

API SUMMER SCHOOL+ INSIGHTS



**Responses from the 2022 participants to 10 key
Challenges and Opportunities in the power sector**



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EXECUTIVE'S INSIGHTS ON CHALLENGES

What are the key challenges facing the power sector - from the perspective of your organisation - and how do you approach these issues as a leader?

Can you encapsulate the main challenge you see in a short "Challenge Question" that can be further assessed by the next generation of leaders in power?

14 leaders from across the API's member organisations rose to our challenge and shared their insights with participants in the API's 2022 Summer School and in the Powerful Women Leadership Programs throughout 2021 and 2022.

Each 30 minute session provided invaluable strategic context to the comprehensive content from industry experts that the 100+ participants explored during the Summer School and Powerful Women programs.

The 50 Summer School participants also used the Challenge Questions as a focus for team collaboration activities (the famous Syndicate Projects) that they worked on in groups of 5 during and after the 2-week residential School, covering 10 of the 14 available Challenge Questions.

Outputs from their efforts included a Board paper and presentation from each project team, exploring:



CONT.

- Exec Summary of the Challenge (included in this compilation report)
- What are the major factors contributing to the Challenge
- What are the major issues and stakeholders impacted by the Challenge
- What is the current state of play
- What are your recommendations for action (for which stakeholders)
- Contributors' biographies

The API's Summer School group projects - called the **Syndicate Projects** - are an important part of the Summer School experience. They assist participants in reflecting on the information shared by the 70+ speakers during the School, prompt them to connect with their fellow participants, develop their knowledge in new areas and strengthen their teamwork and communication skills.

Syndicate projects have traditionally been technically focused topics. But given the rapid evolution of complex challenges for the sector we saw a need to embed more strategic perspectives into the Syndicate projects.

We also had some practical COVID challenges to address and having the Executive Insights challenge questions provided a great opportunity to link the new with the traditional elements of the School.

This melding of new and traditional continued in linking our new Powerful Women Leadership Program to the

presentations of the Syndicate Project results on the second last day of the School; our 2022 Summer School teams had a big audience of all School participants and 60+ extra women undergraduates and graduates (and API Board members).

Through this we had 3 generations of the power sector's current and future leaders sharing and reflecting on the key challenges and pathways forward. It was great!

We're also sharing the written outputs generated by the Syndicate Projects for the first time: this compilation report of the Executive Summaries and the individual Board papers from each of the 10 groups (see here).

We thank our Summer School participants and speakers, and our Execs, for their hard work in creating these insights for us, and we encourage you to connect with the project teams if you want to talk more.

If you'd like to join the next Summer School cohort, please reach out!

Regards,
David

Dr David Pointing
PhD FIEAust CPEng EngExec NER
Chief Executive Officer
The Australian Power Institute
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CHALLENGE #1: MANAGING MINIMUM DEMAND WITH MANY CUSTOMERS USING DER

"Minimum demand means the lowest level of demand from the grid in any given day, week or year and is extremely sensitive to ongoing uptake of solar PV, weather conditions, and local economic activity. The situation is compounded when consumers' energy needs, particularly during daylight hours, are being met by their own distributed energy resources (DER) such as solar PV.

What challenges must we overcome in managing minimum demand and what are the most compelling possible solutions to address these challenges?"



Peter Price, Executive General Manager – Engineering, Energy Queensland



GROUP MEMBERS

Aditi Sachdeva, Department of Transport
Ashley Niebling, SA Power Networks
Frederico Rego, Western Power
Josephine Nga, AEMO
Siphephile (Pep) Ngwenya, Western Power

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SUMMARY

This paper was developed during Australian Power Institute's Summer School program 2022. The recommendations are based on the existing and emerging industry practices and leverage the information shared by leaders and innovators from Network Service Providers (NSPs), Market Operator and Regulators. This paper provides recommendations for managing the cultural, technical, social and political impact of the minimum demand and penetration of rooftop PV.

Minimum demand is causing unprecedented disruption across the energy sector and will permanently change the industry. Whilst this is a challenge, it is also an opportunity to benefit from this revolution. The impacts on non-synchronous generation on the network can be severe and lead to grid-wide blackouts with massive financial and reputational implications, comparable to the impact of the catastrophic failure in South Australia in 2016, which resulted in a loss of \$360 million for business.

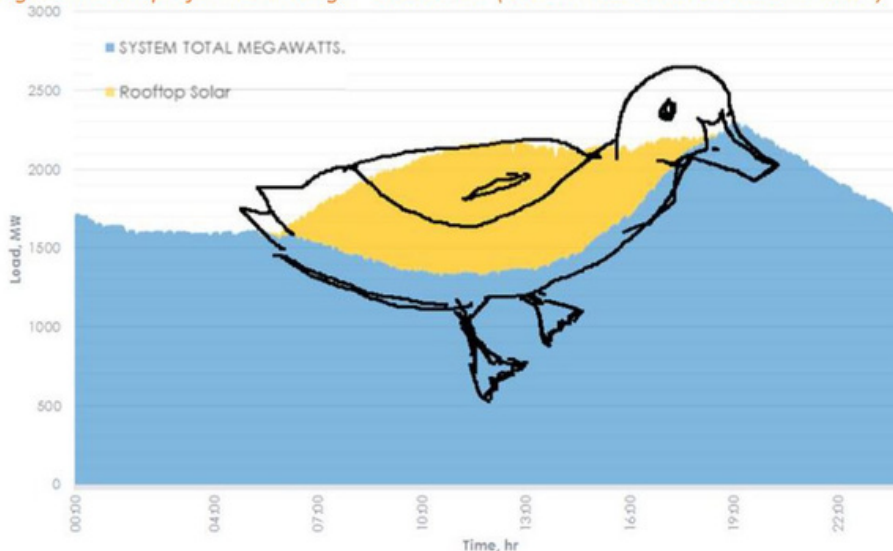
SUMMARY CONT.

Rooftop PV penetration has a major impact on the shift in consumer profile. A new period of minimum demand in the middle of the day has now emerged. The minimum load is approaching a point where it will be below the least amount of load required to maintain the network stability. This phenomenon is commonly referred to as the 'duck curve' is illustrated in Figure 1.

Market players, Regulators and NSPs, are exploring innovative ways to overcome the challenges of minimum demand. The solution requires a holistic approach and knowledge sharing involving all key industry stakeholders. NSPs are currently trialing a number of initiatives like regulatory changes, enhancing control capabilities, use of synchronous condensers to provide inertia and system strength. Each strategic recommendation in this paper is structured as a strategic initiative for NSPs, to provide a range of actions to help NSPs deal with the minimum demand challenge in a sustainable manner.

1. Understanding the consumers improves consumer related information available to NSPs and improves modelling capabilities, enabling more targeted strategies with higher benefits to stakeholders.
2. Understanding NSPs' role improves the alignment of key market players, delivering efficiencies for NSPs and a more equitable distribution of the benefits and costs of the transformation.
3. Managing the assets is aimed at developing adequate asset management strategies to incorporate new assets while maintaining performance of the existing network.
4. Operating the network delivers efficiencies in network operations by targeting demand and increasing automation.
5. Transforming the network provides a list of potential trials for NSPs to remove uncertainty around suitable solutions for different parts of the network.
6. Delivering the transformation proposes actions to streamline delivery and reduce costs.

Figure 1: Load profile illustrating a 'duck curve' (Western Australia 28 October 2018)



CHALLENGE #2: PREP THE SYSTEM AND MARKET FOR A 100% RENEWABLE GRID

“The energy transition is happening faster than anyone expected, and there are no signs its slowing down.

What are the things we as an industry need to do to prepare the system and market for a 100% instantaneous renewable energy grid?

You can tackle this question from a technical engineering, market and regulatory framework, industry culture and capability, or data and technology perspective. Think big and bold!”

Violette Mouchaileh, Chief Markets Officer, Australian Energy Market Operator (AEMO)



GROUP MEMBERS

Caroline Bennett, Green Energy Trading
Diwei Zhang, Transgrid
Nishan Rathnall, TasNetworks
Zahra Rahimpour, UNSW

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SUMMARY

The Australian Energy Market is transforming at a rapid pace toward clean renewable energy sources of energy. The step change scenario of draft 2022 ISP show large amounts of large-scale wind and solar PV as well as distributed PV predicted between now and 2050. These new sources of energy provision or generation will produce using inverter-based resources/technology. It also shows a large amount of coal fired synchronous

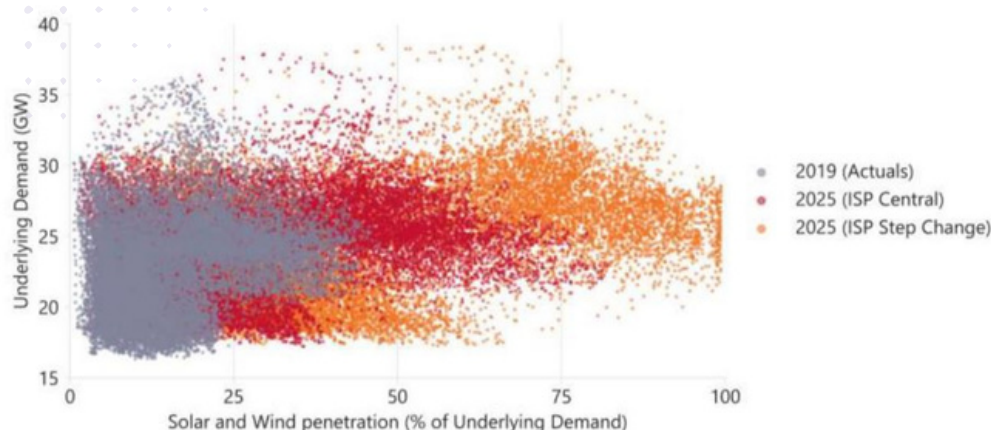
generation decreasing almost entirely by 2045. The challenge given to Syndicate Group 2 was to discuss the challenges and solutions that we as an industry will need to do to prepare the system and the market for a 100% instantaneous renewable energy?

The following areas were evaluated however the focus of this paper are on the highlighted areas below:

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- Technical/Engineering
- Market and regulatory framework
- Industry culture and capability
- Data and technology

The amount of instantaneous renewable energy (large scale and distributed PV) experienced and predicated on the grid as a percentage of demand is shown in the graph below:



Ref. AEMO Renewable Integration Study (RIS) stage 1 Report

It can be seen from 2019 actual results (grey points on the graph) that percentages close to 50% have been reached already. It has been recently reported that South Australia and Tasmania have reached figures as high as 92% and 82% respectively and have operated their systems successfully. These days would become more frequent into the future if more inverter based generation are dispatched. **The technical/engineering challenges are:**

- Secure system operation with increasing uncertainties;
- Increased DPVs (Distributed PVs);
- Decreased system inertia and the consequent frequency issue;
- Decreased system strength;
- Potential gap between supply and demand due to the intermittency of the renewables.

There is also the challenge of the changes required in the industry culture, capability

and role clarity required to solve these future problems. The technical solutions at a high level will revolve around performing intensive power system studies using state of the art software collaboratively between TNSP's and AEMO.

The solutions are briefly discussed below for each challenge stated above:

Secure system operation with increasing uncertainties - The higher the penetration levels of inverter-based generation, the more complex the operation process needs to be with new and more limits introduced for the NEMDE system to process.

Increased DPVs (Distributed PVs) - A large part of the DPV will be "uncontrolled and invisible" roof top solar which is (in certain states) already becoming a large if not largest distributed generator.

SUMMARY CONT.

This presents a problem for traditional fast control for voltage control and stability, frequency control and system strength and inertia.

Decreased system inertia and the consequent frequency issue - With increasing levels of renewables and the consequent, inevitable replacement of synchronous generating units, the system inertia, conventionally originated from the rotating mass from the synchronous machines, declines accordingly. This shortfall causes system stability and recovery during system disturbances mainly on the transmission system.

Decreased system strength - With the accelerating of the synchronous sources closure, new frameworks to determine the system strength requirement for fault level nodes are to be established as the source of the underlying system strength will inevitably change. Options that could be deployed in the short term are limited and require investigation but solutions for the future grid are synchronous condensers from non-network (to be contracted) and network services (RIT-T process to be followed), grid forming solar PV and grid forming wind generation. A case in question is AEMO recently recognising that an innovative technology around solar inverters for assisting with system strength is evolving⁷. It will also be good to explore the feasibility and cost of securing system strength services from old coal or gas station generators being refurbished and converted to synchronous condensers.

Changing culture and capability in the Industry - Power systems experts will be needed to do more scenario modelling (load flow calculations, system stability studies and EMT studies), as well as more detailed operational forecasting.

In addition, data scientists are needed to manage and work with big data and evaluate the quality of the data we use to draw conclusions about the electricity market and power system operations. As a society, we need social scientists to work closely with policymakers and regulators, and more importantly, with consumers to ensure they realize the crucial role they play in ensuring a reliable and efficient electricity market. On the other hand, the regulators and policymakers recognize customer needs and have put in place a business model that will benefit the entire grid and will offer each customer a reliable, equal power supply. The challenge we anticipate facing in the future requires high tech experts to fill in the gaps as we move toward finding efficient and cost-effective high-tech solutions.

Our solution requires a clear vision of the national electricity market and power system operation across different regions to support the NEM as a unified market with strong leadership from Government through all the companies involved.

CHALLENGE #3: EFFECTIVE AND TIMELY ENGAGEMENT OF ALL THE STAKEHOLDERS

“How can we achieve the range of necessary support (from landowners, communities, and tiers of government) and approvals (from environment, land use planning and heritage approvals bodies, energy regulators and governments) in a timely way?”

Bess Clark, Chief Executive Officer, Marinus Link



GROUP MEMBERS

Cathryn McDonald, SA Power Networks
Kirk Martel, AEMO
Mahali Heffner, CS Energy
Samantha Kerr, Aurecon
Samuel Pickering, Transgrid

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SUMMARY

Implementing Australian Energy Market Operator's (AEMO's) Integrated System Plan (ISP), which maps out investment requirements for Australia's transition to a net-zero energy system, will require significant transmission investment in new corridors across the National Electricity Market (NEM) the like of which has not been seen for generations. Delays in achieving the range of necessary support and approvals from relevant stakeholders could postpone Australia's

net-zero energy target and expose customers to affordability, security and reliability risks. The major contributing factors relating to the timely approval of transmission projects include:

- Lack of shared goals, benefits and vision-there is a misalignment of well-defined measurable and attainable goals, benefits and vision between all stakeholders.

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- Project and process limitations -the current process to gain approvals for transmission projects, specifically the ISP and Regulatory Investment Test for Transmission (RIT-T) processes, are fragmented and inherently slow.
- Workforce knowledge and experience -there has been little investment in new large-scale power system infrastructure which creates a gap in the knowledge and experience to effectively engage relevant stakeholders as required.
- Ineffective stakeholder engagement-linked to the abovementioned point, the lack of skills, knowledge and experience in stakeholder engagement creates a gap in effective engagement of stakeholders, particularly landowners, communities and traditional landowners. In order to ensure this support is achieved in a timely manner, we make the following recommendations to stakeholders:

Stakeholder	Recommendation
TNSPs	TNSPs to develop and implement a Reconciliation Action Plan (RAP) that engages traditional owners to assist with community engagement throughout the development and construction of the project.
TNSPs and AEMO	Educate existing workforce in community engagement, land use planning and environmental issues that may impact on transmission line route selection.
TNSPs	Hire staff with experience in community engagement and development approvals from other sectors with recent large infrastructure experience (e.g. local government).
AEMO	Modify the ISP process to require TNSPs to conduct community engagement around potential transmission routes prior to the selection of actionable projects.
Governments	Assist national, state and local communities to develop a shared goal or set of goal(s) for the energy transition.
AEMC	Consider whether a rule change to the current cost allocation principles for transmission investments is in the best long-term interests of consumers.

CHALLENGE #4: GETTING THE MARKET RIGHT

“Is our market working or are we in fact missing markets for things like fast frequency, system strength and inertia?”

Paul Simshauser, Chief Executive Officer, Powerlink



GROUP MEMBERS

Dan Tang, AEMO

Hosoo Yoon, ElectraNet

Lucinda Walker, Clean Technology Partners

Philip Wong, Transgrid

Sebin Jose, Wilson Transformer Company

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SUMMARY

The seismic transition from traditional synchronous to inverter-based resources (IBR), for example wind and solar PV generation, poses some critical challenges to network operators, market participants, and end customers. This is exacerbated further by the shift from traditionally, a handful of large capacity generators to smaller but numerous distributed energy resources (DER) in the National Electricity Market (NEM).

Some of the challenges with the power system transition are:

- Voltage and frequency control with low level of system strength and inertia
- System reliability issues with variability and uncertainty of intermittent generation; and
- System security issues with increasing penetration from DER.

The current NEM can be categorised as Energy Wholesale Market and Market and Non-Market Ancillary Service. Considering these new challenges arising as a result of the transition

SUMMARY CONT.

towards renewable generation, there is a need to introduce new market mechanisms and/or services to incentivise generators and customers alike to support system strength and inertia in new ways.

The Australian Energy Market Commission (AEMC) has made a final rule determination for the efficient provision of system strength. The final rule determination represents an evolution of the current system strength framework to meet new system strength requirements. Furthermore, the AEMC has also published a final rule determination to introduce a new frequency control ancillary services (FCAS) to help maintain system frequency and keep the future electricity system secure.

Further to the above-mentioned rule changes, there are also initiatives currently under consultation by the AEMC, which aim to address the issues raised regarding system strength and the retiring of traditional synchronous machines which traditionally provided system inertia.

These include Operational security mechanism, Operating reserve market, and a Capacity mechanism suggested by Energy Security Board.

In addition, we have highlighted a 'new' potential market to address the issues surrounding times where the network experiences lower than minimum demand on their networks due to distributed behind-the-meter solar PV.

This new market, termed 'Small Generation Management Aggregators' would leverage the existing 'Small Generator Aggregator' in the NEM rules, along with the current implementation of Demand Response (DR) agreements to allow Financially Responsible Market Participants (FRMP) to aggregate behind-the-metre DER for curtailment management purposes.

The generator and/or the aggregator would be incentivised through rewards for reduced generation when called upon during times of minimum demand.

The Challenge Question responses were developed during the 2-week residential Summer School, with teams working together to explore the issues and integrate information from the School.



CHALLENGE #5: COMMUNITY UNDERSTANDING OF THE TECHNICAL CHALLENGES

“How do we improve the understanding and consideration in the public and community debate of the technical challenges in delivering energy systems that support achieving net zero goals, while also continuing to set goals and develop and test ideas that drive change and progress towards the overall outcomes that we seek?”

Stephanie Unwin, Chief Executive Officer,
Horizon Power



HORIZON
POWER



GROUP MEMBERS

Cameron Dinkha, Endeavour Energy
Cori Wilson, Ausgrid
Desiree Sassanfar, Ausgrid
Jai Singh, Endeavour Energy
Monishka Narayan, Advisian

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SUMMARY

With needs to decarbonise, and the rapid pace of digitisation, the industry is expected to research, trial, and install technologies that enable a reliable and affordable future energy system. There are numerous external actors which affect the renewable energy future including the challenges associated with Horizon Power's geography, existing mining infrastructure, uptake of Electric Vehicles (EV), future of the National Electricity Market (NEM), and changing customer wants/needs.

Each of these factors impact different stakeholders such as remote and regional Indigenous communities, large mines,

automobile manufacturers, and the remainder of Western Australia's metropolitan areas. Currently, the wider power and energy industry similarly faces uncertainty associated with the renewable vision. Effective planning, coupled with a step change development mentality, is important to meet set industry targets.

On the community side, communication methods must be tailored depending on the customer group, where managing small rural communities can be done through more intimate and personalised channels. Emerging technologies such as electric vehicles, biodiesel, and hydrogen

SUMMARY CONT.

for microgrid and fleets are options for Horizon Power to consider as they head towards net zero. The uncertainty of the technology transition combined with the consumers growing emotional and financial involvement in their energy needs requires that they can no longer be just the end user.

Early and continued community involvement from the network planning

stages onwards is critical to ensure goals are shared and expectations on the impacts of technological limitations are communicated.

A culturally appropriate and well-timed collaborative marketing campaign with easy to understand and attractive solutions is recommended. Acquiring a skilled workforce to engage with communities, and, construct, commission, maintain and optimise the assets is also recommended.

Winners - most impactful group and individual speakers

At the Summer School Gala Dinner we announced the winners of the API Summer School 2022 Syndicate Projects.

The award for best group presentation went to - Adrian Knack, Redback Technologies, Beer Opatsuan, Energex (Energy Queensland), Fiona Griffith, Ergon Energy (Energy Queensland), Ria Sheryl Belisario, Western Power and Shilpa Kala, Transgrid

The award for best female speaker - Aditi Sachdeva, Department of Transport

The award for best male speaker - Justin Marshall, Western Power

Best Syndicate Presentation



L-R: Adrian Knack, Beer Opatsuan, Fiona Griffith, Shilpa Kala, Ria Belisario.

Best Speaker (female)



**Aditi Sachdeva
Department of Transport**

Best Speaker (male)



**Justin Marshall
Western Power**

CHALLENGE #6: EQUITABLE SHARING OF THE BENEFITS OF RENEWABLE ENERGY

“As the electricity sector transforms to support higher levels of renewable energy, what options should we consider to ensure the benefits of this new technology is equitably shared?”

Gair Landsborough, Executive Manager
Asset Management, Western Power



GROUP MEMBERS

Deeksha Sumanth, Transgrid
Gazinga Abdullah
Jessica Ng, Powerlink
Mick McGreevy, Energy Queensland
Steven Maxwell, SA Power Networks

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SUMMARY

The unprecedented rate of change of the electricity network due to the transition to renewable energy sources is creating equity issues not experienced since the design of the Australian electricity market (AEM).

A cornerstone to the success of solving this challenge is defining what is equitable through urgent proactive collaboration with all market participants.

Inaction will increase the social inequity. This paper is focused on a plan for the next 5 years.

Recommended actions include:

- Proactive collaboration across the AEM to define equity.
- Regulations be reformed to enable future changes to be enacted in a timely manner.
- Stakeholder policies are updated to deliver equity in AEM.
- Implementing parallel solutions to minimise long term risk.
- Equipping the future workforce with market acumen and an appreciation for non-technical skills.

Successful delivery of these actions will ensure equity for all AEM participants as the Electricity network evolves.

Who were our other Executive speakers?

A total of 14 executives shared their insights as part of the program in 2021 and 2022, and our Summer School participants in 2022 focused on 10 of the defined Challenges. The other 4 speakers and the key themes of their Challenges were:

**Patrick Matweew, Chief Executive Office
(and API Board Director)**

Redback Technologies

"How can networks and consumers collaborate effectively and in an easy way without any additional costs to reduce the overall costs of networks and share benefits fairly?"



**Rainer Korte, Interim Chief Executive Officer
ElectraNet**

"How do we coordinate our efforts so that "best for all, overall" solutions are delivered for the benefit of customer and the community? How do we improve the maturity of ongoing customer engagement?"



**Simon Appleby, Acting Group Executive, Asset
Management**

ElectraNet

"How can we have confidence we are making the right transmission investments when we have certainty over the costs but uncertainty over the future benefits".



**Brett Redman, Chief Executive Officer
Transgrid**

"When building new transmission lines, how would you balance the needs of the many (all consumers) with the needs of the few (the land owners where we need to build transmission towers)?"



CHALLENGE#7: MANAGING BROADER ELECTRIFICATION OF ENERGY USE

“What are some of the major challenges and opportunities that electrification will pose for the electricity supply industry? And as an industry, how can we successfully navigate them?”

Doug Schmidt, General Manager Regulation,
SA Power Networks



GROUP MEMBERS

Adrian Lloyd, Yurika, Energy Queensland
Janhavi Kale, Powerlink Queensland
Kailee Standen, Transgrid
Louise Poole, Transgrid
Murray Chapman, Powerlink Queensland

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SUMMARY

Electricity supply currently accounts for roughly 20% of all energy consumed in Australia. To support the decarbonisation of other sectors, it is increasingly likely that electricity networks will need to supply 3 – 5 times more energy than it does today as these sectors turn to cheap and abundant renewable electricity as their energy source.

This paper attempts to highlight the challenges and opportunities

electrification will pose for the electricity supply industry as well as to provide high-level recommendations on how the industry may want to navigate them. The Australian electricity network traditionally comprised of large-scale thermal generation located in close proximity to the fuel source with transmission and distribution assets required to transport the electricity to the loads located where the population resides.

SUMMARY CONT.

For the electricity supply industry to successfully facilitate a highly electrified society, where generation sources and loads may be positioned in non-traditional locations as well as having varied usage profiles, there are a number of barriers to overcome and uncertainties to investigate. This paper has identified four key challenge areas and posed some targeted questions that will require further investigation.

1. Technical: What are the technological advancements available or needed to meet the needs of reliable electrification? And how will resource this transition?
2. Financial: How can the industry move to a regulatory regime that leads, not lags, technology advancement?
3. Regulatory: How can the industry move to a regulatory regime that leads, not lags, technology advancement?

4. Social: What is the best way to educate customers about the challenges and opportunities of Electrification? And how does the industry ensure they are heard their needs considered in the transition toward Electrification?

However, Electrification doesn't have to be all barriers and roadblocks – it also represents a significant opportunity for the electricity supply industry. This paper explores three priority opportunities:

1. Electrification to address Minimum Demand system issues
2. Network revenue growth AND better value for customers
3. Australia can lead the way

In summary, the following Start, Stop and Continue recommendations have been proposed for the electricity supply industry to consider.

How were our Executive speakers selected?

The API's member organisations are among the leaders in the energy sector in Australia, so who better to approach for insights into the key challenges and opportunities of the sector than the leaders of these organisations? The API is also inherently a community focused on common issues and it is in this spirit of working within the group of aligned organisations that we sought Executives to feature in the program.

We then worked with our Governor member organisations and selected other stakeholders from the API's Board and member community to develop the Executive Insights program's focus and to source the first speakers in this new addition to the Summer School.

We thank our members and our Executive speakers for their contributions to this new program. If you are interested in being a speaker in our next Executive Insights program, please reach out.

CHALLENGE #8: OPTIMAL CUSTOMER AND STAKEHOLDER SOLUTIONS DURING FAST CHANGE

“How can we best integrate all these stakeholders, with their competing priorities and interests, to deliver the optimal customer solution in terms of safety, costs, reliability and the environment in a world where technology is redefining solutions faster than ever before?”

Scott Ryan, Chief Asset and Operating Officer,
Endeavour Energy



GROUP MEMBERS

Adrian Knack, Redback Technologies
Beer Opatsuwan, Energy Queensland
Fiona Griffith, Energy Queensland
Ria Belisario, Western Power
Shilpa Kala, Transgrid

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SUMMARY

The Australian energy market is going through a transition from the incumbent centralised generation model to a distributed generation model. Adding to this emission targets resulting from the Paris Agreement and opportunities from increasing technical change have resulted in the major stakeholders in the Australian power industry having differing investment and operational priorities. Accommodating the interests of the growing number and variety of stakeholders, many with more than one role, has proven challenging to date.

This lack of certainty in stakeholder identification and engagement has proven to slow the industry in implementing solutions and focusing investment. Moreover, this slowness is reducing the focus on providing the optimal solutions to the consumer as the target dates approach. It is imperative that as an industry we identify stakeholders early and ensure they are involved in the optimising the customer outcome. To this end this board briefing paper outlines five key recommendations to address this issue.

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Foremost among these recommendations is to establish a trusted, independent industry-wide taskforce to deliver optimal outcomes for customers. This taskforce is entrusted initially with the identification and consultation with all the stakeholder groups. The second stage of works for the taskforce is to create a clear stakeholder engagement strategy for each of the identified stakeholders.

Key to building trust from all stakeholders the taskforce will publish the outcomes of stakeholder engagement sessions. Successful implementation of the recommendations will enable the taskforce to independently review and overhaul the current market structure, thus enabling the energy transition to be accelerated.

RECOMMENDATIONS

1. Establish a trusted, independent industry -wide taskforce to deliver optimal outcomes for customers through the imminent National Electricity Market (NEM) energy transition.
2. Entrust this taskforce with the identification and consultation of all key stakeholder groups and industry considerations necessary to engage in the energy transition journey.
3. Assign the taskforce the role of creating a stakeholder engagement strategy for each of the identified stakeholders.
4. Publish the outcomes of stakeholder engagement sessions. This provides transparency which leads to trust and holds stakeholders to account for their engagements.
5. Empower this taskforce with sufficient jurisdiction to independently review and overhaul the current industry and market structures necessary for a whole of industry unified approach.

Sharing their responses to the Challenges was an opportunity for discussion between three generations of leaders for the power sector, including the Execs, Summer School participants, and students and grads (which continues with this written report).



CHALLENGE #9: HARNESSING THE POWER OF DATA TO MANAGE OUR COMPLEX SYSTEMS

"The power system is becoming increasingly complex and dynamic.

How can innovations and technologies be deployed to support power system operations in processing lots of information and making real-time decisions and actions to maintain a safe, reliable and secure network at all times?

What can we learn from other industries that use big data and automation heavily in their operations?"

Jennifer Hughes, Head of Network Operations, and
Fiona Orton, Head Of Innovation and Energy Transition,
Transgrid



GROUP MEMBERS

Brendan Spiniello, SA Power Networks
Junming (Jimmy) Kuang, AusNet Services
Lincy William, AGL Energy
Rebecca Harvey, Energy QLD
Sandra Thaow, TasNetworks

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SUMMARY

Australia's power system is in transition as coal fired power plants are decommissioned and replaced with dispersed variable renewable energy generation (VRE) sources such as solar and wind. The cost of technology is declining, enabling customers to install, produce and control their energy using distributed energy resources (DER). This transition has resulted in additional complexities when operating the network, including:

- Safety challenges with managing two way power flows,
- Reliability challenges with balancing intermittent supply and demand, and
- Stability challenges with the decrease in synchronous generation to support grid stability during power system events.

With the power system becoming increasingly complex and dynamic:

SUMMARY CONT.

- How can innovations and technologies be deployed to support power system operations in processing lots of information and making real-time decisions and actions to maintain a safe, reliable and secure network at all times?
- What can we learn from other industries that use big data and automation heavily in their operations?

RECOMMENDATIONS

The key recommendation is to establish a shared digital network automation (DNA) system that will enable the sharing of data between the Australian Energy Market Operator (AEMO), generators, network service providers (NSPs), retailers, aggregators and customers. The sharing of this information will enable greater visibility and flexibility in how the power system is operated and enable greater participation in the energy market for large scale generation and DER.

A number of activities are required to be undertaken to enable DNA to be delivered including, but not limited to:

- Building capability within the existing and future workforce to analyse large data sets and make informed decisions using them;
- Engaging with our stakeholders and industry to manage the social licence of the power industry to move to the DNA system and manage any concerns and risks with cyber security;
- Building a “Data Democratic” culture where we identify opportunities to consolidate, share and use existing data sources within existing businesses;

- Collaborating with industry, policy makers, regulators, market and system operators:

- In the development of the DNA strategy and implementation plan so that rule changes and regulations can be implemented in a timely and appropriate manner;
- To establish the operational technology (OT) platform for DNA facility, including data standards to ensure quality and consistency of data and security and privacy risks are mitigated; and
- Obtain funding from research bodies to trial and pilot proof of concept cross-organisational data platforms prior to finalising funding for the implementation of the DNA system and agreeing the ongoing funding arrangements for operations and maintenance of the system

A number of complementary innovations and technologies are also recommended to be explored.

CHALLENGE #10: HOW TO MANAGE THE CHANGE IN OUR ROLES?

“What are the best options for managing the change (eg do we lean in and define our future role vs wait for the market to decide)?”

Kelly Wood, Executive General Manager, Network Delivery & Services, Ausgrid



GROUP MEMBERS

Amra Rullo, Western Power
Elizabeth Tait, SA Power Networks
Julie Morrison, TasNetworks
Justin Marshall, Western Power

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SUMMARY

Ausgrid is facing similar challenges and opportunities as other participants in the Australian energy sector, largely influenced by the high uptake of distributed energy resources (DER). It has a unique opportunity to influence its future operating environment and to some extent influence the effectiveness of the end product of its own transformation. This paper considers key aspects of integrating emerging technologies, resource opportunities, and community, industry, and regulatory engagement required to do this.

While there are many opportunities during this time of energy transition, there will be risks that will need to be mitigated, including:

- Recruitment of key resources during a time of peak demand for these skills;
- Managing and utilising data effectively;
- Influencing regulatory changes where necessary; and
- Engaging with the right people at the right time.

It is recommended that Ausgrid takes a proactive role in determining the environment it wishes to operate within by seeking to become a Distribution System Operator (DSO). This will address the upcoming challenges and opportunities, rather than having to adapt to a model that is developed by others.

RECOMMENDATIONS

It is recommended that Ausgrid lean in to re-imagine themselves as a DSO, as this will provide them with a greater flexibility across the distribution network.

To achieve this broad objective, Ausgrid will need to:

- Identify and engage with key internal and external stakeholders;
- Identify the critical skills required for the future workforce;
- Develop partnerships with the higher education sector and industry to redesign curriculum to address future skills needs;
- Acquire, improve and make better use of data;
- Collaborate with the technology and innovation industry such that various DERs can be integrated into the operation of the distribution network; and
- Lead regulatory and policy reforms to ensure incentives are in place for DSO's to actively and efficiently manage the grid.

The API's Powerful Women Leadership Program's Early Career participants (60 undergraduates and graduates) also joined the online sessions by the Executives and the live presentations from the Summer School teams, building their knowledge of key issues for the sector and strengthening their capabilities to lead in the future.



CONTACT US

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