ALBERTA INNOVATES

CLEAN RESOURCES

CLEAN TECHNOLOGY

HYDROGEN CENTRE OF EXCELLENCE

Gradient 100% H2 syncFURNACE

FUNDING DETAILS

Gradient Thermal is one of the projects selected as part of the Hydrogen Center of Excellence – Advancing Hydrogen Competition 2. This project advances a residential heating appliance fueled by 100% hydrogen, designed for North American homes. Gradient's current syncFURNACE will be converted from natural gas to hydrogen via advancements from this project to meet safety and performance criteria and regulations. If successful, the products will be manufactured and distributed from Alberta to meet global demand for hydrogen fueled home heating in a combined furnace-plus-water heater.

RECIPIENT:
Gradient Thermal Inc.

PARTNERS:
ATCO
InnoTech Alberta
NGIF

TOTAL BUDGET:
$3,766,871

AI FUNDING:
$1,883,435

PROJECT DATES:
FEB 2024 – APR 2026

PROJECT TRL:
Start: 3
End: 6

APPLICATION

The syncFURNACE is a replacement for conventional forced-air furnaces and water heaters in residential applications to allow for hydrogen blending and pure hydrogen replacement for natural gas.

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PROJECT GOALS

To accommodate the safety requirements of using hydrogen as a fuel for effective end performance, technology innovation requires solving for the following large categories:

- Burner design to solve for higher flame speeds and flame temperatures
- Gas train design to ensure effective air/fuel mixing, minimal volume, air tightness and accurate dispensing of both air and gas into the system.
- Flame sensor design
- Controls that manage the system as a whole which includes measuring air/fuel inputs, monitor presence of flame and quickly shut-down in the event of unsafe operating conditions.

BENEFITS TO ALBERTA

1. Impacts to GHG of the Project as compared to a baseline:
   - CO_2 emissions reduction associated with the Project: 58,467 metric tonnes of CO_2 (53% reduction)
   - Baseline scenario: 109,625 metric tonnes of CO_2
   - 100% H2 syncFURNACE conservative implementation: 51,158 metric tonnes of CO2
2. Growing the manufacturing industry in Alberta for fuel efficient residential heating

10 Publications

5 Students Trained

5 Patents

5-10 Project Jobs

40 - 50 Future Jobs

3 New Products/Services

no Spinoff Companies

5 - 10 kt/yr Project GHGs Reduced

50 – 100 kt/yr Future GHGs

CURRENT STATUS

MAR 2024

Project approved and work started on technical enhancements for syncFURNACE for hydrogen fuels. Preparations initiated for expansion of manufacturing facility in anticipation of added volume of new product line.

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