

Background information for the paper Moerschner, Kazmierczak

Title: Detailed components and materials analysis of a German biomass CHP plant: A contribution to data quality improvement for LCA's of bioenergy systems

The CHP plant Pfaffenhofen split into its components and modules for materials analysis

Module	Mass [kg]	Share [%]
Buildings	13 997 322	91,29
Premises	8 743 644	57,03
Administration building	913 419	5,96%
Outside facilities, excavation, duct, etc.	4 340 259	28,31%
Machinery	1 117 334	7,29%
Boiler and heat generator	227 271	1,48%
Fuel storage	83 799	0,55%
Ash and slag removal	13 735	0,09%
Feed water components and pumps	242 976	1,58%
Primary and secondary air supply	64 470	0,42%
Flue gas cleaning	88 965	0,58%
Turbine with related components	27 015	0,18%
Heat exchangers	152 631	1,00%
Miscellaneous aggregates	86 422	0,56%
Operating fluids	130 050	0,85%
Electro-technics	217 970	1,42%
Generator	21 600	0,14%
Transformer	17 500	0,11%
Electric cables	175 670	1,15%
Control system	3 200	0,02%
Total	15 332 626	100,00%

Distribution of the total mass of the CHP-plant Pfaffenhofen to used materials and allocation to the energy produced over a period of 20 years

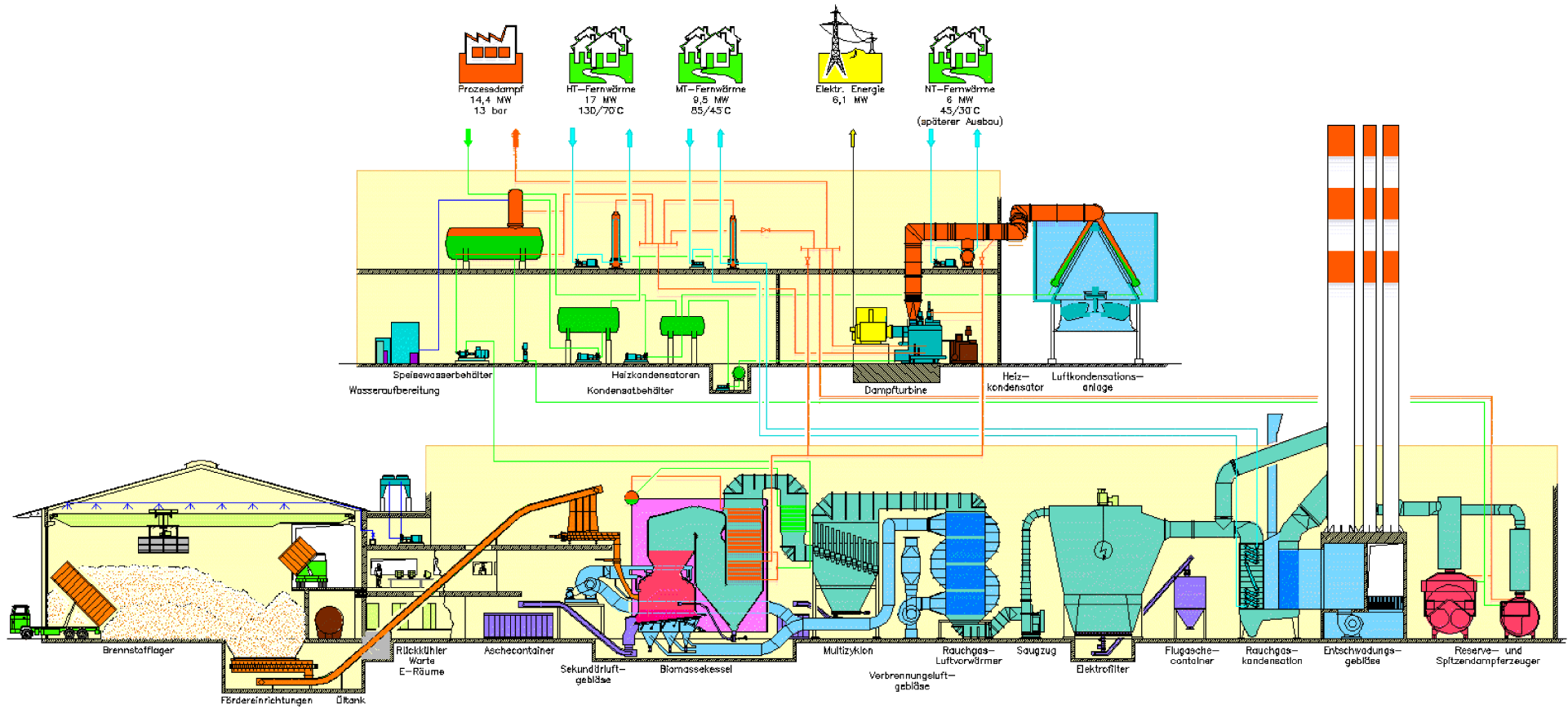
Material	Mass kg	Share %	Specif. materials input for energy supply			
			g/kWh _{el} ¹	g/kWh _{el} ² exerget.	g/kWh _{th} ² exerget.	g/kWh ³ Output
Construction steel	1 993 683	13,00	2,492	1,387	0,431	0,699
Low-alloy steel	94 084	0,61	0,118	0,065	0,020	0,033
High-alloy steel	22 582	0,15	0,028	0,016	0,005	0,008
Cast iron	13 860	0,09	0,017	0,010	0,003	0,005
Aluminium	921	0,01	0,001	0,001	0,000	0,000
Copper	153 625	1,00	0,192	0,107	0,033	0,054
Zinc	2 459	0,02	0,003	0,002	0,001	0,001
Nonferrous metals alloys	2 581	0,02	0,003	0,002	0,001	0,001
Ceramic fiber	3 584	0,02	0,004	0,002	0,001	0,001
Ceramics	42 230	0,28	0,053	0,029	0,009	0,015
Chamotte	76 203	0,50	0,095	0,053	0,016	0,027
PVC	27 756	0,18	0,035	0,019	0,006	0,010
Plastics	3 885	0,03	0,005	0,003	0,001	0,001
Insulation	12 044	0,08	0,015	0,008	0,003	0,004
Oil products	7 050	0,05	0,009	0,005	0,002	0,002
Water, cooling water	123 000	0,80	0,154	0,086	0,027	0,043
Electronics	1 340	0,01	0,002	0,001	0,000	0,000
Glass, silicate	2 722	0,02	0,003	0,002	0,001	0,001
Miscellaneous	192	0,00	0,000	0,000	0,000	0,000
Concrete	7 602 405	49,58	9,503	5,289	1,643	2,666
Walls	1 012 073	6,60	1,265	0,704	0,219	0,355
Grit, gravel	3 885 414	25,34	4,857	2,703	0,840	1,362
Bitumen	227 770	1,49	0,285	0,158	0,049	0,080
Timber	21 163	0,14	0,026	0,015	0,005	0,007
Total	15 332 626	100,00	19,166	10,667	3,313	5,376

¹ All inputs allocated to power production

² The share of materials input allocated to heat and power production respectively was weighted by exergy

³ Materials inputs per kWh produced energy, without distinction between heat and power

The CHP plant Pfaffenhofen: schematic overview on components and functional details



Source: ETA-Energieberatung, Pfaffenhofen