

# THE GREEN TRANSFORMATION – EVOLUTION OR REVOLUTION?

The carbon-neutral future of thyssenkrupp Steel



engineering.tomorrow.together.



thyssenkrupp



# WHO WE ARE:

## Germany's largest flat steel producer



*~11 million tons*  
raw steel p.a.



*~9 billion Euro*  
revenue in 2020/21



*~26,000* employees



Largest flat steel producer in Germany with a factory site that is 5x larger than Monaco



Automotive



Special vehicles



General Industry



Energy generation and turbines



Consumer goods



Transformers and charging infrastructure



Construction elements



Packaging (e.g., cans and closures)







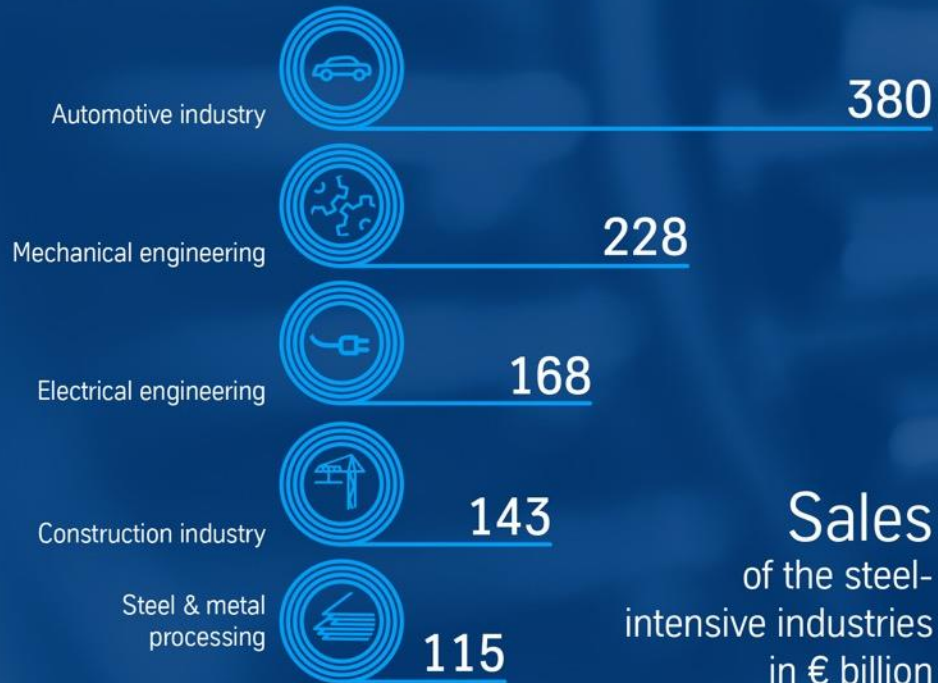
Steel remains an  
**ESSENTIAL PART**  
of our lives

  
**419 kg**

average per capita consumption  
(Ø) of steel in Germany per year



# Steel secures **EMPLOYMENT, WELFARE** and social stability



Sales  
of the steel-  
intensive industries  
in € billion

approx. **4 million**

employees in the largest steel-intensive sectors

over **80,000**  
work directly for the steel industry



# Demand for PRIMARY STEEL IN EUROPE

## Scrap volume is not sufficient

Steel production in Germany 2021

approx. 40 mmt

 28.0 mmt  
Primary route  
(blast furnace)

 12.1 mmt  
Secondary route  
(electric arc furnace)

Scrap approx. 21 mmt

17.4 mmt  
Use in steel production

3.7 mmt  
Export from Germany



It is not possible  
to completely cover  
the product spectrum  
via scrap-based  
electric arc furnaces  
(EAF route)



Ore-based  
primary steel route  
mandatory



# Germany's STEEL LANDSCAPE

Central importance for  
industrial value chains



Primary route (blast furnaces)



Secondary route (electric arc furnaces)





# Steel is an essential lever of the **GREEN TRANSFORMATION**







Steel:

**GRAY TODAY, GREEN TOMORROW**



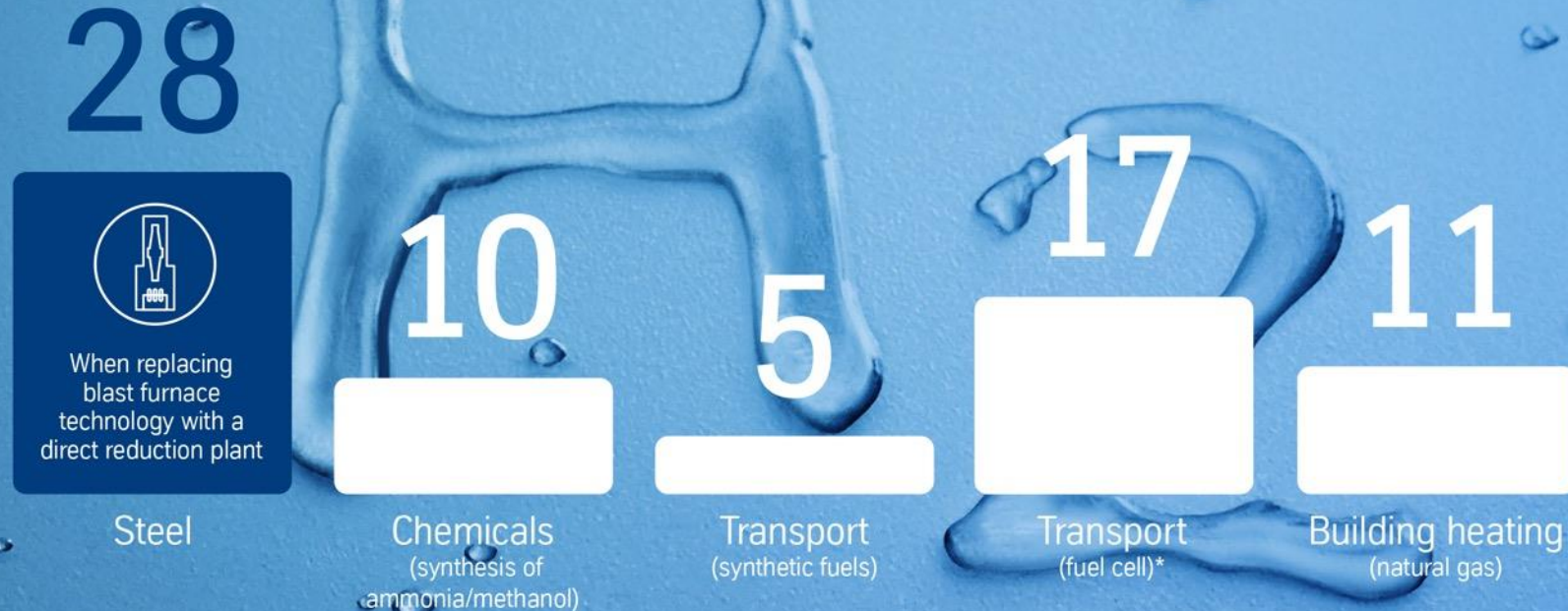
# With hydrogen-fueled DR systems and green electricity **TO CARBON-NEUTRAL STEEL PRODUCTION**



➞ All products can still be produced downstream with the existing processes



# The best course for change: **NOWHERE ELSE IS MORE CO<sub>2</sub> SAVED** per metric ton of hydrogen



Industry comparison: CO<sub>2</sub> reduction potential through use of hydrogen  
Specific savings (t CO<sub>2</sub> / t H<sub>2</sub>)



A detailed 3D architectural rendering of a large industrial complex, possibly a refinery or chemical plant. The model is composed of numerous white, geometric blocks representing buildings, storage tanks, distillation columns, and piping systems. The layout is dense and complex, with various structures interconnected by a network of pipes and walkways. The entire scene is set against a dark blue gradient background, which transitions from a deep navy at the top to a lighter blue at the bottom. The lighting is soft and even, highlighting the intricate details of the industrial design.

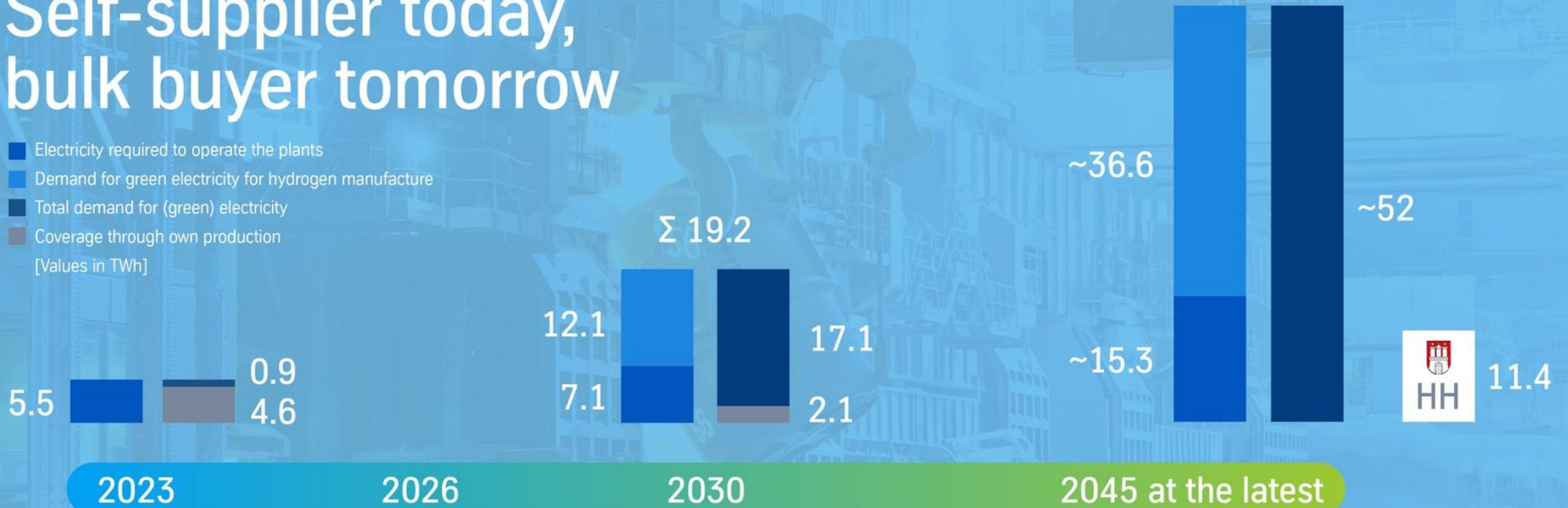
Attention-grabbing lighthouse project:  
Contract awarded for one of the  
**BIGGEST INDUSTRIAL DECAR-  
BONIZATION PROJECTS WORLDWIDE**



# IMMENSE ENERGY DEMAND:

Self-supplier today,  
bulk buyer tomorrow

- Electricity required to operate the plants
  - Demand for green electricity for hydrogen manufacture
  - Total demand for (green) electricity
  - Coverage through own production
- [Values in TWh]



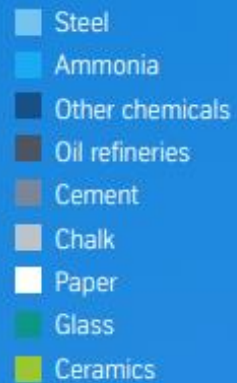
8.5 TWh  
hydrogen demand



25.6 TWh  
hydrogen demand



# Estimated H<sub>2</sub> DEMAND



Duisburg







# ENERGY AVAILABILITY WILL BECOME A KEY FACTOR

The transformation will change the business model





# **STRESS TEST FOR THE TRANSFORMATION**

Current geopolitical situation  
and energy crisis



Steel is  
**THE MATERIAL OF THE FUTURE –**  
innovative as well as environmentally  
and climate friendly





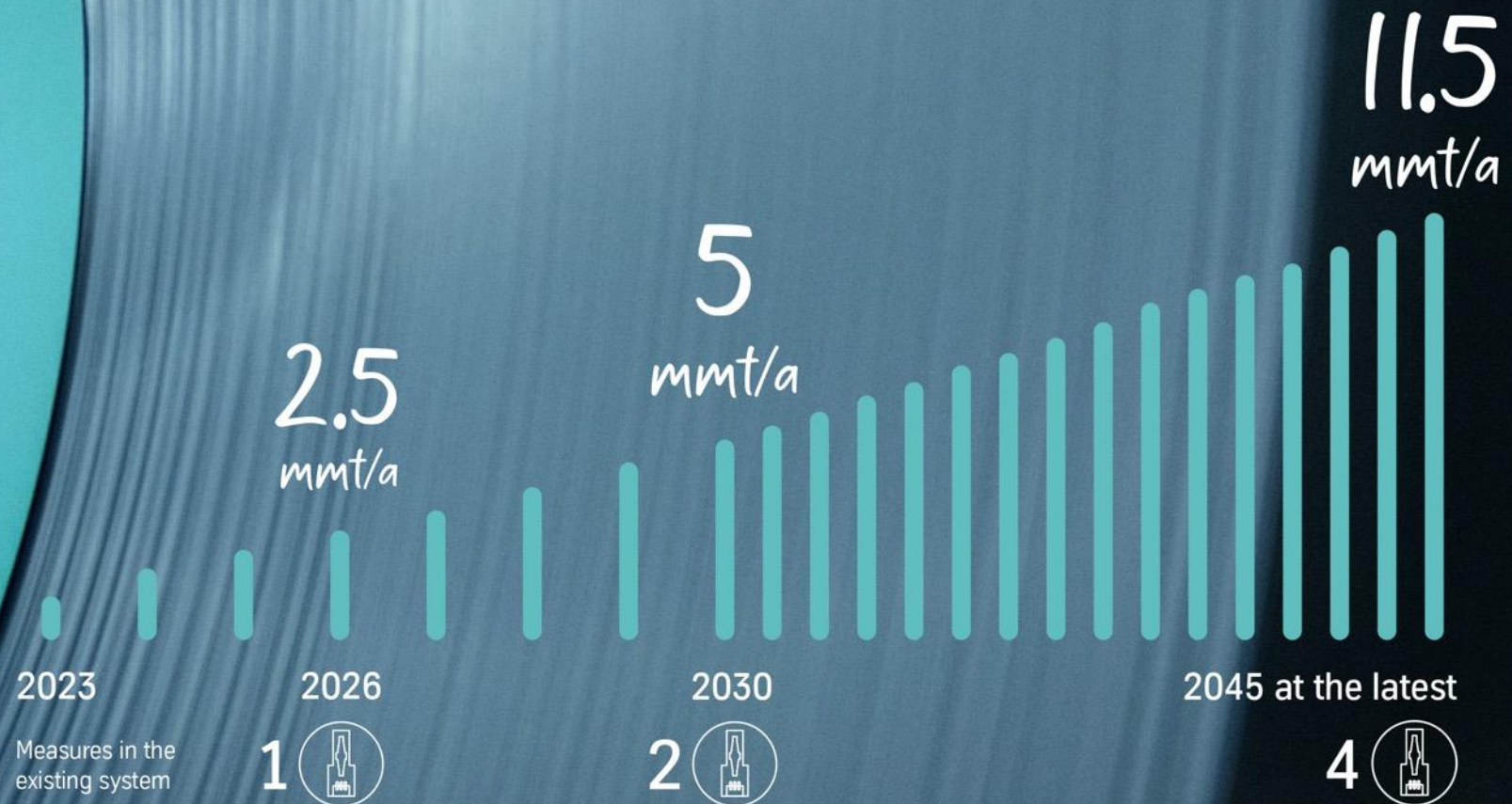
The background is a collage of four images. The top-left image shows a blue car, possibly a Volkswagen, in a dark setting. The top-right image shows a large industrial structure, likely a power transformer or generator, with a blue sky in the background. The bottom-left image shows a steel mill with molten metal being poured. The bottom-right image shows a large blue turbine or engine component.

# Steel is **THE MATERIAL OF THE MOBILITY REVOLUTION AND ENERGY TURNAROUND**

Whether for generation, distribution or utilization –  
when it comes to energy, there's no way around steel.



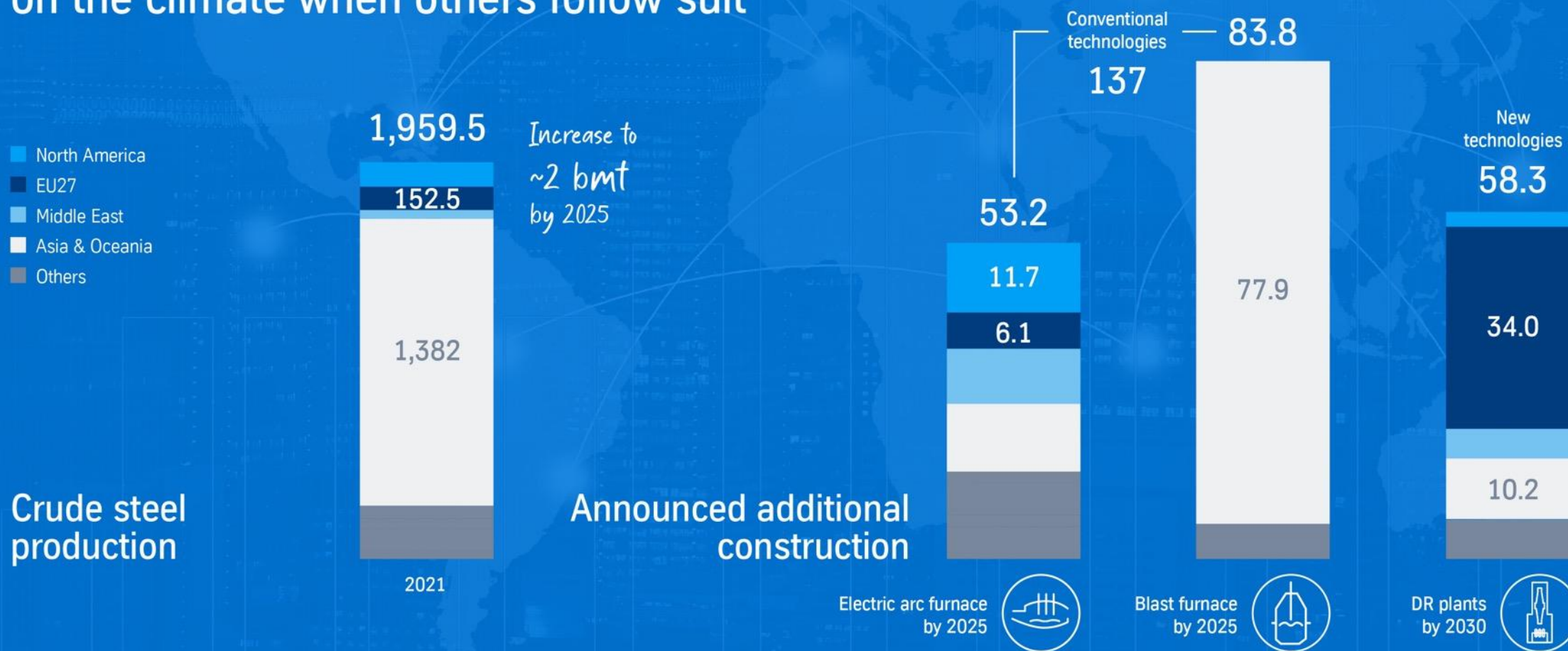
We are bringing  
**"GREEN STEEL"** TO THE MARKET.  
**NOW.**





# BLUEPRINT FOR THE WORLD

The success of our concept in Duisburg will have a full impact on the climate when others follow suit





Innovation, value creation, employment –  
**THE CARBON-NEUTRAL FUTURE  
WITH STEEL**





“ It’s too late to be  
pessimistic ”



thyssenkrupp



