



**ANSALDO  
ENERGIA**

Convegno

**INDUSTRY 4.0**

La Voce di chi Produce



**FESTO  
FESTO**  
Consulting



**The Human Capital in the middle of  
Ansaldo Energia Digital Transformation:  
the Lighthouse Plant project**

**Luca MANUELLI - Chief Digital Officer**

Milan 22/11/2018

# AGENDA

**a. Digital Energy Scenario**

b. AEN Business and Digital Strategy alignment

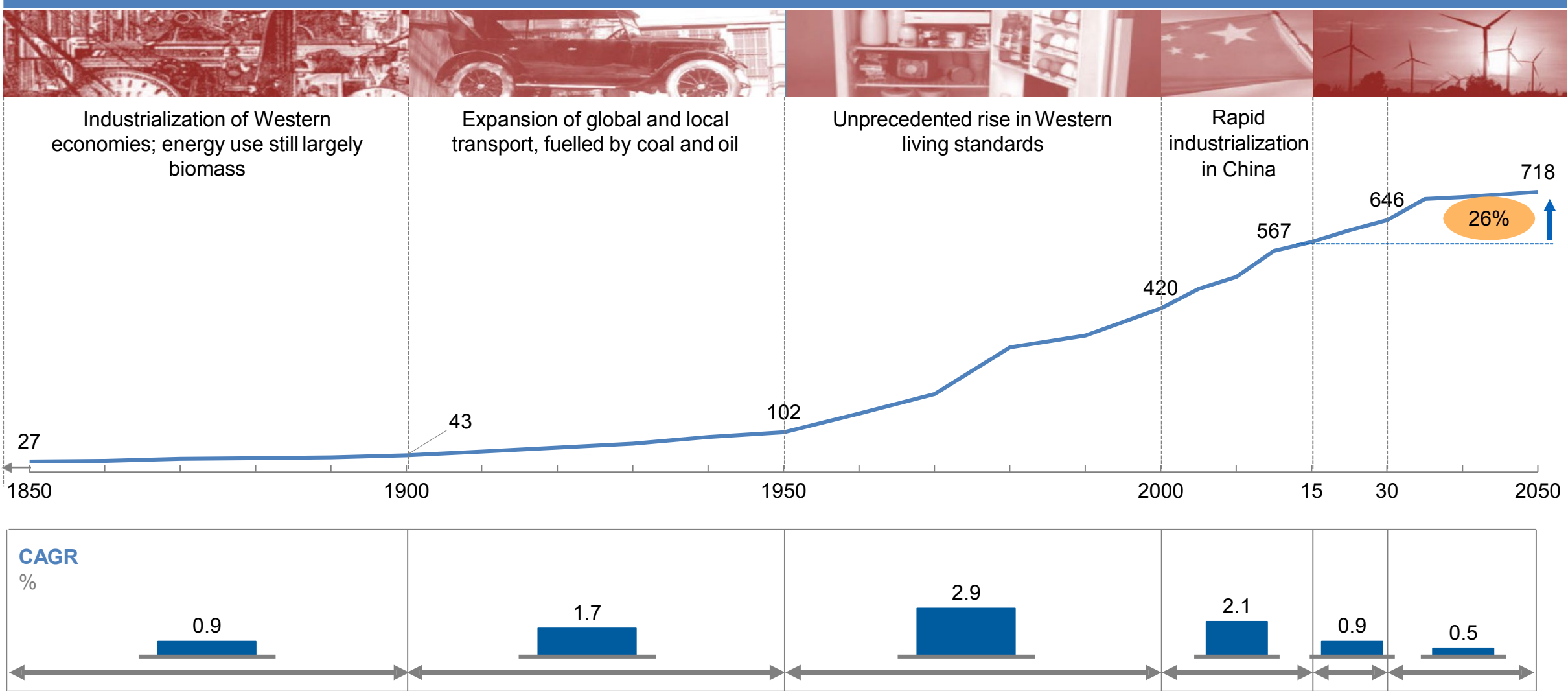
c. The Lighthouse Plant Project to support the empowerment of Manufacturing Processes

d. The Human Capital in the middle of AE Digital Transformation



# ENERGY DEMAND TRAJECTORY: CONTINUED GROWTH, BUT THE RATE SLOWS

Global primary energy demand, Million terajoules



Source: McKinsey Energy Insights' Global Energy Perspective, December 2017; IEA Energy Balances (Historical)

# POWER GENERATION DIGITAL TRANSFORMATION SCENARIO

## The Future of Energy ... the 3Ds

*Energy will be cleaner, more accessible, intelligent, connected and responsive;  
Digital transformation will converge with business transformation.*



### DECARBONISATION

Shifting generation, transmission, distribution and usage towards a lower carbon future.

*Renewable energy, e-Mobility, energy efficiency, new and future fuels, demand side management, etc.*



**44%** of global generating capacity from renewables by 2025

**1,600 GW** of renewables capacity added between 2017 & 2025



### DECENTRALISATION

New DG models with a proliferation of distributed and connected generation, closer to the point of use.

*Distributed generation, energy storage, microgrids, prosumers, VPPs, P2P, etc.*



**12%** of global generating capacity from DG by 2025

**65%** of DG investments will be distributed Solar PV



### DIGITALISATION

Digital technologies to provide infrastructure for more flexible, intelligent, connected & responsive energy systems.

*Smart grid, asset optimisation, demand response, automated trading, active energy management, etc.*



**50 Billion** connected devices – or 'things' - globally by 2025

**>\$1 Trillion** economic value of IoT impact in energy by 2025

Source: Frost & Sullivan

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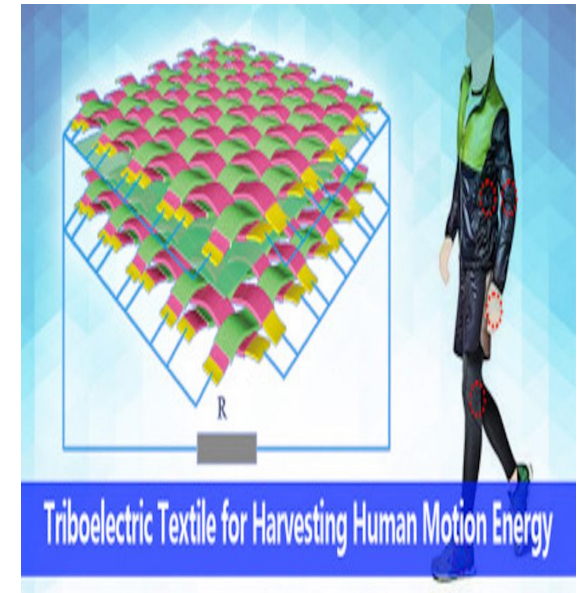
**Each of us will be able to generate, consume and trade energy exploiting new digitized distributed technology**

### THE TRIBOELECTRIC NANOGENERATOR, A NEW SOURCE OF ENERGY HARVESTING FOR WEARABLES

A collaborative research project between the **University at Buffalo** in the US and the **Institute of Semiconductors (IoP)** at the **Chinese Academy of Science (CAS)** has developed a small metallic tab that when attached to the body, can generate electricity from simple movements.

This, in theory, could mean that when the **triboelectric nanogenerator** is attached to the body, it can generate electricity from simple movements – including bending a finger. Although still early days, the triboelectric nanogenerator was **able to power 48 LED lights simultaneously**.

After investigating a number of potential nanogenerators capable of producing the triboelectric effect, the breakthrough came when they used **two thin layers of gold, with polydimethylsiloxane** (also called PDMS, a silicon-based polymer used in contact lenses, Silly Putty and other products) **sandwiched in between. This causes electrons to flow back and forth between the gold layers: the more friction, the greater the amount of power is produced.**





# POWER GENERATION DIGITAL TRANSFORMATION SCENARIO

## Adoption of new technologies is accelerating

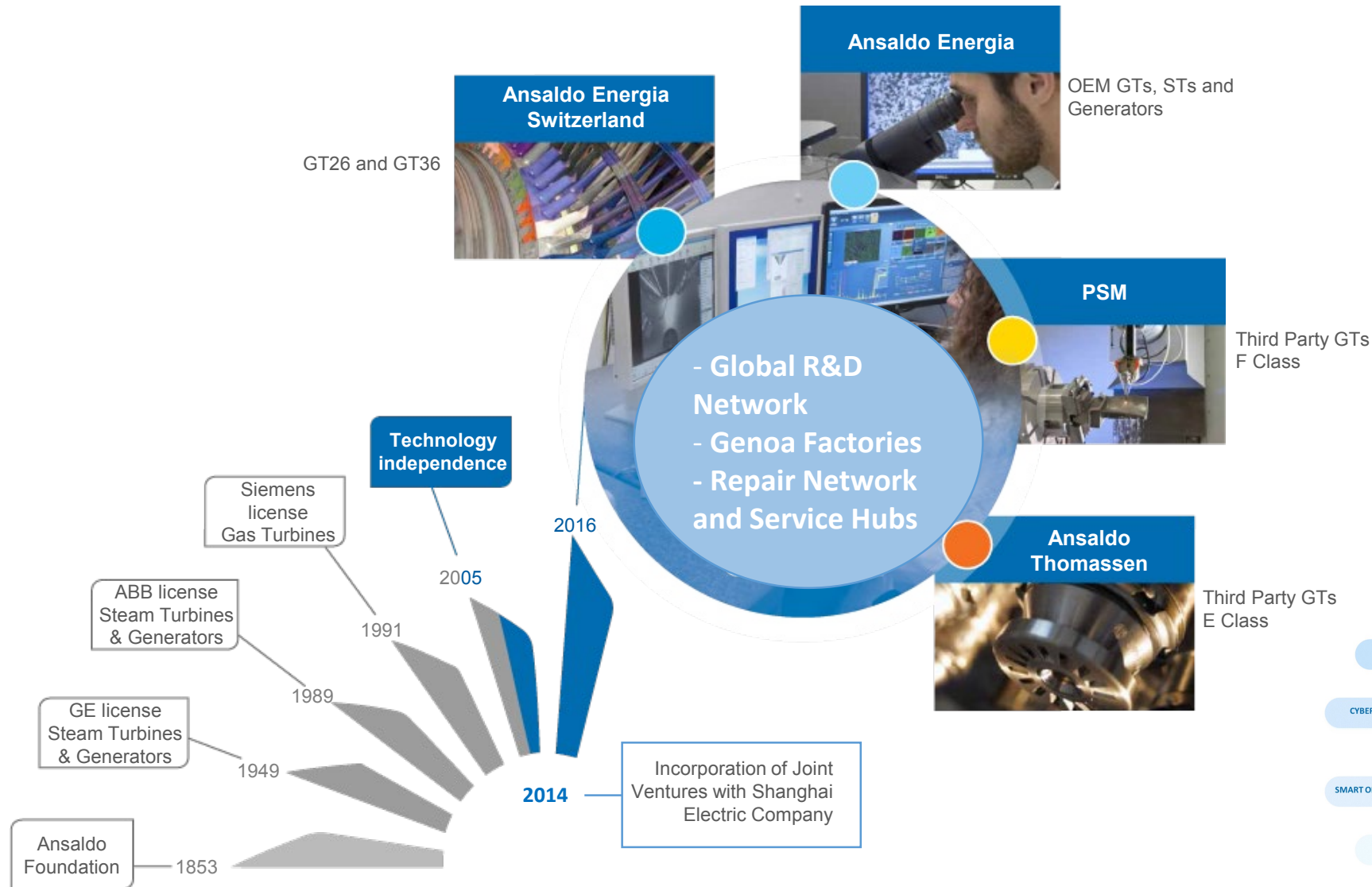
Time to reach 50 million users



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# BUSINESS STRATEGIC EVOLUTION



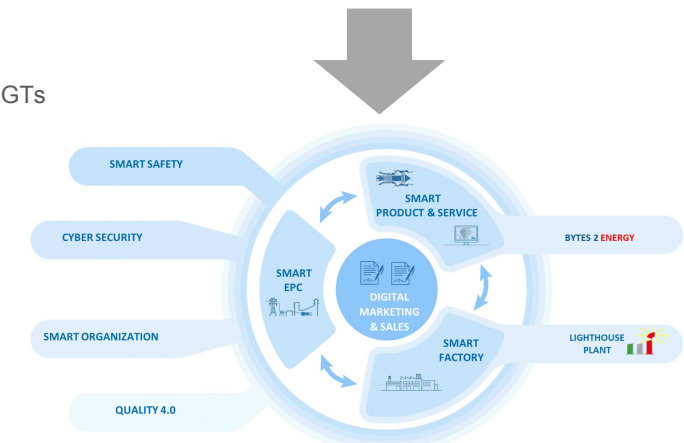
**2 PROPRIETARY  
TECHNOLOGIES  
SUPPORTED BY GENOA  
MANUFACTURING SITES**

+

**MANAGEMENT CAPABILITIES  
OF ALL «STATE OF ART»  
GT TECHNOLOGIES**

=

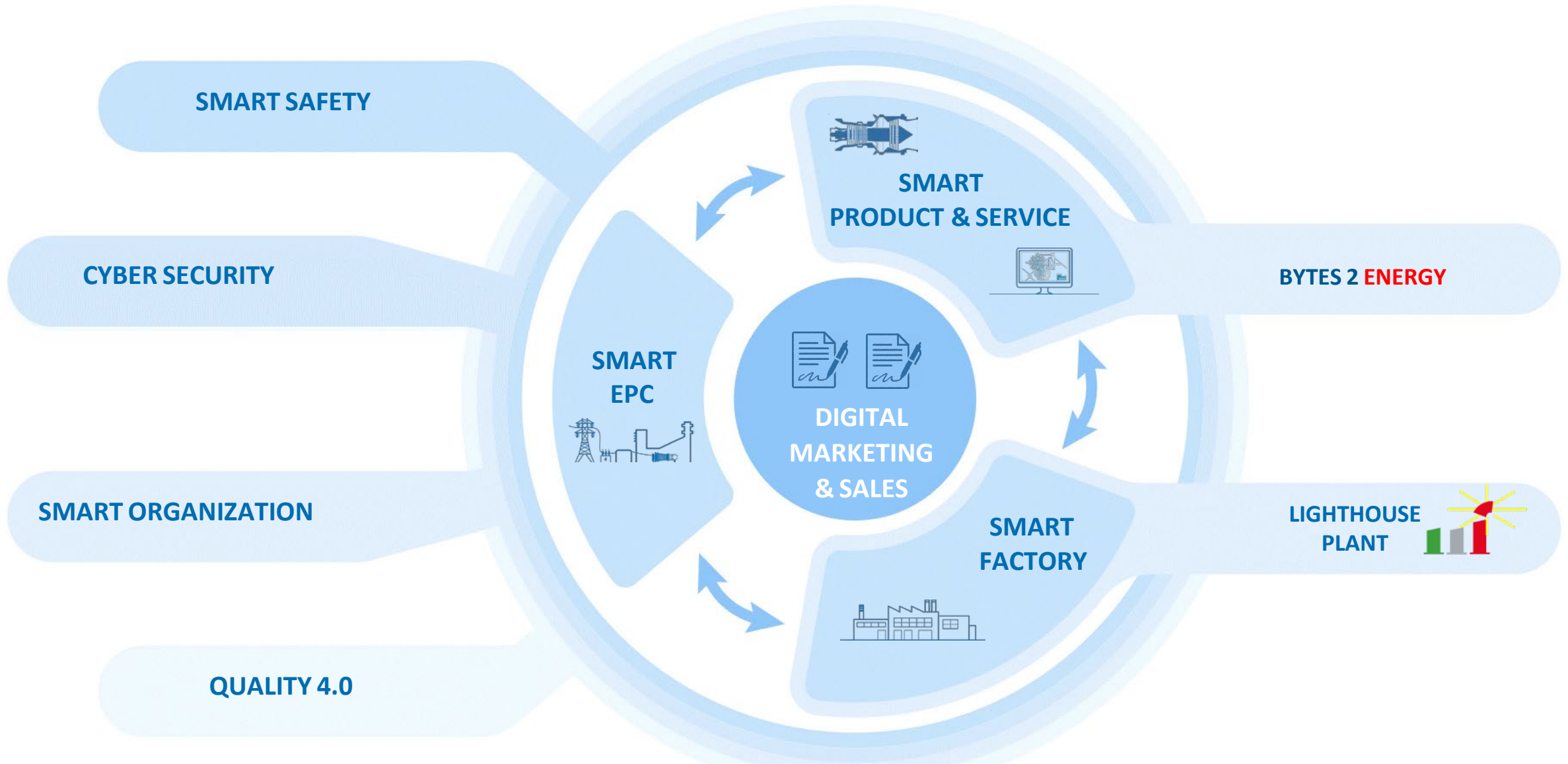
**3<sup>^</sup> PLAYER IN  
POWER GENERATION**



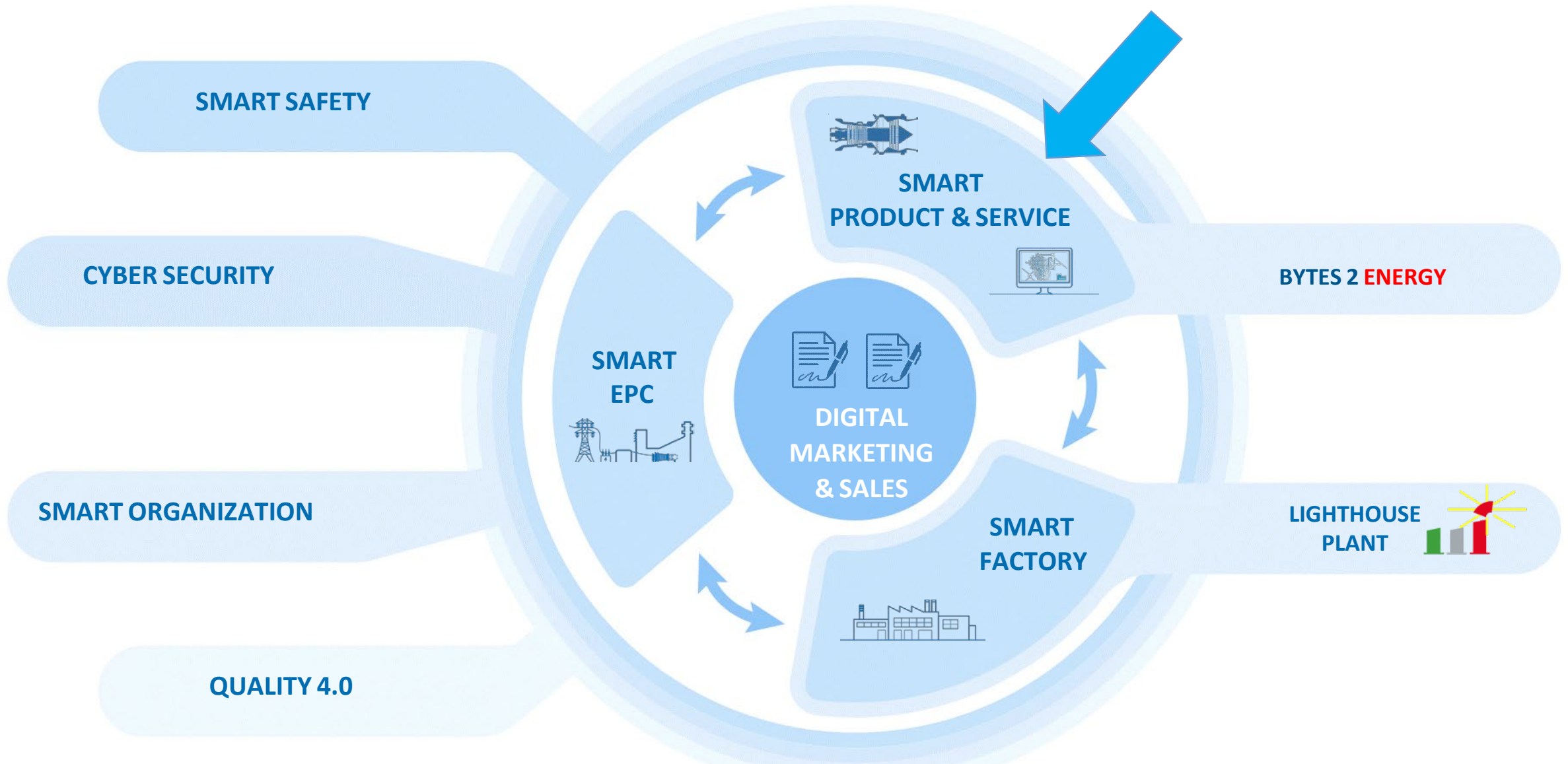
**AEDT ROADMAP**



# ANSALDO ENERGIA Digital Transformation Roadmap

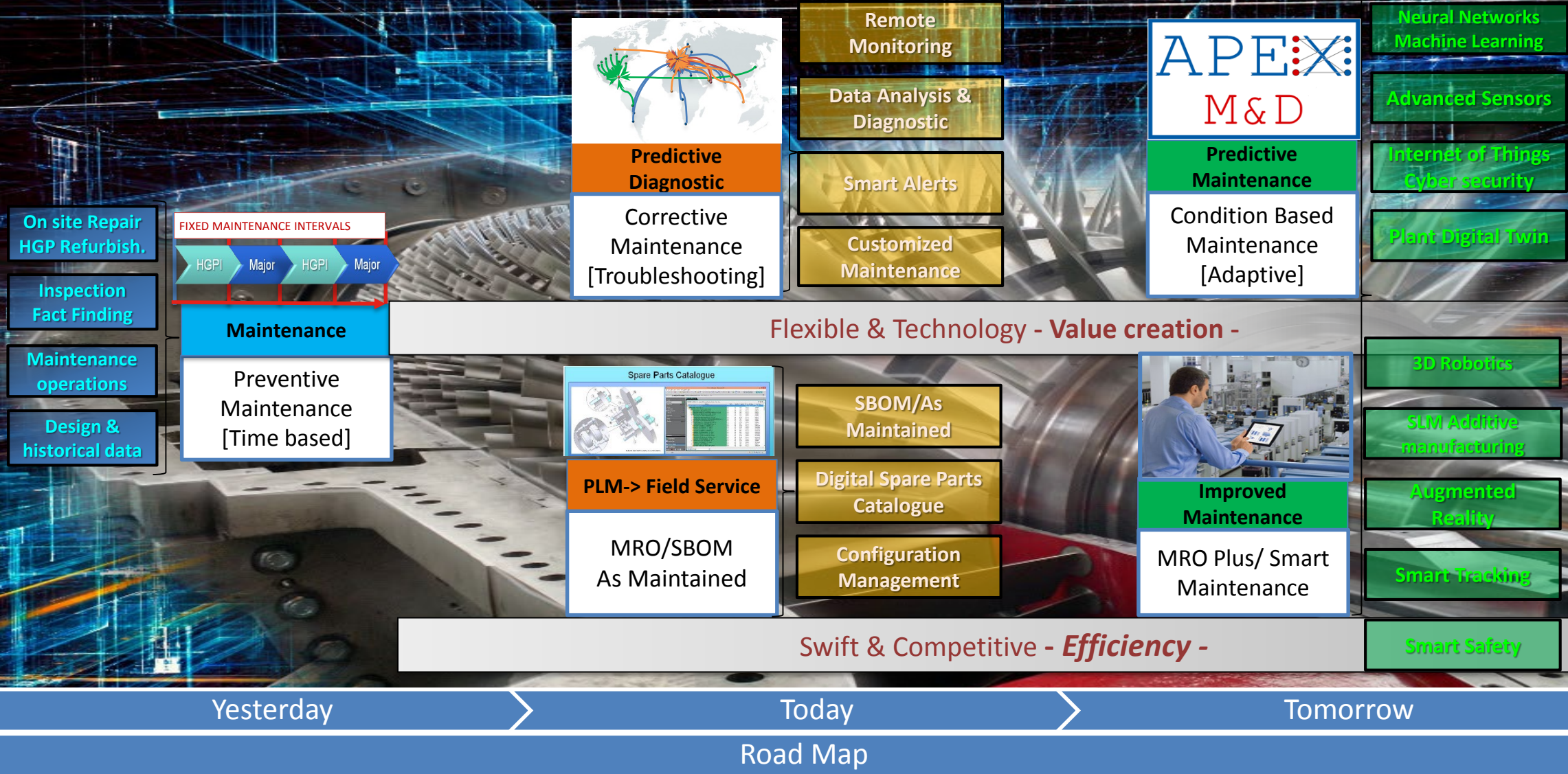


# SMART PRODUCT & SERVICE





# SMART PRODUCT & SERVICE



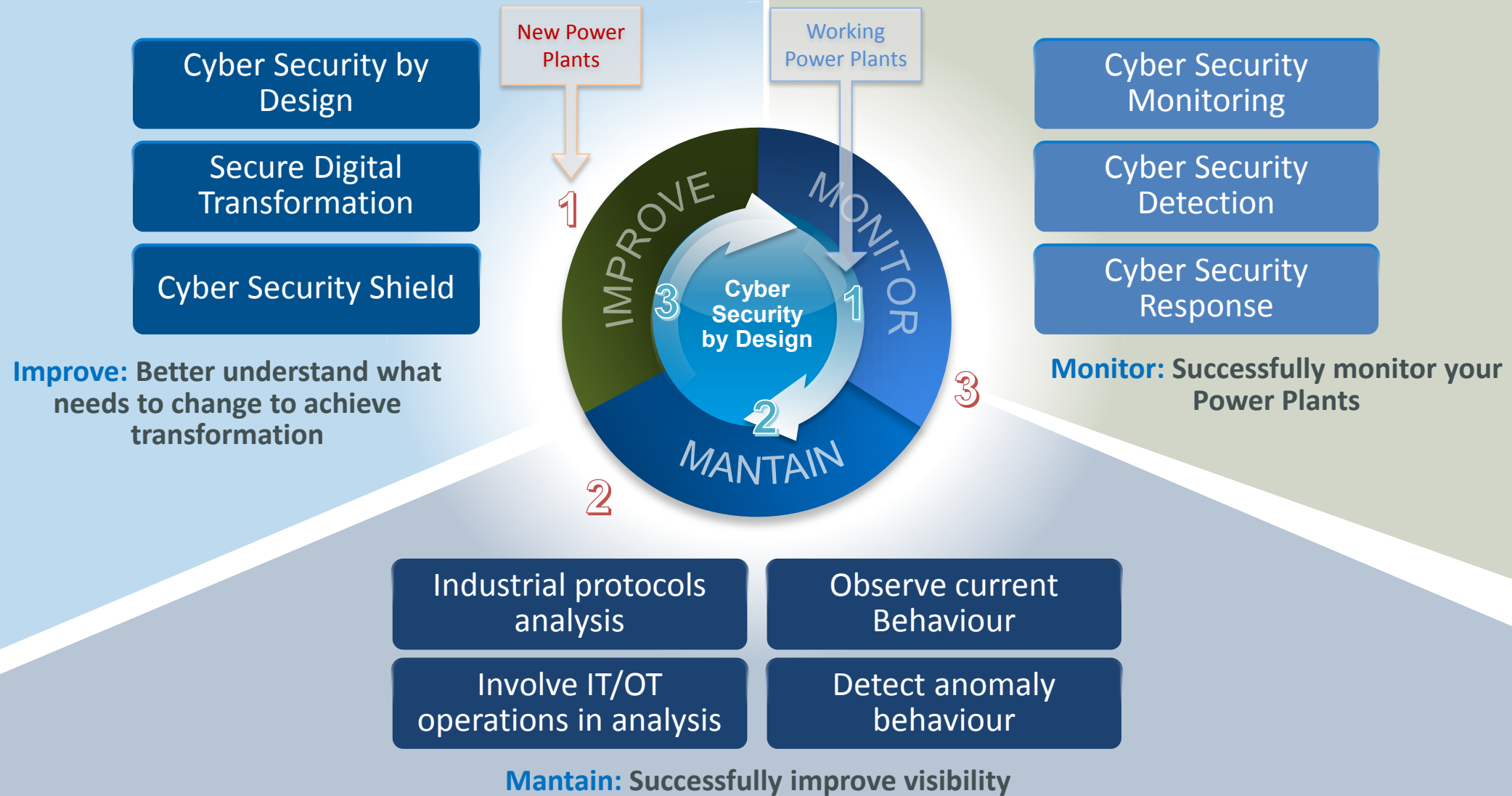


## SMART PRODUCT &amp; SERVICE - BYTES 2 ENERGY SCOPE



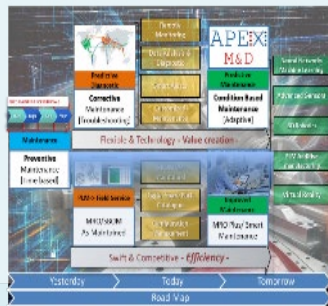
**AGENDA DIGITALE Funding MISE:**  
DM 15 ottobre 2014 e DM 24 luglio 2015  
Duration : 36 months (2018-2020)  
Total Investment: 12,5M€

# AE APPROACH FOR CYBER SECURITY – NEW vs RETROFITTING



# AE APPROACH FOR CYBER SECURITY – PARTNERSHIP

## Digital Power Plant Solution & Services



- Asset monitoring
- Remote diagnostic
- Predictive maintenance Services
- Digital Field Services



## Power Plant Cybersecurity Solution & Services



**LEONARDO**  
Cyber Security IT/OT Integrator:

Technology Operators  
Constraints  
for Cyber Security



Cyber Security Vendors  
Cyber Security  
Technologies



Strong competence on Cyber  
Security on traditional IT and OT  
(Operation Technology)

## Integrated Digital Secure Plant Solution & Services



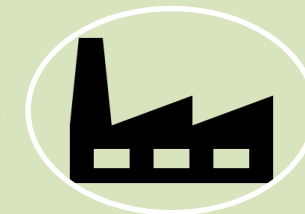
Business partner  
on Power generation:



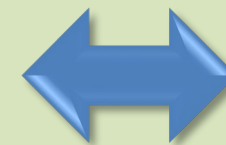
Strong competence of energy environment

**ENERGY MARKET**

Power generation  
key role



**CUSTOMERS' DIGITAL  
TRANSFORMATION**

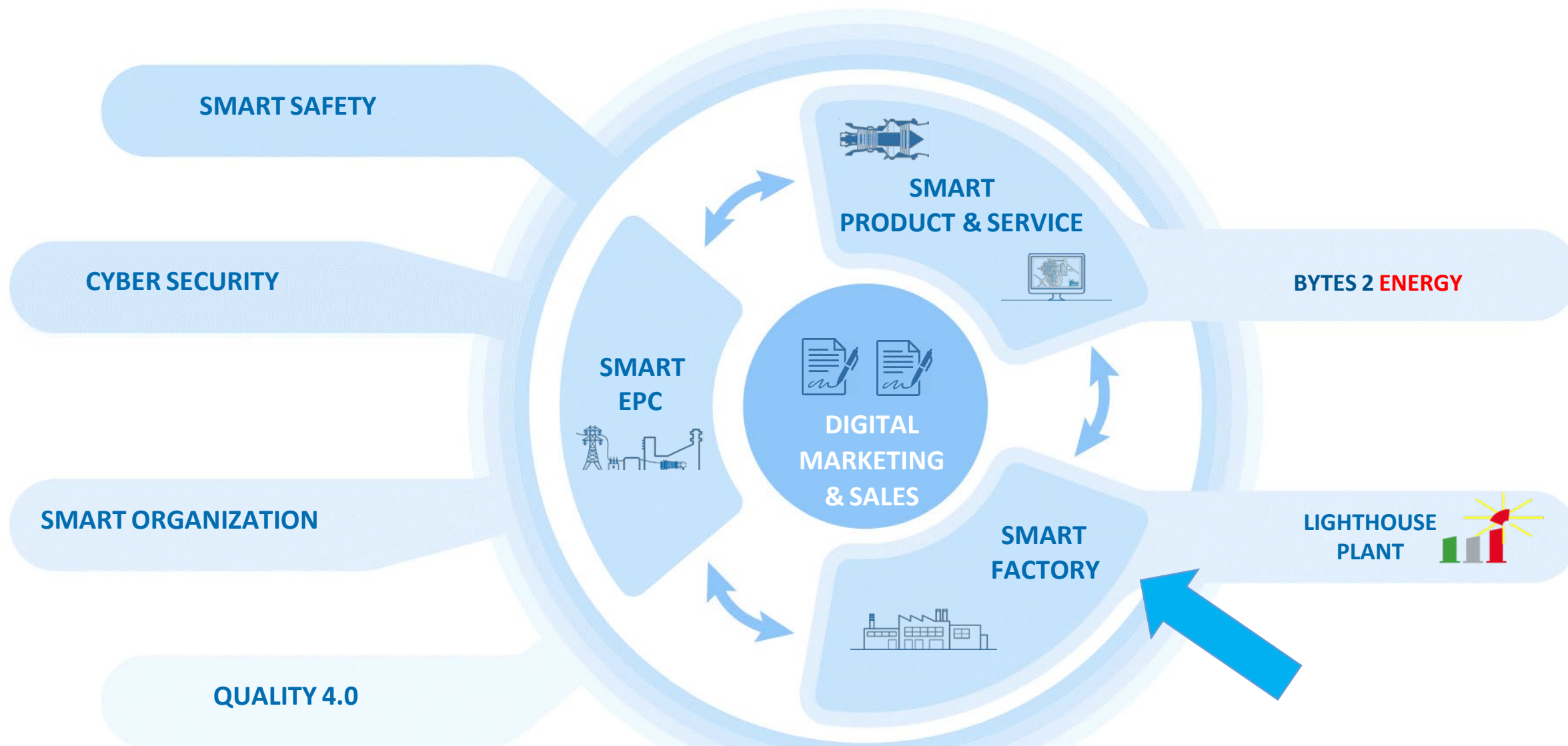




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# SMART FACTORY





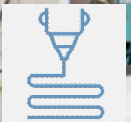
# First Lighthouse Plant of the Enterprise 4.0 Plan



IOT



BIG DATA

HORIZONTAL  
VERTICAL  
INTEGRATIONADDITIVE  
MANUFACTURING

- The Smart Factory Cluster managed the identification, on behalf of **MISE**, of the **Enterprise 4.0 Plan** Lighthouse Plants, leading to the selection of **Ansaldo Energia** as the first **Lighthouse Plant**.
- Since July 2018, Ansaldo Energia has started to **invest** a total of **€14m** in a **three-year Industrial Research and Development Plan**, based on the development and application of the **main digital technologies covered by the Enterprise 4.0 Plan** to the entire manufacturing process at its **two Genoa production sites** (Campi and Cornigliano).
- The terms of the **Innovation Agreement** finalised by **MISE** and the **Liguria Regional Administration** mean that **Ansaldo Energia's investment** - in addition to the incentives provided by the Enterprise 4.0 Plan - will be **eligible for a grant equal to 25% of the total** (20% MISE and 5% Liguria Regional Administration).

AUGMENTED  
REALITYVIRTUAL  
REALITY

SIMULATION

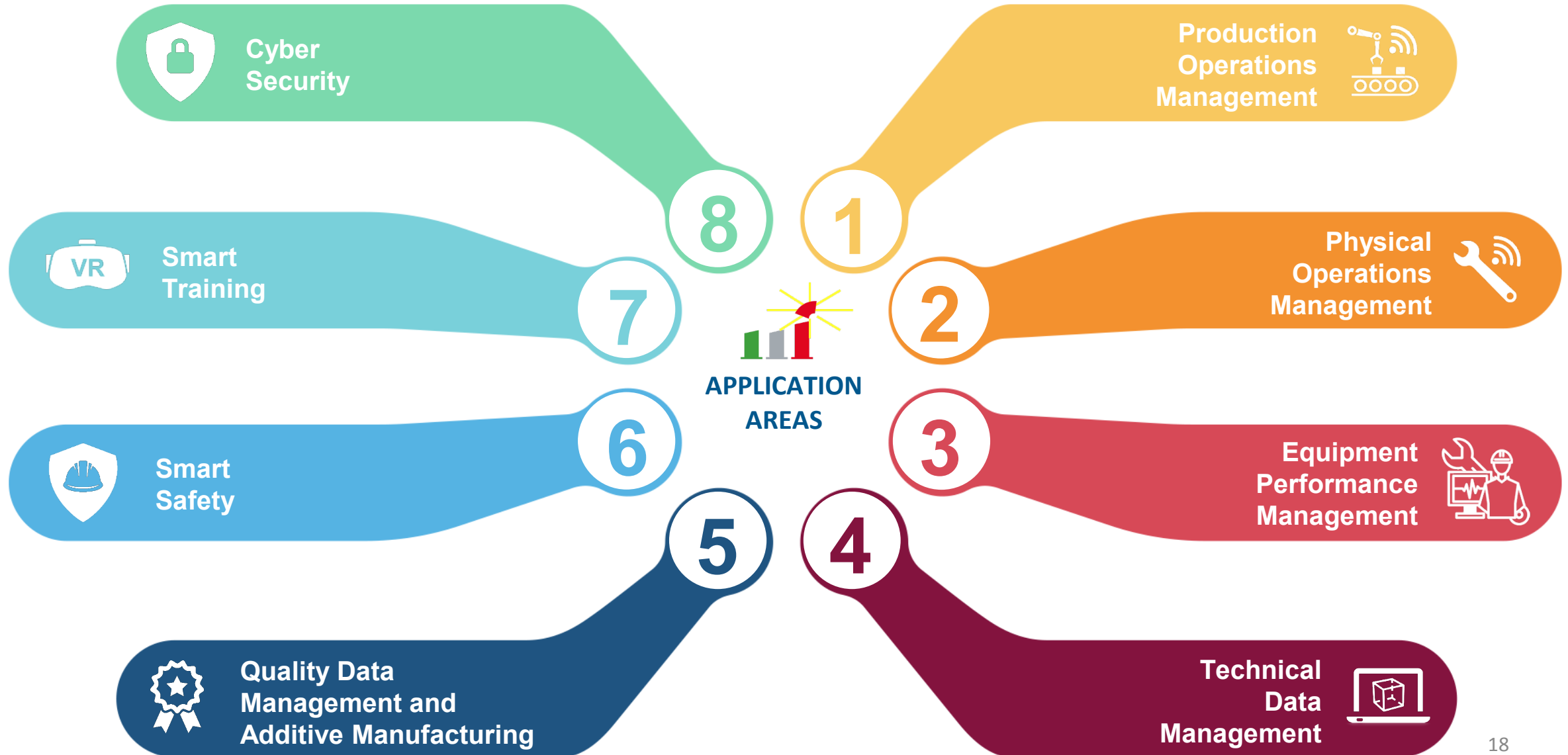


CLOUD



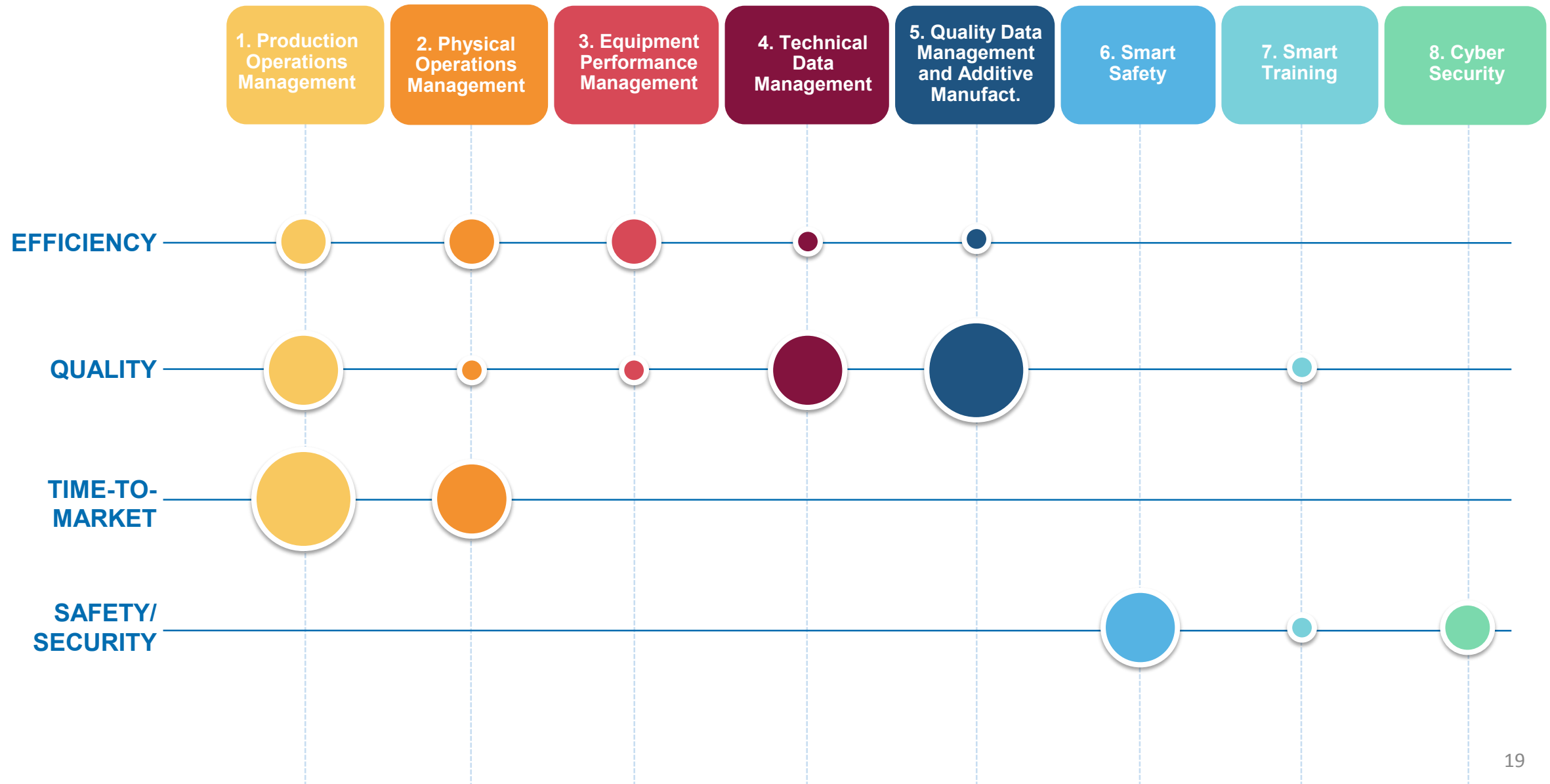


# ANSALDO ENERGIA Lighthouse Plant Scope





## Expected Benefits by Application Area





# Lighthouse Plant extention to other AE Group Key Process



## Smart EPC



## Smart Factory

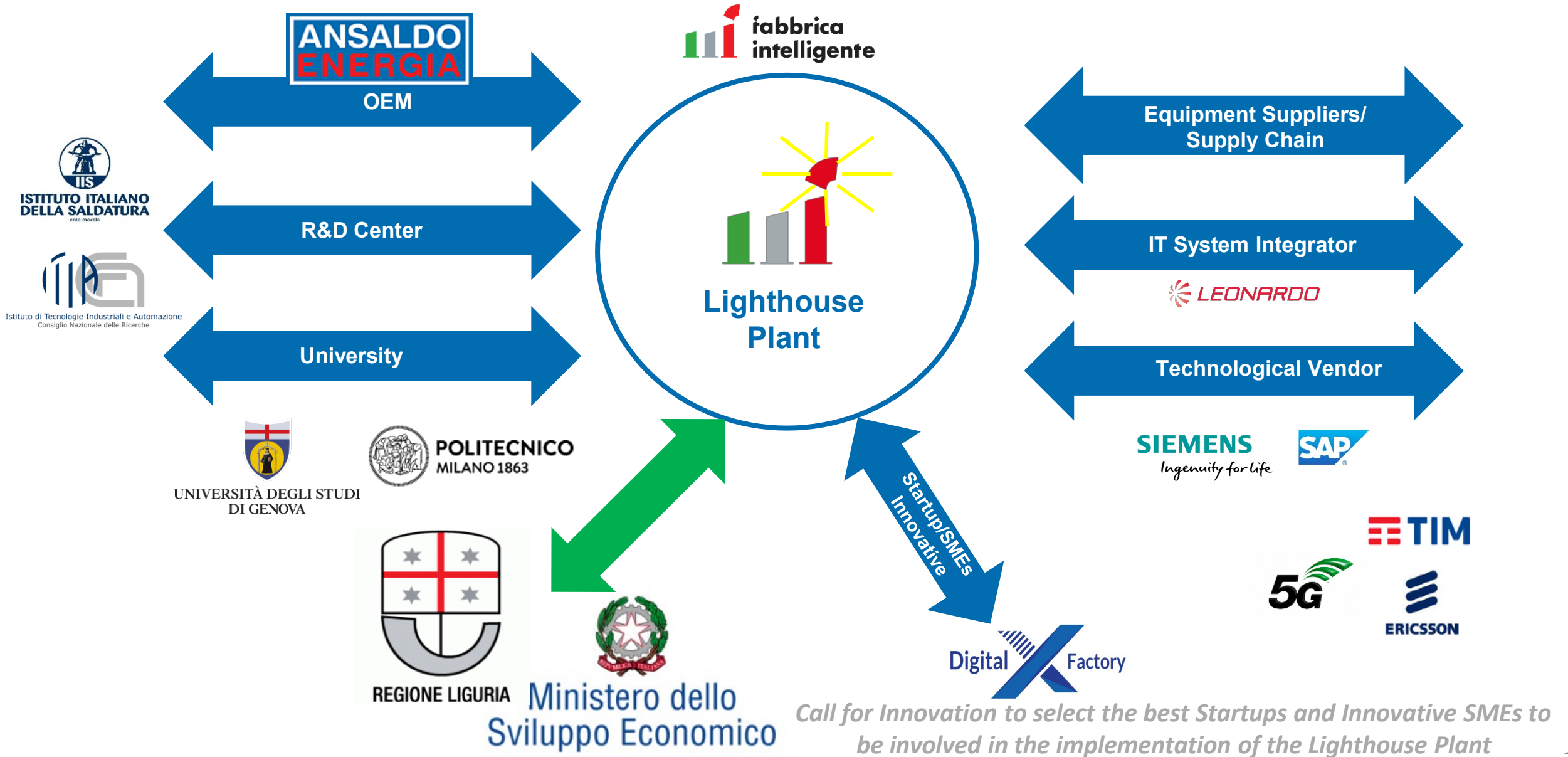


## Smart Product & Service

	Big Data	IOT	Augmented Reality	Simulation	Additive Manuf.	Cloud		Big Data	IOT	Augmented Reality	Simulation	Additive Manuf.	Cloud
←		✓					Production Operations Management		✓				→
							Equipment Performance Management	✓	✓		✓		✓
←			✓				Technical Data Management			✓			→
←	✓					✓	Quality Data Management	✓					✓
←							Additive Manufacturing					✓	→
←		✓					Smart Safety		✓				→
←			✓	✓			Smart Training			✓	✓		→
←	✓					✓	Cyber Security	✓					✓



# Lighthouse Plant Key Partners



# DIGITAL X FACTORY – Call for Innovation for Startups e Innovative SMEs



1 NOVEMBER

CALL  
START

20 NOVEMBER

CALL  
END

10-23 NOVEMBER

SCREENING &  
INVITATIONS

01 DICEMBER

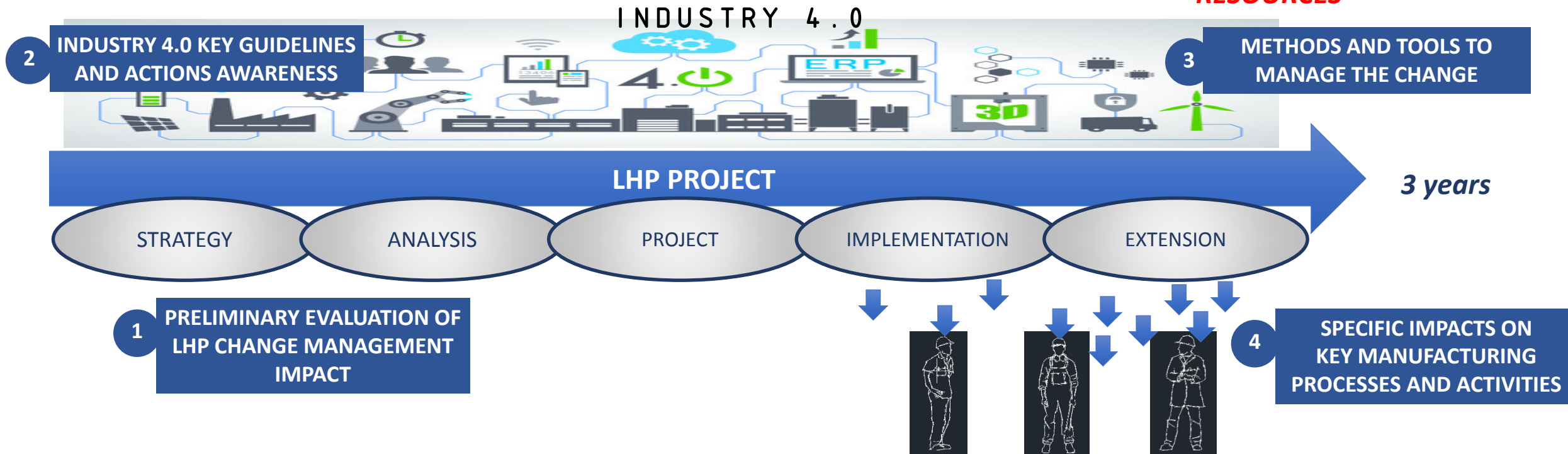
PITCH

160 responding, 90 projectual proposal received,  
11 Startups and Innovative SMEs selected for the final Pitch  
and 6 involved in the AEN Lighthouse Plant implementation

# Lighthouse Plant Project – Change Management

## CHANGE MANAGEMENT APPROACH

**TARGET → 1.000  
RESOURCES**



### LHP Change Management Key Guidelines

- **EXHAUSTIVE** → to address a full alignment about Industry 4.0, Smart Factory and Lighthouse Plant Project
- **STRUCTURED** → to plan and promptly deliver the action plan
- **FLEXIBLE** → to adapt the plan to the day-by-day project activities (deliverables and variances)
- **PRAGMATIC** → to prepare people strongly impacted by the change to adapt their skills and capabilities
- **COLLABORATIVE** → to create a two-way process able to detect weak signals from the field to be processed and fed-back

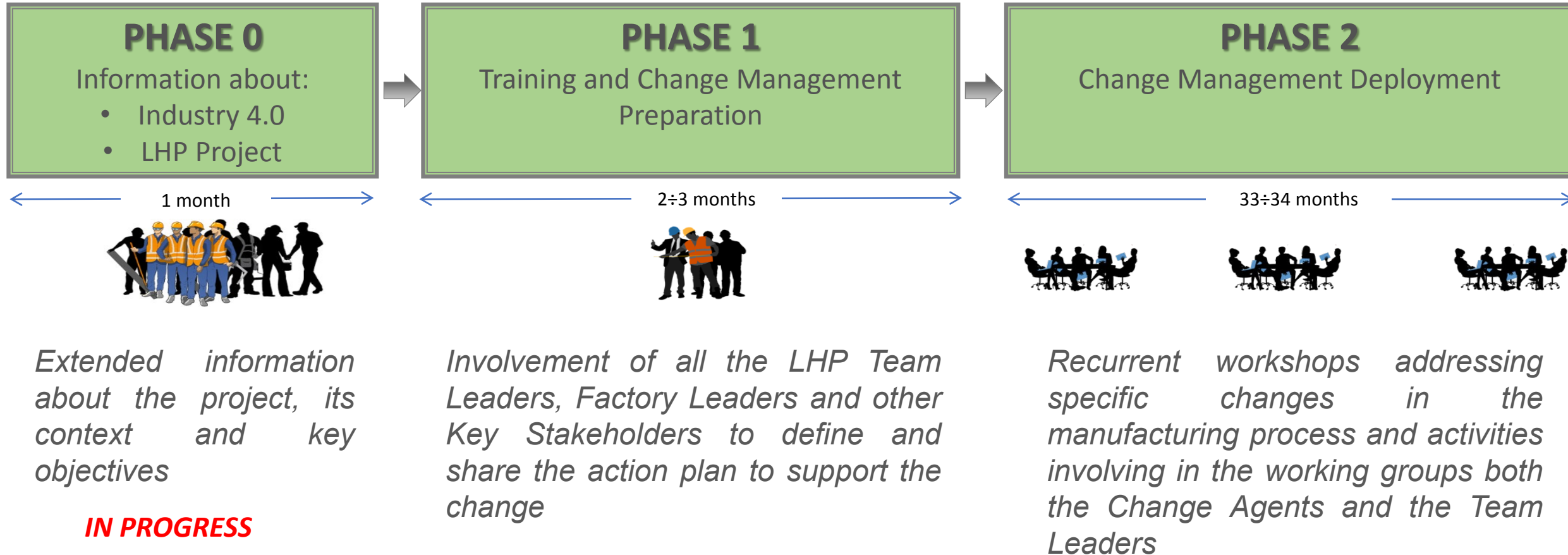


# Lighthouse Plant Project – Change Management

## CHANGE MANAGEMENT PLAN

**TARGET → 1.000  
RESOURCES**

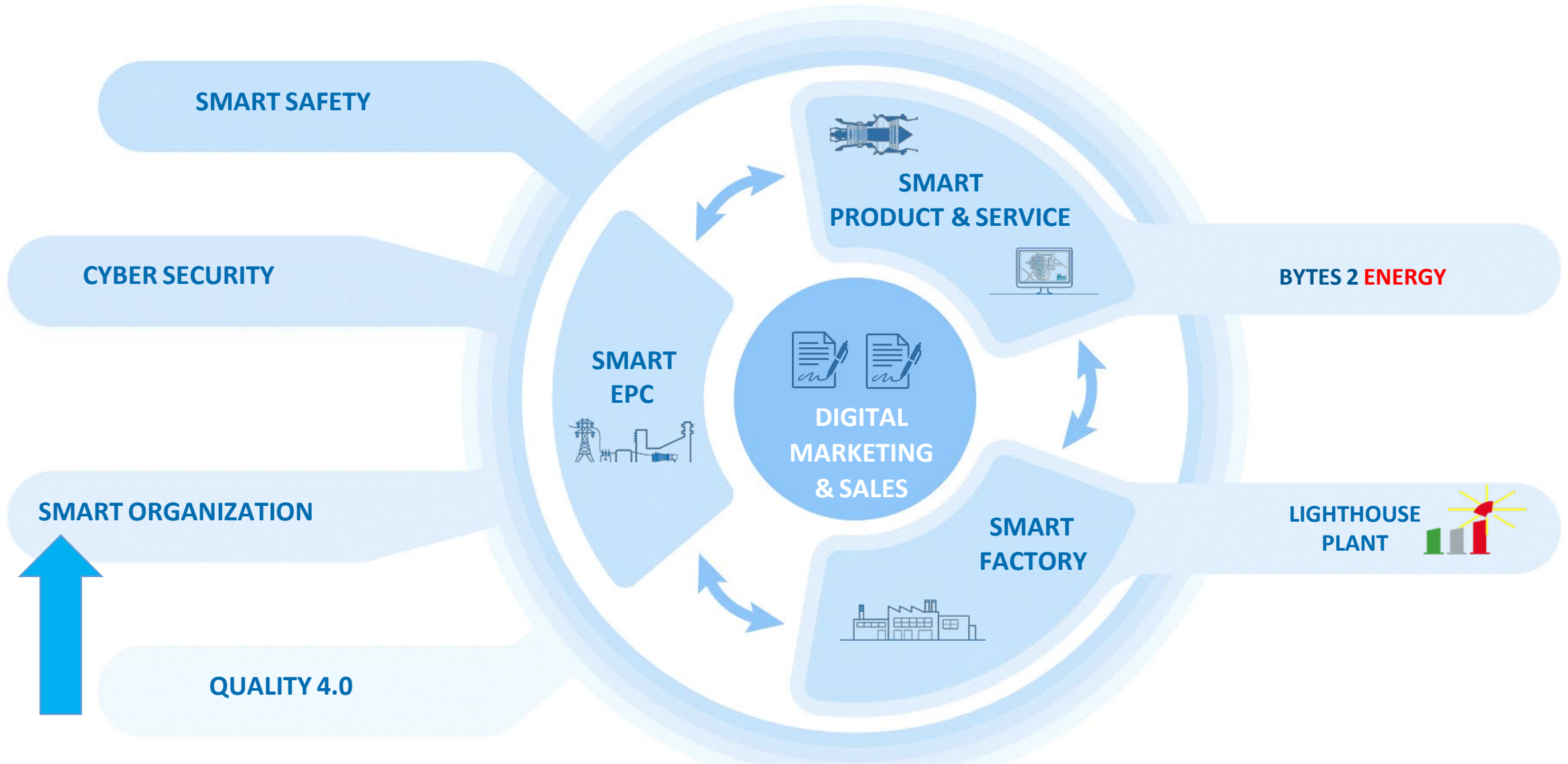
Change Management Plan based on 3 phases



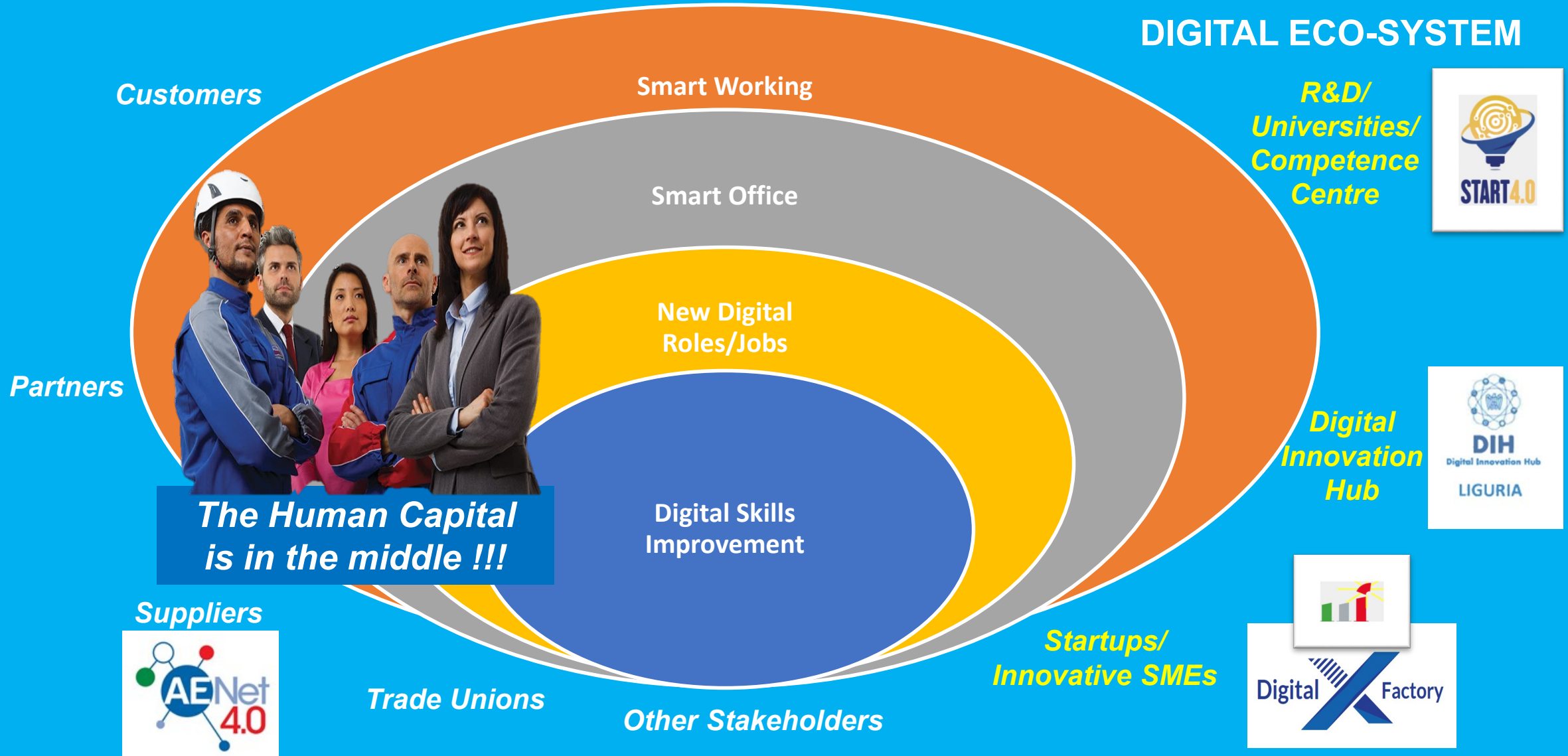
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**Q&A**

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