The University Of Queensland
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ES Cornwall Memorial Scholarship

FOURTH QUARTER REPORT

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SP Energy Networks

Acknowledgements

The fourth quarter of my experience undertaking the ES Cornwall Memorial Scholarship would not have been possible without the help of a number of people whose support I would like to acknowledge and thank here.

Firstly, I would like to express my gratitude to ScottishPower Energy Networks for being open to and enabling my second placement. I would like to specifically thank Iain Divers and Matthew Jones, for taking the time to meet with me to understand the scholarship and my interest and to welcome me into their team, as well as driving the internal requirements to bring me onboard. I would also like to thank Ailidh Meek and my team, Asset Management and Investment, as well as the wider Network Planning and Regulation team, for their support and inclusion.

In addition, I would like to give many thanks to both Stewart Bell and Keith Bell for their support and assistance in helping make my second placement a reality through their generous suggestions and introductions.

Undertaking the ES Cornwall Memorial Scholarship has meant taking extended leave from my role at Energy Queensland and as such I would like to acknowledge the support and flexibility of Energy Queensland in allowing me to step away from my role to participate in this once in a lifetime experience. I am also particularly appreciative of the efforts undertaken by Michelle Taylor, Sophie Allen, and Terese Milford in managing my absence from our Fringe of Grid work. I'm looking forward to sharing many learnings and stories upon my return.

This incredibly unique and extraordinary experience would not exist without the ES Cornwall Memorial Scholarship so I would like to once again express my gratitude and thank the scholarship and its Advisory Committee for providing this opportunity.

Disclaimer

This report provides a summary of the experiences and work undertaken by the author as part of an overseas ES Cornwall Memorial Scholarship placement. Statements and material contained within this report are the opinion of the author and do not reflect the opinion or positions of any other person or organisation. Reproduction or referencing of this report should also reflect this.

Executive Summary

The electricity industry is undergoing multifaceted change, driven by a number of diverse but interlinked factors including changing customer behaviours, changing climate and weather conditions, an increase in high impact events and the advent of new technologies. These changes have given rise to the need for an increased level of flexibility in our networks. Power system flexibility can be defined as the ability to respond to both expected and unexpected changes in demand and supply. Flexibility can also extend beyond this definition to encompass the overall fluidity of the electricity industry including the ability to facilitate greater participation and choice in the market for customers, the ability to shift load to mitigate maximum and minimum demand issues, and the ability to adapt to change. Flexibility is required in all parts of the electricity industry, spanning from generation to transmission and distribution networks, energy storage and demand. For this reason, my scholarship study plan is based around the theme of 'increasing network flexibility through technology innovation'.

This report provides an overview of the fourth and final quarter of my ES Cornwall Memorial Scholarship experience. During this quarter I completed my second placement, at ScottishPower Energy Networks in Glasgow, United Kingdom, with the Asset Management and Investment (AM&I) team. As part of the AM&I team, my work has been focused on completing a 3D digital network performance proof-of-concept project and supporting other day-to-day asset management tasks. During the fourth quarter of my scholarship experience I also had the opportunity to visit the transmission system operator Landsnet during a trip to Iceland. Additionally, I was able to learn more about the topics of Offshore Wind and Agrivoltaics through the Iberdrola Masterclasses program.

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Glossary

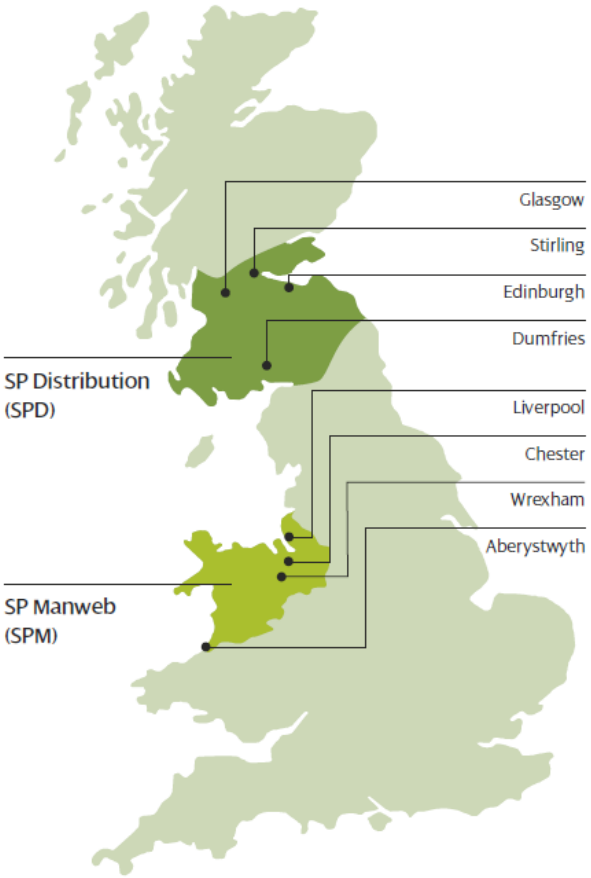
AM&I	Asset Management & Investment (team at SPEN)
C	Criticality Index
CAPEX	Capital Expenditure
CI	Customer Interruptions
CML	Customer Minutes Lost
DNO	Distribution Network Operator
EU	European Union
EV	Electric vehicle
FID	Final Investment Decision
GB	Great Britain
GIS	Geographic Information System
HI	Health Index
HV	High Voltage
LiDAR	Light Detection and Ranging
LV	Low Voltage
NP&R	Network Planning & Regulation (department at SPEN)
O&M	Operation and Maintenance
OHL	Overhead Line
PoC	Proof-of-Concept
PV	Photovoltaics (solar)
RIIO-ED1	UK electricity distribution regulatory (price control) period from 2015 to 2023
RIIO-ED2	UK electricity distribution regulatory (price control) period from 2023 to 2028
SP	ScottishPower
SPD	SP Distribution plc (distribution network in Scotland)
SPEN	ScottishPower Energy Networks
SPM	SP Manweb plc (distribution network in North Wales and Merseyside, England)
SPT	SP Transmission plc (transmission network in Scotland)
TSO	Transmission System Operator
UK	United Kingdom

Placement 2 – Scottish Power Energy Networks

Background

My second placement as part of the ES Cornwall Memorial Scholarship has been at ScottishPower Energy Networks with the Asset Management and Investment team.

ScottishPower Energy Networks (SPEN) owns and operates two regulated distribution networks, SP Distribution plc (SPD) and SP Manweb plc (SPM). SPEN is the only Distribution Network Operator (DNO) group to operate across all three nations of Great Britain (GB) – Scotland, England, and Wales. SPEN also owns and operates one transmission network in Central and Southern Scotland, SP Transmission plc (SPT).



SPEN is part of the ScottishPower Limited group and owned by the Iberdrola Group – a global energy leader, the number one producer of wind power, and one of the world's biggest utilities by market capitalisation.

SPEN serves over 7 million people across 3.5 million homes and businesses. SPEN's assets include 30,000 distribution substations across its SPD and SPM networks, and over 100,000km of cables and overhead lines.

Distribution Networks Planning & Development – Asset Management & Investment

The Asset Management and Investment (AM&I) team sits within the Distribution Networks Planning and Development (NP&D) part of the Network Planning and Regulation (NP&R) department at SPEN. NP&D leads on asset management, system planning and strategic network design for SPEN's two distribution networks areas. As well as the AM&I team, NP&D includes teams for Distribution Networks, Distribution Network Connections, and Distribution Network Planning.

AM&I is a newly formed team responsible for overseeing asset expenditure programmes and delivery of key outputs. This includes engineering investment plans and optimisation, such as end-to-end, holistic asset management strategy e.g., asset/civil/other programmes. The team is also responsible for modelling network asset risk and performance with a focus on improving current engineering capabilities. The AM&I team drives strategy for network resilience, performance, and reliability. During the RIIO-ED2 price control period (see

below), AM&I plans for asset modernisation and network resilience to achieve ED2 outputs, as well as managing emerging risks and supporting RIIO-ED3 control period development.

Project Work

During the fourth quarter of my ES Cornwall Experience I have continued to work on several projects and team tasks at SPEN. The focus of this quarter has been the completion of a 3D digital network performance model proof-of-concept project.

3D Digital Network Performance Model Proof-of-Concept

Project Background and Overview

Traditional overhead line (OHL) modernisation design and risk management typically relies on rules of thumb and sometimes dated standards. SPEN is looking to enhance OHL modernisation design and risk management, and better integrate and use existing datasets such as collected LiDAR data. As such, a Proof-of-Concept (PoC) project was undertaken to develop a pilot 3D digital network performance model and to assess the potential feasibility and benefits of a wider scale roll-out and integration of a non-load 3D digital model for SPEN's HV OHL network.

The PoC project involved the development and analysis of a pilot scale 3D digital network performance model for selected HV circuits in the SPD and SPM networks through the layering of existing datasets such as LiDAR data, asset data, risk data, policies, Customer Interruptions (CI)/Customer Minutes Lost (CML), and weather and operating parameters.

The PoC project utilised the enterprise software platform of an external OHL design and modelling company. The platform has been developed for transmission and distribution utilities and offers both design and analytics capabilities.

The PoC explored two use cases to identify the potential security, resilience, financial and safety benefits of a 3D digital network performance model to improve management of OHL risk and performance investment, planning and design. The two use cases were:

1) Circuit risk management analysis, and
2) Overhead line (OHL) modernisation design.

The initial phases of the project involved formulating a project scope including understanding the potential benefits and capabilities of the software platform and identifying objectives, measures of success, and use cases. Procurement and approval processes were also undertaken and included activities such as presenting the proposed project plan to senior management and project specification development in order to kick off the project with the platform provider. Once the use cases were formulated, work was undertaken to shortlist appropriate network circuits for the proof-of-concept project and determine and collate the required associated data inputs.

In the second half of my placement with SPEN, the PoC project has continued and involved organising and participating in model training sessions, evaluating the model and project use cases, and completing a project report. Through evaluation, the benefits and limitations of the model were identified along with challenges and lessons learnt. Following the project conclusion next steps were determined based on this evaluation.

PoC Model and Use Cases Analysis

Overhead Line (OHL) Modernisation Design

Vegetation Clearance

SPEN business rules utilise two vegetation clearance distances, based on whether the vegetation can support a ladder or human. Where vegetation can support a ladder or human, the clearance is 3 metres. Where vegetation cannot support a ladder or human, the clearance is reduced to 0.8 metres. As the capacity of the vegetation to support a ladder or human is complex to assess using provided data, the PoC model classifies all vegetation clearances using the more conservative 3 metre requirement. The vegetation clearance is then classified into the following categories:

- Critical risk: vegetation within 0.5 metres
- Category 1: vegetation within 1 metre
- Category 2: vegetation within 2 metres
- Category 3: vegetation within 3 metres

Violations of the above categories can then be identified during the vegetation clearance analysis per span when using the PoC models. During the project it was found that a single erroneous LiDAR point can impact the categorisation in the vegetation clearance. This can be mitigated using point cloud thresholds where a minimum number of points are required to help reduce impact of noisy data. This is also discussed in the Limitations and Future Improvements section of this report.

Ground Clearance

Required OHL ground clearances in the models were based on SPEN defined parameters and dependent on whether the OHL crosses a road or railway line. For the PoC project, a UK Government sourced roads dataset was utilised to identify road locations with respect to OHL in the network models.

For each span, the point of minimum distance to ground can be identified and labelled in the PoC models. Terrain data is also incorporated into the models, and so this point may not always correspond to the 'lowest' point along the conductor. Similar to vegetation clearances, ground clearance violations can then be identified during the ground clearance analysis per span when using the PoC models.

Circuit Risk Management Analysis

Both the vegetation and ground clearance analysis in the OHL Modernisation Design use case also provide inputs to the Span risk analysis calculations undertaken as part of the Circuit Risk Management Analysis use case. Along with clearances, span risk is calculated using the PoC models by checking compliance with standards based on SPEN datasets.

Pole risk analysis within the PoC models was based on three inputs:

- *Future Health Index* – SPEN provided data for HV poles with values in format HI | C. These values are determined from age-based factors and assumptions regarding the likely future deterioration of the asset.
- *Weather Severity Index* – SPEN provided data in a Severe Weather Index .tif file for the cumulative period of 2016-2021 with values in the format of an integer scale from

1 to 13, and assigned a risk level of either low, medium, or high in the models, as shown in Table 1.

- *Flood Risk* – Government sourced data with value in format low (0.1% chance of flooding in that year), medium (0.4%) or high (10%).

The pole risk analysis provides the following two outputs to form the pole risk score:

- *Risk score* – value in format of integer.
- *Risk classification* – value in format of low, medium, and high.

The risk integer is calculated by summing the inputs with associated weightings. The weighting is saved as an adjustable data table in the modelling tool. The weighting used for the PoC project is shown in Table 2. The risk classification is also adjustable within the model.

Table 1 Existing Weather Severity Labels in PoC Models

Weather Severity	Assigned Risk Level
1	Low
2	Low
3	Low
4	Low
5	Low
6	Medium
7	Medium
8	Medium
9	Medium
10	High
11	High
12	High
13	High

Table 2 Risk Weightings for Pole Risk Analysis

Risk	Weight
Pole Health Index	0.5
Weather Severity Index	0.25
Flood Risk	0.25

Benefits Identified

- *Building data confidence including LiDAR quality assurance* – At scale data querying between datasets can help to build confidence in those datasets and answer questions such as, *is the GIS data correct?*, *is the asset management data correct?*, *is the LiDAR data correct?*. By combining datasets this can be better understood.
- *Sandpit environment* – Have identified the benefit of being able to use a ‘digital twin’ type model as a sand pit environment to ‘play around’ without impacting core or live datasets.
- *Usage of existing datasets* - Ability to use existing datasets, e.g., SPEN already has GIS, LiDAR, asset management datasets, so new data collection is not specifically

required to use the network performance modelling platform, the platform can leverage existing data and provide additional insights to this data.

- *Data ingestion and adaptability* – All datasets and layers were successfully ingested into the models during the PoC project. Those models can then be further refined easily with additional data as required.

- *Decision making and materials ordering* – Potential of the platform to help with making clearer investment and asset management decisions, such as in the lead up to RIIO-ED3 or in the case of material orders for longer lead time items and knowledge around quantities based on existing material lists within SPEN standards. Having this knowledge well in advance of any development work could help with delivery timeframes and potentially even the placement of material contracts.

Limitations Identified

- *Missing pole height data and defaults* – In some cases missing data means that defaults are used in the models, such as for pole heights, which can reduce the quality of the results produced.

- *Assumed technical specifications* – Where technical specifications were not available or were not feasible to be included due to the scale of the PoC project, assumptions were made within the model to demonstrate the analysis capabilities. This reliance on assumed standards and specifications led to some false positives in the PoC results. Further refinement and scaling up of both inputs and outputs of the model should help address this limitation, but false positives are likely to continue to some extent.

- *Pilot network area edges* – It should be noted that due to the PoC nature of the project, resulting in only small sections of SPEN's networks being modelled, there are 'false edges' of the network in the PoC models where the neighbouring circuits have not been modelled and hence certain poles and conductors appear to be an end point of the network. This can result in issues such as pole loading analysis errors due to the lack of neighbouring circuit data. This condition should not occur when the entire network is modelled but should be taken into consideration when performing analysis on the PoC models, particularly in areas close to the edge of the modelled network.

- *Modelling of transformers and other line assets* – The SPEN PoC models only contain pole and conductor assets and could be further enhanced if other OHL assets were able to be included.

- *GIS location and asset errors* – The PoC models ingest both SPEN provided LiDAR and GIS data. These two datasets can then be compared to identify location data for assets. Differences in resulting locations for poles and conductors are recorded in the models. Poles discrepancies can be classified in the following format:

    - Found Poles: poles that don't exist in GIS but were recorded by LiDAR.

    - Extra Poles: poles that exist in GIS system, but which weren't recorded by LiDAR.

    - This information could be used in the future to both enhance existing GIS records as well as to improve future network performance model analysis.

- *LiDAR point cloud errors and erroneous data points* – Where one lone point can impact the whole analysis, e.g., in vegetation clearance analysis. This can potentially be mitigated by setting up a point cloud threshold to rule out noisy data.

Lessons Learned

The following additional learnings were gained throughout the PoC project:

- Tools such as network performance models are heavily reliant on network data, and the quality of that data. Collecting this data can be challenging when the data is not always available or easy to acquire. This can lead to project delays or present limitations to the project and modelling tool results. Identifying data challenges throughout the PoC has also highlight areas for future improvement in data collection or management. In some cases, data can be added to a network model when it becomes available in the future.
- It can sometimes be challenging to bring external parties up to speed on internal processes which are well established within a business but potentially not readily transferable through documentation.
- Selecting circuits for a PoC scale project can be an additional challenge not experienced in a full scale roll out, presenting the problem of how to pick an appropriate part of the network for the PoC stage without cherry picking too much.
- Several future use cases were also identified throughout the project, such as for storm resilience improvements and storm simulation analysis.

Project Conclusion and PoC Phase 2

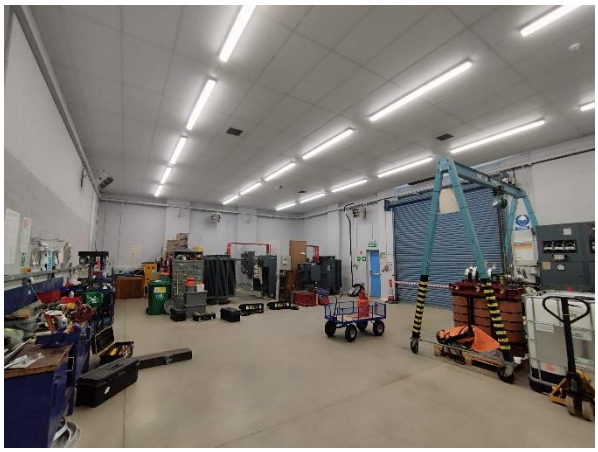
Following the successful completion of the PoC project, SPEN decided to investigate options to undertake a second phase PoC project to explore enhancements and further work identified during the initial PoC project. Before my placement at SPEN came to an end I was able to help prepare the preliminary scope for a second phase PoC project including further exploration of the use cases of *Circuit Risk Management Analysis* and *Storm Resilience Analysis*. A focus on scaling up the network model to ~3,000km of overhead network was also identified for the second phase PoC project.

Additional Learnings

During my time with SPEN I have also sought out opportunities to learn about other projects, activities and concepts within the company and electrical power industry which has broadened my understanding not only of SPEN but of the wider UK and European electricity system. This section outlines some highlights from these additional learnings.

Site Visit – SPEN Hoylake Training Facility

During a visit to the SPM (Manweb) offices and network, a colleague provided with me a tour of the SPEN Hoylake Training Facility near Liverpool in England. Having visited and trained at similar facilities in Australia it was a very rewarding visit, with highlights including noting the vertical LV overhead network in the outdoor training yard and seeing oil sampling underway.



Iceland Networks Visit

During the fourth quarter of my Scholarship Experience I was able to visit the Icelandic Transmission System Operator (TSO) Landsnet with fellow scholarship recipient Mitchell Tap. While in Iceland I was also able to see many elements of the Icelandic electrical power industry including a geothermal power station. This section provides a summary of what I learned through this experience. I would like to give special thanks to Sigridur Ingvadottir-Walters, Steinunn Þorsteinsdóttir, and Margrét Eva Þórðardóttir for helping coordinate and facilitate our visit to Landsnet, including showing us the TSO control room and providing such a comprehensive and insightful introduction to Landsnet and electricity in Iceland.

Overview of Icelandic Electricity System

- Electricity is generated from ~100% domestically sourced renewables, made up of hydro (73%) and geothermal power (27%). Gas and diesel/petrol are imported for use such as in transport, and gas bottles.
- The electricity load has a normal peak demand of about 2.2GW. There are two large aluminium smelters in Iceland, and each have a demand of ~500KW, which means that the transmission system can lose ~20% of the total demand in one go if one of the smelters trips, and they do trip.

- Landsnet is the electricity TSO for Iceland and is a public company. Its network includes 3,000km of transmission lines, ~70 substations and transports electricity primarily at 200kV and 132kV, with a few 66kV lines.

- There are several electricity distribution companies in Iceland which include: Veitur, RARIK, Orkubú Vestfjarða, Norðurorka, and HS Veitur.
- Two remote islands are disconnected from the Icelandic grid and rely on diesel generators.
- Geothermal hot water and heating is used for most of the country. The system electricity load therefore does not show the heating load or shows very little heating load. If there was electric heating the load would be substantially higher. Most of the electricity load is instead industrial demand.
- Iceland has a high market share of electric vehicles (EVs). This may be in part due to government incentives, and the availability of a green source of electricity as well as relatively cheap electricity.

Challenges

Despite being well ahead the global standard in the energy transition to reduce carbon emissions, the electricity system in Iceland is not without challenges. These include:

- *Constraint issues* – there is not great connectivity between the two sides of the country (Northeast and Southwest) where the main masses sit; and the network is also at capacity.
- *Day ahead market* – new in 2024, adding complexities to the electricity system operation.
- *Winter conditions* – severe weather in Iceland creates many challenges including electricity outages, access difficulties and the spiralling ice phenomenon.
- *Introduction of wind* – planned wind power may change the stability of the existing system and introduce new operating challenges.
- *Isolation* – from the rest of the world and substantial distances to neighbouring countries or electricity systems means that the Icelandic system has to be highly self-sufficient and can't easily export the cheap power produced.
- *Backup requirements* – Landsnet owns a backup diesel power station for the remote side of the WestFjords region of Iceland in case the main (and only) line goes out, which usually happens several times in winter. A more national N-1 requirement is being worked on for 2030.

Iberdrola Masterclasses

During my placement at SPEN I was also able to attend two Iberdrola Masterclasses, on the topics of offshore wind and Agrivoltaics. The Iberdrola Masterclasses are organised knowledge sharing opportunities across the wider global Iberdrola group.

Offshore Wind Masterclass

- Presenters: Gillian Noble, Managing Director UK Offshore Development & Operations, and Lucas Gomez Fontecha, Offshore Project Services Director.
- Masterclass on Offshore Wind, including offshore wind overview, the present and future of offshore wind, and a case study of the St Brieuc construction site.
- Iberdrola has a global offshore renewables business which operates under a global structure oriented to project delivery in all phases. Teams are located in strategic locations, including Australia (with development and scoping stage). Currently there are three operational sites with 1.3 GW of installed capacity (two sites in the UK and one in Germany).
- Offshore wind will play a key role in the decarbonisation of the energy system. There was 60 GW of offshore wind installed capacity worldwide in 2022, with a growth forecast of 4 times by 2030 and more than 10 times by 2050. Huge growth is expected particularly in the Asian region between 2030 and 2050.
- Drivers for growth include:
    - Quickest and cheapest way to reach green energy security.
    - Government focus (in some cases) on offshore for self-sufficiency and less vulnerability.
    - Emerging and established markets growing.
- The lifecycle of an offshore windfarm spans from origination and development through to pre-Final Investment Decision (FID), execution and operation and maintenance (O&M). The origination and development phases can take approximately five to 10 years and while incurred cost is low during these phases, risk is high. Higher costs are incurred in the later stage of the lifecycle, but risk is decreased.
    - *Origination and development phases* include: site identification and auction/tenders; pre surveys and feasibility analysis; environmental and site characterisation; basic design and windfarm layout; and permitting activities.
    - *Pre-FID and execution phases* include: main site surveys; detailed engineering; contract and supply chain works; manufacturing and construction programme; and investment dossier for construction.
    - *Operation and maintenance phase* includes: offshore hub approach; optimal operation; maintenance planning and activities; and data management.
- Barriers and challenges include gaining project consent and approvals, grid access, route to market and supply chain. Offshore wind is a highly competitive market.
- How an offshore wind farm works:
    - Turbines are often placed in groups in areas with optimal wind speeds. Energy captured by turbines is transmitted by cables to substations. Electricity flows to an onshore substation linked to the power grid. Various types of wind turbines are used, usually chosen based on depth of water with monopile turbines used in shallow water, jacket turbines used in transitional water depths, and floating turbines used in deep water.
- Offshore wind technology has evolved over time, with increases in turbines and windfarm sizes driving efficiencies and cost reductions. However, larger sizes do also

present challenges in installation, logistics and put pressure on the supply chain. Turbine foundations are also evolving, with increased water depths available with newer technologies. At the point of connection with the grid, technology improvements can support services such as reactive and frequency control, and blackout services.

- Offshore innovation: innovations are being trialled throughout the supply chain. For example, a bubble curtain pilot was launched at the Wikinger offshore wind farm in Germany to reduce noise during foundation installation.
- With Australia not yet having significant offshore windfarm generation it was very beneficial to learn about some of the main challenges and opportunities facing this form of renewable energy generation. As Australia looks to grow the offshore wind farm industry with the announcement of several offshore areas around the east and southern coasts of the country, it will be important to implement learnings from the experienced international offshore wind industry and farms such as those operated by Iberdrola.

Agrivoltaics Masterclass

- Presenter: Alban Gauthier, Head of Agrivoltaics, Renewables France Global.
- Masterclass on the concept of Agrivoltaics, including the benefits and challenges, the application and synergies, the potential of Agrivoltaics, and the progress of Agrivoltaics within Iberdrola.
- There is no exact universal definition for Agrivoltaics but work is being undertaken towards a 'common definition' where Agrivoltaics refers to the practice of combining agriculture and solar energy production, such as solar photovoltaics (PV) on the same plot. Systems are designed in a way that the land can be used for both farming, grazing, livestock, and the installation of solar panels.
- Synonyms include: Agrovoltaics, Agripv, Agrisolar, Agriphotovoltaics, and solar sharing.
- Agrivoltaics provide the opportunity for land use efficiency and the Agrivoltaic concept was pioneered in 1981 to maximise land use.
- Co-benefits include:
    - Support agriculture adaptation to climate change impacts, including through increased agricultural yields such as through climatic hazards impact reduction and soil quality improvement; water savings through soil moisture increases and evaporation decreases resulting in a reduction in irrigation requirements and the additional opportunity to harvest rainwater; and improved animal wellbeing through shading providing reduced temperatures and higher grassland quality.
    - Technical and economic benefits: technical benefits for agriculture through optimising the available light received by crops using solar tracking PV systems; benefits for energy through increasing bifacial efficiency (greater distances between PV modules and the ground); economic benefit through additional farm income and perpetuation of farming activities.
- Challenges include acceptance from population and agricultural institutions; regulation challenges including needing to work on agreeing on a universal definition, development of laws and permits to allow agriculture and energy to coexist; market uptake and financial support; and CAPEX improvement and business acculturation challenges.
- Applications and synergies include with crop production, animal husbandry, ecosystem services, and solar greenhouses.

- Global Agrivoltaics potential: the highest market share is currently in North America and Europe, but market growth rate is increasing globally. Advanced development is also seen in countries with land scarcity and advanced Agrivoltaics regulations in force, such as in France, Italy and Germany.
- Iberdrola has many existing Agrivoltaic projects as well as more in development, including a combined honey and photovoltaic plant in Cáceres, Spain; the Winesolar project, which utilises artificial intelligence in a smart agrivoltaic plant in Spain to control solar panel position based on real-time optimal vineyard conditions; and four demonstration projects in France, one combining dairy cattle and 3MW of solar and the other three aimed at improving agricultural plantations.
- While land scarcity may not be the main driver for Agrivoltaics in Australia, the other benefits put forward a good case for the increased utilisation of land-sharing and complementary projects to improve efficiencies and agriculture conditions. There are already a number of existing Agrivoltaics applications in Australia, such as the Royalla Solar Farm which pairs solar photovoltaics with sheep grazing, with some of the benefits already being observed at these installations.

Scholarship Closeout

Thank you SPEN!

Upon completing the ES Cornwall Memorial Scholarship, I would once again like to thank all those that have made this experience possible. Thank you again to the ES Cornwall Memorial Scholarship for enabling such an incredible and invaluable experience working in the electrical power industry overseas. The completion of my scholarship experience sees my return to Australia and my position as a Fringe of Grid Engineer at Energy Queensland.