



# **HOT-GAS CLEANING FROM BIOMASS GASIFICATION**

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# Eureka EUROENVIRON HOGLIF

## International Project

(2003 – 2005)

*FBC Gasification + Hot Wood-Gas Filter*

Partners:

- *Czech Republic:* ATEKO – the leader, Brno University of Technology, Institute of Chemical Technology Prague
- *Slovakia:* Technical University of Kosice
- *Austria:* SCS Technology Linz

The background of the slide is a dense, textured field of light-colored wood chips or mulch, oriented horizontally. The chips vary in length and are scattered across the entire frame.

**Target**

**Hot Wood-Gas Cleaning:**

**Tar Compounds < 50 mg.m<sup>-3</sup>  
in clean gas**

# Catalyst

- Dolomite:  $\text{MgCO}_3 + \text{CaCO}_3$  (aragonit)  
 $\text{CaCO}_3$  (kalcit)
- Grain size (2 – 5 mm);
- Calcination at 900 – 950°C ( $\text{CaO} + \text{MgO}$ );
- Pressure loss: 3 – 8 kPa

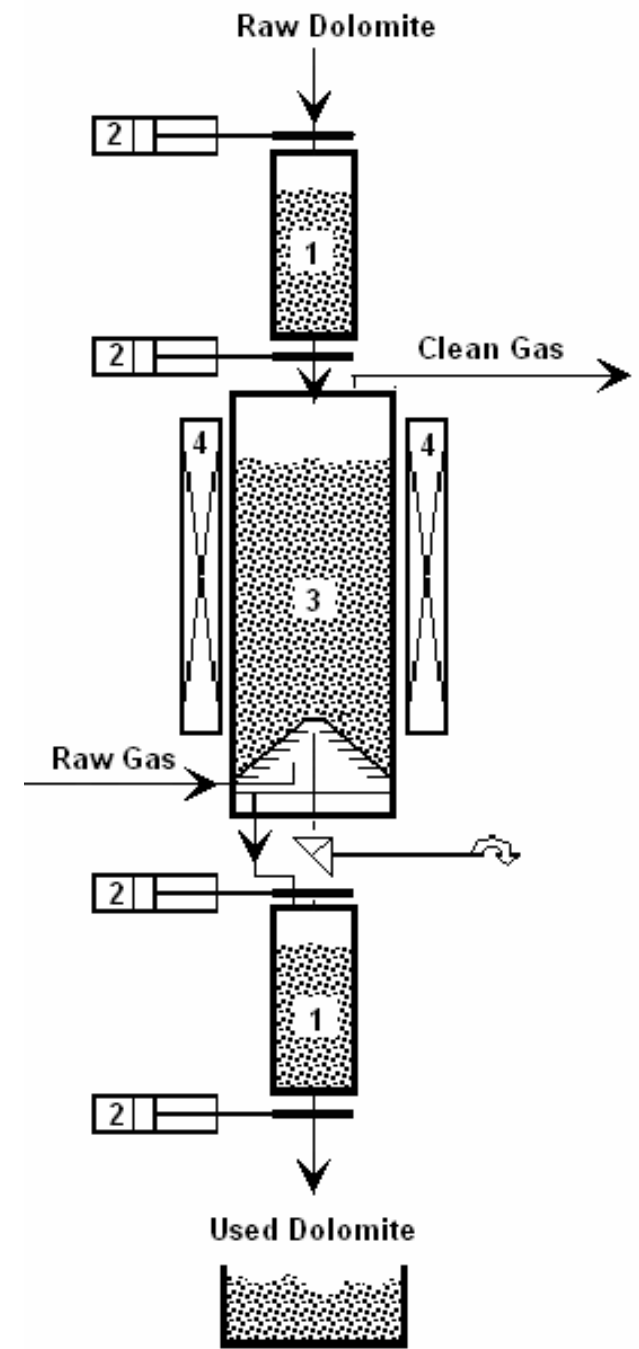
# Pilot-Scale Unit



**CFBC Gasifier**

**Hot-Gas Filter**

# FILTER

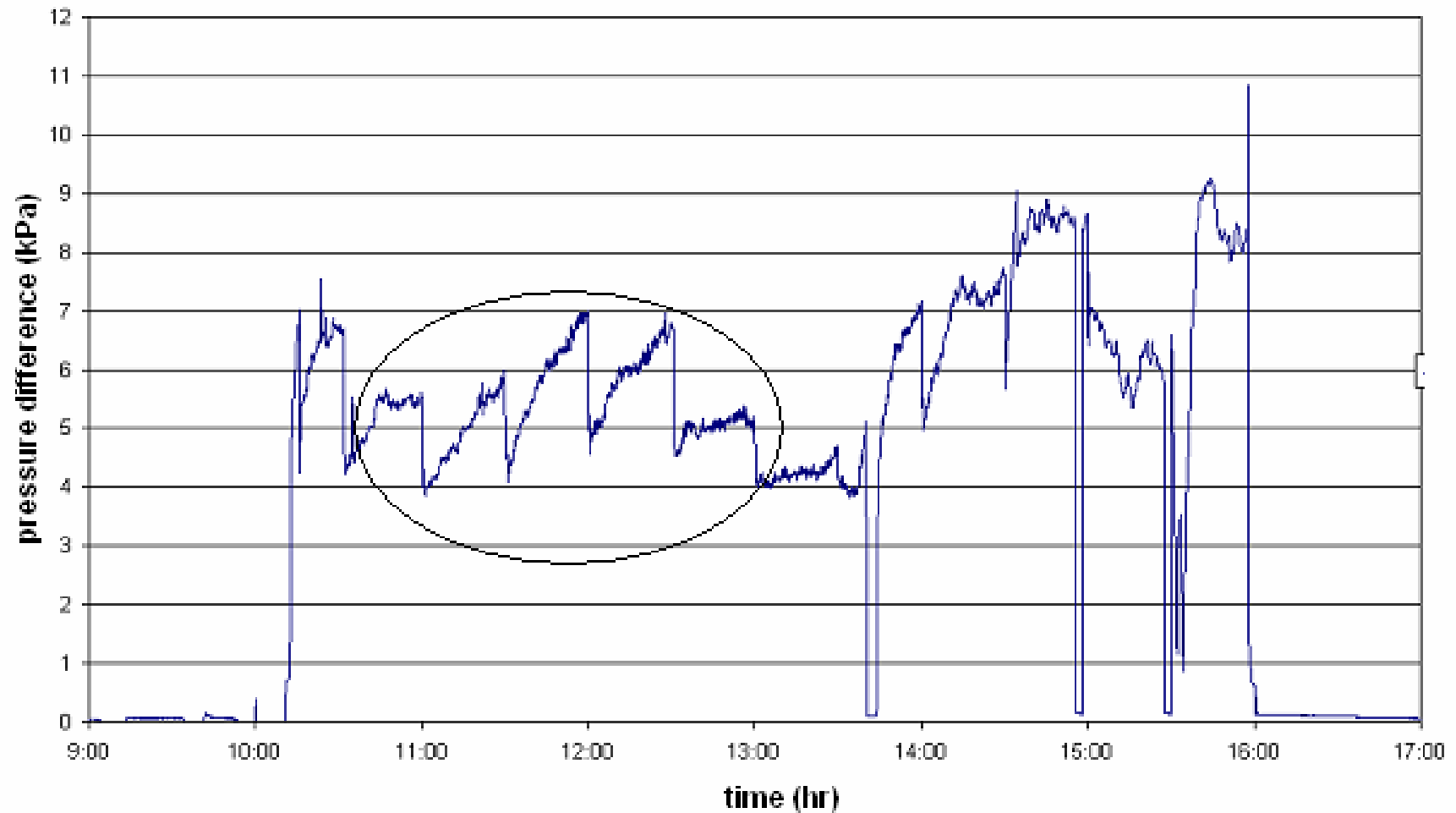




# FILTER PARAMETERS

- *Height: 2 m*
- *Diameter: 0.25 m*
- *Dolomite layer:*
  - height = 1.6 m, wt. = 140 kg
- *Working Temperature: 950°C*
- *Heating Elements: 25 kW<sub>e</sub>*

# Pressure Loss of Hot Filter



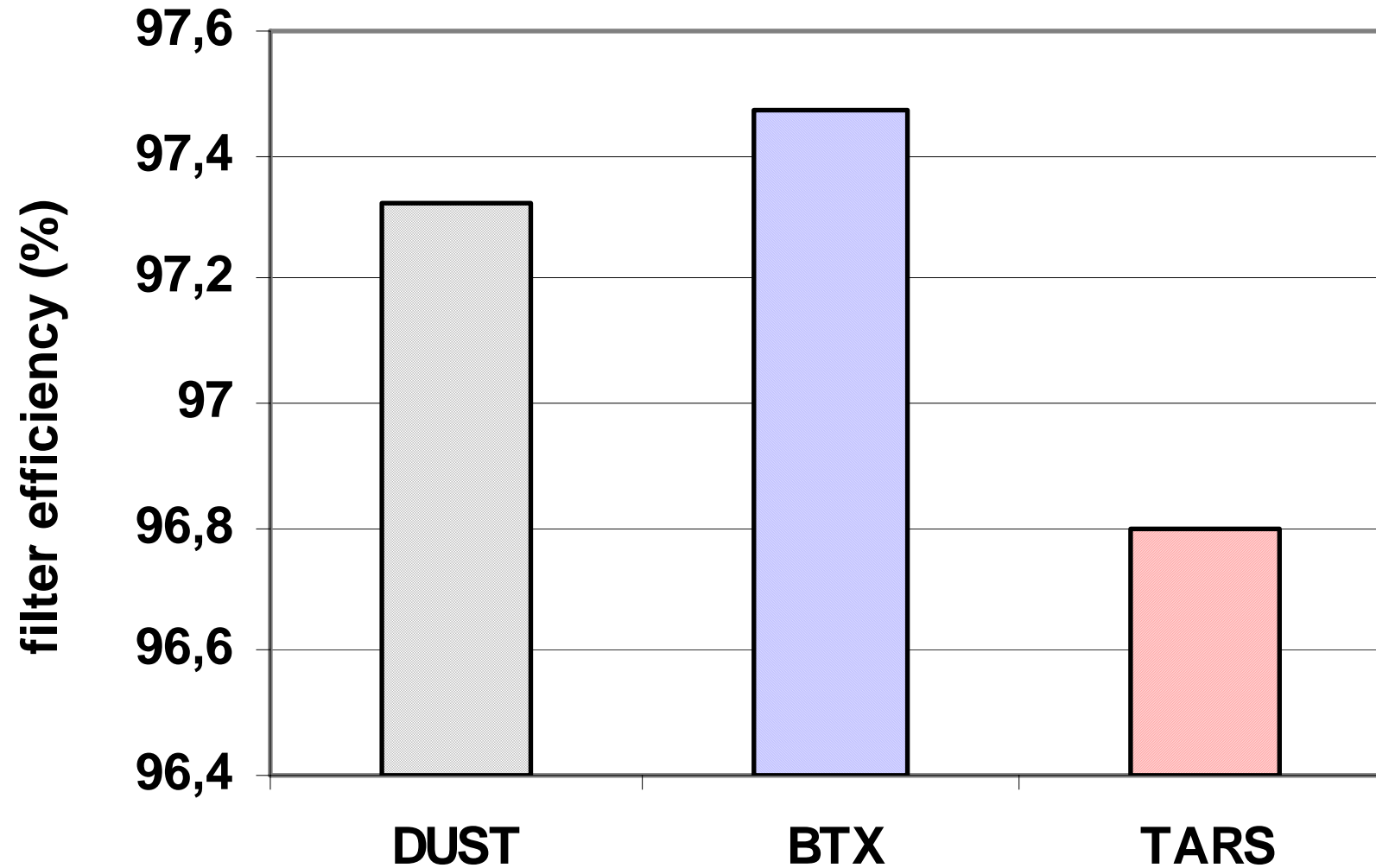
# Filter Results

Experiment concentration (mg/m <sup>3</sup> )	1		2		3		4		5	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
particulates	3437	51	1126	37	3241	8	3913	86	1723	86
tar	3286	3	3167	211	2454	136	1141	6	3782	3

# Min – max precipitation in four tests

	<b>Tar</b>	<b>BTX</b>	<b>Particulate</b>
<b>min – max value (%)</b>	<b>96.0 – 99.9</b>	<b>95.5 – 99.7</b>	<b>95.1 – 99.8</b>

# Filter Capture Efficiency



# Present and Future

We built:

- Counter-Flow Gasifier  
( $150 \text{ m}^3 \cdot \text{hr}^{-1}$ ,  $Q_n = 4.5 \text{ MJ} \cdot \text{m}^{-3}$ , 170 kW)
- Hot-Gas Filter (wood-gas heated)

Two Projects - clean gas utilisation:

- for reburning (DeNO<sub>x</sub>)
- in CHP unit

