EMEA ADVISORY GROUP 2021

Confidential

Transform Execution and Operation with Digital Twin technology

14 June 2021

Julien de Beer – Head of Portfolio Management, Engineering

AVEVA

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

slido

Confidential

In your opinion, what will be the plant of the future?

ⓘ Start presenting to display the poll results on this slide.

Competition, Digitalization & Regulation are forcing rapid change

The World has Changed



Preparing for the 'Plant of the Future' is now a current imperative

The New Normal

The Digital Twin is the digital thread that connects **people, process and assets** across the asset lifecycle enabling:

- CapEx Optimization and Efficiency
- Optimization of operating expenses
- Environmental / Sustainability
- Workforce Safety and Agility
- Integration of the Value Chain

Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

We enable efficiency in a rapid market transformation

Industry Imperatives

Energy Transformation	Sustainability
Consumer Personalization	Operational agility
Health and Safety	Reliability and Safety
Smart Infrastructure	Adaptive and autonomous
Acceleration of digital work	Empowered connected worker

Technology Imperatives

- Industrial IoT/Edge
- Big Data
- Artificial Intelligence
- Extended Reality

Digital Twin

Cloud

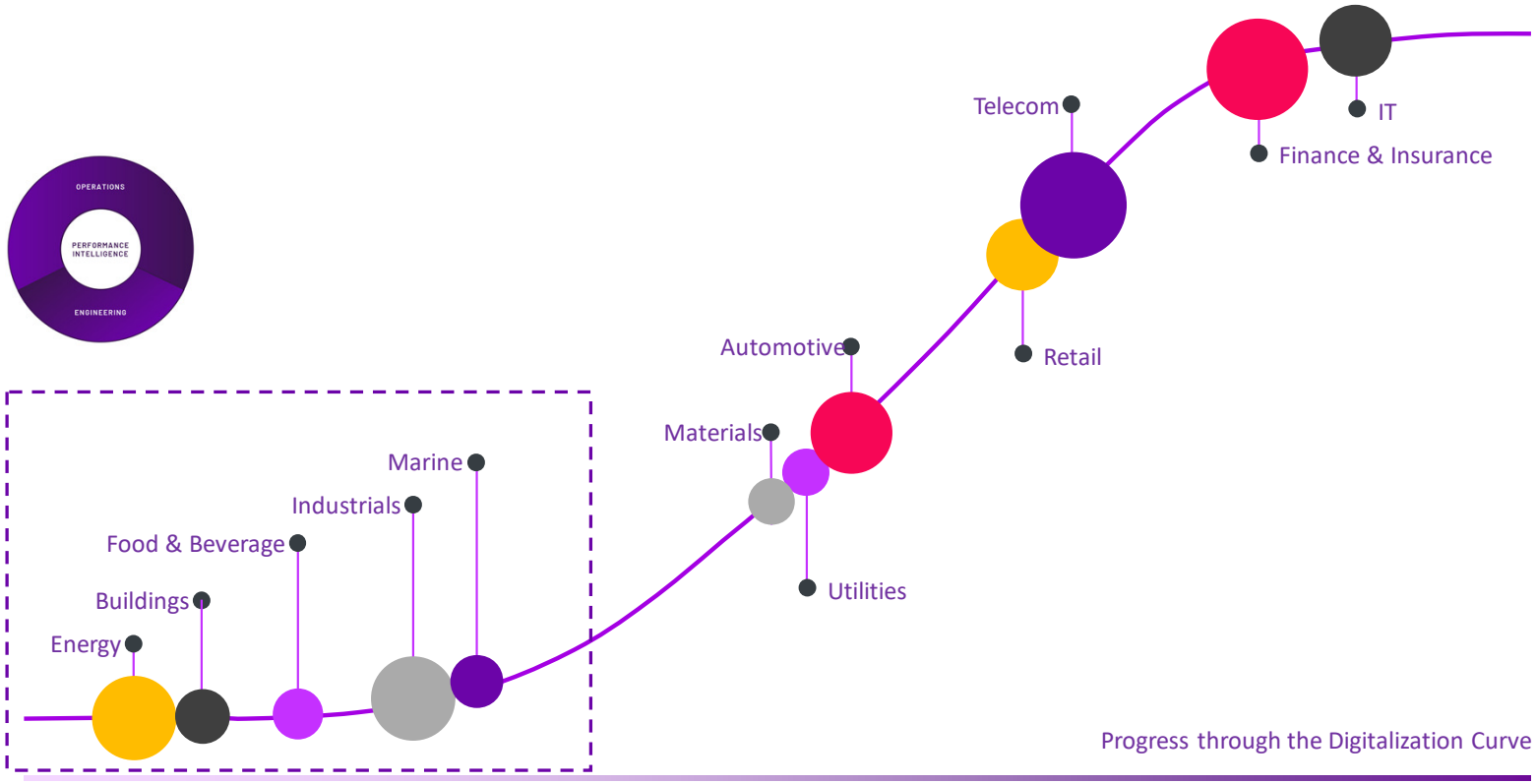
- Standardize and Scale
- Flexible Consumption
- Open
- Access Anywhere
- Data Security

Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA

Oil & Gas Digital Transformation continues to languish



Source: AVEVA Market Insights

Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

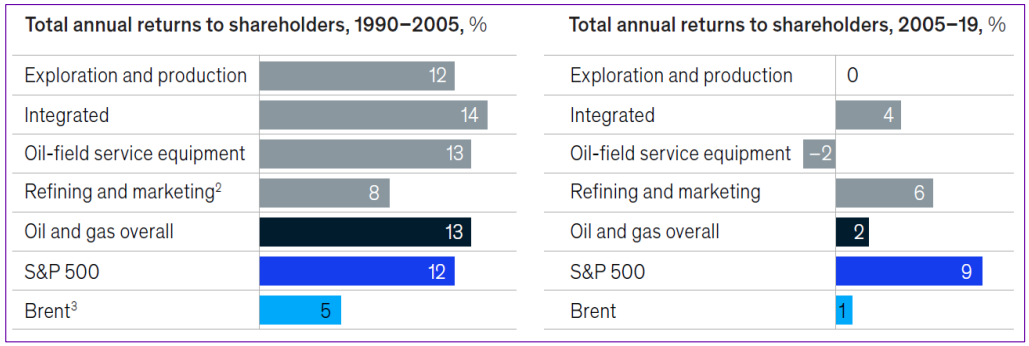
The Challenge: be more green while offering better returns

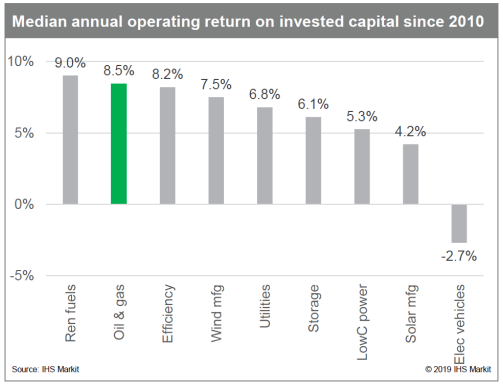
- To meet Sustainable Development Goals, green investment must increase to min 30% of global CAPEX
- Oil & Gas must improve green credentials while…
- Improving the investment case!

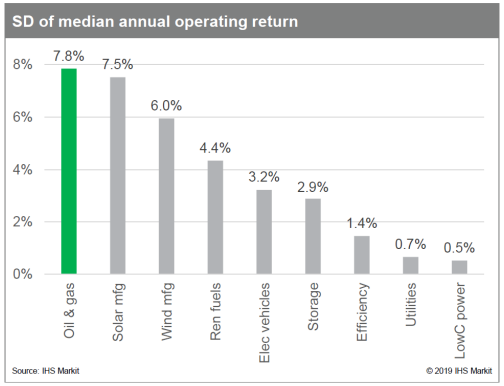
GICS Sector (1)	Green Investment (BAU)	Green Investment (SDG)
Energy	$4,281	$302,118
Utilities	$245,600	$303,071

Source: Global corporate green investment and the UN sustainable development goals, Corporate Knights & Climate Bond initiative, March 2019

Source: McKinsey & Co report: '*Oil and Gas after COVID-19*'







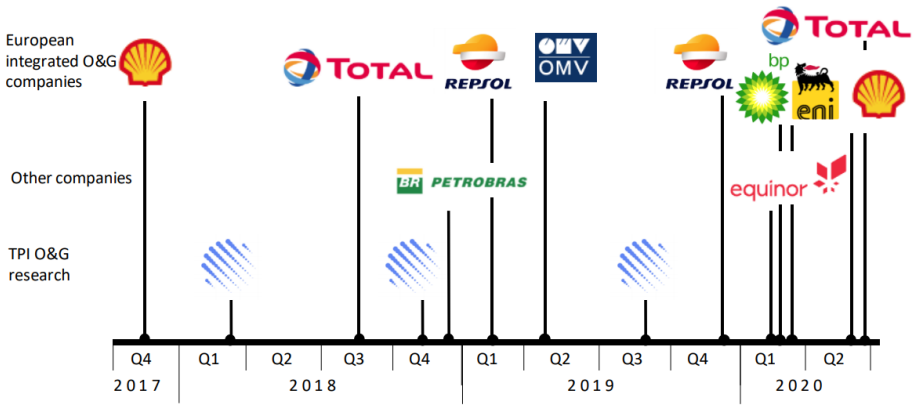
Source: IHS Markit

Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

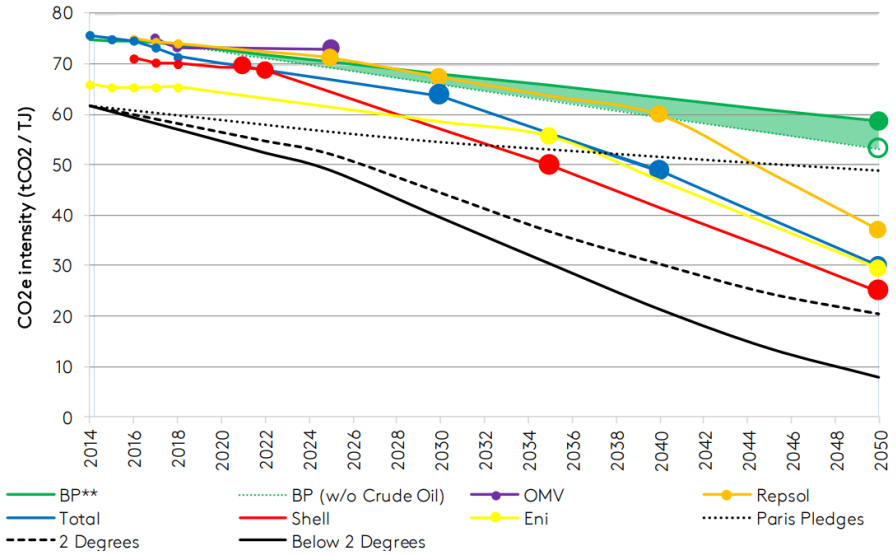
2050 Climate Goal Progress

EU IOCs leading



Dates when oil and gas companies' have set and updated their emission reduction targets, including Scope 3

Ref: 'Carbon Performance of European Integrated Oil and Gas Companies', www.transitionpathwayinitiative.org/tpi/publications/58.pdf?type=Publication



Announced Emission Intensity Targets by European integrated oil and gas

Ref: "Management Quality and Carbon Performance of Energy Companies: September 2020 Update", https://www.transitionpathwayinitiative.org/publications/61.pdf?type=Publication

Confidential

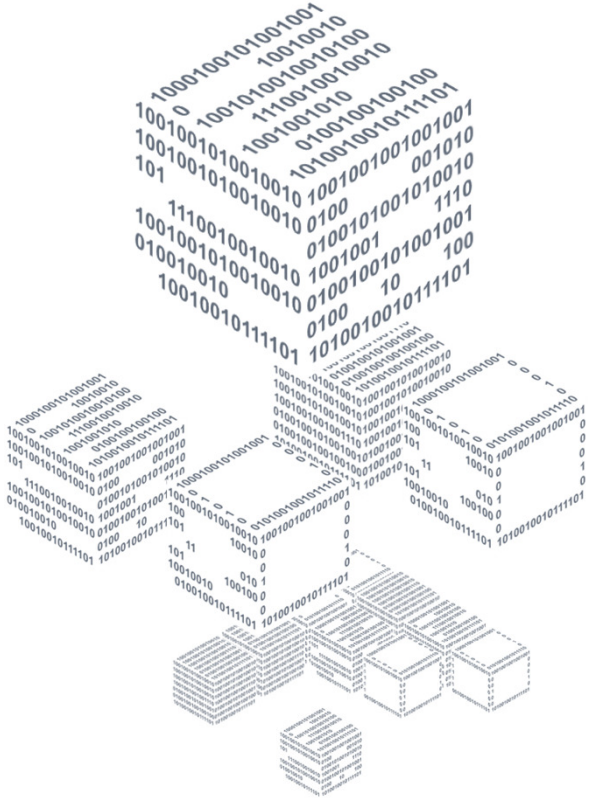
©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

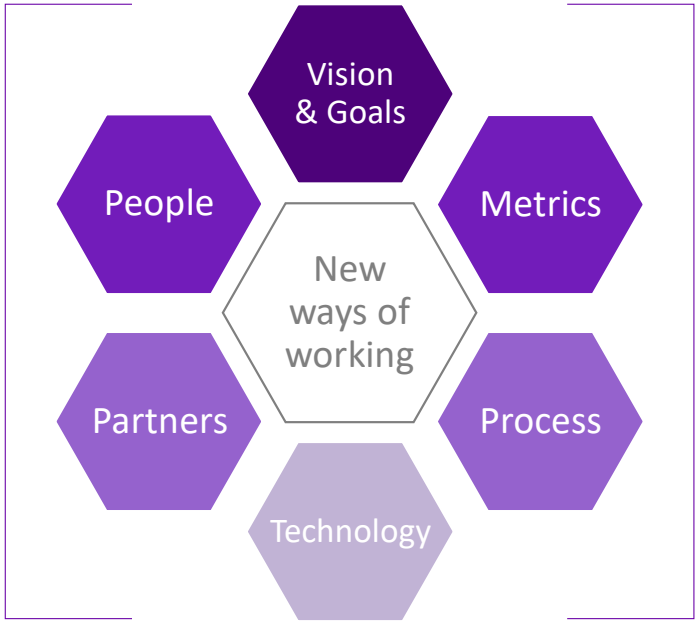
AVEVA

Digital Transformation for the Plant of the Future

Why Digital Twins should be about a new world of work

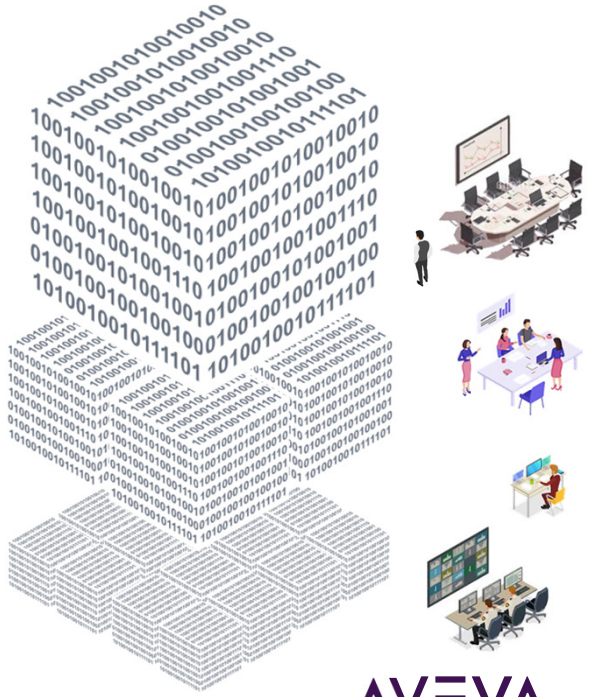
Current state





Future state

(Digital Twin of the “money machine”)



Confidential

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

A trusted future plant strategy

5 steps to modern plants

1. Prioritize the Digital Twin
2. Create data-centric, collaborative processes
3. Account for inevitable change
4. Leverage the cloud
5. Design for optimal operations that can be re-modernized in the future



Confidential

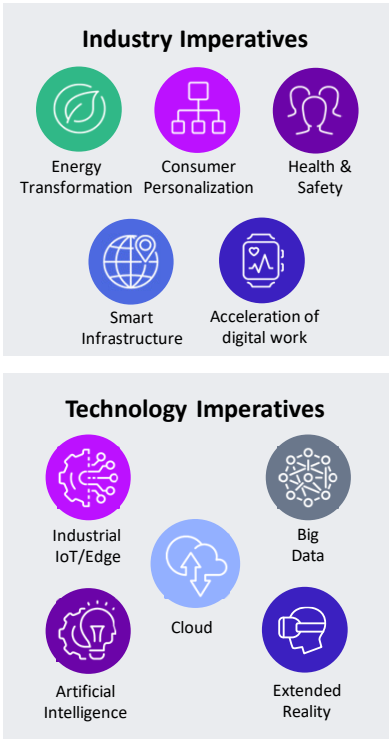
© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

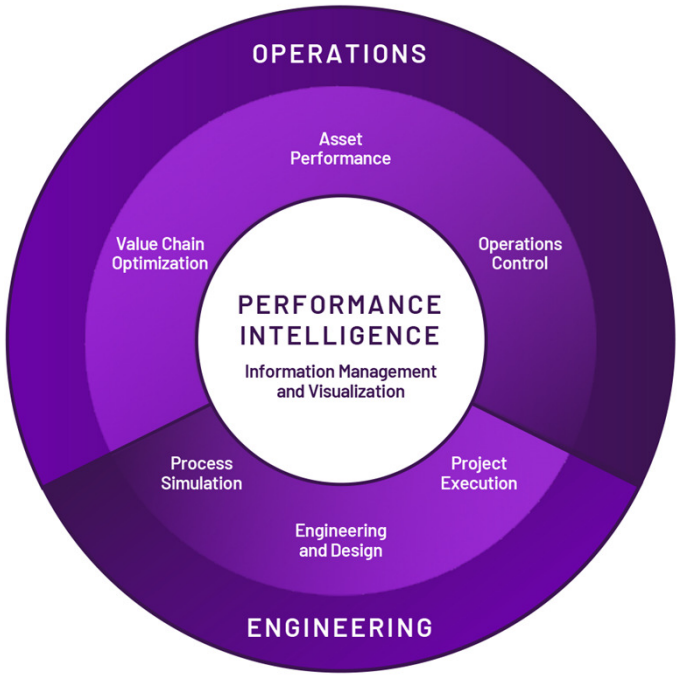
Unified Data Platform: Plant of the Future's beating heart

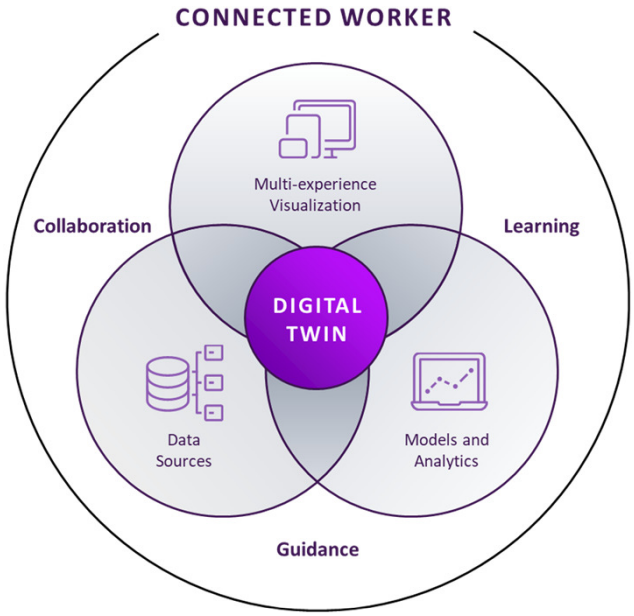
AVEVA's end-to-end industrial software to optimize engineering and operations

+

OSIsoft's PI System is the industry standard for industrial information management







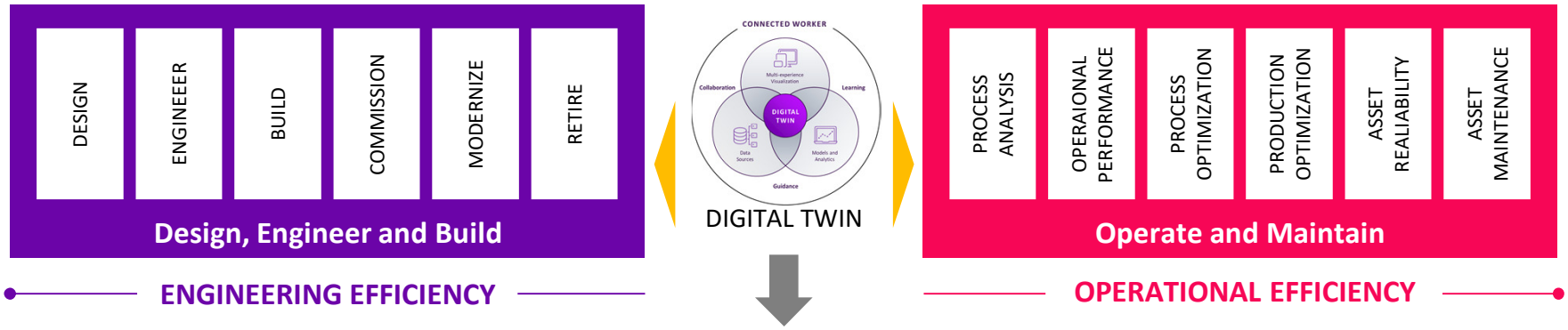
Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA

Insight drives excellence

The Digital Twin delivers actionable, contextualized information to transform your ability to make faster and more reliable decisions, and improve your operational safety, asset integrity and reduce your project risk.



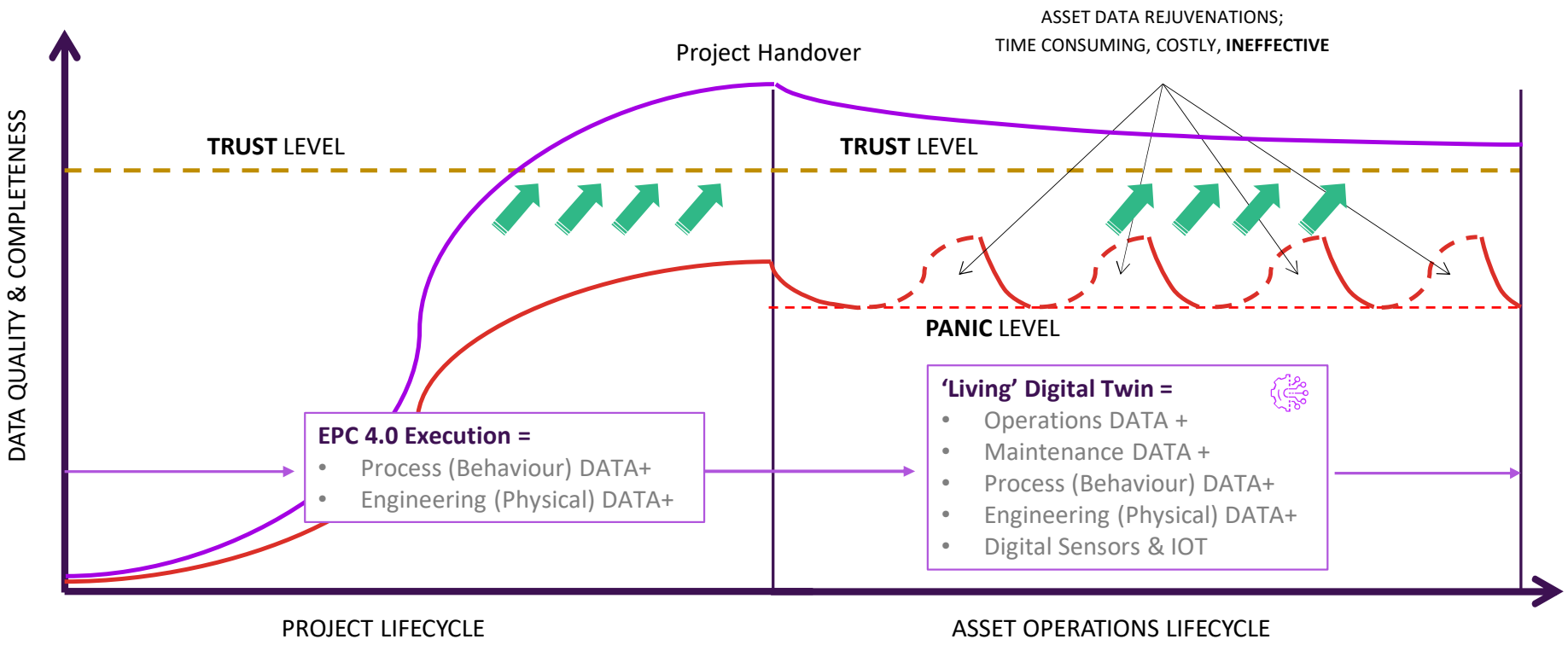
TRUSTED ACTIONABLE INFORMATION IN CONTEXT

AUTHORITY: recognized as the reference of the relevant information.	**AUTHENTICITY**: can be linked back to its source.	**RELIABILITY**: can be trusted as a full and accurate representation.	**INTEGRITY**: complete, unaltered and contextualized.	**USABILITY**: accessible, can be easily located, retrieved, presented and interpreted.

Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

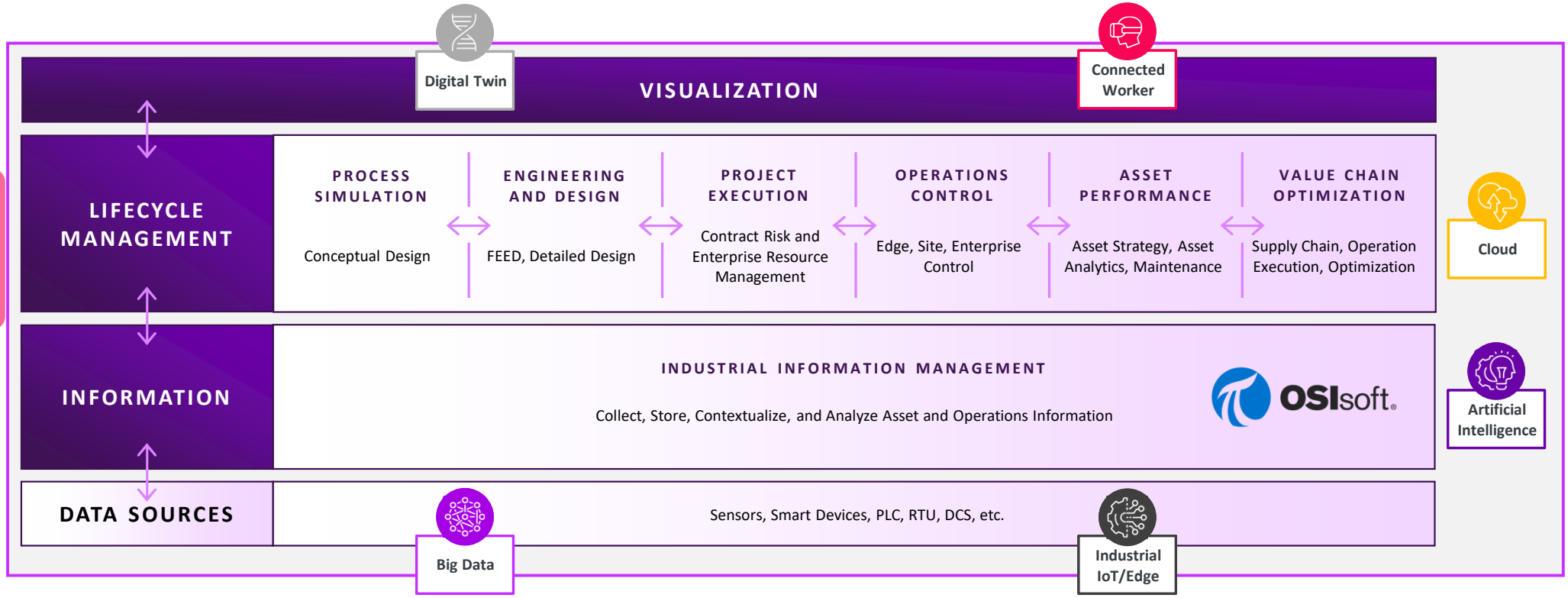
Delivering the Plant of the Future: Unified Data from CAPEX into OPEX



Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

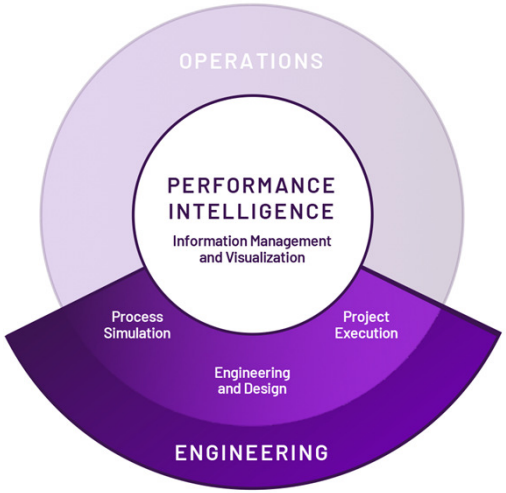
Unified Data Platform: Plant of the Future's beating heart



Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA's EPC 4.0 Suite – Unifying Engineering, Execution and Learning



Simulation

Design

Execution

Learning

Manage

Information Management

MANAGE					
AVEVA Info Standards Manager	AVEVA Info Gateways	AVEVA Reporting and Analytics	AVEVA Visualization (3D)	AVEVA Visualization (Laser)	AVEVA Asset Search

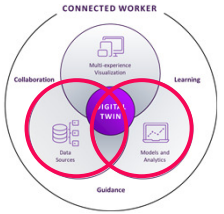
SIMULATION	DESIGN		EXECUTION		LEARNING
AVEVA Process Simulation	AVEVA Engineering	AVEVA E3D Design	AVEVA ERM - Materials	AVEVA Contract Risk Management	AVEVA Unified Learning
AVEVA Dynamic Simulation	AVEVA Electrical & Instrumentation	AVEVA Point Cloud Manager	AVEVA ERM - Construction Management	Project Controls	AVEVA Operator Training
Cost Estimation	AVEVA P&ID and Diagrams	AVEVA E3D Structural Design	AVEVA E3D Fabrication Management	Commissioning	AVEVA Pipeline Training

Unified Engineering | Unified Project Execution | Unified Learning

Confidential

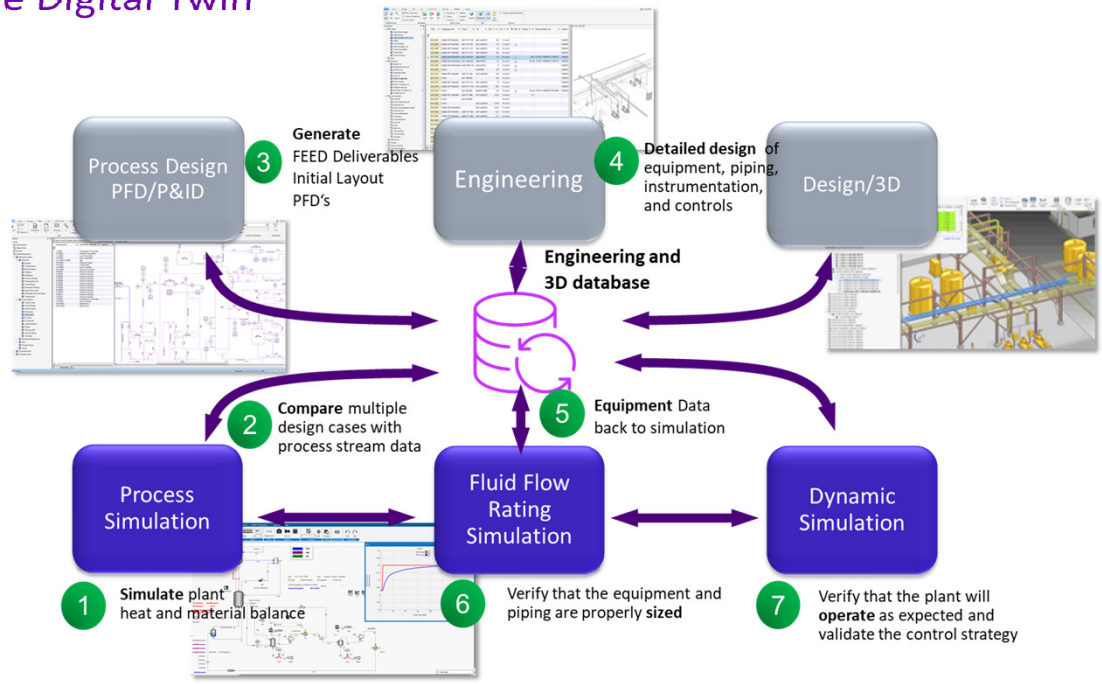
©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

A Sample Digital Workflow with Unified Engineering



Creating & maintaining source asset data for the Digital Twin

- Bringing Asset info together with Behavioural Models - enables continual process validation through asset lifecycle
- Evolve to the single source of truth to provide asset context to the Digital Twin – digitalize legacy data
- Progressive/persistent handover of data to populate operations & maintenance systems as well as OTS, VCO and other optimization tools
- Roadmap to Data-centric MoC and project work processes to keep Digital Twin asset data evergreen



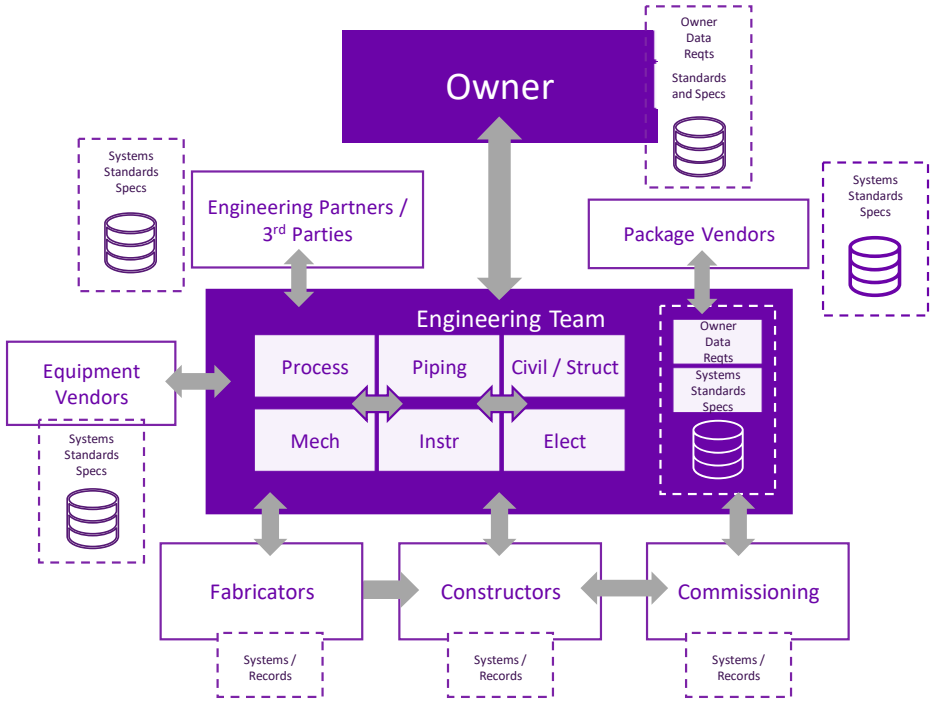
Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

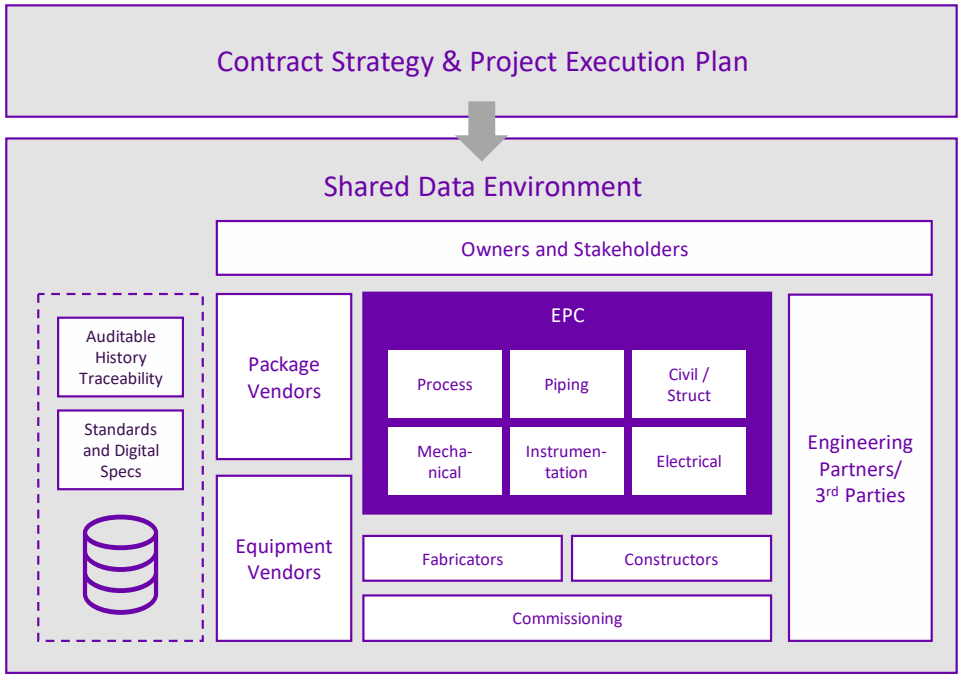
AVEVA

Building the Engineering Digital Twin starts early – creating your Digital Asset as the project progresses

FROM EPC 3.0…



…TO EPC 4.0



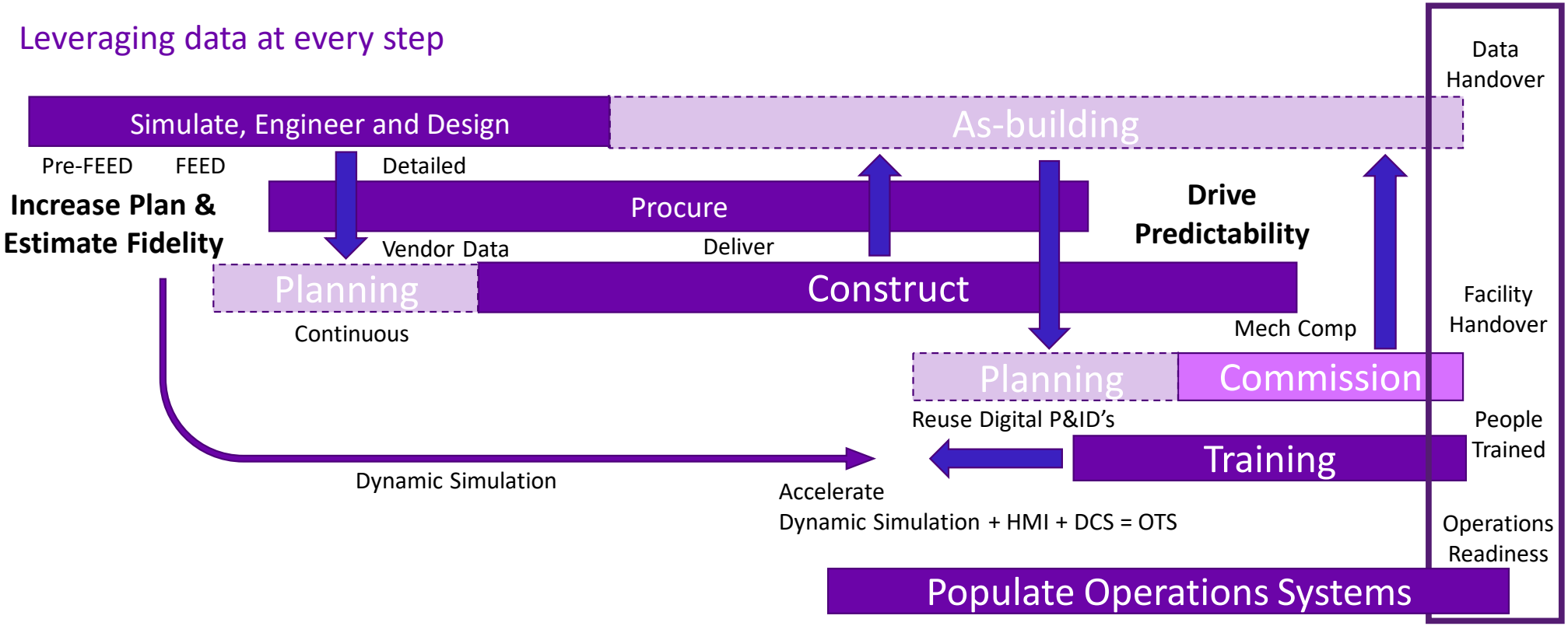
Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA

Getting the Project to Handover …..Digitally

Leveraging data at every step



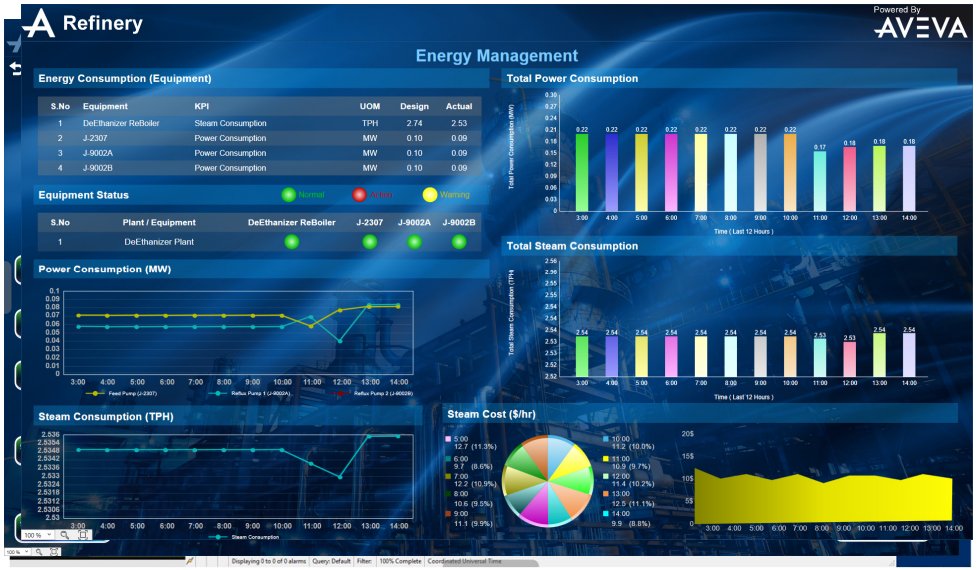
Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA

Plant of the Future: Build for Optimal Performance

Energy Management





Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

Plant of the Future: Monitor & Control for Optimal Performance

Enterprise Value Chain Optimization



Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA

Plant of the Future turns challenges into opportunities

O&G UPSTREAM

Remote Operations

The right information to the right users at the right time and places, for the right actions



Example of example of unified value chain visualization with transportation, HSE, operations and maintenance, for onshore, offshore, pipelines and shipping

O&G MIDSTREAM

Agile and responsive

Integrated information about safety, reliability and operations for more trustworthy performance



Example of unified LNG visualization with reliability, engineering, operations and maintenance, focused on valves

O&G DOWNSTREAM

Agile and responsive

Integrated visualization for higher confidence in asset capability, value-driven decision-making when assessing feedstocks and impact on operations



Example of unified refinery visualization with reliability, supply chain, engineering, operations and maintenance

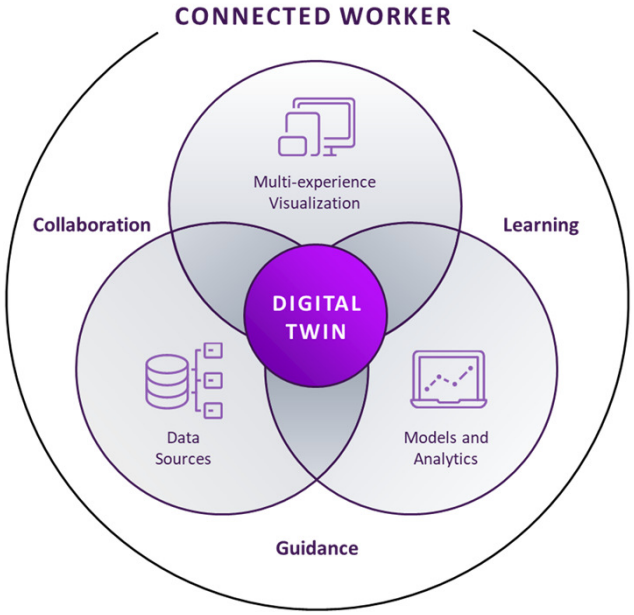
Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

Wrapping Up

Digital Twin = Unlimited Potential

- Digital Twins go way beyond a 3D model
- Levels of insight grow as you expand your Digital Twin
- Evolution of a Digital Twin will vary business to business
- Asset data is a critical element of the Digital Twin
- AVEVA can be your partner in building the right set of solutions to bring your Digital Twin to life…



Confidential

©2021 AVEVA Group plc and its subsidiaries. All rights reserved.

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.

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA



linkedin.com/company/aveva



@avevagroup

ABOUT AVEVA

AVEVA is a global leader in industrial software, driving digital transformation and sustainability. By connecting the power of information and artificial intelligence with human insight, AVEVA enables teams to use their data to unlock new value. We call this Performance Intelligence. AVEVA's comprehensive portfolio enables more than 20,000 industrial enterprises to engineer smarter, operate better and drive sustainable efficiency. AVEVA supports customers through a trusted ecosystem that includes 5,500 partners and 5,700 certified developers around the world. The company is headquartered in Cambridge, UK, with over 6,500 employees and 90 offices in over 40 countries.

Learn more at www.aveva.com

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA