Transforming RPU Engineering with PI

Ed Cortez and Rene Valdez

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Publicly Owned Electric & Water Utility

- Customers – 120,000
- Peak Load – 635 MW
- Service Area – 82 sq.mi.
  - Substations – 14
  - Generation – 250 MW
  - Photovoltaic – 35 MW
  - Transmission – 91 Mi
  - Distribution – 1323 Mi
  - Fiber – 96 Mi

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PI Systems at RPU

- EA License (Electric, Water & Generation)
- Unlimited tags, interfaces, and clients
- 24/7 PI System monitoring and technical support
- Enterprise Project Manager and Center of Excellence

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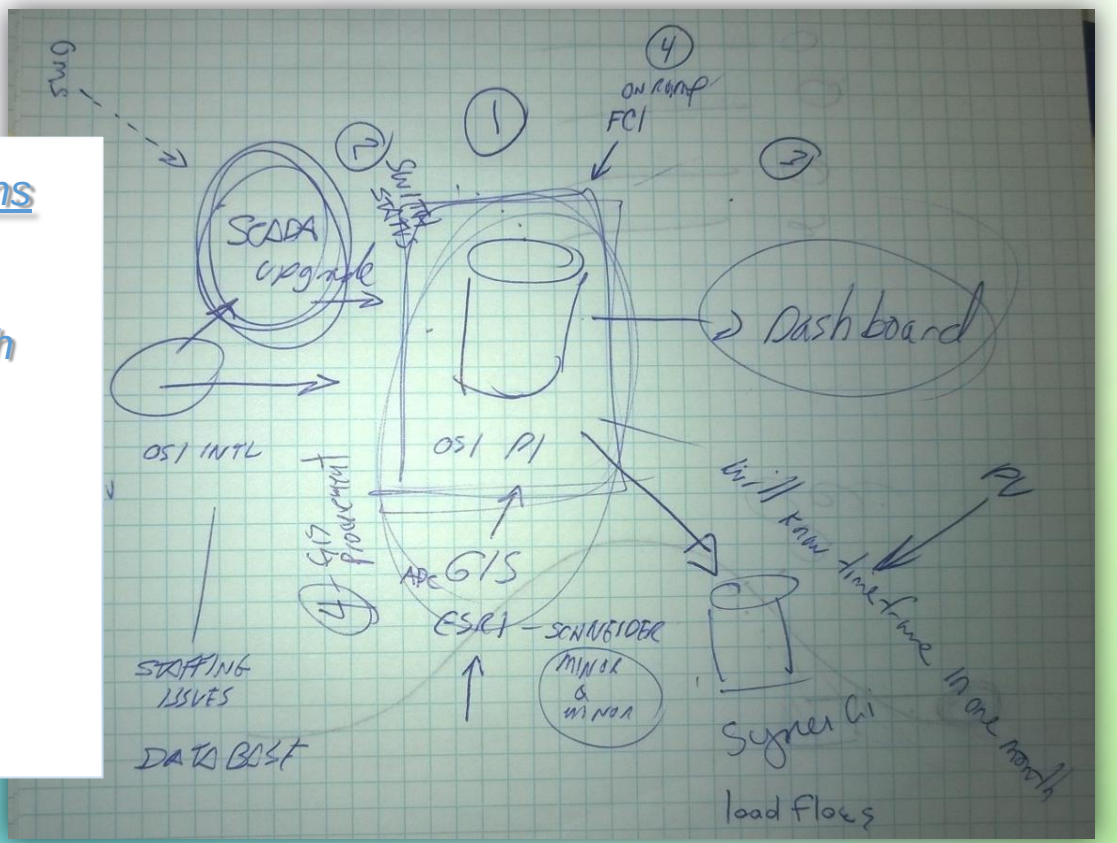
Business Challenge – *Start where you are*

T&D needs determined by applications that could readily talk to PI

- *SCADA (feeder loading and switch status)*
- *GIS (geo-spatial feeder models)*
- *IEDs (remote loading and fault indication)*
- *Simulation (distribution network)*



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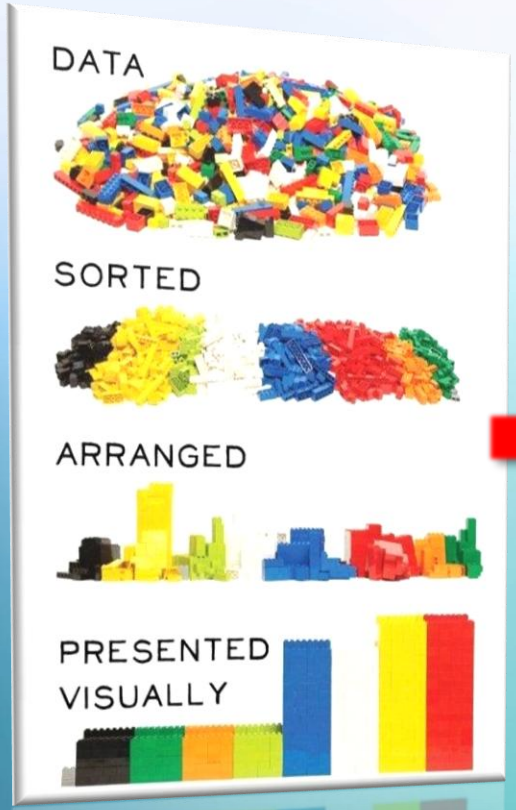
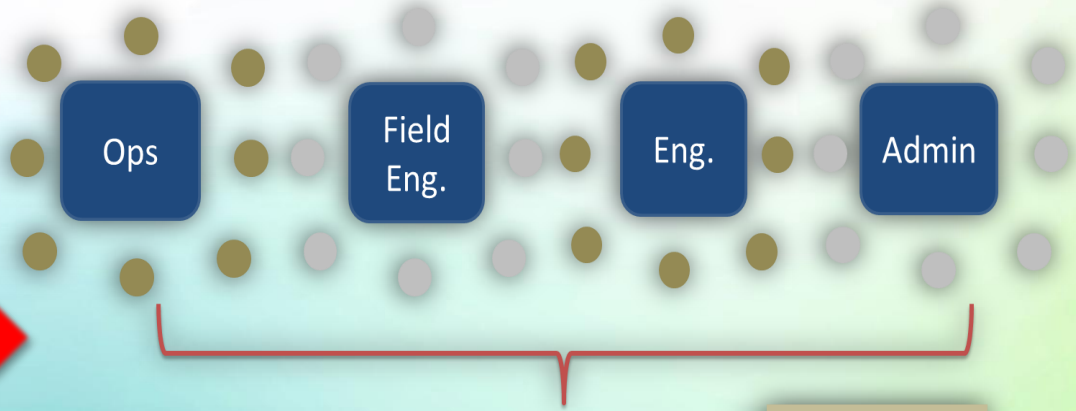
Business Challenge – *Use what you have*





- ✓ Combine different data sources
- ✓ Minimize data movement
- ✓ One platform for analytics
- ✓ One platform for data consumption
- ✓ Streamlined reporting
- ✓ Secure data archiving

OSIsoft PI → Analytics, Reporting, Archiving

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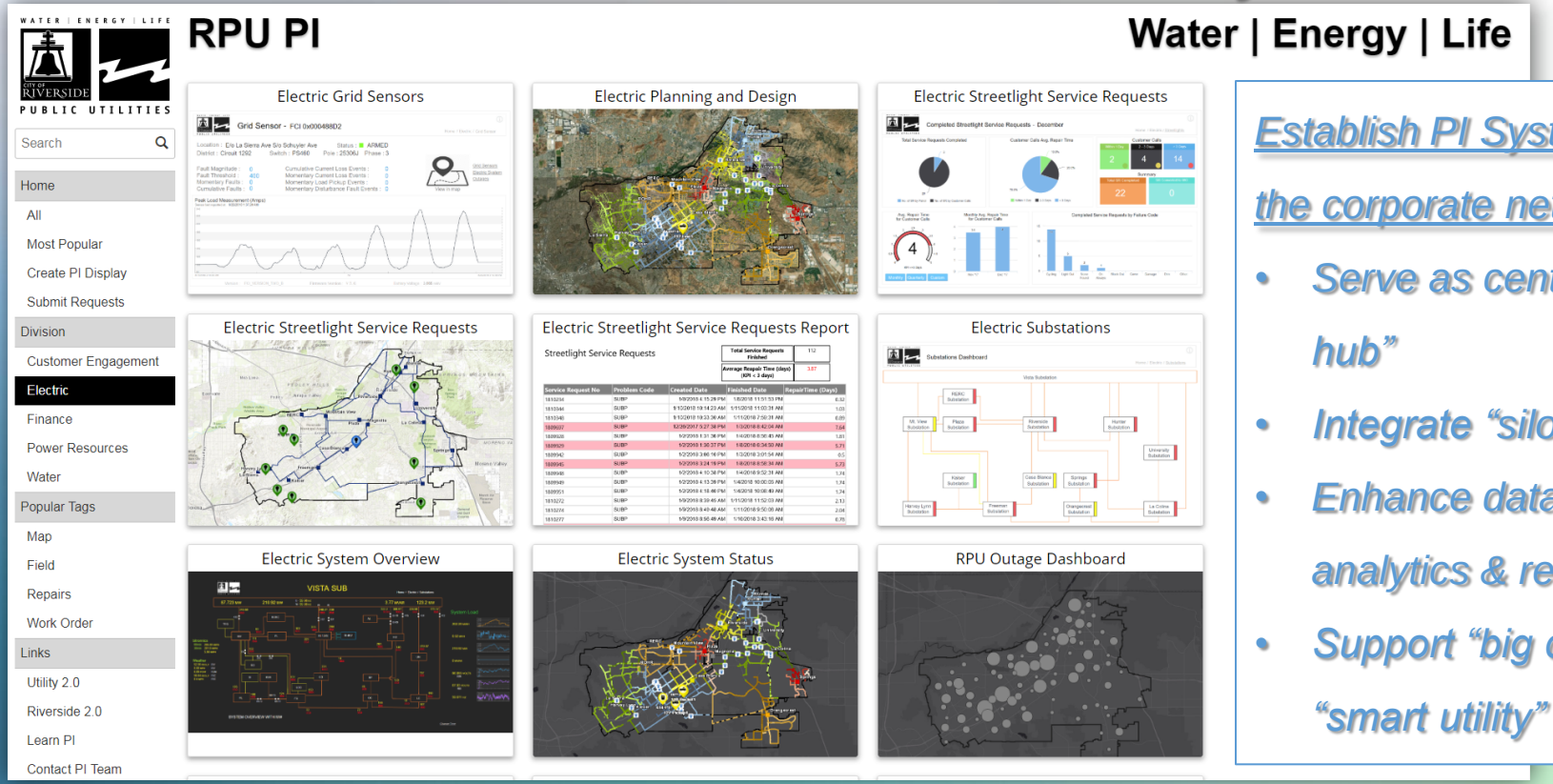
Business Challenge – *Do what you can*



[Establish PI System on the corporate network]

- Serve as central "data hub"
- Integrate "siloed" data
- Enhance data analytics & reporting
- Support "big data" & "smart utility" efforts

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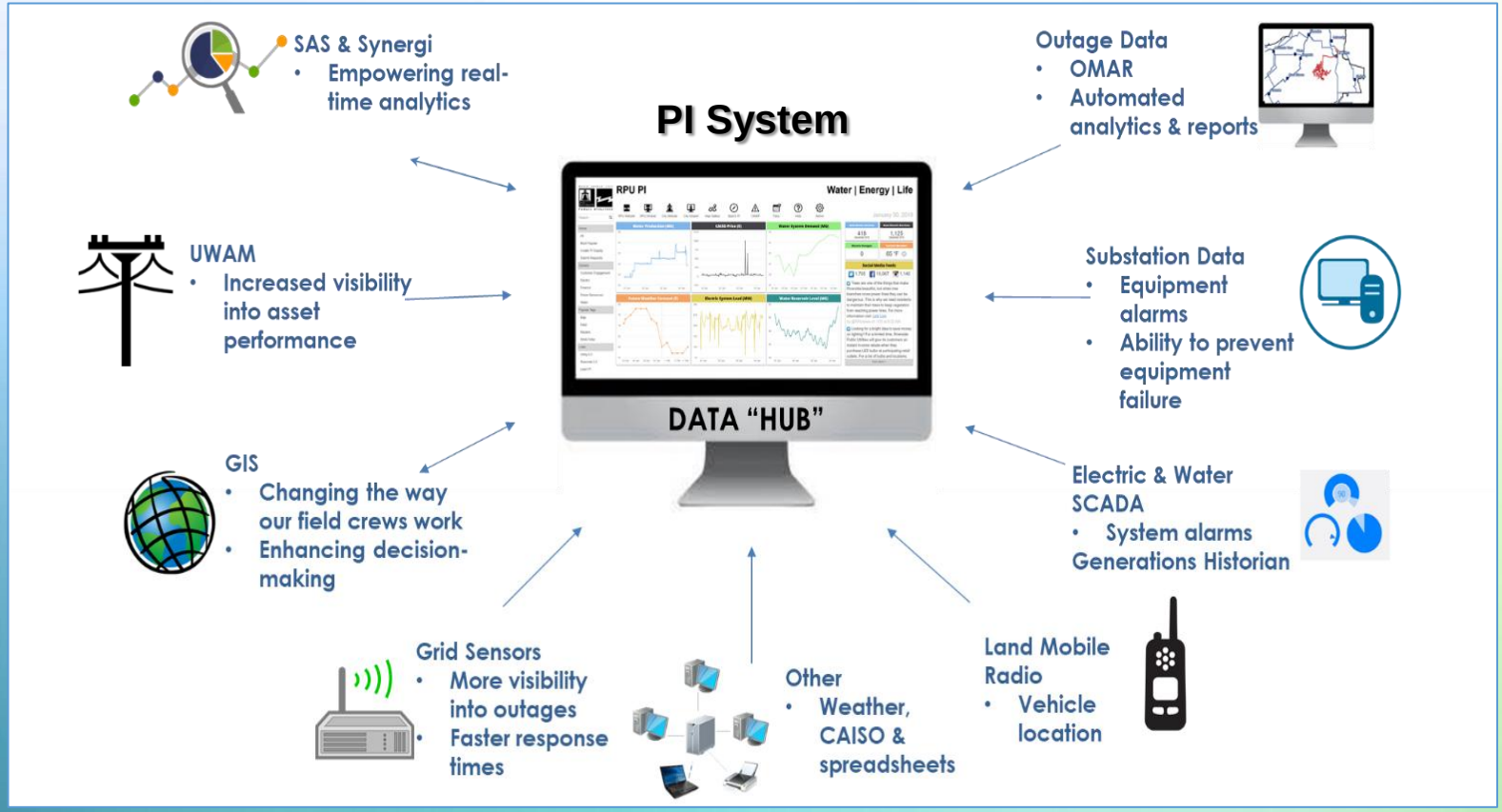
RPU PI System



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RPU PI Systems Benefits

- Improve operational efficiencies
- Reduce staff time and operating costs
- Increased visibility into systems and assets
- Ability to analyze incidents to determine cause and effect for establishing corrective actions
- Automation of manual workflow processes
- Increased proactive (predictive) operations to optimize the cost of operating the system
- Improved analytics of historical data for better capital improvement and resources planning

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“Time-Series” Analysis

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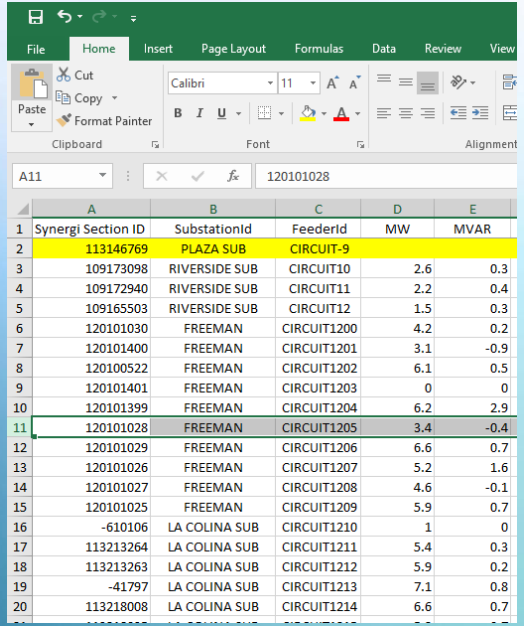
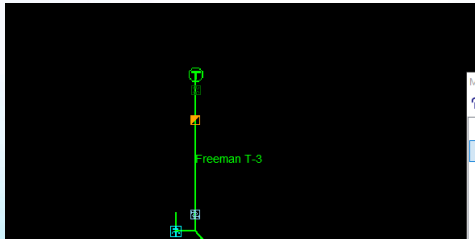
“Time-Series” analysis



	A	B	C	D	E
1	Synergi Section ID	SubstationId	FeederId	MW	MVAR
2	113146769	PLAZA SUB	CIRCUIT-9		
3	109173098	RIVERSIDE SUB	CIRCUIT10	2.6	0.3
4	109172940	RIVERSIDE SUB	CIRCUIT11	2.2	0.4
5	109165503	RIVERSIDE SUB	CIRCUIT12	1.5	0.3
6	120101030	FREEMAN	CIRCUIT1200	4.2	0.2
7	120101400	FREEMAN	CIRCUIT1201	3.1	-0.9
8	120100522	FREEMAN	CIRCUIT1202	6.1	0.5
9	120101401	FREEMAN	CIRCUIT1203	0	0
10	120101399	FREEMAN	CIRCUIT1204	6.2	2.9
11	120101028	FREEMAN	CIRCUIT1205	3.4	-0.4
12	120101029	FREEMAN	CIRCUIT1206	6.6	0.7
13	120101026	FREEMAN	CIRCUIT1207	5.2	1.6
14	120101027	FREEMAN	CIRCUIT1208	4.6	-0.1
15	120101025	FREEMAN	CIRCUIT1209	5.9	0.7
16	-610106	LA COLINA SUB	CIRCUIT1210	1	0
17	113213264	LA COLINA SUB	CIRCUIT1211	5.4	0.3
18	113213263	LA COLINA SUB	CIRCUIT1212	5.9	0.2
19	-41797	LA COLINA SUB	CIRCUIT1213	7.1	0.8
20	113218008	LA COLINA SUB	CIRCUIT1214	6.6	0.7



Freeman Sub - Notepad

File Edit Format View Help

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15221,Section_0006,3,FREEMAN T3 MAIN  SEL351S PHASE 3 AMPS AMPS,1

15221,120101028,1,FREEMAN 1205  PHASE 1 AMPS AMPS,1
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'Bank T4 and Circuits (Single Phase Amps)
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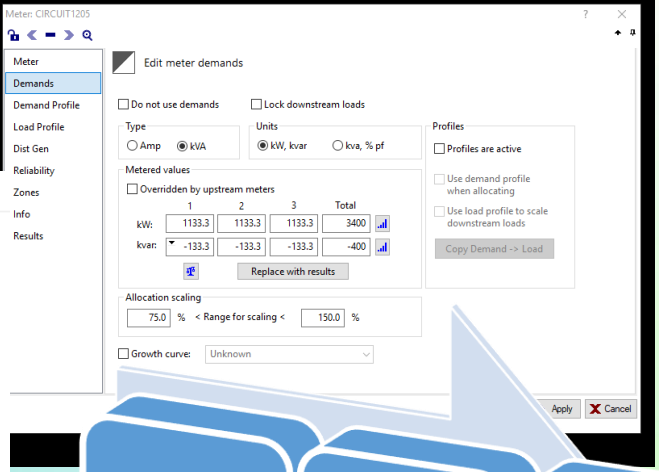

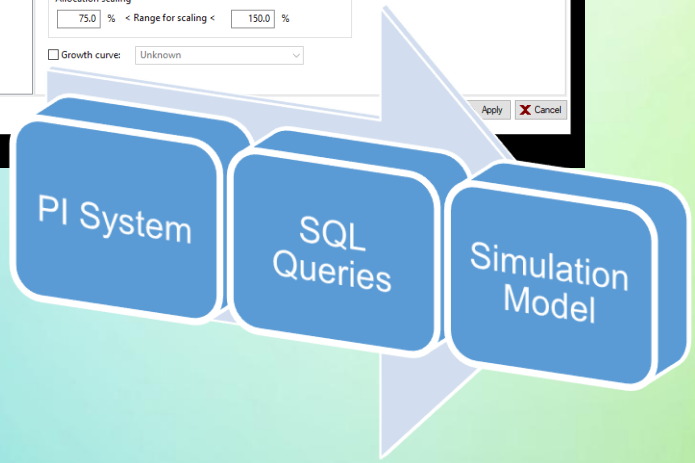

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“Time-Series” analysis

- PI OleDB driver
  - SQL queries used to connect to a PI Historian database through a PI OleDb driver
  - Once connected to the database, the “Application” retrieves values for the tags specified in the query
  - The values are then associated with parameters for various electrical facilities within the “Simulation Model”.
  - Analysis is done automatically
  - ***One-click***

“Easy” as PI

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DEMO

“Time-Series” Analysis

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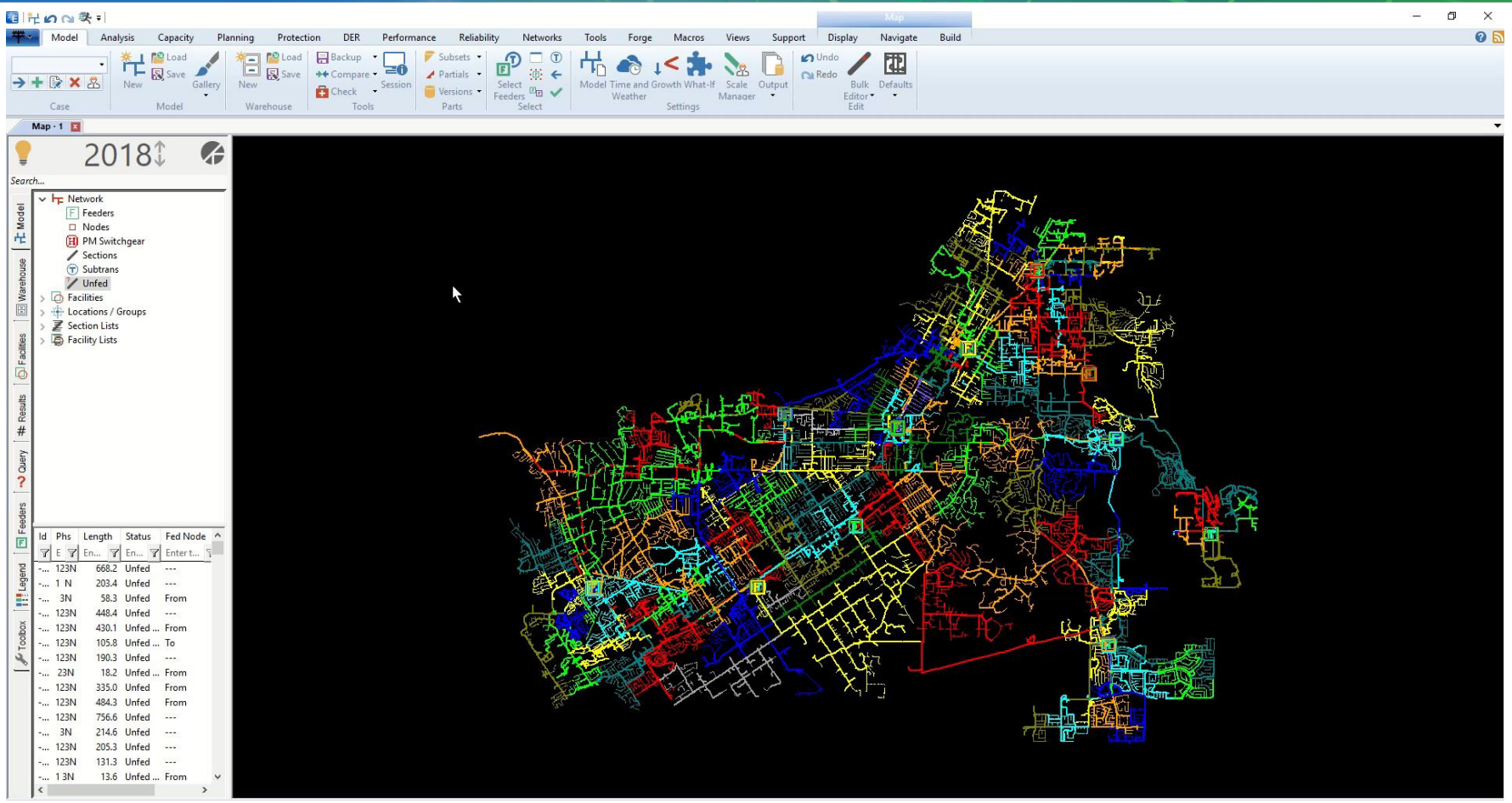

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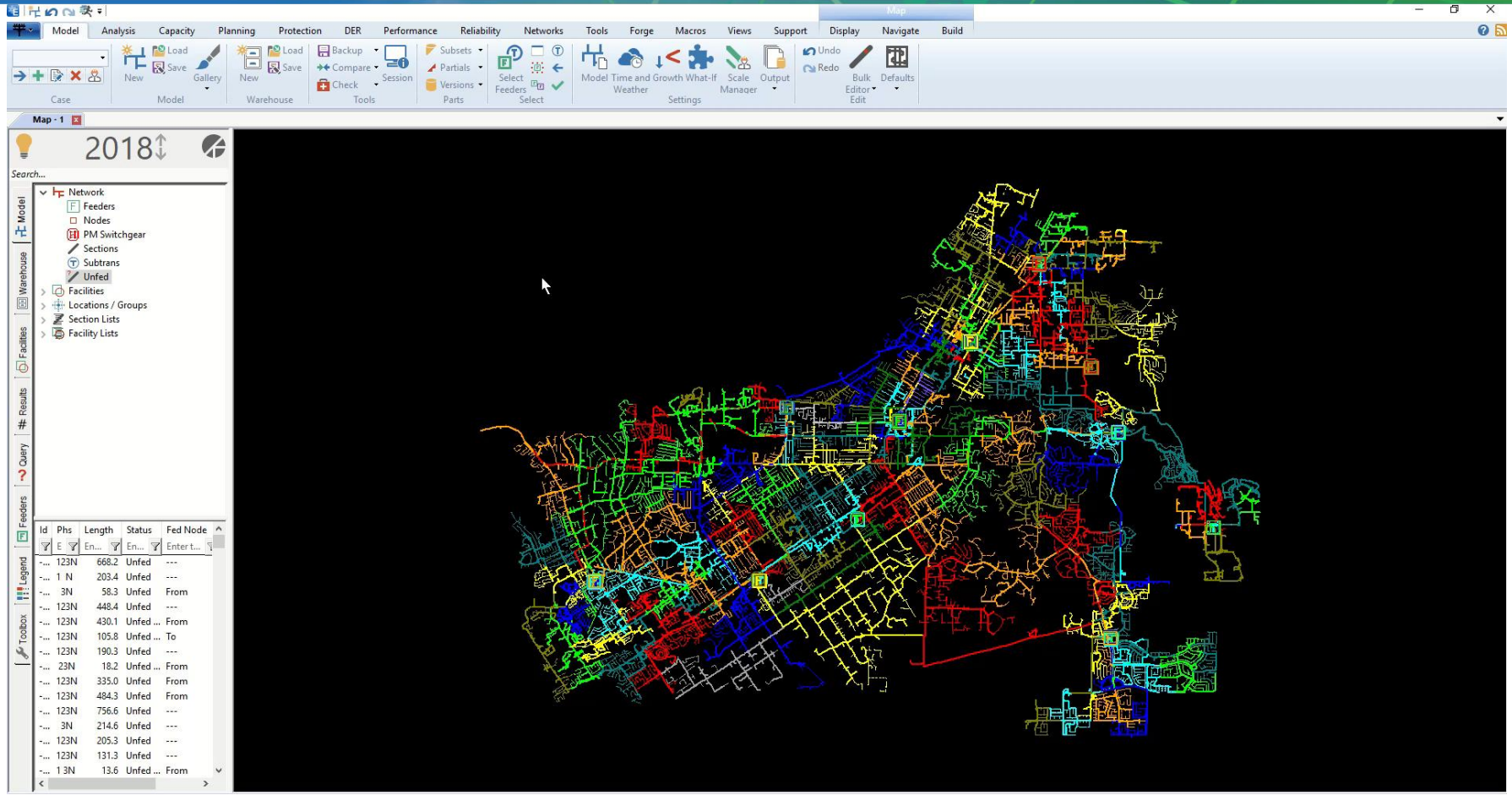

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Planning System Historian

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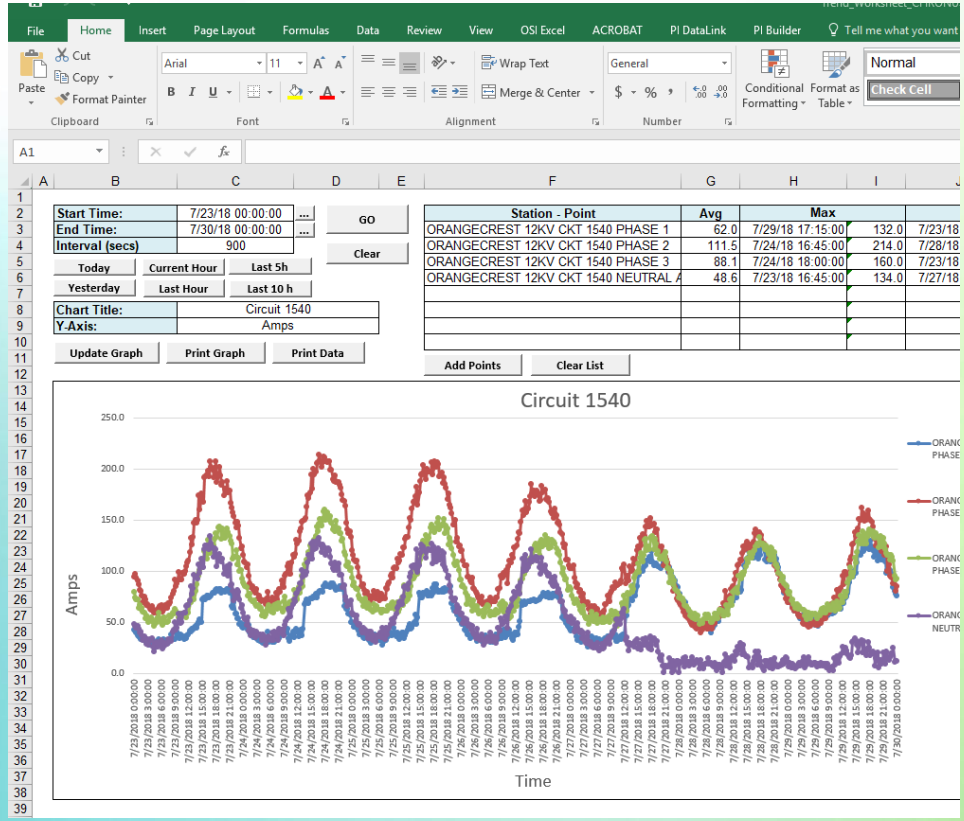
Planning System Historian

Outdated SCADA Historian

- Excel Based
- Manual configuration
- One chart at a time
- Only 3 months of data (crash)



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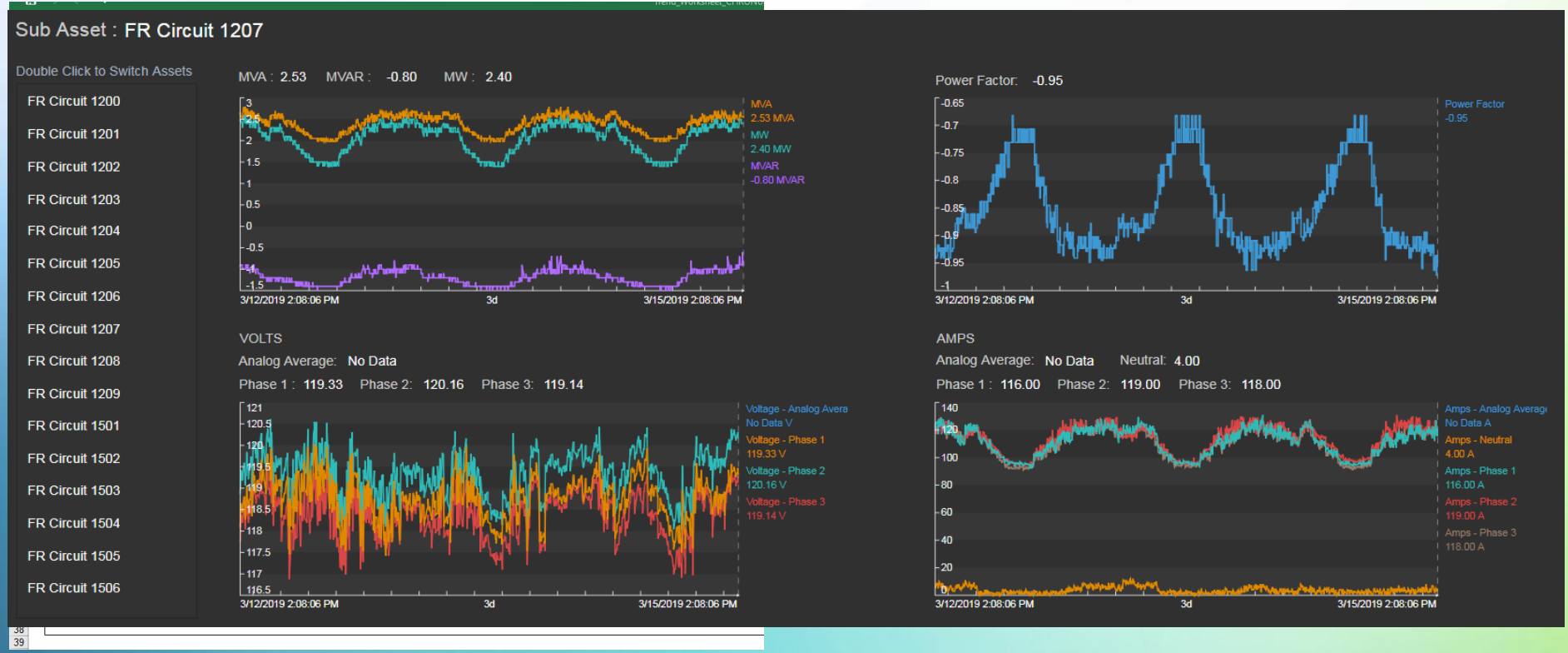
Planning System Historian



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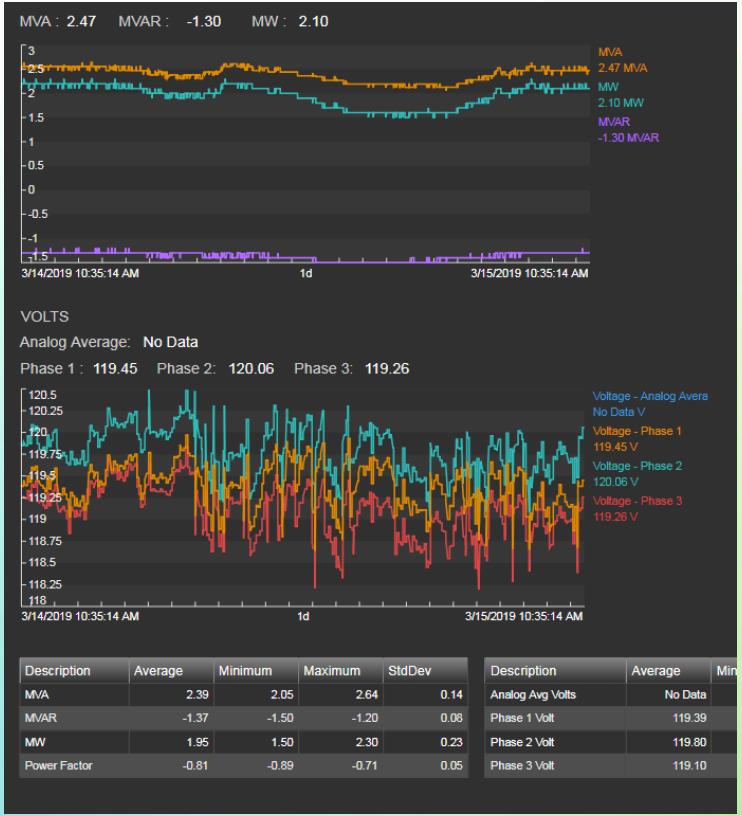
Planning System Historian

Actionable Intelligence

- Collaboration between engineers and operators
- Improved situational awareness
- Improved response times
- PI Asset Framework
- ***PI Vision***



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DEMO

Planning System Historian

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Point	Name

Service=[HDS.PDS_CDS] Resource=[PDS_CDS] Key=[03057005] SampleRate=[2000]
Service=[HDS.PDS_CDS] Resource=[PDS_CDS] Key=[03057006] SampleRate=[2000]
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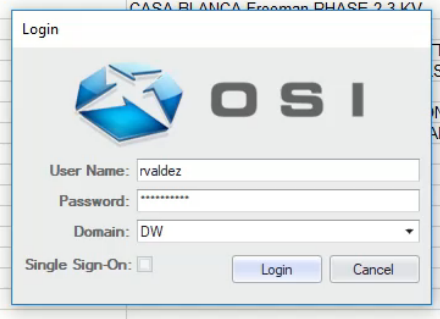
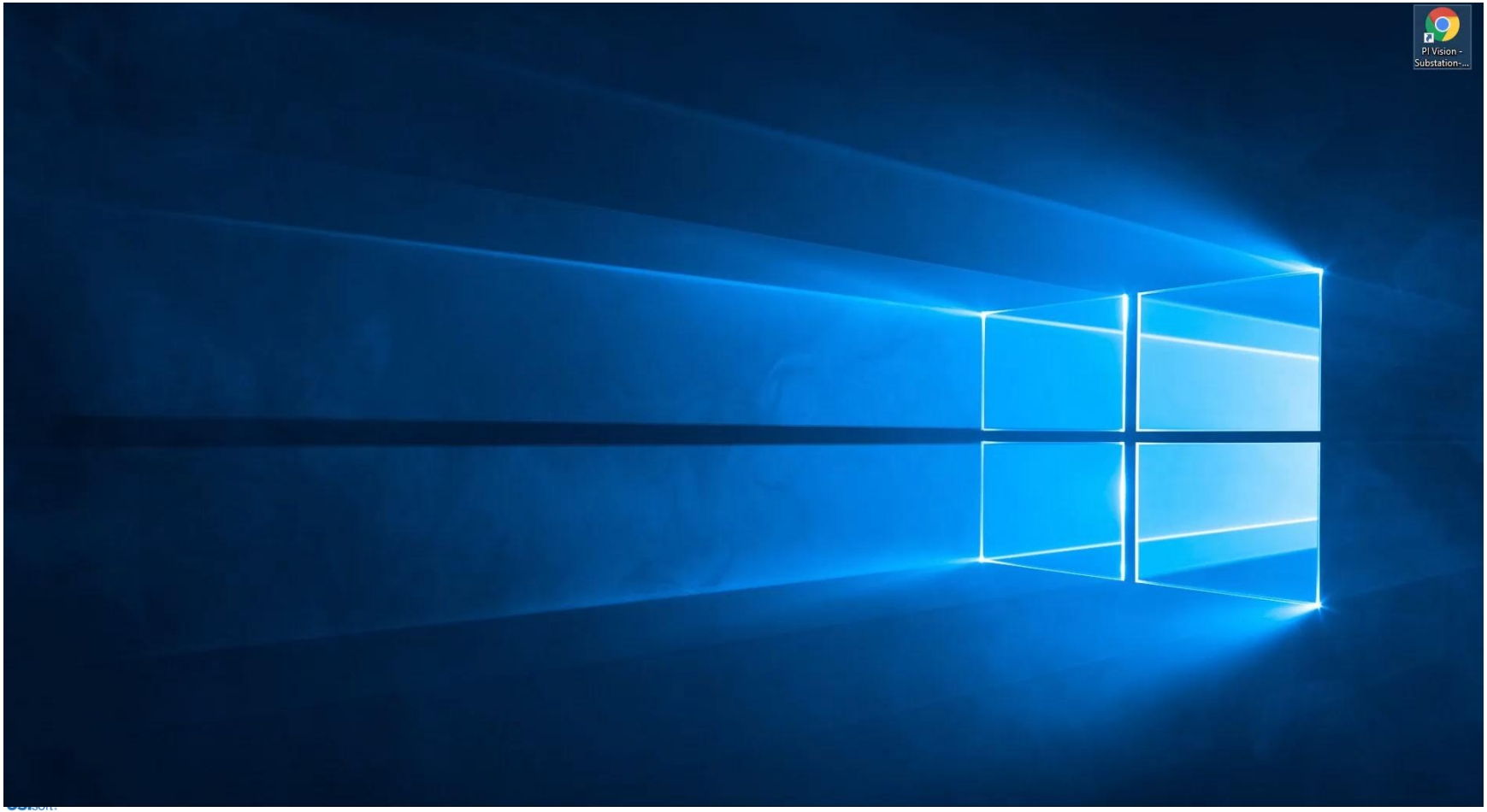


Chart | Data | Points



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Grid Sensors

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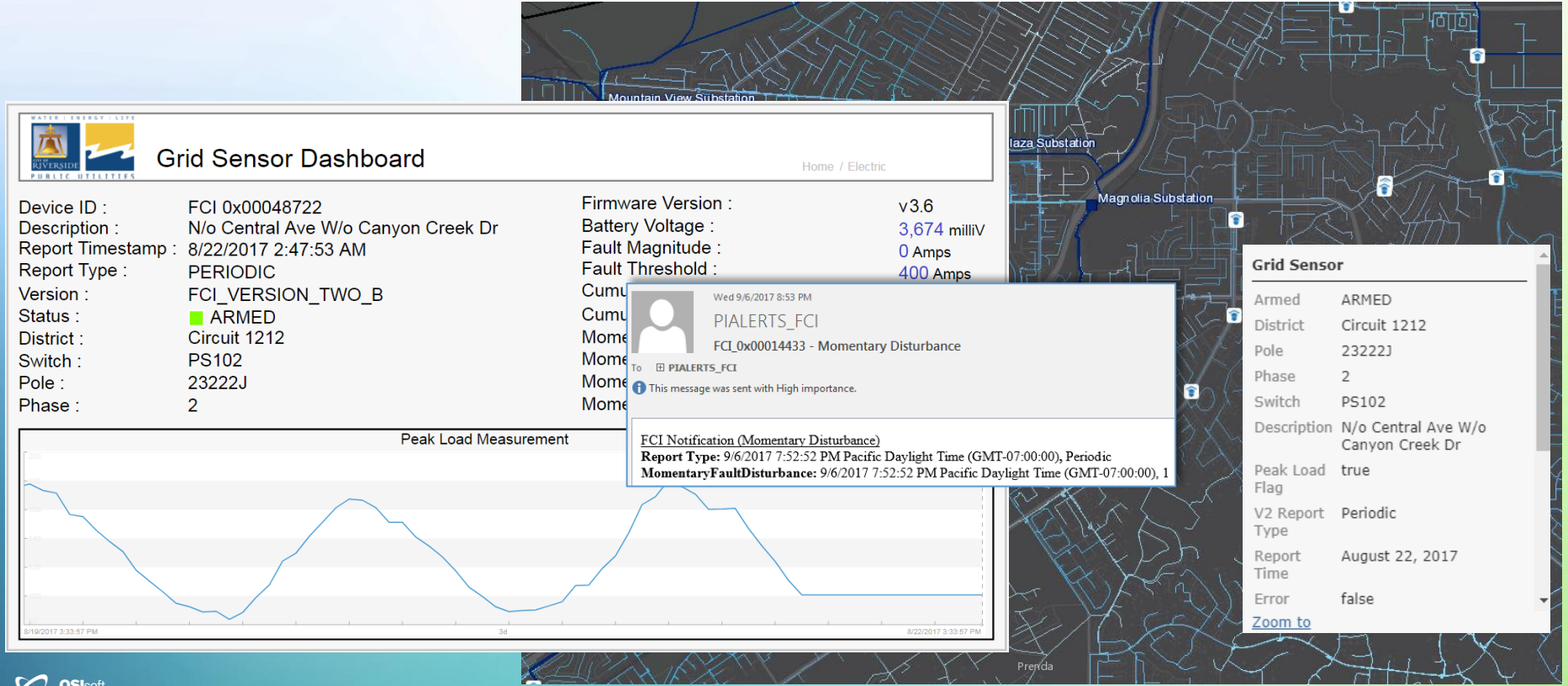
Distribution Grid Sensors



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Distribution Grid Sensors

Move from a reactive mode to a predictive mode to optimize the cost of operating the electric system and improving reliability

- XML Interface
- PI ESRI Integrator – geospatial circuit models + grid sensors = situational awareness
- PI email notifications and alerts
- ***PI Vision***

"Easy" as PI

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Future Applications

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Future Applications

- GIS Upgrade
- AMI
- PV Integration

"Easy" as PI

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Riverside Public Utilities

Transforming RPU Engineering with PI

CHALLENGE

Lack of central data management delays the decision-making processes

- Siloed information
- Isolated data sources
- Difficult to access

SOLUTION

Ability to view one consolidated dataset and provides the tools to exchange data within RPU's business systems

- Integrated T&D data from planning, engineering, and operations
- Single point of contact for getting data
- Open, flexible and scalable environment

RESULTS

Real-time information with visualization and reporting tools enables staff to focus on improving performance

- Improved efficiencies and response times
- Improved justification for Capital Improvement Projects
- $110,000/Year – Electric ROI
- $650,000/Year – Utility ROI

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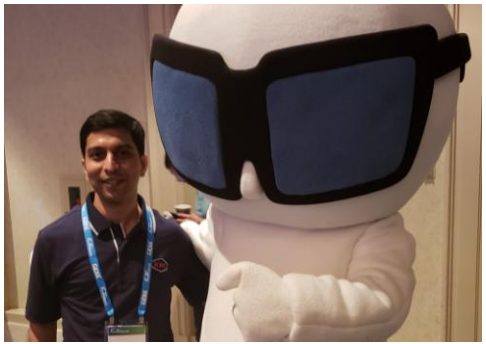

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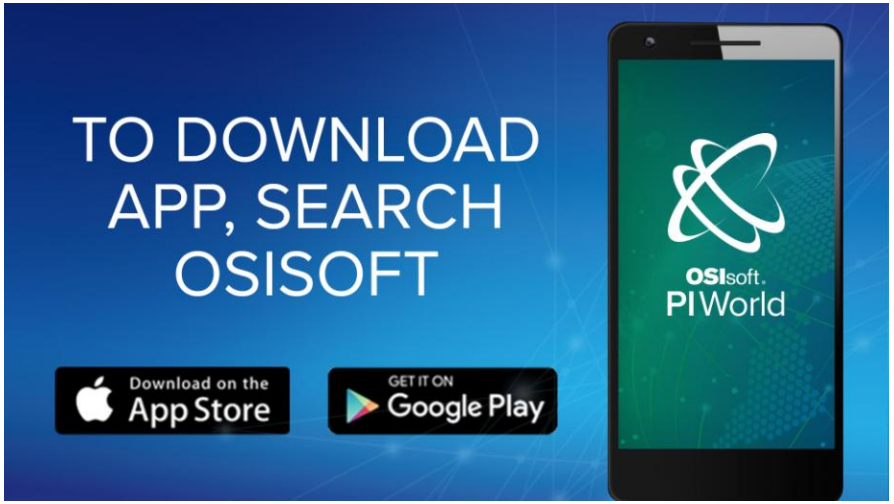
Questions?

Please wait for the **microphone**

State your **name & company**

Please remember



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