Competitiveness and challenges in the steel industry

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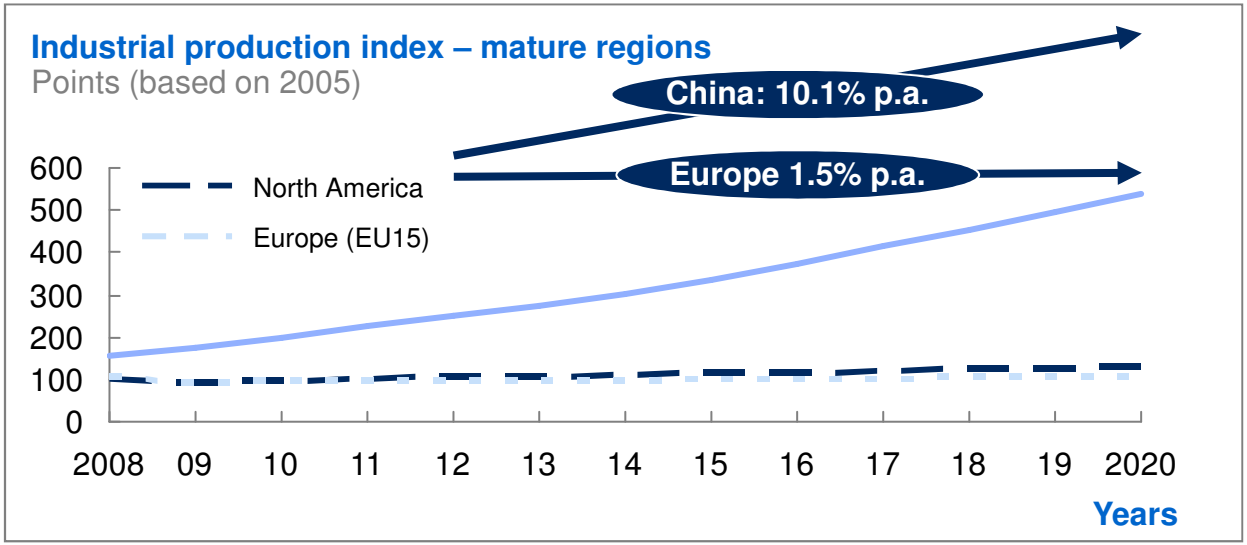
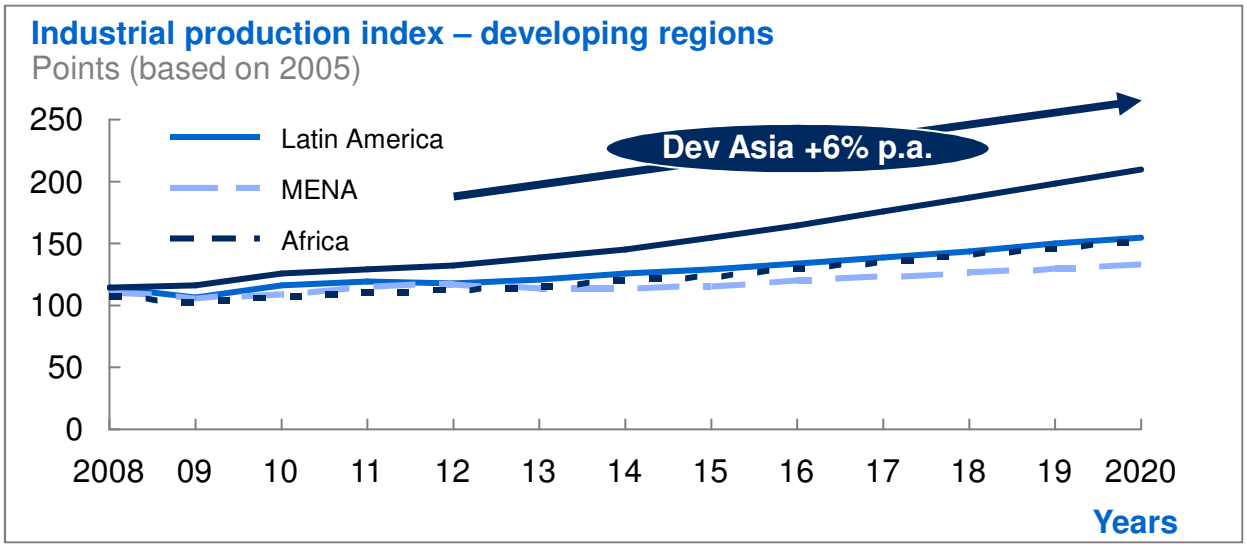
Contents

- **Challenges in the steel industry – cyclicality and increasing competition from emerging economies**
- Competitiveness of the steel industry – beyond cost optimization
- Implications for enhancing competitive-ness – few actions to launch and promote

The development of the industrial production index shows fundamental differences by region



- China and Western Europe are the dominant players in global consumers
- While projections on China are positive, mature regions suffer from no growth

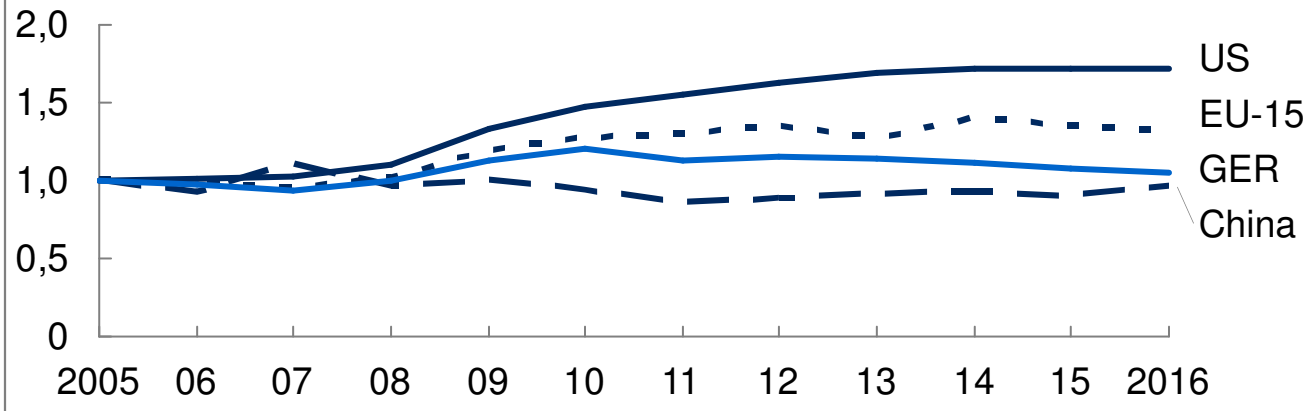


- Emerging regions follow a growth trend line over the next few years
- In all of those regions next to GDP growth, some countries have clear growth stimulating drivers such as energy and resources

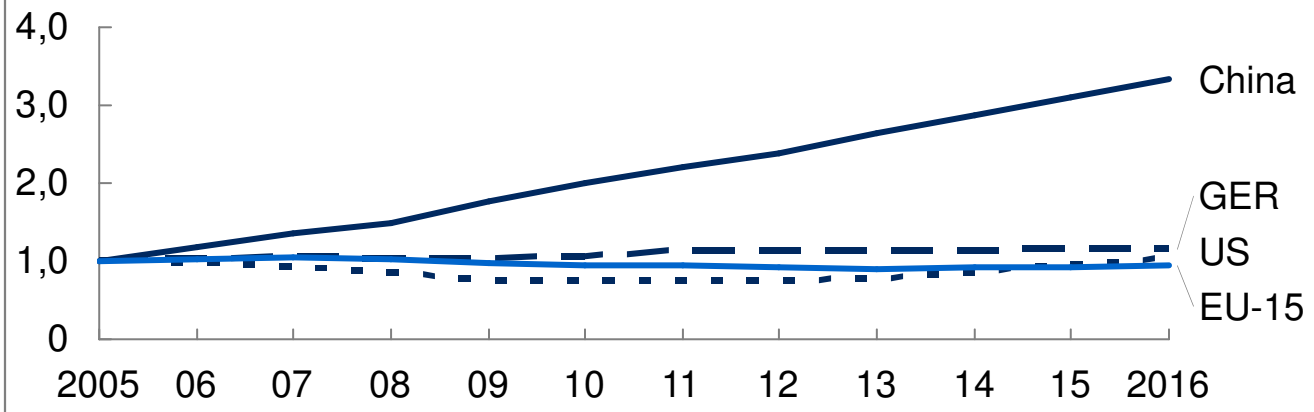
SOURCE: Global Insight; McKinsey

Within major steel economies macro-economic factors indicate uncertainty for demand and utilization

Debt GDP ratio
Index (based on 2005)



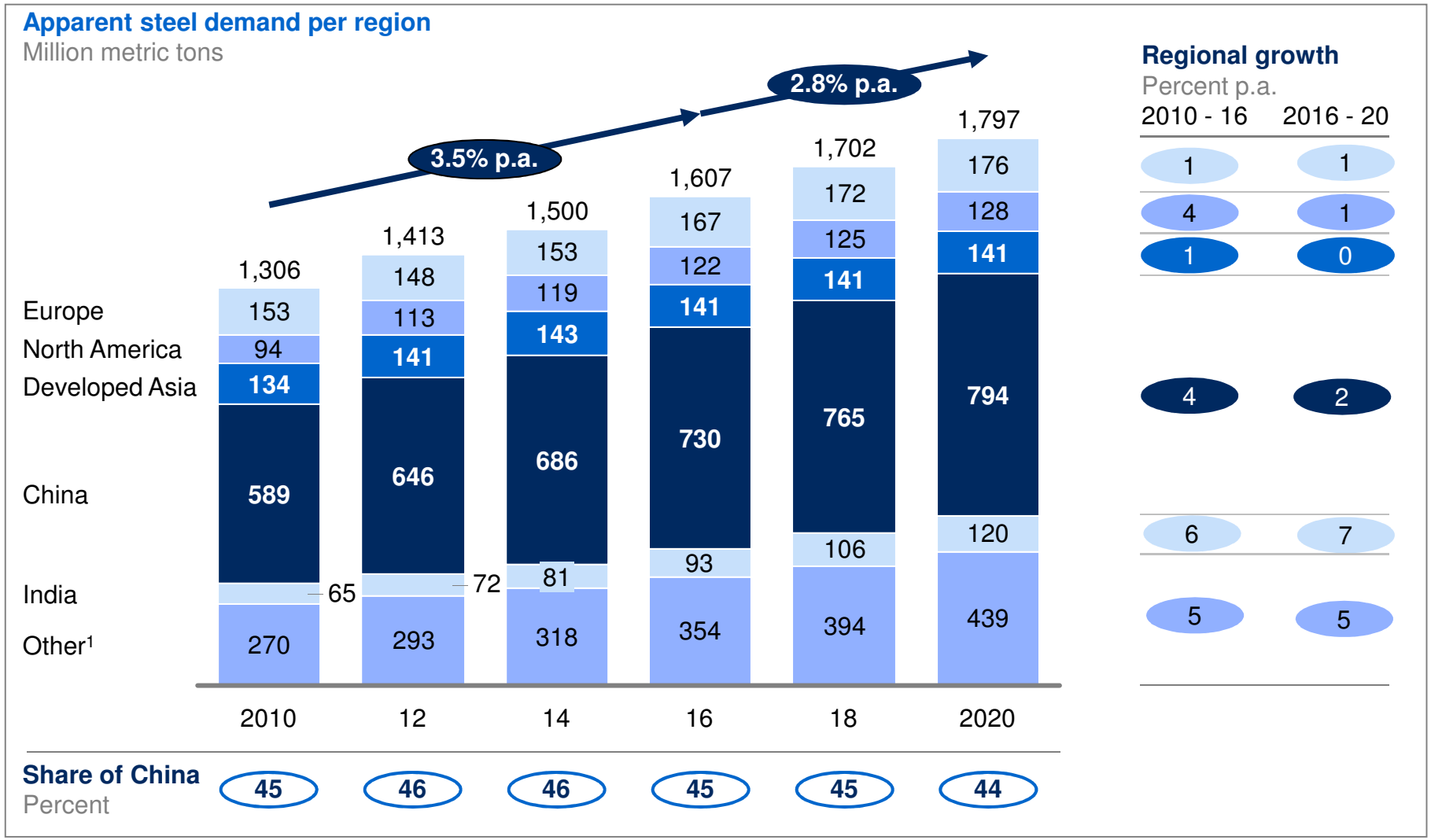
Infrastructure spending
Index (based on 2005)



- Economically uncertain markets in traditional steel-consuming econo-mies
- China's economy stabilizes while the debt to GDP ratio in the US and EU-15 has been increasing steadily since 2008 in combination with strongly declining infrastructural investments
- In addition to weak GDP growth and higher debts, infra-structure investments in EU-15 countries have declined more than 30% between 2011 and 2012

SOURCE: Global insight; McKinsey

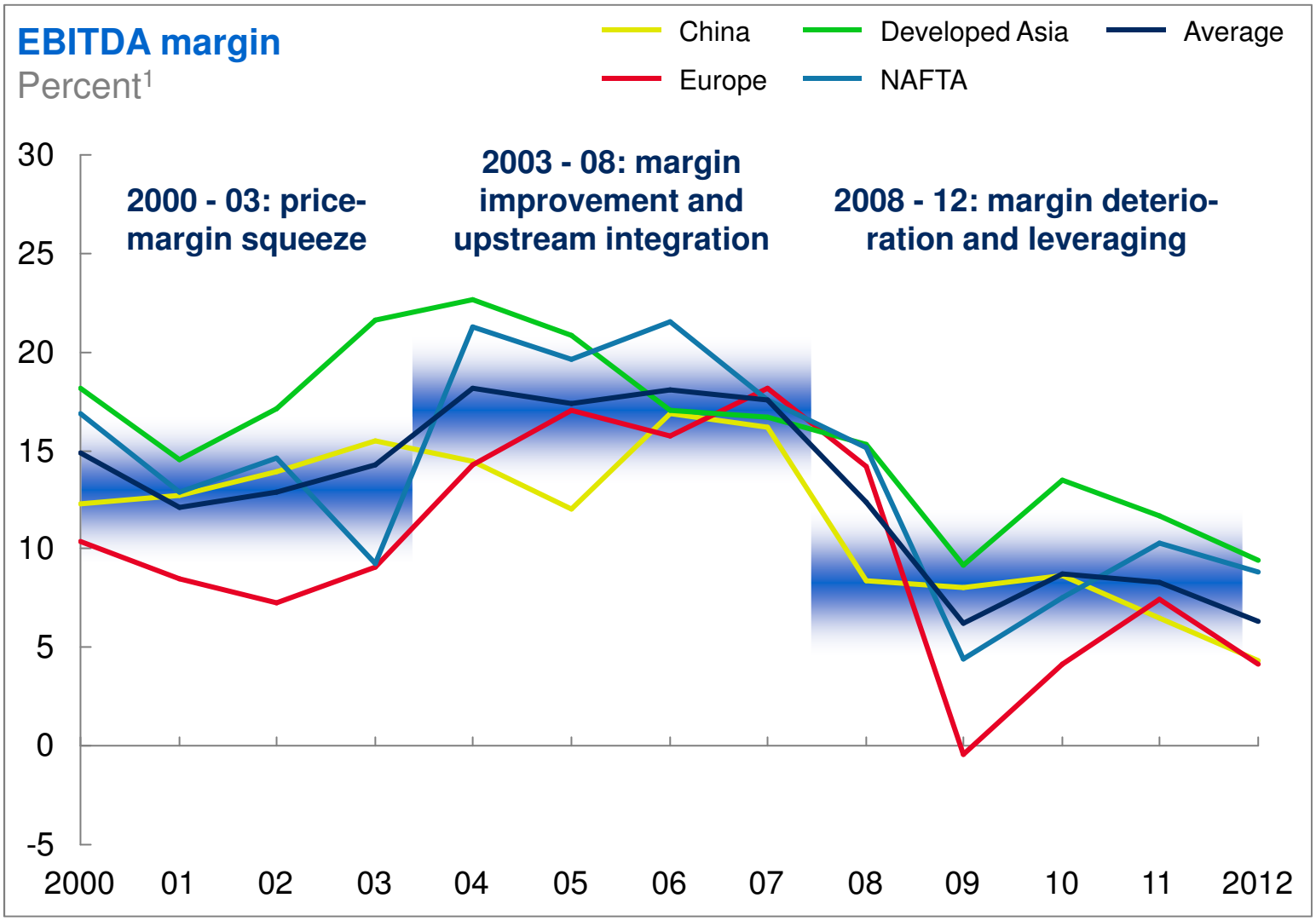
Current projections based on consumption forecasts indicate a global slow-down



1 Africa, other Asia, CIS, Oceania, MENA, Latin America

SOURCE: World Steel Association (WSA); McKinsey Steel Demand Model

The steel industry is very volatile and with depressed profitability since 2008 – mature regions are losing in profitability



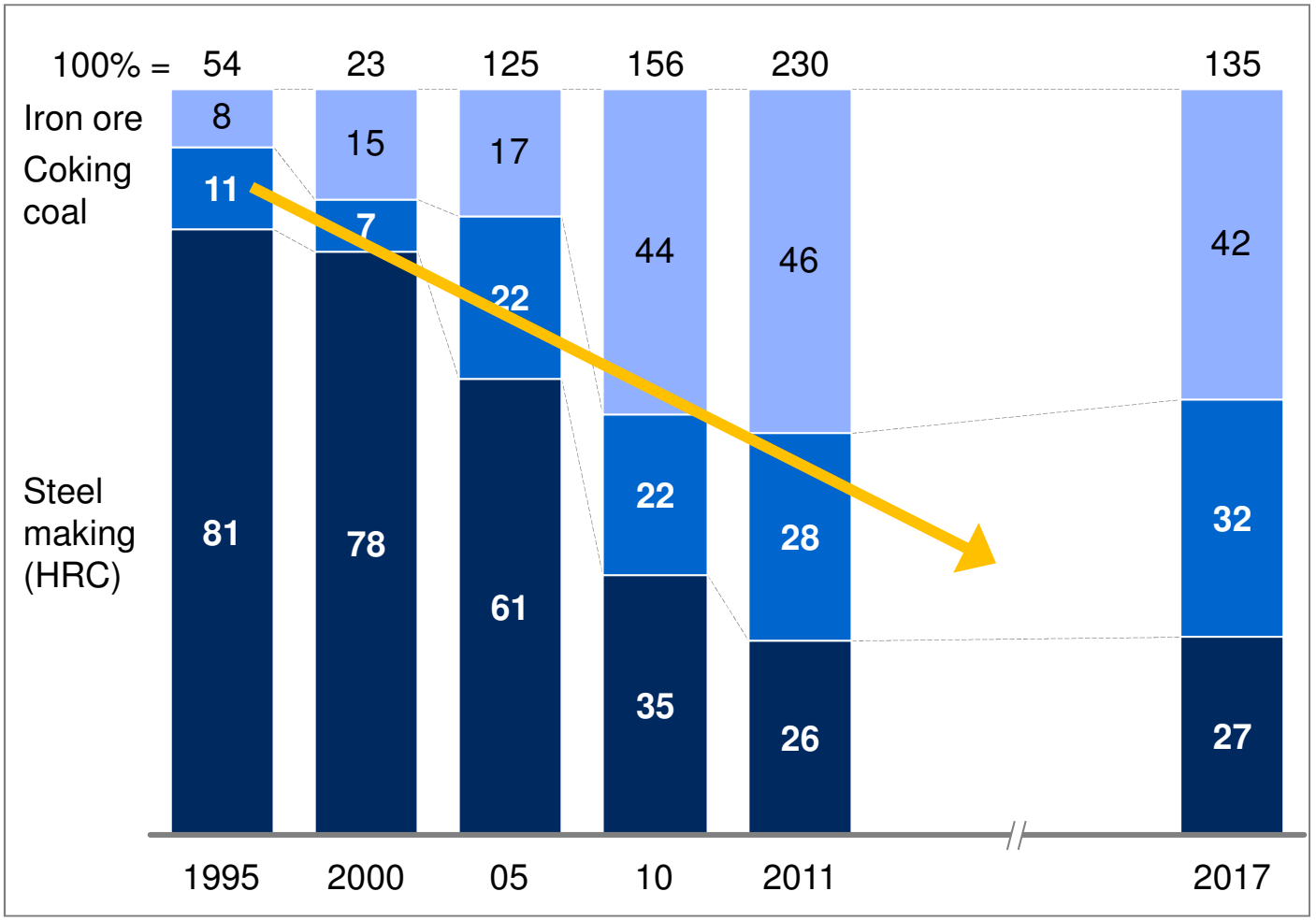
- Margin develop-ment follows a negative trend line
- Current situation worst for a long time

1 Based on a sample of 84 of the largest steel companies globally

SOURCE: Bloomberg; McKinsey analysis

Within the entire steel value chain, profitability is challenged and margins move to mining

HRC value chain[1] profit pool split evolution since 1995, USD billions

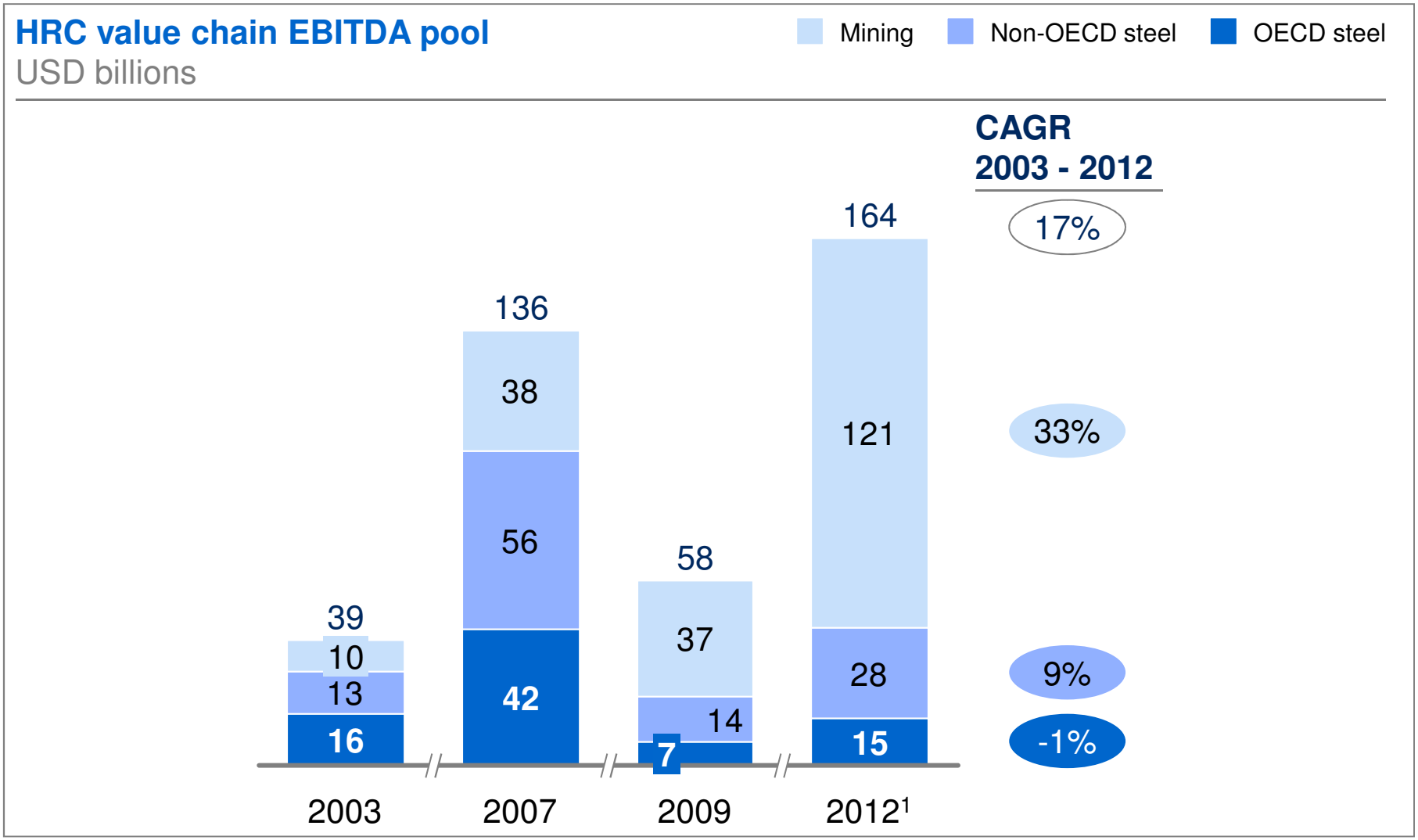


- In the medium term, the value pool in steel will remain in favor of the raw material producers
- There might be shifts in between years, but demand and supply for steel combined with cost for marginal producers will stabilize EBITDA distribution

1 HRC assumed to represent 85% of total hot-rolled flat products. Flat production assumed to use 85% of pig iron as raw materials. Assuming 1.6 t of iron ore per tonne of pig iron and 0.5 tonne of coke per tonne of pig iron

SOURCE: McKinsey Steel Model, McKinsey Mining Value Pools Model

From a perspective on the EBITDA pool, emerging regions benefited most from the China-driven boom of the last decade



1 Based on preliminary estimates

SOURCE: McKinsey (BMI Value Pools Model)

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- Challenges in the steel industry – cyclicality and increasing competition from emerging economies
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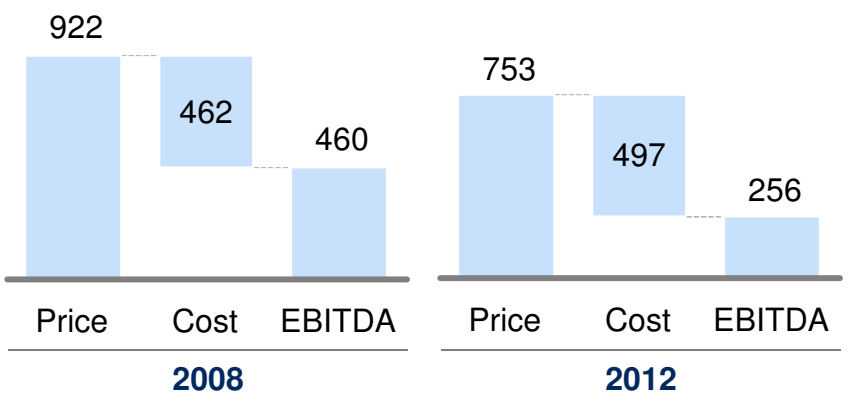
Margin development in steel is a major issue, driven by external factors and plant situation

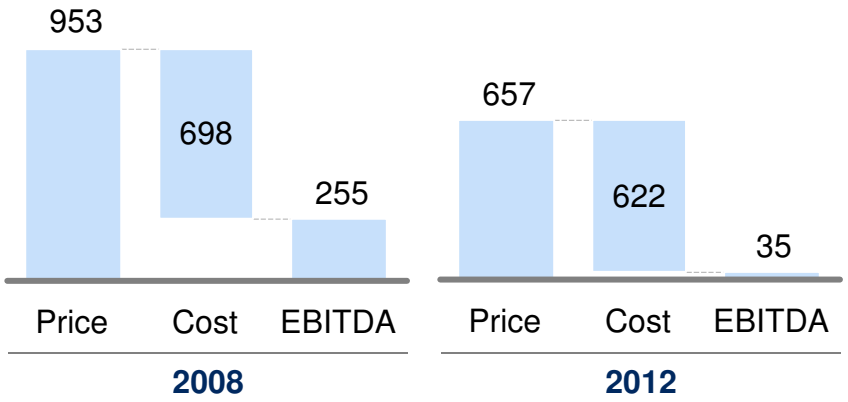
1 Development of industry attractiveness

USD per ton of HRC

Brazil

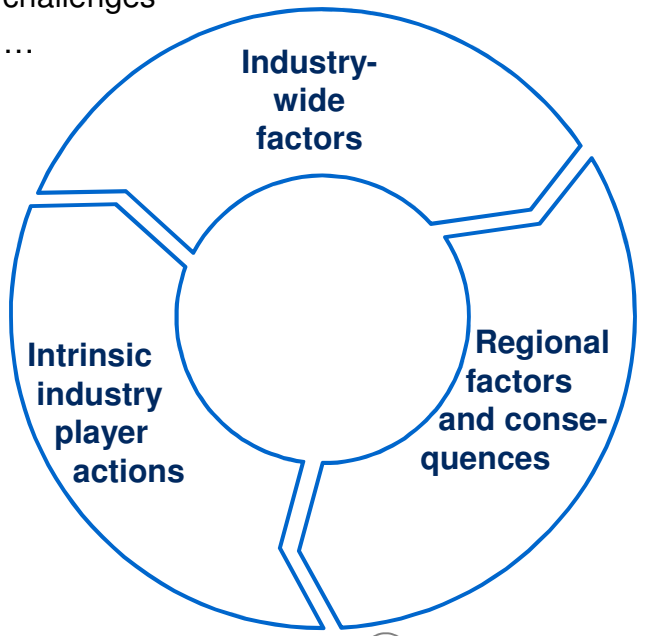


Western Europe



Typical factors driving/challenging competitiveness

2
- Supply balance
- CO_2 and technology challenges
- …



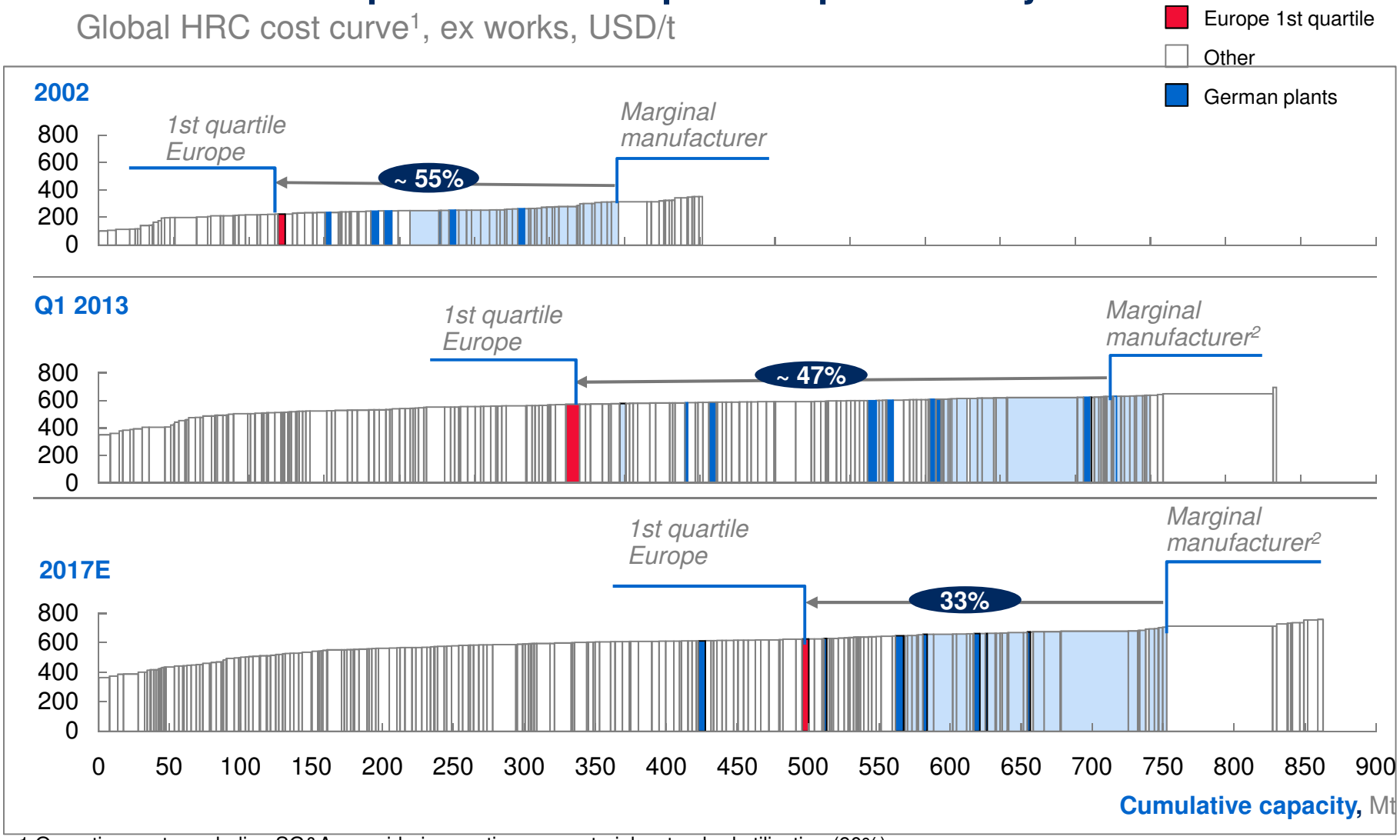
4
- Asset quality and actions
- Operational performance
- …

3
- Access to raw materials/resources
- Fx-rate and cost inflation
- Regulation
- …

SOURCE: SBB, MEPS, McKinsey Flat Steel database

1 Globally competitiveness of some regions gets challenged through erosion of cost position – example Europe/Germany

Global HRC cost curve[1], ex works, USD/t



1 Operating costs excluding SG&A, considering captive raw materials, standard utilization (90%)
2 90% of capacity

SOURCE: McKinsey flat steel cost model; steel press; VDEh; WSA

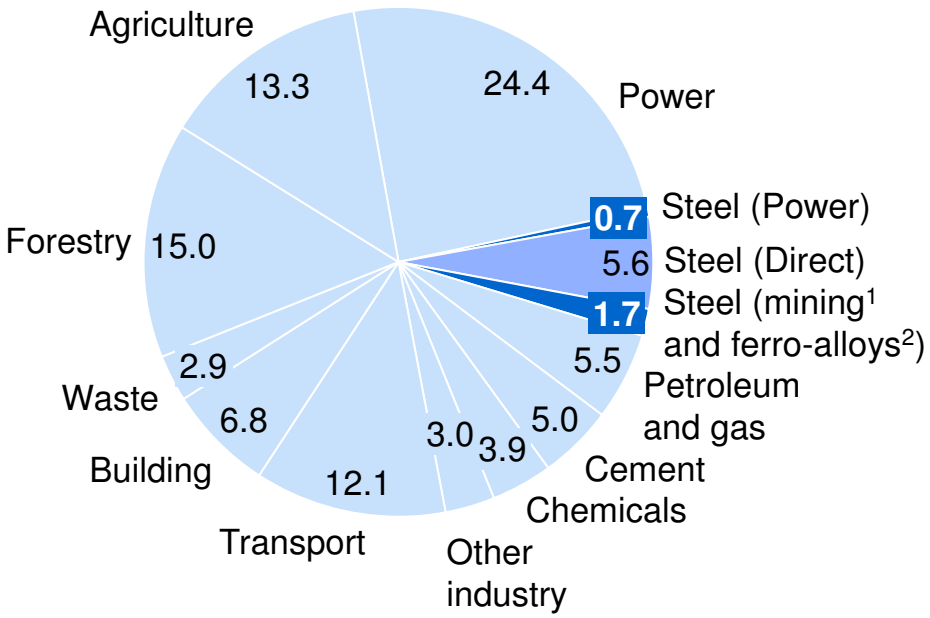
2 Steel will remain a source of CO_2 emissions which is a consequence of the process …

Percent, 2010e

Direct emissions
Indirect emissions

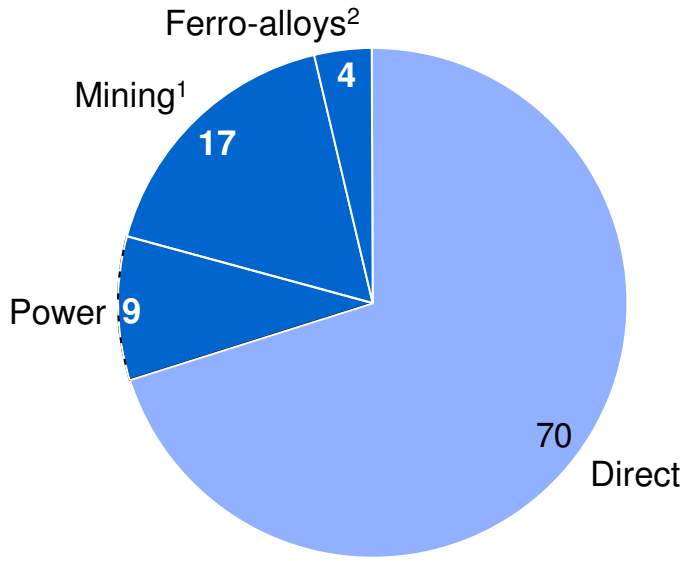
Global CO_2e emissions

100% = 49.4 $GtCO_2e$ per year



Steel CO_2e emissions

100% = 4.0 GtCO2e per year



1 Includes mining and beneficiation of iron ore, coal, limestone, and ferro-alloy ores
2 Production of Ni, FeCr, FeSi, FeMn, SiMn and Al consumed during steel production

SOURCE: McKinsey (Steel CO_2 Model; Global Carbon Cost Curve 2.1)

2 … however, technology differences can lead to significant differences in emissions

- Technology differences between integrated route and EAF route result in significant emission levels
- However, input factor salso change EAF route require additional power supply

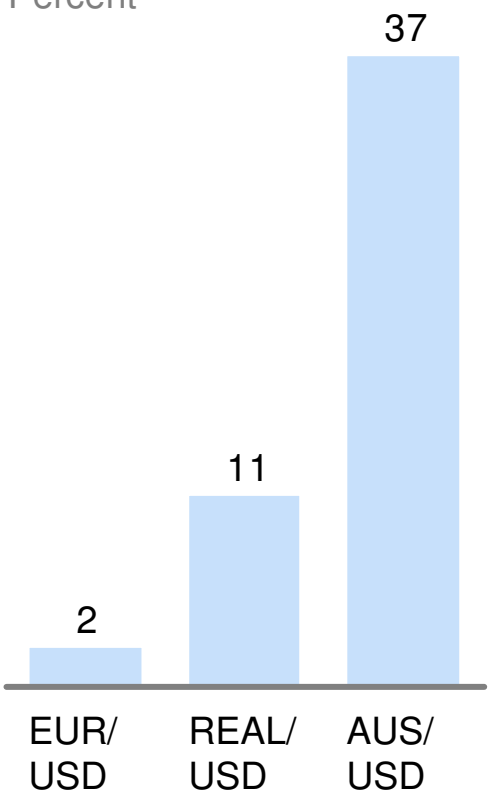
1 CO_2 emissions linked to off-gas are allocated to the process step where the gas is used

SOURCE: McKinsey Steel CO_2 Model

3 Some raw material supplying countries get challenged by appreciation of their currencies and cost inflation

Currency development of "commodity countries"

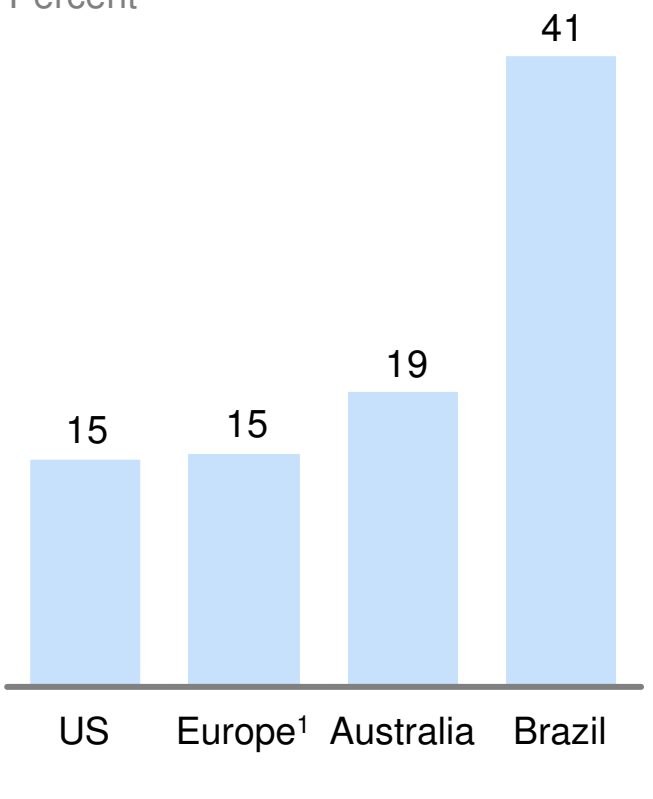
Exchange rate changes (2006 - 13)
Percent



- Commodity countries exposed to external factors
- Cost base for raw materials inflating
- The rationale that inflation results in devaluation does no longer seem to hold true
- Overall economics of raw material countries will challenge markets (higher cost makes steel less attractive)

Price evolution

Consumer price index growth (2006 - 13)
Percent



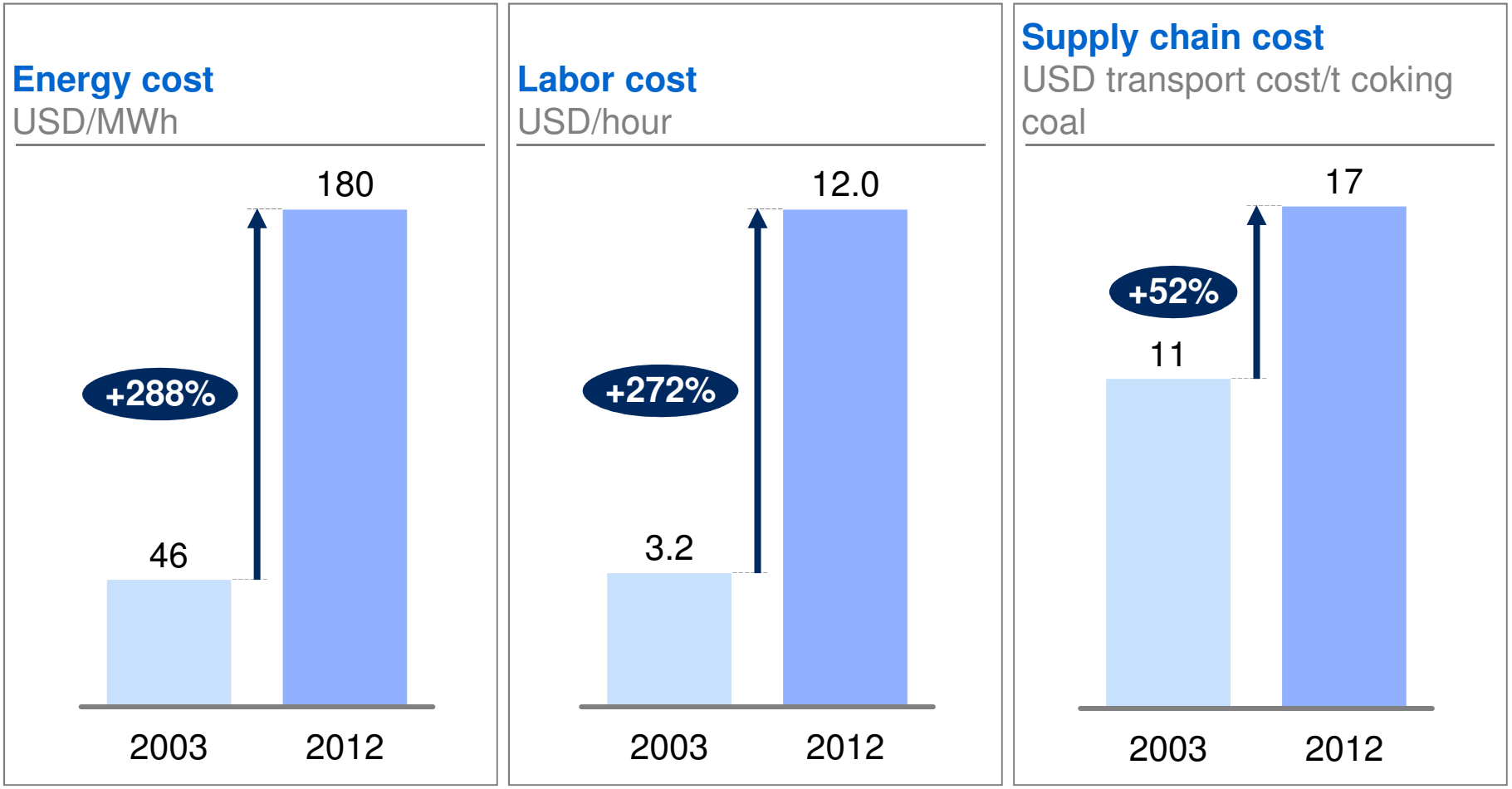
1 Eurozone countries

SOURCE: Global Insight; OANDA; McKinsey

3 Brasil shows how regionally attractivity of a production base can deteriorated

Development of factor costs in Brazil

Million metric tons



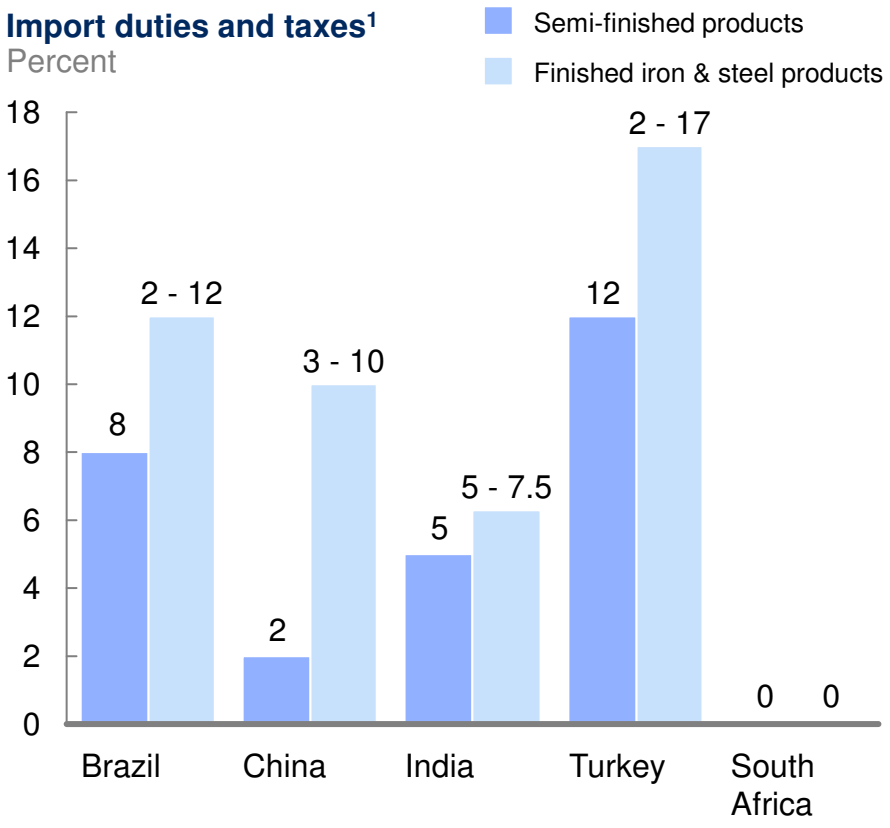
SOURCE: Ministério das Minas e Energia, Aneel, Economist Intelligence Unit, James F. King

3 Also, import and export taxes influence competitiveness, while protecting or even taking away the need for continuous improvement

EXAMPLES

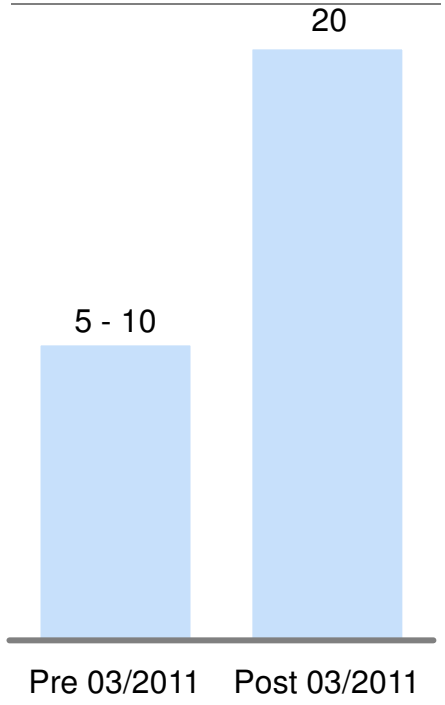
Import duties for steel products

Import duties and taxes[1]
Percent



Export barriers for raw materials

Export duties, iron ore India
Percent



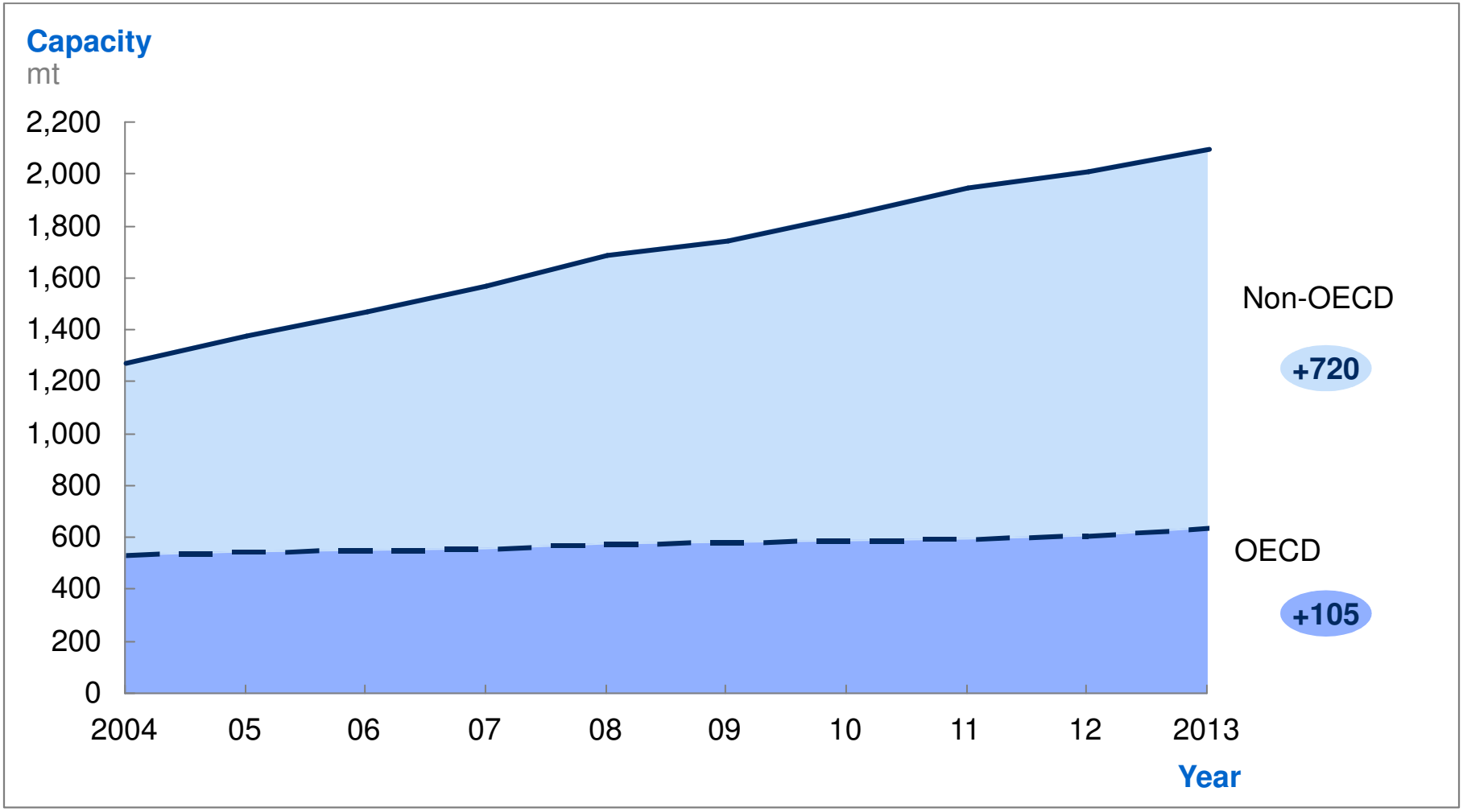
Export bans

- Indonesia export ban on iron, except for miners that build local processing facilities from 2014
- Bans on scrap exports in Indonesia, Mongolia, Saudi Arabia, and many other countries[2]

1 Average applied MFN tariffs
2 In addition China, Russia, Ukraine, India, Guinea, Iran, Argentina, Kazakhstan, Pakistan, UAE and Vietnam impose export taxes

SOURCE: WTO, OECD, European Commission

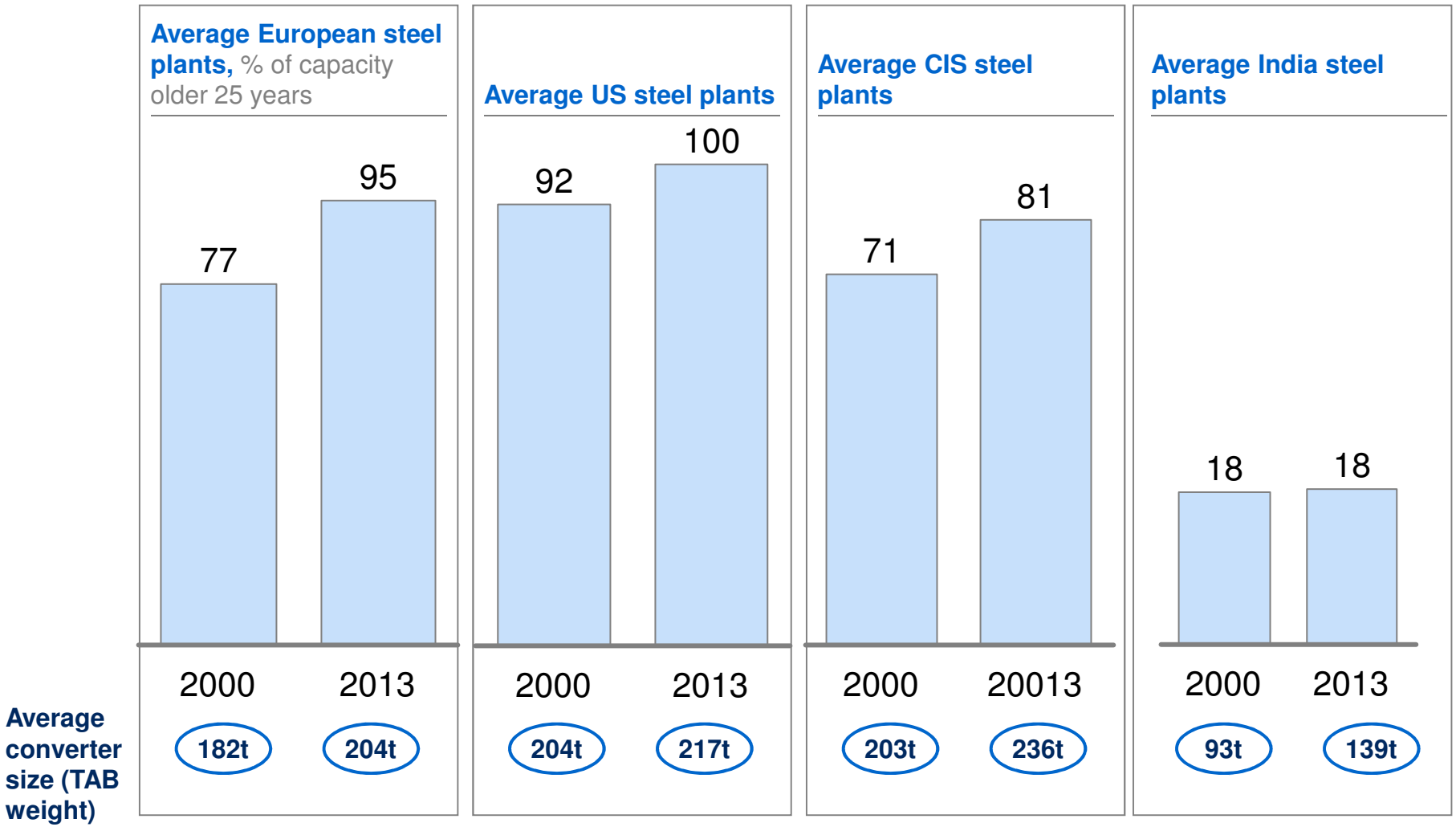
4 Due to low economic attractiveness new assets have been built manly outside OECD



SOURCE: McKinsey Crude steel capacity database

4 Assets had been ageing over time and lose potential structural advantages

Age comparison BOF route

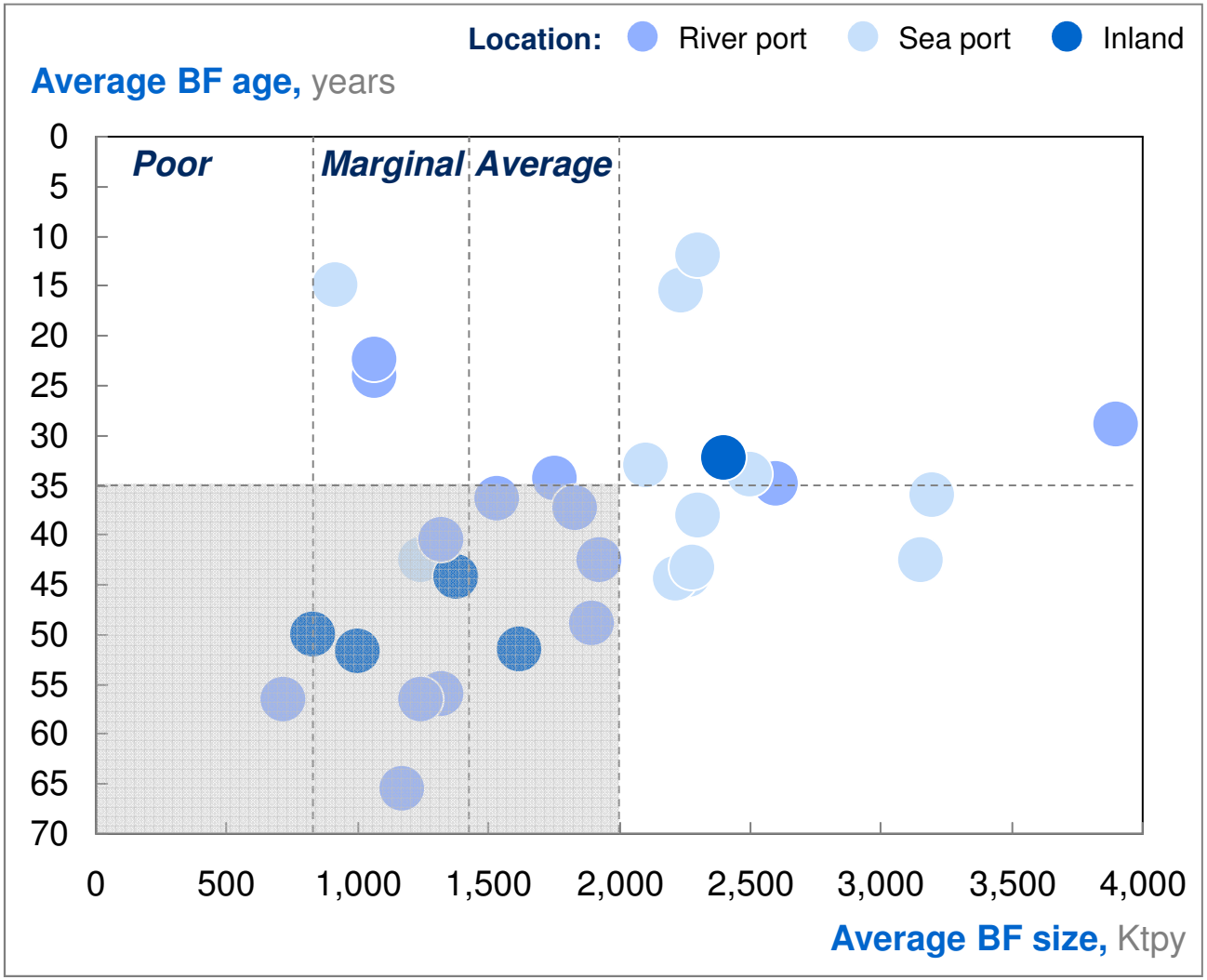


SOURCE: VDEh Plantfacts; Experts Estimate

4 In some regions the asset base calls for reviewing sustainability of assets and to be rebalanced

EUROPE EXAMPLE

Economical challenged



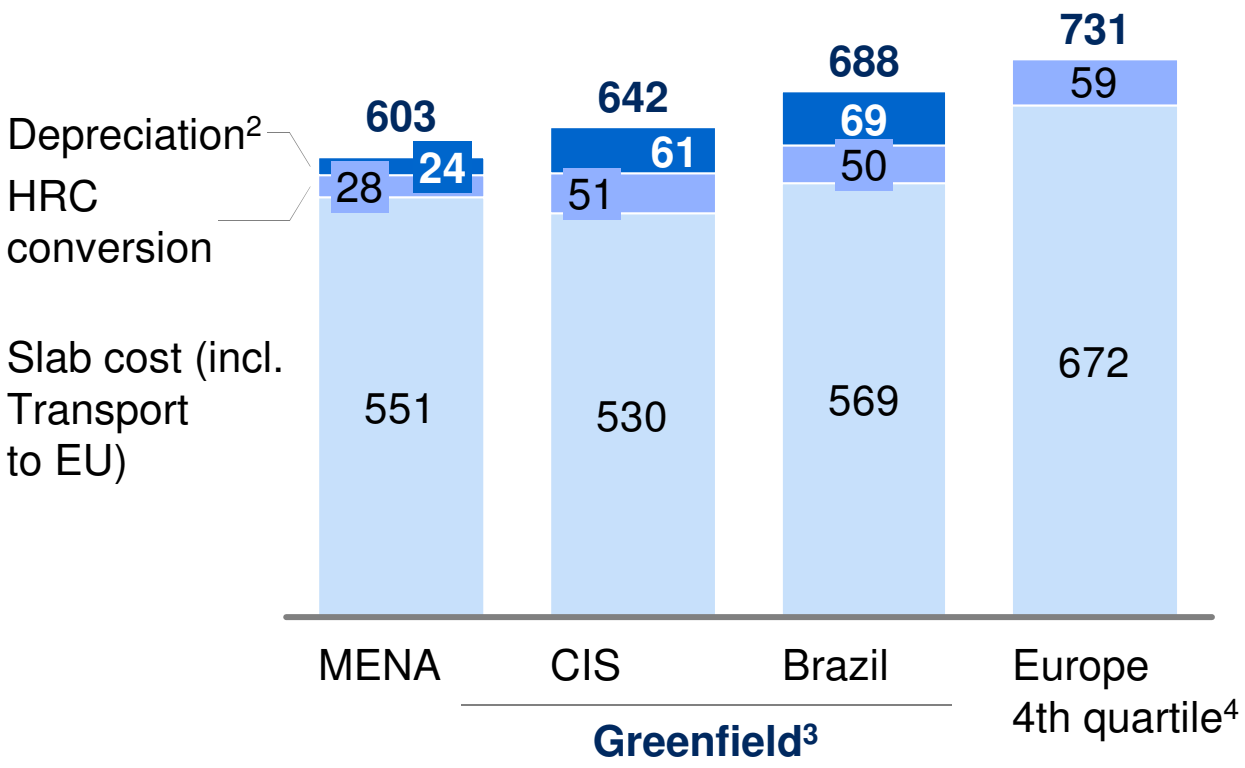
- **Majority of European blast furnaces** have
  - An **average age of more than 35 years** (not considering relines)
  - An average blast furnace **capacity of below 2 million tonnes**
- Additionally, more than **60% of European BF plants** have **logistical disadvantages** (located inland with either river port or rail access)

SOURCE: VDEh Plantfacts; McKinsey

4 In contrast greenfield plants can effectively compete against these low positioned plants in mature region – example Europe

HRC cost

USD/t



Result

- Once capacities are offshored, there will be no economies to relocate quantities back to Europe
- Greenfield plants of new entrants will be able to compete at any price in Europe, especially from MENA

1 Including EU exports; In HRC equivalent; includes HRC and all downstream products
2 Based on capex of 1,200 USD/t for integrated plant, 300 USD/t for EAF slab plant; 170 USD/t for HRC mill; depreciation period 20 years
3 Without captive raw materials
4 Incl. CO_2 costs based on a CO_2 price of 20 USD/t

SOURCE: McKinsey

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EU launched a programme to support steel industry

	Programme elements
Regulatory framework	▪ Assessment of impact of existing and new policies and legislation on competitiveness ▪ Support sustainable steel production to boost demand and EU market share ▪ Fight VAT evasion and black markets in steel
Boosting demand	▪ Promote steel end-use sectors, e.g., through simulating demand for alternative fuel vehicles and renovation of buildings by energy and resource-efficient construction
Level playing field	▪ Ensure to eliminate or reduce tariffs and non-tariff barriers on third markets for EU steel and raw materials ▪ Update anti-dumping and anti-subsidy regulations ▪ Monitor scrap markets and include coking coal in the list of critical raw materials
Energy, climate, resource policies	▪ Create regulatory environment conducive to sustainable growth (renewable energy, impact of the ETS on electricity prices, energy efficiency) ▪ Support internationally binding agreements on climate change and GHG
Innovation	▪ Integrate steel industry into RDI programme for energy-efficient products ▪ Support R&D efforts for new technologies, and shift focus to up-scaling and pilots, including steel/raw materials/recycling
Skills and restructuring	▪ Promote skills relevant to the steel industry going forward ▪ Work with member states and industry on alleviating impact of restructuring or plant closures on local labor markets and societies

SOURCE: EU Commission

Competitiveness should be promoted in a focused way

A **Company specificaction**

- Discover market and **customer opportunities** for steel and adjust accordingly (specialized assets, productivity focused assets, depending on market opportunities), recognize substitution risks
- Optimize **internal performance** further and do some structural adjustments

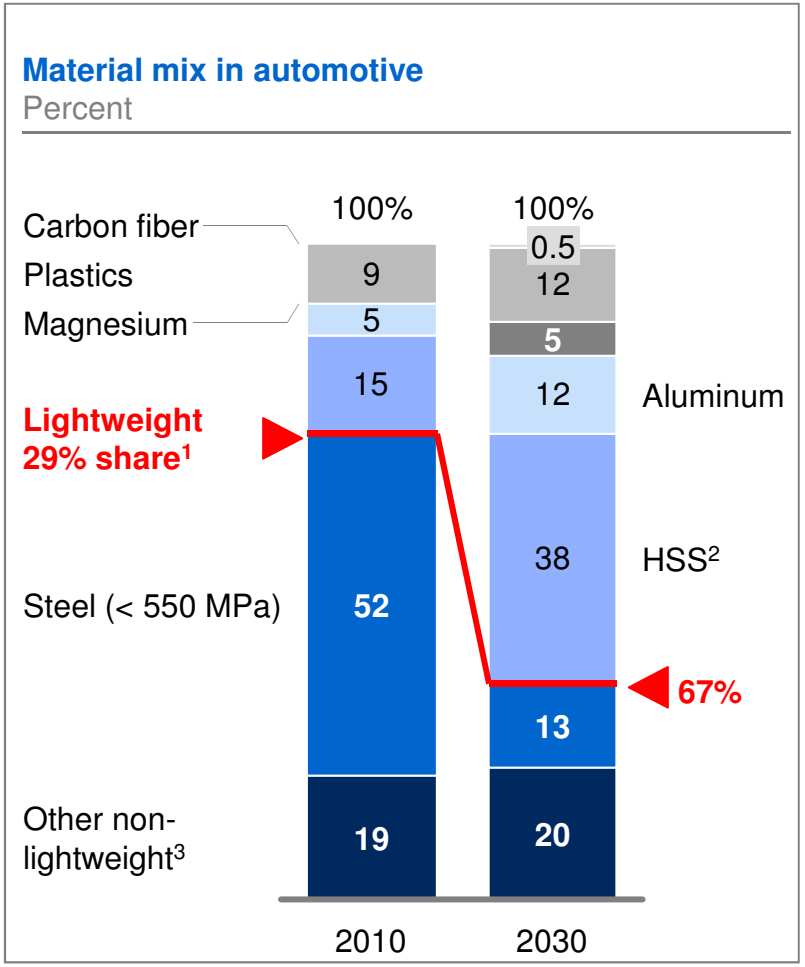
B **Macro-economic initiatives to secure competi-tiveness**

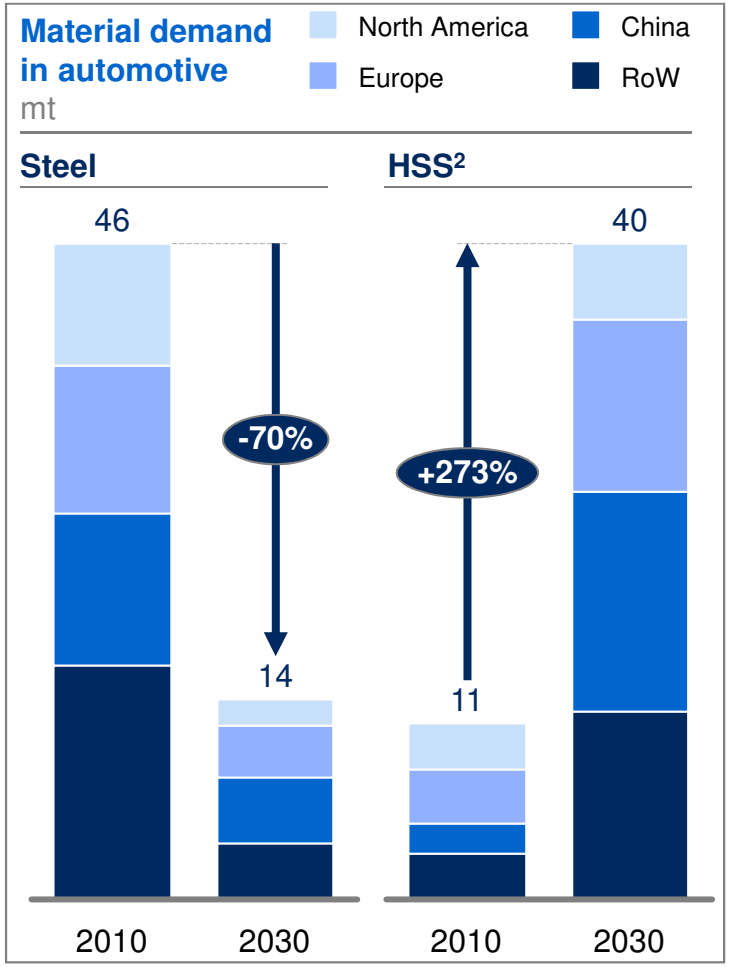
- Monitor implications of **competitive assets outside OECD** which change the game, and reflect on unpredictable (opportunistic) tradeflows

- Promote **industrialization levels with industrial GDP contribution** and establish right incentives, permissions and timely execution
- Allow for **consolidation** in steel where possible and secure no more legacy assets remain kept up
- Secure **level playing field** to allow for sustainable production, e.g., to allow for environmental standards, avoid structural penalties and/or bottlenecks, e.g., in energy

SOURCE: McKinsey

A In some applications, the profile of steel used will dramatically change and high value add grades will be increasing in importance due to light weight concepts





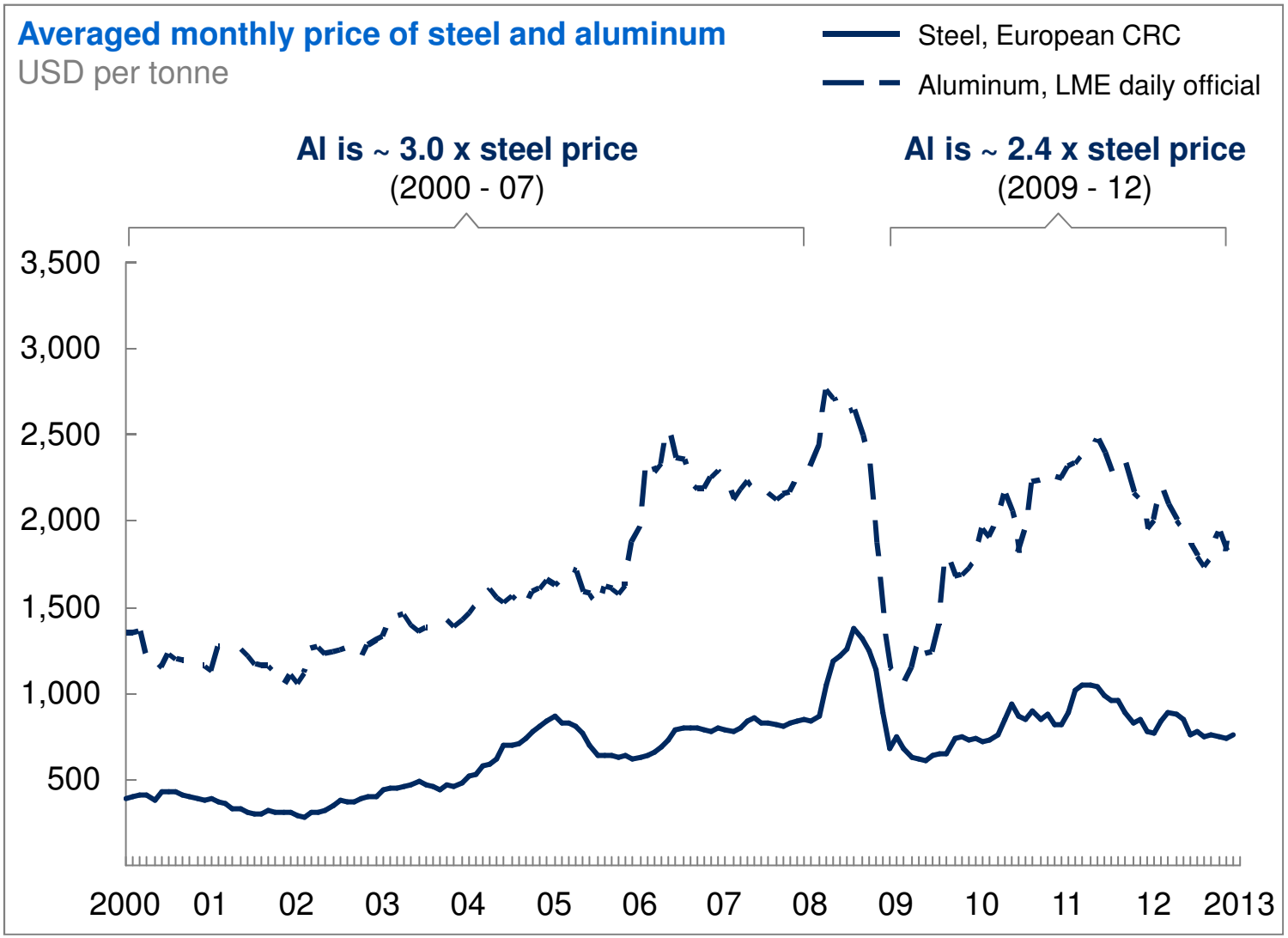
- In applications, the profile of steel will change
  - Need for light-weight applications due to environmental requirements
  - Need for high-strength steels for safety and power applications
  - Alternative solutions due to new power-train concepts (incl. BEV and hybrids)
  - Feasible combinations of high-strength structures and light panels

1 HSS, aluminum, magnesium, plastics, carbon fiber
2 High-strength steel (> 550 MPa)
3 Mainly other metals, glass, fluids, interior parts

SOURCE: McKinsey "Lightweight, heavy impact"; advanced industries perspective 2012

A However, competitiveness of aluminum relative to steel has dramatically increased due to falling price differential …

Averaged monthly price of steel and aluminum
USD per tonne



- Steel to aluminum spreads have been shrinking
- However, current gap between 2 raw materials is over USD 1,200/tonne

SOURCE: MEPS Transaction Prices HRC; London Metal Exchange

A … with the result that after "cost in use" calculations the aluminum disadvantage is affordable and attractive

HIGH-LEVEL ESTIMATES

Body panel example, high-strength steel (HSLA) to aluminum cost bridge

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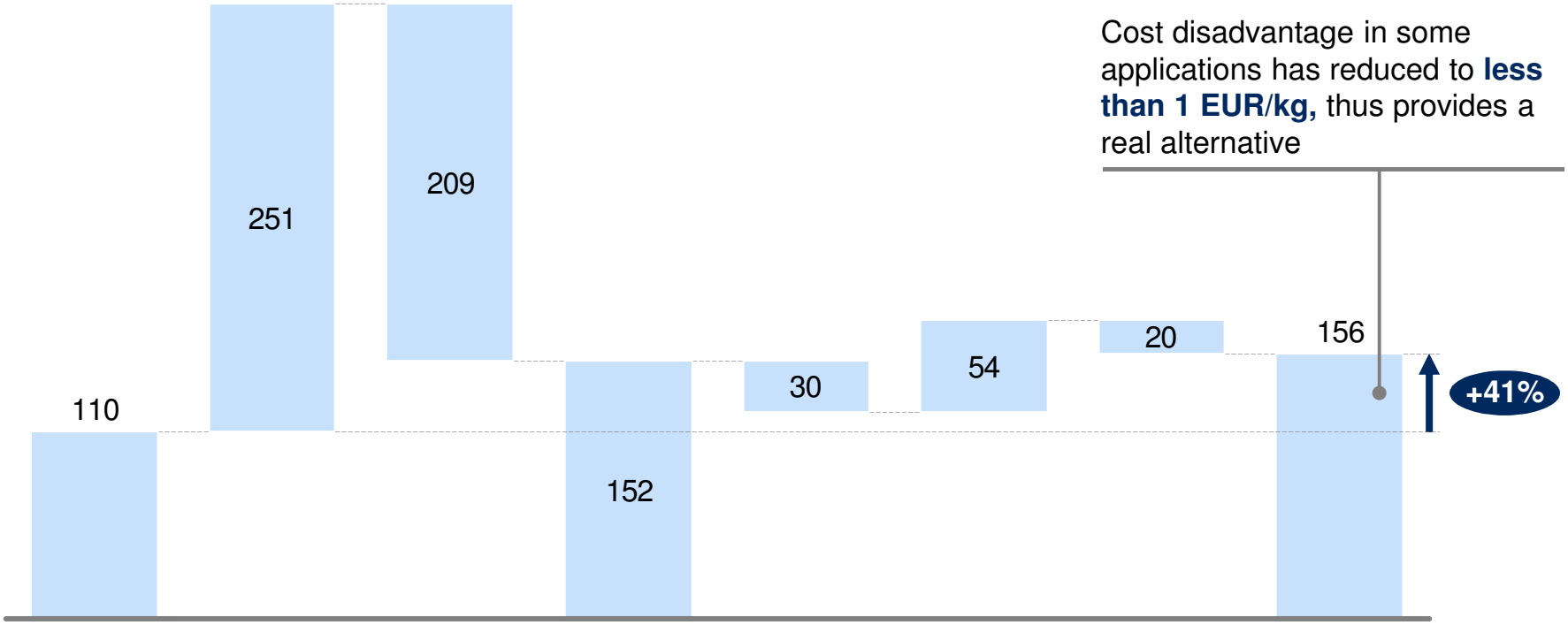
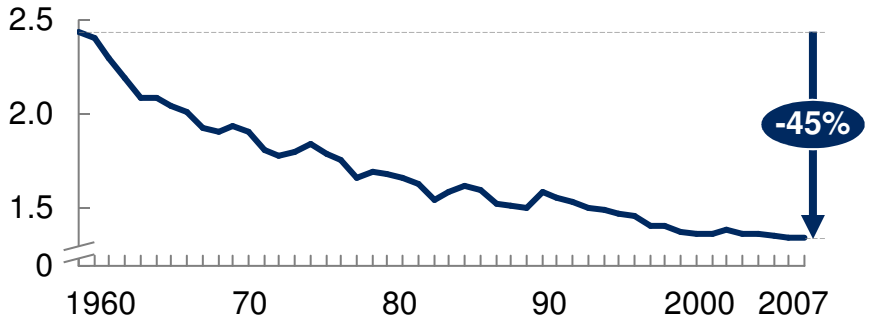


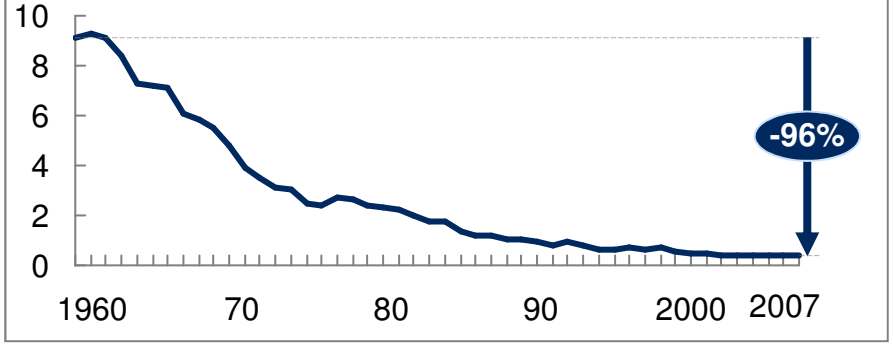
SOURCE: Interviews; ISIS; SRI; The Aluminum Association; FKA Weight Reduction Report

A Ongoing innovation has been a source for enhancing competitiveness

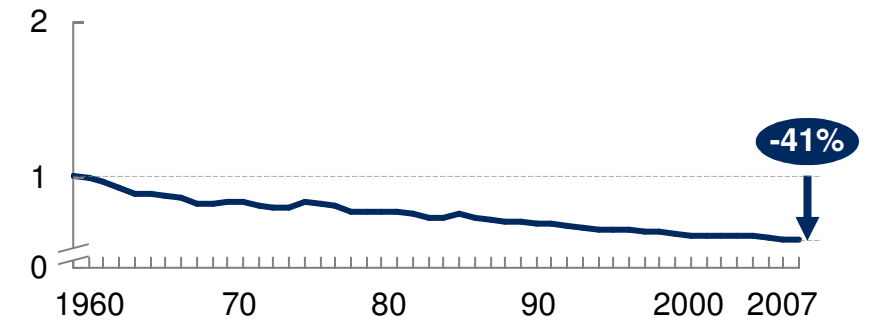
Specific CO_2 emission (Average BF/BOF and EAF)
Metric ton CO_2 per t crude steel



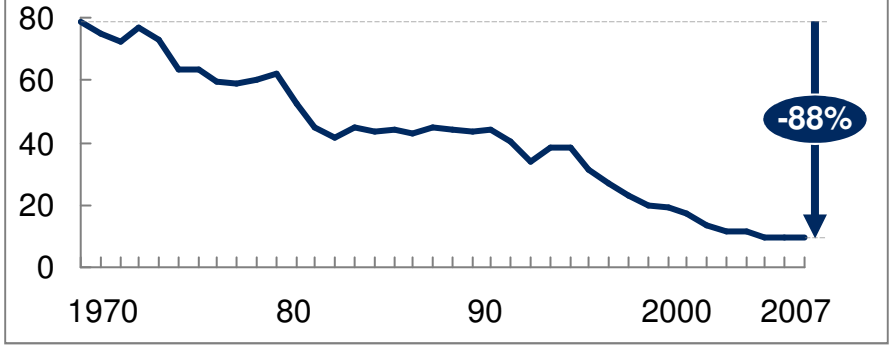
Specific dust emission
Kg dust per t crude steel



Specific energy consumption
Metric ton coal equivalent per t crude steel

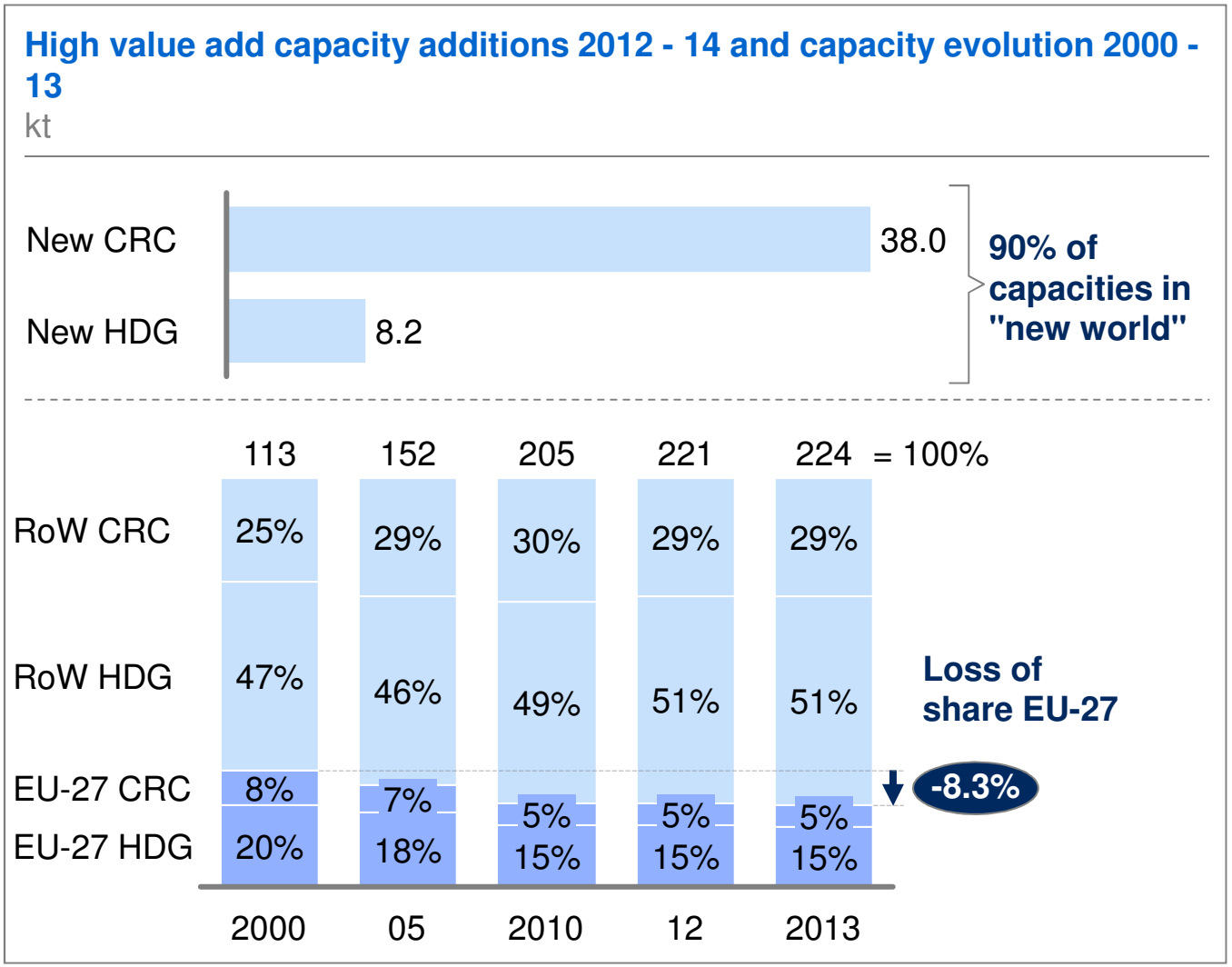


Accident rate
Number of accidents per million working hours



SOURCE: Wirtschaftsvereinigung Stahl, plant facts, McKinsey CO_2 model

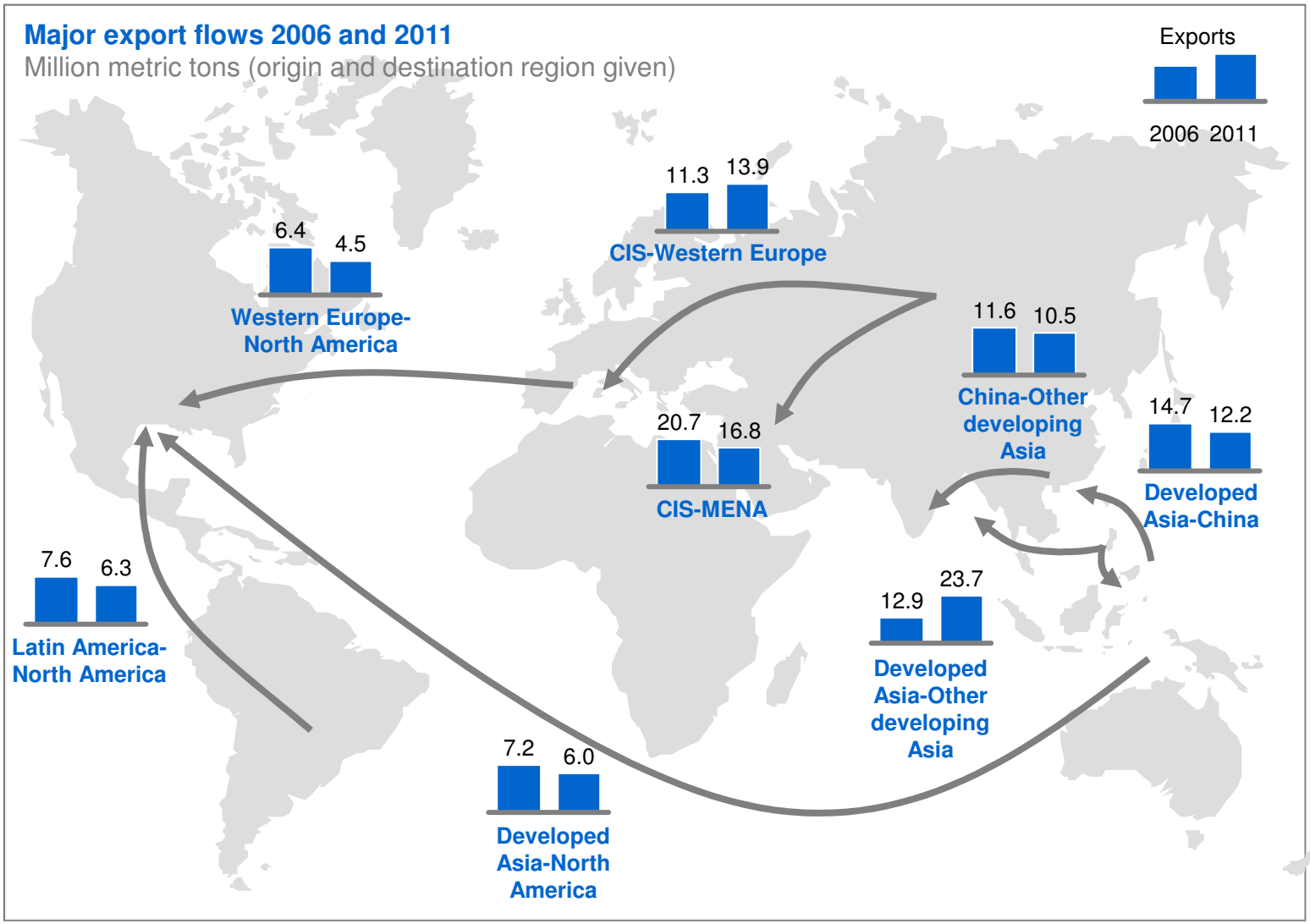
B Capabilities of producing high value added products increase, with require producers in OECD countries to invest in more competiveness



- Downstream steel production is signi-ficantly built up in emerging regions, with focus on value add
- Relevance of producers in mature world and therefore steel production in those regions is decreasing
- Steel mills need to have the funds to compete in these dynamic develop-ments

SOURCE: VDEh Plantfacts 2012; McKinsey Analysis

B Less predictable trade flows require monitoring and countermeasures if the conditions do not match



Emerging observations

- Production flows due to regional imbalances change due to
  - FX changes and cost advantages (e.g., Brazil)
  - Country development combined with local consumption trends (e.g., Russia)
  - Surplus capacity and change of addressable markets (e.g., Europe to US)

SOURCE: ISSB trade flow data base

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