

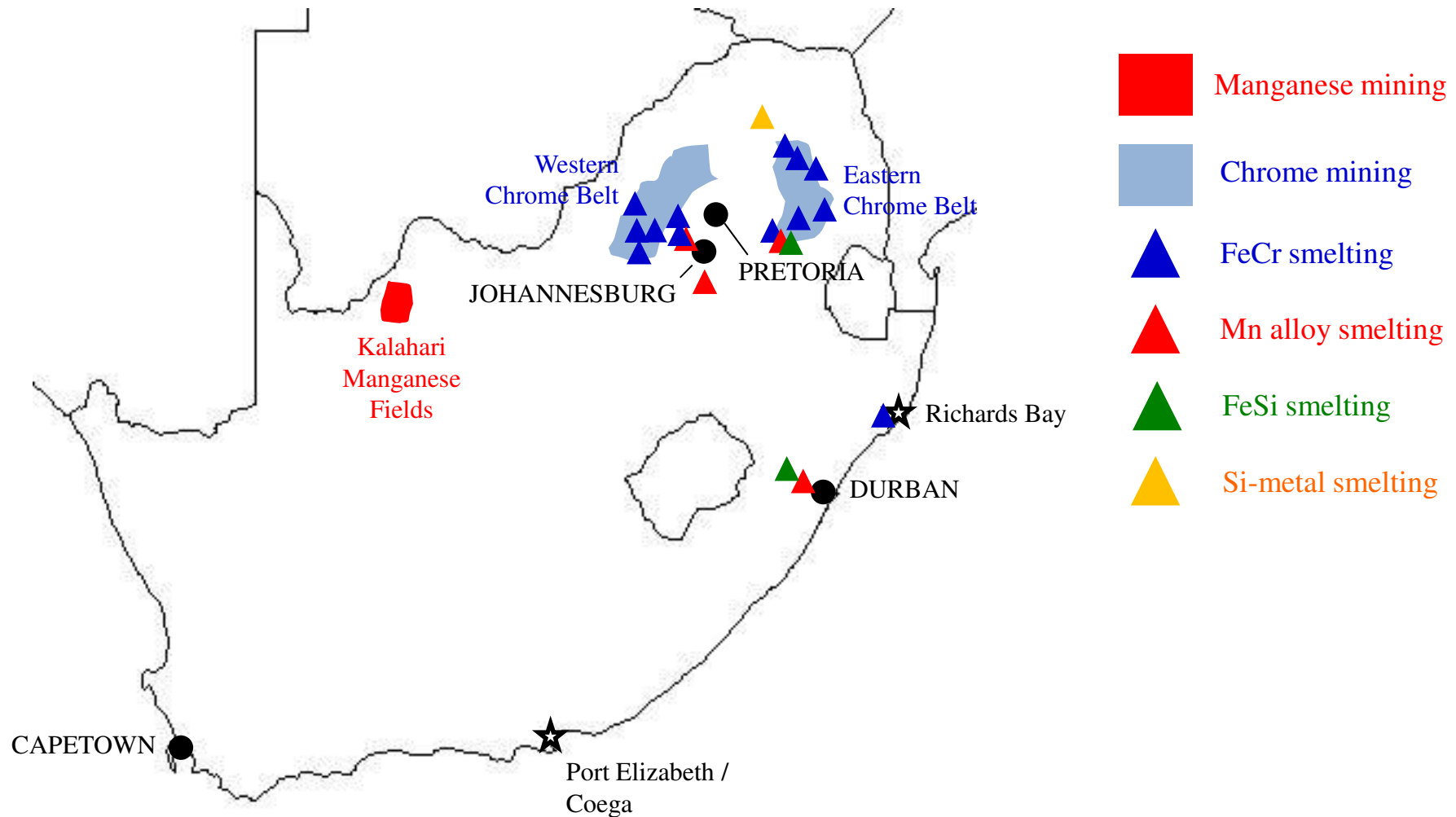
# South Africa's position in the global ferroalloy industry

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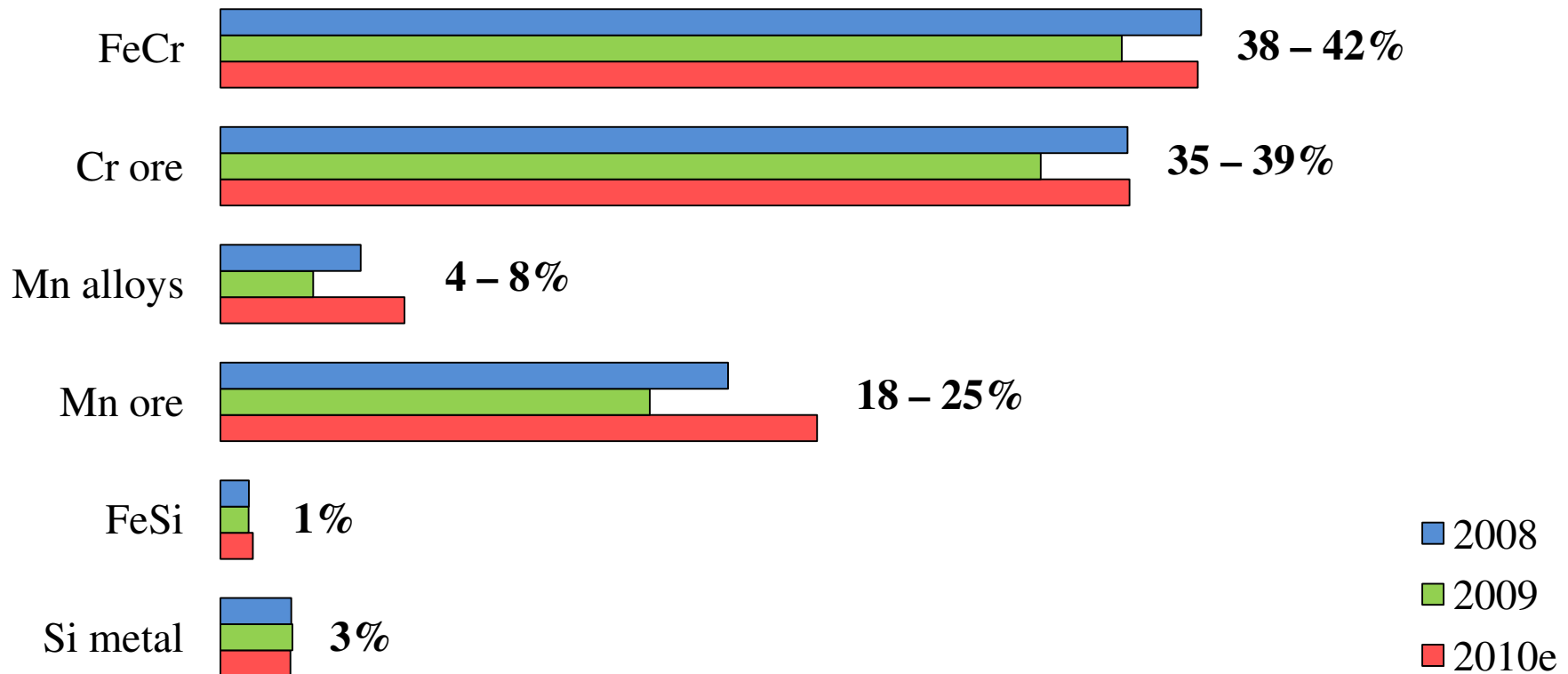


# South Africa has an extensive industry for both mining and smelting ferroalloy products



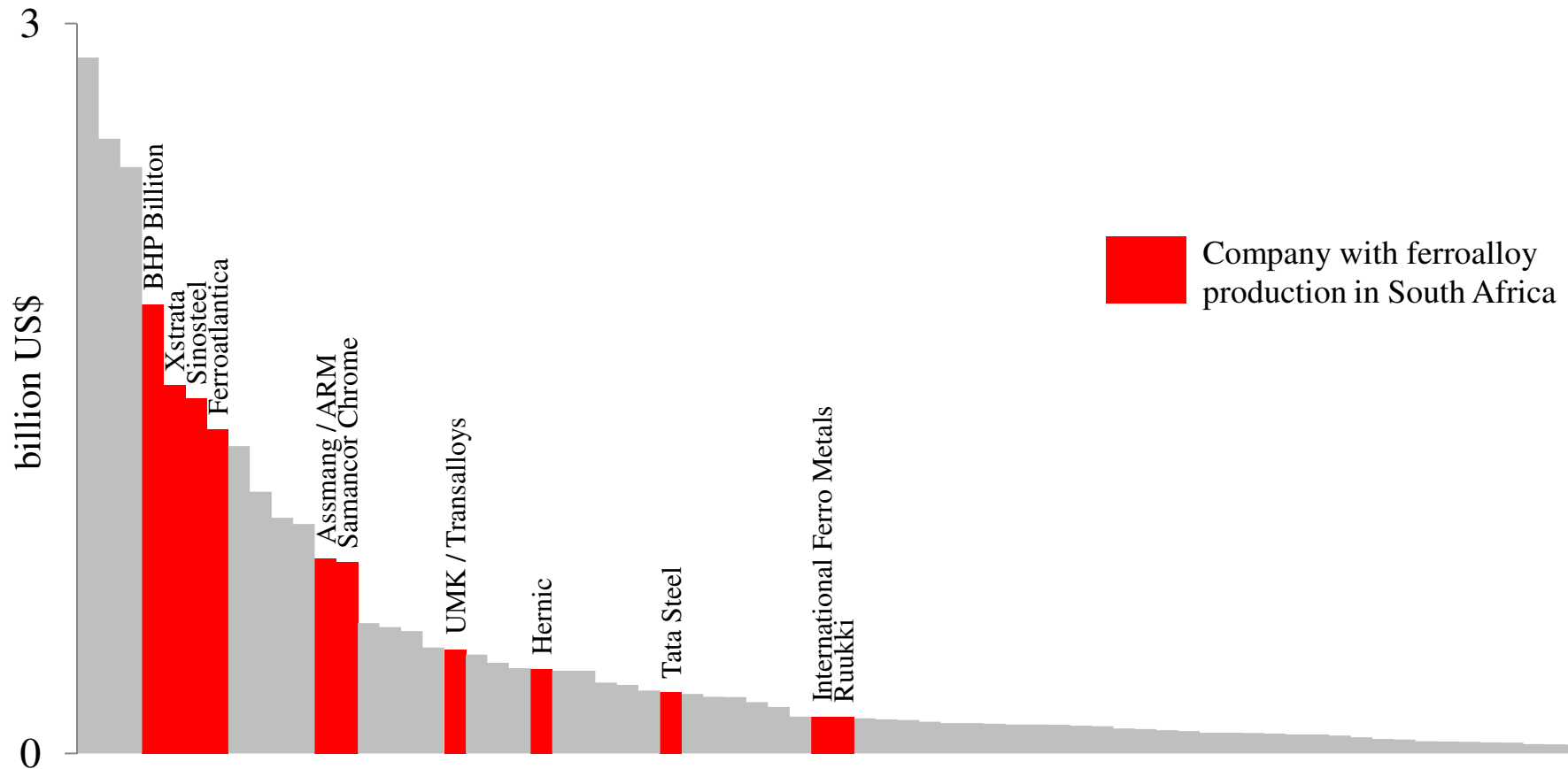
# South Africa is a leading player in the Cr and Mn sectors, but only a minor player in Si and FeSi

*South Africa as a percentage of global output, 2008-10*



# South Africa's ferroalloy production is dominated by major industry players

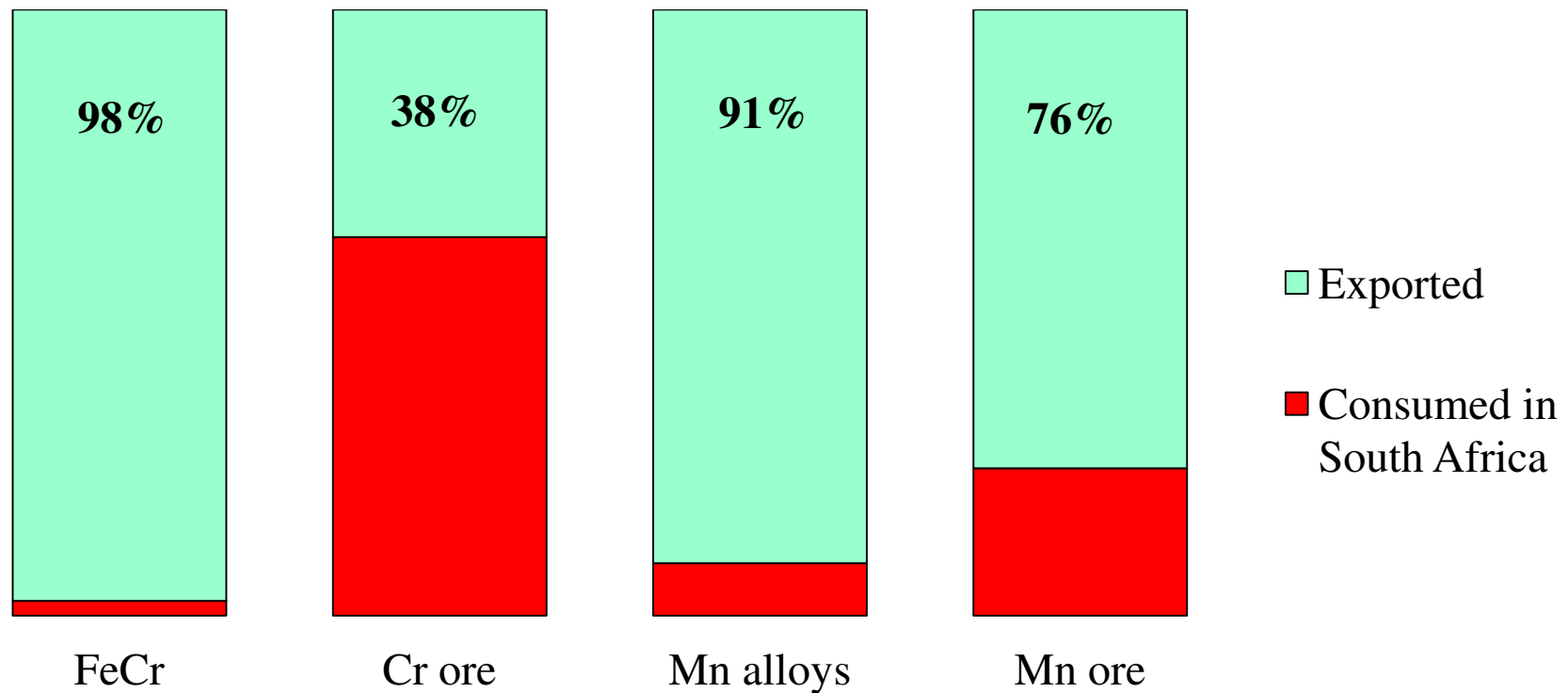
*Global ranking of top-70 ferroalloy companies by ferroalloy revenues  
(estimate for financial year ending 2010)*



# South Africa's ferroalloy production is currently export-focussed, with the exception of chrome ore

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*South African consumption vs exports of Cr and Mn products\**



*\* estimated data for 2010*

# **Present and future power availability is a major constraint for South African ferroalloy producers**

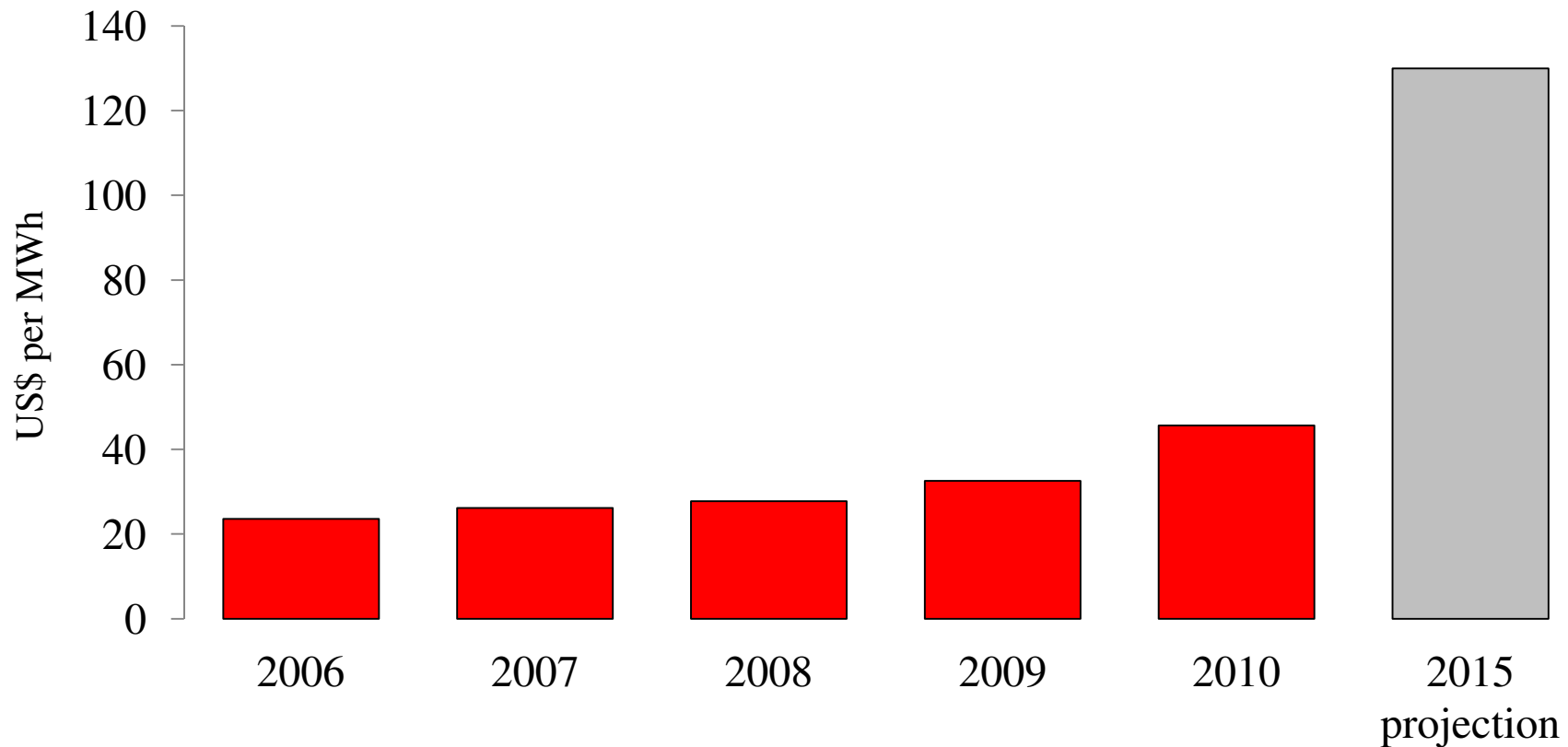
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- Over the past decade, economic growth and development programmes have significantly increased South Africa's electricity consumption
- Generation capacity has not increased in line with demand, and the country has reached the limit of its effective generation capacity
- The ferroalloys industry has been hit by immediate limits on its power consumption
- Power availability will remain constrained at least for the next 5-10 years, making expansion of ferroalloy smelting in South Africa difficult
- Tight power availability has resulted in steep tariff increases. Tariffs are expected to continue rising at 20-40% per year in the next 5 years

# Power tariffs for South African ferroalloy plants are projected to more than double in the next 5 years...

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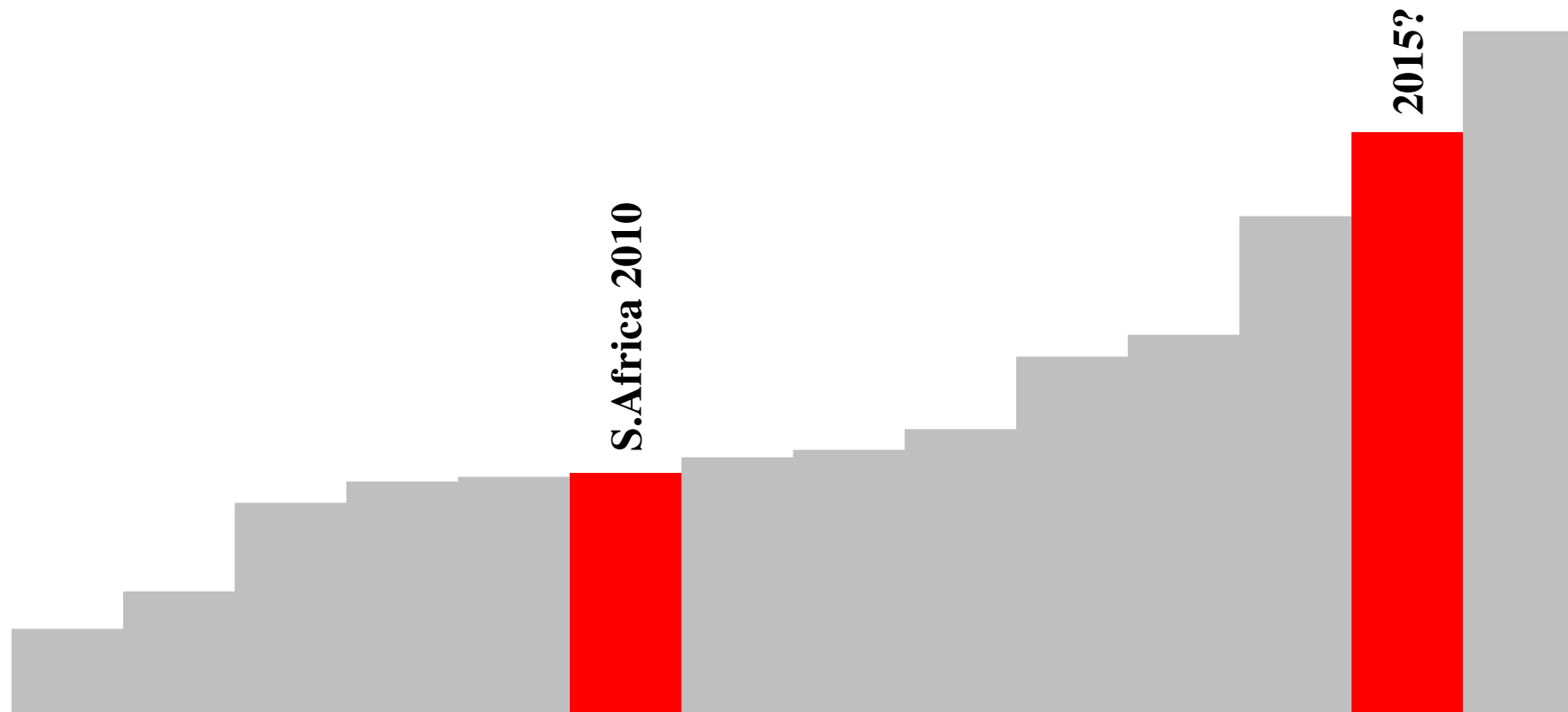
*Average power price for South African ferroalloy plants:*



# ... possibly causing South African power prices to rank amongst the highest in the industry

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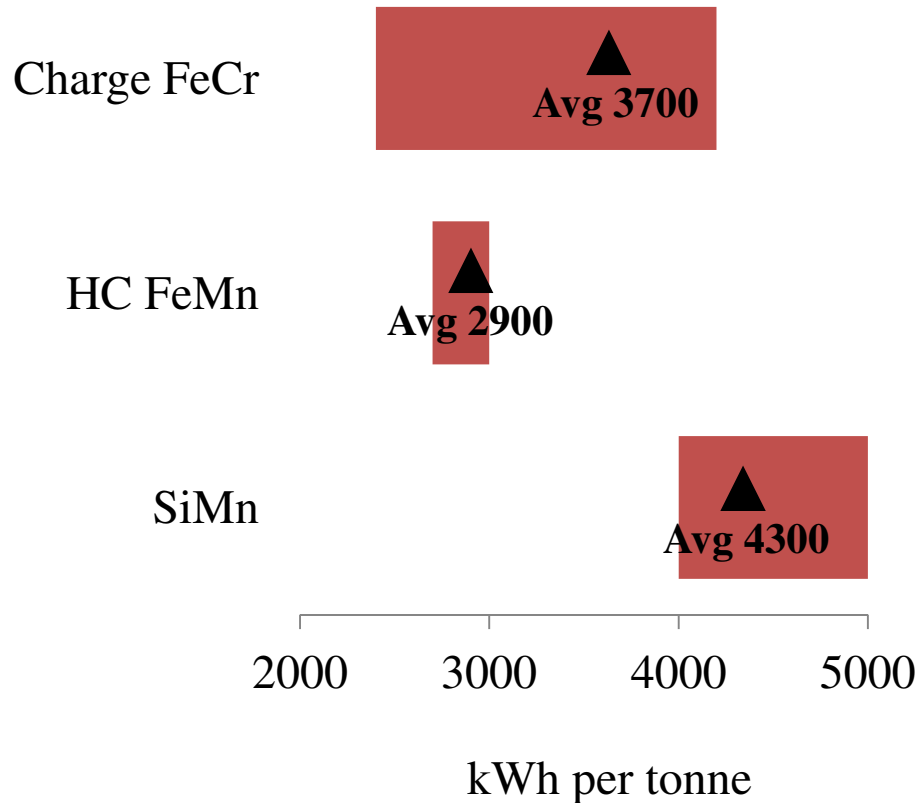
*Global ranking of power tariffs in major ferroalloy producing countries:*



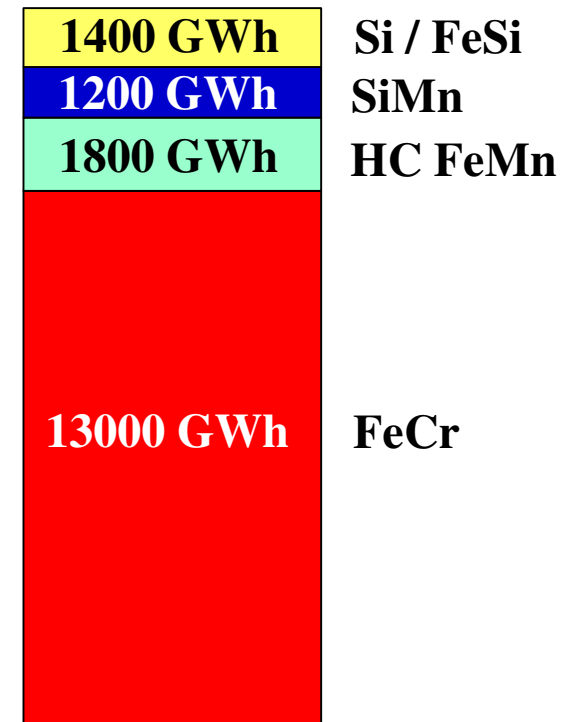


# Of the electricity used in South African ferroalloy output, 75% is used to produce FeCr

*Range of electricity consumption per tonne of ferroalloy produced, South African plants:*



*Annual South African electricity consumption per ferroalloy:*



# Technology continues to reduce unit power consumption in FeCr smelting. Conversions to FeMn possible

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- Power consumption per tonne of FeCr produced in South Africa ranges from 2,400kWh/tonne to 4,200kWh/tonne
- The wide range reflects technology differences across plants  
- eg. pelletising, pre-heating, pre-reduction
- FeCr producers will continue to increase their use of these technologies to reduce unit power consumption and enable increased use of UG2 ore
- Power constraints may also cause producers to switch from FeCr to less electricity-intensive alloys (HC FeMn). Integrated South African production is relatively lower cost for HC FeMn compared with FeCr. Assmang has converted furnaces in 2010

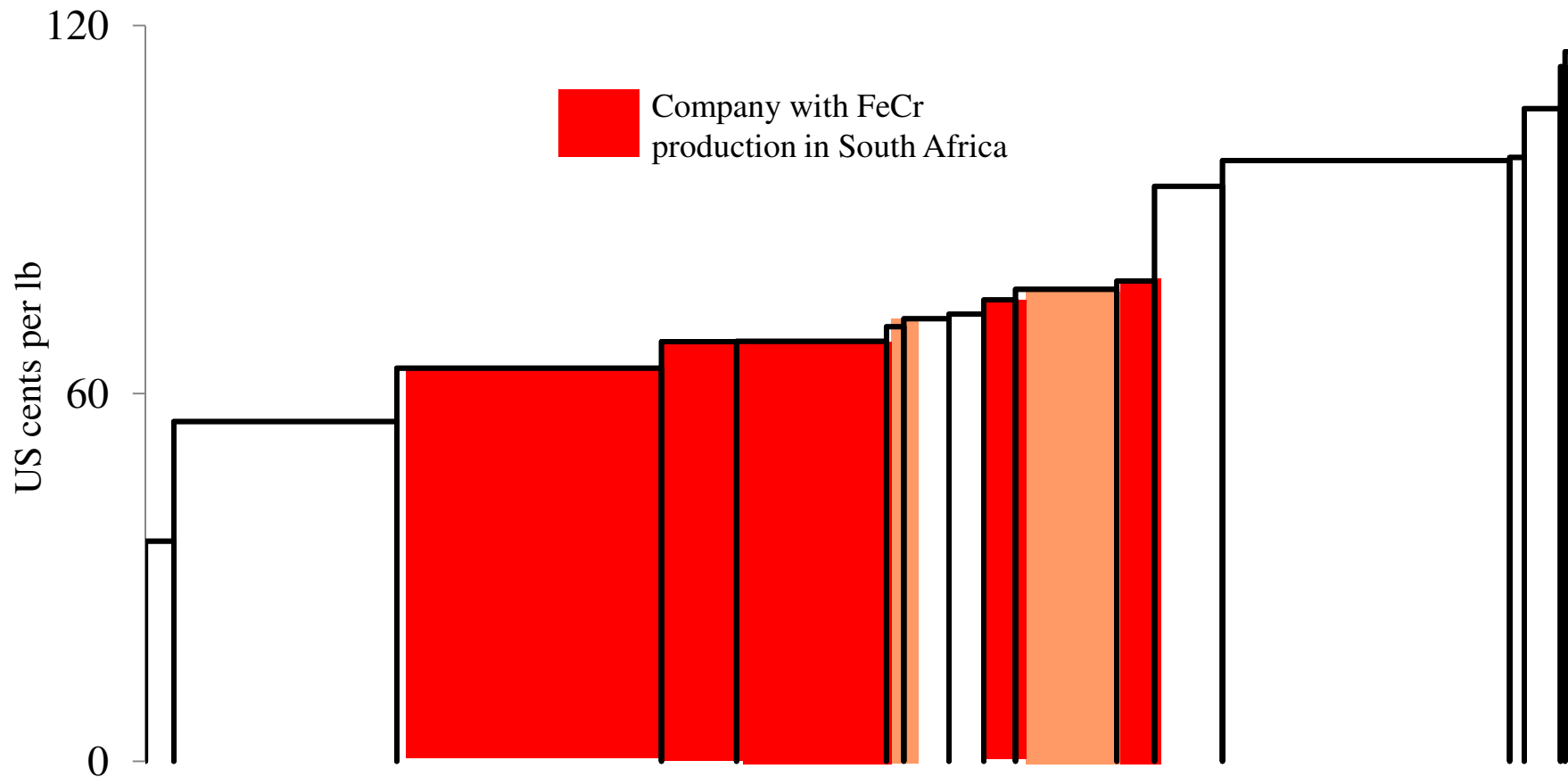
# South African FeCr producers are increasing their use of UG2 ore

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- South African FeCr smelters have become increasingly able to use cheap and plentiful UG2 fines (by products from the platinum industry)
- This reflects more widespread installation of pelletising plants and a move towards installing DC furnaces
- Low  $\text{Cr}_2\text{O}_3$  content of UG2 fines lowers content of FeCr. High percentage of UG2 in ore mix can lower Cr content of FeCr below 50%. This may have customer implications
- UG2 is more difficult and expensive to transport than higher-grade and lumpy ores – nevertheless it is thought that UG2 is now being exported to China

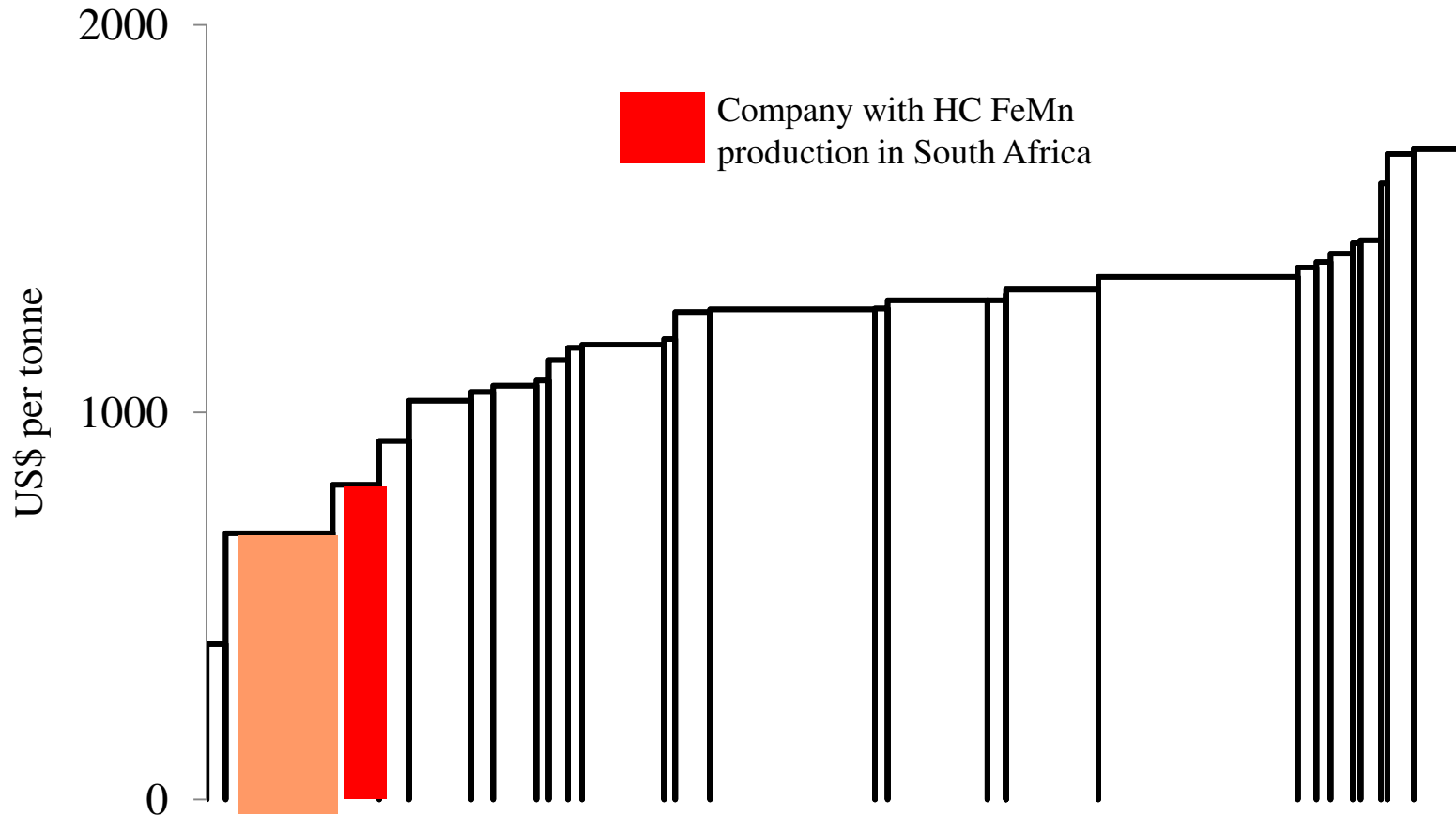
# South African FeCr production costs are now middle-ranking on a global comparison...

*Global HC / charge FeCr production costs, estimated 2010:*



## ... whilst South African HC FeMn production costs remain amongst the lowest in the world

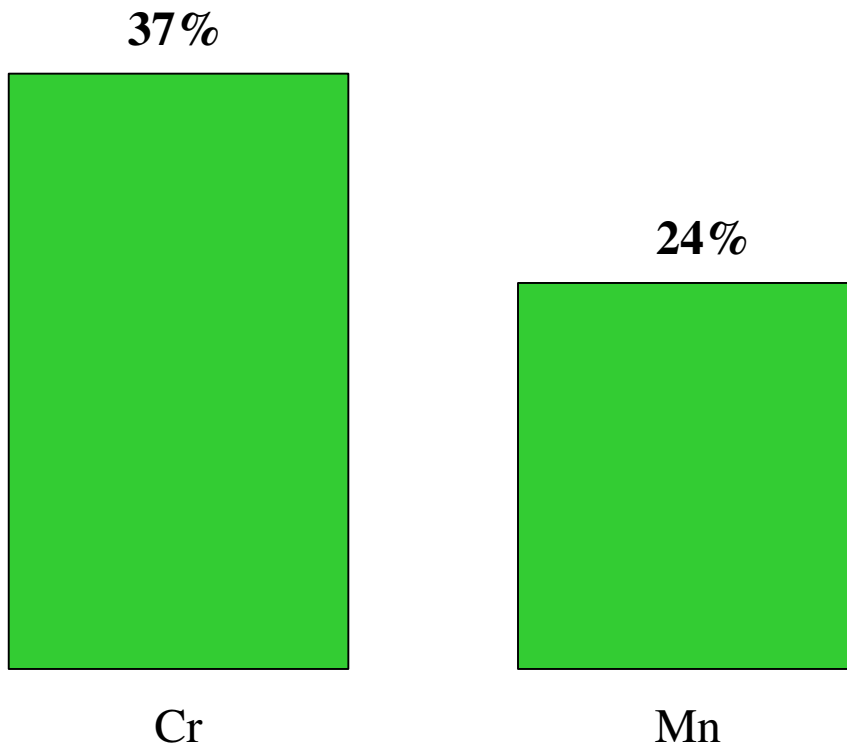
*Global HC FeMn production costs, estimated 2010:*



# The world will need more units of chromium and manganese to be mined in South Africa

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*Percentage of world reserves in South Africa:*

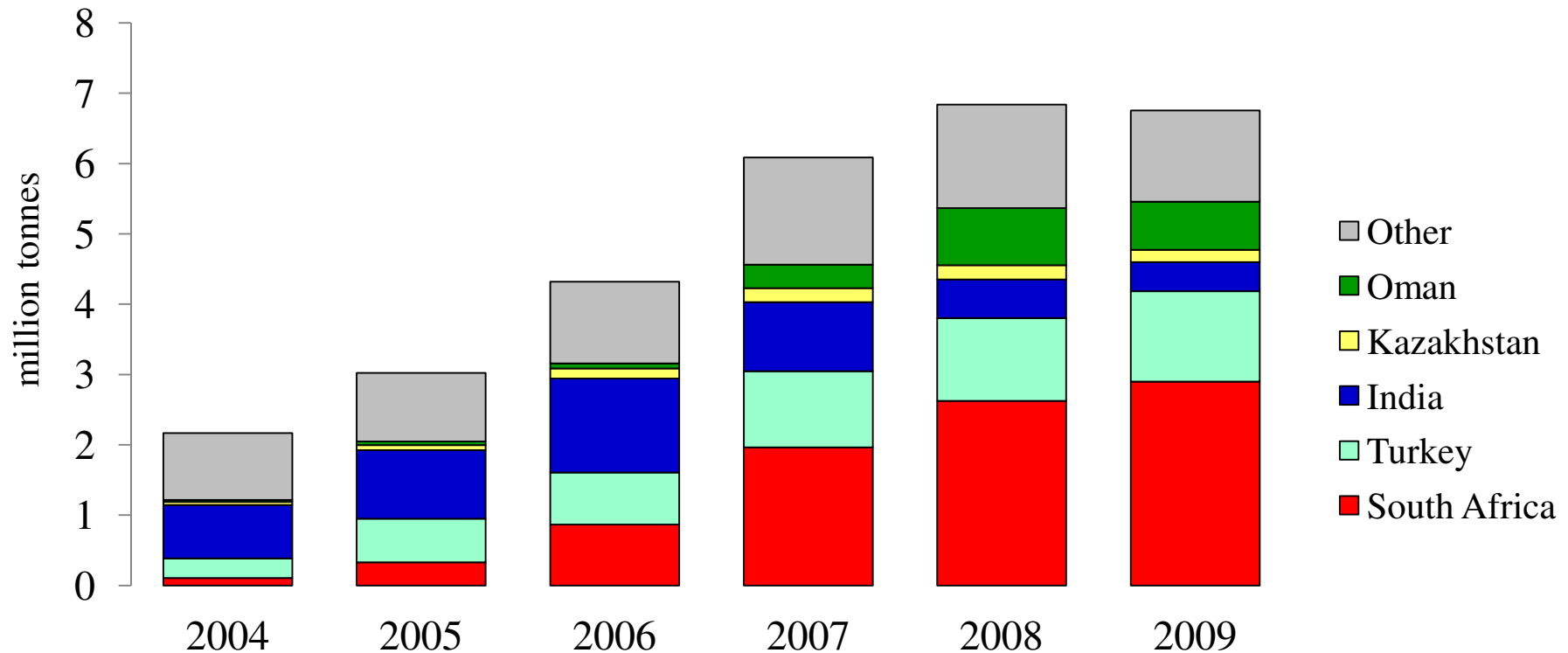


As much as 70-80% of world RESOURCES of these ores are thought to be in South Africa

Source: USGS

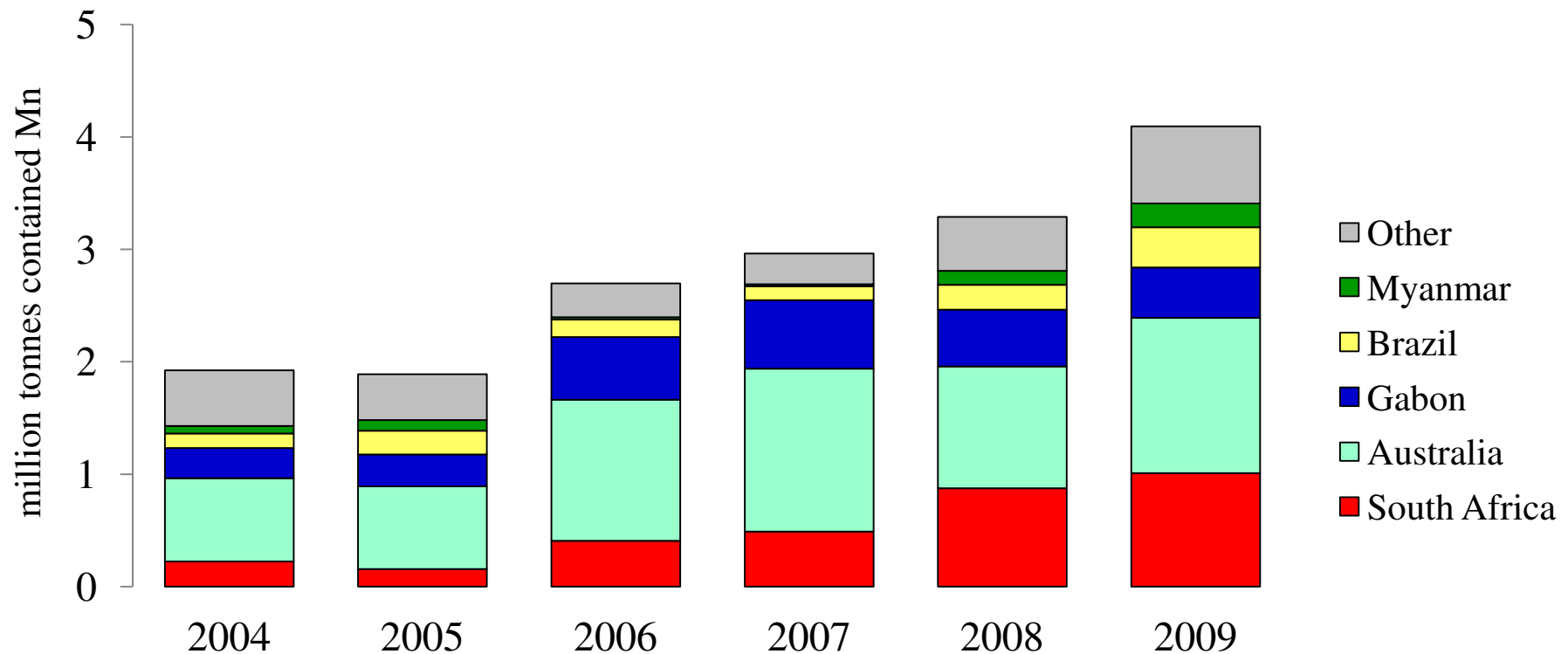
# South Africa now accounts for nearly half of Chinese chrome ore imports...

*Chinese chrome ore imports by source:*



## ... and for around 25% of Chinese manganese ore imports

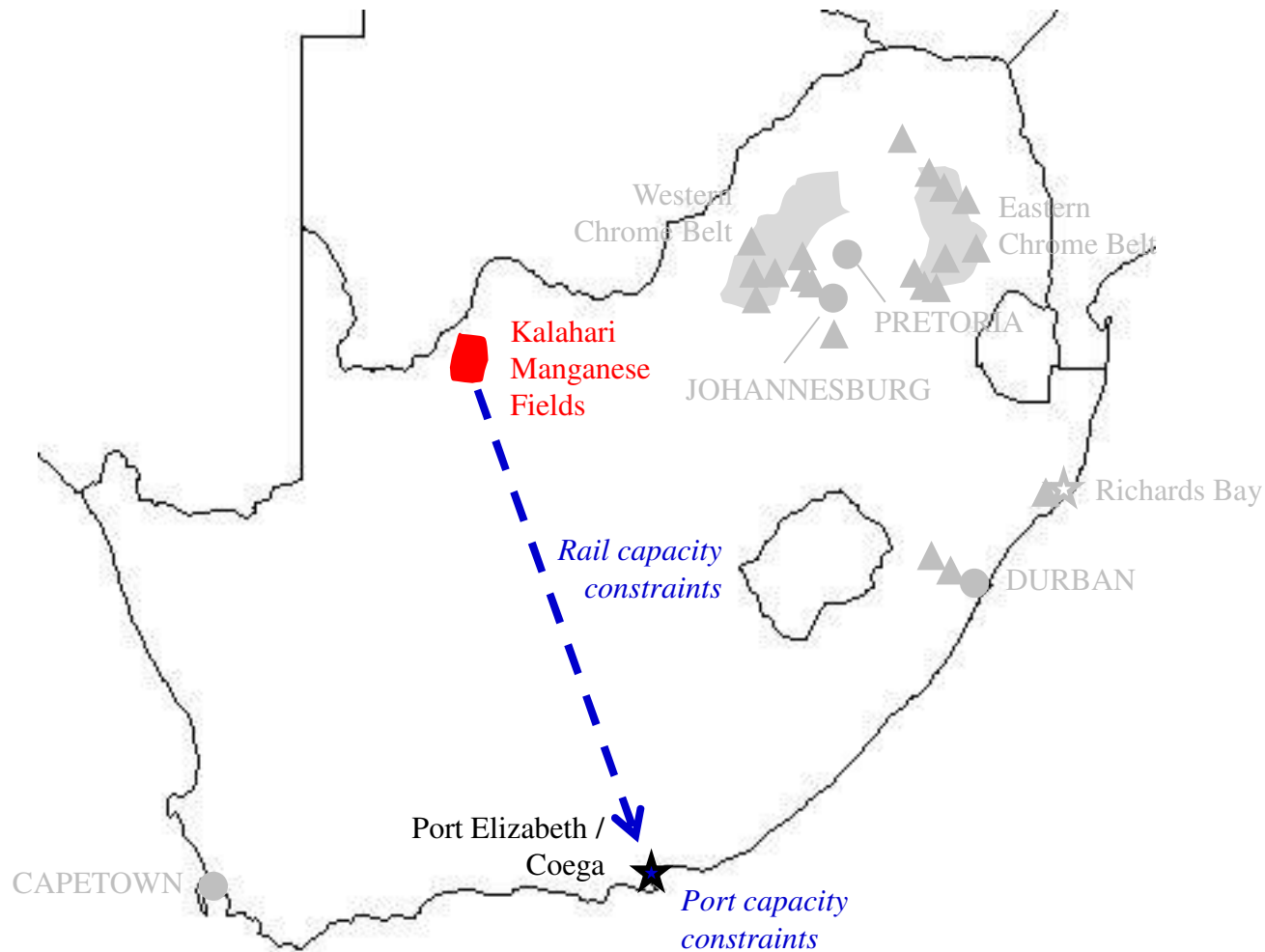
*Chinese manganese ore imports by source:*





# Manganese ore exports from South Africa are constrained by rail and port capacity

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- Manganese ore for export from the Kalahari mines travels to Port Elizabeth down a rail line that is at full capacity
- The manganese export terminal at the port is also capacity constrained
- Short term, this is already leading to rationing of rail paths between producers, with pressure from new mines coming on-stream
- Long term, both rail and port capacity will have to be expanded to enable South Africa to meet growth in world demand for manganese ore
- Trucking to port is an option, but only borderline viable at current prices, and not good for road congestion nor the environment

## In conclusion...

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- South Africa is a leading player in the global ferroalloy industry, especially in the chrome and manganese sectors
- South Africa will need to be an even bigger player in these sectors in the future, given its large percentage of world mine resources
- Power availability will be a significant constraint in terms of smelting ferroalloys in South Africa in the next decade
- Rail and port capacity bottlenecks will continue to limit exports of manganese ore without significant infrastructure investment
- Potential political objections to export of both chrome and manganese ores
- Heavy use of UG2 fines is a cost benefit but may have customer implications

# Thank you for your attention today

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