H2 green steel

The world's first large-scale green steel plant in northern Sweden

Presented by

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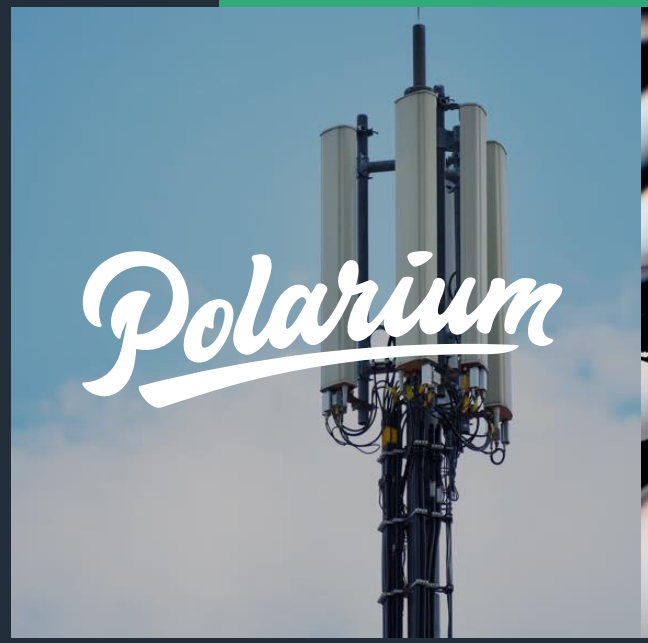
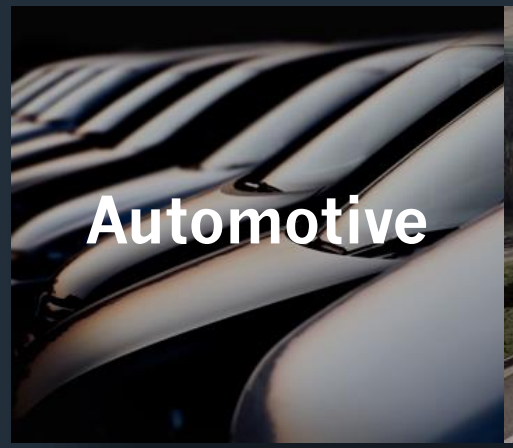
Energy Portfolio Director, H2GS

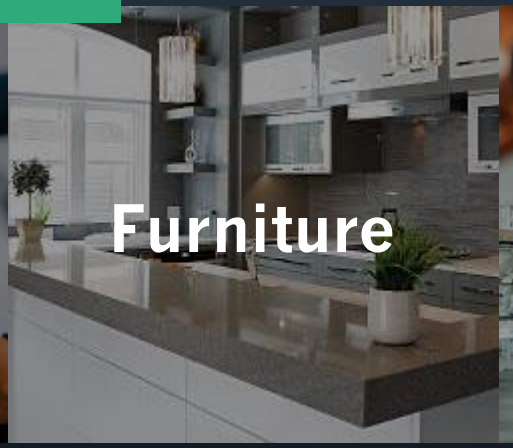

Our mission on H2GS:
We decarbonise hard-to-abate industries
...and we start with steel

Vargas initiates and enables ideas that accelerate sustainable development



Targeting the European flat steel market with potential to eliminate 200 million ton CO_2





Transitioning the steel industry is key to meeting our climate targets…

8%

5%

14%

of total CO_2 emissions

1,900,000,000 tonnes steel produced per year

3,500,000,000 tonnes of CO_2 emitted every year

Introduction to H2 Green Steel

H2GS will build a 5.0Mtpa green steel production facility in Boden, Sweden…

…powered by a 740 MW electrolyzer producing green hydrogen

The facility will produce steel with a ~95% lower CO2 footprint

2026 start of production	2.5Mtpa Phase 1 production (2027)
10 TWh p.a. consumption	5.0Mtpa Phase 2 production (2030)

Close customer partnerships

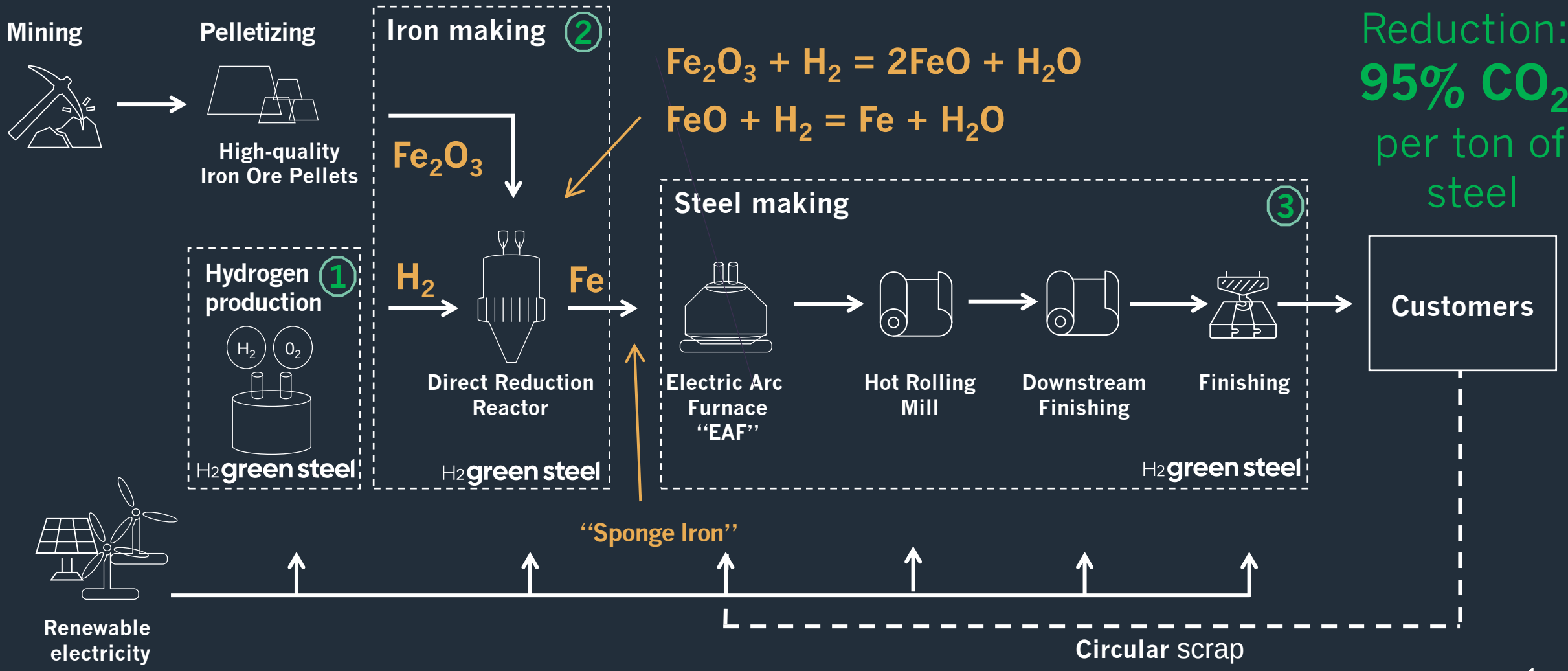
Building a new European industry leader and Swedish export growth engine

5mnt
green steel

10,000
direct and indirect jobs

€3bn
increased net export value

H2GS Boden: Building three scalable platforms

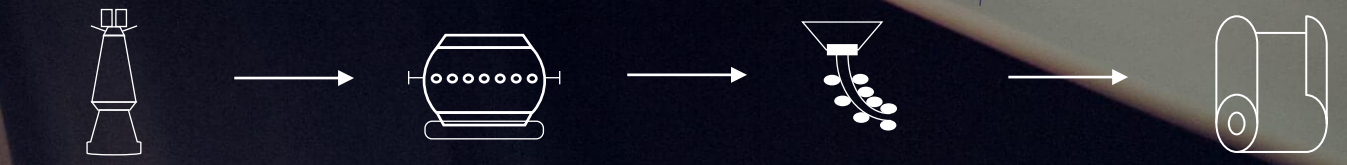


Electrification of each process step

Iron making | **Steel making** | **Casting and hot rolling**

$FeO + C \Rightarrow Fe + CO_2$

Traditional route



Blast Furnace → Basic Oxygen Furnace → Casting → Hot Rolling

~2 ton CO_2 per ton of steel

Electrified route

$FeO + H_2 \Rightarrow Fe + H_2O$

Direct Reduction Reactor → Electric Arc Furnace "EAF" → Continuous Casting and Rolling

~0.2 ton CO_2 per ton of steel

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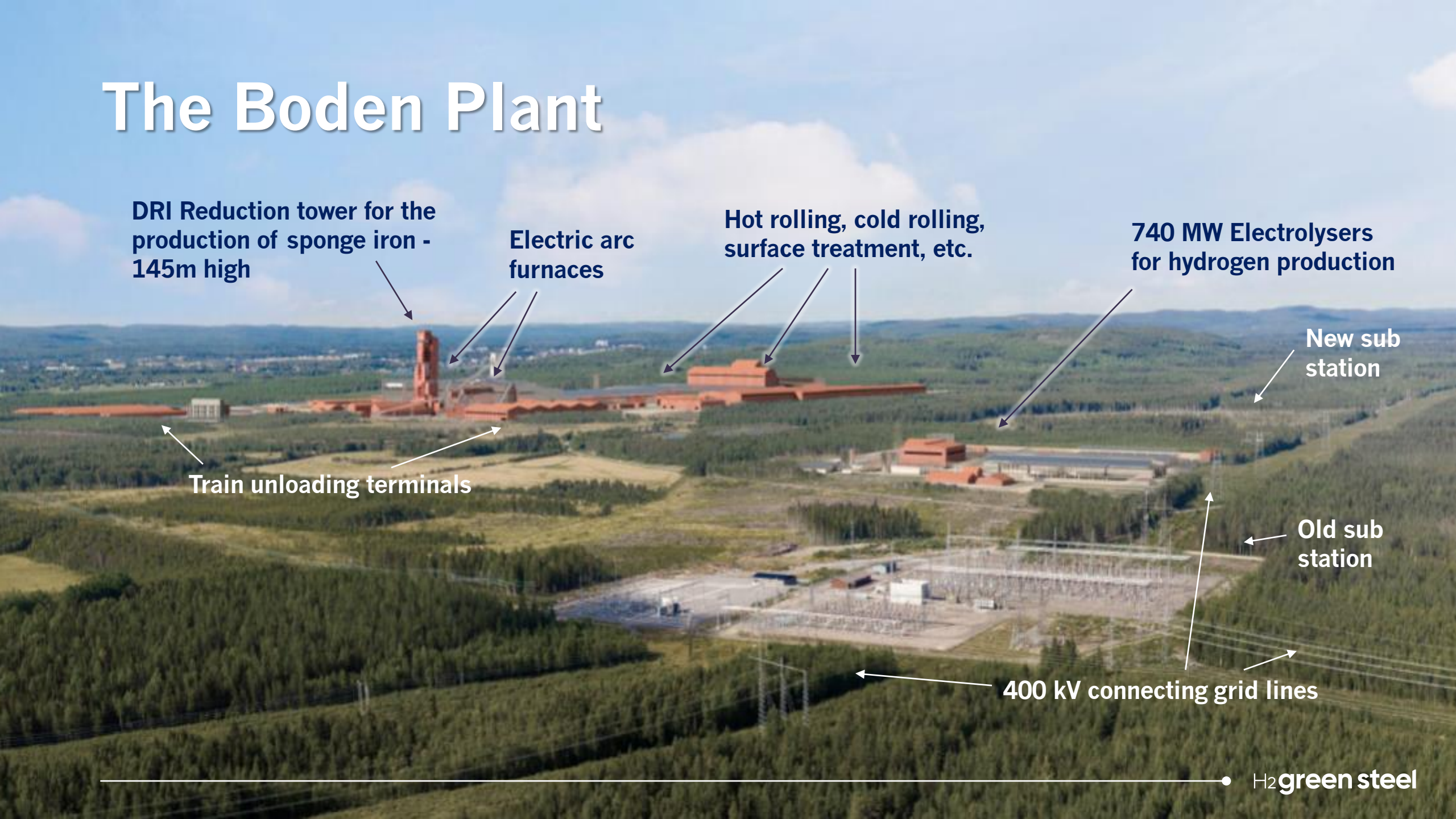
The Boden Plant



H2 green steel

Over €2bn in equity has been raised from a diverse group of investors

Series A & B1 (May 2021 & Oct 2022)

€360mn

ALTOR · AMF · A.P. MØLLER · BILSTEIN GROUP · Daniel Ek, Spotify Founder · Exor · FAM, Wallenberg Family · GIC · Hitachi Energy · IMAS Foundation · Kingspan · KINNEVIK · KOBELCO, Kobe Steel Group · MIDREX · MARCEGAGLIA · Mercedes-Benz · SCANIA · SCHAEFFLER · SMS group · STENA · Cristina Stenbeck, Kinnevik Family · Swedbank · VARGAS HOLDING

Series B2 (Nov 2023)

€1.8bn

ALTOR · AMF · BurdaPrincipal Investments · FAM, Wallenberg Family · GIC · H24 · IMAS Foundation · Goldman Sachs · Hitachi Energy · JUST CLIMATE · KINNEVIK · Lingotto · MARCEGAGLIA · Microsoft · J. SAFRA SARASIN · SCHAEFFLER · SIEMENS · Swiss Re · TEMASEK · vargas

Debt financing

€4.2 billion

Supported by leading European financial institutions.

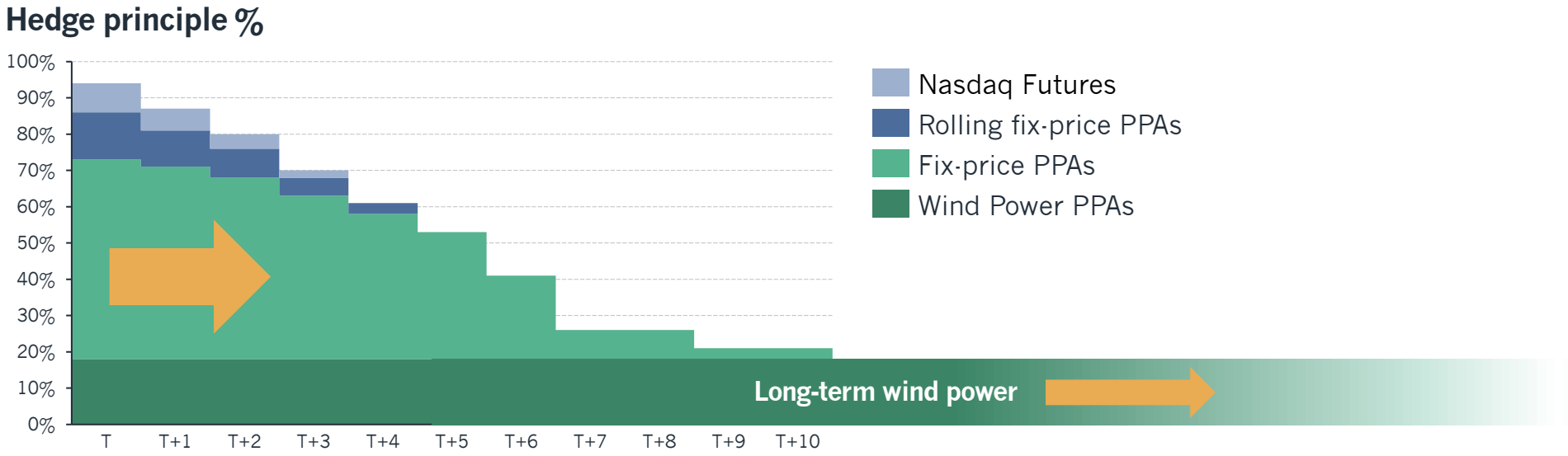
Pre-sold green steel

1,5 mt

~60% Phase 1

A significant share of our production, with a value >€10bn, is already pre-sold at a market premium

H2GS electricity hedging principle

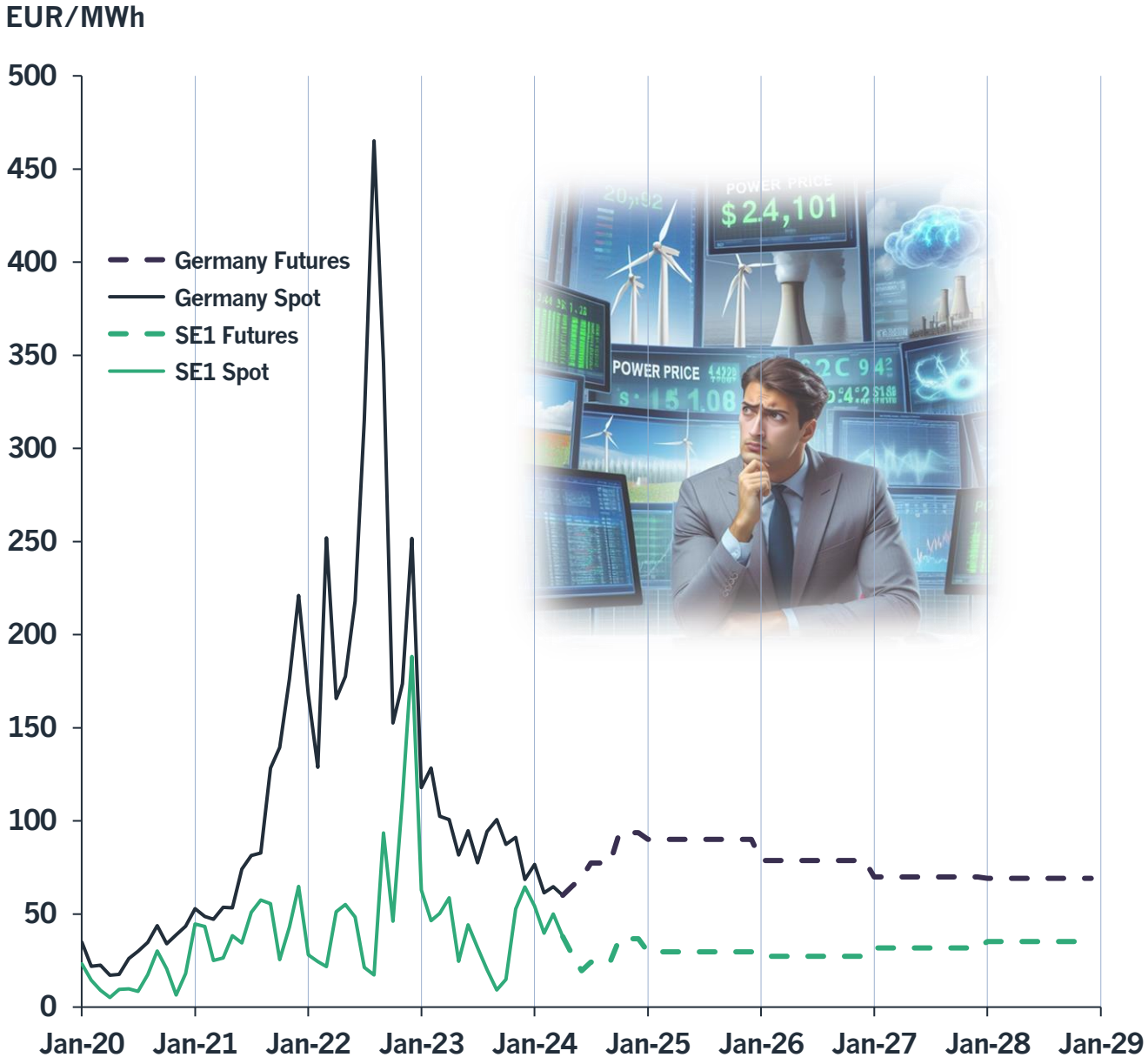


- H2GS are looking for long-term electricity supply agreements (PPAs) with multiple suppliers.
- Wind Power and solar power off-take as pay-as-produced delivery with up to 30 years agreements.
- H2GS believes that market transparency is very important and will act on Nasdaq to perform financial hedging (~10% of total hedging volume).

Key Challenges

Several challenges since 2021

- **War outbreak in Ukraine** with sanctions against Russia has significantly impacted energy prices in Europe in the short and medium term.
- **High anticipation of the electricity consumption** is driving up the level of future electricity prices.
- **High inflation** has driven up the cost of new electricity production, making options such as wind power more expensive.
- **Political disagreement** about the way forward for expanding electricity production in Sweden, creating a **wait-and-see situation**.



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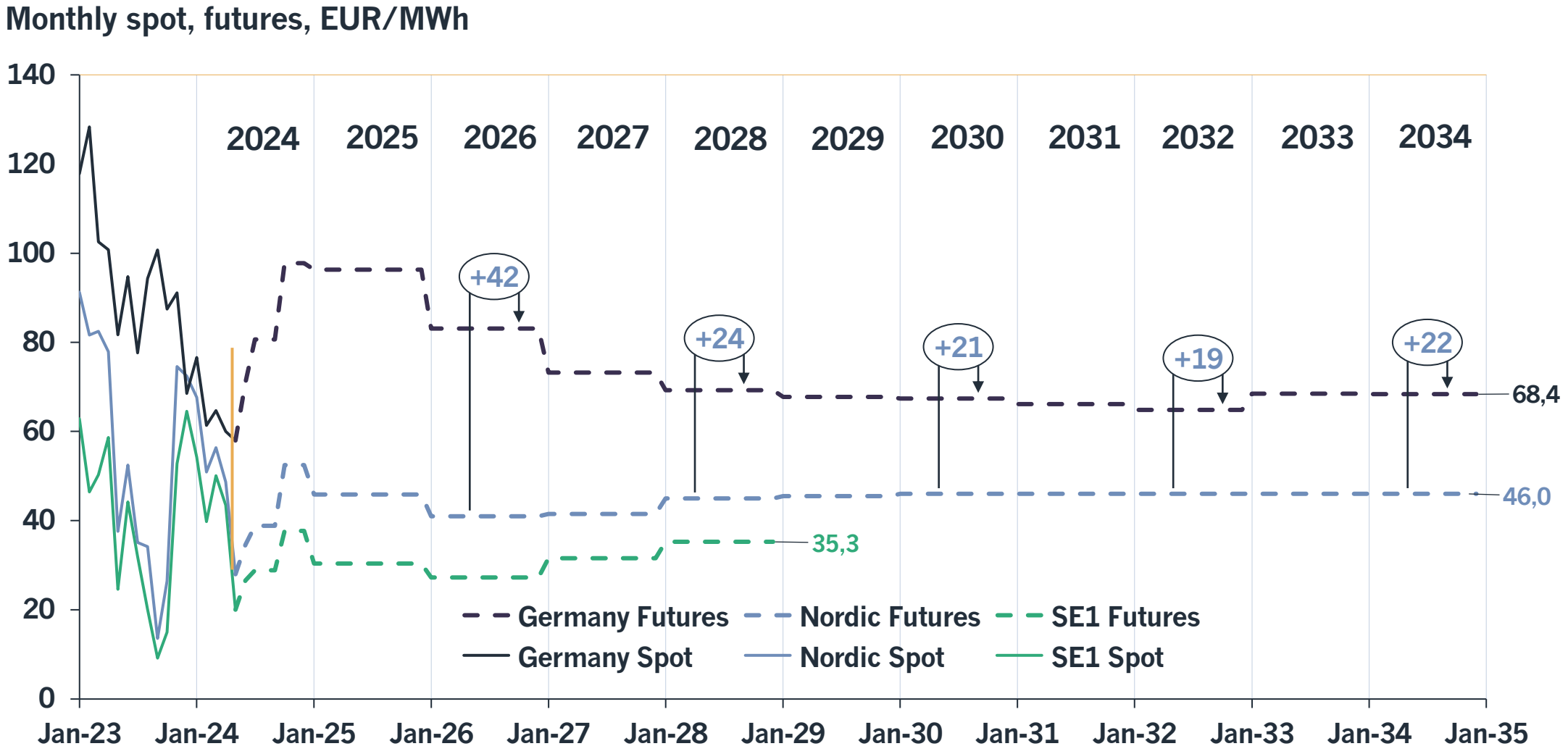
Nordic electricity price vs. Germany – Long-term



Future nominal prices based on Nasdaq Commodities and EEX future markets, closing prices as of 2024-05-20

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Some misunderstandings about the new green industry…

Misunderstandings

1. Growth in industrial electricity consumption will be completely independent of the price!

- ❖ All new green projects need to be bankable!
- ❖ This means ensuring electricity delivery with fixed-price PPAs at competitive costs!
- ❖ Growth in production needs to come first!
- ❖ They all need the power capacity from grid!

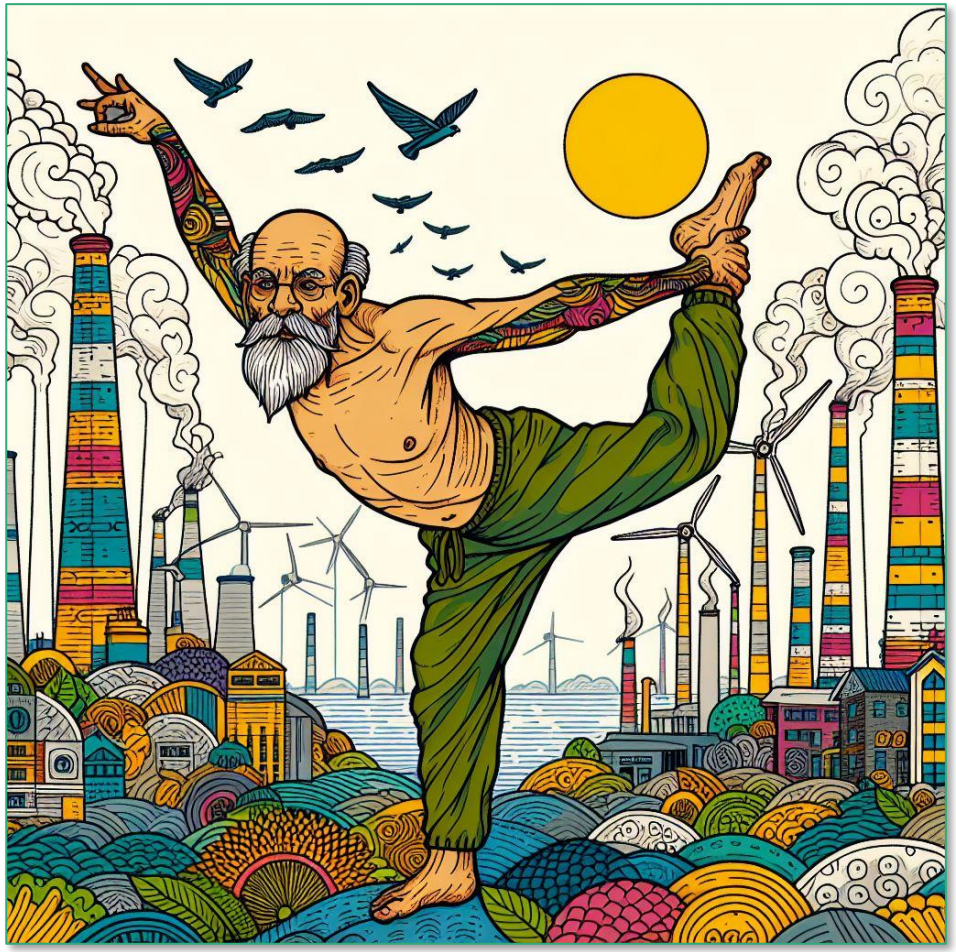
..why build another hydrogen/P2X project in Sweden at a price of 75-85 euros per MWh – when it can be done in Canada or Brazil for 35-45 euros per MWh???

Misunderstandings

2. Hydrogen projects are super flexible and produces only during windy/sunny hours!

- Again, all new projects need to be bankable!
- Flexibility in power consumption costs:
  - Oversizing electrolyzers 200-250%
  - Enormous storage capacity with increased size of compressors etcetera
  - Drives Capex!

To be able to run a hydrogen project flexibly while remaining competitive, the electricity cost must be reduced to extremely low levels!



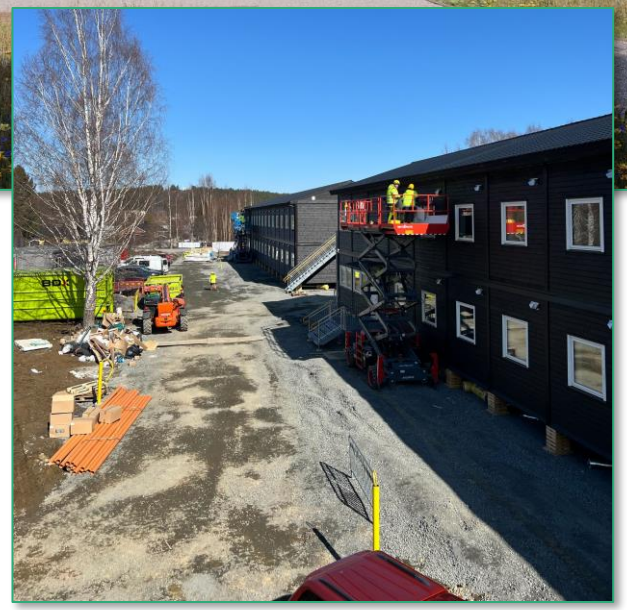
Misunderstandings

3. New green flexible projects can take advantage of low electricity prices on the spot market!

- Again, all new projects need to be bankable!
- This means securing the majority of electricity delivery through fixed-price PPAs!
- Without necessary fixed-price hedges for the wind power industry (above LCOE), there will be no new electricity production!

Instead of buying the electricity at 10 euros per MWh when it's windy, you purchase the delivery at the agreed price of around 40 euros per MWh!

3000 temporal households needed in Boden



Norrländska Socialdemokraten Fredag 12 januari 2024 NYHETER 9

Skissen vissar hur modulboendena på exempelvis Slipvägen kan komma att utformas. Det har varit viktigt för både Bodens kommun och H2GS att boendena ska vara trivsamma för de som bor där med exempelvis grönytor och gemensamhetsytor, men också för de som bor i närheten och nu ska få hundratals nya grannar. FOTO: H2 GREEN STEEL

Nylandsbäcken först ut när H2GS börjar bygga boenden

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Media – High attention!

But... It’s happening!


Thanks!
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