

A nighttime cityscape featuring a river in the foreground with vibrant, multi-colored light trails from moving vehicles. The background is filled with illuminated skyscrapers and a modern cable-stayed bridge, all reflecting on the water's surface.

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Hitachi Energy

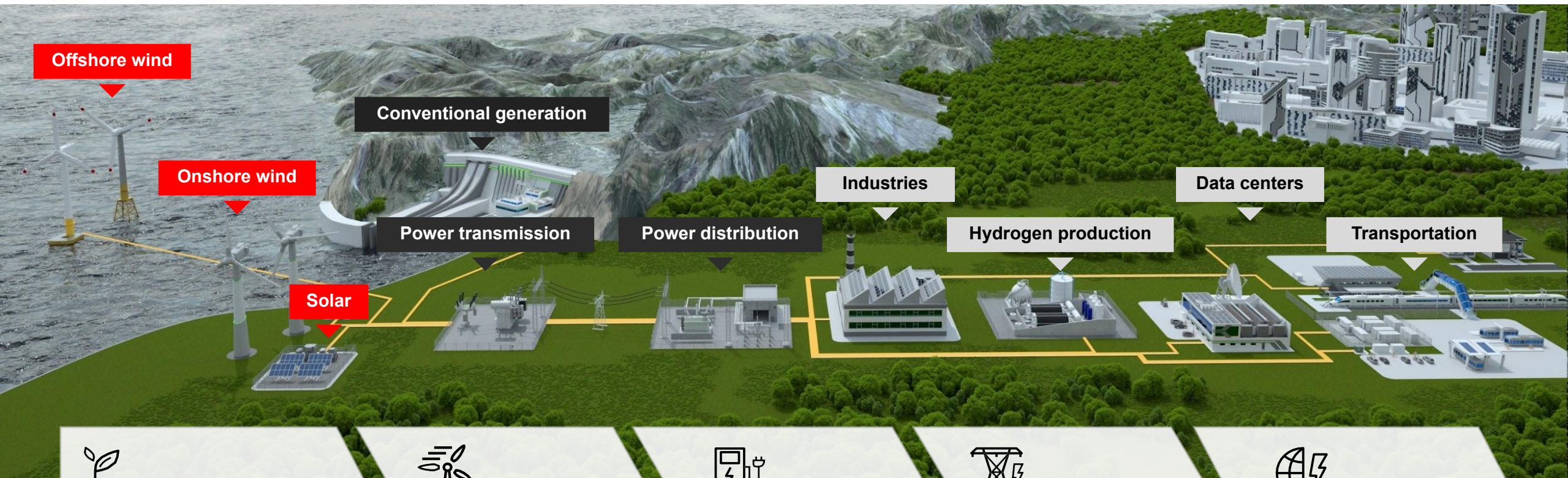
Technologies & Digitalization for Just Energy Transition

Akilur Rahman, CTO - Hitachi Energy India, Market innovation - South Asia

ACEF 2025, ADB - Manila: Pecha Kucha DDW session - Digital innovations for just energy transition, 6-June-2025

Energy transition along the value chain

■ Power generation ■ Power transmission and distribution ■ Energy intensive industries



Transform through
low-carbon technologies and
digital solutions



Accelerate the shift
to renewable power
generation



Decarbonize
through
electrification




Expand and strengthen
the transmission and
distribution grid




Enable sustainable
energy fuels

Expectations from Digitalization


Owner-Operator Perspectives




Reliability
How do I maintain high levels of reliability and resilience over assets' lifetime?



Efficiency
How do I optimize operations and maximize the return on assets?

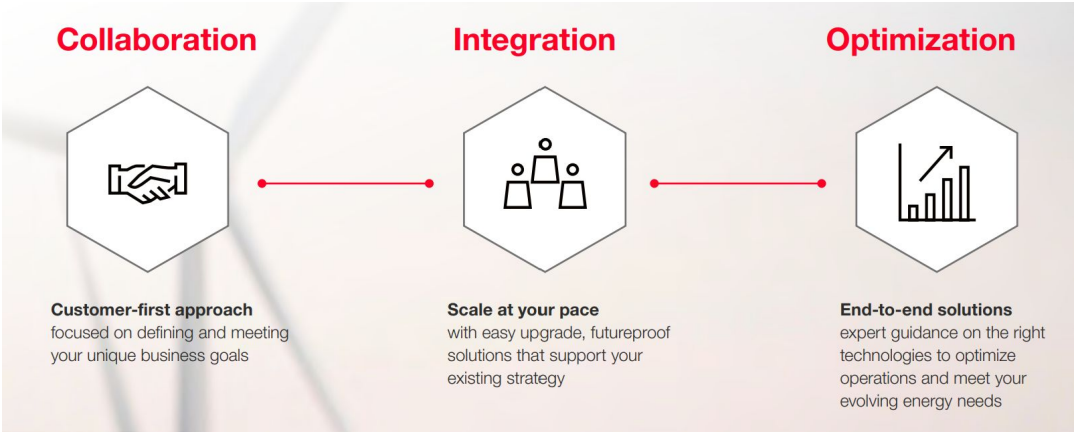
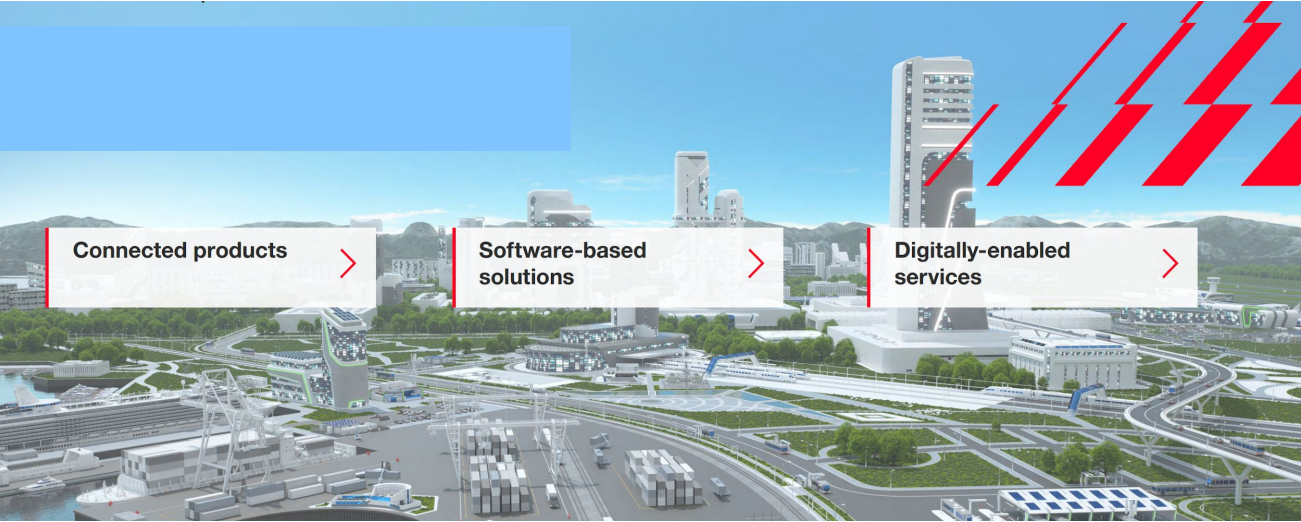


Safety and security
How do I mitigate risk, increase security, and ensure safer operations?



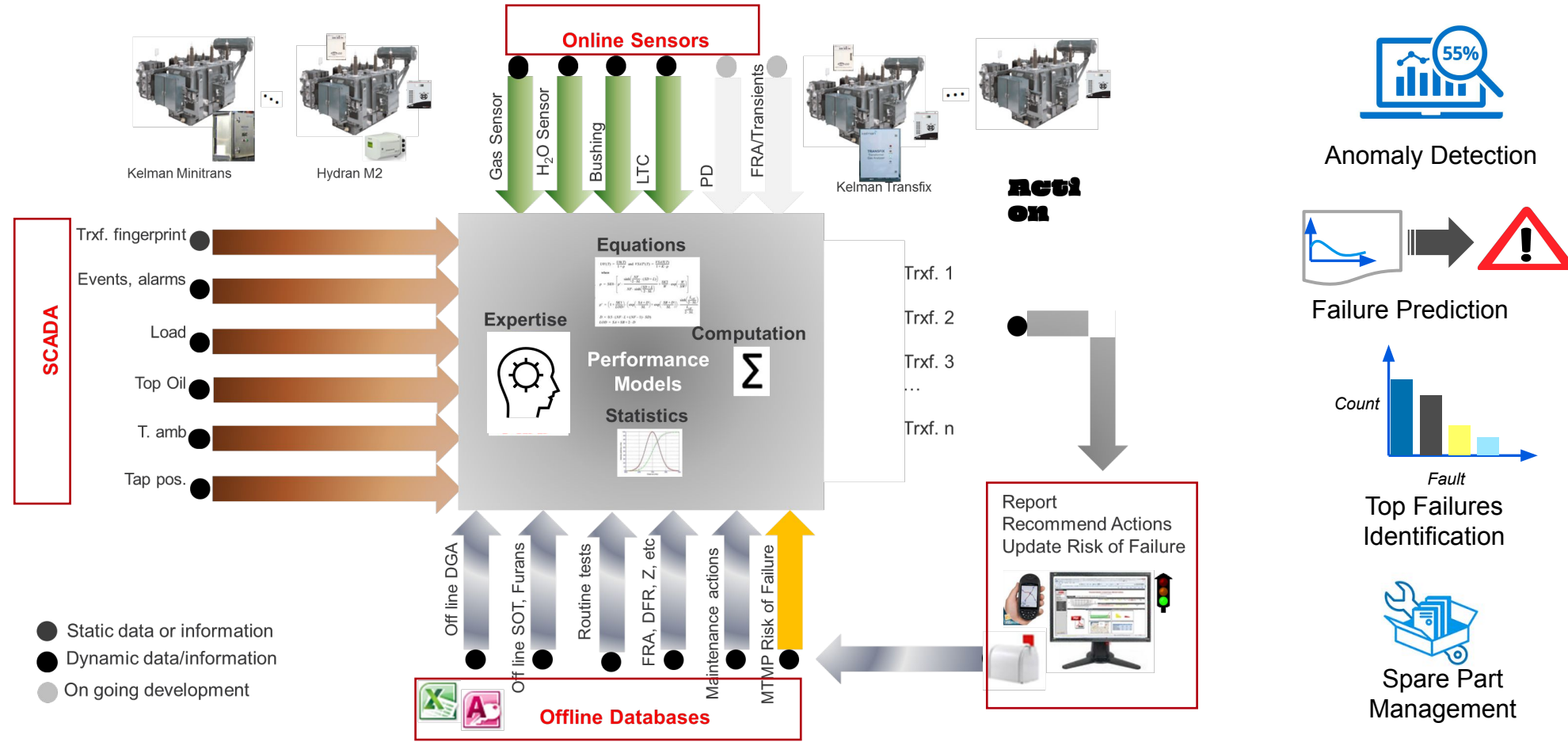
Flexibility
How do I ensure scalable, futureproof operations?

How OEM technology helps



Monitoring & diagnostics with digitalization of assets

Asset Health Index approach - Next level of asset management



Asset Performance Management (APM)

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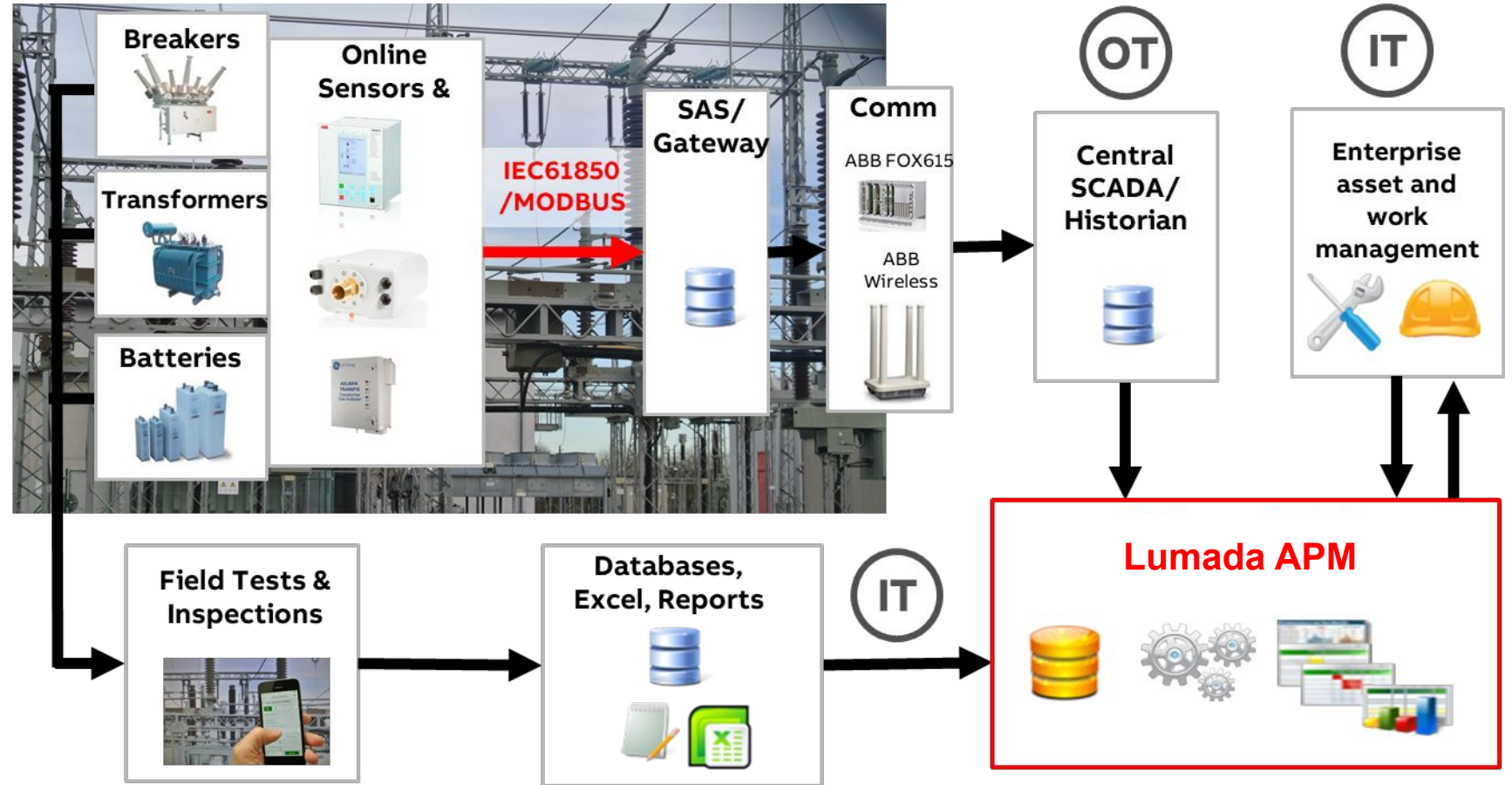
Data flow, typical architecture

APM can be implemented either

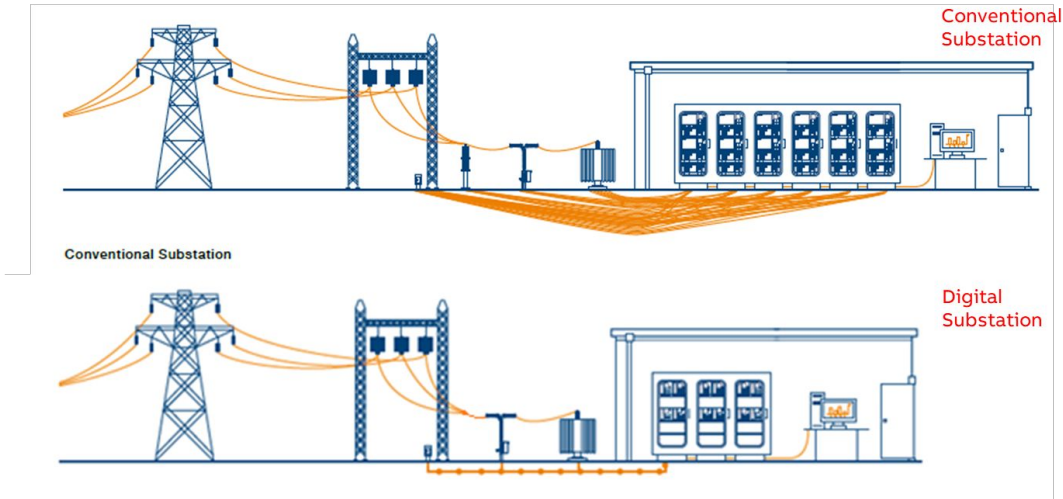
- Cloud-Based
- On-Premise

Cloud based

- Easier & Faster implementation
- Scalability
- Easier maintenance



Digital Substation – creating backbone for digitalization

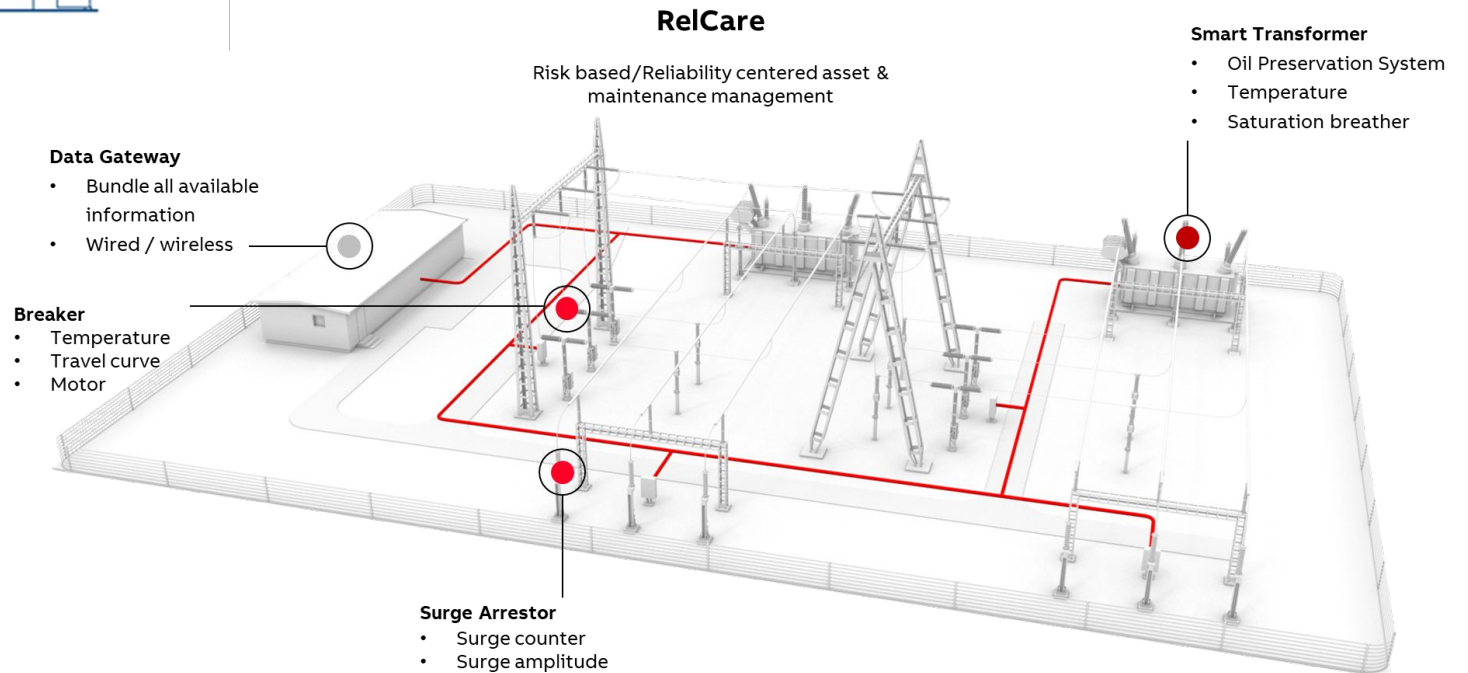


Optimizing and saving

- Space
- Time
- Effort

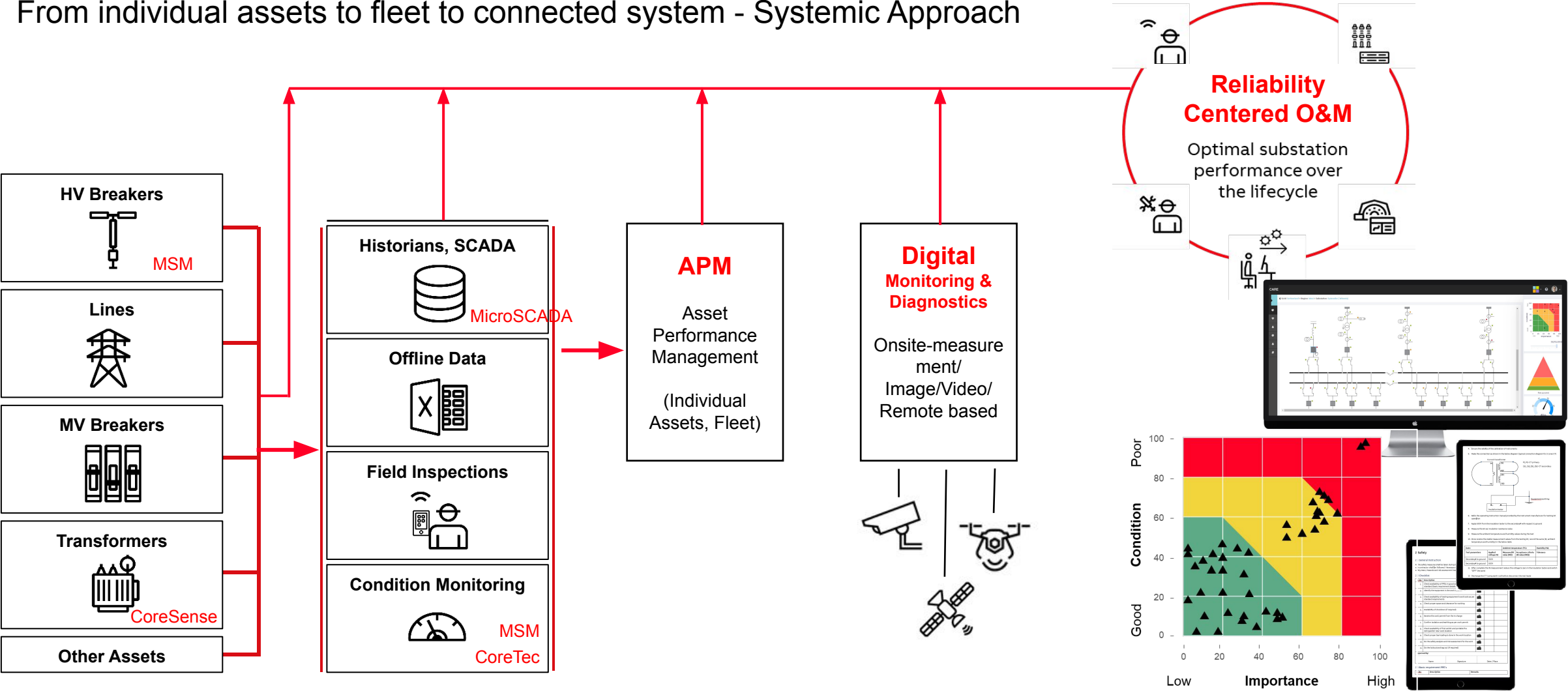
Enabling digitalization to improve

- Asset Performance
- Control and Protection
- Availability and reliability



Digitalization of system and operation

From individual assets to fleet to connected system - Systemic Approach



At a newly developed industrial campus...

Load data



Lumada

Grid data



Real-time Forecast

Hourly, daily, and
weekly load profiles

Market data



Weather data



Historical data

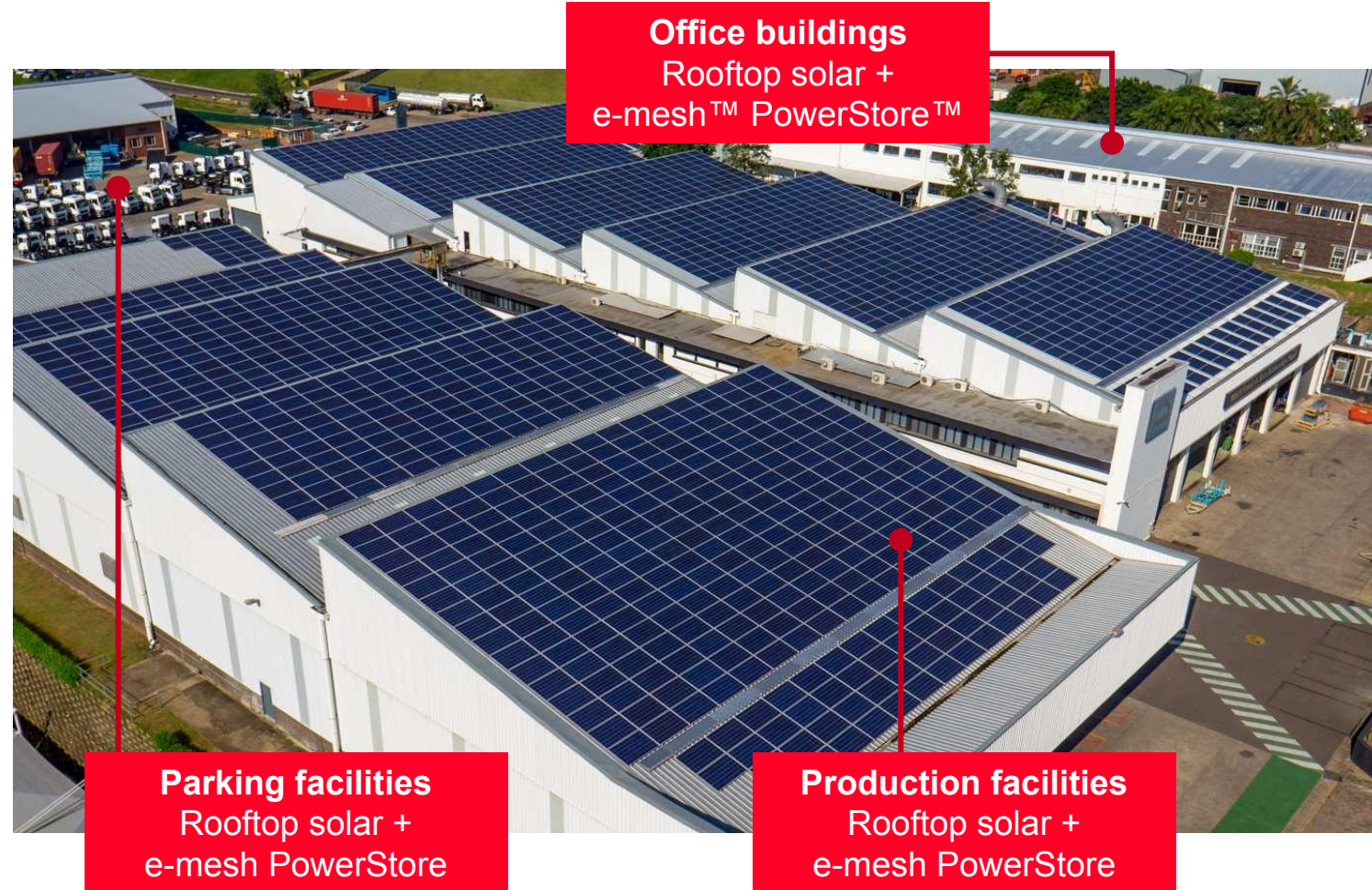


e-mesh™ EMS

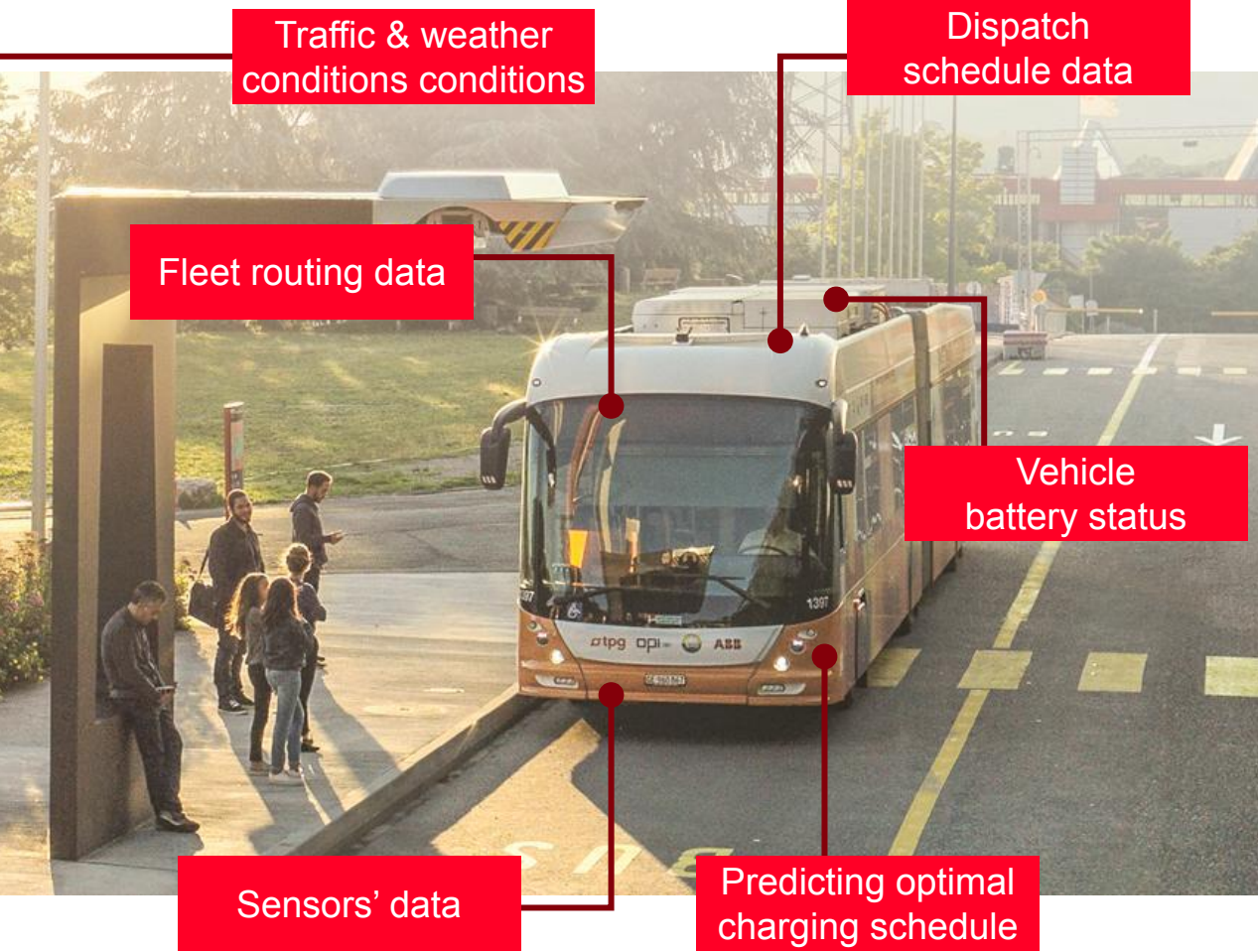
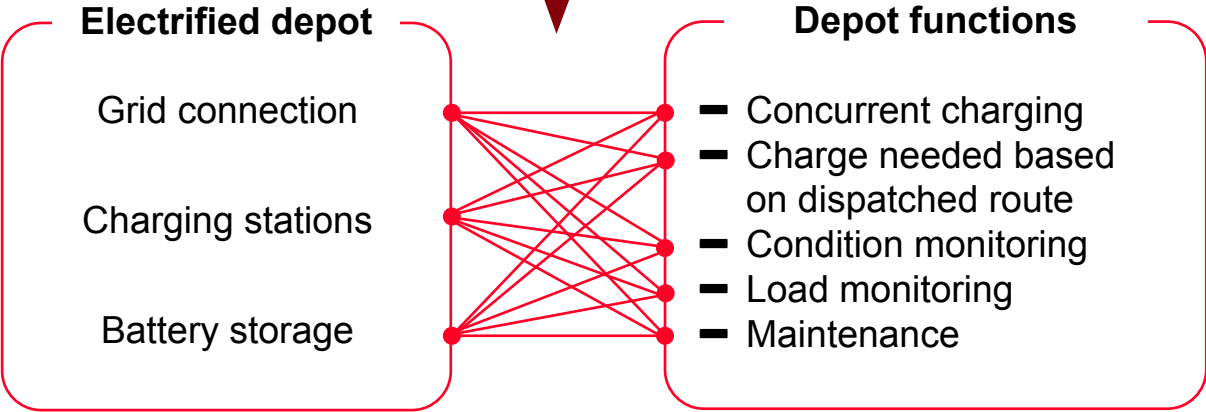
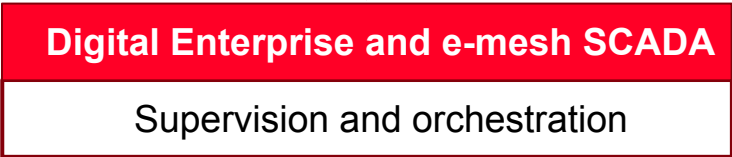
Optimize operational settings to:

Maximize renewable use
and economic benefit

Minimize grid
consumption



On-board wireless maintains connectivity with Digital Enterprise at all times



Delivering detailed asset performance data for real-time insights

Up-to-the-minute data provides...

Load data



Grid data



Market data



Weather data



IoT

Real-time data
Hourly, daily, and
weekly load profiles

Historical data

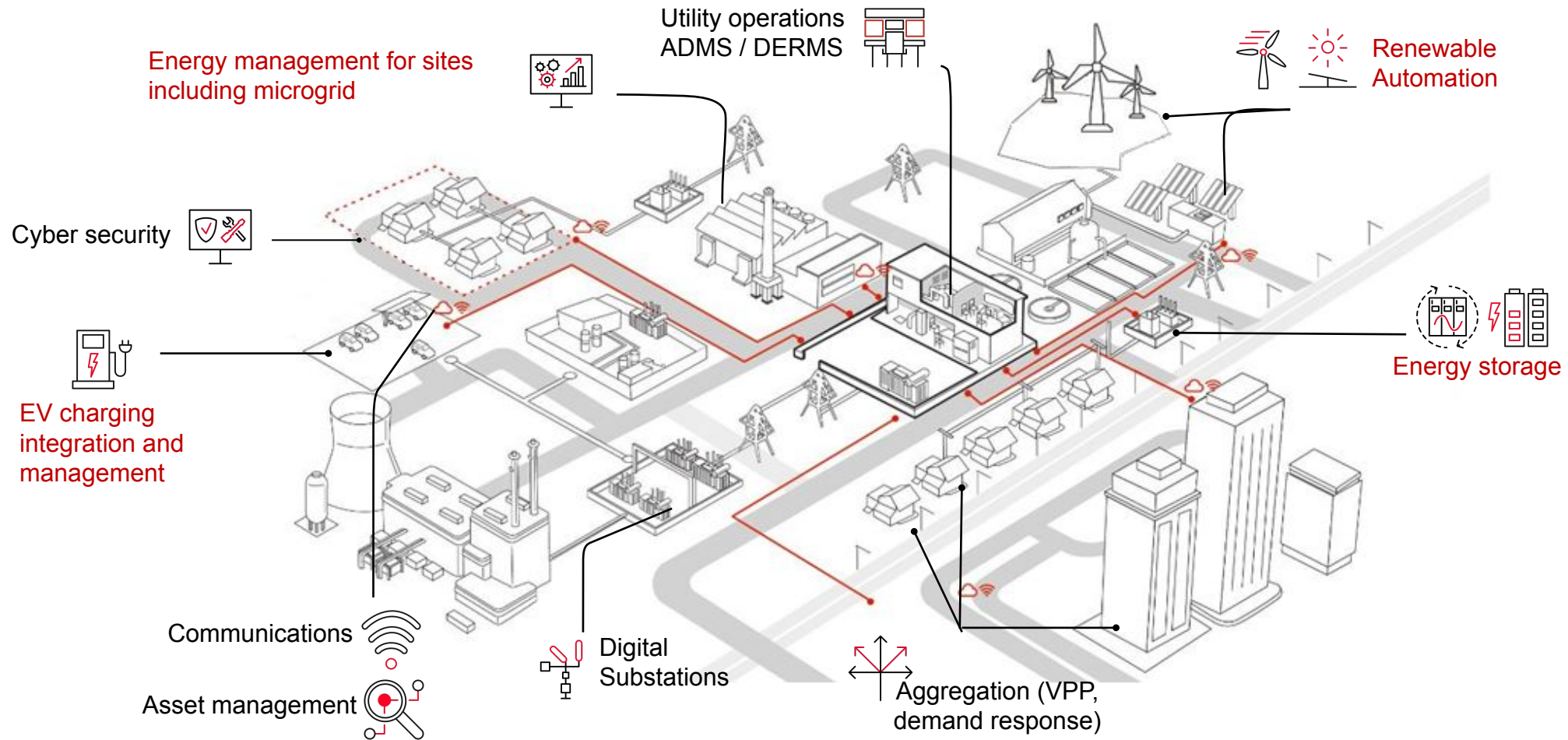
Asset Performance Management

Alert! Possible failure in four weeks
due to part deterioration.

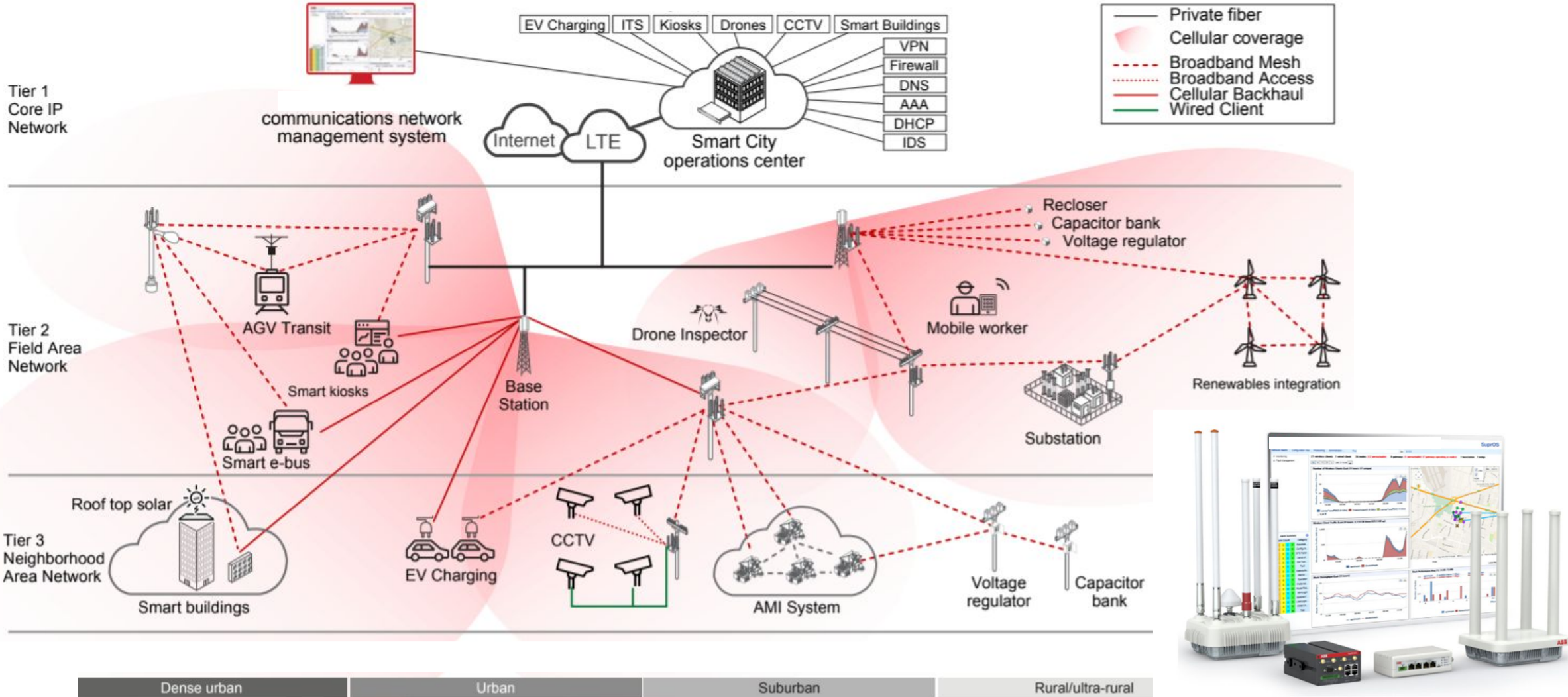
Recommendation:
Reduce load until issue is addressed



Smart City - New energy eco-system



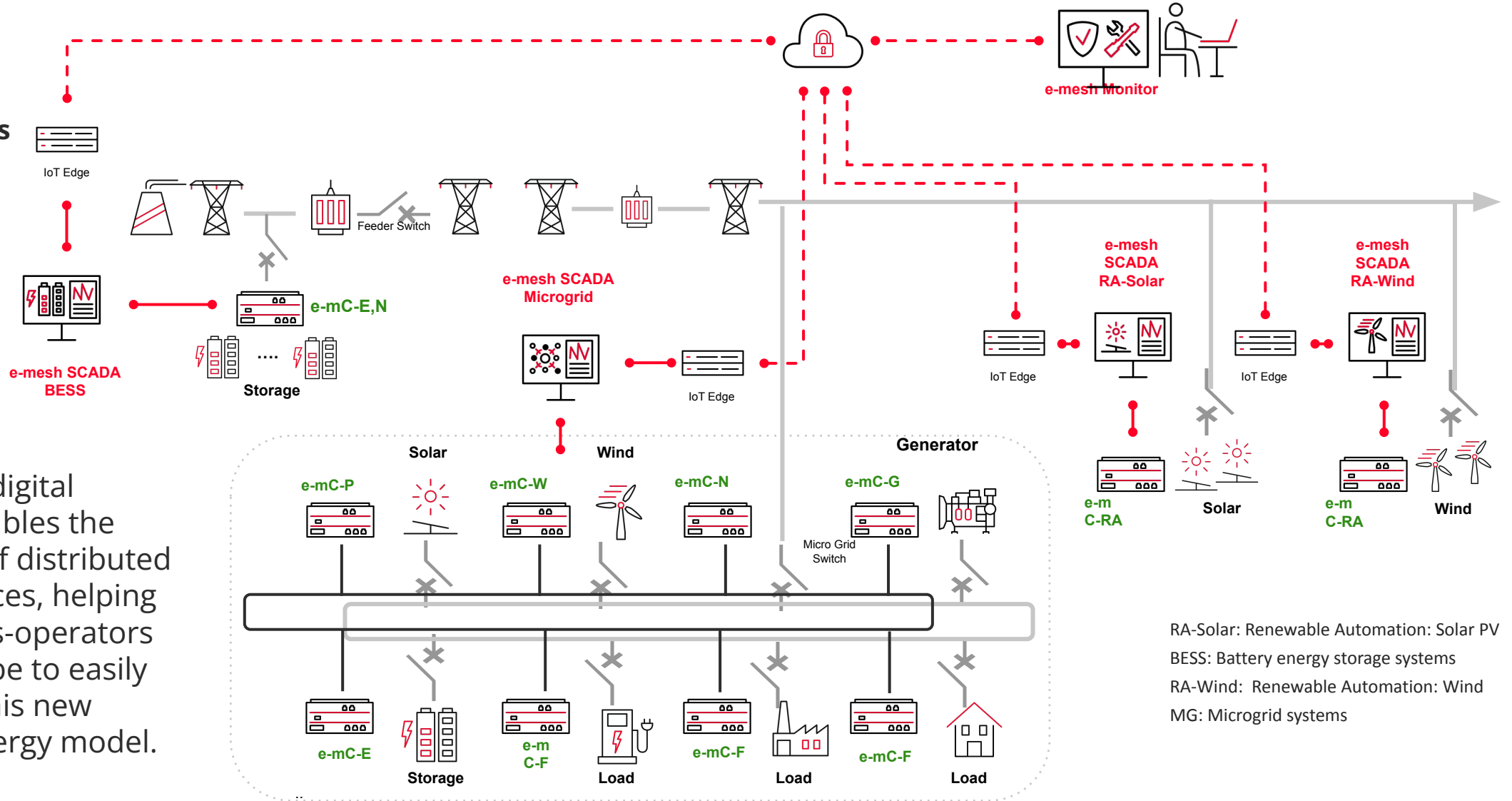
Smart City - Mission critical wireless communication



AGV Automated Guided Vehicle; EV Electric Vehicle; ITS Intelligent Transportation System; LTE Long Term Evolution; VPN Virtual Private Network; AAA Authentication Authorization and Accounting; DHCP Dynamic Host Control Protocol; IDS Intrusion Detection System; PTMP Point To Multi Point; FCI Faulted Circuit Indicator; DNS = Domain Name System

New Energy eco-system - Integration of distributed energy resources

e-mesh™
Infinite insight
into distributed
energy resources



The e-mesh™ digital ecosystem enables the digitalization of distributed energy resources, helping system owners-operators across the globe to easily transition to this new distributed energy model.

Lumada Inspection Insights



Video-based insights

e.g., substation / infrastructure inspections



Image-based insights

e.g., transmission line inspections



Satellite-based insights

e.g., vegetation management

Map enabled actionable insights from images and analytics connected to asset inspections, asset management & control, and field service operations.

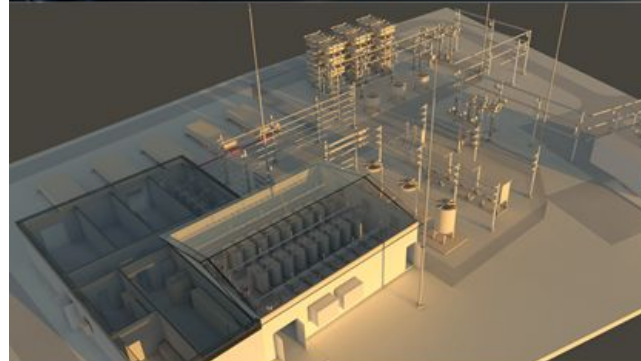


Digital Twin - Virtual Reality

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Walk-through
electrical/power installation -
learning, experiencing,
exploring

Step into Clarity - IdentiQ™

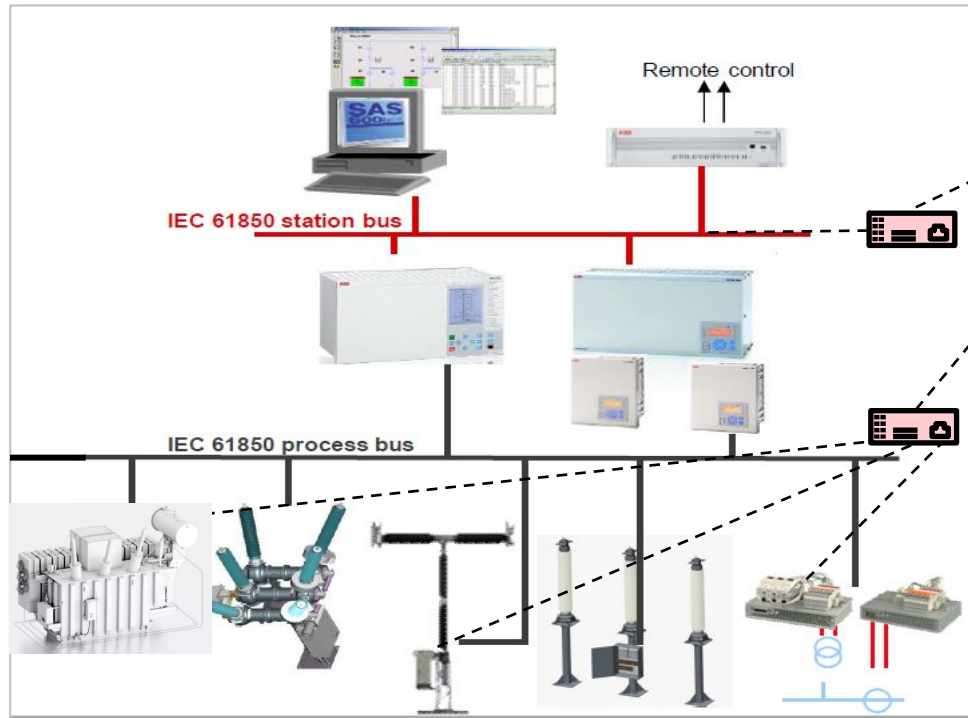


Pioneering the digital energy eco-system

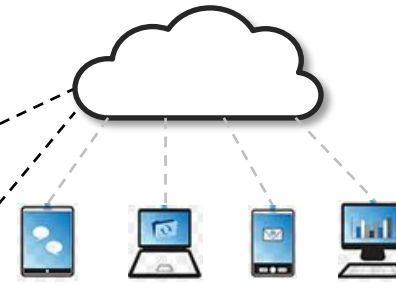
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Core, Automation and Digital Technologies

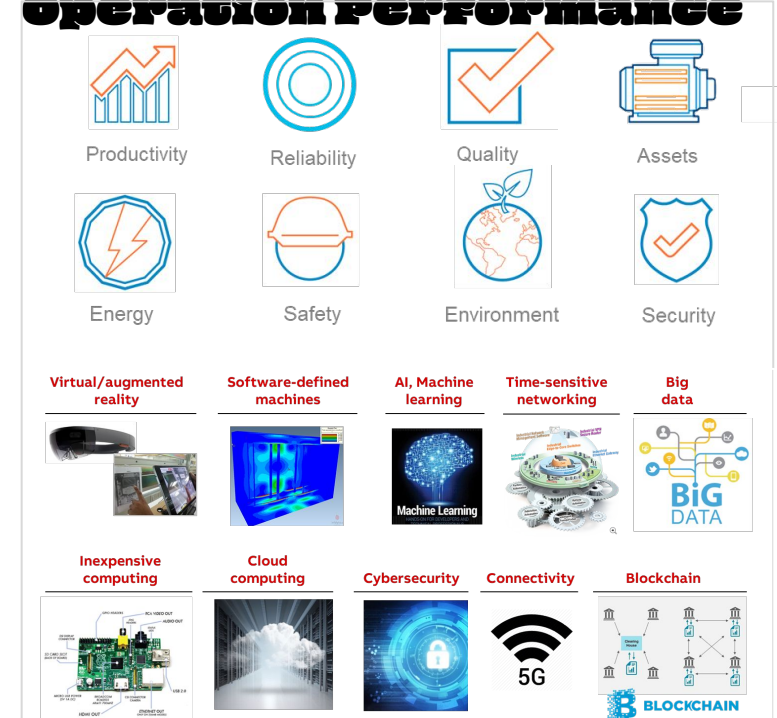
OT + Automation

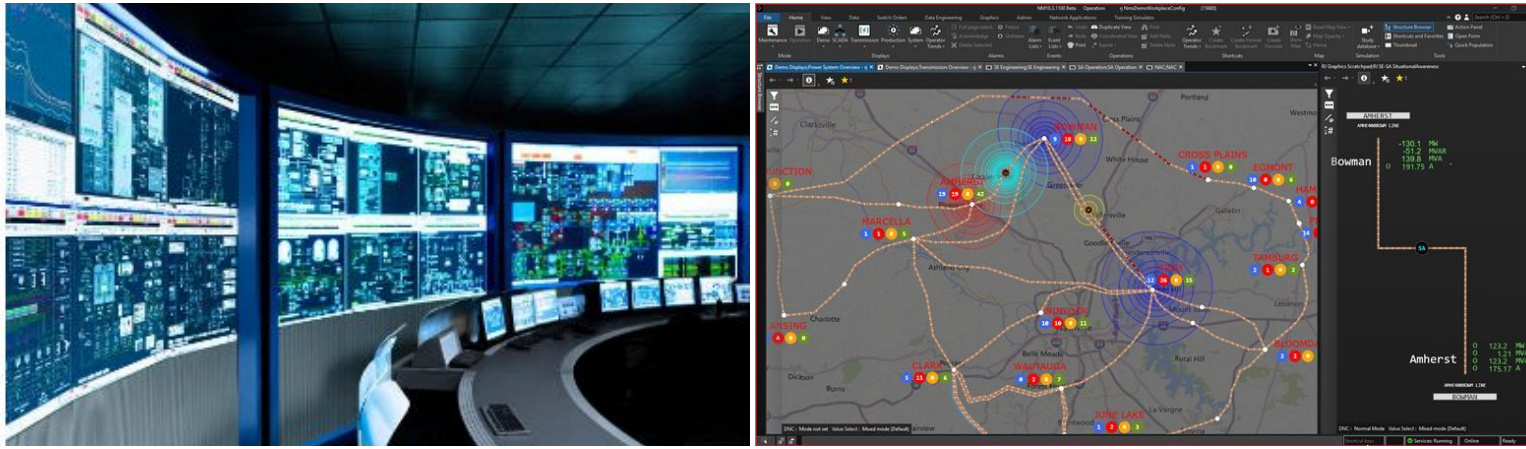


IoT, Digitalization Improving Asset & Operation Performance



- **View and analyze operation and asset data by multiple stakeholders, experts**
- **Combine with other data: weather, market, user requirement, demand, etc.**
- **Use digital technologies**
- **Further improve performance**





Remote Monitoring & Control

- SCADA
- Network Manager
- Energy Trading
- Asset Monitoring

Generation



Transfer



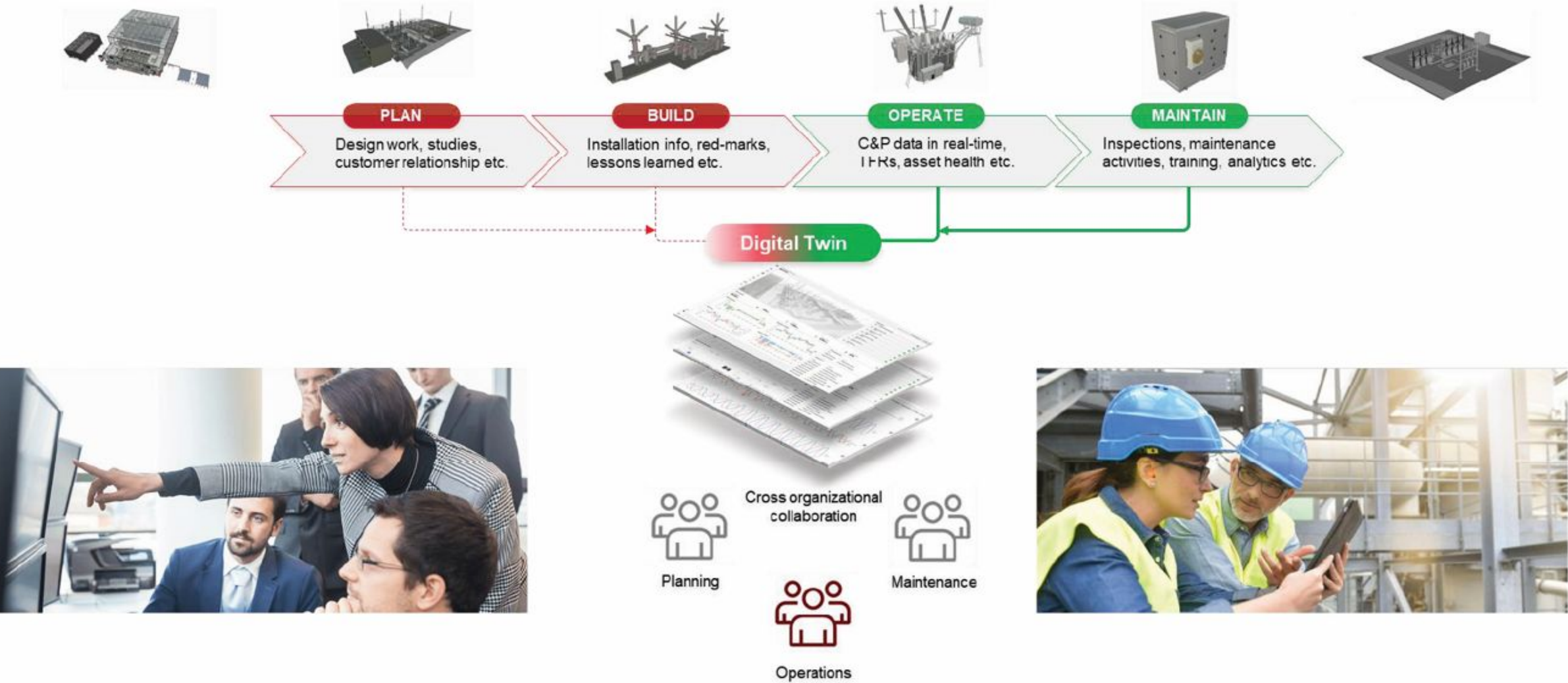
Storage



Consumption



Digitalization across lifecycle of assets and infrastructure



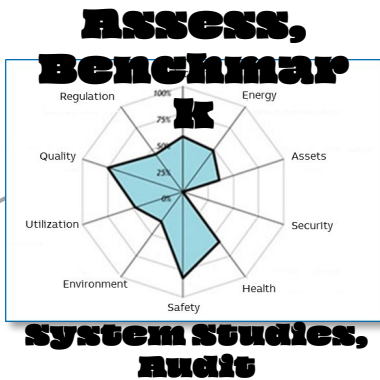
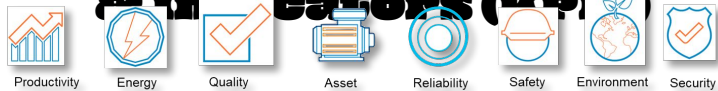
Holistic & continuously improving approach for digitalization

Building a sustainable and continuously improving system with energy and digital transformation

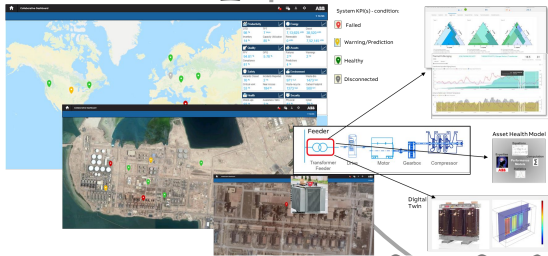


Define Key Performances

Indicators (KPIs)

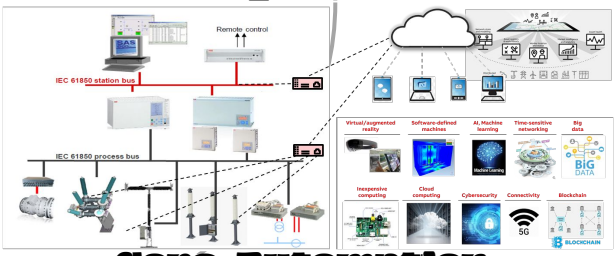


Monitor, Improve



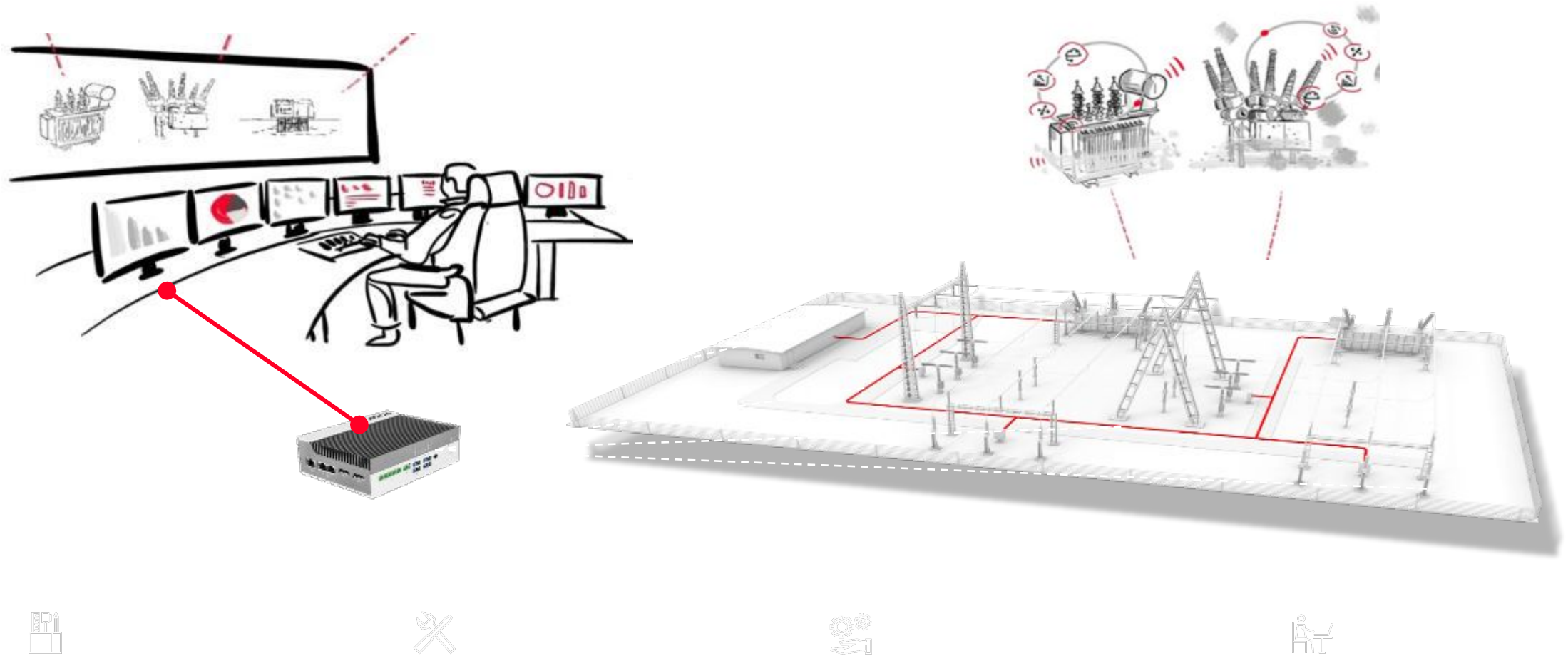
Collaborative Monitoring, Analytics & Actions

Install, Operate



Core, Automation, Digitalization

Visibility from the asset to the control room, across the entire life cycle



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