

Meeting Date: 1 June 2023

ELECTRICITY ENGINEERS' ASSOCIATION PRESENTATION

SECURITY AND RELIABILITY COUNCIL

This paper introduces a presentation from the Electricity Engineers' Association on its role in supporting its members to ensure power system security and reliability.

Note: This paper has been prepared for the purpose of the Security and Reliability Council (SRC). Content should not be interpreted as representing the views or policy of the Electricity Authority except where specifically noted.

The Electricity Engineers Association (EEA)

- 1.1.1 The SRC has asked the secretariat to provide information on the role of various industry organisations and groups, in supporting power system security and reliability as part of the SRC's *Industry Associations and Groups* theme.
- 1.1.2 The presentation notes the EEA's role in providing the New Zealand electricity supply industry with expertise, advice and information on technical, engineering and safety issues affecting the electricity industry.
- 1.1.3 With SRC member input, the secretariat posed a series of questions to the EEA.

The questions:

- (a) *What are the top 3 risks or concerns to security and reliability (including cyber) for your members and what is your organisation's role in reducing those security and reliability risks or concerns? Please include risks or concerns over short-, medium- and long-term horizons.*
 - (b) *Does your organisation believe consumers get value for money, in terms of the security and reliability they currently receive from your members? How does your organisation support consumer trust and confidence in the sector more generally?*
 - (c) *What are some examples of 'wins' for the industry your organisation has led or supported and how did you collaborate to achieve them? Conversely, what are some examples of areas where security and reliability wins were not achievable due to barriers?*
 - (d) *What benefits do you provide to your members, and how? Please give examples of how you ensure the government and regulators make the best choices for the power system and consumers.*
 - (e) *What does your organisation do to achieve consistency and minimum standards of security and reliability across its membership group? What are the impediments to consistency and minimum standards?*
 - (f) *What is the EEA's role in assisting less-well resourced members upskill in areas such as cyber security, fault response and sharing of emergency supplies?*
 - (g) *How does the EEA ensure reliability and safety initiatives are taken up when the geographical location, size and financial state of distributors is so varied?*
 - (h) *If you had the opportunity to give the Electricity Authority Board advice about what it can do to support a secure and reliable electricity supply for consumers, what would it be?*
- 1.1.4 SRC Members are encouraged to raise these or additional questions to the EEA during the presentation, to clarify any points in the presentation and support the SRC's understanding of the EEA's role in supporting power system security and reliability.
 - 1.1.5 The EEA presentation (at slide 5) sets out their view of the key challenges to security and reliability. Members may wish to seek further clarity, as to specific actions proposed under the relevant headings (and industry priorities), to gain a fuller picture of how issues may be addressed.

- 1.1.6 SRC Members may also wish to consider additional questions to elicit the EEA's views on the Authority's role, and how the SRC can support that.
- 1.1.7 SRC Members may wish to enquire further about the EEA's view on *workforce capability development*, given the proposed theme for the SRC's Q3 August meeting of workforce management.
- 1.1.8 Representatives from the EEA will present and be available for questions.

Questions for the SRC to consider

The SRC is asked to consider the following general questions.

- Q1. What further information, if any, does the SRC wish to have provided to it?
- Q2. What advice, if any, does the SRC wish to provide to the Authority?

Appendix A: Electricity Engineer's Association presentation



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**HEALTH & SAFETY
ASSET MANAGEMENT
PROFESSIONAL
DEVELOPMENT**

Presentation to Electricity Authority – Security and Reliability Council

Presented by:

Dr Stephen Jay – EEA President ; Peter Berry – EEA CEO ; Geoff Douch – EEA Vice President
Dr Stuart Johnston – EEA Lead Advisor | Engineering and Technology

EEA.CO.NZ



Presentation will cover

Who are we?

What do we do?

Why is what we do important to the SRC?

What does our future work programme look like?



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Who are we?

- EEA – established in 1927.

“The chief objects of all concerned in the industry is to distribute electricity as cheaply as safety permits, and it is only by close cooperation between all parties that this can be done. “(Electric Supply Authority Engineers’ Association, Chairman’s Report, H F Toogood, 1928).

- Provide an engineering and technical lens for industry, regulators and policy makers.
- The objects haven’t change but the context for delivery has...

“ By 2050 the EEA and its members will have contributed to the realisation of a world where human activity is no longer having a significant negative impact on the planet’s climate and ecosystem. The EEA and its members are fully engaged in the planet’s challenges with respect to climate change, decarbonisation, energy supply resilience, environmental rehabilitation, economic circularity, secure energy systems, and a balanced and equitable world.”



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What do we do?

EEA is a focal point for collaboration and thought leadership in engineering, safety and asset management across the electricity sector...

We are:

- Navigators
- Connectors
- Leaders
- Experts
- Capability builders
- Supporting
 - delivery and implementation of policy
 - growing collective understanding and risk management.



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Understanding Future Security and Reliability

Aotearoa's power system is set to become more dynamic and distributed with more DER (i.e., EVs, solar PV, batteries etc) embedded into the grid & distribution networks and behind-the-meter as we move towards decarbonisation.

In addition, there will be increasing numbers of smart technologies connecting to the system, e.g., home energy management systems, which will make demand more flexible and potentially less predictable.

Key Challenges to Consider - DER/EVs/New Technologies

- Leveraging DER to build and operate the future grid
- Leveraging new technology to enhance ancillary services
- Visibility and observability of DER

Key Challenges to Consider - System

- System Performance
 - Balancing renewable generation
 - Managing reducing system inertia
 - Operating with low system strength
 - Accommodating future changes within technical requirements/Performance Standards
- Power system modelling
- Forecasting

Key Challenges to Consider - General

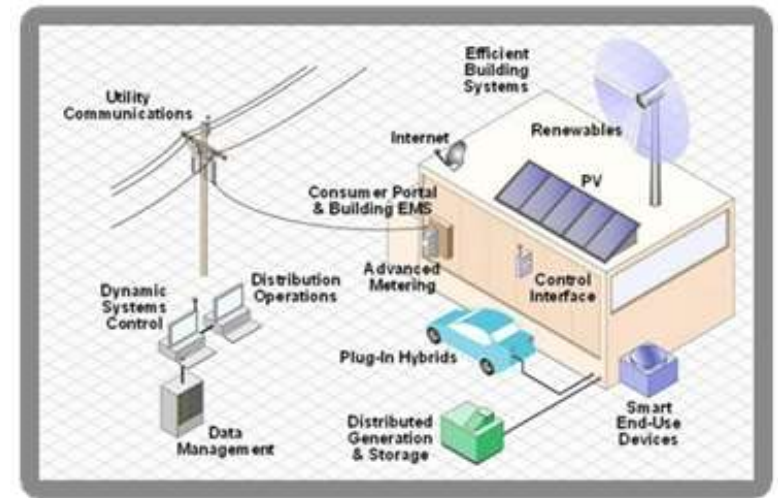
- Cyber security
- Coordination of increased connections and changing/less predictable customer behaviour
- Growing skills and capabilities of the workforce
- Social license



Industry Priorities

Key Priorities to Consider

- ❖ **Define network visibility requirements and network constraints (high/short-term)**
 - Define requirements for increased network visibility to maintain network operations within required parameters
 - Define how to achieve increased network visibility to maintain network operations within required parameters
- ❖ **Define and establish minimum communication and data requirements (High/short-term)**
 - Develop or adopt a Standard on data management frameworks/protocols
 - Develop or adopt a Standard on communication protocols/frameworks
 - Develop or adopt a Standard on cyber security
 - Develop or adopt a Standard on control system protocols
 - Develop or adopt a Standard on interoperability



Industry Priorities

Key Priorities to Consider – Continues

❖ Define and establish minimum technical requirements (short/medium)

- As a priority update the Code, technical standards, connection guidelines, grid and distribution operation processes and procedures etc., to enable the efficient and secure integration of new technologies, whilst ensuring continued system security and reliability, and safety.

❖ Develop pathway to ensure future skills and capabilities of the workforce (medium/long-term)

- Update the skills and capabilities of the current workforce; and train future engineers and technical staff with the relevant skills for our evolving energy landscape
- Accreditation?

❖ Resilience (medium/long-term)

❖ Establish social licence (medium/long-term)



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Key EEA Activities

Asset Management

EEA works with members, regulators and industry partners on key technical issues such as network safety and security of supply, reliability and power quality, the management of peak energy demand, energy efficiency and sustainable energy.

❖ **EEA also produces well utilised Industry Guidelines such as:**

- The Asset Information Maturity Framework (ISO 55001 Asset Management)
- Resilience Guide (resilience planning to support effective management of issues arising from major emergency events)
- Safety in design guide
- Risk Based Vegetation Management Guide

❖ **EEAs current work programme for guidelines includes:**

- Connecting Generating Plant Guide (update) ; DER Connection Guidelines (update) ; Power Quality Guide (update)
- ❖ Knowledge sharing - Asset management forums, events and webinars
- ❖ National Equipment Defect Reporting System NEDeRS® - Provides access to international database on electrical equipment defects
- ❖ Engagement and input into relevant international standards for (IEC, ISO, AS/NZS, IEEE, CIGRE)



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Key EEA Activities - continued

Safety

- Well established Industry Safety Rules (SM-EI)
- Safety performance monitoring – public and workplace
- International standards and best practice

Industry Research

- ❖ **FlexTalk – The Demand Flexibility Common Communication Protocol (EEA & EECA)**
 - This project is testing the Open ADR communication protocol within a real-life New Zealand context.
 - It aims to deliver a set of agreed industry guidelines, practical learning, recommendations and future research areas.

Workforce capability development

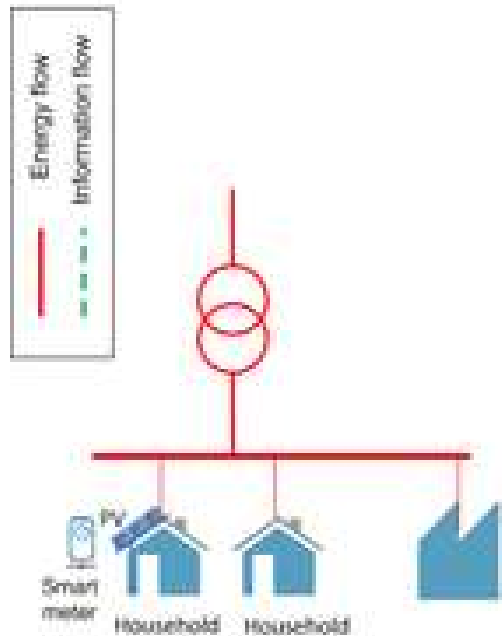
- Collaborating to deliver future capability including professional and career development opportunities for our rangatahi.



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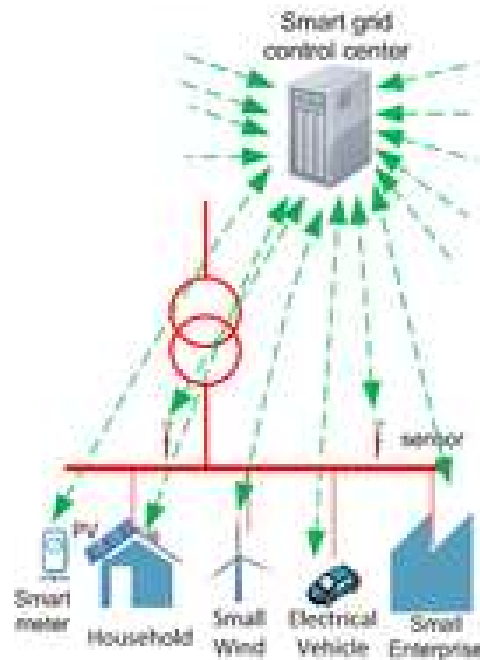


Future Grid



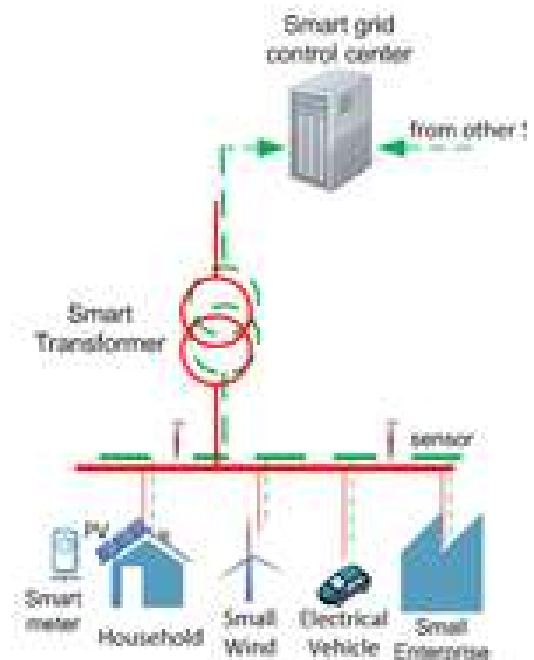
❖ Today

- Central control
- Limited visibility
- Limited hosting capacity



❖ Future (1)

- Decentralised control
- Complex communication requirements
- Major investment in infrastructure



❖ Future (2)

- Distributed control
- Less complex communication requirements
- Moderate Investment in infrastructure

Three things needed for the future?

- **Greater engagement and collaboration across all industry stakeholders, including regulators.**
- **Responsive regulatory frameworks**
- **Workforce regeneration and capability development**



Questions?



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