61TH IEA FLUDIZED BED CONVERSION MEETING
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University of Salerno at Fisciano

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Biomass FBC boiler 32 MWth with expanded fluidized bed

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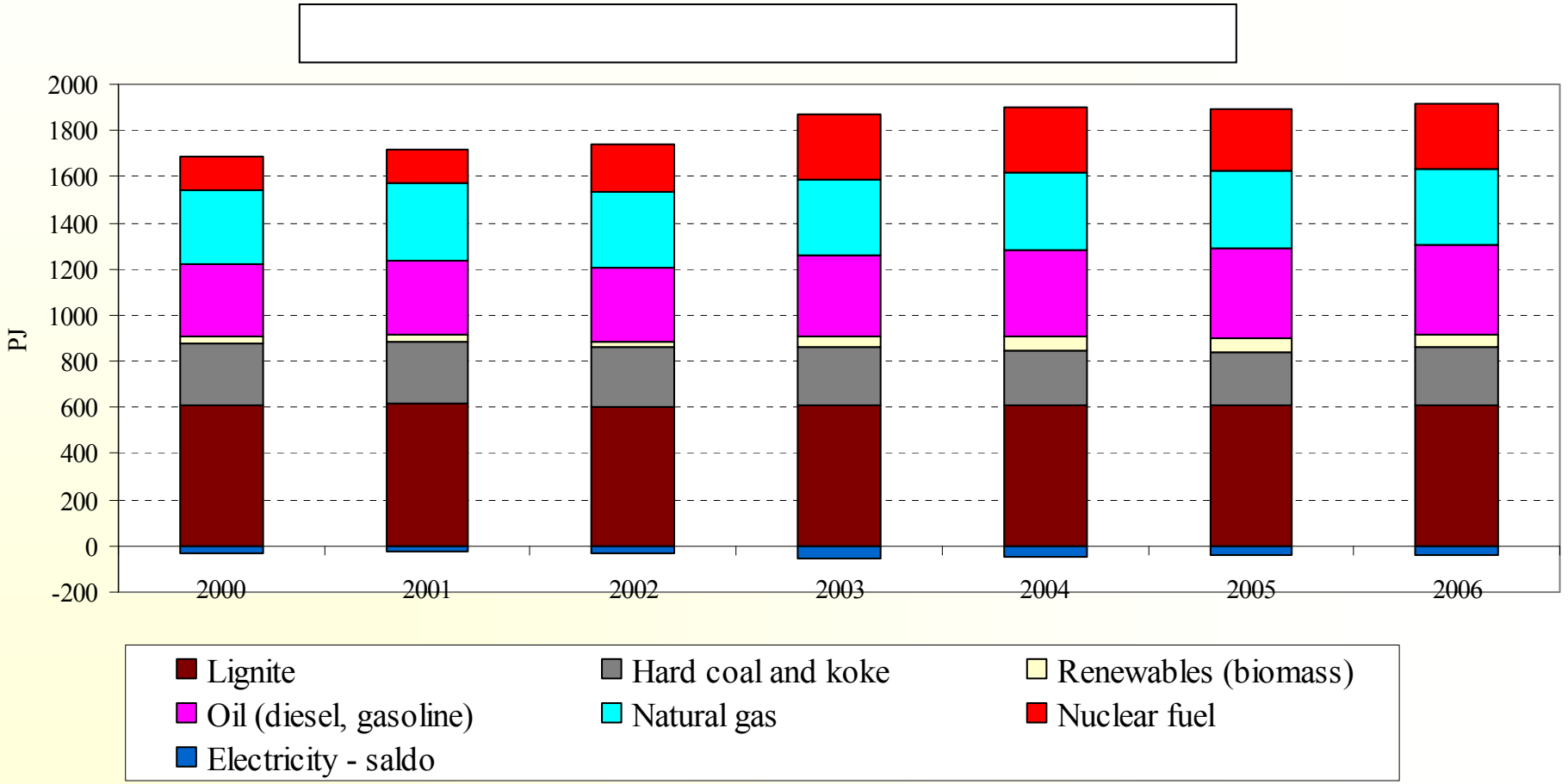
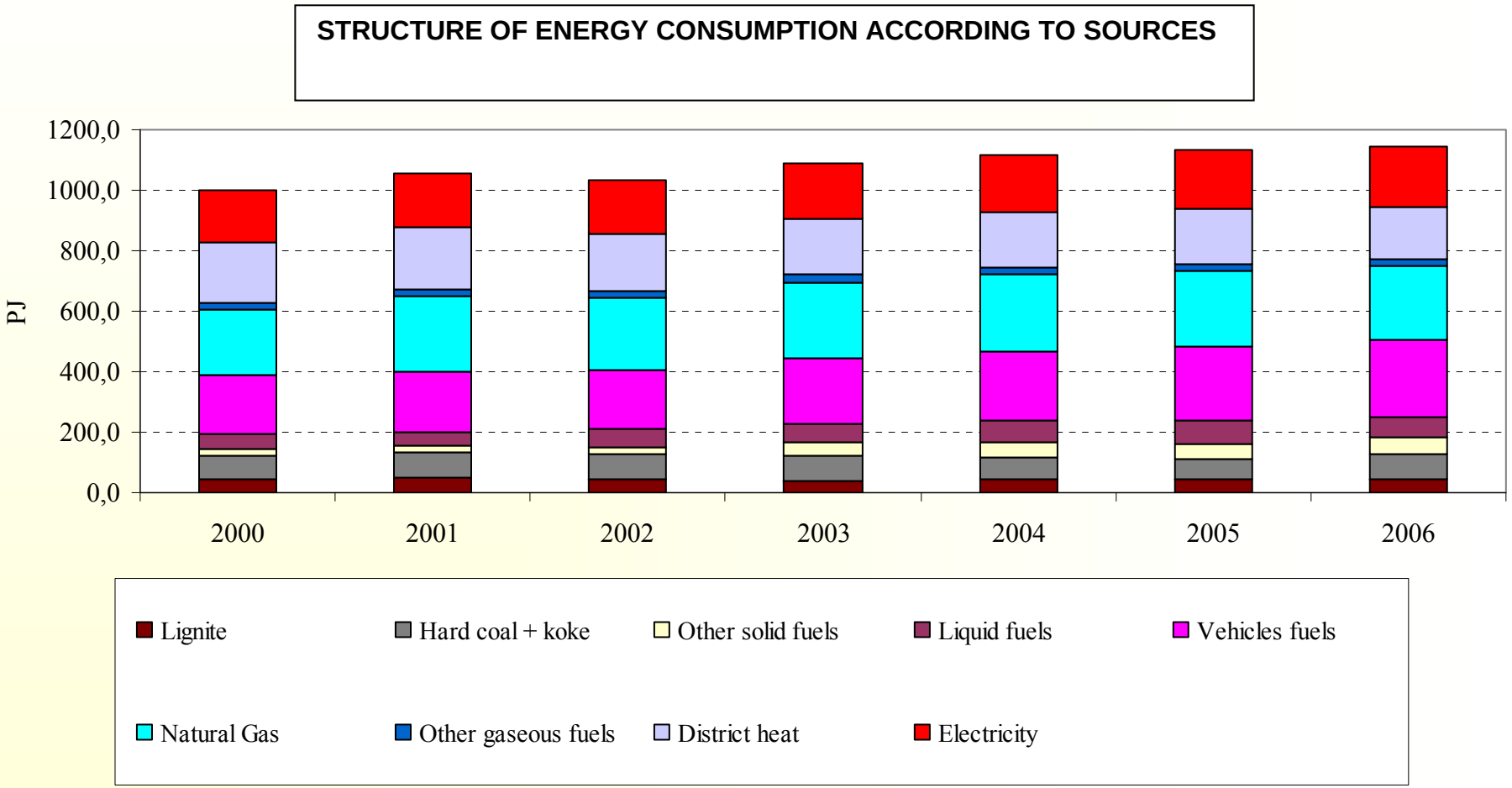
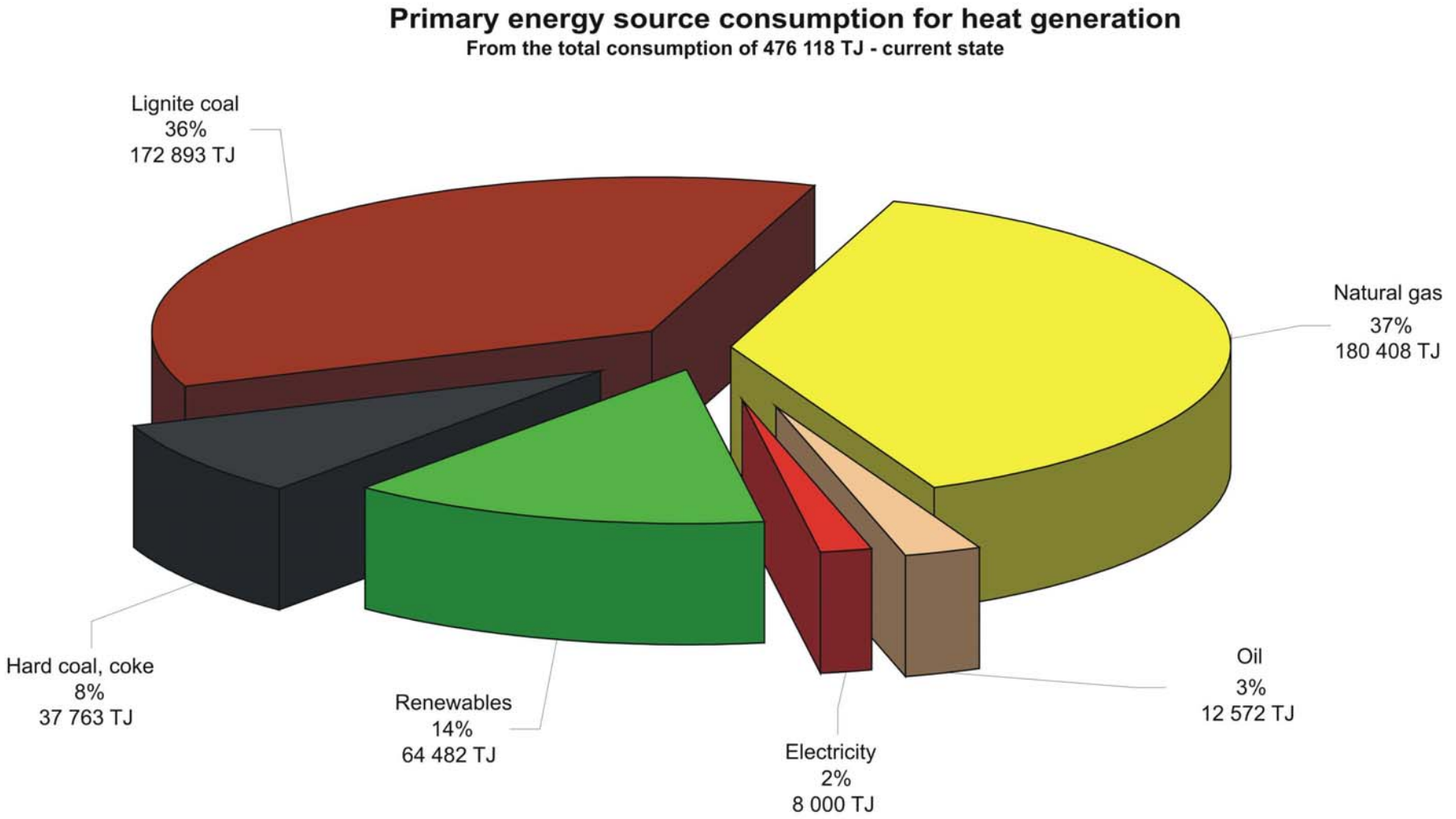
PRIMARY ENERGY SOURCES CONSUMPTION



FINAL CONSUMPTION OF ENERGY

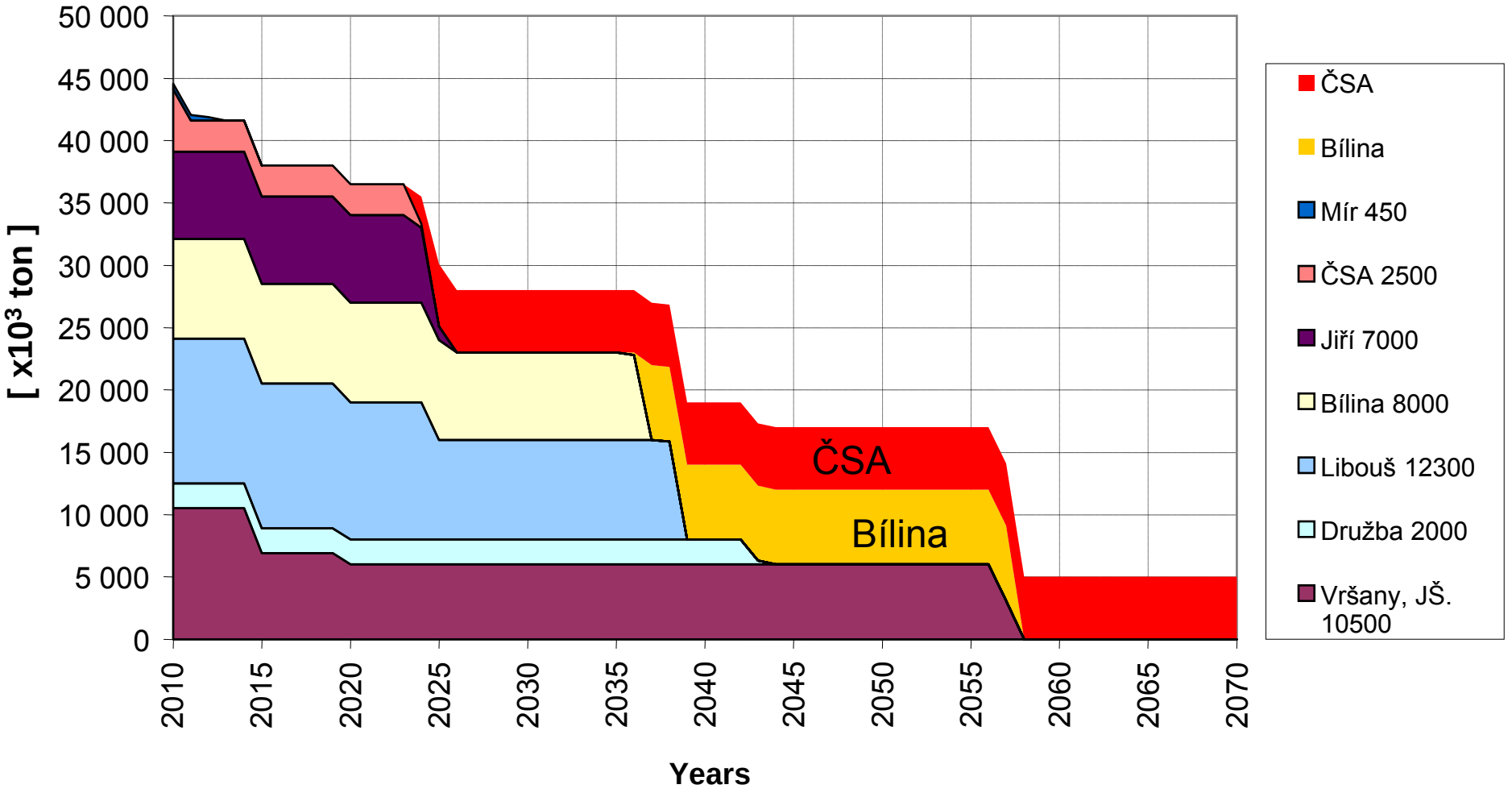


Primary energy sources account to heat production – 470 PJ



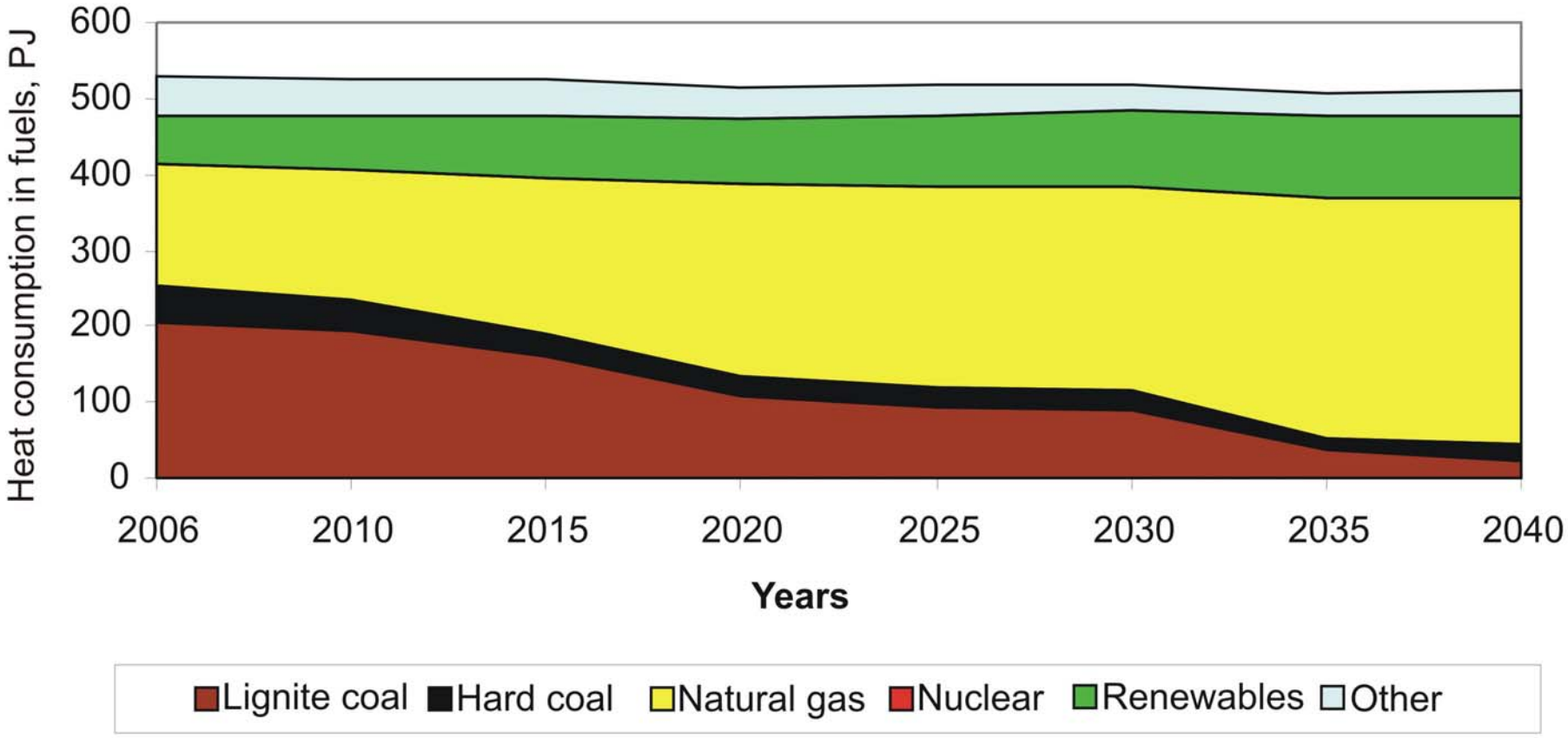
Czech lignite coal, ecological limits of mining, potential energy reserves

Estimate of coal production at blocked reserves and re-evaluation of the limits

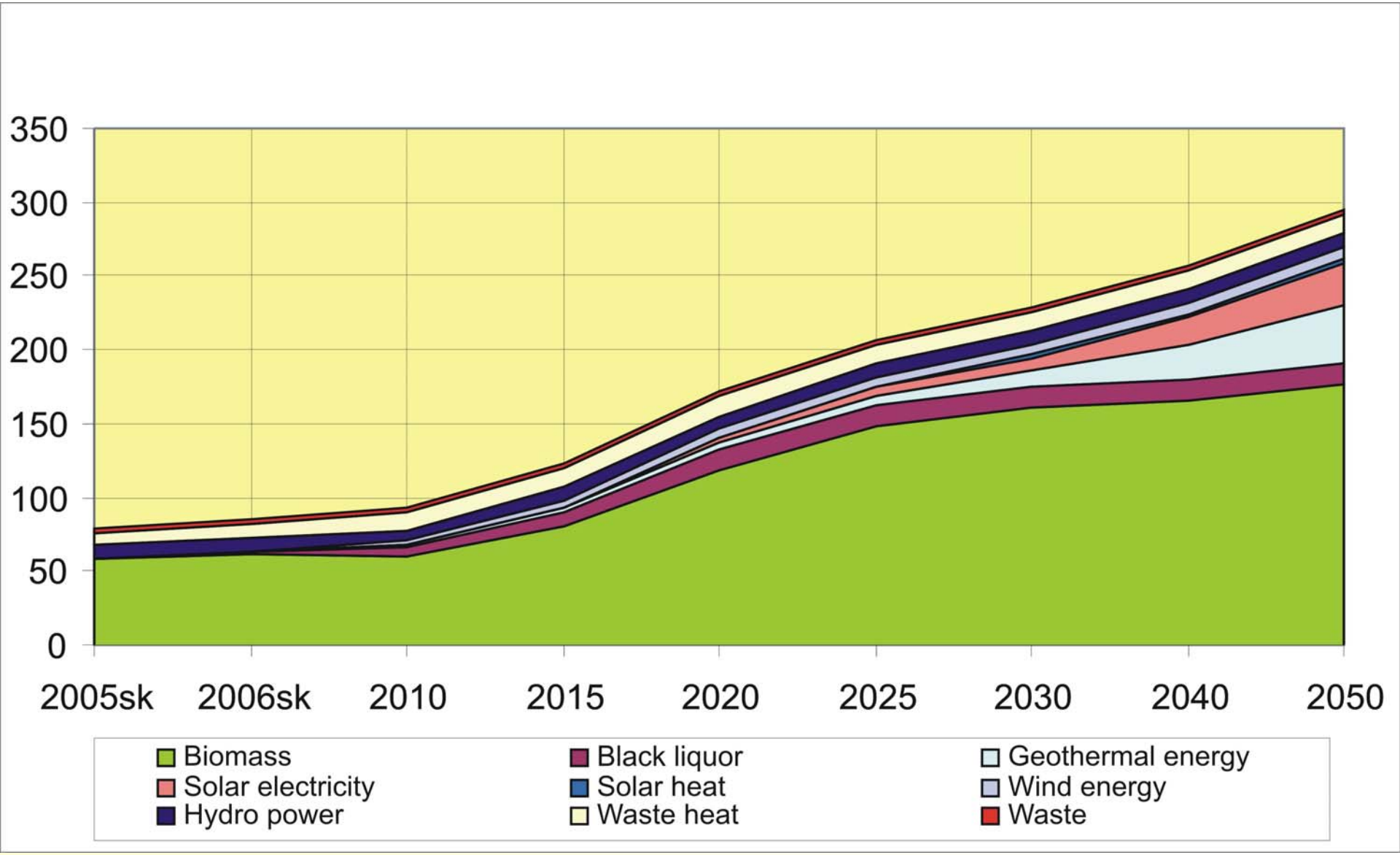


Heat structure without the coal besides the ecological limits

Today about 38 % lignite, 16 % hard coal,8 % oil, natural gas 27 % renewables 10 %



Structure and consumption of renewables (RES = 7 TWh+ 50 PJ in heat from biomass) in PJ



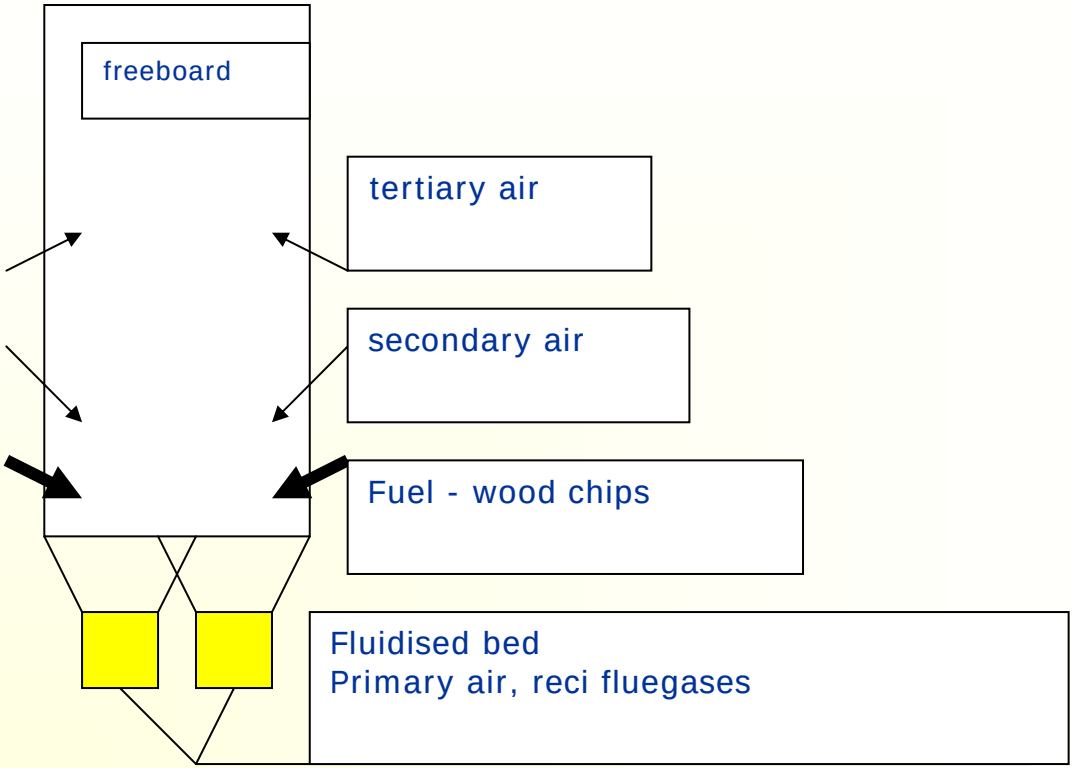
Biomass FBC boiler 32 MWth with expanded fluidized bed

What is the „expanded fluidised bed“?

- high velocity of the fluidization medium at the bottom of the boiler furnace
- specific load of fluidized bed about 20 MW/m^2 in fuel

- velocity of flue gases in freeboard between 2 and 3 m/s
- secondary and tertiary combustion air

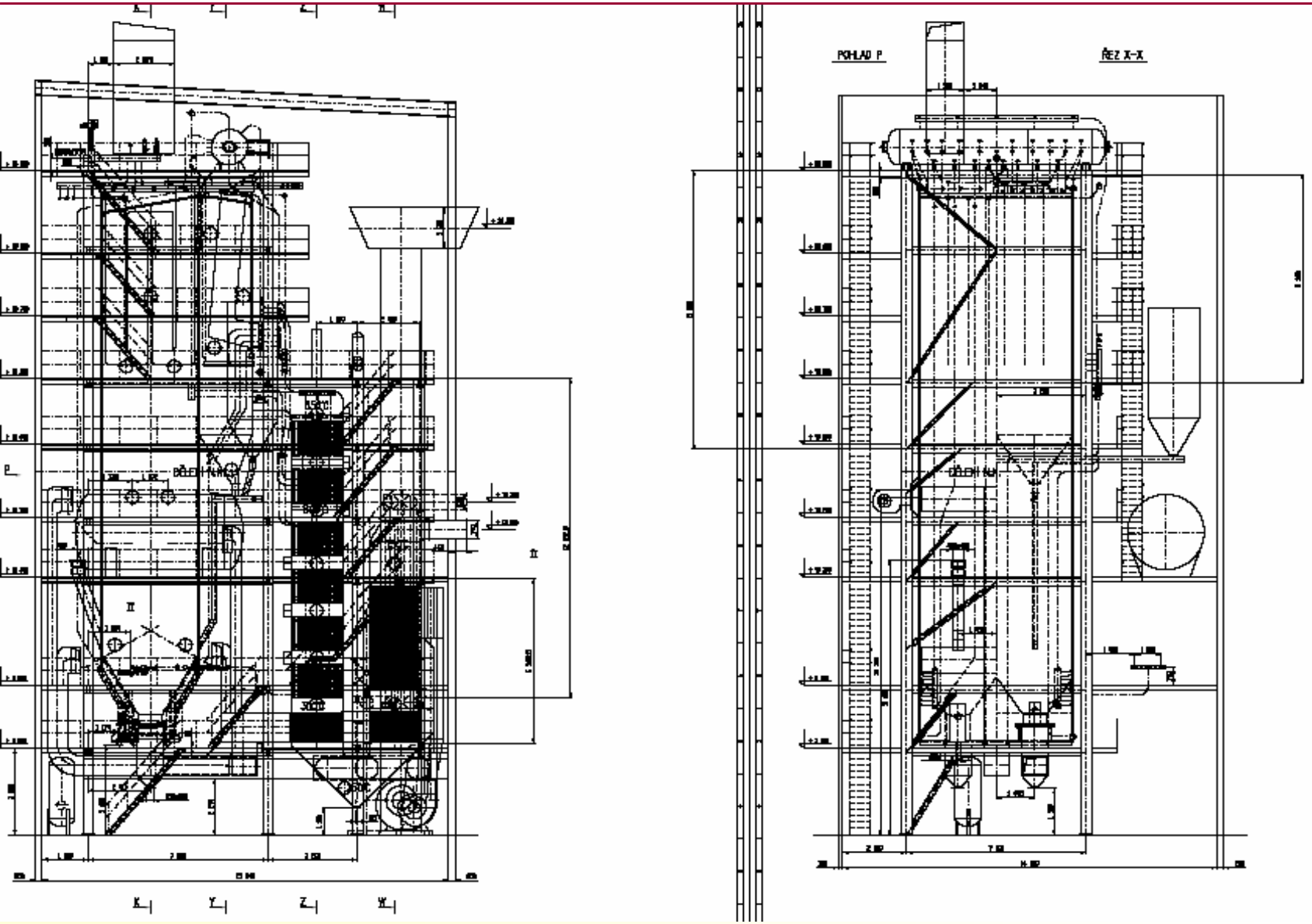
Schematic layout of the boiler (freeboard height 21 m)



Biomass FBC boiler 32 MWth with expanded fluidized bed

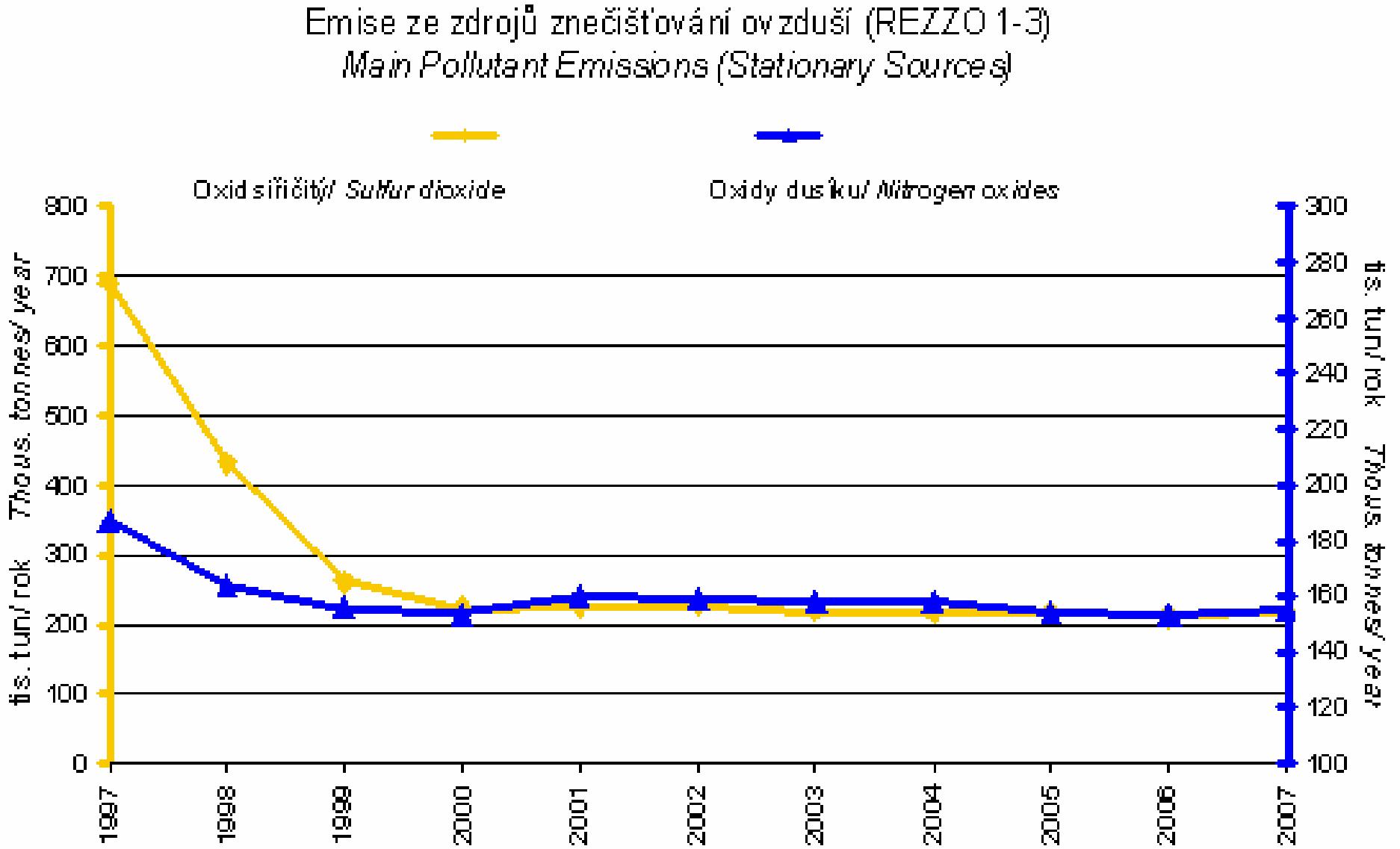
Parameters :		
Steam output	nominal	45 t/h
	maximum	49 t/h
	minimum	16 t/h
Steam pressure		6,7 MPa
Steam temperature		490 ^{0}C
Feedwater temperature		145 ^{0}C
Freeboard temperature		890 – 790 ^{0}C
Fluidized bed temperature		930 ^{0}C
Boiler efficiency		91 %
Turbine net electricity output		10,7 MW
Electricity efficiency		31 %
Fuel – wood chips		7 – 13 MJ/kg

SCHEMATIC LAYOUT OF THE BOILER



Decrease of pollutants in Czech Republic

20 kgSO2 per inhabitant



Flue gases parameters

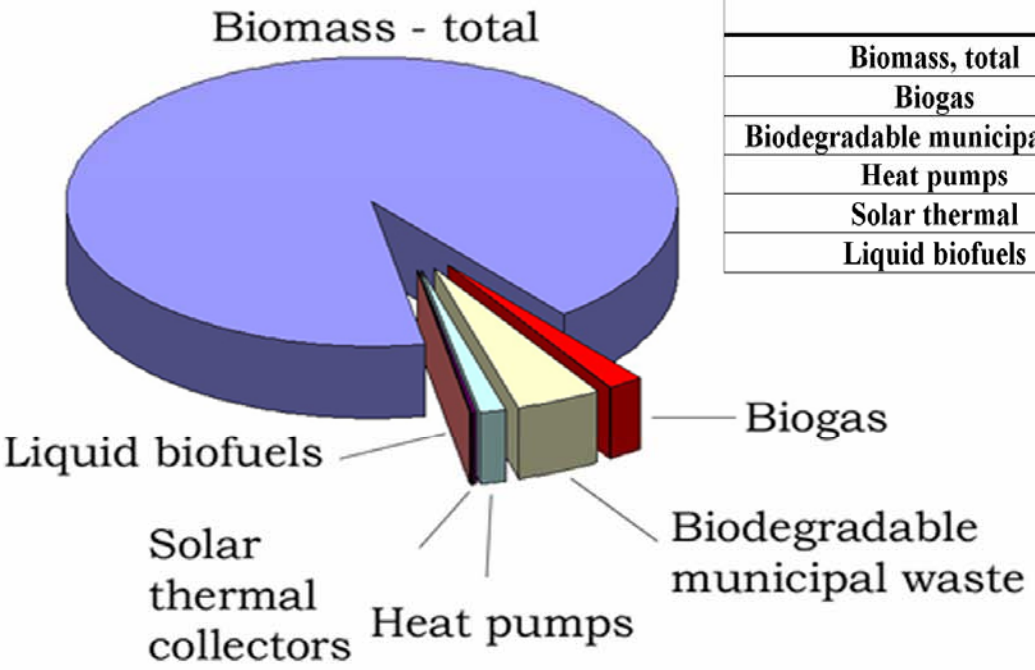
Temperature	132 ^{0}C
O_2	3,4 %
CO	120 mg/m^3
SO_2	15 mg/m^3
NOx	180 mg/m^3
TOC (total organic carbon)	3 mg/m^3
Particles	27 mg/m^3
	6 % O_2, dry fg
Tested technology	co-firing of 10 % plastics chips

LMADUR
DIN 7080-40

Thank you for your attention!

Renewables in heat production

RES SHARE IN HEAT PRODUCTION FROM RES, CR 2006



	Share in heat from RES (%)	Gross production (PJ)
Biomass, total	91,19	41,76
Biogas	2,01	0,92
Biodegradable municipal waste	4,17	1,91
Heat pumps	1,48	0,68
Solar thermal	0,28	0,13
Liquid biofuels	0,00	0,0001

Total heat consumption is 381 PJ/yr , including centralized heat sources (CZT) 209 PJ/yr and decentralized heat sources (DZT) 172 PJ/yr