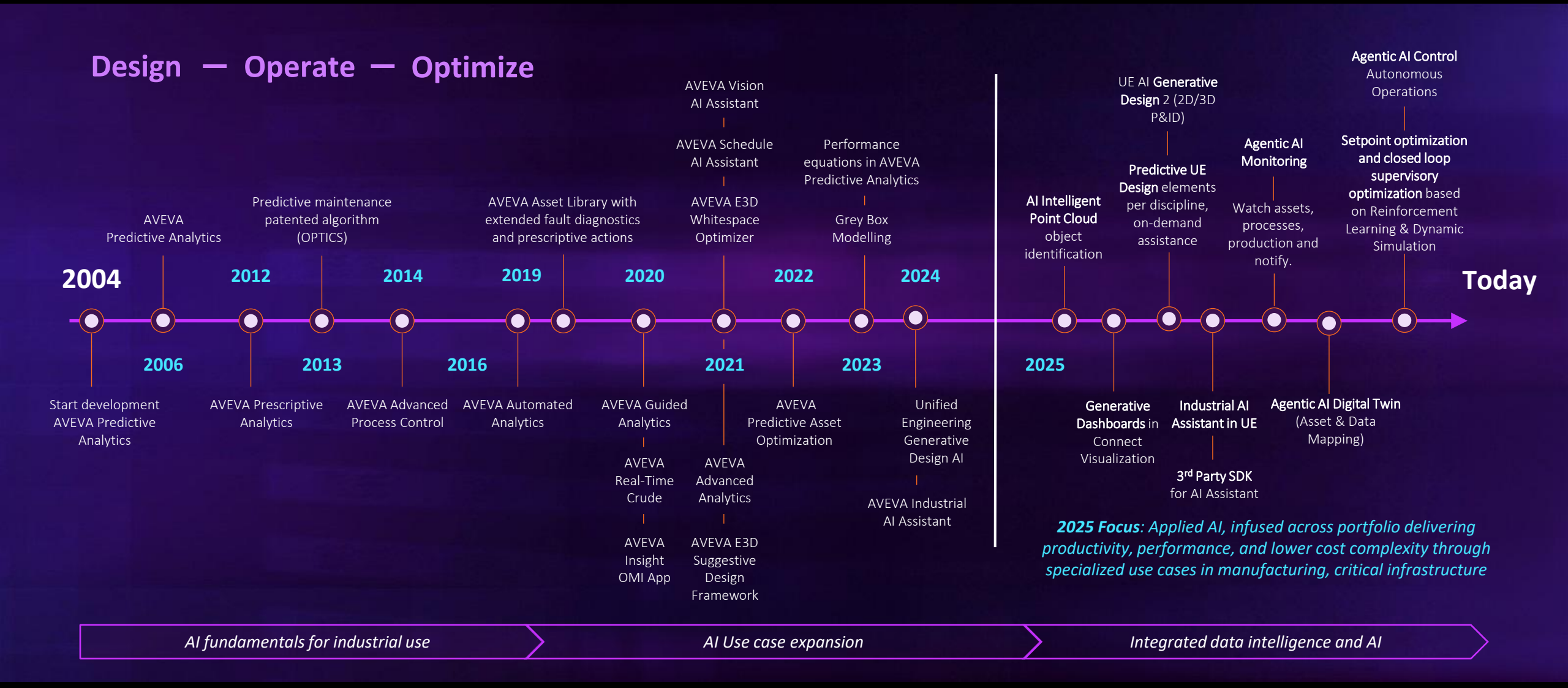
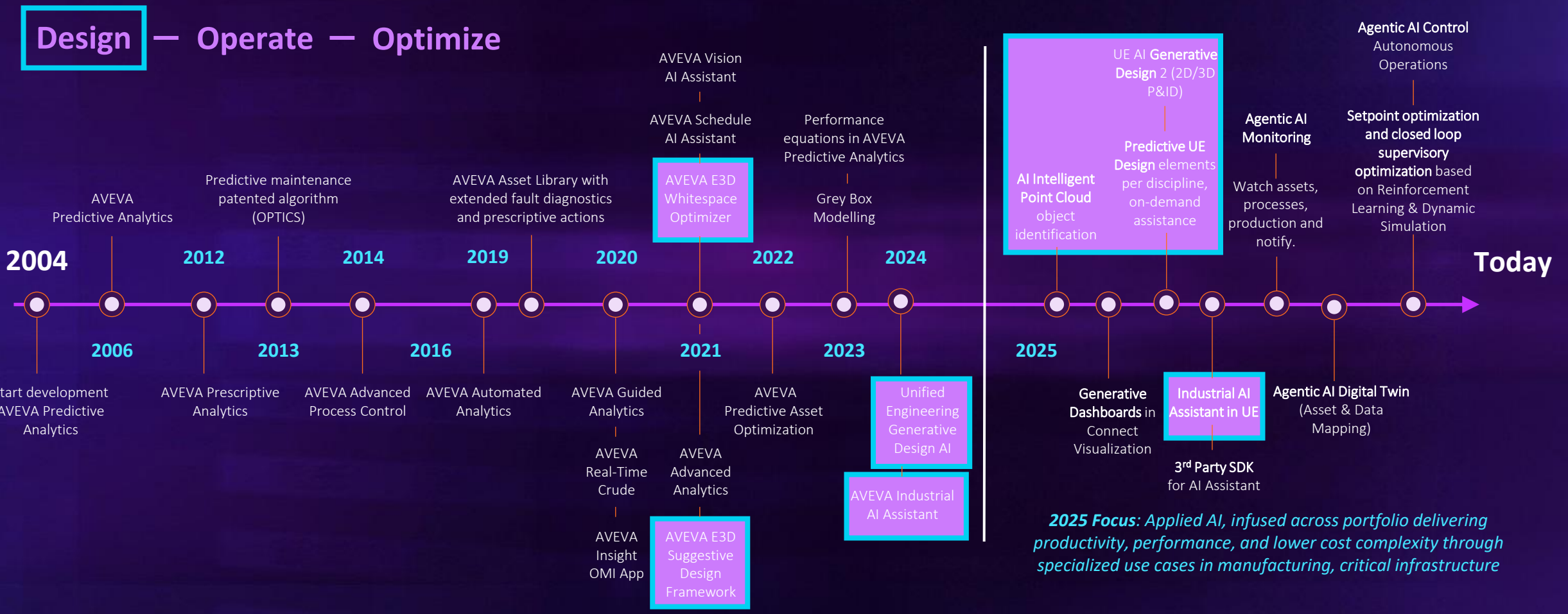

AVEVAWORLD

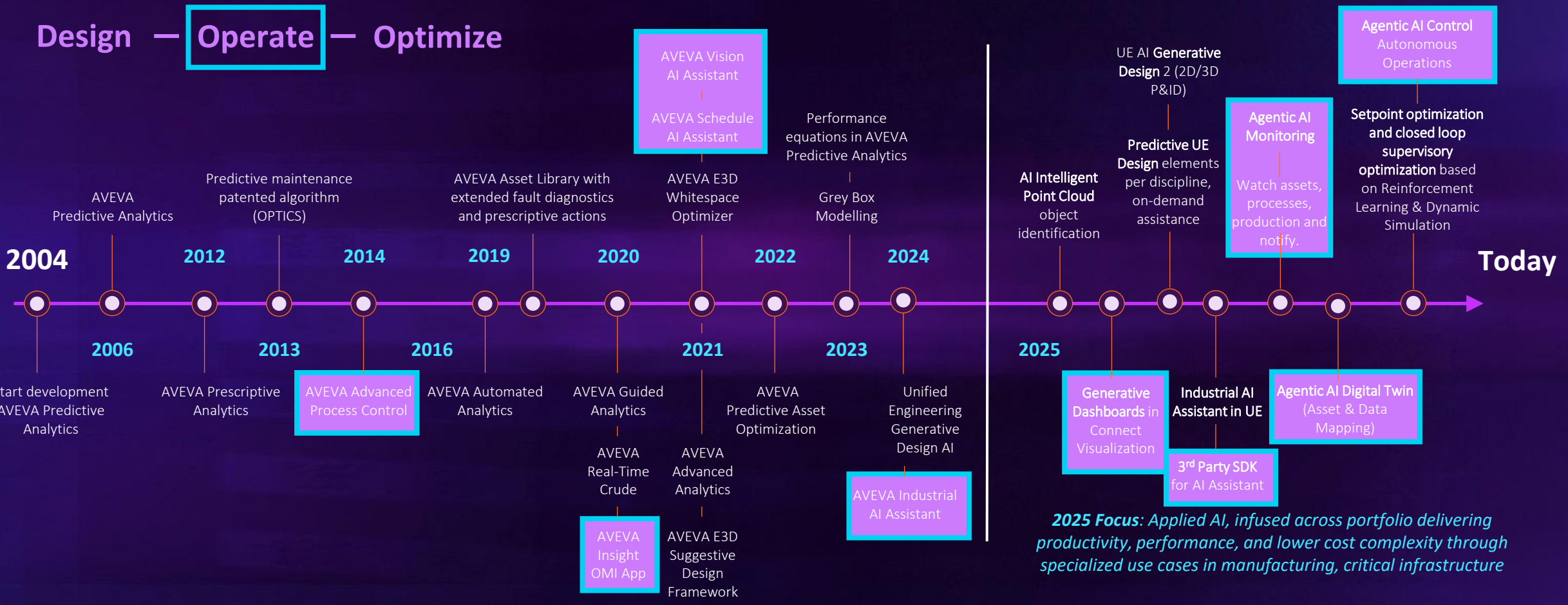
AI Evolution: Accelerating expertise, innovation in Industrial AI



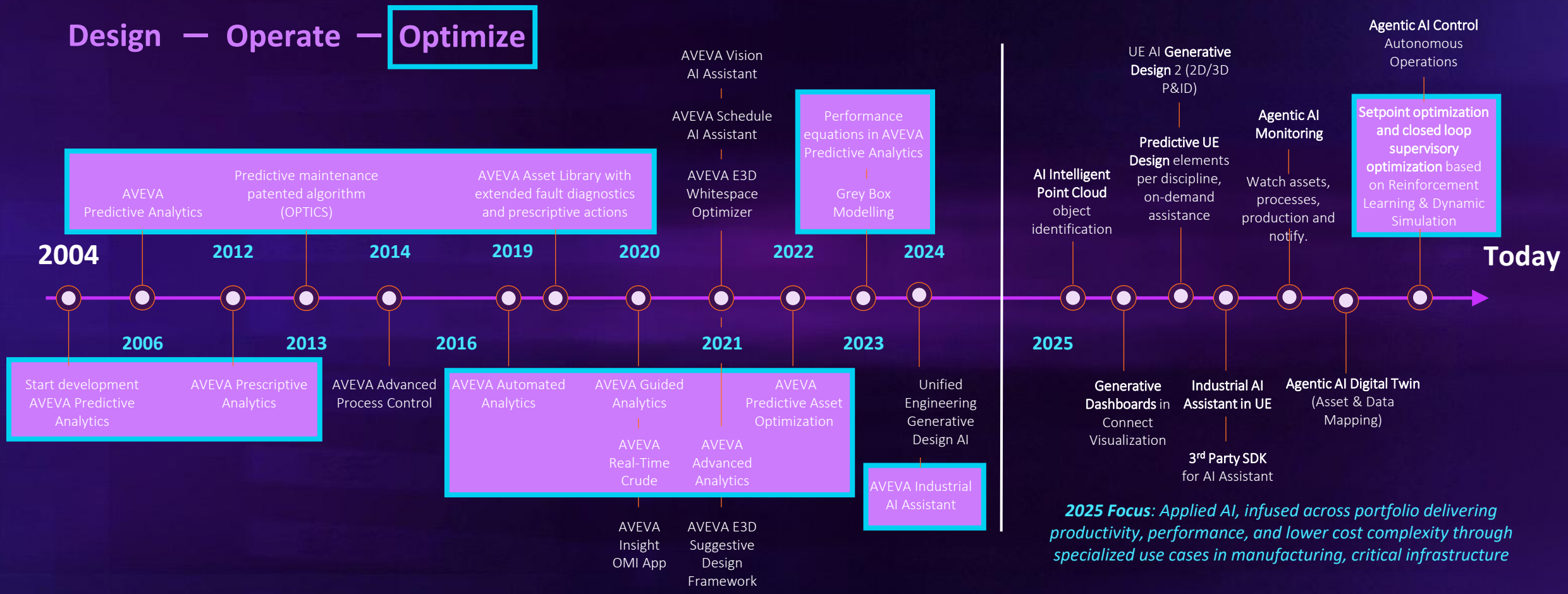
AI Evolution: Accelerating expertise, innovation in Industrial AI



AI Evolution: Accelerating expertise, innovation in Industrial AI



AI Evolution: Accelerating expertise, innovation in Industrial AI

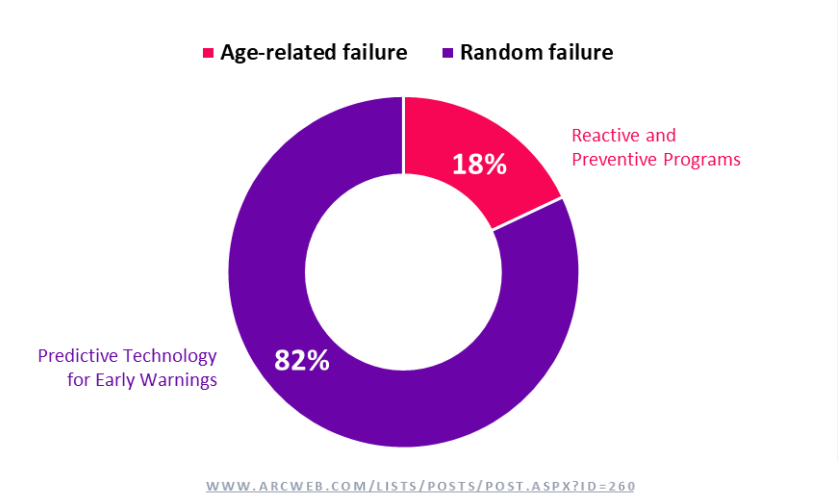


Data + AI in Power

Reliability-centered maintenance

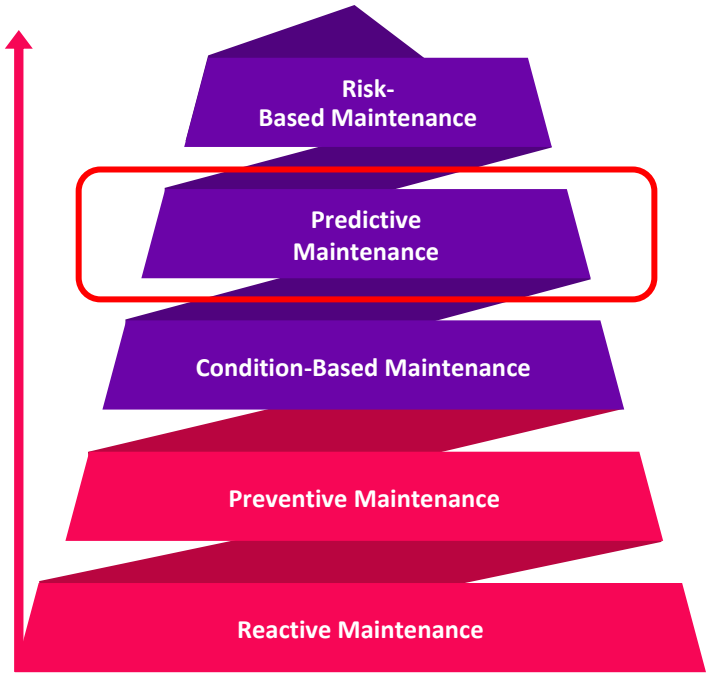
Prevent Equipment Failures

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



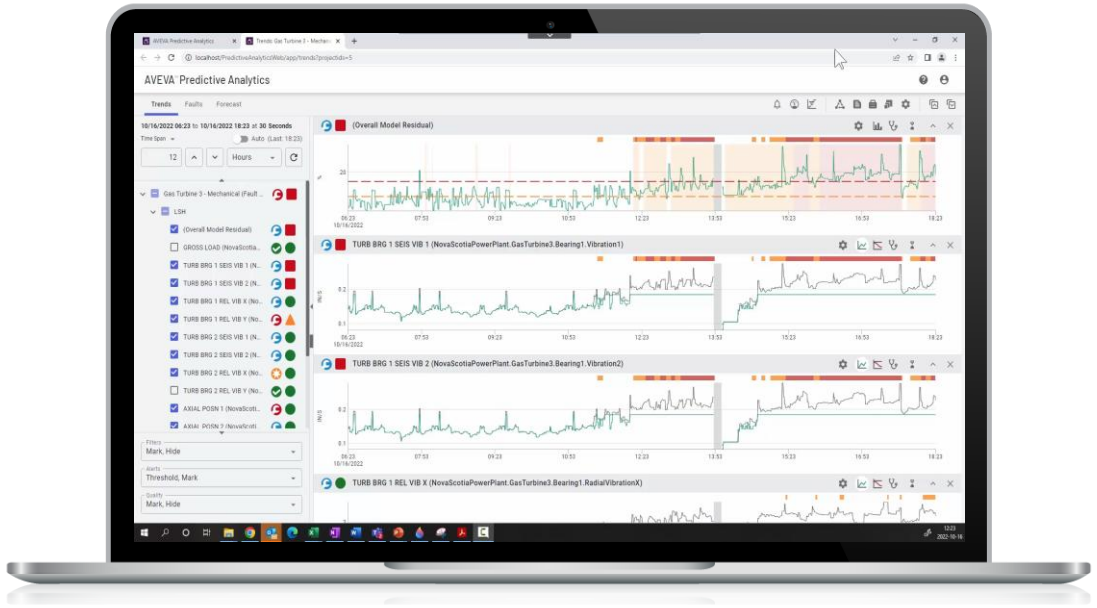
Benefits

- 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



Integrated AI

Predictive + Prescriptive + Prognostic



✓ Historical

What Happened

Historical Domain

✓ Real-Time

What's Happening

Real-Time Domain

✚ Predictive

What If

Machine Learning Domain

✚ Prescriptive

What to do

Maintenance Action Domain

✚ Prognostics

How bad will it get

Artificial Intelligence Domain

AVEVA

Predictive Analytics: Assets

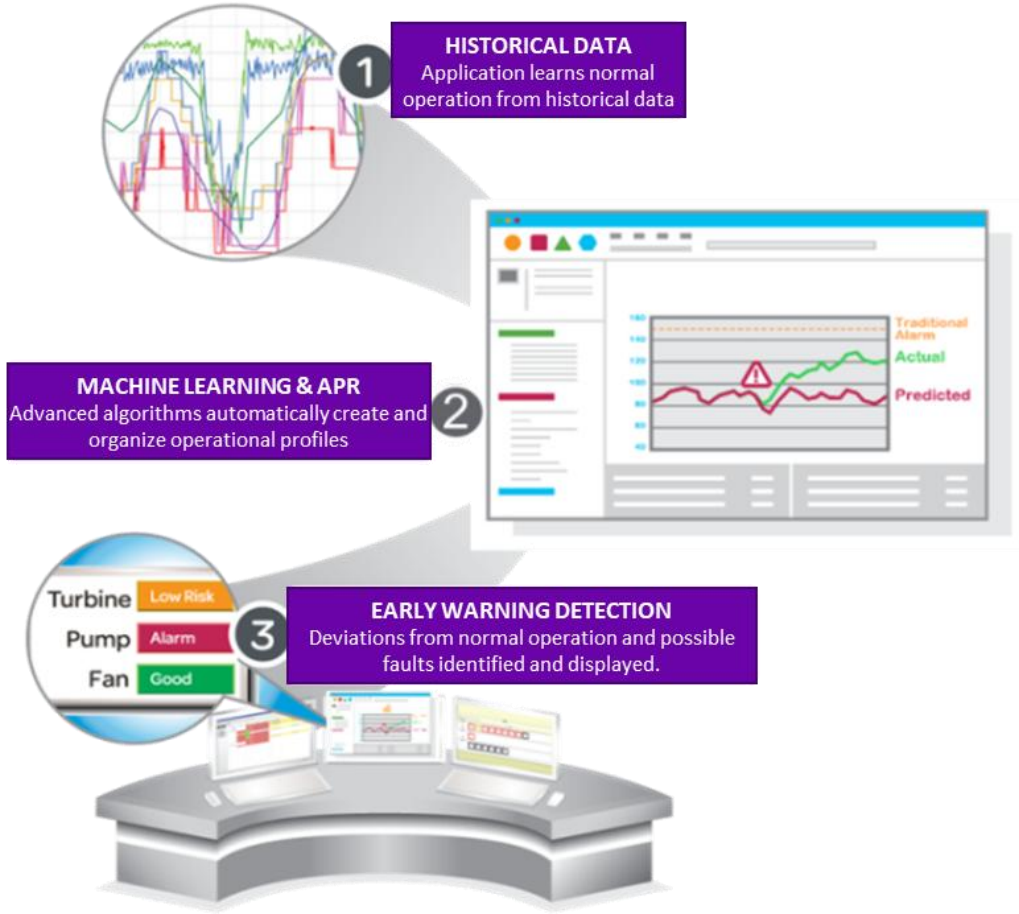
Observations

Received Predictive notification due to Combustion Turbine blade path temperature spread increasing

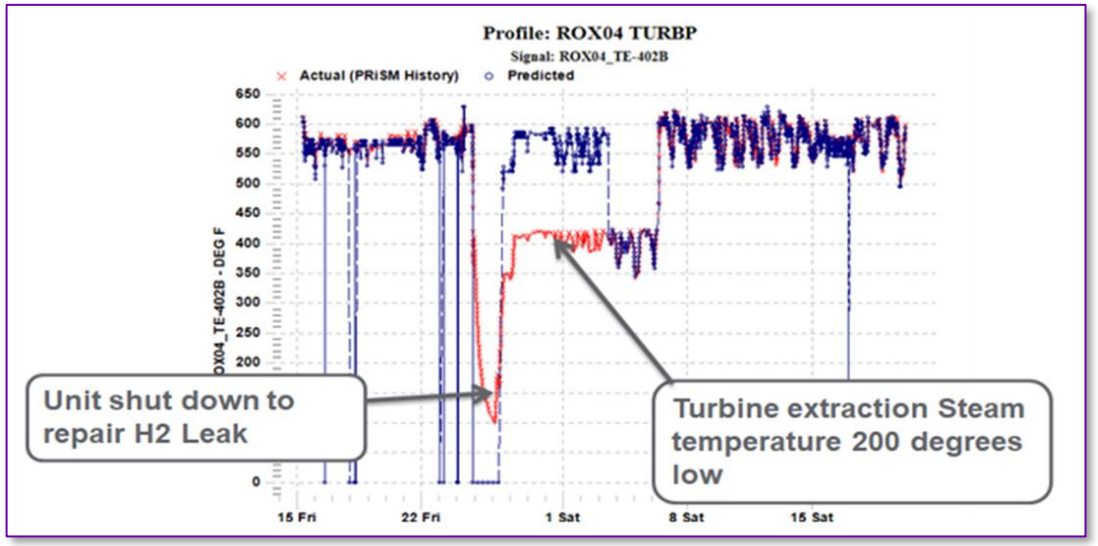
Spread increase was caused by early progression of a transition piece failure

Slow propagation before failure would have caused large amounts of wasted fuel and increased GHG emissions

Customer calculated over $4 million in avoided costs



Predictive Analytics: Operations



Observations

Received Predictive notification on low extraction steam temperature

Could have gone weeks before the plant found the issue

Significant financial impact

Significant environmental impacts:

Excess Fuel Usage -> Increased Emissions

Lower Heat Rate due to low extraction steam temperature requires increased fuel consumption, thus increased emissions

Savings: (approx.) **2,000 metric tons of CO2** emissions averted per week

Water Usage Waste

Steam attemperation requires significant water

Savings: (approx.) **100,000 gallons** of Demineralized Water

Predictive Analytics: Green Energy

Observations

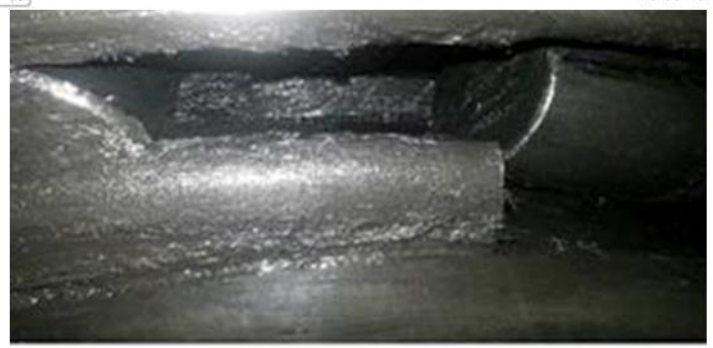
Several wind turbines were identified having bearing vibrations too high for the level of power generated.

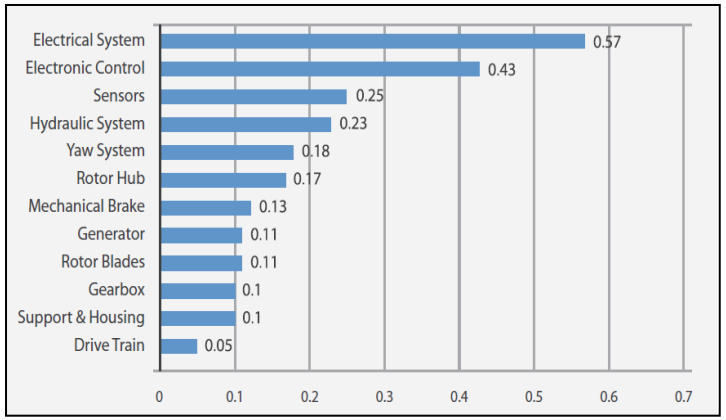
Rollers cocked 180 degrees were found with failed retainers.

1 maintenance trip required to correct all issues.

Early detection avoided significant damage to the turbines.

Early catches like this help improve the cost effectiveness and reliability of renewable energy.





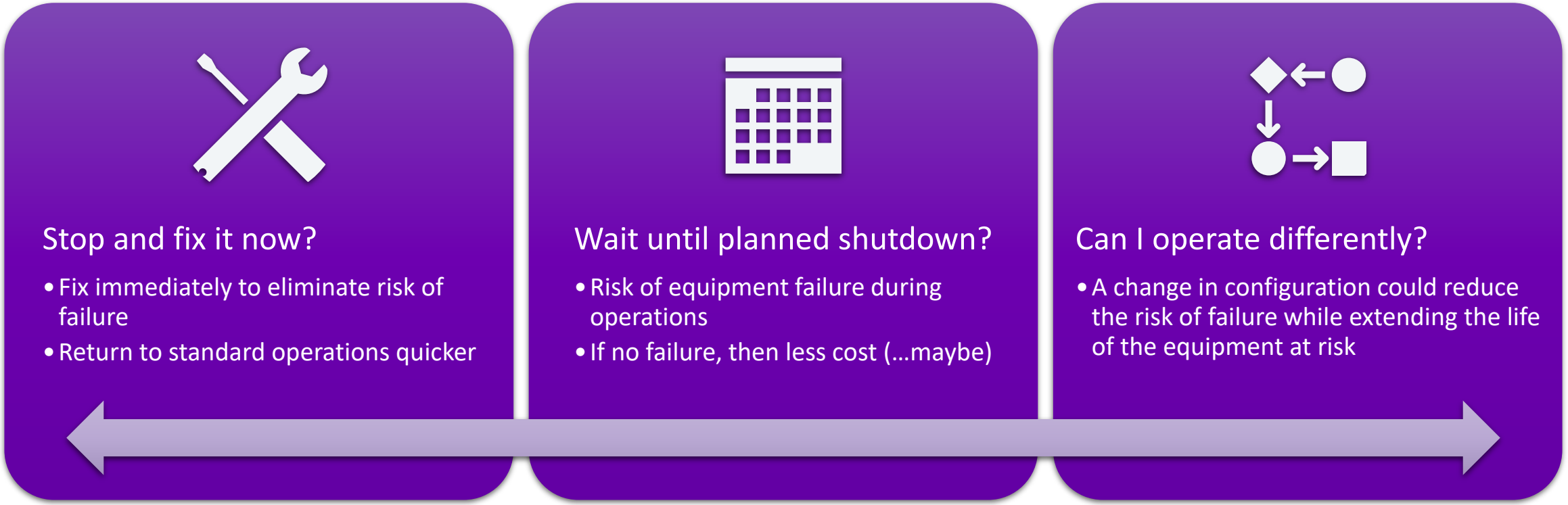
2.43 failures per wind turbine per year*

* WMEP database (1,500 turbines, 17 years, and 64,000 reports)

Now integrate Simulation

Determining the best action when an anomaly is detected

Balancing Risk Vs Cost



AVEVA Predictive Asset Optimization

HDR Models

Detect issues very early with greater clarity

Remaining Useful Life

Forecast intervention window

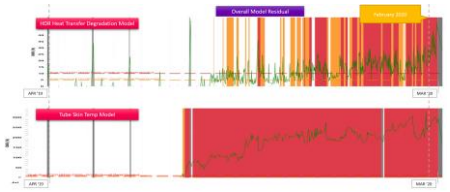
Impact

Assess impact of the issue

Optimize

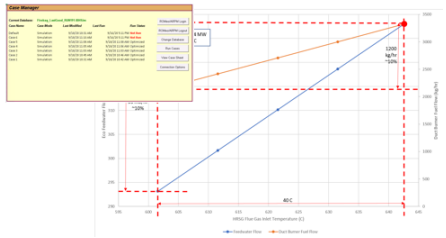
Improve the outcome

Heat Exchanger Fouling



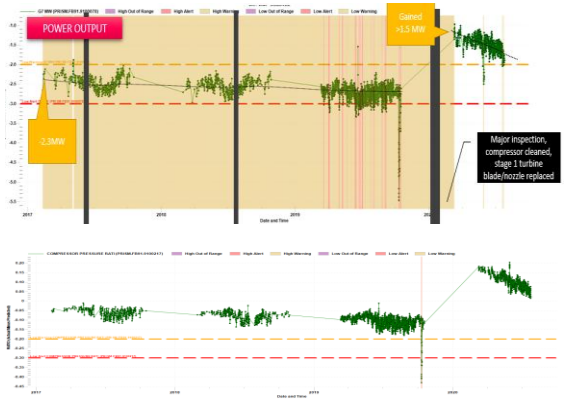
- **HDR models** track changes in heat transfer characteristics which allow us to detect and monitor fouling. In February 2020 fouling has become worse after a water contamination event.

- **RULE** allows us to forecast remaining run time to hit operational limits. We will hit a safe operating limit for tube skin metal temperature within two weeks.



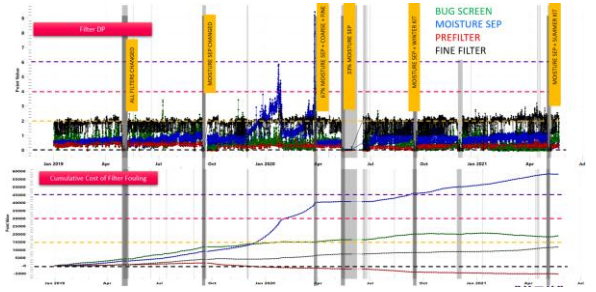
- **Impact and Optimization** shows that by a 10% reduction in duct burner firing we can generate enough headroom in tube skin temperatures to continue operation and avoid an immediate forced outage during which time we can continue to monitor for further degradation.

Gas Turbine Routine Maintenance Optimization

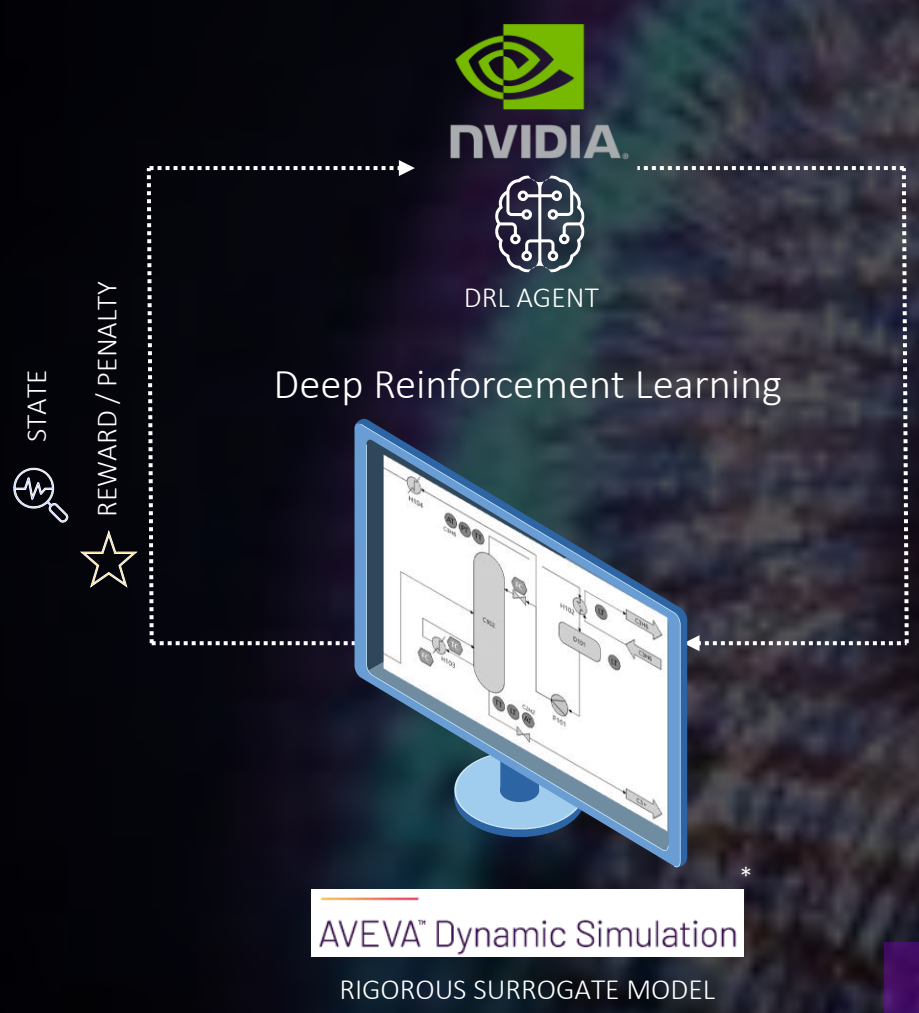


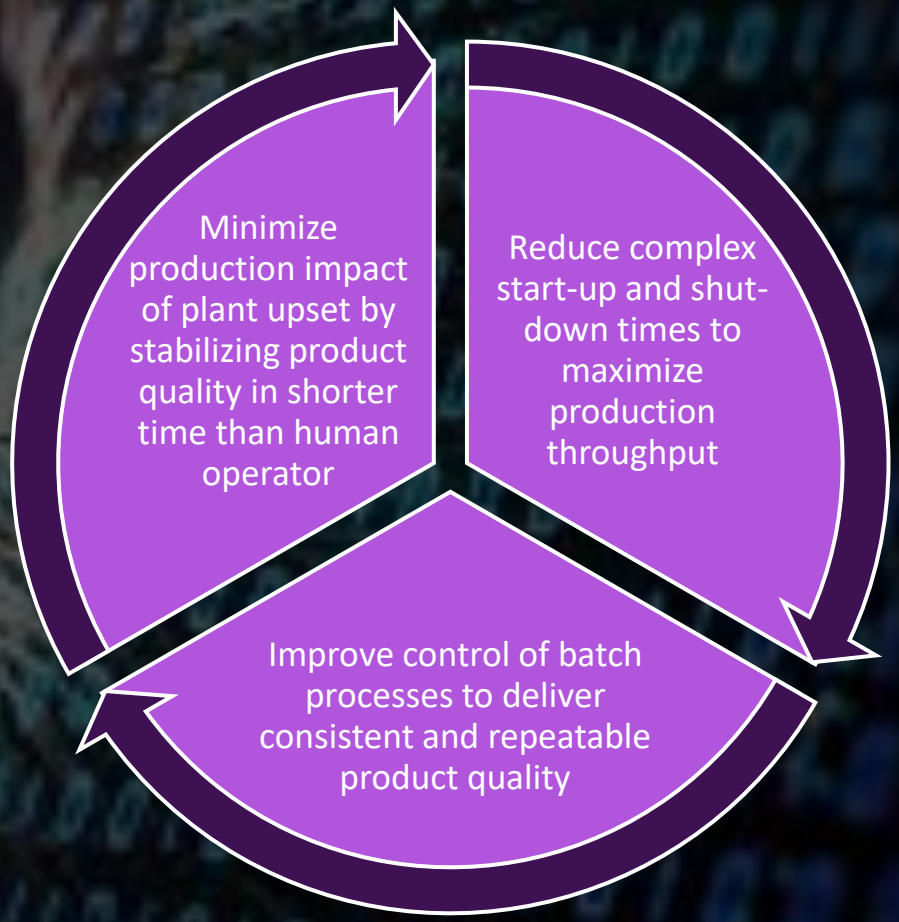
- **HDR models** track changes in KPIs corrected for load and ambient temperature:
  - Power Output
  - Heat Rate
  - Compressor Efficiency
  - Compressor Pressure Ratio
  - Turbine Efficiency
  - Exhaust Temperature

- **HDR models** track cumulative cost of gas turbine filter fouling and payback-time for replacement of each filter section enabling Optimization of maintenance intervals / reduction of unnecessary expenditure.



Autonomous Operations





AVEVA Simulation + NVIDIA Deep Reinforcement Learning

*AVEVA Dynamic Simulation ('Dynsim') is a rigorous first-principles simulator for industrial processes

Generative & Agentic AI

Data & Information Level
“*ask a complicated question*”

Functional Software Level
“*tell it what you want it to do*”

Unified User Experience
“*Agentic AI*”

Available

Coming soon

In development

AI helps drive Net Zero

It’s a Journey

Today

- Improve asset & process efficiency
- Burn less fuel
- Reduce GHG emissions

Tomorrow

- Drive down the cost of green energy production
- Improve the reliability of green energy
- Cause green energy to become more economically viable than traditional sources of energy

Result: Net Zero

AI-driven Digital Twin

Questions?

Please wait for the microphone.

State your name and company.

Please remember to…

Navigate to this session in the mobile app to complete the survey.

Visit us on the CONNECT booth 59 to learn about Generative AI with Industrial AI Assistant

Thank you!

This presentation may include predictions, estimates, intentions, beliefs and other statements that are or may be construed as being forward-looking. While these forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could result in actual outcomes differing materially from those projected in these statements. No statement contained herein constitutes a commitment by AVEVA to perform any particular action or to deliver any particular product or product features. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect our opinions only as of the date of this presentation.

The Company shall not be obliged to disclose any revision to these forward-looking statements to reflect events or circumstances occurring after the date on which they are made or to reflect the occurrence of future events.

linkedin.com/company/aveva

@avevagroup

ABOUT AVEVA

AVEVA is a world leader in industrial software, providing engineering and operational solutions across multiple industries, including oil and gas, chemical, pharmaceutical, power and utilities, marine, renewables, and food and beverage. Our agnostic and open architecture helps organizations design, build, operate, maintain and optimize the complete lifecycle of complex industrial assets, from production plants and offshore platforms to manufactured consumer goods.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life's essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world's most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

Learn more at www.aveva.com

AVEVA