



AVEVAWORLD

ACCELERATE INDUSTRIAL INTELLIGENCE

AVEVA WORLD MILAN, MAY 2026

Beyond Monitoring

Using AVEVA™ Process Simulation to unlock the value of your PI Data

Ryan Muir, Senior Product Manager, AVEVA

AVEVA

AVEVA WORLD MILAN, MAY 2026

Agenda

Beyond Monitoring: Using
AVEVA™ Process Simulation to
unlock the value of your PI Data

Allianz MiCo
Milano

Introduction to Operating Digital Twins

AVEVA Process Simulation vs. AF Analytics

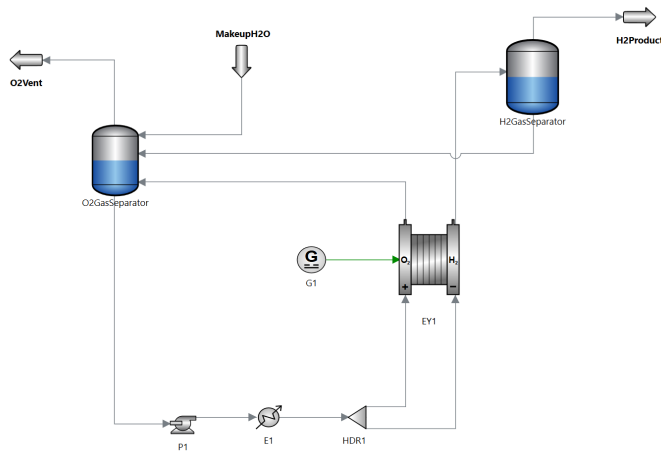
Demo

Q&A

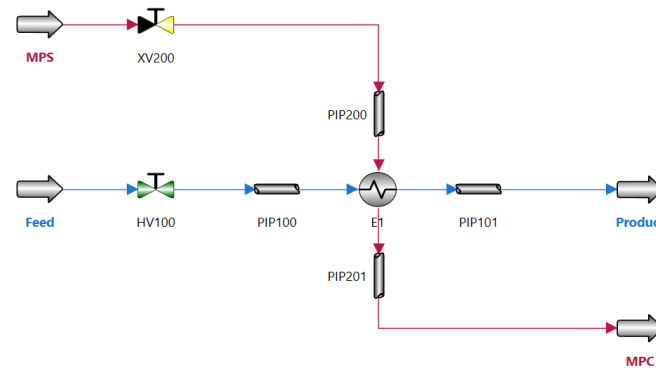
The role of process simulation in design and operations

How is process simulation used throughout the process lifecycle?

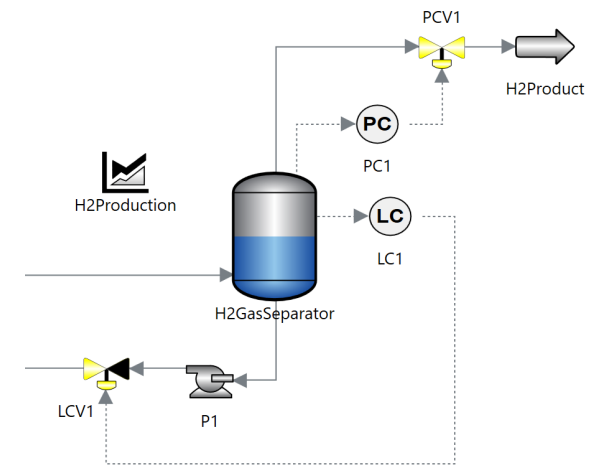
Mass & Energy Balances



Equipment Sizing & Rating



Dynamic Studies / OTS



Thermodynamics

Optimization and Case Studies

Reporting

Operating Digital Twin – PI + APS

Unlocking new value

- **What?**

- An **Operating Digital Twin** for your processes

- **Why?**

- Empower remote and central engineering teams to engage in troubleshooting and provide operations feedback
- Increase transparency of process information to drive business value
- Gain insights into areas of the process where physical transmitters are not available



Monitor KPIs alongside real-time process measurements

Real-time monitoring

- **How?**

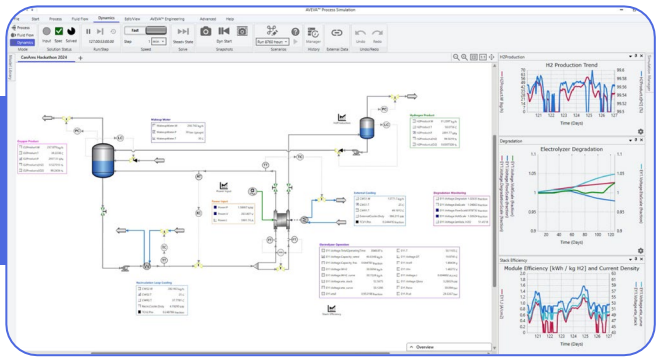
- Combine real time process measurements from PI and first-principles simulation
- Leverage PI Asset Framework to quickly scale-out the digital twin
- Incorporate soft sensors into your monitoring program to track KPIs that can't be measured in the plant (e.g tray efficiencies, heat exchanger fouling, Column flooding, reactor temperature profiles)
- Create alerts for when abnormal process conditions are detected, or sustainability goals are at risk



AVEVA Process Simulation for Operations

Combining world-class solutions to maximize simulation value

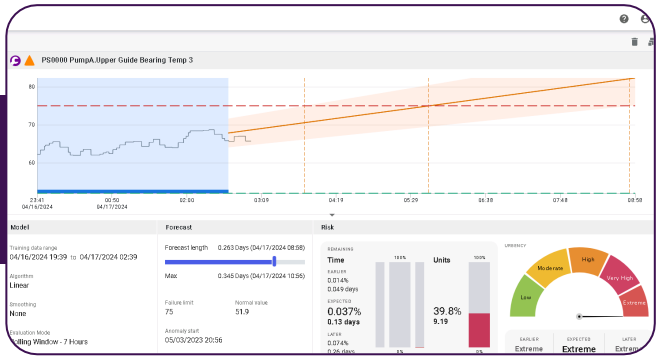
First Principles
Simulation



Process Historian

Category: Simulation Results		
Cell voltage		1.6432 V
Current density		0.0087744 A/cm2
Degradation scale		103.38 %
Efficiency scale		108.29 %
Faraday efficiency		81.123 %
Flow scale		95 %
Fraction of rated capacity		0.79623 %
Heat loss to environment		3.2394 kW
Published stack efficiency		49.736 kWh/kg
Recirc cooling duty		0.00053012 kW
Required cooling duty		-1.8548 kW
Stack efficiency		53.861 kWh/kg
Thermoneutral voltage		1.4827 V
Voltage scale		108 %

AI/ML-based
Predictive Analytics



Contextualized
Data Visualization



AVEVA Process Simulation vs. Asset Framework Analytics

If we have asset analytics, why do we need simulation?

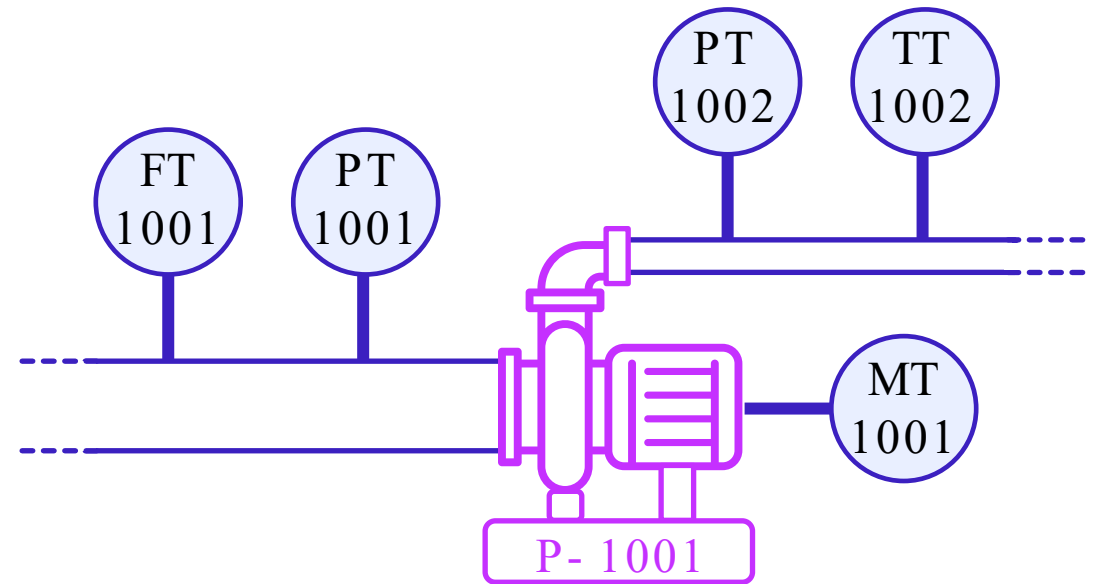


Monitoring KPIs – Pump Efficiency

How to calculate the efficiency of a pump?

$$\eta_P = \frac{\rho * g * Q * H}{P}$$

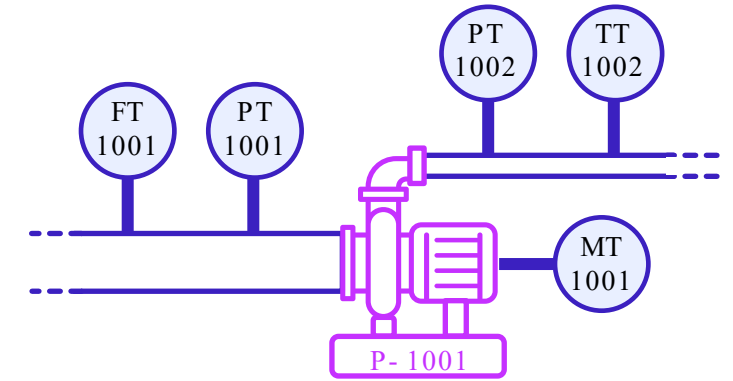
- η_P = Pump efficiency
- ρ = Fluid density
- g = Gravitational constant (9.81 m/s²)
- Q = Volumetric flow rate
- H = Head
- P = Power



1. Read data from PI

What information is available from the process?

- FT1001 = 821.16 m³/h
- PT1001 = 969.29 kPa
- PT1002 = 5012.60 kPa
- MT1001 = 1531.76 hp
- TT1002 = 82.12 °C

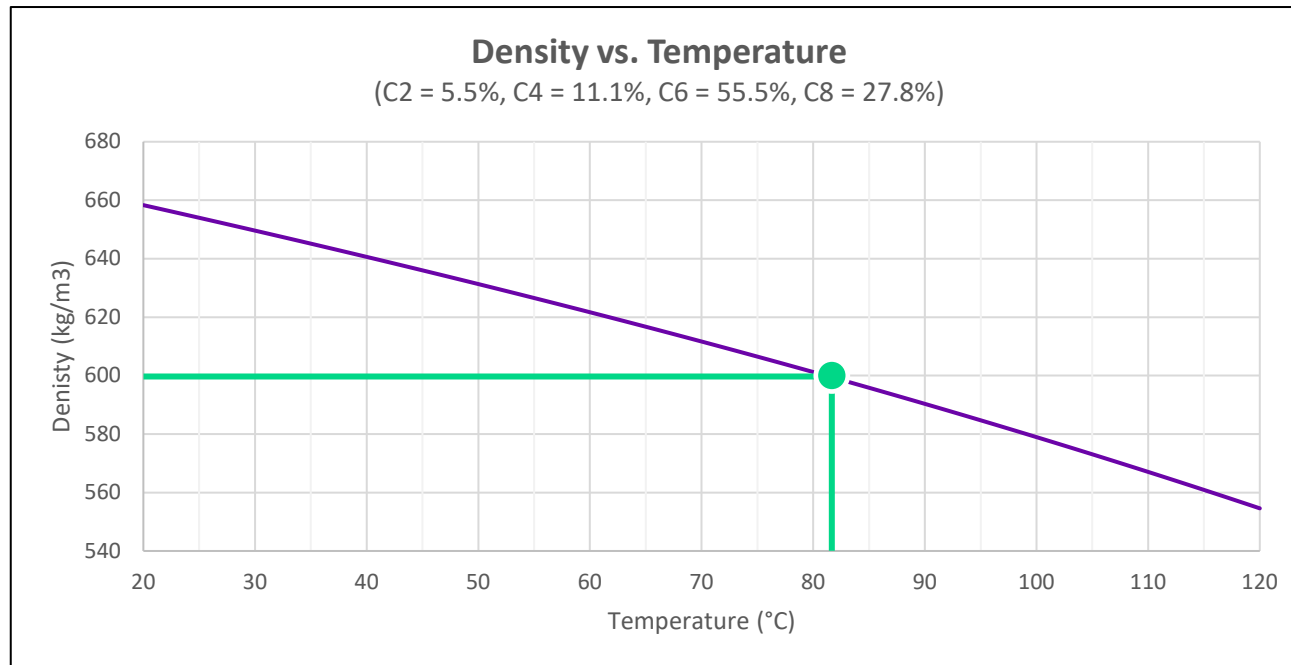


$$\eta_P = \frac{\rho * g * Q * H}{P}$$

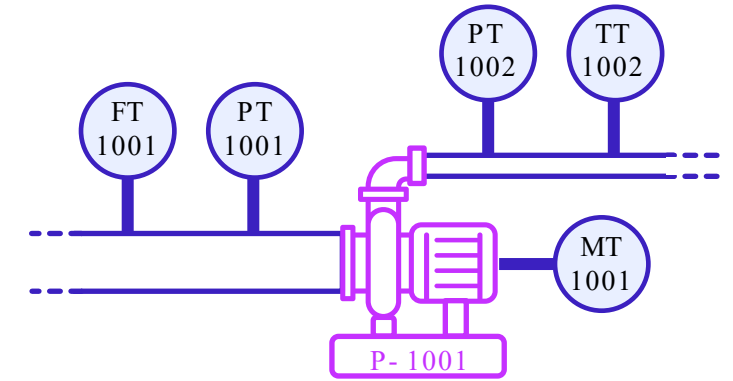
2. Determine fluid density

How do we determine fluid properties without simulation?

- TT1002 = 82.12 °C



- $\rho = 601 \text{ kg/m}^3$



$$\eta_P = \frac{\rho * g * Q * H}{P}$$

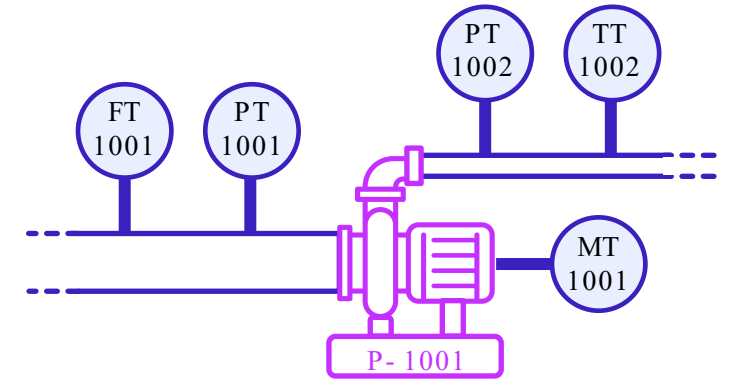
3. Calculate Head

Calculate KPI 'intermediates' – be careful of units!

$$H = \frac{\Delta P}{\rho * g}$$

- PT1001 = 969.29 kPa
- PT1002 = 5012.60 kPa
- $\rho = 601 \text{ kg/m}^3$

$$H = \frac{(5012.60 - 969.29) \text{ kPa}}{601 \frac{\text{kg}}{\text{m}^3} * 6.674 * 10^{-11} \frac{\text{m}}{\text{s}^2}} = \frac{4043.3 \text{ kPa}}{601 \frac{\text{kg}}{\text{m}^3} * 9.81 \frac{\text{m}}{\text{s}^2}} = 685.79 \frac{\text{Pa} * \text{m}^2 * \text{s}^2}{\text{kg}} = 685.79 \text{m}$$



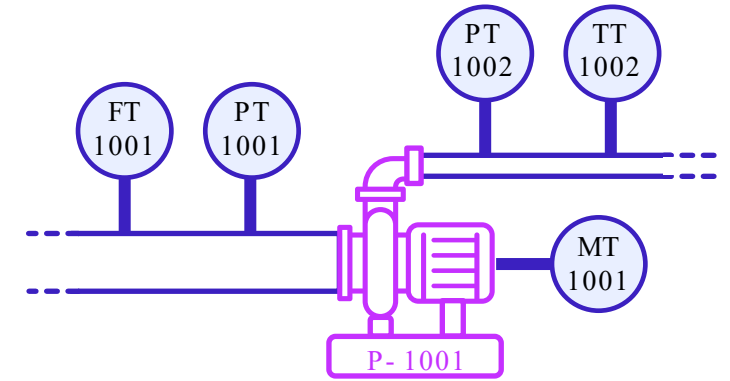
$$\eta_P = \frac{\rho * g * Q * H}{P}$$

4. Calculate Efficiency

$$\eta_P = \frac{\rho * g * Q * H}{P}$$

- $\rho = 601 \text{ kg/m}^3$
- $g = 9.81 \text{ m/s}^2$
- $Q = \text{FT1001} = 821.16 \text{ m}^3/\text{h}$
- $H = 685.79 \text{ m}$
- $P = \text{MT1001} = 1531.76 \text{ hp}$

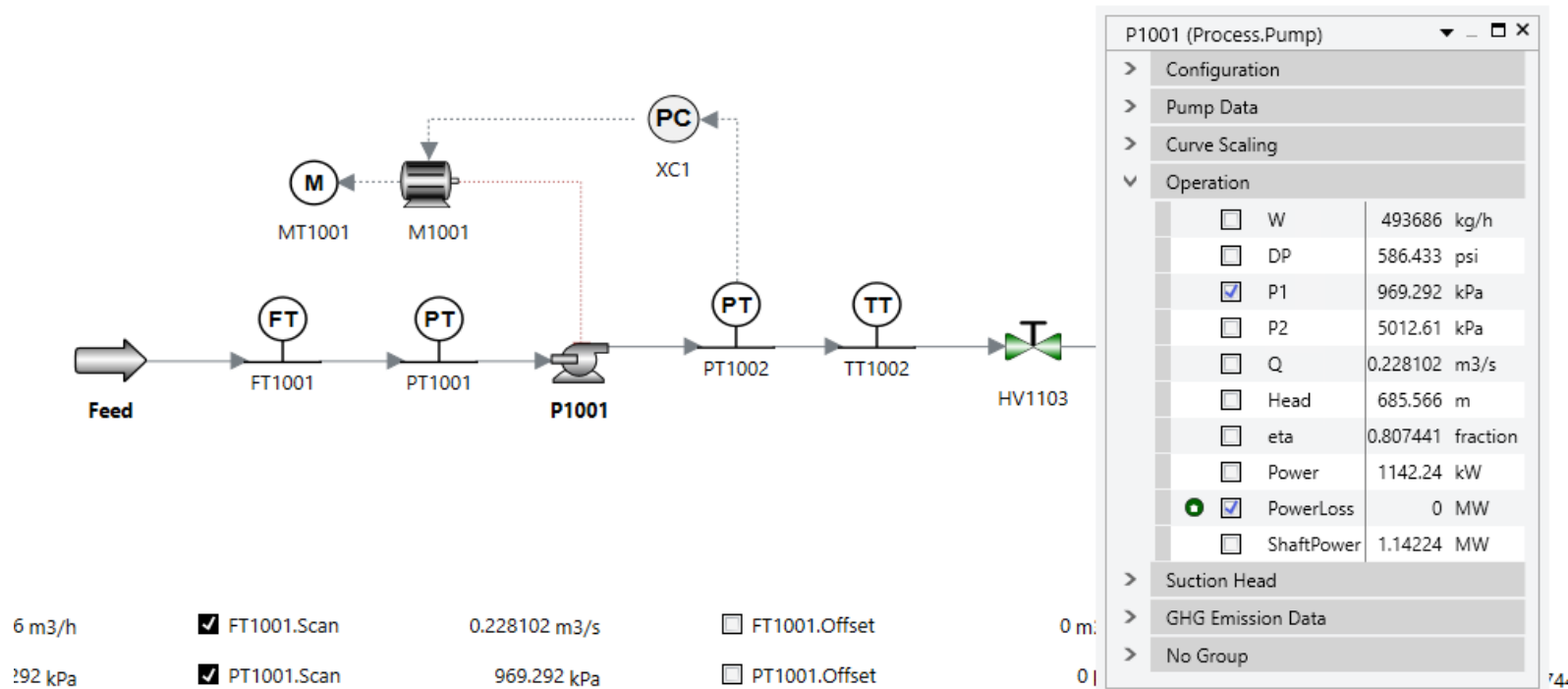
$$\eta_P = \frac{601 \frac{\text{kg}}{\text{m}^3} * 9.81 \frac{\text{m}}{\text{s}^2} * 821.16 \frac{\text{m}^3}{\text{h}} * 685.79 \text{ m}}{1531.76 \text{ hp}} = \frac{601 \frac{\text{kg}}{\text{m}^3} * 9.81 \frac{\text{m}}{\text{s}^2} * 0.2281 \frac{\text{m}^3}{\text{s}} * 685.79 \text{ m}}{1142.23 \text{ kW}} = 80.7\%$$



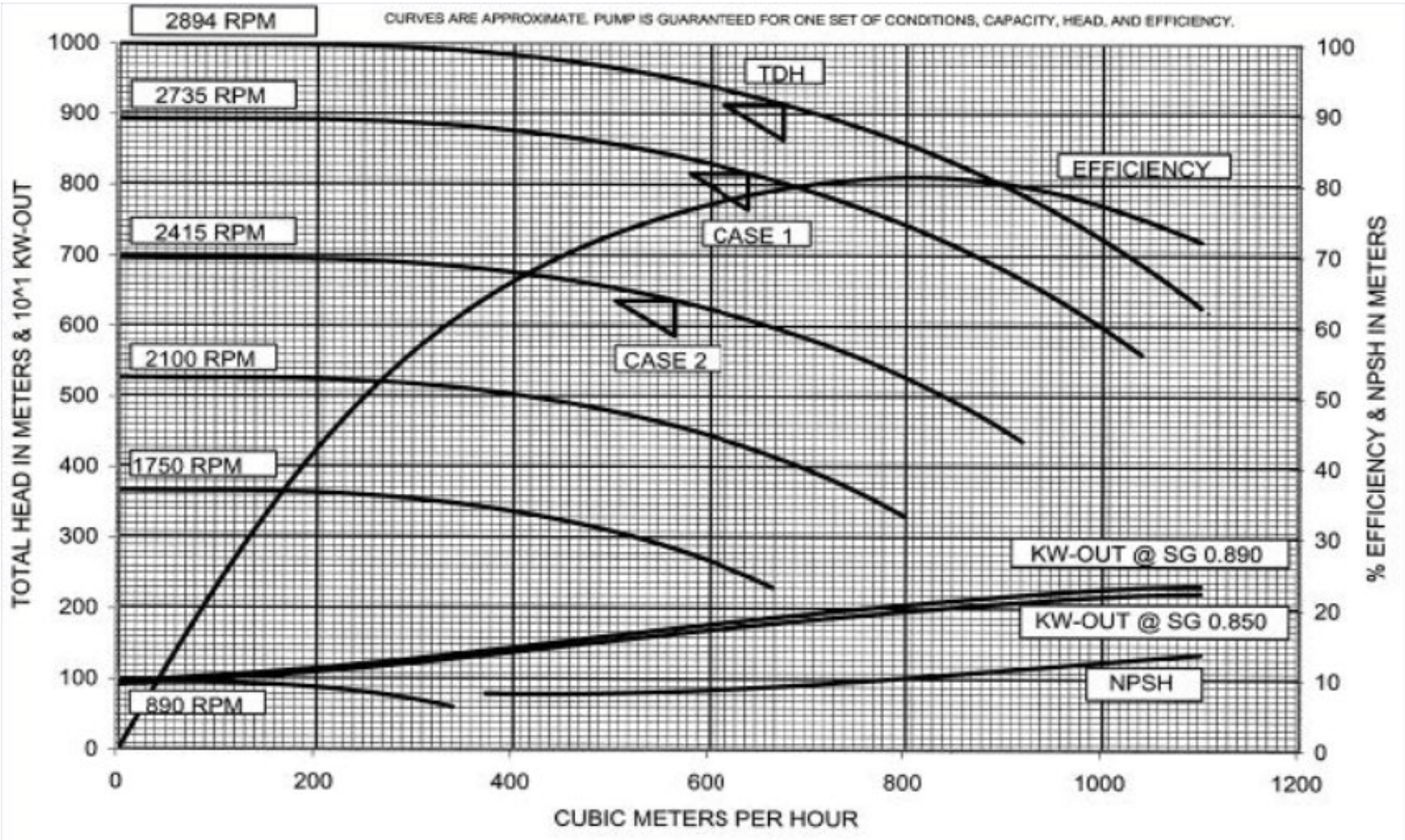
$$\eta_P = \frac{\rho * g * Q * H}{P}$$

Calculating KPIs in AVEVA Process Simulation

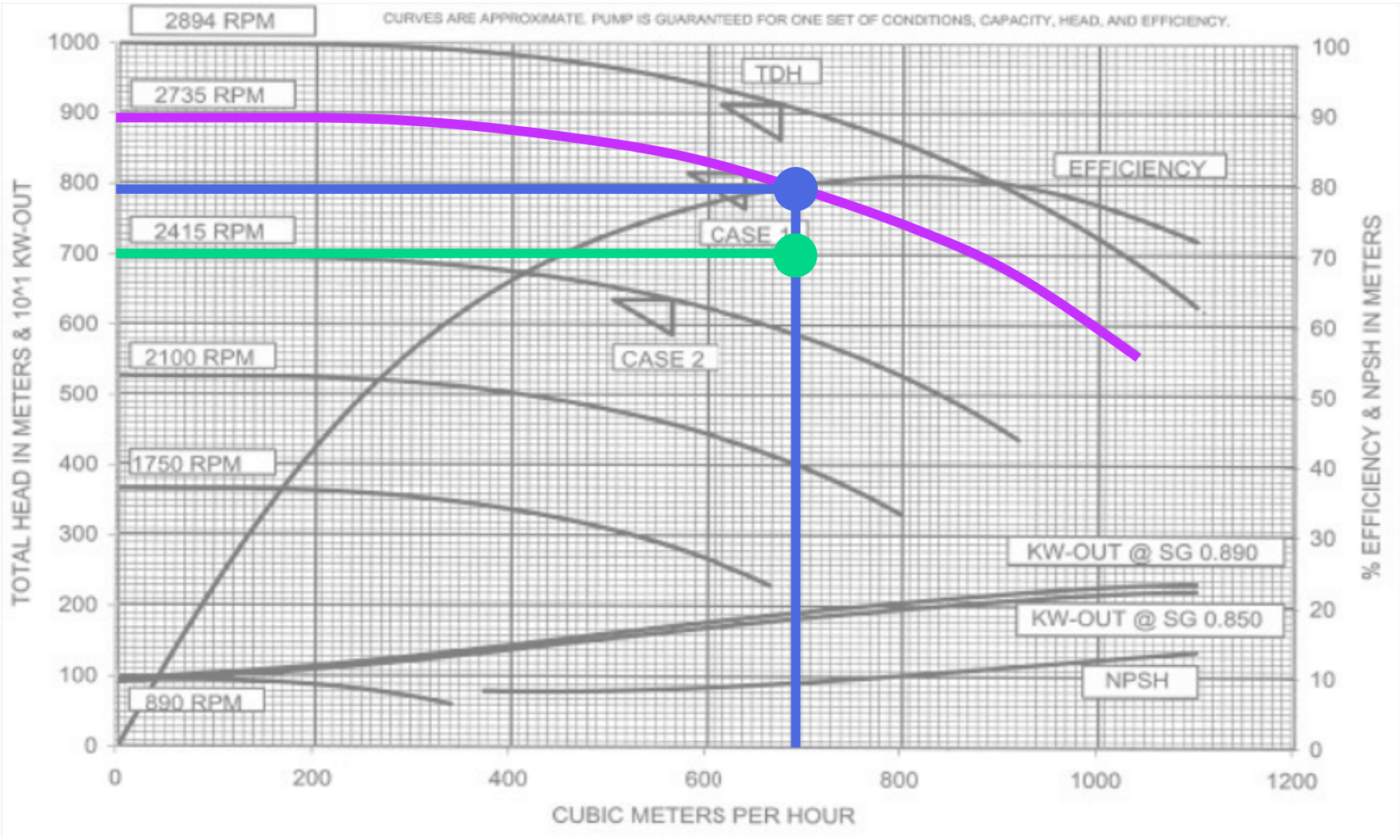
Leverage built-in unit operations and rigorous thermodynamics for easy calculation of KPIs



Additional Information from Pump Curves



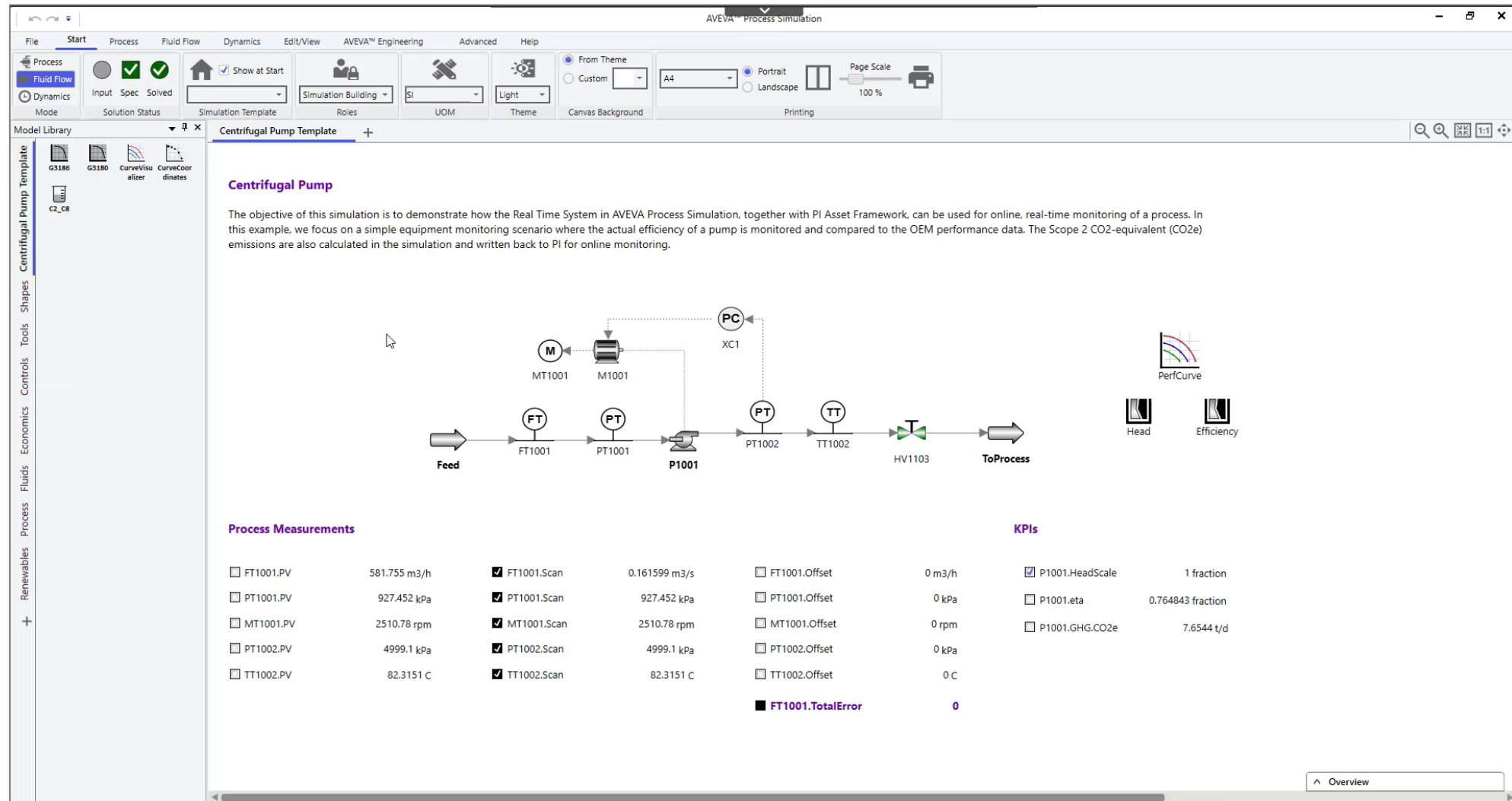
Additional Information from Pump Curves



Demo – Pump Monitoring

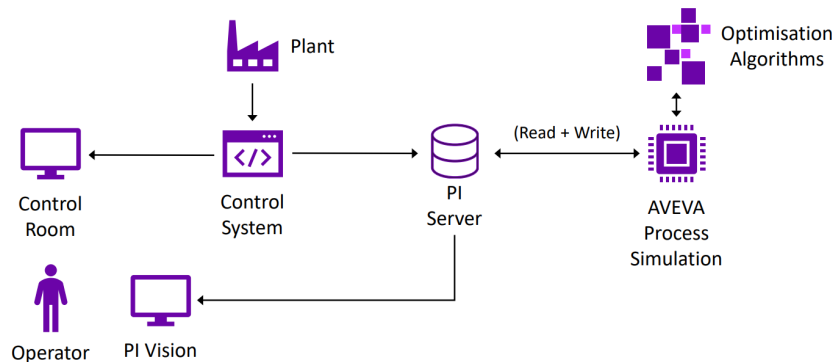


Real-time monitoring (in under 10 minutes!)



Real-time operational efficiency savings – an LNG Case Study

- AtkinsRéalis developed an online simulation model to optimize the Dragon LNG terminal (import, storage, and regasification) in Wales
- The simulation compares current plant operations with several possible configurations and advises operators if an optimized plant configuration is available
- A combination of **AVEVA Process Simulation** and **PI** allows for real-time sitewide optimization of the terminal
- The Process Digital Twin provides **demonstrated savings >\$1M / year** for Dragon LNG and represents a **new commercial offering** for AtkinsRéalis



Aramco

First Principle Driven Online Fault Monitoring

- Applying 1st Principles Simulation (APS) for real-time performance monitoring
- Online Fault Monitoring (OFM) solution provides asset failure prediction and operational support for critical assets across Aramco's operations
- Reduced maintenance costs and improved asset reliability, availability, and performance

Ryan Muir

Senior Product Manager, AVEVA Process Simulation

AVEVA

- ryan.muir@aveva.com



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.

Speak to an expert at the **Design innovative process**
booth (D&B2) in the Innovation Zone!

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](https://www.linkedin.com/company/aveva)

 [@avevagroup](https://twitter.com/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