

**Experiences: Preparation and Utilization
of Solid Recovered Fuels (SRF) from
commercial waste for heat production
Reference Case: Flensburg**

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Introduction

- ✓ **“Stadtwerke Flensburg” operate three hard coal-fired fluidized bed boilers for long-distance heating production, which are renewed and extended for the Co-Combustion of Solid Recovered Fuels (Maximum: 8.75 t/h each boiler, depending on the SRF calorific value)**
- ✓ **Additionally in the year 2006 together with 3 privately owned waste-management companies a plant was realized to produce a furnace-finished, chlorine-depleted SRF from commercial waste.**
- ✓ **The contribution describes the plant and the first operational experiences.**

Treated Waste

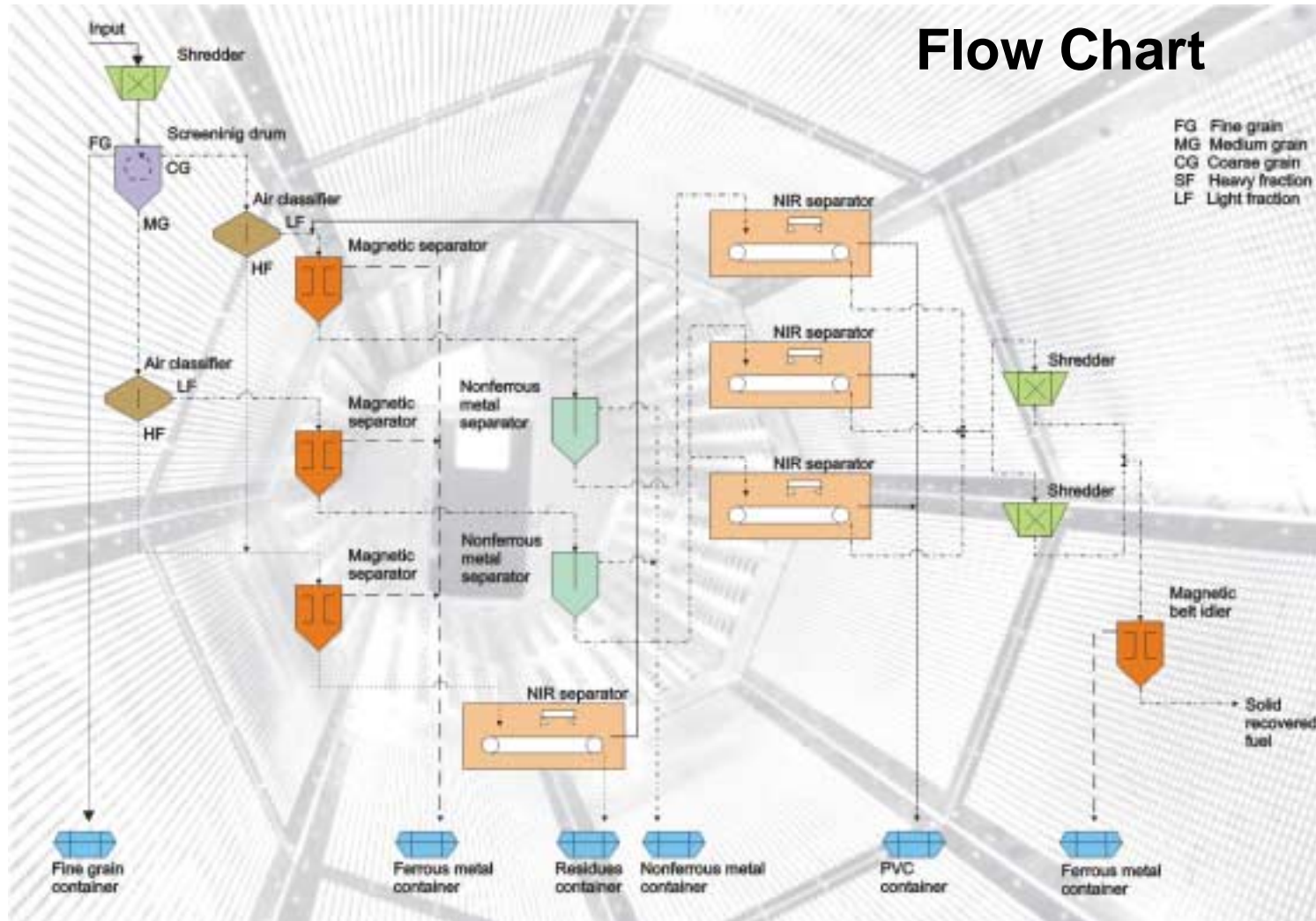
- ✓ **Shredded Residues from a Sorting Plant (recovering Paper, Plastics and Metals) located near Hamburg:
Fraction I: Size 15 to 50 mm (10/2006 – 3/2007)
Fraction II: Size > 50 mm**
- ✓ **Non shredded Residues from a Sorting Plant processing commercial and mixed construction waste.**
- ✓ **Shredded Residues (e.g. plastics) from a Sorting Plant processing WEEE, different grain size range, > 20 mm.**

Quality according to the permission- Examples -

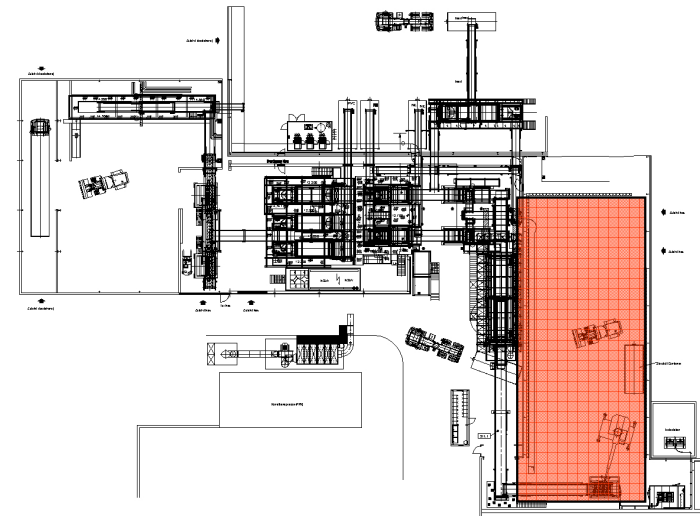
Elements	Unit	Value	
Ash-Content	Ma.-%	< 30	
Chlorine-Content	Ma.-%	< 1 (x)	
Fluorine-Content	Ma.-%	< 0,08	
Lower Calorific Value	kJ/kg	> 11.000 - 24.000	
Aluminium-Content	Ma.-%	< 1	
Heavy Metals		80 % Perzentil	MAXIMUM
Lead	mg/ kg Dry Matter	400	800
Cadmium	mg/ kg Dry Matter	9	16
Chrome	mg/ kg Dry Matter	250	750
Copper	mg/ kg Dry Matter	750	1200
Mercury	mg/ kg Dry Matter	1,2	4

**SWF-Standard: Chlorine < 0,6 Ma.-%, Dry matter;
Grain Size < 50 mm, can be pneumatically conveyed**

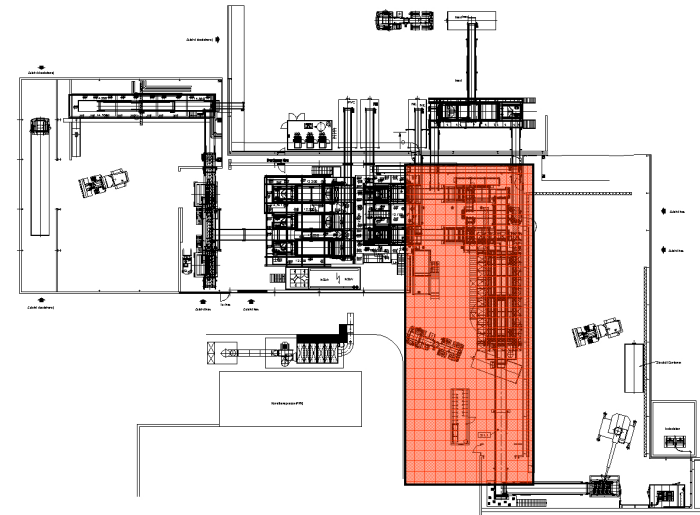
Flow Chart



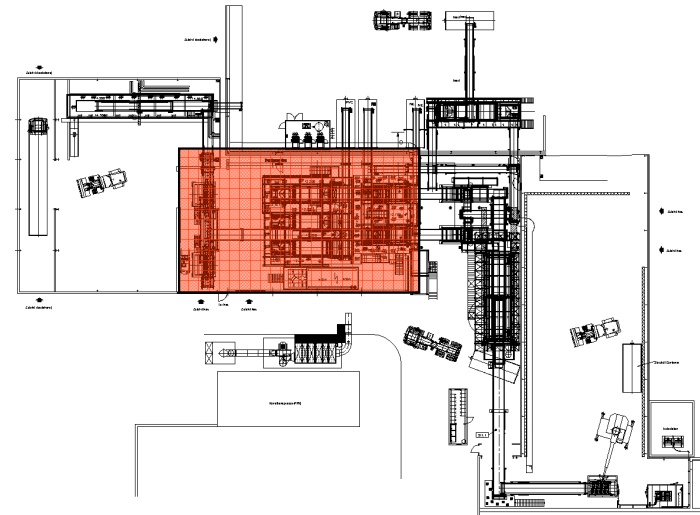
Storage and 1. Shredder



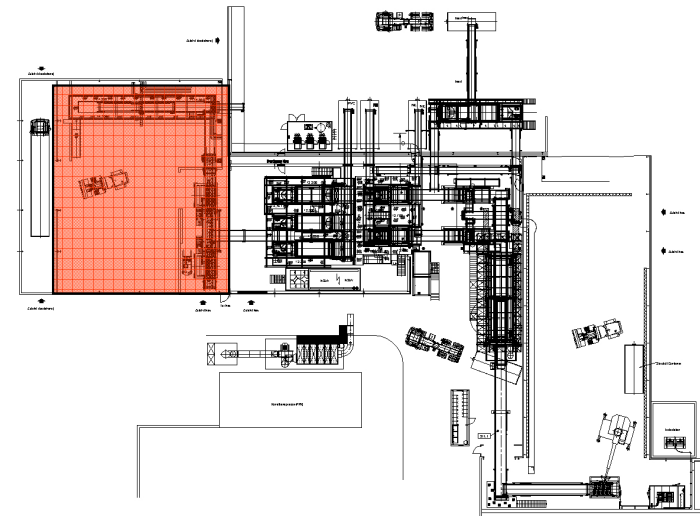
Primary Screen/Air Classifier



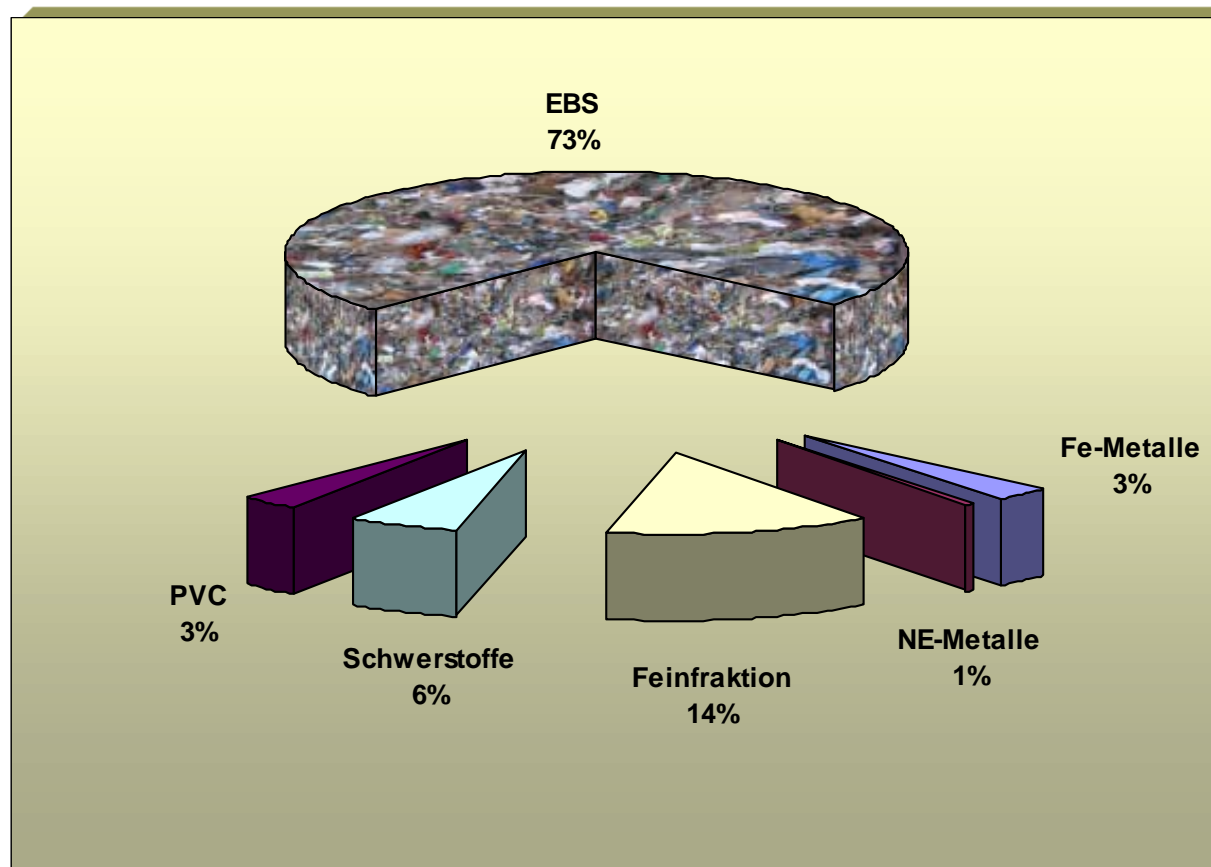
Sorting/2. Shredding



Short-Time Storage for SRF



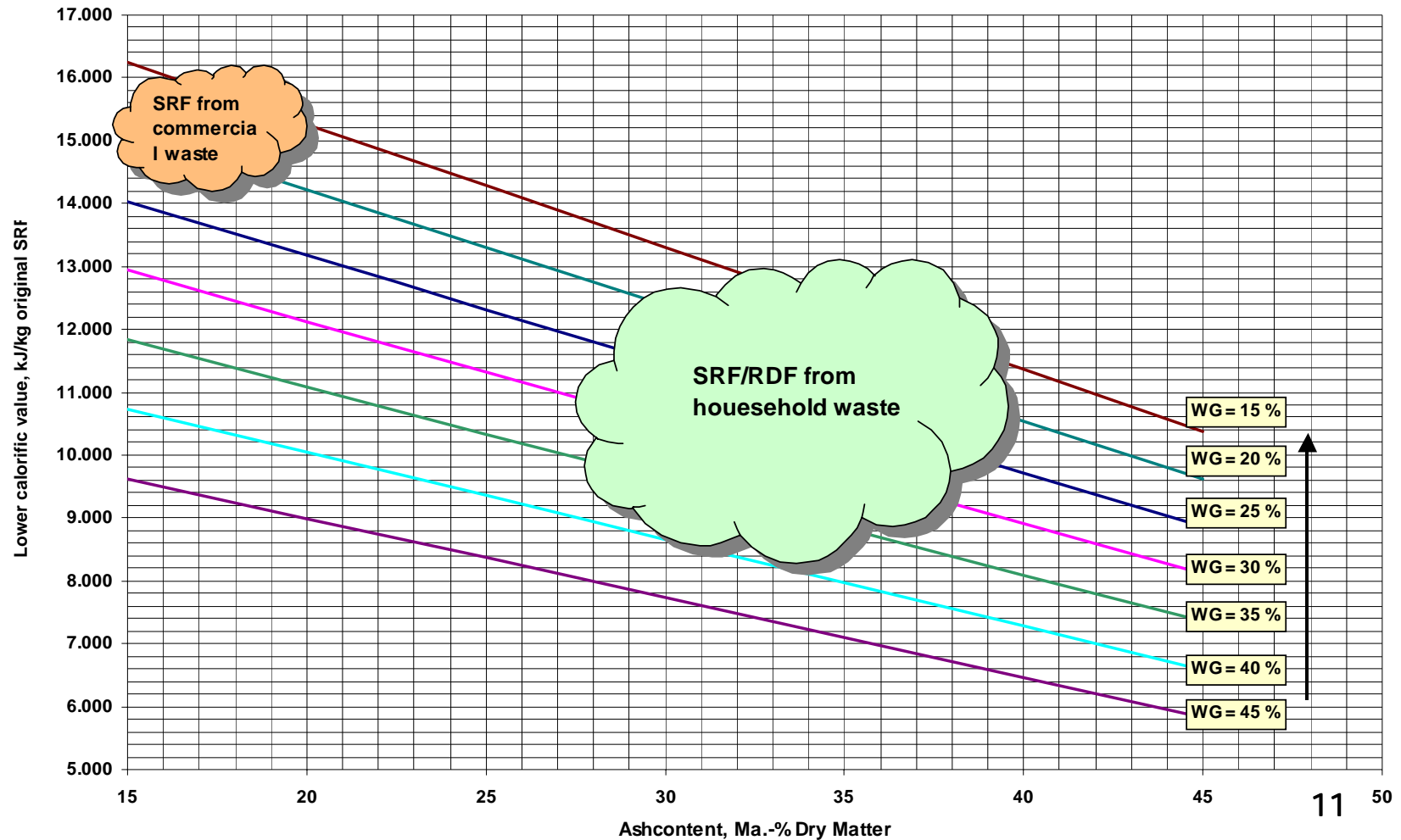
First Operational Experiences: Composition of the Output Material



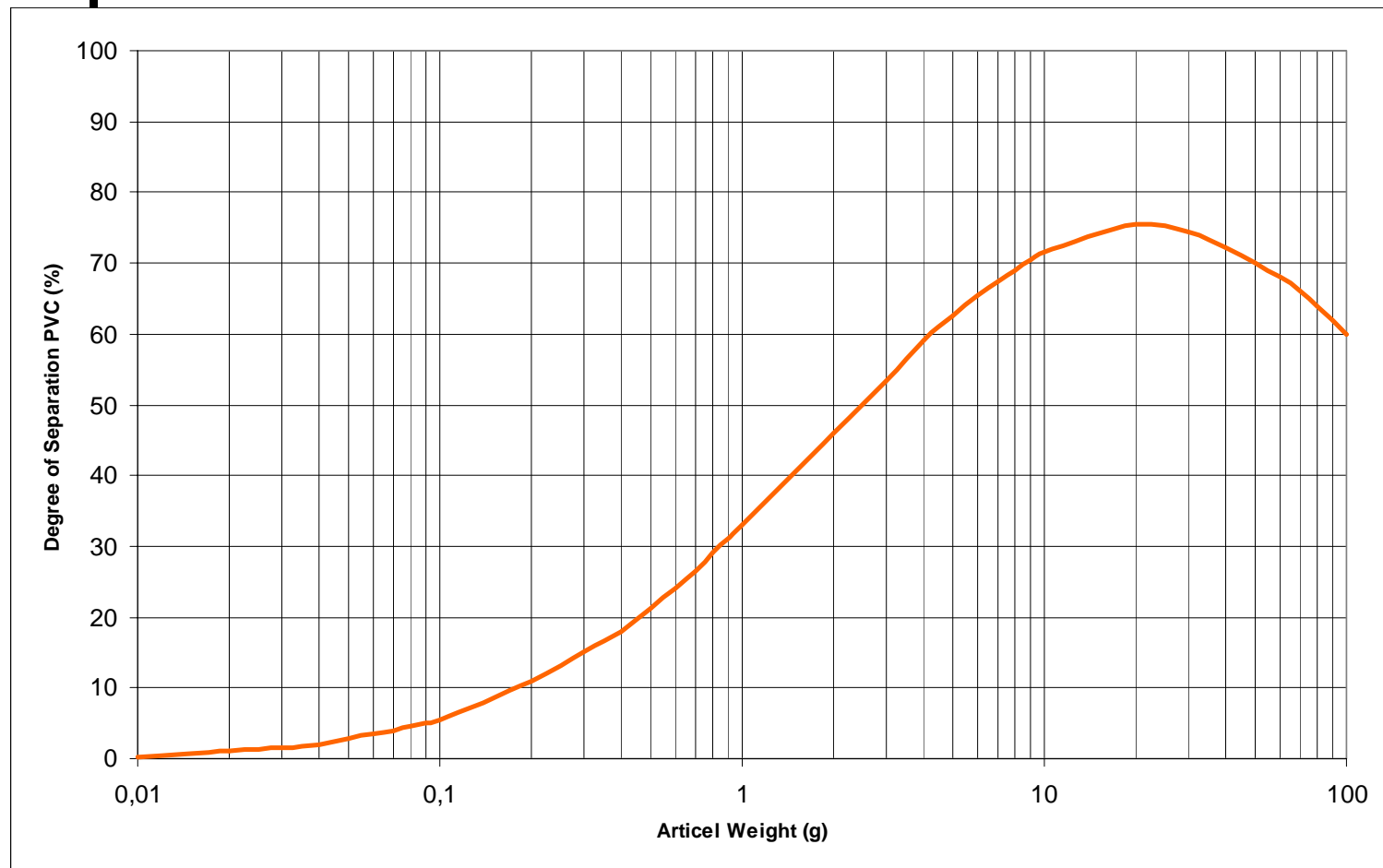
Throughput:
20 t/h Maximum
to produce
good quality SRF

(Mechanical
Throughput:
22 – 23 t/h)

Lower Calorific Value depending on ash- and water-content



First Operational Experiences: Degree of PVC-Separation



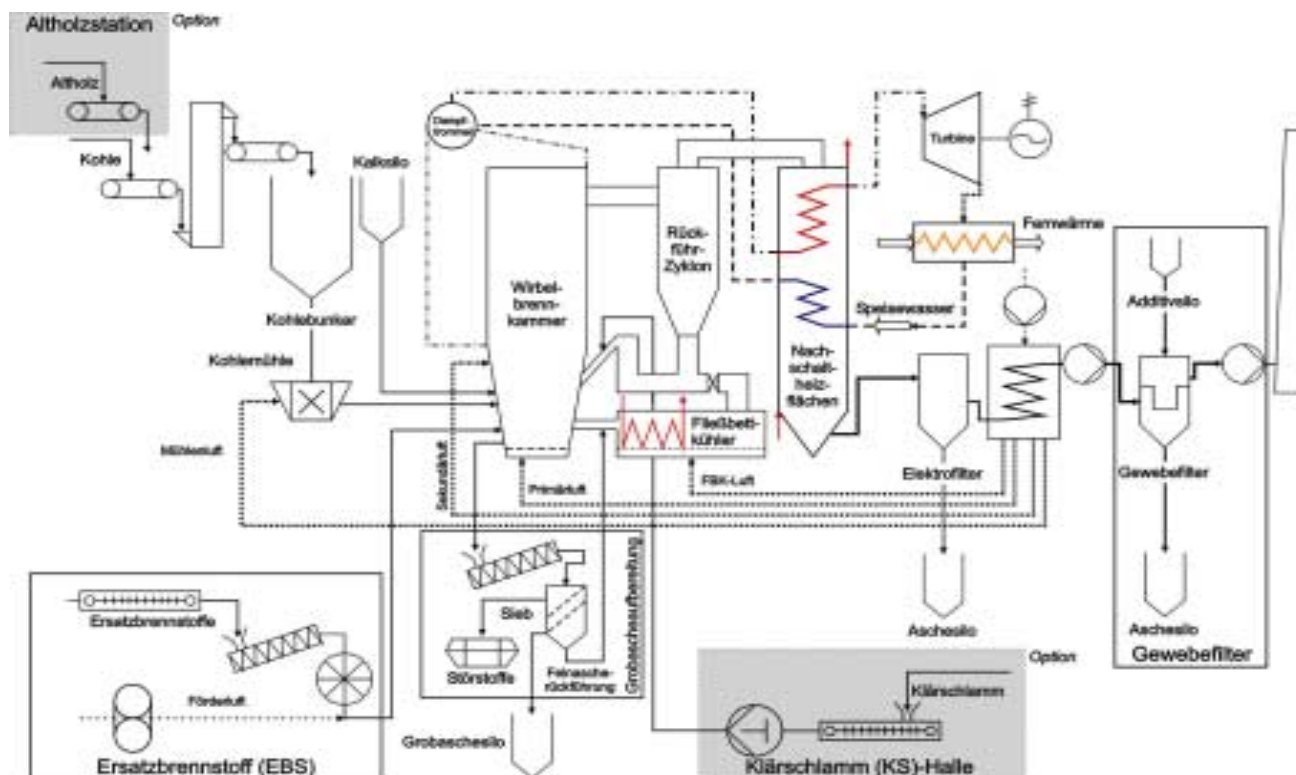
First Operational Experiences: Quality of SRF

- ✓ the quality is altogether already very good
- ✓ Chlorine: Medium 0,7 Ma.-% dry matter, n=23
- ✓ Heavy Metals: mainly uncritically, some samples have too high Copper- and Antimony-Contents.
- ✓ Grain-Size: 1 – 2 % > 50 mm, nearly 100 % < 80 mm
- ✓ Ferrous- and Non-Ferrous Metal-Content < 0,01 Ma.-%, but there are some particles up to 200 mm

- Therefore some optimization are tested or planned:
- Reducing Chlorine-Content (e.g. by reducing the throughput or by changing the screening-efficiency)
- Reducing long size metal components (e.g. by screening the SRF ?)

First Operational Experiences

- ✓ Co-Combustion started in Januar 2007 (at present 4 t/h)



Lessons learned

- ✘ Treatment of Commercial Waste to produce an furnace-finished solid recovered fuel is state of the Art.**
- ✘ The chlorine-content of the raw material varies between 2 – 5 Ma.-%; therefore Near-infrared-Sorting is a must.**
- ✘ The SRF have to be nearly metal-free. Multistage sorting is also a must.**
- ▶ Co-Combustion of Solid Recovered Fuel in an fluidized bed boiler requires adjustments of the past control concepts.**
- ▶ You need time and patience to implement the whole system successfully**