



Scope 3 Emissions: Defining, Measuring & Itemizing Emissions

ROB SWIM • CHEMICAL INDUSTRY MANAGER, NA

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expanding **human possibility**®



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Sustainable Customers

INSIGHTS

Converting data into actionable insights for sustainability and productivity around emissions, energy, water, and waste

IMPACT

Scaling impact and visibility across your value chain, product lifecycle, and ecosystems

INNOVATION

Innovating with our partners and scaling new climate technology production to enable a low carbon, circular future



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2022 ESG HIGHLIGHTS

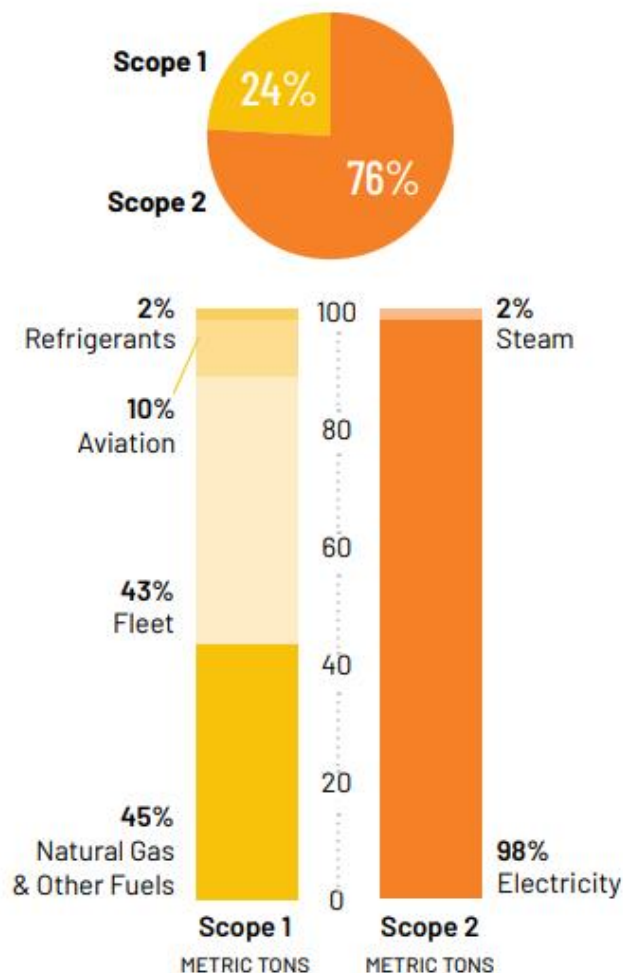
NET ZERO GOAL

Carbon Neutral
(Scopes 1 & 2) by

2030

EMISSIONS SUMMARY

109,498 total metric tons of CO₂ equivalent



WASTE GENERATION

9,136 metric tons of which

7,663 or 84%
was recycled,
reused, energy reclamation

DIVERSE SUPPLIERS

\$185M spent with
small businesses
and businesses with veteran, minority,
women, and LGBTQ owners.

19 sites

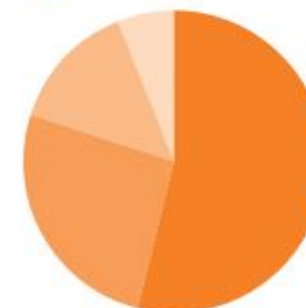
CERTIFIED TO ISO 14001 AND ISO 45001

\$1.9B

**REVENUE GENERATED FROM
ENERGY-EFFICIENT PRODUCTS**
per SASB's definition

PHILANTHROPY

\$10M Total giving



Chemical industry challenges



Market variability and pressure



Before the pandemic, Nearly **50% of the top 100 chemical companies** made changes to their product portfolio (McKinsey)



Productivity and fixed-asset utilization



From 2011 to 2020 the quantities of production-related waste managed by the chemical manufacturing sector **increased by 79%** (EPA)



Process safety and cybersecurity



A recent U.K. government study estimated that **cyberattacks cost** the chemicals industry in general **US \$1.5B a year**



Environmental, Social, and Governance (ESG)



Including fuel and feedstock use, the chemical industries account for about **30% of the total energy consumed in the manufacturing sector** (EIA)



Workforce effectiveness



Experienced staff creates almost **50% of industry personnel**, and most are **retiring in the next 3-5 years** (Deloitte)

OUTCOMES

Accelerate growth through digital transformation

Production optimization

Safe and secure operations

Sustainable operations

Workforce enablement



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Solutions delivering results

OUTCOMES

Accelerate
Growth Through
Digital Transformation

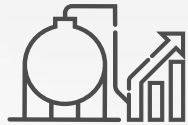


UNIFIED OPERATIONS
PLATFORM

MANUFACTURING
OPERATIONS MANAGEMENT

BATCH PERFORMANCE
ANALYTICS

Production
Optimization



UNIFIED PROCESS AND
POWER CONTROL

ADVANCED ANALYTICS

ASSET PERFORMANCE
MANAGEMENT

Safe and secure
operations



PROCESS SAFETY

MACHINE AND ELECTRICAL
SAFETY

CYBERSECURITY

Sustainable Operations



WAGES MANAGEMENT

**DECARBONIZATION
OF OPERATIONS**

**ADVANCED CONTINUOUS
EMISSIONS MONITORING**

Workforce Enablement



DIGITAL WORK INSTRUCTIONS

















AR/VR CONNECTED WORKER

The connected chemical plant



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Rockwell Solutions for Sustainable Manufacturing

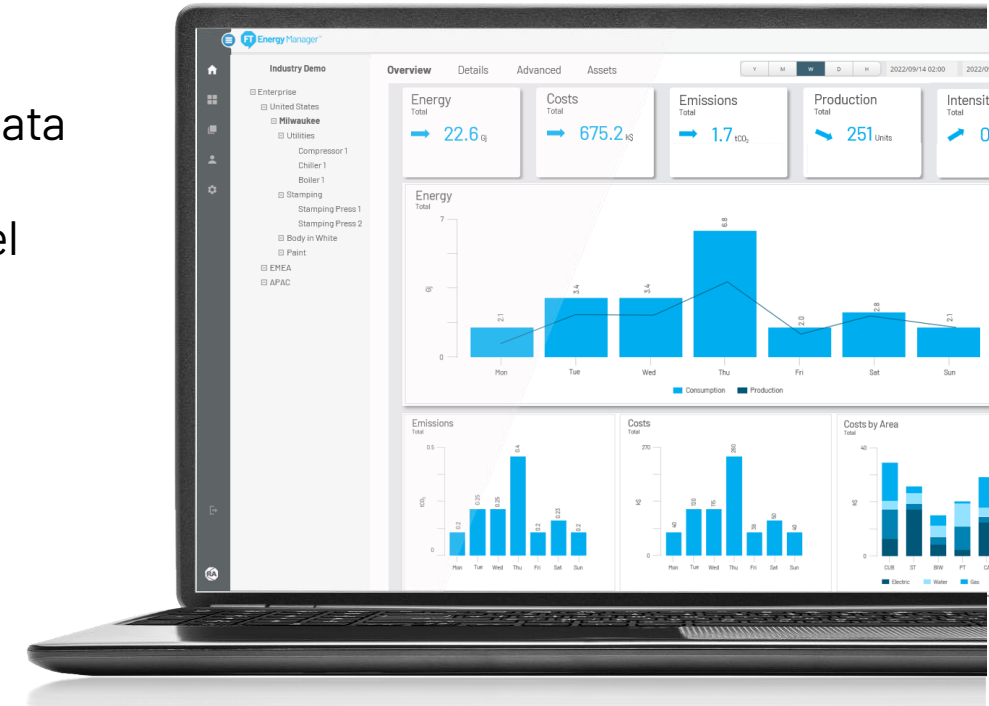
| Smart Energy | | | | Smart Water | | Smart Waste | |
|--|--|---|---------------------------|--|-----------------------------------|--|--------------------------------------|
|  | Continuous emissions monitoring software |  | Power & energy monitoring |  | Energy monitoring & visualization |  | Water quality monitoring |
|  | Edge-to-cloud AI / ML analytics |  | Power & motor control |  | Microgrid control |  | Leak mitigation |
|  | Building automation systems |  | Model predictive control |  | Advanced combustion control |  | Edge-to-cloud AI / ML analytics |
| | | | | | |  | Reman/repair services |
| | | | | | |  | Management execution systems |
| | | | | | |  | Asset management & Pump Optimization |
| | | | | | |  | Regulatory reporting & compliance |

| Kalypso Sustainability Consulting Practice | | | | | | | | |
|--|--|-----------------------------------|---|---|---|--------------------------------|-----------------------------------|---------------------|
| Connected Energy & Smart Facilities Management | Energy Efficiency / Demand Side Management | Demand Response / Load Management | Energy Sourcing and Supply Optimization | Distributed Energy / Renewables Integration | Carbon Neutrality / Emissions Reduction | Plant Cogeneration Integration | Product Sustainability Innovation | EV Fleet Management |

Sustainability & Energy Management Enables Real-Time Improvement

Monitor and manage all your electric and piped utilities and understand Scope 1 & 2 Emissions:

- Foundational Architecture to collect, contextualize and compare energy data from different sources
- Configurable plant asset model builder to create customized energy model hierarchies
- Preconfigured performance dashboards for energy and production information (energy consumption, energy demand and energy intensity)
- Historian connector
- Integration connector to 3rd party protocols and sources
- Billing dashboards for energy cost allocation
- Carbon Accounting, GHG emissions tracking and continuous emission monitoring



Energy Manager

Enable **Energy Managers** to spend their time **pursuing energy improvement opportunities**.



Operations Manager

Realize **performance gains** by **comparing energy usage and cost across the enterprise**.



Facility Managers

Pinpoint equipment that is **consuming energy abnormally** and **take corrective actions** accordingly.



Accounting

Allow accounting to **provide accurate forecasting** of energy costs and **advising operational leadership** in **recovery planning**.



Risk Managers

Allow Risk Managers to **optimize programs and control costs** by leveraging **demand planning, forecasting** and deeper **understanding of energy consumption**.



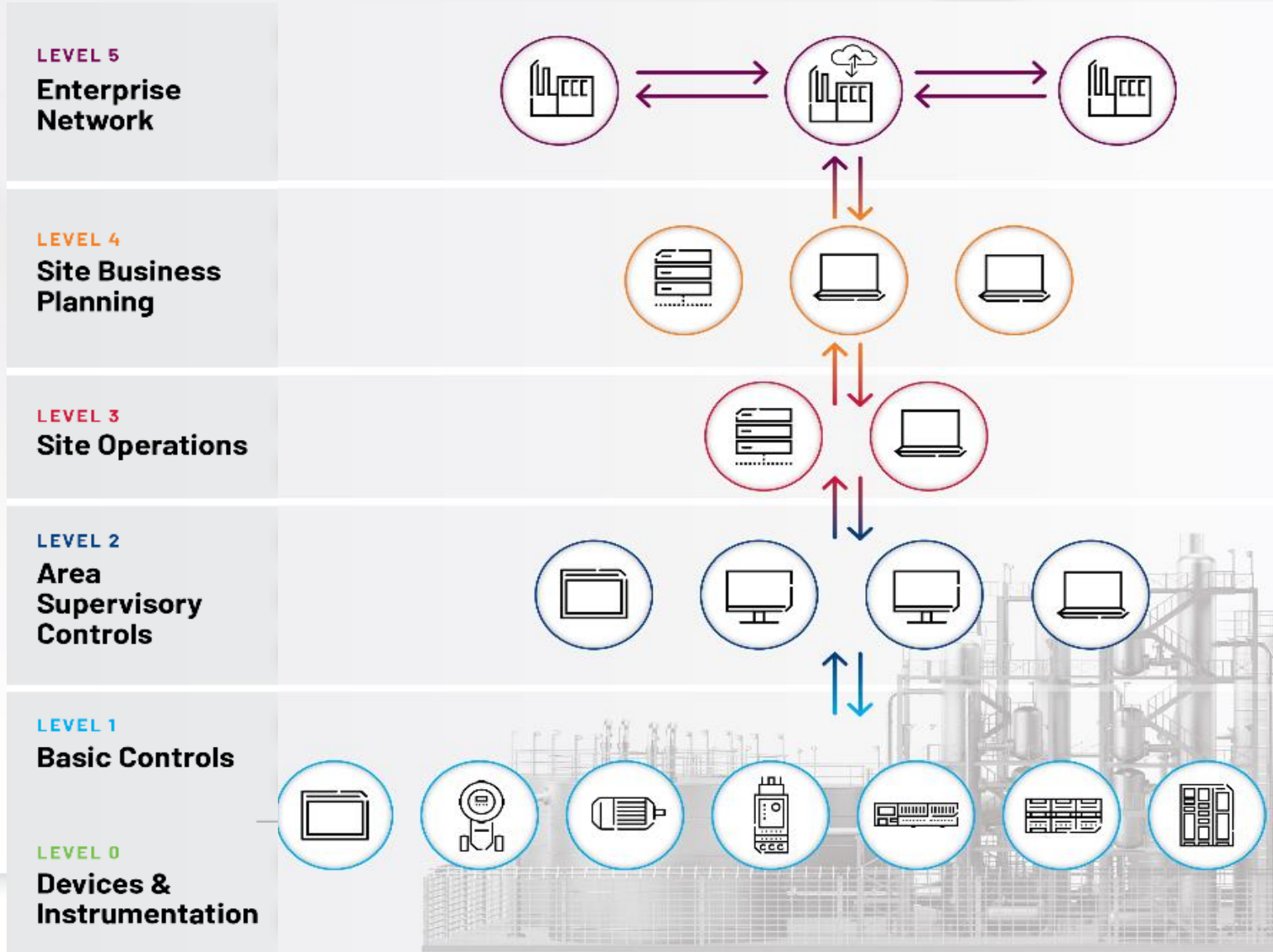
Leadership

Provide the **real-time performance dashboards** at the **site, region, and enterprise** levels necessary for **strategic decision-making**.



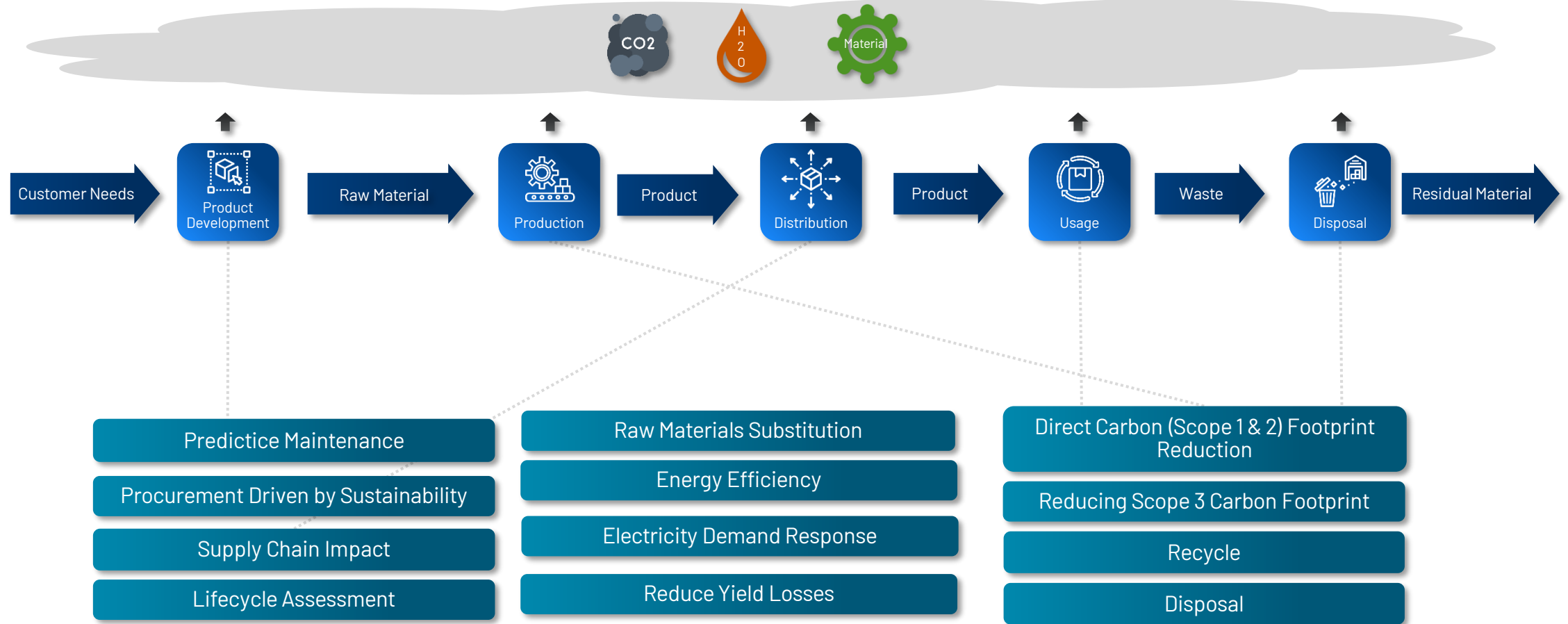
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The Connected Chemical Plant



- Visualization of enterprise-wide performance
- Real-time insights into improvement opportunities
- Enhanced operation
 - Maximized fixed-asset utilization
 - Minimized unplanned downtime
 - Lower operating costs
 - **Improved environmental performance**
- Protection from cyber threats

We deliver the **digital thread** that brings the **connected enterprise to life** and **transforms results**



Sustainable Company



Dow Jones
Sustainability Indexes

12th time named



FTSE4Good

21st time named



9th time named



SmartWay®

Joined in 2007



Partner



10th time named



5th time named



Founding Member



Society of Women Engineers™

A model to support Sustainable Manufacturing



Smart Devices



Process Control



Digitalization



Consulting Services





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[Learn more about us on our chemical industry web page.](#)



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