Proactive Fault Detection with Smart Meters
Enhancing Public Safety and Network Reliability at PowerNet

EEA APEX Summit 2024

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(Graduate Electrical Engineers)


Wanaka
Frankton
Cromwell
Ranfurly
Te Anau
Athol
Palmerston
Manapouri
Lumsden
Monowai
Tapanui
Milton
Tuatapere
Winton
Gore
Clinton
Balclutha
Mataura
Riverton
Invercargill
Owaka
Bluff
Stewart Island
Electricity Network Areas
The Power Company
OtagoNet Joint Venture
Electricity Invercargill
Lakeland Network
Stewart Island Electricity Supply Authority

Our vision

Energy partner of choice

Our purpose

Safe, Efficient, Reliable Power to Communities

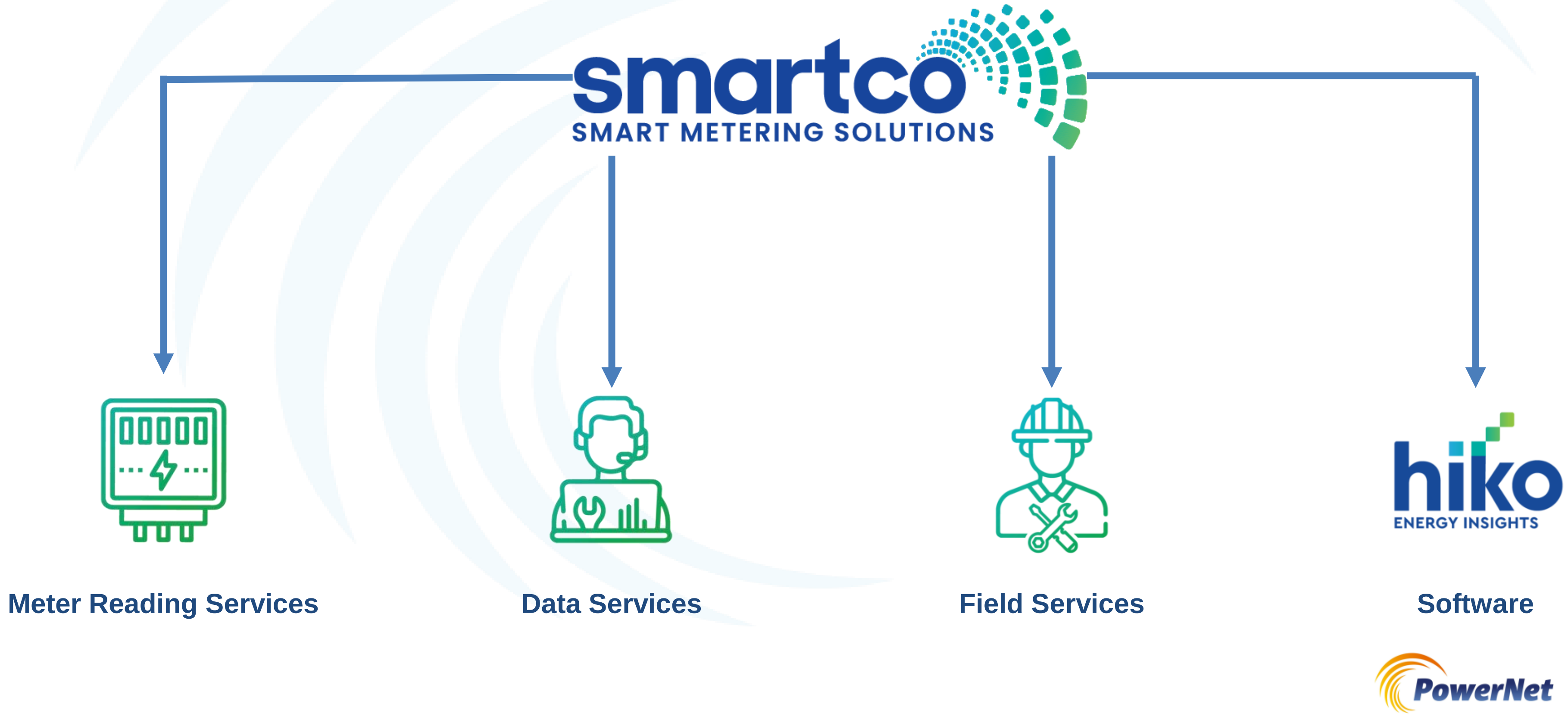
Critical success factors

- Safety always
- Customer focus
- Continuous improvement
- Passionate and empowered people
- Courageous leadership

Values

- Up front and honest
- Make a difference
- Do it once, do it right
- Back each other
- Take positive action

Smartco & Hiko Energy Insights

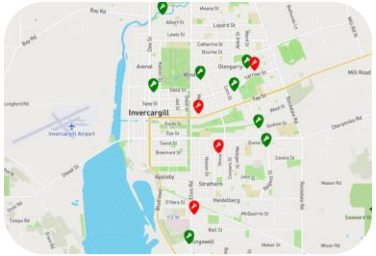


Hiko Energy Insights for LV Monitoring

Proactive Power Management

Safe and Efficient Solar Integration

Streamlined New Customer Connections



Swift Response, Minimal Disruption

Proactive Power Management

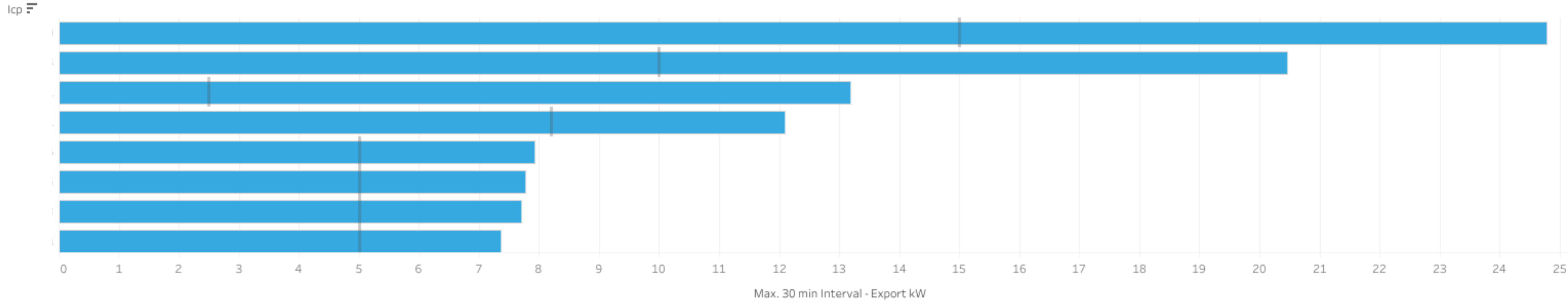
Safe and Efficient Solar Integration

25
Exporting Over Approved Limits

86
Over Voltage while Exporting

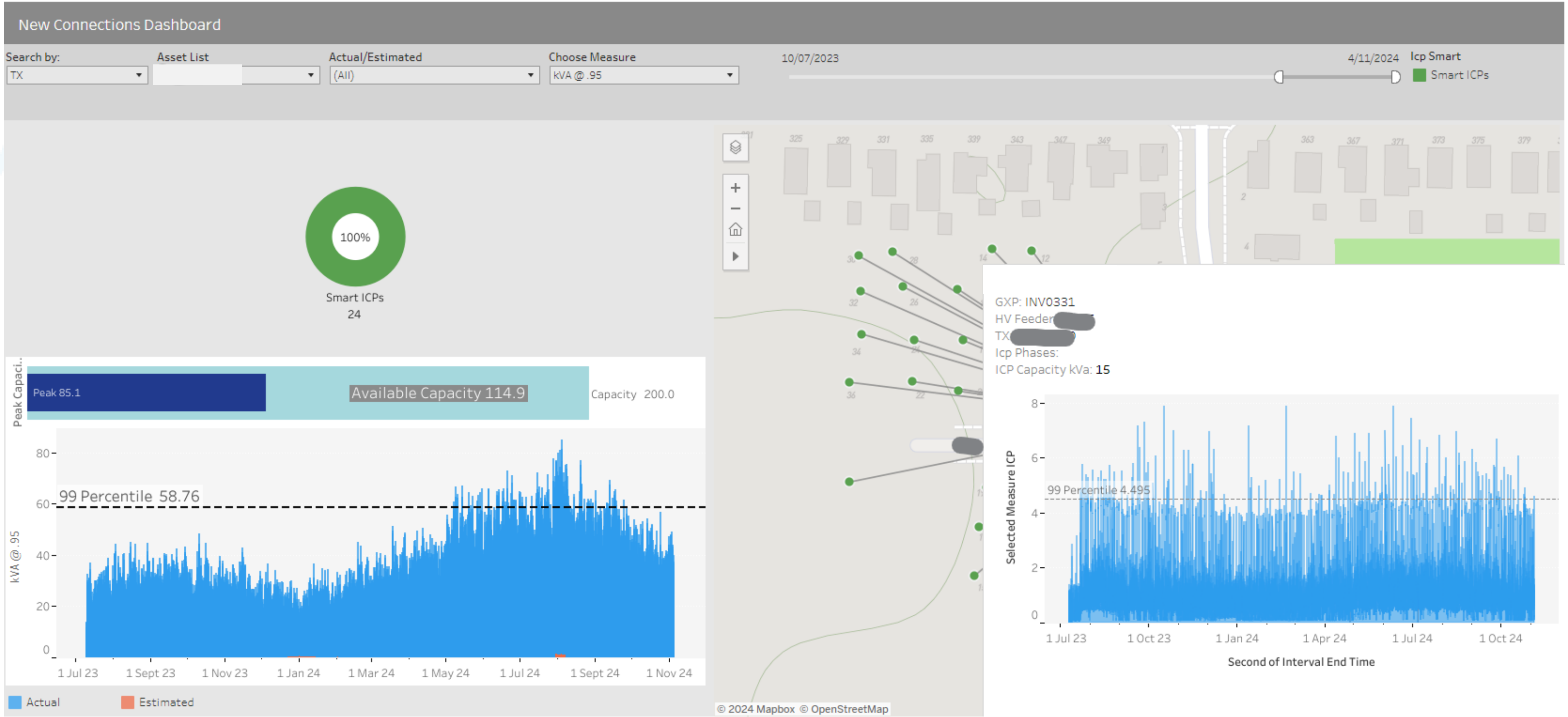
Start Date: 6/10/2024

End Date: 5/11/2024



Icp	Breach Days	Breach Intervals	Max. Export Limit	Unexpected Energy (kWh)	Max. ex
	17.0	75.0	5.0	32.3	
	28.0	496.0	0.0	42.1	
	5.0	15.0	15.0	23.4	

Streamlined New Customer Connections



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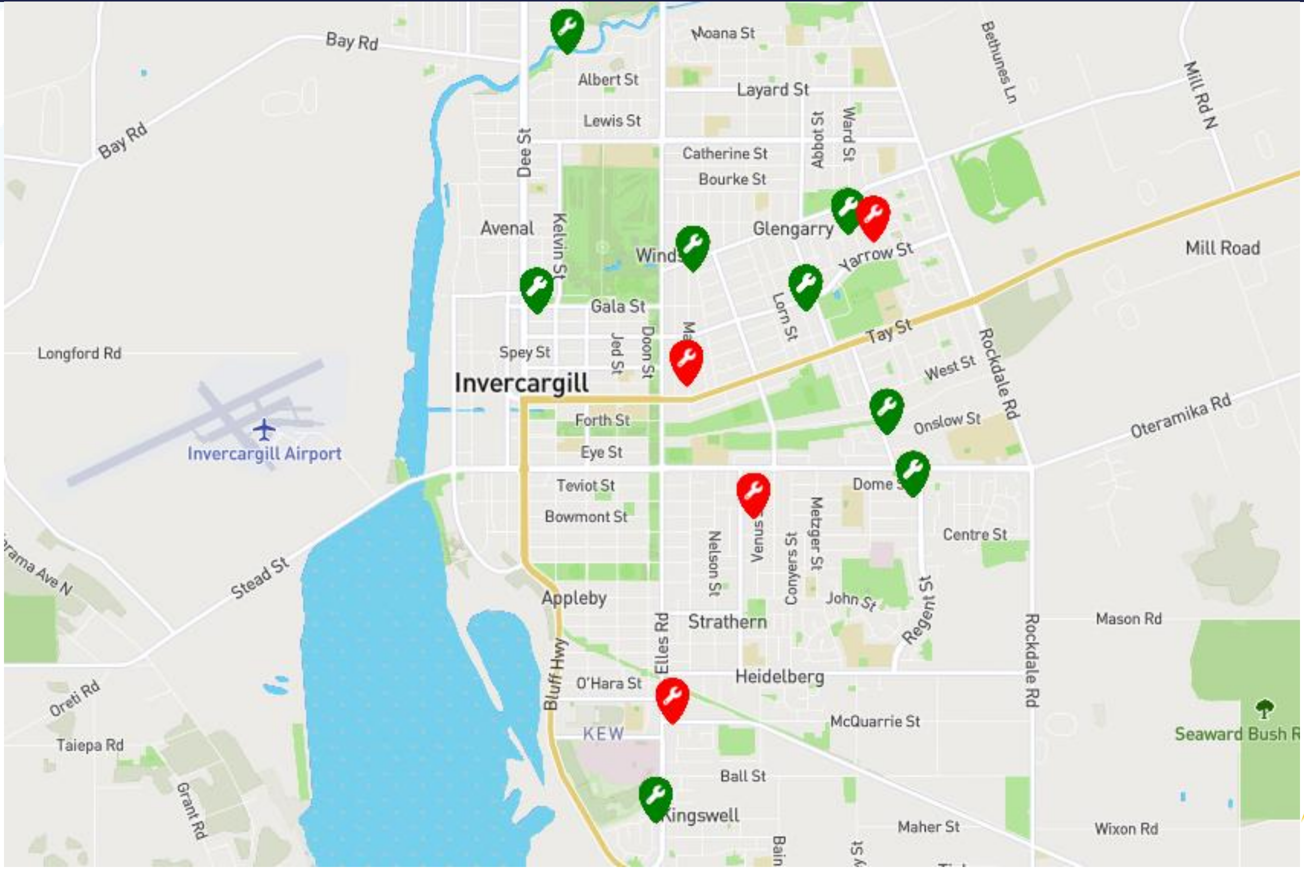
Swift Response, Minimal Disruption



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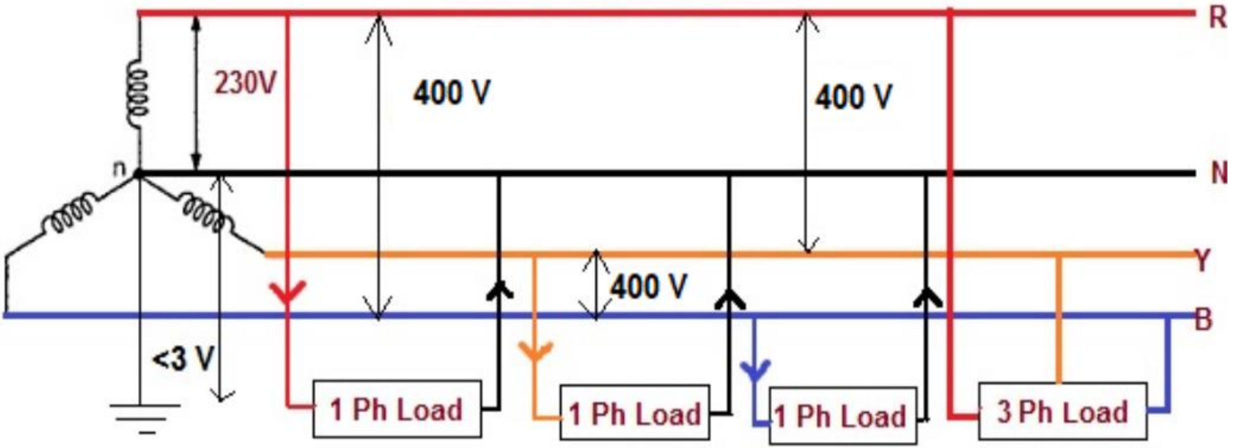
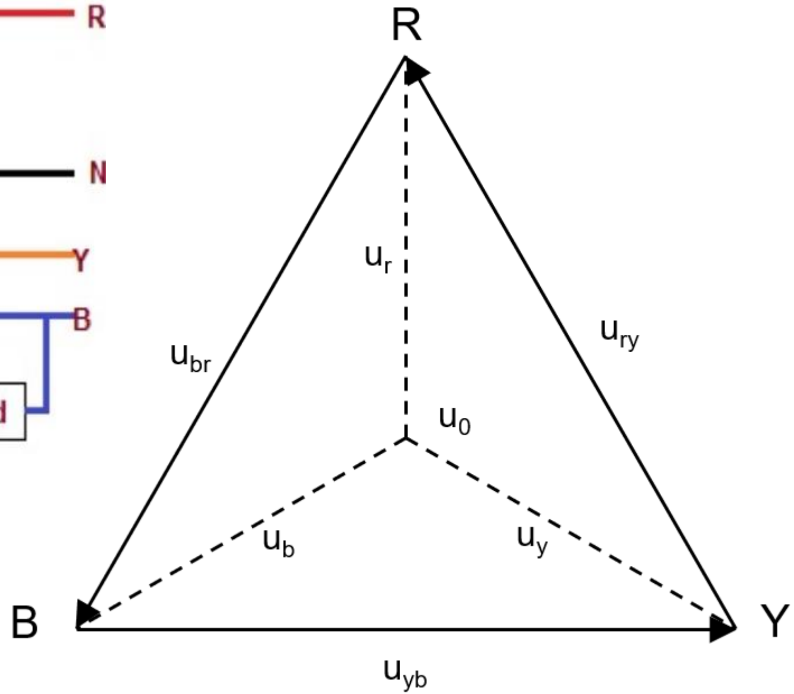
Three Phase 400V System





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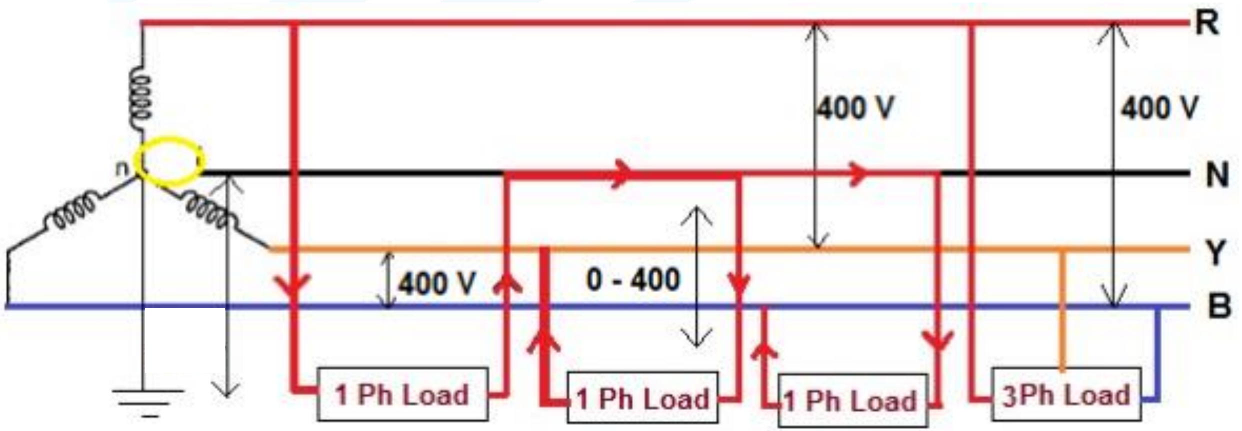
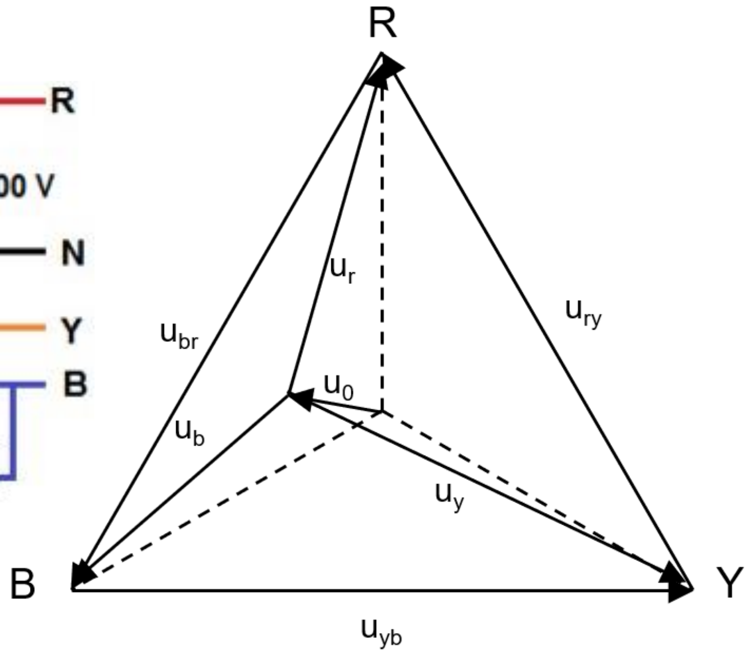
During Neutral Fault





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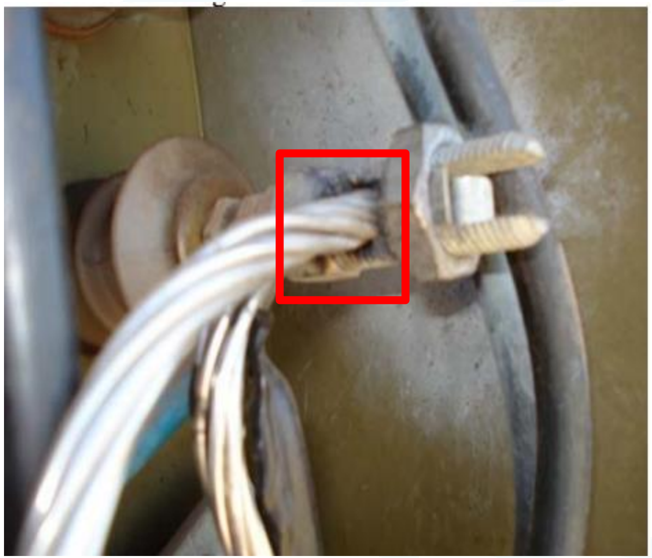
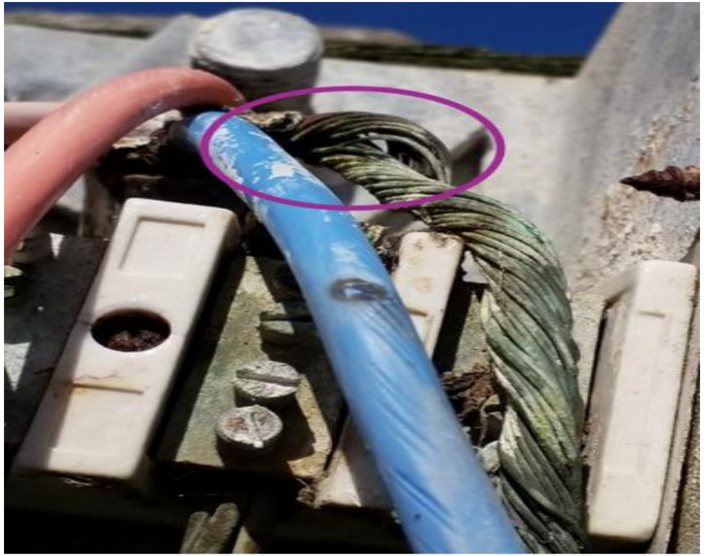
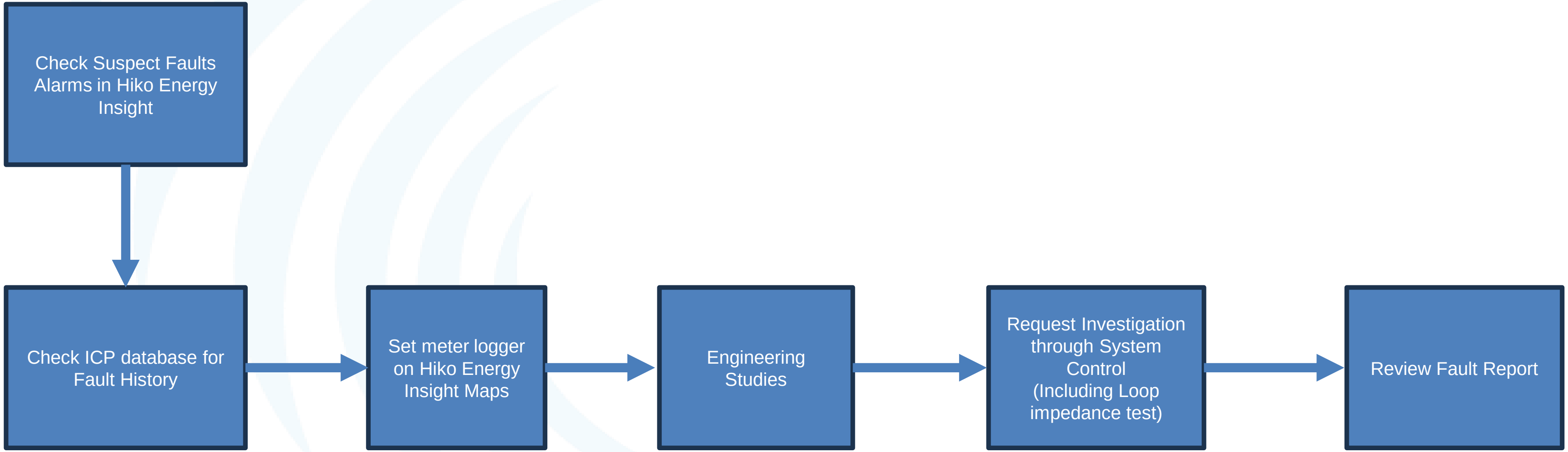
Broken Neutral: Causes and Impacts

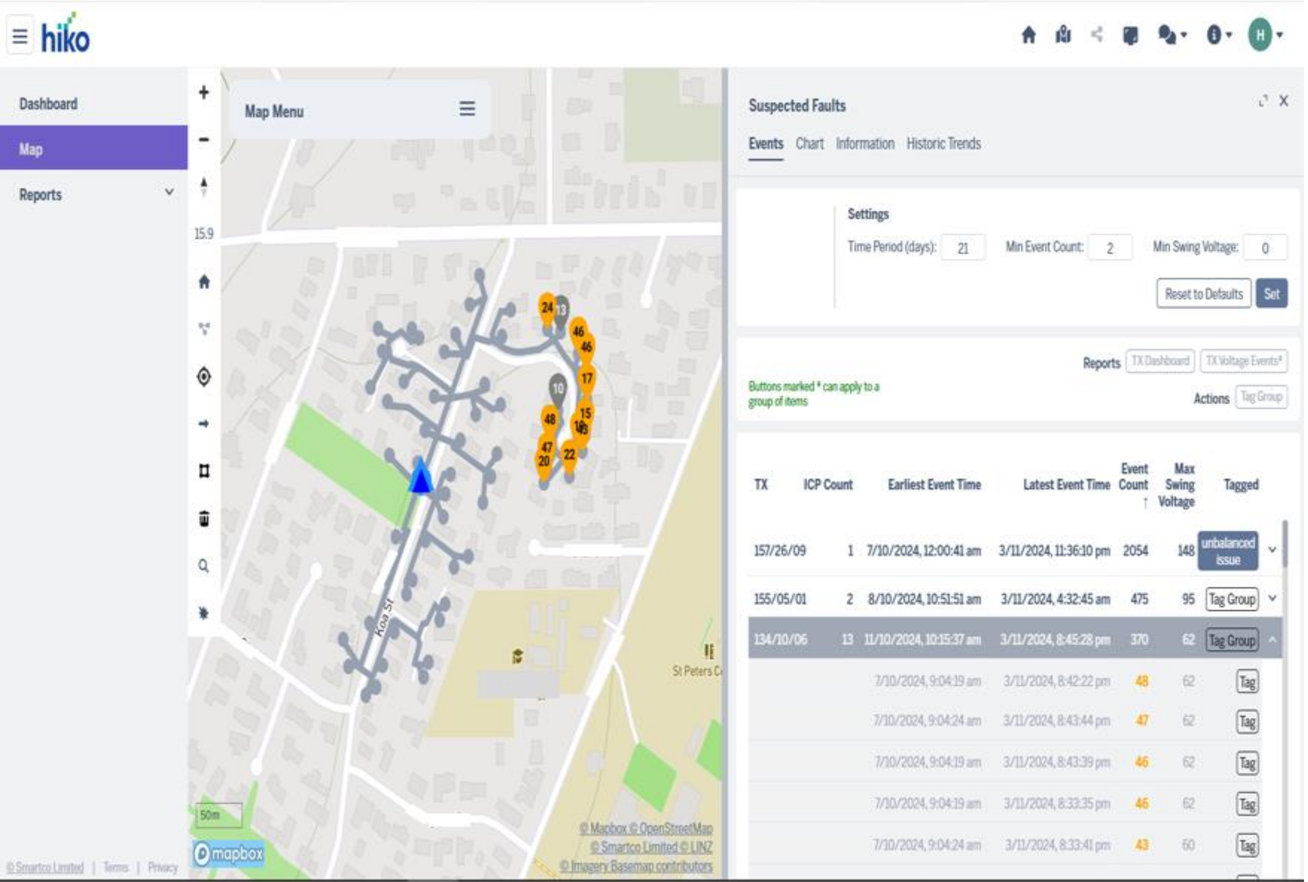


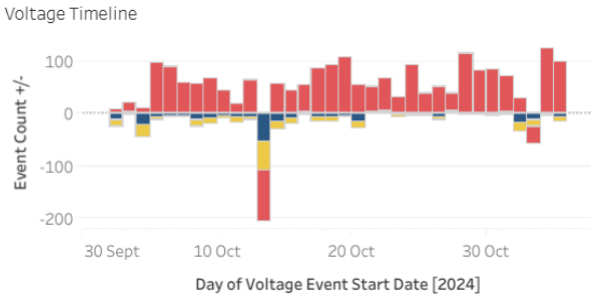


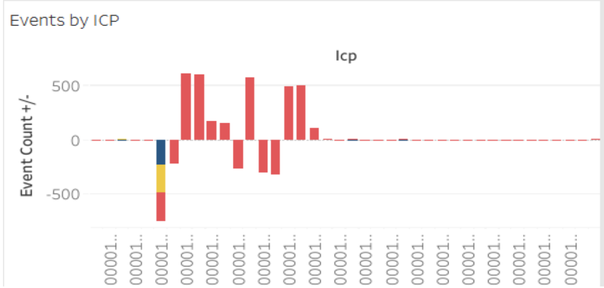
Process Overview: Identifying Broken Neutral



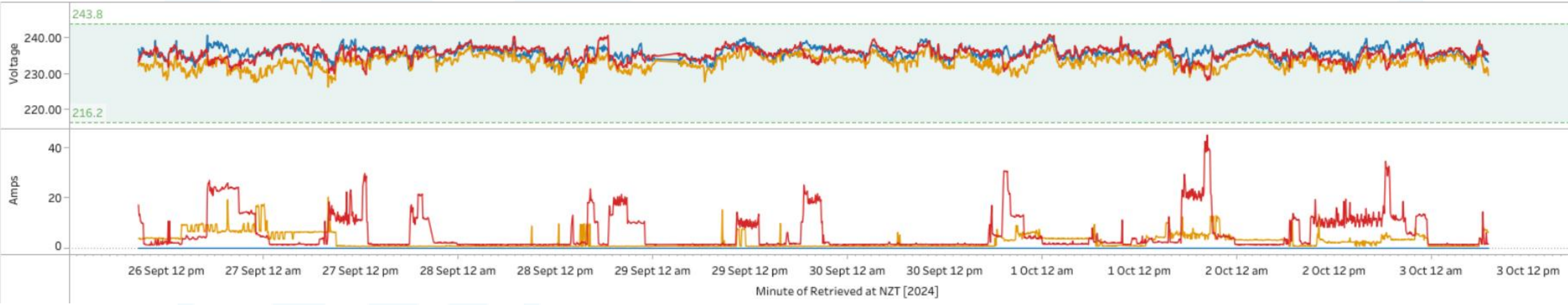
Detecting Broken Neutral Via Hiko Energy Insight

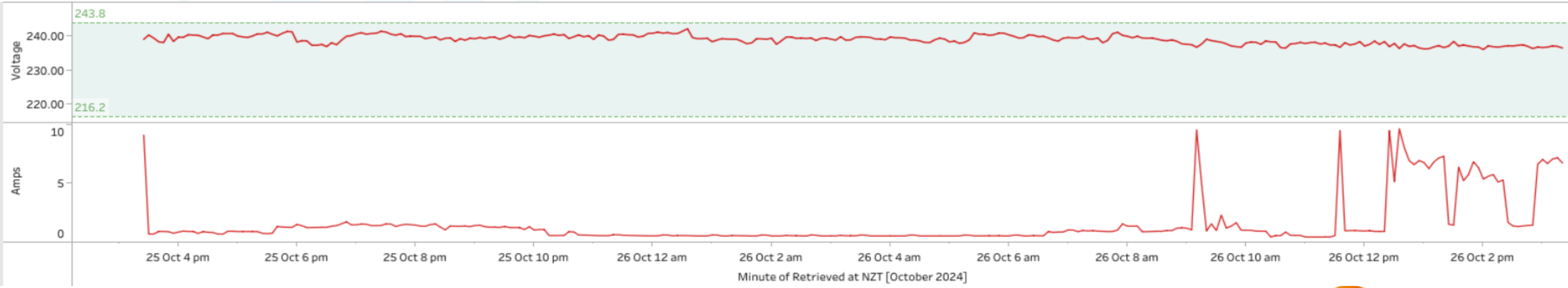






Normal Voltage Profile





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Detecting Broken Neutral Via Hiko Energy Insight

PowerNet

Investigation from System Control

Date
10/08/2023
12:14

Result
Deterioration

Cause
Failed Connection / Joint

Contributing Factors

Removed star box reterm service cables Cable 1 R=237v 1.3 Y=239v 1.2 B=242v 1.2 While completing independent earth test at customer meter box House R=236v 1.2 Y=202v 1.2 B=250v 1.2 R/Y=397v 1.3 R/B=404v 1.2 Y/B=382 1.3 Shed R=244v 1.1 Y=248v 1.1 B=203v 1.1 R/Y=404v 1.2 R/B=398v 1.3 Y/B=384v 1.2 Cable 2 R=231v 1.2 Y=241v 1.1 B=242v 1.2

Pole Number	ICP Fuse	HV Fuse	Chargeable
-	-	-	No

Date
13/03/2024
10:41

Result
Unknown.

Cause
Nothing Found

Contributing Factors

Tested at tranny pole 99379 - At our end everything's fine, internal issue? Loop impedance readings: R - N 241 V & 0.14 Ohms Y - N 241 V & 0.14 Ohms B - N 240 V & 0.13 Ohms R - Y 415 V & 0.21 Ohms Y - B 412 V & 0.21 Ohms B - R 410 V & 0.21 Ohms

Pole Number	ICP Fuse	HV Fuse	Chargeable
99379	-	-	No

Hazard Number
132637

Performance & Key Learnings

Performance

- 24 customers reports before Hiko Energy Insight
- 5 customers reports after Hiko Energy Insight
- 45 Investigation requests sent to System Control over the past year
- 18 cases successfully identified
- Success rate : 40 %

Key Learnings

- The algorithm still requires improvement.
- There are still lots of false positives.
- Collaboration between other EDBs in improving the algorithm is required.

Thank you

Any Questions?