

AVEVA PI WORLD

Extend the power of your PI System with AVEVA Artificial Intelligence

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AVEVA



Jim Chappell

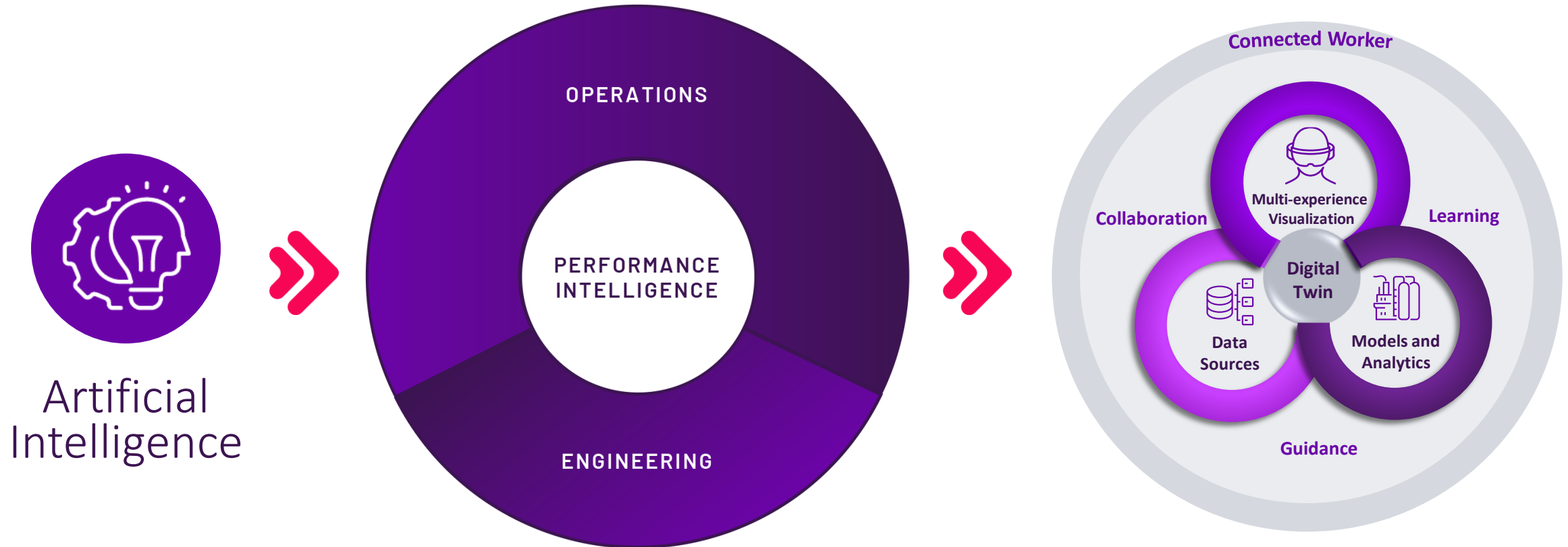
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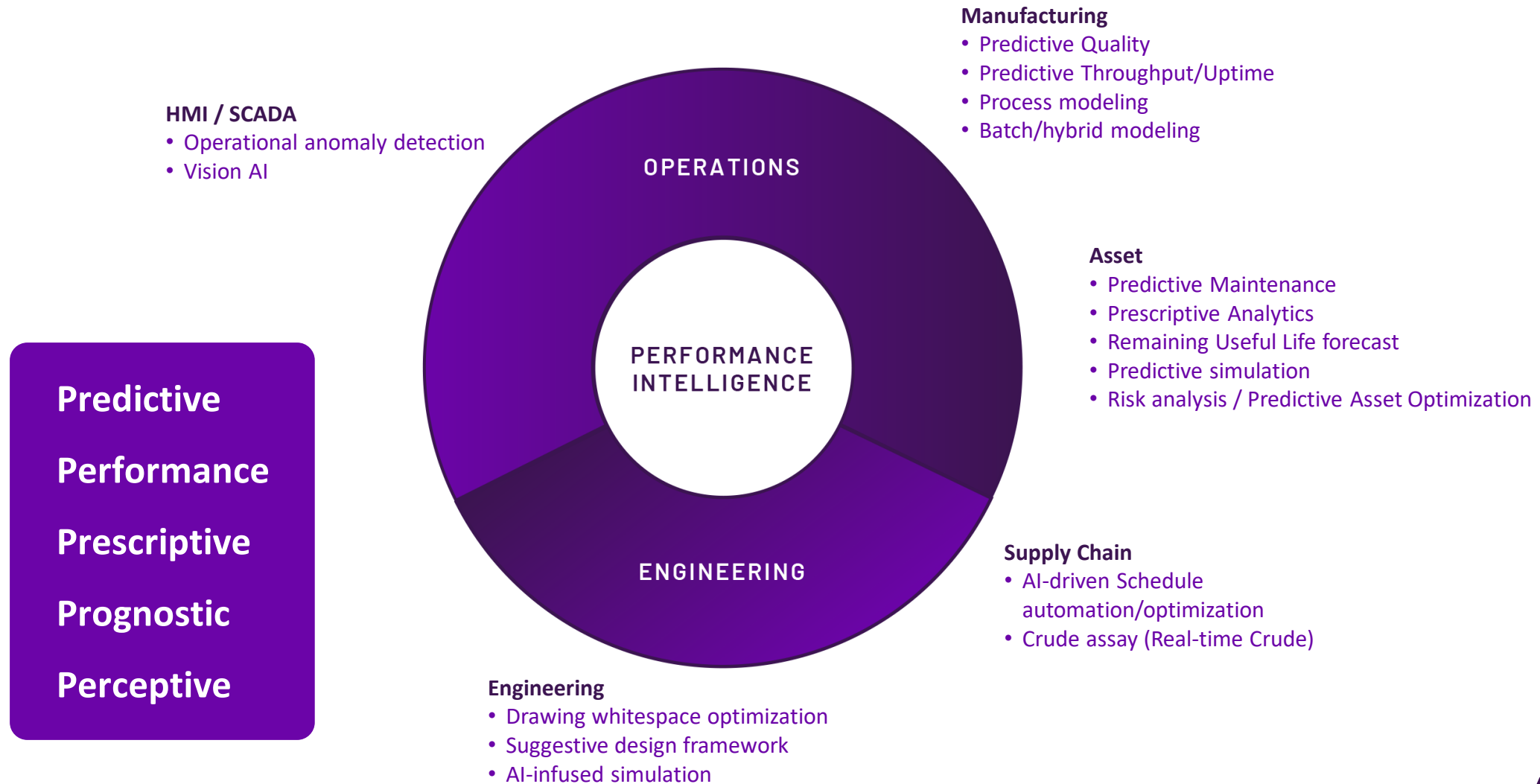
PI + AI to drive Performance Intelligence



Artificial Intelligence Infused Digital Thread



Artificial Intelligence Infused



So... how does this benefit PI?



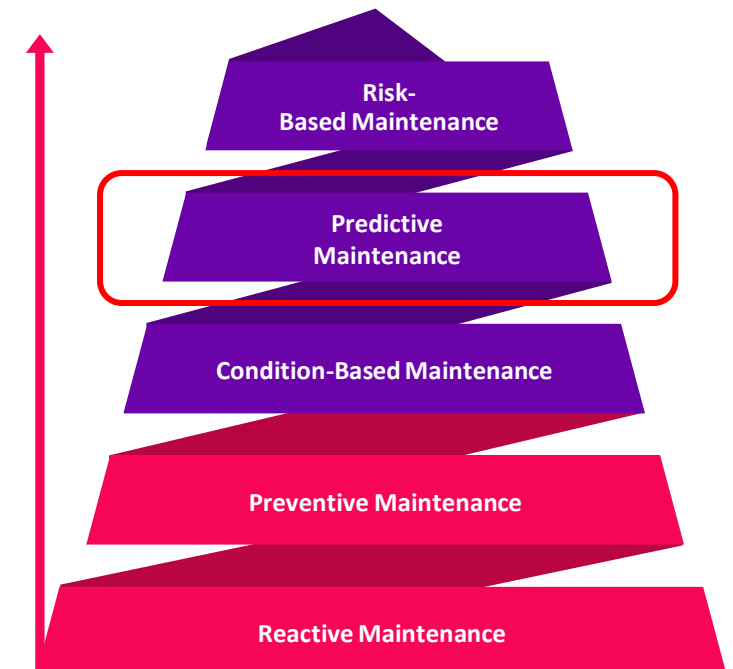
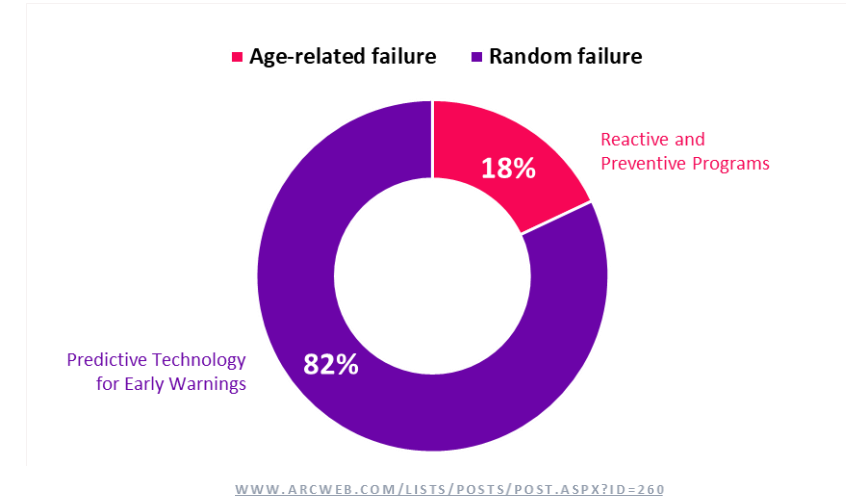
Integrated Predictive/Prescriptive Analytics

Prevent Equipment Failures

- Predictive monitoring of industrial equipment assets
{Compressors, Pumps, Gearbox's, Motors, Turbines, Generators, etc.}
- Early warning detection and diagnosis of equipment problems

Benefits

- Improve asset reliability and performance
- Reduce energy consumption and lost power
- Reduce maintenance costs
- Optimize maintenance planning
- Achieve fast time to value through out-of-the-box predictive monitoring of industrial assets



Predictive/Prescriptive Analytics & the PI System

Today

➤ Customer value

- Comprehensive monitoring & analysis through integrated IIoT data, performance calculations, and predictive & prescriptive analytics
- Very early detection of asset and process issues, long before any control system or SCADA alert
- Ability to manage risk and reduce/eliminate unplanned outages, saving millions of GBP annually in avoided costs

➤ Approach towards delivering customer value

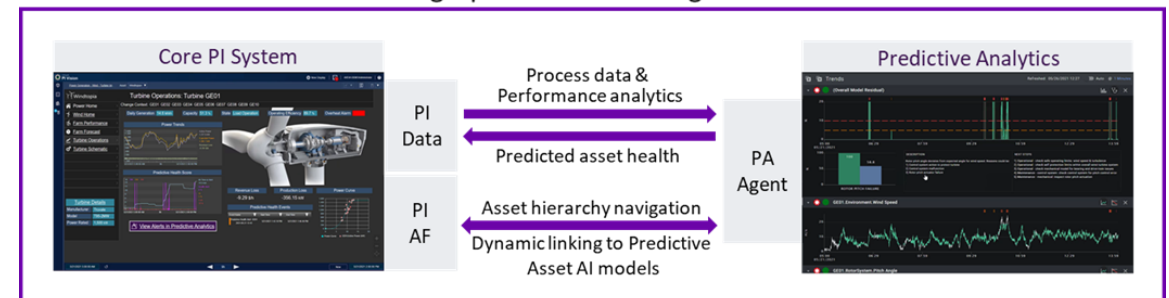
- High-performance integration of the PI System & Predictive Analytics
- Bi-directional data exchange in context
- Drill-down into predicted asset health from PI to Predictive in-context

➤ Heavy industry, including Renewables

Deployed Integration



High-performance Integration



(High-availability through AF SDK)

Predictive/Prescriptive Analytics & the PI System

Developing unified PI + AI integration

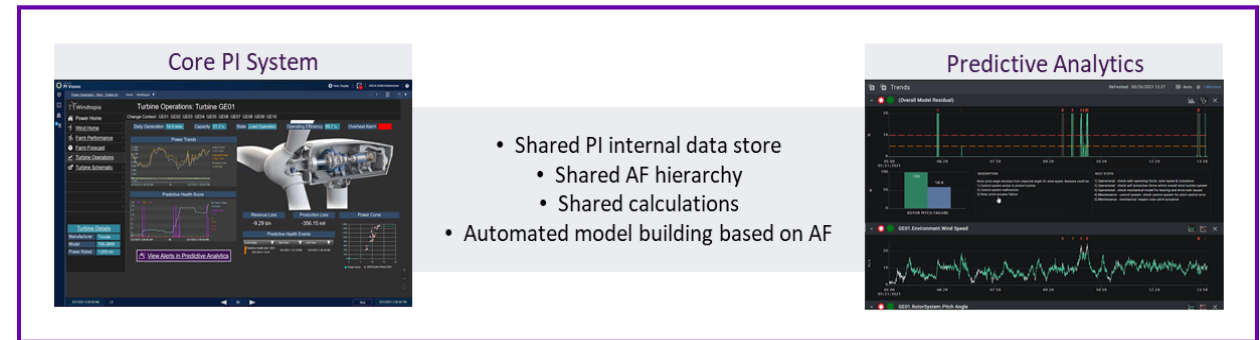
➤ Customer value

- Single solution
- Seamless Performance & AI monitoring/analysis
- Simple model building & maintenance
- Easy overall solution administration

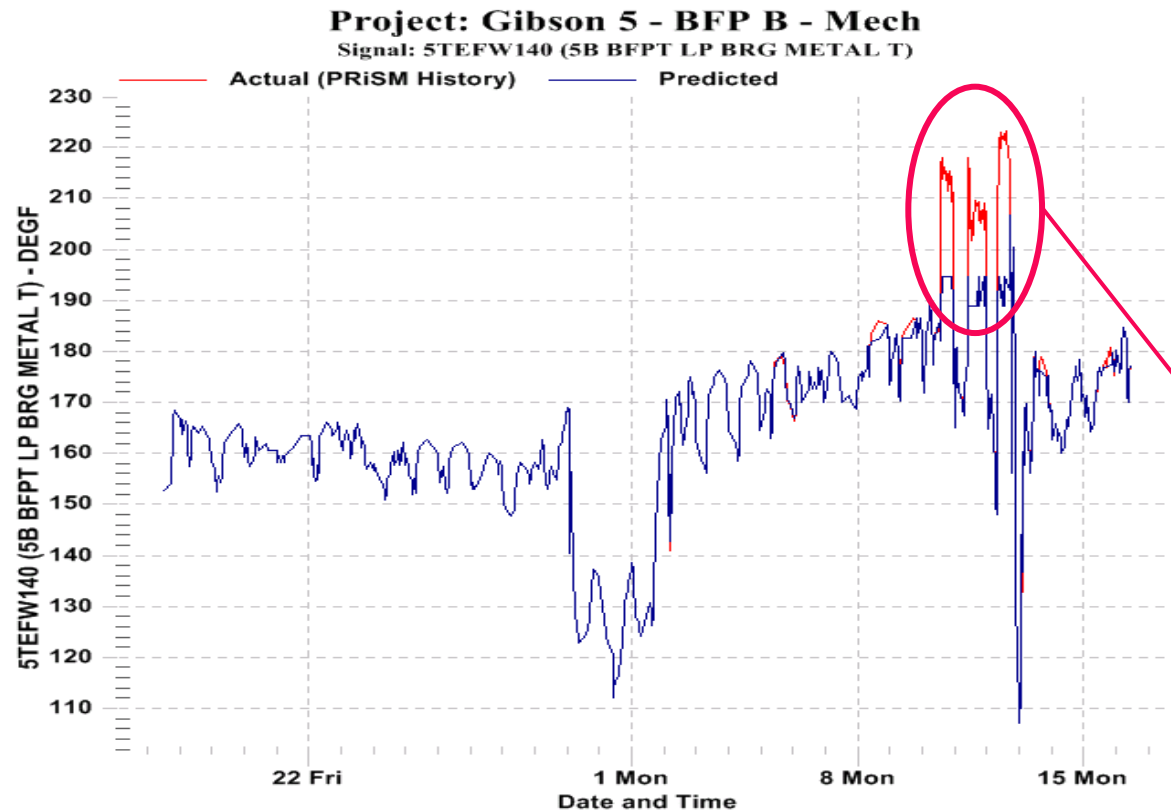
➤ Approach towards delivering customer value

- Integrated PI archive as the Predictive Analytics internal time-series archive
- Automated model building
 - Tag browsing using AF
 - Leverage AF tag properties and calculations to create models more easily
- Improved Digital Twin Maintenance
 - Native PI AF integration using PI AF Templates and Extensions
 - Single Administration for combined solution

Native Integration



Case Study: Pumps & Valving



Predictive “catch”

Observation

Bearing metal temperature spikes were observed.

Results

Site investigation found oil reservoir filled with half water and half oil. It was determined that the intricate valving was supplying too much pressure to the seals resulting in water flowing to the bearings.



Case Study: Environmental

Summary

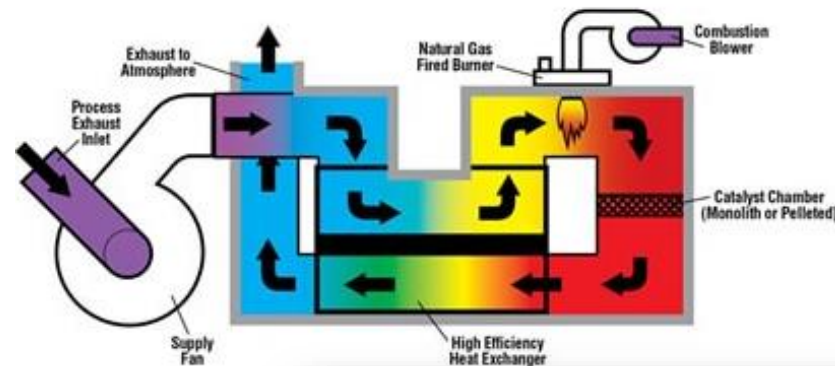
The oxidizer is responsible for reducing environmentally harmful emissions. This is done by burning the exhaust gases at a high temperature (oxidizing) and then running the hot exhaust over a catalyst to help induce a chemical reaction.

Predictive “catch”

The system identified a higher than expected differential pressure across the catalyst bed, indicating a clog which can disrupt the oxidation process. However, this issue only occurred once in awhile.

The site determined that this predictive notification only occurred when the weather was extremely cold, causing the lines that bleed moisture to the outside to freeze. Maintenance personnel thawed the lines, allowing the moisture to dissipate which, in turn, reduced the pressure and eliminated the predictive analytics alarm.

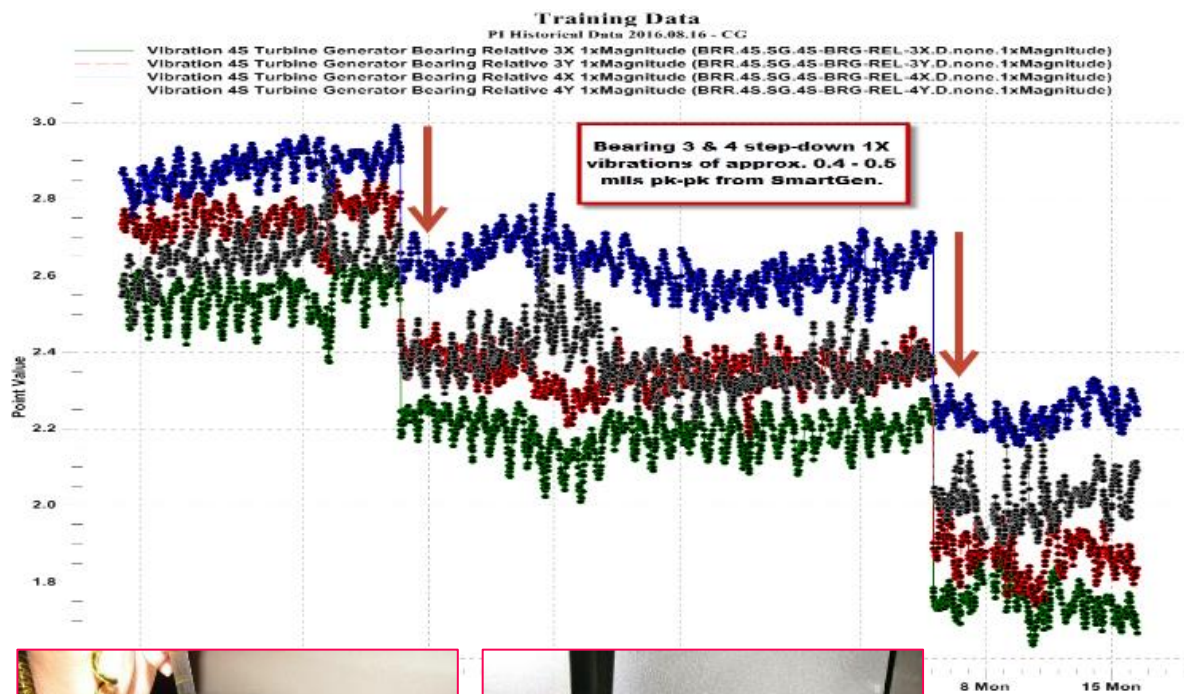
**Catalytic Oxidizer
Airflow Diagram**



Raw Data - M8_Catbed_DP
Wonderware Historical Data 2018.01.17 16:19



Case Study: Steam Turbine



Summary

Due to AVEVA's AI-driven Predictive Analytics and proactive notification system, catastrophic damage to the steam turbine and potential significant personnel injury were averted.

Predictive “catch”

After reviewing the events and actions taken to remedy the situation, the customer calculated that the avoided cost for this predictive “catch” was over **\$34.5M USD**.



Renewables - Wind

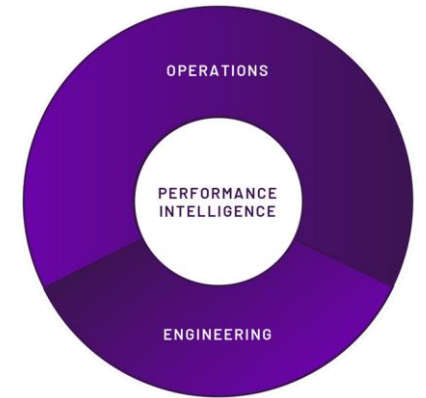
Predictive/Prescriptive Analytics & the PI System

Wind Farm Performance Monitoring + AI

Real-time monitoring
Artificial Intelligence
Predictive maintenance
Root cause analysis
Prescriptive actions
Offshore farms
Onshore farms



Turbine performance
Rotor pitch
Yaw drive mech
Gearbox reliability
Lube oil system
Generator: elec & mech
etc...



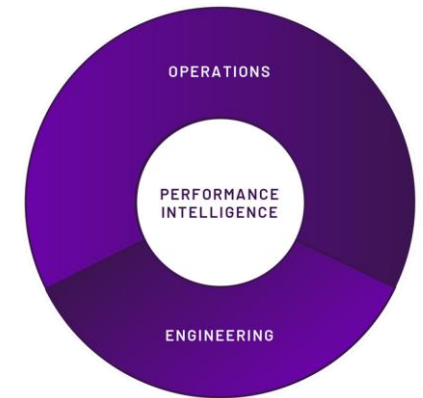
Predictive/Prescriptive Analytics & the PI System

Wind Farm Performance Monitoring + AI

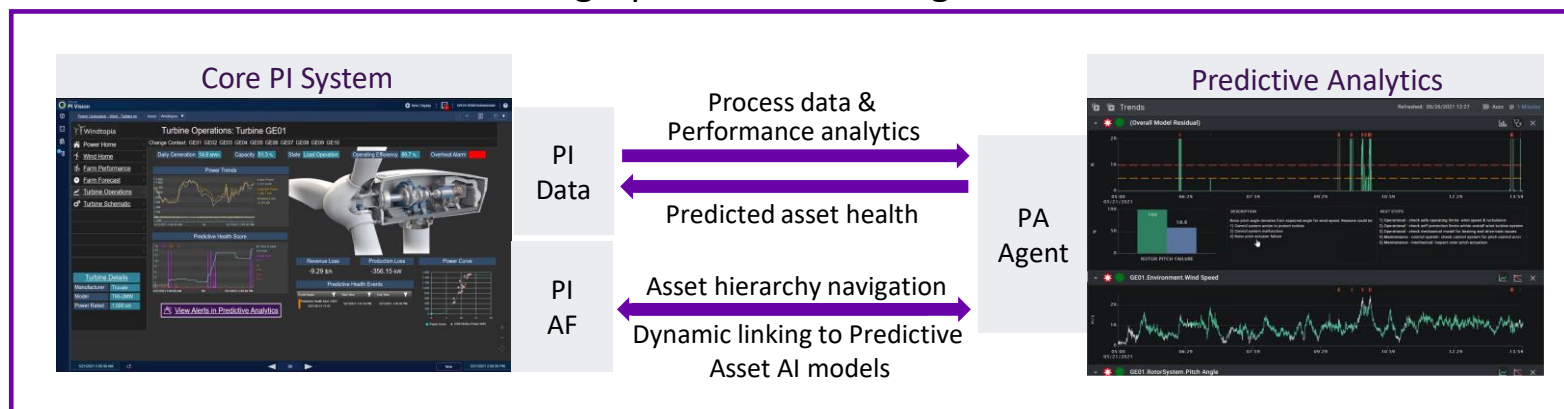
Real-time monitoring
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High-performance Integration



Offshore



Onshore


(High-availability through AF SDK)


Demo: PI + Predictive for Wind



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