

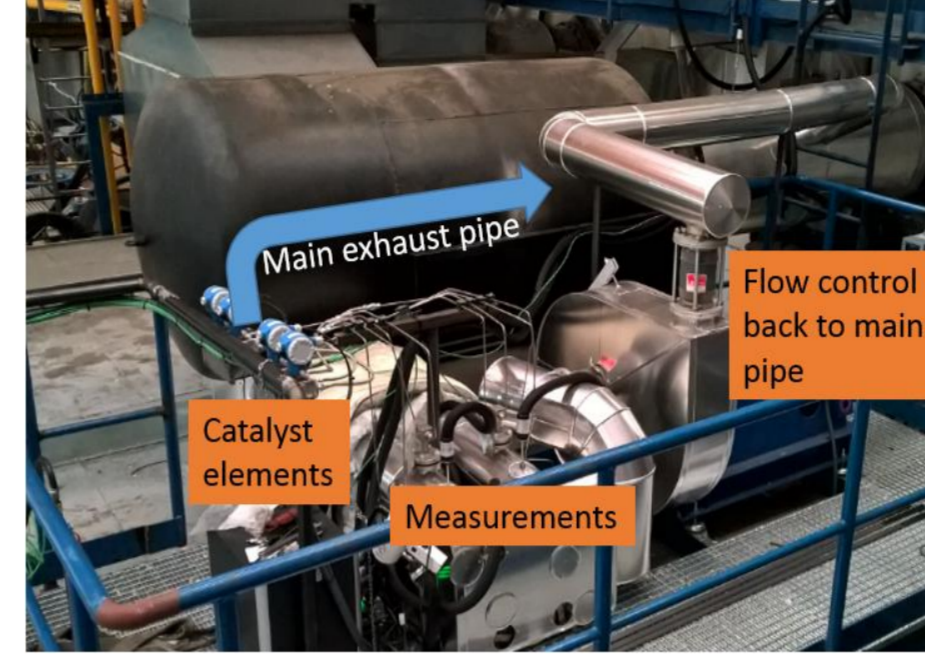
50% Load, 23% EGR

WP 7 On-engine aftertreatment systems.



WP OBJECTIVES

- Integration of SCR (Selective Catalytic Reduction) with the existing strong Miller cycle 4-stroke diesel engine and combining it with particulate emission (PM) abatement technology would enable to achieve more than 80% NOx emission reduction and 25% reduction in PM. Also a combination of integrated SCR and EGR (Exhaust Gas Recirculation) is to be developed. Feasible solutions of combining the above mentioned technologies having as a target the near zero emission engine are also studied.
- Integrating methane and ethane abatement technology into lean burn 4-stroke gas engines will enable compact solutions to reduce methane and ethane slip. The objective is a catalytic system working with the engine and optimization of the engine performance. Also the knowledge on deactivation & regeneration strategies for integrated catalyst solutions and methane formation and location in the engine exhaust system should increase. Target is a greenhouse gas emission decrease up to 15% and fuel savings up to 5%.
- Development of key technology for integration of the currently separated SCR after treatment into existing 2-stroke engine structure, which enables widespread installation of SCR systems on all ship types and additionally increase overall NOx removal efficiency above 80%, reduce overall hydrocarbon emissions (HCs) by 50% or more, reduce PM emissions and lead to potential fuel savings of up to 5%.



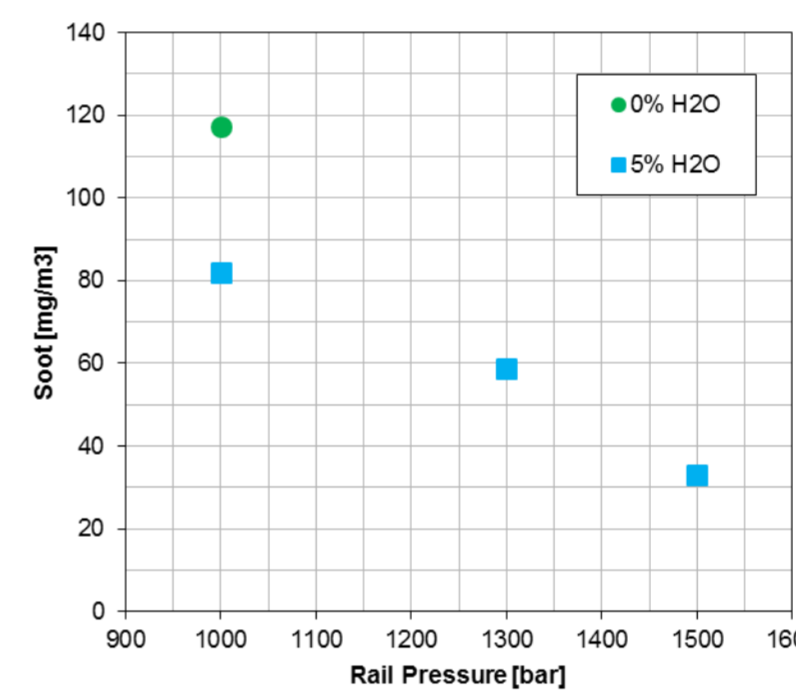
Test equipment for methane and ethane abatement tests



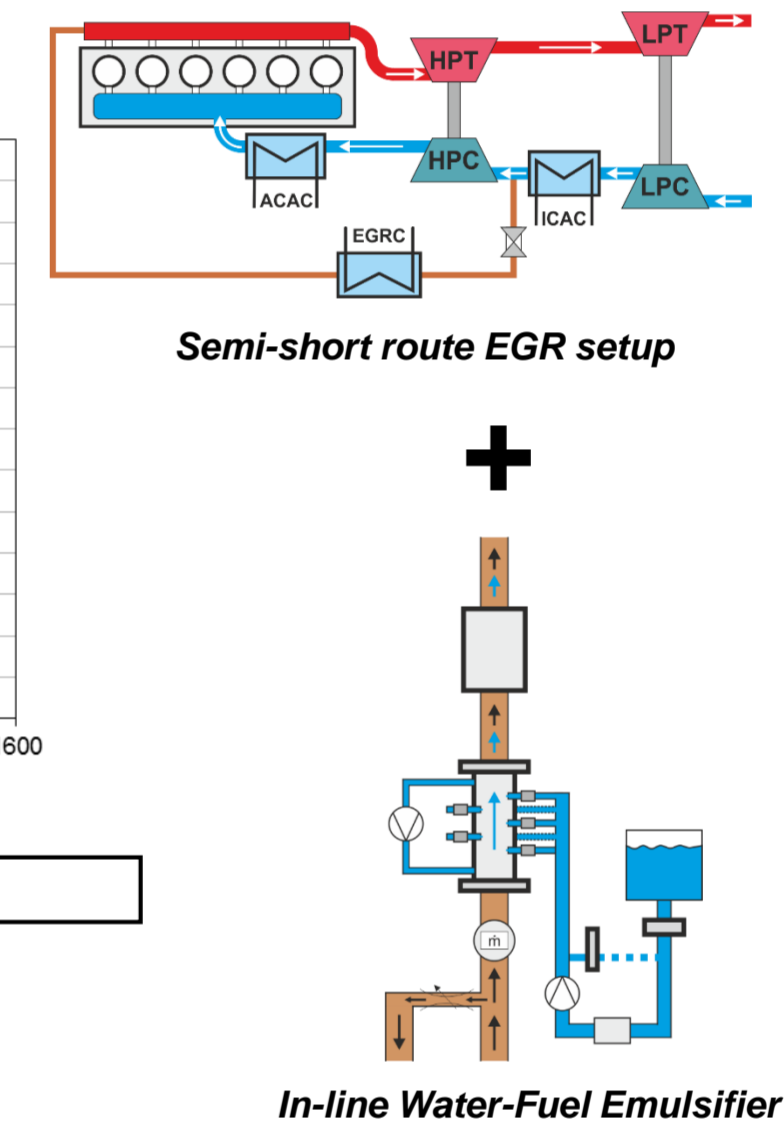
NH₃ sensor installed in stack

EXPECTED OUTCOME

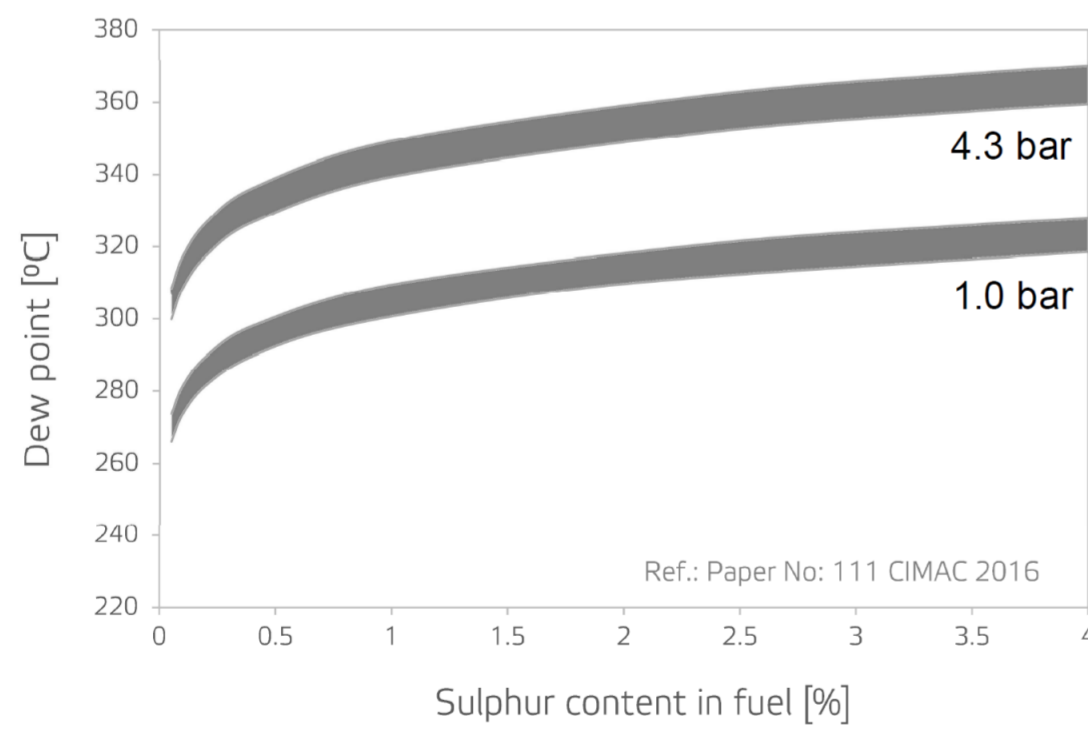
- Literature review regarding SCR engine integration and particulate abatement.
- Emission measurement systems for SO₃, NH₃ and PM emissions to support integrated after-treatment technologies
- Experimental assessment of integration of methane abatement technology into gas engine structure
- Concept about catalyst aging from in-field monitoring and laboratory experiments
- Experimental assessment of SCR reduction agent injection systems with sensors for feedback control
- Experimental assessment of selected combined on-engine emission reduction system for strong Miller cycle 4-stroke diesel engines with tests on rig/engine



Preliminary results from EGR tests



PROGRESS AND PLANS



Robust catalysts for high sulphur HFO operation with safe operating temperatures thanks to slip stream SCR testing on test bed engine.



Hot gas vibration test bed for testing catalyst prototypes for future on-engine SCR systems

WP PARTICIPANTS

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