

LV Fault Management with VisNet

What's the situation?

Utilisation of and dependance on LV networks is growing, reliable supply of electricity is key.

- The LV network has been in existence for over a century, the electrification of heating/cooling, transport and customer self generation is creating a greater dependence on an ageing LV infrastructure.
- With a greater reliance on the LV network, the importance of detecting, locating and repairing faults swiftly is growing.
- There is limited visibility of the performance of LV assets, making it difficult to predict where faults may occur.
- The costs of managing faults are volatile, subject to fluctuations in frequency of events and regulatory penalties.



How does the VisNet Monitoring help manage LV Faults?

LV Monitoring:

VisNet's LV monitoring devices provide real-time visibility of activity across each of your low voltage feeders and MV/LV transformers. The VisNet Hub measures 6 LV feeders, all phases and Neutral.

VisNet's Grid Edge Apps:

The VisNet Hub has a modular scalable approach to add (or remove) functionality from the device at installation or even remotely when deployed in the field. These functionalities are bundled in Apps. In this case, the VisNet Hub has two Apps centered on Reliability, these package alarms and data insights related to LV network reliability in real time.



125,000
LV circuits monitored

Reactive Reliability App:

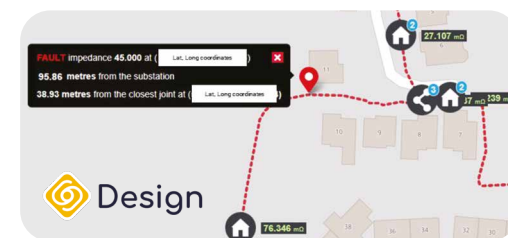


This App provides data insights to allow operations teams to quickly react to any potential issues to reduce customer outages and downtime – significantly cutting down the time, effort required to repair faults, reducing durations of unplanned LV interruptions.

App features include:

- Fuse blow notification
- Fault location
- Fault type
- Fault energy

Fault locations are derived from impedance to fault – these can be directly integrated to our digital twin [VisNet Design] to generate possible fault locations.



Our customers utilizing VisNet Hub fault detection and location data fix faults circa 30% faster. Additional benefits include excavation efficiencies, reducing the operational and material costs of digging multiple holes. These additional value adds help our networks customers save circa 40-50% on LV operational fault costs.

Proactive Reliability App:

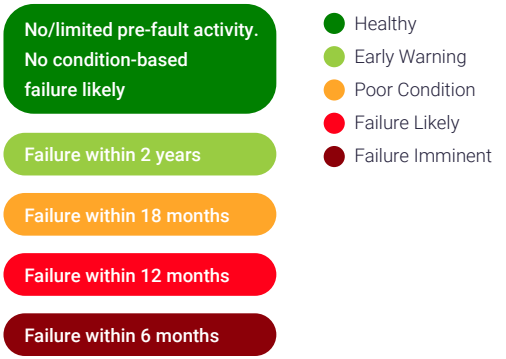
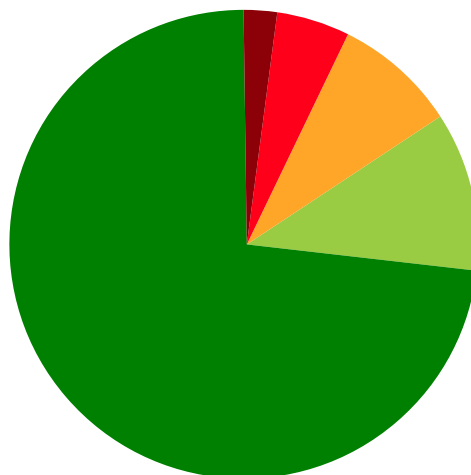


The Proactive reliability App packages data insights used to determine the health of the cable circuits that make up the LV network. The outputs of the App allow network operators to prioritise their maintenance schedule, take a proactive stance on managing LV faults, identify locations for fitting auto reclosers and identify investment needed into improving reliability of their LV network.

- **See the fault before it happens**
[Pre-fault (transient fault) waveforms]
- **Know exactly where the fault is faster**
[Pre-fault location]
- **Specific possibility of failure**
[Circuit condition]
- **Changes in condition over time**
[Event Trending]

From Pre-Faults to Circuit Conditions

Identifying which circuits are most likely to fail and when.



From analysis of multiple utilities, it is evident that 60-80% of faults are caused by 15-25% of circuits categorized as "high risk" circuits.

Targeted use of this data can drive significant OPEX efficiencies as planned activities. A proactive fault management approach also drives LV SAIDI and SAIFI improvements.

Solution Summary

Digitalisation can unlock dynamic and efficient ways of managing LV faults.

- Real-time fault detection:** Identification of an LV fault before a customer calls it in allows you to get faults fixed faster.
- Real-time fault location:** Accurate and real time fault locations allows you to reduce time looking for the fault and the number of holes that need digging.
- More asset condition data:** Collecting insights into the LV circuit condition with the likelihood of failure can be utilized to capitalise fault costs through proactive operational response.
- Improved fault prediction:** LV circuit condition data can be used to increase regulatory investment in your LV assets.

With VisNet Hub you get LV control, LV proactive and reactive reliability, and condition insights for basic LV visibility cost.

The VisNet Hub is equipped with a range of data applications (Apps) that offer significant benefits to DNOs/DSOs, from supporting network planning and asset management to enabling proactive operations. All these Apps can run simultaneously on the same device.

Reactive Reliability Apps:

Detects and locates LV faults, improving repair times.

Proactive Reliability Apps:

Provides insights into cable conditions and the likelihood of failure, allowing DNOs/DSOs to proactively manage faults.

Power Quality Apps:

Monitors THD and other power quality features to identify areas of the network under high stress and potential poor supply quality.

Fault Level Apps:

Identifies when fault levels are outside acceptable limits, posing challenges to protection systems.

