



Cement - AFR & Innovation

Energy and waste market influences



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alternate resource
partners
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Topics of Presentation

- Introduction Alternate Resource Partners
- What are pricing/ economic factors for AFR ?
- Characteristics cement & waste organizations
- Characteristics cement & waste markets
- “Cost” factors using AFR in cement manufacturing
- Cost & pricing factors waste management
- Balance between energy and waste market
- Some examples of Market development
- Observations & Conclusions
- Take home messages



Introduction Alternate Resource Partners I

- Company started in 2009
- Consultants, engineers, trainers, coaches & field operators for resource management
- Worldwide experience in both mature and emerging countries replacing all fossil fuels by waste – to - AFR
- ARP & partners have > 100 years experience in all aspects of resource management and cement manufacturing when it comes to AFR



Introduction Alternate Resource Partners II

Main activities ARP:

- ✓ Resource management business development in cement, lime & electric power industry,
- ✓ Waste – to – AFR market research, feasibility study, etc.,
- ✓ Pre- & Co-processing Marketing & Sales training & coaching,
- ✓ Consulting, reviews & audits on health, safety & environmental behaviour,
- ✓ HAZOP Studies on waste/AFR Installations
- ✓ Development of specialized recycling machines for waste to AFR activities, example: oil - filter recycling machine for emerging countries



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Topics of Presentation

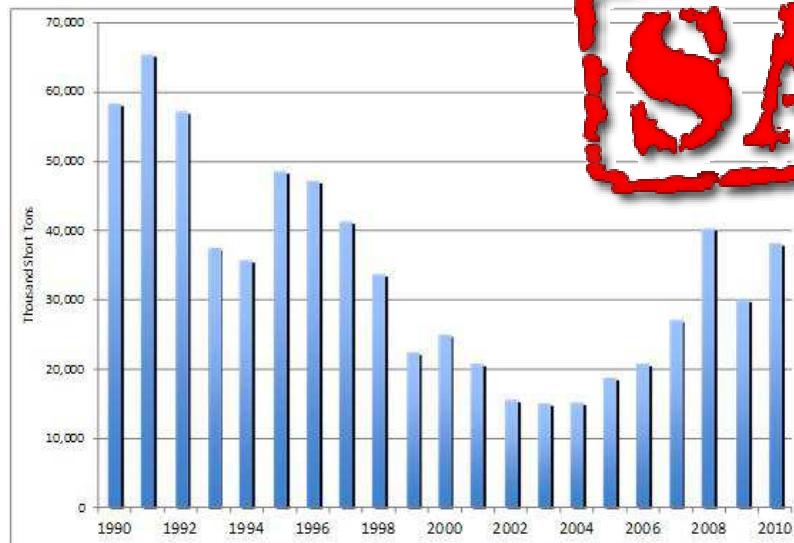
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What are the pricing factors for AFR

For some cement manufacturers
(Like Plant Managers & Purchasers)
the answer to this question is simple;

“IS IT CHEAPER THAN COAL?”

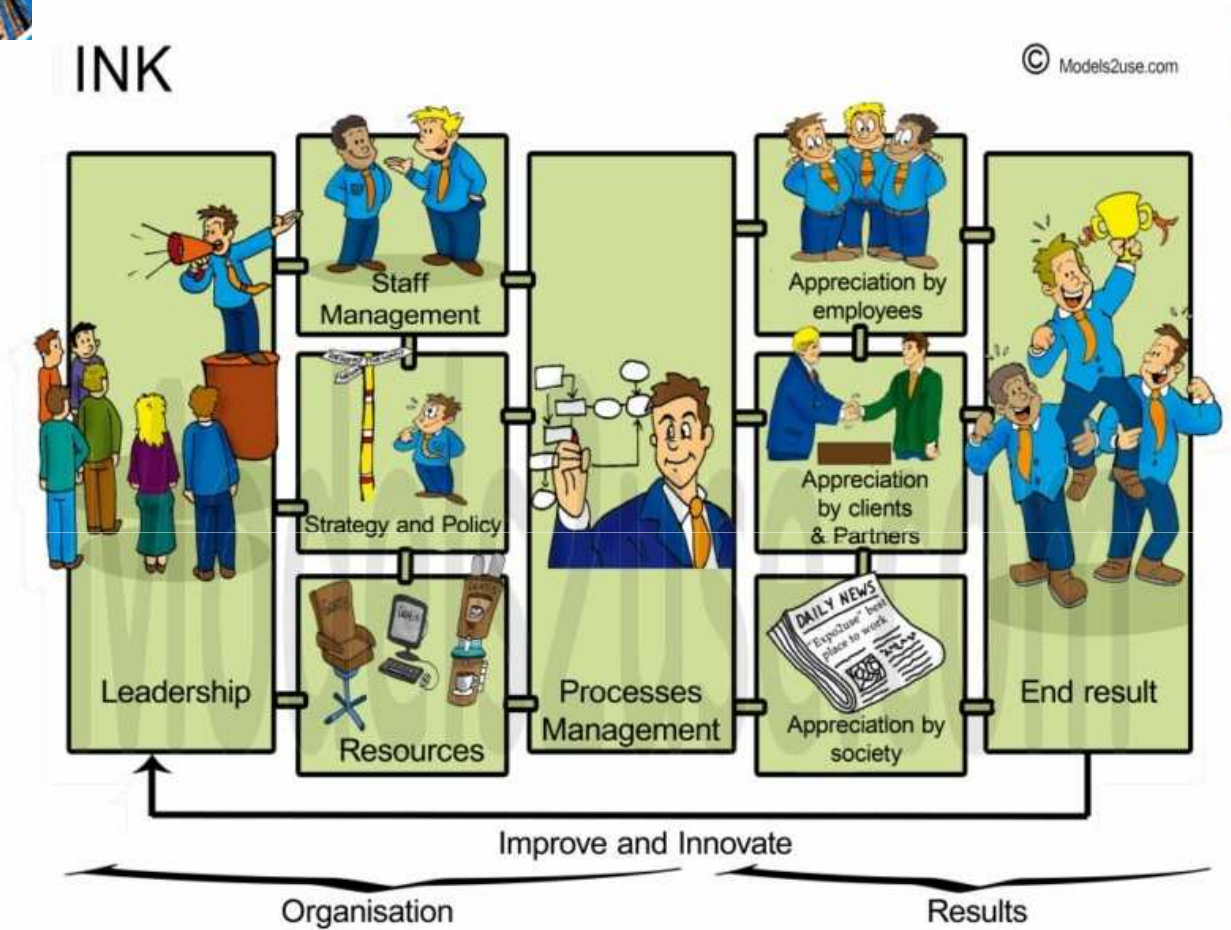


SALE





What are pricing factors for AFR ?



For some it's a complete different business line



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Characteristics cement & waste organizations

Cement organization

- Product oriented
- Cost driven
- Relative slow response
- Capital intensive
- Process Stability focus
- No experience in handling potential hazardous materials
- Don't like change
- Supply/purchase relationship
- Often TSR focused

Waste organization

- Service & solution oriented
- Revenue driven
- Fast response
- Relative low capital
- Opportunity driven
- Used to handle potential hazardous materials
- Change part of mindset
- Customer focus



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Characteristics cement & waste markets

Cement & Energy

- Small number of customers with similar needs
- Competition with same technical standards
- Less influence legislation
- Cost reduction becomes more important
- CO2 reduction important, preparing for expected environmental/financial future CO2 performance

Resource & Waste

- Large number of customers with specific needs
- Competition different technical & environmental standards
- Legislative driven
- (lack of) Enforcement is pricing factor
- From waste to resource – not always a negative value
- MSW incinerators become energy producer – R1 status or WTE installations



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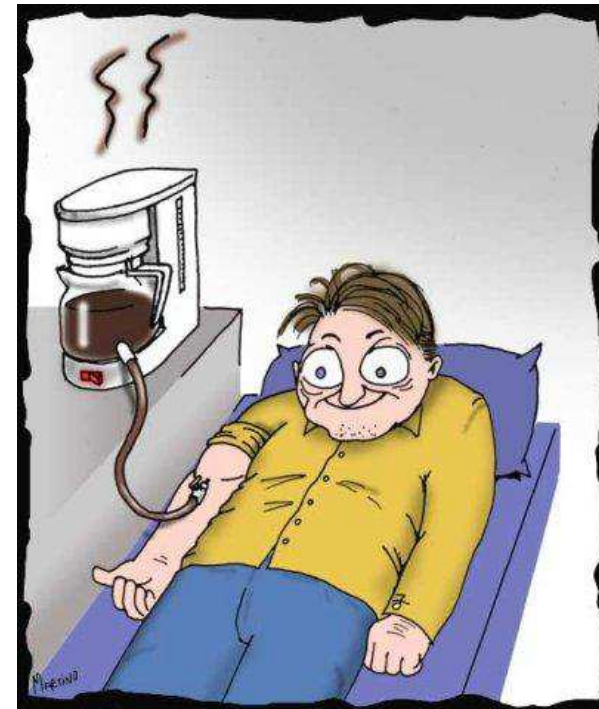
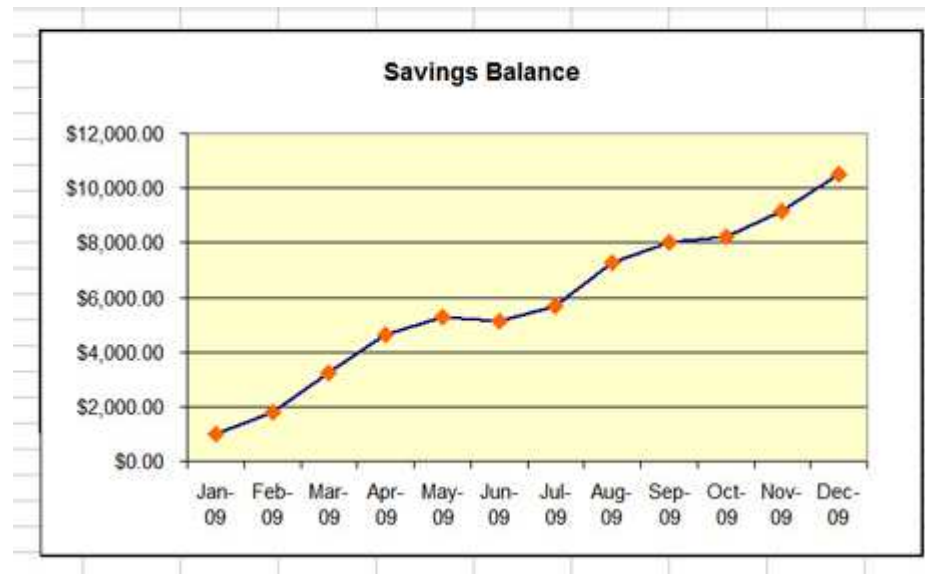
“Cost” factors using AFR in cement manufacturing

- ✓ Energy +/- 30 – 40 % of manufacturing cost
- ✓ Fossil fuel cost reference towards potential savings
- ✓ CO₂ has become part environmental performance and licence to operate
- ✓ Investment in storing & feeding systems AFR
- ✓ Quality control waste – to – AFR pre-processing
- ✓ Loss of production due to AFR properties and variability in feed/quality
- ✓ Continuous Emissions Monitoring Systems (CEMS);
- ✓ Sampling and testing materials including extra Q control on clinker and cement products



“Cost” factors using AFR in cement manufacturing

Once **cost savings** of AFR become part of yearly budget of cement plant, the plant gets “addicted” to these savings in future budgets





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Cost & pricing factors waste management

- ✓ Cost are basically supply-chain costs, collection, transportation, pre-processing, documentation, receiving, handling, treatment, co-processing, monitoring & reporting - hazard level/legislation plays role in all this
- ✓ Waste services mainly sold on added value concept & environmental performance (waste hierarchy)
- ✓ Lack of resources put attention to our waste and its potential value – this resource thinking versus “throw - away” attitude is changing waste markets; first in mature markets, later on in emerging markets
- ✓ New opportunities - new legislation, lack of or overcapacity of waste solutions
- ✓ Lobby on environmental performance resource recovery versus waste treatment



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Balance between energy & waste market

- Strategy on each type of waste – to – AFR & market.
Approach needs to be jointly agreed, for this we need:
 - Transparency between partners
no difference between 3rd party or cement waste subsidiary
 - Understanding dynamics of both markets by all involved partners
 - Benefits shared based on input & total cost of ownership
 - Fossil fuel savings need to be transparent
 - Revenue/margin of waste – resource services need to be transparent
 - Market research (resources, alternative energy & raw materials) and market development to be jointly understood

AND BE INNOVATIVE WHEN MARKET CHANGES



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Some examples of Market development

Comparing RDF/SRF situation in UK & Germany/NL

- Volumes & price in Germany/Netherlands downward trend
- Volumes & price in UK upward trend

Why - Reasons ??

- Germany/Netherlands implemented the EU landfill directive several years ago long before UK
- Since 2007 UK have/will increase landfill tax from **£24** to **£80** in 2014
- Germany build MSW incinerator capacity resulting in overcapacity

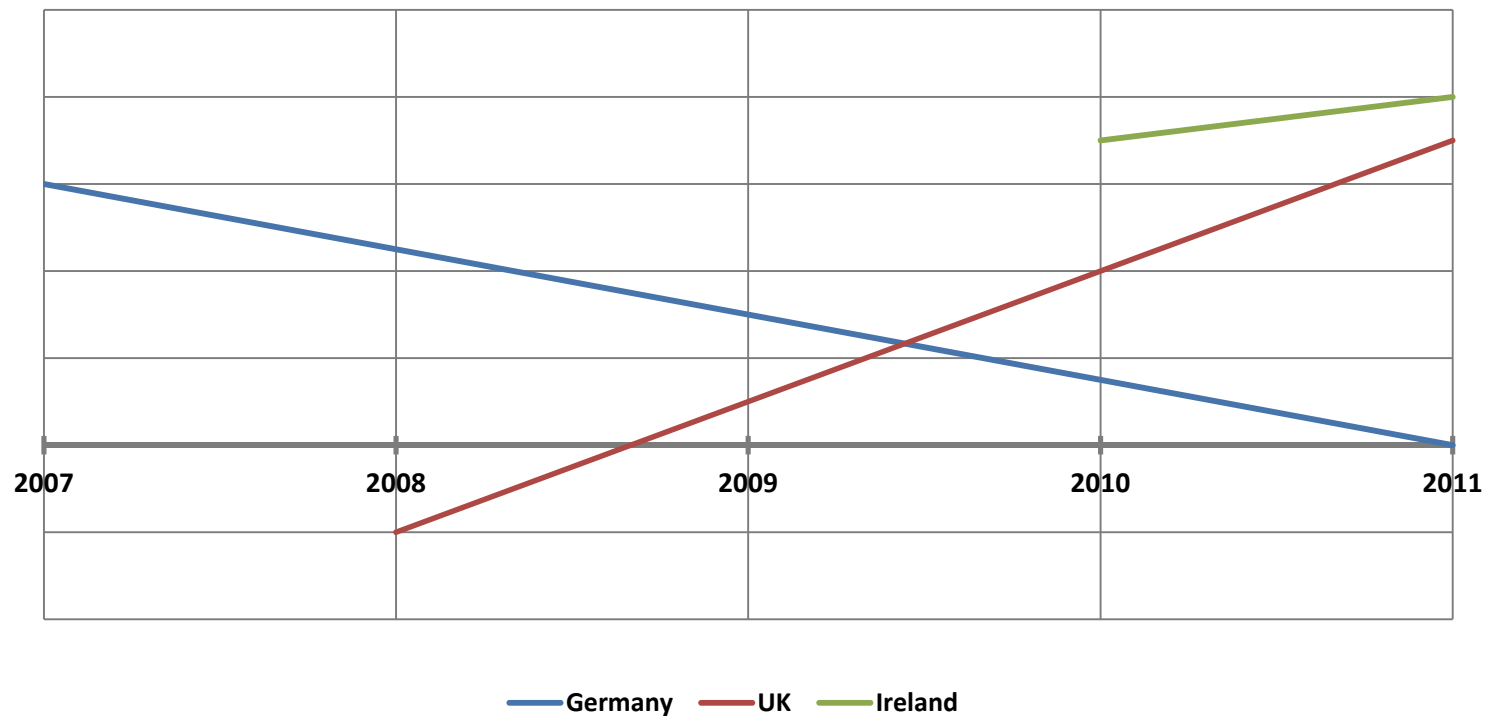
Results:

- ✓ Incinerator cost sometimes below preparation cost RDF/SRF
- ✓ UK exports RDF/SRF over long distances into Europe
- ✓ UK is planning/building WTE facilities, which in itself will be a treat to cement kiln solutions (big volumes will go directly with no or little preparation to WTE installations)
- ✓ Dutch incinerators have asked/got R1 status so import volume from EU under which UK is increasing



Some Market development examples

RDF/SRF situation in UK and Germany





Some Market development examples

Price development HWDF in US

In the period 2003 – 2008 price/fee (to be received by Cement kilns for whole tyres (TDF) and solvent based liquid fuel (HWDF) went in opposite directions.

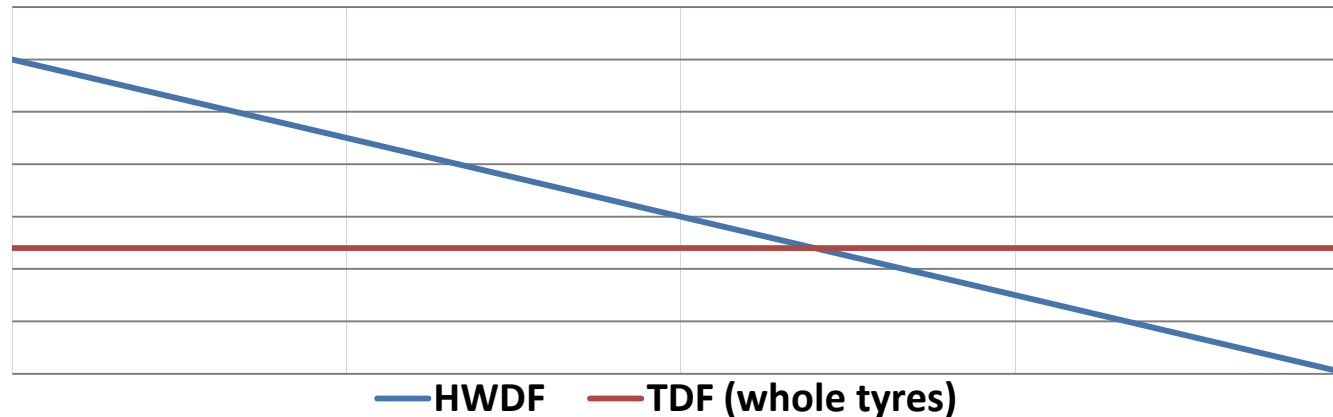
TDF became more profitable than HWDF for some years in above mentioned period!!!!!!???????

Why - Reasons ??



Some Market development examples

Fee for HWDF versus TDF (whole tyres) US



Because of high price/fee for HWDF & learning curve overall HWDF capacity of cement kilns in the US increased dramatically AND.....

Capacity became bigger than market demand



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Observations & conclusions I

- ❖ Partnership (JV or contract) between cement & waste company needed for this **an Agreement** need to have or allow for:
 - ✓ Transparent conditions, so changes (energy cost – waste service revenue – availability on market, etc.) to baseline for calculations can be made easily

 - ✓ Service Orientation – The organization must be focused on providing service to waste generators, providing consistent and reliable solutions to their waste recycling needs.



Observations & conclusions II

- ❖ This Agreement need to have or allow for:
 - ✓ Providing AFR to Cement Plants of **Maximum Value** and **Minimum Impact** to Operations .The **most effective** way to accomplish this is with **Pre-processing** that can regularize the AFR product delivered . This expands range of waste the organization is able to handle and co-process.

 - ✓ Coordination, Communication and Trust between both partners These organizations must **actively** work to develop trust and co-operation at both corporate and plant levels



Observations & conclusions III

❖ This Agreement need to have or allow for:

✓ Communications and Public Affairs

Effective education and communication are necessary to build trust and understanding with legislators, regulators, non-governmental organizations and communities.

✓ Environmental, Health, and Safety

Capability to ensure environmental, health and safety risks due to handling, storage and use of alternative fuels and raw materials are minimized. This is of vital importance both to internal and external stakeholders.

Nothing destroys an AFR program faster than

an environmental or safety emergency /accident



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Take home messages I

- ✓ AFR pricing is a moving target just like waste flows to the lowest point
- ✓ Opportunities come & go and need to be captured when available
- ✓ Energy savings and resource value will become target of 3rd parties – this will give need to adapt strategy of cement industry for waste - to - AFR sources
- ✓ Multi year budgeting will become more difficult because of shorter waste solution cycles
- ✓ AFR pricing isn't an exact science
- ✓ Co-processing will continue to grow as part of resource management activities



Take home messages II





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Thank You for Your attention

Questions?? – Remarks!!





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