CO-COMBUSTION OF COAL AND BIOMASS

in an FBC boiler

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New Czech law „ SUPPORT OF THE RENEWABLE ENERGY“

- MAIN GOAL – 8 % OF THE ELECTRICITY PRODUCTION IN CR FROM THE **RES** IN THE YEAR 2010
- CO COMBUSTION OF BIOMASS WITH COAL IN THE COAL CFB POWER UNITS – ONE OF THE IMPORTANT EVENTUALITY

SHORT TIME OPERATION

- LOT OF MAIN CZECH PRODUCERS OF ELECTRICITY AND HEAT realised co combustion tests of coal and biomass
- DESCRIPTION of the results from two different tests :

- CFB coal boiler in Plzeňská teplárenská
- Industrial pulverized coal boiler in Lovochemie a.s.

Both boilers: coal – lignite from west north bohemian mines, biomass – cutwood and sawdust

PLZEŇ

Main goal:

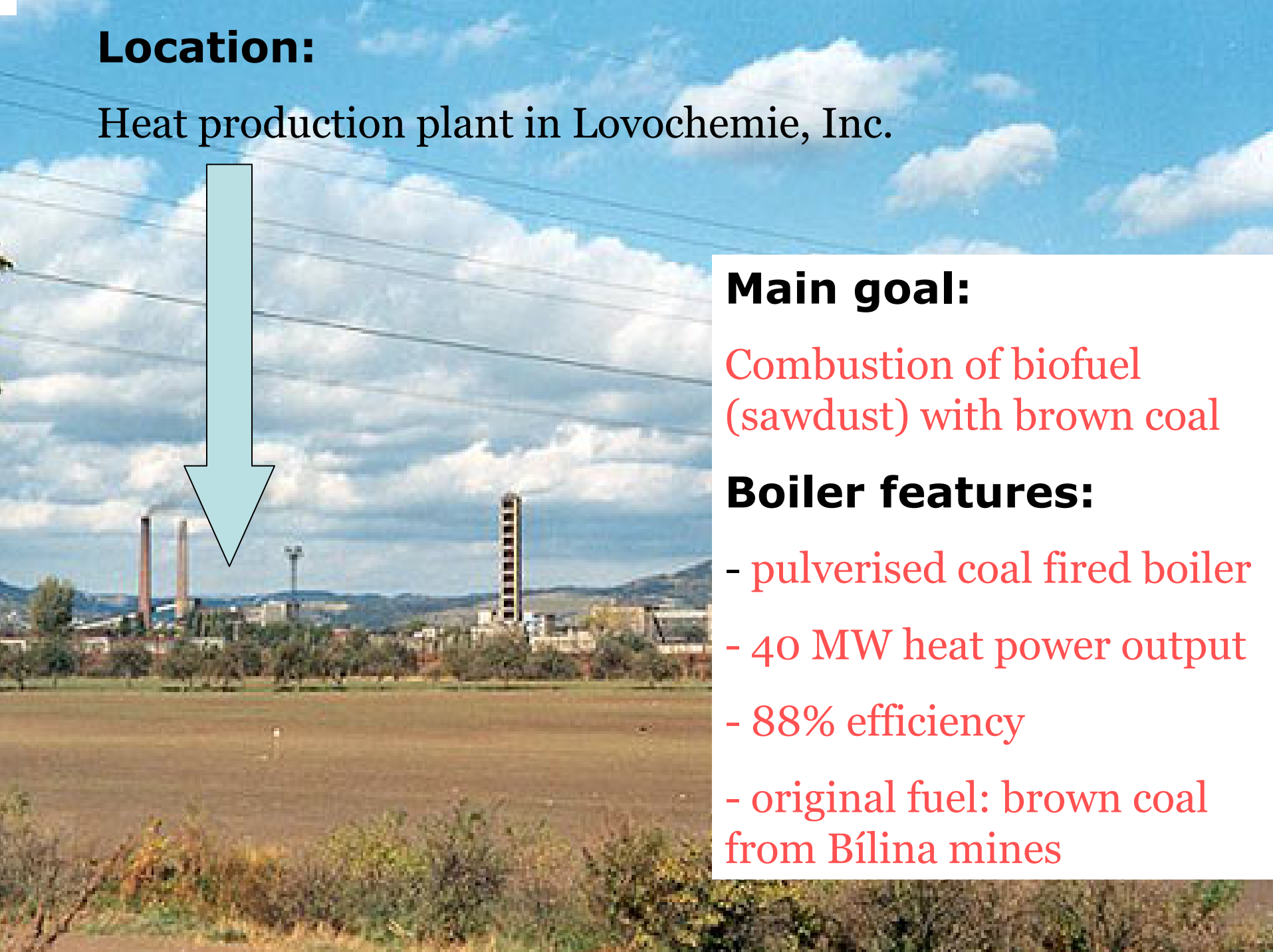
Combustion of biofuel (cutwood) with brown coal

Boiler features:

- CFB boiler
- 140 MW heat power output (steam 540 °C, 136 bar)
- 92% efficiency
- original fuel: brown coal from Sokolov mines

Location:

Heat production plant in Lovochemie, Inc.



Main goal:

Combustion of biofuel (sawdust) with brown coal

Boiler features:

- pulverised coal fired boiler
- 40 MW heat power output
- 88% efficiency
- original fuel: brown coal from Bílina mines

Fuel preparation in PLZEŇ:

- mixing of the sawdust with the coal in the coal bunker

- addition of the mixture throught the chain convayor into the basalt chute

Boiler operation:

- full power

- no changes in power output during the experiment

Fuel preparation in LOVOSICE:

- mixing of the sawdust with the coal in the coal bunker

- addition of the mixture into coal mill and coal dryer

Boiler operation:

- full power

- no changes in power output during the experiment

Biofuel features:

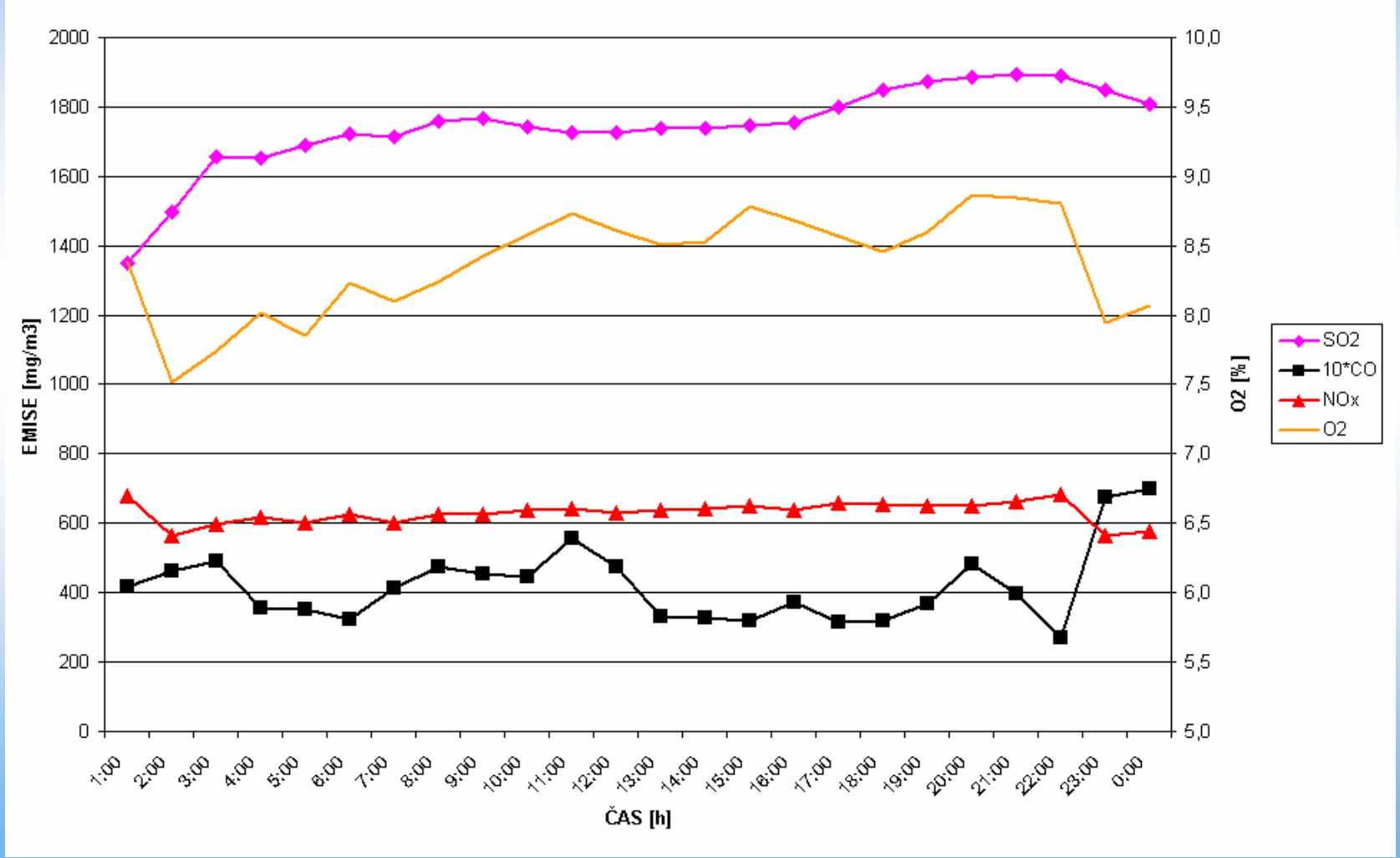
- sawdust
- cutwood
- humidity approx.
40 % in Plzeň
65% in Lovosice
- added in approx.
ratio 1:10

Measurements:

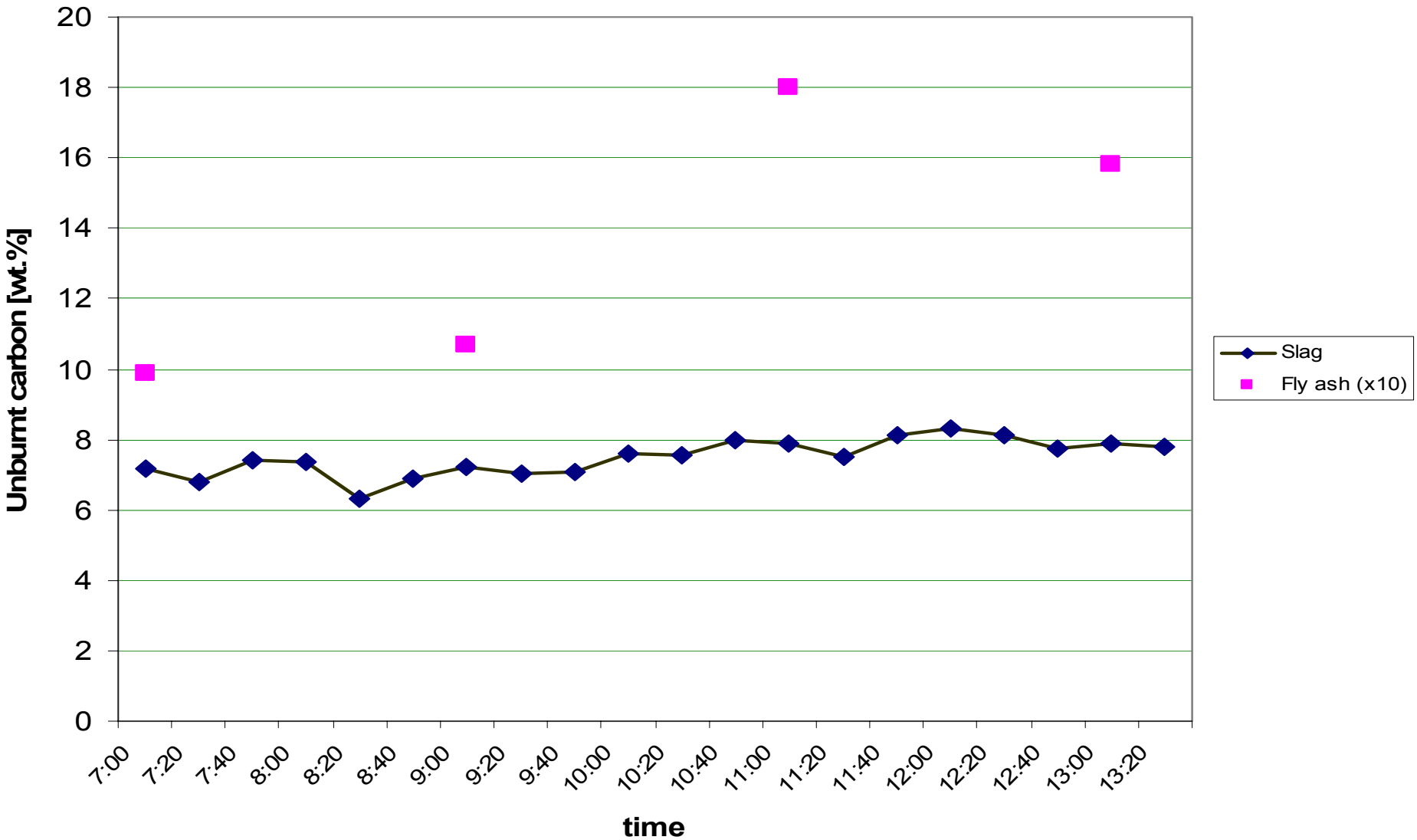
- CO, NO_x, SO_2 and O_2 at flue gas outlet
Lovosice plant
- unburnt carbon in slag (by the operator)
- unburnt carbon in fly ash (by the operator)

Results:

1. CO, NO_x, SO_2 and O_2 at flue gas outlet

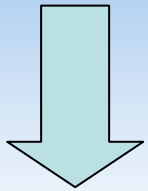


2. Unburnt carbon in slag and fly ash



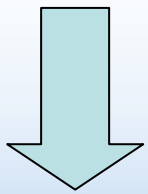
Problems:

1. Insufficient mixing of the biofuel and the coal



real biofuel/coal ratio unknown

2. High water content in the biofuel



problems can occur in the fuel bunker with the sticking and crowning mix fuel

Conclusions:

Short-time combustion of coal and biofuel up to 10:1 ratio **is possible**

1. Positives

⇨ decrease of SO_2 emissions

⇨ addition of biofuel through existing fuel system is to the mix ratio 1 : 10 possible

2. Negatives

⇨ insufficient homogenisation of the fuels by the digger

⇨ emission of dioxines is not negligible by green cutwood using (0,5 ng/m^3) –CFB boiler

⇨ expected increase of unburnt carbon in slag and fly ash

Recommendations – what is necessary?

- ⇨ development of mixing technology for biofuel and coal
- ⇨ execution of long-time combustion tests
- ⇨ setting of optimal coal/biofuel ratio
- ⇨ development of technique for coal/biofuel ratio determination
- ⇨ development of the combustion technology of the needles

Thank you for your attention!