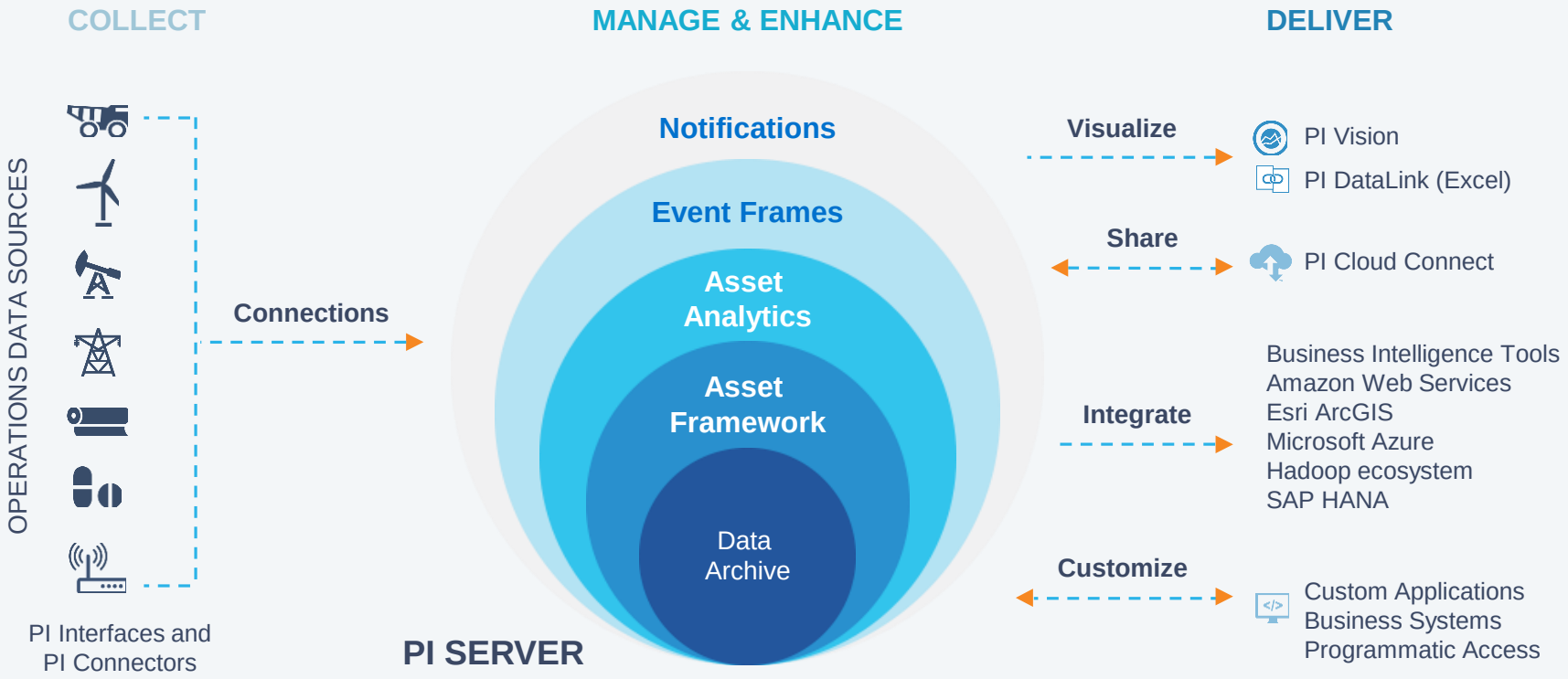
We believe that people with data can transform their world

We built the PI System to give people the tools that they need to collect, manage, enhance, and deliver that data

And you have helped to show us how we can add more tools

To create a modern PI System that is designed for today's opportunities and challenges

The Components of the **Modern** PI System



What does success look like with the modern PI System?

PI Vision

A unified visualization infrastructure to support your diverse needs across the enterprise in a seamless, powerful, extensible environment

How do our users employ PI Vision?

Interactive, cross-platform data dashboards

Anomaly and event comparison displays

Rapid data visualizations and exports

Asset-based analyses and investigations

PI Vision - Transformer Dissolved

dfwebapp.osisoft.com/PIVision/#/Displays/11626/Transformer-Dissolved-Gas-Analysis-Overview

OSIsoft PI Vision

New Display | OSI\dlopez

Transformer Dissolved Gas Analysis … (read-only) (explorer-mode) Asset: WAL TF1+

Export

ALPHA ENERGY | ASSET HEALTH

Overview | Regions | Substation | Equipment | Analysis

Transformer Dissolved Gas Analysis Overview | Walnut WAL TF1

CO2	1,440 ppm	
CO	389.2 ppm	
C2H6	0.6 ppm	
C2H4	0.6 ppm	
C2H2	0.2 ppm	
H2	8 ppm	
CH4	4.6 ppm	
N2	44,000 ppm	
O2	5,900 ppm	
H2O	2 ppm	

Name	Value
WAL TF1\Manufacturer	McLaren
WAL TF1\Model	1250
WAL TF1\Install Date	1/14/1984 11:00:00 PM
WAL TF1\Last Maintenance	12/31/2014 11:00:00 PM
WAL TF1\Maintenance Technician	Janet McDonald
WAL TF1\Asset Threshold	1E+05
WAL TF1\Run Hours Since Last Maintenance	Pt Created

Oil Temperature 33.03 °C
Transformer MVA 74.52 MVA

7/11/2020 12:05:04 PM | 31d | 8/11/2020 12:05:04 PM

7/11/2020 12:05:04 PM | 31d | Now | 8/11/2020 12:05:04 PM

PI Vision - Transmission and Distr

dfwebapp.osisoft.com/PIVision/#/Displays/208/Transmission-and-Distribution-v1P--Transformer

OSIsoft PI Vision

New Display | OSI\dlopez

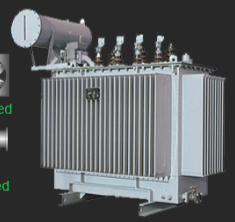
Transmission and Distribution v1P- Tr… *(read-only)* *(explorer-mode)* Asset: MAP TF1 ▼ Export

OSISOFT ELECTRIC

« Home « Region « Substation OSIsoft Electric Transformer: TF1

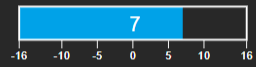
Substation: Maple

Manufacturer / Model:
Mitsubishi EED-190
Serial number:
SAS34903843092
Last maintenance:
6/1/2017
Last Work Order
TM05679-170601



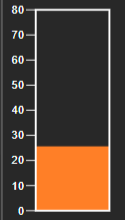
Stopped
Stopped

TAP position

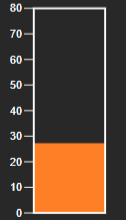


Transformer Availability

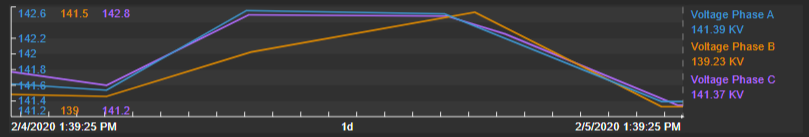
MW



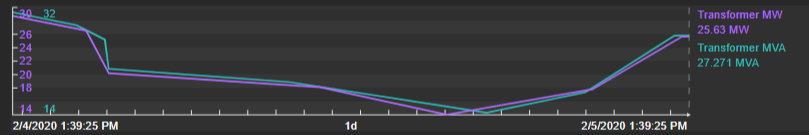
MVA



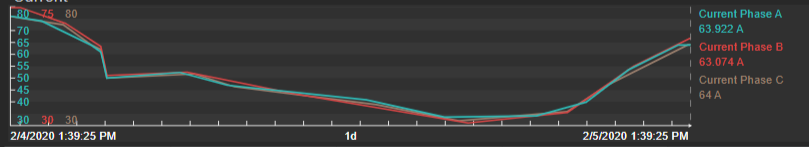
Voltage



Power



Current



Event Name	Asset	Start Time ▲	End Time	Acknowledgment
MPL TF-1 - LTC High TAP Count - 02/27/18 02:30	MAP TF1	2/27/2018 4:30:00 AM	In Progress	Acknowledge
MPL TF-1 - LTC High TAP	MAP TF1	4/11/2018 4:00:00 AM	In Progress	Acknowledge

Temperatures

Ambient Temperature:	0.00 °C
Transformer Oil:	36.98 °C
TAP changer Oil:	No Data °C
HV Winding:	39.26 °C
LV Winding:	37.30 °C

DGA

O2:	●	C2H2:	●
H2:	●	C2H4:	●
N2:	●	C2H6:	●
CO:	●	CH4:	●
CO2:	●	H2O:	●

2/4/2020 1:39:25 PM ◀ 1d ▶ Now 2/5/2020 1:39:25 PM

PI Vision - Power Generation - W

dfwebapp.osisoft.com/PIVision/#/Displays/11809/Power-Generation---Wind---Farm-Forecast

OSIsoft PI Vision

New Display | OSI\dlopez

Power Generation - Wind - Farm Fore… *(read-only)* *(explorer-mode)* Asset: Windtopia+

Export

Windtopia

Farm Forecast: Black Mesa Wind Farm

- Power Home
- Wind Home
- Farm Performance
- Farm Forecast
- Turbine Operations
- Turbine Schematic

Change Context: Big Buffalo Wind Farm Black Mesa Wind Farm Black Wolf Wind Farm

Monthly Revenue

12,176 $

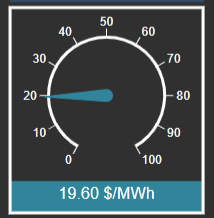
75,000 70,000 60,000 50,000 40,000 30,000 20,000 10,000 0

Daily Revenue

635.03 $

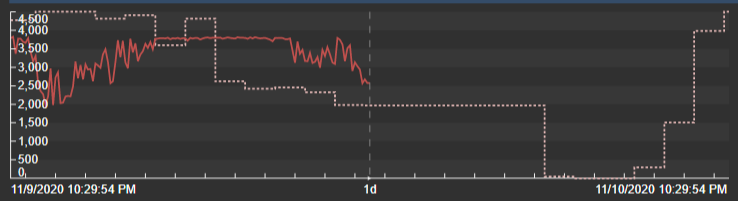
100 90 80 70 60 50 40 30 20 10 0

Power Price

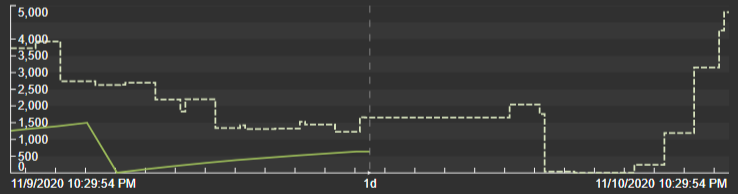


19.60 $/MWh

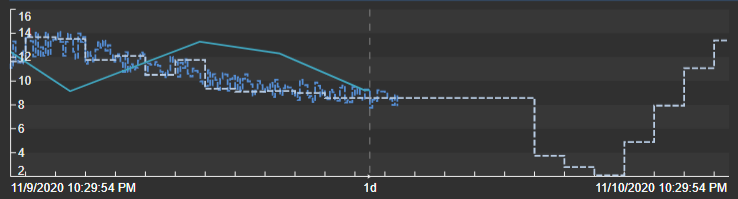
Power Generation vs Forecast



Revenue and Generation Forecast



Wind Speed Forecast



11/9/2020 10:29:53 PM 1d Now 11/10/2020 10:29:53 PM

PI Vision - AE_AH_Executive

dfwebapp.osisoft.com/PIVision/#/Displays/11606/AE_AH_Executive

OSIsoft PI Vision

New Display | OSI\dlopez

AE_AH_Executive *(read-only) (explorer-mode)* Asset: Alpha+

Export

ALPHA ENERGY

Overview | Regions | Substation | Equipment | Analysis

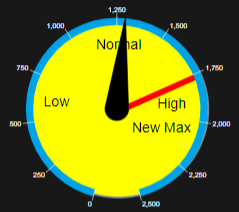
System Demand

Current Demand	Forecast Demand
1,290.6 MW	790.26 MW

Percent of Max Demand YTD 65 %

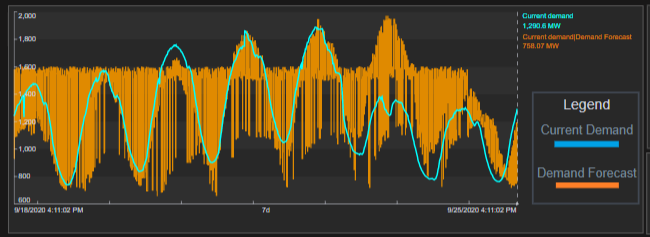
Max Demand YTD	Highest Recorded
1,888.2 MW	1,972 MW

System Demand



1,290.6 MW

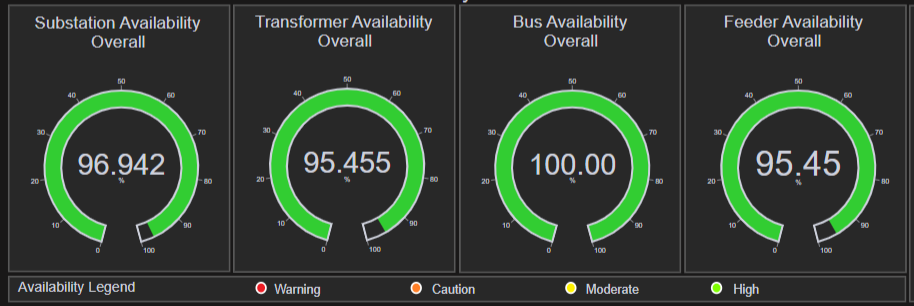
Current Demand vs Forecast



Reliability Metrics

SAIDI	8.6308 min	Avg outage duration/customer
SAIFI	0.14144	Avg number of outages / customer
CAIDI	55.33 min	Avg outage duration for customers
Index of Reliability	0.99976	

Availability Metrics



Station Alarm Level

ALD	APP	BEE	BIR
CAN	CED	COC	COT
DUR	EKK	FRO	HIC
KAR	KOT	LAU	MAP
OAK	PER	POP	PUR
TEA	WAL	WIL	

Legend - Alarm Level

Critical
Alert
Warning
Normal

Ambient Temperatures

Central Region 81.8 °F

East Region 27.0 °F

West Region 36.5 °F

Alpha Energy - Customers

Total	Central Region	East Region	West Region
123,469	52,140	38,009	33,320

9/18/2020 4:11:02 PM | 7d | Now | 9/25/2020 4:11:02 PM

PI Vision - AE_AH_TransformersO

dfwebapp.osisoft.com/PIVision/#/Displays/11615/AE_AH_TransformersOverview

OSIsoft PI Vision

New Display | OSI\dlopez

AE_AH_TransformersOverview *(read-only) (explorer-mode)* Asset: ALD TF1+ Export

ALPHA ENERGY | ASSET HEALTH

Overview | Regions | Substation | Equipment | Analysis

Transformers Overview

Legend Transformer Status: In Service | Not In Service | Under Repair | Under Maintenance | Spare | No Data

MAP TF1 — In Service — Load 45.12 MVA — Cooling Status Stage1 Normal Stage2 Normal — Temperatures: Oil, Ambient, HV Winding, LV Winding — 8/4/2020 12:10:02 PM 8/11/2020 12:10:02 PM

MAP TF2 — In Service — Load 22.02 MVA — Cooling Status Stage1 Normal Stage2 Normal — Temperatures: Oil, Ambient, HV Winding, LV Winding — 8/4/2020 12:10:02 PM 8/11/2020 12:10:02 PM

POP TF1 — In Service — Load 57.35 MVA — Cooling Status Stage1 Normal Stage2 Normal — Temperatures: Oil, Ambient, HV Winding, LV Winding — 8/4/2020 12:10:02 PM 8/11/2020 12:10:02 PM

POP TF2 — In Service — Load 55.96 MVA — Cooling Status Stage1 Normal Stage2 Normal — Temperatures: Oil, Ambient, HV Winding, LV Winding — 8/4/2020 12:10:02 PM 8/11/2020 12:10:02 PM

WAL TF1 — In Service — Load 74.65 MVA — Cooling Status Stage1 Normal Stage2 Normal — Temperatures: Oil, Ambient, HV Winding, LV Winding — 8/4/2020 12:10:02 PM 8/11/2020 12:10:02 PM

WAL TF2 — In Service — Load 69.2 MVA — Cooling Status Stage1 Normal Stage2 Normal — Temperatures: Oil, Ambient, HV Winding, LV Winding — 8/4/2020 12:10:02 PM 8/11/2020 12:10:02 PM

8/4/2020 12:10:02 PM | 7d | Now | 8/11/2020 12:10:02 PM

Events

Automatically refresh the list

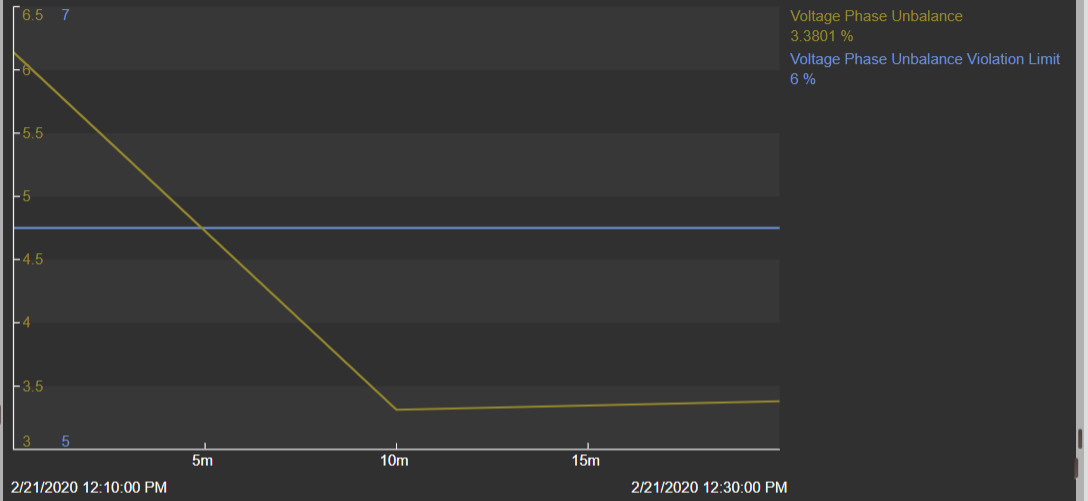
- OSIDEMO_FD111 Voltage Phase Unbalan…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- **OSIDEMO_FD111 Voltage Phase Unbalan…**
  2/21/2020 12:10:00 PM - 2/21/2020 12:30:00 PM
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Unbalan…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Unbalan…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Unbalan…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Unbalan…
- OSIDEMO_FD111 Voltage Phase Limit Vi…
- OSIDEMO_FD111 Voltage Phase Limit Vi…

Edit Search Criteria

OSIDEMO_FD111 Voltage Phase Unbalance 2020-02-21 12:10:00.000

2/21/2020 12:10:00 PM - 2/21/2020 12:30:00 PM

Event Type: Voltage Phase Unbalance
Asset: ...\Energy and Power Data\Assets\FD111



Trigger Attributes (2) FD111	Start Value	End Value	Units
FD111 Voltage Phase Unbalance	6.1392	3.3801	%
FD111 Voltage Phase Unbalance Violation Limit	6	6	%

Event Attributes (4) OSIDEMO_FD111 Voltage Phase Unbalance 2020-02-21 12:10:00.000	Value	Units
OSIDEMO_FD111 Voltage Phase Unbalance 2020-02-21 12:10:00.000	4.0824	%

Comments

Add Comment

Phase imbalance was .139% over the max violation limit; incident is under investigation by D. Lopez

Incident report.txt

Add

Actions and Comments (0)

Assets

Search in Substation Relay Data

- Home
- Substation Transformer Monitoring
- Substation Relay Data
  - Q9X2 21/112A
  - R5G8 21/112A

Attributes

- MaxPhaseCurrentTime
- TriggerTime

Live Event Report Data - Voltage

- VA
- VB
- VC
- Vdc
- VS

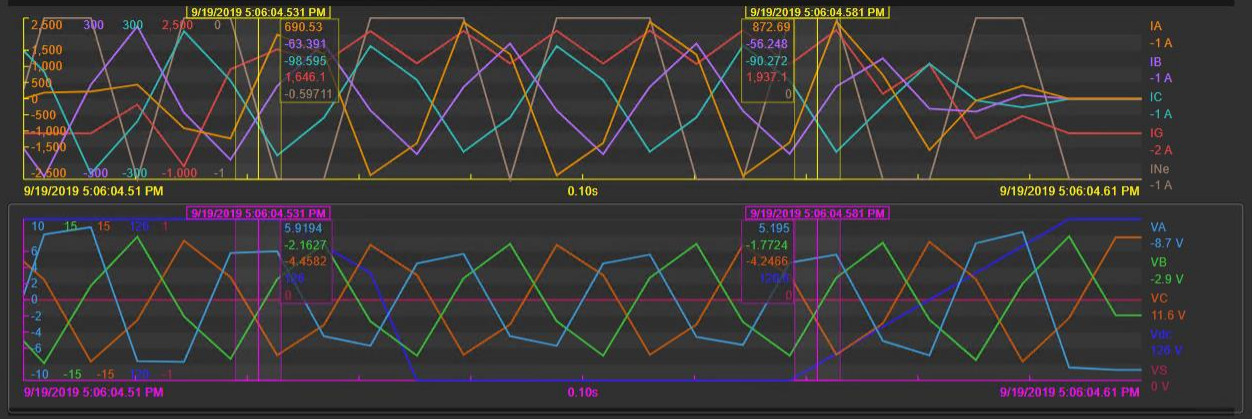
Metadata

- Element Name
- Element Path
- Element Template Name
- Parent Element Name
- PI Data Archive Name

Substation Relay Event Display Asset: Q9X2 21/112A

PI Vision Home

Substation Relay Event Data: Q9X2 21/112A

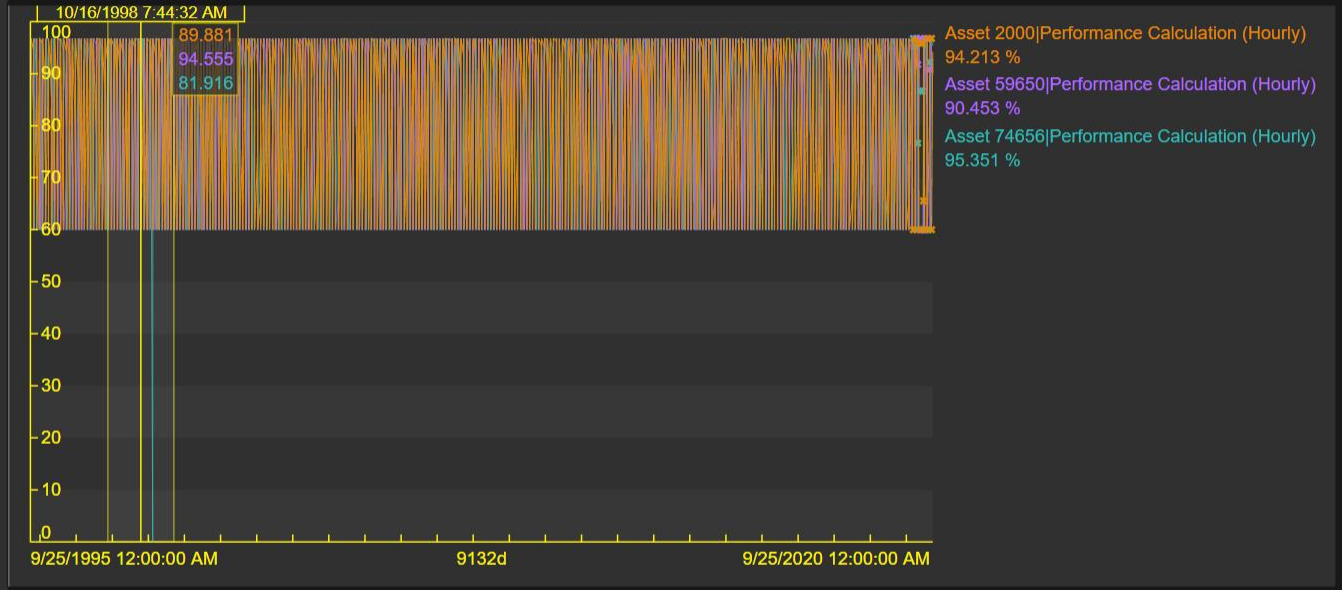


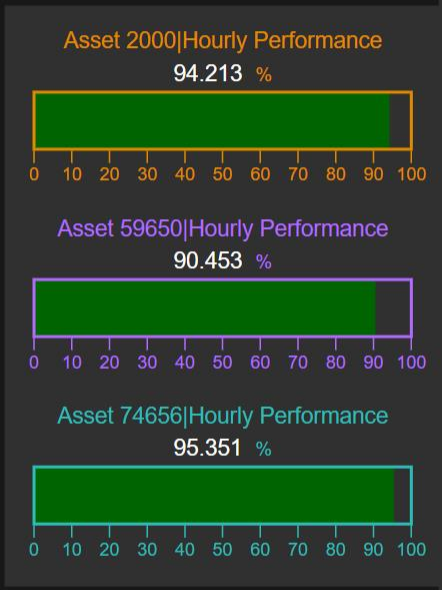
Name	Value	Units	Time	Trend	Average	Minimum	Maximum
Q9X2 21/112A|MaxPhaseCurrentTime	9/19/2019 5:06:04.582687 PM		9/19/2019 5:06:04 PM		N/A	N/A	N/A
Q9X2 21/112A|TriggerTime	9/19/2019 5:06:04.524338 PM		9/19/2019 5:06:04 PM		N/A	N/A	N/A
Q9X2 21/112A|Detailed Event File Data End	9/19/2019 5:06:04.607681 PM		9/19/2019 5:06:04 PM		N/A	N/A	N/A
Q9X2 21/112A|Detailed Event File Data Start	9/19/2019 5:06:04.491012 PM		9/19/2019 5:06:04 PM		N/A	N/A	N/A
Q9X2 21/112A|Frequency	60.32	Hz	9/19/2019 5:06:04 PM		60.009	59.72	60.32
Q9X2 21/112A|In	2...		9/19/2019 5:06:04 PM		N/A	N/A	N/A
Q9X2 21/112A|Out	1....		9/19/2019 5:06:04 PM		N/A	N/A	N/A

Name	Value	Units	Time	Trend	Average	Minimum	Maximum
Q9X2 21/112A|Curr	4,364.4		9/19/2019 5:06:04 PM		4,364.4	4,364.4	4,364.4
Q9X2 21/112A|Dist	3.09		9/19/2019 5:06:04 PM		3.09	3.09	3.09
Q9X2 21/112A|Dur	5		9/19/2019 5:06:04 PM		5	5	5
Q9X2 21/112A|EType	1CA		9/19/2019 5:06:04 PM		N/A	N/A	N/A

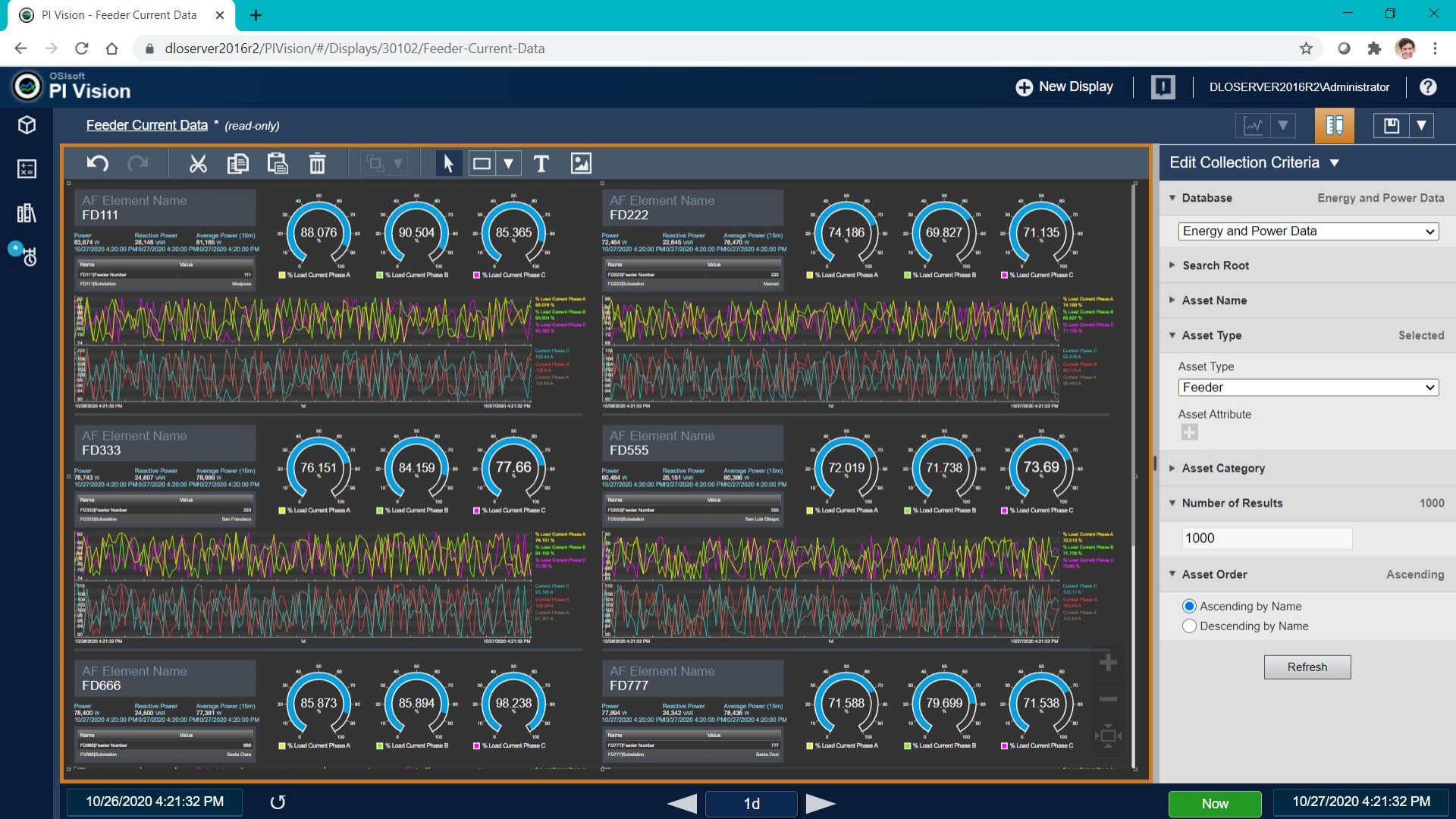
PI Vision Home

Hourly Performance Monitoring





Path	Value	Units	Time	Trend	Average	Minimum	Maximum
\\DLOSERVER2016R2\DB1\Performance Monitoring\Asset 2000|Performance Calculation (Hourly)	94.213	%	9/25/2020 12:00:00 AM		88.99	60	96.761
\\DLOSERVER2016R2\DB1\Performance Monitoring\Asset 59650|Performance Calculation (Hourly)	90.453	%	9/25/2020 12:00:00 AM		88.983	60	96.761
\\DLOSERVER2016R2\DB1\Performance Monitoring\Asset 74656|Performance Calculation (Hourly)	95.351	%	9/25/2020 12:00:00 AM		88.997	0	96.761


PI Vision - Feeder Current Data
dloserver2016r2/PIVision/#/Displays/30102/Feeder-Current-Data
OSIsoft
PI Vision
New Display
DLOSERVER2016R2\Administrator
Feeder Current Data * (read-only)
AF Element Name
FD111
88.076
90.504
85.365
% Load Current Phase A
% Load Current Phase B
% Load Current Phase C
AF Element Name
FD222
74.186
69.827
71.135
AF Element Name
FD333
76.151
84.159
77.66
AF Element Name
FD555
72.019
71.738
73.69
AF Element Name
FD666
85.873
85.894
98.238
AF Element Name
FD777
71.588
79.699
71.538
Edit Collection Criteria
Database
Energy and Power Data
Energy and Power Data
Search Root
Asset Name
Asset Type
Selected
Asset Type
Feeder
Asset Attribute
Asset Category
Number of Results
1000
1000
Asset Order
Ascending
Ascending by Name
Descending by Name
Refresh
10/26/2020 4:21:32 PM
1d
Now
10/27/2020 4:21:32 PM

PI Vision - Data Query Display

dloserver2016r2/PIVision/#/Displays/120111/Data-Query-Display

OSIsoft PI Vision

New Display | DLOSERVER2016R2\Administrator

Data Query Display * *(read-only)*

Asset	Current Power Generation	Air Temperature	Humidity	Last Service Date	Manufacturer	Model	Status	Visibility
Array 1	2,902.4 kW	85.445 °F	66.961 %	1/6/2015 10:00:00 AM	MMotors	74656	GENERATING	10 mi
Array 10	4,095 kW	95.074 °F	46.777 %	11/1/2015 2:30:00 PM	CEngineering	NX01	GENERATING	10 mi
Array 11	3,101 kW	95.222 °F	43.554 %	9/1/2015 3:00:00 PM	KDY	74205	GENERATING	10 mi
Array 12	3,191.5 kW	96.148 °F	45.558 %	11/1/2015 2:30:00 PM	KDY	NX2000	GENERATING	10 mi
Array 13	3,130.5 kW	95.154 °F	39.777 %	11/14/2015 11:00:00 AM	MMotors	74656	GENERATING	10 mi
Array 14	2,861 kW	96.148 °F	38.925 %	12/1/2015 9:00:00 AM	MMotors	NX01	GENERATING	10 mi
Array 15	2,818 kW	96.075 °F	39.704 %	9/1/2015 3:00:00 PM	CEngineering	74205	GENERATING	10 mi
Array 16	3,492.3 kW	94.074 °F	45.777 %	12/1/2015 9:00:00 AM	CEngineering	NX2000	GENERATING	10 mi
Array 17	3,408.5 kW	93.142 °F	45.629 %	11/1/2015 2:30:00 PM	KDY	74656	GENERATING	10 mi
Array 18	1,944.8 kW	92.926 °F	46.999 %	9/1/2015 3:00:00 PM	KDY	NX01	GENERATING	10 mi
Array 19	1,549.7 kW	91.704 °F	51.343 %	11/14/2015 11:00:00 AM	MMotors	74205	GENERATING	9.7996 mi
Array 2	2,556.8 kW	87.926 °F	60.704 %	9/1/2015 3:00:00 PM	MMotors	NX01	GENERATING	10 mi
Array 20	3,706.8 kW	97.075 °F	38.925 %	12/1/2015 9:00:00 AM	MMotors	NX2000	GENERATING	9.9948 mi
Array 21	3,311.3 kW	93.148 °F	48.258 %	1/6/2015 10:00:00 AM	CEngineering	74656	GENERATING	10 mi
Array 22	2,985.7 kW	93 °F	46.926 %	11/1/2015 2:30:00 PM	CEngineering	NX01	GENERATING	10 mi
Array 23	3,688.7 kW	94.062 °F	45.78 %	11/14/2015 11:00:00 AM	KDY	74205	GENERATING	10 mi
Array 24	3,182 kW	92.222 °F	46.777 %	11/1/2015 2:30:00 PM	KDY	NX2000	GENERATING	10 mi
Array 25	4,095 kW	94.074 °F	36.852 %	11/1/2015 2:30:00 PM	MMotors	74656	GENERATING	10 mi
Array 3	3,448.2 kW	93.296 °F	37.406 %	11/1/2015 2:30:00 PM	CEngineering	74205	GENERATING	10 mi
Array 4	3,466 kW	92.145 °F	39.777 %	11/14/2015 11:00:00 AM	CEngineering	NX2000	GENERATING	10 mi
Array 5	3,078.6 kW	99.222 °F	36.704 %	9/1/2015 3:00:00 PM	KDY	74656	GENERATING	10 mi
Array 6	2,972.6 kW	99.222 °F	34.555 %	11/14/2015 11:00:00 AM	KDY	NX01	GENERATING	10 mi
Array 7	3,042.9 kW	97.075 °F	35.703 %	9/1/2015 3:00:00 PM	MMotors	74205	GENERATING	10 mi
Array 8	2,956.4 kW	94.223 °F	42.703 %	9/1/2015 3:00:00 PM	MMotors	NX2000	GENERATING	10 mi
Array 9	3,011.6 kW	95.148 °F	39.703 %	1/6/2015 10:00:00 AM	CEngineering	74656	GENERATING	10 mi

Search Criteria

- Database: Power
- Search Root: Regions\Completed\Southwest\Solar Arrays
- Asset Name
- Asset Type: Selected

Asset Type: Solar Array Template

Asset Attribute: Current Power Gen > 1000; Status = GENERATIN

Select the asset template associated with the asset

- Asset Category: Any
- Number of Results: 2000
- Asset Order: Ascending

(•) Ascending by Name
( ) Descending by Name

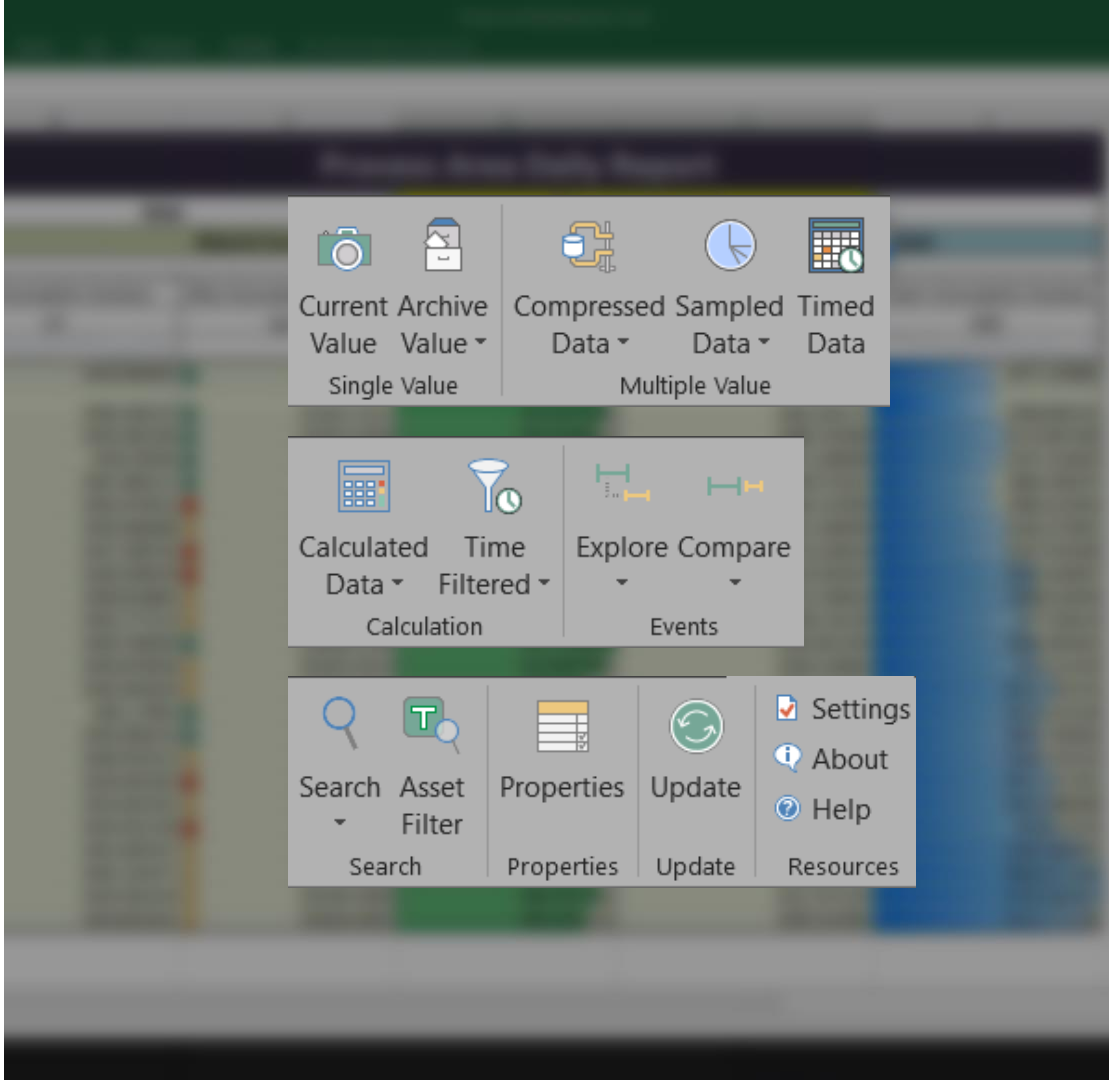
Refresh

9/18/2020 8:57:27 AM | 8h | Now | 9/18/2020 4:57:27 PM

What does success look like with the modern PI System?

PI DataLink

Directly integrate your PI Server data with Microsoft® Excel® so you can easily analyze operational data using the powerful analytic features of your spreadsheets



Energy and Power Usage PI DataLink Report.xlsx - Excel

File Home Insert Page Layout Formulas Data Review View Developer Add-ins PI DataLink PI Builder Team Tell me what you want to do... Dan Lopez Share

Current Value | Archive Value | Compressed Data | Sampled Data | Timed Data | Calculated Data | Time Filtered | Explore | Compare | Search | Asset Filter | Properties | Update | Settings | About | Help

Single Value | Multiple Value | Calculation | Events | Search | Properties | Update | Resources

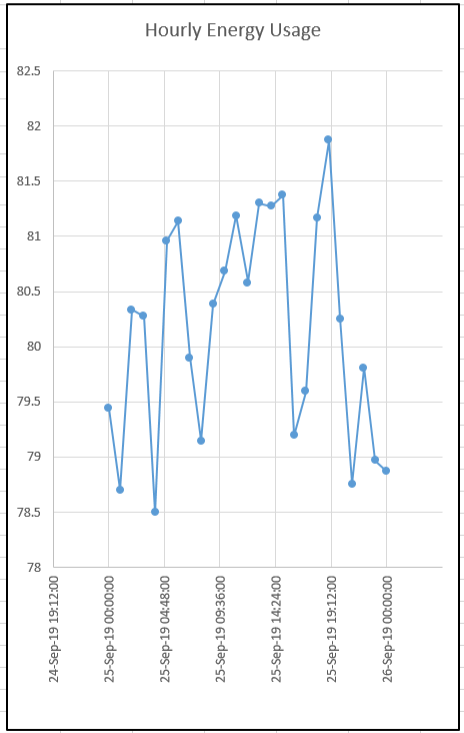
A1

Energy and Power Usage Report

Start Time	t-1d
End Time	t
Area	\\DLOSERVER2016R2\Energy and Power Data\California\Oakland\San Francisco

Power	(kW)
Number of Values:	145
25-Sep-19 00:00:00	76.82925
25-Sep-19 00:10:00	79.35840625
25-Sep-19 00:20:00	83.09313281
25-Sep-19 00:30:00	77.72229688
25-Sep-19 00:40:00	76.94194531
25-Sep-19 00:50:00	76.89392969
25-Sep-19 01:00:00	79.62839063
25-Sep-19 01:10:00	75.03315625
25-Sep-19 01:20:00	79.4133125
25-Sep-19 01:30:00	83.075929969
25-Sep-19 01:40:00	84.93694531
25-Sep-19 01:50:00	81.58017969
25-Sep-19 02:00:00	76.30688281
25-Sep-19 02:10:00	78.51828906
25-Sep-19 02:20:00	80.63177344
25-Sep-19 02:30:00	78.25932031
25-Sep-19 02:40:00	85.43714844
25-Sep-19 02:50:00	79.44571875
25-Sep-19 03:00:00	82.42900781
25-Sep-19 03:10:00	77.50446875
25-Sep-19 03:20:00	78.15780469
25-Sep-19 03:30:00	80.08211719
25-Sep-19 03:40:00	78.78891406

Hourly Energy Usage	(kWh)
25-Sep-19 00:00:00	79.43931641
25-Sep-19 01:00:00	78.70642188
25-Sep-19 02:00:00	80.33452669
25-Sep-19 03:00:00	80.27669922
25-Sep-19 04:00:00	78.49662044
25-Sep-19 05:00:00	80.96041862
25-Sep-19 06:00:00	81.13873763
25-Sep-19 07:00:00	79.90521029
25-Sep-19 08:00:00	79.14534701
25-Sep-19 09:00:00	80.38401302
25-Sep-19 10:00:00	80.68214974
25-Sep-19 11:00:00	81.18750846
25-Sep-19 12:00:00	80.58791927
25-Sep-19 13:00:00	81.29944076
25-Sep-19 14:00:00	81.27172982
25-Sep-19 15:00:00	81.37146484
25-Sep-19 16:00:00	79.19738151
25-Sep-19 17:00:00	79.59452995
25-Sep-19 18:00:00	81.17129948
25-Sep-19 19:00:00	81.87114583
25-Sep-19 20:00:00	80.25097917
25-Sep-19 21:00:00	78.76302669
25-Sep-19 22:00:00	79.81083398
25-Sep-19 23:00:00	78.96978255



Report Areas

Ready 90%

Transformer Summary

Start	End
25-Oct-18	01-NOV-18

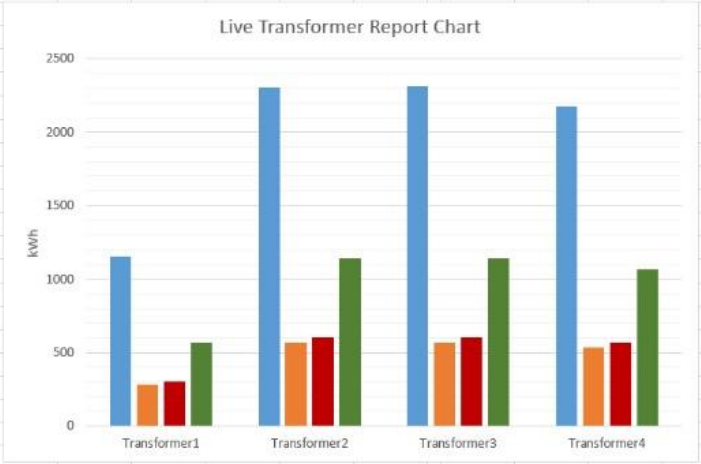
Summary

Transformer Totals	kWh	Shoulder	Peak	OffPeak
Transformer1	1157.398104	284.1146765	302.6162002	570.6170874
Transformer2	2307.314821	566.3111115	603.3528214	1138.028961
Transformer3	2308.618921	567.3156319	604.1453209	1138.622101
Transformer4	2173.770032	538.183857	569.2841873	1066.756142

Selected Transformer

Transformer1

Meter totals	kWh	Shoulder	Peak	OffPeak
6000	73.86497068	16.07544565	18.93602479	38.85350037
6001	168.7473726	40.20955896	44.5914793	83.94633341
6002	32.38909411	10.76919246	8.224327624	13.39557385
6003	50.67891932	8.288259923	13.68035454	28.7103045
6004	36.28805351	14.12327498	9.286082447	12.87869656
6005	74.83223295	16.27636206	19.17230487	39.38356495
6006	166.2530918	39.74675155	44.08061242	82.42572689
6007	32.22618008	10.70595795	8.175771713	13.34445095
6008	51.14297891	8.35590297	13.79120535	28.99587107
6009	35.96893954	14.00050378	9.205389857	12.76304549
6010	72.79782915	15.83436155	18.65168071	38.31178665
6011	166.379776	39.72315788	44.05347323	82.60314322
6012	32.81330514	10.87546533	8.304471433	13.63336813
6013	50.46614194	8.250711679	13.61810577	28.59732485
6014	36.19054961	14.1015625	9.272140443	12.81684679
6015	72.80700731	15.81908941	18.63298166	38.35493493
6016	167.8863916	39.98529577	44.34242201	83.55867338
6017	32.46188593	10.7745086	8.227834404	13.45954287
6018	50.14130235	8.189605296	13.51645994	28.43523669
6019	36.39726758	14.19803786	9.335900724	12.86332911
6020	73.34597921	15.93802786	18.77314281	38.63480926

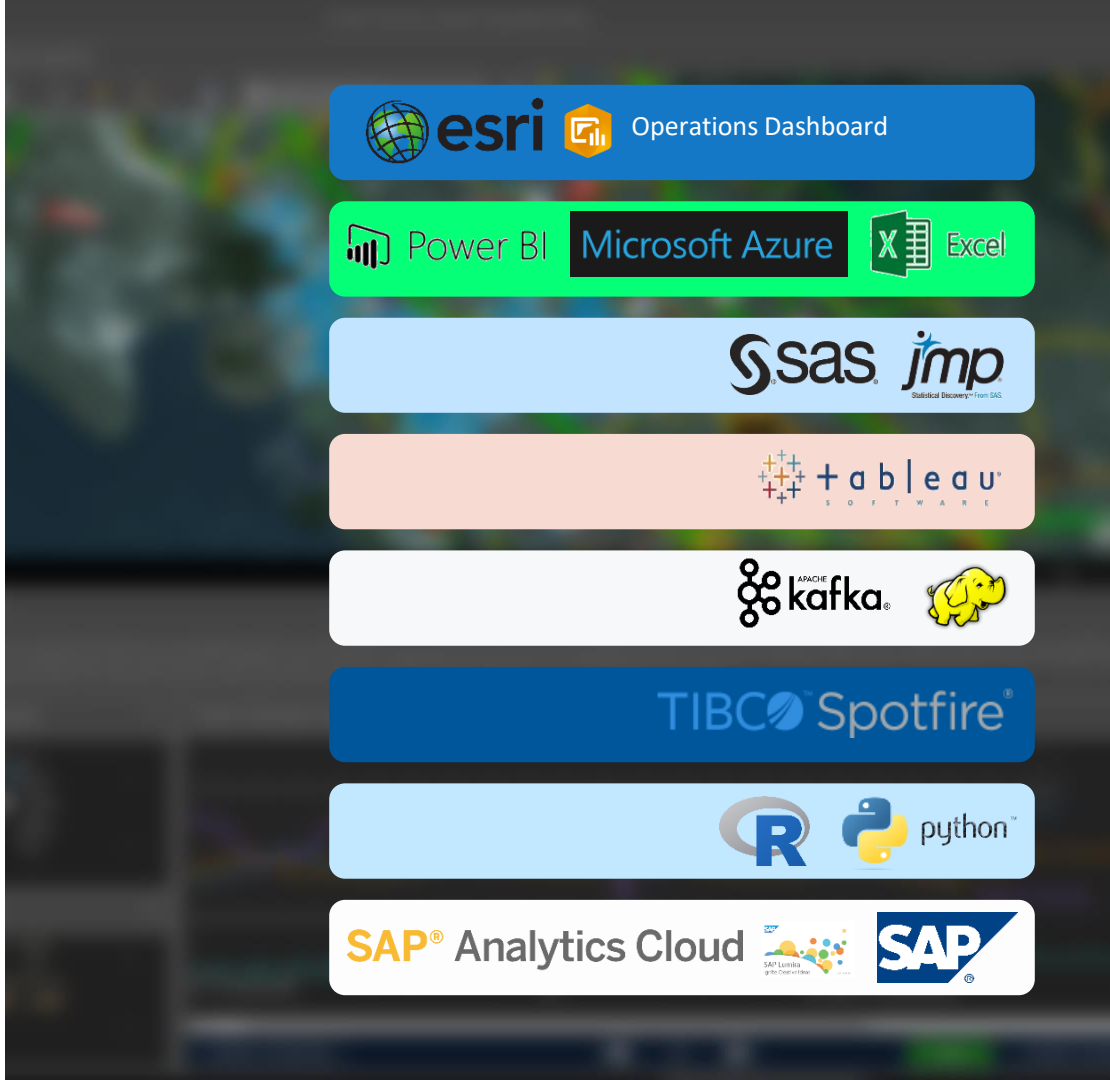


Meter Summary | Sheet1 | Total Summary

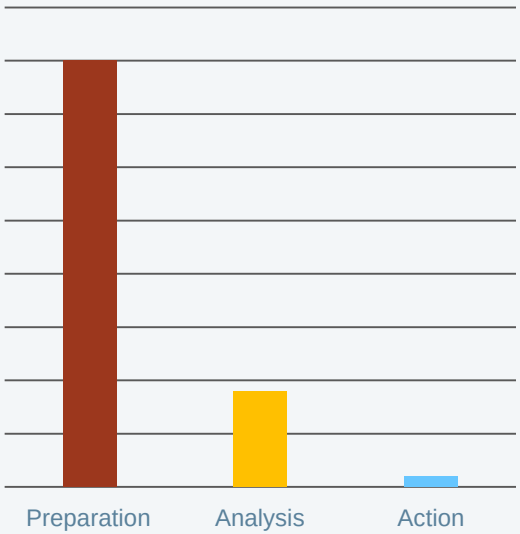
Ready

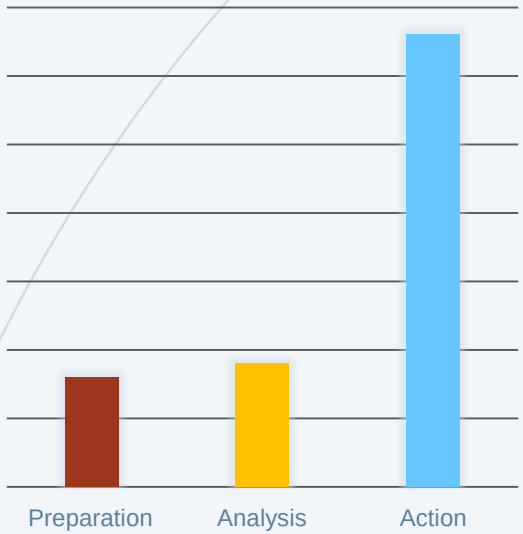
PI Integrators

Publish large-scale real-time exports and streams of PI System data and metadata to third-party geospatial, big data, or business analysis platforms



Decrease Inefficient and Expensive Preparation Time



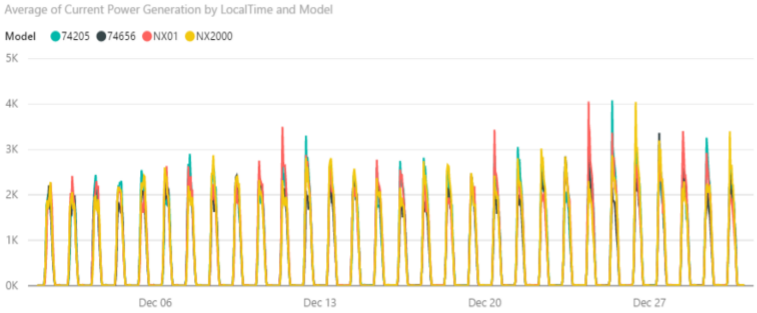


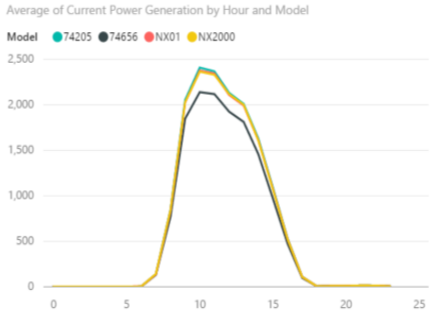
Free up time to act on the results of your analyses!

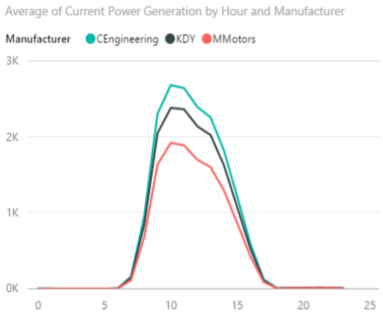
https://hbr.org/2014/04/the-sexiest-job-of-the-21st-century-is-tedious-and-that-needs-to-change/

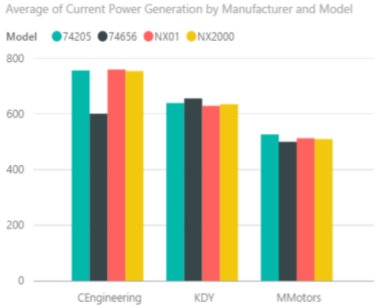
Solar Array Analysis - Power BI Desktop

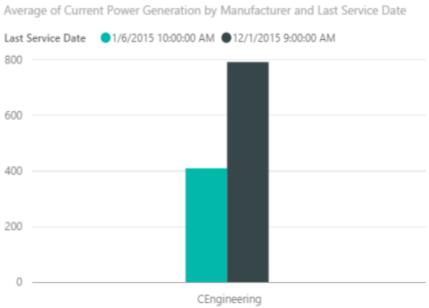
File Home Modeling











Page 1

PAGE 1 OF 1

Visualizations

Values

Drag data fields here

Filters

Page level filters

Drag data fields here

Report level filters

Drag data fields here

Fields

Search

Query1

- Air Temperature
- Array Number
- Array Subgroup
- Conditions
- Current Power ...
- Hour
- Humidity
- Last Service D...
- LocalTime
- Manufacturer
- Model
- Solar Array Te...
- Visibility
- WeekDay

UPDATE AVAILABLE (CLICK TO DOWNLOAD)

- Array: **GE03** Power: 1,510.1
- Array: **GE05** Power: 842.2
- Array: **GE10** Power: 1,259.15
- Array: **GE08** Power: 213.71
- Array: **GE04** Power: 443.88
- Array: **GE07** Power: 574.97
- Array: **GE06** Power: 1,164.89
- Array: **GE03** Power: 195.2
- Array: **GE05** Power: 254.97

Last update: a few seconds ago

Map Legend

Maintenance Vehicles

Solar Arrays

Solar Arrays - Power Output

active_power

> 104.4 to 115

> 93.7 to 104.4

Total Power Generation

8,273.474

Last update: a few seconds ago

Heavy Crane NX01

Vehicle **Heavy Crane NX01**, a **Heavy Crane** asset, driven by **J. Paulsen**, is currently located at **36.17** latitude, **-106.03** longitude. It is currently heading for **36.18** latitude and **-106.06**; at this moment is is **South-East of the destination** km from that destination.

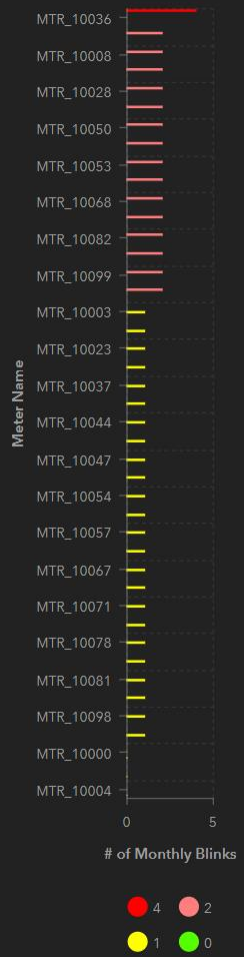
It is moving at **-2.81** kph (**-8.06** shaft RPM), heading **112.53** degrees. Its boom is at **88.85** degrees

Last update: a few seconds ago

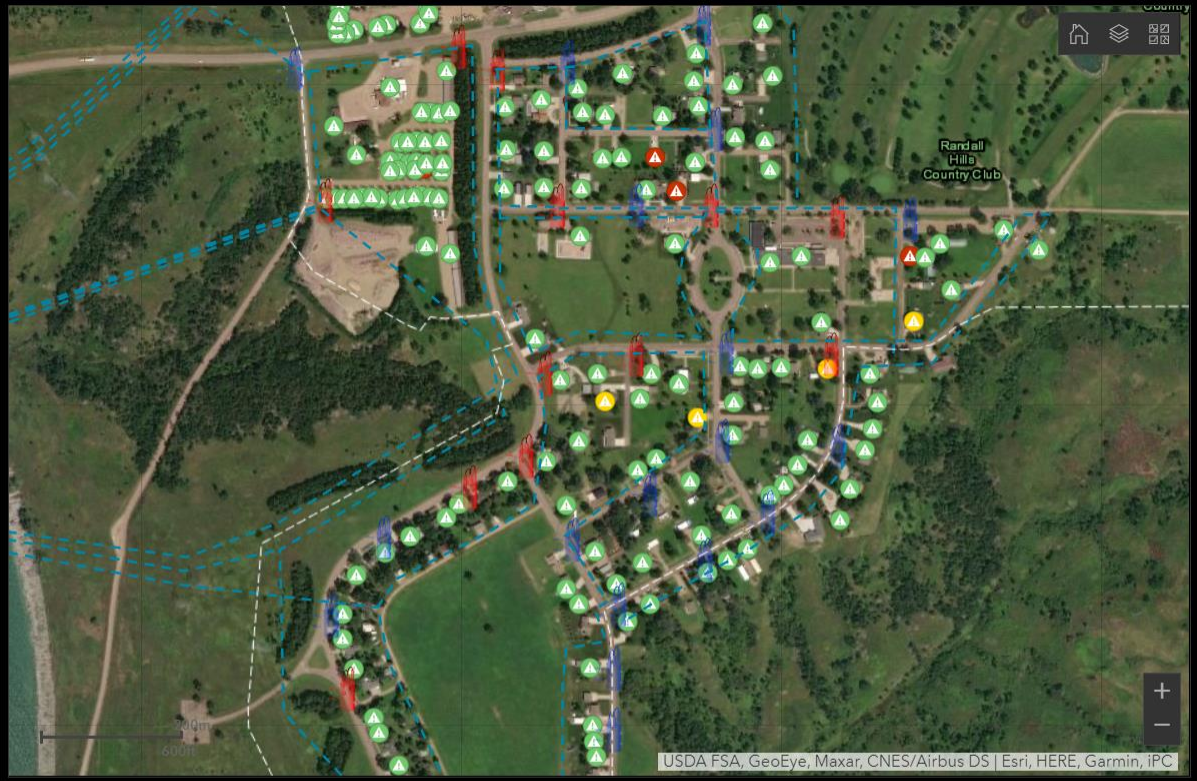
Current Power Generation

Last update: a few seconds ago

Monthly Meter Blinks by Meter



Last update: a few seconds ago



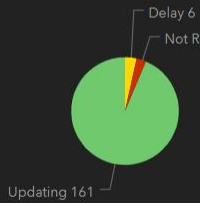
Meters Sending Updates

Last update: a few seconds ago

Meters Not Responding

Last update: a few seconds ago

Meter Status Breakdown



Delay	3.49%
Not Responding	2.91%
Updating	93.6%

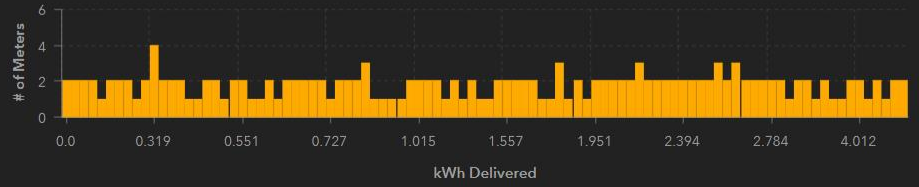
Last update: a few seconds ago

Total # of Meters on Display

172

Last update: a few seconds ago

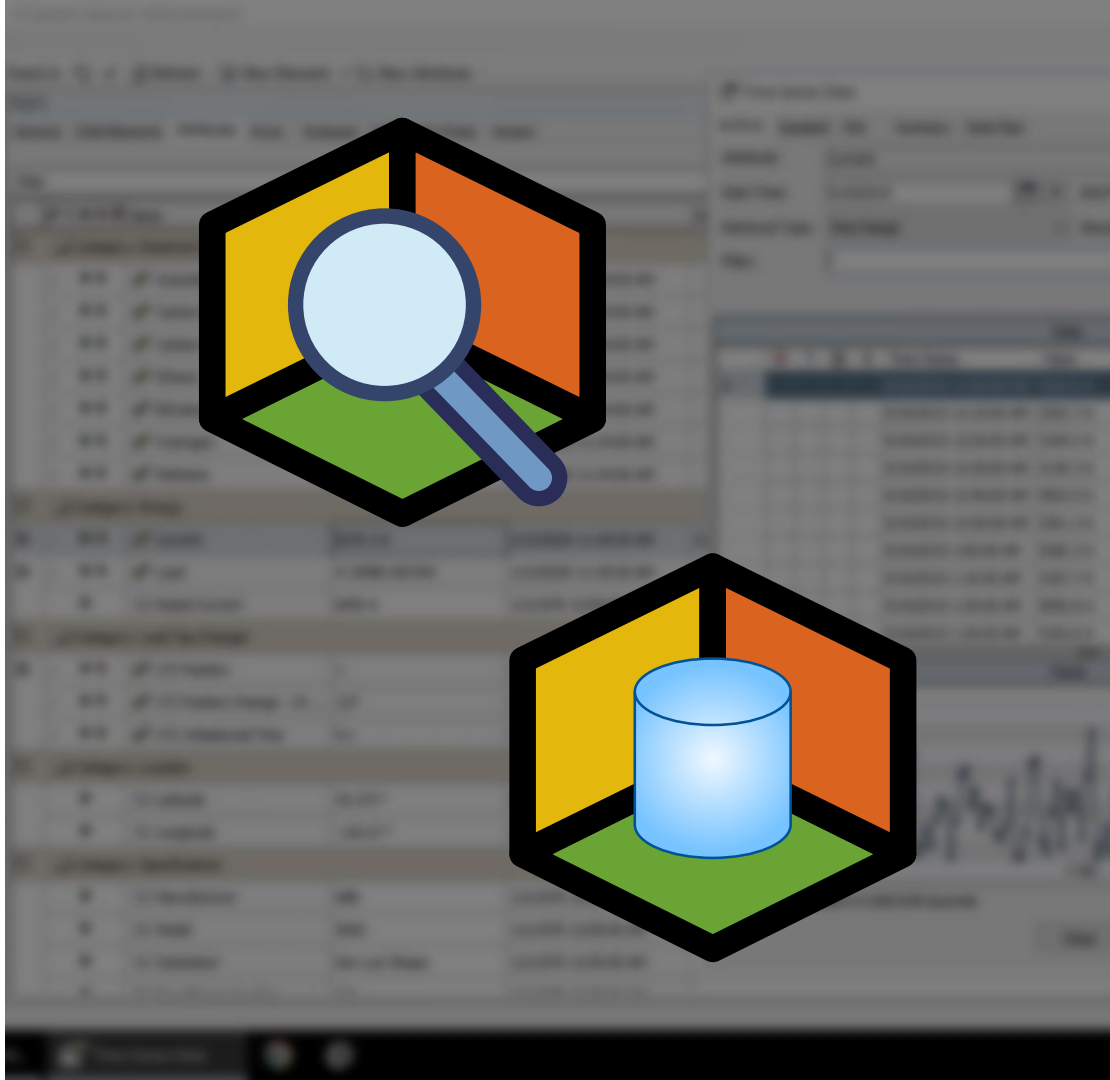
of Meters by kWh Delivered



Last update: a few seconds ago

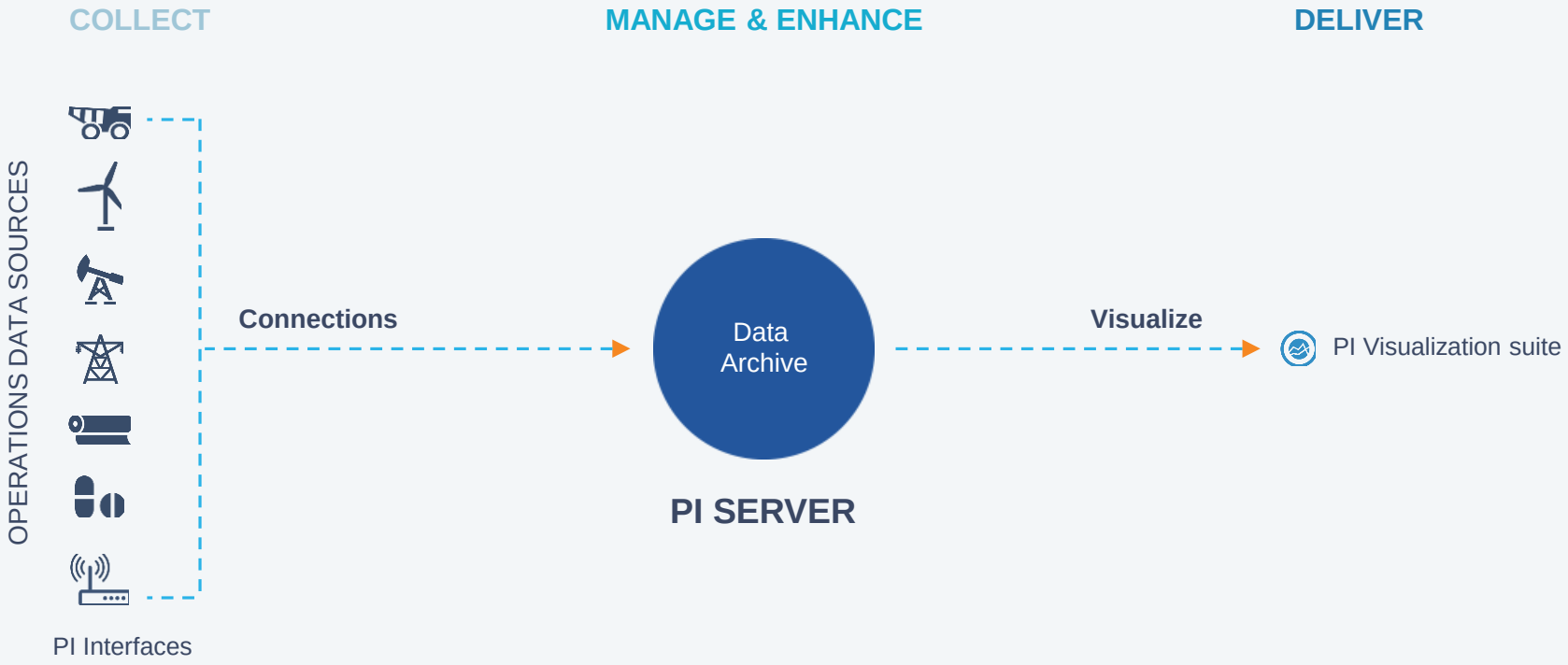
PI AF

Turn your raw data into actionable information by defining data relationships, structures, and templates, and by adding metadata, calculations, and event framing

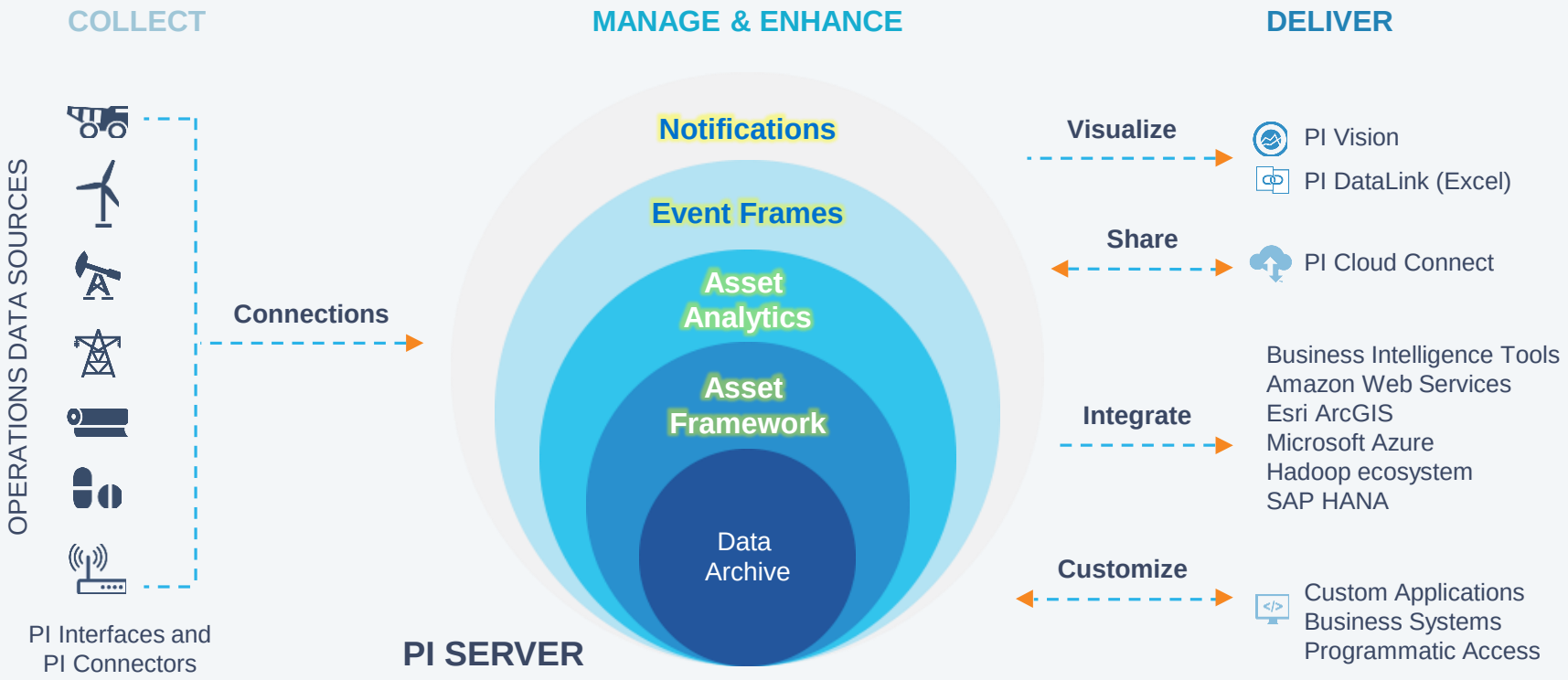


The importance of PI AF: Fully leverage your PI System

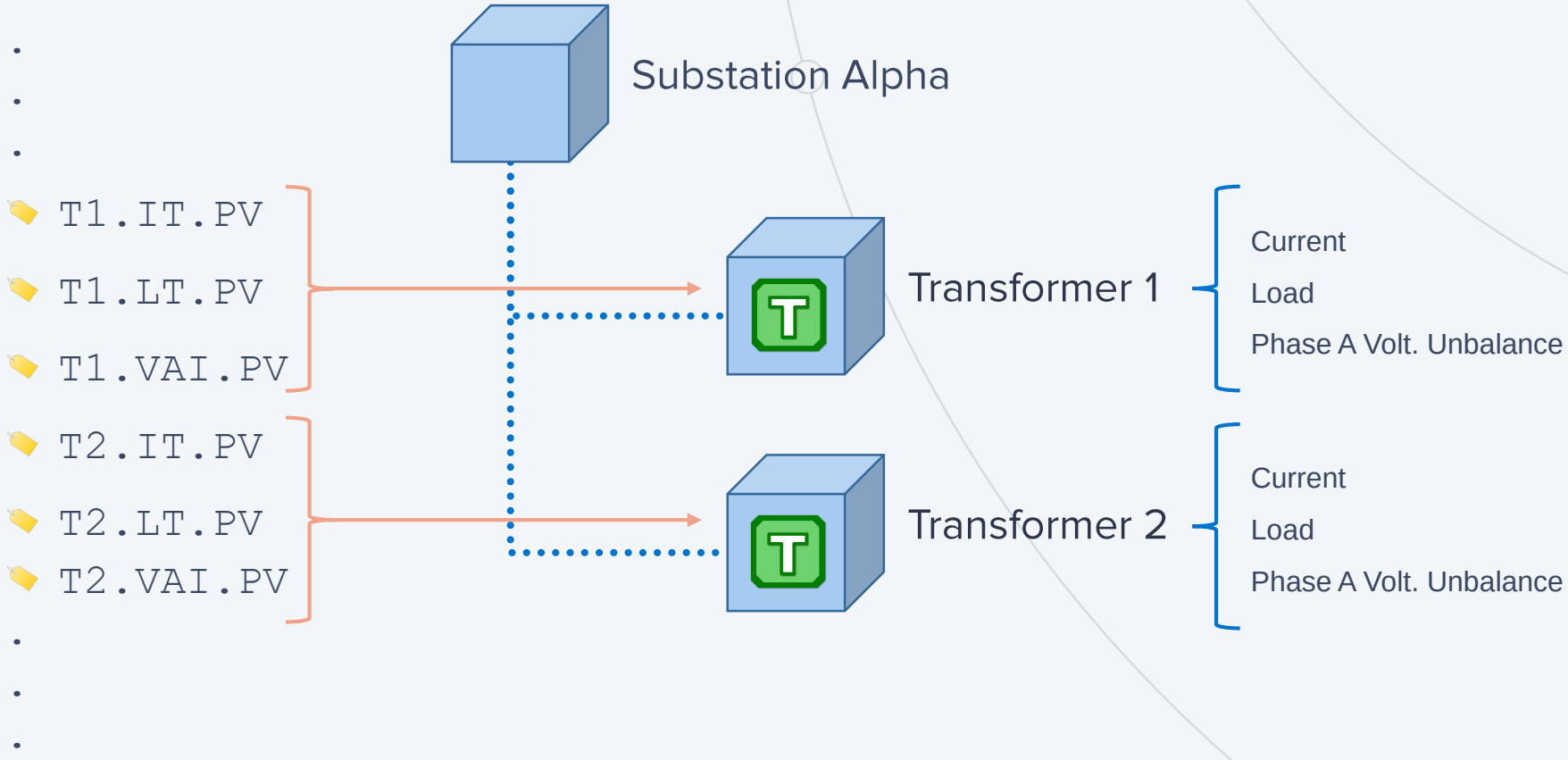
The Components of the **Original** PI System



The Components of the **Modern** PI System

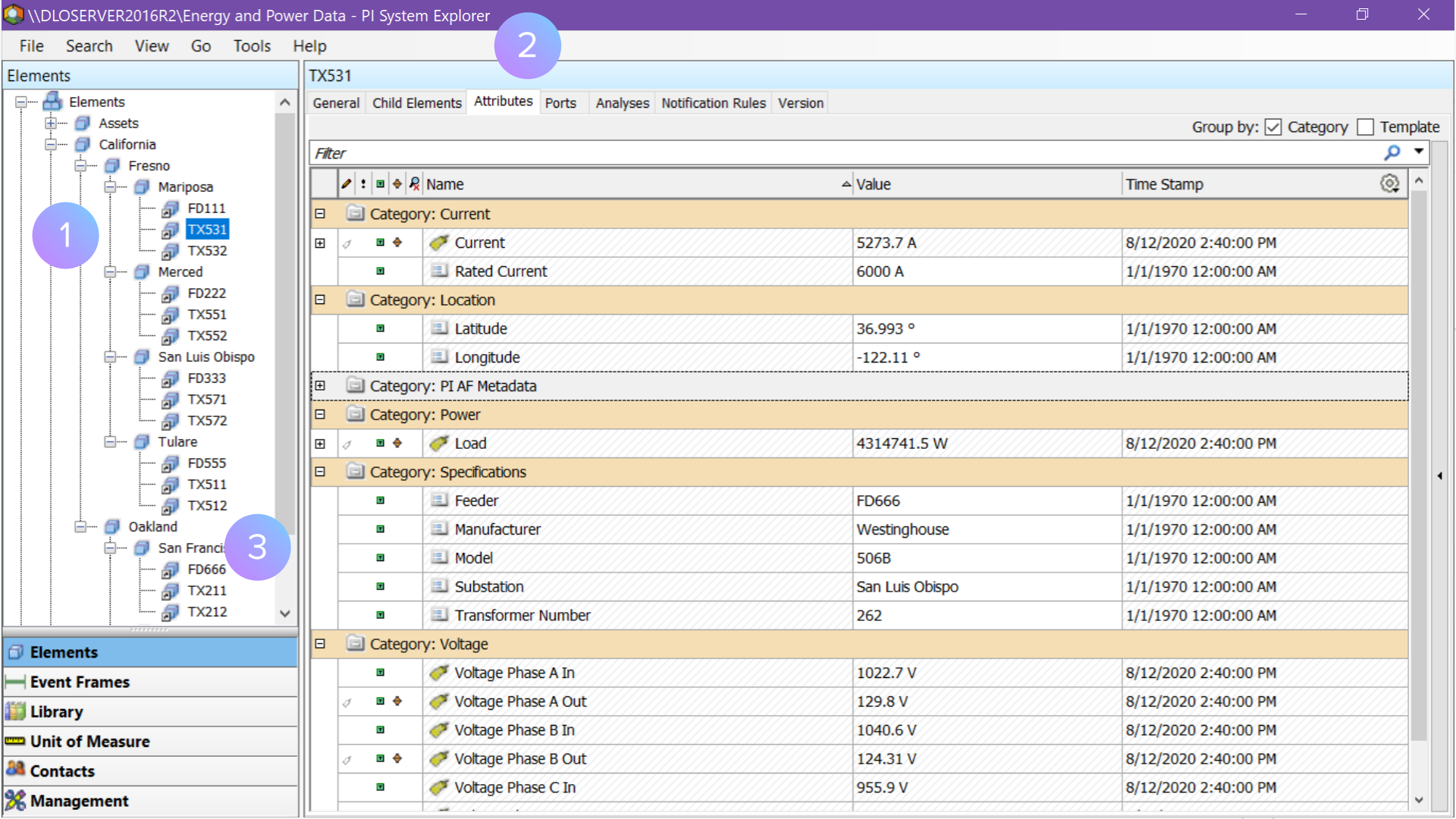


How specifically can PI AF help you succeed?



Leverage AF Elements

- Label data with human-friendly names
- Group commonly queried data inside AF Elements
- Standardize groupings, labels, and units in AF Element Templates
- Add metadata with static AF Attributes
- Use one-to-many references to present data to different users


\\DLOSERVER2016R2\Energy and Power Data - PI System Explorer
File
Search
View
Go
Tools
Help
2
Elements
Elements
Assets
California
Fresno
Mariposa
FD111
TX531
TX532
Merced
FD222
TX551
TX552
San Luis Obispo
FD333
TX571
TX572
Tulare
FD555
TX511
TX512
Oakland
San Franci
FD666
TX211
TX212
1
3
Elements
Event Frames
Library
Unit of Measure
Contacts
Management
TX531
General
Child Elements
Attributes
Ports
Analyses
Notification Rules
Version
Group by: Category Template
Filter
Name
Value
Time Stamp
Category: Current
Current 5273.7 A 8/12/2020 2:40:00 PM
Rated Current 6000 A 1/1/1970 12:00:00 AM
Category: Location
Latitude 36.993 ° 1/1/1970 12:00:00 AM
Longitude -122.11 ° 1/1/1970 12:00:00 AM
Category: PI AF Metadata
Category: Power
Load 4314741.5 W 8/12/2020 2:40:00 PM
Category: Specifications
Feeder FD666 1/1/1970 12:00:00 AM
Manufacturer Westinghouse 1/1/1970 12:00:00 AM
Model 506B 1/1/1970 12:00:00 AM
Substation San Luis Obispo 1/1/1970 12:00:00 AM
Transformer Number 262 1/1/1970 12:00:00 AM
Category: Voltage
Voltage Phase A In 1022.7 V 8/12/2020 2:40:00 PM
Voltage Phase A Out 129.8 V 8/12/2020 2:40:00 PM
Voltage Phase B In 1040.6 V 8/12/2020 2:40:00 PM
Voltage Phase B Out 124.31 V 8/12/2020 2:40:00 PM
Voltage Phase C In 955.9 V 8/12/2020 2:40:00 PM

1

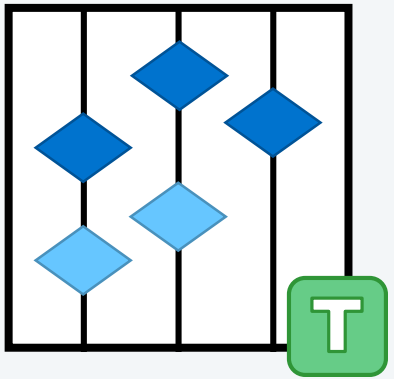
Status

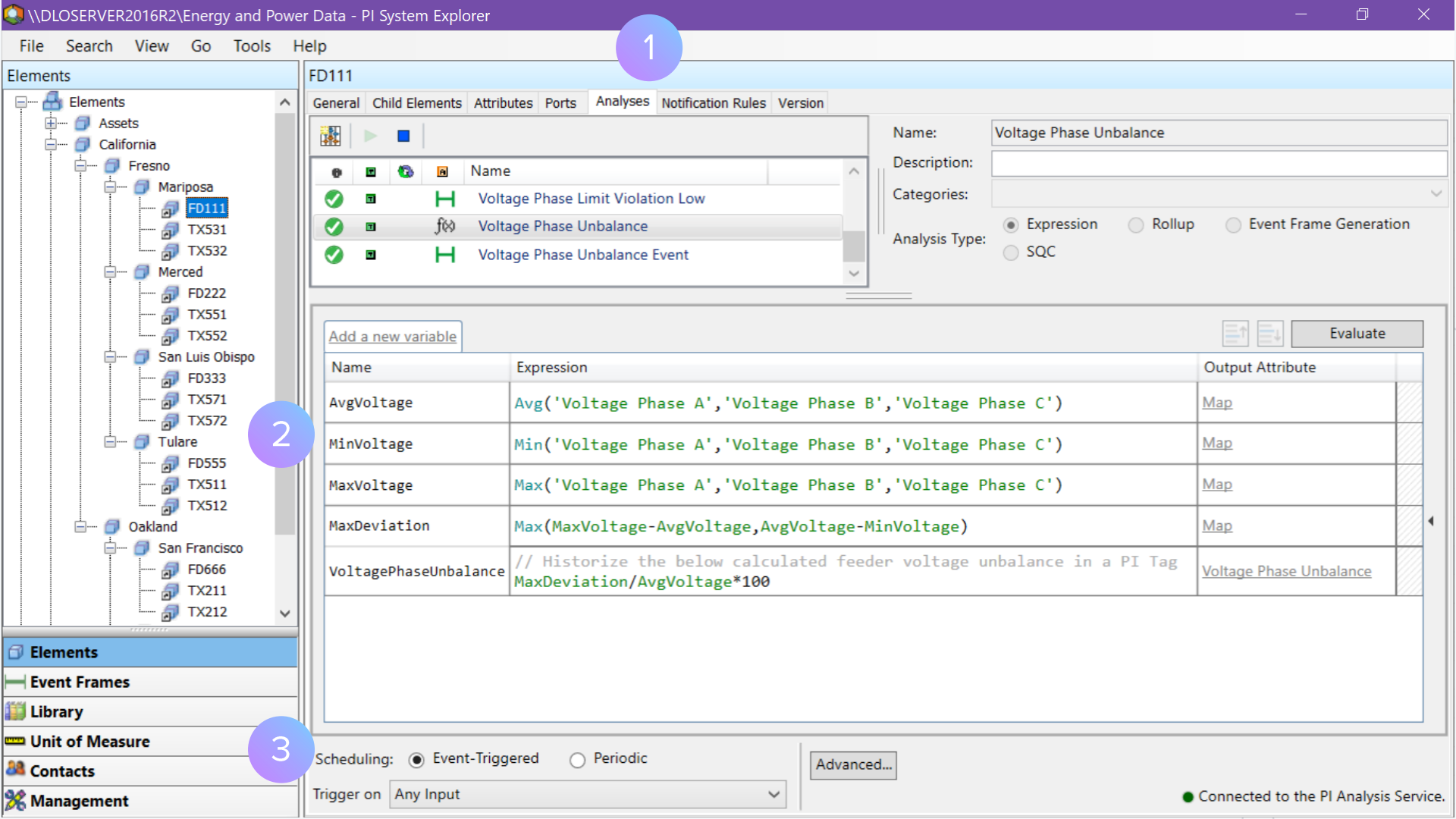
2

Calculate the unbalance based on three-phase voltage, starting **now**, and continuing **forever**

Leverage Asset Analytics

- Copy equations into the PI System from Excel or from other tools—or write your own!
- Customize calculation schedules and triggers, including backfilling
- Roll out calculations across multiple assets using Templates
- Test and preview calculations before ever writing data to a PI tag




\\DLOSERVER2016R2\Energy and Power Data - PI System Explorer
File
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Tools
Help
1
Elements
Elements
Assets
California
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Mariposa
FD111
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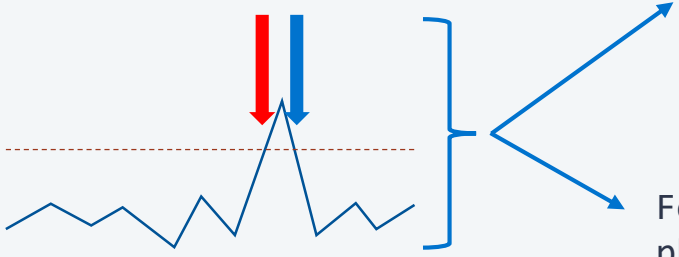
TX532
Merced
FD222
TX551
TX552
San Luis Obispo
FD333
TX571
TX572
Tulare
FD555
TX511
TX512
Oakland
San Francisco
FD666
TX211
TX212
2
Elements
Event Frames
Library
Unit of Measure
Contacts
Management
3
FD111
General
Child Elements
Attributes
Ports
Analyses
Notification Rules
Version
Name
Voltage Phase Limit Violation Low
Voltage Phase Unbalance
Voltage Phase Unbalance Event
Name: Voltage Phase Unbalance
Description:
Categories:
Analysis Type:
Expression
Rollup
Event Frame Generation
SQC
Add a new variable
Evaluate
Name
Expression
Output Attribute
AvgVoltage
Avg('Voltage Phase A','Voltage Phase B','Voltage Phase C')
Map
MinVoltage
Min('Voltage Phase A','Voltage Phase B','Voltage Phase C')
Map
MaxVoltage
Max('Voltage Phase A','Voltage Phase B','Voltage Phase C')
Map
MaxDeviation
Max(MaxVoltage-AvgVoltage,AvgVoltage-MinVoltage)
Map
VoltagePhaseUnbalance
// Historize the below calculated feeder voltage unbalance in a PI Tag
MaxDeviation/AvgVoltage*100
Voltage Phase Unbalance
Scheduling:
Event-Triggered
Periodic
Trigger on
Any Input
Advanced...
Connected to the PI Analysis Service.



Unbalance Event

- Phase Unbalance
- Start Time
- End Time
- Source Element

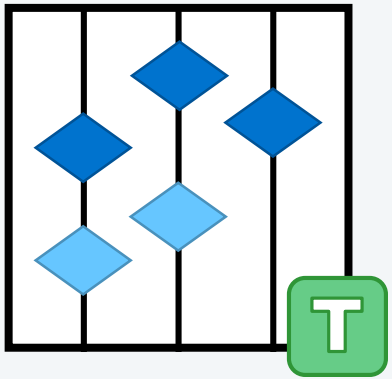
For each feeder, every time you calculate a new phase unbalance value:

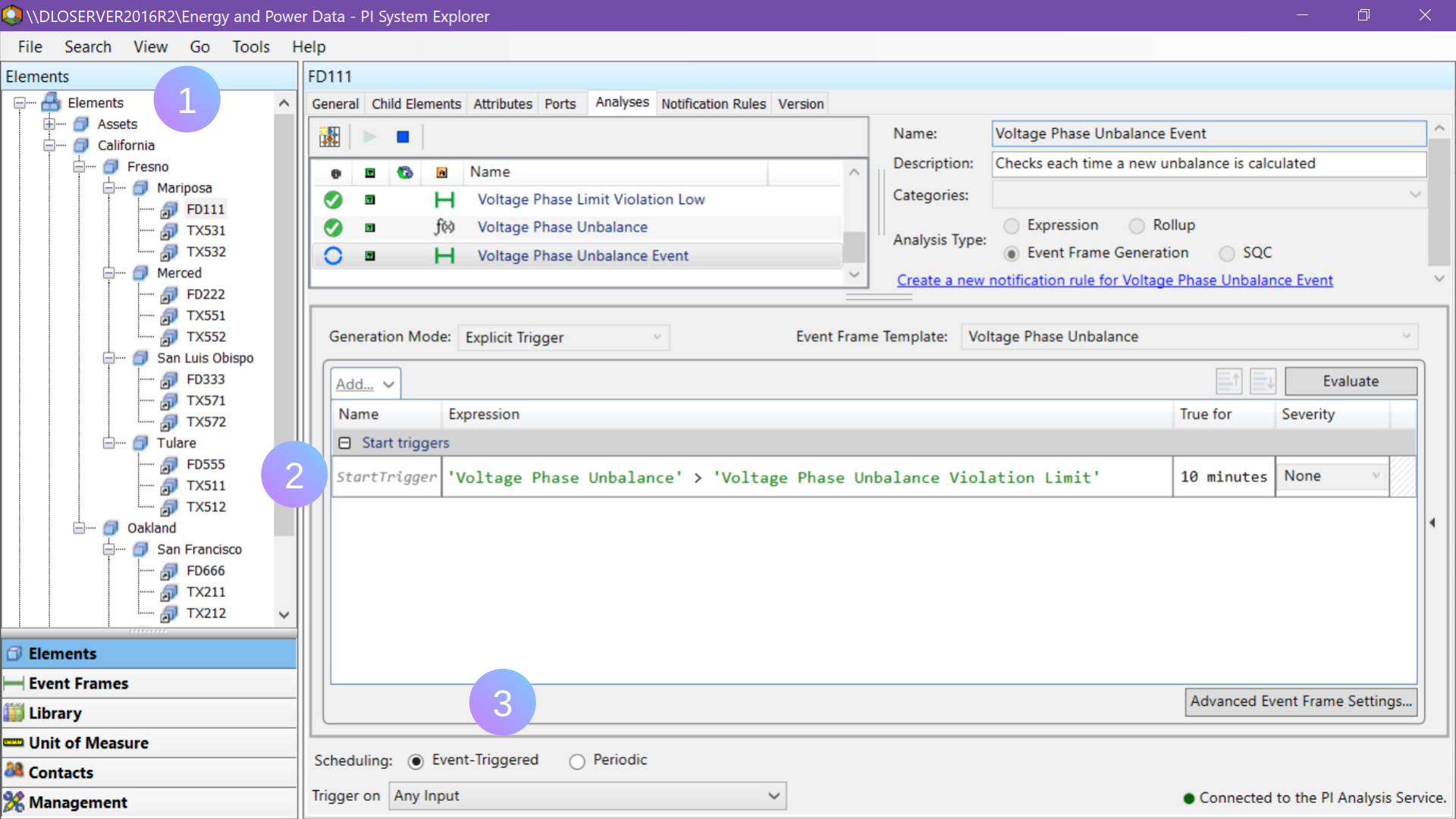
Start an event (using the **template**) if the **value** is **over** the limit for **at least** 10 minutes

And **end** that event once the **value drops** back **below** the limit

Leverage Event Frames and Notifications

- Use Analytics or PI tags to trigger the start and stop of events
- Customize event triggers to automatically capture downtimes, outages, or other issues
- Easily roll out event detection and notifications to multiple assets using a Template-based approach
- Design specific email formats for different recipient groups




\\DLOSERVER2016R2\Energy and Power Data - PI System Explorer
File
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Elements
1
Elements
Assets
California
Fresno
Mariposa
FD111
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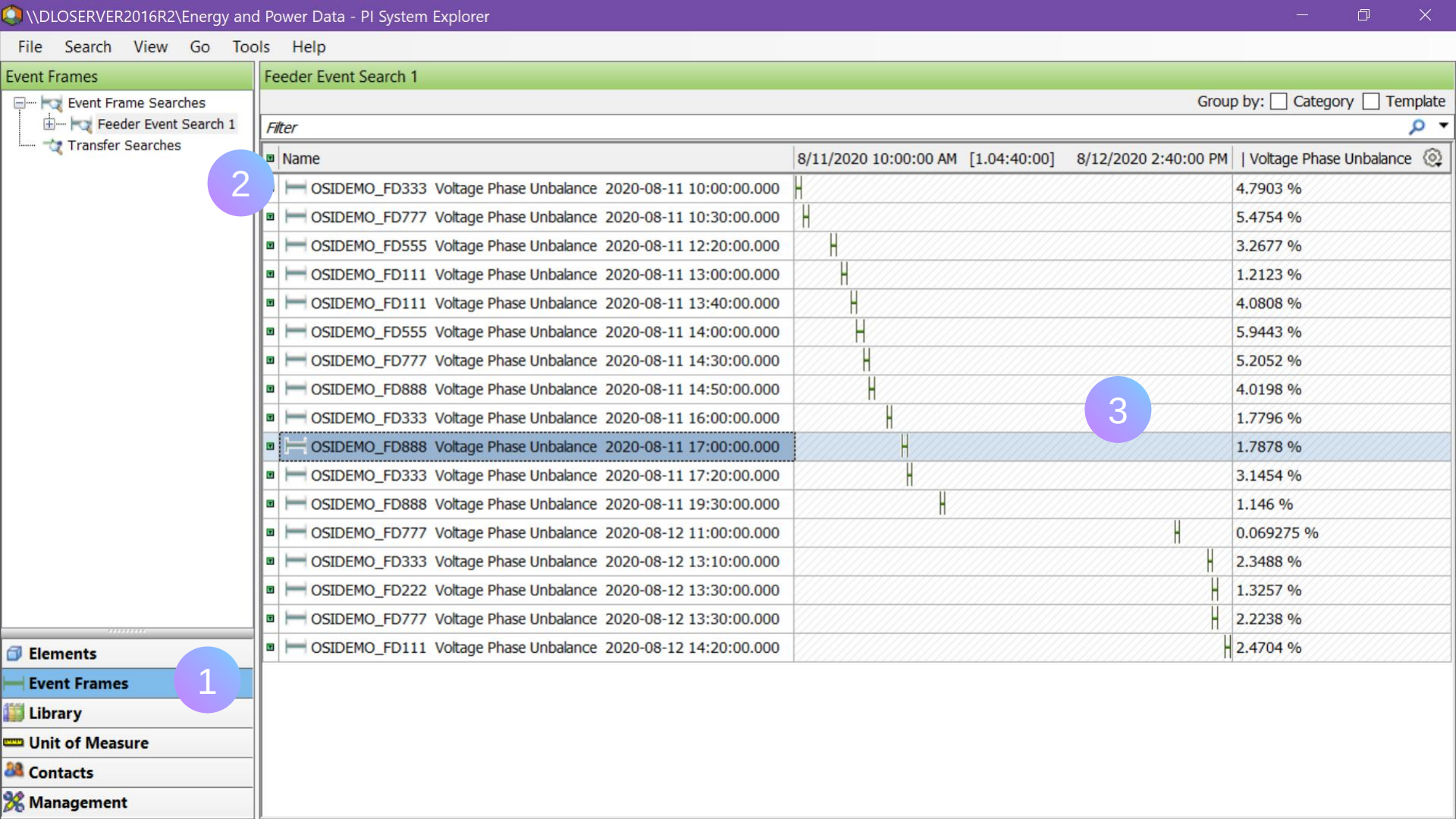
TX552
San Luis Obispo
FD333
TX571
TX572
Tulare
FD555
TX511
TX512
Oakland
San Francisco
FD666
TX211
TX212
Elements
Event Frames
Library
Unit of Measure
Contacts
Management
FD111
General
Child Elements
Attributes
Ports
Analyses
Notification Rules
Version
Name
Voltage Phase Limit Violation Low
Voltage Phase Unbalance
Voltage Phase Unbalance Event
Name:
Voltage Phase Unbalance Event
Description:
Checks each time a new unbalance is calculated
Categories:
Analysis Type:
Expression
Rollup
Event Frame Generation
SQC
Create a new notification rule for Voltage Phase Unbalance Event
Generation Mode:
Explicit Trigger
Event Frame Template:
Voltage Phase Unbalance
Add...
Evaluate
Name
Expression
True for
Severity
Start triggers
2
StartTrigger
'Voltage Phase Unbalance' > 'Voltage Phase Unbalance Violation Limit'
10 minutes
None
3
Advanced Event Frame Settings...
Scheduling:
Event-Triggered
Periodic
Trigger on
Any Input
Connected to the PI Analysis Service.


\\DLOSERVER2016R2\Energy and Power Data - PI System Explorer
File
Search
View
Go
Tools
Help
Event Frames
Event Frame Searches
Feeder Event Search 1
Transfer Searches
Feeder Event Search 1
Group by: Category Template
Filter
Name
8/11/2020 10:00:00 AM [1.04:40:00] 8/12/2020 2:40:00 PM
Voltage Phase Unbalance
OSIDEMO_FD333 Voltage Phase Unbalance 2020-08-11 10:00:00.000 4.7903 %
OSIDEMO_FD777 Voltage Phase Unbalance 2020-08-11 10:30:00.000 5.4754 %
OSIDEMO_FD555 Voltage Phase Unbalance 2020-08-11 12:20:00.000 3.2677 %
OSIDEMO_FD111 Voltage Phase Unbalance 2020-08-11 13:00:00.000 1.2123 %
OSIDEMO_FD111 Voltage Phase Unbalance 2020-08-11 13:40:00.000 4.0808 %
OSIDEMO_FD555 Voltage Phase Unbalance 2020-08-11 14:00:00.000 5.9443 %
OSIDEMO_FD777 Voltage Phase Unbalance 2020-08-11 14:30:00.000 5.2052 %
OSIDEMO_FD888 Voltage Phase Unbalance 2020-08-11 14:50:00.000 4.0198 %
OSIDEMO_FD333 Voltage Phase Unbalance 2020-08-11 16:00:00.000 1.7796 %
OSIDEMO_FD888 Voltage Phase Unbalance 2020-08-11 17:00:00.000 1.7878 %
OSIDEMO_FD333 Voltage Phase Unbalance 2020-08-11 17:20:00.000 3.1454 %
OSIDEMO_FD888 Voltage Phase Unbalance 2020-08-11 19:30:00.000 1.146 %
OSIDEMO_FD777 Voltage Phase Unbalance 2020-08-12 11:00:00.000 0.069275 %
OSIDEMO_FD333 Voltage Phase Unbalance 2020-08-12 13:10:00.000 2.3488 %
OSIDEMO_FD222 Voltage Phase Unbalance 2020-08-12 13:30:00.000 1.3257 %
OSIDEMO_FD777 Voltage Phase Unbalance 2020-08-12 13:30:00.000 2.2238 %
OSIDEMO_FD111 Voltage Phase Unbalance 2020-08-12 14:20:00.000 2.4704 %
Elements
Event Frames
Library
Unit of Measure
Contacts
Management
1
2
3

What is the end result?

Your PI System users **find** their data more quickly

They can more easily **analyze** it and use it in calculations

They let the system work for them, **automatically** tracking events

They **retrieve** and **receive** data how and when they want it