



Role and markets for SRF

Geert Cuperus

ERFO

IEA/ERFO workshop

17 May, Copenhagen

About ERFO

- 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 frame of sustainable development
 - Help establish high quality standards for such fuels at European level
- Members from: BE, NL, DE, ES, FR, UK, IT, FI, SW
 - Full members: producers of SRF
 - Associate members: other entities supporting the SRF concept

About SRF

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 requirements laid down in EN15359

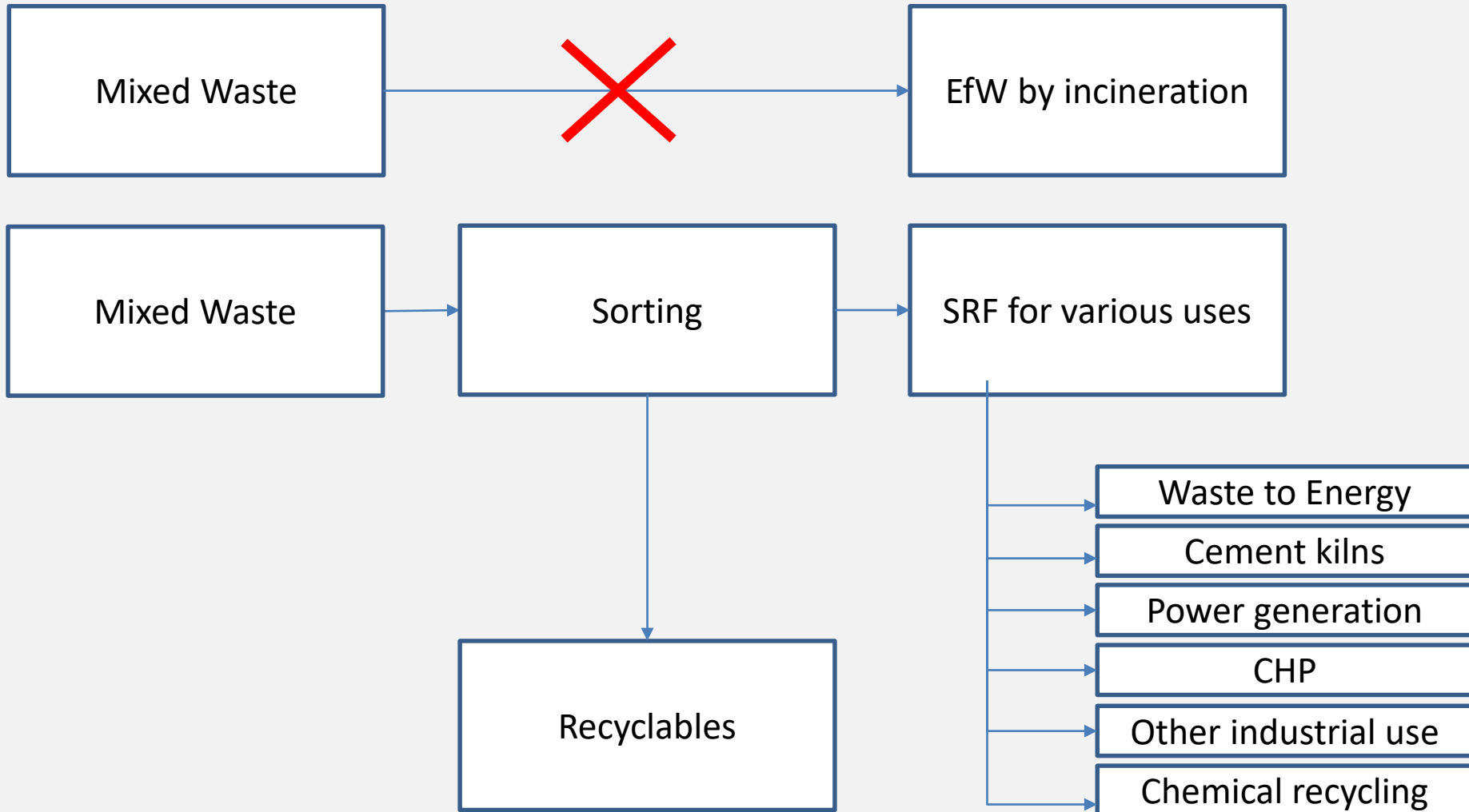
The wording SRF has only to be used in this context

The specific characteristic of SRF:
Compliance with European EN standards

The missing link

- Circular Economy Package
 - SRF production is part of the sorting process
 - No competition with recycling
- EU Energy Strategy
 - Flexible EfW solution: use where there is a demand
 - Use in processes designed to generate power and/or heat
 - Use of existing infrastructure

The missing link



Added value of SRF – case NL

- “Integral solution” of C&I waste: incineration
- 2 million tonnes, to be reduced to at least 1 million
- Through source separation and sorting facilities
- Anyway: a high calorific residue remains

Added value of SRF – case NL

- Residue of 13-14 MJ/kg, incinerators built for lower NCV
- Incinerators not built to treat high calorific waste
- At current residues are rejected by incinerators → significant amounts go to landfill
- Dutch Transition Agenda: Incinerators not to be used for integral waste, as this is not a circular solution
- Residue as source for SRF

Added value of SRF

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	

Source:
Prognos,2008

EU Energy from Waste Strategy

- Avoid overcapacity of incinerators
- Proven techniques to improve the efficiency of WtE, 2 of the 4 techniques mentioned:
 - Co-incineration in combustion plants, for instance using gasification of SRF (comment: SRF-gasification is not state of the art, further developments necessary)
 - Co-incineration in cement and lime kilns

Potential SRF production and use

Waste	Arising EU (Mt/year)	Assumption	Potential volume SRF (Mt/year)
MSW	213	<ul style="list-style-type: none"> • 50 Mt additionally available for SRF • Output MBT 35% SRF 	17.5 (in addition to current production)
C&IW	270	<ul style="list-style-type: none"> • 50% available for SRF • Output 15% SRF 	20
C&DW	630	<ul style="list-style-type: none"> • 20% available for sorting • Output 15% SRF 	19

→ Appr. 60 Mton



Source:
ERFO/Cembureau 2015



→ Appr. 50 Mton

Market	Volume	Source	Potential SRF volume(Mt/year)
Industry	3497 PJ ¹⁾	[Pardo, 2012]	12
Cement industry	522 PJ/year	[CEMBUREAU, 2013, 2015]	12
Power generation	3,13 million GWh	[Eurostat]	16
Biomass power generation	100 Mtoe	[Eurelectric, 2011]	6
District heating	815088 TJ	[Pardo, 2012]	2

Technology & Market Opportunities for SRF

	Existing Technology	New Technology
Existing Markets	Market Penetration CHP District heating Co-Combustion cement	Product Development Synthetic Biofuels Pyrolysis oils
New Markets	Market Development Co-Combustion steel	Diversification Chemicals H ₂

(K. Maniatis, DGEner, Presentation 2016)

A broader scope

- SRF now can become a feedstock for chemical recycling
 - Into fuel or syngas → optimised energy efficiency
 - Into chemicals → SRF as part of recycling
- Further technical developments and support/funding necessary
- SRF-standards (CEN/TC 343) helps to describe and guarantee reliable fuel-qualities, thus laying the foundation for the success of chemical recycling

Conclusions

- Added value of SRF as the missing EfW link
 - Part of the recycling route
 - Solution for the calorific residue
 - CO2 reduction compared to other routes
- Recognised as a main factor to improve EfW efficiency
- Potential of production and use established
- SRF higher up the ladder as recycling concept