



Specialist Consultants
to the Electricity Industry

PSC NEWS

Helping our clients power the world



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PSC assists Power and Water Corporation with Substation Projects

Power and Water Corporation is responsible for electricity transmission and distribution and provides water and sewerage services across the Northern Territory of Australia, an area of more than 1.3 million square kilometres.

PSC has recently assisted Power and Water Corporation with two distribution substation projects, a new 66/22kV zone substation at Strangways and a project to build an indoor 22kV substation to replace outdoor 22kV switchgear at the Tennant Creek substation.

PSC staff provided major input on the secondary systems associated with these projects. The secondary systems involved the installation, configuration, integration and commissioning of: IED's (Management Relays), RTU's (Remote Terminal Units), communications and a SCADA/EMS (Energy Management System). These items needed to be seamlessly integrated to effectively provide the required control and protection of the primary plant, and therefore the reliable supply of electricity.

Specific aspects of the projects performed by PSC included:

- Project management and coordination
- Architectural and design review
- Network communication design
- RTU and HMI configuration
- SCADA/EMS modelling
- Field commissioning

- Point to point testing
- Technical documentation
- Support and training

Through detailed planning, coordination and implementation, both substation projects were completed successfully. This included the cutover process for the system operators when the new equipment was integrated into the EMS/SCADA system.

PSC is pleased to have contributed to these two successful projects for Power and Water Corporation and looks forward to providing additional services to support their electricity network.

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PSC team members Ken Choy (L) and Roger Ward at the Tennant Creek substation





PSC System Studies Capabilities

PSC's team of transmission and distribution system study specialists combines engineering excellence, deep domain knowledge and a thorough understanding of the mathematical tools used to study electrical networks. Our varied and extensive experience in the modeling, analysis and planning of transmission and distribution networks make PSC the partner of choice for electricity industry participants seeking experts they can trust.

System Impact Studies

PSC's study engineers have extensive ongoing expertise in generator, load and transmission interconnection studies in the United States, Canada, Australia, New Zealand, the United Kingdom and Ireland. Our clients include North American ISOs and RTOs as well as transmission and distribution providers and private developers around the world.

PSC can help with:

- Feasibility and sensitivity studies of large and small networks
- Generator stability assessment using time domain simulations requiring detailed modelling of complex networks and generator controls
- Frequency domain assessment of harmonic distortions caused by non-linear loads such as HVDC facilities and PV inverters
- Testing of network contingencies to evaluate compliance with relevant reliability criteria, planning standards and grid codes

Network and Station Planning

PSC's planning engineers are familiar with the uniquely complex nature of transmission and distribution investment justification. PSC delivers the technical analysis required to support justifiable investment recommendations and can provide critical reviews of utility investments for internal and external stakeholders.

- Multi-year network development plans based on deterministic or probabilistic criteria
- Discounted cash flow analysis
- Planning level cost estimates of projects
- Development and assessment of non-transmission alternatives

Operations and Market Support

PSC engineers bridge the gap between the reliable operation of the electric power system and the electricity markets including:

- Grid outage planning and operations studies

- Root cause analysis of network events
- Risk analysis and security studies for transmission and distribution networks
- Concept design and testing of automated protection schemes (e.g. RAS, SPS)
- Development of network constraint equations for use in market dispatch

Detailed Engineering Studies

Project developers and asset owners from transmission providers, generators and large industrial loads require detailed calculations and assessments to safely energize and operate their equipment. PSC engineers excel at detailed analysis and modeling of electric networks and their component parts covering:

- Insulation co-ordination
- Equipment and technical specifications, Independent technical review
- Modal analysis and generator control tuning
- Fast transient analysis, including switching surge and lightning surge analysis
- Power quality analysis and modelling of transmission and distribution networks and large industrial loads
- Research and development of power system optimization models

Analytical Tools

Tools and software used by members of our power system studies team include:

- DigSILENT PowerFactory
- Siemens PTI PSS/E
- PowerGEM TARA
- PSCAD/EMTDC
- EMTP-RV
- ASPEN
- PSCHarms, our in-house harmonics package
- Mathworks MATLAB/Simulink

EirGrid East West Interconnector SCM and IT Upgrade Specification

EirGrid plc (“EirGrid”) is a state-owned company that manages and operates the transmission grid in Ireland. It owns the East West Interconnector (EWIC) which is a 500 MW High Voltage Direct Current (HVDC) link between the electricity transmission grids of Ireland and Great Britain.

As part of its ongoing asset management plans, EirGrid plans to upgrade the Station Control and Monitoring (SCM) and IT systems, and network security at its converter stations. PSC was engaged by EirGrid under a subcontract arrangement with PB Power to prepare a specification for the upgrade of this equipment.

Bringing together a global multi-disciplinary team of HVDC, SCADA, IT network, and security experts while including inputs from IT security audits carried out in 2014 and 2015, PSC developed the specification for the upgrade and replacement of Station Control and Monitoring, IT systems and networks security. This included the development of a new networking and security concept design, specification of the upgrade

requirements for the HVDC SCM equipment, application software, network equipment, workstation and server hardware, electronic security systems, installation of new video monitoring for high voltage equipment, improved IT remote access arrangements, equipment supply, testing and commissioning requirements.

PSC delivered a high quality technical and functional specification that contained the best practice knowledge for SCM and IT systems based on PSC’s global power systems industry experience. PSC worked collaboratively with the EWIC asset management staff, the HVDC OEM vendor and EirGrid IT staff to ensure that the specification was robust and fit for purpose.

New PSC office in Adelaide



PSC Adelaide Conference Room

To meet the growing work load in South Australia, PSC has moved to a new office at 4 Moger Lane in Adelaide. The new office can comfortably accommodate all permanent and visiting PSC staff and has a large conference room suitable for hosting training courses. A successful social function for staff and clients to celebrate the office opening was held on the 4th August.

The office will house PSC transmission lines and operational

technologies engineers, which includes a powerful combination of engineering knowledge and experience in transmission lines modelling, engineering analysis and design, SCADA/EMS, telecommunications, and IT networking and security. For more information please contact PSC Australia’s IT & Telecommunications Manager Kevin Box at: kevin.box@pscconsulting.com



PSC WELCOMES NEW STAFF

ZIA EMIN

PSC UK is pleased to welcome Dr Zia Emin who joins our Power Networks team as Technical Director and will lead our systems studies business in the United Kingdom. Zia has many years' experience in power system modelling, power quality and switching studies, substantial experience in harmonic performance specification for HVDC converter stations, renewable generation connections and the connection of traction supply points. He is active in many CIGRE working groups at various capacities within the system technical performance area related to power quality and insulation co-ordination. He was the past UK representative and currently the chairman of CIGRE Study Committee C4 System Technical Performance.



IAN GILBERT

PSC UK is pleased to welcome Ian Gilbert who joins our Power Networks team as a Principal Power Systems Engineer. Ian has over 38 years' experience in the Electricity Supply Industry, in particular transmission and distribution. He has held a variety of roles ranging from Distribution Network Operator (DNO) large customer metering quality control, transmission system maintenance, system operations, transmission system security, operability and outage planning through to HVDC asset management. Ian will be providing power systems consulting services to PSC clients in the United Kingdom.



Visiting a Special Friend

As the PSC Group Chairman and Co-founder, Tony Armstrong travels frequently on international business to visit clients and PSC staff across the PSC group of companies. Recently while visiting PSC clients in Sweden, Tony caught up with a special friend Olavi Timonen in Ludvika, Sweden. Olavi and Tony met over 22 years ago when Tony, was working on the New Zealand HVDC Bipole project. Olavi was an Engineer for ABB and has had an impressive portfolio of international HVDC projects.

As part of the New Zealand HVDC Bipole project, when the project moved to New Zealand, Olavi was on-site to complete the commissioning and oversee the defects liability period. The Armstrongs and the Timonens have shared a great friendship since this project and catch up when they can despite the large distance between Sweden and New Zealand. In this visit Tony presented the latest PSC jacket to Olavi, our Honorary Life PSC Member.



Olavi Timonen (L) and PSC Chairman Tony Armstrong

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