An innovative and climate protective waste treatment system

The Herhof Dry Stabilat Process

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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
- CO_2 savings for 2/3 of the output material (Stabilat)

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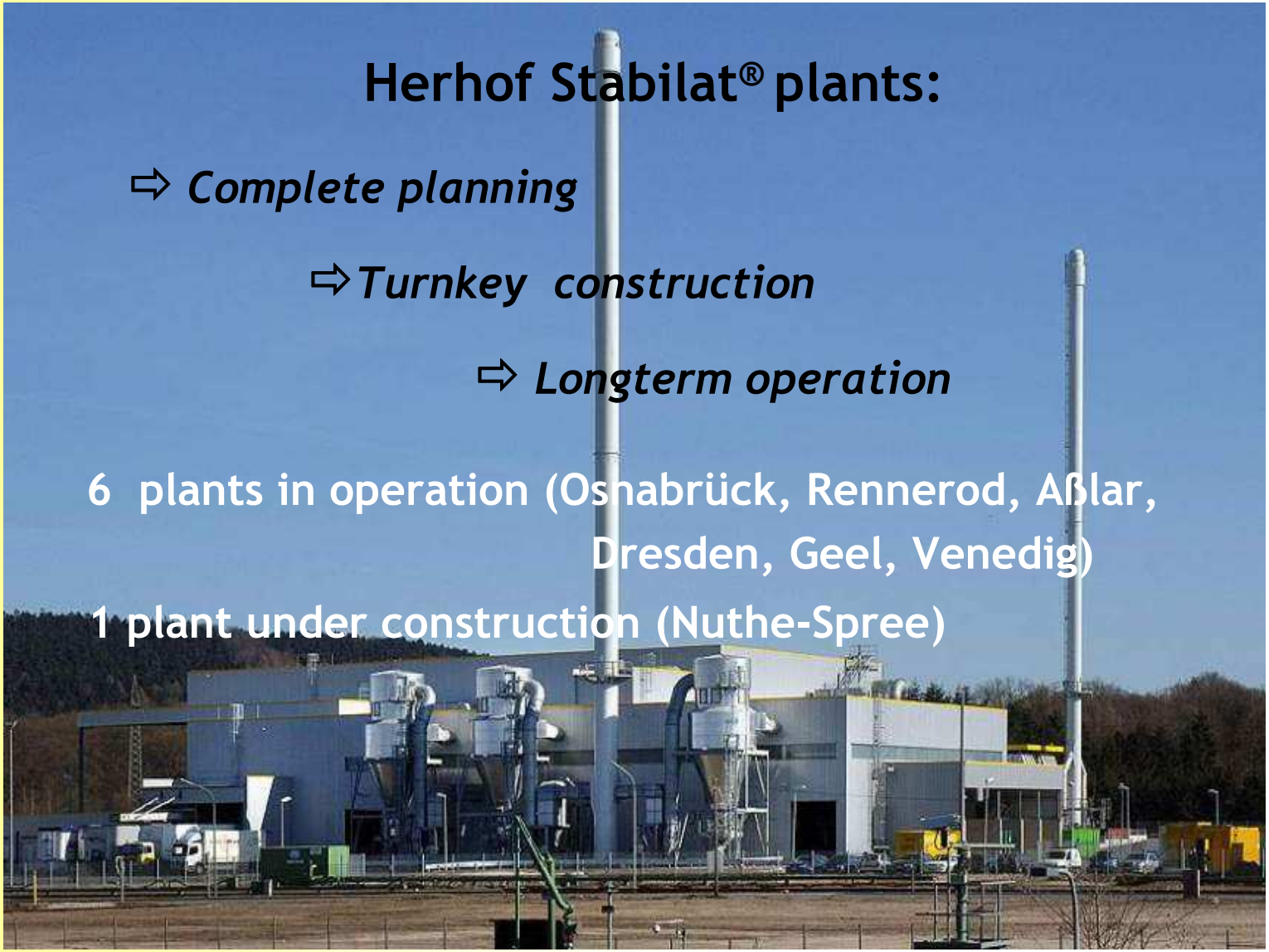

Herhof Stabilat® plants:

⇨ *Complete planning*

⇨ *Turnkey construction*

⇨ *Longterm operation*

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

1 plant under construction (Nuthe-Spree)

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Stabilat® technology - Using MSW as a resource

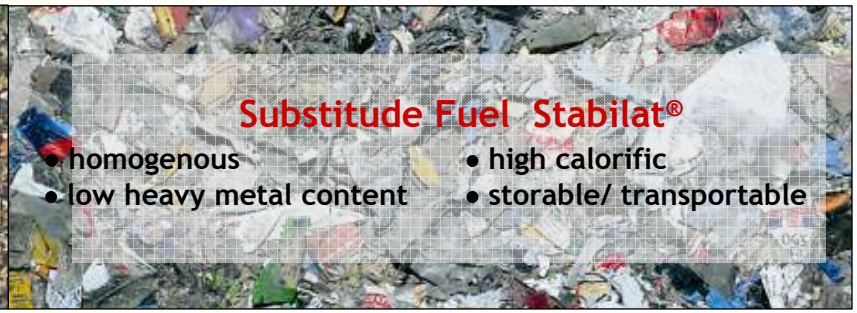
Material Recovery

Energy Recovery

Condensate / Permeate
30%

Metals
Fe NF*
4 % 1%

Inerts/ Glass
12%
Batteries / Electronic scrap



Stabilat®
53%

NF*= Nonferrous

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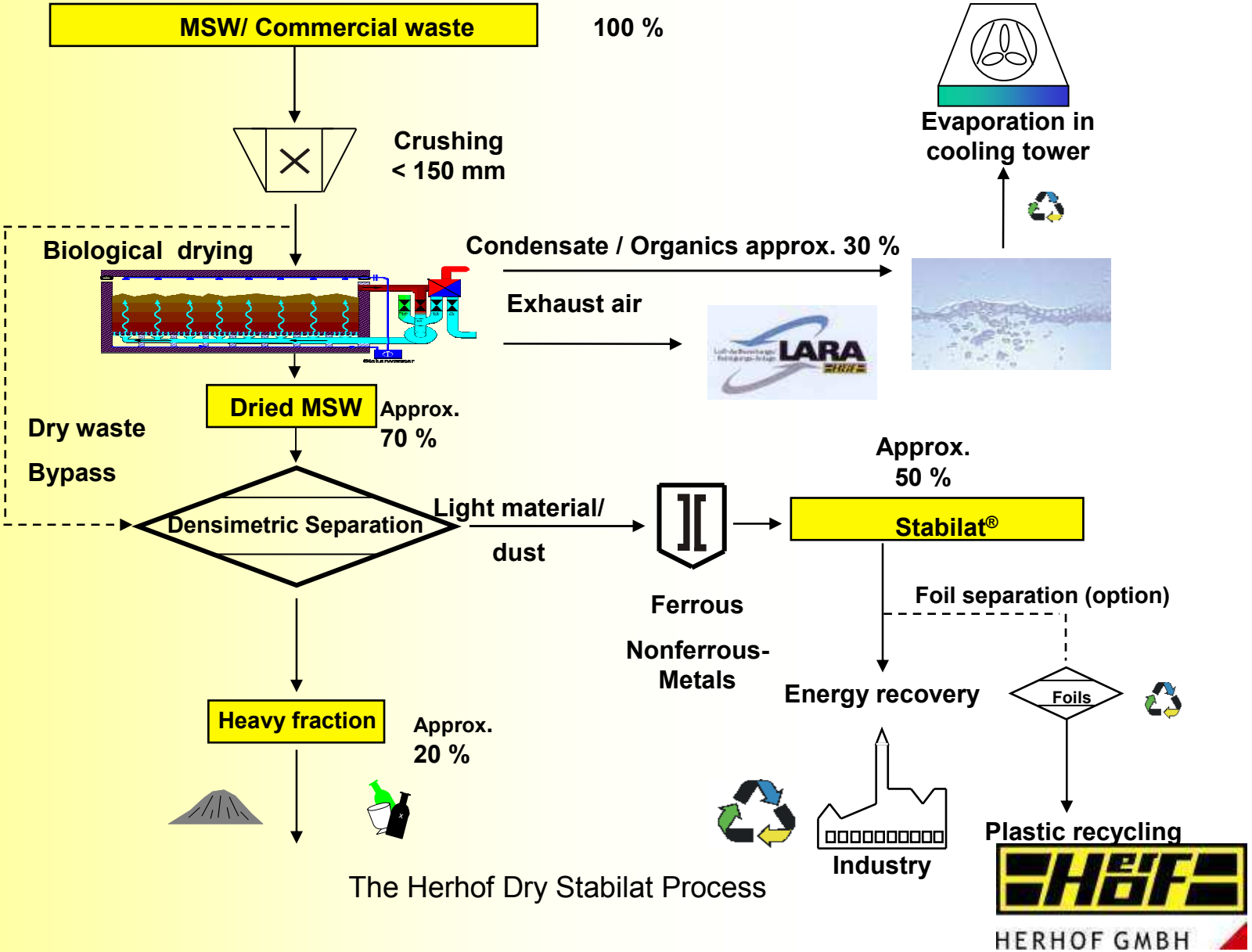
Herhof Stabilat® Technology
- with glass separation -



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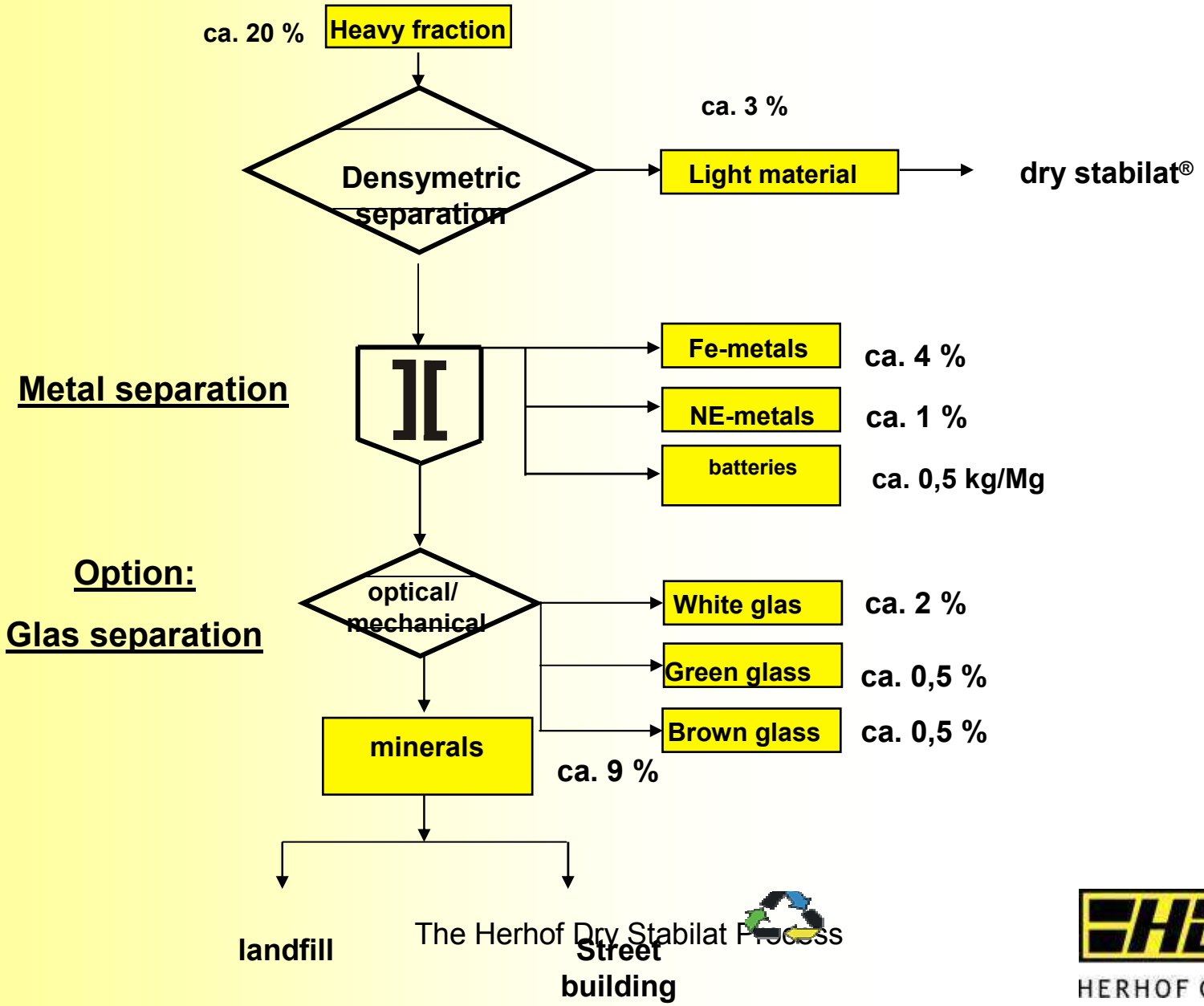
Separation of the heavy fraction



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View of a plant
(MBS Osnabrück)

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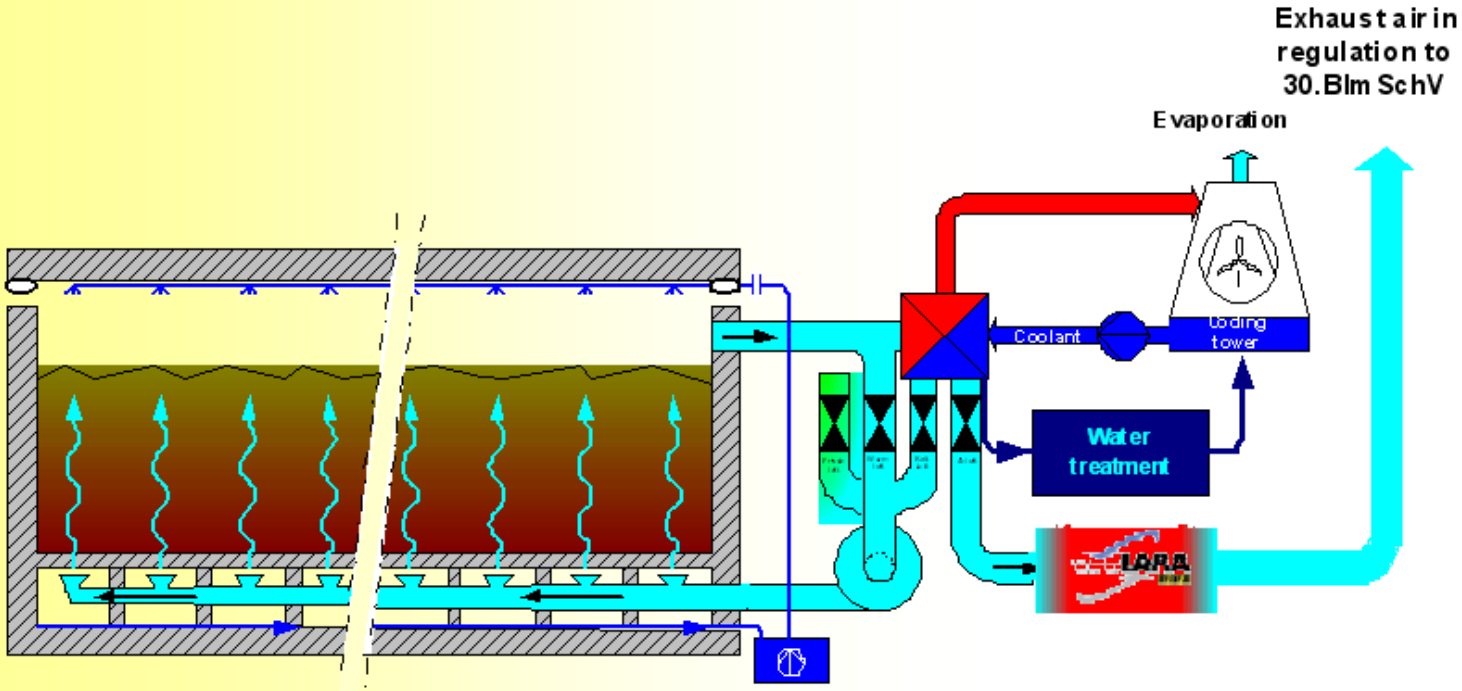
Composting boxes

Composting / Biological drying process with the Herhof composting box



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Herhof box with process crane

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Ventilation corridor

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Condensate cleaning

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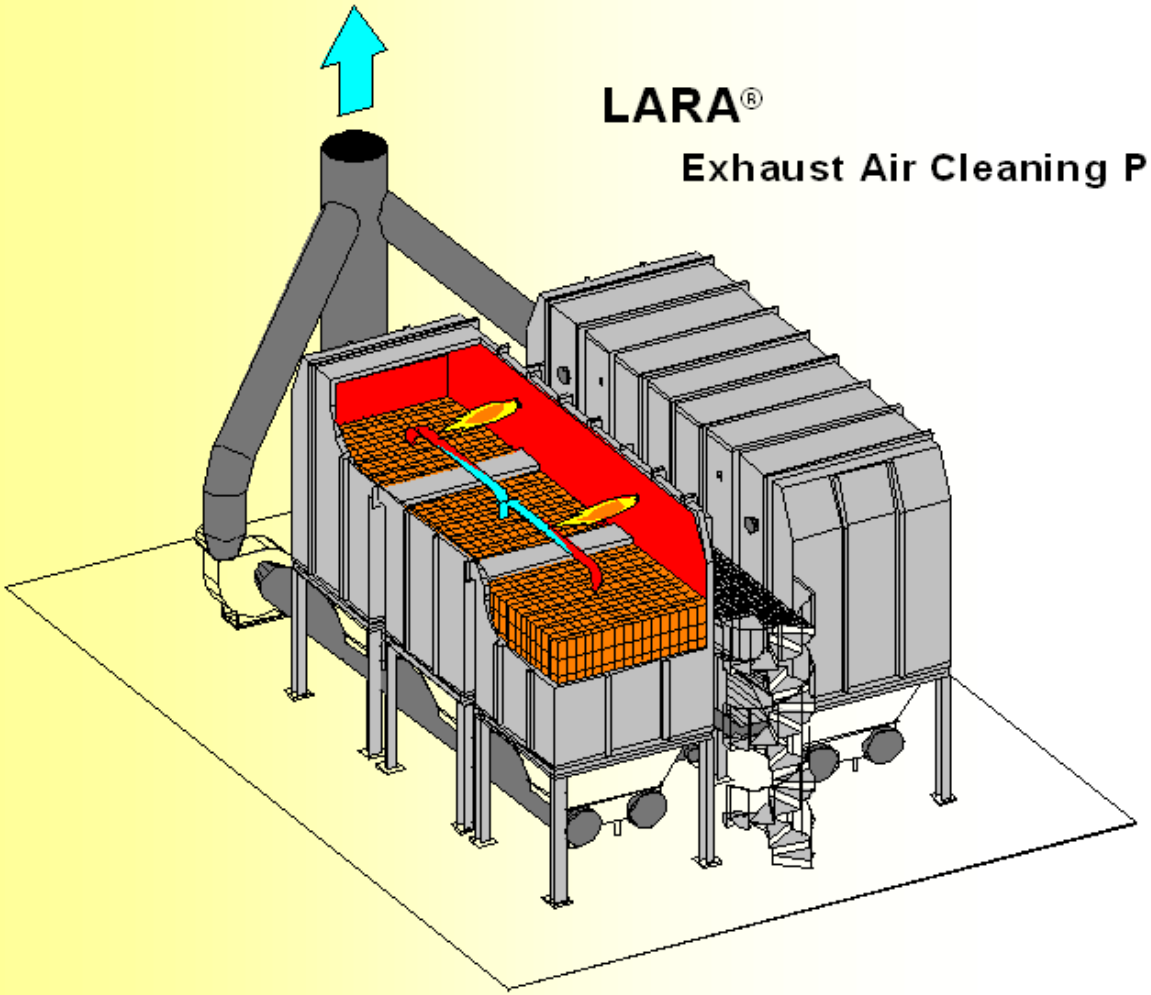
Exhaust air cleaning



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LARA air cleaning

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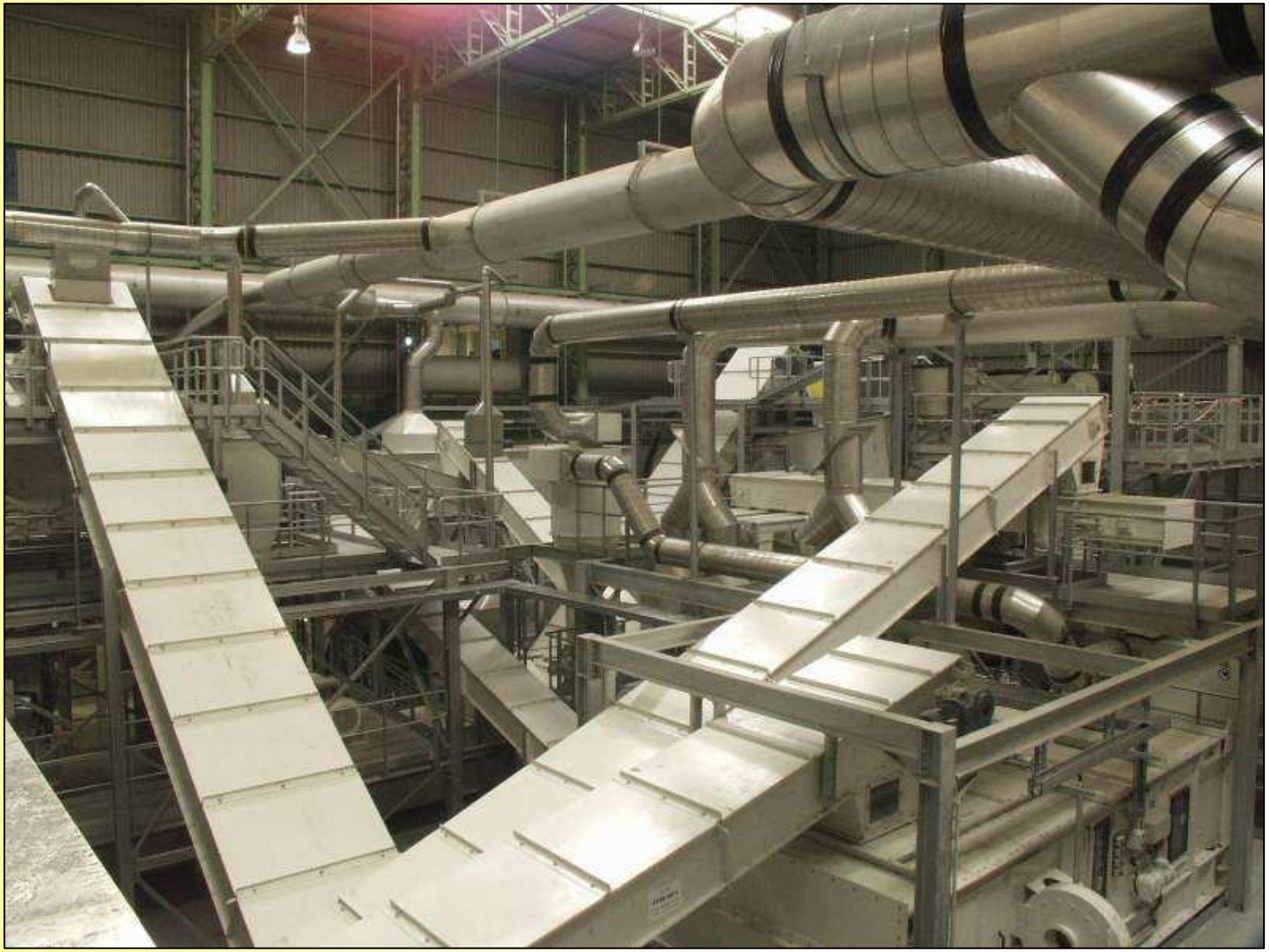
Machinery Hall



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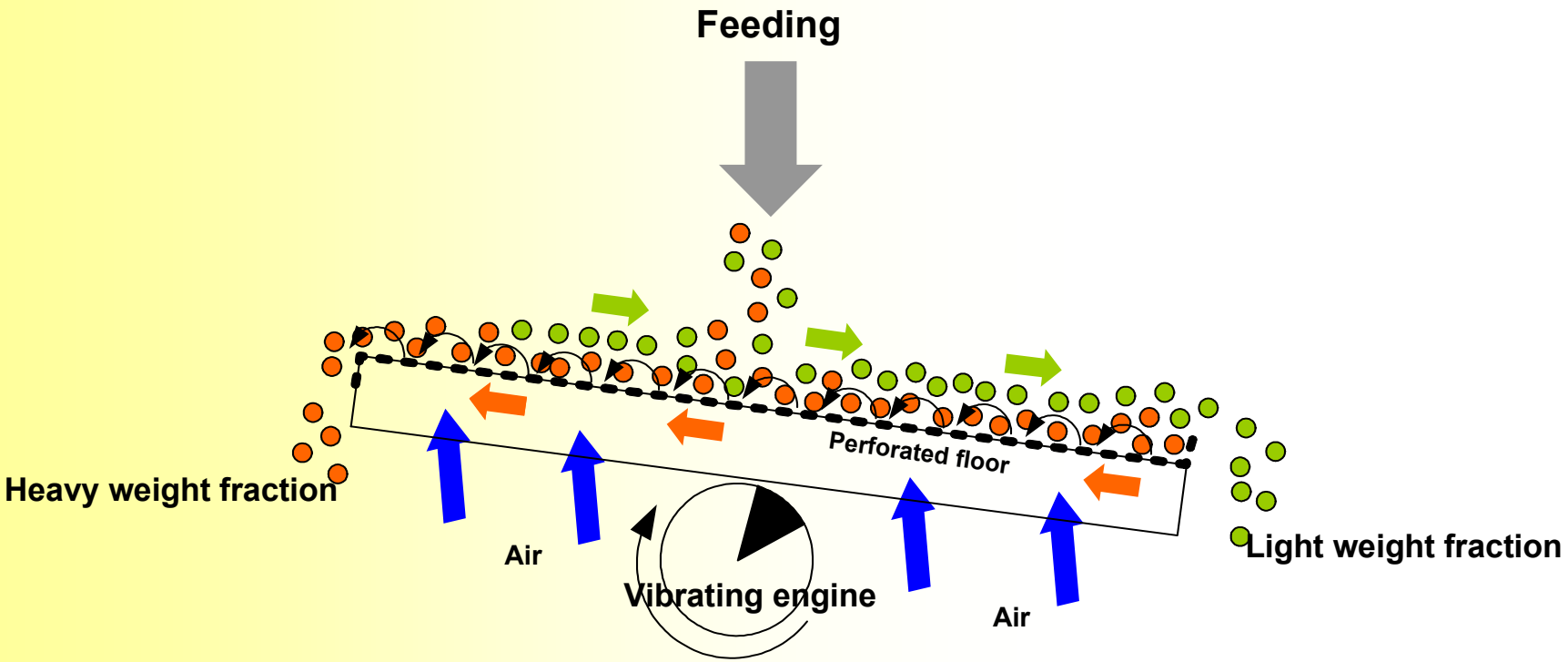
Wind sighter



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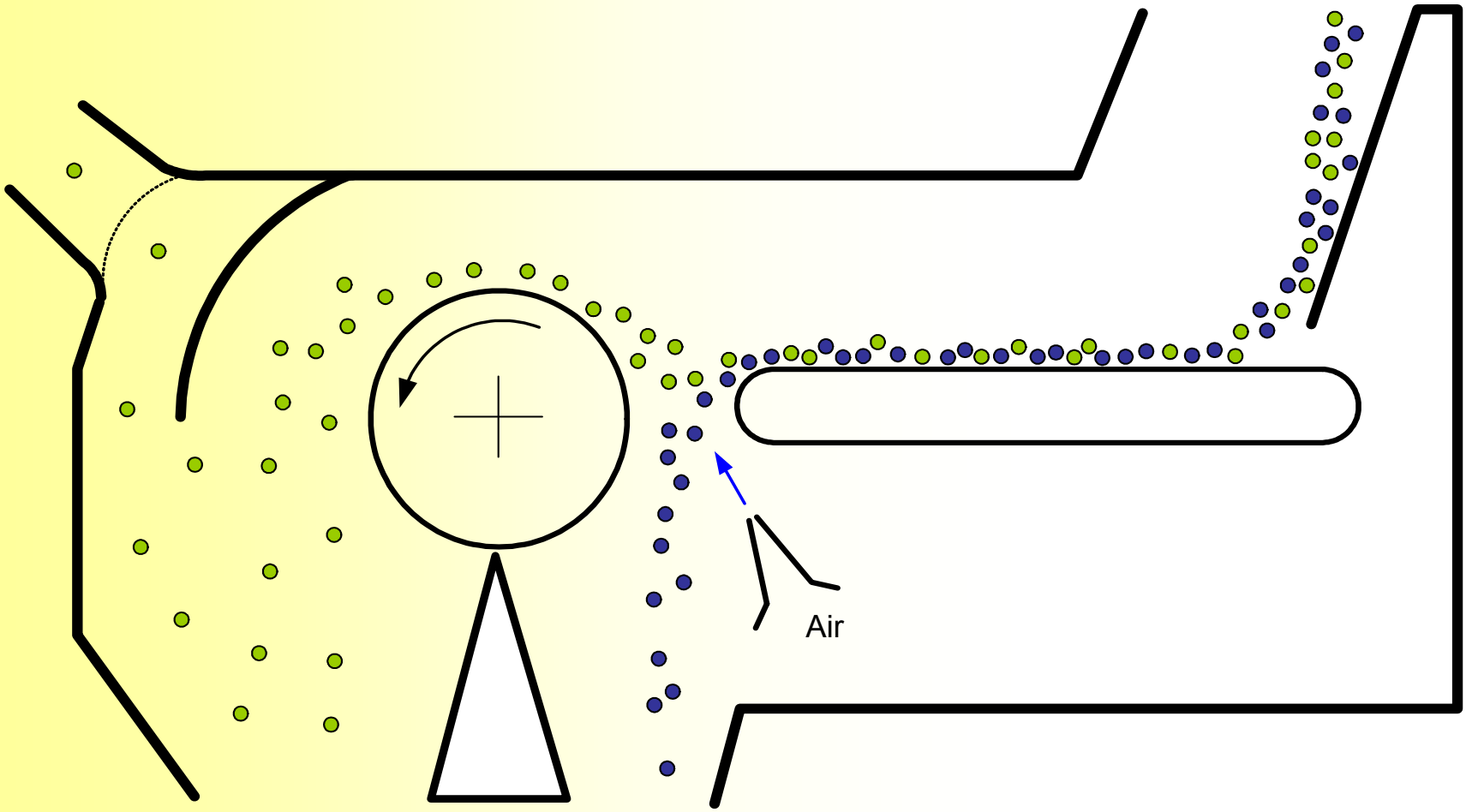
Wind sighter



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Batteries

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Stabilat® - Fluff

Stabilat® - Softpellet

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Stabilat® - Hardpellet

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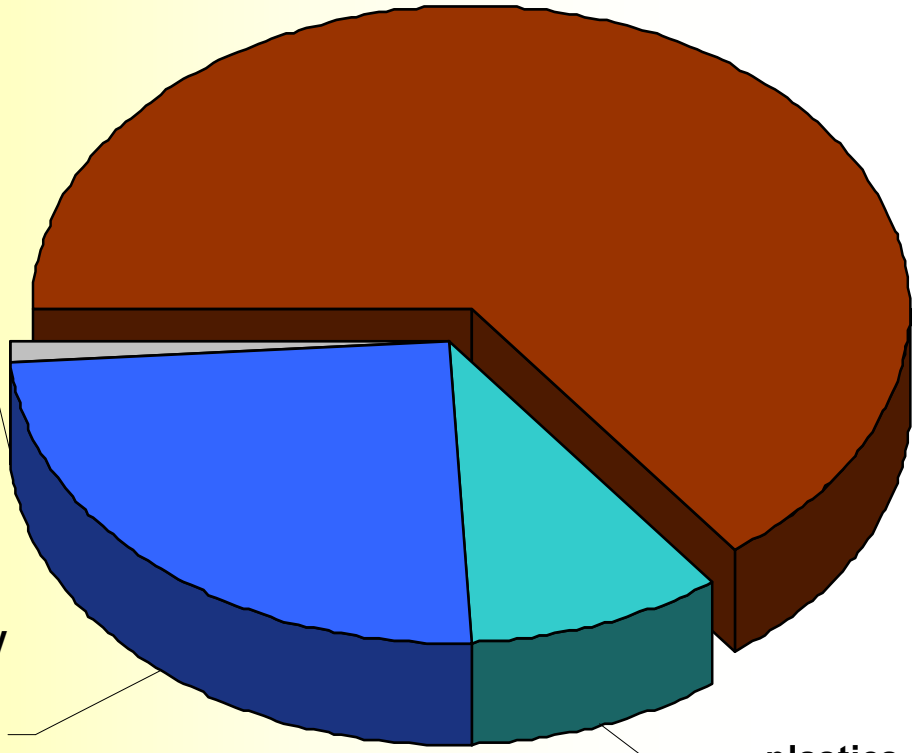
Composition of stabilat®

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-%**

non-combustible material (stones, glass, metals) <1 **weight-%**

other fossil energy sources (textiles, rubber, composites, etc.) ca. **25 weight-%**

plastics ca. **9 weight-%**

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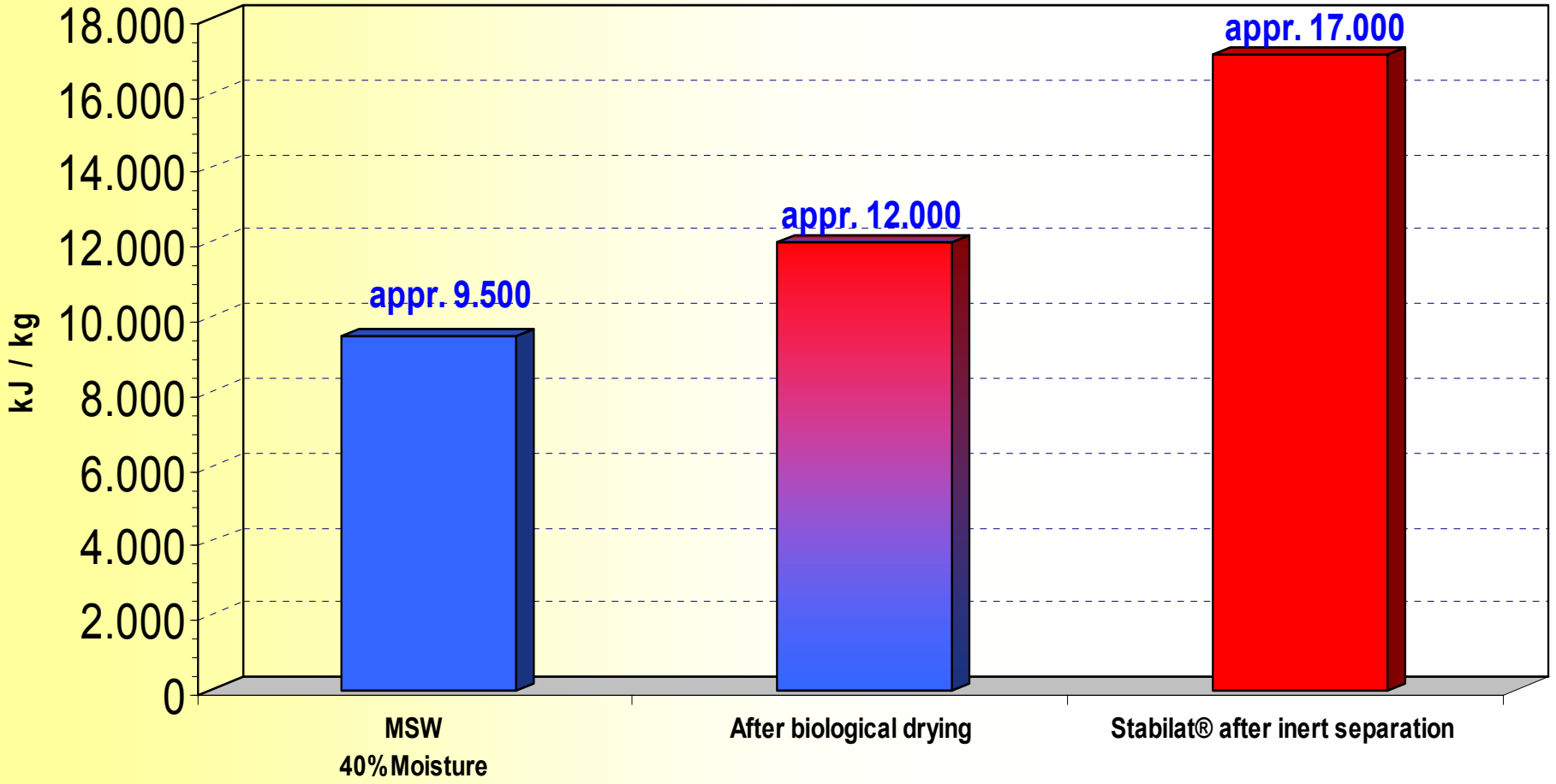
Increase of calorific value



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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

Energy recovery

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

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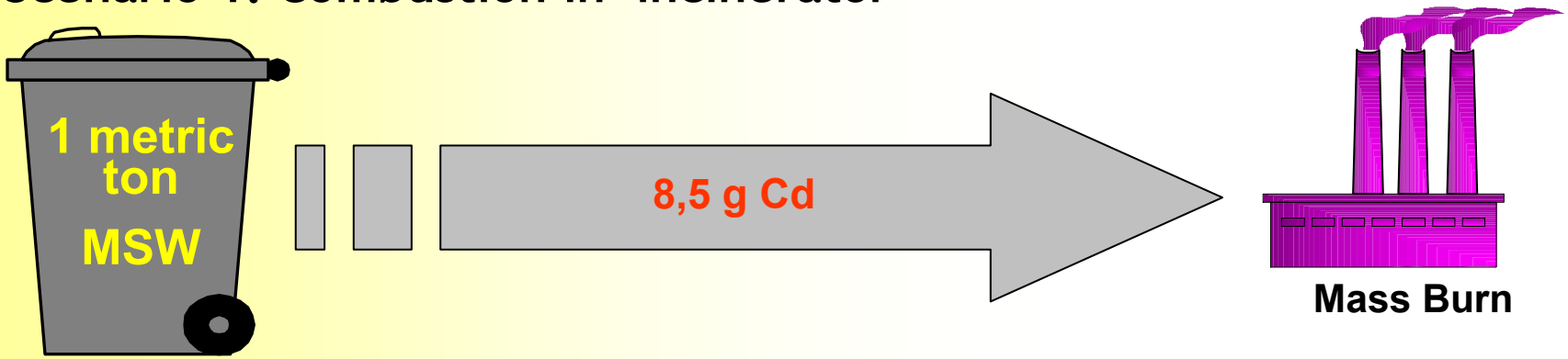
Comparison of traditional mass burn and the Herhof Stabilat® process in terms of heavy metal reduction

- Cadmium -

Scenario 1: Combustion in incinerator



Scenario 2: Recovery by Stabilat® Technology

Cd reduction in fuel -94 %

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Export via metals, batteries and electronic scrap

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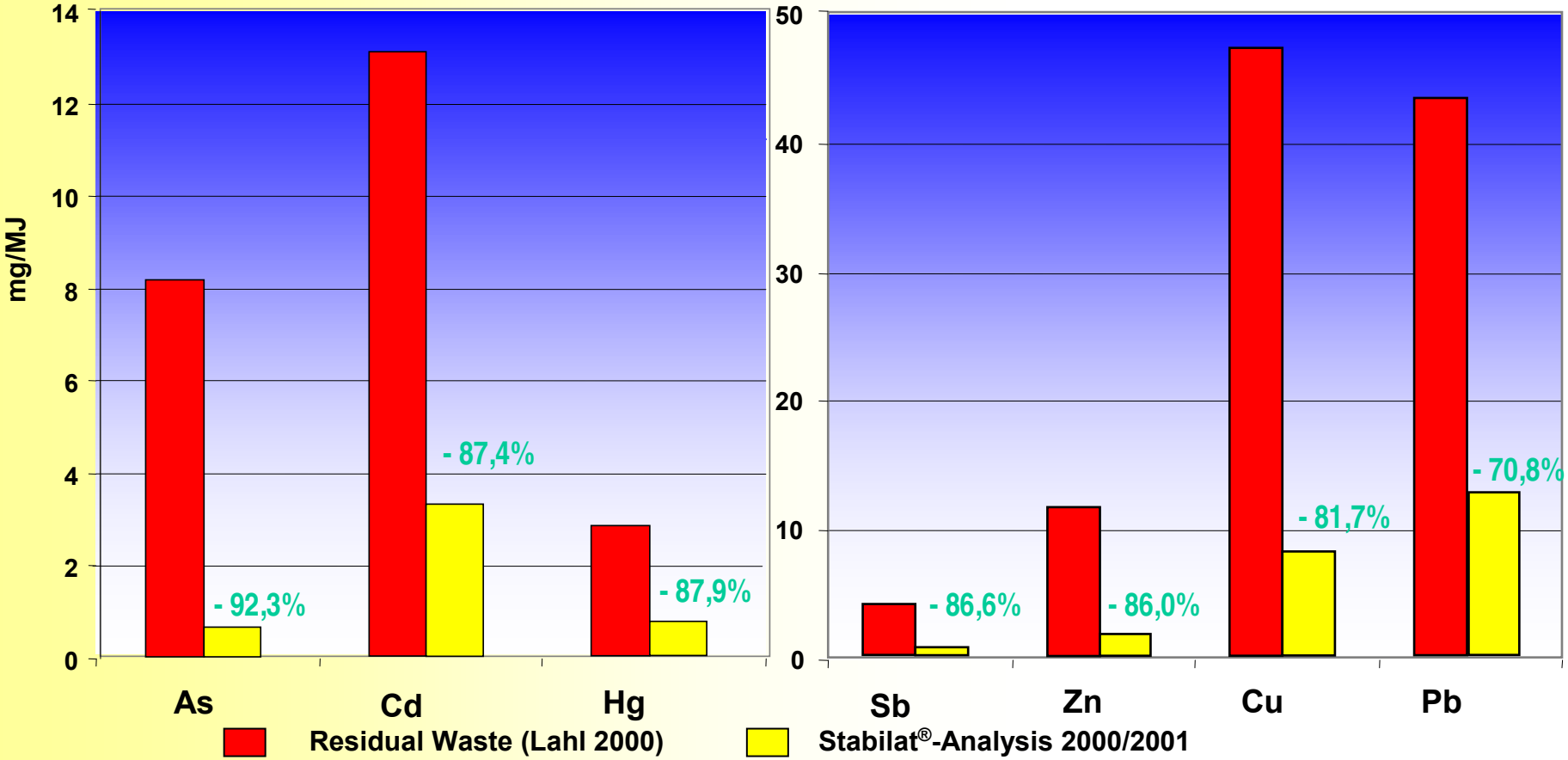
Energy Related Heavy Metal Reduction
MSW vs. Stabilat®



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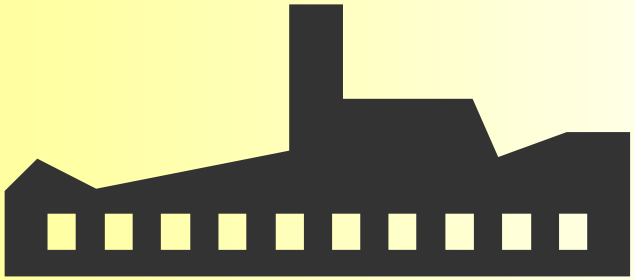
Energy Recovery with Stabilat®



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

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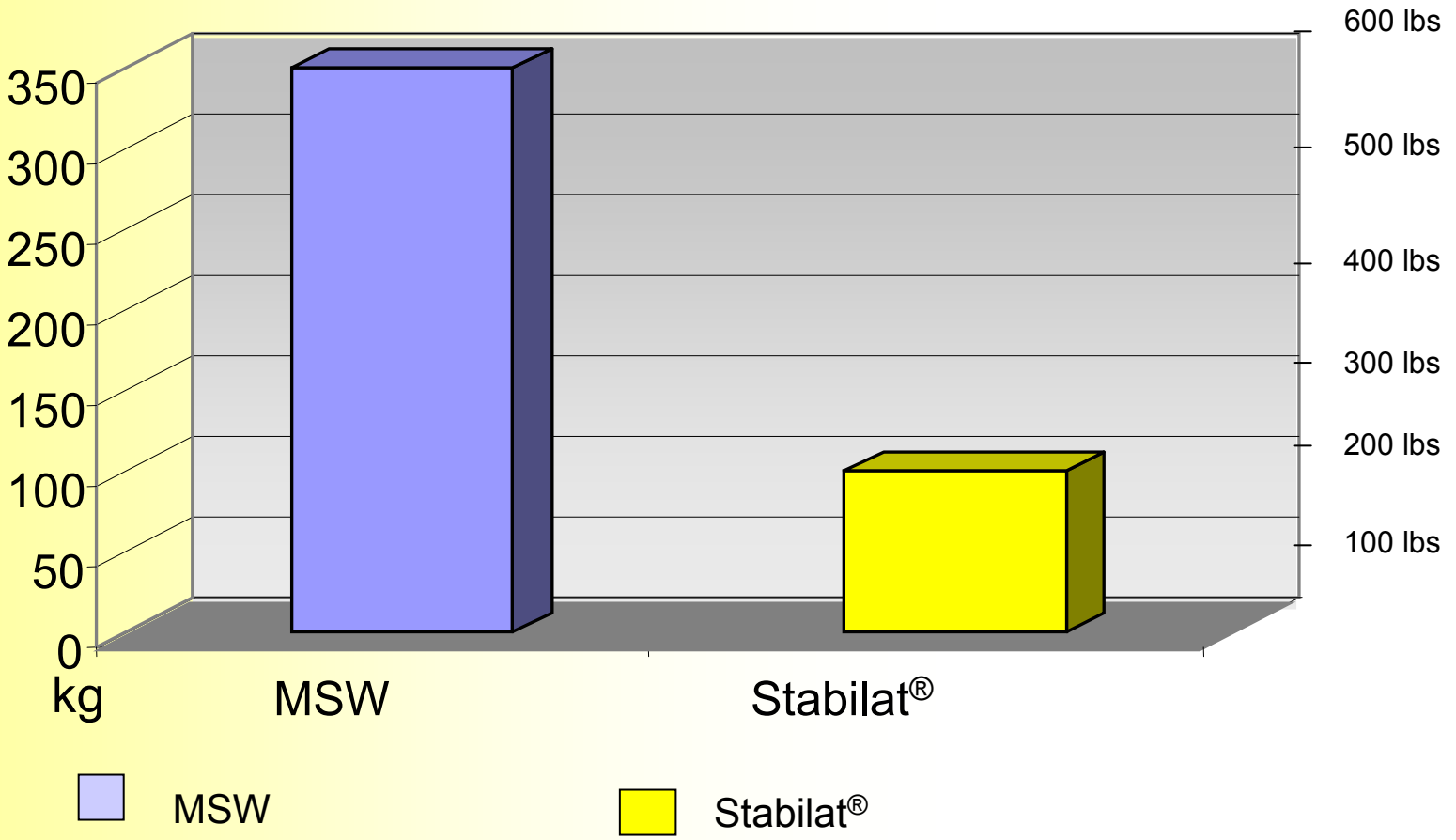
Bottom Ash from 1 metric ton MSW



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Climate effective CO_2-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

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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 frementation 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

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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
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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.

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