

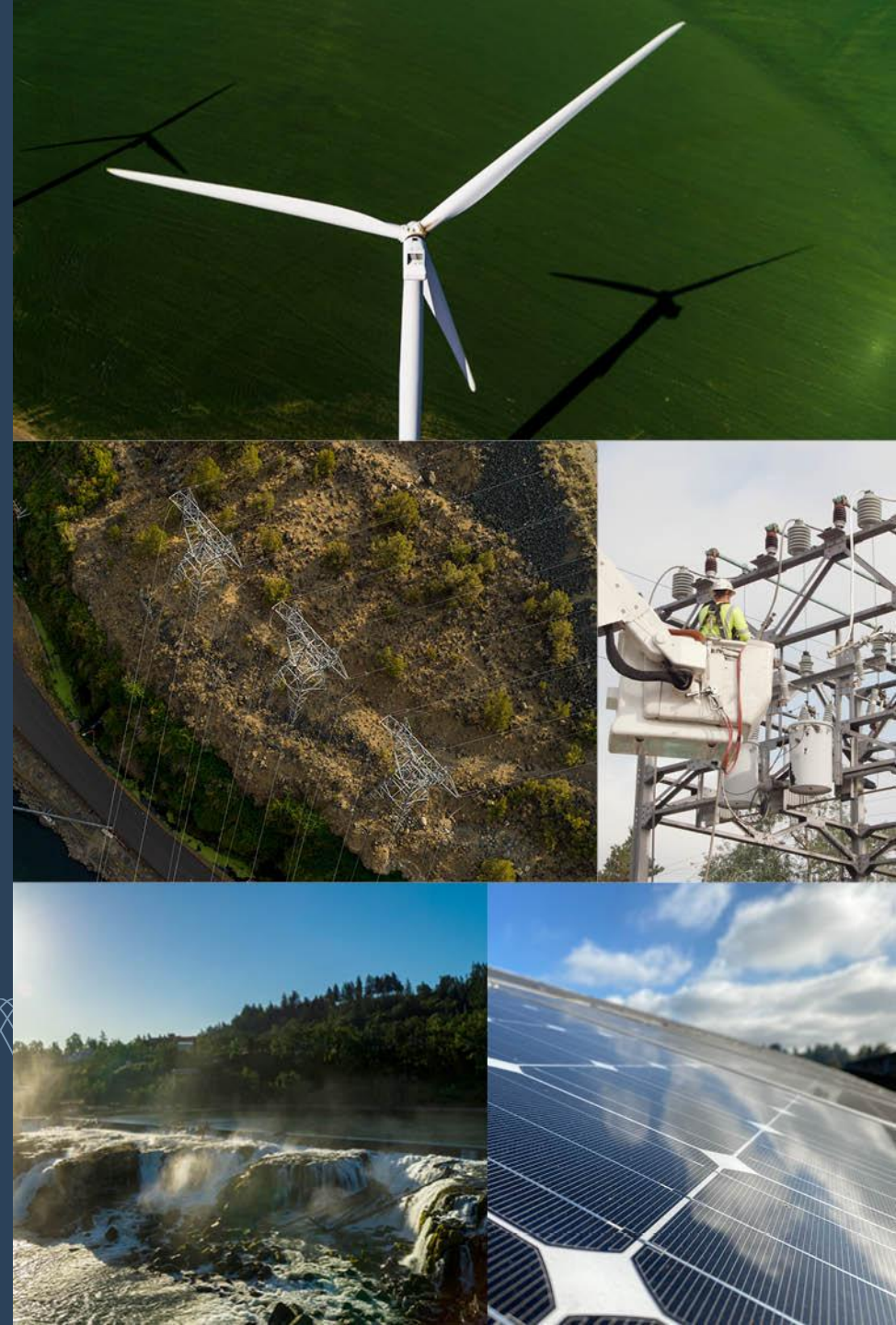


AVEVA WORLD

PGE: Empowering Operational Excellence

Our Journey with the AVEVA PI System

Jagdish Konathala – Principal System Integration Specialist



PGE at a glance

Leading the way to a clean energy future for Oregon

Portland General Electric is a publicly traded Fortune 1000 company and fully integrated energy utility based in Portland, Oregon. PGE serves nearly 950,000 customers with a service area population of 1.9 million Oregonians in 51 cities. The Company was founded in 1888 and has more than 2,900 employees across the state.

We are committed to building a clean energy future for Oregon and setting an example for the world of what's possible when customers, stakeholders, and the Company align behind a common clean energy purpose.

Business description

- Nearly 950,000 retail customers within a service area of 1.9 million residents
- Roughly half of Oregon's population lives within the PGE service area, encompassing 51 incorporated cities entirely within the State of Oregon
- More than two-thirds of Oregon's commercial and industrial activity occurs in the PGE service area
- 16 generating plants, 14 of which are in Oregon
- More than 30,000 circuit miles of transmission and distribution lines⁽¹⁾

3,300+ MWs of generation



Wind Turbine Power Curve Analysis



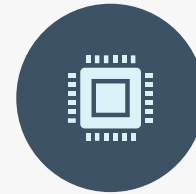
Power Curve Performance Monitoring



Wind turbine performance is measured against design power curve



Power output vs. wind speed relationship is critical



PI System enables real-time performance monitoring



Deviations from expected curve indicate potential issues

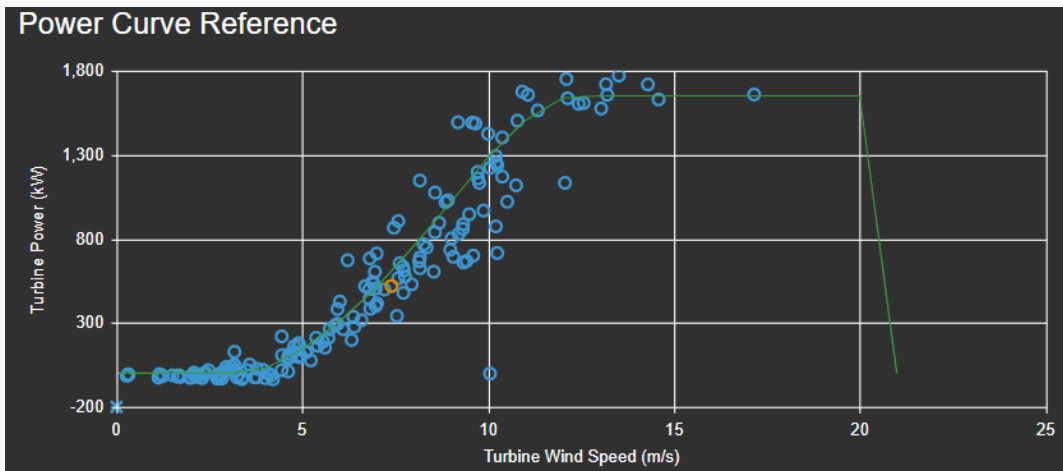


Early detection prevents significant revenue loss

Performance Comparison

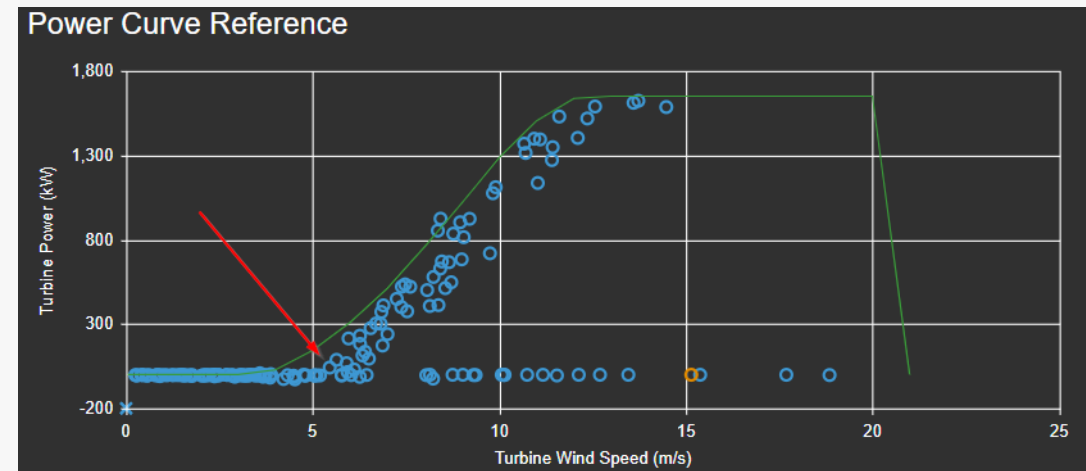
Normal Performance

- Turbine power output follows design curve
- Consistent energy production
- Expected revenue generation
- Optimal operation



Anomalous Performance

- Four turbines underperforming
- Deviation detected after overhaul
- Power output below design curve
- Immediate investigation triggered



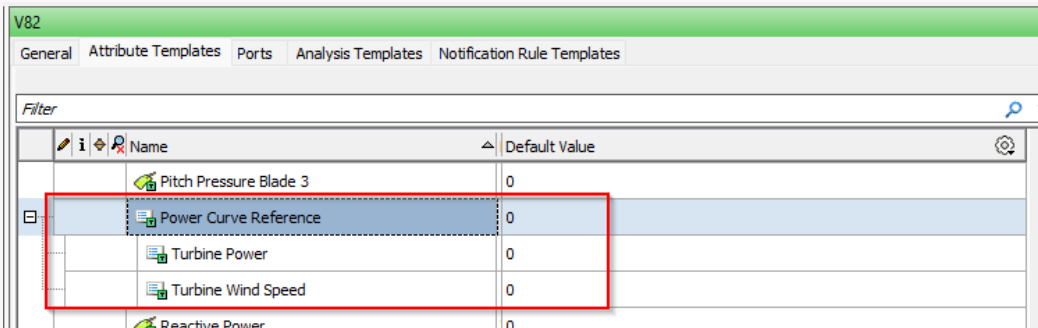
PI System Implementation

Data Visualization

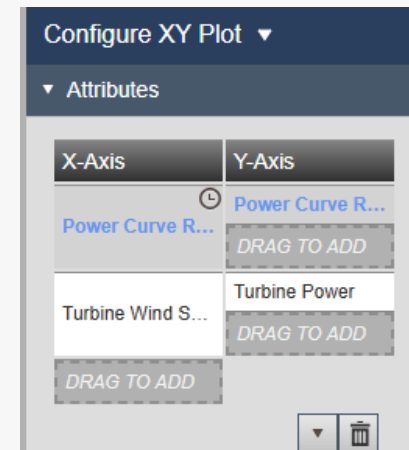
- XY Plot in PI Vision
- Real-time performance tracking
- Historical trend analysis
- Intuitive visual comparison

Advanced Configuration

- Design curve integration
- Tables and Attribute Templates
- Automated deviation alerts
- Performance threshold monitoring



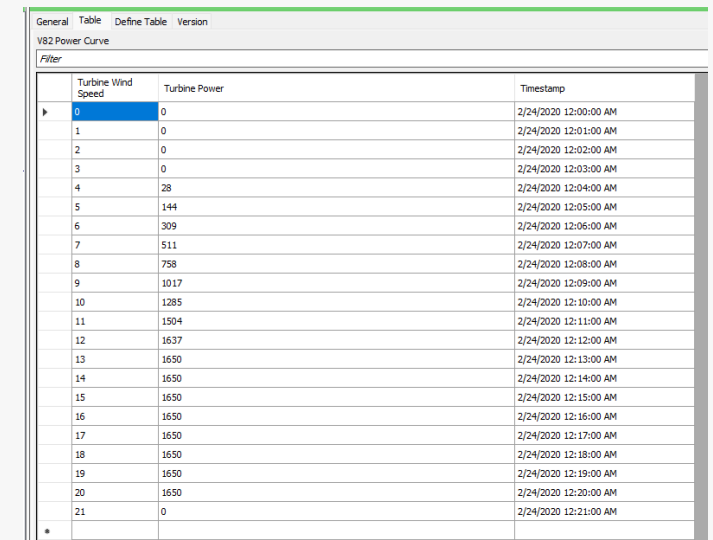
| Name | Default Value |
|------------------------|---------------|
| Pitch Pressure Blade 3 | 0 |
| Power Curve Reference | 0 |
| Turbine Power | 0 |
| Turbine Wind Speed | 0 |
| Reactive Power | 0 |



X-Axis
Y-Axis

Turbine Wind S...
Power Curve R...

DRAG TO ADD
DRAG TO ADD



| Turbine Wind Speed | Turbine Power | Timestamp |
|--------------------|---------------|-----------------------|
| 0 | 0 | 2/24/2020 12:00:00 AM |
| 1 | 0 | 2/24/2020 12:01:00 AM |
| 2 | 0 | 2/24/2020 12:02:00 AM |
| 3 | 0 | 2/24/2020 12:03:00 AM |
| 4 | 28 | 2/24/2020 12:04:00 AM |
| 5 | 144 | 2/24/2020 12:05:00 AM |
| 6 | 309 | 2/24/2020 12:06:00 AM |
| 7 | 511 | 2/24/2020 12:07:00 AM |
| 8 | 758 | 2/24/2020 12:08:00 AM |
| 9 | 1017 | 2/24/2020 12:09:00 AM |
| 10 | 1285 | 2/24/2020 12:10:00 AM |
| 11 | 1504 | 2/24/2020 12:11:00 AM |
| 12 | 1637 | 2/24/2020 12:12:00 AM |
| 13 | 1650 | 2/24/2020 12:13:00 AM |
| 14 | 1650 | 2/24/2020 12:14:00 AM |
| 15 | 1650 | 2/24/2020 12:15:00 AM |
| 16 | 1650 | 2/24/2020 12:16:00 AM |
| 17 | 1650 | 2/24/2020 12:17:00 AM |
| 18 | 1650 | 2/24/2020 12:18:00 AM |
| 19 | 1650 | 2/24/2020 12:19:00 AM |
| 20 | 1650 | 2/24/2020 12:20:00 AM |
| 21 | 0 | 2/24/2020 12:21:00 AM |

Business Impact

$$\begin{aligned} \text{Avoided Cost Value} &= \\ (4 \text{ turbines}) &\left(732 \frac{\text{Lost MWh}}{\text{turbine}} \right) (\$50/\text{MWh}) \\ &= \$146,400 \end{aligned}$$



732 MWh/year loss per underperforming turbine



\$146,400 annual revenue for 4 turbines



Early detection enables prompt maintenance



Prevents cascading performance issues



Optimizes maintenance scheduling and resource allocation

Transformer Monitoring



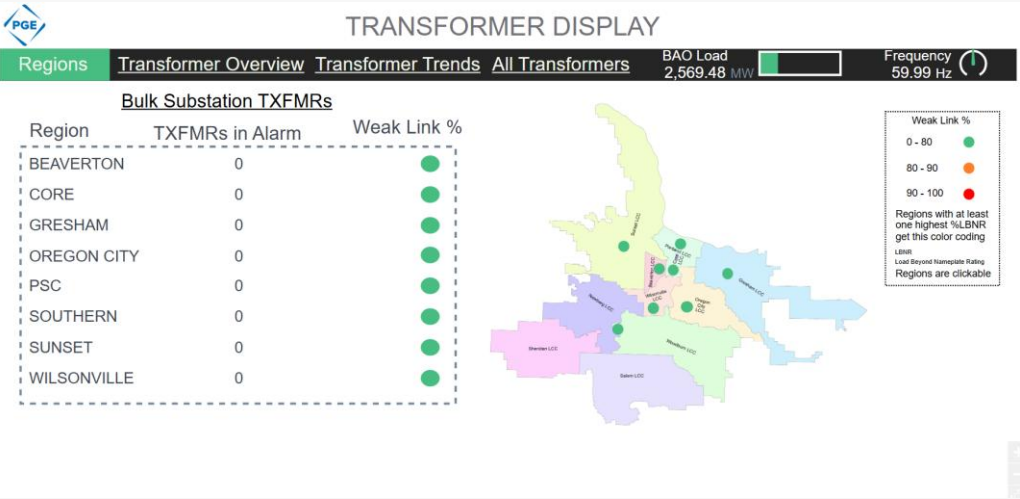
Transformer Display

Key Features

- Real-time regional overload monitoring
- Seasonal weak link value automation
- Historical heat event analysis
- Oil temperature anomaly detection

System Components

- Regional dashboard with visual indicators
- Transformer-specific trend analysis
- Fleet-wide sorting and comparison
- Weak Link % monitoring

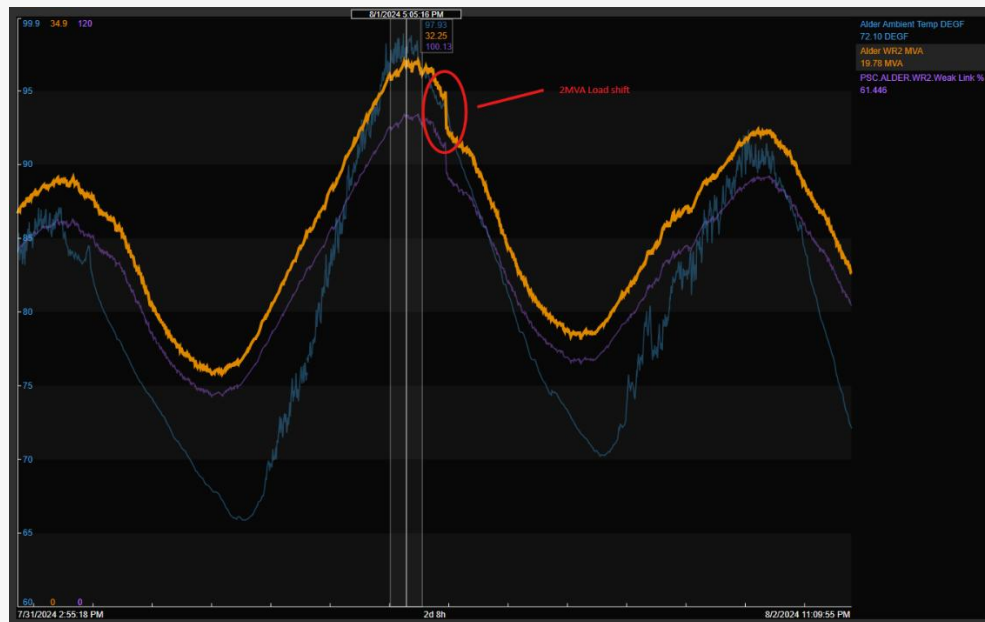


| Region | Substation | Asset | Weak Link % ▼ | Oil Temp | View Trends | One-Line |
|-------------|--------------|-------|---------------|----------|-----------------------------|--------------------------|
| PSC | HARRISON | WR1 | 91.02 | 84.00 | View Trends | One-Line |
| PSC | ALDER | WR1 | 84.23 | 85.00 | View Trends | One-Line |
| SOUTHERN | LIBERTY | WR2 | 83.75 | 72.01 | View Trends | One-Line |
| OREGON CITY | LELAND | BR1 | 81.79 | 64.00 | View Trends | One-Line |
| SOUTHERN | INDIAN | WR1 | 80.60 | 72.38 | View Trends | One-Line |
| WILSONVILLE | BOONES FERRY | WR2 | 80.53 | 64.16 | View Trends | One-Line |
| SUNSET | HILLSBORO | BR2 | 80.06 | 54.79 | View Trends | One-Line |
| BEAVERTON | OAK HILLS | WR2 | 79.85 | 68.62 | View Trends | One-Line |
| SOUTHERN | NEWBERG | WR1 | 78.91 | 71.17 | View Trends | One-Line |
| WILSONVILLE | OSWEGO | WR3 | 78.24 | 58.39 | View Trends | One-Line |
| BEAVERTON | HUBER | WR2 | 78.08 | 0.06 | View Trends | One-Line |
| BEAVERTON | MURRAYHILL | WR1 | 78.00 | 64.48 | View Trends | One-Line |

Alder Transformer Case Study

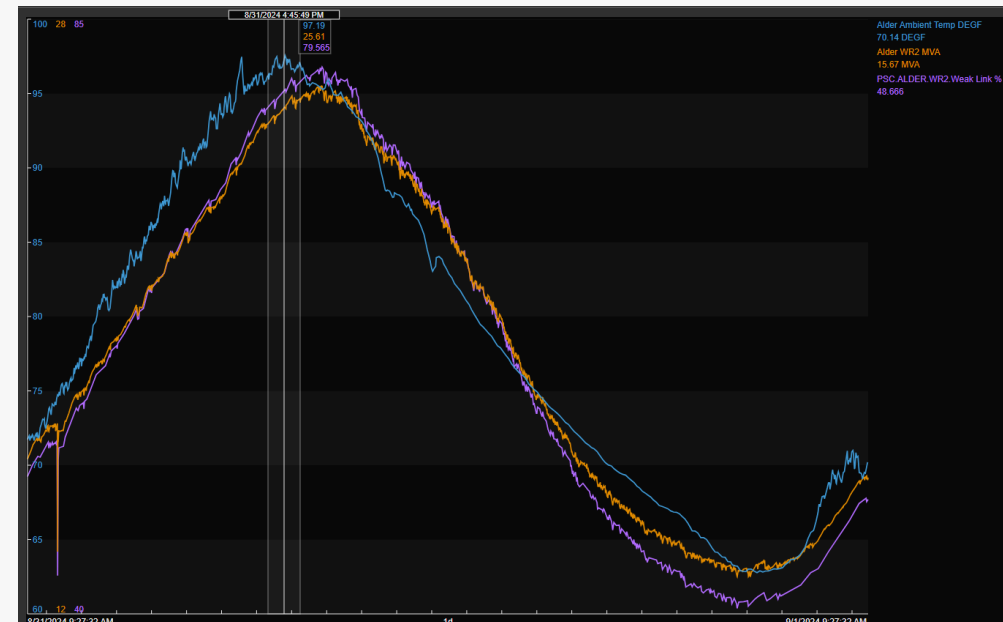
Challenge & Response

- Alder WR1 offline during heat wave
- Alder WR2 reached 100% weak link
- 2MW proactively shifted to Glencoe WR1
- Early intervention based on PI data



Results & Impact

- Second heat event: load at 79.5% weak link
- Prevented potential transformer failure
- Optimized field crew dispatching
- Enhanced grid resilience



Merchant Real Time Operations



Challenges & Solutions

Previous Challenges

- Manual tracking processes
- Constant back-and-forth with CAISO
- Fragmented data across systems
- Limited battery performance visibility
- Reactive transmission monitoring

PI System Solutions

- Automated alarming in PI Vision
- Streamlined interface
- Real-time battery monitoring
- Proactive Battery site warranty compliance
- Integrated transmission monitoring

California ISO

OASIS

ATLAS REFERENCE

REPORT DEFINITION

PRICES

TRANSMISSION

SYSTEM DEMAND

ENERGY

ANCILLARY SERVICES

CONGESTION REVENUE RIGHTS

PR

Date From: 03/28/2025

To: 03/28/2025

Market/Process: RTD

BAA Group ID: PGE

Apply

Reset

Download XML

Download CSV

EIM Transfer

Market

Op Date

Balancing Authority Area Group ID

Op Interval

HE01

HE02

HE03

HE04

HE05

HE06

HE07

HE08

HE09

HE10

HE11

HE12

HE13

HE14

HE15

HE16

| | | | | | | | | | | | | | | | | | | | | | |
|-----|------------|-----|----|--|--------|--------|--------|--------|--------|--------|---------|--------|--------|---------|---------|--|--|--|--|--|--|
| RTD | 03/28/2025 | PGE | 1 | | 87.64 | 235.64 | 328.96 | 435.09 | 451.34 | 119.34 | 1.98 | 106.20 | 255.82 | 170.89 | -32.35 | | | | | | |
| RTD | 03/28/2025 | PGE | 2 | | 149.51 | 235.09 | 363.32 | 433.94 | 481.07 | 85.75 | -102.64 | 97.37 | 290.26 | 111.06 | 8.03 | | | | | | |
| RTD | 03/28/2025 | PGE | 3 | | 151.12 | 192.09 | 371.47 | 429.42 | 489.43 | 141.52 | -125.48 | 131.46 | 302.85 | 143.78 | 47.59 | | | | | | |
| RTD | 03/28/2025 | PGE | 4 | | 92.59 | 192.57 | 376.10 | 438.67 | 511.00 | 239.96 | -58.84 | 126.33 | 264.22 | 128.98 | -140.39 | | | | | | |
| RTD | 03/28/2025 | PGE | 5 | | 105.89 | 213.68 | 383.49 | 439.96 | 511.00 | 184.06 | -40.32 | 145.73 | 264.48 | 148.81 | -115.71 | | | | | | |
| RTD | 03/28/2025 | PGE | 6 | | 127.40 | 225.86 | 409.91 | 433.94 | 511.00 | 171.73 | -72.44 | 105.95 | 276.53 | 166.24 | -119.85 | | | | | | |
| RTD | 03/28/2025 | PGE | 7 | | 131.77 | 241.25 | 418.17 | 430.80 | 511.00 | 185.48 | -55.31 | 93.23 | 288.20 | 97.88 | -196.02 | | | | | | |
| RTD | 03/28/2025 | PGE | 8 | | 140.94 | 244.85 | 397.14 | 444.51 | 511.00 | 191.13 | -43.21 | 104.83 | 297.35 | 143.25 | -253.75 | | | | | | |
| RTD | 03/28/2025 | PGE | 9 | | 146.85 | 256.94 | 406.04 | 457.61 | 511.00 | 245.77 | -17.45 | 89.47 | 254.16 | 41.73 | -270.89 | | | | | | |
| RTD | 03/28/2025 | PGE | 10 | | 113.54 | 229.79 | 413.77 | 471.20 | 511.00 | 274.26 | 6.31 | 124.30 | 114.62 | -94.81 | -273.72 | | | | | | |
| RTD | 03/28/2025 | PGE | 11 | | 74.43 | 247.61 | 419.04 | 462.13 | 511.00 | 213.85 | 12.71 | 152.62 | 151.83 | -111.91 | -266.34 | | | | | | |
| RTD | 03/28/2025 | PGE | 12 | | 237.29 | 274.46 | 424.00 | 490.68 | 373.23 | 100.50 | -17.89 | 234.58 | 111.70 | -90.99 | -238.18 | | | | | | |

Report Generated: 03/28/2025 17:55:16



Measurable Business Impacts

Key Metrics

- Prevented transmission violations (\$2,000/MW savings)
- Battery warranty compliance protection
- Minimum 2 FTE efficiency gain
- More effective transmission utilization

Operational Improvements

- Enhanced reliability through proactive monitoring
- Improved test preparation and tracking
- Comprehensive situational awareness
- Day-ahead planning integration
- Optimized decision-making

“

The PI System has become an indispensable tool for our market operations. It provides real-time situational awareness of precise tracking and understanding of system constraints and flexibilities. With advanced features like PI Vision and PI Analysis, we gain the best forward-looking insights—spanning variable energy forecasts, storage optimization, hydro resource management, and market performance within the Western Energy Imbalance Market. This integration empowers us to make data-driven decisions and stay ahead in a dynamic energy landscape.

Imad Deeb, Principal Real Time Trader

Coyote Springs Generating Facility



Eliminating Manual Data Entry Errors

Challenge

- Multiple instances of "Fat-Fingering"
- Overpayment for water use
- Increased oversight needed
- Loss of confidence in data

| | | Data Entry | | | | |
|-----------|-------------------|------------|------------|-----------|------------|------------|
| New Month | COMMON FACILITIES | | | | | |
| | TOTAL CT MAKEUP | | | WASTE | CT MAKE UP | |
| Mar 2025 | Well 3 | Carl/Tod | City | Evap Pond | City | Wells |
| Day | 60,861,405 | 24,473,095 | 85,122,089 | 566,781 | 14,225,646 | 66,000,951 |
| 1 | 60,861,405 | 24,841,658 | 87,225,216 | 566,781 | 15,392,201 | 66,242,071 |
| 2 | 60,861,406 | 25,174,025 | 89,144,865 | 566,781 | 16,426,774 | 66,394,153 |
| 3 | 60,861,406 | 25,538,065 | 91,249,749 | 566,781 | 17,588,537 | 66,598,429 |
| 4 | 60,861,593 | 25,907,661 | 93,441,692 | 566,781 | 18,819,349 | 66,814,500 |
| 5 | 60,872,108 | 26,302,774 | 95,805,085 | 566,781 | 20,171,137 | 67,071,570 |
| 6 | 60,878,957 | 26,716,189 | 98,282,420 | 566,781 | 21,593,568 | 67,338,030 |
| 7 | 60,880,711 | 27,073,722 | 357,418 | 566,781 | 22,763,786 | 67,549,947 |
| 8 | 60,889,312 | 27,447,024 | 2,536,019 | 566,781 | 23,990,551 | 67,780,129 |
| 9 | 60,889,318 | 27,774,506 | 4,461,270 | 566,781 | 25,041,905 | 67,969,963 |
| 10 | 60,898,451 | 28,177,720 | 6,921,193 | 566,781 | 26,415,603 | 68,235,455 |
| 11 | 60,913,589 | 28,580,852 | 9,370,200 | 566,781 | 27,845,574 | 68,525,324 |

PI System Solution

- PI AF monthly datasheet automation
- Consistent timing for data capture
- Shifted focus to data validation
- 20+ hours saved monthly

| | Name | Value | Time Stamp |
|----------------------------|---|--------------------|---------------------------|
| Category: <None> | | | |
| | Cooling Tower Blowdown | 76179.47 US kgal | 3/31/2025 11:16:47.268 AM |
| | Cooling Tower Make-Up Water | 346054.60 US kgal | 3/31/2025 11:16:15.432 AM |
| | Cooling Tower Wells Make-Up Water | 103421.10 US kgal | 3/31/2025 11:18:06.259 AM |
| | MMF BackWash Throughput Totalizer Monthly | 30.31256 US kgal | 3/31/2025 10:00:59.458 AM |
| | Nuet Tank Throughput | 1607.40600 US kgal | 3/31/2025 11:23:51.449 AM |
| | RO Concentrate Discharge | 29872.72 US kgal | 3/31/2025 11:21:30.738 AM |
| | Well 4 Water Flow | 598.11 US kgal | 3/31/2025 11:15:10.702 AM |
| Category: Daily Totalizers | | | |
| | Daily Cooling Tower City Make-Up | 260.23438 US kgal | 3/31/2025 12:00:00 AM |
| | Daily Cooling Tower Wells Make-Up | 137.06250 US kgal | 3/31/2025 12:00:00 AM |
| | Daily MMF BackWash Throughput | 0.00000 US kgal | 3/31/2025 12:00:00 AM |
| | Daily Nuet Tank Discharge | 0.00000 US kgal | 3/31/2025 12:00:00 AM |
| | Daily RO Concentrate Discharge | 0.00000 US kgal | 3/31/2025 12:00:00 AM |
| | Daily Water Usage Cooling Tower Blowdown | 1.12891 US kgal | 3/31/2025 12:00:00 AM |
| | Daily Well 4 Flow | 0.61 US kgal | 3/31/2025 12:00:00 AM |

Eliminating Single-Point Failures

Challenge

- Critical reports known by one person
- NERC/GADS, water usage reports
- Reporting delays during absences
- Anxiety around reporting deadlines

PI System Solution

- Automated reports via PI AF
- One-click data access for all staff
- Eliminated compliance delays
- 5-10 hours saved monthly

| Summary of Gas and Megawatt Data 2021 | | | | | | | | | | | |
|---------------------------------------|------|----------------------------------|-----------------------------------|-------------------------------|-------------------------------|--------------------------|----------|-------------------|--------------------|----------------------|---------------|
| Year: | 2021 | | | | | | | | | | |
| | | Net Plant Output (switchyard) MW | Houseload from Aux Transformer MW | GT Breaker Closed Hrs.On-Line | ST Breaker Closed Hrs.On-Line | Back Feed from BPA & UEC | AB Hrs | Full Factored Hrs | Part. Factored Hrs | Final Factored Hours | Gas HHV BTU's |
| April | | 181,518 | 3,403 | 720.00 | 720.00 | (0.70) | 4.00 | 720.00 | 0.00 | 720.00 | 1,037 |
| May | | 66,346 | 1,452 | 276.37 | 274.94 | 143.70 | 519.00 | 272.00 | 2.50 | 274.50 | 1,034 |
| June | | 12,837 | 402 | 75.45 | 71.55 | 91.61 | 720.00 | 41.00 | 19.00 | 60.00 | 1,033 |
| July | | 167,368 | 3,193 | 740.53 | 738.94 | 9.88 | 744.00 | 667.00 | 37.00 | 704.00 | 1,038 |
| Aug | | 172,653 | 3,200 | 732.24 | 731.01 | 37.17 | 744.00 | 703.00 | 16.00 | 719.00 | 1,041 |
| Sept | | 179,638 | 3,137 | 720.82 | 720.82 | 0.00 | 720.00 | 717.00 | 1.50 | 718.50 | 1,054 |
| Oct | | 173,815 | 3,324 | 695.84 | 693.61 | 118.78 | 205.00 | 683.00 | 6.50 | 689.50 | 1,046 |
| Nov-DS | | 163,287 | 3,412 | 698.15 | 698.13 | 55.52 | 30.00 | 656.00 | 20.50 | 676.50 | 1,047 |
| Dec | | 0 | 0 | 0.00 | 0.00 | 0.00 | 744.00 | 744.00 | 0.00 | 744.00 | - |
| YTD | | 1,568,917.52 | 31,067.89 | 6,539.81 | 6,524.48 | 891.59 | 4,889.00 | 7,003.52 | 143.74 | 7,147.26 | 1,041 |

| CS1 Summary of Gas and Megawatt Data 2021 | | | | | | | | | | | |
|---|-------------|----------------------|---------------------|--------------|------------|-------------------------------|--------------------------------|-------------------|-------------------|--------------------------|----------|
| Year: | 2021 | | | | | | | | | | |
| Start: | Feb 02 2021 | | | | | | | | | | |
| End: | Jan 01 2022 | Gas Turbine Gas Burn | Aux Boiler Gas Burn | GT Output | ST Output | Net Plant Output (switchyard) | Houseload from Aux Transformer | GT Breaker Closed | ST Breaker Closed | Back Feed from BPA & UEC | AB Hrs |
| | | MMBTU | MMBTU | MW-Hrs | MW-Hrs | MW-Hrs | MW | Hrs.On-Line | Hrs.On-Line | MW | Hrs |
| Jan | | 820,255.31 | 19,052.06 | 79,264.70 | 36,370.57 | 112,387.35 | 2,718.30 | 473.26 | 468.50 | 420.50 | 406.10 |
| Feb | | 1,128,978.88 | 2,162.10 | 106,715.05 | 50,566.07 | 153,399.38 | 3,298.38 | 672.00 | 672.00 | 0.00 | 42.00 |
| Mar | | 1,357,836.13 | 0.00 | 132,257.20 | 59,252.34 | 187,251.59 | 3,543.39 | 743.00 | 743.00 | 0.00 | 0.00 |
| April | | 1,316,754.38 | 0.00 | 128,030.97 | 57,586.25 | 181,518.28 | 3,403.38 | 720.00 | 720.00 | 0.00 | 0.00 |
| May | | 485,705.28 | 27,878.92 | 46,618.57 | 21,579.87 | 66,346.01 | 1,452.01 | 276.19 | 274.76 | 143.70 | 519.00 |
| June | | 100,137.79 | 37,726.30 | 8,898.04 | 4,600.05 | 12,836.99 | 402.11 | 75.76 | 71.87 | 91.60 | 720.00 |
| July | | 1,206,538.63 | 39,542.84 | 114,228.91 | 56,996.64 | 167,368.02 | 3,193.05 | 739.68 | 738.09 | 9.88 | 744.00 |
| Aug | | 1,233,646.88 | 38,868.93 | 118,549.51 | 58,028.62 | 172,689.83 | 3,199.58 | 731.44 | 730.21 | 37.16 | 744.00 |
| Sept | | 1,264,796.50 | 37,920.11 | 124,347.55 | 59,117.82 | 179,638.27 | 3,136.85 | 720.00 | 720.00 | 0.00 | 720.00 |
| Oct | | 1,236,875.00 | 11,084.50 | 122,562.29 | 55,261.47 | 173,815.20 | 3,320.85 | 695.12 | 692.89 | 119.13 | 205.00 |
| Nov | | 1,179,631.00 | 1,433.96 | 113,892.17 | 53,411.10 | 163,286.63 | 3,408.35 | 696.95 | 696.92 | 55.52 | 30.00 |
| Dec | | 1,135,264.25 | 10,589.96 | 109,590.00 | 50,330.39 | 155,830.22 | 3,429.44 | 658.15 | 656.29 | 133.84 | 206.76 |
| YTD | | 12,466,420.81 | 226,259.68 | 1,204,954.95 | 563,101.21 | 1,726,367.76 | 34,505.69 | | | 1,011.33 | 4,336.86 |

Business Impact Summary



25+ hours saved monthly across reporting processes



Prevented costly forced outages through early detection



Eliminated compliance risks from reporting delays



Increased staff engagement and data confidence



Shifted focus from data entry to data analysis



Removed single-point failures in critical processes

Monitoring & Diagnostics Center



PI System Governance Group



Bring different groups
using PI System
together in one forum



Prioritize business PI
needs and work with IT



Share knowledge and
help resolve PI System
data needs



Discuss Use Cases and
roadmaps with AVEVA



Help extract maximum
value out of the
Enterprise Agreement

PI System to Maximo

Successful Port Westward Pilot

Savings of over \$52,000 per year with just this pilot alone

132 Maximo Engine Location meters get updated with runhour information from PI System every night

Fleetwide rollout planned (Hydro and Thermal sites)

Maximo - PI System Explorer

View Go Tools Help

Query Date [icon] [icon] [icon] Back [icon] Check In [icon] Refresh [icon] New Element [icon] New Attribute [icon]

ENGINE 1

General Child Elements Attributes Ports Analyses Notification Rules Version

Filter

| Name | Value | Time Stamp | Value |
|-----------------------|----------------------------|----------------------|-------|
| Category: MaximoMeter | | | |
| RUNHRS | 10380 h | 2/17/2021 2:35:00 PM | Doc |
| MaximoMeter | | 1/1/1970 12:00:00 AM | St |
| ASSETNUM | | 1/1/1970 12:00:00 AM | St |
| INSPECTOR | OSIPI | 1/1/1970 12:00:00 AM | St |
| ISDELTA | False | 1/1/1970 12:00:00 AM | Bo |
| LOCATION | 1126265 | 1/1/1970 12:00:00 AM | St |
| METERNAME | RUNHRS | 1/1/1970 12:00:00 AM | St |
| METERS | "500 HR": 500, | 1/1/1970 12:00:00 AM | St |
| NEWREADING | 10380 | 2/17/2021 2:35:00 PM | St |
| ORGID | GEN | 1/1/1970 12:00:00 AM | St |
| SITEID | PWW | 1/1/1970 12:00:00 AM | St |
| zIsEnabled | 1 | 1/1/1970 12:00:00 AM | In |
| zLastError | No Error | 1/1/1970 12:00:00 AM | St |
| zLastUpload | 2021-02-16T22:59:03; 10376 | 1/1/1970 12:00:00 AM | St |

tion
/W
Unit 2
ENGINE RUNNING HOURS
ENGINE 1
ENGINE 10
ENGINE 11
ENGINE 12
ENGINE 2
ENGINE 3
ENGINE 4
ENGINE 5
ENGINE 6
ENGINE 7
ENGINE 8
ENGINE 9
Archive
rches

eRounds

Fleetwide Hydro and Thermal rollout

Implemented at Carty, CSP, Sullivan, Beaver, Port Westward

3rd Party License savings and data remained within PGE

iPad and iPhones deployed

Ability to scan QR code and enter data

Third-party license savings

PI System to Maximo tie-in planned

Carty Gas Turbine & Gen

Last Round Time
2/16/2021 11:09:56 PM

CT Control Oil

| Name | Value | Units |
|--|---------|-------|
| A CT CONTROL OIL PUMP IN SERVICE | Yes | |
| B CT CONTROL OIL PUMP IN SERVICE | No | |
| CT CONTROL OIL DISCHARGE FILTER CLEAN | Yes | |
| CT CONTROL OIL DISCHARGE PRESSURE READING | 1,463.7 | PSI |
| CT CONTROL OIL KIDNEY LOOP FILTER IN SERVICE | Yes | |
| CT CONTROL OIL KIDNEY LOOP PRESSURE READING | 0.5 | PSI |
| CT CONTROL OIL RETURN FILTER IN SERVICE NORTH OR SOUTH | N | |
| CT CONTROL OIL RETURN LINE FILTER CLEAN | Yes | |
| CT CONTROL OIL RETURN PRESSURE READING | 1,443.7 | PSI |
| CT CONTROL OIL SYSTEM FREE FROM LEAKS Q | Yes | |
| CT CONTROL OIL TANK LEVEL READING | 5 | IN |
| CT CONTROL OIL TANK TEMPERATURE READING | 96.367 | DegF |
| FG CTRL HOUSE INSPECTED | Yes | |

CT Generator Seal Oil

| Name | Value | Units |
|---|--------|-------|
| CTG SEAL OIL DRAIN TANK LEVEL | 0.1741 | MM |
| CTG SEAL OIL EMERGENCY PUMP IN AUTO | Yes | |
| CTG SEAL OIL FILTER DP READING | 0 | PSID |
| CTG SEAL OIL FILTERS ROTATED | Yes | |
| CTG SEAL OIL PUMP DISCHARGE PRESSURE READING | 120 | PSI |
| CTG SEAL OIL PUMP IN SERVICE | Yes | |
| CTG SEAL OIL SEAL DP | 9.8 | PSID |
| CTG SEAL OIL SUPPLY PRESSURE READING | 58.826 | PSI |
| CTG SEAL OIL SYSTEM FREE FROM LEAKS Q | Yes | |
| CTG SEAL OIL VACUUM PRESSURE READING | 29.4 | InHG |
| CTG SEAL OIL VACUUM PUMP IN SERVICE | Yes | |
| CTG SEAL OIL VACUUM PUMP WATER DRAINED | Yes | |
| CTG SEAL OIL VACUUM TANK LEVEL | -1 | MM |
| CTG SEAL OIL VAPOR EXTRACTOR IN SERVICE | Yes | |
| CTG SEAL OIL VAPOR EXTRACTOR PRESSURE READING | 1.75 | InH2O |

CT Lube Oil

| Name | Value | Units |
|--|---------|-------|
| A CT LUBE OIL VAPOR EXTRACTOR IN SERVICE | Yes | |
| A CT MAIN LUBE OIL PUMP IN SERVICE | Yes | |
| B CT LUBE OIL VAPOR EXTRACTOR IN SERVICE | No | |
| B CT MAIN LUBE OIL PUMP IN SERVICE | No | |
| CT LUBE OIL FILTER DP READING | 3.7364 | PSID |
| CT LUBE OIL FILTER IN SERVICE NORTH OR SOUTH | N | |
| CT LUBE OIL SUPPLY PRESSURE READING | 26.982 | PSI |
| CT LUBE OIL SYSTEM FREE FROM LEAKS Q | Yes | |
| CT LUBE OIL TANK LEVEL READING | 8.9817 | IN |
| CT LUBE OIL TANK PRESSURE READING | -7.6673 | PSI |

CT Generator CO2

| Name | Value | Units |
|-----------------------------------|--------|-------|
| CO2 TANK LEVEL | 8,000 | LBS |
| CO2 TANK PRESSURE | 300.86 | PSI |
| FULL CO2 PURGE CYLINDERS STAGED Q | Yes | |

CT Generator H2

| Name | Value | Units |
|----------------------------------|--------|-------|
| CTG BLOWER DIFFERENTIAL PRESSURE | 0.04 | PSID |
| CTG H2 BOTTLE PRESSURE | 566.84 | PSI |
| CTG H2 GAS PURITY | 99.7 | PRCT |
| CTG H2 INTERNAL PRESSURE | 44.735 | PSI |
| CTG H2 SUPPLY PRESSURE | 117.79 | PSI |



PGE drives operational excellence through data-driven insights

Challenge

- Manual processes and fragmented data systems created inefficiencies across operations
- Single-point failures in reporting created compliance risks and operational anxiety
- Limited visibility into critical asset performance hindered proactive maintenance

Solution

- Deployed AVEVA™ PI System™ with PI AF, PI Vision and PI Analysis to create a unified operational intelligence platform across wind, thermal, and distribution assets

Results

- Prevented \$146,400 annual revenue loss across four wind turbines through early performance deviation detection
- Saved 25+ hours monthly by automating manual data collection and reporting processes
- Enhanced grid resilience by enabling data-driven load management during extreme weather events



Thank you