

Project SHOWPLACE Texas Gulf Coast

Storing Hydrogen from Offshore Wind Power for Load-balancing and Carbon Elimination

Objectives

Project SHOWPLACE is an Industry-Government-Public-Academia collaborative demonstration project that aims to establish the commercial feasibility of synergies between offshore wind power & hydrogen generation & storage. Key concept elements include:

- Re-purpose existing offshore Gulf of Mexico oil and gas platforms and pipelines
- Install floating or fixed (to platform) wind turbines
- Transport power to onshore electric grid within capacity constraints
- Utilize excess wind power to generate freshwater via desalination
- Generate hydrogen from freshwater via electrolysis
- Store hydrogen in subsurface geological reservoirs
- Transport freshwater to shore or reuse later for subsequent hydrogen production
- Transport hydrogen to shore for use as industrial feedstock or for power generation
- Comprehensive roadmap that also addresses
 - Ocean observing systems
 - Hydrogen safety
 - STEM curriculum and workforce retraining programs
 - Community engagement, economic growth, and job creation opportunities
 - Regulatory requirements

Project Details

This concept offers multiple advantages.

- Capital outlay reduction through reuse of installed infrastructure
- Long term energy storage via hydrogen and freshwater enables utilization of all available wind power (zero curtailment goal)
- Active hydrogen economy in Texas Gulf Coast
- Multiple revenue streams with potential for revenue optimization
- Individually technologies generally proven; key challenge is cost-effective combination of these proven technologies offshore
- Scalable across the Texas Gulf Coast with accompanying cost reductions
- Skilled energy industry workforce in Texas Gulf Coast
- Leverage learnings from multiple similar projects globally

Project work will be carried out using federal and state funding with relevant domain expertise for each of the 6 key technical modules that make up the project.

- Module 1: Wind Power Generation
- Module 2: Power Transmission to Shore
- Module 3: Freshwater Generation, Storage and Supply
- Module 4: Hydrogen Generation & Utilization
- Module 5: Hydrogen Storage
- Module 6: Offshore Infrastructure

Each module will also include foundational aspects such as data analytics, digitalization, safety, and environmental considerations.

Deliverables

Phase 1 – Concept Selection (12 months)

- Concept validation, preliminary economics, and a business plan
- Technology research, development, and qualification plans
- Roadmap for policy (business, public and regulatory)
- Alignment and buy-in from “customers”
- Plan for community engagement and education

Phase 2 – Detailed Engineering (24 months)

- Selection of offshore pilot location and implementation partner
- Technical design, cost, economics, and implementation schedule
- Plans to integrate into power and hydrogen grids
- Preliminary regulatory alignment and approvals
- Public acceptance and training plans

Phase 3 – Demonstration Project (24 months)

Current Partners

- | | |
|--|---|
| <input type="checkbox"/> University of Houston | <input type="checkbox"/> Texas A&M University |
| <input type="checkbox"/> Texas General Land Office | <input type="checkbox"/> Siemens |
| <input type="checkbox"/> Center for Houston’s Future | <input type="checkbox"/> Lummus Consultants |
| <input type="checkbox"/> American Bureau of Shipping | <input type="checkbox"/> Technip FMC |
| <input type="checkbox"/> Strategic Ventures Group | |

Contact

Dr. Ram Seetharam
 Energy Center Officer, UH Energy
rvseetharam@uh.edu
 832-538-2667

Prof. Ramanan Krishnamoorti
 Chief Energy Officer, UH
ramanan@uh.edu
 713-743-4307