

# Off-Grid Subsea Electrolytic Hydrogen Production

## A New Architecture for Long-Duration Energy Storage

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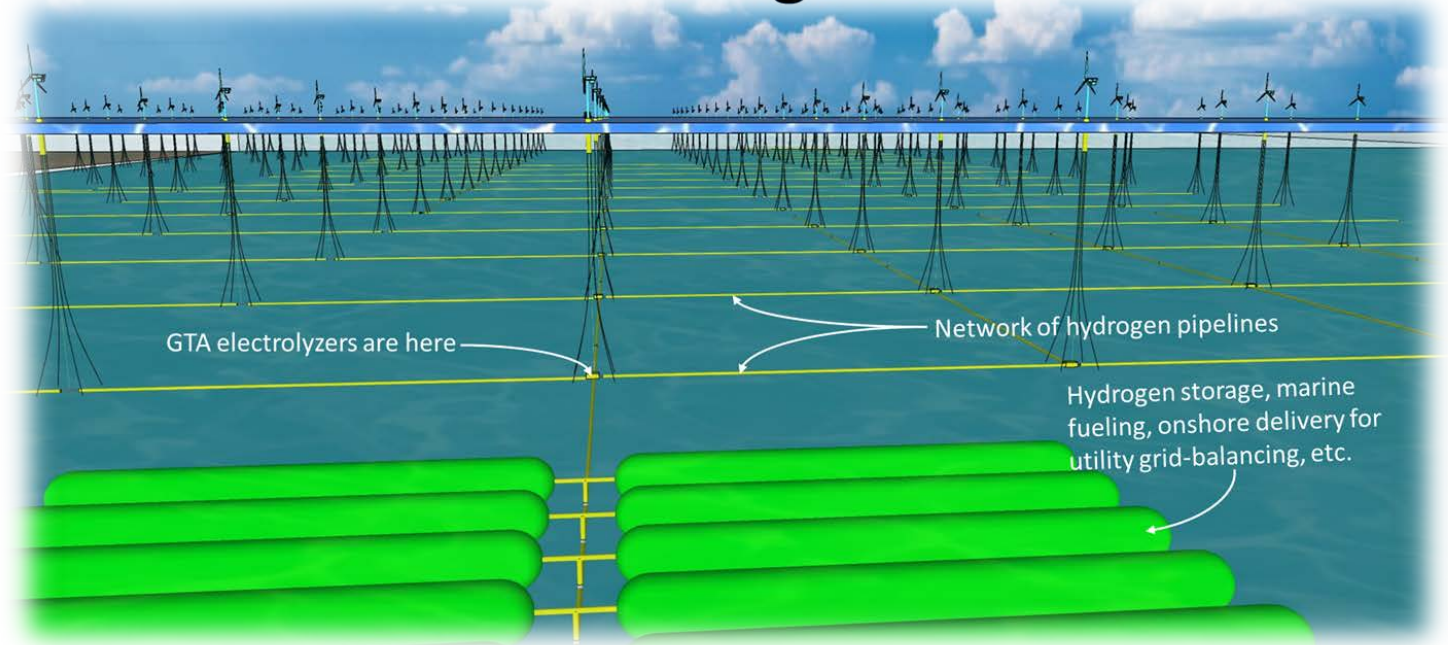
Annual Workshop

National Consortium for the Advancement of  
Long Duration Energy Storage Technologies

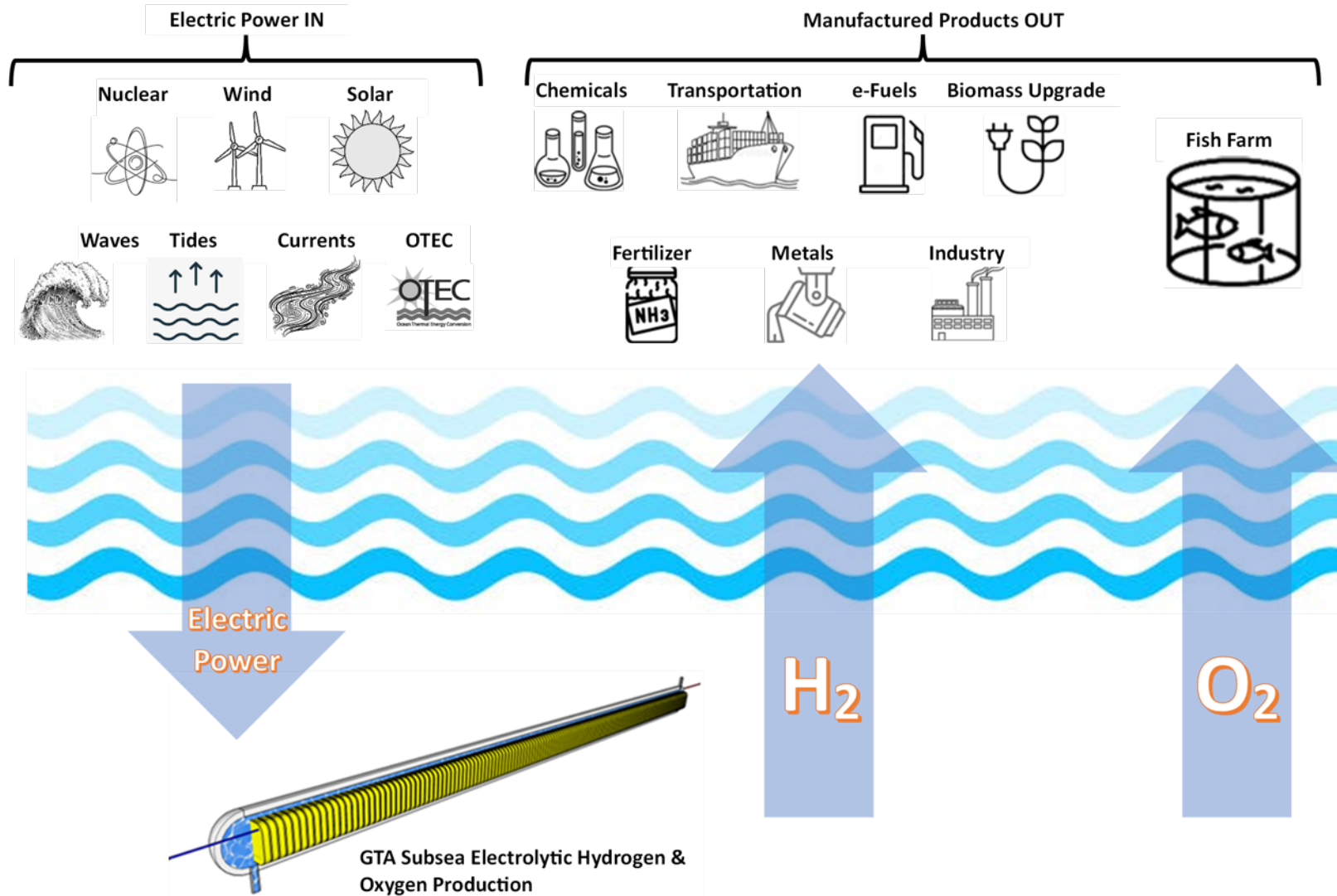
University of Utah

July 14–15, 2026

### Behind the Meter Hybrid: A 1 GW Integrated Subsea H<sub>2</sub> Production and Storage Farm

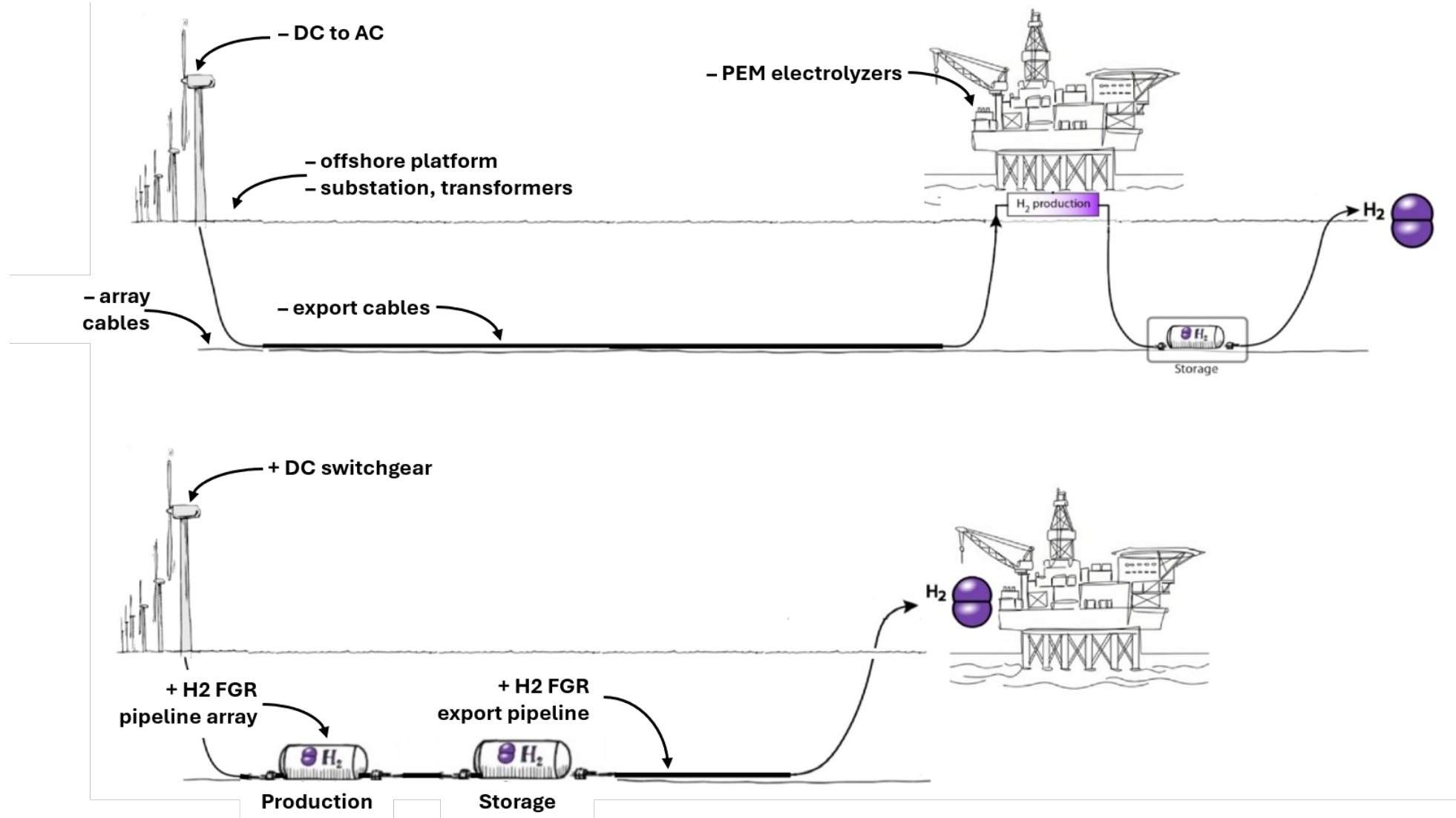


# Maritime Manufacturing @ Scale



# Technology Overview

## Ocean Platforms vs. Subsea

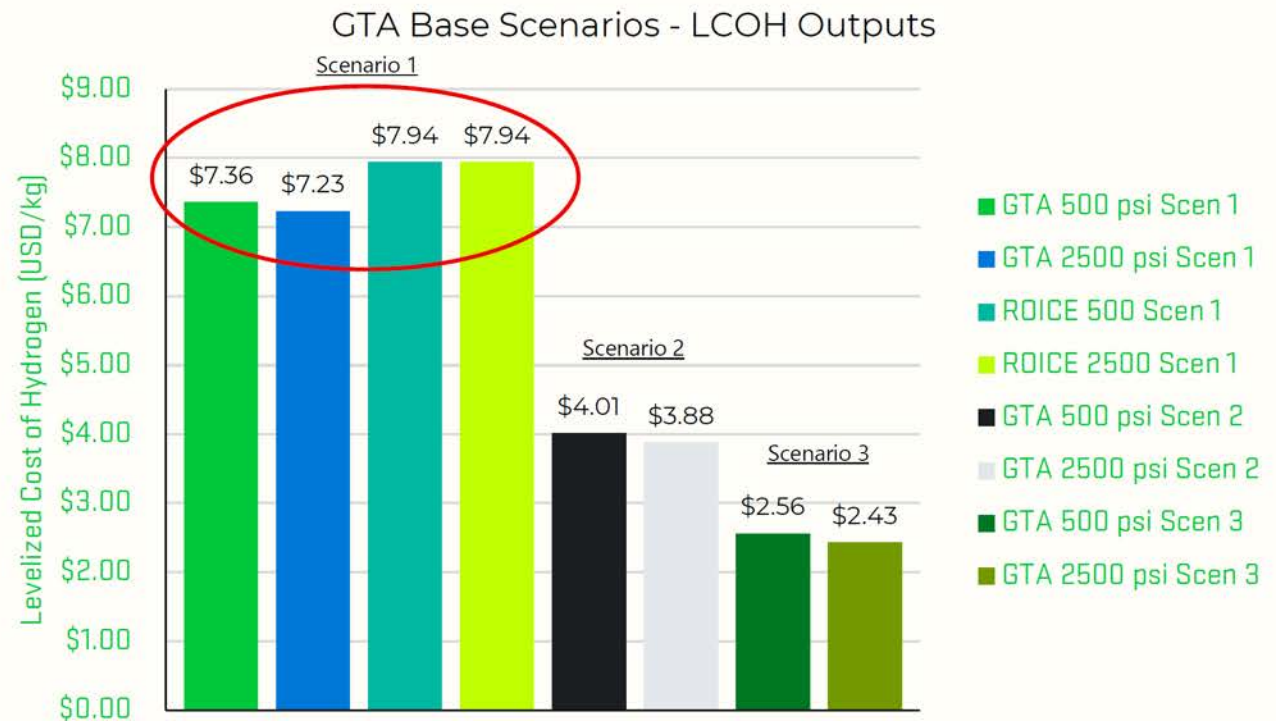


# Techno-Economics

## Levelized Cost of Hydrogen: Three Scenarios



Figure 1. GTA Base Scenarios - LCOH Outputs



# Technology Overview

## Subsea Hydrogen Storage is Becoming Mainstream

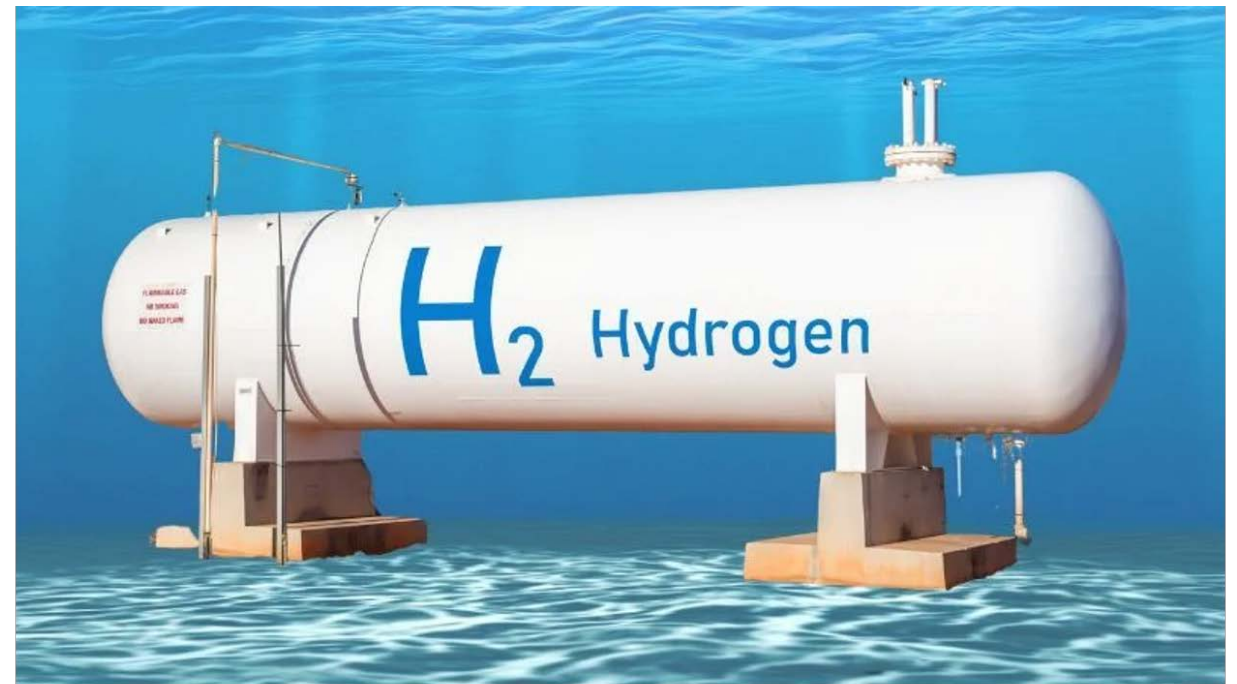
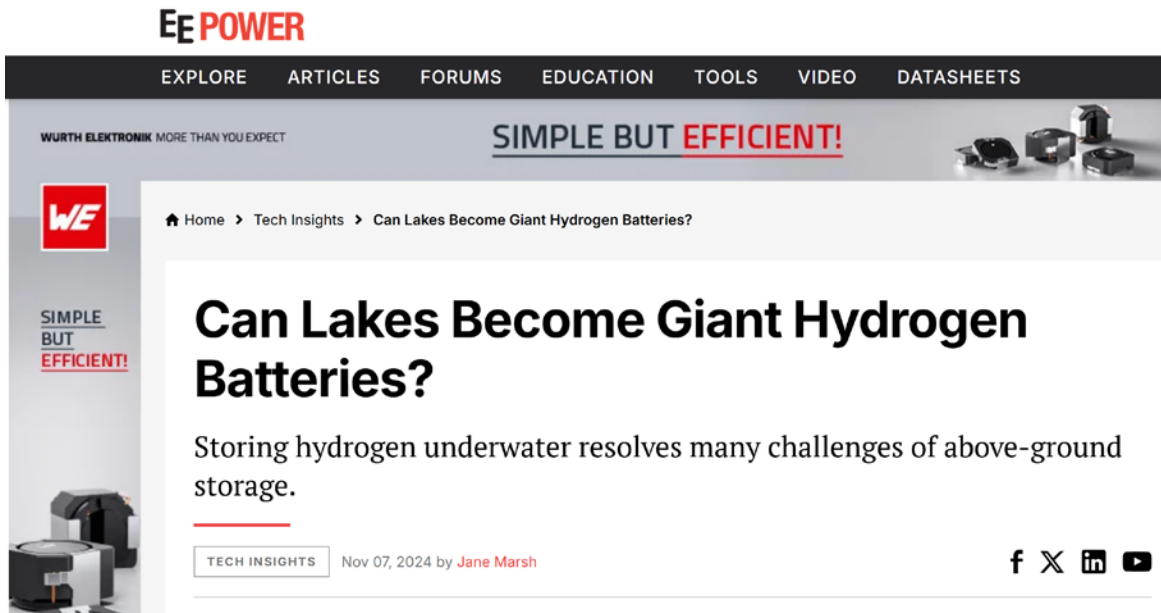


Image Credit: Canva, <https://eepower.com/tech-insights/can-lakes-become-giant-hydrogen-batteries/#>

# Performance and Key Metrics

| Metric                    | GTA Target                          |
|---------------------------|-------------------------------------|
| Storage duration          | Days to seasonal                    |
| Energy capacity           | Practically unlimited               |
| Power rating              | MW–GW scalable                      |
| Electrolyzer architecture | Modular distributed                 |
| Response time             | Seconds                             |
| Renewable compatibility   | Offshore wind, wave, tidal, nuclear |
| Product                   | Hydrogen                            |
| Secondary product         | Oxygen – Fish Farming               |

# Differentiation and Value Proposition

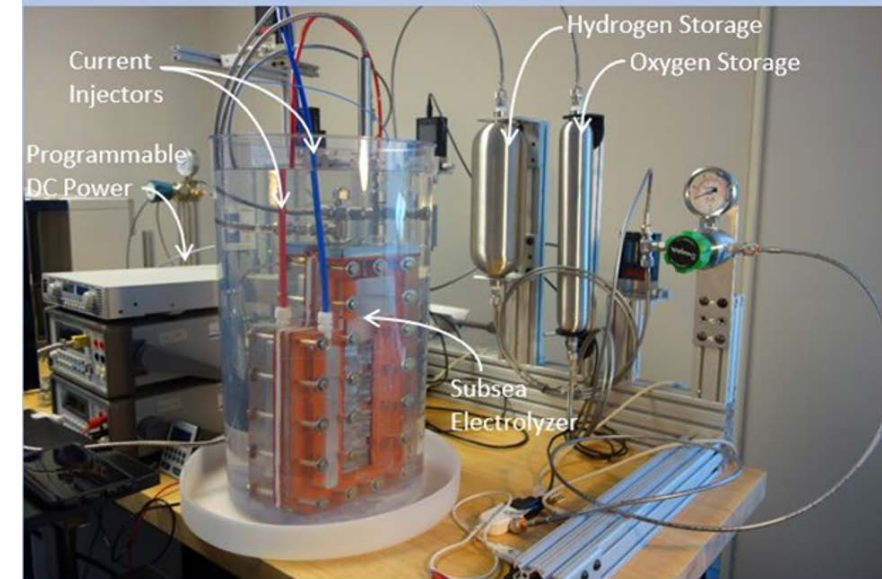
## Compared with Conventional Offshore Electrolysis

| Conventional               | GTA                                      |
|----------------------------|------------------------------------------|
| Large steel platforms      | Distributed polymer modules              |
| Large hydrogen inventories | Distributed production                   |
| Complex topside equipment  | Minimal offshore infrastructure          |
| High structural weight     | Lightweight polymer construction         |
| Significant safety zones   | Improved intrinsic safety                |
| Expensive fabrication      | Injection molding and automated assembly |

# Development Status

| Category                | Status                                |
|-------------------------|---------------------------------------|
| Technology Readiness    | TRL 5                                 |
|                         | Lab demo in relevant environment      |
|                         | Materials validation                  |
|                         | Patent portfolio established          |
| Manufacturing Readiness | Injection molding, Plastic welding    |
|                         | Electrode digital winding             |
|                         | Highly scalable manufacturing methods |
| Accomplishments         | DOE OTT Voucher Recipient             |
|                         | DOE H2@Scale CRADA Program            |
|                         | TechConnect Defense Innovation Award  |

TRL 5 – Proof of Concept in a Relevant Environment:  
Ocean Water



# Remaining Risks

| Category          | Task                                                                       |
|-------------------|----------------------------------------------------------------------------|
| Technical         | Long-duration field validation                                             |
|                   | Marine deployment                                                          |
|                   | Maintenance logistics                                                      |
|                   | Autonomous monitoring                                                      |
| Commercial        | Offtakers                                                                  |
|                   | Supply chain scaling                                                       |
|                   | Certification, Permitting, Insurance                                       |
| Manufacturing     | Scale-up, Quality control                                                  |
|                   | Automated production, Certification Standards                              |
| Noteworthy Points | No new scientific breakthroughs appear necessary.                          |
|                   | Remaining work is primarily engineering development and commercialization. |

# Path Forward

| Category          | Task                                                                       |
|-------------------|----------------------------------------------------------------------------|
| Technical         | Long-duration field validation                                             |
|                   | Marine deployment                                                          |
|                   | Maintenance logistics                                                      |
|                   | Autonomous monitoring                                                      |
| Commercial        | Offtakers                                                                  |
|                   | Supply chain scaling                                                       |
|                   | Certification, Permitting, Insurance                                       |
| Manufacturing     | Scale-up, Quality control                                                  |
|                   | Automated production, Certification Standards                              |
| Noteworthy Points | No new scientific breakthroughs appear necessary.                          |
|                   | Remaining work is primarily engineering development and commercialization. |

# Partnership Opportunities

| We seek partners: | Utilities                    |
|-------------------|------------------------------|
|                   | Wind / nuclear developers    |
|                   | National laboratories        |
|                   | Manufacturers                |
|                   | Marine engineering           |
|                   | Investors                    |
|                   | Federal agencies             |
|                   | University researchers       |
|                   | Consortium support requested |