

# NASA SBIR/STTR Technologies

## Hydrogen Recovery System

Sustainable Innovations LLC – Glastonbury, CT

PI: Dr Trent Molter

Contract No.: NNX11CC74C



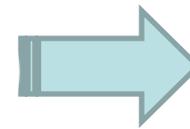
### Identification and Significance of Innovation

- Hydrogen/helium separation
- Recovery of helium lost to venting at significant savings to test operations
- Reduction of H<sub>2</sub> year cost by up to 50%
- Utilization of H<sub>2</sub> currently lost to boil off, currently 50% loss p.a.
- Ultra high purity H<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> storage

#### **Hydrogen Fueled Vehicle Applications**

- Compression & purification of hydrogen for vehicle storage

#### Contacts

Dr. Trent Molter, PI, Sustainable Innovations, (860) 652-9690  
Mr. Jonathan Dickey, COTR, NASA/SSC, 228-688-1856  
NASA Shared Services Center (NSSC), SBIR/STTR  
Contracting Officer, (877) 677-2123

**NON-PROPRIETARY DATA**