# NASA SBIR/STTR Technologies

## Hydrogen Recovery System

**Sustainable Innovations LLC – Glastonbury, CT**

**PI: Dr Trent Molter**

**Contract No.: NNX11CC74C**

Identification and Significance of Innovation

- Hydrogen/helium separation
- Recovery of helium lost to venting at significant savings to test operations
- Reduction of $H_2$ year cost by up to 50%
- Utilization of $H_2$ currently lost to boil off, currently 50% loss p.a.
- Ultra high purity $H_2$ produced, 99.9999% pure
- Scalable architecture – high flow rates, multi stage compression

Estimated TRL (1 – 9) at beginning and end of contract: TRL 3 → 5

**Electrochemical Cell Hardware**


**System for $H_2$ Compression/He Separation**

Technical Objectives and Work Plan

Technical Objective: Development, demonstration and delivery of a fully-integrated prototype that separates helium and hydrogen from a NASA facility and compresses the helium for re-use.

Work Plan:

1. Cell Hardware Development
2. Fluids Management Modeling
3. Prototype System Development
4. Prototype System Fabrication
5. Laboratory Prototype System Testing
6. In-Situ Verification Testing
7. Program Management and Reporting

NASA and Non-NASA Applications

**NASA Applications**

- Capture & purification of $H_2$ boil off from cryogenic storage tanks
- Hydrogen/helium separation
- Hydrogen pump/mechanical actuation for ISRU
- Fuel cell powered space missions

**Commercial Applications**

- Recovery of boil off for industries using cryogenic $H_2$ storage

**Hydrogen Fueled Vehicle Applications**

- Compression & purification of hydrogen for vehicle storage

Contacts

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