

New Energy Quarterly: Energy Security

SPRING 2022



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Editorial

On 15 June 2022, AEMO published a 'Declaration of Market Suspension' suspending the spot market from 2:05PM until further notice in NSW, QLD, SA, TAS and VIC. Lasting until 22 June 2022, the suspension brought the energy crisis to Australia's front door, suggesting the nation may not be as insulated from the price fluctuations and supply scarcity impacting international markets.

While the National Energy Market (**NEM**) has returned to normal operation, energy prices remain at historically high levels. In fact, some large energy consumers, like South Australian manufacturers InterCast and Forge, were forced to shut down and lay off staff in response to the market suspension. The suspension highlights a critical threat to Australia's energy future: Australia's current energy infrastructure is ill equipped to address the challenges and opportunities facing the modern energy landscape.

In particular, the market suspension laid bare the tremendous influence the fossil fuel lobby continues to exercise over Australia's energy markets. In the midst of the market suspension, industry observers noted that Australian consumers will bear the brunt of the price spikes as energy retailers pass on the costs while coal and gas generators will continue to reap the benefits of higher energy prices. This is not a new phenomenon. In 2021, almost \$100 million in compensation was paid to generators, a more than 50% increase on 2020's figures.

While extraordinary events like spot market suspensions have historically been rare, June's market suspension illustrates the necessity of diversifying Australia's energy supply with renewable technologies and removing the supply risks caused by continued reliance on coal and gas generators.

Already there are signs of a new sense of urgency among public and private entities to address this challenge. In October 2022, Queensland, the nation's most coal dependent state, pledged to shut down all of its coal fired power plants by 2035. Meanwhile Victoria has announced plans to fund battery storage projects that will allow the state to achieve its energy storage target of 6.3GW by 2035. On the private side, things are accelerating at an equally rapid pace. According to a report from PwC, Australian firms have allocated \$250 billion to finance more than 90 hydrogen fuel projects across the country. Trends in both public and private investment reflect a growing consensus that the nation's energy future lies not in Australia's monolithic fossil fuels industry, but in the dynamic application of renewable energy sources.

At Hamilton Locke, we are seeing this urgency play out in real time. In October 2022, the firm acted as lead counsel for the joint venture between international renewable investment firm Octopus Investments Australia and the Clean Energy Finance Corporation in the reverse auction of the Victorian Renewable Energy Target 2 (**VRET2**). The joint-venture was subsequently awarded a supply contract for the Fulham utility scale solar and DC coupled battery project in Gippsland, Victoria. This project will have a solar capacity of 80MW and will significantly contribute to Victoria's efforts to decarbonise and diversify its energy supply.

Collaborative ventures like VRET2 reflect the trajectory of Australia's renewable adoption. However, it is essential both the public and private sector seize the initiative to drive the nation's adoption of renewable energy. The global energy crisis makes it clear we need a diversification in energy production technologies. We need to remain open to considering new ways to manage demand, supply and transmission. We need a policy framework that provides for us to pay the way forward for upgrades in transmission required a NEM powered by renewables. In short, we need to ensure we have the economic and policy flexibility required to make renewable energy the future not only of Australia, but of the world.

This quarterly explores the ways in which we can make this a reality. In the following pages we discuss the importance of avoiding greenwashing and adhering to carbon reduction in ['It's not easy being green: The demand for environmentally friendly, sustainable and ethical Renewable Energy Projects'](#). In ['Offshore Hydrogen – Get Low, Low, Low'](#) we examine how placing offshore hydrogen production plants in coastal windfarms could make green hydrogen commercially competitive. We examine the challenges and opportunities created by the energy crisis for renewables in our [two-part expert insight](#) series with Mike Jefferies of Octopus Australia. And we take a close look at how new cybersecurity legislation will play a critical role in ensuring Australia is protected from continuing international headwinds in ['Optus Breach – What is Cyber Security for renewable energy generators?'](#)

Each of these articles examines not only the tools available to address the energy crisis, but the opportunities that will emerge in building a diversified, renewable energy system well beyond this quarter.

Watt's happened

Hamilton Locke advises Octopus Investments Australia and CEFC on Successful VRET2 Auction

► Hamilton Locke acted as lead counsel for the joint venture between Octopus Investments Australia (Octopus) and the Clean Energy Finance Corporation (CEFC) in the reverse auction of the Victorian Renewable Energy Target 2 (VRET2). On 7 October 2022, the Victorian Government announced that the joint venture has been awarded a supply contract for the Fulham utility scale solar and DC coupled battery project in Gippsland, Victoria.

► The project has the potential to contribute significantly to Victorian renewable electricity supply with a solar capacity of 80MWac and large scale storage of 116MWh. Construction of the project is set to begin in Q2/Q3 2023. The Fulham project is expected to be the first of many major projects in the Gippsland region by Octopus and the CEFC, supporting the energy transition of Gippsland over the coming years.

[View Post](#) [View Article](#)   

Hamilton Locke partnered with H2Q Hydrogen Queensland.

[View Post](#)

Hamilton Locke attended various Energy Conferences. See our 2022 Energy Conferences Round-up.

[View Article](#)

Hamilton Locke's Matt Baumgurtel and Adriaan van der Merwe spoke at the Carbon Capture Summit.

[View Article](#)



Alumnus Andrew Smith has joined one of the leading developers in Australia.

"The Hamilton Locke team has greatly contributed to my skill development and made me a better energy lawyer. I continue to value my relationships with the people at Hamilton Locke and look forward to seeing their practice grow."

– Andrew Smith



NEAN – New Energy Associates Network (N.E.A.N)

As the new energy sector continues to innovate and grow, it is more important than ever to create dialogue and foster relationships for those people early in their careers.

To encourage relationship-building and promote learning opportunities, the Hamilton Locke New Energy Team has created N.E.A.N. This networking-based quarterly event series will allow members to connect and learn from each other in a casual environment.

The series is targeted at all junior to mid-level professionals in the new energy sector, with each event focusing on a specific theme or topic and featuring a keynote speaker and networking drinks/light food.

Our inaugural N.E.A.N event took place on 3 November and featured a discussion with keynote speaker [Mike Jefferies](#) from [Octopus Investments Australia](#).

New Energy Bulletins



LTESA – Tenders for Long-Term Energy Service Agreements now open

[Read more](#)



Offshore Wind Zones for Australia

[Read more](#)

Watt's new at Hamilton Locke?



Hamilton Locke New Zealand is launched

[Read more](#)



Introducing our New Hamilton Locke Brand

[Read more](#)



Regulatory and Compliance Firm, The Fold Legal, Joins Hamilton Locke

[Read more](#)

New starters



Sophie Bradshaw
Partner



Leong Khoo
Special Counsel



Stephanie Patterson
Special Counsel



Matthew Lawson
Special Counsel



Verity Stone
Senior Associate



Clara Hagan
Senior Associate



Penelope Nicholls
Senior Associate



Georgina Buckley
Lawyer



Kallaya Bencharongkul
Lawyer



Katrina Zivkovic
Lawyer



Xiuxiu He
Lawyer



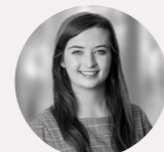
Janice Yew
Lawyer



Lucy Hallwright
Lawyer



Phillip Craig
Lawyer



Hayley Cummings
Associate
(foreign qualified)



Nele Bhebhe
Associate
(foreign qualified)



John McDonagh
Associate
(foreign qualified)



Annabelle Parmegiani
Graduate



Alexander Bird
Graduate



Freya Hine
Graduate



Adam Cajaglis
Graduate



Emily Jobling
Paralegal



Annabel Ryan
Paralegal

Watt's new in the Market?



[The actual total cost of the market suspension in June 2022 broken down.](#)



[Early coal closures opens path to 100 pct renewables.](#)



[The AER's interpretation of energy data during the market suspension that may be problematic.](#)



[What would happen if there is limitless green energy?](#)



[Hamilton Locke met Gelion who have just opened a new zinc-bromide battery manufacturing plant in NSW.](#)



[Scientists in the US are working on alternative storage technologies that are less reliant on lithium - Vanadium is the new buzz word.](#)



[The uptake of renewable powered crypto currency mines continue to gain momentum.](#)

Market Recognition

Announcing the finalists and winners of the 2022 Australian Growth Company Awards

[Read more](#)

Hamilton Locke Lawyers Rank in IFLR1000 Guide

[Read more](#)

Hamilton Locke Partners with Next Transition Group

[Read more](#)

AFR Continues to Recognise Hamilton Locke as Australia's Fastest-Growing Law Firm

[Read more](#)

Announcing the winners of the 2022 Technology Scale-up Awards

[Read more](#)

Nick Humphrey Features in Lawyers Weekly on Mental Health in the Legal Profession

[Read more](#)

Hamilton Locke Recognised in Australasian Lawyer's Employer of Choice 2022

[Read more](#)

Watt's next?



The next New Energy Quarterly – 'Hydrogen no longer a pipe dream'



Hamilton Locke on the LTESA – Hamilton Locke will provide an overview on the LTESA and how generators and developers can apply for it.

Watt's in the Federal Budget for Renewables?

Target	Amount	Purpose
National electric grid	\$20 billion	Unlocks the potential of new renewable technology, increase the security of the grid and drive down power prices.
Empowering Regions Fund	\$1.9 billion	Provides dedicated support to decarbonisation efforts in regional Australia.
Electric Car Discount	\$345 million	Boosts electric vehicle uptake by exempting eligible vehicles from the fringe benefits tax and the five per cent imput tariff.
Driving the Nation Fund	\$275 million	Reduces transport emissions by building a national electric vehicle charging network and invests in wider zero-emissions infrastructure.
Community Batteries Household Solar Grants Program	\$224.3 million	Expands national storage capacity by deploying 400 community-scale batteries for up to 100,000 households.
Critical Infrastructure	\$157.9 million	Improves critical infrastructure security and reliability by allocating funds to: <ul style="list-style-type: none"> • National Energy Transformation Partnership • First Nations Clean Energy Strategy • Energy and transmission planning • A National Energy Performance Strategy
Community Solar Banks	\$102.2 million	Provides 25,000 Australians living in apartments, rentals, and low-income households with solar power.
First Nations Community Microgrid	\$83.3 million	Improves renewable access and energy security for remote communities.
Scaling Hydrogen	\$71.9 million	Allocated to fast track the development the develop of a 'hydrogen hub' in Townsville, Queensland.
Dispatchable Storage	\$63.9 million	Provides funding for large scale battery projects to increase national storage capacity.
Energy Efficiency	\$62.6 million	Provides grants small and medium sized businesses to increase energy efficiency.
Clean Energy Workforce Program	\$62 million	Provides financial support towards mentoring 10,000 New Energy Apprenticeships.
National Electricity Market (NEM)	\$22.8 million	Supports the Australian Energy Regulator (AER) in introducing renewable energy generation into the NEM.



Watt is ARENA funding?

Program	Summary	Funding available	Closing Date
Advancing Renewables Program (ARP)	<p>The ARP awards grants to a range of projects that seek to:</p> <ul style="list-style-type: none"> - Optimise the transition to renewable electricity - Commercialise clean hydrogen - Support the transition to low emission metals 	Up to AUD \$50 million	Ongoing
Industrial Energy Studies Program (IETS)	<p>IETS looks to assist large energy users in undertaking engineering and feasibility to identify ways to lower energy costs and reduce carbon emissions.</p> <p>Funding is available to companies and organisations in agriculture, mining, manufacturing, gas supply, water supply, waste services and data centre sectors.</p> <p>Funding will be provided in two streams:</p> <ul style="list-style-type: none"> - Feasibility Studies: to provide an independent assessment that examines all aspects of a project - Engineering Studies: to determine whether a EPC contract could be executed 	AUD \$43 Million	Stream A: March 2023 Stream B: July 2023
Regional Australia Microgrid Pilots Program (RAMPP)	<p>RAMPP aims to improve the resilience and reliability of power supply for regional and remote communities.</p> <p>Grants between \$1 million and \$5 million are available to projects that have successfully completed a feasibility study.</p> <p>This is an open, non-competitive funding round, with funds available in two stages:</p> <ol style="list-style-type: none"> 1. \$30m until CY2022; and 2. \$20m until CY2023. 	AUD 50 million	31 December 2026
Future Fuels Program (FFP)	<p>FFP is designed to drive co-investment in charging and refuelling infrastructure projects for future transport needs.</p> <p>Intended to fund demonstration and deployment projects.</p> <p>Funding is available for:</p> <ol style="list-style-type: none"> 1. light vehicle fleet operators - charging and electrical infrastructure; and 2. heavy fleet operators - enabling infrastructure and some vehicle costs. 	AUD 177.7 million	ongoing
Clean Energy Innovation Fund (CEIF)	Seeks to fund emerging Australian technologies and businesses to speed the nation's transition to a renewable economy.	Up to \$5 million	ongoing

Check your eligibility here:

If one of the programs sparked your interest you can check your eligibility [here](#).

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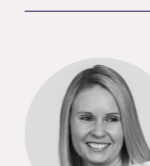
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Special Counsel

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Lawyers

Missed our previous quarterlies?
No dramas – read them here:

Special Edition – Digital Power >>
Mobile Power >>
Power Plus >>
Hydrogen's Green Horizon >>
The Rise of Dispatchable Renewables >>

Spotlight - David O'Carroll

David has a passion for law and looking at problems with a logical and strategic lens, using his extensive knowledge and skills of the market to find positive outcomes for clients. Through his collaborative, perceptive and diligent approach, David strives to provide meaningful counsel to find the best outcome for complex problems.

David has expertise in energy, infrastructure and resources, as well as project development and construction. In particular, David's expertise includes drafting and negotiating project agreements, EPC and O&M agreements, connection agreements and other construction contracts (including D&C and construct only contracts).

Journey to becoming a lawyer

I'm originally from Kilkenny, Ireland - probably best known for its exported beer of the same name. I chose law as an undergraduate degree as I was strong at English and History at school and was much better at logical thinking than creative. I was and still am absolutely useless at art and music. Law as an undergraduate degree was also nice and broad. It meant that I didn't have to specialise too early as I still didn't really know where I wanted to end up. I then applied for training contracts coming out of university as I knew a solicitor qualification would keep me in good stead even if I chose to do something else afterwards. After two and a half years, I was happy with my decision to stay in law and qualify as a solicitor into the Infrastructure, Construction and Utilities team at Arthur Cox in Dublin. I then made the move to Australia at the end of 2018 having backpacked here for a month in 2017 and have been here ever since and am very happy to call Australia home!

What are you most proud of in your career to date?

Being dual qualified in Ireland, England & Wales and most recently in Australia is something I'm quite proud of. As every lawyer knows, sitting all those exams requires no uncertain amount of hard work and discipline.

Tips for aspiring lawyers?

Be enthusiastic, work hard, take ownership and remember that the most helpful thing you can do is to make the life of the person above you easier. Another good tip to producing good work is to approach it as if it is going to be sent straight to the client unchecked.



What do you like most about Hamilton Locke?

I really like the encouragement, mentoring and ownership you are given at all levels within the firm. All team members are valued, as are their opinions and contributions. I also really appreciate the respect and consideration the firm gives to people's personal lives.

If you have undertaken the Da Vinci program, what activity did you undertake and why?

A perfect example of how Hamilton Locke is promoting a healthy work life balance within the firm. I'm currently participating in the Da Vinci program and have set myself the lofty task of lowering my golf handicap from 15 to 12 in the next year. This will take A LOT of time, effort and patience!

Rising Star – Alexander Bird

What are you most proud of in your career to date?

Having just completed my law degree earlier this year, my legal career has been tragically brief. However, during law school I worked as an intern for Lawyers Without Borders, a legal non-profit in Washington D.C. that helps legal professionals in global conflict zones become more effective advocates for the rule of law in their communities. While interning, I had the opportunity to work with members of the Kenyan government to organise a training session for Kenyan lawyers to help victims of child abuse. That was very rewarding.

What do you enjoy about working in the legal industry?

I enjoy that there is rarely an unfilled moment and always a problem to solve. Like any industry, working in the legal profession is defined by the people you collaborate with. A great thing about the law is that it often attracts people who enjoy the collaborative nature of problem solving. Being surrounded by people who are willing to tackle anything from esoteric legal questions to the Saturday Morning Quiz is what makes working in the law an enjoyable experience.

If you have undertaken in the Da Vinci program, what activity did you undertake and why?

I've chosen sailing for my Da Vinci this year. Since moving to Sydney four years ago, I've been looking for ways to better engage with the elements of the city that define its community and culture. Chief among those elements is the harbour and coastline. I'm hoping that getting



out on the water will provide a new perspective on Sydney and allow me to engage with my home in a new way. Maybe run the Sydney to Hobart race in a few years. Who knows.

What do you like most about Hamilton Locke?

That it brings to the forefront my favourite thing about working in the law - people. That and the nearly endless supply of KitKats in the pantry.

What does being a part of Halo Group mean to you?

In my application to join the HL graduate program, I listed agility as the HALO value that resonates with me the most. Since starting the graduate program, I've found this value is more than a talking point - it is an applicable tool those in the HALO community use assist in both collaboration and problem solving. Seeing agility and HALO's other core values in action on a daily basis, celebrating the authenticity of that action - that's what being apart of HALO means to me.

Top reads / favourite movie and why / if you could invite anyone to dinner, who would it be and why?

Reads

This Side of Paradise by F Scott Fitzgerald
Cleopatra by Stacy Schiff
Things I Didn't Know by Robert Hughes

Movie

All the President's Men. Robert Redford and Dustin Hoffman walk around as jaded journalists in plaid suits, force Richard Nixon to resign, and shine a light on the decaying virtue of American civic life. All while having great hair. What's not to love?

Dinner Guests

Bob Woodward and Carl Bernstein, authors of the book All the Presidents Men. I would like to find out if people really used to dress like that.

Dream Destination: Charleston, South Carolina

Favourite Podcast: The Rest is History with Tom Holland and Dominic Sandbrook

Favourite meal: Pizza from Louie and Ernie's in New York

New Energy Team Conference Attendance 2022

Authors:
Cedric von Duering & Rahul Tijoriwala

Conference Season this year evolved around the global and national energy crisis, and experts from the industry gave their hottest takes on solutions going forward. In this section, we provide an overview of conferences attended by the Hamilton Locke New Energy Team and our most interesting takeaways.



2022 Smart Energy Council's Conference and Exhibition

4-5 May 2022

Day 1: [View Post](#)

Day 2: [View Post](#)

On 4th and 5th May 2022, Hamilton Locke attended the 2022 [Smart Energy Council](#) Conference and Exhibition.

This two-day conference focused on solar, storage and smart energy solutions.

Key takeaways:

- Australia needs an aligned national policy to achieve decarbonisation of the Australian economy.
- The presentation by [Nicola Falcon](#) from [Australian Energy Market Operator \(AEMO\)](#) outlined that periods of generation curtailment are inevitable when supporting a renewable grid. The question is how this excess supply can be used productively. Our recent new energy quarterly expanded on this topic - <https://lnkd.in/evg8bBsJ>
- [Oliver Yates](#), CEO of [Sentient Impact Group](#), argued that nothing gets done without the involvement of the finance market and that we need to ensure that this involvement is future focused. See our publication on the important role of ESG - <https://lnkd.in/eJCW37pX>
- The team at [SunWiz - Advisor to Solar Businesses](#) presented an insightful session discussing key battery market statistics, differences in PC and PV storage costs and signs of market evolution.
- [Yixi Jiang](#) from [AlphaESS](#) presented a session on battery technology, the transformation in solar and wind electricity production and the need for it to be more effective and efficient.
- [Dean Williamson](#) from [GoodWe/BE](#) hosted a session on global and local trends in 2022 and the accelerated conversation around the switch to EV's following the ongoing conflict between Russia and the UK.
- [Joshua Moran](#) at [Fortescue Future Industries](#) discussed their progress in deploying capital to their ambitious energy plans.
- [Alana Barlow](#) at [Sumitomo Australia Pty Ltd](#) and [Scott Trevean](#) at [DNV](#) outlined the priority of Infrastructure for Hydrogen and the planning and development that is already underway.
- [Wayne Smith](#) and [Simon Franklin](#) spoke on the constant rise of grid-scale batteries and the increase of the commerciality of batteries as a result of real-world data.
- We heard from [Dr Jemma Green](#), [Ghazal Avijegon](#) and [Simon Dawes](#) regarding Hydrogen certification schemes being underway and will be eminent.

Clean Energy Council's Large Scale Solar Forum 2022

19 May 2022

[View Post](#)

On 19th May 2022, Hamilton Locke attended the [Clean Energy Council's](#) Large-Scale Solar Forum. The team enjoyed the discussion forum on "Sharing the sun: minimising the environmental and social impacts of large-scale solar."

Key takeaways:

- The need to have solar generation, ecology and farming exist in greater harmony;
- Agrivoltaics, while still undergoing research in Australia, is incredibly promising;
- Ecovoltaics should be preferred to Agrivoltaics in areas with less than 500mm rainfall;
- Instead of clearing saltbush for solar facilities, we'd rather roll the bush flat with a road roller. It cuts down costs 10-fold, use no water for dust control and protects 100 year old plant growth.



The Path to Becoming a Green Hydrogen Superpower – YEP Event

22 June 2022

[View Post](#)

On 22 June 2022, Hamilton Locke attended a Young Energy Professionals event on the Path to Becoming a Green Hydrogen Superpower. We enjoyed a great YEP event organised by [Nicky Aspinall](#), [Alexandra Motbey](#) and [Lucy Burke](#).

Key takeaways:

- [Tristan Ashford](#) from [Fortescue Future Industries \(FFI\)](#) showed us how FFI thinks about bringing the renewable energy supply chain to Australia.
- [Felix Silberstein](#) from [Baringa](#) offered a view on the strengths and weaknesses of hydrogen production with grid electricity. A thought worth exploring.
- [Matthew Rowe](#) from [PwC](#) provided awesome insight on how project developers think about pricing their hydrogen. He also asked what we will do with merchant quantities of hydrogen.



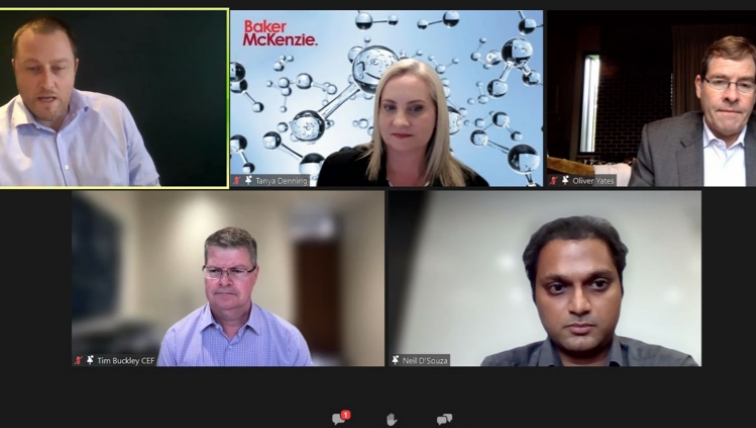
Energy Cluster- German-Australian Chamber of Industry and Commerce's Solar, Smart Grid and Storage Event

23 June 2022

On 23 June 2022, Hamilton Locke attended the Energy Cluster – German – Australian Chamber of Industry and Commerce's midyear event on the topic of Solar, Smart Grid and Storage.

Key takeaways:

- Doris Spielthener's noted that the ratio of Australian tax dollars per meter of transmission line is often underestimated when drawing comparisons to other jurisdictions.
- Thomas Maschmeyer's technology and company Gelion offers a lithium free path for storage and has the potential to be highly disruptive - soon, very soon.
- Felix Jander's delved into his insight from within AGL and their VPP trials.



Smart Energy Council's Renewable Hydrogen Offtake Forum

23 June 2022

[View Post](#)

On 23 June 2022, Hamilton Locke attended the [Smart Energy Council's Renewable Hydrogen Offtake Forum](#). [Matt Baumgurtel](#), [Hamilton Locke](#) partner and New Energy lead, chaired the opening session which discussed "Renewable Hydrogen Ambition", which examined the key market information for producers and some of the critical issues for offtake.

The Hon [Lily D'Ambrosio MP](#), Minister for Energy, Environment and Climate Change delivered a presentation as part of the discussion. The other panellists were [Oliver Yates](#) at [Sentient Impact Group](#), [Tim Buckley](#) at Climate Energy Finance, [Neil Sebastian DSouza](#) at [Argus Media](#) and [Tanya Denning](#) at [Baker McKenzie](#).

Key takeaways:

- Demand for hydrogen (supported by secure offtake agreements) is crucial to get projects off the ground.
- Australia should replace ammonia imports with domestic production.
- Green hydrogen needs to be made cost competitive with other forms of hydrogen.
- Efforts should focus on scaling up green hydrogen production capacity - blue hydrogen is a red herring.
- Banks will probably not finance blue hydrogen projects.
- Technological advancement has moved the market away from carbon capture storage (CCS).

The New Energy team also enjoyed sessions on:

- "Domestic Offtake", which considered how to break into the Australian projects' market quickly and effectively; and
- "Blueprints for Innovation – Domestic and International Focus", which discussed some of the key projects in Australia and what is in store for the future.

You can read more on green hydrogen in our previous New Energy Quarterly titled "[Hydrogen's Green Horizon.](#)"

Clean Energy Council Summit 2022

19-20 July 2022

[View Post](#)

On 19 and 20 July 2022, Hamilton Locke attended the Clean Energy Council Summit in Sydney. The New Energy Team enjoyed leaders of the energy industry sharing their knowledge and insights of the year gone by and the year ahead.

Key takeaways:

- [Anna Collyer](#) stated that If things move as fast as planned, we may look at the first capacity market auctions in July 2024.
- Historically the focus in the NEM was about super optimisation of the grid. In this phase we have to move away from over optimisation and work it out as we go. We need to be ahead of the plan.
- [Brett Redman](#) addressed the transmission expansions association with complex challenges which require us to keep acting with urgency. We cannot lose momentum.
- [Angela Karl](#) stated the three key concerns for superfunds and sovereign overseas investors appear to be: policy certainty, transmission (currently a piece of spaghetti) and ambition.
- [Saul Griffith](#) presented 'one point' from various angles to clarify that renewable energy generation and storage assets are and will become even more cost effective than fossil fuel generation assets.
- [Amanda Cahill's](#) called for seizing this transformative moment to change and improve disadvantaged and indigenous communities.
- [Steven Nethery](#) presented on the importance of regulatory changes staying ahead of technological developments. His point on creating investment certainty around R1 is one we strongly agree with.



Connecting Green Hydrogen APAC 2022

25-26 July 2022

[View Post](#)

On 25 and 26 July 2022, Hamilton Locke attended Connecting Green Hydrogen APAC 2022 in Melbourne. [Matt Baumgurtel](#), [Hamilton Locke](#) partner and New Energy lead, moderated the session on Accelerating the Uptake of Green Hydrogen in the APAC region. We enjoyed listening to panellists [Will Temple-Smith](#), [Stephanie Moroz](#), [Tim Rogers](#), [Shaun Reardon](#) and [Russell James](#) and their valuable inputs.

Key takeaways:

- Price parity is crucial, if we get demand right the infrastructure will be follow.
- Acceleration will require carrots and sticks from government.
- Don't put square pegs in round holes - hydrogen solutions should only be implemented if it provides the best solution.
- Start by activating domestic demand for hydrogen.
- Community engagement and education is crucial to ensure success.
- Collaboration is key to unlocking the benefits of the sector.



Ammonia Energy Association Conference

24-26 August 2022

Day 1: [View Post](#)

Day 2: [View Post](#)

On 24-26 August 2022, Hamilton Locke attended the 2022 edition of the Ammonia Energy Association Conference.

The 3-day event explored the strides being taken in Australia to develop its own ammonia energy industry. [Matt Baumgurtel](#), [Hamilton Locke](#) partner and New Energy lead spoke and moderated on “Australian Policy” and “Greentime maritime corridors” respectively.

Key takeaways:

- The war on Ukraine and other geopolitical events will actually accelerate the transition to green hydrogen and importantly create a demand market for Australian green hydrogen; this demand will in turn help secure Australian energy security; as soon as technology ramps up at scale, the investment will be there to get projects and generation off the ground.
- Certification is vital to provide confidence to offtakers and consumers alike.
- Co-firing ammonia in existing coal fired power stations is arguably the largest opportunity in the short term.
- Ensuring safety standards are maintained while scaling up production is paramount.
- Incentives for electrolyser manufacturers will build supply and demand and promote the use of existing supply chains.
- The levelised cost of hydrogen is the key metric for investors and developers and not just the upfront capital cost of getting projects off the ground.

H2Q Hydrogen Queensland's #HydrogenConnect2022

8-9 September 2022

Day 1: [View Post](#)

Day 2: [View Post](#)

On 8 and 9 September 2022, Hamilton Locke attended [H2Q Hydrogen Queensland's #HydrogenConnect2022](#) in Brisbane. We enjoyed the days of discussion on interesting topics during the panel discussion on “Hydrogen finance: Determining bankability, risks and rewards”:

- [Sam Reynolds](#) of [Octopus Investments Australia](#) flagged that superannuation funds will first want to see massive transmission investment and upgrades before investing in projects.
- [Rupert Maloney](#) of [Clean Energy Finance Corporation](#) noted that there is no one solution, it will take all industry players to fully commit to get these projects off the ground.
- [Dr Cameron Kelly](#) of [Australian Renewable Energy Agency](#) highlighted that the capital cost of electrolysers and solar and wind generation will still need to come down significantly to attract investment.
- [Matt Baumgurtel](#), [Hamilton Locke](#) partner and New Energy lead, spoke of the short term low hanging fruits of decarbonising the hard to abate sectors and using existing infrastructure to transport hydrogen.

More key takeaways included;

- Environmental Scientist [Tim Jarvis AM](#) stressed the importance of committing to incremental but consistent progress in developing renewable energy sources to combat climate change and the degradation of global ecosystems.
- [Ko Watanabe](#), Head of Business Development at Japan's Sumitomo Corporation, discussed the opportunities for international collaboration between Japan and Queensland in the hydrogen space.
- [Andrew Clennett](#), CEO of [Hiringa Energy](#), noted the dynamic role hydrogen can play in transitioning diesel transportation fleets by utilising existing pipeline infrastructure.

Young Energy Professionals Discussion on Energy Crisis

19 September 2022

[View Post](#)

On 19 September 2022, [Hamilton Locke](#) joined forces with [Young Energy Professionals](#) and hosted a panel presentation discussing the recent suspension of the National Electricity Wholesale Market.

We enjoyed hearing from leading minds of the energy industry [Oliver Nunn](#) of [Endgame Economics](#), [Brian Nelson](#) of the [Australian Energy Market Operator \(AEMO\)](#), [Owen Logan](#) of [Iberdrola Australia](#), and [Graham Mills](#) of the [Australian Energy Market Commission \(AEMC\)](#) who provided their valuable insights.



Congestion Management Model – COGATI again?

Authors: Matt Baumgurtel, Cedric Von Duering and Megan Chau

First published: 18 October 2022

In June, the Energy Security Board (ESB) proposed a Congestion Management Model (CMM) which aimed to protect electricity generators from excessive grid congestion issues in the National Electricity Market (NEM).

The CMM contemplated imposing congestion charges on generators, where the amount of the charge reflects the generator's impact on congestion. Eligible generators, including those located in Renewable Energy Zones, may claim a rebate that is funded by congestion charges. The idea was to provide a financial incentive for generators to connect in specific areas where network capacity is readily available and through this, reducing the risk of multiple generators congesting the grid.

COGATI again?

In 2019, the Australian Energy Market Commission conducted a market review on the 'coordination of generation and transmission investment implementation' referred to as COGATI. The effect of the review was that energy related contracts (e.g. PPAs, O&Ms, etc.) implemented mechanisms that would come into play if COGATI manifested. In short, it created an uncertainty for parties contracting in the NEM.

The ESB's CMM proposal has the same effect. We are back to including provisions in energy related contracts that contemplate the potential introduction of a capacity market or capacity market in the NEM. The CMM creates another uncertain risk that investors, developers, generators off-takers and financiers must assess and value.

In this article, we consider the market feedback from the ESB's stakeholder consultation and provide our view on the CMM. In particular, we look at the responses from stakeholders from Snowy Hydro, NEOEN and AGL.

1. Snowy Hydro Response

Snowy Hydro criticised the basis of the CMM, which purports to use a financial incentive (or nodal pricing) to compel power generators to locate to specific areas. Contrary to incentivising the construction of generators in specific areas, Snowy Hydro asserts that ultimately, generators will be built where the best quality fuel is and

where higher quality resources are competing against the transmission investment cost, the former is likely to prevail. The CMM also appears to operate on the assumptions that:

- A. Lower transmission costs can off-set the increased costs associated with lower-quality resources; and
- B. There is a guaranteed, quality and infinite energy source near the rebate locations compared to the areas at risk for congestion, both of which are not necessarily true.

As opposed to implementing the CMM which seeks to reduce congestion as an ancillary issue to transmission, Snowy Hydro proposes to solve the issue by directly augmenting the transmission itself. Investment in better transmission will allow consumers to access interstate generators at a reduced cost and facilitate the connection of new generators and improve the reliability of supply which, in turn, increases the potential for the development of new, sustainable renewable energy projects.

2. NEOEN Response

NEOEN similarly criticises the access regime proposed by the CCM that is based on locational marginal pricing – where the price of electricity at a particular 'load zone' is calculated with consideration to the congestion and subsequent 'loss' of electricity – because it fails to address the fundamental transmission issue and limits investment in areas that are not entitled to receive a rebate under the proposed CMM scheme.

To facilitate a continued stream of investments, NEOEN proposes using a traffic light system to guide investors looking to invest in a proposed project in a particular area, where:

1. **Green** – means more information about the hosting capacity of the network is provided;
2. **Yellow** – warns that the proposed project will cause inefficient levels of congestion and the project must reduce its size, contribute to transmission augmentation or utilise storage in order to operate with minimum consequence; and
3. **Red** - The project is too harmful and should not be allowed to connect to the NEM (to be used sparingly).

3. AGL Response

The primary concern raised by AGL in relation to CMM is the likelihood that such a system will make investment outside Renewable Energy Zones or other areas entitled to a rebate, unviable. Without access to rebates, these projects will effectively become subject to locational marginal prices, which are impossible to forecast; and this uncertainty diminishes the project's ability to attract confident investments or financing.

Conclusion

The CMM was proposed as a solution to facilitate the smooth supply of energy from generators to consumers and create investor security. However, the effect on the market since the ESB's proposal has been the opposite. So much so that the discussions around the CMM have died down.

Sadly, the CMM illustrates that little has been learned from COGATI. The CMM is another proposal that sought to provide investor security and alleviate congestion issues,

however, it resulted in the opposite. We have made no progress on congestion issues and diminished investor certainty.

If anything, the CMM signalled to investors that transmission and congestion issues in the NEM remain to be a significant and problem-solving approaches involve little learnings from the past.

The NEM has the potential to be the world's greatest electricity market powered by renewables however, we require strong leadership that is willing to allocate the required investment to upgrade the transmission network to allow the NEM to reach its potential.

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Offshore Wind - The Breeze has Shifted

Authors: Matt Baumgurtel, Alexandra Frizelle, Cedric von Duering and Alexander Bird
First published: 5 October 2022

Australia has the potential to grow a domestic offshore wind industry. In the past, it lacked the regulatory framework required to tap into that potential, but now the breeze has shifted.

In contrast to most onshore windfarms, offshore wind farms provide a more reliable generation profile at larger scale, which is much needed in Australia. The Federal Government is aware of this and has recently started to pave the way for Australia to become an offshore wind energy generator. Since 2 June 2022, the *Offshore Electricity Infrastructure Act 2021 (Cth) (Act)* has been in force.

In this article, we set out the most important points in the Act and provide our view on Australia's offshore opportunities.

The Offshore Electricity Infrastructure Act 2021 (Cth): Effect and Methodology

The Act aims to provide an effective regulatory framework for planned offshore generation and transmission infrastructure, enabling significant investment and job generation in Australia's coastal areas.

While the Act provides a crucial step forward in helping Australia to 'catch up' with renewable energy powerhouses in Europe and North America, the Act has its challenges. Developers must now navigate the Act to obtain the appropriate licencing to commence development of offshore wind farms.

Licences under the Act

The Act introduces four types of licences that authorise offshore electricity infrastructure activity in 'Commonwealth offshore areas', a term referring to an area that extends 370 kilometres off Australia's coast.

Each licence authorises a particular form of offshore development and a period in which that development may occur.

Licence type	Authorisation	Term
Feasibility licence	Permits an assessment of the feasibility of an offshore infrastructure project in the licence area.	Up to 7 years with potential to extend for up to 7 years.
Commercial licence	Permits the development of a commercial offshore energy project within the licence area. An applicant must have a feasibility licence (see above) before applying for this commercial licence.	Up to 40 years with the potential to extend for up to 40 years.
Research and demonstration licence	Permits the licence holder to carry out an offshore infrastructure project if it is for the purpose of: - Conducting research relating to the feasibility or capabilities of a technology, system or process; - Demonstrating the capabilities of a technology, system or process; and - Conduct research relating to the exploitation of, or exploration for, renewable resources.	Up to 10 years with the potential to extend for up to 10 years.
Transmission and infrastructure licence	Allows for the development of transmission and other ancillary infrastructure (including the storage, transmission and conveyance of electricity).	Licence may be granted for the life of the asset – this is not a fixed term.



Grant of a licence

The grant of a licence is based on ministerial discretion and is subject to the relevant Minister designating a specified offshore area as a 'declared area'. Once a declared area is established, the relevant Minister will consider the applications from eligible persons for a licence. Under the Act, an eligible person refers to a body corporate that maintains a registered office in Australia in accordance with the *Corporations Act 2001* (Cth) or was established by a state or federal government.

The relevant Minister will then apply the Act's criteria to determine whether an eligible person should be granted a licence. This criteria includes a merit test where the relevant Minister assesses whether:

"...the eligible person is likely to have, or be able to arrange to have, the technical and financial capability to carry out the proposed commercial offshore infrastructure project for the feasibility licence."

If licences overlap between applicants and areas, the regulations accompanying the Act provides that the Minister will consider the merits of each application.

Opportunities for Offshore Wind Projects in Australia

Globally, offshore wind is booming – the UK plans to quadruple offshore wind capacity to 40 gigawatts (**GW**) by 2030, while the EU has an ambitious goal of 60GW and the United States of 30GW. Despite Australia's sluggish start, momentum is quickly building in Australia as state and federal governments realise the potential benefits of offshore wind.

In our September 2021 [article](#), we considered the opportunities for offshore wind, exploring how wind turbines can be constructed taller and with larger blades, boosting efficiency and capitalising on stronger, more consistent ocean winds.

Australia's first project

In August 2022, Federal Energy Minister Chris Bowen announced the creation of Australia's first offshore wind zone off the coast of Southeast Victoria. To date, four offshore wind farms have been proposed for that zone.

The first project likely to enter construction is the 2.2GW 'Star of the South', developed by Copenhagen Infrastructure Partners, Cbus and Australian co-founders Andy Evans, Terry Kallis and Peter Sgardelis. The project aims to

construct up to 200 wind turbines at a distance of 7 kilometres from the Victorian coast. If approved for development, the project has the potential for an investment of approximately \$8.7 billion and the creation of 2,000 jobs. Once connected to the grid in Victoria's Latrobe Valley, the wind farm could provide up to 20% of Victoria's electricity demand. Construction of the project is scheduled to begin in 2025 and take approximately 5 years.

Conclusion

The Australian offshore wind industry is in its infancy. Regulations, legislative frameworks, and licences for the industry, not to mention the existing gap in specialist skills, supply chains, engineering and industrial capabilities remain in the early stages of development. Additionally, it will take time to drive down the currently high technology costs for offshore wind.

Despite these preliminary challenges, offshore wind presents a unique opportunity for Australia to capitalise on additional renewable electricity generation with a more stable generation profile.

Now is the time to consider measures like regulatory streamlining, additional policy targets to de-risk investments and further expenditure in R&D. If we can successfully navigate the development stage, offshore wind has the potential to play a significant role in Australia's energy transition and help Australian's out of the energy crisis.

¹Offshore Electricity Infrastructure Act 2021 (Cth) s 34(1)(a).

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Off-Shore Hydrogen – Get Low, Low, Low

Authors: Matt Baumgurtel, Cedric von Duering, Alexander Bird and Megan Chau
First published: 18 October 2022

The appetite for green hydrogen in Australia is steadily growing. AEMO's Integrated System Plan considers an Australia as a "Hydrogen Superpower" scenario and more than \$250 billion have been allocated to finance more than 90 hydrogen projects across the country. However, the high cost of hydrogen production remains a significant hurdle to commercial viability and industrial scalability.

In our September 2021 [article](#), we discussed the opportunities to drive production costs down by producing green hydrogen offshore. This year, a [2022 study from University College Cork](#) considered floating hydrogen plants and offshore hydrogen production (UCC Study). The question remains: how low can the green hydrogen production costs go?

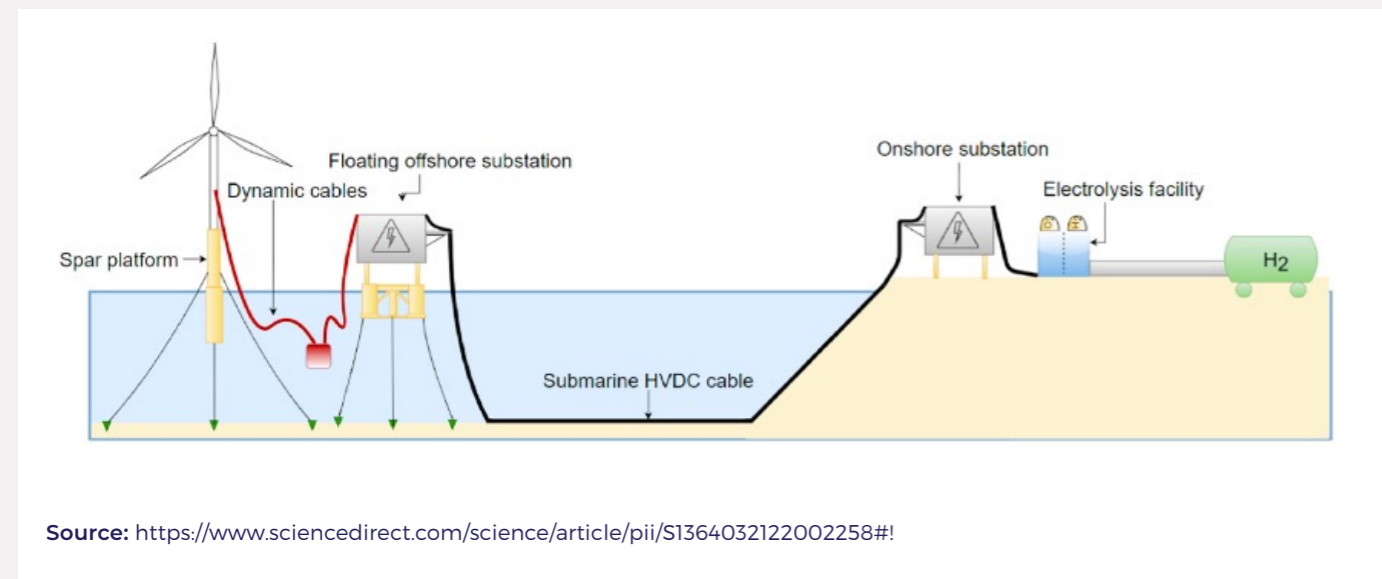
In this article, we look at the proposition of the UCC study, the global push for offshore hydrogen pilot plants and its possible application in Australia.

UCC Study

The UCC Study looks at the use of electricity generated by an off-shore windfarm to produce hydrogen onshore and offshore (centralised and decentralised, see below). Most interesting is the comparison of transporting power generated by offshore wind to land for electrolysis versus conducting the electrolysis offshore (either centralised or decentralised) and transporting the hydrogen to land. Before looking at the advantages of the different systems, we examine what they look like.

Onshore Hydrogen Production

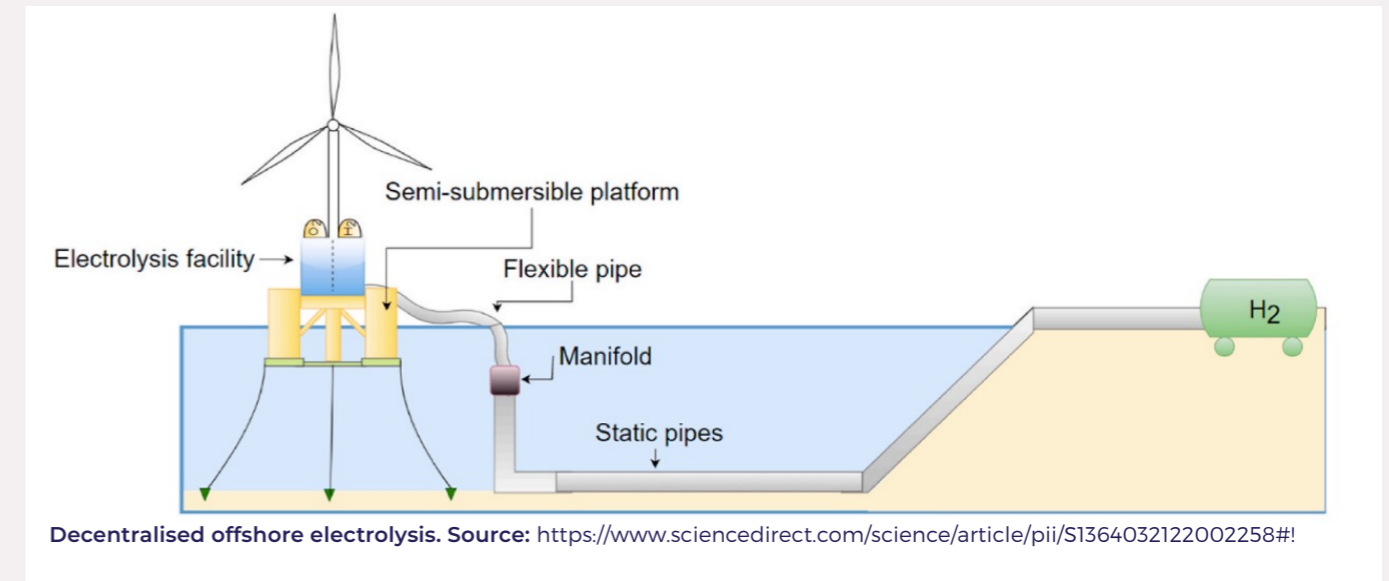
The onshore hydrogen production contemplates a common offshore windfarm setup with electrical transmission infrastructure to an onshore electrolysis facility.



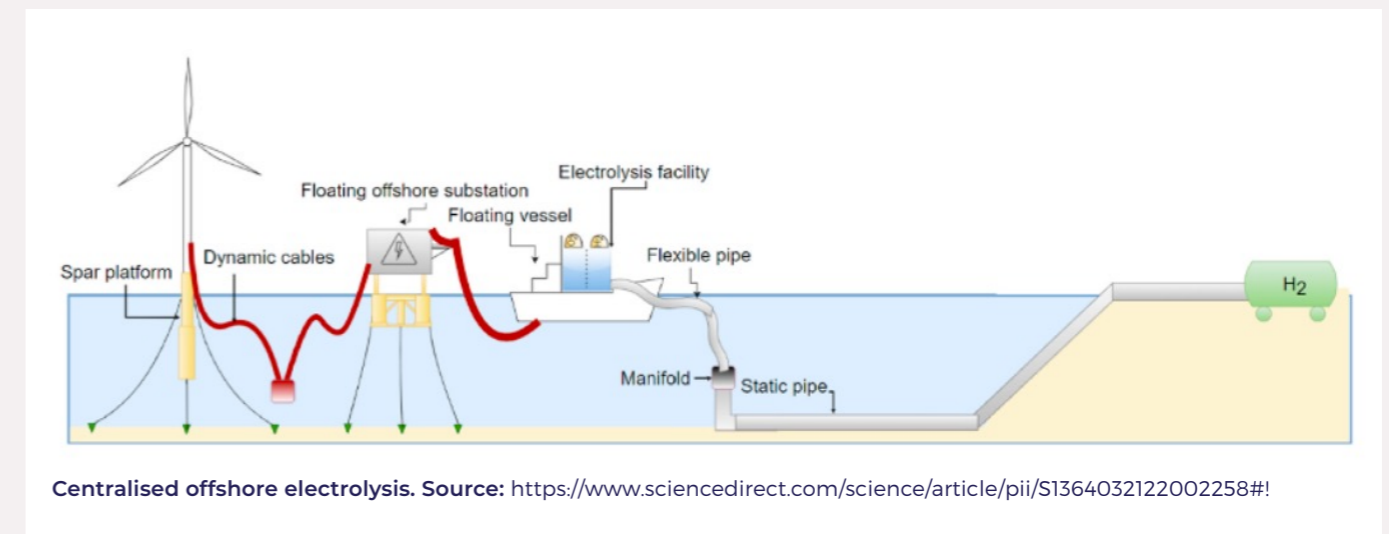
Offshore Hydrogen Production

The offshore systems (centralised and decentralised), on the other hand, contemplate an electrolysis facility and desalinisation plant connected to an offshore wind farm. In both systems, the desalinisation plant and electrolyzers are used to generate green hydrogen that is then transported to land.

Decentralise off-shore production



The decentralised system contemplates an electrolysis facility at each wind turbine of a windfarm whereas the centralised system envisages connecting an entire windfarm to a centralised floating electrolysis facility.



Findings

The UCC Study concludes that, in comparison to high voltage cables required for the onshore hydrogen production, the use of submarine hydrogen pipelines of both offshore systems bring the following advantages:

1. they facilitate expansion as the pipeline is not limited to 2 GW transmission per cable (as it is standard with offshore windfarm cables); and
2. they are believed to be more economical for large scale farms, especially for windfarms with longer offshore distances.

The absence of electrical transmission drastically reduces the electricity cost for both offshore

systems. However, the decreased cost comes with the disadvantage of electricity being limited to times the wind is blowing as the offshore systems cannot import any electricity.

From an environmental perspective, the offshore purification of water during the desalination process raises issues related to the disposal of the residual products of the pre-treatment, such as brine. The marine ecosystems are directly affected by brine, however, impact studies have yet to be taken.

Offshore – centralised vs decentralised

Comparing the centralised and decentralised offshore systems the UCC Study finds the below advantages and disadvantages.

	Advantage	Disadvantage
Decentralised Offshore Electrolysis	<ul style="list-style-type: none"> • Can use existing electrolyser technology • Relatively more manageable in failure events due to modular set up • No separate additional support structure is required • Hydrogen pipelines are cost efficient for large farms and long offshore distances • Brine discharge (if permitted) is more diffuse as compared to centralised offshore typology and as such should minimise impact to marine life 	<ul style="list-style-type: none"> • Electrolyser response to offshore conditions needs validation • Complex system • Challenging O&M procedures (two different systems on the same platform)
Centralised Offshore Electrolysis	<ul style="list-style-type: none"> • Reduced maintenance for individual turbines • Relatively quicker repair times • Hydrogen pipelines are cost-efficient for large farms and long offshore distances • Competitive at deep water sites with the spar platform 	<ul style="list-style-type: none"> • More challenging in failure events • May require multiple large offshore vessels with multiple decks to accommodate the electrolysers • Vessels or islands require permanently manned crew • High CAPEX of the vessels • High asset risk due to all electrolysers in single location • Electrolysis response to offshore conditions needs validation • Brine discharge (if permitted) impact to the marine environment

Pilot Projects

As of writing, there are no fewer than eleven offshore hydrogen projects trying to tap into the offshore hydrogen potential. In September 2022, French green hydrogen producer Lhyfe and Atlantique Offshore Energy, the energy division of French Ship Builder Chantiers de l'Atlantique, will launch a pilot system for offshore hydrogen production, SEM-REV.

Should the pilot system prove successful, Lhyfe and Chantiers de l'Atlantique intend to scale the project to work with existing on and off grid wind farms. Following a memorandum of understanding signed in June 2022, Chantiers de l'Atlantique will design, build and install the platforms, while Lhyfe will be in charge of the design and operation of the renewable hydrogen production facilities. Both firms intend to have a fully operational offshore hydrogen plant supplying power to mainland Europe in 2024.

Bringing Offshore Hydrogen to Australia

Currently, there are no significant offshore hydrogen projects underway in Australia. However, there are various offshore wind projects under development that may pave the way to the introduction of offshore hydrogen in the future.

In June, the *Offshore Electricity Infrastructure Act 2021* (Cth) came into force, which provides for the development of offshore electricity infrastructure in designated offshore areas. To date, four offshore wind farms have been proposed for that zone. The first project likely to enter construction is the 2.2GW 'Star of the South' and aims to construct up to 200 wind turbines seven kilometres from the Victorian coast.

It is possible that once large-scale developments like the Star of the South are completed, they might be paired with offshore hydrogen production facilities. These facilities could use the excess energy produced by the farms to power the electrolysis process.

Such projects would not only bolster Australia's transition to net zero but also provide a dependable source of green fuel that could be consumed domestically and shipped internationally.

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Can Data Centres Stabilise the Grid?

Authors: Matt Baumgurtel, Adriaan van der Merwe, Cedric Von Duering and Megan Chau

First published: 23 September 2022

The energy transition does not only require new and innovative ways to generate electricity, but also requires innovative solutions to strengthen the electricity grid. In this article we explore how to strengthen the grid with batteries located within data centres, we look at the recent grid connection of a Microsoft data centre's battery in Ireland and consider the potential application of this technology in Australia.

Case Study: Ireland

35% of Ireland's electricity is generated by 400 wind farms. While admirable, this is placing increasing pressure on grid operators to balance supply and demand, and maintain grid stability.

The lithium-ion batteries at a Microsoft data centre in Dublin are providing an innovative solution to this conundrum. While the batteries are typically used as a backup generator for the data centre in the event of an emergency, they have now been tested, certified and approved to connect to the grid, provide system strengthening services and provide access to stored renewable energy capacity.

The multiple benefits to using data centre batteries in this way include:

Additional storage investment: As the investment costs for batteries are high, acceptable revenue projections for grid connected batteries can be difficult to achieve. Developing grid connected batteries with large industrial off-takers can however result in an:

- increase of investment in the development of energy storage systems;
- increase in the bankability of energy storage systems; and
- acceleration of the development of energy storage systems that provide grid strengthening services.

Decarbonisation of the Grid: Power grid operators have historically had to rely on fossil fuel-generators to maintain a store of excess

power (a "spinning reserve") that could be used to respond quickly to power supply shortages. If batteries are used to store excess power, this reduces the 'spinning reserve' requirement and the accompanying fossil fuels. Diminishing fossil fuel usage contributes to the decarbonisation of the power sector. Baringa, a leading energy advisory firm, suggests that up to two million metric tons of carbon emissions (a fifth of Ireland's projected total emissions in 2025) can be avoided by making the switch to batteries.

Uninterrupted Power Supply: In their current role batteries ensure an uninterrupted power supply to the Microsoft data centre. When this role is expanded to the grid, consumers will receive the same uninterrupted service without the associated high maintenance costs of maintaining a 'spinning reserve', and the need for renewable energy generators to adjust their dispatch due to grid fluctuations will be reduced.

Potential for improvement: In the future, data centre operation may be supplemented further by liquid immersion cooling for servers and the use of hydrogen fuel cells for backup power generation.

Developments in Australia

In 2021, we wrote about the rise of [batteries and dispatchable renewables](#). On 6 July 2022, the Australian Renewable Energy Agency (**ARENA**) invited 12 projects to submit applications for the \$100 million Large Scale Battery Storage Round, which offers funding for grid scale battery energy storage projects capable of providing essential system services to the electricity grid. At the time ARENA stated that it is increasingly important to find new ways of delivering system services whilst preserving the stability of the grid.

On the data centre side, Quinbrook Infrastructure have recently unveiled plans for a \$2.5 billion 'Supernode' data storage project in Brisbane. The project will be fuelled by renewable energy, and the incorporated 2,000 MW battery will help stabilise the grid in the surrounding area of Moreton Bay. To be constructed in four phases, the first phase of the Quinbrook project is expected to commence by the end of 2022 and reach completion by the end of June 2023.

Conclusion

The Irish project demonstrates how large electricity consumers can mobilise investment for battery development, and how these developments can double as grid stabilisers. Quinbrook Infrastructure's ambitious 'Supernode' shows that funding is available for such projects in Australia and that there is profit to be made from such arrangements.

For more information, we have previously written about the opportunities of data centres in the New Energy transition in our Digital Power series [here](#) and [here](#).

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Optus Breach – What is Cyber Security for Renewable Energy Generators?

Authors: Matt Baumgurtel, Janice Yew, Cedric von Duering and Alexander Bird

First published: 4 October 2022

The recent Optus Data breach raised nationwide concerns, however, the Commonwealth Government has already introduced a slate of new cyber security regulations aiming to strengthen the protection of critical infrastructure, including renewable energy assets.

The regulations aim to equip critical infrastructure providers with financial and regulatory support required to ward off malicious cyber-attacks. They introduce significant reporting obligations for critical infrastructure operators, which are valuable targets for malevolent state and non-state actors.

In this article, we break down the Commonwealth's new statutory regimes, examining the financial and regulatory support provided by the legislation and the practical ramifications of the regulations for renewable energy asset holders.

Commonwealth Expands Definition of 'Critical Infrastructure'

In 2018, Federal Parliament introduced the *Security of Critical Infrastructure Act 2018 (Cth) (Act)*. The Act introduced a range of cyber risk management obligations for four sectors – electricity, ports, gas, and water and sewerage.

In response to increased reliance on digital communication and storage, which surged in the wake of the COVID-19 pandemic, the Commonwealth Government passed the *Security Legislation Amendment (Critical Infrastructure) Act 2021 (SLACI Act)*, which amends the Act. In addition to introducing further compliance obligations, the SLACI Act significantly expands the definition of 'critical infrastructure' to capture nine additional sectors.

The SLACI Act also imposes two new important obligations on entities responsible for critical infrastructure.

'Critical Electricity Assets'

Critical infrastructure in the Act includes 'critical electricity assets', which is 'an electricity generation station that is critical to ensuring the security and reliability of electricity networks or electricity systems in a State or Territory.' An electricity generation station will

only be critical to security and reliability, if it:

1. has an installed capacity of at **least 30 megawatts**; and
2. is connected to a wholesale electricity market (**Critical Electricity Asset**).²

If the above criteria is met, the electricity generation station may be subject to the following obligations.

Owners of Critical Electricity Assets should also consider compliance with the Australian Energy Sector Cyber Security Framework (**AESCSF**). The AESCSF is a voluntary cyber security framework developed by the Australian Energy Operator to address increasing cyber security risks faced by the Australian energy sector.

Through the framework, participants are able to assess the criticality of their assets in relation to other participants and improve their own cyber security capabilities. This participation serves to assist participants in warding against future attacks. The AESCSF is still voluntary but may become mandatory at a later stage.

Government Assistance Obligations

AEMC has justified this draft determination on the Part 3A of the Act creates government assistance obligations for all 'responsible entities'.

Depending on the obligation, the responsibility will sit with either:

- the entity with ultimate operational responsibility for Critical Electricity Asset (**Responsible Entity**), or
- the entities that hold a direct or joint interest of at least 10% in a Critical Electricity Asset, or that hold an interest and are able to directly or indirectly influence or control the asset (**Direct Interest Holders**).

These obligations give the Department of Home Affairs more tools to incentivise compliance with the regulatory framework of the Act. They include:

- **Issuing Information Gathering Directions:** requiring Responsible Entities to provide support and relevant information in the event of a cyber security incident.

- **Issuing Intervention Requests:** requiring Responsible Entities to cooperate with the Australian Signals Directorate, the Australian government agency responsible for information security and cyber warfare, in response to a cyber security incident. This includes allowing access to computer systems and entity data, installing software and removing devices from the Responsible Entity's network.
- **Issuing Action Directions:** requiring Responsible Entities to comply with directions relating to specific actions issued by the Department in response to a cybersecurity incident.³

While these new powers are broad, they do not provide the government with a carte-blanc to intervene in cyber security incidences. To impose an obligation on a Responsible Entity, the authorising Minister must be satisfied that several criteria are satisfied, including that:

1. no other regulatory system could be used to provide a practical and effective response to the incident;
2. there is a material risk that the incident in question will seriously prejudice Australia's social or economic stability, defence or national security; and
3. a cybersecurity incident on a Critical Electricity Asset is occurring or imminent.

Cybersecurity Incident Notification Obligations

Part 2B of the Act creates additional reporting requirements for any Responsible Entity that has experienced or is experiencing cybersecurity issues in relation to a Critical Electricity Asset.

Like the obligations discussed above, the reporting requirements will only apply where they have been actively instituted under the instruction of the relevant Minister.

¹Security of Critical Infrastructure Act 2018 (Cth) s 10(1)(b).

²Security of Critical Infrastructure (Definitions) Rules (LIN 21/039) 2021 (Cth) s 5(a)ii, (b).

³<https://www.legislation.gov.au/Details/C2018A00029>

Once imposed by the relevant Minister, the obligations impose strict time limits on reporting incidents. A Responsible Entity is required to notify the Federal Government within:

- 12 hours of discovery if the incident has a 'significant impact'; or
- 72 hours of discovery if the incident has a 'relevant impact',

on the sector's functionality. A 'significant impact' refers to scenarios in which a cybersecurity incident has a material effect on public accessibility to essential goods and services. A 'relevant impact' includes any other kind of incident that affects critical infrastructure.

Hamilton Locke's View

For renewable energy developers, operators and owners with generation assets producing 30 MW or more, it is 'critical' to understand whether their project is a Critical Electricity Asset for the purpose of the Act. Early identification of cyber security obligations and incorporation of a AESCSF compliant cyber security system can result in significant cost savings.

If you have any questions regarding your obligations under the Act, please do not hesitate to contact [Matt Baumgurtel](#) – the head of the Hamilton Locke New Energy team.

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It's not easy being green: The demand for environmentally friendly, sustainable and ethical Renewable Energy Projects

Authors: Matt Baumgurtel, Adriaan van der Merwe and Alexander Bird

First published: 12 October 2022

Kermit the frog famously sang “[It's not easy being green](#)”.

The contrary would seem to be true, with many companies successfully greenwashing their businesses to appear environmentally friendly, sustainable and ethical.

The days of routine greenwashing, however, are coming to an end. As explained in our [July 2022 article](#), regulators around the globe are introducing stringent reporting requirements to ensure green industry activity is in fact green.

To this end the Australian Securities and Investments Commission (ASIC) recently issued a 'greenwashing review' urging business to review current reporting practices and stating that cracking down on greenwashing remains a focus for the regulator.

While renewable energy projects are vastly more environmentally friendly when compared to fossil fuel generators, we are seeing an increase in project developers and investors questioning the environmental, sustainability and ethical credentials of renewable energy projects. This is a direct result of informed customers who are willing to pay a premium for responsible goods. In this article we explore the often-unmentioned elements of renewable energy projects, and highlight areas for improvement.

Resource Extraction and Equipment Manufacture

While the energy that a renewable facility produce is carbon free, the carbon footprint of the material and equipment used to construct the facility is often not. Mineral extraction, for example, often occurs in jurisdictions that shy away from environmental protections and human rights.

Australia is committed to combatting modern slavery and has ratified the *United Nations Guiding Principles on Business and Human Rights*. The *Modern Slavery Act 2018* (Cth) implemented a framework for entities with consolidated revenue of more than \$100 million to report on the risks of modern slavery in their operations and supply chains.

This is of particular importance to the developers of renewable energy projects, and we are seeing an increased focus to ensure that projects steer away from any modern slavey connotations.

Another issue is that while the energy produced by a renewable energy project is green, the energy used to manufacture its equipment is often not. Market forces are however working to address these issues, as stakeholder reporting obligations are making project owners acutely aware of the legacy that comes with equipment.

To that end, many mining equipment makers have turned to renewable energy sources to offset or eliminate the carbon output of early resource extraction. An example of this is the BHP Group and Caterpillar Inc. partnership to develop zero-emissions mining trucks to help reduce emissions.

Another important contribution is the diversification of where rare earth minerals (which are essential for the manufacture of renewable energy equipment) are mined. An example of such diversification in Australia is the nation's first rare earth separation plant (being built by Arafura Resources) 135km from Alice Springs. Once constructed, the plant could provide upwards of 5% of the world's rare earth mineral supply.

Transport

A benefit of a world economy is that equipment can be produced where it is most economical to do so. While this is good from a financial point of view, it is often not desirable from an environmental standpoint, as it requires the transportation of equipment across large distances.

As discussed in our article of [1 June 2022](#), global shipping emits around 800 million tonnes of CO2 annually, which is 3% of the world's total CO2 emissions. While only a portion of this is made up of renewable energy equipment, the impact is evident.

In the light of technological advances, hydrogen and ammonia circles are touting this part of the lifecycle as low hanging fruit for decarbonisation. Proponents of hydrogen point out that it is relatively easy to retrofit



existing shipping fleets with hydrogen cells. According to the International Council on Clean Transportation, 99% of the voyages made in the world's busiest shipping corridor between China and the United States could, for example, be powered by hydrogen with minor changes to ship fuel capacity or route.

Land use

Good renewable facility land is often good agricultural land, and an inadvertent payoff between the two industries arise. There are however several proven ways to address this payoff.

One of these is agrivoltaics. As discussed in our article of [10 March 2022](#), the simultaneous use of land for solar photovoltaic power generation and agriculture is proving to be revolutionary across the world. Agriculture can either take the form of growing crops with a lower light requirement, or grazing livestock on the same site. Another adjacent intervention is ecovoltaics, which is the enhancement of biodiversity by growing native species on the same land as solar facilities. These interventions contribute to the creation of microclimates, water efficiency, increased panel performance (due to cooler ambient temperatures) and diversification of land use and income streams.

Another way to ensure that land is used efficiently is by installing solar panels over canal lanes. An example of this is Project Nexus in California, which will see 2,500 metres of solar panels installed over canal lanes in the state's Turlock Irrigation District. Our [29 March 2022](#) article covers this in more detail.

A further method to make optimal use of land is carbon farming, which is the optimisation of carbon capture on working landscapes by implementing farming practices that are known to improve the rate at which CO2 is removed from the atmosphere and stored in

plant material and/or soil organic matter. Under schemes like the Emissions Reduction Fund, landowners can earn Australian Carbon Credit Units (ACCUs) for implementing such carbon reduction practices. You can read more [here](#).

Decommissioning

With renewable energy projects having a long design life, the issue of project decommissioning, equipment recycling and land remediation has not been at the forefront of many developer's minds. This is changing, with landowners increasingly looking to ensure that land will be returned to the condition it was in before construction. This places a financial burden on the viability of projects, with the result of new insurance products being developed to mitigate this risk. Waste management is also important, with the NSW government for instance forecasting that the state will generate 40,000–71,000 tonnes per year of battery storage and solar PV waste by 2035.

Conclusion

While Kermit was right that it is not that easy being green, it is heartening that the renewable energy industry is committed to going the extra mile to ensure that its projects can legitimately claim to be environmentally friendly, sustainable and ethical.

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Making Hydrogen Bankable: The Opportunities and Challenges Facing Australia's Hydrogen Future

Authors: Matt Baumgurtel, David O'Carroll and Alexander Bird

First published: 25 October 2022

In September 2022, Matt Baumgurtel, Partner and New Energy Lead at Hamilton Locke, moderated the discussion on "Financing 'Bankable' Hydrogen: Invigorating hydrogen finance, investment and funding: Determining bankability, risks and rewards" at the inaugural Hydrogen Connect Summit in Brisbane, hosted by H2Q.

Joining Matt on the panel were Dr Cameron Kelly, General Counsel, Australian Renewable Energy Agency (ARENA); Rupert Maloney, Head of Hydrogen, Clean Energy Finance Corporation; and Sam Reynolds, Managing Director, Octopus Australia.

This article is based on the panel's discussion that day.

Hydrogen Export: An Australian Opportunity

This article explores the opportunities and obstacles facing scalable hydrogen investment in Australia, looking at how Australia can make hydrogen a commercially viable alternative to conventional fossil fuels, particularly in the eyes of the investors essential to industry success.

Australia has the ability to produce more renewable energy than it will ever need. With 80% to 90% of global energy transported by molecules rather than through power lines, Australia is well positioned to become one of the world's chief exporters of hydrogen. According to the Clean Energy Council, Australia's hydrogen market could be worth upwards of \$10 billion a year by 2040. However, unlocking that growth requires significant private capital investment.

Australia is at the doorstep of land constrained countries such as Indonesia, South Korea, Japan and Singapore. While economically robust, these countries will continue to rely heavily on energy imports to power their economies into the next century – Japan alone will need to continue to import over 90% of its energy via ocean transport. Australia possesses the production capacity and geographical proximity to meet regional trading partner's renewable energy demand – in fact some of these countries are closer to Darwin than Darwin is to Melbourne. With the proper investment in production and

transportation infrastructure, Australia could become central to renewable energy production in the Pacific region.

Further, Australia's political stability is a key asset. Regional neighbours are looking for stable trading partners – partners that lack the political volatility of contemporary energy superpowers in Asia and the Middle East. Australia's relatively stable political system presents an inviting alternative to the routine political upheaval that so often impacts energy exports in Eastern Europe and the Middle East.

Roadblocks to Australia's Hydrogen Future

Despite these domestic advantages, there are significant obstacles for hydrogen production in Australia. Currently, green hydrogen production has two main cost drivers: the development and construction cost of electrolyzers and the cost of raw materials. That translates to green hydrogen costing about \$50/MWh. This figure needs to drop by another two-thirds to make green hydrogen commercially viable.

Further, it is difficult to project the needs of hydrogen projects into the future. Water is a chief concern. It is difficult to determine how projects will maintain a sustainable water source for the period of a project – drought, competition from agriculture and general growth in demand all undermine the long-term stability of these projects.

In addition, there are issues with grid capacity. Over the next ten years, Australia will lose 70% of its coal industry. It is not possible to simply replace a coal powered station with one hydrogen plant – three to four times the amount of renewable energy is required to generate the same level of electricity.

Further, these projects cannot be built in proximity to the urban centres that require electricity because the land is too expensive. Nor does building these renewable projects in rural regions solve the problem – the existing grid infrastructure to transport the energy to the urban areas where it is most required is not up to scratch. As a result, the grid infrastructure must be built and/or transformed – a process that would take at least a decade. This waiting



period keeps significant capital on the sidelines until the creation of a fit for purpose transmission system.

In some respects, this process is already underway – the Federal Government has set aside \$20 billion for transmission upgrades. However, there is going to be a lag effect that will keep energy prices high as Australia works to scale capacity in an existing system which is currently not fit for purpose.

Pushing Government to Unlock Potential

Currently, there is a wall of capital that wants to get into hydrogen financing. To let that capital in, hydrogen must become mainstream – it must be attractive to major sources of capital like superannuation pension funds and global insurance companies. 15 years ago, the UK, Europe and the US promoted solar subsidies to draw conventional investment institutions to the novel technology. As the technology scaled, the cost of manufacturing came down and the industry began to grow organically. Australia is 7-8 years behind where it needs to be. If Australia wants to be a global leader in hydrogen, it needs government intervention to kick start the industry.

This becomes clear when looking at the actions taken abroad. In the US, the recent inflation reduction bill provides a \$3 tradable tax credit for every kilo of hydrogen produced. This places hydrogen almost at price parity with fossil fuels and will create a viable hydrogen industry overnight when the credit takes effect on 1 January 2023.

The UK Government has introduced a scheme to incorporate 10GWs of hydrogen energy into its domestic grid by 2030. This utilises a reverse auction mechanism through which the Government will subsidise the gap between the price that the producer needs to sell at and the price that the buyer is willing to pay. This is a great way to stabilise contract prices and ensure hydrogen can compete commercially with traditional fuels.

However, Australia is not completely without initiative. The HyGATE project between Australia and Germany is a first of its kind program intended to incentivise cooperation between the Australian and German Governments, specifically in relation to accelerating early-stage green hydrogen projects. While in the early stages of funding, the project is being backed by a €50 million grant from the German Government.

Should Australia continue to invest in projects of a similar nature, while at the same time borrowing from the initiative and examples of our international counterparts, it has the potential to become a world leading international energy exporter. Not only can hydrogen fuel Australia – Australia can fuel the future of hydrogen.

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New Energy Expert Insights: The Global Energy Crisis and Hydrogen's Opportunity

Authors: Matt Baumgurtel, David O'Carroll and Alexander Bird
First published: 26 October 2022

Expert: Mike Jefferies, Octopus Investments Australia

In this two-part New Energy Expert Insight series, we spoke with Mike Jefferies, Investment Manager with Octopus Investments Australia, to discuss the current state of play in the energy markets six months on from the beginning of the Ukraine crisis.

A long-standing member of the Octopus Investment team, Mike has experience across several areas of renewable energy, contributing to over \$1 billion of utility-scale renewable generation equity and debt financing across retail and institutional funds. Octopus is one of the largest owners of renewable energy projects in Australia and Europe, managing some 300 assets for wholesale and institutional investors. In Australia, the firm oversees \$1 billion in assets across construction and operational industries.

In part I, Mike explains how the global energy crisis is impacting the adoption of renewables.



Part I

The Ukraine Crisis has upended long standing assumptions about energy security and the global energy markets. Now six months on from the beginning of the crisis, what in your view has been its greatest impact on the global energy markets and has this had any effect on the Australian energy market?

Clearly, the energy crisis is front of mind for a lot of people worldwide as it's a substantial input cost to everyone's daily lives and the cost of living. As a society we take energy for granted and always assume it will be there and will be affordable. The energy crisis has largely been driven by high global commodity prices, exacerbated by supply chain issues and sadly the conflict in Ukraine. All of this has certainly shifted the mindset of continents with regards to their energy mix as seen by Europe's pivot away from reliance on Russian natural gas. Before the crisis, Europe imported 40% of its gas from Russia. Now, Europe is showing a clear commitment to diversifying its energy supply mix and is seeking long term energy security from other global sources which have less sovereign risk and greater certainty, even if it's more expensive.

The key question for Europe is where do they go to meet fuel demand? Currently, the volume of natural gas flowing into Europe has been largely reduced from Russia and markets are showing that liquified natural gas (LNG) imports from Asia have increased over the last six months to combat this supply shortfall. This is relevant to the Australian energy market for several reasons. The Australian LNG Market is largely organised through long-term contracts (~80%) which is probably why we are seeing a large delta between LNG netback prices vs domestic prices (~\$60/GJ vs ~\$35/GJ) as European demand has helped push up Asian spot prices as they look to fill their storage capacity ahead of winter.

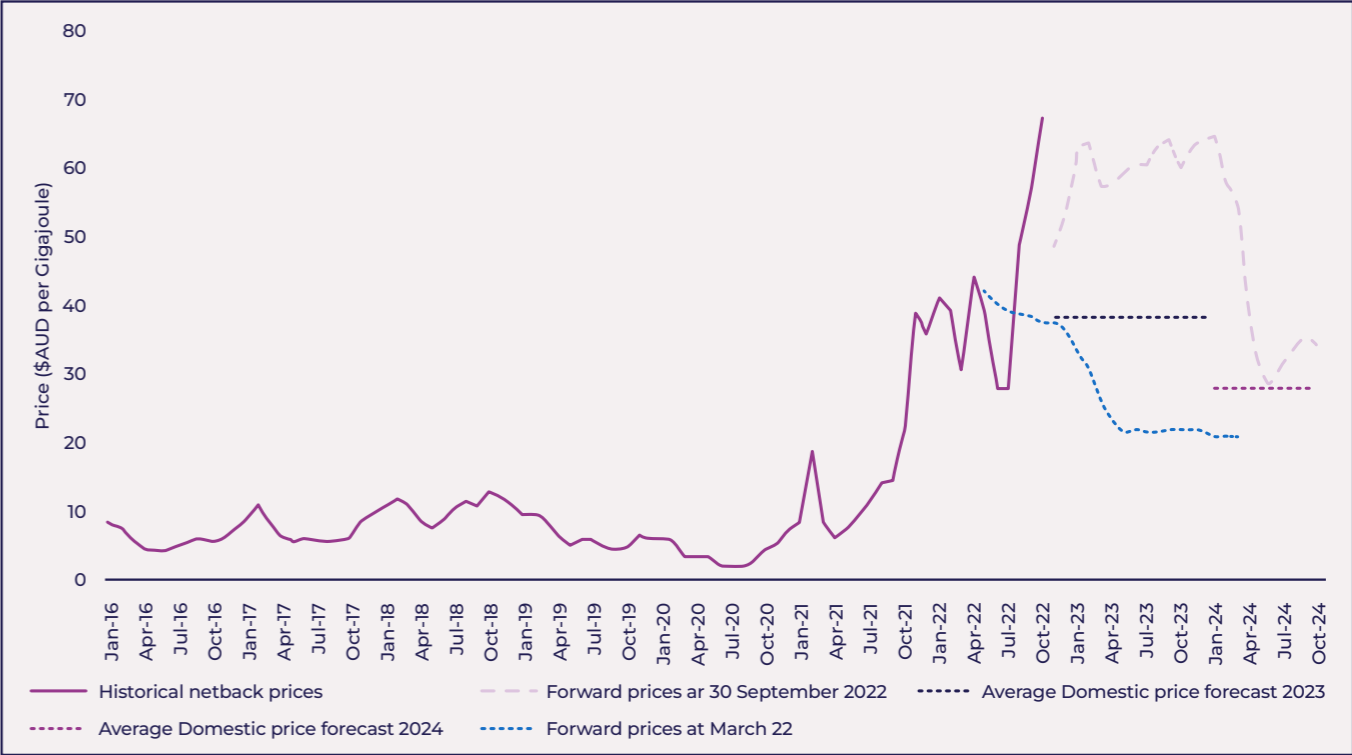


Figure 1 Historical and forward short-term LNG netback prices¹

¹LNG netback price series | ACCC

²Could Russia's actions in Ukraine accelerate renewables investment? – pv-magazine Australia (pv-magazine-australia.com)

Also, the world is now clearly in the transition to renewables and the balancing source of energy is currently gas. So not only is there added pressure coming from Europe but retailers also need to access the gas spot market to cover any short fall in supply, creating further volatility simply through supply and demand.

What's interesting is a lot of the long-term LNG contracts in Australia are set to expire at the end of the year and therefore suppliers looking to re-contract will become fully exposed to the spot market until they re-contract.

Accordingly, key factors in the Australian energy market will be:

- how big of a role Australian LNG plays in Asia and Europe;
- what global options counterparties who are looking to re-enter new LNG contracts have, noting that typically these large LNG plants have been highly contracted in the past with multi-year tenors to provide greater certainty to their owners;
- what prices will the new contracts get locked in at; and
- how much will be supplied and for what tenor.

Theoretically this should impact LNG netback prices which in turn could flow through to sustained high energy prices in Australia, particularly with coal exiting the market and the supply gap widening.

I think the impact of these contracts coming to an end, coupled with high European demand will be important to watch in Australia over the next six to twelve months.

How is the recent volatility in global LNG spot prices impacting the adoption of renewables, particularly hydrogen?

The rollout of renewables is primarily driven by shortfalls in supply and rising energy price expectations. Renewables are the lowest cost and quickest form of new generation capacity. The energy crisis has also certainly thrown the diversification of the global energy supply into high gear, illustrated by various countries recently announcing either recalibrated supply strategies or new ambitious renewable supply targets. So, in short, these high commodity prices should be driving more adoption.

We are also seeing more support come through in the hydrogen market. For example, you have the European Union scheme to provide financial support to make up the difference between the market contract price for hydrogen and the price of hydrogen itself. In the United States, the tradable carbon tax credit performs a similar function – both make hydrogen commercially competitive. I believe more schemes like these will be seen globally.

There is also the time element. Currently, Europe is capping energy prices for individuals and corporations. This is applying a short-term answer to a long-term issue. However, there is also robust support across the continent not just for hydrogen development but for creating a market that can sustain it. So, what we're seeing is government intervention addressing short-term fiscal issues lending itself to long-term renewable energy development. Should this continue, energy diversification will happen at a quicker pace.

Australia is well placed to capitalise on this, not only because we have access to an abundance of land, water, shipping and ports, but Australia also provides an option of low sovereign risk and a history of providing long-term energy contracts to other countries with certainty.

How do you see that global diversification trend playing out in Australia? Do we have the right policies in place to drive growth in renewables?

As I mentioned earlier this year², it's tough to deny that an energy market working in perfect harmony with 100% renewables would supply lower costing and greener energy to consumers vs the energy markets we see today, which are still heavily reliant on fossil-fuels. The delta in the falling levelized cost of electricity between renewables vs their fossil-fuel counterparts is a clear reflection of this, as higher commodity prices translate to a stronger investment incentive in clean energy. This understanding coupled with a current environment of high wholesale energy prices, supply chain constraints and the over reliance on others to meet domestic energy needs, are all clear drivers towards a well-diversified domestic energy supply mix for any country.

For Australia, we are certainly in the transition phase with both the State and Federal government putting policies in place to help drive growth in renewables. However, the issue really becomes the speed and connectivity between State and Federal policies. In an ideal world it should all work in unison.

Focusing on the hydrogen market, I think it goes beyond just supporting decarbonisation targets – we also need government to actively step in and support the industry by creating stable market conditions for suppliers and helping buyers determine whether the hydrogen they are buying is of a certain standard. From an investment point of view, this is critical. Setting development targets, underwriting procurement, enabling infrastructure development, utilising skilled labour, incentivising electrification and driving down the levelized cost of energy to make it more competitive – these are essential to supporting the bankability of projects, the growth of the market and allowing for countries to push their energy diversification strategies.

Here in Australia, how do you think the Reserve Bank's multiple rate rises will impact domestic renewable investment?

Rising interest rates are having an impact on investment in projects in Australia. However, from a global perspective I am not sure the rate increases are being considered a significant hurdle to investment. Investors are happy to take on known equity risks with a view that the markets will eventually unwind in the coming years, at which time they can refinance at a lower rate.

However, it is important to remember that the forces impacting the cost of financing projects are all interconnected. Higher rates are going to drive up the general cost of business, which in turn results in higher CapEx costs and tighter economics. This, coupled with continuing supply chain constraints, will impact the flow of capital into new projects over the next couple of years.

Join us for Part II as we examine what impact the changing energy landscape will have on the scalability and adoption of renewable hydrogen.

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In Part I, Mike explained how the global energy crisis is impacting the energy markets and project financing in the renewables sector. In this Part II, Mike explains how the energy crisis has the potential to accelerate the transition to net zero, in particular through a burgeoning renewable hydrogen economy.

Part II

We've now seen how vulnerable a country's energy security can be to global events. What in your view does the future hold for the energy transition and can renewables help guarantee energy security?

The energy crisis has really thrown the diversification of the global energy supply into a higher gear. Countries and whole continents, particularly in Europe, are concerned about energy security – ensuring that domestic energy supply is not impacted by international events.

A lack of access to energy supply combined with volatile commodity prices has fed through to both global fuel and energy prices, and I don't think we will see the energy prices mean revert any time soon.

From the latest government announcements we have seen regarding commitments to targeting additional renewable capacity build-out, it certainly feels like governments see renewables as a way to, in the long term, bring prices back down to earth.

What does this mean for the wider renewables market? The more efficient solar pv, wind and battery technologies become, the more we will see long-term capex prices fall. This will help drive down the cost of supplying energy. This can be seen via various forecasts of levelized cost of energy which are falling. There is a chance we will also see more companies move to manufacturing equipment domestically, in turn reducing the risk around future supply chain constraints. As I touched on previously (read [here](#)), the main bottleneck for mass adoption is continued government support. Government holds the key to the acceleration of renewables by enabling infrastructure development and grid build out, utilising skilled labour and by simplifying permit processes for projects.

The ability to produce renewable hydrogen independently of fossil fuels for energy supply makes it an attractive alternative to conventional fuels. For renewable hydrogen, its production is limited to where you can generate renewable electricity. As countries

continue to transition their energy mix to renewable resources and technology (ie electrolyzers), costs should come down, and the ability to produce renewable hydrogen at scale will follow. This is a potential alternative fuel to liquefied natural gas (LNG) which can hugely contribute to energy security and fuel independence for countries fortunate enough to have the renewable resources to produce renewable hydrogen at scale.

Do you see the same level of adoption playing out in Australia?

Australia has been lagging behind in policy support compared to our European Union and American counterparts. It is one thing to back net-zero targets and commit to carbon neutrality – it is another to actively step in and support the hydrogen industry by creating stable market conditions.

This doesn't mean just awarding grants to buy electrolyzers. Substantive support is about creating the kind of economic environment that makes hydrogen competitive with traditional fossil fuels and allows buyers to ensure the hydrogen they're buying is of an acceptable standard. Doing so will increase the bankability of hydrogen projects and, in turn, attract the investment capital that is essential to growing the hydrogen industry.

Australia now has a government that seems to believe in renewables, which we are seeing through various commitments and programmes such as the more recent "Rewiring the Nation" announcement, which is great. For hydrogen, seeing policy help stimulate a sustainable market will be a big step forward.

What policies and incentives do you think could work for Australia?

Implementing similar programs to those in Europe and the United States would be a good start. One option could be for the Federal Government to guarantee the creditworthiness of hydrogen companies. This would ensure emerging hydrogen companies possess the financial security to compete with larger international firms in securing the finance required to scale hydrogen projects and to attract international investment. That kind of active government participation in the market would certainly help to level the playing field.

In terms of what these policies should achieve, fostering investor confidence is key. Right now, you're already starting to see some large names crop up in the Australian hydrogen market – SK Group, FFI, etc. While this is promising, these investors already have huge sums of capital and can invest in hydrogen now. What we're still not seeing in Australia is the investment from smaller investors – the cost of production and offtake risk are still high, and there is not currently the bankability to make investment worthwhile for a lot of players. Creating confidence in the market will be key for hydrogen projects to become a permanent fixture in our energy mix.

Hydrogen scalability presents a huge opportunity. Not just for those who intend to continue to deploy more traditional renewable technologies like solar pv, wind and batteries to

power green hydrogen sites, but also for those wanting to invest more primarily into hydrogen technology itself. We are already seeing those who have a bigger risk appetite looking for exposure to hydrogen development. However, these early stage investments are different from the early 21st century boom in solar and wind. Hydrogen production and storage is more complex – you need a really high level of specialisation both in labour and materials.

As a result, the growth of the industry has been slower than its renewable counterparts – it is being driven more by purposeful action by project developers. While it is a different ballpark to solar and wind, there is tremendous opportunity – particularly for companies like Octopus who focus on bringing specialists in house to engage in a more active style of management with projects on a day-to-day basis. The opportunities are there and have been brought to the fore by recent global events. It's now up to government and private industry to work together to take advantage of those opportunities.

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About Matt Baumgurtel Partner – Head of New Energy

Matt has over 17 years' experience, particularly focused in the energy sector. Matt approaches his work with a one firm, one team philosophy. He strives to deliver creative solutions in all of his representations, providing proactive ways to add value to client's businesses and to help achieve successful outcomes.

Matt has considerable expertise in project development, construction, financing, joint ventures, and mergers and acquisitions transactions. He specialises in legal advice throughout the energy and infrastructure lifecycle, and acts for investors, developers, and constructors of solar, thermal, wind, hydrogen, electricity transmission, waste to energy and energy storage projects in Australia and the APAC region.

Matt's expertise also includes drafting and negotiating project and finance agreements, EPC and O&M agreements, connection and access agreements, and power purchase agreements. Matt also has extensive experience managing non-recourse project financing, including parallel bank negotiations, due diligence and transaction documentation.

Prior to joining Hamilton Locke, Matt was a partner and co-lead of the energy, infrastructure and resources group at K&L Gates. He was also previously the General Counsel at Fotowatio Renewable Ventures (FRV) for eight years. Prior to this, he worked for a number of leading global and national law firms, including Gilbert + Tobin and Clifford Chance.

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About David O'Carroll Senior Associate – Energy, Infrastructure and Resources

As an energy, infrastructure and resources specialist, David has a passion for law and looking at problems with a logical and strategic lens, using his extensive knowledge and skills of the market to find positive outcomes for clients. Through his collaborative, perceptive and diligent approach, David strives to provide meaningful counsel to find the best outcome for complex problems.

David has expertise in energy, infrastructure and resources, as well as project development and construction. In particular, David's expertise includes drafting and negotiating project agreements, EPC and O&M agreements, connection agreements and other construction contracts (including D&C and construct only contracts).

Prior to joining Hamilton Locke, David was a lawyer with Arthur Cox in Dublin, as well as with Ashurst in Sydney.

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