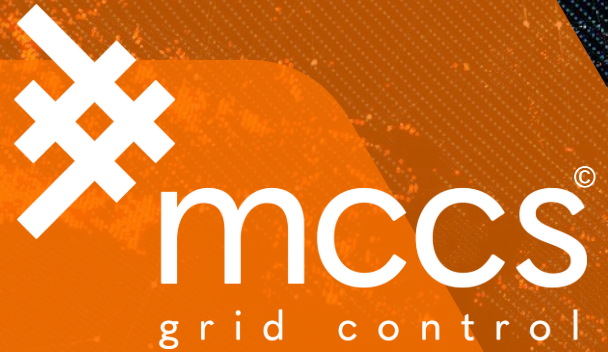




Modular Control Center System of the Next Generation

Designing a Future-oriented Control Center System
for a Successful Energy Transition

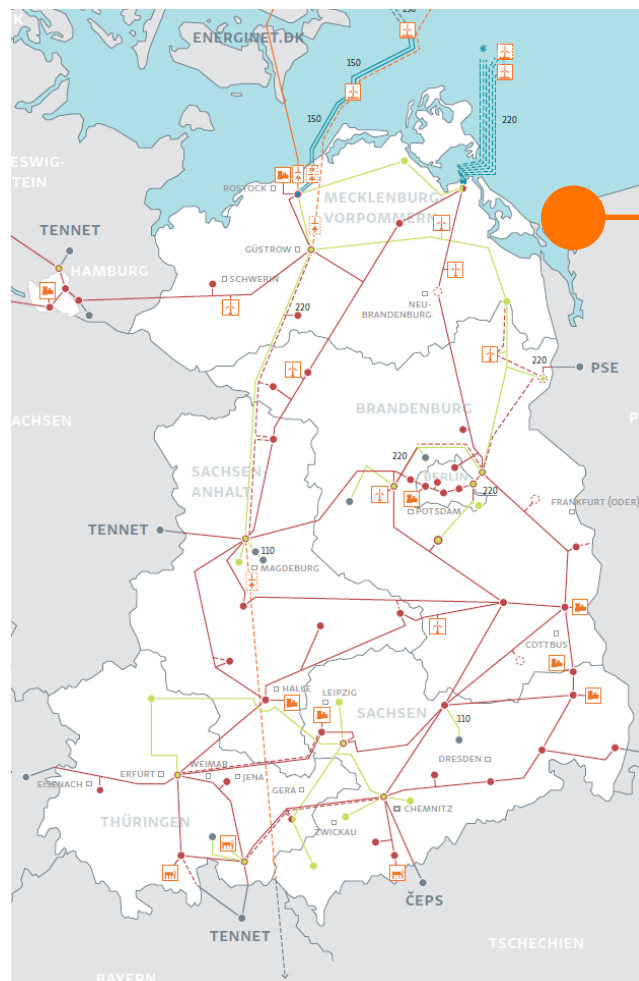
22.02.2022 Mirko Pracht, Ralf Heisig

The transmission system operator 50Hertz – responsible for ...

- ... securing electricity supply to 18 million people in northern and eastern Germany
- ... operating the electrical system in Berlin, Brandenburg, Hamburg, Mecklenburg-Vorpommern, Saxony, Saxony-Anhalt and Thuringia
- ... operation, maintenance, expansion and safety of the extra-high voltage grid – onshore and offshore



50Hertz – at a glance



RES share in power consumption

2019

~ 60 %

2010

~ 25 %



Installed capacity

57.432 MW (~ 26 %*)

38.354 MW (~35 %)

thereof wind

19.777 MW (~ 34 %)

11.318 MW (~40 %)

thereof photovoltaics

12.705 MW (~ 22 %)



Power consumption

ca. 99 TWh
(~ 20 %*)

ca. 98 TWh
(~20 %)



Turnover

10,2 bn. €

5,6 bn€



Staff

1.138

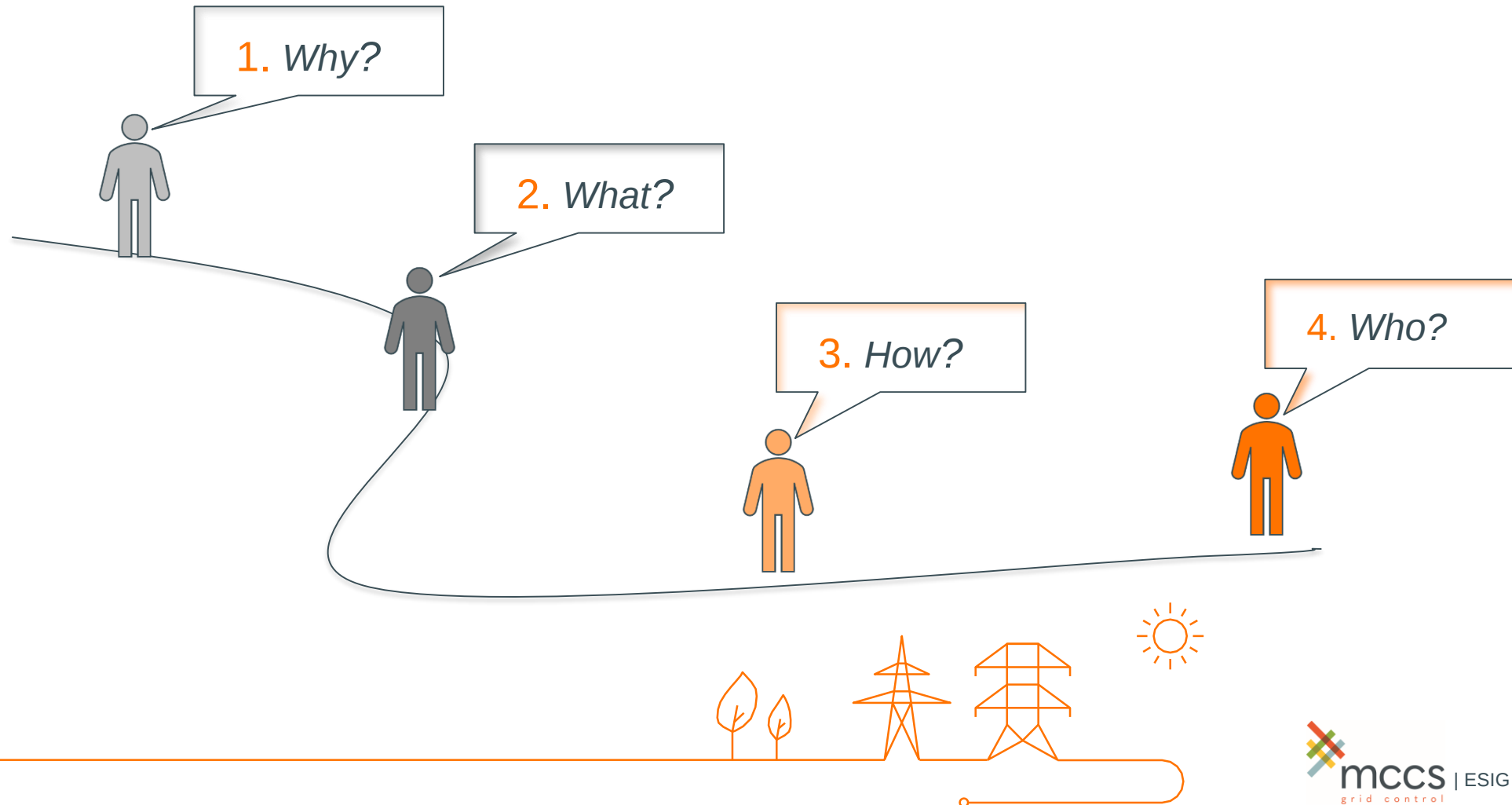
643



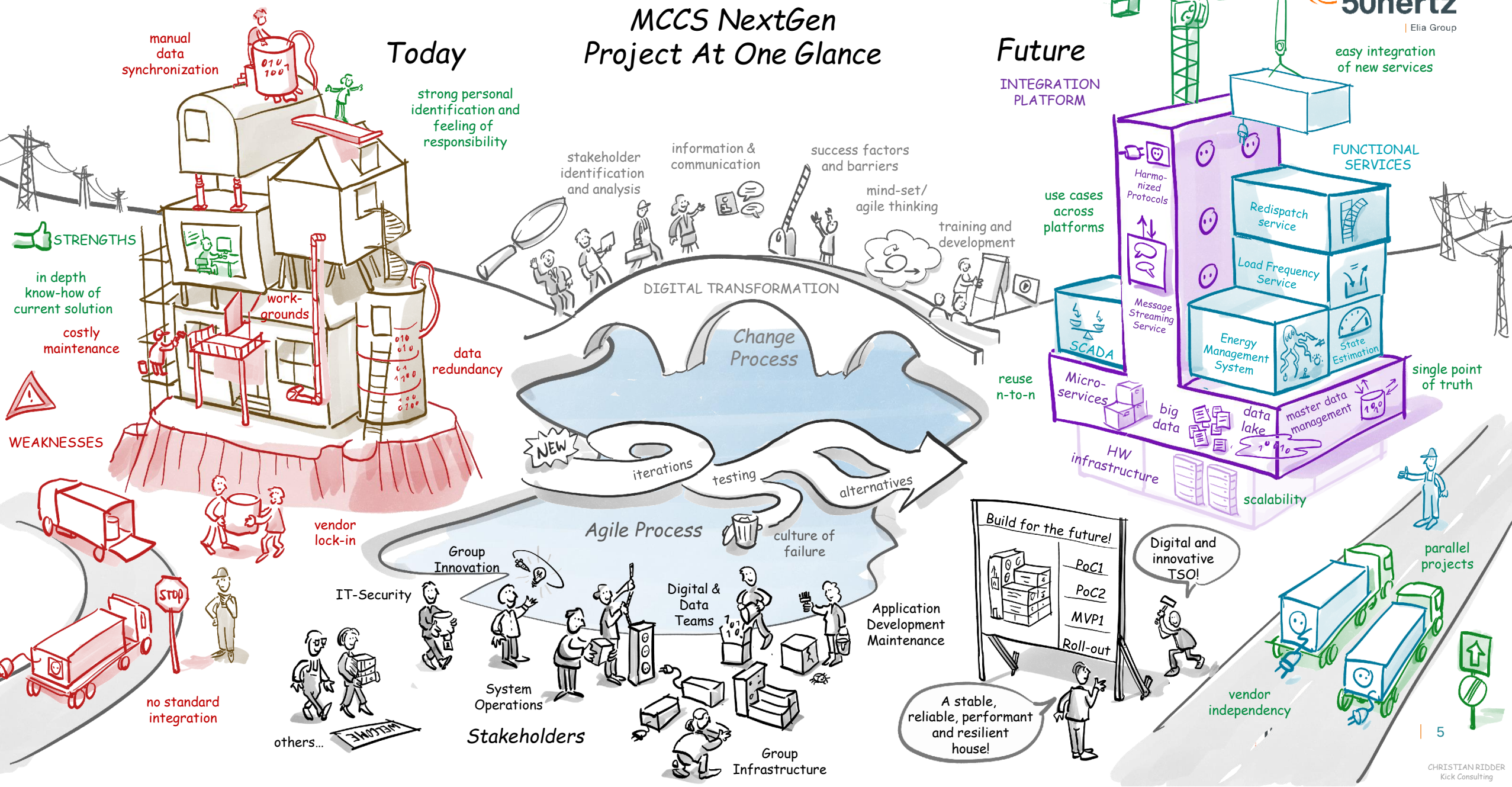
(share of Germany)

*Data as of 13/02/2020

Storyline MCCS NextGen



50Hertz MCCS NextGen Project At One Glance



Typical TSO Problems

What stays!

Our systems stay >99,99% reliable & available

Fulfilling of all high security requirements

Fantastic how many challenges of TSOs we are about to solve with Modular Control Center Solution NextGen!



The Old Way

"...speed of change slow... availability of new functions only in large "time intervals..."

"...High costs, always linked to major changes..."

*"...Results late and often different to expectation..."
(Black box development)*

*"...Change Requests are not fulfilled by supplier because they might not match with supplier's product strategy..."
(e.g. for Interfaces)*

*"...Changes only possible for the "entire system" as update or upgrade, no partial replacement ..."
(Monolithic Block)*

"...High Risk when changing monoliths – it fully works or not -..."

"... High effort & costs when multiple monolithic systems to be integrated and engineered at one single point in time..."

"...all requirements described at the beginning – hoping to know what is really needed in x years..."

"...multiple data maintenance and (manual) synchronisations very problematic..."

Multiple Applications – all with individual user interface, different behaviour..."

"...Vendor lock-in..."

Vs

We Do It Better!

With our fast and short implementation cycles, results are available after short time period!

Smaller deliverables/ packages related to minor costs!

Product is continuously developed & evaluated by System operation !
(e.g. frequency measurement in MVP1)

We own the product and drive the changes by our self!

Function by function or service by service can be updated or replaced (Modular approach)

Safe rollouts via multiple but smaller and manageable changes, small impact and lower risk!

Integration and engineering effort in relation to incremental deliveries – small and continuous steps!

Fundamental requirements are clear and base for development or purchasing – further improvements based on early customer feedback!

Single source of truth – many data consumers (modules) get equal data!

One centralised and integrated user interface –optimised for business processes and following a comprehensive style guide – less training effort for system operators

Independent modules & functions can be integrated or replaced
one by one – multiple vendors participation possible

Why do we do it?

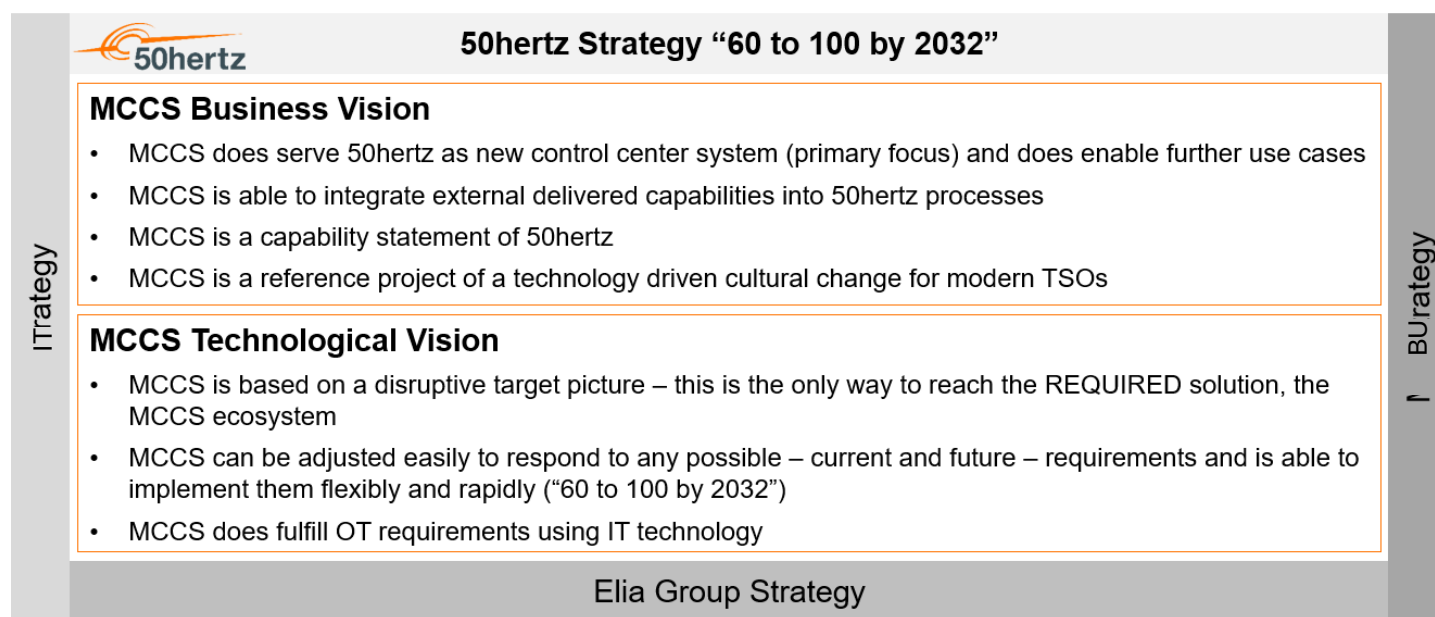
Why can we not continue with the current control center system?

The current control center system does not allow us to realize our strategy „60 to 100“ by 2032, because it is not even able to implement all current business requirements, not to mention future business requirements.

+

What does the product vision look like?

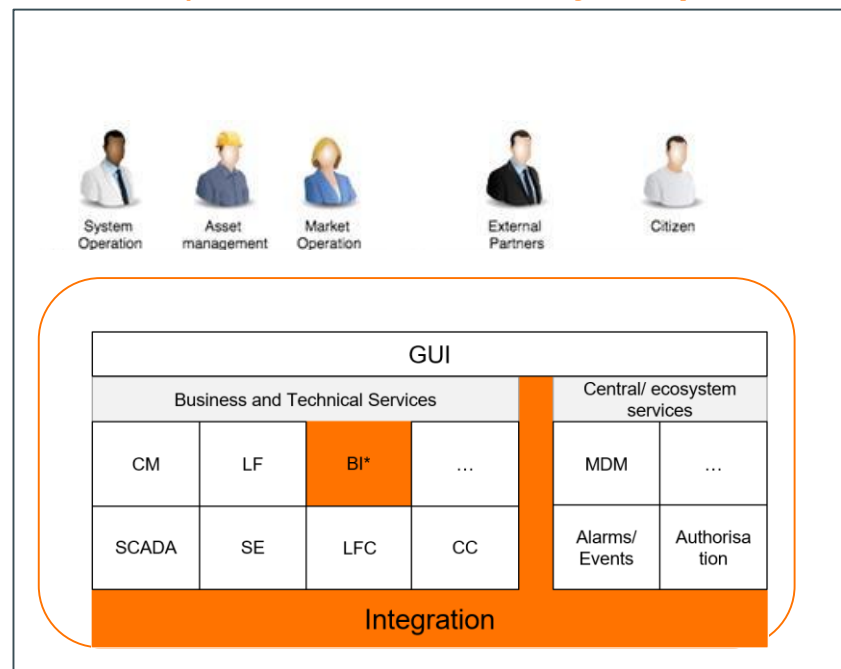
“We don’t build a system for yesterday and NOT ONLY for today, but ALSO for the FUTURE!”



What is the product?

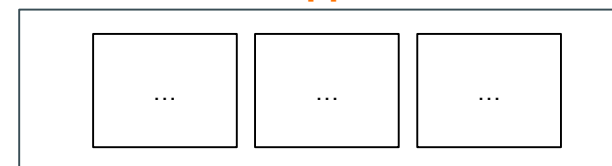
Focus on 50Hertz' MCCS Eco-System, but we are open for other use cases

Modular Control Center System (50Hertz' MCCS Eco-System)



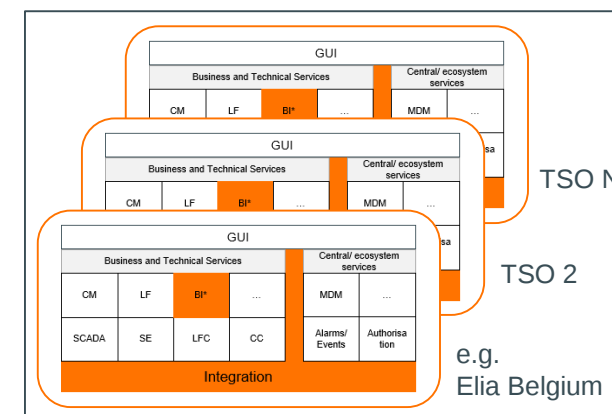
+

Other applications



+

Other ambitions



Legend:



Control Center (Eco-System) : 100% Know How for Orchestration & Operation 50Hertz



Integration Platform & 50Hertz modules: 100% property & Know How 50Hertz



Services developed by 50Hertz or bought from multiple 3rd-party suppliers (make or buy-decision)

Approach & Setup

Iterative & customer-centric to check disruptive target scenario

Key aspects

- **Disruptive** target scenario
- **Iterative** process with fast deliveries
- **Feedback-driven** with regular customer feedback (sounding boards, product result & technology demonstrations, etc.)
- **Continuous improvement**
- **Adaptive** to complex and changing environment
- **Interdisciplinary** across all teams

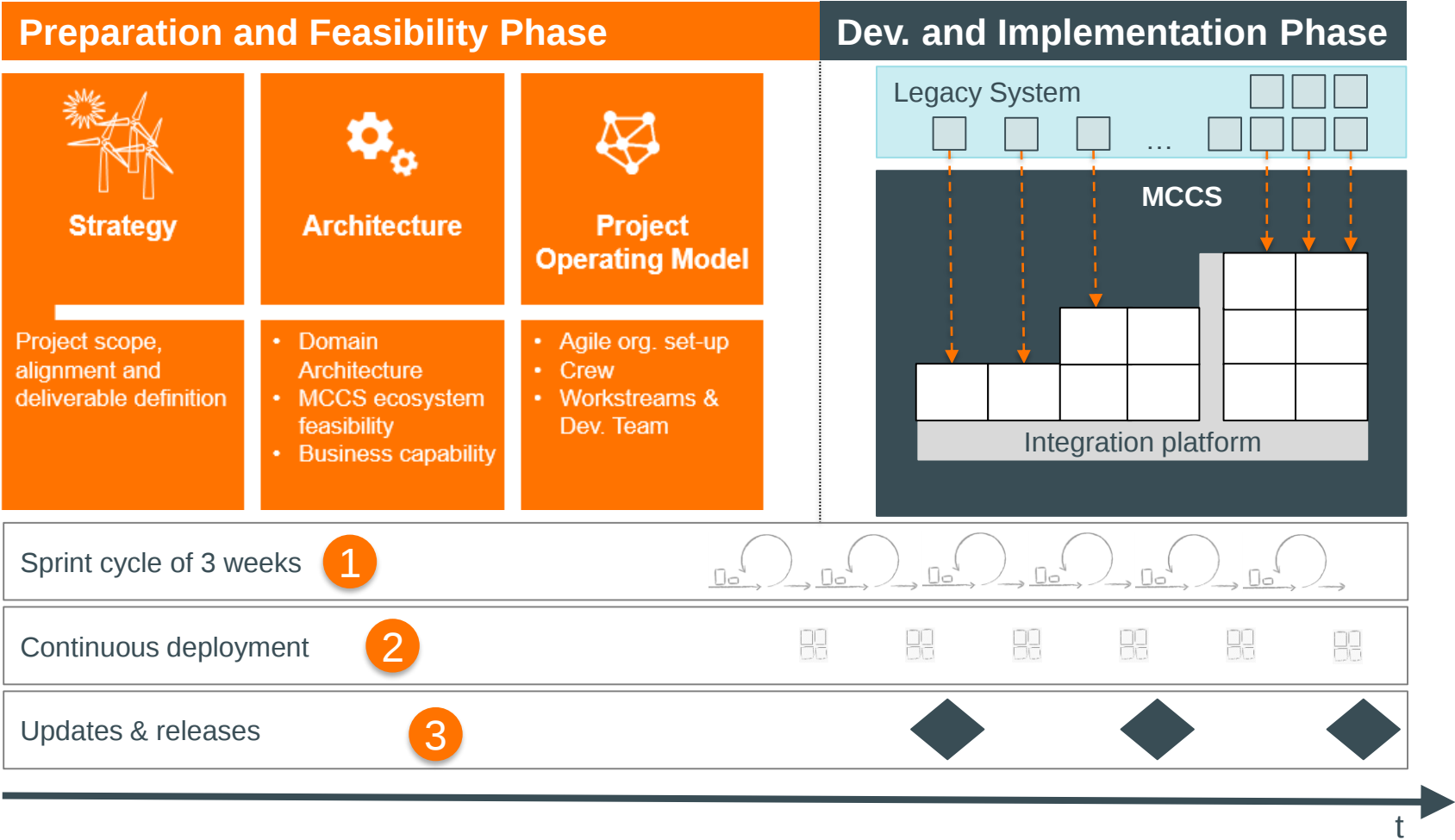
Lessons learned past projects

- **Too many** requirements for one vendor
- **Mismatch** in requirement understanding
- **Flexible framework** (modules) necessary to be able to implement new requirements
- **Vendor dependency** blocks idea of ecosystem & increases costs



Approach & Setup

Increments lead the way (Checkpoint21, Checkpoint22-Q1, ...)

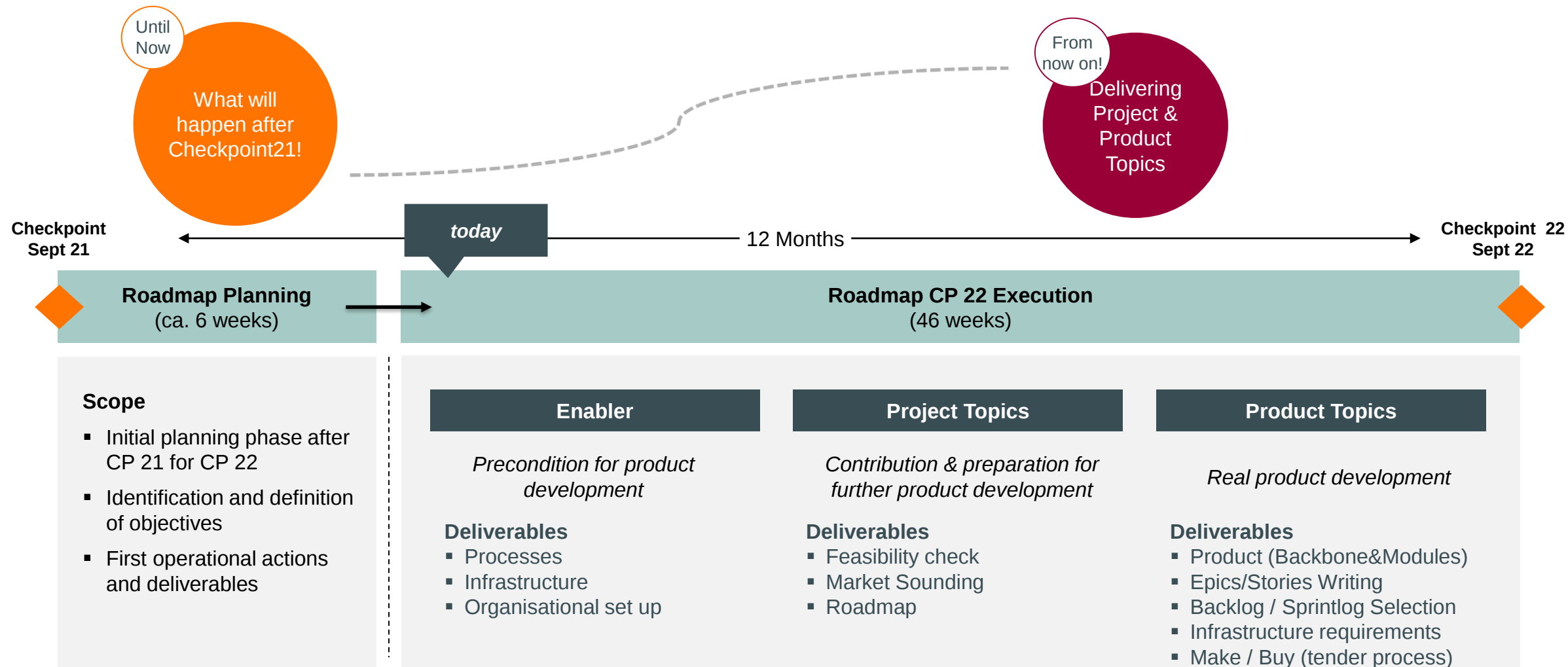


Service by Service is transferred to the target system to finally replace the entire legacy landscape.
 No “Big Bang” – all in transparent increments with early customer feedback.



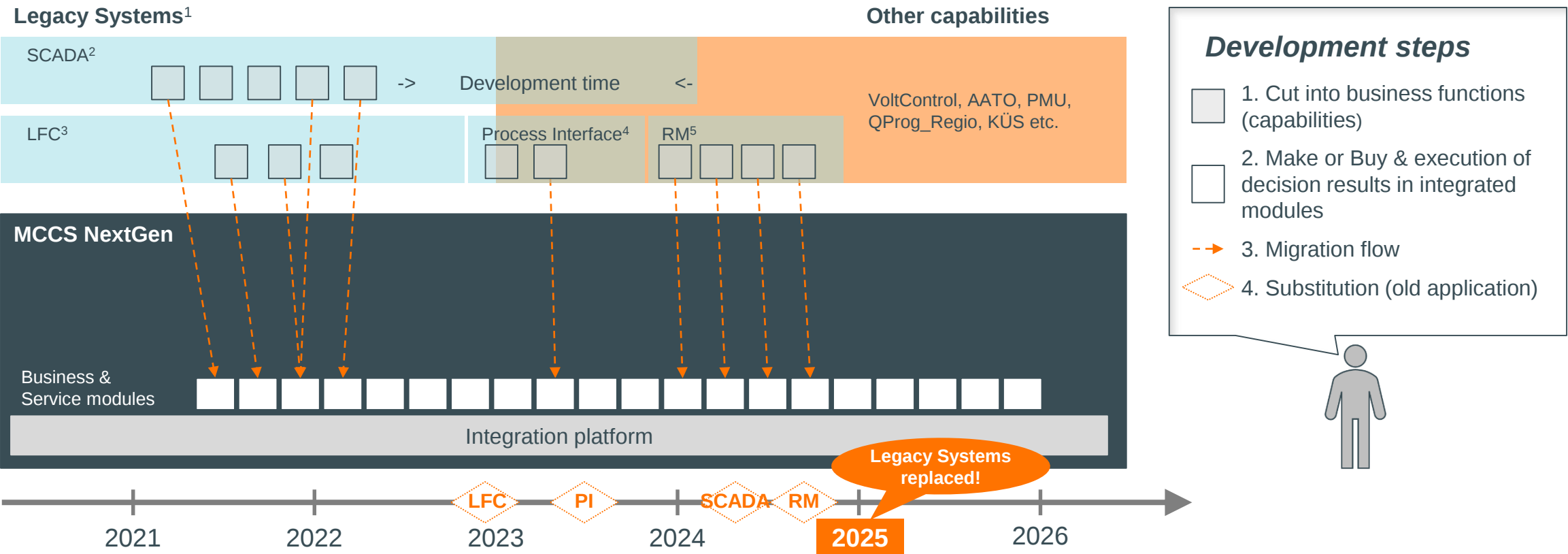
In order to deliver value for CP22, we follow a two-phase approach

After having set a plan, we are on our journey towards CP22



Migration Roadmap & Development Plan

Incremental development in product-mode and flexible releases in alignment with CC



- Legend:

1. Legacy Systems are secured until ~2026 via Retrofit measures!

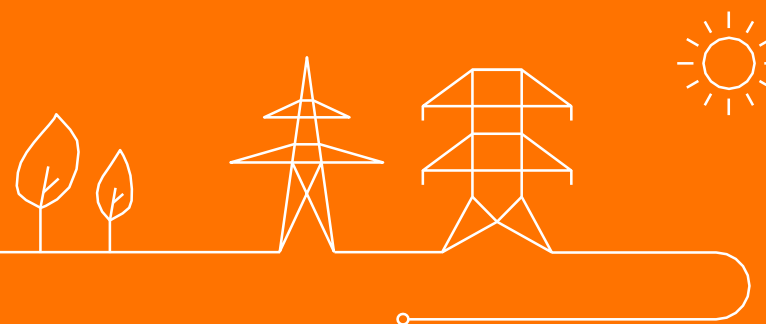
2. SCADA
 - SCADA RT Monitoring
 - SCADA Alarm
 - Data Acquisition & MDM
 - SCADA Control

3. LFC
 - Data Acquisition
 - LFC Alarms
 - LFC Control

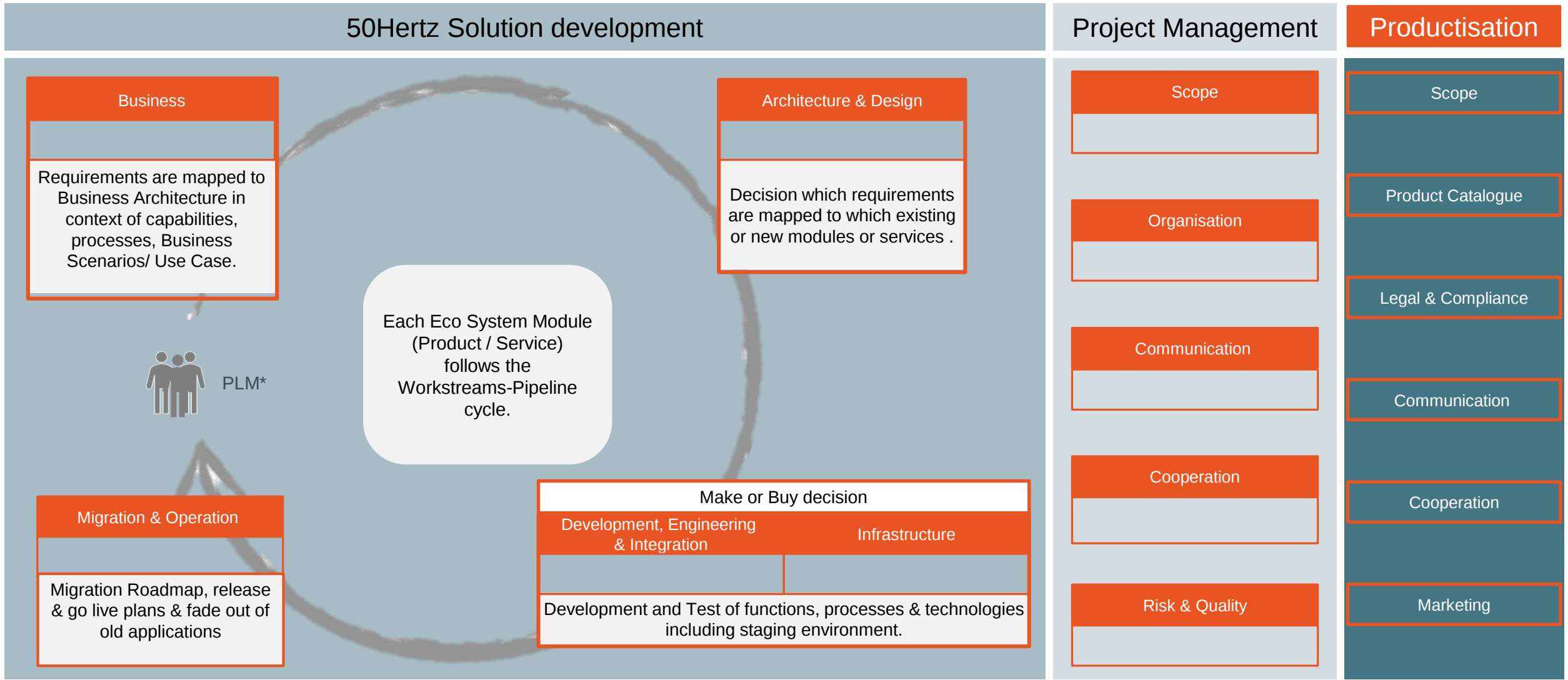
4. Process Interface
 - Gateway(s)

5. RechenModul
 - Model
 - Power Flow
 - Export
 - Optimisation

Introduction of the crew setup



MCCS NextGen I 50Hertz Project with Workstream Structure



*PLM= Product Lifecycle Management

MCCS Goals

Goals of MCCS

Primary goal: to create a new **ecosystem** for modular Control Center services and replacing ALL 50hertz OT legacy systems, NOT ONLY “LFC, Process Interface, SCADA.”

Secondary goal: to contribute to several strategic goals of Elia Group by...

- ... working with product / productization
- ... improving project modes
- ... implementing organizational change

In addition, it promotes:

- Interest of society by leading an innovative world-wide community & collaboration
- Increasing flexibility and decreasing TCO*

„Checkpoint21“ – Evaluation milestone
with clearly defined goals reached in September 2021

Outcomes demonstrate that MCCS has already contributed to several strategic Elia Group goals

1	Product (MVP) Functionality Integration Platform Infrastructure	✓ Development (BY OURSELVES): Platform & multiple modules (UI, Alarm, LFC & MDM) ✓ First 3 rd party integration of market module ✓ Architectural setup allows for easy adaptation by others
2	Project Crew Set-up Methods	✓ Project setup as a development factory ✓ Process for know-how acquisition via externals
3	Organisation Performance Resources Know-How Processes	✓ Network and collaboration across the whole organisation

*Total Cost of Ownership

Next steps

Improvement of product, project & organisation to the next level required, otherwise we slowdown the journey to strategic Elia Group goals

1 Product

- ... to continue to build MCCS as a **product**
- ... to **establish** & develop cooperation with other market players in general
- ... to **arrange** cooperation agreements with first partners & TSOs

2 Project

- ... to switch from classical project to **product-mode**

3 Organisation

- ... to **transform** MCCS into **product organisation** that enables **fulltime resources**



Join our Vision

Get in touch with us and TSOs, DSOs, Vendors or other interested groups



Mirko Pracht,

Director, Digitalization in System Operations, Program Lead & Initiator for MCCS

Ralf Heisig

Product Manager MCCS NextGen, 50Hertz

[Contact our PMO via Email](#)