

Arc Flash and Power System Studies

MEGAVAR

PARTNERS IN POWER

About Megavar

An arc flash study calculates the incident energy and arc flash boundary at each point in an electrical system so the right arc-rated PPE, approach distances and warning labels can be set. Megavar delivers arc flash studies to IEEE 1584 and the power system studies beneath them: load flow, short circuit, protection coordination, harmonics and earthing, modelled from real settings by engineers who also test the protection.

What We Do

Arc flash hazard analysis, load flow, short circuit, protection coordination, harmonic and earthing studies in ETAP, PowerFactory, SKM and CAPE, from data collection to an audit-ready report, label schedule and settings.

Where We Work

From offices in Hobart, Launceston, Adelaide, Newcastle and Gladstone, for sites and connections in every Australian state and territory.

Why It Matters

Incident energy is set by how fast the fault clears, so an arc flash study is only as good as the protection model behind it. Ours are built from the site's own settings, and the changes that lower the hazard can be implemented by the same team.

Megavar at a Glance

Established
2003. Australian owned and privately held.

People
57 engineers, technicians and support staff.

Offices
Hobart, Launceston, Adelaide, Newcastle and Gladstone.

Coverage
Tasmania, South Australia, Victoria, New South Wales and Queensland.

ABN
88 104 344 765



Arc Flash Study and Hazard Analysis

Study Method

Data Collection
Single line diagrams, equipment ratings, protection relay settings and utility fault levels, gathered on site where records are incomplete.

Power System Model
Network modelled in ETAP or PowerFactory, with short-circuit and fault level study across three-phase, single-line-to-ground, line-to-line and double-line-to-ground faults.

Protection Review
Protection coordination review of clearing times, because arcing time drives incident energy.

Incident Energy Calculation
Incident energy in cal/cm2 and arc flash boundary at each item of switchgear to IEEE 1584-2018.

Deliverables

Arc Flash PPE
Arc-rated PPE category assigned for every assessed location, selected to IEC 61482.

Arc Flash Labels
Warning label schedule with incident energy, arc flash boundary, working distance and PPE for each location.

Audit-Ready Report
Findings, model assumptions, results tables and practical mitigation recommendations in one report.

Standards Applied
IEEE 1584, ENA NENS 09, AS/NZS 4836, IEC 61482 and NFPA 70E, supporting the WHS duty to manage electrical risk.

Mitigation

Faster Fault Clearing
Optimised protection settings and grading, the most effective lever on incident energy.

Maintenance-Mode Settings
Reduced-energy settings for work periods, with the switching and reset logic to match.

Equipment Options
Current-limiting devices, remote racking and remote operation, and arc-resistant switchgear.

Implemented, Not Just Recommended
Megavar configures, tests and commissions the protection changes it recommends.

When a Study Is Required

New Installations
New substations, switchboards and connections before energised work is authorised.

Network Changes
Modifications that change fault levels, generation contribution or protection settings.

Periodic Review
Review at least every five years, and after any arc flash incident.

Power System Studies

Load Flow and Short Circuit

Load Flow
Steady-state voltages, currents and power flows under normal and contingency conditions, verifying equipment ratings, voltage limits and capacity for growth or generation to NER and NSP planning standards.

Short Circuit
Prospective fault currents for switchgear and protection ratings, including synchronous, inverter-based, motor and network contributions, to IEC 60909 and AS/NZS 3851.

Inverter-Based Resources
Solar, wind and BESS modelled with their own fault contribution characteristics.

Protection Coordination

Protection Coordination Study
Time-current coordination curves for relays, fuses and reclosers, so the device nearest the fault trips first.

Relay Settings
Settings for overcurrent, earth fault, distance, differential and special schemes, delivered as setting files and calculation reports.

Fault Investigations
Post-event analysis of relay records and remediation design.

Harmonics and Grid Connection

Harmonic Analysis
Non-linear load and inverter impacts modelled, with distortion at the point of connection checked against AS/NZS 61000.3.6 and filter design where required.

Grid Connection Studies
Studies supporting NEM generator connections, Generator Performance Standards and NSP requirements.

Typical Programme
A focused protection study for one substation in two to four weeks; a full load flow, short circuit and coordination study for a new connection in six to ten weeks.

Earthing and Software

Earth Potential Rise
EPR, step and touch voltage analysis, earth grid optimisation and transfer potential to ENA EG-0 and AS 2067.

Software
ETAP, DIgSILENT PowerFactory, SKM Power Tools and CAPE, working in the client's existing model or building one from SLDs and equipment data.

Earthing Modelling
MALT, MALZ and HIFREQ in CDEGS for grid design and EMF assessment.

Credentials and Commitment

Accreditations and Licences

Certified Management Systems
ISO 9001, ISO 14001 and ISO 45001, certified since 2015.

Certified Scope
Planning, design and delivery of high voltage electrical and engineering projects, including project management, engineering consultancy and equipment rental.

Electrical Contractor Licences
Held in every Australian state: NSW 284109C, VIC 21203, QLD 73595, SA PGE 267537, WA EC010840 and TAS 947267.

Insurance
Professional indemnity $10 million, public and products liability $20 million, cyber liability $1 million.

Test Instrumentation
Studies are proven in the field with an owned OMICRON fleet: CMC 356 and CMC 500 for settings and clearing times, CPC 100 and CT Analyser for ratio and burden, and Red Phase and AEMC earth test instruments, calibrated to NATA-traceable standards.

Next Step
Read more about arc flash and power system studies on megavar.com.au
Request a quote
1300 730 499 | service@megavar.com.au

Clients and Sectors

Networks
Transgrid, ElectraNet, TasNetworks, Essential Energy, Evoenergy, Powercor, AusNet, Western Power, Zinfra and Jemena.

Principal Contractors
Downer, Ventia, RJE, Enerven, CPP, ACLE, RBD and Worley.

Renewable Generators and OEMs
Acciona, Vestas and Goldwind.

Industry
Alcoa Portland.

Sectors
Network augmentation, wind, solar and battery storage connections, heavy industry and sites with energised work.

Other Megavar Capability Statements
One is available for every Megavar service line. Ask your Megavar contact or email service@megavar.com.au.

Why Megavar

Studies and Protection in One Business
The engineers who model the hazard also set and prove the relays that control it.

Independent
No switchgear or PPE to sell, so the mitigation advice is the one that works.

Real Settings, Not Assumptions
Models built from the site's applied settings and utility fault levels.

Records That Survive Audit
Models, calculations, label schedules and settings, as one pack.

Our Principles

Integrity
When Megavar does it, you know it has been done right.

Responsiveness
When clients need us most, we will be there every time.

Teamwork
Only together can we achieve great outcomes.

Accountability
We hold each other to high standards, and fix what we get wrong.

Safety
Looking out for each other gets us home safe.

Speak to our team today

megavar.com.au

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