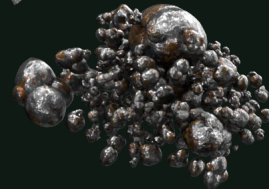
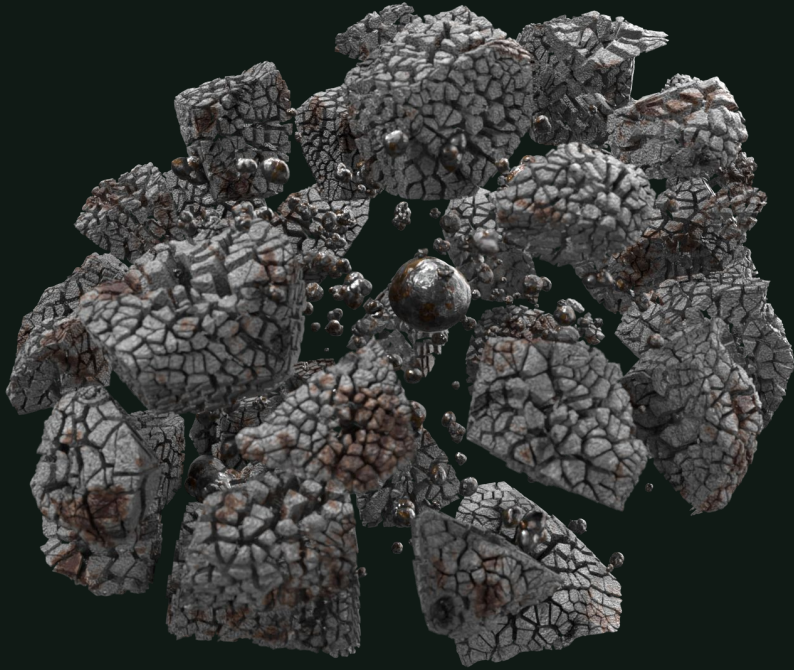


# MAGSORT

Steel slags - zero CO<sub>2</sub> raw material  
and full recycling solution when  
processed properly

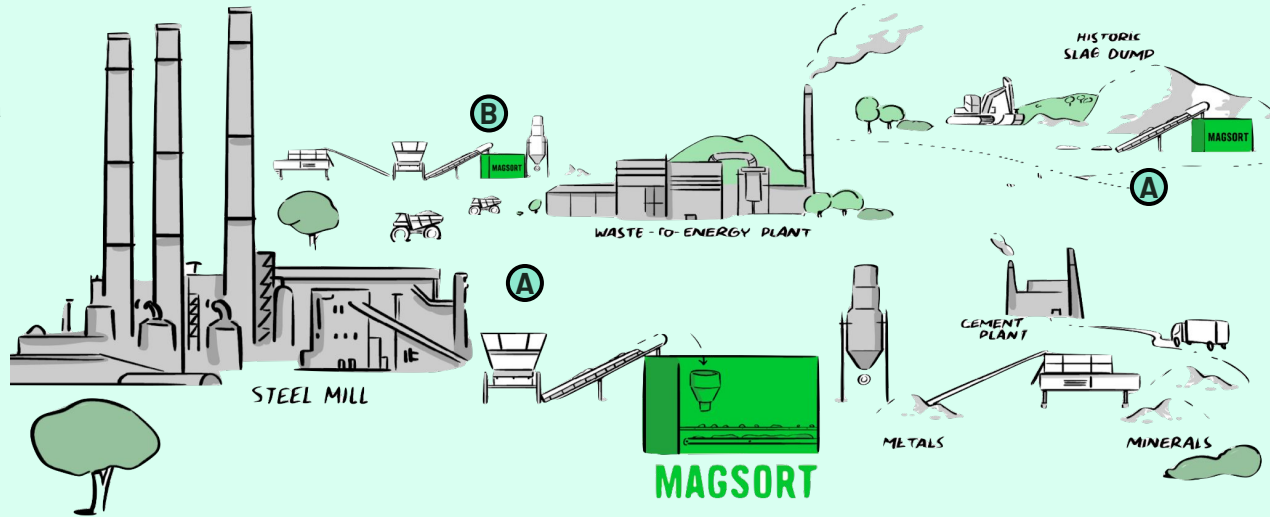
Magsort Ltd.



# Magsort is turning waste materials into valuable metal and mineral products

## **A** Steel Slag Recycling

- Recovering metals from steel slags, which is a side product of steel mills
- Refining the residual to use it for aggregates, cement and concrete production



## **B** Incinerator Bottom Ash (IBA) Recycling

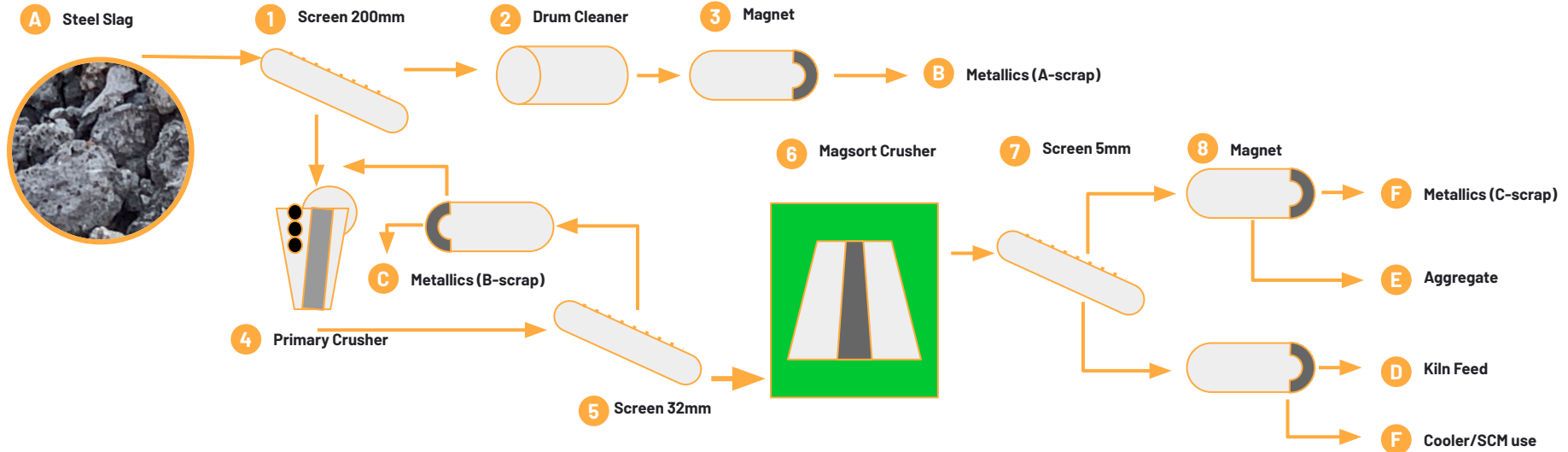
- Recovering the metals from incinerator bottom-ash generated by Waste to Energy plants
- Recovering metals and minerals to the material circuit



► Processing line for 700.000tpa in Raigarh, India

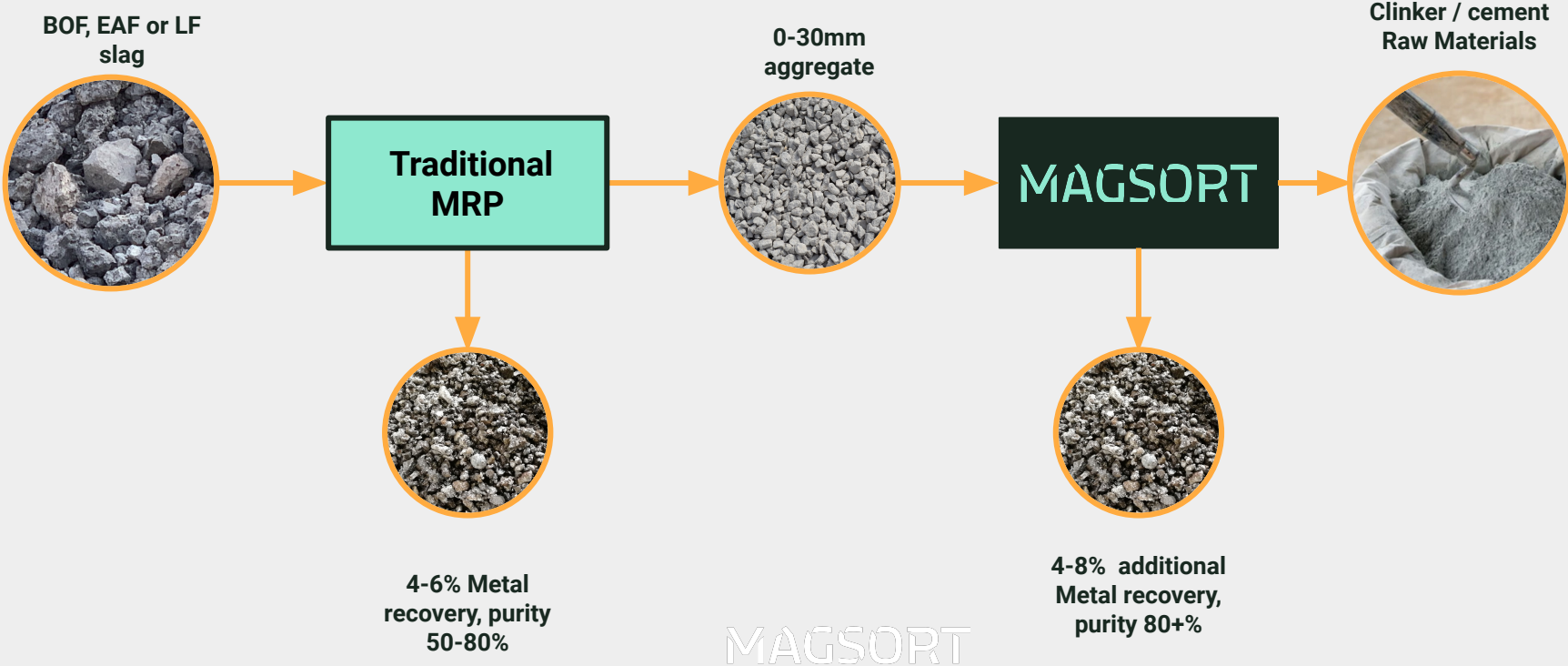
# Magsort Slag Process Schematic

Addition of Magsort Crusher for fines increases valorisation rate for steel slag



# Extending the value chain of the slag processing into cement

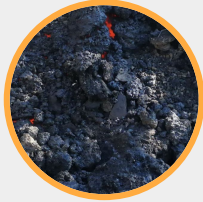
Traditional MRP:s have been focused on recovering larger pieces of metal and selling the slag as the low value aggregate or storing in piles. Magsort has reinvented the process in order to further valorise the products for zero CO<sub>2</sub> cement raw materials and better metal recovery



Different steel slags

# But one size does not fit all...

Limestone, Clay, Silica, Fe-corrective

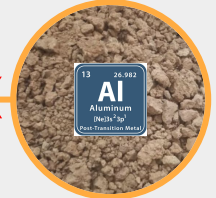
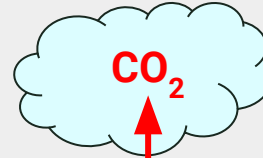
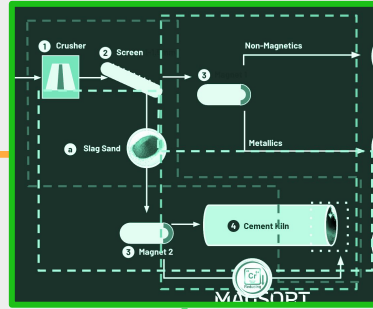


26 3d<sup>4s</sup>  
**Fe**  
Iron  
55.847

20 4s 3d<sup>10</sup>  
**Ca**  
Calcium  
40.078  
(Alkaline Earth Metal)

13 3s<sup>2</sup> 3p<sup>1</sup>  
**Al**  
Aluminum  
26.982  
(Transition Metal)

14 3s<sup>2</sup> 3p<sup>2</sup>  
**Si**  
Silicon  
28.086  
(Metalloid)



CO<sub>2</sub>

With the right combination of steel slags tailored for each specific clinker and cement chemistry, significant CO<sub>2</sub> emissions reductions and monetary savings will be achieved.

MAGSORT

# Magsort Products for Cement Industry



**MAGSORT**

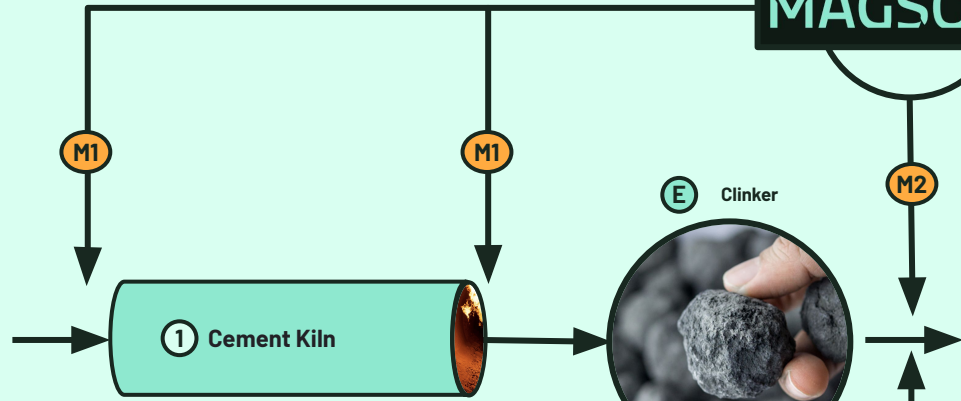
**M1 Raw Material For Clinker Manufacturing**

- Saves CO<sub>2</sub>
- Saves fuel
- Increases production due to no LOI
- Avoids Cr6+ formation
- Activates Hydraulic properties in Slag

**M2 SCM (Supplementary Cementitious Material)**

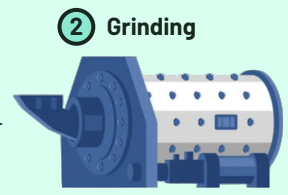
- Saves CO<sub>2</sub>
- Gives better strength
- Works even without BFS

- Limestone CaCO<sub>3</sub> (A)
- Clay (B)
- Iron Corrective (C)
- Silica (D)



**M2**

- (F) Gypsum
- (G) Other SCMs



**2 Grinding**



**H Cement**

**MAGSORT**

# Magsort Slag Processing Solution

## Steel Slag (BOF, EAF or LF slag)



### Minerals <5mm

- <0.5% metallics
- Usage for Cement industry as Kiln feed, SCM or Active aggregate
- Approx. 80-90% of steel slag
- Value: 25-90 €/tn (depending on CO<sub>2</sub> tax)



### Metals >2mm

- 4-6% additional metallic recovery
- Purity >80%
- Direct usage in EAF or Converter
- Value: 300-450 €/tn



### Magnetics <2mm

- 2-3% magnetic recovery
- Purity 60-70%
- Direct to sinter/pelletising plant or briquetting
- Approx. 5-15% of steel slag
- Value: 100-170 €/tn (mill scale)





# Why has this not been done in large scale before?



**Limestone is cheap** and abundant. Magsort can not change this - regulators are, however influencing the emissions caused by  $\text{CaCO}_3$  - thus influencing the perceived value of limestone



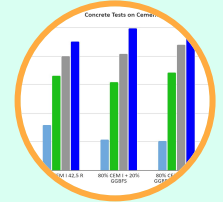
**Metal in Slag** causes it difficult or impossible to grind - Magsort treated slag has no residual metal



**Potential  $\text{Cr}^{6+}$  buildup** in the Cement Kiln. Magsort's patented solution addresses and eliminates the formation of  $\text{Cr}^{6+}$  in the kiln (by steel slag)

**MAGSORT**

**Steel Slag is inert.** Not the case. Steel slag can be activated by GGBFS, thermally or chemically so that it is a replacement for GGBFS



Steel slag is **not part of the standard** in most countries. This is true for steel slag use as SCM but not as raw material for Clinker production. Steel mills and cement companies can influence the standards (if there is a will there's a way)

Cement	Product	Number of the 17 products types (reference cement)			Other	Steel Slag
		K	S	S*		
Portland cement	CEM I	80-100	-	-	-	-
	CEM III/A-S	80-100	0-20	-	-	-
	CEM III/B-S	80-100	21-50	-	-	-
Pulverised blast furnace cement	CEM III/A-S	80-100	-	-	-	8-100
	CEM III/B-S	80-100	-	-	-	-
	CEM III/C-S	80-100	-	-	-	-
Pulverised blast furnace cement	CEM III/A-S	80-100	-	-	-	-
	CEM III/B-S	80-100	-	-	-	-
	CEM III/C-S	80-100	-	-	-	-
	CEM III/D-S	80-100	-	-	-	-
Other	CEM III/V	80-100	-	-	-	-
	CEM III/V	80-100	-	-	-	-

**Magsort Ltd**  
735 followers  
2mo · 🌐

Magsort and Jindal Shadeed Iron & Steel (JSIS), the leading steel manufacturer in Oman, have entered into a long-term agreement to process the historical steel slag piles of the JSIS Sohar ...more



**JSIS and Magsort to refine historical steel slag piles into cement raw materials in Oman**

[magsort.com](https://magsort.com)

Emirates Steel Arkan and MAGSORT Collaborate in the First Industrial Pilot Project to Reduce Cement CO2 Footprint up to 15%

🕒 February 21, 2024



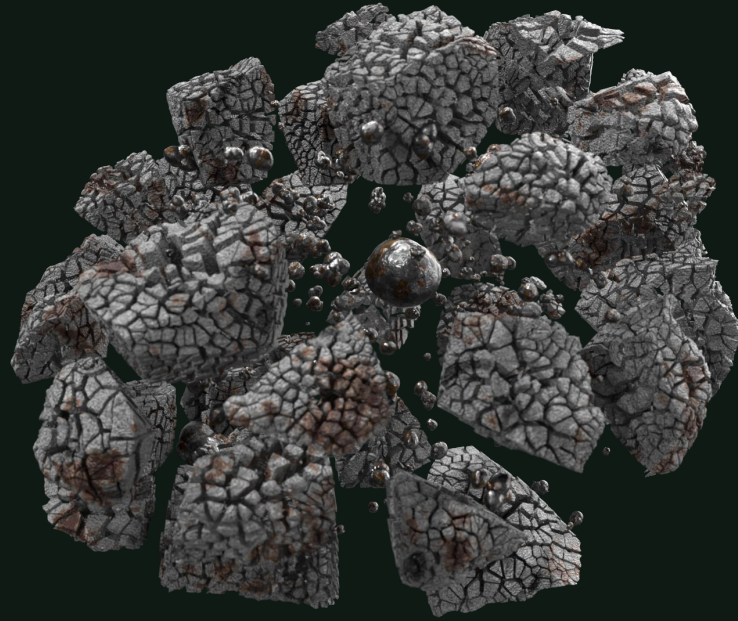
Following COP28 commitment and contributing to the UAE First Long-Term Strategy (LTS) demonstrating commitment to Net Zero by 2050, Emirates Steel Arkan (ESA), one of the largest publicly traded steel and building materials manufacturers in the region, announced its strategic collaboration with MAGSORT, a Finnish decarbonization company, to drive an innovative initiative across its Al Ain Cement Factory. The partnership, announced during CEMTECH MEA 2024, positions ESA's cement operations at the forefront of sustainability, aligning seamlessly with the Group's decarbonization targets and setting the stage for a transformative approach to Green Cement production.

**Now it will be done!**

**Thank you for your attention**

**MAGSORT**

MAGSORT



**Thank you!**