Outokumpu and circular economy in practice

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The world needs sustainable solutions to tackle climate change

Global megatrends

Economic and population growth	Mobility and urbanization	**Climate change and limited resources**
		

Stainless steel – at center of circular economy

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Stainless steel is sustainable: 100% recyclable, efficient and long lasting

100% recyclable

Corrosion resistant

Heat resistant

High strength

Hygienic

Aesthetic

Cost efficient

- Oil & gas, petrochemical
- Chemical and pharmaceutical
- Automotive
- Aerospace & marine transport
- Catering and household goods
- Architecture and building
- Medicine and medical engineering

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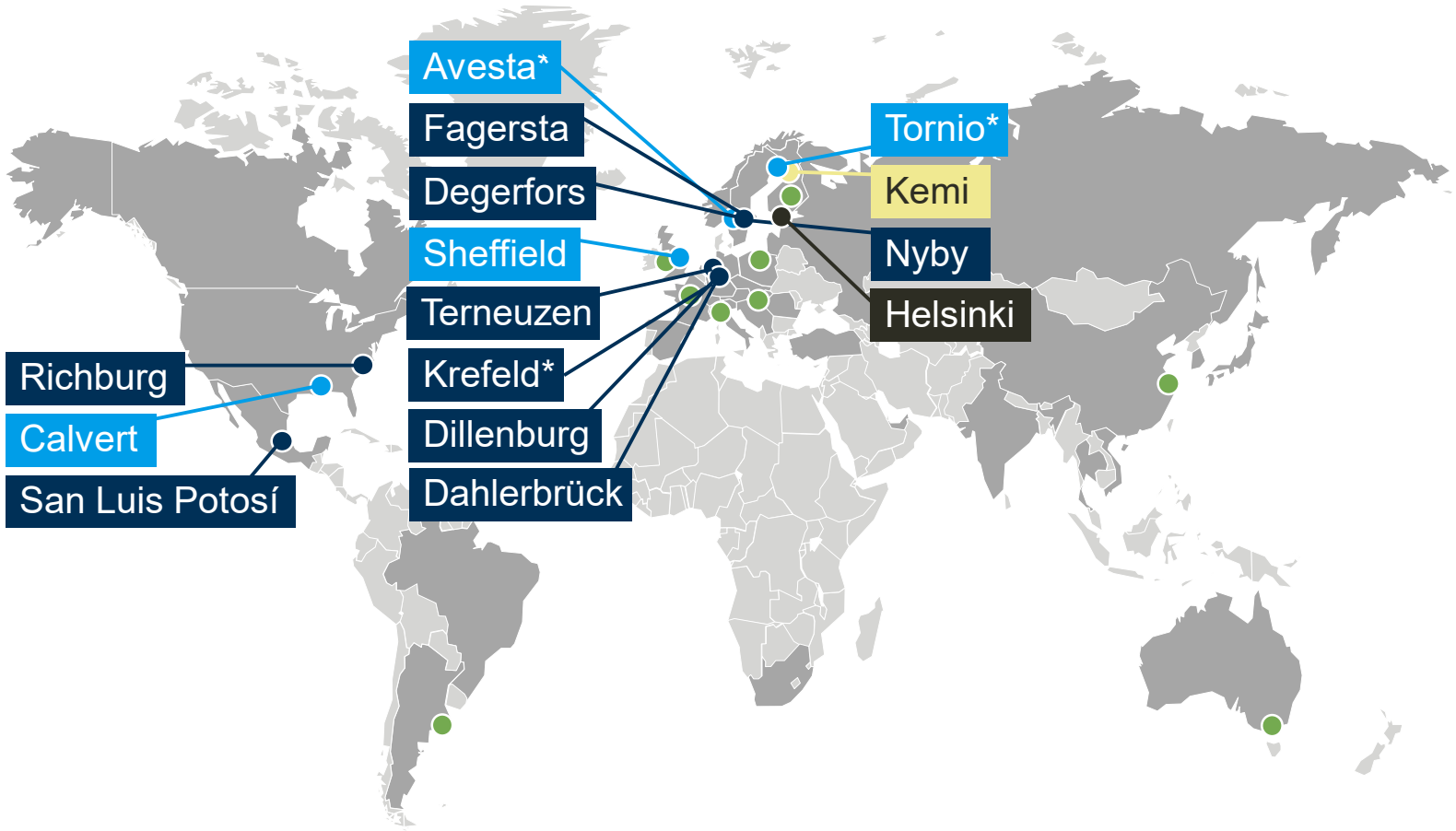
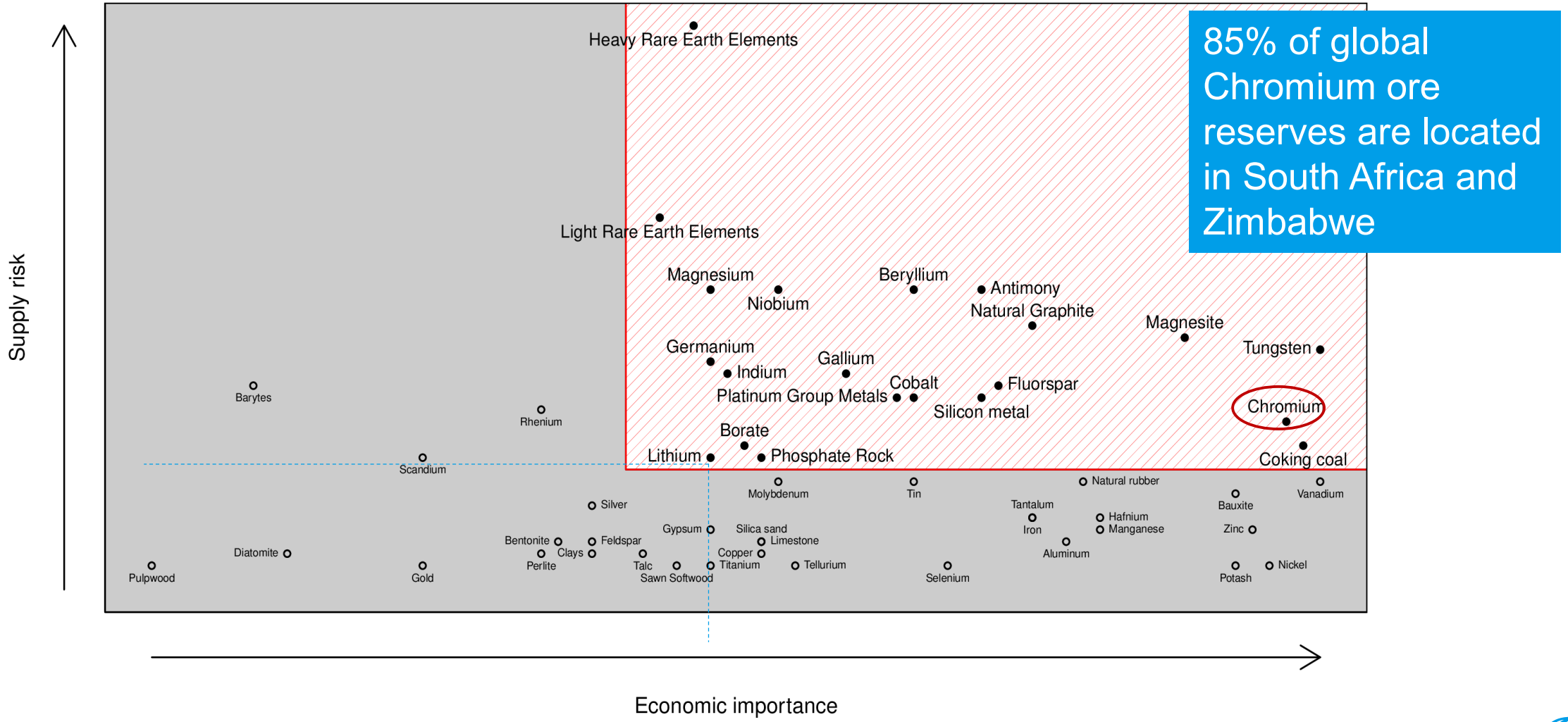
Outokumpu has a solid presence in key regions



- Integrated melt shop, hot and cold rolling
- Other mills
- Mine
- Service centers
- Headquarters in Helsinki, Finland
- * R&D centers

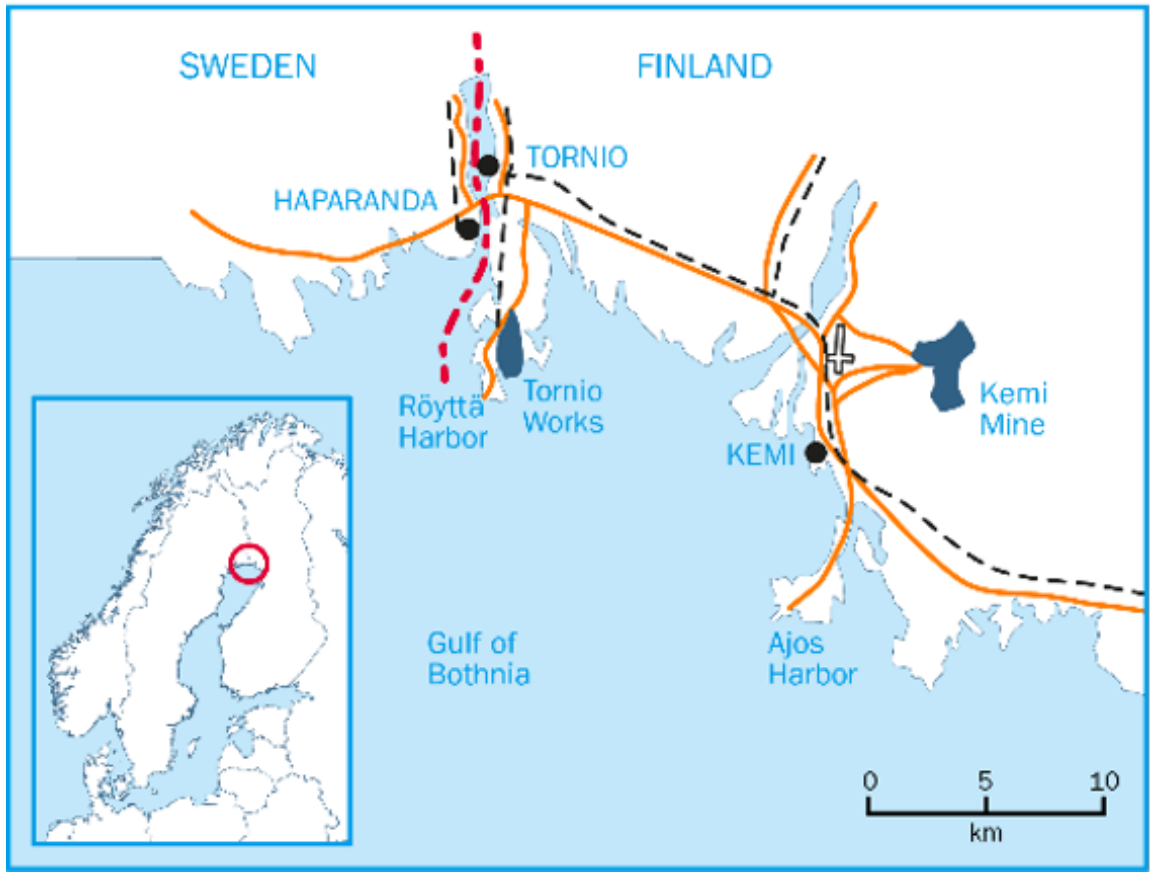
Chromium makes steel stainless



85% of global Chromium ore reserves are located in South Africa and Zimbabwe

Source: Critical minerals and metals for the EU.

Kemi mine and Tornio Operations



- Integrated ferrochrome and stainless steel production chain in Kemi-Tornio area.
  - ✓ World class chrome deposit in EU
  - ✓ Integrated, world class efficiency
  - ✓ Low carbon electricity
- Capacities:
  - Ferrochrome 530,000 tons annually
  - Stainless steel production 1,400,000 tons annually
- Impact of direct and indirect employment:
- > 10 000 jobs in Finland

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Kemi Mine – The only chromium mine in the EU

- The biggest underground mine in Finland. Annual ore handling capacity is 2.7 million tons.
- Products are delivered to Tornio FeCr-plant which feeds stainless steel mill

- Ferrochromium (FeCr) is the most important alloy for stainless steel
- Mines are needed – recycling of metals is not enough

Outokumpu Tornio works - the biggest material recycler in Europe

Our stainless steel contains the highest proportion of recycled content on the market

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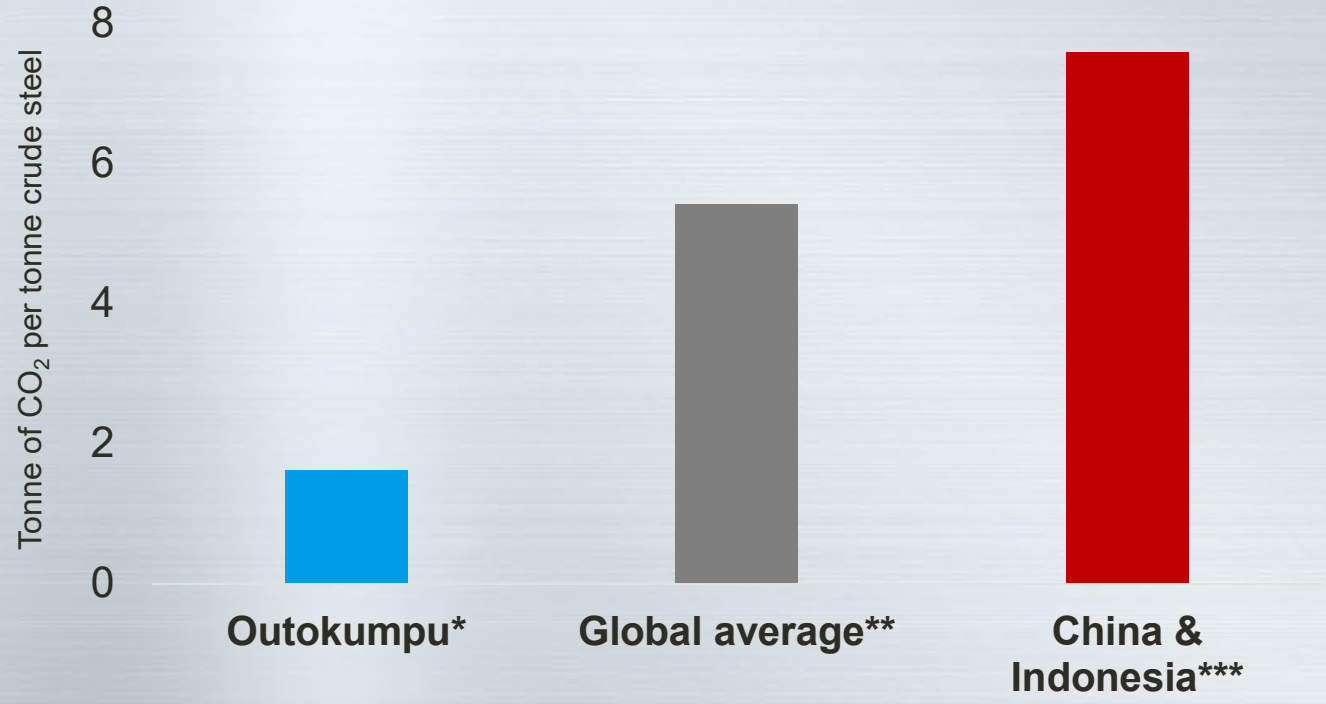
high performance stainless steel

Stainless steel from China & Indonesia has up-to five times higher carbon footprint vs. Outokumpu

CO_2 emissions of stainless steel producers



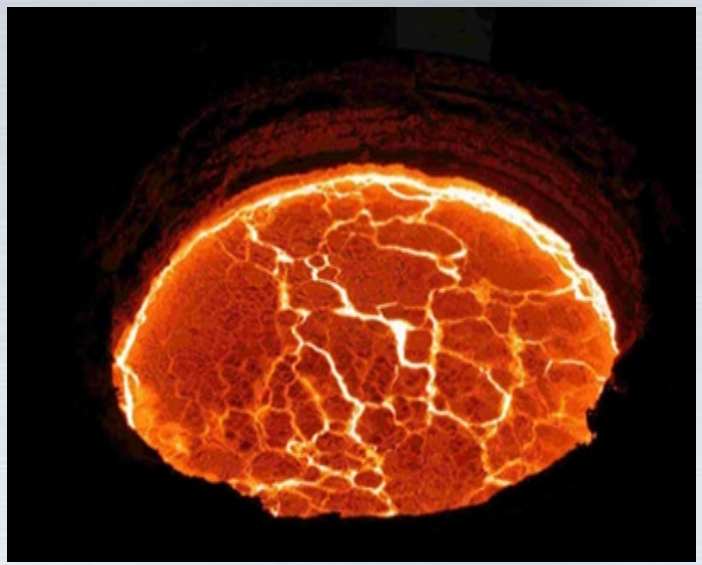
*) Source: Outokumpu January 2020
**) Average of ISSF study 2018 and China & Indonesia
***) Outokumpu estimates for China and Indonesia

Drivers for high carbon footprint of China & Indonesia stainless steel

1. Low utilization of recycled material
2. Low nickel content ore and high emissions from blast furnaces
3. Use of coal as main electricity source

By-products create sustainability in society

- Without slag there is no metal products
  - Slag formers needed (natural limestone, quartsite)
  - Slag = Mineral product
- Outokumpu slag products are sold mainly to construction purposes
- Annual use of Tornio FeCr slag in road and basement construction saves 1 000 000 tonnes of virgin materials and 350 000 t CO2 emissions



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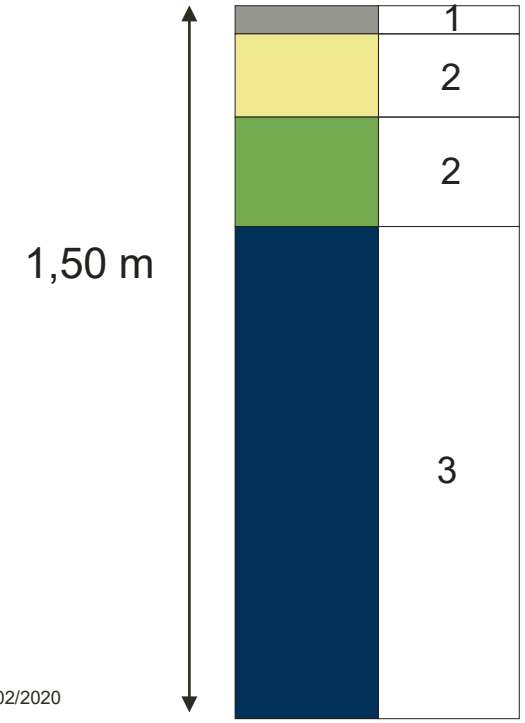
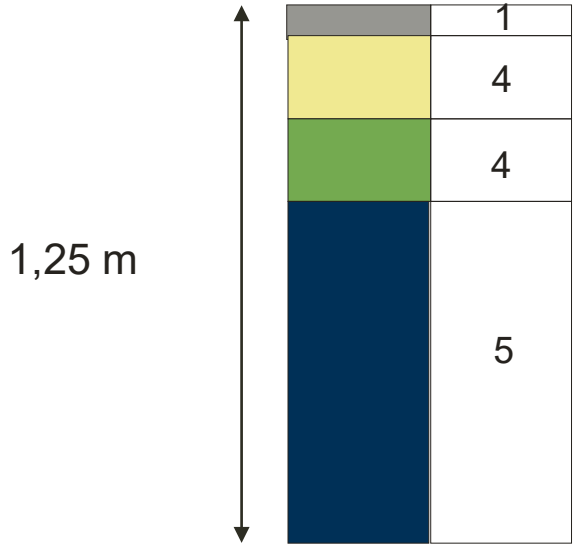
Environmental and economical benefits of slag products in roads

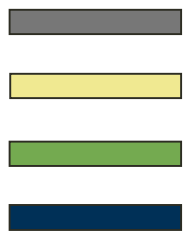
In road construction the use of slag products means ~35% less total material (~200 truck loads less per road kilometre!)

Sand/aggregate construction



FeCr slag construction





1	Tarmac
2	Rock aggregate
3	Sand
4	Crushed FeCr slag aggregate
5	Granulated FeCr slag

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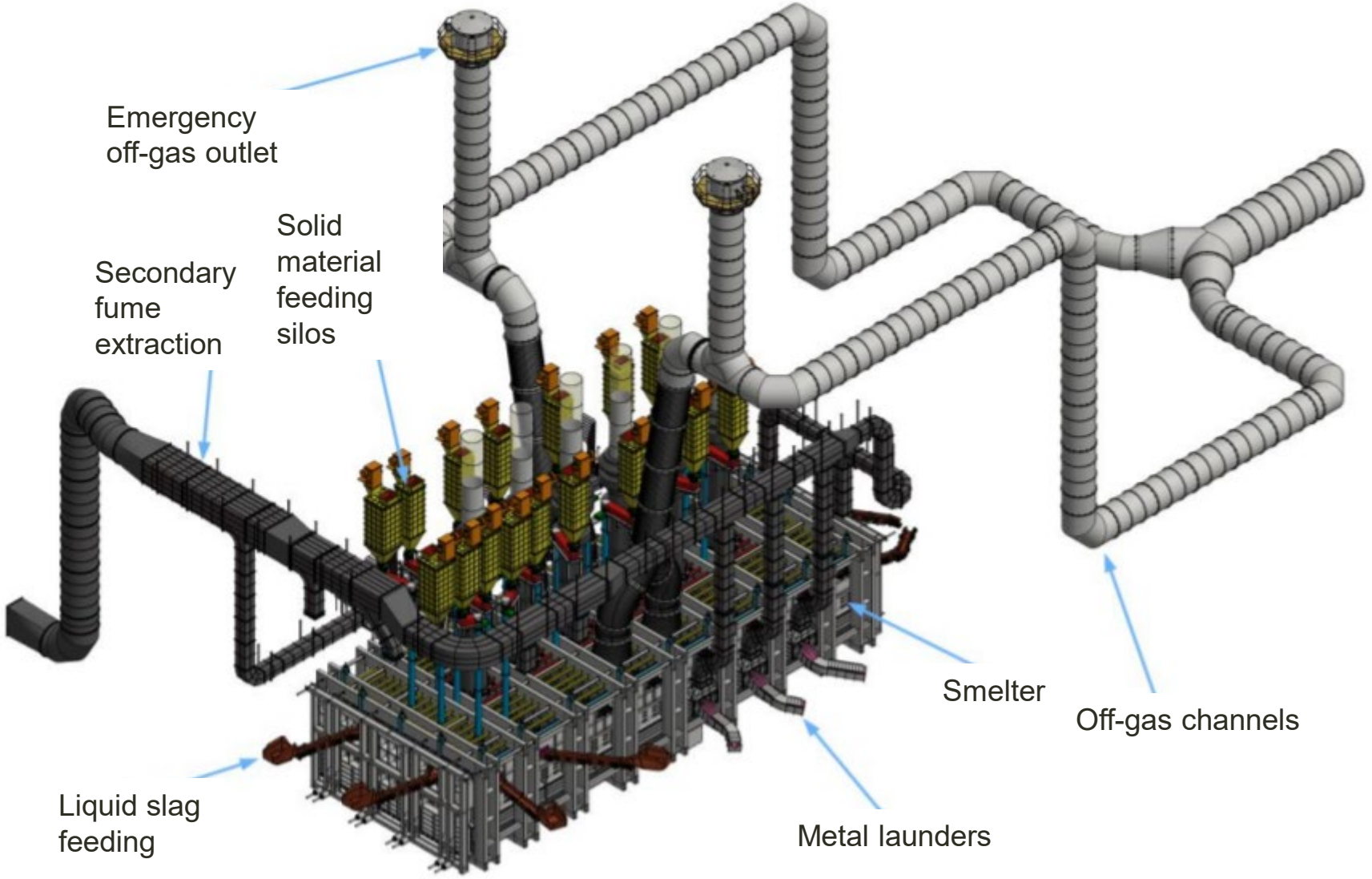
Zero Waste slag smelter – the next generation in circular economy?

- Completely new method of maximising the yield from slag and other by-product streams
- EIA process ongoing
- No investment decision done
- Reduces the need of virgin raw materials



Draft of a corresponding smelter. (Material of technology provider)

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Material flows of Zero Waste Slag Smelter

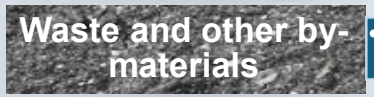
Offgas
989 MNm3/a

Dust
~10 000 t/a

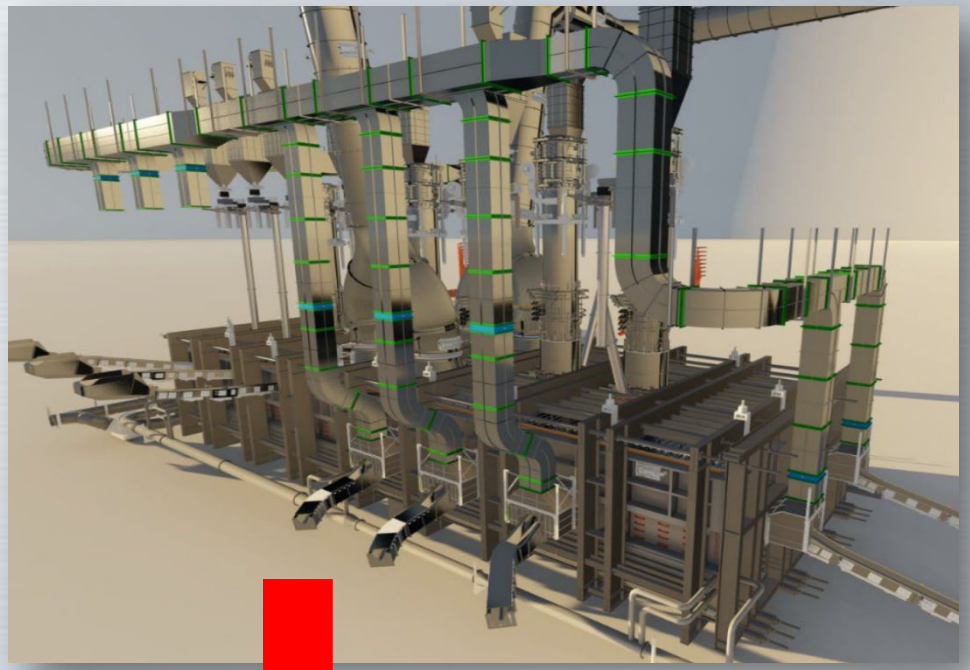
• 1 070 000 t/a

• 100 000 t/a

• 70 000 t/a



• 145 000 t/a



Slag products
~1 065 000 t/a

Benefits: Improved metal recovery & new metal product for recycling from waste and side-materials - and deleting waste flows

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We are committed to reach carbon neutrality by 2050 – in-line with EU Green Deal targets

We're on track with the target of reducing our carbon footprint by 20% by 2023[1]

We're committed to reach carbon neutrality by 2050

1) Reduction of Outokumpu CO2 footprint to 1.5 tons / tons of steel by 2023 vs baseline 2014-16 average of CO2 footprint of 1.86 (CO2 tons / ton of steel)

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Thank you!

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