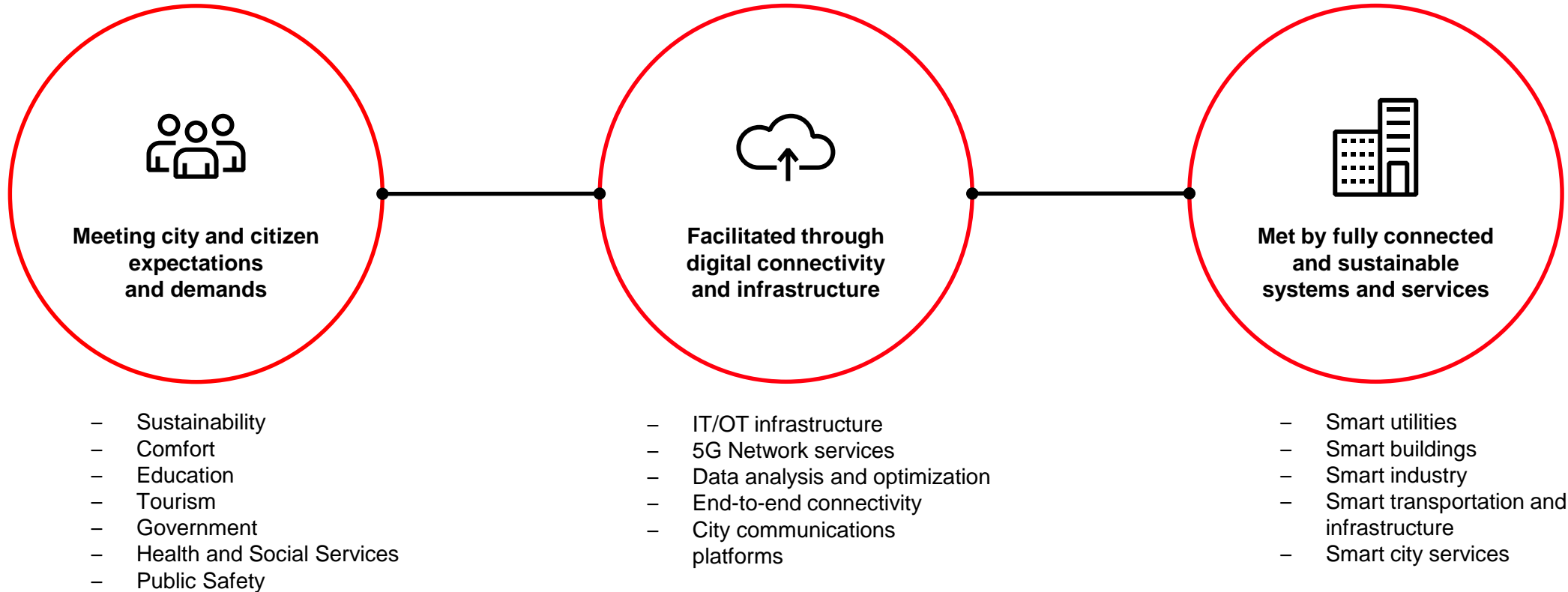# Andrea Trebiani, ABB Industrial Automation, Energy Industries

I nuovi modelli di business per le multiutility resi possibili dall'automazione digitale

Smart cities – the vision

A holistic view of smart city projects with clear ambitions

Meeting city and citizen expectations and demands

Facilitated through digital connectivity and infrastructure

Met by fully connected and sustainable systems and services

- Sustainability
- Comfort
- Education
- Tourism
- Government
- Health and Social Services
- Public Safety

- IT/OT infrastructure
- 5G Network services
- Data analysis and optimization
- End-to-end connectivity
- City communications platforms

- Smart utilities
- Smart buildings
- Smart industry
- Smart transportation and infrastructure
- Smart city services

Smart cities – the vision

The need to look at the big picture

A modern smart city demands intelligent combinations of data, people and technology to create inclusive and sustainable solutions.

This demands new, collaborative partnerships across the ecosystem including public agencies and citizens together with digital, technology and engineering specialists.

It requires local expertise and insight allied to global thinking and experience.

Changing the life of the Smart City stakeholders

01 ENGAGE YOUR CITIZENS
Through connected mobile services to increase transparency, satisfaction and participation

02 EMPOWER YOUR EMPLOYEES
to do their best work by leveraging the power of mobility to have fact based decision support

03 OPTIMIZE GOVERNMENT OPERATIONS
to ensure cost and operating efficiencies with real-time information through trusted cloud services

04 TRANSFORM YOUR SERVICES
and better utilize data to produce actionable analysis and enable better decision making

What do we consider a smart city?

Gains for the city, citizens and businesses

Water
- Clean water with great taste
- Reduce water leakage rate from today's 20% with increased understanding of big data visualization.

District heating
- Secure sufficient comfort with reduced production and advanced asset management of equipment owned and used by others in the distribution grid.

Smart Buildings
- Real estate owners: new ways of purchasing comfort and safety for its tenants with reduced costs, active participation in a Smart Grid.

Utility
- Predictable production to minimize environmental impact
- Secure sufficient comfort with reduced production and advanced asset management of equipment owned and used by others in the distribution grid.

Network / Grids

Hydro power

Solar power
- Optimization of power
- Optimize power sources for optimal benefit of the environment and cost perspective.

Digital infrastructure
- Integrated communication and computing infrastructure allows any data to be accessed, visualized and analyzed.

Asset management
- Best practices and processes helping to manage assets from day to day and throughout their lifecycle.

City assets, Roads, Lights
- Optimization and coordination of road maintenance
- Predictive Asset management for new equipment.

Public services
- New ways of communication, case management system, crisis management
- Increased speed and synchronization with reduced administration.

EV infrastructure
- Connected services, systems for billing

Emergency operation
- Visualization of current status reduces response time
- Info from water, roads, property owners, citizen's video streams etc, creates a better overview of available resources and situational awareness.
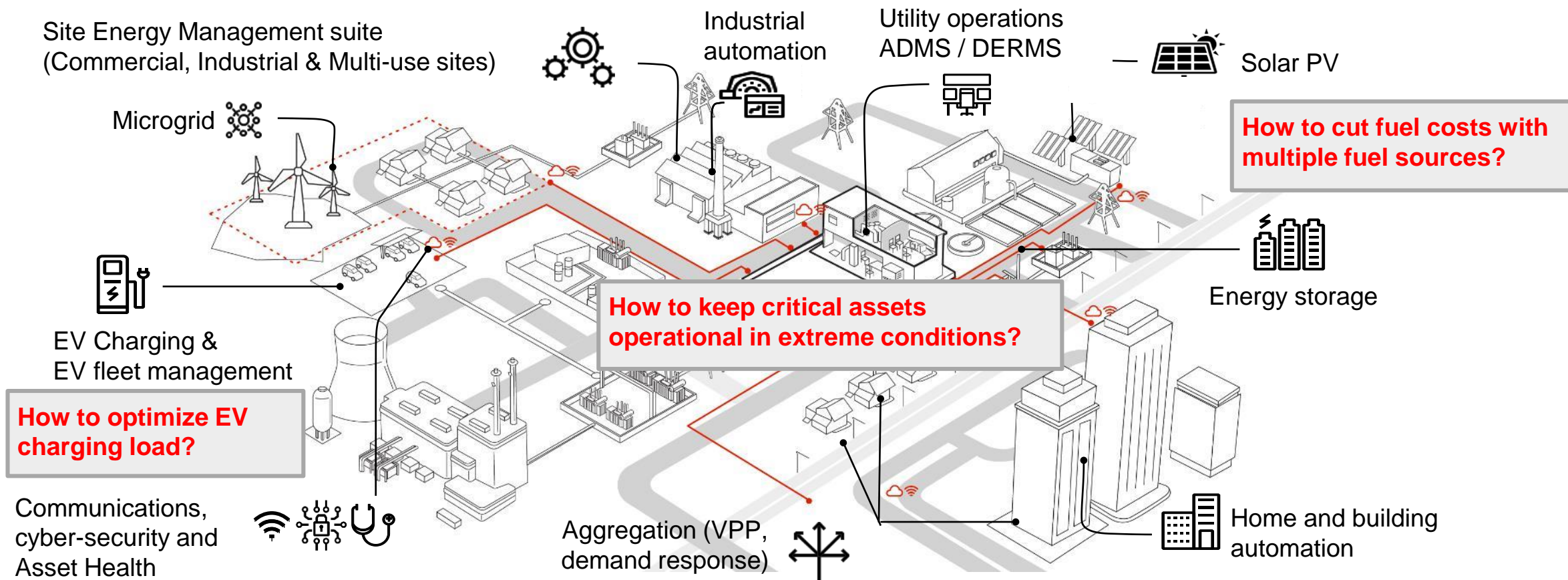
Local expertise combined with global experience
The Smart City collaboration model

Big data as enabler to solve critical business problems

Scoping & capturing the right data points

Site Energy Management suite
(Commercial, Industrial & Multi-use sites)

Microgrid

Industrial
automation

Utility operations
ADMS / DERMS

Solar PV

**How to cut fuel costs with
multiple fuel sources?**

**How to keep critical assets
operational in extreme conditions?**

Energy storage

EV Charging &
EV fleet management

**How to optimize EV
charging load?**

Communications,
cyber-security and
Asset Health

Aggregation (VPP,
demand response)

Home and building
automation

ANIE AUTOMAZIONE
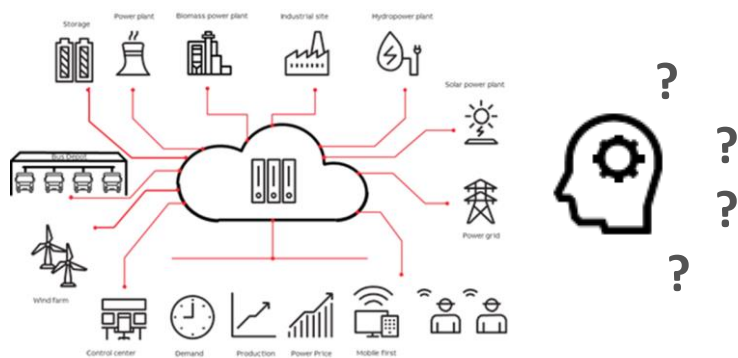
messe frankfurt

Journey becoming Data Insights driven Enterprise

Three key areas

①

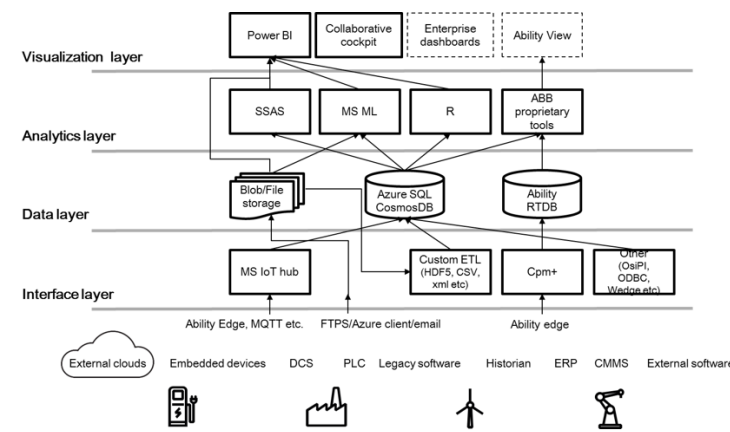## Business-lead approach to data

- Scope the business problem
- Identify the useful related data sets
- AI/ML algorithms enable to go beyond human to make use of data

②

Making integrated data available

- Pull from scattered devices, systems & applications landscape IT, OT, IT/OT
- Role-based UI to access the data
- Basis for advanced analytics

③

Continuous improvement

- 360 view visibility to start improving awareness and collaboration
- Add data sets, add managing fleets
- Gradually define impacts to process -> to sites -> across enterprise

Integrated Platform & Analytics partner

Making IT&OT data available - co-creation of new services and analytics

Integrated Platform:

- Integration of data from anywhere on shop floor to Cloud

- Open platform and ecosystem

- Secured data transmission & systems

- Easy visualization for multiple target groups
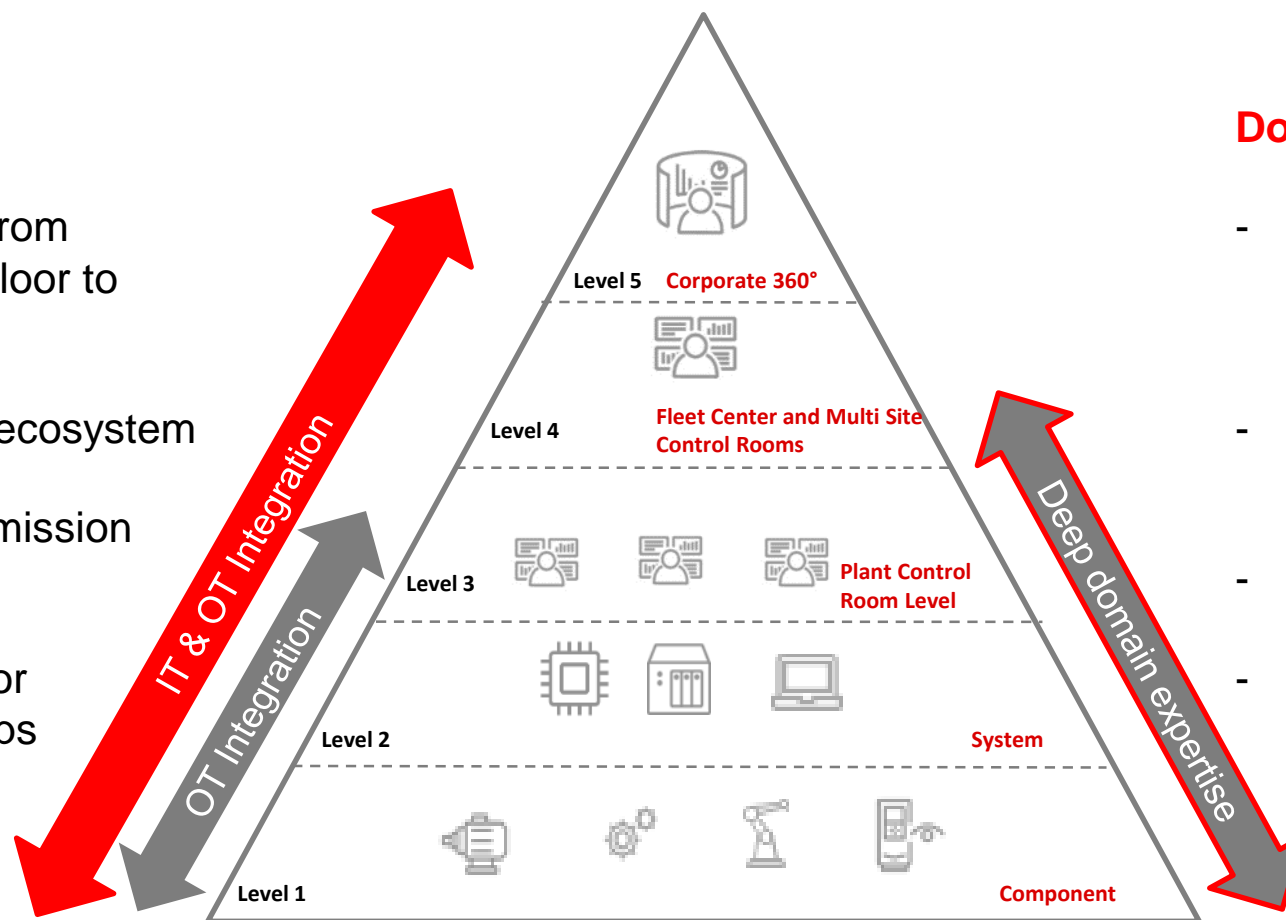
Domain & technology expertise:

- Deep domain expertise in industries, processes, applications and systems

- OT world & systems and operations knowledge

- Analytics co-creation

- True industrial partner for change implementation

IT & OT Integration

OT Integration

Deep domain expertise

Level 5   Corporate 360°

Level 4   Fleet Center and Multi Site Control Rooms

Level 3   Plant Control Room Level

Level 2   System

Level 1   Component

Proving the model

Developing smart city solutions in partnership with Mälarenergi for Sweden's fifth largest city of Västerås

The net result of this collaboration is that we can know more, do more, and do better.
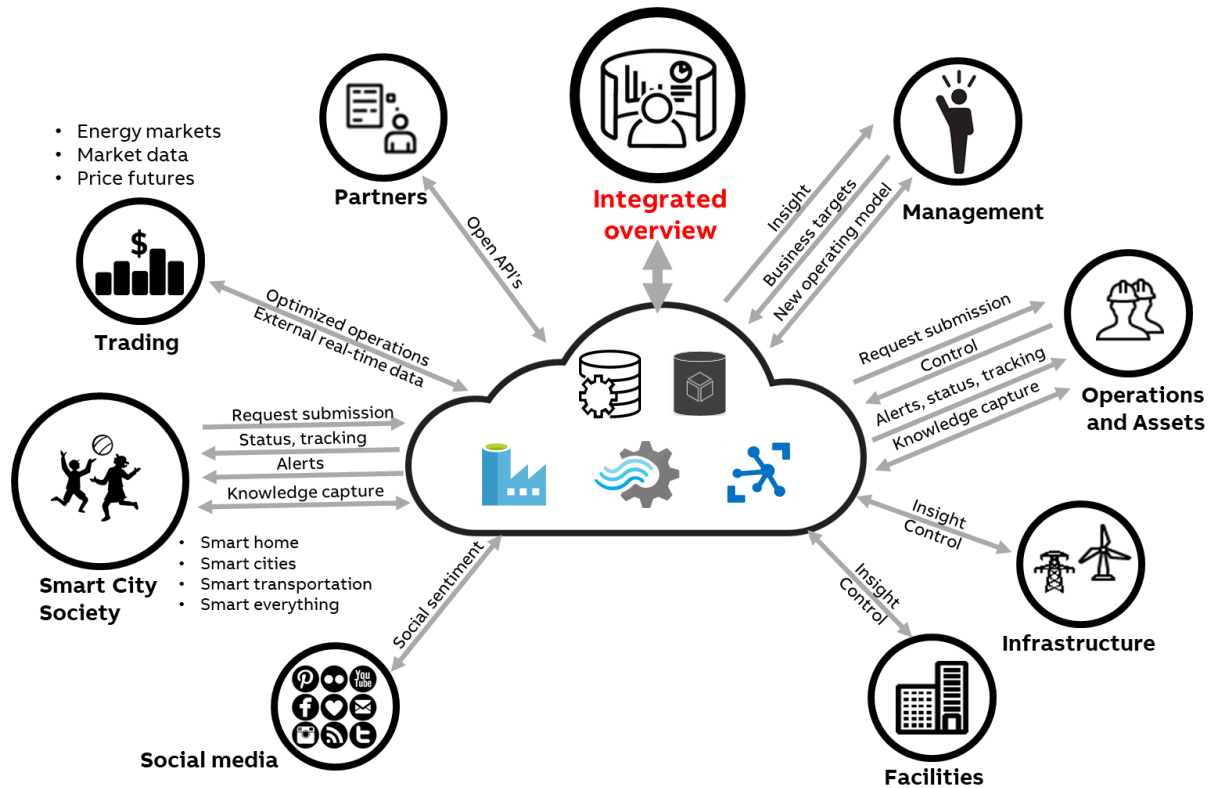
Together we are achieving:

– Cleaner water and reduced loss through leakage

– District heating that adds comfort and reduces energy consumption

– Better asset management throughout the entire life cycle

– Predictable energy production with less environmental impact

– Optimization of cost and environmental benefits across the grid

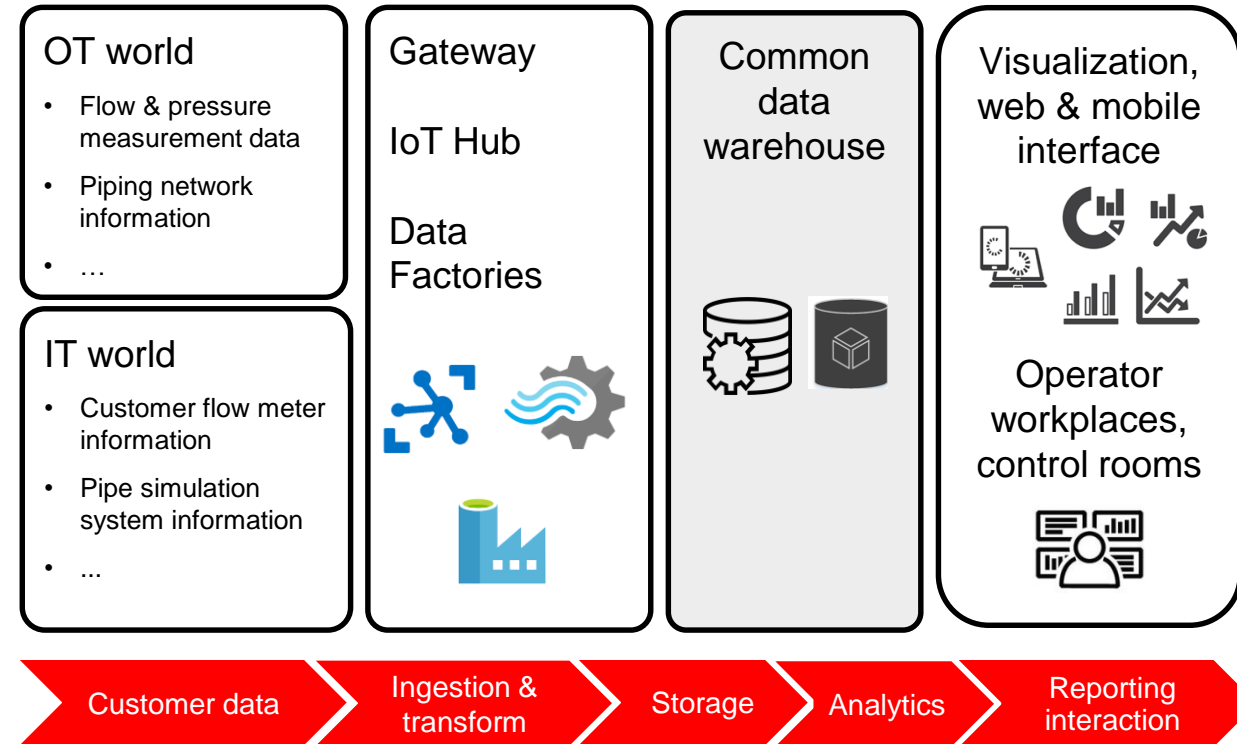– A wide range of smart city opportunities

Making Smart City into reality
Starting to see the value of combined IT/OT data

From the vision of Smart City conceptualized…

...to a Smart City integrated overview

- Energy markets
- Market data
- Price futures

Partners

Integrated overview

Management

Open API's

Insight
Business targets
New operating model

Trading

Optimized operations
External real-time data

Request submission
Control
Alerts, status, tracking
Knowledge capture

Operations and Assets

Request submission
Status, tracking
Alerts
Knowledge capture

Smart City Society
- Smart home
- Smart cities
- Smart transportation
- Smart everything

Insight
Control

Infrastructure

Social sentiment

Insight
Control

Social media

Facilities

OT world
- Flow & pressure measurement data
- Piping network information
- …

IT world
- Customer flow meter information
- Pipe simulation system information
- …

Gateway

IoT Hub

Data Factories

Common data warehouse

Visualization, web & mobile interface

Operator workplaces, control rooms

Customer data → Ingestion & transform → Storage → Analytics → Reporting interaction

Water and Waste Water

Reduce water leakage and optimize energy through digital solutions

Consolidated data, advanced analytics combined with modern visualization allows an improved situational awareness, better insight and more optimal decisions independent of place or time.

Access to information by decision makers, citizens, emergency services and other stakeholders improves safety and comfort.

- Reduce the energy consumption by up to 10%, improve water quality and avoid pipe breakages by **optimizing the pumping**.

- Reduce water losses by up to 30% with **advanced real-time leakage detection**, react immediately to network problems

- Reduce equipment downtime by 80% and maintenance cost by 50% by **predictive maintenance and enterprise-wide asset management**

- Prevent building and road damages, and reduce traffic disturbances by **predictive flooding detection** based on advanced analytics, weather forecasting and cognitive video analytics

District Heating and Cooling

Secure sufficient comfort with reduced production - Advanced asset management in distribution grid

Visualization and analytics of district heating network helps track network utilization, plan expansions and investments and give a better transparency into the operations.

Securing availability of sufficient heating and cooling for all consumers, avoiding reduced performance in distant parts of the network.

- Thermal losses in the heating and cooling networks can be reduced up to 5% when introducing **advanced control of the feed temperature** based on predicted consumption and weather conditions.

- An **optimized return temperature** can have effects on the electricity production from e.g. steam turbine plants, with additional 5% improvement

- **Dynamic optimization of pump configurations** in complex networks can reduce the pumping energy consumption by up to 5%.

- **Active** demand-side **control in smart buildings** helps optimizing heat generation and can reduce consumption e.g. when the building is unoccupied

Digital Infrastructure

Integrated communication & computing infrastructure allows any data to be accessed, visualized & analyzed

Building a smart city requires building access to information that allows to get an overview of the activities, and to implement tools to better visualize, optimize and analyze the data.

- All the information sources in the city, **wired, wireless and 5G communication, cloud and mobility** are all elements of the smart city infrastructure.

- Protecting the city digital infrastructure from **cyber attacks** needs to be an integral part of any smart city infrastructure project

- Integrating the data allows to form an **online holistic view** of the activities, remove barriers between organizations and reducing retention time

- It will enable **new business models**, helping the city prosper

- It will also enable the **development of new services** and solutions for a safer, more optimized and environmentally friendly city

The ABB Ability™ technology powering smart cities

GRAZIE PER L'ATTENZIONE