EESA
Electric Energy Society of Australia

NATIONAL BULLETIN

Bulletin 11 | 2023

EECON 2023 – WHAT A BLAST!

By Terry Lampard, National President of the Electric Energy Society of Australia

I am delighted to report that EECON 2023, held in Melbourne on 15-16th November, was a great success. Around 340 people attended, including over 20 fantastic exhibitors.

The conference was preceded by a site tour to an Ausnet Rapid Earth Fault Current limiter site followed by a guided tour of the Phillip Island Community Energy Storage System. Thanks to Ausnet for hosting this interesting tour.

On Wednesday morning the Conference got off to a roaring start with a thoughtful opening presentation by The Hon. John Pesutto (leader of the Victorian Liberal Party), followed by a keynote address from Dr Alan Finkel and a video message of support from The Hon. Lily D'Ambrosio, Victorian Minister for Climate Action, Energy and Resources, and the State Electricity Commission.

A Plenary Session followed, which featured Prof. Julie Arblaster, Mr. Tony Wood, Dr. Robert Barr, and Mr. Scott Ryan. The theme was The Energy Transition – the bumpy road ahead. I think every attendee would have been imbued with a sense of urgency by the conclusion of this session.

Terry Lampard
National President of the Electric Energy Society of Australia

Parallel sessions then proceeded with themes centering on meeting net zero, reducing our carbon footprint, and reliability and resilience.

A well-attended Conference dinner was then enjoyed by many of the delegates.

The next morning commenced with an address from Danielle Laidley who described her own approach to a personal transition which demonstrated enormous courage.

NATIONAL BULLETIN

Bulletin 11 | 2023

Day 2 presentations then commenced continuing the theme of meeting net zero and reliability/resilience, but also introducing themes of future-proofing networks and energy storage.

A final plenary session included Prof. Michael Brear, Mr Alistair Parker, Mr Rod Jones, Dr Ron Ben-David and Melanie Koerner.

The Conway Prize for Best Presentation by a member was awarded to Lianne Moller, Asset Investment Planning Manager – Ausgrid for her presentation on "Modelling the capability of our distribution network to support Consumer Energy Resources - Ausgrid's journey and perspective". The Cresswell Prize for Best Presentation by a non-member was awarded to Nick Finch, Head of Engineering – Akaysha Energy for his presentation on "The Waratah Super Battery". Both of these prizewinners are entitled to expenses-paid attendance at EEANZ and their presentations will be considered for inclusion in the conference program. Congratulations Lianne and Nick!

We also took the opportunity to present our Young Power Engineer of the Year Prize to Joshua Paoli of TasNetworks. This Prize entitles Joshua to attend an international conference (such as CIGRE or CIRED) with expenses paid. Congratulations Joshua!

Sincere thanks go to our major sponsors – Siemens, AusNet and EVOPOWER and our key supporter the Australian Power Institute who once again supported the logistics of EECON by sending a number of students who were all exposed to the emerging challenges facing us over the next decades.

My personal thanks go to the Organising Committee, particularly Harsh Tayal, Russell Ellen, Michael Bacon and David Wilkinson, supported by a team of volunteers all of whom made a significant contribution to a great conference program. We were also ably assisted by Candice Rapp (2em) and Penelope Lyons (EESA Executive Officer) who kept things running smoothly.

Preparations have already started for EECON 2024 which will be held in Sydney next November. This promises to be a fantastic event, and unique in the sense that it coincides with our 100-year anniversary as a Technical Society. Speaking of which...

Affiliations

NATIONAL BULLETIN

Bulletin 11 | 2023

EESA 100-year anniversary

The Electricity Supply Engineers Association of NSW (ESEA) held its first meeting on 22nd April 1924 – which makes 2024 our centenary year. Documenting the history of ESEA from its origins through to its modern incarnation as the nationally-based Electricity Supply Association of Australia (EESA) is one of numerous tasks we are undertaking to celebrate the occasion.

The first ESEA Conference was held in 1927 and, amazingly, we have copies of conference papers dating back to then. (Thanks go to Peter Dulhunty for scanning and hyperlinking papers from 1927 through to 2008.) Another task for us is to fully index these papers and point intelligent tools at it to allow full value to be obtained from this historically significant archive.

I will keep you all updated on our centenary celebrations in future issues of the Bulletin.

EESA
Electric Energy Society of Australia

NATIONAL BULLETIN

Bulletin 11 | 2023

Meet the 2024 National Council

We are pleased to announce the 2024 EESA National Council. We look forward to a year of collaboration and meaningful initiatives. Keep an eye out for updates on upcoming events and opportunities to participate in the life of EESA.

Terrence Lampard

National President

Larry Meng

National Honorary Treasurer and NSW Chapter Treasurer

Penelope Lyons

National Executive Officer & Secretary

Simon Lewis

NSW/ACT Chapter Chair and National Council Member

Martyn Pearce

SA/NT Chapter Chair and National Council Member

John Tope

Tas Chapter Chair and National Council Member

Marcus Leaver

Queensland Chapter Chair

Amy Phan

Qld Chapter Social Media Coordinator and National Council Member

Harsh Gupta

Vic Chapter Chair and National Council Member

Jeffrey Allen

Immediate Past National President & NSW/ACT Chapter Committee Member

Franco Crisci

SA/NT Chapter Committee Member and National Council Member

Natalie Hutchinson

Vic Chapter Treasurer and National Council Member

Affiliations

ENGINEERS AUSTRALIA · CIRED · cigré AUSTRALIA · ATSE · API The Australian Power Institute

CONTENTS

LOCAL NEWS

CORPORATE MEMBER RECENT ACHIEVEMENTS

CONTENTS CONT.

CONTENTS CONT.

LOCAL NEWS

RETHINKING AUSTRALIA'S ENERGY TRANSITION: SIX INSTITUTIONAL REFORMS

By Dr Ben David| November 2023 | Source: Energy Insights

Australia's current regulatory landscape is ill-equipped to facilitate the rapid transition of the national energy system. Today's institutional arrangements were put in place 20-30 years ago to manage very different set of challenges. The urgency of the energy transition requires rethinking the roles played by markets, regulators and governments.

Current challenges in Australia's energy transition

The existing regulatory framework in the Australian energy sector is struggling to satisfy the demands of the energy transition. Emissions reduction targets are not being met at the required pace, inadequate investment is jeopardizing system reliability, and price relief for consumers is nowhere in sight. Transition focussed reforms require:

1. laser-like focus on addressing coordination risks
2. rethinking who is rewarded for producing what value
3. adopting realistic expectations about consumer conduct, and
4. eliminating ambiguity from current governance arrangements.

Reforms to address shortcomings of the current system

Six institutional reforms are proposed in response to these four priorities. The are:

- **Promoting urgency over efficiency:** The National Electricity Objective (NEO) focuses exclusively on promoting efficient investment and operations in the energy market. While self-evidently worthwhile, this narrow focus no longer aligns with the urgency of the energy transition. A timely transition must now be recognised as a central policy and regulatory objective within the relevant laws and rules. Trade-offs between timeliness and efficiency will be required. This will necessitate transferring certain decision-making responsibilities from regulators to policy-makers.

LOCAL NEWS

- **Investing in long-term system planning:** Given the constraints on resources and budgets, and the importance of maintaining ongoing community confidence in the energy transition, long-term system planning is essential. Maximising the use of existing assets and minimising the demands on private and environmental resources are critical considerations. Public investment in long-term planning is necessary to address critical path-dependencies in network investment.

- **Good governance requires leadership by state governments:** State governments are reasserting their constitutional responsibilities for securing reliable, low-emissions energy for their communities. The National Energy Law has always provided the opportunity for individual states to derogate from the national framework. Greater and more systematic use must now be made of these derogation powers to avoid the current confusion of accountabilities for the energy transition.

- **Reorganising the market to internalise coordination problems:** The current market structure, defined by a four-way linear structural separation of the energy system, does not align with the coordination challenges of the energy transition. This mismatch is driving the rapid growth in the volume and complexity of the rules and processes governing the energy market as regulators struggle to accommodate new technologies and business models. Reorganising the market around a Bulk Supply Provider (BSP) transacting with a Net Demand Purchaser (NDP), would internalise many coordination challenges and reduce the need for ever more rules and regulatory processes.

- **Realistic expectations of consumer behaviours:** While demand-side participation has gained great prominence in recent times, the increasing complexity of market contracts poses significant risks for consumers. If these risks are allowed to materialise, they will undermine consumers' confidence in, and support for, the energy transition. The consumer facing energy market must be designed in ways that do not punish consumers who do not act like sophisticated market traders.

- **Mobilising technical expertise:** Technology gaps in the emerging energy grid will inevitably arise. They must be addressed urgently to facilitate the energy transition. Public funding is required to support rapid deployment teams of technical experts to solve knowledge gaps as they emerge.

A call for bold institutional reforms

The current market, regulatory and governance landscape in Australia's energy sector is ill-suited to the urgency of the energy transition. The proposed institutional reforms presented in this article offer a roadmap for tackling these challenges and accelerating the transition to a sustainable energy future. While the path forward requires a significant realignment of roles and responsibilities, continuously tinkering with the status quo is not a viable option. Policy makers must come together to quickly implement the institutional reforms required for a successful energy transition in Australia.

LOCAL NEWS

ON THE MAP: A STATE-BY-STATE GUIDE TO ALL OPERATING GENERATORS ON THE NEM

November 2023 | Source: RenewEconomy

Torrens Island big battery. Photo: AGL.

Where is that wind and solar farm that we keep on hearing about? Where is that big battery?

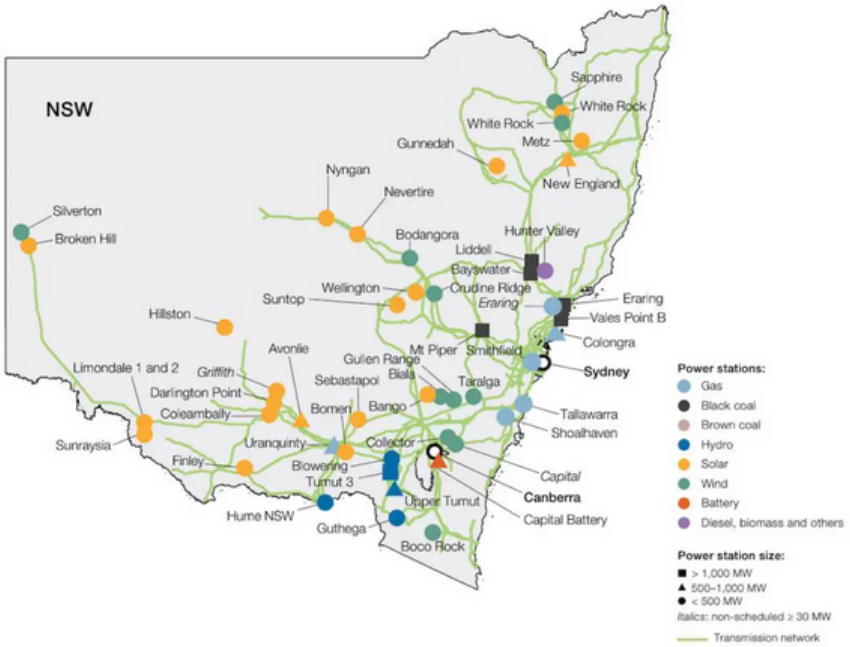
Australia talks a lot about its electricity grid and the shift from fossil fuels to renewables, but the reality is that few people actually know where projects are located – apart from those who live close to them or see them as drive past.

This set of maps was published recently in the Australian Energy Regulator's State of the Energy Market report, and we thought it would be a useful ready reference for those people wondering where exactly stuff has been built.

Such is the pace of change on the grid that it is already out of date – it does not include the Torrens Island big battery, for instance, in South Australia, and we can't see the Wallgrove battery in NSW.

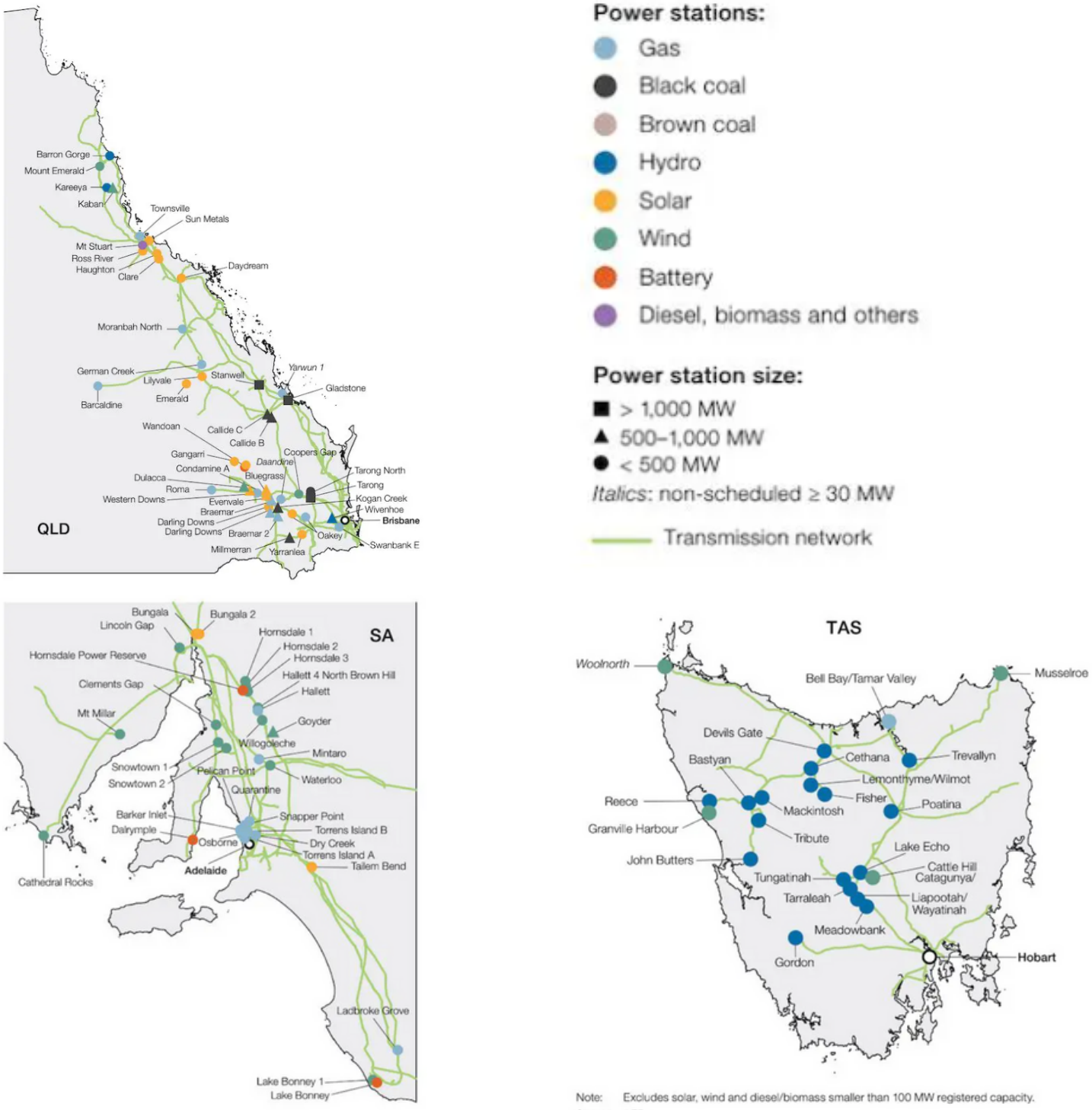
It ostensibly includes only completed projects, but we now learn that the Capital battery in Canberra won't be commissioned until next year.

Still, it is a useful reference. For those wanting to learn more about locations of projects in the pipeline, you can also check out RenewEconomy's own online maps for battery storage (including all proposed and committed projects), as well as onshore wind, offshore wind and large scale solar.



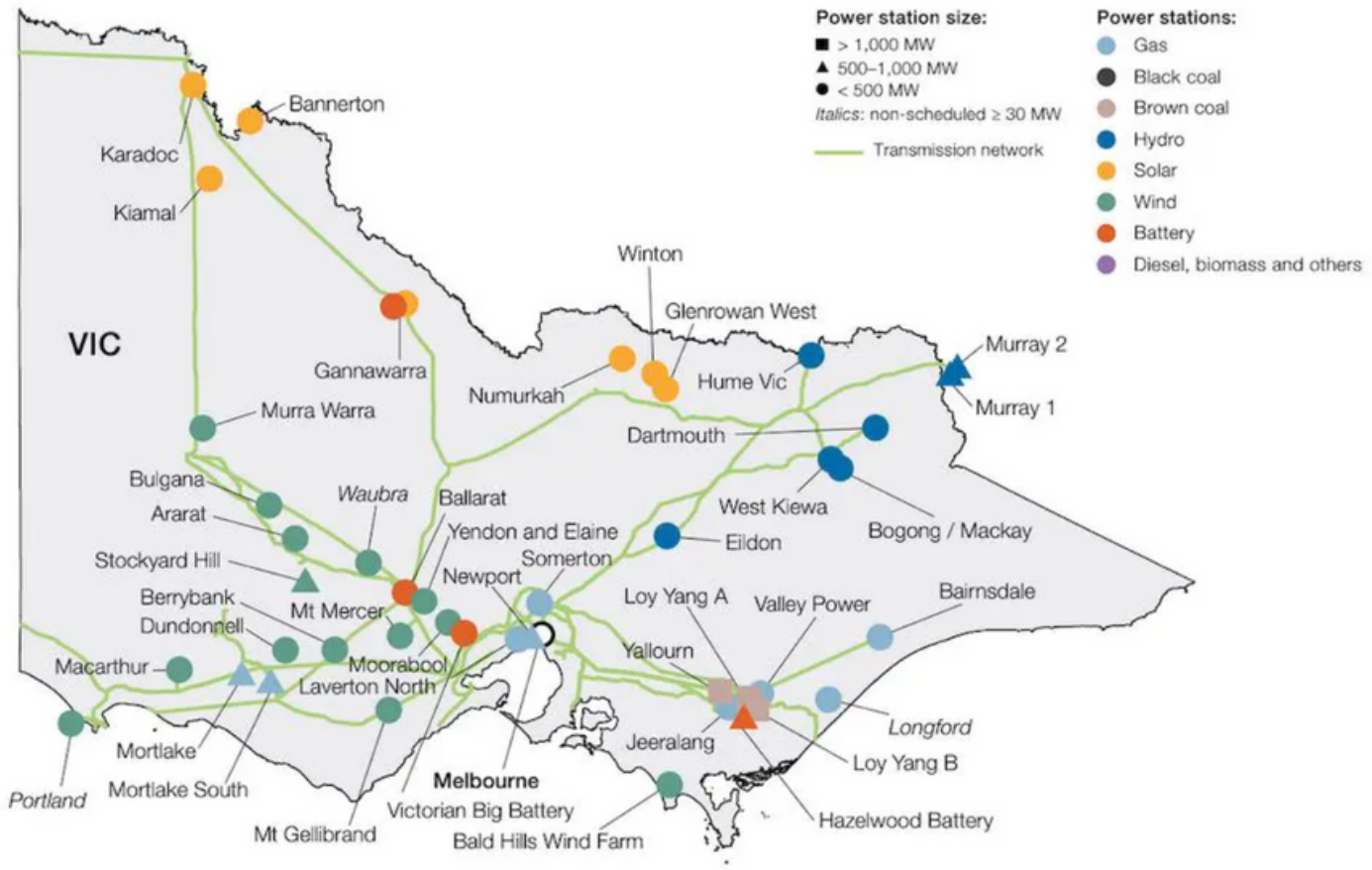
LOCAL NEWS

Figure 3.19 Generators in the NEM



Note: Excludes solar, wind and diesel/biomass smaller than 100 MW registered capacity.
Source: AER.

LOCAL NEWS



STATE OF THE ENERGY MARKET 2023 | National Electricity Market 64

LOCAL NEWS

COMMUNITIES AND INDUSTRY TO HAVE THEIR SAY AS NSW ACCELERATES RENEWABLE ENERGY TRANSITION

November 2023 | Source: Planning

The NSW Government is getting the state's energy transition back on track by releasing new draft guidelines to accelerate the planning approval and construction of wind, solar and transmission infrastructure.

Feedback is being sought on draft guidelines which are designed to promote faster decisions, provide certainty to investors and industry, and improve transparency for communities.

The draft guidelines provide clarity on how noise, visual and other community impacts should be evaluated and managed through the development assessment process.

They also propose new benefit-sharing arrangements through planning agreements with councils across NSW. Renewable energy projects are expected to deliver more than $400 million to support local government initiatives over the next 25 years.

This is in addition to the hundreds of millions of dollars available under the NSW Government's Community and Employment Benefit Program in Renewable Energy Zones.

The draft guidelines are aligned with recommendations made by the Electricity Supply and Reliability Check Up and the NSW Agriculture Commissioner's report on renewable energy generation and agriculture.

A range of draft tools to help landholders considering hosting renewable energy development are also on public exhibition.

Development of large-scale solar and wind energy projects are critical to delivering a secure and affordable supply of electricity and achieving NSW's Net Zero targets.

All stakeholders including industry, councils and residents are encouraged to have their say on the draft guidelines before Monday, 18 December 2023.

The Department of Planning and Environment will review submissions and finalise the proposed guidelines in early 2024.

To have your say visit: planning.nsw.gov.au/energy-policy-framework

LOCAL NEWS

Quote attributable to Minister for Energy Penny Sharpe:

"We want communities and industry to provide feedback so we can crack-on with delivering the renewable energy NSW needs."

"The draft guidelines are critical to delivering renewable energy and reducing greenhouse gas emissions."

"The guidelines also suggest how communities can benefit from the transition. Community feedback is essential and we look forward to it."

Quote attributable to Minister for Planning and Public Spaces Paul Scully:

"It's vital that the planning system adapts and evolves so we can deliver the energy generation and transmission infrastructure our state needs into the future."

"These proposed new guidelines will support faster decisions and clearer rules that will increase certainty for the industry and communities."

LOCAL NEWS

ACTEWAGL TO INSTALL 58 EV CHARGERS AT PARLIAMENT HOUSE

By: Nadia Howland | November 2023 | Source: Energy Source & Distribution

ActewAGL is leading the installation of 58 new electric vehicle (EV) chargers throughout the Parliament House precinct, with the initial stage of this project being the launch of 10 EV chargers in the visitor's car park, one of the largest public EV charging installations in the ACT.

In partnership with EV charger delivery partner EVSE Australia and local installation partner Shepherd Electrical, the project has provided an exciting opportunity for local businesses to work with the Commonwealth Government in support of the National Electric Vehicle Strategy. Further, the project will support the transition of the COMCAR fleet from internal combustion engine (ICE) vehicles to EVs.

Available to the public from 13 November, the 10 visitor's car park chargers will contribute to the ACT Government's Zero Emissions Vehicles Strategy, particularly their target of achieving at least 180 public chargers online by 2025.

The remaining 48 chargers will be located within the Senate, House of Representatives, and Ministerial car parks at Parliament House and are due for completion in 2024.

Seven of the new EV chargers will be installed in dedicated accessible car parking spots and tailored to ensure that the infrastructure and spaces are accessible for all.

ActewAGL general manager retail Rachael Turner said, "This impressive EV charging solution has been developed by ActewAGL for Parliament House with our EV charger delivery partner, EVSE Australia, following significant consultation with the Commonwealth and local installation partner, Shepherd Electrical. The Ocular 7kW and 22kW chargers will be available on the Exploren public charging network, allowing users to tap and pay seamlessly for their charging.

"ActewAGL has already installed more than 100 EV charge points in the ACT and surrounds for the public, ACT Government, Federal Government, local businesses, multi-dwell occupancies and new developments. We're also contracted to install a further 100 charge points within the region across the next 12 months, further demonstrating our commitment to providing EV charging infrastructure in line with current and future demand for the public, business community and visitors to the ACT." In addition to supporting the local charging infrastructure, ActewAGL's award-winning evHub is helping customers find, finance and charge EVs. Customers can purchase vehicles in stock now and explore EV charging solutions for homes, apartment complexes and businesses.

LOCAL NEWS

WARATAH SUPER BATTERY

November 2023 | Source: EnergyCo

To ensure NSW continues to have reliable energy supply following the anticipated closure of the Eraring Power Station in 2025, the NSW Government is delivering the Waratah Super Battery (WSB) project. The WSB project is a System Integrity Protection Scheme (SIPS) designed to act as a 'shock absorber' in the event of any sudden power surges, including from bush fires or lightning strikes.

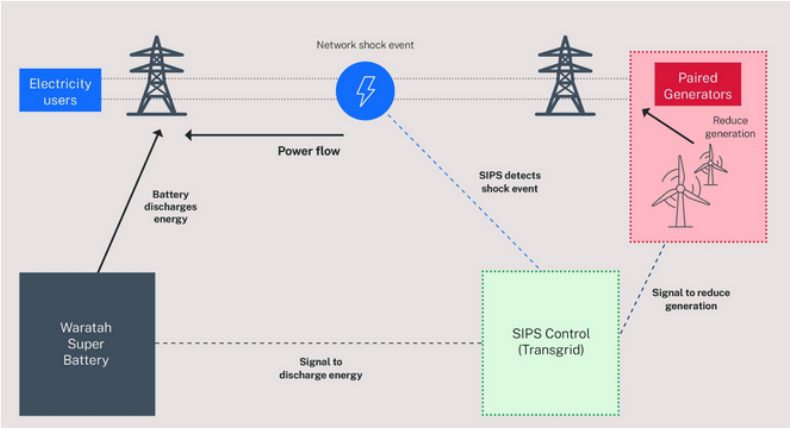
WSB project components:

- A SIPS Service provided by a Battery Energy Storage System (BESS) located at the former Munmorah coal-fired power station that is capable of providing a guaranteed continuous active power capacity of at least 700 MW and a guaranteed useable energy storage capacity of at least 1400 MWh.
- Paired Generation Services provided by multiple generators across NSW that are capable of providing technical services to support the SIPS.
- Network Augmentations and SIPS Control provided by Transgrid in its role as Network Operator that includes the SCADA, telecommunications, minor augmentations and control scheme equipment required to operate the SIPS.

The WSB project provides a virtual transmission solution that unlocks latent capacity in the existing transmission system, allowing electricity consumers in the Sydney, Newcastle, Wollongong demand centres to access more energy from existing generators.

The WSB project is being delivered as a Priority Transmission Infrastructure Project, or PTIP, under the Electricity Infrastructure Investment Act 2020 (the Act), and is the first PTIP to be delivered under the Act.

The WSB project is expected to stimulate up to $1 billion in private investment into new energy storage and associated network augmentations, generate significant capital investment in the Hunter and Central Coast regions, and support over 100 jobs during construction.



Transgrid appointed as Network Operator

On 14 October 2022, the Minister for Energy appointed Transgrid as Network Operator and formally directed Transgrid to carry out the WSB project as a PTIP under the Act, published in the NSW Gazette here.

As Network Operator, Transgrid will coordinate the delivery of the project components described above and will be responsible for operating the SIPS once the WSB project is operational.

LOCAL NEWS

Akaysha Energy appointed as SIPS Service Provider

EnergyCo in its role as Infrastructure Planner for the WSB project, appointed Akaysha Energy as the SIPS Service Provider following a competitive procurement process conducted throughout 2022.

Akaysha Energy is responsible for the construction of a BESS located at the former Munmorah coal-fired power station that is capable of providing a guaranteed continuous active power capacity of at least 700 MW and a guaranteed useable energy storage capacity of at least 1400 MWh for the purposes of providing the SIPS Service.

The physical size of the of BESS is expected to be 850 MW / 1680 MWh which is understood to one of the largest committed BESSs in the world, both in terms of power and energy storage capacity. This oversizing of the BESS allows for degradation of the battery over time to ensure security of supply. It also allows Akaysha Energy to utilise the excess capacity to tap into additional revenue streams, putting downward pressure on the cost of the SIPS Service provided to NSW consumers.

Munmorah Site

The WSB project will be developed within the former Munmorah Power Station site at 301 Scenic Drive, Colongra (the Munmorah Site).

On 2 September 2022, the Minister for Planning declared the potential development of the WSB project on the Munmorah site as Critical State Significant Infrastructure (CSSI), in recognition of the critical nature of the project to NSW's energy security.
For further information, you can download a newsletter about the Waratah Super Battery – Munmorah.

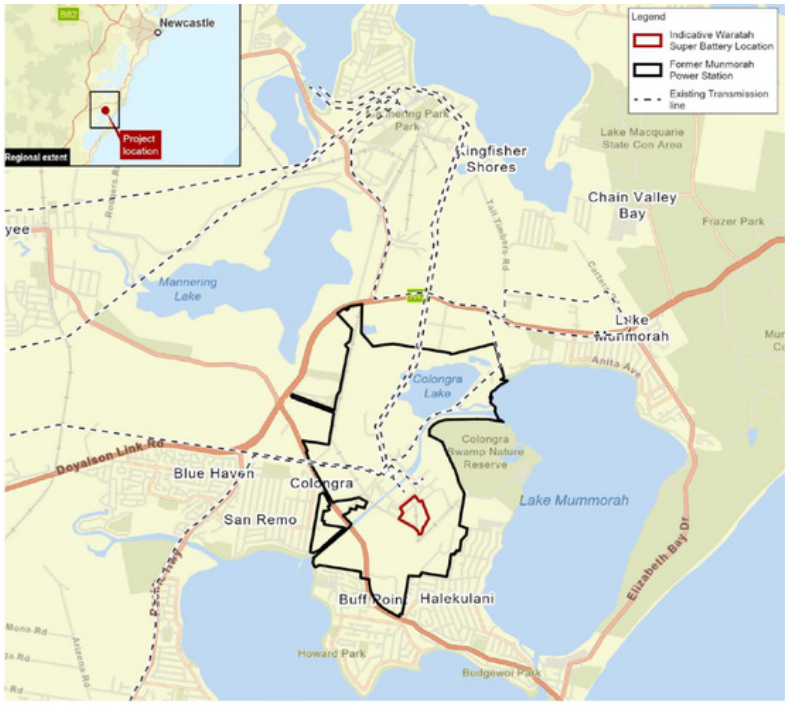
LOCAL NEWS

EnergyCo prepared a comprehensive Environmental Impact Statement (EIS) which assessed the impacts of the WSB project on the environment and surrounding communities. As part of the preparation of the EIS, EnergyCo consulted with a range of stakeholders, including residents in the surrounding community.

The EIS was publicly exhibited between 11 November and 8 December 2022 on the Department of Planning and Environment's major projects website.

Following the consultation period and after review of submissions, the NSW Government granted planning approval for the construction and operation of the Waratah Super Battery Project on 23 February 2023.

On 31 May 2023, Akaysha Energy began construction on the Waratah Super Battery. Construction is expected to be completed before August 2025.



Regulatory

The WSB project is composed of two contestable components (a SIPS Service and Paired Generation Services) and a non-contestable component (Network Augmentations and SIPS Control). The Australian Energy Regulator (AER) in its role as Regulator under the Act, is required to make revenue determinations for each component of the WSB project.

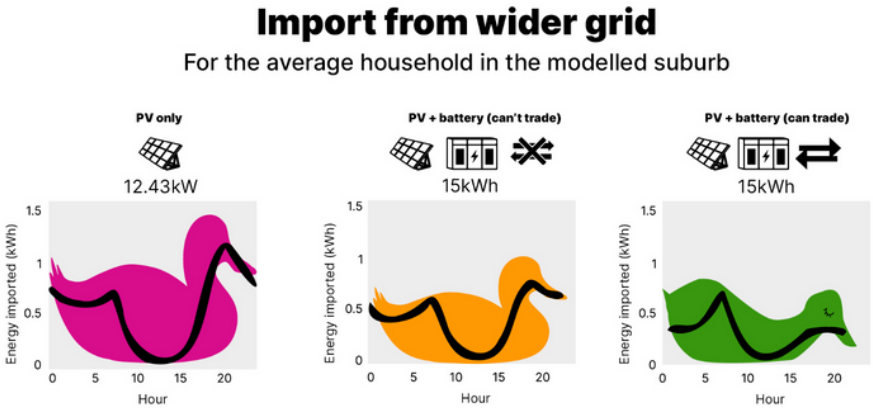
Under the Act, the Scheme Financial Vehicle (SFV) must pay the Network Operator in accordance with the amounts set out in the AER's revenue determination. The SFV recovers the cost of the NSW Electricity Infrastructure Roadmap from Distribution Network Service Providers who in turn recover those costs from NSW electricity consumers through network charges on their retail bills.

On 14 December 2022, a revenue determination for the SIPS Service component of the WSB project was published by the AER on its website.

LOCAL NEWS

MODELLING SHOWS HOUSEHOLD STORAGE IS KEY TO LOWERING COSTS

By Dr Gabrielle Kuiper | Source: IEEFA



Based on ITP Renewables modeling. Source: IEEFA

Modelling shows household storage is key to lowering costs

27 April 2023 (IEEFA Australia): IEEFA guest contributor Dr Gabrielle Kuiper says the right regulations could help lower energy costs for all consumers as household solar, storage and load management becomes ubiquitous. For the first time ever, a study has looked at what will happen when Australia will reach saturation levels of distributed energy resources (DER).

The study, by ITP Renewables, modelled a range of DER scenarios and found that the costly evening peak could be almost completely eliminated and network peak use in summer could also decrease significantly.

Dr Kuiper said, "Modelling plays a central role in planning for the future of Australia's energy markets and by turning the concept 180 degrees, ITP Renewables has created a fresh understanding. We know eventually every rooftop in the National Electricity Market (NEM) that can have solar, will. Households will also be all electric with flexible demand in the forms of controlled loads, like hot water and electric vehicles able to be time-shifted to match solar availability.

"We don't know when this will happen, but we can model what this might look like through a range of scenarios, starting with 70% of houses with solar, then adding different varieties of DER in sequence to examine the impacts on PV exports, PV export peak, network peaks and high spot price periods. This approach to modelling gives a sense of the consequences for electricity flows locally and through the broader grid for an 'ideal' saturation DER suburb in a way that iterative modelling from the past is unlikely to do. The most significant finding from this fresh approach is that rooftop solar plus batteries will chop the head off the famous solar-created duck curve," she said.

The more batteries and flexible load in the system, and the easier the regulations make electricity trading by households and businesses, the greater the likelihood of a flatter grid demand/supply curve. Regardless, the 4–8pm peak is the time where generators have traditionally earnt the bulk of their revenue. If this peak no longer exists, there will likely be significant impacts on the spot market. The logical consequences should be significant downward pressure on wholesale spot prices, which benefits all consumers.

Distribution network costs are the largest component of consumer electricity bills even with recent increases in wholesale market prices. Australia's distribution networks have been built to meet summer evening air-conditioning peaks and the

LOCAL NEWS

$82.6 billion collective value of the regulated asset bases of the distribution businesses in the NEM is largely based on their capacity to supply electricity from the grid at these times.

Dr Kuiper said, "Rooftop solar exported back into the grid reverses this flow and reduces the need for distribution network capacity. Solar PV alone reduces the summer network peak by almost a third and moves it later in the day, decreasing the average summer network peak by almost two-thirds. There are location-specific issues – for example in Victoria where winter peaks will change with the heating electrification – and networks will need to consider this. In general, however, the study shows that software rather than network investment is needed to cope with increasing electricity flows from DER."

The Australian Energy Regulator already has approved expenditure for these types of investments in the Victorian distribution networks. The smart software systems can be cost-effectively combined with traditional tools that quickly and cheaply enable more solar, such as transformer tap changes at substations.

Overall, with decreased network peaks, reduced capex would seem logical, and with that, lower distribution charges for customers. The system-level benefits of DER should be passed on to all customers. This requires the Australian Energy Regulator to understand this modelling and, preferably, for the regulation for distribution revenue to be adapted to meet the new circumstances of growing levels of DER.

Dr Kuiper notes that none of the scenarios modelled by ITP Renewables were ideal. They were simply different combinations of technology and enabling conditions. She says that we could create even better outcomes by planning for them. From the insights of ITP's saturation DER modelling there are some further clear policy directions for the Commonwealth's energy performance strategy and state government DER policies and programs. These are:

- The Australian Energy Regulator should adapt distribution revenue regulation to meet the new circumstances of growing levels of DER. Ideally, the Australian Energy Market Commission would rethink revenue regulation from first principles given the dramatic changes coming in distribution networks.
- Policies and programs should aim to maximise flexible demand, especially shifting water heating with controlled load to the middle of the day and assisting consumers to switch from gas to smart electric hot water systems.
- Distribution network service providers (DNSPs) should be looking at matching renewable resources and network capacity by location for EV charging. It's not clear any organisations are taking a system-optimisation view of EV charging and there's a danger that the lack of EV charging standards and coordination will end up increasing overall costs for consumers. The modelling also looked at scenarios involving 'neighbourhood' batteries and further investigation is needed into how these can be used for the greatest benefit for consumers, as opposed to the DNSPs.
- Projects Edith, Edge and Symphony have begun to experiment with targeted remuneration for DER services within a local network area. DNSPs should continue to support this evolving work and the energy market institutions need to ensure consumers can be compensated for the services their behind-the-meter devices can provide to the grid.
- Finally, the Australian Energy Market Operator's next Integrated System Plan (ISP) should revise its DER uptake forecasts and attempt integrated planning with distribution networks. In particular, the ISP should model as many different scenarios for DER as it does for large-scale renewables. In general, we need energy system and market planning to better understand the implications of high levels of DER on the need for large-scale generation and storage.

LOCAL NEWS

Dr Kuiper says that DER has all the advantages of being small, modular and able to be deployed quickly without additional network capex investment. Given the delays to transmission builds and Snowy 2.0, the government needs to put greater focus on renewables and designing the policies, programs and regulations that will lower costs for all consumers by growing levels of DER.

LOCAL NEWS

"THE FUTURE DOESN'T INVOLVE YOU," AND OTHER THINGS THE AER WON'T TELL DYING GAS NETWORKS

By: Sophie Vorrath | November 2023 | Source: RenewEconomy

The Australian Energy Regulator has issued an almost indistinguishable warning to gas distribution companies to brace for "rapid change" to the policy settings governing how networks can recoup their costs, after deciding on doing nothing, for now, to adjust the mechanisms that set network prices.

The issue over the so-called death spiral for gas networks is a critical one for the industry and consumers, because one of the unresolved problems of the push to electrification and to kick gas out of the home is who gets to bear the cost of stranded gas pipelines and other infrastructure.

It looks like the issue is to hard to solve for the AER.

In a final determination on its Review of gas distribution network reference tariff variation mechanism and declining block tariffs, the AER said on Wednesday that it has decided "to not make sector wide changes."

"Instead, we will consider these issues on a case-by-case basis in the context of individual access arrangement reviews," the decision says.

"In this way we can better account for the differing levels of reliance on natural gas as an energy source across different jurisdictional markets, different policy settings applicable in each of those markets, and the views of distributor-specific stakeholders."

This means the industry is – for the remainder of each company's current pricing arrangement, anyway – stuck with the existing price cap tariff variation mechanisms, which, as the AER puts it, "incentivises gas distributors to grow the volume of gas carried by their networks."

On the other hand, gas companies are also stuck with the existing declining block tariff structures, which the AER says have benefited consumers by coming out in the wash as lower per-unit transport costs being paid by customers.

In this sense, Craig Memery, who leads the energy consumer advocacy program at the Public Interest Advocacy Centre, which made a submission to this review, says the AER's decision to hold fire on tariff changes is the right one.

Memery says the current gas tariff structure is already set up in a way that "adequately, from the perspective of consuming impacts," balances equity of pricing against the changing demand profile of gas in the residential market.

LOCAL NEWS

"If we were to turn it on its head, and change the network charges so that they're not as steep – so that they charge less for low use, and then more for high use – then that could have the perverse impact of keeping people with low gas use on the gas network and give them a false sense of security that their gas costs will remain affordable into the future.

"That's going to mean that they're not getting off gas completely and we're not solving the problem. Meanwhile, it would also penalise the people who can't get off gas by making them pay even more for this fuel that many already can't afford," Memery told RenewEconomy.

But the problem with the AER's decision is that it isn't really a decision – rather, the regulator has kicked that can down the road.

In the case of Victoria, where the exit from residential gas is gathering serious momentum thanks to the incoming state government ban on new connections to new homes, it puts off making important calls on tariff structures by around four years.

That's because under the new approach, the AER says gas distributors will submit a combined proposal for reference services, tariff variation mechanism and tariff structure 12 months ahead of their four-yearly access arrangement review. Victoria's current regulatory period expires on June 30, 2028.

"We will publish the proposal, as we currently do for standalone reference service proposals, and call for stakeholder submissions. We will release a non-binding AER decision on the combined service/tariff mechanism/tariff structure proposal within 6 months of its submission to us," the regulator says.

The AER adds that it expects distributors to undertake "substantive stakeholder consultation" to inform their proposals, and that it will be "looking for active consideration by distributors and their stakeholders of how best to balance the efficiency and emissions abatement objectives within the updated National Gas Objective."

And that's about as stern as the determination gets, except for when the AER adds later, in a section called "our considerations:"

"More broadly, the policy context for our gas network determinations is evidently now subject to change. Sometimes rapid change. Policy settings which seemed appropriate in the past or in the present, may soon appear inappropriate or unnecessary in future.

"We will weigh these considerations in the context of individual access arrangement proposals."

This is far from clear, though. And it goes nowhere near laying down the law on who will pay for what – and when – in the gas death spiral.

"We should ignore the gas industry's Gas Vision 2050 where households have hydrogen powered four-wheel drives and hydrogen powered barbecues which they're supplying from a reticulated gas connection at home.

LOCAL NEWS

"Aside from maybe a handful of harder-to-electrify locations, in 2050 gas will be gone from homes, the way that gas street lighting has already gone; it won't be a thing anymore because we've got better electrical options.

"What Governments and regulators ultimately need to do is signal to the gas businesses about the future is: 2050 doesn't involve you. Then we can plan for that future."

Memery says what is needed is a national plan for the wind-down of residential gas networks, starting with a discussion about who pays for what and who carries the risk of existing assets becoming stranded.

He also argues that for anything spent on gas networks from now on – and especially for new connections, where they're allowed to do them – the gas networks should have to bear the full financial risk.

"We've got about... $10 billion or $12 billion in regulated asset base for those networks that needs to come from somewhere – and gas network businesses are saying that should all come from consumers.

"I would say a lot of it represents future stranded assets and it's reasonable that a little bit comes from consumers, but gas businesses should be on the hook for a significant amount of it and maybe government should chip in, too."

Memery says that in comparison to, say, nuclear powered submarines, the public cost of buying out stranded gas assets could be seen as a small price to pay.

"Government could buy out a significant chunk of the gas networks and just take the problem away altogether," he says.

"Then you won't be fighting with an industry that's got a vested interest in keeping the asset running and recovering every cent from consumers."

Bruce Mountain, the director of the Victoria Energy Policy Centre, says the AER's decision underscores that the exit of gas from residential markets is an issue for state governments to sort out.

"Why do we cede the regulation of jurisdictionally defined network assets which are subject to jurisdictional policies to a national agency?" he asks.

"Why is it not a Victorian agency which is determining the regulatory settings for the energy transition?"

Dan Cass, executive director of Rewiring Australia, says that whoever sets the rules, the writing is well and truly on the wall for gas companies – and has been for some time.

"The climate emergency and the steadily improving economics of electrification means business as usual for gas is over.

"It is surprising and disappointing to see that the Australian Energy Regulator hasn't come to this conclusion yet.

"The failure to provide some rigorous regulatory intellectual leadership at this point creates more uncertainty which means more cost to the consumer."

LOCAL NEWS

For Memery, who is more forgiving of the AER's game plan, the crucial test will be how it handles future negotiations when the time for each gas company's tariff review comes around.

"Our position is the way the gas network tariffs are structured now is actually fine," he tells RenewEconomy.

The important role for the AER going forward, he adds, is "sticking to their guns on the price control mechanism, which is the price cap; don't let gas network businesses have their way on moving to a revenue cap.

"And we need continuous straight-line depreciation – don't let the network businesses have accelerated depreciation," he says.
"Accelerated depreciation would be a terrible idea, because what they're trying to do there is get consumers to cover their risk, rather than them covering their risk themselves.

"Using accelerated depreciation at the expense of consumers instead of carrying your own investment risk is like not thinking about climate change in the investment decisions you make … The time in which you could be forgiven for doing that has long since passed."

And as for plans of piping renewable hydrogen through existing network assets, that should be a hard no, says Memery.
"Just put a hard line through that and say, 'no hydrogen in gas networks, full stop'.

"It's already proven to be technically impossible at high volumes, and even in the very unlikely event that you could pull it off in small volumes it would be so expensive – why do that when you could do so many better things with hydrogen?"

LOCAL NEWS

PROGRESS ON 2030 RENEWABLE ENERGY TARGETS BY COUNTRY

By: Selin Oguz | November 2023 | Source: Visual Capitalist

Progress on 2030 Renewable Energy Targets

The International Energy Agency states that the global installed capacity of renewable energy must triple by 2030 to limit global warming to 1.5°C above pre-industrial levels.

This makes the next six years critical in the climate fight, with the upcoming United Nations COP28 event in Dubai representing a great time to assess the progress of countries toward achieving their 2030 targets.

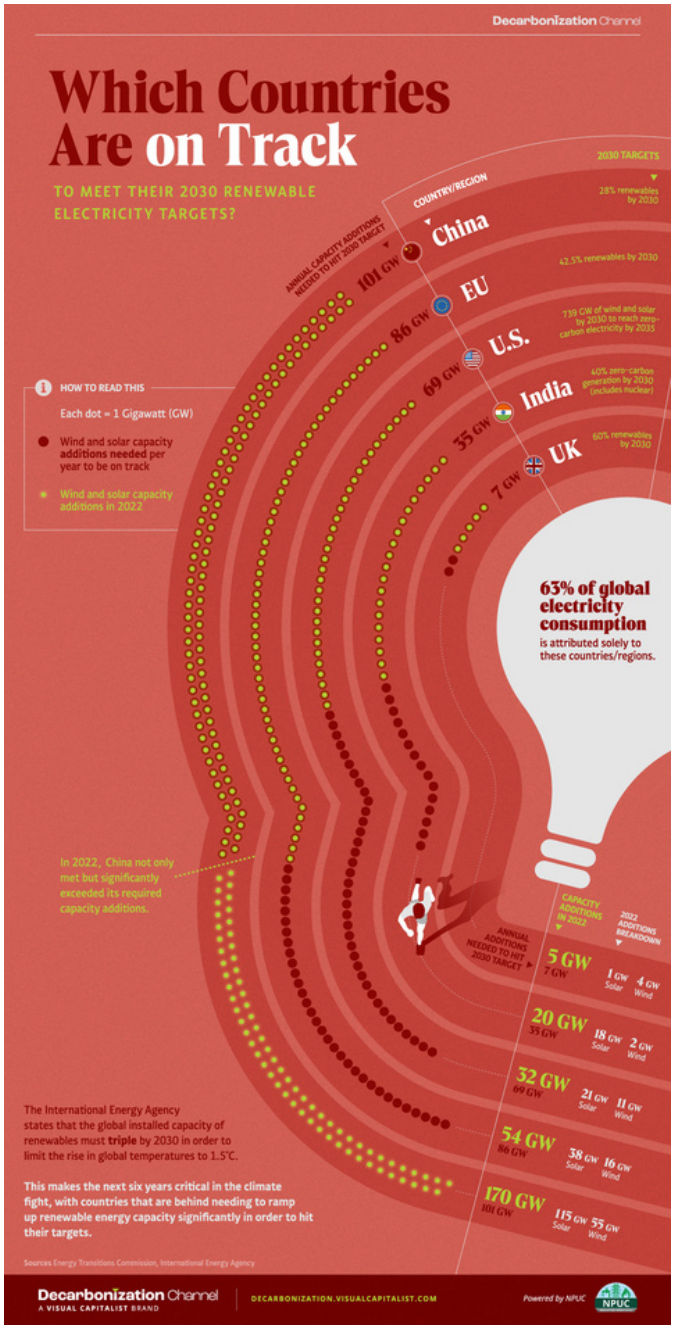
Checking in on Progress

As set out by their Nationally Determined Contributions in the Paris Agreement, many countries, including major electricity consumers such as the U.S., European Union, China, India, and the UK, have set ambitious targets for increasing their solar and wind power generation capacities by the year 2030.

The data, however, suggests that many are struggling to keep pace with the required annual capacity additions that will allow them to hit these targets.

Currently, China stands out as the only nation on track to meet its 2030 target. In 2022, it not only met but significantly exceeded its required capacity additions to remain on track, adding 168% of the required 101 GW.

Let's now take a closer look at how each of these countries are faring, comparing how much wind and solar capacity they needed to add with how much they actually did in 2022.



LOCAL NEWS

Country / Region	2030 Target	Annual Average Wind and Solar Capacity Additions Needed to Hit 2030 Target			Actual Capacity Additions in 2022		
		Wind	Solar	Total	Wind	Solar	Total
India	40% zero-carbon generation by 2030 (includes nuclear)	16 GW	19 GW	35 GW	2 GW	18 GW	20 GW
China	28% renewables by 2030	57 GW	44 GW	101 GW	55 GW	115 GW	170 GW
United States	739 GW of wind and solar by 2030 to reach zero-carbon electricity by 2035	34 GW	35 GW	69 GW	11 GW	21 GW	32 GW
United Kingdom	60% renewables by 2030	4 GW	3 GW	7 GW	4 GW	1 GW	5 GW
European Union	REPowerEU: 42.5% renewables by 2030	38 GW	48 GW	86 GW	16 GW	38 GW	54 GW

Overall, the U.S. and India were the furthest off from their targets in 2022, adding only 46% and 57% of what was needed, respectively. European countries, on the other hand, made progress but still need substantial annual additions to meet their targets by 2030.

Playing Catch-Up: The Path to 2030

Collectively, the U.S., European Union, China, India, and the UK account for more than 60% of global electricity consumption, underscoring their profound responsibility in decarbonizing their electricity sectors.

Investments in research and development, policy support, and infrastructure development are all crucial pieces of the puzzle when it comes to achieving 2030 targets.

In the coming years, these nations have an opportunity to transform the global energy landscape and move the needle toward achieving net-zero on a global scale.

LOCAL NEWS

RUST TO RICHES: GOETHITE'S ROLE IN SHAPING AUSTRALIA

by Grace Kirby | November 2023 | Source: CSIRO

Goethite, an iron-rich mineral, is crucial to both the country's iron ore industry and its rich cultural and geological tapestry.

Have you noticed many Australian landscapes, like the outback and our deserts, are brown and orange? This is especially easy to see looking at a satellite image. Australia's red centre is coloured by an abundant mineral scorched into Australian soils and sediments.

Goethite (pronounced ger-thahyt) is an iron-bearing mineral. It is an important source of iron oxide on earth. It's also a historically and culturally important mineral for Australia.

It has been used by humans for thousands of years in different forms and continues to support Australia's economy today.

Dr Erick Ramanaidou in Wetern Australia

How is goethite formed?

Goethite forms when iron-rich minerals weather and become oxidised. It is the main component of rust, and gives colour to many Australian soils, rocks and landscapes.

The formation of goethite in Australia is closely tied to our unique geological history. About 2.6 billion years ago, Earth's atmosphere lacked oxygen. The oceans contained high levels of dissolved iron. Over millions of years, photosynthetic bacteria started releasing oxygen to the oceans and atmosphere, kick starting the process of oxidation.

This led to the precipitation of a special kind of rock. Banded iron-formations (BIF), are a beautiful rock made of several iron minerals, including magnetite and hematite. The minerals create bands alternating with gangue, which are the impurities closely mixed with a wanted mineral in an ore deposit.

Dr Erick Ramanaidou is one of our experts in iron ore and lateritic nickel. He says that this ancient process laid the groundwork for the immense goethite deposits that we find in Australia today.

"Five million years after the mass extinction event that killed off the dinosaurs, at the end of the Cretaceous 65 million years ago, the gangue minerals of the BIF were replaced by goethite," Erick says.

LOCAL NEWS

Goethite can be found in various geological formations including lateritic deposits and weathered BIFs. It also forms delicate stalactites and stalagmites in caves.

"In Australia, goethite is predominantly associated with the vast iron ore deposits of the Hamersley Basin in Western Australia," Erick says.

Goethite is also found in other iron ore regions such as the Pilbara, Yilgarn, and the Middleback Ranges.

NASA even found goethite on Mars, where it helps them study the history of water on the planet.

Pigment for Paleolithic paint

Humans have used goethite since paleolithic times. They used yellow ochre pigment to create cave paintings and body art. It is still used by many cultures around the world in the same ways. Australia's indigenous groups continue to source and use goethite pigments for traditional works.

Today, goethite appears in everything from iron oxide pigments to colour paints, as food colourants, in cosmetics and more.

Ochre pigments were used by many Indigenous groups in art, and continue to be used today. Walinynga (Cave Hill) archaeological site, South Australia. C National Museum of Australia © C National Museum of Australia

Scorched into Australian soils

When goethite rich soils and bushfires come together, something peculiar happens. The high temperatures of the bushfire transform the goethite into maghemite. This is a magnetic mineral can be seen in soils in many parts of Australia.

Iron ore for steelmaking

Goethite is the main mineral in iron ore, which is used to make steel. Australia is the world's largest iron ore exporter and demand is expected to grow. Our red centre is central to our economy.

Iron ore is Australia's largest source of export revenue. In 2022, we produced a whopping $120 billion in iron ore exports. The industry is also a major employer. Around half of the 130,000 people directly involved in mining in Western Australia work with iron ore.

LOCAL NEWS

Ore-some resource

The Hamersley Province of Western Australia is unique. It contains two major types of iron ores which provides 40 per cent of worldwide iron ore production. These iron ores are called martite goethite (M-G) and channel iron deposits (CID). They contain about 50 to 60 per cent goethite.

Discovering and understanding iron ore deposits is critical to ensure our iron ore exports thrive. It's also important for Australia to think about the emissions our iron ore produces once it enters the steelmaking process.

Our Towards Net Zero mission is exploring low emissions steel making processes that bring together our innovative ore processing expertise and our renewable energy potential.

LOCAL NEWS

AER STATEMENT – INSTITUTE FOR ENERGY ECONOMICS AND FINANCIAL ANALYSIS REPORT ON ELECTRICITY NETWORK PROFITS

November 2023 | Source: Australian Energy Regulator (AER)

IEEFA's estimates of outperformance on returns are similar to those reported in the AER's Annual Electricity Network Performance Report.

The ability of business to outperform the regulated rate of return is the incentive-based framework working as intended under the legislation. The outperformance is not an indicator of "supernormal profits", nor having a material impact on customer bills.

The AER publishes an annual Electricity network performance report that assesses the overall performance of network businesses and outcomes under the existing regulatory framework.

In the last two reports the AER has highlighted that as provided for under the rules, electricity networks have outperformed the regulated rate of return, with the level of outperformance reducing over time.

IEEFA in its 2022 and 2023 report has used data from the AER's reports and converted the outperformance reported to a dollar measure and inferred a bill impact to consumers. IEEFA's 2023 report estimates outperformance based on a return on equity measure over the 2014–22 period of $11.1 billion ($2022, real).

We derive a similar outcome to IEEFA with a return on equity of $9.7 billion out of total revenue of $122 billion ($2022, real).

The difference is that our estimate uses the actual leverage of the networks businesses as opposed to average gearing across networks used by IEEFA.

The current incentive-based regulatory framework delivers large benefits to consumers

The AER implements the current regulatory framework in line with legislative requirements which specify that an incentive-based approach should be taken in regulating network businesses.[1] Our position is that the current regulatory framework is effective and consistent with the National Electricity Law (NEL) and National Energy Objectives (NEO).

The incentive schemes in place under the regulatory framework reward networks for improving productivity and service performance beyond benchmarks. This ultimately provides benefits to customers in the form of lower prices and superior service levels.

LOCAL NEWS

Current expenditure incentive schemes are designed so that 70 per cent to 80 per cent of the benefits of reductions in expenditure by networks are shared with consumers, such that the additional returns to networks earned from increasing efficiency in the current regulatory period, are passed on to consumers in the form of lower prices in the next period.

Our analysis shows that over 2014–22:[2]

- Capital expenditure per customer has declined by 36 per cent
- Operating expenditure per customer has declined by 24 per cent
- Service performance levels have improved, with the number of outages decreasing by 19 per cent, and a general downward trend in the duration of outages except for a slight increase in the most recent year
- Revenue per customer has declined by 33 per cent

View our October 2022 statement on the IEFFA 2022 report.

LOCAL NEWS

ARENA FUNDING FOR WA RENEWABLE HYDROGEN STUDY

November 2023 | Source: Australian Renewable Energy Agency (ARENA)

One of Australia's largest energy infrastructure businesses and one of Western Australia's largest chemical manufacturing companies are set to investigate producing and transporting renewable hydrogen through an existing natural gas pipeline south of Perth, in a new study backed by the Australian Renewable Energy Agency (ARENA).

On behalf of the Australian Government, ARENA is providing $1.3 million to APA Group (APA) and Wesfarmers Chemicals, Energy and Fertilisers (WesCEF) for the $3.5 million 'Parmelia Green Hydrogen Project – Feasibility Study'.

The study will progress investigations into the development of a large-scale renewable hydrogen production facility supported by purpose built renewable generation south of Kwinana, WA.

This hydrogen would be transported via a 43-kilometre section of APA's existing Parmelia Gas Pipeline to WesCEF's ammonia production facilities at the Kwinana Industrial Area south of Perth.

WesCEF currently manufactures ammonia from natural gas and the renewable hydrogen produced by this project has the potential to reduce overall emissions from the facility.

The project follows APA's work investigating the technical feasibility of its Parmelia Gas Pipeline to transport hydrogen gas, which has found that it is technically feasible to operate the southern 43-kilometre portion of the pipeline with 100 per cent hydrogen.

Renewable hydrogen will play a key role in Australia's journey to net zero, by enabling hard to abate industries like metals and chemicals production to substantially reduce their emissions.

The feasibility study will help improve understanding of developing large scale renewable hydrogen projects in Australia as well as the technical requirements and economics of transporting renewable hydrogen via pipelines.

ARENA CEO Darren Miller said the feasibility study is a step forward for renewable hydrogen in Western Australia.

"The decarbonisation of the industrial sector is critical to progressing Australia's 2030 and 2050 net zero targets. Renewable hydrogen will be vital to cutting emissions in heavy industries like ammonia production and will be hugely important in industrial centres like Kwinana," Mr Miller said.

"This feasibility study will tell us more about what it takes to develop a renewable hydrogen industry in Western Australia and ARENA will play an active role in sharing those lessons with the market.

APA is already leading in this space with their work on pipeline conversion and ARENA is confident in backing them and WesCEF in this investigation."

LOCAL NEWS

APA CEO and Managing Director Adam Watson said: "This funding contribution from ARENA will support the next stage of this exciting project, which will play an important role in supporting the decarbonisation ambitions of industry."

WesCEF Managing Director Ian Hansen said: "We are pleased to continue to our collaboration with APA in this exciting project to explore the application of existing infrastructure to support the journey to Net Zero."

Since 2017, ARENA has committed over $315 million to 48 renewable hydrogen projects spanning early-stage research through to first-of-a-kind deployments including hydrogen refuelling and hydrogen trucks, hydrogen for producing renewable ammonia, hydrogen for use in alumina refining and remote power.

In October, ARENA opened applications for the $2 billion Hydrogen Headstart program, which aims to support renewable hydrogen production by bridging the gap between the cost of producing renewable hydrogen and the market price.

LOCAL NEWS

AEMO PREPARED FOR A POSSIBLE CHALLENGING SUMMER

November 2023 | Source: AEMO

AEMO has today released its 2023-24 Summer Readiness Overview, outlining expected weather conditions, energy system preparations, and contingencies to maintain electricity reliability in Australia's main power systems this summer.

AEMO works on an ongoing basis with generation and transmission businesses, federal and state governments, and key agencies to manage risks to the National Electricity Market (NEM) that serves the eastern and south-eastern regions of Australia, and the Western Australian South West Interconnected System (SWIS).

AEMO Executive General Manager Operations, Michael Gatt, said that months of planning with industry has gone into preparing the power systems for a possible summer of extreme demand.

"Our extensive planning with industry, governments and network businesses aims to have enough generation and transmission available year-round to meet consumers' electricity needs," Mr Gatt said.

"This year's summer forecast is for hot and dry El Niño conditions, increasing the risk of bushfires and extreme heat, which could see electricity demand reach a 1-in-10-year high across the eastern states and in Western Australia.

"The entire industry has been focusing and continues to focus on managing possible risks for the summer ahead, particularly during high demand periods," he said.

In August, AEMO identified periods when electricity reliability thresholds were at risk in the NEM and SWIS this summer. AEMO is in the process of procuring additional reserves through the Interim Reliability Reserve and Reliability and Emergency Reserve Trader (RERT) mechanisms in the NEM. In Western Australia, AEMO is tendering for reserves through the Supplementary Reserve Capacity mechanism.

Compared to last summer in the NEM, an average 1,500 megawatts (MW) of scheduled generation and an extra 2,000 MW of generation capacity from new wind and solar projects will be available this summer. In the WEM, nearly 50 MW of extra scheduled generation is expected to be available.

"The increase in generation availability and additional reserves being procured will help navigate reliability pressures, should they eventuate," Mr Gatt said.

In addition to AEMO's collaboration with industry, governments and network businesses to identify and plan for relevant summer risk scenarios, extensive briefings and emergency exercises to test contingency plans and communication processes have taken place ahead of summer.

LOCAL NEWS

AEMO CEO SPEECH AT MACQUARIE GREEN ENERGY CONFERENCE

November 2023 | Source: AEMO

Transitioning Australia's electricity grid

I would like to begin by acknowledging the Gadigal people of the Eora Nation, the traditional custodians of this land on which we meet today.

I pay my respects to Elders past and present, and thank all Traditional Owners for the care they've shown as they've looked after this great country of ours for more than 60,000 years.

Thank you for inviting me to speak today on behalf of the Australian Energy Market Operator at this important Macquarie Green Energy Conference.

The Clean Energy Finance Corporation estimates that $120 billion of capital is needed to finance new wind, solar, hydro, storage and transmission in the National Electricity Market by 2030.

$120 billion. By 2030.

And the Clean Energy Investor Group and Bloomberg both quote a figure nearly four times that over the decades to 2050, to deliver a 1.5 degree aligned pathway.

We are standing on the cusp of an investment opportunity roughly twice the size of Australia's LNG boom.

This investment will provide clean, reliable and affordable energy to Australian homes and businesses, it will create jobs, and it will deliver returns to investors.

Investment is needed because our coal-fired power stations are closing down, and the lowest cost energy future for Australian homes and businesses will be built on four pillars:

1. Low-cost renewable energy, taking advantage of the abundant wind, solar and hydro resources that Australia has to offer
2. Storage and backup technologies like batteries, pumped hydro, and flexible gas generation – to smooth out the peaks and troughs of that variable renewable energy
3. New transmission to connect these low-cost sources of generation to our towns and cities
4. Power systems capable of running, at times, entirely on renewable energy.

As you probably know, every two years we produce our flagship report – in wide and deep collaboration with industry, governments and consumer groups – the Integrated System Plan.

LOCAL NEWS

It is a comprehensive roadmap for the lowest cost, least-regret pathway to replace those retiring assets, to meet new growth from the electrification of homes, vehicles and industry, and to meet government targets as Australia transitions to a net-zero economy.

There are scenarios and sensitivities as you'd expect to help manage uncertainty, but the message from AEMO, from this report and others, continues to be consistent and clear: Australia needs urgent and sustained investment to ensure reliable, affordable and cleaner energy for consumers.

And investors tell me that they're up for it.

In fact, Australia already has a substantial pipeline of proposed generation projects for the NEM, around 250GW, or four times the capacity installed today.

But what's critical is to get these projects from concepts, through investment committees, and delivered as physical assets that generate, store and transmit electricity to Australian homes and businesses.

In generation, it means large-scale renewable generation, on shore and offshore.

It means hydro and pumped storage.

It means gas generation, to provide backup power for droughts in renewable energy production. Gas unlocks renewables, and it is an essential component of the energy mix into the future.

In storage, it means grid-scale batteries of different depths.

And there are investment opportunities not only in the generation and storage of power, but in equipment like synchronous condensers, including the conversion of existing or retiring plant, that provide essential services that help keep the heartbeat of the power system strong and stable.

And new technology like grid-forming inverters, which can be installed alongside either new or existing batteries, will enable more renewable generation into the grid.

There will also be distribution-level investments, like batteries and charging infrastructure as we electrify our transport fleet.

And it means harnessing and orchestrating consumer energy resources, like rooftop solar and batteries, which now make up the biggest generation fleet in the nation.

Australian households are continuing to make their own investment decisions in rooftop solar systems – at kitchen tables instead of boardroom tables – increasingly bolstered by battery storage and smart management software.

In fact, over the past 5 years the installation of rooftop solar has grown at an average rate of 25% year on year.

LOCAL NEWS

Rooftop solar is now the largest form of generation in the National Electricity Market, overtaking black coal and providing over 18 GW of capacity. That's around a quarter of all generation capacity when the sun is shining at its brightest.

So orchestrating rooftop solar, batteries and the charging patterns of electric vehicles … that means helping this large and important segment of our national electricity market respond to market and operational signals … is critical to a successful energy transition.

AEMO is at the heart of Australia's energy systems.

And the insights from our control rooms that manage the power system in real time, are the same as those from our engineering and our planning functions: that urgent and sustained investment is needed.

And wherever it's possible for AEMO, we strive to make Australia's energy transition as investable as possible.

But I've been a developer and an investor, and I know that deploying capital isn't always easy.

Investors will have different risk appetites. Some will prefer exposure to market-based revenue, but many will need the greater revenue certainty that can come from existing and upcoming government schemes which aim to help unlock investment in renewable and firming generation.

At AEMO, we are pleased to be partnering with Commonwealth and state governments to evolve the investment frameworks needed to deliver that new energy infrastructure.

Schemes like the Commonwealth's Capacity Investment Scheme to ensure there is enough generation capacity available to meet times of peak demand like the long, hot spells over summer…

… or the NSW LTESAs – the Long-Term Energy Service Agreements – that are underpinning investment to deliver the state's Electricity Infrastructure Roadmap…

… or the capacity market tenders in Western Australia …

…and other schemes in Queensland, Victoria, South Australia, the ACT, Tasmania.

So the investment frameworks are continuing to evolve, to deliver the energy infrastructure that Australia needs.
But I know that other risks need to be overcome too.

Global supply chain constraints …

….on manufactured components, like wind turbine blades, control systems, and towers…

…on tunnel boring, earth moving, and construction equipment…

LOCAL NEWS

...on local skilled labour ...

...and on planning and regulatory approvals.

While I know these and many more challenges exist, I do believe that there are pathways forward, through investment decision-making and project delivery.

I can assure you that at AEMO we are 100% committed to enabling your investment wherever we can.

One of our core functions is to operate the power system in real time, but I can tell you the NEM wasn't designed for high levels of renewable generation. In fact no power system is.

That's why we're working furiously to understand what it takes to run the power system on 100% renewable energy, and to steadily remove the barriers to operating at high penetrations of renewable energy.

We're a fair way down the road actually, and we're collaborating with our international peers, leading academics and of course industry to continue to progress at pace.

We've published new standards for system strength, and an initial specification for grid forming inverters, and a technical settings compliance report for consumer energy resources.

Let me be clear though. Australia's power system is one of the most complex machines in the world. And recent events in telecommunications have highlighted the value in making sure that each element works as intended and doesn't disrupt the system.

So it's important that the process to connect new generators is rigorous, but not cumbersome.

We've put a huge effort into working with the developer community to improve the connections process for all involved. And we're not done yet.

AEMO and the Clean Energy Council have been working closely together to remove delays and simplify the process of connecting to the grid.

As part of the broader work, AEMO is working with developers, network companies and equipment manufacturers to cut months off the average time for our parts of the process – front-end approval process, registration and the commissioning process – and to make the overall connections process more transparent and predictable.

And this work is now bearing fruit.

Some projects are now getting their important technical standards approval in just one third the time that it used to take. That allows them to capitalise on pre-negotiated financing and construction arrangements.

LOCAL NEWS

We've launched a connection simulation tool that allows developers and equipment manufacturers to test their plant and control systems models directly on our model of the NEM power system.

That's a world-first for a power system operator, and while we still need to work through some commercial issues, we know that access to this tool will further accelerate the grid-connection process.

And we're not nearly satisfied – we know that working together, we can streamline our parts of the process even more. And these improvements will help investors deliver the construction part of the project more efficiently and more quickly as well, delivering even greater time and cost savings.

But there's one really critical factor in moving forward with the transition, and that's community sentiment.

It goes for all assets, whether wind or solar farms and batteries, …

… and even more so for the 10,000 kilometres of new transmission lines are required to connect areas of renewable generation with demand centres.

I know it comes as a shock to communities that new infrastructure will be needed in places where they live and work, and that's a situation not helped by the fact there has been so little new infrastructure, like transmission towers, built in the past few decades.

The energy transition is happening at pace, and we must help communities to understand and accept the essential need for new infrastructure to keep the system safe, reliable, at the lowest possible cost … and deliver that investment with minimal disruption, maximum care, fair process and appropriate compensation to those who are affected.

Without community acceptance and support, every project in this investment cycle will be harder, slower and more expensive than would otherwise be the case.

So my ask of everyone in this room and beyond, who have assets on the ground in construction, and in the pipeline for future investment, is to build support and help prepare communities for what's ahead.

Not just for your projects, but for the ones that follow.

Because we are standing on the cusp of an investment supercycle in Australia's energy systems.

Investment that will provide clean, reliable and affordable energy to Australian businesses, and stable returns to investors over many years ahead.

So let's continue to work together to unlock this much needed investment, that will underpin Australia's journey to a net-zero economy.

Thank you.

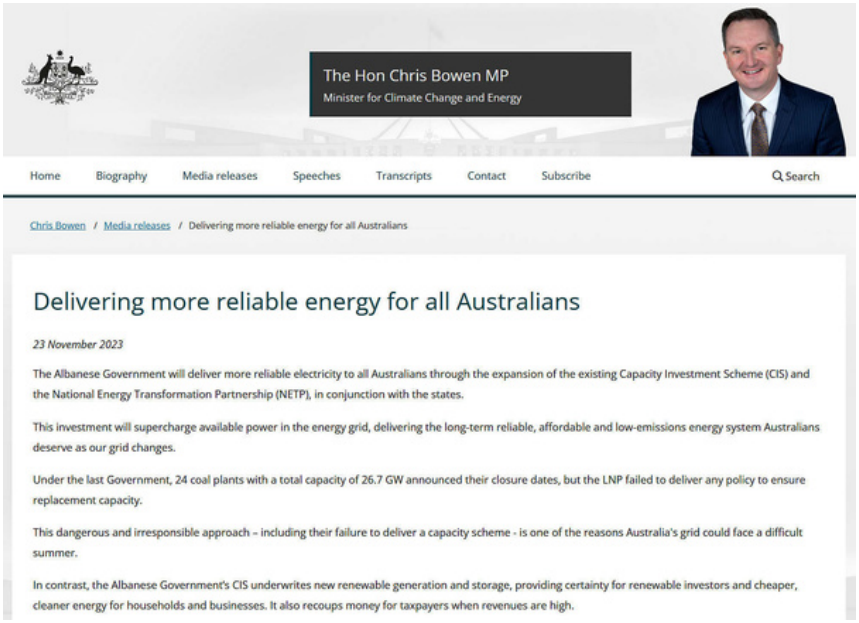
LOCAL NEWS

FEDERAL GOVERNMENT ANNOUNCES EXPANSION OF THE CAPACITY INVESTMENT SCHEME ON 23RD NOVEMBER 2023

November 2023 | Source: AEMO

Federal Minister for Climate Change and Energy, Chris Bowen, has today announced the expansion of the existing Capacity Investment Scheme (CIS), along with an expansion of the National Energy Transformation Partnership (NETP). Early media commentary has indicated that the expansion of the CIS scheme will effectively replace the current Renewable Energy Target scheme which is due to end in 2030.

In this morning's press release, it was stated that "this expansion will take the CIS from the current pilot stage to 9 GW of dispatchable capacity and 23 GW of variable capacity nationally – for a total of 32 GW nationally."
Whilst full details of the scheme's expansion are yet to be released, the media statement did note:



- To ensure the rollout is orderly and coordinated, the Commonwealth will also negotiate bilateral agreements with states and territories under the existing NETP.
- States will be asked to work with the Commonwealth to ensure renewables are rolled out and reliability is enhanced through objective benchmarks, an orderly transition, and potential strategic reserves.
- Around half of the capacity offered under the expanded CIS (18 of 32 GW) will be subject to these agreements. Capacity may be re-allocated from any jurisdictions that don't make agreements to those that do.

Responses from Industry

Given the size of the announcement, many industry bodies have released media statements in response. I have noted the following media statements in the past 24 hours:

- **Australian Aluminium Council**

The AAC welcomed the announcement stating that the expansion will "bring forward investment and placing downward pressure on electricity prices for consumers"

LOCAL NEWS

- **Australian Energy Council**

In their media statement, the AEC and CEO Sarah McNamara highlighted that the move is important but "is not without risk".

- **Clean Energy Council**

The CEC's CEO Kane Thornton welcomed the announcement and stated "We look forward to working closely with the Federal Government on the detailed design of the contracting mechanism"

- **Energy Consumers Australia**

Brenan French of ECA released a statement on behalf of the organisation and stated "While this announcement about new renewable generation is welcome, there is more work required on the consumer side of the equation"

- **Energy Users Association of Australia**

The EUAA CEO, Andrew Richards welcomed the announcement stating "it should provide a level of certainty for investors and consumers in these highly volatile times".

- **Investor Group on Climate Change**

Erwin Jackson from the IGCC said in a statement "An expanded Capacity Investment Scheme will draw investment to Australia and help put the Government on track to meeting its renewable energy goals"

- **Smart Energy Council**

In a statement and recorded video, John Grimes of the SEC "strongly welcomed" the government's announcement.

Early media commentary

For useful reference to our readers, I have noted the following news coverage as of early this afternoon:

- **ABC**

Chris Bowen appeared on the ABC this morning to talk about the investment scheme.
Alexandra Humphries reported about the announcement on ABC News Radio this morning.

- **The Australian**

Geoff Chambers wrote Chris Bowen gambles with taxpayers' cash to hit renewables target.

- **Australian Financial Review**

Jacob Greber, Mark Ludlow, and Samantha Hutchinson wrote Bowen dramatically expands green energy support.

LOCAL NEWS

- **The Guardian**

Katharine Murphy and Adam Morton wrote Albanese government to rapidly expand investment scheme for clean energy project.

- **Sydney Morning Herald**

Mike Foley wrote Chris Bowen's renewable bid to keep the lights on.

- **RenewEconomy**

Giles Parkinson wrote Bowen dumps RET for 32 GW of auctions in massive policy shift to supercharge renewables
Tim Buckley and Annemarie Jonson wrote Bowen has put a rocket under big renewables. Small-scale market must be next
Tristan Edis wrote How to ensure Bowen's underwriting scheme doesn't create another Snowy 2.0 debacle

- **Other**

Renju Jose of Reuters wrote Australia to boost spending to back new renewable energy projects
Karen Barlow from The Canberra Times wrote Chris Bowen 'clear-eyed' for global progress ahead of COP28 climate talks
Simone Grogan from The West Australian wrote Climate Minister Chris Bowen to table climate scheme boost in bid to keep renewables targets on track
Sky News host Caleb Bond briefly covered the story last night on The Late Debate.

Early media commentary

I've spotted much discussion about the policy announcement on both X (a.k.a. Twitter) and LinkedIn. Below I've highlighted a few of the longer-form social media posts that stood out to me today:

On X, Iain MacGill, Professor at the University of New South Wales, commented that he favored the policy announcement over another extension of the RET.

LOCAL NEWS

On X, Tennant Reed of the Australian Industry Group commented on the future performance of the energy-only market design of the NEM.

On LinkedIn, Joel Gilmore of Iberdrola provided his comments about the announcement in relation to the existing RET scheme.

CORPORATE MEMBER RECENT ACHIEVEMENTS

AUSGRID AWARDED ENERGY NETWORKS AUSTRALIA'S INDUSTRY INNOVATION AWARD

September 2023

Ausgrid takes home Industry Innovation Award

Ausgrid's Project Edith has been awarded Energy Network Australia's 2023 Industry Innovation Award at last night's annual dinner.

Project Edith is a world-leading innovation that showcases how the grid can facilitate the participation of green energy solutions in the energy market while staying within distribution network capacity limits.

Edith exemplifies the opportunities to optimise network investment by focusing on intelligent systems, resulting in lower energy costs for all. A project driven by our people, for our customers.

Visit our Project Edith hub for more information.

(L-R) CEO Marc England, Stakeholder Relations Manager Selina O'Connor, Head of Regulation Fiona McAnally, Group Executive Market Development & Strategy Alex McPherson, Head of Brand & Reputation Kate Hawke, Public Affairs Manager Emma Forbes, Group Executive Distributed Services & PLUS ES Rob Amphlett Lewis, Head of DSO Jonathon Dore and Regulatory Policy Manager Naomi Wynn.

CORPORATE MEMBER RECENT ACHIEVEMENTS

SA POWER NETWORKS WINS PREMIER'S AWARD FOR FLEXIBLE EXPORTS

November 2023

SA Power Networks has been recognised at the Premier's Awards for Mining and Energy, winning awards for its Flexible Exports option and safety.

The world-leading Flexible Exports option for solar, which allows customers to maximise the value of their investment in rooftop solar energy, won the Innovation and Collaboration Award for the energy sector. SA Power Networks' response to the River Murray floods also won the Health and Safety Award for the sector.

The Flexible Exports service is the result of years of innovation and engagement with local, national and international industry. It uses hi-tech smarts to allow newly-connecting solar customers in eligible areas to export up to 10kW per phase from their rooftop system while responding to rare localised network constraints in real time.

In the River Murray floods, 4,000 Stobie poles and 400 kilometres of powerline were standing in water for many months—creating a major community safety challenge. Thankfully there was not one report of electric shock. SA Power Networks also undertook a significant program of community engagement to support the wellbeing of the River community.

"Apart from the emotional and economic impacts of the prolonged flood, electric shock due to flood inundation of electricity infrastructure was a key risk to the community, emergency services personnel and SA Power Networks employees," SA Power Networks CEO Andrew Bills said.

"To ensure a safe response to the floods, SA Power Networks created a raft of new safety procedures for employees; adopted modern artificial intelligence (AI) and remote sensing LiDAR processing capabilities to help manage connection and reconnection of power; and undertook extensive community and stakeholder engagement to manage risk, inform the community and support wellbeing.

CORPORATE MEMBER RECENT ACHIEVEMENTS

"The safety outcome highlights the collaboration with emergency services, government and the community to ensure safety. Our focus had to be on avoiding the very significant potential for an electric shock or even electrocution. We knew having power disconnected was disruptive, so our use of modern AI technology meant we were able to reconnect power earlier because we had a very accurate understanding of where floodwaters were receding and where we could reconnect supply safely."

The development of the Flexible Exports option for solar involved significant engagement with more than 6,000 stakeholders across the energy sector including solar retailers/installers; internationally-based manufacturers who have developed a new generation of compliant inverters; and government and regulatory bodies.

"Flexible Exports has been developed by SA Power Networks with industry and customers to ensure we as a state get the most value we can from our exciting energy transition," Bills said.

"Compared with a fixed limit all year round that has to be suitable for worst-case conditions, a flexible limit means the network can be much more efficiently utilised and we can accommodate much higher levels of rooftop solar and defer or avoid the need to upgrade the network in congested areas.

"The Premier's Award is great recognition for what has been an outstanding and world-leading piece of innovation and collaboration."

EV NEWS

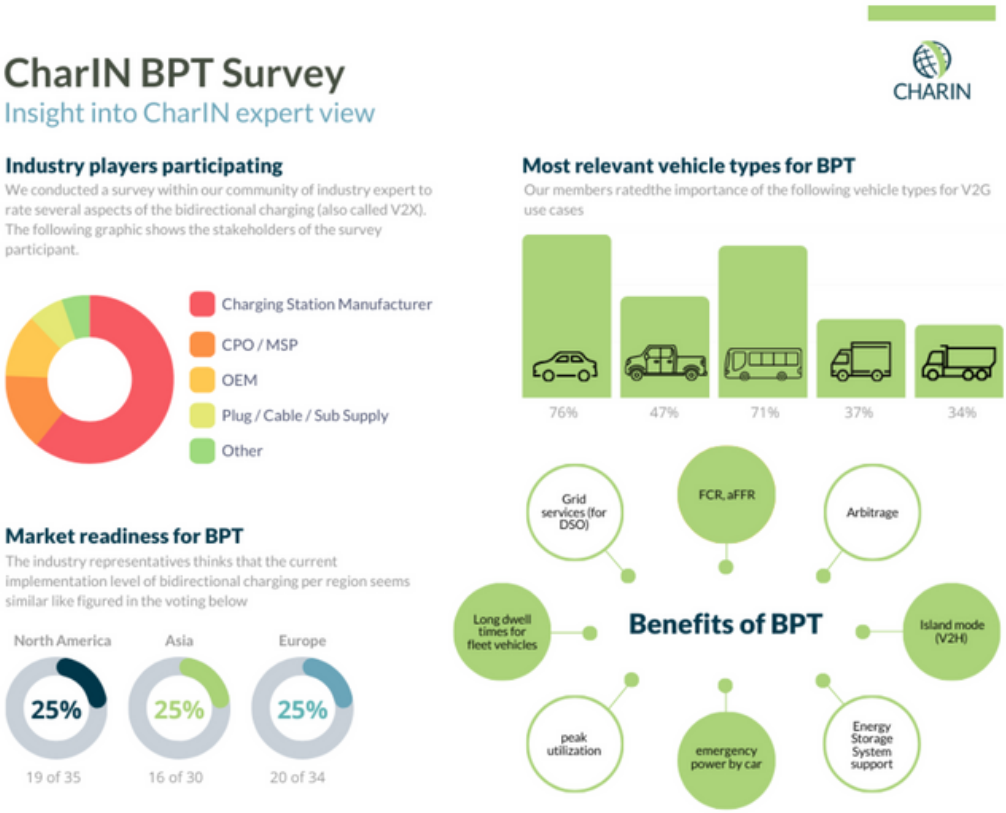
CHARIN EXPERTS SHARE IN-DEPTH INSIGHTS ON BIDIRECTIONAL POWER TRANSFER (BPT) AND V2G IN RECENT SURVEY

November 2023 | Source: CharIN

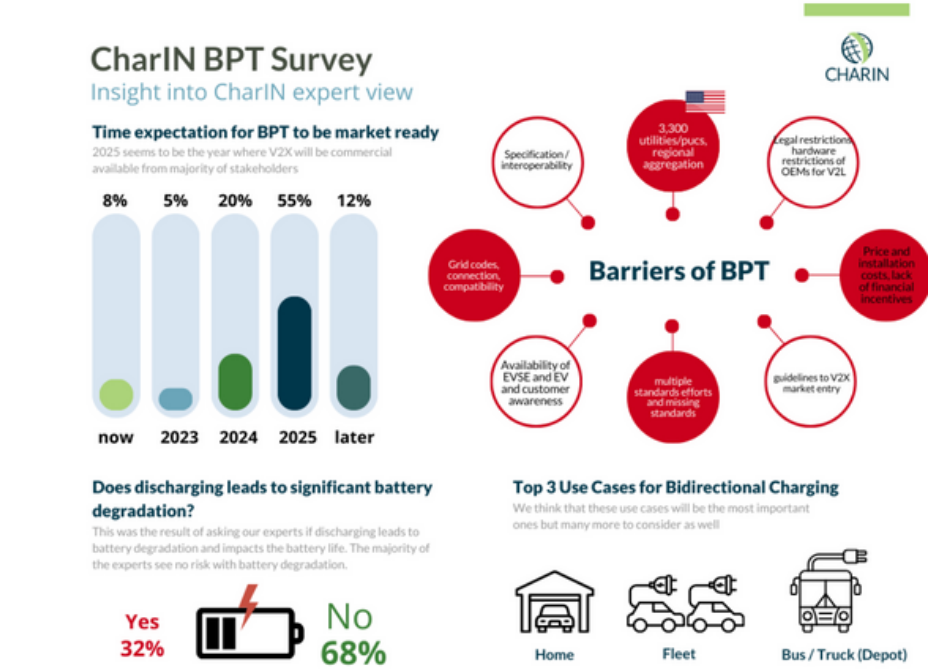
The experts of the Focus Group Grid Integration and Energy **conducted a comprehensive internal survey** to tap into the wealth of expertise within its network.

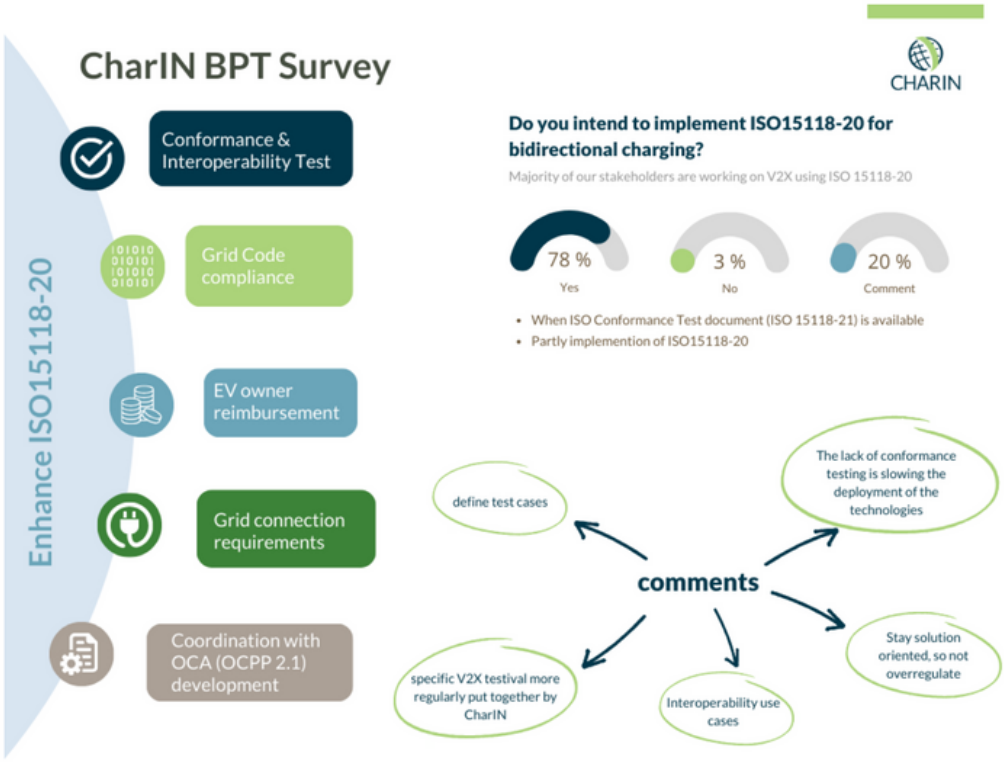
The survey's primary focus was on Bidirectional Power Transfer (BPT), also recognized as Vehicle-to-Grid (V2G), aimed at gathering the most up-to-date insights regarding market readiness, benefits, barriers, and technology directly from the Focus Group participants within CharIN.

They shared their perspectives, shedding light on critical aspects such as the expected timeline for market readiness, the myriad benefits of BPT/V2G, potential challenges, and specific comments highlighting the importance of this transformative technology. The survey outcomes have provided a profound understanding of BPT/V2G and its far-reaching implications on the electric mobility landscape.



EV NEWS


CharIN BPT Survey
Insight into CharIN expert view
CHARIN
Time expectation for BPT to be market ready
2025 seems to be the year where V2X will be commercial available from majority of stakeholders
8%
5%
20%
55%
12%
now
2023
2024
2025
later
Barriers of BPT
Specification / interoperability
3,300 utilities/pucs, regional aggregation
Legal restrictions hardware restrictions of OEMs for V2L
Grid codes, connection, compatibility
Price and installation costs, lack of financial incentives
Availability of EVSE and EV and customer awareness
multiple standards efforts and missing standards
guidelines to V2X market entry
Does discharging leads to significant battery degradation?
This was the result of asking our experts if discharging leads to battery degradation and impacts the battery life. The majority of the experts see no risk with battery degradation.
Yes 32%
No 68%
Top 3 Use Cases for Bidirectional Charging
We think that these use cases will be the most important ones but many more to consider as well
Home
Fleet
Bus / Truck (Depot)


CharIN BPT Survey
CHARIN
Enhance ISO15118-20
Conformance & Interoperability Test
Grid Code compliance
EV owner reimbursement
Grid connection requirements
Coordination with OCA (OCPP 2.1) development
Do you intend to implement ISO15118-20 for bidirectional charging?
Majority of our stakeholders are working on V2X using ISO 15118-20
78 %
Yes
3 %
No
20 %
Comment
When ISO Conformance Test document (ISO 15118-21) is available
Partly implemention of ISO15118-20
comments
define test cases
The lack of conformance testing is slowing the deployment of the technologies
Stay solution oriented, so not overregulate
specific V2X testival more regularly put together by CharIN
Interoperability use cases

EESA

EV NEWS

WHY EV CHARGING CYBERSECURITY DEMANDS AN ECOSYSTEM APPROACH

By Chris Warren | November 2023 | Source: EPRI Journal

EPRI leads a consortium identifying vulnerabilities and recommending solutions to protect consumers and the grid.

They are the type of stories that cause electric vehicle advocates to lose sleep. On the Isle of Wight in the United Kingdom, hackers gained access to EV chargers and displayed pornography on the equipment's screens. In the United States, hosts of a YouTube channel tweeted a video showing how to take control of the operating system of an Electrify America EV charger. A recent story in The Wall Street Journal highlighted the numerous cyber vulnerabilities that EV drivers could face when they fuel their cars and trucks.

Any successful cyberattack that leads to a driver's personal or financial information falling into the hands of a hacker is worthy of concern. However, the impact of these sorts of attacks on the grid's reliability remains small. That is largely due to the simple fact that EVs constitute a relatively small proportion of vehicles. But that is changing quickly. Indeed, according to the International Energy Agency, EVs' share of the overall global car market rose from approximately 4 percent in 2020 to 14 percent in 2022 and is expected to hit 18 percent in 2023. And by 2030, U.S. auto executives expect that 50 percent of domestic new car sales will be electric.

That means cyber vulnerabilities, especially related to EVs at fast public chargers, can be expected to grow as the total number of EVs increases. "Today, the electric vehicle market is maybe five to ten percent in the U.S., depending on which part of the country you're talking about," said Sunil Chhaya, a senior technical executive at EPRI focused on clean transportation and low-carbon energy system integration. "But as EVs and the public charging infrastructure needed to fuel them scale, the cybersecurity problems will also scale if they haven't been designed into the charging system.

And at some point, you may have to shut charging down and start over because some of these problems can't be fixed with patching. There are big risks and costs for not addressing this now."

EV NEWS

The Need for a Holistic Approach to EV Charging Cybersecurity

That's not to say that the many stakeholders who have a stake in robust public, EV fast-charging cybersecurity—from EV and charging manufacturers to charging network operators to electric utilities—are unaware of the potentially grave consequences of not ensuring security. The challenge is that EV charging security requires the commitment and cooperation of everyone involved.

"The fast-charging ecosystem is complex as it involves a variety of different technologies, including chargers, EVs, grid management systems, payment systems, as well as the participants developing or deploying these technologies, including aggregators, car manufacturers, charge network providers, utilities, and customers," said Xavier Francia, an EPRI principal technical leader for distributed energy resources (DER) cybersecurity. "Each of these components and entities has a unique set of security responsibilities they must fulfill. While it may be tempting for these entities only to want to focus on their own domain of technologies and the set of risks that directly impact their business, there are ecosystem-wide risks of concern that can impact everyone."

For example, Francia points to the growing number of vehicle-to-grid (V2G) use cases—including the delivery of backup power during an outage and providing electricity during peak demand—to illustrate worrying ecosystem-level risks. "While several attack vectors and risk scenarios are possible, the root of the problem is ensuring harmonization of security across all players and technologies such that no weak links, often the target of focus by adversaries, are present in the system," Francia said.

A Collective Approach to Charging Cybersecurity

To begin addressing ecosystem-level EV cybersecurity risks in a proactive and standardized manner, EPRI spearheaded research supported by the U.S. Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy. The research findings were recently published in the Cybersecurity Platform and Certification Framework Development for Extreme Fast Charging (XFC)-Integrated Charging Ecosystem report.

The work intentionally embraced a collaborative approach, enlisting the input and involvement of utilities, national research laboratories, EV manufacturers, charging network operators, cloud computing providers, and others involved with operating extreme fast charging equipment, defined as 200 kilowatts and above. "This process was completely open," Chhaya said. "Everyone with a stake in charging could see how we were thinking about things, what we were doing, and give feedback and the benefit of their experiences."

The group's approach was to first determine the main cybersecurity risks present throughout the EV charging ecosystem. After identifying risks, the group developed best practice recommendations about how to prevent and mitigate the risks. The recommendations developed have the potential to become requirements that purchasers of the equipment and networks involved with EV charging could demand suppliers meet during procurement.

"Establishing a minimum protection profile and standards for electric vehicle supply equipment (EVSE) and V2G services will enable a more uniform risk assessment of providers and services against those profiles and standards and differentiate those that offer even greater security options," said Victor Calderon, a senior advisor for cybersecurity at

EESA

EV NEWS

Southern California Edison (SCE). "Those systems should rise to the top of utility-approved or validated lists."

SCE recently worked with EPRI to prepare a proposed work plan, Cybersecurity Gap Analysis of Electric Vehicle Charging Equipment Products Used in Transportation Electrification Programs. The California Public Utilities Commission (CPUC) approved the plan, and work will begin this year identifying cybersecurity gaps in existing protocols and equipment and developing recommendations about closing the gaps.

Besides its collaborative and systemic approach, the EPRI-led research was also unique because it went beyond identifying specific vulnerabilities and prescribing ways to address them.

Indeed, the recommendations developed were tested in laboratories run by EPRI, the National Renewable Energy Laboratory (NREL), and the Argonne National Laboratory (ANL).

To make the group's research findings practical and usable to those involved in EV charging, researchers also developed an open-source Secure Network Interface Card (SNIC) that demonstrates the ways EV chargers can be protected. "We gave the practitioners something to work with by developing a credit card-sized network adapter that has all the cybersecurity features built in that can be integrated into the charging station itself," Chhaya said. "That way, if there is any hacker activity, it knows how to protect itself and protect the data or disallow the intrusion."

In addition, an online Electric Vehicle Charging Cybersecurity Management (EVC2M) tool to guide a holistic cybersecurity assessment is being developed and will be released to the public. The tool provides those responsible for EV charging cybersecurity with guidance about how to think about the security problems they face, as well as checklists about how to develop effective protection solutions.

A Broad Ecosystem with Many Vulnerabilities

Much focus on the vulnerabilities of the public EV charging network centers on the fast chargers themselves. The truth is, however, that the cyber vulnerabilities extend well beyond the charger to include three interconnected systems.

"One is the payment system people use because they must pay to charge their EVs. Then there is the data and communication network, which leaves people vulnerable to having data of all kinds stolen," Chhaya said. "And the third is the power network. Although the most vulnerable place may be the charging station itself, an intrusion can happen anywhere. A malicious actor can get in from any part of the network and do bad things at the charging station."

In its research, the EPRI-led EV cybersecurity stakeholder group categorized the types of risks faced by the EV charging ecosystem and the equipment that makes up the ecosystem. For example, the four categories of risk are:

- Reliability risk: This includes any risk that impacts the reliability of a system or sub-system in the charging ecosystem. Generally, these risks are associated with the failure or malfunctioning of a component. These risks are faced primarily by EVs, chargers, and cloud computing providers. An example of how an attack could impact reliability is if a thief tampers with or jams a cellular modem and renders payment services inoperable.

EV NEWS

- Privacy risk: The theft of customer data is a major concern because it violates the privacy of EV owners. The risk is most pronounced for the software systems, cloud storage providers, and systems on board EVs that store personally identifiable information (PII). Those utilizing EV chargers to fuel their vehicles are most vulnerable to this risk. One example of an attack related to privacy is when a criminal targets WiFi, Ethernet, RF, or other communication systems to steal customer information.
- Financial risk: Both EV drivers and the operators of charging networks face the risk of fraudulent financial charges. The negative consequences can be significant, including lost revenue for consumers and charging network operators. An example is when a criminal uses a skimmer or hacks into the communication system to steal payment information.
- Safety risk: Physical injuries and infrastructure damage are possible if the charging ecosystem is compromised. This can happen due to minor changes to software that cascade all the way to a charger or EV and result in damage to equipment and a potential accident.

To perform thorough and holistic assessments of the vulnerability of different pieces of the EV charging ecosystem, the researchers also identified the specific subsystems that are in the ecosystem. They are:

- The Electric Vehicle Supply Equipment (EVSE) subsystem, which are the chargers
- The electric vehicle subsystem
- The network operator or charging station operator subsystem
- The EVSE building/utility interface subsystem

Vulnerability Analysis Informs Recommendations to Mitigate Cybersecurity Risk

A clear categorization of the risks, their interdependencies, and the specific systems of assets that constitute the EV charging ecosystem helped researchers conduct the vulnerability analyses needed to develop best practices for mitigating cybersecurity risks. In this project, researchers conducted vulnerability assessments on each of the four EV ecosystem subsystems and developed potential mitigation suggestions.

EV NEWS

For example, one vulnerability at charging stations is using magnetic card readers to process payments. This is standard at chargers, gas stations, and other retailers. The vulnerability arises when criminals install a skimmer that can capture payment information when a credit or debit card is inserted into the station's card reader. When payment information is stolen, thieves can use the card until a financial institution or customer detects fraud and blocks future use of the card. Mitigating the threat requires effective and continuous monitoring of the charger to detect the installation of a skimmer or the implementation of new technology that doesn't require the transmittal of payment information at the charger.

Based on its work identifying risks, threats, and vulnerabilities to the EV charging ecosystem, EPRI and its research partners then developed various recommendations for protecting EV charging infrastructure. For example, one recommendation is to ensure that extreme fast chargers have two-way communication. The reason is that two-way communication provides the monitoring and control needed for charging service providers to receive alerts and alarms about cyberattacks and quickly address them. The recommendations developed were then tested by EPRI, ANL, and NREL.

"We really put our recommendations to the test to see if they were valid at identifying the risks and vulnerabilities correctly," Chhaya said. "We tried to break into the equipment to see whether the mitigation efforts worked."

More Work to be Done

The findings from the EPRI-led consortium are being applied in follow-on research led by the National Institute for Standards and Technologies (NIST) National Cybersecurity Center of Excellence. NIST is working to incorporate the findings into an EV Infrastructure Cybersecurity Framework, which can be used to implement the recommendations into certifications that verify EV charging equipment is secure. The research will also deepen utility industry-specific cybersecurity knowledge, specifically around Vehicle-Grid Integration cybersecurity.

Ultimately, all this work aims to ensure a consistent approach to EV charging cybersecurity. "The immediate need is a cybersecurity framework that all entities in this ecosystem can utilize to understand their security responsibilities and the cybersecurity capabilities that they must enable in their respective technologies and organizations," Francia said. "EPRI's work with the Department of Energy has made great strides in making this reality, and we look forward to working with NIST, our utility members, and other industry stakeholders as they utilize our research to socialize and operationalize the Cybersecurity Framework Profile for Electric Vehicle Extreme Fast Charging Infrastructure. One way of approaching this is to create an implementation guide for the NIST requirements. We also look forward to supporting SCE as they work with the CPUC to identify cybersecurity gaps in EVSE technologies and communication protocols expected to be utilized in their grid interconnected with EV."

Over the longer term, EPRI will continue collaborating with its members and other stakeholders to develop even more robust cybersecurity approaches, including zero-trust architecture that requires all users and devices to be verified.

For SCE, the evolution of cybersecurity approaches and tools is critical to achieving its decarbonization objectives, known as Pathway 2045. "Cybersecurity risks arise with SCE's externally facing connections that are necessary to operate our systems and enable our Pathway 2045 future.

EV NEWS

These are taken very seriously by SCE, and our Cyber team is inherently engaged in architectural design and operation of our networks," according to Jordan Smith, a consulting engineer within the grid technology innovation team at Southern California Edison. "As EV penetration increases, SCE will continue to follow industry best practices and leverage a defense in depth strategy to better mitigate cybersecurity risks as they are identified."

EV NEWS

ELECTRIC VEHICLES WILL CUT HOUSEHOLD ENERGY BILLS IN HALF, SAYS NETWORK CHIEF

By Giles Parkinson | November 2023 | Source: RenewEconomy

The head of the electricity network in the world's most advance renewable energy grid says the uptake of electric vehicles will help households halve their annual energy bills as they swap fossil fuels for green electricity.

Andrew Bills, who recently left his role as head of Queensland coal generation company CS Energy to become CEO of SA Power Networks, says electric vehicles are the next "big thing" in the green energy transition, given that more than one third of homes already has rooftop solar.

"We can kill two birds with one stone when it comes to electric vehicles, with cheaper transport and cheaper energy for households," Bills said.

"(EVs) have batteries three to ten times the storage capacity of home batteries and are a great opportunity to utilise the state's abundance of renewable energy. Emerging technologies like smart two-way chargers for EVs also have real potential to slash energy costs for consumers.

"Electricity is much cheaper for running a vehicle than petrol/diesel and indicatively we believe that the average household could halve their total energy spend from about $4,500 to about $2,400 per annum by switching to an EV."

South Australia is leading the world in the transition to renewables, mostly because its renewable power comes entirely from variable sources such as wind and solar, and not from hydro or geothermal that dominate other high renewable grids in Scandinavia, Canada, Iceland and Uruguay.

Wind and solar account for more than 71 per cent of state demand – averaged over the year – and in month of October averaged 86.9 per cent of state demand. The state is expected to reach "net" 100 per cent renewables – averaged over 12 months – within a few years.

Another feature of the South Australia grid is the high penetration of rooftop solar, which is now meeting all the demand needs on the SAPN network from time to time.

Bills says the network company needs to be getting more value from customer investment in energy resources such as rooftop solar, batteries and even electric vehicles, including from two-way power flows.

"South Australia already is a world leader with 350,000 rooftop solar installations, more than 35,000 batteries and significant potential that will be unleashed by electric vehicles as we electrify transport," Bills said.

EV NEWS

More than 37% of the network's customers have rooftop solar, with a total installed capacity of almost 2.2GW – and this is more than sufficient to regularly meet the State's electricity needs in the middle of mild sunny days.

Bills says the uptake of EVs is expected to "explode" as car manufacturers move away from ICE vehicles, and said there was more than spare capacity in the local grid to meet the demand from EVs without costly upgrades.

"The network has tremendous spare capacity outside peak times," Bills said.

"We can unlock this capacity and create significant value for customers and the community by encouraging 'flexibility' in energy use. If we get it right, we can significantly increase network asset utilisation and help lower energy costs for all."
The main focus would be to encourage households to use electricity as much as they could in the daylight hours, soaking up the excess solar and putting it in their EVs, or powering other appliances.

This can be done with smart energy management that respond to network signals; and by ensuring vehicle charging is spread across the day and week.

EESA

EV NEWS

WHY AUSTRALIA SHOULD COPY THE NORWEGIAN MODEL FOR RAPID EV ADOPTION

By Chris Johnson | November 2023 | Source: The Driven

Circle K EV Charging forecourt. Image: Circle K Norway.

The Australian Electric Vehicle Association (AEVA) held its annual conference in Perth on November 3, boasting a sell-out Friday symposium and gala dinner.

This success reflected a carefully curated program, exceptional speakers and a high level of underlying interest in the EV transition. The program covered transport planning and demand, policies for affordable EVs, charging and non-car electric transport, to name a few. Most presentations will be accessible through the member portal on the AEVA website.

It was an inspired decision to invite two project officers from Norse Elbilforening (the Norwegian EV Association), Helene Busengdal and Markus Nilsen Rotevatn. Markus delivered the closing keynote presentation at the Friday conference, covering the Norwegian experience of rapid EV uptake and the policies that led them there.

Helene and Markus also ran a closed workshop for AEVA members the day before, offering a masterclass in how to grow and foster an EV association.

Garnering 120,500 members in a country with just one fifth of Australia's population, being positioned as THE EV organisation for all commentary on EVs and being recognised by government as the most effective NGO in the country is very impressive, as were the communication skills of Helene and Markus.

Norse Elbilforening's strategy is deceptively simple – the sole aim and mission statement is to electrify transport as quickly as possible. That's it.

Their strategies are clearly working, as new car sales in Norway are 83% BEV, and 54% even in Finnmark province well above the Arctic Circle. The accompanying graphic shows how fleet transition transition still takes time, with BEVs still only making up 22% of all cars on the road.

The key to being the most influential NGO in Norway is that the association represents consumers, free of commercial interests. This ensures that its EV policies are consumer orientated, not always the case when policy is developed by politicians or industry.

The association gets access to government because it is consumer based and has no vested interests. This would not be the case for an organisation that was technically or commercially based, although nothing has prevented the association from accruing a huge database on EV drivers and their charging habits.

EV NEWS

Through their annual EV survey Norsk Elbilforening know EV drivers better than anyone and can develop policy based on what drivers need rather than what an external party might think (or perhaps hope) was required.

The association also receives payment from government to maintain the main database on all EV chargers in Norway, bringing more legitimacy as a source of expertise.

The association's income is almost entirely from membership, with a small portion from sale of data. The key to membership retention is the extensive set of membership benefits, including a roaming RFID device capable of activating all charging stations in the EU and Norway and automatically billing your account.

This single benefit has caused many fleet operators to join the association.

Other benefits for members through third parties include Norway's cheapest roadside assistance, a 24/7 help line and discounts on various products including car insurance, car seats, accessories and hotels. The association negotiates these but makes no income from them.

A national, consistent policy from a professionalised association has allowed them to partner with EV importers who pay for the first year of membership. A membership package is on offer to every new EV buyer, taking the burden of assistance for new drivers from the OEMs and dealers.

The association is extremely active in policy development and once again takes a simple fact based approach. Policy development is done through regular conferences and annual member surveys, concentrating on what is immediately relevant; about 50% concerns charging, mainly on planning early for expansion.

Effort is prioritised to personal transport, and areas where policy is covered by others (eg buses and ferries) or where resources aren't adequate are left alone.

Markus and Helene gave an outstanding rundown on how the association achieves policy successes. It largely stems from professionalising the association, adequate paid staff (55 employees) and the employment of extremely skilled negotiators like the Secretary-General, Christina Bu.

Policy achievements include zero registration fees and VAT for BEVs (Normally 25%, although currently under review), access to bus lanes, reduced tolls, parking and ferry charges, as well as elimination of ICE vehicles after 2025 and a zero emissions policy in public procurement.

In this policy environment, 63% of BEV buyers do so strictly on cost, rather than environmental factors. Norway's apparent state of EV nirvana presents a compelling model for Australian electro mobility associations to emulate.
There is a pressing need in Australia for a purely consumer based EV organisation with an effective voice to government. However, it didn't come easily for the Norwegians and was the result of a lot of thinking and hard work from very dedicated individuals, fortunately working in a relatively rational political environment.

It also helps when the government has sovereign control over the country's oil and gas. Just sayin'.....

EV NEWS

FIVE PRACTICAL DESIGN LESSONS FOR NEW EV CHARGING STATIONS

By Andrew Webster | November 2023 | Source: Australian Renewable Energy Agency

Discussions about designing charging points often focus on big picture items, like how many do we need across Australia, but what about the detail of designing an effective charging layout.

JOLT's EV charging trial tested operations in 21 locations in and around Adelaide (Image supplied)

A new report from EV charging service provider JOLT provides valuable information for designers of charging stations.

The JOLT Lessons Learnt – Final Report is part of the ARENA supported Metro Advertising Revenue Funded Electric Vehicle Charging Trial.

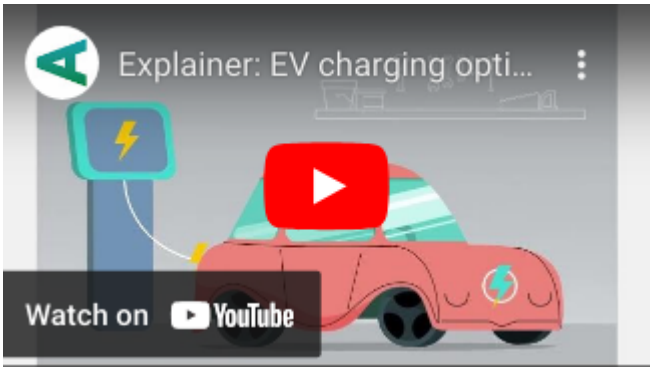
The $2 million trial, supported by $984,000 ARENA funding, tested operations in 21 locations in and around Adelaide. The project tested whether drivers could charge their EVs with up to 7 kWh (equivalent to about 45 km driving distance) for free, with costs covered by revenue from display advertising at each charger.

But the final report includes five key findings which could be useful for any future EV charging service models.

Customer service is vital

This goes beyond the customer's experience during individual charging sessions.

JOLT found that providing customers with information around support, charging instructions or troubleshooting times, significantly reduced customer contact with JOLT's support services.



Setting up active and consistent communication channels allowed JOLT to provide updates, notifications, and important information related to charging services, such as maintenance schedules, service disruptions, or new features.

EV NEWS

Clearly mark parking bays

Public EV charging points worldwide are plagued by ICEing. That's an industry term to describe when a vehicle with an Internal Combustion Engine (ICE) occupies an EV charging spot.

JOLT found that council-erected signs were not enough. It was only when the parking bay itself was painted with highly visible green and white markings that the project saw a significant decline in ICEing across the network.

The benefits include improved safety, space efficiency and consumer experience. But one extra effect any errant ICE driver should note, it also made parking rules more easily enforced.

Don't skimp on the length of charging cables

The location of charging ports on different EV models varies widely. For instance, the Tesla Model 3's charging port is on the back right of the vehicle, whereas the Audi E-Tron's is the front right, and the Hyundai Kona Electric charges from the front centre of the vehicle.

Also, some drivers prefer to park nose first, while others reverse into parking bays.

A salutary lesson learnt early was that four-metre cables, were too short. JOLT responded by updating cable lengths to seven metres.

JOLT's trial revealed the need for longer charging cables to reach charging ports on all EV models (Image supplied)

Wheel stops are crucial

For such a simple device, low wheel stops delivered a bunch of benefits.

From preventing collisions with charging infrastructure, to providing correct alignment and distancing for safe and efficient charging, wheel stops really work.

Install remote monitoring capabilities

JOLT's Adelaide charging network evolved over time to include a range of remote checks on its performance.

Remote monitoring developed beyond maintenance and diagnostics checks designed to improve network reliability. Real-time measurements deliver data for analysis to improve the service.

By understanding usage patterns, service providers can more accurately predict demand, which in turn offers opportunities to integrate renewable energy sources into the charging network.

EESA

EV NEWS

VANADIUM FLOW BATTERIES STAKE A CLAIM FOR ROUND THE CLOCK STORAGE FOR RENEWABLES

By Marion Rae | November 2023 | Source: RenewEconomy

Image supplied by Yadlamalka.

Vanadium could be the answer to using solar and wind round the clock, potentially silencing critics who say the technologies are useless when the sun doesn't shine and breeze isn't blowing.

So-called flow batteries may be more expensive up front but last for decades, don't catch fire and can store and dispatch sunshine for 10 to 18 hours – in contrast, the backers say, to rows of lithium-ion batteries springing up around the country are handy backup to meet peak energy demand for a few hours at a time.

Australia has vast reserves of vanadium but most of the world's supply is sourced from China, Russia and South Africa and goes into making steel alloy.

That is rapidly changing as allies eye the potential of an end-to-end chain – from mine to electricity grid – in Australia.

Chief commercial officer Matt Harper at Invinity, the British company behind the southern hemisphere's largest vanadium flow battery, told AAP the company is in talks with local developers to use Australian vanadium within two to four years.

"Lithium batteries have done a great job at showing many problems on the grid can be solved by batteries," he says.

"We want to be able to take solar power and make it available 24 hours a day."

In coming years, Invinity aims to use the technology with vanadium that is mined in Australia and manufacture for the domestic market.

Because the technology is built around vanadium that is suspended in the electrolyte, a solution inside the battery, it doesn't require giga-factories to make them.

"We are definitely looking at doing that in-country," Mr Harper says.

He says blending the vanadium into the liquid electrolyte is an intermediate step that could also be done in Australia.

EV NEWS

That would bring a technology invented in Australia back home. It was created in the 1980s by Professor Maria Skyllas-Kazacos and her team at UNSW and Mr Harper worked for the company that took it to North America.

Invinity's Port Pirie VFB in South Australia is fully commissioned and going through its final technical tests before connecting to the national electricity market.

Backed with $5.7 million in seed funding from the Australian Renewable Energy Agency (ARENA) in 2020, officials say the set-up demonstrates the potential for grid-connected VFB to provide energy and frequency control services.

Coupling a six megawatt solar plant with an eight MWh flow battery at the site will produce 10 GWh of dispatchable solar power yearly.

"These are assets that serve the grid not for five or 10 years, which is how long a lithium-ion battery lasts, but for decades," Mr Harper says. (Editor's note: Lithium-ion batteries actually have a warranty for 15 years).

Harper says the technology is at the point where it doesn't require direct subsidies but does need the right regulatory thinking.

If there's a battery than can deliver over 25 years, then a contract should be available to lock in that generation and storage for that period and give certainty to developers and investors, he explains.

The Australian Energy Market Operator and the federal government's first Low Emissions Technology Statement identified the technology as having potential to support industrial-scale, low-emission energy projects.

ARENA CEO Darren Miller says flow batteries are an "exciting technology" to address the emerging energy storage requirement, complementing established technologies like pumped hydro and lithium-ion batteries.

Non-flammable, vanadium flow batteries can be stacked up at utility scale and offer more flexibility in where they are built compared to pumped hydro energy storage.

In July, a utility owned by the Western Australia government announced plans for a vanadium flow battery at Kununurra as part of a long-duration energy storage trial to see what works best in harsh conditions.

Horizon CEO Stephanie Unwin said the pilot program would test its ability to provide long periods of 100 per cent renewable energy in a regional energy system.

An energy subsidiary of Perth-based developer Australian Vanadium Ltd (AVL) will supply, install and commission the energy storage system – also sourced from manufacturer Invinity.

Several potential vanadium mines have been granted major project status over the years by federal and state governments but none have got off the ground.

EV NEWS

AVL is developing a project south of Meekatharra in WA for an ethically sourced supply of vanadium to global steel, battery and critical metals markets, with a processing plant planned.

The mining company expects to be able to provide Invinity with electrolyte from next year, with the plant to be commissioned by the end of 2023.

Earlier this month, Invinity's Mr Harper advised the House of Lords Science and Technology Committee on their use in the United Kingdom, where they are considering rapid deployment.

In place for decades in China, the technology – and need for reliable supply chains – is also on the minds of European governments who need industrial-scale clean energy.

China has pushed hard on VFB and has a number of companies who are champions of the technology, while lithium batteries are the cornerstone of their electric vehicle industry.

EESA

EV NEWS

TESLA REVEALS PLAN TO BE AUSTRALIAN ENERGY RETAILER AND "DISRUPT TRADITIONAL INCUMBENTS"

By Giles Parkinson | November 2023 | Source: RenewEconomy

Tesla – having already disrupted the trillion dollar global car and petrol retailing industries – has now confirmed its plans to take on electricity retailers in Australia, saying it will seek to combine rooftop solar, batteries and EVs and disrupt the business models of "traditional incumbents."

The move by the electric car and battery storage monolith, first flagged exclusively by RenewEconomy back in September, has now been made official after the Australian Energy Regulator on Thursday said it had accepted its application and opened it up for submissions.

Tesla has already provided the technology for numerous big batteries in Australia, including the original Hornsdale Power Reserve and the Victoria Big Battery, along with household batteries with its PowerWall product, and the creation of "virtual power plants" that it markets through Energy Locals.

Tesla has also completely dominated the rapidly growing electric vehicle market in Australia, accounting for nearly two thirds of all new EVs in Australia through its top selling Model Y and Model 3 electric cars.

Now it wants to combine the storage, renewable energy generation, and EVs in retail electricity packages for households across the main grid, something that the existing big energy retailers have been slow to come to grips with.

Tesla is seeking a retailing licence for Tesla Energy Ventures in NSW, Victoria, Queensland, South Australia, Tasmania, and the ACT, and says it will target households and small and large scale commercial customers.

Like its similar ventures in Texas and the UK, its initial focus will be on customers who own either a Tesla EV or a household Powerwall battery, or a bigger Megapack battery in the case of commercial customers.

These number around 150,000 in Australia and are growing quickly. Tesla's rationale is that it would like to control the appliances to service grid markets such as pricing events and frequency control, and it will also help manage the load of its large and growing EV Supercharger network across the country.

Little other detail of its business plans are revealed in the published AER application, which is focused on compliance and regulatory issues. Anything interesting is redacted and the annexes outlining the detailed business plans and targets are not publicly available.

EV NEWS

It does say: "This is just the beginning. With Tesla building its most affordable car yet, Tesla continues to make products accessible and affordable to more and more people, ultimately accelerating the advance of clean transport and clean energy production.

"Electric cars, batteries, and renewable energy generation and storage already exist independently, but when com mined, they become even more powerful – that's the future we want."

The Australian venture will be led by Cleve Schupp, the Melbourne-based head of global marketing and content for Tesla'a energy division. Tesla Energy Ventures currently has little more than a handful of employees, but presumably this will grow quickly after its launch.

In a recruitment drive in the UK, ahead of the launch of Tesla Energy there, the company highlighted its intention to disrupt the status quo, and the legacy utility business, as it has done in the global car market.

It said it was looking for a new executive "with a healthy scepticism of the status quo" to manage the company's entry into the UK market.

It made it clear it was aiming to "support the transition of the entire electricity grid to 100% renewables", which still seems to be CEO and major shareholder Elon Musk's ambition, despite the prominence of his right wing views on Twitter/X that he also now owns.

Tesla has also launched an energy retailer in Texas, where it says "Tesla Electric is a retail electricity provider that allows you to power your home, vehicle and community with sustainable electricity from Tesla."

The move by Tesla in Australia for a local electricity retailer licence is significant for a number of reasons, and not just its potential impact on the business model of the incumbents, particularly the big three "gentailers" – AGL, Origin and EnergyAustralia – and the federal government owned Snowy Hydro.

It also comes amid a big leap in the uptake of EVs in Australia, the huge surge in rooftop solar across the country in response to the fossil-fuelled rise in household electricity bills, and renewed focus on the importance of consumer energy resources (CER), or distributed energy resources (DER) to the grid.

There are growing discussions about how best to "orchestrate" the rooftop solar, household batteries and EVs to help fill the gap created by the mass exit of Australia's ageing coal fired generators.
Tesla thinks it knows. And, as in the car industry where it had no legacy business to protect, it is not afraid of pushing the boundaries to where it thinks the consumer wants to go. It should be fascinating.

INTERNATIONAL NEWS

OFGEM ANNOUNCES TOUGH NEW POLICY TO CLEAR 'ZOMBIE PROJECTS' AND CUT WAITING TIME FOR ENERGY GRID CONNECTION

November 2023 | Source: Ofgem

New rules to speed up electricity grid connections for viable projects and allow stalled or speculative developers to be forced out of the queue have been announced by Ofgem.

The change is a big step away from the existing 'first-come, first-served' system, which has led to a long queue of energy projects which could generate almost 400GW of electricity – well in excess of what is needed to power the entire British energy system.

The new queue management milestones will be implemented by the UK grid's operator, National Grid ESO, from 27 November 2023 and will be introduced to both existing and future grid connection agreements. This will terminate stalled projects that are blocking the queue for high-voltage transmission lines and means ready-to-go generation and storage to enable net zero can be fast-tracked.

The rule change will give National Grid ESO the power to introduce strict milestones into connection agreements and terminate projects if they do not hit them at each project stage. The ESO will publish guidance on 27 November on how it will use its powers with first terminations likely to happen as early as 2024.

It comes after Ofgem's CEO Jonathan Brearley said in May that urgent reform to the connections system was vital to unlock new investment and hit national targets – 50GW of offshore wind capacity by 2030 and 70GW from solar by 2035. Today's announcement comes ahead of a joint connections action plan which Ofgem and DESNZ (Department of Energy Security and Net Zero) are due to publish later this month. It also comes ahead of the government response to recommendations to halve the time to build transmission infrastructure by the then Electricity Networks Commissioner, Nick Winser.

It also builds on National Grid ESO's five-point plan, which includes near-term initiatives with Ofgem support that will create capacity and acceleration of connection dates for transmission projects.

Eleanor Warburton, Ofgem's Deputy Director for Institutions for Net Zero Energy Systems Management and Security said:

"The transition to net zero demands urgent changes to the electricity connections system – or we cannot unlock investment, speed up network build and accelerate new technology.

"This is a big step towards phasing out the first-come first-served queuing system. We want new power on the grid as quickly as possible, so if you're ready, you can connect sooner. If you're not ready and are blocking the progress of others, you'll be removed – you can't sit on the queue with no consequences."

INTERNATIONAL NEWS

Julian Leslie, Chief Engineer and Head of Networks at the ESO said:

"We warmly welcome these new rules approved by Ofgem enabling us to proactively terminate zombie projects in the connections queue. This is a milestone moment in the ESO's efforts to lead the transformation of the grid connections process, making it fit for purpose for a modern network that is rapidly evolving and decarbonising.

"The ESO will be uncompromising in our approach to driving out projects that cannot meet their connection date, paving the way for more viable projects that have a real chance of plugging into the grid, energising the UK economy."

INTERNATIONAL NEWS

COALITION'S NUCLEAR SMR POSTER BOY CANCELS FLAGSHIP PROJECT DUE TO SOARING COSTS

By Giles Parkinson | November 2023 | Source: RenewEconomy

NuScale, the controversial proponent of nuclear small modular reactor designs that has been championed by the federal Coalition and technology ideologues around the world, has had its flagship project cancelled because of rising costs.

NuScale is often cited as the company with the most advanced plans on nuclear SMRs – a technology that does not actually exist in the commercial market – and had planned to build six such 77 MW reactors in Utah under a much vaunted proposal.

But the contract has been cancelled because its proposed customers – mostly municipal based utilities – refused to pay the target price for nuclear power, which had already jumped earlier this year by 53 per cent to $US89 a megawatt hour ($A139/MWh), despite a $US30/MWh subsidy from the US government.

The US Department of Energy had bet heavily on the technology, and NuScale itself, giving it $US600 million since 2014, according to a Reuters report, and promising a further $US1.35 billion for the Utah project in 2020.

NuScale is the only developer of SMRs to have received a licence from US nuclear regulators, but had to go back to the drawing board and re-apply after deciding that the licenced SMR design was too small to be commercial successful. Now it seems that the bigger units don't add up either.

Despite the fanciful nature of the technology, and an expected wait of at least 20 years for it to be commercially available in Australia, if at all, nuclear SMRs have been pushed heavily by the Coalition and conservative media, particularly the Murdoch press, Sky News, the AFR and various radio networks.

They have argued that Australia should halt the closure of coal fired power stations, stop the rollout of new transmission lines and new wind, solar and storage projects, and wait for SMRs to appear – despite the increased urgency of climate action and emission cuts urged by scientists.

Some nuclear proponents have said, absurdly, that SMRs could be brought to Australia within a decade, but most of the media have had to resort to interviewing emergency doctors, school children and sales people to find any support for that idea.

The NuScale news was seized upon by Australian energy minister Chris Bowen, who noted that a "grassroots" pro nuclear social media campaign run by Coalition energy spokesman Ted O'Brien was organised by a former Nuscale staff member.

INTERNATIONAL NEWS

"The Opposition's only energy policy is small modular reactors," Bowen said in a statement. "Today, the most advanced prototype in the US has been cancelled. The LNP's plan for energy security is just more hot air from Peter Dutton."

NuScale's share crashed on the news, falling more than 20 per cent according to Reuters, taking their losses since August last year to more than 80 per cent as the market reassessed the company's claims.

NuScale still wants to pursue SMRs, and hopes to build up to 2GW of plants in Ohio and Pennsylvania for Standard Power, but it is now targeting markets where there is less regulatory oversight and more government support. Reuters says it is looking at Poland, Ukraine, Kazakhstan and Romania.

The New York Times reports that decision to cancel the project followed an update from NuScale this year regarding the cost of building the reactors, which had soared to $US9.3 billion – for just 462 MW of capacity – from $US5.3 billion because of rising interest rates and inflation.

This translates to a capital cost of US$20,000/kW , or $A31,130/kW, 70 per cent higher than the $18,167/kW cost that CSIRO projected for 2030 in their GenCost Report. Members of the Coaliton and Australia's small but vocal nuclear advocacy community have frequently lambasted CSIRO as having exaggerated the costs.

Mason Baker, the CEO of UAMPS, the group of municipal utilities in Utah that had signed up to the proposed SMRs, said the decision to cancel the contract was "the best course" and "what is best for member communities."

In a statement, Baker said the utilities will look at alternative technologies for their low carbon energy needs. In an interview with a local newspaper, he cited wind and solar projects, geothermal and gas plants with a mix of green hydrogen as likely alternatives.

INTERNATIONAL NEWS

PROPOSAL TO INTRODUCE THE FUTURE REGULATION SANDBOX

November 2023| Source: Ofgem

The GB energy market is characterised by continued change and innovation, which is helping to delivering a net zero energy system at lowest cost to consumers. As the regulator, we face the challenge of keeping the rulebook that governs the energy sector fit for purpose and in step with these changes, balancing the desire to enable innovation with the need for rules to ensure sufficient protection to consumers, system integrity and efficient market functioning. To meet this challenge, we have been looking at ways in which we ourselves can innovate our practices as a regulator.

We are proposing to introduce a Future Regulation Sandbox (FRS), an innovative policy instrument to test and trial changes to the energy rulebook before making them, in a controlled environment. This proposal builds on the experience of other regulators in several countries who have used trials to inform decisions about potential regulatory changes. We believe such Sandboxes can be a powerful tool to unlock and drive innovation.

This call for input is our response to the Innovation Link's call for feedback on evaluation and evolution of our innovator support services. This document paints our vision for the FRS, its purpose, potential use-cases and how it could be implemented. We are seeking views from stakeholders on whether they too see value in our proposal for a FRS, what topics it could be used for, and how the FRS could best be implemented to maximise their benefits to the market.

We request that stakeholders send us their responses by 17:00 on 19 January to InnovationLink@ofgem.gov.uk.

INTERNATIONAL NEWS

SOLAR SHEEP

By Chris Warren | June 2023 | Source: EPRI Journal

How grazing sheep can reduce vegetation management costs and bolster community support for solar projects

Over the past decade and a half, Aron Patrick has had a singular career focus: to expand the deployment of solar and other renewable energy generation. For nearly seven years, Patrick worked as assistant director and manager of renewable energy in Kentucky's Department of Energy. He then held various positions at the utility Louisville Gas & Electric and Kentucky Utilities (LG&E-KU) for nearly seven years before joining PPL Corporation, LG&E-KU's parent company, as director of research and development in the summer of 2022.

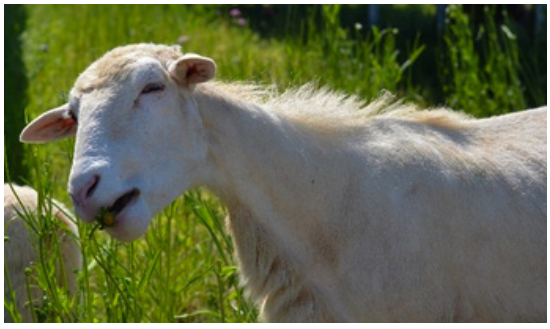
Patrick's wide-ranging experience deploying solar projects has taught him a lot about the barriers that need to be overcome to get more solar projects built. "Right now, the greatest single challenge we have to expanding solar generation in Kentucky is the problem of more land," Patrick said. "There are local communities that are opposed to using land for renewable energy."

In some cases, the opposition is the result of past solar projects that have had a negative impact on local ecosystems. For instance, Patrick has seen instances when developers have cut down forestland for a solar site and then laid down gravel and sprayed chemicals to reduce the need for vegetation management.

From a purely financial perspective, there is a rationale for this approach. Vegetation management is a significant operations and maintenance (O&M) expense. But solar and other renewable energy projects in Kentucky and around the country need community support to get built.

"At a minimum, these projects need to integrate with the natural environment and leave it no worse than it was before," Patrick said. "But what we really need to do is integrate these solar sites so that they improve the ecosystem and fit into the agricultural heritage our ratepayers expect. It's taking a solar farm from being potentially harmful to the environment to something that is beneficial and beautiful to look at."

A Grazing Solution?



In Kentucky and around the globe, an emerging answer to both address community concerns and reduce vegetation management costs has four legs and eats all day: sheep. While still at LG&E-KU, Patrick collaborated with EPRI to develop and implement a plan for sheep to graze 10 acres of a 50-acre solar farm in Mercer County, Kentucky. The demonstration project began in 2020, and a detailed description of the grazing plan and results can be found in the EPRI report, Solar Grazing: Viability of Grazing Sheep for Vegetation Management, Year 2.

INTERNATIONAL NEWS

For Patrick, the potential to reduce O&M expenses was made clear on a visit to a solar farm. "I was out at a site and noticed we had 30-plus people weeding underneath the panels," Patrick said. "This was labor-intensive and also a safety issue because you have low-trained workers on the property who could potentially weed eat a wire." LG&E-KU estimated the cost for the traditional mowing and weed eating to manage 10 acres of the solar farm was $14,000 in 2020.

While containing costs is important, the potential benefits of using sheep for vegetation management also include an improved local ecosystem. For example, a well-designed seeding and grazing plan for sheep will prevent most vegetation from growing taller than the panels and negatively impacting energy production. A sustainable grazing plan can also reduce water runoff, improve water and soil quality, and enhance regional biodiversity.

But all those potential benefits hinge on sheep being a practical solution for vegetation management. And that's what LG&E-KU and EPRI set out to learn in the demonstration project.

"We were worried about the safety and welfare of the animals," Patrick said. "We had accounting questions and legal questions. Are sheep a capital or O&M expense? We also had questions about whether the sheep would get away. I think people imagined this chaotic environment of sheep running around and our staff chasing them."

Choosing Sheep and Creating a Grazing Plan

To begin answering these questions, a selection of Shetland and Katahdin sheep were brought to the solar site from nearby Shaker Village—a local non-profit that preserves the architecture and ways of the Shakers who moved to the area in the 1800s—to graze from the early spring to late fall of both 2020 and 2021. The breeds of sheep were selected because they were believed to be least likely to damage the solar panels and equipment.

One reason that is the case is that Shetland sheep are relatively small, which is an advantage in reaching vegetation growing under and around panels as low as 36 inches off the ground. The breed's small stature enables the animals to navigate around the panels and equipment without getting caught up in wires and other infrastructure. Larger Katahdin sheep were added later to help manage taller vegetation, like the invasive species Johnson grass.

The grazing plan developed for LG&E-KU by Shaker Village evaluated the optimal number of sheep to use and how often to rotate the animals on and off the land. Typically, a 10-acre pasture where sheep don't rotate would require about 20 animals. In this case, though, it was a priority to keep vegetation from growing taller than the lower edge of the panels to prevent panel shading and use rotational grazing. Rotational grazing is a type of regenerative grazing that provides a range of ecological benefits, from improving soil health to reducing soil erosion. It's also important to note that the intention was always to evolve and change the original grazing plan based on environmental conditions. Flexibility in devising and adapting the grazing plan promotes the health of the sheep while meeting the solar site's vegetation management goals.

With that in mind, LG&E-KU installed nine one-acre paddocks that 25 sheep would rotate through. Another element of the grazing plan was determining how long sheep would graze in a paddock before allowing the vegetation to regenerate. This matters both for the sheep and the plants. Short grazing intervals followed by a restoration period allows the plants to keep growing and ensures that animals benefit from more palatable and nutritious vegetation.

INTERNATIONAL NEWS

The grazing plan initially included five days of grazing followed by 45 days of recovery, which is the same approach used in the Shaker Village's pastures.

Lessons Learned Lead to Changes

After the first grazing season, LG&E-KU and EPRI made several adjustments for 2021. The grazing plan was also adjusted to move away from a uniform five days of grazing followed by 45 days of regeneration. This was done better to match the natural seasonal variation in vegetation growth.

For example, cooler early spring temperatures mean plants grow slower, and fewer sheep are needed to control vegetation. As temperatures and vegetation growth rates increased, more sheep were grazed. For example, 18 sheep grazed for seven days in the early spring, followed by 63 days of recovery. From late spring through the summer, 51 sheep grazed for three days, followed by 27 days of recovery.

According to Dr. Ashley Bennett, an environmental research scientist at EPRI, who worked closely with LG&E-KU to implement the demonstration project, one takeaway from the first two years of grazing was basic but important. Sheep can be an effective vegetation management solution.

Not only were concerns that sheep would cause chaos and damage equipment unfounded, the animals reduced the utility's vegetation management costs. Indeed, the cost to use sheep in the project's first year was about $11,500, compared to $14,000 using mowers and weed eaters. In the project's second year, vegetation management costs were reduced to about $9,000 thanks to an improved grazing plan.

A National Solution for Better Vegetation Management and Community Support?

LG&E-KU participated in the demonstration project because it wanted to serve as a model for other utilities considering grazing as a vegetation management solution. An upcoming EPRI report, Evaluating opportunities for sheep grazing at utility-scale solar farms in the United States: A Review, is expected to be published in 2023 and chronicles the challenges, opportunities, and practical application of agrivoltaics, specifically grazing, around the nation.

Agrivoltaics refers to the dual use of land for solar energy and agricultural production. Besides grazing livestock to manage vegetation, agrivoltaics can also include habitat conservation, especially for pollinators, as well as crop production in and around solar projects. Utilizing solar sites for multiple uses can bolster community support.

INTERNATIONAL NEWS

"From the landowner and community standpoint, land stewardship is a favorable aspect of agrivoltaics," said Terry Jennings, an EPRI principal project manager whose research focuses on advancing economically and environmentally responsible renewable energy development. "Local communities may be more supportive if they perceive the solar operator and landowner as good stewards of the land. Another aspect is continued agricultural usage that helps to maintain the agricultural heritage of a site or community."

Agrivoltaic applications like solar grazing are gaining interest and deployment. For example, the American Solar Grazing Association (AGSA) was founded in 2019 and had over 500 members by 2022. AGSA estimates that 15,000 acres of solar installations representing 2,500 megawatts are currently using animals to control vegetation.

But there are still challenges, including variable and uncertain costs. Solar developers are incentivized to build their projects as quickly, cheaply, and profitably as possible. Utilities are keen to reduce O&M costs but also are motivated by sustainability. "Many of our utilities are very interested in conservation and how solar sites can provide environmental benefits," Bennett said. "But the utilities also must have a business case to make changes, such as using a native seed mix to support pollinators instead of a non-native turf grass mix. They need to show modifications to current practices will not increase their costs and will provide ecological benefits."

Barriers to Implementation and More Research Needed

While there is genuine interest in solar grazing, EPRI's report also identified several barriers and areas that require additional research. Perhaps the most significant obstacle is an insufficient number of sheep and shepherds. Already, there are not enough sheep to graze the solar plants in operation across the U.S., let alone to manage vegetation at the many solar sites that will be built in the future.

Another barrier to more widespread solar grazing is the need for additional infrastructure at solar plants, including water for sheep to drink. Strong communication between solar power plant owners, operators, and sheep grazers is also important to develop and evolve grazing plans. It's also true that not all solar sites will be suitable for sheep grazing.

EPRI's report also notes that grazing sheep to manage vegetation at solar plants is still in its infancy, and much more needs to be learned.

For example, more experience is needed to develop guidelines and best practices for successfully using sheep in vegetation management across different geographies and ecosystems. This includes learning how to combine pollinator habitat and grazing on the same site to integrate multiple ecological benefits. For now, the optimal approach for utilities and developers considering solar grazing is to work with experts to develop a grazing plan and to pilot it on a small parcel of land to test whether it can work and is cost-effective.

INTERNATIONAL NEWS

The Importance of Patience

At LG&E-KU, the initial experience of using sheep for vegetation management has been successful enough to expand the practice to a second, much larger solar farm near Harrodsburg, Kentucky. "We're planning ten 1,500-acre solar farms in the next few years, and there's no question moving forward how we are going to manage the land at our solar sites," Patrick said. "I can't imagine a situation where you wouldn't want sheep in some way."

But Patrick is also quick to point out that the utility's approach is evolving with the lessons it's learning. For example, LG&E-KU has even lowered its vegetation management costs by embracing technology—like motion detectors and security cameras—to monitor sheep. This has reduced the need for shepherds always to be on-site, a significant cost savings because labor is the largest expense of using sheep for vegetation management.

Patrick says another big lesson for anyone thinking about solar grazing is to understand it takes time. "This is not something where you can have one employee get it done quickly and expect it all done in a month," Patrick said. "We spent about a year planning and then two years in site prep. But that time is well spent when you see how beautiful these sites can be and how much they benefit local communities."

INTERNATIONAL NEWS

OFFSHORE WIND FARMS CAN 'STEAL' THE CAPACITY OF OTHER FARMS UP TO 50KM AWAY

November 2023 | Source: E+T Magazine

Offshore wind farms can "steal" the capacity of other farms in their wake at distances of up to 50km away, a study has found.

According to a researcher from the University of Bergen in Norway, efficiency can be reduced by up to 20 per cent from this distance due to wake loss.

PhD candidate Eirik Finserås said that current regulations are "ambiguous" and should be developed to accommodate the proliferation of offshore wind development in the North Sea in order to maximise efficiency.

"The incentive to develop an offshore wind farm can diminish with just a five per cent reduction in capacity, based on economic considerations," he said.

The Norwegian government is currently planning the development of offshore wind farms in Sørlige Nordsjø II. The field is located approximately 22km southeast of the planned Danish offshore wind park Nordsren III.

"The Norwegian offshore wind farm in Sørlige Nordsjø II will likely 'steal' wind from the proximate Danish planned offshore wind farms. Whether this will have any legal consequences for the Norwegian plans is difficult to say," Finserås noted.

Under Norway's current regulations, there are no rules to prevent different offshore projects from being built near each other.

Beyond being a good neighbour by consulting other stakeholders, there is no obligation to enter into agreements with them or to take other steps to limit energy loss from wake effects.

"As far as I know, Norwegian authorities have not consulted the Danes with regards to the likely transboundary wake effects resulting from offshore wind development in Sørlige Nordsjø II," Finserås added.

"In any case, regulatory frameworks need to be developed and made clearer regarding the regulation of offshore wind farms and the challenges related to wake effects so that the green energy transition is carried out as smoothly and effectively as possible."

INTERNATIONAL NEWS

According to RenewableUK, the UK's offshore wind pipeline was close to 100GW in generation in February – a 14GW year-on-year increase. Much of the infrastructure is also located in the North Sea and could be impacted by wind farms built by other states.

Last December, the UK signed an agreement with the EU and other countries bordering the North Sea to develop energy interconnectors.

INTERNATIONAL NEWS

CLIMATE BENEFITS OF HYDROGEN ARE AT RISK AS FOSSIL FUEL INDUSTRY PRESSURES MOUNT

By Julie McNamara | November 2023 | Source: Scientific American

Rigorous standards are required to scale hydrogen as a clean energy solution; otherwise, it will be a costly, polluting diversion

Hydrogen can play a critical role in the clean energy transition. However, hydrogen is not, and never will be, the core of the clean energy economy. Despite that, the littlest molecule has lately claimed the largest space in seemingly every climate conversation—and is increasingly grabbing an outsized share of climate funding, too.

One headline policy, the Regional Clean Hydrogen Hubs program, or "H2Hubs," is a $7 billion Bipartisan Infrastructure Law initiative charged with concurrently developing clean hydrogen production, transport, storage and use. A second, the clean hydrogen production tax credit, or "45V," is a lucrative Inflation Reduction Act incentive that could add up to tens of billions of dollars—or more—to shift the economics away from carbon-intensive hydrogen to low-carbon hydrogen.

Targeted support to enable hydrogen as a clean energy solution is valuable; unbridled hydrogen enthusiasm is not. The risks are twofold: First, that it distracts from the pressing priority of directly displacing fossil fuels with renewable electricity throughout the economy; and second, that it fails to tailor hydrogen production processes and end uses to those that are truly beneficial and climate-aligned.

Severe consequences will follow from a reckless start to the clean hydrogen economy. That's because missing on hydrogen by a little actually means missing by a lot, quickly flipping the gas from a valuable tool for climate progress to an outright reverser of climate gains. As the Biden administration finalizes the details for these two policies, which could fundamentally shape whether and how hydrogen contributes to the clean energy transition in the time ahead, it must get them right.

If it does, hydrogen can slot in as a real and true contributor to climate progress. That's because when cleanly produced, hydrogen enables the decarbonization of those tricky corners of the economy short on clean energy alternatives. They run the gamut from industrial processes such as steelmaking, to transportation applications such as long-haul aviation.

But if they get it wrong, people and the environment will suffer numerous and consequential harms, including to climate, to health and to the perpetuation of environmental injustices that disproportionately impact communities of color and low-income communities across the country.

INTERNATIONAL NEWS

Here's why. Today, hydrogen is nearly exclusively produced from natural gas in a heavily polluting process called steam methane reforming. But hydrogen's climate credentials require its low-carbon production. Today's fossil fuel–based approach could be coupled with systems to capture and store some of the resulting climate pollution. Or, to fully sidestep carbon emissions, renewable electricity could split water into hydrogen and oxygen through a process called electrolysis.

The catch is, it's not enough to just evaluate the production process to determine whether the produced hydrogen is low carbon. There can still be wide differences in total resulting emissions across projects—so much so, in fact, that what might superficially appear to be cleanly produced hydrogen can actually generate even higher levels of carbon emissions than today's heavily polluting approach.

The Treasury Department must ensure this risk does not become reality in the new hydrogen production tax credit. In particular, three boundary-setting decisions threaten to turn a tax credit intended to incentivize clean hydrogen into one that actually encourages heavily polluting projects instead.

First, upstream methane leakage. The fossil fuel industry is lobbying hard to use outdated assumptions about low rates of natural gas leaking from throughout the extraction, processing and gas transport system. When those assumptions are updated to reflect the best available science, however, they result in much higher leakage rates, such that any fossil-based project—even those achieving very high rates of onsite carbon capture (in and of itself a big "if")—would be undone by the climate implications of methane released upstream.

Second, carbon offsets. The fossil fuel industry is also advocating for the use of carbon offsets within the tax credit, which would allow today's heavily polluting hydrogen production projects to now count as "clean" by reducing pollution elsewhere in the economy. But the tax credit is not set up to rigorously manage cross-economy offsetting, and the offsets being pursued by the fossil fuel industry are primarily based on flawed assumptions about industrial farming operations. Greenwashing fully polluting projects to suddenly qualify as clean, without any change to technology or process, would be an abject policy failure and a terrible waste of billions of dollars of taxpayer funds.

Finally, system impacts of electrolysis. Industry incumbents are advocating for the tax credit to ignore the grid-wide impacts arising from the large amounts of electricity needed to run electrolyzers. This omission would improve project economics for hydrogen producers, but only because it hides pollution and shifts costs onto consumers. Without safeguards, the climate and ratepayer impacts are likely to be towering, increasing the price of electricity and forcing costly infrastructure upgrades, while triggering the ramp-up of coal- and gas-fired power plants elsewhere on the grid.

Tools are readily available to address each of these tax credit implementation risks; the Biden administration must simply stand up to industry and apply them.

Beyond ensuring hydrogen is cleanly produced, it's also of paramount importance to use hydrogen just where we need it most. Hydrogen generates health-harming nitrogen oxides when combusted, is an indirect global warming pollutant when leaked, and requires significant water supplies to produce. Moreover, nontargeted use would wastefully divert renewable energy from its foremost task of directly displacing fossil fuels. As a result, focusing on just high-impact applications is critical.

INTERNATIONAL NEWS

However, because hydrogen can be used in nearly any application currently running on fossil fuels, it has become a favorite "someday solution" by the fossil fuel industry—and despite that narrative being devoid of plausible paths to a climate-compatible future and in full opposition to the best interests of the public, this has trickled down into wide-ranging policy supports.

In this October's first round of funding announcements for the H2Hubs program, for example, most selected projects were premised in full or in part on fossil fuel–based hydrogen production and included plans for multiple applications failing the end-use prioritization test. This is a failure of vision and purpose. Moving forward, the H2Hubs program must be laser-focused on cultivating innovative projects that could unlock truly forward progress in those hardest-to-decarbonize sectors.

The Biden administration is right to reckon with the wide range of solutions ultimately required by a wholesale shift to a thriving clean energy economy. But it must be mindful that hydrogen is not a guaranteed clean energy solution. That makes it critical that the administration set rigorous standards from the outset. Otherwise, hydrogen will burn taxpayer money while increasing climate pollution and wasting preciously scarce time needed for real climate progress.

INTERNATIONAL NEWS

WHERE TRASH TURNS INTO TREASURE: THE FUTURE OF SOLAR ON LANDFILLS

By Breanna Sandridge | Oct 2023 | Source: EnergyTech

To overcome growing community concerns and continue installing solar projects to support the country's net-zero goals, developers and local governments are turning to an unlikely solution – closed landfills.

According to Wood Mackenzie, the total operating solar capacity in the United States is projected to expand from its present 153 GW to nearly 375 GW by 2028.

But as these projections portray a positive shift in the country's energy mix, concerns are growing over where these projects will be built.

The Environmental Protection Agency estimates a typical 500 kW to 2,000 kW community solar project will require 3 to 12 acres of cleared land – land that many farmers and communities would prefer to see developed into housing or agricultural projects.

While community solar projects provide a host of benefits to the surrounding areas, such as increased tax revenues, decreased electricity costs, and sustainable job creation, anti-solar sentiments have not abated and continue to impact the rate at which new solar projects are commissioned.

"Community concerns have made it harder for some developers to scale solar projects at the rate that science dictates that we need to," said David Murray, American Clean Power Association's Director of Solar Policy.

According to Wood Mackenzie, while 17 GW of utility-scale solar capacity was installed in the U.S. in 2021, an additional 1.7 GW of proposed solar capacity was canceled during the permitting stage.

"For every single large-scale solar project, you're seeing very well-organized opposition on social media," said Matthew Sahd, Solar Market Analyst at Wood Mackenzie.

To overcome these growing concerns and continue installing solar projects at a rate that can support the country's net-zero goals, solar project developers and local governments are turning to an unlikely solution – closed landfills.

Landfills are drawing the attention of solar developers for two main reasons: land availability and land mass.

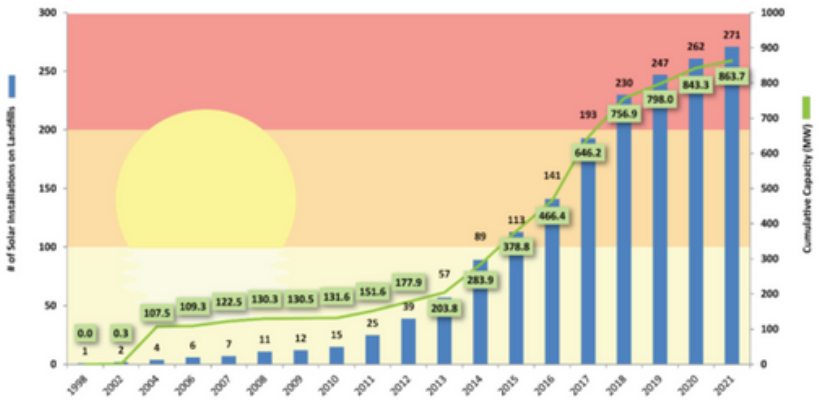
INTERNATIONAL NEWS

Most cities and counties own and operate actively managed or closed landfills, meaning solar developers have access to multiple acres of cleared land in almost every part of the country.

Closed landfills lack redevelopment opportunities, meaning solar developers are utilizing land that would otherwise go unused, avoiding land-use conflicts with the community.

Landfills also provide large parcels of land with adequate sun exposure for strong solar irradiation, as well as existing connections to electric distribution infrastructures and access roads for construction, operations, and maintenance tasks. Many federal and state organizations also provide grants and incentives to alleviate additional upfront costs.

These benefits have been so enticing that over the past 10 years, almost 50% of all renewable energy projects on brownfields, or land that is underused due to contamination concerns, were located on landfills.



Annual Growth of Solar Installations on Landfills. Image Source: Environmental Protection Agency.

As of the end of 2022, solar landfill had a capacity of 2.4 GW, enough to power nearly half a million homes, and the Rocky Mountain Institute estimates this capacity could grow at least 25-fold in the coming decades.

While many provide prime and relatively inexpensive, although environmentally sensitive, real estate for solar projects, not every landfill is an ideal match. Certain factors must be taken into consideration during the siting process.

For example, the physical condition of the landfill determines whether the location can support a solar infrastructure. This includes factors such as the landfill slope and orientation, the cap depth, and the settlement potential.

Unlike typical solar projects, a capped landfill cannot be punctured to secure the PV systems; instead, developers must utilize a ballasted system. Land settlement can also affect solar installation; as the ground continues to settle over time, solar panels can become misaligned, lowering their solar generation potential.

"There's more due diligence, there's more design and engineering, and people's time that has to go into sufficiently planning this," said Matthew Popkin, Urban Transformation Manager at Rocky Mountain Institute. "If you put a stake in the grass in a random field poorly, the dirt might suffer. If you put a stake in a landfill poorly, the community might suffer."
For a candidate landfill to be selected, a preliminary, decision-grade feasibility study must be conducted. If the landfill passes this initial inspection, it is subject to a final investment-grade feasibility study. These feasibility studies are similar in nature, except the investment-grade study requires a more in-depth information collection process followed by rigorous analyses.

INTERNATIONAL NEWS

Several companies have recently had great success launching solar landfill projects, including DSD Renewable's 4.3 MW solar project in New York, Coast Energy's 8.6 MW project in Long Island, and CS Energy's 10 MW project in New Jersey.

Where many see only acres of unusable space, solar developers are beginning to see potential and the promise of a solution that brings developers, government officials, and local communities together to support the growing energy transition. Through the repurposing of landfills, the solar industry can build an infrastructure ready to support the country's net-zero goals.

INTERNATIONAL NEWS

HOW A TINY PACIFIC ISLAND BECAME THE GLOBAL CAPITAL OF CYBERCRIME

By: Jacob Judah | November 2023 | Source: MIT Technology Review

Despite having a population of just 1,400, until recently, Tokelau's .tk domain had more users than any other country. Here's why.

Tokelau, a necklace of three isolated atolls strung out across the Pacific, is so remote that it was the last place on Earth to be connected to the telephone—only in 1997.

Just three years later, the islands received a fax with an unlikely business proposal that would change everything.

It was from an early internet entrepreneur from Amsterdam, named Joost Zuurbier. He wanted to manage Tokelau's country-code top-level domain, or ccTLD—the short string of characters that is tacked onto the end of a URL.

Up until that moment, Tokelau, formally a territory of New Zealand, didn't even know it had been assigned a ccTLD. "We discovered the .tk," remembered Aukusitino Vitale, who at the time was general manager of Teletok, Tokelau's sole telecom operator.

Zuurbier said "that he would pay Tokelau a certain amount of money and that Tokelau would allow the domain for his use," remembers Vitale. It was all a bit of a surprise—but striking a deal with Zuurbier felt like a win-win for Tokelau, which lacked the resources to run its own domain. In the model pioneered by Zuurbier and his company, now named Freenom, users could register a free domain name for a year, in exchange for having advertisements hosted on their websites. If they wanted to get rid of ads, or to keep their website active in the long term, they could pay a fee.

In the succeeding years, tiny Tokelau became an unlikely internet giant—but not in the way it may have hoped. Until recently, its .tk domain had more users than any other country's: a staggering 25 million. But there has been and still is only one website actually from Tokelau that is registered with the domain: the page for Teletok. Nearly all the others that have used .tk have been spammers, phishers, and cybercriminals.

Everyone online has come across a .tk––even if they didn't realize it. Because .tk addresses were offered for free, unlike most others, Tokelau quickly became the unwitting host to the dark underworld by providing a never-ending supply of domain names that could be weaponized against internet users. Scammers began using .tk websites to do everything from harvesting passwords and payment information to displaying pop-up ads or delivering malware.

Many experts say that this was inevitable. "The model of giving out free domains just doesn't work," says John Levine, a leading expert on cybercrime. "Criminals will take the free ones, throw it away, and take more free ones."

Tokelau, which for years was at best only vaguely aware of what was going on with .tk, has ended up tarnished. In tech-savvy circles, many painted Tokelauans with the same brush as their domain's users or suggested that they were earning

INTERNATIONAL NEWS

handsomely from the .tk disaster. It is hard to quantify the long-term damage to Tokelau, but reputations have an outsize effect for tiny island nations, where even a few thousand dollars' worth of investment can go far. Now the territory is desperately trying to shake its reputation as the global capital of spam and to finally clean up .tk. Its international standing, and even its sovereignty, may depend on it.

Meeting modernity

To understand how we got here, you have to go back to the chaotic early years of the internet. In the late '90s, Tokelau became the second-smallest place to be assigned a domain by the Internet Corporation for Assigned Names and Numbers, or ICANN, a group tasked with maintaining the global internet.

These domains are the address books that make the internet navigable to its users. While you can create a website without registering a domain name for it, it would be like building a house without an easily findable postal address. Many domains are familiar. The UK has .uk, France .fr, and New Zealand .nz. There are also domains that are not tied to specific countries, such as .com and .net.

Most countries' domains are run by low-profile foundations, government agencies, or domestic telecom companies, which usually charge a few dollars to register a domain name. They usually also require some information about who is registering and keep tabs to prevent abuse.

But Tokelau, with just 1,400 inhabitants, had a problem: it simply didn't have the money or know-how to run its own domain, explains Tealofi Enosa, who was the head of Teletok for a decade before stepping down in July 2023. "It would not be easy for Tokelau to try and manage or build the local infrastructure," Enosa says. "The best arrangement is for someone else from outside to manage it, trade it, and bring in money from it."

This is precisely what Zuurbier, the businessman from Amsterdam, wanted to do.

Zuurbier had come across Tokelau while chasing the internet's next big idea. He was convinced that just as people had adopted free email addresses by the millions, the natural next step was for them to have their own free websites. Zuurbier intended to put advertisements on those sites, which could be removed for a small fee. All he needed to turn this billion-dollar idea into reality was a place with a ccTLD that had not yet found a registrar.

Tokelau—the last corner of the British Empire to be informed about the outbreak of World War I, where regular shortwave radio wasn't available until the '70s and most people were yet to even see a website—was the perfect partner.

Representatives from Tokelau and Zuurbier met in Hawaii in 2001 and put pen to paper on a deal. Quickly, .tk domain names began to pop up as people took advantage of the opportunity to create websites for free. He still had to convince ICANN, which oversees the domain name system, that Tokelau couldn't host its own servers—one of the criteria for ccTLDs. But Tokelau—which switched off its power at midnight—would still need a reliable internet connection to keep in touch. In 2003 Zuurbier took a grueling 36-hour boat ride from Samoa to Tokelau to install internet routers that he had bought for $50 on eBay.

INTERNATIONAL NEWS

Gone was the unreliable dial-up. Tokelau had met modernity. "He provided all the equipment, got all the three atolls connected up, and then he also provided some funding which I used to share with the community," says Vitale, who established internet cafés that could be used for free by anybody from Tokelau's four hamlets.

For the first time, thousands of Tokelauans in New Zealand were able to easily connect with home. "What was important for Tokelau was that we were getting some money that could help the villages," says Vitale. Many of the initial sign-ups on .tk were completely innocuous individuals wanting to blog about thoughts and holidays, as well as gaming communities and small businesses.

Zuurbier sent Teletok regular reports about .tk's growth, and they indicated that the free-domain model was working better than anybody expected. Tiny Tokelau, which was being paid a small cut of the profits Zuurbier was making, was going global.

"We were hearing how successful .tk was. We were bigger than China," says Vitale. "We were surprised, but we didn't know what it meant for Tokelau. What was more meaningful at the time was that we were getting money to help the villages. We didn't know about the other side of it then."

As the decade wore on, however, it looked to Vitale as if things were beginning to blow off course. "We went in blind," he says. "We didn't know how popular it would be."

Things fall apart

It took until the late 2000s for Vitale to realize that something had gone badly wrong. After problems first arose, Zuurbier invited ministers and advisors from Tokelau to the Netherlands, paid for their flights, and explained the business's nuts and bolts in an effort to reassure them. They went to watch Samoa play at the Rugby World Cup in France.

"He [Zuurbier] appeared to be a really nice person," Vitale remembers. "There was all this nice stuff that felt homely, warm fuzzies." .Tk had hit the milestone of 1 million domain users.

But soon after this trip, he says, Zuurbier started falling behind on scheduled payments to Tokelau worth hundreds of thousands of dollars. (MIT Technology Review requested an interview with Zuurbier. He initially accepted but subsequently did not answer the phone or respond to messages.)

Meanwhile, Vitale had begun receiving complaints from concerned members of the "internet community." He and his peers started to become aware that criminals and other questionable figures had cottoned onto the benefits that registering free domains could bring—providing an almost unlimited supply of websites that could be registered with virtual anonymity.

"It was obvious from the start that this was not going to turn out well," says Levine, coauthor of *The Internet for Dummies*. "The only people who want those domains are crooks."

INTERNATIONAL NEWS

Levine says that .tk had started attracting unsavory characters almost immediately. "The cost of the domain name is tiny compared to everything else that you need to do [to set up a website], so unless you're doing something weird that actually needs lots of domains—which usually means criminals—then the actual value in free domains is insignificant," he says.

What started as techies complaining to Vitale about spamming, malware, and phishing on .tk domains soon turned into more worrisome complaints from the New Zealand administrator tasked with overseeing Tokelau, asking him whether he was aware of who .tk's users were. Allegations surfaced that .tk websites were being used for pornography. Researchers had found jihadists and the Ku Klux Klan registering .tk websites to promote extremism. Chinese state-backed hackers had been found using .tk websites for espionage campaigns.

"Satanic stuff" is how Vitale describes it: "There were some activities that were not really aligned with our culture and our Christianity, so that didn't work very well for Tokelau." With Zuurbier not replying to worried emails, Vitale moved to unplug him. He opened negotiations with Internet NZ, the registry that runs New Zealand's squeaky-clean domain, about how Tokelau might be able to wiggle out of its arrangement. He didn't manage to get an answer before he moved on from Teletok.

His successor, Enosa, tried to set the relationship on a new footing and signed new deals with Zuurbier on the understanding that he would clean up .tk. However, that never happened. One of Enosa's final acts as general manager at Teletok, in the summer of 2023, was to reopen negotiations with Internet NZ about how Tokelau might be able to extricate itself from the deal once and for all.

Meanwhile, most of Tokelau's residents weren't even aware of what was happening. Elena Pasilio, a journalist, saw firsthand how much this was hurting her home. When she was studying in New Zealand a few years ago, people—knowing that she was Tokelauan—started to tag her on social media posts complaining about .tk.

At first, she felt confused; it took time before she even realized that .tk meant Tokelau. "I was really surprised by how many users it had, but then I realized that a lot of people were using .tk to make dodgy websites, and then I felt embarrassed. I was embarrassed because it had our name on it," Pasilio explains. "It has got our name tangled up there with crimes that people here would not even begin to understand."

There is a sense from both Vitale and Enosa that Zuurbier cared little as Tokelau's reputation was dragged through the mud. "I would argue with Joost," Enosa says, adding that he would remind him he was the custodian for a legal asset that belonged to Tokelau alone. According to Enosa, he would shoot back: "I built this infrastructure from my own pocket. I spent millions of dollars building it. Do you think that was easy? Do you think that Tokelau can build this kind of infrastructure itself?"

"I said: 'Okay. Understood,'" Enosa recalls. "I understood how a white man looks at it. You know? This is how white men look at things. I understand that."

INTERNATIONAL NEWS

Digital colonialism

What has happened to Tokelau is not unique. The domains of small islands across the Pacific are cited in numerous stories either celebrating dumb luck or complaining of massive abuse.

Tuvalu has managed to turn .tv into approximately 10% of its annual GDP. Micronesia's .fm has been pushed heavily at radio stations and podcasters. Tonga's .to has been favored by torrent and illegal streaming websites. Anguilla, in the Caribbean, is heavily marketing its .ai at technology startups.

But these success stories seem to be the exception. In 2016, the Anti-Phishing Working Group found that alongside .tk and .com, the Australian Cocos Islands (.cc) and Palau (.pw) together represented 75% of all malicious domain registrations. They had been flooded by phishers attacking Chinese financial institutions. The Cocos Islands made headlines in Australia when websites allegedly hosting child sexual abuse images were recently found on its domain.

Those domains whose names—by linguistic luck—seemed to mean something tended to attract better managers. Sharks seem to have circled around those that did not, or had a market that was less clear.

While the abuse of Pacific Islands' domains has waxed and waned over the years, the islands' tiny size means that even small associations with crime can have damaging consequences.

"There is a problem in Polynesia," says Pär Brumark, a Swede who represents the Pacific island of Niue abroad. "You had these internet cowboys running around taking domains everywhere."

Niue lost control over the domain .nu after it was "stolen" by an American in the late 1990s, Brumark says. Its management was given to the Swedish Internet Foundation—which manages Sweden's native .se—in a "shady deal" in 2013, he claims. .Nu has been wildly popular in Sweden, as it translates directly to "now." Niue, which is also linked to New Zealand, is now fighting a David-versus-Goliath battle in the Swedish courts. It is seeking as much as $20 million in lost revenue—almost one year's worth of Niue's annual GDP.

"Digital colonialism," claims Brumark. "They exploit resources from another country without giving anything back. They have never spoken to the government. They have no permissions. They exploit. Colonialism to me is if you take resources from a country that you do not have the permission to take."

But now there may finally be some accountability—at least in the case of Zuurbier.

In December 2022, courts in the Netherlands found in favor of an investor suing Freenom, the company that managed .tk and four other domains—those of Gabon, Equatorial Guinea, the Central African Republic, and Mali—that were subsequently added to the model it pioneered. The courts found that Freenom had fallen foul of various reporting rules and appointed a supervisory director.

And in March of this year, Meta, which owns Facebook, Instagram, and WhatsApp, also sued Freenom for damages, claiming that sites hosted on .tk and the four African domains were engaging in cybersquatting, phishing, and trademark infringement.

INTERNATIONAL NEWS

Meta provided examples of websites that appeared to be registered at .tk with the express purpose of deceiving users, such as faceb00k.tk, whatsaap.tk, Instaqram.tk.

In an interview with the Dutch newspaper NRC, Zuurbier denied Meta's allegations about the "proliferation of cybercrime." But the Cybercrime Information Center recently reported that "in past years Freenom domains were used for 14% of all phishing attacks worldwide, and Freenom was responsible for 60% of the phishing domains reported in all the ccTLDs in November 2022." Zuurbier says that Freenom distributed to over 90 trusted organizations, including Meta, an API that allowed them to take down offending sites and that Meta itself failed to continue using it. But many in the tech industry resent what they see as Freenom shifting the cost of policing its domains onto others.

As of January 2023, it is no longer possible to register a .tk domain. All four African countries—many thousands of times larger than Tokelau—have broken ties with Freenom. Tokelau, which did not seem aware that there were other countries in the same boat, is still trying to figure out what to do next.

It now looks as if Freenom is essentially finished as a company. But Enosa doesn't believe that'll stop Zuurbier from pursuing more shady schemes. "Joost always wins," he says.

Shifting tactics

Without access to the unlimited pool of free domain names that were available through .tk and the four other Freenom ccTLDs, many cybercrime groups that relied on them are being forced to adapt. Certain scattergun approaches to spamming and phishing are likely to go out of fashion. "Spammers are fairly rational," explains Levine, the spam expert. "If the spam is cheap and the domains are free, they can afford to send out a lot of spam even though the likelihood of response is lower. If they actually have to pay for the domains, then they are likely to make it a lot more targeted."

"Bad things online require a domain name at some point," says Carel Bitter, head of data at the Spamhaus Project, which tracks malicious activities online. "You need people to go somewhere to fill in their account details. If you can't get domains for free, you will have to get them somewhere else." Analysts have noted upticks in malicious use of cheap "new" generic TLDs such as .xyz, .top, and .live, whose reputations have been wrecked by dodgy dealers.

While other domains may only cost $1, a drop in the ocean for the largest gangs, the fact that they now need to be purchased may limit the damage, says Bitter: "Any cybercrime business that relies on domain names will have some sort of natural limit that determines how much they can spend on domain names." Others, though, may seek to compromise existing websites with low security.

It is likely that "basement" operations—so-called "ankle-biters"—will feel the biggest pinch. "What is possible is that the guys that are just doing it as a dabble won't want to put the money up, but the professionals are not going away," says Dave Piscitello, director of research activity at the Cybercrime Information Center. "They will go elsewhere. If you are staging a revolution and the cost of a Kalashnikov goes from $150 to $250, you aren't going to say 'Forget it.' It is the business."

INTERNATIONAL NEWS

An existential issue

The media sometimes reports that Tokelau makes millions from the use of .tk. Zuurbier himself claims on his LinkedIn that his relationship with Tokelau adds over 10% to the atolls' GDP.

"Bullshit," says Enosa when asked. "That's a lie."

Enosa claims that .tk provided a "very small" proportion of Teletok's income: "It doesn't give us good money. .Tk was nothing to my revenue."

While the arrival of the internet on Tokelau promised to zip information across the Pacific instantaneously, the islands have remained isolated. Even while I was reporting this story, it took weeks to get in touch with Pasilio and other sources there. Interviews were repeatedly delayed because of the price of data packages. Internet in Tokelau is among the most expensive in the world, and NZ$100 (US$60) worth of data can sometimes last only 24 hours at a time. Phone calls to Tokelau from Europe did not connect.

"I feel sorry for our Tokelau," Pasilio says. "We have been taken advantage of. I think people would be shocked if they knew what had been going on with .Tk."

Even many Tokelau elders had not fully understood the problem, at least until recently.

There are other, arguably more existential problems the islands need to deal with, including climate change, emigration, and the atolls' future relationship with New Zealand. "Our islands are already shrinking as it is, with the sea levels rising," says Pasilio. She says her father tells her about reefs and sand banks that have sunk beneath the Pacific. "They would rather worry about things that they can see physically and that they know more about, rather than fighting back on this .Tk thing," she says.

But the issue of the abused .tk domain was recently raised in the General Fono, or Parliament, indicating that the issue had finally broken out of its technical niche and into the wider public.

Those existential issues facing the islands are not wholly unrelated to .tk. Questions over the future of the domain have arisen at the same time that a debate over Tokelau's political future has been revived.

Tokelau is classified by the United Nations as a "non-self-governing territory" under the oversight of the Special Committee on Decolonization. In 2006 and 2007, referenda on whether Tokelau would enter "free association" with New Zealand—a possible stepping stone toward eventual independence—was approved, but not enough of Tokelau's population voted to meet the turnout threshold. In May 2022, it was decided that another referendum on Tokelau's future would be held ahead of the centenary of New Zealand rule in 2025.

Repairing Tokelau's devastated international reputation by cleaning up .tk will be a necessity if the atolls are to make any serious bid for sovereignty. Vitale is now the general manager of Tokelau's government and wants to see its internet domain make a triumphant return to make it clear that the islands are turning a new page.

INTERNATIONAL NEWS

"We are building nationhood here," he explains. "We are on a pathway toward self-determination. We want to use the .tk as a catalyst to promote our nationhood and be proud of it—our domain name and our identity among the internet community."

All of Tokelau's email and website addresses are currently hosted on New Zealand's .nz. "What does that mean to people? It means that we are in New Zealand," says Vitale with a sigh. "We should be selling ourselves as being in Tokelau, because .tk is the domain—the identity—for Tokelau."

"When you have people coming to knock on your door with attractive packages," he adds, "you see it as an opportunity you hook onto—not realizing what the consequences will be further down the road."

INTERNATIONAL NEWS

NEGATIVE PRICES AN OPPORTUNITY

December 2023 | Source: Eenergy Informer

In the December edition of EEnergy Informer Perry Sioshansi writes that Demand flexibility can act as a gigantic electricity shock absorber

As frequently reported in his newsletter, grid operators in renewable-rich parts of the world are routinely encountering periods of generation in excess of demand, which causes wholesale prices to plunge, often going negative. In some cases, even negative prices are not enough to get rid of the excess generation, which means that the grid operator has to curtail renewables as a last resort. That is the last thing politicians like to read in newspaper headlines, namely renewable generation that cannot be utilized. A typical but not unique example of this increasingly happens at the California Independent System Operator (CAISO). The latest data from CAISO shows that it is increasingly curtailing solar as it faces continued growth in California Wind is also occasionally curtailed but on a much smaller scale.

As with all grid operators,curtailment occurs due to congestion, when there is insufficient transmission capacity to deliver the excess generation elsewhere, or overgeneration, when renewable generation exceeds demand on the network.
In the case of CAISO, the former has significantly increased since 2019 . The simple explanation is that the pace of solar additions in California has been outpacing upgrades in transmission capacity – not atypical of other grids.

CAISO curtailed 2.4 million MWhs of utility-scale solar (and some wind) output in 2022, a 63% increase from 2021. The latest data covering the period to July 2023 shows curtailment of more than 2.2 million MWh of solar and wind for the first 7 months of the year. The figure for the entire year will be even bigger.

In California's case, solar accounts for nearly 95% of the energy curtailed in all of 2022 and 94% for the first 7 months of 2023. Solar curtailment tends to be high in the spring when demand tends to be low due to moderate temperatures, which means little space heating or air conditioning. Solar generation, however, tends to be high in the clear sunny spring months.

The situation is different in Texas, for example, where both wind and solar are curtailed when there is overgeneration. Add distributed rooftop solar to the mix and the problem is further exacerbated, causing localized congestion on the distribution network.

The problem is expected to get worse before it gets better. In 2014, California had a mere 9 GW of wind and solar capacity. As of July 2023, that number had grown to 17.6 GW with another 3 GW expected by the end of 2024.
Facing pressure to address the issue, CAISO has been exploring a number of remedies including:

- Expanding trading within the Western Energy Imbalance Market (WEIM), a real-time market that allows participants outside of CAISO to buy and sell energy to balance supply and demand. In 2022, more than 10% of curtailments were avoided by trading within thenWEIM. Additionally, CAISO expects to have a day-ahead market in operation by spring of 2025;

INTERNATIONAL NEWS

- Expanding transmission capacity to reduce congestion – easier said than done. CAISO currently has 45 transmission projects to accommodate load growth and a larger share of generation from renewables;

- Promoting the development of flexible resources that can quickly respond to sudden increases or decreases in demand especially battery storage.California has 4.9 GW of battery storage with plans for another 7.6 GW by the end of 2024 with the aim to store the excess generation for later use;

- Developing new and flexible sources of demand which can soak up the excess generation – for example, to produce hydrogen through electrolysis for use in the higher-demand periods;

- Increasing demand response programs by use of time-of-use (TOU) tariffs which could shift customer demand from high to low demand hours; and

- Incorporating electric vehicle charging systems that can soak up the excess mid-day solar generation and store it in car batteries.

The new accepted reality of power systems is that they will be increasingly dominated by variable renewable resources – since the aim is to transition towards a low carbon future. This means that the traditional solutions to match supply-and-demand in real time – which was to adjust generation to follow load – is not going to work anymore because renewable generation is non-dispatchable.

Spring is the worst for solar overgeneration.

Overgeneration,renewable curtailment and negative prices are inevitable and will continue to rise. This means that the grid operators and policymakers must step out of the box and embrace these new challenges – and turn them into opportunities.

This newsletter is not the first, nor will it be the last, to observe that instead of characterizing overgeneration and negative prices as problems they should be viewed as opportunities.

Customers, large or small, with demand flexibility should be rewarded for shifting their consumption patterns to periods where supplies are plentiful and cheap – or when price are negative – and away from the opposite.

And it is not just CAISO who must accept these realities but grid operators everywhere.

The Australian Energy Market Operator (AEMO) recently announced that negative pricing events make up 1 in 5 trading intervals as the growth of renewables, particularly solar, continues to result in periods of oversupply in the middle of sunny days. In many competitive wholesale markets, some generators bid to be dispatched at very low or even zero prices for variety of reasons.

INTERNATIONAL NEWS

This offers customers with flexible demand strong incentives to shift their consumption patterns to take advantage of the low prices, when available, while avoiding high prices. It is not rocket science and it makes good business sense. Electric vehicles, electric water heaters, customers with heavy pumping loads, energy-intensive industry and a variety of other applications have built-in flexibility to take advantage of the daily feast and famine which happens with regularity and predictability in many markets.

Flexible demand can, and should, be developed into a gigantic electricity shock absorber that soaks up the overgeneration at low or negative prices .

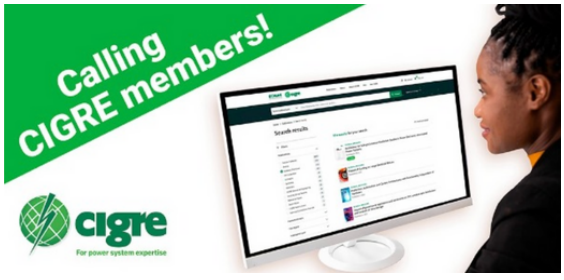
CIGRE UPDATE

CAIRNS23 SYMPOSIUM
SENIOR LEADERS FORUM KEY POINTS

During the Cairns23 Symposium, a group of invited global senior leaders met to discuss some of the issues and challenges arising from the Energy Transition. These discussions were held in camera, however some of the key issues arising were:

- We need to focus on ways to speed up the transition while maintaining reliability – this will require innovative thinking.
- The necessity for increased standardisation and the early identification of plant needs will be critical to accelerating the transition.
- Market modifications are required to reflect the changing nature of power systems and associated services.
- There is a need to urgently ramp up the supply of skilled resources and highlight the energy transition as a major issue for humanity.
- Stakeholder engagement will be more critical than ever. There is a need for robust, independent advice to Governments.

There is clearly a role for CIGRE in addressing these challenges and a report on the key issues from the Forum has been provided to the Administrative Council of CIGRE.



FIND OUT MORE

Five key points about CIGRE membership in 2023:

#1 Collaboration with experts is booming in 2023.

#2 Our global perspectives are increasing in 2023.

#3 New eCIGRE release in 2023, part of CIGRE's enriched global access. Our new multi-device responsive website, enriches membership access to over a million pages of power system expertise and technical resources.

#4 Record number of new Technical Brochures released in 2023.

#5 New digital benefits coming in 2024 and beyond.

CIGRE UPDATE

CAIRNS CIGRE SYMPOSIUM PAPER OF INTEREST

Paper number: 1115
Paper title: CIGRE fourth reliability survey on transmission & distribution equipment

Study Committee SC A3 –Transmission and distribution equipment
Paper Stream 1. Learning from experience
Authors Hiroki Ito, Frank Richter, Robert le Roux, Wayne Pepper
Affiliations (optional) On behalf of CIGRE WG A3.48
Email address Hiroki Ito@aj.MitsubishiElectric.co.jp

Summary

Reliability of substation equipment in power systems is of great interest especially for transmission and distribution system operators and asset owners. A major failure of substation equipment may result in significant system outages with the associated power restoration efforts as well as possible safety implications. Poor reliability will contribute to higher system operating and maintenance costs to the operators and, ultimately, their customers.

CIGRE periodically conducted international reliability surveys on equipment in power systems that can provide good feedback on the validity of international standards on the related equipment.

The first reliability survey collected the data of circuit breakers with all technologies serviced in 1974-1977 [1]. The second survey collected the data of single pressure SF6 circuit breakers serviced in 1988-1991[2],[3]. The reliability data related to GIS were also collected in 1991 (first survey [4], [5]) and in 1996 (second survey [6], [7]).

The previous third survey collected the data for not only circuit breakers (CB) but also disconnecting switches(DS), earthing switches (ES), instrument transformers (IT) and gas insulated switchgear (GIS) serviced in 2004- 2007. The results were presented in CIGRE Technical Brochures 509 to 514 [8]-[13].

CIGRE established the WG A3.48 in July 2022 to analyse the data on equipment serviced in 2014-2017 collected as part of the recent fourth survey. The paper will present interim results of the fourth survey focusing on equipment such as CB, DS, VCB and GIS and compare them with the results in the previous surveys.

DOWNLOAD PAPER

CIRED UPDATE

SEE YOU IN CHICAGO IN NOVEMBER 2024!

Resilience of Electric Distribution Systems

Since 2008, CIRED workshops on specific topics have been organized in Europe every two years between CIRED main conferences.
Building on the success of these workshops, CIRED has decided to extend its geographic coverage by organizing workshops outside the continent. This next out of Europe event will be held for the first time in the USA.

SAVE THE DATE!

The workshop will take place 1 year from today, on 7 & 8 November 2024 at the Sheraton Grand Chicago Riverwalk, in the River North district.

CALL FOR PAPERS

The workshop will address the Resilience of Electric Distribution Systems. This main topic will be discussed around 3 themes:

1. Resilience Concepts, Metrics, and Planning
2. Technologies and Solutions for Resilience Improvement
3. Case Studies for Assessing and Improving Resilience

The call for papers will be open in January 2024.

IMPORTANT DATES

12 January 2024

Call for papers available online

12 April 2024

Deadline for the abstracts submissions

1 June 2024

Registrations open online

CIRED PAPER

SOLAR FARM EARTHING – NOT JUST AN EXTRA-LARGE SUBSTATION

Rome | 12-15 June 2023 | Paper n° 935

Special Requirements Met by Risk-based Design and Focused Testing

William (Bill) CARMAN
Bill Carman Consulting – Australia
billcarman2@gmail.com

Matthew BALE
Safearth Consulting – Australia
mbale@safearth.com

ABSTRACT

To design and commission the earthing system of a utility scale solar farm as if it was an extra-large substation has been shown to miss key requirements and can result in non-compliant safety performance excessive expenditure and, in time, a compromised earthing system. This paper identifies special requirements and issues that designers of large-scale solar farms need to consider and proposes how they may be addressed during system design, construction, commissioning and maintenance.

DOWNLOAD PAPER

UPCOMING EVENTS

EESA SOCIAL ROULETTE

WED 13 DECEMBER 2023 | NSW ACT | VIEW EVENT

Overview:

Join us for Social Roulette
What: a virtual event where to meet and greet electric energy industry reps from around Australia, with themed prompt questions

Time: 5 PM - 6 PM AEST

Location: Virtual Event

AMPEAK24 – NAVIGATING THE ASSET MANAGEMENT JOURNEY

14 - 17 APRIL 2024 | SA | VIEW EVENT

Overview:

Enabling leaders in asset management to achieve excellence in the management of assets AMPEAK24 is the meeting place for asset managers and a place to engage in lively discussion on emerging topics of interest in asset management, share new ideas and knowledge, and find practical solutions to take and use in your workplace.

Location: Adelaide, South Australia

THANKS TO OUR CORPORATE MEMBERS

PLATINUM

MISSION
"Through our passion for innovation and always finding a better way, we are taking reliability, customer service and product value- for-money to a new level in the transformer industry."

GOLD

SILVER

BRONZE