FUNDING DETAILS

Assessing the Techno-Economic and Environmental Feasibility of Distributed Hydrogen Production Pathways to Decarbonize Heavy-Duty Transport in Alberta

Transitioning to a net-zero energy system where hydrogen is used as a fuel for heavy-duty transport, will require the creation of new value chains that make hydrogen available at a reasonable cost at widely distributed fueling stations across Alberta. The objective of this project is to analyze feasibility, cost, and emissions of producing hydrogen on-site at heavy-duty fueling stations across Alberta. The results of the study will provide insights and transfer knowledge to industry, government agencies, utilities, and investors interested in building, and/or operating heavy-duty fueling stations.

RECIPIENT:
University of Alberta

PARTNERS:
University of Calgary
The Transition Accelerator

(A) DISTRIBUTED WATER ELECTROLYSIS
(B) DISTRIBUTED METHANE PYROLYSIS

NG   Natural Gas
PPA Power Purchase Agreement
Potential Source of greenhouse gases
Production unit
Power and/or Feedstock supply
By-product mgt and H₂ processing
System boundary/Scope

TOTAL BUDGET:
$400,000

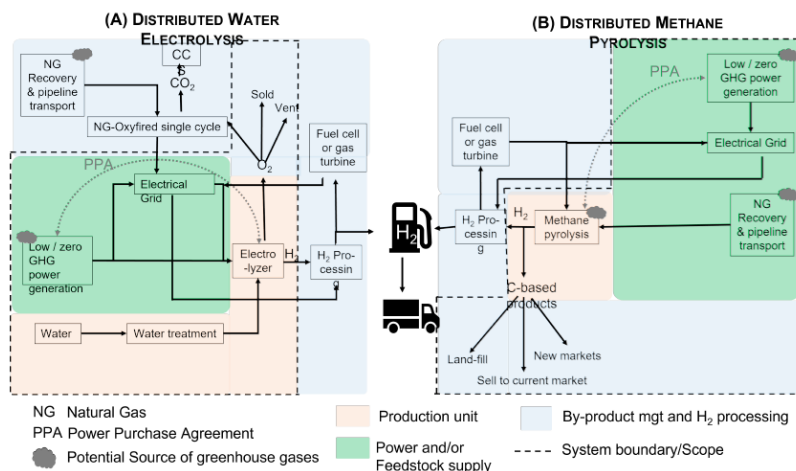**AI HCOE FUNDING:**
$200,000

PROJECT DATES:
MAR 2023 – JUL 2025

PROJECT TRL:
Start: 6
End: 8

APPLICATION

The decarbonization of the heavy-duty class 8 trucks is a key priority for the province of Alberta. Class 8 trucks and other heavy-duty (HD) vehicles such as buses, trains and off-road vehicles account for account for 36% of total emissions from the transport sector in Alberta. The application of the project is to help the buildout of hydrogen infrastructure needed for decarbonization of Alberta's heavy-duty transport sector.

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CLEAN RESOURCES

CLEAN TECHNOLOGY

HYDROGEN

PROJECT GOALS

- Conduct techno-economic-environmental assessment of water electrolysis and methane pyrolysis-based processes to produce hydrogen at heavy-duty fueling stations located along key transport corridors in Alberta.
- Create techno-economic models for deploying hydrogen fueling station sites across the province.
- Provide insights and transfer knowledge to industry, government agencies, utilities, and investors interested in building, and/or operating heavy-duty hydrogen fueling stations.

BENEFITS TO ALBERTA

- Development of a fuel hydrogen value chain offers a great opportunity to advance towards a clean future and creates diverse job opportunities in multiple sectors.
- The analysis, insights, and the decision support tool developed in this project can be used by industry, government agencies, utilities, and investors to deploy hydrogen technologies.
- This project could create new jobs across the value chain spanning hydrogen production, processing, distribution, transport, heating and in heavy industry.
- This would also create investment opportunities for the province, create infrastructure that supports transportation of hydrogen.

3 Publications

3 Students Trained

>1000 Future Jobs

1.6 MM t/y Future GHGs Reduced

CURRENT STATUS

MAY 2025

The project is almost complete with detailed technoeconomic analysis conducted on distributed H2 production based on methane pyrolysis and water electrolysis at scales of 1-10 tonnes of H2 per day, suitable for deploying at Hydrogen fueling stations.

Classification: Protected A