

CLEAN RESOURCES

CLEAN TECHNOLOGY

HYDROGEN

FUNDING DETAILS

Clean, Low Cost, Distributed Hydrogen Production Using RF-Driven Methane Pyrolysis

Aurora Hydrogen and Aceleware are collaborating to develop the most efficient, clean, and scalable hydrogen (“H₂”) production process designed to-date, supporting a transformative opportunity for Canada’s energy sector. The project employs a new methane pyrolysis approach, utilizing electricity converted to radio frequency (RF) electromagnetic waves to heat a pyrolysis reactor. The reactor then converts natural gas (“NG”) to hydrogen and solid carbon without any other inputs or outputs (CH₄ → 2 H₂ + C).

This ‘made-in-Alberta’ project targets one of the most promising, scalable hydrogen conversion methods to-date and could further Alberta’s position as a global leader in highly economic and zero GHG hydrogen production.



RECIPIENT:
**Aurora
Hydrogen Inc.**



PARTNERS:
**Aceleware Ltd.
Sherritt
International**



TOTAL BUDGET:
\$5,536,250



AI HCOE FUNDING:
\$2,000,000



PROJECT DATES:
**FEB 2023 –
DEC 2024**



PROJECT TRL:
**Start: 3
End: 6**

APPLICATION

This technology will be applied in distributed hydrogen production, to supply hydrogen in locations that are farther away from major production hubs but still have access to natural gas. This solution will overcome the challenges of transporting hydrogen over long distances while minimizing the greenhouse gas emissions profile of hydrogen production.



ALBERTA INNOVATES CLEAN RESOURCES

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PROJECT GOALS

- Prove RF technology capable of heating reactor efficiently as existing microwave pyrolysis reactor.
- Scale-up demonstration at 200 kg/day system output
- Prove methods and pathway to 2 t/day scaleup viability
- Support carbon by-product usage in industrial applications
- Support data for techno-economic assessment of novel technology performance.

BENEFITS TO ALBERTA

- Prove distributable and scalable hydrogen reactor designs
- Low-cost solution with high H₂ conversion efficiency
- Environmentally friendly, no water and limited land use
- Leverages existing NG infrastructure, secures jobs
- No or limited CCS infrastructure required based on conversion at point of use.
- Design, built and exported from Alberta creating 1000s of jobs within manufacturing, installation, and service.
- Valuable solid carbon by-product to generate new use and replacement materials for critical industries.
- Significant technology export potential
- Secures future for NG industry and supporting operations



4 Students Trained



8 Patents



5-7 Project Jobs



6 New Products/Services



25-35 Future Jobs



1.4-12.4 MtCO₂e/yr
2030-2040 Future GHGs

CURRENT STATUS

FEB 2023

Beta version testing underway, R&D underway for scale-up version to 200kg/d unit. Verification of RF capability to heat carbon to desired temperatures underway.