

Co-firing of coal and biomass with high water content

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Properties of washed beet pulp

- water content
- ash content
- combustible
- calorific value

$$W^r = 79,7 \%$$

$$A^r = 1,21 \%$$

$$h^r = 19,09 \%$$

$$Q_i = 1,455 \text{ MJ/kg}$$

Two possibilities of washed beet pulp burning

- **single beet pulp combustion after reduction of their moisture**
- **co-firing of pulp with better fuel**

Single beet pulp burning

is possible after reduction of moisture to 45%



calorific value increase to 8.5 MJ/kg

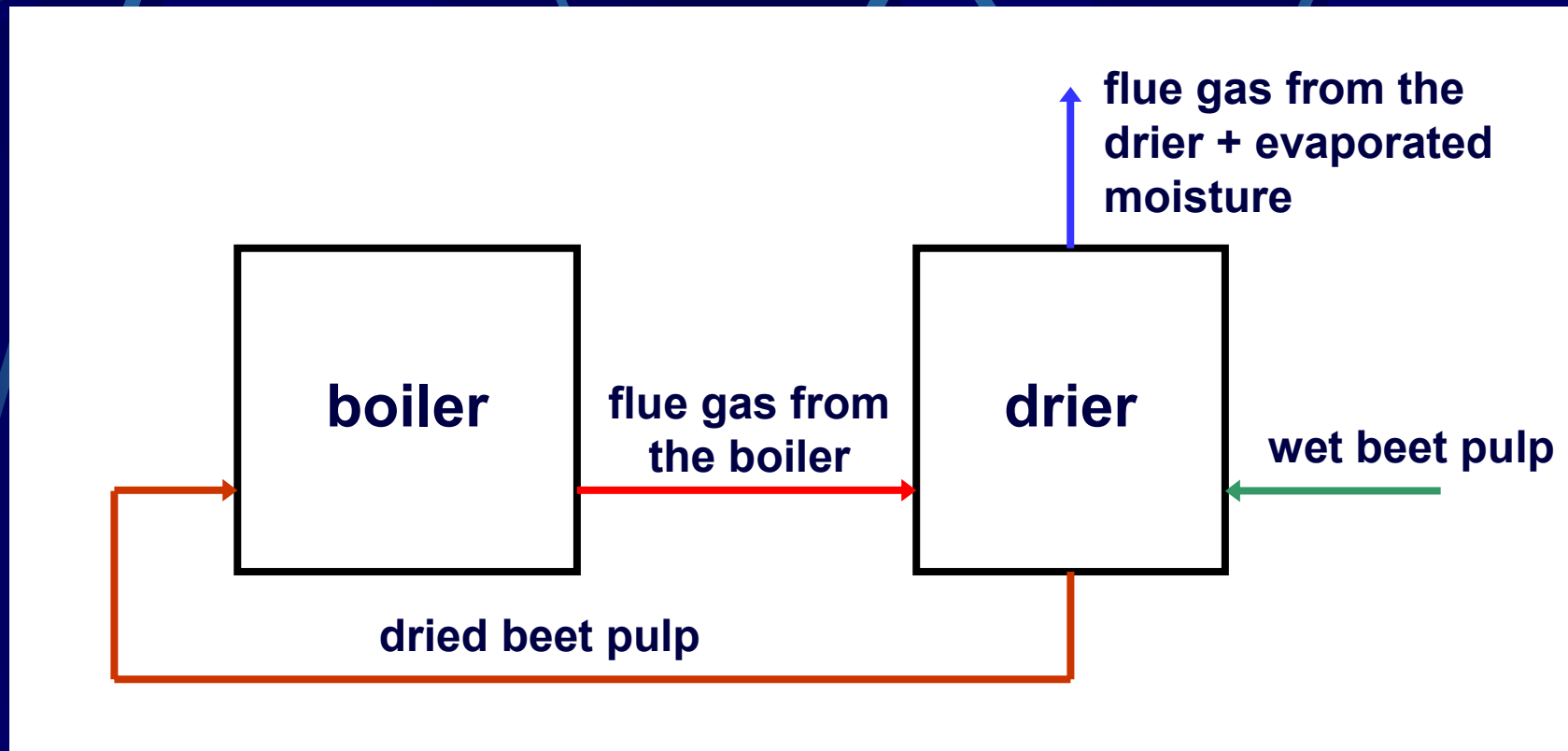
options of pulp moisture reduction

- mechanical squeeze
- drying
- combination of both possibilities

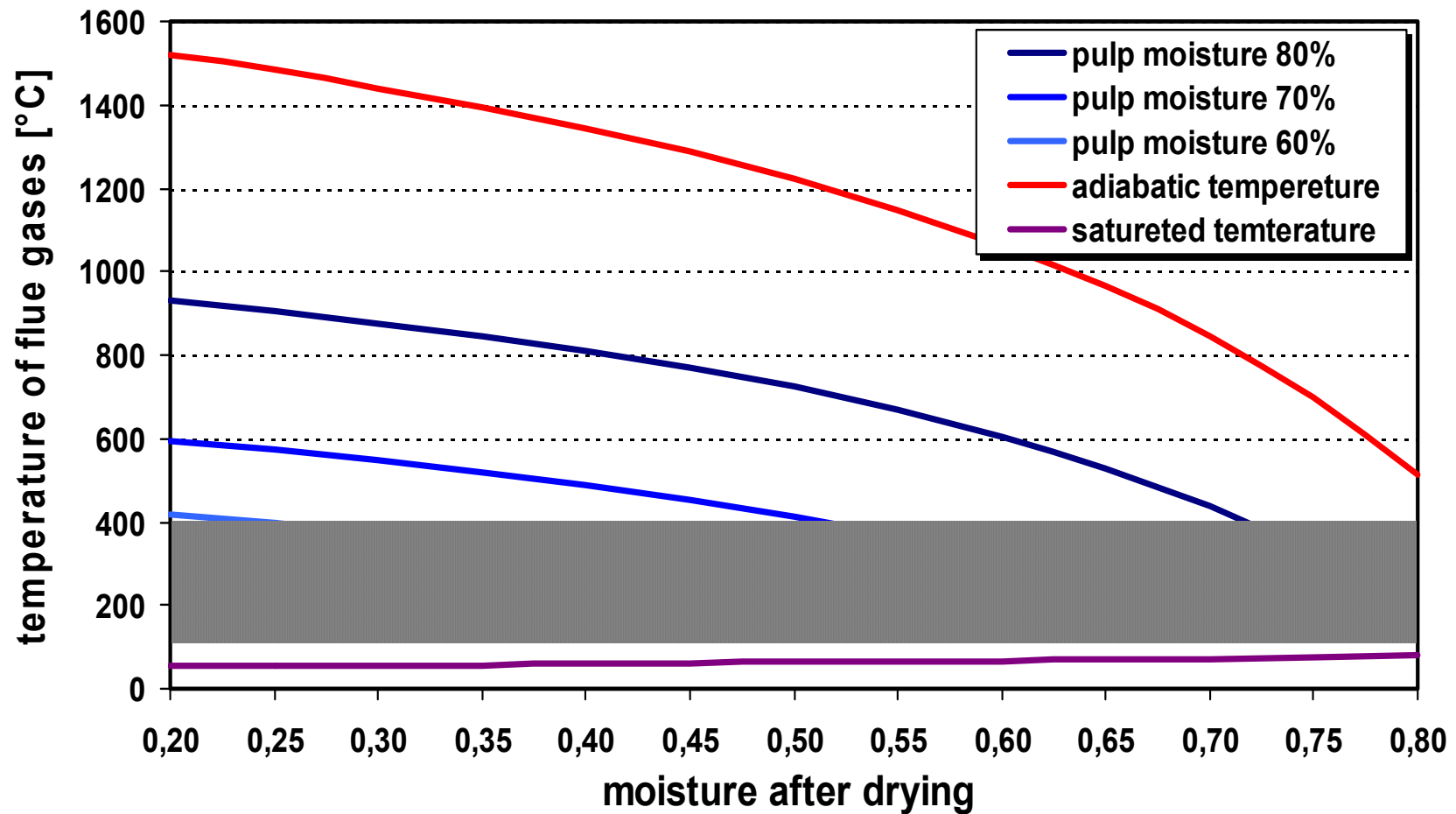
Possibilities of beet pulp drying

- by flue gases after beet pulp burning
- by flue gases after burning of any different fuel
- by steam generated in the boiler for pulp combustion

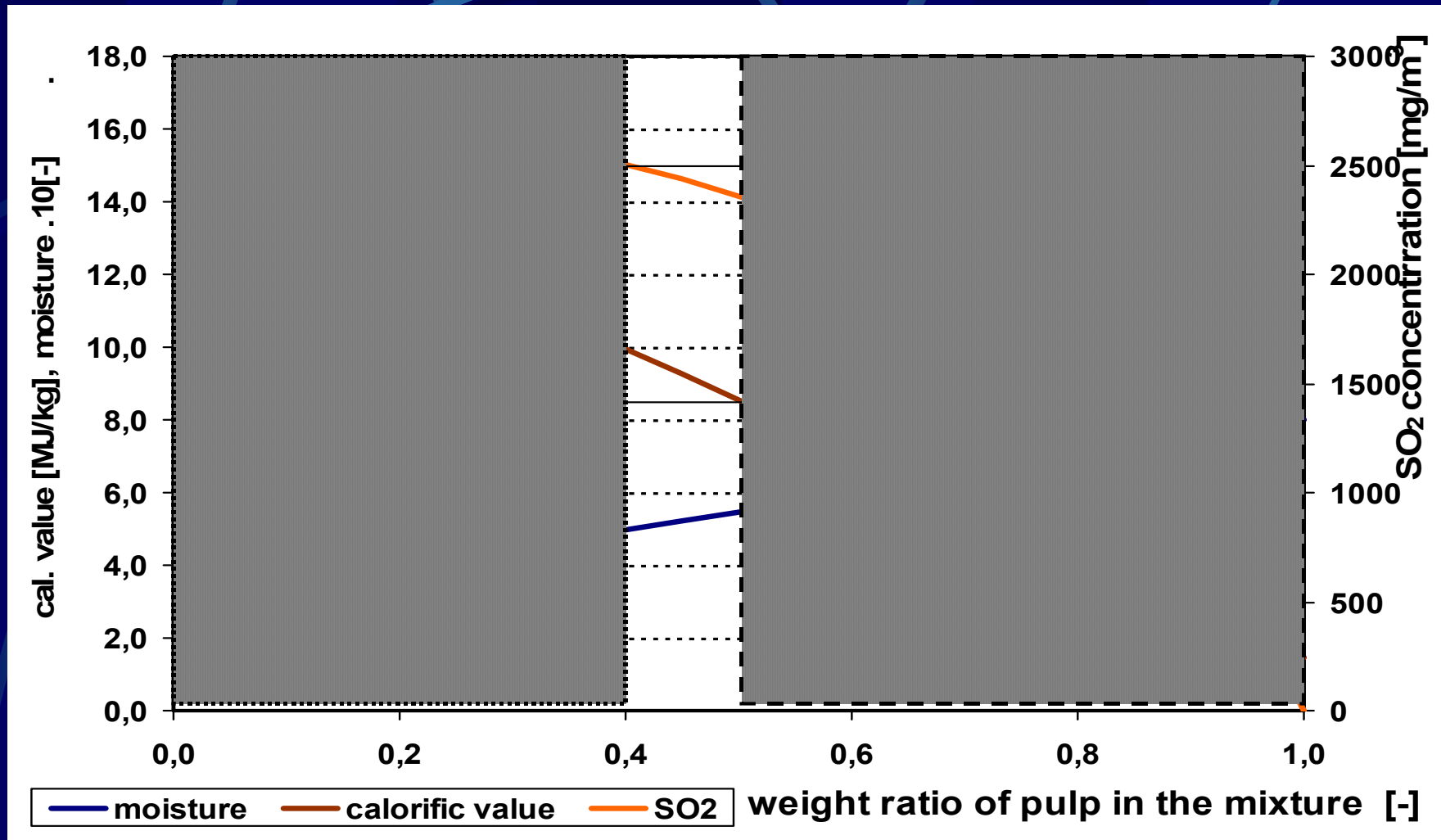
Scheme of the open drying circuit



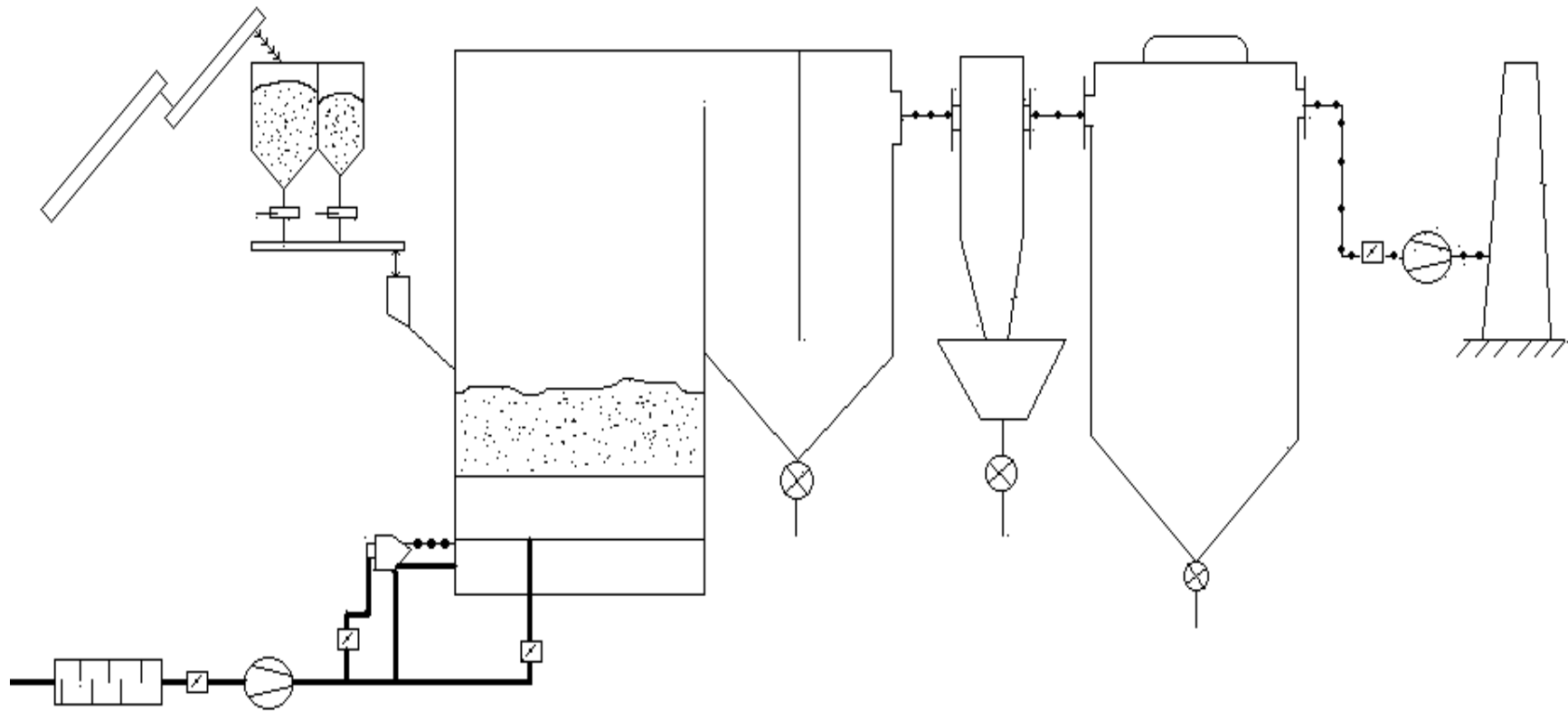
Temperature necessary for pulp drying



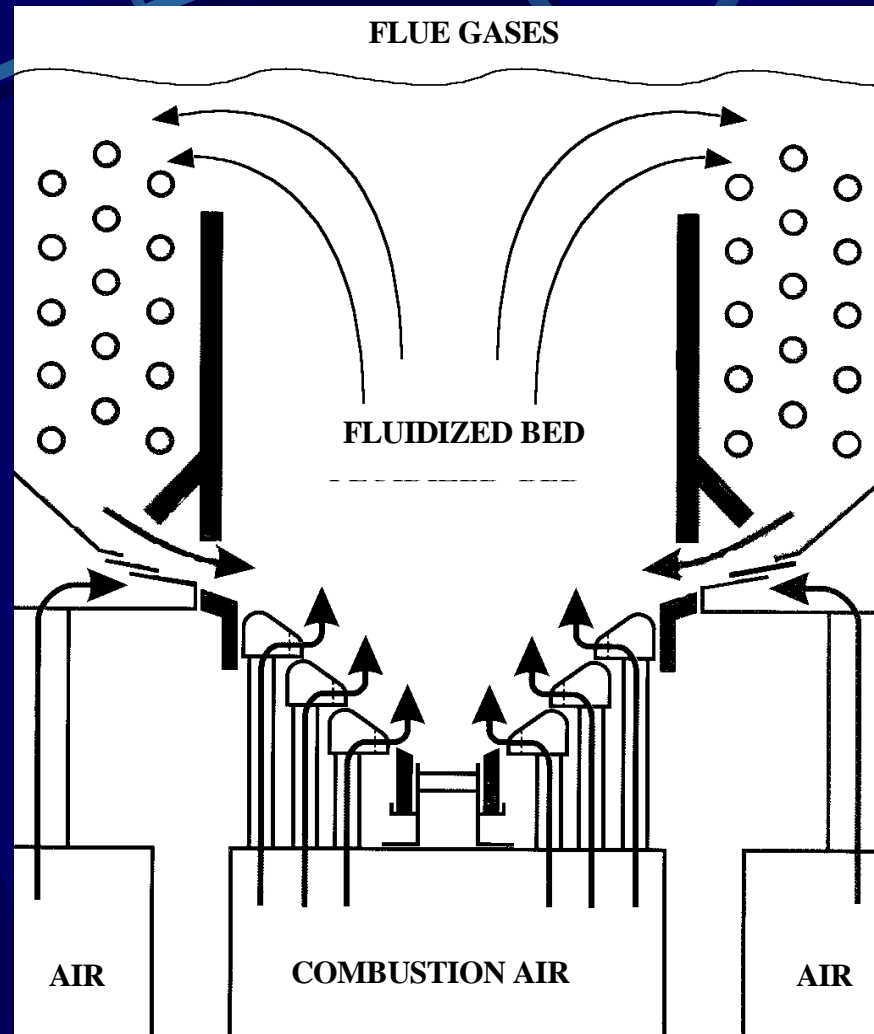
Co-firing of beet pulp with lignite



Scheme of the fluidized bed boiler FK 2 MW - Roztoky u Křivoklátu



Trof fluidized grage



Measurement on the boiler FK 2 MW

Fuel – lignite hp I AD 16,4 MJ/kg		Lignite	Lignite / pulp ratio	
			3 : 1	1 : 1
Output	kW	1150	1100	1200
O ₂	%	10,1	9,2	8,6
CO related to O ₂ =6 %	mg/m ³	24	111	196
Excess air	-	1,95	1,78	1,7
NO _x related to O ₂ =6%	mg/m ³	658	616	570
Bed temperature	°C	860	835	845

Conclusions

- washed beet pulp burning could cover from 30 % to 50 % of heat and power consumption of sugar mill
- co-firing of pulp with coal could reduce emissions of SO_2 a NO_x