



IESO Wholesale Metering Using 8650A

MAKING SUSTAINABLE, ATTAINABLE™

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Agenda



- Introductions
- Rodan's meter and data success (over the 20 plus years of MSP)
 - What are client's needs
 - Reliability
 - Energy costs
- Meter is core to success
 - ION 8650 specification
- IESO Requirements
 - Conforming meter list
 - Hardware overview (memory and communication ports)
- IESO Metering Consideration (after 20 plus years of metering evolution)
 - Benefits of various metering locations
 - Open Phase Detection case
 - Real Time monitoring (remote – cloud based)
 - IESO operations and Hydro One operations access
 - Hydro One PQ program
- Connect with Rodan



RODAN
ENERGY SOLUTIONS

MAKING SUSTAINABLE, ATTAINABLE™



**Reducing
Energy Spend**



**Achieving
Sustainability Goals**



**Improving
Power Reliability**



Your Turnkey Energy Solutions Provider

Making Sustainable, Attainable™ for Businesses, Power Producers, and Utilities



1,400+

MWs of Load Managed



225+

Utility, ISO, and Power Producer Clients



720+

Sites managed across North America



9500+

Data points monitored daily



20+

Years in business helping clients



ION8650 Meter Overview



- Most accurate revenue meter. 9S & 35S form
- Used for wholesale and retail applications.
- Power quality observation ability
- Telemetry ability



ION 8650 A, B, and C Comparison



Feature	ION8650A	ION8650B	ION8650C
Metering			
Power, energy, and demand	■	■	■
Power quality			
Sag/swell, harmonics monitoring	■	■	■
Harmonics: individual, even, odd, up to	63 rd	63 rd	31 st
Harmonics: magnitude, phase, and inter-harmonics	50 th		
Symmetrical components: zero, positive, negative	■	■	■
Transient detection, microseconds (50/60 Hz)	20/17		
Sampling rate, samples per cycle	1024	1024	1024
Logging and recording			
Onboard memory	128 MB	64 MB	32 MB
Number of Channels	800	320	64
Min/max logging for any parameter	■	■	■
Timestamp resolution in seconds	0.001	0.001	0.001

ION 8650 A, B, and C Comparison



Feature	ION8650A	ION8650B	ION8650C
Communications and I/O			
RS-232/485; RS-485; Optical; IRIG-B	■	■	■
Ethernet, Internal modem	optional	optional	optional
DNP 3.0 via serial, modem, Ethernet, I/R ports	■	■	■
Modbus TCP master/slave	■ / ■	■ / ■	- / ■
Modbus RTU master/slave	■ / ■	■ / ■	- / ■
EtherGate, ModemGate, MeterM@il, WebMeter	■	■	■
Internal KYZ outputs/Form A inputs (optional)	4/3	4/3	4/3
Internal KYZ outputs/Form A output/Form A inputs (optional)	4/1/3	4/1/3	4/1/3
Ext. digital status inputs/counter/solid state outputs (optional)	8/8	8/8	8/8
Setpoints, alarming, and control			
Setpoints, number/minimum response time	65 / ½ cycle	65 / ½ cycle	65 / 1 sec
Math, logic, trig, log, linearization formulas	■	■	■
<u>D</u> ail-out on single- and multi-condition alarms	■	■	■
Revenue metering			
MV-90 on serial, modem, and Ethernet ports (if present)	■	■	■
Multi-year scheduling: hourly activity profiles	■	■	■
Transformer/line loss compensation; ITC	■	■	■

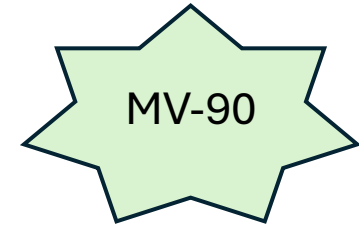
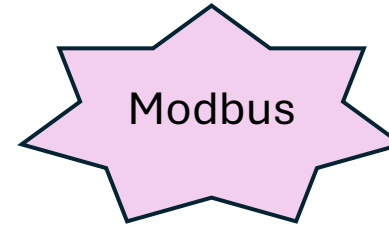
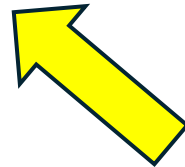
ION 8650A Specs



Hardware

Log	Allocated	Duration	Records
Load Profile	1.61%	97.2 days	28000
Event Log	0.13%	N/A	5000
Sag/Swell Waveforms	2.22%	N/A	90
Transient Waveforms	2.78%	N/A	90
Sag/Swell COMTRADE	1.09%	N/A	30
Transient COMTRADE	1.25%	N/A	30
Equipment Log	1.01%	156.2 days	15000

Log Memory: 98304 kB In Use: 16.4% Available: 83.6%



	Port connection	Wire or connector
 COM breakout cable	COM1 (RS-232) ¹	DB9 connector (from breakout cable)
	COM1 (RS-485) ²	White wire (from breakout cable)
		Black wire (from breakout cable)
	RS-485 common shield	Bare wire (from breakout cable)
 COM 2 (modem)	COM4 (RS-485)	Red wire (from breakout cable)
		Black wire (from breakout cable)
 Ethernet		RJ45 connector
	 IRIG-B ³	



ION 8650A – Wholesale Meter

THE MAIN PURPOSE OF THIS METER

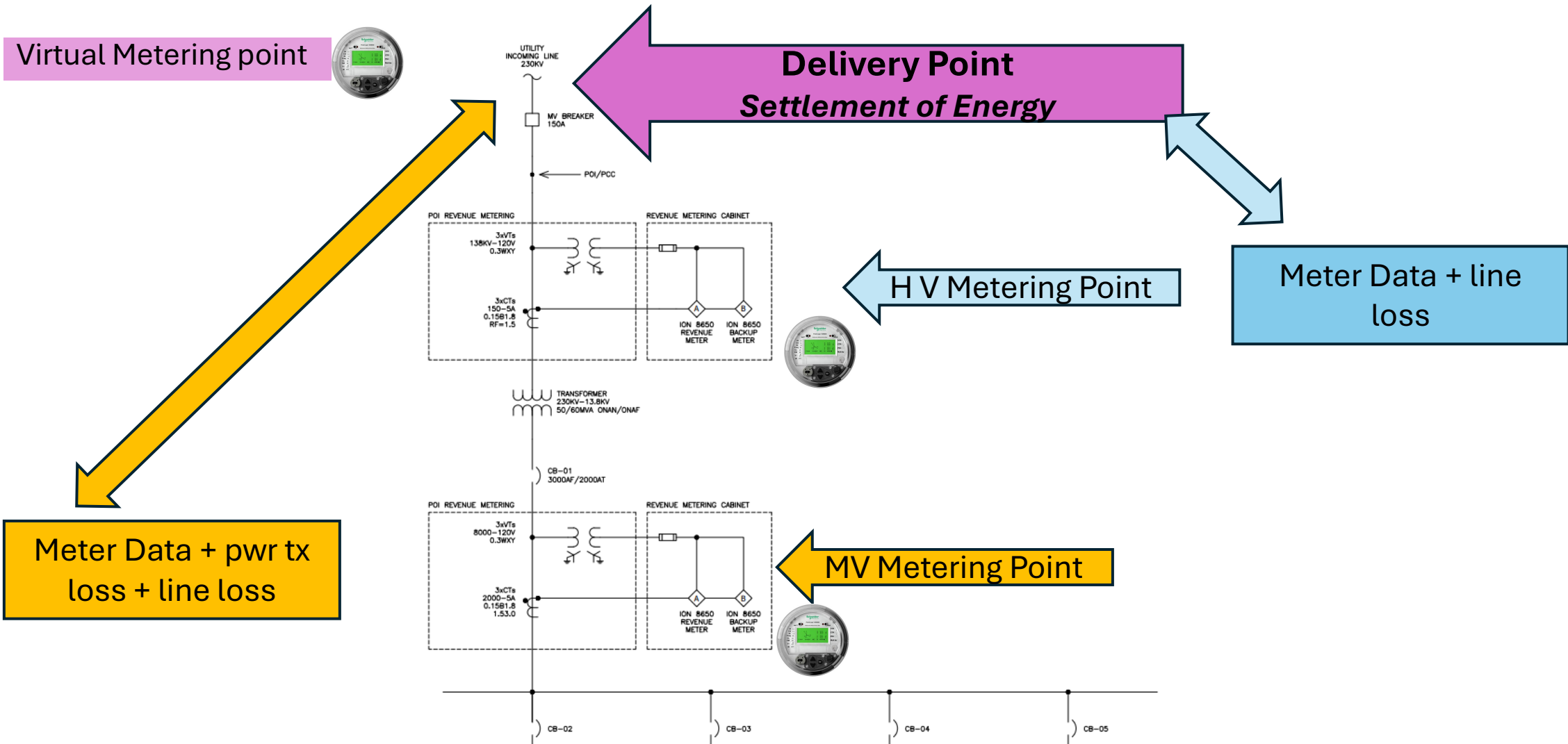
ION8650 meter overview

- IESO compliancy
 - [Conforming Meter List](#)
- Metering accuracy – ANSI/IEC Class 0.2 (or better).
- Loading to 20 Amps (with CT Rating factors improving)
- Telemetry ability (IESO and HONI operations needs)



Make	ION
Model	8650
Firmware Version	(1) 8650V403 (2) 8650V405 (3) 8650V407 (4) 8650V004.021.000 (5) 8650V004.031.002 (6) 8650V004.040.001
Market Category	Main and Alternate
Date Listed	(1) Jan 25, 2013 (4) Jun 8, 2018 (5) Nov 11, 2020 (6) May 14, 2021
Conditions of Acceptance	None. 2.5 element accepted for missing V ² h.

ION 8650A – Wholesale Meter Process



Wholesale Meter Location



Metering at HV Side

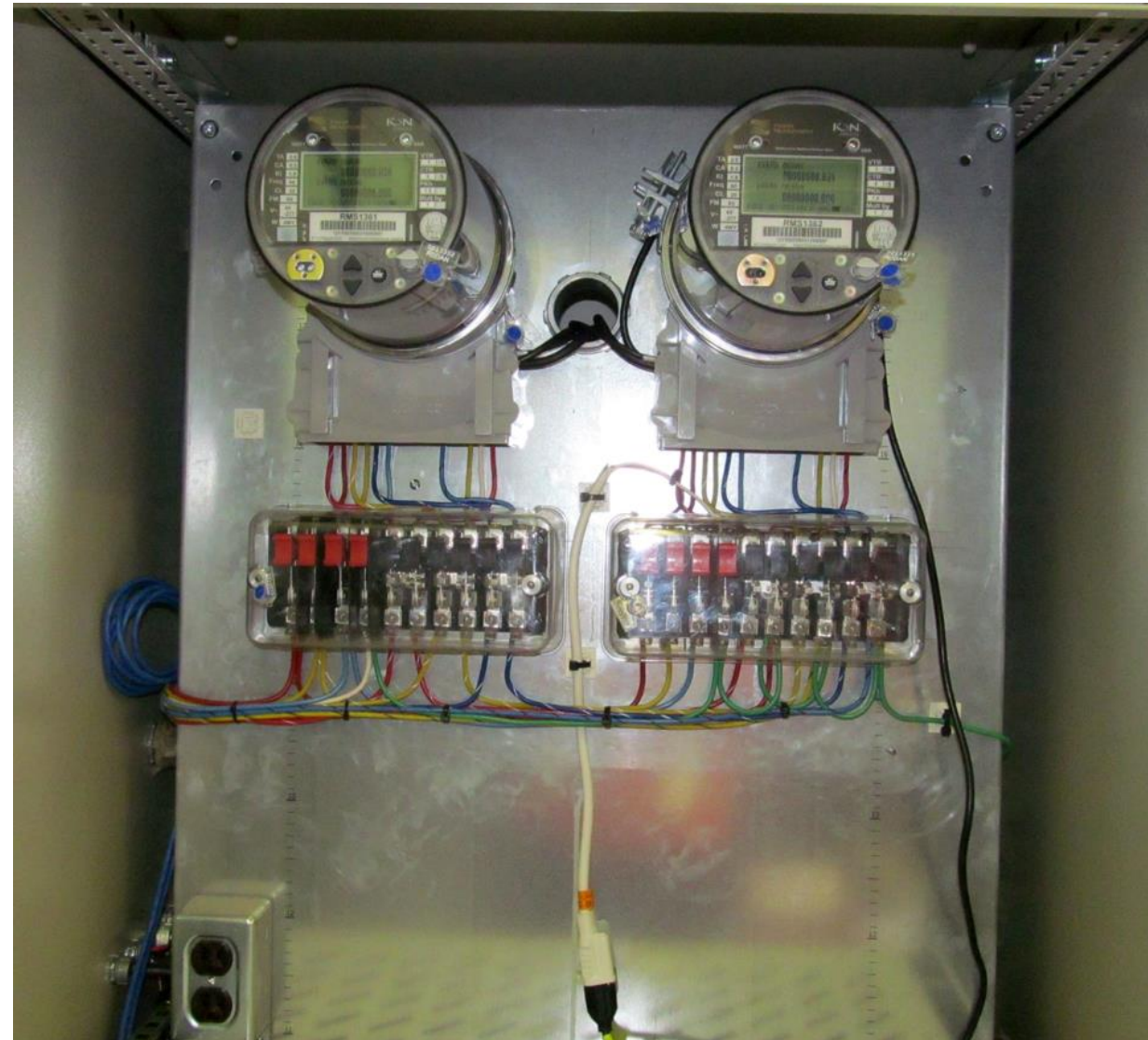
- Line loss calculation only.
- PQ vantage from Grid connection

Metering at MV Side

- Cheaper to install (MV instrument transformers costs are less)
- PQ vantage point on 13.8kv with any HV affects buffered by Power TX coils
- Calculate losses of line losses PLUS power transformer when on potential (or not)

Wholesale Meter Location

Single metering point



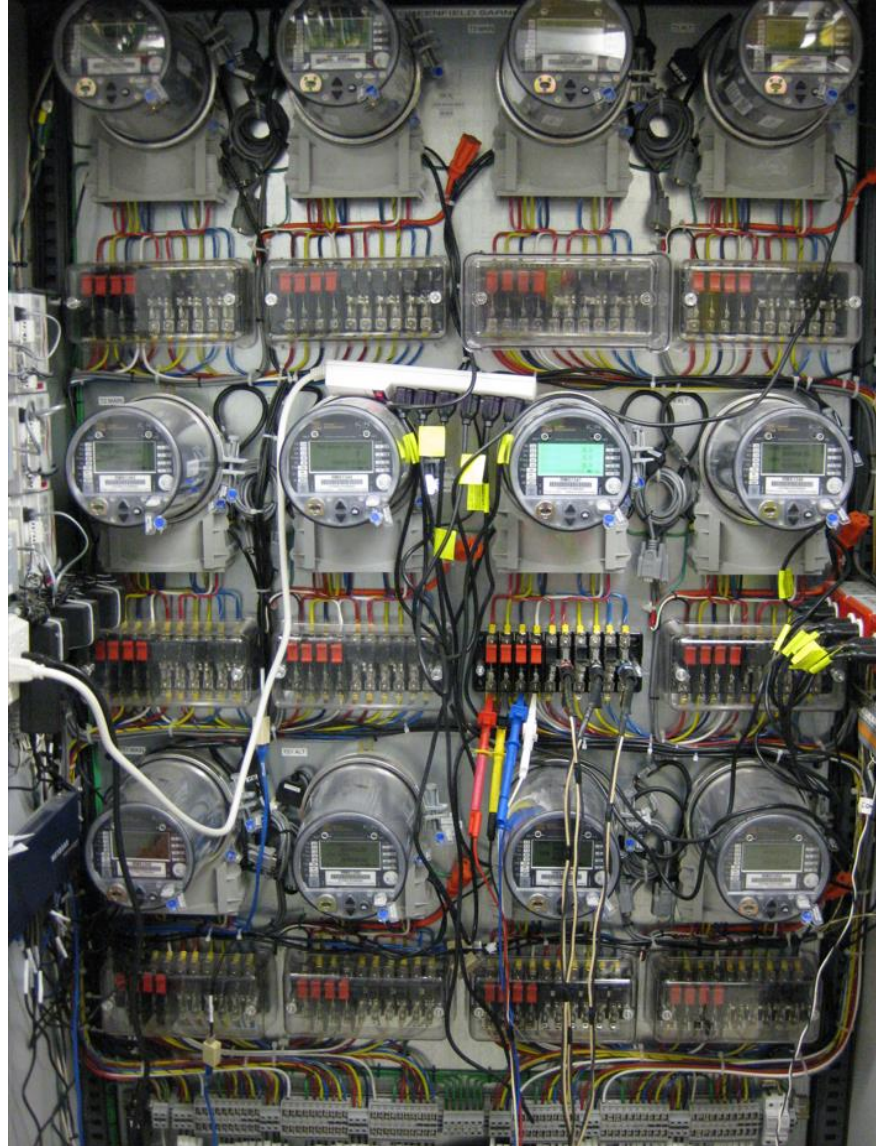
Wholesale Metering

Two Metering Points –
(example for double ended substation)



Wholesale Meter

Multi Metering points

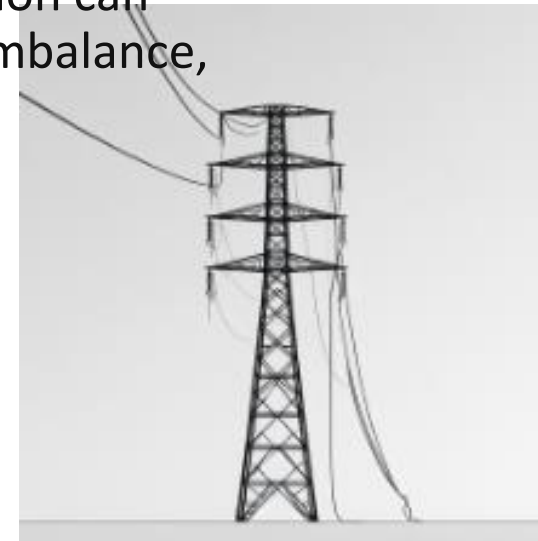


Wholesale Meter Power Reliability Case Study



Open phase detection in electrical power systems is crucial for identifying and mitigating the loss of a single phase in the supply path to power transformers. This condition can occur due to incorrect switching operations or an unintentionally open or grounded conductor. Detecting such conditions is essential to prevent unbalance that can impact critical safety functions, damage equipment, or interrupt operations.

Open phase detection is crucial for motor operation because an open phase condition can significantly affect the performance and longevity of motors. Impacts are voltage imbalance, reduced torque, increase vibration, and overheating.



Wholesale Meter Power Reliability Case Study



Smart Metering for Open Phase Detection

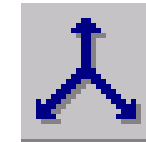
OPD Case Debriefing

- Cause/impact for power plant SS loads leading to tripping pumps.
- Need detection, annunciate and protect against OPD



Solution:

- ION Meter and its location to the grid.
- Symmetrical component modules provided information about unbalanced voltages and currents.
 - Use positive/negative/zero sequence current and voltage
 - These modules identified affected areas.
- Meter contacts provided alarming to control room for action to take.
- PME software provided dashboard alerting to specifics as well as recording the events.
- Safe switching to other station services provided protected the critical equipment base on the alarms

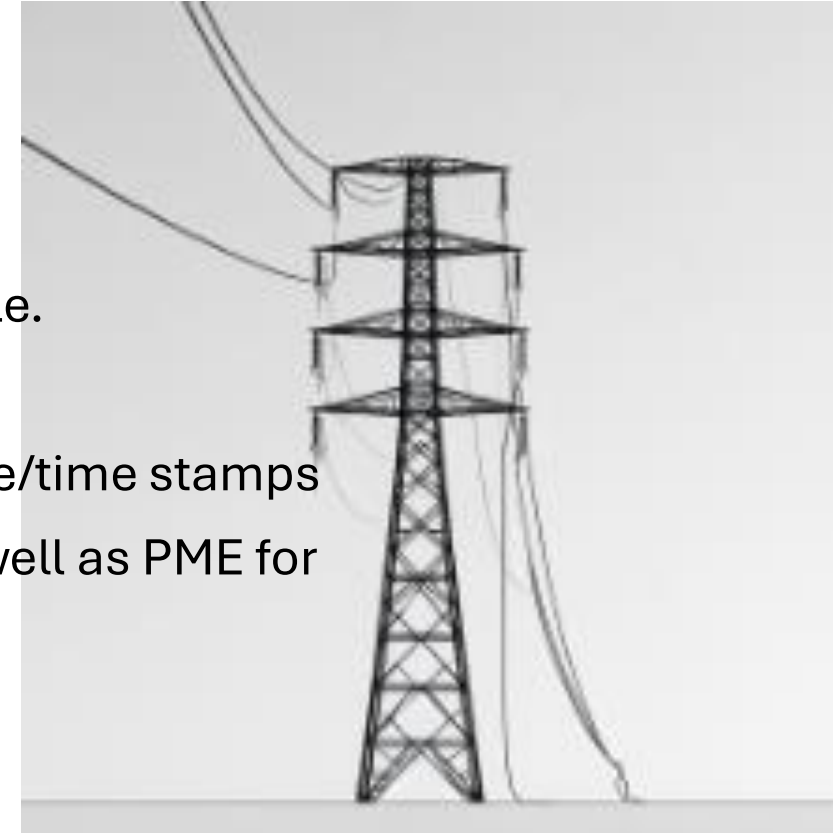


Wholesale Meter Power Reliability Case Study



Metering Summary:

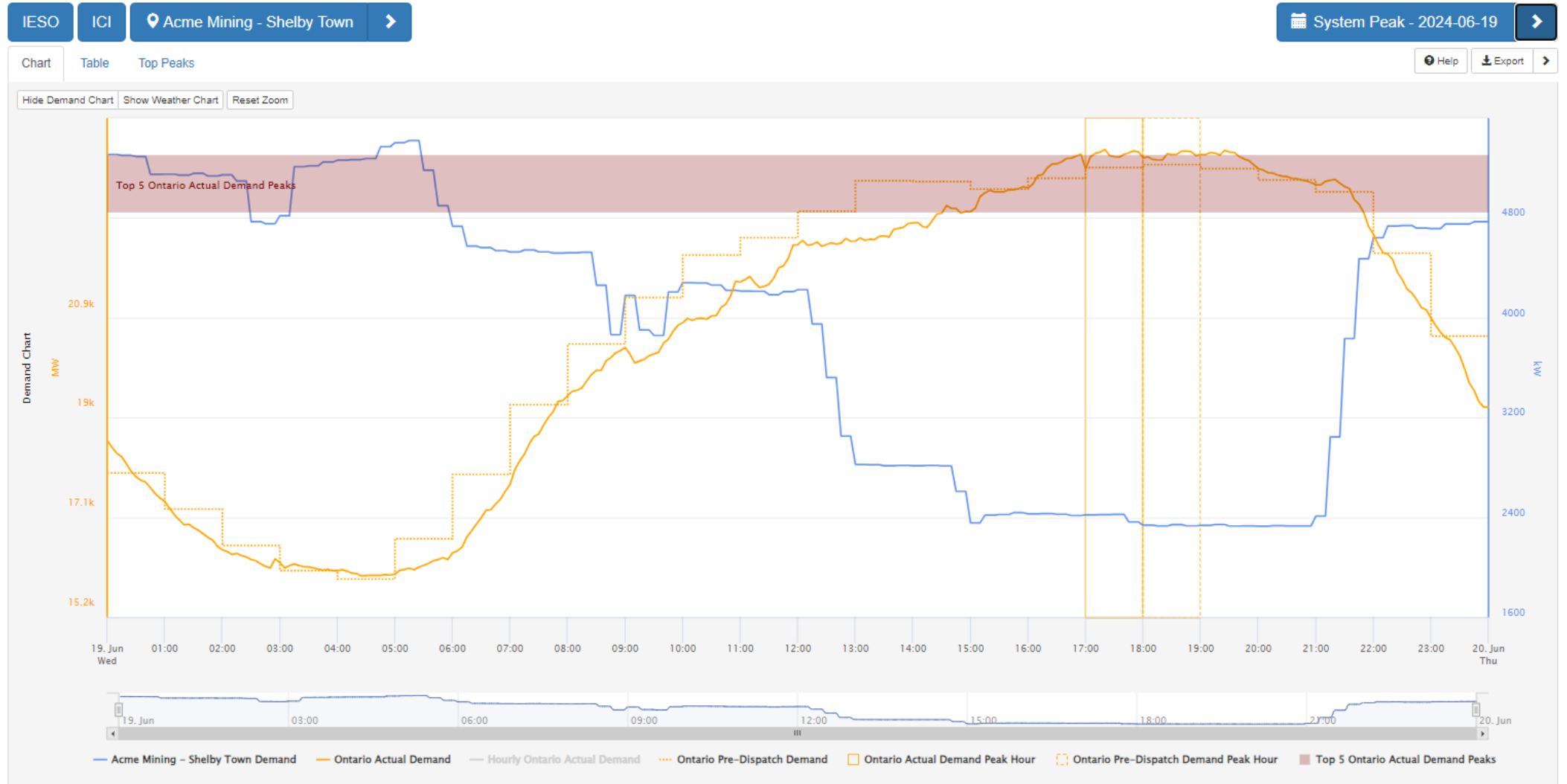
- Internal programming utilizing the Symmetrical component module.
- PME software for event recording and Dashboard monitoring.
- Logic will provide alarming for incidences as well as recording date/time stamps
- System link to client DCS for operation monitoring (real time), as well as PME for engineering reviews and management.



Facility Intelligence



Easily assess your load before, during and after events



Facility Intelligence



Benefits

Enhanced Monitoring: Clients can continuously monitor their energy usage patterns, helping them identify inefficiencies and areas for improvement.

Informed Decision-Making: Real-time data and analytics enable clients to make informed decisions about energy management, potentially leading to cost savings.

Operational Efficiency: By having a clear view of energy consumption, clients can optimize their operations to reduce waste and improve efficiency.

Flexibility and Convenience: The ability to access energy profiles from anywhere provides flexibility and convenience, especially for clients with multiple sites or remote operations.

Security: The secure web-based display ensures that sensitive energy data is protected from unauthorized access.

Rodan's platform is designed to empower clients with the tools they need to manage their energy usage effectively, ultimately leading to better resource management and cost savings.

The Rodan Advantage



24/7 NOC

We operate a 24/7 network operations center (NOC) to ensure continuous monitoring and support for your assets and business.



Automated Dispatch Tools

Utilized for over 5 years, this proprietary tool developed for dispatches, accepts and executes all dispatches sent from utilities for any Energy or Ancillary service program.



Forecasting

Multiple forecasting functions available from, dynamic forecasting models; PV forecasting, Facility Load Forecasting, Energy/OR price forecasting, and many more.



Industry leading software

Recipient of E+E Leader's 2024 top product award, Rodan offers innovative technology and tools that provide environmental and energy management and optimization.



Real time monitoring

Real-time monitoring and adjustment as required to take advantage of any energy arbitrage opportunities to optimize your assets.

Key Points



What do people want from their electrical system:

1. Reliability
2. Energy Information

Basic Infrastructure in most cases is already in place.

This is the building block to the foundation of your Energy, Operations, and PQ needs.

Questions?



Connect with Rodan Energy



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Thank you

Thank You!