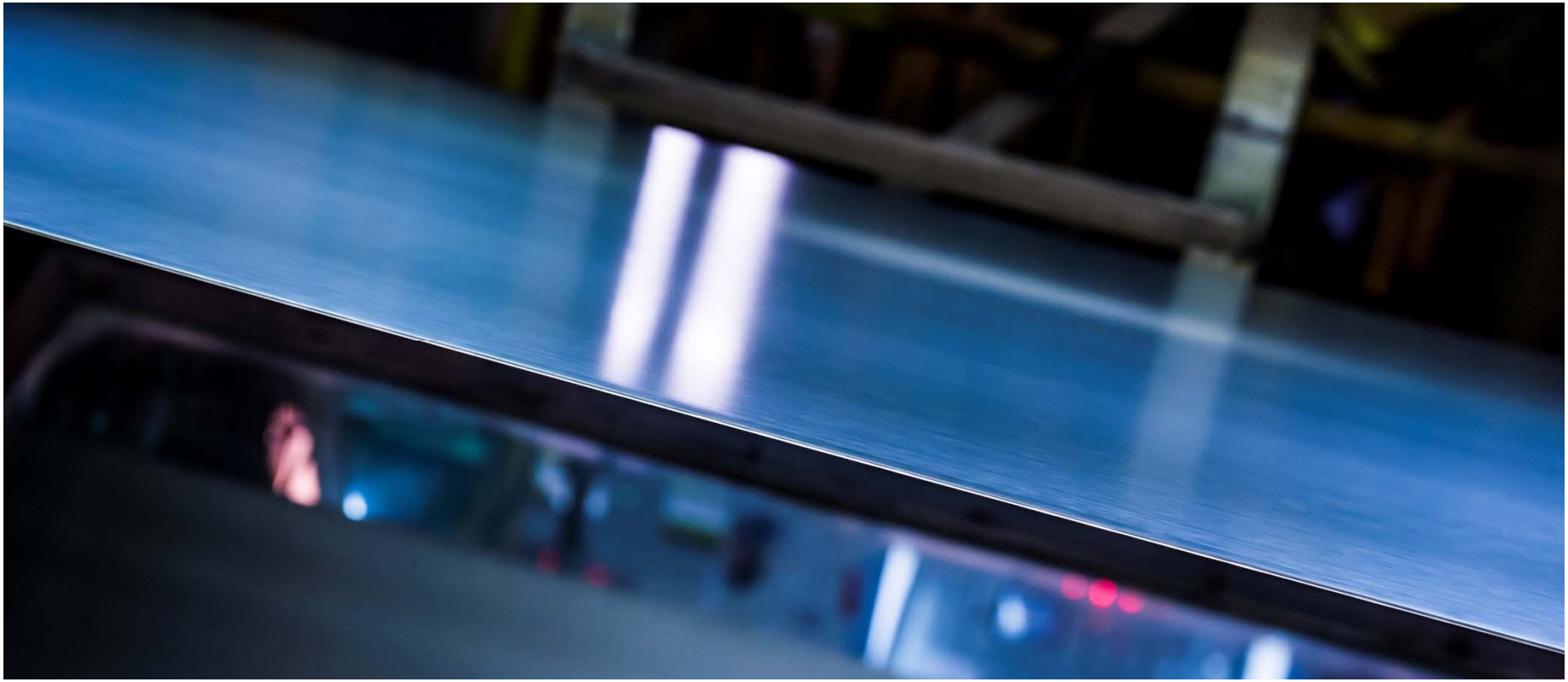
worldsteel
ASSOCIATION

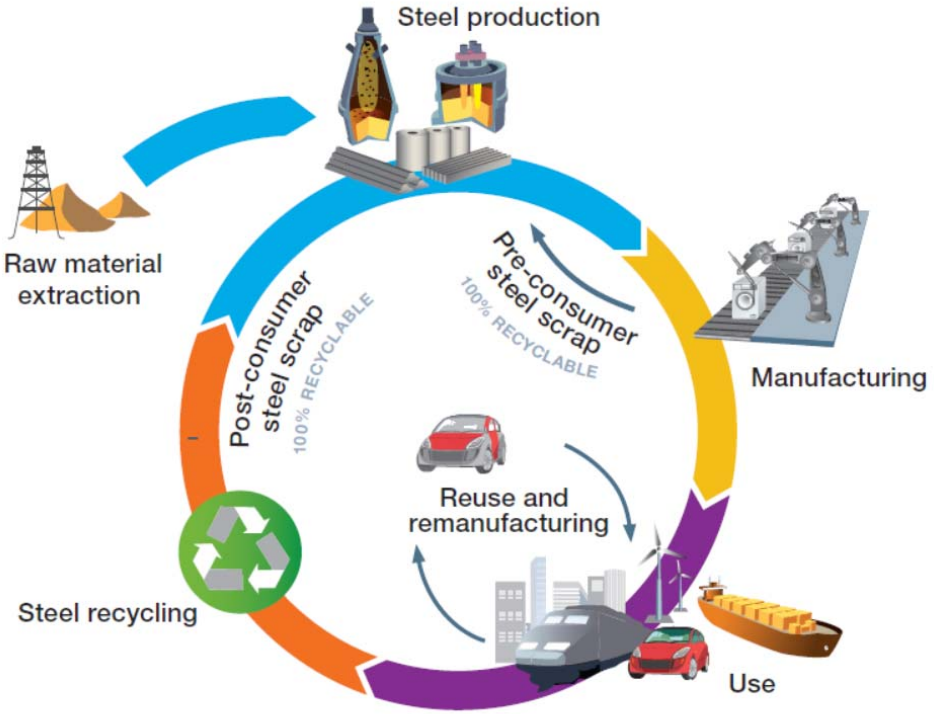
Steel and CO_2 – a global perspective

IEA Latin American Expert Dialogue
22nd August 2018 Sao Paulo



Steel in use

- Steel is the worlds most recycled material and also uniquely positioned to contribute to the transition to the circular economy
- Any balanced consideration of the Environmental impact of steel needs to look beyond the issue of direct emissions



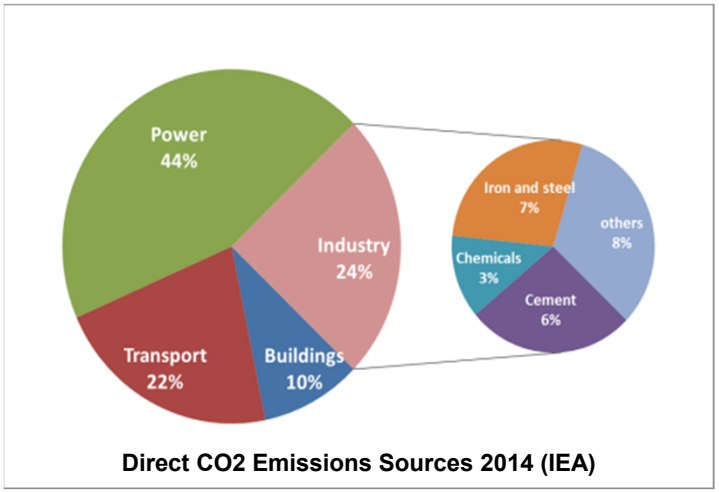
Steel enables mitigation

Almost every GHG mitigation technology **relies on steel**

Thermal and renewable energy, electrification, mass transport, smart cities, shipping, CCS, hydrogen…

The goals of the Paris agreement cannot be met without Steel

Ways of visualising steel's total CO_2 + others = GHG footprint



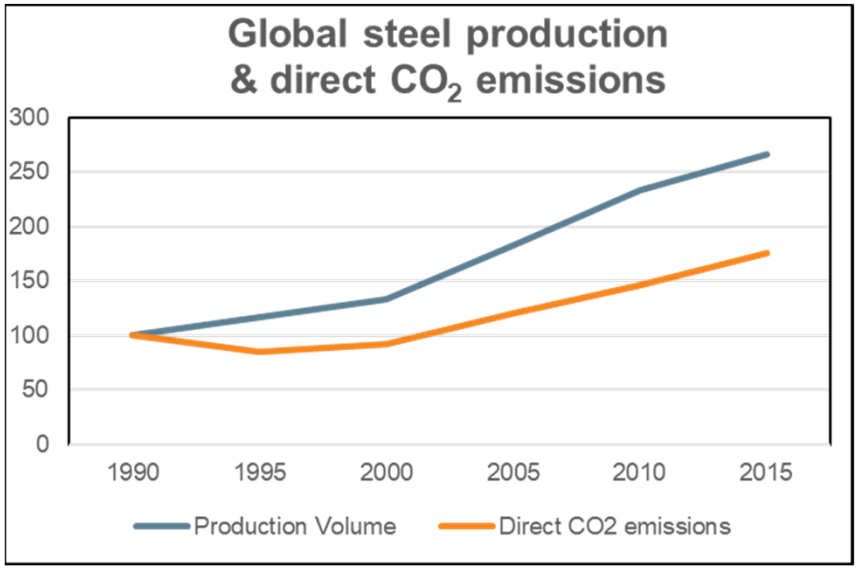
Direct CO2 Emissions Sources 2014 (IEA)

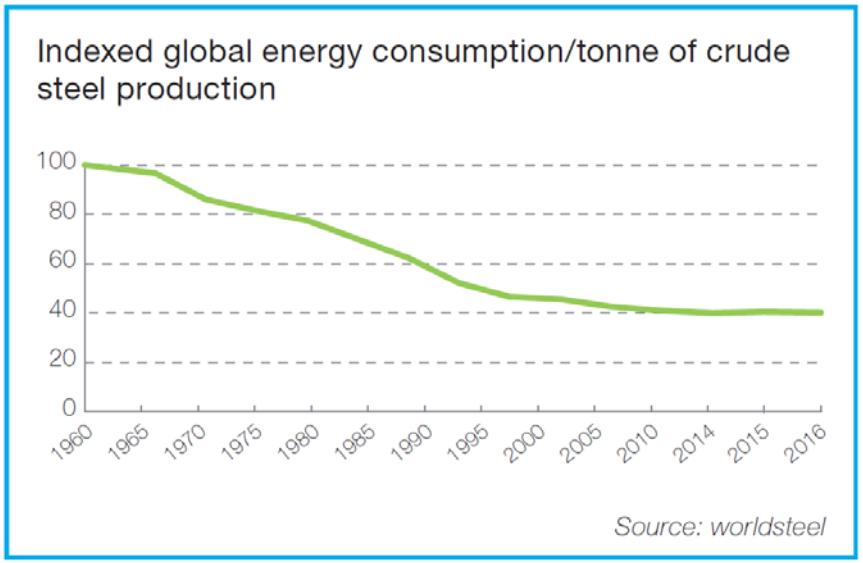
- In ore based steelmaking most emission are Scope 1 (direct). Scrap based steelmaking is mainly Scope 2 (electricity purchase and use).

- Direct emissions from our industry represent about 7% of the global total

Steel industry has seen steady gains in GHG efficiency

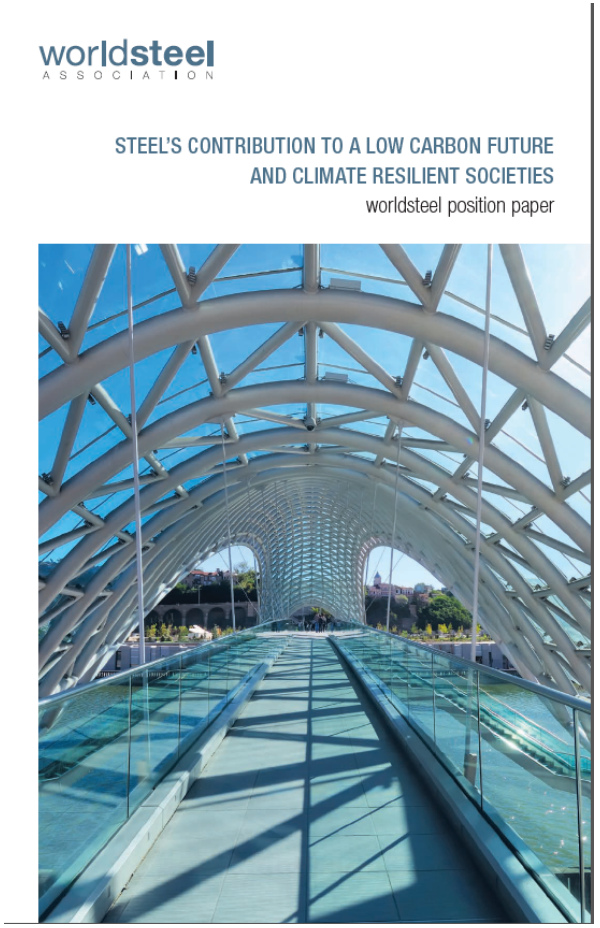
- In ore based steelmaking carbon is primarily used as a reducing agent, not a source of thermal energy
- Energy constitutes a significant portion of the cost of steel production, from 20% to 40%
- 1990 - 2015 BOS/EAF Volume increased by 166%, emissions by 77%
- **Steel is now more CO_2 efficient than ever before.**



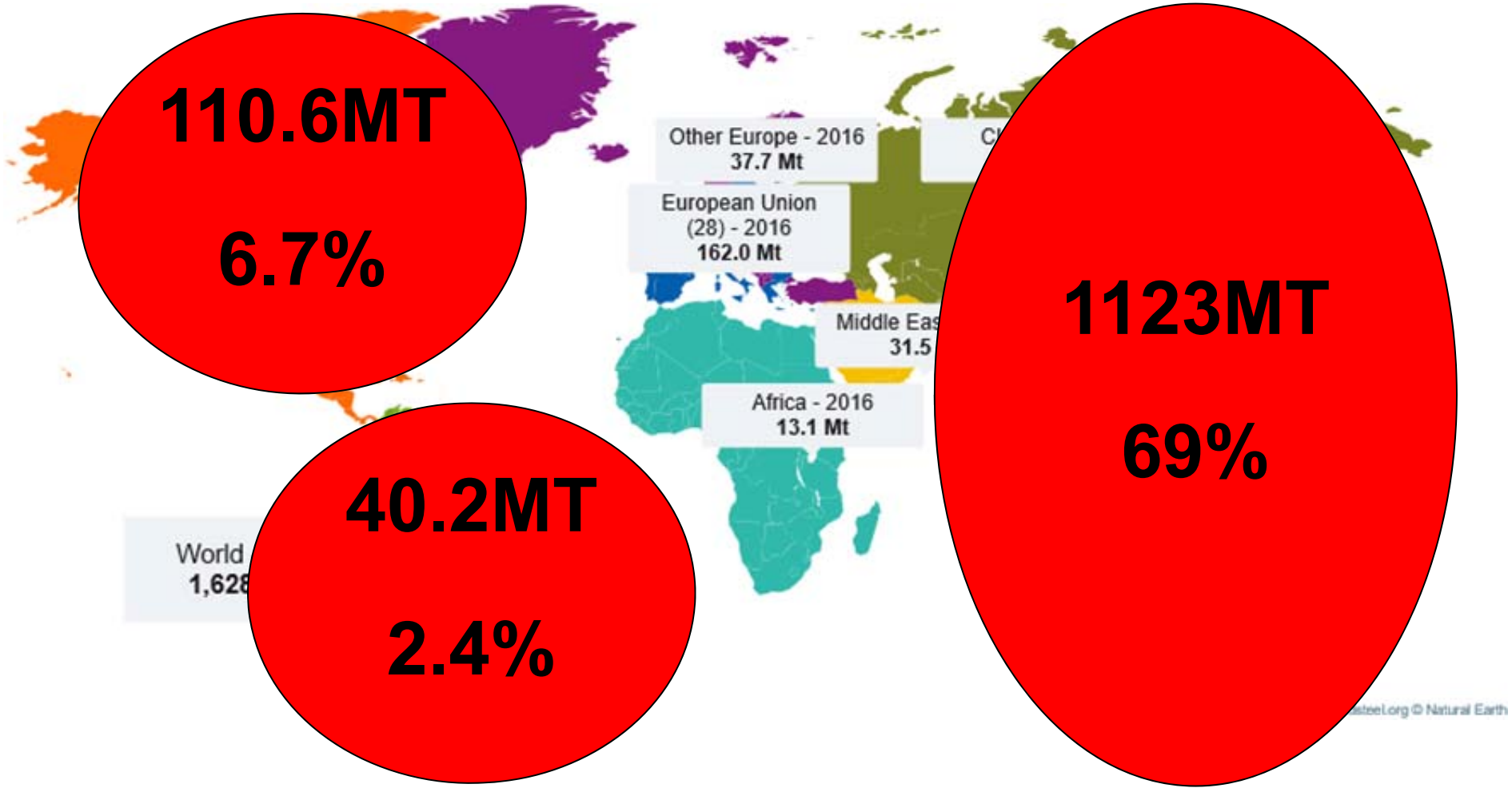


Steel industry position

- Governments need to recognise and embrace the importance of a strong and healthy industrial base and engage with the industry when developing climate policy
- Steel is a CO_2 and energy intensive, but highly competitive industry that enables CO_2 mitigation in other sectors. Inequities introduced by carbon pricing mechanisms could jeopardise fair competition
- A life cycle approach is an important tool for future environmental policy
- Governments should promote and encourage a circular economy approach
- Progress in breakthrough technology development in steelmaking and implementation must be maintained or accelerated requiring the financial burden to be shared.



Crude steel production in million tonnes - 2016



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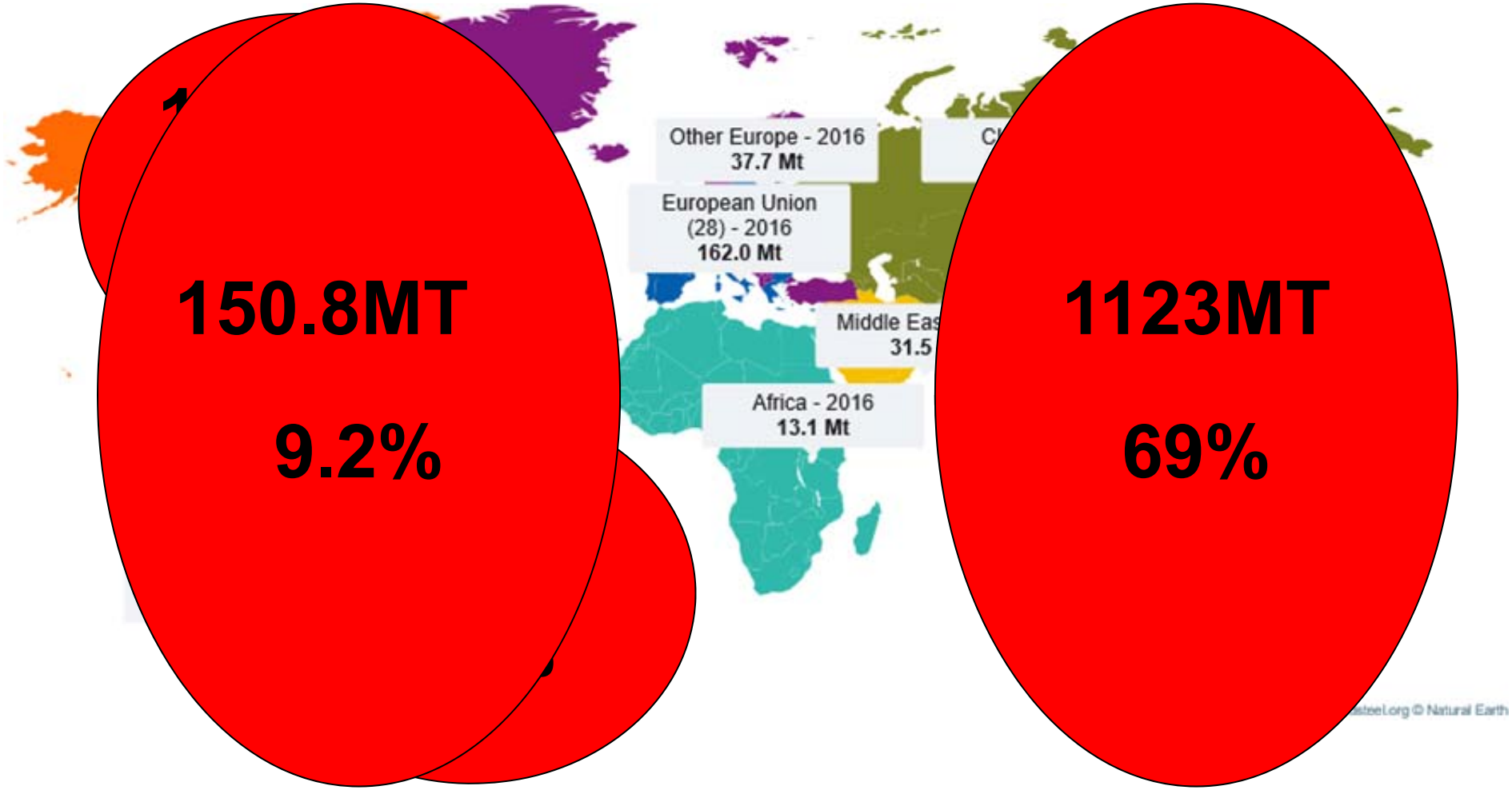
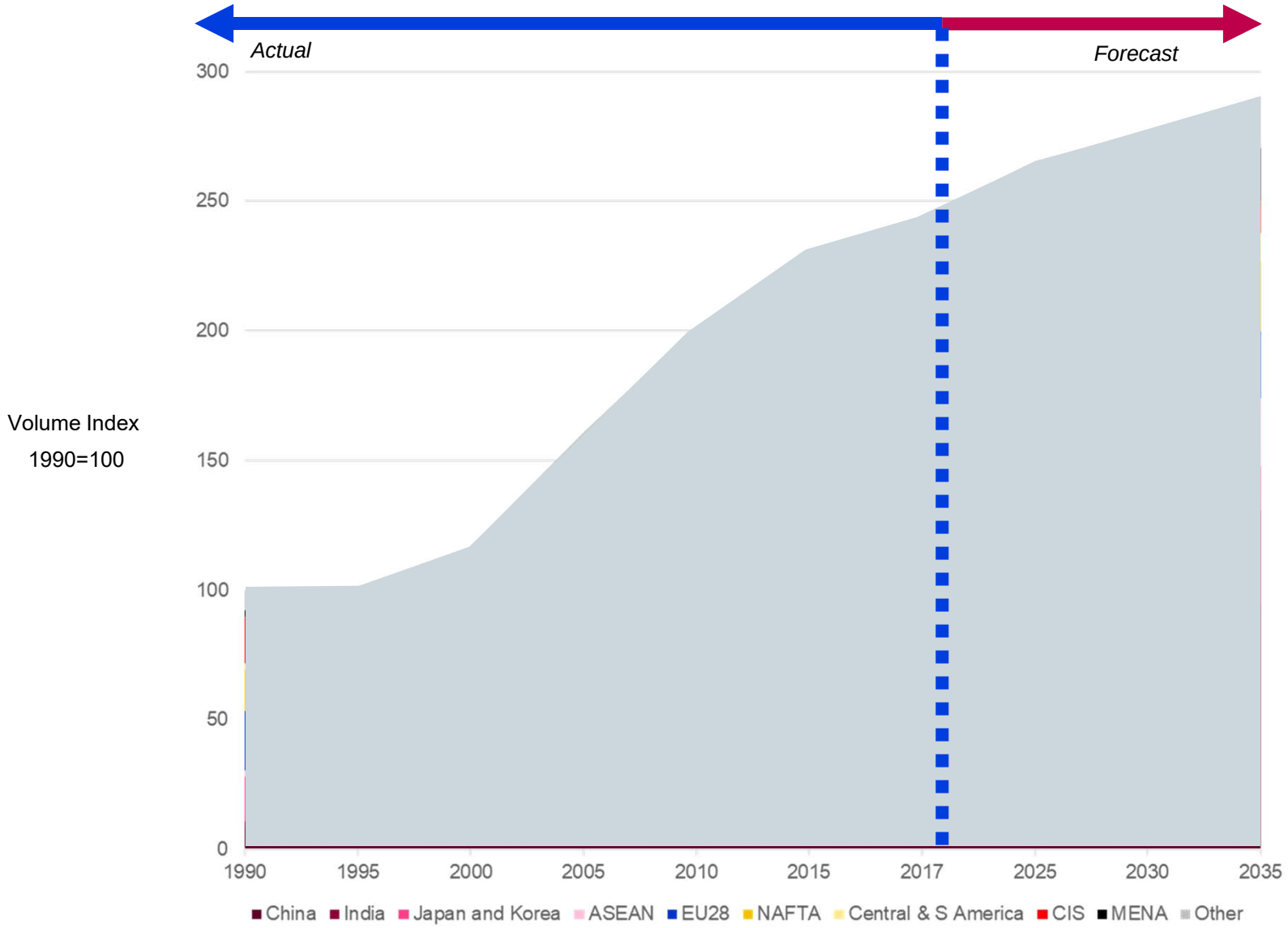


Finished Steel Demand – regional trends



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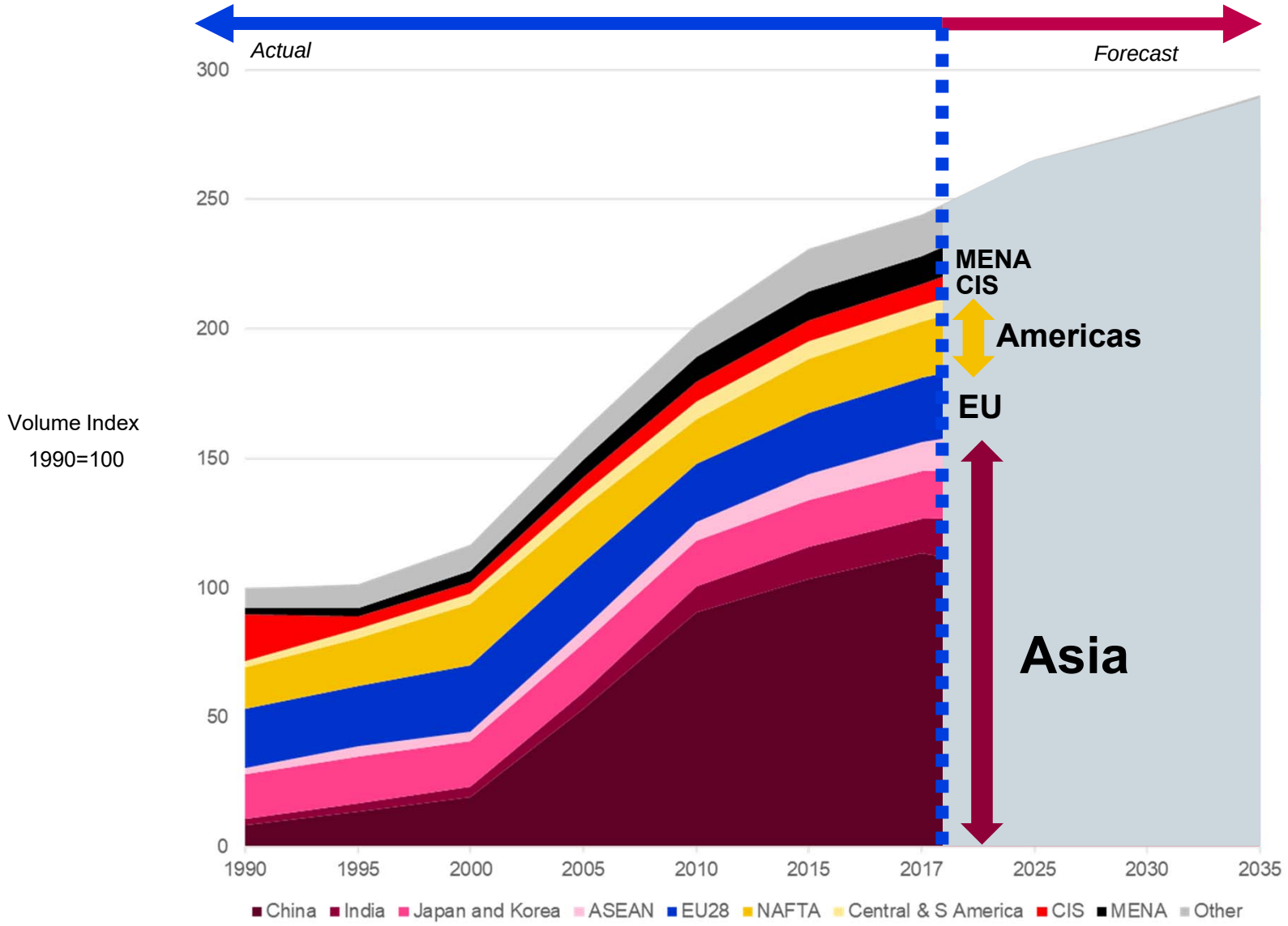

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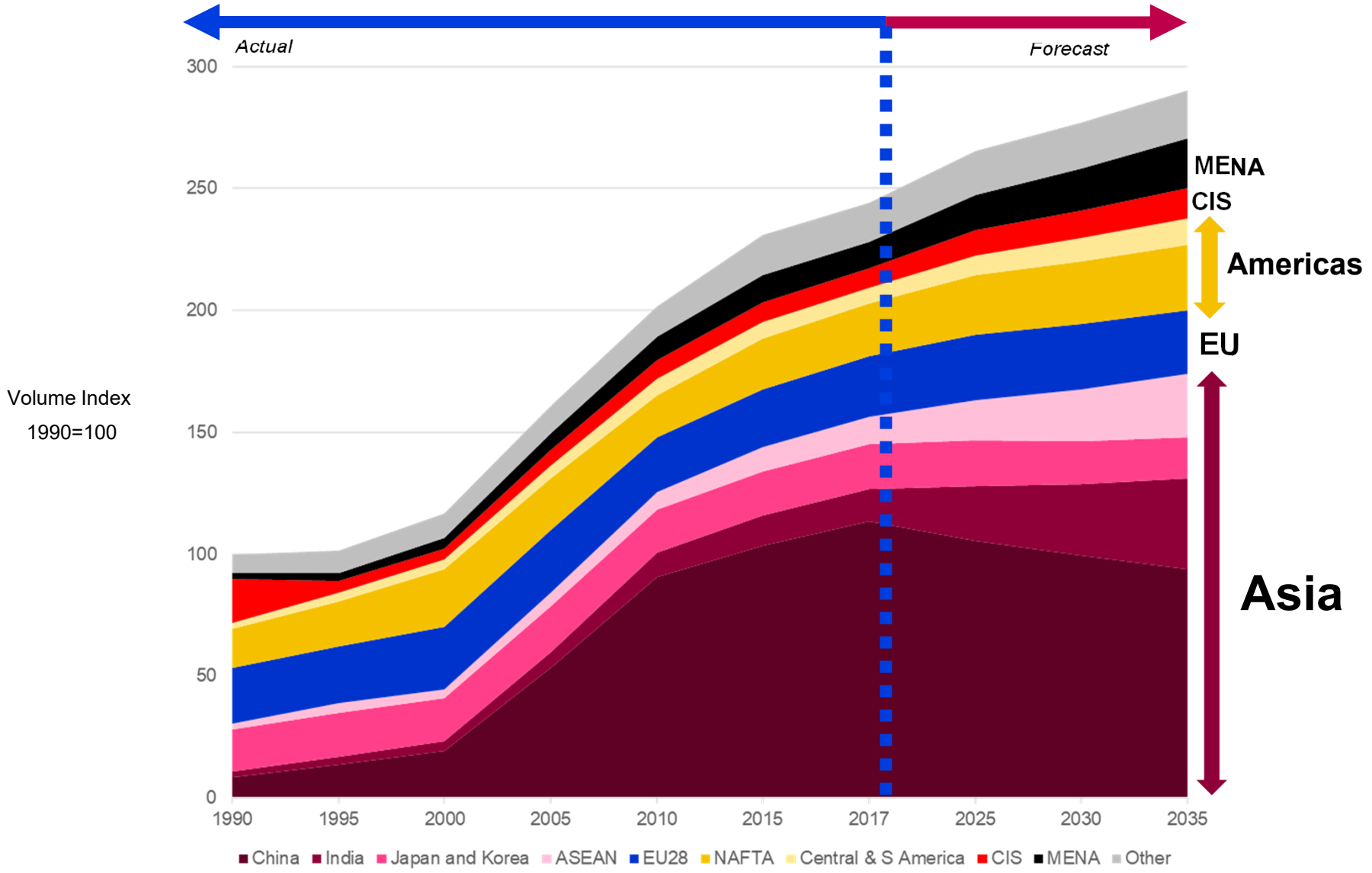
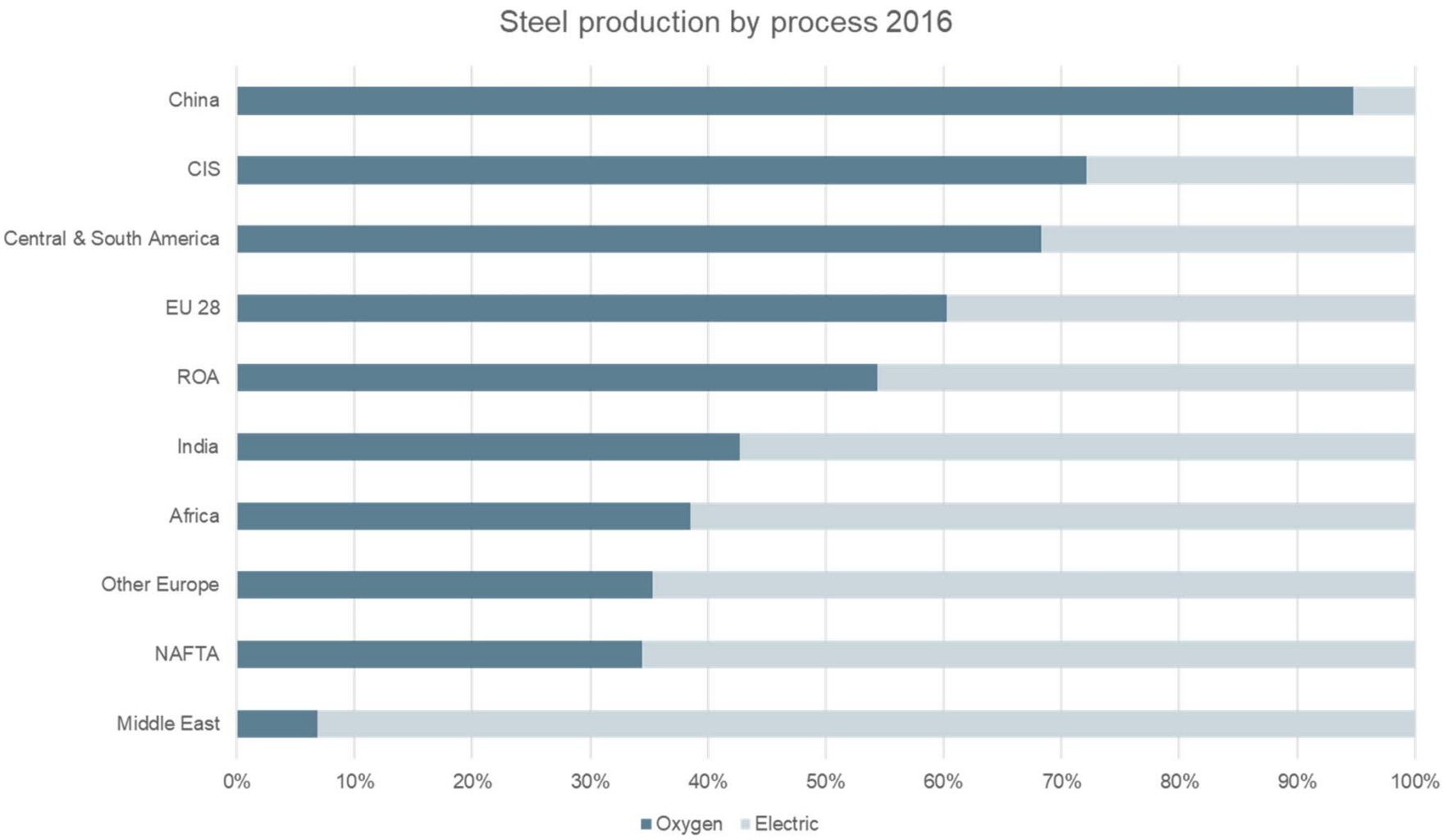
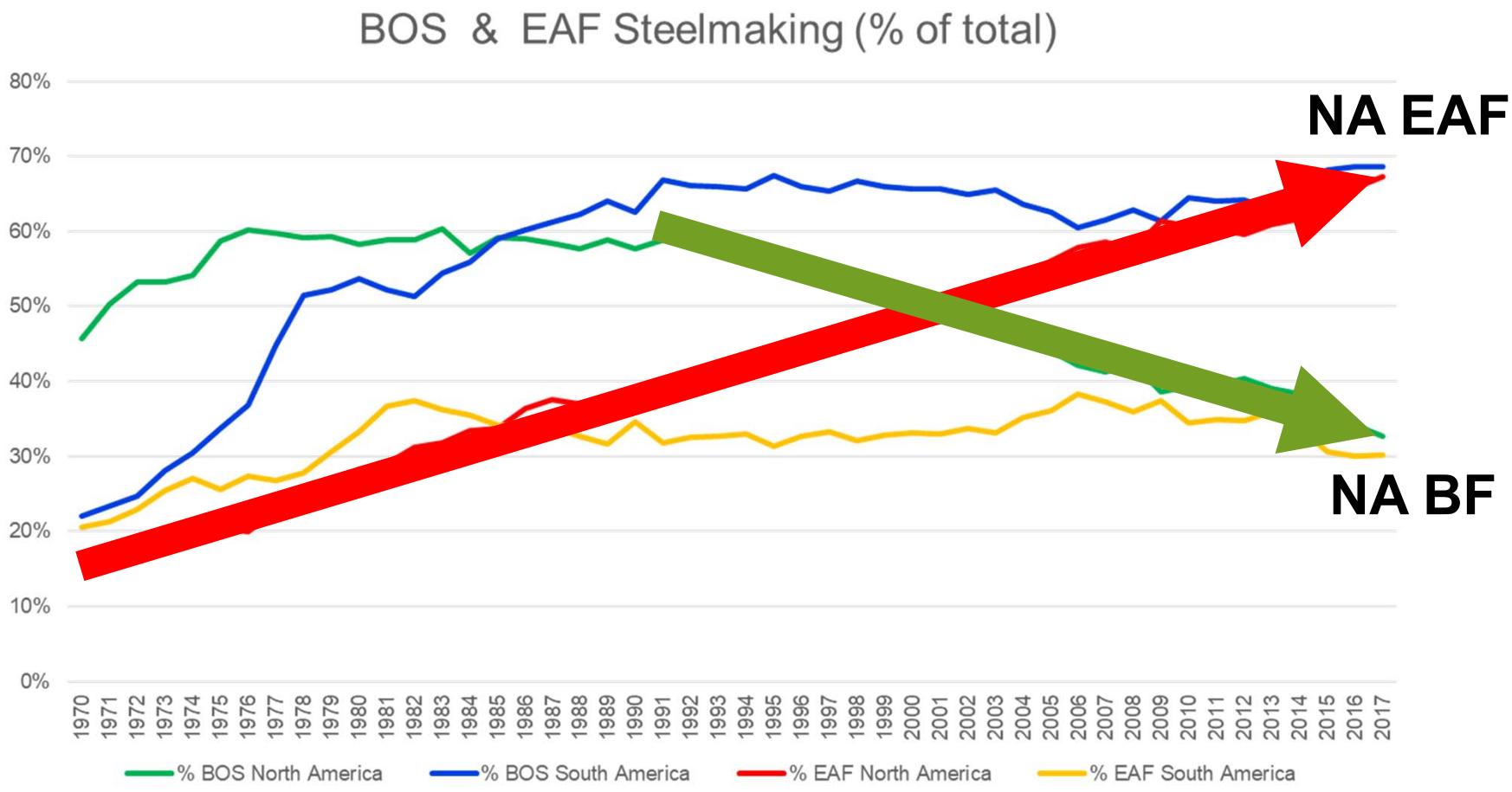


Steelmaking technology varies by region



The BF/EAF balance in the Americas is shifting



- In North America EAF steelmaking has been growing for 50 years

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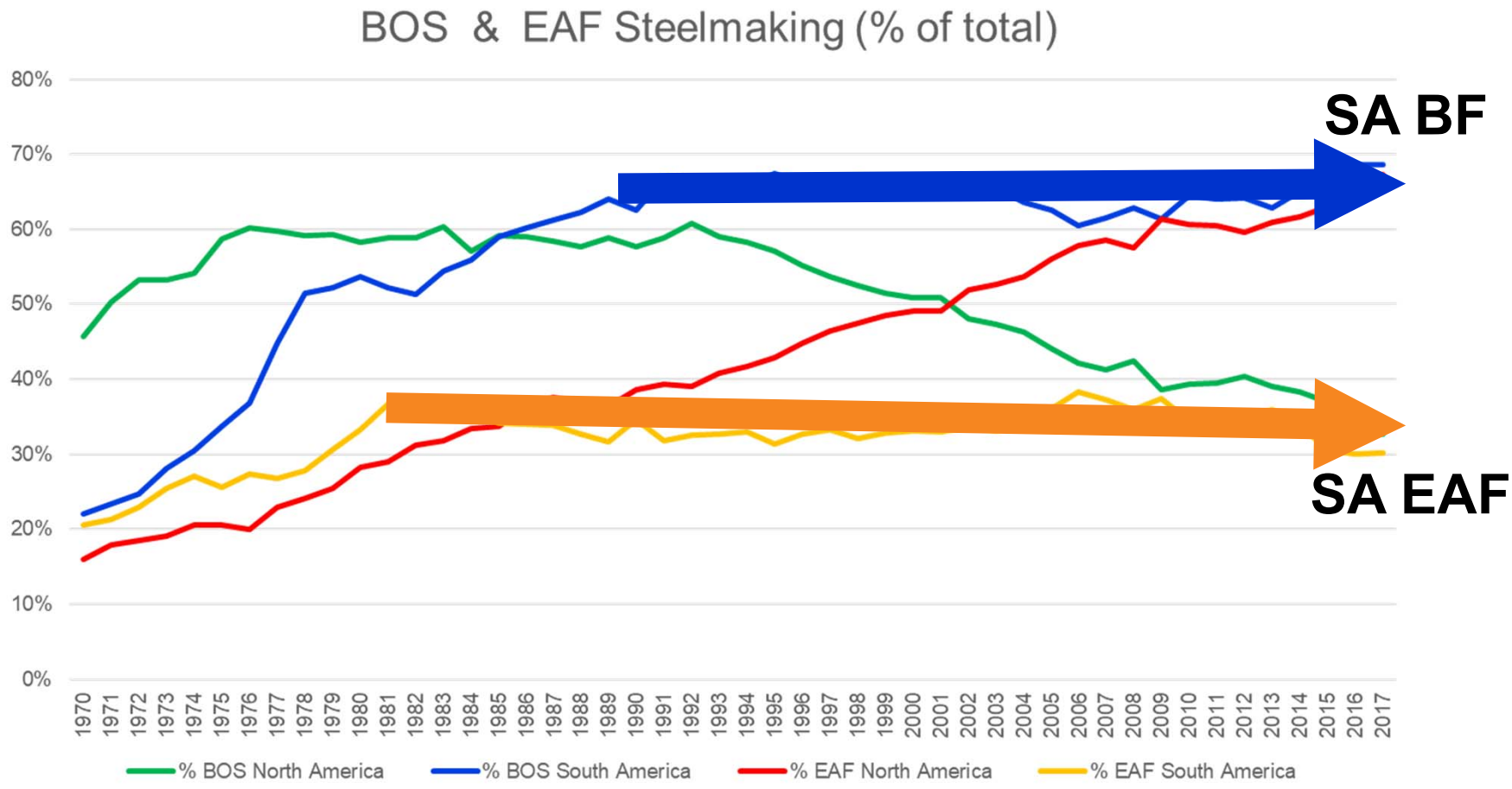
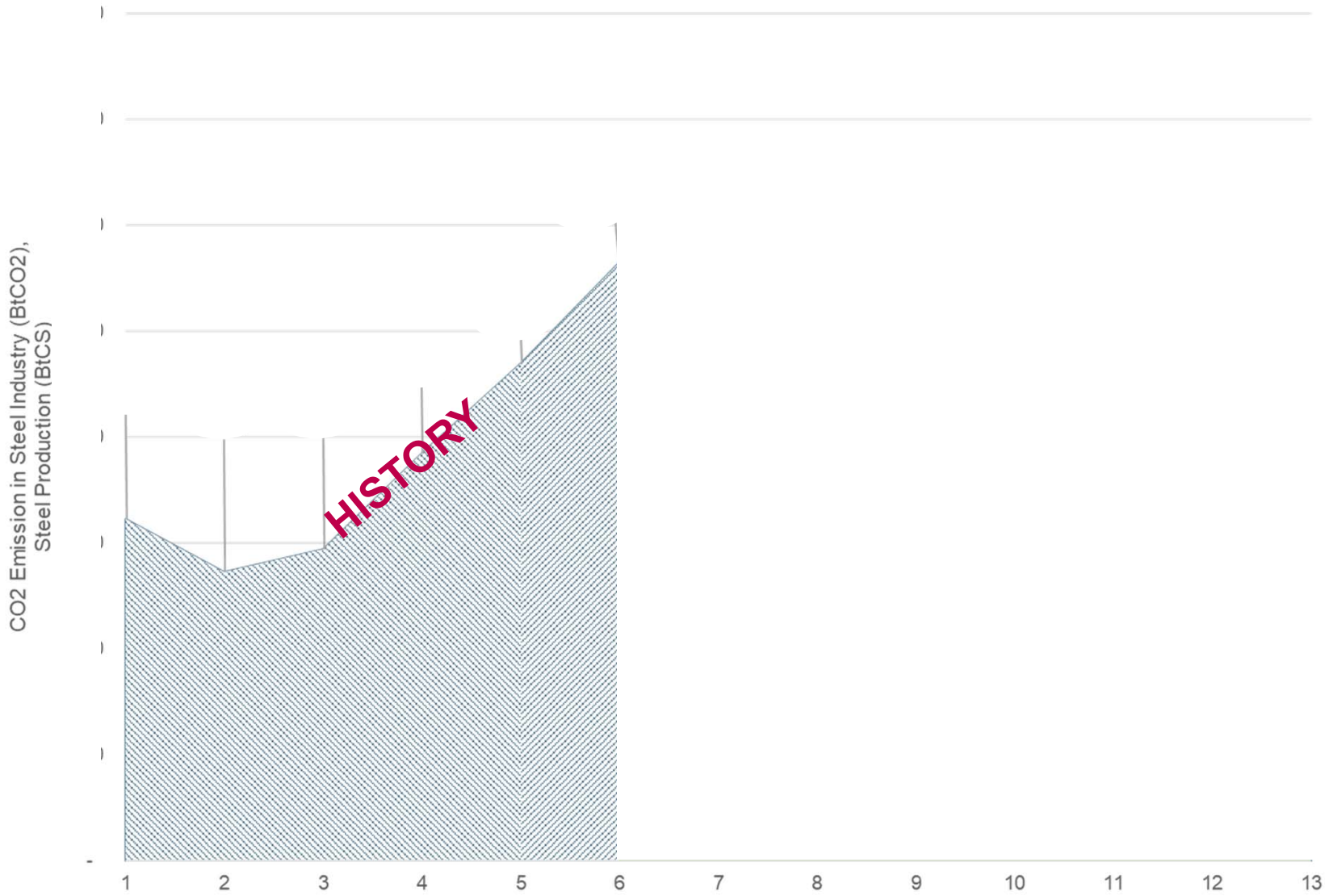


- In South America EAF/ BF steelmaking has been stable

Improving performance levels – CO2 emissions from steelmaking



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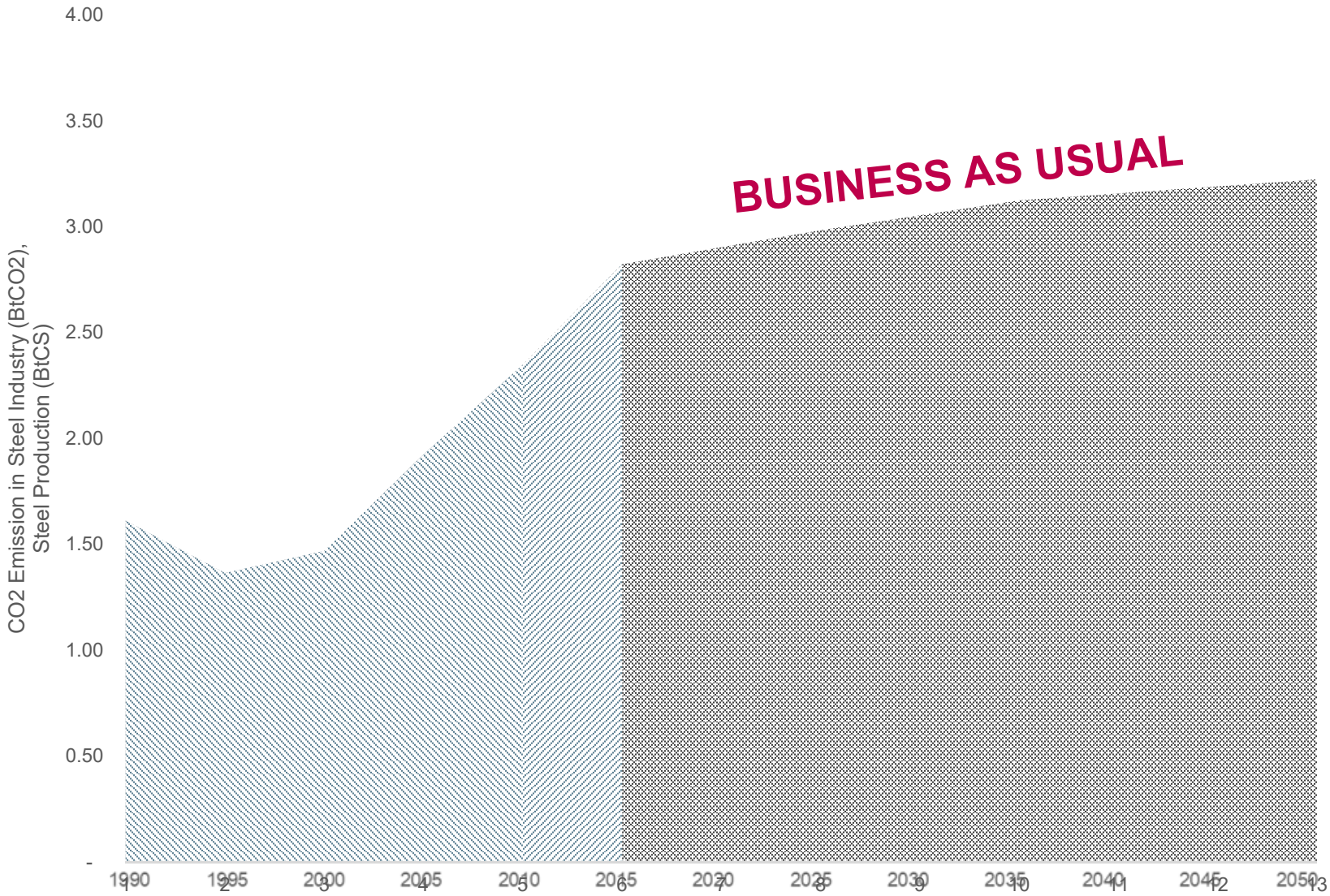

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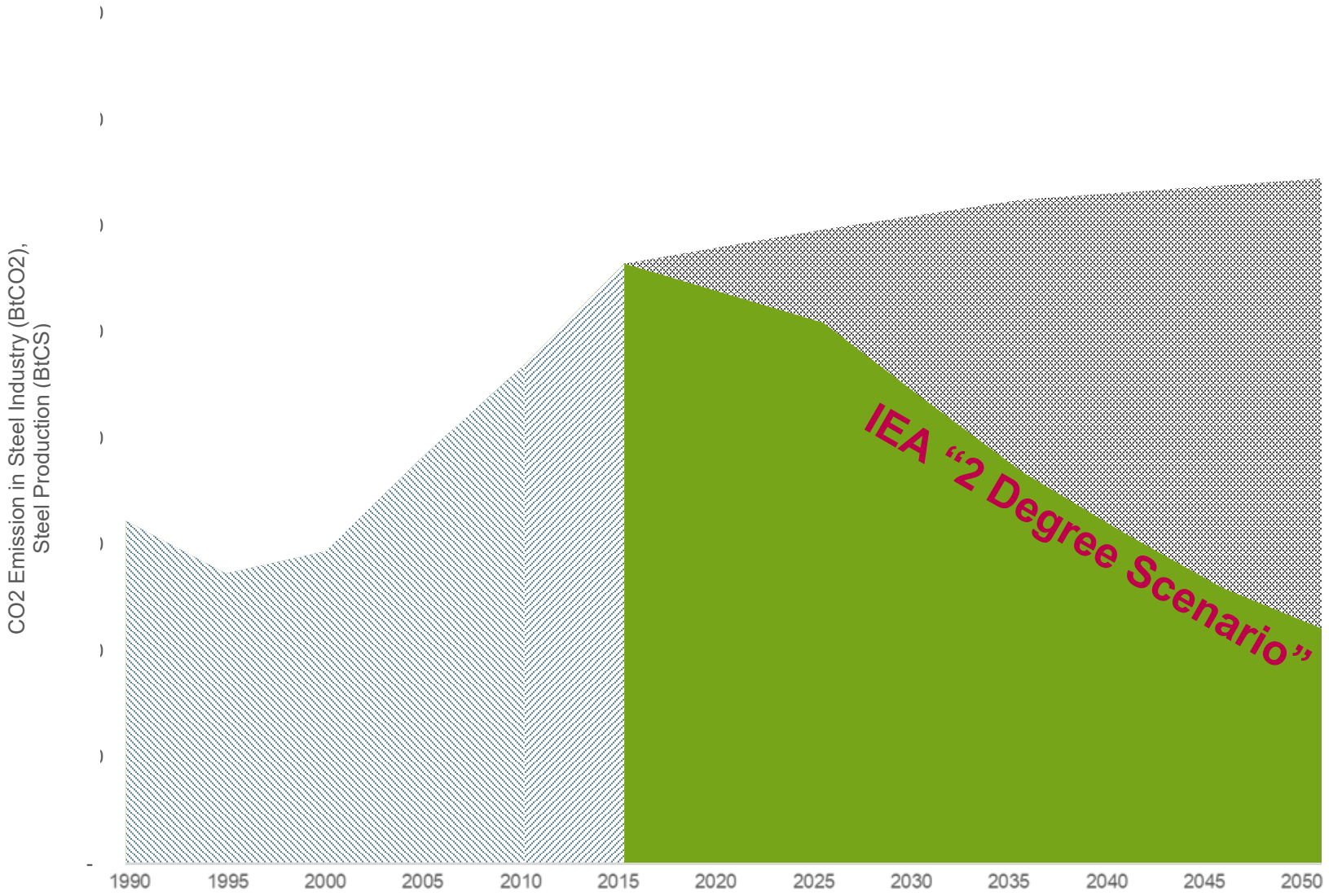

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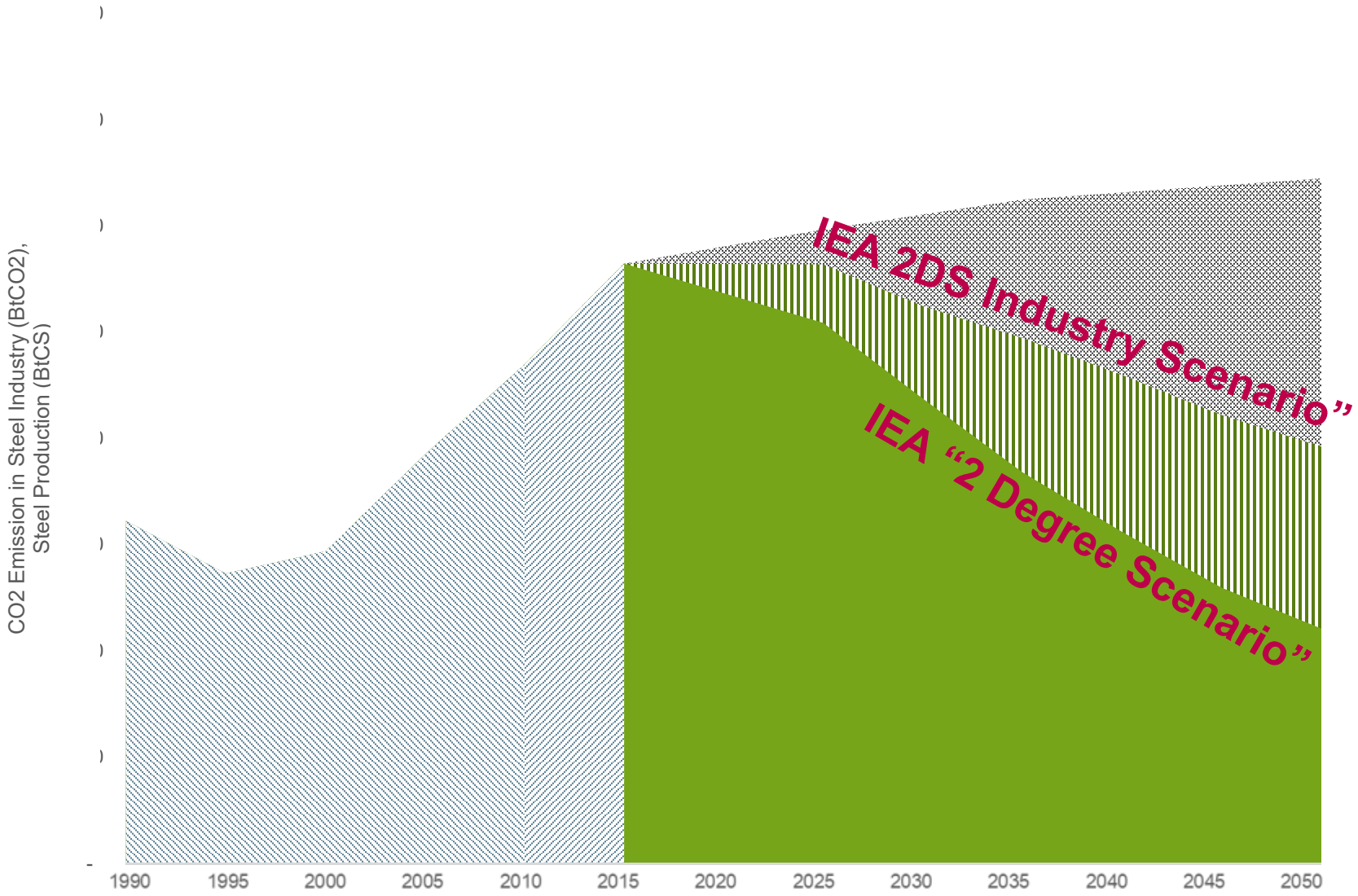

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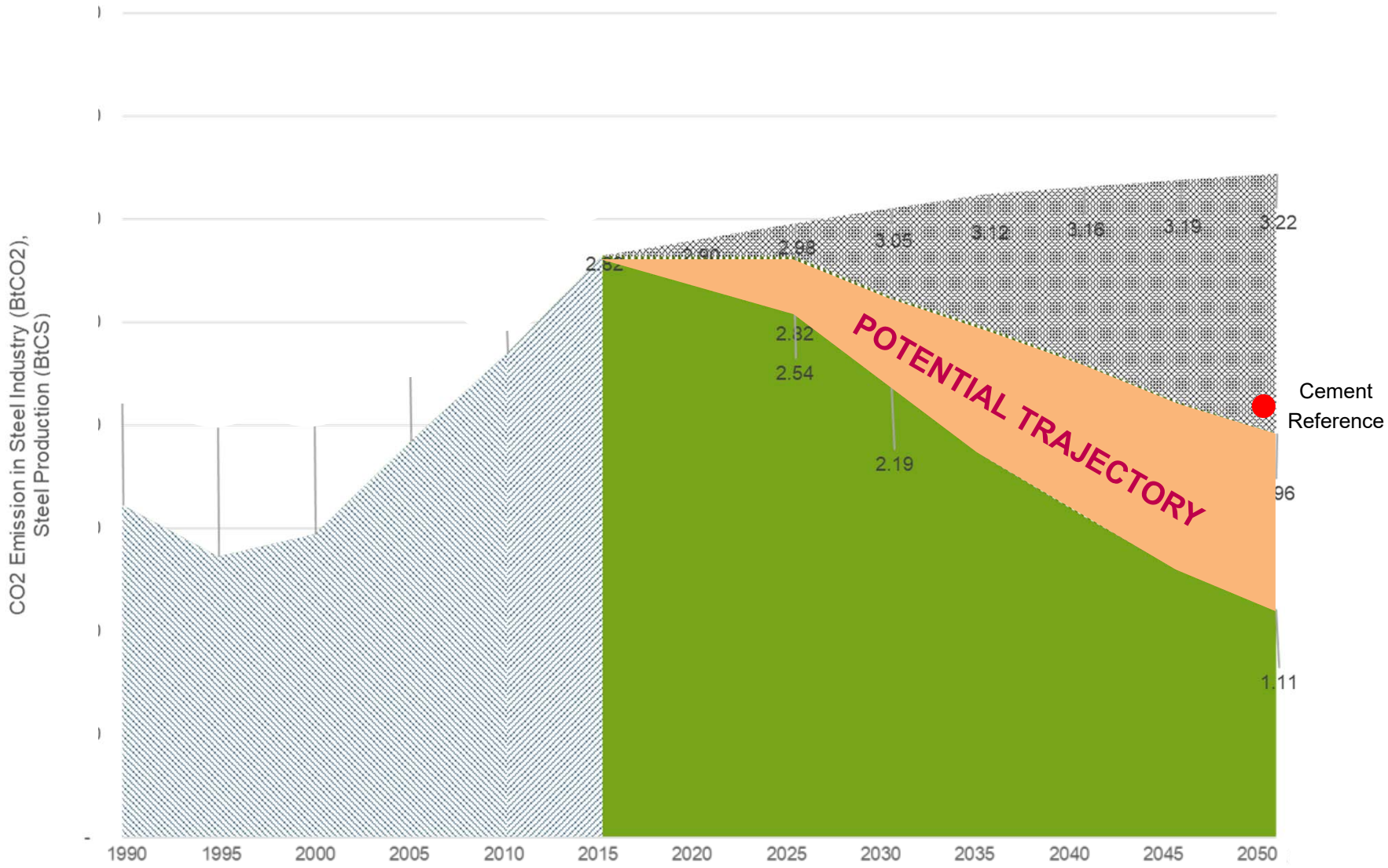

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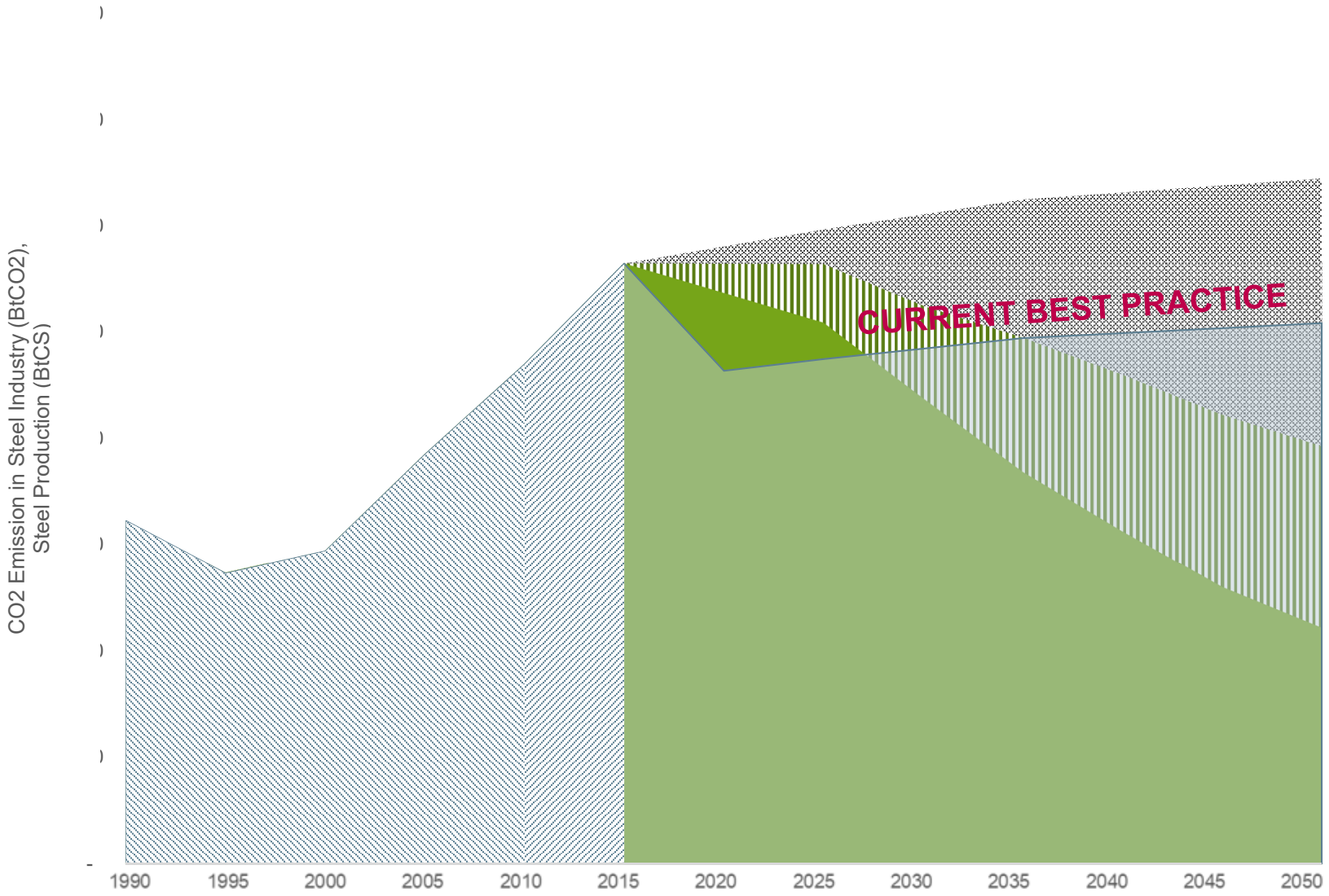

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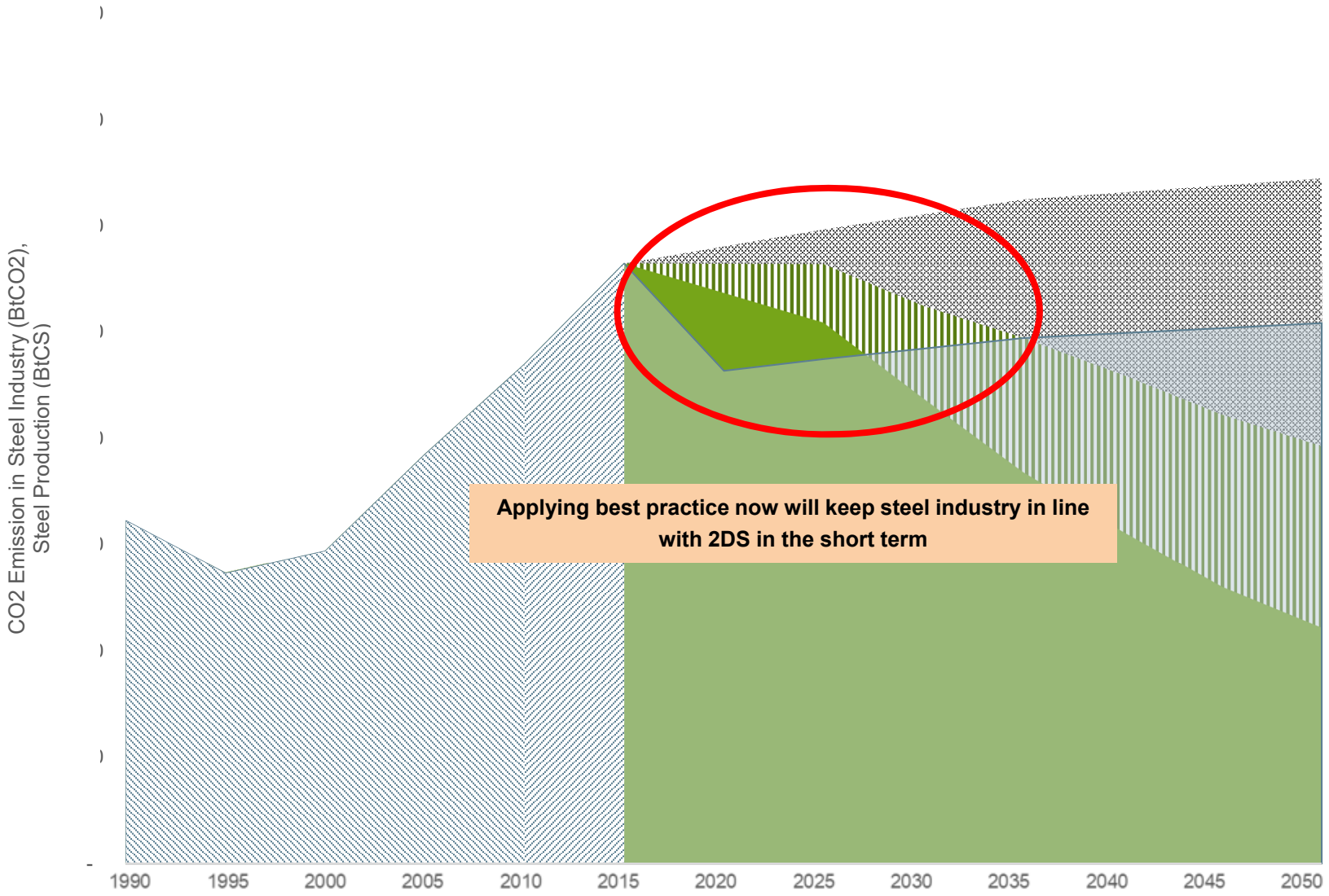
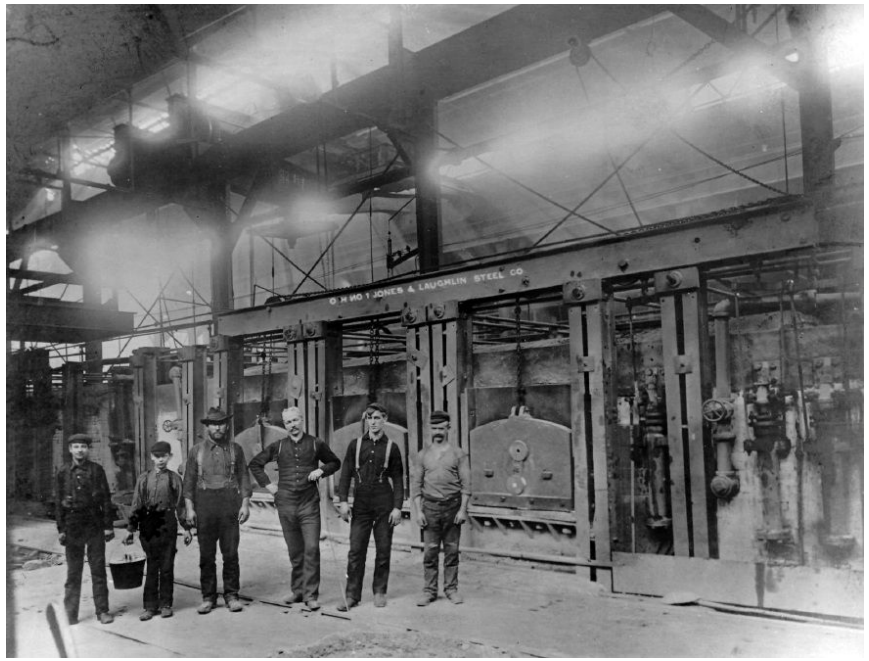


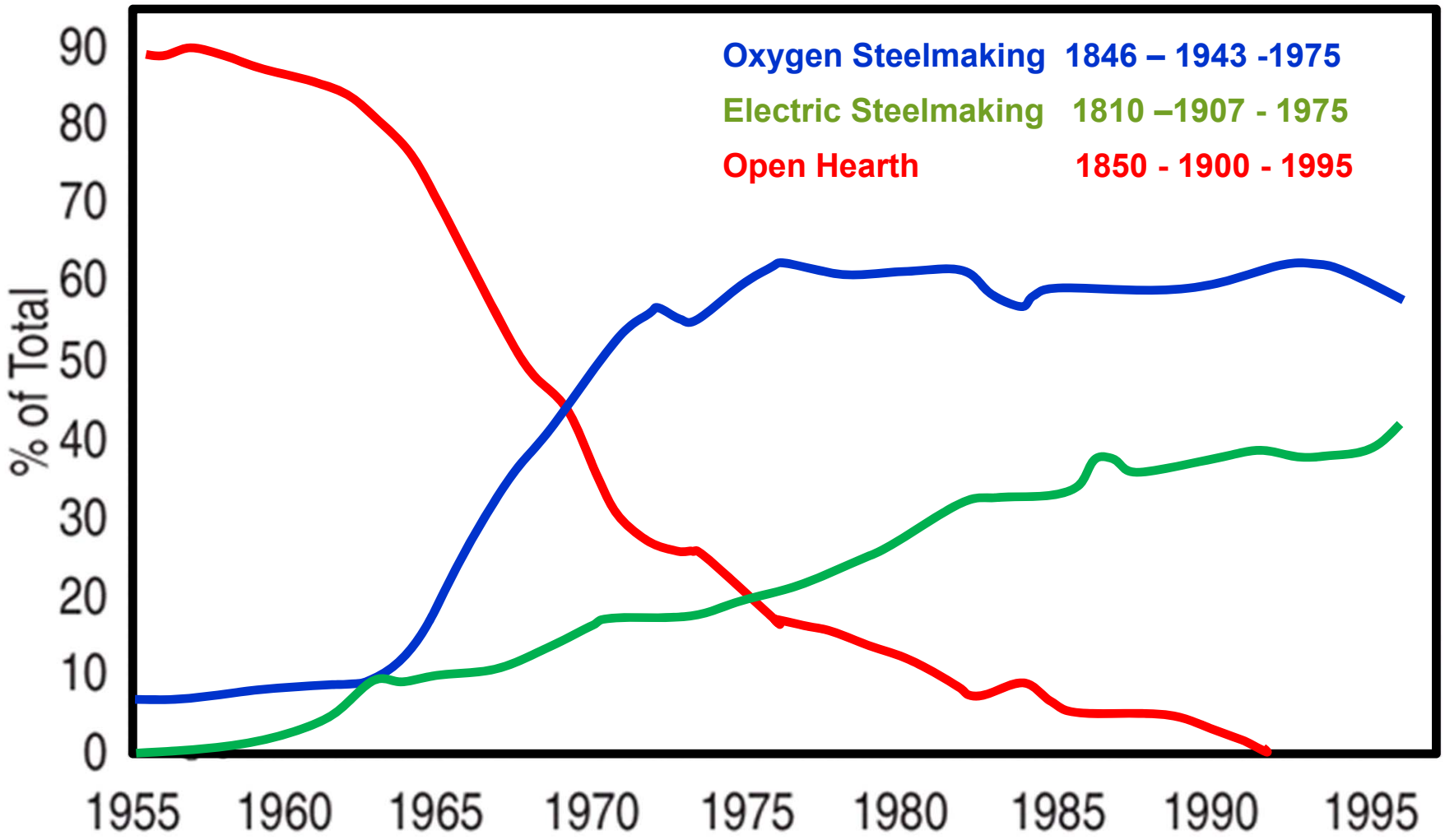
Breakthrough technology in steelmaking



Open Hearth Steelmaking

BOS Steelmaking

Steelmaking technology has always advanced



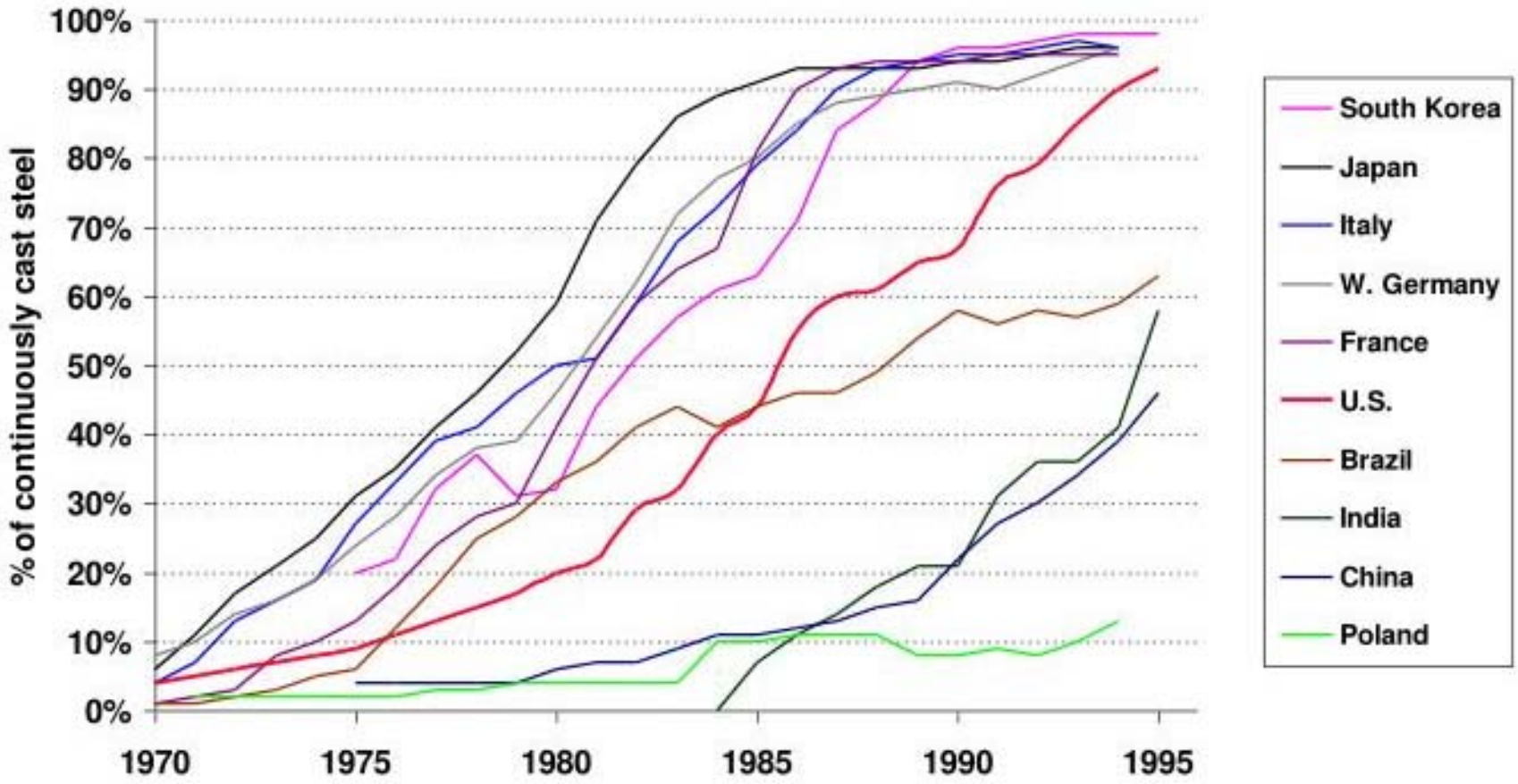
Breakthrough technology in casting

Ingot casting

Continuous Casting

Steelmaking technology has always advanced

Adoption of Continuous Casting 1970-1995



TKS BF8

Commissioned 2007

Euro 200 million

Replaced a 41 year old BF

Expected to last 20 years

Climate Action Recognition

- worldsteel collects and collates emissions data from steel producers
- Scheme recognises that a steel producer has fulfilled its commitment of the worldsteel CO_2 data collection program
- Data must be complete, verified and approved

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Company	38	49	45	51	52 (33*)	50 (37*)	49 (37*)	50 (36*)	48 (35*)
Site	188	207	208	212	212	210	212	215	198

* Companies that submitted data for 5 consecutive years

- Participants are noted on worldsteel website
- CO_2 Data coverage (Crude Steel production)
  - Including China : 23.0%, Excluding China : 45.6%

Examples of key factors that affect CO2 intensity

- Raw materials selection (Iron-ore quality, coal quality)
- Reducing agent rate: (Coke + PCI + other fuels)/ t Hot Metal
- Switching into carbon lean or Hydrogen containing fuels: Coke → Coal → Natural Gas & H2.
- Increase in PCI (part coking coal and coke replacement)
- Natural gas injection into BF (PCI replacement)
- Heat or energy recovery, from processes and by-products.
- 100% utilisation of by-products

Source : worldsteel analysis

Summary

- Steel is an essential mitigator of emissions in all other sectors
- However producing steel does result in GHG emissions
- The Steel Industry must play its part in achieving the goals of the Paris Agreement
- Efficient, safe and well run plants are also environmentally efficient plants
- worldsteel member's are committed to achieving top 15% performance to gain the time to develop breakthrough technology
- We need to understand why the best plants do so well
- Longer term, there is need to develop breakthrough technology.

Thank you for your attention.

For further information contact:

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