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Industry Insights

this issue

Construction Advisor

Welcome to the Monthly

Construction Advisor is pleased to welcome you to our new monthly newsletter – Industry Insights. Bringing you all of the latest industry news, project announcements and data to help you to plan and build your business.

COVID19 Restrictions in Victoria: Phase 2/3

- No worker number restrictions on site.
- High-Risk COVIDSafe Plan required for all sites.
- Physical distancing on all sites required.
- COVID Marshal recommended.
- Temperature testing on major site entry is compulsory.
- Mandatory site testing if a positive case is identified.
- Site inductions to be carried out outside.
- Stagger workshifts to avoid cross-over.

It is not over. COVID19 is still in our community whether testing is finding it or not. We all need to adhere to basic personal safety and sanitation. Wear a mask, wash hands and socially distance.

The Energy Issue.

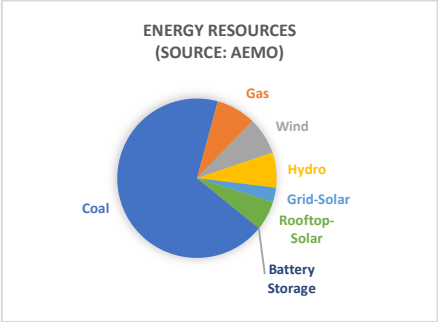
Construction, Energy and Resources go hand-in-hand. As the Federal Government Budget puts its faith in gas as its preferred interim power generation medium, we take a look at the state of energy production in Australia. Where are we now, where are we going and what does it mean for the construction industry?

First, some basics, the Australian energy market is divided by the states and territories that are involved in the National Electricity Market (NEM) and those who aren't (WA & NT). The NEM is a wholesale spot-market that was established in 1998 trading over $16bn in energy contracts and supplying 200 terawatt hours per annum. The WA equivalent is the Wholesale Electricity Market (WEM). Sitting above these is the Australian Energy Market Operator (AEMO).

Talking about electricity can be confusing – terawatts, megawatts, kilowatts, per-hour, per year. Put simply, Australia currently requires 229bn kWh of electricity per annum, we produce around 243bn kWh. Basically, we produce enough electricity for what we need. The next questions is how are we producing it?

Australia has invested heavily in renewable electricity generation but remains reliant on coal. This varies significantly between regions as does the renewable resources: Tasmania is strong on hydro, Victoria has a mix of wind and solar, NSW has a mix which also includes the massive Snowy Hydro, Queensland has significant solar generation and SA has significant Wind and battery resources.

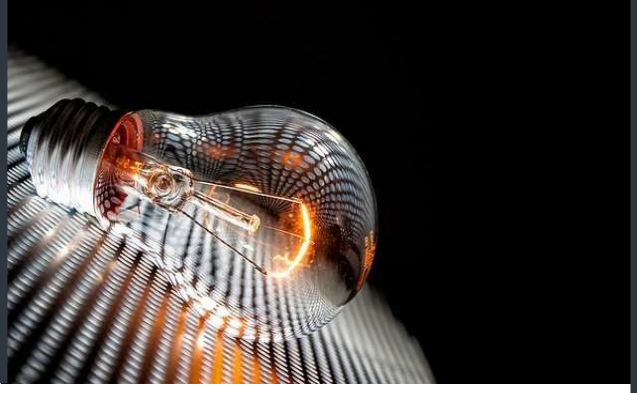
This article is far too short to delve into the philosophical and cultural detail of coal versus renewables, but we do seek to map out the transition as it currently stands. Many coal-fired generators have already been shutdown such as those in the LaTrobe Valley in Victoria and Alcoa on the South Coast. Whilst major renewable projects in wind and solar have already been delivered the industry has faced many headwinds in integrating new generation to the grid and replacing base-load power.



Part of the solution has been to invest in industrial-scale battery solutions such as the 100MW Tesla battery in South Australia and the recently announced 300MW battery plant in Victoria.

Currently (as at Sept 2020) there are 91 projects in the construction phase expected to deliver $19bn in capital costs and 10,531MW of capacity nationally. The majority of this activity is in VIC and NSW which each are delivering roughly 3000MW and $5bn. The technology split of these projects according to the clean energy council is approx. 50% wind and 50% solar (excludes hydro). The Snowy Hydro 2.0 scheme will add 2000MW to the NEM at a cost of $5bn with major works expected to get underway in early 2021.

According to Rystad Energy, this investment means that Solar Photovoltaic and Wind generation are on track to overtake traditional Coal and Gas generation from 2026 onwards.



Before everyone jumps on the "stop mining, go green" bandwagon, let's just clarify. Wind turbines require copper, aluminium, steel and fibreglass. Solar panels require aluminium, copper and silicon. The mining industry is responsible for delivering the components required to 'go-green' and will do for the future. Some minerals such as coal may have reached 'peak' in terms of global use, but we are a long way from just flicking the switch on this resource. The broader energy grid and infrastructure will need to adapt to these new sources through the use of batteries in order to satisfy the needs and demands of the populace in terms of both base-load power requirements and surge requirements.

So far, our discussion has been primarily focussed on electricity generation, however, an energy discussion must include consideration of our petroleum and distillate needs as a nation. As we go to print, BP has announced that its refinery in Kwinana (WA) will be converted into an energy hub – including an import facility. This leaves just 3 operational refineries in Australia – all on the East coast.

The march of the electric vehicle may be strong but Australia does have unique needs in terms of covering vast distances which frankly, electric vehicle technology is currently incapable of covering. Moreover, the loss of another refinery must be considered in the frame of national security. In the sad and unlikely eventuality of another major global conflict, fuel supplies are essential for the military machinery that we deploy. Also a lack of domestic refining capability leaves us at the mercy of foreign influence. Short memories mean that many in today's Australia have no idea of what it meant to line up with jerry-cans during the fuel crisis in the 1980s on the back of the Iran/Iraq conflict.

So, let's bring this back to construction…

Energy Infrastructure is a mixed bag for the construction industry. Some projects such as pipelines and power plants provide significant jobs and capital. Alternately, a lot of gas infrastructure and renewable projects are highly capital intensive due to the components but offer less in terms of jobs and local manufacturing opportunities.

For those not keeping close tabs on the sector, renewables in general faced a rough 2019. This was largely on the back of the bankruptcy of contractor RCR Tomlinson (in late 2018) after a number of major project delays led to the company's collapse. In simple terms, the contractor had a large number of solar projects that were delayed in their connection to the grid, this led to contract breaches and liquidated damages. Without going in to the detail, this preceded a 6 month reset of the industry as it absorbed the news and its commercial implications going forward.

Where does the future lie in energy construction then? Politics aside, the renewables march is now inevitable – particularly in Australia. The Federal Government has committed to using gas-powered power stations as an interim solution as ageing coal-fired stations reach the end of their useful-life.

Investment in wind, solar and hydro is already on a strong pathway to continue taking over from traditional energy generation. Victoria has a strong pipeline in solar focused in the western part of the state and is actively exploring off-shore wind opportunities along with the flagged 300MW battery facility. NSW and QLD both have significant development plans for renewables, particularly in the respective western parts of the States whilst SA has possibly the greatest opportunities in wind technology on the Eyre Peninsula.

Projects worth keeping an eye on include: the Western Port Hydrogen Plant (Victoria), Cribb Point LNG Terminal (Victoria), 300MW Battery Facility (near Geelong Victoria). Finally, the 10,000MW wind/solar export proposal (AREH) which plans to build a mega-power-project in the Pilbara which supports both the local mining industry and exports power to Asia.

Alternatives for used panel disposal – Overcoming the solar e-waste problem in the years to come.

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In recent years, the solar photovoltaic (PV) panel industry has boomed. They have the ability to generate reliable clean power, however, solar panels do not last forever. According to most manufacturers, the typical operational life of a solar panel is 25 years.

As the world embraces PV as a green technology, they have the potential to become a large electronic waste ("e-waste") problem in the years to come. By 2050 an estimated 900,000 tons of solar panels waste is predicted to exist in Australia alone, with a worldwide figure of 60 million tons. At the moment there are no laws to regulate PV waste. So what possibilities are there to tackle this problem? Is recycling the only way forward? This article discusses the possible ways to tackle this problem.

Recycling Solar Panels

Recycling of PV panels is considered one of the best solutions to prevent them from ending up in landfill. Unfortunately today, landfill is their most common destination, despite their high recyclability. This is not sustainable, as they contain a few toxic elements. Generally, glass is a major contributor (75%) to the total weight of PV modules and the rest includes polymer, aluminium, silicon, copper, and little amounts of tin, silver, and lead.

Material	% cont to weight of panel
Glass	75%
Polymer	10%
Aluminium	8%
Silicon	5%
Copper	1%
Silver,Tin & Lead	1%

While almost 90% of glass and silicon can be reused for producing new panels, elements like lead and tin can cause environmental and health issues if they leak into groundwater and soil, making the landfill option risky. In Australia, Reclaim PV is the only dedicated photovoltaic recycler and claims to be able to recycle 90% of the materials in a Solar Panel.

A stripped solar panel does not have much value. All those components and elements add up to a total of just over $8. The breakdown of value can be seen in Table N°2

Material	Value (AUD)
Glass	$0.40
Polymer	$0.09
Aluminium	$0.21
Silicon	$6.40
Copper	$0.85
Silver,Tin & Lead	$0.20

The energy that goes into recycling costs more than the PV panel scrap value. Therefore, recyclers end up charging the customer for recycling their panels ($30 per panel). As the value recovered from those parts won't pay for the cost of recycling, some government incentives are needed. If not, a more energy-efficient recycling process should be an important point of study in the coming years.

Moreover, the energy used to transport PV panels to the recycling facility, then powering the recycling process may be sourced from burning fossil fuels. This could turn the recycling alternative into a non-sustainable option if the newly produced PV panel cannot offset the carbon footprint that was generated to recycle and manufacture it in the first place.

A possible solution could be powering the recycling plant and transportation using clean energy. In France, the energy for powering the PV recycling plant predominantly comes from nuclear and renewable energy. Germany employed biogas powered trucks for collecting garbage to displace fossil fuel consumption for transportation. Following these sustainable ways will make the recycling process a better option.

Resale Market of PV panels

According to many manufacturers warranties, a PV panel should still produce 90% of its original rated power output on its tenth birthday, and 80% when it reaches the end of its 25 year lifetime. In reality for the majority of PV panels out there, a mere 8% drop in efficiency has been observed by the end of 25 years. In addition, good quality PV panels would work for up to 40 years with reduced power capacity.

This gives the resale of PV panels a good prospect. Historically, the demand for used PV panels is low.

One of the main reasons for this is the solar rebates (STCs) offered by the Australian government are not applicable when installing used panels. Thankfully in recent years, there has been a slight increase in demand for used PV panels, especially for those which are less than 10 years old. Online marketplaces like EnergyBin and Pvxchange are some of the best options when considering the resale or purchase of used PV panels. Let us review these two options now.

EnergyBin is an American based wholesale business-to-business solar exchange platform, where people can buy and sell used PV panels. Access to this marketplace is done via a monthly subscription. According to EnergyBin, 2020 has been a good year for used PV panels, with one member (Jay's Energy), selling 25MW worth of used PV panels. The buyers are looking for panels with an age of 10 years or less and at least 50% to 75% of price reduction, compared to new modules.

Pvxchange is a German-based company with a marketplace for worldwide distribution of PV components. It is considered the world's biggest brokerage platform for solar modules and PV components, with more than 10,000 registered users.

Donating Panels for Charity

If the panel performance is low after many years of usage they may not be suitable for trading on marketplaces like those discussed above. So what then? An estimated 50,000 still-functioning PV panels end up in landfill every day. Instead of throwing them for scrap or sending it to recycling facilities, donating them to charity projects is an interesting option to consider. Organisations such as GoodSun will use these modules to light up schools, hospitals, orphanages, and homes of poor and needy communities.

940 million people worldwide still don't have access to electricity. So Installing these donated PV panels in indigenous and rural communities have the potential to change lives. Imagine a world where everyone has access to clean energy, this sort of work can be a small but important step in realising this vision.

Solar PPAs and Panels Disposal

Energy Terrain is committed to seeing a world powered by renewable energy. We want to see sustainability as the underlying thread of everything we do. Solar Power Purchase Agreements (Solar PPAs) can be a pathway for the responsible disposal of used panels. Through a Solar PPA, Energy Terrain owns the solar system on the roof of businesses and sells the energy at very competitive rates. Our company can handle the final destination of modules, letting businesses focus on their core activities and know that they are part of a greater vision for a sustainable world for generations to come.

ENERGY TERRAIN

Energy Terrain creates value by providing quality solar generation infrastructure at no cost to commercial entities, supporting businesses and commercial landlords to accelerate their adoption of rooftop solar energy into their products and services, and to lower their electricity costs.

We understand how important quality and reliability is to our clients. Our brand promise is to ensure that everything we offer is of the highest quality available, affordable and reliable. Our reputation depends on it. Importantly we install, own, monitor and fully maintain the installed infrastructure, leaving our customers to focus on their business, and their customers.

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Those who fail to learn from history are condemned to repeat it.

Those famous words were given to us by Winston Churchill in 1948 and are as relevant today as they ever were. Water, gold, food, coal, oil… resources have been the cause of conflict and war as long as civilizations have existed. If the past few years have taught us anything it is that these tensions are still very real.

Even as the modern world slowly transitions away from fossil fuels, old tensions and conflicts remain. Both the USA and Russia are probing Artic waters for fossil fuels and other riches whilst China aggressively seeks control over the South China Sea for new fisheries and other resources. Many still believe that the western conflicts in Iraq of the last couple of decades were largely driven by concerns about oil supply. Despite modern niceties and diplomacy, global ambition remains remarkably primal – under the guise of 'national interest' politicians of all colours and shapes still seek to expand national reach and control. Before anyone shakes their heads at 'the sins of strangers', Australia is not immune with our behavior in the Timor Sea gas negotiations seriously questionable.

Even recent activity in the Middle East has echoes of history. Modern day pirates of Somalia, Yemen or Ethiopia now hound oil and gas tankers along with cargo ships. 200 years ago, pirates of Algiers and Tripoli did exactly the same only then it was grains and cotton. Indeed, those Barbary Wars led to the creation of the US Navy which now sails against these modern pirates in nearby waters.

Why do nation-states still seek control of fossil-fuel resources if it is being phased out domestically? The short answer is that, like it or not, most foreign policies are developed with input from respective militaries and the war machines of today are not that different from the war machines of yester-year. No-one is shouting from the rooftops about the latest 'solar-powered battleship' or 'electric tank'. Those weapons are still powered by oil (with some nuclear exceptions). This means that strategically, countries with armed forces to maintain are still seriously concerned about securing lines-of-supply for oil and refining facilities that are strategically defendable.

Returning to our earlier point about national interest and expansionism, the simple fact is that the 'new' energy resources of today cannot be 'taken'. Gold, grain, oil, gas even iron ore can be extracted and shipped away. The sun, wind and water are where they are. True, energy can still be shipped (via batteries) or transmitted (via cable) but the economics of this are not the same as plundering resources in the way that the Spaniards did to South America. This means that any energy-war of the future would have to be based on geographic retention.

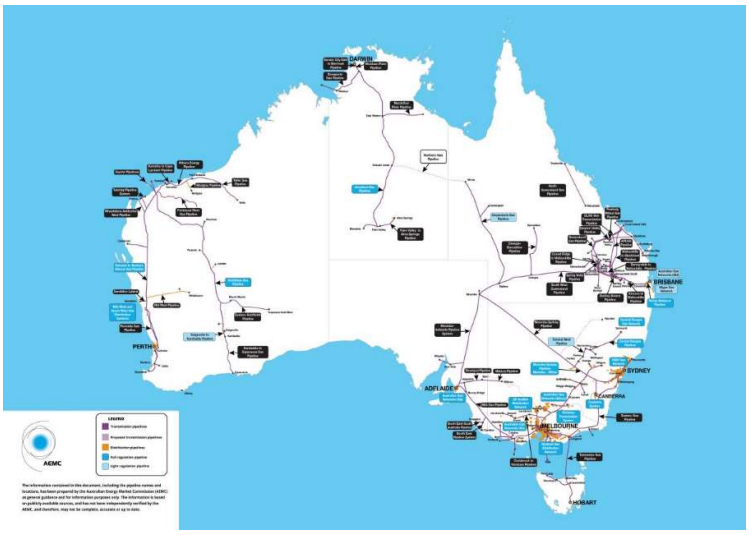
At this point, you would be fair to be questioning why a construction publication focused on energy and resources would be talking about oil/warfare and global politics… quite rightly so. This is not an indulgence but a serious question about what this means for construction in this sector.

The closure of the BP refinery in Kwinana (WA) leaves Australia with three operational refineries, two of which are under review (Geelong and Brisbane). To put this in context in 1999 Australia had eight fully functioning refineries nationally. The closure will take Australia's domestic production capacity from 27.6bn litres p.a. down to 19bn lpa. This closure will make Australia reliant on imports for over 50% of its transport fuel needs.

Australia is blessed with abundant gas reserves, over 70 trillion cubic feet of proven deposits are in its territories. This is equivalent to over 40x its annual domestic needs. As of mid-2020 Australia is now the worlds largest exporter of LNG after overtaking Qatar. Where petroleum refining has dwindled, the country now has ten LNG production terminals – 5 in WA, 2 in NT and 3 in QLD. Herein lies the odd contrast, as we export more and more LNG to the world, the domestic market is undersupplied, and prices are strangely high by international benchmarks. So instead of LNG becoming the replacement (albeit interim) for reducing coal power generation, domestic markets are having to look to renewables to shore up supply.

In 2019, renewable energy achieved 21% of the national energy generation market – 5744 GWh. At the current growth rate, renewables will overtake coal in approx. 10 years however this is subject to a number of other factors such as a shift towards gas generation. To our earlier discussion, this trend towards climate based power reserves actually improves and strengthens the nations energy security from foreign factors be they conflict or trade disputes. The threat now becomes a changing climate – the wind will continue to blow but increasing severe storm activity could damage solar infrastructure and long-term droughts threaten hydro supplies.

Moving Gas – Australia's Pipeline Network



Source: Australian Energy Market Commission

As we've noted in earlier articles, Australia is rich in natural gas resources. Proven gas-fields exist both on-shore and offshore. Major reserves exist off NW and West WA, around Victoria in Bass Straight and inland Queensland and South Australia. The next step is delivering this gas to either domestic markets or export terminals for shipping. This is where Australia's vast network of gas pipelines comes into play.

Transmission pipelines (not to be confused with distribution pipelines used to deliver gas to domestic customers) are typically >300mm and carry pressurized gas from the production facility to its destination. The gas is kept under pressure using compressor stations dotted along the pipeline.

Australia's transmission lines run for over 38,000km and unlike many North American, Asian and European infrastructure are almost entirely subterranean (buried). There are a number of reasons for this but primarily it is a safety design and also protects the assets from the harsh Australian weather.

It is worth noting that at this point we are talking about natural gas, not LNG, this is the process taken prior to shipping and export. Where natural gas is to be shipped, it is sent to a Liquified Natural Gas processing facility. The gas is cooled to minus 161 degrees Celsius reducing its volume by up to 600 times. At this point the LNG is piped onto shipping tankers in its liquid form. At its destination the LNG is regasified before being fed into its next distribution network.

In 2020 with billions of dollars in post-pandemic infrastructure grants up for grabs, a long running proposal has resurfaced – the East-West pipeline. The proposal is simple, build a pipeline from North-West WA to pump gas into the East Coast domestic market. In theory this would bring down the cost of domestic gas with a significant increase in supply. The project would cost upwards of $5bn and take many years to complete.

So far, so good, but not everyone is on board with the project. For many, it appears to be a quick way to address rising electricity costs in domestic markets. Other proponents see it as a way to open up further resource development in remote areas such as the Kimberley and Fitzroy River regions which would otherwise be unfeasible.

Opponents have equally compelling arguments however. Alongside the cost of the project, many view gas as a short-term 'interim' power technology that, whilst better than coal, remains a major pollutant compared with renewable power generation. Their position is that this represents a $5bn white elephant that won't even be required in 10 years time. Additionally, it must be recognised that this pipeline, regardless of its final proposed route, will be traversing some of the harshest and most remote land on the planet, not to mention some preciously protected natural areas.

We don't have the answer.

Keeping up with the latest news? This is what you should have seen on Constructionadvisor.com.au

- ADCO gets underway on $33m Brookvale Centre of Excellence — block editor
- New generation Mercedes-Benz trucks come without wing mirrors — block editor
- Plenary gets the chequered flag on $1.5Bn project — block editor
- $1Bn Olive Downs given the green light
- A familiar sight is missing from the US urban skyline
- Australia's first lithium-ion battery factory to be built in NSW
- Australian Construction Industry Charter launched for Industry reform
- Autodesk launches BuildingConnected in ANZ
- BMD Picks Up Another $163m Piece of the Bruce
- CIMIC Sells Down 50% Stake in Thiess
- Construction Advisor is a proud supporter of NAIDOC Week
- Decmil notches up $41m win at Iron Bridge
- Decmil turns the first sod at Albany
- Easy Come, Easy Go, CIMIC To Write-Down almost $1bn
- Fatal Construction Incident At Curtin University
- First 6 Star Green Star rating awarded to CBus property in Brisbane
- Giant airbags trial for the protection of roadside workers
- Have you heard of 'hear-through" technology?
- Holding back the tide in Venice
- How the Coronavirus will continue to affect the US Construction Industry in 2021
- Humans are not the only things veggies are good for
- Industry on notice in scaffolding blitz
- Melbourne workers may get the Melbourne Cup off, but at JCB, holidays start on Christmas Eve
- More and more women are building careers in Construction
- National Institute for Artificial Intelligence in Construction
- New Infrastructure technology – 'Gamechangers' awarded by the American Society of Civil Engineers
- New Safety Marketplace Launches in Australia
- Perth Refinery to be shut down
- Plastic bottles recycled to build Australia's infrastructure
- Road repair enters the robotic market
- Road technology going slow in the fast lane
- Robotic arm improves safety when working in tunnels
- Seymour Whyte Locks Away Package C on the Pacific
- Submissions open for review of dangerous goods act
- Suspension trauma can be a thing of the past
- Tenders now open for $150m Walkerston Bypass
- The Art of Building photography competition returns for 2020
- The heat is on
- Training funds provided to support UK's Green Home scheme
- Trialling sustainable cement in Sydney
- Victorian State Government implements new procurement approach to aid local companies
- Virgin Hyperloop Certification Centre to be built in West Virginia
- Warming up to rubber roads
- What's it like inside a 6 star Green building?
- Wooden wind towers trialled in Sweden

World Quality Day online conference announced