

SRF in Europe

Workshop Combustion of Solid Recovered Fuel

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20 October 2011
Dublin



ERFO in short

- European Recovered Fuel Organisation
- A non profit association
- Purpose
 - Represent European companies which produce fuels prepared from non-hazardous waste
 - Promote the use of such recovered fuels within the framework of sustainable development
 - Help establish high quality standards for such fuels at European level
- Members from: BE, NL, DE, ES, FR, UK, UA, IT, FI, IE



ERFO'S INVOLVEMENT

- SRF standardisation work within CEN / TC 343
- Participation in R&D programs
 - Pre-normative research on sampling, sample preparation and determination of biomass content
 - QUOVADIS : validation of Technical Specifications, Quality Management system and perspectives in new EU countries
- Participation in debates, works and lobbying activities related to SRF
- Main contribution to the SRF chapter of the BREF Waste Treatment and preparing already a contribution for the BREF WT review



SRF, Solid Recovered Fuel

Category of substitution fuel	Solid Bio-fuels	Solid Recovered Fuel (SRF)	Hazardous waste fuels	Specific fuels
Waste for this preparation	Non treated wood	I&CW and MSW	Hazardous waste : solvents, waste oil, soiled packaging...	Animal meal, tyres , ...

Solid Recovered Fuel (SRF) is, a “solid fuel prepared from non-hazardous waste to be utilised for energy recovery in incineration or co-incineration plants, and meeting the classification and the specification requirements laid down in EN15359 which will be published soon

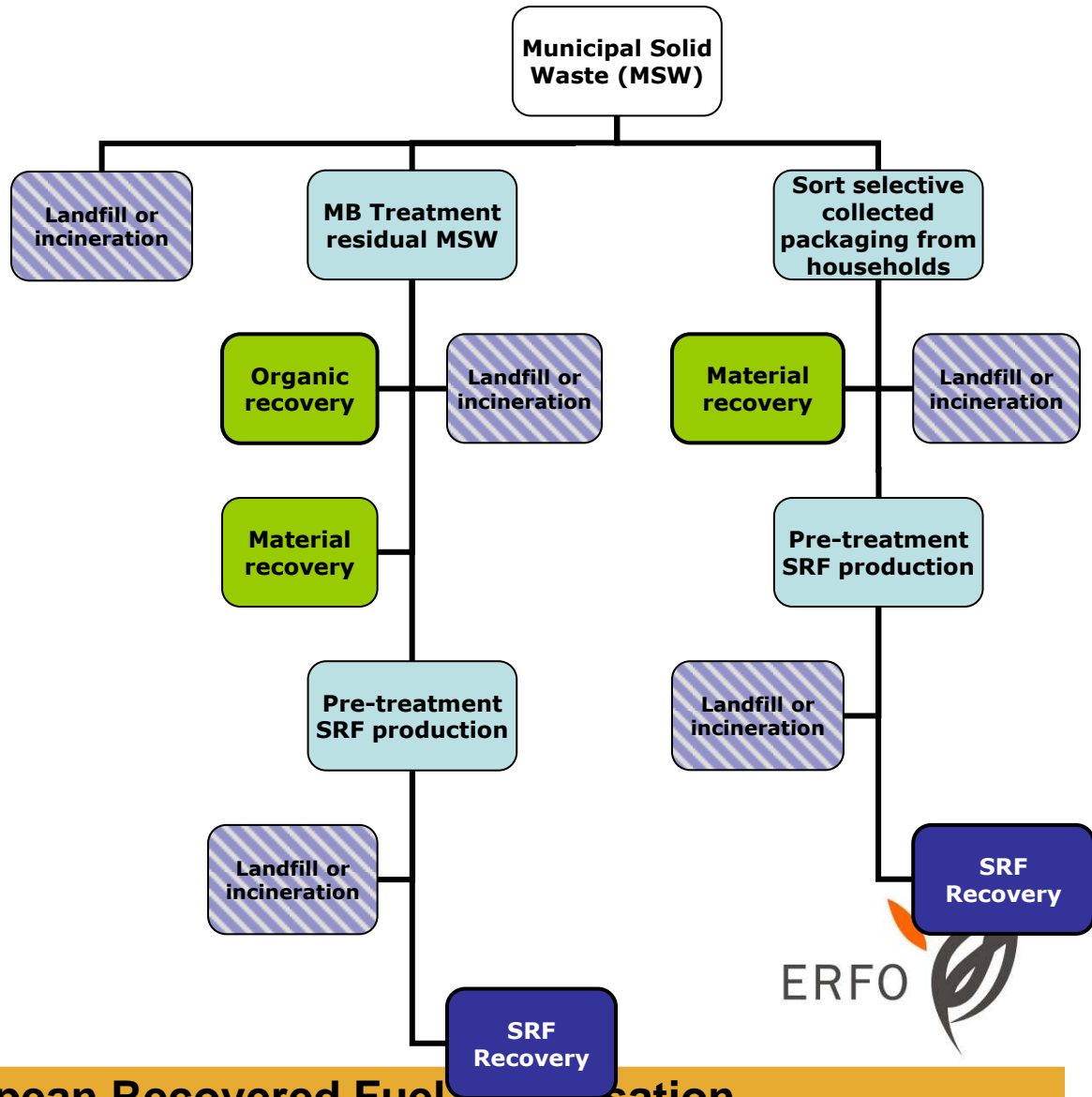
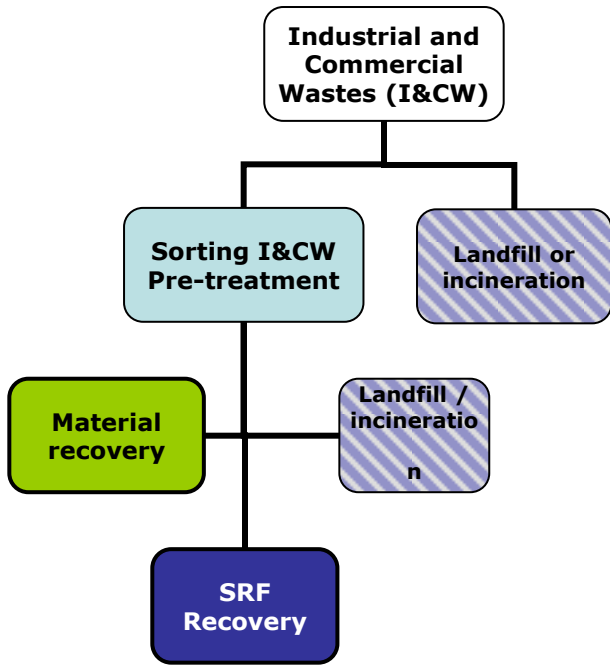
The wording SRF has only to be used in this context

The specific characteristic of SRF:

Compliance with classification and specification requirements

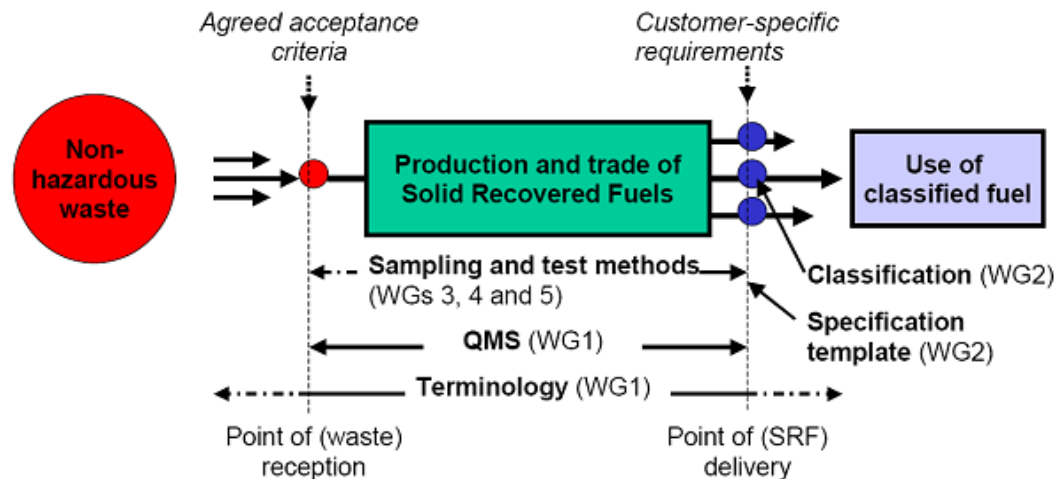


Origin of SRF



Standardisation

- The efforts of CEN delivered rather a clear framework than a set of specifications
 - Detailed procedures for sampling, analysis and physical tests
 - Classification SRF according to key properties NCV, Hg, Cl
 - A framework, with broad interval's, for classifying SRF
 - Upgrading TS's into EN's will be completed by the end of 2011



SRF deals also with ...

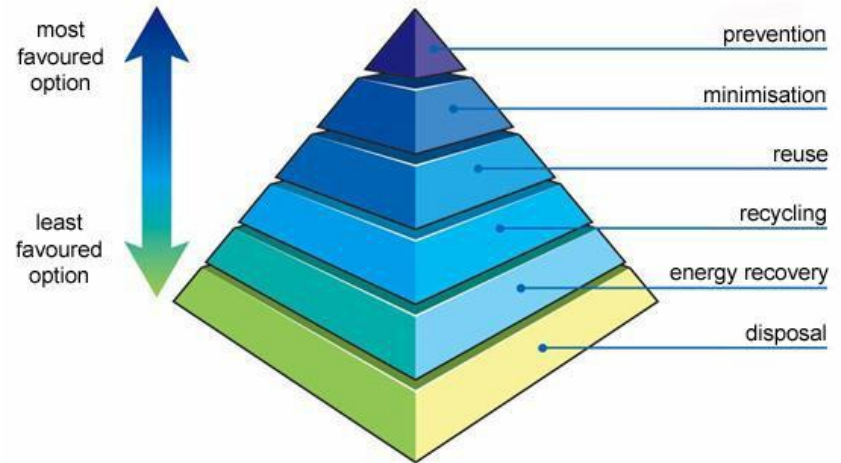
- SRF is a waste derived fuel meeting the classification and specification requirements of EN 15359
- Main regulations concerned :
 - Waste Framework Directive (definition, recovery, EoW)
 - Waste Shipment Regulation
 - Industrial Emissions Directive (BAT, BREF)
 - Emissions Trading Scheme

 - Renewables Directive (targets, definition biomass)
 - Waste Incineration Directive (ELV's, measurements)
 - European Court of Justice jurisprudence
 - Reach



From the waste side

- Less disposal
 - Landfill Directive
 - Waste Framework Directive



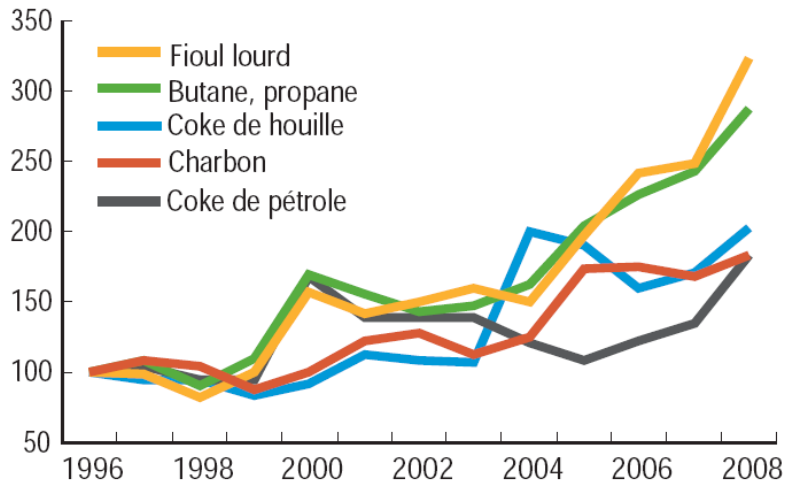
- Reduction of the emissions of greenhouse gases
 - Reduction of land-filling biodegradable fractions
 - Contribution the Kyoto protocol and 20/20/20 objectives

From the energy side

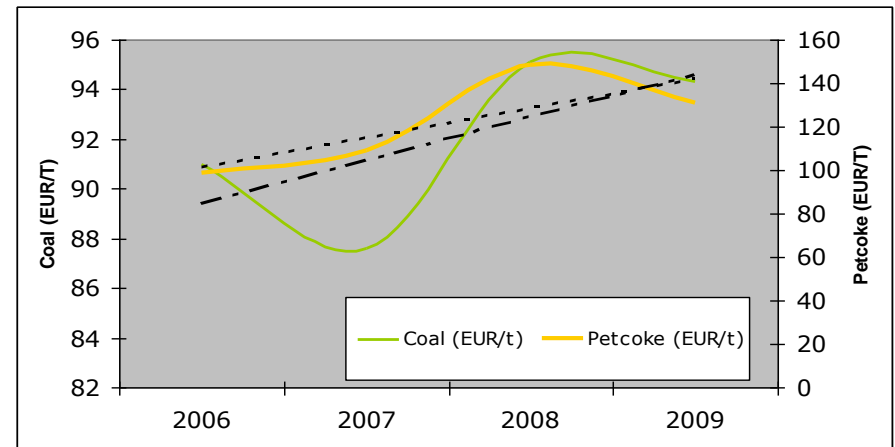
- Rise of the impact of the energy cost in industrial production
- Heavy price variations
- General trend : increasing prices

Average price of combustibles used in industry

Indices, base 100 en 1996

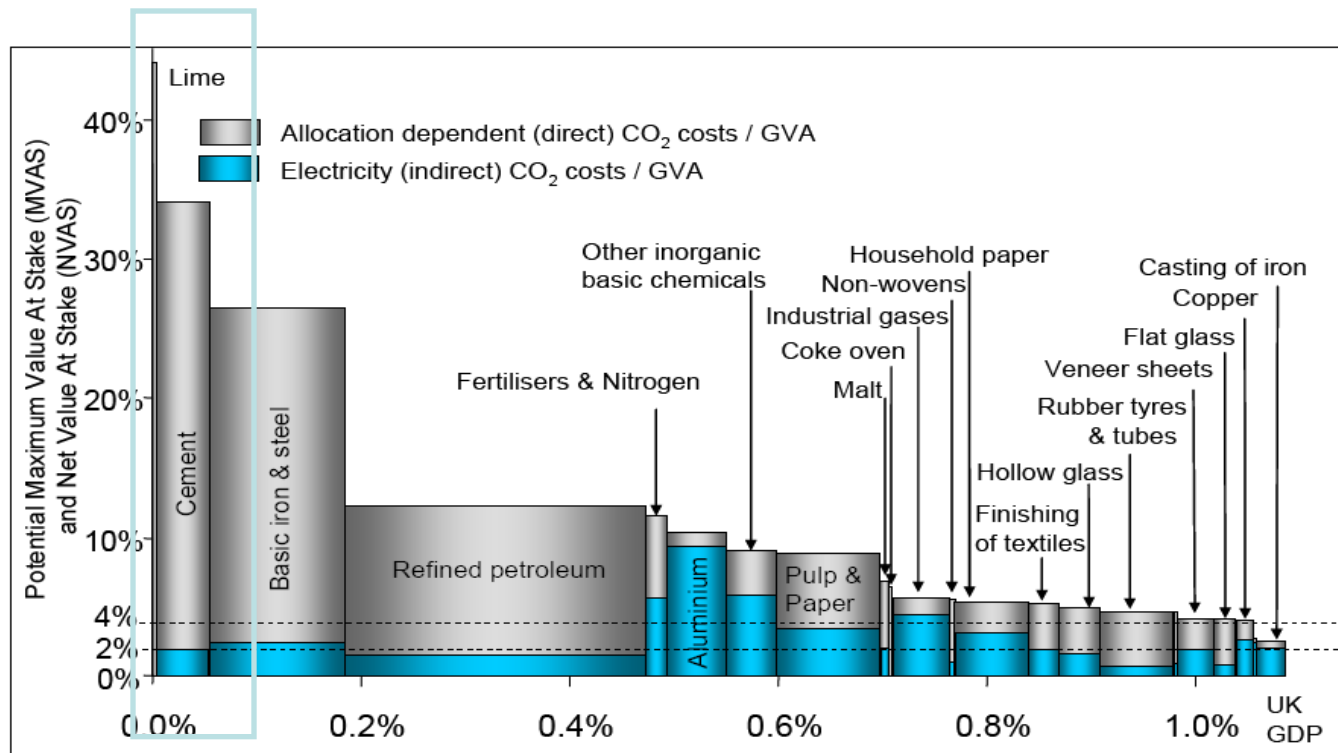


Champ : industrie manufacturière hors IAA.
Source : Insee - EACEI.



From the CO₂-side

- Different sectors and end-users of SRF fall under the ETS (CO₂)
- Probable acceleration when progressive auctioning of quota's in the ETS-phase 3 (2013-2020), cost impact on different industries



Source : Hourcade et al., 2008 (hypothesis : Quota at 20 EUR / tCO₂ and 10 EUR / MWh in the electricity price).



Potential, Quantities, Percentages

- In 2006 the total potential in EU 27 = 70 Mt ; coming from municipal, industrial , and demolition & construction sources and including plastics, paper, cardboard, textiles, wood, high calorific fraction from MBT
- About 12 Mt was energy recovered or 17%
- National recovery rates differed between 2% and 35%
- Even regional differences, within a member state, can be observed
- The processing took place in energy intensive industries; like cement, paper, metal and chemical industries
- The countries with the highest recovery rates are : Denmark, Germany, Netherlands, Sweden
- The countries with the lowest recovery rates are : Bulgaria, Greece, Romania, Poland

- » Source : Prognos, EU Atlas Secondary Raw Materials
- » Eurostat



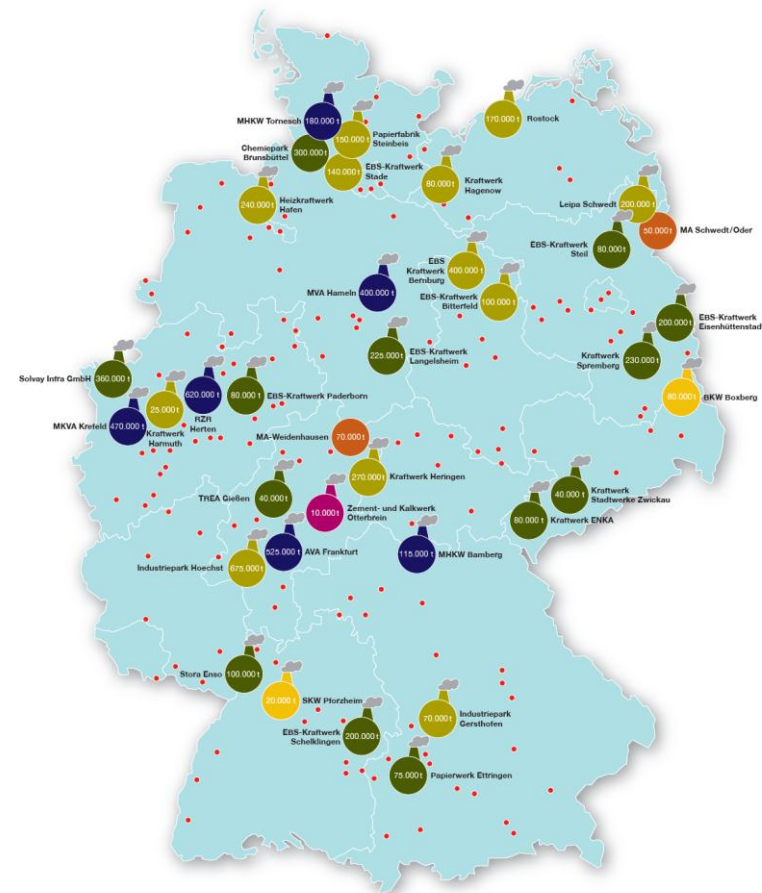
Historical drivers to develop secondary fuels

- Not every country had the same drivers and the same history
 - D : Landfill ban and resource strategy (TASI, KrW/AbfG), Energy crisis and energy price development, necessity to substitute expensive fossil fuels (1995)
 - UK : political choice, difficulties to obtain a permit for a EfW (2005)
 - I : legislation allowing a product status (withdrawn)
 - B : demand of cement plants (1997)
 - SP : political choice, demand of cement plants
- Common economic factors
 - Price of primary fuels (petroleum coke included)
 - Availability or lack of alternatives at a certain moment : tyres, meat & bone meal, hazardous waste.....



Germany

- Important contribution to the expansion and the maturation of this treatment option
- Influence of the energy market and the necessity of increased efficiencies on the waste market has been underestimated
 - Overcapacities of MSWI
- Increasing competition between all types of installations for energetic valorisation: MSWI, dedicated incinerators, co-incineration
 - High share fix costs of existing MSWI is limiting the production of SRF but also the development of other recycling activities
 - Often positive prices



Geplante und in Bau befindliche Müllverbrennungsanlagen in Deutschland



1 Der individuelle Zahlenwert beschriftet die Verwertungsleistung in Tonne pro Jahr
 2 Der individuelle Zahlenwert beschriftet die Sortierleistung in Tonne pro Jahr
 3 Der individuelle Zahlenwert beschriftet die geplante Gesamtverwertungsleistung

Germany

- Disposal (EfW-plants) gate fees crashed
- Gate fees and + or – revenues at the end user are hardly sufficient
- SRF – platforms (and recycling plants) are increasingly by-passed and some are put in mothballs
- Ways out : pre-treatment plant optimisation, quality improvement, synergies between pre-treatment and final users
- Need for a transparent reflection about the energy and CO₂-value with regard to the pricing system for SRF



Northern Europe and Poland

- The overcapacity in certain countries in Northern Europe is compensated by imports from neighbouring countries; like Norway and United Kingdom
 - Resolution expected at long term of this non-equilibrium with the development of local capacities
 - Overcapacity in the Northern Europe can also be filled up with other types of materials
- Important production of SRF in Poland (+ 500 000 tons) for co-incineration, despite low prices for disposal
 - Often positive prices



France

- Moderate increase of SRF production (< 100 000 tons), not more than one installation in service per operator
 - Use other substitution fuels
 - Low willingness to pay co-incinerators
 - Priority given by the public bodies to the organic valorisation of MSW
 - Gradual increase of the environmental taxes don't lead to a drastic switch in the way of treatment of wastes
 - Price close to 0 EUR/t



Spain

- Gradual increase of SRF production
- Consumption of renewable energy in Spain, year 2008, was 7.6% of the primary energy (**3.6% from biomass and waste**, 4% from other renewable sources).
- Cement kilns is the most important destination for SRF in Spain.
 - 28 of the 41 cement plants of the Spanish cement association had in 2006 permits for the use of alternative fuels (including SRF).
- In 2006 the consumption of alternative fuels for cement sector was 298.114 t.
- The “Instituto para la Sostenibilidad de los residuos” estimates the potential SRF consumption in Spain is 5 Mt. This quantity includes cement industries, and other industrial sectors.



Developments at the output side

- Big power plants are looking for high quality SRF with a constant composition to reduce i.e. corrosion risk. The availability of high quality SRF (with low Cl-values) shall increase their consumption.
- High quality SRF can be delivered by SRF-preparation plants if they use well selected waste inputs and if their operational devices are high tech (NIR,...)
- Cement industry promotes the development of SRF to ensure quantities of their alternative fuels.
- Alternative fuels enable cement kilns to “significantly” reduce their fuel costs



BENEFITS OF SRF

SRF (CEN/TC 343 CERTIFIED) will bring

- Standards
- Quality assurance
- Confidence and trust
- And CO2 reduction

Material Waste Stream	Item	CO ₂ emissions	Benefit (+) / Burden (-)
		kg CO ₂ -equivalent	kg CO ₂ -equivalent
Solid fuel waste	Co-incineration of SRF/ RDF in a cement kiln	440	1,040
	Substitution of fossil fuels co-incineration cement kiln	1,480	
	Co-incineration of SRF in an optimised MSWI	440	460
	Electricity and heat substitution	900	
	Co-incineration of SRF/ RDF in a coal power plant	450	1,060
	Substitution of fossil fuels co-incineration coal power plant	1,510	



The dedicated incineration model

- Comparison with « gas » combustion scenario

	Incinerator dedicated (26 MW)	Gas boiler (24 MW)	
		Gas at 27 € / MWh (35 € / MWh useful)	Gas at 21,6 € / MWh (28 € / MWh useful)
Investment amount (m€)	30	2,4	2,4
Proportional charges (without SRF cost) (m€ / y)	0,56	7,3	6,0
Fixed charges (m€ / y)	1,3	0,05	0,05
Operating charges & maintenance (m€ / y)	2,1	0,05	0,05
Financial charges (m€ / y)	2,6	0,2	0,2
TOTAL (m€ / y)	6,6	7,6	6,3
Potential value of SRF (€ / t SRF break even point)		19,2	- 4,8
Key assumptions	Dedicated incineration (56 000 t SRF) replacing delivery of steam by gas plant ; Price CO ₂ quota : 15 €/EUA		

- Less obvious benefits if gas prices remain relatively low



Conclusions

- A sector with potential, under the following conditions
 - A more balanced economy between pre-treatment facilities and co-incinerators, leading to positive prices. SRFs calorific and biogenic content has to be valorised
 - Moderate/restrictive of MSWI-capacities, especially in the NMS
 - Maintaining a regulatory framework as waste, coupled with an enrolment of some SRF on the Green List.
 - Positive development of energy prices and CO₂-credit-cost
 - High standards of preparation to ensure health and safety
 - Technological progress to explore high substitution rates

