



THE 20TH INTERNATIONAL OPERATIONS & MAINTENANCE
CONFERENCE IN THE ARAB COUNTRIES

PRACTICAL ASPECTS OF ASSET MANAGEMENT SYSTEM IMPLEMENTATION

Workshop 07

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Slovenia

    #OmaintecConf

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Introduction

The workshop is based on the authors' practical experience with AMS implementation in accordance to ISO 55001 and with upgrades of different processes supporting AM.

Some examples are taken from the **Case on HSE Group** (presented on Day 2 of the Conference).

Even though it is short, the WS is intended to be **interactive** and will tackle the following practical aspects:

- AM and AMS,
- Use of International Standards and Guidelines,
- Maturity Assessment,
- Strategic Implementation Framework,
- Project Roadmap and Organization,
- Change Management,
- Deliverables,
- Suggestions for future AMS Implementations.



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Initial Discussion with Participants

- Have you already been **involved** in Asset Management as defined by the ISO 55000 series?
- Have you had a chance to **read** the ISO 55001 standard?
- What are the main factors influencing decision-making **FOR** AM System implementation?
- What are the main factors influencing decision-making **AGAINST** AM System implementation?

Use of International Standards and Guidelines

AM and Maintenance

Are you sure you know (are aware of) the benefits of introducing

- **Asset Management** and
- **Maintenance within the Asset Management**

to the company's business, their employees and „maintenance department“?

ISO/TS 55010:2019

Guidance on the alignment of financial and non-financial functions in asset management

ISO 55011: ??

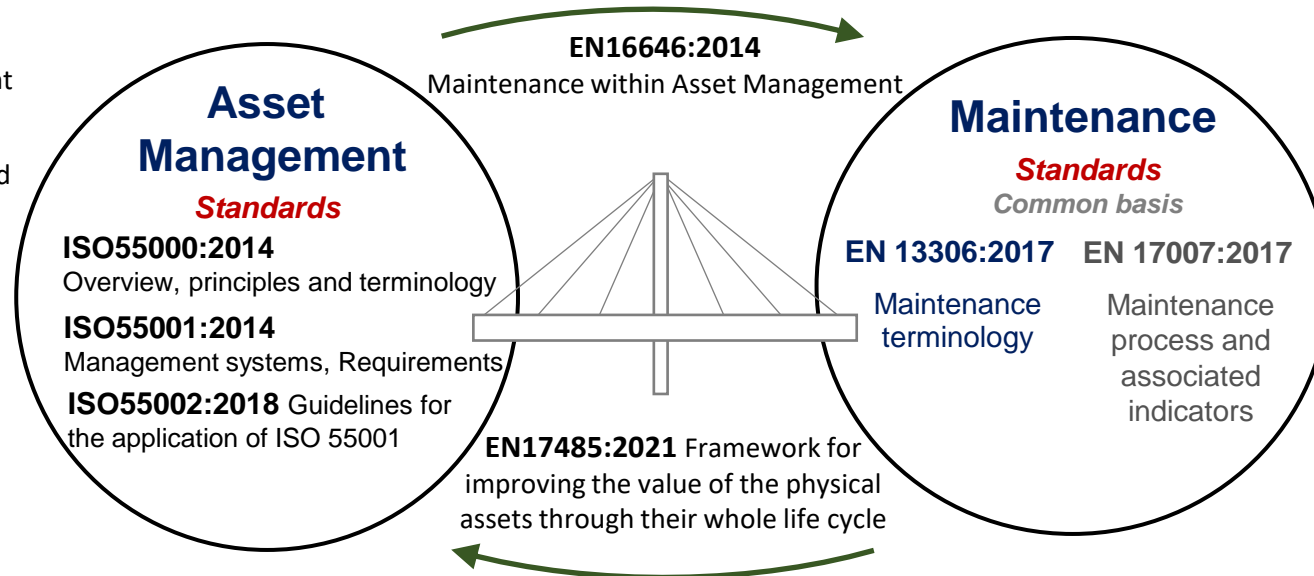
Guidance for development and application of public policy to enable asset management

ISO 55012: ??

People involvement and competence

ISO 55013:

Guidance on the management of Data Assets in asset management



EN 17666:2022

Maintenance engineering: Requirements

EN 15341:2019

Maintenance Key Performance Indicators

EN 16991: 2018

Risk-based inspection framework

EN 13269: 2016

Guideline of maintenance contracts

EN 15628: 2014

Qualification of maintenance personnel

EN 15331: 2011

Criteria for design, management and control of maintenance services for buildings

EN 13460: 2009

Documentation for maintenance

prEN 17840: ??

Performance and condition assessment for buildings and civil engineering. Framework for assessment within physical asset management



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Use of International Standards and Guidelines

Project Management

Useful guidance can be found in ***ISO 21502:2020 Project, programme and portfolio management — Guidance on project management***, together with other related standards:

- ISO 21500:2021 Context and concepts,
- ISO 21503:2017 Programme management,
- ISO 21504:2015 Portfolio management,
- ISO 21505:2017 Governance,
- ISO 21506:2018 Vocabulary,
- ISO 21508:2018 Earned value management,
- ISO 21511:2018 Work breakdown structures,
- ISO 21512 EVM implementation guide (under development).



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Use of International Standards and Guidelines

Structure and BIM

- ISO 19650 – BIM and ISO 16739 – Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries
- ISO 14224 - Petroleum, petrochemical and natural gas industries — Collection and exchange of reliability and maintenance data for equipment
- EN 81346 – Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations
- EN 61355 – Classification and designation of documents for plants, systems and equipment



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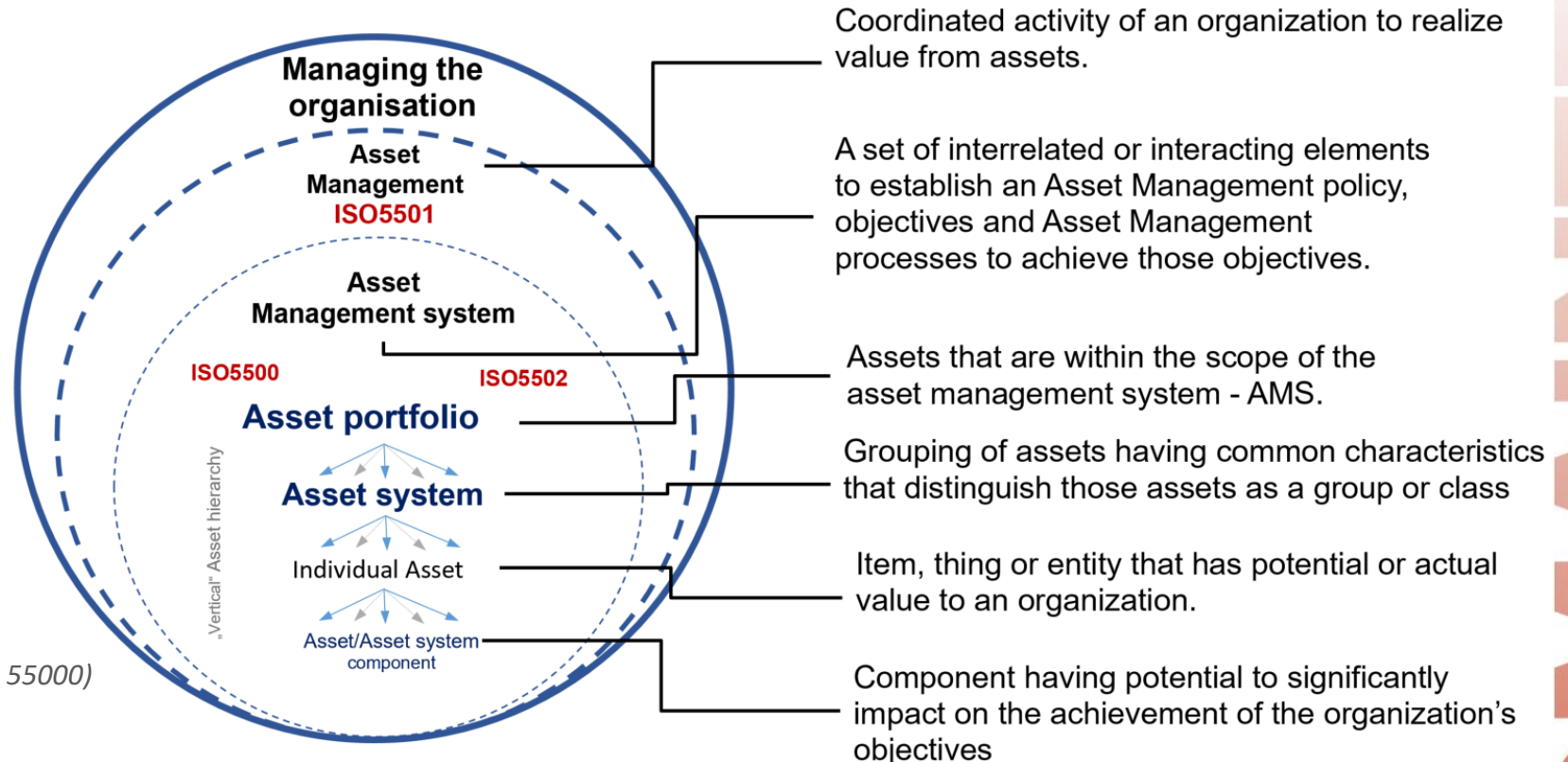
Use of International Standards and Guidelines

Guidelines

- **GFMAM** www.gfmam.org
- **IAM** www.theiam.org
- **EFNMS** www.efnms.eu
- **ISEAM** www.iseam.org

AM and AMS

The relationship between managing the organization, AM and AMS



(Source: AM Consulting, adapted from ISO 55000)



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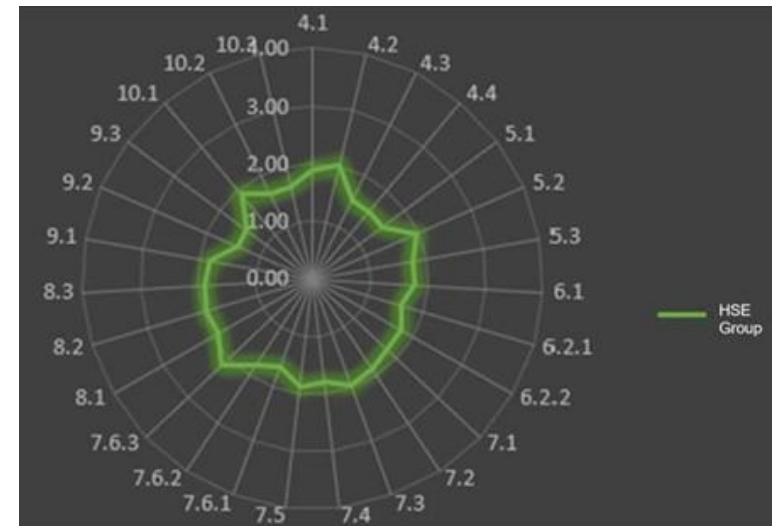
Maturity Assessment

ISO 55001 Maturity Scale

Innocent	Aware	Developing	Competent	Optimising	Excellent	
Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Beyond		
The organisation has not recognised the need for this requirement and/or there is no evidence of commitment to put it in place	The organisation has identified the need for this requirement, and there is evidence of intent to progress it.	The organisation has identified the means of systematically and consistently achieving the requirements, and can demonstrate that these are being progressed with credible and resourced plans in place.	The organisation can demonstrate that it systematically and consistently achieves relevant requirements set out in ISO 55001.	The organisation can demonstrate that it is systematically and consistently optimising its asset management practice, in line with the organisation's objectives and operating context.	The organisation can demonstrate that it employs the leading practices, and achieves maximum value from the management of its assets, in line with the organisation's objectives and operating context.	

(Source: The IAM, SAM+)

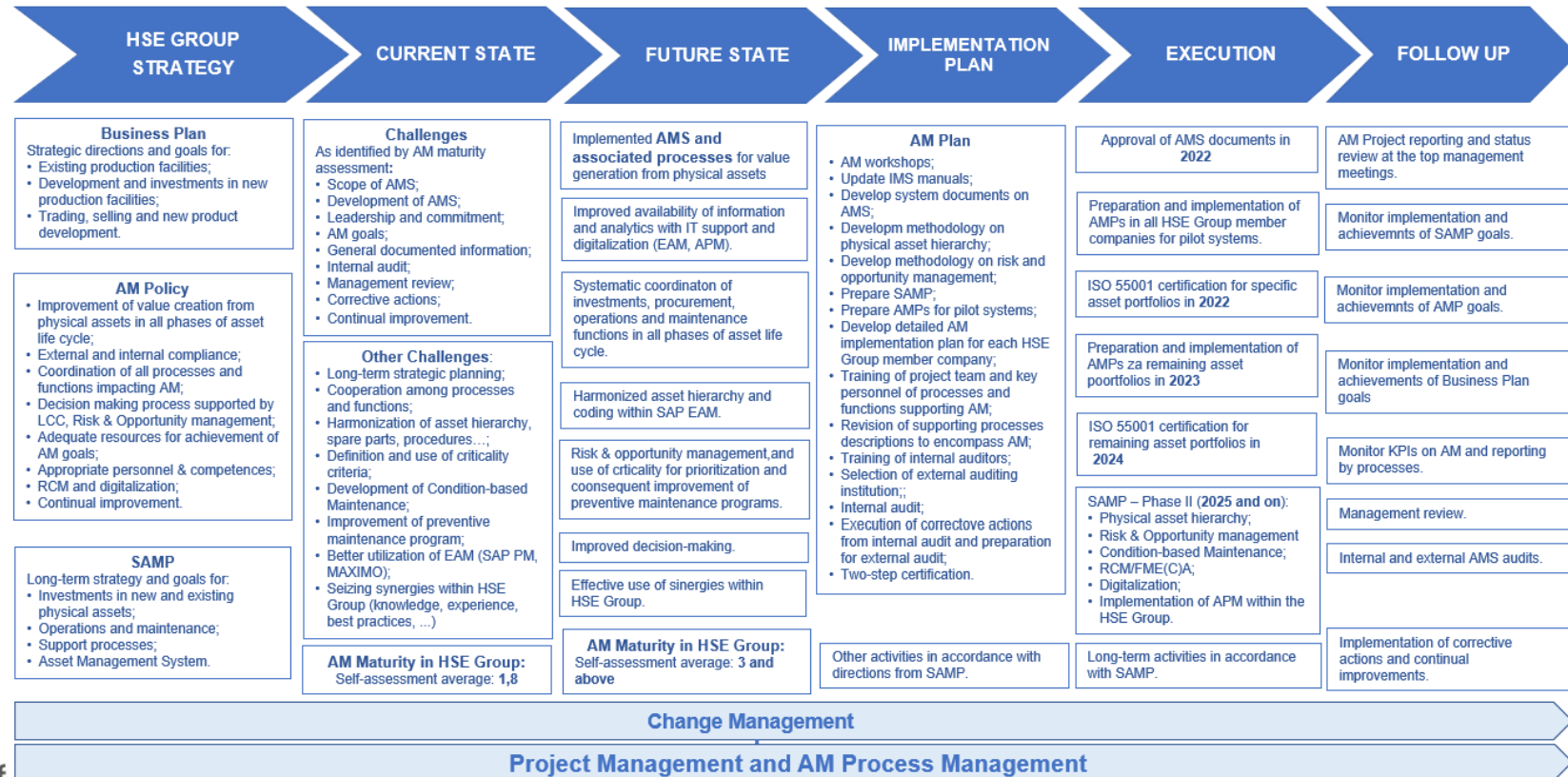
Initial AM maturity self-assessment results, an example



(Source: HSE Group)

Strategic Implementation Framework

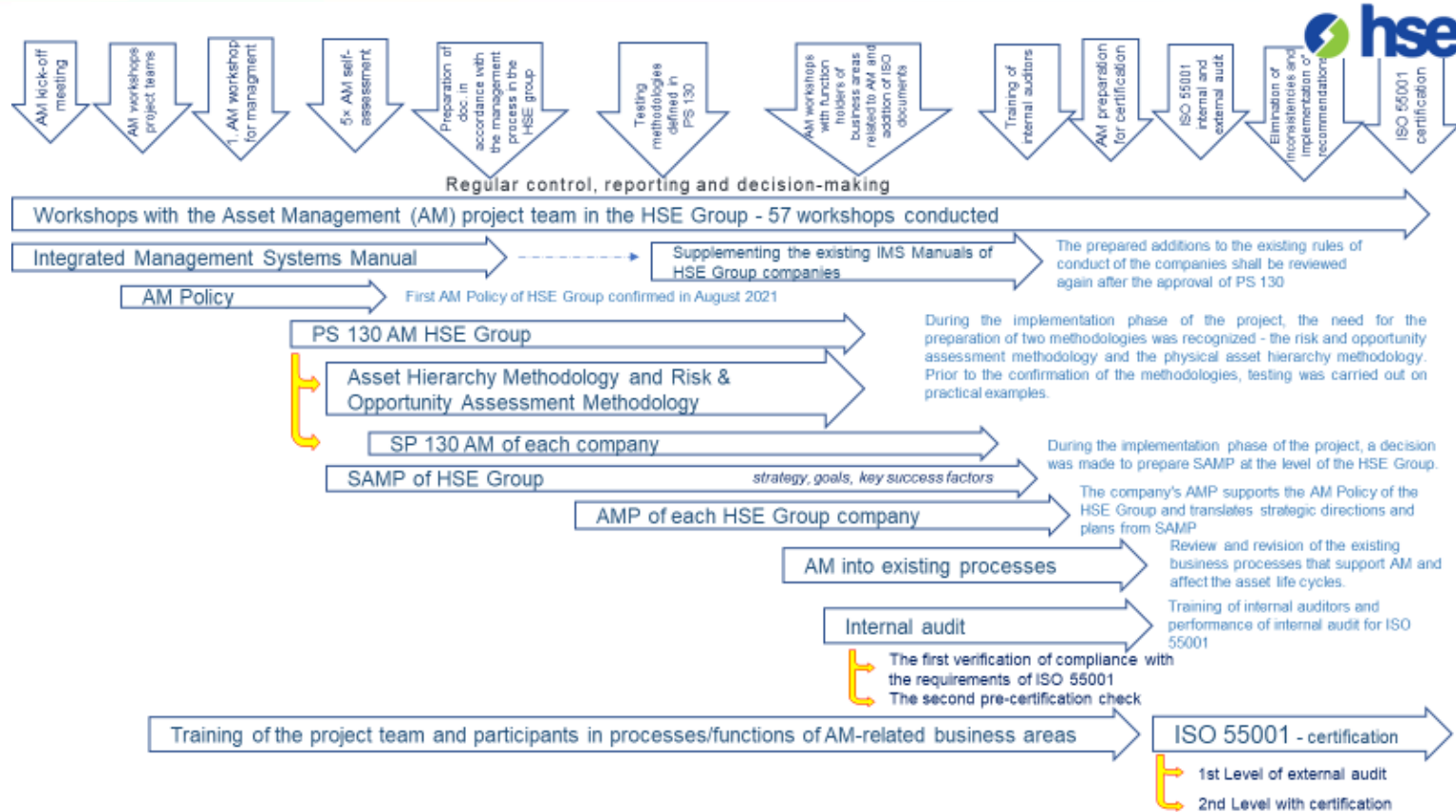
An example of a Strategic Implementation Framework; a high-level view



(Source: HSE Group)

Project Roadmap

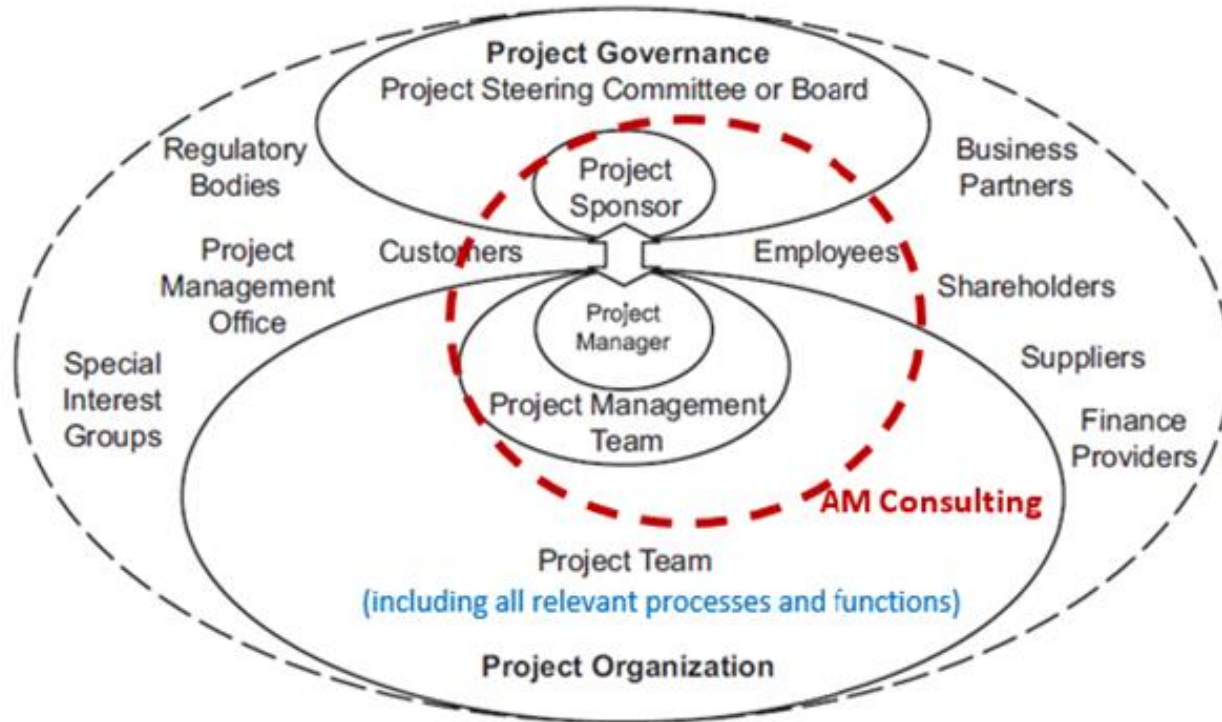
An example of a Project Roadmap; a high-level view



(Source: HSE Group)

Project Organization

All important stakeholders need to be involved

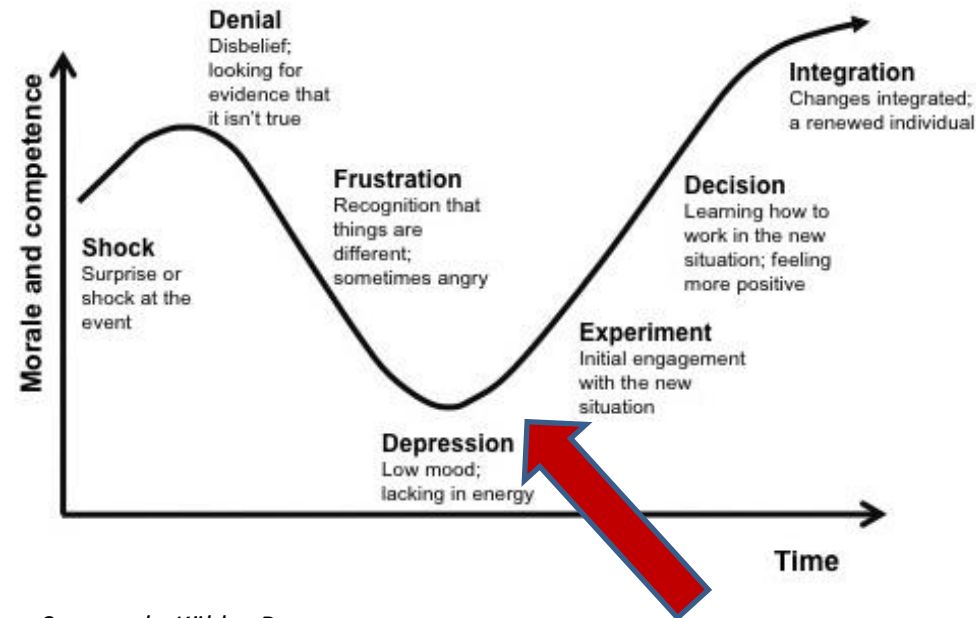


(Source: AM Consulting, adapted from ISO 21502)

Change Management

AMS Implementation
is a Change Project!

Typical human reaction – The Change Curve:



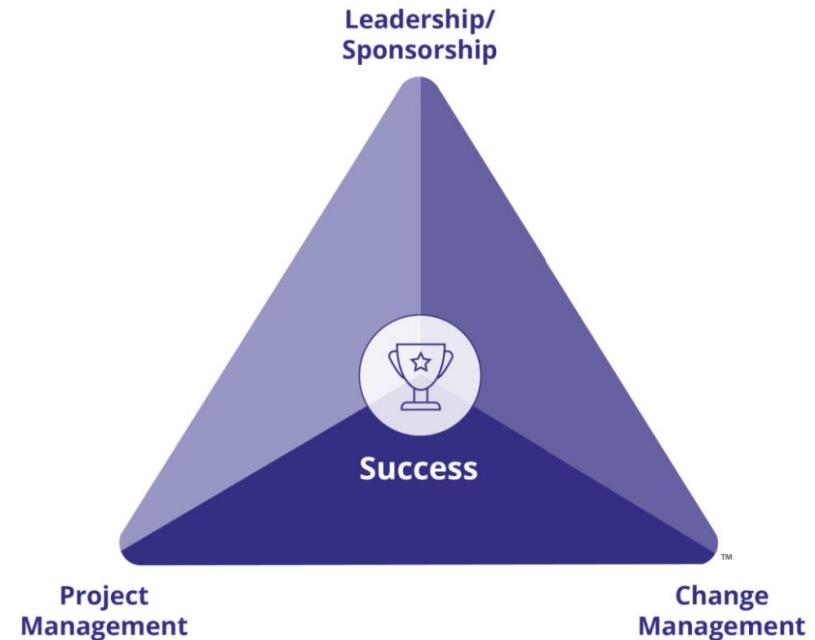
Source: dr. Kübler-Ross

Very often, implementation of change gets stuck at
this point...

Change Management (Cont'd)

PCT (Prosci Change Triangle) Model - For a successful change project, the following three elements should be aligned:

- **Leadership / Sponsorship**, providing guidance and governance,
- **Project Management**, assuring structure of technical contents,
- **Change Management**, supporting people side of the change (*use of proven methodologies e.g., Prosci, Kotter etc. is highly recommended*).

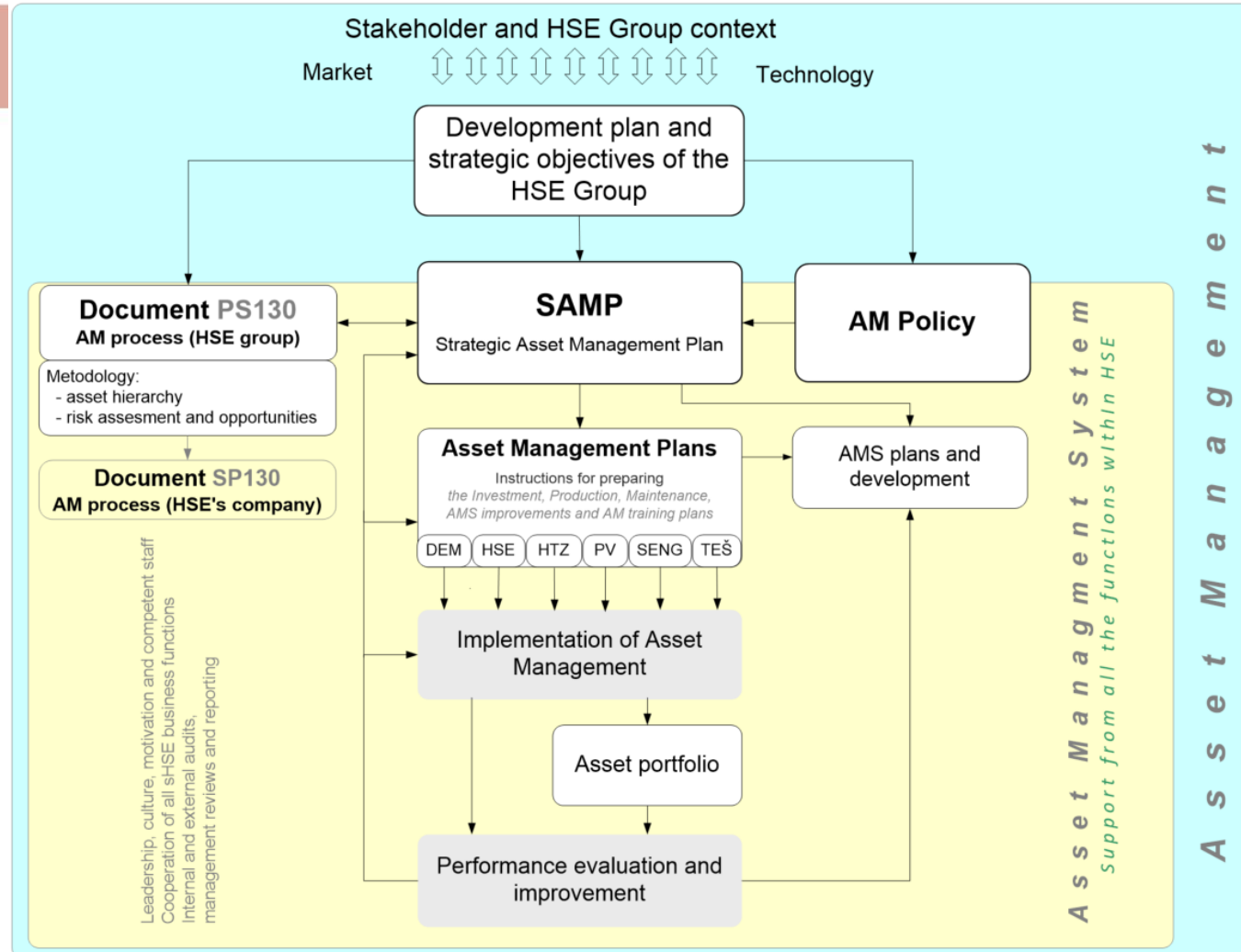


(Source: www.prosci.com)

Deliverables

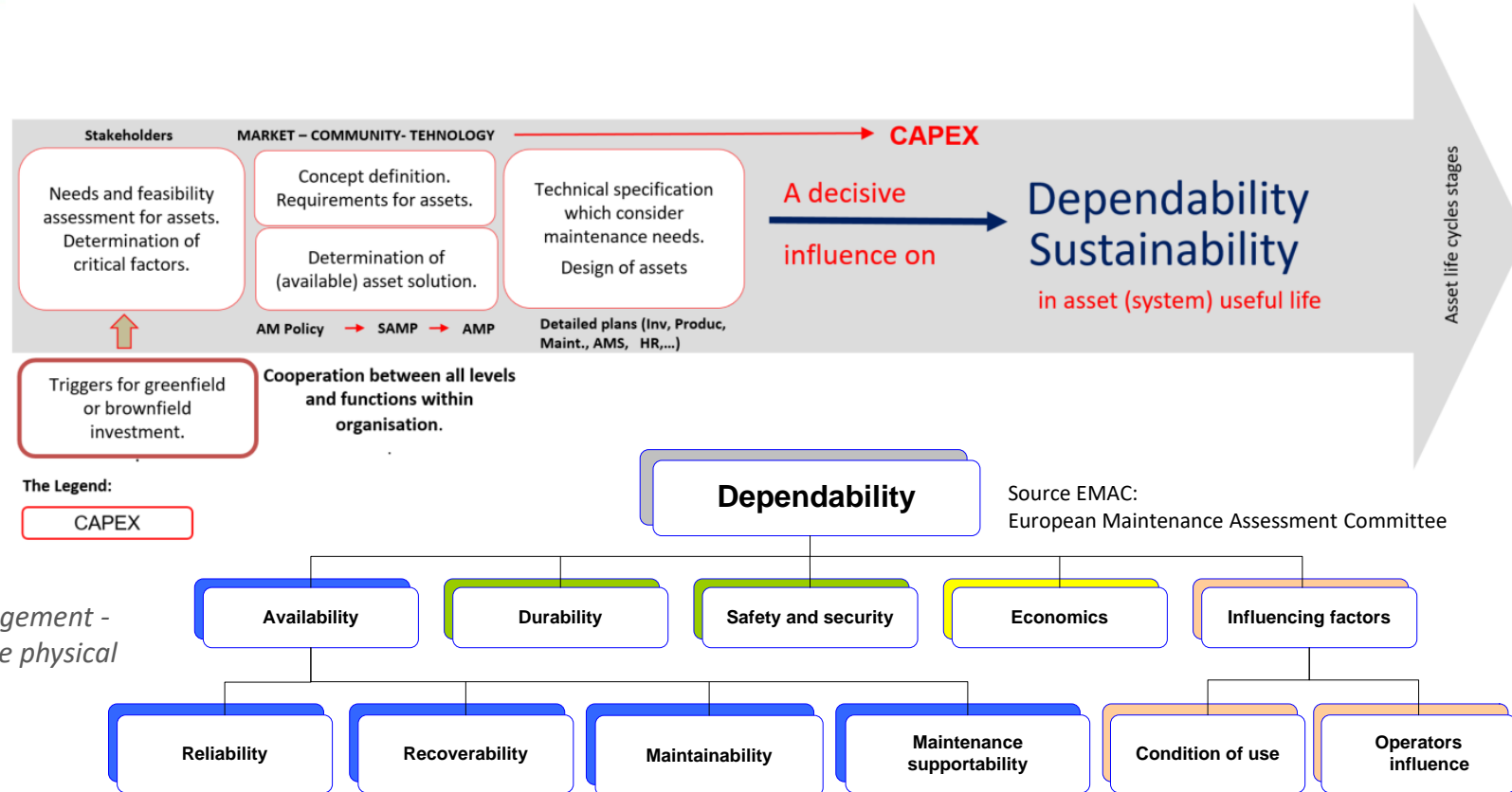
- **Definiton of documents and activities of AMS** (an example of HSE Group)

(Source: HSE Group)



Deliverables

- In-depth Training and Workshops on different aspects of AM, AMS and Life Cycle Delivery

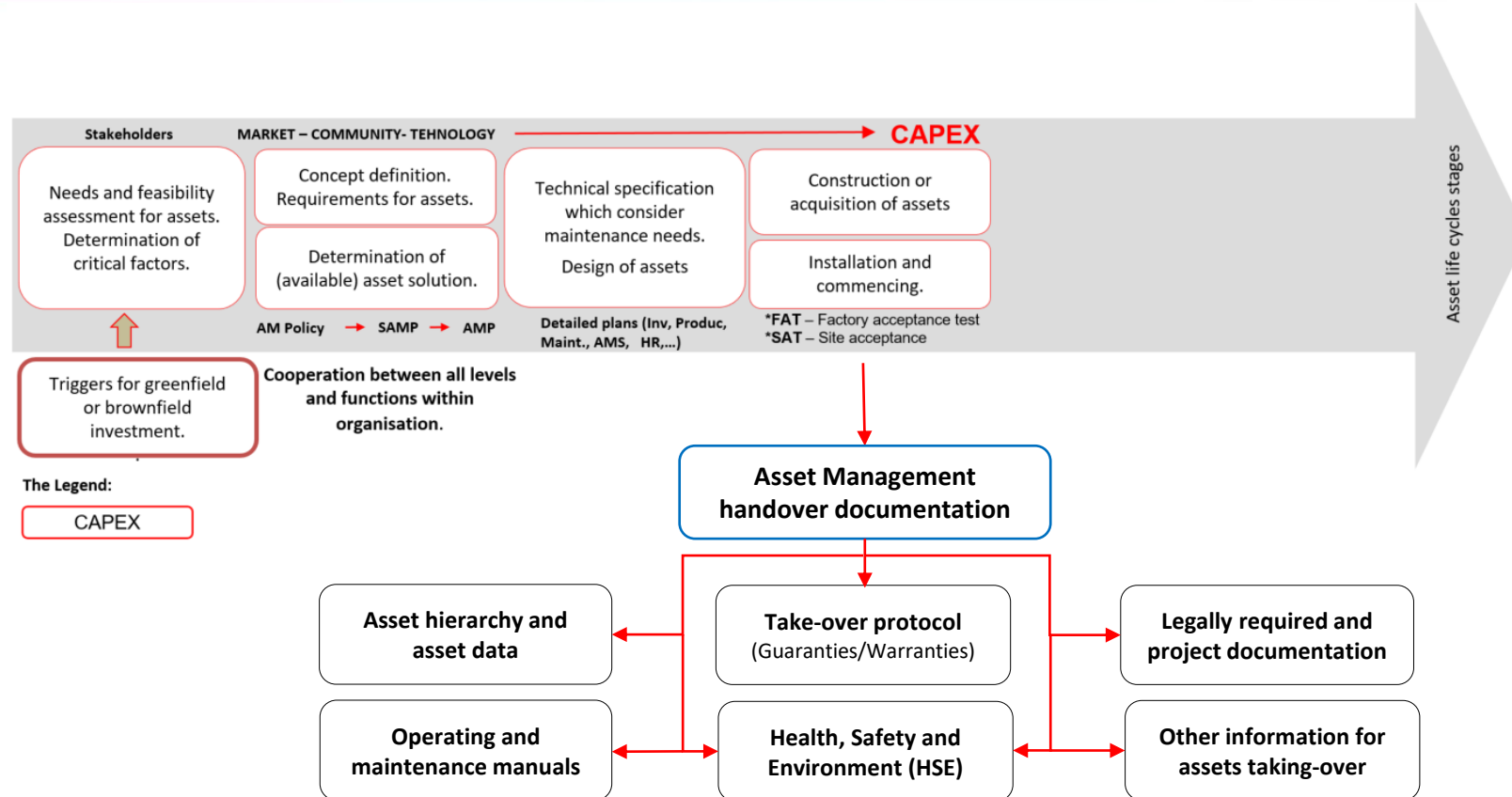


(Source: AM Consulting, adapted from EN 17485)

Maintenance within physical asset management - Framework for improving the value of the physical assets through their whole life cycle

Deliverables

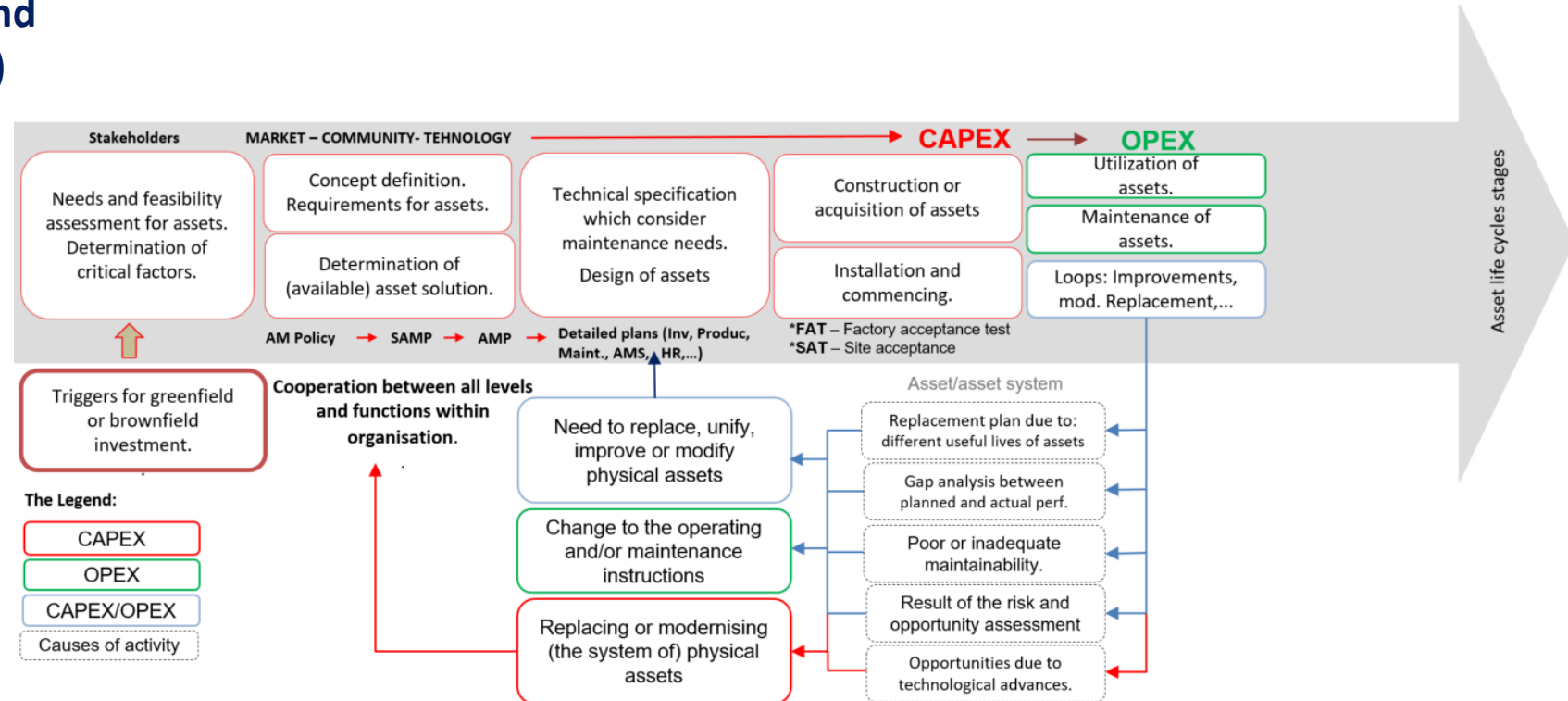
- In-depth Training and Workshops (Cont'd)



(Source: AM Consulting, adapted from EN 17485)

Deliverables

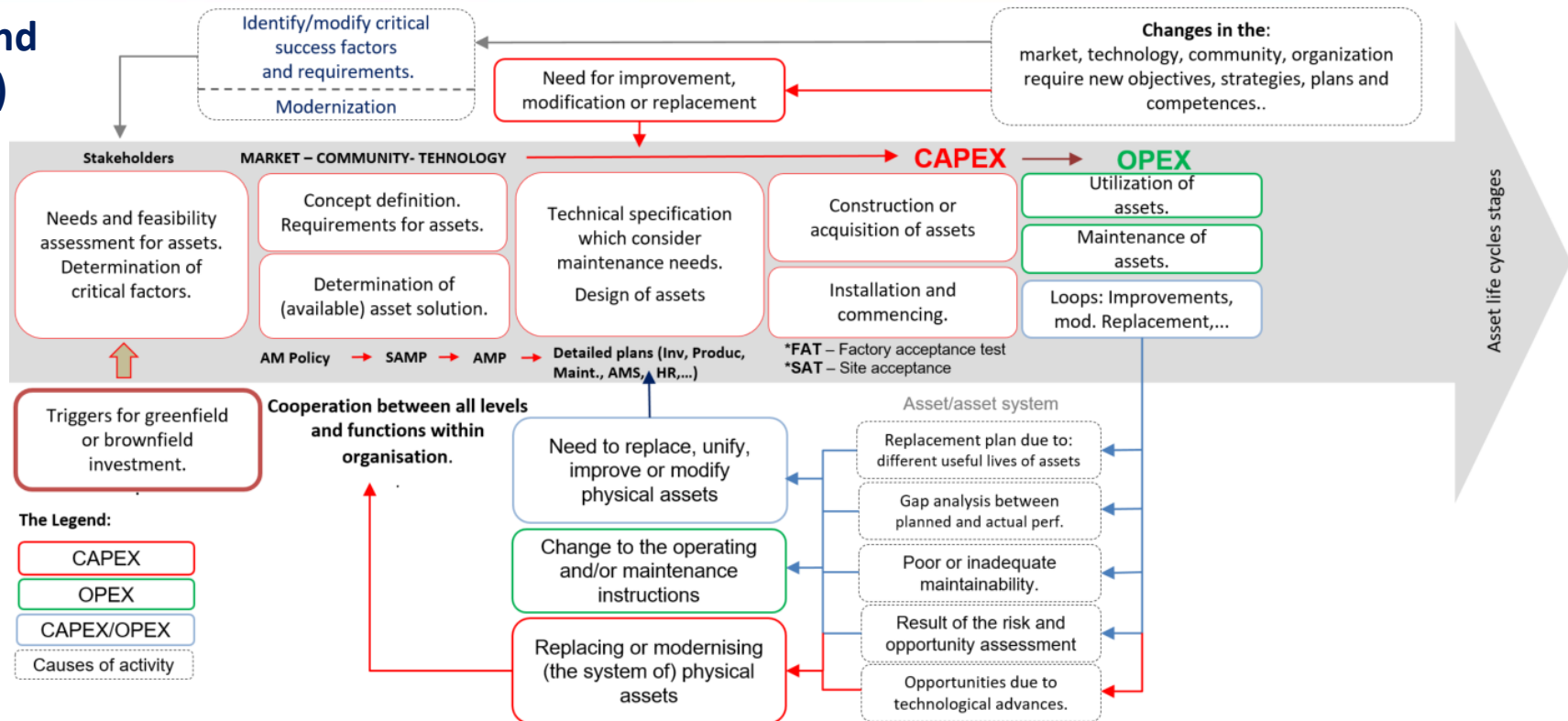
- In-depth Training and Workshops (Cont'd)



(Source: AM Consulting, adapted from EN 17485)

Deliverables

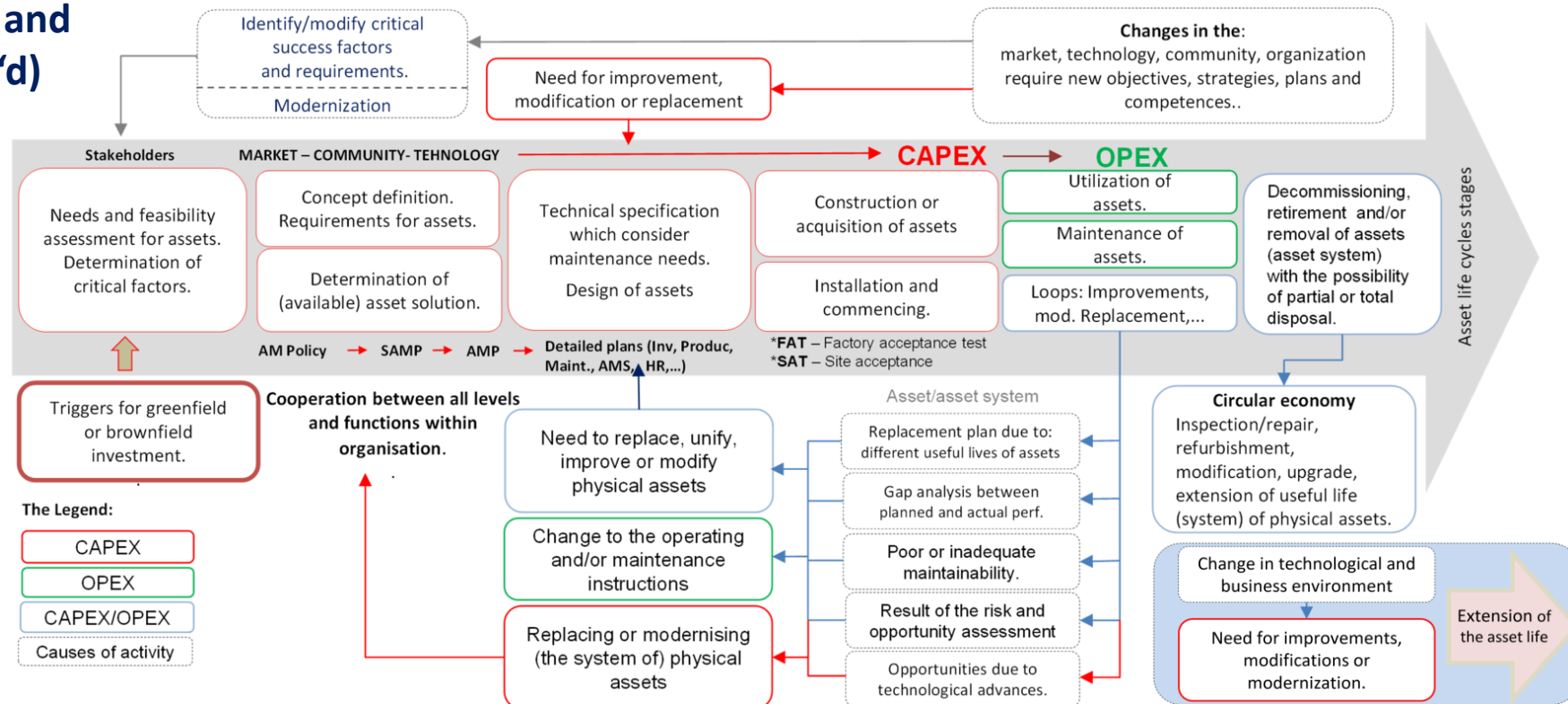
- In-depth Training and Workshops (Cont'd)



(Source: AM Consulting, adapted from EN 17485)

Deliverables

- In-depth Training and Workshops (Cont'd)



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Deliverables (Cont'd)

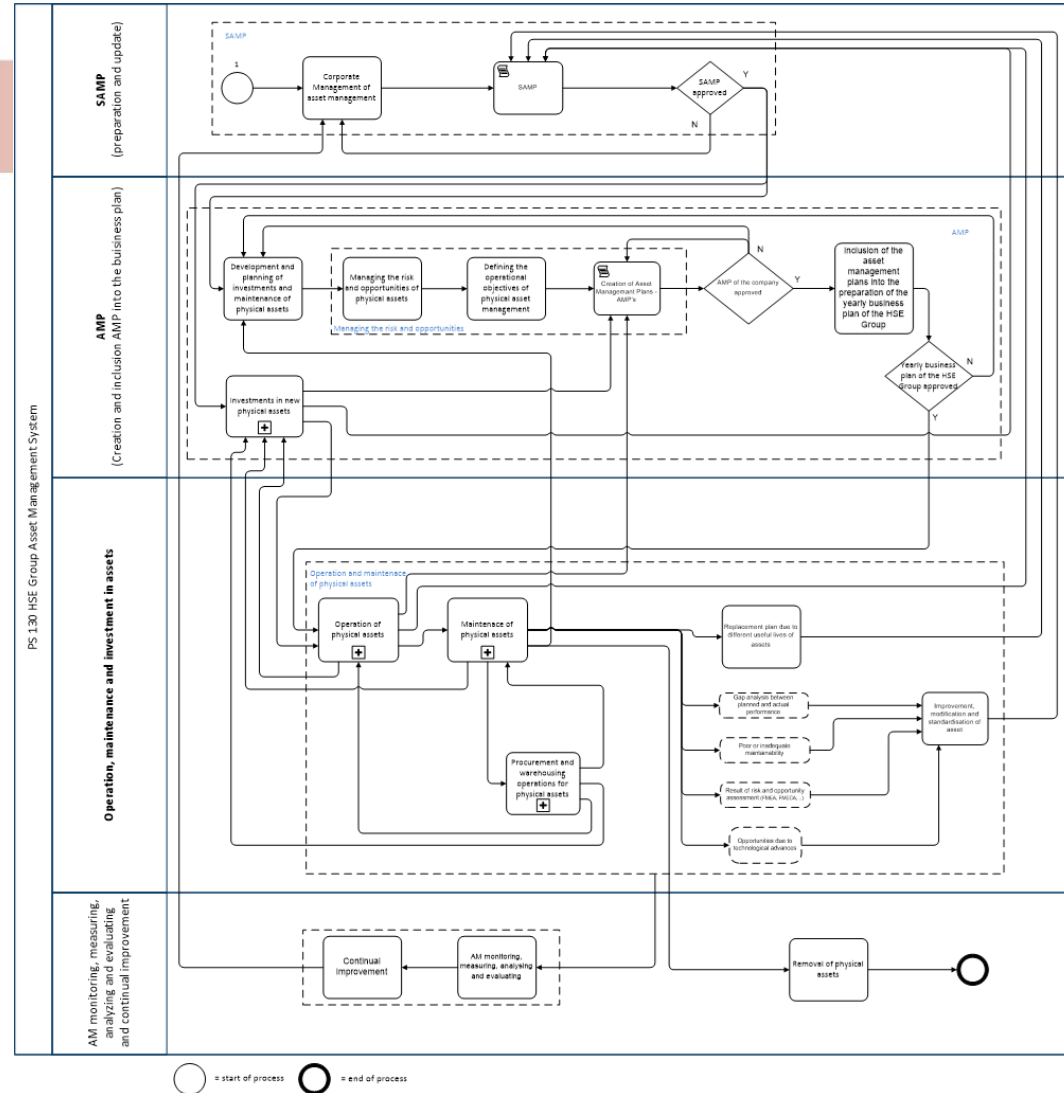
- Asset Management Policy
- Updated Integrated Management Systems (IMS) Manual
- Strategic Asset Management Plan (SAMP)
- ISO 55000 series handbooks
- AM process description - RACI Matrix (example)

(Source: HSE Group)

	Activity and/or process	Responsible									
		HSE top management	CEO of key function	HSE management representative for AMS	HSE Group AM process owner	Owners of other HSE Group processes	Management of the HSE Group company	Managers / heads of individual areas of HSE Group companies	HSE Group company management representative for AMS	AM process owner at HSE Group company	Other process owners at the company
1.	Corporate Management of AM, SAMP development	V	I		SI	SI	SV*	SI**		SI*	SI*
2.	Development and planning of investments and maintenance of physical assets		V		SI	I	V*	SV*		SI*	I*
3.	Managing the risks and opportunities of physical assets			SI	V, SI	I			SI*	V*, SI*	I*
4.	Defining the operational objectives of physical asset management		V	SI	SI	I	V*	SV*	SI*	SI*	I*
5.	Creation of Asset Management Plans – AMP's		V		SI	I	V*	SV*		SI*	I*
6.	Inclusion of the asset management plans into the preparation of the yearly business plan of the HSE Group	V	SV SI		SI	I	V*	SV* SI*		SI*	I*
7.	Operation, maintenance and investment in physical assets		V		SI	I	V*	SV*		SI*	I*
8.	Procurement and warehousing operations for physical assets		V		SI	I	V*	SV*		SI*	I*
9.	Removal of physical assets		V		SI	I	V*	SV*		SI*	I*
10.	AM monitoring, measuring, analysing and evaluating and continual improvement		V	SV	SV	I		V*	SV*	SV*	I*

Deliverables (Cont'd)

- **AM process description - Process Flow Diagram**



(Source: HSE Group)



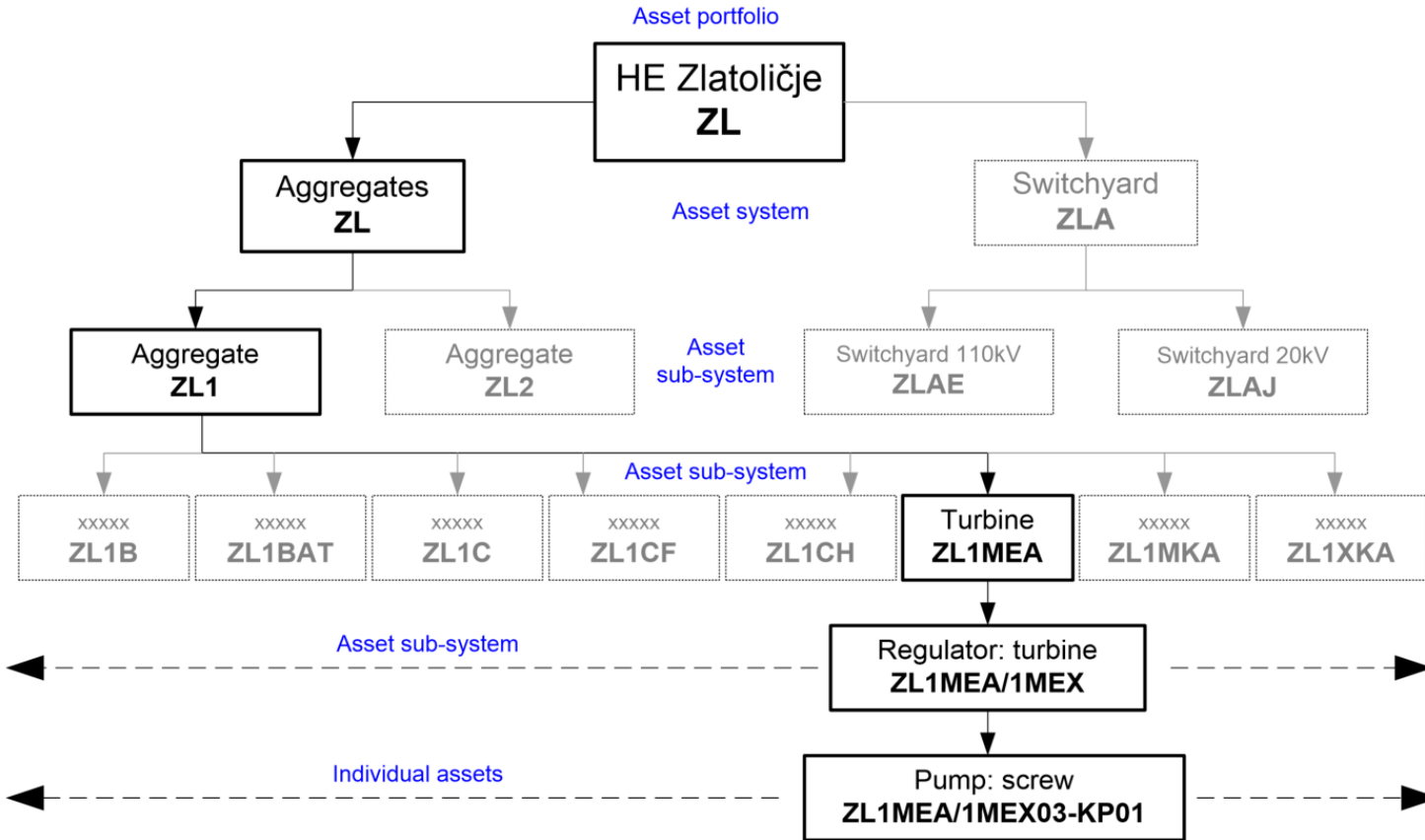
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Deliverables (Cont'd)

- **AM process description** - Integration of Functions and Processes
 - **Recommendations on AM-related upgrade of existing processes**
 - **Guidelines on Maintenance Requirements for investments and hand-overs**
- ✓ Corporate governance,
 - ✓ Investments,
 - ✓ Operations,
 - ✓ Maintenance,
 - ✓ Risk management,
 - ✓ Controlling,
 - ✓ Procurement and warehousing,
 - ✓ Human resources,
 - ✓ Finance and accounting,
 - ✓ IT,
 - ✓ etc.

Deliverables (Cont'd)

- Guidelines on Asset Hierarchy



(Source: HSE Group)

Deliverables (Cont'd)

- Methodology on Risk & Opportunity Assessment
- Guidelines on Asset Group PM tasks - example
- Specific Maintenance Guidelines

(Source: HSE Group)

hse	MAINTENANCE PROGRAM (320)		Rev.: 2			
	PR PA-320-1-2 Asset group PM tasks - TRANSFORMERS					
HSE - Preventive maintenance tasks		Criticality based (RAM) task execution period				
Task	Comment	Critical	Important	Less important	Non-critical	
1. ROUTINE INSPECTIONS (daily, weekly, monthly)						
Oil level inspection	oil TR only	1W	1W	1M	1M	
Cooling system inspection		1W	1W	1M	1M	
Air dryer inspection	oil TR only	1W	1M	1M	1M	
Oil sump inspection	oil TR only	1W	1M or as needed	1M or as needed	1M or as needed	
Inspection of fire extinguishing CO2 bottles		1W	1W	1M	1M	
Inspection of water quantity in fire extinguishing tank		1W	1W	1M	1M	
Thermometer inspection		1W	1W	1M	1M	
2. TRANSFORMER OIL ANALYSES						
Gas chromatography oil analysis (GC)		1Y	2Y	6Y	6Y	
Liquid chromatography oil analysis (LC)		1Y	2Y	6Y	6Y	
Physical and chemical oil analysis, infrared spectroscopy (C + IR)	1 x 6 yrs for TR up to 12 yrs, 1 x 3 yrs for TR older than 12 yrs	1Y	4Y	6Y	6Y	
Prebojna napetost olja in voda v olju (Pn + v)		1Y	2Y	6Y	6Y	
3. ELECTRICAL MEASUREMENTS						
Isolation resistance		1Y	5Y	6Y	8Y	
Magnetizing currents	*as needed, based on the GC/LC analyses results.	4Y	5Y	6Y	8Y	
Resistance measurement at all stages	*as needed, based on the GC/LC analyses results.	4Y	5Y	6Y	8Y	



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Deliverables (Cont'd)

- **Asset Management Plan (AMP) Preparation Procedure, addressing harmonized plans on:**
 - ✓ Investments into new physical assets,
 - ✓ Investments into existing physical assets,
 - ✓ Operations,
 - ✓ Maintenance,
 - ✓ AMS improvements, and
 - ✓ Human resources.



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Certification

- Internal audits
- 1st level external audit
- 2nd level external audit with certification

Note: management system audits are to be integrated wherever possible.



IQNET Building trust together.

Certificate

SIQ Ljubljana has issued an IQNET recognized certificate that the organization:

HOLDING SLOVENSKE ELEKTRARNE d.o.o.
Koprska ulica 92, 1000 Ljubljana, Slovenia

has implemented and maintains an
Asset System

for the following scope:
Asset management in production infrastructure.

which fulfils the requirements of the following **standard:**

ISO 55001:2014

Issued on: **2022-11-11**
First issued on: **2022-11-11**
Expires on: **2025-11-11**

Registration Number: **SI - AM-003**


Alex Stoichitoiu
President of IQNET


Gregor Schoss
Managing director of SIQ Ljubljana



This attestation is directly linked to the IQNET Member's original certificate and shall not be used as a stand-alone document.

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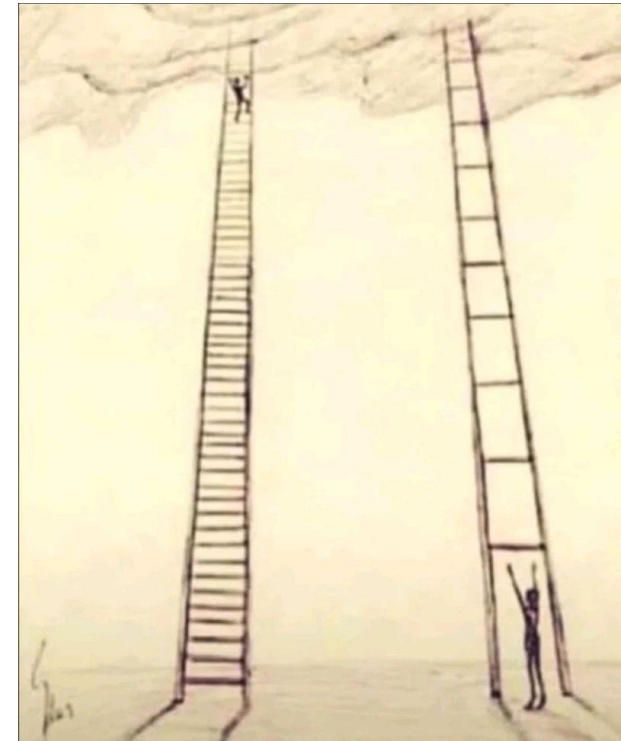
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Suggestions for Future AMS Implementations

- Set realistic goals, establish AMS in line with current AM maturity –
STEP BY STEP,
- Gain top management support where necessary,
- Establish and motivate an active project management team,
- Regularly communicate,
- Define clear Ownership of the project – consultants provide structure and guidance, customer owns and executes,
- Utilize Change Management methods as much as possible,





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Suggestions for Future AMS Implementations (Cont'd)

- Pay utmost attention to alignment of functions and processes & harmonize the decision-making,
- Introduce risk and opportunity methodology at the asset system and individual asset levels,
- Use implementation of AMS as a learning process,
- Utilize international standards and guidance wherever feasible,
- Do not overdo contents of a single project - be cautious with simultaneous alignment and upgrade/re-engineering of AM supporting processes (e.g. Investments, Procurement, Maintenance etc.).
- As part of digitalization, make BIM a key supporting tool for Asset Management on the long run.



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Questions?

For any later questions the authors can be reached at:

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