

BIOFLAM

**APPLICATION OF LIQUID BIOFUELS IN NEW
HEATING TECHNOLOGIES FOR DOMESTIC
APPLIANCES BASED ON COOL FLAME
VAPORIZATION AND POROUS MEDIUM COMBUSTION**

Thomas BREHMER

OMV AG

Competence Center Heating Fuels

Schwechat / Austria



**BIO-ENERGY
ENLARGED PERSPECTIVES**

Budapest ,16-17 October 2003

9 PARTNER, 4x IND, 4x RES, 1x EU



OMV AG Vienna (A)

RWTH EST Aachen (D)

LSTM Erlangen (D)

HOVAL Vaduz (LI)

IST Lissabon (P)

NTUA Athen (GR)

PTC Balerna (CH)

CSEM Neuchâtel (CH)

EHI (EU)

CONTENT

- ❖ **Market situation**
- ❖ **Project aims**
- ❖ **Technical concept**
- ❖ **Cooperation of partners**
- ❖ **Project status**
- ❖ **Summary and outlook**



MARKET SITUATION



- ❖ Emissions of NO_x and CO_2 per kWh of conventional oil heating systems exceed emissions of gas heating systems
- ❖ Conventional oil heating systems are not certified for biofuel
- ❖ State of the art oil burners can only be modulated in a very small power range
- ❖ Condensing boilers for oil are not widely accepted or available

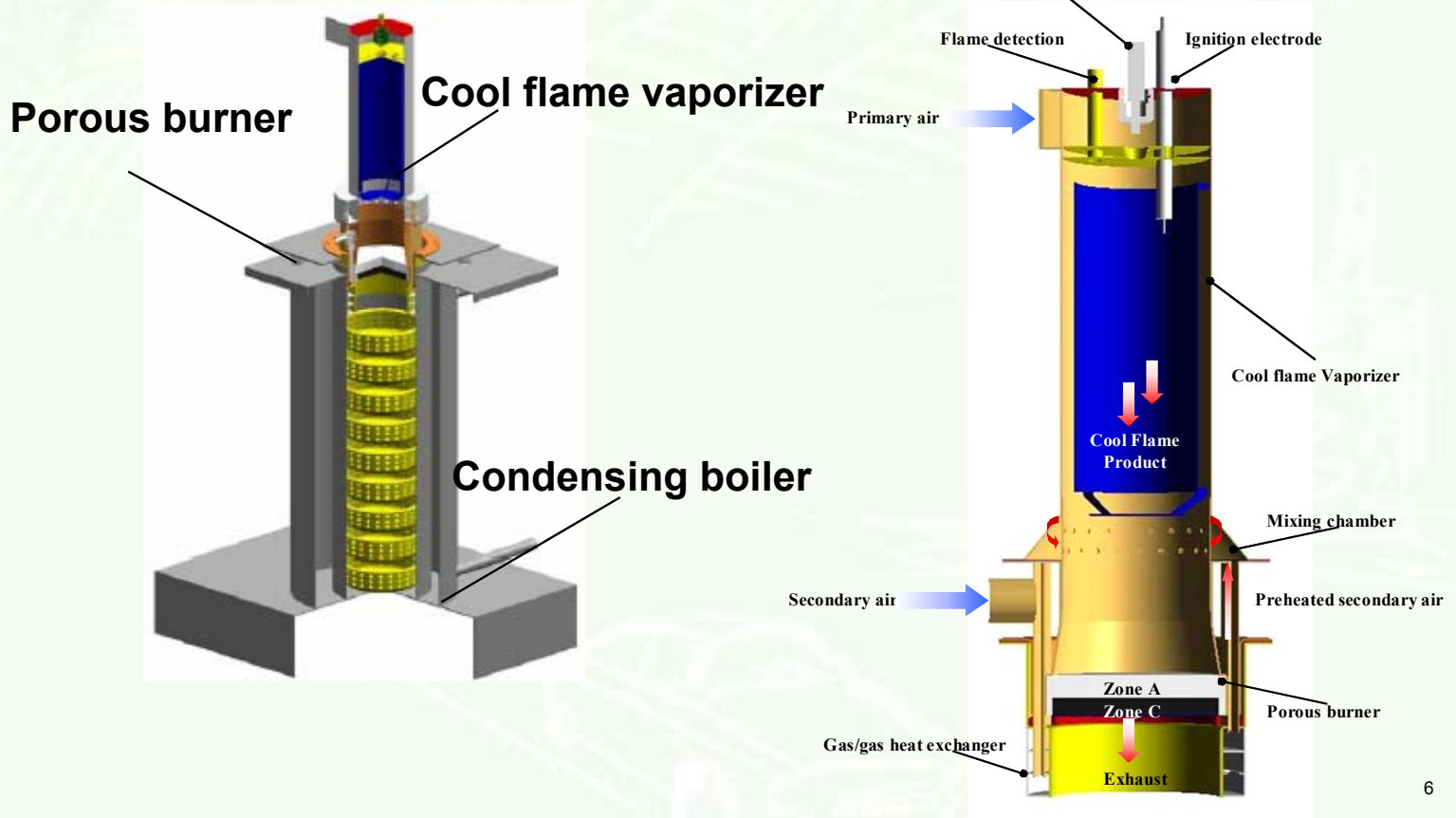
PROJECT AIMS



**Development of an oil fired
condensing boiler with the following
attributes:**

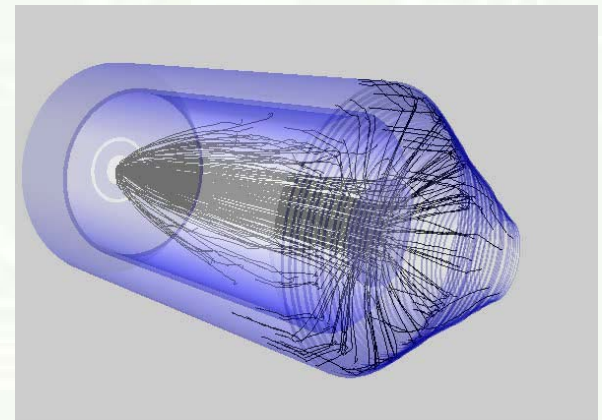
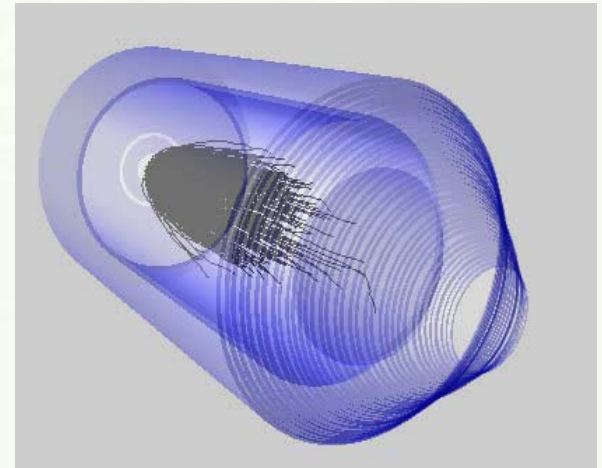
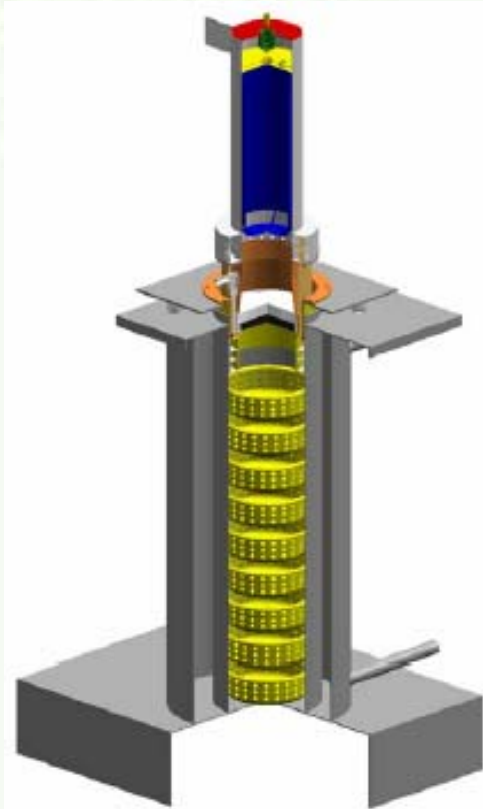
- **Operation with biofuels**
- **Reduction of NO_x emissions of 50 %
compared to conventional oil fired**
- **Minimum power-modulation 1:10**
- **Condensing boiler**
- **Cost of production target: € 2500,--**

TECHNICAL CONCEPT



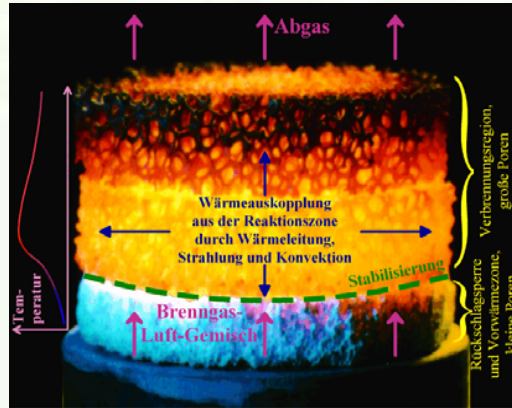
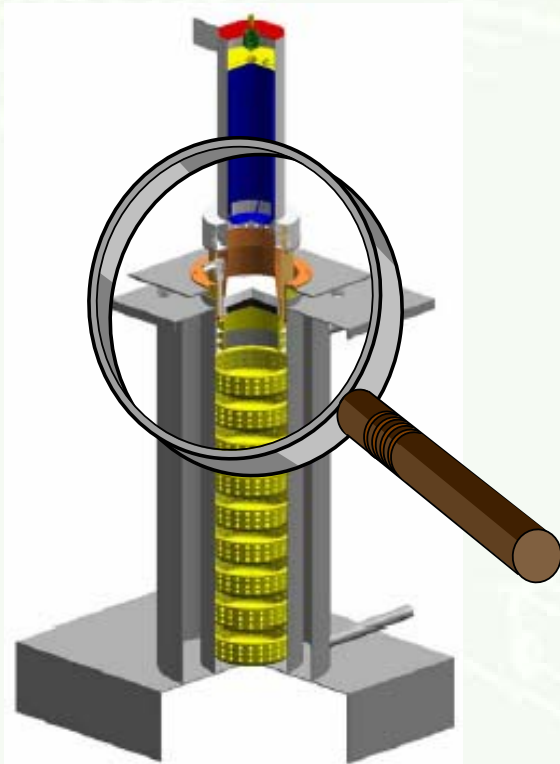
COOPERATION OF PARTNERS

RWTH EST Aachen (D), NTUA Athens (GR)



COOPERATION OF PARTNERS

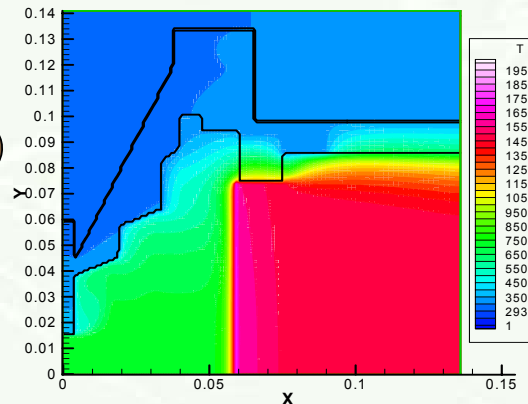
LSTM Erlangen (D), IST Lisbon (P), PTC Balerna (CH)



START



STOP

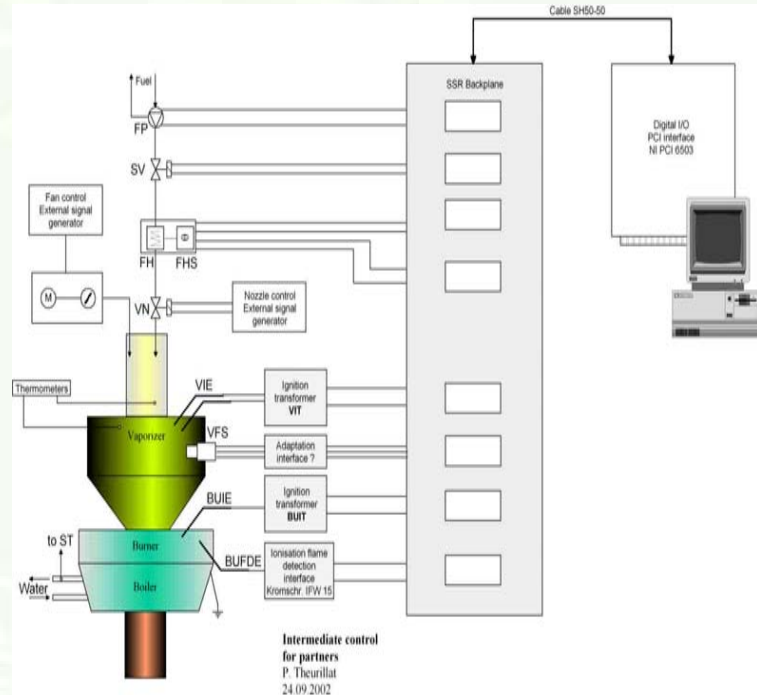


COOPERATION OF PARTNERS

HOVAL Vaduz, (LI), CSEM Neuchatel (CH)



HOVAL (Li)



CSEM (CH)

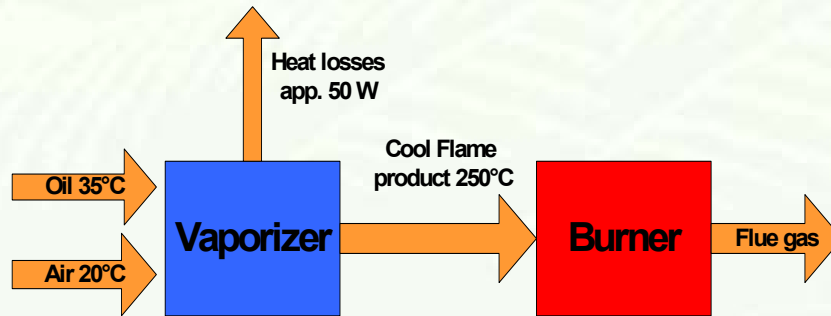
COOPERATION OF PARTNER

OMV AG, Vienna, (A), EST Aachen (D), NTUA Athens (Gr)

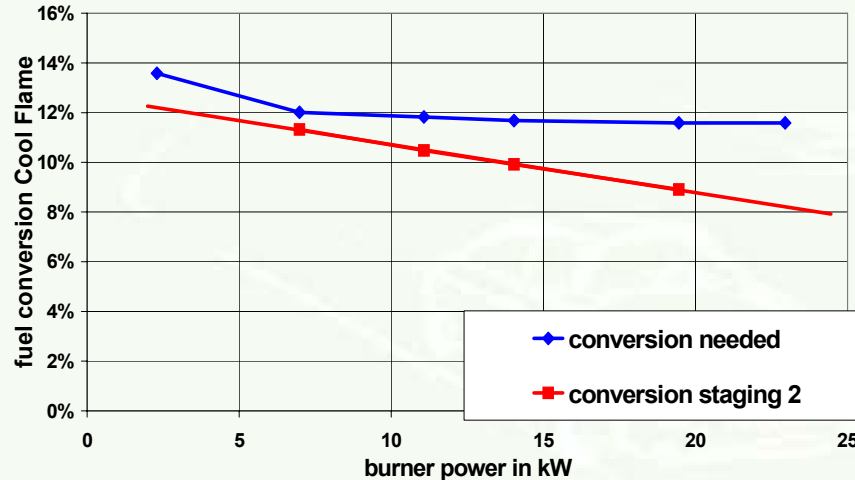


- ❖ **Fuel characterisation**
- ❖ **Production of Blends**
- ❖ **Fuel Stabilisation**
- ❖ **Tests at test rigs**

PROJECT STATUS

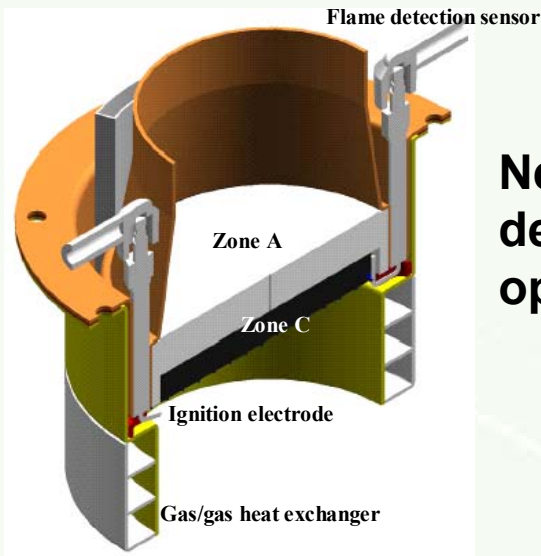
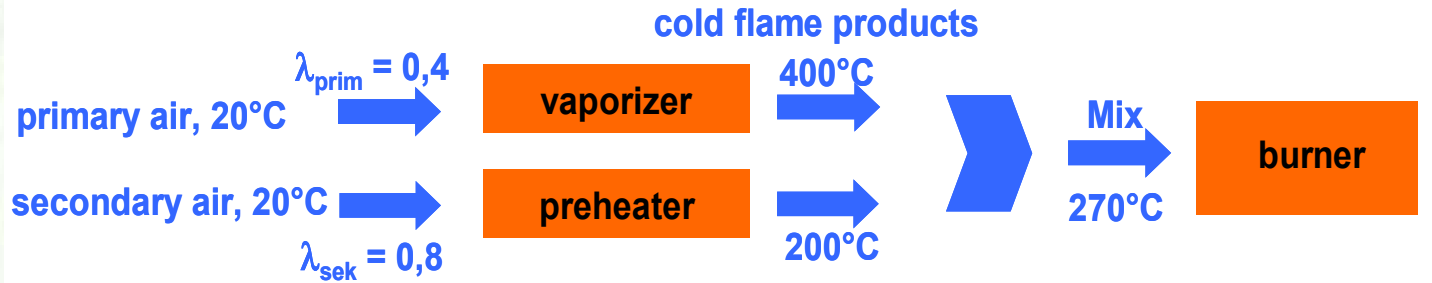


Cool Flame Conversion: 2.3 kW burner power \rightarrow 13.8%
 23 kW burner power \rightarrow 11.8%



Heat balance of the cool flame vaporizer

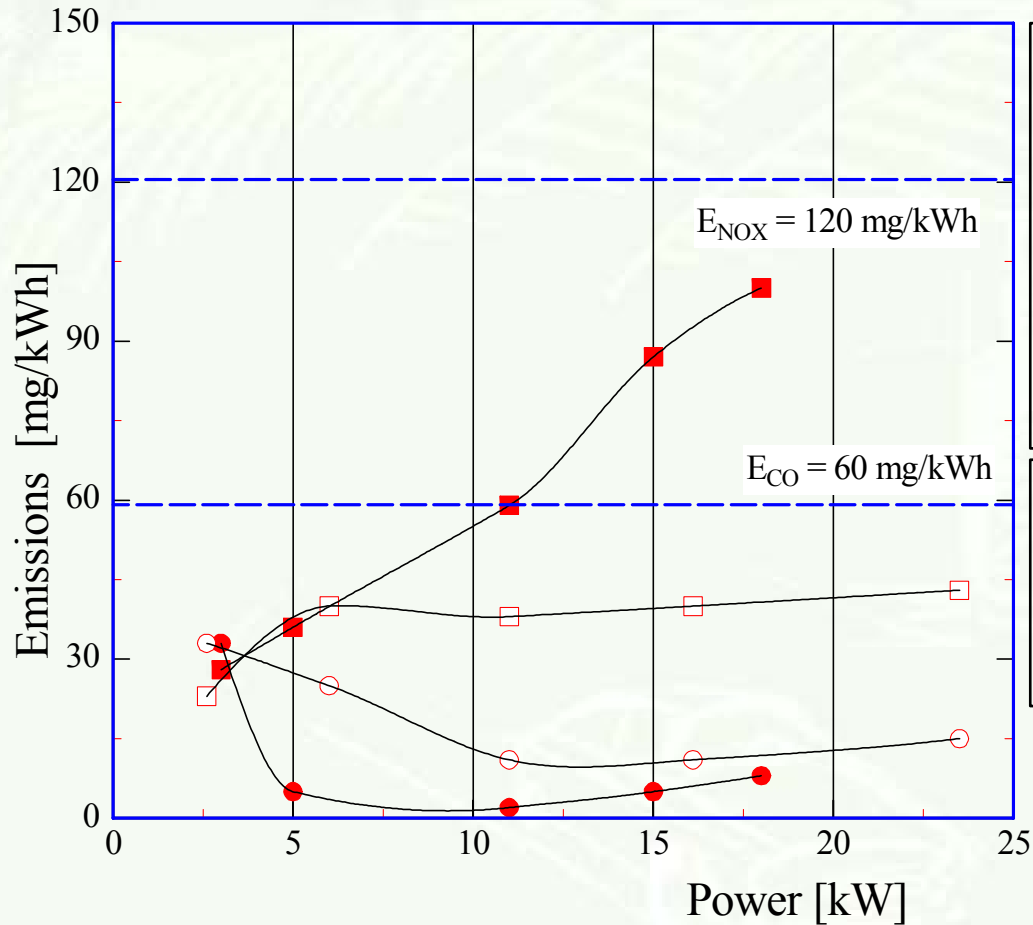
PROJECT STATUS



**New Porous burner
design and burner in
operation**



PROJECT STATUS



1st version:
 preheating of the entire air
 $T_{air,total} = 350\text{ }^{\circ}\text{C}$
 $P_{vaporizer} = 3.5 - 18\text{ kW} ; \lambda = 1,35$

2nd version:
 preheating of the secondary air
 $T_{air,sec} = 200\text{ }^{\circ}\text{C}$
 $P_{vaporizer} = 2.5 - 23\text{ kW} ; \lambda = 1,25$

- CO 1st version
- NO_x 1st version
- CO 2nd version
- NO_x 2nd version



SUMMARY AND OUTLOOK



- ❖ **System certification in autumn 2003**
- ❖ **Field tests in Austria and Switzerland**
- ❖ **5 prototypes in 2003**
- ❖ **15 prototypes in 2004**