# Steel Industry Energy & Value Chains

## The threat to Competitiveness

**Presentation to the Consultative Committee on Industrial Change of the EESC**
**Brussels 7th May 2008**
**By Ian Goldsmith, UK Public Affairs Manager, Corus**

# About Steel

- Ubiquitous
  - If not made of steel, it's been made using steel
- Growing rapidly globally after a period of stagnation
  - But not in Europe
- Energy and CO2 intensive
  - Efficient processes
    - Little further scope for significant improvement
  - Need breakthrough technology to make a real difference
- Competitive market
  - Imports set the price floor
  - But facing rapid cost escalation from raw materials and energy inputs
- Policy priorities discourage major investment in EU facilities

# Steel is fundamental to modern society

- Recycling
  - steel is the most recycled material in the world
- Transport
  - bicycles, trains, cars, lorries, ships are all made of steel
- Energy
  - exploration and extraction, transportation, refining, electricity production
- Water
  - extraction, transportation and purification
- Housing and Construction
  - steel construction is time & energy efficient
- Packaging
  - steel packaging is light, versatile and recyclable
- Agribusiness
  - steel-based farm equipment essential to modern farming
- Automotive
  - new steels reduce body weight with compromising safety
- Communication
  - ballpoint pens to satellites
- By-product reuse
  - using slags reduces minerals extraction and $CO_2$ emissions

**Steel is one of the solutions to a more climate friendly society**

# Steel Solutions
## Carbon neutral housing

**All new homes in the United Kingdom will have to be carbon neutral by 2016**

# Steel Solutions

## New generation vehicles

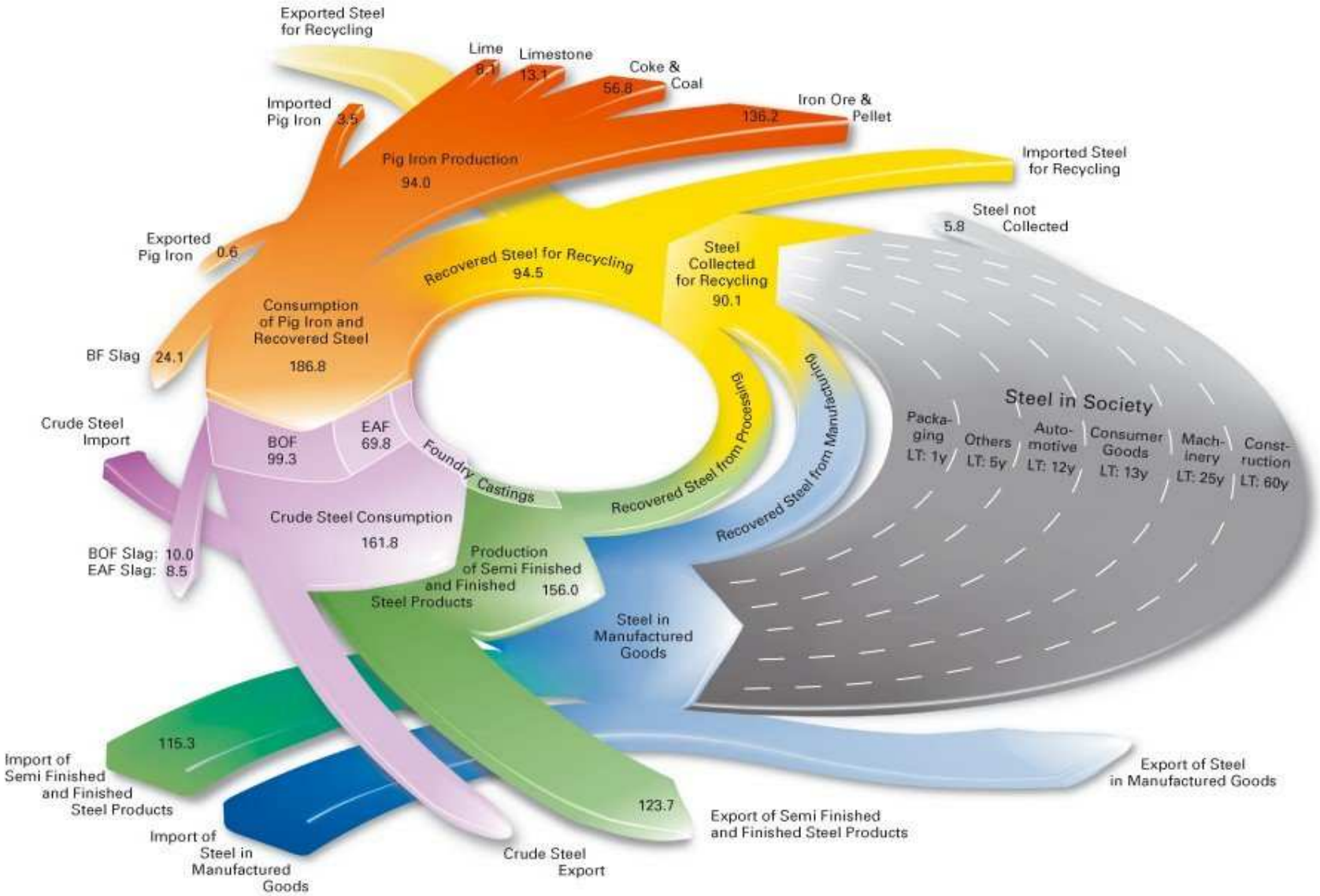
**AHSS is predicted to be more than 50% of sheet steel in cars in 2010 contributing a 5% reduction in total GHG emissions**

# Steel Solutions
## Wind turbines

**Steel support for renewable electricity**

# Illustration of Steel Flows in EU 15 (2004)

EUROFER
European Confederation of Iron and Steel Industries

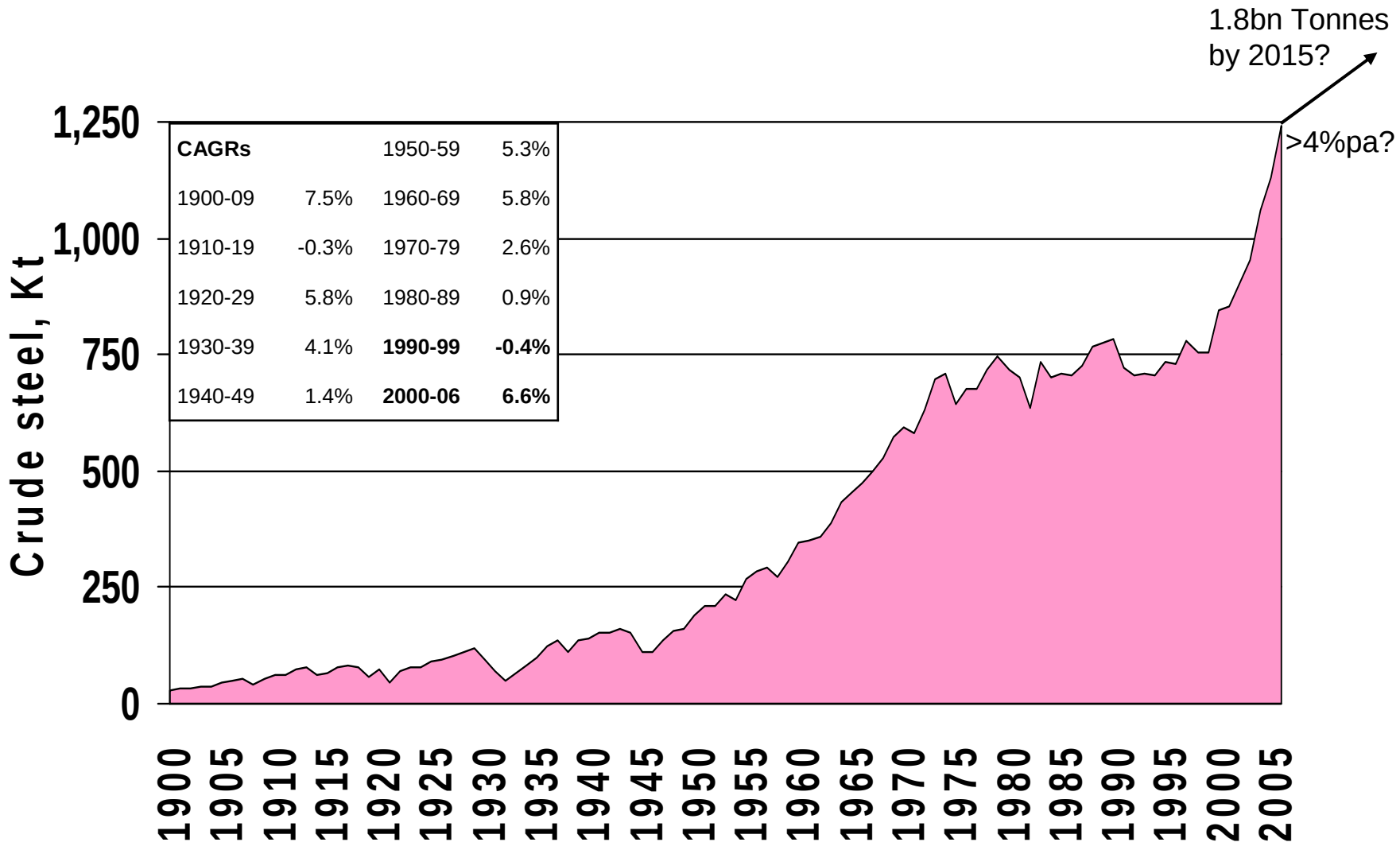



Steel is in constant circulation, but a significant amount is 'stored' in society

LT: Lifetime [years]
Values in Million Metric Tons

Data taken from the International Iron and Steel Institute (IISI), Steel Statistical Yearbook 2006, World Steel in Figures 2006, CAEF 2005, European Blast Furnace Committee 2006

# World steel production still growing fast by recent standards




Data: Hatch Beddows, IISI. Note: CAGR – compound annual growth rate

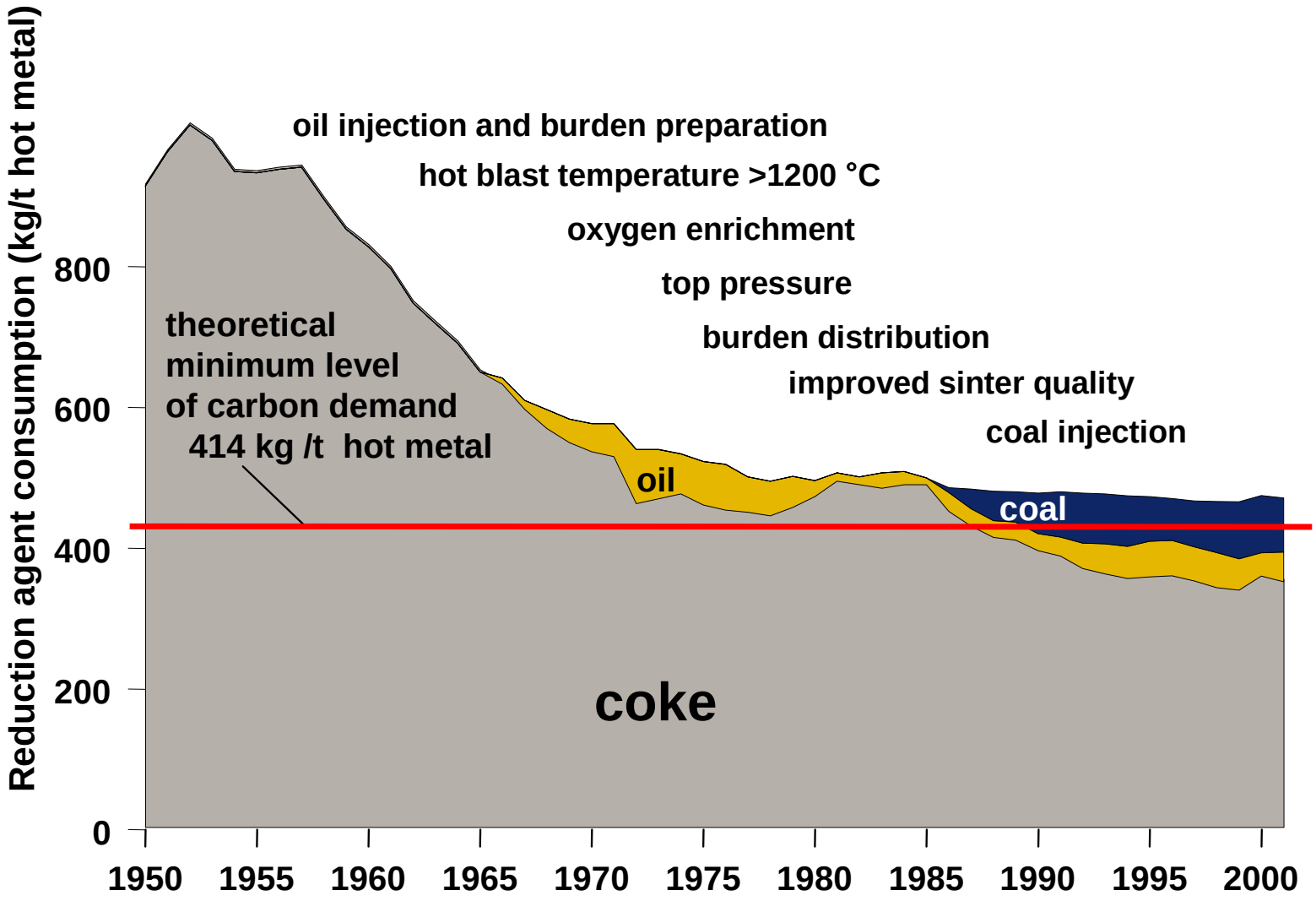
# Business Environment
## Climate change

| Indicator | | Value | Data Year |
|---|---|---|---|
| Global $CO_2$ emissions (anthropogenic) | **100 %** | 32.2 Bt $CO_2$ | 2000 |
| Global $CO_2$ emissions (anthropogenic) in C equivalent | | 8.8 Bt $C_{eq}$ | 2000 |
| Global $CO_2$ emissions ($C_{eq}$) by region: | USA & Canada | 26.3% | 2000 |
| | Western Europe | 14.3% | |
| | Communist East Asia | 13.6% | |
| | Eastern Europe & Former Soviet States | 12.4% | |
| | India & Southeast Asia | 11.2% | |
| | Australia, Japan, Pacific Ocean States | 6.8% | |
| | Central & South America | 6.2% | |
| | Middle East | 5.7% | |
| | Africa | 3.5% | |
| Global $CO_2$ emissions from steel industry | **4 %** | 1,442 Mt $CO_2$<br>1,920 Mt $CO_2$ | 2000<br>2005 |
| $CO_2$ emissions from EU (25) steel industry | **0.9 %** | 330 Mt $CO_2$<br>319 Mt $CO_2$ | 2000<br>2005 |
| Direct $CO_2$ emissions from Corus Group | **0.09 %** | 29.6 Mt $CO_2$<br>28.4 Mt $CO_2$<br>29.4 Mt $CO_2$ | 2000<br>2005<br>2006 |

**Year 2000**

Source: IPCC Report and IISI. 2000 data has been used to provide greater accuracy of information.

# Carbon as a reducing agent = non reduceable process emissions of blast furnaces



# EU steelmaking has become more energy efficient

- **-20% through dramatic improvement of material efficiency**

  1975: 71.5%  2005: 92%

  Continuous casting; quality control; process management

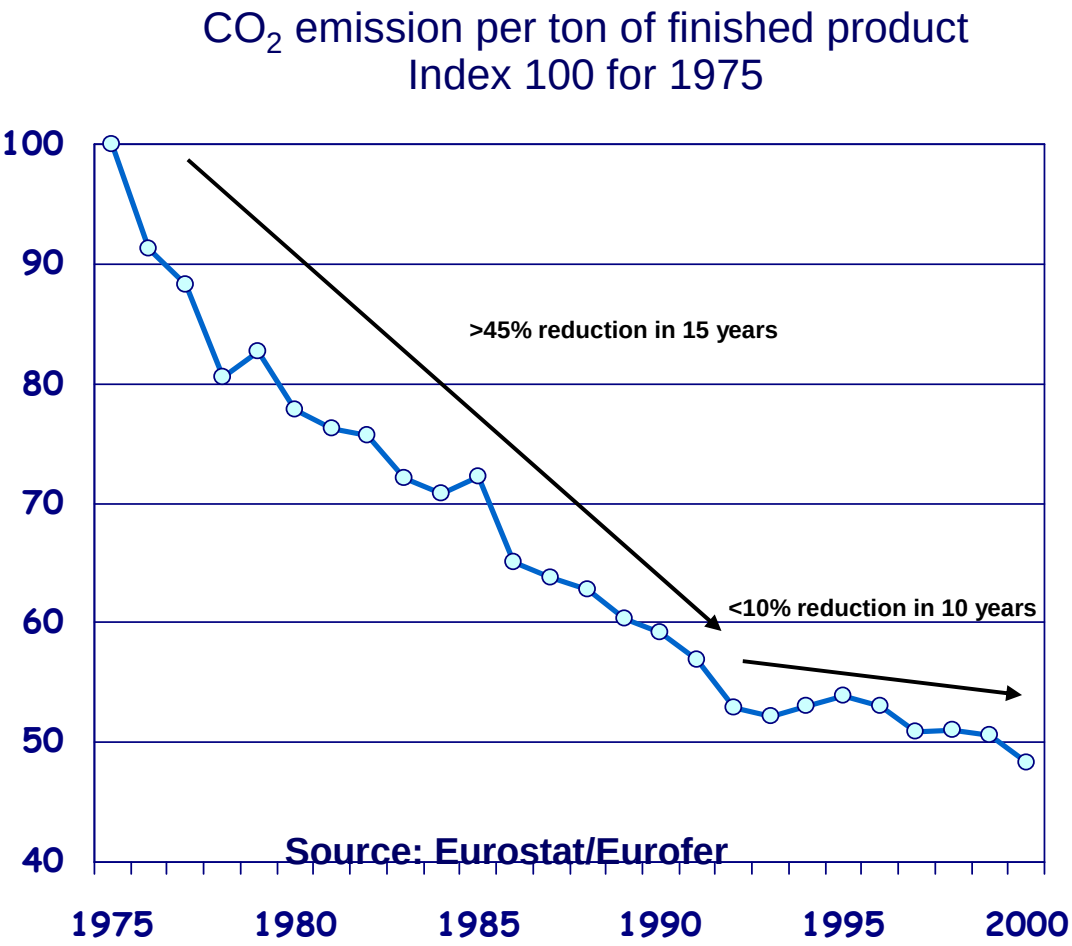
- **-14% through increase in scrap availability**

  1975: 55Mt/y  2005: 80MT/y

- **-18% through improved BF management and concentration**

  Measurements; models; charging; high grade ores

- **-6% through shift away from local C-bearing iron ores**




Incremental improvements limited: Technology change needed

# Breakthrough technology
# ULCOS – Ultra-Low $CO_2$ Steelmaking

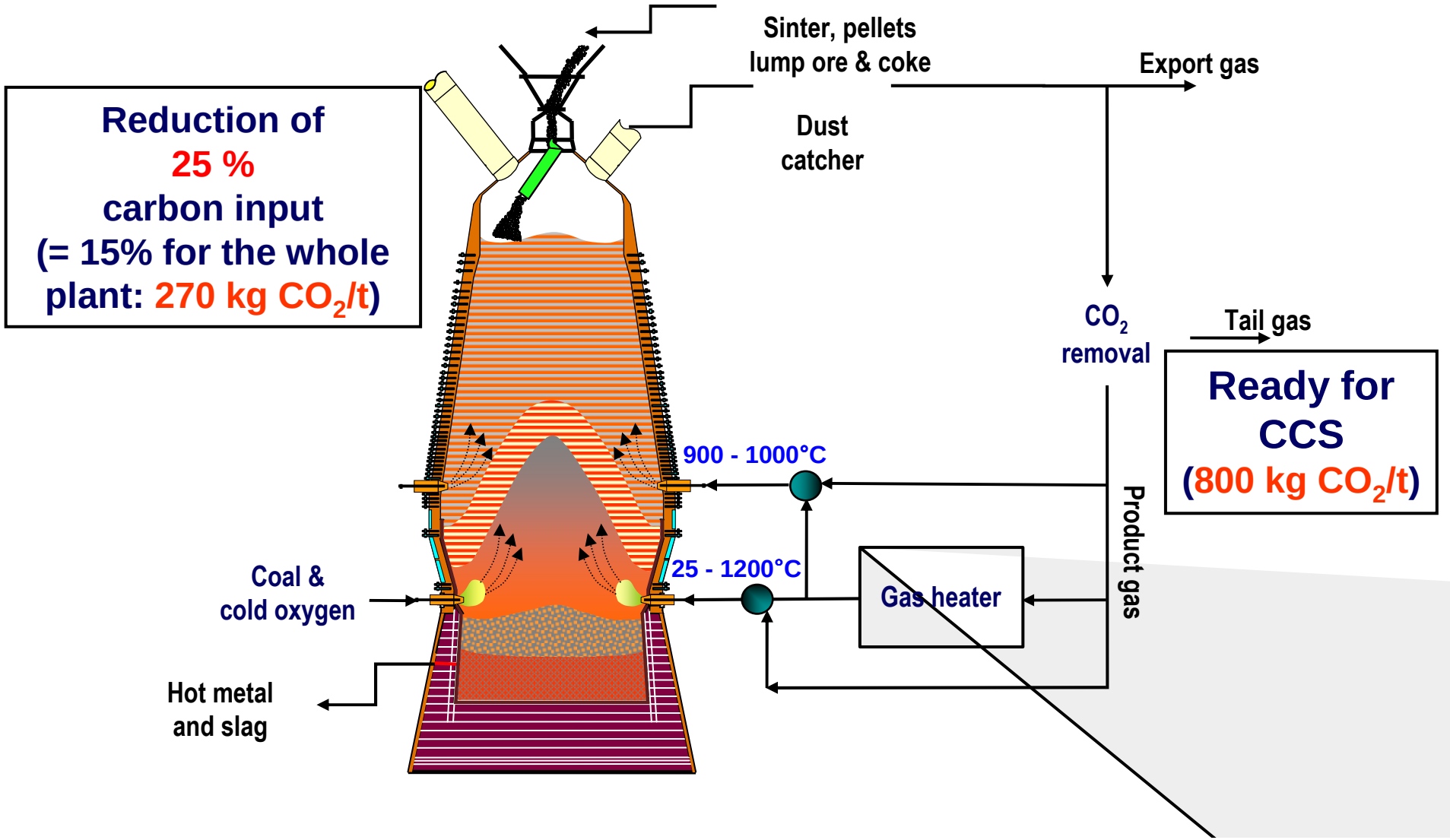
- Objective: to reduce $CO_2$ emissions by 50% by 2050 compared to today's best routes
  - 5 year project
  - €59m budget
    - Equivalent of 60 man-years
    - Involving well over 100 people
  - 48 companies and organisations from 15 European countries
  - Funded by industry (56%) and the EU (44%)

  - 80 options examined
  - 4 process concepts selected for further development

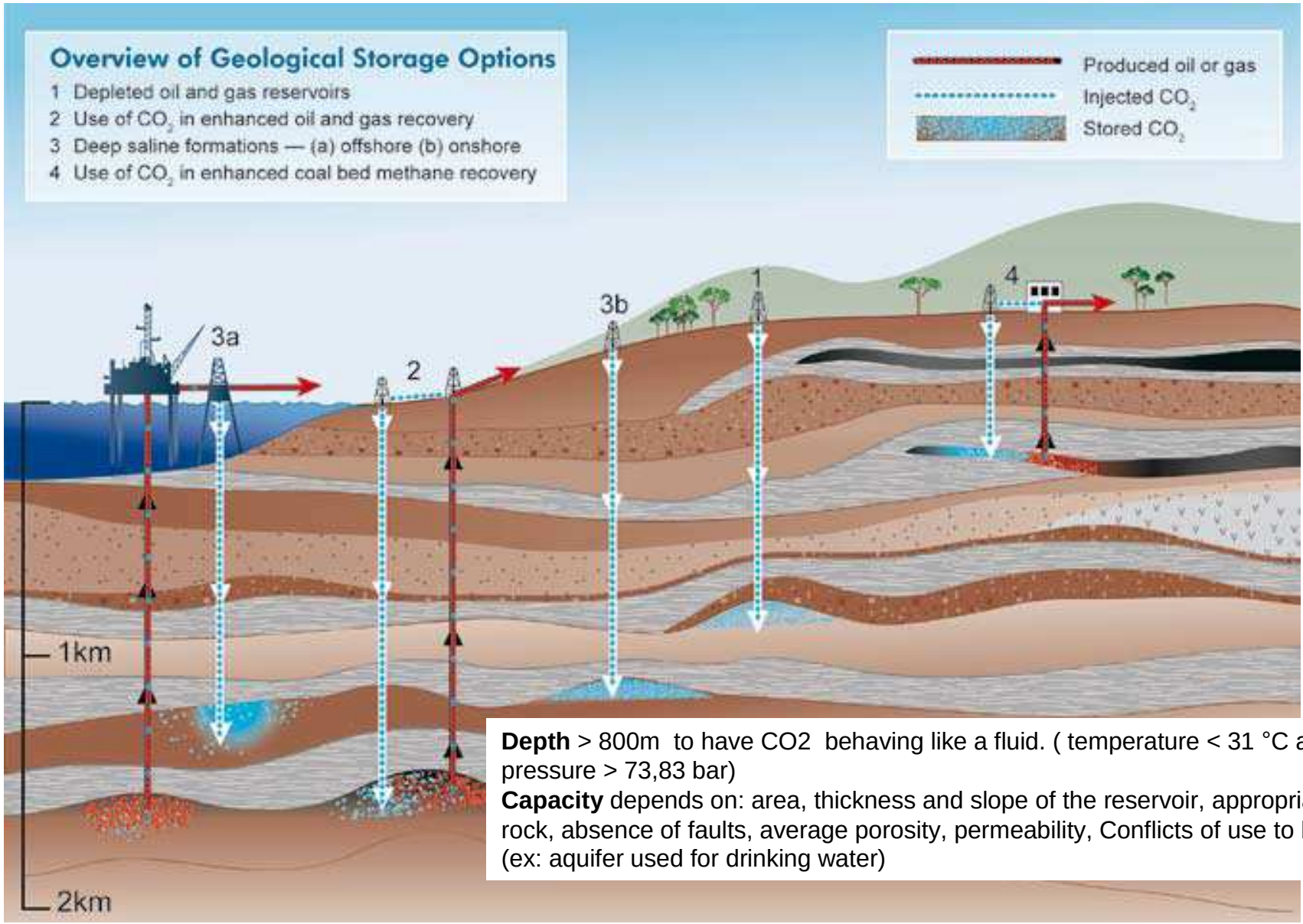
  - Next stage
    - to move to large-scale pilot
    - Potentially costing some €300m per technology
  - Implementation?
    - Unlikely before 2020

# ULCOS II:
# Top Gas Recycling Blast Furnace

Modification of blast furnace with gas recycling, $CO_2$ removal & injection of oxygen

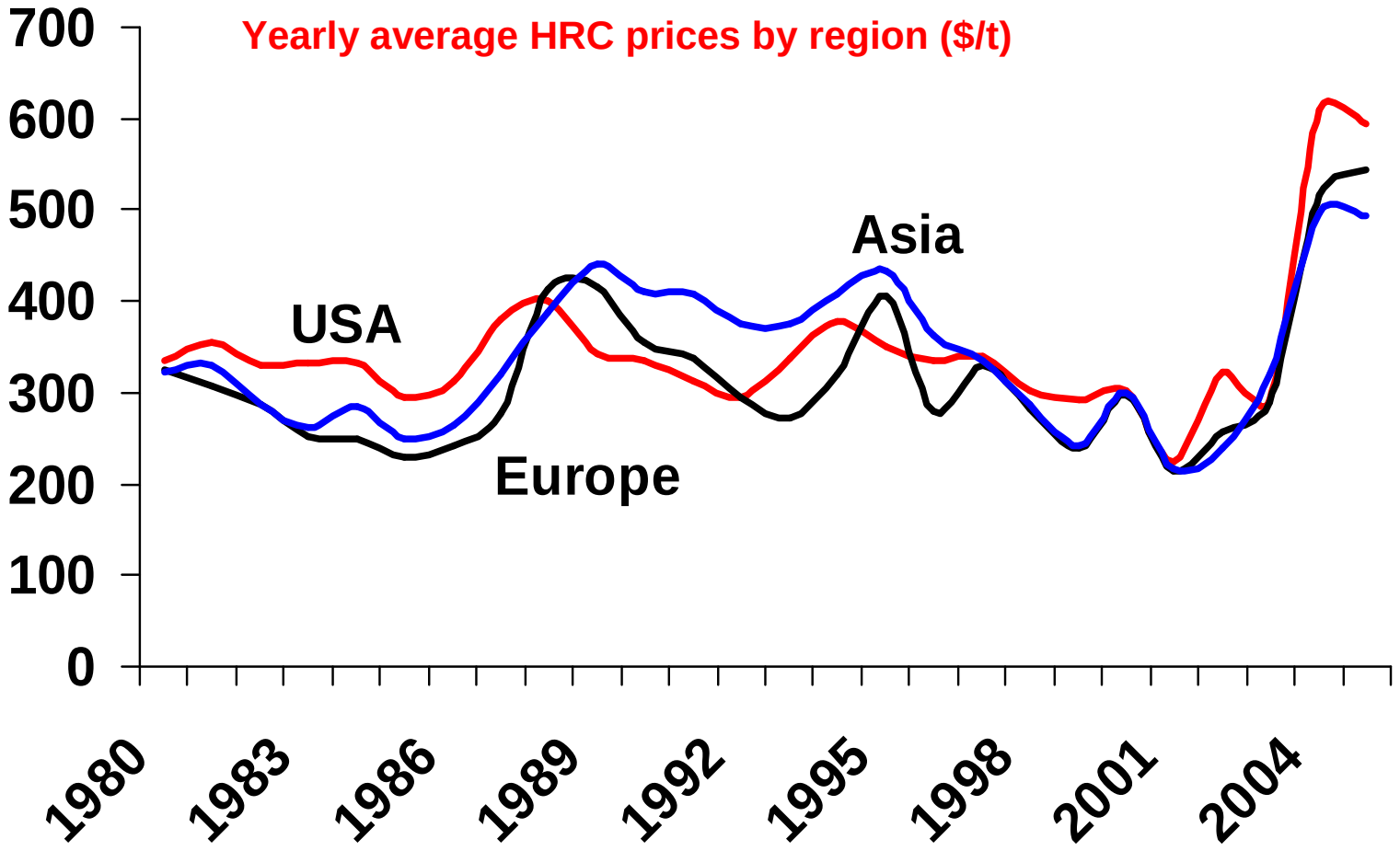


# ULCOS II: Geological storage




**Depth** > 800m to have CO2 behaving like a fluid. ( temperature < 31 °C and pressure > 73,83 bar)
**Capacity** depends on: area, thickness and slope of the reservoir, appropriate cap rock, absence of faults, average porosity, permeability, Conflicts of use to be checked (ex: aquifer used for drinking water)

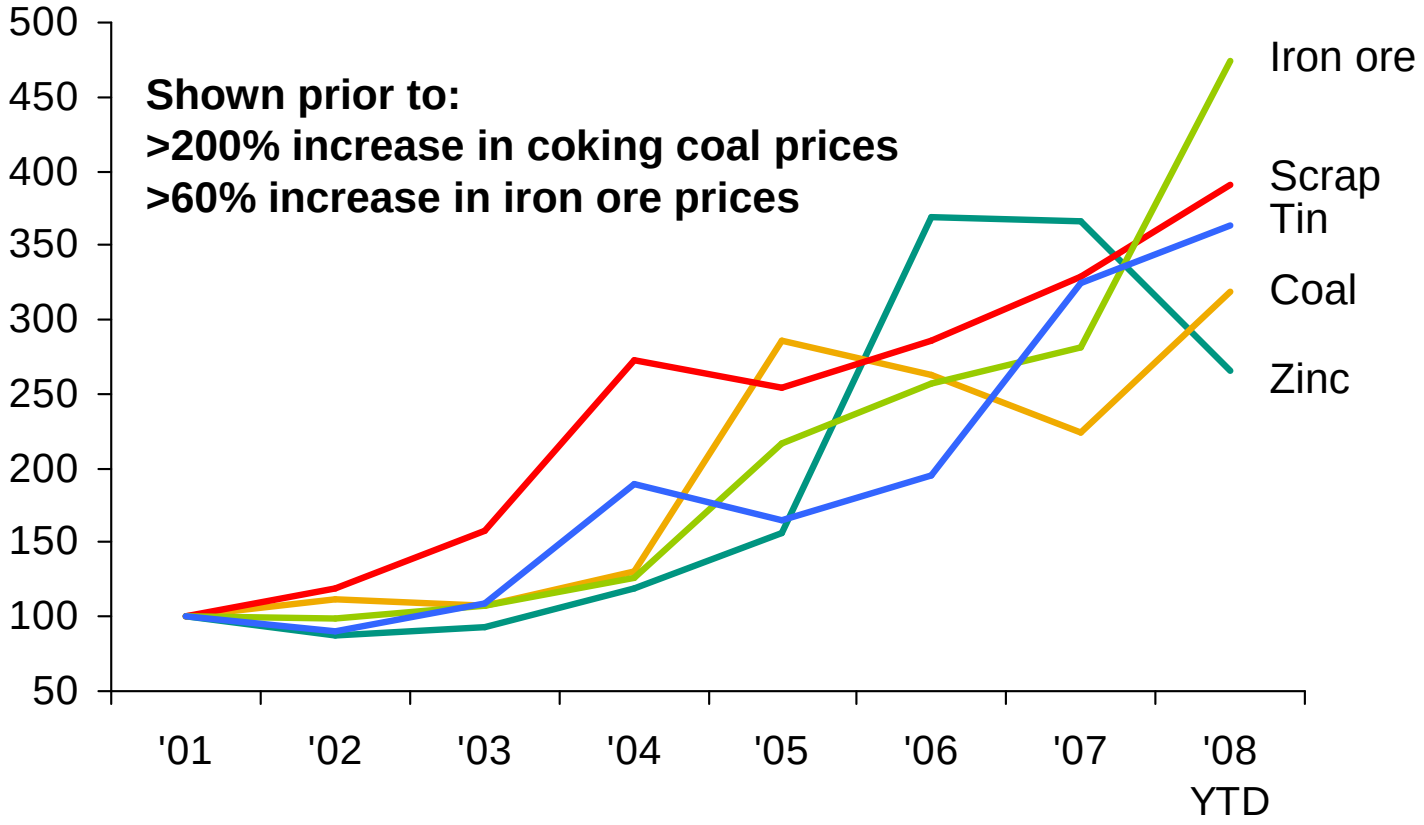
# Product prices are set globally




Data: Hatch Beddows, SBB. Note: USA: Midwest prices, fob mill. Europe: North European prices, ex-works. Asia: East Asian imports, c&f port. All prices are annual averages in nominal terms

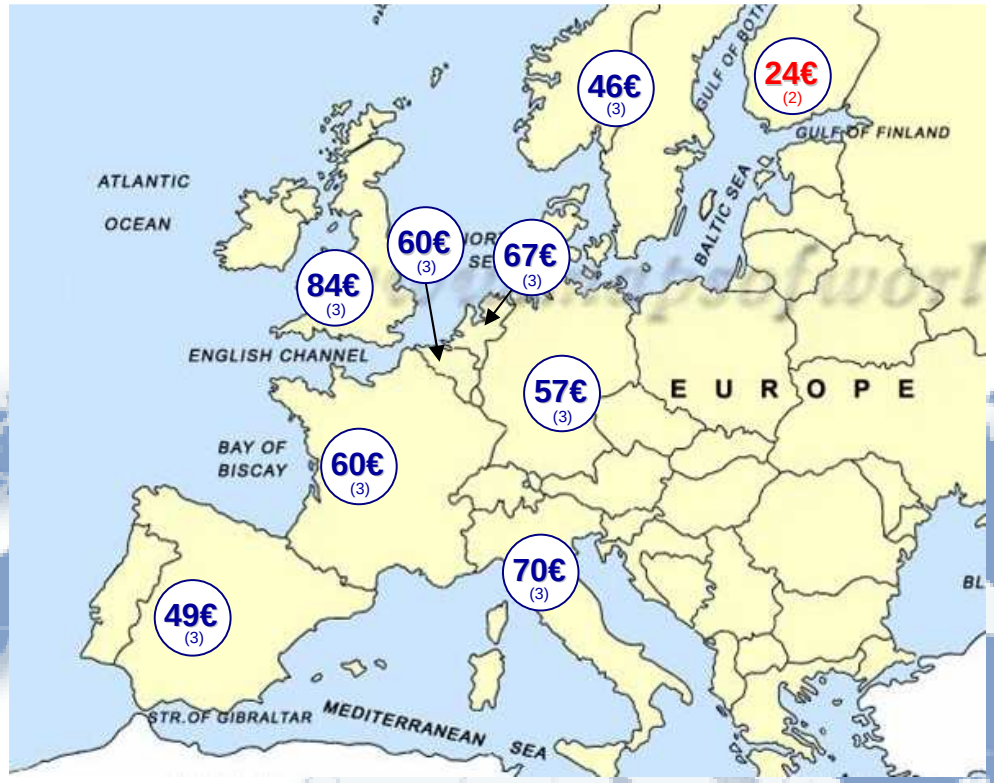
# Steep increases in raw material prices

## Raw material prices indexed to 2001




Indexed on 2001 prices

Source: CRU including 2008 forecasts for iron ore and coking coal, Thomson Datastream showing 2008 year to 29/01/2008 data for scrap, tin & zinc

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22€ (1)

25€ (4)

8€ (4)

26€ (1)

< 20€ (4)

16€ (1)

# World Map of electricity prices (€/MWh)

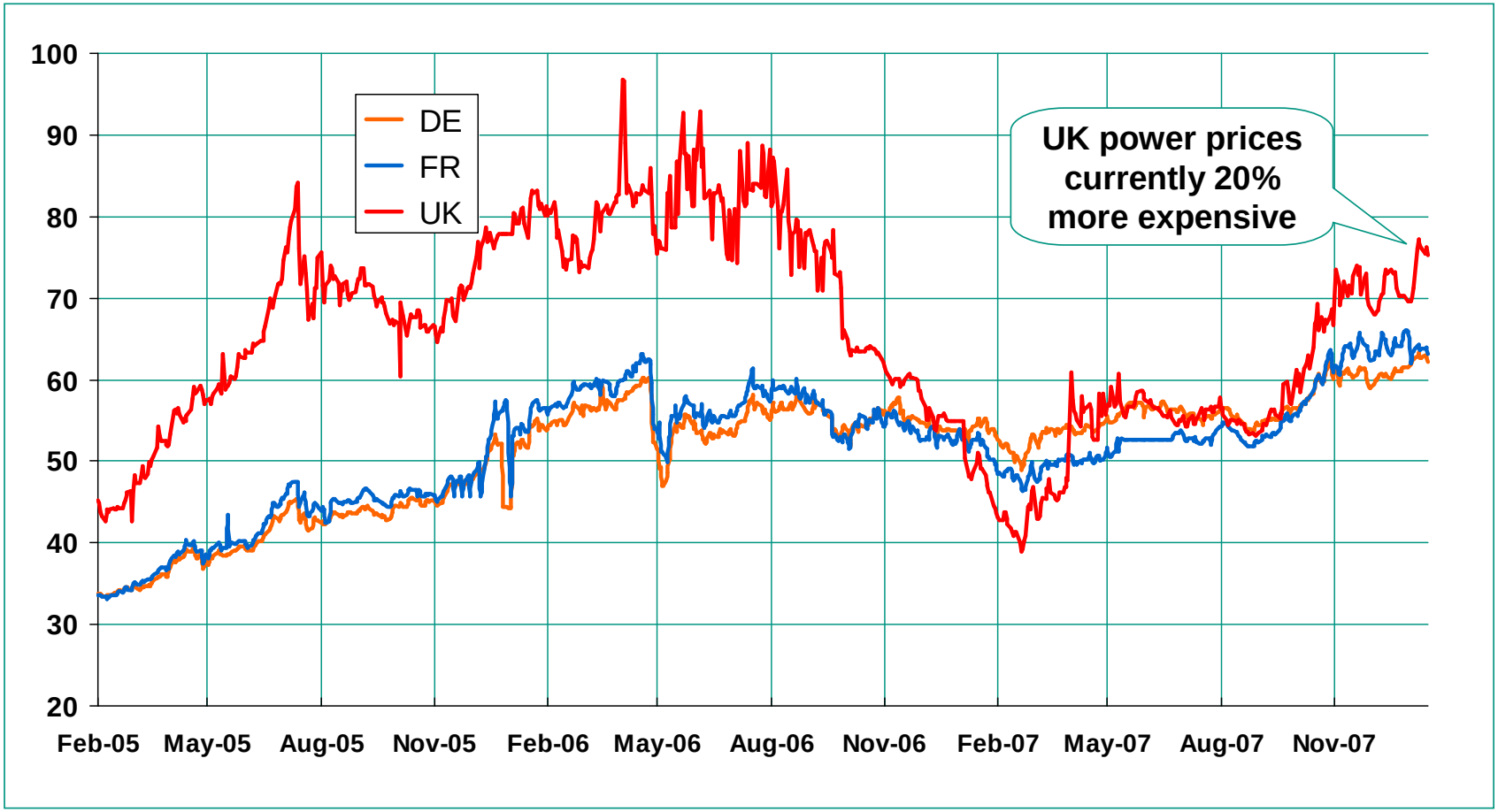
Sources:
(1) Presentation European Aluminium Association HLG-Ad hoc 1 (Long Term Contracts) - 2005
(2) TVO EPR R.Tarjanne and K. Luostaninen, Lappeenranta University of technology (Long term contract) – 2003
(3) Platts Base load year 2007 (Platts 4 April 2006)
(4) CEFIC

UK Electricity costs

# Competitiveness gap with Europe

## UK wholesale electricity prices

Electricity: €/MWh baseload, year forward



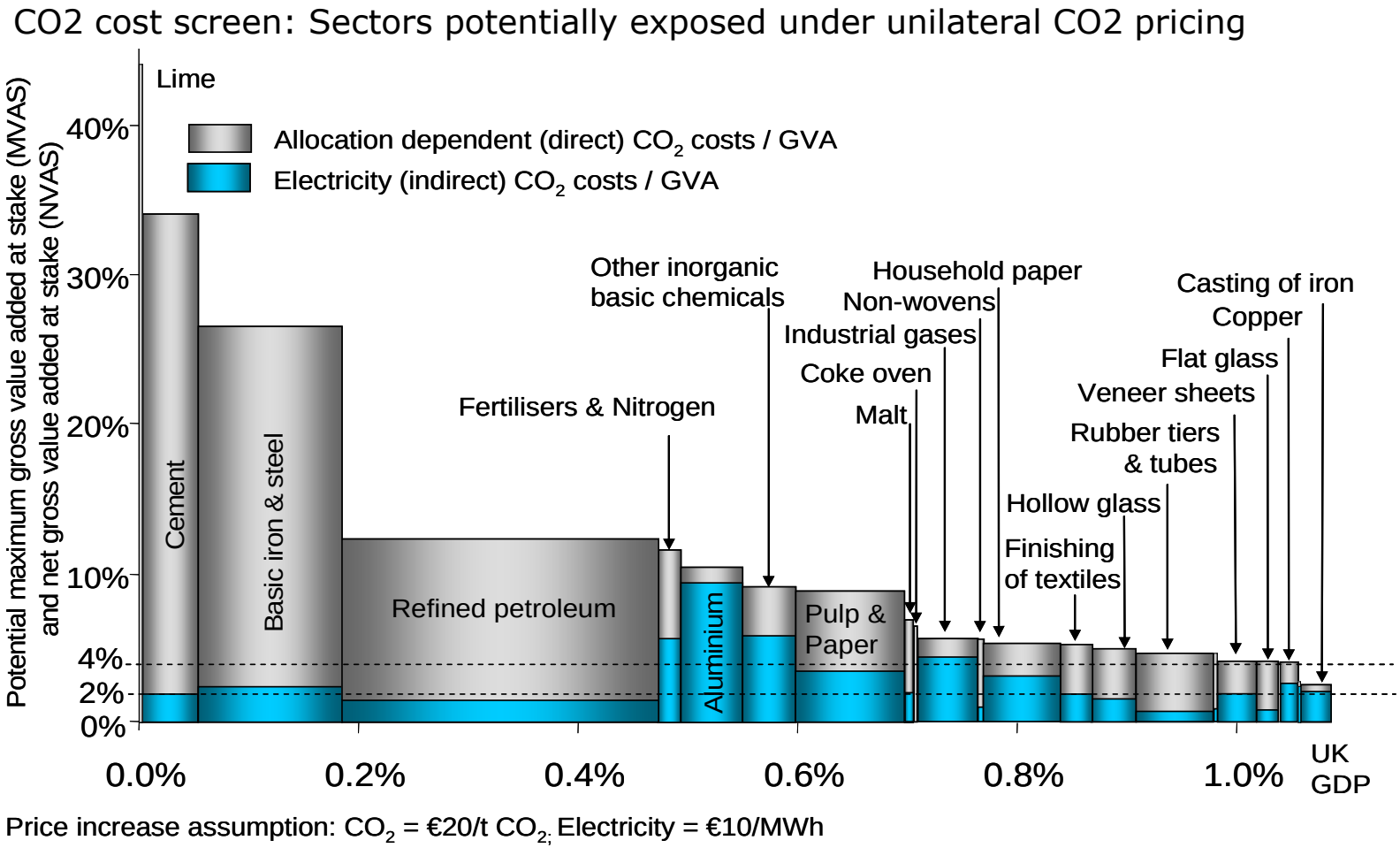

Source: Reuters

# Political Situation/Business Environment
## European position

## Policy confusion?

- **Burden sharing under Kyoto Protocol**
  - 8% reduction in GHG emissions
  - But no targets beyond 2012
- **EU Climate Change Policy**
  - Target of 20% reduction in $CO_2$ emissions by 2020 (30% if others take action)
  - Target for automotive $CO_2$ of 130g/km
- **EU Emissions Trading Scheme**
  - Cap & trade system, implemented by Member States in different ways in Phase I
  - Move from free allocation towards auctioning post 2012
- **Energy market/supply issues**
  - Lack of a level playing field across Europe
  - The current liberalisation proposals may not be enough to fix the problem
- **High Level Group on Competitiveness, Energy & Environment**
  - Recognition that energy intensive industries in Europe are at risk.

# EU ETS
## Impact on competitiveness of auctioning




Hourcade et.al. *Differentiation and dynamics of EU ETS industrial competitiveness impacts.*
*Source: Carbon Trust*

# Global problems need global solutions

- Being “first mover” is not always an advantage
  - If policy drives up costs locally, globally competing companies will lose out
  - Customers decide to buy elsewhere
    - Manufacturers follow them
    - The more mobile the product, the quicker it will shift
  - Competitors are becoming more sophisticated
    - Competition is no longer for basic products offered in bulk
      - China is a large supplier of galvanised steel to the European market
        - » Now offering organic coated steels

# Industry response to policy

- As long as it can remain competitive, industry will continue to:
  - Drive down energy use
  - Reduce $CO_2$ emissions where possible
  - Research new process technologies
  - Develop new energy efficient product applications
  - Invest in existing facilities
- Industry therefore needs policy solutions that will:
  - Maintain competitiveness of EU-based companies
  - Maintain industrial base in Europe
  - Avoid encouraging $CO_2$ migration (leakage)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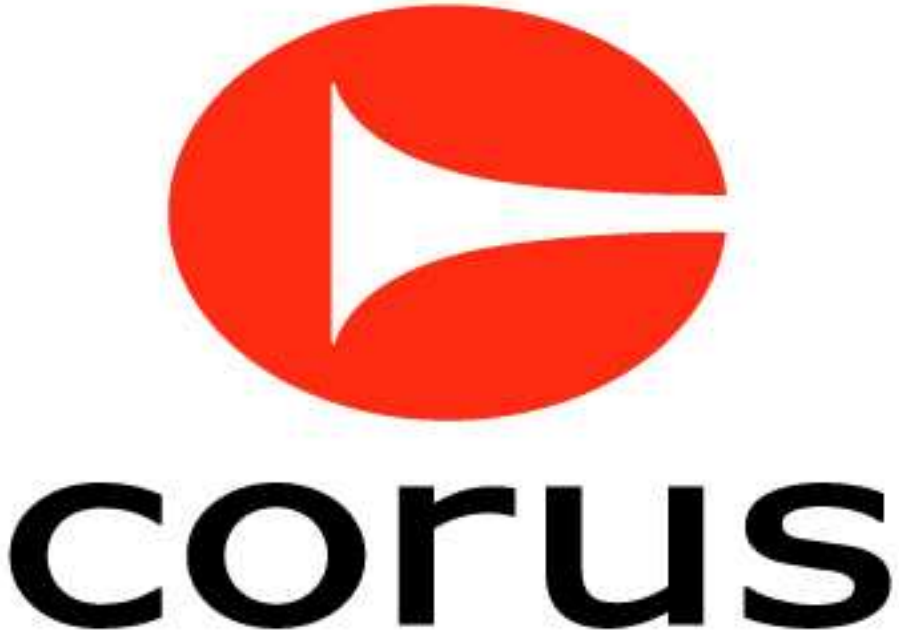
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