

POWER ENGINEERING SERVICES

CAPABILITY STATEMENT



SAFETY - QUALITY - RESPONSIBILITY - VALUE

INTRODUCTION AND COMPANY OVERVIEW

POWER ENGINEERING SERVICES (PES) is an Australian-owned and operated company established in 2015, based in Perth, Western Australia. Our core expertise lies in the engineering design, supply & installation, commissioning, testing, maintenance, and repair of high voltage (HV) and low voltage (LV) electrical systems and associated equipment.

Our highly skilled team, comprising electrical engineers, HV technicians, electricians, trade assistants, and apprentices, is dedicated to delivering safe and effective solutions, ensuring projects are completed on time and within budget. We also offer after-hours service and value-added support to our clients across multiple industries, including mining, oil and gas, utilities, heavy and light industries, manufacturing, construction, and commercial sectors.

PES operates across Australia and internationally, reaching locations where our expertise is required.

CERTIFICATION

Our HSEQ Management System, developed by JS ISO Services and certified by GRS Certification, complies with the following standards:

- ISO 9001:2015 (Quality),
- ISO 14001:2015 (Environment) and
- ISO 45001:2018 (Safety).

VISION & MISSION

Vision: To be a leader in high voltage and low voltage engineering solutions, ensuring safety, quality, and reliability across industries.

Mission: To deliver top-tier electrical engineering services by employing expert professionals, utilizing cutting-edge technology, and implementing the highest standards of safety and efficiency.

EXPERIENCE

Since our inception, PES has been involved in major projects across diverse sectors. Our team has extensive experience working with leading industry clients, ensuring reliable service delivery and innovative solutions. We have successfully executed projects in power stations, mines, industrial plants, and commercial infrastructures, covering, supply, install, commissioning, maintenance, testing, and repairs.

QUALITY ASSURANCE

PES upholds the highest quality standards, ensuring compliance with Australian and international regulations. Our management team is experienced in Six Sigma methodologies, quality system management, and ongoing professional development.

ENVIRONMENTAL COMMITMENT

PES is committed to environmental sustainability and the responsible management of resources. Our practices include:

- Minimizing waste and emissions
- Implementing energy-efficient solutions
- Ensuring compliance with environmental regulations
- Promoting sustainability in all our operations

CORE COMPETENCIES

Testing & Commissioning

- Power transformers
- Current & voltage transformers
- Circuit breakers & switchgear
- Protection relays & Revenue meters
- Power System Scheme Tests
- Power Cables LV/HV Testing
- Earthing systems
- Lightning Protection Systems Assessment
- Battery Testing

Asset Management

- Asset Condition Monitoring & Trend analysis
- Thermographic surveys (online & offline)
- Corona discharge & partial discharge testing (online & offline)
- Transformer oil analysis & diagnostics
- Development & implementation of asset maintenance strategies
- Statutory Compliance Assessments
- Power Quality Analysis
- Root Cause Analysis (Using Six Sigma Tools)

Supply & Installation

- HV & LV Equipment Supply and Installation – Provision and installation of new HV & LV electrical infrastructure, including power transformers, switchboards, switchgear, Protection Relays, circuit breakers, cables
- Equipment Replacement & Upgrades
- Earthing Systems Supply & Installation – Design, supply, and installation of effective earthing systems

Maintenance & Repairs

- Servicing of power transformers, circuit breakers, protection relays, and HV/LV electrical assets
- Transformer oil filtration and regeneration
- SF6 gas circuit breaker servicing, gas filling, leak detection, and analysis
- Cable jointing, terminations, and diagnostics

SERVICES OFFERED

PES offers a wide range of services across industries:

- Power system scheme testing
- Protection relay testing and configuration
- HV/LV switchgear commissioning and maintenance
- Earthing system design and testing
- DC power system commissioning and battery capacity testing
- HV & LV cable diagnostics and fault finding
- Power line inspections using drone technology
- Electrical testing of mobile elevated work platforms
- Workshop facilities for repairs and equipment testing
- Dry ice cleaning for electrical components
- Electrical Equipment Disposal as per environmental regulations
- High Voltage Switching up to 33kV
- Electrical Testing and Calibration

MAJOR CLIENTS

PES has successfully delivered projects for numerous clients, including but not limited to:

- APA Group
- Co-operative Bulk Handling (CBH)
- Civmec
- EDL Energy
- Fremantle Ports
- Fredon WA Electrical
- Genus
- IPSA Australia
- Metrowest
- Monadelphous
- Newmont Boddington Gold Mine
- Sandvik
- TransAlta
- Tronox
- UON
- Ventia Australia

DETAILS OF SERVICES PROVIDED

○ Power System Scheme Tests

- Applicable standards AS 2067, IEEE C37.2-2022, IEC 61850, IEC 60255, ANSI/NETA ECS-2024
- Examples of equipment used – Omicron CPC 100, Omicron CMC 256 & 356, 3 Phase Variac, Omicron CMGPS, etc.
- Tests include Transformer through tests to check transformer protection stability.
- Bus Zone primary injection to check stability.
- Protection Relay blocking logic tests.

○ Protection Relays

- Applicable standards AS 3831, AS 2067, IEC 60255 & IEC 61850, IEEE C37.90, IEEE C37.2-2022, IEEE C37.90.1, NETA ECS-2024, NETA ATS & MTS
- Examples of equipment used – Omicron CPC 100, Omicron CMC 256 & 356, Omicron CMGPS, etc.
- Set up and configure settings files.
- Secondary and Primary injection Testing.
- Time-Current Curve Testing:
- Logic tests (cause and effect logic).
- Accuracy and Sensitivity Testing (including overcurrent, differential, and distance protection)
- System Integration (Assist with SCADA tests).
- Software Updates and Upgrades:
- Functional Testing.
- Compliance Testing using the IEC 61850, IEEE C37.90, AS 3831 and local regulations protocols.

○ High Voltage & Low Voltage Switchboards

- Applicable standards AS 62271, AS/NZS 61439, AS 2067, AS 3000, AS 60947, IEEE C37.90, IEC/AS 62271.100, IEC 61439-1 to 3, NETA ECS-2024, NETA ATS & MTS
- Examples of equipment used – Omicron CPC 100, Omicron CT Analyser, Omicron CP CB2, Omicron CP TD12, Megger MIT1025, UltraTEV Plus2, Omicron MPD800, Phenix BK130, etc.
- Commissioning, Testing and Maintenance.
- Insulation Diagnostic / Dielectric Testing.
- Circuit Breaker time travel tests.
- Power frequency with standard Testing
- CT and VT tests.
- Protection Relay injection tests.
- Assist with SCADA tests.
- Functional tests, Interlocks, Electrical & Mechanical Operation etc.
- Online and Offline Partial Discharge testing.

○ Earthing Systems

- Applicable standards AS 2067, IEEE80, IEEE81, AS/NZS 1768, AS/NZS 3000, AS/NZS 3007, AS/NZS 3835, AS/NZS 4853, AS/NZS 60479, AS/NZS 7000 ENA-EGI 2006, EG-0, EG-1 and ENA
- Examples of equipment used – Omicron CPC 100, Omicron CU1, Omicron HGT1, Megger DLRO10, etc.
- Soil Resistivity Testing.
- Earth Grid Inspections for Compliance.
- Continuity tests to check for adequate bonding
- Earthing System Current injection tests to determine: (EPR, Earth Grid Impedance, Current Distributions, Step and Touch potential tests).
- Fall of Potential (FOP) measurements
- Earthing Systems Design
- Earthing Systems installations

○ **DC Power System**

- Applicable standards AS 3011, AS/NZS 4777.1:2024, AS 2067, AS 3011, IEEE 946, IEEE 1657-2018, IEEE 450-2020, IEEE 946
- Examples of equipment used – Megger Torkel, Megger Bite-2
- Commission Battery systems.
- Battery Capacity Testing.
- Battery Impedance Testing

○ **Current transformers (HV & LV)**

- Applicable standards AS 61869.3:2021, AS 60044, IEC 61869-2, IEEE C57.13-2016
- Examples of equipment used – Omicron CPC 100, CT Analyser, Omicron CP TD12, Megger MIT1025, UltraTEV Plus2, etc.
- Ratios, Polarity, Magnetisation Curves, Winding Resistance, IR & PI.
- Dielectric Loss Angle.
- Partial Discharge (Online & Offline).

○ **Voltage Transformers (HV & LV)**

- Applicable standards AS 61869.3:2021, AS 60044, IEC 61869-3, IEEE C57.13
- Examples of equipment used – Omicron CPC 100, Omicron CP TD12, Omicron, Megger MIT1025, UltraTEV Plus2, etc.
- Ratios, Polarity, Winding Resistance, Insulation Resistance & Polarisation Index.
- Dielectric Loss Angle.
- Partial Discharge (Online & Offline).

○ **High Voltage Cables**

- Applicable standards Per IEC 60502, IEEE 400-2023, IEEE 1265, AS/NZS 4026:2008
- Examples of equipment used – HVA60 & HVA90, HVA45TD, HVA TD60, HVA PD60,
- Omicron MPD 800, UltraTEV Plus2, Megger MIT1025, Megger DLRO10, etc.
- Commissioning tests including
 - Insulation Resistance (IR).
 - Polarisation Index (PI).
 - Very Low Frequency (VLF) Tests.
 - Partial Discharge (Online & Offline).
 - Tan Delta (DLA).

○ **Power Transformers**

- Applicable standards IEEE C57.12, IEEE C57.91, IEEE C57.98, IEC 60076, AS 60076, AS 3786, AS 3000:
- Examples of equipment used – Omicron CPC 100, Omicron CP TD12, Omicron Dirana, Omicron Franeo, Omicron CP SB1, Omicron MPD 800, Megger MIT1025, Testrano 600, UltraTEV Plus2, etc.
- Insulation (Oil & Paper) Analysis.
 - Oil Quality, Dissolved Gas Analysis.
 - Paper Insulation moisture content.
 - Oil filtration.
 - Regeneration of oil.
- Transformer Devices.
 - Surge Devices.
 - Temperature Devices.
 - Oil.
 - Winding.
 - Buchholz Relay.
 - Oil Level.
- Transformer Tests.
 - Insulation Resistance.
 - Ratio.
 - Winding Resistance, Dynamic Resistance.
 - Vector group & Polarity.
 - Short Circuit tests.
 - Excitation Current.
 - Sweep Frequency Response Analysis tests.
 - Leakage Reactance & Impedance.
 - Dielectric Loss Angle.
 - Partial Discharge (Online & Offline).
- Transformer Tap Changers:
 - Operation checks & Maintenance.
 - Dynamic resistance tests.
 - Leaking Bushings & Tap Changers.
 - Radiators.
- Maintenance and repairs of Transformers:
 - Oil streamlining and regeneration.
 - Replacement of bushings and radiators.

- **High Voltage & Low Voltage Circuit Breakers**
 - Applicable standards AS 60947, AS 62271 AS 3439, AS 60056, IEEE C37, IEC 60947, IEC 62271, ANSI C37
 - Examples of equipment used – Omicron CPC 100, Omicron CP CB2, Omicron CP TD12, Omicron Cibano, Omicron CB MC2, Megger MIT1025, Various OEM OCR checkers, RH973-SF6 Analyzer, UltraTEV Plus2, Phenix BK130, etc.
 - All types of Circuit breakers – Air, Oil, Vacuum, SF6
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 - SF6 Gas Services.
 - Charge with SF6
 - SF6 Leak detection
 - SF6 Gas analysis
 - SF6 Dew Point tests
 - Safety function tests (low gas lockout)
 - Electrical tests including
 - Insulation Resistance Power Withstand
 - Contact Travel and Timing Minimum operating voltages (Open/Close)
 - Spring Charge Motor
 - Charge time
 - Charge current/load.
 - Contact Resistance
 - Static & Dynamic
 - Dielectric Loss Angle
 - Partial Discharge
 - Online & Offline
 - On-board Protection Relays (LV)
 - Set up and configure relays.
 - Primary & Secondary injection
 - Maintenance
 - Contact wear
 - Mechanical
 - Oil change
 - SF6 and Oil Analysis
 - Mechanical
- **Cable Jointing and Terminations up to 33kV**
 - Applicable standards AS 60038, AS 3000, AS/NZS 5000.1, IEC 60502, IEC 61238-1: IEEE 48, IEEE 400, ANSI C119
 - LV and HV Cables.
 - XLPE Cables.
 - PILC Cables.
 - Transition Joints.
- **HV Switching up to 33kV**
 - Develop switching programs.
 - Carry out switching.
- **Dry Ice Cleaning**
 - Electric Motors.
 - HV & LV Stators.
 - HV & LV Rotors.
- **Lightning Protection Systems**
 - Applicable standards AS/NZS 1768, IEC 62305, IEEE 998
 - Examples of equipment used – Omicron CPC 100, Omicron CU1, Omicron HGT1, Megger DLRO10, Surge Protection Testers etc.
 - Lightning Risk Assessments
 - Lightning Protection System (LPS) Inspections – Verification of LPS components for integrity and compliance.
 - Continuity and Bonding Tests – Ensuring proper grounding and electrical continuity.
 - Surge Protection Device (SPD) Testing – Assessment of surge protection effectiveness.
 - Earth Potential Rise (EPR) Testing – Evaluates the impact of lightning strikes on earthing systems.
 - Step and Touch Voltage Assessments – Ensuring personnel safety during fault conditions.
 - Soil Resistivity Testing

○ **Power Lines**

- Applicable standards IEEE 516-2009, IEEE 539-2010, ANSI C119.4
- Examples of equipment used - FLIR E54 24, Megger MIT1025, Megger DLRO10, UltraTEV Plus2, etc.
- Pole Inspections using drone technology.
- Corona Discharge surveys.
- Thermographic surveys.
- Live line insulator washing.
- Maintenance of pole top hardware (Disconnectors, Isolators etc.)
- Corona Inspection Through Drone.

○ **Workshop Facilities**

- Repairs, maintenance & testing are carried out on most pieces of High Voltage equipment within our workshop.
- Programming, Configuring, setting up and testing protection relays.
- Electrical testing of mobile elevated work platforms on and off-site.
- Testing of:
 - HV Gloves & Hot Sticks.
 - HV Portable Earths.

CLIENTS & PROJECTS

Detailed below is a summarized list of our clients and projects: -

- **APT Management Services (APA)**
 - Gruyere Power Station – Testing of Protection Relays.
- **Co-operative Bulk Handling (CBH)**
 - Various Sites – Maintenance of HV Switchboards, Transformers, HV Cables, Earthing Systems, Protection relays etc.
- **CIVMEC**
 - FMG Iron Bridge – Commission Transformers, HV Cables, Earthing System.
 - Gruyere Mine – Commissioning Transformers, HV Cables, Earthing Systems, Protection Relays.
 - Gruyere Mine – Perform HV Switching & energization of equipment.
- **EDL Energy**
 - 10 x Kimberly Power Stations – Maintenance of HV & LV Switchgear, Testing of Transformers, HV Cables, Protection Relays and Alternators.
- **Fremantle Ports**
 - Inner and Outer Harbors – Commissioning of new HV Substations, Earthing System, Transformers, Cables, Protection relays etc.
 - Inner and Outer Harbors – Maintenance of Ship Loaders, HV Switchboards, Transformers, HV Cables, Earthing Systems, Protection Relays etc.
 - HV Cable Diagnostic & Condition Tests & Assessments.
 - Perform HV Switching as required.
- **Fredon WA Electrical**
 - Garden Island – Commission 27 x Kiosk Substations (HV Switchgear, Protection Relays, HV Cables, Transformers, Earthing Systems).
 - Campbell Barracks – Commission new HV Kiosks (HV Switchgear, Protection Relays, HV Cables, Transformers, Earthing Systems) and locate faults on HV Cables.
- **Genus**
 - Covalent Kwinana – Commissioning of MRN & KBP 132kV/22kV Switchyard.
 - Neerabup GWTP Commissioning – Commissioning of new HV Motor Feeder, Earthing Systems, Transformers, HV Cables, Protection relays etc.
- **IPSA Australia**
 - RAAF Learmonth – Supply and Commission (Factory & Site Acceptance Testing) on 11 x 11Kv/415V Ring Main units, 2 x 11kv/415V Cyclone Kiosks and associated LV Switchboards & Panels. Supply and Commission 4 x 11kv/415V Transformers.
 - Test Earthing Systems and HV Cables.
 - Locate faults on HV Cables.

- **Metrowest**
 - Western Power Depot – Commission new HV Substations (HV Switchgear, Protection Relays, HV Cables, Transformers, Earthing Systems).
 - Fujitsu Data Centre – HV & LV Circuit Breaker maintenance and Relay Protection testing.
 - Perform HV Switching/Energisation of equipment.
- **Monadelphous**
 - Yandi – Commissioning of HV and LV electrical equipment.
- **Newmont Boddington Gold Mine**
 - Shutdown maintenance on HV & LV electrical equipment.
 - Testing of HV & LV Cables and Protection Relays.
 - Testing of HV Gloves and Hot Sticks.
- **UON**
 - Maintenance and testing of various Containerised Switchrooms.
 - Includes HV & LV Switchgear, Protection Relays, HV Cables and Transformers.
- **Ventia Australia**
 - RAAF Learmonth – Maintenance of Power Station Equipment (HV Switchgear, Protection Relays and Scheme Checks and HV Cable Diagnostic & Condition Tests).

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