



# ***Ferrochrome – background information***

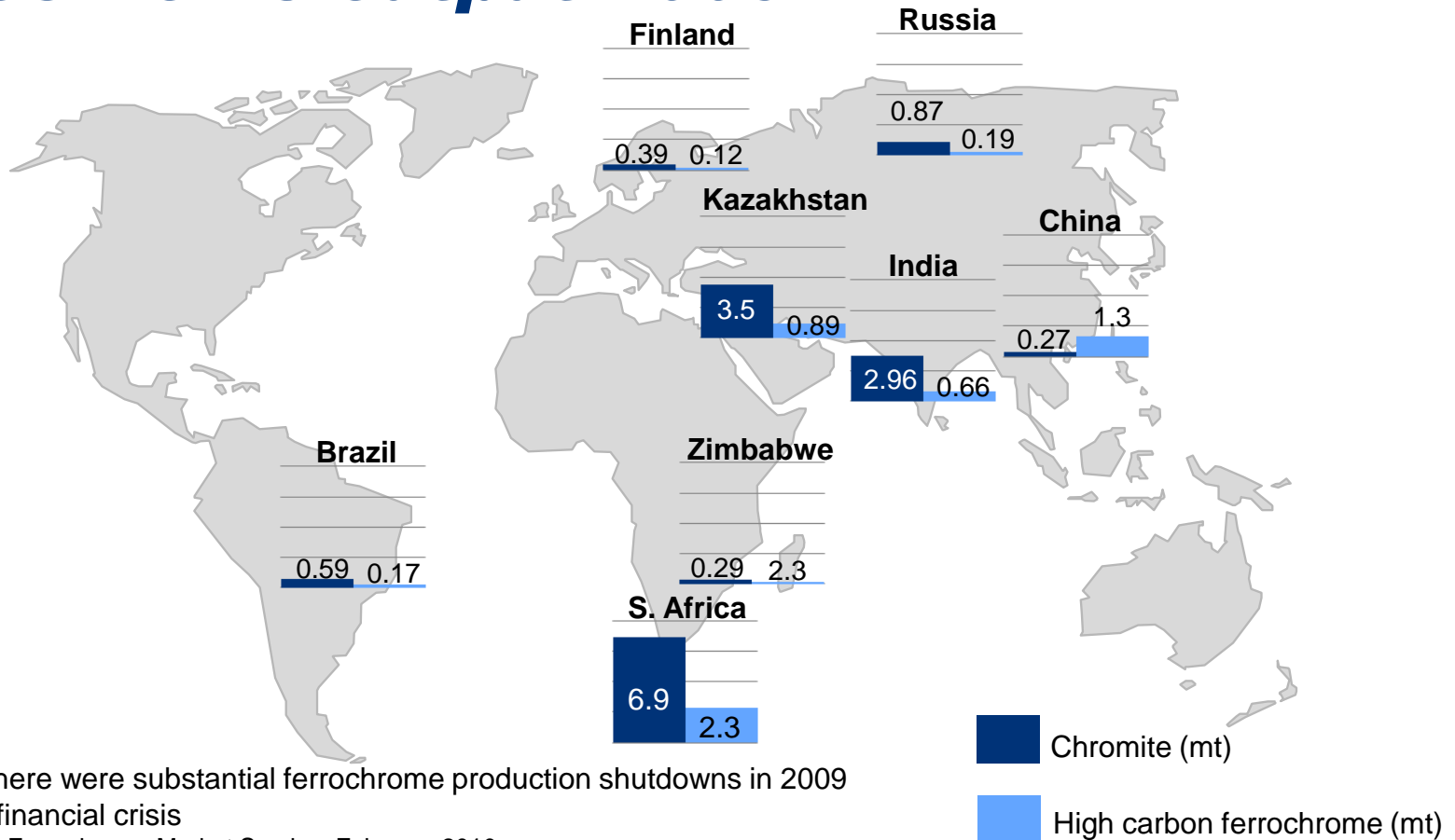
***June 2010***

[www.outokumpu.com](http://www.outokumpu.com)

# ***Ferrochrome demand - key drivers***

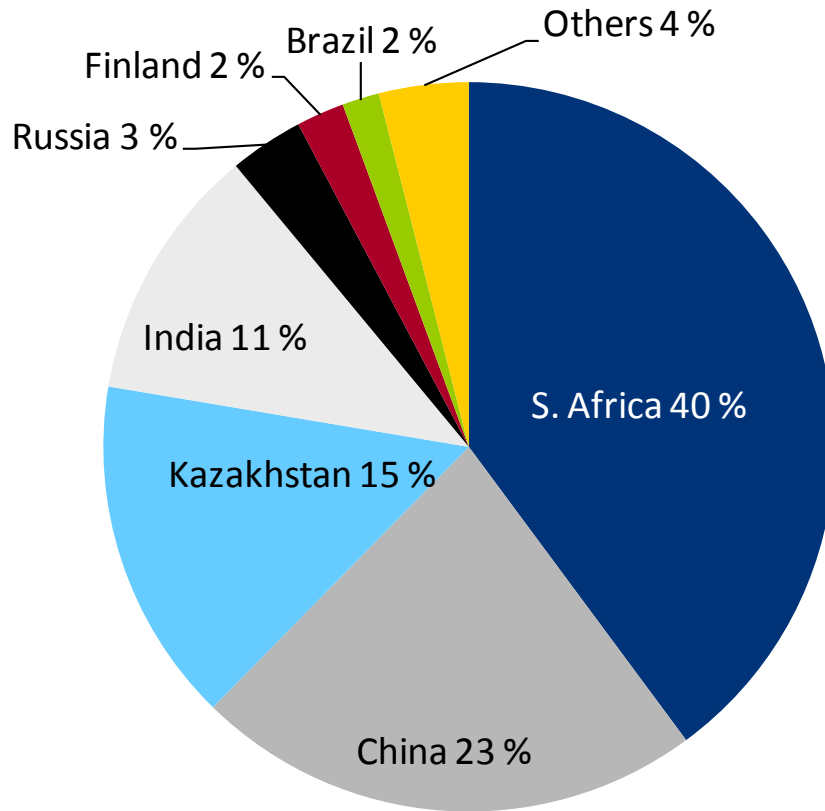
- Long-term price driven by overall growth in stainless steel (chrome makes steel stainless)
  - CAGR 5-6% over last 25 years
- In South Africa, accounting for 40% of global market, restrictions in electricity supply are resulting in significantly higher electricity prices
  - Higher production costs to keep ferrochrome price high
- High growth expectations and rising demand especially in China
- Development of grade series production ratio
  - shift from chrome and nickel-containing austenitic grades to no nickel, more chrome-containing ferritic grades

# World chromite and high carbon ferrochrome output 2009



Unique position – Outokumpu Kemi mine is the only chromite mine in Europe and Outokumpu the only stainless producer with captive FeCr production

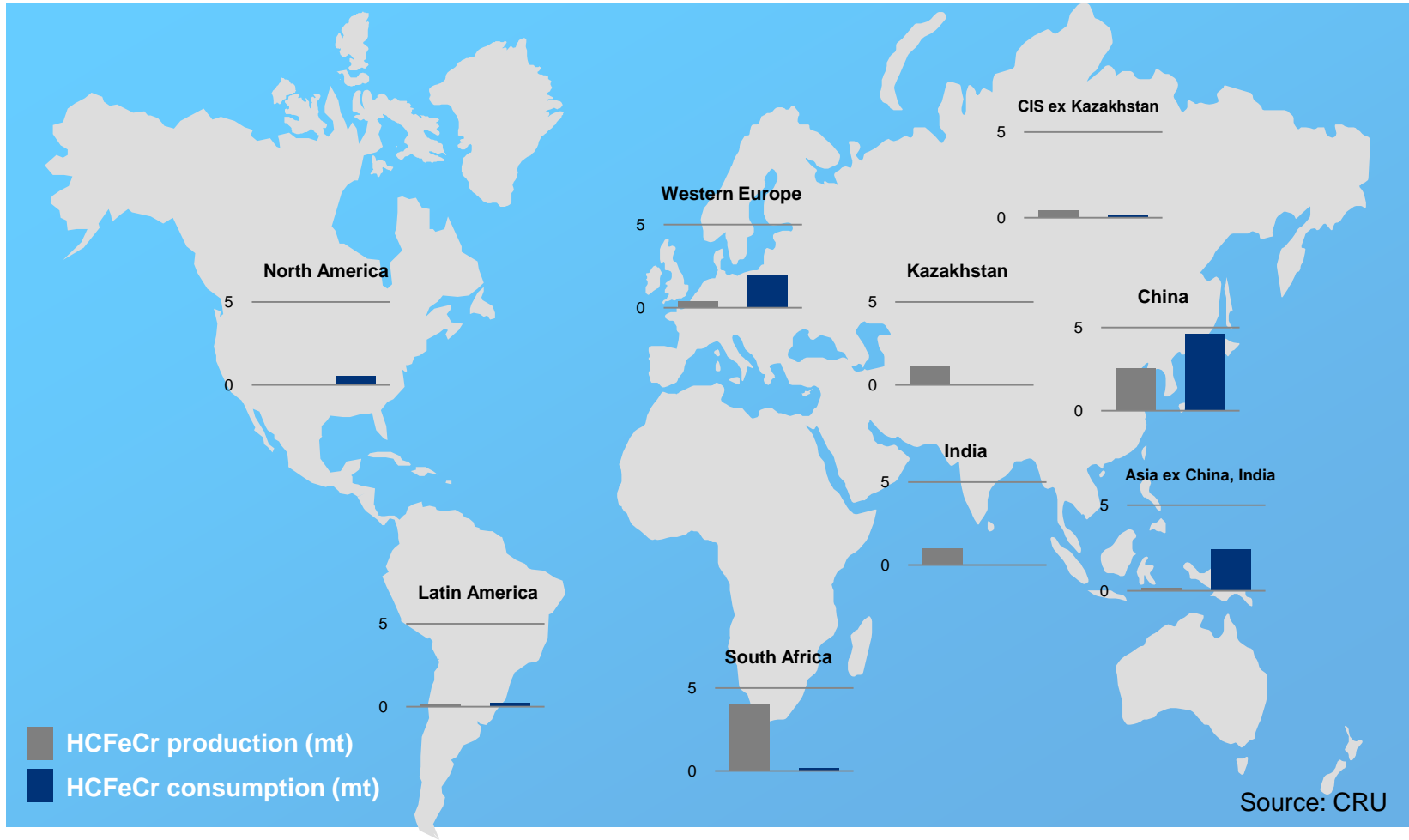
# Global ferrochrome production in 2009



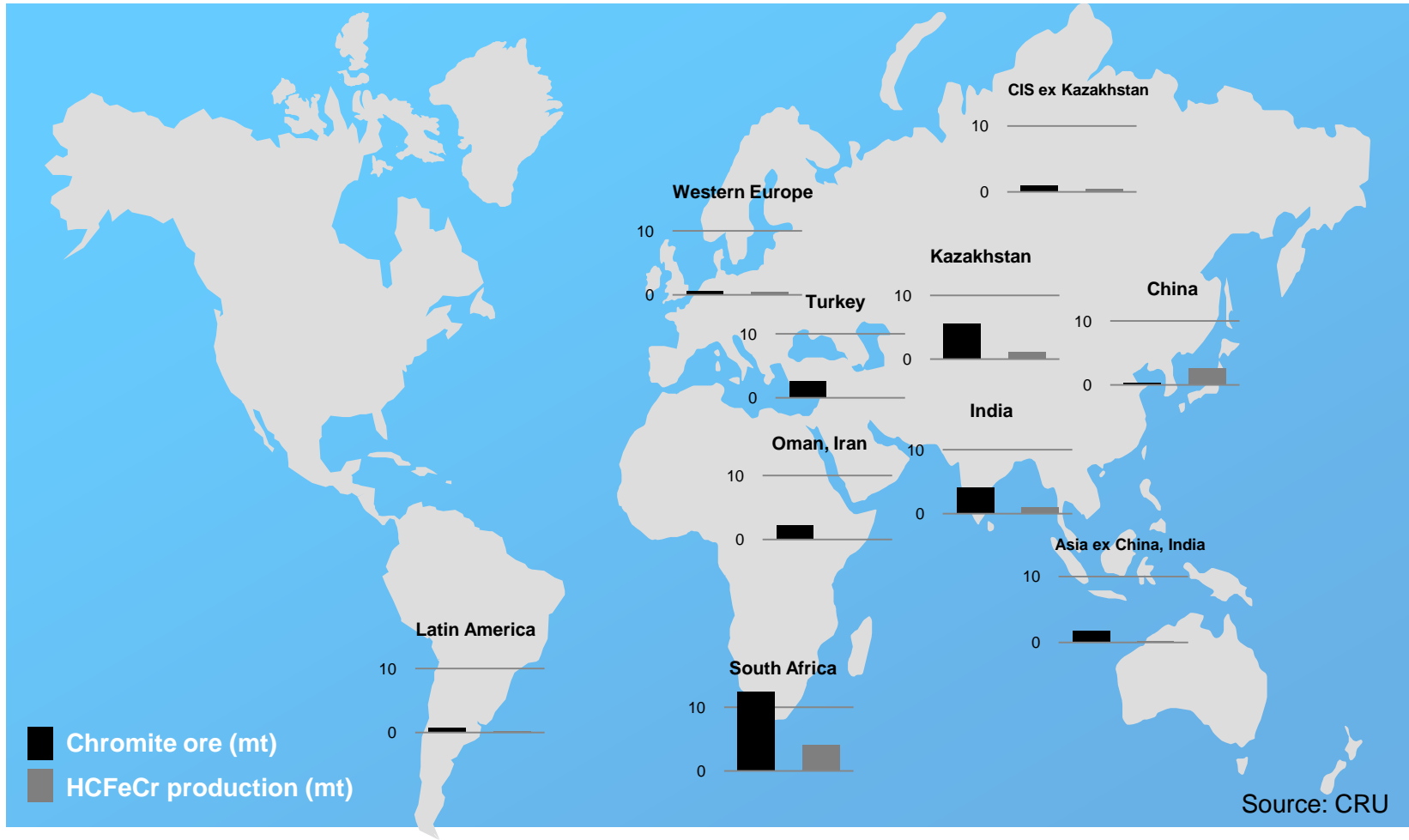
Global production, ktons	
2007	7 711
2008	7 536
2009	5 764

Source: CRU, Ferrochrome Market Service February 2010

# HCFeCr consumption and production forecast for 2014



# Chrome ore and HCFeCr production forecast for 2014



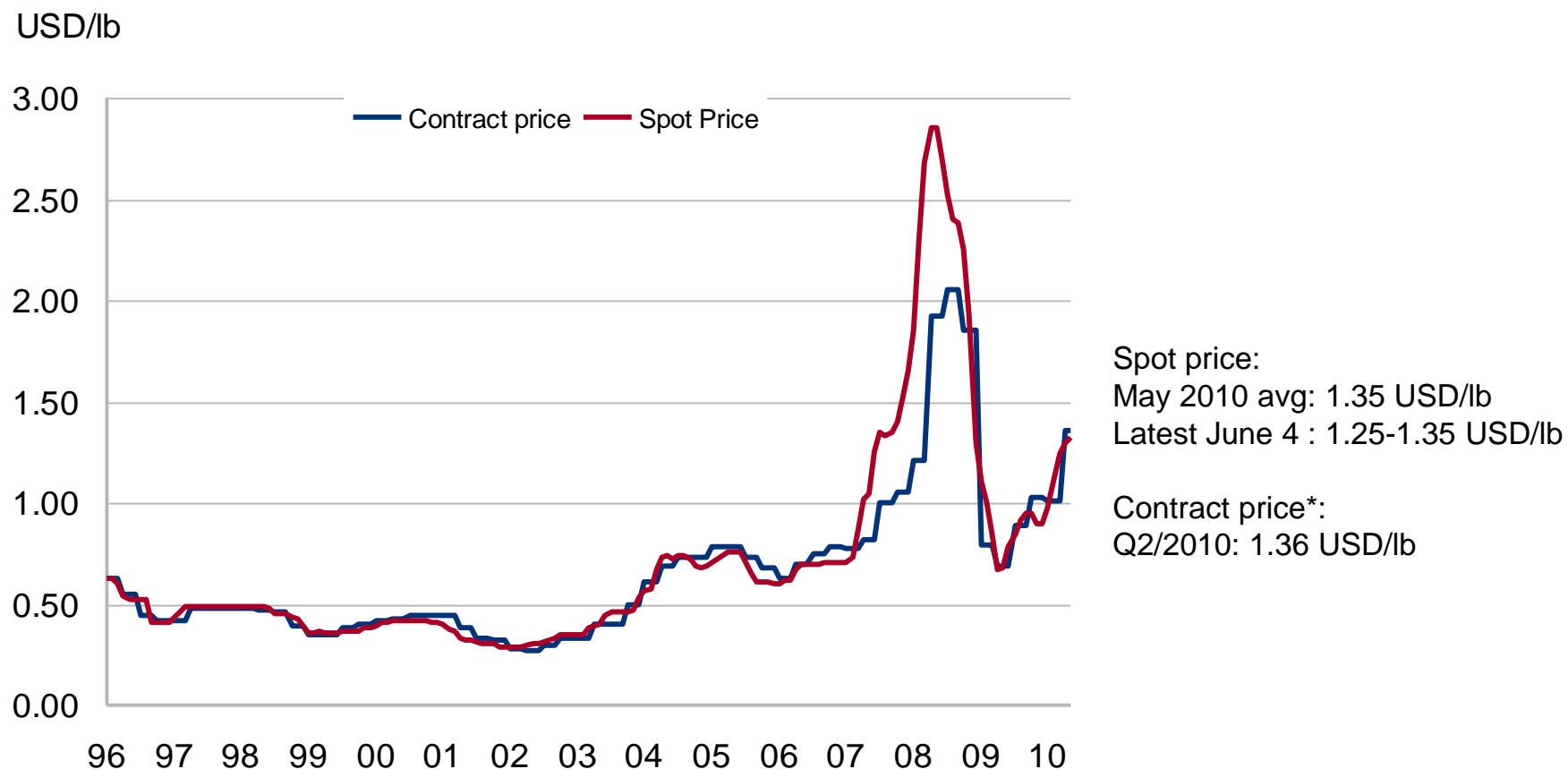
# ***Use of ferrochrome***

- Around 90% of mined chromite is converted into different grades of ferrochrome, used by the metallurgical industry
- Stainless steel industry consumes about 80% of ferrochrome produced (mainly high-carbon / charge grade)
  - Chrome makes steel stainless
  - Stainless steel contains 11% chromium at minimum
- Other end-users include refractory industry, foundry sands, and chemical industry

# ***Ferrochrome production technologies***

- Chromite mining occurs both in open-pit and underground mines
- After mining, the ore is sorted, crushed and impurities are removed
- Ferrochromium is produced in open or more modern closed electric arc furnaces
  - principal raw materials are often upgraded lumpy chromite ore and pelletised chromite concentrate and reductant, usually coking coal
  - process is very energy-intensive, using high amounts of electricity

# Ferrochrome prices have started to recover



Source: Metal Bulletin. Spot prices are monthly averages - latest June 4 \*Contract prices are on a quarterly basis and the reference is the price agreed between South African ferrochrome producers and European buyers.