



# ***Ferrochrome capacity expansion in Tornio***

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# ***Expansion of ferrochrome production capacity***

- Double Kemi mine output to 2.7 million tonnes of chromium ore, chromite concentrates some 1.3 million tonnes
- Double Tornio ferrochrome production capacity to 530 000 tonnes
- New capacity in place during H1/2013 with capacity ramped up in 2015
- Secures Outokumpu's internal ferrochrome need and makes the Group a significant seller
- Adds 120 permanent jobs in Kemi and Tornio

# ***Financial evaluation***

- Capital expenditure EUR 440 million during 2010-2013
- The expansion has a solid financial background
- Sensitivity with expanded ferrochrome capacity in use:
  - the effect of a 5 US\$/lb change in the contract price of ferrochrome on the Group's operating profit will double from the current EUR 10 million to some EUR 20 million annually
- At current prices and exchange rates, the expansion brings additional annual operating profits in the order of EUR 150 million at full capacity

# ***Self-sufficiency in ferrochrome improves competitiveness***

- Sourcing the material at cost and pricing the chromium at market price in the final stainless steel product
- Integrated with the stainless steel process in Tornio, ferrochrome can be used in the stainless steel melting process in liquid form
  - an exceptional cost-advantage as the material does not need to be re-melted
- Carbon monoxide from the ferrochrome process is used as fuel in the stainless steel mill
  - reducing the need for external energy

# ***Expansion brings new business opportunities***

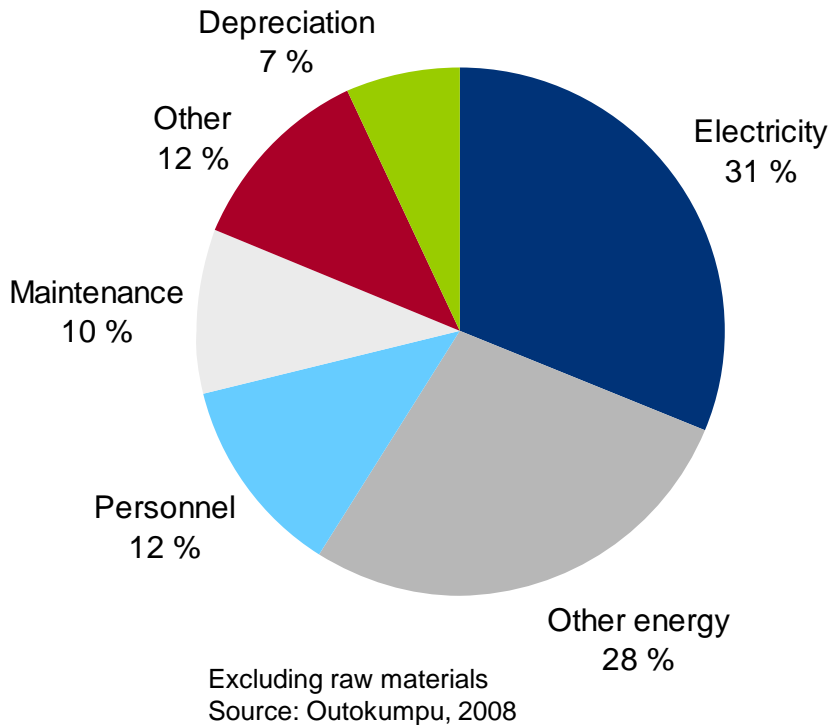
- Outokumpu to be a significant seller of ferrochrome
  - External sales over 200 000 tonnes ferrochrome annually
- Establishing a permanent position on the ferrochrome market as a high-quality service provider
- Building long-term customer contracts

# ***Positive effect to global carbon dioxide emissions***

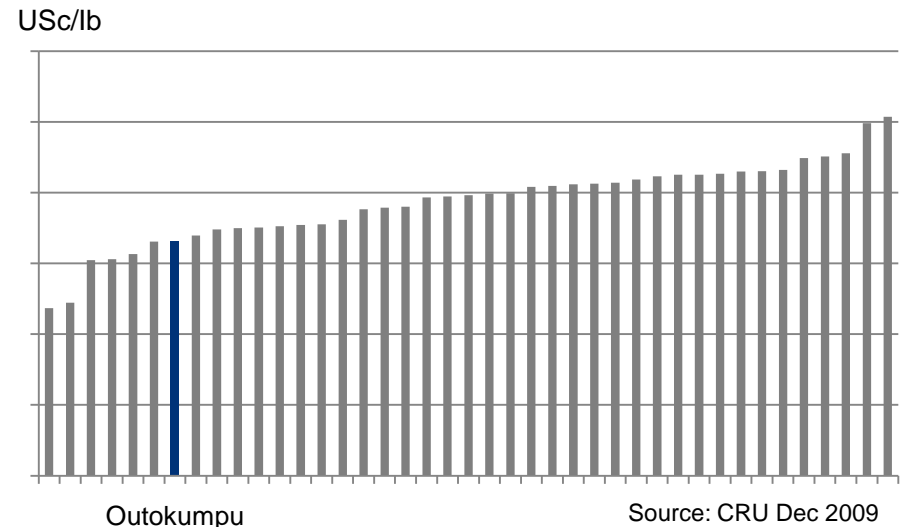
- The ferrochrome expansion will increase Tornio's annual CO<sub>2</sub> emissions by some 270 000 tons
  - The main source of CO<sub>2</sub>, the use of coke, cannot be substituted in the ferrochrome process
- Production of ferrochrome in Tornio with the mainly in-house developed state-of-the-art technology will reduce global emissions significantly
  - In Tornio, electricity mainly sourced from hydro and nuclear power, in South Africa and Kazakhstan mainly from fossil based plants
- Expanding the capacity in Tornio is estimated to reduce the global CO<sub>2</sub> emission by some one million tonnes as opposed to sourcing the material from South Africa or Kazakhstan

# Outokumpu's ferrochrome production very cost-competitive

Cost structure of Outokumpu's ferrochrome production



Cost curve of total delivered cost for ferrochrome production



# ***Kemi mine mineral resources greater than earlier estimated***

- Intrusion containing chrome ore extends to 2-3 km (proven to 1 km)
  - Chromitite layer possibly to at least 2-2.5 km
- Sufficient resources to allow centuries of mining
  - even with doubled annual production volumes
  - previous estimate 70-80 years
- Mineral resources not to be updated based on these findings

<b>Kemi mine and FeCr smelter, production</b>	<b>2009 *)</b>	<b>2008</b>	<b>Ore reserves and mineral resources</b>	<b>2009</b>	<b>Grade</b>
Ore excavated, million tons	0.5	1.3	Ore reserve, Proven	37	26% Cr <sub>2</sub> O <sub>3</sub>
Chromite concentrates, 1 000 tons	247	614	Mineral resources, Indicated	13	30% Cr <sub>2</sub> O <sub>3</sub>
Ferrochrome, 1 000 tons	123	234	Mineral resources, Inferred	73	29% Cr <sub>2</sub> O <sub>3</sub>

\*) Production closed April-September

# ***Kemi Mine - currently***

- Chrome deposit found in 1959
- Decision to exploit the deposit in 1964
- Production started in 1968
- Annual production 1.3 million tonnes of ore
- Ore reserves 37 million tonnes, additional mineral resources 85 million tonnes
- Products: upgraded lumpy ore and fine concentrate

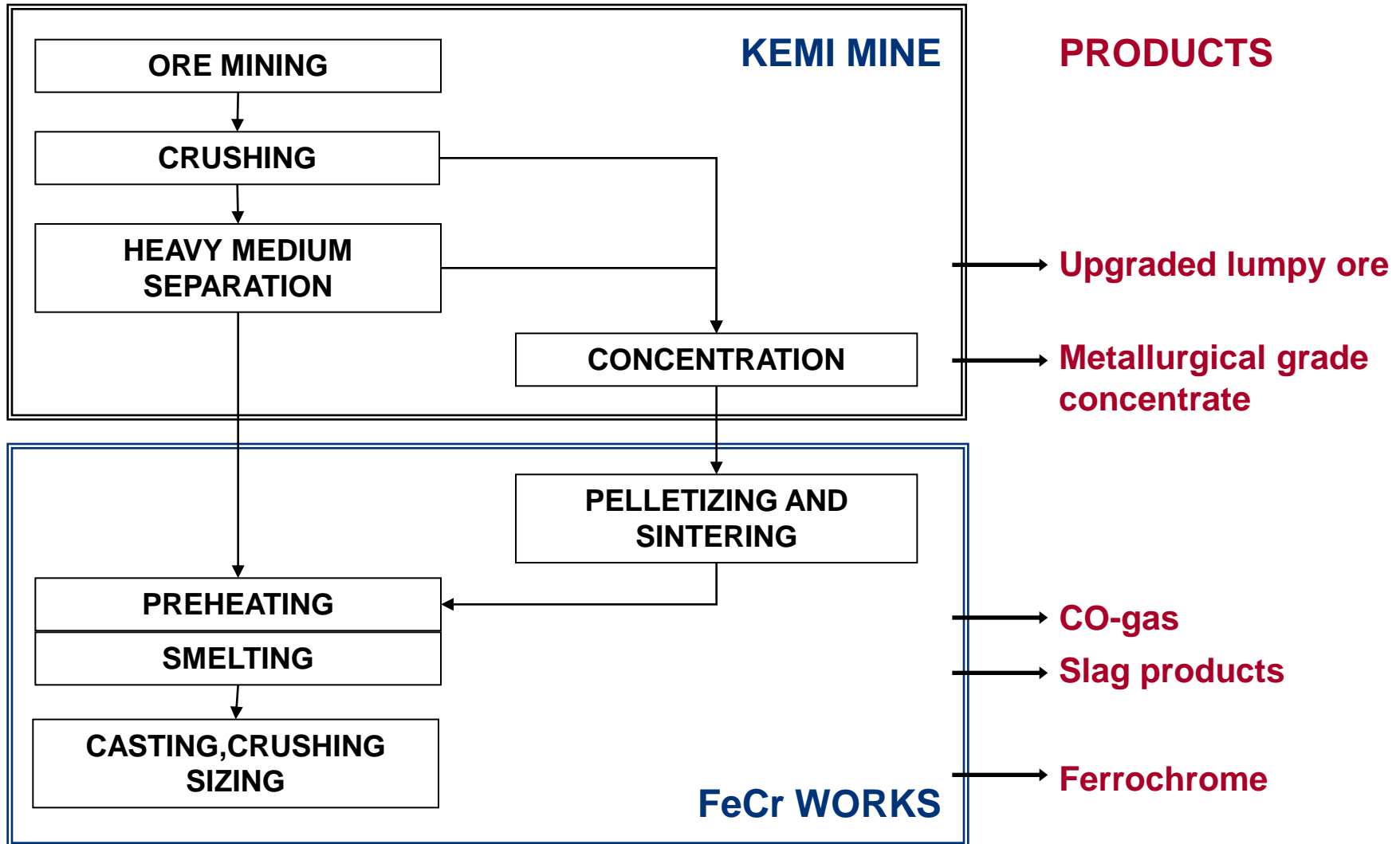


# ***Tornio ferrochrome smelter - currently***

- Production commenced in 1968
- Ferrochrome smelter expanded by second smelting furnace in 1985
- New pelletizing and sintering plant commenced in 1989
- Current annual capacity 265 000 tonnes ferrochrome accounts for 3.5% of the global ferrochrome capacity



# Ferrochrome production – flow sheet



# Ferrochrome sintering and smelting process

