



Foundry Industry 2020: Trends and Challenges

Düsseldorf, 23rd April 2015



1 Economic environment of the global foundry industry

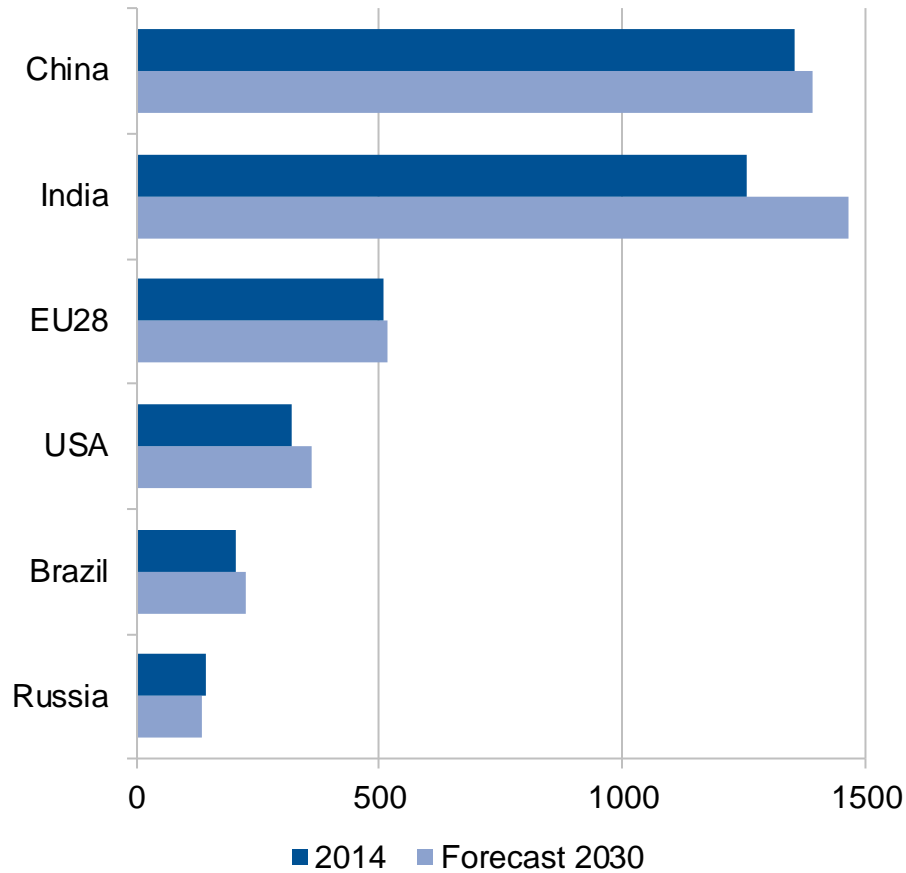
2 Casting production: Growth in eastern markets

3 Differences in earnings

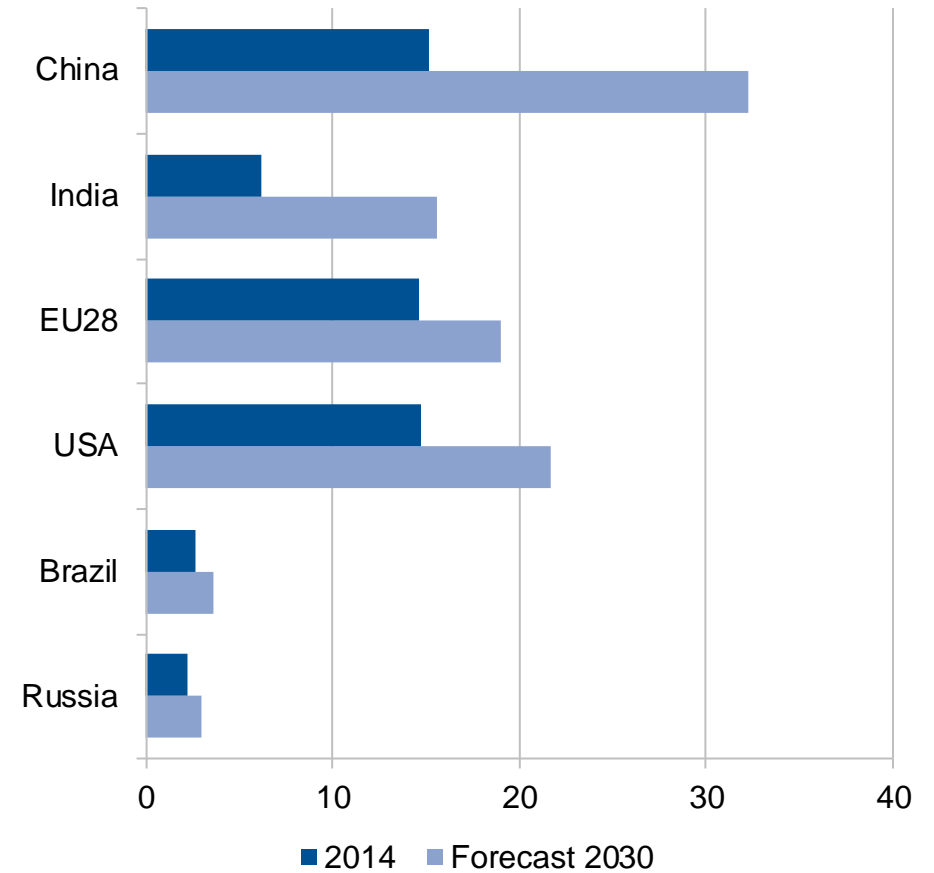
Appendix

World Economy 2030: China moves ahead, India catches up with EU and US

Population in million

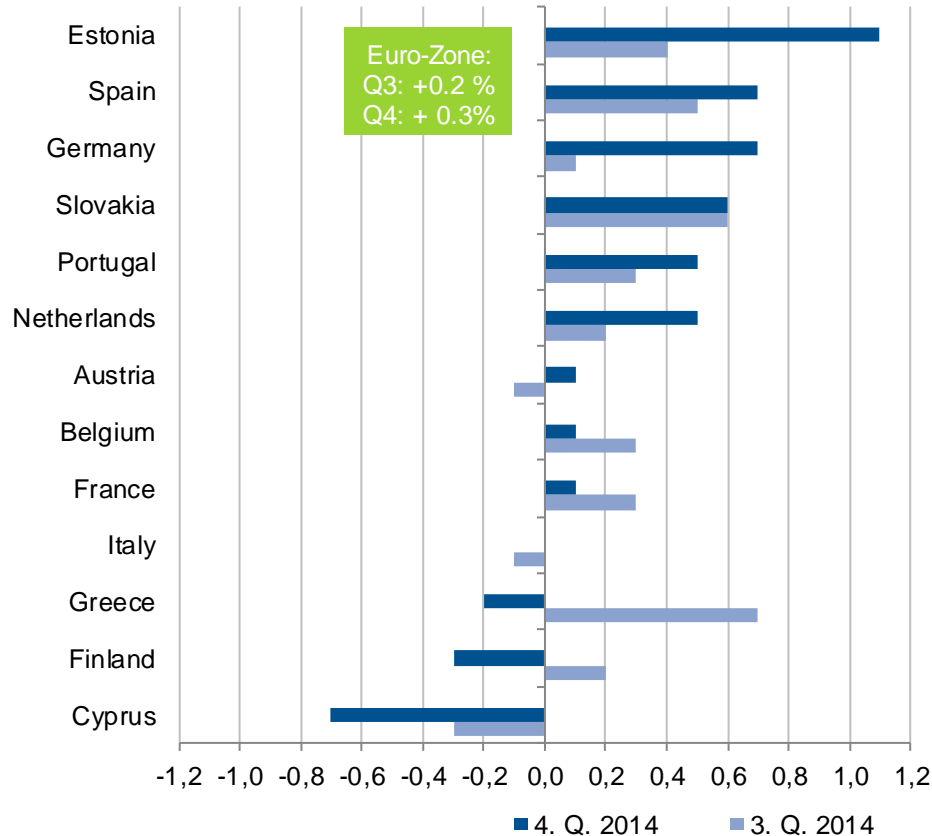


GDP in PPP in prices of 2005 in bn US-\$

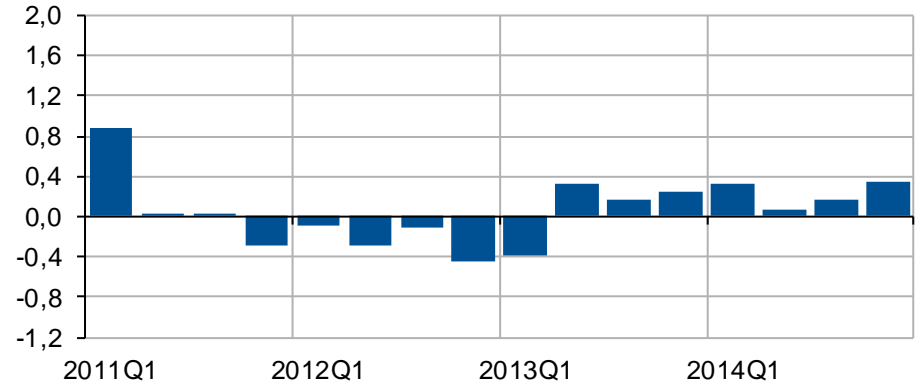


Eurozone: Improvement amid positive general conditions

Real GDP growth in %, qoq



Real GDP growth in %, qoq

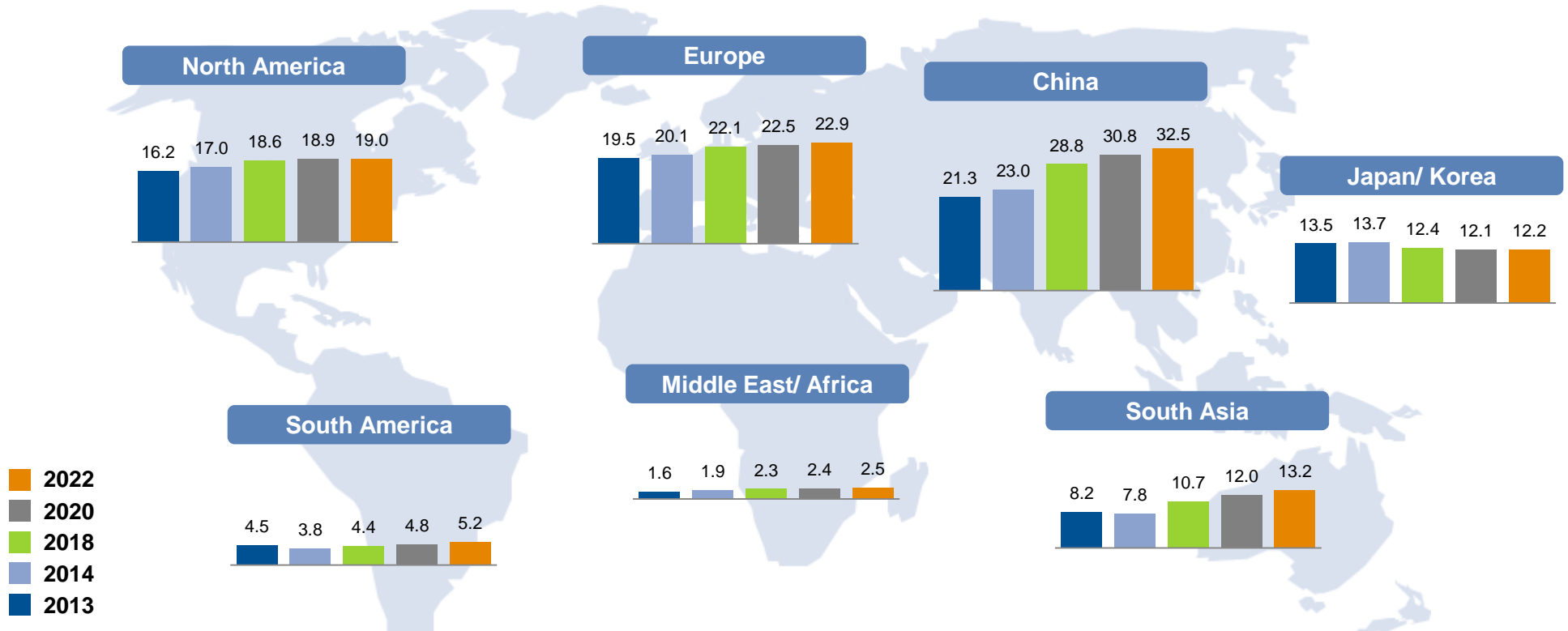


In detail

- We see signs of a further stabilization in the eurozone. The growth rate was significantly higher in the fourth quarter of 2014 and GDP improvement could be observed in most countries. Only Italy (0.0 %) and France (0.1 %) lagged behind
- Therefore, IKB forecasts GDP growth of 1.3 % for the eurozone in total
- The depreciation of the Euro, lower oil prices and low interest rates should stimulate growth in the eurozone going forward

Light vehicles: China dominates while production in Japan/ Korea declines

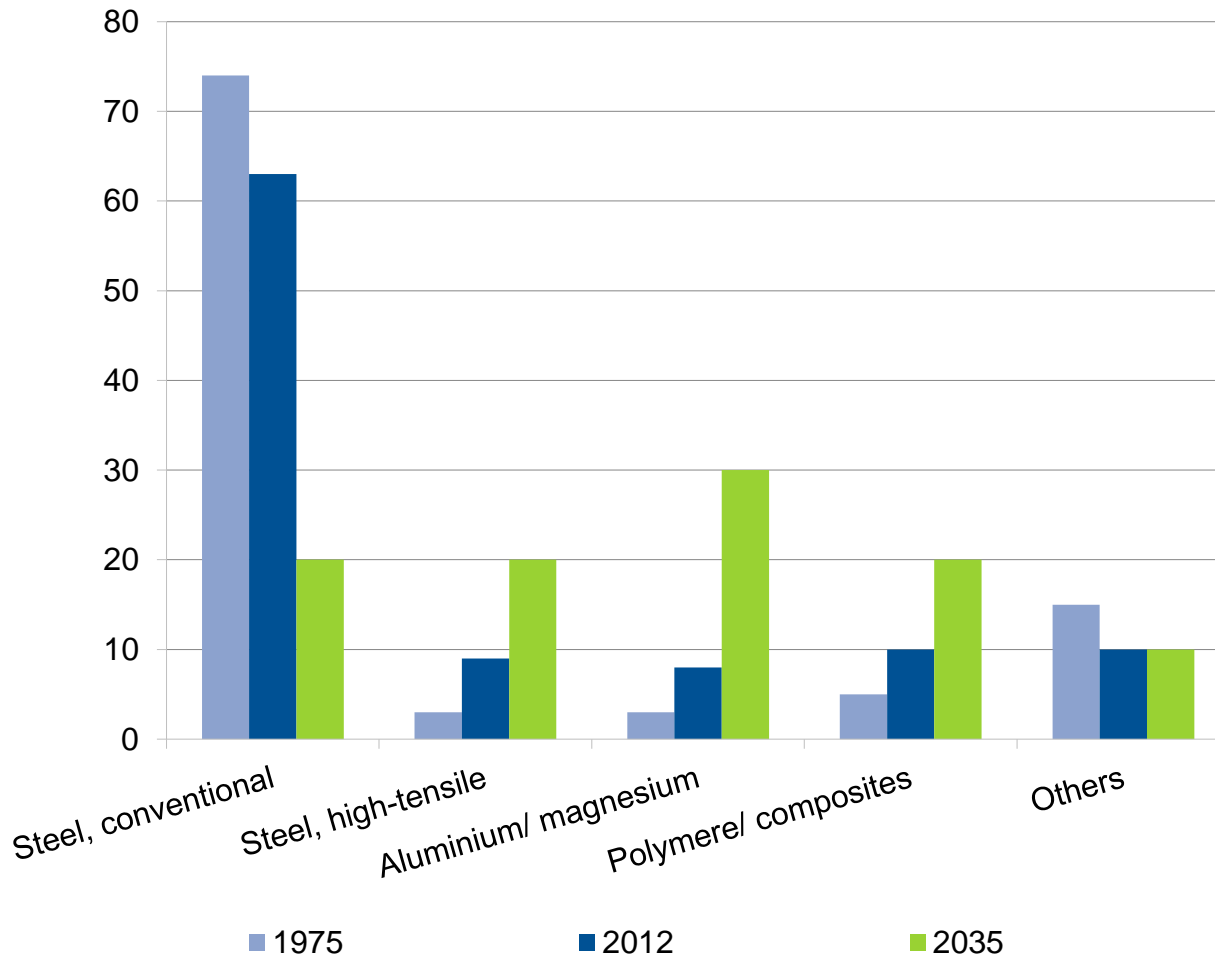
Global light vehicle production (in million)



- The German car manufacturers are expected to gain market share during the recovery of the Western European automotive industry
- The positive development in North America results from growing production in Mexico and investments of foreign OEMs in the US
- South Asia and Japan/ Korea lose production volumes to China

Changing light vehicle material mix

Material split in light vehicles; in %

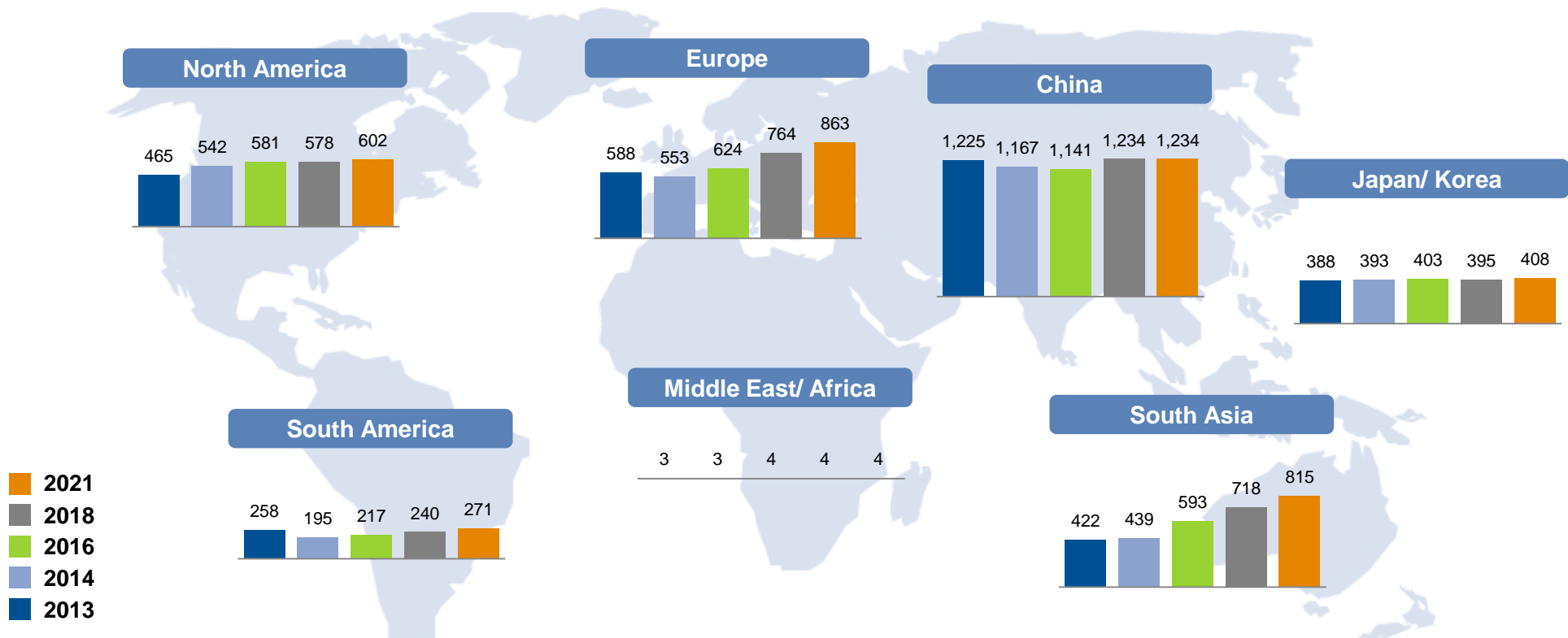


In detail

- Increasing requirements for energy efficiency and stronger emission regulations will support the trend towards lightweight production in the upcoming two decades
- The biggest loser concerning the change of material application is conventional steel. In the future, only about one fifth of the total materials used will be conventional steel. Another fifth will be accounted for by high-tensile steel
- The light metals aluminum and magnesium will significantly gain in importance
- Another fifth will be made up by plastics and composites, of which however only a small share is attributable to carbon fibers, mainly used in luxury class

Emission regulations stimulate demand for trucks

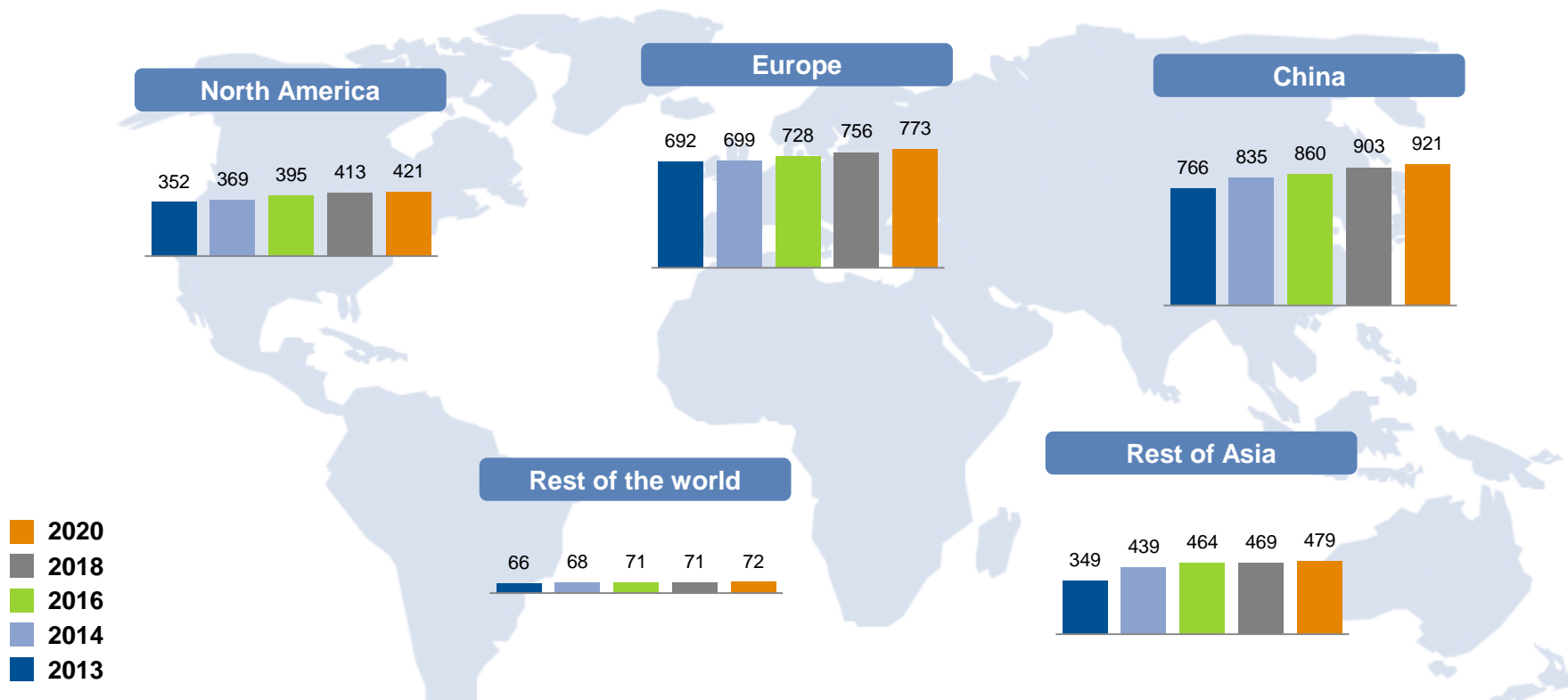
Global truck production (in thousand)



- Regulations of the European Union and the US target reduced fuel consumption and lower emissions
- This leads to investments in the modernization of truck fleets

Mechanical engineering: Recovery in Europe, growth in Asia

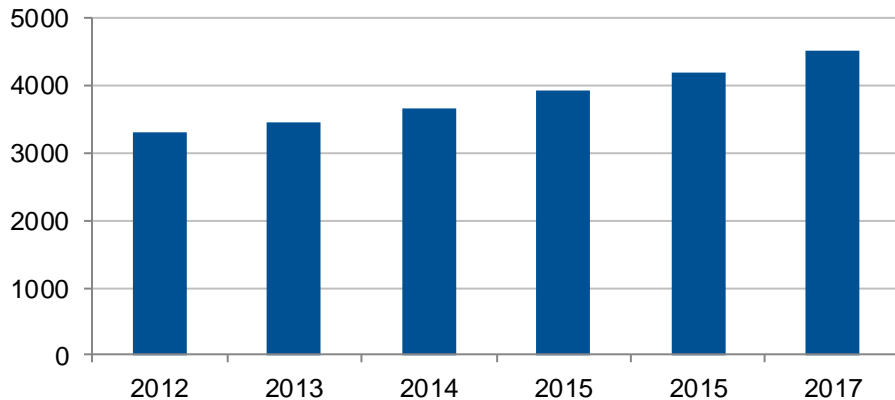
Global mechanical engineering revenues (in €bn)



- Globally, we expect a strong increase in demand for mechanical engineering products
- In 2016, revenues of China will surpass the sum of both North America and rest of Asia taken together
- In Europe, Germany and Italy gain market shares to the detriment of other Western European countries
- As in the automotive industry, trends towards lightweighting and higher flexibility in robotics & machine tools increase the use of aluminum

Construction sector: Improvement in the US, China still strong

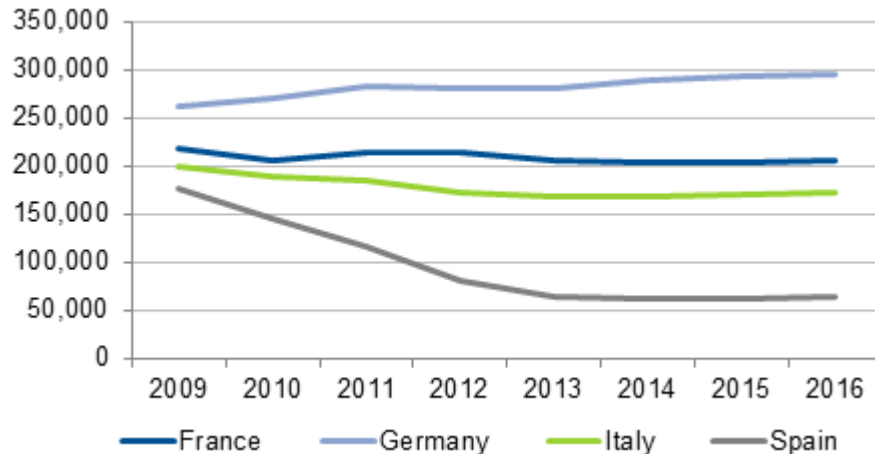
Global construction & engineering industry; in US-\$ bn



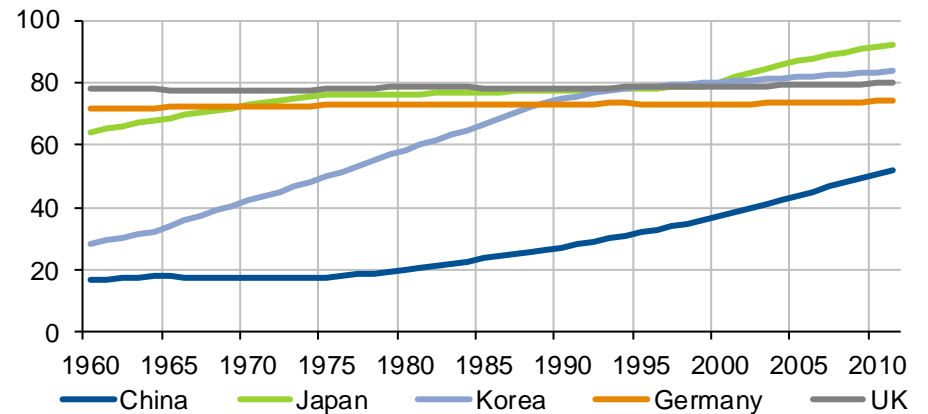
Boom through urbanization

- The US construction industry is expected to see a strong increase in construction starts
- Today, more than half of the Chinese population lives in rural areas. Further migratory movements into urban regions are expected during the next ten years
- The construction sector in the European Union is also likely to revitalize. Eastern European EU members are likely to show significantly higher growth compared to Western European countries. Even the Spanish construction industry seems to show a slight recovery after years of significant decline

Total construction volume in selected countries; in €m



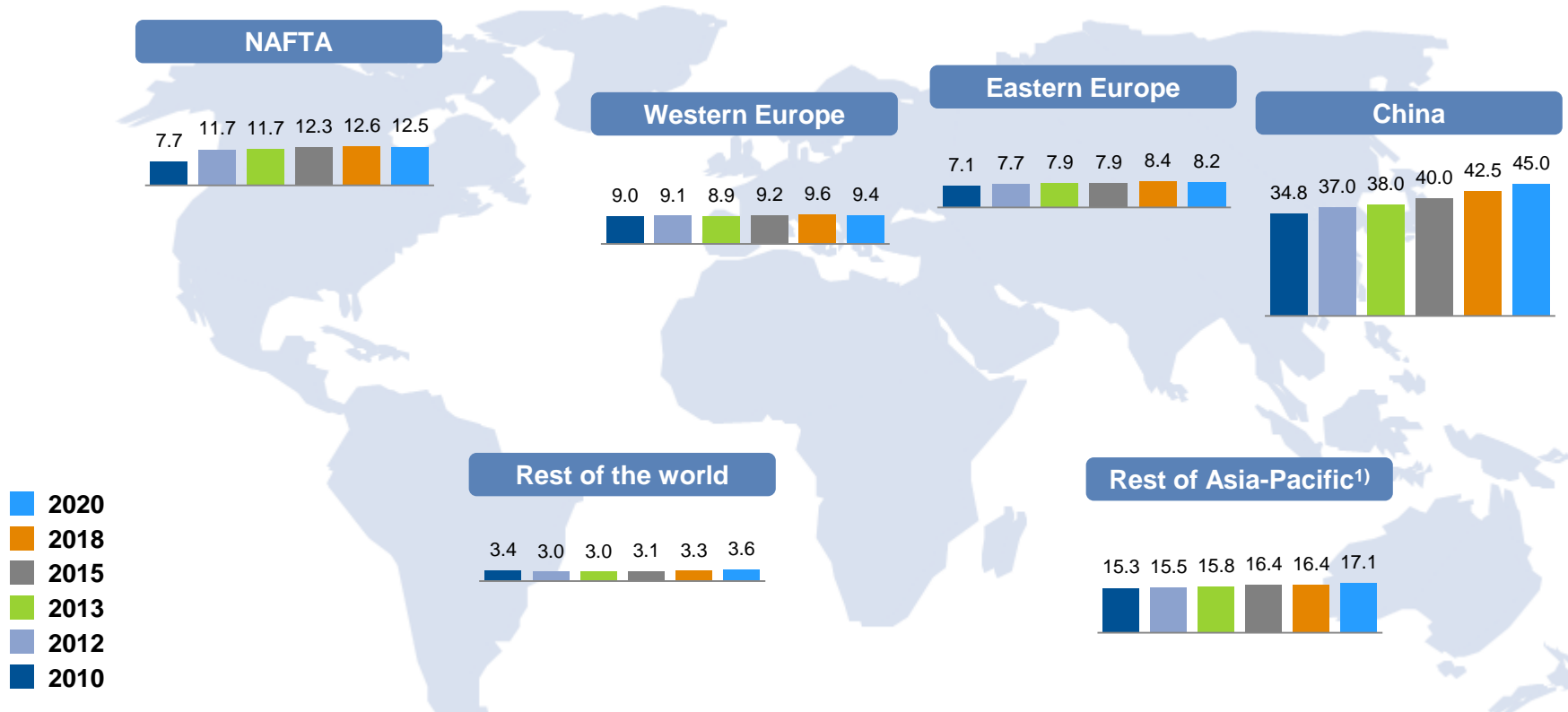
Urban population share; in %



1	Economic environment of the global foundry industry
2	Casting production: Growth in eastern markets
3	Differences in earnings
Appendix	

Iron and steel cast: Asia outgrows general market

Global grey iron, ductile iron and steel cast production (in million tons)

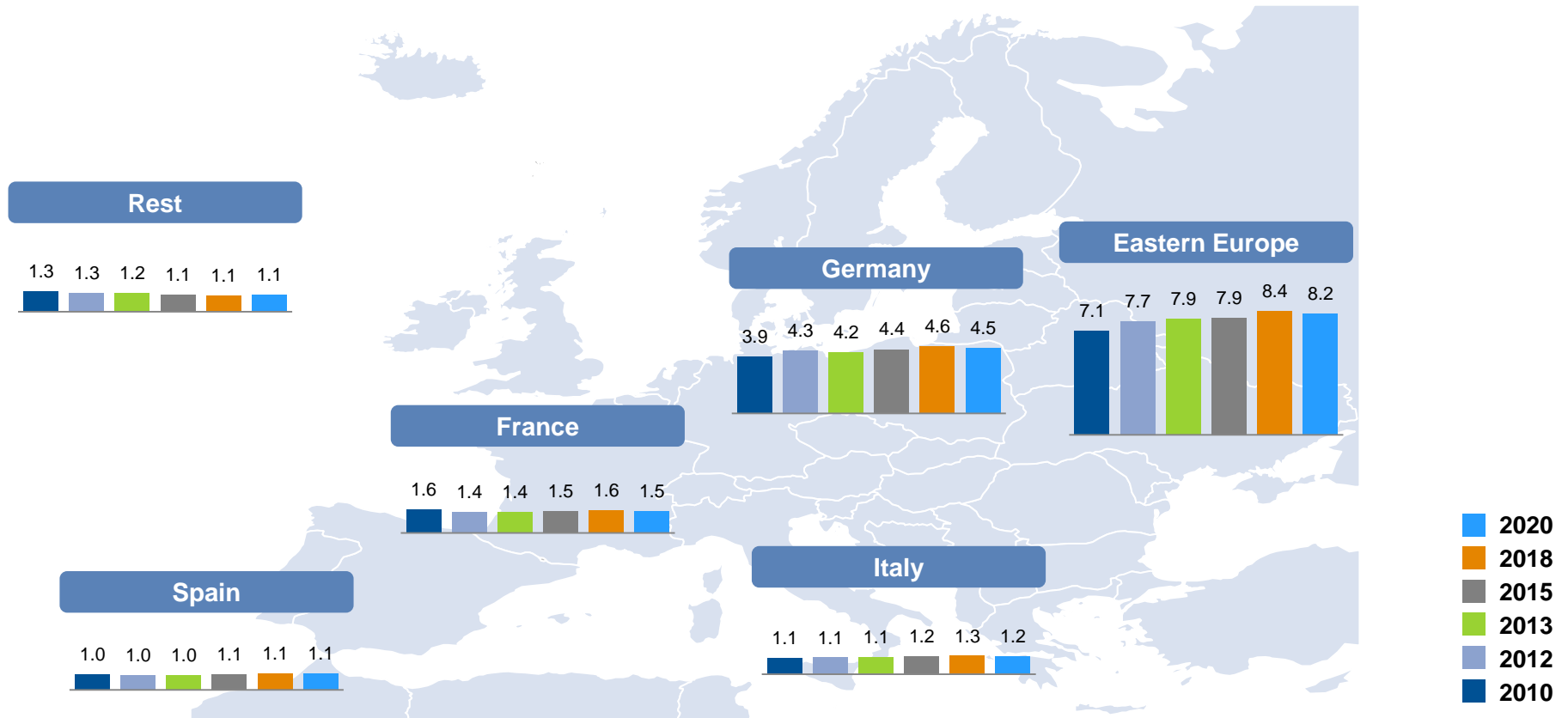


- Production in Western Europe mostly stable with relative market share gains in Germany
- NAFTA states profit from the re-industrialization due to lower energy costs, inducing significant growth especially in Mexico
- China's market share grows further, India catches up, Japan and Korea lose casting production to these countries

1) Includes Australia
Sources: World Census, CAEF, IKB

Iron and steel cast in Europe: Strong growth in Eastern European markets

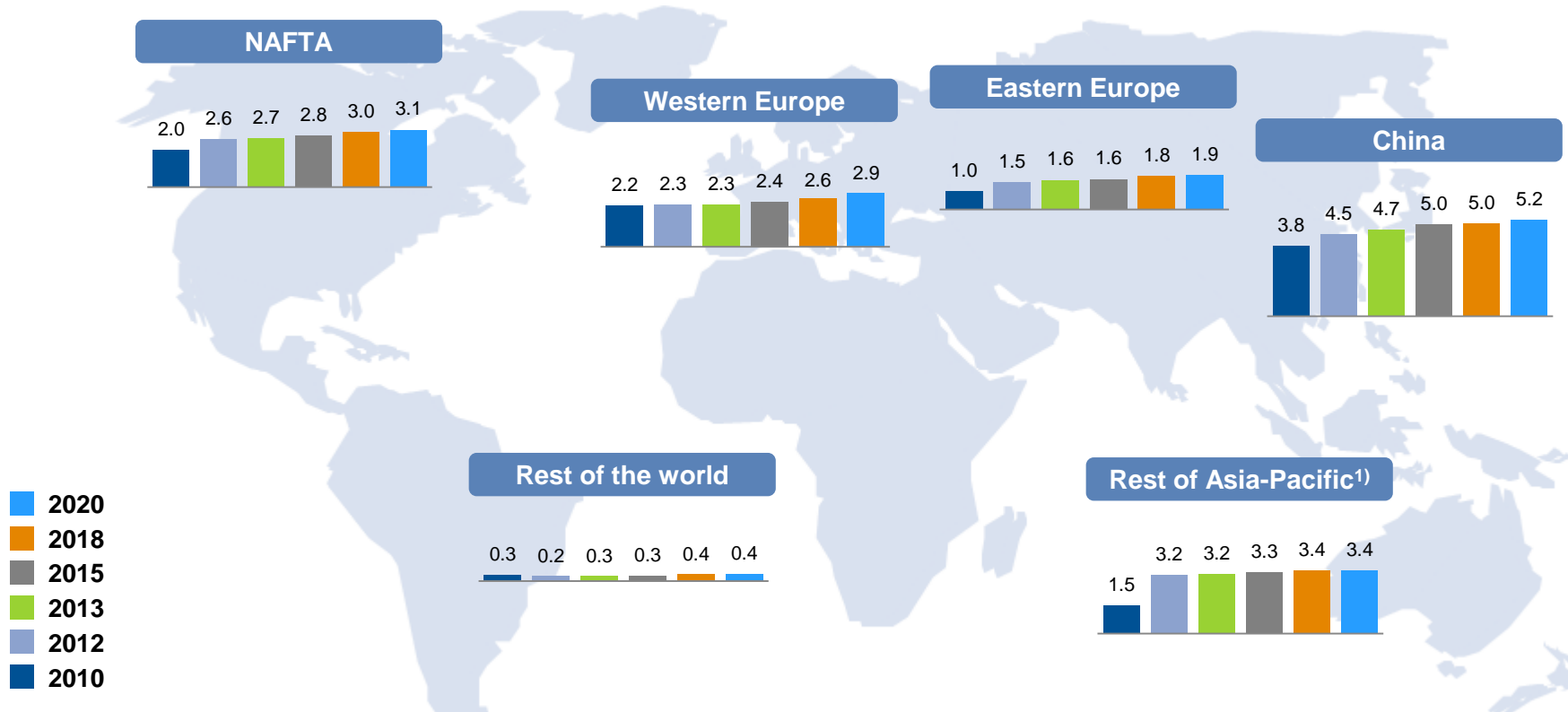
European grey iron, ductile iron and steel cast production (in million tons)



- Major part of European growth taking place in Eastern Europe; which however also includes Turkish production volumes
- Western European production on the other hand recovers slowly, Italy and Germany are more likely to grow and gain market shares in competitive comparison

Aluminum cast: China dominates its competitors

Global aluminum cast production (in million tons)

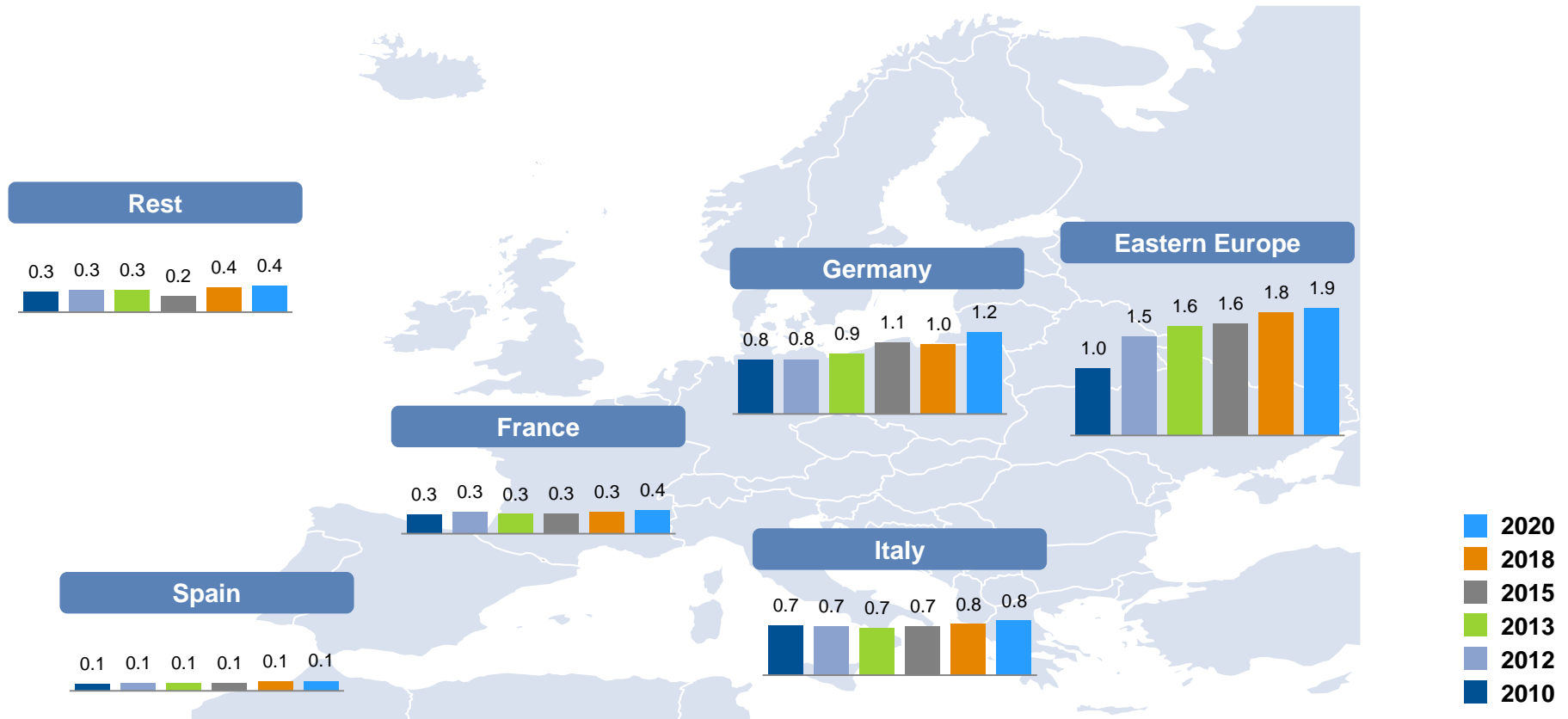


- Germany gains market shares within Europe at the expense of Western European competitors; catching-up process stronger in Eastern Europe
- Most of the growth in NAFTA states due to investments of foreign OEMs
- Korea und Japan lose market shares to China

1) Includes Australia
Sources: World Census, CAEF, IKB

Aluminum cast in Germany: Approaching 1 million tons

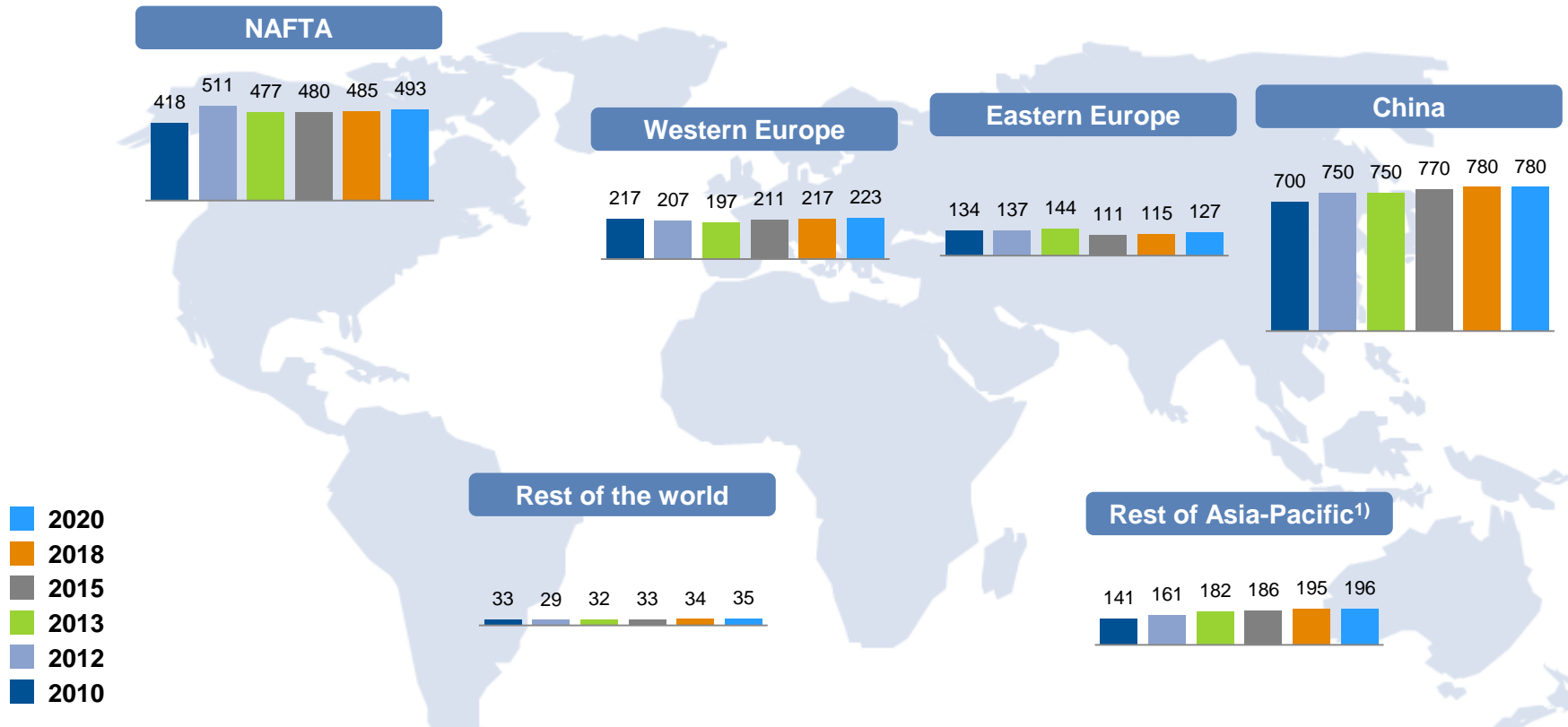
European aluminum cast production (in million tons)



- The leap in Eastern Europe can be associated with the commissioning of a new alloy wheel production in Turkey; furthermore, capacities in Slovakia were expanded
- After strong growth in 2014, the German aluminum foundries are approaching the 1 million ton mark of good cast

Copper cast: China significantly ahead of other regions

Global copper cast production (in thousand tons)

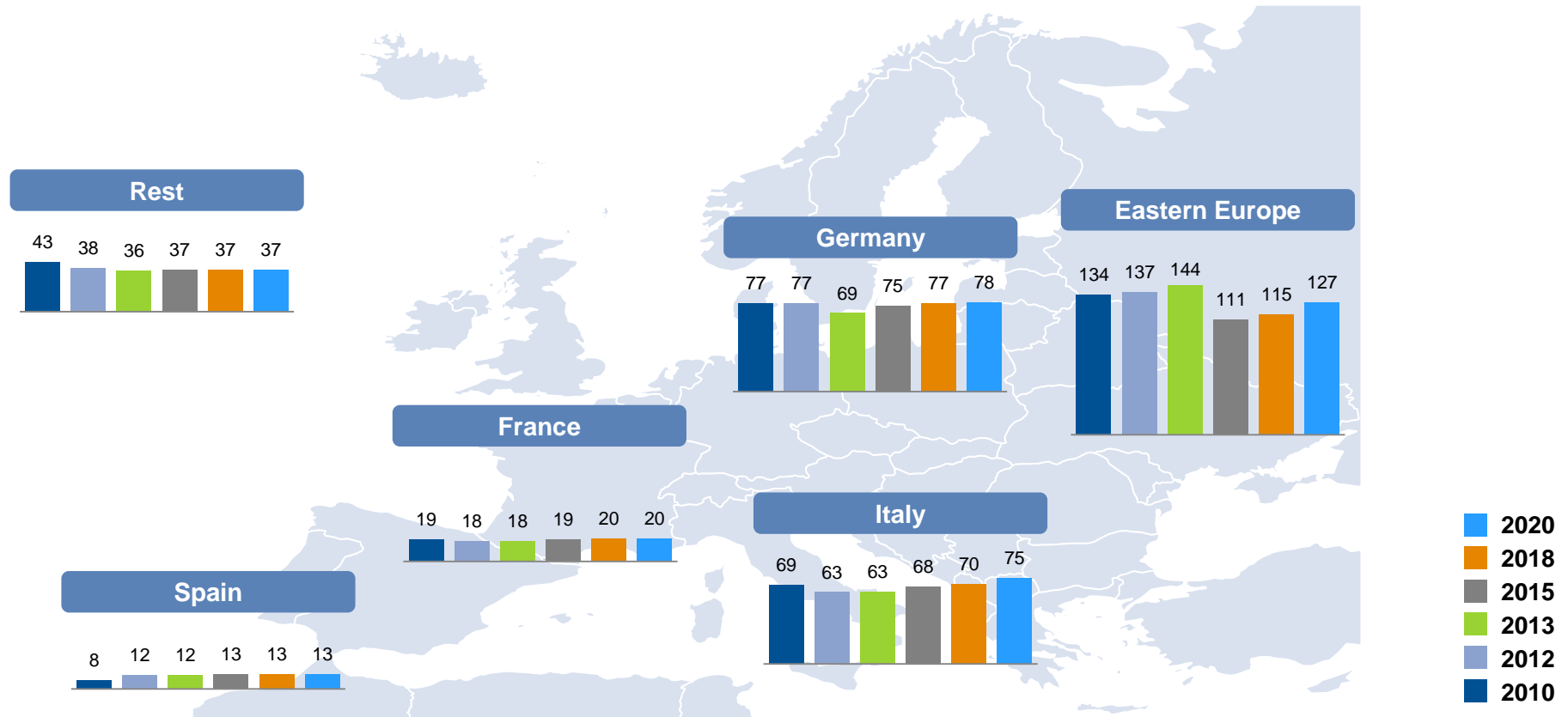


- The global copper cast production increased by 2.7% annually between 2010 and 2013 – until 2020 a significantly lower growth rate of 0.6% is forecasted
- While China’s market share remained constant since 2010, particularly the USA was able to gain market share; going forward no major changes of market positions are expected

1) Includes Australia
Sources: World Census, CAEF, IKB

Copper cast in Europe: Decline in Eastern Europe expected

European copper cast production (in thousand tons)

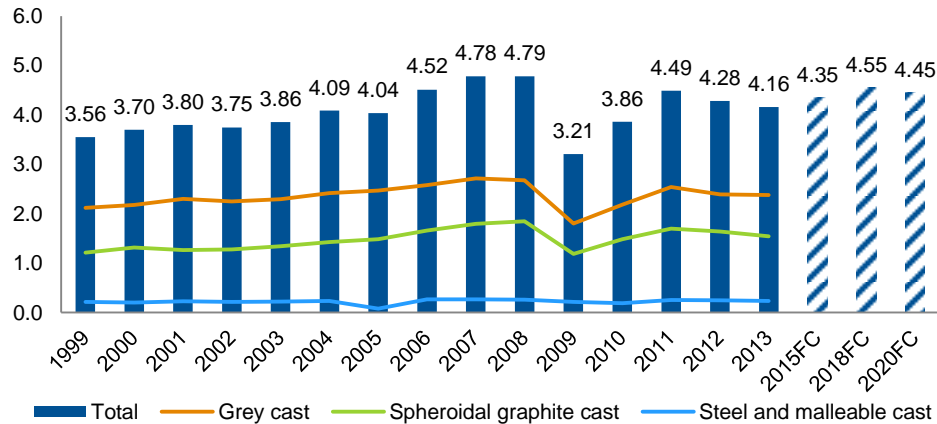


- While the copper cast production in Western Europe declined by 10% between 2010 and 2013, production is expected to experience a 13% increase until 2020 with the highest growth in Italy, Germany and France
- In Eastern Europe, a production decrease is expected, whereas Turkey is forecasted to show strong growth of c. 20% until 2020

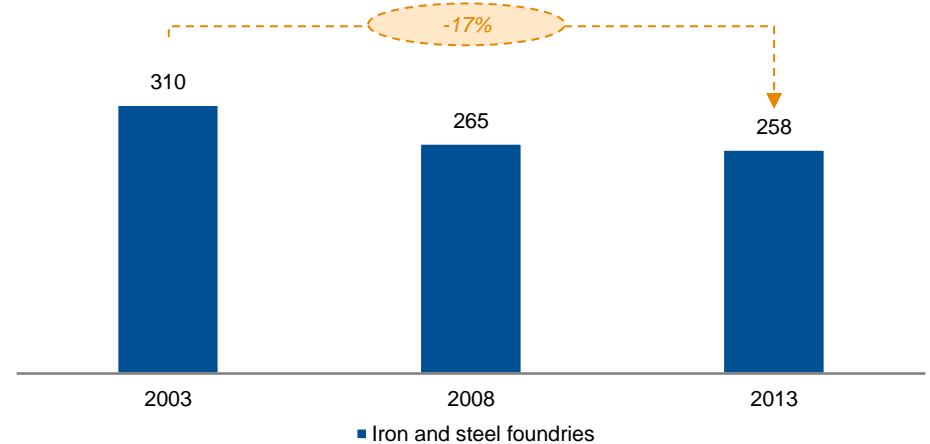
Key developments in the German foundry market

Development of the EST casting production¹⁾

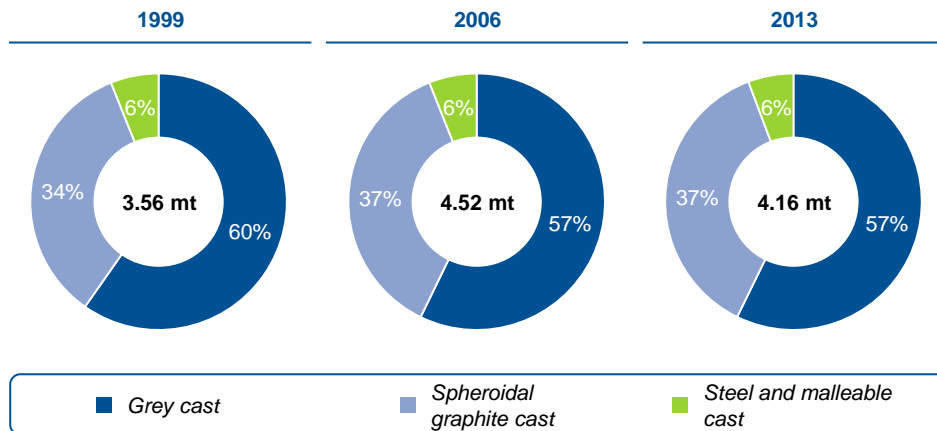
Cast production in mt



Development of the number of iron & steel foundries



Composition of the casting production



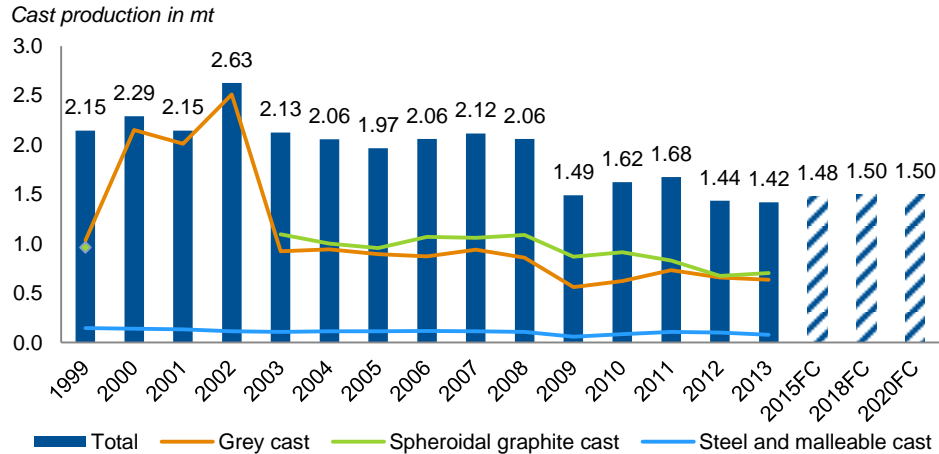
In detail

- The average output per foundry increased by around 30% between 2003 and 2013, from 12,452 t to 16,124 t
- Growing importance of spheroidal graphite cast iron (partly due to vermicular graphite cast)
- German foundries with market share gains in Europe strengthen sales volume
- Relative performance of foundries with good contacts to German premium OEMs considerably better compared to other foundry companies

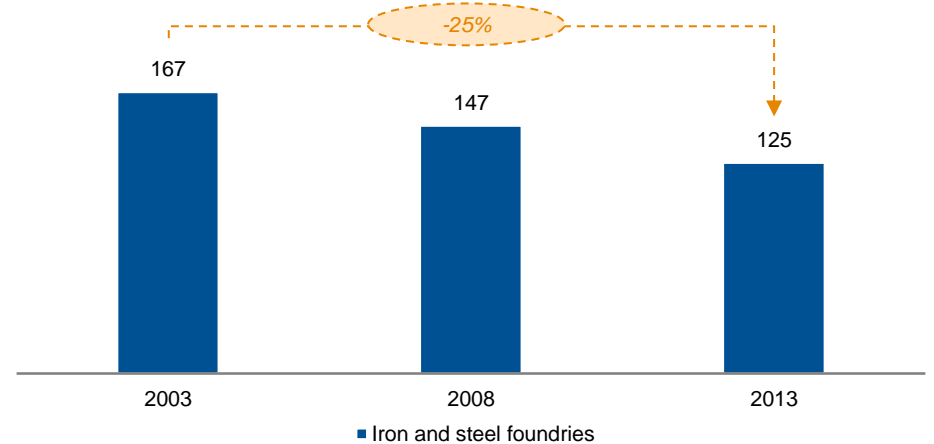
1) For 2015, 2018 and 2020: IKB extrapolation
Sources: Modern Casting, IKB research & analysis

Key developments in the French foundry market

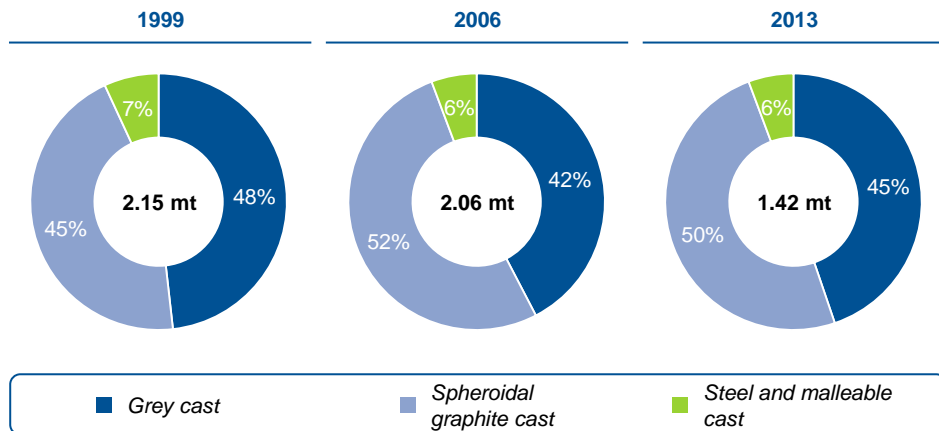
Development of the EST casting production¹⁾



Development of the number of iron & steel foundries



Composition of the casting production



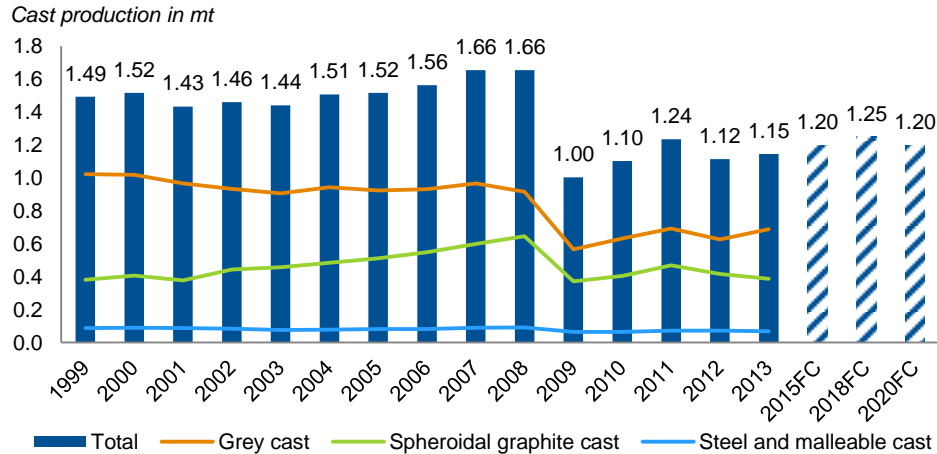
In detail

- The average output per foundry decreased by nearly 11% between 2003 and 2013, from 12,754 t to 11,360 t
- Strong drop caused by decreasing domestic vehicle production
- Also weak performance on the part of French mechanical engineering companies

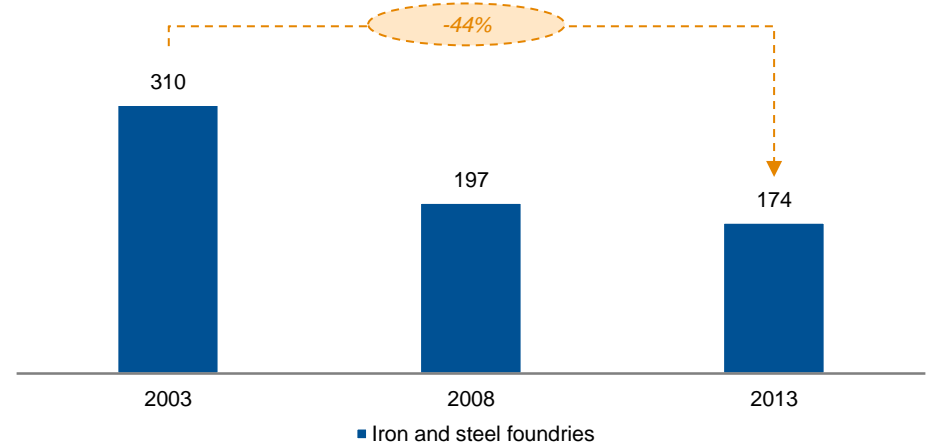
1) For 2015, 2018 and 2020: IKB extrapolation
Sources: Modern Casting, IKB research & analysis

Key developments in the Italian foundry market

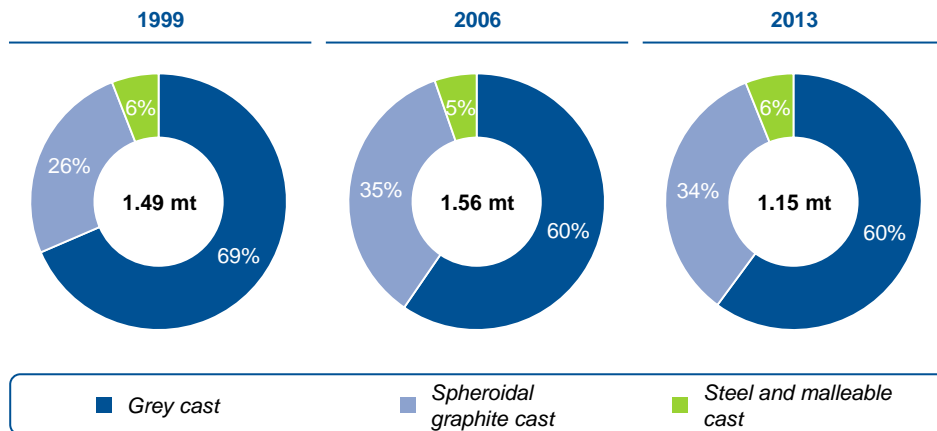
Development of the EST casting production¹⁾



Development of the number of iron & steel foundries



Composition of the casting production



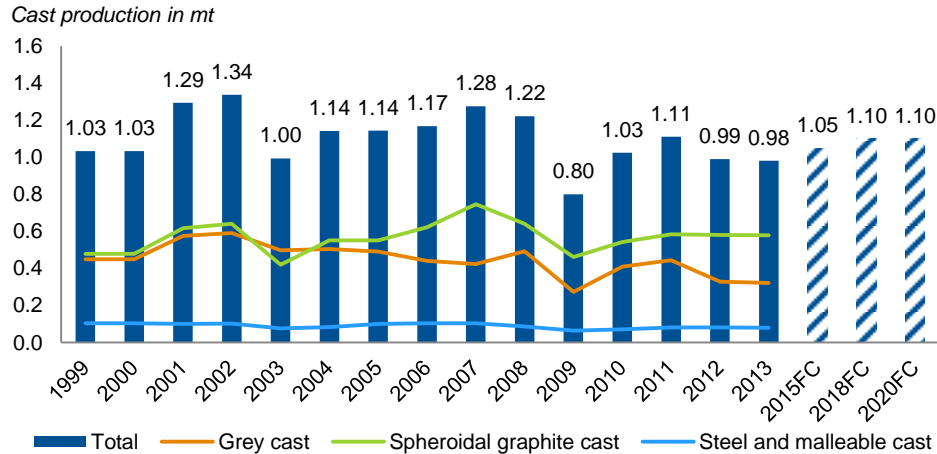
In detail

- The average output per foundry increased by more than 42% between 2003 and 2013, from 4,645 t to 6,609 t
- The Italian foundry market has a relatively small-scale organization
- The development is negatively influenced by high energy costs as well as a weak Fiat production
- Upside potential due to recovery of the Italian mechanical engineering industry

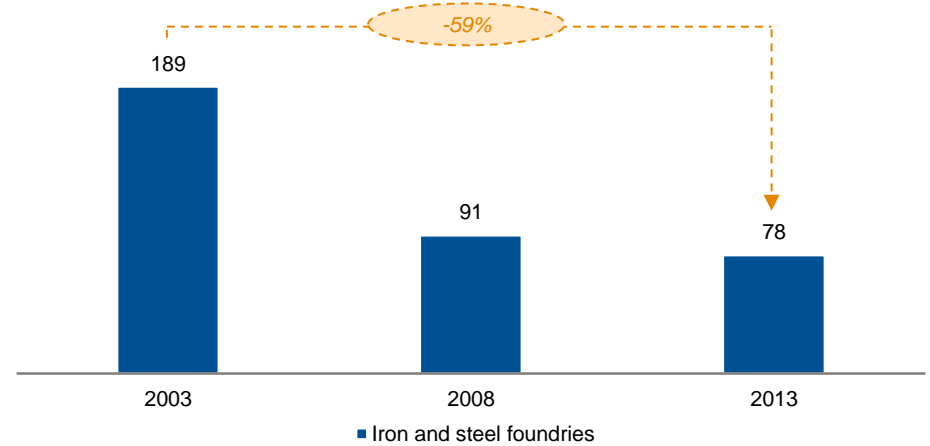
1) For 2015, 2018 and 2020: IKB extrapolation
Sources: Modern Casting, IKB research & analysis

Key developments in the Spanish foundry market

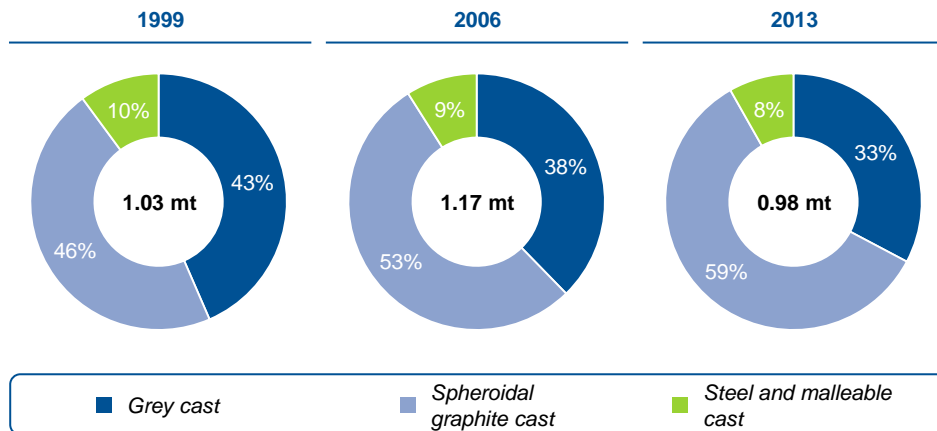
Development of the EST casting production¹⁾



Development¹⁾ of the number of iron & steel foundries



Composition of the casting production



In detail

- After the drop of the Spanish economy in 2007, not least because of the plummeting construction industry, the EST casting production decreased as well (particularly in construction-related segments)
- Based on the slight recovery in 2013, we are expecting a moderate rise of casting tonnage until 2018
- In total, a constant change of the casting production from grey cast to more complex material groups such as spheroidal graphite iron was observed. This is mainly caused by mechanical engineering and vehicle manufacturing
- During the past ten years, a strong consolidation wave took place in the Spanish foundry market
- Thus the average output per foundry rose; nevertheless reaches only three quarters of the German comparison value

1) For 2015, 2018 and 2020: IKB extrapolation
Sources: Modern Casting, IKB research & analysis

Strategic challenges of the global foundry industry

Globalization



- Major part of the demand growth will occur in emerging markets
- Especially the automotive industry is increasingly demanding local presence outside of Europe
- Increases the need for a global footprint

Technological leadership



- Maintaining the technological leadership is of great importance for European foundries
- Pressure on unit weights will continue
- This changes the material mix and increases the requirements for the alloy competence

Retain qualified personnel



- Many qualified foundry workers will retire during the next years
- Competition for staff intensifies due to changing age structure
- Requires new worker loyalty programs (pension schemes, profit-sharing, flexibility regarding family & job)

Investment requirements



- Growing trend towards completely finished cast parts will necessitate respective investments
- Complexity of foundry materials will grow and consequently drive investment requirements
- Globalizing market requires increased investments in logistics processes

Margin pressure



- Growing international competition in the vehicle manufacturing industry
- This limits the possibility of passing on cost increases to end consumers
- On the part of OEMs this pressure could be passed through to suppliers

Industry consolidation



- Thus the industry consolidation is expected to continue
- Main reasons, besides the pressure for globalization, are increasing investment requirements
- Also, many family businesses face succession-related problems from our point of view

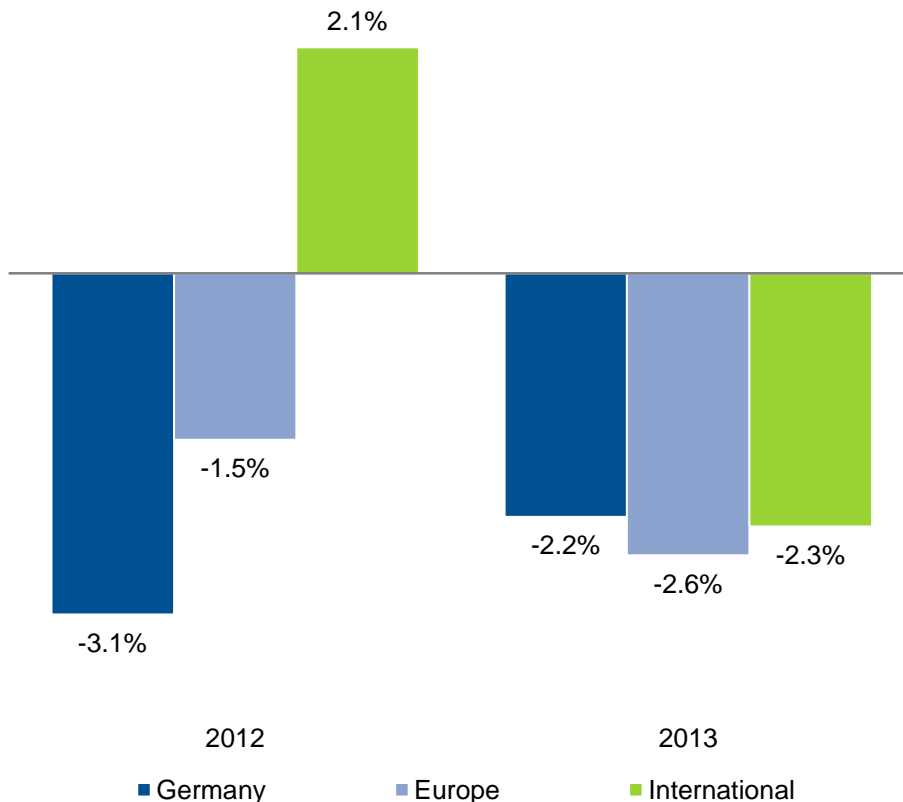
►► **The global foundry industry will face rising investment requirements. Together with succession-related problems in mid-sized companies, this might increase industry consolidation**

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Appendix	

Sales development influenced by drop of raw material prices

Sales development in an international comparison

Weighted average



In detail

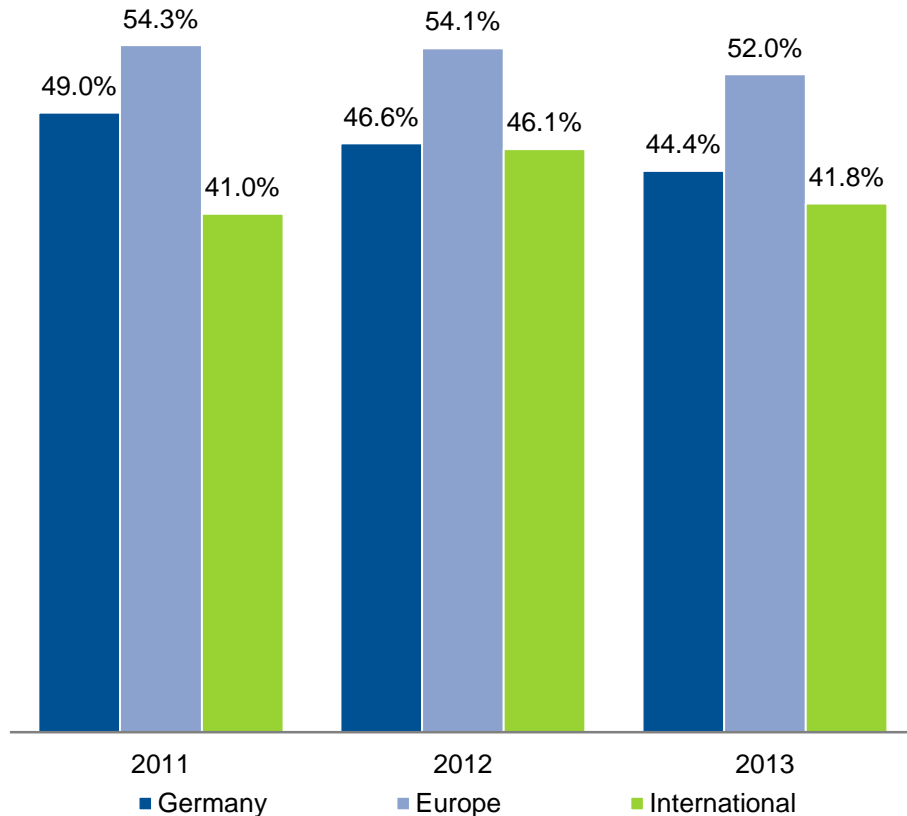
- The global foundry industry was able to expand its tonnage; however, the drop of raw material prices, given a material use of on average half of total output, prevented a respective sales increase
- At the beginning of 2011, the price per ton of aluminum alloy at the LME was 2,275 US\$/t, in 2013 it was only 1,790 US\$/t
➔ **Drop of about 21%**
- Prices for old steel scrap (type 1) declined from on average 342.50 €/t in January 2011 to 250 €/t in December 2013
➔ **Drop of about 27%**
- Therefore, the sales drop of German and international foundries is relativized

▶▶ **The expansion of casting tonnage was accompanied by a price drop for raw materials, effectively preventing a respective sales increase**

Material expenses decline

Material cost ratio in an international comparison

Weighted average



In detail

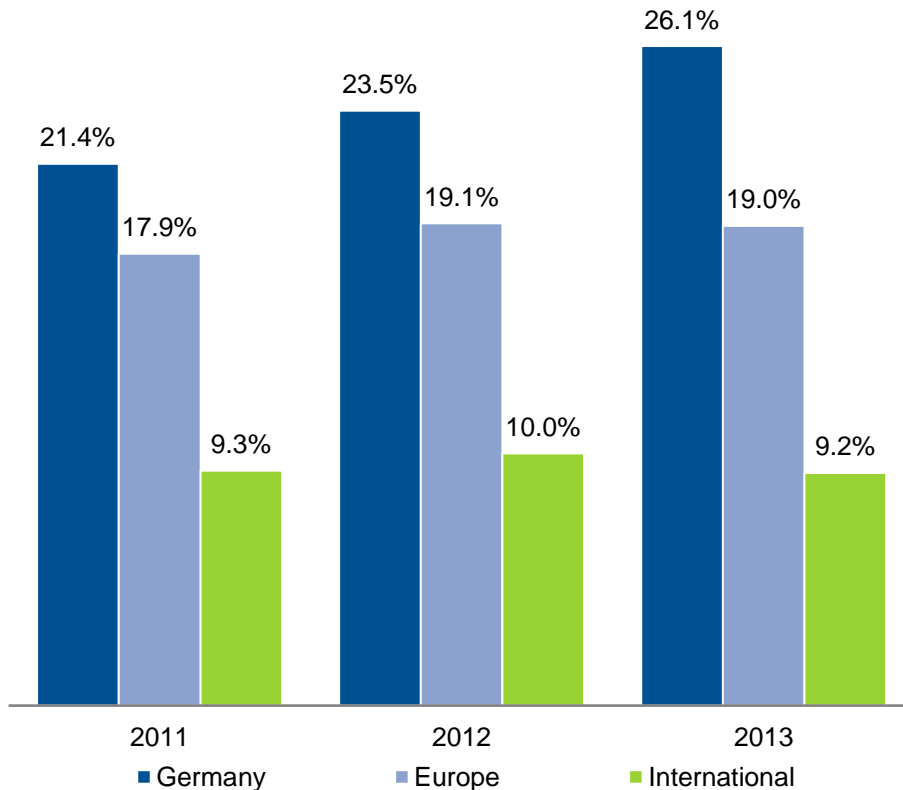
- German foundries saw a significant reduction of their material cost ratio, from 49% to 44.5%, during the observation period 2011 to 2013. Together with the slightly increased personnel expenses ratio, this indicates a higher added value of foundries
- Given growing supply of completely finished and ready-to-install parts, as e.g. in the automotive industry, foundry companies can increasingly strengthen their position in the value chain
- European foundries achieved a slight drop of their material cost ratio, from 54% to 52% of sales. Several foundries in Eastern Europe are even above this value, which indicates outsourcing of simple cast parts without great complexity
- For Asian foundries, material expenses only changed marginally during the observation period. However, identification of energy costs is not always straightforward from annual reports of Asian foundries

▶▶ Declining material expenses indicate a higher added value for many foundries, particularly in Western Europe. This in turn improves the long-term positioning in the value chain

Personnel expenses globally increasing

Personnel expenses ratio in an international comparison

Weighted average



In detail

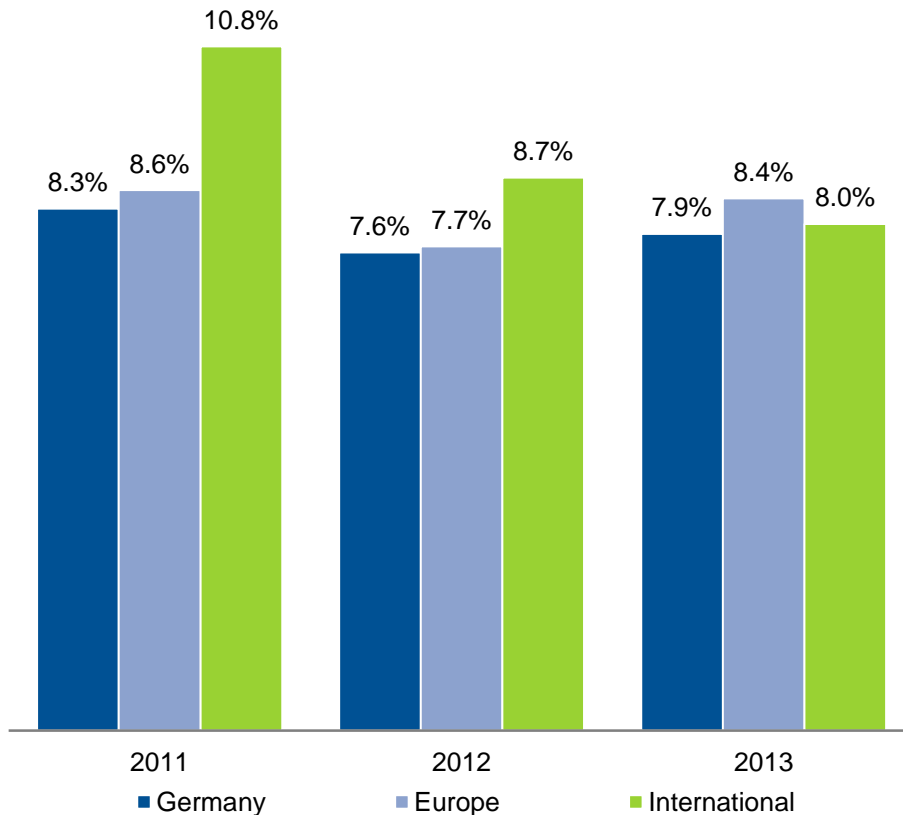
- The personnel expenses ratio predominantly increased across all regions, except for Asia, where it rather stagnated
- However, personnel expenses are in general significantly lower in Asian countries. Note that our selection comprises primarily Chinese and Indian foundries. In Japan, expenses are comparable to German levels
- Further increasing personnel expenses are expected in emerging markets going forward
- Despite the crisis in the Euro-zone, rising personnel expenses ratios were observed within Europe. The ratio rose from 18% to 19% between 2011 and 2013. Differences can be seen between Western and Eastern European states. In spite of increasing salaries, personnel expenses ratios in the latter region remained considerably lower
- In Germany, personnel expenses rose from c. 21.5% to 26%. The gap between Western and Eastern German foundries reduced

► In the medium-term, personnel expenses in Asian emerging markets are forecasted to increase further

EBITDA: Profitability under pressure

EBITDA margin in an international comparison

Weighted average



In detail

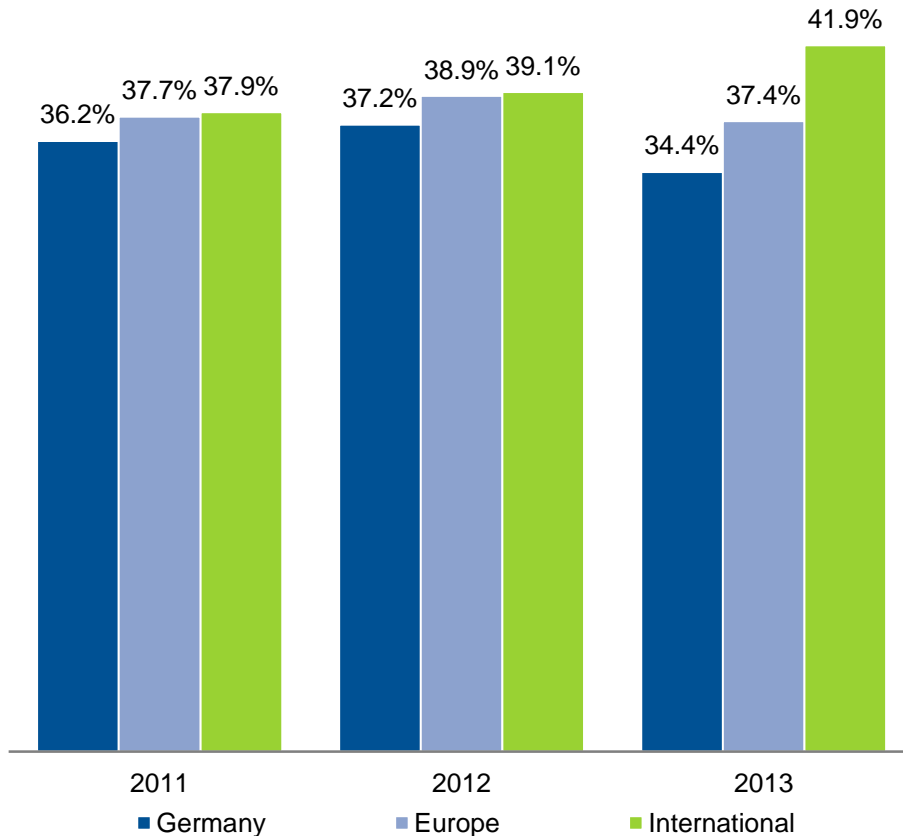
- Profitability of foundries tended to decrease during the observation period. Despite the reduction of material expenses in all regions, this was not sufficient for a noteworthy improvement of earnings
- Asian foundries experienced the largest decline. While their operating profitability, as measured by EBITDA, was considerably higher than the comparison values of German and European foundries in recent years, foundries from all observed regions are now on average on a comparable level
- Reasons for the low profitability are on the one hand increasing pricing pressure of the leading customer industry, vehicle manufacturing, and on the other hand overcapacities in individual sub-segments
- Sub-segments with particularly high overcapacities were:
 - a) Construction-related casting applications in Southern European countries
 - b) Castings for wind turbine components, especially for offshore plants. Here, not only the planned commissioning dates were pushed back, also the overall market expectations were revised downwards relative to previous forecasts

►► Pricing pressure of customer industries recently increased

Divergent capital base

Equity ratio in an international comparison

Weighted average



In detail

- German foundries experienced a declining capital base primarily caused by increasing investments between 2011 and 2013
- European foundries outside of Germany on the other hand were able to stabilize their capital base. However, this was also due to a scaling back of investments, partly caused by limited access to loans in Southern Europe. This in turn could lead to a degradation of the companies' competitive positions in the medium- to long-term
- Asian foundries on the contrary were able to increase their capital base. In this context, relevant companies profited from various subsidies and tax incentives

▶▶ Asian foundries profit from subsidization and overall good market environment



➤ The global foundry industry is set to profit from strong growth of key customer industries during the next years



➤ Asia is expected to outgrow the general market even in the medium- to long-term



➤ Competitive pressure from other technologies e.g. forging or sheet metal forming is expected to remain strong; however, especially for structural components in light vehicles we see a trend towards casting technologies



➤ In Europe, we expect higher growth rates for aluminium foundries compared to iron, ductile iron and steel foundries. In Germany, an aluminium casting production of around 1.2 million tons is possible until 2020



➤ The profitability, as measured by EBITDA margin, globally declined during the last years due to increased pressure from customer industries. Asian foundries with higher capital base, not least resulting from various forms of subsidies



➤ During the next years we forecast an ongoing consolidation process in the global foundry industry

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Appendix	

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