

From German National Hydrogen Strategy to market-readiness

Online seminar – 29 October 2020

Experts:

Dr. Christoph Ploß - Member of the German Bundestag, CDU

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Barbara Lempp - Managing Director EFET Germany

David Scrimgeour - Promoter of co-operations on hydrogen between Germany and the UK

Moderators:

Dr. Gabriele Haas - Partner, Dentons

Thomas Schubert - Partner, Dentons

German National Hydrogen Strategy

- **German National Hydrogen Strategy** (June 2020) setting out 38 measures. Worth € 9 billion in total in addition to existing programs:
 - Objective: To make hydrogen competitive. To boost a German hydrogen market.
 - To path the way for German hydrogen players on a global scale.
 - To establish hydrogen as an alternative source of energy.
 - To decarbonize carbon heavy industrial production.
 - To decarbonize (heavy) traffic and mobility
 - To decarbonize the heating sector in the long run.
 - To boost the development of a global hydrogen market
 - To support the development of (well needed) international co-operations to meet hydrogen demand.
- The **EU Hydrogen Strategy** for a climate neutral Europe (July 2020) worth up to € 470 billion in 2050.
- Big ambitions – how to get there?



Online-Seminar Dentons
29 October 2020

From German National Hydrogen Strategy to market-readiness

A traders' perspective

Barbara Maria Lempp
CEO EFET Deutschland



EFET Wish List:

How to drive the creation of a functioning hydrogen market



1. Ambitious, economy-wide climate neutrality objective at Union level.
2. Reforming and expanding the EU ETS.
3. Harnessing market based mechanisms.
4. A pan-European, cross-border approach to any financial support schemes for renewable, decarbonised and low carbon gases.
5. Technological neutrality of measures including a level playing field between power and gas systems.

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Verband Deutscher
Energiehändler e.V.

Transformation of steel production

Our contribution to climate neutrality

DATE | SPEAKER | POSITION | thyssenkrupp Steel Europe AG

tkH₂Steel

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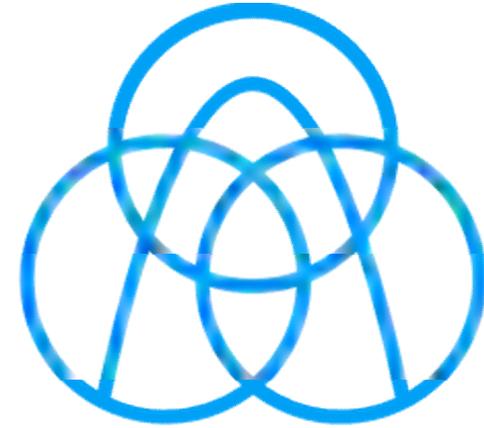
Paris Agreement 2015

195
countries



<2°
Joint efforts to
limit global warming

2050
KLIMANEUTRAL
CLIMATE NEUTRAL



thyssenkrupp

makes its contribution and will
be climate-neutral by 2050



We have defined clear interim goals

-30% Emissions from our own production operations and processes¹

2030

-30% Emissions from energy procurement²

¹) SCOPE 1-Emissions; ²) SCOPE 2-Emissions (Base year 2018)



We have launched a long-term transition



- 1 Development and pilot phase
- 2 Implementation of industrial-scale solutions
- 3 Overall climate-neutral production

Changes take time



Our industry is energy- and plant-intensive and involves long investment cycles



Steel production accounts for 95% of thyssenkrupp's direct emissions

Hydrogen for climate-neutral steel

2024 onwards The milestone

Using a large-scale direct reduction plant (DR) which will be operated using green H₂ in the future, thyssenkrupp will produce sponge iron which will then be processed in the blast furnaces (BF), allowing a further reduction in emissions.

2026 onwards The melting unit

We will optimize the hot metal system using a new, electrically powered melting unit. The sponge iron from the DR plant is thus liquefied for the BOF meltshop. In this way, we will replace the first coal-based blast furnace.

2030 onwards The scale-up

We will replace another coal-based blast furnace using a second, larger DR plant and another melting unit.

2050 onwards Climate-neutrality

We will produce our steel climate-neutrally in four DR plants and four melting units.

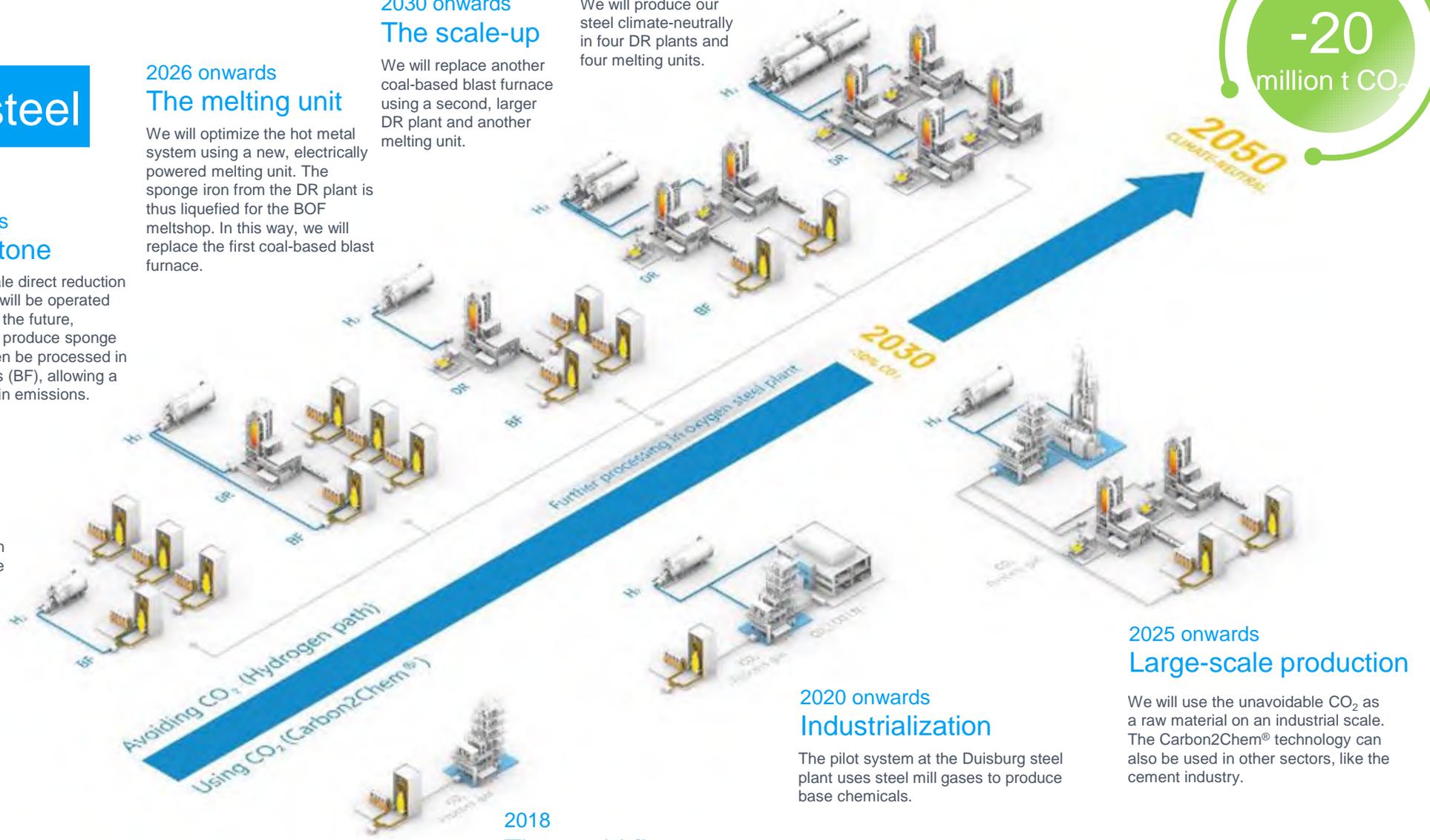
-20 million t CO₂

2050
CLIMATE-NEUTRAL

2019 - 2022

H₂ in the blast furnace

We have been testing the use of hydrogen in a working blast furnace since 2019. The goal: The equipment of blast furnace 9.



2018 The world first

The concept: CO₂ becomes raw materials. In September 2018, thyssenkrupp produced methanol from steel mill gases for the first time at its Carbon2Chem® technical center in Duisburg.

2020 onwards Industrialization

The pilot system at the Duisburg steel plant uses steel mill gases to produce base chemicals.

2025 onwards Large-scale production

We will use the unavoidable CO₂ as a raw material on an industrial scale. The Carbon2Chem® technology can also be used in other sectors, like the cement industry.



The hydrogen path: Covering the hydrogen demand



- Produced in existing industrial processes (e. g. refineries and chemical plants)
- Available, but causes CO₂ emissions



- Produced from natural gas
- Available in the medium term and climate-neutral using offshore CCS



- Produced by electrolysis with electricity from renewable energies
- Climate-neutral
- Large quantities only available in the long term

Complete climate neutrality in steel requires large amounts of green hydrogen



The political framework conditions are essential
for the success of our transformation



An aerial photograph of a white wind turbine standing in a lush green field. The turbine is positioned on a dirt road that runs diagonally across the frame. The surrounding landscape is a patchwork of green fields, with some darker areas that could be water or shadows. The sky is a pale, hazy blue.

The conditions for

the transformation must be created now

- Climate-neutral steel production in Germany by 2050 will mean an **additional power requirement of at least 130 TWh per year** for the requisite hydrogen – on the basis of renewable energies.
- Germany's **National Hydrogen Strategy** must quickly be transposed into a **reliable legal framework**, under which hydrogen should be available **primarily to sectors** in which it is **de facto indispensable for CO₂ reduction**.
- Urgent action: All types of hydrogen must be included and treated equally in the **Energy Industry Act (EnWG)**; **EEG-exemption** for **electrolyzers**, **Pilot** for **CFDs** for steel.
- Existing gas grids must be made available for **H₂ transportation**.
- **Production conditions** in Germany and the EU must **not deteriorate**



Markets must be created for the sale of climate-neutral steel

- There are **not yet any incentives for customers to pay a higher price for climate-neutral steel**. Consequently the transformation is not yet economically viable for steel producers.
- Therefore in the short term the possibility of **crediting climate-neutral steel against the emission targets of customer industries** (e.g. the automotive industry) and in the medium to long term **standards and quotas** for “green steel” should be considered.
- In **public-sector procurement**, requirements for the use of climate-neutral steel could be introduced.



Thank you

for your attention!



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David Scrimgeour MBE

DS Consulting GmbH

„Promoting co-operations on hydrogen between Germany and the UK“

29 October 2020

Dentons Online Seminar: *From German National Hydrogen Strategy to market-readiness*

Hydrogen Alliance Bavaria

Alliance of the Bavarian Government with companies, institutions and associations that demonstrate their commitment to strengthening and expanding Bavaria's technological competence:



SHFCA Members: Building a Hydrogen Economy

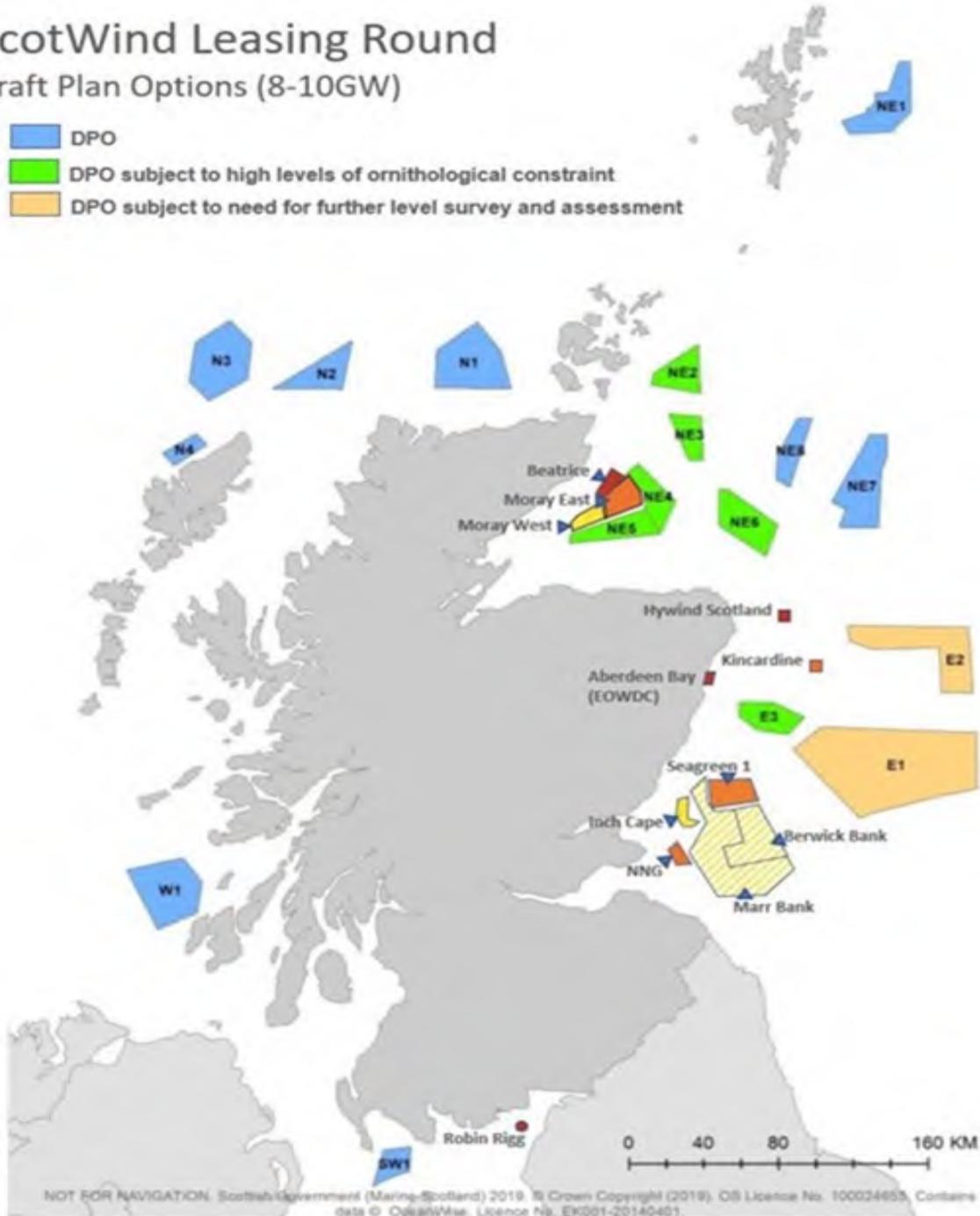


Some of our 100+ SHFCA members... contact info@shfca.org.uk for membership details

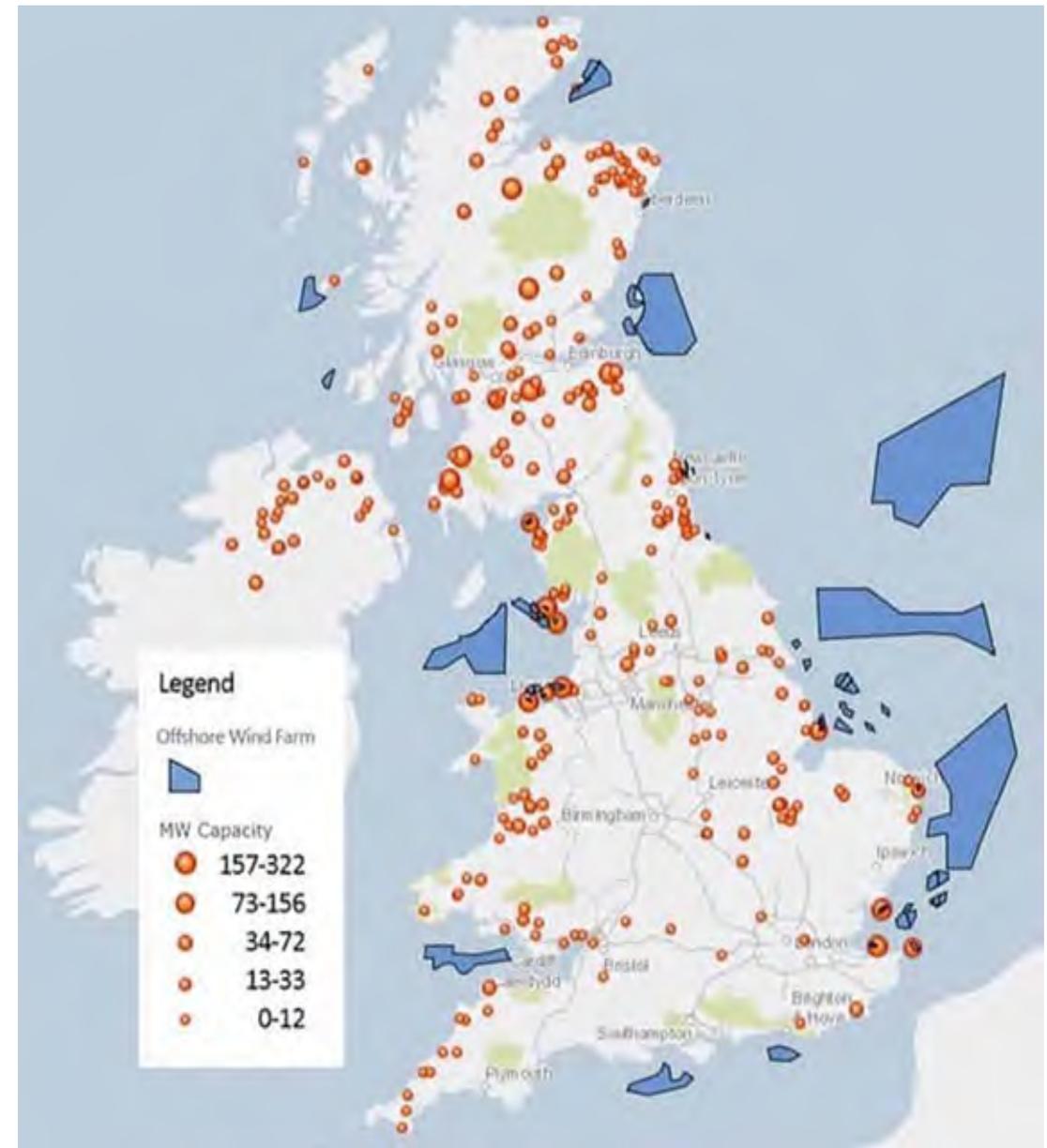
ScotWind Leasing Round

Draft Plan Options (8-10GW)

-  DPO
-  DPO subject to high levels of ornithological constraint
-  DPO subject to need for further level survey and assessment



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- Legend**
- Offshore Wind Farm
- MW Capacity
-  157-322
 -  73-156
 -  34-72
 -  13-33
 -  0-12

And next year in Glasgow...

1 – 11 November 2021





Thank you for your attention

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Thank you for your attention.

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