



UCIMU-SISTEMI PER PRODURRE



**ANIMA**  
CONFINDUSTRIA  
MECCANICA VARIA



**ANSALDO  
ENERGIA**

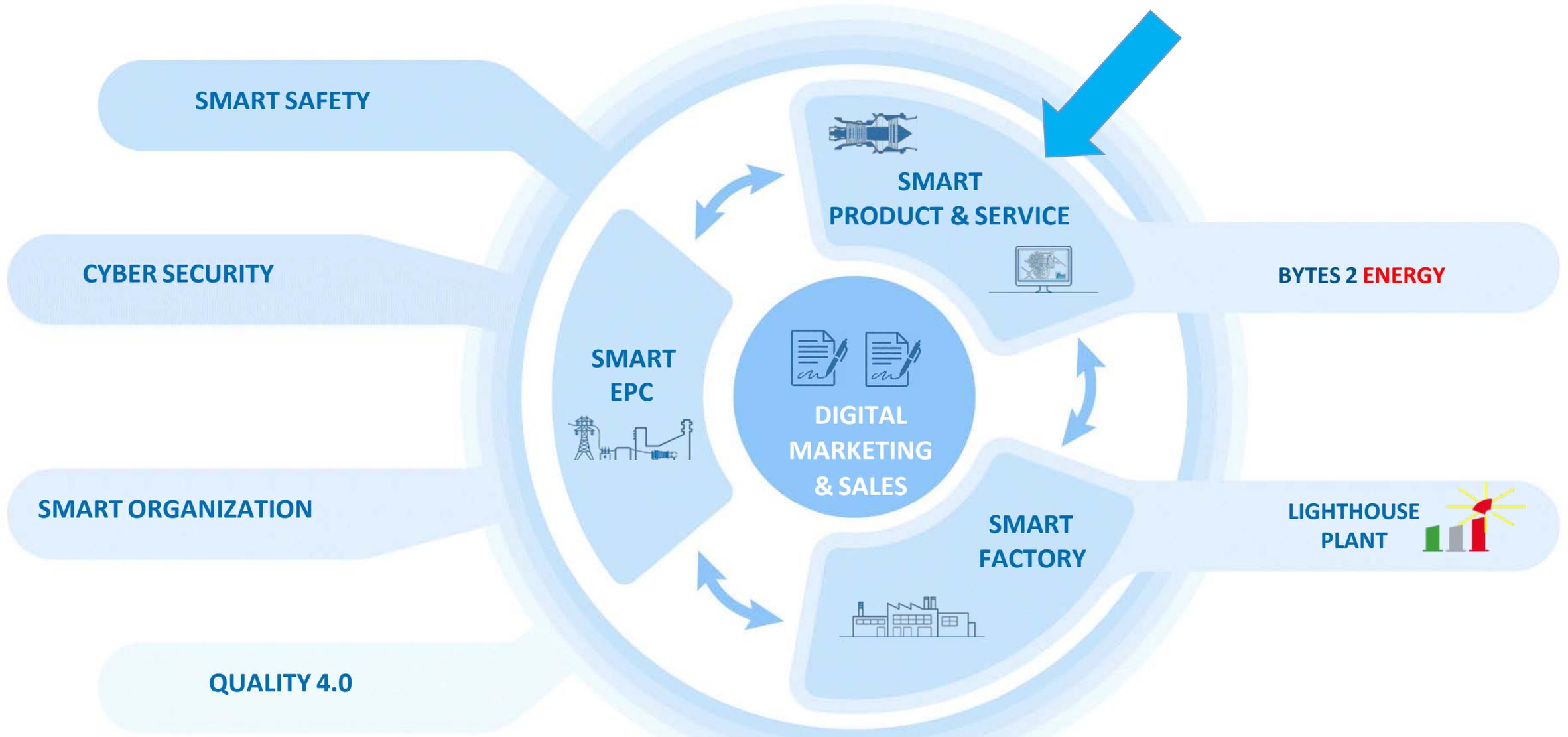
Da Industria 4.0 a Impresa 4.0:  
digitalizzazione, sicurezza e competenze



**THE ANSALDO ENERGIA  
LIGHTHOUSE PLANT  
AS A KEY PILLAR  
OF ITS DIGITAL TRASFORMATION**

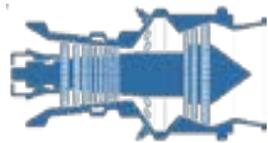
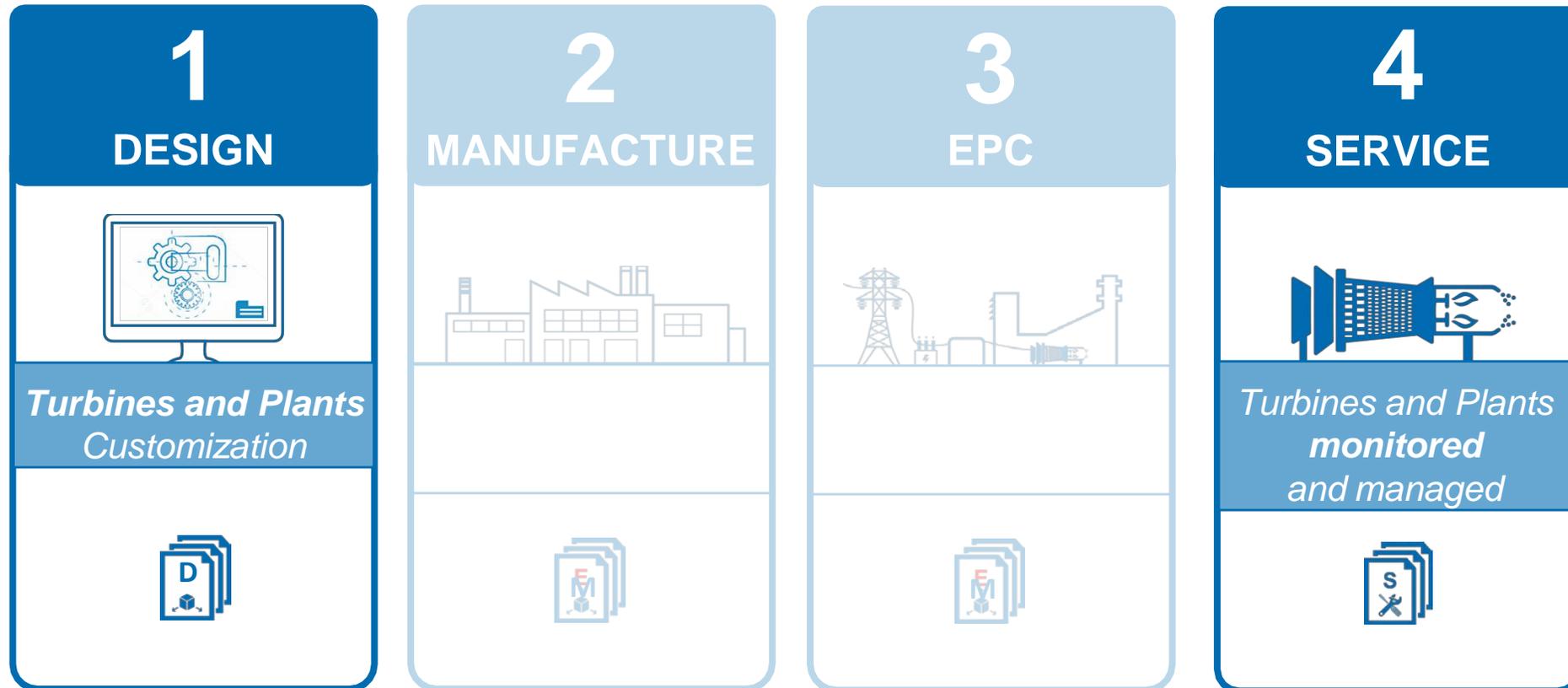
*Luca MANUELLI - Chief Digital Officer*

# ANSALDO ENERGIA Digital Transformation



# SMART PRODUCT & SERVICE

## BYTES 2 ENERGY



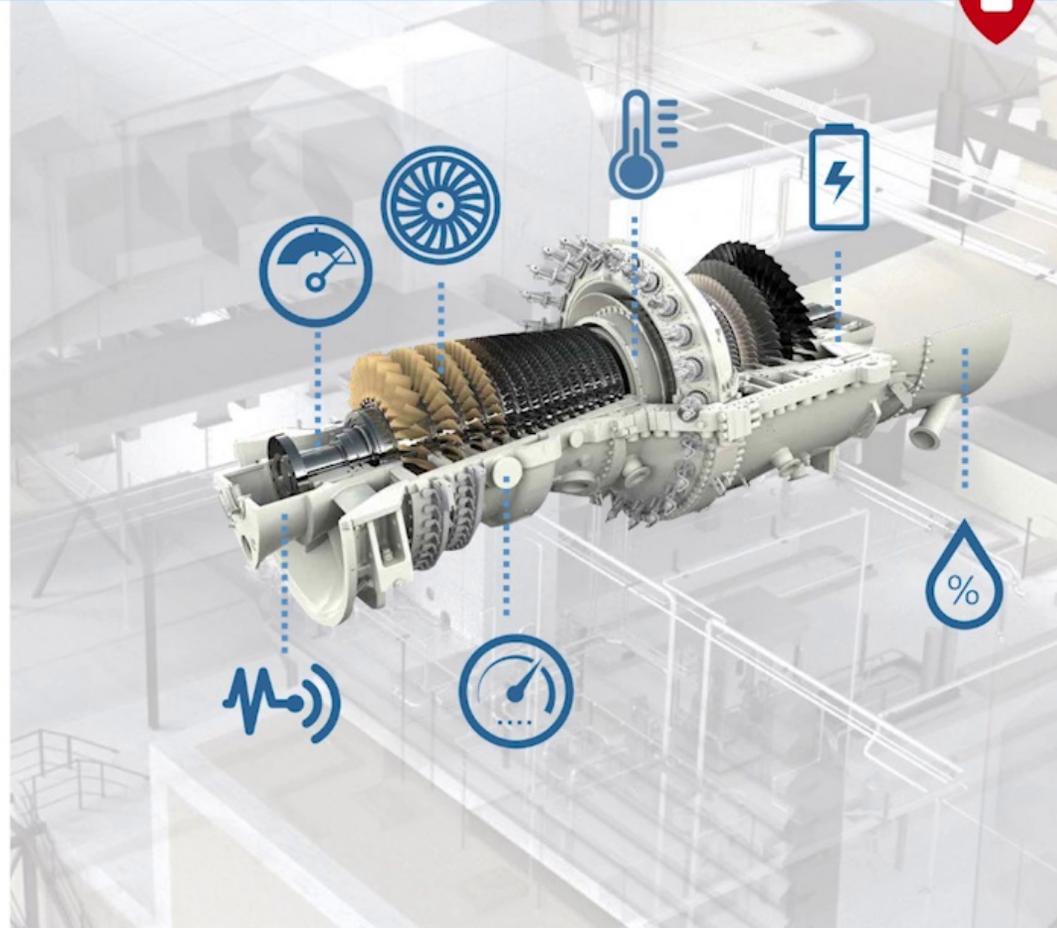
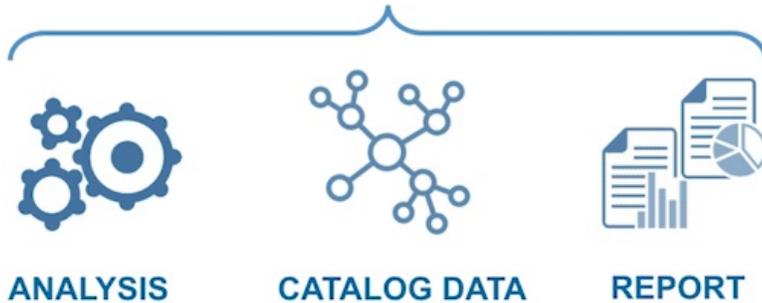
IoT PRODUCT  
DEVELOPMENT  
& PREDICTIVE  
MAINTENANCE

# ANSALDO ENERGIA Digital Transformation

## PREDICTIVE MAINTENANCE - TURBINE

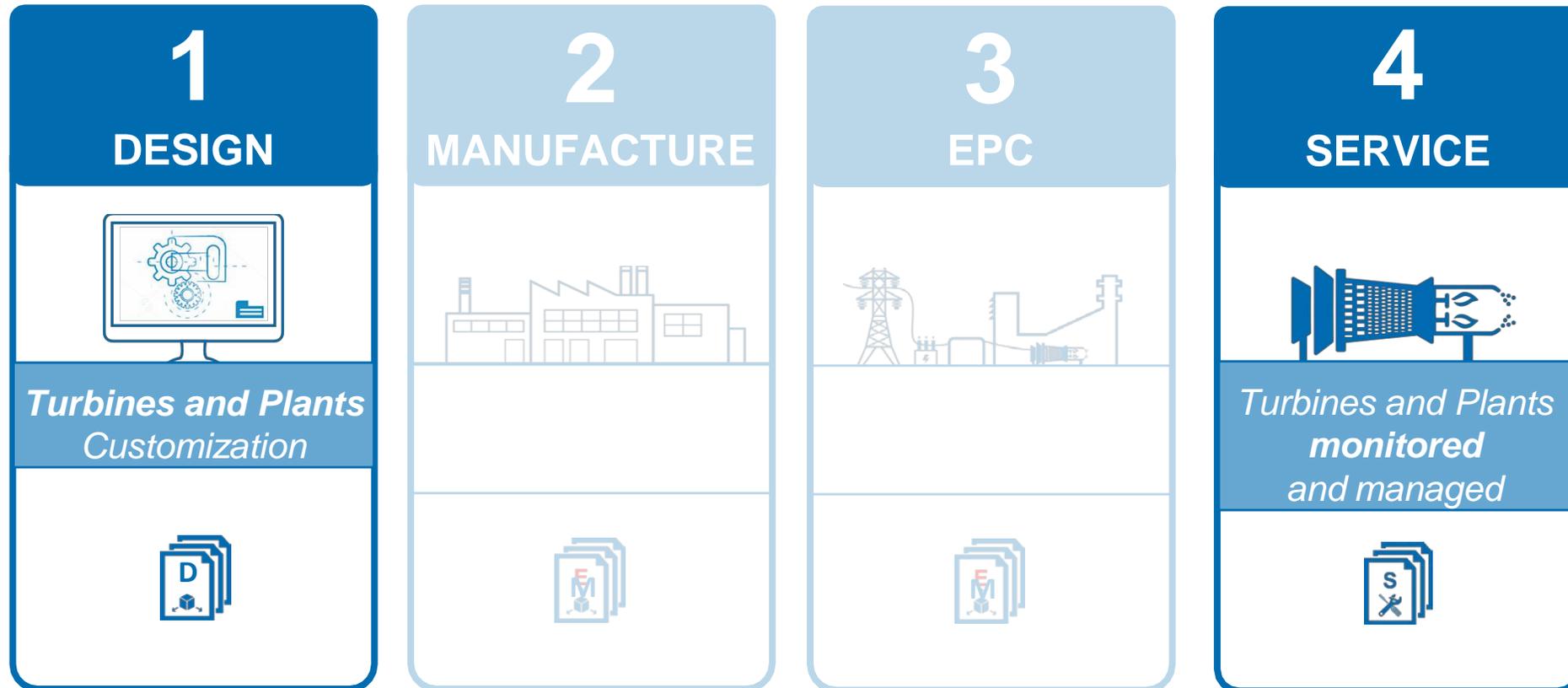


SENSOR BIG DATA



# SMART PRODUCT & SERVICE

## BYTES 2 ENERGY

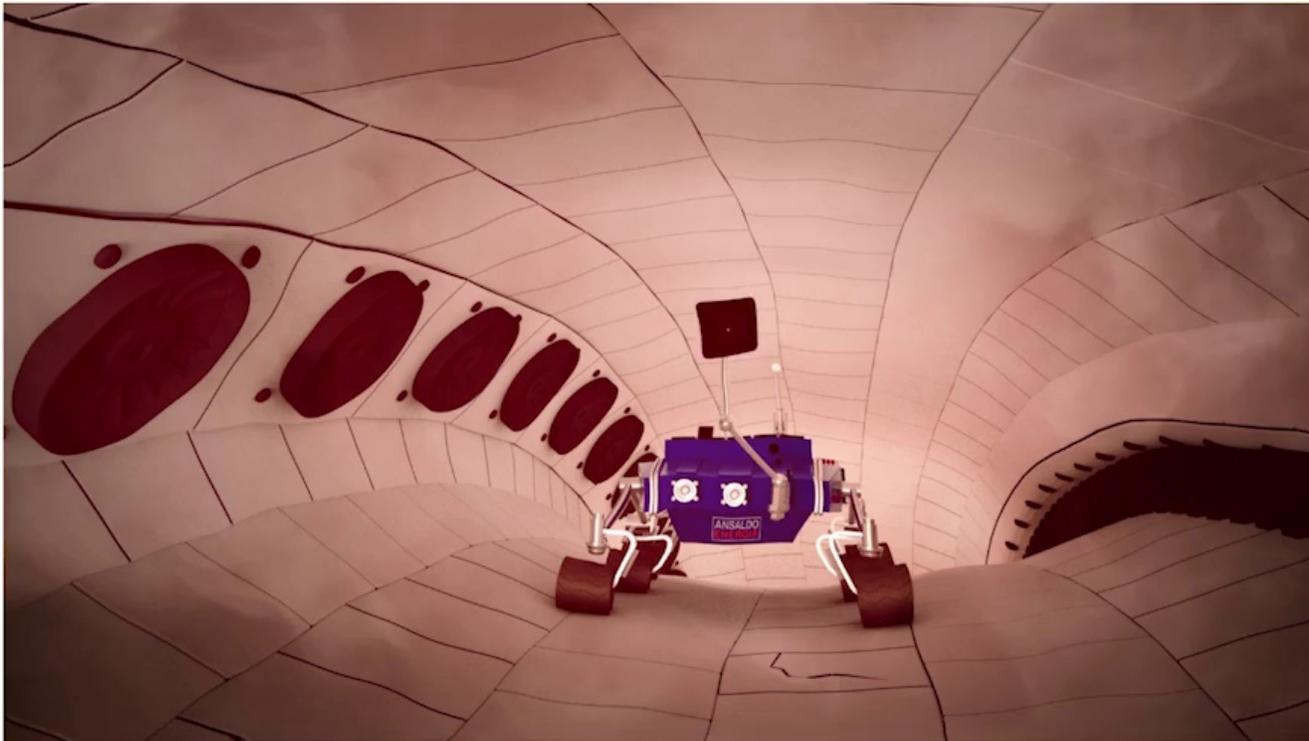


**ROBOTICS  
SMART INSPECTION**

# ANSALDO ENERGIA Digital Transformation

## SMART SERVICE - ROBOT

### ROBOTIC VEHICLE FOR INSPECTION OF GAS TURBINE CERAMIC TILES



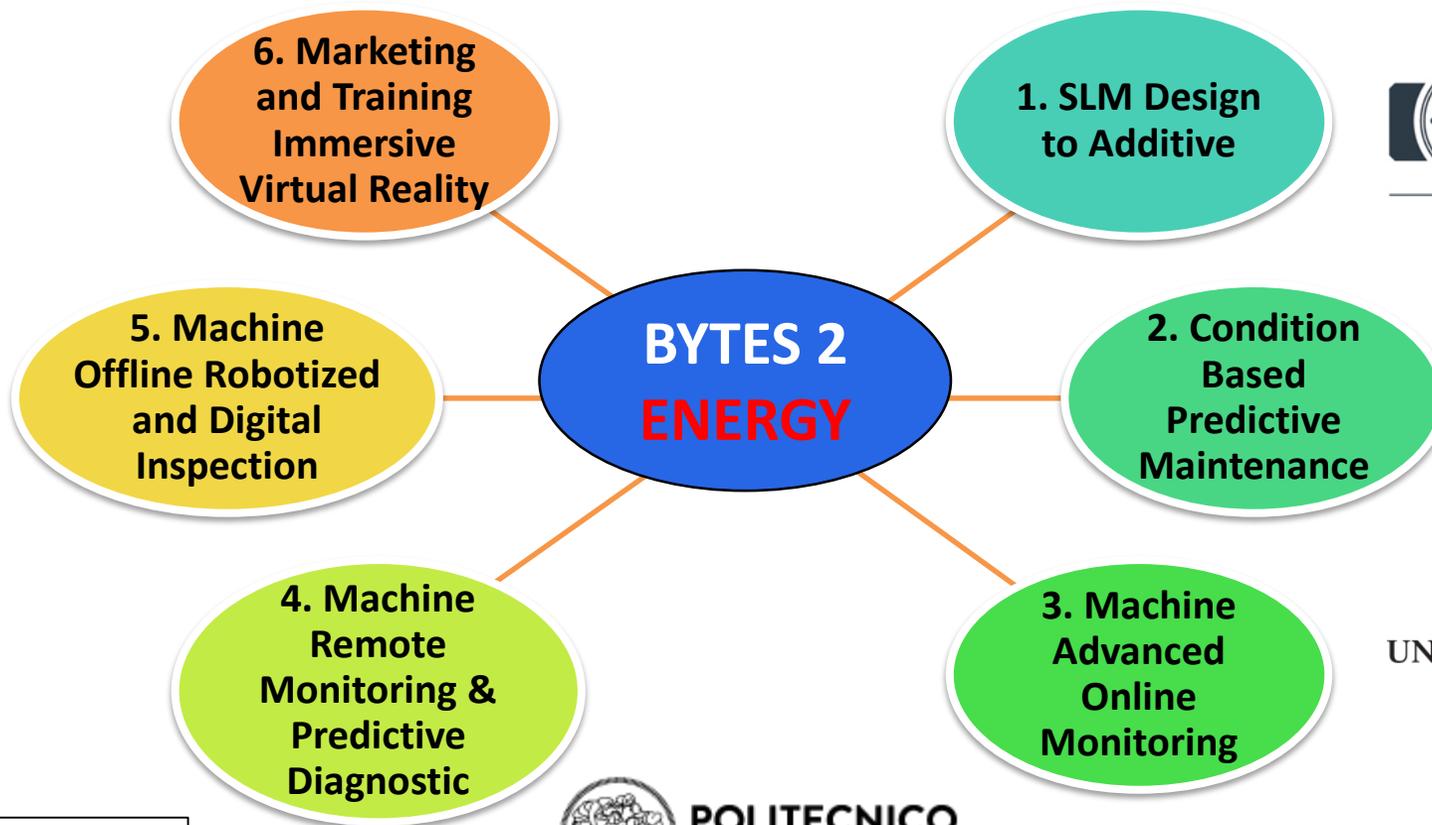
OPERATING SAFELY AT  
HIGH TEMPERATURES

TIME SAVING

MICRO DAMAGES  
EARLY DETECTION

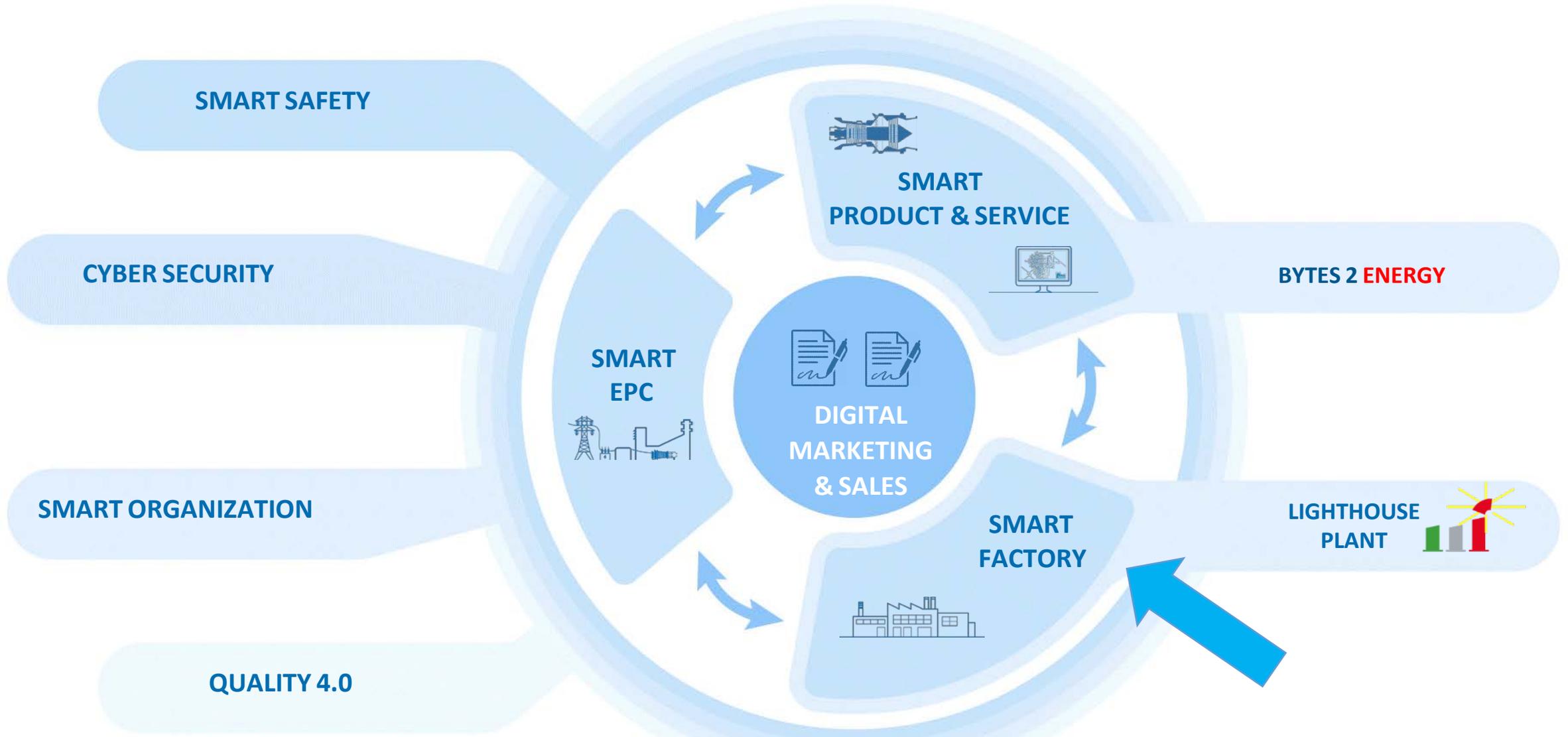
DIGITAL ARCHIVE  
OF THE INSPECTION

# SMART PRODUCT & SERVICE



**AGENDA DIGITALE Funding MISE:**  
 DM 15 ottobre 2014 e DM 24 luglio 2015  
 Duration : 36 months (2018-2020)  
 Total Investment: 12.5M€

# ANSALDO ENERGIA Digital Transformation





# 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 one of the two **Lighthouse Plants** finalized so far.
- Ansaldo Energia will 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

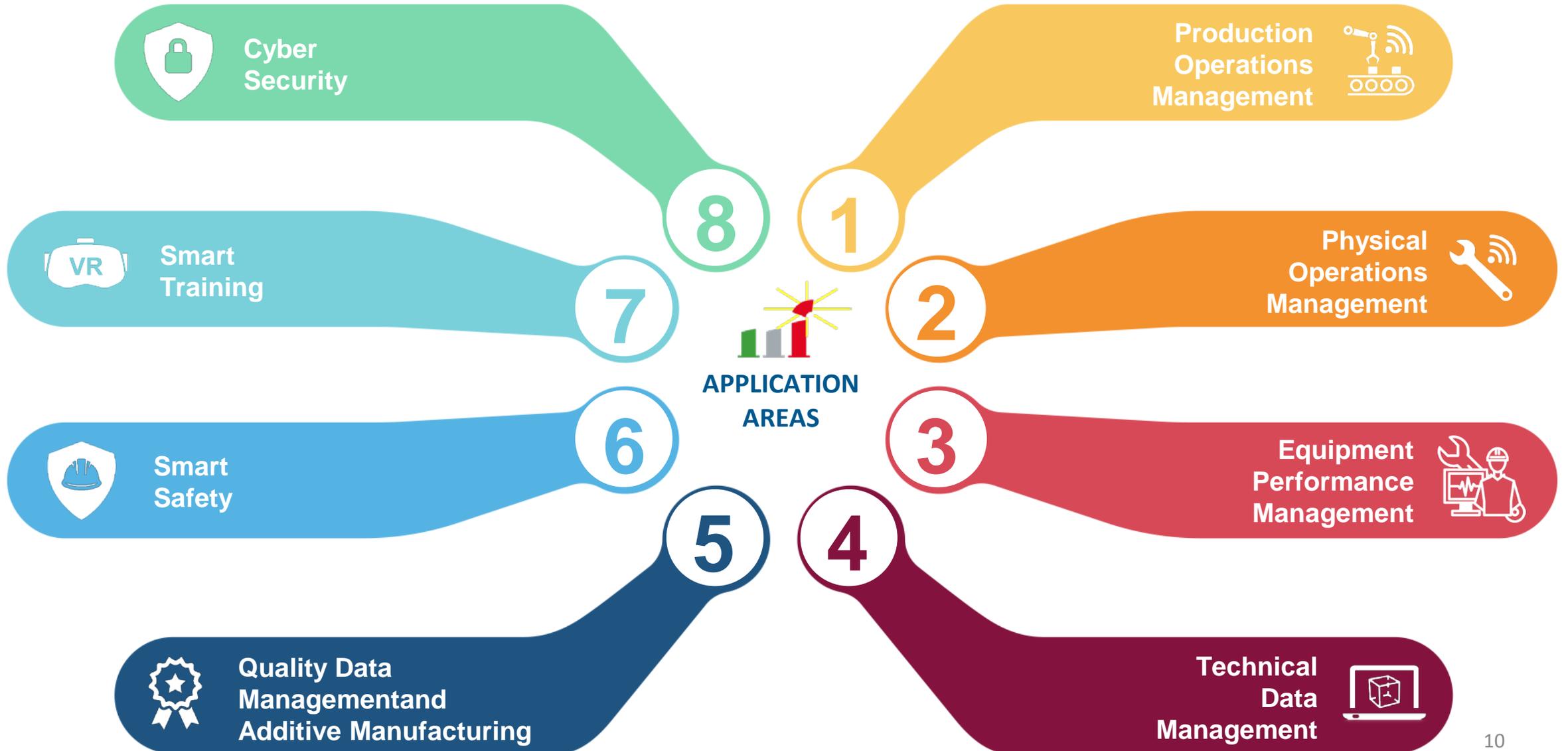
SIMULATION



CLOUD



# ANSALDO ENERGIA Lighthouse Plant



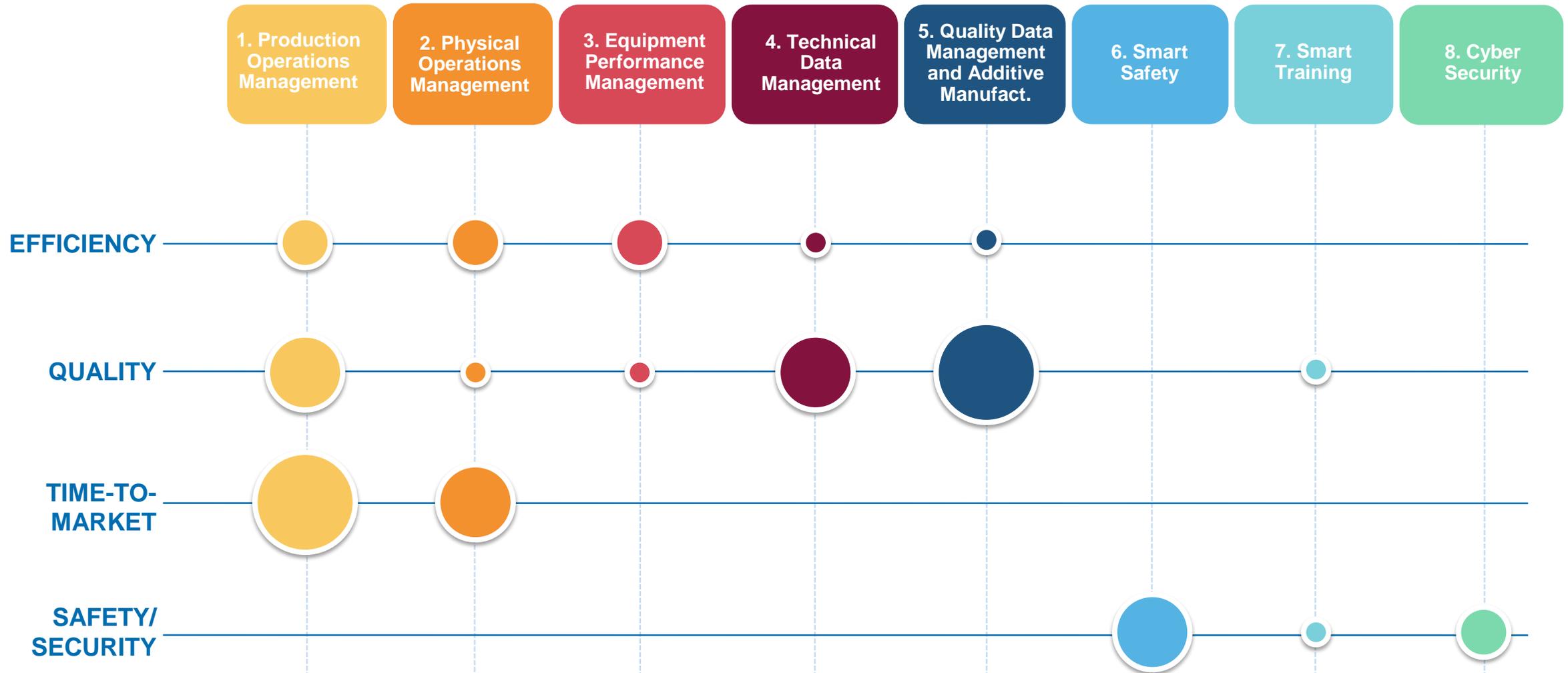


# 4.0 Technologies by Application Area

	1. Production Operations Management	2. Physical Operations Management	3. Equipment Performance Management	4. Technical Data Management	5. Quality Data Management and Additive Manufact.	6. Smart Safety	7. Smart Training	8. Cyber Security
<b>BIG DATA</b>			✓		✓			✓
<b>IIOT CONNECTIVITY</b>	✓	✓	✓			✓		✓
<b>AUGMENTED REALITY</b>			✓	✓			✓	
<b>SIMULATION</b>	✓		✓	✓			✓	
<b>ADDITIVE MANUFACTURING</b>					✓			
<b>HORIZONTAL &amp; VERTICAL INTEGRATION</b>	✓			✓	✓			
<b>CLOUD</b>	✓	✓	✓	✓	✓		✓	✓



## Expected Benefits by Application Area





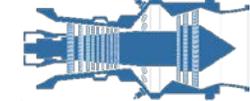
## Lighthouse Plant extension to other AE Group Key Process



### Smart EPC



### Smart Factory

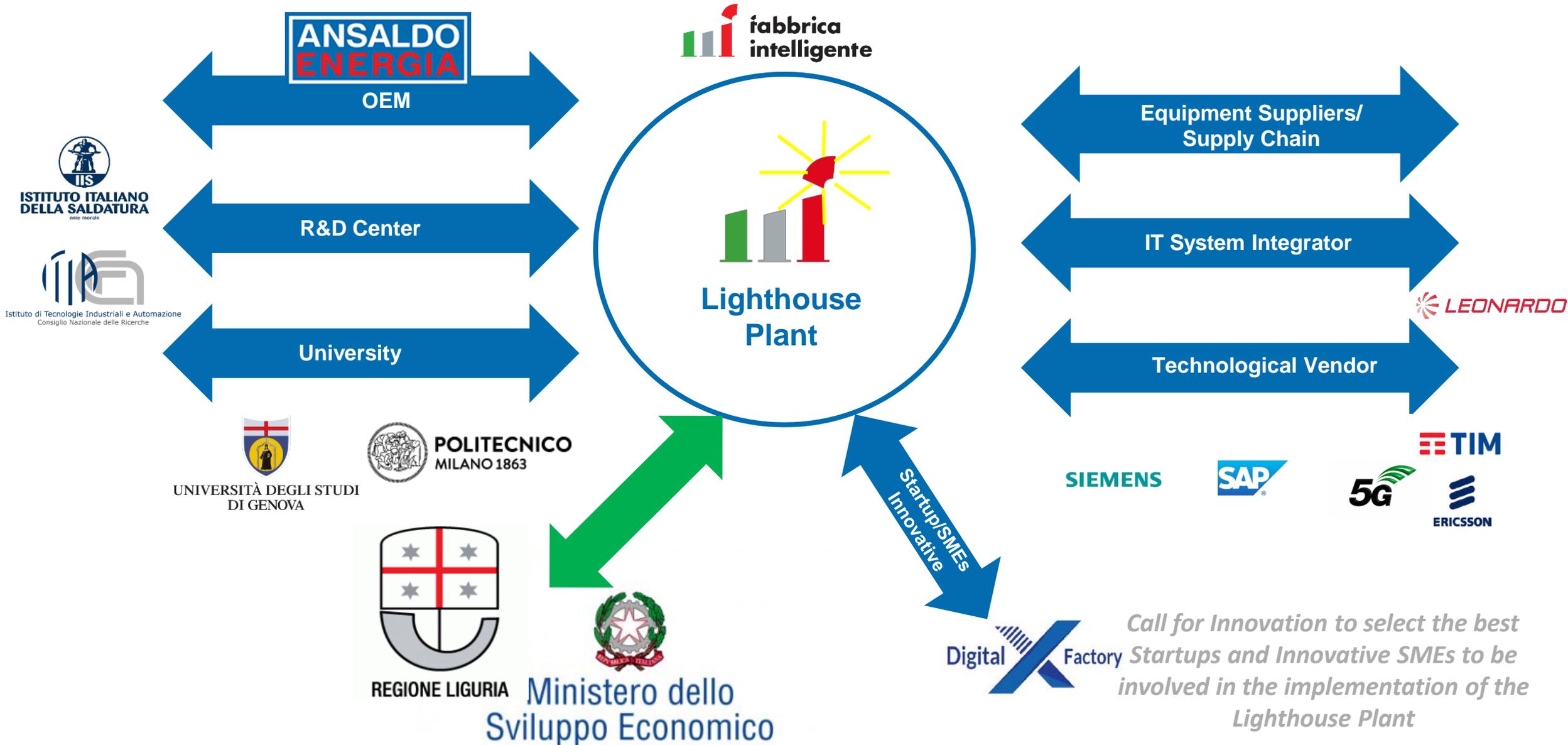


### Smart Product & Service

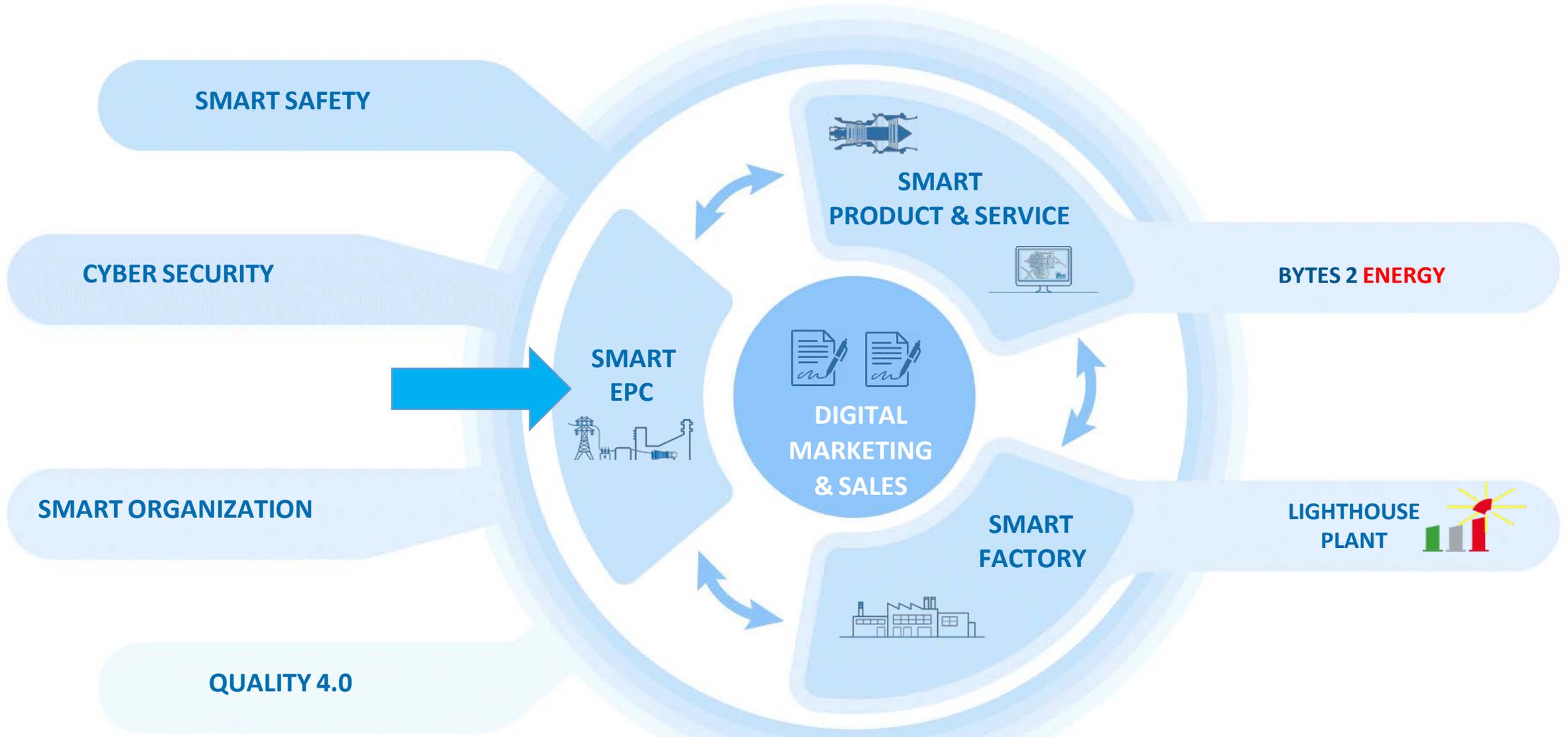
	Big Data	IOT	Augmented Reality	Simulation	Additive Manuf.	Cloud		Big Data	IOT	Augmented Reality	Simulation	Additive Manuf.	Cloud
Production Operations Management		✓							✓				
Equipment Performance Management								✓	✓		✓		✓
Technical Data Management			✓							✓			
Quality Data Management	✓					✓	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



## Key Players

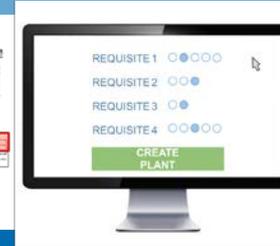
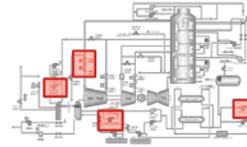


# ANSALDO ENERGIA Digital Transformation



# SMART EPC

3D SMART EPC  
PLATFORM



1

DESIGN



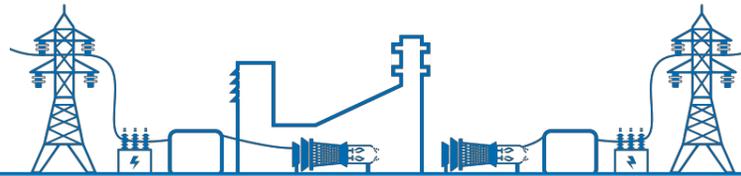
2

MANUFACTURE



3

EPC



*Power Plant*



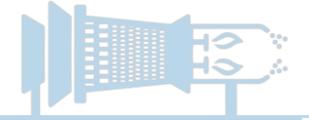
**E**NGINEERING

**P**ROCUREMENT

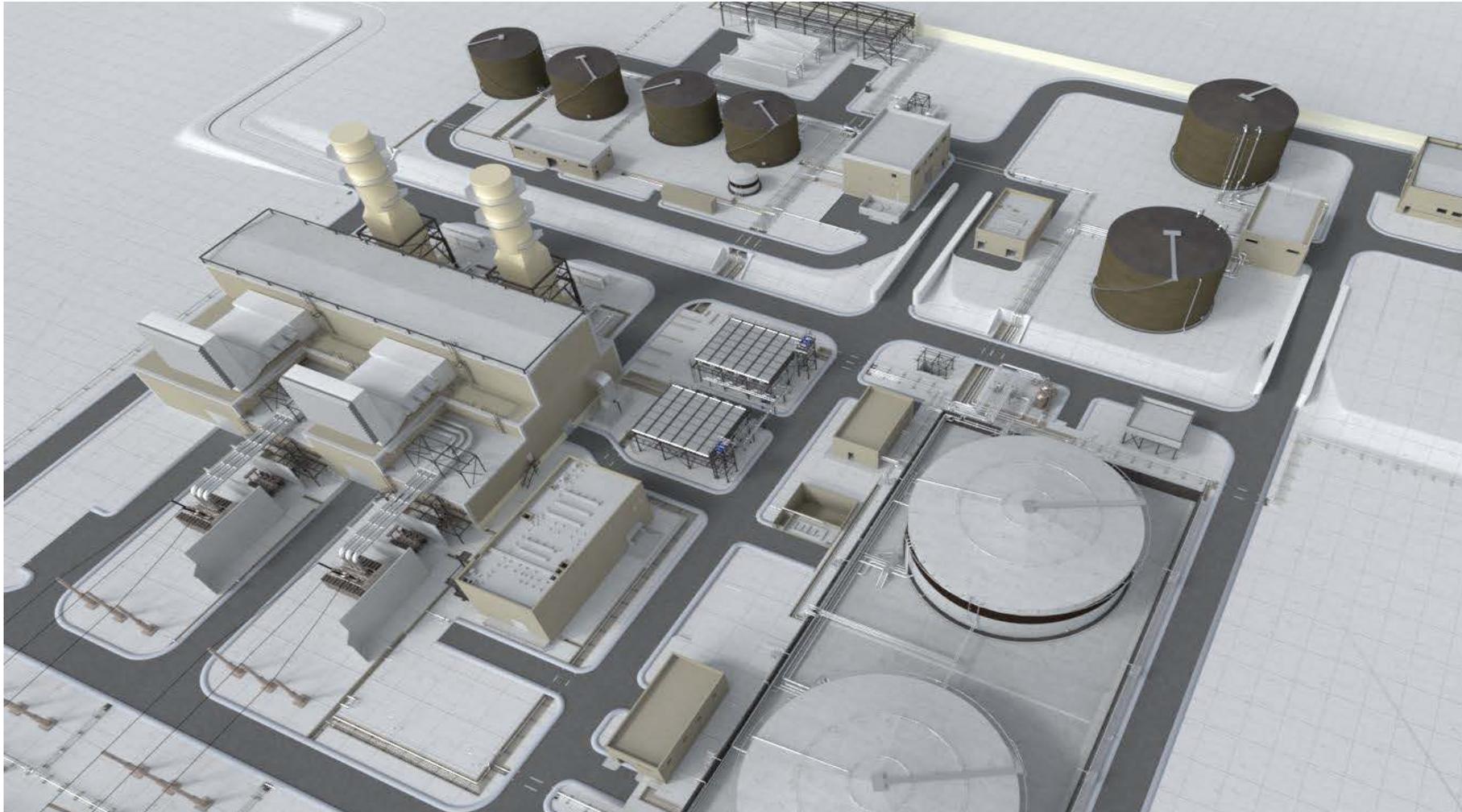
**C**ONSTRUCTION

4

SERVICE



# SMART EPC - 3D SMART EPC PLATFORM

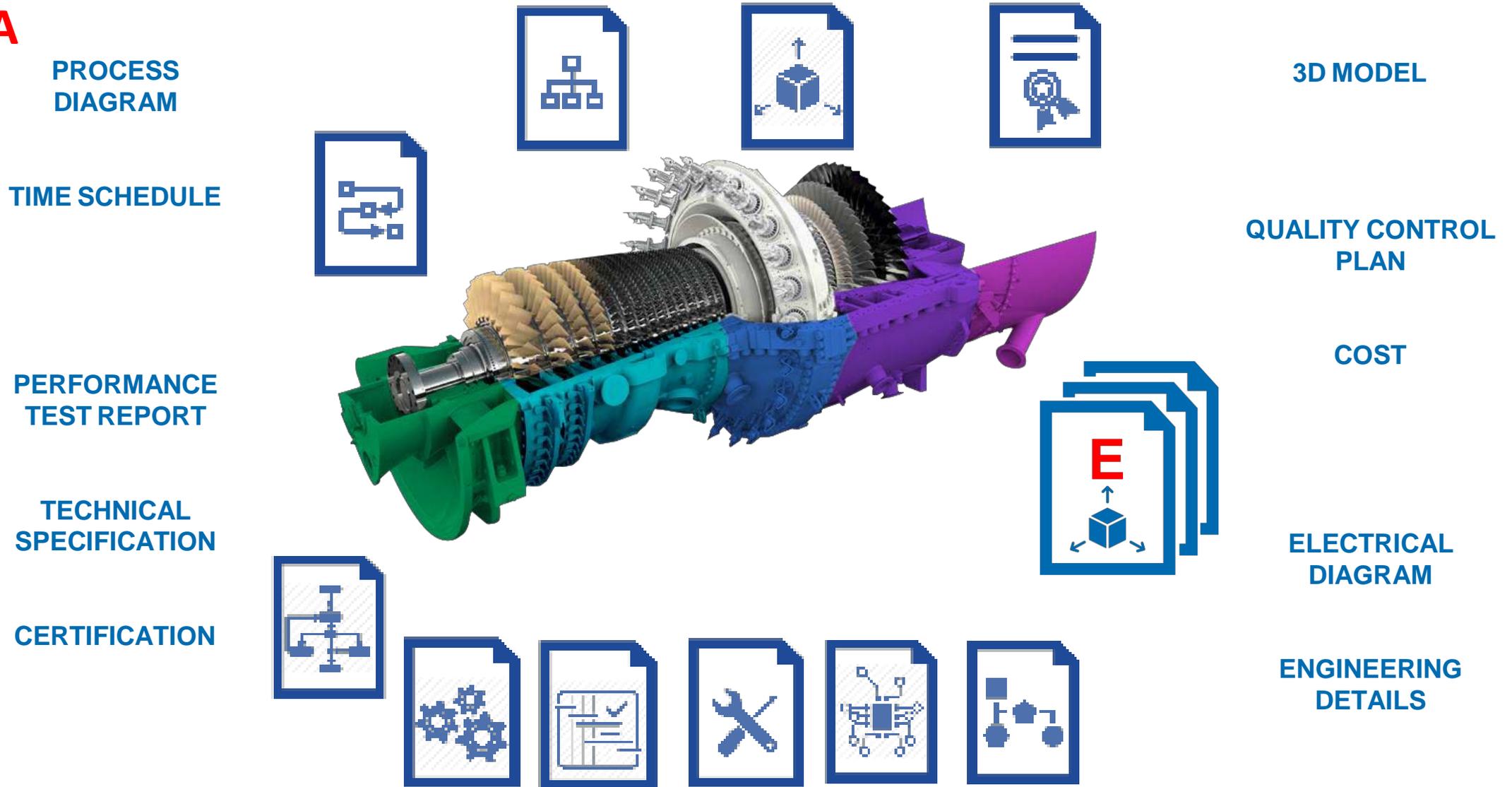


**TURBINE  
GENERATOR  
STACK  
AUXILIARY AIR  
INTAKE  
STEEL STRUCTURES  
PIPING CABLES  
BUILDING  
COMPONENTS AND  
SYSTEM**

**14 - 36 MONTHS  
150.000+ HH ENGINEERING  
8.000 - 20.000 DOCUMENTS  
13.500+ COMPONENTS  
3.500 - 5.000 PACKAGES  
1.000 - 1.500 SUPPLIES  
200+ SUPPLIERS  
1.500.000+ HH ASSEMBLY**

# SMART EPC - 3D SMART EPC PLATFORM

## BIG DATA



# SMART EPC - 3D SMART EPC PLATFORM

## ENGINEERING Power Plant Configuration

REQUISITE 1    ○ ● ○ ○ ○

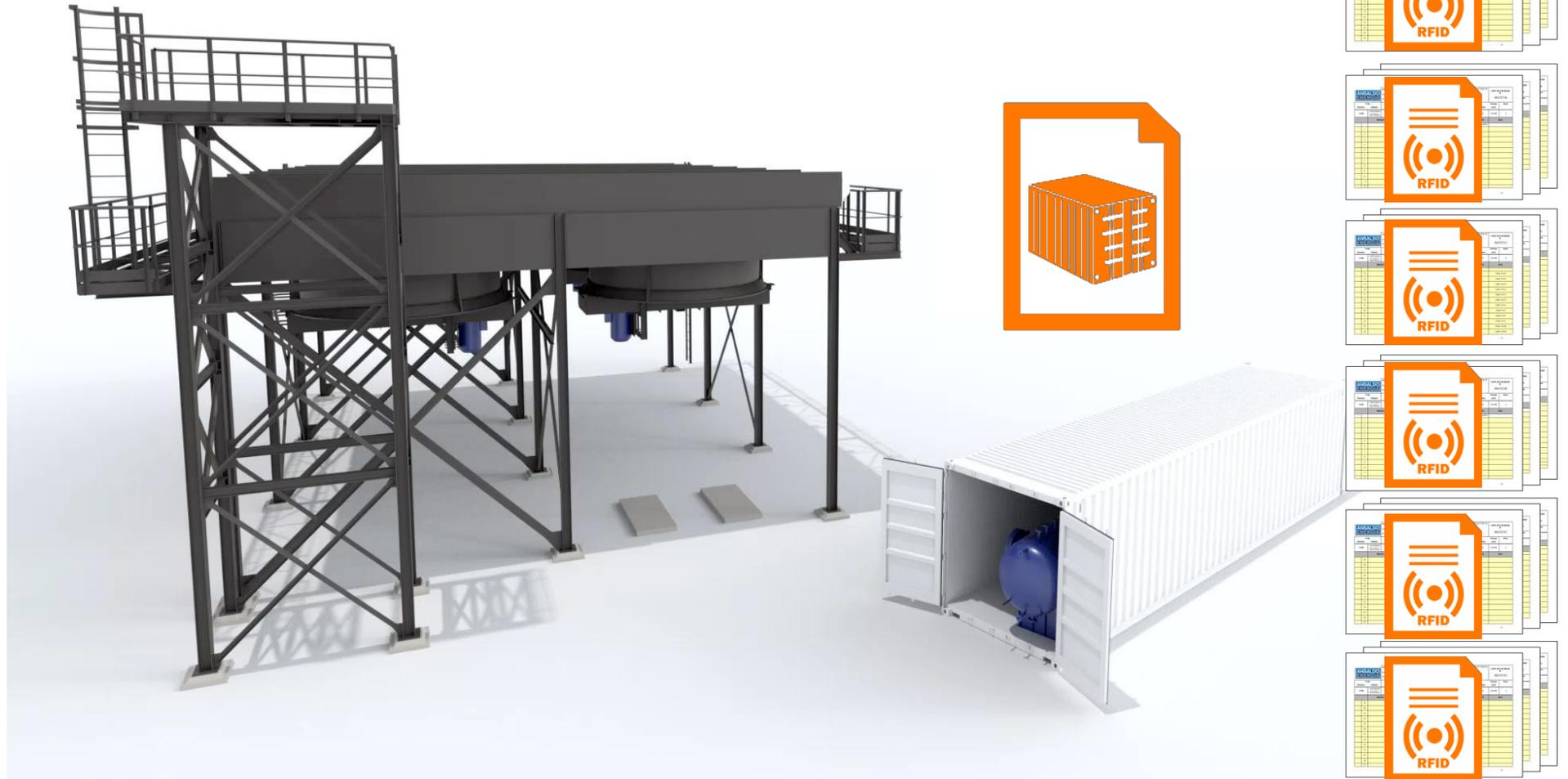
REQUISITE 2    ○ ○ ● ○ ○

REQUISITE 3    ○ ● ○ ○ ○

REQUISITE 4    ○ ○ ● ○ ○

**CREATE PLANT**

## SMART EPC - 3D SMART EPC PLATFORM

**PROCUREMENT  
Smart Tracking  
(Fin Fan Cooler  
Packing List)**

# SMART EPC - 3D SMART EPC PLATFORM

**PROCUREMENT**  
**Smart Tracking**  
**(End-to-end**  
**Smart Tracking)**



**REAL TIME  
 TRACKING PACKAGE**

**1.000+ SHIPMENTS**  
**3.500 – 5.000 PACKAGES**  
**1.000 – 1.5000 SUPPLIES**  
**200+ SUPPLIERS**

# SMART EPC - 3D SMART EPC PLATFORM

## PROCUREMENT Smart Tracking (Packing List Site Check)

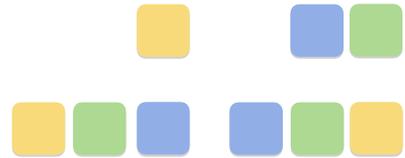


ANSALDO ENERGIA		CONSTRUCTEUR: Ansaldo Energia S.p.A. Via N. Lovati, 8 10152 Genova GE Italia				A L'ORDRE DE LA SOCIÉTÉ ALGERIENNE DE PRODUCTION DE L'ÉLECTRICITÉ S.P.E. - S.P.A.			LISTE DE COLABO 053727127	
Numero	Entail	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit
Numero	Entail	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit
1008	CONTREPLAQUE	1000	1000	1000	1000	1000	1000	1000	1000	1000
101		1	PCS	COLONNE HEAD-LL-0001	1000	1000	1000	1000	1000	1000
102		1	PCS	COLONNE HEAD-LL-0002	1000	1000	1000	1000	1000	1000
103		4	PCS	DISQUE ANCIENNE LL-0001	1000	1000	1000	1000	1000	1000
104		4	PCS	DISQUE ANCIENNE LL-0002	1000	1000	1000	1000	1000	1000
105		4	PCS	DISQUE ANCIENNE LL-0003	1000	1000	1000	1000	1000	1000
106		1	PCS	DISQUE ANCIENNE LL-0004	1000	1000	1000	1000	1000	1000
107		1	PCS	DISQUE ANCIENNE LL-0005	1000	1000	1000	1000	1000	1000
108		1	PCS	DISQUE ANCIENNE LL-0006	1000	1000	1000	1000	1000	1000
109		1	PCS	DISQUE ANCIENNE LL-0007	1000	1000	1000	1000	1000	1000
110		1	PCS	DISQUE ANCIENNE LL-0008	1000	1000	1000	1000	1000	1000
111		1	PCS	DISQUE ANCIENNE LL-0009	1000	1000	1000	1000	1000	1000
112		1	PCS	DISQUE ANCIENNE LL-0010	1000	1000	1000	1000	1000	1000
113		1	PCS	DISQUE ANCIENNE LL-0011	1000	1000	1000	1000	1000	1000
114		1	PCS	DISQUE ANCIENNE LL-0012	1000	1000	1000	1000	1000	1000
115		1	PCS	DISQUE ANCIENNE LL-0013	1000	1000	1000	1000	1000	1000
116		1	PCS	DISQUE ANCIENNE LL-0014	1000	1000	1000	1000	1000	1000
117		1	PCS	DISQUE ANCIENNE LL-0015	1000	1000	1000	1000	1000	1000
118		1	PCS	DISQUE ANCIENNE LL-0016	1000	1000	1000	1000	1000	1000
119		1	PCS	DISQUE ANCIENNE LL-0017	1000	1000	1000	1000	1000	1000
120		1	PCS	DISQUE ANCIENNE LL-0018	1000	1000	1000	1000	1000	1000

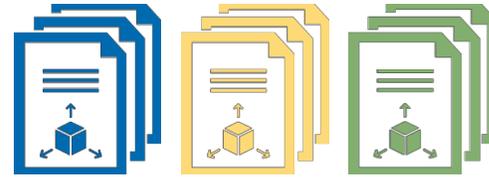
# SMART EPC - 3D SMART EPC PLATFORM

## CONSTRUCTION

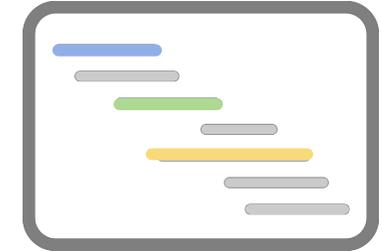
### WAREHOUSE



### DOCUMENTATION



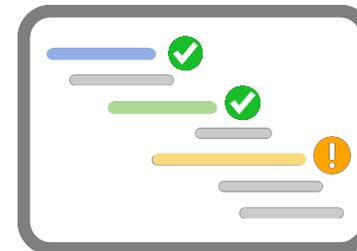
### PLANNING



### TEAMS



### MONITORING



**1.500.000 HH ASSEMBLY**  
**20 – 40.000 M3 CONCRETE**  
**1500-5000 TONS STEEL STRUCTURE**  
**400 – 800 KM CABLES**  
**500 – 1.300 TON PIPING**

# SMART EPC



SPE (SMART  
POWERFUL EYE)  
E-COMMISSIONING

1

DESIGN



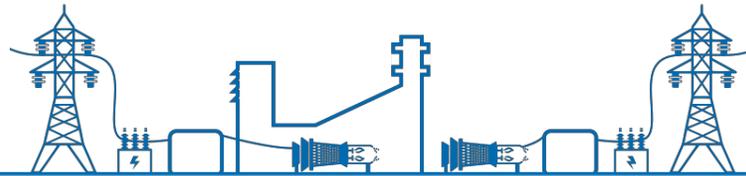
2

MANUFACTURE



3

EPC



*Power Plant*



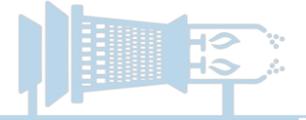
ENGINEERING

PROCUREMENT

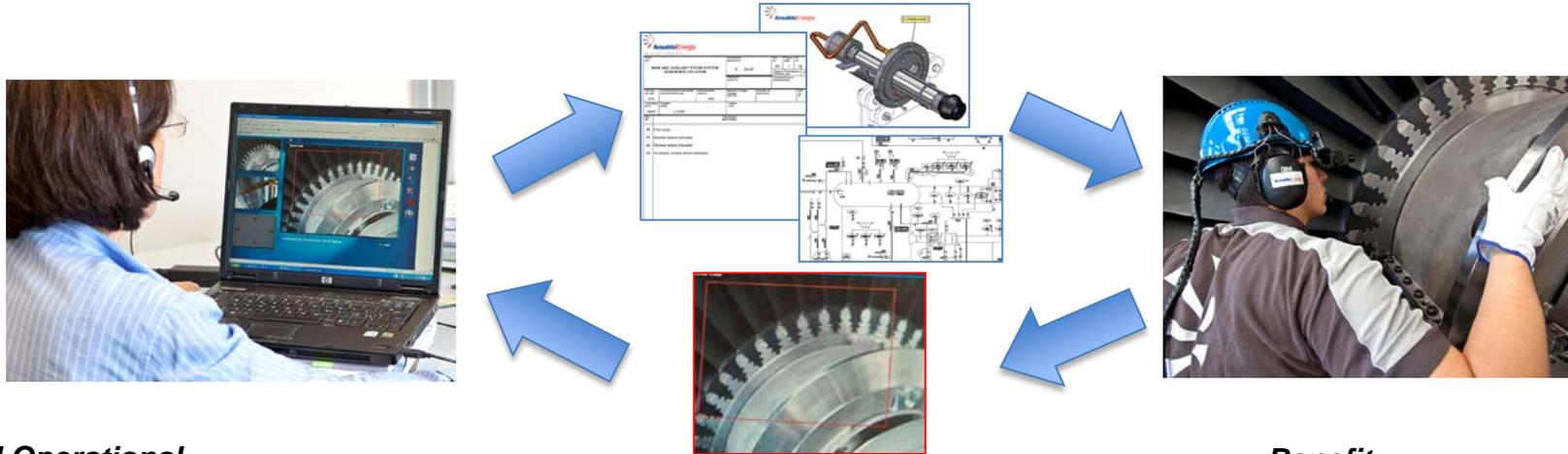
CONSTRUCTION

4

SERVICE



# SPE (SMART POWERFUL EYE) E-COMMISSIONING



## **Field Operational Support:**

- Installation
- Commissioning
- Supervising
- Work progress overview
- Troubleshooting e fault-finding
- Maintenance
- Customer Support

## **SPE**



## **UPGRADE SPE**

## **Benefit:**

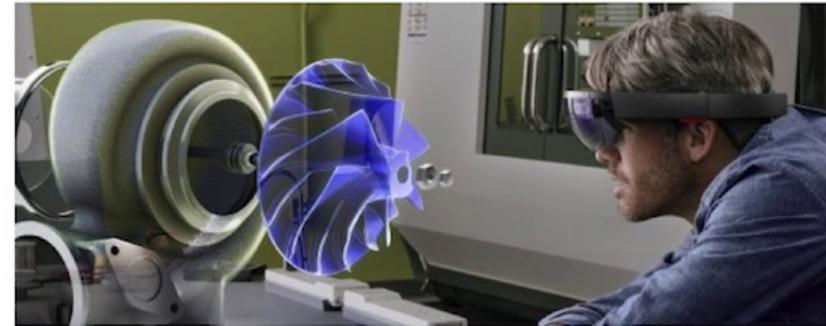
- Supporting Field activities from HQ
- Answer time reduction
- Ansaldo people on field reduction
- Link between different experts in different sites
- One expert can support different sites
- Plant: best availability

# SPE (SMART POWERFUL EYE) E-COMMISSIONING

## AUGMENTED REALITY FOR REMOTE COMMISSIONING

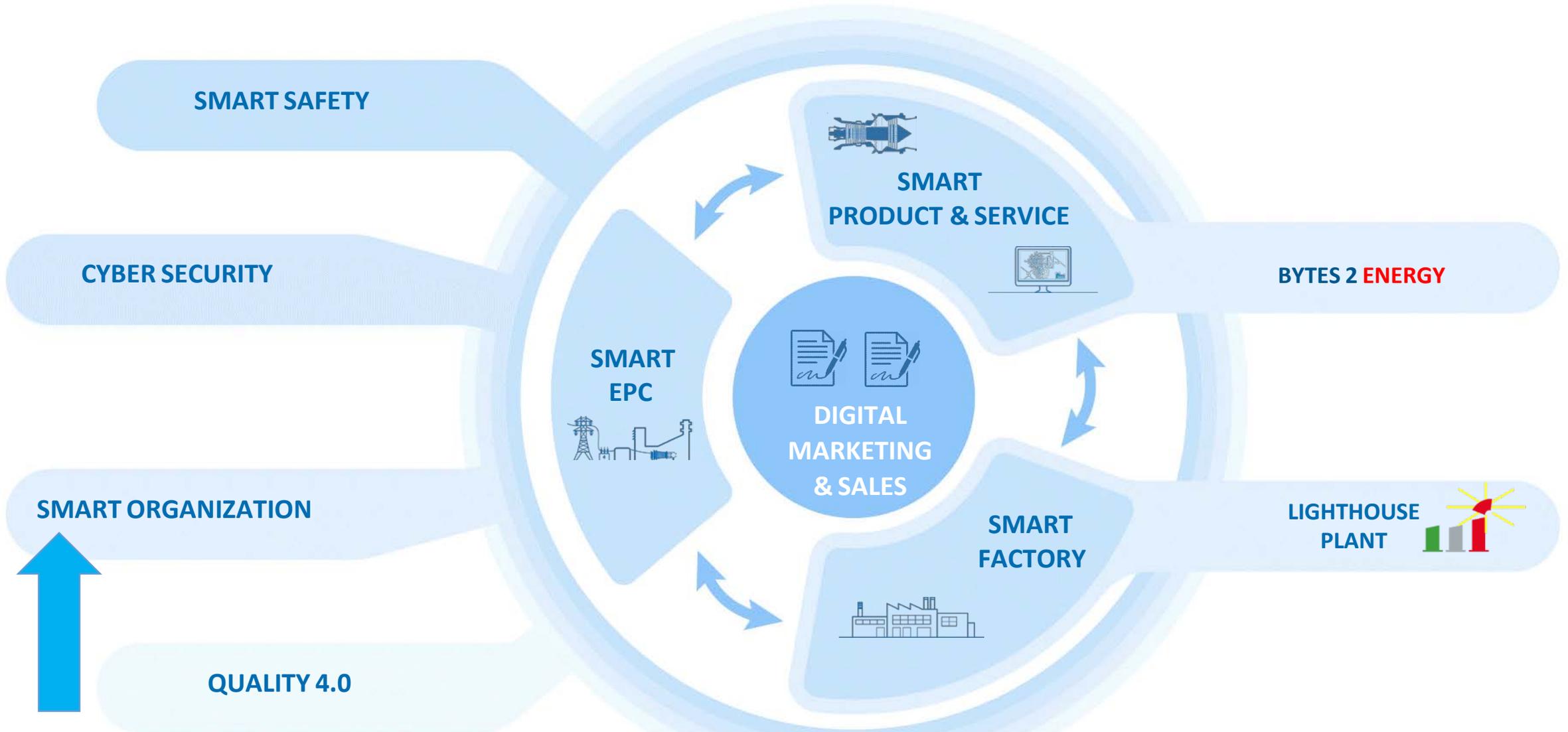


NEW TECHNOLOGIES, NEW POSSIBILITIES (Mixed Reality)

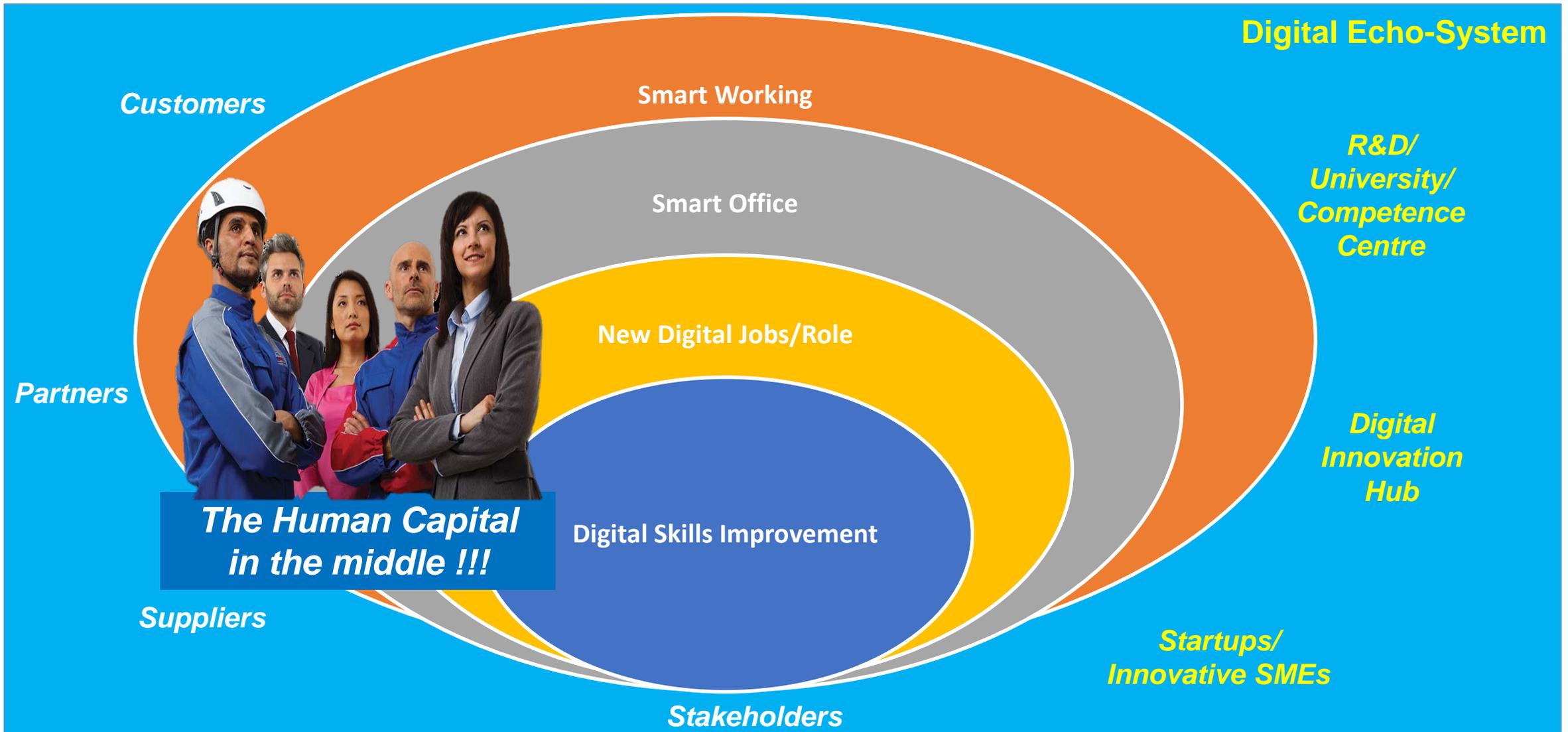


BENEFITS
POOLING OF QUALIFIED COMPETENCES
REAL-TIME COOPERATION IN DIFFERENT LOCATIONS
TIME RESPONSE SHORTENING
EASIER REAL-TIME ACCESS TO PLANT OR EQUIPMENT DATA
VIRTUAL TUTORIALS AND TRAININGS

# ANSALDO ENERGIA Digital Transformation



# ANSALDO ENERGIA Digital Transformation





UCIMU-SISTEMI PER PRODURRE



**ANIMA**  
CONFINDUSTRIA  
MECCANICA VARIA



**ANSALDO  
ENERGIA**

Da Industria 4.0 a Impresa 4.0:  
digitalizzazione, sicurezza e competenze

**Q&A**

**THE ANSALDO ENERGIA  
LIGHTHOUSE PLANT  
AS A KEY PILLAR  
OF ITS DIGITAL TRASFORMATION**

*Luca MANUELLI - Chief Digital Officer*