

Experimental Investigation with PACT facility and CFD modelling of oxy-coal combustion with recycling flue gas

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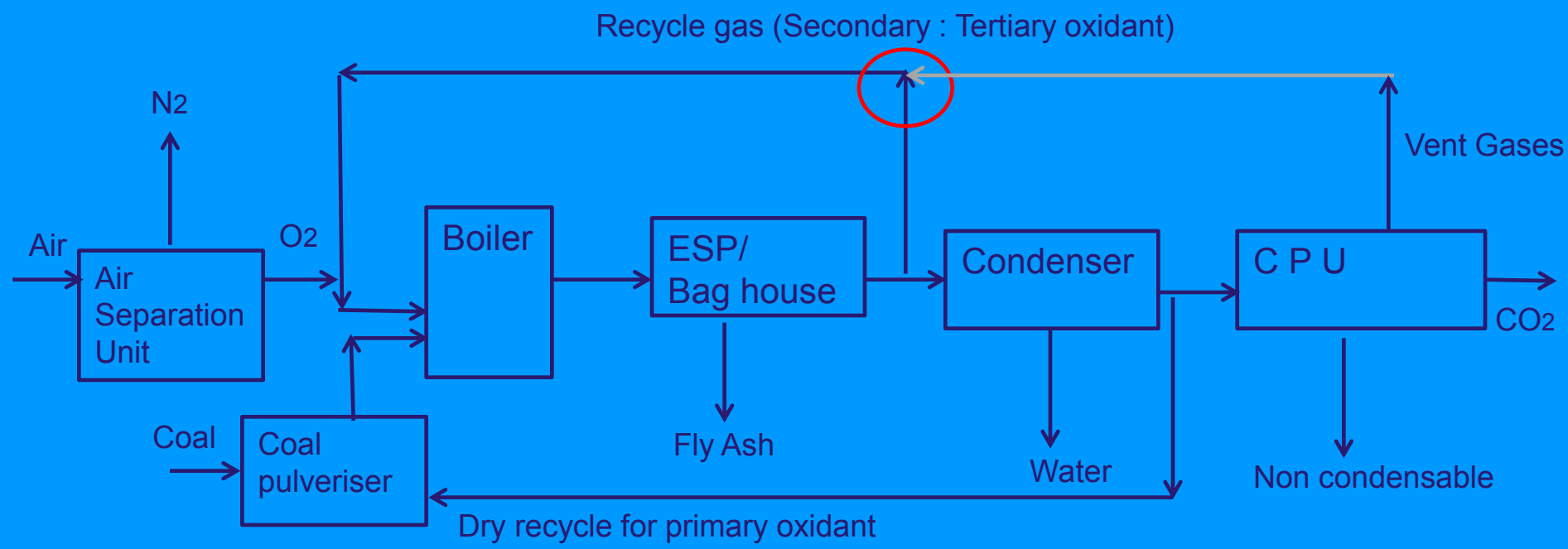
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Contents

- The Project
- $0.25\text{MW}_{\text{th}}$ combustion test facility
- Results- discussions
- Summary

The Project



0.25MW_{th} PACT Facility- upper level



Heating Element for Oxidants

Combustion modules of the furnace

Flue Section

Cyclone Separator

0.25MW_{th} PACT Facility- bottom level



Combustion modules of the furnace- bottom level

Coal feeder

Control Panel

0.25MW_{th} PACT Facility-NO inj. skid

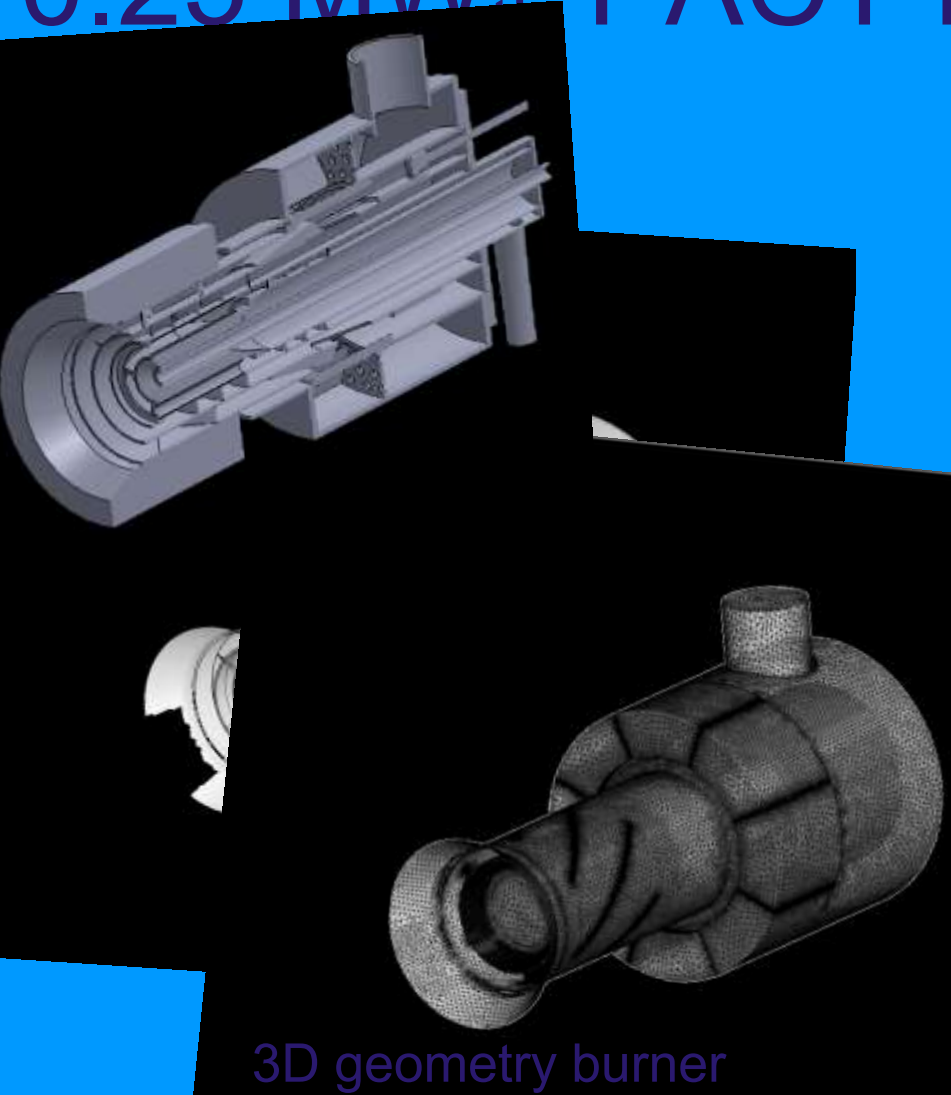
NO injection metered skid



NO injection skid- safety relief valve, shut off valve



0.25 MW PACT Facility - Burner



3D geometry burner



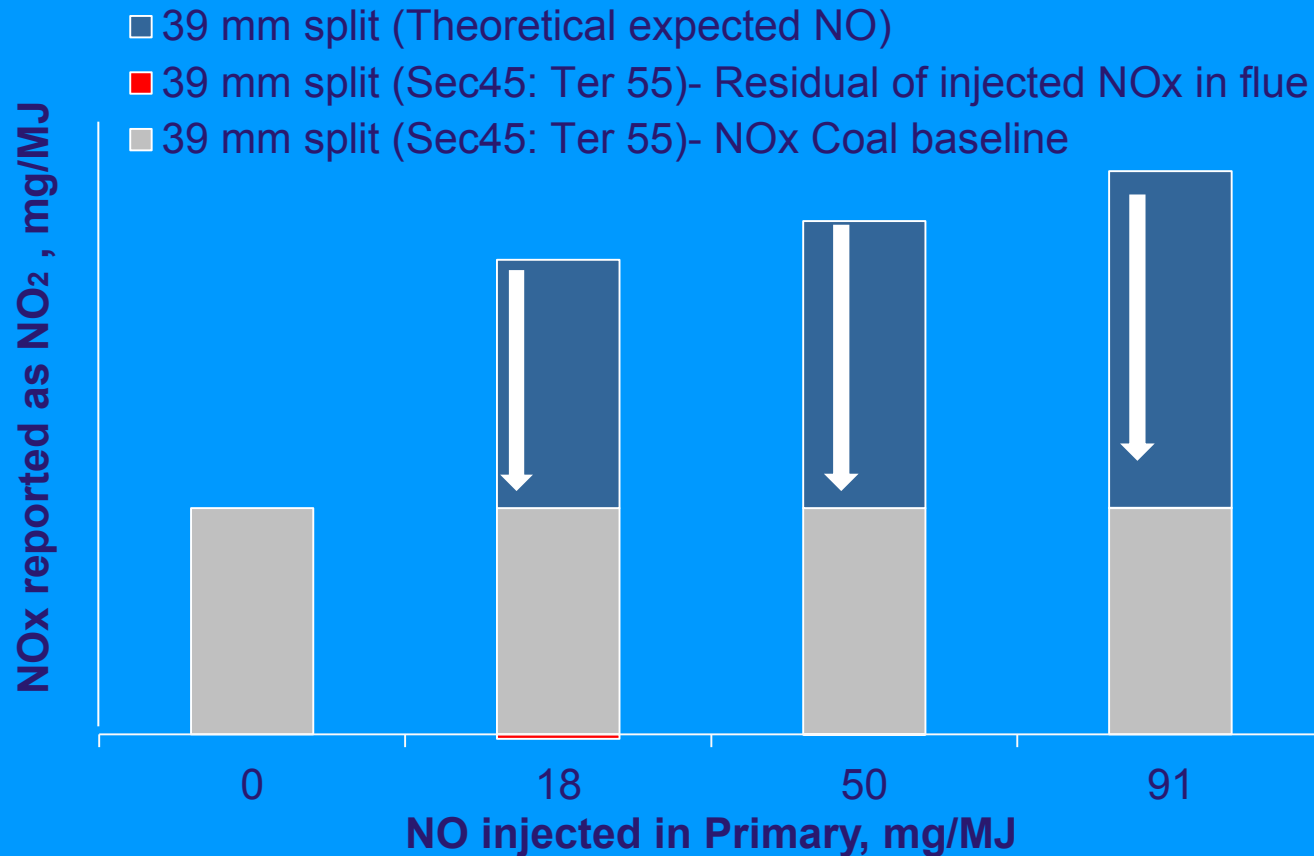
0 8 28 39 49 65 mm



Split Position- mm	Secondary Split, %	Tertiary Split, %
0	100	0
8	85	15
28	48	52
39	45	55
49	30	70
65	0	100

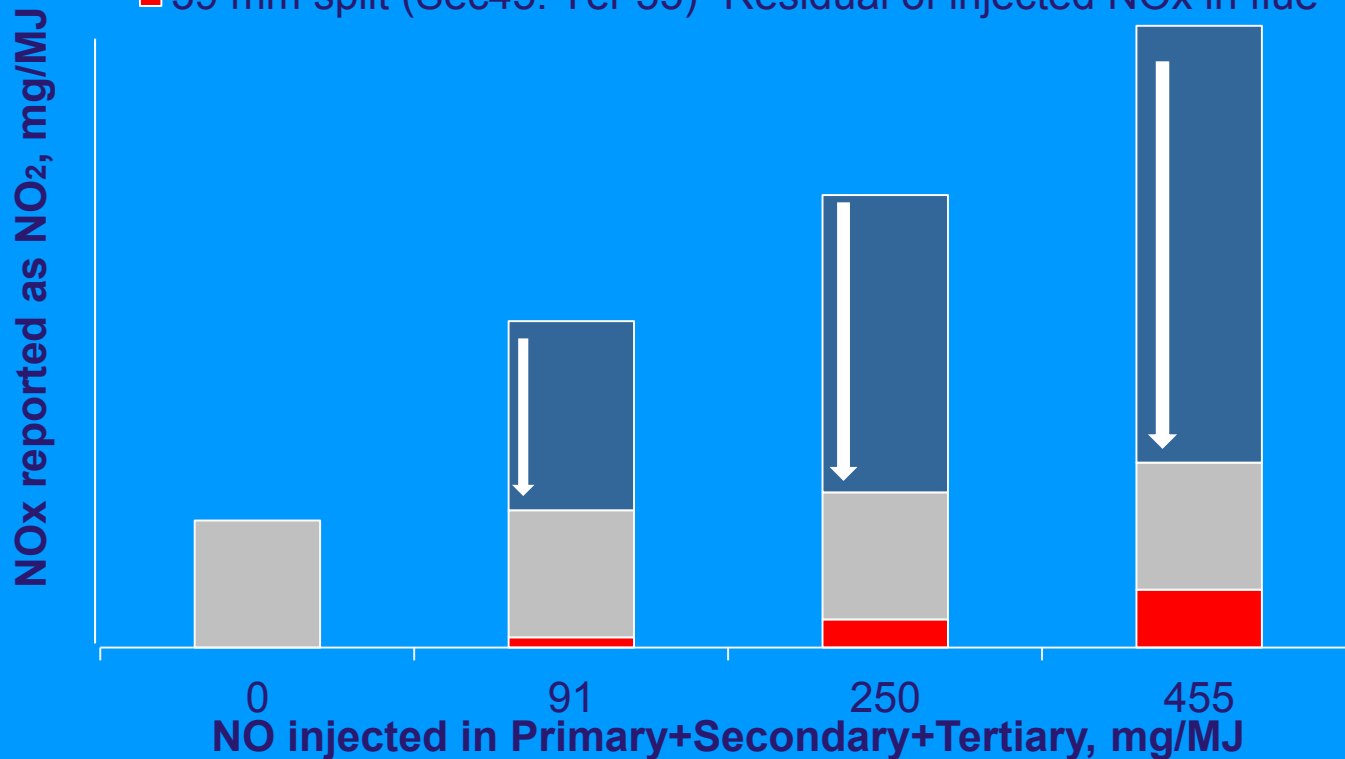
NO Injection- Primary Air

NO destruction $\approx 100\%$



NO Injection- Air (Prim.+Sec.+Ter)

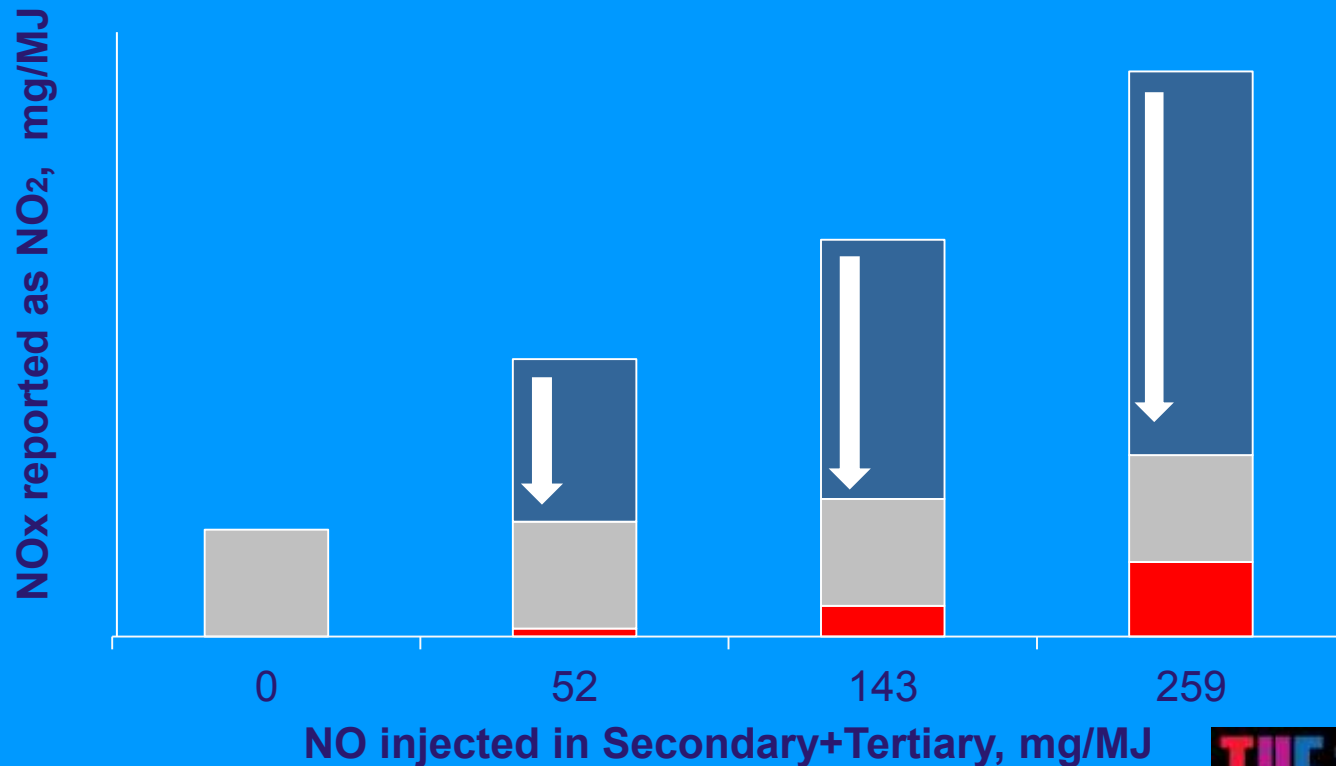
- 39 mm split (Theoretical expected NO)
 - 39 mm split (Sec45: Ter 55)- NO_x Coal baseline
 - 39 mm split (Sec45: Ter 55)- Residual of injected NO_x in flue
- NO destruction $\approx 86\%$



NO Injection- Oxy 28%

NO destruction \approx 75%

- 39 mm split (Theoretical expected NO)
- 39mm split (Sec 48: Ter 52)-NOx coal baseline
- 39 mm split (Sec45: Ter 55)- Residual of injected NOx in flue



Summary

- Achievements
 - Installation and commissioning of the NO injection skid.
 - Optimization of the combustion test facility i.e. flows; emissions; combustion efficiency
- Results
 - 100% NO destruction of the injected NO in Primary air stream
 - Overall 85% NO destruction in all air streams.
 - An overall 75% NO destruction- Oxy 28%
- Work in progress
 - (NO injection in Oxy 25, 31% ; 2D flame imaging; In-flame measurements; NO injection in recycle flue gas).
 - The validation of the CFD results is under progress.

Acknowledgements

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Thanks

