PAPER THEMES AND CONTEXT

"Engineering, Technology and Innovation - In a Low Carbon Environment".

The 2021 EEA Conference is show casing 'futures thinking' within our industry. Our theme 'Engineering, Technology and Innovation - In a Low Carbon Environment' reflects the challenges of 'now' and 'the future' for us all. Theme areas include:

- Low carbon economy/climate change
- Customer-driven change
- Emerging technology and innovation
- Assets - management, resilience and planning
- Data-driven future
- Security and reliability of supply
- Distributed energy resources (DER)
- Open networks transformation
- Transport energy options
- Future skill requirements
- Safety - Critical risks and essential controls
- Smart systems and demand response
- Sustainability and environmental

The following are some paper "topic areas" to consider. (Note: Topics below are NOT in any priority order nor is it an exhaustive list of topics that could be offered.)

<u>Emerging technologies – Opportunities, integration and impacts</u>

- Distributed generation (e.g. solar, wind etc)
- Battery storage
- Emerging technology - trials and outcomes
- Electric transport infrastructure
- Demand response and pricing frameworks
- Hydrogen - a future power and energy storage source
- 'Smart opportunities' - cities, homes and appliances
- Micro-grids
- Network stability
- Customers technologies and smart multi energy solutions

- Artificial intelligence, robotics, and customer technologies
- Pilot projects
- Pump storage

Existing assets – management, optimisation and integration

- Asset management – priorities and planning in uncertain times,
- Interoperability – common platforms, interactions and integrating new technologies and existing assets
- Assessment and maintenance of critical assets (e.g. transformers, poles, conductors, switchgear, earthing and substations)
- Ageing Infrastructure – lifecycle and reliability – maintain, refurbish or replace?
- Infrastructure design for new technologies and safety
- LV networks – monitoring, modelling and management
- Resilience
- Earthing
- Solar, battery and wind – Integration
- Maintenance strategies, standards and issues– poles, conductors, cables and other key assets
- Automation/SCADA/Fault resolution
- Power quality, security and stability
- Projects /case studies
- Work method selection – Live or de-energised

Data – Challenges and opportunities

- Asset data – condition assessment, health indicators, planning and performance metrics
- LV and HV data for asset and system management
- System modelling and simulation
- Network forecasting and planning
- Cyber security/data protection
- Unmanned aerial vehicles
- Data visualisation
- Artificial intelligence, data science and machine learning - operational aspect of the grid.
- Peer-to-peer trading, Blockchain, Big Data, Edge intelligence and The Internet of Things
- SCADA & ADMS

Drivers for change

- Low carbon economy
- Open networks
- Economic regulatory frameworks – security and reliability - impacts on customer service, investment, technology,
- Transmission - grid connection, technology, markets and priorities
- Electrifying transport and the impact on the power system
- Resilience

- International standardisation to support NZ adoption of technology, systems and products
- Regional challenges

Consumer/Community Focus & Market Models

- Behind the meter - Impact of smart consumer technology
- Customer/community demand response – aggregators, pricing, demand and resilience
- Distributed energy resource management systems (DeRMS)
- Unlocking customer data for insights on future directions
- Prosumers and future electricity markets

Future workforce

- Future requirements and delivering on engineering, technical and analytic capability
- Developing/maintaining core skills, capability and engagement with our people
- Workforce diversity and inclusion – attracting and retaining talent
- Workforce gaps – trends and challenges
- Common Competency – opportunities and challenges
- Innovation contracting/service delivery

Safety, health and environment

- Critical risks – essential control strategies
- LV work management
- Mental health and wellbeing
- Asbestos
- SF6
- H&S challenges from emerging technologies
- Risk frameworks for work method selection
- Monitoring and auditing workplace and public safety
- Safety 2
- Shared learnings for better safety performance
- Hazardous substances management