JOINT FINAL EVENT

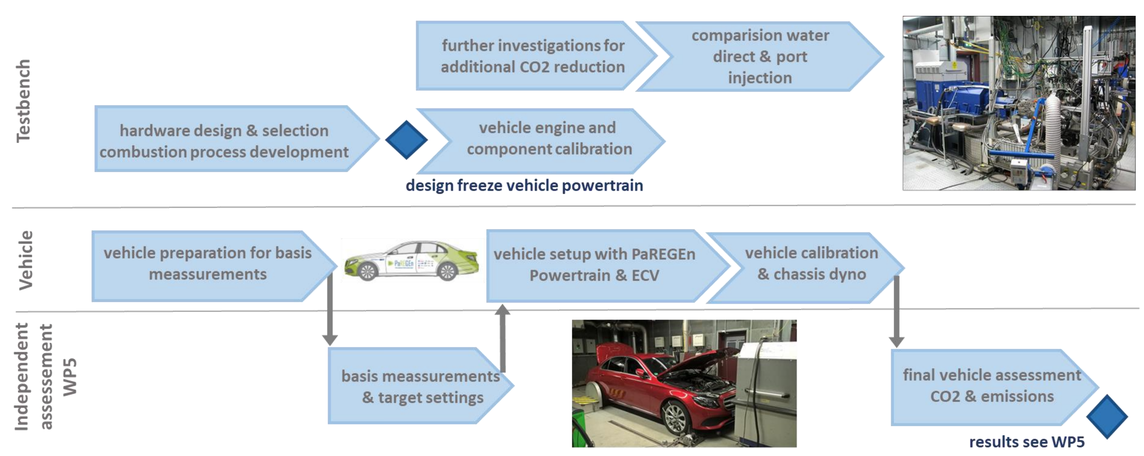
PaREGEn + PEMs 4Nano

PaREGEn Engine and Vehicle

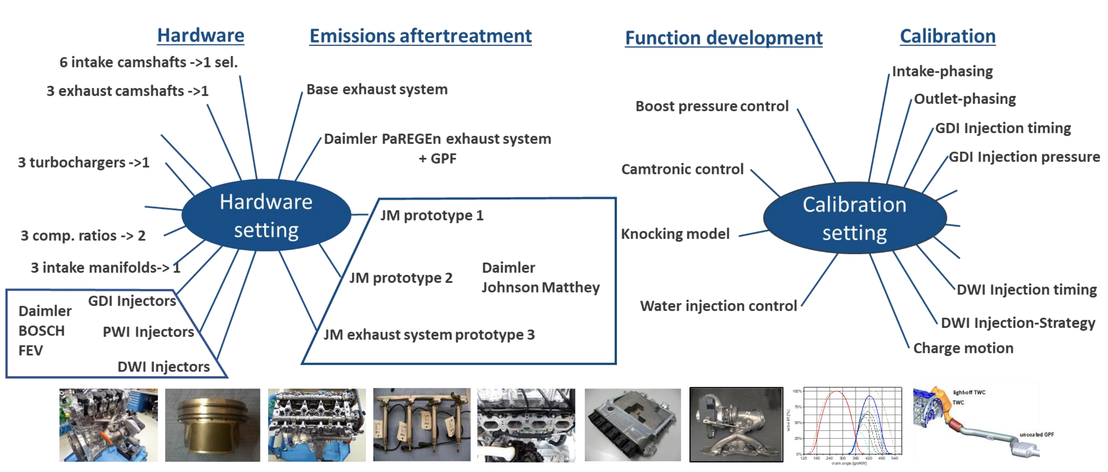
Focus

- Selection and optimization of the combustion system to reduce CO2 and to reach future emission demands
- Setup of a test vehicle with a research drive train including
  - rightsized engine and advanced components for stoichiometric Miller combustion system
  - new Engine Control Unit with additional required functions
  - Advanced turbocharger and aftertreatment system
- Water injection as further enabler for increased compression ratio
  - Port Water Injection (PWI) on Demo Vehicle
  - Direct Water Injection (DWI) on Testbench
- Exhaust gas condensation for water recovery and service free water supply.
- Final evaluation of achievable CO2 reduction potential with investigated technology by cycle simulation

Engine & Vehicle investigations overview



Hardware design, selection and Combustion Process Development



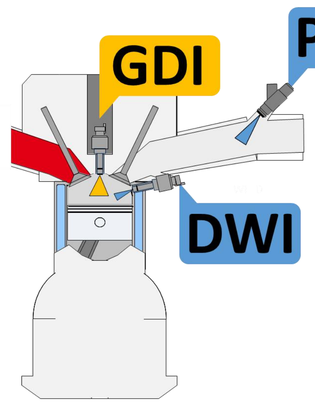
Water Injection

Motivation: CO_2 Reduction, λ=1

- Higher compression ratio (increase efficiency → reduce CO_2 emissions)
- No fuel enrichment: λ = 1 @ high loads

Port Water Injection (PWI)

- @ Bosch in series development
- Implementation in demonstrator vehicle



Direct Water Injection (DWI)

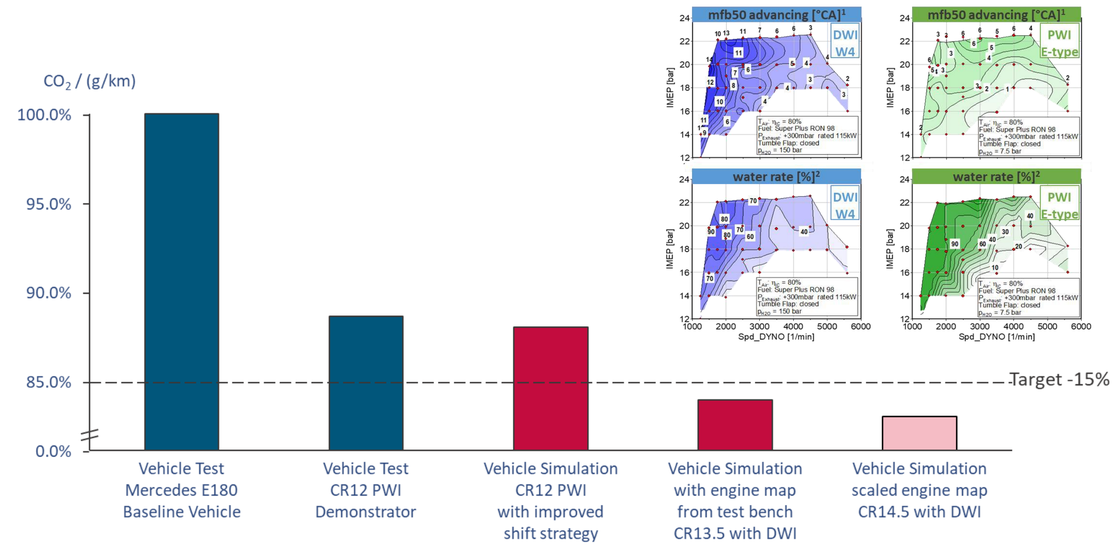
- Low Technology Readiness Level
- Evaluation at engine test bench

Results

Targets

CO2	Standard contaminants	PN
* Reduction of 15% based on the WLTC results of the baseline vehicle * Additionally: reduction of 15% based on the 2015 BIC (*) New Reg 1.43 (2020)	Complicane with Euro 6 (d) limits **RDE** Final Conformity Factor of 1.5 in case of NOx (*)	Reduction of sub 23 nm to at least 10 nm **RDE** Final Conformity Factor of 1.5 in case of PN

Vehicle-test	THC (mg/km)	NOx (mg/km)	CO (mg/km)	CO2 (g/km)	PM (mg/km)	PN ≥ 10nm (pk/km)
Mercedes Demonstrator WLTC Low	100	60	1000	Basel Vehicle → -15 %	4,5	6,0E +11
Mercedes Demonstrator WLTC High	100	60	1000	Base Vehicle → -15 %	4,5	6,0E +11
Mercedes Demonstrator RDE	---	90	---	---	---	9,0E +11
Targets on Vehicle Dyno and Testbech fulfilled	✓	✓	✓	✓	✓	✓



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