OCTOBER 24, 2023

# Welcome, Track Introduction & AVEVA O&G Vision

## Oil, Gas & Energy Industry Track

Craig Harclerode, Stan Devries
Oil and Gas Industry Principals, AVEVA

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# Welcome!

# Thank you for attending!

**150+**   Oil and Gas Companies

**600+**   Oil and Gas Attendees

**50+**    Countries Represented

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# Your Hosts: The O&G Industry Principal Team

**Michele Cacciari**
Global Oil and Gas
Segment Lead

**Cindy Crow**
Industry Principal
Upstream

**Craig Harclerode**
Industry Principal
Midstream/LNG

**Stan Devries**
Industry Principal
Downstream

**Not in Attendance**

**Russell Herbert**
Industry Principal
Upstream

**Joachim Boese**
Industry Principal
Downstream

**Abdullah Almontasheri**
Industry Principal
Downstream

**Stuart Parker**
Industry Principal
Midstream/LNG

**Cormac Ryan**
Industry Principal
EPC

**Roy Calder**
Industry Principal
New Energies

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**The Role of the O&G Industry Principals**

- **Providing "art of the possible"** value and use case visioning to enlighten and enable

- **Positioning the AVEVA O&G digital framework** to help provide context for discussions and use cases

- **Assisting in the realization of synergy value** across the AVEVA portfolio

- **Providing 'industry voice'** to AVEVA product roadmaps to address key gaps in capabilities

- **Engage in strategic business and digital transformation discussions**

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# Housekeeping

- Presentations are being recorded – these will be made available on-demand on the AVEVA World website

- Please be back in your seats >5 minutes before the start times

- Use the opportunity to network and visit the exhibit areas

- Consider presenting at future AVEVA World conferences

- If you need help, please reach out to members of the AVEVA staff – we are here to make your conference experience better!
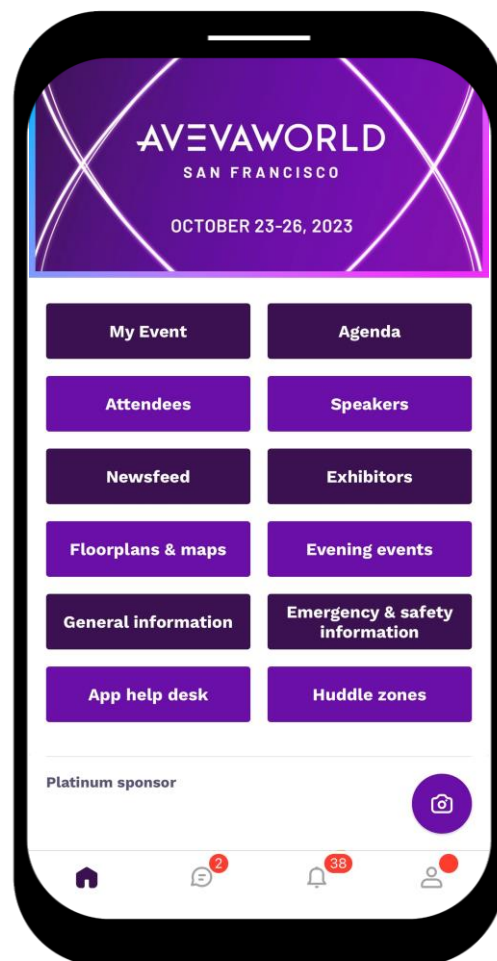
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# Event Mobile App

## Leverage the event app to get the most out of AVEVA World

swapcard



1. Download mobile app (swapcard)
2. Log in with the same email/PW used to register for AWC2023



- Easily browse and navigate sessions
- Build a **personalized agenda**
- **Connect and network** with peers and presenters
- **Set up meetings** in dedicated meeting areas
- **Fill out surveys for each presentation** to help us drive continuous improvement
- Quickly access maps, logistics, FAQs and reach out for emergencies – our team is ready to help

**Huddle Zone**
Speed Networking Area
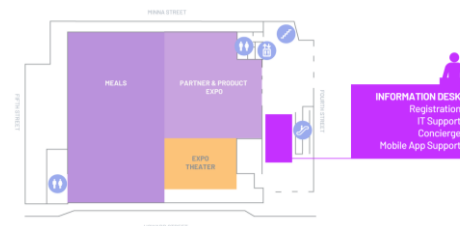
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# Oil, Gas & Energy Track At-A-Glance

Craig Harclerode

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# Oil, Gas and Energy Track Overview

Use the event app to explore session information and build your personalized agenda



**Tuesday**

AVEVA

YINSON Production

Ovintiv

TotalEnergies

BR PETROBRAS

**Wednesday**

ENBRIDGE

Shell

Schneider Electric

Petrabytes
ENERGY DATA INSIGHTS

PERTAMINA

Cameron LNG

SoCalGas
Process Innovations
Process Plugins

saudi aramco أرامكو السعودية

PRefChem

PETRONAS

**Thursday**

bp

OXY

PETRONAS

EOT

bpx energy

radix
Engineering and Software

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# Introduction and Context for the O&G Sessions

Stan Devries

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# The Trilemma...

The Energy Industry is still facing a very complex market, and geopolitical situation with the need to balance all the dimensions of the trilemma...
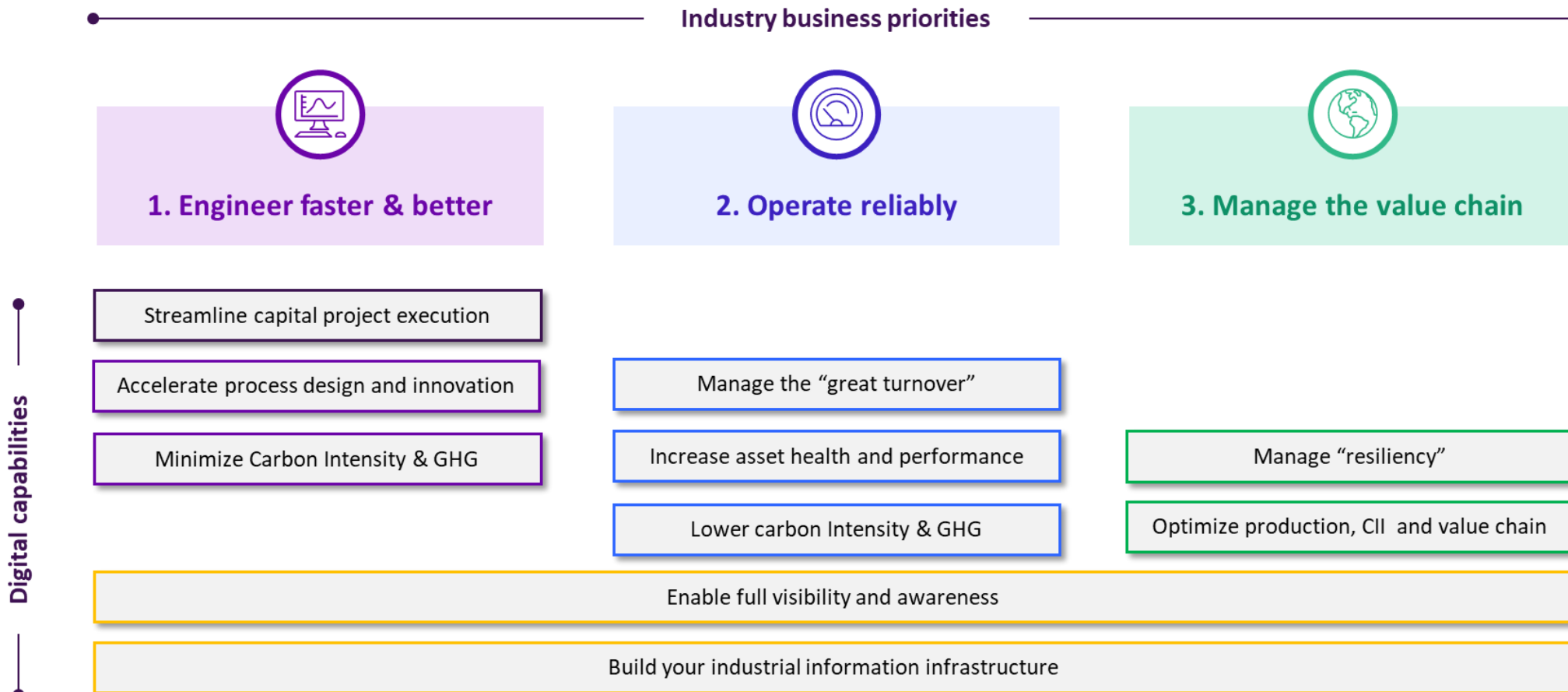
## Security

## Affordability

## Sustainability

# The Trilemma...

...digital technologies are key enablers to achieve the required industry & business transformation...

**Industry business priorities**

**1. Engineer faster & better**

**2. Operate reliably**

**3. Manage the value chain**

**Digital capabilities**

| Streamline capital project execution | | |
| Accelerate process design and innovation | Manage the "great turnover" | |
| Minimize Carbon Intensity & GHG | Increase asset health and performance | Manage "resiliency" |
| | Lower carbon Intensity & GHG | Optimize production, CII and value chain |

Enable full visibility and awareness

Build your industrial information infrastructure

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# The Trilemma…

…but vision & continued digital evolution are complex & multifaceted

Strategic, not tactical, use of digital technologies is key to addressing the energy trilemma

Hybrid Cloud w/Commercial flexibility

Value Chain Integration

Autonomous operations

Integrated agnostic Digital Framework

OPEX SME self-serve Knowledge Capture

Industrial & Service Community data sharing

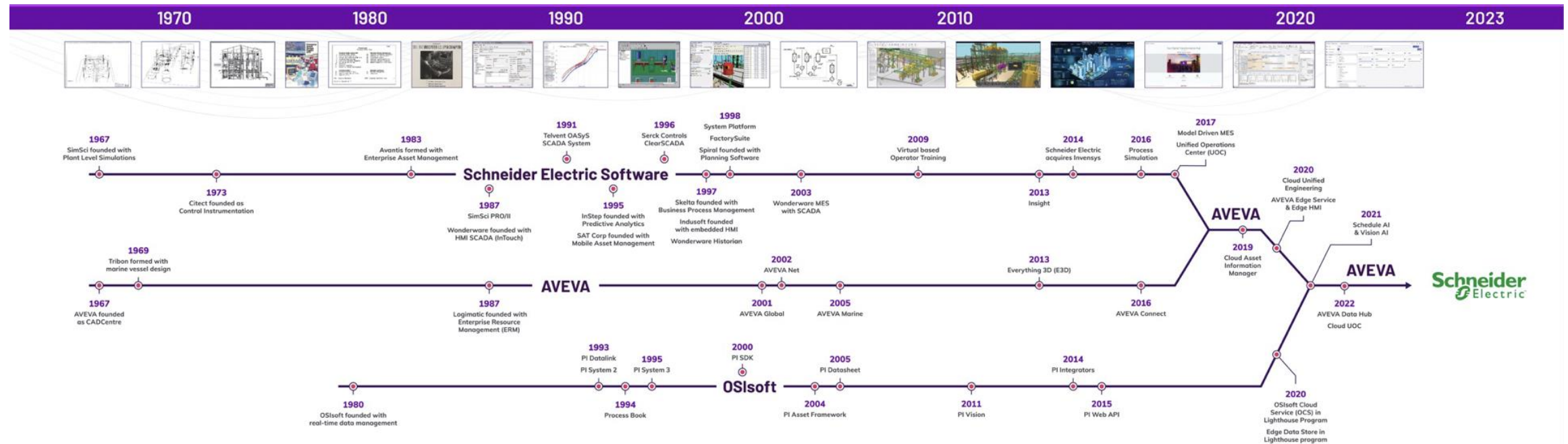Connected Worker & Mobility

Industrial Analytics/AI

Carbon Determination & Accounting

IIOT

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# AVEVA Overview

AVEVA agnostic framework that simplifies and accelerates "digital"

Built from 40+ years of strategic acquisition, integration and digital evolution
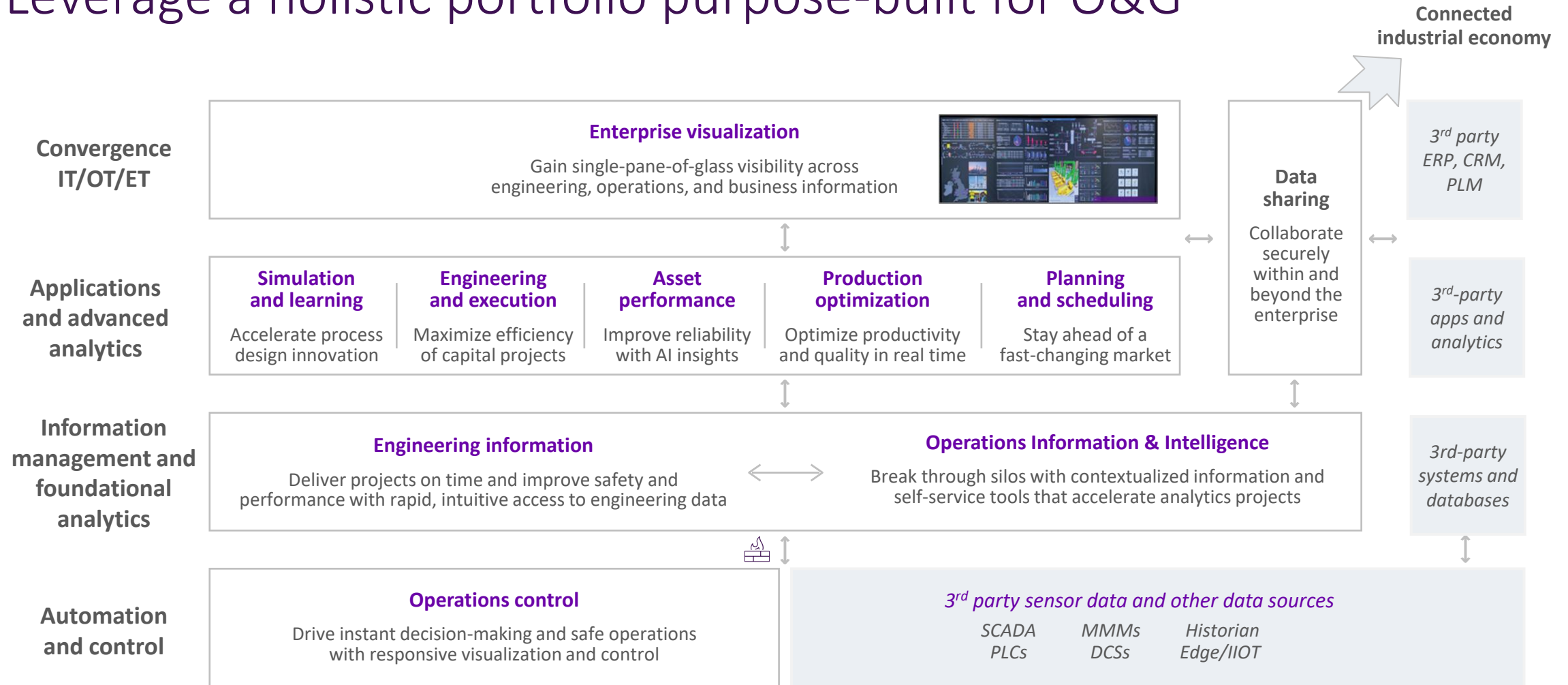
# The Trilemma...

...treats Information as a Strategic Asset and digital foundation

Digital thread across the engineer – operate – optimize life cycle
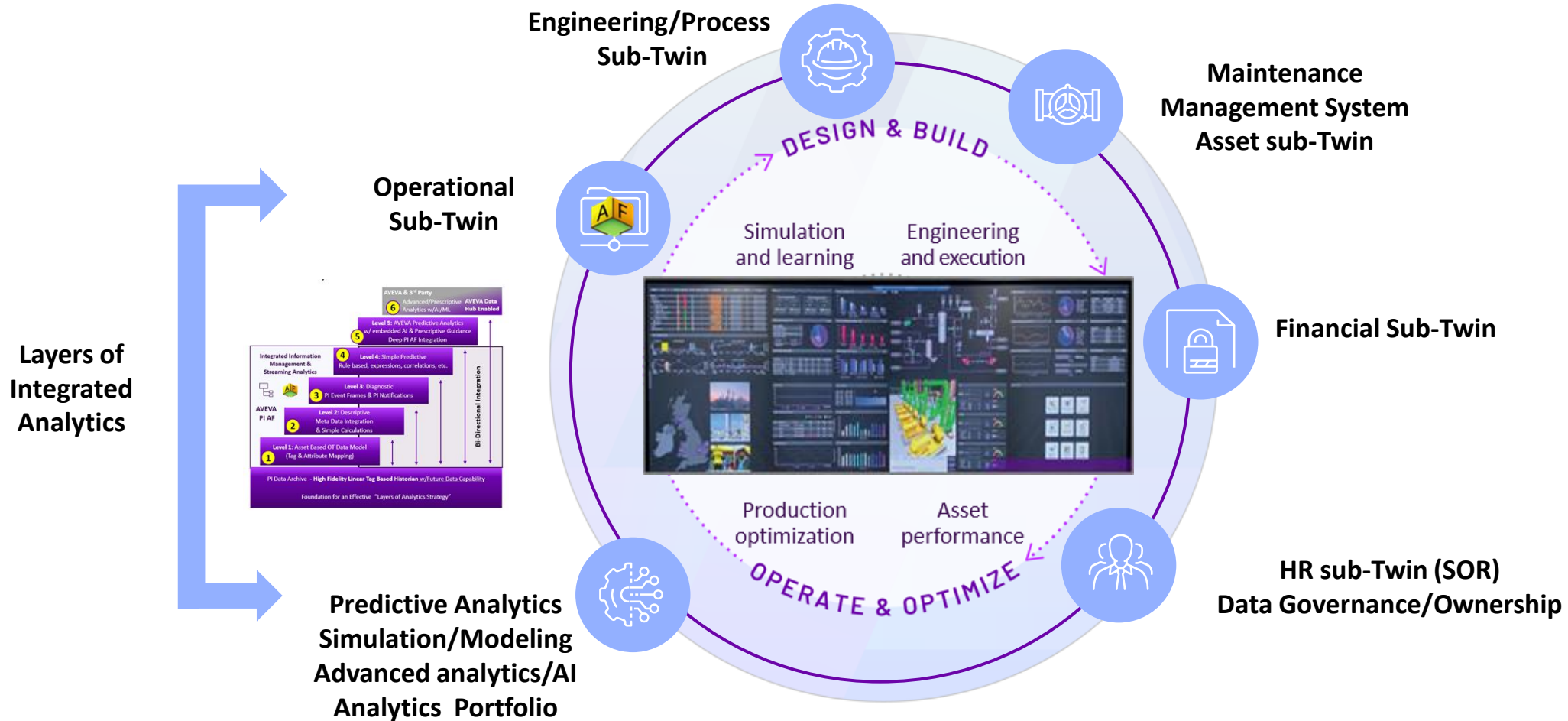
# Leverage a holistic portfolio purpose-built for O&G

**Connected industrial economy**

## Convergence IT/OT/ET

**Enterprise visualization**

Gain single-pane-of-glass visibility across engineering, operations, and business information

*3rd party ERP, CRM, PLM*

**Data sharing**

Collaborate securely within and beyond the enterprise

## Applications and advanced analytics

| **Simulation and learning** | **Engineering and execution** | **Asset performance** | **Production optimization** | **Planning and scheduling** |
|---|---|---|---|---|
| Accelerate process design innovation | Maximize efficiency of capital projects | Improve reliability with AI insights | Optimize productivity and quality in real time | Stay ahead of a fast-changing market |

*3rd-party apps and analytics*

## Information management and foundational analytics

**Engineering information**

Deliver projects on time and improve safety and performance with rapid, intuitive access to engineering data

**Operations Information & Intelligence**

Break through silos with contextualized information and self-service tools that accelerate analytics projects

*3rd-party systems and databases*

## Automation and control

**Operations control**

Drive instant decision-making and safe operations with responsive visualization and control

*3rd party sensor data and other data sources*

| SCADA | MMMs | Historian |
|---|---|---|
| PLCs | DCSs | Edge/IIOT |

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# Redefining the Digital Twin

Craig Harclerode

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# The Digital Twin across a hybrid cloud architecture

Digital thread across the engineer, operate, and optimize life cycles – enabling the path to net zero



**Engineering/Process Sub-Twin**

**Maintenance Management System Asset sub-Twin**

**Operational Sub-Twin**

**Layers of Integrated Analytics**

**Financial Sub-Twin**

**HR sub-Twin (SOR) Data Governance/Ownership**

**Predictive Analytics Simulation/Modeling Advanced analytics/AI Analytics  Portfolio**

DESIGN & BUILD

Simulation and learning

Engineering and execution

Production optimization

Asset performance

OPERATE & OPTIMIZE

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# The "Green" Digital Twin – Integrating Carbon Intensity and CO2$_e$

## Digital thread across the engineer, operate, and optimize life cycles – enabling the path to net zero

**Engineering/Process Sub-Twin (SOR) $+CO_2e$**

**Maintenance Management System Asset sub-Twin (SOR)**

**Operational Sub-Twin (SOR)** w/self-serve streaming visualization & analytics including CO$_2$e : Proxy & molecular

**"Layers of bi-directionally Integrated Asset, energy, performance & GHG Analytics"**

**Predictive Analytics Simulation/Modeling Advanced analytics/AI $+CO_2e$**

**Analytics system**

DESIGN & BUILD

Simulation and learning

Engineering and execution

Production optimization

Asset performance

OPERATE & OPTIMIZE

**Financial Sub-Twin (SOR) $+CO_2e$**

**HR sub-Twin (SOR) Data Governance/Ownership**

**CO$_2$e sub-Twin (SOR)** Based on CO$_2$e emissions at the molecular level – Layers of CO$_2$e

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## Enterprise Data Management with the "Modern PI System"

**TotalEnergies**

### Challenge

AVEVA PI System used as a "tag-based historian across TotalEnergies operations creating "Excel hell"

*How to share local knowledge?*

*How to democratize the data?*

*How to digitize assets and add value to data?*

### Solution

Implemented strong operational data management with governance

Engaged sites and SMEs to migrate to the modern PI System/PI AF

### Benefits

Significant improvement in data management and migration to a data-driven culture with proactive, exception-based operations

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**OIL & GAS**

## Our Development Process

All generic use cases pass through a unique process
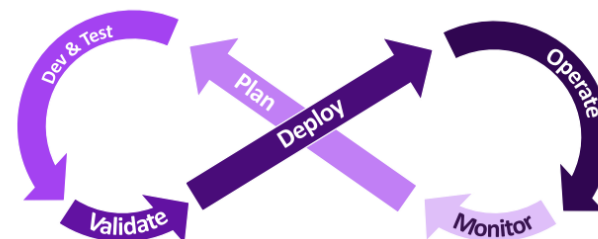


To deliver our AF use cases:

- **A dedicated team** made of process engineers and AF developers

- **Agile** approach = Quick delivery

- Use of Azure **DevOps** platform to manage our projects:
  - Easy to follow and track any changes
  - Lifecycle of AF objects / PI Vision displays

- 1 Use case = **AF templates + PI Vision displays**
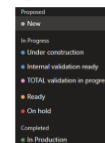
## Concretely...
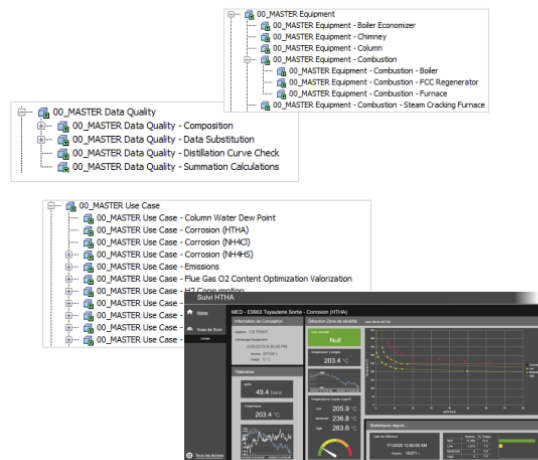
**Today** at TotalEnergies (RC Branch):

- **400 master AF element templates** covering several needs: Energy, Environment, Process, Maintenance, Data Quality...

- Templates already used and **instantiated by sites**
  Ex:
  - 50 boilers / furnaces
  - 400 streams digitalized in AF
  - 7 packinox units, 3 HDS, 3 reformers

- **160 master PI Vision displays**
  - Full control of site objects = **Autonomy**

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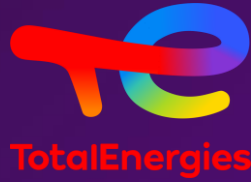
# Digital Decarbonization: GHG Molecular Determination for Combustion Sources

## Challenge

Lack of accurate GHG determination for combustion globally

GHG determination was disconnected to energy management and asset performance management

## Solution

Developed PI AF GHG templates for combustion sources using the molecules as "assets" with stoichiometry and thermodynamics

## Benefits

Rolled out globally

Foundational to TotalEnergies "layers of GHG" strategy with more accurate baselines and operationalization via AVEVA PI System streaming analytics and decision support

AVEVA World 2022 Link

# Digital Twin Representations

Customer presentations throughout 3 days to reinforce value of AVEVA PI System & the Digital Twin

# AVEVA & our Partner Ecosystem are here to help

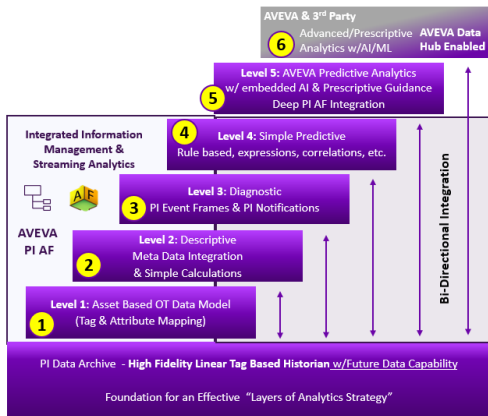## Opportunity to unlock power of the "modern PI System" to support transformative business value



Achieving PI AF full potential has been problematic

"Layers of Analytics"

OT — IT

Redefining the
OT-IT Partnership
to support and empower
the SMEs

PI AF
Acceleration Options

### AVEVA Operational Digital Twin Success Services
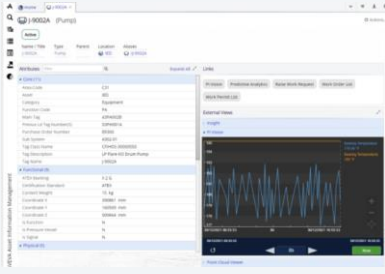
### PI System/PI AF Partner Ecosystem

# Key Themes to Note in the Presentations
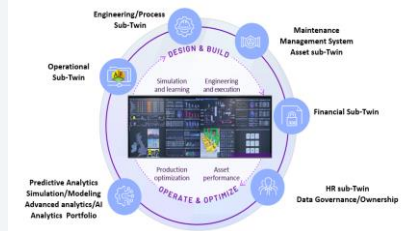
## Enabling the use of digital technologies to address the energy trilemma with the AVEVA portfolio
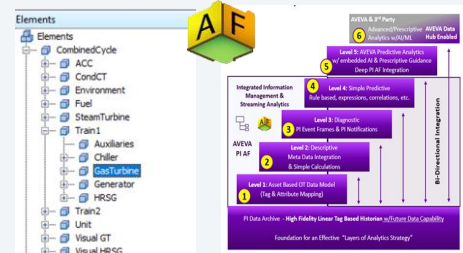


Treat Information as
a Strategic Asset

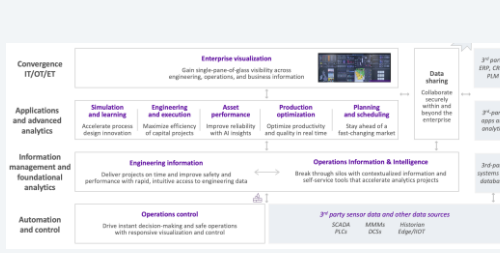

Value Chain Visibility and
Collaboration



Various "Sub Twins" of the
Digital Twin



Synergy Value Between
AVEVA Offerings



Importance of PI AF and Layers of
Analytics from PI AF to AI



Flexible and Agnostic To
Enable Business Value

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# Presenter Information

Feel free to reach out if you saw anything of interest or had any questions



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# 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.

# Thank you!

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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.

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