

Post-consumer steel scrap

Technical developments and economic feasibility

Resources & Recycling

5-7-2013

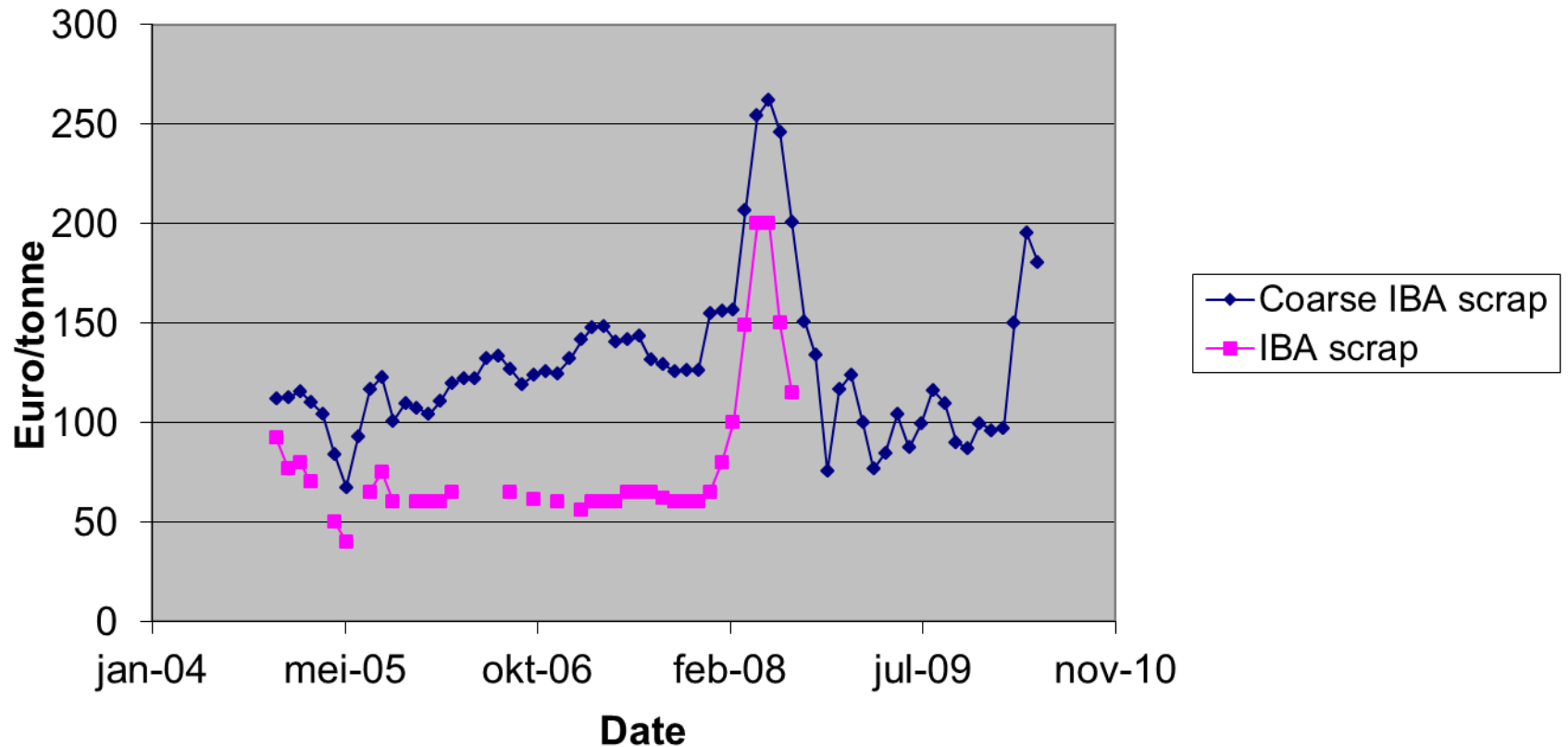
Resources & Recycling at Delft

Mission

Create innovations in recycling that
add value from all perspectives:
social, environmental and
industrial-economic

Steel scrap from IBA

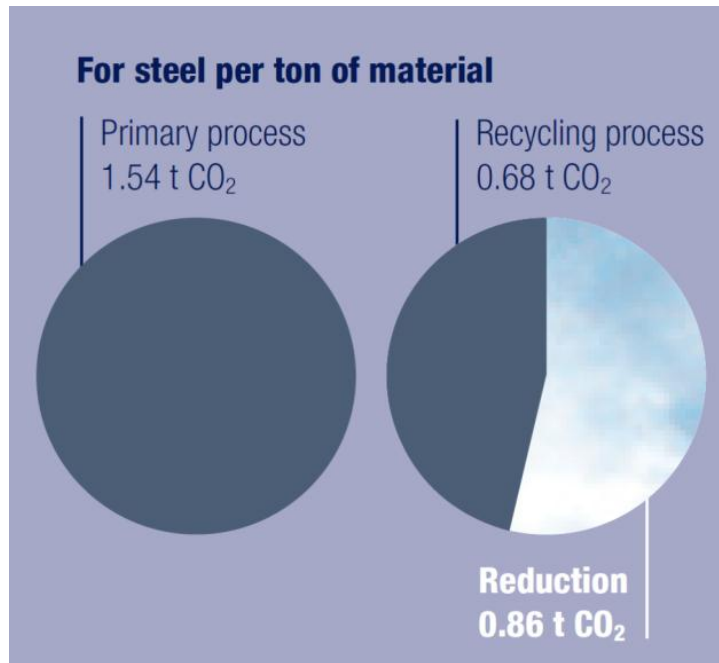
High contamination levels > low/variable price



Double gain from cleaning: sales of Cu and increased value of steel

Environmental gain recycle steel

CO₂-emission



Recovering fine & midsized steel from 1 ton of IBA saves 30-50 kg of CO₂-emission

Steel scrap upgrading

CSM technology



*Installation at Sluiskil,
the Netherlands
(Resteel, 50 t/h)

Steel scrap upgrading

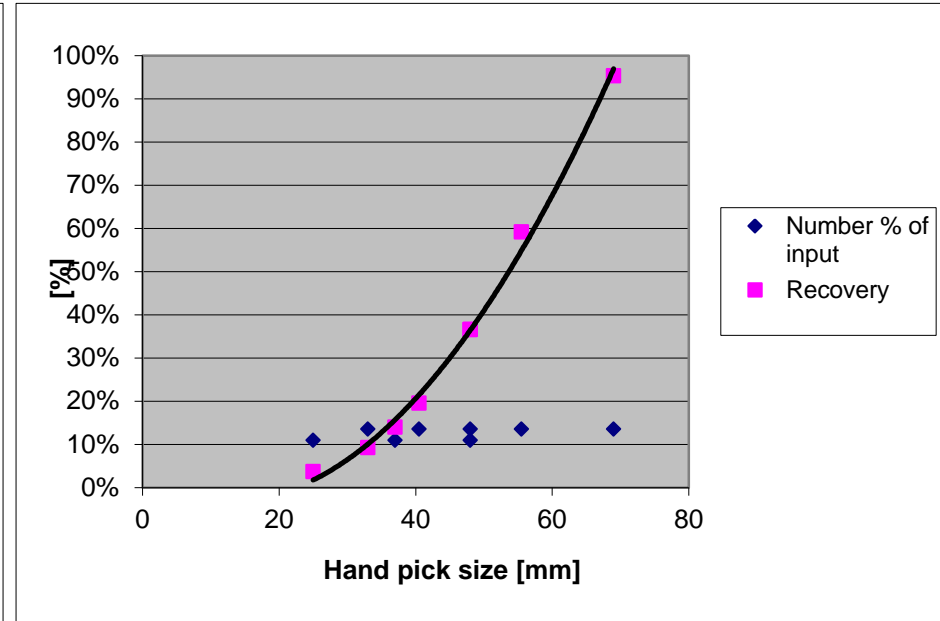
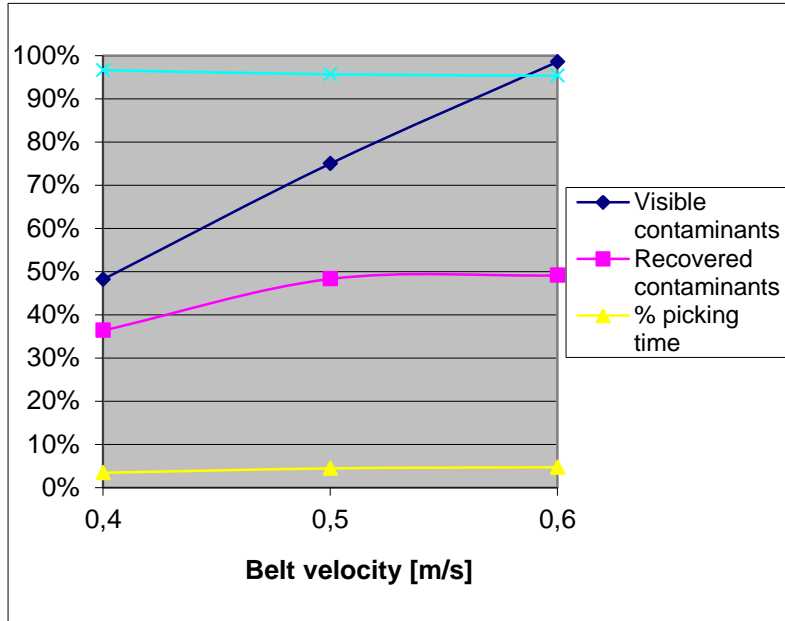
Flows and contaminants

Type of steel scrap	EU production [Mt/y]	Typical capacities* [t/h]	Typical contaminants/levels
WEEE	2	1-5	2.3% Cu
IBA	1	2-20	0.7% Cu, 1% batteries, Phosphor, 0.1% S, 10% sand/rust, 0.2% coarse stone, 0.1% cloth/plastic
ELV	8-11	30-200	0,7% Cu, rubber, stainless, cast Al
Total	11-14		

*Input steel scrap for hand sorting operations

Steel scrap upgrading

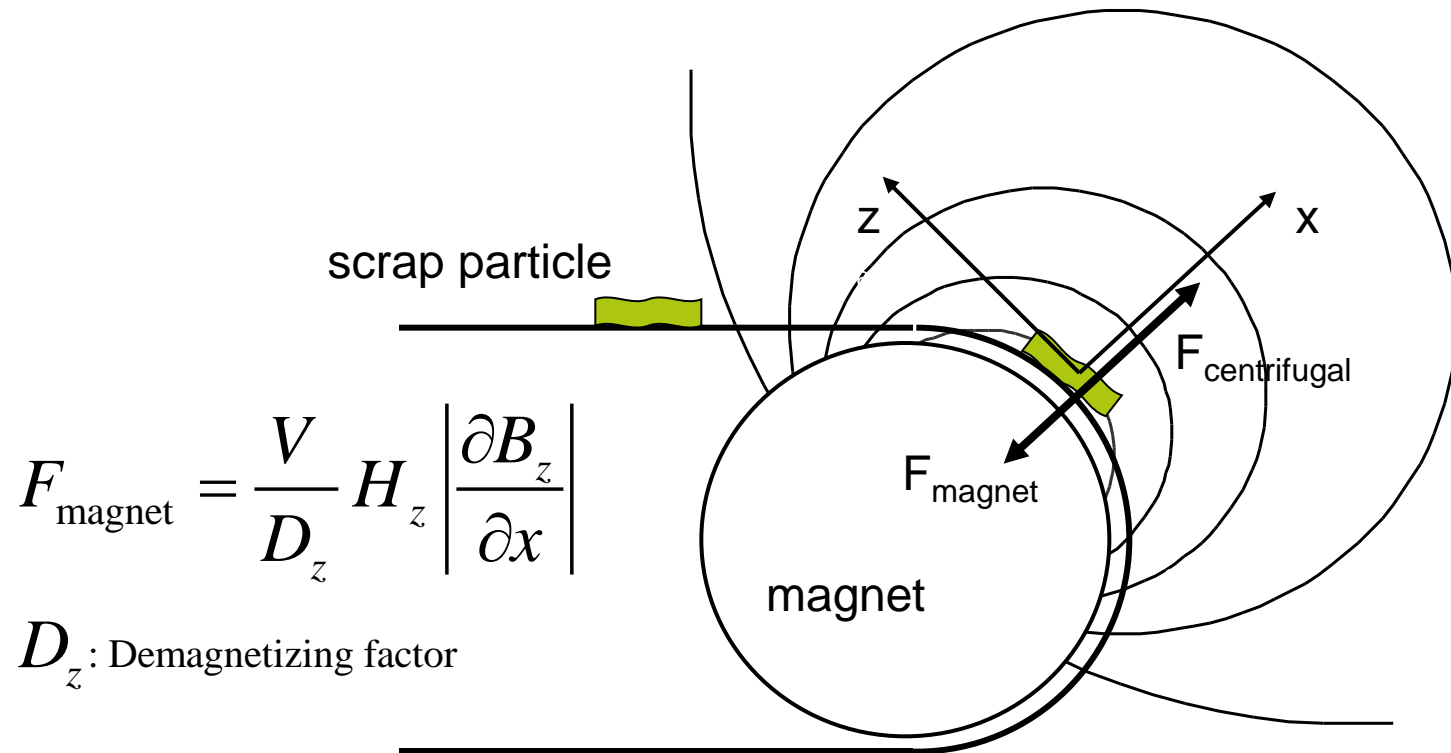
Hand picking of Cu-parts: statistics & costs



At 18 t/h of IBA scrap, six hand-pickers recover max. 50 mass% of the copper contaminants, at a (hand-picking) cost of about 6 €/t of IBA scrap

Steel scrap upgrading

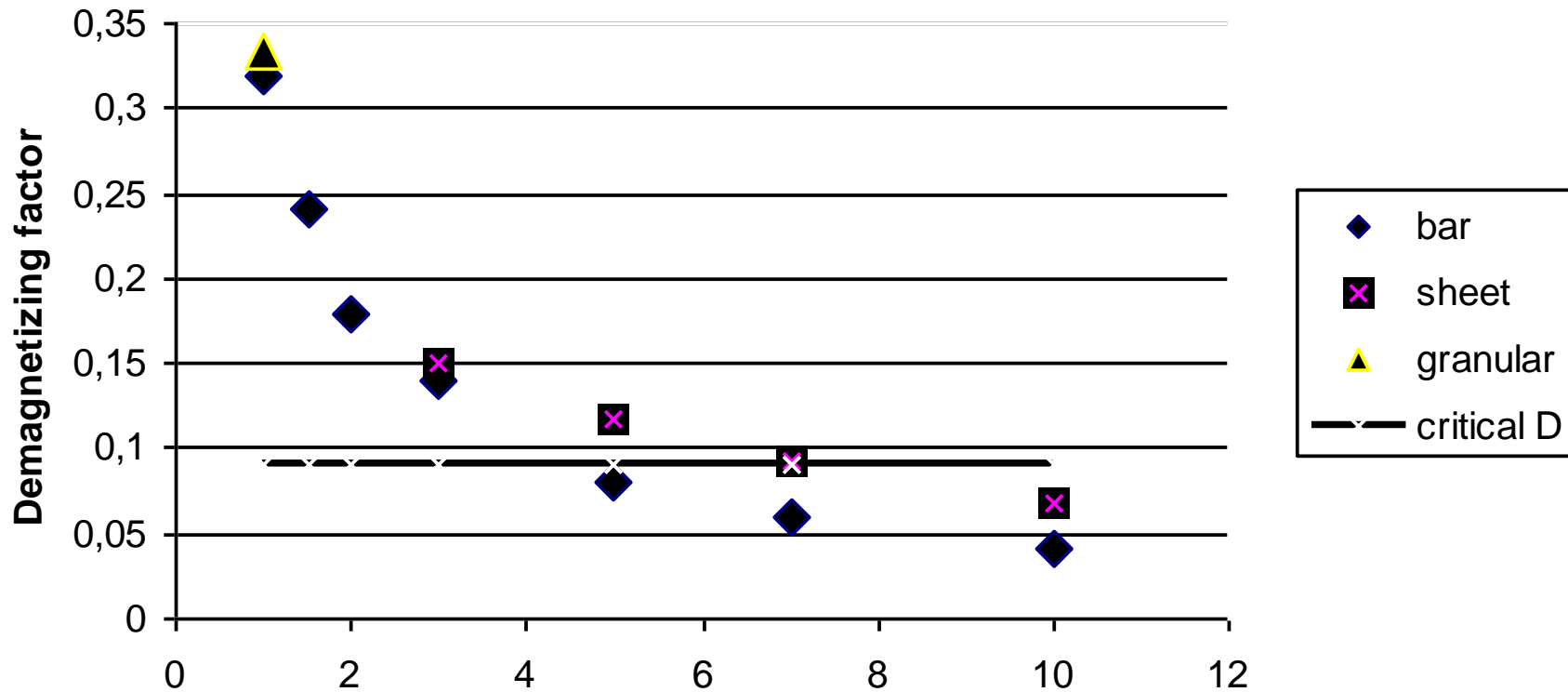
Principle of CSM technology



Shape & orientation-sensitive field

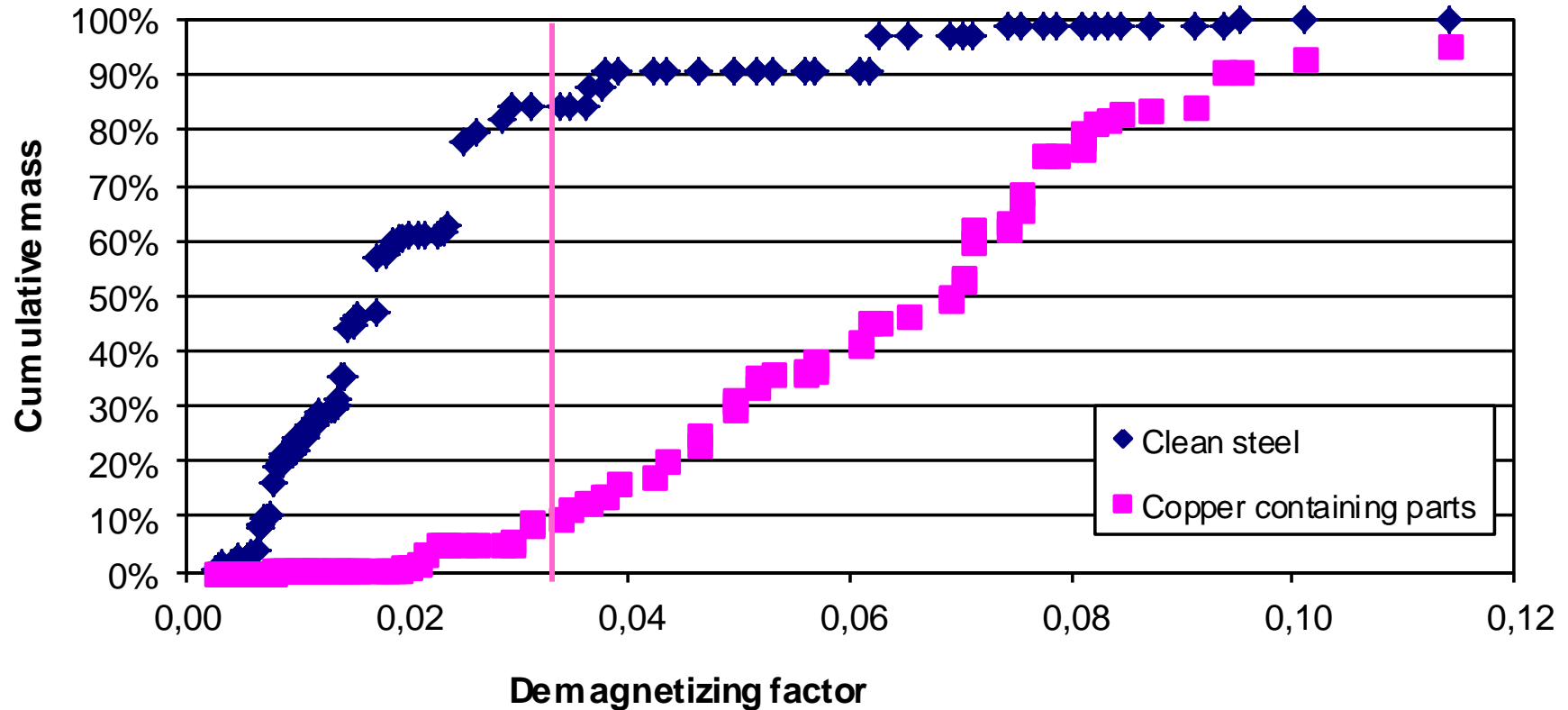
Principle of CSM

Relation shape & orientation and D-factor



Principle of CSM

Distribution of D-factor for IBA steel scrap



Steel scrap upgrading

Example parts ending up in two products of CSM

Near product



Flat & bar-shaped steel

Far product

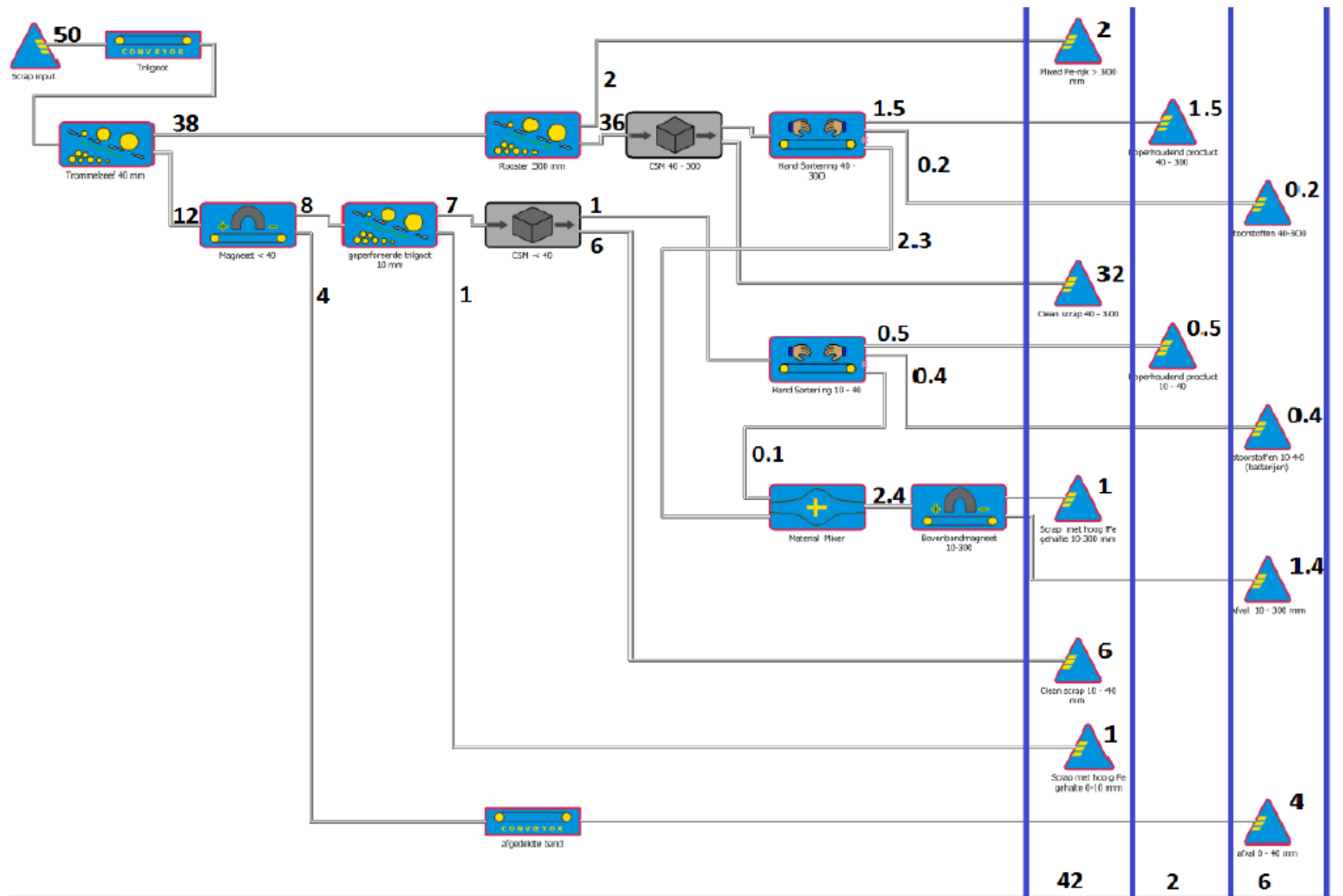


Ball-shaped steel, Cu-parts, batteries, rock, cloth

Beverwijk, the Netherlands



Flowchart IBA scrap plant



IBA Steel scrap upgrading

Beverwijk, the Netherlands

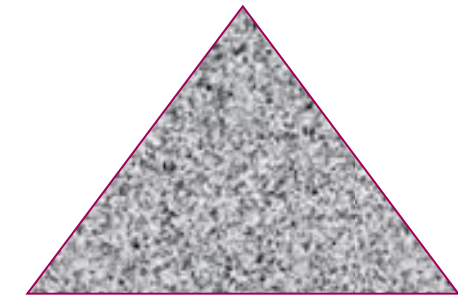


50 t/h input



2 t/h Cu-parts

6 t/h sand/dirt



42 t/h clean steel

IBA Steel scrap upgrading

Economics 50 t/h (investment CSM plant 1.6 M€);

Extra product revenue per ton IBA:		3.1 €
60 kg Ferrous 15-300 mm	0.035 €/kg	2.1 €
2 kg copper-containing parts	0.7 €/kg	1.4 €
8 kg sand/dirt	-0.05 €/kg	-0.4 €
CSM plant processing cost per ton IBA*		-0.5 €
Net profit per ton IBA		2.6 €

*based on 80 kton/a of IBA scrap

Thank You