



TATA STEEL

**Green hydrogen
steelmaking in
the Netherlands**

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General Manager Long Term Asset Strategy

NAP Contact Meeting, 8 June 2023

Tata Steel IJmuiden, part of Tata Steel Netherlands (TSN)



Steel is and will be essential for everyday life and serves as input for many industrial supply chains

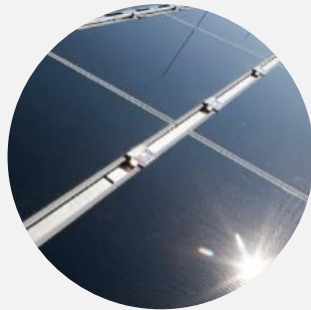
How much steel does a European use on average per day?

~ 1 kg

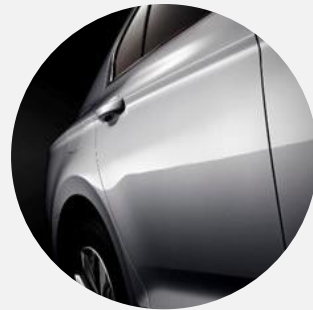
Example essential applications are...



Car batteries



Solar panels



Car bodies



Windmills



Food packaging



Tubes for construction

Clean Green Circular

Leadership principles

Themes

- Connect
- Change
- Care

- People & Society
- Environment & Community
- Decarbonisation & Sustainability
- Customers & Value



Purpose

Why we are on the journey

Improving how people around the world work, live and move, through sustainable steel

Mission

The route we follow

To continue to play a meaningful role for all our stakeholders as a clean, green, circular steel company that creates value, is an employer of choice, and maintains an ongoing dialogue with our neighbours

Vision

What we expect to find when we arrive

A clean, green and circular steel company that is sustainable in every sense

TSN has an ambitious plan



TSN is committing to a clean, green future with two programmes

Roadmap+

Reduction of local emissions and improvement of local nuisance situation by taking environmental measures, incl. dedusting and deNOxing the pellet plant, and limiting emission at the cokes plant

Implementation timeline of **2019-2025**

35%

PM10 (fine dust) reduction by 2023

85%

Odour reduction by 2023

50%

PAH-emissions reduction by 2022

30%

NOx emissions reduction by 2025



Focus of today

Transition to clean, green steel

Transition to green hydrogen-based steel making by replacing current blast furnace-technology with DRI-plants and electric smelters

Implementation timeline of **2022-2035**

35-40%

CO₂ emissions reduction after first BF-replacement by 2030

60-70%

CO₂ emissions reduction after second BF-replacement by 2035

100%

CO₂ emissions reduction by 2045

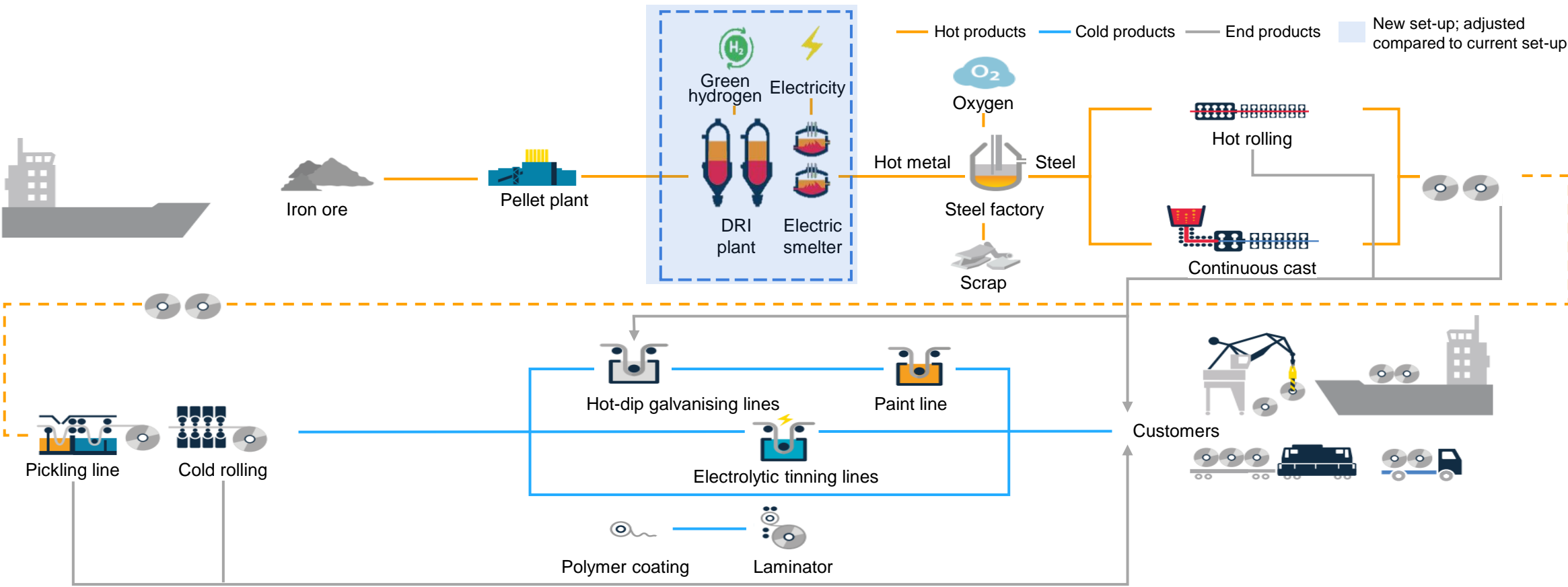
Exact impact to be determined

Additional reductions in PM10, odour, PAH, and NO_x emissions

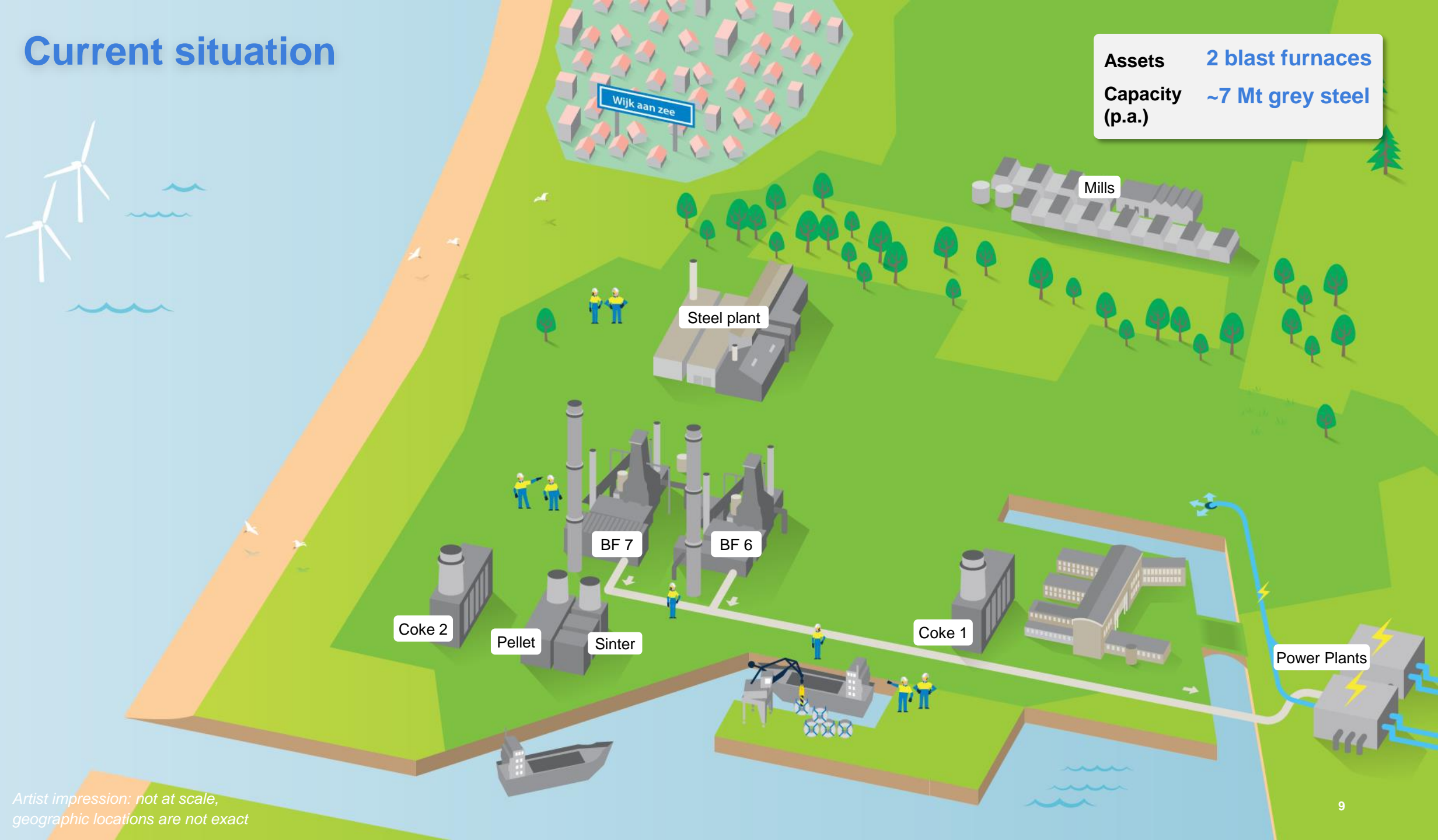
Blast Furnaces, Tata Steel IJmuiden



For the transition to green steel, one blast furnace will be closed and replaced with hydrogen-based direct reduction plants by 2030



Current situation







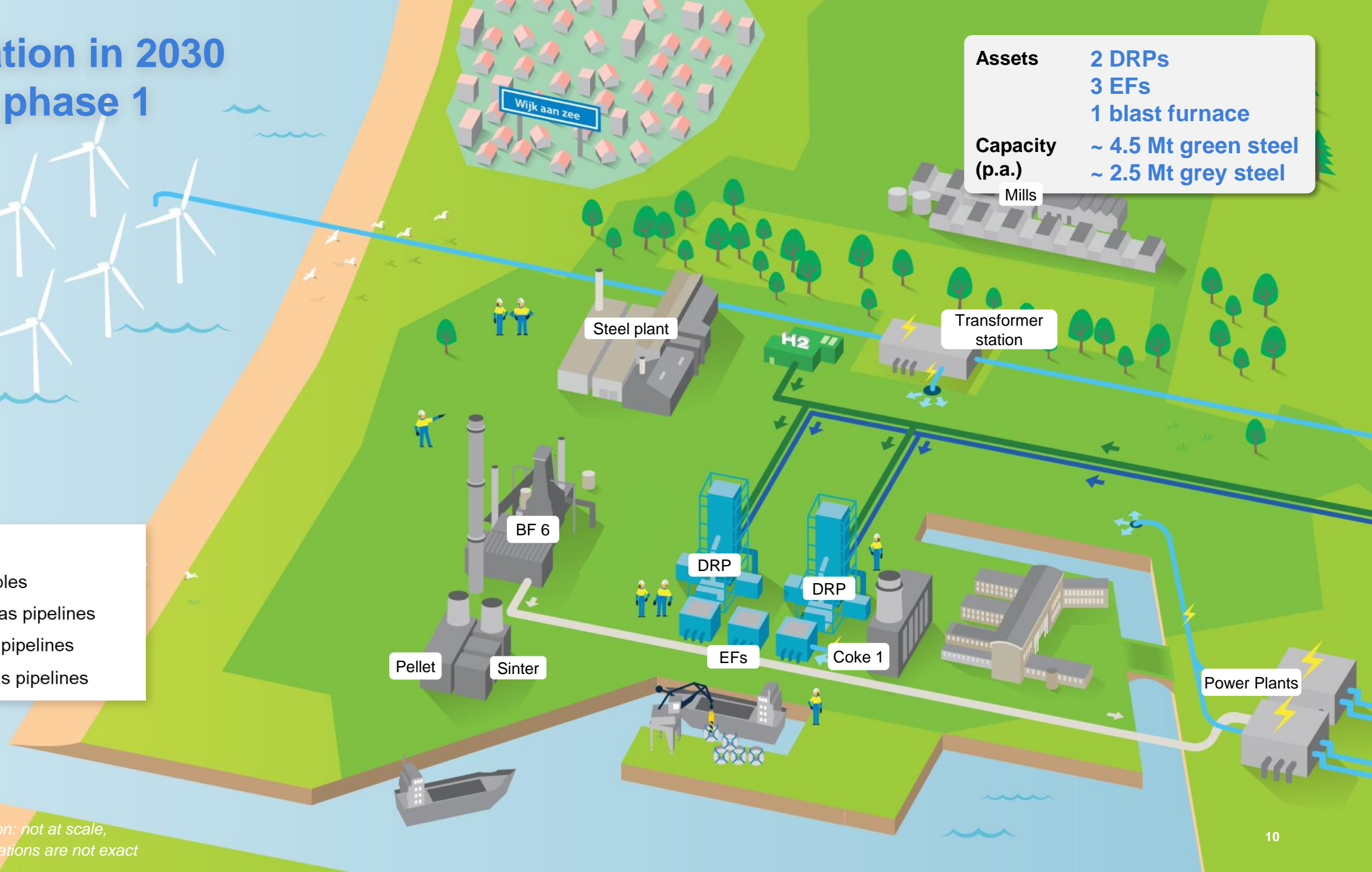
Artist impression: not at scale,
geographic locations are not exact

Situation in 2030 after phase 1

Assets	2 DRPs 3 EFs 1 blast furnace
Capacity (p.a.)	~ 4.5 Mt green steel ~ 2.5 Mt grey steel

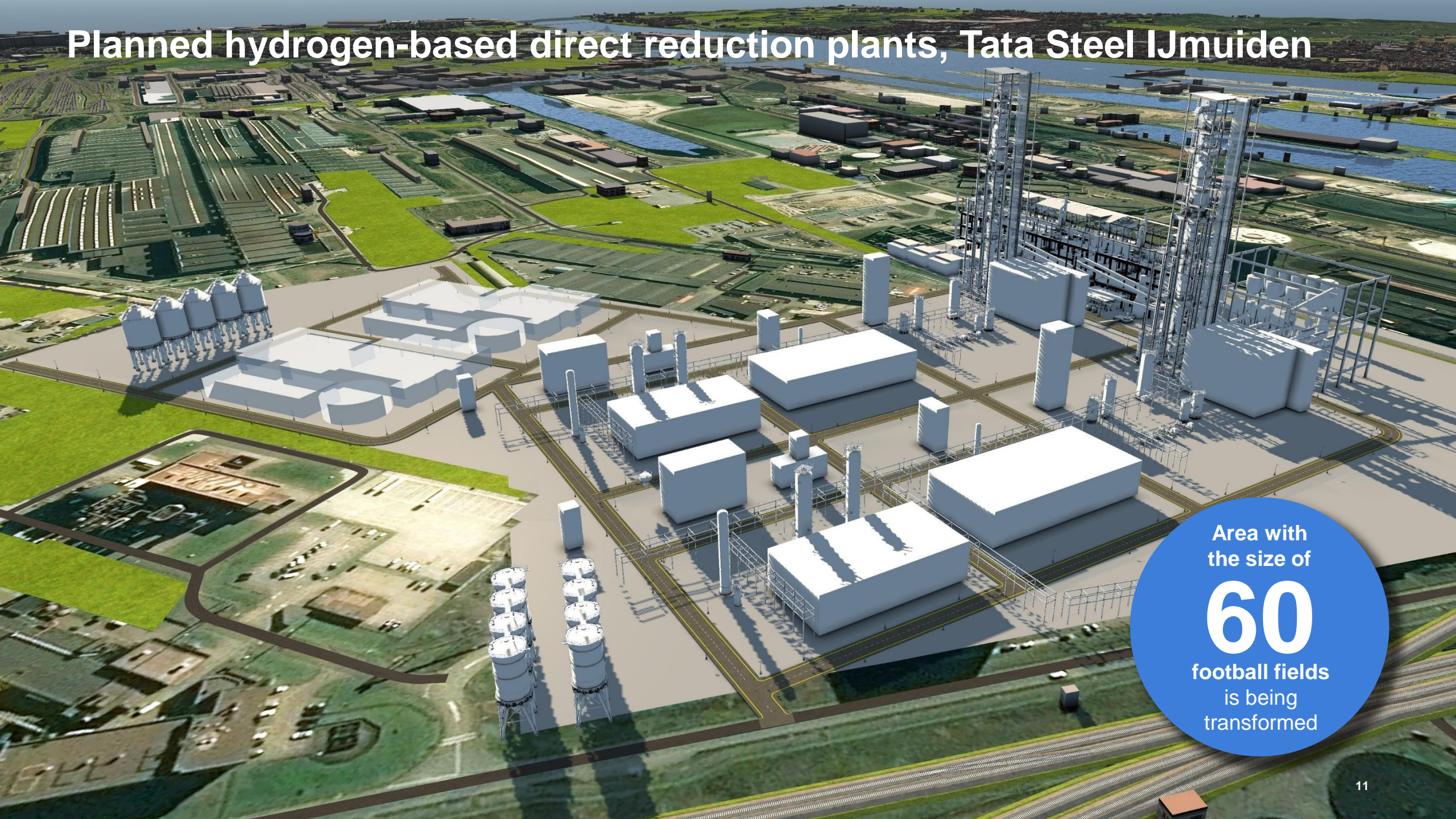
Legend

-  Power cables
-  Process gas pipelines
-  Hydrogen pipelines
-  Natural gas pipelines



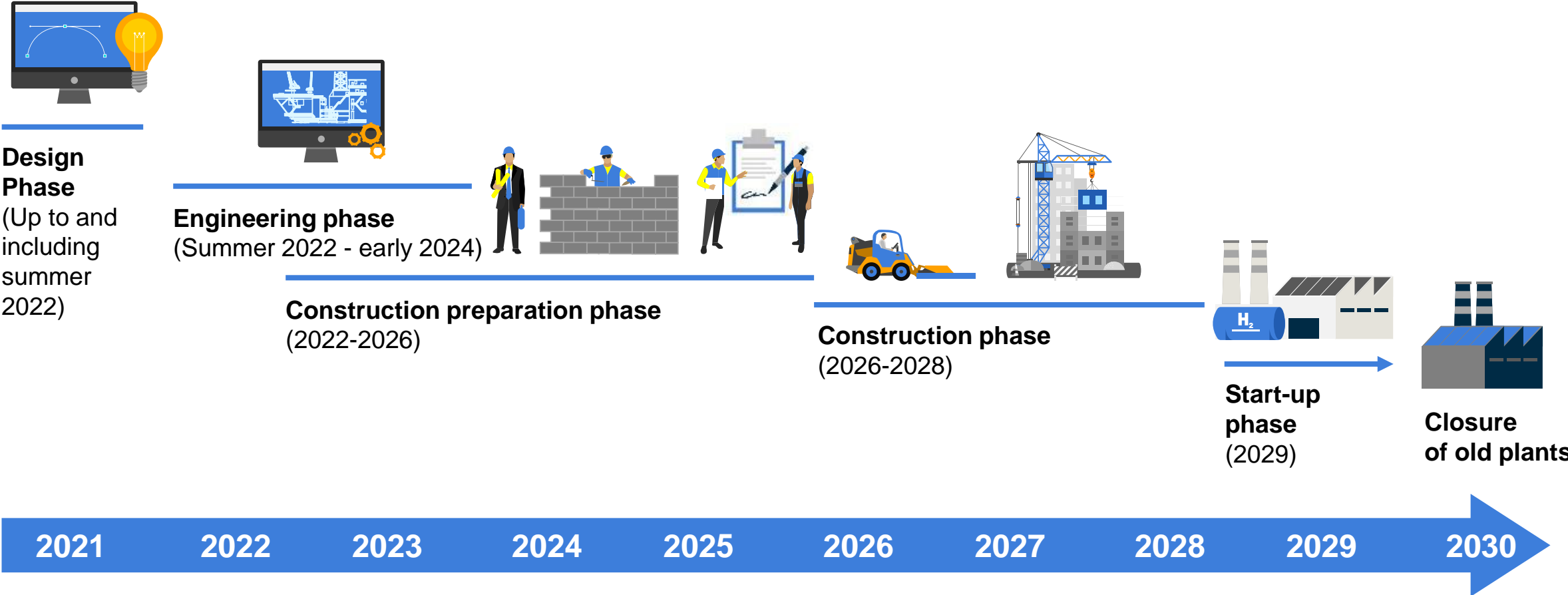
Artist impression: not at scale,
geographic locations are not exact

Planned hydrogen-based direct reduction plants, Tata Steel IJmuiden



Area with
the size of
60
football fields
is being
transformed

TSN's transition consists of five phases



TSN and the Netherlands are uniquely positioned to harvest the benefits of hydrogen-based green steel

- 1 Competitive offshore wind energy
- 2 Electricity grid
- 3 Connection to future hydrogen infra
- 4 Existing natural gas infrastructure (needed for transition)
- 5 Existing efficient integrated steel complex
- 6 Deep sea port & railway connection



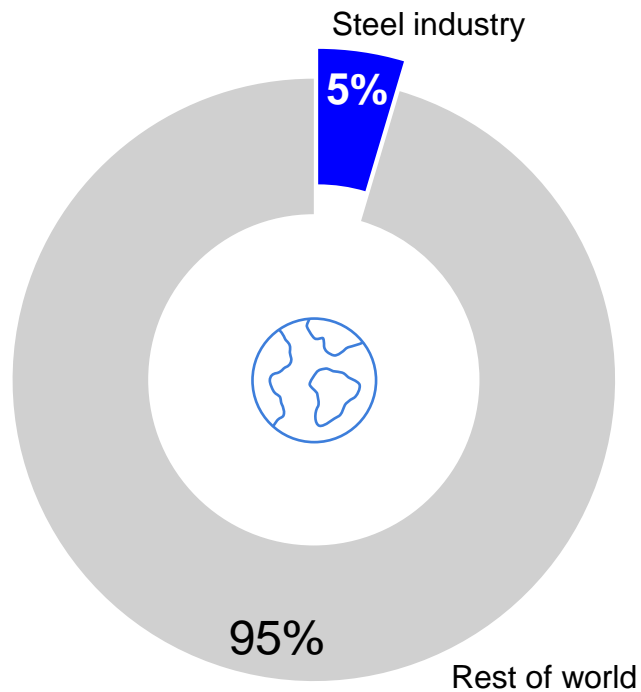
The transition will reduce CO₂ emissions by 6-7% of the NL abatement target for 2030

Today

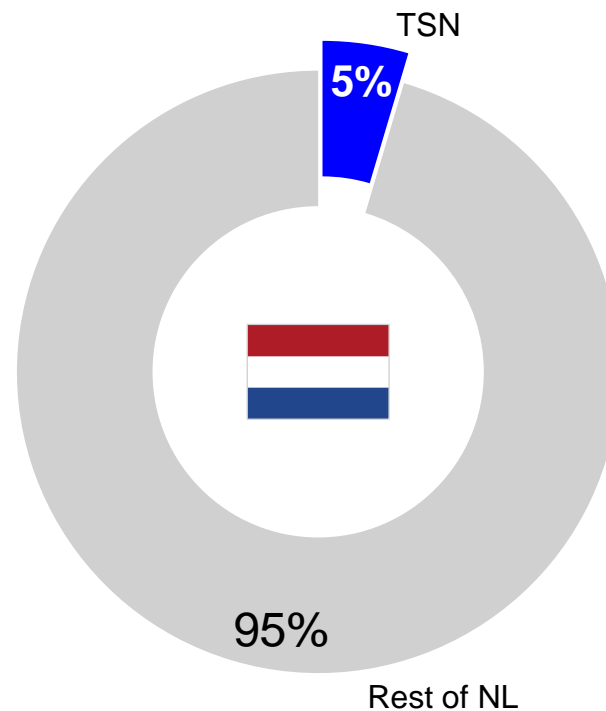
TSN's share of CO₂ emissions in NL is comparable to the share of CO₂ emissions of steel globally

GHG emissions of steel globally and GHG emissions of steel in NL, % of total

Global emissions, 2021



NL emissions, 2021

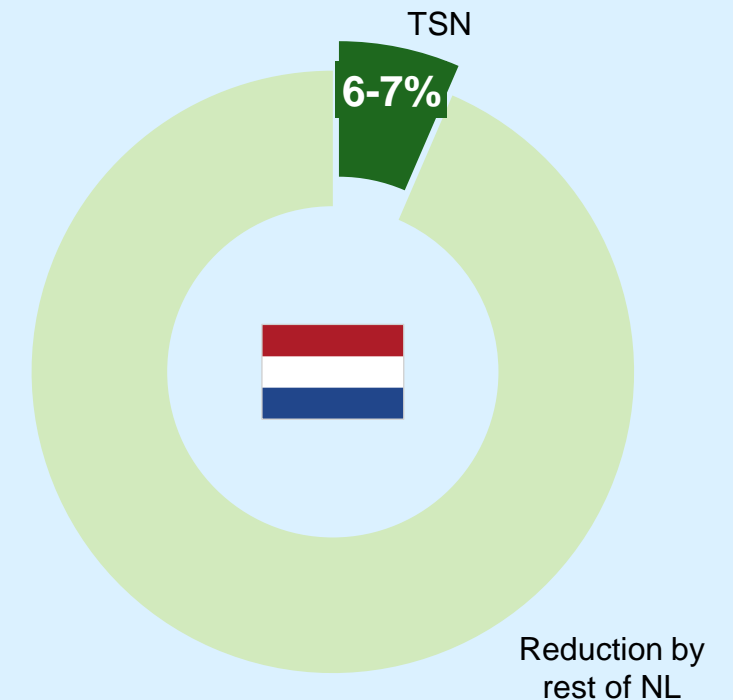


2030

TSN's planned abatement corresponds to 6-7% of NL industry reduction targets

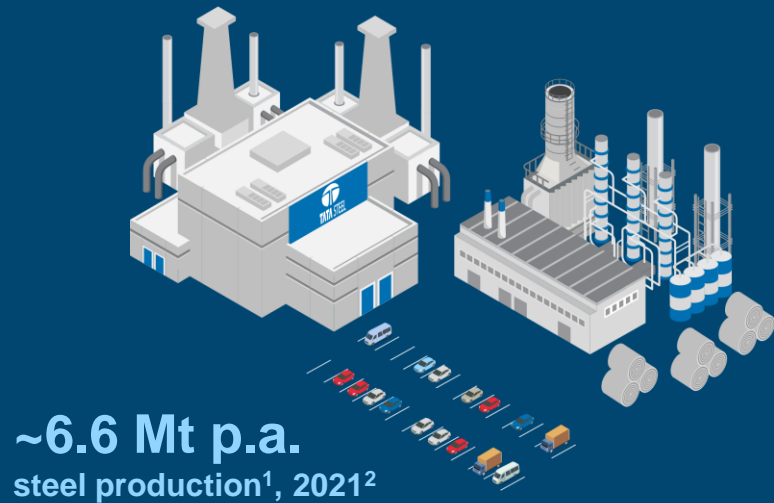
GHG emissions reduction targets NL, % of total

NL abatement target



This transition is pivotal to secure the strategic value of TSN for NL

TSN is a key player in the Dutch manufacturing industry and the largest producer of steel in NL



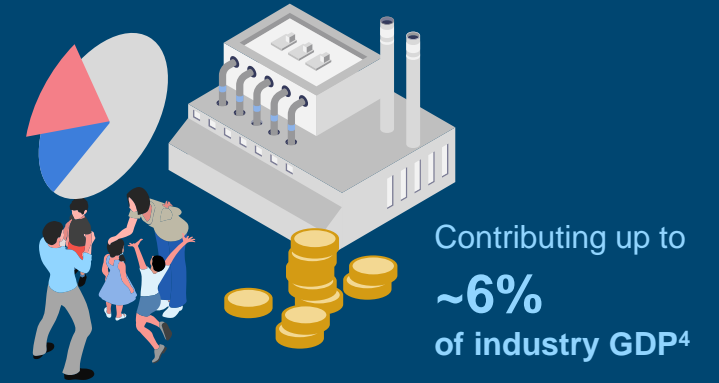
TSN helps to safeguard strategic self-reliance



TSN provides a major contribution to the Dutch labour market



TSN contributes significantly to the Dutch economy



TSN invests heavily in innovation, education and expertise



1. Steel demand and production on crude steel basis, based on World Steel Association, 2. Calendar year 2021, 3. According to "The Impact of the European Steel Industry on the EU Economy, 2019" report by Oxford Economics, with TSN correction based on internal data, 4. Based on direct and indirect GVA contribution according to "The Impact of the European Steel Industry on the EU Economy (2019), and CBS SBI C manufacturing GDP contribution 2017

**TSN is already taking
important steps to make the
plan reality**



TSN is truly committed and is already taking significant steps to realise the 35-40% CO₂ reduction by 2030

May 2021

Start construction of 2GW transformation station by TenneT

Deep-dive next

Sep-Oct 2021

Launch of TSN's decarbonisation project

Jul 2022

Sign of amended and restated Expression of Principles

Herziene Expression of Principles Tata Steel Nederland

NIEUWS Engelstalig richtgevend document om te komen tot maatwerkafspraken voor de transitie van Tata Steel Nederland naar een meer duurzame en schone staalproductie.

Aug 2022

Start of basic engineering with McDermott, Danieli and Hatch - EUR 65 mn committed

Tata Steel investeert 65 miljoen in productie op waterstof

NIEUWS Staalconcern Tata Steel steekt 65 miljoen euro in het ontwerp van...

Jan 2022

Start of concept engineering for design of new installations – EUR 40 mn invested



Technology partners for the core ironmaking equipment



HV cable from offshore wind turbines



Transformer station Tennet & connection to Tata Steel



TSN has launched the green steel brand Zeremis to kick-start the green steel market

Zeremis™

Zeremis – short for zero emissions – is our promise to the planet to become carbon neutral by 2045. The Zeremis brand represents the journey Tata Steel Nederland is taking with our customers, together towards a zero-carbon emissions, circular world.



**TSN cannot do this alone and
also needs help from all
stakeholders**



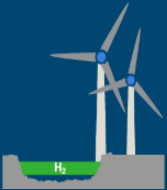
Requirements for a successful and sustainable transition



Green hydrogen



Government support



Renewable energy and infrastructure



Timely and careful permitting



Customer offtake agreements



Through a successful transition to green steel, we will realise...



... green steel for our customers



... in a clean environment



... securing our role as responsible employer



... and creating a substantial reduction in CO₂ emissions