PaREGEn

Particle Reduced, Efficient Gasoline Engines

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Publishable Summary

The European Union initiated the PaREGEn Project because of increasing traffic in Europe and its detrimental effects on the environment and human health. Regarding future legislation, the challenge is to reduce particles, NO_x and CO_2 sufficiently in real driving. In this context, with the PaREGEn project, a new developed engine generation is planned for 2020. The aim for this engine generation is a 15 % CO_2 reduction compared to equivalent engines in 2015, together with compliance to Euro 6 RDE limits, especially with particle sizes considered down to 10 nm.

As part of the PaREGEn project, Daimler with its partners BOSCH, FEV and RWTH develop a new stoichiometric gasoline direct injection engine. The engine concept is based on the Miller Cycle, with high pressure injection, downsizing, water injection, two stage valvetrain, advanced ignition system and an advanced turbocharger system with reduced backpressure. Parallel to the development of the operating strategy, supported through 0 to 3D modelling software, an optimal integration of the three-way catalyst (TWC) and gasoline particle filter (GPF) in the aftertreatment system should be realized. Through the investigation of an optimized water injection strategy, the fuel consumption reduction potential of this technology can be demonstrated. Regarding the water injection approach, port water injection and direct water injection will be analyzed. In this context, a solution for alternative water harvesting out of the exhaust gases or air conditioning system condensate is to be found. In 2019, a demonstrator vehicle is being built up, which represents these advanced technologies for reducing fuel consumption and real driving emissions. This report gives an intermediate status, showing the results of the engine testing and its calibration.

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Project partners:

#	Partner	Partner Full Name
1	RIC	RICARDO UK LIMITED
2	DAI	DAIMLER AG
3	JLR	JAGUAR LAND ROVER LIMITED
4	BOSCH	ROBERT BOSCH GMBH
5	FEV	FEV EUROPE GMBH
6	JM	JOHNSON MATTHEY PLC
7	HON	HONEYWELL, SPOL. S.R.O.
8	JRC	JOINT RESEARCH CENTRE – EUROPEAN COMMISSION
9	UNR	UNIRESEARCH BV
10	IDIADA	IDIADA AUTOMOTIVE TECHNOLOGY SA
11	SIEMENS	SIEMENS INDUSTRY SOFTWARE SAS
12	LOGE	LUND COMBUSTION ENGINEERING LOGE AB
13	ETH	EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH
14	UDE	UNIVERSITAET DUISBURG-ESSEN
15	RWTH	RWTH AACHEN UNIVERSITY
16	UFI	UFI FILTERS SPA
17	UOB	UNIVERSITY OF BRIGHTON
18	GARR	GARRETT–ADVANCING MOTION

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