Power4 Steel

Power4Steel – Europe's largest steel decarbonization project

Challenges and chances in low $C0_2$ emission steel production

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Future Steel Forum 2026

DILLINGER SHS - STAHL - HOLDING - SAAR saarstahl

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Overview Stahl-Holding-Saar: SHS is one of the largest German steel producers and the most important employer in the Saarland

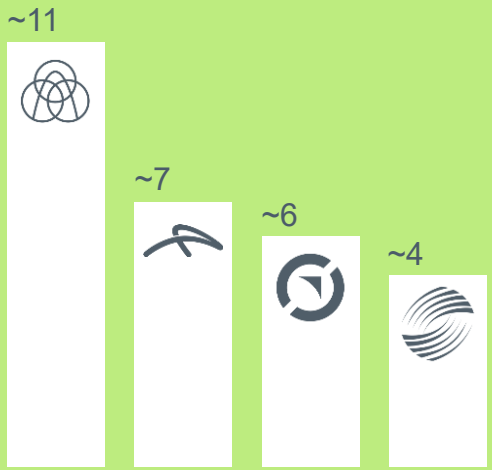
Largest employer in Saarland

~ 5 Mrd. €
Revenue per year

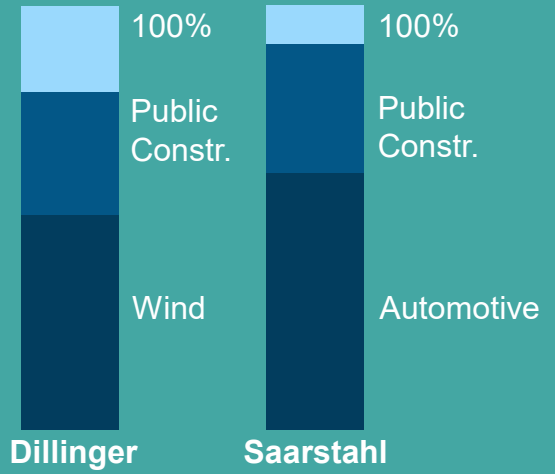
~ 4 Mio. t
Shipments per year

~ 13.000
Permanent employees

Fourth largest steel producer in Germany, Mio. t



Customers in green end-markets
Sales mix



Power4Steel is pursuing an ambitious goal:
SHS on the way to the “Fit for 55” climate target

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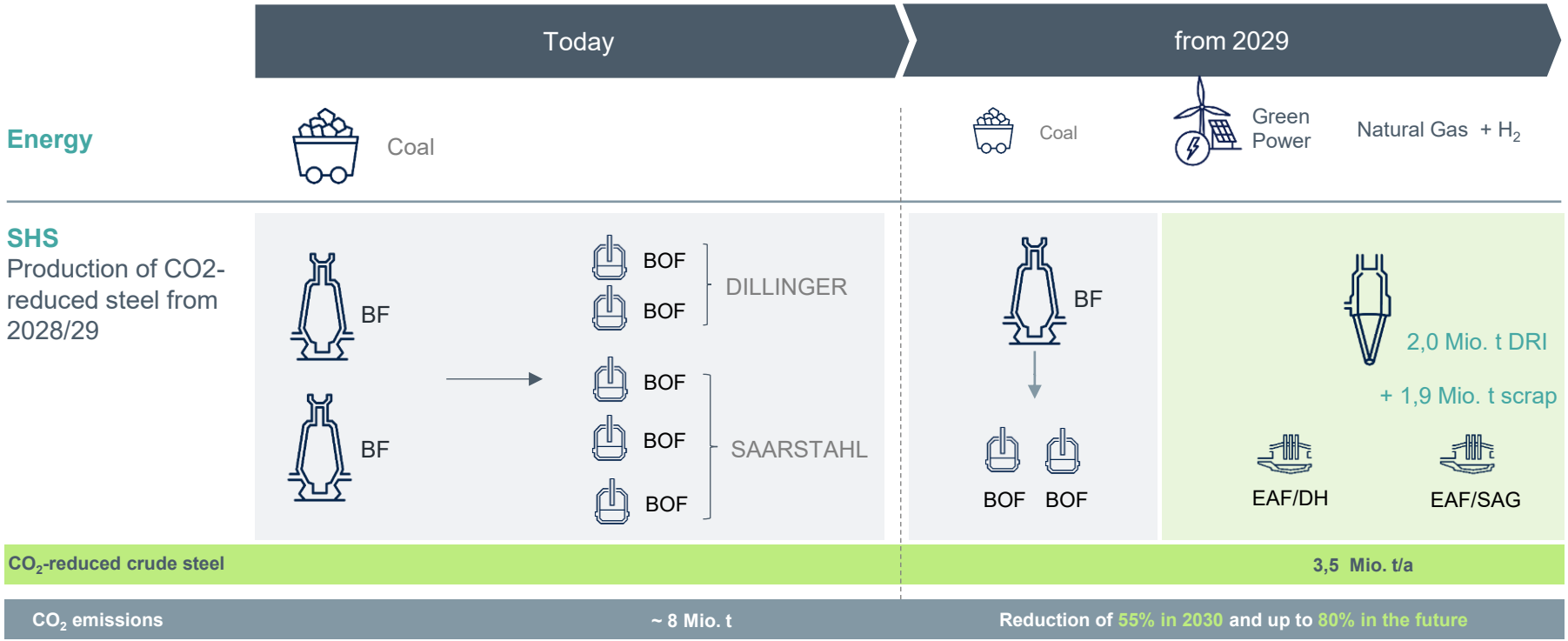

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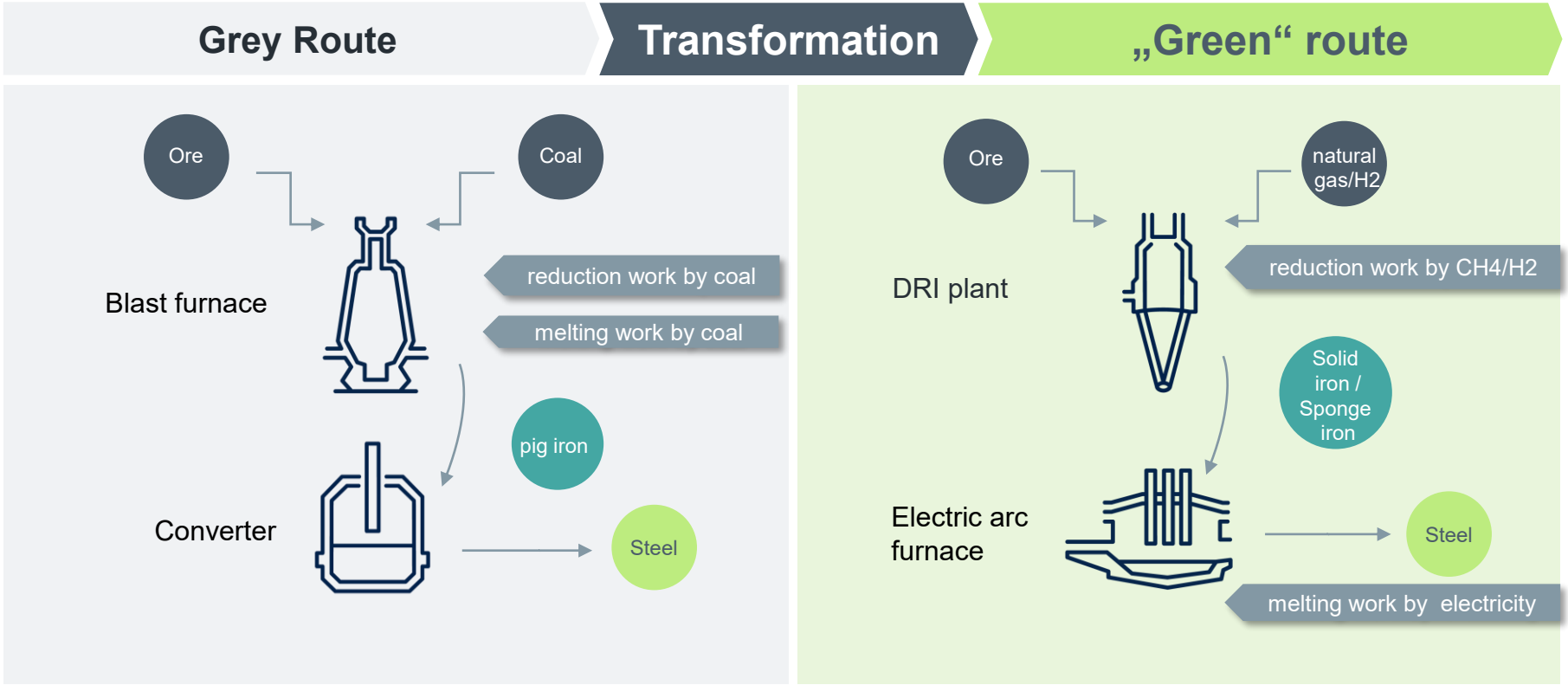
Core of the decarbonization of Power4Steel: DRI – EAF - Technology



Power4Steel Core Units

DRI Plant Dillingen

Procedure: Innovative Midrex Flex Technology

Annual Capacity: 2 Mio. t DRI

Commissioning: Q2/2029

Hydrogen: Use of renewable hydrogen. Volume of at least 6000t p.a. in 2029

Supplier: Primetals & Midrex

Dillinger EAF

Tapping weight: 195 t

Commissioning: Q2/2029

Final product: Heavy plate

Supplier: Primetals

Saarstahl EAF

Tapping weight : 190 t

Commissioning: Q3/2028

Final product: Long steel

Supplier: SMS

Transformation - Milestones
Timeline

December 2023
Governmental funding approval for 2.6 billion Euros

October 2024
Signing of the contracts

February 2025
BImSch permits

July 2025
Banks' financing approval

September 2025
Signing of hydrogen supply contract

Q3 2026
Completion of foundation work on the main plant components

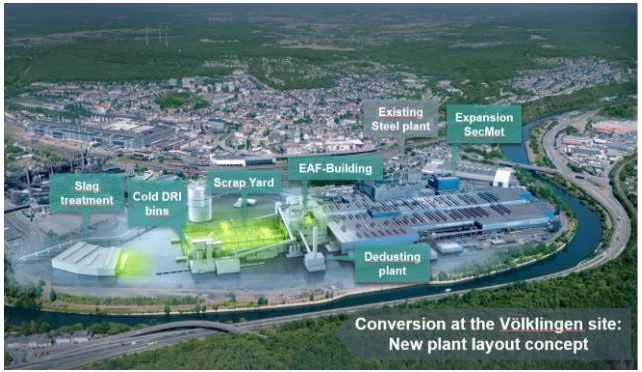
Q3 2028
Commissioning of the EAF plant in Völklingen

Q3 2029
Comm. of the DRI plant in Dillingen

Q2 2029
Commissioning of the EAF plant in Dillingen

Investment measures of EUR 4.6 billion are progressing

future



Works are running - what has been accomplished so far

Project

- ✓ Financing secured
- ✓ All permits obtained (incl. BImSch approval)
- ✓ ~ 70% of engineering completed
- ✓ ~ 60% of equipment procurement completed
- ✓ Concept development and preliminary studies completed

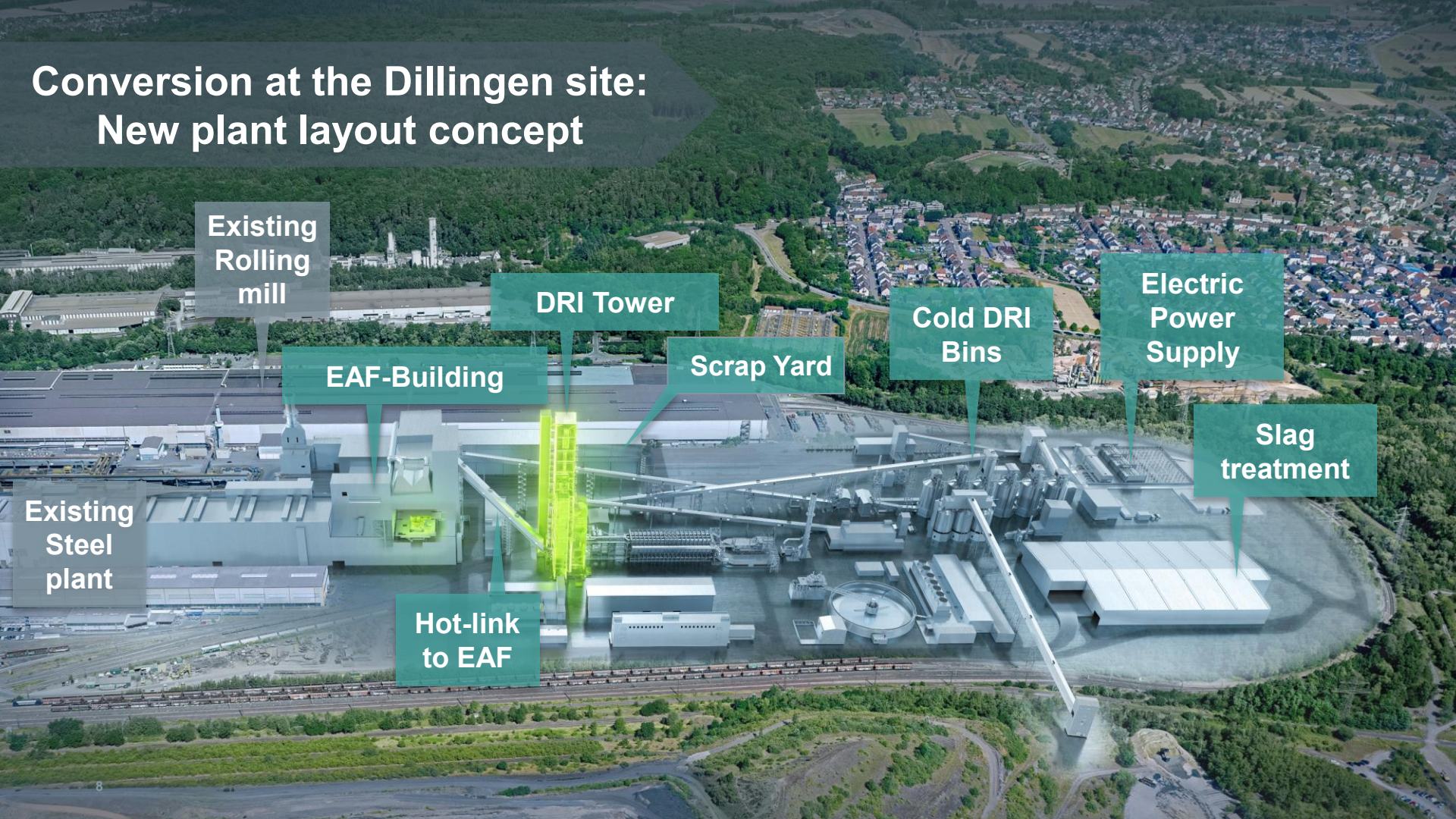
Construction

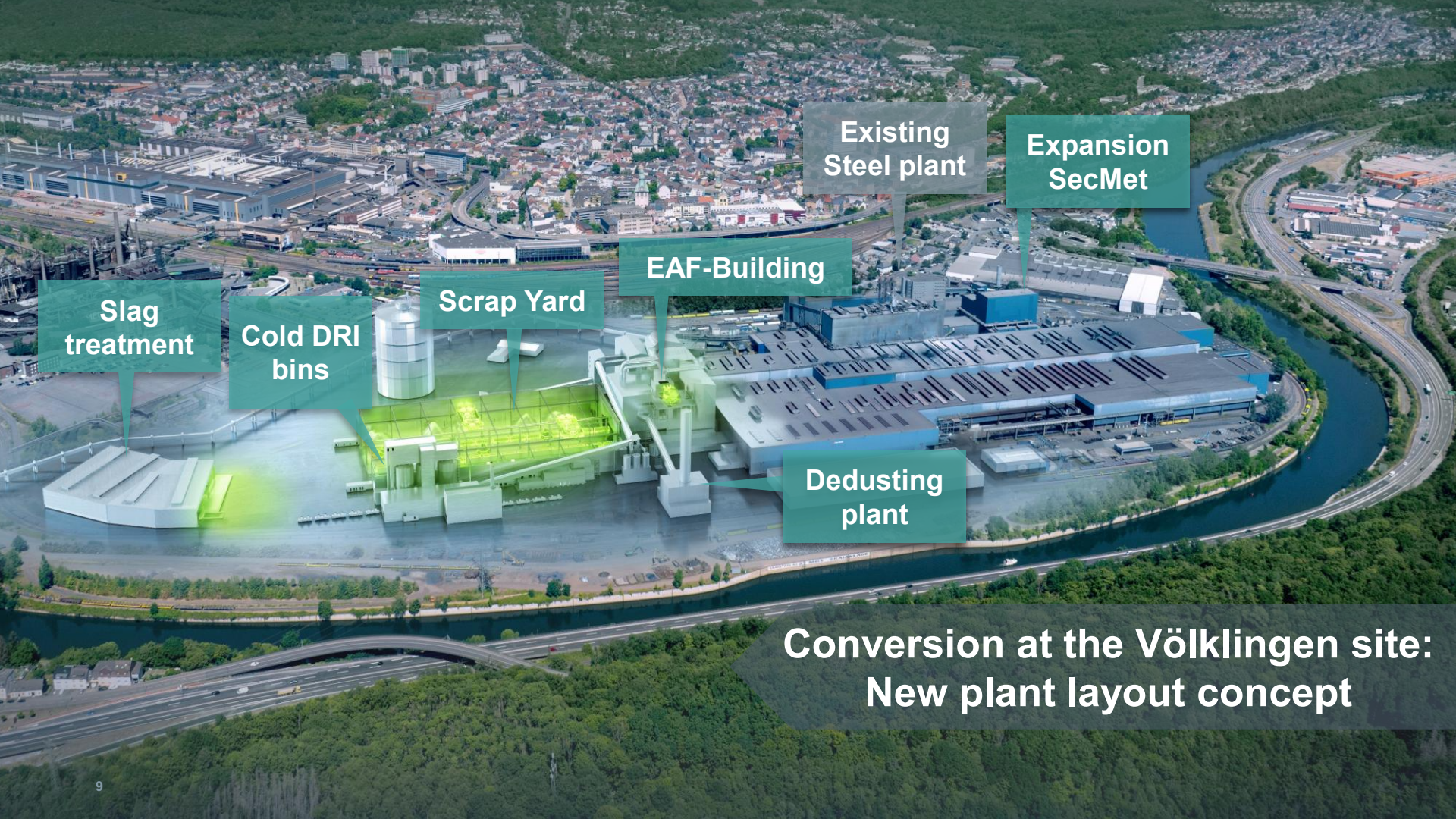
- ✓ Site preparation completed
- ✓ Civil works in progress
- ✓ OEMs scheduled to be on-site from 2027 onwards

Key challenge

keeping the project on schedule and within budget

Conversion at the Dillingen site: New plant layout concept



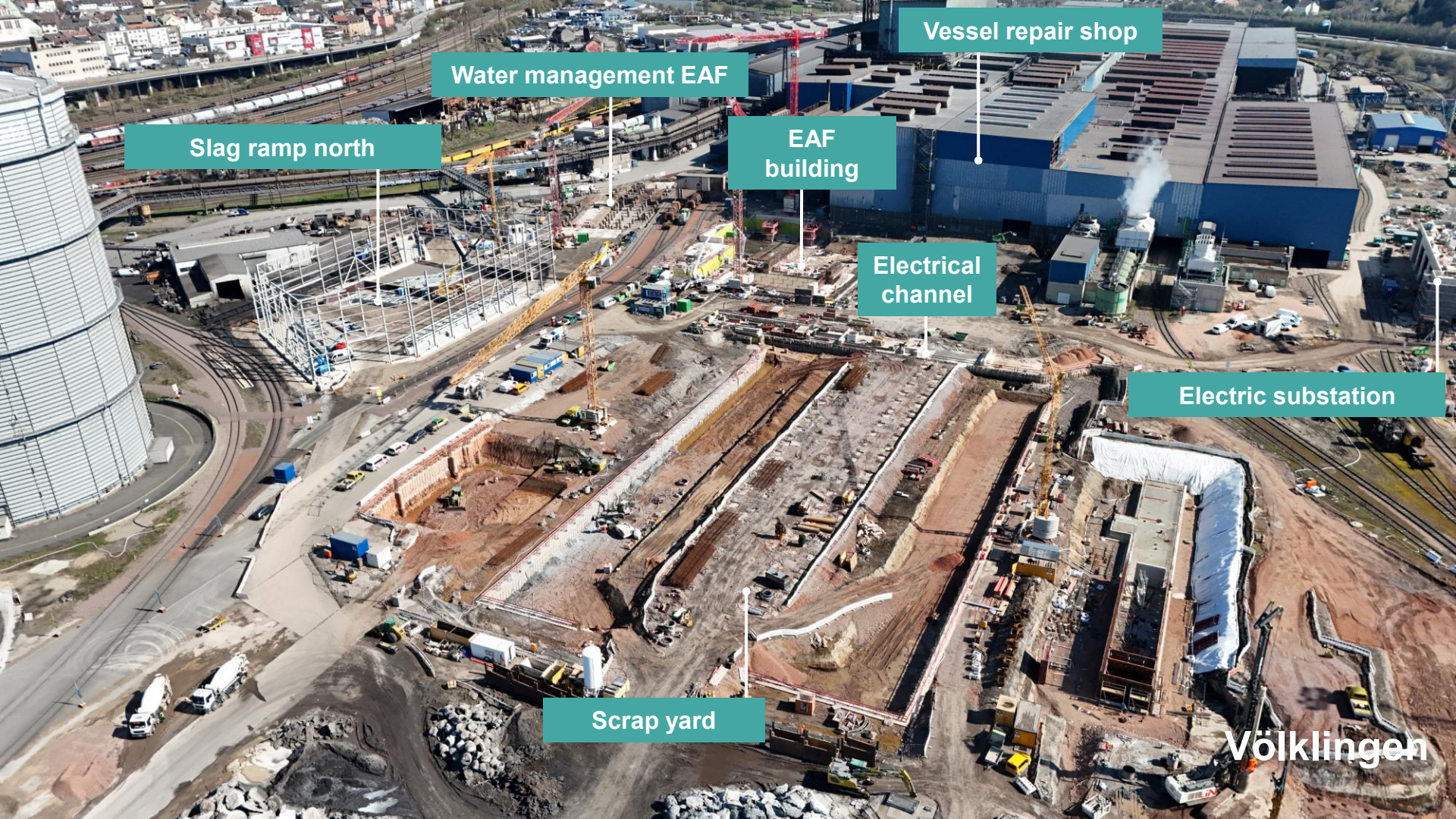


Conversion at the Völklingen site: New plant layout concept

Construction site Dillingen


Construction site Dillingen


Slag ramp north
EAF
Slag treatment
Scrap yard
Cold-DRI bins
Electric substation
Construction site Völklingen


Vessel repair shop
Water management EAF
Slag ramp north
EAF building
Electrical channel
Electric substation
Scrap yard
Völklingen

Power4Steel is more than a mega construction project – It is the transformation of our complete business model

Plan for Redesign the Energy System

The phase-out of process gases necessitates new concepts

New Workforce & Training Framework

Transition to green route requires new competencies

New IT System

AI as a lever

IT systems to optimize the new processes in order to realize an economic business case

New logistics concept

for planning and managing scrap and DRI

Green Power Procurement

three large-volume PPAs already concluded

New metallurgical concepts

New metallurgical has to secure product quality under boundary condition of an economic DRI/Scarp ratios

Rawmaterial

No more coal
Highgrade DR-Pellets
Scrap in high amount an sufficient quality

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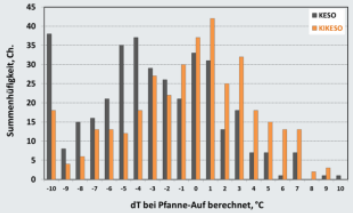
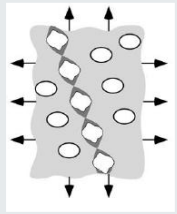
As part of the transformation, SHS is increasingly and cross-functionally focusing on AI and machine learning

1

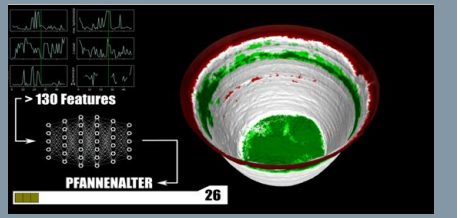
Process optimization
Cost optimization





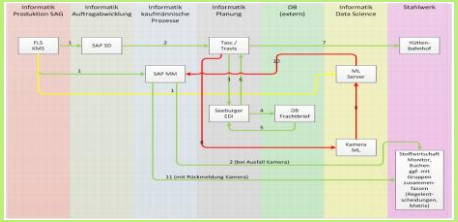
2

Quality maintenance
Quality improvement
Quality monitoring



3

Hyperautomation



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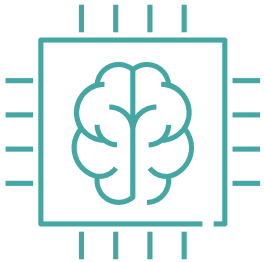
SHS successfully implemented numerous AI flagship projects to optimize value creation processes



Selection of implemented AI projects

AI-supported **temperature models** to increase energy efficiency in steelworks

Cross-location stamp reading for consistent material tracking

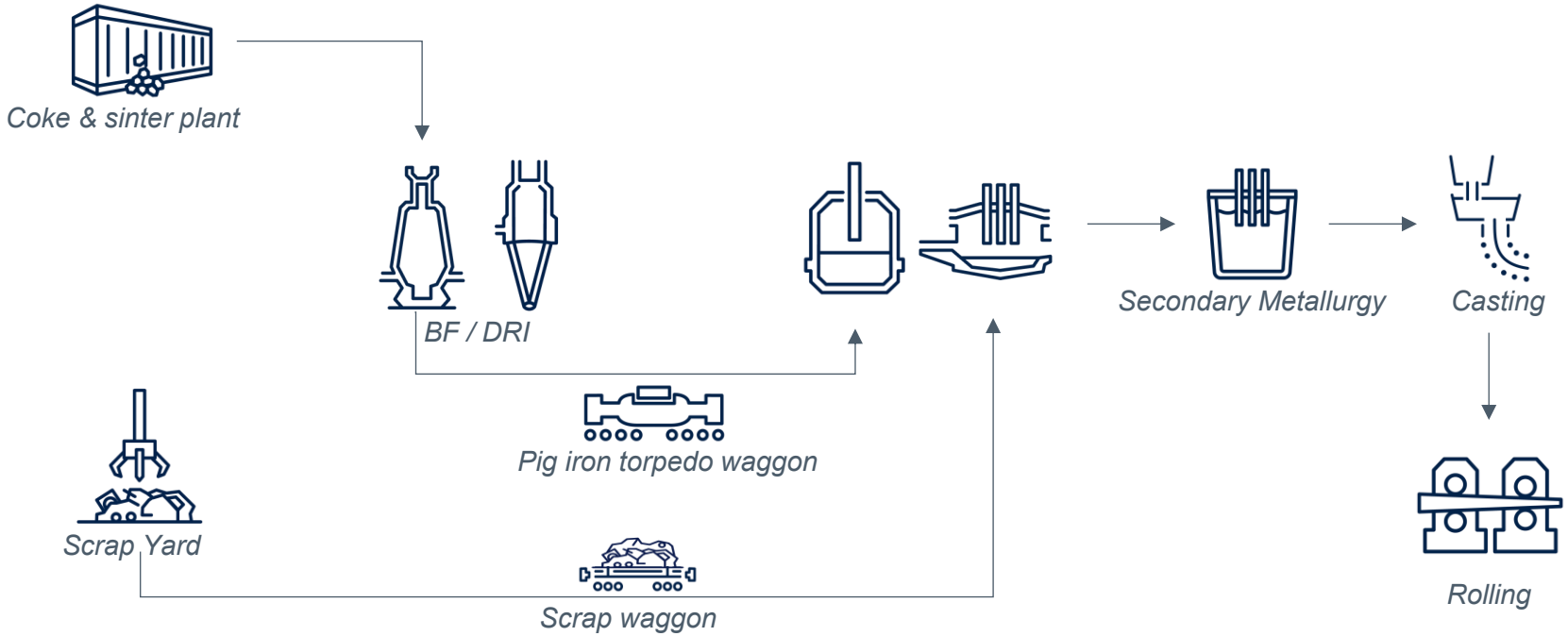
Wear prediction for steel mill ladles to increase production time & reduce material costs

AI-supported **surface inspection** to optimize costs and avoid extensive replacement investments

…and much more!

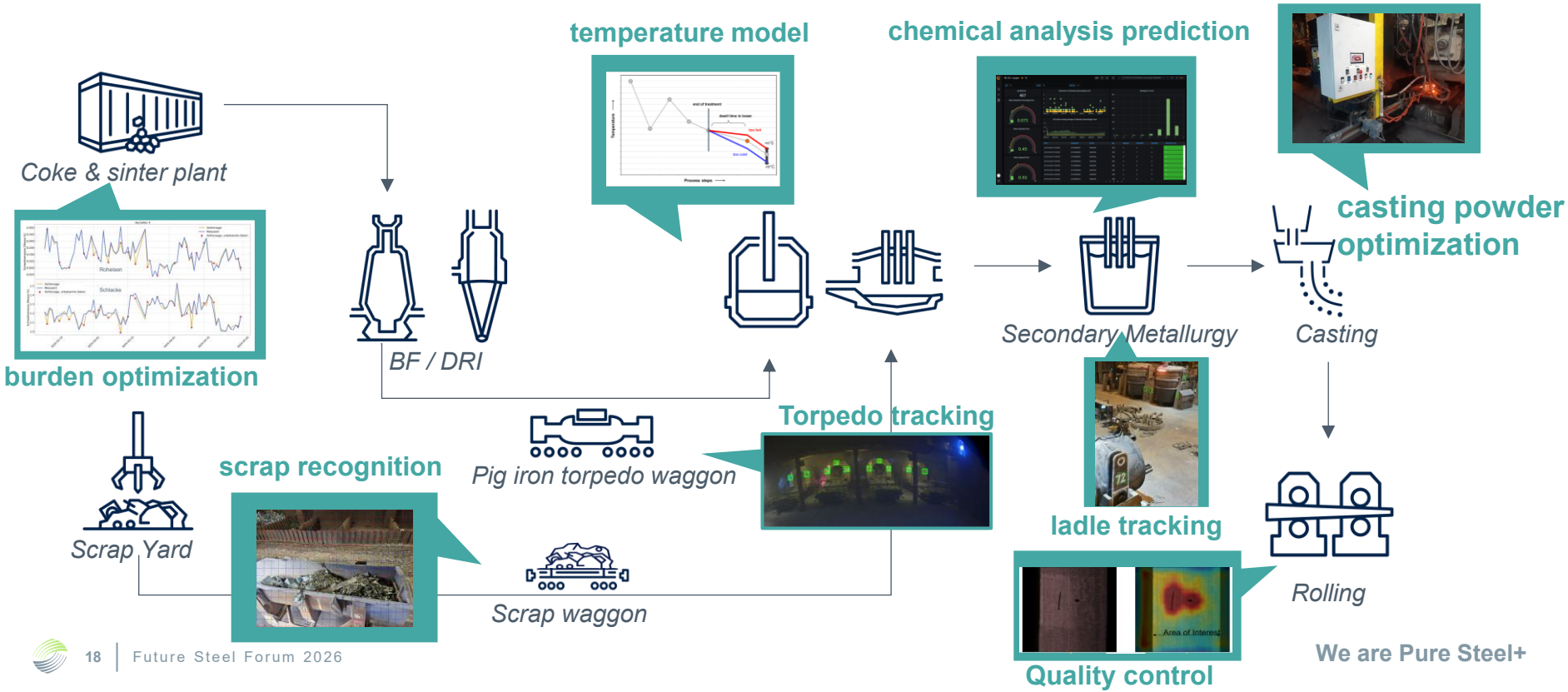
AI solutions are already being used — and will increasingly be used in the future - at many stages of the production process

Simplified production process



At SHS, AI is applied across the entire production chain to optimize processes end to end.

Simplified production process with examples of SHS AI solutions



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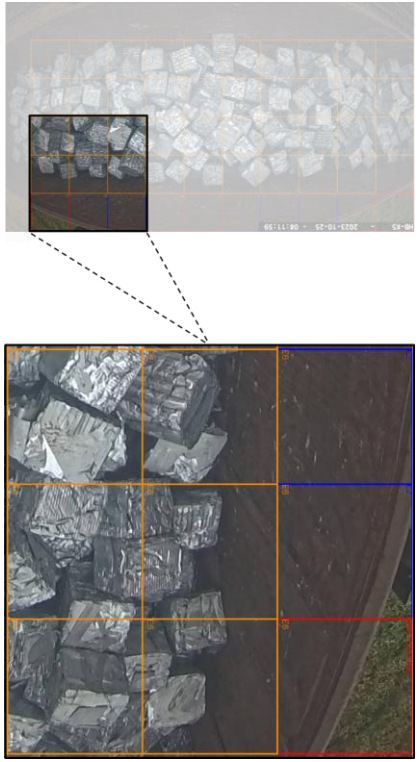
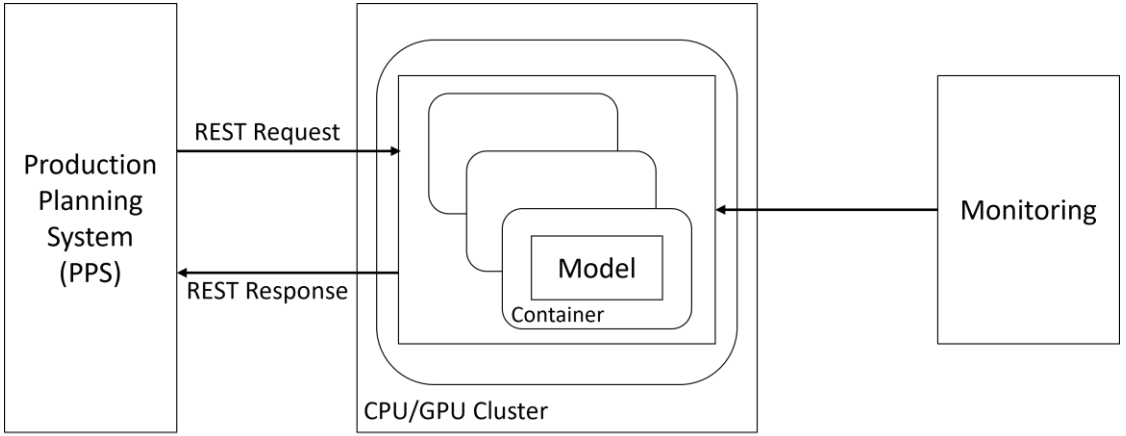
AI is a lever to optimize scrap mixes

Example

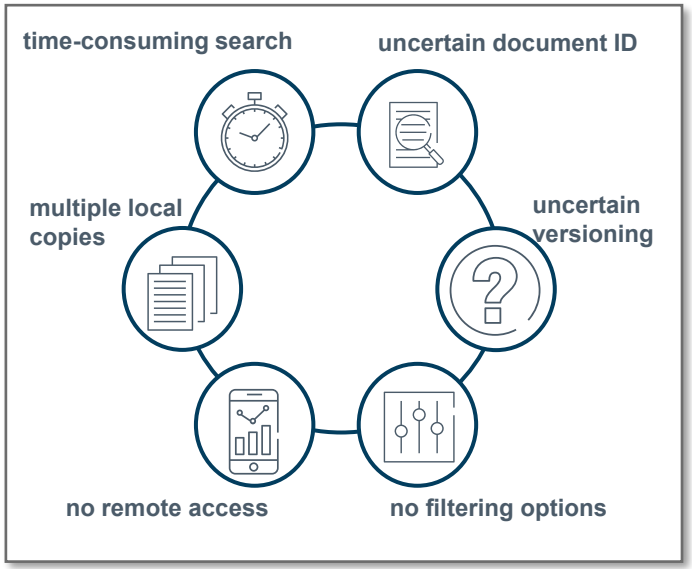


- Steel scrap can be classified with an accuracy of approximately 98.73%
- AI-powered online models enable optimization of scrap mixes
- New alloy models and adaptation capabilities



Completely new plant control and communication enabled by maximum Wi-Fi/5G coverage across the entire facility, down to each individual unit

Problem



Solution

Maximum & safe network coverage of every unit

Result

- **Fast availability of all documents**
- **Deep links to all relevant document versions**
- **Full access from the plant network**
- **Facilitated collaboration with colleagues off-site**
- **Minimal training effort, also usable for external contractors**

…and much more

Use Case: maintenance and repair *(Example)*

Time savings in repairs and maintenance, always have the right document at hand, remote access, always the most up-to-date version of documents, secure digital backups,…

Higher plant availabilty!

Summary

- **Power4Steel is the largest decarbonization project in Europe, with a budget of €4.6 billion, and also represents the most significant transformation of DILLINGER and Saarstahl's business processes.**
- **Staying on schedule and within budget is the key challenge for Power4Steel and is essential to the financial health of Saarstahl and DILLINGER.**
  Currently, Power4Steel is on schedule and within budget.
- **The Power4Steel construction project focuses on maintaining and minimizing CAPEX, while the transformation project focuses on optimizing future OPEX.**
- **AI & digitalization will play a significant role in our future within the Power4Steel project!**
- **Over the next few years, we expect AI to be operating across significantly more of our processes and further strengthen our competitiveness!**

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SAARLAND

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Thank you!

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