Hydrogen Integrated Greenhouse Horticultural (HIGH) Energy

Hydrogen Innovation Fund Project Details

Proponent: University of Windsor

Partner: Kruger Energy, OGVG, Enbridge Inc., Under Sun Acres, and Agriculture and Agrifood Canada

Project Type: Research study

Project Total Cost: $285,000

Year Contracted: 2023

Location: Windsor

Status: Open

Project Objectives

The objective of this research study is to model the hydrogen production of a wind-coupled electrolyzer facility from an existing transmission-connected wind farm in southwestern Ontario and asses the ability of the coupled wind farm/electrolyzer to provide grid services. It will also study and model the cost of storing, transporting, and using of the wind-powered produced hydrogen to displace the natural gas used to fuel an existing 13.3 MW cogeneration facility that provides heat and power to a large nearby Greenhouse. Finally, it will assess current market barriers for the operation of a transmission-connected wind farm with a distribution-connected hydrogen production facility.

Outcomes

If successful, this research study will explore the potential feasibility of a hybrid transmission/distribution wind-coupled hydrogen production facility to provide grid services. The study will provide technical and financial analysis on the production, delivery, and consumption of hydrogen produced by wind-coupled hydrogen facility. It will deliver results from a recent blended-fuels study to increase knowledge and de-risk use cases for new hydrogen customers in the greenhouse sector. Finally, it will offer high level recommendations for regulatory changes to enable market participation by hybrid transmission/distribution connect wind farms. The expected outputs will include:

- Business case for hydrogen production, delivery, storage, and usage for a transmission/distribution wind farm-coupled electrolyzer capable of providing ancillary services to the bulk or local grid.
- Thermodynamic and electricity generation data from a comprehensive series of fuel blending combustion tests between 10% and 100% hydrogen blended into natural gas.
- List of policy, market, and contractual barriers preventing a transmission-connected wind farm to provide Power Purchase Agreement style electricity supply locally and recommendations on how to remove these barriers.
- Comparative insights of hydrogen and other energy storage technologies.