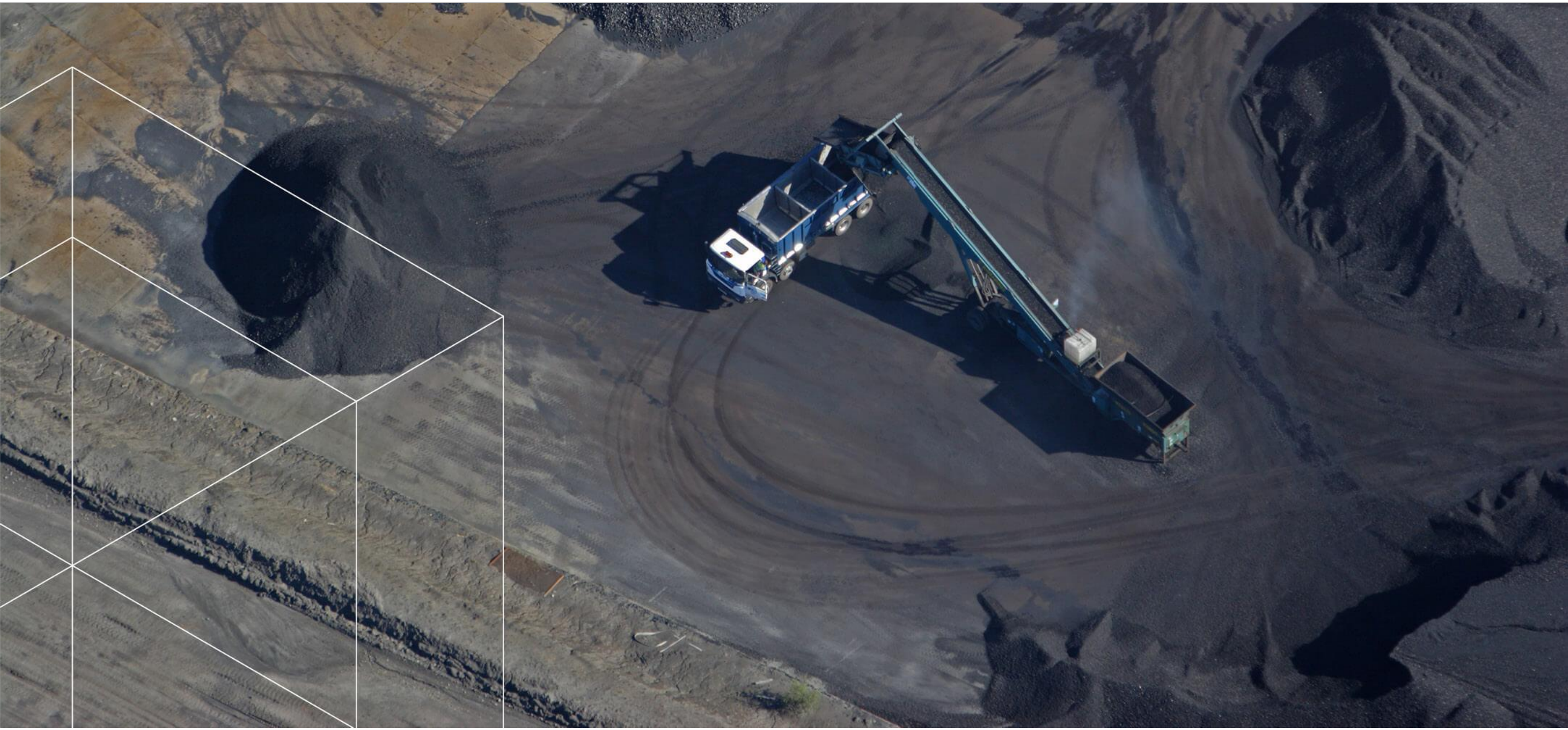
Steel and iron ore outlook

Cicero Machado – April 2019



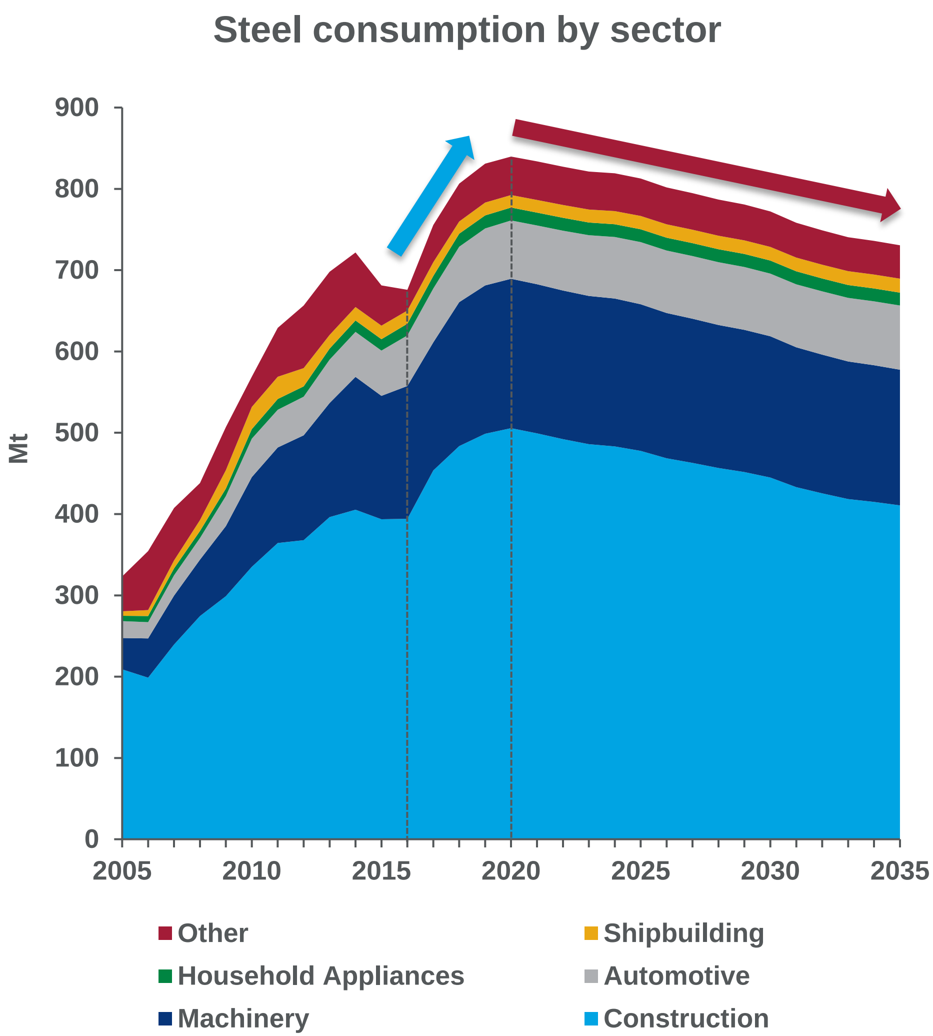
Agenda

1. **Steel outlook**

2. Iron ore outlook

China: steel consumption to peak in 2020

Construction to modestly grow, then decline



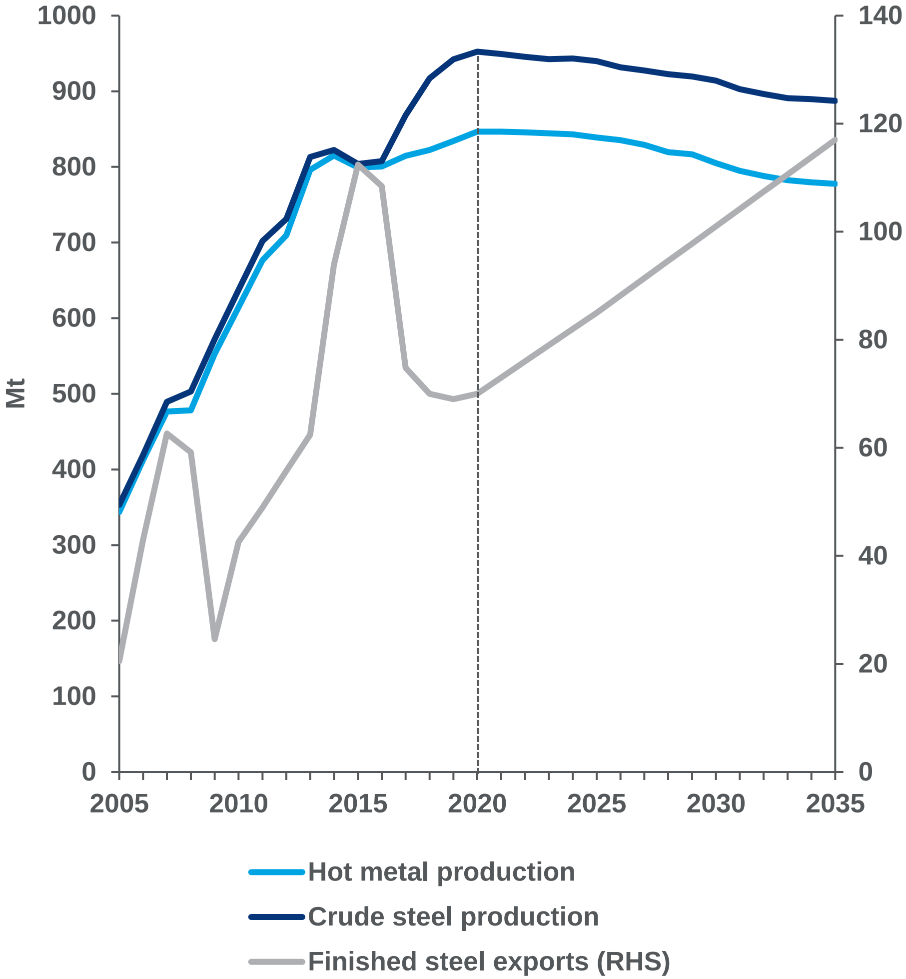
Source: Wood Mackenzie

- Decline in construction activities will undermine steel demand in the long term.
  - Property:
    - Short-medium term: credit easing and 'old home' renovation program to support growth.
    - Long term: growth from lower-tier cities will not support steel demand expansion.
  - Infrastructure:
    - Short-medium term: highway construction to be the main contributor for growth until mid-2020s.
    - Long term: efforts to curb public debt risk will negatively impact infrastructure.
- Manufacturing: government stimulus will support medium-term growth. Trade wars may bring uncertainties to the export of manufacturing goods over the long term.
- Largest growth in steel demand will come from the automotive sector as vehicle ownership increases and domestic-manufactured vehicles are promoted.

China: steel production to remain resilient until mid-2020s

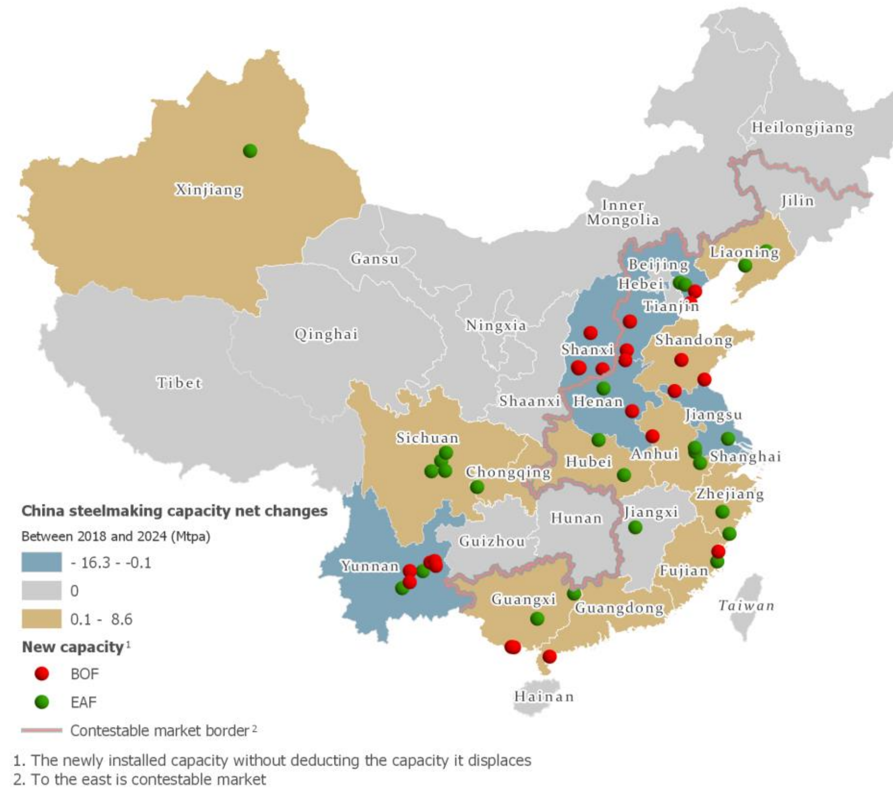
Exports will maintain production high in the medium-long term

Demand contraction to be partially offset by an increase in exports in the long term



Source: Wood Mackenzie

Net capacity decline of <5Mt will allow China to fill out the global supply gap in the long term



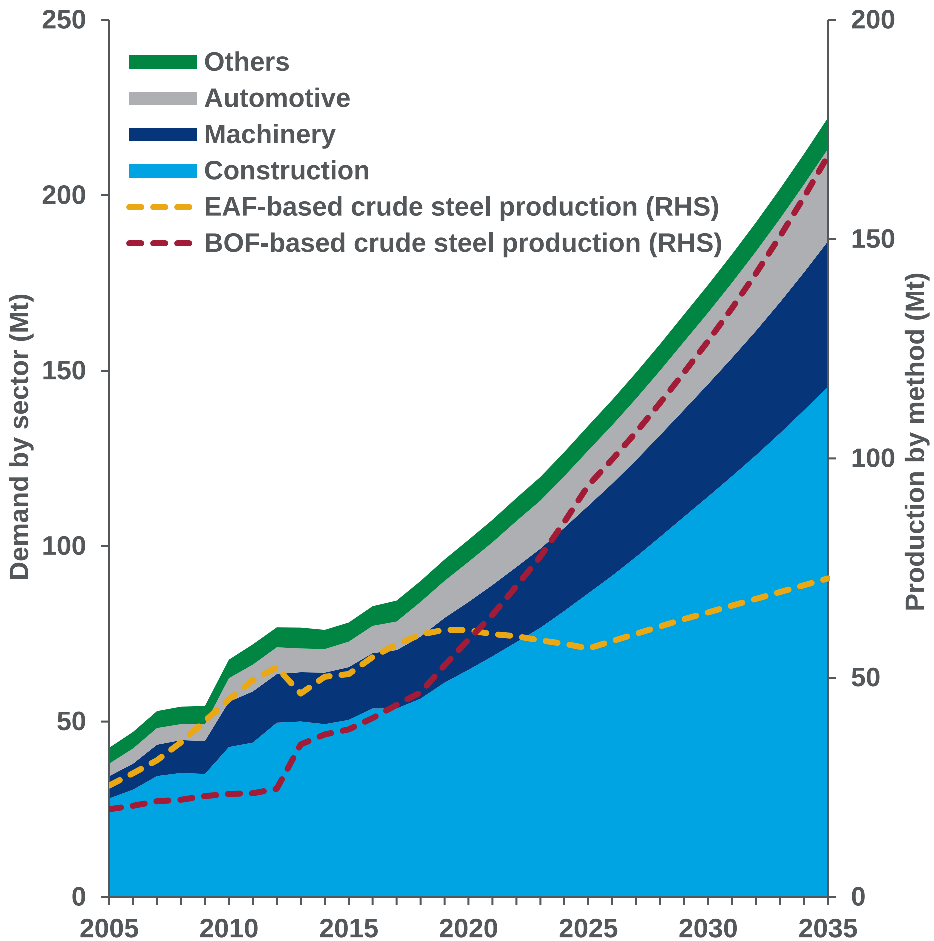
1. The newly installed capacity without deducting the capacity it displaces
2. To the east is contestable market

Source: Wood Mackenzie

India: steel demand has scope to grow significantly

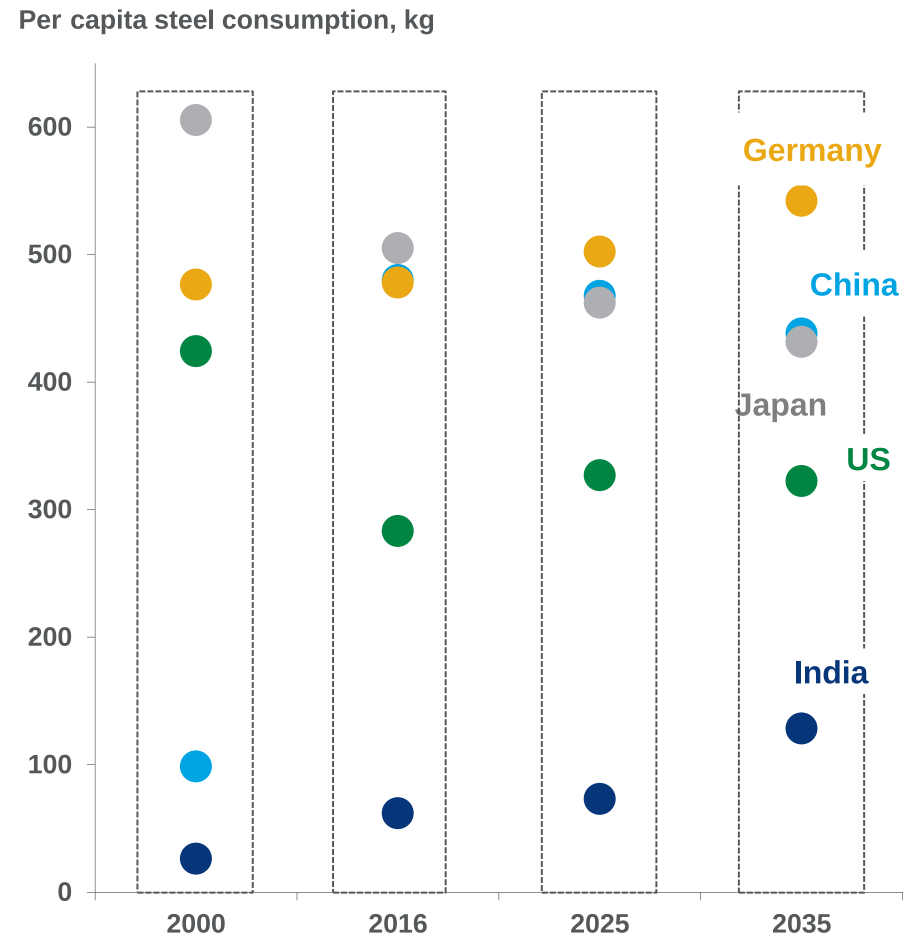
Lack of investment has constrained growth over the past few years

Growth will speed up as economic reforms set in



Source: Wood Mackenzie

Real potential for steel demand growth!

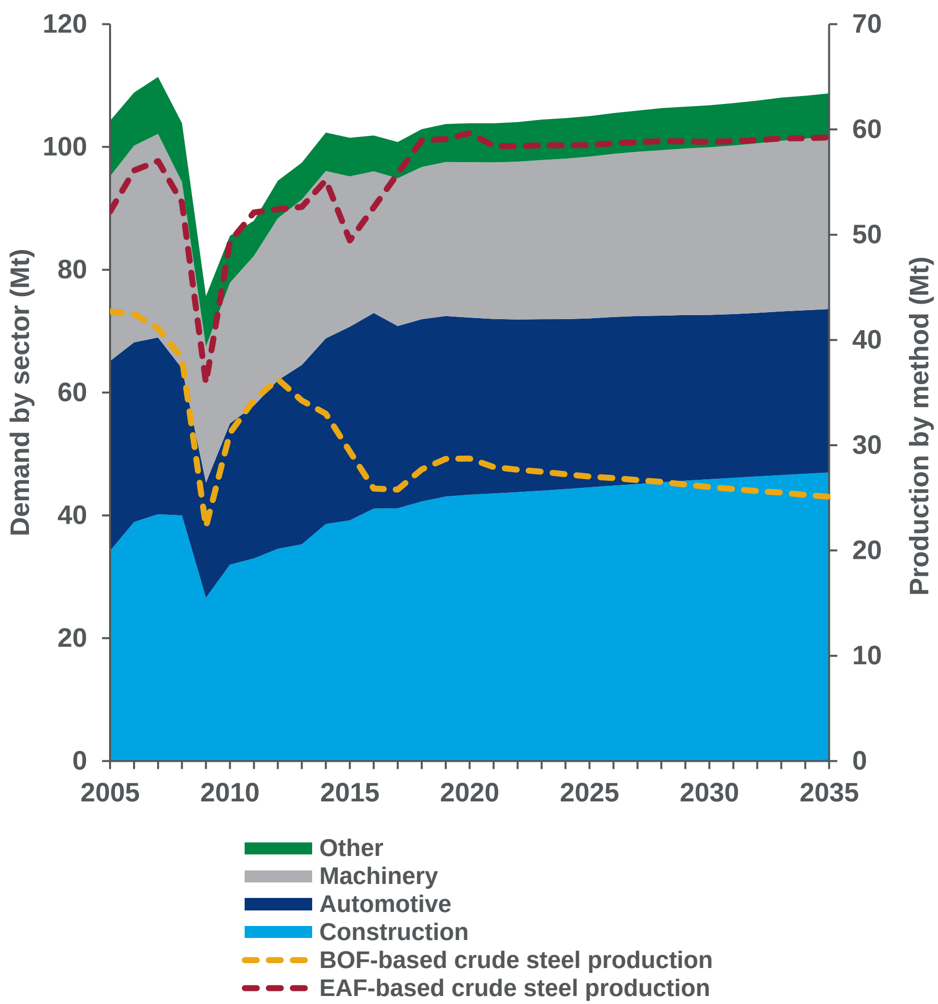


Source: Wood Mackenzie, WSA, World Bank, United Nations

USA: At first glance, American steel is great again!

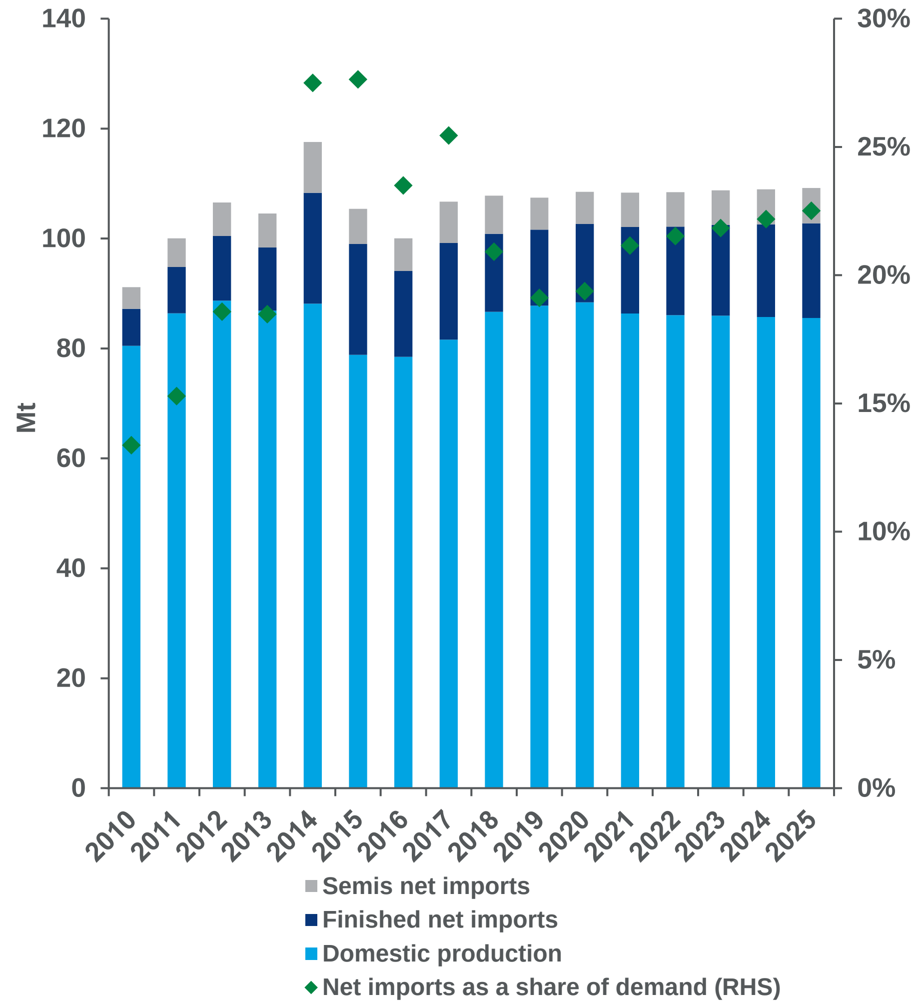
Higher prices followed by import restrictions have not (yet) led to demand destruction

Commercial construction and infrastructure to lead demand growth; automotive sector to disappoint



Source: Wood Mackenzie

High price premium will keep imports attractive!



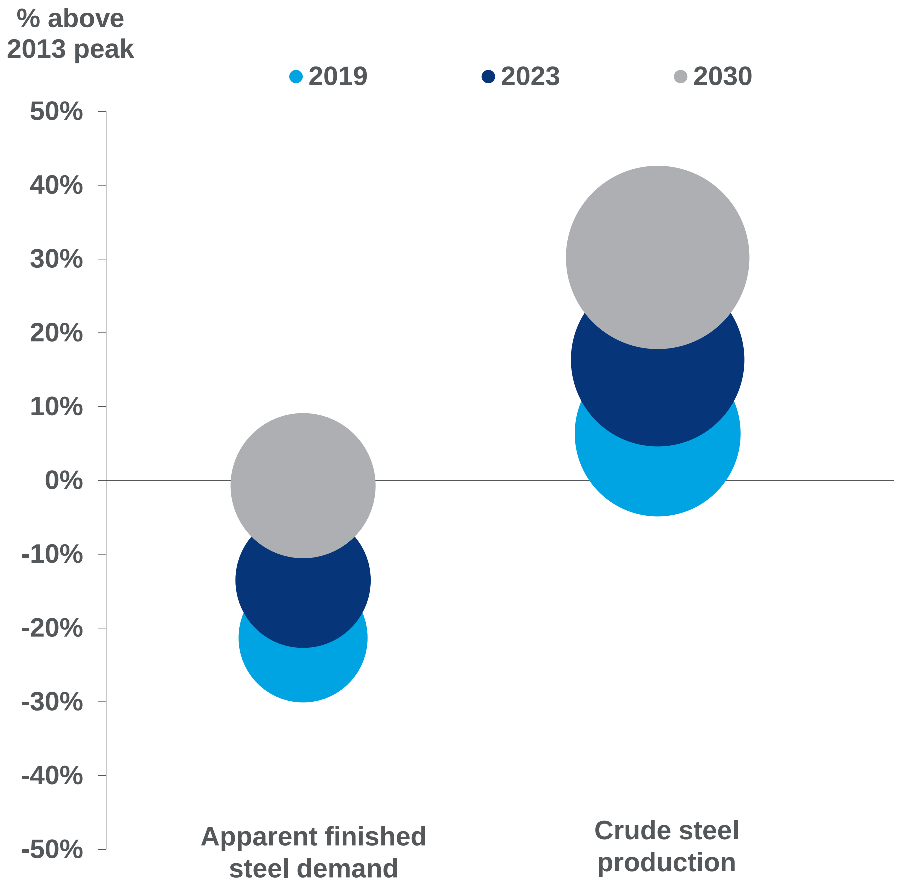
Source: Wood Mackenzie

Brazil: the worst is over but the recovery will be a drawn-out affair

Production is structurally geared towards exports

Demand will remain below its pre-crisis peak until the end of the next decade

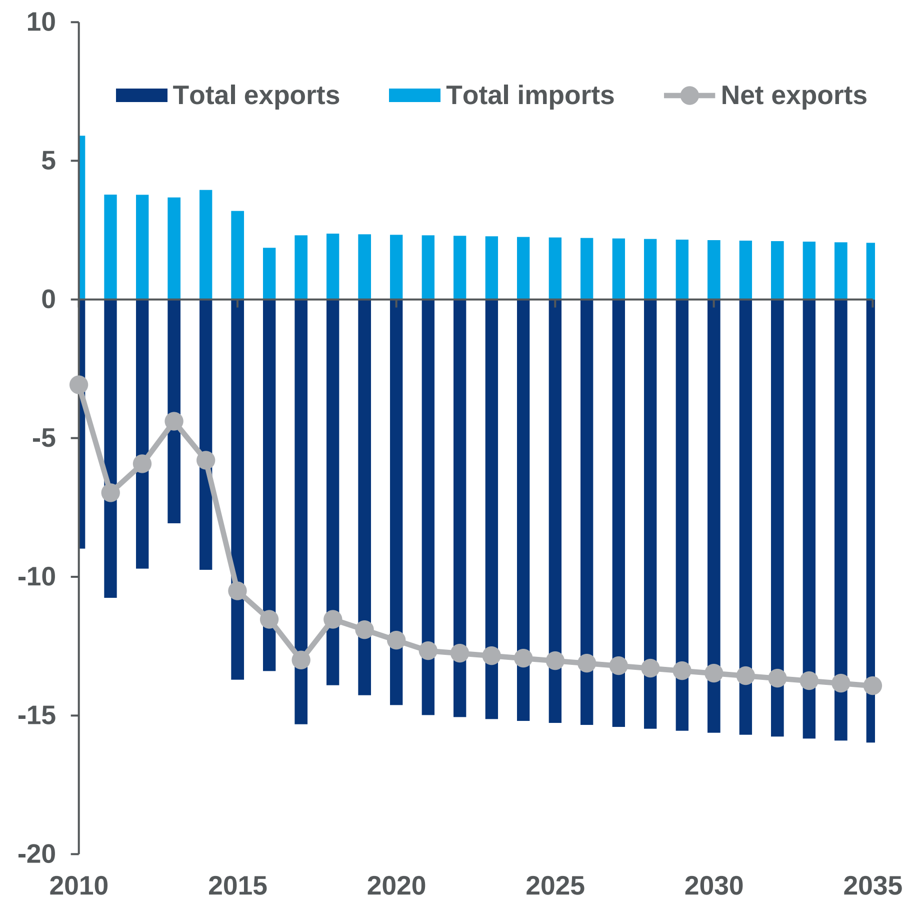
Brazilian steel demand and production (bubble size = Mt)



Source: Worldsteel, Wood Mackenzie

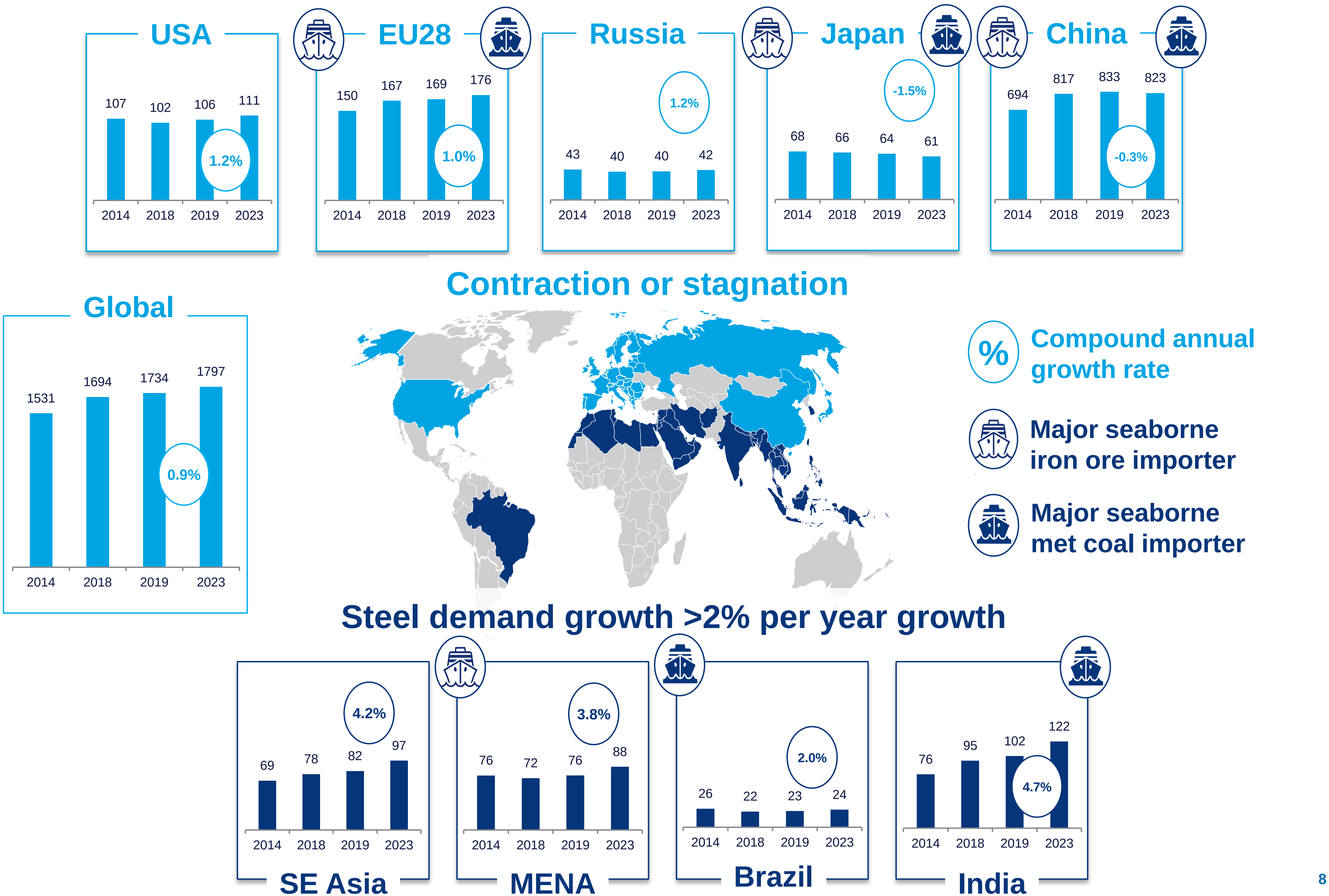
Most of Brazilian exports to remain competitive even with Section 232 tariffs

Brazilian steel trade (Mt)



Source: Wood Mackenzie, WSA

Global demand: recovering, but slowly

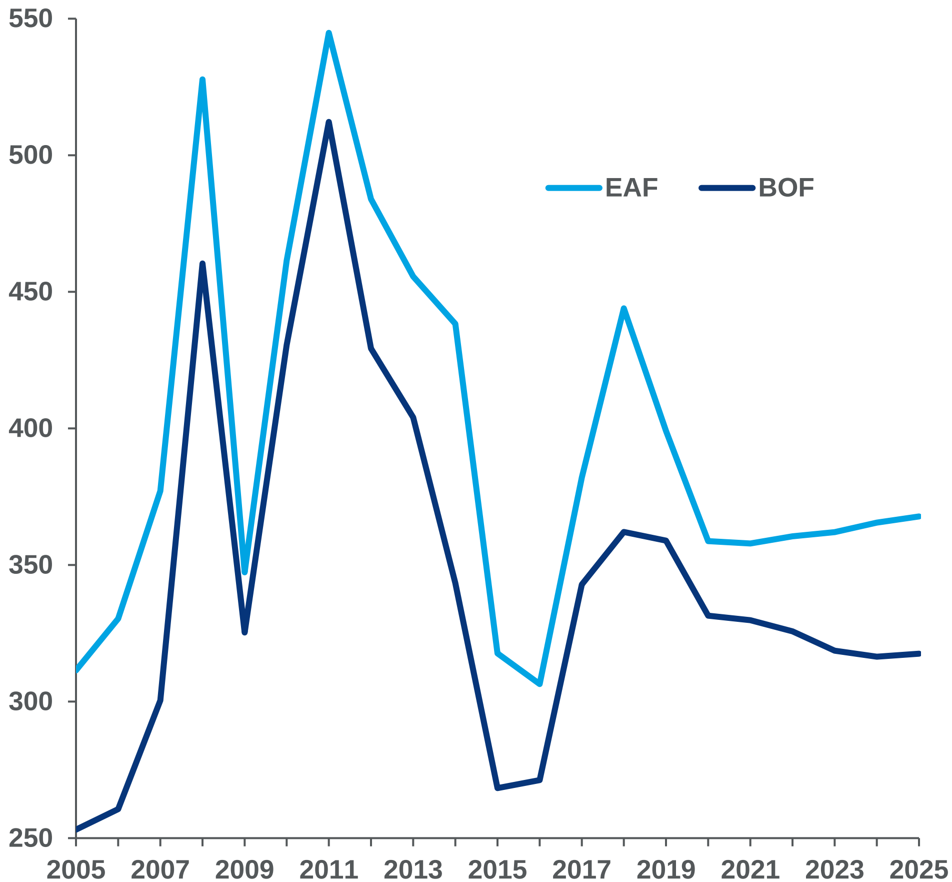


Higher raw materials prices lifted production costs in 2018

Costs to shrink until 2020, when BOF and EAF will take different paths

Despite lower scrap prices, higher gas and electricity will take a toll on EAF steelmakers…

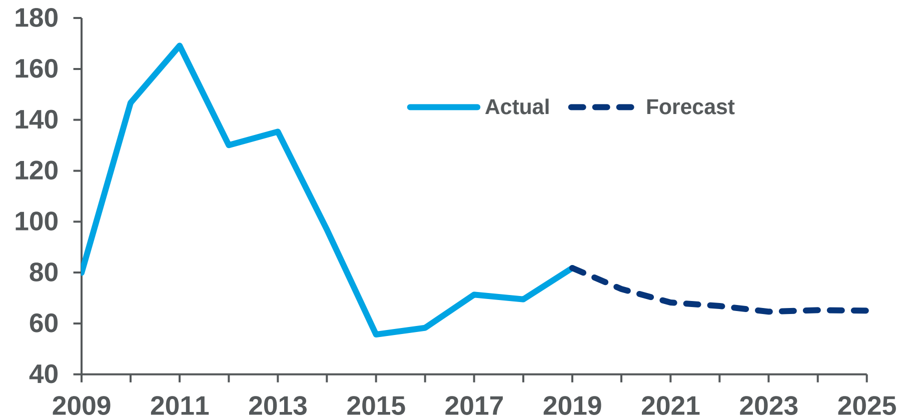
BOF vs EAF crude steel costs, US$/tonne



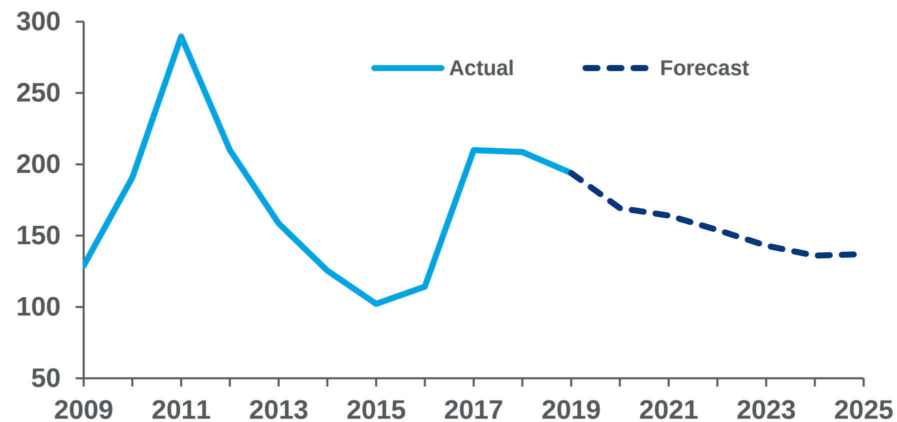
Source: Wood Mackenzie

…while BOF producers will continue benefiting from weaker coking coal and iron ore prices

62% Fe sinter fines, CFR China, US$/tonne



QLD HCC, FOB Australia, US$/tonne



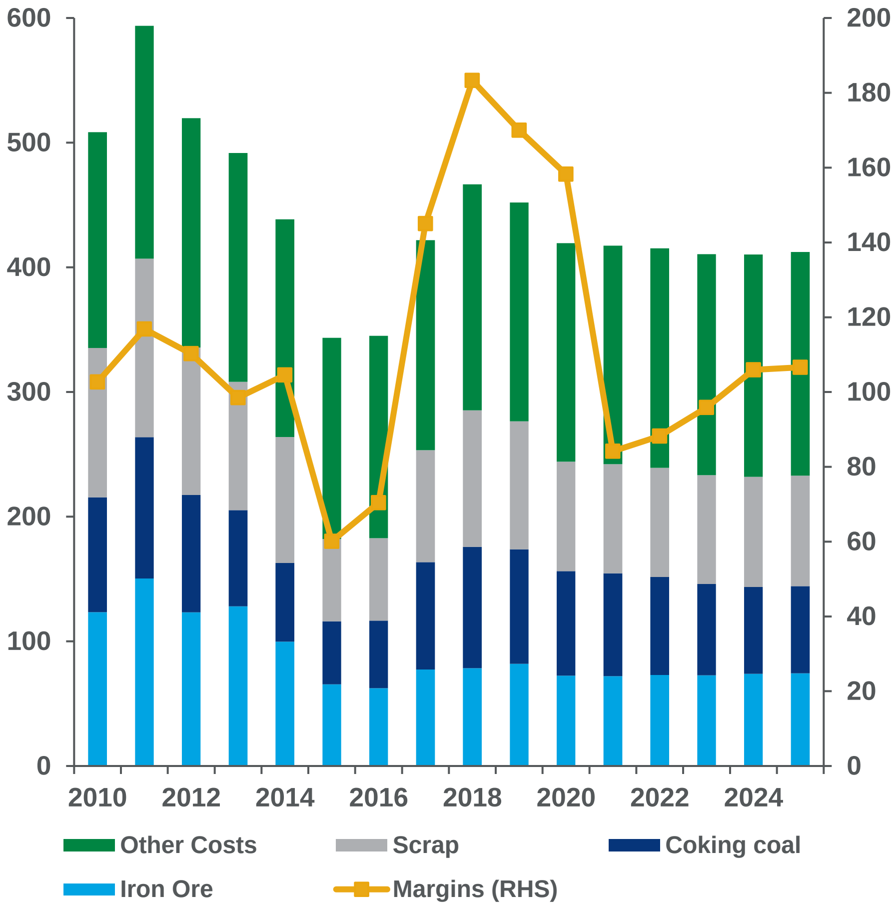
Source: Wood Mackenzie
Nominal until current year and then real thereafter

Prices to drop, then stabilise

Stronger-than-expected demand, capacity closures and protectionism have pushed prices up

Big drop on margins to occur in 2021 pushed by stable production costs…

Weighted average rebar costs and margins, US$/tonne

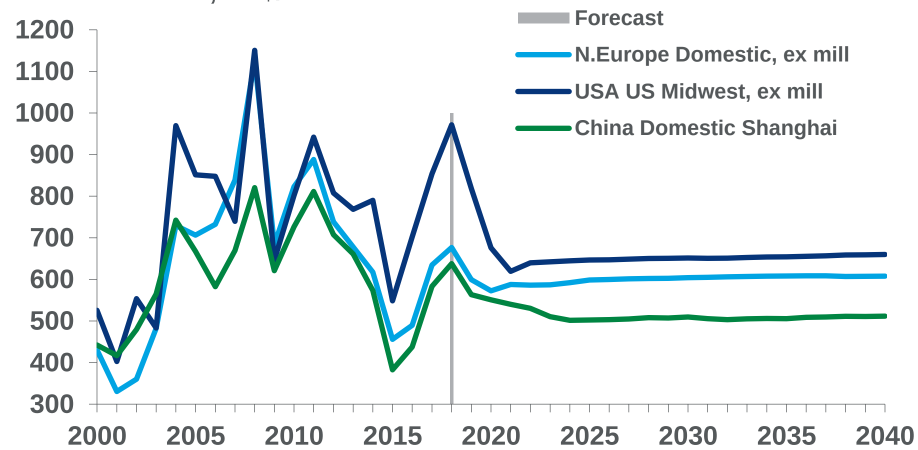


Source: Wood Mackenzie

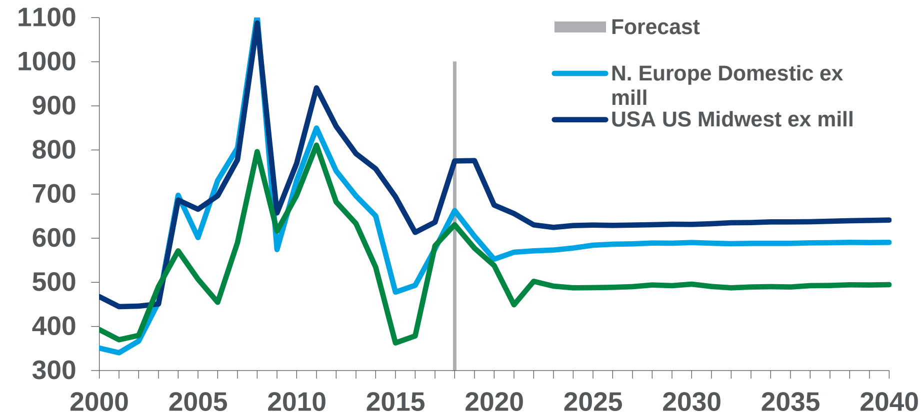
Nominal until current year and then real thereafter

…and (still) declining steel prices

Hot-rolled coil, US$/tonne



Rebar, US$/tonne



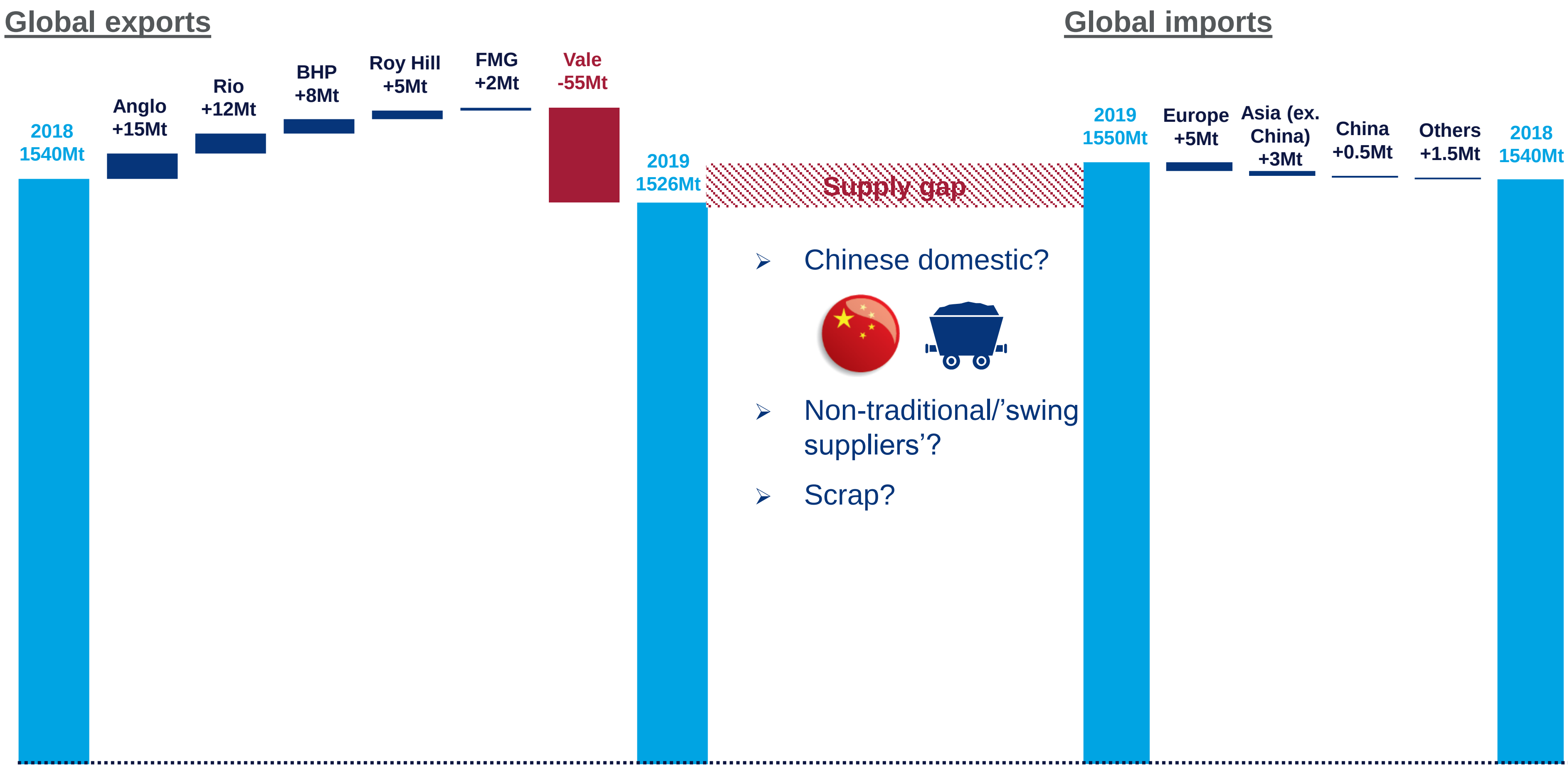
Source: Wood Mackenzie

Agenda

2019 seaborne supply/demand outlook

Vale to withdraw close to 55Mt from the seaborne market – at least for now!

The big question: who can fill the supply gap?

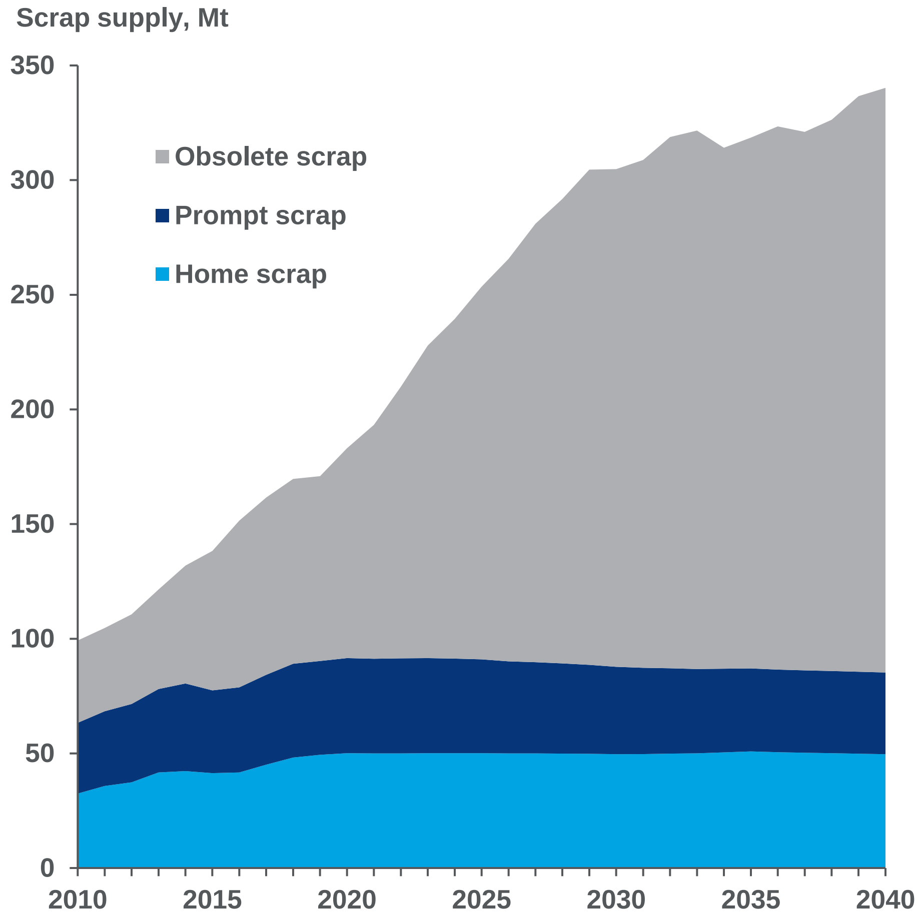


Source: Wood Mackenzie

Chinese iron ore demand is nearing its peak!

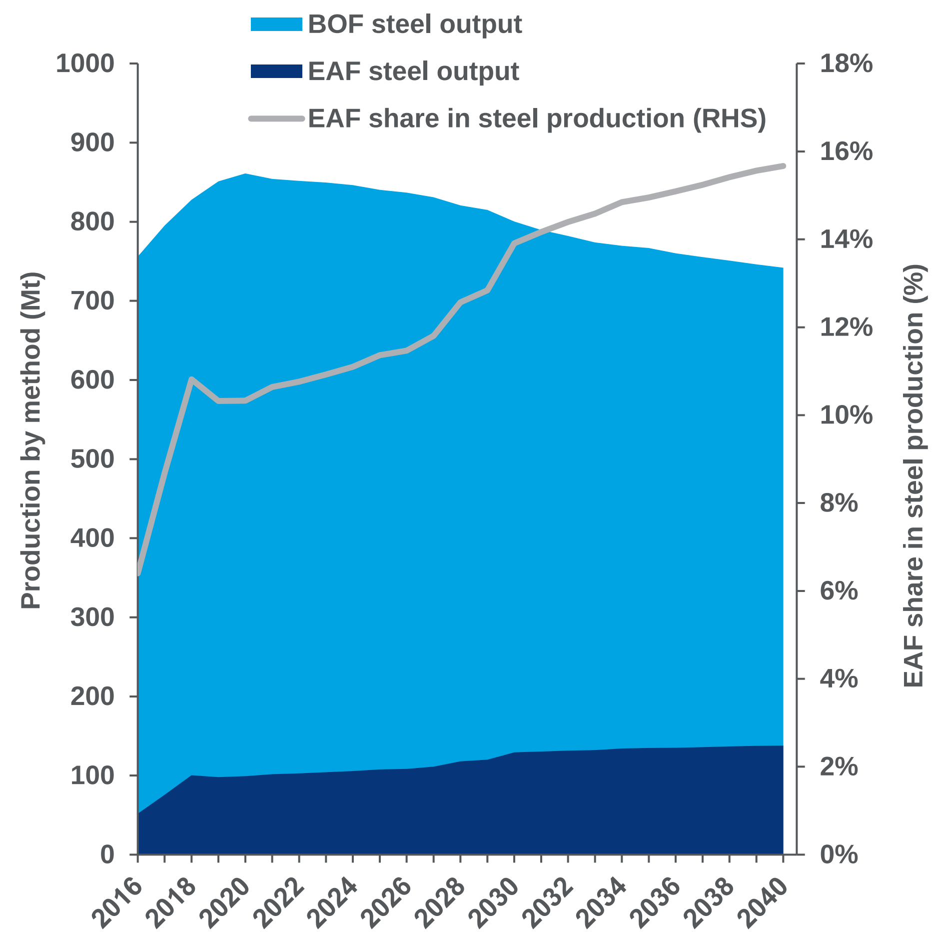
Higher scrap availability and growing EAF to constrain demand in the long term

A surge in “obsolete” scrap supply – a matter of “when” not “if”



Source: Wood Mackenzie

EAF share to increase from 10% to 16% by 2040

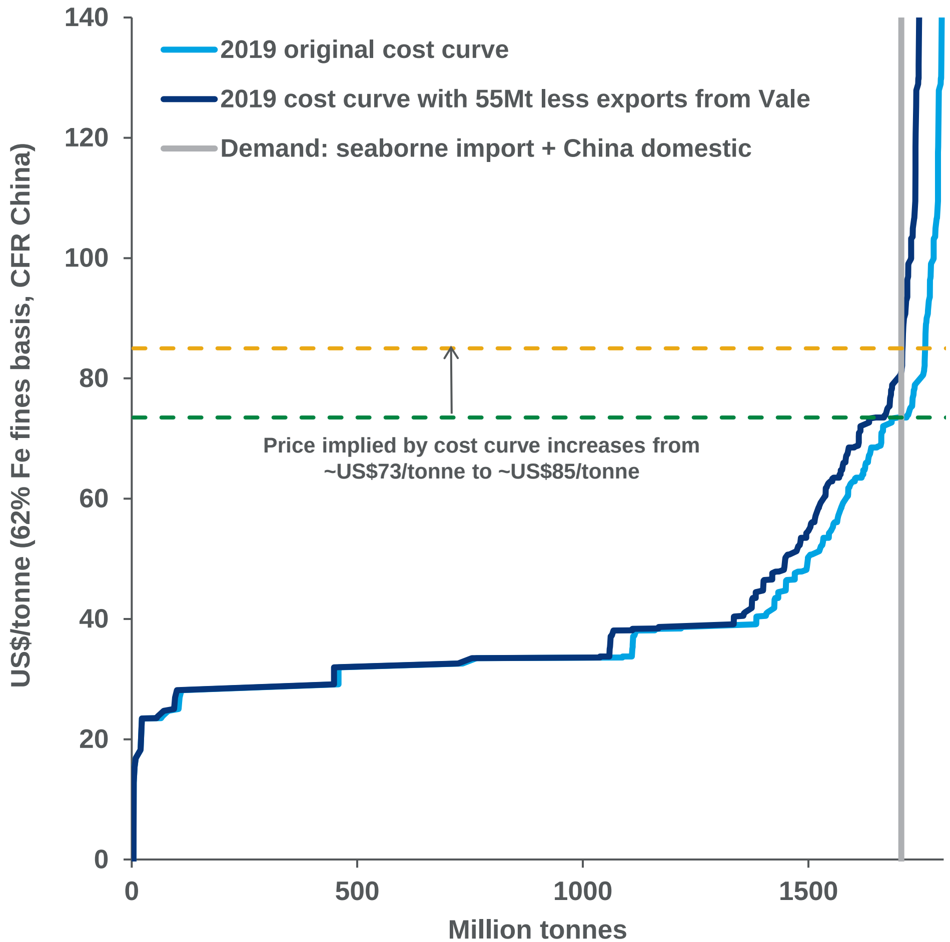


Source: Wood Mackenzie

Vale's dam disaster: quantifying the price impact

Price is a moving target!

Cost curve shifts to the left and becomes steeper with the removal of part of Vale's supply



Source: Wood Mackenzie

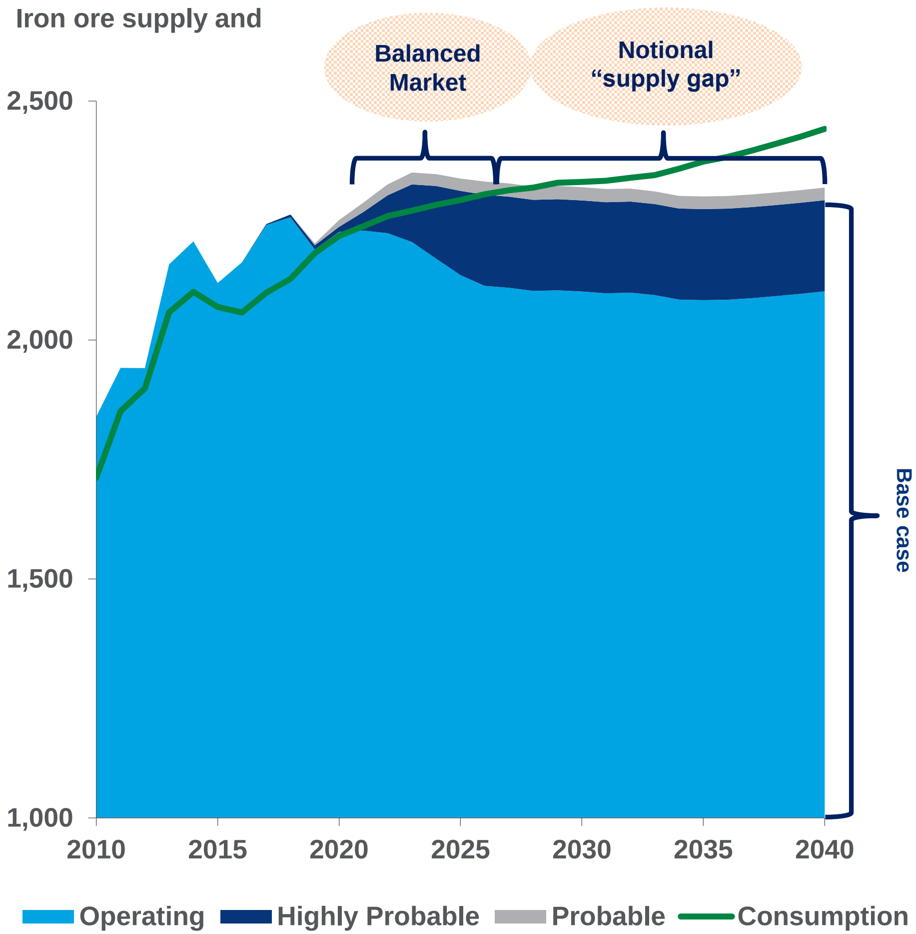
*VIU adjusted cost, basis 62% Fe fines, CFR China, including sustaining capex.

- Assuming demand remains constant, price rises to ~$85/tonne with the removal of 55Mt of exports.
- Given the gradient of the curve, any 10Mt either way can move the interception point to the mid-US$70/t range or the US$90/t one. But:
  - What will be the duration of Vale's current curtailments? More to come?
  - Other producers in Minas Gerais to "join the boat"?
  - Will seaborne 'swing supply' be able to quickly respond? What about Chinese domestic?
  - What will be the demand response? Higher scrap use?

Long-term – base case supply to meet demand until mid-2020s

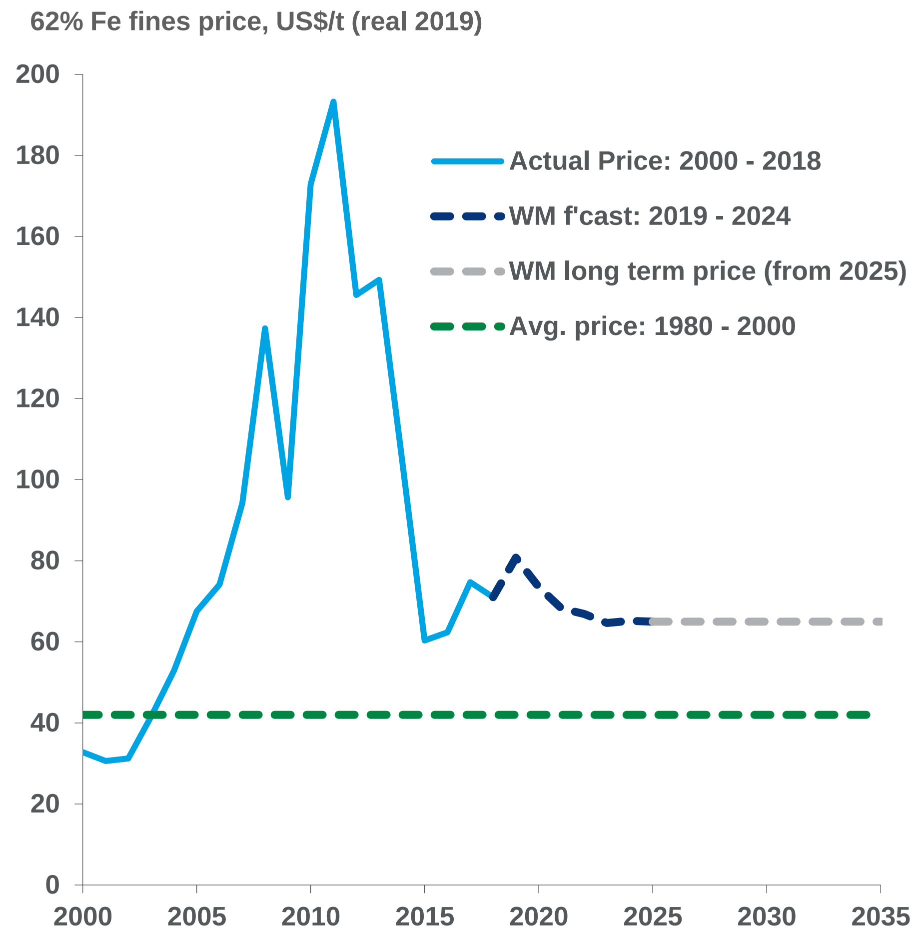
"Supply gap" expected as Indian demand grows

"Gap" to be filled by greenfield and/or brownfield expansions that are out of our base case



Source: Wood Mackenzie

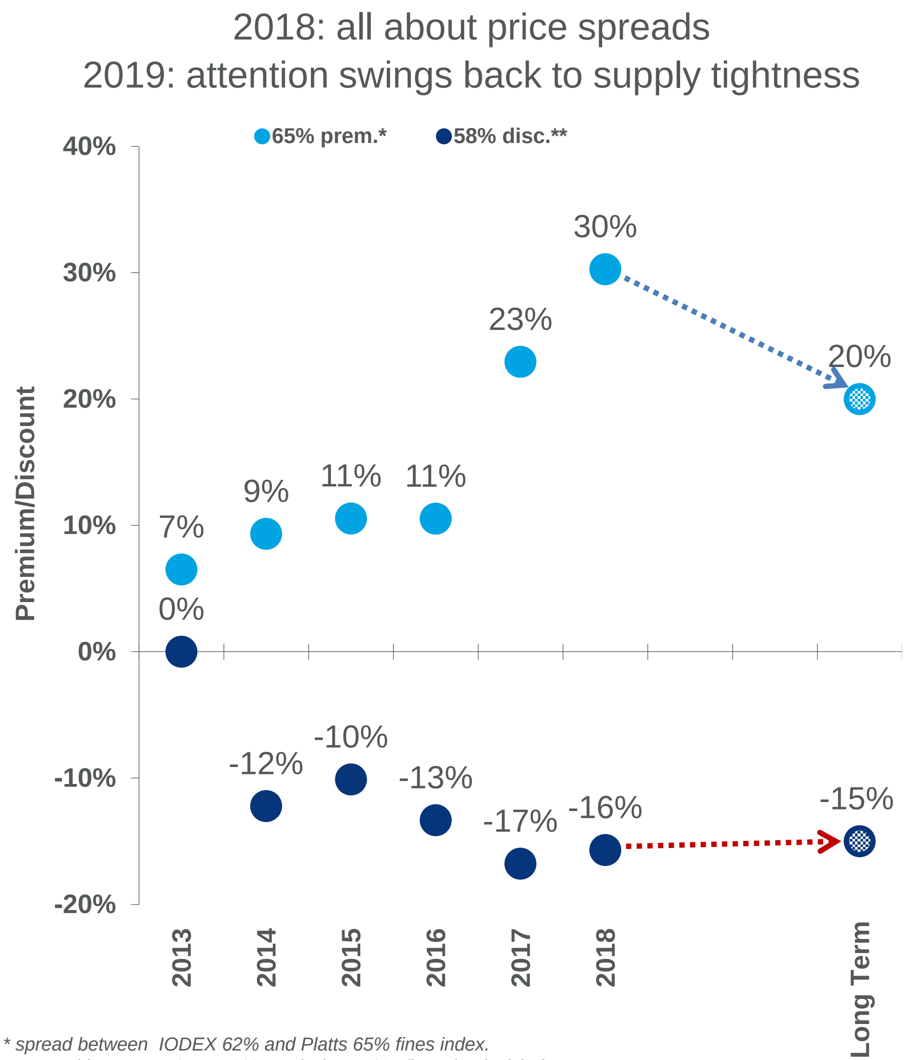
62% Fe fines price to hover around the US$65/tonne mark over the long term



Source: Wood Mackenzie

Tiered pricing: a structural change

Gap between high and low grade to narrow as steel prices and margins are pressured



** spread between IODEX 62% and Platts 65% fines index.*
*** spread between IODEX 62% and Platts 58% (low alumina) index.*

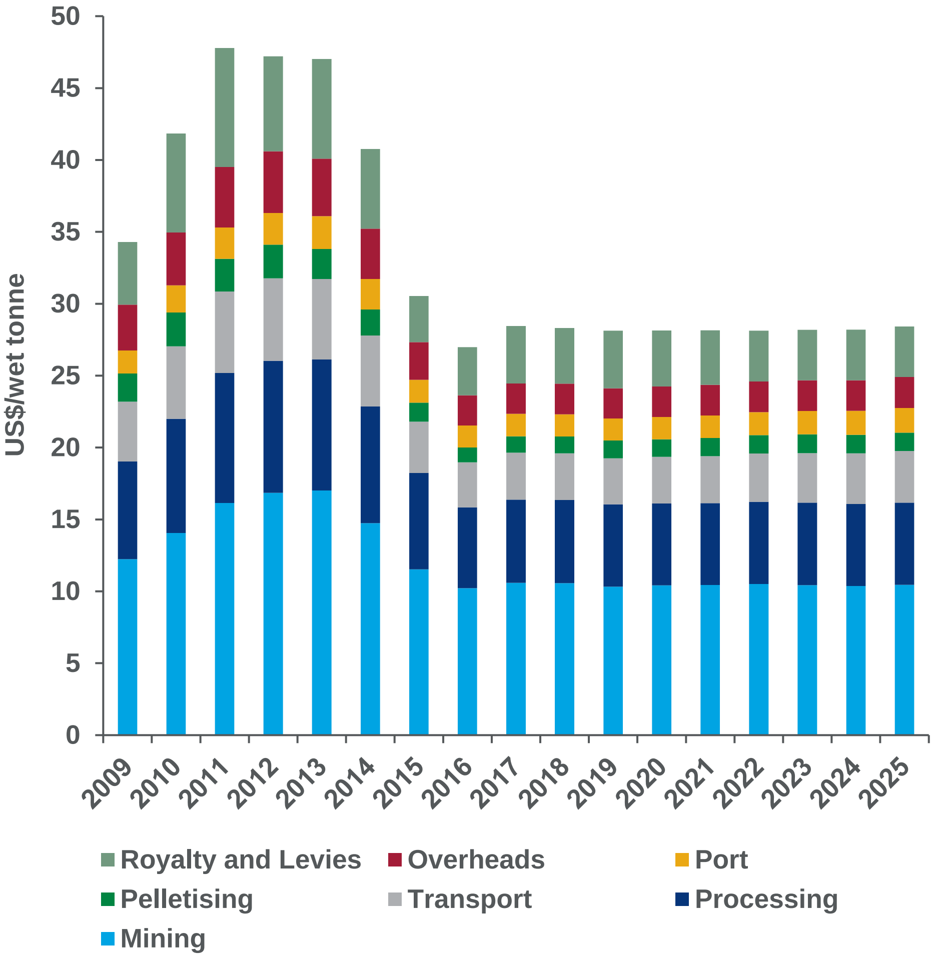
Source: Platts-SBB, Wood Mackenzie

- Short term:
  - High-grade premium – down, then up
  - Alumina penalty – up (Vale to stop selling SFLA and IOCJ in the spot market)
  - Lump – up
  - Pellet – up (compelling supply/demand fundamentals!)
- Medium-long term:
  - Tiered pricing is set to endure, but gap between high and low grade to narrow as steel margins are squeezed.
  - Lump and pellets – down (adjusting from a high base!)

Costs to (modestly) increase year on year

Higher oil prices and unfavorable FX to be (partially) offset by growing productivity levels

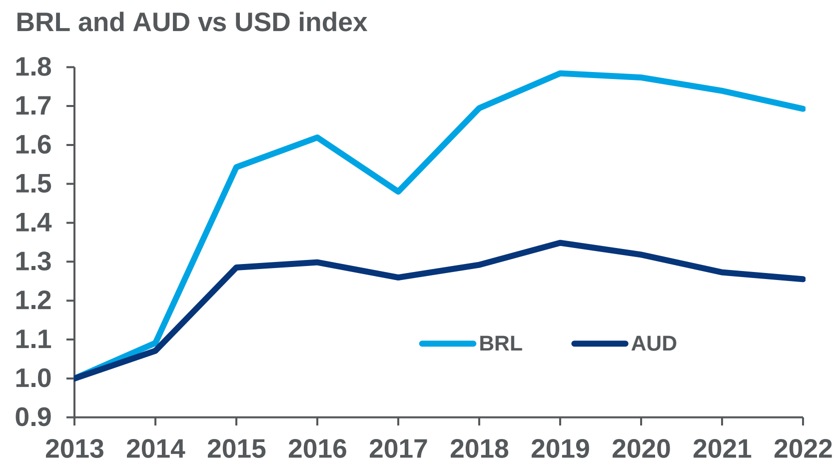
Average total cash cost of iron ore miners



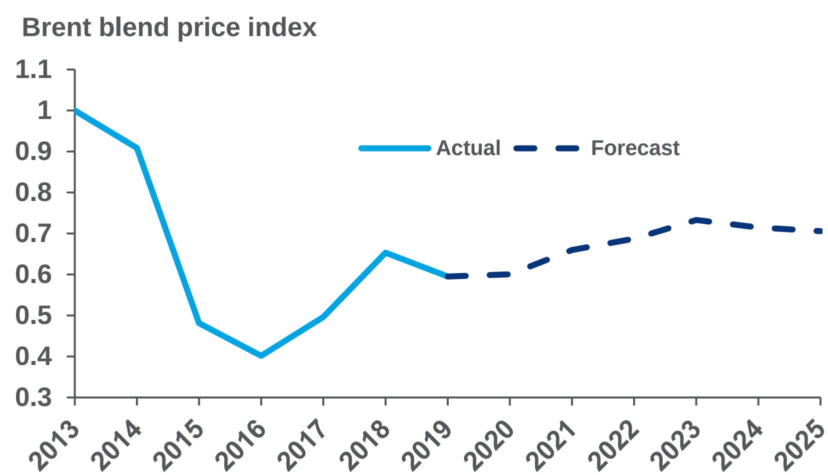
Source: Wood Mackenzie

Nominal until current year and then real thereafter

Index of selected cost drivers



Source: Wood Mackenzie



Source: Wood Mackenzie

Nominal until current year and then real thereafter

Summary of Wood Mackenzie's view of iron ore and steel

Decline in construction and manufacturing will undermine Chinese steel demand in the long term, despite a small growth in the automotive sector. **Exports to increase** again in the long term.

Global steel demand will recover, but slowly. India will lead the recovery in the long term.

A massive **"supply-shock"** has changed iron ore's S/D dynamics in 2019, with **prices** now set **to remain in US$80-90/tonne range**. **Change to a two-tier market is structural** and set endure.

Iron ore's production costs to slightly increase year-on-year mainly pushed by higher diesel prices.

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