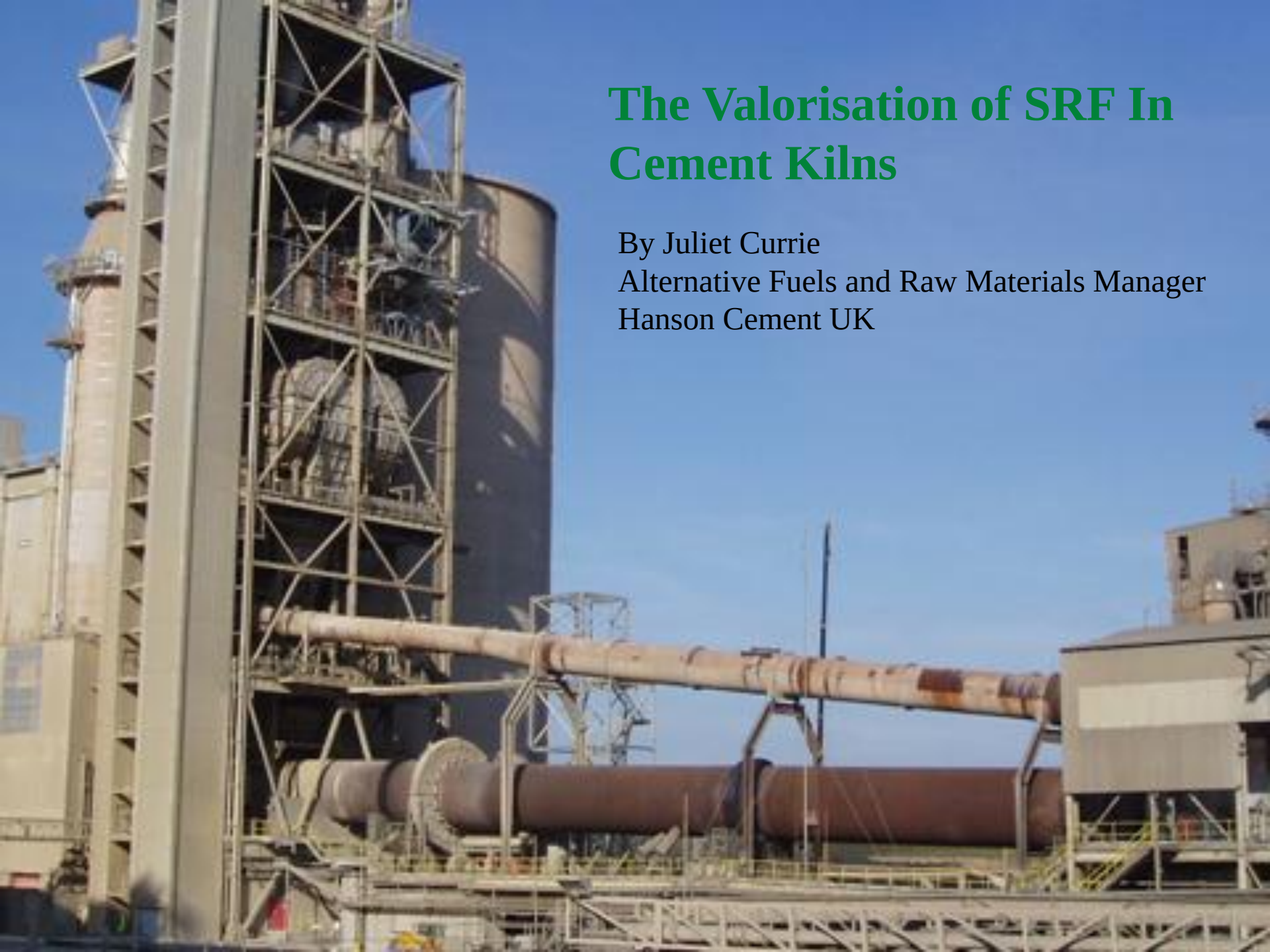

The Valorisation of SRF In Cement Kilns

By Juliet Currie
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Contents

Transformation of Waste into Energy

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Hot End of a Rotary Kiln

The average needs for 1 ton of Clinker =

- 200kg Coal
- 1,600kg of raw meal :

- Limestone CaCO3
- Iron oxide Fe203
- Silica Si02
- Bauxite Al203

- 100 kwh electricity to grind clinker

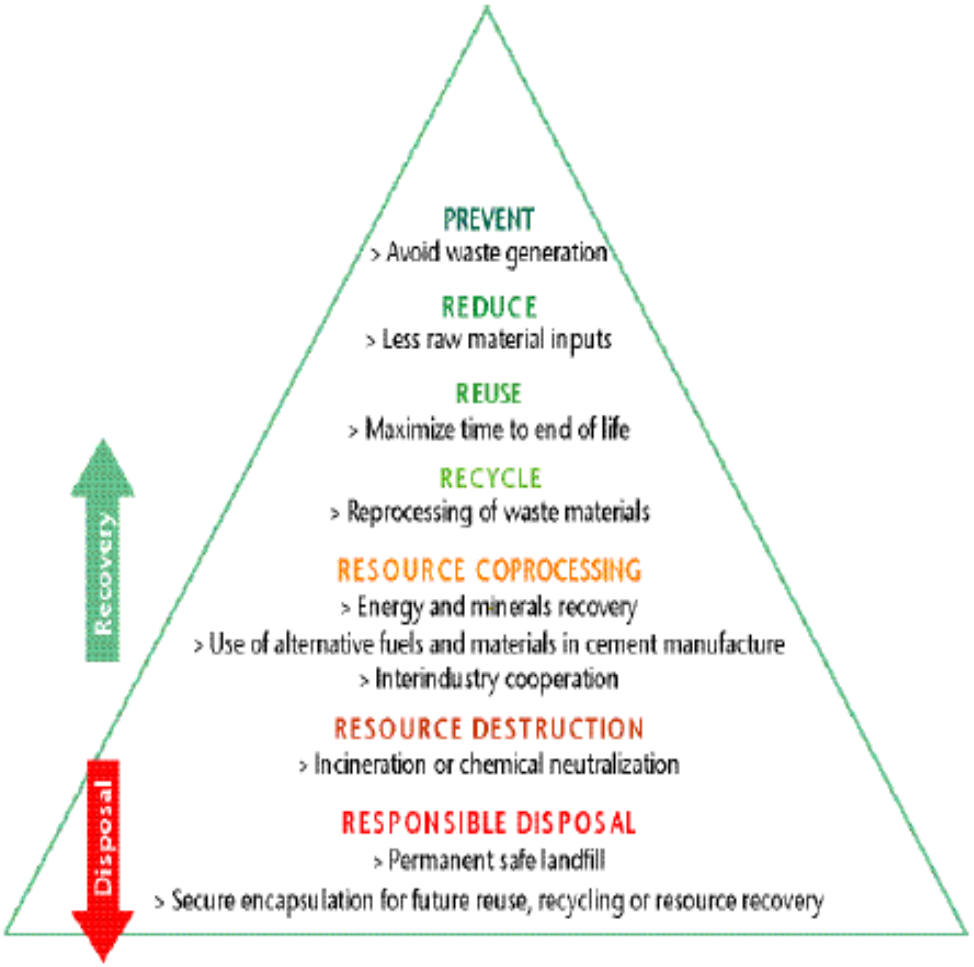
- Worldwide cement production in 2007 was 2.77 billion tonnes and will rise to 3.4 billion tonnes in 2015.

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



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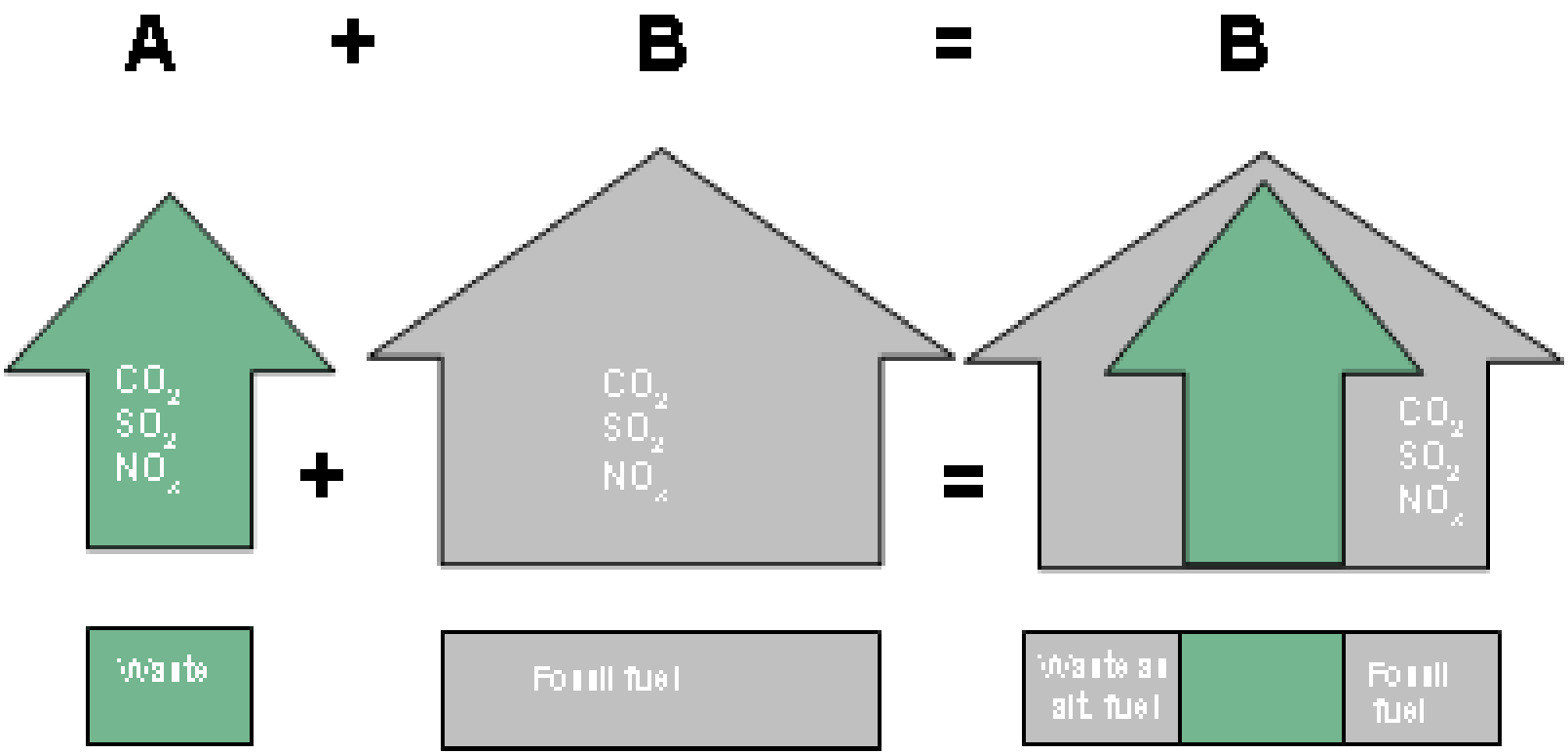
Advantages co-processing in a cement kiln



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

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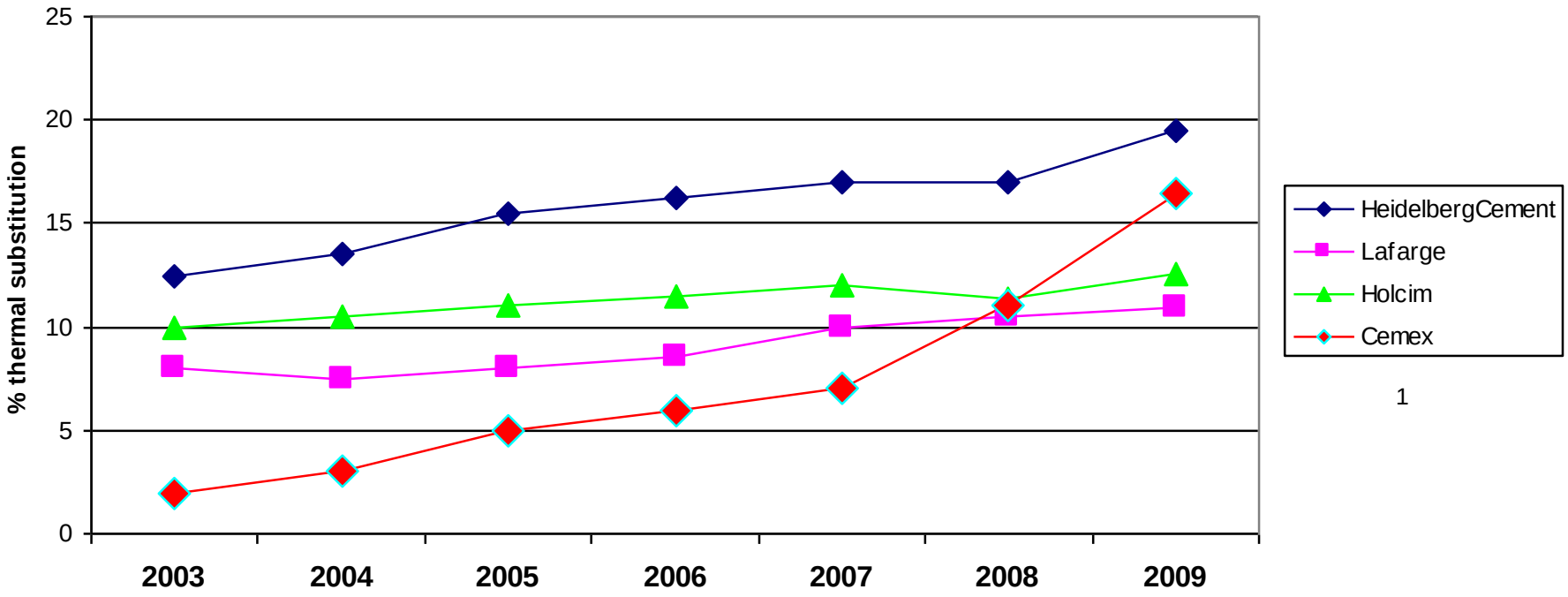
AF use: HC best in class! CEMEX fast increase!



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HeidelbergCement Target 2020: 30%

1. No data available for Cemex in 2009

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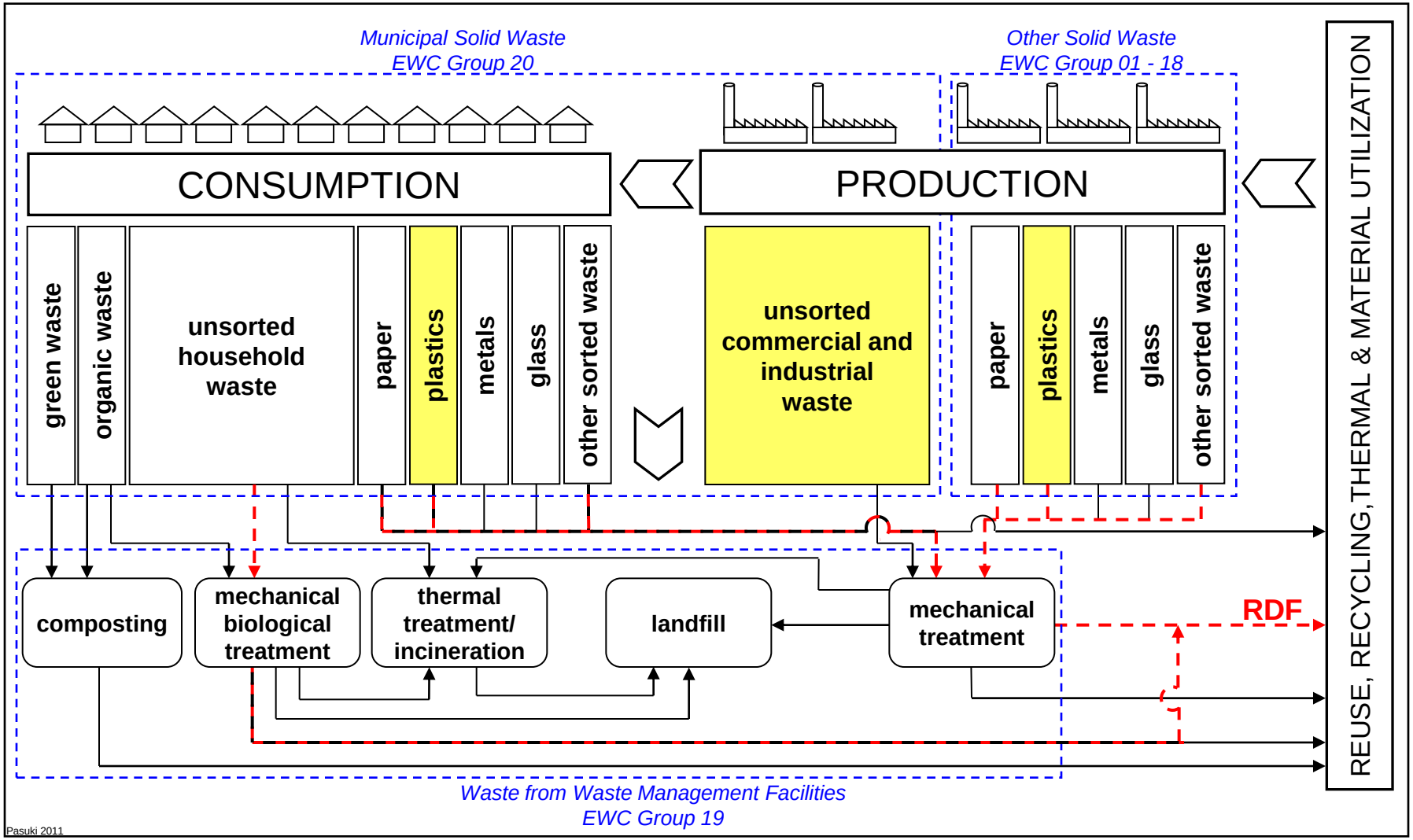
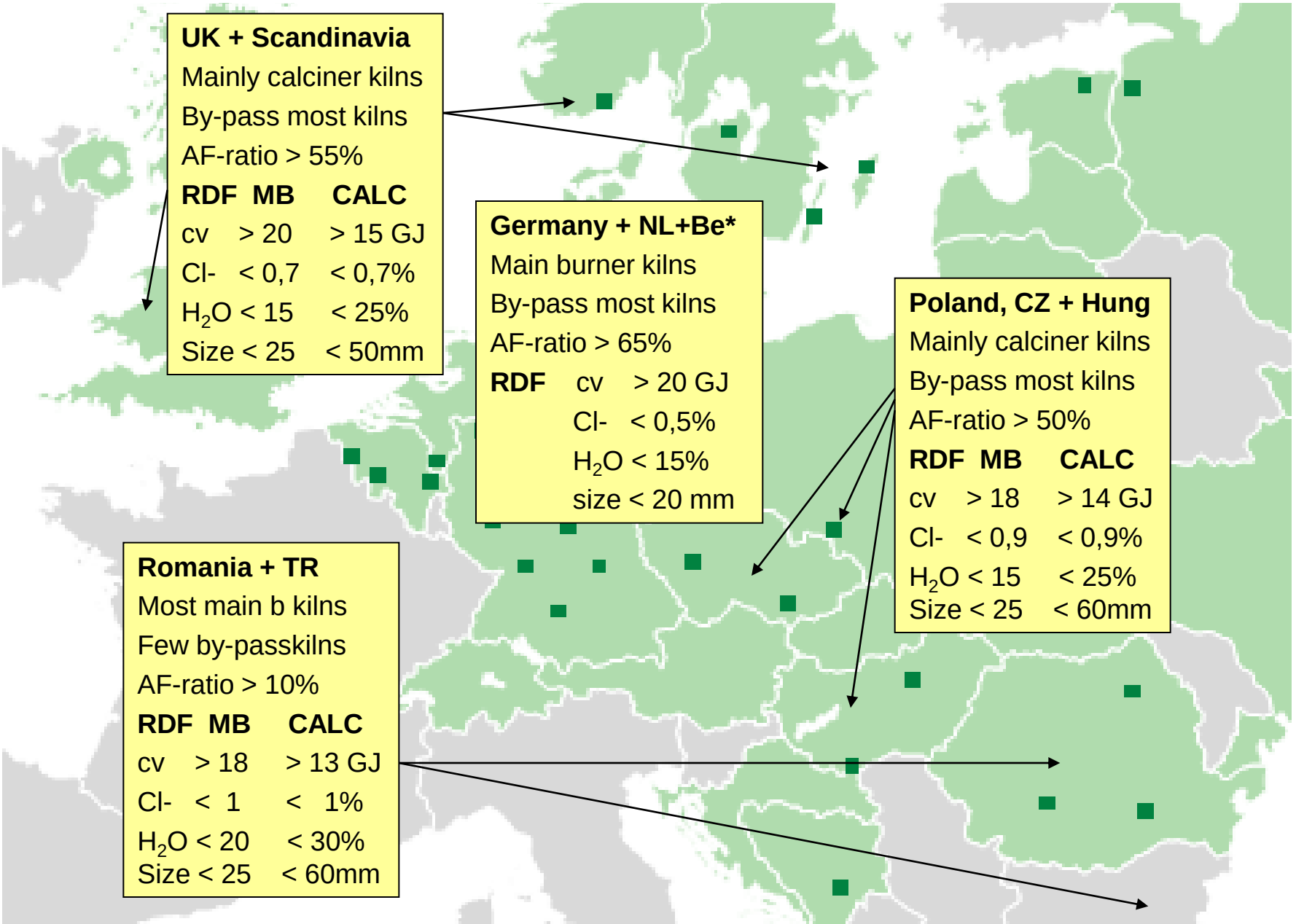
RDF: normally, we are aiming for high calorific waste



Typical RDF Composition

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

HC different kilns in each area → other specifications



UK + Scandinavia
Mainly calciner kilns
By-pass most kilns
AF-ratio > 55%

RDF	MB	CALC
cv	> 20	> 15 GJ
Cl-	< 0,7	< 0,7%
H_2O	< 15	< 25%
Size	< 25	< 50mm

Germany + NL+Be*
Main burner kilns
By-pass most kilns
AF-ratio > 65%

RDF		
cv	> 20 GJ	
Cl-	< 0,5%	
H_2O	< 15%	
size	< 20 mm	

Poland, CZ + Hung
Mainly calciner kilns
By-pass most kilns
AF-ratio > 50%

RDF	MB	CALC
cv	> 18	> 14 GJ
Cl-	< 0,9	< 0,9%
H_2O	< 15	< 25%
Size	< 25	< 60mm

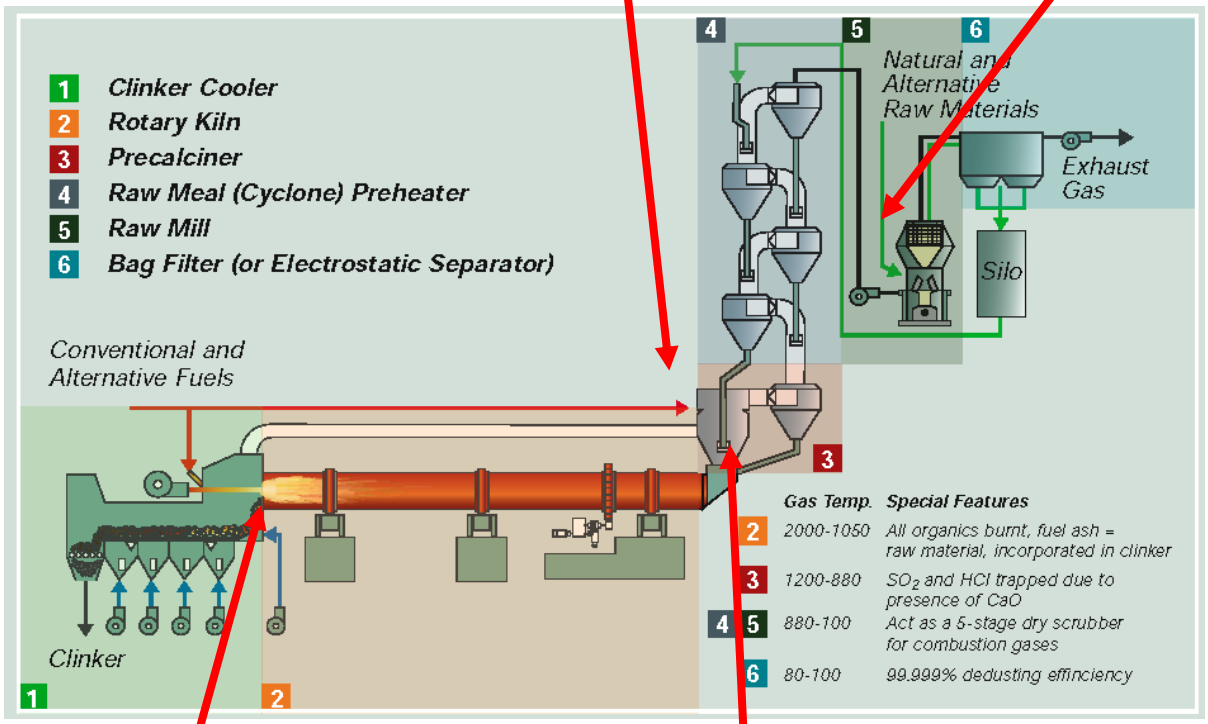
Romania + TR
Most main b kilns
Few by-passkilns
AF-ratio > 10%

RDF	MB	CALC
cv	> 18	> 13 GJ
Cl-	< 1	< 1%
H_2O	< 20	< 30%
Size	< 25	< 60mm

RDF use in cement kilns

by-pass (Cl-)

ID-fan (moisture)



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

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

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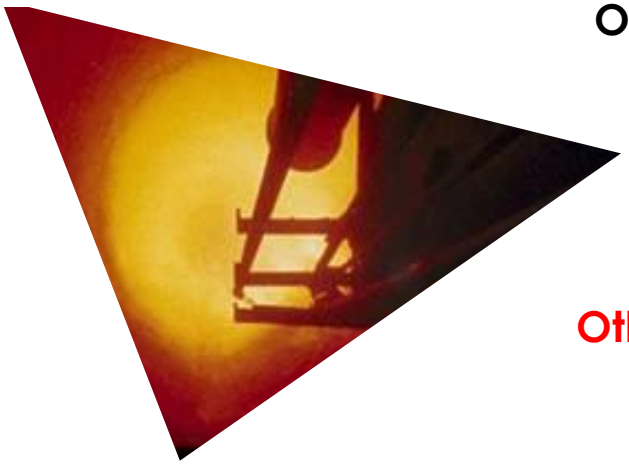
Elements that do influence value/burden of RDF

Cost avoidance

Primary fuel costs

CO_2 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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