ALBERTA INNOVATES

CLEAN RESOURCES

CLEAN TECHNOLOGY

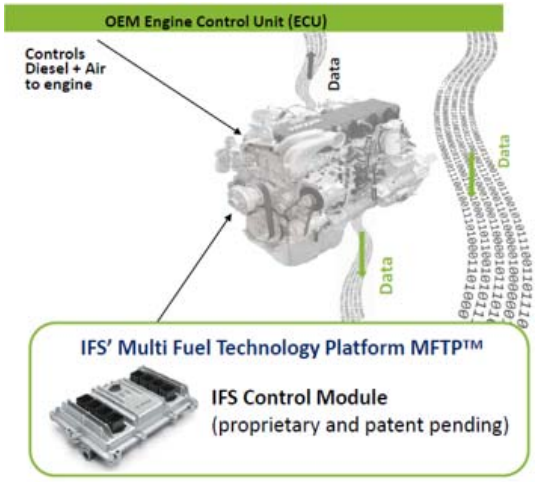
HYDROGEN

FUNDING DETAILS

Hydrogen Dual-Fuel Technology for Heavy Duty Long Haul Vehicles

Innovative Fuel Systems Ltd. (IFS) dual-fuel technology provides heavy-duty trucks with the same power, torque, carrying capacity, and range as a regular diesel truck. The truck fleets are able to revert to 100% diesel when hydrogen is unavailable on a route. IFS' in-cylinder mixing kits are intrinsically safe and do not void the engine warranty while delivering improved fuel efficiency with an average diesel substitution of up to 45%. This hydrogen usage results in a nearly 40% reduction in CO2e GHG emissions with advantages over BEV and FCEV alternative trucks.

This project will test 3 diesel engines with hydrogen–diesel dual-fuel retrofits kits by a consortia of trucking partners on the road; 3 trucks per partner.



RECIPIENT:
Innovative Fuel Systems Ltd

PARTNERS:
Trimac Transportation Services, KAG Canada, Top 5 Canadian Fleet

TOTAL BUDGET:
$5,135,000

AI HCOE FUNDING:
$2,000,000

PROJECT DATES:
JAN 2023 – MAR 2025

PROJECT TRL:
Start: 4
End: 7

APPLICATION

This project enables hydrogen use in heavy duty trucks to offset diesel emissions. Using a dual-fuel conversion kit, current diesel truck engines will be able to operate either on a dual-fuel mode, if hydrogen is available, or solely on a diesel fuel mode. This flexibility is critical as emerging hydrogen infrastructure is developed. To overcome the current challenge of diesel displacement fuel blending to achieve low fugitive emissions, IFS' technology uses in-cylinder mixing and has sequential hydrogen port injection which is more efficient and cleaner by avoiding unburned fuel and eliminating combustible mixtures outside the cylinder.

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PROJECT GOALS

- IFS will develop a hydrogen dual-fuel system for 3 types of diesel engines using a sequential port injection, with in-cylinder mixing technique, to introduce hydrogen into the engine as an alternate lower emission fuel
- The method will include a retrofit kit for the diesel engine and will consist of the following major systems:
    - hydrogen tank module(s),
    - hydrogen filling module and delivery system, and
    - IFS engine control unit (ECU)
- The project will road test, validate and optimize engines on a group of consortia partner's trucks for up to 6 months.

BENEFITS TO ALBERTA

- Lower emissions: Enables significant reduction in heavy truck emissions by approximately 40%
- Expanded market opportunities: Alberta-based manufacturing of kits will create jobs and economic activity while creating global export opportunities.
- Advancing net zero goals: greater cost competitiveness over BEV or FCEV which accelerates shift to net zero ambitions in Alberta
- Supporting development of a local hydrogen ecosystem by creating demand for hydrogen fueling stations; this generates opportunities for the whole hydrogen supply chain.
- Creation of jobs: Training and retaining Highly Qualified and Skilled Personnel in Alberta in the emerging hydrogen economy.

20 Publications

3 Patents

2 - 7 Project Jobs

4,000 Future Jobs

3 New Products/Services

550 – 1100 t/yr Project GHGs

118 - 236 Mt/yr Future GHGs

CURRENT STATUS

FEB 2023

The project has initiated contracting activities and is working to finalize the budget and work scope sequencing that aligns with their JIP partners plans. Final contribution details with the JIP members are in progress which will characterize the optimizing of the test kits and road test details on their fleet of trucks. IFS has commenced sourcing of the required test equipment and diesel test-engines needed for the project.