OCTOBER 25, 2023

Panel: Connect to drive the circular economy

The future of connected communities and what it means for critical infrastructure

Hosted by Max McKay, AVEVA

AVEVA

We are exploring the future of connected communities and what that means for critical infrastructure. With connectivity being a focal point of conversations within the industry, we will dive into what "connectivity" truly means and the value that comes from technology adoptions throughout your infrastructure organization's digital journey.

AVEVA

Connect to drive the circular economy

Gary Wong
AVEVA

Jeffrey de Wit
EPCOR

Remi Duquette
Maya HTT

Eric Conder
Inframark A&I

Tiffany Gispanski
Schneider Electric

AVEVA

OCTOBER 25, 2023

Connected infrastructure

The power of the connected industrial economy

Gary Wong, Global Industry Principal of Infrastructure & Water, AVEVA
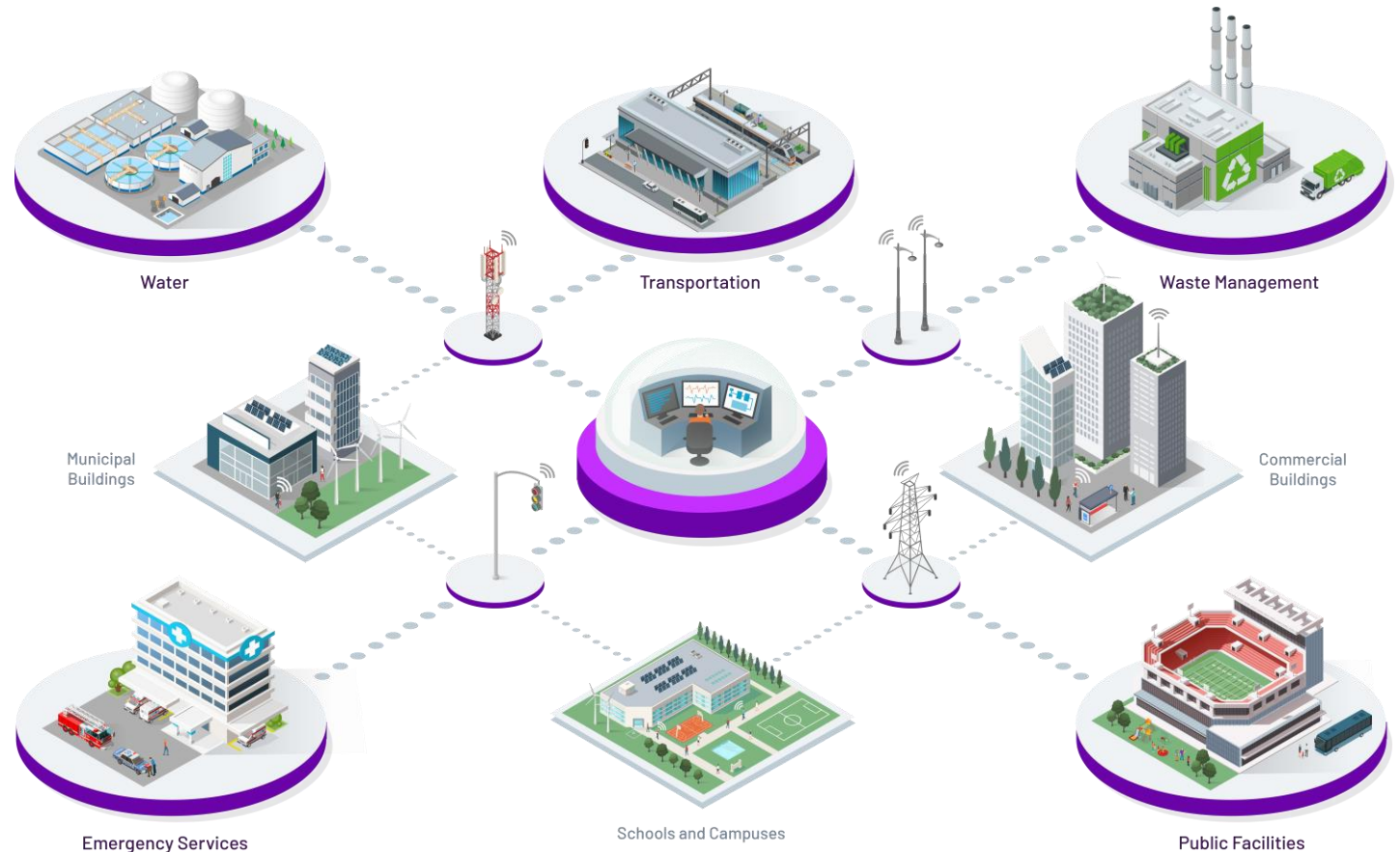
AV∃VA

We are connected

Visibility and multi-org collaboration enabled through agnostic **connectivity, visualization, and sharing**

Addressing the challenges

- Data silos hampering coordinated response
- Supporting multiple entities and stakeholders
- Integrating disparate systems
- Optimizing workflows and efficiencies

Addressing business imperatives

- Agility and resiliency
- Operational efficiency
- Transformation of work
- Asset reliability and safety
- Sustainability and net zero

Water

Transportation

Waste Management

Municipal Buildings

Commercial Buildings

Emergency Services

Schools and Campuses

Public Facilities

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Savings with data-driven decisions at Pimpri-Chinchwad, India
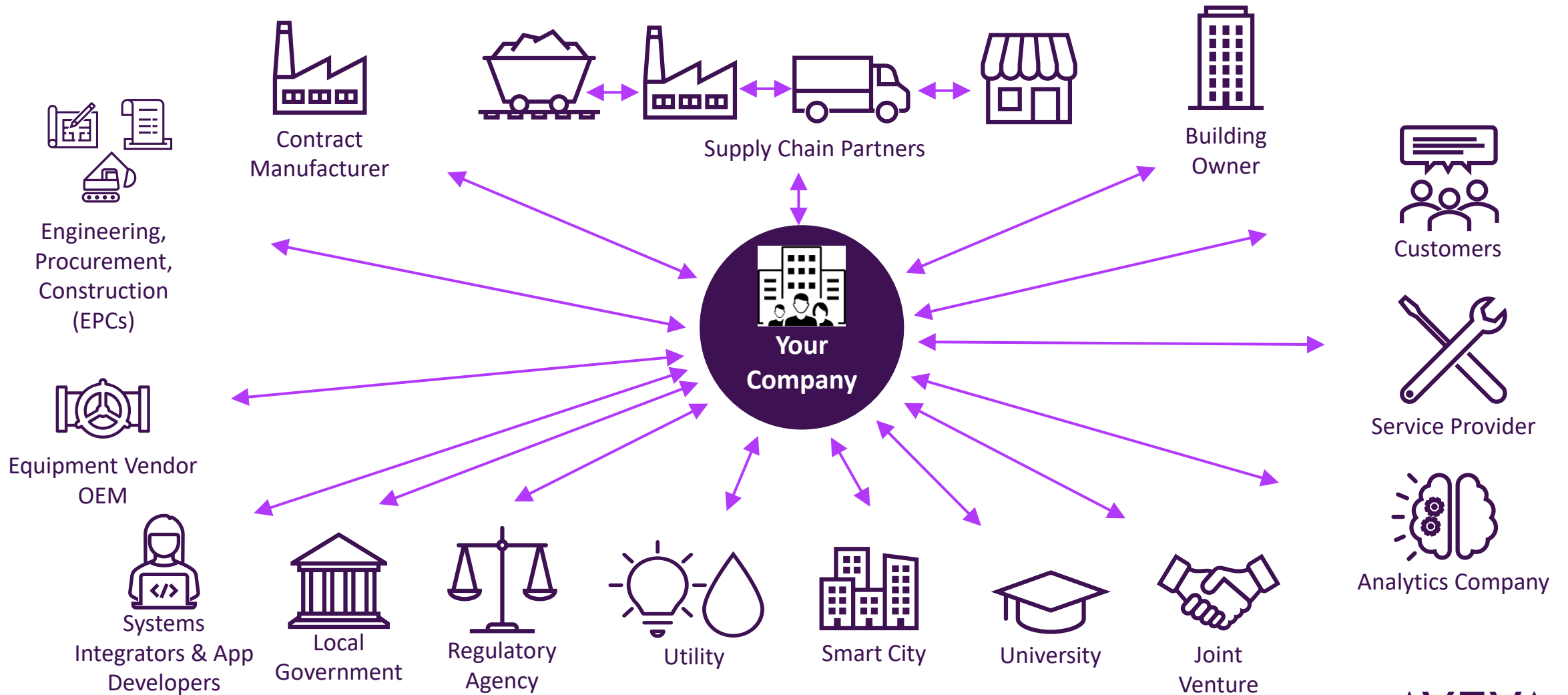

ENERGY USE CUT BY 18-22%

- 2 million people in Western India

- 4,600 individual municipal systems and applications – traffic to water

IMPACT

- Reduced energy use by >15%

- Cut water losses by 18%

- Cut traffic congestion by >20%

Full video:
https://www.youtube.com/watch?v=BNJSS4nDln4

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Many stakeholders connecting the value chain

Contract Manufacturer

Supply Chain Partners

Building Owner

Customers

Engineering, Procurement, Construction (EPCs)

Your Company

Service Provider

Equipment Vendor OEM

Analytics Company

Systems Integrators & App Developers

Local Government

Regulatory Agency

Utility

Smart City

University

Joint Venture

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WHA Thailand turns industrial properties into smart facilities

- Comprehensive deployment covers environmental and CCTV monitoring
  - Water and air quality
  - Rainfall
  - Water & wastewater production
  - CCTVs for infrastructure, road, utilities
  - Solar, and more
- Supporting predictive maintenance and energy optimization

- IMPACT: Reduced 75 tons of CO2 GHG emissions / year
  - *Full write up: https://www.wha-group.com/en/sustainability/our-campaigns/governance-economic/1207/unified-operation-center-uoc*

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AVEVA is helping transform the world's infrastructure

NetworkRail
Enables energy-efficient travel for 8,000 daily commuters

UCDAVIS UNIVERSITY OF CALIFORNIA
On track to be carbon neutral by 2025 with estimated savings of $197M over 60 years

COSATRON
Utilizes the cloud to deliver remote air quality monitoring services in real time

OCWA ONTARIO CLEAN WATER AGENCY / AGENCE ONTARIENNE DES EAUX
Increased efficiency and cost control, scalability and standardization

sabesp
Increased customer satisfaction and reduced water shortages from 14% to 5%

GORI
Reduced energy consumption by 45% with savings of 80,000 euros per month

Ajuntament de Barcelona
Centralized all infrastructure systems to enable seamless management in real time

POWER (قطر للطاقة)
Improved safety and saved more than $1.4 million per year

HELEN SÄHKÖVERKKO
Improved data management saves time and money, making power distribution more efficient

Kansai Electric Power power with heart
Improved efficiency and saved $3 million a year in one plant alone

Shanghai Laogang Project
Digital design of 9000 KwH waste-to-energy plant

VEOLIA
Connects 260 global engineering teams driving 20% better collaboration

मोर Raipur SMART CITY
Real-time insight and management of critical infrastructure systems across the city

TasWater
Reduced response times by up to 13 hours to protect ecologically sensitive environments
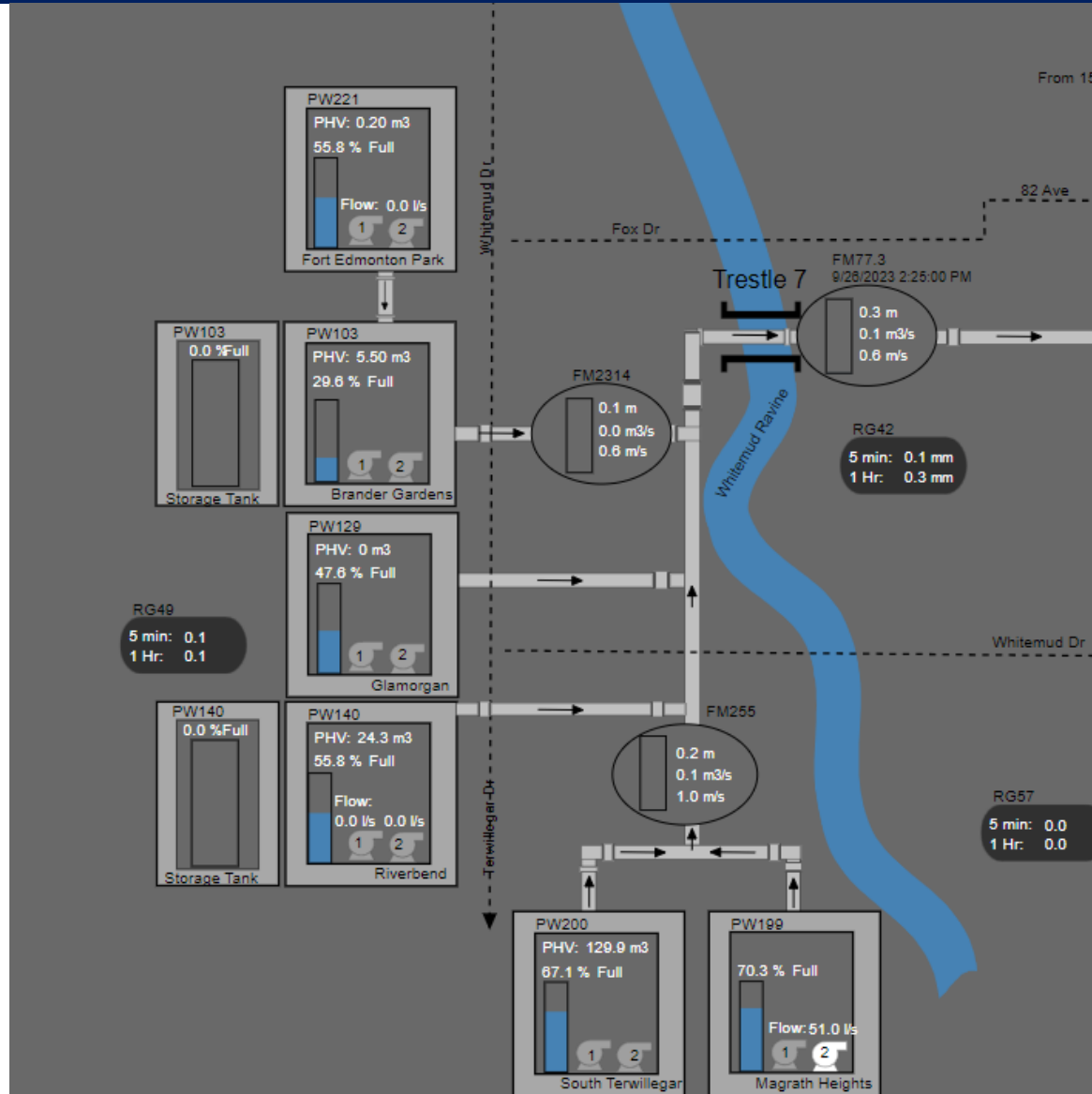
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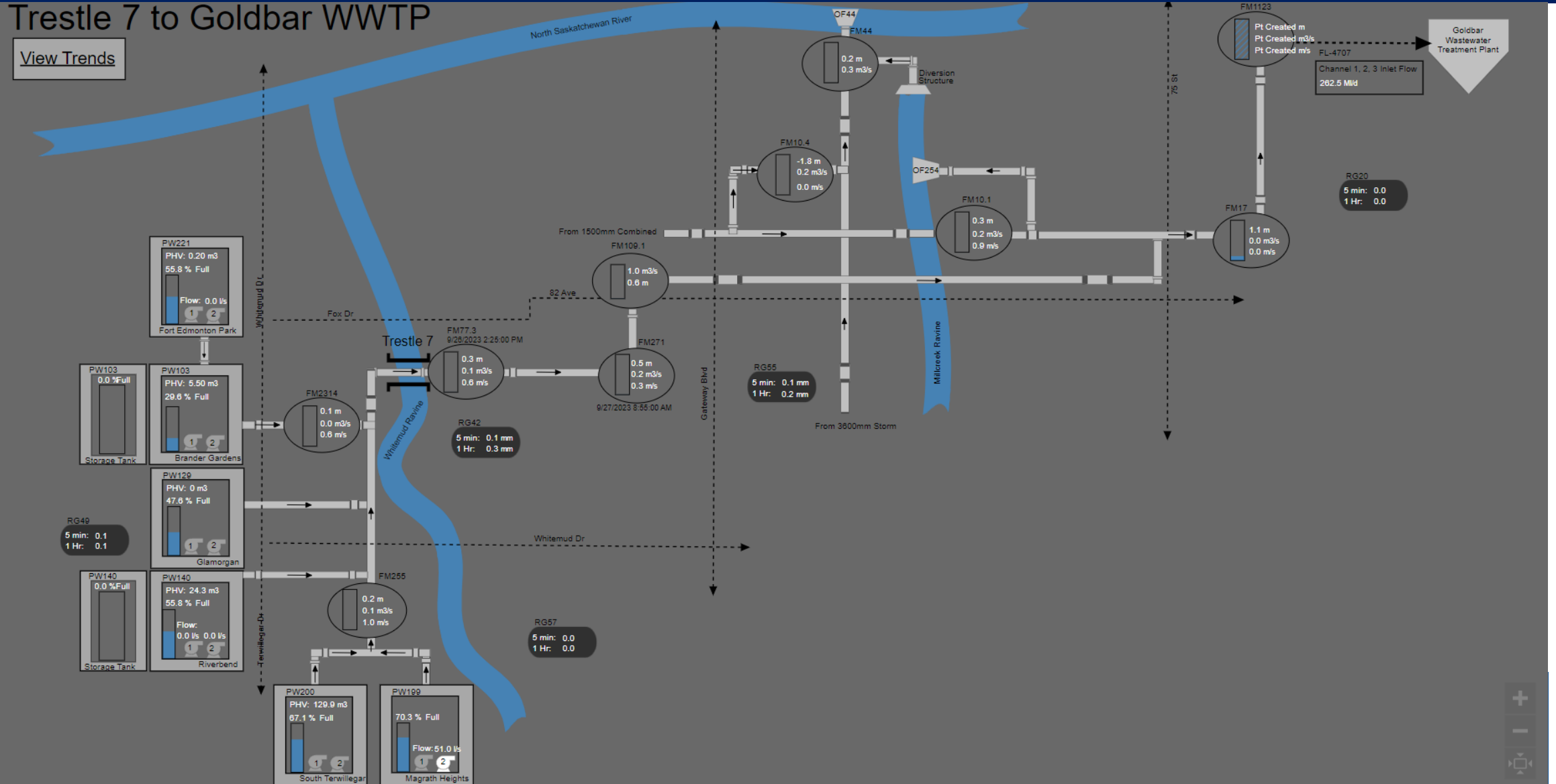OCTOBER 25, 2023

EPCOR Water Services

JEFFREY DE WIT

Trestle 7 to Goldbar WWTP

NORTHWEST STORM SYSTEM - PFD

EPCOR uses real-time data to drive situational awareness and improve resiliency
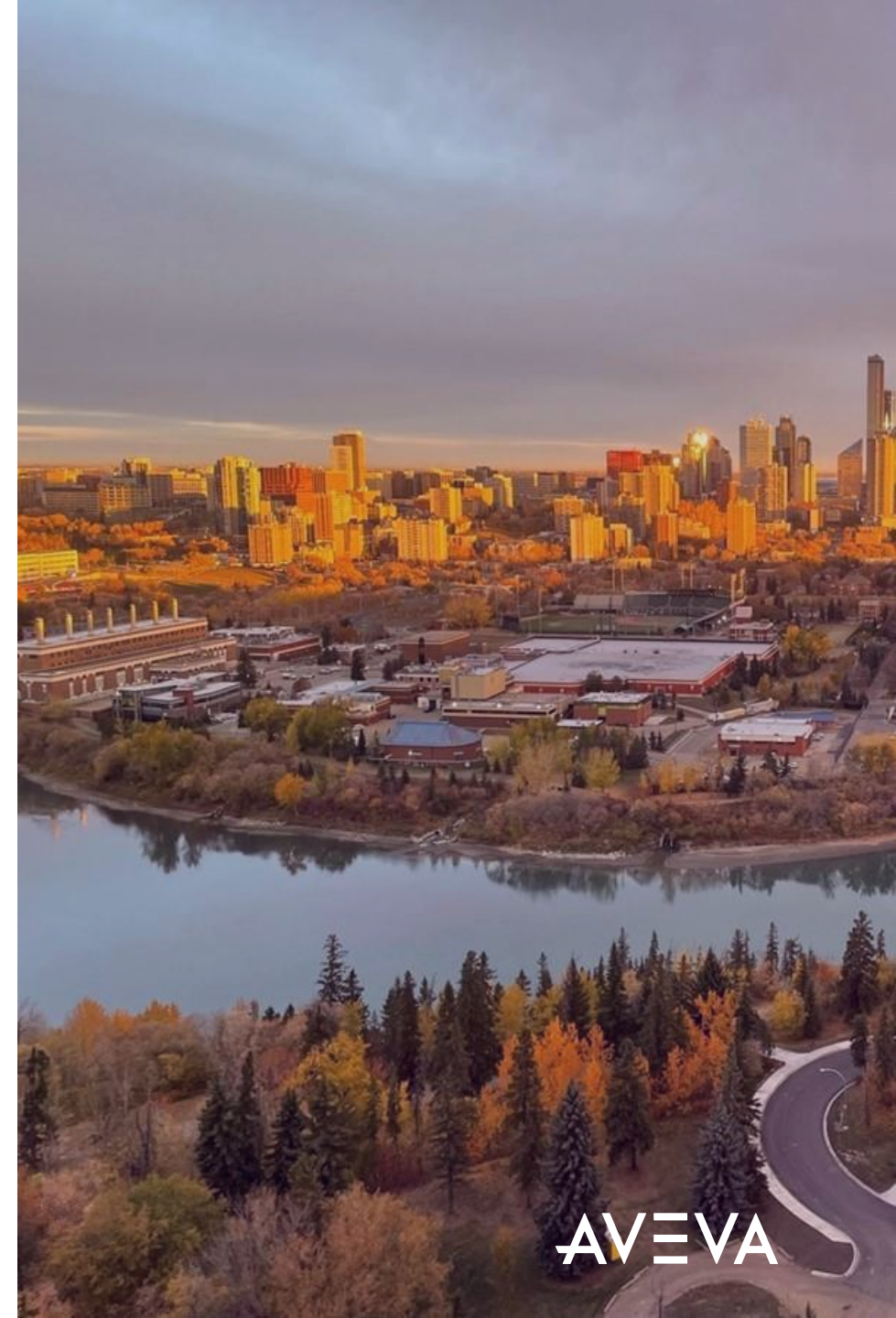
Challenge

- Increased risk of large rainfall events necessitated a new approach to prevent and reduce the impact of stormwater and urban flooding in the City of Edmonton
- Distinct and isolated systems prevented a real-time view of system performance
- Needed to create secure access to centralized data for user groups and business applications to access actionable information for monitoring, reporting and analysis

Solution

- Implemented AVEVA™ PI System™ to predict and manage the movement of stormwater through smart sensors and technologies that integrate into the collection system

Results

- **Unlocked data and made it accessible to users and applications**
- **Developed system allows people to discover process interdependencies, improving operational performance and cutting response times from days to minutes**
- **Enabled dynamic management of stormwater systems during flood events, ensuring public safety, avoiding environmental releases and saving thousands in regulatory fines**

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Maya HTT

Remi Duquette, Vice-President | Industrial AI

AVEVA

The AVEVA™ PI System™ at CSL integrated by Maya HTT

1- Digitizing Vessel Data

Systems data and crew inputs are captured and archived in a digital twin located onshore

2- Expanding with Context

Vessel data is enriched with voyage, geofencing, traffic, compliance, weather, and user inputs

Voyage (IMOS)

Traffic

Geofencing (ESRI)

Weather

Compliance

CSL TACOMA		
Data Source	OT Sensor	Status
ECDIS	NAV MOXA	
Nav. Lights	NAV MOXA	
RAI	NAV MOXA	
AMS	MFD5	
Ammeters	AMS	
Flow Meters	AMS	
Torque Meter	AMS	
SUL	CP Lean Processor	
OWS	Alfa Laval BlueBox	

PI Data Collector

Vessel Dashboard

Digital Twin

VSAT
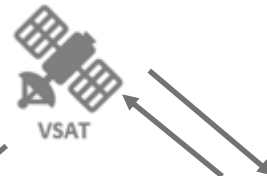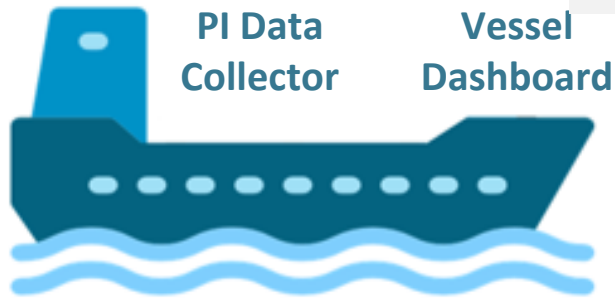
O2 digitally generated report

| GREAT LAKES PILOTAGE REGION DISTRICTS TRANSIT SUMMARY	
(C)-Cornwall (Saint-Lambert to Snell)	0
(1)-District 1 (Snell to Cape Vincent)	0
(LO)-Lake Ontario (Cape Vincent to Port Weller)	3
(2)-District 2 (Port Weller to Huron Cut Buoy 11&12)	11
(3)-District 3 (Navigable waters above Huron Cut Buoy 11&12)	0

3- Advisory and Analytics

Produces decisional Advisory Dashboards and Analytics Reports using algorithms and third-party plugins. Helps crew and office make better-informed decisions.
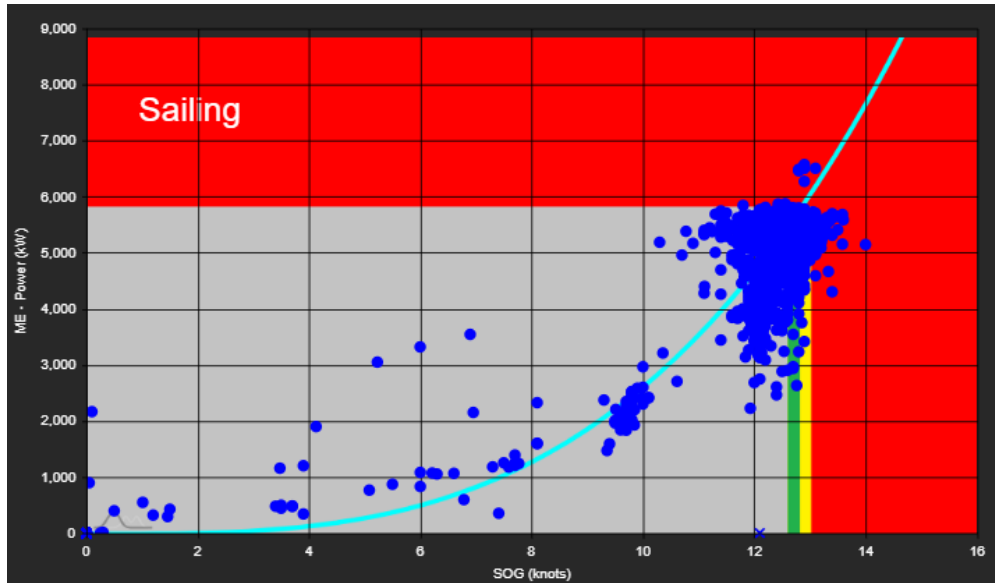
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Energy Management with custom AVEVA™ PI Vision™ widgets
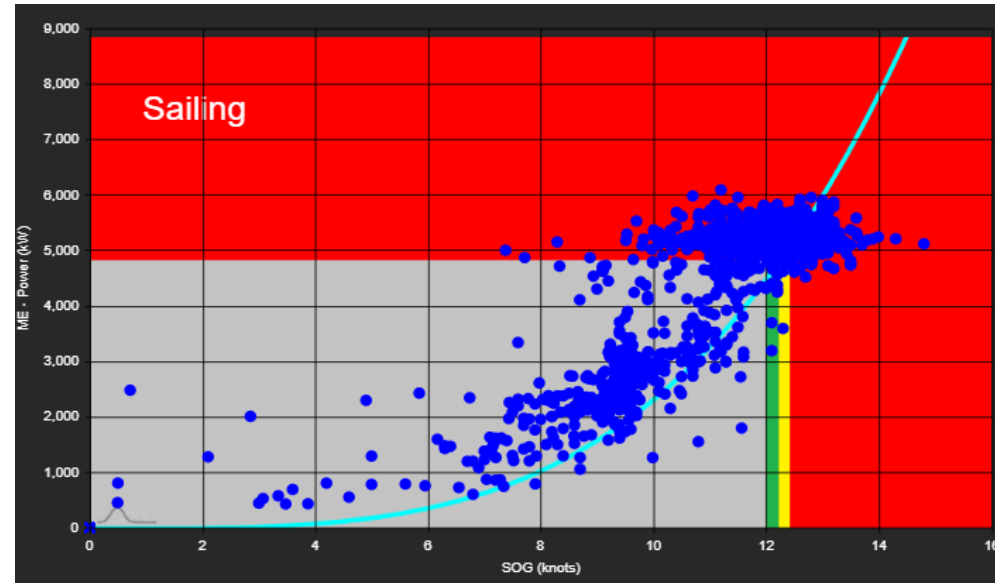
Speed Optimization Trial Results

In 2022, 8 Canadian vessels trialed and sailed 219 days in open water

299 MT of fuel was saved, equivalent to 956 MT of CO_2 reduction

No negative side impact on the business due to fuel savings
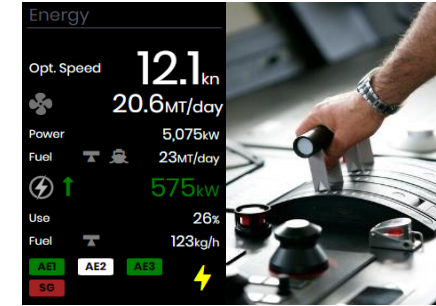
Speed Optimization

No Speed Optimization

CSL reduces fuel consumption by ~3-5% per trial vessel per year and achieves asset failure avoidance goals

Challenge

- Improving operations has always been a primary drive of CSLers, and remains a key business priority

- Regulations not always easy to follow (there are no street signs on waterways)

- Lots of manual entries and paperwork

- Distributed fleet worldwide

Solution

- Deployed AVEVA™ PI System™ to streamline data collection, access, analysis, and reporting

Results

- **Estimated 3-5% fuel saved per vessel per year – validated with trial on 8 vessels**

- **Estimated ~120 MT CO_2 saved per vessel per year – validated with trial on 8 vessels**

- **Potential failure avoidance by applying ~80+ preventive repairs thus far**

AVE\/A

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Inframark A&I

ERIC CONDER

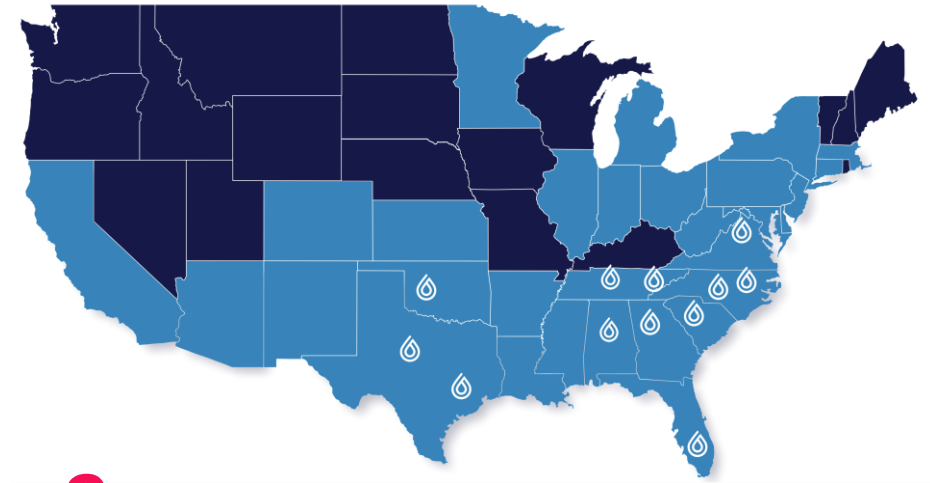**AVEVA**

Who is Inframark?

Largest US-based Operations Company in North America

180+
Employees

33+
Years of Service Excellence

1,500+
Clients Served

1,200
Treatment Projects Completed

9
Office Locations

CISSP
Certified Cybersecurity Services

1 MILLION
Data Points Managed on Cloud Hosted SCADA

AVΞVΛ

Who is Inframark A&I?

INFRAMARK
WATER & INFRASTRUCTURE SERVICES

- **500+** business and municipal clients

- Combined capability of treating more than **1 billion gallons** of water and wastewater daily

- Manages more than **8,000 miles** of collection and distribution lines

- **200+** wastewater and **170** water facilities

- Manages more than **100,000 dry tons** of biosolids annually, much of which is reused

- More than **1,500 employees** across North America in **19 states**

- Serves over **4 million** water and wastewater customers

AVEVA

Eric Conder

HMI Department Manager

- Inframark A&I Division
- econder@mrsystems.com
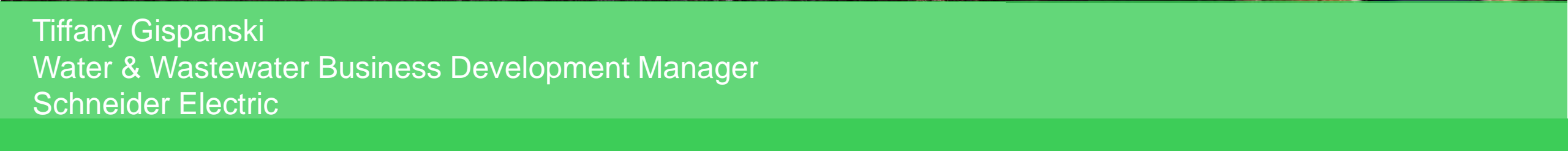
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OCTOBER 25, 2023

Schneider Electric

TIFFANY GISPANSKI

AVEVA

Connecting Communities for a Sustainable Future

Tiffany Gispanski
Water & Wastewater Business Development Manager
Schneider Electric

Life Is On | Schneider Electric

The Impact of Water

Average water use in the U.S. is **~82 gal per person per day**, which means that **~10M gal** is equivalent to the **daily consumption of 1 small city** (pop. 122k)

2% of the U.S. energy usage is being accounted to the water industry = **45 million tons of GHG per year**

Global water use has increased **6x** over the past 100 years and continues to grow steadily at a rate of **about 1% per year.**

Global warming is accelerating the access to water issue. **By 2030**, we will only have **60%** of the water supply we need.

Challenges of **water resource conservation** (water basin, desalination, water leakage); **sustainability commitments** (energy efficiency, carbon footprint); aging workforce; aging infrastructure; increasing regulations; extreme weather events; **lack of data strategy**

Energies & Chemicals

3x - 5x barrels *of water needed for every barrel of oil.*

6.6T gal *of water is needed for green hydrogen production by 2050.*

Semiconductors

8.5 gal of water *is needed to make a single chip for a laptop or smartphone.*

3.1M gal *of ultra-pure water is needed per day to extensively clean the silicon wafers.*

≈Tens of millions gal per day at one plant

Mining, Minerals & Metals

Water is ~15% *of total mining spend.*

132B gal *of water is required for copper production in Chile.*

Consumer Packaged Goods

6,600 gal *of water is needed to grow and produce a day's supply of food for a family of four.*

160B gal/year *of water is used by five global F&B manufacturers*

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Internal

The Digital Transformation Journey

It all starts with the right strategy, partners… and data.

Digitally Evolved

Enterprise management

Integrated system-of-systems

- Business integration and optimization
- Closed-loop process optimization
- End-to-end visibility
- Cybersecure hybrid networks (cloud)
- Digital twin
- IT/OT Convergence

Digital Transformation

Advanced management

Connected systems

- Real-time, aggregated data contextualization
- Advanced automated control
- Asset & Predictive maintenance
- Energy management
- Empowered workforce, increased bandwidth
- IT/OT Collaboration

Digitalization

Siloed management

Basic connectivity

- Smart, IoT devices
- Cybersecure, reliable network
- Basic automation & control
- Use of software tools & data

41% of water utilities are collecting data but not leveraging effectively
32% of water utilities are collecting some data
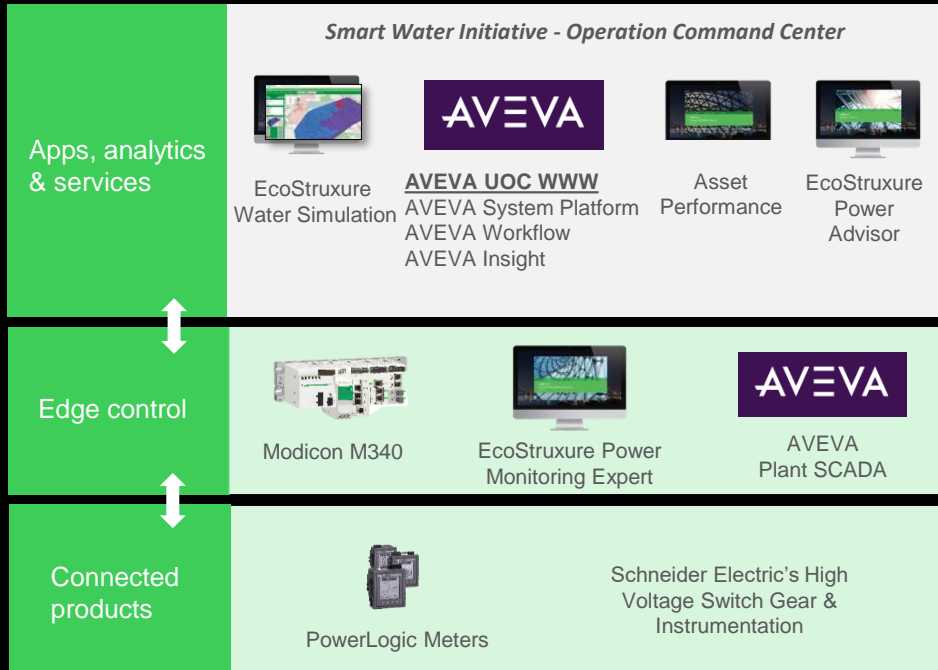
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![eastwater GROUP logo]

Largest supplier of raw water (250 miles of pipeline) in the Eastern region of Thailand to industrial estates, municipalities & households https://www.eastwater.com/en/MediaCenter/CorporateNewsDetails/27

"Smart water initiative" – **AVEVA's Unified Operation Center** with **Schneider Electric's EcoStruxure Solutions** established EastWater as Thailand's most advanced, efficient & 'smart' water supplier.

> Project **reduced water loss** by **17%**, **reduced energy cost up to 3%,** & increased overall **operation efficiency** up to **30%.**

EcoStruxure™ — Innovation At Every Level

for Water & Wastewater
Water Resources & Networks

SCADA Operation Command Center

Smart Water Initiative - Operation Command Center

Apps, analytics & services

EcoStruxure Water Simulation

AVEVA
AVEVA UOC WWW
AVEVA System Platform
AVEVA Workflow
AVEVA Insight

Asset Performance

EcoStruxure Power Advisor

Edge control

Modicon M340

EcoStruxure Power Monitoring Expert

AVEVA
AVEVA Plant SCADA

Connected products

PowerLogic Meters

Schneider Electric's High Voltage Switch Gear & Instrumentation

Moreover, East Water is able to reduce energy consumption by 2-3 percent a year.

https://www.youtube.com/watch?v=djgoYJVavNg

Infrastructure of the future : Digital connectivity for **efficiency** and **sustainability**.

1 **Operational Excellence**

Lean Management

Industry 4.0

Delays
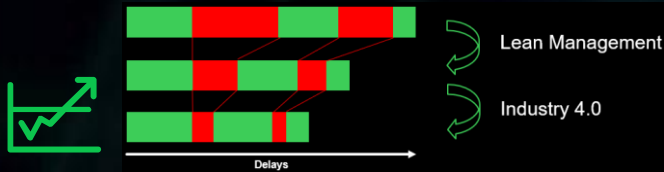
2 **Assets Performance** Contextualized Data

EcoStruxure™
Innovation At Every Level

Building | Data Center | Industry | Infrastructure

Apps, Analytics & Services AVEVA EcoStruxure Advisors

Edge Control

Connected Products
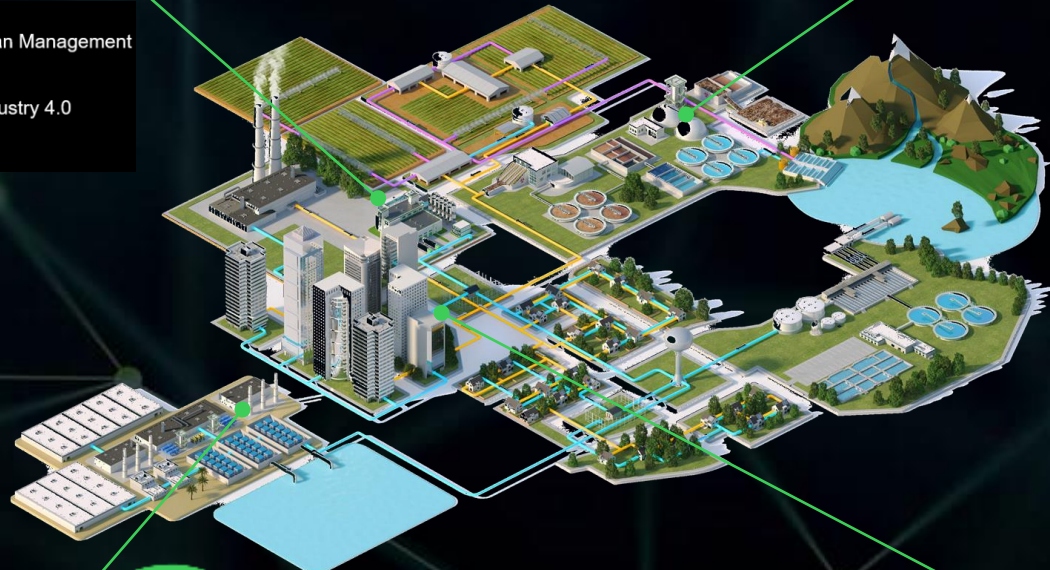
4 **Energy management & Sustainability**
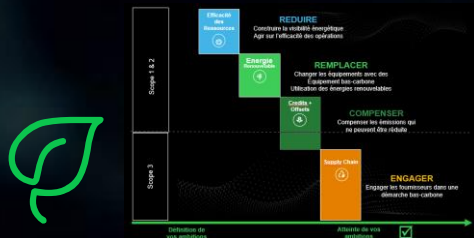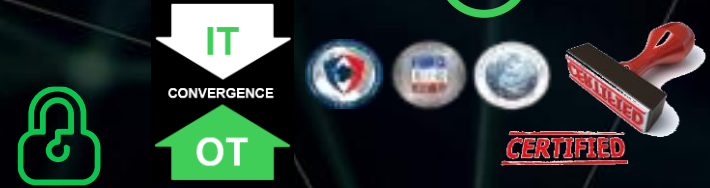
RÉDUIRE
Construire la visibilité énergétique
Agir sur l'efficacité des opérations

REMPLACER
Changer les équipements avec des
équipement bas-carbone
Utilisation des énergies renouvelables

COMPENSER
Compenser les émissions qui
ne peuvent être réduite

ENGAGER
Engager les fournisseurs dans une
démarche bas-carbone

3 **Cybersecurity**

IT
CONVERGENCE
OT

CERTIFIED

CERTIFIED

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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

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