

# From Predictive Maintenance to Sovereign Asset Performance:

## Rethinking value chains for a Resilient, Low-Carbon, and Secure Industry 5.0

# PRESENTATION

**Strategic Solutions & Training HUB Platform bridging European innovation & Expertises with MENA growth potential including a International Ecosystem.**

We federate industries, infrastructures, and cutting-edge technological solutions while delivering last trends certified trainings. We are a community of professionals, including, manufacturers, solution-providers, decision-makers, start-ups, universities, clusters, experts, and certified practitioners, gathers around a leading platform of sustainable Asset Management (for Infrastructures and Industries), Maintenance, and Reliability.

## **Our Mission :**

Connecting Europe and MENA through disruptive solutions and advanced expertise transfer in key sectors.

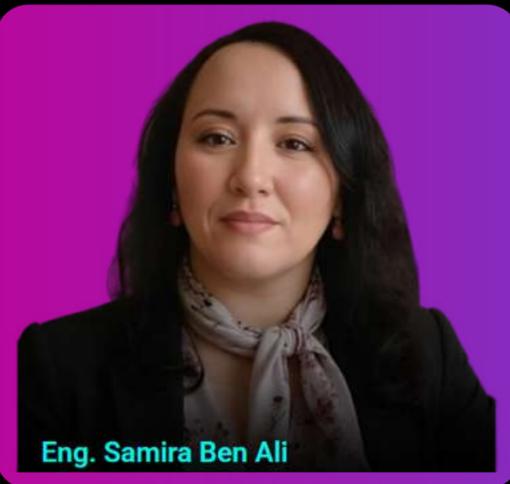
## **Key Objectives :**

- Foster a dynamic knowledge exchange environment
- Promote professional development
- Share best practices in asset management, reliability and maintenance
- Facilitate networking opportunities locally and internationally



**Digital Twinning to Improve Smart Building Management Efficiency :**

Data as the New Fuel: Driving Facility Management Efficiency Through Smart Information Management - Abdeslam Koubaa - P2Q



**Predictive Maintenance and Sustainable Energy System :**

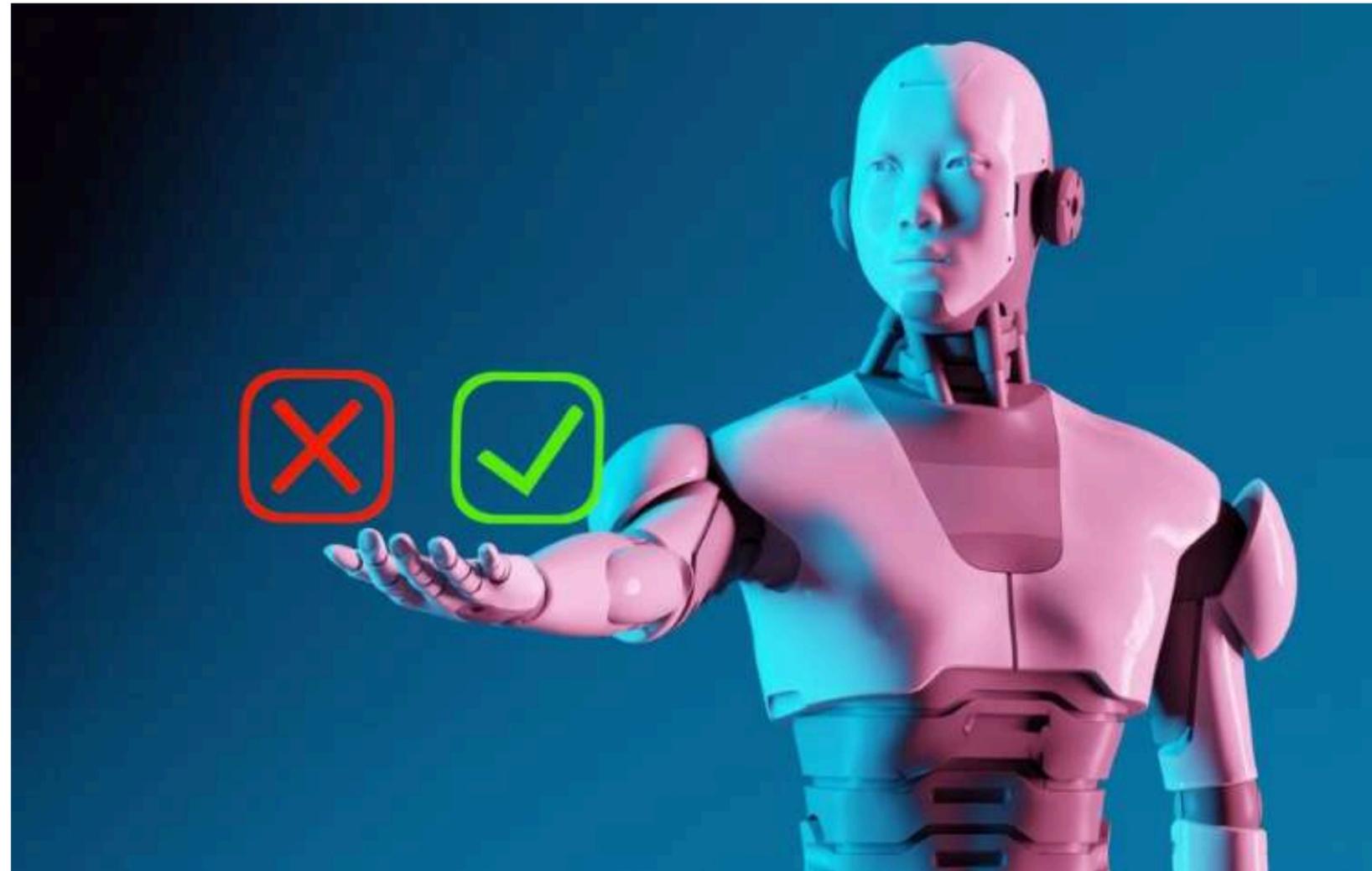
From Predictive Maintenance to Sovereign Asset Performance: Rethinking value chains for a Resilient, Low-Carbon, and Secure Industry 5.0 - Eng. Samira Ben Ali - MARAMM



**Digital Twins and Advanced Technologies: Enhancing Efficiency in Infrastructure Maintenance :**

Generative AI Challenges: Data Leaks, Shadow AI, And Regulatory Responses - Eng. Mustapha Annouh - SHIELD AI

## AI: A Double-Edged Sword for Industry

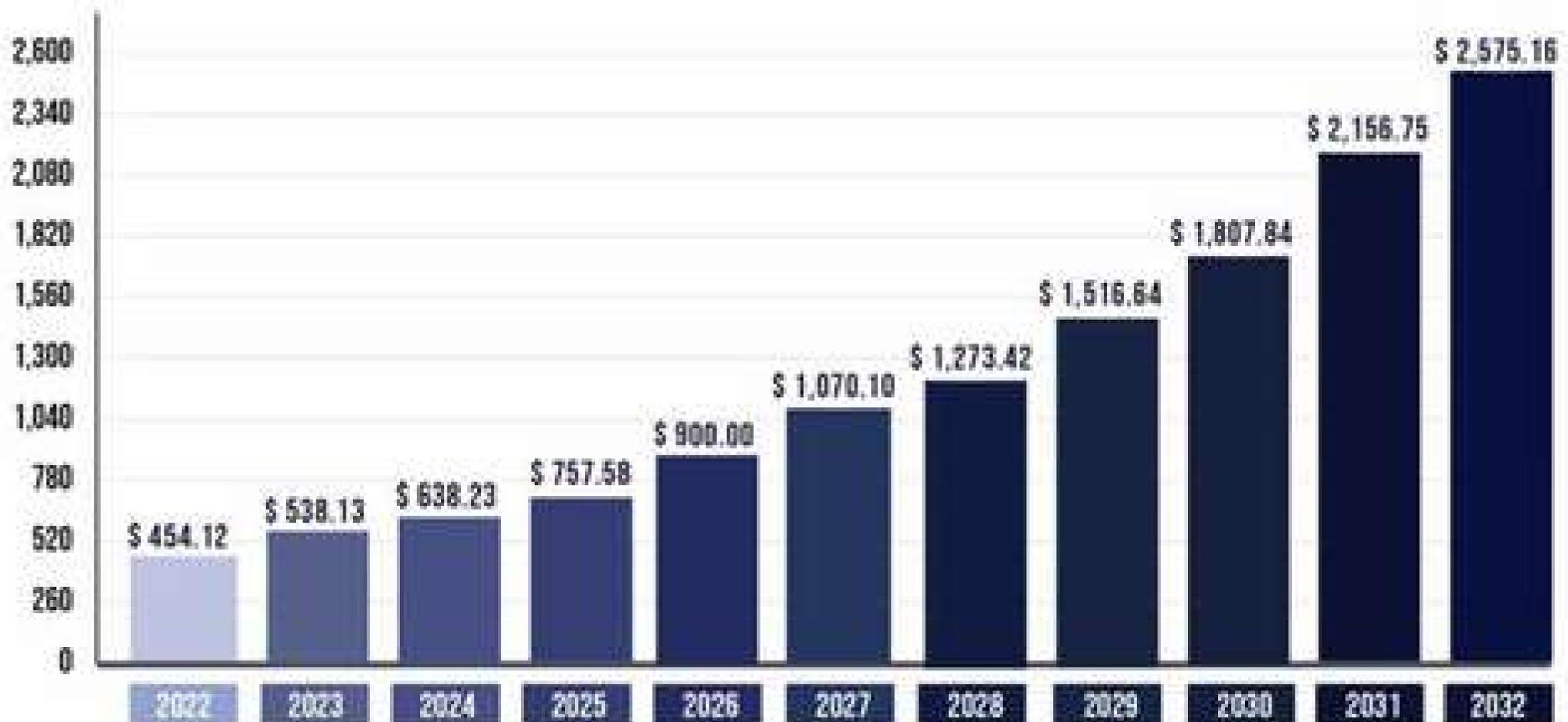


## THE BOOM OF MARKET AI



PRECEDENCE  
RESEARCH

### ARTIFICIAL INTELLIGENCE (AI) MARKET SIZE, 2022 TO 2032 (USD BILLION)





“60% of productivity gains by 2030 will come from AI and data.”

McKinsey Global Institute, "The Future of Work in AI and Automation" (2023)

Today's industrial AI is like an Iceberg

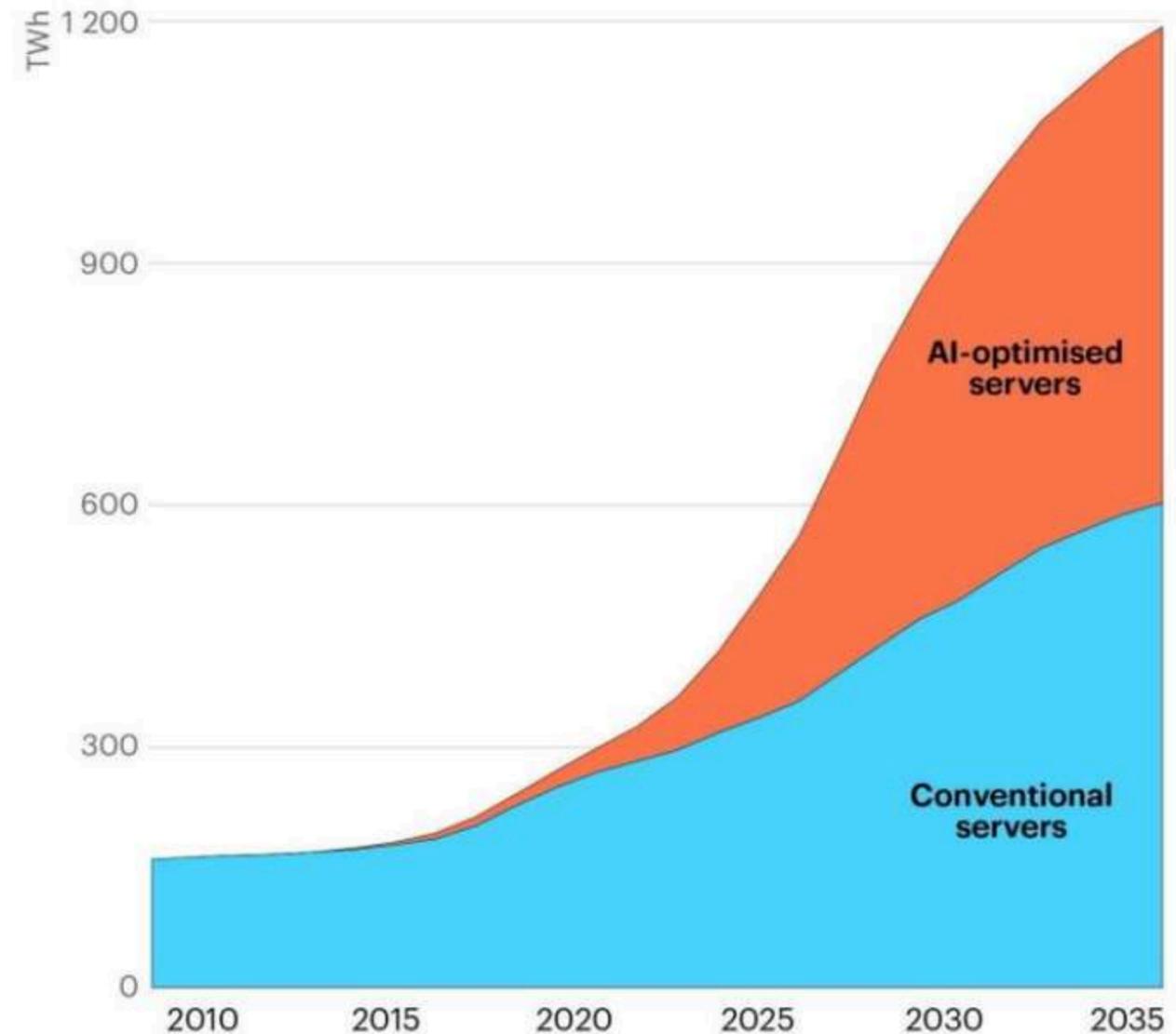
20% of visible efficiency gains,  
while ignoring the 80% hidden costs



## Annual Water Consumption of Data Centers :

- Between 5.7 and 7.6 million liters of water per year.
- Google's data centers in the U.S. used 12.7 billion liters of freshwater in 2023.

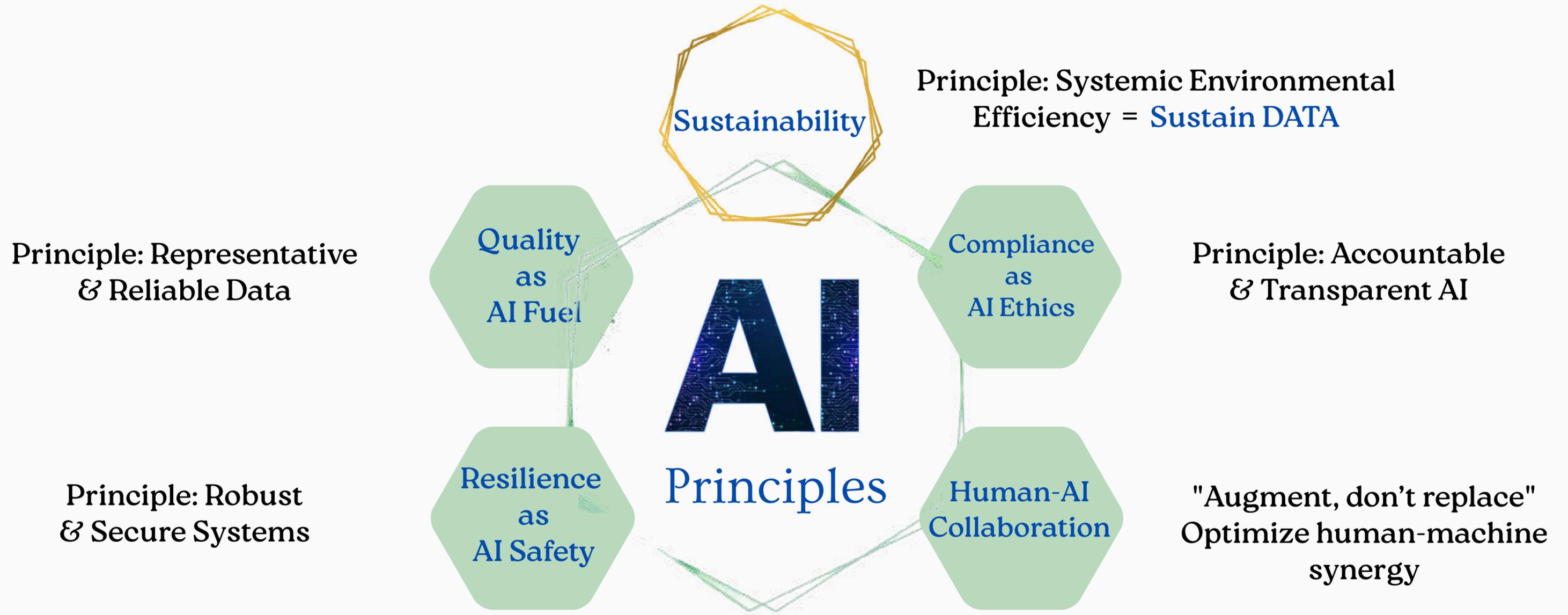
Data centre electricity demand, historical & projected through 2035



- Customers want to do AI but doesn't have a strategy. They have poor data quality or availability and not clear objectives : **Data has a critical role**
- Asset Data Management Framework is a structured approach to transform data into value :
  - ✓ Acquire critical data assets
  - ✓ Monitor real-time data integrity
  - ✓ Leverage through AI/advanced analytics
  - ✓ Optimize long-term value generation
- No self-respecting Asset Management Organisation would invest in assets and then neglect them



# Challenges and Limitations ABOUT AI



# ROADMAP

## START :

### Data Readiness

Only what's needed, minimize waste

- ✓ Choose sustainable sources:
  - Prioritize IoT sensors with low-power designs
  - Avoid redundant data collection (reduce storage/energy costs).

✓ Local-first aggregation:  
Use edge gateways to pre-process data on-site

## DATA ENGINEERING :

### Clean & Lean

Optimize data pipelines for energy efficiency

- ✓ Energy-aware processing:  
Schedule heavy computations during off-peak hours.
- ✓ Circular data practices:  
Reuse historical datasets (avoid re-collection & auto-delete obsolete logs)

# ROADMAP

## MODELING (Optional) :

Apply only necessary AI/analytics

- ✓ Edge-native models:  
Deploy TinyML for predictive maintenance.
- ✓ Sustainable training:  
Use small, curated datasets (vs. energy-hungry big data).

## OPERATIONS :

Sustainable Monitoring  
Maintain value without excess energy use

- ✓ Low-overhead monitoring:  
Lightweight dashboards  
Alerts only for critical thresholds.
- ✓ Closed-loop updates:  
Patch/retrain models locally (no cloud dependency, local server) : DATA SPACE  
Data Encryption, AI encrypted

## DIGITAL SUSTAINABILITY (GREEN IT) AND SECURITY

Covers:

- Energy (energy efficiency, carbon footprint reduction)
- Hardware (reduction of e-waste, recycling)
- Data (resource optimization, privacy, resilience)

Example in Industry 4.0

- PLCs encrypting data locally reduce failure risks from cyberattacks → more durable equipment and less energy consumption
- Employ LLMs for specific tasks /Tiny ML/ Edge-AI



# Human-Centric Cyber Resilience

## The Missing Layer of Data Sovereignty

Data sovereignty is not achieved solely through infrastructure choices. It fundamentally depends on an organization's ability to remain operational, coordinated, and decisive when facing cyber stress. This implies human and organizational resilience, beyond just technology.

**Data & AI**  
Critical systems, distributed architectures, data governance, and advanced analytical capabilities.

**Trust & Resilience**  
Internal trust, organizational resilience culture, continuous learning, and rapid adaptation to new threats.



### Human Decision-Making

Decisive leadership, clear communication, rapid decision-making, and team coordination in crisis situations.

### Governance

Continuity policies, clear chains of command, defined responsibilities, and effective escalation protocols.

Most cyber incidents are not pure data failures. They are human and organizational failures revealed and amplified by data systems. Without human-centric resilience, data-driven strategies create a false illusion of control, leaving organizations vulnerable to the most common attack vectors.

# From Data Roadmap to Resilient Execution

Cyber resilience enables data strategies to survive real-world conditions.

## Maintain Control

Ensure the continuity of critical operations, maintain communication channels, preserve decision-making even in the event of partial system failures, thereby guaranteeing operational capability during disruptions.

## Protect Without Paralyzing

Protect critical data while enabling operations; implement security measures that do not slow down business processes, balance protection and agility, and allow innovation under control.

## Align When Necessary

Synchronize technology, governance, and people under pressure; coordinate technical teams, governance frameworks, and decision-makers in real-time, create a shared vision of resilience, and align security objectives with business goals.

This is where data management, cyber sovereignty, and human collaboration converge towards operational resilience, the true foundation of organizational continuity.



# CLOUD Act & Data Sovereignty

Understanding the Critical Gap in Current Cloud Strategies

## 1. The CLOUD Act Reality

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### Your Company

Saudi Arabia /  
Morocco / Europe



### EU Data Center

Frankfurt /  
Amsterdam / Paris  
**AWS / Azure /  
Google**



### US Government

Can request access  
**CLOUD Act  
(2018)**

### ▲ **Key Reality Check**

- ▶ **Physical location ≠ Data sovereignty**
- ▶ American cloud providers (AWS, Microsoft Azure, Google Cloud) must comply with US law
- ▶ Even if your data is stored in European or Middle Eastern data centers
- ▶ US government can request access without your knowledge or consent
- ▶ Applies to: Industrial data, customer information, strategic assets performance



## Traditional Cloud Approach

- ▶ **All data to cloud** - No classification
- ▶ **Vendor lock-in** - Dependency on American providers
- ▶ **Legal exposure** - CLOUD Act compliance
- ▶ **Loss of control** - Cannot guarantee sovereignty
- ▶ **Hidden costs** - Data transfer, storage, processing
- ▶ **Strategic risk** - Critical asset data exposed



## SAP Sovereign Approach

- ▶ **Data classification** - Critical vs Non-critical
- ▶ **Hybrid architecture** - On-premise + selective cloud
- ▶ **Local sovereignty** - Critical data stays local
- ▶ **Interoperability** - Open standards, no lock-in
- ▶ **Cost optimization** - Pay only for non-critical cloud
- ▶ **Strategic control** - Full control over critical assets

**● CRITICAL  
DATA**

**ON-PREMISE /  
LOCAL**

**Must stay sovereign - No external access**

- ▶ Real-time asset performance (critical infrastructure)
- ▶ Predictive maintenance alerts (energy, water, defense)
- ▶ Security & safety systems data
- ▶ Strategic operational decisions
- ▶ Proprietary algorithms & IP
- ▶ Customer sensitive information

**Storage:** Local data centers, Edge computing, Private cloud (local providers)

**● NON-CRITICAL  
DATA**

**CLOUD  
OK**

**Can use cloud - Lower sensitivity**

- ▶ Historical trends & analytics (anonymized)
- ▶ General benchmarking data
- ▶ Public reporting metrics
- ▶ Training datasets (non-proprietary)
- ▶ General operational dashboards
- ▶ Collaborative project data (non-strategic)

**Storage:** Hybrid cloud (AWS, Azure, Google) for scale and cost efficiency

# +40%

Increase in hybrid/on-premise projects (2024-2025)

## Why Companies Are Returning

- ▶ **Sovereignty concerns** - CLOUD Act, geopolitical tensions
- ▶ **Cost realization** - Cloud not always cheaper long-term
- ▶ **Performance needs** - Edge computing for real-time decisions
- ▶ **Regulatory compliance** - GDPR, local data residency laws
- ▶ **National strategies** - Vision 2030, tech independence

## SAP Hybrid Architecture Benefits

- ▶ **Best of both worlds** - Sovereignty + scalability
- ▶ **Risk mitigation** - Critical data protected
- ▶ **Cost optimization** - Use cloud where appropriate
- ▶ **Flexibility** - Adapt to changing regulations
- ▶ **Strategic alignment** - Vision 2030 compliant

### SA Saudi Vision 2030 Requirements

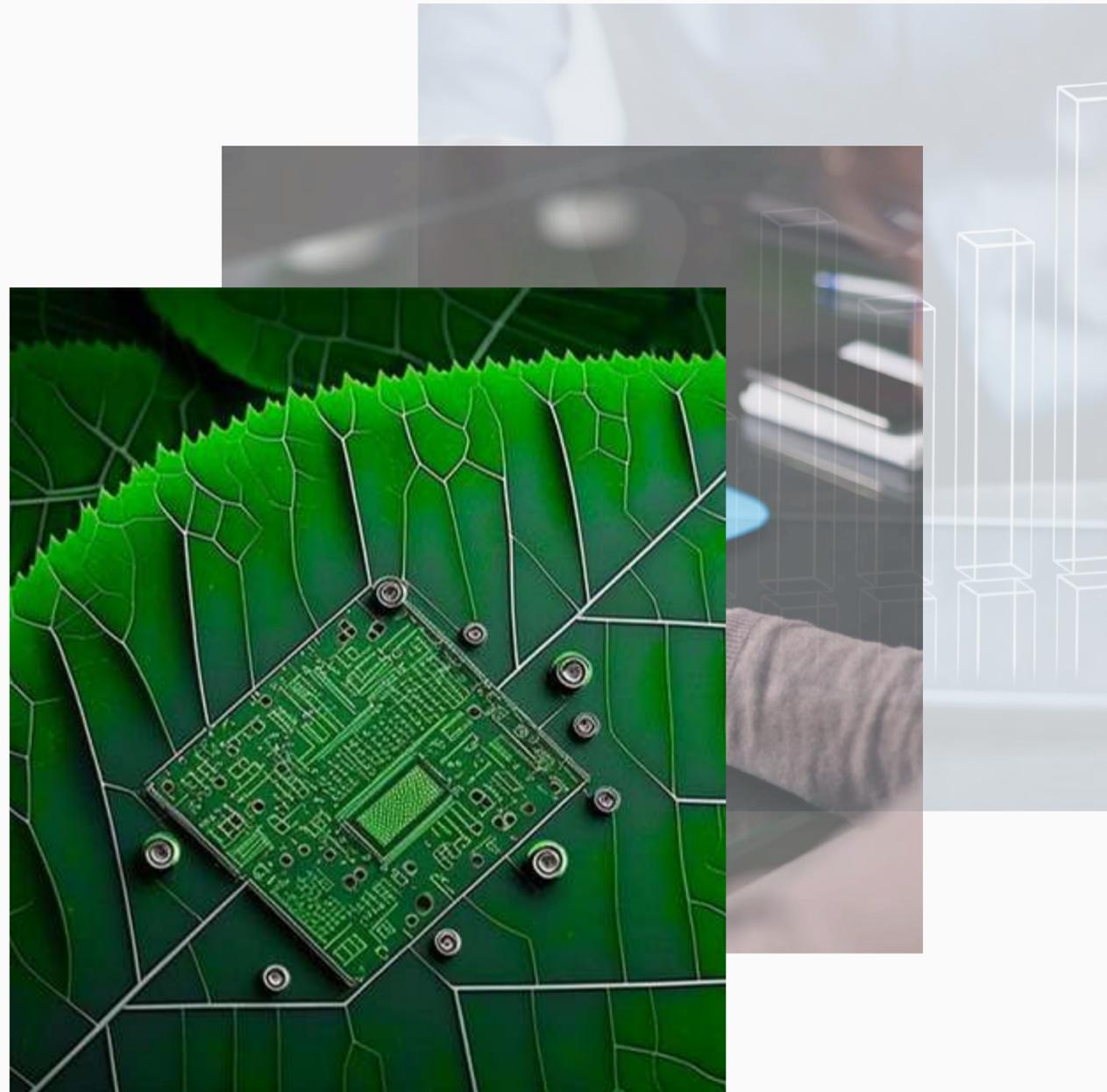
- ▶ **Technological Independence** - Reduce dependency on foreign tech
- ▶ **Local Data Sovereignty** - Critical data must remain local
- ▶ **Knowledge Transfer** - Build local capabilities, not just import
- ▶ **Sustainable Development** - Low-carbon, resilient infrastructure
- ▶ **Economic Diversification** - Tech-enabled industrial growth

# SOVEREIGN ASSET PERFORMANCE

- ✓ Asset Data Management (Data as Production Capital & performance) + DATA Sovereignty
- +
- ✓ Cyber-Resilient Data Governance (Protection + Quality + Integration)
- +
- ✓ Sustainability by Design (Energy-Aware Execution)

Real-World Applications in Industry 5.0 : Predictive maintenance (data value) + embedded encryption (resilience) + eco-designed Edge systems

○





THANK YOU



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