

# REPURPOSING OFFSHORE INFRASTRUCTURE FOR CLEAN ENERGY



**ROICE: An Industry-Government-Public-Academia Collaborative to Develop the Project Implementation Framework for Clean Energy Repurposing Projects**



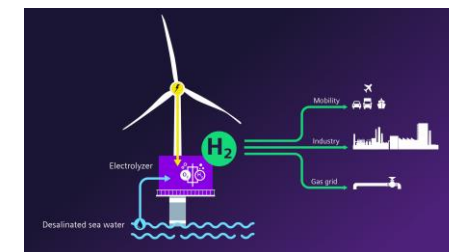
Division of Energy and Innovation  
UNIVERSITY OF HOUSTON

## ROICE Workgroups

### Overview



Courtesy: Endeavor Management



Courtesy: Siemens Gamesa

# UH Energy Repurposing Initiatives



## Project SHOWPLACE

Techno-Economic Framework  
For Repurposing in US GOM

Initially Focused on Wind and  
Hydrogen

Advised by SHOWPLACE  
Collaborative (SPC)

Federal and State Funding

Led by UH Energy

## ROICE Workgroups

Project Implementation Framework For  
Repurposing in the US GOM

Initially Focused on Clean Energy and  
Carbon Storage

Open to All Stakeholders

Self Funded Participation

Coordinated by UH Energy

**REPURPOSING OFFSHORE  
INFRASTRUCTURE  
FOR CLEAN ENERGY**



*Common Objective: Develop a comprehensive framework for successful  
repurposing projects in the Gulf of Mexico*



# ROICE Workgroups – Project Implementation Framework

**Objective:** ROICE Workgroups will develop the implementation framework for clean energy repurposing projects – currently focused on wind, hydrogen and CO<sub>2</sub> sequestration

**Scope:** Three-pronged approach – Regulatory, Commercial and Technical; Informed by techno-economic results from Project SHOWPLACE

**Deliverable:** Project Implementation Framework via a set of white papers delivered by each sub-group by early December

## **Each Workgroup Needs to Address:**

- *What is the current state of knowledge / processes?*
- *What needs to change to make ROICE Projects feasible and successful?*
- *Any show-stopper challenges?*
- *What does a roadmap for the change look like and what resources are needed?*

## **ROICE Workgroup Outcomes**

### *Alignment on Work Products*

*Published by UH – Draft by Nov 15; Final By Dec 8*

*White Paper for each workgroup (7)*

*Exec Summary for each Category (3)*

*Exec Summary for the whole project (1)*

### *Additional Dissemination Methods:*

*Workshop and/or Webinars to present results*

*Workgroup members can also present at conferences*

*Peer Reviewed journals*



# ROICE Workgroups Kickoff Meeting

## 7 ROICE Workgroups

(# of Current Members)

### Regulatory Considerations (RC) Workgroups

- RC-1: Regulatory Requirements & Pathways (11)
- RC-2: Financial Assurance & Decommissioning (11)

### Commercial Considerations (CC) Workgroups

- CC-1: Project Scope, Scale & Business Models (7)
- CC-2: Financing, Uncertainties & Risk Management (6)

### Technical Considerations (TC) Workgroups

- TC-1: Decommissioning & Reuse (13)
- TC-2: Re-certification (7)
- TC-3: Transportation & Storage (9)

## Governance and Process

- Each workgroup will have a Lead, Co-Lead
- One facilitator will be assigned from the ROICE Advisory Board
- Groups meet independently (virtual meetings) bi-weekly
- Full set of Leaders will meet once a month
- All members workshop in August and October
- Final white papers will be available to general public

## Outstanding Questions

- *Should we form a ROICE Executive Board*
  - *Role: Review and guidance and approval of final products*
  - *Invited to Aug/Oct workshops*
  - *Invited to review draft exec summary white papers*
- *Interaction with BOEM and BSEE?*
  - *Invite to be on Executive Board?*
  - *Invite to Workshops?*
  - *Request to review white papers before finalizing?*



# Regulatory Perspectives Workgroups

## **RC-1: Regulatory Requirements & Pathways**

- Define and collect reference materials for current set of regulations relevant to ROICE
- Document current regulatory expectations & concerns
- Expand on Alt Use RUE / Competitive Interest Determination
- Potential use of lease transfer / research lease options for ROICE projects
- Document relevant pipeline regulations
- Restrictions or regulations for the ROICE scope (e.g., wind, H2)
- Predecessor notification requirements for ROICE projects

## **RC-2: Financial Assurance (FA) & Decommissioning**

- What does FA look like for ROICE projects
- Review recently issued set of rules and understand impact / relevance to ROICE projects
- Schedule and process (e.g., maintenance and monitoring plans)
- Reuse of bankrupt assets / assets transferred back to the state
- Liabilities – decommissioning, spills & clean ups
- Current owner leasing assets to new developer
- Asset sale for repurposing
- Pre- and post-ROICE repurposing subsets
- Liability transfer for deferred elements
- Deferral while evaluating repurposing



# Commercial Perspectives Workgroups

## CC-1: Project Scope, Scale & Business Models

- Minimum size; repeatable
- Potential for small projects
- Types of projects
- Revenue Streams – convert to Ammonia?
- H2 market development – transportation
- Dependence on the product / revenue stream
- Partnerships model
- PPL model? No royalty or revenue sharing for CCS?
- Hybrid model – equity + debt; combine CO2 sequestration with another commodity product
- Platform investment – multiple projects – to derisk the investment
- Supply chain / workforce development – credits from Fed Govt.
- Financial / Legal / Technical Stability requirements
- Tax Credits
- Who would own / operate / fund or invest?
- ESG Drivers
- Operator issues & concerns as stakeholders (including identify additional stakeholders)

## CC-2: Financing, Uncertainties & Risk Management

- P&A / decommissioning liability; assumption of liability for CO2 storage
- Offtake contracts – and temporary purchase of carbon credits while waiting on permits
- H2 market (market development, pricing evolution) vs Power Market (regulated); uncertainty on carbon tax cap & trade
- Contracts with CO2 emitters
- Understand and monitor/influence development of 45 Q / 45 V application rules
- Class VI permitting risk and schedule delays; uncertain regulatory regime for offshore CCS wells
- Insurance products for these projects still under development
- Funds availability - DOE Loan Program Office; strategic investors
- Funds availability - Private Equity; Europe funds; green project investors;
- Interest from O&G Majors vs. Medium and Small Operators;
- Funding rounds – early-stage funding; interest in investment into asset-based projects
- 45 Q / 45 V; Credit worthiness of offtakers
- Project Economics; expected rate of return - Unlevered returns in upper teens vs less than ten for normal utility projects
- Cost competitiveness with high carbon alternatives
- Cost competitiveness with new build



# Technical Perspectives Workgroups

## TC-1: Decommissioning & Reuse

- Jackets, Decks, Equipment, Wells, Utility systems
- Adapting materials and equipment for new use, noting different operating conditions
- Keep operations in mind – not just build, but have to operate for decades
- 2010 or newer? Post-updated version of RB2A(?)  
Anything older may be harder to certify
- Cost competitiveness with new build
- Shallow water vs deeper; relocating movable structures
- Repurposing more suited for demonstration projects vs commercial ones?
- Decommissioning scope split pre-and post-repurposing
- Complete topsides liftoff vs partial
- Wells and pipelines

## TC-2: Re-certification

- Asset lists and current status
- Desired characteristics of assets
- Remaining life / integrity / life extension potential
- Removal mandates
- Ranking of assets
- Codes, analysis, design; critical joints testing; cathodic protection
- Remaining Life estimation – re-baselining the remaining fatigue life
- Analysis techniques have advanced – revisit conservatism around safety factors
- Life extension methods; use data on condition of the asset; history of inspections
- Older platforms and newer codes (higher air gap requirements)
- Removing conductors and topsides increases fatigue life by several decades

# Technical Perspectives Workgroups

## TC-3: Transportation & Storage

- Pipeline Re-Use
- Blending with natural gas
- Mitigate H2 leakage; subsea losses - economic risk vs hazard?
- Pipeline operating specs and design code updates – impact on repurposing pipelines?
- Tanks and tankers
- Gas vs liquid H2 vs. H2 with a substrate
- CO2 service
- Role in power to shore projects?

