

Meeting with ThyssenKrupp Steel (“TKS”) Occasion: Commissioning of TKS’ first H2-DRI plant

Scene setter

You are meeting [REDACTED]
ThyssenKrupp Steel Europe (“TKS”). Previous to joining TKS, [REDACTED]
[REDACTED]
[REDACTED]

The occasion for your meeting is the recent commissioning of TKS of the construction of its first hydrogen-based direct reduction plant (“H2-DRI”) integrated into the companies Duisburg site, Europe’s largest integrated steel site. The construction of the facility was commissioned to SMS Group, a German world leader in the metallurgical machine and plant engineering sector, on an Engineering-Procurement-Construction (“EPC”) basis. The order volume for SMS Group alone has a value of over EUR 1.8 billion.

The plant will rely on American Midrex Flex DRI-technology. Midrex, next to Danieli, is one of only very few license providers for H2-DRI. The facility will have a production capacity of 2.5 million tonnes of directly reduced iron (DRI) per year and is planned to start production as early as 2026, saving 2.5 million tonnes of CO2 annually.

The German Federal State of North Rhine-Westphalia, which is home to both the steel site and the construction company, is supporting the project with up to EUR 700 million.

ThyssenKrupp intends to use Direct Reduction technology (H2-DRI) replacing coal with green Hydrogen as both reduction agent and fuel in the steel production process. So far, H2 DRI technology is only in operation at a single pilot-scale plant in the EU, the HYBRIT plant in Sweden (funded by the Innovation Fund first Large Scale Call).

The Commission expects that around 30% of EU primary steel production can be decarbonised by 2030, requiring 1.4 million tonnes of hydrogen and investments of around EUR 18 billion.

Speaking points

- Congratulation on the investment and commissioning decision.

Possible interesting questions to [REDACTED]:

- How much clean hydrogen will the facility require and how do you intend to procure that hydrogen? Is TKS aware of the upcoming H2 auctions under the Innovation Fund?
- Europe’s competitive advantage in the medium term may not lie with being a major cheap hydrogen producer, but rather with being an innovative technology provider. How can Europe become a major provider for green steel technology?

- Which business and licensing models will we need upstream of actual steel production? How can Europe catch up with US and Chinese OEMs / license providers?
- Does TKS consider developing its own IP or licensable processes on the basis of the Duisburg project?
- What were the key factors in selecting SMS Group as the provider of Engineering-Procurement-Construction?

Defensives

There were no specific questions posed in the meeting requests. Possible areas of questions:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

2) Which regulatory and financial environment does the EU provide to support first movers in the industry transition?

The EU has the ambition to provide the regulatory and financial framework conditions for making green steel production successful in Europe and allowing Europe to become a technology leader in this area. We believe that financial support alone cannot solve the problem of decarbonising industry and that in the medium term green industrial production needs to be supported by the market and a reliable regulatory environment.

- The **EU ETS** provides the backbone of internalising the carbon costs of energy intensive products and giving a market advantage to green alternatives.
- The **Carbon Border Adjustment Mechanism** will further ensure that high environmental standards in the EU do not lead to carbon leakage at the expense of the competitiveness and survival of industry within the EU.
- **Standardisation and Certification** allow to create markets and green premiums for clean technologies in the first place. The EN-Standard for steel sets out CO2 accounting rules and enables the application of a life-cycle approach.
- **Green Public Procurement** and other demand-side regulation such as the Construction Products Regulation and the 2023 Commission proposal on **Eco-design for Sustainable Products** present an additional lever to create markets for green steel.

3) What financial support mechanisms are available to support first movers in the steel sector?

- The **Innovation Fund** is already supporting one of the world's most innovative steel projects and stands ready to provide large scale funding necessary for the upscaling of breakthrough technologies. Carbon Contracts for Difference will make use of possible competition on an EU level and support the commercial roll out of deep decarbonisation technologies in industry. At a carbon price of 75 EUR, the IF will provide over 40 billion EUR in funding until 2030.
- Various **Research and Innovation programs**, most notably the new Research Fund for Coal and Steel (RFCS) big ticket calls and the Clean Steel Partnership support R&I initiatives from pilot to demonstration phases
- The **Invest EU Programme** is leveraging an EU guarantee of 26 billion EUR, and channelling parts of the volume into the Green Transition facility, which also supports investments in low-carbon steel.
- The **Sustainable financing taxonomy** aims to align financial flows with global climate goals.
- The **Recovery and Resilience Facility** is providing member states with the ability and incentive to “build back better”, in allocating at least 37% of investments towards green transition

Background

Importance of the steel sector for the green transition:

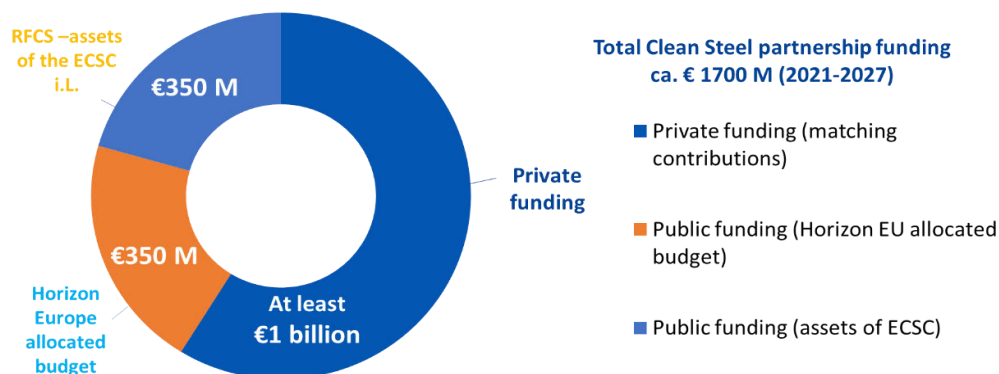
- Steel is a key building block of the green and digital transitions. Steelmakers participate in wider value chains including sectors that are crucial for the EU competitiveness, like construction, automotive, mechanical engineering, energy generation and networks, mobility, and defence.
- The decarbonisation of the steel industry is a priority to achieve climate neutrality by 2050. We need a competitive European steel industry to continue on its decarbonisation pathway.
- Steel is infinitely recyclable, and its residues and waste energies can become valuable resources, thus contributing to a circular EU economy.
- The EU steel industry has already reduced emissions by 26% since 1990 and we welcome the progress achieved so far.
- But 2050 is just one investment cycle away for a sector like steel, which has long-lasting capital assets. Therefore, the next five years will be crucial to develop and scale-up clean breakthrough technologies and deploy abundant and affordable renewable energy.
- Green hydrogen is a key enabler. There are already important demonstration projects in place that look at how to decarbonise steel via hydrogen.
- Following the Ukraine crisis and the crisis in the EU energy sector, the RePowerEU is supporting use of hydrogen for primary steel production – 30% of primary steel with green H₂ by 2030.
- The Hybrit pilot in Sweden is a successful example showing that near-zero steel is a reality. Funding from Innovation Fund: € 143.000.000.
- The Commission is keen to move from demonstration projects to large commercial projects within the next ten years.

- Recent allocation of public funding under the IPCEI is targeting the steel industry; 2nd hydrogen IPCEI approved in September includes hydrogen use for steel.

Other EU Initiatives supporting the European steel sector:

The Clean Steel Partnership (CSP)

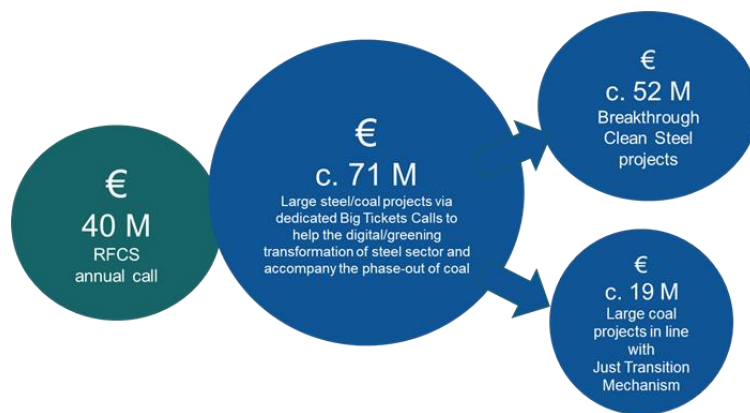
- Public-private co-programmed European partnership under Horizon Europe, started in 2021.
- The Clean Steel Partnership is developed in the context of the EU goal and policies to achieve climate neutrality by 2050 -the European Green Deal, the Clean Planet for All strategy and the Paris Agreement.
- General objective of the CSP is to develop technologies at TRL8 to reduce CO2 emissions stemming from EU steel production by 80-95% compared to 1990 levels. This has to be achieved while preserving the competitiveness and viability of the EU steel industry and making sure that EU production will be able to meet the growing demand for steel products.
- The investments for the period 2021-2027 are:



The RFCS Programme

- RFCS is a EU funding programme supporting research and innovation in the coal and steel sectors. The RFCS has its own legal bases and stands outside the Multiannual Financial Framework.
- The RFCS was created in 2002 to continue supporting research in the coal and steel sectors in order to keep the related industry competitive and sustainable.
- It is funded via the revenues generated by the European Coal and Steel Community (ECSC) in liquidation assets.
- In 2021 the legal base was revised. There are 3 innovative aspects of the new RFCS legal base:
 - The full alignment with the policy objectives of the European Green Deal: decarbonisation, climate neutrality and twin transformation (digital and green).

- The possibility to launch dedicated calls on top of the standard annual call to help the transformation of the steel and coal industrial sector in line with the policy priorities. These are the Big Tickets, supporting breakthrough technologies for steel making and the just transition for coal, for an annual cumulative EU funding of 71 million EUR.
- The possibility to better use the financial interest and make use of the assets, to ensure a financial annual allocation to manage the standard RFCS calls for proposals of at least EUR 40 million. This will give stability and predictability to the programme.
- The annual call budget is:



Contact point: [REDACTED]