

International Workshop on Solid  
Recovered Fuel  
Helsinki  
31 Mai 2010

SRF market views in Europe



# 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, UA, ... and probably soon IT, IE, FI, SW



# 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 SRFs
- Main contribution to the SRF chapter of the Bref Waste Treatment



# SRF definition

- Solid Recovered Fuel (SRF) is, as per the mandate that was given by the European Commission to the Technical Committee (TC343) of the European Standardisation Committee (CEN), 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 prCEN15359 (European Standard in preparation)
- Note : prepared means processed, homogenised and up-graded to a quality that can be traded amongst producers and users.

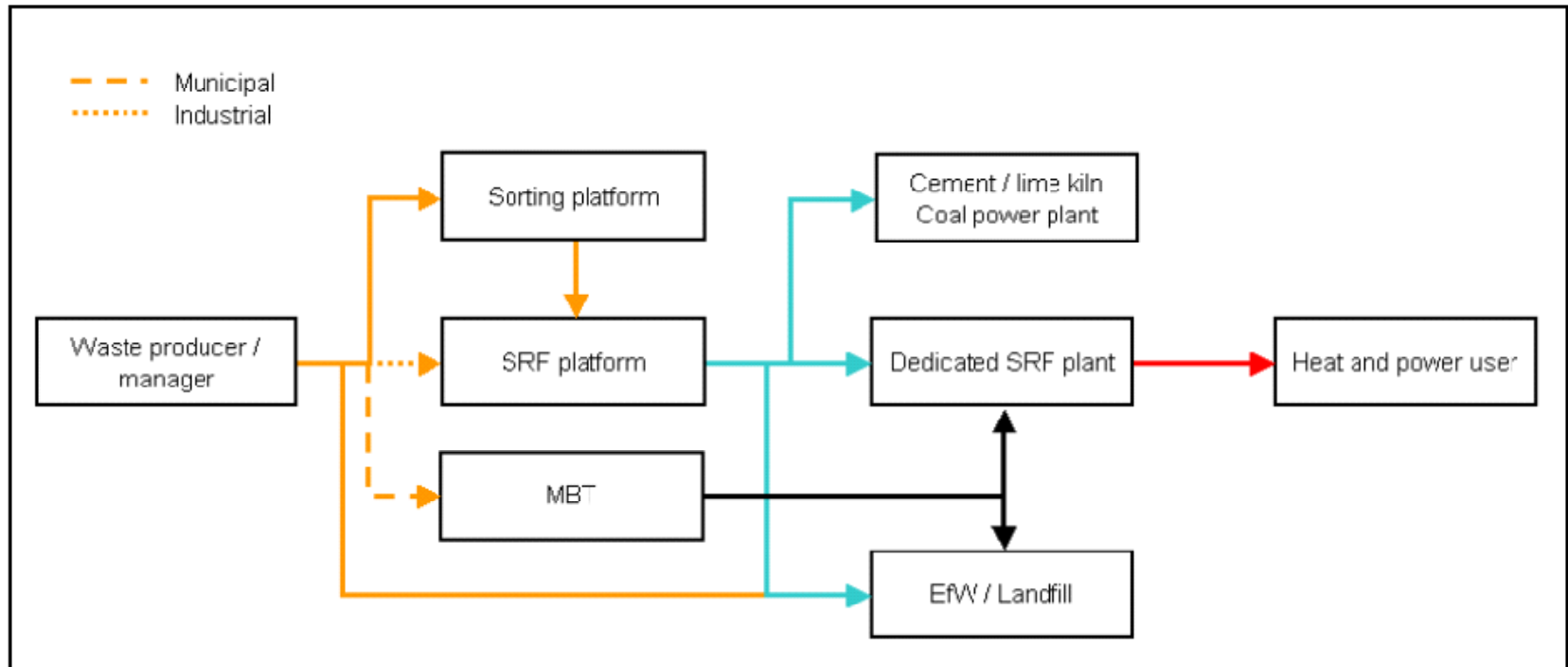


# Two fundamental remarks

- Solid fuel prepared from non-hazardous waste to be utilised for energy recovery in incineration or co-incineration plants is a very general definition leading to different interpretations.
  - What is in ? Mixed plastic, shredded wood, tyres shred, ...prepared MSW out of MBT plants... , production specific wastes, sludges ???
- And a lot of people forget the second part of the sentence : meeting the classification and the specification requirements laid down in prCEN15359 (including compliance rules and declaration of conformity)
- = the wording SRF is often not used in the right context



# Example of a SRF material chain



# SRF deals with different regulations

- Today SRF is still considered as waste, although it meets standards and specifications
- Main regulations concerned :
  - Waste Framework Directive (definition, recovery, EoW)
  - Waste Shipment Regulation
  - CEN standardisation work
  - Reach
  - Industrial Emissions Directive (BAT, BREF)
  - Emissions trading scheme
  - Renewables Directive (targets, definition biomass)
  - Waste Incineration Directive (ELV's, measurements)
  - European Court of Justice jurisprudence



# SRF's main quality related elements

- Producing certified SRF, developed according to end users specifications, is more stringent and expensive than producing simple non-certified secondary fuels.
- The most critical elements for the end users are often the following:
  - Calorific value; the energy content of the fuel with a strong contribution from plastics,
  - Chlorine, as a possible precursor to dioxins emissions and corrosion problems, coming often from PVC,
  - Sulphur, leading to emission and corrosion problems,
  - Heavy metals, with a focus on mercury,
  - Ash content, leads to lower calorific values and requires post-combustion disposal, except for cement manufacturers,
  - Moisture, leads to lower calorific values,
  - Biomass content, as it represents a source of savings for facilities covered by the ETS



# 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



# Figures from the Prognos report

Table 37: Total amount of solid fuel waste as per scenario (all figures rounded to thousand)\*\*

	Solid fuel potential	Solid fuel waste energy recovery					
		reference year 2004	2006	scenario 1 2020	scenario 2 2020	scenario 3 2020	scenario 3a 2020
		tonne	tonne	tonne	tonne	tonne	tonne
Total energy recovery	70,064,000	15,102,000	18,957,000	35,971,000	54,890,000	61,122,000	63,704,000
Cement kilns		8,306,000	9,634,000	12,965,000	14,122,000	16,754,000	22,084,000
Power plants		2,265,000	3,060,000	5,499,000	6,448,000	7,638,000	11,495,000
CHP plants / WtE plants (R1)*		4,531,000	6,263,000	17,508,000	34,320,000	36,729,000	30,124,000



# Historical drivers to develop secondary fuels

- Not every country had the same drivers to develop secondary fuels from wastes
  - D : Landfill ban (TASI), early 2000 under capacity for disposal in Germany, development of MBT
  - UK : political choice, difficulties to obtain a permit for a EfW
  - I : legislation allowing a product status (withdrawn)
  - B : demand of cement plants
- Common economical factors
  - Price of primary fuels (petroleum coke included)
  - Availability or lack of alternatives at a certain moment : tyres, meat & bone meal, hazardous waste.....



# Benefits of SRF

- Needed drivers
  - Long-term availability
  - Long-term predictable price levels
  - Quality assurance
- Encountered problems
  - Quality was not always guaranteed (RDF had a bad name)
  - Users want to buy non-problematic material
- SRF (CEN/TC 343 CERTIFIED) will bring
  - Standards
  - Quality assurance
  - Confidence and trust

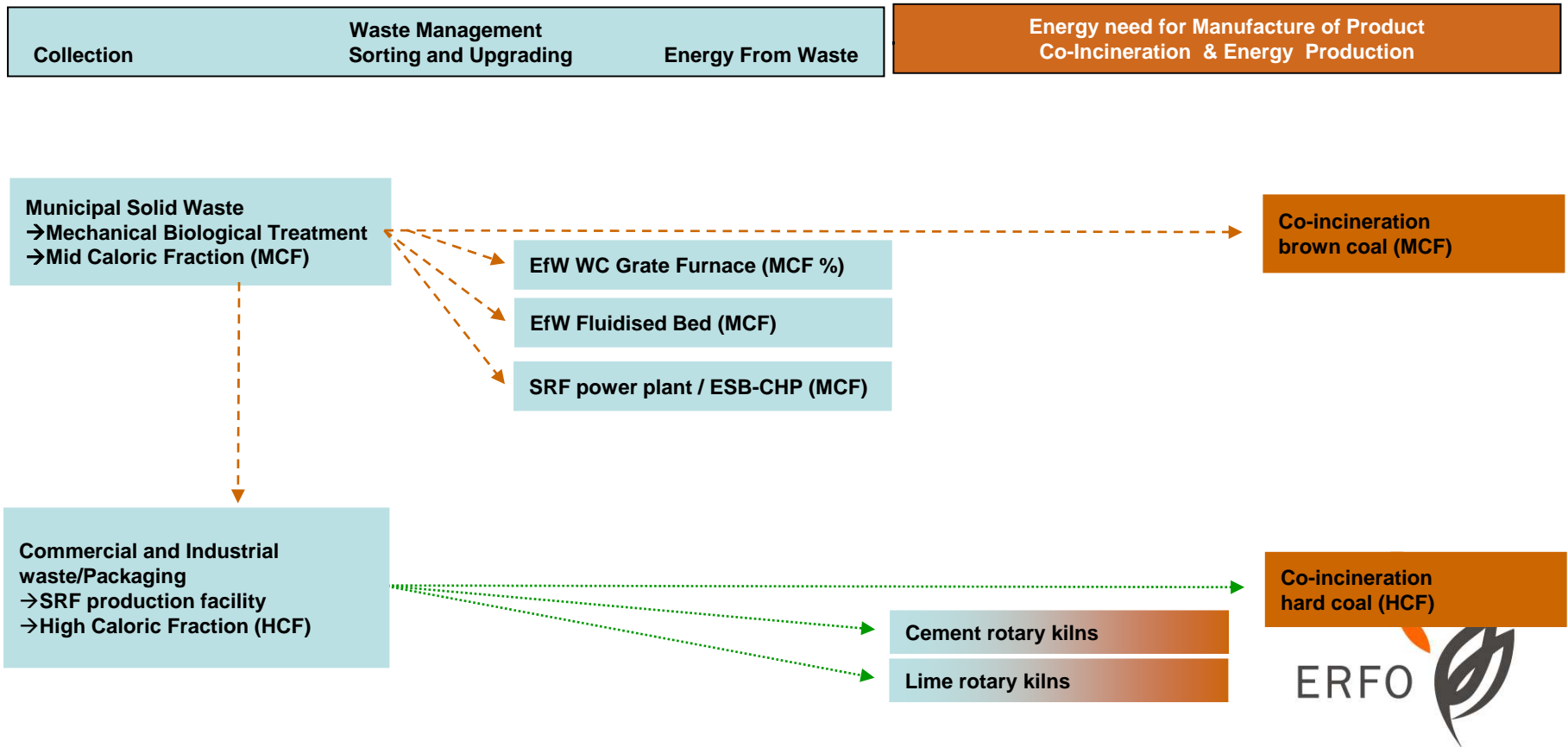


# Different output possibilities

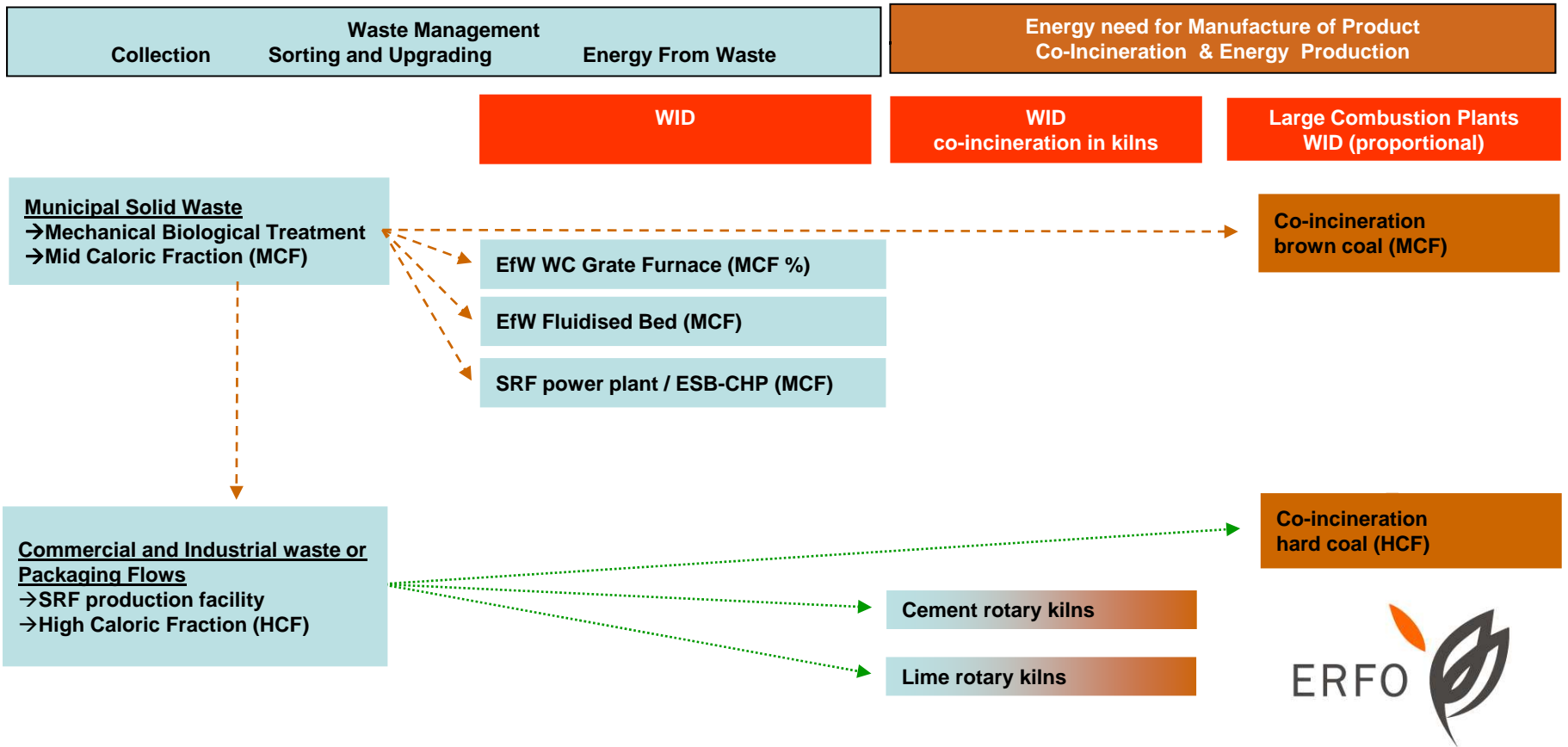
## Terminology

Solid Recoverd Fuel (SRF) = is quality certified and normed

Refuse Derived Fuel (RDF) =sorted and shredded waste



# Different emissions

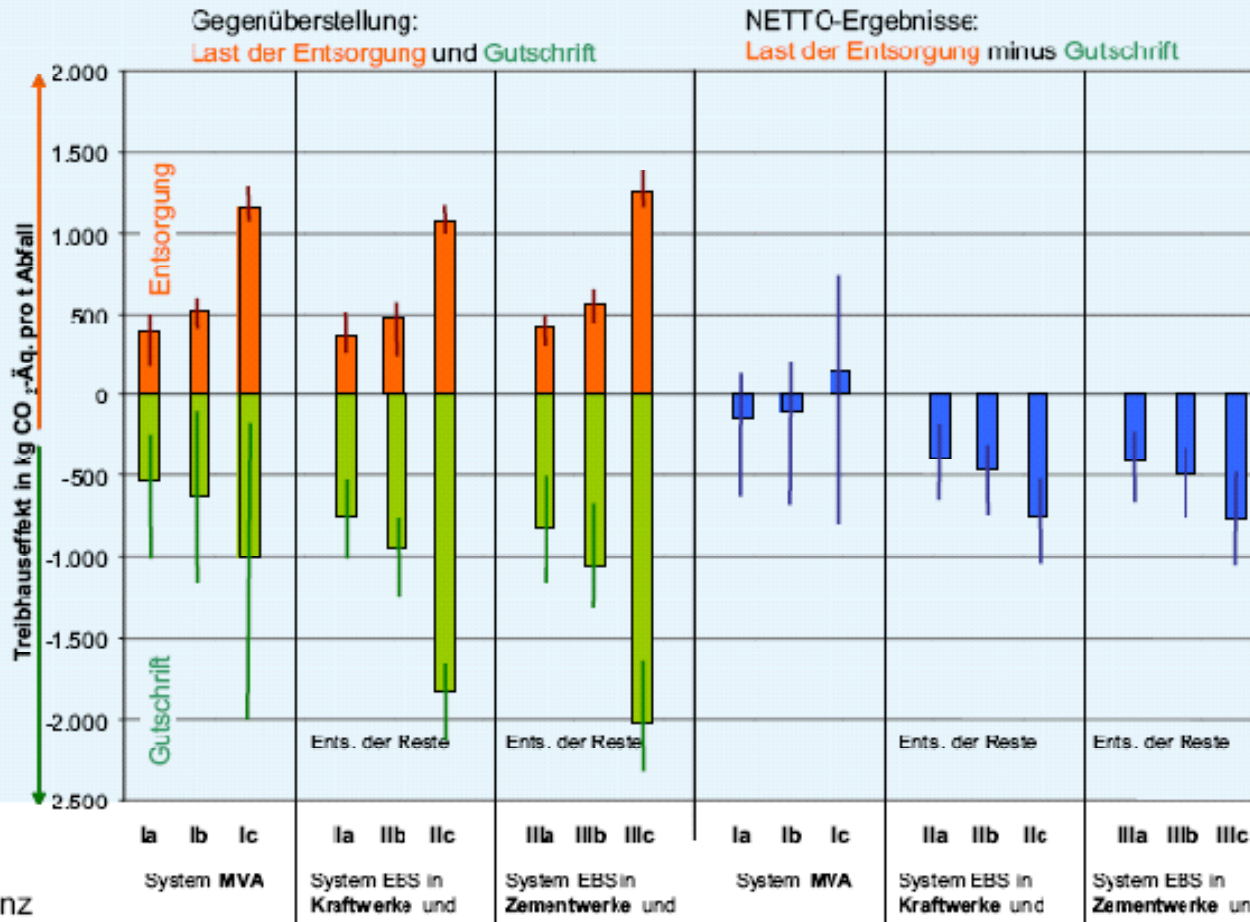


## ...be aware that ...

- Stimulating recycling will discourage incineration
- Not every waste can be transformed in SRF
- Differences exist between emission regimes
- Use of SRF can play an important role in sustainability
- Not all organisations promote the SRF approach

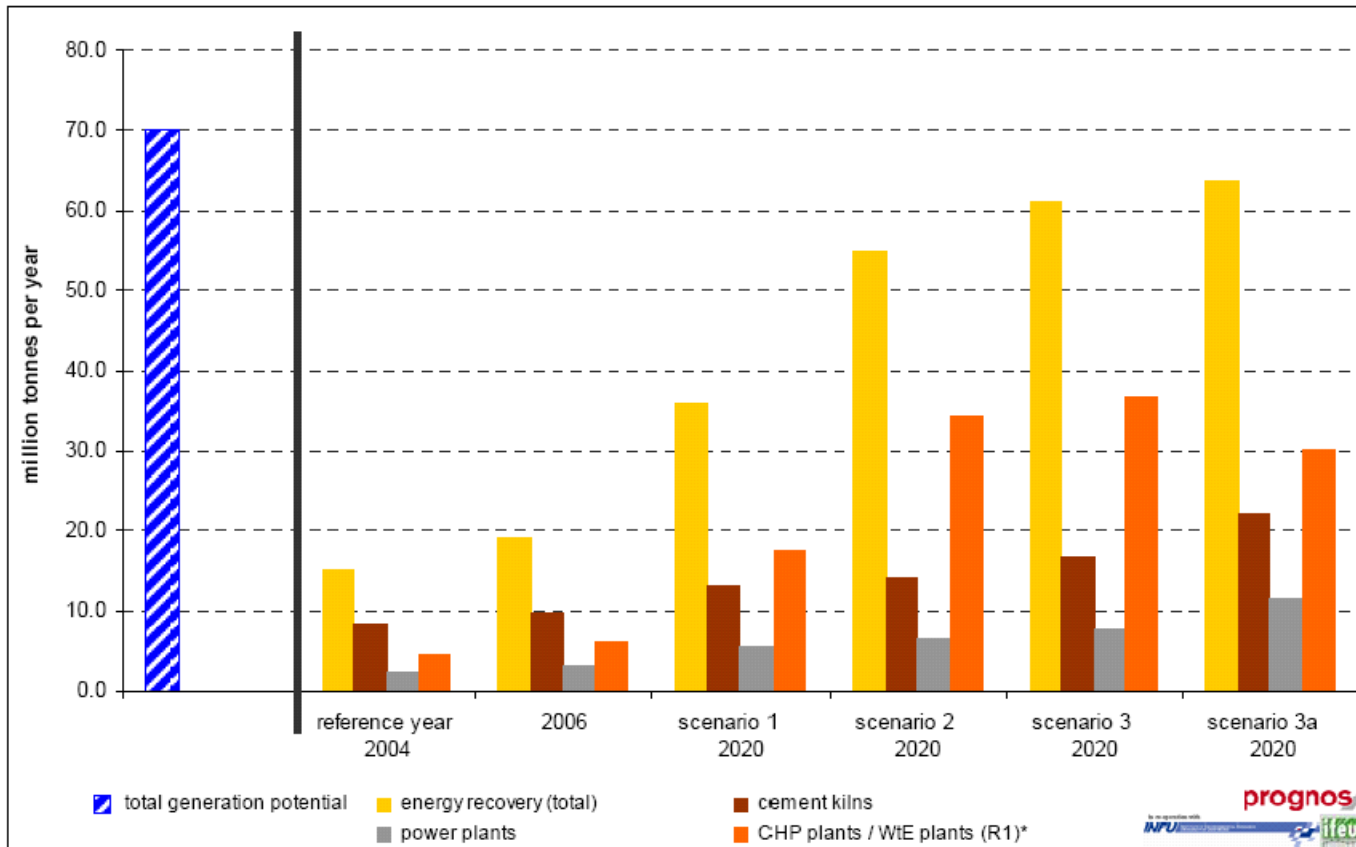


# Sustainability



# Sustainability

Figure 80: Solid fuel waste energy recovery rates as per scenario



# Developments at the output side

- Powerplants

- Powerplants are looking for high quality SRF with a constant composition which can guarantee reliable operations. Especially if they operate new generation boilers with high steam parameters and where 1 day shutdown due to fouling or corrosion would cancel all the potential benefits. The availability of high quality SRF 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,...).
- MBT – plants started too late to produce the requested high quality SRF. Due to Q-aspects the use is limited in PP's.
- The actual situation is that the MBT Plants overall costs are higher than anticipated when capex for MSWI has recently decreased which explains the recent shutdown of some MBT Plants. Vatenfall is of the opinion that MBT remain an adequate solution for country sides where MSWI is the better solution for large cities



# Developments at the output side

- **Cement kilns**

- **Lafarge** promotes the development of JV with Waste Companies to ensure quality and quantities of alternative fuels through preparation Plants. As alternative fuels remain waste, this provides transparency through reception control procedures and this is important to the Cement Companies.
- Lafarge is developing some MSW preparation Plants, where inerts are extracted, 40 to 50% SRF is generated. Chlorine content is managed by optical sorting of PVC which could enable to have Cl < 0,2% in SRF in best cases, < 0,4% in most cases.
- **Cemex** : Alternative fuels enables to reduce emissions (NOx and CO2) and “significantly” reduces fuel costs (coal +/- 65 €/t) but this requires technology, capex, know-how, change mindset ...
- Cemex in UK started to look at MSW and C&I waste and is now also interested by C&D waste, encouraged by the steady increase of the LF tax. They have developed a trade name CLIMAFUEL for a SRF with 17 – 22 MJ/kg (will move further down, possibly to 10MJ/kg), moisture <15%, particle size < 40mm, chlorine < 1% (>< SRF average is 0,2 to 0,4% as mentioned by LAFARGE !) and heavy metals limitation.
- **Greece** : the fact that cement industry in Greece is still facing some problems (mainly licensing), regarding the reception of alternative fuel, producers are interested in exporting the alternative fuels they produce.



# Tomorrow a product?

- **EoW candidates**
  - JRC - Brussels - 04.03.2010
  - Categorie II (Q3 2010 - Q3 2011)
  
  - Biogas
  - Biodiesel
  - Waste oil
  - Waste solvents
  - Waste wood
  - Waste tyres
  
  - RDF from MSW
  
  - SRF, proven in Germany, brings standardisation and traceability. For ERFO the product status is not a current issue.
- pre-study on the suitability of different types of wastes derived fuels for EoW before combustion - based on the conditions given in Art. 6 WFD, considering a particular the application of the WID
  
  - REACH and the consequences are near !!!



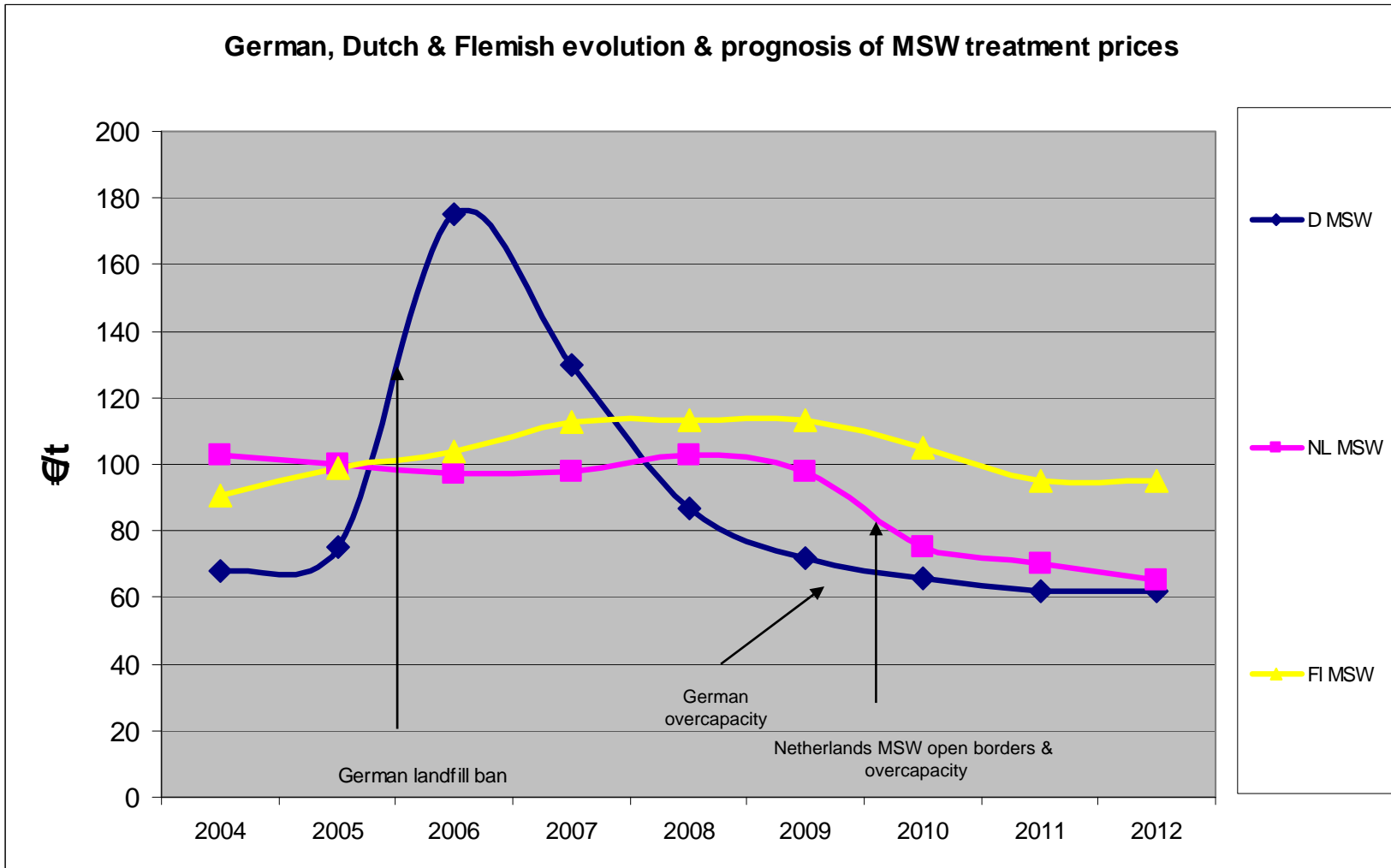
# Incineration overcapacity ?

Incineration capacity / inhabitant

Country	Incineration capacity (T)	Number inhabitants	Kg Cap./inh
Germany	24.500.000	82.500.000	<b>297</b>
Netherlands	8.000.000	16.500.000	<b>485</b>
Belgium	3.280.000	10.500.000	<b>312</b>
Switzerland	3.500.000	7.200.000	<b>486</b>



# Influence of local legislation & politics



# Influences on SRF

- Disposal (EfW-plants) gate fees crashed
- SRF – platforms are increasingly by-passed
- Prices (gate fee and + or – revenue at the end user) are hardly sufficient to justify the pre-treatment stage
- Installations put in mothballs
- Upside market can't bring more income (competition EfW)
- Pre-treatment cost can't be compressed
- Pre-treatment opex will increase
- Only way out is that SRF users adjust their prices to reflect the energy and CO2 savings rather than alternative waste treatment costs



# SRF users have room of manoeuvre

	Co-processing in cement plant	Co-firing in coal power plant
SRF calorific value (kJ/Kg)	18000	14000
Energetic savings (€/T <sub>SRF</sub> )	48.5	21.5
CO2 savings (€/T <sub>SRF</sub> )	12	17.7
Over cost investments (€/T <sub>SRF</sub> )	-6.7	-3.6
Over cost operations (€/T <sub>SRF</sub> )	-3.3	-8.5
Potential value (€/T <sub>SRF</sub> )	50.5	27.1
Average	39	39
Principal hypothesis	Invest: storage, injection, CI by-pass Petcoke price : 70 €/t (26 GJ/t) Price CO2 quota : 15 €/EUA	Invest : storage, injection, ... Lignite price : 13 €/t (8.5 GJ/t) Price CO2 quota : 15 €/EUA



# Minimum needed gate fee if SRF is getting earnings for its calorific and carbon value

	Low cost SRF production	High cost SRF production
SRF preparation cost ( $\text{€T}_{\text{SRF}}$ )	-50	-70
Transport cost to SRF user ( $\text{€T}_{\text{SRF}}$ )	-20	-20
Positive value ( $\text{€T}_{\text{SRF}}$ ), average of previous table	+39	+39
Needed gate fee for break even	-31	-51



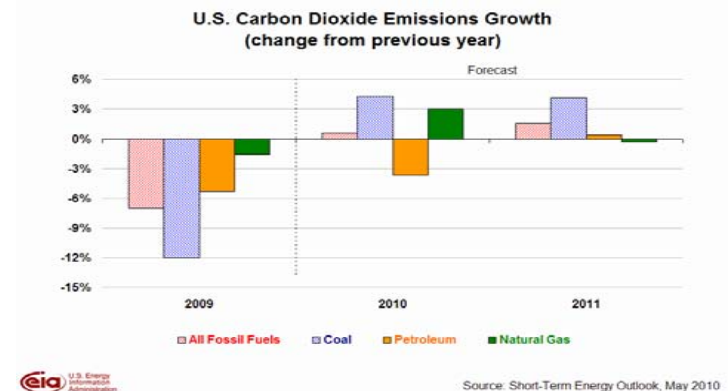
## ...and about the CO2 price...

- CO2 price dropped during the market crashes. When the value of financial and energy commodities decrease, so does the CO2 price. Analysts agree that the CO2-market is more and more delinked from the oil and gas price. Hence, the CO2 price depends on demand and supply on the CO2 market itself. The CO2 market becomes less a bank driven market but more a compliance driven market [comply with CO2 caps].
- Analysts are optimistic, as power companies start to build up their compliance position. Société Generale expects a price of 21-26 Euro. Pointcarbon 22 Euro.
- In the United Kingdom, by contrast, the government's latest carbon price estimates range from \$41 to \$124 per ton of CO2, with a central case of \$83



# ...and...

- From 2013, over one billion allowances are expected to be auctioned annually, compared to less than 150 million in Phase II thus far.
- Power producers will have to buy 100% of their permits at auction; non-trade-exposed industrial installations will have to buy 20% in 2013 (rising to 100% by 2027); and the newly-included aviation sector will have to buy at least 15% at first.
- EUA price projection (euro/t) for the period 2013-2020
  - Deutsche Bank : 42
  - Fortis : up to 48
  - Societe Generale : up to 35
  - JP Morgan : 33



# CO2 value = long-term

- Reasons why the CO2-price should be rather high
  - Low CO2-price = less incentives to develop CO2-clean technology
  - Low CO2-price = less earnings for the authorities
    - → Pressure to reach their goals
    - → Subsidies
- Ways to influence the CO2-price
  - Lowering the emissions ceiling for ETS – sectors
  - Less CDM (clean development mechanism) and/or emission rights
  - Minimum price at sale by auction



# Conclusions

- SRF needs to take the place it deserves
  - Production of a certified and reliable secondary fuel
  - Differentiating from other waste derived substitution fuels
- Product status is not a current issue
- SRF wants to be paid for the calorific content of it's material
- SRF wants to be paid for the biogenic carbon content of it's material



# Annexe

**Table 12** Summary of existing standards, adapted and presented in uniform units

		<i>Finland</i>			<i>Germany*</i>		<i>Italy</i>	
<i>Unit</i>		<i>Class I</i>	<i>Class II</i>	<i>Class III</i>	<i>Median</i>	<i>80<sup>th</sup> perc.</i>	<i>standard</i>	<i>High qual.</i>
NCV	MJ/kg						>15	>19
Moisture	ar						<25	<15
Ash	%						<15	<13
Cl	% ar	<0.13	<0.42	<1.3			<0.9	<0.7
Hg	mg/MJ ar	<0.005	<0.01	<0.025	<0.026/0.034	<0.051/0.068	<0.35**	<0.045
Cd + Tl	mg/MJ ar	<0.05	<0.2	<0.2	<0.17/0.23	<0.38/0.51	-	<0.180
Sum HM	mg/MJ ar				<14.9/59.4	<45.9/139.4	<52***	<15.6***

\* Different values for SRF derived from production specific waste (first figure) and SRF produced from MSW (second figure).

\*\* Cd+Hg. There is no separate value for this quality in the Italian standard, see also note 3 table 11.

\*\*\* The sum property does not include several HM, see also note 3 table 11.

