

# WTE-plant MVA Coburg

## Main-Parameter:

2 Lines for approx. 115.000 t/a throughput

Average heating value: 10,5 MJ/kg

Bunker volume: 8000 m<sup>3</sup>:

Martin grid,

Boiler 25 t/h, 400 °C, 40 bar steam

Turbine 5,3 MWel, heat capacity ca. 9,5 MWth



## Defined optimisation targets:

- Increase throughput and energy production by > 3 %
- Save supportive fuel of > 90.000 t

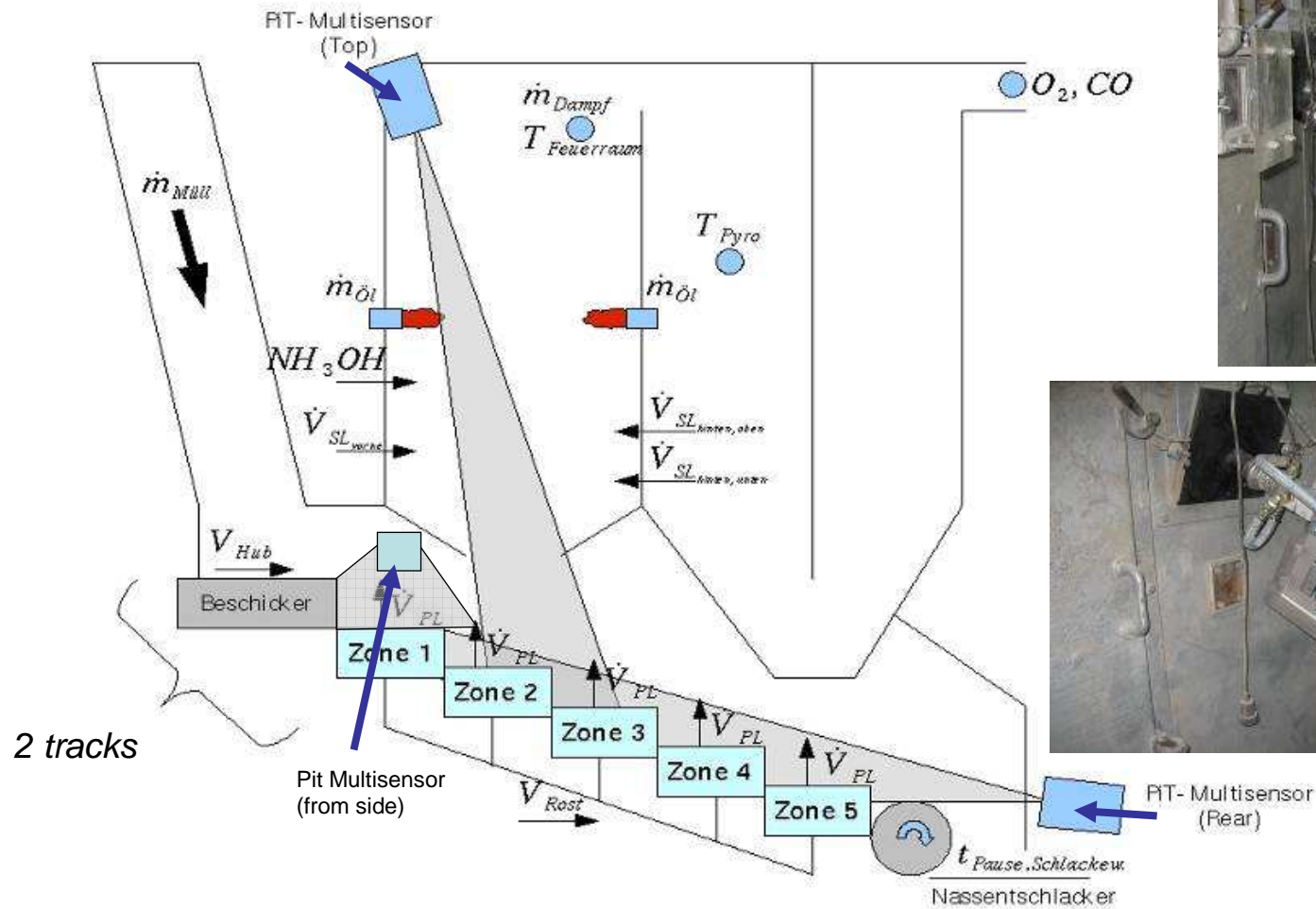
## Reasons for decisions for PiT

### Navigator:

- self learning adaptivity
- fast amortisation
- easy handling
- efficient, multi dimensional controller
- ***guaranteed target achievement even with Bonus/Malus-settlement***

# Martin-Grid in Coburg: Sensors & Actuators

Cameras (PiT Multisensors) marked with blue arrows



# MVA Coburg, Line 2: Results

Time frame	01.09.2007-30.09.2007		01.03.2007-31.03.2007		Difference
	PiT Navigator <b>ON</b>		PiT Navigator <b>OFF</b>		
	Average	Deviation	Average	Deviation	
Steam set point [t/h]	25,9	-	25	-	3,6%
Steam production [t/h]	25,8	1	24,8	1,2	4,0% (target 2,5%)
Steam Min [t/h]	16,1	-	15,3	-	5,2%
Steam Max [t/h]	32,3	-	28,3	-	14,1%
O2 [Vol%]	7,5	1,1	8,1	1	-7,4%
CO [mg/Nm3]	12,9	10,6	26,3	13,9	-51,0%

worse
no change
better



= Guarantee

Targets overachieved

# PiT Navigator = Soft Computing Tool

## Soft-Computing-Tool

= Linear + Fuzzy + PiD + Artificial Intelligence  
= **PiT Navigator**

Examples for fixed rules at MVA Coburg Line 2:

Automatic steam capacity set point lowering:

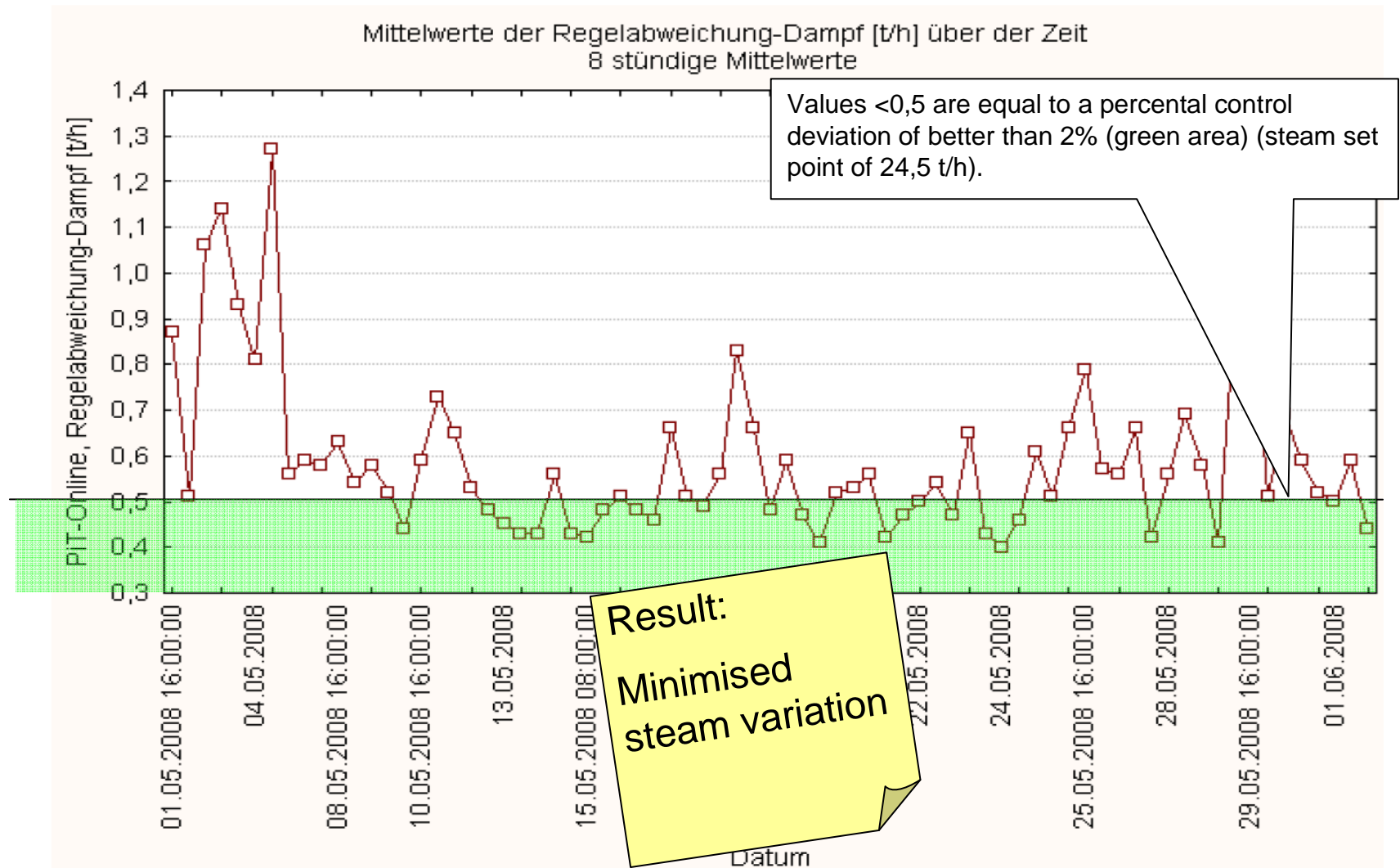
- Heating value 7610 to 6280 kJ/kg: Lowering to 18 t/h.
- Heating value reduction > 800kJ/kg in 5 minutes: Lowering of 0,5t/h
- Soot blower pre heating: Lowering of 1,0 t/h

Prevention grid covering from control of allowed height burnout line.

- More primary air main burning zone (zone 2),
- Stop feeder
- Increase grid speed (higher rake effect at reverse-acting grates)

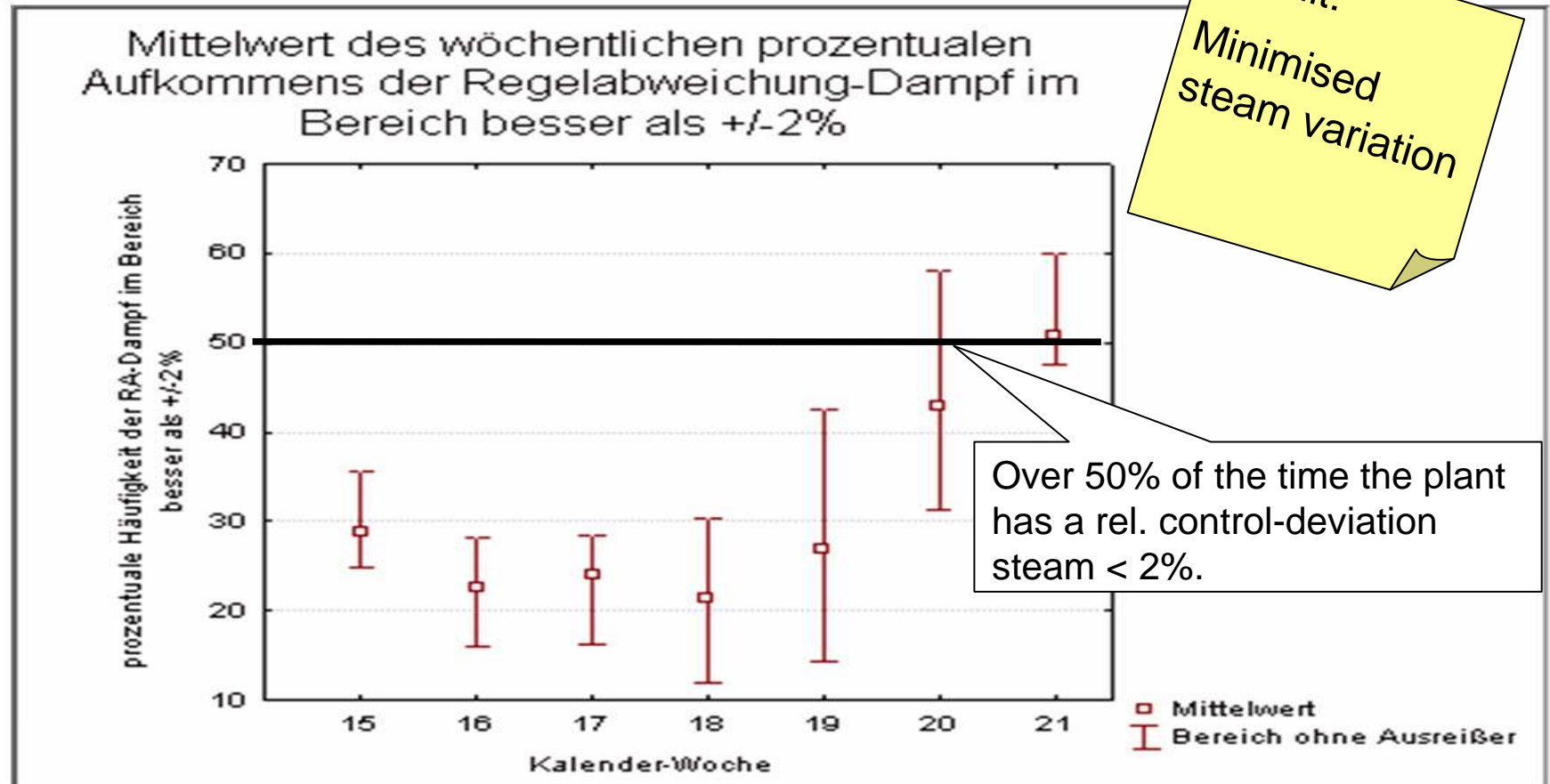
# MVA Coburg

## Evaluation control deviation over one month



# MVA Coburg

## Evaluation control deviation over 7 weeks



# ZVA Coburg: Results over four month

Comparison line 2 (without Powitec) versus line 1 (with Powitec)  
**01.11.2008 to 24.02.2009**

	Without Powitec	With Powitec	Difference
Control deviation steam [%]	3,09	2,66	-13,9%
Control deviation steam [t/h]	0,76	0,65	-14,5%
CO [mg/m <sup>3</sup> ]	15,59	10,73	-31,2%
Amount oil [l]	7.066	3.723	-47,3%

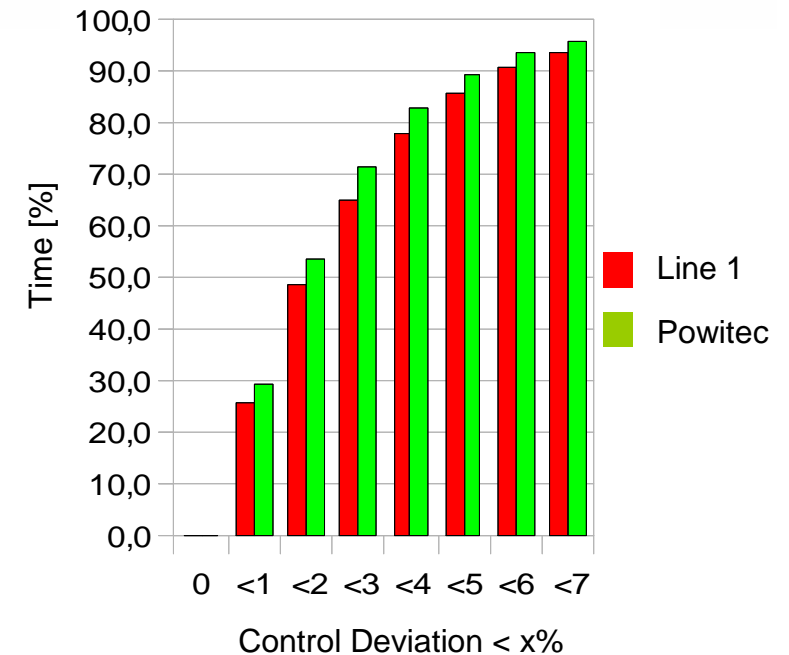
# ZVA Coburg: Comp. Nov-Feb with Mar-Jun

	Comparison w/wo Powitec					
	Line 1	Powitec Line 2	Difference	Line 1	Powitec Line 2	Difference
	Nov-Feb	Nov-Feb		March-June	March-June	
Steam control dev. [%]	3,09	2,66	-14%	2,95	2,38	-19%
CO [mg/m <sup>3</sup> ]	15,6	10,7	-31%	23,2	13,0	-44%
Oil [l]	7.066	3.723	-47%	2.560	440	-83%

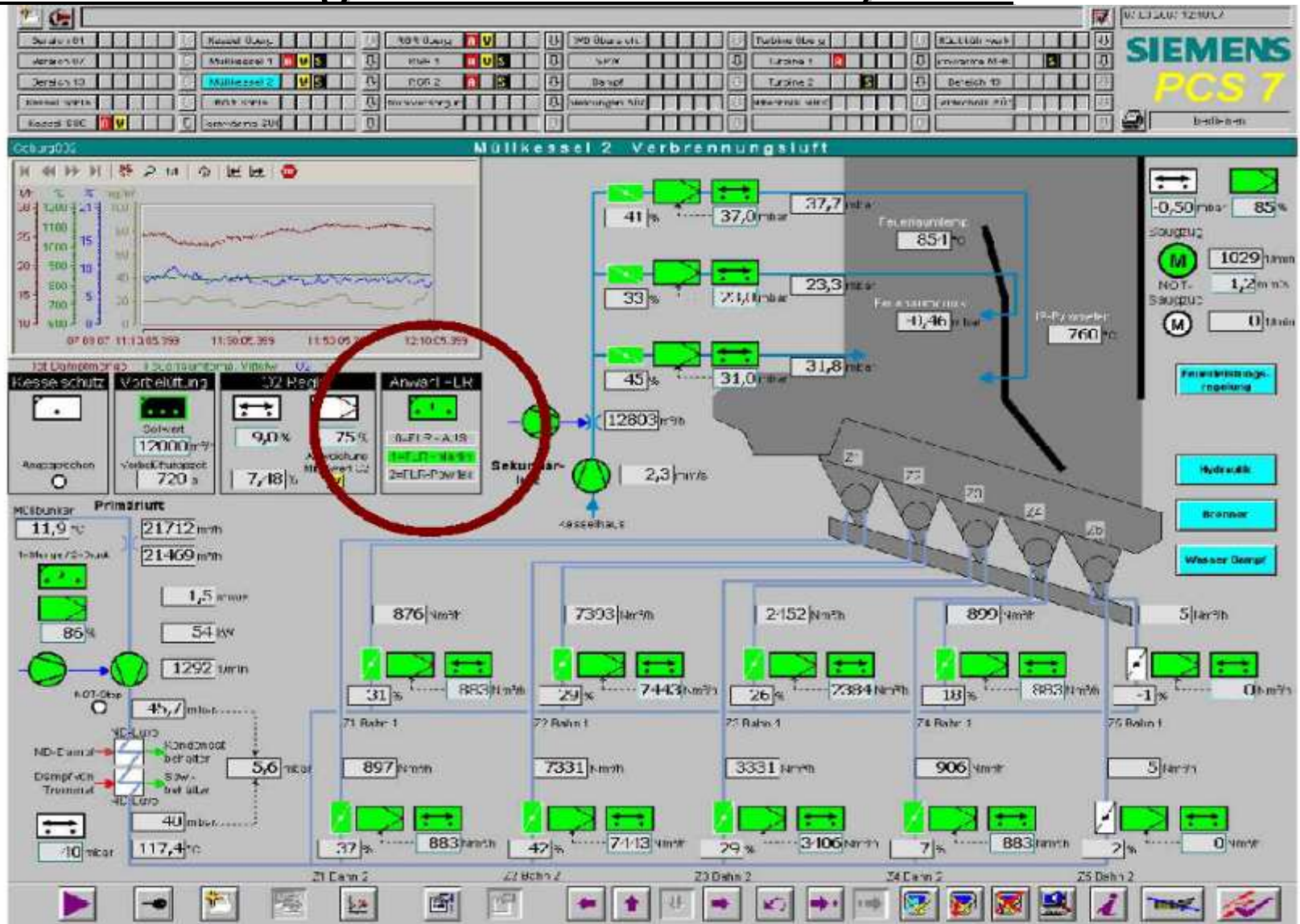
worse better

## Conclusion

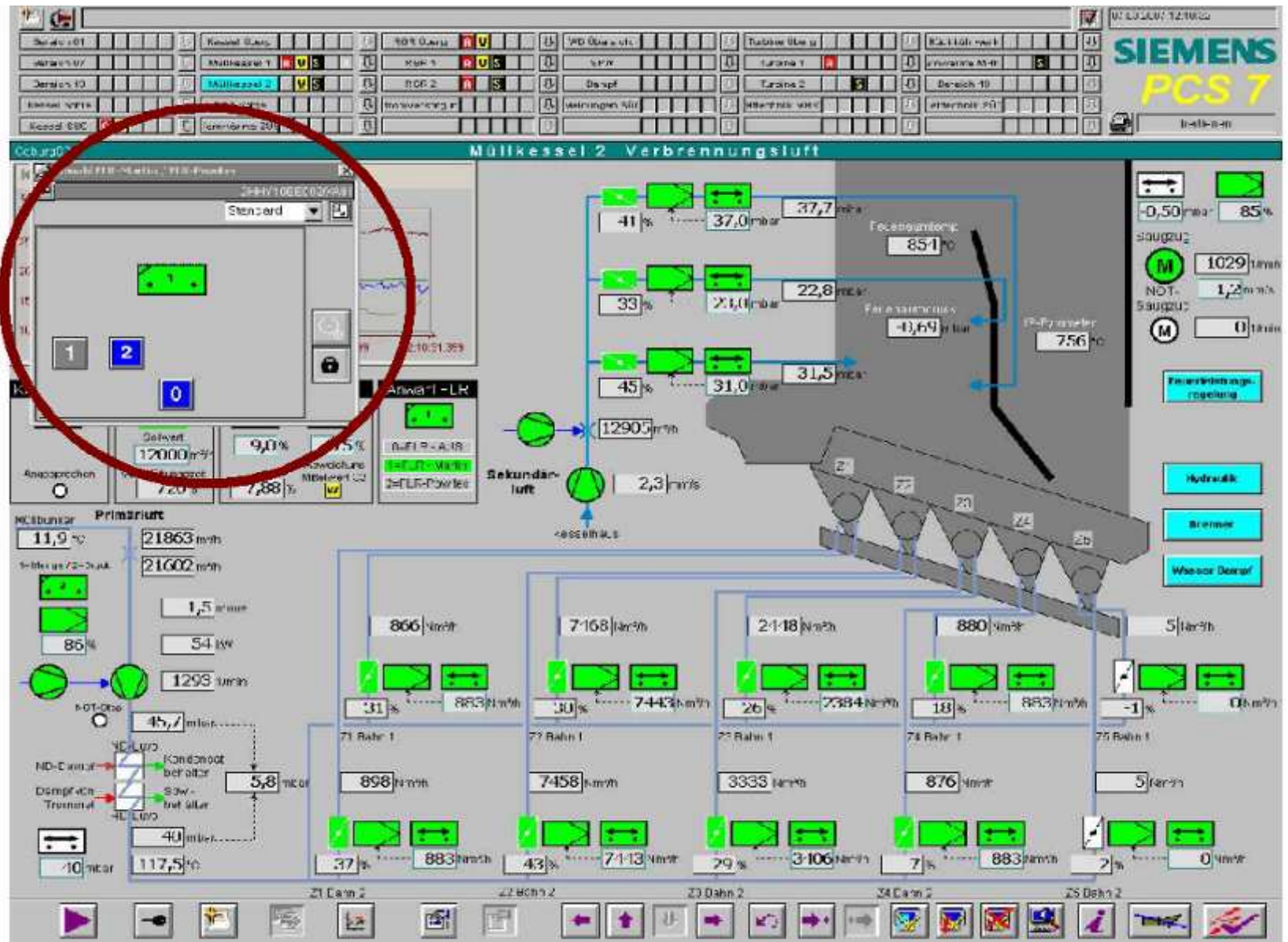
- More (14 – 19%) homogenized process with PiT Navigator
- Less (31 – 44%) emissions
- Reduced (47 – 83%) oil consumption



# Implementation in the existing Process Control System



# Select combustion optimizer



The screenshot displays the Siemens PCS 7 control interface for a boiler system, titled "Müllkessel 2 Feuerleistungregelung". The interface is organized into several functional panels:

- Top Panel:** Displays various status indicators and the Siemens PCS 7 logo.
- Ölbrenner (Oil Burner):** Shows two burners with their respective temperatures and flow rates.
- Feuerraumtemperatur (Furnace Temperature):** Displays temperatures for different zones (links, Mittelwert, rechts).
- IR-Temperatur (IR Temperature):** Shows IR temperature readings and status indicators.
- Dampfmengenregler (Steam Output Controller):** Controls steam output with parameters like "Dampf gesamt" and "Dampf aus M1".
- O2 Regler (Oxygen Controller):** Manages oxygen levels in the furnace.
- Laufzeitregler (Run Time Controller):** Controls the run time of the burners.
- Anwahl FLR-MARTIN/FLR-POWITEC (Selection):** A red circle highlights the selection between "FLR-MARTIN" and "FLR-POWITEC".
- Primärluftkurve (Primary Air Curve):** Shows air flow curves for different burners.
- Beschickantriebe (Feeding Drives):** Controls the feeding of fuel into the furnace.
- Rostantriebe (Grate Drives):** Controls the movement of the grate.
- FLR-POWITEC (Powitec Air Control):** A detailed control panel for the Powitec air control system, showing "aktuelle Dampfmenge" (25,3 t/h) and "Menge primäre Luft" (21921 m³/h).
- Primärluft (Primary Air):** Shows total primary air flow and distribution.
- Sekundärluft (Secondary Air):** Controls secondary air flow and distribution.
- Zonen (Zones):** A table showing air flow and temperature for five different zones.

Zonen	Kapazität	Luftmenge	Temperatur	Luftmenge	Temperatur
Zone 1	31,3 %	883 m³/h 881 m³/h	883 m³/h	889 m³/h	889 m³/h
Zone 2	30,0 %	7443 m³/h 7462 m³/h	7443 m³/h	7547 m³/h	7547 m³/h
Zone 3	26,2 %	2384 m³/h 2115 m³/h	2384 m³/h	3398 m³/h	3398 m³/h
Zone 4	17,8 %	883 m³/h 871 m³/h	883 m³/h	865 m³/h	865 m³/h
Zone 5	-1,2 %	0 m³/h 5 m³/h	0 m³/h	5 m³/h	5 m³/h