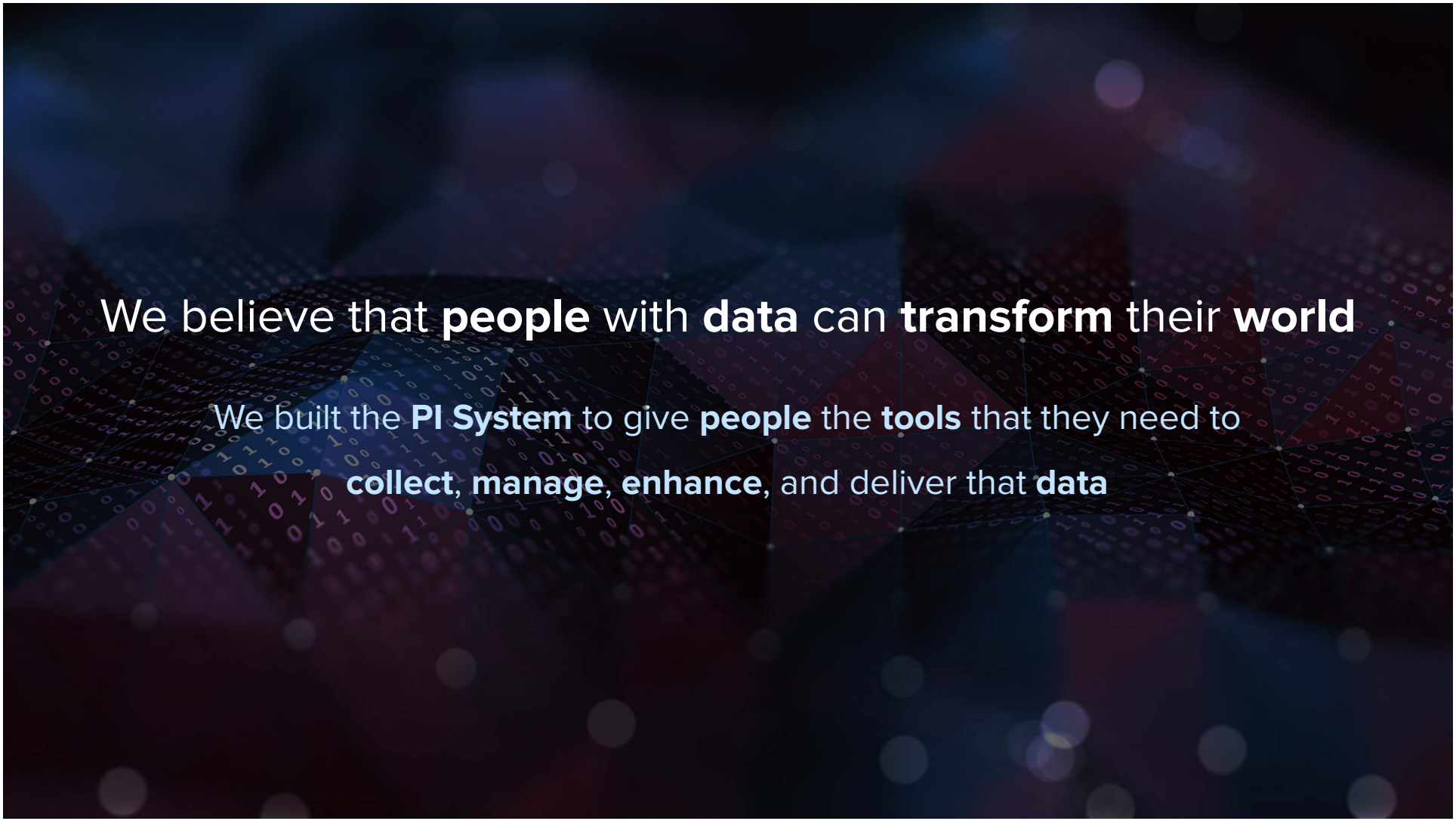
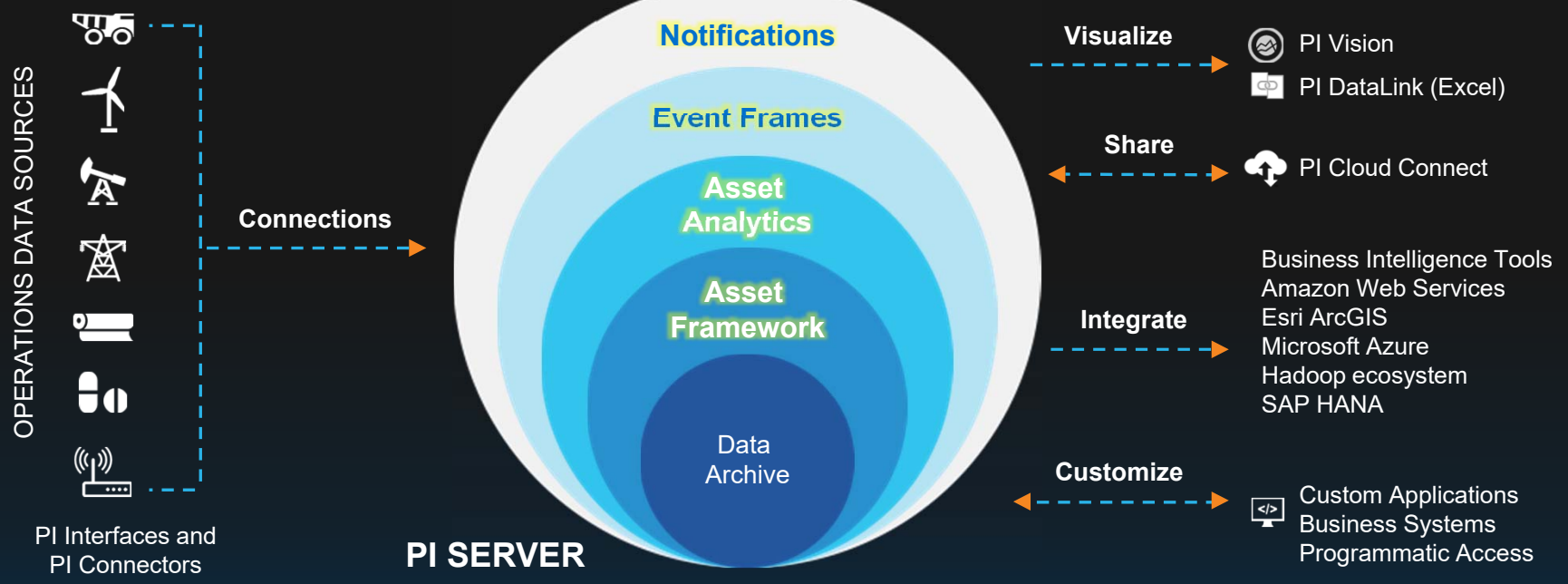

We believe that **people** with **data** can **transform** their **world**
We built the **PI System** to give **people** the **tools** that they need to
collect, **manage**, **enhance**, and deliver that **data**

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

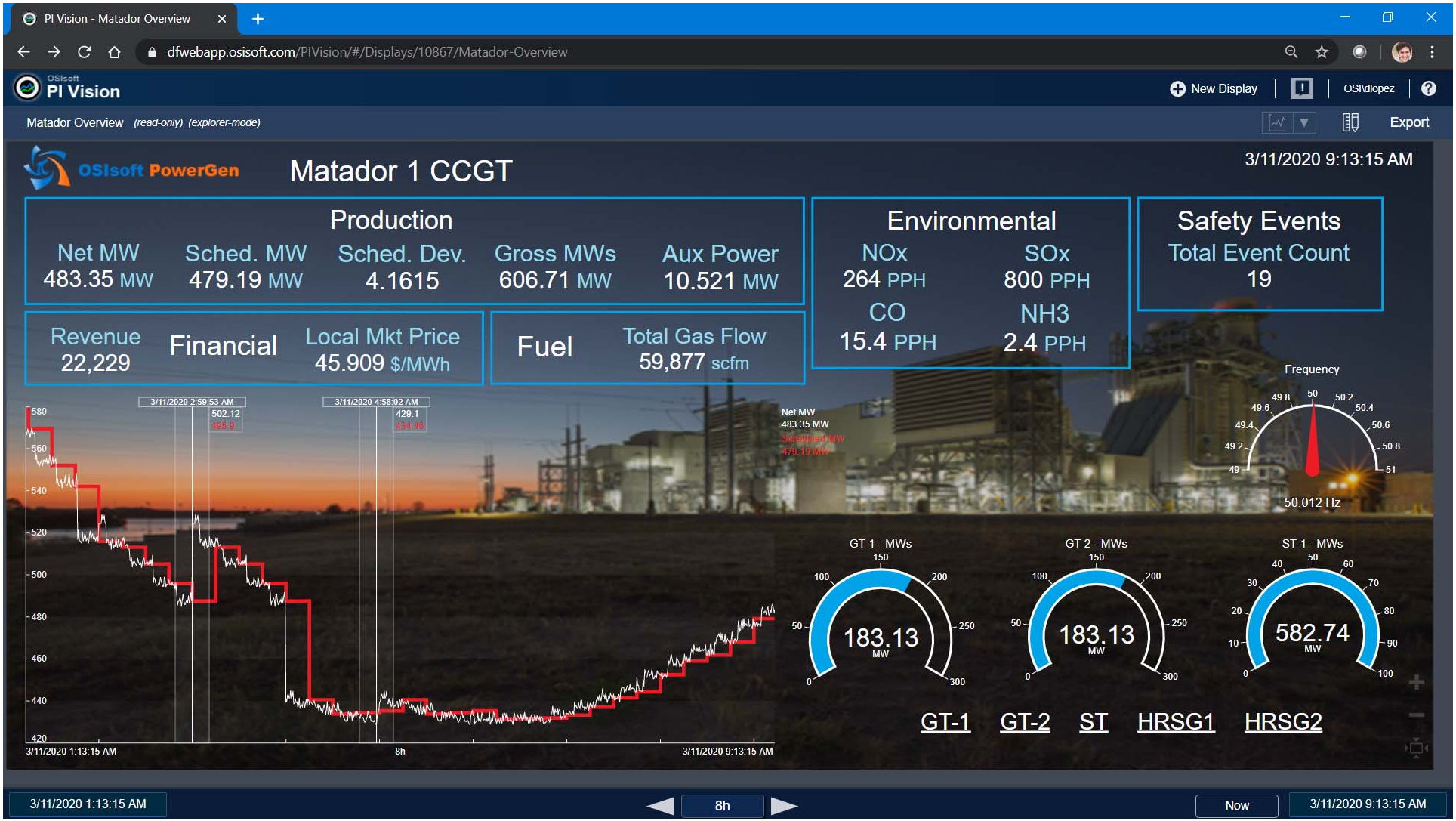


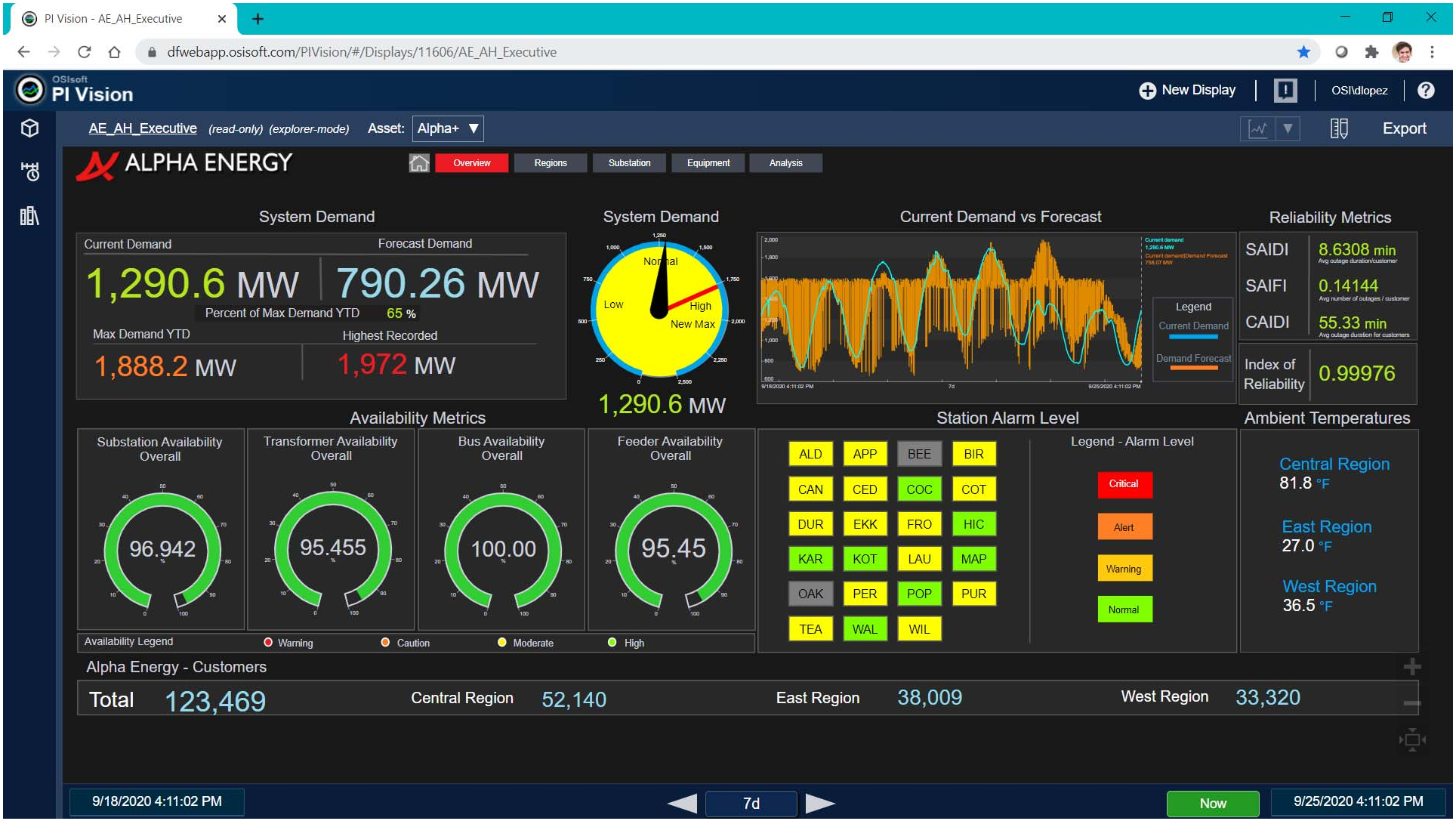
How do users benefit from the **modern PI System**?

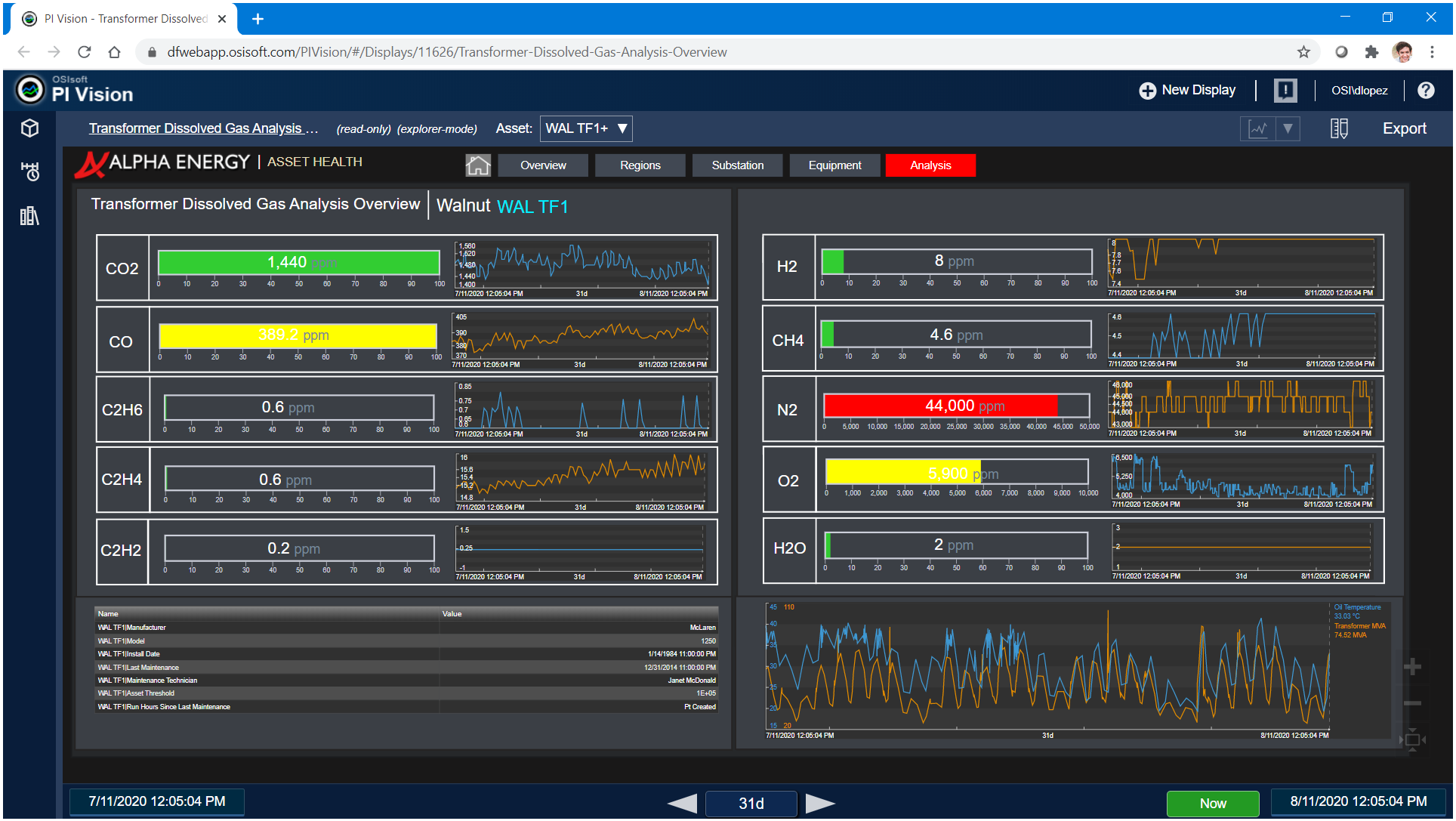
Interactive, cross-platform **data dashboards**

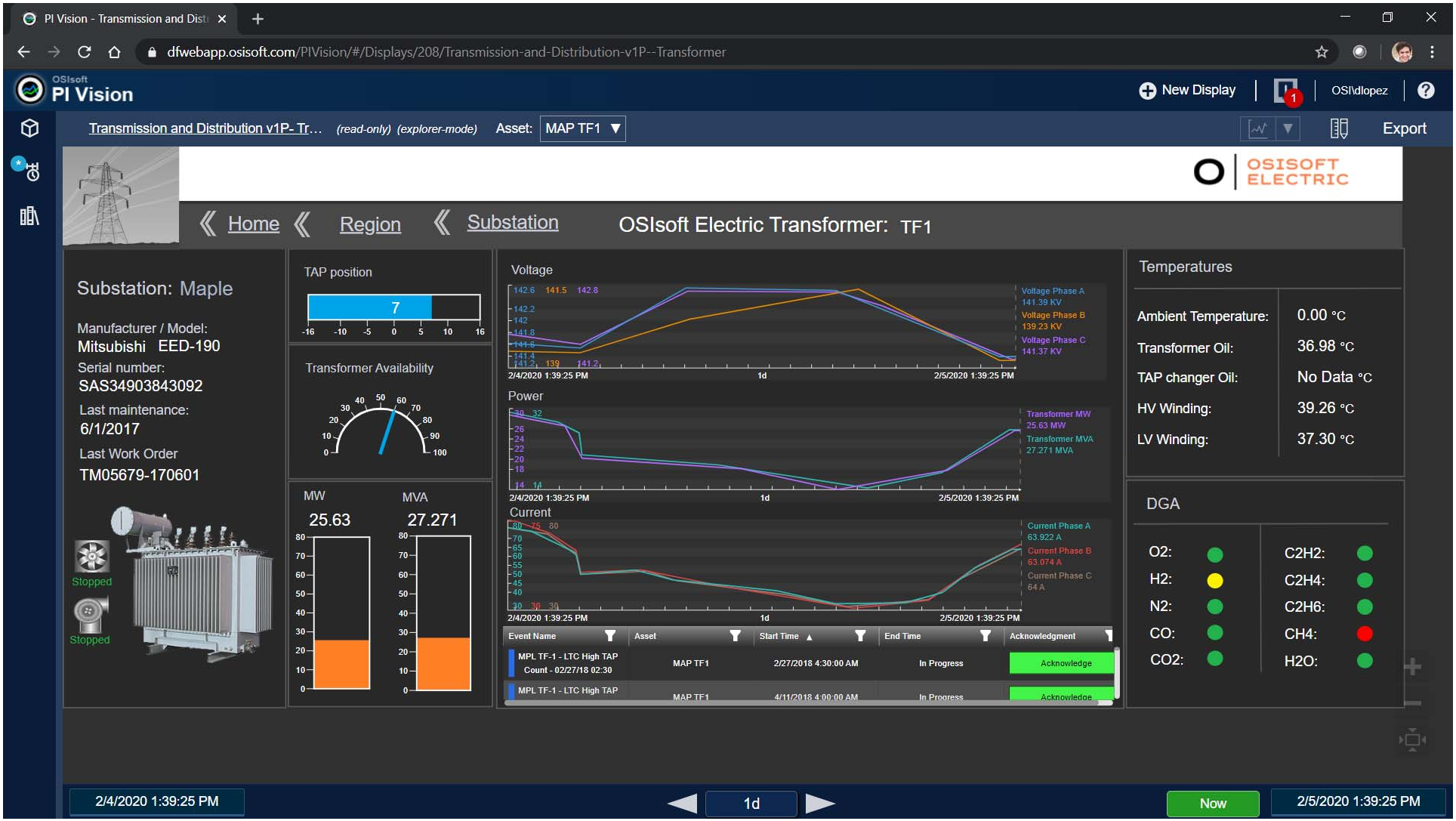
PI Vision:

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


PI Vision - Matador Overview
dfwebapp.osisoft.com/PIVision/#/Displays/10867/Matador-Overview
OSIsoft PI Vision
New Display
OSI\dlopez
Matador Overview (read-only) (explorer-mode)
Export
OSIsoft PowerGen
Matador 1 CCGT
3/11/2020 9:13:15 AM
Production
Net MW
483.35 MW
Sched. MW
479.19 MW
Sched. Dev.
4.1615
Gross MWs
606.71 MW
Aux Power
10.521 MW
Environmental
NOx
264 PPH
SOx
800 PPH
CO
15.4 PPH
NH3
2.4 PPH
Safety Events
Total Event Count
19
Revenue
22,229
Financial
Local Mkt Price
45.909 $/MWh
Fuel
Total Gas Flow
59,877 scfm
3/11/2020 2:59:53 AM
502.12
3/11/2020 4:58:02 AM
429.1
Net MW
483.35 MW
Scheduled MW
479.19 MW
3/11/2020 1:13:15 AM
8h
3/11/2020 9:13:15 AM
Frequency
50.012 Hz
GT 1 - MWs
183.13
MW
GT 2 - MWs
183.13
MW
ST 1 - MWs
582.74
MW
GT-1
GT-2
ST
HRSG1
HRSG2
3/11/2020 1:13:15 AM
8h
Now
3/11/2020 9:13:15 AM


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
Normal
Low
High
New Max
1,290.6 MW
Current Demand vs Forecast
Legend
Current Demand
Demand 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
Substation Availability Overall
96.942
Transformer Availability Overall
95.455
Bus Availability Overall
100.00
Feeder Availability Overall
95.45
Availability Legend
Warning
Caution
Moderate
High
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 123,469
Central Region 52,140
East Region 38,009
West Region 33,320
9/18/2020 4:11:02 PM
7d
Now
9/25/2020 4:11:02 PM


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
Now


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
7
Transformer Availability
MW
25.63
MVA
27.271
Voltage
Voltage Phase A
141.39 KV
Voltage Phase B
139.23 KV
Voltage Phase C
141.37 KV
2/4/2020 1:39:25 PM
1d
2/5/2020 1:39:25 PM
Power
Transformer MW
25.63 MW
Transformer MVA
27.271 MVA
Current
Current Phase A
63.922 A
Current Phase B
63.074 A
Current Phase C
64 A
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:
H2:
N2:
CO:
CO2:
C2H2:
C2H4:
C2H6:
CH4:
H2O:
2/4/2020 1:39:25 PM
1d
Now
2/5/2020 1:39:25 PM

OSIsoft
PI Vision

New Display | OSI\dlopez

Water World - WWTP *(read-only) (explorer-mode)* Asset: Iona WWTP+ ▼

Export

Iona WWTP

Back to map

Plant Summary

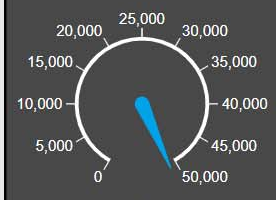
Status:

Percent Capacity: 209.23 %

Max Capacity: 7.2E+07 gpd

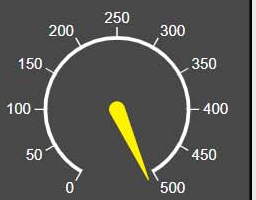
Population Serviced: 18.6 K people

Waste Water Flow



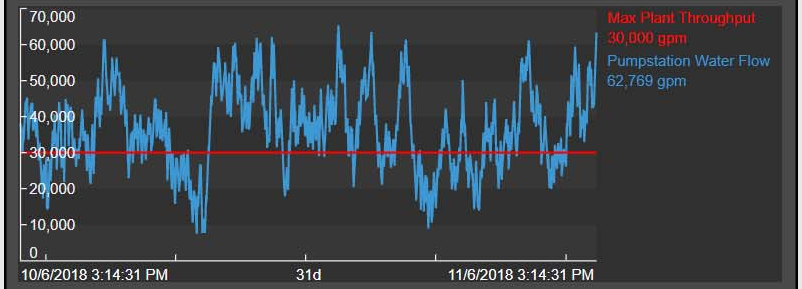
62,769 gpm

Energy Consumption



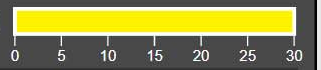
862.75 kWh

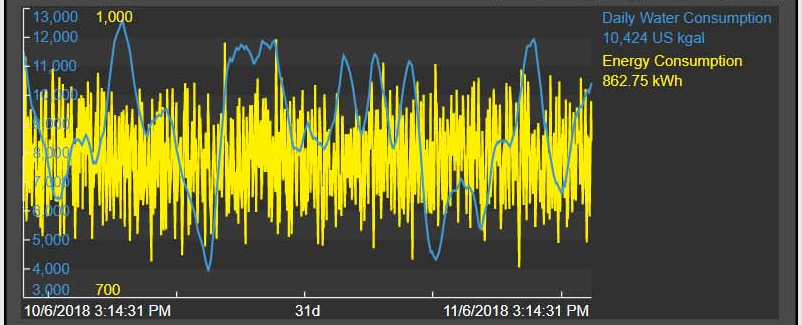
Waste Water FlowRate



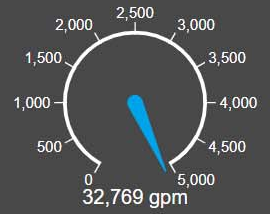
Utility Usage

Energy cost ($/h)





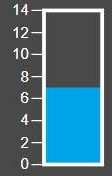
Overflow Rate



32,769 gpm

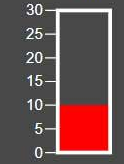
pH

7



Residual Chlorine

10 ppm



Equipment Status

Influent Pump1 | Pump Station 1:

Influent Pump2 | Pump Station 2:

Centrifuge: | Digester:

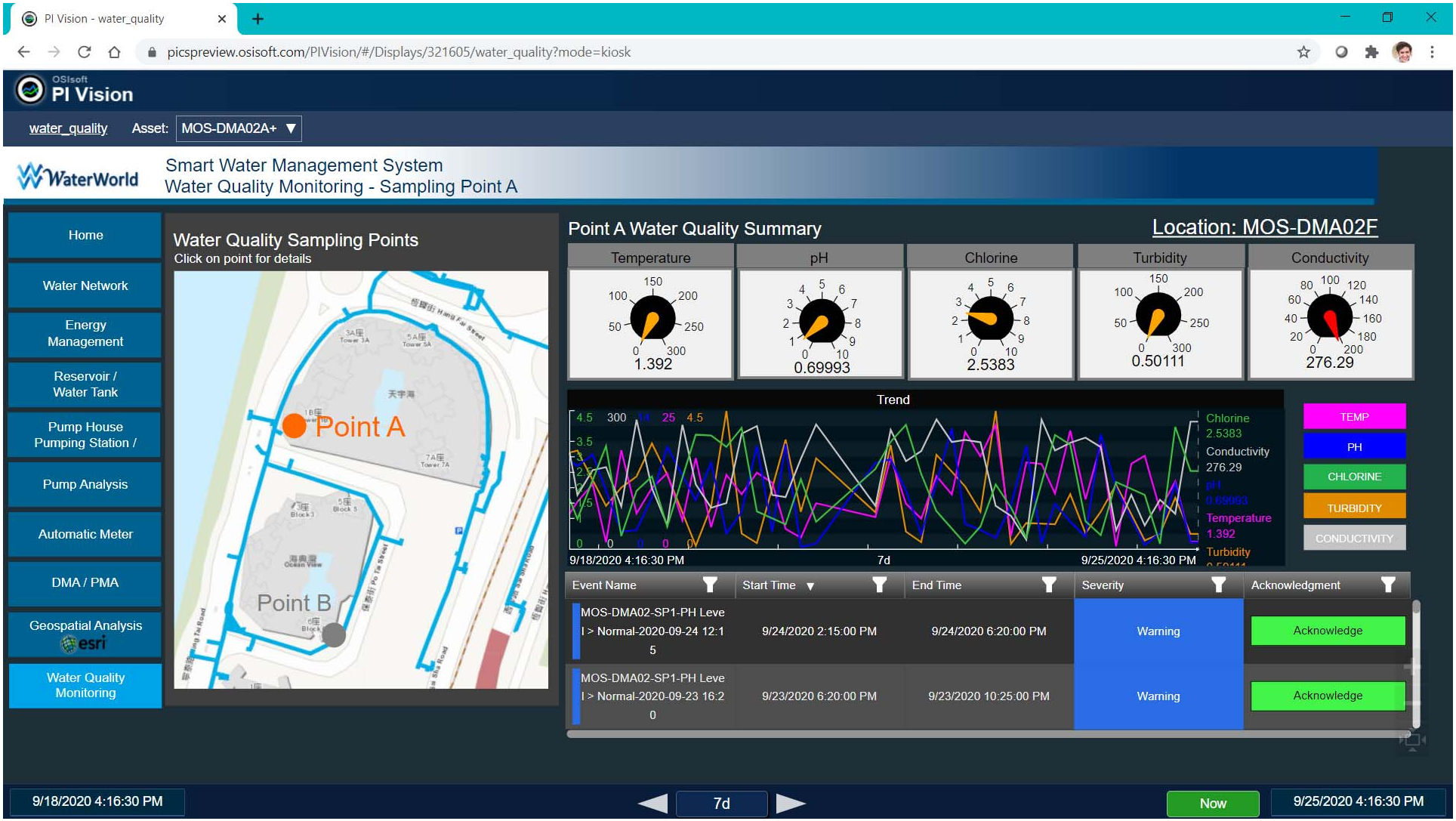
Double-click an equipment to drill-down.

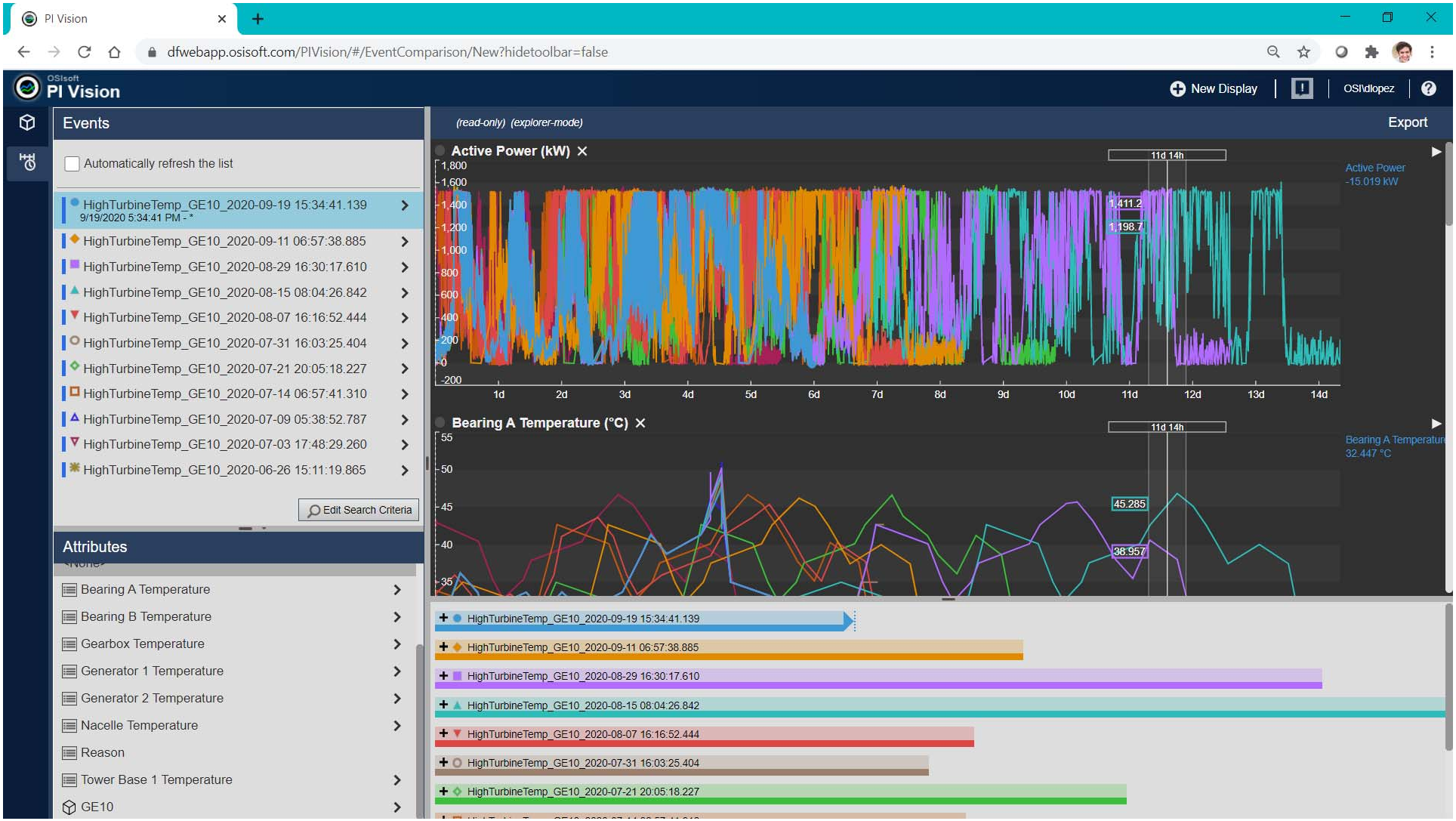
10/6/2018 3:14:31 PM ◀ 31d ▶ Now 11/6/2018 3:14:31 PM

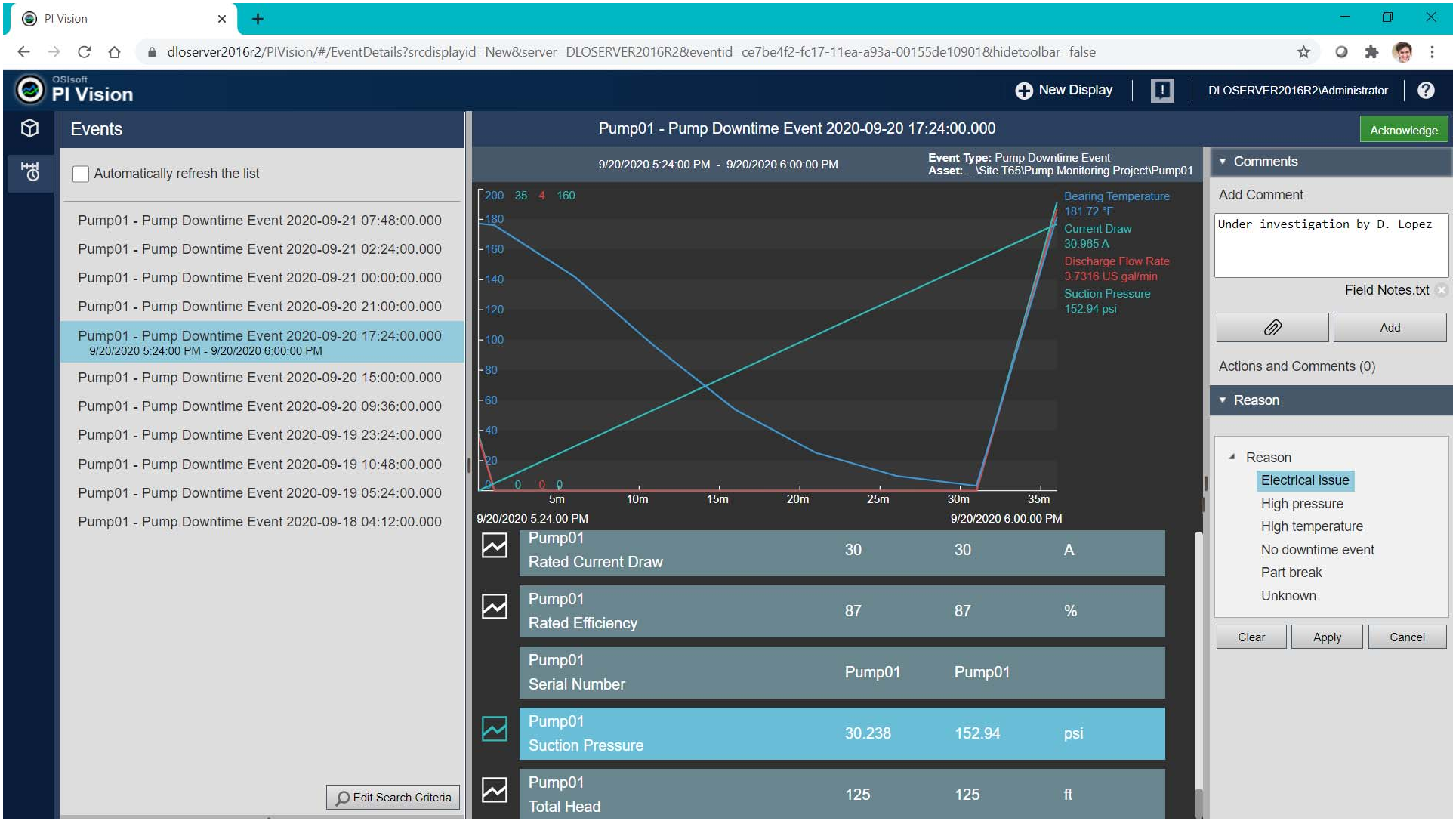
Interactive, cross-platform **data dashboards**

Anomaly and **event investigation** displays


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
MAP TF2
In Service
Load 22.02 MVA
POP TF1
In Service
Load 57.35 MVA
POP TF2
In Service
Load 55.96 MVA
WAL TF1
In Service
Load 74.65 MVA
WAL TF2
In Service
Load 69.2 MVA
Temperatures
Oil
Ambient
HV Winding
LV Winding
Cooling Status
Stage1
Stage2
Normal
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


PI Vision - water_quality
picspreview.osisoft.com/PIVision/#/Displays/321605/water_quality?mode=kiosk
OSIsoft
PI Vision
water_quality
Asset: MOS-DMA02A+
WaterWorld
Smart Water Management System
Water Quality Monitoring - Sampling Point A
Home
Water Network
Energy Management
Reservoir / Water Tank
Pump House Pumping Station /
Pump Analysis
Automatic Meter
DMA / PMA
Geospatial Analysis
esri
Water Quality Monitoring
Water Quality Sampling Points
Click on point for details
Point A
Point B
Point A Water Quality Summary
Location: MOS-DMA02F
Temperature
1.392
pH
0.69993
Chlorine
2.5383
Turbidity
0.50111
Conductivity
276.29
Trend
Chlorine 2.5383
Conductivity 276.29
pH 0.69993
Temperature 1.392
Turbidity
9/18/2020 4:16:30 PM
7d
9/25/2020 4:16:30 PM
TEMP
PH
CHLORINE
TURBIDITY
CONDUCTIVITY
Event Name
Start Time
End Time
Severity
Acknowledgment
MOS-DMA02-SP1-PH Level > Normal-2020-09-24 12:15
9/24/2020 2:15:00 PM
9/24/2020 6:20:00 PM
Warning
Acknowledge
MOS-DMA02-SP1-PH Level > Normal-2020-09-23 16:20
9/23/2020 6:20:00 PM
9/23/2020 10:25:00 PM
Warning
Acknowledge
9/18/2020 4:16:30 PM
7d
Now
9/25/2020 4:16:30 PM

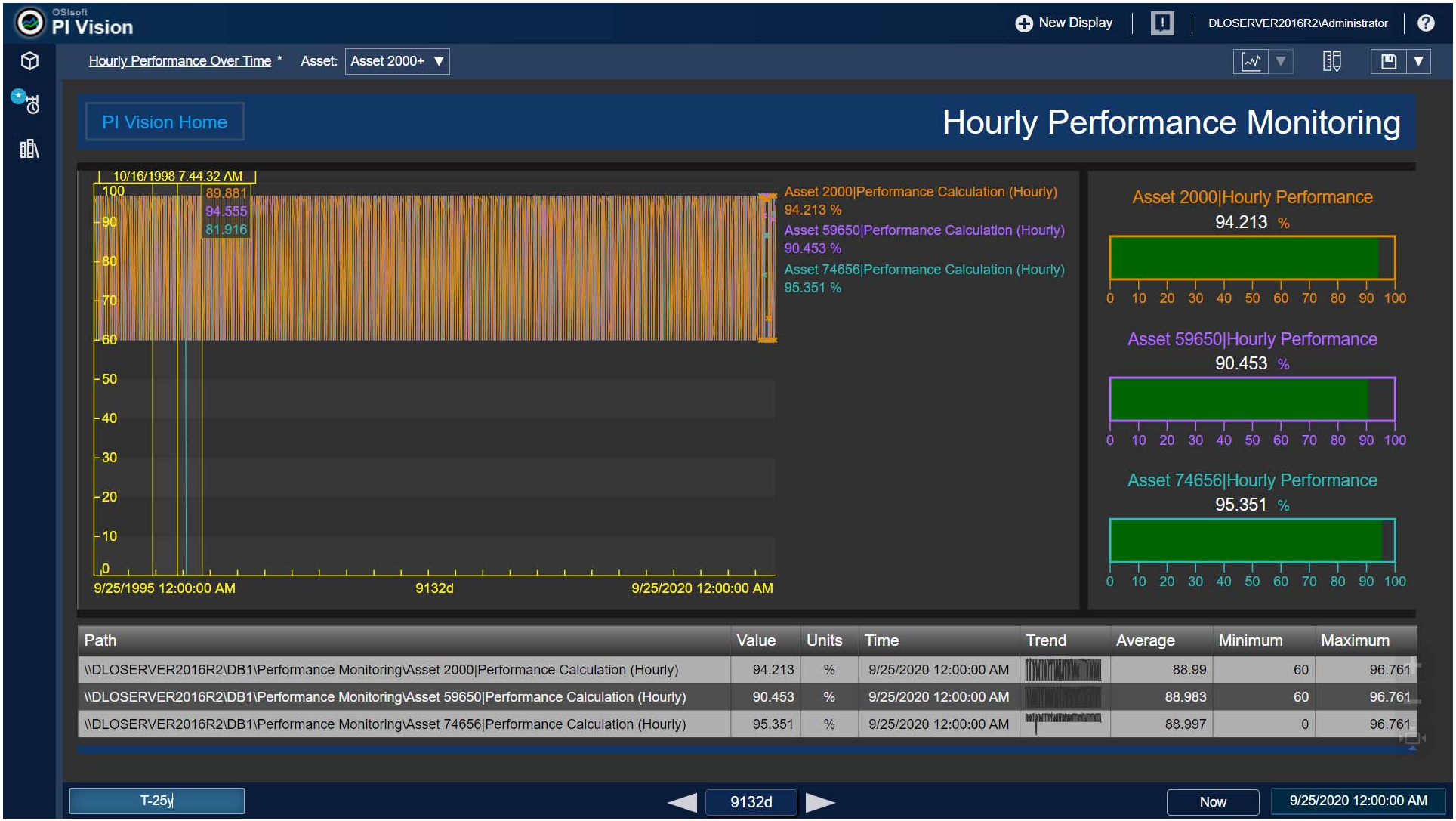

PI Vision
dfwebapp.osisoft.com/PIVision/#/EventComparison/New?hidetoolbar=false
OSIsoft
PI Vision
New Display
OSI\dlopez
Events
Automatically refresh the list
HighTurbineTemp_GE10_2020-09-19 15:34:41.139
9/19/2020 5:34:41 PM - *
HighTurbineTemp_GE10_2020-09-11 06:57:38.885
HighTurbineTemp_GE10_2020-08-29 16:30:17.610
HighTurbineTemp_GE10_2020-08-15 08:04:26.842
HighTurbineTemp_GE10_2020-08-07 16:16:52.444
HighTurbineTemp_GE10_2020-07-31 16:03:25.404
HighTurbineTemp_GE10_2020-07-21 20:05:18.227
HighTurbineTemp_GE10_2020-07-14 06:57:41.310
HighTurbineTemp_GE10_2020-07-09 05:38:52.787
HighTurbineTemp_GE10_2020-07-03 17:48:29.260
HighTurbineTemp_GE10_2020-06-26 15:11:19.865
Edit Search Criteria
Attributes
Bearing A Temperature
Bearing B Temperature
Gearbox Temperature
Generator 1 Temperature
Generator 2 Temperature
Nacelle Temperature
Reason
Tower Base 1 Temperature
GE10
(read-only) (explorer-mode)
Export
Active Power (kW)
11d 14h
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
-200
1d
2d
3d
4d
5d
6d
7d
8d
9d
10d
11d
12d
13d
14d
1,411.2
1,198.7
Active Power
-15.019 kW
Bearing A Temperature (°C)
11d 14h
55
50
45
40
35
45.285
38.957
Bearing A Temperature
32.447 °C
HighTurbineTemp_GE10_2020-09-19 15:34:41.139
HighTurbineTemp_GE10_2020-09-11 06:57:38.885
HighTurbineTemp_GE10_2020-08-29 16:30:17.610
HighTurbineTemp_GE10_2020-08-15 08:04:26.842
HighTurbineTemp_GE10_2020-08-07 16:16:52.444
HighTurbineTemp_GE10_2020-07-31 16:03:25.404
HighTurbineTemp_GE10_2020-07-21 20:05:18.227


PI Vision
dloserver2016r2/PIVision/#/EventDetails?srcdisplayid=New&server=DLOSERVER2016R2&eventid=ce7be4f2-fc17-11ea-a93a-00155de10901&hidetoolbar=false
OSIsoft
PI Vision
New Display
DLOSERVER2016R2\Administrator
Events
Automatically refresh the list
Pump01 - Pump Downtime Event 2020-09-21 07:48:00.000
Pump01 - Pump Downtime Event 2020-09-21 02:24:00.000
Pump01 - Pump Downtime Event 2020-09-21 00:00:00.000
Pump01 - Pump Downtime Event 2020-09-20 21:00:00.000
Pump01 - Pump Downtime Event 2020-09-20 17:24:00.000
9/20/2020 5:24:00 PM - 9/20/2020 6:00:00 PM
Pump01 - Pump Downtime Event 2020-09-20 15:00:00.000
Pump01 - Pump Downtime Event 2020-09-20 09:36:00.000
Pump01 - Pump Downtime Event 2020-09-19 23:24:00.000
Pump01 - Pump Downtime Event 2020-09-19 10:48:00.000
Pump01 - Pump Downtime Event 2020-09-19 05:24:00.000
Pump01 - Pump Downtime Event 2020-09-18 04:12:00.000
Edit Search Criteria
Pump01 - Pump Downtime Event 2020-09-20 17:24:00.000
Acknowledge
9/20/2020 5:24:00 PM - 9/20/2020 6:00:00 PM
Event Type: Pump Downtime Event
Asset: ...\Site T65\Pump Monitoring Project\Pump01
200 35 4 160
180
160
140
120
100
80
60
40
20
0 0 0
5m 10m 15m 20m 25m 30m 35m
Bearing Temperature
181.72 °F
Current Draw
30.965 A
Discharge Flow Rate
3.7316 US gal/min
Suction Pressure
152.94 psi
9/20/2020 5:24:00 PM
9/20/2020 6:00:00 PM
Pump01 Rated Current Draw 30 30 A
Pump01 Rated Efficiency 87 87 %
Pump01 Serial Number Pump01 Pump01
Pump01 Suction Pressure 30.238 152.94 psi
Pump01 Total Head 125 125 ft
Comments
Add Comment
Under investigation by D. Lopez
Field Notes.txt
Add
Actions and Comments (0)
Reason
Reason
Electrical issue
High pressure
High temperature
No downtime event
Part break
Unknown
Clear
Apply
Cancel

Interactive, cross-platform **data dashboards**

Anomaly and **event investigation** displays

Rapid data **visualizations**



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

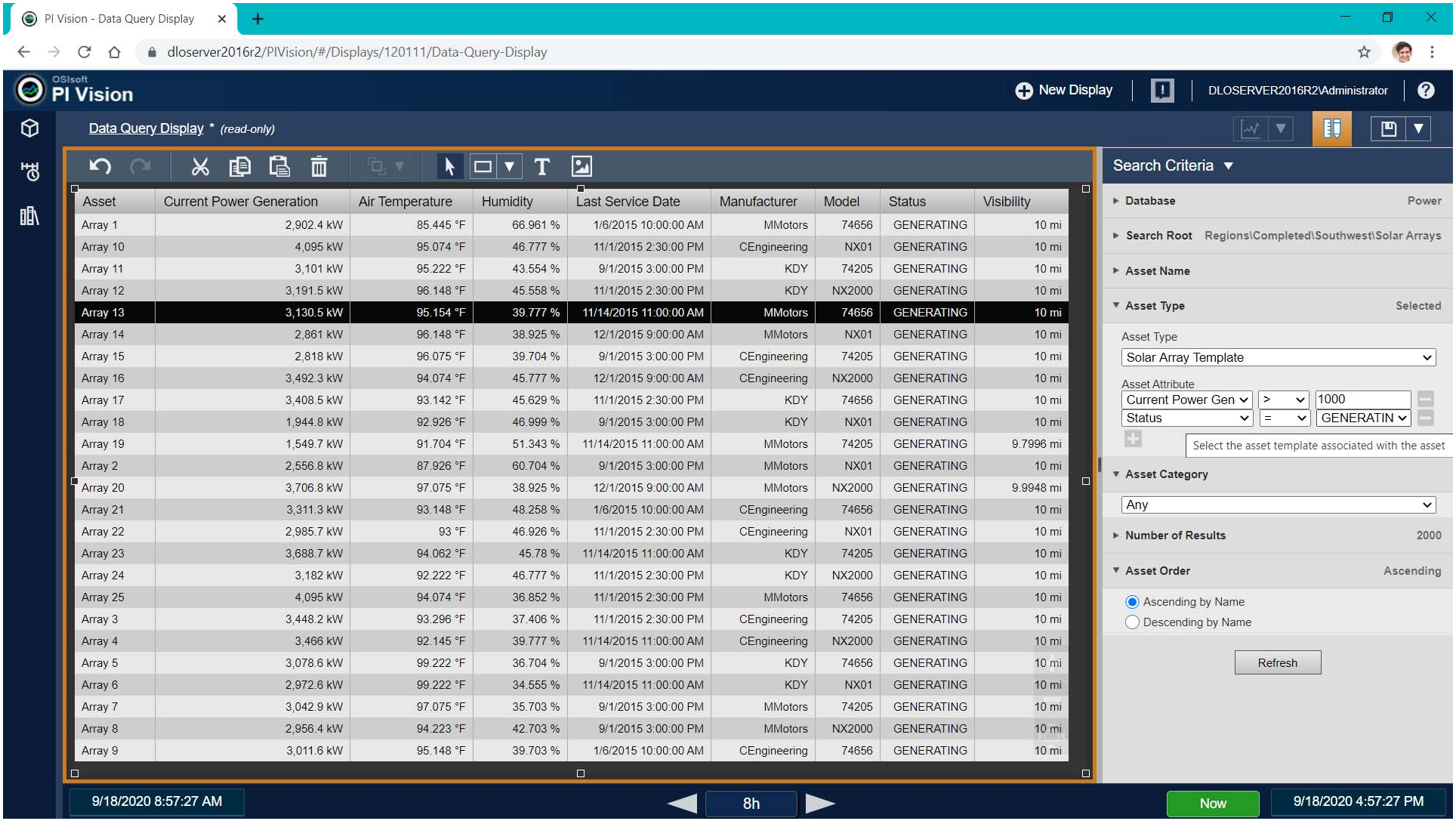
Interactive, cross-platform **data dashboards**

Anomaly and **event investigation** displays

Rapid data **visualizations**

Comparing and contrasting **assets**


PI Vision - Pump Monitoring Disp
dloserver2016r2/PIVision/#/Displays/50099/Pump-Monitoring-Display
OSIsoft
PI Vision
New Display
DLOSERVER2016R2\Administrator
Events
Automatically refresh the list
Pump04 - High Bearing Temperature Event ...
2/11/2020 10:50:00 AM - *
Pump03 - High Bearing Temperature Event ...
Pump02 - High Bearing Temperature Event ...
Pump01 - High Bearing Temperature Event ...
Pump05 - Pump Downtime Event 2020-02-1...
Pump06 - High Bearing Temperature Event ...
Create Events Table
Edit Search Criteria
Attributes
Pump04 - High Bearing Temperature Event ...
Asset Properties
Asset: Pump04
Event Information
Source Element Name: Pump04
Source Element Path: Sites\Site T65\Pu...
Process Limits
Bearing Temperature Upper Limit: 185 °F
Process Variables
Pump Monitoring Display *
Asset:
Pump Monitoring Project
Pump01
Bearing updates in last 5 minutes
1 count
2/11/2020 11:20:53 AM
Pump Status
ON
2/11/2020 10:48:00 AM
Alert in progress
False
2/11/2020 11:20:53 AM
Downtime Reason
No downtime event
2/11/2020 11:20:00 AM
Maintenance Status
Needs maintenance
2/11/2020 11:00:00 AM
6.3663
%
Hourly Average Efficiency
Bearing Temperature
179.61 °F
Hourly Average Efficiency
6.3663 %
Current Draw
19.179 A
Discharge Flow Rate
5.8539 US gal/min
Suction Pressure
148.16 psi
Installation Date
8/2/2019 12:00:00 AM
Maintenance Date
8/26/2019 6:00:00 AM
Starts Since Maint.
1,116 count
Runtime Since Install.
4,182 h
Runtime Since Maint.
3,691.2 h
Name
Value
Units
Pump01|Horsepower
5.5
hp
Pump01|Manufacturer
PumpsXStream
Pump01|Pump Type
Centrifugal
Pump01|Rated Current Draw
20
A
Pump01|Rated Efficiency
85
%
Pump01|Total Head
140
ft
Pump01|PI Data Archive Name
dloserver2016r2
Pump01|Parent Element Name
Pump Monitoring Project
Pump01|Element Template Name
Pump Template
Pump02
Bearing Temperature
179.4 °F
Hourly Average Efficiency
6.3112 %
Current Draw
25.469 A
Edit Collection Criteria
Database
Condition Based Monitoring Project
Search Root
Sites\Site T65\Pump Monitoring Project
Asset Name
Asset Type
Selected
Asset Type
Pump Template
Asset Attribute
Operating Tir
=
Needs n
No maintenance needed
Needs maintenance
Asset Category
Number of Results
16
Asset Order
Ascending
Refresh
2/9/2020 11:20:53 AM
2d
Now
2/11/2020 11:20:53 AM



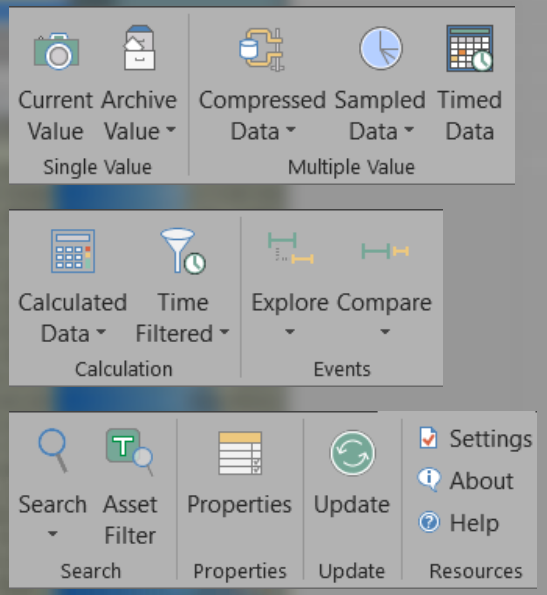
Asset	Current Power Generation	Air Temperature	Humidity	Last Service Date	Manufacturer	Model	Status	Visibility
Array 1	2,902.4 kW	85.445 °F	66.961 %	1/6/2015 10:00:00 AM	MMotors	74656	GENERATING	10 mi
Array 10	4,095 kW	95.074 °F	46.777 %	11/1/2015 2:30:00 PM	CEngineering	NX01	GENERATING	10 mi
Array 11	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

How do users benefit from the **modern PI System**?

Intuitive integration with **BI tools**

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



Transformer Summary

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

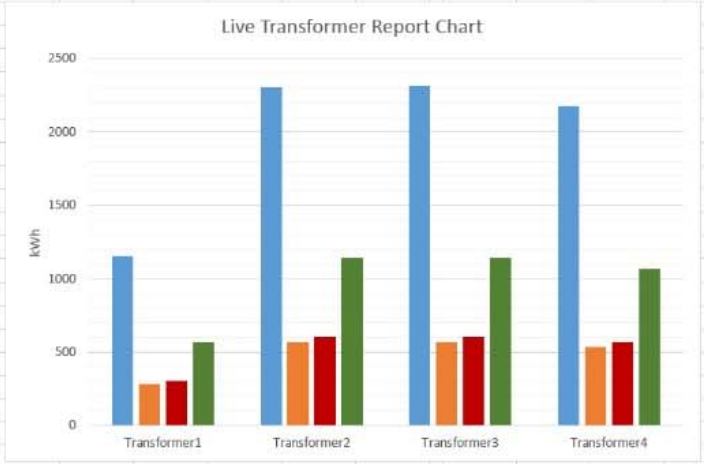
Summary

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

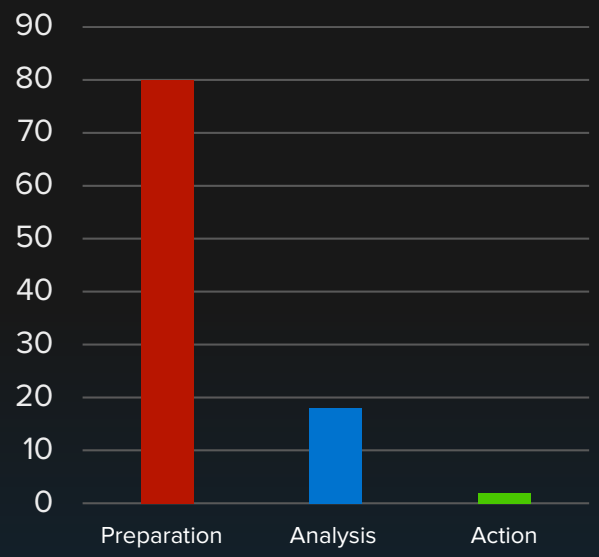
Meter totals	kWh	Shoulder	Peak	OffPeak
6000	73.86497068	16.07544565	18.93602479	38.85350037
6001	168.7473726	40.20955896	44.5914793	83.94633341
6002	32.38909411	10.76919246	8.224327624	13.39557385
6003	50.67891932	8.288259923	13.68035454	28.7103045
6004	36.28805351	14.12327498	9.286082447	12.87869656
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

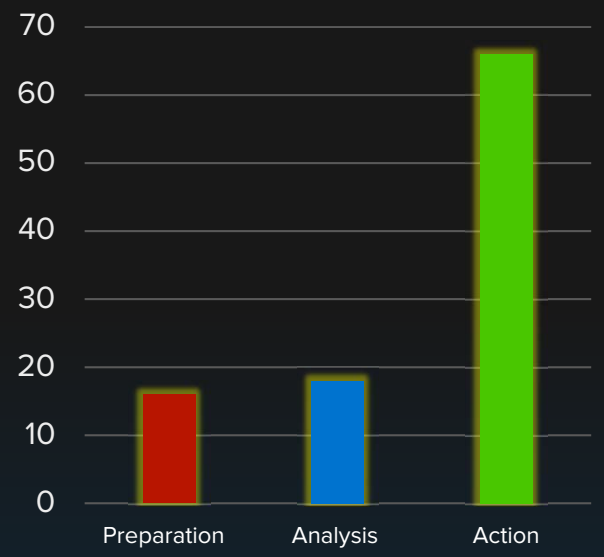


PI Integrators:

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/

Equipment Health Investigation Report - Power BI Desktop

File | Home | View | Modeling

Daniel Lopez

Paste | Cut | Copy | Format Painter — Clipboard

Get Data | Recent Sources | Enter Data | Edit Queries | Refresh — External data

Solution Templates | Partner Showcase — Resources

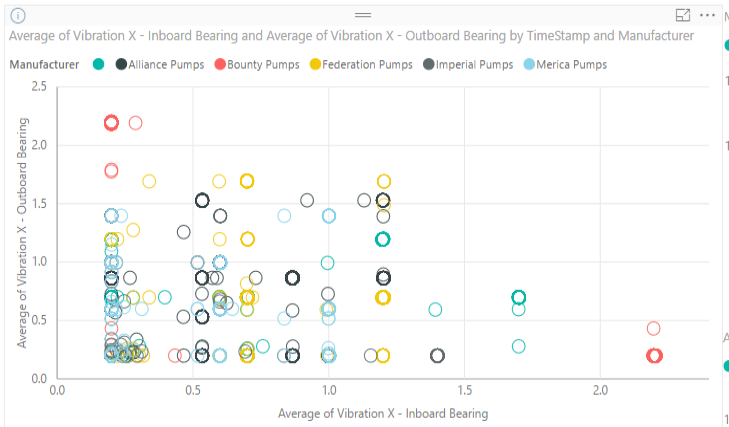
New Page | New Visual | Text box | Image | Shapes — Insert

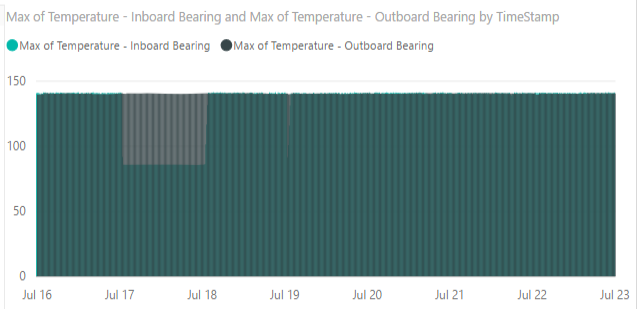
From Store | From File — Custom visuals

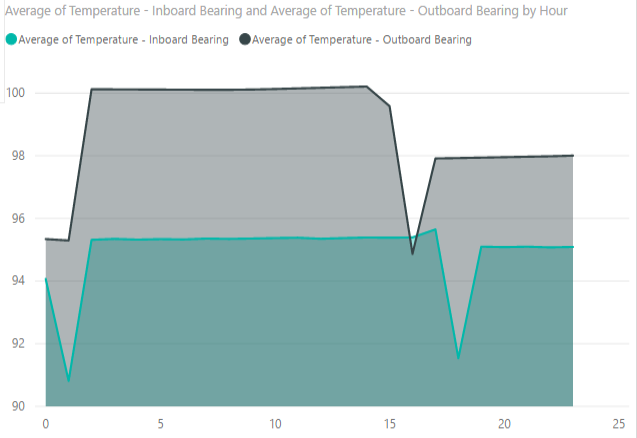
Manage Relationships — Relationships

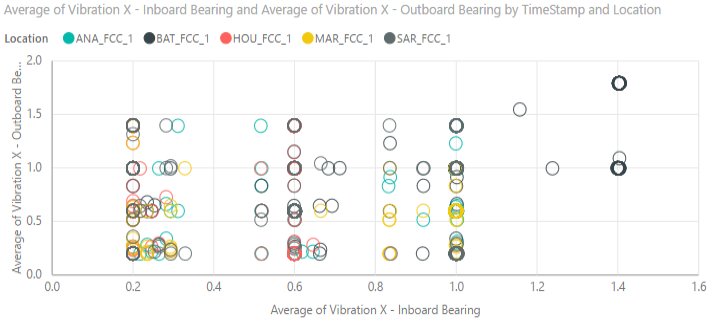
New Measure — Calculations

Publish — Share









Visualizations

Values

Drag data fields here

Filters

Page level filters

Drag data fields here

Report level filters

Drag data fields here

Fields

Search

Equipment Health Investigation

- Date - Installed
- Date - Last Service
- Day of the Week
- FCC Pump Process
- Hour
- Id
- Location
- Manufacturer
- PlIntShapeID
- PlIntTSTicks
- Serial Number
- Temperature - Inboard Bearing
- Temperature - Outboard Bearing
- TimeStamp
- Vibration X - Inboard Bearing
- Vibration X - Outboard Bearing
- Vibration Y - Inboard Bearing
- Vibration Y - Outboard Bearing

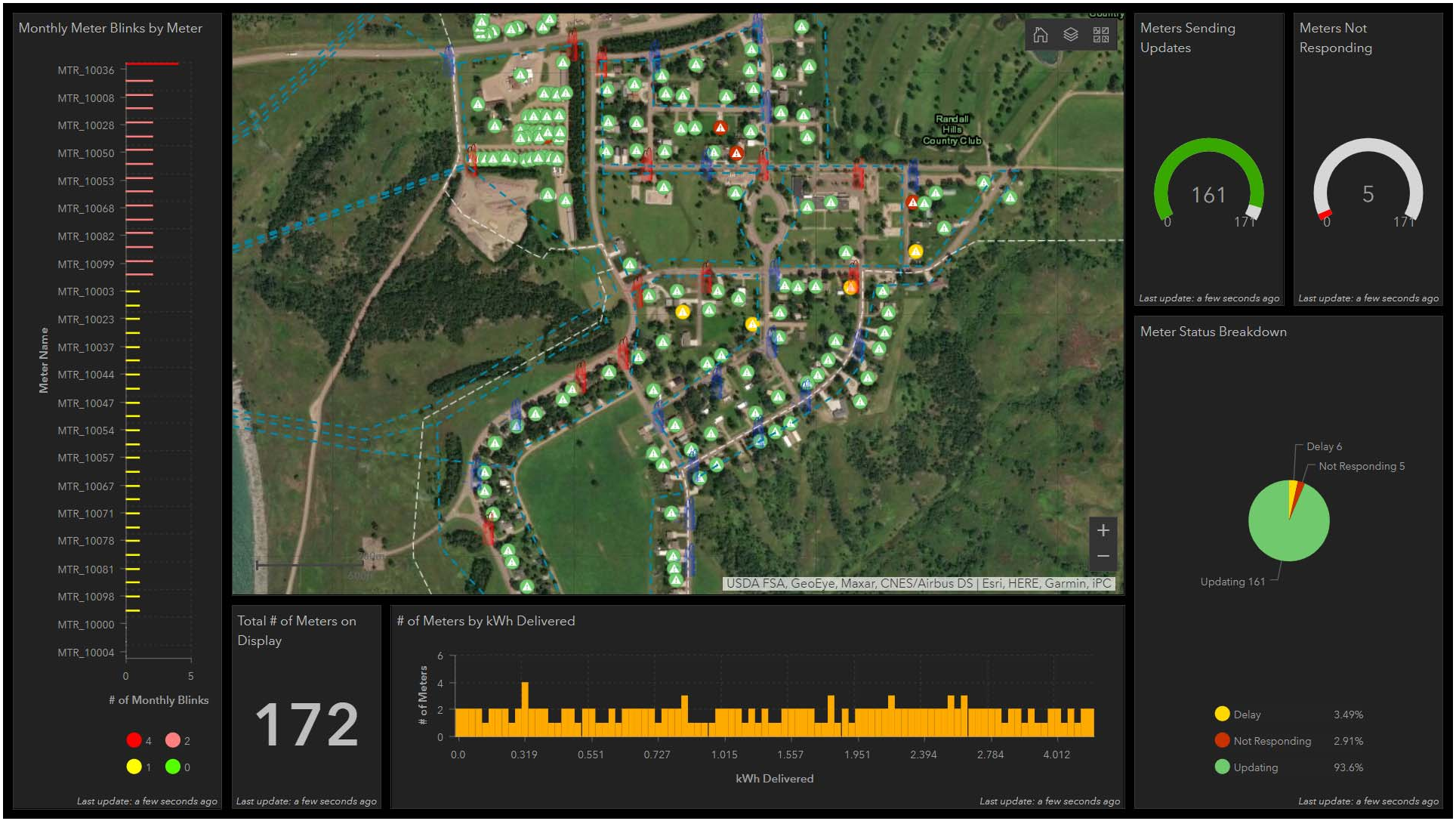
Page 1

PAGE 1 OF 1

UPDATE AVAILABLE (CLICK TO DOWNLOAD)

Intuitive integration with **BI tools**

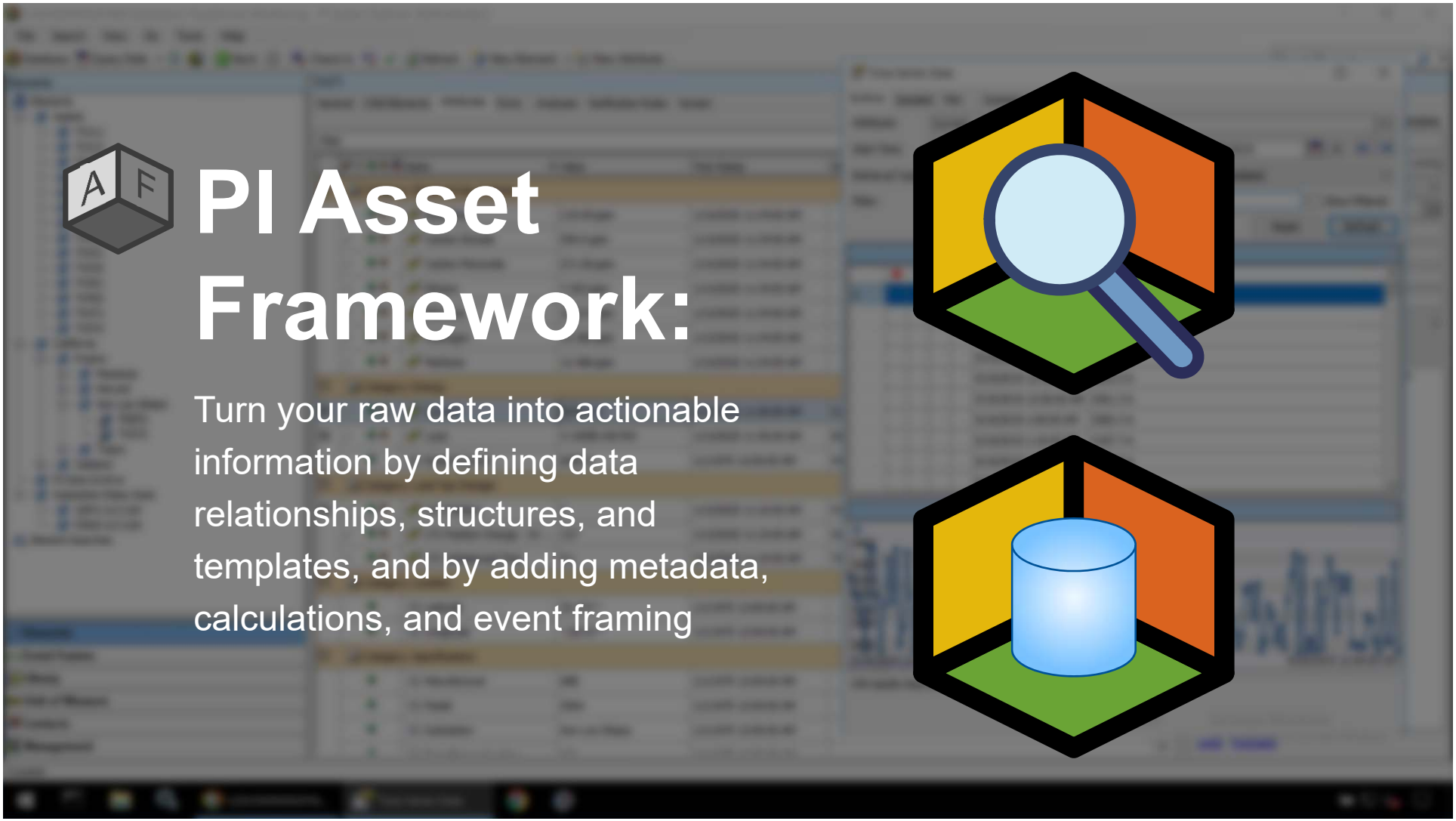
Live connectivity to **Esri ArcGIS** geo-analytics


Monthly Meter Blinks by Meter
MTR_10036
MTR_10008
MTR_10028
MTR_10050
MTR_10053
MTR_10068
MTR_10082
MTR_10099
MTR_10003
MTR_10023
MTR_10037
MTR_10044
MTR_10047
MTR_10054
MTR_10057
MTR_10067
MTR_10071
MTR_10078
MTR_10081
MTR_10098
MTR_10000
MTR_10004
Meter Name
0
5
# of Monthly Blinks
4
2
1
0
Last update: a few seconds ago
Randall Hills Country Club
USDA FSA, GeoEye, Maxar, CNES/Airbus DS | Esri, HERE, Garmin, iPC
Meters Sending Updates
161
0
171
Last update: a few seconds ago
Meters Not Responding
5
0
171
Last update: a few seconds ago
Meter Status Breakdown
Delay 6
Not Responding 5
Updating 161
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
# of Meters
6
4
2
0
0.0
0.319
0.551
0.727
1.015
1.557
1.951
2.394
2.784
4.012
kWh Delivered
Last update: a few seconds ago

Intuitive integration with **BI tools**

Live connectivity to **Esri ArcGIS** geo-analytics

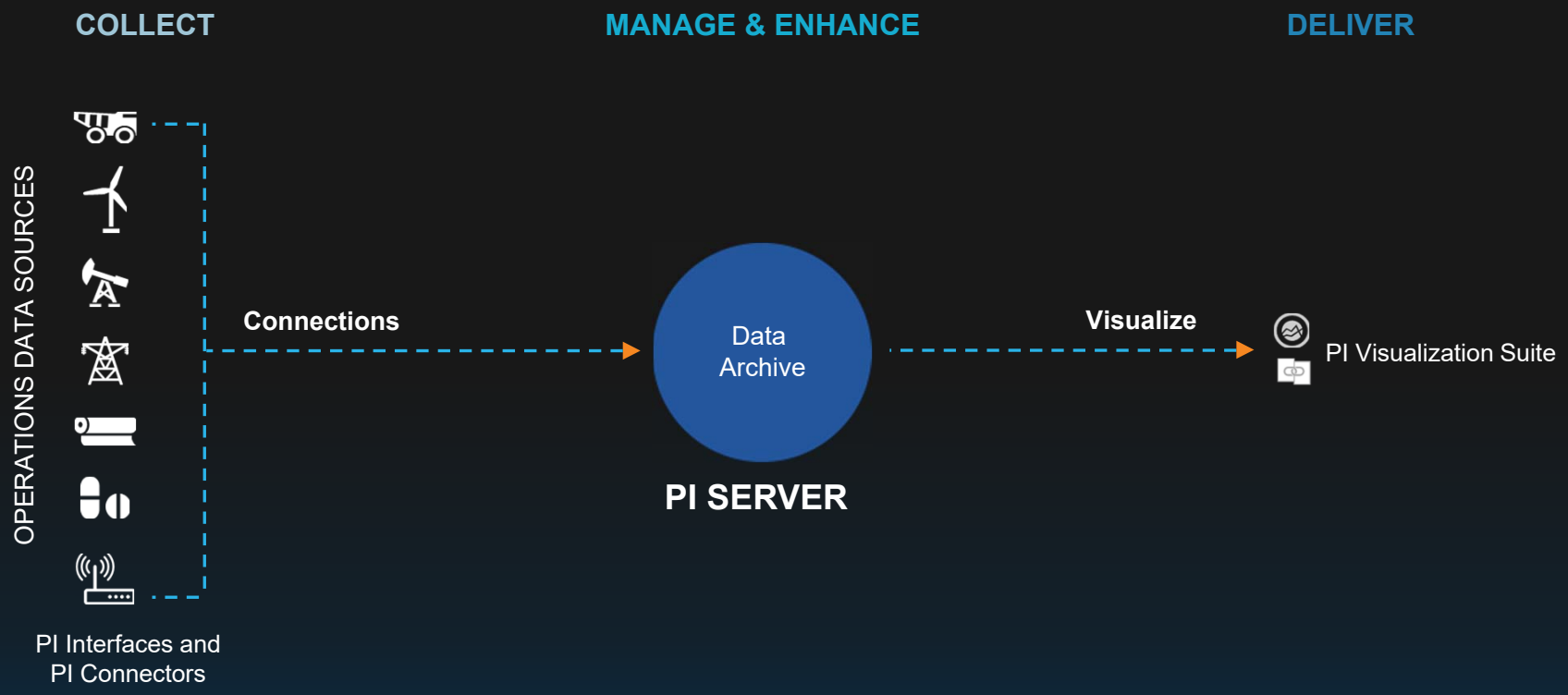
A data **modeling and analytics** framework


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

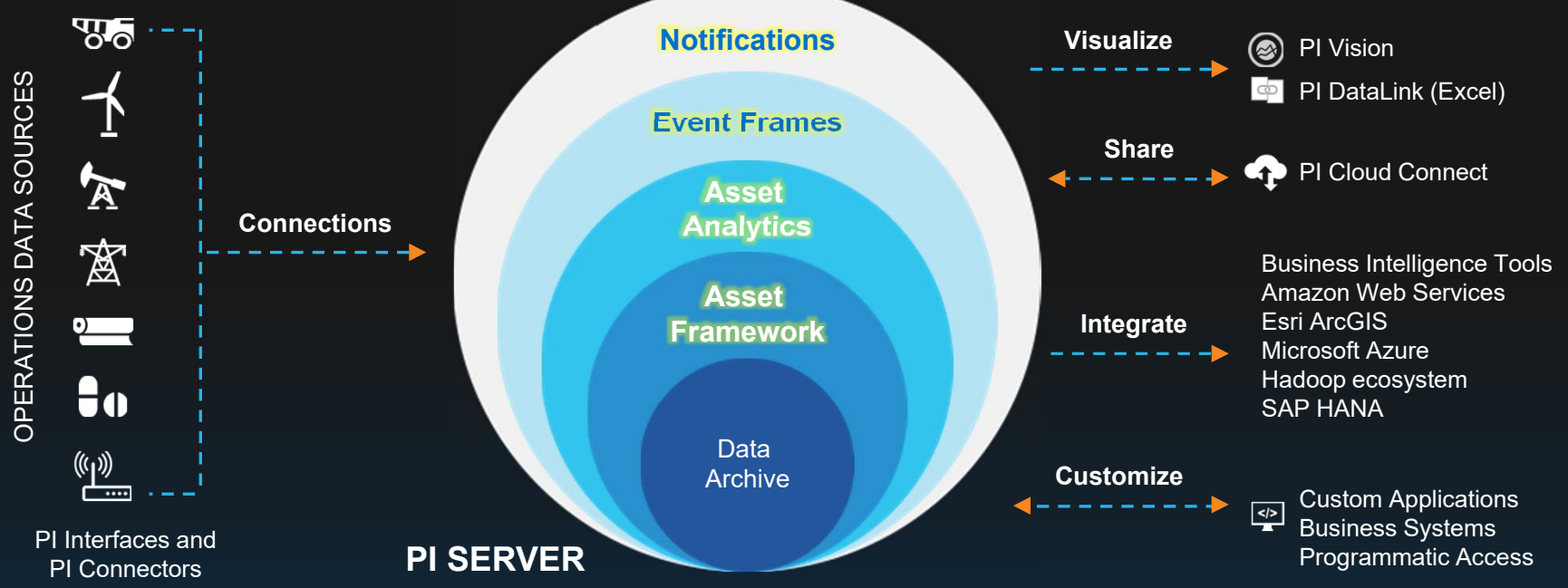
The Importance of **PI AF**

Fully **Leverage** Your PI System

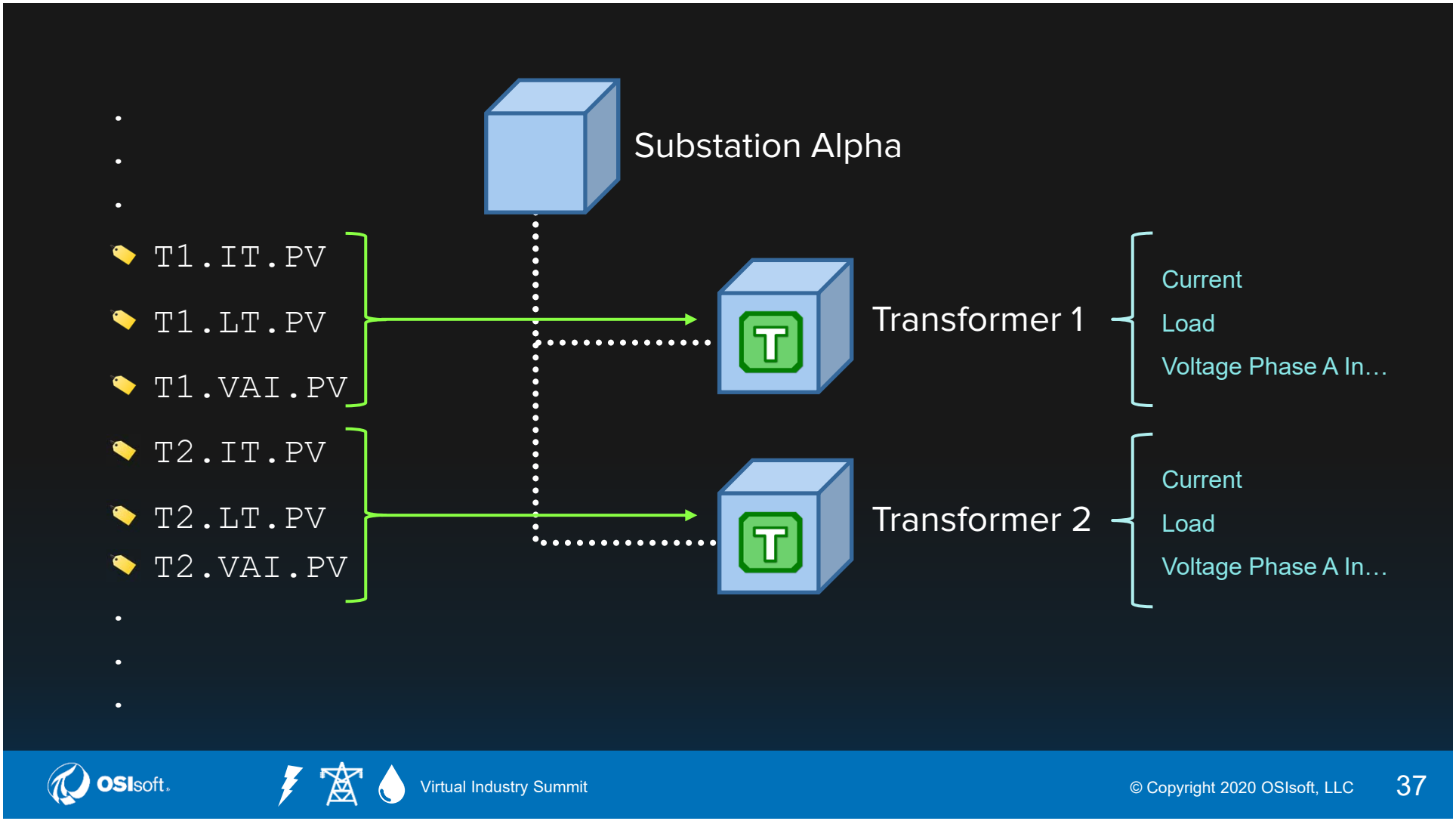
The Components of the Original PI System



The Components of the Modern PI System

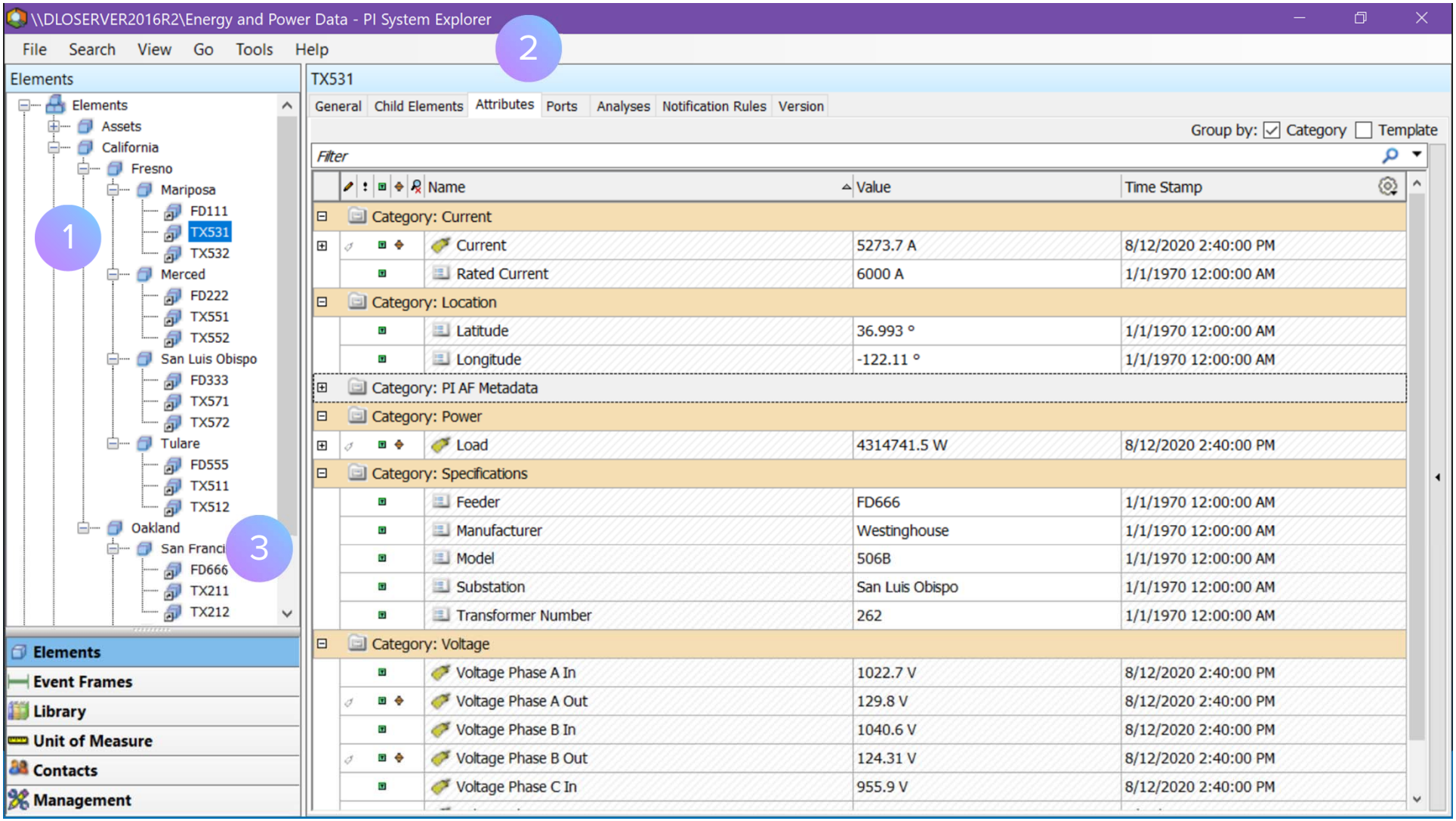


How Specifically Can **PI AF** Help You Achieve **Success**?



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

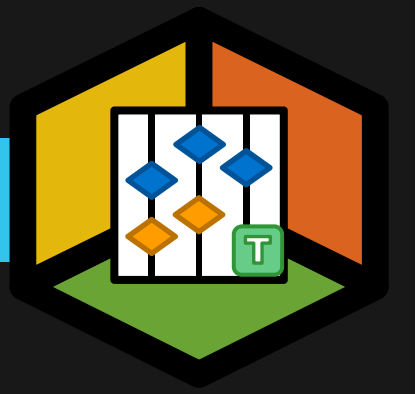
Status

2

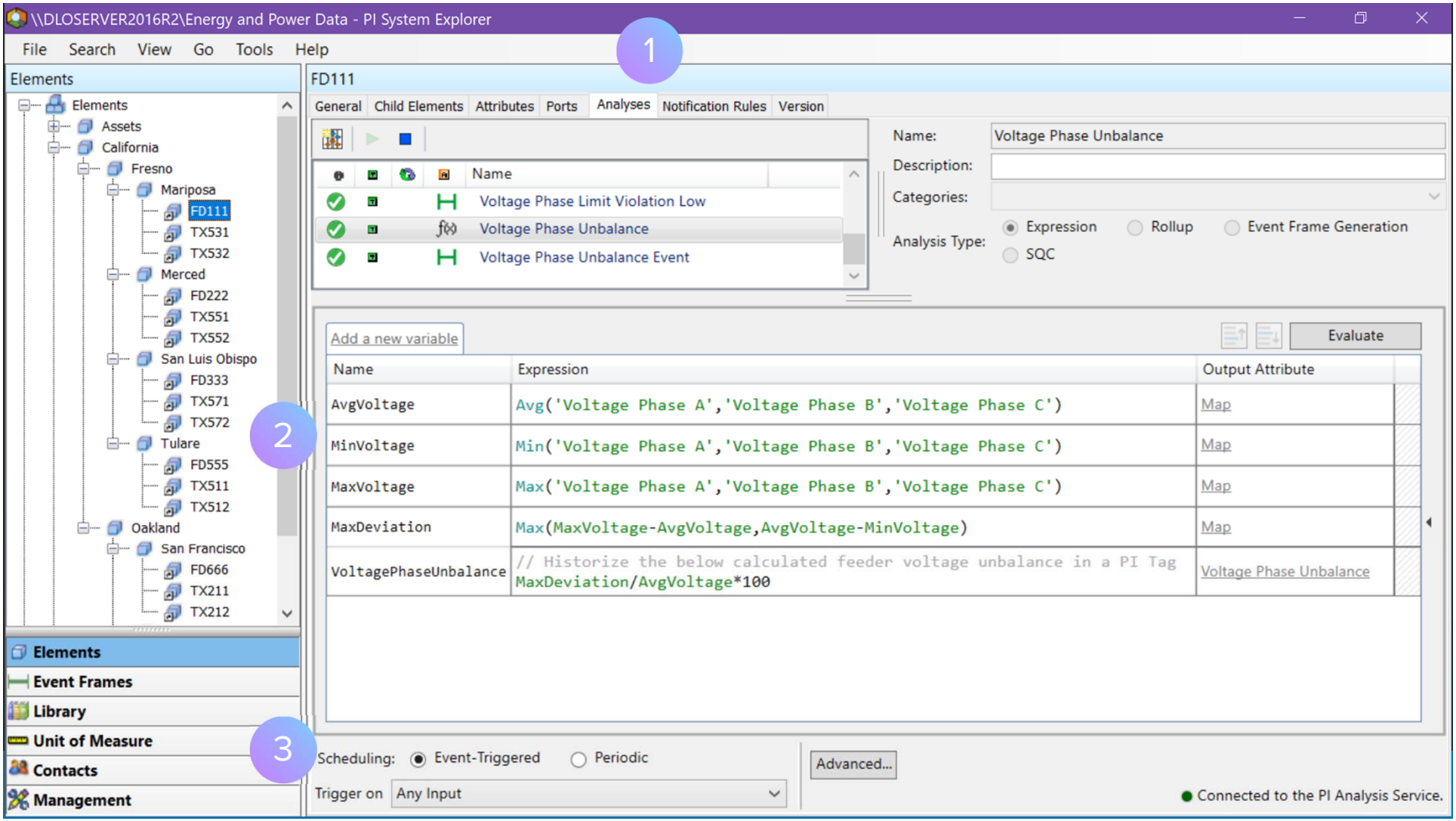
Investigate **phase unbalance**!

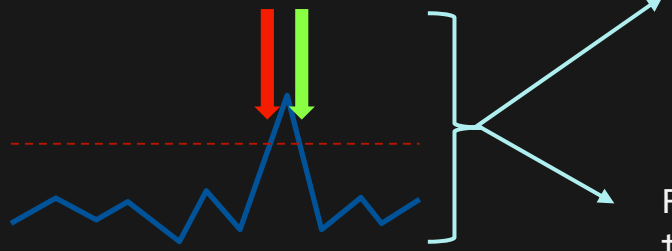
Calculate the unbalance based on three-phase voltage, starting **now**, and continuing **forever**

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
Search
View
Go
Tools
Help
1
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 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.



High Temp. Event

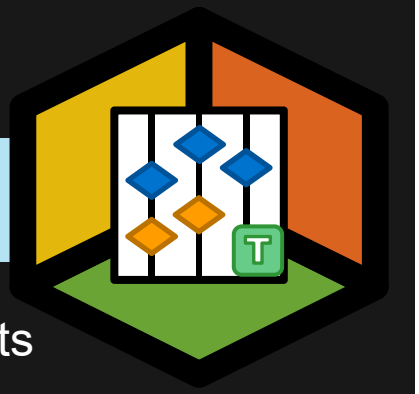
- Bearing Temperature
- Start Time
- End Time
- Source Element

For **each pump**, **every time** you get a **new** temperature **reading** for that pump:

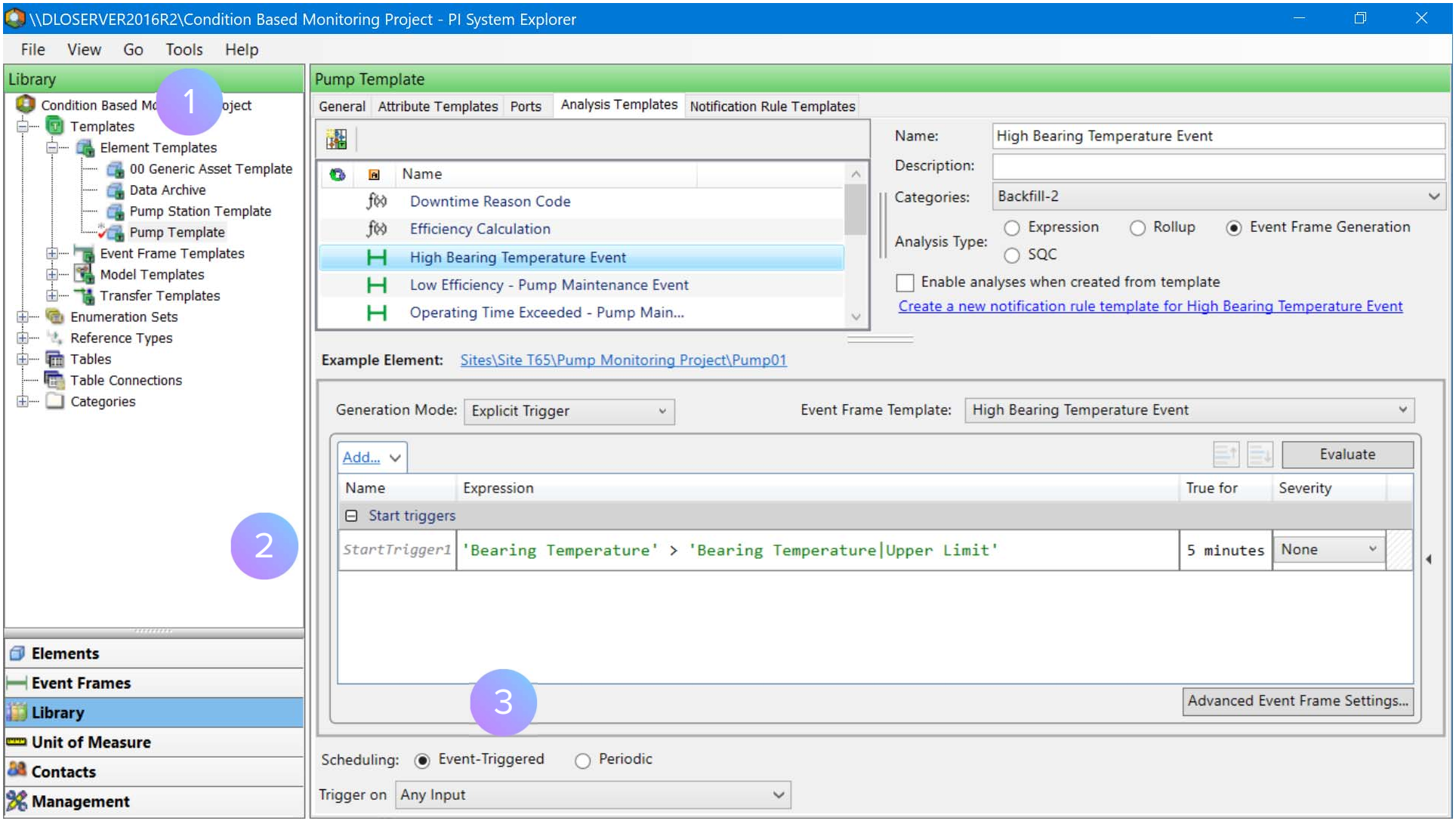
Start an event (using the **template**) if the **value** is **over** the limit for **at least** 5 minutes

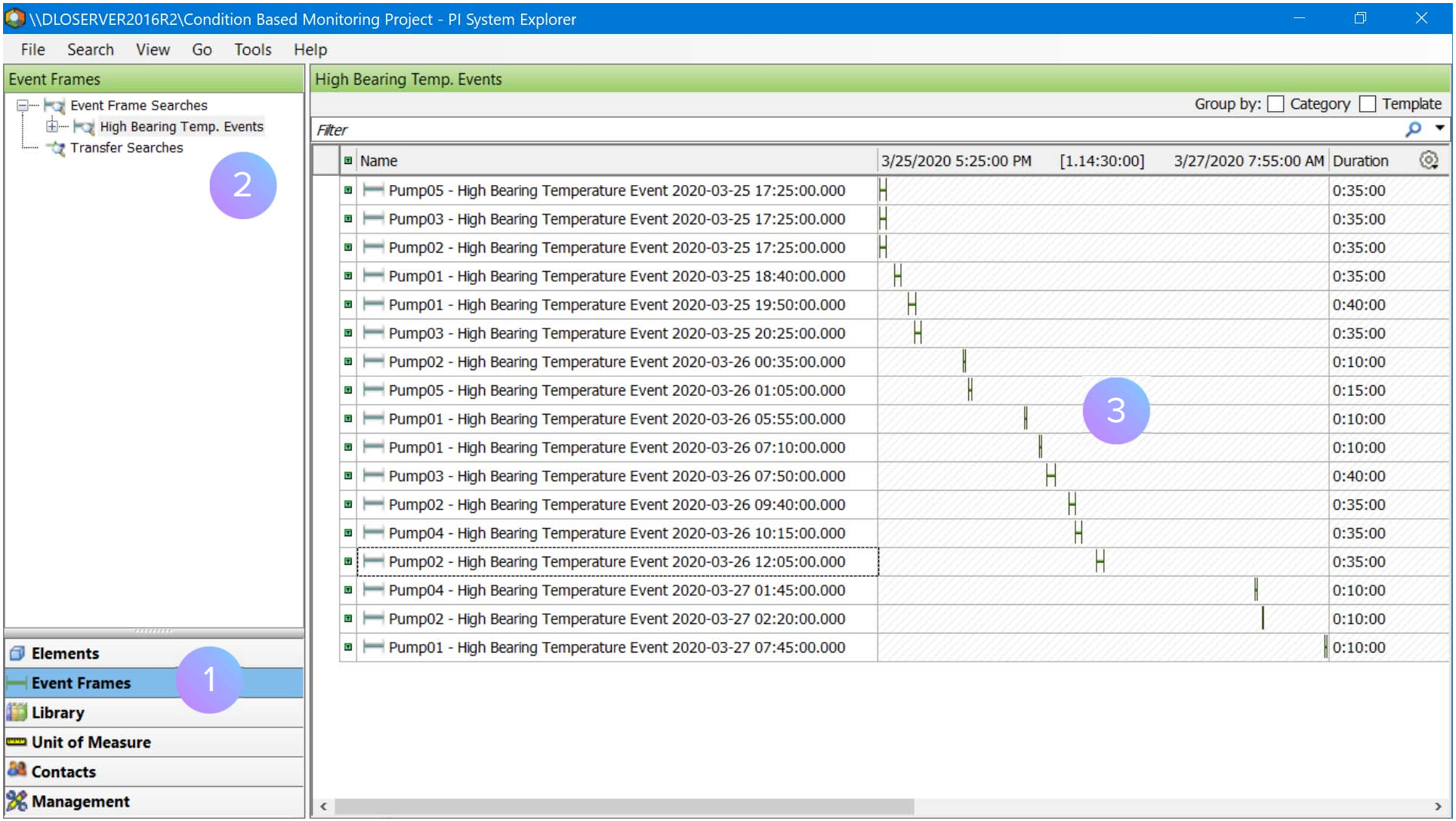
And **end** that event once the **value drops** back **below** the limit

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\Condition Based Monitoring Project - PI System Explorer
File
View
Go
Tools
Help
Library
Condition Based Mo oject
Templates
Element Templates
00 Generic Asset Template
Data Archive
Pump Station Template
Pump Template
Event Frame Templates
Model Templates
Transfer Templates
Enumeration Sets
Reference Types
Tables
Table Connections
Categories
1
2
3
Elements
Event Frames
Library
Unit of Measure
Contacts
Management
Pump Template
General
Attribute Templates
Ports
Analysis Templates
Notification Rule Templates
Name
Downtime Reason Code
Efficiency Calculation
High Bearing Temperature Event
Low Efficiency - Pump Maintenance Event
Operating Time Exceeded - Pump Main...
Name: High Bearing Temperature Event
Description:
Categories: Backfill-2
Analysis Type: Expression Rollup Event Frame Generation SQC
Enable analyses when created from template
Create a new notification rule template for High Bearing Temperature Event
Example Element: Sites\Site T65\Pump Monitoring Project\Pump01
Generation Mode: Explicit Trigger
Event Frame Template: High Bearing Temperature Event
Add...
Evaluate
Name
Expression
True for
Severity
Start triggers
StartTrigger1
'Bearing Temperature' > 'Bearing Temperature|Upper Limit'
5 minutes
None
Advanced Event Frame Settings...
Scheduling: Event-Triggered Periodic
Trigger on Any Input


\\DLOSERVER2016R2\Condition Based Monitoring Project - PI System Explorer
File
Search
View
Go
Tools
Help
Event Frames
Event Frame Searches
High Bearing Temp. Events
Transfer Searches
2
Elements
Event Frames
Library
Unit of Measure
Contacts
Management
1
High Bearing Temp. Events
Group by: Category Template
Filter
Name
3/25/2020 5:25:00 PM
[1.14:30:00]
3/27/2020 7:55:00 AM
Duration
Pump05 - High Bearing Temperature Event 2020-03-25 17:25:00.000 0:35:00
Pump03 - High Bearing Temperature Event 2020-03-25 17:25:00.000 0:35:00
Pump02 - High Bearing Temperature Event 2020-03-25 17:25:00.000 0:35:00
Pump01 - High Bearing Temperature Event 2020-03-25 18:40:00.000 0:35:00
Pump01 - High Bearing Temperature Event 2020-03-25 19:50:00.000 0:40:00
Pump03 - High Bearing Temperature Event 2020-03-25 20:25:00.000 0:35:00
Pump02 - High Bearing Temperature Event 2020-03-26 00:35:00.000 0:10:00
Pump05 - High Bearing Temperature Event 2020-03-26 01:05:00.000 0:15:00
Pump01 - High Bearing Temperature Event 2020-03-26 05:55:00.000 0:10:00
Pump01 - High Bearing Temperature Event 2020-03-26 07:10:00.000 0:10:00
Pump03 - High Bearing Temperature Event 2020-03-26 07:50:00.000 0:40:00
Pump02 - High Bearing Temperature Event 2020-03-26 09:40:00.000 0:35:00
Pump04 - High Bearing Temperature Event 2020-03-26 10:15:00.000 0:35:00
Pump02 - High Bearing Temperature Event 2020-03-26 12:05:00.000 0:35:00
Pump04 - High Bearing Temperature Event 2020-03-27 01:45:00.000 0:10:00
Pump02 - High Bearing Temperature Event 2020-03-27 02:20:00.000 0:10:00
Pump01 - High Bearing Temperature Event 2020-03-27 07:45:00.000 0:10:00
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

THANK YOU

for your time and attention