Turnkey High Voltage Electrical Infrastructure and Secondary Systems
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We believe in developing our skills and people to provide the highest level of quality and service to our clients. The use of highly trained engineering staff and state of the art technology has placed PSD Energy at the forefront of this niche electrical industry.

Solutions Offering
- Project Management including detailed design, procurement, supply, installation & commissioning
- Detailed Design covering primary and secondary electrical plant, including civil and mechanical components of the plant
- Supply, manufacture and installation of secondary equipment (protection / metering and SCADA)
- Design, manufacture and factory acceptance testing of transportable buildings
- Complete factory acceptance testing of integrated control and protection systems
- Complete factory acceptance testing of primary plant equipment
- Site construction, installation and maintenance services
- Complete site acceptance testing including secondary injections, primary injections and stability testing
- Commissioning and hand-over of a complete and functional power system

Company History
PSD Energy was formed in 2005 with the company’s head office based in Adelaide, South Australia. We employ an experienced team of Design Engineers, Project Managers, Supervisors, Electricians / Commissioning Engineers and Administration Staff. PSD Energy also operates a transportable building manufacturing facility in Burton, South Australia, with the technical expertise for complete design, fabrication and factory acceptance testing of transportable buildings.
PSD Energy have delivered turnkey projects to both Australian and International clients within South East Asia from 400V up to 275kV. The developed experience gives PSD Energy the capability to deliver green field and brown field turnkey projects. PSD Energy have vast project delivery experience within the utility, mining and renewable energy sectors. The company understands the importance of project coordination from concept through to practical completion.

**Project Management**
Our project management team are completely focused on client satisfaction, delivering the required scope within the predetermined set of parameters. Detailed planning, scope mapping and the client’s specification are the key factors for successful project delivery. The project manager, with assistance from the project engineer, ensures all key areas of detailed design, procurement, supply, installation and commissioning are executed to the highest industry standards. From the initial program launch our experienced project managers liaise with the end client and other key stakeholders to plan, communicate and execute the project’s key milestones and deliverables.

**Procurement**
Supplier relationships, contract management and strong product knowledge are the key areas for successful procurement. Tighter project deadlines and more stringent industry specifications result in the requirement for expert procurement specialists and planning. Long lead items are identified by the projects team immediately to ensure the right product is delivered to the correct location at the precise point in the construction program. We specialise in contract management / negotiation, inventory control and freight coordination, supplier auditing and risk management.

**Construction**
Our extensive in-house construction crews are responsible for the onsite construction functions. Strategic industry partnerships ensure that skilled labour and construction services are readily available to service any sized construction scope. Our team takes safety, quality and environmental management very seriously with an underlying goal of zero injuries and zero defects.

We have completed turnkey projects as well as balance of plant projects for clients in power generation, renewable generation, transmission utilities, distribution utilities, oil & gas and mining industries.

Power generation, renewable generation, transmission utilities, distribution utilities include:

- A15, GIS and hybrid substations from 11kV to 275kV
- MV Switchgear AIS and GIS installations
- Reactive plant installation
- Replacement and upgrade projects
- Repair and maintenance

Oil & gas and mining industries include:

- MV Switchgear AIS and GIS installations
- Motor control centres (MCC’s)
- RMU and padmount transformer installations
- Black start generators
- Power cabling and reticulation

**Testing and Commissioning**
Our secondary system design engineers produce Factory Acceptance Testing (FAT) and Site Acceptance Testing (SAT) procedures, as well as commissioning plans which are developed specifically in accordance with the project scope of works as part of the design process.

**Factory Acceptance Testing (FAT)**
Before equipment is sent to site, a full series of Factory Acceptance Tests (FAT) are conducted and comprehensive FAT documentation is produced. The FAT documentation range from general wiring tests through to full functional testing of relays / logic and communications back to a SCADA master station simulator. As part of the FAT procedure, the secondary drawings are also revised to factory “As built” prior to issuing for final construction.

**Site Acceptance Testing (SAT)**
Our engineers lead the testing teams to ensure that the installed equipment meets the design requirements. A full series of Site Acceptance Tests (SAT) are conducted and comprehensive SAT documentation is produced which is made available to the client prior to energisation of equipment. We have vast experience in the commissioning of HV substations and switchyards including the critical aspects of secondary circuit isolations in existing substations.

Testing Services Include:

- Protection relay and scheme testing upgrades
- Power station generation control testing and upgrades
- Medium and low voltage switchboard testing
- High voltage motor and generator testing
- High voltage substation testing
- Transformer testing
- AC and DC pressure testing of power cables
- Current Transformer & Voltage Transformer testing and upgrades
- High and medium voltage cable testing
- Substation batteries and charger testing
- Surge arrester testing
- Busbar inspection and testing
- Power factor correction system testing
- Power generation online and offline testing
- Medium and low voltage circuit breaker testing
- Earth testing and surveys
PSD Energy employs a comprehensive in-house design team of qualified chartered engineers, design engineers and project engineers to carry out and certify detailed electrical design. The team is supported by experienced drafters to execute design services to any form of specification. Capabilities include detailed HV Substation design; civil, mechanical, electrical - primary and secondary / SCADA designs to any required design standards or client specification.

Primary Design and Calculations
- Design Drafting of Substation arrangements, sections and details (AS2067)
- Tubular and Strung busbar design including: sag, expansions, tension, short circuit, seismic, wind loading calculations (AS3866, IEC86; AS1170)
- Conductor, busbar and bolted connection current rating calculations (AS5531, IEE738; AS62271)
- Power Cable sizing calculations (IEC60287 & CYMCAP-Software)
- AS3000 design and cable sizing calculations
- Insulation co-ordination assessment and studies (EMTP-RV Software & IEC60071)
- EMF assessment and studies (CDEGS Software)
- Earth grid design and assessments (CDEGS Software & IEE80)

Civil Design and Calculations
- Specifications for substation primary plant
- Lighting design (AGI32 3D modelling)
- Lightning Protection (AS1768)
- Air Conditioning sizing
(AGI32 Software)
- Detailed bill of quantities and material
- Safety in design assessments

Structural Design and Calculations
- Design Drafting of steel work arrangements and support structures
- Structural load calculations including structural member sizing, deflection, seismic and wind loading calculations (AS1170)
- Detailing of lattice structures for gantries and terminal towers

Software and Design Package Proficiency
- Bentley MicroStation V8i
- & MicroStation AECxim
- AutoCAD & AutoCAD Civil 3D
- DigSilent PowerFactory power system software
- CYMCAP cable ampacity calculation
- CDEGS earthing software
- AGI32 lighting software
- EMTP-RV power system transient modelling software
- Camel air conditioning loading software
- Manufacturer proprietary device configuration software

Secondary and Protection Design
- Writing and reviewing of relevant client specifications, including:
  - Project scope of works
  - Design standards and manuals
  - Functional design specifications (FDS)

Complete IEC 61850 expertise including technology integration and consulting services including:
- Successful integration using alternative relay manufacturers
- IEC 61850 system configuration
- GOOSE and MMS design and testing
- Ethernet communications network design, documentation and testing
- Integration between protection relays and SCADA equipment
- Systems are designed to meet redundancy and fault clearing time performance required by the National Electricity Rules
- Built-in design features to ensure future maintenance, modifications and upgrades are not obstructed
- SCADA master station communications via legacy protocols
- Standards development and documentation

Load flows and fault calculations
- Feasibility studies for new and augmented power system installations
- Audits of existing power system plant
- DigSilent PowerFactory software

Protection coordination and grading studies
- Comprehensive protection setting philosophy and calculation reports
- Development of relay setting files

Secondary, control and protection designs
- Preliminary and concept design including single line diagrams, communications network architectures, control building layouts, selection of protection and control relays, and protection and control philosophy documentation
- Detailed design drawings and documentation including protection and control panel layouts, schematics, wiring diagrams, cable and termination schedules, and interfacing to new and existing plant and equipment
- As-built drawing updates incorporating all onsite amendments.

Development of training and operating manuals for protection and control systems
- Fault investigation, analysis and remedial works

SCADA Design
- Complete design and integration of Substation SCADA and communications services

Design and Programming Services
- Ethernet networking design for industrial and substation applications
- HMI design services
  - Siemens WinCC
  - GE ifix
  - Citect
- Clear SCADA
  - IA SCADA
  - Tailored / Custom developed

Industrial / Substation communication design
- IEC61850
- Profinet
- Modbus
- IEC 103
- Tailored / Custom developed

Industrial / Substation Data acquisition and control
- Allen-Bradley PLCs
- Siemens PLCs
- Siemens SICAM PAS RTU
- GE D2O / D200 RTUs
- Inverensi Foxboro CSi / SCD5200 RTUs
- SEL-3530 RTAC
- SEL-2440 DPAC
- Legacy SEL-2030 / SEL-2032
Manufacturing Capabilities

Substation Transportable Buildings
We hold in-house technical expertise for complete design, fabrication and factory acceptance testing of transportable buildings. Our switchroom buildings are BCA 2013 compliant and are fully engineered to suit the specified total equipment loading. We offer complete turnkey building options which incorporate protection panel / cubicle design and layout, building sizing and in-house fabrication. The factory acceptance testing assures all aspects of the building are completely functional and will perform under site specific conditions.

Custom sizes with the following options are available:
- Fire rating
- BAL Compliant
- Galvanised or painted chassis
- Security systems
- Suppression systems
- Variety of colour schemes
- Provision for data and communications
- Fire extinguishing equipment
- Cable trays and gland plates
- Support beams, rails, landings and stairs
- Air conditioning and ventilation (HVAC)
- Pressure vents
- Region A, B, C or D compliant

Substation Control and Protection Panels / Enclosures
We are equipped with complete in-house manufacturing facilities for the fabrication of secondary control and protection panels. Fit-out and wiring is a core competency of the organisation with a complete team of skilled electricians performing these key tasks.

We have extensive experience in designing and building enclosures for:
- Control and Protection panels and cubicles – relays, power supply and circuit protection
- Data acquisition and control (PLCs / RTUs / DCSs)
- Networking enclosures
- UPS enclosures
- I/O enclosures
- Marshalling enclosures
- Accommodation of custom specifications
- 400V Motor control centres
- 400V Power factor correction boards
- 400V Soft stater panels

400V Power Distribution Switchboards
PSD Energy have the internal capabilities to design, manufacture and commission 400V power distribution switchboards.

Our capabilities include:
- Type tested solutions up to 7000A at 120kA
- Rated insulation voltage of 1000V AC as standard
- Fully modular design
- Enclosure and type tested busbar system
- Form 1 up to Form 4B segregation
- Construction – fixed, plug-in and withdrawable
- IP43 up to IP54 rated
- Arc fault containment of ingoing and outgoing units tested to AS 3439.1:2002

In-house building fabrication and fit-out.
Quality Management – ISO9001 certified
We have both a proven track record and reputation for delivering a product that reflects our high quality culture. This reputation is built over many years of our commitment to and our demand for quality and continuous improvement. The PSD Energy Quality Management System is certified to ISO9001 Standard.

The Board of Directors are committed to the development and implementation of the quality management system and to continually improve its effectiveness.

Our quality management system has been designed to provide managers, employees and all interested parties with the necessary guidance to achieve the highest level of service and to meet all statutory and regulatory requirements as well as to meet and exceed all customer requirements.

WHS&E Objectives
We are committed to the moral and legal principles of workplace health and safety, and as such have developed an WHS&E Policy in accordance with AS4801. A site specific management plan is developed for each individual project to cover all aspects of WHS&E and quality assurance.

We are committed to zero injuries and ensuring the health and safety of all our employees, contractors and the community. We also hold ourselves accountable to minimise any impact we may have on the environment through customised and site specific plans.

All personnel are responsible and accountable for implementing and maintaining our health, safety and environment systems.

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Warehousing and Logistics
Our skilled warehousing and logistics team handle both the day to day inventory and stocking duties as well as coordination of shipments for capital work projects. Internally the company uses a Kanban inventory style system to coordinate stocking levels, engage sub-suppliers and provide extraordinary visibility throughout the supply chain. This system minimises defects and drives continuous improvement.

Detailed planning and coordination is required for onsite logistics, in particular HV electrical equipment, ensuring all areas of the supply chain are managed such as: oversized vehicle permits, site entry plans, safe lifting plans etc.

Consultancy, R&D and other Services
> IEC61850 Consultancy
> Writing and reviewing of client specifications and feasibility studies
> Fault investigations
> Load / Current testing and Investigations
> Power System studies and audits
> Earthing studies and reports (CDEGS)
> Detailed setting reports, load flows and fault studies (DiGSIENT)
> HV switching and Routine Maintenance
> Conceptual and Pre-Tender Designs
> Protection Audits
> Technical training