CEPS – Benchmarking
Insights from Steel – Benchmarks and the Environment

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Benchmarks cannot be seen in isolation but are embedded in systems

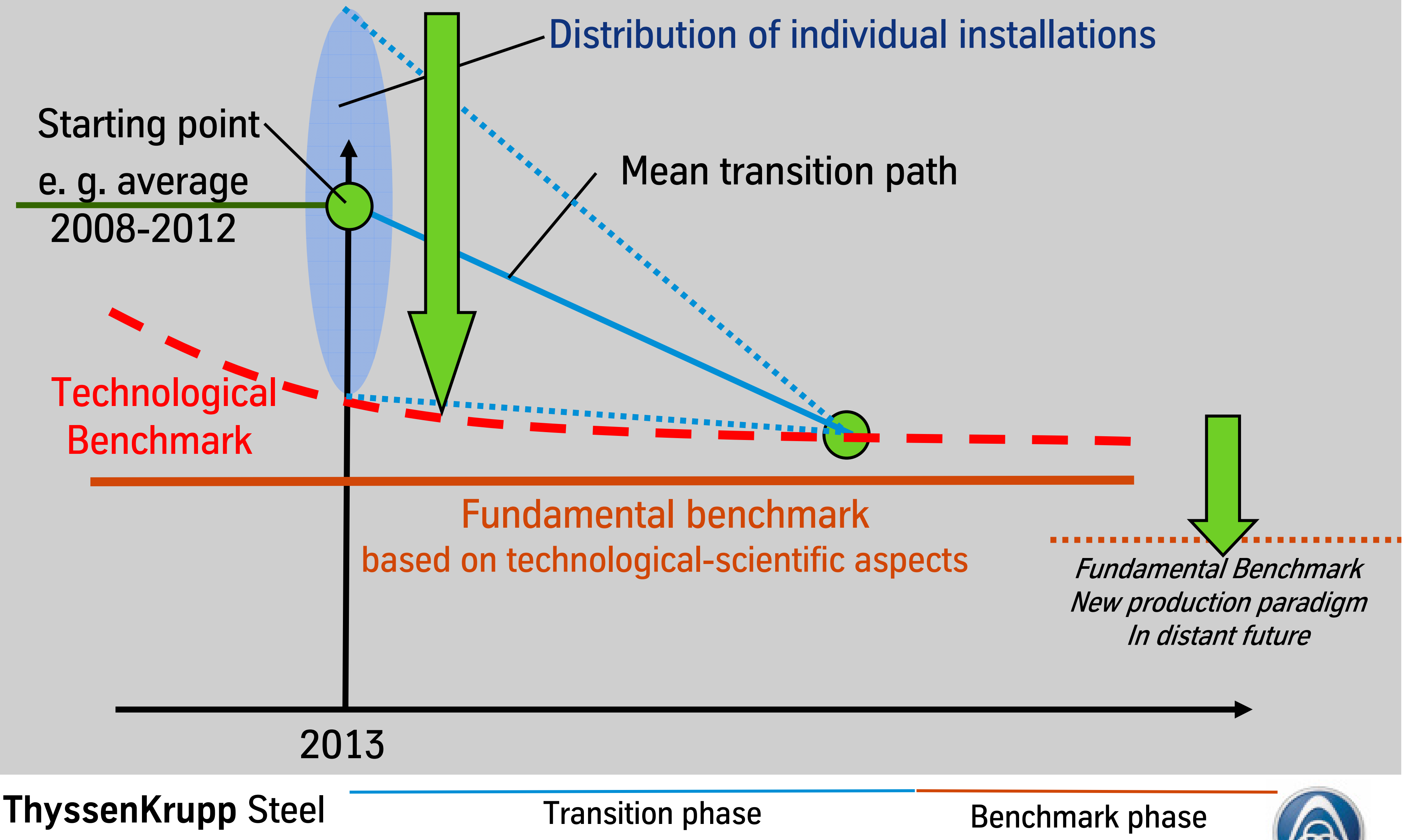
Benchmarking and Time

- Are Benchmarks eternally fixed?
- How do Benchmarks evolve?
- How does time affect applicability?

Benchmarking and Competition

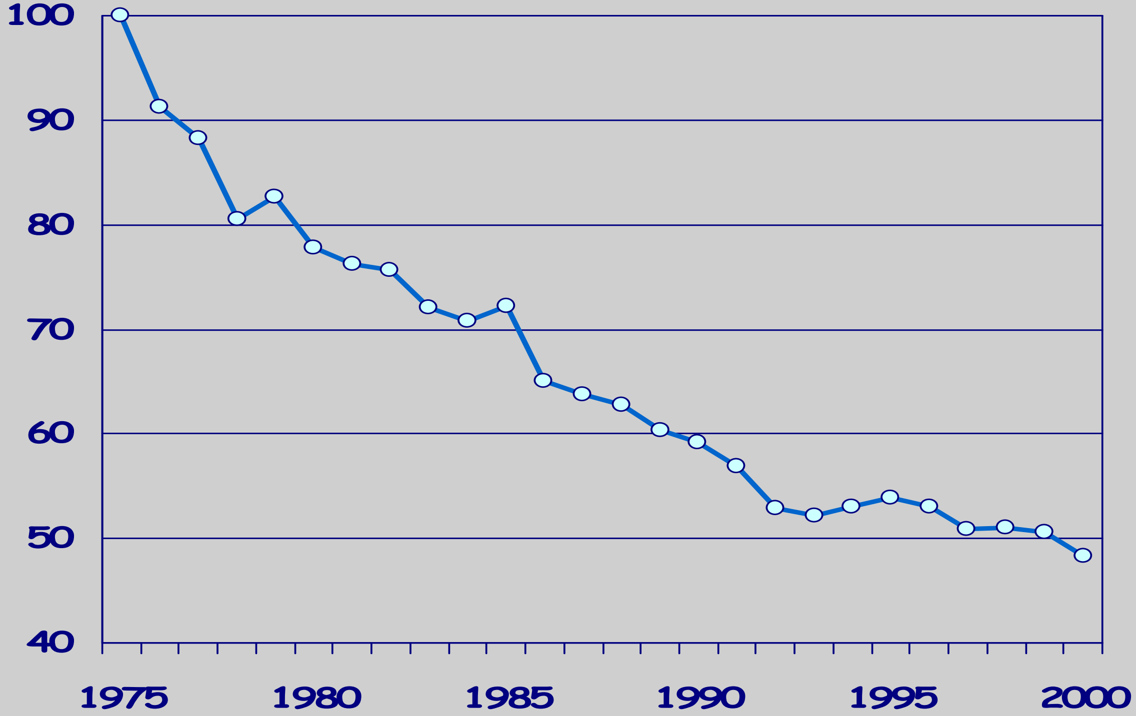
- What are Benchmarks worth?
- How do Benchmarks impact competition?

General Elements of a benchmark approach - scematic



ThyssenKrupp Steel

Past achievements in Europe Steel Industry (EU15) are already considerable – very early action!

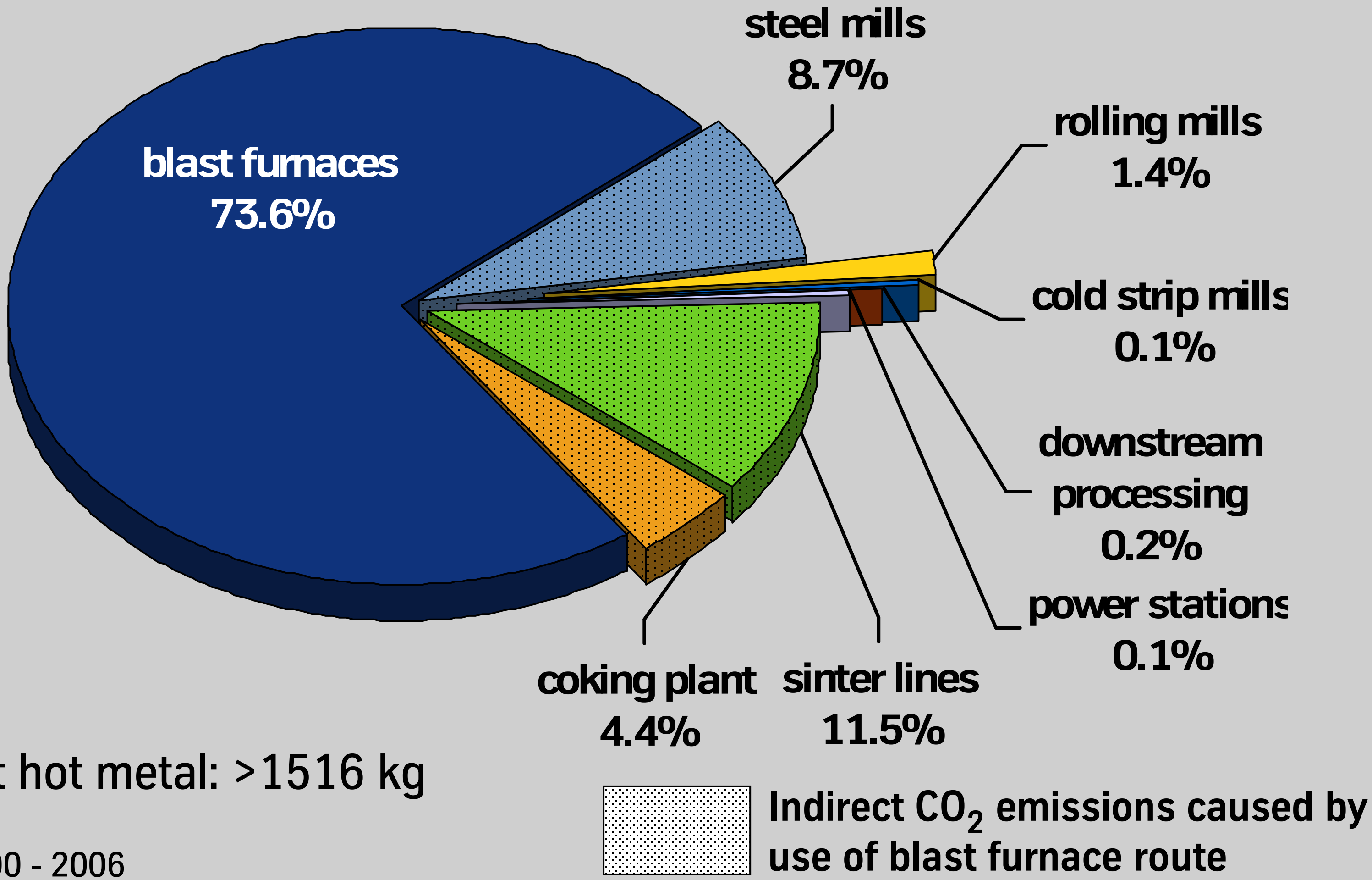


CO_2 emission per ton of finished product
Index 100 for 1975

Source: Eurostat/Eurofer

The Blast Furnace is main CO_2 emitter in steel production

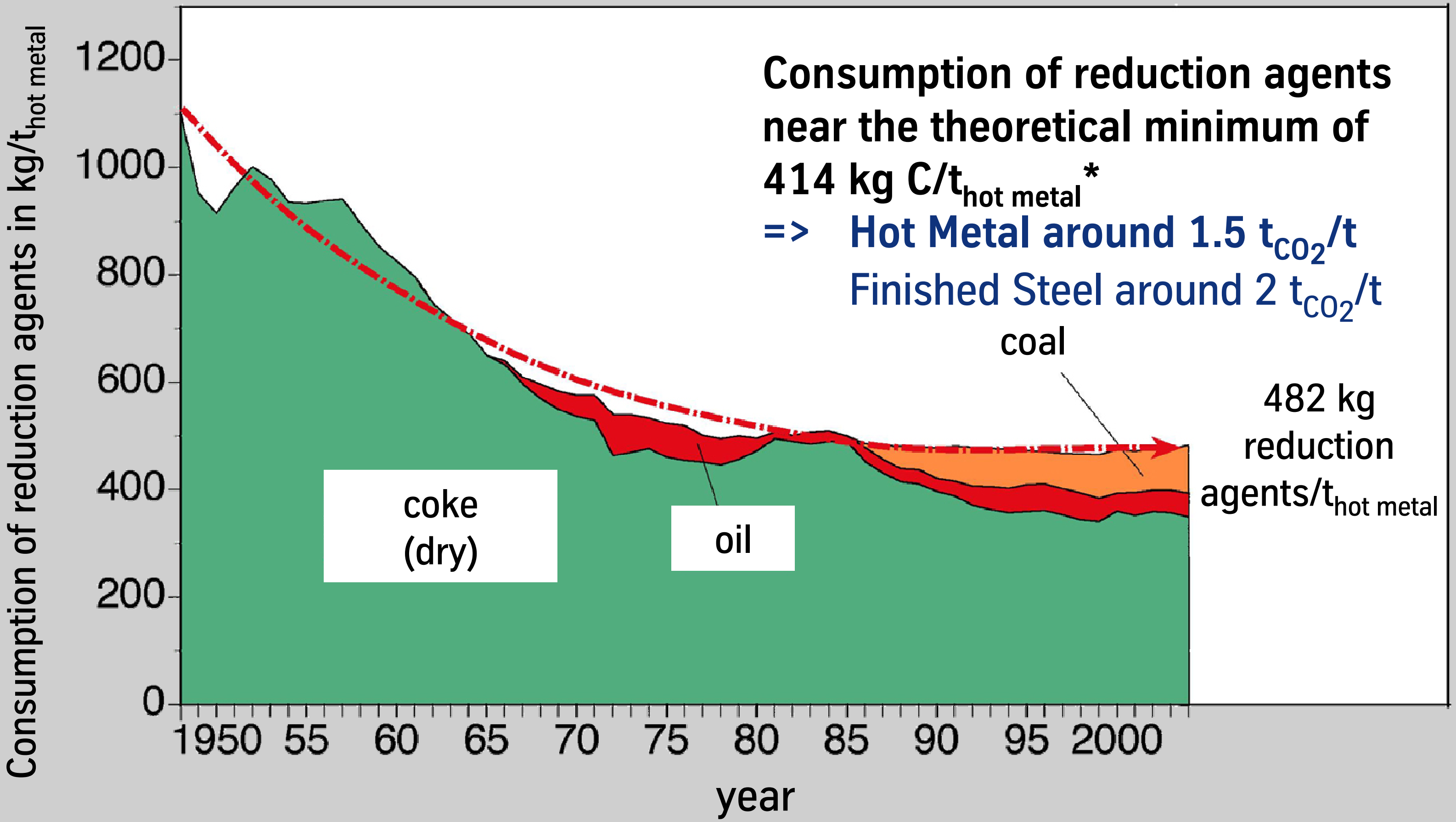
Direct and related emissions account for well over 90%.



Total CO_2/t hot metal: >1516 kg

average 2000 - 2006

Reduction Agents' Consumptions already reduced to minimum – no way to go further on this route to reduce CO_2



Source: VDEh, Blast Furnace Committee

*414 kg C/$t_{hot\ metal}$ according to 465 kg coke/$t_{hot\ metal}$

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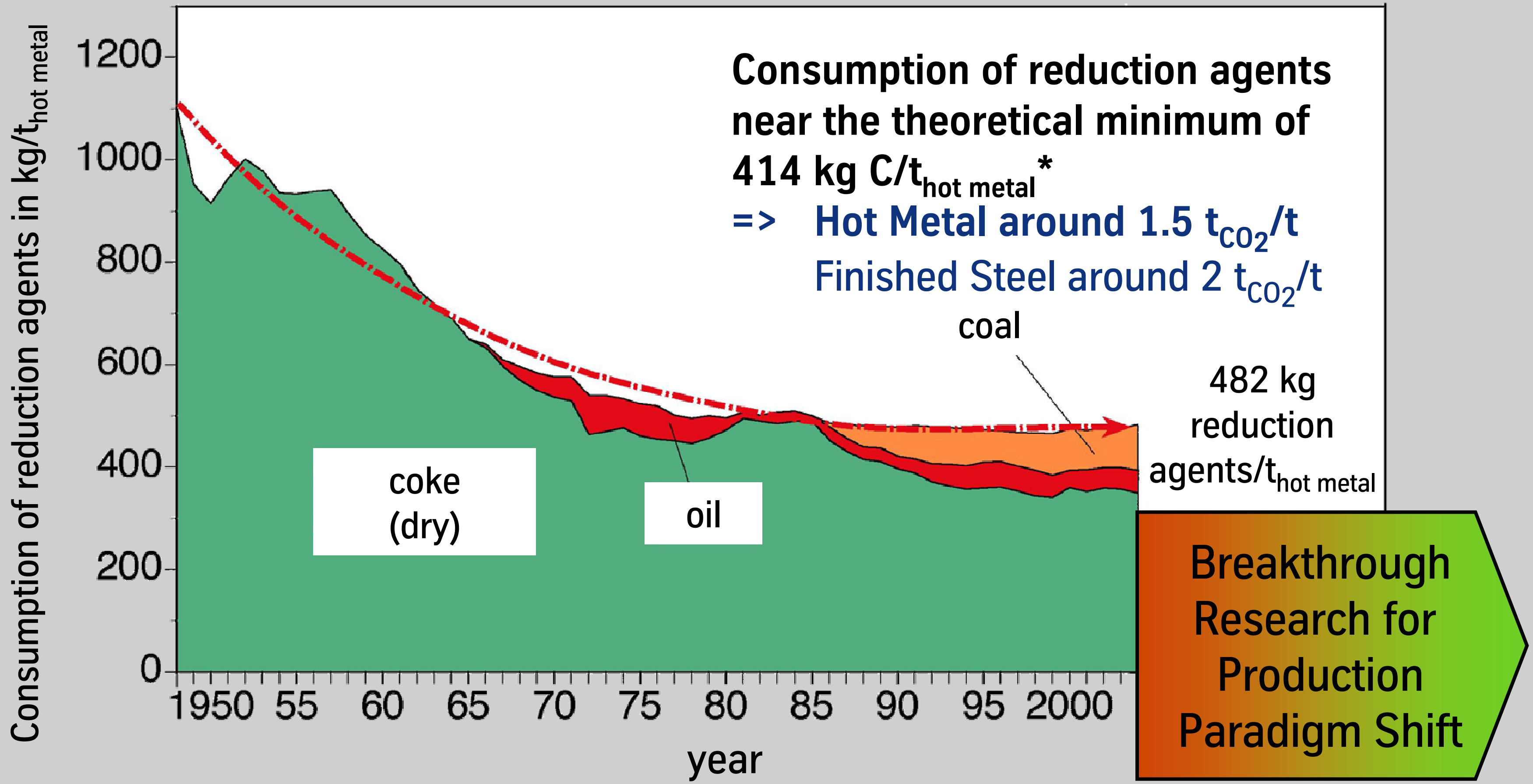

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Scientific fundamentals limit possible actions.

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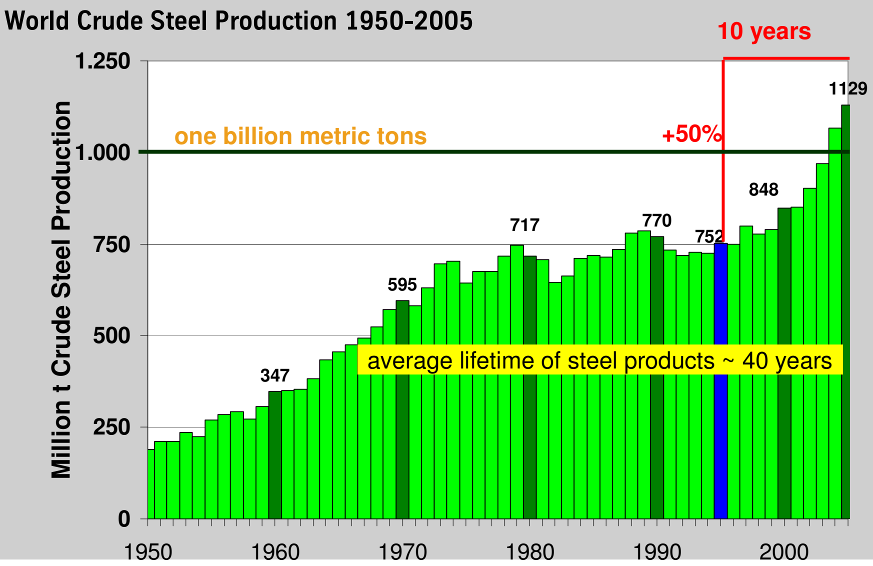

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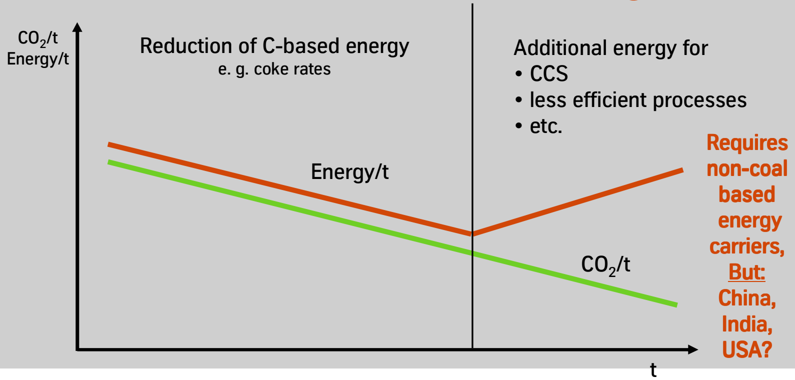

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a) accept necessary CO2 in steelmaking as investment in CO2 saving products downstream

ULCOS – Ultra Low CO2 Steelmaking

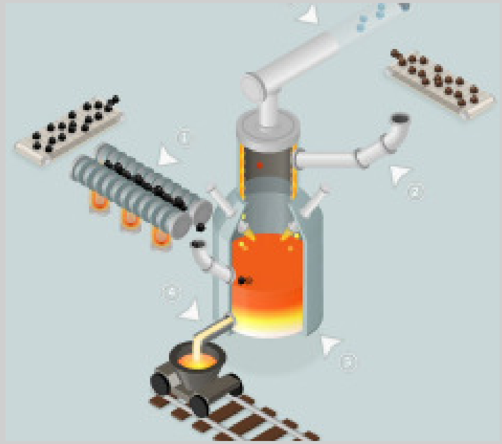
Breakthrough Technologies for the next generations of steel making processes

Top-gas Recycling Blast Furnace

from 2025 ?

HIsarna

from 2030 ?



Direct Reduction (ULCORED)

from 2035 ?

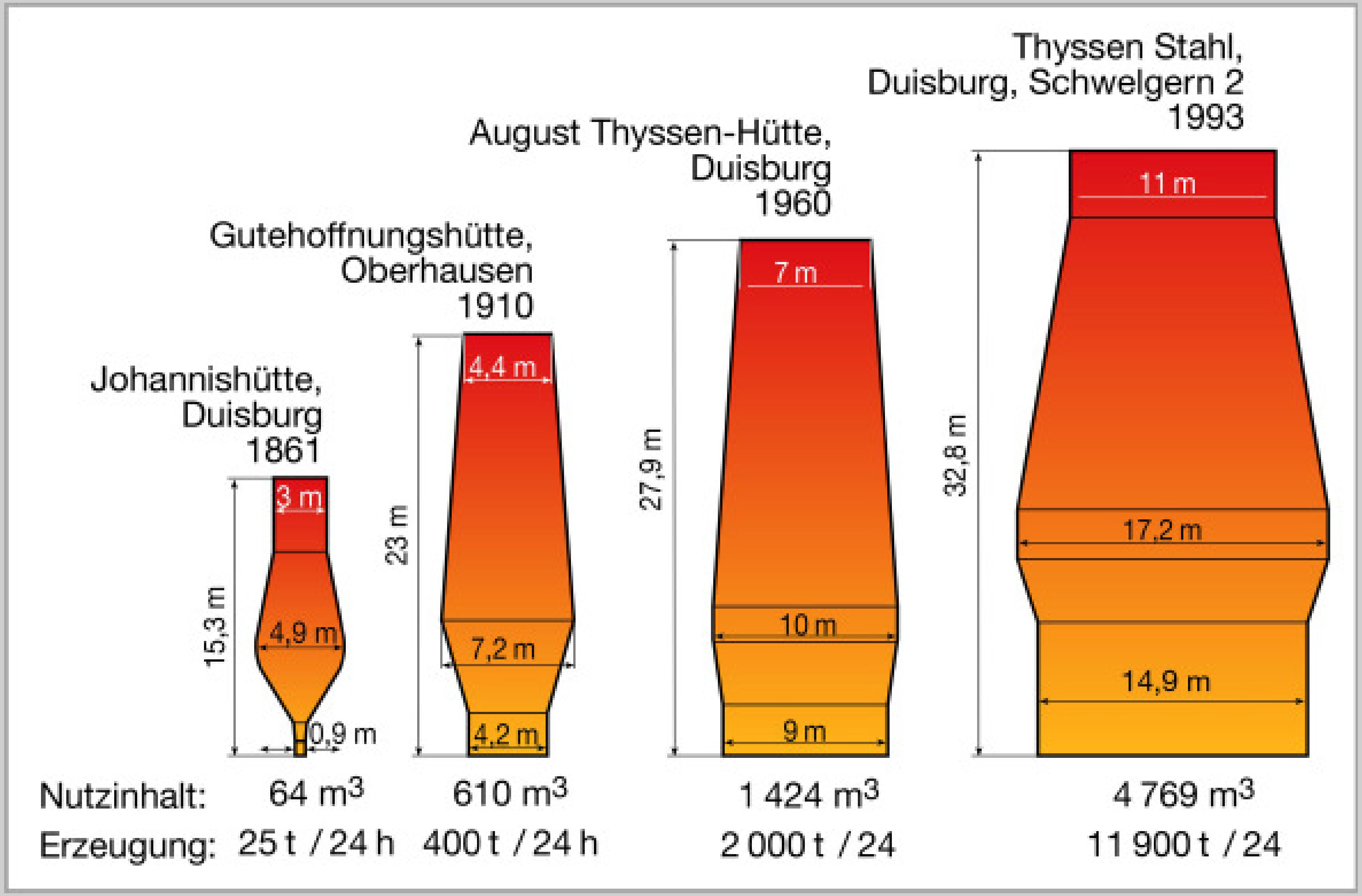
Electrolytic Steelmaking (ULCOLYSIS, ULCOWIN)

2050 ?

However, all solutions rely on commonly availability CCS and CO2-free electricity

Upscaling of Blast Furnace Concepts takes very long time

ULCOS developments not expected to be applicable immediately…



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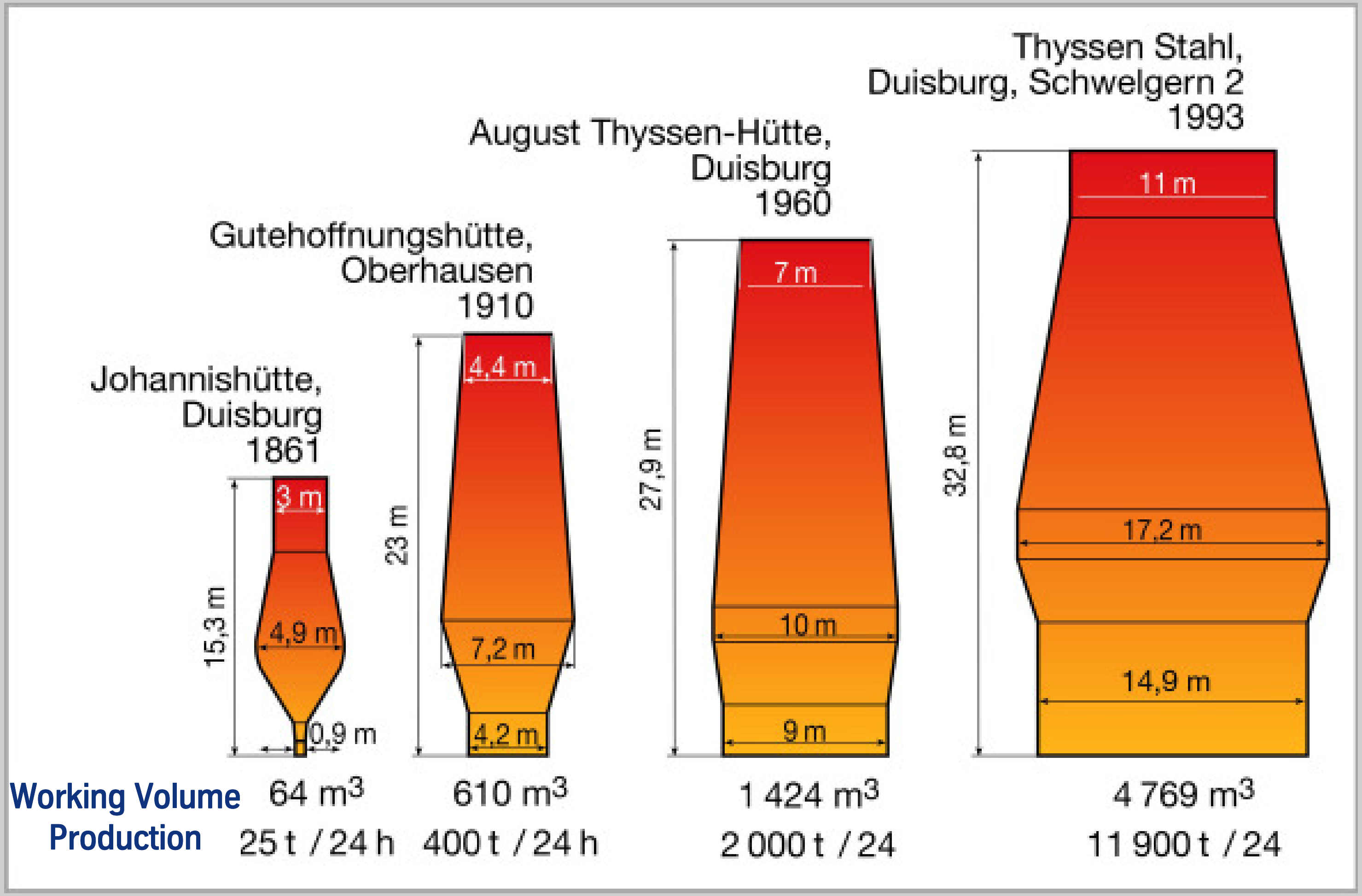
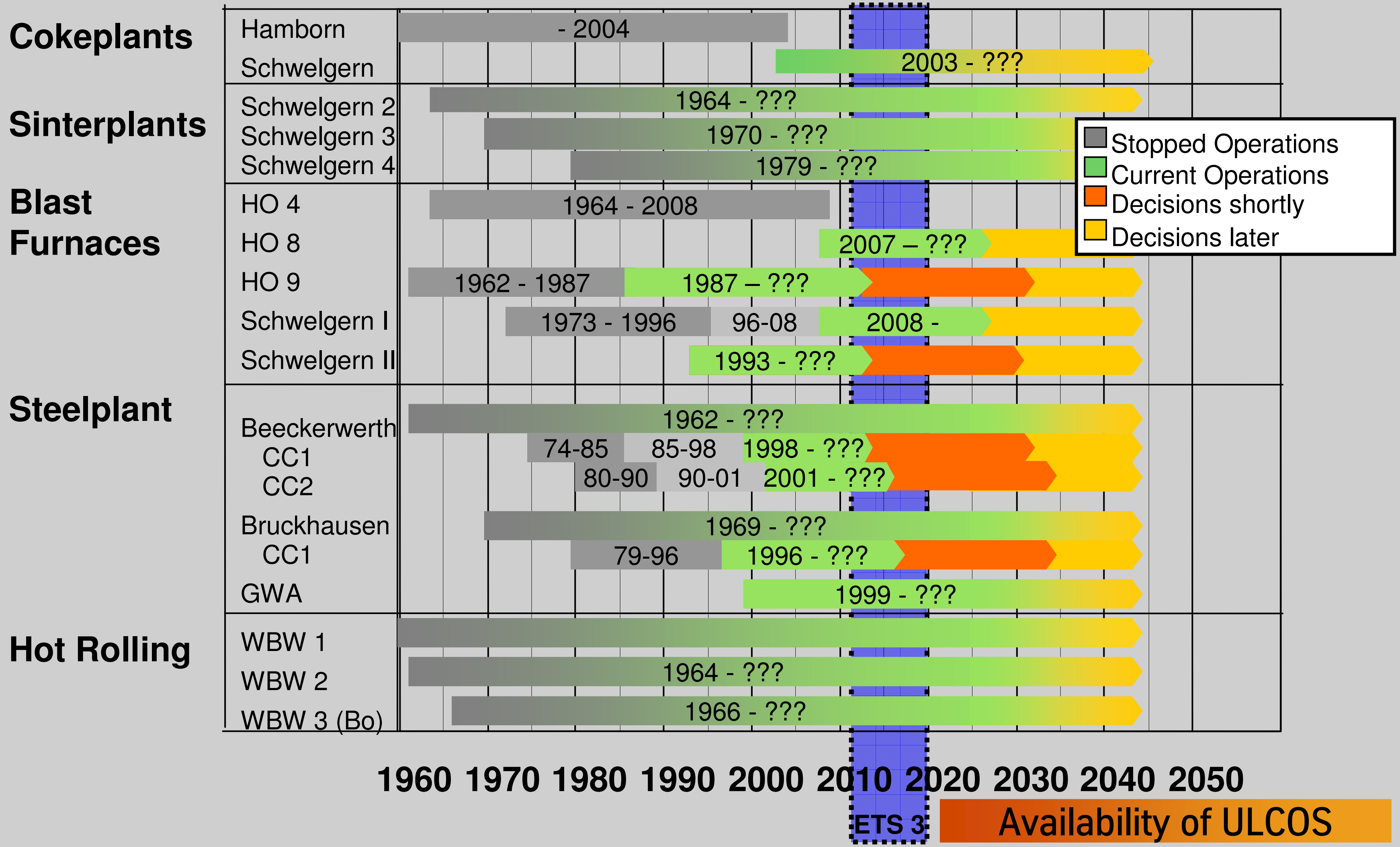
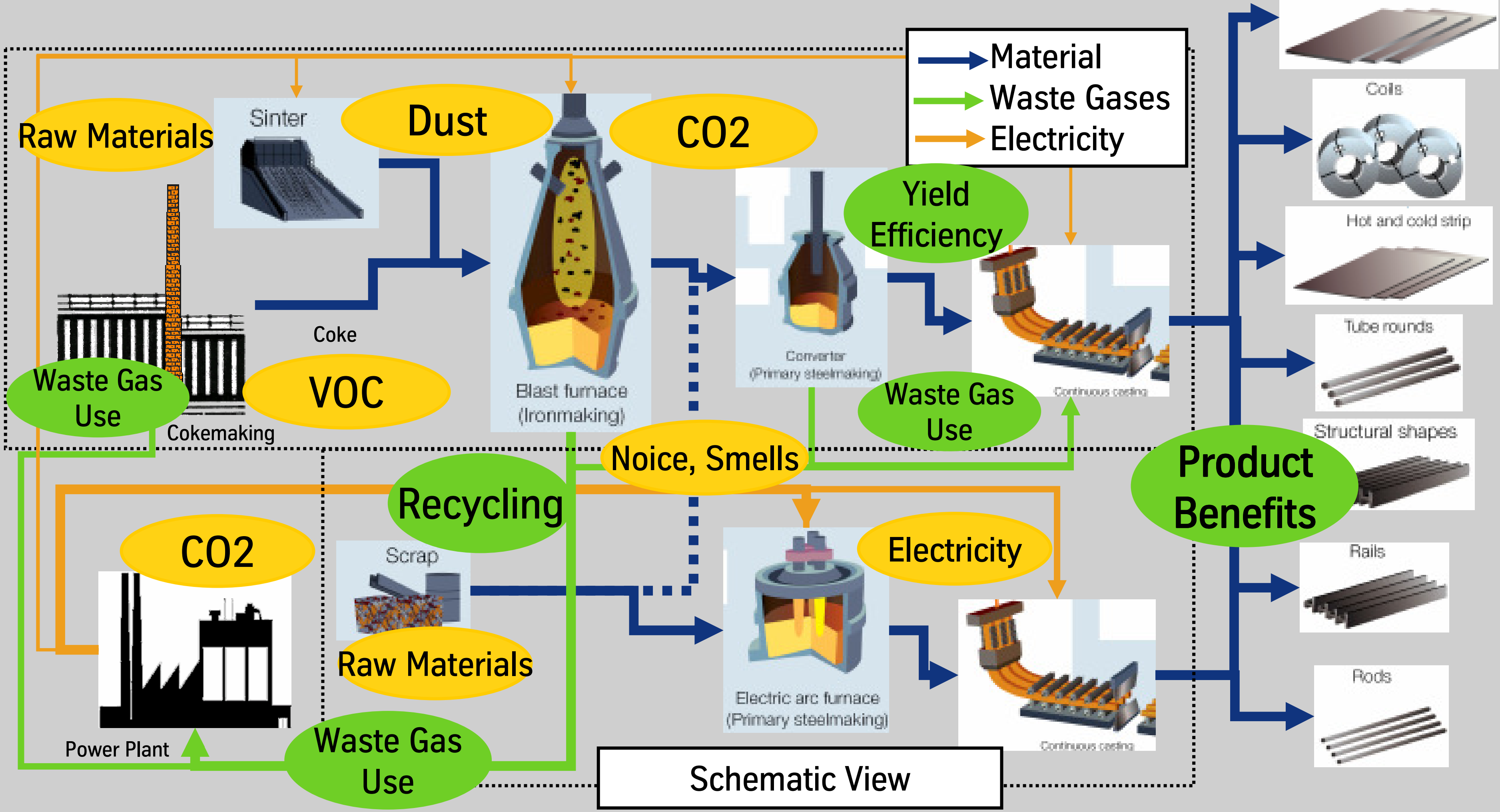


Timeframe of Operations much longer than ETS phases



Steel Production and ist Environmental and Climate Issues

After decades of optimisation very complex process.



Intelligent Steel Uses taps into huge saving potentials

Examples – Heavy Plate, Hot Rolled, Electrical Steels, Tin Plate

Heat-treated heavy plate for high performance applications

Mobile Cranes: Relation Lifting Capacity to Weight in use raised to 8:1

Grain-orientated Electrical Steel for effective energy generation

Efficiency up to 99%

HR with thicker diameters in sour gas qualities

Supports economic access to oil and gas fields under increasingly difficult conditions

Tin Plate offers innovation potential for packaging applications

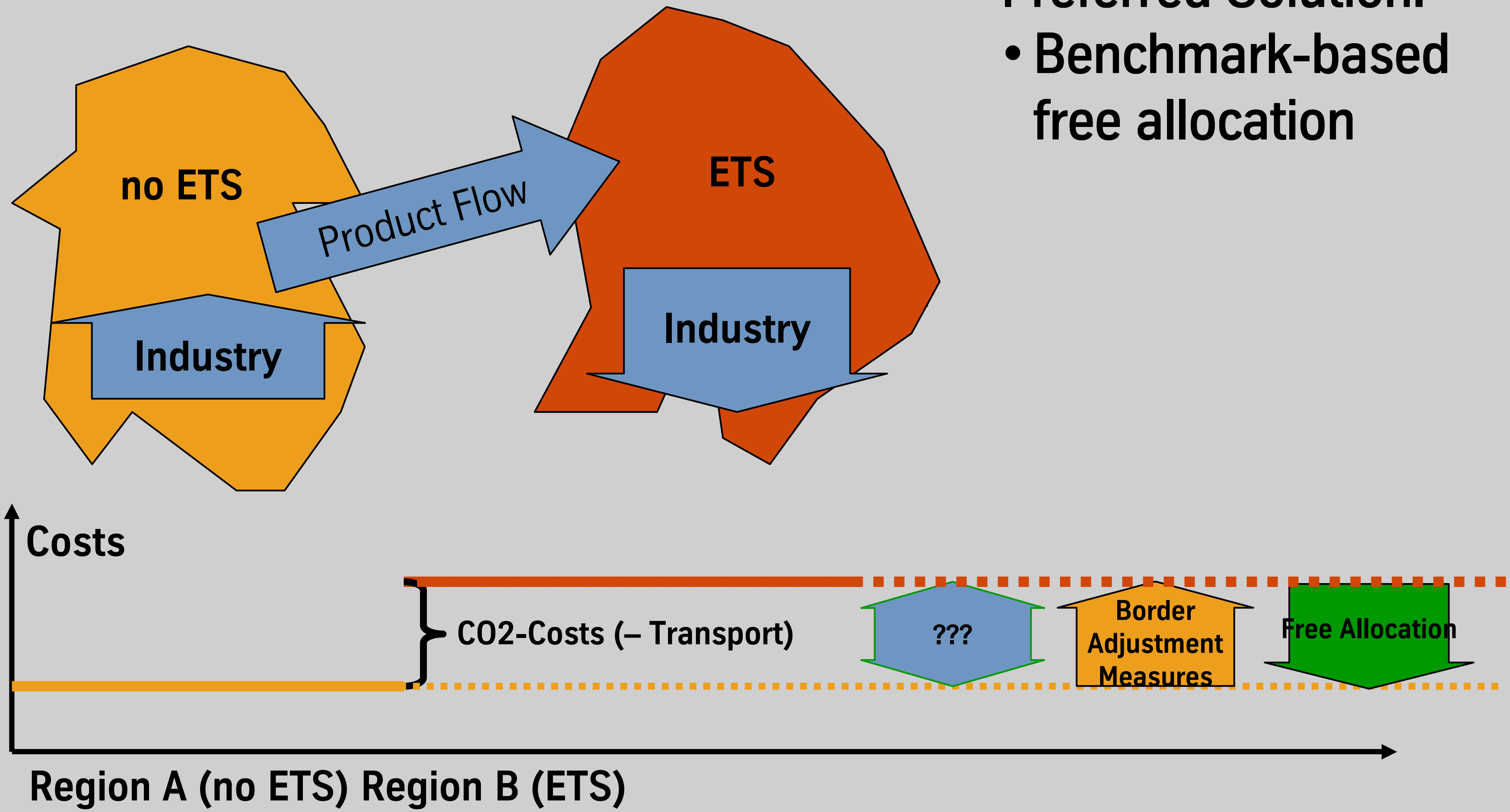
Thicknesses of 0.07mm results in extreme demands on deep-drawing capability

Carbon Leakage must be avoided – free allocation one way

But how comparable are benchmarks?

Preferred Solution:

- Benchmark-based free allocation



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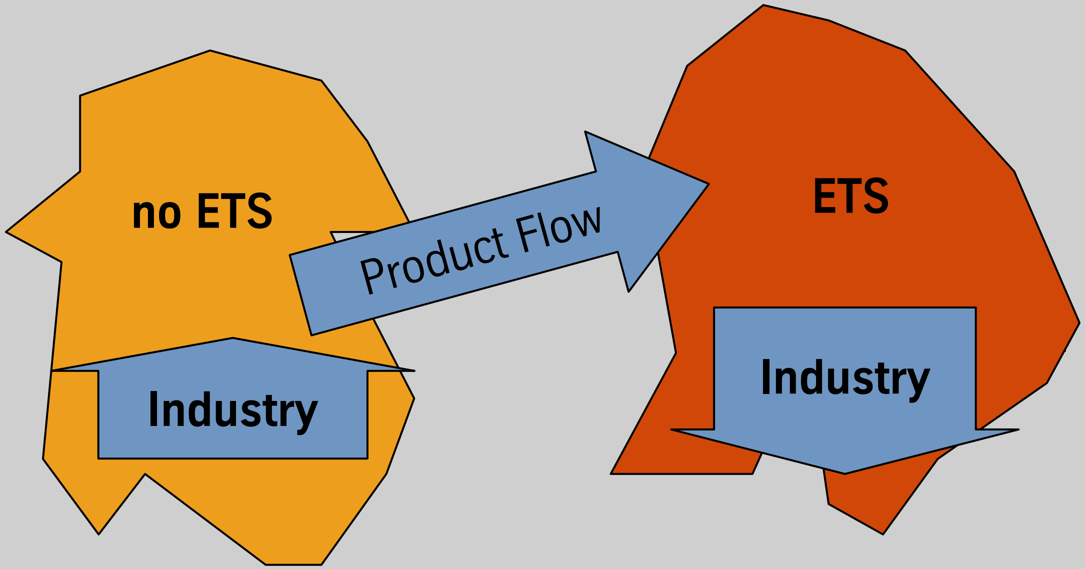

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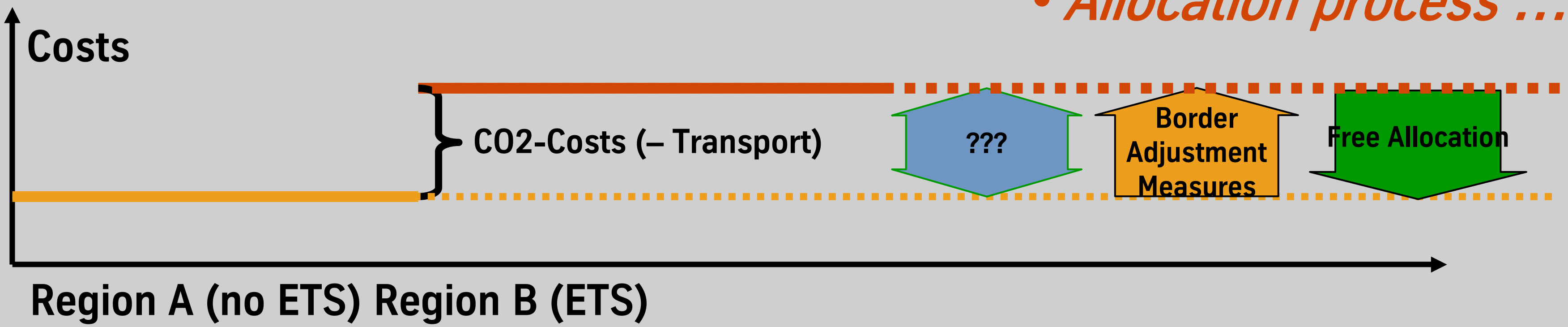
Benchmarks:
- 10% best ?
- Average performer ?
- Political number ?
- *Allocation process …*



Benchmarks, Cap and Carbon Leakage

Benchmarks are important, but only part of the story…

Climate Issues

- Cap setting
    - Benchmarks to identify the „doable“ (Bottom-up approach)
- Sharing the burden: Sectoral crediting, CDM, etc.
    - Benchmark to identify the reference

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Competition Issues

- Benchmark-based Allocation
    - Global comparability and competitive level-playing field requires
        - Same benchmarks (but regional particularities?)
        - Same allocation rules (costs and amounts)
- Benchmark-based Border Adjustment Measures
    - Company, Country or Global?

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Technology Issues

- Benchmark CO2 emissions of technologies (x $t_{CO2}/t_{product}$); or
- Benchmark existence of technology (x out of y technologies from list)

Viaduc de Millau