

A photograph of a wind farm at sunset. The sky is a gradient of orange, pink, and blue. Several white wind turbines are visible on the horizon. A white rectangular box with a grey drop shadow is positioned on the left side of the image, containing text.

Building an AI Center of Excellence at an Energy Utility: Learnings + Challenges

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Agenda

- What does Elia Group do?
 - Intro to Energy Transmission
 - Intro to the Energy Transition
 - Why is AI important for realizing the energy transition?
- Starting the AI CoE
 - 3 Pillars
 - Main Learnings
- Main challenges
- Questions/discussion



Elia Group: one of Europe's top 5 TSOs

Elia Group is active in electricity transmission.

It encompasses two leading TSOs strategically located in two European regions:

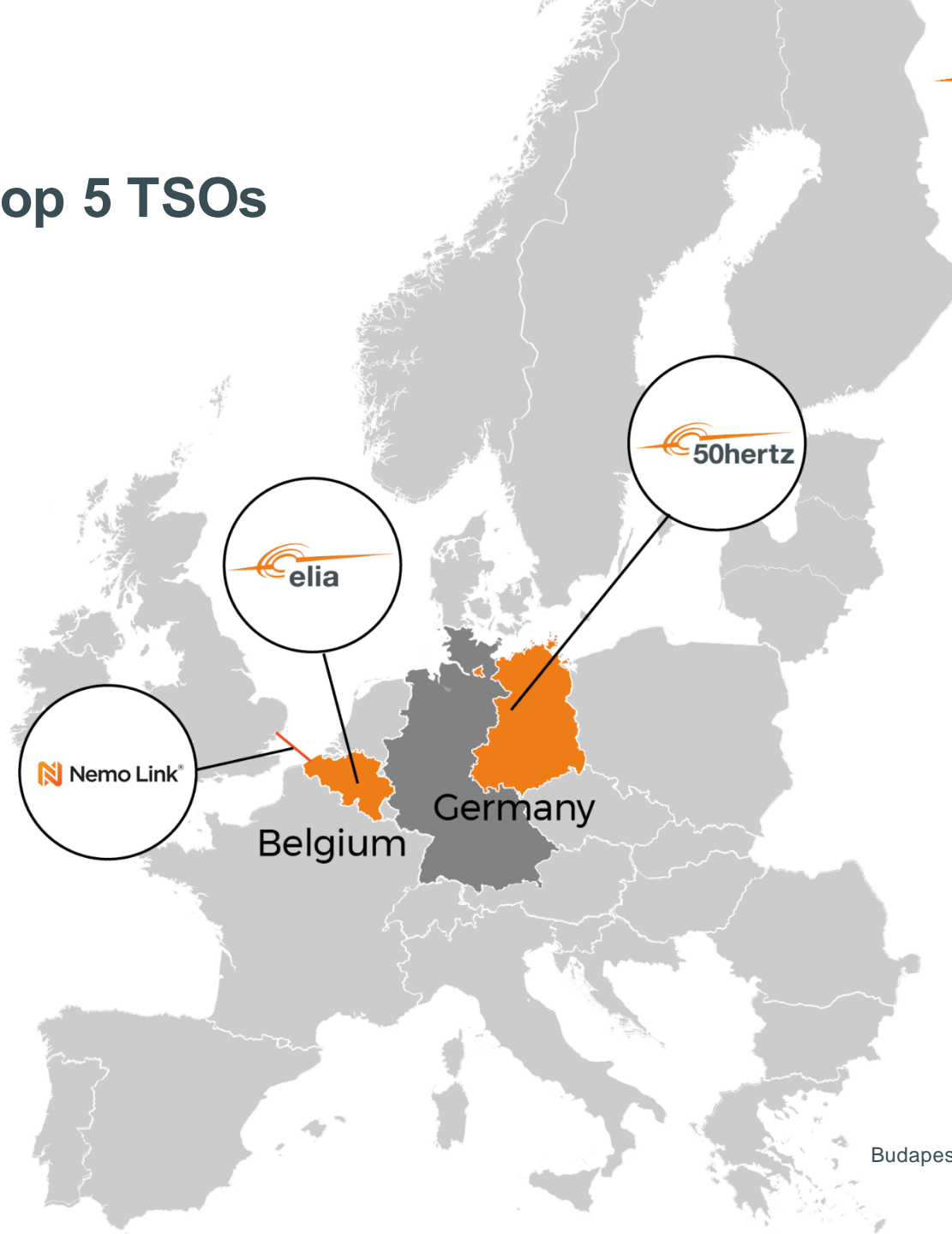
- Elia in Belgium
- 50Hertz in Germany



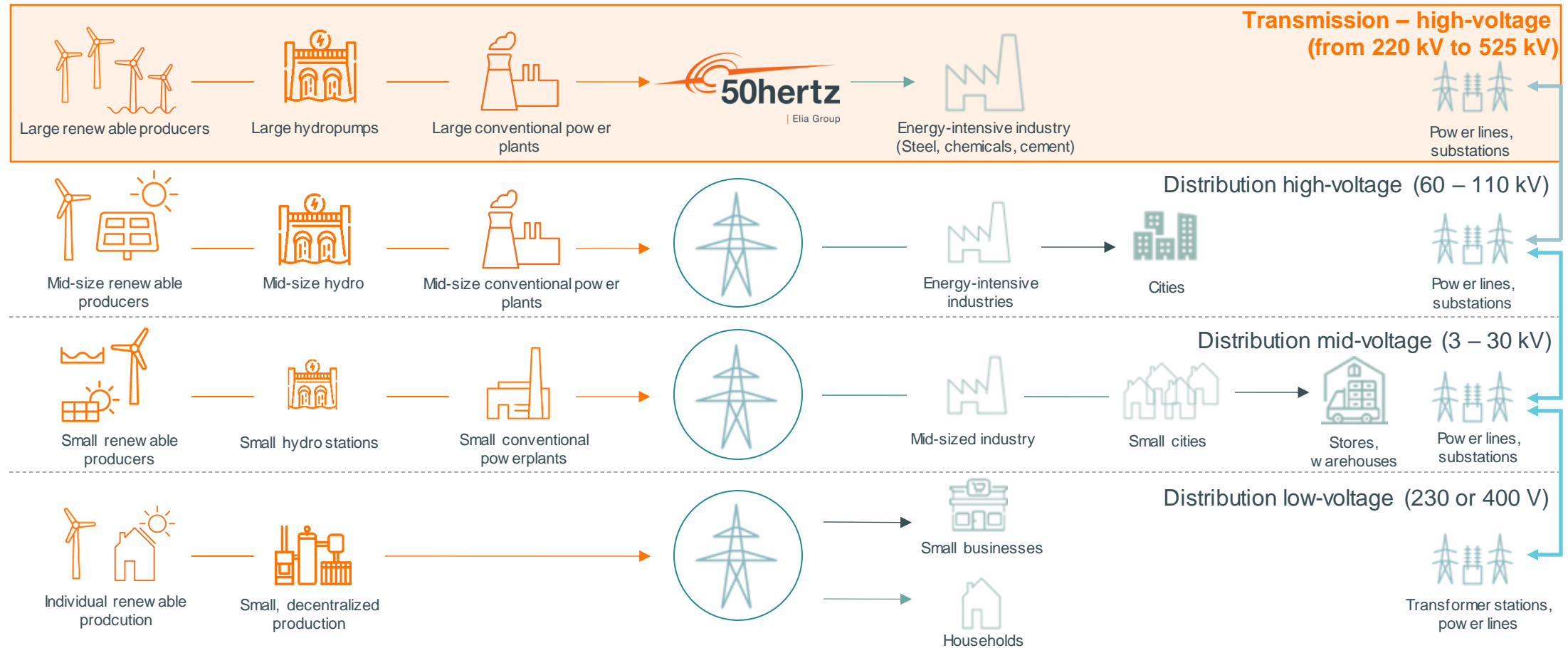
International
consulting services



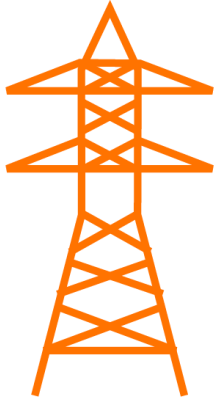
Connect to energy
data and digital
products via APIs



Elia Group as a central player in the European energy industry



Our core tasks



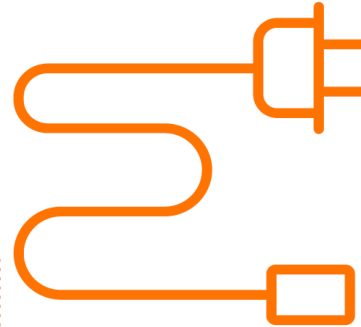
Grid Ownership

We prepare to deliver the infrastructure of the future



System control

We maintain the balance



Market Facilitation

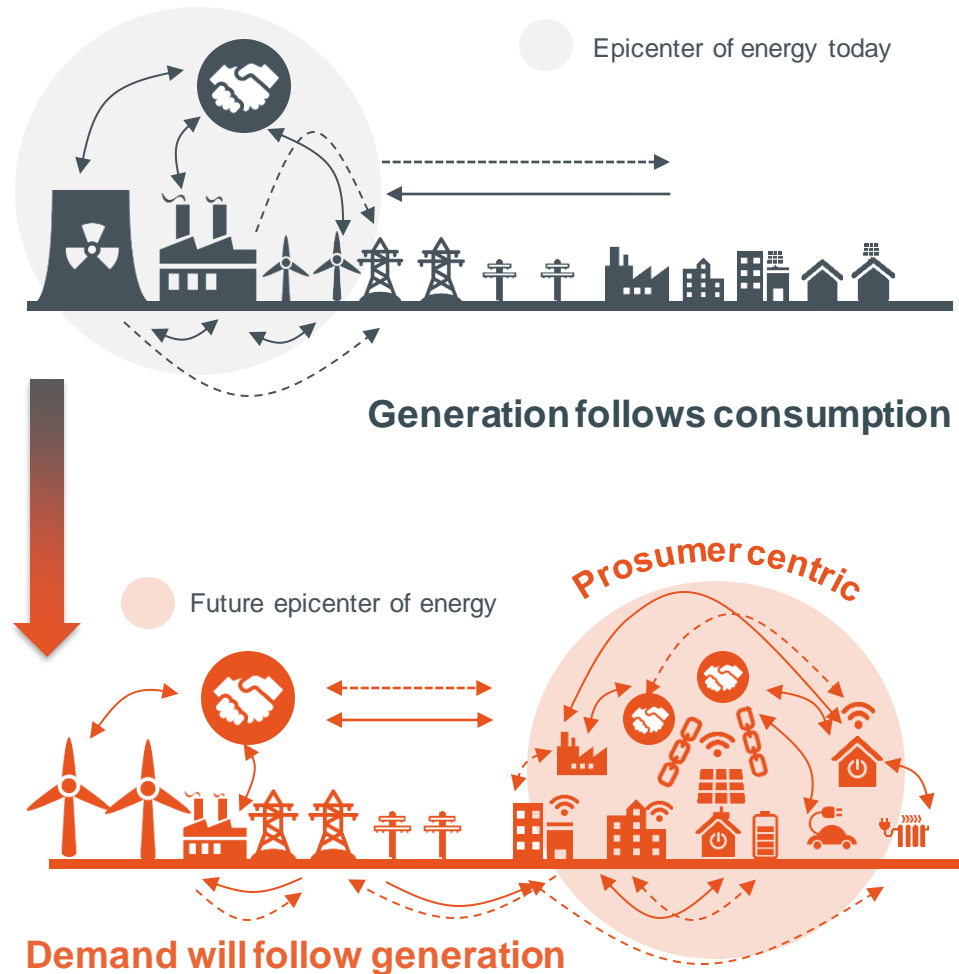
We are part of the European integrated market



Trusteeship

We transparently integrate renewable energies into the market

Energy transition is characterized by a high penetration of renewables and a fundamental paradigm shift towards “demand follows generation”



Increasing scalability needs



Increasing intermittency and uncertainty



Increasing complexity of grid planning

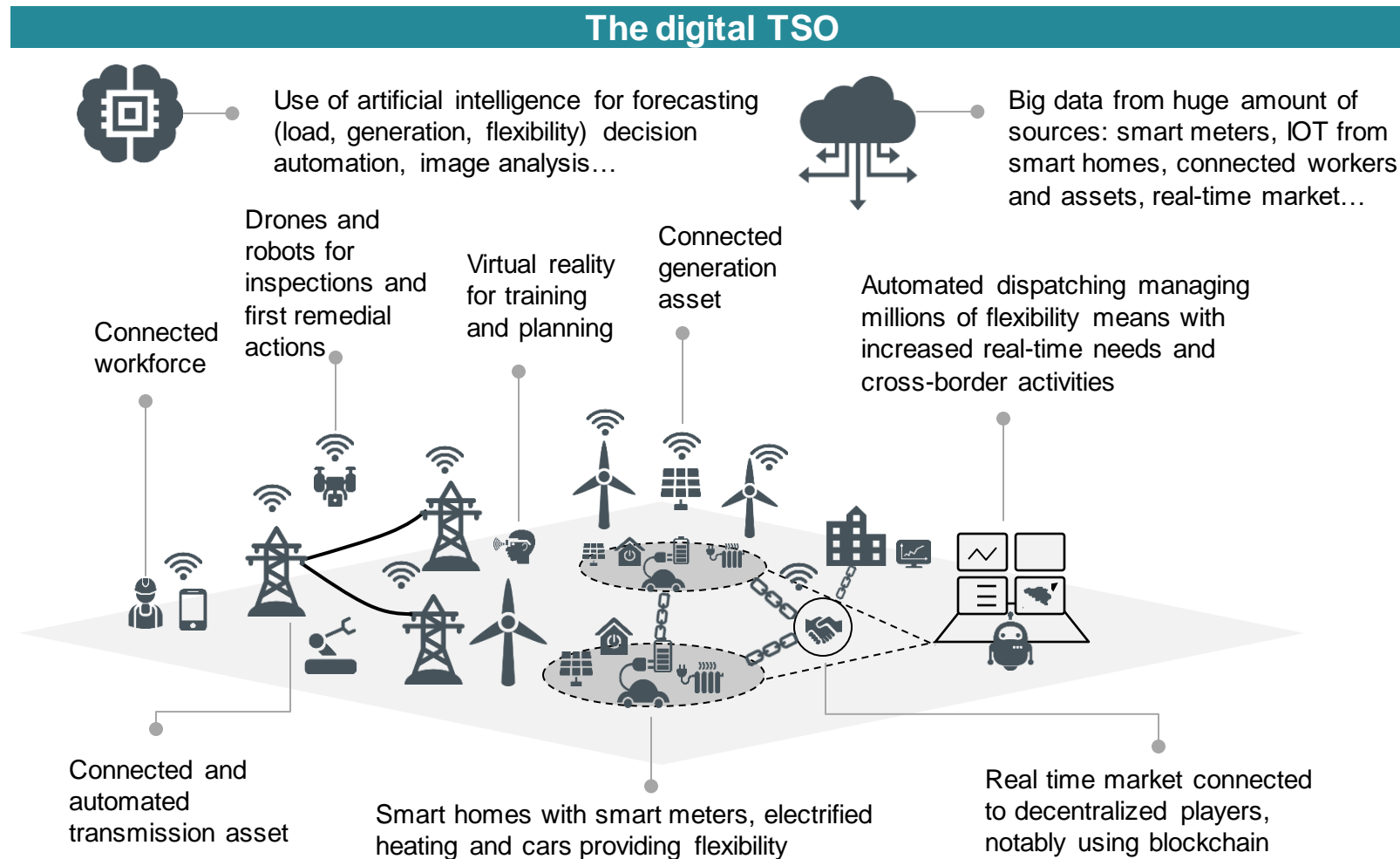
Affordable



Secure

Sustainable

In the context of the increase complexity of RES, Digital TSO is a pre-requisite to stay relevant ... **and AI a mandatory tool!**



Advanced Analytics Power Laboratory with 3 objectives

1 Innovate & pilot development

- Identify opportunities in the use of data and advanced analytics with potential to fundamentally improve Elia's operations and core business.

2 Deploy relevant AI initiatives

- Identify and prioritize first promising initiatives to be industrialized and integrated into Elia's operations

3 Talent and competences acquisition

- Internalize knowledge and competences in this area to lead future initiatives
- Ensure that Elia staff continues to develop awareness about the possibilities of advanced analytics by working with experts in this field



Two types of projects in order to develop fast and never reinvent what is existing

Projects focusing on TSO business and activities

- The problem is related to electricity grid management and system operation.
- No product available on the market
- Internal development and research via AAPLab

In partnership with **N-SIDE**
OPTIMIZING YOUR DECISIONS
and internal hiring planned with HR



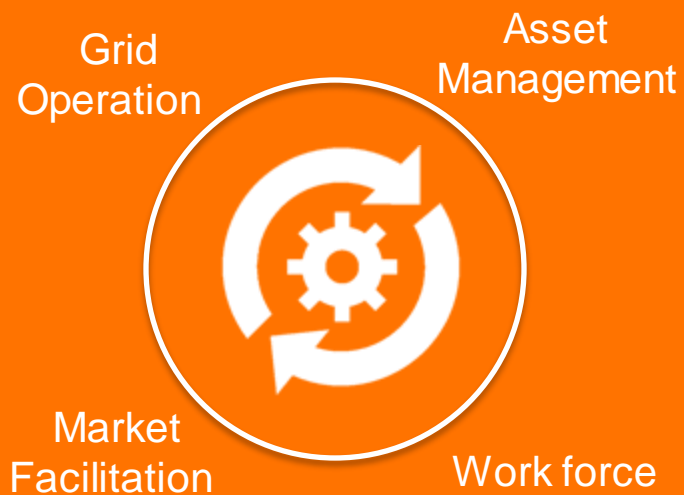
Project content not only dedicated to TSO business

- The problem is not only present at TSO side but also for other industries.
- A product already exist on the market
- Not developing the solution internally
- Test of Start-ups via the start-up speed boat



Three pilot projects in the AAPLab

Smart Operational planning



Smart dispatching

Automatise the **Switching notes** or supporting the operator to rapidly react in case of **emergency**



Smart Market

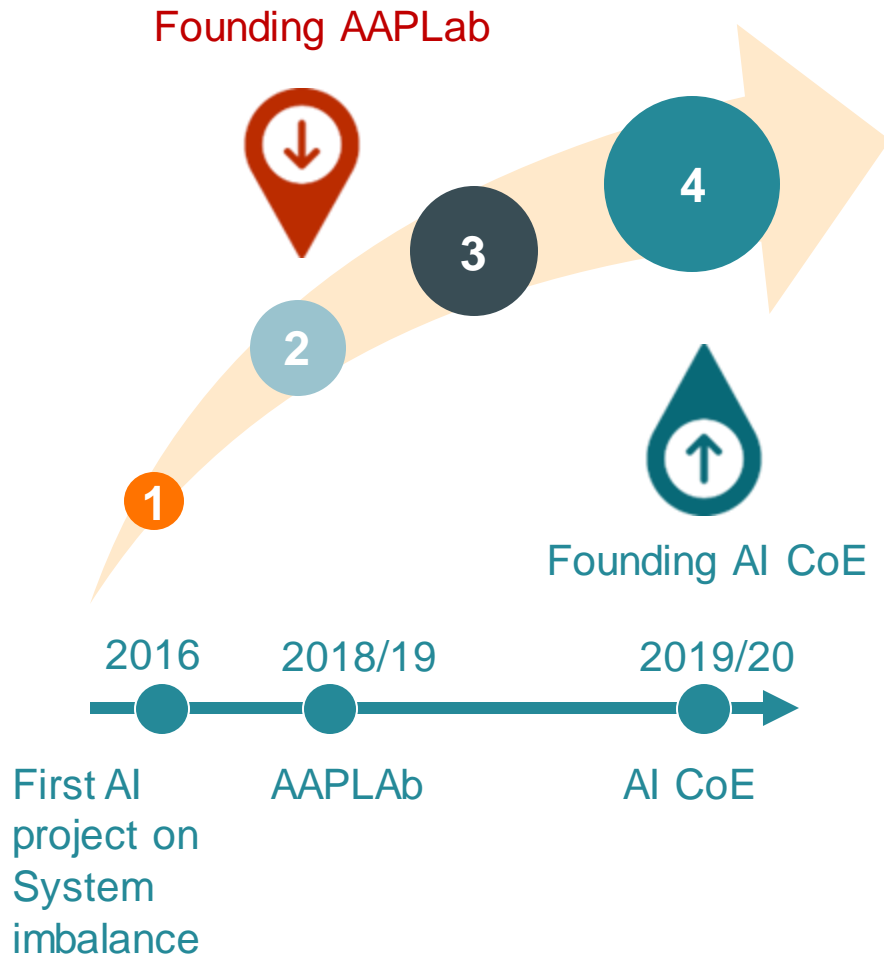


More info on

<https://innovation.eliagroup.eu/projects/ioenergy-checkmyflex/>



AAPLab, from a Laboratory to an Elia Group Center of Excellence



Focus

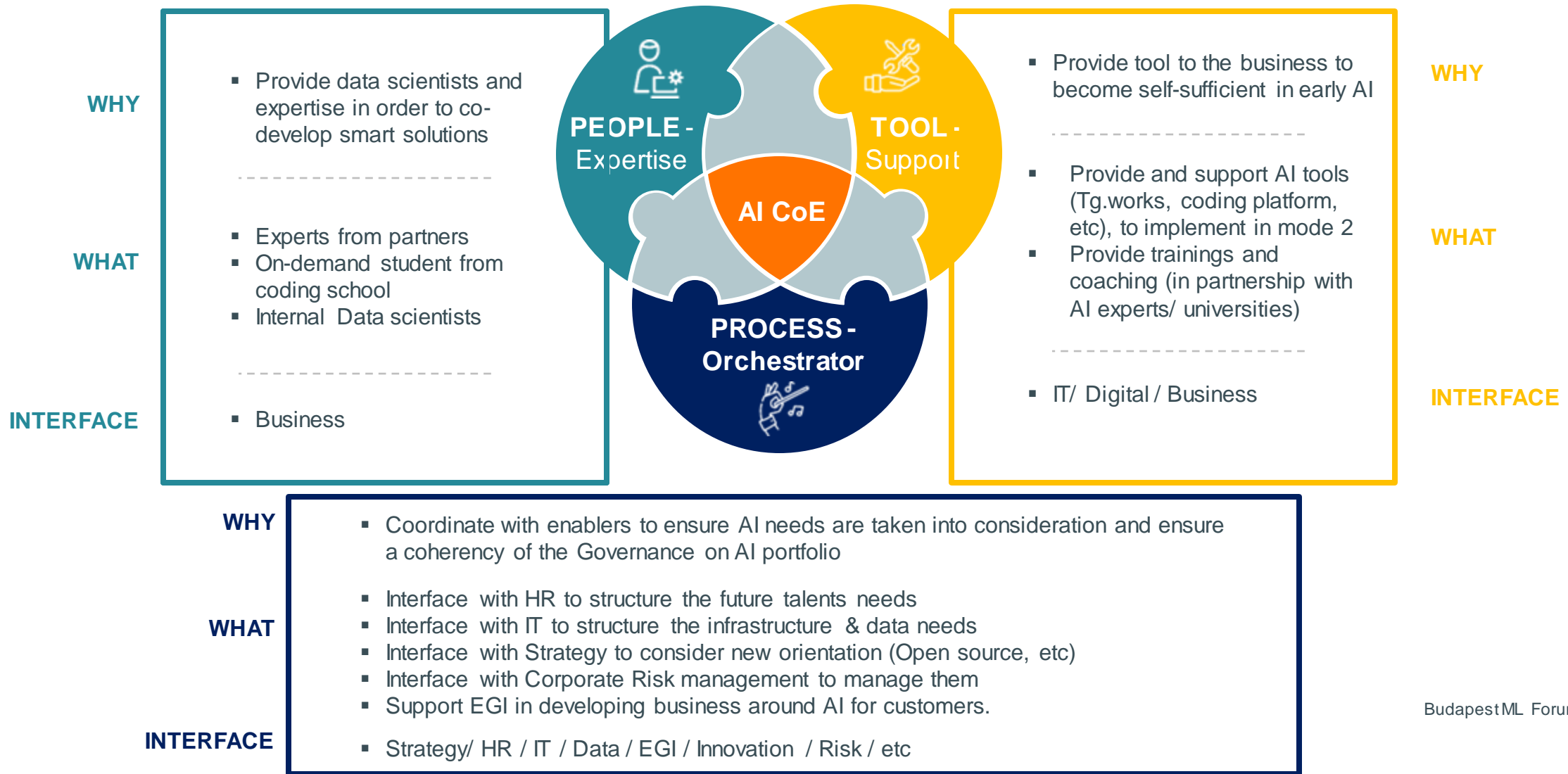
- 1 **Novice:** Has not taken proactive steps on the technology journey & at best is in assessment mode
- 2 **Ready:** Better understanding of the technology and identification of relevant use cases justifying a structural effort
- 3 **Proficient:** A reasonable degree of practical experience and understanding of how to move forward with the technology. But there are still gaps and limitations.
- 4 **Advanced:** A good level of technology expertise and experience, with a proven track record across a range of use cases

About the AI Center of Excellence

The AI Center of Excellence **enables and empowers** everyone with Elia Group to harness the power of artificial intelligence and machine learning to **use their data**, improve their processes, and drive efficiency improvements.



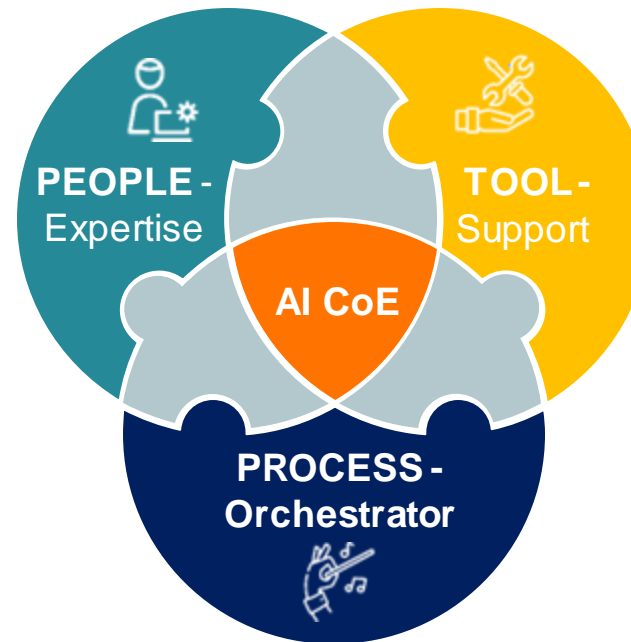
Establishing an AI CoE – What we will need to enable AI in the business



Starting AI CoE – Status 2020: Where were we?



- One internal data scientist, brand new (me)
- Business (mostly) does not know what DS, ML is
- Isolated DS projects in other parts of the company

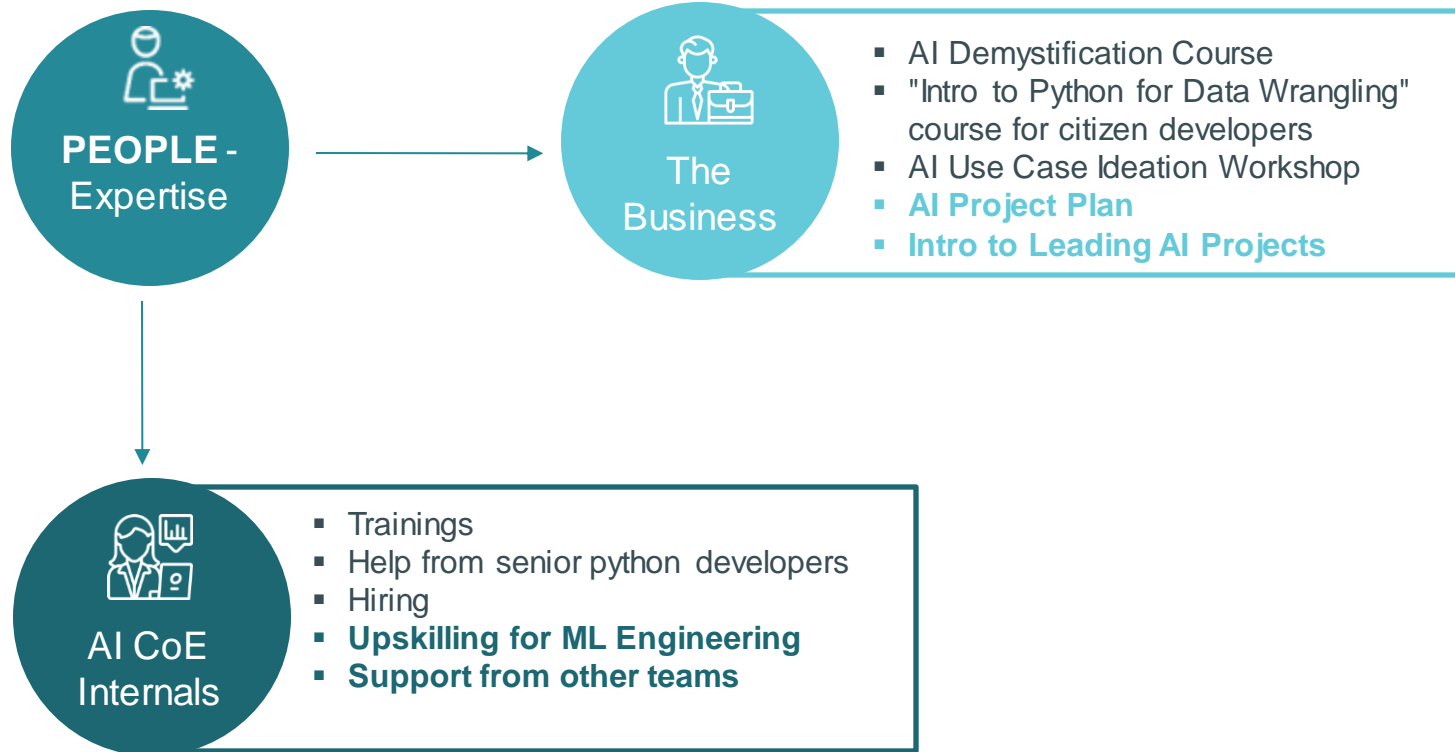


- Jupyter notebooks in cloud the only development environment
- No python allowed on local machine
- DS not seen as full IT developer, no full access rights

- Data infrastructure not set up for AI projects
- No set project process
- No process for approaching the business to get more projects

PEOPLE -
Expertise

1. People Expertise



- People expertise was broader than we initially thought
- Both the AI CoE and the business needed to upskill
- Trainings involved both theory and practice, depending on the roles
- Citizen Development Center of Excellence developed
- For the business, ML projects are completely new





TOOL-
Support

2. Tools Support

2020



2022



- "Data Scientists are tough clients"
- How to combine work on DS tooling with Citizen Development tooling
 - Without that DS are seen as not "real" developers
- How much is security-related, how much fear-related?
- Currently:
 - How to improve workflow
 - Which tool to recommend for what purpose?



PROCESS - Orchestrator

3. Orchestration

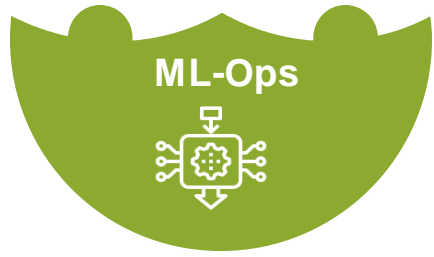


PROCESS-Orchestration

- Process orchestration is an ongoing task, which is vital for all the others
- Coordinating and communicating about:
 - What ML is
 - Our improvements, ways of working, processes
 - New developments
- Process orchestration is less of a workstream, than a mindset and way of working



3. ML-Ops and Models in Production



- Also involves upskilling of both our data scientists, and of business project owners



- New tools needed: model monitoring, deployment

- New processes for us: model retraining and monitoring, new tools like ML-Flow

- Need that became clear over the course of the projects
- We needed to have governance and ownership over models in production
- New pillar for us – first models moving from POC/MVP to full industrial production



What's needed for an AI Center of Excellence - 2022



- Combines the learnings we've gathered over the past 2 years
- Focus on models in production
- Seeing all of these as constant processes: never "finished"

PROCESS-Orchestration



Biggest Challenges

- AI, digital transformation and energy transition at the same time: many moving targets
- Misconceptions about AI need to be corrected
 - No AGI
 - No "one" AI model
- Agility is key
- Culture change in a risk-averse sector and company



Q & A

