

IGR



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ideas

# Process X

**Datenräume für die  
Prozessindustrie**

Felix Buss, Maja Diebig-Lorenz, Sven Weise  
VCI Webinar // 10. Juli 2025

## 01 Process X – Data Spaces for Processindustry

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## 02 Potentials in Energy Management

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## 03 Optimization of Steam Production



# Das Panel



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Head of Sustainability  
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Energy

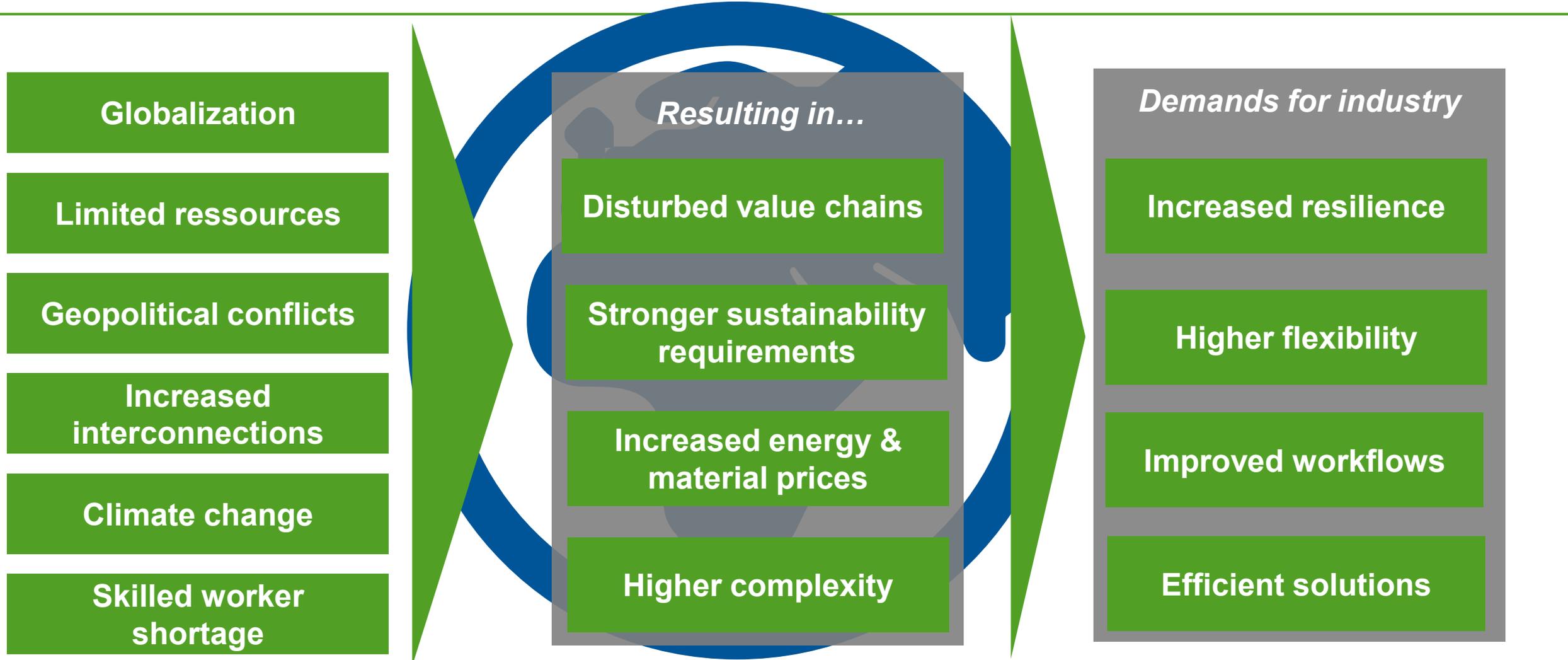
**Currenta GmbH &  
Co OHG**



01

# Process-X Data Space for the Process Industry

# Complex Global Situation



## Infrastructural Interconnections

- Special role of process industry
- Integrated chemical complexes (chemparks)
- Process industry often infrastructurally strongly interconnected
- Central media and energy supply and waste disposal by site operator

**Well  
connected**

## Digital interconnections

- Limited data availability and structure
- Lack of data analysis – open potential for process optimization
- Data silos within and above company borders
- Concerns in data sharing due to unclear guidelines and cyber security

**Huge  
potential**

## Pull

The need for improved resilience and efficiency in production and supply chains requires increased cross-company collaboration and information sharing

**Secure, standardized and comprehensive cross-company data exchange**



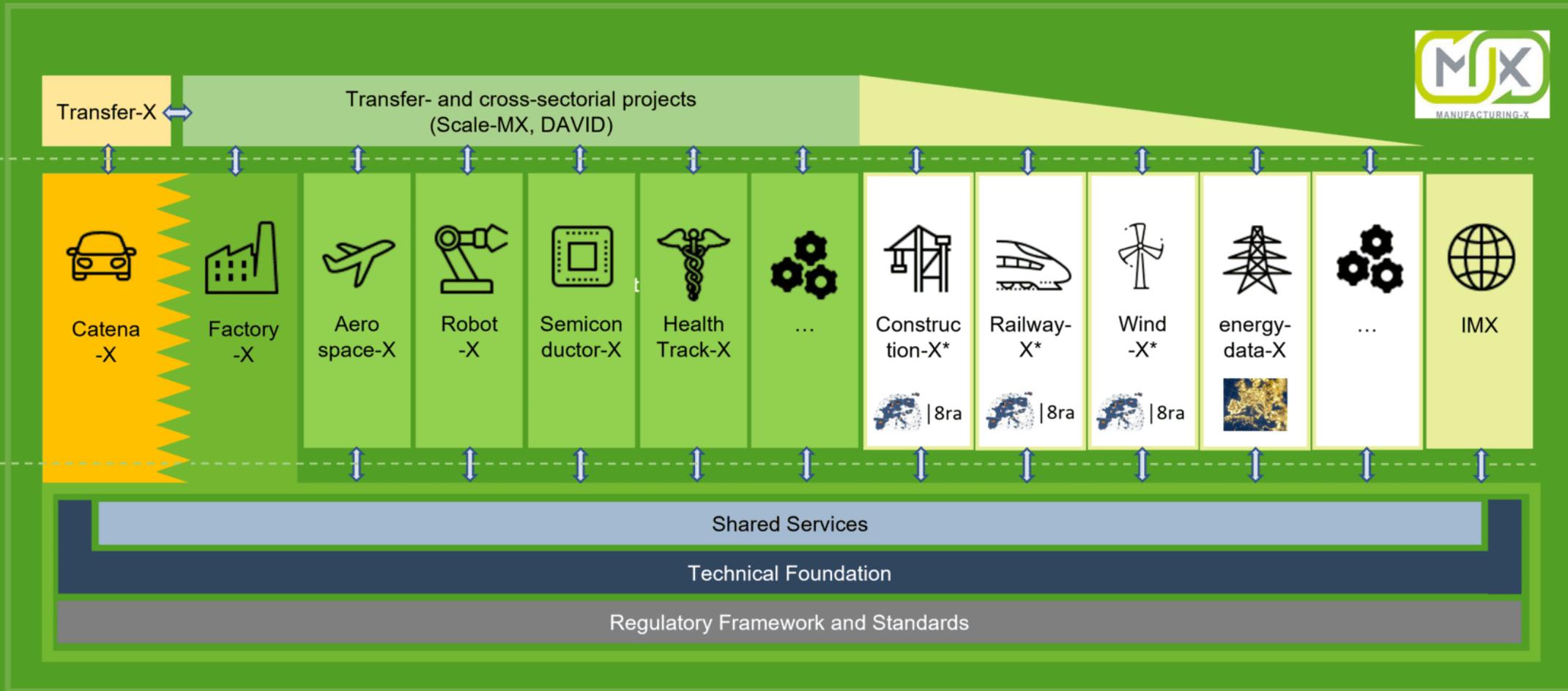
**Willingness to share data multilaterally and to develop new digital business models**

## Push

- Manufacturing-X initiative of the German government
- Basic concepts of cross-company data spaces
- Standardization of information

# Manufacturing-X

Initiative to digitalize supply chains in the industry



All icons by icons8

# Manufacturing-X

Industrial Policy Initiative of German Government



- Initiative under leadership of the I4.0 platform to develop a decentralized data exchange system for German and European industry
- Initiative embedded in European framework (Gaia-X)
- Objective: Ability to use data on production and supply chains jointly, in a sovereign manner, and in compliance with increased security requirements
- Avoiding dependencies on globally dominant digital platforms
- Lighthouse projects for data spaces for each relevant leading industry started

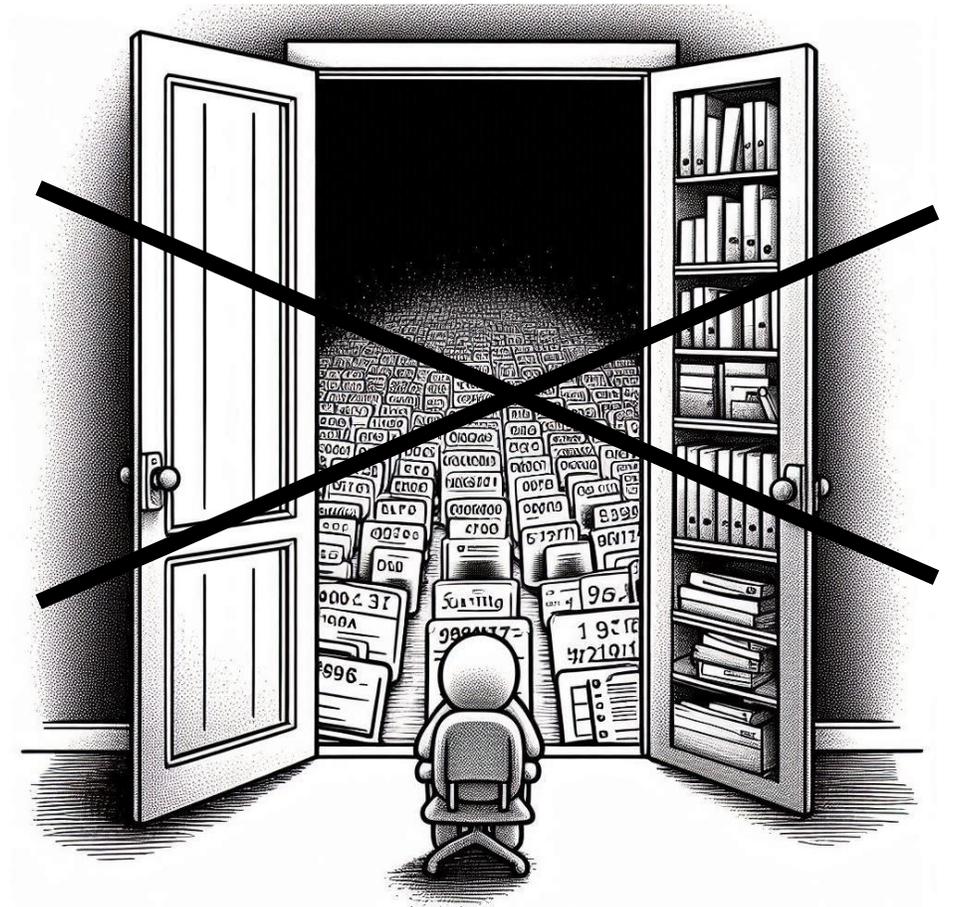


# Data Space – a digital ecosystem

What it is not ?



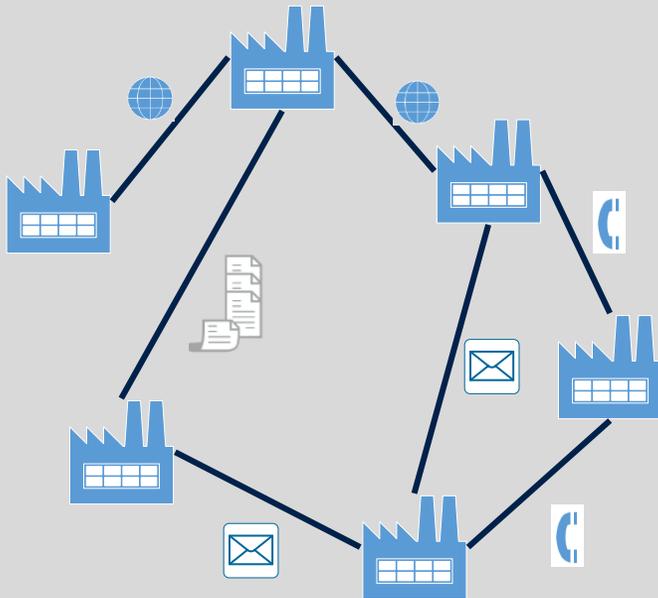
**It is not a Sharepoint for  
data outside the company !!!**



# Data Space – a digital ecosystem

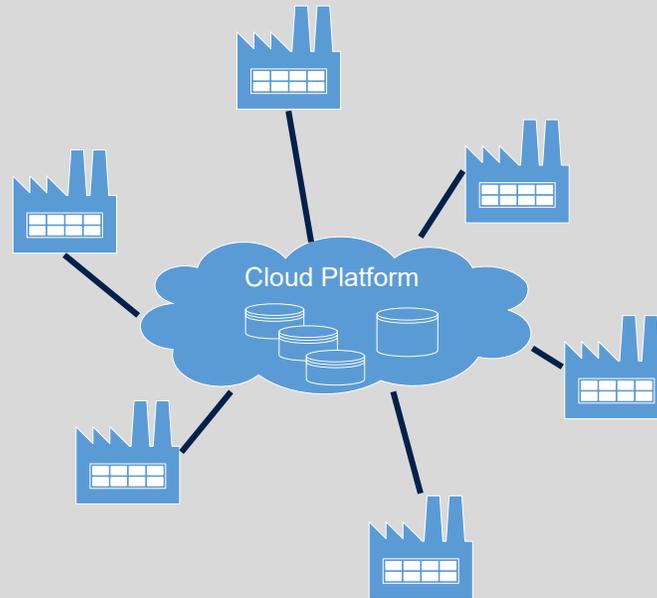
What makes a data space different?

## Status Quo



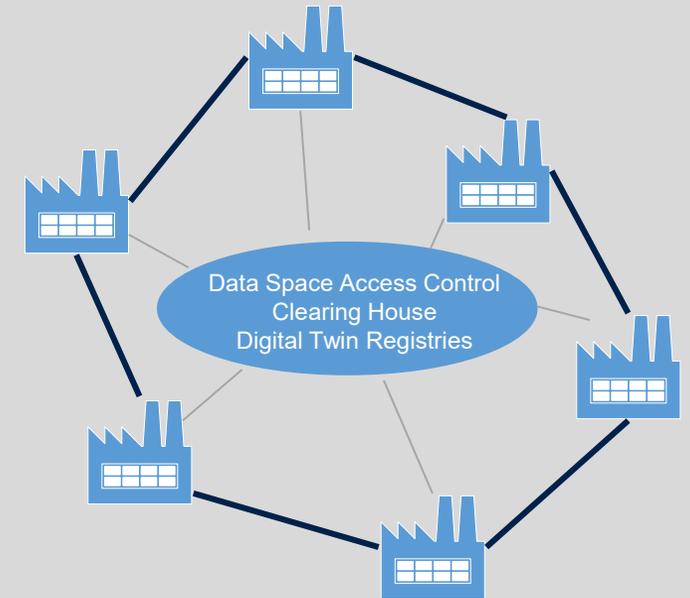
Individually agreed bi-directional data exchange via various media

## Cloud Platform



Centralized data exchange via platforms hosted by third parties

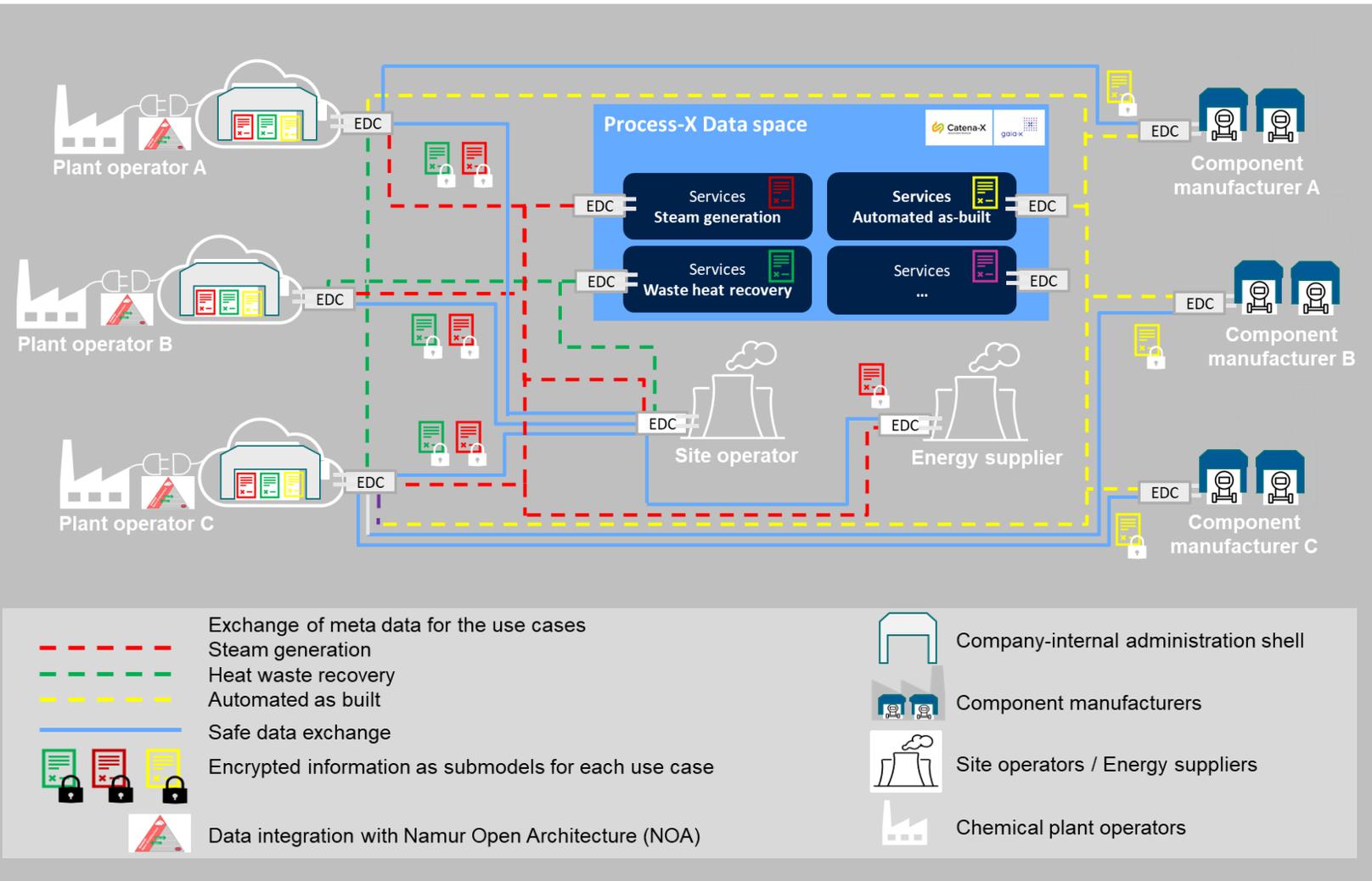
## Data Space



Decentralized data exchange via standardized data structures and exchange rules

# The Process-X Data Space

(Initial Concept, Based On Catena-X Data Space)



1. Company-internal data provision
  - Based on NOA concept
  - Administration shell submodels
  
2. Information use agreement
  - Encrypted transfer of meta data with Process-X data space using connectors (e.g. EDC)
  - Negotiation of contracts regarding exchange use of use case-specific information
  
3. Safe exchange of contractually defined user data
  - Use of desired services

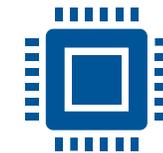
# Bringing the right People Together



Site / Plant Operators



Software Service Providers



Component Manufacturers



Transfer Community & Governance



Research Partners

02

# Potentials in energy management through cross- company networking



# The future energy supply landscape will require more flexibility in consumption patterns

Transition to Renewable Energy & Sustainability



Mi - 03. Jul 2024  
**CURRENTA UND BAYER SCHLIESSEN LANGFRISTIGEN LIEFERVERTRAG FÜR GRÜNSTROM<sup>1</sup>**

Do - 16. Mai 2024  
**INNOVATION CLUSTER DENKT INDUSTRIELLE WÄRMEVERSORGUNG NEU<sup>2</sup>**

## Renewable energies / legal situation

- // Energy is available at certain times
- // Future site energies will be more closely oriented towards the electricity generation curve
- // Energy storage not available on large scale, dealing with overcapacities challenging
- // Legal situation: cross-company waste heat transparency, obligation to avoid waste heat

**VS.**  


## Classical chem. Production

- // Fixed energy levels are provided permanently with capacity reserve
- // Energy availability is no control parameter, low operational buffer capacities
- // Production plans according to market requirements and plant availability
- // Focus on in-house flexibility reserves



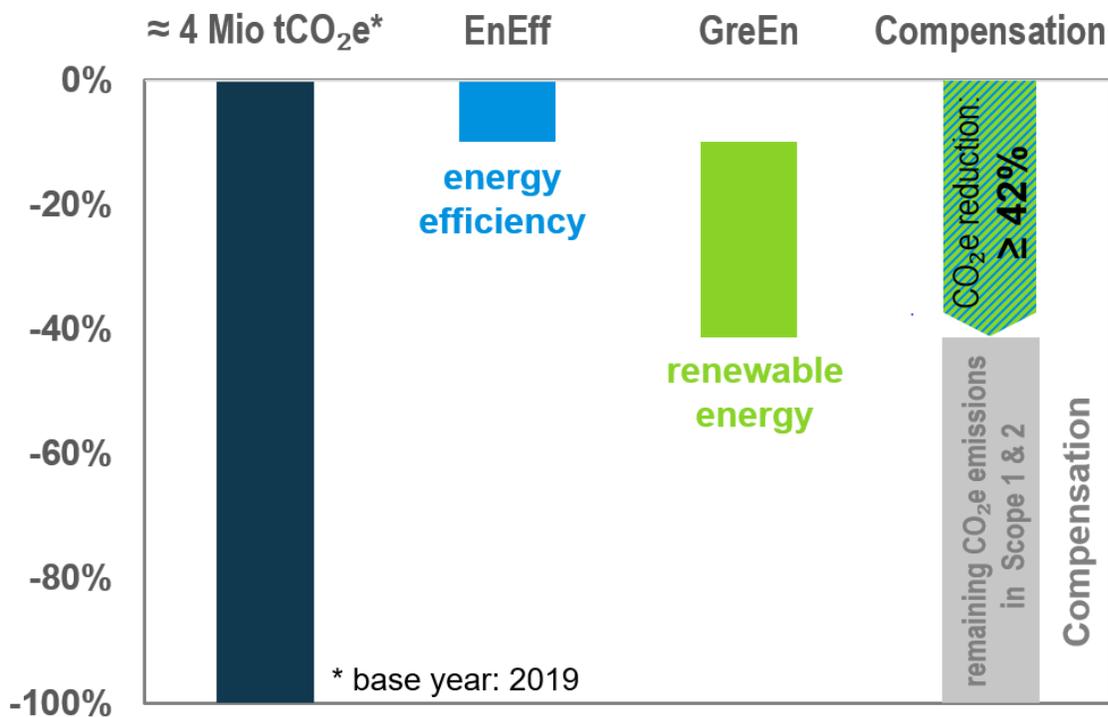
**Levers for flexibilization and optimization must be found**

<sup>1</sup> <https://www.currenta.de/currenta-und-bayer-schliessen-langfristigen-liefervertrag-fuer-gruenstrom/>, <sup>2</sup> <https://www.currenta.de/innovation-cluster-denkt-industrielle-waermeversorgung-neu/> accessed 15.11.2024

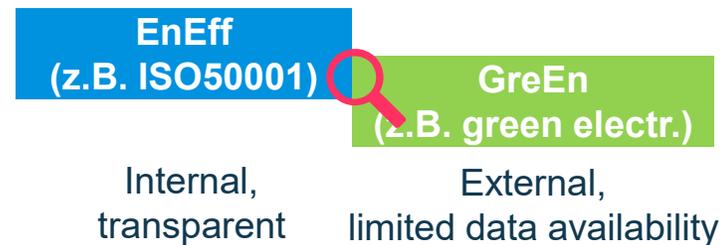


# En-Mgmt. according to ISO50001 serves internal company potentials, sustainability goals go beyond

## Bayer Scope 1 (direct) & 2 (indirect) emissions



## How does ISO50001 Energy Management work?



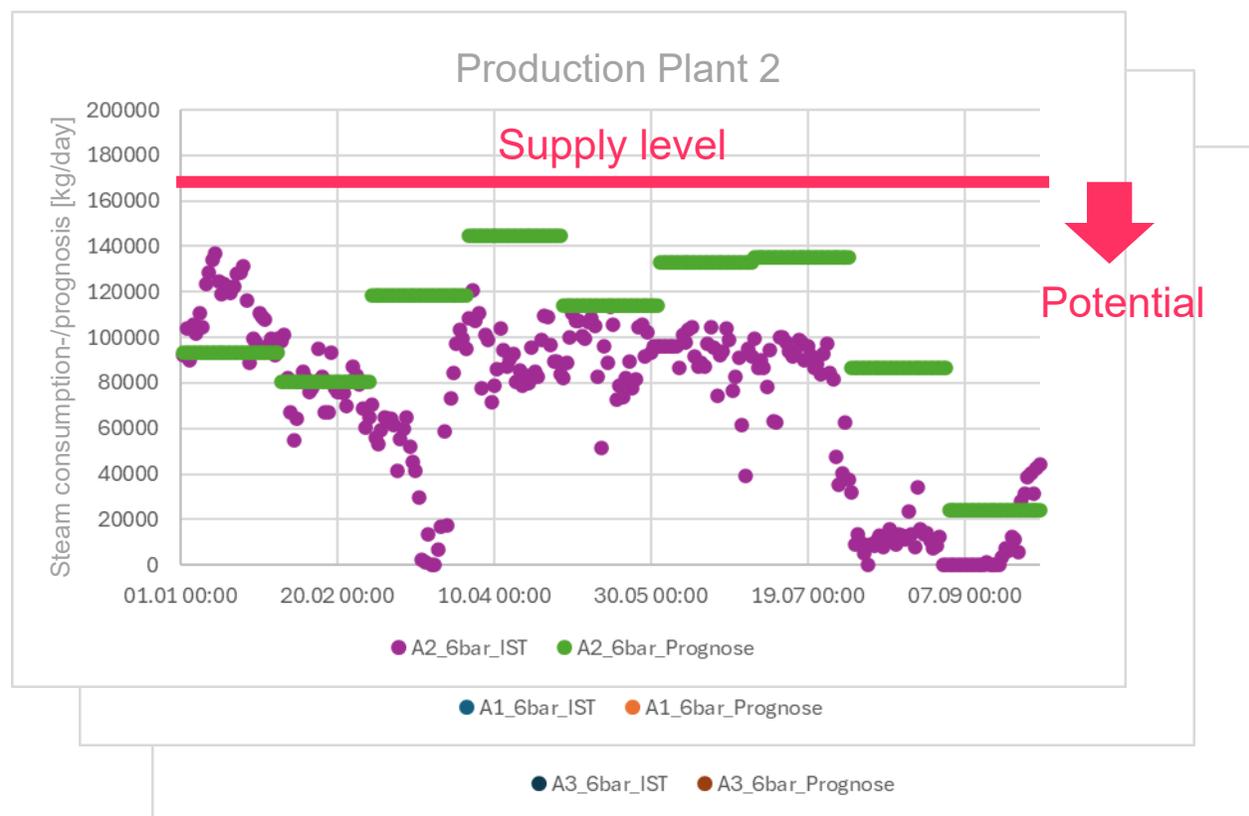
- // Energy savings according to ISO50001 result in internal cost savings
- // Not necessarily effects CO<sub>2</sub>e reduction, as CO<sub>2</sub>e-neutral energy source can be used
- // The biggest levers for CO<sub>2</sub>e reductions often lie outside the ISO50001 scope, but are connected to usage of green energies or modification of energy infrastructure



# The CO<sub>2</sub>e-footprint of steam supply can be reduced through demand-based generation

Use Case "Optimized Steam Generation"

## Schematic: Steam forecast vs. generation

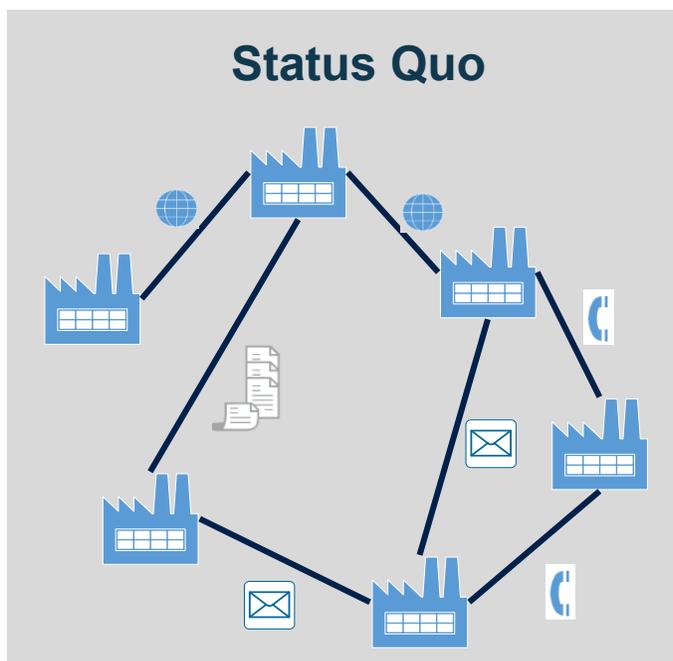


- // Regular customer forecasts enable the energy supplier to adjust the supply volumes
- // Customer energy demand is not reduced, lower generation volumes reduce CO<sub>2</sub>e footprint and primary energy use / costs ≠ energy management according to ISO50001
- // A suitable data exchange format and definition of forecast quality requirements are necessary (granularity?, frequency?, batch vs. continuous production?)



# A wide variety of information formats between companies inhibit optimized energy control

"Optimized steam generation and distribution" at Chempark requires standards in data exchange



Individually agreed bi-directional data exchange via various media

## Opportunities and hurdles in data exchange

- // Energy demand forecasts of individual companies are available, but not standardized
  - // Sharing forecasts can increase efficiencies in normal operation and reduce the risk of failure in the event of a fault or shortage
  - // Data not always shareable with all Chempark partners, as information can be sensitive
  - // Data has to be merged at energy producers in a time-consuming process. Means loss of time and information.
- Suitable exchange format and exchange rules enable the increase of efficiencies in larger networks for a wide variety of use cases



**Standardized data exchange enables a wide range of business opportunities in energy supply, e.g. waste heat market place, maintenance planning, product carbon footprint determination**

03

# Optimization of steam production and modernization of infrastructure

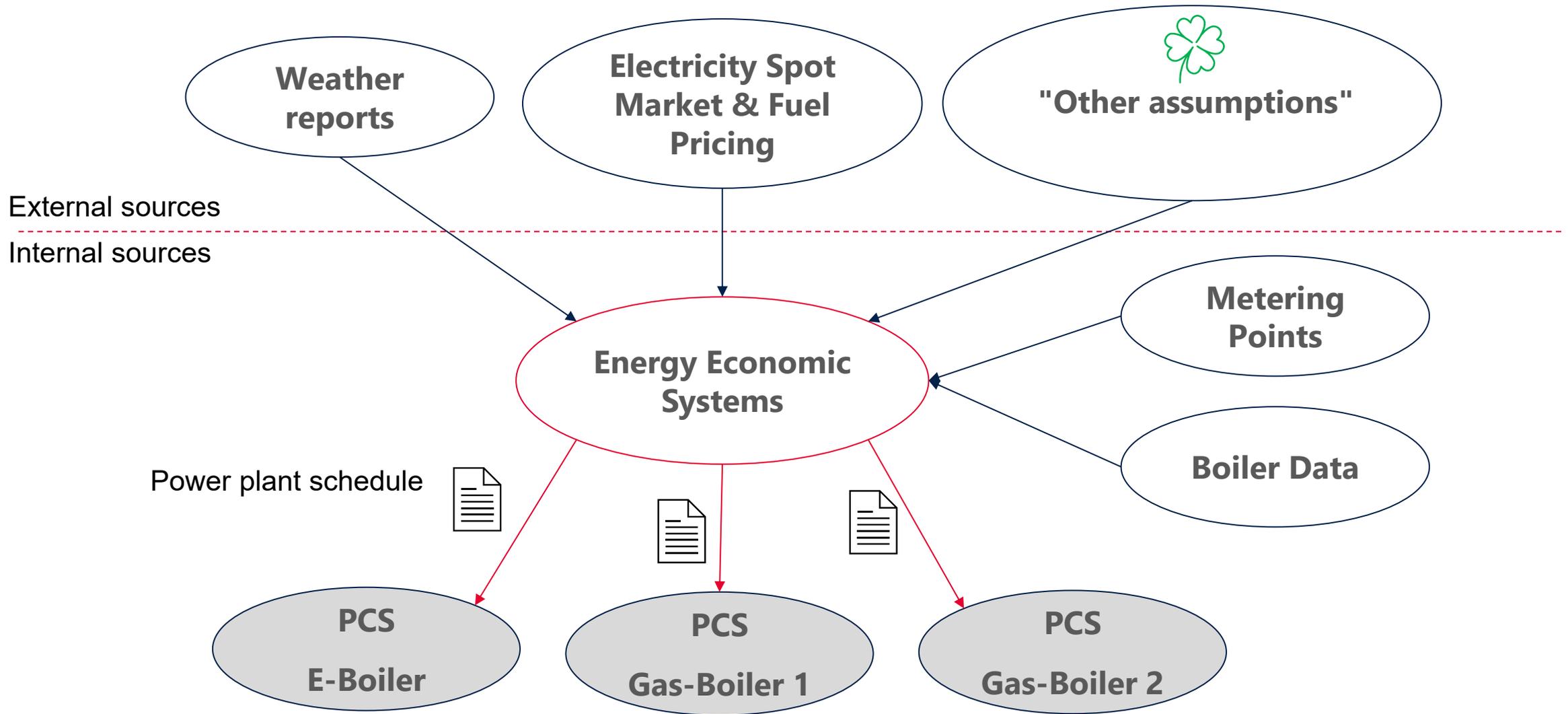
# Introduction



- **Currenta operates and manages one of the largest chemical sites in Europe – The Chempark**
  - Sites in Leverkusen, Dormagen and Krefeld
- **Operator of infrastructures and supplier of everything our customers need**
  - Steam, power grids, gas, cooling, water supply, wastewater disposal, waste management, security, network infrastructures, pipelines, analytics, education...
- **Chempark in Numbers**
  - Dynamic Steam generation
  - Gas, coal (still in use), waste, and electric boilers.
  - Natural Gas: ~12 TWh/year (3%) of the consumption of all German households
  - Electricity: 5–6 TWh/year (4%)
  - Steam: Heat demand equivalent to that of Cologne & Düsseldorf
  - Water: 5 times the consumption of Hamburg
  - Installed Capacity
    - Heat (Steam): 2,650 MW
    - Electricity: 540 MW



# Steam production data architecture

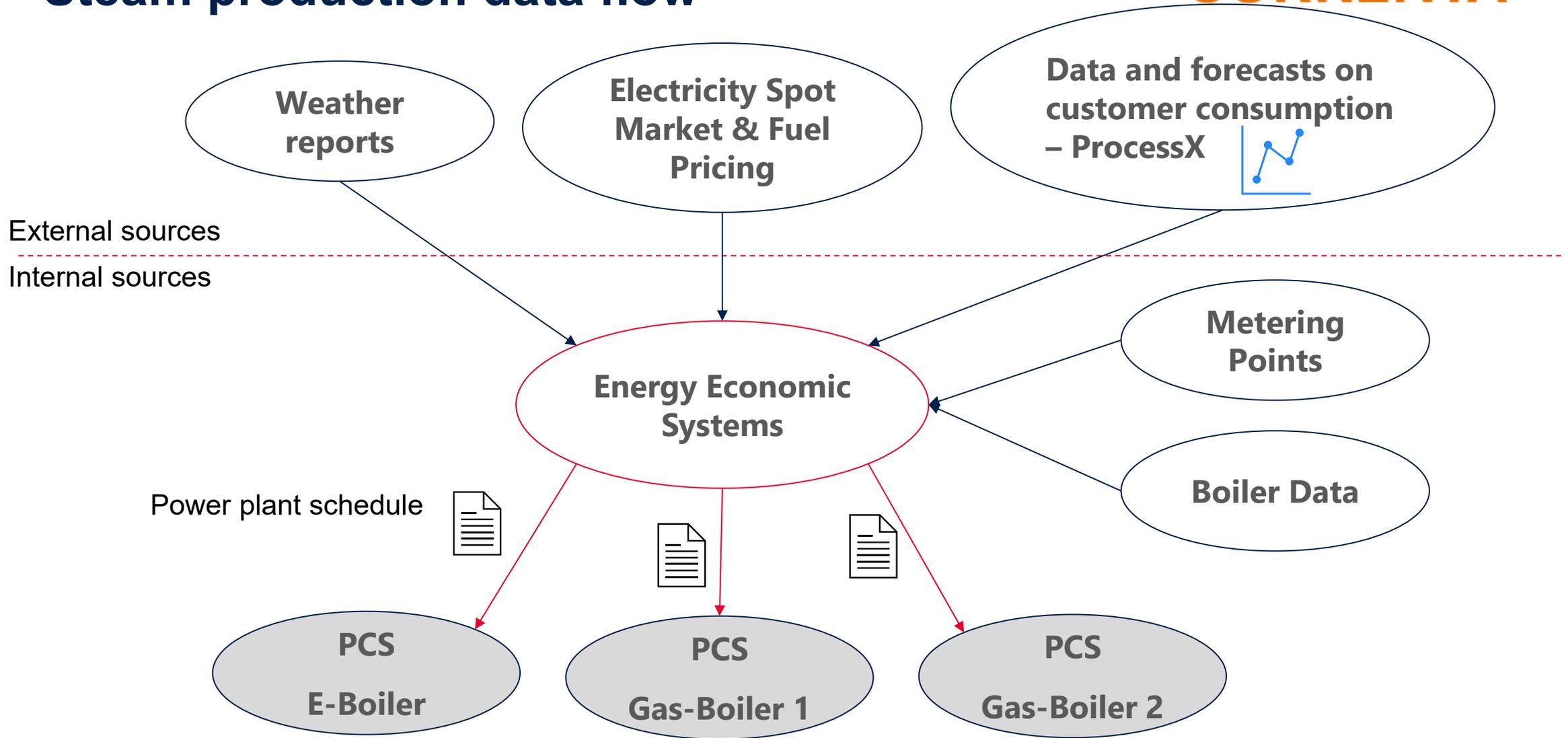




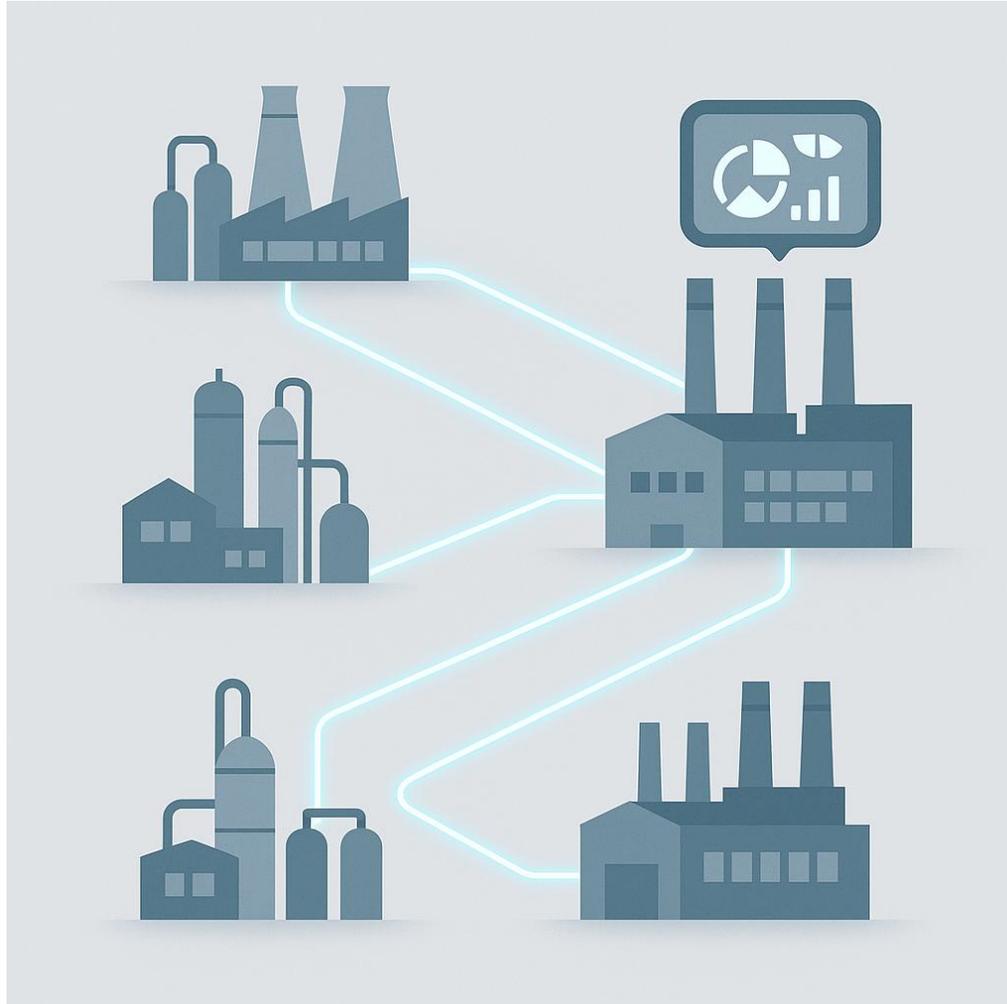
### "Other assumptions"

- **Emails/calls from customers**
- **Knowledge of downtime periods**
- **Familiarity with processes within the chemical park**
- **Plant availability**
- ...

# Steam production data flow



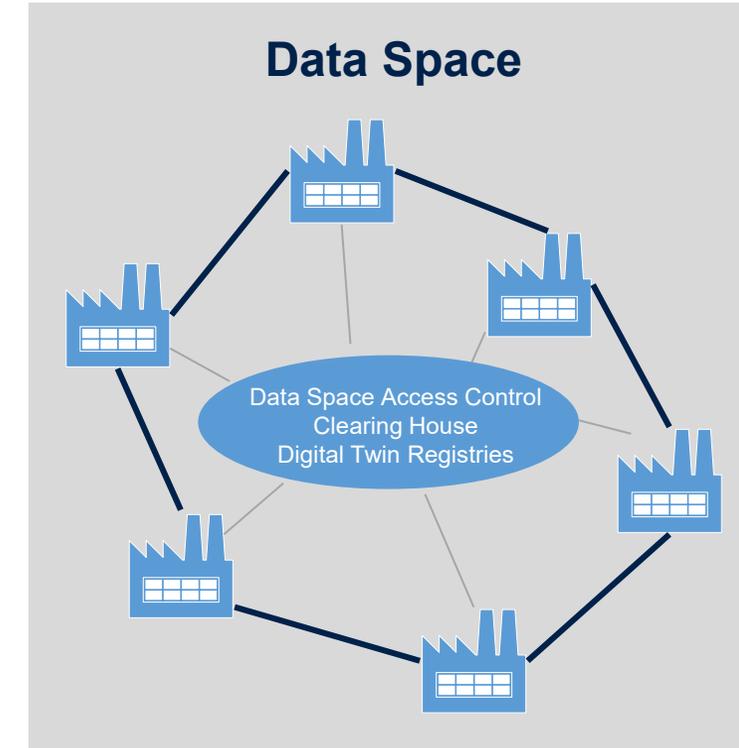
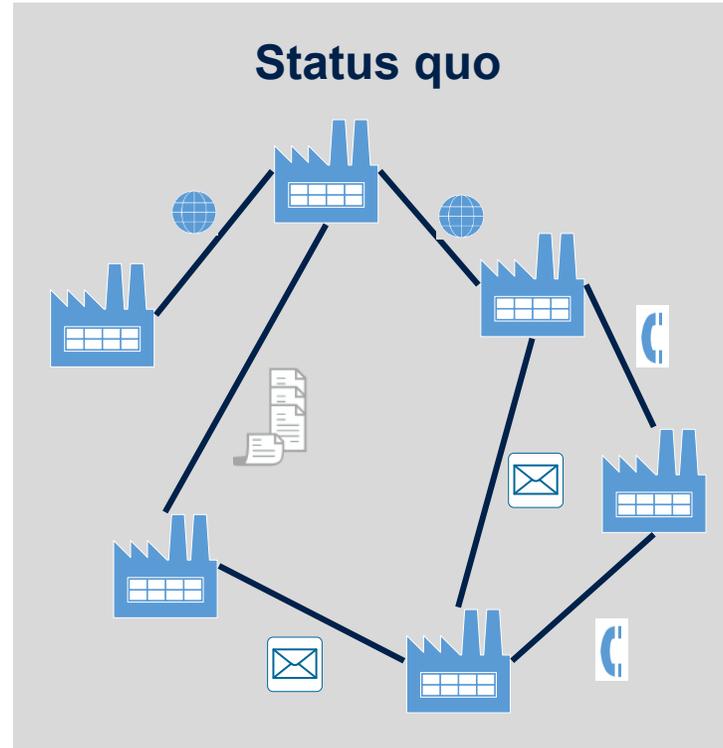
# Benefits of ProcessX in site steam production **CURRENTA**



- Fewer assumptions, more data — leading to deeper insights
- Smarter and more efficient generation of power plant schedules
- Steam production that is more dynamic and customer-driven
- Greater efficiency throughout the entire process chain

# The infrastructure perspective

- The structures in chemical plants have developed over many years
- Information is exchanged through various technical means
  - Telephone, emails, file transfers, copper signal cables, APIs, control system-specific protocols, conversations
- Finding a universal standard is difficult, and the range of possibilities is vast
- The Asset Administration Shell enables the exchange of various data between companies and brings order to the chaos



# What's next?



- **Initial System Setup:** Currenta plans to establish a first system infrastructure in collaboration with Bayer in Dormagen
- **From Theory to Practice:** The goal is to transition the previously theoretical model into operational reality
- **Data Collection:** The setup aims to gather initial steam data from a customer facility
- **Scalability:** If the setup and initial data model prove successful, a broader rollout is planned
- **Long-Term Vision:** In the future, the administration shell could replace legacy communication models

# Upcoming Webinar



***September 2025 – Process-X:***

***Use Case „Asset Health Insights” – Datenräume für Instandhalter***

***Oktober 2025 – Process-X:***

***Übersicht über technische Voraussetzungen für Datenräume***

***November 2025 – Process X:***

***Use Case „KI-sy” – Ausblick auf KI kombiniert mit Datenräumen***

# Time for questions

# Thank you!



Process X Webpage



Process X@LinkedIn



Process X - Datenräume für  
die Prozessindustrie // VCI  
Webinar // 2025-07-10