

Not dead yet?

The future of FeSi consumption and production in Europe

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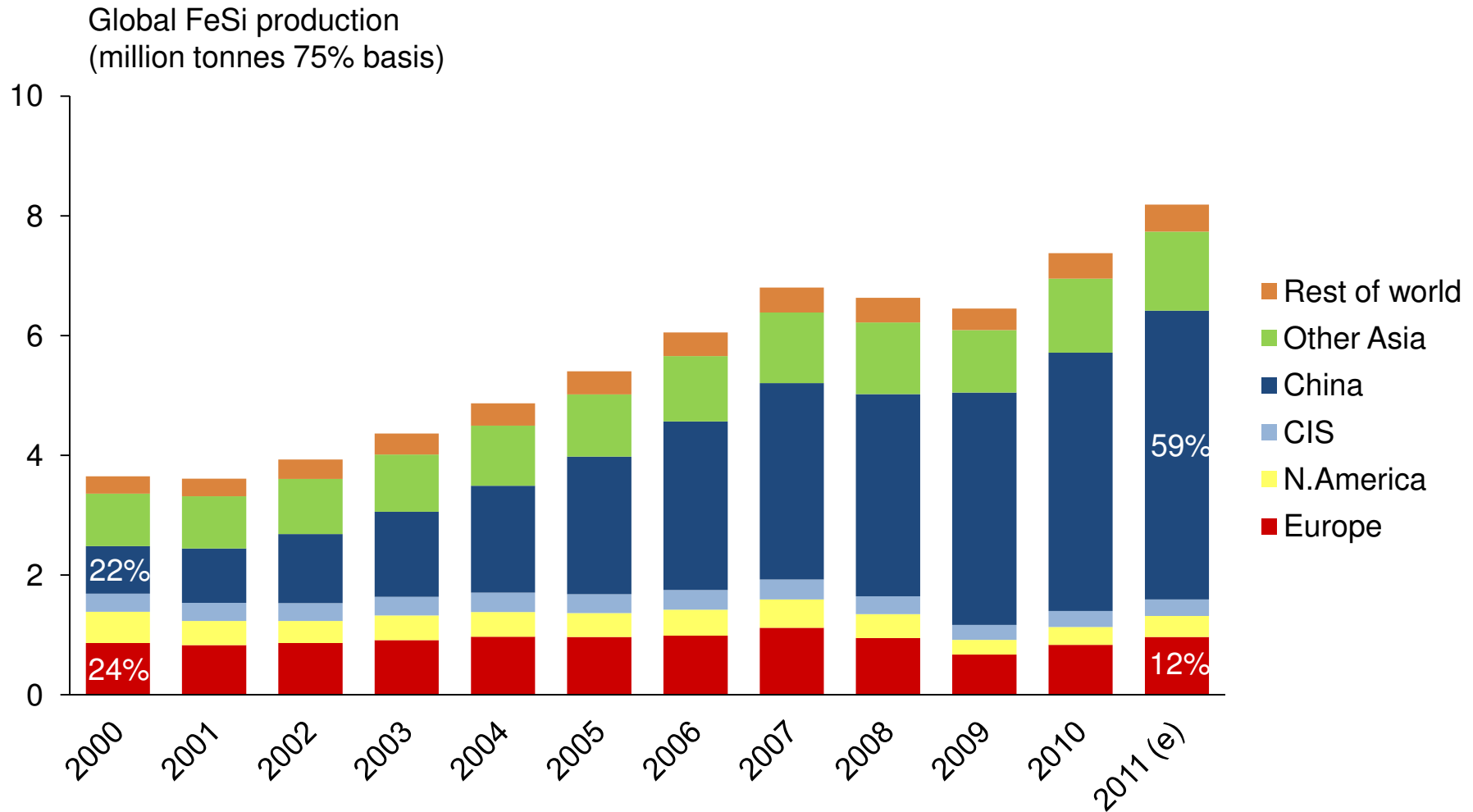
15th November, 2011



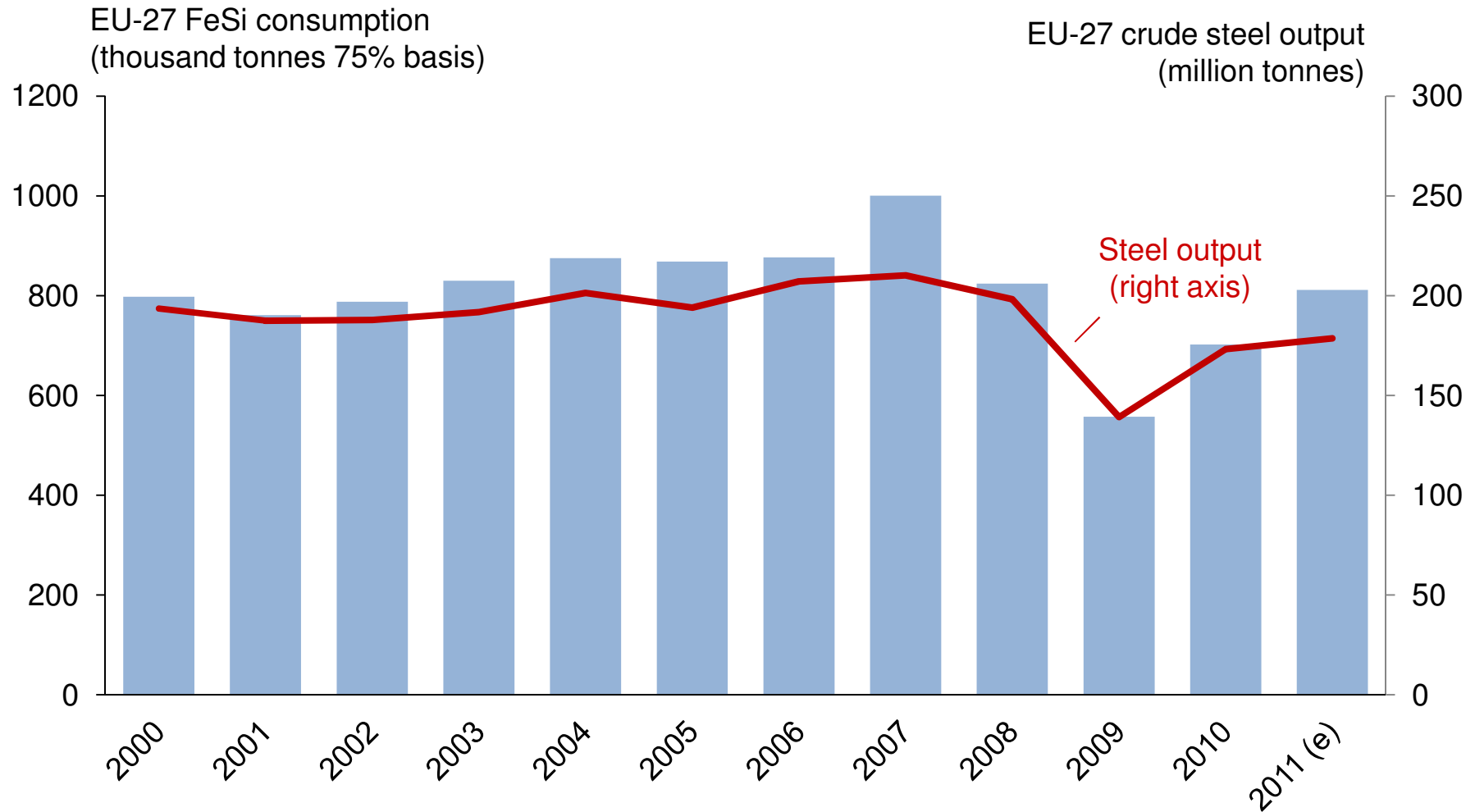
What is ferrosilicon?

- A ferroalloy of iron and silicon (FeSi), normally ~75% Si
- Used extensively in molten crude steel as a de-oxidising agent
- Also used to add electrical conductivity and corrosion-resistance properties to steel
- Average Si content of steel is 0.3%. Many individual grades are much higher in Si – stainless steel (up to 1% Si), electrical steels (up to 7% Si)
- Around 70% of global FeSi output is used in steel
- Other important applications are for de-carburising molten grey iron for the production of foundry castings (20% of global FeSi consumption) and for producing magnesium metal in China (7% of global FeSi consumption)

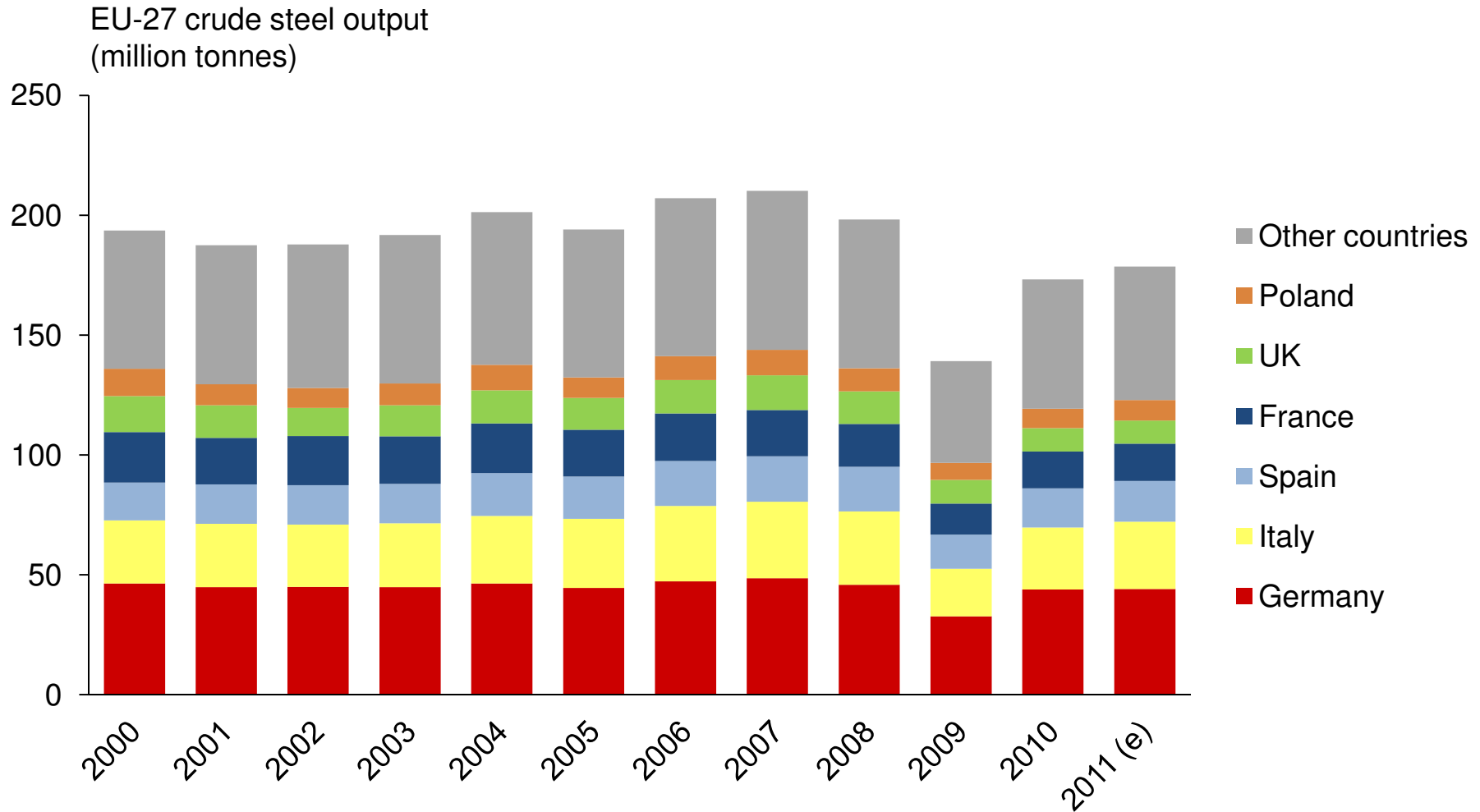
Global FeSi demand is 8Mt in 2011. European share has fallen from 24% in 2000 to 12% in 2011



European FeSi consumption has developed broadly in line with European crude steel output



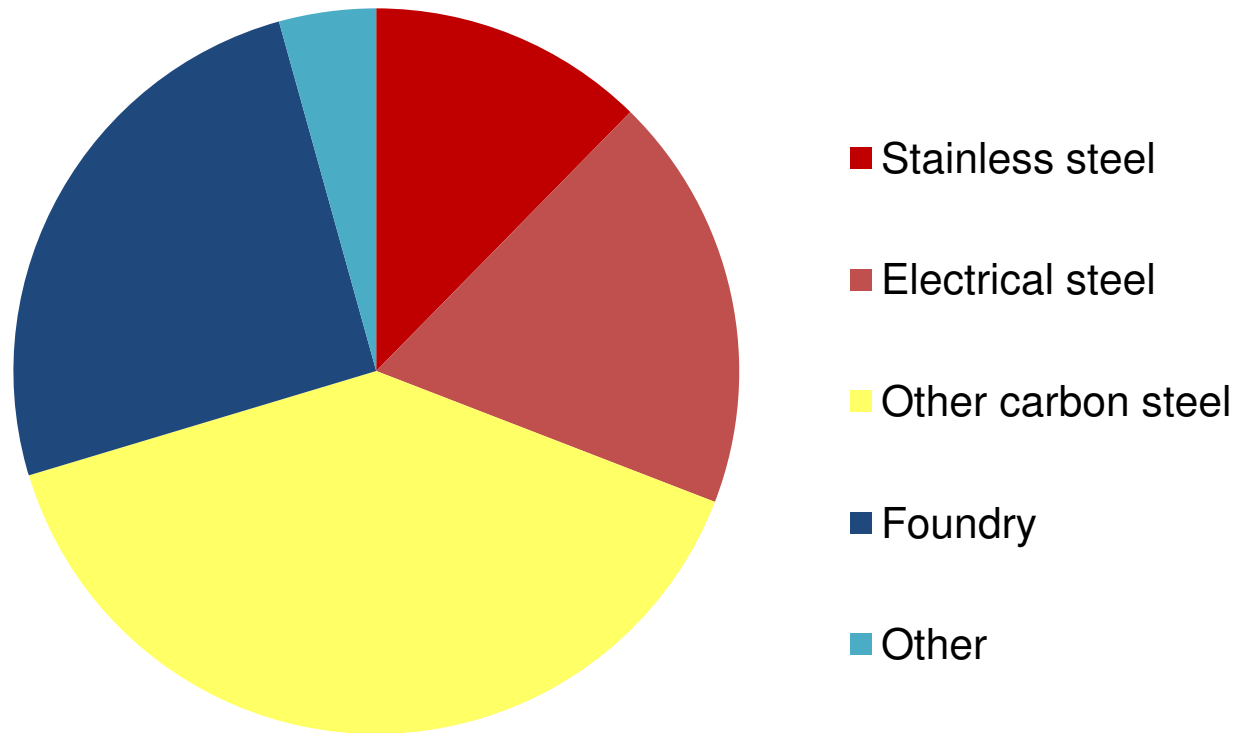
The geography of European FeSi demand reflects the geography of European steel output



Source: worldsteel.org

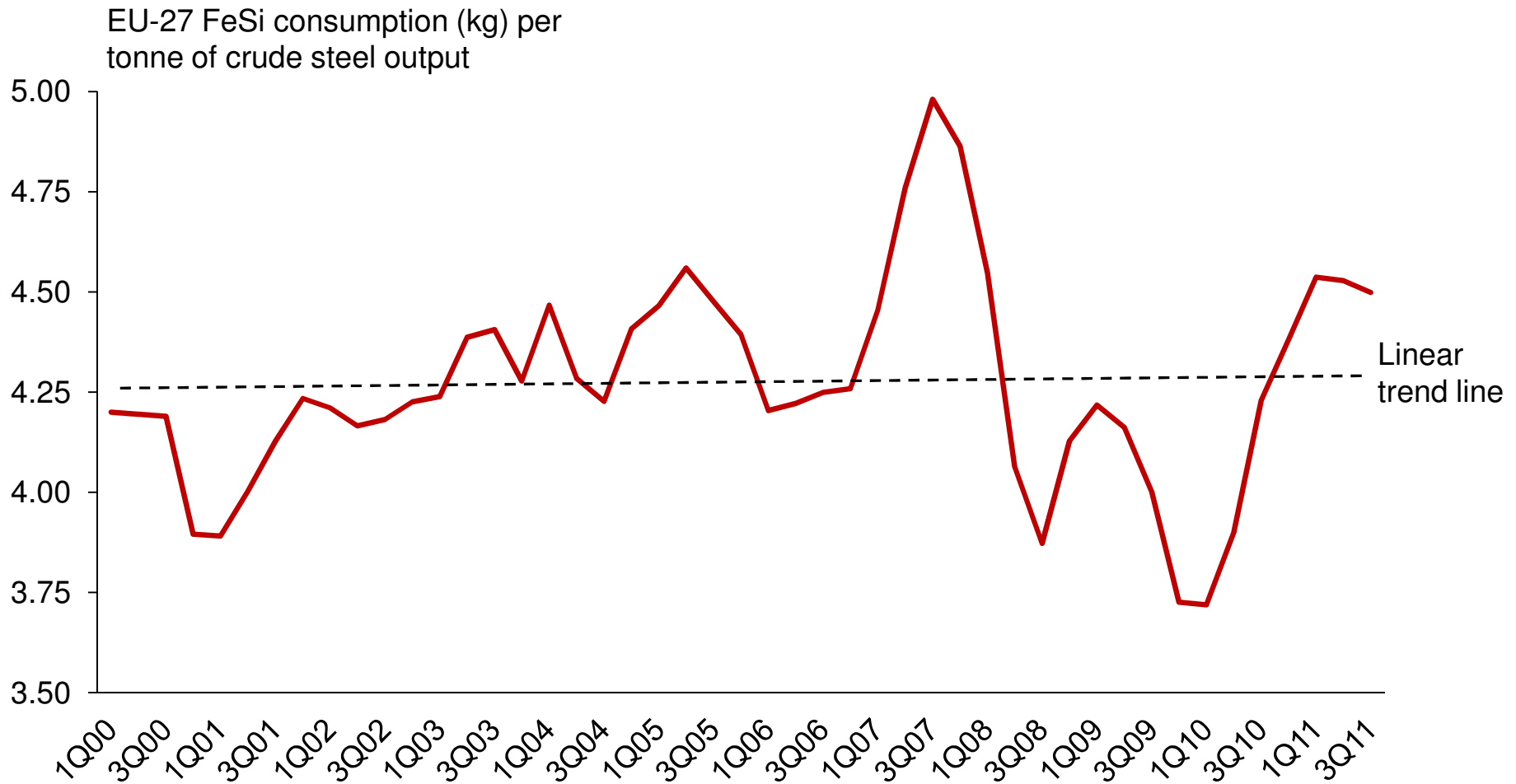
FeSi demand in Europe is heavily focused on niche grades – stainless, electrical, foundry castings

EU-27 FeSi consumption by end-use, 2011*

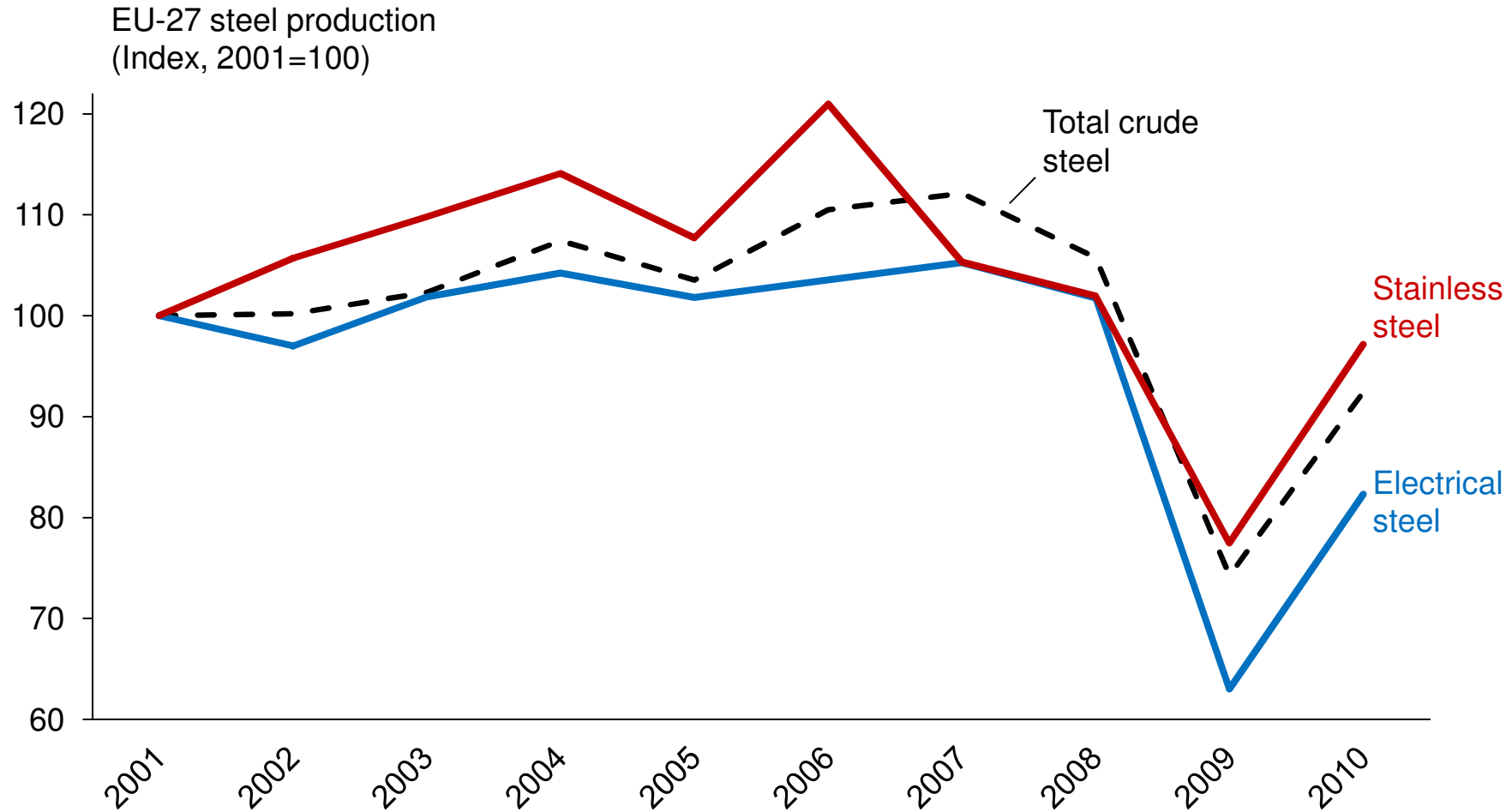


*total consumption ~800,000mt

Consumption of FeSi per tonne of steel in Europe remains on a flat long-term trend

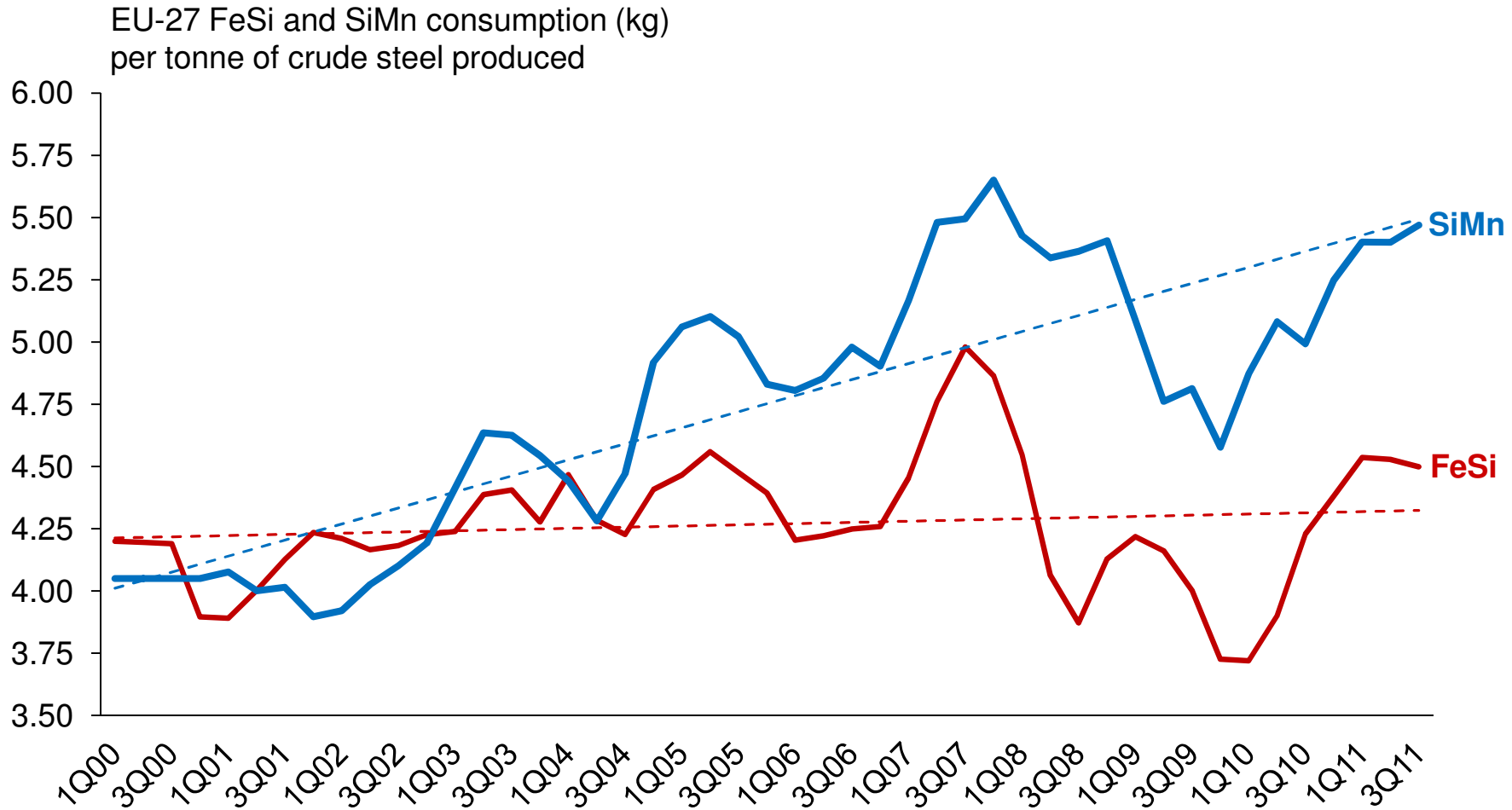


This reflects a balance of electrical steel output under-performing the average, and stainless over-performing



Source: worldsteel.org, ISSF

Whilst consumption of FeSi per tonne of steel in Europe is flat, the trend for SiMn is rising

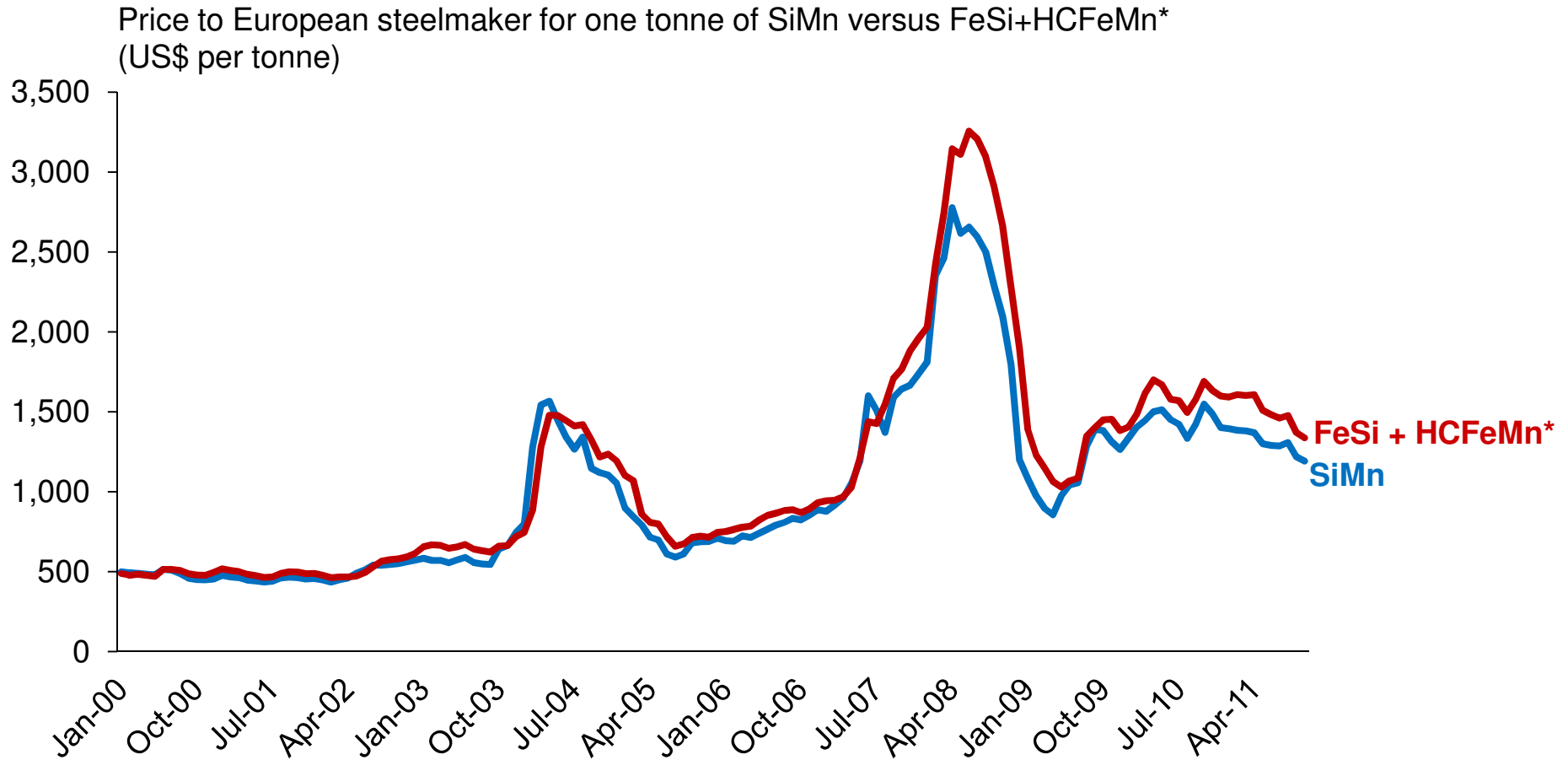


Whilst consumption of FeSi per tonne of steel in Europe is flat, the trend for SiMn is rising

This reflects several factors:

- Increasing use of manganese to add strength to European steel – especially auto steels. Many non-surface-exposed auto steels can use SiMn, which is seen as the most cost-effective option
- Increasing cheapness of SiMn relative to using FeSi + FeMn
- Over time, steel plant hopper configurations and management culture can be adapted to switch between SiMn, FeMn and FeSi
- Short-term substitution between SiMn, FeMn and FeSi does not occur in Europe to any significant degree

Using SiMn is consistently cheaper for European steelmakers than using FeSi+FeMn

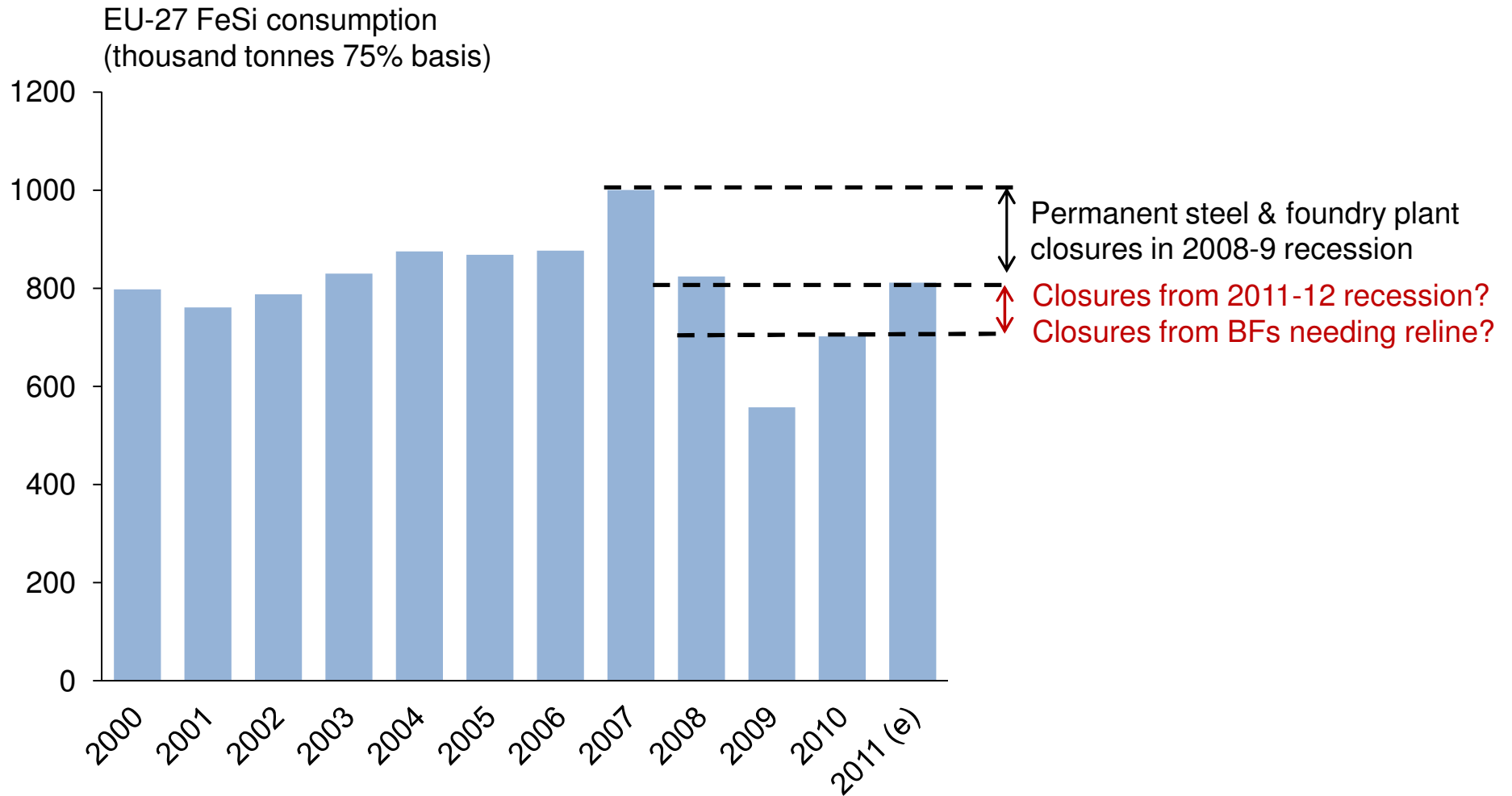


*Equivalent quantities of FeSi and HCFeMn needed to provide same level of Si and Mn as one tonne of SiMn, incorporating credit for extra Fe units

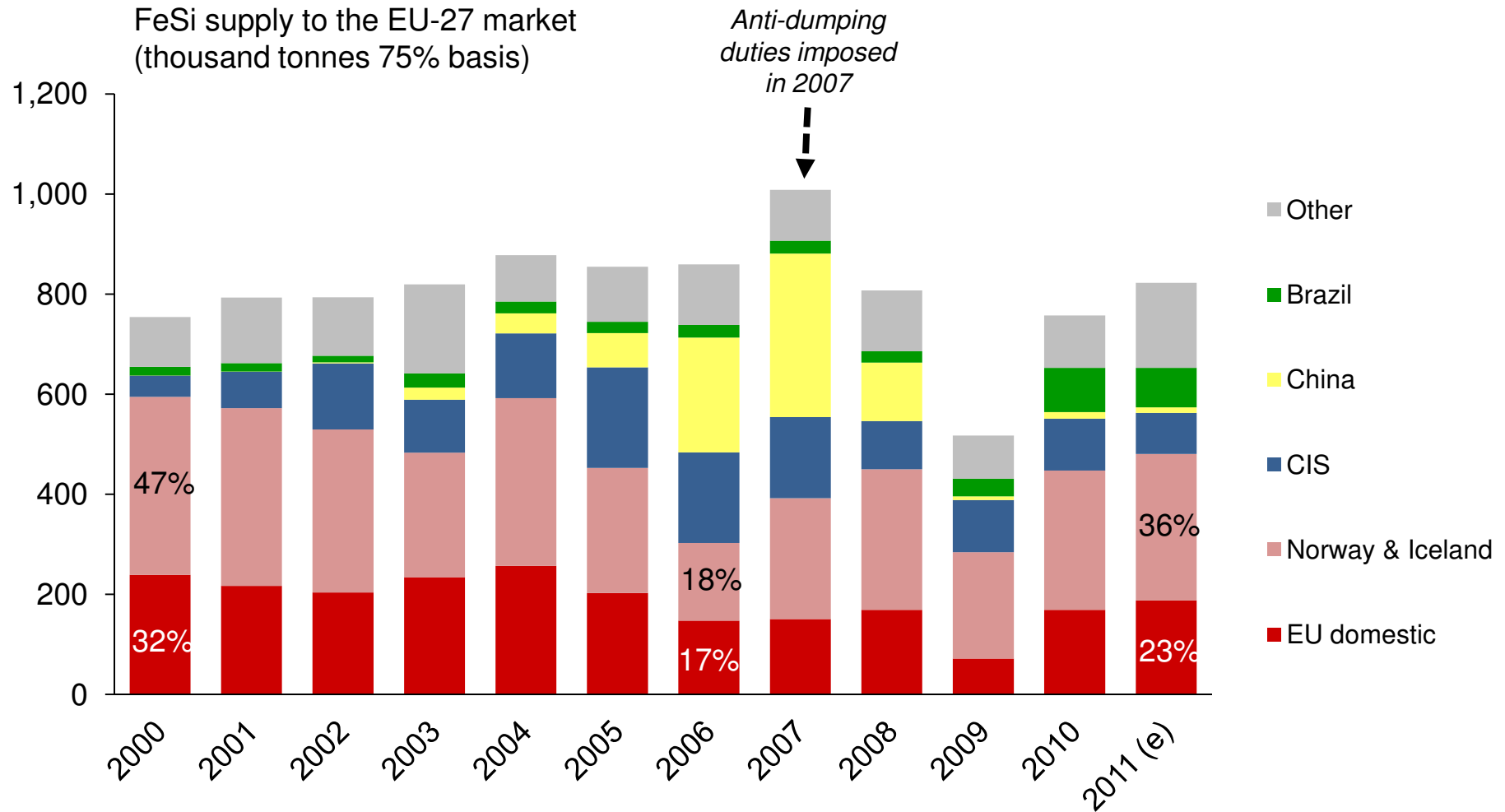
Nevertheless, a significant proportion of European steelmakers are restricted in their ability to use SiMn

- To use SiMn, ideal Si to Mn ratio in steel is 1 to 4
- FeSi necessary in all steels where Si to Mn ratio is high (eg electrical steels – ratio of max 20 to 1)
- High Si to Mn ratio also in most foundry iron castings
- Plant design and configuration difficult and expensive to change
- Steel company inertia, and engineer-led purchasing

Future European FeSi consumption will be in the range of 700-800,000mt per year



Currently, European and Scandinavian producers supply 60% of the European FeSi market



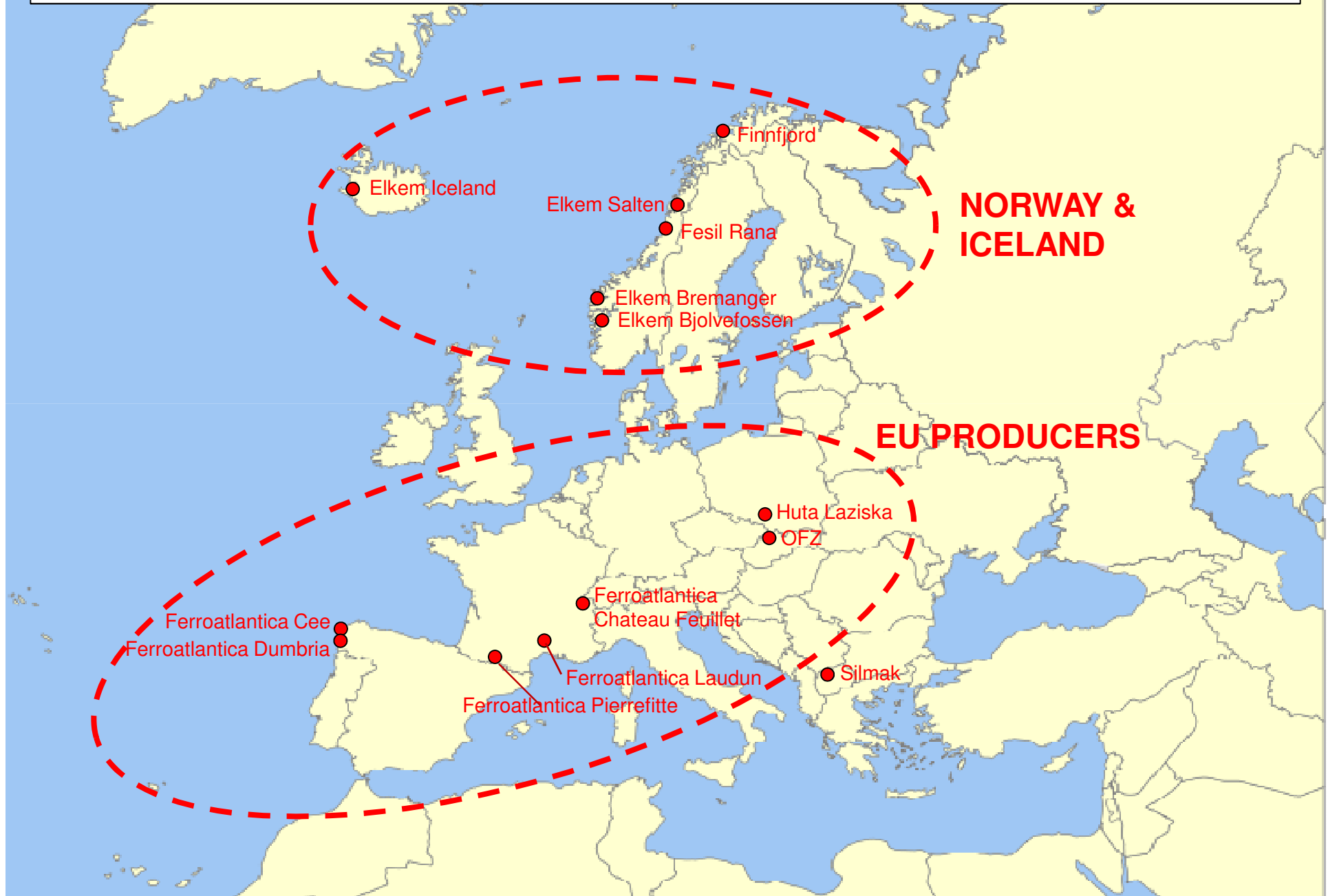
FeSi anti-dumping duty rates in the European Union, as imposed in 2007

China – Erdos	16%
China – others	29 – 31%
Egypt	15 – 18%
Kazakhstan	34%
Macedonia	5%*
Russia	18 – 23%**

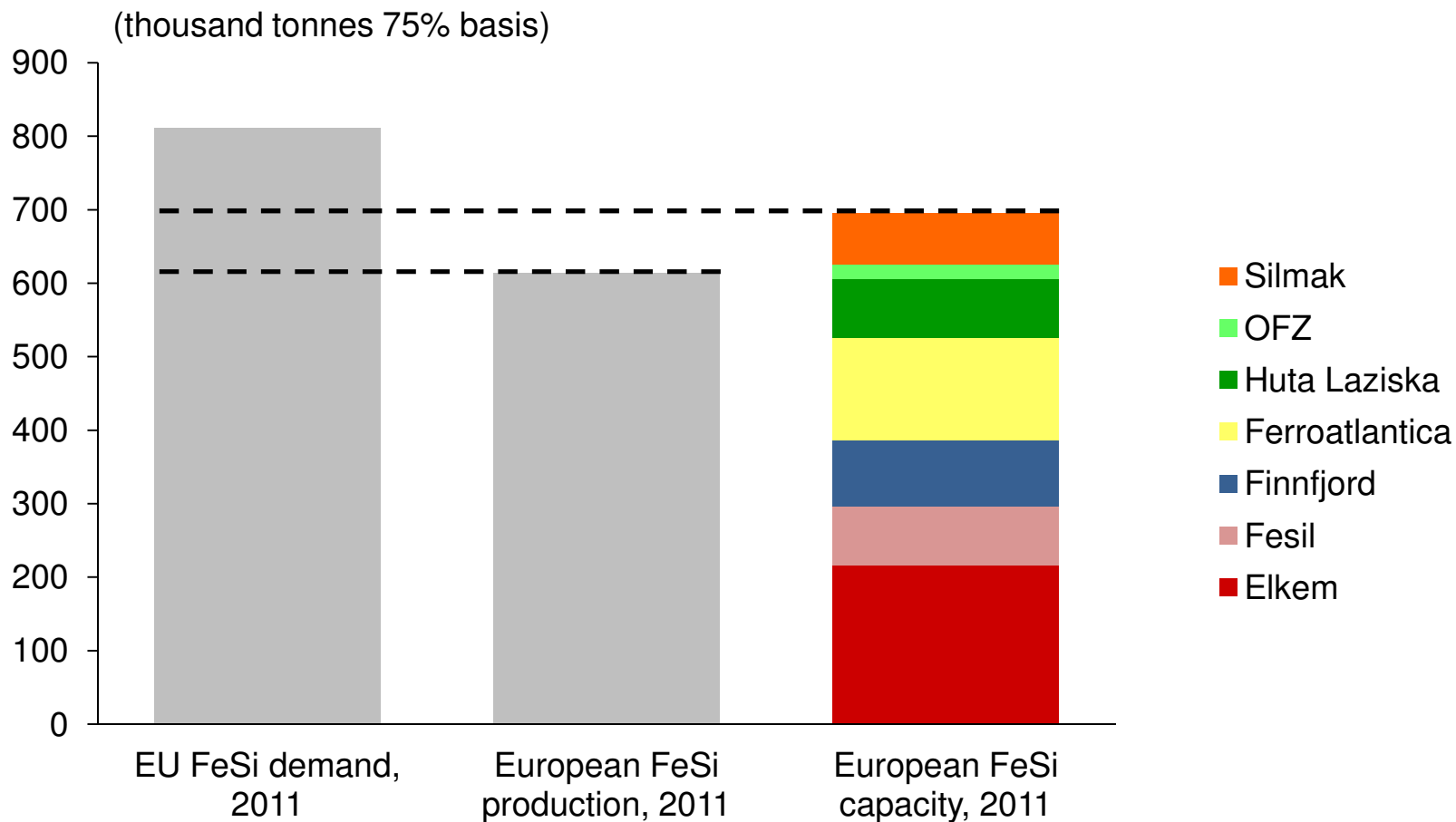
* Reduced to zero in review, Dec 2009

** Subject to as yet unsuccessful review in 2010-2011

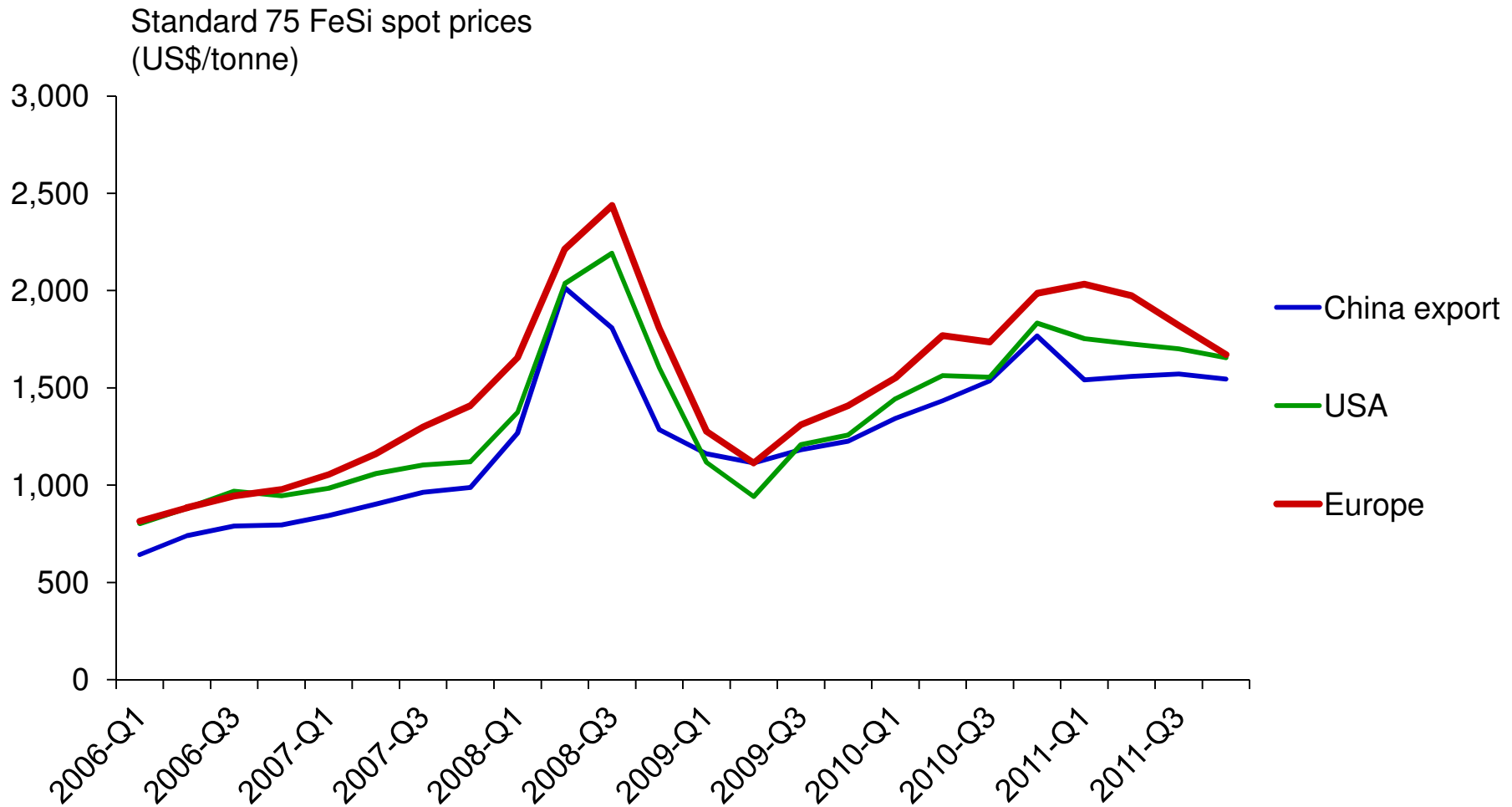
A map of European ferrosilicon producers



European FeSi production capacity is 700,000 tonnes per year, 85% of European consumption

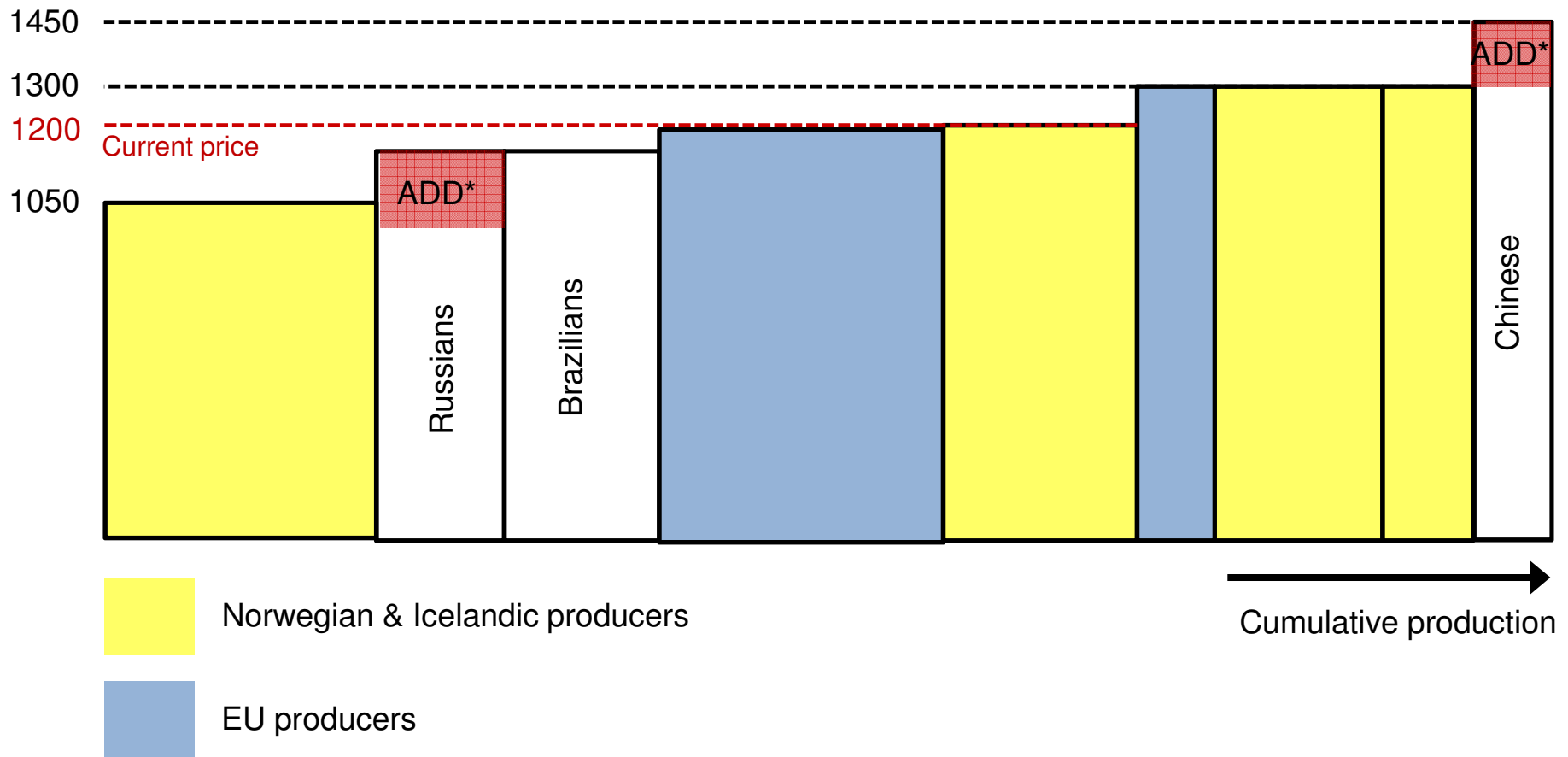


FeSi spot price development – recent steep declines in Europe



At current prices, one third of supply to the European FeSi market is in loss-making territory

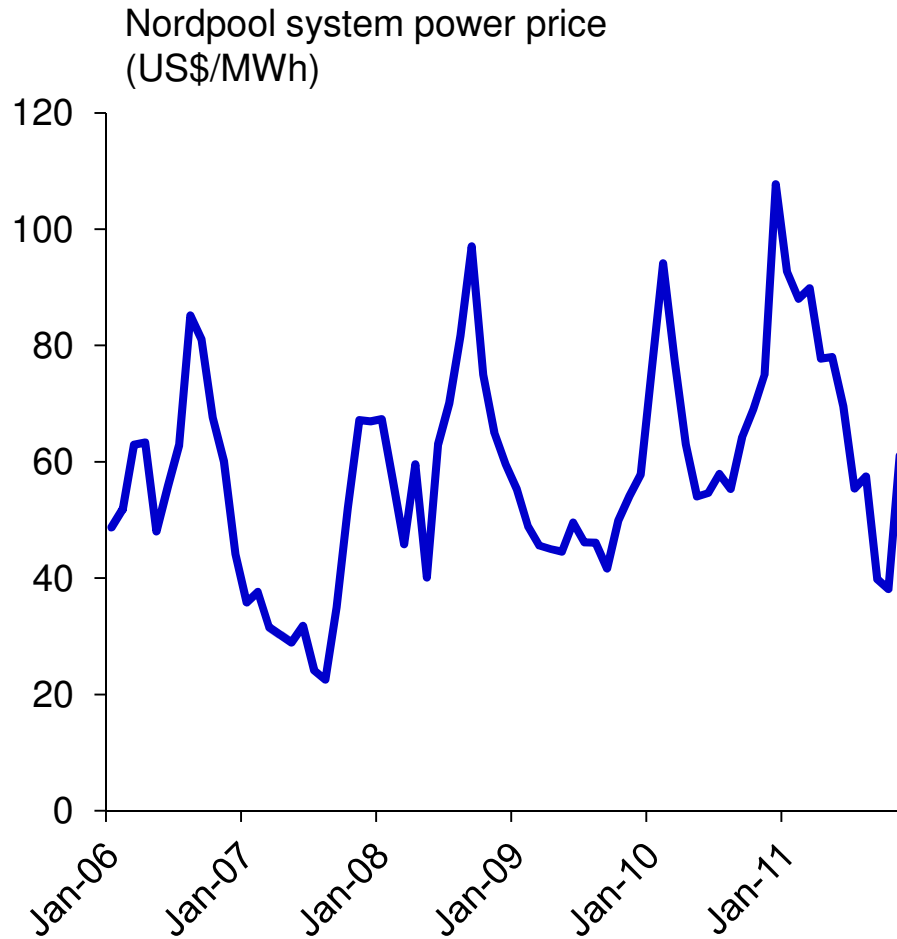
European FeSi operating cost** curve, 2011, Euros per tonne



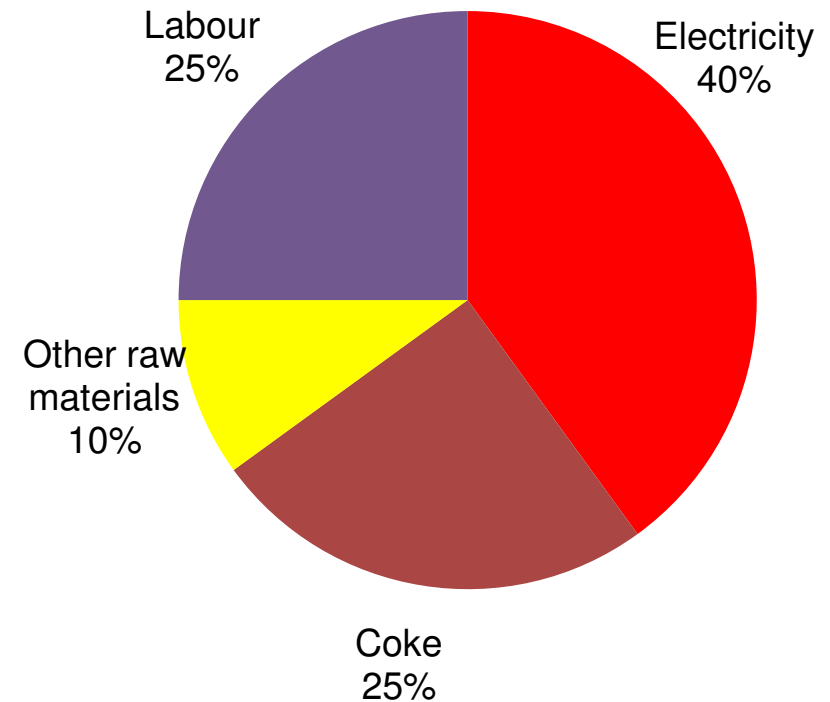
*ADD = anti-dumping duty

** cash cost plus depreciation

European power prices have provided respite in 2011, but have started to rise again



Production cost breakdown by component for average European FeSi plant



In conclusion...

- European production and consumption of FeSi is “not dead yet”, and both still have a future
- Consumption of FeSi relative to steel output in Europe has stuck to a stable long-term trend
- Some consumption decline likely in next 5 years reflecting prospects for EU steel production, but demand of 700,000 tonnes should be maintained
- SiMn is gradually gaining market share in Europe, but sudden short-term switching from FeSi is not likely
- Break even costs for European swing/marginal capacity sets medium term price level in market protected by anti-dumping duties
- Current prices are €50-100/tonne below break-even for marginal producers; output reductions seem likely in short term