INITIATE
A STEPWISE PROJECT

Valorising Emissions from Steel Making into Sustainable Products

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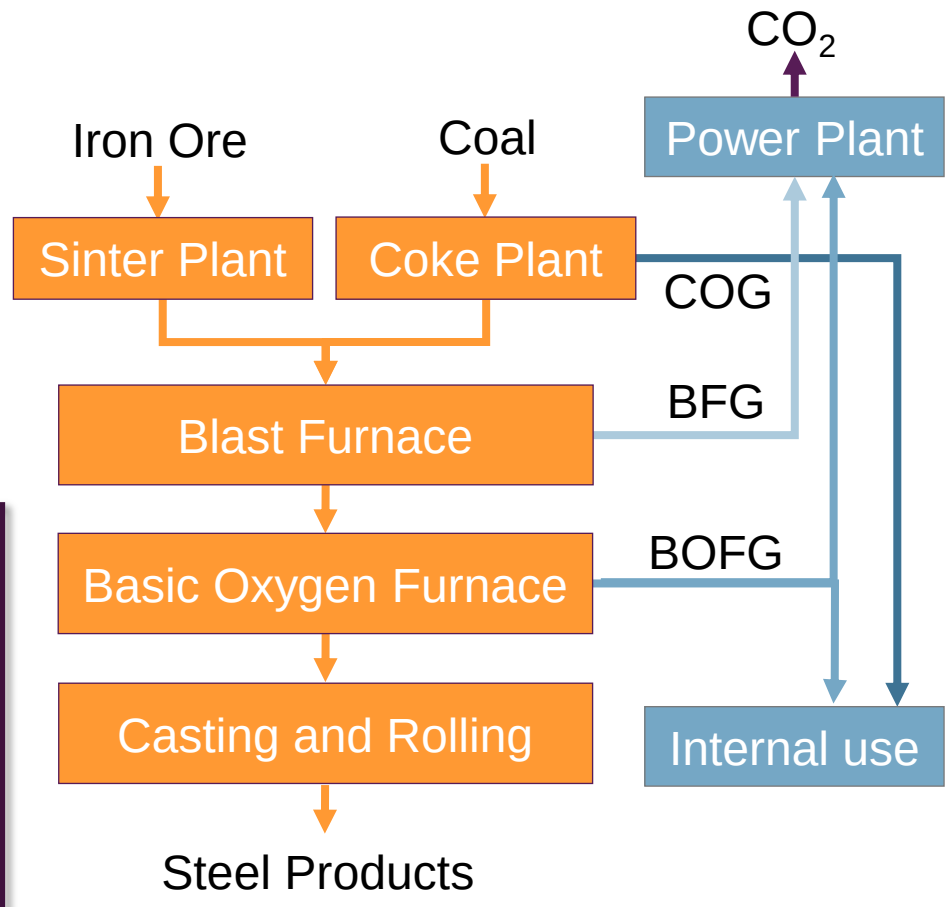
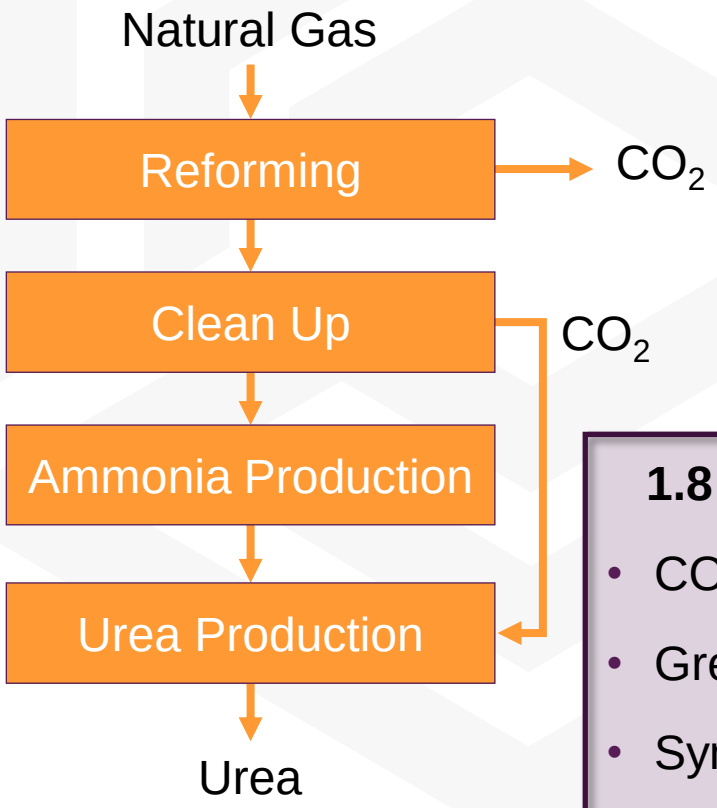
PUBLIC

Multiple routes to CO_2 neutrality



2 t_{CO2}/t_{HRC}

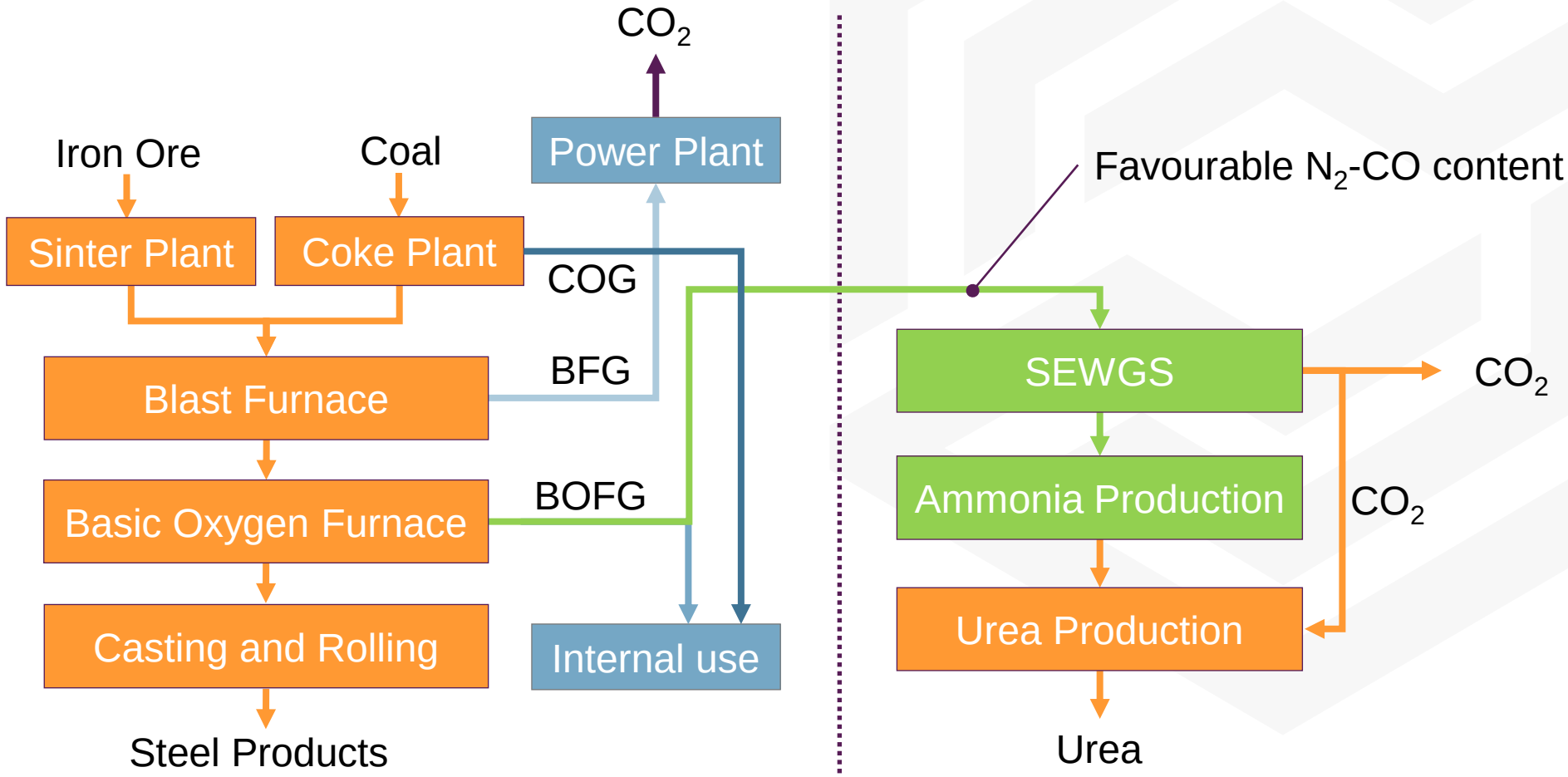
- Coal → NG, H_2
- CO_2 capture
- More scrap
- Efficiency



1.8 t_{CO2}/t_{NH3}

- CO_2 capture
- Green H_2
- Symbiosis?

INITIATE Industrial symbiosis



INITIATE project concept and vision

Concept: industrial symbiosis between **iron and steel** sector and **ammonia/urea** production

Demonstrate operational reliability for commercialisation (TRL7)

Demonstrate continuous production of 5 t/d of NH_3 from steel gases

Confirm positive business case (target IRR > 15%)

INITIATE project concept and vision

Concept: industrial symbiosis between **iron and steel** sector and **ammonia/urea** production

Demonstrate operational reliability for commercialization (TRL7)

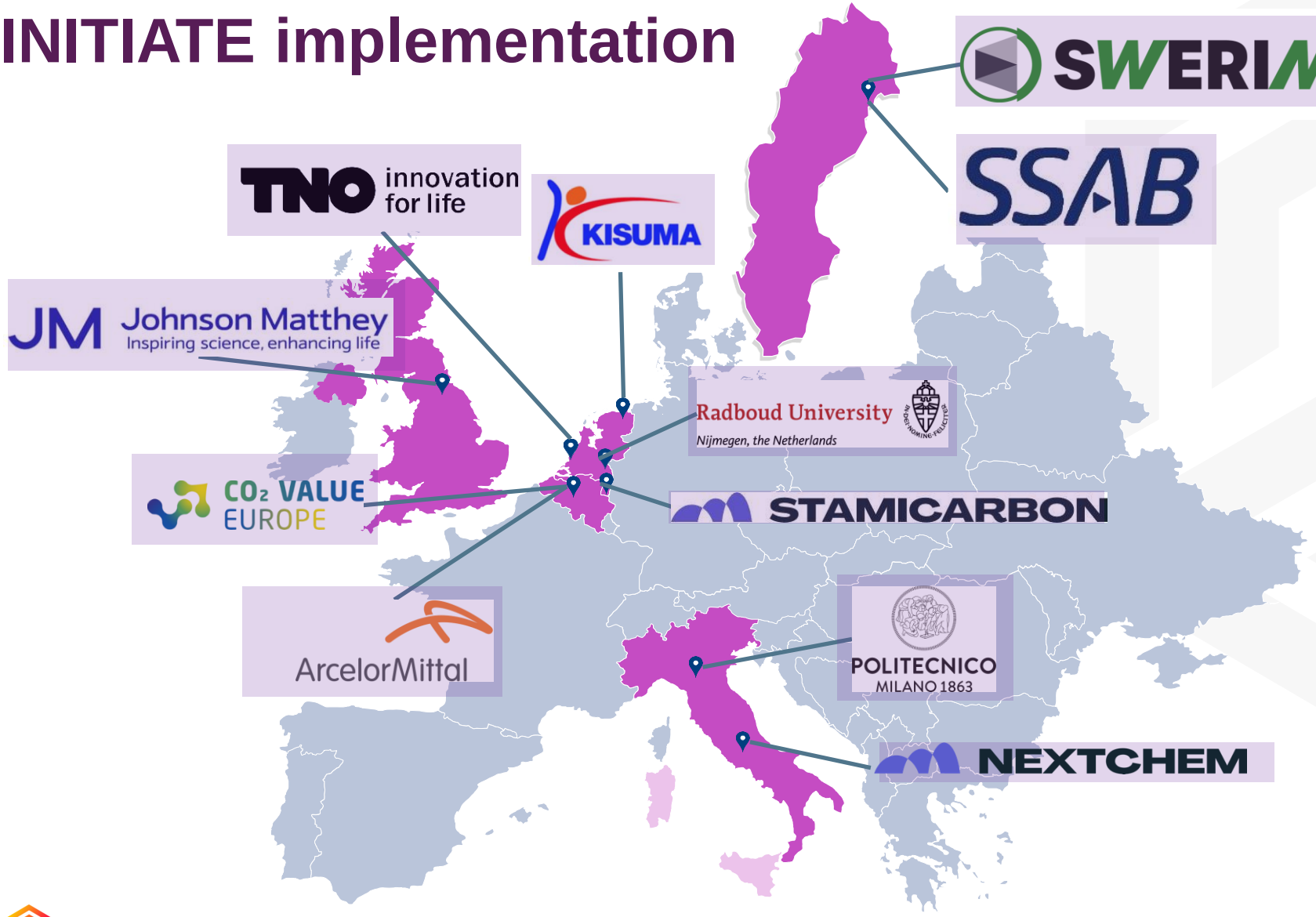
Demonstrate continuous production of 2.8 t/d of NH_3 from steel gases

Confirm positive business case (target IRR > 15%)

Towards a first of a kind plant

- Value engineering and integration to reduce cost
- Pre-FEED for a bankable, first-of-a-kind plant at selected location
- AI based control for gas dynamics
- Quantify social, economic and environmental impact of industrial symbiosis in Europe

INITIATE implementation



Materials and equipment

Technology licensors

End-users

Knowledge support

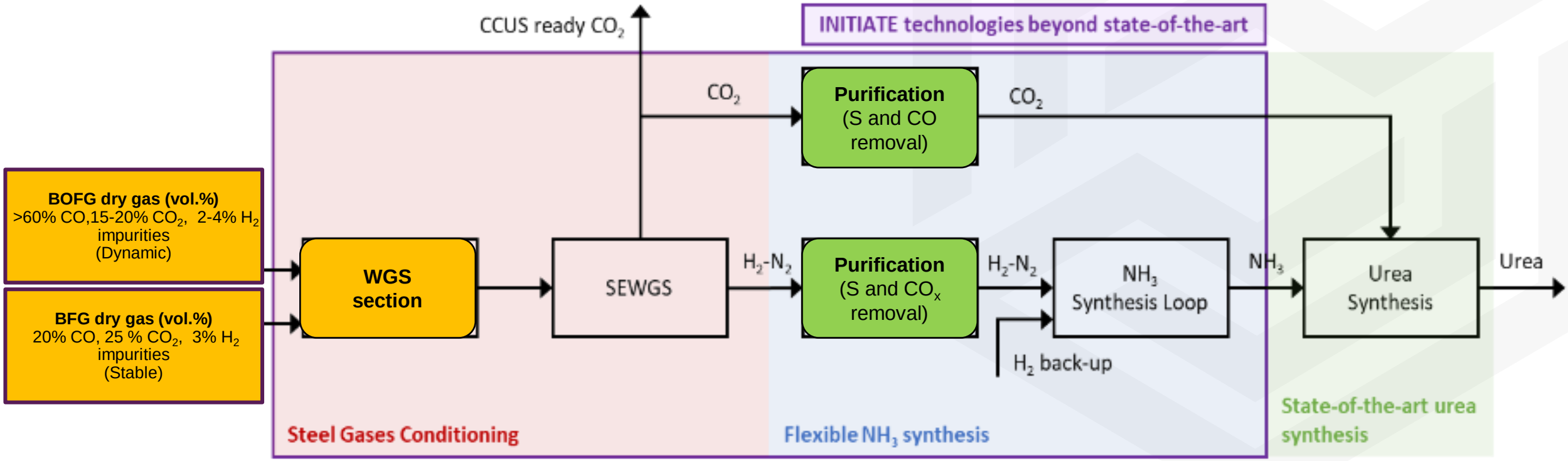
5 years
Nov. 2020 – Nov. 2025

21.3 M€ EU funding

958318
H2020-LCCI-2020-EASME
A.SPIRE

INITIATE technology flowsheet

A novel symbiotic process to produce urea from steel residual gases (BOFG & BFG)



Functional materials for the INITIATE pilot plant

Literature review on impurities

- **Key highlights:**[1,2]
  - Contaminants of concern in BOFG:
    - Acids: HCl, HF, H_2SO_4
    - NH_3, HCN, S-compounds
    - SO_x and NO_x
    - O_2
    - Metal dust

Measurements campaigns are required at SSAB steel plant, Lulea, to detect and quantify all potential impurities

[1] Remus, R.; Aguando-Monsonet, M. A.; Roudier, S.; Sancho, L. D. Best available techniques Reference Document for iron and steel production; 2013.
[2] Jalkanen, H.; Oghbasilasie, H.; Raipala, K., Recycling of Steel Making Dust – the radust concept. Journal of Mining and Metallurgy 2005, 41 (B), 1 - 16.

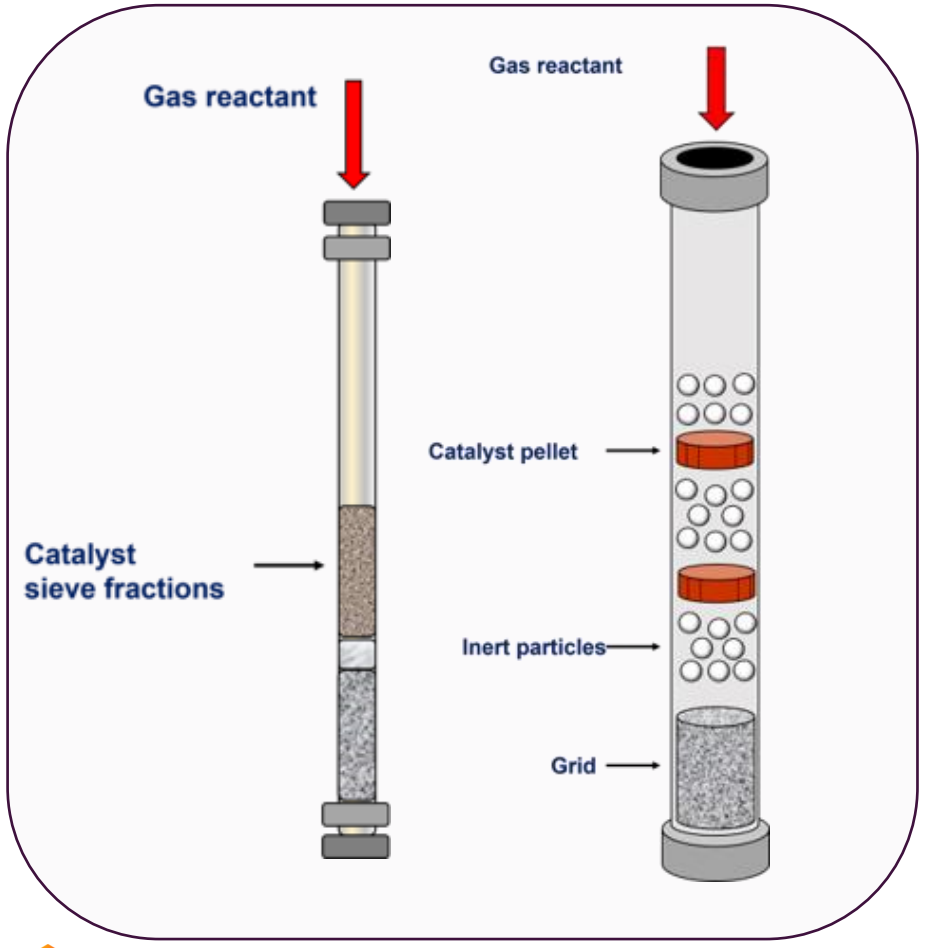
Contaminants identification and quantification at SSAB steel plant

Wet chemical sampling

Learnings are used for the evaluation of functional materials and engineering design of the INITIATE pilot plant

Lab-scale evaluation of functional materials for the pilot plant: approach

Catalytic studies



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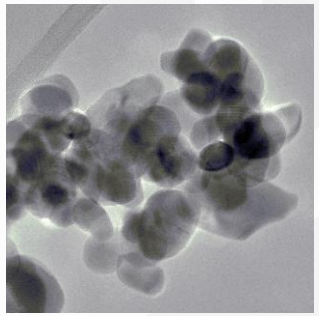
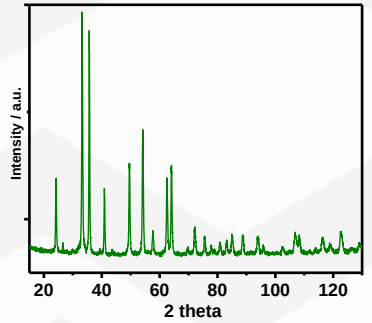
Post-characterisation of materials

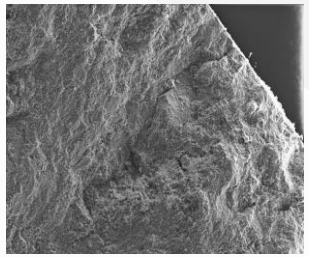
TEM



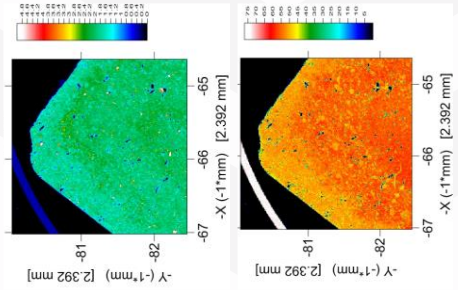
XRD



SEM

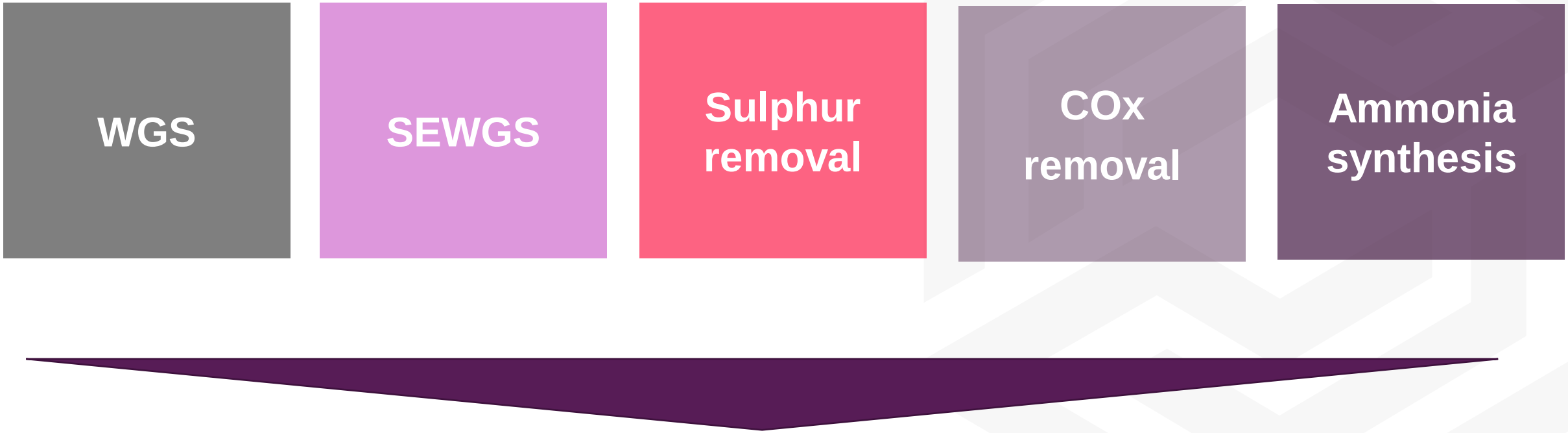


EPMA



XPS, LECO, CHN, N_2 adsorption etc

Evaluation of functional materials for the pilot plant



Suitability of functional materials for the pilot plant was demonstrated

Learnings were incorporated into basic and detailed engineering design of the INITIATE pilot plant

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Thank you

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www.initiate-project.eu

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