



Iron Ore Pellet Market Dynamics



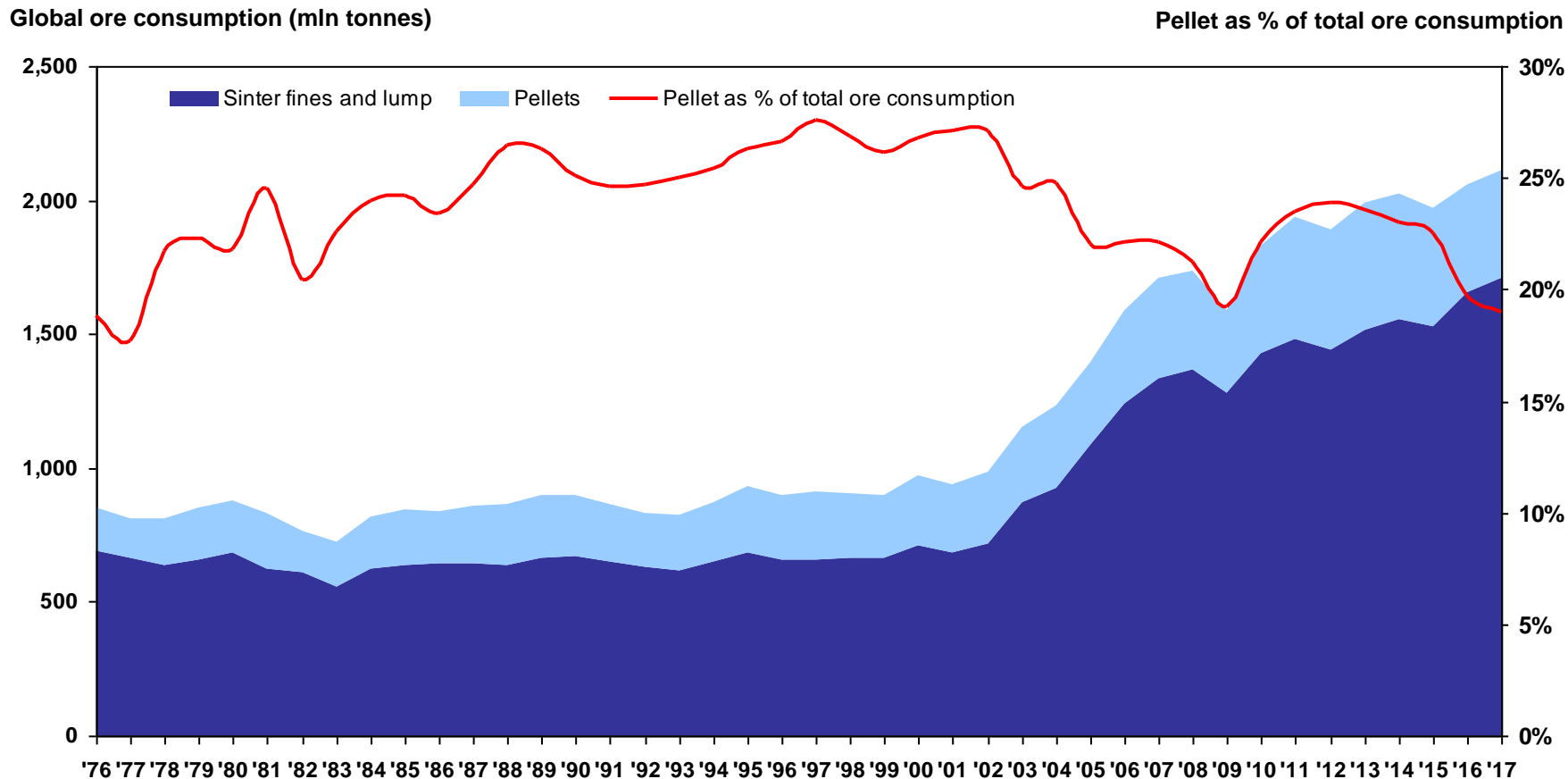
Corem 4th Symposium on Iron Ore Pelletizing
Quebec City, 30 September - 3 October 2018



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Pellets are increasingly popular as a feedstock for ironmaking, though large sinter expansions in China have undermined the penetration of pellets on a global basis in the last decade

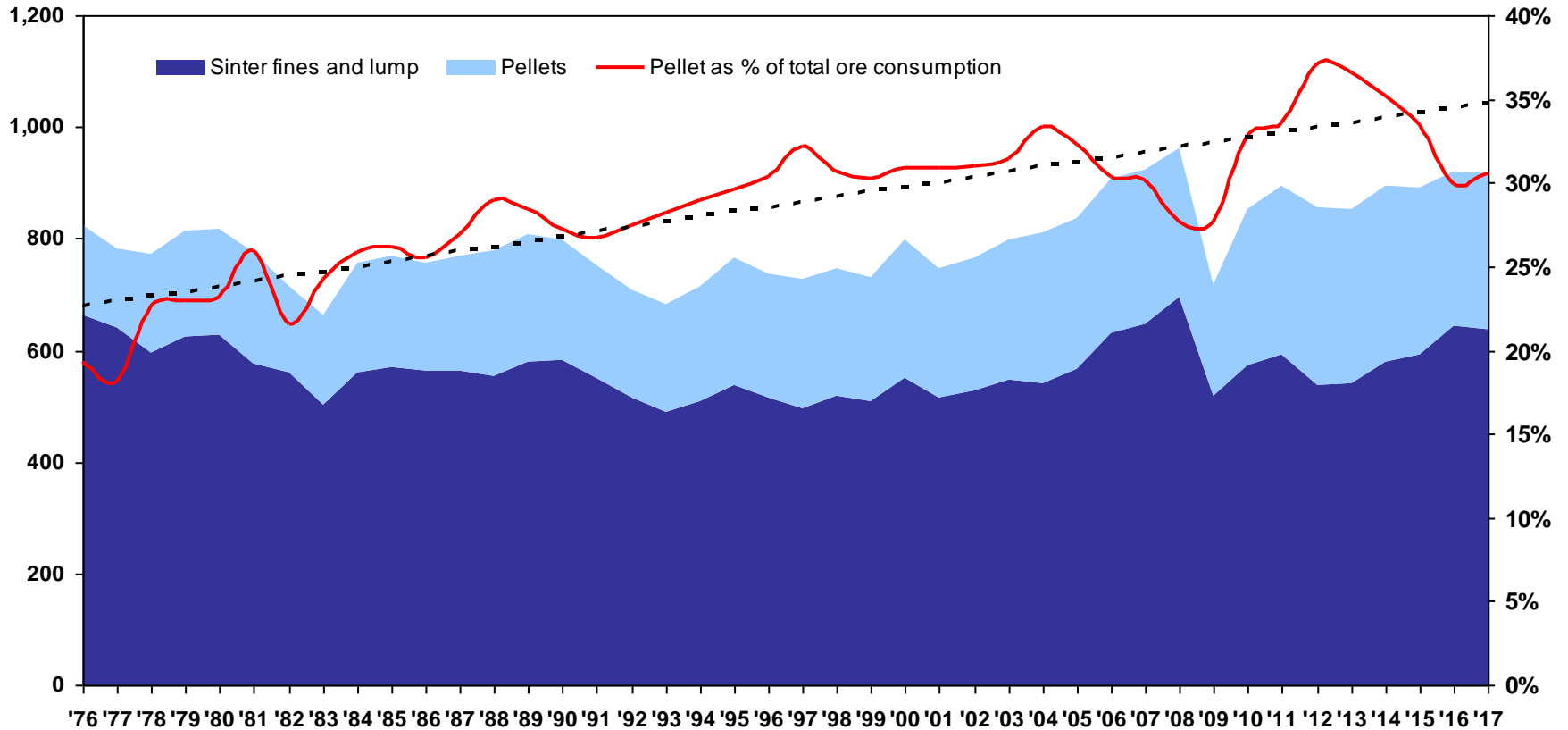


Source: WSA, Tex Report, SteelConsult estimates

In the world outside China pellets have been steadily rising over the long term, despite the closure of Samarco’s large pellet plants in 2015

Ore consumption, world excl. China (mln tonnes)

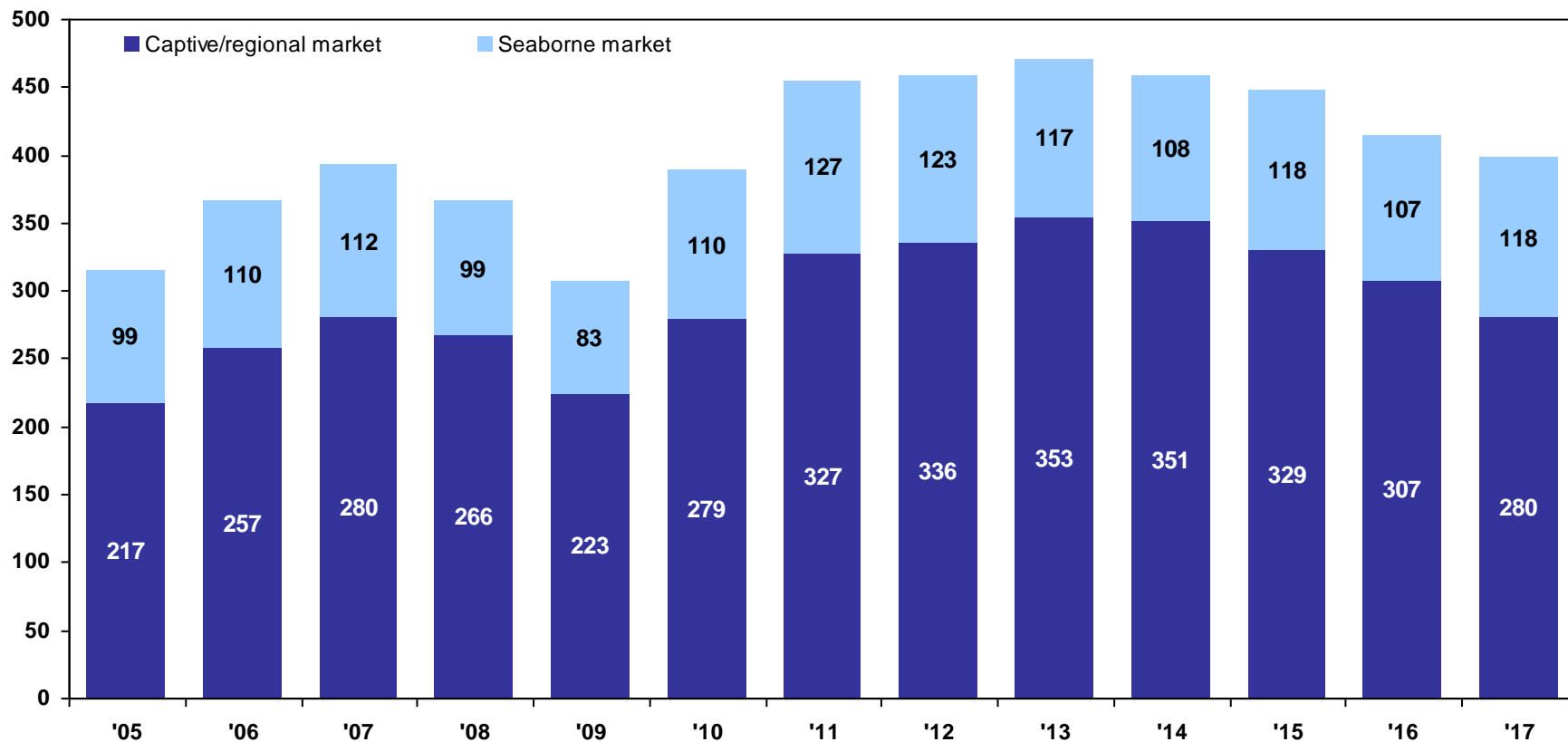
Pellet as % of total ore consumption, world excl. China



Source: WSA, Tex Report, SteelConsult estimates

The pellet market consists of the captive/regional market on one hand, and the seaborne market on the other hand. Whilst most pellet production is consumed in-house or shipped to nearby customers, but at a volume of ~120 million tpy, the seaborne market is also significant

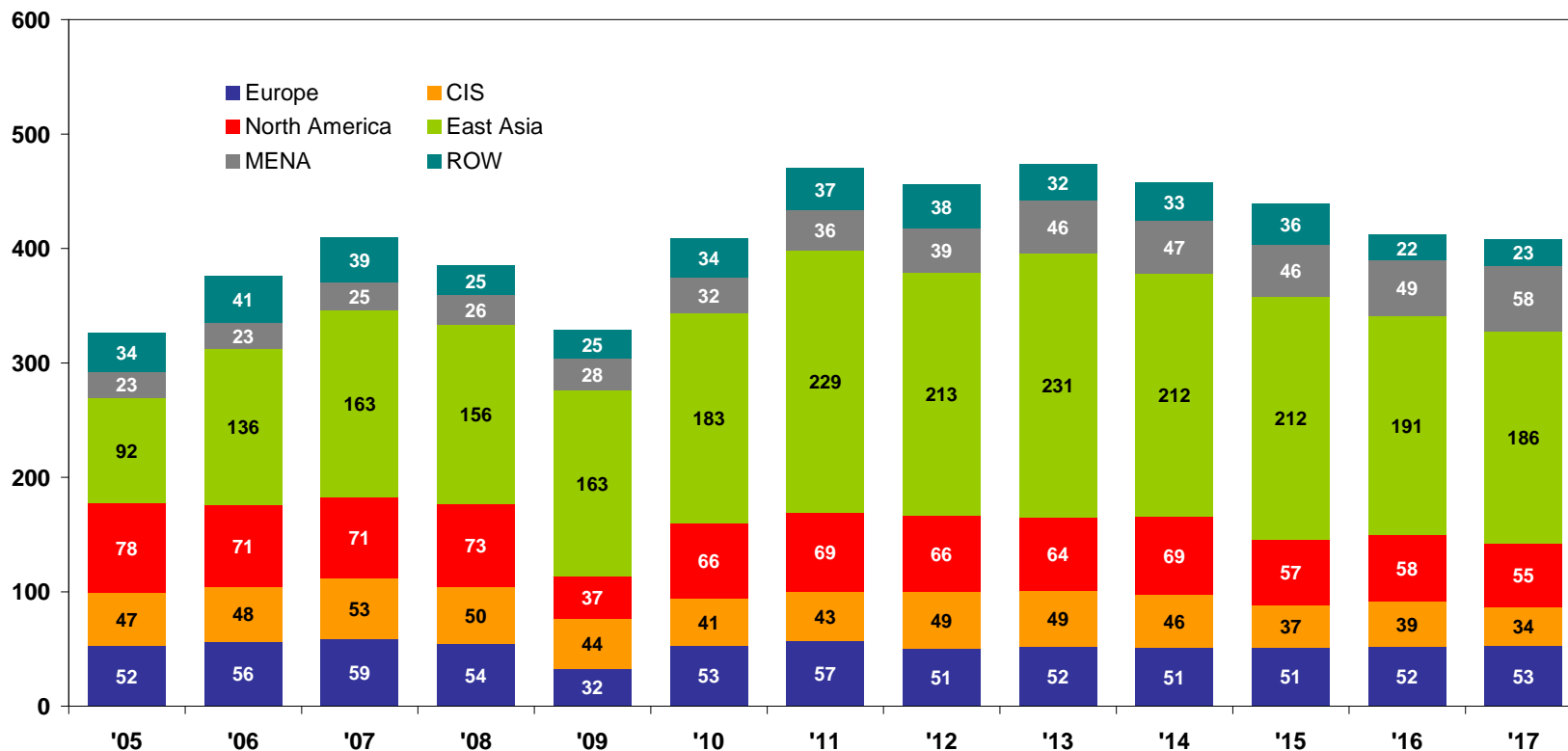
Total pellet market (mln tonnes)



Source: Tex Report, UN Stats, SteelConsult

Pellet consumption has grown fastest in the MENA and Asian regions

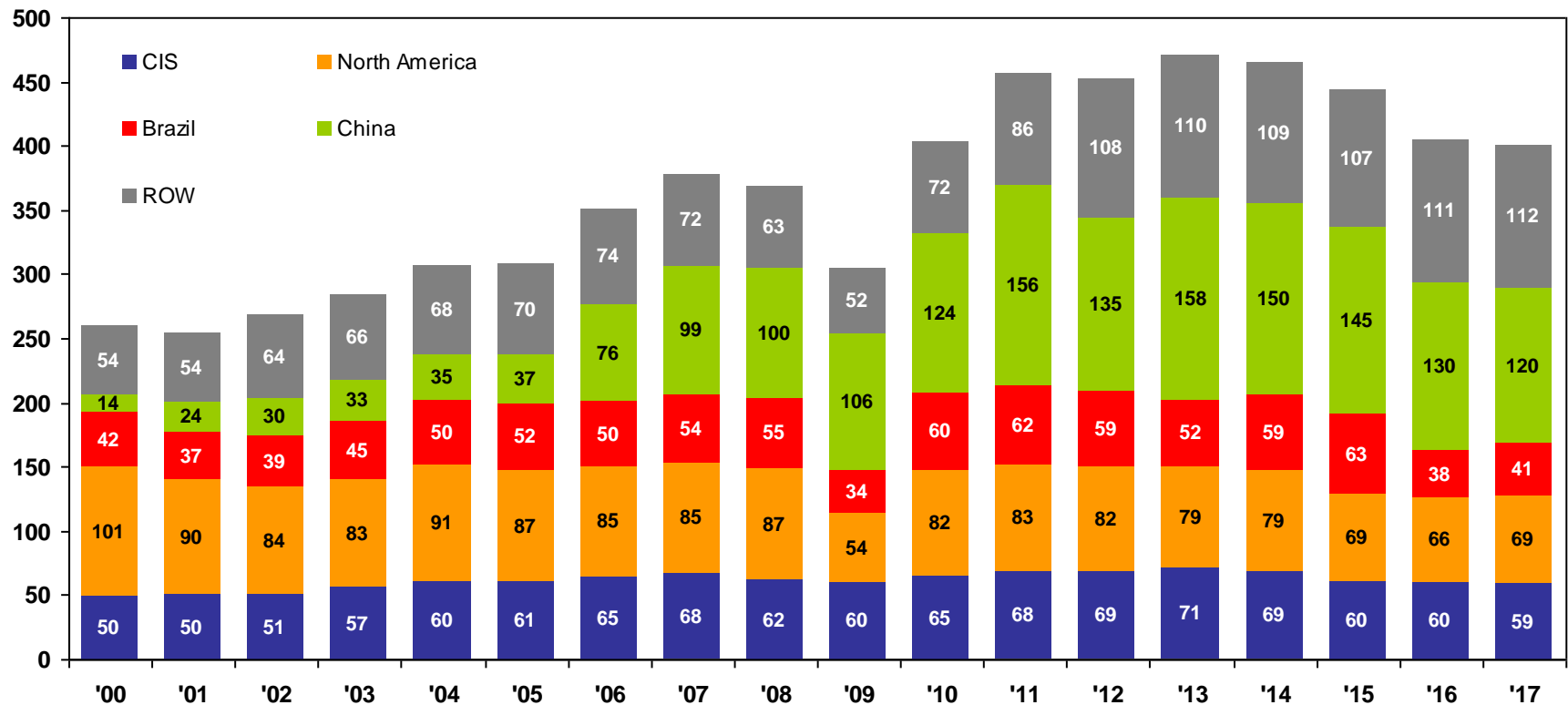
Consumption of pellets (mln tonnes)



Source: Tex Report, SteelConsult estimates

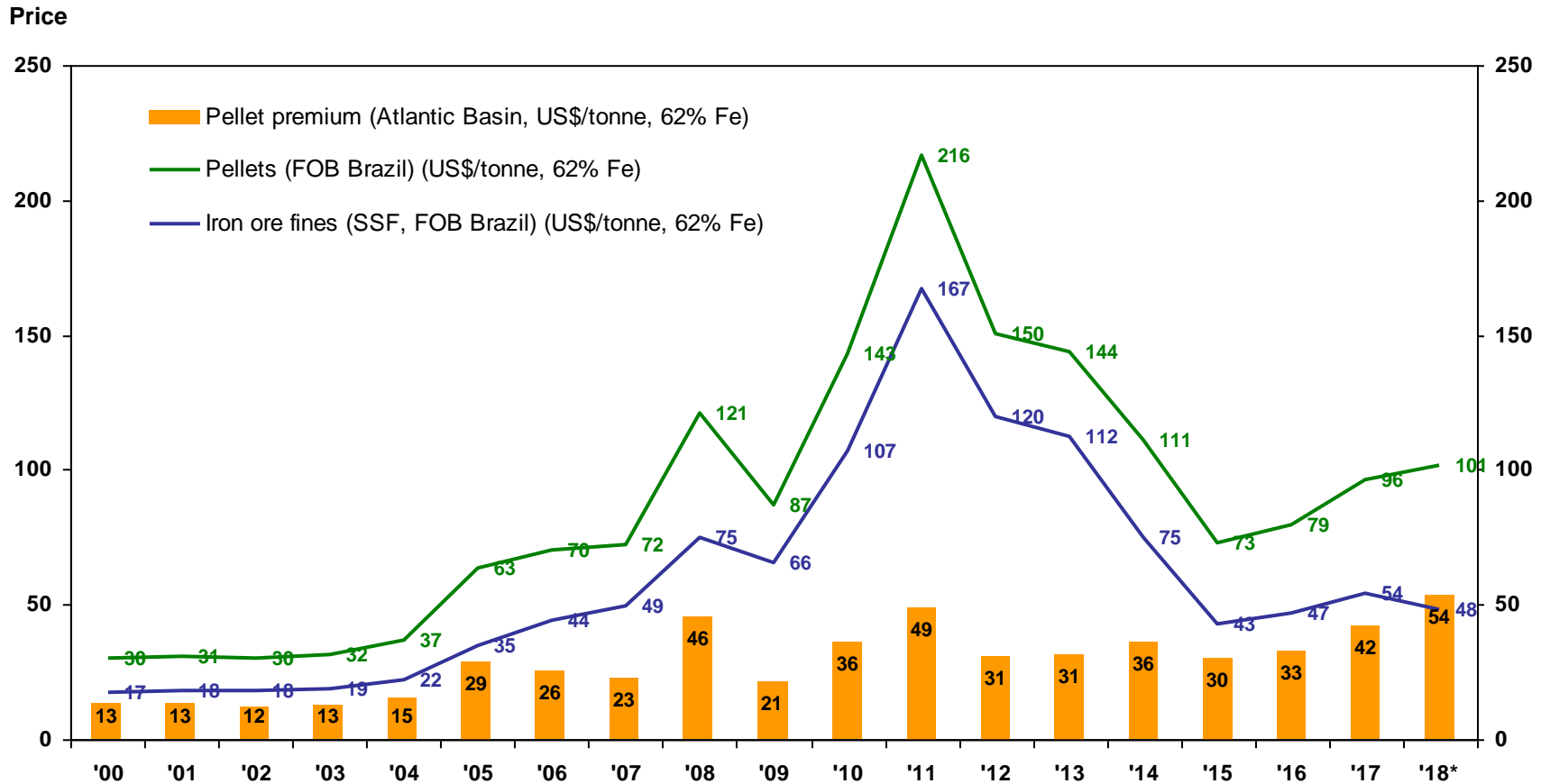
Pellets are produced in-house only by some mills in North America and China. In the rest of the world, they are produced mainly by the mines

Production of pellets (mln tonnes)



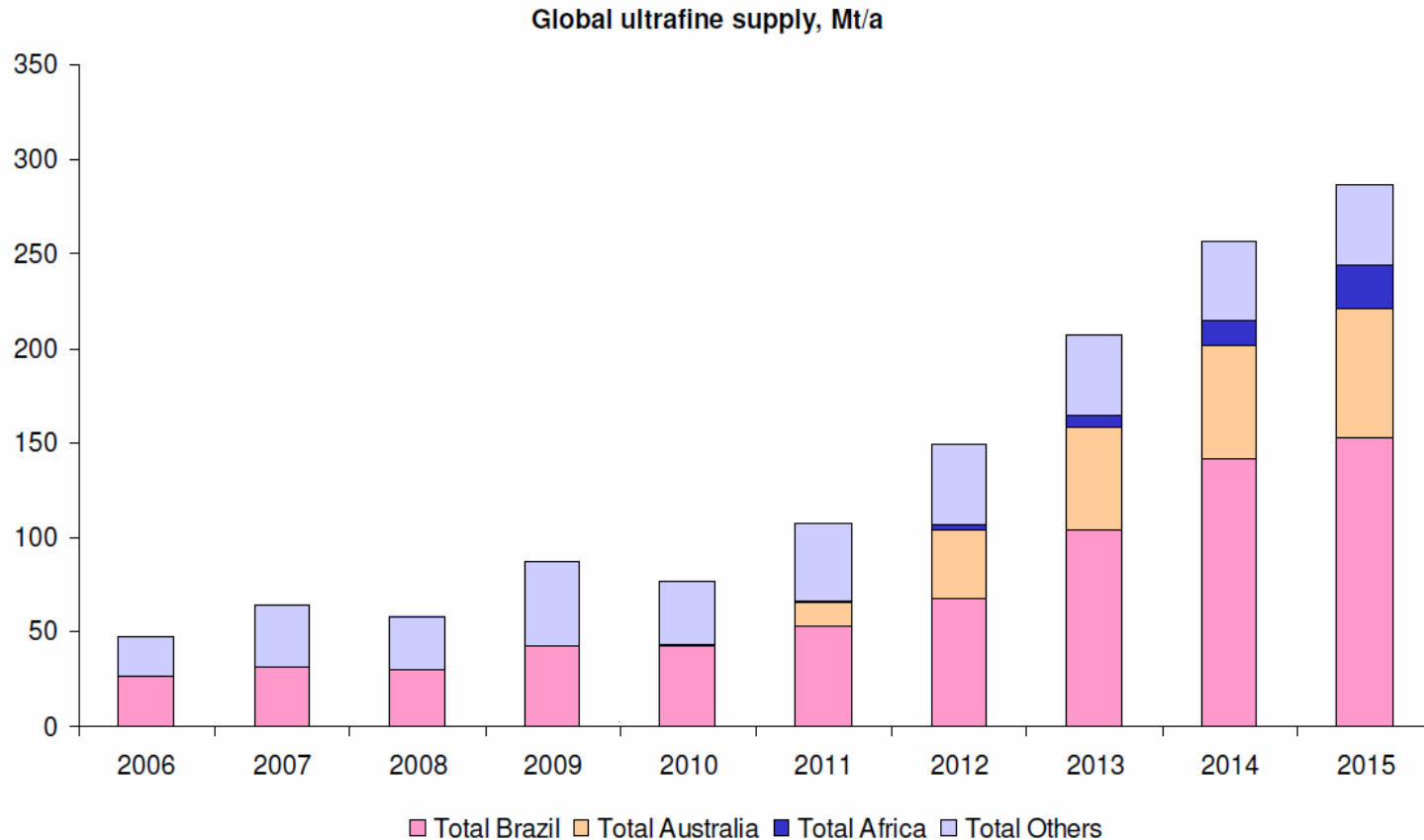
Source: Tex Report, SteelConsult estimates
Note: China 2017 is estimate

Pellets are the swing material for many integrated mills, and the pellet premium can be volatile. Pelletizing has generally been an attractive business over the last 10-15 years



Source: SteelConsult analysis, SBB, Steel First
Note: *H1

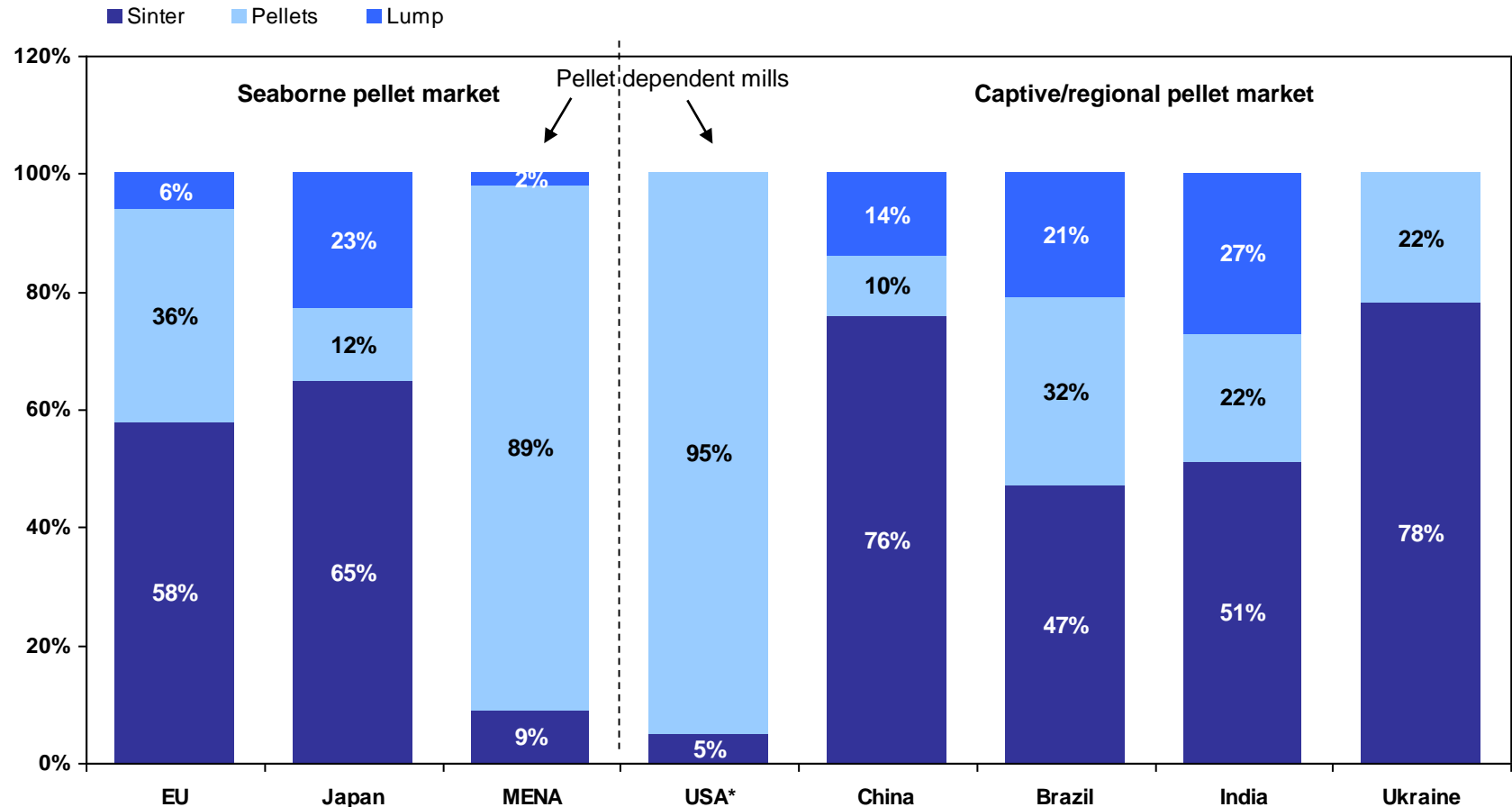
On the supply side, pellet production is driven by the increasing availability of ultrafine ores, due to deteriorating iron ore reserve qualities. Most of these ultrafines should be used for pelletizing



Source: Hatch Beddows

Pellet use varies significantly by mill and region, depending on process, local availability and mill preference. For integrated mills pellets also offer advantages in terms of raw materials flexibility, capital savings and overcoming bottlenecks

Average ore burden mix to produce hot metal

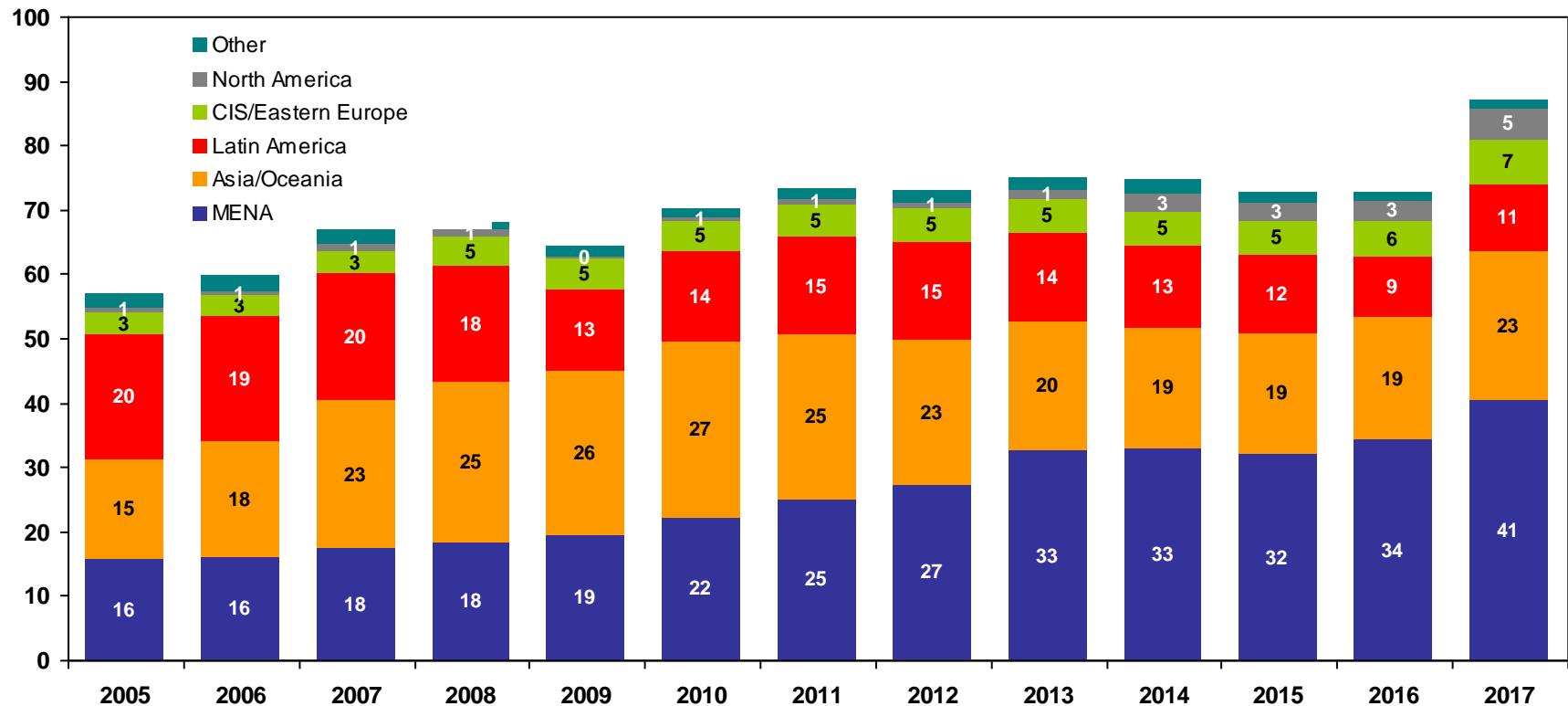


Source: SteelConsult analysis

Note: USA sinter also includes reverts and scrap

Another important driver of pellet demand growth has been the fast rise of DRI production, which is almost completely reliant on pellet as feedstock material

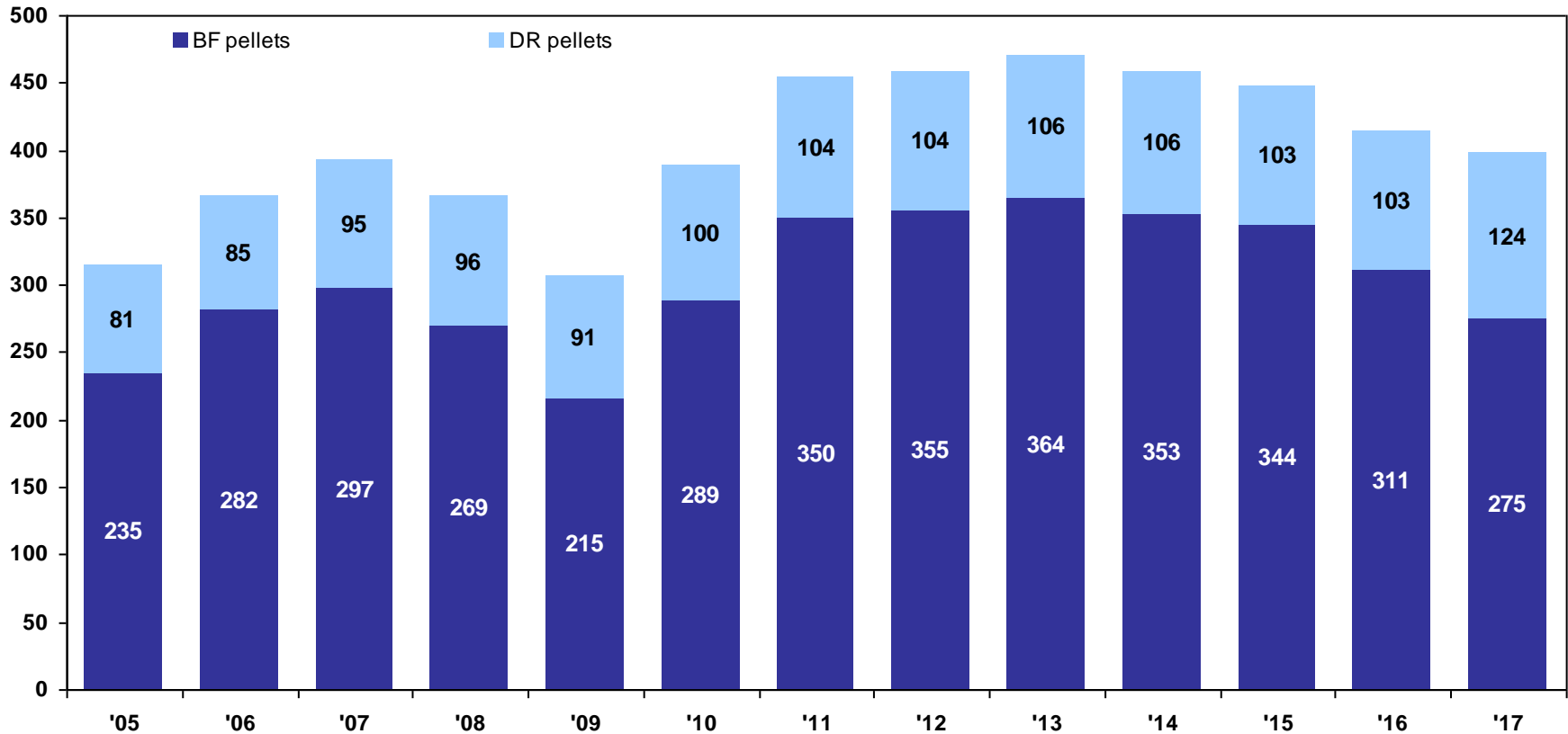
DRI production by region (mln t)



Source: Midrex

As a result, demand for DR pellets has grown firmly, accounting for about 1/3rd of the global market

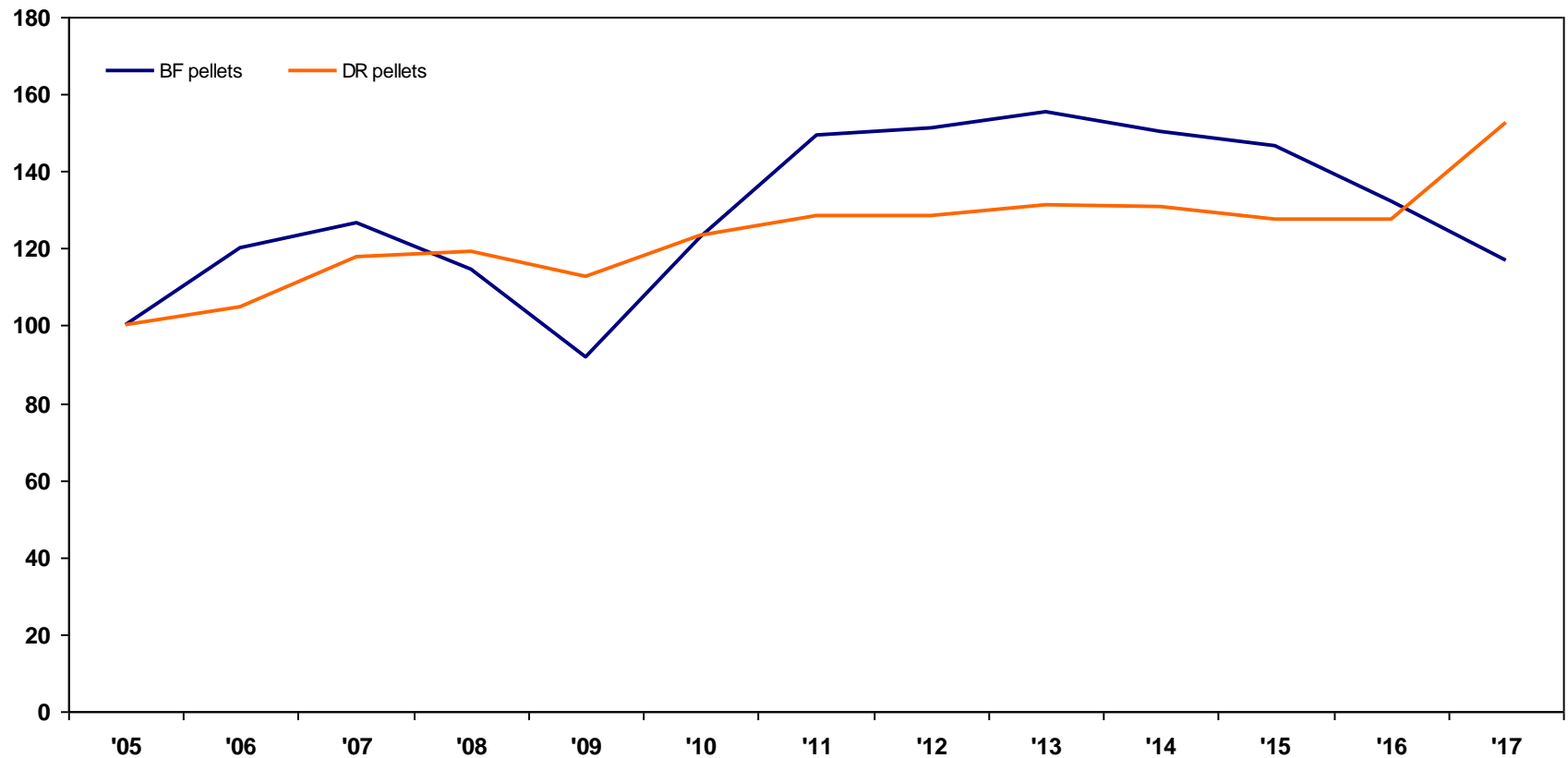
Total pellet market (mln tonnes)



Source: Tex Report, UN Stats, SteelConsult

However, demand for BF pellets has also grown fast

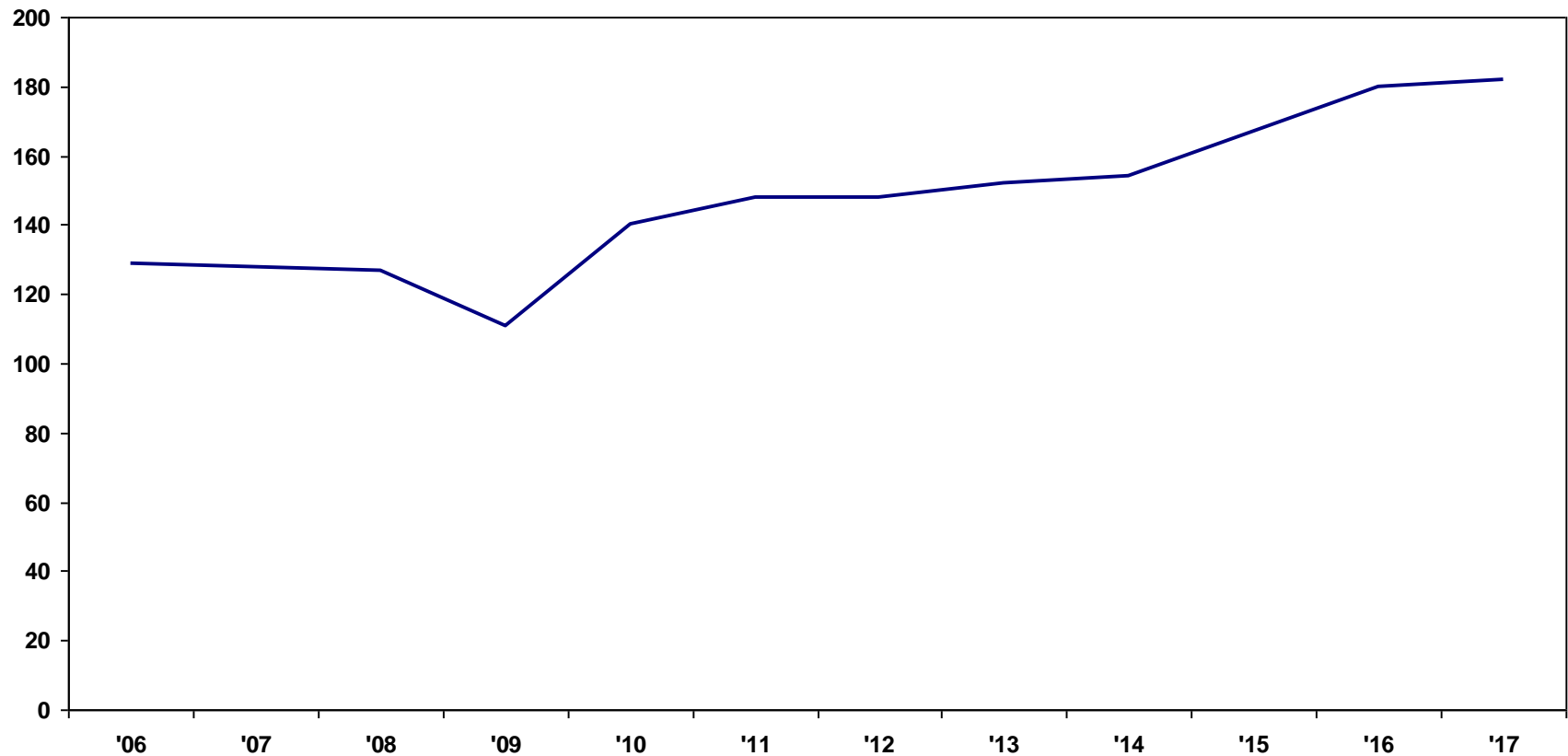
Market growth (indexed, 2005=100)



Source: SteelConsult analysis

Integrated mills are using pellets to maximize productivity, compensate for declining SF quality and mitigate rising coking coal costs, in a number of cases as part of a high PCI/high pellet practice

Average PCI rate* EU mills (kg/thm)

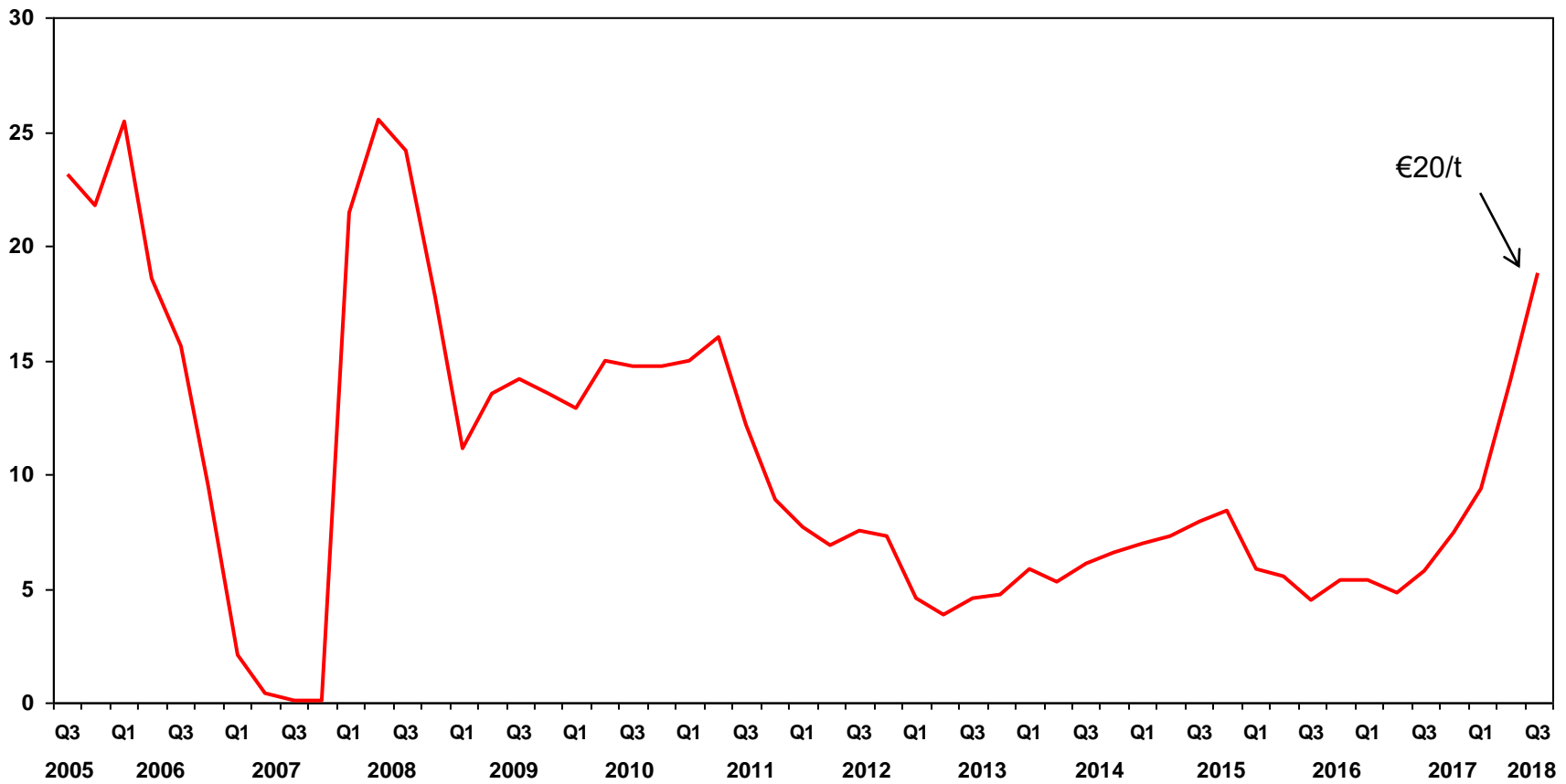


Source: SteelConsult analysis

Note: *Total PCI as a share of total hot metal output

Pellets also offer environmental benefits, as sinter processes face increasingly strict environmental regulations. But even more significant could be the impact of CO₂ emissions costs, with CO₂ prices surging sharply in recent months

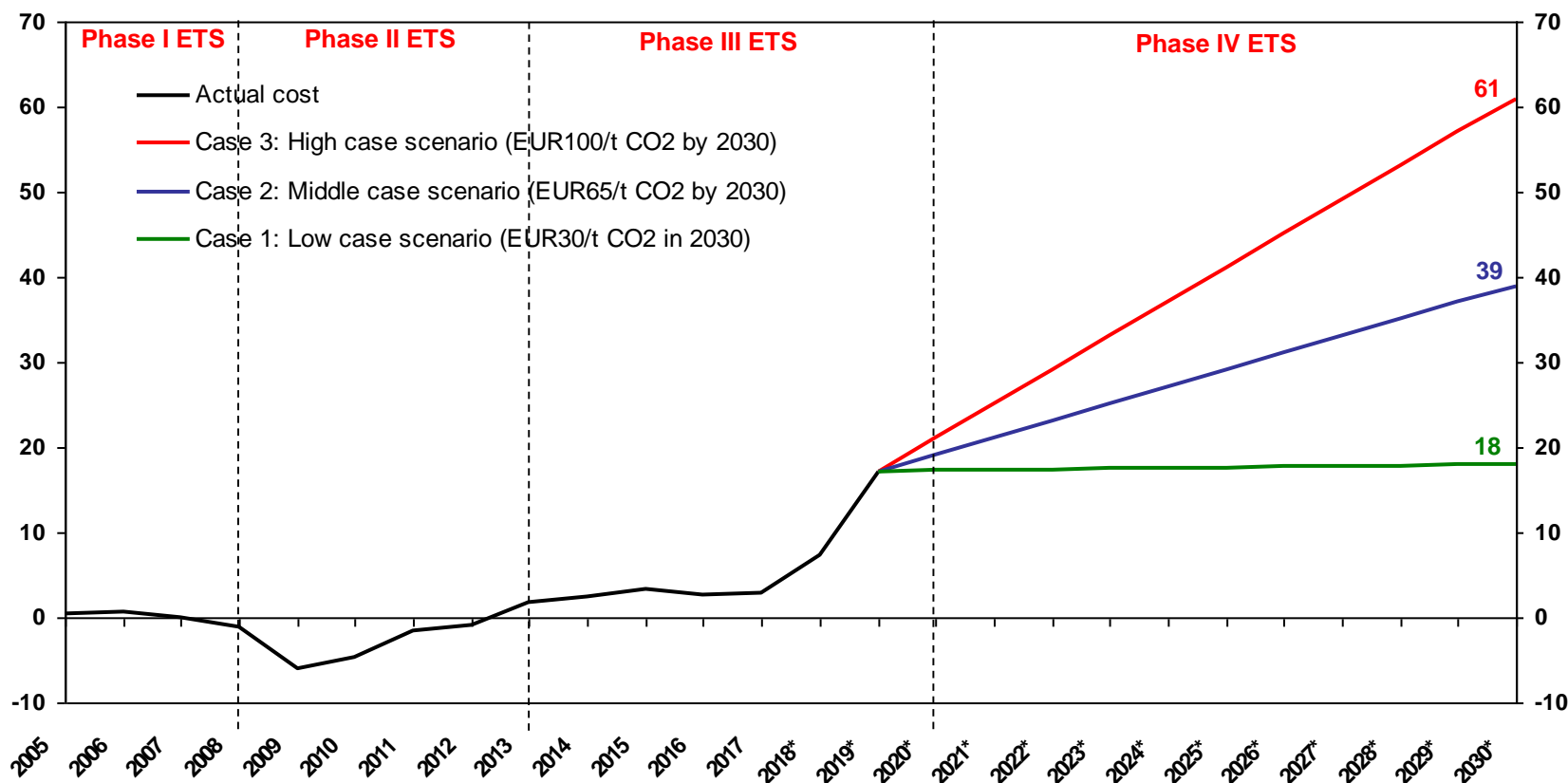
Spot carbon emission price ETS (€/t CO₂)



Source: EEX

The EC’s CO₂ emissions regime is getting stricter and CO₂ emissions costs are expected to increase to levels of ~€20-60/t crude steel in Phase IV of the ETS. Using pellets will increasingly become an effective way to outsource CO₂ emissions

CO₂ emissions costs, average of integrated EU steel mills (€/t crude steel)



Source: SteelConsult analysis

Note: Indicative only, forecasts are subject to specific assumptions

The various drivers are expected to continue to support the use of pellets in the future. Declining availability of lump ore and rising CO₂ emissions costs will provide significant additional boosts to the use of pellets

Supply:

- Rise of ultrafines
- Rising use of pellets to complement declining SF burden quality
- Decline of lump availability

Demand:

- Saving of capital
- Growth enabler in case of sinter or BF bottleneck
- Raw materials and cost flexibility
- Productivity benefits
- Coke saving
- Rise of DRI in MENA, CIS and USA
- Environmental benefits (outsourcing CO₂ emissions, rising env. costs for sinter plants)

Thank you for your attention!



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