POWER NETWORKS

Power System Modelling and Studies

We help our clients plan and evaluate with confidence relying on our extensive experience in modelling, analysing and planning transmission and distribution networks.

Overview

PSC's UK/IRE 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 modelling, analysis and planning of transmission and distribution networks make PSC the partner of choice for electricity industry participants seeking experts they can trust.

Network planning for investment justification

- Multi-year network development plans based on deterministic or probabilistic criteria
- Load flow and short-circuit analysis as per ER G74
- Planning level cost estimates of projects
- PQ/PV curves, need case for series or shunt compensation
- Development and assessment of non-transmission alternatives

System impact and distribution/grid code compliance studies

- G99 connection studies
- Feasibility and sensitivity studies of large and small networks
- Network contingency impact analysis on thermal and voltage stability criteria effecting reliability
- Generator (synchronous or renewable) transient stability assessment in the electromechanical time domain
- Fault ride through studies requiring detailed modelling of complex networks and generator controls
- Harmonic emission assessment studies as per G5/5 and/or IEC 61000-3-6 using frequency domain modelling
- System unbalance assessments as per ER P24 & ER P29, flicker and voltage step assessments as per ER P28
- Harmonic compliance studies against specified limits for wind and solar PV inverters
- Complex subsynchronous resonance studies covering series compensation effect and interaction of power electronic controls
- Protective relay coordination studies
- Arc Flash studies based on IEEE 1584 and NFPA 70E

Smart grids and network innovation studies

- Smart grid controls modelling and feasibility studies
- Time series simulations and curtailment studies
- Network innovation projects tender support
- Generation sizing optimisation for hybrid sites, e.g. standalone PV, BESS and diesel power supply for a remote mine

Operational planning and control studies

- Grid outage planning and operations studies
- Root cause analysis of network events
- Risk analysis and security studies for transmission and distribution networks
- Reliability study for transmission and distribution networks

Detailed engineering studies

- Insulation co-ordination studies, including switching and lightning surge analysis
- Slow, fast and very fast front transient analysis
- Transformer energisation, cable energisation, de-energisation, power frequency resonance, ferroresonance, load rejection, single-phase auto reclose, shunt reactor switching, current chopping and temporary overvoltage analysis
- Rise of earth potential and earth return current calculations
- Equipment and technical specifications
- Independent technical review
- Modal analysis and generator control tuning
- Research and development of power system optimisation models

Analytical Tools

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

- DIgSILENT PowerFactory
- Siemens PTI PSS/E
- PSCAD/EMTDC
- PSS SINCAL
- EMTP/ATP
- EMTP-RV
- Mathworks MATLAB/Simulink
- Python
- OpenDSS
- EDSA
- IPSA+
- ERACS
- ETAP
- Amtech Protect

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