spread goodwill and confidence in Australia's actions hereon.

Her commendable efforts are preceded however by one Australian businessman who for more than a decade has made a material difference to the lives of Fijian islanders by installing climate-friendly solar PV systems at numerous schools.

Thanks to Its Time foundation, Bananban school on the Fijian island of Rabi gets a makeover with a 5.5kW solar power system, much to the delight of the local community

The efforts driven by Its Time founder Rob Edwards are delivering numerous benefits, dispensing with the need for costly, noisy, polluting diesel generators, educating the next generation of Fijians on the merits of renewable energy, and boosting their lifetime opportunities and wealth creation through improved education.

During the undertaking Rob's been challenged by the odd '100 year' cyclone wiping out solar systems and bricks-and-mortar schools, and weathered challenges brought on by the tyranny of distance involved in sourcing and shipping supplies from points across the US and Australia to an island so remote it sits on the edge of the international date line.

Added to that are the additional difficulties of travelling to and within remote regions, occasional failed internet connections, shortages of vital components, faulty parts and heck, a case or two or debilitating food poisoning to boot!

There's more: the onset of COVID in 2020 not only hampered progress for a couple of years but also landed at a critical time when Its Time was on the cusp of securing a large sponsor that could have fast tracked tens of projects.

Rob, who puts on hold his day job as a motivational speaker to manage Its Time, finds the mental fortitude to take each setback on the chin, to persevere and build systems one by one.

June 2022 marked the completion of the 24th solar system.

Littering the otherwise glittering Pacific

Pacific Islanders are watching with alarm as sea levels rise and storm activity rages in the region. That's only part of their concern.

There's also the deeply problematic build-up of plastics waste in the ocean. Plastic pollution riles Rob, who now encourages Fijian school kids to spend 20 minutes a week trawling beaches for plastic waste. The size of their waste piles, and all the implications for aquatic wildlife, is alarming and confronting.

Rob's combined his broader environmental concerns with his motivational skills to develop a similar plastics waste collection program in Sri Lanka. So successful is the self-sustaining model that many impoverished locals are now eking out a living from plastic waste collections in the bankrupt island nation.

The solar installation at the Bananban school on the Fijian island of Rabi (pronounced Rambi) involved flights from Sydney to Nadi, then on to Suva to link up with local installation partner CBS Power Solutions, stock checking of all equipment and loading it into a truck for a trip to Suva port.

There followed a 16-hour ferry trip, a three-hour four-wheel drive on a bumpy dirt road, the loading of equipment onto six metre outboard boats and a one-hour sea crossing to the village itself.

Only on arrival to find a wrong component had been supplied in one of the boxes.

A right Pacific problem!

Banding together

"Yet responses to such misfortunes invariably highlight the strength and spirit of Islander communities whose coconut telegraph works rather brilliantly," Rob said.

"That setback was resolved in quick time. It involved a call to Suva where CBS arranged the correct part and got it to Suva airport where it was put on a small plane bound for a larger island near Rabi.

"From there, it was put a local bus and dropped off at a village three hours up the road. Next morning, we sent the outboard to pick it up.

"After a while you get to understand how everything works and how problems always get resolved.

"This is one of the joys of working in the region," Rob said. "Islanders band together well to help out, especially when they recognise the long-term benefits it will bring to their communities."

Solar installations also invariably involve joint efforts by local villagers who get involved digging foundations for the ground-mounted solar arrays, however Its Time engages qualified electricians employed by Suva-based CBS Power Solutions for all technical operations.

"Of course, local knowledge is vital, as is the triangular relationship built between the school, CBS and Its Time for future system maintenance," Rob explained.

"Even when we secure hoped for big funding for projects I'd retain that model of engaging the village community. Locals gain immense pride in ownership of the system installations. They really appreciate what we can do and that they can be a contributor is disproportionately cool.

"We are all great mates by the end of the project. It is gold."

The work is underpinned thanks to the generous support of equipment and financial supporters (iitime.org/supporters).

A group of CWP Global shareholders brought together by Michael Vawser was the lead sponsor of the recent Banaban School project.

Great potential

The delivery systems, local and international relationships are sound and enduring, the model well honed, but there's the ongoing and often demoralising challenge of fund raising, especially when it comes to meeting the costs of maintenance and repairs on existing systems.

Its Time is pinning hopes on the generous support of business partners and the proceeds of a raffle for an all-expenses five-night stay at a luxe Fijian resort to fund more systems.

"But there will be a point where I say we don't have the funding structure in place to properly scale and that will be very frustrating given the number of schools in Fiji still running on diesel power or which have no power at all," Rob lamented.

160, to be precise.

"I'm at a stage now where Its Time operations need to scale up. It's a no brainer. We have a decade of history under our belt with all the relationships in place, all the resources too," Rob told *Smart Energy*.

"In each region we could transform five or ten schools, not just one or two at a time. Boost education levels and quality of life, provide kids with much greater opportunities. It's a 'just add money scenario'.

"Repeat that on all islands. It would be relatively easy to do."

Rob is appealing to the federal government ministers who are leading Australia's efforts and objectives in the Pacific to contribute to the schools' transformation.

The message, he says, is compelling: Kids. Education. Emissions Reduction. Pacific Islands.

Updating the energy systems of all the remote schools in Fiji to be powered by solar PV would not be too expensive. The money and carbon emissions saved by ditching diesel is a bonus on top of giving generations of kids the fair chance of a modern education like their urban peers, Rob said.

"It's great story for Australia-Pacific relations and at a critical time in world history."

He'll keep pressing government to recognise the merits of building solar systems on schools in the Pacific to replace climate wrecking fossil fuel diesel generators that are at odds with Islanders' aspirations, Australia's too.

But no time to dwell.

Thanks to lead financial sponsor Clenergy and other supporters another noisy generator will be silenced in September when Its Time undertakes its biggest project to date: an 18kW system at a school on the Fiji island of Taveuni housing 800 students.

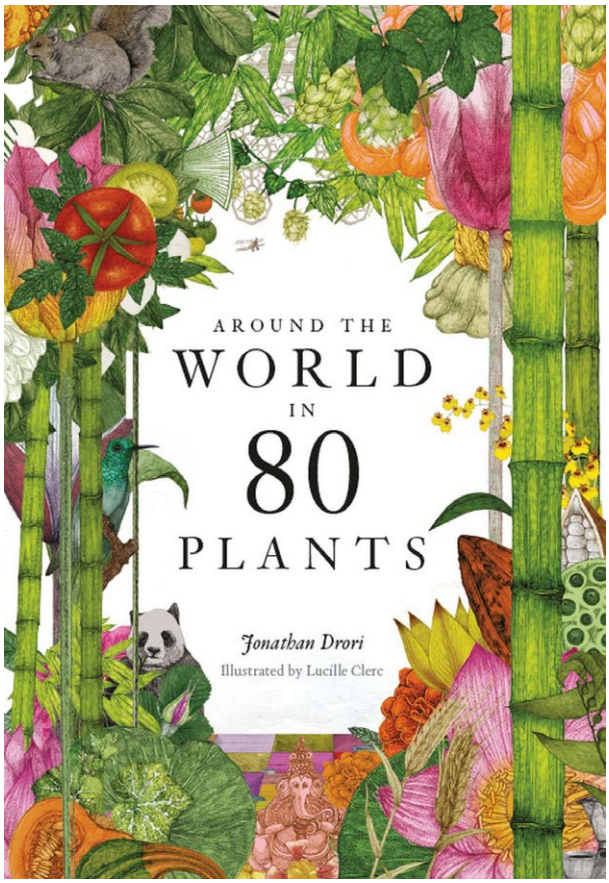
www.iitime.org

PRESERVATION OF PLANET EARTH

All things blooming wonderful

Anyone with even the slightest appreciation of the wondrous world of flora with all its colour and diversity might like to indulge themselves by picking up a copy of Jonathan Drori's quite remarkable and beautifully illustrated book *Around the World in 80 Plants.*

Readers will enjoy learning more about the fascinating origins of plants and all their uses across all walks of life. It's a feast for the eyes and the soul, and a reminder of what we stand to lose if we fail to rein in carbon emissions.



Ditching coal and planting renewables

The Blueprint Institute delved into the regional realities of Australia's shift to a clean energy future and concluded opportunities abound in Central Queensland, the Latrobe Valley of Victoria, the Central Coast of NSW and the Collie region of WA – regions that are home to all Australia's remaining coal-fired generators.

Analysis revealed that of the 10,000 jobs dependent on coal-fired power generation and 40,000 direct jobs tied to coal mining, within the next three to seven years these five regions offer renewable projects that could deliver 24,660 short-term jobs in construction and installation, and 2,600 permanent jobs in operations and maintenance.

That's 27,260 jobs in all, and one significant opportunity.

It's also a stark reality check that government must do more to enable wider regional economic diversification in these communities, says Blueprint CEO David Cross.

"Our analysis finds that all of the regions studied are full of untapped potential that the clean energy economy, broad diversification, private investment, and targeted government backing in vital areas can unlock," he said. "Coal's demise is imminent."

www.blueprintinstitute.org.au

IN A SIMILAR VEIN calculations undertaken in the US by the University of Michigan School for Environment and Sustainability unearthed the fact that local renewable energy employment can fully replace US coal jobs nationwide.

In 2019 coal-fired electricity generation directly employed nearly 80,000 workers at more than 250 plants in 43 US states.

The UM study finds local wind and solar jobs can fill the electricity generation and employment gap, even if it's required that all the new jobs are located within 80 kilometres of each retiring coal plant.

Keeping employment local would increase the costs of replacing US coal-plant workers by US$83 billion, or 24 per cent, nationwide, according to the study.

"These costs are significant in isolation but are small relative to annual US power investments of $70 billion and to the total costs of transitioning the US energy system away from fossil fuels, which have been estimated to be as high as $900 billion by 2030," said lead author Michael Craig

Snail's pace for storage

Australia will take 250 years to be fully reliant on renewable energy based on the current rate of battery take-up, according to Planet Ark Power CEO and Co-Founder of eleXsys Energy, Dr Bevan Holcombe (pictured). With the battery era still in its infancy it would need a dramatic escalation if Australia was to reach the point of not relying on coal-fired power stations.

"But nearly all the batteries being introduced today are for grid stability purposes and not for storing energy created from renewable sources," he said.

"What I'm talking about is a battery era where all our non-solar hours and non-wind hours are supplied from batteries, which will be very different to how we're using batteries today."

Australia currently uses about 250GWh of energy daily with around 40-60 per cent of this coming from renewables.

"That means we would need about 250GWh of battery power outside of solar and wind hours to be fully renewable. In 2021, the amount of new battery storage installed across Australia topped 1GWh for the first time, which means at that rate it would take about 250 years to reach 250GWh.

"We have a huge job in front of us. We've got to build factories to manufacture batteries, we've got to get them in the right places and we've got to use them for renewable energy storage.

"My fear is that we're not going to make net-zero by 2050 – less than 30 years away."

GO FOR IT! In related news, Australian-developed clean energy solution eleXsys which "turns today's legacy one-way grids into two-way smart grids without the need to spend billions of dollars on infrastructure and equipment upgrades" has been nominated for the 2022 Earthshot Prize. Launched by Prince William and The Royal Foundation two years ago, the Earthshot Prize represents a worldwide search for the most extraordinary eco-solutions for the planet.

The *Smart Energy* team wishes Dr Holcombe all the best in securing the prestigious prize.

Capping global warming at 1.5°C

In a new open-access book, scientists at UTS detail how a carbon budget can be apportioned across 12 key industry sectors including steel, cement, aviation, road transport and buildings.

With a foreword by UN Climate ambassador Nigel Topping, *Achieving the Paris Climate Agreement Goals Part 2: Science-based Target Setting for the Finance industry – Net-Zero Sectoral 1.5°C Pathways for Real Economy Sectors* (Springer Nature, 2022) presents emission reduction targets in five-year steps from 2025 to 2050.

Pathways were originally developed using the OneEarth Climate Model devised by UTS researchers in 2019 to support the United Nations Principles for Responsible Investment initiative by providing sustainability guidance for the global finance industry.

Associate Professor Dr Sven Teske (pictured), lead author and editor of the book, said "We are dedicated to make a difference and to provide a solid scientific pathway out of the climate catastrophe to limit global warming to +1.5°C in line with the Paris Climate Agreement. The support of global finance institutions during our research was overwhelming and encouraging.

"The transition to a global decarbonised economy is within technical reach, it is economic and we do have access to over 90 per cent of the technologies already. All we need is the support of governments – the finance industry clearly showed its commitment to shift investments.

"Our message in this book is clear: We can limit global warming to 1.5°C with the technology pathways we describe – I would call it an action plan to save the future of our children."

IMAGE: ANDY ROBERTS

Sensational solar skin: Is this the build of the future?

In what's deemed an Australian first, an eight-storey $40m building in West Melbourne will be covered by 1,182 solar panels that will generate about half the building's electricity and become carbon-neutral after a few years, eliminating 70 tonnes of carbon dioxide emissions each year.

The thin-film PV module 'Skala' system is manufactured by German company Avancis and is touted as capable of producing 50 times the energy of the average rooftop PV system used in residential housing. When complete, the system will supply almost enough power to cover the building's energy needs. With the addition of extra panels on the roof, the building is expected to have almost no ongoing power costs

Buildings currently account for around 40 per cent of annual CO_2 emissions.

Building architect Pete Kennon commented "We did not invent the product but we've invented the way it can come to our country, and our country is such an enormous market because of the access to sunlight.

"I can't believe it hasn't been done already."

Solar panel recovery and reuse

Solar Recovery Corporation is establishing recovery centres across Australia where materials from end-of life-solar panels can be recovered and reused.

According to Solar Recovery Corp chief executive Rob Gell (pictured) the end-of-life solar panel recovery industry is set to grow into one of the country's biggest industries.

"Like all manufactured goods, solar panels provide us with a particular problem. Energy is required to manufacture them and the metals and materials used in their manufacture can be a problem if they're not managed properly at end-of-life."

Solar panels contain materials including lead and cadmium that in landfill can leach into the ground contaminating both soil and groundwater. Other materials such as silicon take up to 500 years to break down.

"Some states have banned all e-waste, including solar panels from landfill, but by 2030 millions of solar panels could end up in landfill unless we have universal legislation and programs to manage the valuable materials in them. In our efforts to generate sustainable energy, we have potentially caused another massive headache," Gell said.

Solar Recovery Corporation is currently accepting end-of-life solar panels in Townsville and Biloela in Queensland.

www.srcorp.com.au

Designed to empower.

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GEN24

The Fronius GEN24 provides you with many of the advantages of generating your own energy. With “Fronius UP”, your PV system becomes even more flexible. That’s because you can turn via software update the Fronius GEN24 into our Fronius GEN24 Plus hybrid inverter with all its functions and advantages – from the connection of a battery storage system to the “Full Backup” emergency power function. **Fronius GEN24. Designed to empower**.

www.fronius.com.au/gen24

THE EYES AND RISE OF GENERATION Z

Lifestyles created and enjoyed by baby boomers have delivered a heavy carbon footprint and problems for future generations to endure and to ameliorate. That includes the likes of renewables intern ***Mitchell Stephens*** *who is in his final semester of a Bachelor of Renewable Energy Engineering degree at the University of Newcastle. He's determined to make a difference. Here Mitchell shares his views on the industry of today and tomorrow.*

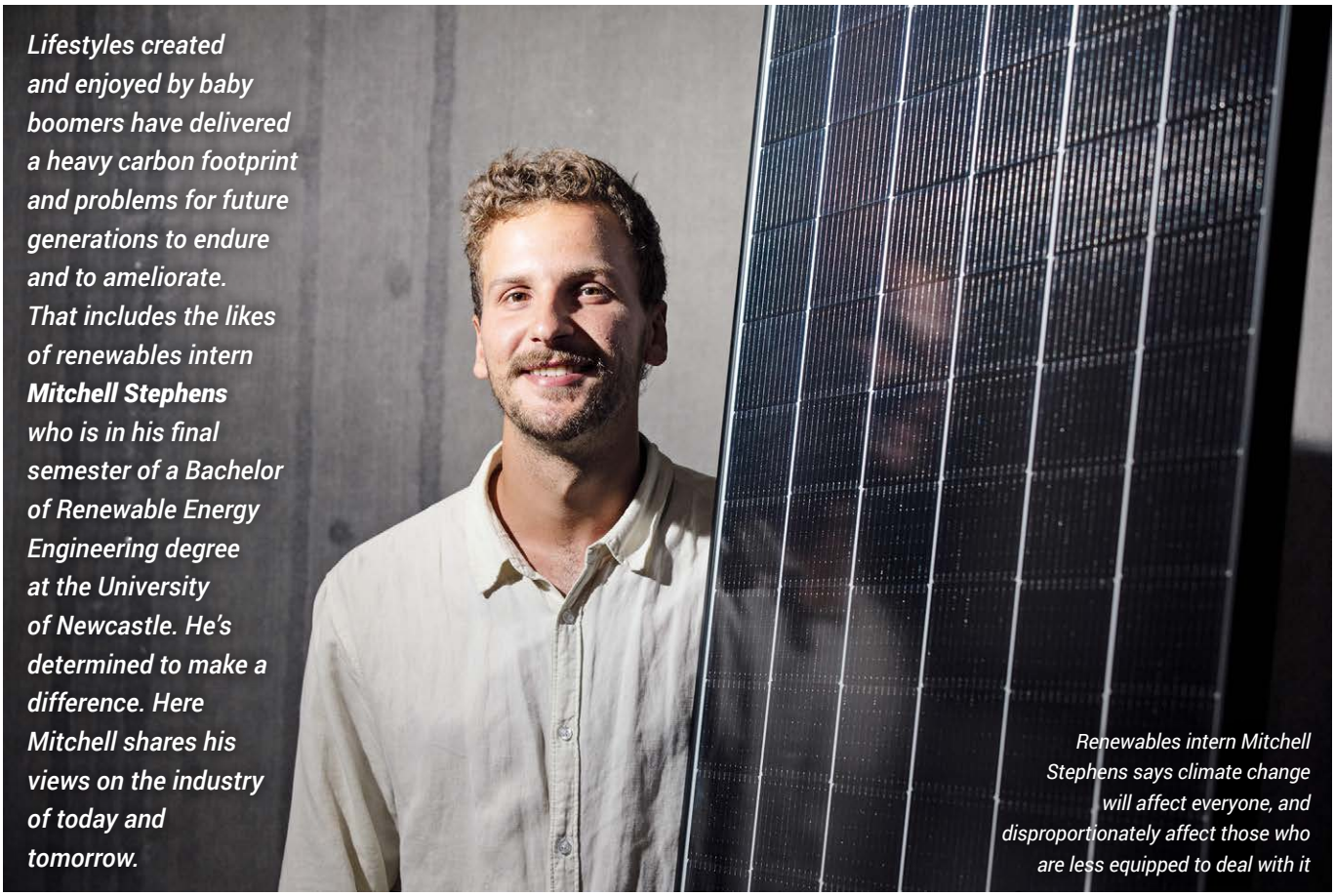

IMAGE: PETER STOOP OF NEWCASTLE WEEKLY

Renewables intern Mitchell Stephens says climate change will affect everyone, and disproportionately affect those who are less equipped to deal with it

SMART ENERGY: What is the current focus of your academic studies?

My degree is a hybrid of electrical and chemical engineering. I am currently writing two theses: a group design thesis detailing how to create a green hydrogen export hub in the Hunter region and an individual thesis which is a techno-economic analysis/feasibility report on using green hydrogen as a fuel for peaking plants.

SE: How has your academic grounding helped in your career?

My academic journey has been incredibly informative for me; without that grounding my prospects of being involved in the field of renewable energy would have been rather limited.

My academic record and drive to work landed me my first job in the industry at earthconnect following the first application I sent out, which was flattering to say the least!

My role as an engineering intern has been quite interesting. I am working with an incredible team to deliver some impressive, and record-breaking, projects.

SE: Tell us more

The first project I was ever involved in at earthconnect and in the renewables industry was the installation of the largest rooftop solar system in Australia; a 10MW solar PV system in Oberon NSW.

To go from working in a kitchen, a café and a pub on the weekends while studying to working on a project of that scale can be intimidating!

But I've found that asking the right questions can get you a long way when you are surrounded by good people. I have picked up many skills during my degree, but so far what has helped me the most in the workplace is effective communication.

SE: Have your fellow students or graduates also managed to secure interesting roles in renewables?

Yes, a majority of those in my cohort who applied for work in renewables landed roles quite easily. I believe it is a great time to be a newcomer to the industry, given that there are opportunities for work everywhere [but] whether the jobs are fulfilling depends on the workplace as much as the role.

People coming straight out of university tend to accept any conditions just to gain the experience to get the role they are chasing, but with the skilled worker shortage I don't think graduates should sell themselves short on their workplace expectations.

There are new, innovative ideas everywhere and I think it is important for people in my position to put their hands up for whatever role they desire, despite the imposter syndrome we all feel when going after roles we want.

So much of the sector is new, so it makes sense to include fresh minds as much as possible.

SE: What are your views on the trajectory of smart, renewable energy?

Energy supply is a fundamental need as well as a right and renewables present the cheapest and cleanest source of it.

I believe that we are finally on the right track to see some positive change in the industry, and I hope we can reach our decarbonisation targets as soon as possible. I think it is reasonable to be bullish on the industry at this point in time!

SE: How might we hasten decarbonisation?

I would imagine some suggestions would be to reintroduce some mechanism for emissions pricing, which will be done as border adjustments for exports regardless, and electricity transmission upgrades.

The best advice for a political leader would be to listen to industry experts. We have a good idea of what we need to move the decarbonisation of the grid along already, and we could use some government assistance.

SE: What elements of the industry do you find frustrating, and conversely the most uplifting?

It has been extremely disheartening to have watched the previous government's inaction regarding the climate, however it is an enormous relief to finally have a [carbon emissions and renewables] target.

It may not be the perfect target but it represents significant progress; the target will go a long way in solidifying investor confidence in the Australian setting.

"My goal, and the reason I chose to study renewable energy engineering, is to help mitigate the effects of climate change."

We could do a lot more to match the targets of some of our international partners, but Australia will get there eventually.

SE: In three decades the energy mix will…?

…be unrecognisable from the current mix. I would hope that our transmission network has been completely overhauled, or upgraded beyond recognition, to allow for a decentralised mix. Ideally, every household will be generating energy via rooftop solar and have ample storage; be it household batteries and/or EVs.

SE: Your dream job?

I feel that it will present itself to me. There are so many brilliant people working in the renewable energy industry, and I'll learn what I can from them, and I know that will get me wherever I need to be.

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Contact Positive Quality™ Manager Alistair McGrath-Kerr on 0499 345 013, email alistair@smartenergy.org.au or visit www.smartenergy.org.au

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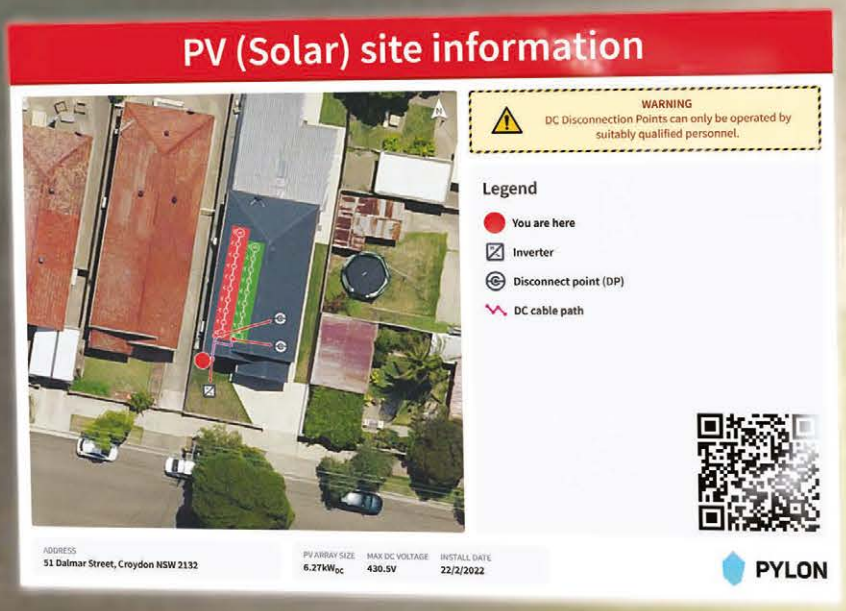

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