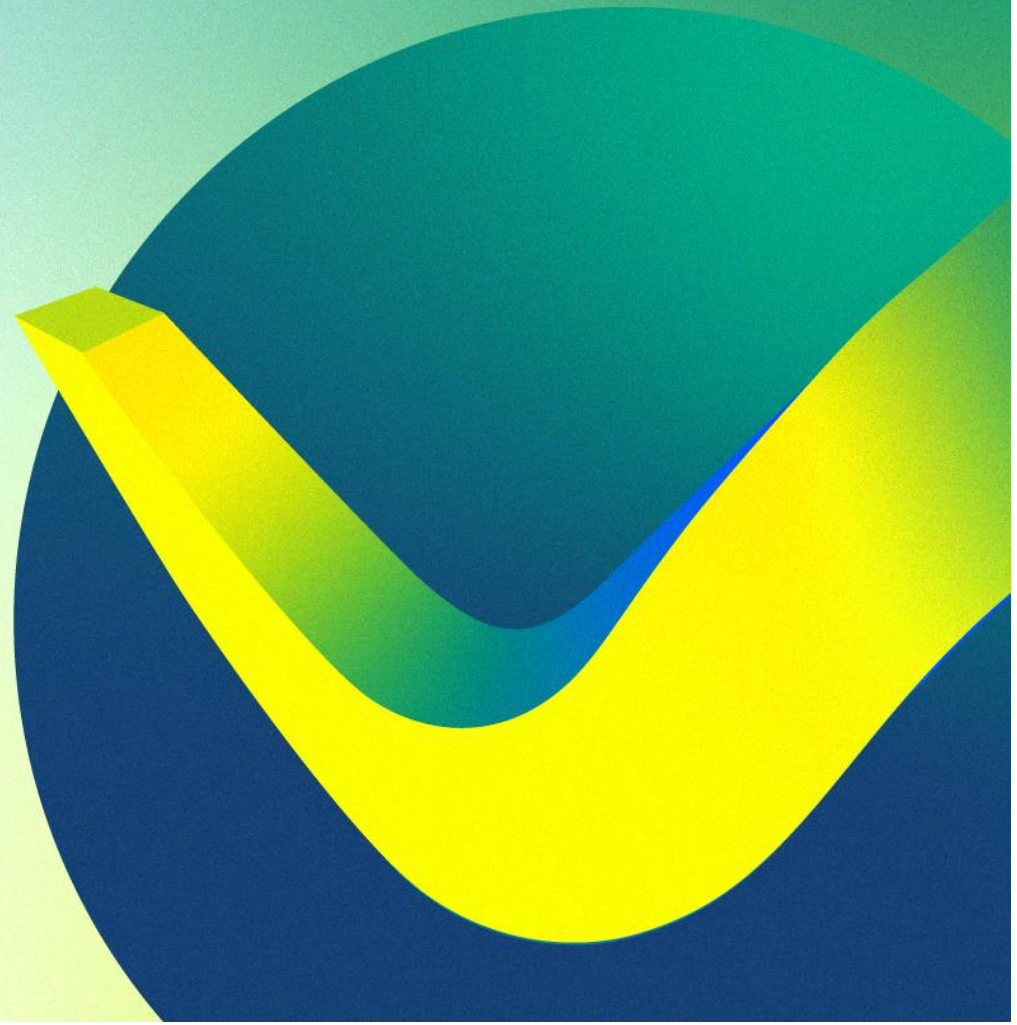
Future sustainable steel production

Jonas Larsson, Head of Environmental Affairs

Jonas Adolfsson, Business Development Mobility



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THE NEED FOR FOSSIL-FREE STEEL

Both recycled and iron ore based steel are needed

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Source: Swedish iron and steel producers' association, Jernkontoret

SSAB has built a leading position

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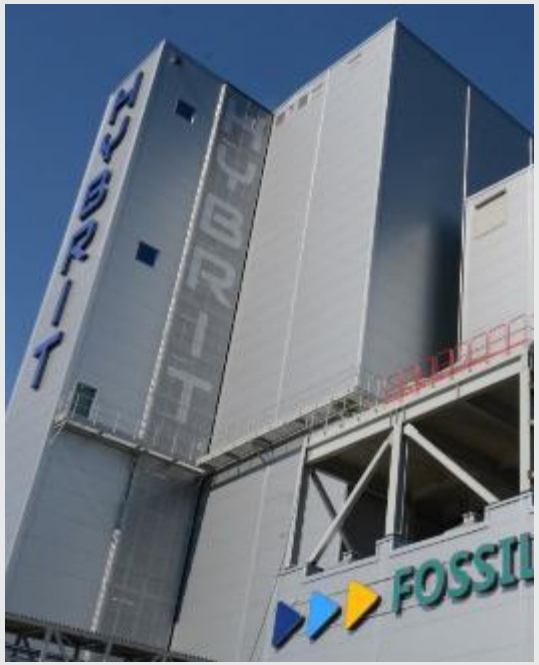
LKAB

VATTENFALL

SSAB

HYBRIT
Joint Venture between SSAB, LKAB, Vattenfall formed in 2017



World-unique pilot plant started operation in 2020

World's first fossil-free steel rolled and delivered to Volvo Group in 2021

Pilot shipments to strategic customers

500 tonnes in 2022

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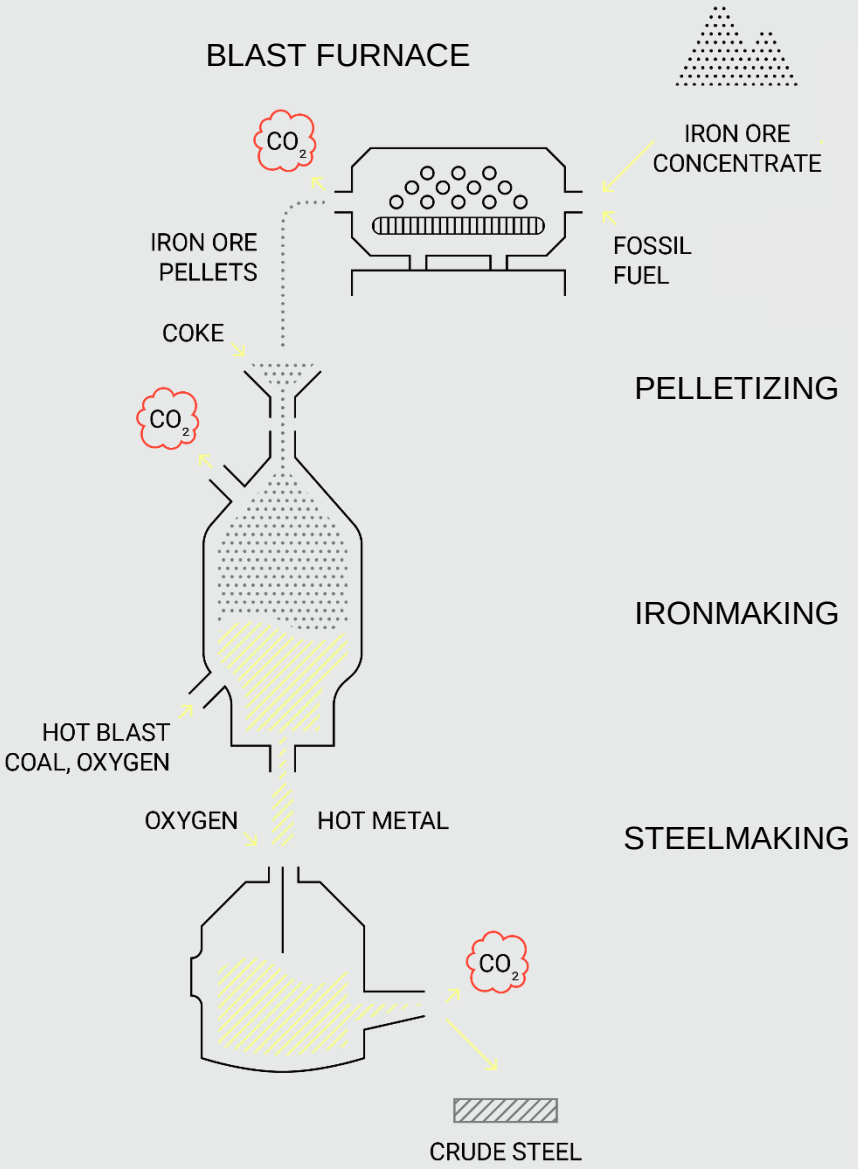
HOW TO MAKE FOSSIL-FREE STEEL

The HYBRIT technology

Two ways to make steel from iron ore today



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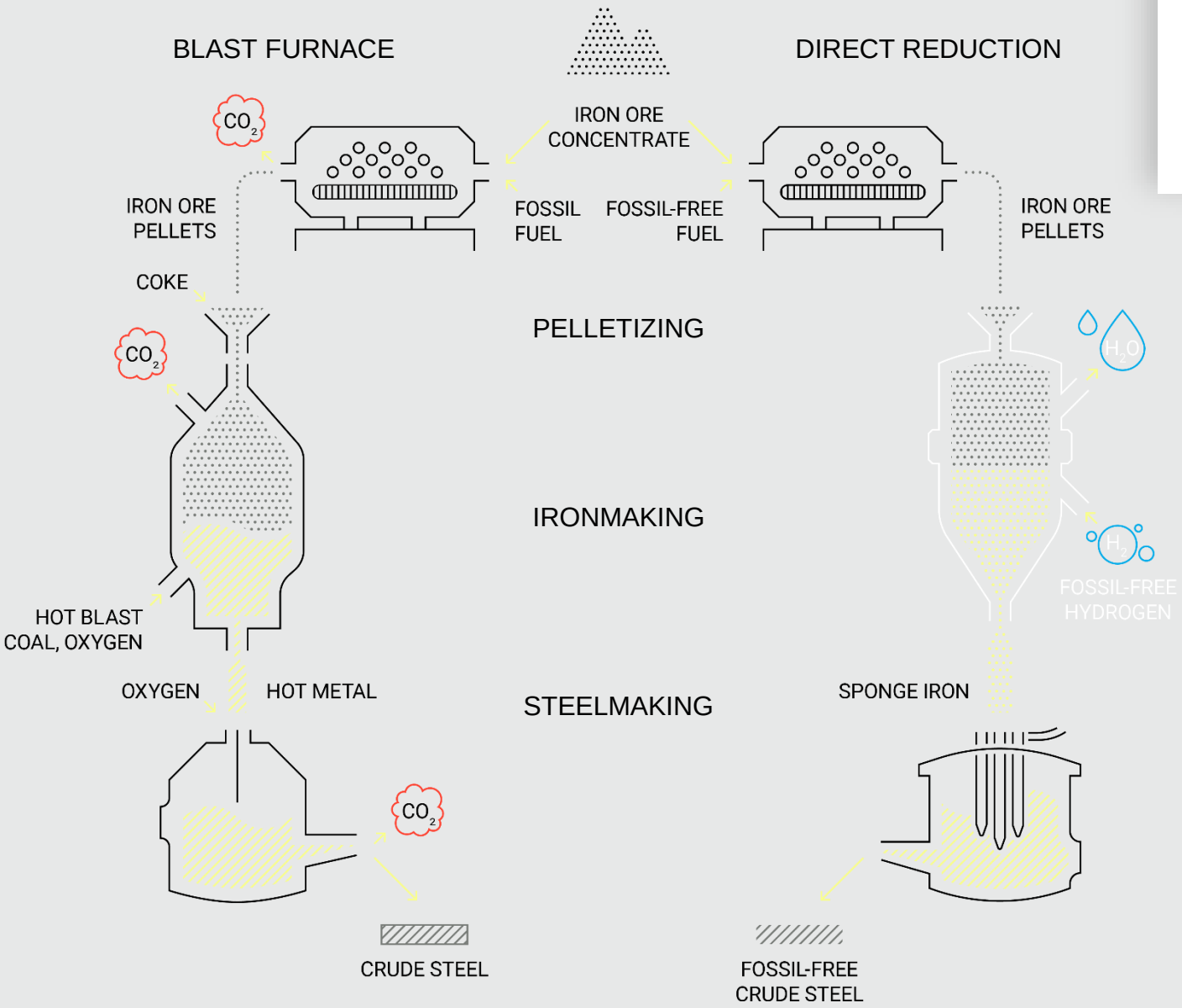
The HYBRIT technology

Two ways to make steel from iron ore today



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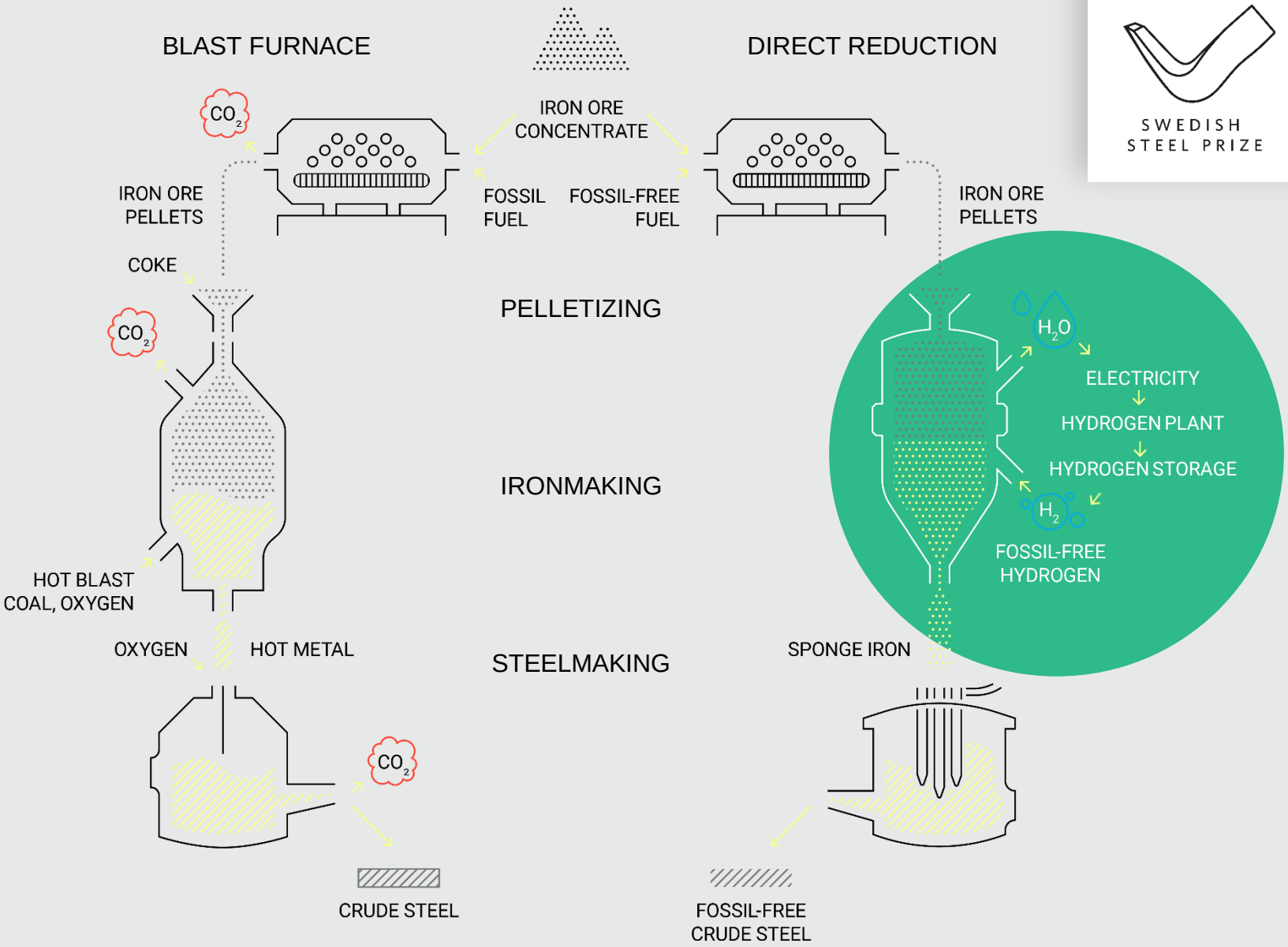
The HYBRIT technology

Fossil-free steel making



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The first fossil-free steel rolled in July 2021

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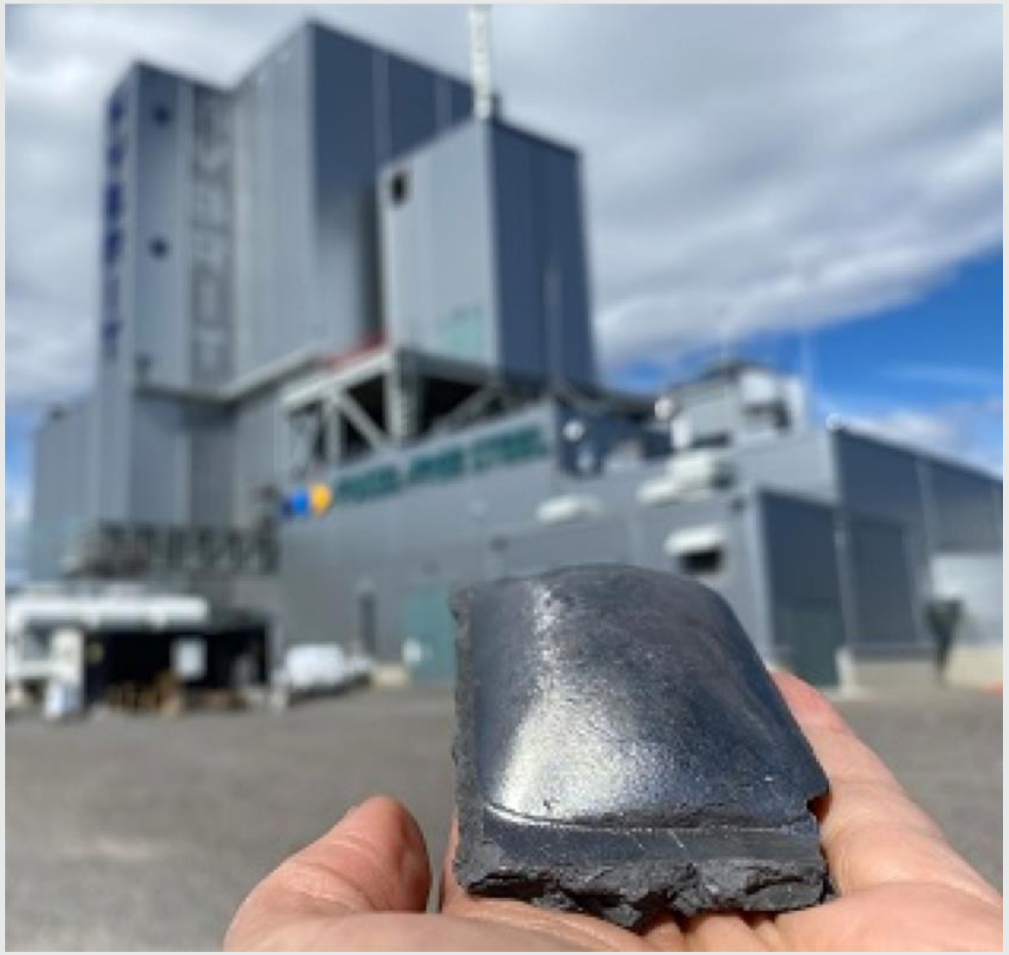

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CARBON EMISSIONS IN LCA FOR STEEL

What is Life Cycle Assessment (LCA)?

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Scope 3 Upstream =

Raw materials & other supplies

Scope 2 =

Energy

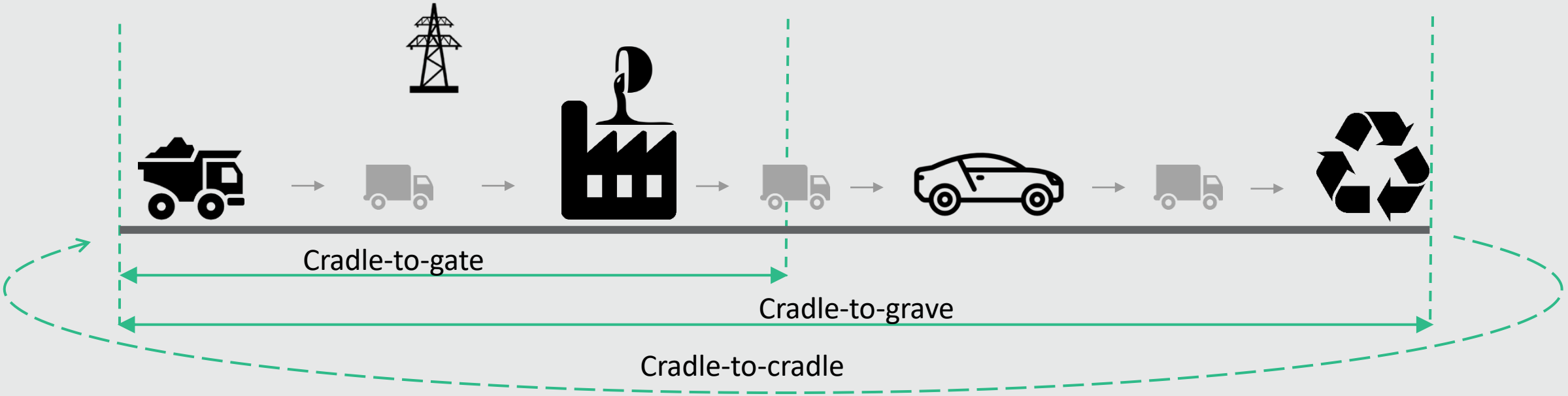
Scope 1 =

Production

Scope 3 Downstream =

Use of product

End of life



Iron ore based steel is the origin of scrap

Since this is a valuable raw material it gives a credit in Environmental Product Declarations, EPDs

The SSAB EPD shows world leading LCA values

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TABLE 2A. POTENTIAL ENVIRONMENTAL IMPACT PER 1,000 KG OF HOT ROLLED STEEL SHEETS AND COILS

Parameter	Unit	A1-A3	C3	C4	D
Global warming potential (GWP)	kg CO_2 equiv.	2.16E+03	2.49E+00	7.44E-01	-1.48E+03
Eutrophication potential (EP)	kg $(PO_4)^{3-}$ equiv.	4.16E-01	4.22E-03		
Acidification potential (AP)	kg SO_2 equiv.	3.90E+00	1.76E-02		
Photo-oxidant formation potential (POCP)	kg ethene equiv.	4.38E-01	1.95E-03		
Ozone Layer Depletion Potential (ODP)	kg CFC11 equiv.	9.67E-11	8.13E-15		
Abiotic depletion potential: fossil (ADP-fossil)	MJ, net calorific value	2.36E+04	4.83E+01		
Abiotic depletion potential: elements(ADP-elements)	kg Sb equiv.	1.27E-03	2.80E-06		

- The SSAB LCA CO_2 emission:
  - Calc: 2.16 – 1.48 = 0.68 ton CO_2e/ton steel
- Comparable to scrap based production
  - With fossil-free steel, SSAB will be significantly lower

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TARGETING A FULLY SUSTAINABLE STEEL PORTFOLIO

SSAB ZERO® STEEL

- Fossil-free electricity
- Fossil-free fuels
- Fossil-free internal transports
- Fossil-free sponge iron based on the HYBRIT® Technology
- Based on high-quality recycled steel

SSAB FOSSIL FREE STEEL™

SWEDISH STEEL PRIZE

- Fossil-free electricity
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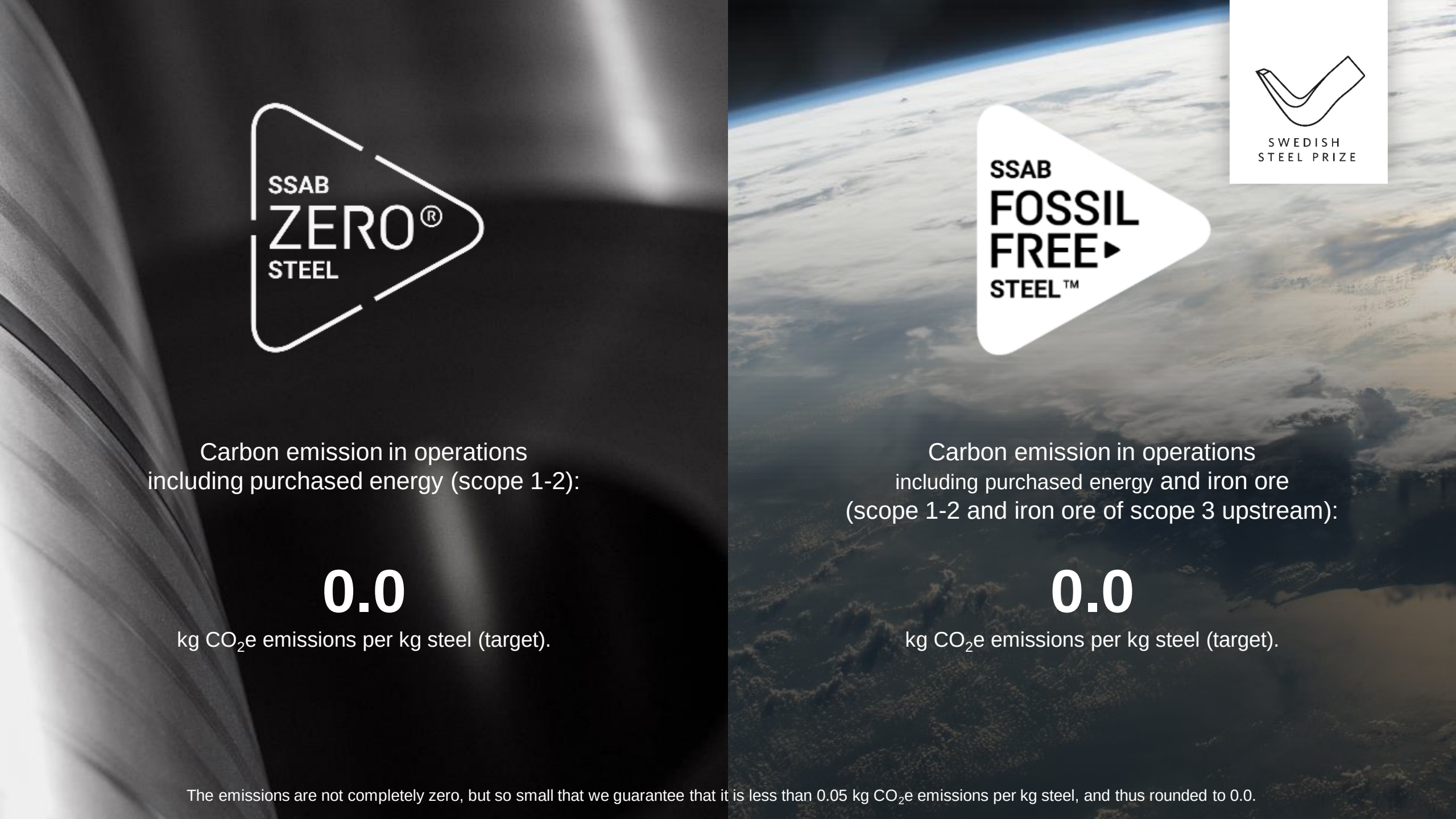

Carbon emission in operations
including purchased energy (scope 1-2):

0.0

kg CO_2e emissions per kg steel (target).

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FREE
STEEL™

Carbon emission in operations
including purchased energy and iron ore
(scope 1-2 and iron ore of scope 3 upstream):

0.0

kg CO_2e emissions per kg steel (target).

The emissions are not completely zero, but so small that we guarantee that it is less than 0.05 kg CO_2e emissions per kg steel, and thus rounded to 0.0.

Carbon emissions of SSAB Zero™

Carbon emission in operations,
including purchased energy (Scope 1-2):

0.0 kg CO_2e emissions per kg steel (target)

The emissions are not completely zero, but so small that we guarantee that it is less than 0.05 kg CO_2e emissions per kg steel, and thus rounded to 0.0.

Carbon emission in operations including purchased energy and raw material (Scope 1-3 Upstream): 0.3 kg CO_2e emissions per kg steel (target).

Carbon emissions of SSAB Fossil-Free™ steel

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Carbon emission in operations,
including purchased energy and iron ore mining
(Scope 1-2 and part of scope 3 upstream):

0.0 kg CO_2e emissions per kg steel (target).

The emissions are not completely zero, but so small that we guarantee that it is less than 0.05 kg CO_2e emissions per kg steel, and thus rounded to 0.0.

Carbon emission in operations including purchased energy and raw material (Scope 1-3 Upstream): 0.3 kg CO_2e emissions per kg steel (target).

Unbeatable results – using SSAB Fossil-Free™

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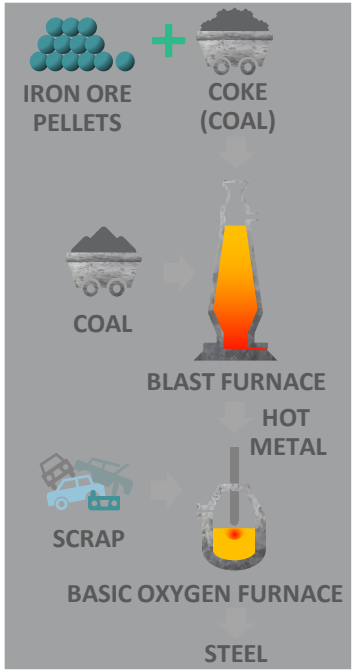
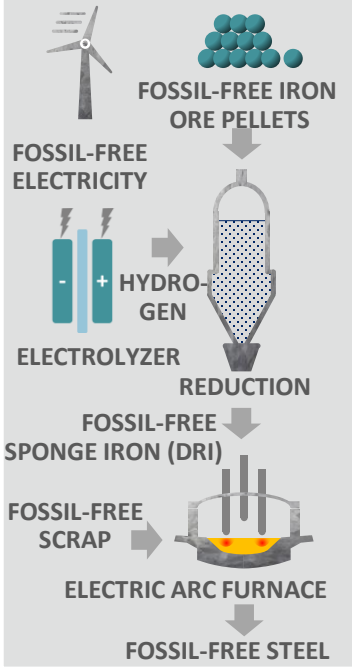
In addition to the carbon emissions in operations, there is a potential **credit up to 1.5 kg CO_2e** per kg steel to be deducted, when customers include the end-of-life in an LCA calculation.

In contrast to scrap-based steel production, steel production from primary fossil-free sponge iron generates additional steel scrap for recycling at the end of its life cycle.

This is referred to as Module D in Environmental Product Declarations (EPD). In the Product Environmental Footprint (PEF) methodology and the Circular Footprint Formula (CFF) this is also taken into account.

LCA values for different steel production routes

Steelmaking processes	Global average Blast Furnace	SSAB Zero™	SSAB Fossil-free™ steel
			
Report	**Global average ton CO_2e/ton steel**	**Targets ton CO_2e/ton steel**	**Targets ton CO_2e/ton steel**
Operations. Scope 1 and 2.	**2.0**	**0.0**	**0.0**
Cradle-to-Gate	**2.4**	**0.3**	**0.3**
Cradle-to-Gate + End-of-Life	**1.2**	**0.4**	**-1.2**
PEF Methodology*	**1.4**	**0.4**	**-0.9**

Sources: World Steel Association, SSAB.
Note: *Product Environmental Footprint (PEF) with Circular Footprint Formula (CFF). 95% recycling rate at EoL.

True numbers

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SSAB is **not** engaging in mass balancing **allocation of emission reduction**, where general carbon emission savings are allocated to achieve net zero or carbon neutral steel.

SSAB is **not** engaging in carbon **emission offsetting** activities, where investments in forest preservation are used to sell net zero or carbon neutral steel.

SSAB Zero™ Certificate of carbon emissions

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SSAB Zero™ Plan

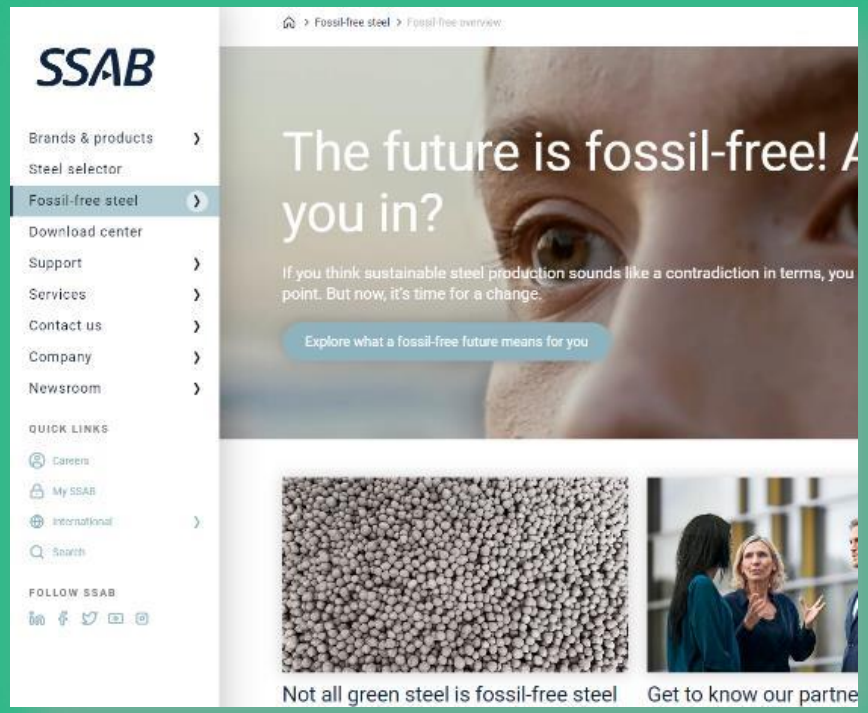
Product Verification Statement

Environmental product declarations (EPD)

SSAB Zero™: around 2024

SSAB Fossil-free™ steel: around 2027

Resources



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