Welcome to KEZO

Turns waste into energy and new resources!!

Waste to energy plant with E-waste recovery option

21.6.2019

Bettina Häuselmann

Kezo belongs to 36 communities

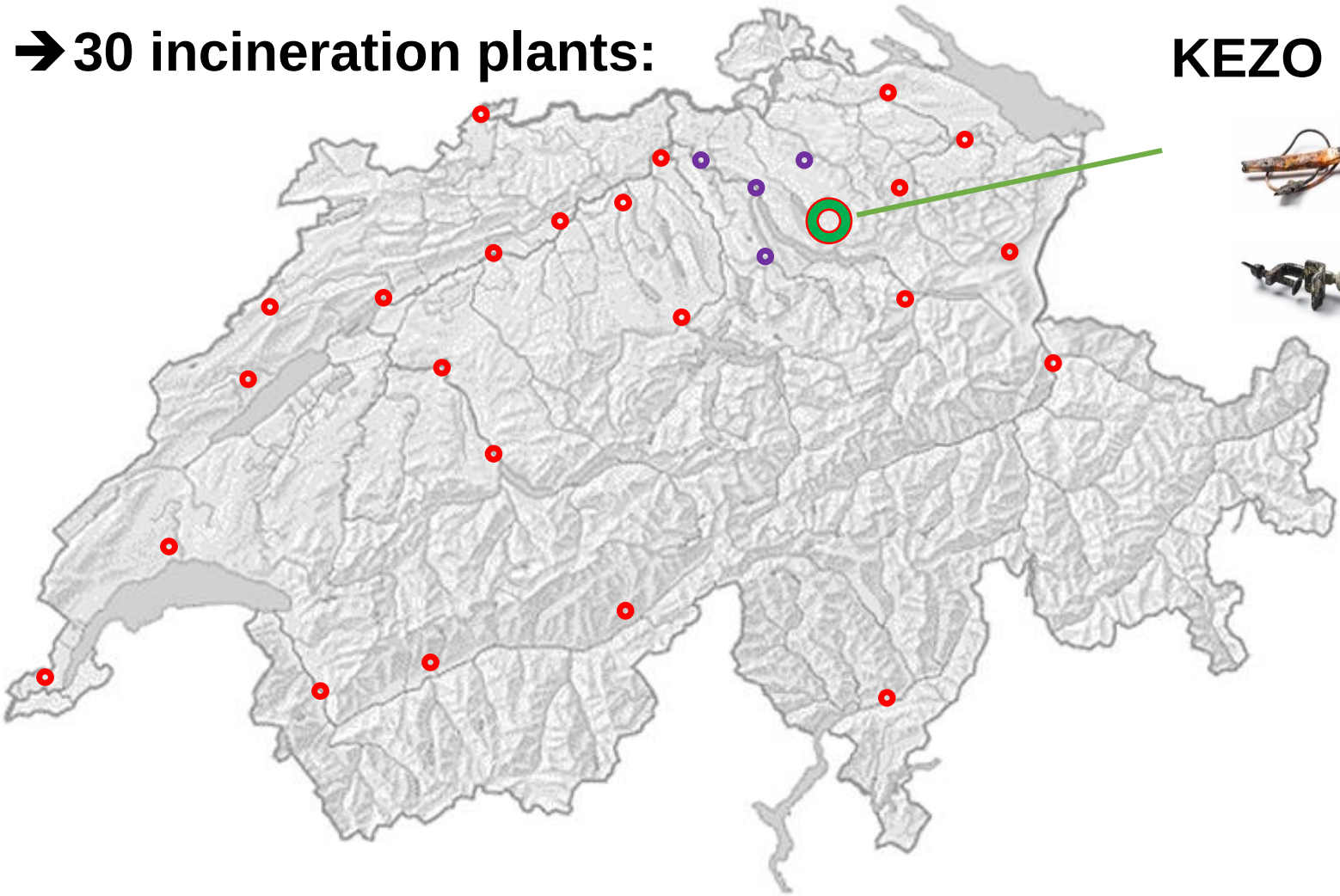
Association of communes

Dumpsites / Landfills

Recycling rate in Switzerland: ≈ 55 %
What is not directly recyclable,
we incinerate: ≈ 45% and bring that back to the circular economy as energy and raw materials.

30 WTE-plants in Switzerland

➔ **30 incineration plants:**



KEZO Hinwil

thermo re®

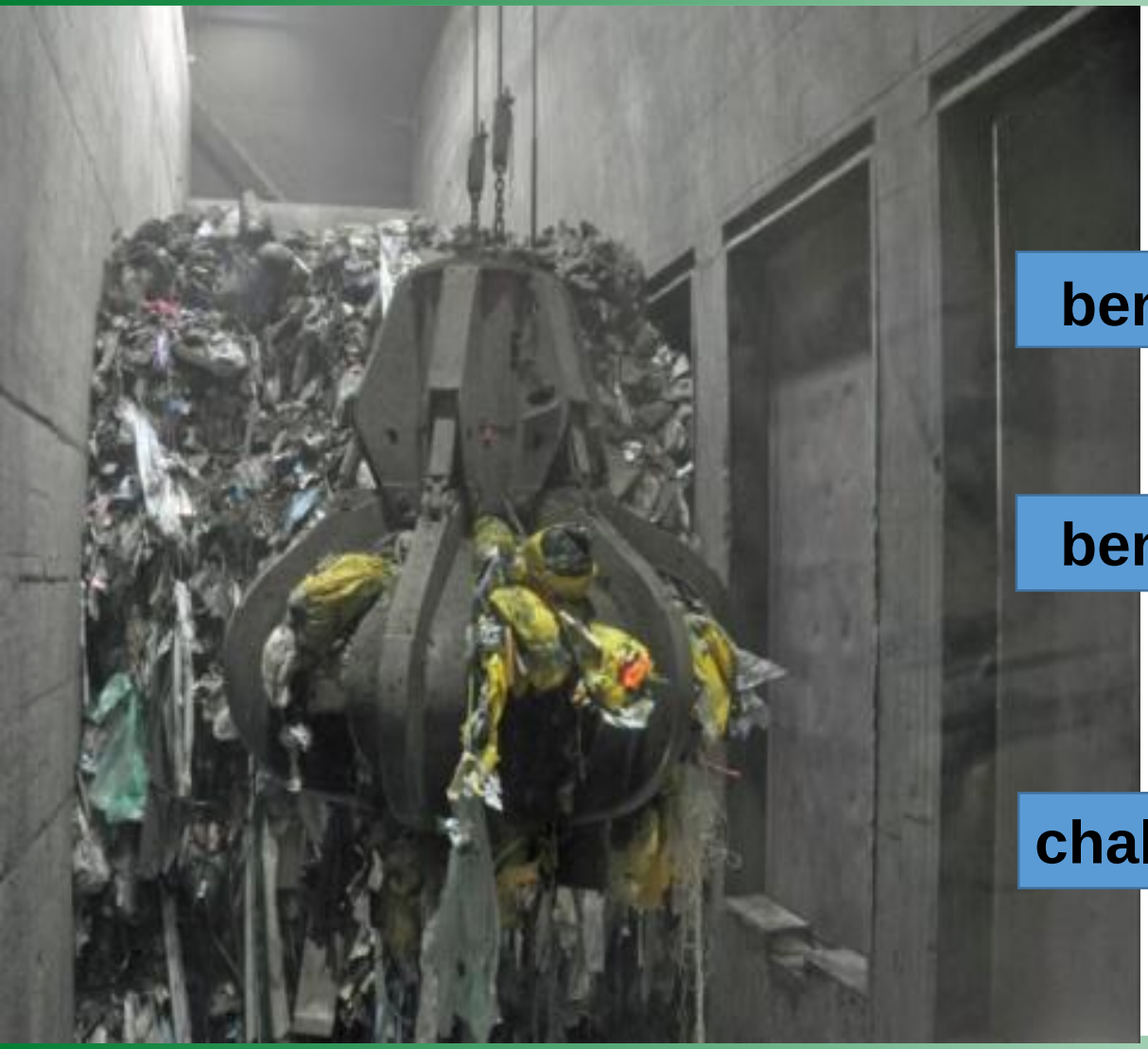
Thermo-Recycling –

A new recycling-strategy

More information ► www.zar-ch.ch



Waste is valuable



Thermo-Recycling

benefit → **energy**

benefit → **raw materials (metals, glass)**

challenges → **emissions residues**

Advantage of Thermo-Recycling

volume reduction
up to 90 %

mass reduction up
to 80 %

Hygenisation !!!

Thermo-Recycling

energy

thermo re®

waste → collecting → waste treatment → incineration → residue treatment → landfill

resources

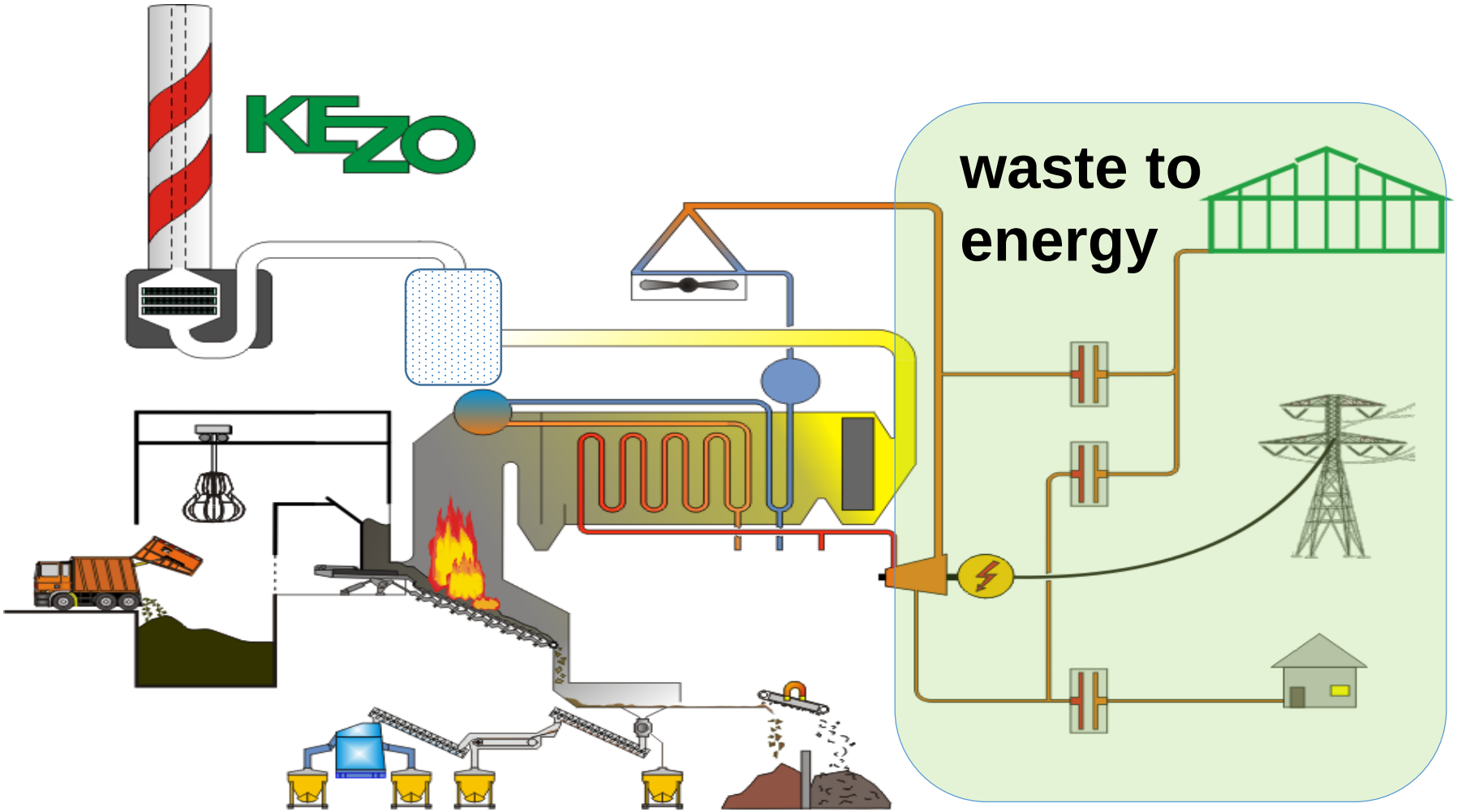
out of fly ash:

- **metals (Zn, Cu, Pb, Cd, ….)**
- **minerals**

out of bottom ash:

- **ferrous**
- **non ferrous (Al, Cu, Ag, Au…)**
- **minerals**

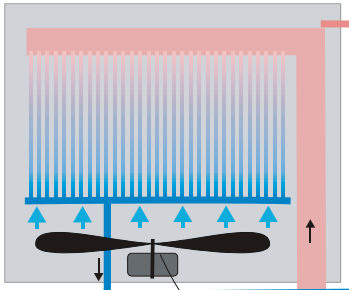
Waste ➡ Energy

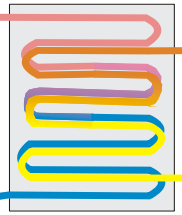


Waste to energy (2016-2018)

Database: 200’000 t of waste

Air cooled condenser





Heat exchanger

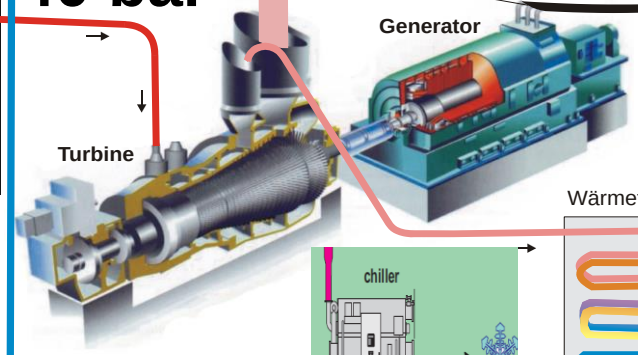
Green house

≈ 35‘000 MWh/a

Electricity

≈ 133‘000 MWh/a

40 bar



Heiz-Kessel

Steam generator (boiler)

Heat exchanger

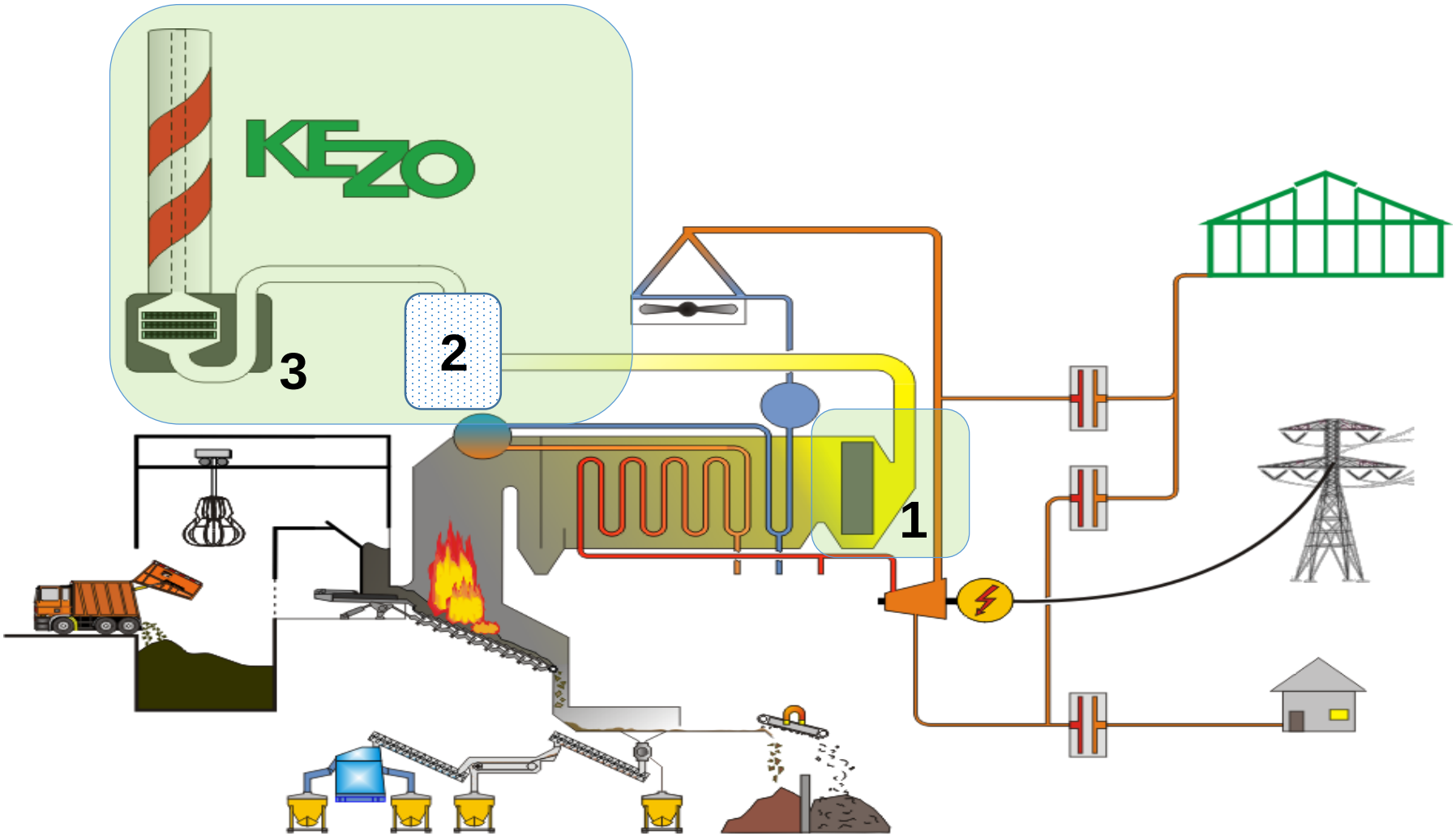
Fernwärmenetz

District heat network

≈ 24‘000 MWh/a

Energy supply for Greenhouses

From flue gas to clean gas



Low emissions

Nitrogen oxide 80mg/Nm3
NO + NO2 = 50,3 mg/Nm3

Sulfur dioxide 50mg/Nm3
SO2 = 6,2 mg/Nm3

Carbon monoxide 50 mg/Nm3
CO = 12,5 mg/Nm3

Ammonia 5mg/Nm3
NH3 = 0,6 mg/Nm3

Hydrochloric acid 20 mg/Nm3
HCl = 0

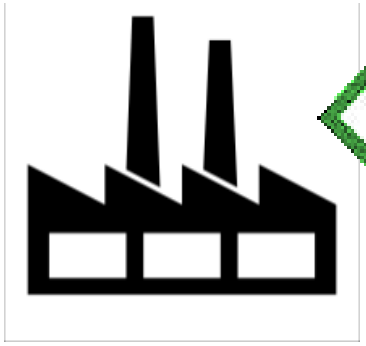
Fine dust 10mg/Nm3
Fine dust = 0

Dioxine/Furane 0,1ng/Nm3
0,002 ng/Nm3

Black: :Legal limits
Blue: KEZO data

Zinc from fly ash

FLUREC



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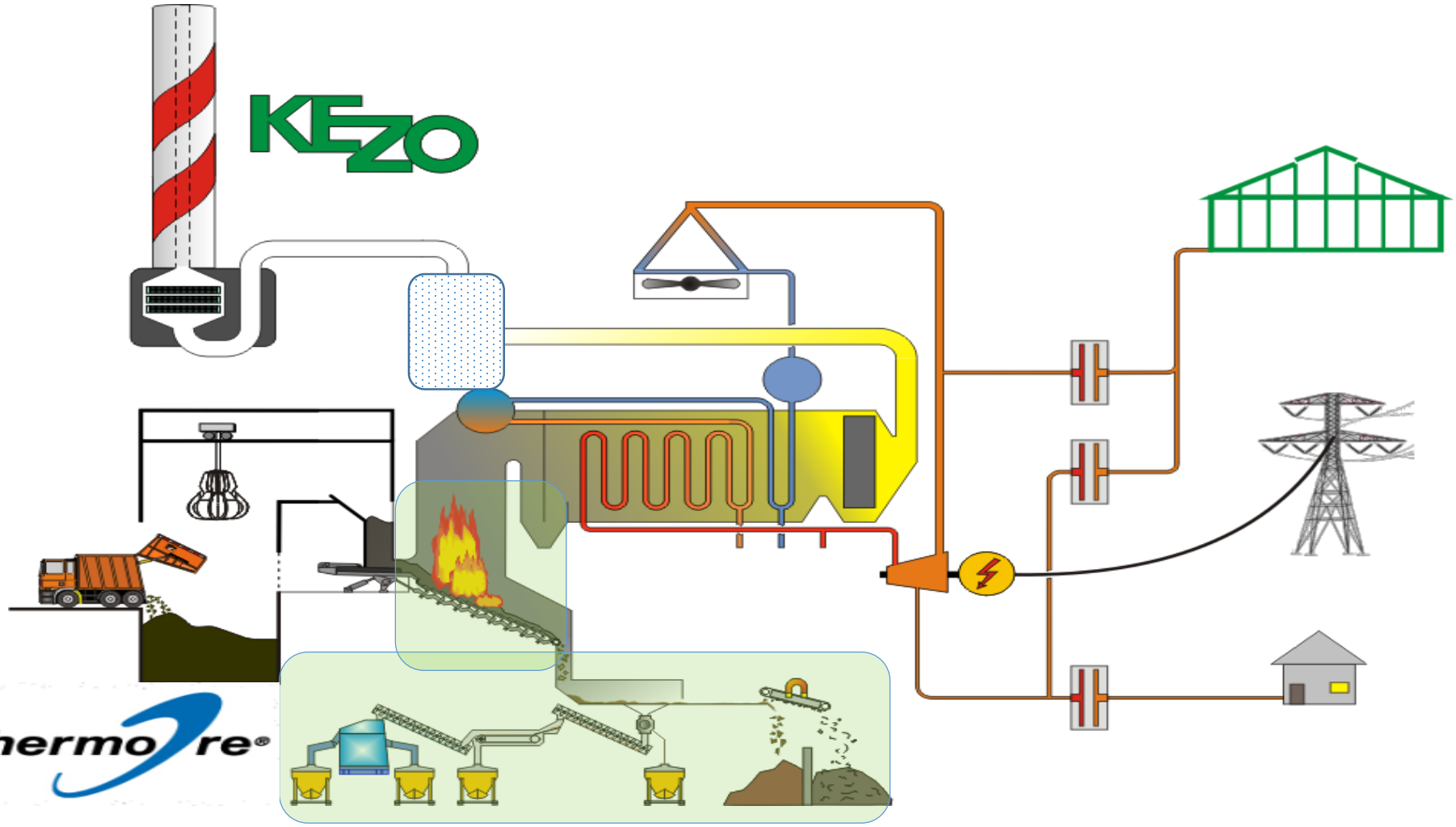
Slag processing



1st step of innovation

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Dry slag (dry discharge)

Wet slag (wet discharge)

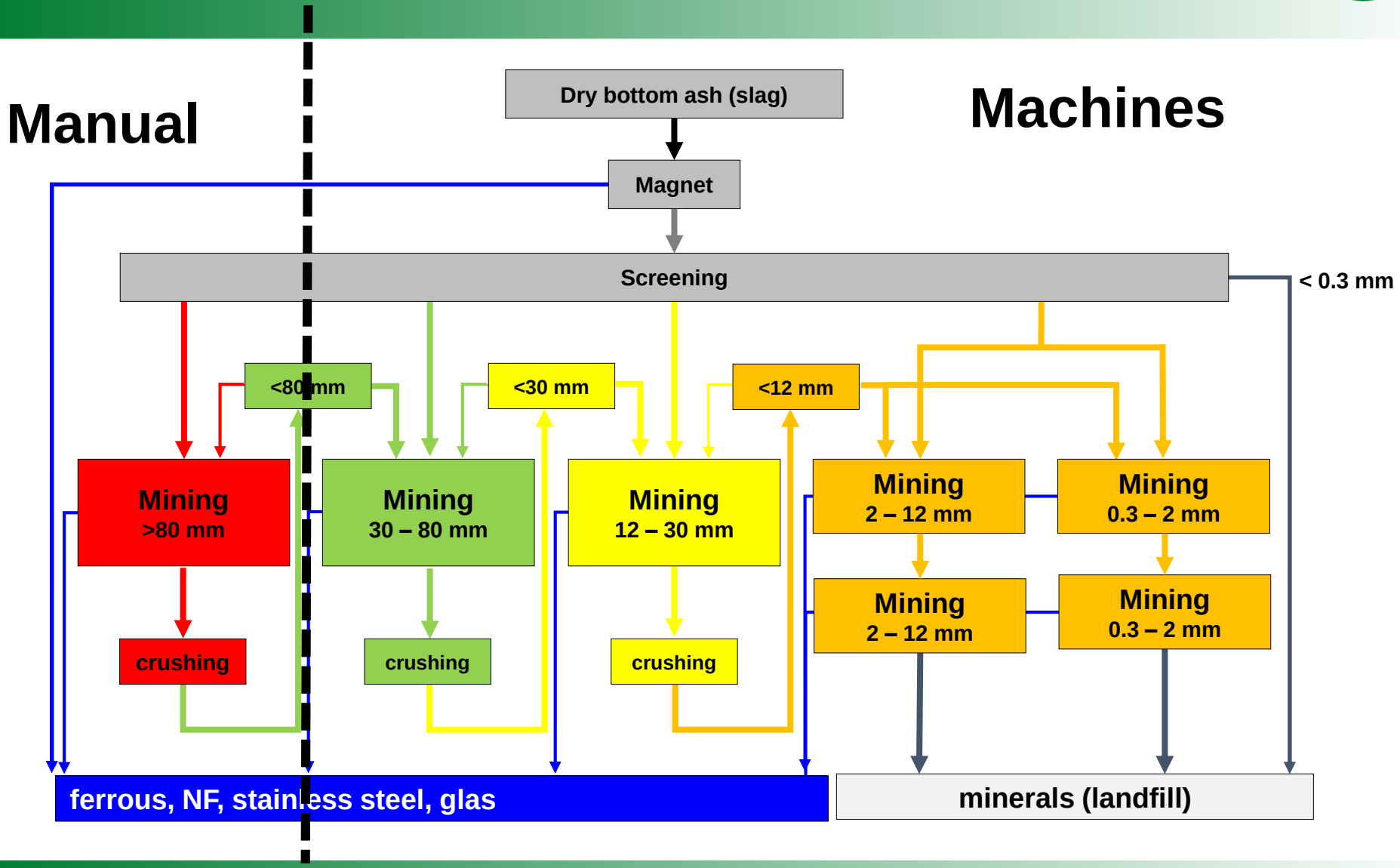
Resources

1t of waste

190 kg minerals

30 kg metals

Slag processing



Slag processing: Magnet separator

Triage hall

Disc screening
> 80 mm

Circular vibrating screens
30 – 80 mm
12 – 30 mm

Linear vibrating screen
0.3 – 12 mm

Manual sorting

Material > 80mm

Selective crushing (jaw crusher)

Slag agglomerates contain a lot of (NF-)metals

Jaw crusher

Fine material < 80mm

NF recovery

Separating tables

Products: base 100’000 t of slag

2017: Iron 3518 t Non Iron-Metals: 1707 t
Ag 1750 kg Au 65 kg

ZAV RECYCLING

Produkte (Beispiele)

NE leicht (Aluminium)

0.3-1.2mm ... 8-15mm

NE schwer

0.3-1.2mm ... 8-15mm

NE Mix 15-30mm

NE Mix 30-80mm

VA-Stahl 15-80mm

Glas 15-30mm

Where do the metals come from?

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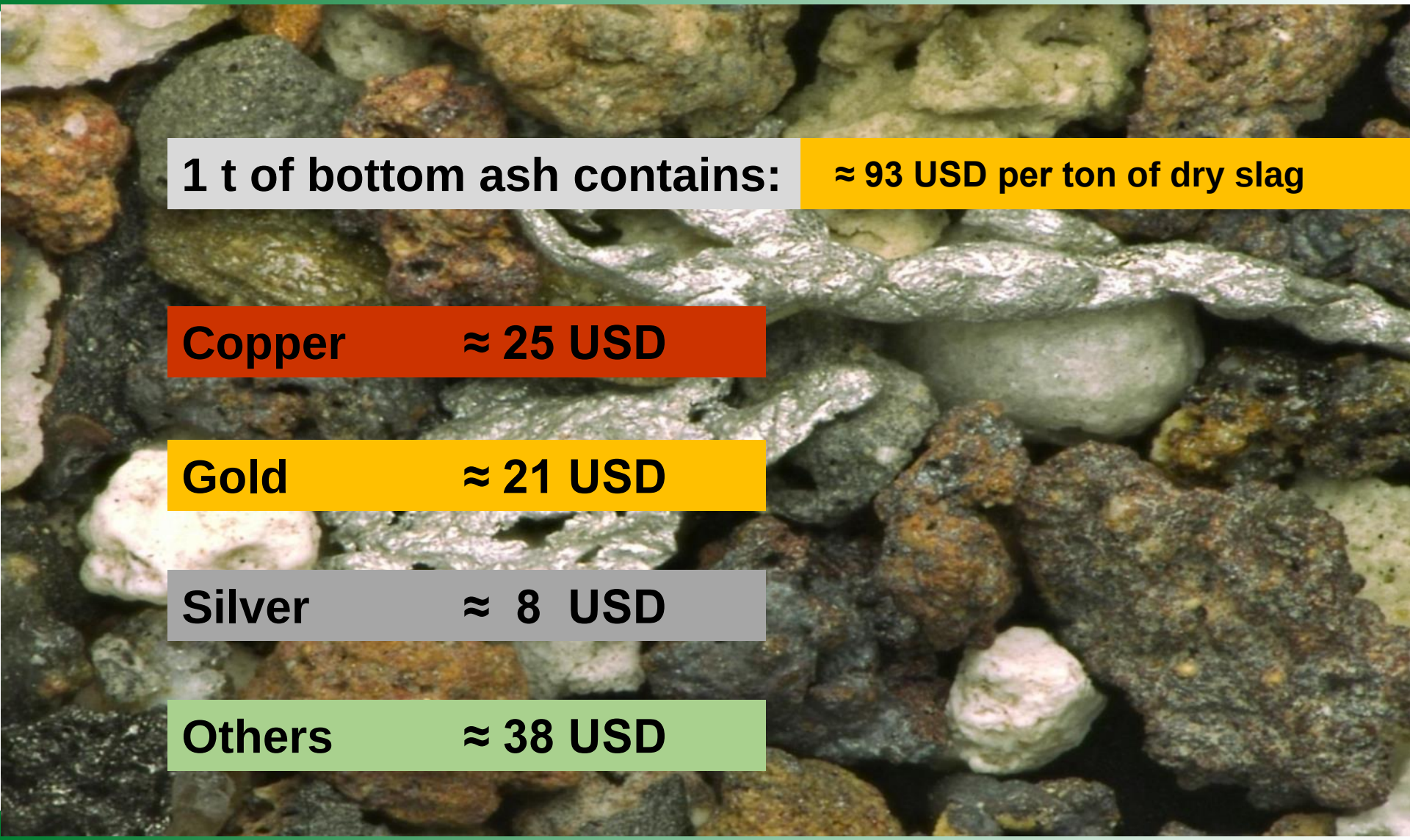
One example!!

Economical



1 t of bottom ash contains:	≈ 93 USD per ton of dry slag
Copper	≈ 25 USD
Gold	≈ 21 USD
Silver	≈ 8 USD
Others	≈ 38 USD

Great saving of EIP (Environmental impact points)

1000 EIP = 3km by car (source: Carbotech)

Basis	Aluminium [kg]	cupper [kg]	gold [kg]
7‘753‘000 EIP	1000	34	0.100
Equal benefit for	1000	260	0.037

Finest aluminium

Use without melting process possible!
Foundries – explosives industries

0.3 – 1.2 mm

Clean recovery of precious resources!

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E-waste treatment

Benefits Thermo-Recycling

- **Hygenic treatment**
- **Volume and mass reduction (80-90%)**
- **Energy production (efficiency up to 70% is possible)**
- **Raw materials (metals, glass)**
- **E-waste treatment is possible**

- **Mineral residues with low emissions and therefore have a potential to use for cement production**
- **Minimal impacts to the environment: For example «no methan emissions», clean gaz, landfill without harmful impacts (air, groundwater), circular economy of metals**