Karlsruhe Institute of Technology

Trends in Waste Incineration and Residue Management

Jürgen Vehlow

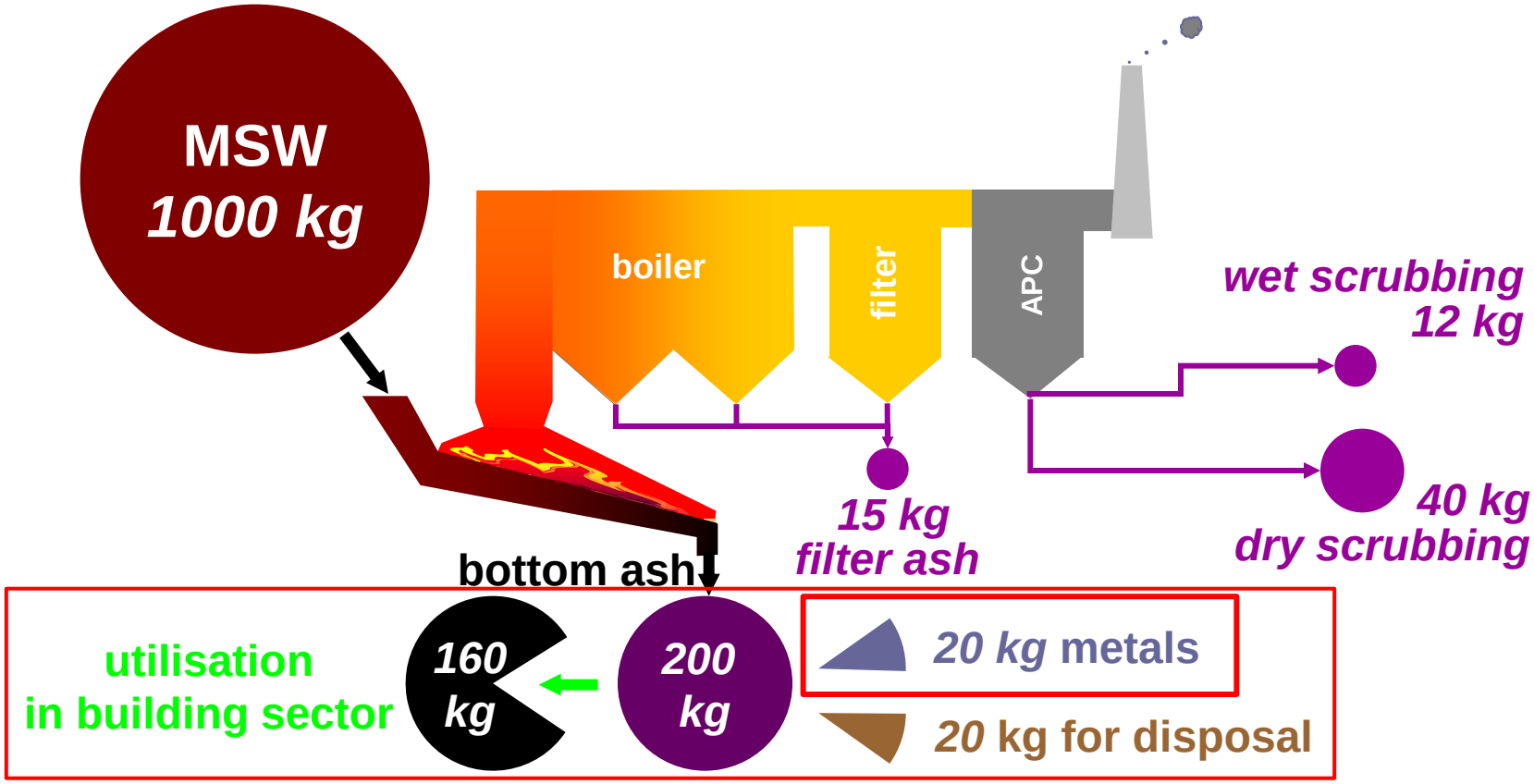
Institute of Technical Chemistry (ITC)

WTERT 2012 Bi-Annual Conference at Columbia University
October 18 - 19, 2012

New York City

goals of waste incineration

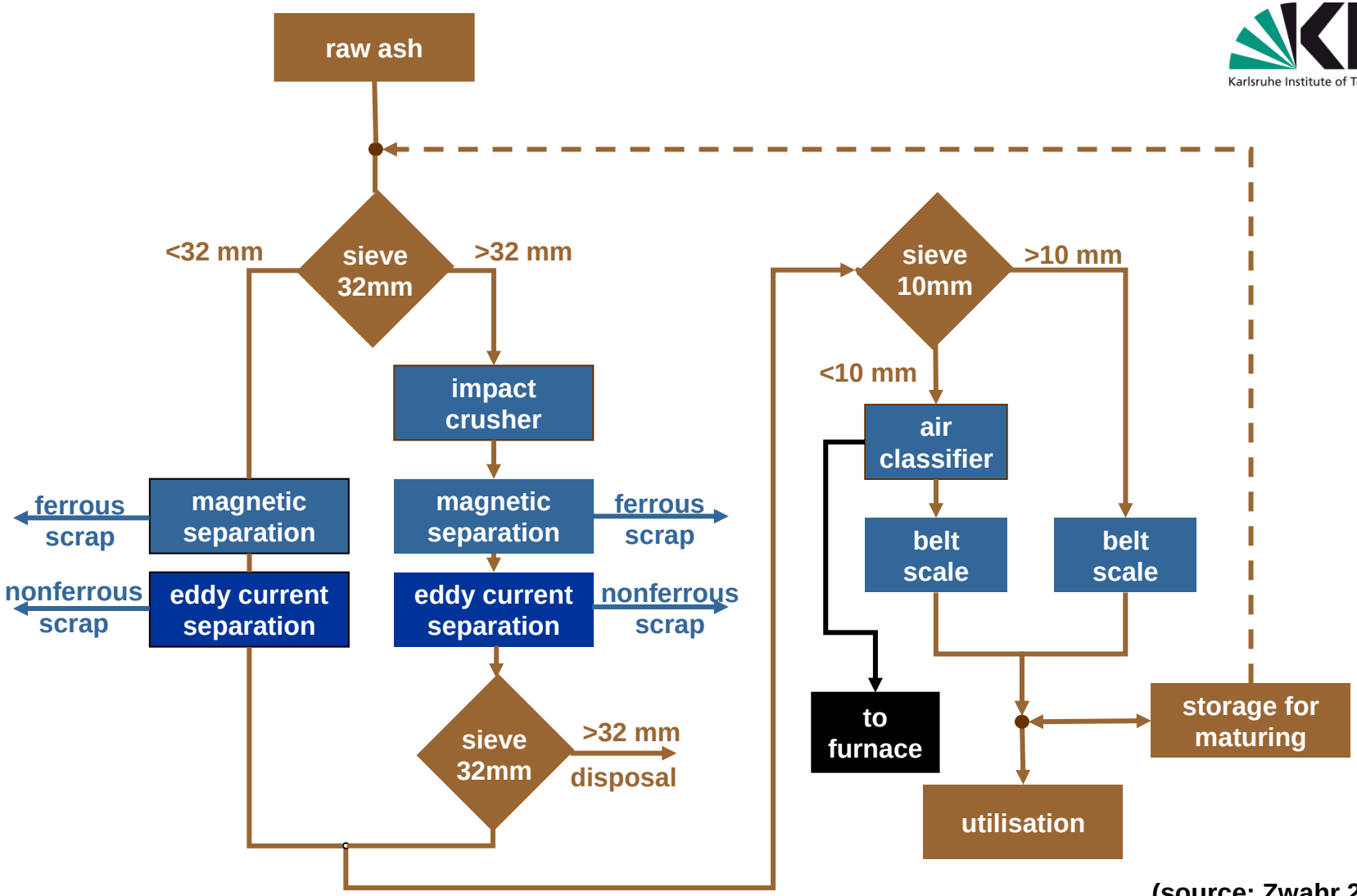
- **aftercare free disposal**
  - **inertisation**
  - **mass and volume reduction**
- **side conditions**
  - **protection of human health**
  - **environmental compatibility**
- **actual trends in Europe**
  - **improvement of energy recovery**
  - **improvement of material recovery**



mass flow in a modern MSWI

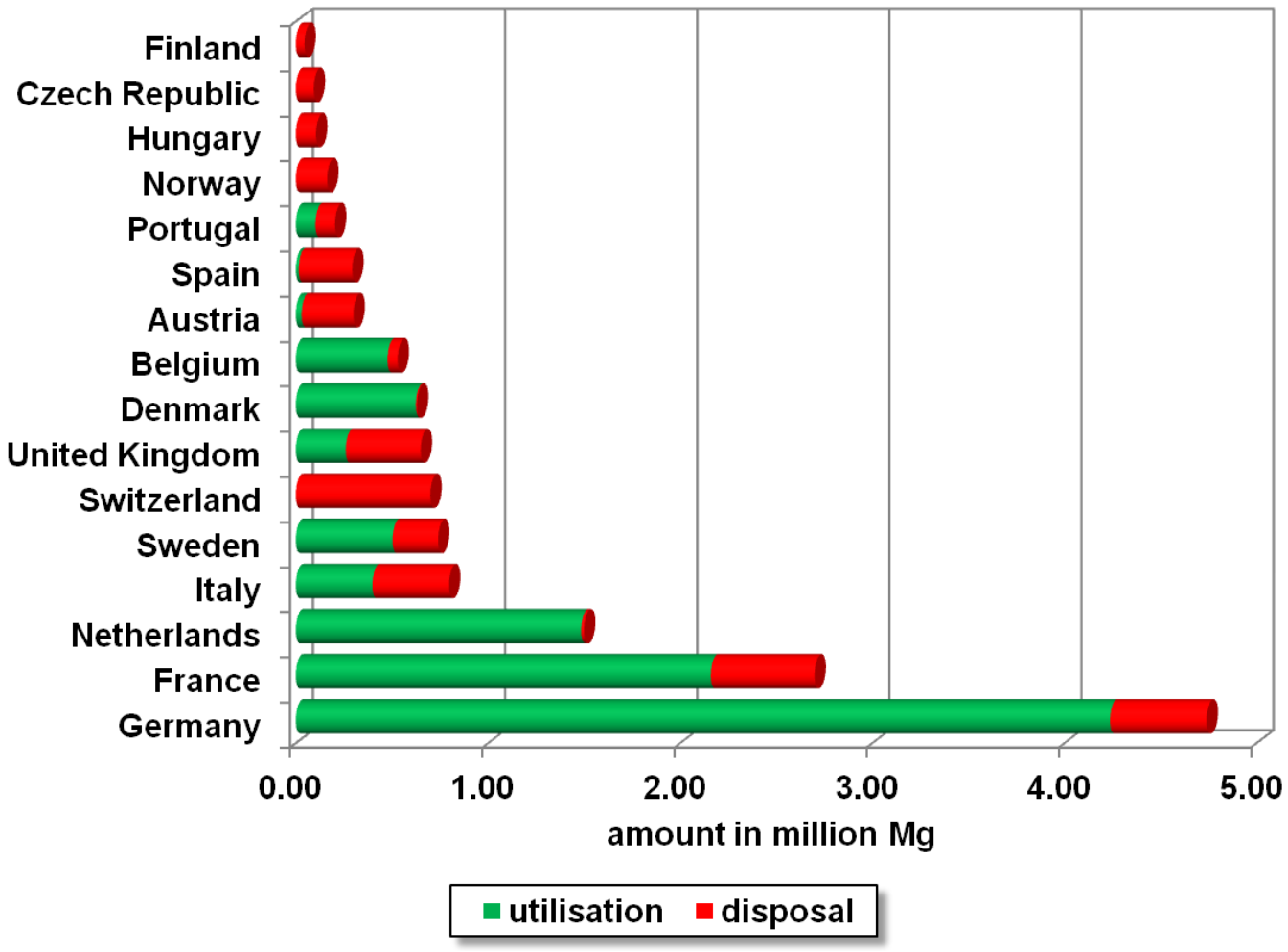
conventional bottom ash utilisation

- **main drivers**
  - **increasing landfill gate fees**
  - ***stringent landfill access standards***
- **pretreatment**
  - **size classification**
  - **metal separation**
  - **aging / maturation**
- **markets**
  - **construction (roads, noise protection walls, ...)**
  - ***aggregate (concrete, ...)***



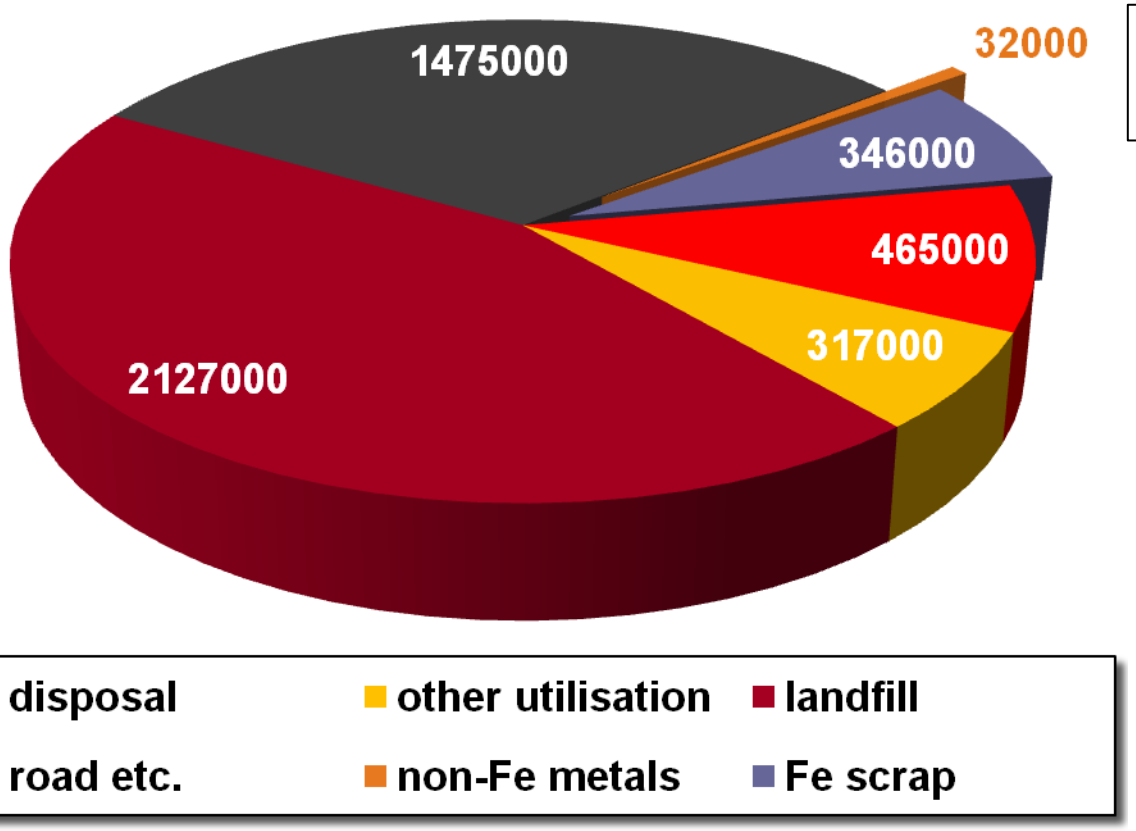
(source: Zwahr 2005)

treatment of bottom ash for utilisation (Hamburg)



bottom ash management in Europe 2009/2010

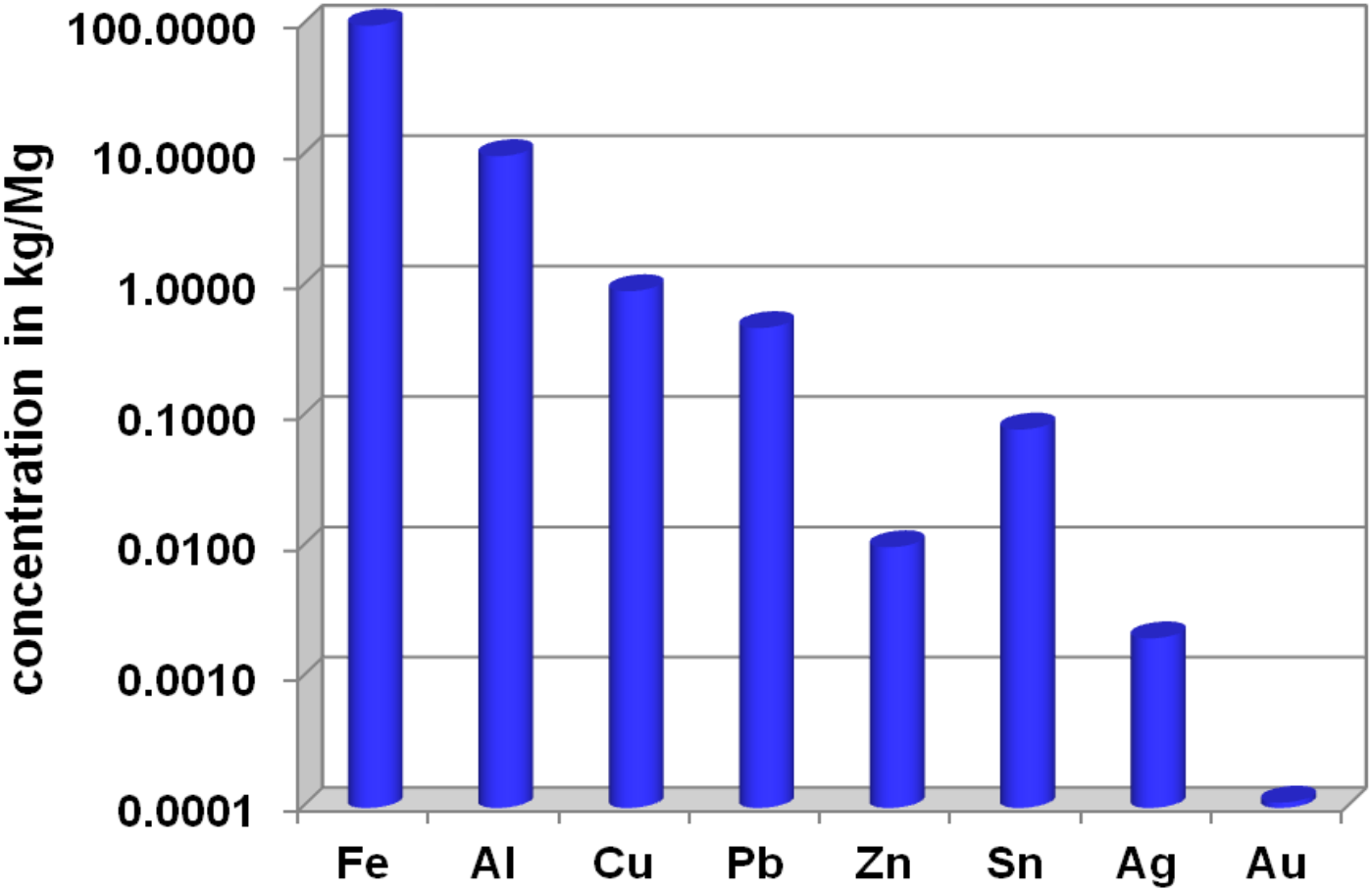
total: 4,762,000 Mg



metals
≈ 8 %

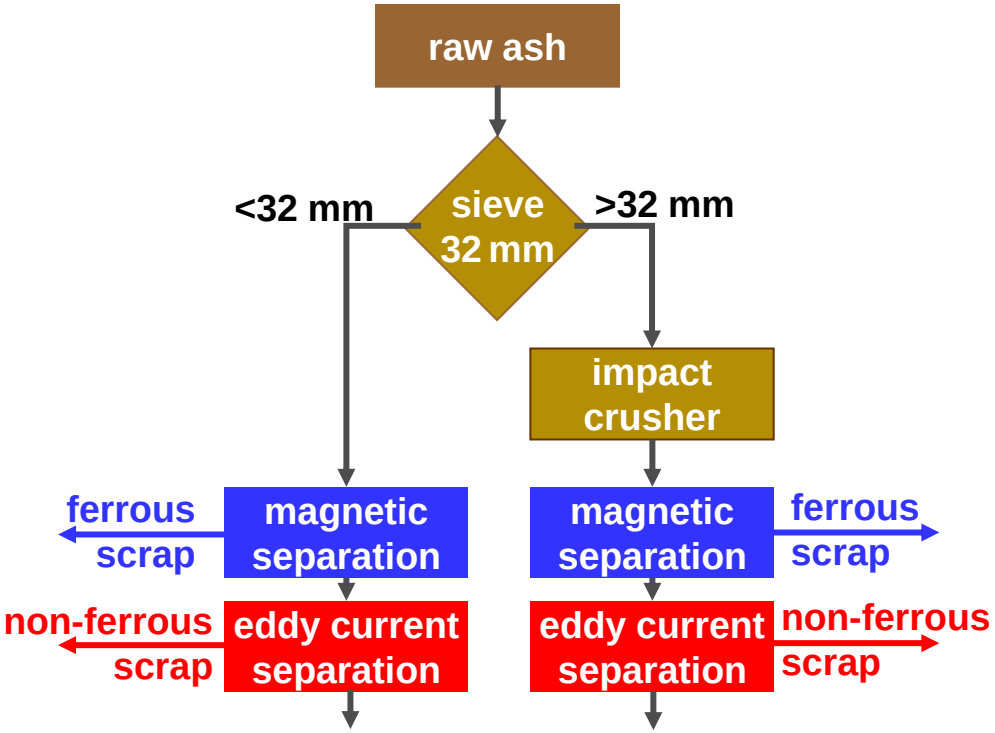
source: ITAD 2009

management of German bottom ash in 2008

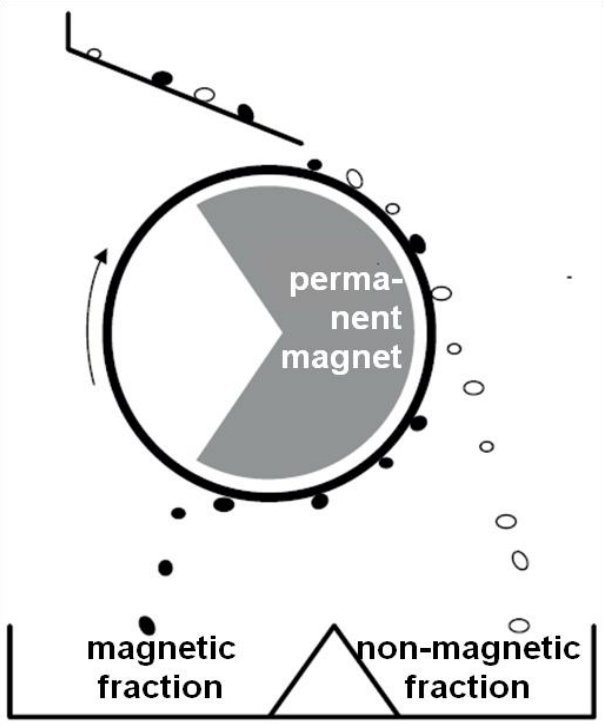


metal content in bottom ash in kg/Mg

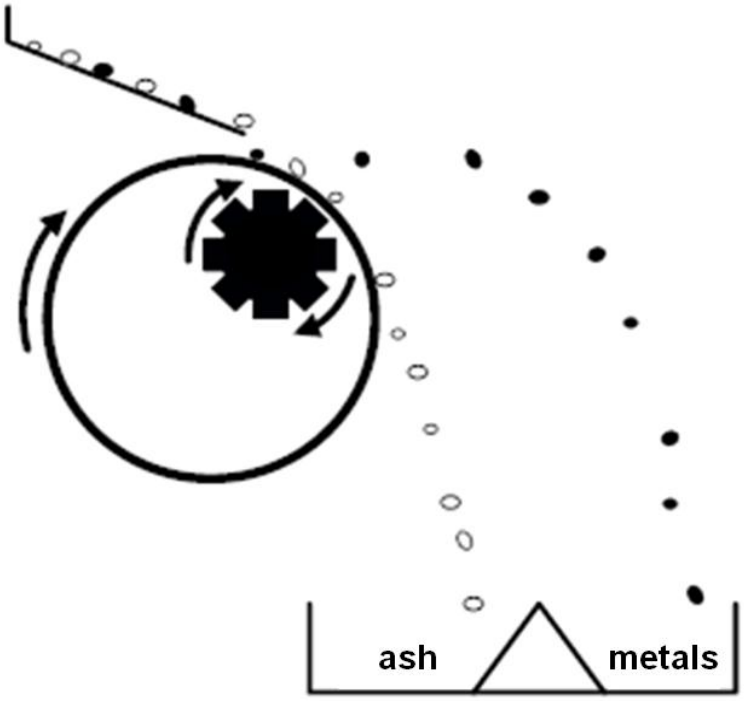
over band magnet separator



metal separation as part of bottom ash treatment (Hamburg)

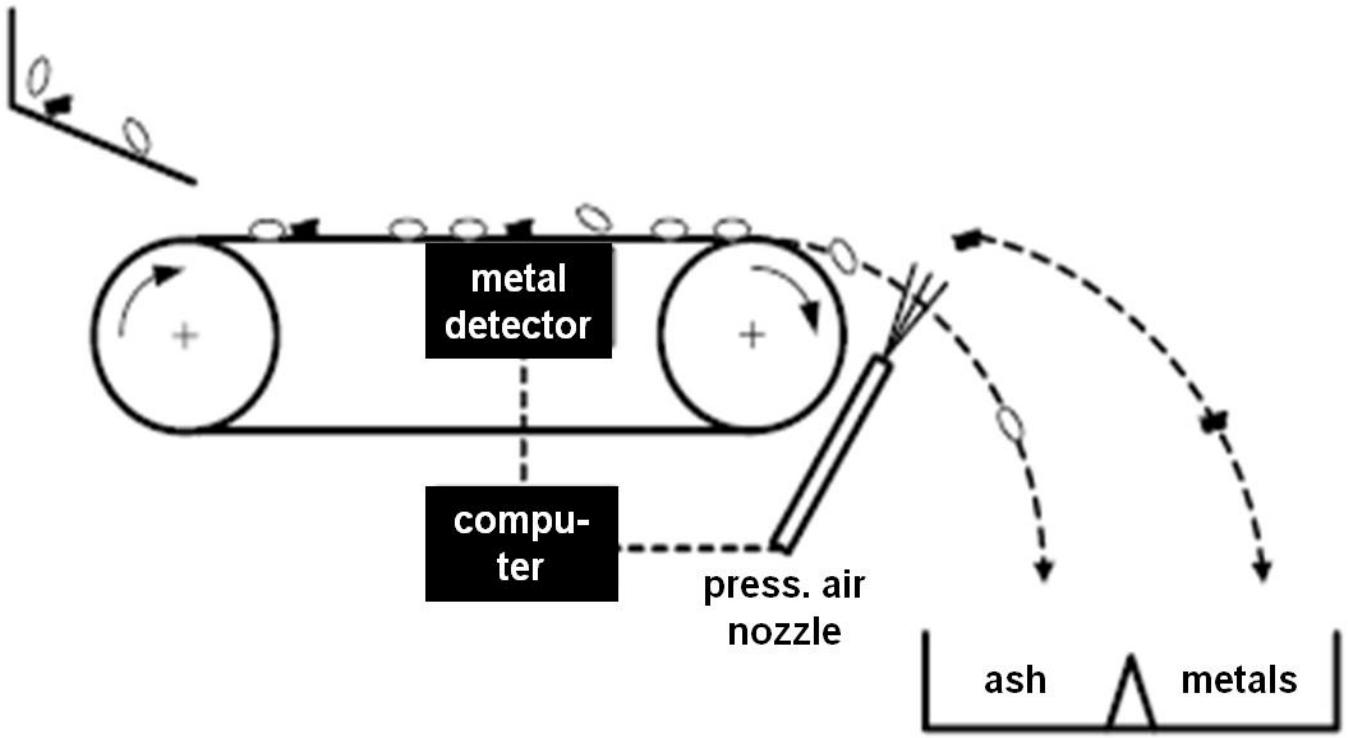


magnetic drum separator



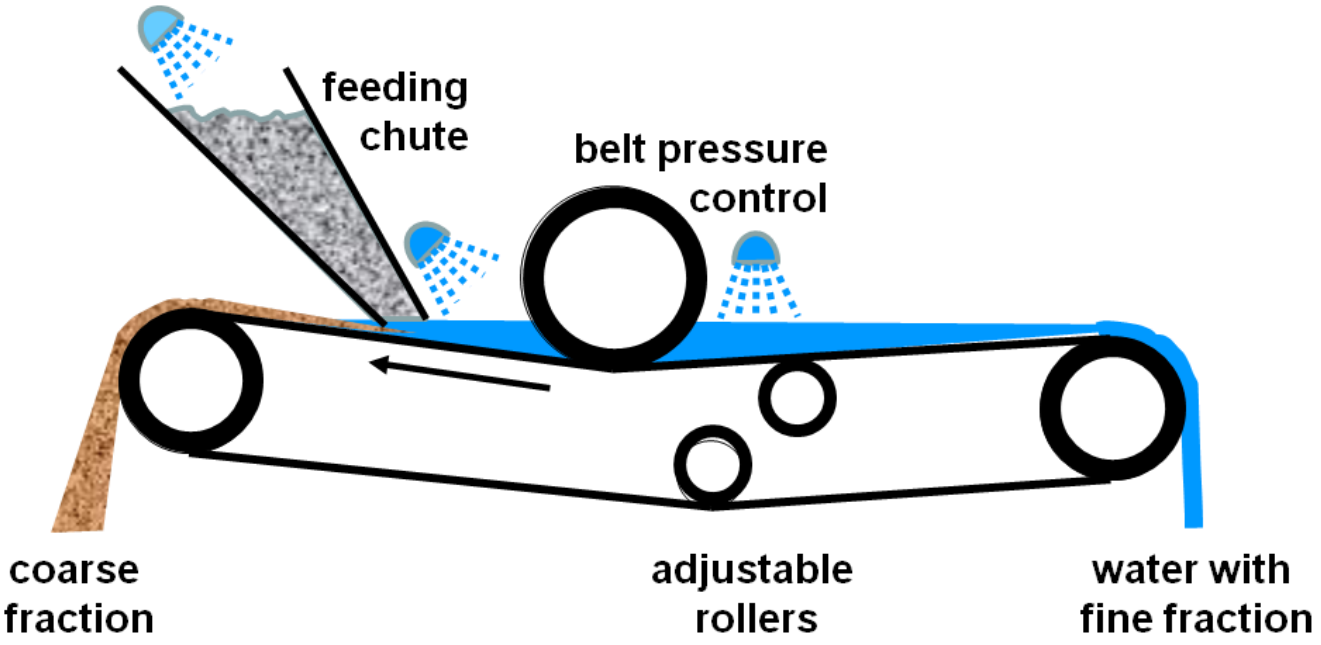
eddy current system

metal separation equipment (I)



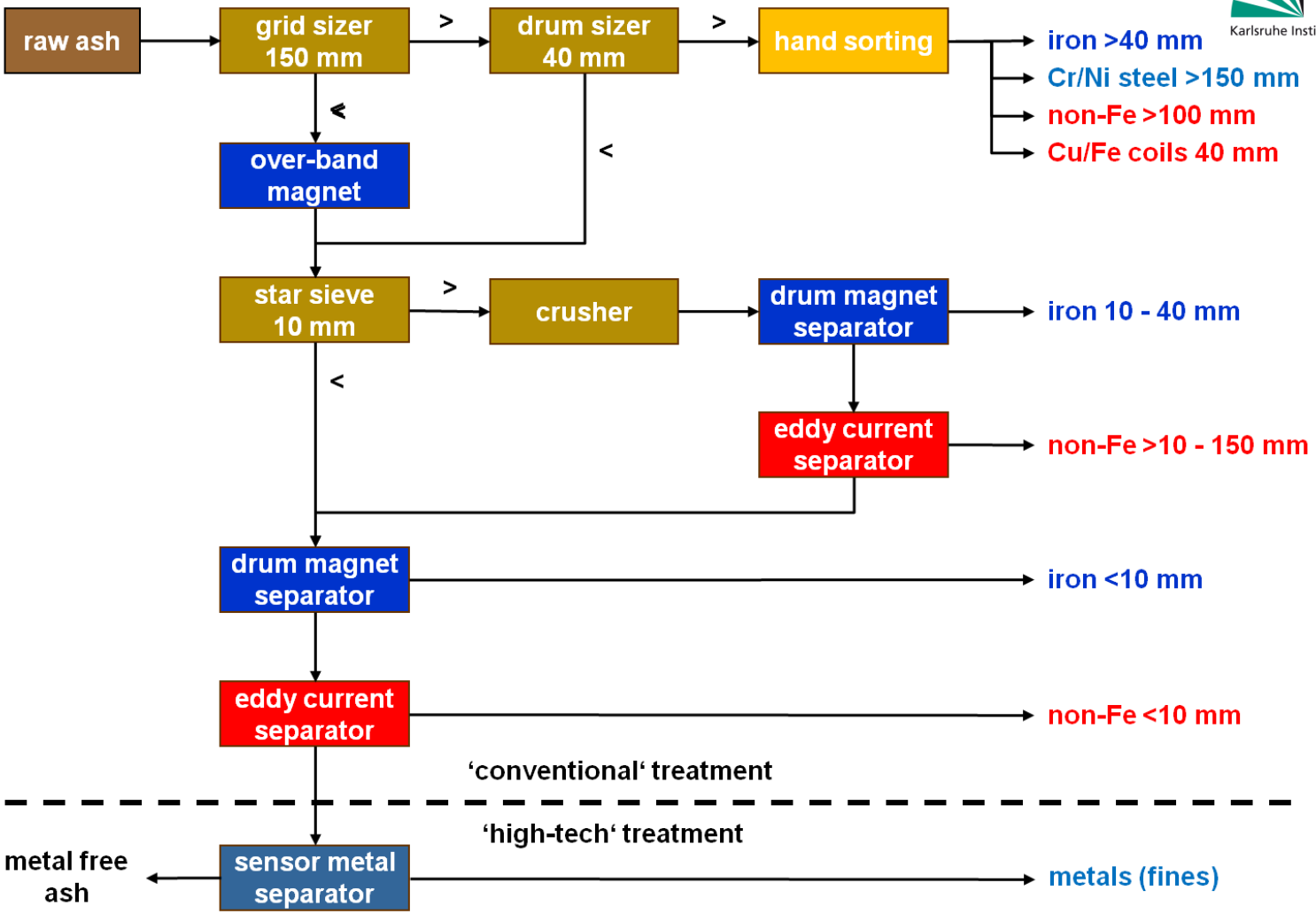
sensor operated system

metal separation equipment (II)



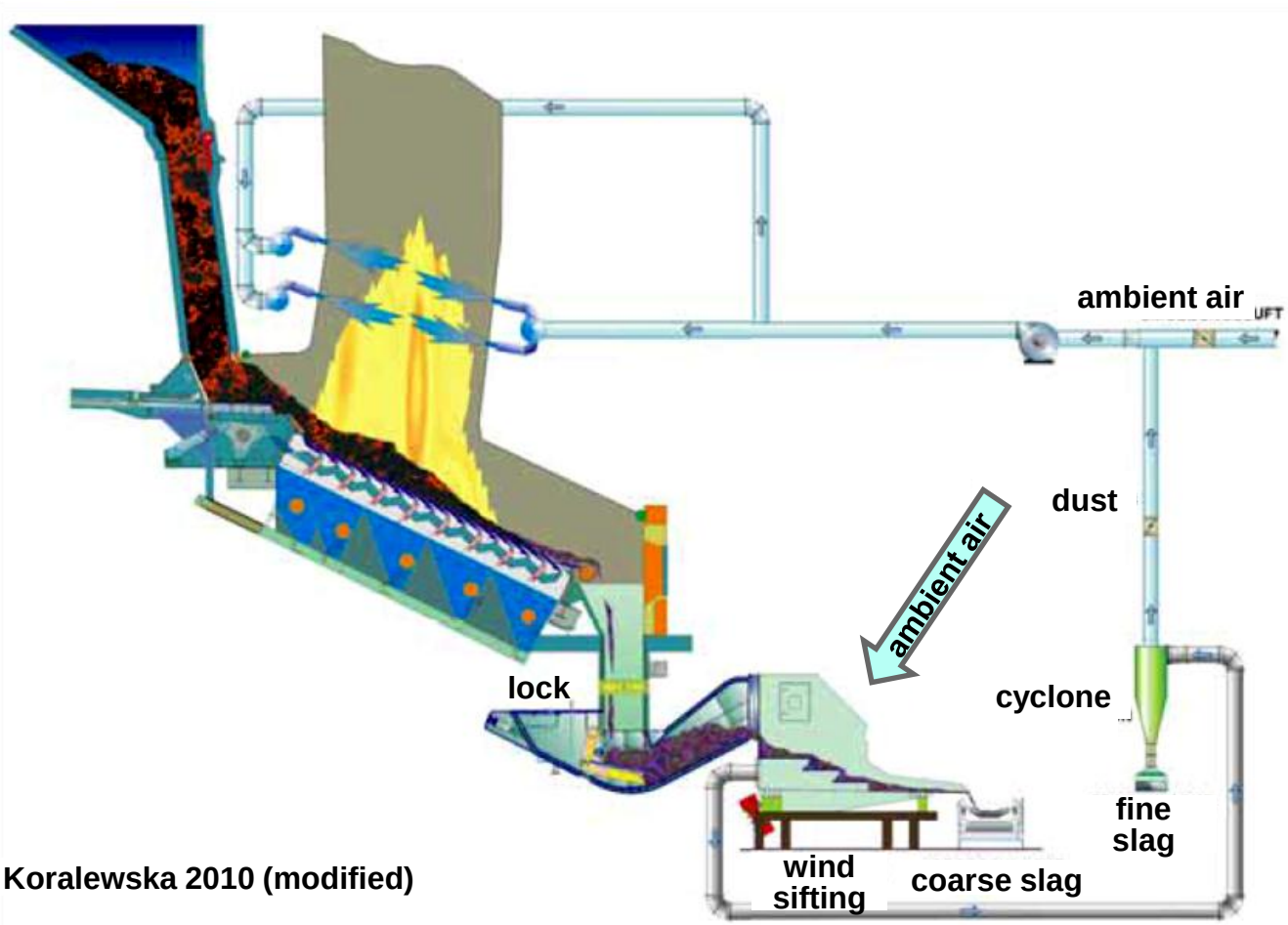
hydraulic belt separator

metal separation equipment (III)



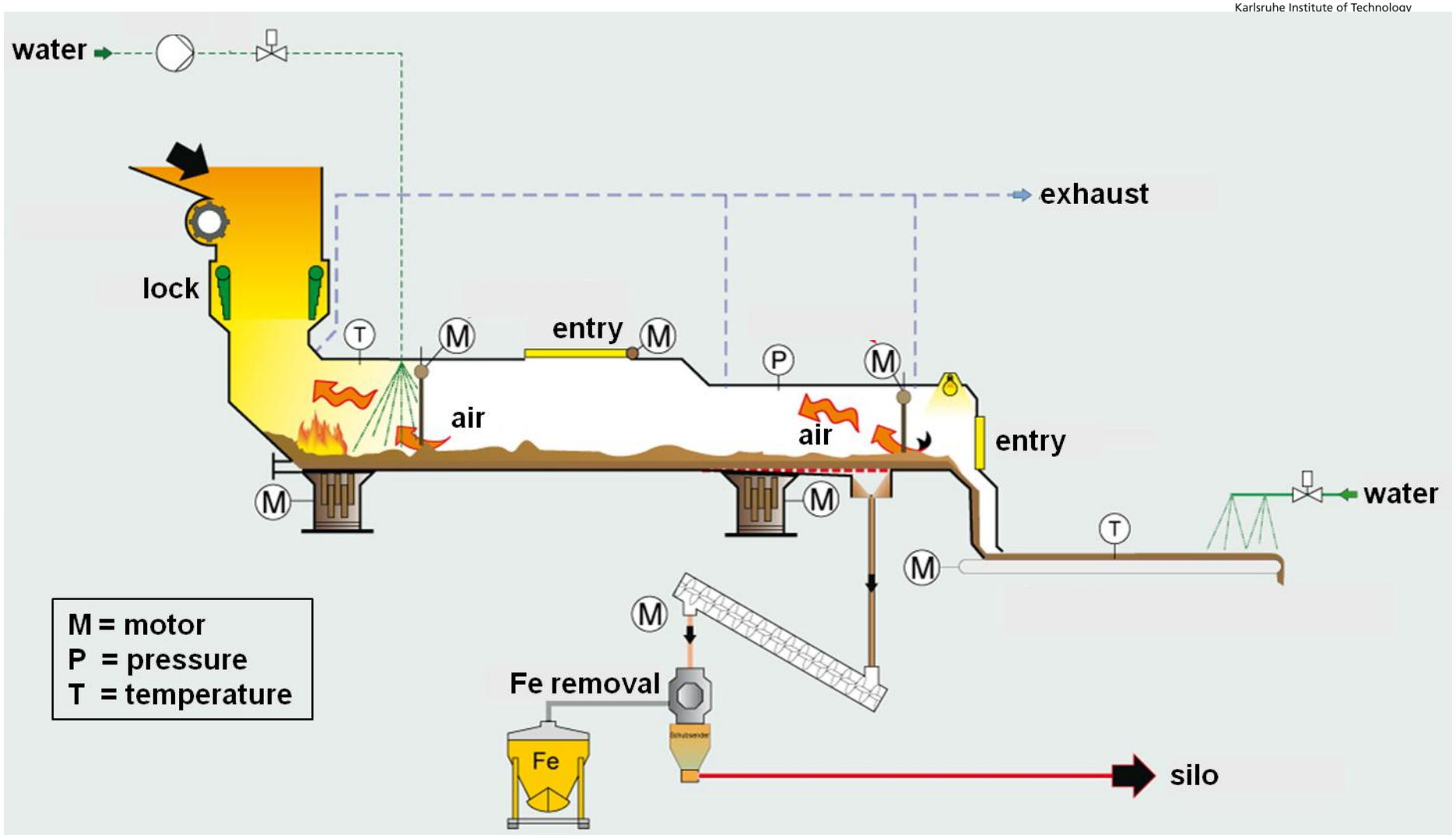
source: Bunge 2010

metal separation from bottom ash with classification

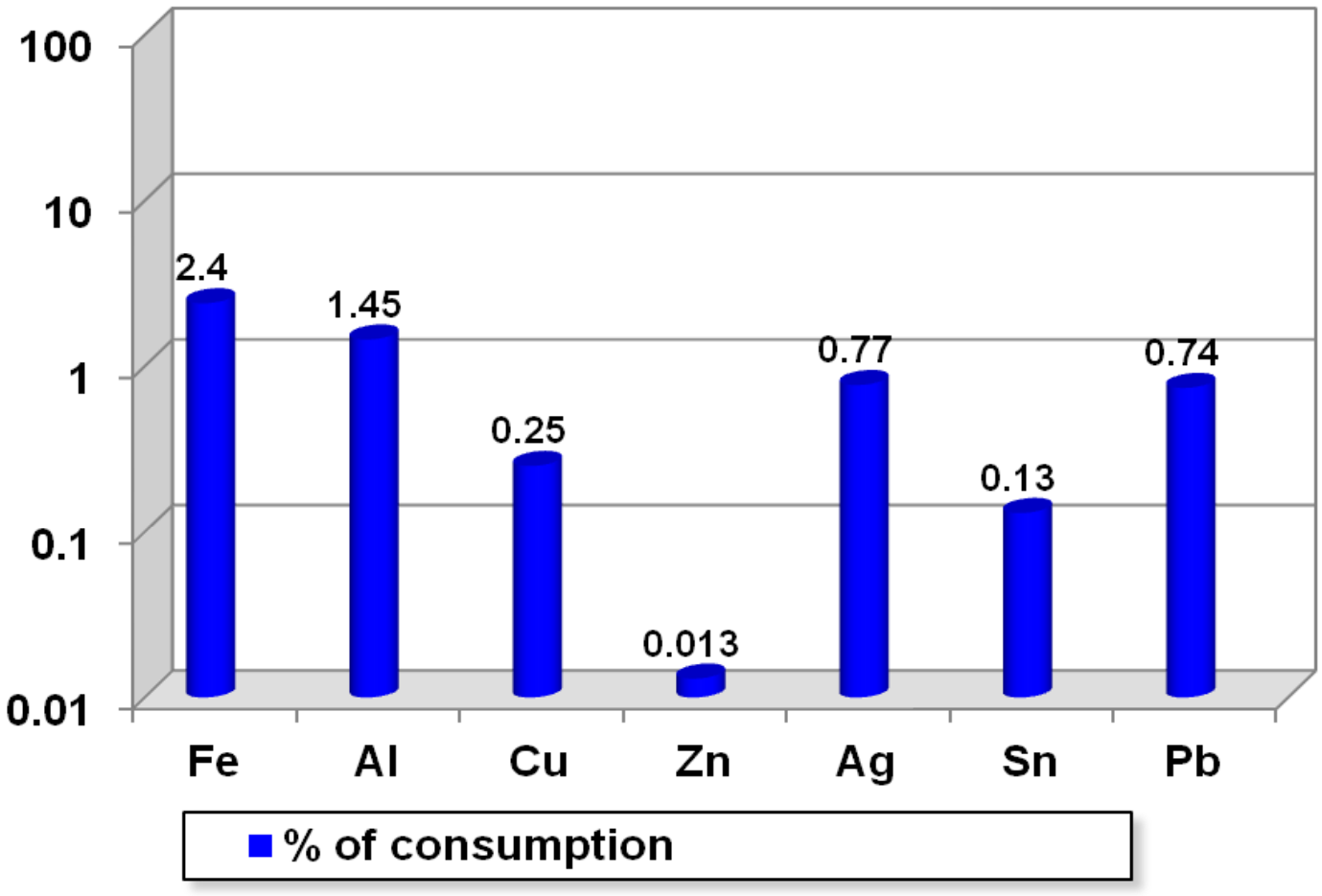


source: Koralewska 2010 (modified)

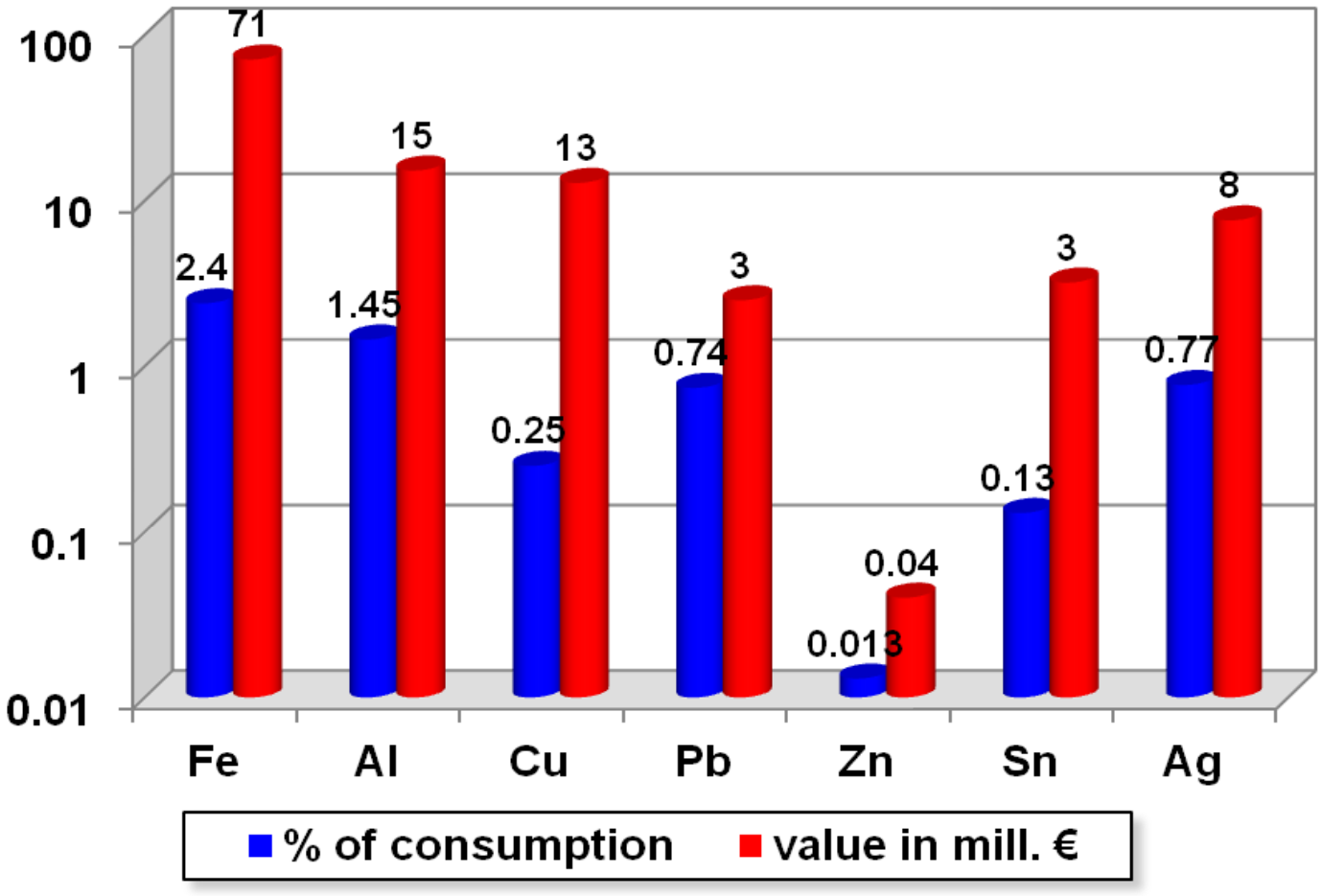
dry deslagging – concept SATOM Monthey



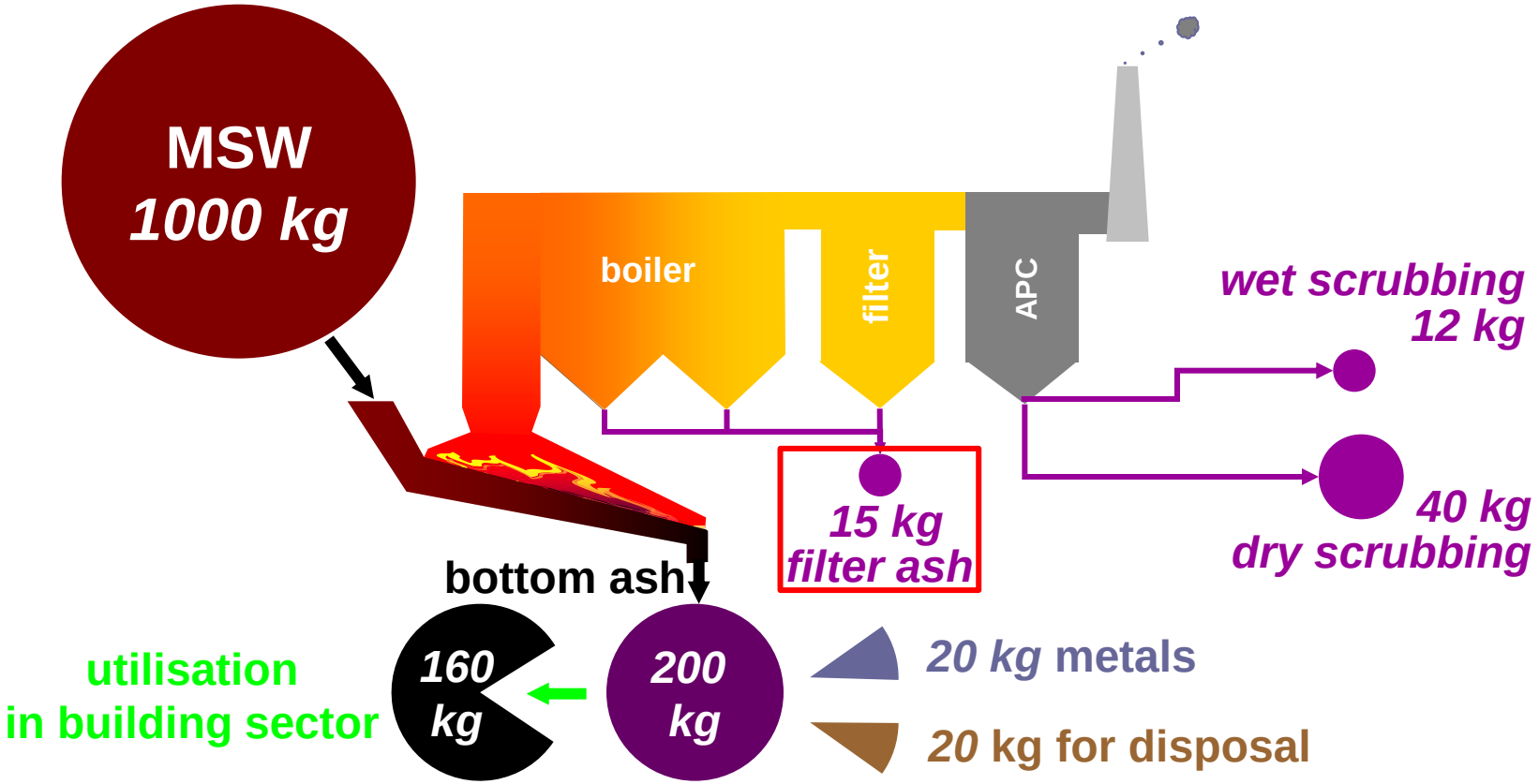
dry deslagging – concept KEZO Hinwil



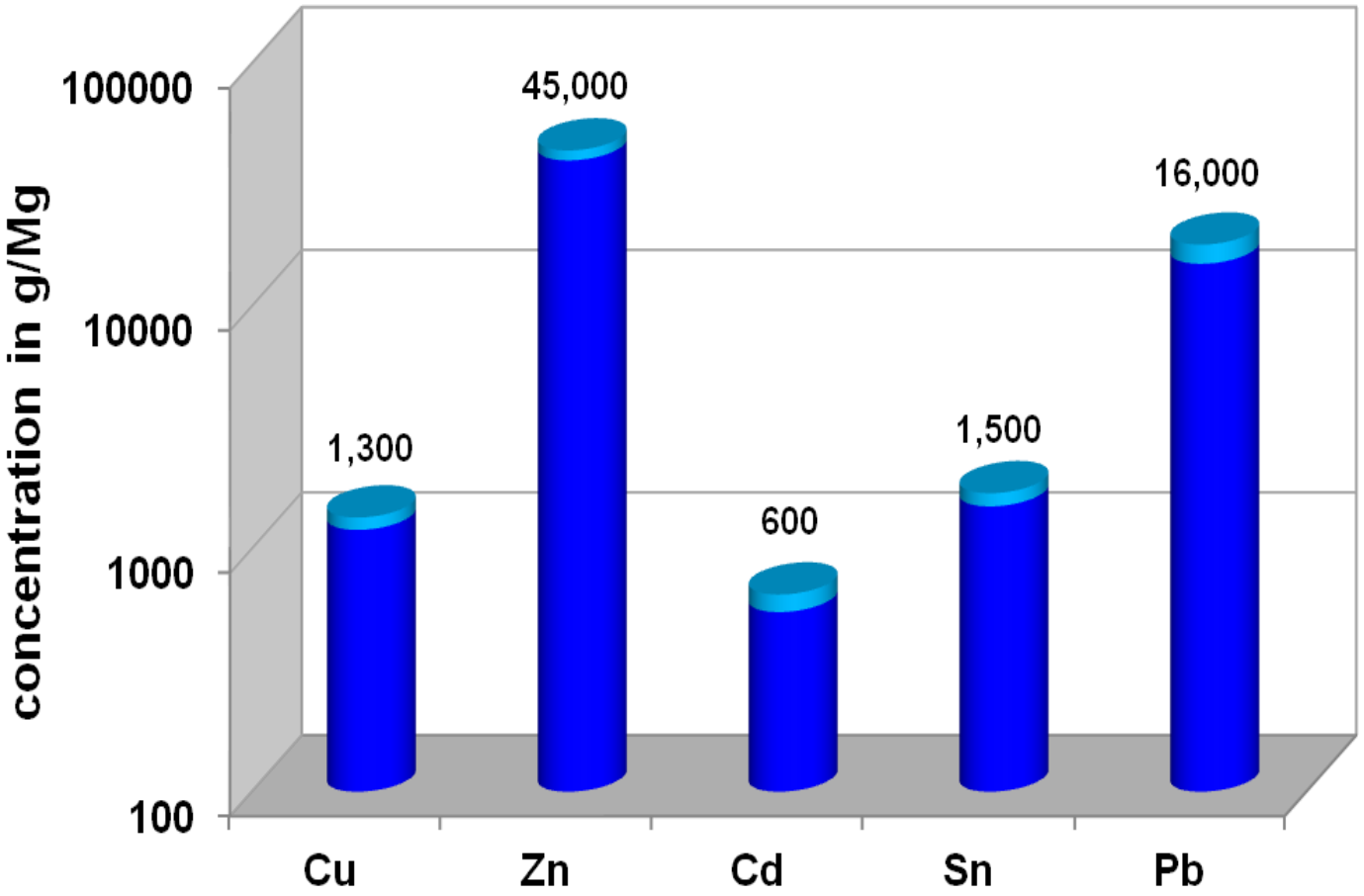
potential of metal recovery in Germany



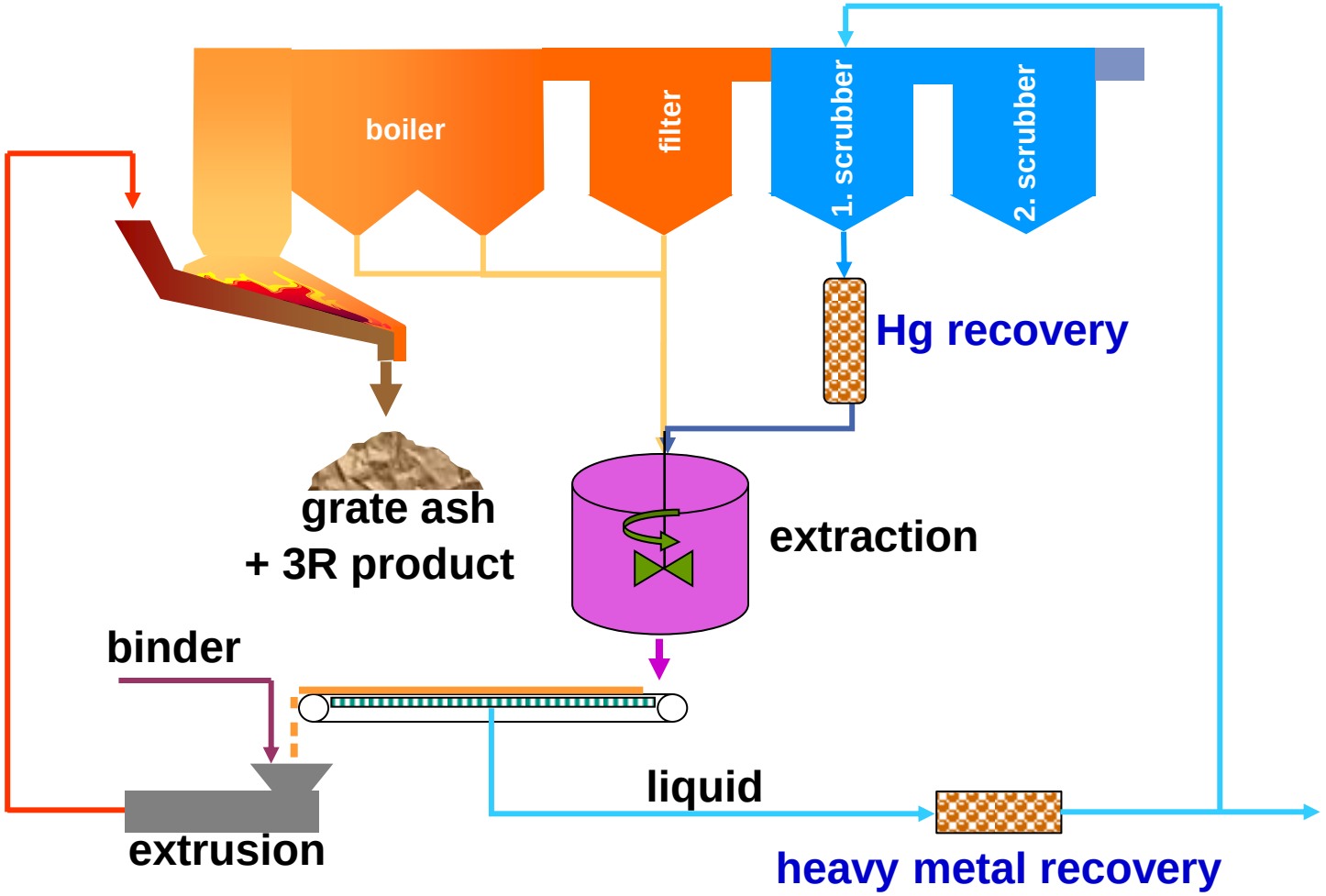
potential of metal recovery in Germany and its value



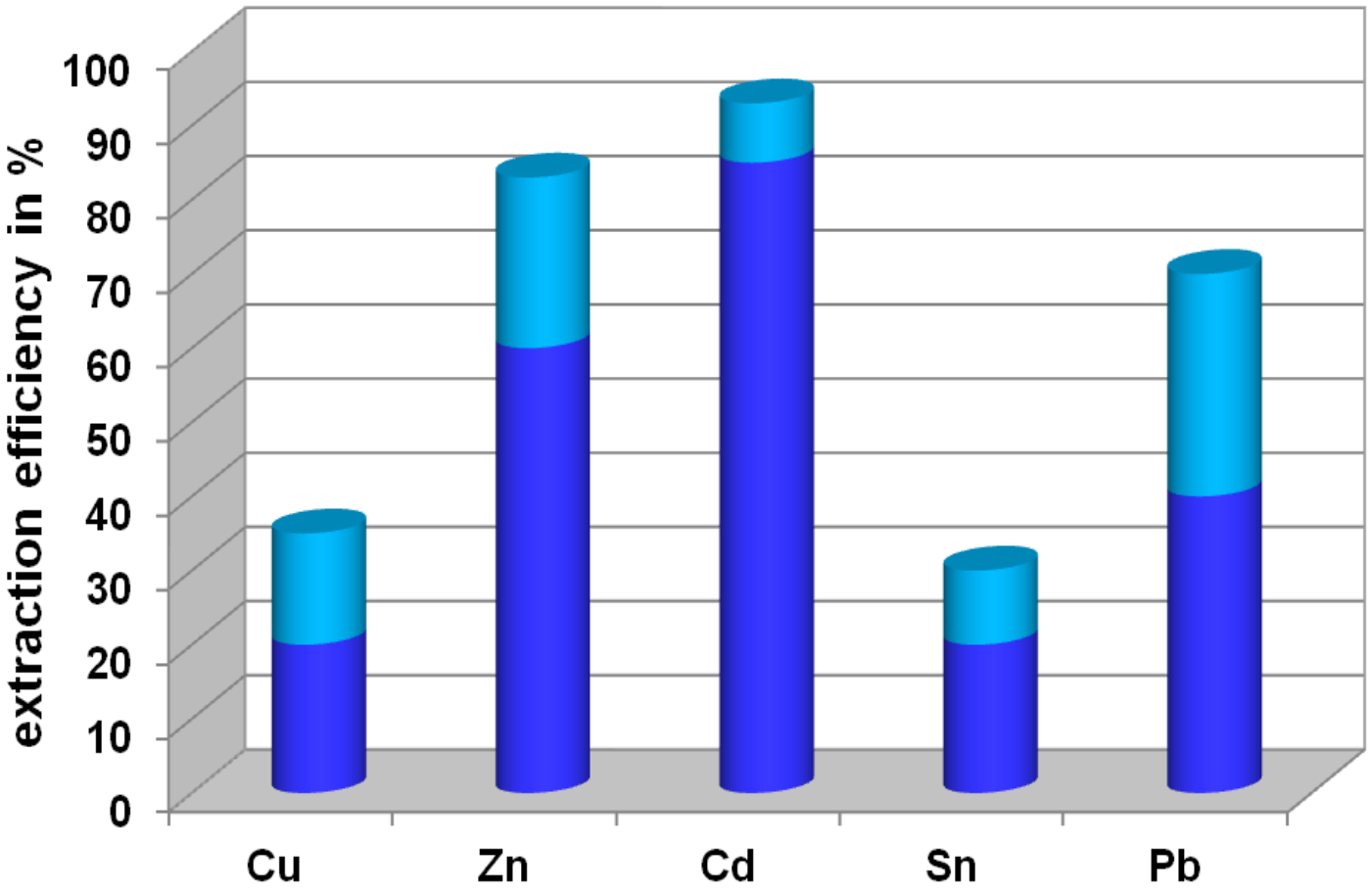
mass flow in a modern MSWI



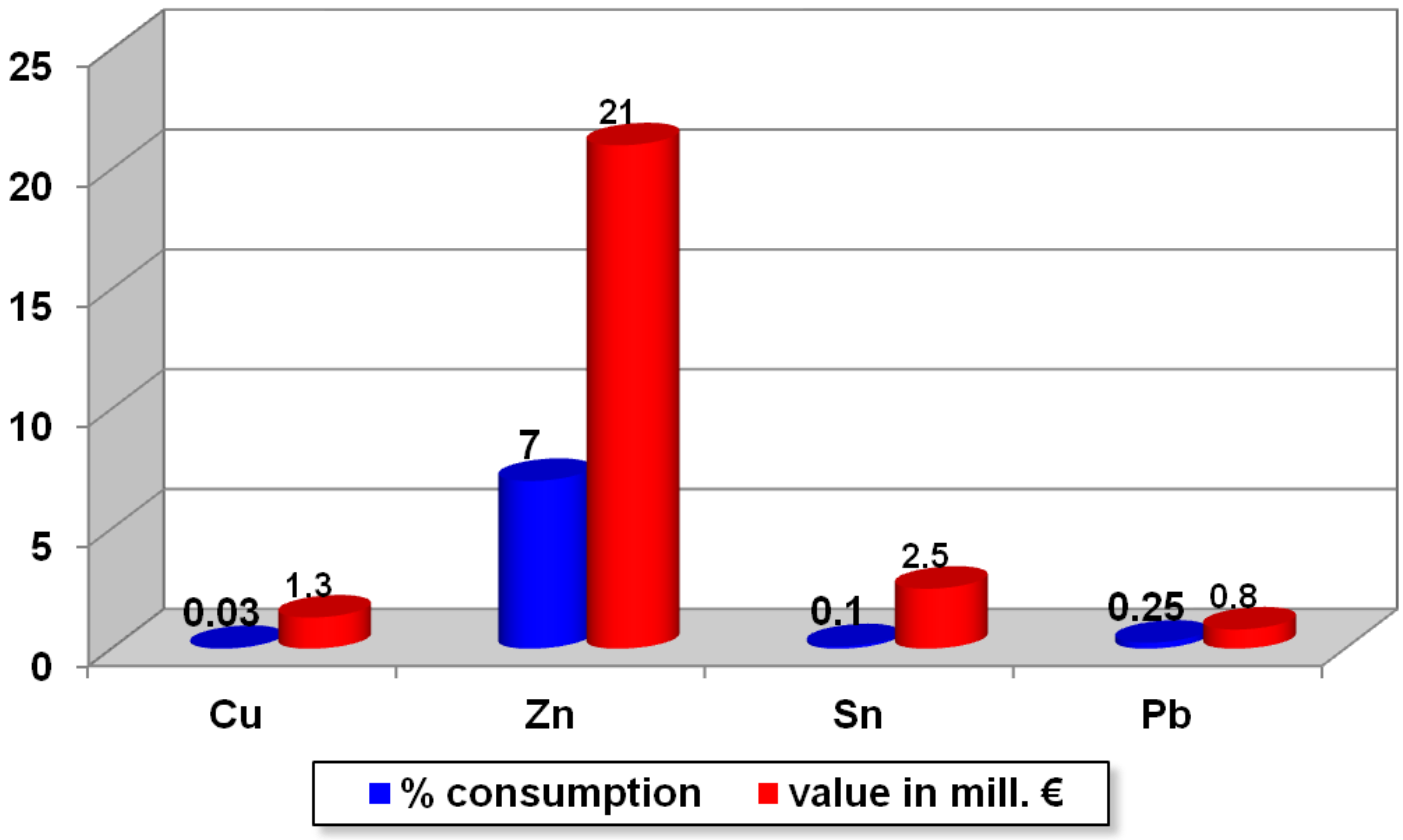
metals in filter ashes



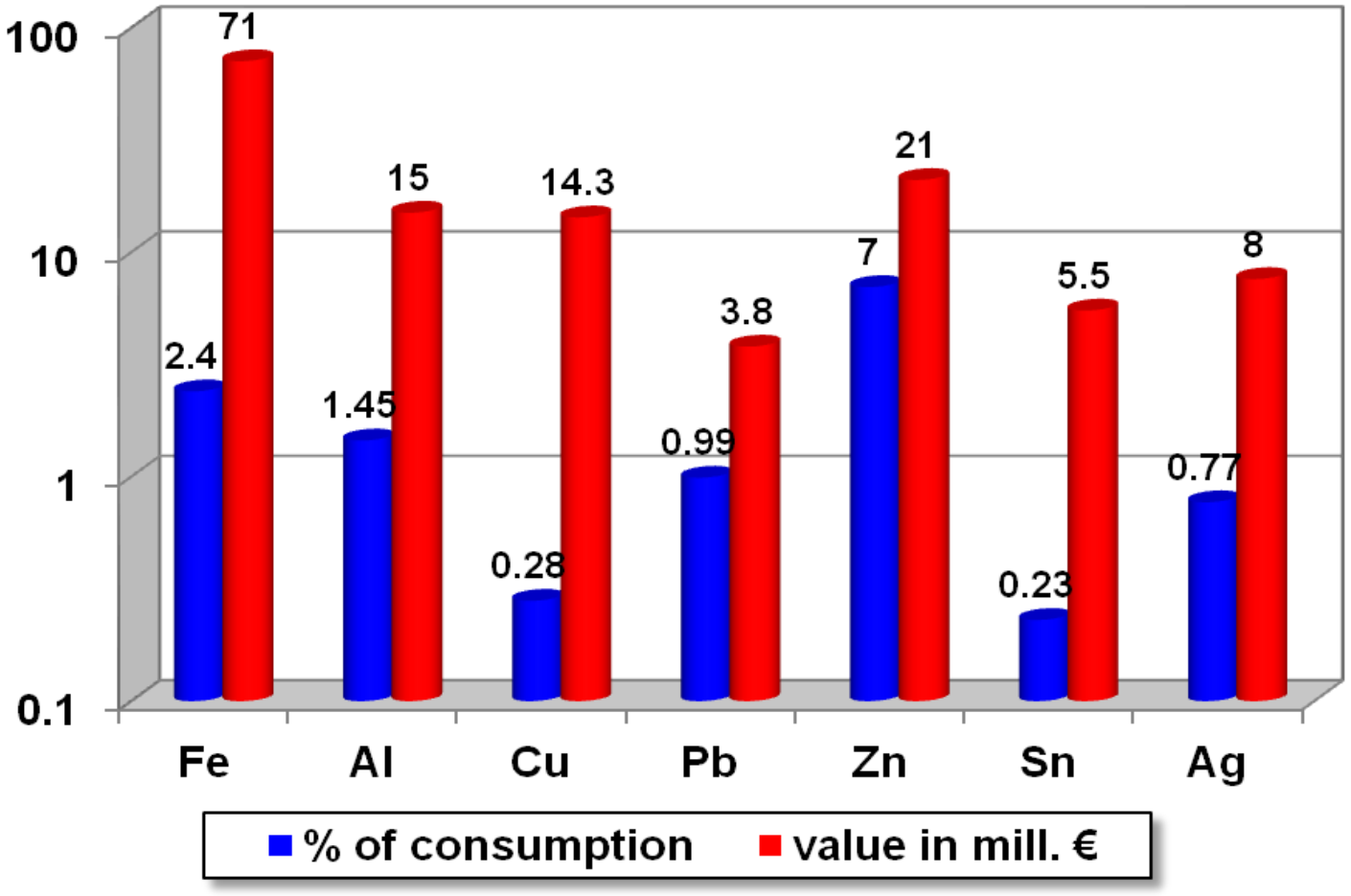
scheme of the 3R Process



extraction efficiency in the FLUWA and 3R Process



potential of metal recovery and its value in Germany



potential of metal recovery from WtE residues in Germany

conclusions

bottom ash management

- utilisation as building material is widely used in Europe
- metal recovery is actually more important
  - ferrous scrap recovery is common practice
  - non-ferrous metals gain in interest (Al and Cu)

filter ash management

- inertisation by extraction and Zn recovery in Switzerland

APC residue management

- disposal prevails, only few cases of recovery

outlook

- **future of bottom ash utilisation as building material unclear**
- **rising prices will push metal recycling**
  - **dry bottom ash discharge may expand for better metal separation from fine fractions**
  - **high sophisticated separation techniques will be applied**
  - **focus will be on heavy non-ferrous metals**
- **Zn recovery from filter ash becomes attractive**
- **eventual consequences**
  - **wider application of FLUWA/3R like processes**
  - **return to wet scrubbing**
- **APC residues remain a problem**
  - **final sink for watersoluble salts is missing**
  - **future of recovery of components?**