Design Capability Statement





01 Solar and Embedded Generation Design Services

GSES is a multi-disciplinary organisation specialising in professional services and training across the Sustainable Energy sector and comprises a team of highly experienced systems engineers, accredited designers, installers and accredited trainers. Collectively, GSES has over 50 years of local and global experience undertaking projects in Australia, NZ, Asia, Africa and the Pacific Islands.

From 2016 GSES applied our training experience by offering a design consultancy service, providing detailed system design services with a solid foundation in standards and best practice installation practices. GSES works with a number of industry leading C&I solar companies to deliver high quality solar installations at the right price.

All design services are provided as a whitelabelled Design Pack with your company's logo and credentials, allowing you to send a clear message to your clients about what you deliver and who they are dealing with.

GSES is well positioned to assist your company with the deliverables listed below. Further scope and deliverables can be quoted upon discussion.

Standard Offerings

- Concept Designs
- Tender Responses
- Construction Plans
- Network Technical Studies
- HV Connections
- Connection Applications

02 Concept Designs



GSES produce fast turnaround concept designs to quickly visualise your plans to clients. These designs allow you to price the Bill of Materials and identify performance to quantify the financial benefits of the project.

- 3D Model
- PVSyst Performance Estimates and Interval Analysis
- Multiple system variants

03 Construction Issue Design Packages

GSES is able to produce a Design Pack ready for construction.

This will incorporate information from site inspections, structural reports, and client feedback. As well as taking care of the design, we can also manage your connection application with the DNSP.



04

Issued For Construction Design Packages

Typical deliverables for a project include:

- Site plan
- String layouts
- AC single line diagram
- DC single line diagram
- AC voltage rise
- DC voltage drop
- Tray/ trench/ conduit design
- Performance estimates
- DNSP liaison
- Fault studies
- Export limiting
- Protection grading
- Secondary protection design
- Monitoring schematics
- HV connection single line diagram
- Earth grid design
- System performance modelling
- Site inspection
- Buried cable detailed studies
- Interval analysis
- Arc flash
- Lightning per AS 1768
- Shading analysis

05 Tender Response

GSES provides extensive tender response services. Rather than commit your own team to planning and designing for potentially complex tender responses, GSES can take the work on and allow you to focus on your already committed projects. We work to the tender spec provided to ensure you are able to submit a conforming response and if you have other ideas a non-conforming response can be assembled too.

Plans provided are almost ready for construction and can be used for cost estimation.

- Site plan
- AC SLD (indicative)
- DC SLD (indicative)
- Performance Estimate with detailed shade analysis





06 Network Studies

GSES has in-house expertise in completing network studies for a variety of stakeholders, including Australian DNSPs and international minigrid projects.

We are experienced in the following modelling suites:

- ETAP
- PowerCAD
- PSSE
- Sincal
- PSCAD

Static and Dynamic modelling can be carried out to get your system through the connection maze with DNSPs.



07 BESS Services

Service Overview

GSES has extensive experience in Battery Energy Storage System (BESS) design built over 30 years of experience in the Australian and international energy sector. Utilising in-house modelling tools as well as proprietary tools; PVsyst, HOMER Grid and HOMER Pro, GSES is able to optimise storage systems to meet various targets. Grid Connect with Battery systems are typically optimised to provide for:

- Lowest CAPEX cost
- Highest return on investment
- Maximising solar utilisation
- Peak load lopping
- FCAS services

Case Studies

Several case studies are presented below.

Lithium Ion vs Vanadium Flow Batteries Analysis

HOMER Grid was used to model a series of scenarios for battery installations on sites selected by NSW Government. Lithium Ion and Vanadium Flow battery technology was compared, with and without the presence of PV.

Lithium Ion batteries were determined to be the most cost effective when taking into account CAPEX, O&M and replacement costs. Battery technology and serviceability was also assessed.

2.5 MW Utility Battery in Canberra

GSES conducted static network studies for EvoEnergy in Canberra enable connection of a 2.5 MW battery. Currently undergoing the dynamic network studies using PSSE. The battery will be used to support grid stability and operate in FCAS markets.

100 kW Microgrid for a Stormwater Pumping Station

GSES designed and optimised sizing for a stormwater treatment and pumping station located off grid. Diesel backup was implemented. HOMER Grid and PVsyst were both utilised to minimise the system costs and diesel consumption.