Network Strategy and Transformation Capability Statement and Projects

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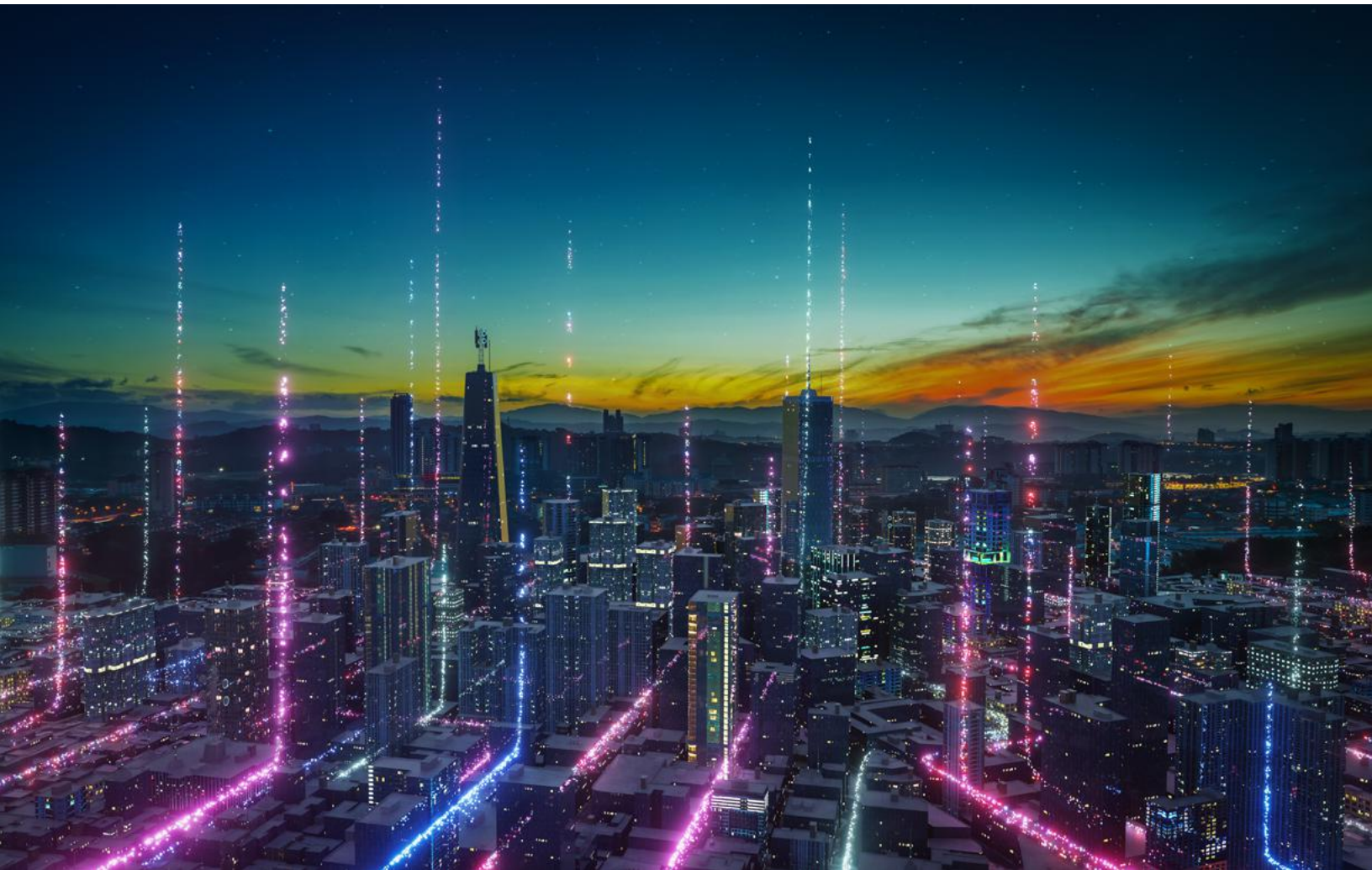
Capability Statement & Projects | EA Technology

An Overview Into Australia's Energy Future

The electricity distribution network is becoming more complex as customers adopt new low-carbon technologies (LCTs). With the rise of renewable energy, the grid is evolving – transitioning from a centralised to a decentralised system, with energy generated at both ends.

The increasing demand for more power, coupled with the demand to reduce carbon emissions, creates a tough challenge for network operators who must meet the clean energy ambitions of Net Zero. Overhauling ageing networks is critical to keep progress on track.

Networks need novel approaches to manage the increase in demand and complex, unpredictable network flow patterns resulting from the uptake of solar PV, energy storage and electric vehicles (EV). That's where we come in…



Network Transformation

Case Studies

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Project: DER and LV Management - Finding the Least-Cost Strategy

Client: **South Australian (SA) Power Networks**

Objective: **Investigate a range of strategies SA Power Networks could employ to respond to future challenges on the LV network.**

Summary

A significant shift has changed how customers connect to the LV network. The 'passive' approach to LV management would not be fit for purpose as customers continue to install Distributed Energy Resources (DER) at an increasing rate.

Benefits

- Identify the best value strategy for both the network and customers

- Utilise modelling outputs to communicate with customers going forward

- Client gained full support from their regulator (AER) and was granted the full fund request amount

Testimonial

"We engaged EA Technology to undertake the modelling that underpins our approach. EA Technology was selected through a competitive tender process as they are recognised as leaders internationally for their expertise in this area. The modelling is highly rigorous and takes into account a broad range of factors, including the mitigating impact of battery storage in absorbing solar during the day, the impact of local inverter Volt-VAr response, and potential impact of tariff changes in shifting loads."

Bryn Williams
SA Power Networks

More Information:

Client: **Energy Networks Australia (ENA)**

Objective: **Prepare the grid in Australia to be fit for purpose in 10 years' time, countering future challenges such as increased DER, increased renewable generation, and bidirectional power flow.**

Summary

EA Technology was commissioned to describe the future operating platform for the grid under four future scenarios. We used a high-level SGAM approach that could visualise all key actors in the four scenarios. By understanding how key actors interact and how their role can change over time, a least-regret pathway for the next decade was established.

Benefits

- Demonstrate the changes needed in today's electricity system to facilitate one of the four future worlds

- Understand key interactions across all four future worlds

- Determine the least regret pathway

- Present data in a highly visual manner

Testimonial

"The development of the Electricity Network Transformation Roadmap required the engagement of several experts from around the world. Being able to call upon EA Technology's vast experience of network innovation and their leading-edge thinking concerning the transition from 'network operation' to 'system operation' was hugely valuable and contributed to a successful outcome in defining the roadmap."

Stuart Johnston
Executive Director of Assets and Network Transformation, Energy Networks Australia

More Information:

Project: LV Network DER Hosting Capacity Assessment

Client: **TasNetworks**

Objective: **Enable the trading, aggregation and management of Distributed Energy Resources (DER) and transport decarbonisation.**

Summary

EA Technology worked with TasNetworks to gather network data from their LV circuits. Using Sincal, our consultants performed detailed power system analysis to identify the levels of DER that networks could accommodate before breaching voltage or reverse power flow limits.

Benefits

- Identify the feeders that may need intervention due to increased DER penetration

- Determine the connected capacity of solar photovoltaics

- Determine the anticipated benefits from a range of different mitigations

- Demonstrate how hosting capacity can be increased

More Information:

Client: **Energy Networks Australia (ENA), Australian Energy Market Operator (AEMO)**

Objective: **Understand the roles of a future Distribution System Operator (DSO) and AEMO in the future energy system to ensure that value is returned to all customers; at both transmission and distribution level.**

Summary

This project produced a network framework that can facilitate market access for all stakeholders – including DER owners, aggregators, network operators etc. while ensuring the integrity and security of the network, maintaining a reliable power supply for all.

Benefits

- Data obtained allowed ENA and AEMO to form a view on the preferred DSO framework going forward

- Key stakeholders could explore various features of the DSO framework

Testimonial

"The Commission supports the work undertaken by OpEN."

Australian Energy Market Commission (AEMO)

More Information:

Project: DSO Capability Model and Roadmap

Client: **An Australian Distribution Network Service Provider (DNSP)**

Objective: **Develop a cohesive roadmap that shows how existing initiatives contribute to the delivery timeline of a customer centric, DER-enabled network and identify new initiatives for this transition.**

Summary

EA Technology created a capability model framework that can be integrated into the services of Australia's network operators. The current, projected and target capability maturity levels of these services, over time, were also mapped out in the framework.

Benefits

- Identify the initiatives needed to bridge the client's capability gap

- Allow clients to prioritise their investments and prepare for the upcoming price control period

More Information:

Electrification of Transport

Case Studies

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Project: My Electric Avenue

Client: **Scottish and Southern Electricity Networks**

Objective: **Investigate the impact that clusters of Electric Vehicles (EVs) have on Britain's electricity network.**

Summary

The project undertook trials with over 200 customers to determine how electricity networks in Britain are likely to cope at peak times as the sales of EVs continue to rise. This was the first project to ever focus purely on the impact that clusters of EVs have on an electricity network in the UK.

Key Findings

- Peak hours for EV charging on weekdays are before and after work

- Peak hours for EV charging on weekends fall between 10am to 6pm

- 70% of EVs were only charged once a day

- More than 65% of EVs were charged to full battery

More Information:

Client: **Western Power Distribution**

Objective: **Understand the impact of domestic Electric Vehicle (EV) charging on distribution networks in the UK.**

Summary

Following the success of 'My Electric Avenue', this project sought to understand the charging behaviour for different vehicle types and evaluate the technical feasibility and customer acceptance of smart charging solutions to manage additional demand.

Key Findings

- Demand management is feasible and accepted by majority of the participants

- There is flexibility in charging – but without incentive, the demand in evening peak requires management

- Time of Use (ToU) incentives are highly effective at moving demand away from the evening peak

- Data from smart chargers provide strong evidence to help DNOs make efficient investments

Award

EA Technology won the coveted Northern Automotive Alliance Marketing Award for the Electric Nation launch

More Information:

Project: Charge Project

Client: **SP Energy Networks (SPEN)**

Objective: **Accelerate the connection of Electric Vehicle (EV) charging infrastructure in the UK by combining transport planning and electricity network planning.**

Summary

Charge is a project that will give greater connection choices to customers, lower connection costs and ultimately, expedite EV uptake. EA Technology identified a solution by developing interactive tools that allow customers to pinpoint the most cost-effective location and method of connection.

Benefits

- Identify the most cost-effective location and method of installing EV charge points

- An easy-to-use interactive software tool (ConnectMore)

– Enable stakeholders from non-engineering backgrounds to identify the charge point options that are available

More Information:

Low Voltage Monitoring Solutions

Real-Life Case Studies on VisNet Hub - Our LV Monitoring Device

technology

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Case Study: Using VisNet Hub to Locate Faults in LV Networks

Network operators have historically dealt with faults by reacting to off-supply customer calls. Once they know customers are off supply, depending on the severity of the fault, it can take many hours to find and fix. VisNet Hubs offer a modern solution to this perpetual problem by using network data to pinpoint the location of faulty assets, thereby aiding engineers to locate the fault more expediently.

Need for LV Monitoring

LV networks power our homes, businesses and now support Distributed Energy Resources (DERs) such as photovoltaics and electric vehicles. With more responsibility than before, LV monitoring is essential to ensure the robustness of LV networks.

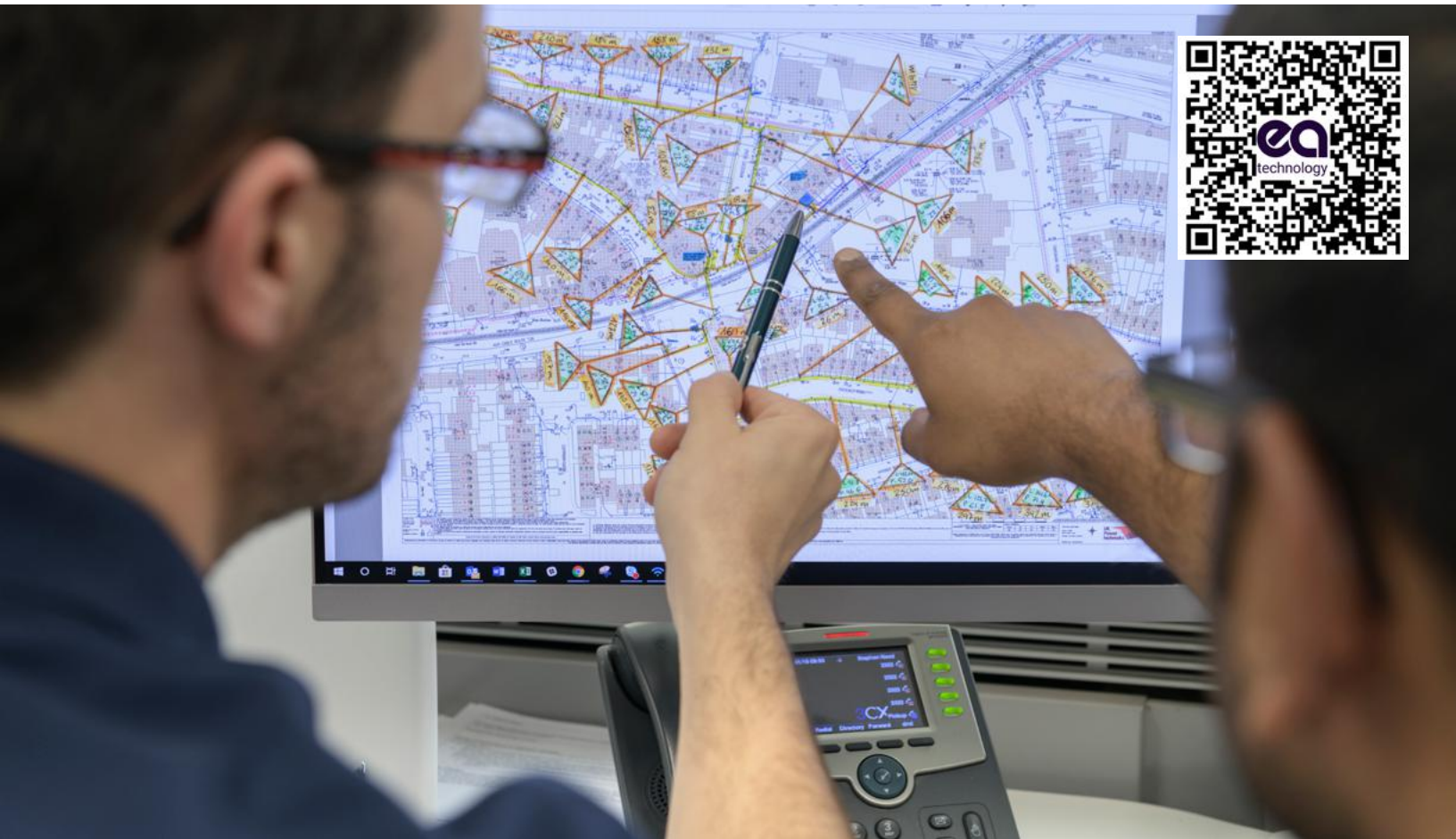
Benefits of LV Monitoring

- Collects a range of data that can be used to determine exact location of fault

- Early fault location results in a faster repair time

- Provides network visibility to network operators

More Information:



Case Study: Using VisNet Hub to Investigate Power Quality Issue

A major network operator was contacted by a customer who experienced dimming of lights on a regular basis. Traditional power quality monitoring equipment was installed and network was reconfigured. However, these efforts failed to resolve the issue. VisNet Hub was later installed to assess the situation. Once installed, VisNet Hub continually monitored network data and measured the number of irregular current events. Based on data collected, the team found that the issue originated from a pump motor powering up and was able to identify and contact the water utility to carry out repairs within 24 hours.

Need for LV Monitoring

Poor power quality can affect and damage commercial and domestic electronics, leading to customer frustration and penalties for network operators. LV monitoring provides insights into LV distribution systems, allowing the cause of power quality issues to be identified.

Benefits of LV Monitoring

- Provides insights that can be used to investigate power quality issues

- Provides network visibility – enabling prompt response to network issues

- Allows network operators to manage LV networks in real-time

More Information:

Case Study: Using VisNet Hub to Detect Distributed Energy Resources

Traditionally, power flows from transformers to consumers. However, on networks with a high number of photovoltaics (PVs), power can flow from network to transformers – reverse power flow. The number of PVs connected to LV networks is not always known and these undetected PVs create a risk of overloading, making it difficult to install new connections.

Need for LV Monitoring

LV monitoring provides visibility to electrical networks by detecting the impact that PVs have on power flow at substations. This prevents substations from overloading.

Benefits of LV Monitoring

- Enhance network visibility

- Prepare for increased DER penetration

- Provide insights into the number of PVs connected to the network

- Provide insights for network designers and asset owners

More Information:

Our Services

Supporting the shift towards our Energy Future

We seek to establish the path that should be taken to allow transition from the grid of today to that which is fit-for-purpose for future challenges. Expertise includes:

- Electricity Network Roadmap
- Future Grid Strategic Planning
- Microgrids
- DSO Transition
- DER Integration
- Achieving Net Zero

Electrification of Transport

We pioneered smart solutions designed to mitigate the demands that increasing adoption of EV places on the grid. Expertise includes:

- Electrical Vehicle Infrastructure
- Electric Vehicle Integration

Our Clients

We have extensive experience in the Australian network transformation industry and have worked with industry leaders:

Company Details

Brisbane Office Details

Tel: +61 (0) 7 3256 0534

Email: au.sales@eatechnology.com

Website: https://eatechnology.com/australia/

381 MacArthur Avenue, Hamilton, QLD 4007

Key Contacts

Neil Davies

Manging Director, EA Technology Australia

Mobile: +61 (0) 447 751 292

Email: neil.davies@eatechnology.com

LinkedIn: https://www.linkedin.com/in/eatlneildavies/

Yogendra Vashishtha

Head of Future Networks, EA Technology Australia

Mobile: +61 (0) 439 692 010

Email: yogendra.vashishtha@eatechnology.com

LinkedIn: https://www.linkedin.com/in/yogendra-vashishtha-b28ab610/

Global Footprint

At EA Technology we specialise in smart solutions
for owners and operators of low voltage (LV) network assets.

Founded in 1966 we have over 50 years' experience in the industry and 6 regional offices around the world to support our global customer base.

We work with many clients on a long-term basis to help them safeguard their LV networks.

We advise our clients on strategy and implementation of a range of technology solutions to counter future challenges associated with increased DERs, revewable generation and bidirectional power flow.

ea technology

Safer, Stronger, Smarter Networks

EA Technology Australia
381 MacArthur Avenue,
Hamilton, QLD, 4007

t + +61 (0) 7 3256 0534
e au.sales@eatechnology.com
www.eatechnology.com/australia