



# REWARD

REal World Advanced Technologies for Diesel Engines

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**Project partners:**

- 1 - AVL - AVL List GmbH - AT
- 2 - REN - Renault SAS - FR
- 3 - VCC - Volvo Car Corporation - SE
- 4 - CRF - CRF SCpA - IT
- 5 - CNRIM - Istituto Motori – Consiglio Nazionale delle Ricerche (CNR) - IT
- 6 - JM - Johnson Matthey Plc - UK
- 7 - RIC - Ricardo Plc - UK
- 8 - SCF - Schaeffler AG - DE
- 9 - LMM - Le Moteur Moderne - FR
- 10 - DELPHI - Delphi Automotive Systems Luxembourg S.A. - LU
- 11 - UNR - Uniresearch BV - NL
- 12 - IFPEN - IFP Energies Nouvelles - FR
- 13 - VIF - Virtual Vehicle Research Center - AT
- 14 - CTH - Chalmers Tekniska Högskola - SE
- 15 - CTU - Czech Technical University - CZ
- 16 - UPVLC - Universitat Politècnica de Valencia – Motores Termicos - ES

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## Publishable Executive Summary

WP 5 develops a new low NOx combustion concept with an experimental engine provided by RENAULT (based on 1,6L R9M). The advanced test engine features a new engine architecture such as revised high pressure and low pressure EGR systems, a new charge air cooler arrangement and various other technical improvements.

The testing components for the experimental development of the new combustion concept were thoroughly chosen in a way that the optimum hardware configuration could be determined from a manageable matrix of test configurations. A previous Deliverable (D5.1) already reported the specification of fuel injection nozzles, swirl levels and combustion bowl geometries. The development was carried out by Design of Experiments (DoE) which models the combustion characteristics and thus enables the comparison of hardware configurations at their optimum calibration settings such as timing, EGR rate, rail pressure, VNT position etc. Furthermore, the main trade-off characteristics as e.g. NOx versus Soot emissions and NOx versus fuel consumption can be retrieved from these models. This is of specific interest as any low NOx combustion concept must be considered in combination with other emissions, fuel consumption and the characteristics of the aftertreatment system.

This report describes the selection of the optimum hardware configuration for the combustion concept. The chosen configuration will be used for the final calibration of the engine and the adaptation of the aftertreatment system.