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Part3: Concept development of 'Renewable Marine Island (REMARIS)'

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Abstract

This paper highlights about the Renewable marine function islands, the outbreaking innovation where consumer appurtenances utilize the renewable energy from near shore and offshore renewable marine hybrid islands to process the energy population and meet the green energy demand. In other words, Renewable marine islands are Central processing Smart ocean fuel stations where homes, vessels, carriers, planes and ships capture energy retrofit in batches towards its marine journey. The marine floatation includes hydrogen production, topside processing, LNG re-gasification, pipeline production, tank storage, internal combustion, energy conversion, electric generation, propeller motion etc.

Keywords: Renewable Marine Island; Energy Island; Floating Hydrogen; Smart fuels, Geothermal; Energy Storage; Pearl Harbor

1. Introduction

The energy islands are those generation of energy from offshore wind, aimed at creating a green energy supply for electricity grids. Operating as green power plants at Sea, the islands are expected to play a major role in the phasing-out of fossil fuel energy sources. Where as, renewable marine function islands in contrast emphasize not only the basis for supply of electricity but also serve the purpose of renewable e-fuels, bio-fuels, organics and inorganics develops as a fuel hybrid grid for expected marine and aviation consumers. Renewable marine hybrid islands are thus of utmost importance that extends the facets of energy islands.

2. What is Renewable Marine Island?

The Renewable marine islands (REMARIS) are artificial or naturally formed functional hybrid islands that forms a Central processing Smart ocean fuel station where homes, marine vessels, carriers, ships like VLCC, FPSO, RFSU, LNG, LOHC etc and even airplanes capture energy in batches that docks to function island towards its marine and aviation journey. The below concepts (i), (ii)&(iii) may be utilized to produce various energies from hydrogen, wind, solar, organics, inorganics, geo-captures and bio-captures as seen in *figure-1*. The marine energy floatation includes Hydrogen production, Topside processing, LNG Re-gasification, Pipeline production, Tank storage, Internal combustion, Energy conversion, Electric generation, Propeller motion etc.

The concepts and features of Renewable Marine Island (REMARIS) include:

(i) Marine Island Green Energy Conversion (MIGEnC), utilizes Hydrogen from Wind & Solar

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(ii) Marine Island Hydrogen Capsulate (MIHyCAPS), utilizes all Hydrogen spectrum functions
(iii) Marine Island Geothermal Capture (MIGCAPS), utilizes geothermal aquifers, volcanic traps, coal bed methane.

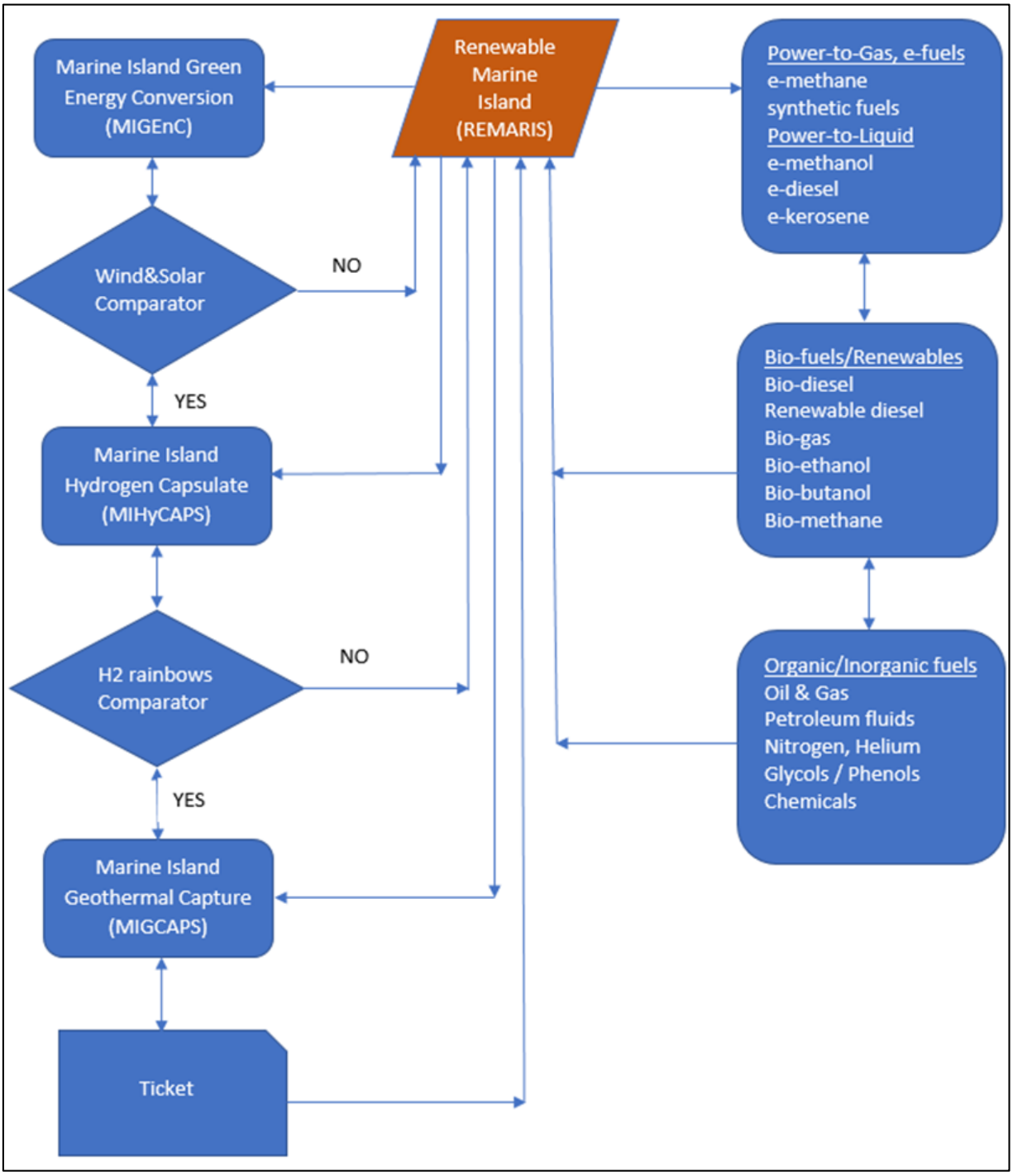

Figure 1 Concept algorithm of Renewable marine function island

(i) Marine Island Green Energy Conversion (MIGEnC), utilizes Hydrogen from Wind & Solar
(ii) Marine Island Hydrogen Capsulate (MIHyCAPS), utilizes all Hydrogen spectrum functions

For topics (i) & (ii), please refer to Article, Part-1: 5X Definitions of hydrogen and renewable energy latex and their importance, Accessible via. *https://doi.org/10.30574/ijsra.2023.9.1.0345.* See the Clean hydrogen policy priorities in REMARIS function Island in figure-3.

(iii) Marine Island Geothermal Capture (MIGCAPS)

This topic (iii) shall be discussed here in fractality. MIGCAPS utilizes energies made from geothermal aquifers, volcanic traps etc. in the subsoil. The brief explanation of MIGCAPS and Science fiction is shown below.

Figure 2 Science fiction of Renewable Marine Island (REMARIS). ©Copyright of Ravi S.Gonella, Dan Orfester.

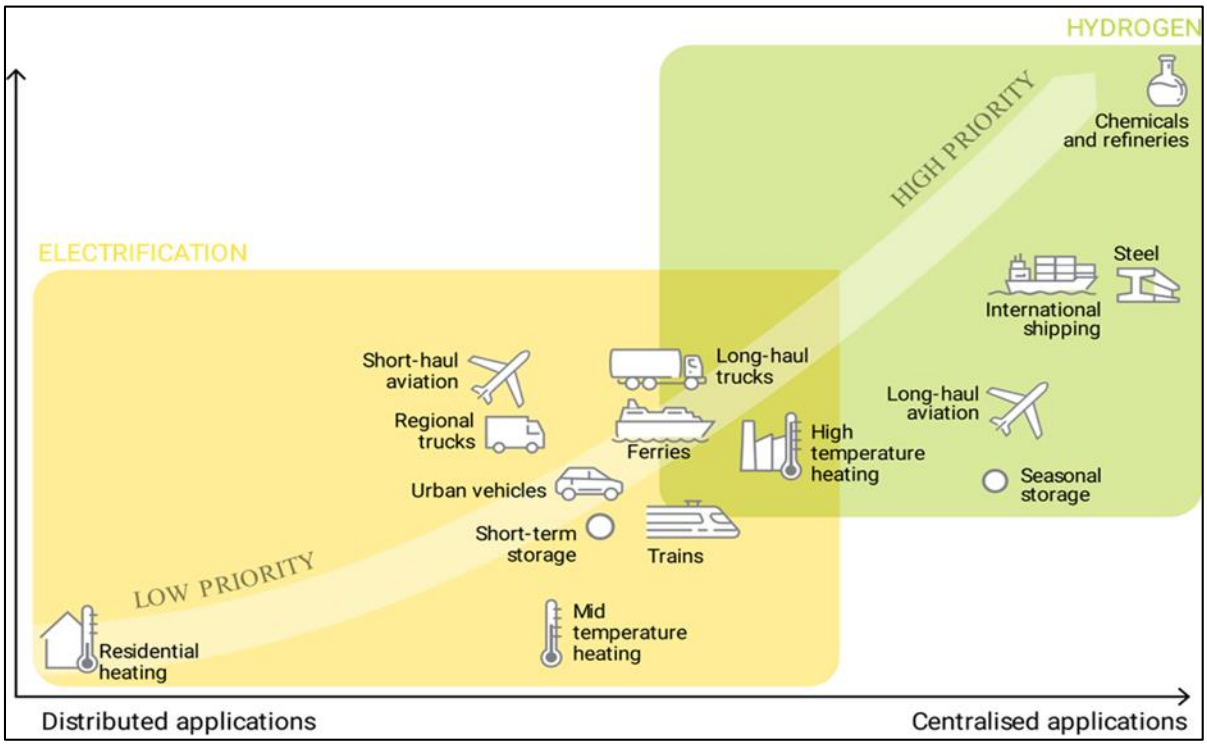

Figure 3 Clean hydrogen policy priorities in REMARIS function Island. Courtesy of Dan Orfester.

3. What is Heat (or) thermal energy?

All states of matter are made of tiny particles called atoms, molecules and ions. These tiny particles are always in motion either bombarding each other or vibrating back and forth. Thus the motion of particles creates a form of energy called heat or thermal energy.

4. What are Thermal energy storage methods?

MIGCAPS utilizes Thermal Energy Storage (TES) methods which are the most economical among all proposed grid-scale energy storage solutions. There are various options used to store thermal energy like steam accumulators, sensible heat of a liquid or a solid, latent heat of fusion, and reversible thermochemical reactions. These methods are classified into three main categories.

(iv) Sensible heat
(v) Latent heat
(vi) Thermochemical reactions

5. What are Thermal energy storage systems?

Thermal energy storage systems comprise of low and high temperatures thermal options. Low temperature thermal options can be divided into Aquifer low temperature energy storage (AL-TES) and Cryogenic energy storage (CES). AL-TES energy storage is not used for electricity generation so will not be further discussed.

- Cryogenic energy storage like LNG is a developing technology, using off-peak power or renewable energy sources to generate cryogenic fluid, which can then be used in a cryogenic heat engine to generate electricity. This technology is currently in development and expected to have relatively high energy density, low capital cost per unit energy and a relatively long storage time.
- High temperature thermal energy storage (HT-TES) options are classified as either sensible or latent heat storage.

Sensible heat storage system applies heating of mediums, such as steam and hot water accumulators, graphite, concrete, molten salt and hot rocks, to store energy without phase change of the medium. Heat is recovered when needed to produce water vapor and drive a turbo-alternator system. The sensible heat storage method is becoming popular as costs for development are relatively low and manufacturing is simple, however the energy density of this method of thermal storage is lower than for other thermal technologies.

Latent heat systems use high temperature phase changing materials, including paraffin and inorganic salts and metals to store heat. These systems involve solid-solid or solid-liquid transformation of the material at constant temperature. Solids are transitioned into liquid or undergo crystal transition during accumulation of energy and reverse back to the original solid state during retrieval. Heat is transferred using a heat transfer fluid. Latent heat materials have a high heat and energy density storing between 5 and 14 times more heat per unit of volume than sensible heat storage materials (Koukou *et al*., 2018). Most phase change materials are non-toxic with long cycling lives and undergo small volume changes during the phase change.

Latent heat storage systems have found in particular use with that of solar thermal power. The advantage of thermal storage with solar thermal power is that the energy is collected and stored as heat directly without conversion to electricity which significantly increases the round trip efficiency of the process.

6. Conclusion

The importance of REMARIS is discerned here. To commission the features of Renewable Marine Island, the following are a few approaches for a comprehensive beginning.

- We arrange Call for Papers, Panel discussions and Forum discussions, Podcast interviews.
- We reach Climate and Energy Ministry's, Regulatory bodies and Policy makers.

- We contact World Organisations for Capital investments on modern technologies pertaining to Renewable Marine Island *(REMARIS),* making the World greater, greener and cleaner.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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