



Specialist Consultants
to the Electricity Industry

PSC NEWS

Helping our clients power the world



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PSC - PowerOn™ Fusion/Advantage

PSC is pleased to announce the expansion into the GE PowerOn™ Fusion/Advantage project area with Jarrod Chesney and Brenton Ford joining PSC. Jarrod and Brenton have pushed PowerOn services forward with the development of innovative software and cutting edge methodologies, fine tuned throughout the successful delivery of projects for clients in Australia and New Zealand.

PSC now has the software tools, experience and a team dedicated to the GE PowerOn™ Fusion/Advantage DMS application suite, and are able to complete any part of a GE PowerOn™ Fusion/Advantage implementation project including ongoing support services.

PSC services include the following:

- ▶ Strategic planning
- ▶ DMS configuration
- ▶ Operations implementation
- ▶ Infrastructure installation
- ▶ Network model migration
- ▶ SCADA migration
- ▶ User and configuration testing
- ▶ Training
- ▶ Go live implementation
- ▶ Onsite support

Jarrod and Brenton have worked for Synerty, a company that specialised in GE PowerOn™ Fusion/Advantage projects. At the recent GE Asia Pacific Software users conference, Jarrod and Brenton demonstrated the software developed by Synerty for the PowerOn™ Fusion/Advantage DMS application suite.

PSC has become a reseller for Synerty's product lineup, including Peek, an open source enterprise pluggable platform, and Attune, simple server automation. Peek powers a new generation of desktop and mobile web apps, including the live DMS Diagram, GIS Diagram and field switching and incident solutions. This is a win for PSC, giving the new PowerOn™ Fusion/Advantage initiative an advantage as the Peek DMS Diagram plugin gains interest from all utilities.

For more information please contact Jarrod Chesney, PSC Principal Solution Architect at jarrod.chesney@pscconsulting.com



PSC's PowerOn Fusion specialists – Brenton Ford (L) and Jarrod Chesney (R)

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TRANSMISSION PROJECT REVIEWS REQUIRE INDEPENDENT EXPERTISE

Over the past several years, the US and Canadian electricity industries have witnessed the emergence of a competitive environment for the right to design, build, own and/or operate assets that support transmission network expansion, asset renewal and the reliable integration of new energy resources. The drivers of competition are varied but significant drivers include:

- ▶ FERC Order 1000, which seeks to drive optimal investment outcomes across regions by removing barriers to entry faced by new investors, developers and established market participants;
- ▶ RFPs for renewable energy that require significant electricity infrastructure investments across multiple jurisdictions and wholesale markets, the investment framework has changed forever; and
- ▶ Investor owned utilities looking to the market to maximize the net benefits of their investment.

Across jurisdictions, the arbiters of these competitions are varied and typically include ISOs and market operators with participation and oversight by quasi-governmental agencies. These groups are tasked with making objective decisions based on empirical and transparent criteria that include economic, financial, regulatory and engineering considerations while ensuring that the objectives of diverse shareholder and stakeholder groups are met. The very nature of their role in the market ensures their impartiality and confirms their suitability as independent judges.

These organizations have a profound understanding of the electricity industry matched by considerable subject-matter expertise that is correctly focused on their mandates. However, many of the decision makers in competitive processes do not design, build, own, operate or maintain the assets they plan and have influence over. As such, their internal expertise does not generally include the ability to perform the requisite engineering

analysis of competitively bid projects. Fortunately, there are many highly capable design and engineering firms to assist the decision makers.

However, many of these decision-making organizations have struggled to find the engineering support they need to evaluate the engineering component of competitive bids without running into prospective or actual conflicts of interest from service providers.

Most firms with the necessary skill set to competently evaluate multiple projects against a set of technical criteria operate business models that allow them to bring economies of scale to large projects. By taking on engineering review engagements for competitive projects, engineering, procurement and construction (EPC) firms are effectively barred from providing engineering support to project bidders. This often makes the prospect of projects reviews unattractive to them. In other words, large engineering and EPC firms concentrate on designing and building projects and not evaluating them.

This is where PSC steps in. As specialist consultants to the electricity industry, PSC's business model places us in a privileged position as qualified engineering experts geared towards offering services rather than projects. As a result, we are generally conflict free for review work that requires absolute independence from competing internal interests. PSC's team of engineering consultants includes specialists on emerging network technologies, specifications, transmission line and substation design, control system design, as well as site management, procurement and commissioning.

PSC - GENERATOR CONNECTION STUDIES FOR WIND AND SOLAR PROJECTS

PSC is a leading engineering consultancy in the field of power systems studies and network analysis. Our system study specialists have extensive experience in the modelling, analysis and planning of transmission and distribution networks, with generator connection activity being a key focus in the Australian grid at present.

PSC's team of power system study specialists have completed a number of generator connection studies and associated generator performance standards (GPS) for utility-scale wind and solar projects across Australia, ranging from 11 MW up to nearly 300 MW. As a result, PSC has a deep understanding of the NER (National Electricity Rules), and of the evolving ESCOSA (Essential Services Commission of South Australia) licensing requirements in South Australia.

PSC's engineers carry out robust testing of PSS/E, PowerFactory and PSCAD user models – for example, inverter, wind turbine, and power plant/park controller models – based on AEMO's dynamic model acceptance guidelines, to determine their

suitability for use in connection studies. The aim is to identify any potential issues in the early stages of the application process that could present challenges in compliance with the NER or utility requirements.

Connection studies carried out by PSC for the Australian market encompass:

- ▶ Reactive power capability
- ▶ Dynamic response to voltage and frequency disturbances
- ▶ Power quality
- ▶ Loadflow contingency analysis
- ▶ PSCAD model development and simulations
- ▶ Guidance during GPS negotiations

PSC has developed strong relationships with our clients by providing high quality generator connection studies and associated support. We can also provide a wide range of detailed engineering studies tailored to the project requirements of our clients.



PSC SPONSORS ELECTRIC BICYCLE COMPETITION

It has been a busy few months for a team of students at Scots College in Wellington New Zealand as they build an electric bicycle for the Evolocity electric vehicle school competition. The team's electric bicycle recently competed in the Wellington regional competition in September.

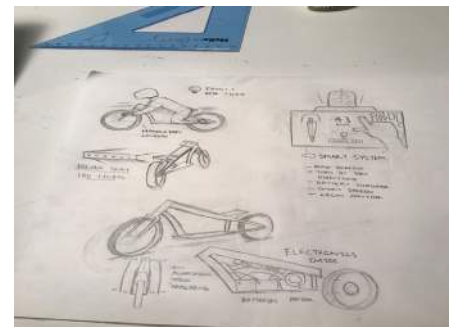
The competition included several different courses and challenges for their bike to compete in as well as incorporating two technologies that improves the driving and control of their bike.

The team contacted PSC due to our involvement in EV vehicles and we are pleased to provide sponsorship for this

project. The students have had to explore innovative ways to engineer the design, in a test of problem-solving, teamwork and skill.

All this hard work has paid off and PSC congratulates the team on being invited to the national competition in Christchurch on the 2nd of December.

The team is proud to be going to Christchurch in December to represent Scots College and PSC in the national event. They have also thanked PSC for helping to make this happen and in particular Keith Fisk and Paul Chandler from PSC for their advice and help during the project.



Grid Solutions
Solutions Provider

PSC is pleased to announce that PSC Australia has been appointed as an authorized service provider for Grid Solutions products in Australia and New Zealand.



CIGRÉ WINNIPEG SHINES LIGHT ON INDUSTRY DIRECTION

PSC was the Diamond Sponsor of CIGRÉ Winnipeg 2017, held in Winnipeg, MB, Canada this October. This was a unique event that saw the convergence of three of CIGRÉ study committees – A3 High Voltage Equipment, D1 Materials & Emerging Test Techniques, and B4 HVDC & Power Electronics. This culminated in a joint colloquium, tutorial series, and exhibition that was organized by the Study Committees and hosted by Manitoba Hydro at the RBC Convention Centre Winnipeg.

PSC reinforced a commitment to CIGRÉ events around the world in 2017, as a sponsor of the CIGRÉ Conference on the Integration of Distributed Energy Resources (CIDER) in Australia, and at the CIGRÉ Dublin Symposium.

This marked the fourth straight year that PSC was a Diamond Sponsor of CIGRÉ Canada.

"PSC is proud to support CIGRÉ in Canada and around the world as it works to evolve the state of the art within our industry both from a product and operations perspective," said President and CEO Alex Boyd, who was in Winnipeg for the event.

"We at PSC see the research, knowledge sharing, and community fostered by CIGRÉ as vital to the work we do on behalf of our customers."

Mr. Boyd was joined by PSC Co-Founder Tony Armstrong and several PSC Directors and technical experts:

- ▶ Marc Brunet-Watson – Director, Power Networks
- ▶ Ramesh Hariharan – Senior Power Systems Engineer
- ▶ Brad Railing – Director, HVDC
- ▶ Geoff Love – Principal HVDC Engineer

CIGRÉ events present an opportunity to gain insight about the technical and organizational trends developing in the industry. The role of distributed energy resources and their impact on grid planning and operations was a popular theme.

"It was great to see all the attention that distribution networks are getting from transmission network owners and operators," said Marc Brunet-Watson, Director of Power Networks for PSC. "They are recognizing the considerable influence that distributed generation and storage is having on the future development and operation of the grid."

PSC was involved beyond the exhibition hall, attending Working Group presentations on pertinent technical issues.

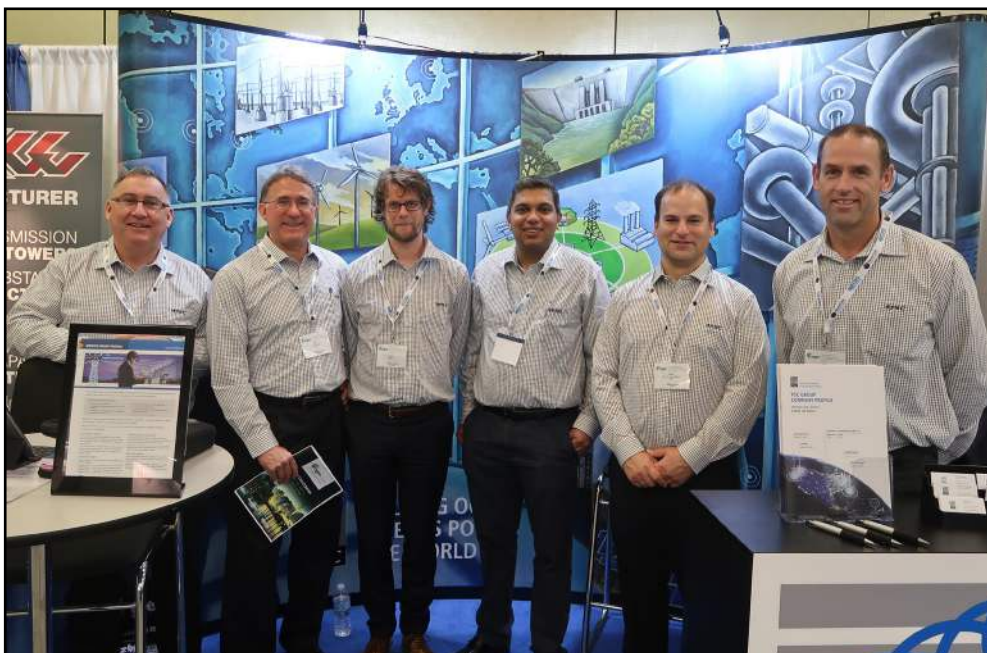
"PSC is highly involved in providing studies for HVDC /FACTS, so I was very interested in the most recent findings presented by the B4 Working Group," said Ramesh Hariharan, a Senior Power Systems Studies Engineer for PSC in North America.

CIGRÉ Working Groups are composed of international experts who produce technical documents defining best industry practice, many of which form the basis for IEC or IEEE standards. Working Group B4 is responsible for HVDC and Power Electronics.

CIGRÉ Session 47 will take place in Paris, France in August, 2018. The biennial sessions are the most highly anticipated and attended CIGRÉ events, hosting participants from more than 93 countries.

Globally, PSC is deeply involved in CIGRÉ, with more than 25 staff in key leadership positions as well as members and contributing authors to various CIGRÉ publications. Our staff hold chairman, convenor and membership positions in several CIGRÉ panels and study committees including:

- ▶ Australian National Committee - Treasurer and Director
- ▶ UK National Committee - Technical Committee Chairman
- ▶ C4 - System Technical Performance - Group Chairman
- ▶ C2 - System Operation and Control
- ▶ B2 - Overhead Lines
- ▶ B4 - HVDC & Power Electronics
- ▶ D2 - Information Systems and Telecommunications - Australian Panel Convenor.



The PSC team at CIGRÉ from L to R: Tony Armstrong, Brad Railing, Geoff Love, Ramesh Hariharan, Marc Brunet-Watson, Alex Boyd



PSC WELCOMES NEW STAFF

DEBASHIS PAUL

PSC is pleased to welcome Debashis Paul as a Senior Lines Electrical Engineer, with over 10 years of experience in transmission lines of up to 500kV and distribution lines design, construction and asset management support services. Debashis has experience on projects throughout Australia and Bangladesh where he worked at Power Grid Company of Bangladesh Limited as Deputy Manager (Transmission Line Design & Quality Control). Debashis will be part of the PSC Transmission Lines team in Australia. Debashis has relocated from Perth, and his family will be following to reside in Adelaide by the end of the year once his daughter finishes her school year.



KHOSRO KABIRI

PSC welcomes Senior Studies Engineer Khosro Kabiri to the Power Networks team in Vancouver, B.C. Khosro has considerable experience performing system impact studies for the integration of distributed energy, as well as EMTP studies including transformer energization and transmission overvoltage. Khosro has a close relationship with the Vancouver area, having received his Ph.D. in Power Engineering at the University of British Columbia. Khosro has since supported transmission clients around the world with power system studies including power flow, contingency and transient analysis.



PETER KRAMP

We are pleased to welcome Peter Kramp to the PSC team supporting the Exelon RTU Communications project in the US. Peter is a native Minnesotan and a veteran of many campaigns as a technical leader with Control Data's Energy Management Systems Division (CDC EMSD), which later became Siemens Digital Grid. Peter was also a senior manager at the Midcontinent ISO before joining us at PSC. He has extensive EMS / SCADA systems knowledge and leadership experience, gained by participating in over 15 utility implementations worldwide. This experience includes complex Energy Management Systems with large data volumes.



JARROD CHESNEY

PSC is pleased to welcome Jarrod Chesney who joins PSC Australia as a Principal Systems Architect and has been working on SCADA and DMS projects in the electricity industry for 15 years. He has had a heavy involvement in all technical aspects, end to end upgrade projects and post go-live support. Jarrod's company Synerty provided software and consultancy services and Jarrod worked predominantly on PowerOn Fusion projects, performing data migrations, system integrations and environment builds.



DAVID MILLS

PSC welcomes David Mills to our Warwick, UK office. David completed his electrical engineering degree and PhD at the University of Southampton where he modelled the ageing mechanisms in high voltage cable insulation. After receiving his degree, David worked as a power systems consultant at London Power Associates where he gained experience in power system studies and in particular system planning for distribution and transmission operators in the UK, Ireland, middle east and Africa. He has experience in a range of steady state and transient power system study tools including the development of Python scripts to automate system studies.



PSC WELCOMES NEW STAFF (CONTINUED)

BRENTON FORD

PSC welcomes Brenton Ford who joins us as a Senior Systems Architect with over 10 years of experience in all aspects of large distributed SCADA systems. He has a broad range of experience with many diverse SCADA systems across a range of plant and equipment and has been involved with numerous greenfield and brownfield projects. As the Senior SCADA/DMS Architect with Synerty, Brenton has been involved in PowerOn Fusion projects including system upgrades, new implementation projects and the development of a new field mobile solution for PowerOn Fusion.



MARTIN STACEY

PSC welcomes Martin Stacey who has joined PSC Australia as an Executive Consultant and has over 20 years' experience as a leader and manager developing operational technology strategies, teams and solutions for the mission critical business functions of electricity distribution, transmission and generation companies. Martin will continue this work for PSC where he will apply his expertise for continuous improvement of operational decision making using SCADA/Historian/ERP smart asset condition based risk assessment that leads to improved asset life and network availability.



KEVIN CHEUNG

PSC North America is pleased to welcome Kevin Cheung to our North American management team as Business Unit Manager for the North American Operational Technology Group. Prior to joining PSC, Kevin worked for Cosmo Tech as the Director of Solutions North America. Going back further, Kevin held management positions with Viridity Energy and Alstom Grid. Many of our customer may remember Kevin from his days at Alstom Grid, leading the SCADA group or managing customer projects. With PSC, Kevin will be leading the operation and business development for our Operational Technology Group covering EMS/DMS/SCADA as well as IT & Telecom.



JEANINE BOWL

PSC North America is pleased to welcome Jeanne Bowl to our North American team as Project Administration Manager. Prior to PSC, Jeanine spent much of her career with GE Grid and the many predecessors all the way back to the ESCA days so she is no stranger to our industry and many of our customers. At PSC, Jeanine will be managing many of the administration functions for the North American group. She'll be responsible for the administration of many of the PSC jobs and she will play a role in the global PSC administration organization.



SUMITH MADAMPATH

PSC is pleased to welcome Sumith Madampath who joins the PSC team in Singapore as a Power Systems Engineer and has experience in power system modelling and analysis, power system operations and associated equipment. This includes experience in project management and technical project delivery for renewable integration to the grid, power system modelling and analysis, and SCADA, EMS and DMS systems. Sumith has extensive software experience and his most recent role has included power system planning activities across South East Asia and India.



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