Biomass Power Plant Vienna

SBSTA 26

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Background/Timetable

- 2001: cooperation of socialist and green parties: agreement to build a biomass power plant
- May 2001: feasibility study
- Aug. 2002: law on power production based on renewable energy sources → feed-in tariffs
- May 2003: foundation of operating company
  - Shareholders: WienStrom GmbH
    Fernwärme Wien GmbH
    ÖBf Beteiligungs GmbH
- Jan. 2005: start of construction
- Jan. 2006: start of commissioning
- Oct. 2006: start of regular operation

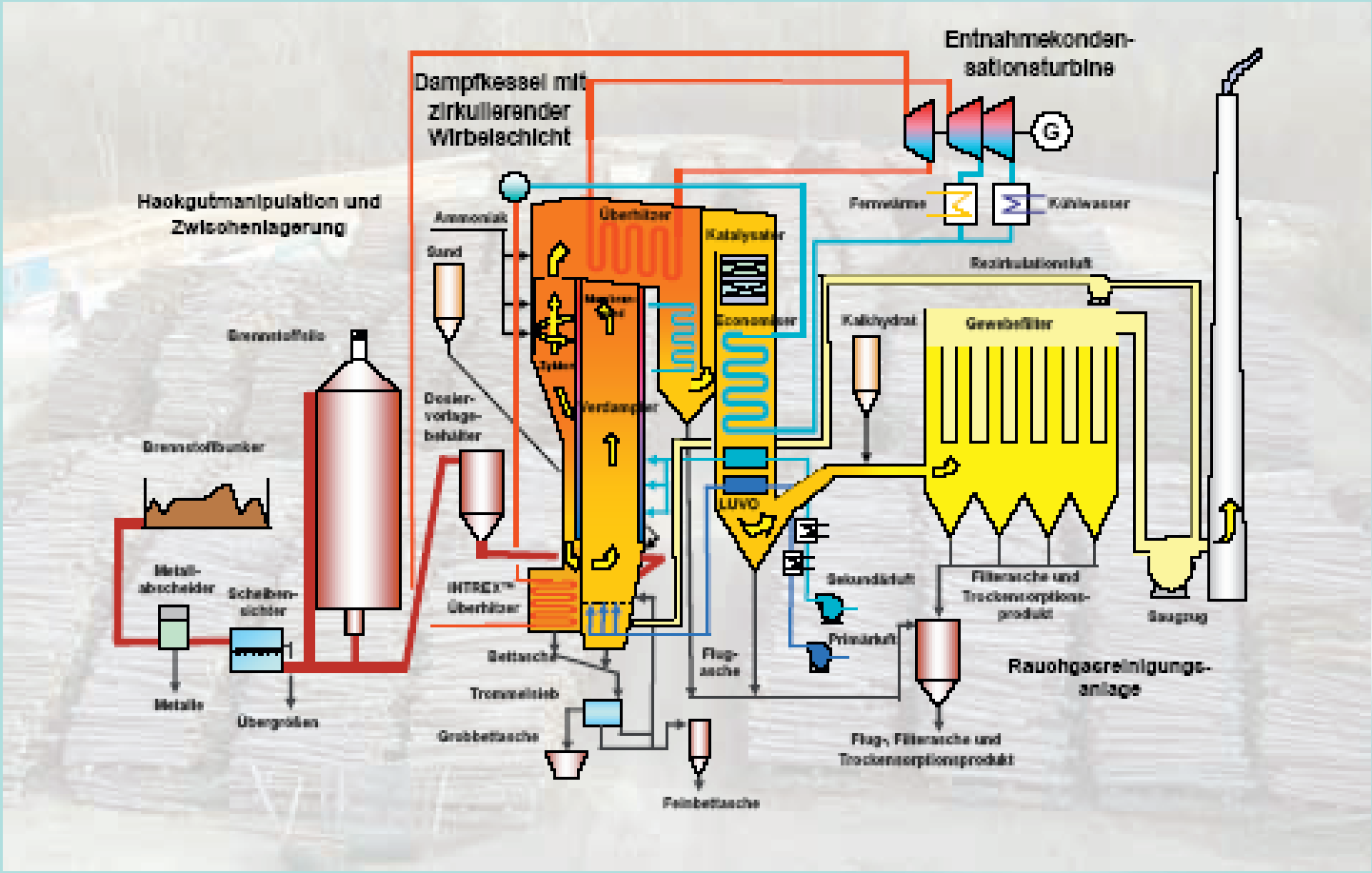
Costs/Location

- investment costs: 52 mio. €
  - 20 % higher than planned! - mainly due to rising steel prices
- federal subsidies
- location: Simmering, Vienna
  - possibility to deliver heat and power
  - 2 fossil fuel fired power plants on site → shared infrastructure
  - possible connection to railway
  - fuel preparation nearby - chipping place at port Albern

Fuel

- wood biomass: mainly round timber, some waste wood fractions – chipped near site (bulk <10 cm)
- consumption: ~195.000 t/a = wood chips: ~600.000 m^3/a = ~520.000 MWh/a
- moisture content: 30-50 %
- providers: federal Austrian forest holding (ÖBf = shareholder), private forest enterprises
- delivery:
  - from within a radius of 100 km
  - originally intended: railway (mainly), truck, ship
  - realized: only by truck!

Engineering



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Engineering

- fuel bunker
- separator: metals, larger chip sizes (>25 cm)
- fuel silo (7.500 m^3)
- circulating fluidised bed incinerator
- flue gas cleaning:
  - primary measures for NO_x reduction
  - SCR - addition of NH_3
  - bag filter - addition of lime hydrate
  - addition of activated coke – on demand
- live steam: 520 °C, 120 bar!
- extraction condensing turbine → heat (only in winter!) and power

Planned Data

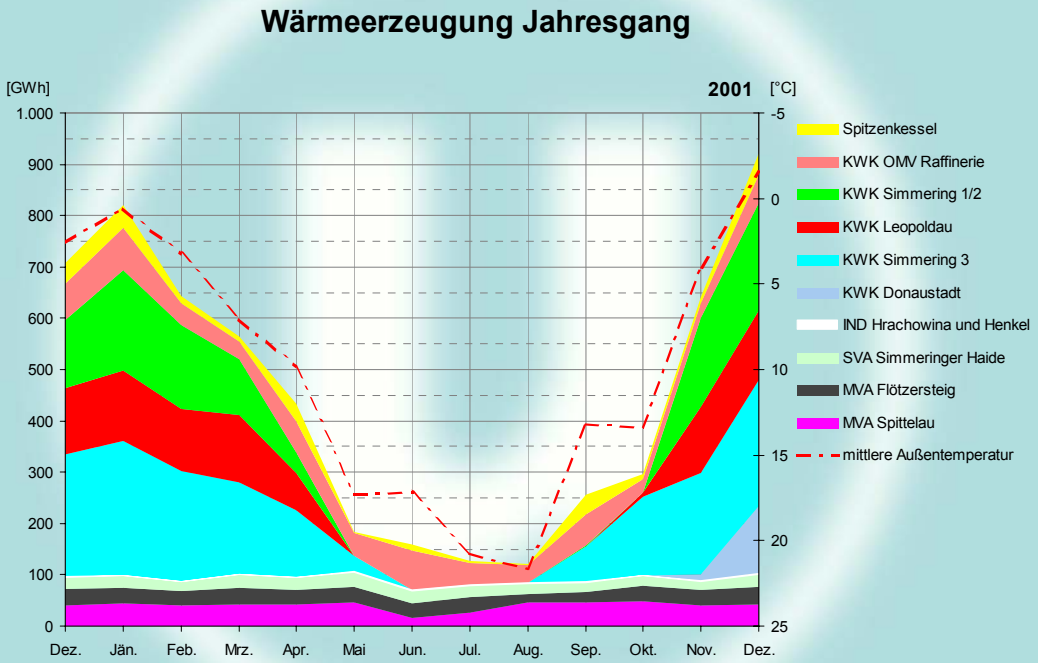
- nominal capacity: 65,7 MW

	winter	summer
power output:	15,1 MW	24,5 MW
heat output:	37,0 MW	0 MW
max. efficiency:	79 %	36 %

- power production: ~160.000 MWh/a
- heat production: ~95.000 MWh/a
- no heat decoupling during summer
  → annual fuel use efficiency: <50 %!

Heat Production

- heat demand in summer produced by waste incineration plants
- → no additional heat demand in summer
- → only 2.500 h/a operated as CHP
- → 5.500 h/a only power production
- → low efficiency as CHP!



Emission Limits

Pollutant	Half Hour Average	Daily Average
SO_2	50	
NO_x	100 (!)	100
CO	100	50
VOC	20	10
HCl	10	
HF	1	
NH_3	10 [1)]	10 [1)]
Dust	10 (!)	10
PCDD/F	0,1 [2)]	

- all values in mg/Nm^3, dry gas, 13 % O_2
- [1)] mg/Nm^3, dry gas, 0 % O_2
- [2)] ng TEQ/Nm^3, dry gas, 13 % O_2

- → very effective flue gas cleaning
  → low emissions into air!
  permit according to waste incineration ordinance

Summary

positive aspects:

- renewable energy
- effective flue gas cleaning → low emissions into air
- regional added value

negative aspects:

- only partially operated as CHP (2.500 out of 8.000 h/a)
  → low fuel use (<50 %)
  → could deliver 3 times more district heat
- delivery by truck → emissions (pollutants, noise,…)
- high costs (investment costs, operating costs)
- high moisture content (avg. 40 %)

Conclusions

criteria for biomass power plants:

- high efficiency:
  - especially for large plants
  - designed AND operated as CHP
- effective flue gas cleaning
  - dust
  - NO_x
- disposal of fly ash and bed ash
- fuel transport
  - low distance
  - delivery by train