Value Added by High Efficiency Hurricane Cyclones in an RDF Incineration Plant

€ Millions can be saved in landfill disposal costs with ash separation

RDF plants spend yearly millions of Euros in landfill disposal costs of hazardous ash released by the incinerator. In several countries, such as the UK, the trigger for fly ash to be considered "hazardous" lies in its high PH. However, it is the hydraulic lime injected in Spray Absorbers, destined to reduce HCL and SOX in the flue gases, which is responsible to turn the fly ash alkaline.

By using high efficiency cyclones upstream in the process, after the Economizer and before the Spray Absorber where hydraulic lime is injected, the amount of dust which will get in contact with that chemical will be highly reduced. This contaminated ash is finally captured in a bag filter.

Separation of dusts into two qualities ("non-hazardous" and "hazardous") has a dramatic importance for the economics of the plant. Instead of having 100% of the dust collected in the bag filter and being considered hazardous (option without cyclones), by using ACS cyclones, near 85-90% of the dust will be collected prior to chemical injection and treated at 36€/ton in less expensive landfills.

Only what escapes the cyclone and finally gets captured in the baghouse (10-15%) will need to be disposed at near 170€/ton (UK figures).
Cyclones also have the benefit of optimising the baghouse which, by itself, offsets the costs with the additional pressure drop.

ASH DISPOSAL COSTS:	
Non Hazardous ash with normal PH at boiler, economizer and cyclone:	36€/ton
Hazardous ash with high PH at bag filter:	170€/ton
Value of electricity (regarding additional parasitic load)	90€/MWh

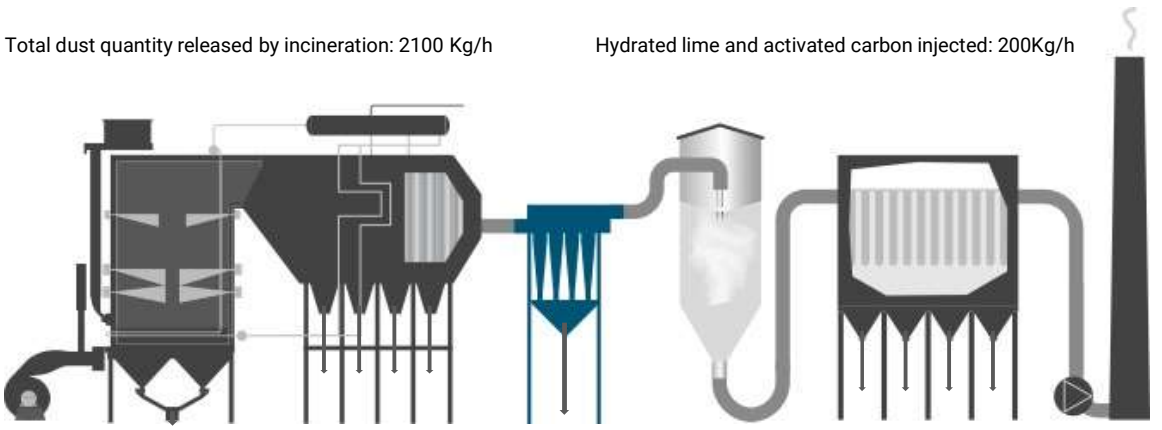
DUST LOAD AND CURRENT EXPECTED DUST EXTRACTIONS :	
Dust load released by incineration:	2100kg/h
Dust captured at the boiler (bottom ash):	500kg/h
Dust captured by the economiser:	100kg/h
Hydrated lime addition before the bag filter:	200kg/h

COST COMPARISON:	Without Cyclone	With ACS
Dust collected in Cyclone (Kg/h) (non Hazardous)	0	1275
Dust load collected by the bag filter (Kg/h) (Hazardous)	1700	425
Cost of Non Hazardous ash treatment per hour	21,70 €	67,80 €
Cost of Hazardous ash treatment per hour	288,15 €	72,00 €
Cost of Non Hazardous ash treatment per year	182 246,40 €	569 520,00 €
Cost of Hazardous ash treatment per year	2 420 460,00 €	605 115,00 €
Estimated additional electricity cost per year	0	68 342,40 €
Total cost per year	2 602 706,40 €	1 242 977,40 €
Total Savings per Year (2 602 706,40€ - 1 242 977,40€)		**1 359 729,00€ ***

(Assumption: 24h/day during 350 days per year operation)
* Not considering the savings on bags replacement and bag filter maintenance)

Total dust quantity released by incineration: 2100 Kg/h

Hydrated lime and activated carbon injected: 200Kg/h



	Boiler	Economizer	Hurricane	Spray absorber	Bag filter	Stack
Without Cyclone	500 Kg/h	100 Kg/h	NA		1700 Kg/h	
With ACS	500 Kg/h	100 Kg/h	**1275 Kg/h**		**425 Kg/h**	

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