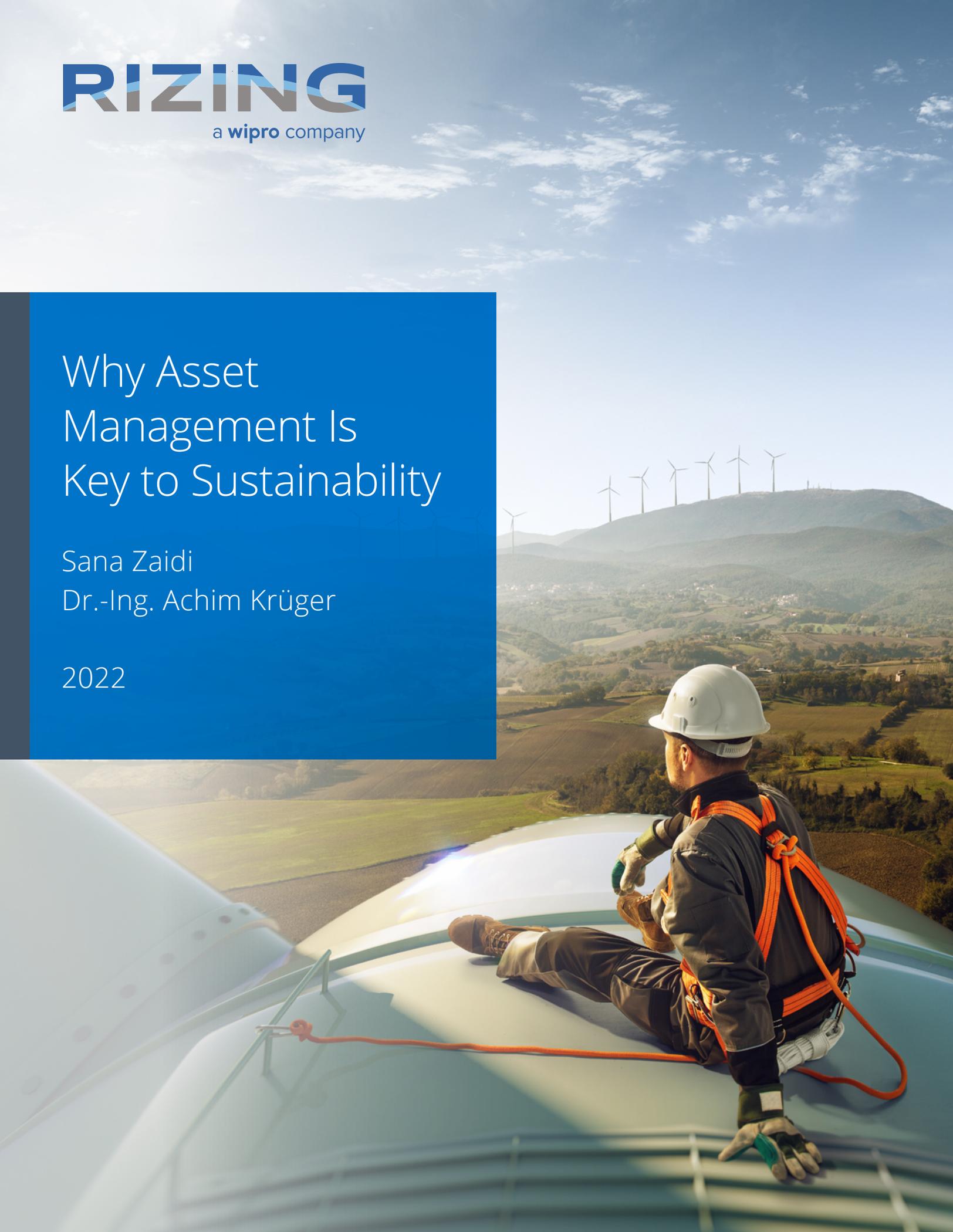


Why Asset Management Is Key to Sustainability

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1.1 ASSET MANAGEMENT IS DIFFERENT FROM MANAGING ASSETS

People have always managed assets, but the formal discipline of Asset Management didn't start until the early 1970's in the defense industry.

Here in current-day corporate life, what's the difference between managing assets and Asset Management? It's not an either or. It's more about putting a structured management system in place and establishing a broader focus.

Asset Management is "the coordinated activity of an organization to realize value from assets". It's more than just "doing things to assets" – it's using assets to deliver value and achieve the organization's business objectives".¹

The ISO 55000 series of standards were introduced in 2014, and ISO 55000 "Asset management – Overview, principles and terminology" states:

"An organization's top management, employees and stakeholders should implement planning, control activities (e.g. policies, processes or monitoring actions) and monitoring activities, to exploit opportunities and to reduce risks to an acceptable level. Asset management involves the balancing of costs, opportunities, and risks against the desired performance of assets, to achieve the organizational objectives. The balancing might need to be considered over different timeframes."²



ASSET MANAGEMENT

(realizing value from assets):

- ✓ Requires balancing **performance**, **cost**, and **risk**.
- ✓ Is the **alignment** between organizational, technical, and financial decisions, plans, and actions.
- ✓ Needs to provide **assurance** that assets will do what they are supposed to do.

¹Asset Management – an anatomy by The Institute of Asset Management, <https://theiam.org/knowledge-library/asset-management-an-anatomy>

²<https://www.iso.org/standard/55088.html>

1.2 ASSET MANAGEMENT AND CSR/SUSTAINABILITY

No organization today can neglect **Corporate Social Responsibility** (CSR) which includes **Sustainability**.

CSR is integrated into most organizations' vision, mission, and strategy. It's also a factor in Asset Management decision making.³

Organizations striving to provide **Assurance** about achieving their objectives face risks including:

- Environmental impacts
- Staff safety
- Product quality
- Asset integrity

All of these may impact businesses negatively.

Stakeholders often expect to hear how these risks have been mitigated and how the organization remains compliant with relevant laws.

Having asset management contributing to **Sustainability** means having risks under control while either maximizing performance of the asset system under a given cost or minimizing costs under a given performance level. Ultimately, the goal is a system that prevents waste of resources, ensures sustainable operations, and contributes to an overall resilient supply chain.

Companies setting their environmental, social and governance (ESG) goals will need to take Asset Management practices into account.

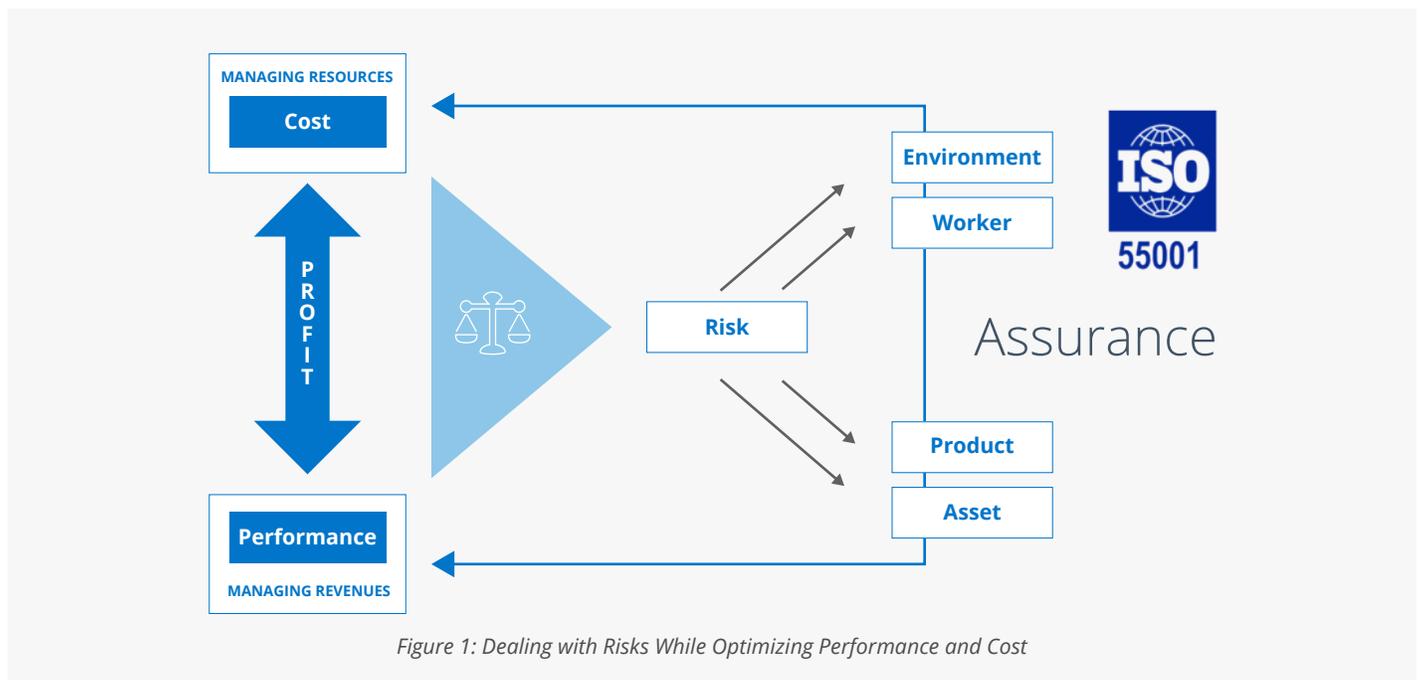


Figure 1: Dealing with Risks While Optimizing Performance and Cost

There will be specific impact on how companies perform:

- Risk Management
- Asset Investment Planning
- Compliance Reporting

All these disciplines require accurate and complete asset information to be shared with stakeholders.⁴

³Also see: https://en.wikipedia.org/wiki/Corporate_social_responsibility.

⁴More detail: <https://portfolio.cpl.co.uk/IAM/202108/opinion-greeman>.

Business Processes Affecting Sustainability 02

2.1 OVERVIEW

Organizations tracking Sustainability related KPIs have a desire to understand and visualize the impact their assets have to their sustainability goals. The scope of sustainability is broad and branches into many different areas of operations, with a wide array of impacts across all industries. In order to standardize the data and metrics with unified oversight, there are a number of Sustainability frameworks that have been established and continue to evolve over time. They may be leveraged to manage Environment, Social, and Governance (ESG) goals. The United Nations Sustainable Development Goals were established in 2015 and identified 17 targets to be achieved between 2020 and 2030.⁵



Figure 2: The United Nations Sustainable Development Goals

The World Economic Forum has established a sustainability framework to manage ESG Metrics and Disclosures.⁶ With wide support from industry leaders these metrics have expounded on existing guidelines outlined by GRI, TCFD, SASB, CDSB,⁷ and others to establish 21 areas of core metrics and disclosures that span four main pillars:⁸

- **Principles of Governance:** focuses on a company's commitment to ethics and societal benefit
- **Planet:** looks at the themes of climate sustainability and environmental responsibility
- **People:** examines the roles human and social capital play in business
- **Prosperity:** focuses on business contributions to equitable, innovative growth

⁵Source: <https://sdgs.un.org/goals>

⁶See: https://www3.weforum.org/docs/WEF_IBC_Measuring_Stakeholder_Capitalism_Report_2020.pdf

⁷GRI = Global Reporting Initiative <https://www.globalreporting.org>

TCFD = Task Force on Climate-related Financial Disclosures <https://www.fsb-tcdf.org>

SASB = Sustainability Accounting Standards Board <https://www.sasb.org>

CDSB = Climate Disclose Standards Board <https://www.cdsb.net>

⁸Source: <https://www.weforum.org/press/2020/01/measuring-stakeholder-capitalism-world-s-largest-companies-support-developing-core-set-of-universal-esg-disclosures>

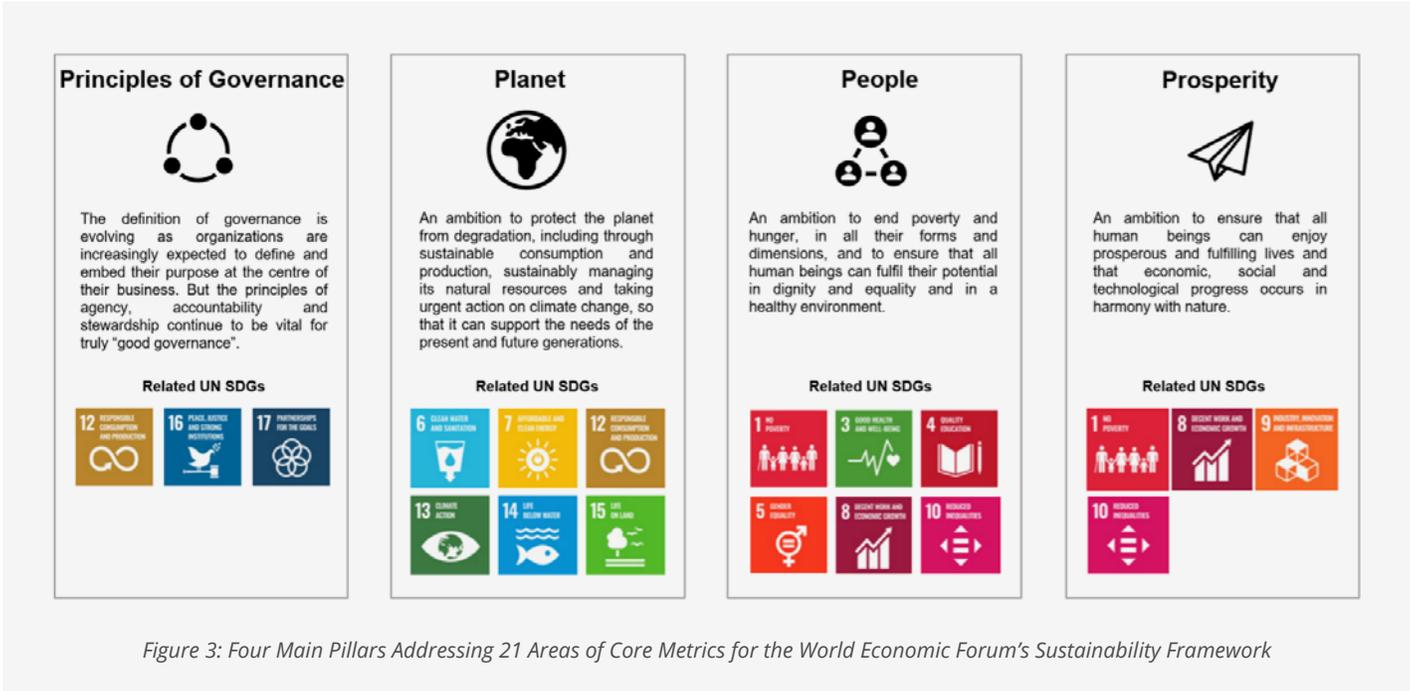


Figure 3: Four Main Pillars Addressing 21 Areas of Core Metrics for the World Economic Forum's Sustainability Framework

When reporting about Sustainability, SAP follows a very similar approach with their Sustainability Control Tower application.⁹



Figure 4: Holistic Sustainability Reporting with SAP's Sustainability Control Tower

⁹<https://www.sap.com/products/sustainability-control-tower.html> and <https://blogs.sap.com/2021/12/14/getting-esg-reporting-and-performance-management-under-control-with-the-sap-sustainability-control-tower>



The value proposition for **sustainability** comes from integrating respective data into every business process.

All processes that touch Asset Management are affected, too, including:

- Asset investment planning and repair vs. replace decisions
- Selecting the right maintenance strategy
- Management of spare parts
- PRTs and infrastructure
- Maintenance execution¹⁰

Assets don't have a purpose in themselves, instead they deliver a capability contributing to an outcome. That capability can be optimized for sustainability and other goals.

Costs and environmental impacts are determined early in an asset's lifecycle. Companies should complete a thorough investigation of stakeholder needs and system requirements to find the right balance of performance, cost and risk.¹¹

Consequently, Enterprise Asset Management (EAM) – as an IT solution portfolio supporting the discipline of Asset Management – needs to embrace the complete lifecycle of an asset. Let's take a closer look at various software applications and how they can better support business processes crucial for reaching Sustainability goals.

¹⁰SAP EHS Value Proposition, *The Case for SAP EHS*

¹¹Compare: [Capability Delivery Model of the Australian Asset Management Council](#).

2.2 DIGITAL TRANSFORMATION

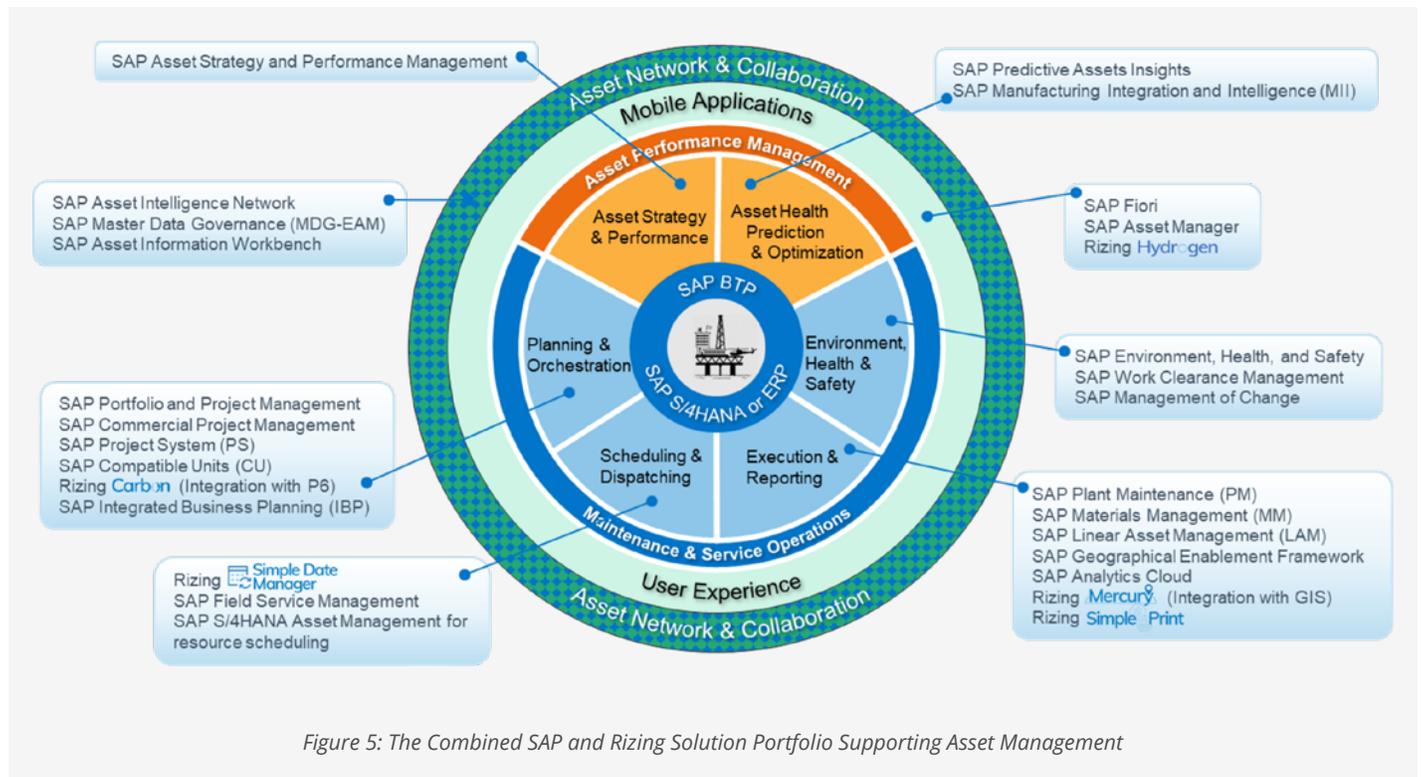


Figure 5: The Combined SAP and Rizing Solution Portfolio Supporting Asset Management

Accurate, complete, and consistent asset information is crucial for an integrated Asset Management management system. The first step is establishing a coherent asset register across systems representing a true “Digital Twin” of the physical asset system.

Organizations can then begin a digital transformation - digitalizing processes based on coherent data and integrated flows.¹²

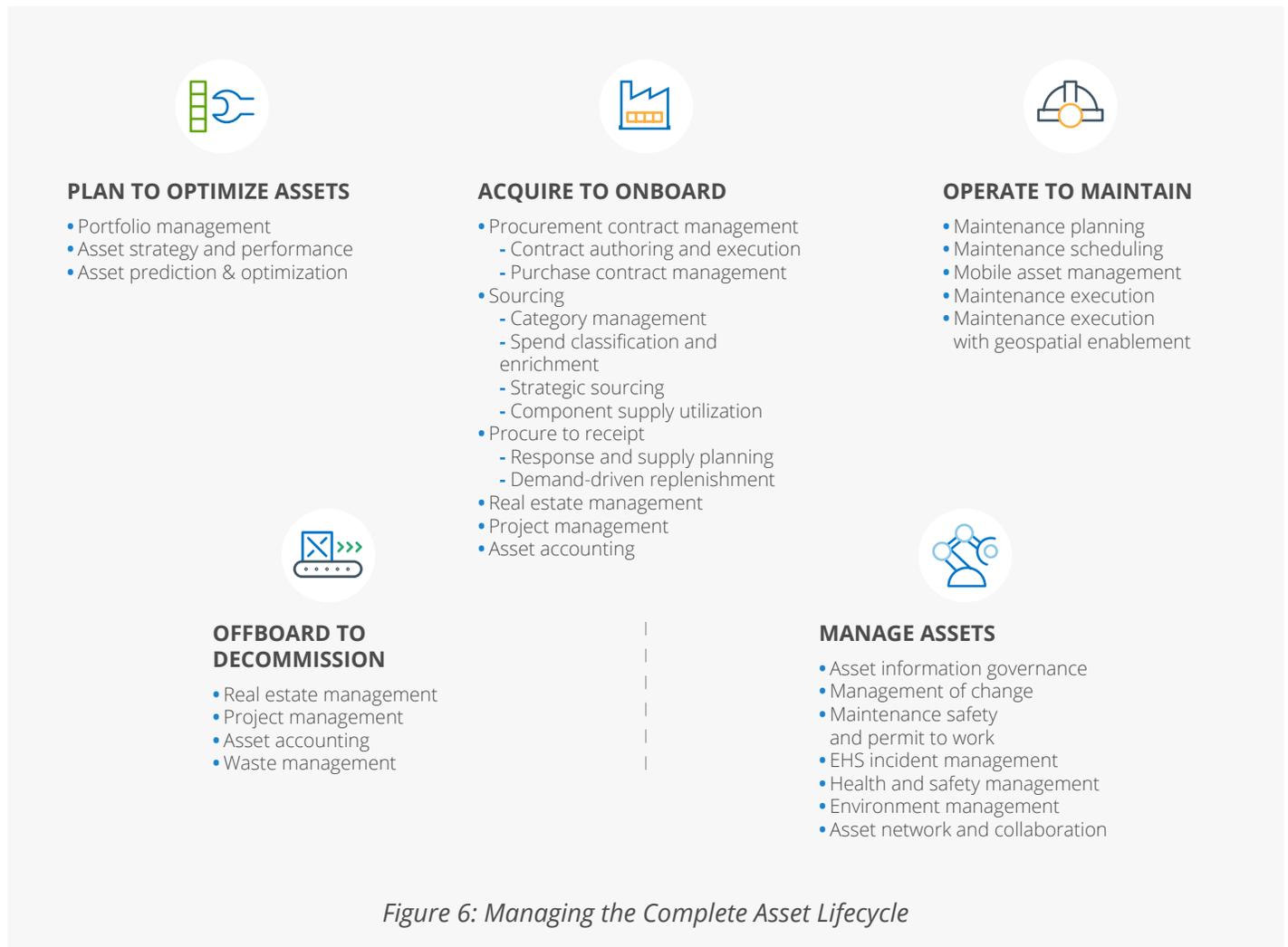
Benefits of Digital Transformation:

- Optimal assessment of maintenance needs (reliability, risk or performance) to deliver recommendations for all proactive maintenance work.
- Collaborative exchange of master data and planning of maintenance work for assets when interacting with third parties such as contractors, engineering companies or manufacturers.
- Integrated planning and optimization of inventory for maintenance spare parts to reduce total purchasing spend and holding costs.
- Complete knowledge about all assets to ensure technicians, planners, reliability engineers, and algorithms have the required information to develop the best maintenance plan and perform the work properly the first time.
- Detailed planning and tracking to ensure the best person with the right skills and the correct parts performs a completely prepared job at the optimal time.
- Continuous improvement of future asset maintenance and performance plans based on automated feedback and analysis of failures, performance, life span benchmarking and other insights.

Digital transformation supports sustainability by digitalizing all respective business processes and consequently, ensuring a coherent Digital Twin and transparency about what’s going on in the asset system. This way it builds the basis for all changes that pertain to Sustainability.

¹²See [Transform Asset Management with SAP® Solutions](#).

2.3 ASSET PERFORMANCE MANAGEMENT



Asset performance management (APM) systems improve the reliability and availability of physical assets while minimizing risk and operating costs.

APM includes:

- Condition monitoring
- Predictive maintenance
- Asset integrity management
- Reliability-centered maintenance
- Asset health data collection, visualization and analytics technologies

APM improves key metrics like uptime, mean time to repair (MTTR), asset longevity, cost, quality/yield and safety. Success with these metrics improves revenue, margin, customer satisfaction and work-in-process (WIP) inventory.¹³

Asset Performance Management Supports Sustainability by:

- Reducing waste and emissions by eliminating over-maintenance
- Reducing downtime by minimizing incidents
- Reducing liabilities

¹³Source: <https://www.arcweb.com/technologies/asset-performance-management>

2.3.1 OPTIMIZED MAINTENANCE STRATEGIES

To improve their asset management strategies, companies need to balance the performance of each asset, the cost of that performance and the risk exposure the asset brings.

Risks include:

- Impacting people's health and safety
- Non-compliance with environmental regulations
- Unplanned downtime and failures
- Overspending by over-maintaining

Companies that rely on time-based, fixed-interval preventative maintenance strategies can actually end up overspending on maintenance. Yet running a non-critical or redundant asset until it fails isn't a great strategy either. Evaluating the probability and consequences of all types of failures can help identify critical assets and reduce maintenance efforts in non-critical areas.

Applying methodologies like RCM/FMEA or RBI can ensure every maintenance dollar spent has the highest impact. Manually evaluating a few critical assets is doable. However, if you need to evaluate a high number of assets you need a more intelligent approach. The evaluation should deliver structured, integrated data that helps you make confident decisions. A solution like SAP Asset Strategy and Performance Management – fully integrated with SAP S/4HANA – is an efficient, automated way to rate a large group of assets.¹⁴

Optimized Maintenance Strategies Support Sustainability by:

- Reducing waste and emissions by eliminating over-maintenance
- Reducing downtime by minimizing incidents
- Reducing liabilities

2.3.2 MOVING FROM REACTIVE TO PROACTIVE MAINTENANCE

The Internet of Things (IoT) combines Information Technology (IT) and Operational Technology (OT), enabling us to connect to assets and get historical and current data.

By analyzing that data using machine learning and artificial intelligence, we can predict the future state of the asset and convert unexpected failures into a planned maintenance events.

Assets can also be digitally modeled, which requires fewer physical sensors. A digital twin of a real-world asset can be used in simulations to deliver predictive insight across the asset lifecycle, from design to operations.¹⁵

Asset health simulations using a digital twin allow reliability professionals to reveal issues impossible to discover otherwise. Digital twin simulations can also determine the root causes of performance problems and proactively schedule preventative maintenance. You can evaluate control strategies, encourage collaboration to maximize product performance, and minimize operating expenses, all in near real-time.

SAP Predictive Asset Insights Supports Sustainability by:

- Getting a higher return on assets
- Doing more with less
- Reducing waste

¹⁴More detail: <https://d.dam.sap.com/a/5vVHH2W> (Solution Brief SAP ASPM)

¹⁵More detail: <https://d.dam.sap.com/a/yAyXw> (Solution Brief SAP PAI)



2.4 PLANNING AND SCHEDULING

Most companies still schedule preventative maintenance at fixed intervals. Corrective maintenance is used for fault recovery. Problems common in these companies are:

- Notifications and work orders aren't properly used for maintenance planning, scheduling and execution.
- Failures can't be prevented.
- Low correlation between maintenance intervals and effective consumption of components.
- Scheduling doesn't look at asset health.
- Resources aren't used efficiently.

Efficiency in planning and scheduling can only be achieved when:

- Accurate asset master data enables a Digital Twin.
- All resources are covered in planning and all work is included in planning.
- Schedules are adhered to.
- Work processes are automated and can be rated by KPIs.
- The EAM system aligns with real world processes.

When all of these criteria are met, asset management is in control about what is happening and risks are low with the right mitigation strategies in place.

Planning and scheduling supports sustainability by mitigating breakdown of assets and maintaining optimal workforce efficiency. Hence, effort and resources are not wasted.

2.5 MAINTENANCE EXECUTION

Engineers and technicians often deal with incomplete, inconsistent or even incorrect data. Different systems can tell a different version of the truth.

Even if asset data quality is high, if it's hard to find or difficult to understand it will impact Asset Management negatively.

The Japanese have the concept of “muda (無駄)” which is a non-value-adding process that should be eliminated. The Toyota Production System (a precursor of lean manufacturing) also sought to get rid of overburdens or “muri (無理)” and inconsistencies or “mura (村)”.

Asset managers need the right piece of information, at the right time and at the right place. This is achieved by a coherent user experience on all possible devices.

SAP's Fiori design paradigm, technology, and mobile applications allow asset managers to select the right information from the backend system in a role-based approach.

This includes:

- Mobile access to location-enriched data, facilitating holistic asset management and work execution processes.
- Detailed insights into the asset registry, equipment behavior and health scores.
- Consumer-grade user experience and performance.
- Native backend integration.

Maintenance execution supports sustainability by always having accurate and necessary information available for asset management optimization.

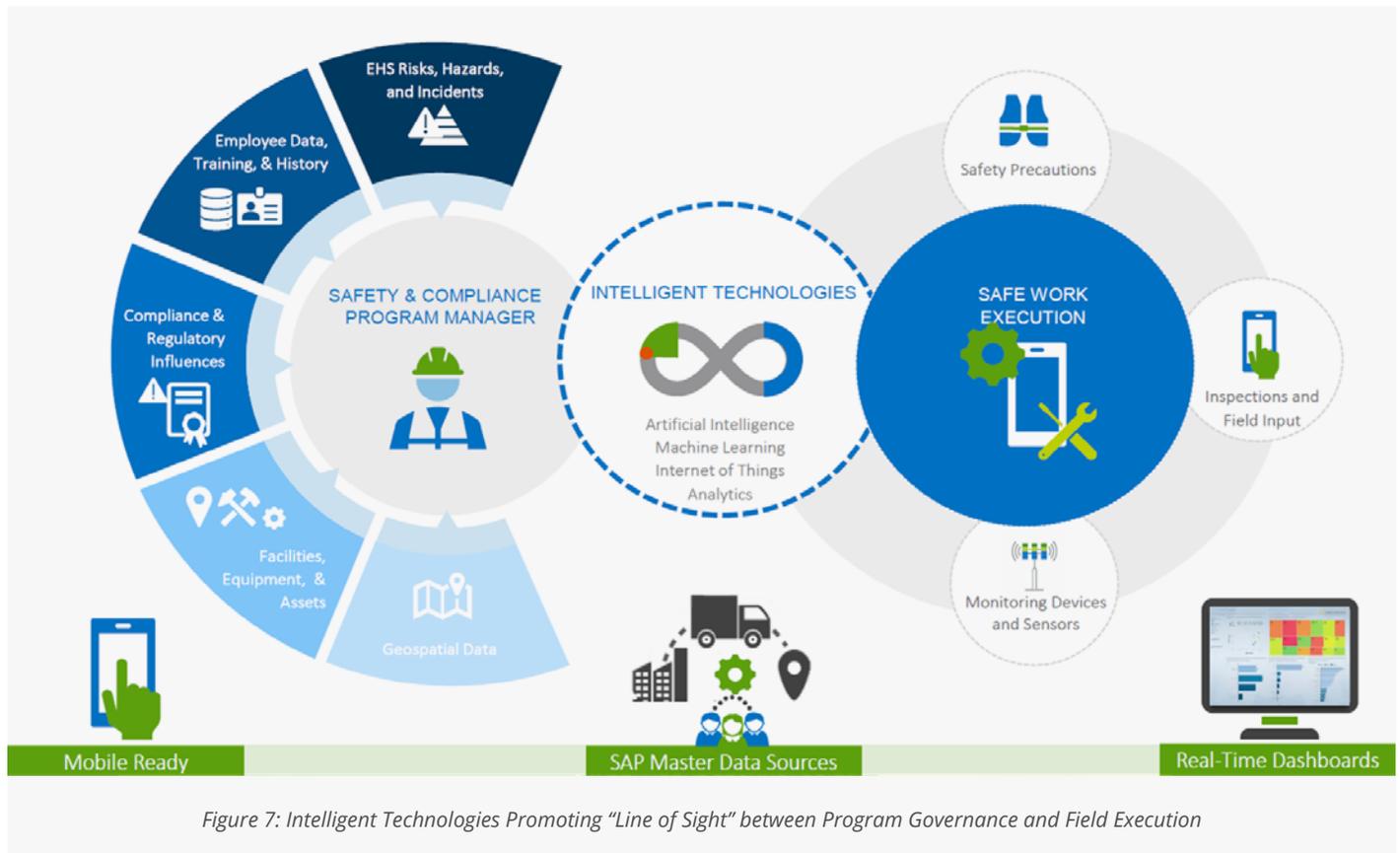


2.6 ENVIRONMENT, HEALTH, AND SAFETY

Environment, Health, and Safety (EHS) management is the concept and practice of having all necessary systems, processes, and procedures in place to ensure compliance and safety of employees and assets. It's closely linked to balancing performance, cost, and risk while assuring the creation of value from assets. EHS compliance management across the enterprise takes a holistic approach to identifying sources of potential incidents, compliance risk, and hazards to proactively apply safety precautions to improve worker health and safety along with organizational compliance.

Operating safely means to:

- Identify, analyze and mitigate risks
- Manage chemicals safely
- Monitor industrial hygiene
- Reduce environmental impacts

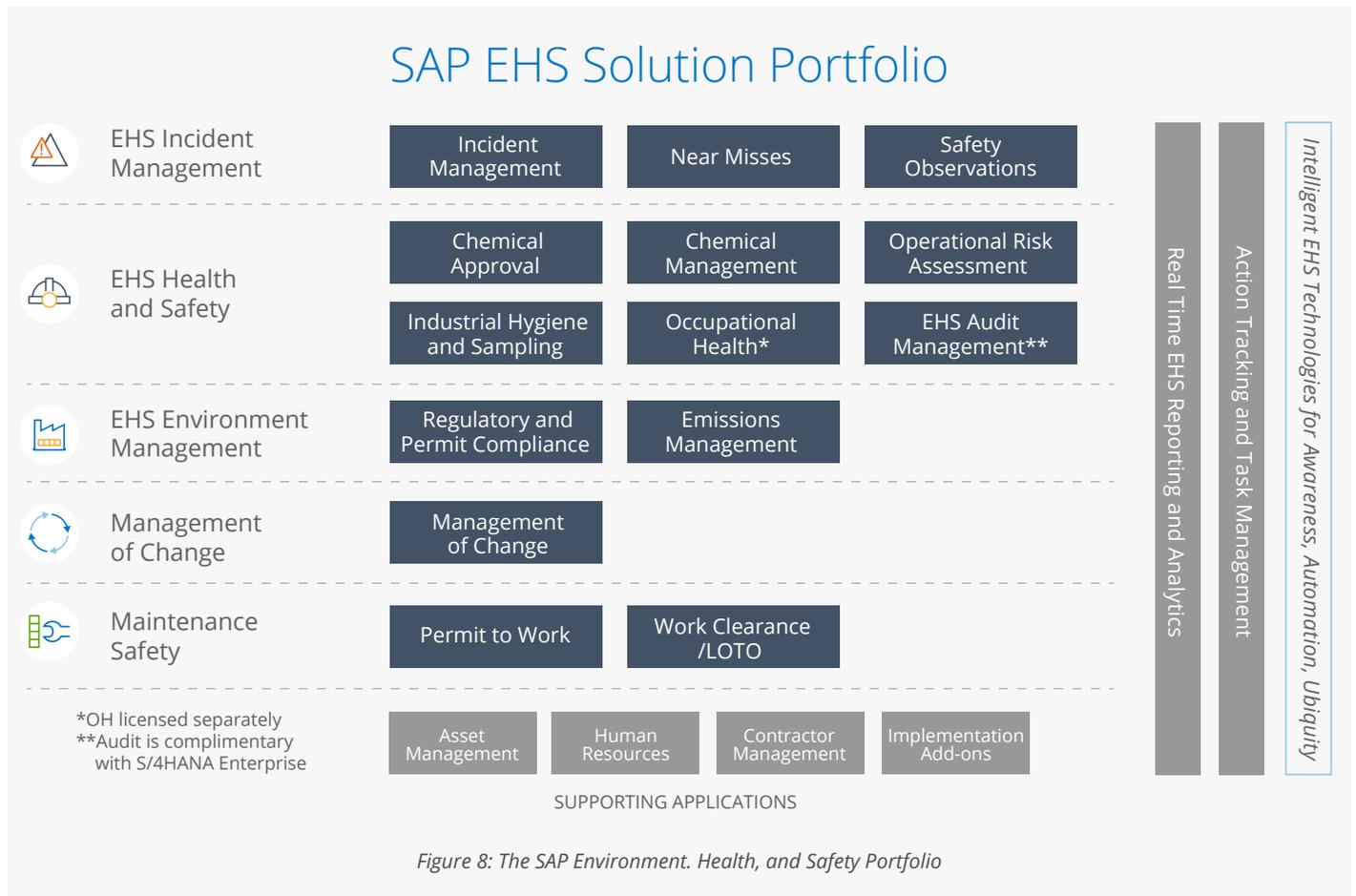


Linking EH&S to corporate sustainability goals requires:

- Embedding safety and operational risk management into all operations.
- Publishing and maintaining critical safety and compliance information - top floor to shop floor - to foster a proactive safety culture.
- Managing key component and source information for sustainability reporting and performance management.

Asset Managers need to know their operating environment. They need to anticipate the risks and opportunities that will determine successful operations and business resilience.

Software solutions can help with and address the respective areas of activity:



2.6.1 INCIDENT MANAGEMENT

Organizations should foster a corporate safety culture and avoid incidents by:

- Providing a centralized solution to track all types of incidents.
- Having a consistent process for incident entry, investigation and corrective actions.
- Having an end-to-end process for identifying and dealing with all manner of hazards and risks.

A consistent process for incident entry, investigation, and corrective actions, and creating transparency and standardization with templates, task tracking, and automated analytical reporting will help lower the number of incidents while also reducing their severity.

Looking at near misses helps an organization to learn, adapt and make better decisions.

Evaluating the criticality of incidents requires a holistic view that includes all asset management related aspects as well as financial information. It shouldn't be done in a separate system.

This means:

- Incident Management needs to be integrated with all other aspects of Asset Management including Finance and Human Resources.
- All incidents must be tracked using a consistent process for recording, investigation and corrective actions.
- Analytics and reporting must show root causes.

2.6.2 HEALTH AND SAFETY MANAGEMENT

Sustainability requires controlling asset and process-related risks. Integrated health and safety processes address all operational risks in relation to potential damages.

This requires:

- Managing general and equipment-related safety instructions centrally.
- Minimizing workplace exposures and related health impacts.
- Integrating health and safety processes for managing chemicals.
- Enhancing risk assessment processes by leveraging chemical data control banding methods, support for mixtures, and identification of exposures to monitor.
- Using chemical data for flexible reporting, including merging logistics and inventory data.

Comprehensive EHS risk assessments (including job hazard analysis) will help with the identification of risk areas or trends and control failures. They will trigger follow-up actions and track them to completion. Finally, they will provide additional assurance that output-related and sustainability goals will be met.

2.6.3 ENVIRONMENT MANAGEMENT

Many people associate sustainability mainly with the impact of operations on the environment. While that's a too-narrow view, Environment Management is an important part of Sustainability.

A comprehensive environment management plan addresses greenhouse gas emissions and other air or water emissions. It helps data transparency, monitoring, and fulfillment of legal requirements.

But Environment Management is not just about compliance. It also preserves the reputation of the organization as a good "corporate citizen".

Environment Management includes:

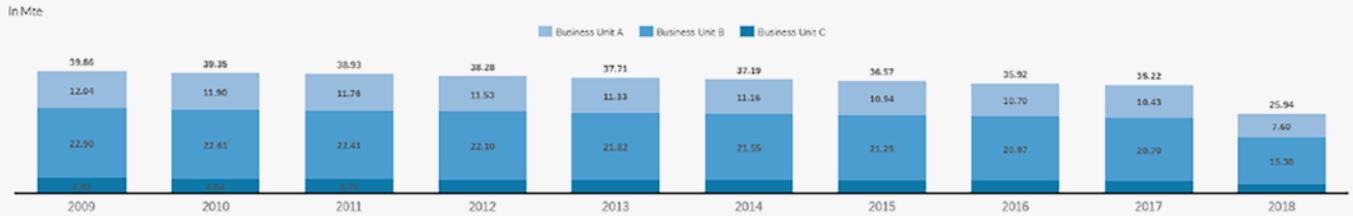
- A simplified process to track substances that are subject to regulation and to manage exposure limits to such substances.
- Forecasting emission data based on past emission data with the help of predictive learning algorithms and statistical methods.
- Managing emissions of greenhouse gas (GHG) as well as other air or water emissions to fulfill legal requirements.
- Calculating aggregate emissions while fostering proactive data transparency and monitoring.
- Detecting and communicating deviations, including investigations and follow-up activities.

Aggregating and analyzing data from across the company helps organizations proactively manage their future situation.



Solutions Approach — Outputs using SAP Analytics Cloud

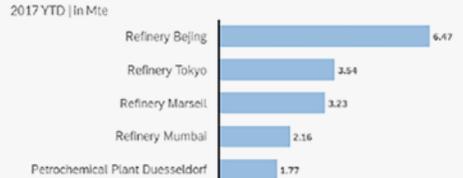
Yearly Greenhouse Gas Emissions in CO2e by Business Unit (A = Upstream, B=Downstream, C= Chemicals)



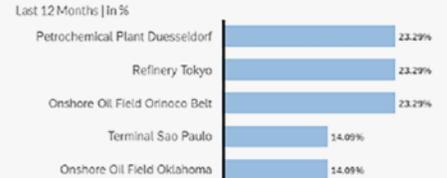
Monthly Emissions in CO2e



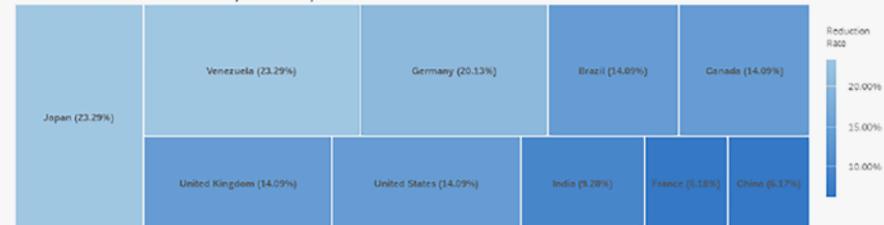
Top 5 Locations by Total Emissions in CO2e



Top 5 Locations by Reduction Rate



10 Year Reduction Rates by Country



Emissions by EHS Location Type in CO2e

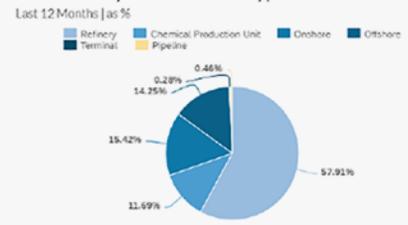


Figure 9: SAP Analytics Cloud Providing a Dashboard for Emission Management

2.6.4 MAINTENANCE SAFETY AND PERMIT TO WORK

Work clearance and permit management links asset health and worker safety – both for internal and external staff – even as projects get bigger.

Integrated processes between EAM and EHS are crucial to communicate safety risks and control the maintenance work being performed.

Respective capabilities include:

- Linking environment, health and safety (EHS) information to equipment and plant maintenance tasks.
- Full electronic support for controlling hazardous work using permits and isolation procedures.
- Support for different levels of work permits and approvals.
- Managing necessary operational lists, tags, and test tags within the isolation procedures.
- Automating the permit process.
- Full enforcement of auditable procedures that promote consistent behavior.

Ensuring safe operations will lead to process resilience and support your goals for a sustainable business.

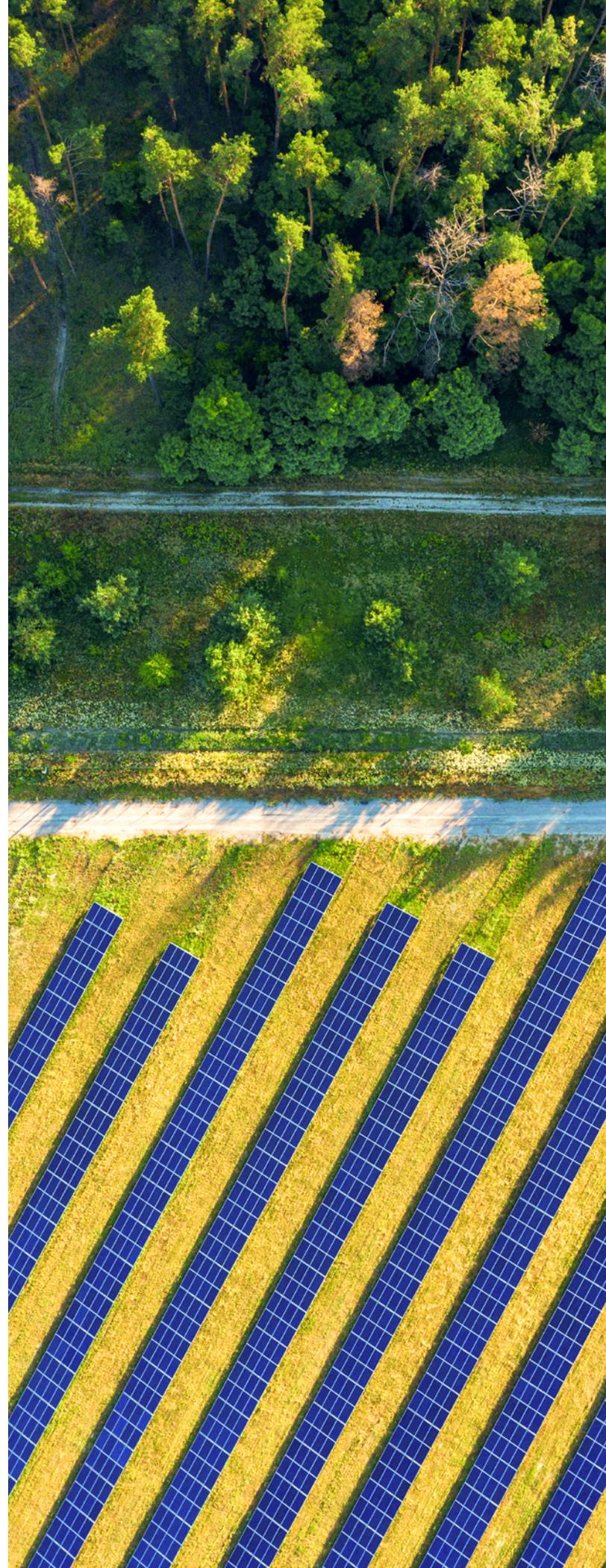
2.6.5 MANAGEMENT OF CHANGE

Assets and their related engineering and business processes are subject to constant change. Businesses need to make sure changes don't put sustainability goals at risk.

Any change needs to be accompanied by proper workflow and approvals.

A change management system should include:

- Simplified and streamlined change requests, with automated involvement of people.
- Consistent execution using templates and rules.
- Thorough review, risk mitigation, documentation and approval.
- Integration with the Digital Core to reduce data entry and ensure accuracy.
- An engaging user experience that encourages participation.
- Highly configurable templates and rules to decrease implementation and adoption costs.
- Support of PHA studies (HAZOP and what-if scenarios).
- Timely and effective reviews, approvals and change implementation activities.





Summary and Conclusion

03

Using integrated systems for Asset Management provides an unprecedented opportunity to balance performance, cost and risk in a way that leads to optimal outcomes promoting Sustainability.

This requires full integration between Information Technology and Operational Technology, enabling a true, virtually distributed, continuously updated Digital Twin.

Solutions from the SAP Intelligent Asset Management portfolio, complemented by products and services from Rizing can turn this vision into reality.



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