

NOWASTE: WASTE HEAT RE-USE FOR GREENER TRUCK

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ABSTRACT

Automotive world is rapidly changing driven by the CO₂ emission regulations worldwide asking for a significant fuel consumption reduction. The internal combustion engine will be the principal powertrain concept for the upcoming decades, especially when it comes to road transportation. Even if the efficiency of the ICE's has increased within the last years, around 30-50% of the fuel indicated energy is still lost via waste heat and could be partly recovered via secondary cycles as the Rankine cycle, Brayton cycle or Stirling cycle. However, preliminary studies have shown that for a heavy duty Diesel application the Rankine cycle offers the highest potential when it comes to efficient waste heat recovery.

The adoption of such technology in the automotive domain requires specific R&D activities to develop the components and identify the most appropriate system architectures and level of integration in order to achieve sustainable costs and the required level of reliability.

In this context, the EU has funded in the frame of the 7th framework program the project NOWASTE: a collaborative project between several companies and institutions: Centro Ricerche Fiat S.C.p.A., Volvo Technology AB, Dellorto SPA, Univesità de Liege, AVL List GMBH, Faurecia systems d'échappement SAS. This project has the goal to develop a waste heat recovery system based on Organic Rankine Cycle (ORC) for a Heavy Duty Truck application with the aim to realize fuel economy savings. The target applications have been chosen among the Iveco and Volvo fleets.

The partners have designed and realized two Rankine cycle systems suitable to be installed on board of a truck with the aim to convert the waste heat of the exhaust gases into useful energy to be used in mechanical or electrical form. The performances of these systems have been evaluated on engine test benches and are currently under evaluation also the system's on board performances.