SELF-HEALING NETWORK TECHNOLOGY

SREEJA SREEKUMAR

Electra

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Electra

AGENDA

- Overview of Electra's network
- Why a Loop Automation Scheme
- Where is this installed
- Understanding a Loop Automation
- How this worked in Electra's network
- Benefits after the installation

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AN OVERVIEW OF ELECTRA'S NETWORK

- Electra is spread over the Horowhenua and Kapiti districts
- Owned by Electra Trust
- The network covers approximately 1,628 km2
- 2 GXPs, 10 Substations and 48 feeders

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WHERE WAS THIS INSTALLED

- Electra chose Opiki/Tokomaru region
- Difficulty in obtaining the location of the fault
- Area frequently affected by wind, trees outside notice zone and birds
- Location far away from depots

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WHY A LOOP AUTOMATION TECHNOLOGY

Isolation & restoration of supply in under 1 minute

No human operator intervention

Reduces the number of customers affected

Reduces the length of unplanned outages

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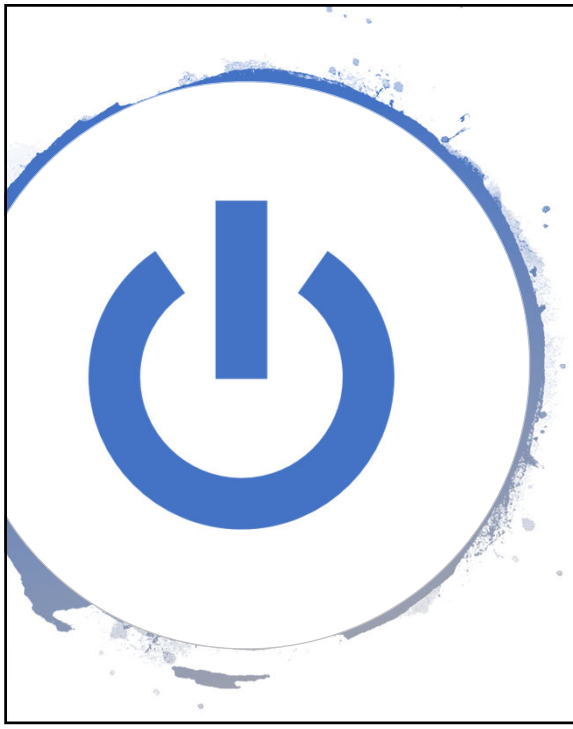

LOOP AUTOMATION

- Time, voltage, power flow and a set of simple rules
- Reconfigures the network during a fault
- Restores power quickly back to the fault free section
- Works with 3 types of devices
  - Feeder device
  - Mid point device
  - Tie device

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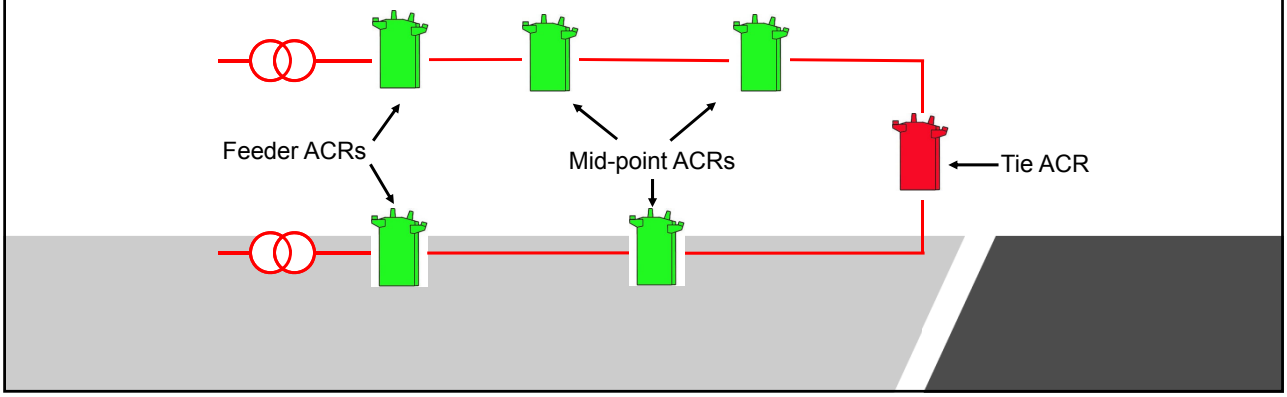
Requirements by the Loop Automation

Feeder Device – located near the substation

Mid point Device- anywhere between the feeder device and the tie

Tie Device- open point between 2 feeders.



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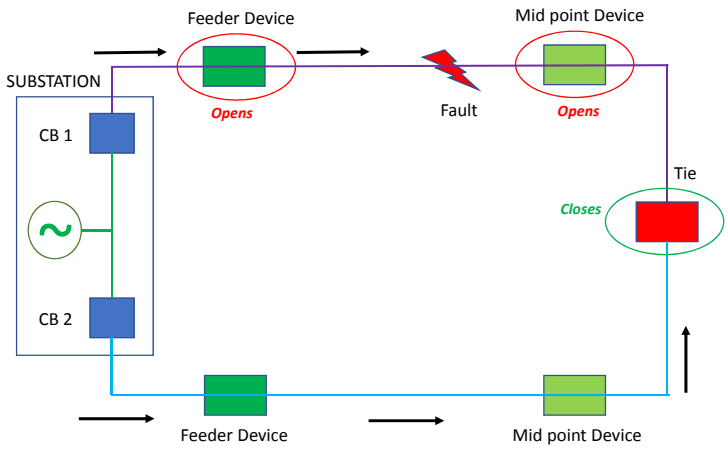
Understanding the Loop Automation

1. *Feeder Device Opens*- when supply is lost
2. *Tie Closes*- when supply to one side is lost
3. *Mid point Device Opens*- Protection settings trips



Embedded voltage detection, timers and fault passage indicators are used

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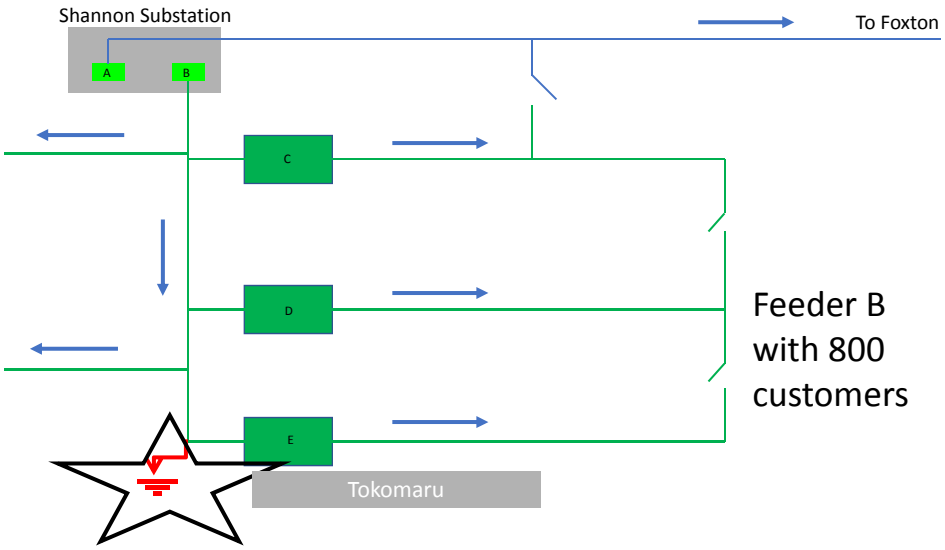
Before Loop Automation in Electra's Network



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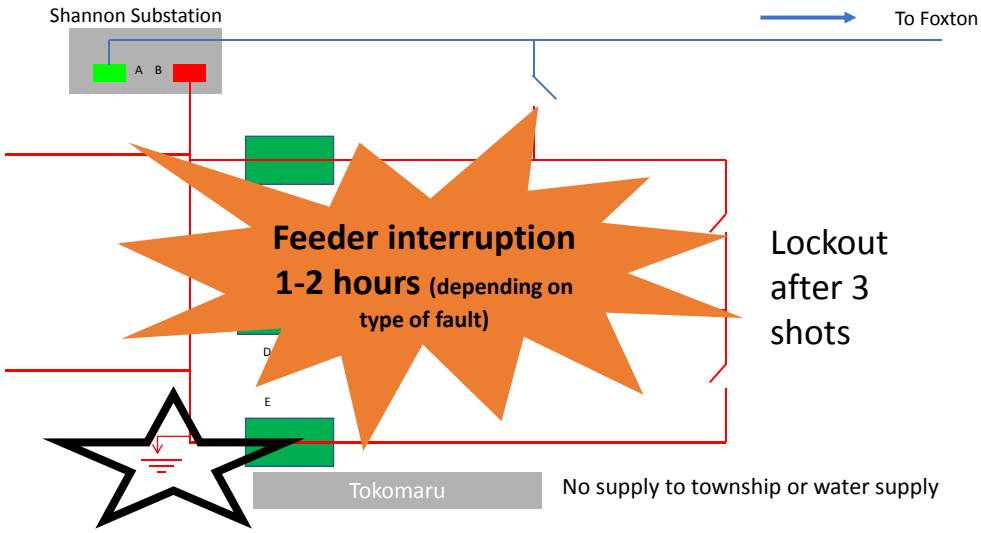
Feeder interrupted



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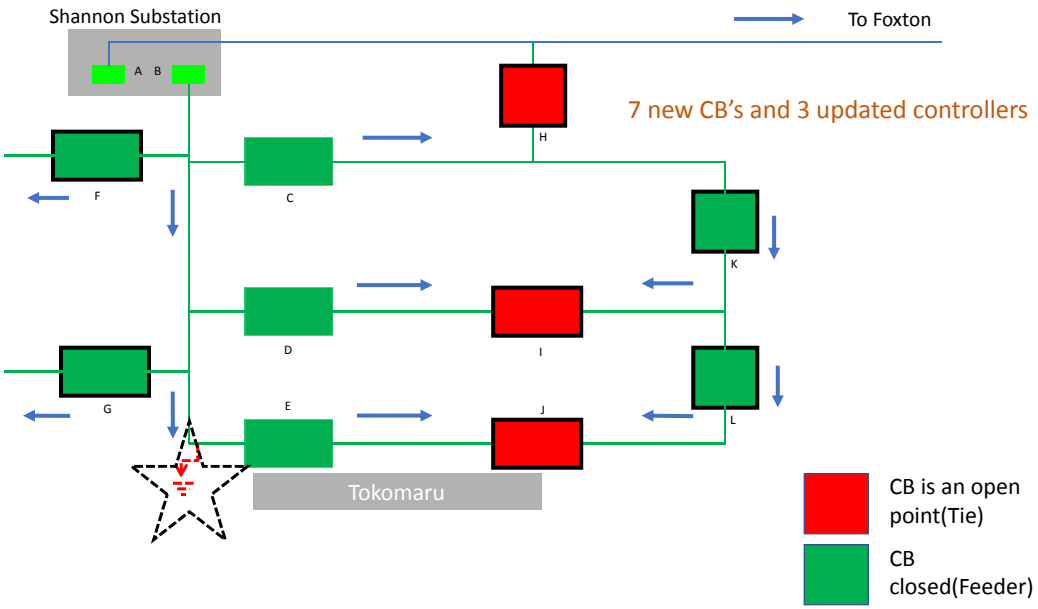
Loop Automation



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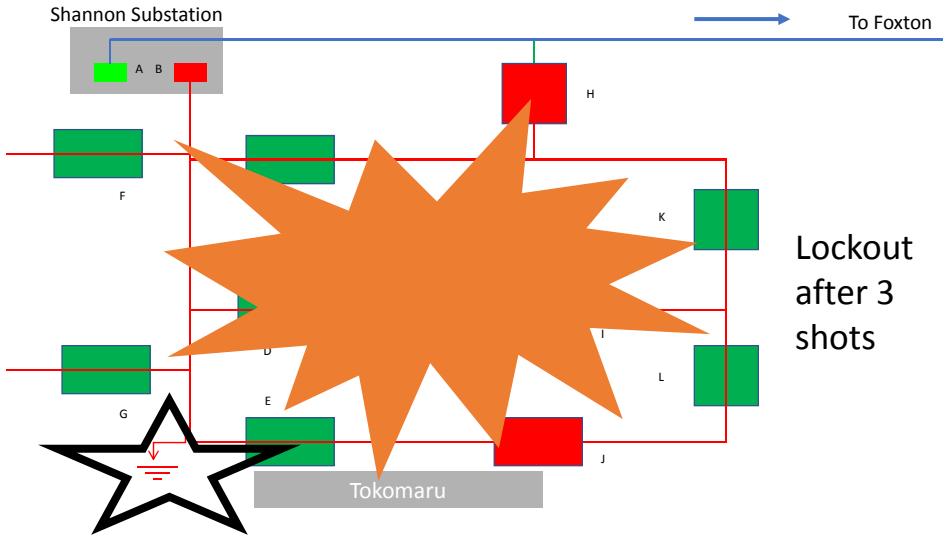
Protection Operation



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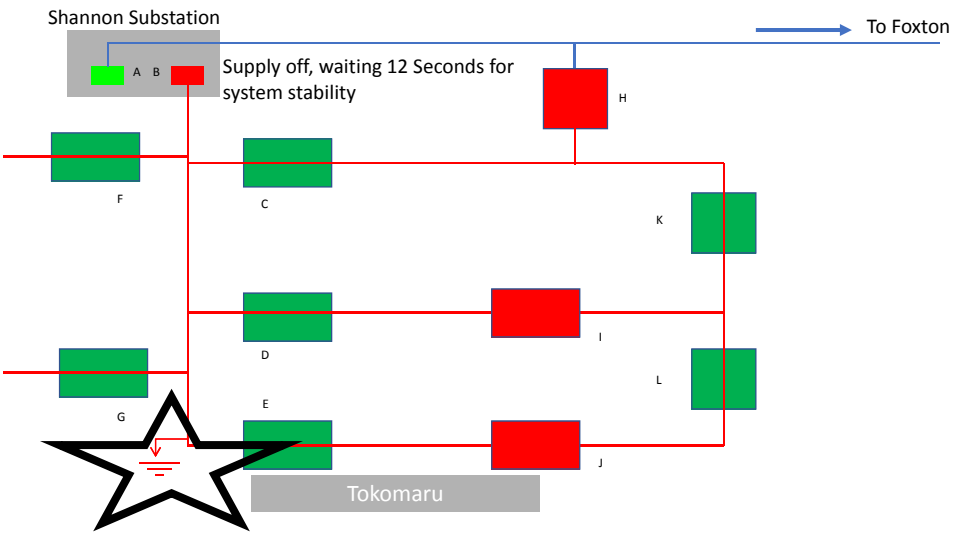
LOOP AUTOMATION STARTED



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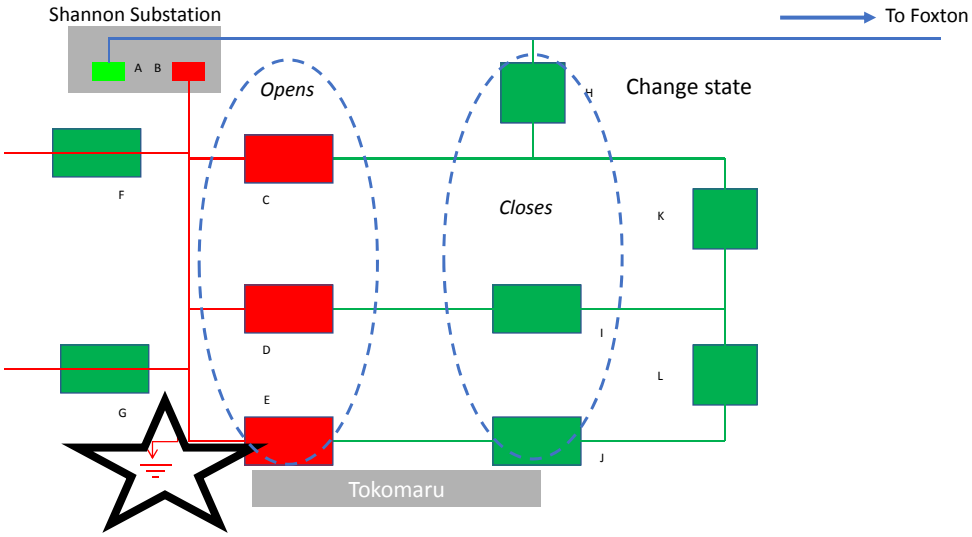
CHANGED RECLOSER POSITIONS



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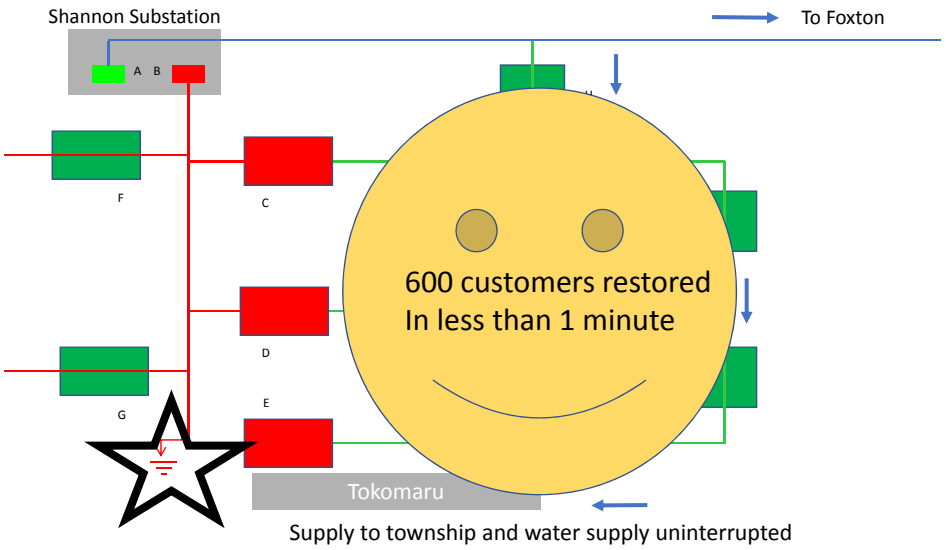
POWER RESTORED



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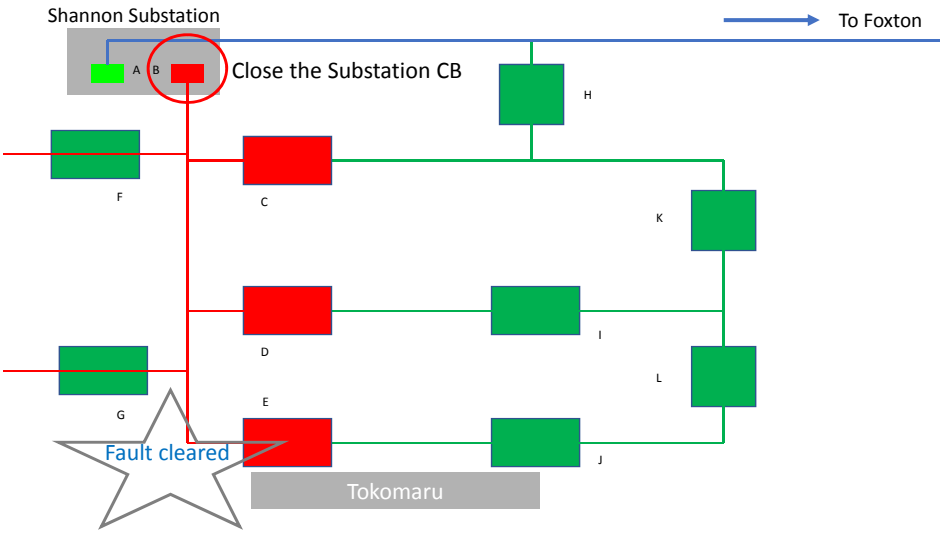
FAULT CLEARED



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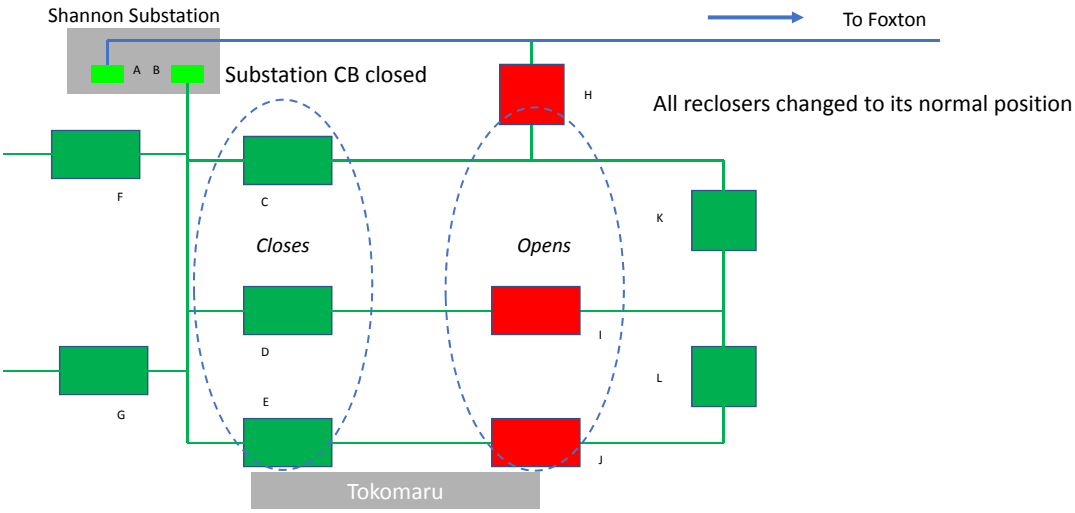
SCHEME RESTORED BY SCADA



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What we have gained/planned

- No communications required
- No operator intervention
- Fast restoration of unfaulted sections
- SAIDI and SAIFI statistics improved
- Ongoing projects

YEAR	AVG. SAIDI
2012-2014	11.12
2015-2017	5.02

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THANK YOU

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