



First in fossil-free steel

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SSAB

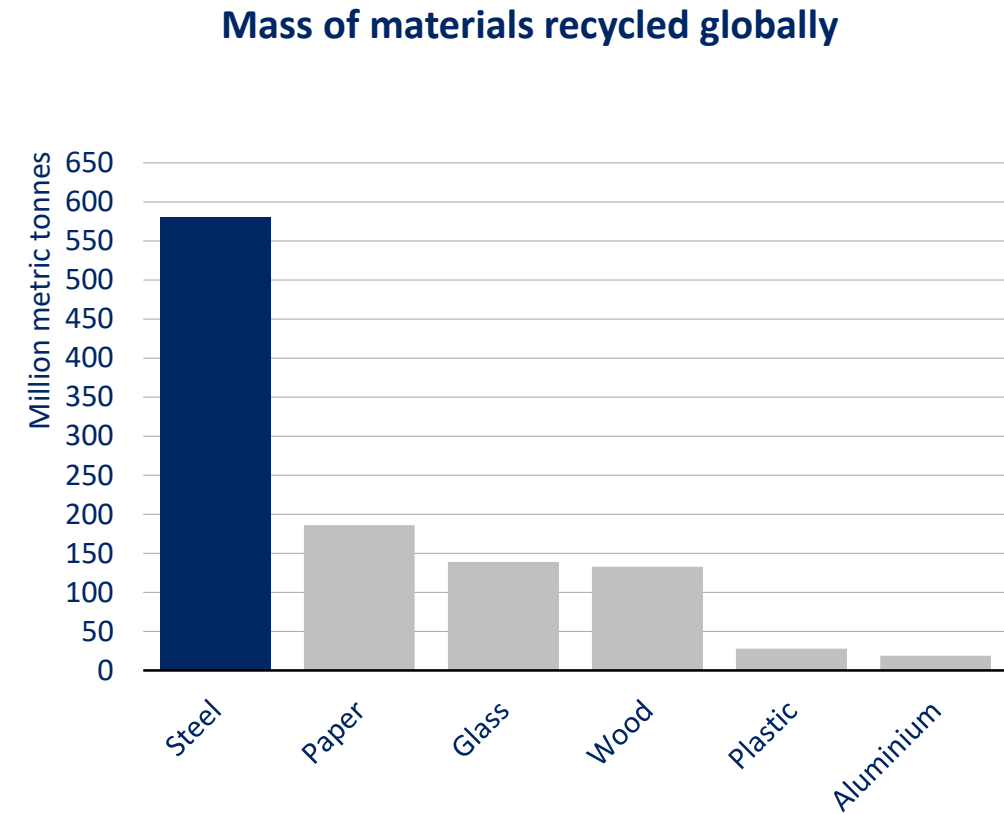
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Why SSAB is converting to fossil-free steel

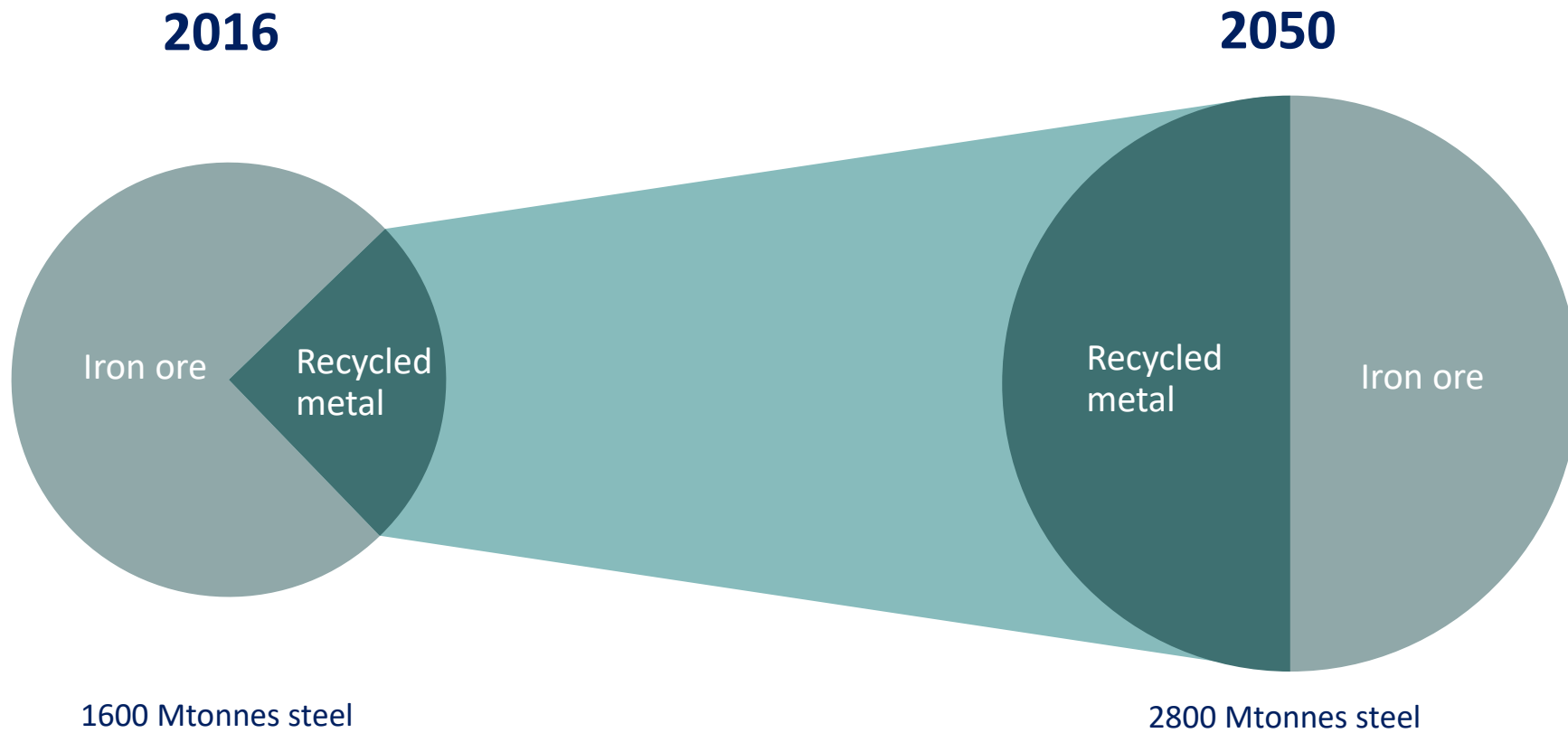
Steel is the most circular material in the world

- ▶ More steel is recycled than all other materials combined
 - 100% recyclable indefinitely
 - Without loss of quality
 - Recycling rate above 85% worldwide
- ▶ Steel is used everywhere
 - Steel is critical when building society and infrastructure



Recycling will not be enough

– 50% iron ore-based steel will still be needed by 2050



Reducing the footprint of customer products

1

SSAB to introduce fossil-free steel in the market in 2026

- Launch of a premium product without fossil CO₂ footprint
- This means no fossil CO₂ emissions when producing this product, and a requirement to use fossil-free sponge iron

2

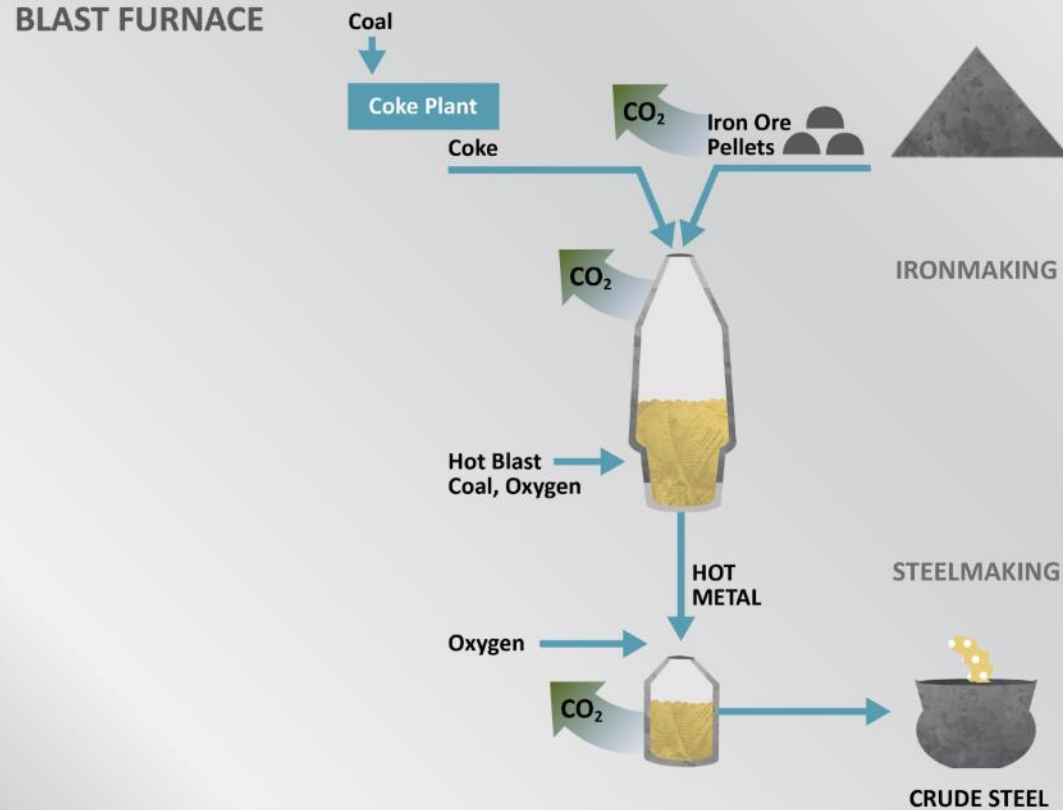
SSAB to have leading sustainability performance; fossil free by 2045

- To be fossil free within the entire operation by 2045, by stepwise reducing CO₂ footprint
- This means net zero CO₂ emissions from our own operations and purchased energy

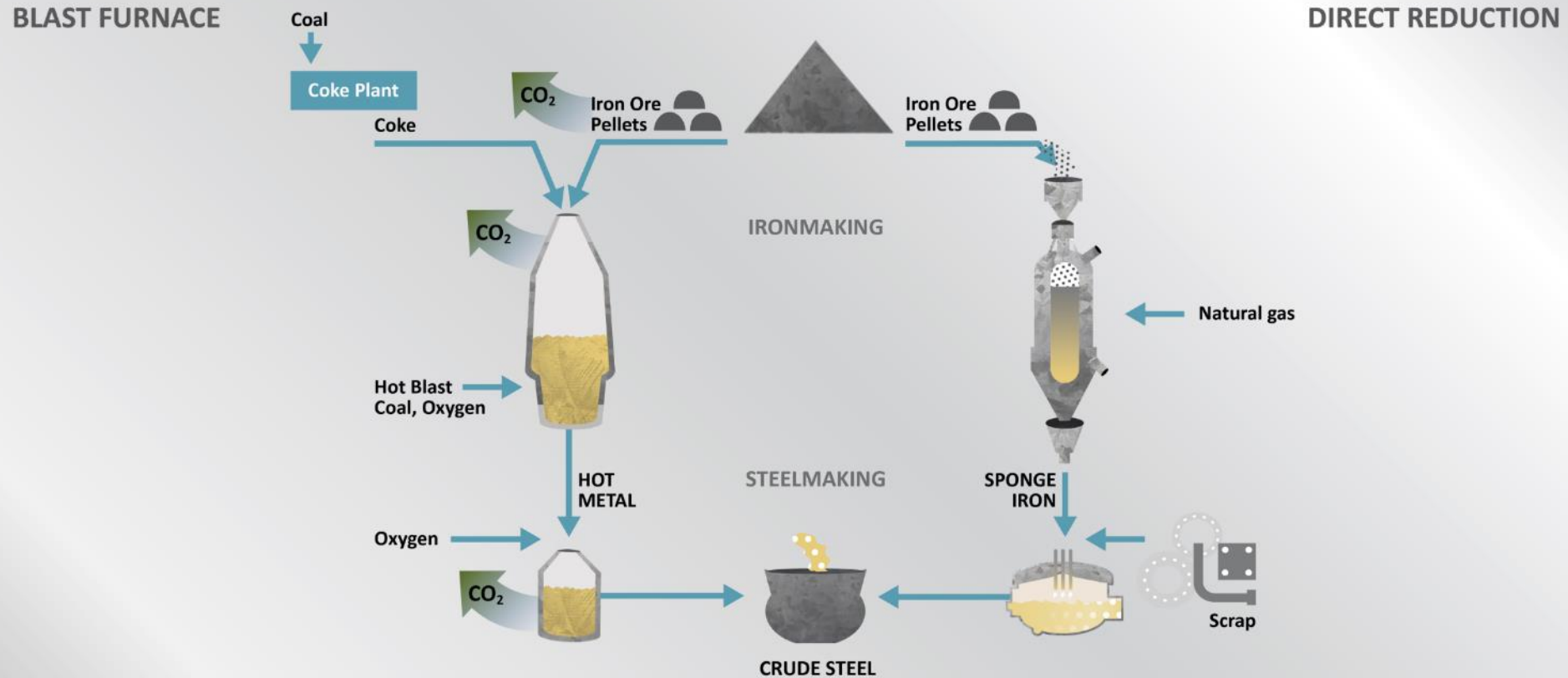
The HYBRIT technology



Two ways to make steel from iron ore today

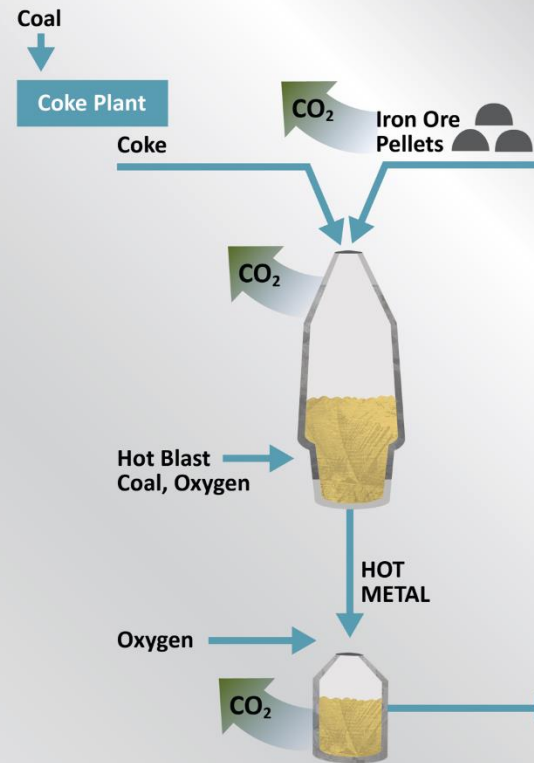


Two ways to make steel from iron ore today



HYBRIT – Fossil-free steelmaking

BLAST FURNACE

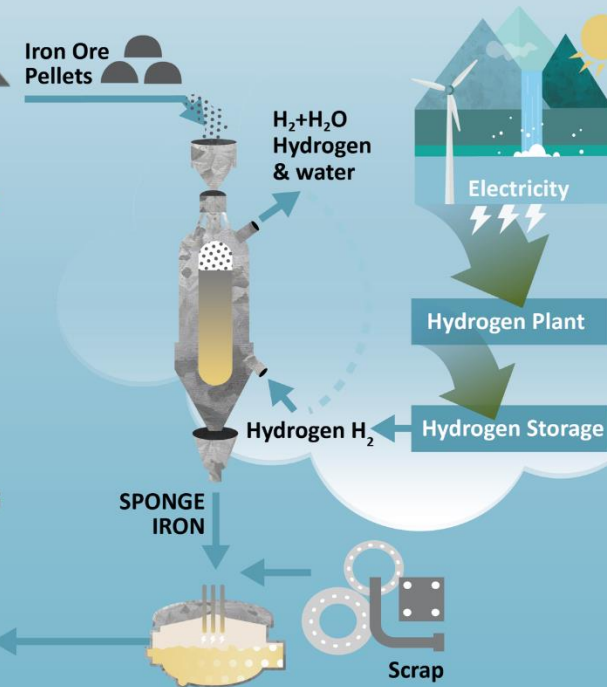


IRONMAKING

STEELMAKING

CRUDE STEEL

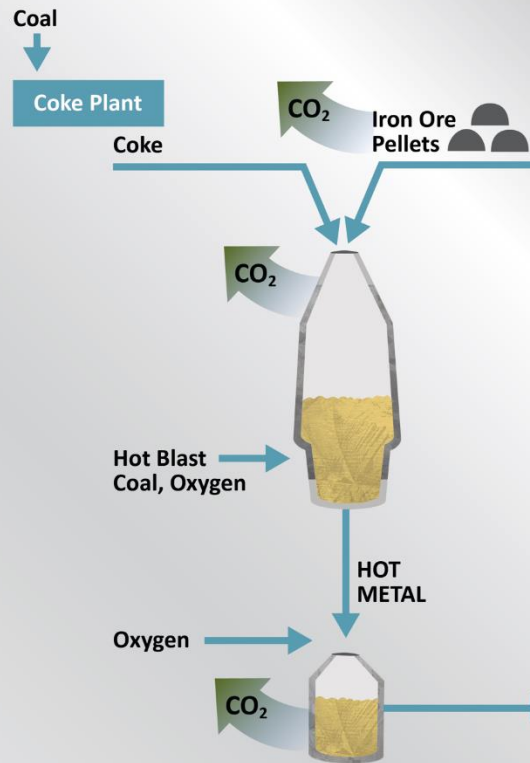
DIRECT REDUCTION



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HYBRIT – Fossil-free steelmaking

BLAST FURNACE

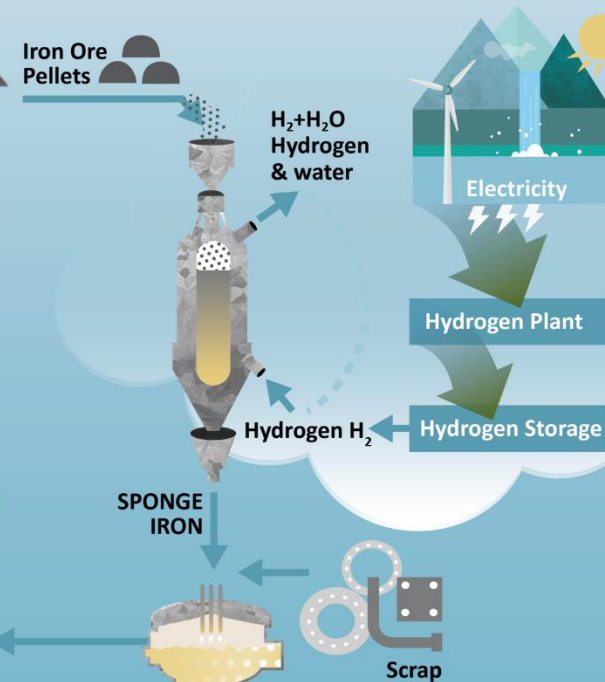


IRONMAKING

STEELMAKING

CRUDE STEEL

DIRECT REDUCTION



HYBRIT would eliminate ~90% of SSAB's total CO₂ emissions

2016-2017

Pre-feasibility Study

2018-2024

Feasibility Study & Pilot plant trials

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2026 –

Demonstration Plant

SSAB starts up the world's first pilot plant for fossil-free steel



On August 31st 2020 Swedish Prime Minister Stefan Löfven started up the plant together with Isabella Lövin, Minister for Environment and Climate and Deputy Prime Minister

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HYBRIT Luleå

pilot plant



Direct reduction Pilot Plant

Reference runs ongoing

Hydrogen production
Hydrogen reduced sponge iron

Iron melting Pilot Plant

Reference runs completed

Melting of Hybrit sponge iron

2020

Q1 2021

Q2 2021

Q3 2021

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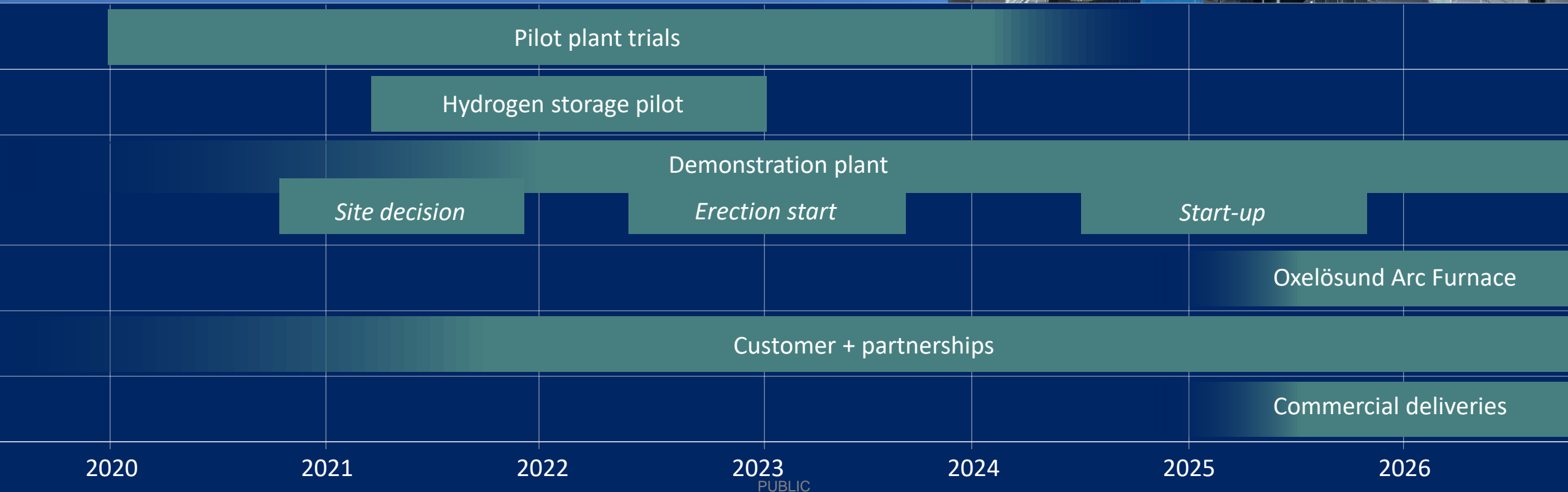
The first fossil-free steel rolled in July 2021



HYBRIT Luleå

pilot plant

First products reaching
the market in 2026

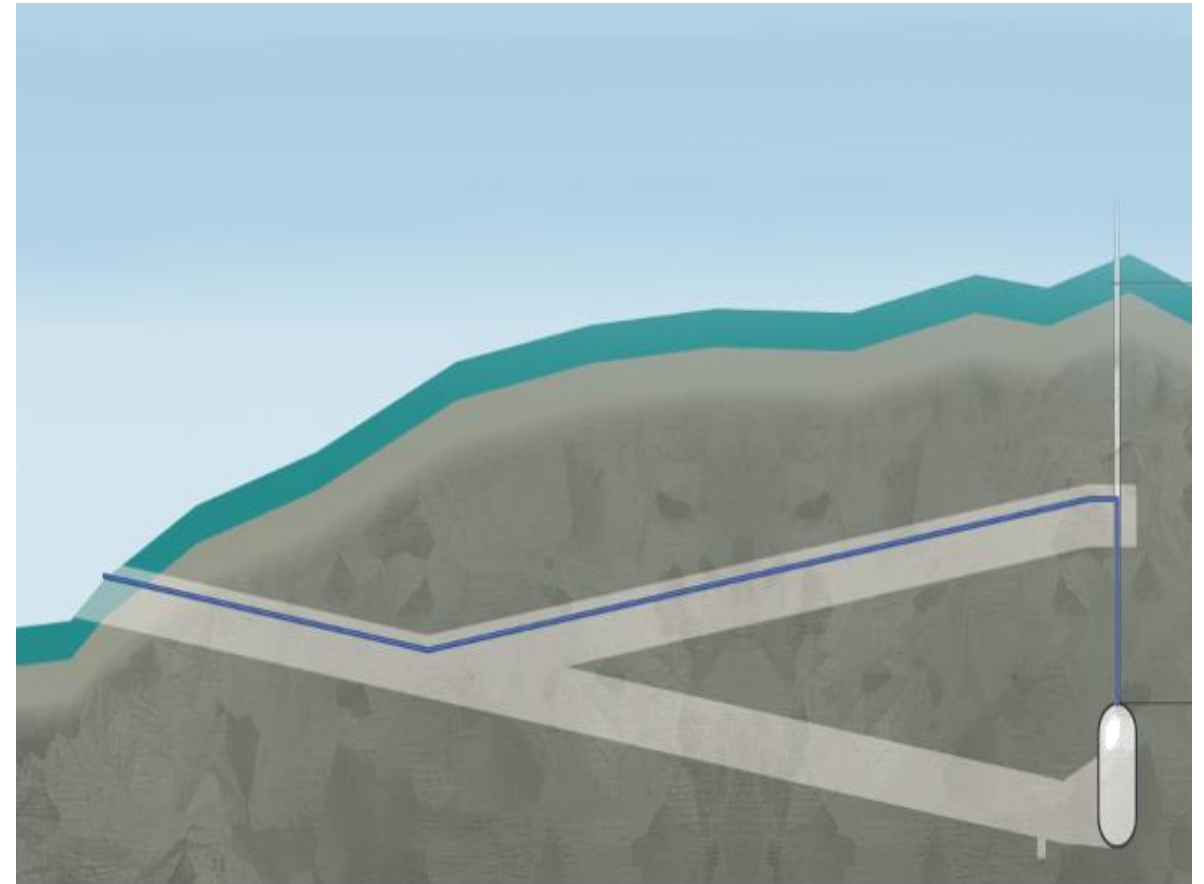


World's first production plant for fossil-free sponge iron

- ▶ Industrialization of HYBRIT technology
 - The world's first production plant for fossil-free sponge iron
 - In Gällivare, northern Sweden
- ▶ The demonstration plant which will be ready in 2026
 - Production capacity of 1.3 million tonnes of fossil-free sponge iron
 - Goal to expand production to 2.7 million tonnes by 2030
- ▶ Gällivare gives industrial synergies
 - Integration with iron pellet making
 - Transportation and logistics
 - Electricity supply and energy optimization

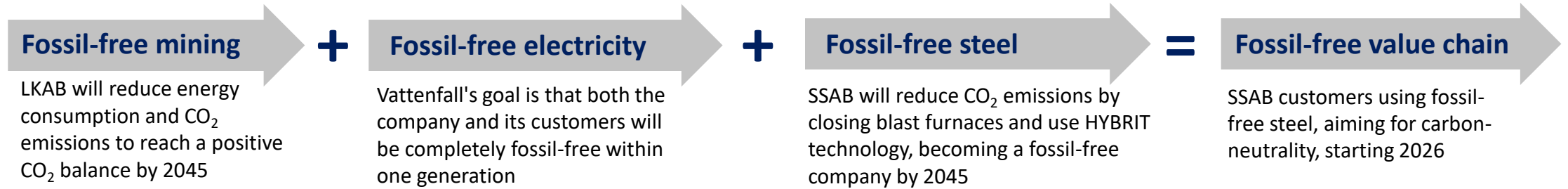
Hydrogen energy storage in the rock

- ▶ A rock cavern storage facility for fossil-free hydrogen gas on a pilot scale
 - Next to the Hybrit pilot plant in Luleå
 - Ready and operational from 2022 until 2024.
- ▶ 100 cubic metre hydrogen storage 30 metres below ground
 - Underground storage to ensure the pressure required
 - Storing large amounts of energy in a cost-effective way
- ▶ Hydrogen storage provides opportunity to stabilise the electrical power grid
 - Producing hydrogen when there's a lot of electricity
 - Using stored hydrogen when less electricity is available

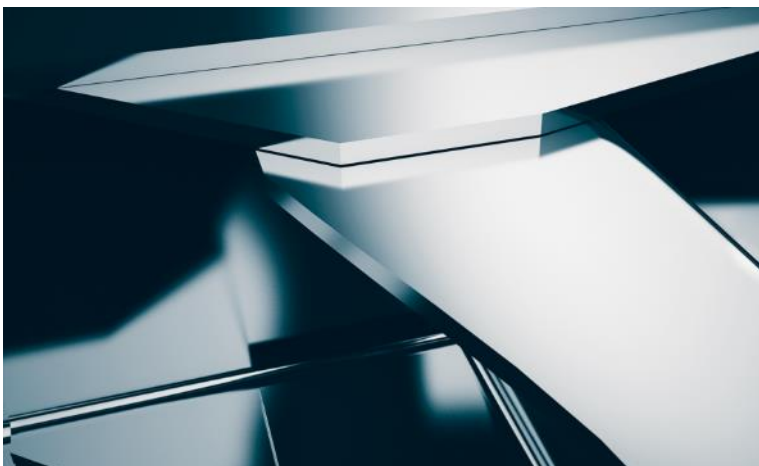


Go fossil free

Be the first to offer fossil-free products



Three ways to reduce environmental impact



► Use better steel

- Reduce your footprint with low CO₂ steel



► Use steel better

- SSAB high strength steels makes products lighter and stronger
- Reduce CO₂ emissions in the use phase



► Go fossil free

- Be part of a fossil-free value chain
- Be the first to offer fossil-free products

SSAB is already today at the forefront

SSAB's blast furnace-based production is among the most CO₂ efficient in the world. This gives a competitive advantage to SSAB and our customers.

Compared to Chinese steel mills, SSAB steel saves on average

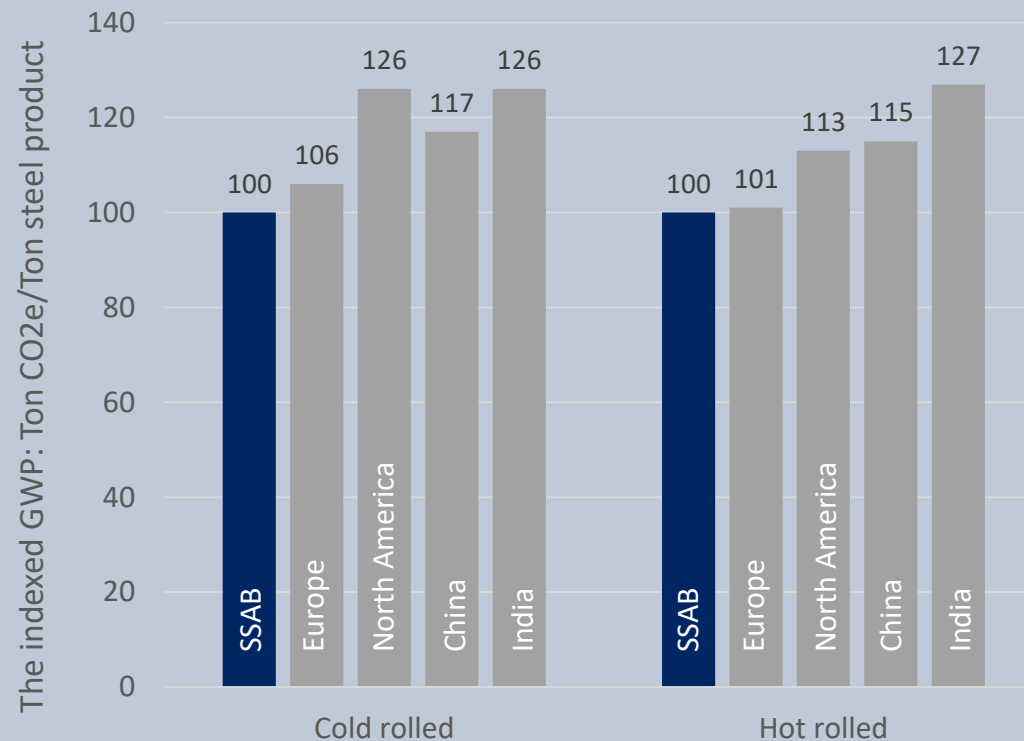
1 600 000 tonnes

of CO₂ every year

This means that a German customer would generate

21%

higher CO₂ emissions, including transportation, when using steel from an average Chinese steel mill



Source: thinkstep, BF GWP benchmarking, 2019, and SSAB EPD data

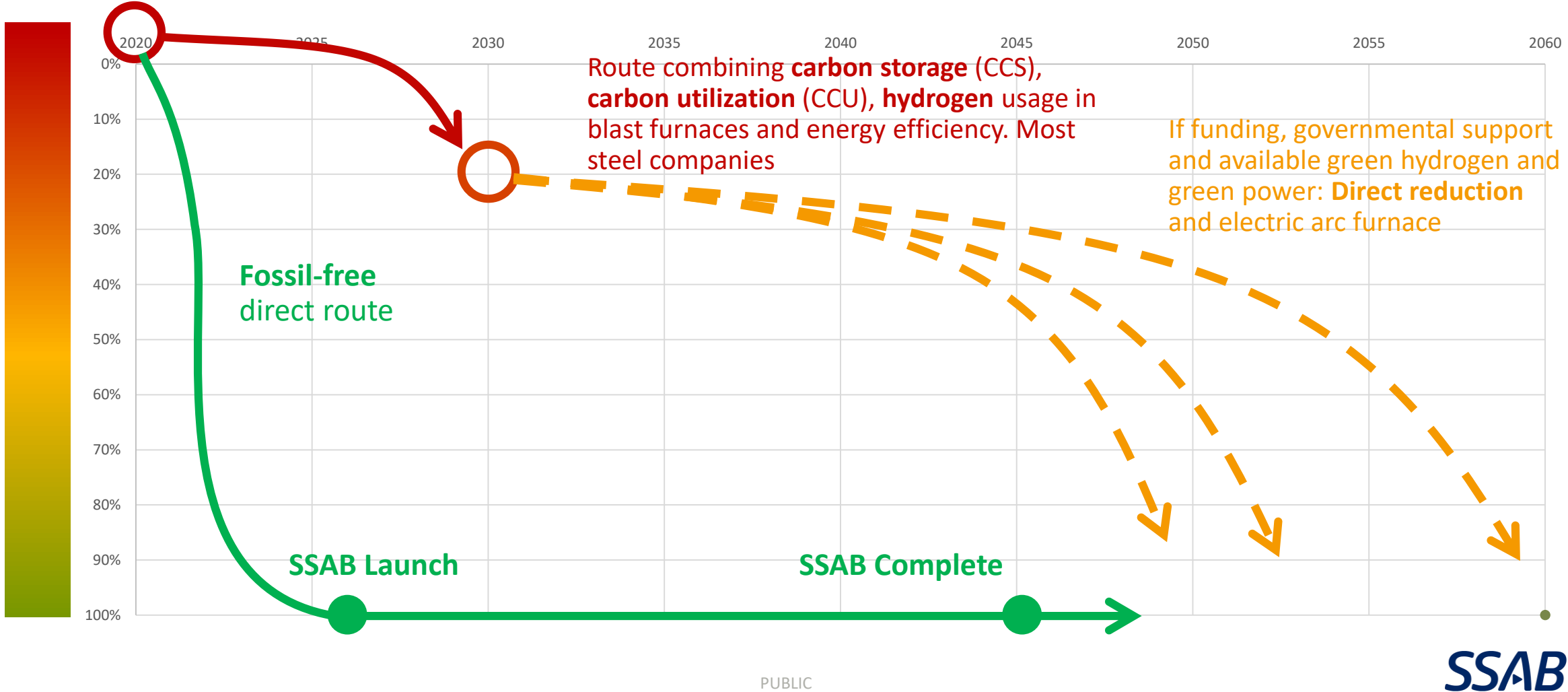
All “green” steel is not fossil free

1. Iron ore-based steelmaking with carbon capture and reuse or storage	CO ₂ from steel mill captured and used as raw material for chemical industry. CO ₂ storage in underground geological formations.	The chemical industry will still have CO₂ emissions. Storage of CO₂ are not available yet and criticized on due to availability, costs and leakage risks.	0% - 50% CO ₂ reduction*
2. Iron ore-based steelmaking with reduced use of carbon	Stepwise or partly replacing coal and coke with hydrogen in existing technology . Introducing different types of green electricity .	Large variations in commitment (amount of CO ₂ reduction and timing). Many initiatives lack funding and/or government support .	10% - 40% CO ₂ reduction*
3. Scrap-based steel production with reduced use of carbon	Increasing productivity/resource efficiency . Introducing different types of green electricity .	Recycled steel scrap is not enough to cover world demand (at least 50% must still be iron ore-based steel in 2050). Recycled steel has a CO₂ burden from steel original production.	10% - 50% CO ₂ reduction*
4. Steelmaking with fossil-free raw material and fossil-free energy	Completely replacing coal and coke with hydrogen in new plants . Fossil-free iron-ore. Fossil-free fuels. Fossil-free electricity.	New technology. Large investments . Strong finances needed. Leaves fossil fuels and raw material in the ground and eliminates the CO₂ emissions .	90% - 100% CO ₂ reduction*

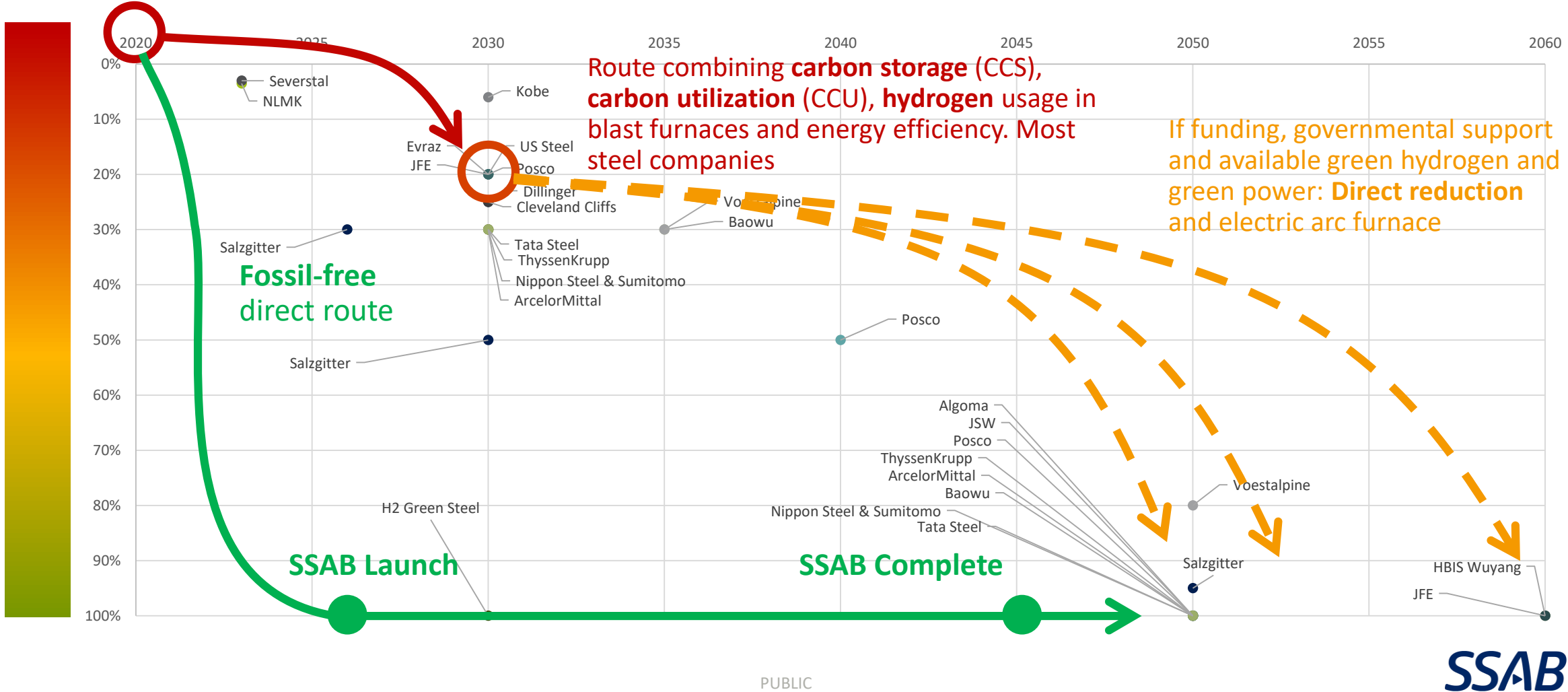
*) Estimated CO₂ reduction cradle-to-gate vs. conventional technology.

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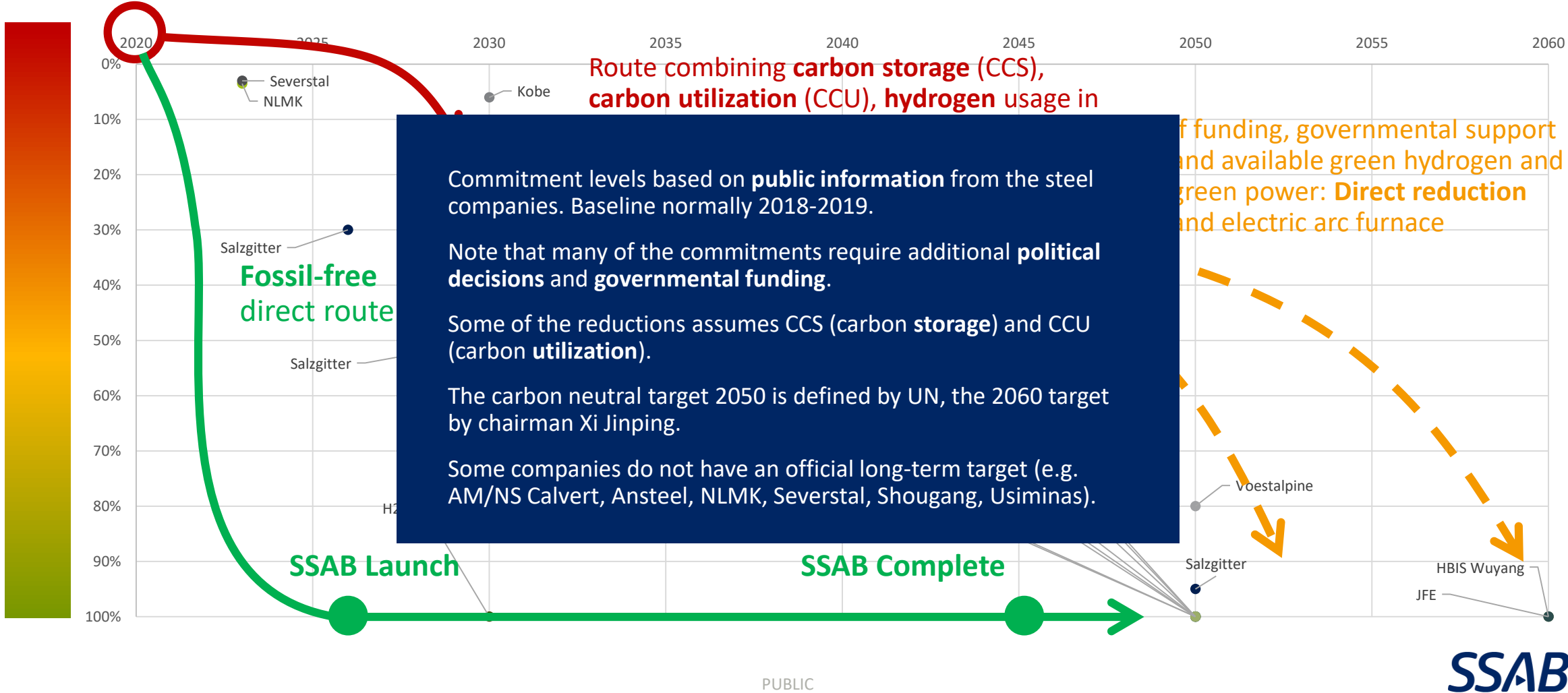
CO₂ reduction commitments



CO₂ reduction commitments



CO₂ reduction commitments



What makes SSAB unique?

1. SSAB is **first**
2. Only SSAB aims for **eliminating the fossil fuels and raw material**
3. SSAB includes mining and the **upstream value chain**
4. SSAB is not only talking about methods for reducing CO₂.
SSAB **invests in new production facilities** to make fossil-free products
5. Starting 2026 SSAB will introduce **all products and brands in a fossil-free version**
6. SSAB has a **customer and end-user focus** and will support the customers in creating fossil-free end-products
7. SSAB continues to bring **world leading technology** to the market

SSAB's Environmental Product Declarations

- ▶ Independently verified documents
 - Transparent and comparable information about the life-cycle environmental impact
 - Using LCA methodology
- ▶ All product groups
 - Hot rolled steel plates
 - Hot rolled steel sheets and coils
 - Cold rolled steel sheets and coils
 - Metal coated steel sheets and coils
 - Color coated steel sheets and coils
 - Tubular Products

- ▶ Registered in the International EPD® System
 - www.environdec.com and www.ssab.com
 - Ruukki Construction EPDs are also available for Roofing and Components in the Finnish RTS EPD





Want to know more?

www.ssab.com/fossil-free
www.ssab.com/sustainability

Frequently asked questions

Why is SSAB converting to fossil-free steel?



Global warming is the rapid increase in the Earth's average surface temperature over the past century. This is primarily **caused by CO₂** released from fossil fuels.

The **steel industry** accounts for **7% of global CO₂ emissions**, making it one of the biggest single industrial CO₂ emitters.

The fact that SSAB is a **highly CO₂-efficient steel company** is no reason to be satisfied. We **need to do more**. Much more.

That is why SSAB aims to **launch fossil-free steel** from 2026 and has taken the lead in decarbonizing the steel industry.

What is fossil-free steel?



Fossil-free steel is a **premium steel** produced with **no fossil CO₂ emissions** in the production process and by using only fossil-free fuels and electricity.

The fossil fuels **remain in the ground** and the by-product of the process is water instead of CO₂. This is achieved using the **unique HYBRIT fossil-free steelmaking technology**.

Instead of using coal and coke as in the blast furnace process, oxygen is removed from iron ore with **hydrogen gas** in the HYBRIT process. SSAB aims to launch fossil-free steel on the market in 2026.

Is green steel better than fossil-free steel?



Fossil-free steel is made **without fossil CO₂ emissions** in the steelmaking process and by using only fossil-free electricity. The **fossil fuels remain in the ground** and don't contribute to any CO₂ emissions.

Green steel is mostly used for products that **don't fulfill any currently recognized definition** for emission levels or environmental performance.

The unique HYBRIT fossil-free steel technology developed by SSAB, in collaboration with LKAB and Vattenfall, **eliminates the carbon footprint** and is powered by fossil-free energy. SSAB aims to launch fossil-free steel on the market in 2026.

Is fossil-free steel better than steel?



The **mechanical properties** of steel from SSAB are created in the downstream steelmaking and heat treatment processes, which **will be the same as they are today**.

The difference is that the processes only use fossil-free fuels and electricity.

The process **eliminates the carbon footprint** and makes sure that fossil fuels stay in the ground. SSAB aims to **launch fossil-free steel on the market in 2026**. Steel from SSAB is already the world's leading high-performing steel and fossil-free production will make it an even better choice!

What is the secret behind fossil-free steel?



The secret is in the **unique HYBRIT fossil-free steelmaking technology**. Instead of using coal and coke as in the blast furnace process, oxygen is removed from iron ore with **hydrogen gas** in the HYBRIT process.

The **by-product is water** instead of CO₂ and we use **fossil-free electricity** to produce hydrogen from water via electrolysis.

The HYBRIT process produces solid sponge iron that is melted in an electric arc furnace. We use only fossil-free fuels and electricity in the downstream processes, which means that the end product is **truly fossil-free steel**. That is how SSAB will make fossil-free steel already in 2026!

Can I buy fossil-free steel only from SSAB?



So far, SSAB is the **only steel producer** that has **committed** to and is investing in SSAB truly fossil-free steel production.

HYBRIT fossil-free steel technology **eliminates fossil CO₂ emissions**, and makes sure that **fossil fuels remain in the ground**.

SSAB has taken the **lead in decarbonizing the steel industry** and aims to launch **fossil-free steel in 2026**. Long-term, **all serious steel producers** are likely to replace their fossil-based processes with **fossil-free technologies**.

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Why will fossil-free steel have a higher price?



Fossil-free steel is a **premium product** sold at a premium compared to standard fossil-based steel products.

It is a unique product that offers an additional value to SSAB customers and end-users.

The main cost drivers for fossil-free steel production are **production and infrastructure investments**, switching from coal to fossil-free electricity and hydrogen, switching from natural gas to biogas and switching from iron ore pellets to HYBRIT sponge iron.

To learn more, please talk to your SSAB sales contact.

What are the benefits of using fossil-free steel?



The advantage of fossil-free steel for a customer is that the **fossil fuels** and **fossil raw material** will **stay in the ground** and not contribute to global warming.

In addition, it means that your **customers and end-users also will reduce their carbon emissions** and become a part of a fossil-free value-chain.

You will be able to offer a **unique product** to your customers

SSAB



*A stronger,
lighter and more
sustainable world*

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