Workshop

Which future for the SRF market?

Milano - November 20, 2013

Organized by

IEA Bioenergy

Task 36 - Integrating energy recovery into solid waste management

RSE

RegioneLombardia

Under the patronage of

CTI ENERGIA AMBIENTE

Production and use of SRF in Italy

by Sergio Scotti for

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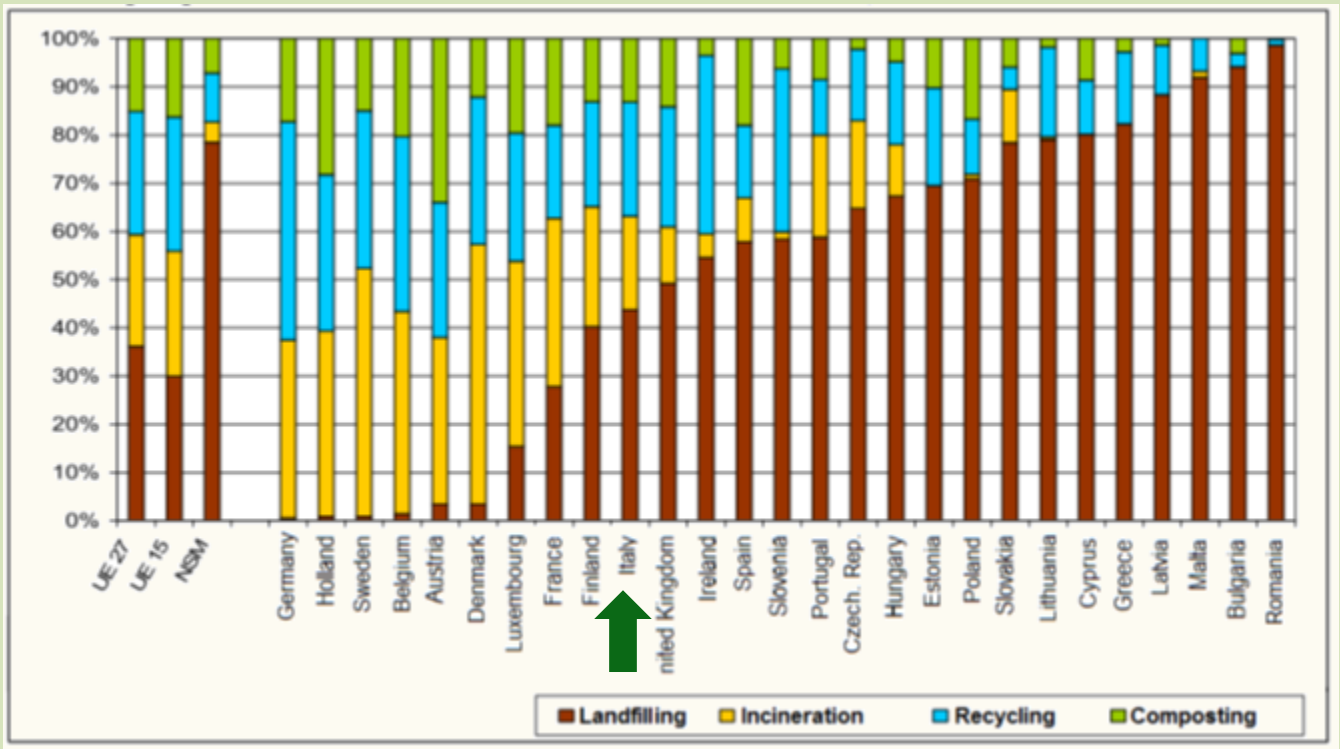
MSW treatment systems in Europe

In Italy in 2011 31,3 Million of tons of MSW are produced.
42% of MSW go to landfill.



Source *ISPRA on Eurostat data*

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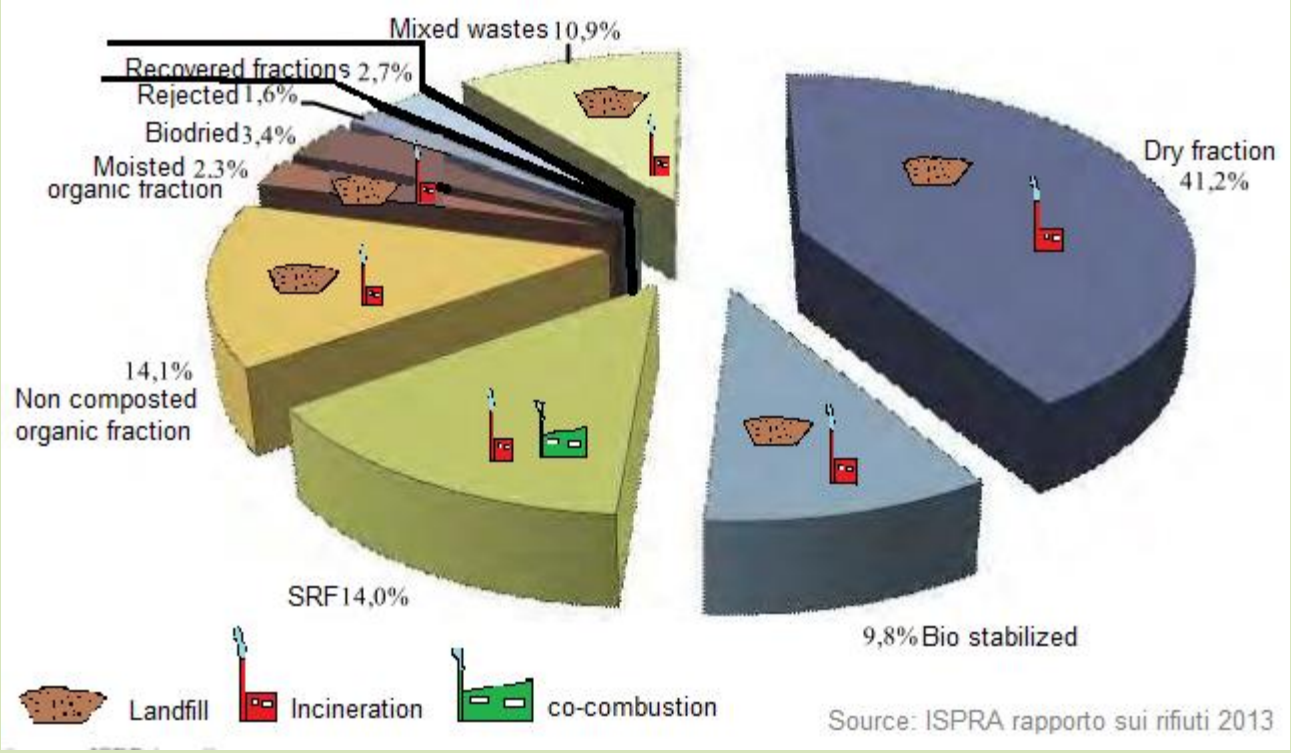
Production of SRF in Italy

In Italy in 2011 were treated in MBT
9 Million tons of wastes in 122 plants and
8 Millions tons of different fractions are produced.
In detail
1.1 Million tons of SRF are produced.



Destination of SRF:

- **Waste to Energy plant**
- **Cement Kiln**
- **Power Plants**

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«OLD SRF» and «NEW SRF EoW»

"New" SRF Classification from a plant actually authorized to produce "Old SRF"

		Limits on Mean / Median / 80 Percentile UNI 15359	***Mean***	***Median or 80°Percentile***
NCV (mean)	*MJ/Kg a.r.*	*25(1) 20(2) 15(3)*	20,58	
Cl (mean)	*% d.m.*	*0,2(1) 0,6(2) 1,0(3)*	0,51	
Mercury (median)	*mg/MJ a.r.*	*0,02(1) 0,03(2)*		0,01
Mercury (80°Percentile)	*mg/MJ a.r.*	*0,04(1) 0,06(2)*		0,01
Ashes	*% d.m.*	-	13,00	
Moisture	*% w.w.*	-	11,23	
Antimony (median)	*mg/Kg d.m.*	*50*		17,10
Arsenic (median)	*mg/Kg d.m.*	*5*		0,90
Cadmium (median)	*mg/Kg d.m.*	*4*		0,40
Chrome (median)	*mg/Kg d.m.*	*100*		52,75
Cobalt (median)	*mg/Kg d.m.*	*18*		6,65
Manganese (median)	*mg/Kg d.m.*	*250*		102,50
Nickel (median)	*mg/Kg d.m.*	*30*		15,75
Lead (median)	*mg/Kg d.m.*	*240*		*71,15*
Copper (median)	*mg/Kg d.m.*	*500*		*106,80*
Thallium (median)	*mg/Kg d.m.*	*5*		*0,58*
Vanadium (median)	*mg/Kg d.m.*	*10*		*3,35*

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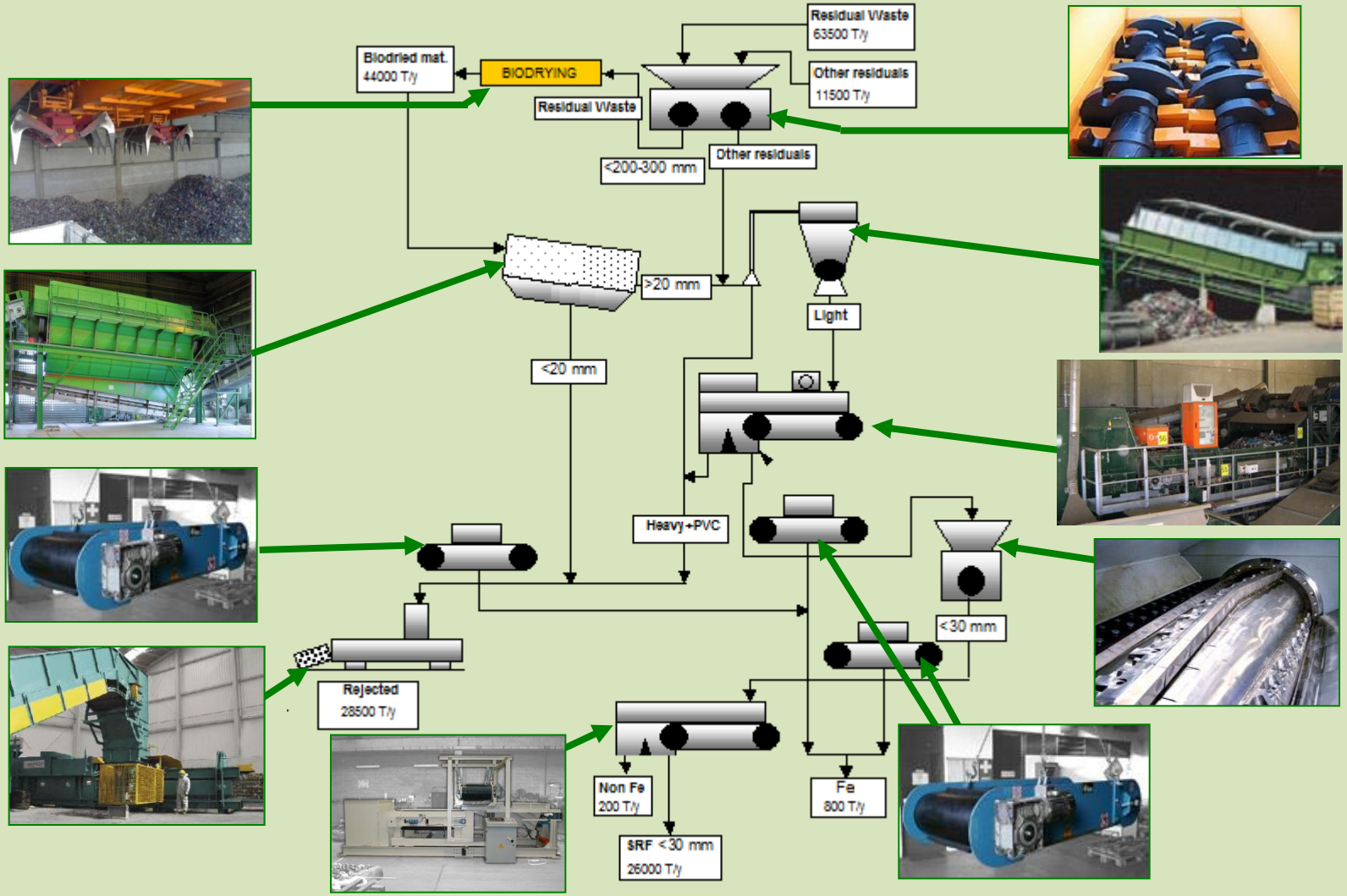
SRF Production process: cement kiln

Example of production of SRF for Cement Factory



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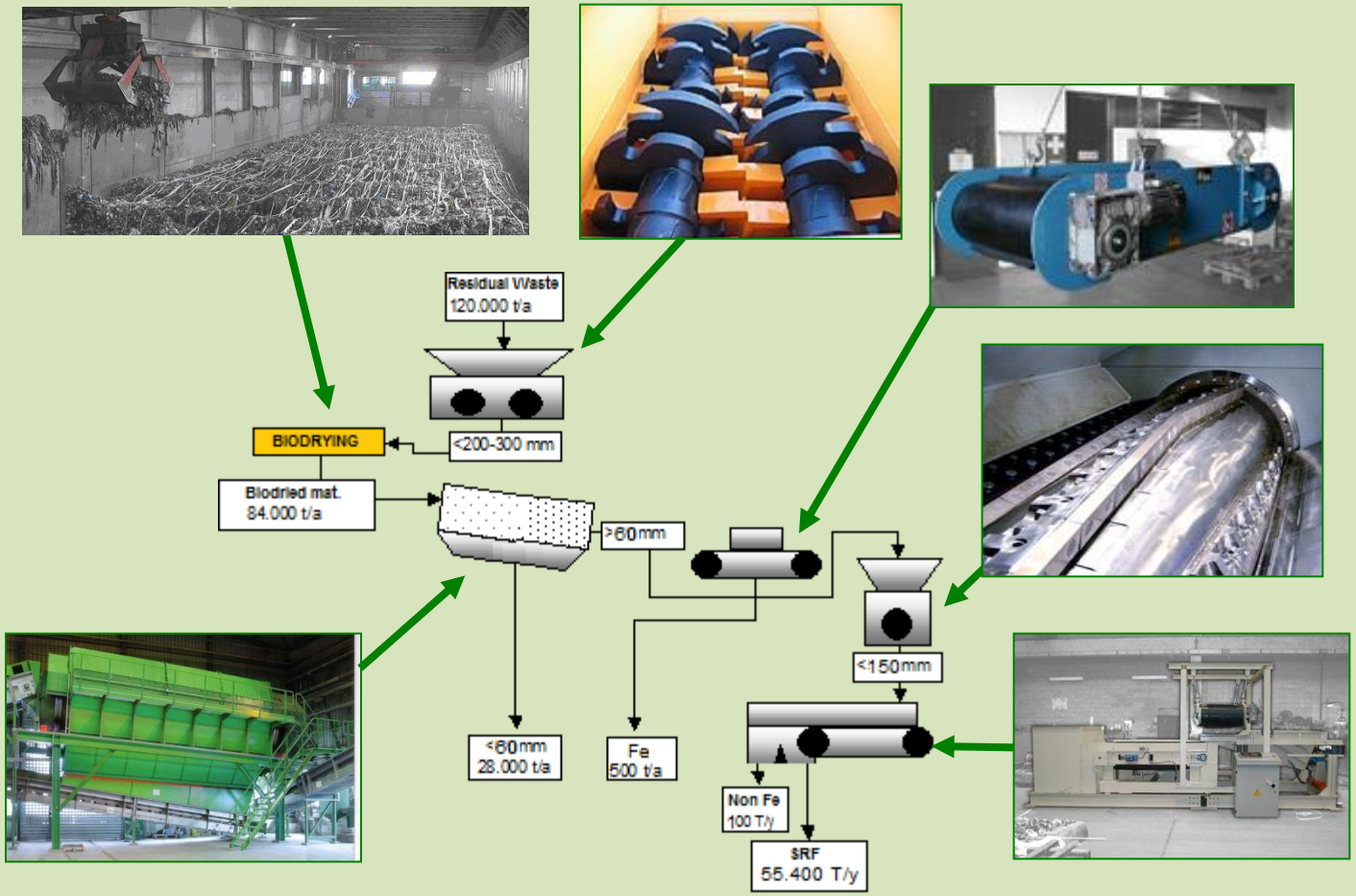
SRF Production process: WtE

Example of production of SRF for Dedicated WtE Plant



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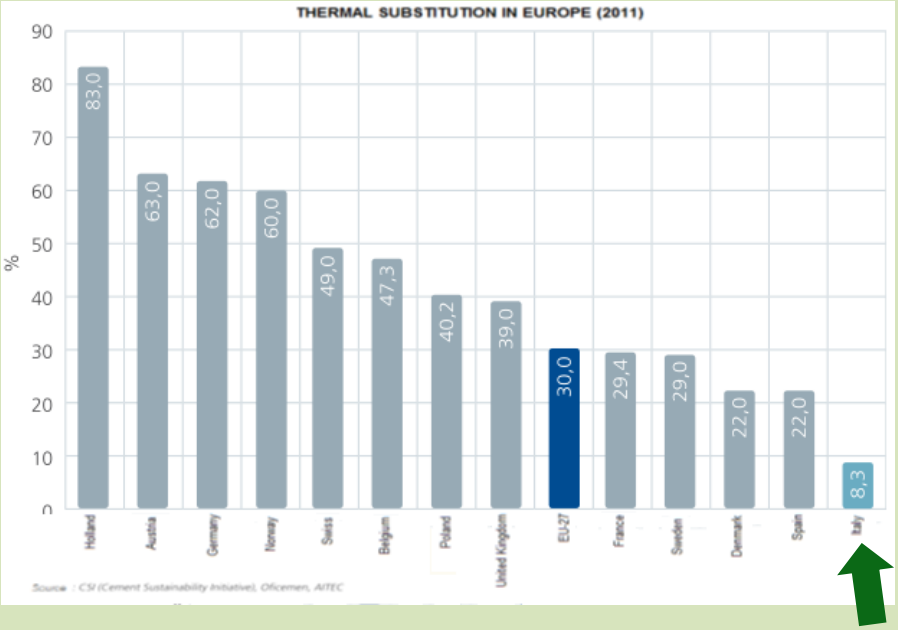
Actual SRF market for co-combustion in Italy

- **Landfill** (low eco-taxation)
- **SRF quality** (not constant)
- **Complicate** (too long) **authorization procedures**
- **Low acceptance by population** (NIMBY syndrome)

- *CEMENT INDUSTRY*

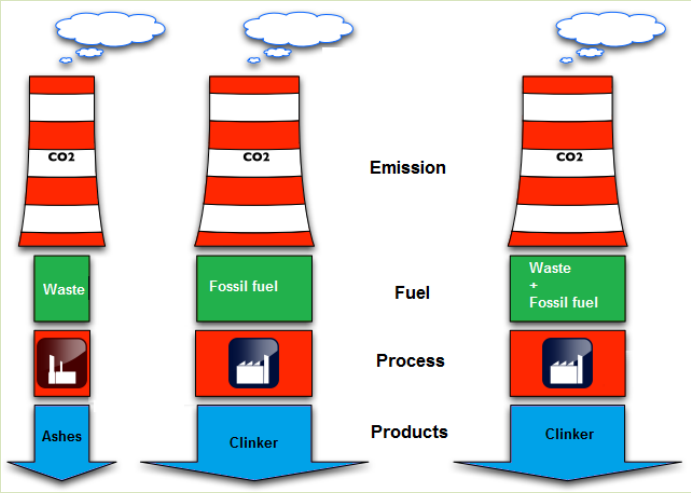
Only 8% of thermal energy in cement factories comes from alternative fuels (including SRF for 170-180.000 t/y)

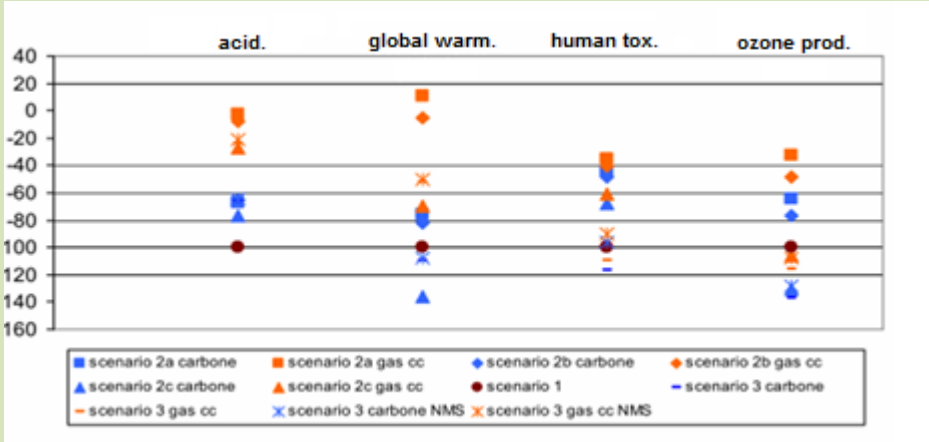


- *POWER PLANTS*

Only 1 Plant (Fusina-Veneto Region) uses SRF (60-70.000 t/y).

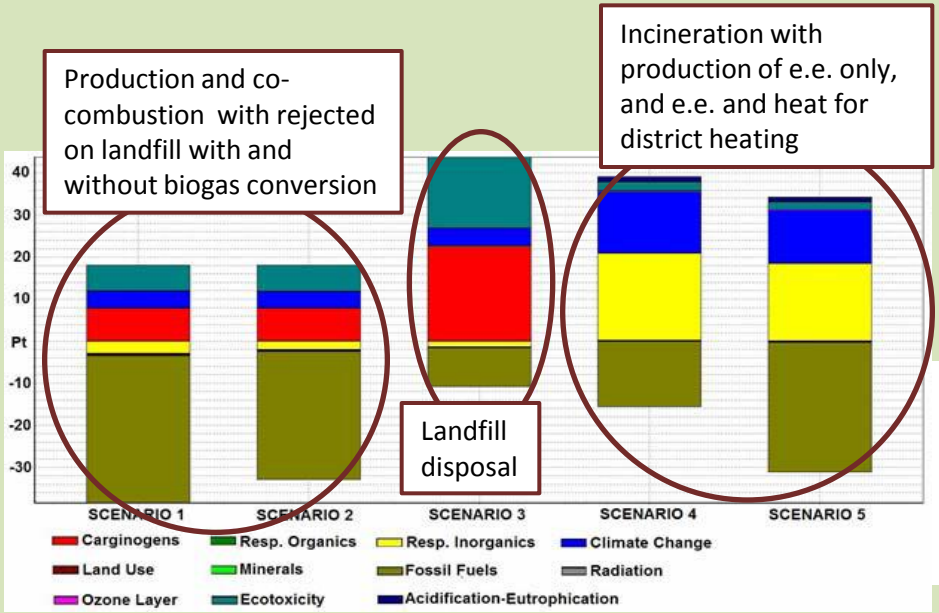
Co-combustion of SRF: environmental adv.





LCA for SRF production and co-combustion in Fusina Power Plant (●) compared with other options

(Grosso, Rigamonti, 2011).



LCA for SRF production next to Milano and co-combustion in Cement Plant, 80 km away compared with other disposal options (Scotti, Minetti, Barone 2008).

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DM 22/2013

It defines the necessary condition for a SRF to be defined as «product» instead of «waste» by law (End of Waste)

Obligation by producer

Obligation by final user

MSW and some non hazardous wastes

Treatment

UNI EN 15358

EMAS

REACH – ECHA Registration

UNI EN 15359 Characteristics of classification							
	Statistical measur.	Unit of Measur.	Maximum values per class				
			1	2	3	4	5
NCV	mean	MJ/kg a.r.	≥ 25	≥ 20	≥ 15	≥ 10	≥ 3
Cl	mean	% d.m.	≤ 0.2	≤ 0.6	≤ 1.0	≤ 1.5	≤ 3
Hg	median	mg/MJ a.r.	≤ 0.02	≤ 0.03	≤ 0.08	≤ 0.15	≤ 0.50
	80th percentile	mg/MJ a.r.	≤ 0.04	≤ 0.06	≤ 0.16	≤ 0.30	≤ 1.00

+ **Heavy metals limits**

End of Waste

Final User Contract. Price >=0

emissions DLG 133/2005

Cement factories
>500 ton/d of clinker
IPPC
UNI EN ISO 14001 or EMAS

Power plants
>50 MW
IPPC
UNI EN ISO 14001 or EMAS

emissions DLG 133/2005

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SRF EoW «CSS COMBUSTIBILE»

Restrictive limits	**Energy conversion efficacy** and emission control
Restriction on **allowed wastes**	Reduction of Environmental risk, (Recycling industry **synergy)**
REACH registration	Guarantees for Environment and Health & Safety, easier delivery
Production and utilization chain certified	Materials and processes monitored along the whole **production and use cycle**
Industrial **end users** only	**IPPC** submission and **BAT** application

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SRF EoW : SWOT Analisys

S

- *Free delivery*
- *Coal replacement < prices*
- *Easier Authorization procedures for the final users*

W

- *High cost of production*
- *Limits in storage and transport*
- *Not enough information about SRF EoW*

O

- *No new landfill allowed*
- *+Renewable –fossil resources*
- *No public incentives required*
- *Compatibility with recycling*

T

- *Landfill not enough discouraged*
- *Final users not obliged to a not stoppable public service*

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Co-combustion: where?

Cement factories

52 plants (complete cycle)
produced in **2012** more than
18 Mtons of Clinker and
23 Mtons of Cement requiring about
2 Mtons of fuel (Pet Coke)

Coal power plants

13 plants with 9.700 MW of e.e. capacity
required in **2012** about
19 Mtons of fuel (Coal)

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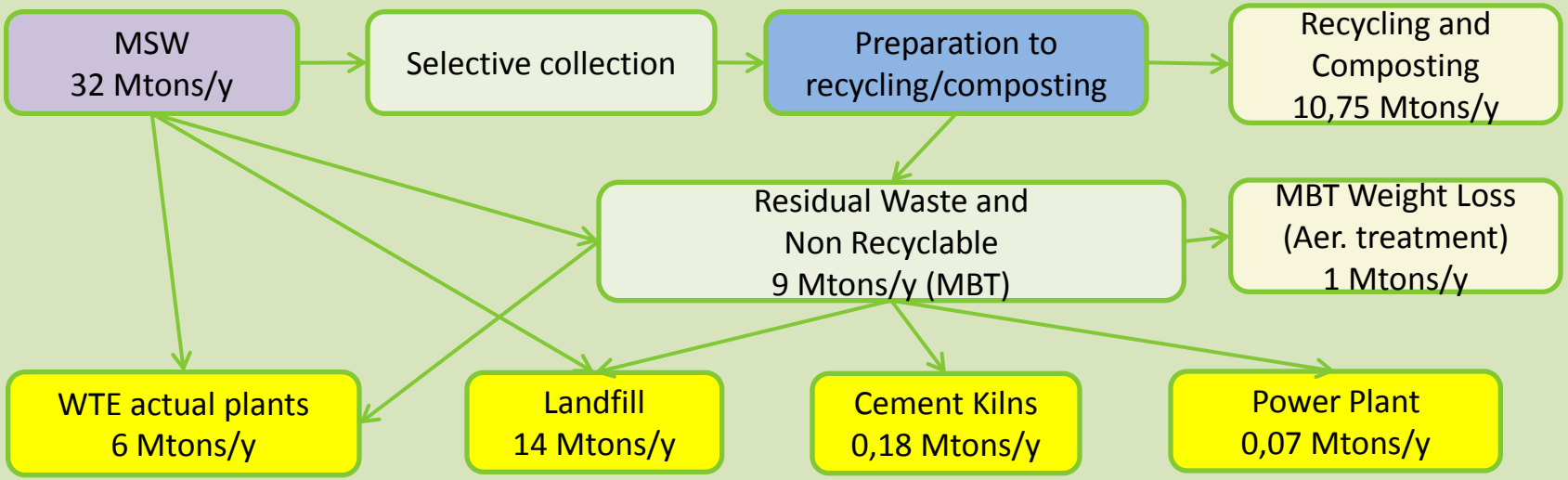
Co-combustion: How many tons (today)?

PRESENT SITUATION
In 2011 only 180.000 t/y of SRF (NON EoW) has gone to Cement Factories and 70.000 t/y to Power Plants



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Co-comb.: How many tons (tomorrow)?

SCENARIOS AT 2020

This Scenario is drawn depending on Thermal Substitution of Fossil Fuel in Cement Kilns and Power Plants.

Other assumptions are:

1. MSW production not changed (ref. 2011)
2. WTE capacity not changed (ref. 2011),
3. Cement factories necessity of fuel not changed and Power plant necessity of fuel 10% reduced (ref. 2012),
4. The target of 50% of recycling is reached as requested by directive 2008/98/EC.

MSW
32 Mtons/y

Selective collection

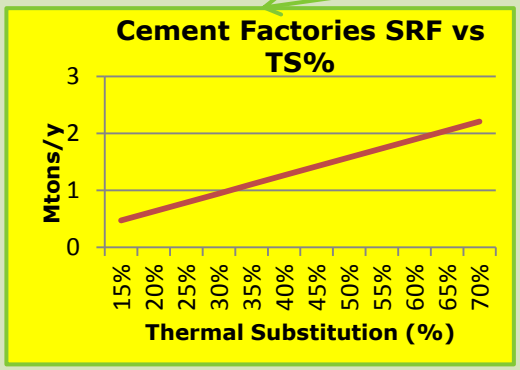
Preparation to recycling/composting

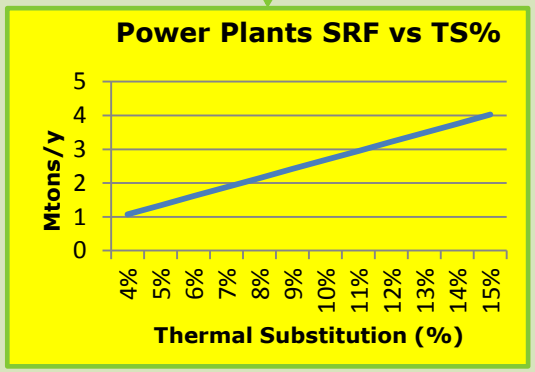
Recycling and Composting
16 Mtons/y

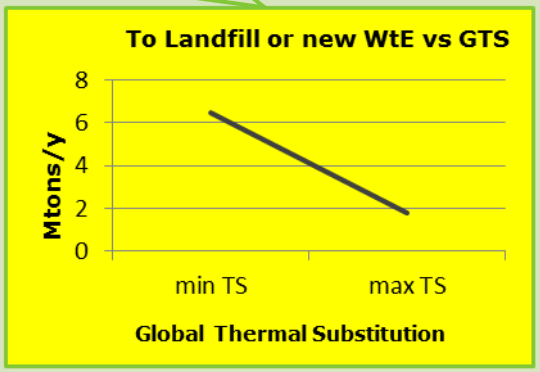
WTE (actual plants)
6 Mtons/y

Residual Waste and Non Recyclable
16 Mtons/y (MBT)

MBT Weight Loss
(Aer. treatment)
2 Mtons/y







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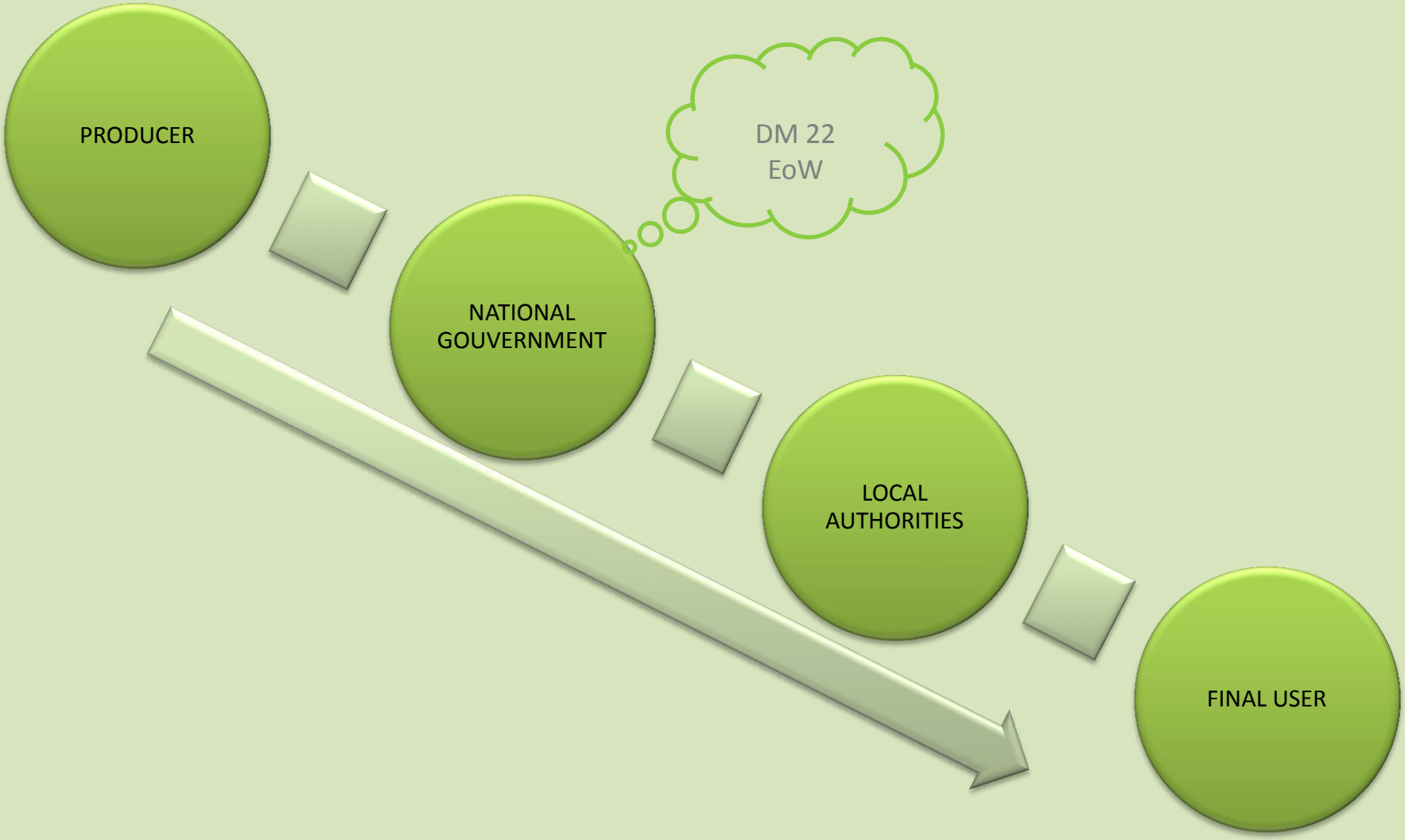
Conclusion



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Thank you

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