



An innovative and climate protective waste treatment system



The Herhof Dry Stabilat Process



Advantages of the Herhof technology

- Waste to energy
- No waste material for landfilling
- Biological drying increases calorific value
- Separation of waste into material for energy recovery and material recovery
- 50% of input material transferred into secondary fuel
- Secondary fuel has 2/3 of organic material
- CO₂ savings for 2/3 of the output material (Stabilat)

The Herhof Dry Stabilat Process



Herhof Stabilat® plants:

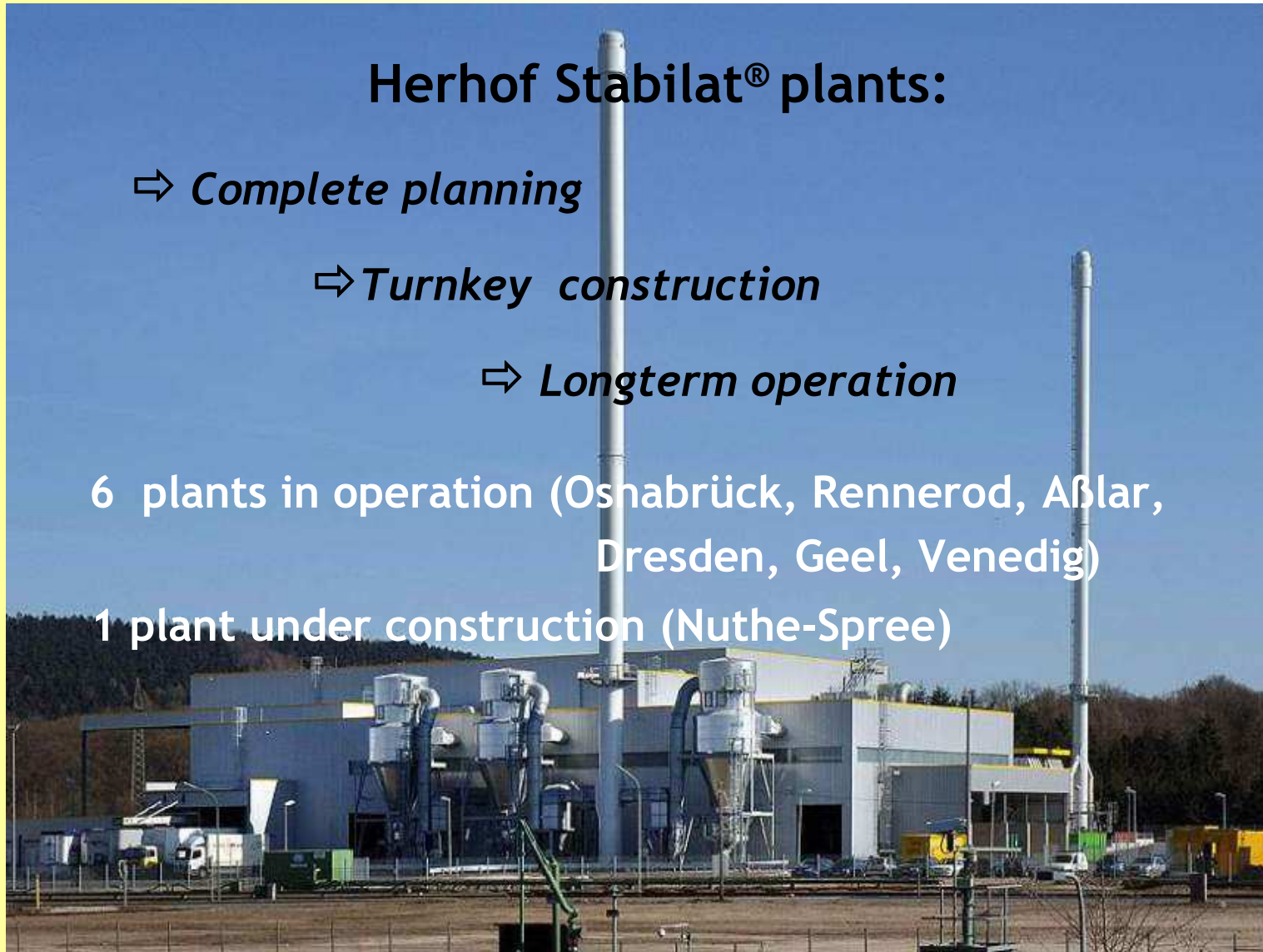
⇒ *Complete planning*

⇒ *Turnkey construction*

⇒ *Longterm operation*

6 plants in operation (Oshabrück, Rennerod, Aßlar,
Dresden, Geel, Venedig)

1 plant under construction (Nuthe-Spree)



The Herhof Dry Stabilat Process



Stabilat® technology - Using MSW as a resource



**Material
Recovery**

**Energy
Recovery**



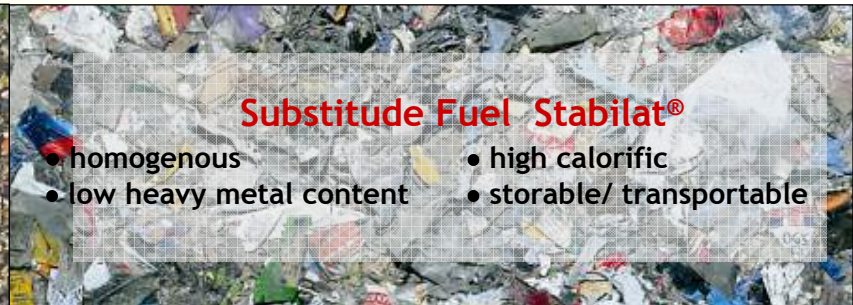
**Condensate / Permeate
30%**



Metals
Fe 4%
NF* 1%



Inerts/ Glass
12%
Batteries / Electronic scrap



Substitute Fuel Stabilat®

- homogenous
- high calorific
- low heavy metal content
- storable/ transportable

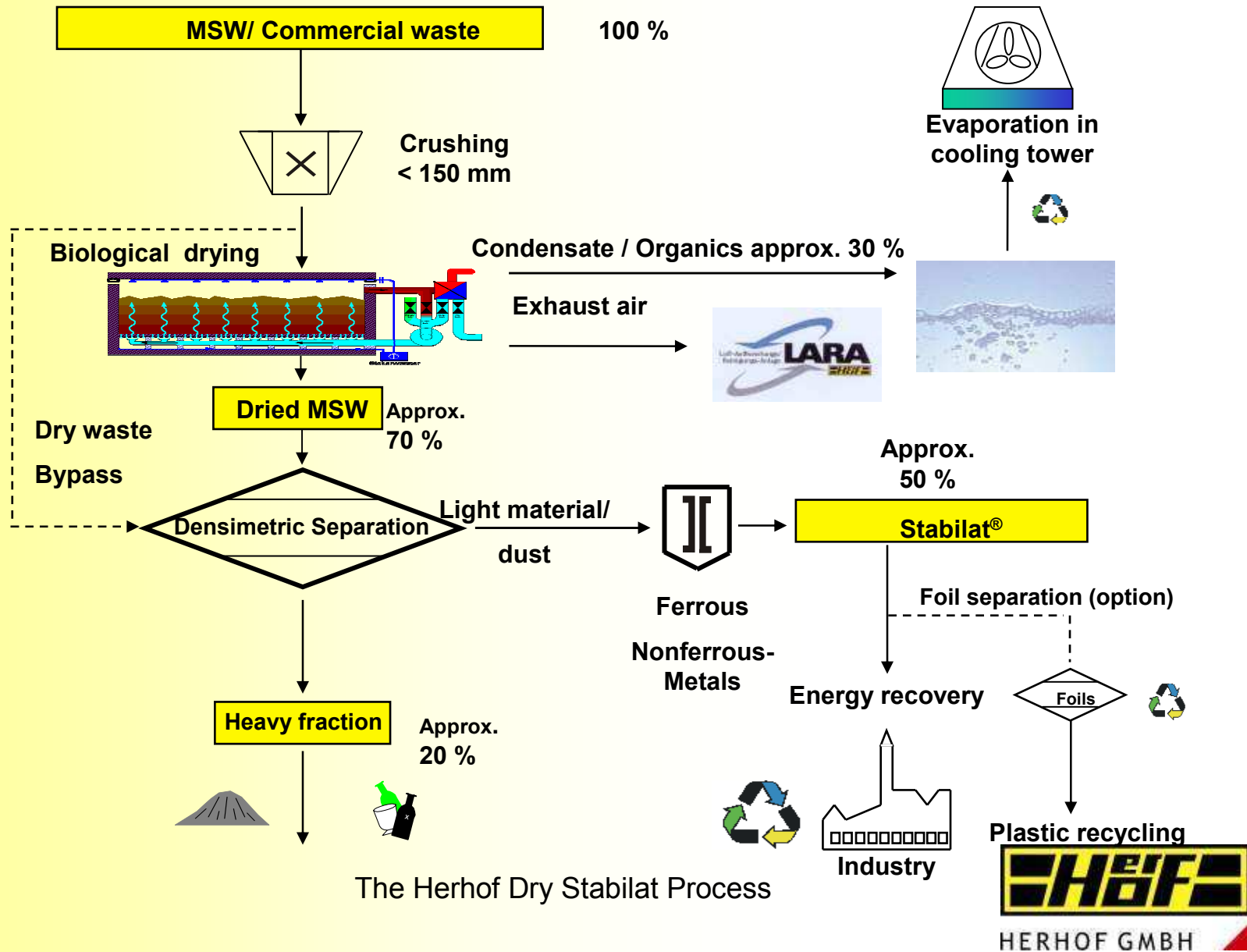
**Stabilat®
53%**

NF* = Nonferrous

The Herhof Dry Stabilat Process

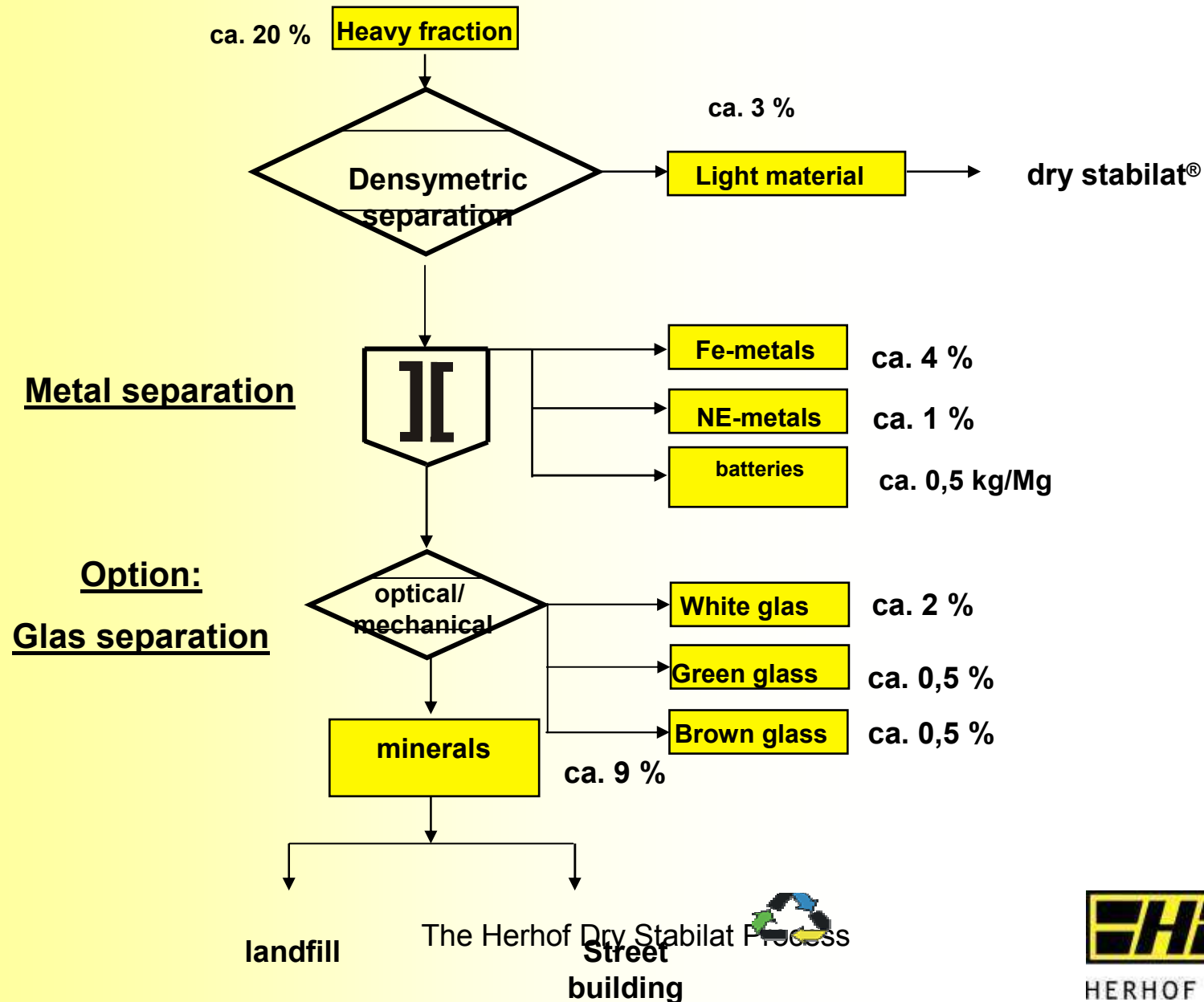


Herhof Stabilat® Technology - with glass separation -



The Herhof Dry Stabilat Process

Separation of the heavy fraction



View of a plant (MBS Osnabrück)

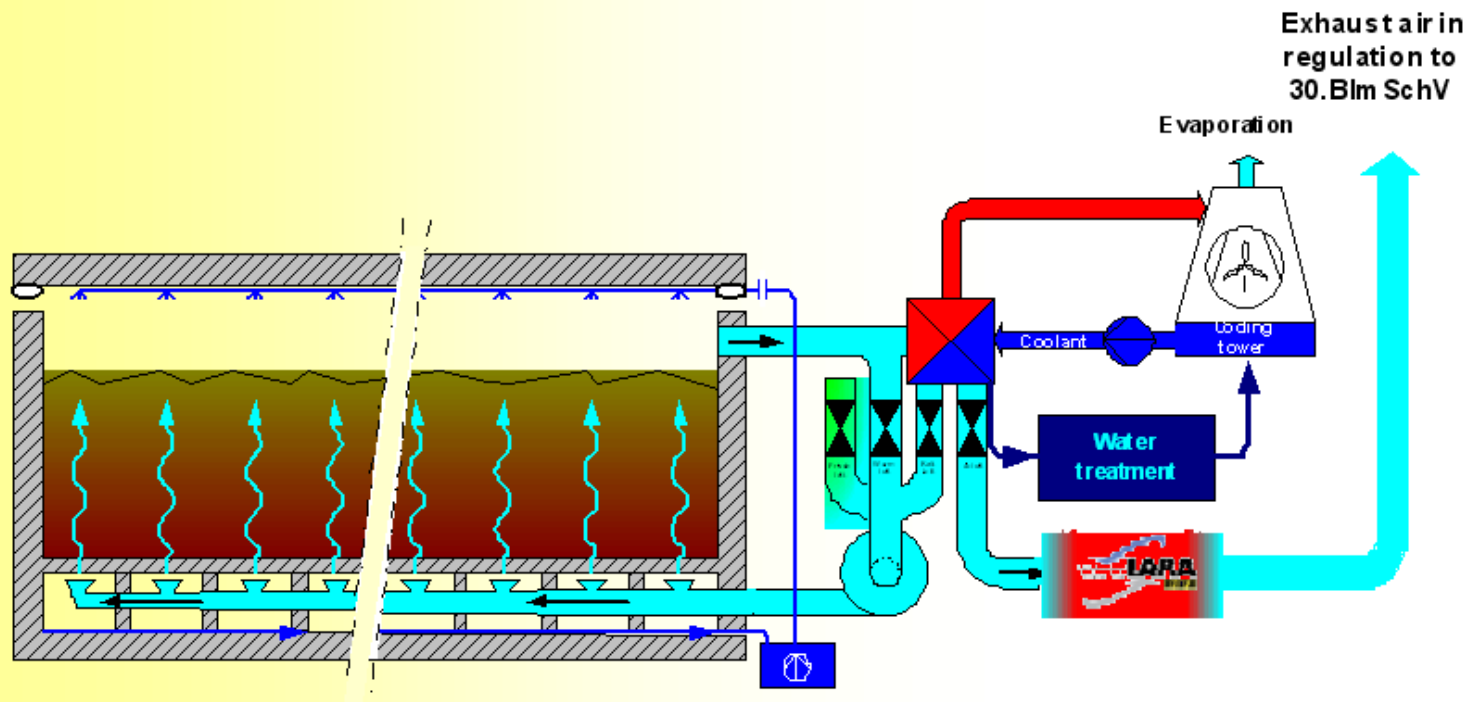


The Herhof Dry Stabilat Process



Composting boxes

Composting / Biological drying process with the Herhof composting box



The Herhof Dry Stabilat Process

Herhof box with process crane



The Herhof Dry Stabilat Process

Ventilation corridor



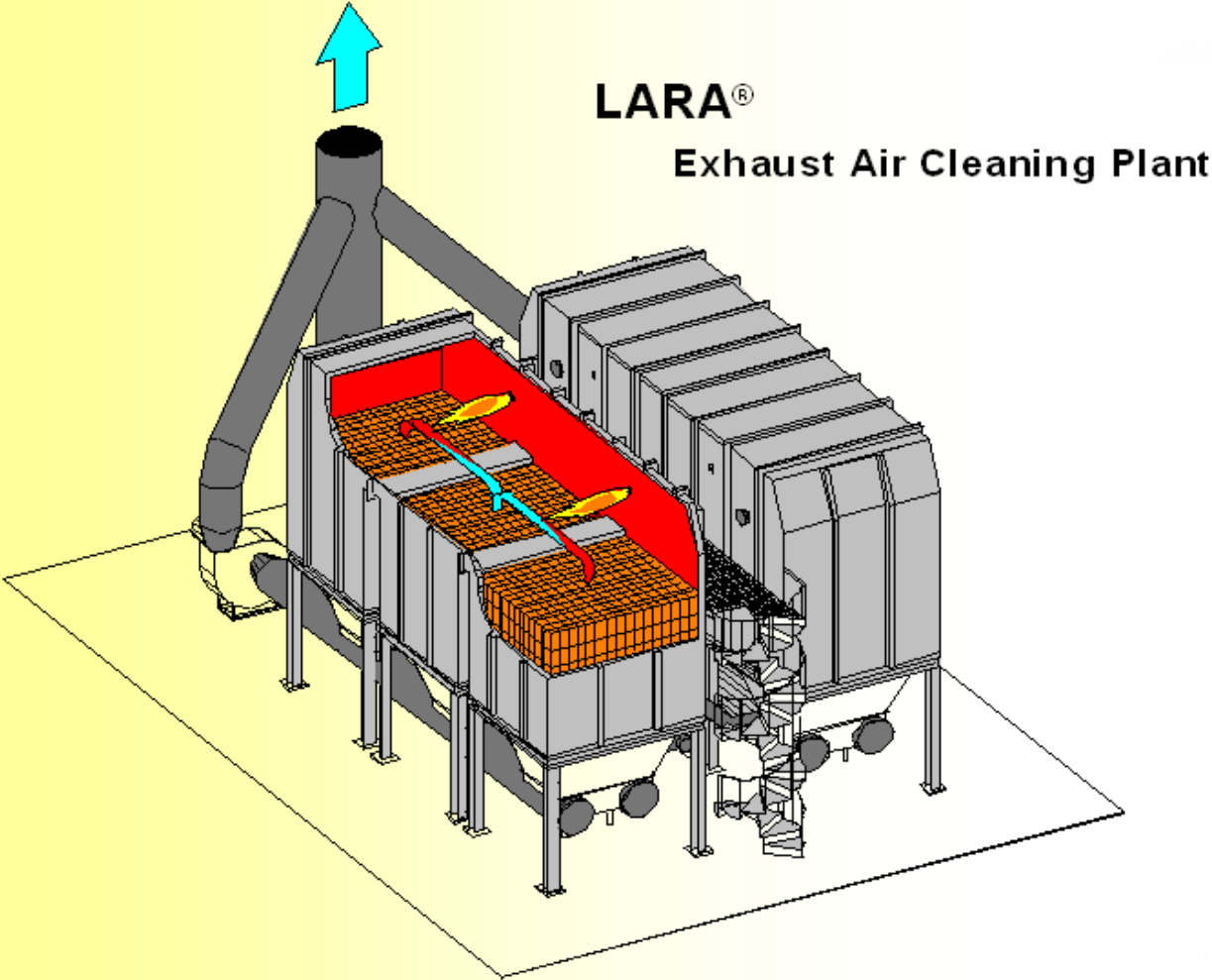
The Herhof Dry Stabilat Process

Condensate cleaning



The Herhof Dry Stabilat Process

Exhaust air cleaning



The Herhof Dry Stabilat Process

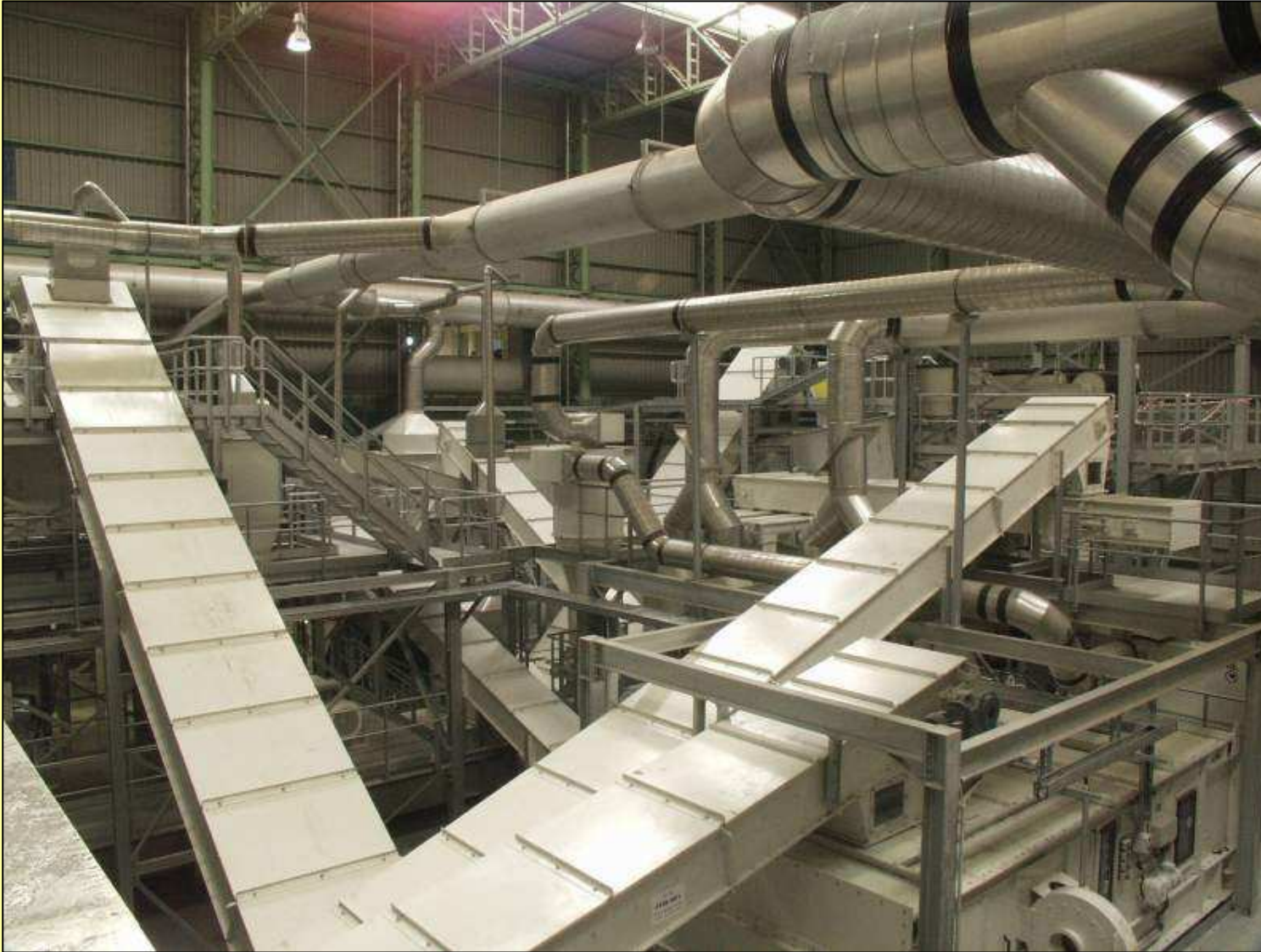


LARA air cleaning



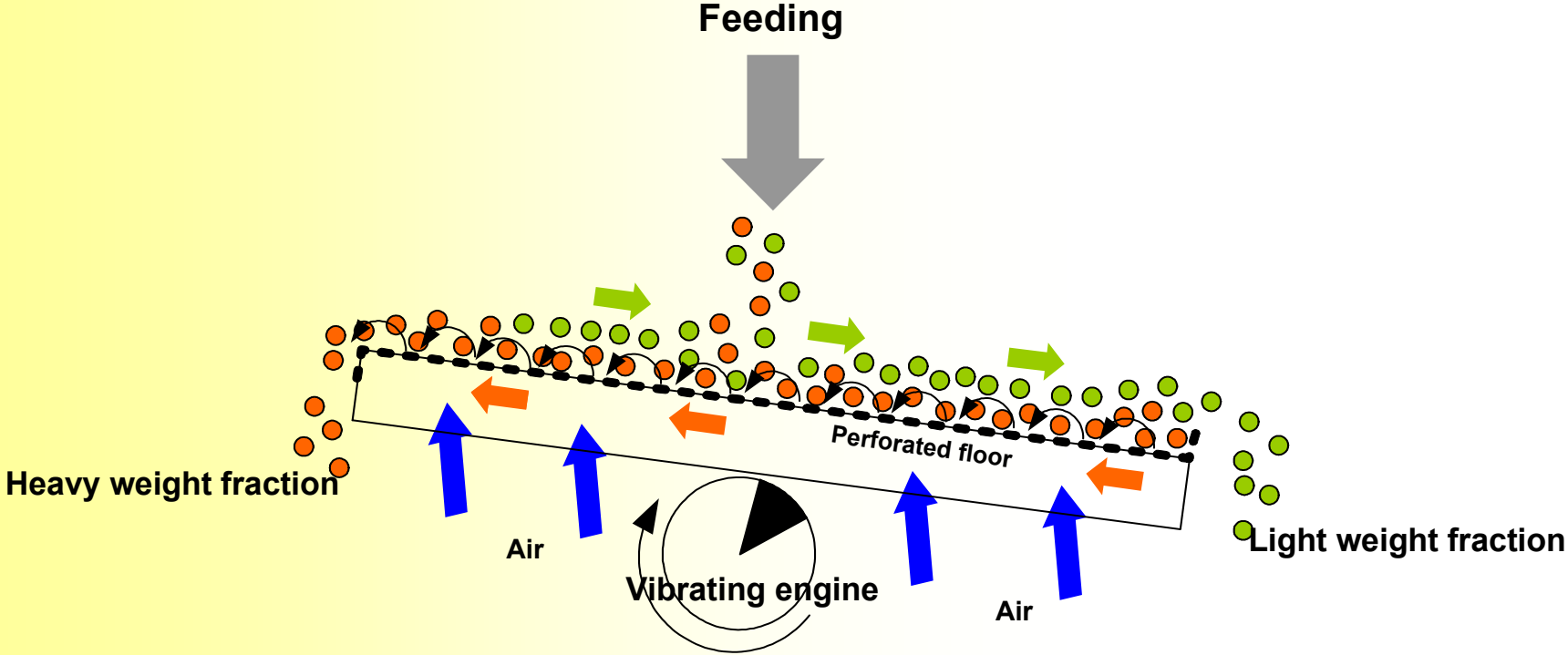
The Herhof Dry Stabilat Process

Machinery Hall



The Herhof Dry Stabilat Process

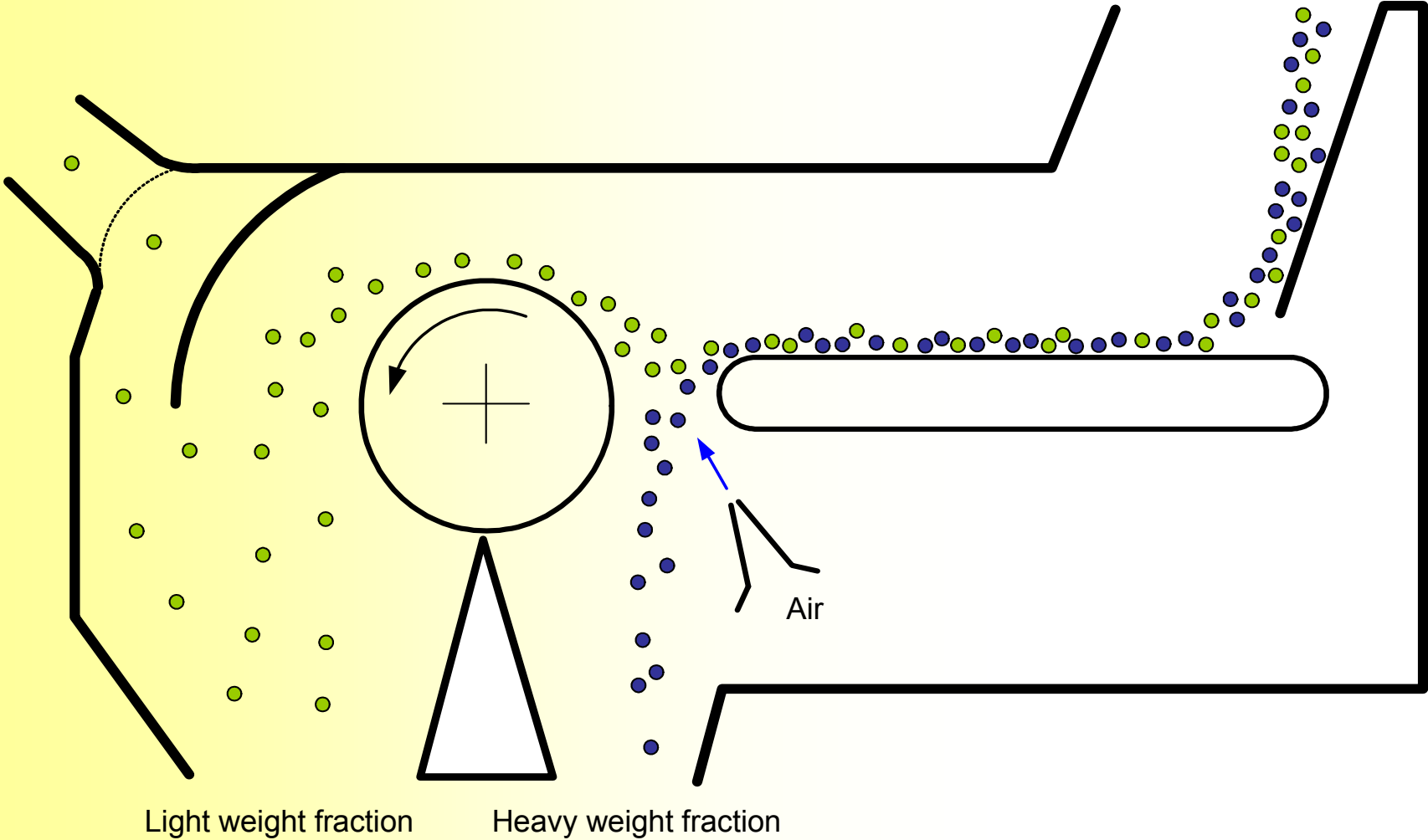
Wind sifter



The Herhof Dry Stabilat Process



Wind sighter



The Herhof Dry Stabilat Process



Batteries



The Herhof Dry Stabilat Process



Stabilat® - Fluff



Stabilat® - Softpellet



The Herhof Dry Stabilat Process

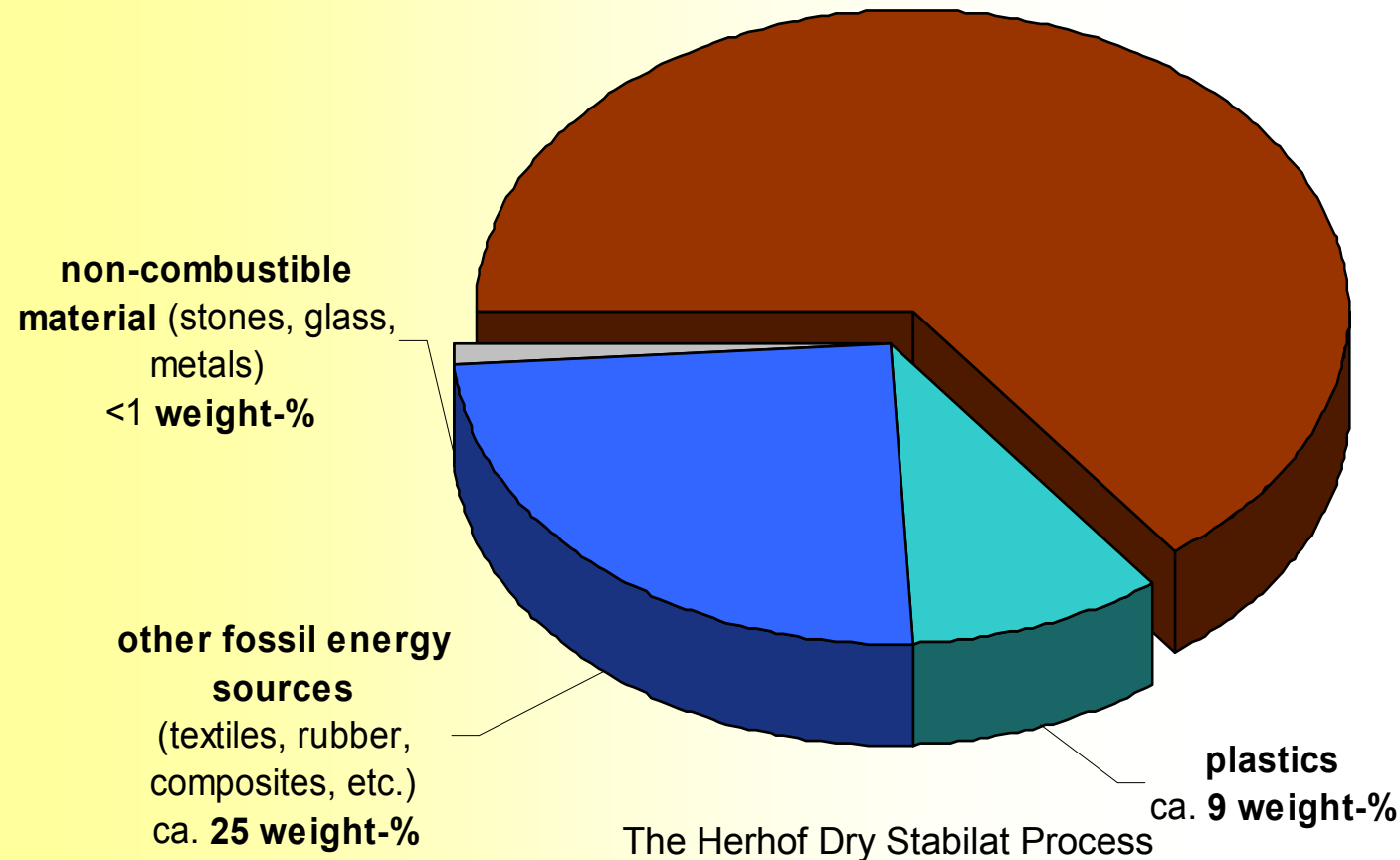
Stabilat® - Hardpellet



The Herhof Dry Stabilat Process

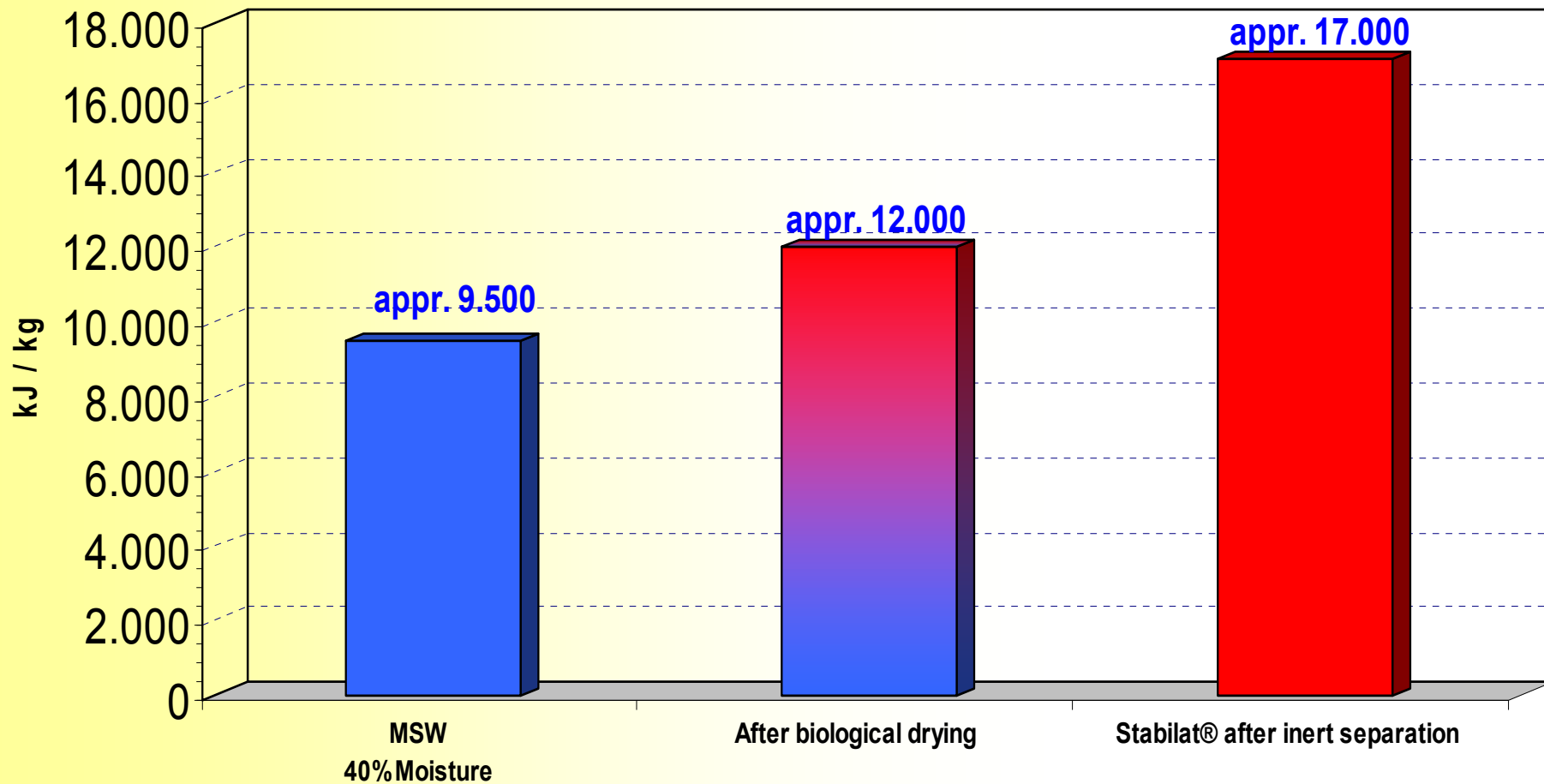
Composition of stabilat®

Heating value : 15 - 18 MJ/kg
Water content : ca. 15 weight-%
Percentage of the total waste throughput : ca. 53 weight-%



renewable energy sources
(paper, textiles, wood, organic material, loss on ignition of the fine particles)
ca. 65 weight-%

Increase of calorific value



The Herhof Dry Stabilat Process



Calorific values of different fuels in comparison

Fuels	Calorific value [kJ/kg]	Calorific value [Btu/lbs]
Lignite	8,000 – 16,000	3,600 – 7,200
Wood	10,500 – 16,500	4,500 – 7,100
Paper	13,500	5,800
Stabilat [®]	16,000 – 18,000	6,900 – 7,800
Pulverized lignite	20,000	8,600
Hard coal	22,000 – 33,000	9,500 – 14,200
Heating oil	42,000	18,100

The Herhof Dry Stabilat Process

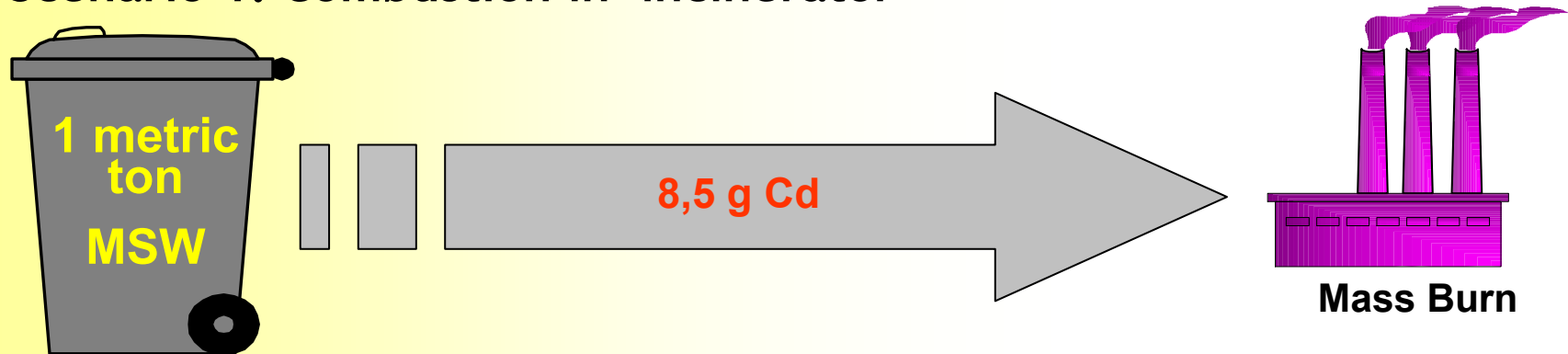
Energy recovery

- 1,000 tons Stabilat equal approx.
 - 447 MJ (heat recovery) and
 - 114 kW (el. Power)

Comparison of traditional mass burn and the Herhof Stabilat® process in terms of heavy metal reduction

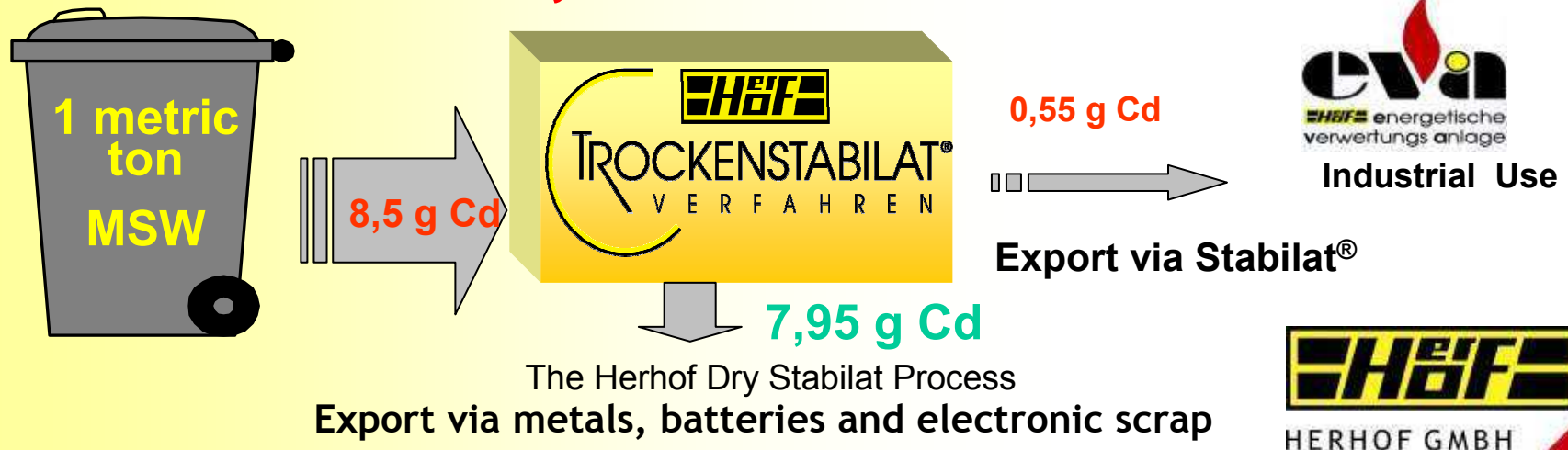
- Cadmium -

Scenario 1: Combustion in incinerator

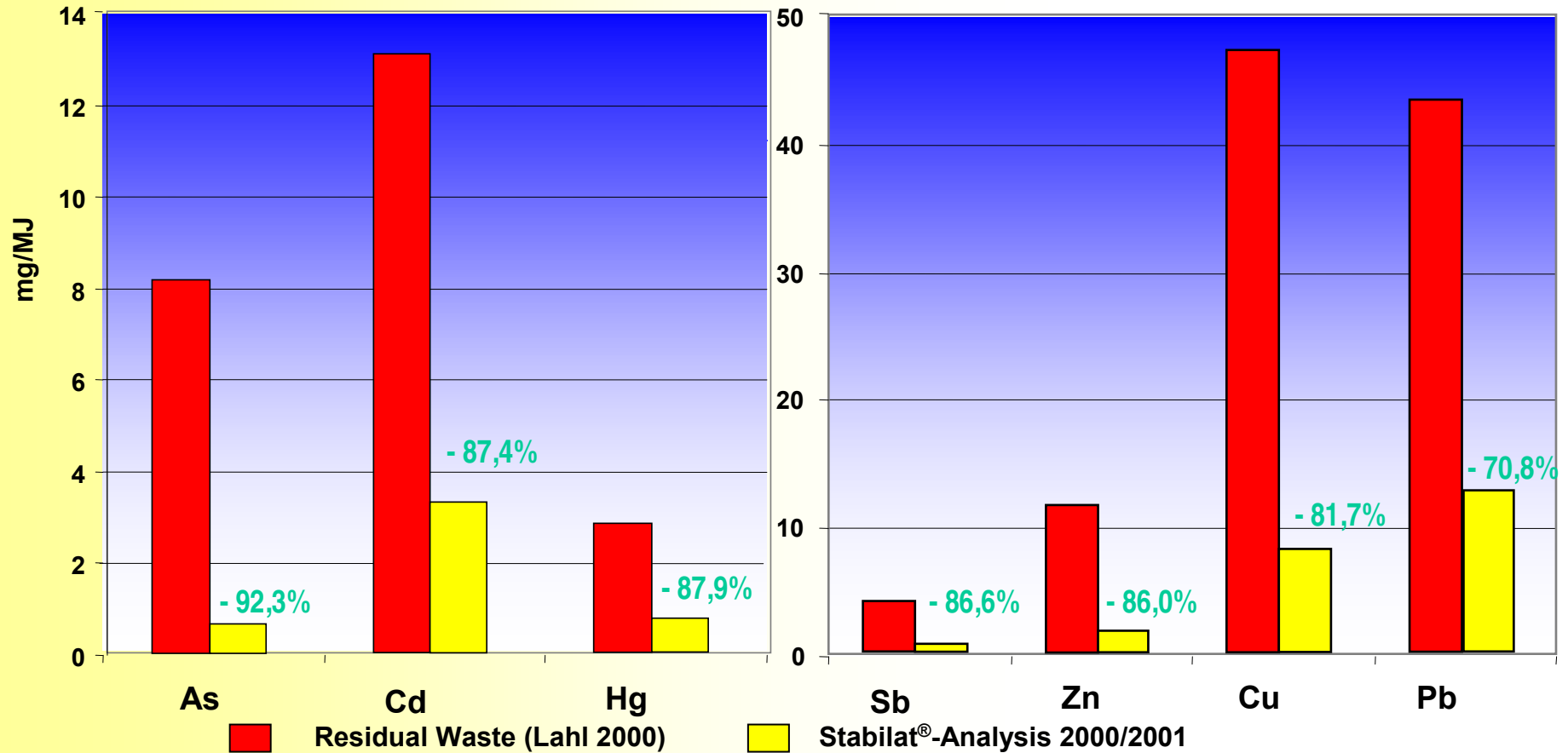


Scenario 2: Recovery by Stabilat® Technology

Cd reduction in fuel -94 %



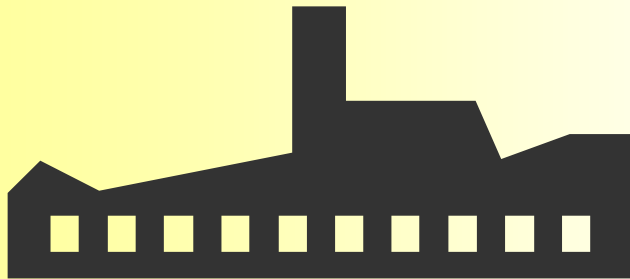
Energy Related Heavy Metal Reduction MSW vs. Stabilat®



The Herhof Dry Stabilat Process



Energy Recovery with Stabilat®



Industrial energy recovery:

Co combustion

- Cement kilns
- Power plants

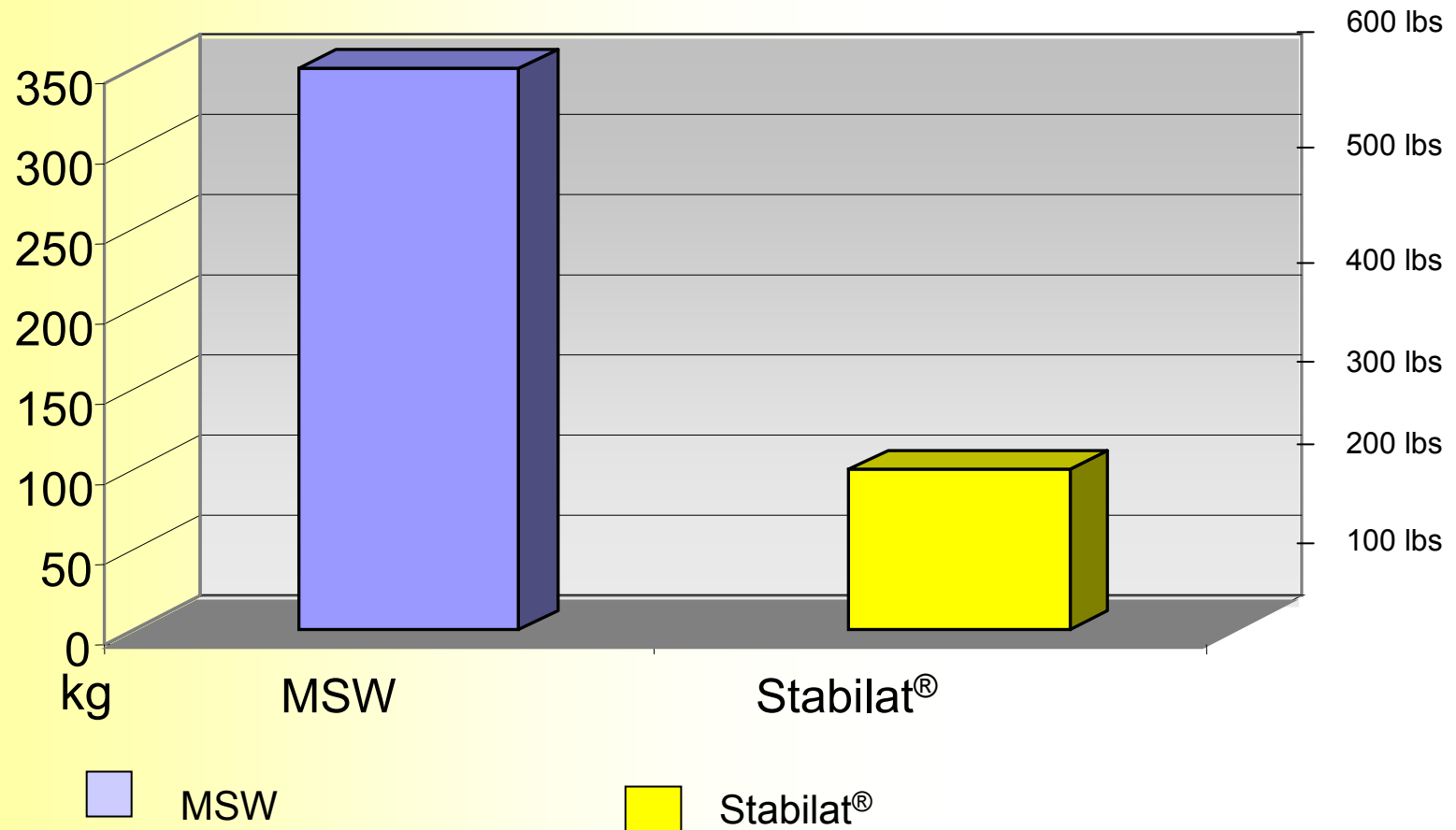


Material utilisation

- Gasification with the IPV process
- Production of diesel fuel
- Production of methanol
- Energy and heat generation

The Herhof Dry Stabilat Process

Bottom Ash from 1 metric ton MSW



The Herhof Dry Stabilat Process



Climate effective CO₂-emissions

- comparison of fossil energy sources with stabilate® -

energy source	Overall CO ₂ - emission factor	heat value	specific Overall-CO ₂ - emissions	regenerative energy contingent	specific fossil CO ₂ - emissions	fossil CO ₂ - emission factor
	g CO ₂ /MJ	MJ/kg	g CO ₂ /kg	%-energy contingent	g CO ₂ / kg	g CO ₂ /MJ
brown coal	111	8,6	955	0%	955	111
hard coal	93	29,7	2.762	0%	2.762	93
fuel oil	74	35,4	2.620	0%	2.620	74
natural gas	56	31,7	1.775	0%	1.775	56
stabilate	71	15	1.067	66,8%	354	24

The Herhof Dry Stabilat Process



Status report for the contribution of the waste management to climate protection and possible potentials

Source: Öko Institut e.V. and ifeu Heidelberg GmbH; August 2005
by order of Bundesumweltamt

There are 3 alternative processes for MSW:

1. Conventional MBT with disposal of the rotting residuals in a waste incineration plant
2. MBT with fermentation of the „wet fraction“, drying of the fermentation residuals in a curing area and disposal in a waste incineration plant
3. **Mechanical-Biological Stabilisation (MBS)** with drying of the complete input by means of an intense rotting process; mechanical separation of the dry waste in a secondarye fuel fraction, metals and inerts

The Herhof Dry Stabilat Process





Status report for the contribution of the waste management to climate protection and possible potentials

Source: Öko Institut e.V. and ifeu Heidelberg GmbH; August 2005
by order of Bundesumweltamt

Concerning the mentioned criterias there is no basic difference between the three processes.

But it is assumed that the MBS will put the other two processes out of business - under the premise that no residuals will be sent to landfill, because in connection with energy recovery the MBS is the cheapest process.

The Herhof Dry Stabilat Process

