

Reduce re-energisation time for your electricity customers

Introducing a cost-effective self-healing
solution for underground open-loop networks



Schneider
Electric™



Under **30 seconds**

That's how fast our underground self-healing solution restores power to healthy areas of a distribution network

A simpler way to boost grid availability and reliability



Operating an electrical distribution grid is an increasingly complex business. The challenges posed by growing demand, integration of distributed generation resources, and ageing infrastructure – to name just a few – all have an effect on overall grid reliability, and on customer satisfaction.

Grid operators need to face these challenges in order to boost efficiency, protect their customers and avoid regulatory scrutiny, but it's not easy. Most solutions that reduce the frequency and duration of power outages also require large capital expenditures,

complicated installation of new equipment, and can take years to implement.

There is another option, though – a self-healing network solution from Schneider Electric. This is a smart, cost-effective way to enhance the reliability of underground electrical distribution grids. Moreover, deployment takes just months, so customers in critical areas can enjoy improved power availability without waiting years for it.

Re-energise your grid faster with self-healing capability



Self-healing is an innovative solution that improves re-energisation time and availability in underground distribution networks. In the event of a fault, it independently isolates faults and swiftly restores service to fault-unaffected areas of the grid.

The solution is based on an off-the-shelf product, the Schneider Electric Easergy T200 substation control unit. Once installed at the main MV substations in the loop, Easergy T200 units establish peer-to-peer communication over an IP network.

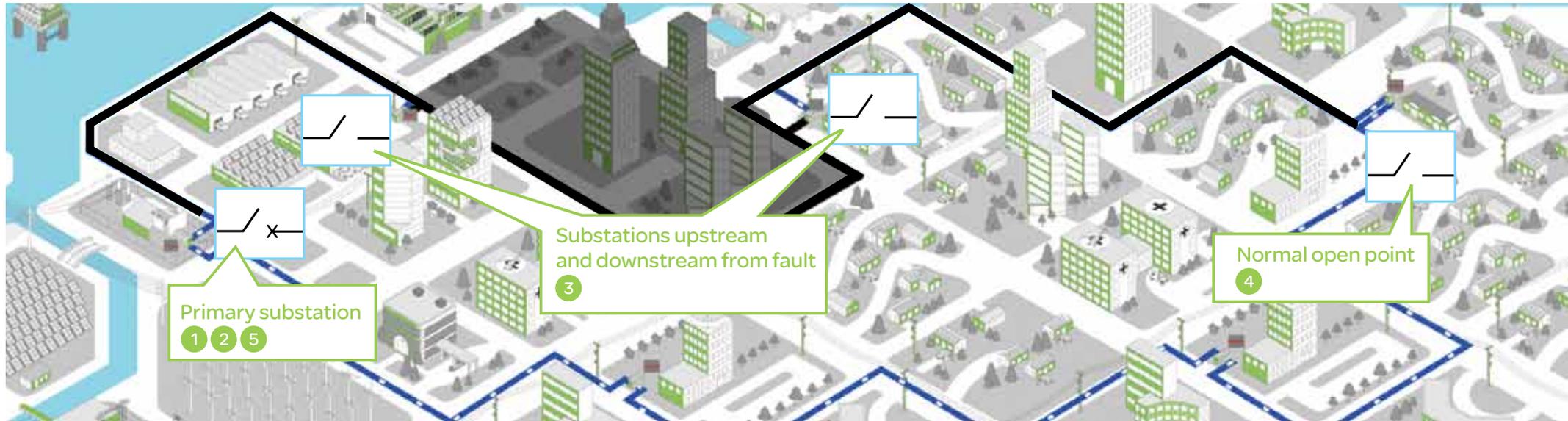
The entire system is decentralised, designed to function without DMS or to complement it. The control centre is notified of a fault, but there's no waiting for an operator response. Instead, the Easergy T200 units communicate automatically to find the fault, isolate it, and re-energise the unaffected areas of the grid.

What's more, this is a complete, fully supported solution. Schneider Electric is there every step of the way, from concepting and design to implementation and training.

Benefits

- > Fault isolation and service restoration in under 30 seconds, reducing SAIDI
- > Quick design and simple implementation
- > Simple roll-out, with no DMS required
- > Cost-effective modernisation using an off-the-shelf product
- > Flexibility and ease-of-configuration via decentralisation
- > Ease of scalability and replicability
- > Greater savings, as data gathered by the Easergy T200 can be used to maximise infrastructure efficiency

Automatically restore power after a fault



The self-healing grid solution is designed for underground networks featuring open-loop architectures. By employing simple peer-to-peer communication and step-by-step reconfiguration, it isolates the faulted area, automatically restoring power to unaffected customers

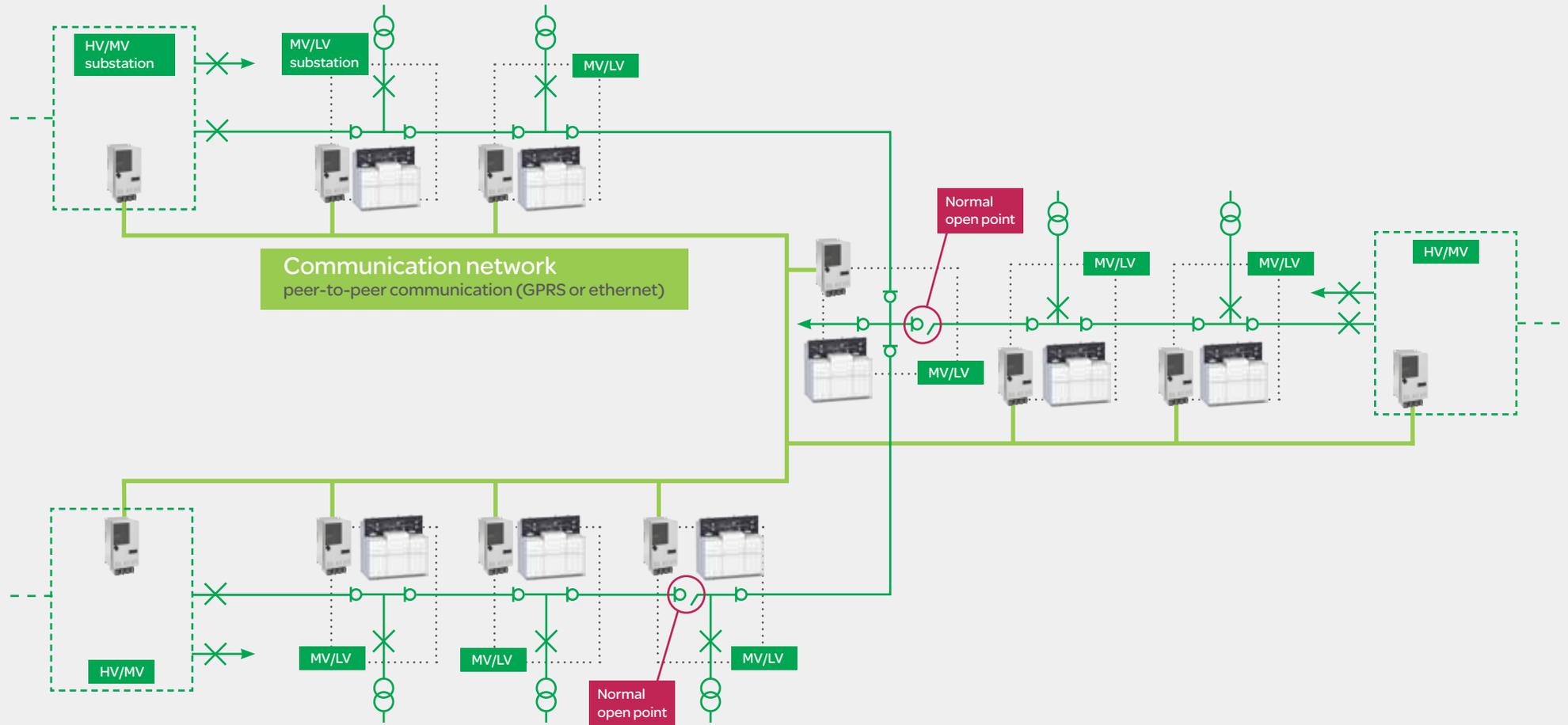
in under 30 seconds. This translates to higher power availability in critical areas, a lower SAIDI value, and greater customer satisfaction.

Here's how it works:

- 1 When a fault occurs, the circuit breaker in the primary substation trips and the rest of the feeder up until the normal open point is de-energised.
- 2 The primary substation's Easergy T200 unit communicates with its immediate neighbour and so on along the feeder until the fault is located.
- 3 When the fault area is localised, switches in the substations immediately upstream and downstream from the faulty section are opened to isolate the fault.
- 4 The normal open point is closed to restore supply downstream from the faulty section.
- 5 The primary substation circuit breaker is closed again to restore supply upstream from the faulty section.

The result is the automatic restoration of power to the unaffected area of the network within 30 seconds of an outage.

Self-healing network scheme covering three feeders



Key solution components

Easergy T200 control unit



The Easergy T200 control unit is designed for use in MV substations. This off-the-shelf product has a number of vital functions, allowing remote control, high-performance fault current detection, and measurements for better control of network load. The Easergy T200 is also the heart of the self-healing solution, enabling decentralised monitoring and control of substations.

- > Easy to install and cost-efficient
- > Compatible with any SCADA system
- > Compatible with current and legacy Schneider Electric switchgear as well as third-party equipment
- > Rugged and reliable design tested for use in harsh conditions
- > Includes back-up power supply for motorisation, transmission equipment, and the control unit

Optimal switchgear for self-healing solution



A variety of Schneider Electric gas-insulated ring main units are ideally suited to the self-healing solution, including FBX, Ringmaster, and RM6. These switchgear are highly reliable, designed for underground secondary distribution applications, and have a wide installed base. For an even greater level of integration, the RM6 is available with an embedded T200 unit.

VD23 voltage detection relay



Compact and highly efficient, the VD23 perfectly complements a self-healing grid, providing reliable data regarding voltage presence.

VPIS voltage indicator



The VPIS has a robust design and exceeds the standards set by IEC 62271-206. It works in tandem with the VD23 to increase network safety and reliability.

Time-related performance capability	
Maximum time to re-energise fault-unaffected area	Typically 20 seconds. Maximum 30 seconds (depending on communications and number of nodes)
Performance capability	
Number of controlled MV/LV substations per loop	< 30
Maximum number of feeding points in a meshed network	3
Overloaded circuit prevention helps avoid damage to lines, cables, switchgear, and other hardware	
Communications	
Communication to SCADA	IEC 870-5-104, DNP3 over IP, Modbus TCP
Peer-to-peer communication	Modbus TCP
Media	Ethernet, GSM/GPRS, 3G
Backup battery supply	
AC supply	230 Vac - 50 Hz, (90 V to 270 Vac, with optional 43 V and 57 V).
Battery backup	Up to 16 h + 10 open/close (O/F) cycles
Battery monitoring	Total discharge, periodic tests, end of life
Fault passage indication and measurement	
Phase-fault detection	
Earth-fault detection	
Ammeter, Maximeter	
U, I, P, Q, S measurement, energy and power factor, $\cos \varphi$	With Modbus slave device (F200C, PM)
Voltage presence	With additional VD23 or Flair 23DM unit


Discover more about Schneider Electric self-healing solutions and see how the system works for yourself!
 Visit www.schneider-electric.com/selfhealing today!

Schneider Electric Industries SAS

Head Office
 35, rue Joseph Monier
 CS 30323
 92506 Rueil-Malmaison Cedex
 France

www.schneider-electric.com