Claude Morris BACHELOR OF ENGINEERING (BENG)

Renewable, Energy Storage & Hybrid System Specialist

Location
Perth, WA, Australia

Experience
10 years

Qualifications/Accreditations
– Bachelor of Engineering (BEng) Merit Honours in Electrical Power Engineering and Renewable Energy Engineering, 2009

Key technical skills
– Experience with power systems analysis and feasibility software including: HOMER (energy storage, fossil fuel and renewables economic optimisation modelling), RETScreen, Power Factory, Power Tools, and Wind Farm.

Memberships
– International Microgrid Association (IMA)
– Technical and Standards Working Group Member

Relevant experience summary

Claude is GHD's microgrid, storage and integration team lead in Western Australia and Australian Energy Storage step-up initiative lead. He is a recognised industry specialist in this area, having worked on numerous fossil fuel/ renewables/ battery microgrids for the past 10+ years. Claude has successfully delivered the integration of several standalone power systems, microgrids and utility-scale solar and energy storage projects throughout regional Western Australia, and has worked on projects in the Middle East, UK, North America, Asia-Pacific and Africa. Claude is experienced in the planning and modelling, contract development, designing, inspection and commissioning of generation and network assets for interconnected and islanded power systems.

Project experience – International microgrid and battery energy storage.

Role: Microgrid, Storage & Integration Team Lead
Location: Perth, WA, Australia
Date(s): 2019 - Present

Claude brings international microgrid and battery energy storage experience and knowledge which can be applied to GHD's client's projects. His role is to oversee, lead or assist as necessary in delivering micro grid, renewable and energy storage projects with the following key focuses and services:

- Provision of microgrid, grid-connected and Stand Alone Power System and energy storage engineering services with specialty in:
  - Feasibility, optimization and renewable energy yield studies;
  - Concept and tender design;
  - Procurement and commercial support;
  - design and commissioning support; and
  - Operational optimisation and improvement projects.
- Ensure product and service offerings are aligned with target market needs; enhance, build and develop new products and services as required.

Role: Engineering Lead
Location: Pilbara, WA, Australia
Date(s): 2019 - Present

- 25 and 50 MW Solar Farm Feasibility Studies
- Confidential Tier 1 Mining Clients

Claude is carrying out the feasibility study and concept design for two large scale solar PV projects in Pilbara. His responsibilities include:

- Energy yield, network, dispatch, reliability and stability modelling;
- Techno- economic optimisation modelling and analysis;
- Capital and operating cost estimates;
- Interdisciplinary design reviews; and
- Producing technical and procurement deliverables.

Nauru Solar Development Project

Role: Renewable (PV) AND Energy Storage (R&ES) Specialist
Client: Asian Development Bank (ADB)
Location: Nauru (APAC) and United Kingdom (UK)
Date(s): 2018 - 2020

Claude is carrying out the feasibility study and concept design for the solar PV and ES installation. His responsibilities include:

- Dispatch, stability, feasibility, and economic optimisation modelling and analysis;
- Capital and operating cost estimates; and
- Producing battery and solar farm technical specifications and control functional descriptions.

Solar Power Integration Project

Role: R&ES Specialist
Client: Indigenous Services Canada
Location: British Columbia, Canada
Date(s): 2018 - 2020

Claude is carrying out feasibility studies and concept design for the solar/hydro microgrid. His engineering support responsibilities include:

- Capital and operating cost estimates;
- Dispatch, stability, feasibility, and economic optimisation modelling and analysis;
- Producing battery and solar technical specifications and procurement support; and
- Owner's Engineer (OE) services.

Onslow Distributed Energy Resources (DER) Project

Role: Renewable Energy & Storage Specialist
Client: Horizon Power
Location: Perth, WA, Australia
Date(s): 2016 - 2018

Claude provides economic modelling, procurement, design and acceptance testing support services for the expansion project for the regional Western Australian town of Onslow. His engineering support responsibilities included:

- Capital and operating cost estimates;
- Dispatch, stability, feasibility, and economic optimisation modelling and analysis;
- Producing battery and solar farm technical specifications and DERMS/control functional descriptions;
- Tender evaluation and negotiations;
- Protection studies; and
- Commissioning manager.

South Tarawa Water Supply Project

Role: Renewable Energy & Storage Lead
Client: ADB | Kiribati (APAC) & WA
Location: Perth, WA, Australia
Date(s): 2017 - 2018

Claude carried out the feasibility study and concept design for the power supply to a desalination plant. His engineering support responsibilities included:

- Capital and operating cost estimates;
- Dispatch, stability, feasibility, and economic optimisation modelling and analysis; and
- Concept design and operating regime analysis.

Yungngora Solar Farm & ES Project

Role: Design and Commissioning Manager
Client: Horizon Power
Location: Perth, WA, Australia
Date(s): 2014 - 2015

Claude managed the successful technical delivery of the project from feasibility studies to practical completion. The scope included the installation of a PV array and solar smoothing energy storage system into an existing diesel power station as the sole power supply for a remote indigenous community. His engineering support included:

- Capital and operational cost estimates Front-end, basis of design engineering;
- Producing technical specifications;
- Tender TQ response, evaluation and negotiations;
- Safety in Design analysis;
- Detailed design review;
- Equipment inspections and witnessing; and
- Site commissioning and reliability testing.

Miscellaneous

Role: Technical Advisor and Design Support
Location: Perth, WA, Australia
Date(s): 2015 - Present

- Concept design review| Sunraysia, Australia | 250 MW PV array | Decmil;
- Concept design development and budget estimate| Australia | Confidential site, 10 MW PV array | Tier 1 Mining Client
- Specification review| Confidential site, Australia | 100 MWh BESS | AGL.
- Design review| Papua New Guinea| PV & ES microgrid | New Zealand Ministry of Foreign Affairs (MFAT); and
- Generation Optimisation studies | multiple sites, Australia | PV arrays & ES | Horizon Power.

Murchison Radio-astronomy Observatory (MRO) Hybrid Power Station Project

Role: Design Manager
Client: Horizon Power
Location: Perth, WA, Australia
Date(s): 11/2014 – 09/2016

Claude managed the successful technical delivery of the MRO Power Station (Greenfields) project from the preliminary design to the Issued for Construction detailed design package. The scope included the installation of a diesel power station, solar hybrid power station and a MV network upgrade.
The second stage of the project included the integration of an additional 1.4 MW of PV and 1.4 MW/2.5 MWh energy storage system.
His engineering support included:

- Front-end, basis of design engineering;
- Producing technical specifications; and
- Responding to technical queries and clarifications.

Authority for Electricity Regulation

Role: Technical Advisor
Client: Oman
Location: Perth, WA, Australia
Date(s): 2018 - 2019

Claude carried out the following tasks and deliverables:

- Review of the LV installation design, installation, inspection and approval framework;
- Independent review of the original and development of updated edition of wiring regulations including international benchmark; and
- LV Installation inspections and audits.

60 MWh/30 MW BESS

Role: Energy Storage (ES) Technical Lead
Client: Confidential Client
Location: Perth, WA, Australia
Date(s): 2018 - 2019

Claude assisted a client with their submission for a Build Own Operate storage opportunity by carrying out the following technical assessment services:

- EPC Technical specification and supporting contract schedules development;
- EPC submission evaluation and recommendation; and
- Technology and vendor red flag analysis.

Carnarvon Energy Storage Trial (CEST) Project

Role: Design and Commissioning Manager
Client: Horizon Power
Location: China and WA
Date(s): 2016 - 2017

Claude managed the detailed design, integration and commissioning of a 2 MW/ 2 MWh energy storage system into an existing gas fired power station. Commissioning is complete and has successfully completed the milestone of live spinning reserve support tests on the town and operational handover. His engineering support responsibilities included:

- Front-end, basis of design engineering;
- Producing technical specifications;
- Responding to technical queries and clarifications;
- Tender evaluation and negotiations;
- Safety in Design analysis;
- Detailed design for integration works and review for turnkey packages;
- Equipment inspections/witnessing (FAT in China);
- Site commissioning;
- Tender evaluation and negotiations;
- Safety in Design analysis;
- Detailed design review; and
- Factory Acceptance Testing.

Oldham and Thurrock Gas Peaking Plants

Role: Technical Advisor
Client: Armstrong Energy
Location: United Kingdom (UK)
Date(s): March – July 2018

Claude provided advice and undertook a technical and commercial review regarding two X 20 MW gas-fired reciprocating engine power stations. His support responsibilities included:

- Procurement strategy review;
- Technical and commercial Interface and back-back analysis; and
- Producing technical and commercial contract schedules.

Other

- **Awards.** 2016 GHD Global Technical Excellence Award for Power, Instrument and Control for his work on “Integration of High-Penetration Solar in Diesel-Hybrid Islanded System through the Implementation of Dynamic Solar Smoothing Energy Storage”
- **Published - Co-Author of - “**A Brief Investigation into Current Microgrid Standards and the Gaps”: The International Microgrid Association (IMA) Whitepaper. Paper Presented at AuSES Solar 2010 Conference, Paper Title: “Transformerless PV inverters – Recent Test Results and a Discussion of DC Current Injection and Safety Issues”.
- **Guest presenter and lecturer**
  - EECON 2019;
  - IMA 2019 Sundowner;
  - Australian Energy Storage Conference 2019;
  - IE Aust for Design and implementation of a 200 kW solar array and Battery for Yungngora; and
  - Edith Cowan University (ECU) for Sustainability and Renewable Energy, PV Sizing and Energy Storage.