

David Bones BENG(ELEC)**Executive Manager – Risk, Assurance and Regulation****Location**

Brisbane, Australia

Experience

30+ years

Qualifications/Accreditations

- Bachelor of Engineering (Hons) Power Systems

Key technical skills

- Economic and technical regulation of the electricity networks
- Investment justification and governance
- Strategic asset management
- Power system operations and planning
- Market operations

Memberships

- Member of Engineers Australia
- Member of IEEE
- CIGRE Australia Board Member
- Chair of the CIGRE Australia Technical Committee

Relevant experience summary

David has held executive and management positions within regulated electricity network companies and the national electricity system and market operator. He has successfully delivered nationally significant projects and lead capacity planning activities, across both transmission and distribution networks.

Project experience – Energy Regulations and Reviews***Essential Services Framework Business Impacts***

Role: Project Director
Client: Western Power
Location: Australia

David was responsible for directing GHD's analysis of the potential exposure to Western Power's business of proposed arrangement for recovering the costs of essential system services. Western Power sought to understand this potential exposure from a qualitative point of view, and then to understand the order of magnitude of the expected exposure by modelling a series of scenarios.

Specifically, Western Power sought modelling of the financial impacts on its business related to ESS under the following scenarios: network normal; forced outage; and planned outage.

Technical Rules Framework Review

Role: Project Director
Client: Western Power
Location: Australia

David was responsible for directing GHD's review of the Western Power Technical Rules and associated regulatory frameworks.

The review compared the existing framework in Western Australia with equivalent frameworks in place in the National Electricity Market (NEM), Great Britain and Ireland and identified strengths and weakness of each framework. The review developed, at a high-level, recommended revisions to the Technical Rules and associated regulatory frameworks.

Technical Rules Review - GPS

Role: Project Director
Client: Western Power
Location: Australia

David was responsible for directing GHD projects that have assisted Western Power to develop and implement an appropriate Generator Performance Standards (GPS) framework for transmission connected generators. The work began with a project completed in 2018 that developed the WEM Generator Performance Guideline. This document presented the rationale for implementing GPS and provided an initial description of proposed standards in sufficient detail to enable consultation with key stakeholders.

In a subsequent assignment, completed in 2019, GHD developed revisions to the Technical Rules necessary to implement the GPS. Rather than implementing the changes to the Technical Rules, it was assessed that changes should instead be made to the WEM Rules. The revisions developed by GHD were used to guide the implementation of revisions to the WEM Rules.

Review of NT Regulations -GPS

Role: Technical Advisor

Client: Utilities Commission of the Northern Territory

Location: Northern Territory, Australia

David provided lead technical input into the review of Power and Water Corporation's proposed revisions to the Network Technical Code and associated regulations. The review assessed the appropriateness of the changes to the NTC proposed by PWC to introduce generator performance standards for the NT power systems.

GPS Advice

Role: Technical Advisor

Client: Department of Energy and Water Supply (DEWS)

Location: New South Wales, Australia

David provided lead technical input into the review of AEMO's proposed revisions to the generator performance standards for the NEM. The focus of the review was to identify those revisions most relevant for the Queensland power system and to assess the implications on network security both in the short and long term if the AEMC process was delayed.

Essential System Services Review

Role: Technical Advisor

Client: Energy Transformation Implementation Unit (ETIU)

Location: Western Australia, Australia

GHD was engaged by the ETIU of the Western Australian Government to complete a review of the requirements for essential system service in the South West Interconnected System (SWIS) focusing mainly on frequency control services. The deliverable was an information paper that identifies potential frequency control challenges and summarises the changes to essential system services required to securely operate the SWIS and support the Wholesale Electricity Market.

Template for Generator Compliance Programs

Role: Project Director and Technical Lead

Client: AEMC Reliability Panel

Location: New South Wales, Australia

GHD was engaged to review and where necessary recommend revisions to the template for generator compliance programs for the NEM.

The template is published by the Reliability Panel and assists generators to develop programs that meet their obligations under the National Electricity Rules (NER) to make routine measurements to confirm the ability of their generating plants to meet their registered generator performance standards.

Hydrogen to Support Electricity Systems

Role: Project Director

Client: Department of Environment, Land, Water and Planning (DELWP)

Location: Victoria, Australia

GHD provided a report to assist with the development of the national hydrogen strategy. Partnering with ACIL Allen, we assessed the roles, opportunities and challenges that hydrogen might play in future to support Australia's power systems.

Our report also considered whether the relevant regulatory frameworks are compatible with both enabling an industrial-scale hydrogen production capability and use of hydrogen for power generation.

Queensland Pumped Hydroelectricity and Energy Storage Review

Role: Project Director

Client: Department of Natural Resources, Mines and Energy (DNRME)

Location: Queensland, Australia

GHD provided a report to DNRME examining the potential need for energy storage as Queensland progresses towards a zero emissions power sector. The report considered many different technologies and the relative advantages and challenges with utilising each.

Technologies covered included battery energy storage, compress air energy storage, solar thermal, hydroelectric generation, pumped hydroelectric systems, flywheels, synchronous condensers, demand management.

Project experience – Due Diligence and Transactions

Due Diligence

Role: Technical Advisor

Client: Confidential Client

Location: New South Wales, Australia

GHD was engaged to carry out Technical Due Diligence of the Endeavour Energy network by a potential purchaser.

David's role was to provide regulatory input and network planning input to the DD report.

Due Diligence

Role: Technical Advisor

Client: Confidential Client

Location: Western Australia, Australia

GHD was engaged to carry out Technical Due Diligence of Alinta's proposed 220 kV transmission line and substations to supply the Roy Hills Mine.

David's role was to provide regulatory input to the DD report.

Due Diligence

Role: Technical Advisor

Client: Confidential Client

Location: New South Wales, Australia

GHD was engaged to carry out Technical Due Diligence of the Green State Generation assets for a bidder.

David's role was to provide regulatory input to the DD report.

MLF and FCAS Estimates

Role: Project Director and Technical Lead

Client: Generation Developers

Location: Australia

GHD is regularly engaged by Generation Developers seeking to connect to the NEM to provide an assessment of the future marginal loss factors and the ancillary service costs that their project may face.

Project experience – Technical Assurance and Investment Advice

RIN Reviews

Role: Technical Review Team Lead

Client: TasNetworks

Location: Australia

GHD was engaged to review non-financial information prepared by TasNetworks, SA Power Networks and ActewAGL in response to regulatory information notices issued by the AER.

David directed the review teams ensuring robust and timely reviews.

Non-Network Solutions Review

Role: Project Director

Client: TransGrid – Powering Sydney's Future

Location: New South Wales, Australia

GHD was engaged to review the options to utilise non-network solutions as an alternative to a proposed new 330 kV underground cable supplying the Sydney CBD.

David directed the project and oversaw the project delivery – presenting outcomes at a public forum.

Capex Reviews

Role: Technical Advisor

Client: TransGrid – Powering Sydney's Future

Location: New South Wales, Australia

GHD was engaged to review the project planning and justification documents underpinning the CAPEX proposed by TransGrid in their revenue submission lodged with the AER in 2014.

David directed the project and oversaw the development and implementation of efficient methods for reviewing the diverse range of investments.

Queensland R400 Project

Role: Technical Advisor

Client: Department of Energy Water Supply (DEWS)

Location: Queensland, Australia

ACIL Allen was engaged with GHD and KPMG to assist DEWS with its assessment of the wholesale energy market opportunities for renewable energy investment in Queensland and the development and execution of a process to identify preferred projects for receiving government financial support.

David provided lead technical input on generation and storage technology, grid connection and system security. He also led the exploration of the use case for battery energy storage in Queensland when coupled with variable renewable energy generation.

Review of Protected Event

Role: Project Director and Technical Lead

Client: AEMC Reliability Panel

Location: New South Australia, Australia

GHD was engaged to provide an independent review of AEMO's application to the Reliability Panel for the declaration of a protected event to assist in managing power system security in the South Australia.

David led and assessed the technical feasibility and costs of options presented by AEMO for managing system security following the loss of multiple transmission elements resulting in generation disconnection in the South Australian region during destructive high wind conditions.

Review of Perth CBD Network Investment Plans

Role: Project Director and Technical Lead

Client: Western Power

Location: Western Australia, Australia

GHD was engaged to review network investment options allowing the demolition of the East Perth 66 kV substation. This work involved completing an independent review of potential transmission and distribution options that would maintain a secure supply to the Perth CBD and allow decommissioning of the East Perth 66 kV substation.

Review of Sydney CBD Supply Strategy

Role: Project Director and Technical Lead

Client: Ausgrid

Location: New South Wales, Australia

GHD was engaged to provide an executive level review of Ausgrid's investment strategy for supply to the Sydney CBD.

The review considered the robustness of the investment strategy and the risk of regret that might flow from its implementation.

David led the project and provided the lead input into the review that was commissioned by the acting CEO.

Tool to Assess Hybrid System Investments

Role: Project Director

Client: DEDJTR

Location: Victoria, Australia

GHD was engaged to develop systems and tools to allow comparison of the merit of investing in hybrid systems comprising generation and Battery Energy Storage Systems (BESS) as an alternative to extending the distribution network to supply Victorian rural and regional customers. David led the project team and reviewed developed tools.

Demand Forecast Review

Role: Project Director

Client: Ausgrid

Location: New South Wales, Australia

GHD was engaged to provide an independent review of the demand forecasting systems and approaches used by Ausgrid to develop demand and electricity consumption forecasts.

David led the project team and provided the review of all project deliverables.

Demand Forecast Review

Role: Project Director

Client: CitiPower PowerCor

Location: Victoria, Australia

GHD was engaged to provide an independent review of the demand forecasting systems and approaches used by CitiPower and PowerCor to develop demand and electricity consumption forecasts.

David led the project team and provided the review of all project deliverables.

Business Case

Role: Project Director

Client: SA Power Networks

Location: South Australia, Australia

GHD was engaged to develop business cases to support investment programs included in SA Power Networks' revenue submission addressing bushfire risk, reliability performance and trials of micro-grids.

David led the project teams and reviewed developed business cases.

Project experience – Power System Operations Advice

SWIS Restart Plan

Role: Project Director and Technical Lead

Client: AEMO

Location: Western Australia, Australia

GHD was engaged to review and refresh the restart plan for the SWIS. This work completed in 2018 involved facilitating workshops with AEMO and Western Power to develop an agreed structure and scope for the restart plan, and to populate the plan with information drawn from available data and documents.

Gaps in the plan were identified and options to address those gaps proposed.

Health Check of System Operations

Role: Project Director and Technical Lead

Client: AEMO

Location: Western Australia, Australia

GHD was engaged to complete a health check on the processes, capability, systems and resources used to manage the SWIS in light of findings from the investigation into the system black event in South Australia in 2016.

The focus of the review was to identify whether learnings from South Australia had been captured in AEMO's existing approach to managing the SWIS.

Impact of variable renewable generation of system operations

Role: Project Director and Technical Lead

Client: AEMO

Location: Western Australia, Australia

GHD was engaged to assess and quantify the potential system security impacts likely to arise from the connection of additional non-synchronous generation to the SWIS.

LFAS Review

Role: Project Director and Technical Lead

Client: AEMO

Location: Western Australia, Australia

GHD was engaged to review the amount of Load Following Ancillary Service procured by AEMO for regulating frequency in the SWIS.

The work included completing statistical analysis of performance data for the SWIS to identify the quantity of service needed to regulate frequency.

MTPASA and Generator Adequacy Review

Role: Project Director and Technical Lead

Client: AEMO

Location: Australia

GHD was engaged to assist AEMO in reviewing systems used to complete the medium term assessment of generator adequacy.

GHD's role included reviewing international practice and providing an independent critique of proposed changes to the MTPASA process in the NEM.

Visualising Reserve Adequacy

Role: Project Director and Technical Lead

Client: AEMO

Location: Australia

GHD was engaged to assist AEMO to visualise the forecast adequacy of generation reserves in the NEM across peak demand periods.

GHD developed a deterministic assessment of the supply demand balance to provide a contrast to the information developed by AEMO thorough probabilistic analysis.

Project experience – Generation Connection Advice

Generation and BESS Requirements for DKIS

Role: Regulatory Lead

Client: Generation Developers

Location: Australia

GHD supported Epuron with the negotiation of connection arrangement for the Katherine Solar Farm.

This work included development of a functional specification for a battery Energy Storage System to meet the technical performance requirements specified by System Management including those in the draft generator performance standards.

Generator Connection Studies

Role: Project Director and Technical Lead

Client: Generation Developers

Location: Australia

GHD is regularly engaged by Generation Developers to complete connections studies to demonstrate their ability to meet generator performance standards specified in the NER.

GHD assists with the connection studies and the negotiation of the generator performance standards with AEMO and the connecting NSP.

Project experience – Electrical Network Safety

Safety Regulations Review

Role: Technical Review and Team Lead

Client: Western Power

Location: Western Australia, Australia

David led the comparative review of electrical network safety regulations that apply in Western Australian and other Australian Jurisdictions.

The review assessed key areas where approaches aligned, and key differences. For those key differences, the review considered the implications for Western Power.

Electrical Safety Reporting Review

Role: Review and Team Lead

Client: IPART

Location: New South Wales, Australia

David led the review of electrical safety reporting completed for IPART.

The review provided recommendations to IPART and assisted in developing guidelines for annual reporting by electricity network service providers against the network safety regulations.

Project experience – Expert Advice

Electrical Connection and System Security

Role: Expert Witness

Client: Westlink Power Station

Location: Queensland, Australia

David provided Expert Witness Services to assist the land court in its deliberations regarding applications to prevent the zoning of land to allow the development of a gas fired power station.

David was engaged by the power station developer to provide Expert advice in relation to power system development and grid connection.

Land Court Proceedings

Role: Senior Advisor

Client: Powerlink

Location: Australia

David provided assistance to Powerlink in their Land Court proceedings regarding disputed compensation for the loss of amenity due to the development of a portion of the Greenbank to Middle Ridge Transmission Line and the widening the easement to allow potential 500 kV development.

Land Court Proceedings

Role: Expert Witness

Client: Tilt Renewables

Location: South Australia, Australia

David acted as an Expert Witness in a proceeding before the land court in South Australia concerning the development approval for a proposed wind farm.

David was retained by the developer to assist the court in understanding the regulations and processes in place in the NEM that govern the connection of generators and to describe how those processes support the maintenance of system security.

Land Court Proceedings

Role: Expert Witness

Client: South Burnett Regional Council

Location: Queensland, Australia

David acted as an expert witness in a proceeding before the land court in Queensland concerning the development approval for a proposed solar farm.

David was retained by the South Burnett Regional Council to assist the court in understanding the technical impacts of the proposed solar farm on the resilience, reliability and security of electricity supply to the local electricity consumers.

Frequency Control Ancillary Service

Role: Senior Advisor

Client: Confidential Client

Location: South Australia, Australia

David provided Expert Advice in relation to a dispute involving the settlement of Frequency Control Ancillary Service (FCAS) costs associated with meeting local FCAS requirements in South Australia during outages required for the commissioning of upgrades to the Heywood interconnector.

Project experience – Electricity Network Planning and Strategic Advice

Electricity Network Expansion – Western Power MWEF Project

Role: Technical Director and Project Sponsor

Client: Western Power

Location: Western Australia, Australia

David led the stakeholder consultation, power system studies, market modelling and cost benefit analysis for the \$420M stage 1 Mid West Energy Project.

Regulatory and investment approvals were achieved allowing 2012 commencement of construction of the double circuit 330 kV transmission line extending north from Perth to Three Springs.

Electricity Network Revenue Submissions

Role: Network Capacity Planning Manager

Client: Western Power

Location: Western Australia, Australia

David led the development of the capacity expansion plans, load forecasts and supporting material for Western Power's 5 year revenue submission (Access Arrangement 3) covering both the transmission and distribution networks.

The project successfully defended the AA2 period investments from any write-down, which was a significant improvement compared to the write down awarded for Western Power investments in the AA1 period.

Network Investment Excellence Project

Role: Project Leader and Sponsor

Client: Western Power

Location: Western Australia, Australia

David joined Western Power shortly after the ERA decided to write down \$250 million of the investments made during AA1. The write-down reflected an inability to demonstrate that the projects undertaken were prudent and delivered efficiently.

As Capacity Planning Manager, David led the development and implementation of improvements in the network investment framework to reduce the risk of future asset write-down. The project delivered a new network investment strategy, various supporting processes and artefacts and cultural changes that collectively delivered prudent and efficient investments addressing the write-down risk.

State of the Infrastructure Report

Role: Production Team Lead

Client: Western Power

Location: Western Australia, Australia

David led the production of the first state of the infrastructure report for the Western Power Network, which incorporated reporting of reliability and safety performance, asset condition and compliance with planning standards.

NEM Planning and Operations

Role: Various

Client: NEMMCO and AEMO (12 years)

Location: Australia

David joined NEMMCO prior to the start of the National Electricity Market (NEM) and across 12 years performed many roles associated with the planning and operation of the NEM. This included two years serving on the NEMMCO Executive Committee as General Manager Planning.

David's experience at NEMMCO included:

- Contracting for ancillary services;
- Assessing the security of the power system through details system analysis;
- Tuning generator controls to optimise system performance;
- Managing inter-regional tests associated with the commissioning of new interconnectors;
- Coordinating national planning activities;
- Electricity market modelling to assess reserve requirements and interconnector benefits;
- Production of various planning documents;
- Coordinating the technical assessment of the impact of new generators on the performance of the power system; and
- Developing changes to the NER to establish the technical performance standards framework.