Sustainable. Clean. Uncompromising. The Internal Combustion Engine Becomes Green

Rapports

Informations projet

H2Engine

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Site Web du projet

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Projet clôturé

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Coordonné par
KEYOU GMBH
Germany

Periodic Reporting for period 2 - H2Engine (Sustainable. Clean. Uncompromising. The Internal Combustion Engine Becomes Green)

Période du rapport: 2021-09-01 au 2022-08-31

Résumé du contexte et des objectifs généraux du projet

The internal combustion engine is the most widely used and highly developed machine available for medium to heavy-duty trucking. However, fossil fuels cause enormous damage to the environment and health of people and the planet. With the conversion of a fossil fuel-based engine to a hydrogen-propelled one, it is possible to decarbonize the transport industry while at the same time continuing to use existing high-tech know-how as well as production and maintenance infrastructure. On the one hand, saving CO2 by drawing on existing production facilities, and on the other hand, the jobs of thousands of skilled workers and precious materials needed for batteries or fuel cells.
In this project, a commercial vehicle is equipped with a hydrogen combustion engine to test and qualify it for pre-series production. The vehicle is a two-axle 18-ton truck.
The main objective of the project: the hydrogen engine, including all hydrogen-specific components as well as the hydrogen combustion process, should be further developed from the proof-of-concept state - stationary operation - to transient operation as required for use in a vehicle. Subsequently, the engine will be installed in a truck to be tested in real-life operation to qualify as proven zero-emission technology according to the clean-vehicle-directive of the European Union (Directive (EU) 2019/1161, Article 4(5)).

Travail effectué depuis le début du projet jusqu'à la fin de la période considérée dans le rapport et principaux résultats atteints jusqu'à présent

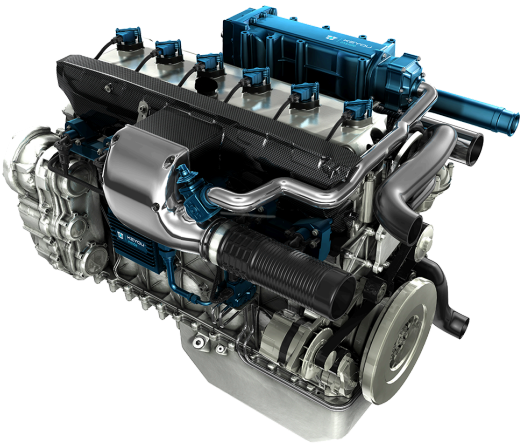
Main topics performed during the project duration:
- Development of a hydrogen system in a commercial vehicle
- Technical development to install a hydrogen internal combustion engine into a vehicle, thus elevating it from test-bench operation in stationary mode (TRL 6) to transient operation in a fully functional vehicle (TRL 9)
- Hydrogen Vehicle buildup and testing
- Establishment of a Quality Management system and processes at KEYOU
- Demonstrating the driving hydrogen vehicle (e.g. on exhibitions)
- Further development of KEYOU´s business model

Progrès au-delà de l'état des connaissances et impact potentiel prévu (y compris l'impact socio-économique et les conséquences sociétales plus larges du projet jusqu'à présent)

KEYOU developed the first hydrogen internal combustion engine that is efficient enough to expect a similar or lower total cost of ownership for vehicle operators as they are accustomed to with diesel vehicles.
Due to decarbonisation efforts worldwide vehicle operators are looking to switch their fleets to vehicles that can use renewable energies such as renewable electricity or green hydrogen. However, with currently available technologies they have to restructure their business model du to higher capital and operational costs of zero-emission vehicles, additionally, battery vehicles will not be able to perform well in the heavy-duty segment. With KEYOU's driving vehicle, which can be tested in real operations,

we can finally offer end-users a solution that is cost effective, as well as environmentally sound and it does not disrupt their mode of operation. Maintenance of a hydrogen engine is possible for any worker who is trained on diesel or gas engine vehicles. Additionally, existing production and value-chains for conventional engines can be converted easily for the production of hydrogen engines, this omitting CO2 emissions, high costs, and efforts in the erection of new production facilities while at the same time jobs of skilled workers are being saved.

After the project end the demonstrator vehicle will be handed to an end-customer for testing and collecting technical feedback on the performance, which will be used for the production of a pre-series fleet of trucks and buses. With the hydrogen engine KEYOU enriches the bouquet of technologies to counteract the climate change and support the Green New Deal objectives of the European Union.



Engine with KEYOU-inside components

KEYOU Prototype 18 ton Truck Model

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