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PPA CONFERENCE 2026 · CROWNE PLAZA, FIJI

How Equipment Selection, Quality, and Asset Management Shape Grid Reliability and Rates

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Ensuring fair rates and reliable services while accelerating investment in renewables and grids

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About Delstar

01 **Equipment supply**
Substation, distribution and lines equipment, specified to the application

02 **Engineering services**
Installation, commissioning, testing and condition assessment

03 **EPC contracting**
Design, procurement and construction of substation and network projects

20+
years supplying the region's networks

30+
utility and contractor customers

NZ · AU · Pacific
delivery reach

Source: Delstar Capability Statement 2026

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Where is reliability actually decided?

01 SPECIFIED

02 BUILT

03 MAINTAINED

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What reliability means to a customer

SAIFI

How often supply is interrupted, per customer per year

SAIDI

How long, in customer-minutes per year

PACIFIC BENCHMARK (PPA)

< 200

total customer-minutes lost per year (planned and unplanned)

FY2023: highest reported unplanned SAIDI was 1,225 minutes

Source: PPA Pacific Power Utilities Benchmarking Report, FY2023

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Reliability is a chain

Generation

Enough firm capacity and reserve

→

Transmission

Higher-voltage lines and substations (above 33 kV in PPA benchmarking)

→

Distribution

Feeders, transformers, switching

→

Customer

Feels every weak link

Most Pacific utilities: one organisation owns the whole chain

New Zealand and Australia: generators, transmission operators and distribution businesses are separate, each with its own reliability measures

Source: PPA Benchmarking Report FY2023 (generation events can be significant in small island systems)

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What shapes reliability

Generation adequacy

Reserve to ride through the loss of a unit

Network design

Redundancy, ratings, protection coordination

Protection and automation

Reclosers and fault isolation limit customers affected and outage time

Equipment and its quality

What is installed, and how well it is built

Maintenance and asset management

Finding problems before they become outages

Weather and operations

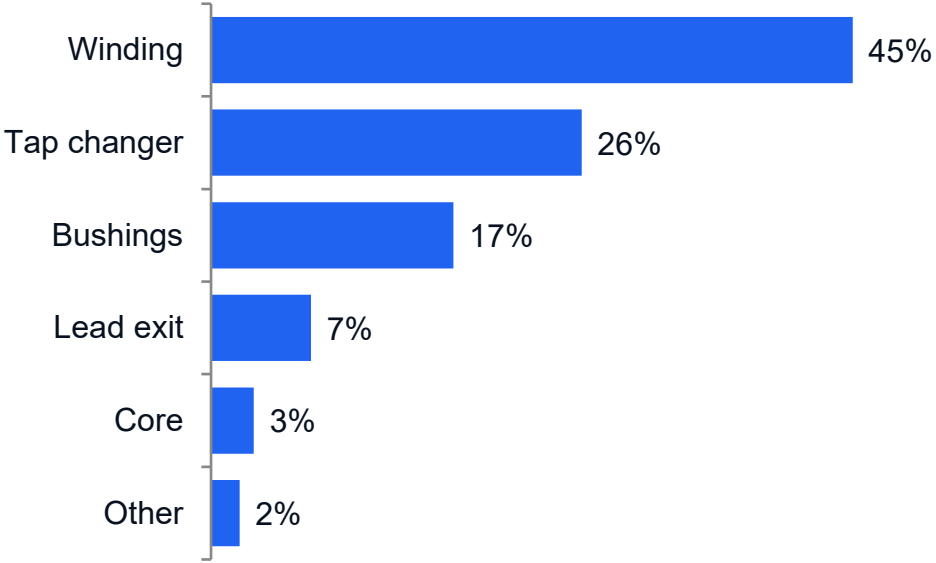
Cyclones, salt, vegetation, response time, spares

Today's focus: the two highlighted factors

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Where things go wrong

TRANSFORMER FAILURES BY LOCATION



CIRCUIT BREAKER MAJOR FAILURES

~50% operating mechanism

~30% control and auxiliary circuits

~20% parts at service voltage

Sources: CIGRE A2.37 (substation transformers, via IEC White Paper 2015); CIGRE TB 510 (SF6 circuit breakers)

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Right equipment for the application

Duty and loading

Switching frequency, load profile, thermal cycling

Fault level

Short-circuit ratings matched to the network, now and later

Environment

Salt, humidity, heat, cyclone winds, UV

Serviceability

Spares, local skills, and long delivery times to remote islands

Renewables change the duty

- More switching operations
- Power flowing both ways
- Variable, cyclic loading
- Assets specified for a steadier era

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Quality: same nameplate, different life

Two units can share a rating and still age very differently.

01 Materials and workmanship

02 Type and routine testing to recognised standards

03 Sealing, moisture and corrosion protection

04 Quality assurance and traceability

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Case study: transformer dryout

BEFORE

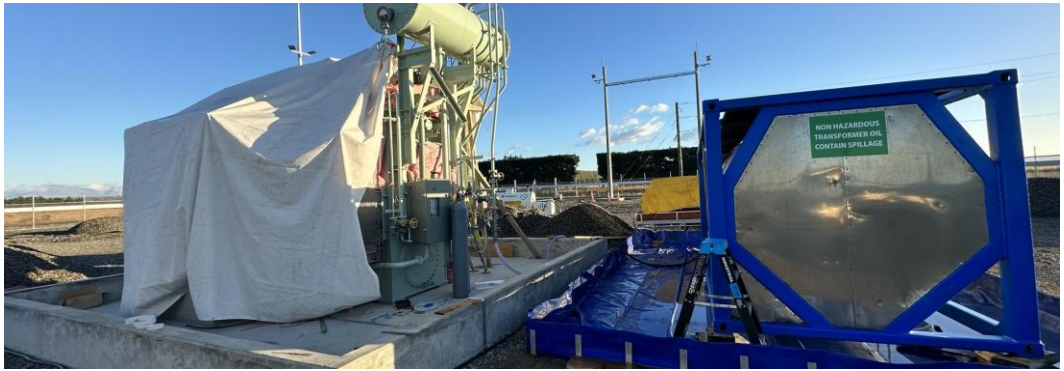
>2%

moisture in the paper insulation

AFTER

<1%

moisture in the paper insulation







Dried on site: moisture in the paper insulation cut from over 2% to under 1%.

Recent dryout for a New Zealand distribution customer. Moisture assessed by dielectric frequency response (DFR).

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Why moisture matters: service life

- Moisture accelerates ageing of the insulation
- Higher moisture erodes dielectric margin
- Found early, it can be removed. Left alone, it shortens life.

Source: CIGRE [insert paper reference and figure number]

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Asset management: start where you are

01

Know your assets

Register, age, location, nameplate

→

02

Inspect and test routinely

Visual, thermography, oil and gas tests

→

03

Act on condition

Trend results, intervene early

→

04

Manage by risk

Rank by criticality, prioritise spend

Good maintenance protects a good specification. It cannot rescue a poor one.

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What an outage costs

Outage cost = **energy not supplied × value of lost load**

$35,305

per MWh: value of lost load in New Zealand's distributor quality incentive (Commerce Commission, 2024)

2%

of allowable revenue put at risk by that incentive: reliability is linked to revenue

US$25-80k

ILLUSTRATION: 3 MW off for 24 h (72 MWh) at PPA tariffs, before repairs and customer losses

Regulators put a dollar value on outages. Utilities can too.

Sources: Commerce Commission NZ, DPP4 final decision (Nov 2024); PPA Benchmarking Report FY2023 (tariffs). Pacific example is illustrative.

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The cost of getting it wrong

Planned

- Scheduled outage
- Competitive procurement
- Crews and spares ready
- Customers notified

Unplanned

- Emergency procurement and freight
- Overtime crews, temporary supply
- Possible damage to adjacent equipment
- Customer minutes lost

Avoidable failures cost more, and those costs usually end up in tariffs or on the utility's balance sheet.

PPA Benchmarking Report FY2023 (generation): unplanned outages "quickly translate into higher tariffs, supply disruptions, or increased subsidies"

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Next steps, wherever you are

Starting out

- Build a simple asset register
- Write specifications for your real conditions
- Hold critical spares

Building up

- Routine oil and thermography testing
- Ask suppliers for type-test and QA evidence
- Record failures by asset and supplier

Well established

- Risk-rank assets by criticality
- Use lifecycle cost in every tender
- Feed failure data back into specifications

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What this looks like in practice



TRAINING

Operation and maintenance workshop on vacuum oil treatment plants, for EFL



INSTALLATION AND COMMISSIONING

Power transformers installed and brought into service on site

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How we can help

01 Specify

Specifications for your conditions, by experienced Chartered engineers

02 Assess

Condition assessment and testing of critical substation assets

03 Build the framework

A simple asset management framework: manage by risk, not by failure

04 Train

Practical training in proactive maintenance for your team

Meeting the rating on paper is easy. Performing for decades in your network takes the right specification and strong manufacturer QA and QC.

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Fair rates and reliable services are decided long before the outage

THANK YOU • QUESTIONS?