Sustainable Manufacturing & Reduced Environmental Impact

Thomas Hörnfeldt

VP Sustainability & Public Affairs

PUBLIC

SSAB

Strong globally and locally

MORE THAN

50

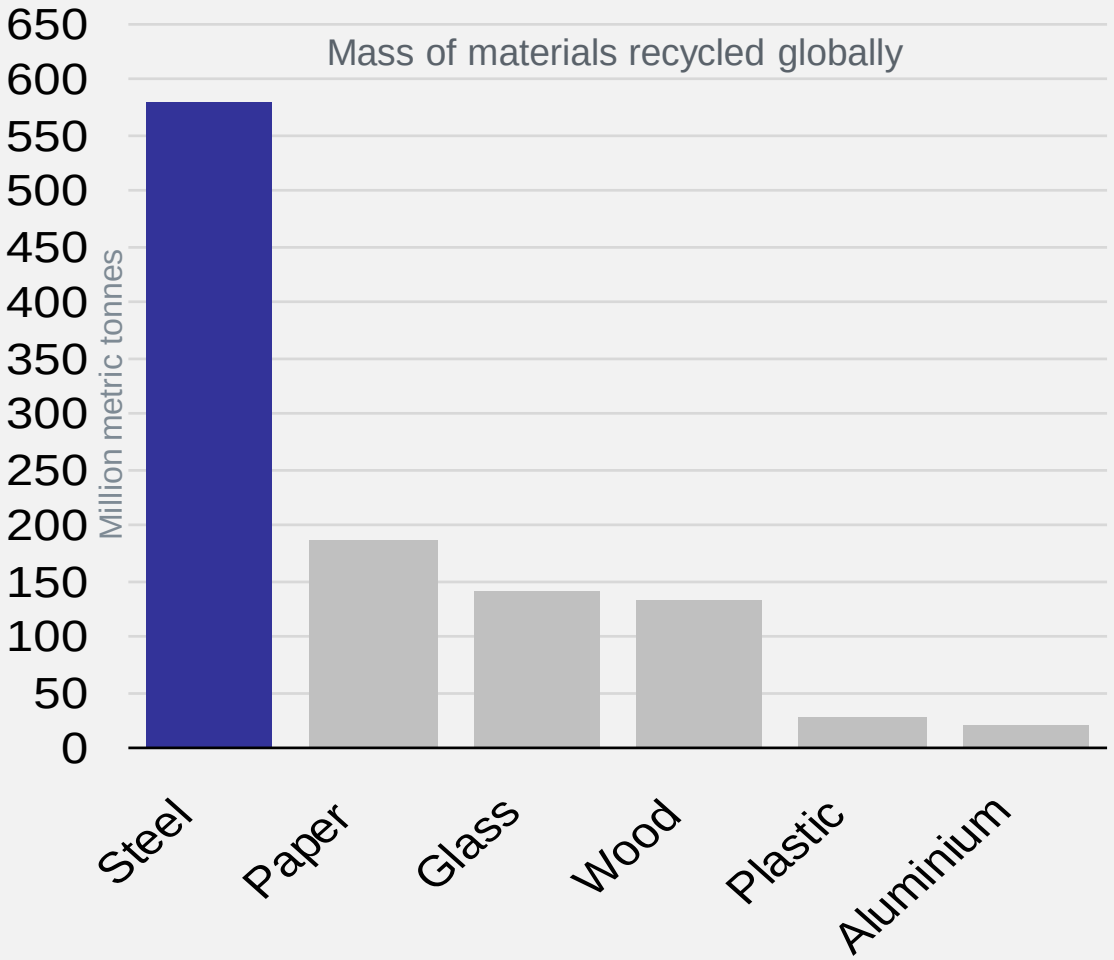
COUNTRIES OF SALES COVERAGE

SSAB

Global drivers

Steel is the most recycled material in the world

- The amount of recycled steel is more than all other materials together
- Steel can be recycled fully and indefinitely without loss of quality



Source: worldsteel 2012, Recycling of industrial materials in 2010

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Most CO_2 efficient steel production in the world

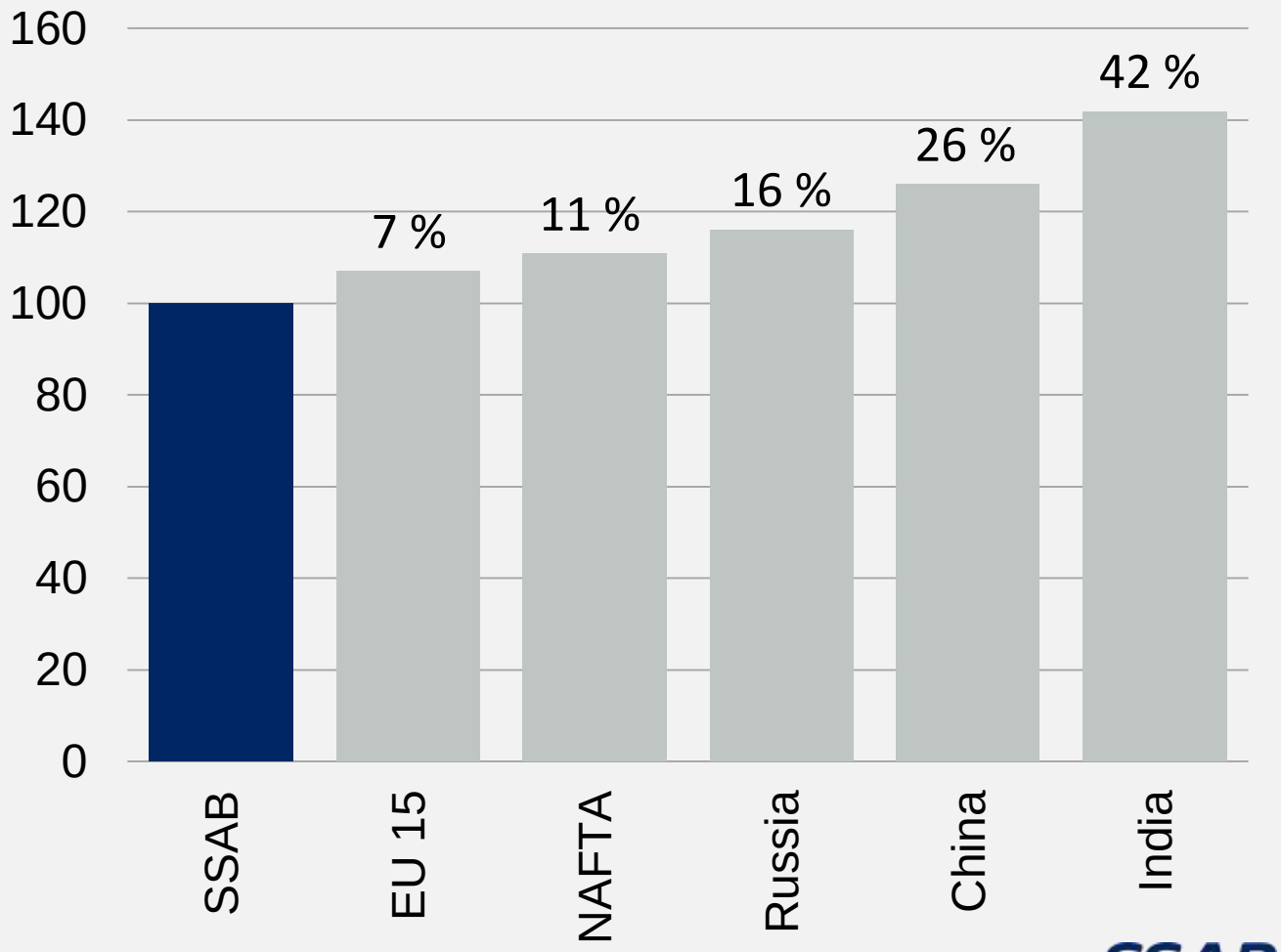
If the SSAB steel production is moved from the Nordics to China emissions will increase by

2 200 000 tons

or the equivalent of

1 100 000 cars

driving 15 000 km/year



Source: Stahl-Zentrum. *The indexed carbon efficiency in iron-making based on coal consumed 2012

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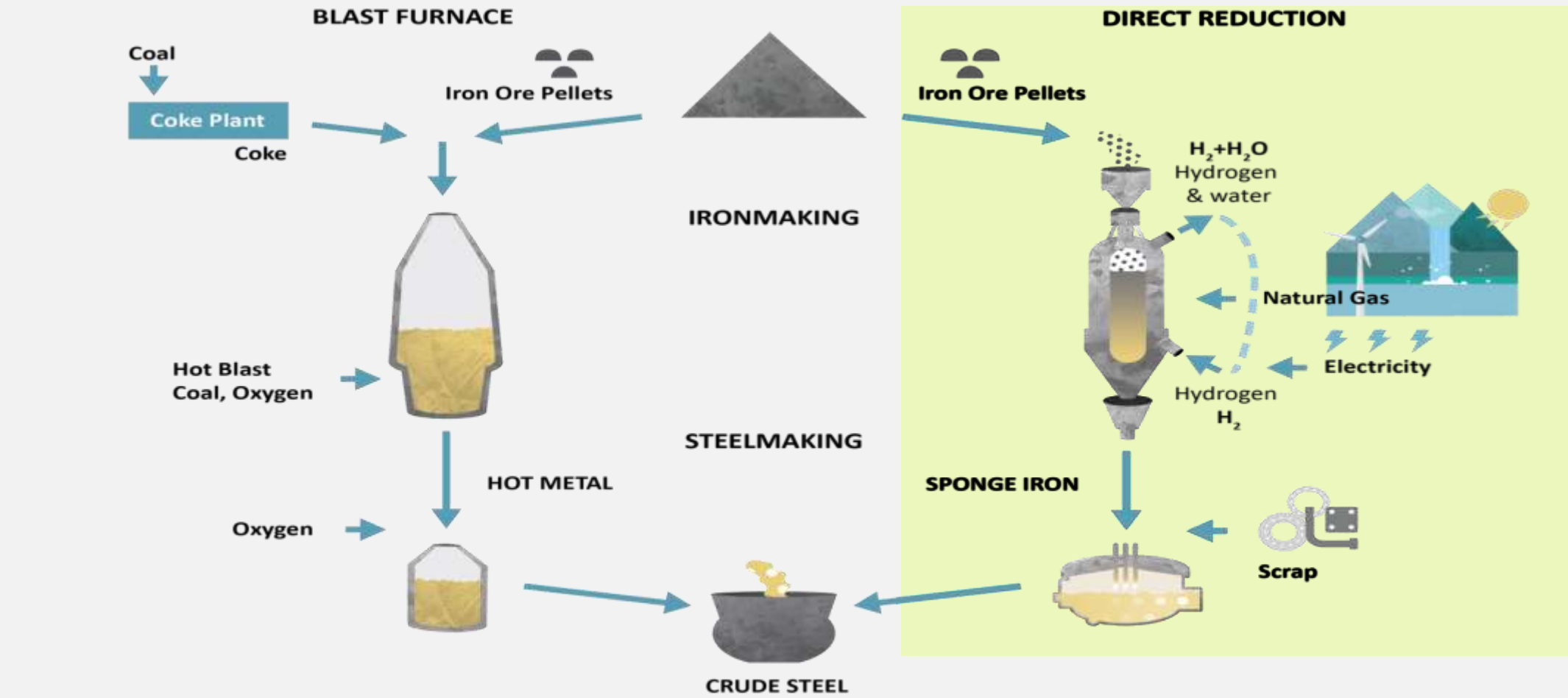
CO_2 emission free ironmaking



HYBRIT would eliminate ~90% of SSAB's total CO_2 emissions

2016-2017	**2018-2024**	**2025-2035**
Pre-feasibility Study	Feasibility StudyPilot plant trials	Demonstration Plant Trials

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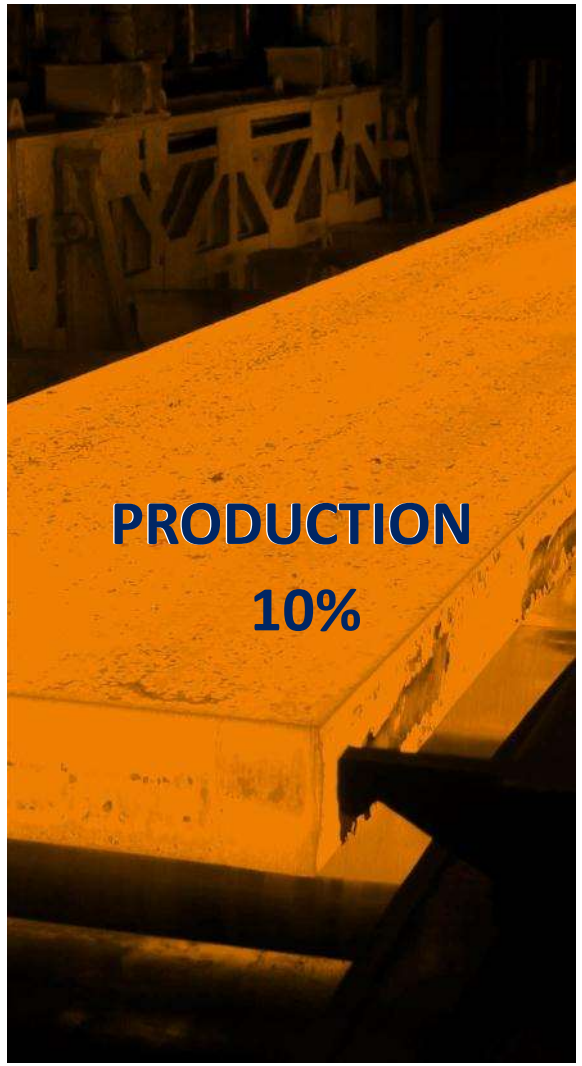
Where is the environmental impact?



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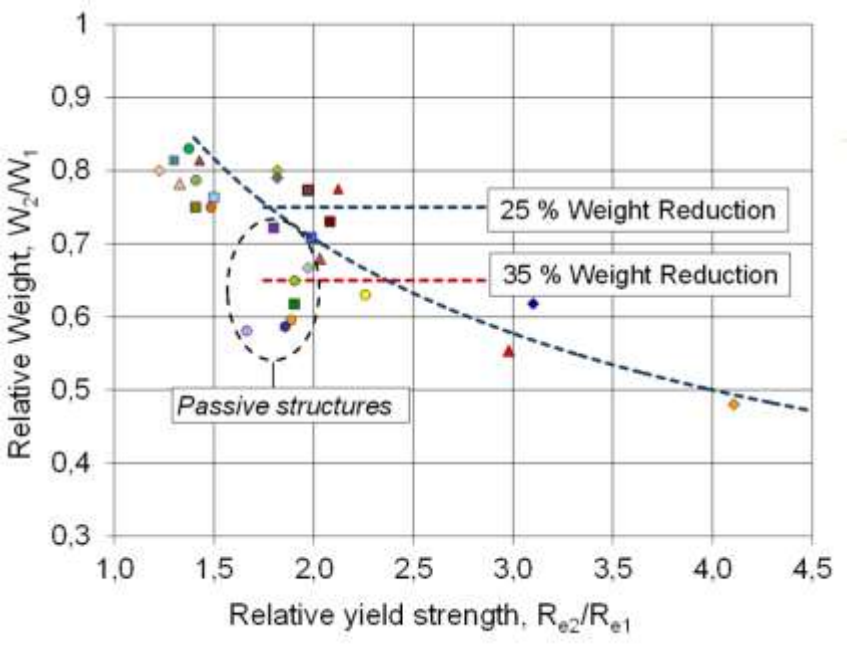
The environmental value of high strength steels

- Environmental research programme
  - The Steel Eco-cycle
  - Hosted by Jernkontoret
  - 2004—2013

- Scientific Report
  - Case studies
  - Life Cycle Assessments

- The cases follow the rule of thumb

$$\frac{W_2}{W_1} = \sqrt{\frac{R_{e2}}{R_{e1}}}$$



Index 1: Ordinary Steel
Index 2: High Strength Steel

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10% LOWER WEIGHT
5% FUEL SAVINGS

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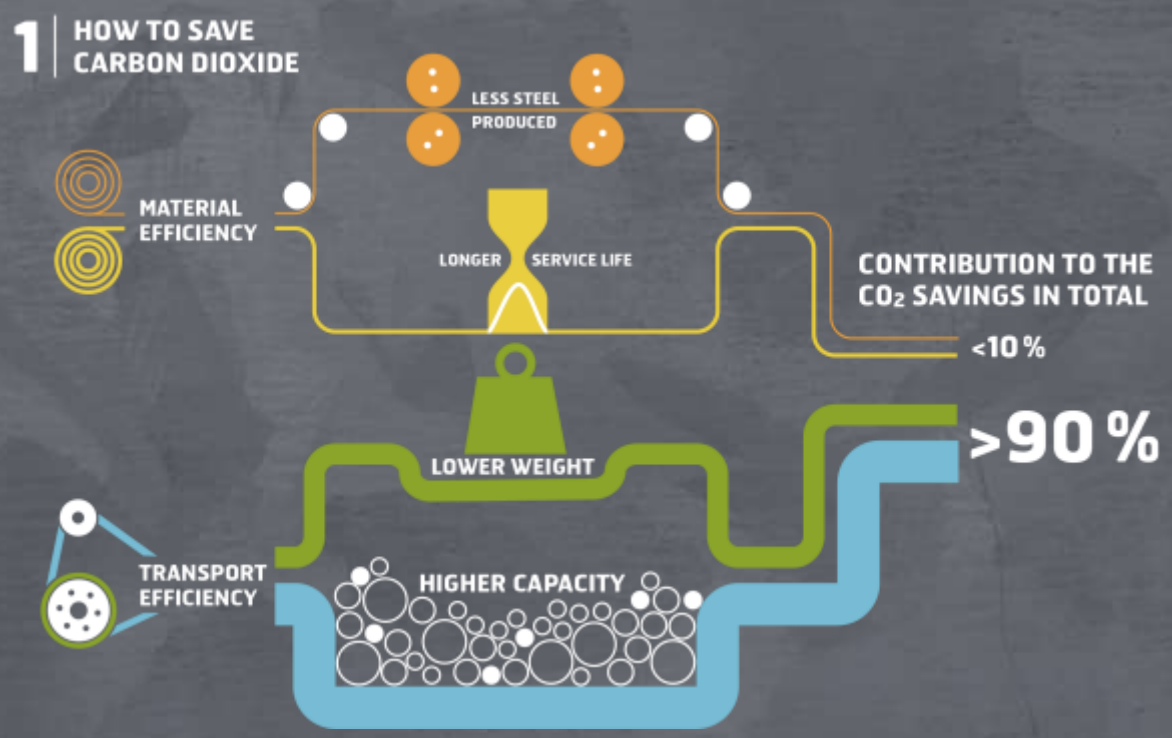
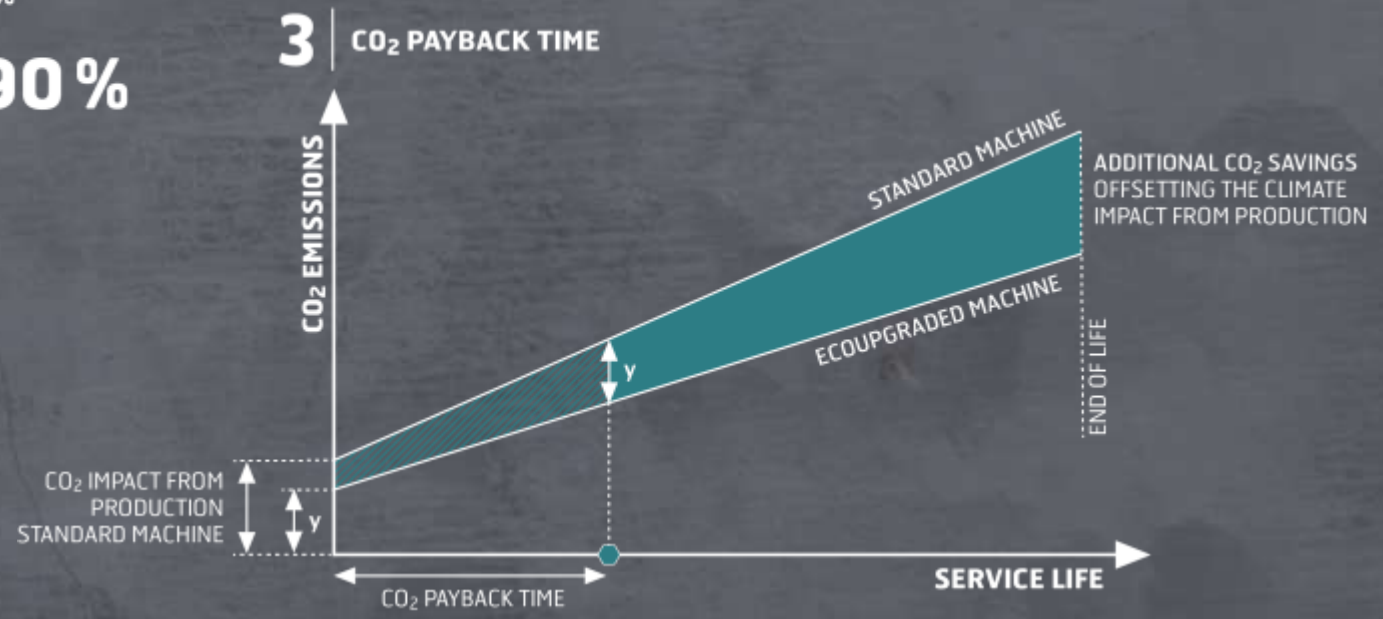
SSAB EcoUpgraded





SSAB EcoUpgraded

Together with our customers, SSAB continually upgrades steel and equipment designs. SSAB EcoUpgraded saves CO_2 both in steel PRODUCTION and during the full lifetime of the machine.

From the CO_2 payback time and onwards, every extra hour brings additional savings.

www.ssab.com/ecoupgraded

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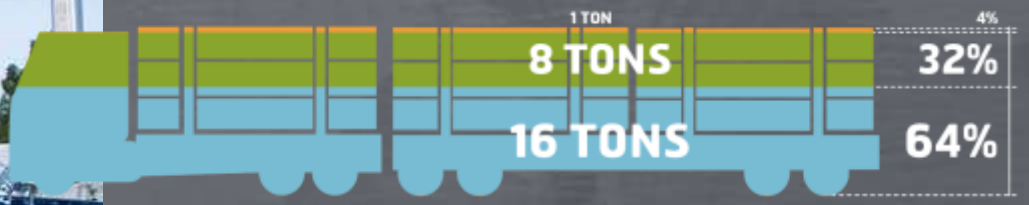
“CO_2 emissions payback in 3 months”

Savings on CO_2



LESS STEEL PRODUCED

LOWER WEIGHT

HIGHER CAPACITY

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SSAB ECO UPGRADED

CO_2 SAVINGS	CO_2 PAYBACK TIME	FUEL REDUCTION
25	3	8,100
TONS/LIFETIME	MONTHS	L/LIFETIME

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TIMBER TRAILER

The longitudinal beams of the trailer were upgraded from yield strength 310 MPa to Strenx 700, saving 350 kg of weight, or 37%, of the upgraded parts. The total weight of the timber trailer could be reduced by an additional 150 kg through changes in design in other parts of the chassis. In total, the trailer´s load capacity was increased by 500 kg.

	SSAB EcoUpgraded
Fuel consumption, fully loaded	0.71 L/km
Fuel consumption, unladen	0.35 L/km
Vehicle usage per year	175,000 km/year
Weight critical transports	50%
Service lifetime	7 years
Steel saved by increased wear resistance	0 kg/lifetime
Weight reduction	500 kg
Total weight upgraded parts	950 kg
Curb weight*	20,000 kg
Total payload*	40,000 kg
Maximum weight*	60,000 kg

*) Valid for the whole truck-trailer vehicle.

www.ssab.com/ecoupgraded

Reference document: Environmental evaluation of steel and steel structures – a handbook produced within The Steel Eco-Cycle project, Jernkontoret, 2013.

“Heavy metal getting lighter”

MINING TRUCK BOX

This heavy-duty mining truck was redesigned and upgraded using Hardox 450 in the tipper body. The weight of the tipper body was reduced by 22%. This reduced the weight by 2.5 tons, which increased the load capacity. In addition to this, the life-time of the body is now three times longer than the original, decreasing overall steel consumption and reducing the need for lengthy overhauls.

	SSAB EcoUpgraded
Fuel consumption, fully loaded	220 L/h
Fuel consumption, unladen	120 L/h
Vehicle usage per year	7,300 h/year
Weight critical transports	50 %
Service lifetime	10 years
Steel saved by increased wear resistance	24,500 kg/lifetime
Weight reduction	2,500 kg
Total weight upgraded parts	8,600 kg
Curb weight	69,000 kg
Total payload	91,000 kg
Maximum weight	160,000 kg

www.ssab.com/ecoupgraded

Reference document: Environmental evaluation of steel and steel structures – a handbook produced within The Steel Eco-Cycle project, Jernkontoret, 2013.

Savings on CO_2

LESS STEEL PRODUCED

LOWER WEIGHT

LONGER SERVICE LIFE

HIGHER CAPACITY

SSAB EcoUpgraded

Together with our customers, SSAB continually upgrades steel and equipment designs. SSAB EcoUpgraded saves CO_2 both in steel PRODUCTION and during the full lifetime of the machine.

From the CO_2 payback time and onwards, every extra hour brings additional savings.

CO_2 SAVINGS	CO_2 PAYBACK TIME	FUEL REDUCTION
1,005	2	317,000
TONS/LIFETIME	MONTHS	L/LIFETIME

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“Winds of change – less drag, more load”

ROLL-ON CONTAINERS

These containers were upgraded from 355 MPa standard steel to Hardox 450, increasing the load capacity by 2,100 kg for the total vehicle with a set of three containers. This allows more payload per trip and also reduces the fuel consum-ption for the empty vehicle. The removal of stiffeners on the sides also lowers wind drag, which further reduces the fuel consumption.

	SSAB EcoUpgraded
Fuel consumption, fully loaded	0.69 L/km
Fuel consumption, unladen	0.35 L/km
Vehicle usage per year	100,000 km/year
Weight critical transports	50%
Service lifetime	12 years
Steel saved by increased wear resistance	0 kg/lifetime
Weight reduction	2,100 kg
Total weight upgraded parts	7,650 kg
Curb weight*	26,700 kg
Total payload*	37,300 kg
Maximum weight*	64,000 kg

*) Valid for the whole truck-trailer vehicle.

www.ssab.com/ecoupgraded

Reference document: Environmental evaluation of steel and steel structures – a handbook produced within The Steel Eco-Cycle project, Jernkontoret, 2013.

Savings on CO_2

LESS STEEL PRODUCED

LOWER WEIGHT

HIGHER CAPACITY

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SSAB ECO UPGRADED

CO_2 SAVINGS	CO_2 PAYBACK TIME	FUEL REDUCTION
105	1.3	33,600
TONS/LIFETIME	YEARS	L/LIFETIME

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Green truck – Innovate UK

- 2 000 kg weight reduction
  - 2 500 litres annual fuel saving
- 7% aerodynamic improvements
  - 2 500 litres annual fuel saving
- 180 tonnes less CO2 emissions
  - 15 tonnes annually
- Total fuel saving 60 000 litres

Innovate UK

LAWRENCE DAVID

A sustainability strategy with long term objectives

Sustainable operations

Fossil-free 2045

SSAB will stepwise move toward a fossil-free steelmaking process through the HYBRIT initiative and eliminate other fossil fuel related emissions, making it possible to be fossil free within the entire operation

Sustainable offering

10 Mtonne annual customer CO_2 savings 2025

By using SSAB's high-strength steels, customers can achieve CO_2 savings during their end product's use-phase that are as large as SSAB´s direct production emissions

Responsible partner

SSAB manages risks and takes responsibility for business ethics and responsible sourcing, and continuously strive to improve safety, diversity and employer attractiveness

SSAB

SSAB

A stronger,
lighter and more
sustainable world