D2.7 – Characteristics and specifications of EAS for engines operated with Diesel fuel and Diesel and renewable fuels in Dual-Fuel operation

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Publishable summary

This report describes the development and layout of an exhaust aftertreatment system for engines operated with Diesel fuel and optionally with blends of Hydrogenated Vegetable Oil (HVO).

At start of the work the LONGRUN emission targets were discussed and considerably aggravated for NOx and N2O. The revised targets have been based on an initial proposal from CLOVE, Oct 2020. Thus, the limit for NOx was set to 80 mg/kWh and the limit for N2O to 35 mg/kWh. Both limits refer to combined WHTC (cold/ warm). In terms of NOx, this represents a reduction compared to the current EURO VI limit by approximately 83 %. While N2O is not yet regulated in the European legislation, in US there is a limit of 100 mg/bhp-hr in the combined FTP cold/hot meaning that the LONGRUN target of 35 mg/kWh is a ~75 % reduction compared to the current US legislation.

The investigation of the optimum aftertreatment system architecture started with an experience-based assessment of 26 system configurations together with UMICORE and VOLVO who are partners of WP2, Sub-Task ST2.3.2.

Five architectures were selected for detailed investigations. Vanadium and copper-based SCR technology was used in the simulation study. While state-of-the-art Cu-SCR kinetics were taken from the AVL model database, Umicore provided syngas measurement data of the V-SCR technology. Based on this syngas data a corresponding simulation model was set up in AVL CruiseM™.

Lowest NOx and N2O emissions have been predicted with exhaust aftertreatment system configurations with two SCR-stages. The introduction of an electrical heater shows high potential to reduce emissions right after cold start. The use of Vanadium-based SCR technology is mandatory in view of N2O emission compliance.

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Project partners:

#	Partner	Partner Full Name
1	FEV	FEV EUROPE GMBH
2	DAF	DAF TRUCKS NV
3	FPT	FPT INDUSTRIAL SPA
4	FORD	FORD OTOMOTIV SANAYI ANONIM SIRKETI
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