



# The Valorisation of SRF In Cement Kilns

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## ■ Transformation of Waste into Energy



## Hot End of a Rotary Kiln



## ■ The average needs for 1 ton of Clinker =

- 200kg Coal
- 1,600kg of raw meal :
- Limestone  $\text{CaCO}_3$
- Iron oxide  $\text{Fe}_2\text{O}_3$
- Silica  $\text{SiO}_2$
- Bauxite  $\text{Al}_2\text{O}_3$
- 100 kwh electricity to grind clinker
- Worldwide cement production in 2007 was 2.77 billion tonnes and will rise to 3.4 billion tonnes in 2015.



## Waste is growing worldwide in line with an increasing population

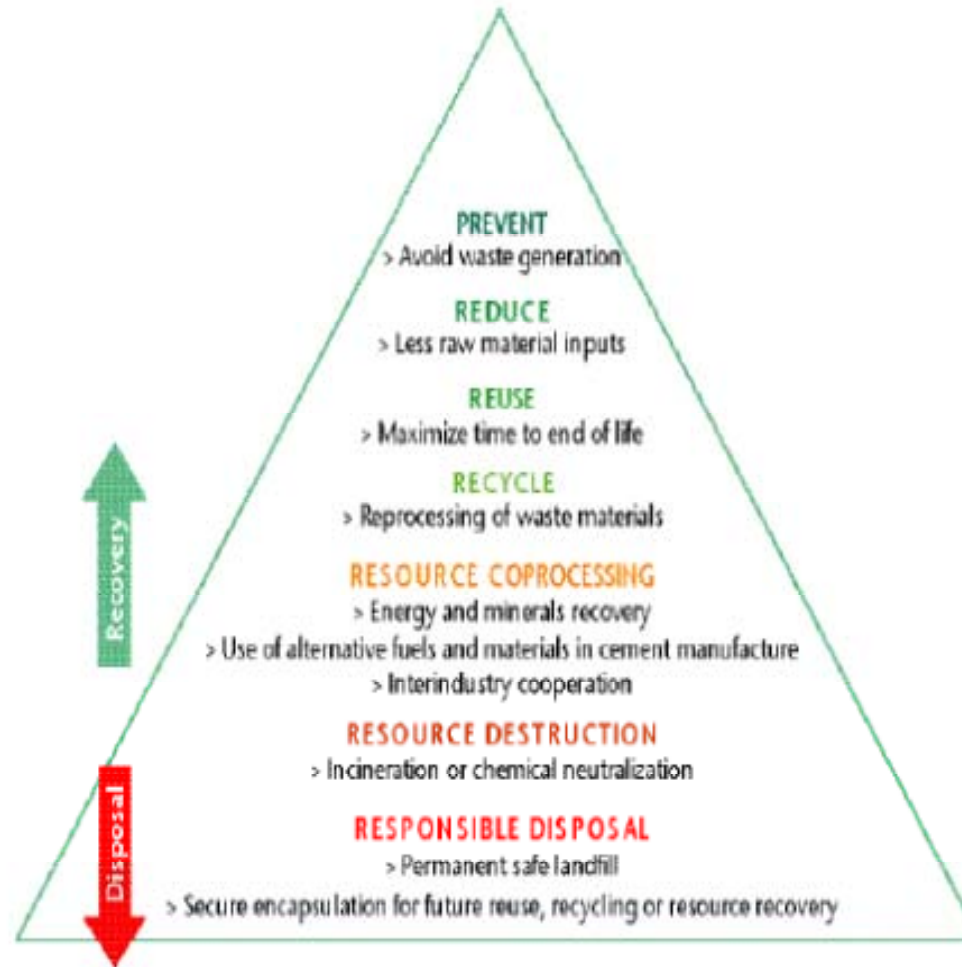


## ■ Waste..... Still a problem



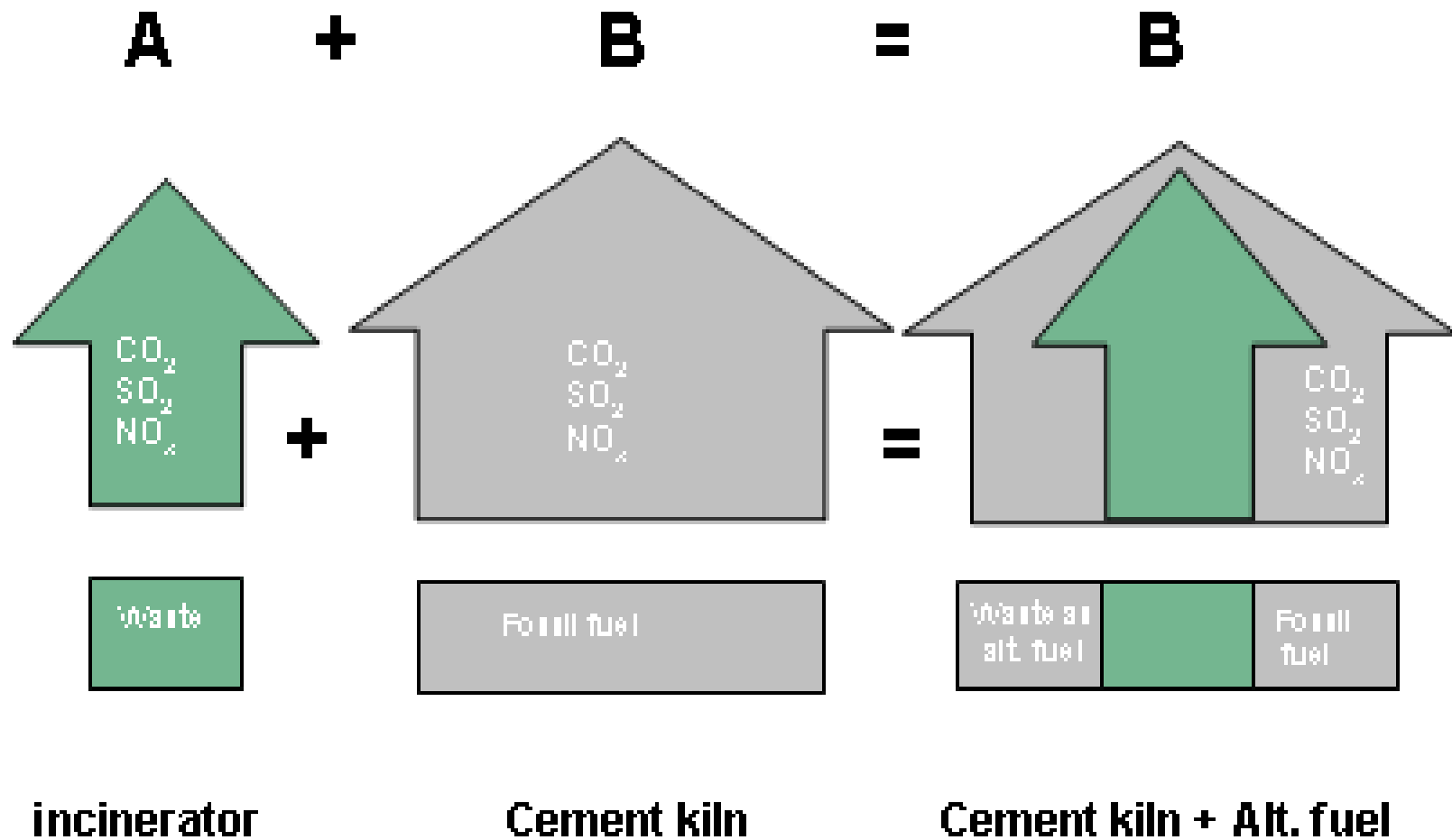
- Vast majority of waste still being land filled, dumped or burned illegally.
- Causing contamination of soil, water resources and atmosphere
- Consequences – deterioration in health of the population
- Solution – Cement Industry important contributor to Waste Management

## Co-processing of waste, recognised as a Recovery operation under EU Legislation





## Advantages co-processing in a cement kiln



# ■ HeidelbergCement applied waste materials for clinker

## ■ North America

Tyres  
Plastics  
Sewage sludge  
Waste wood  
Obsolete corn  
Waste oil

Fly-ash

## ■ Europe

Tyres  
Animal meal  
RDF  
Hazardous waste  
Sewage sludge  
Carbon-waste  
Waste wood  
Waste oil & solvents

Fly-ash  
Polluted soil  
Foundry sand

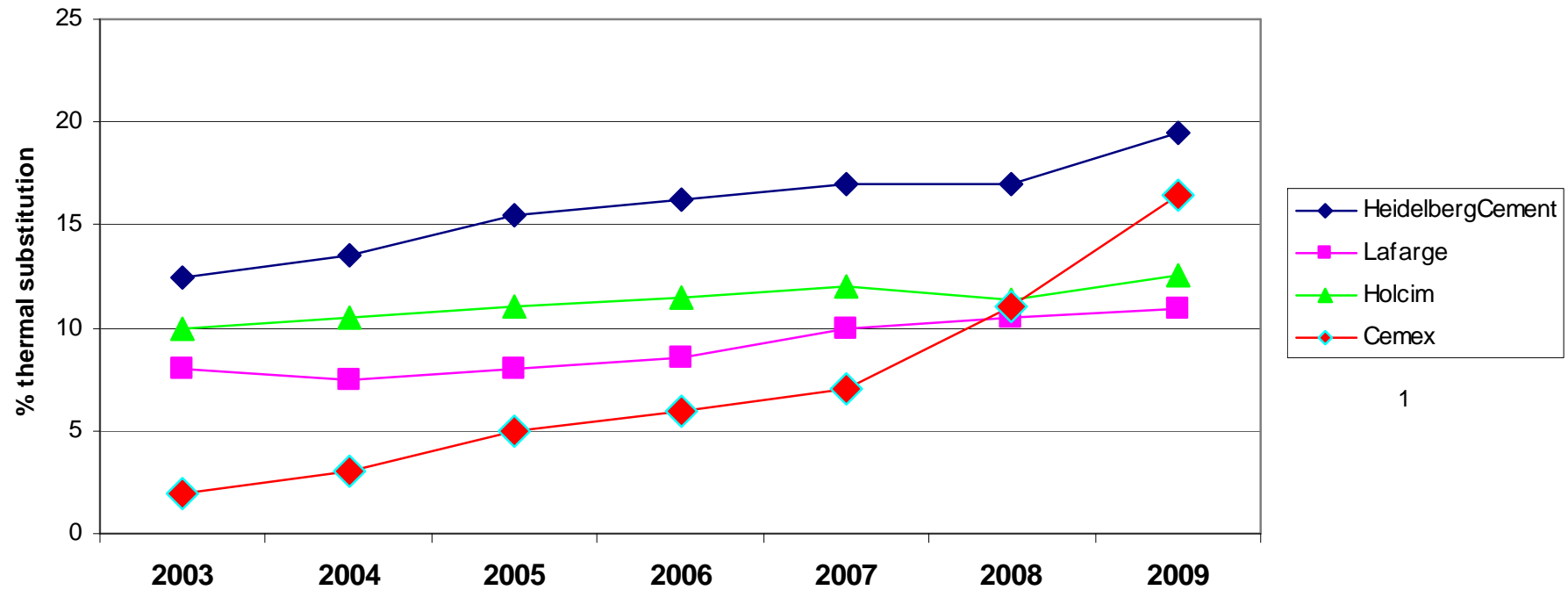
## ■ Asia-Australia-Africa

RDF  
Hazardous solids  
Sewage sludge  
Rice husks  
Waste oil

Fly-ash  
Polluted soil

**Total processed waste materials @ clinker in 2009: 5,5 mio ton**

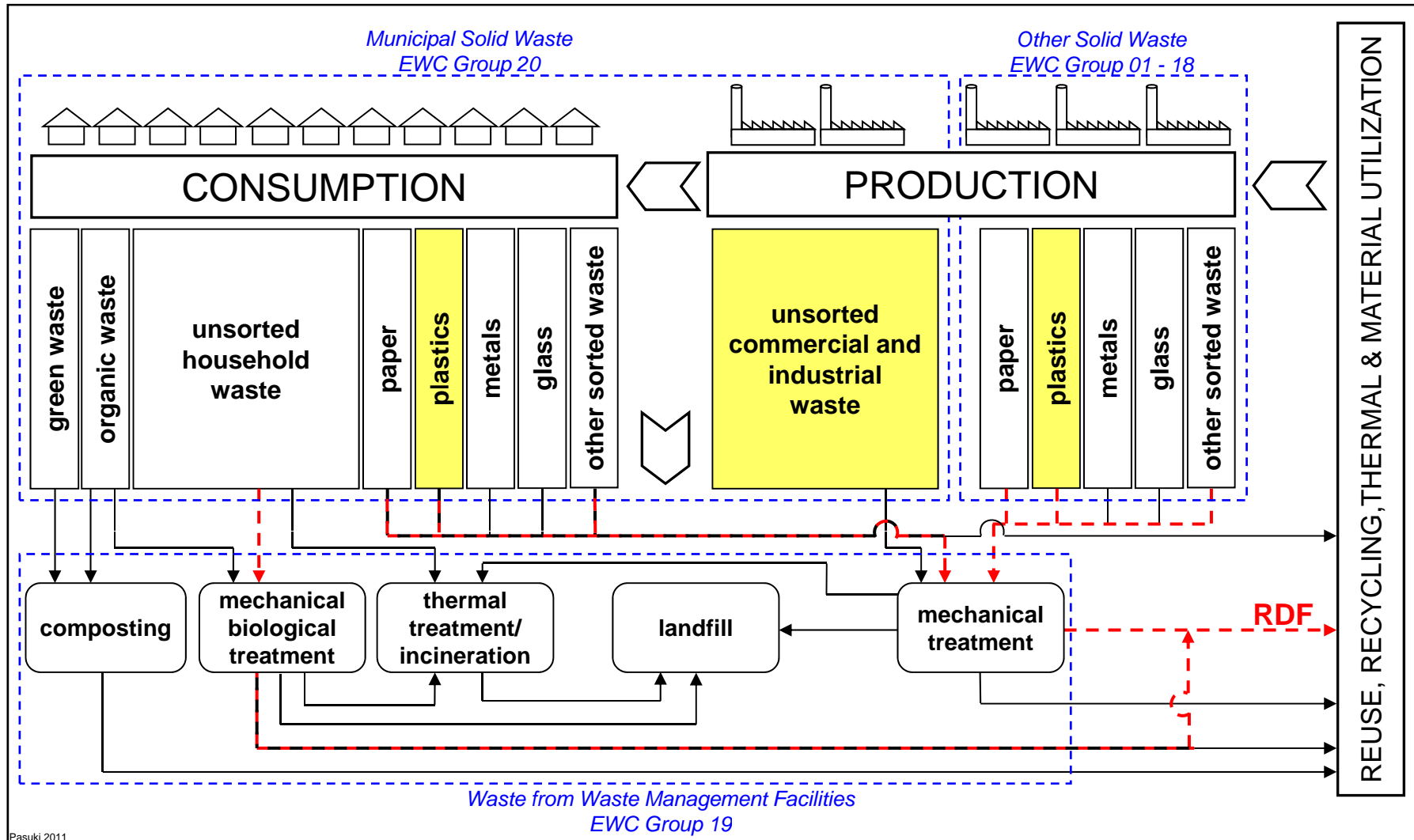
# AF use: HC best in class! CEMEX fast increase!



**HeidelbergCement Target 2020: 30%**

1. No data available for Cemex in 2009

# RDF: normally, we are aiming for high calorific waste



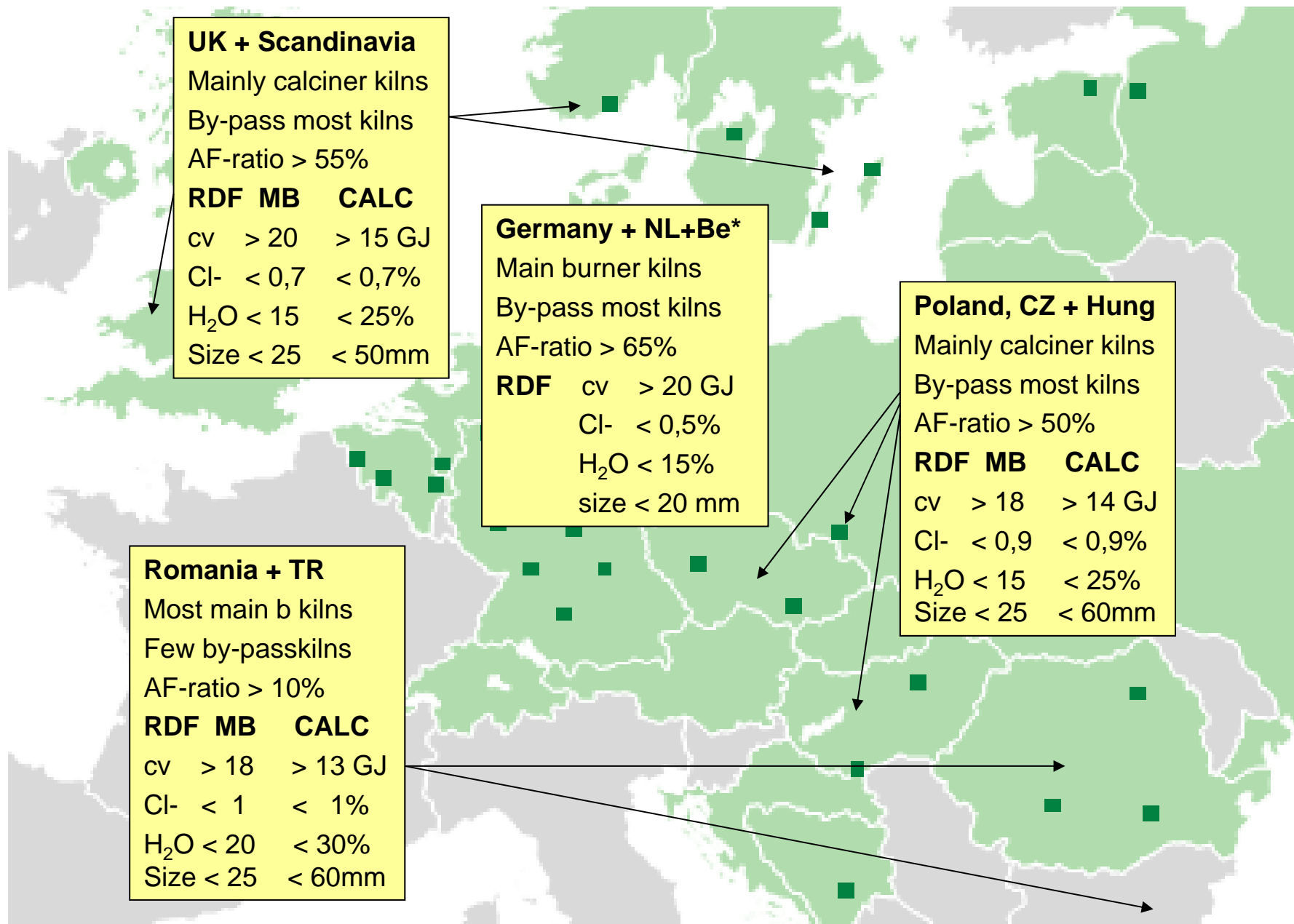
Pasuki 2011

## ■ Typical RDF Composition

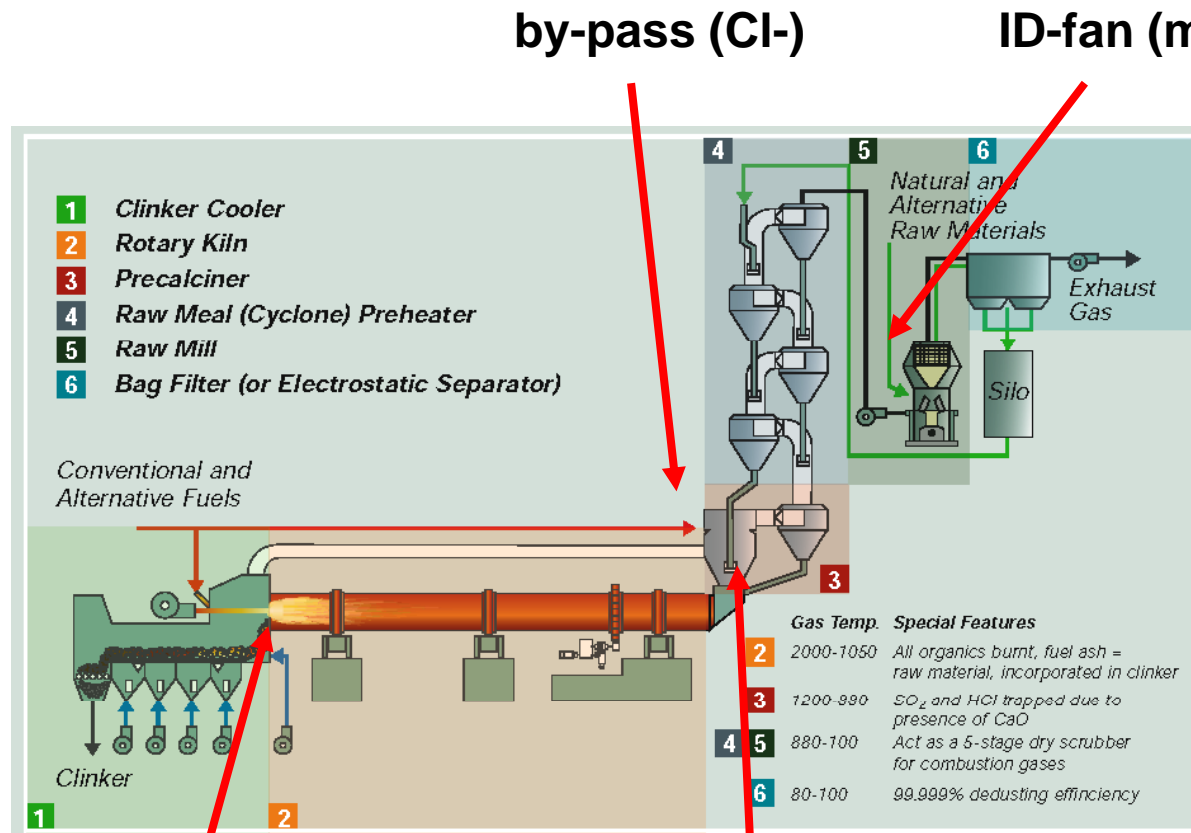


■ Plastics	31%
■ Textiles	14%
■ Paper/Cardboard	13%
■ Wood Fractions	12%
■ Others	30%

# HC different kilns in each area → other specifications



# RDF use in cement kilns



**main burner:**  
 \* fine RDF  
 \* high cv

**calciner:**  
 \* coarse RDF  
 \* moderate cv

# ■ Elements that do influence value/burden of RDF

## Cost avoidance

Primary fuel costs  
CO<sub>2</sub> reductions



## Value RDF

Other alternative wastes

Heat value  
Ash-content

Cl- content

Moisture content

Other elements (S, Hg, Cr)

## Operation costs

Depreciation storage + feeding

Impact clinker production

Shorter lifetime of lining

Emission + process control

Quality control + reporting

Stakeholder management

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# Thank You for your Attention

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