INVESTIGATIONS OF HYDROGEN AS AN ALTERNATIVE MARINE FUEL
Recollecting that the Initial IMO Strategy on Reduction of GHG emissions from ships is vital for the work of organization and that of member states.

The Strategy serves as a vital link to progress the aspirational values to promote global climate change initiatives.

Malaysia is keen to draw your attention to the initiatives on the key concepts – of alternative fuels.

The Presentation we will talk about 2 key areas

UPSTREAM – PRODUCTION & DISTRIBUTION – CRYOGENIC & NON CRYOGENIC

DOWNSTREAM – APPLICATIONS – MARINE AND NON MARINE

IN MARINE APPLICATIONS – BOTH ARE PREVALENT ON BOARD
Malaysia responded to the globally anticipated energy security crisis and climate change by diversifying fuel-resources to include renewable and alternative energy, and developing green-energy technologies for the future. Fuel cell, using hydrogen energy, is an advanced green energy technology that has the potential to bring a clean, zero emission energy technology for a sustainable nation. The Blueprint for Fuel Cell and Hydrogen Industries in Malaysia released in 2017 by the Academy of Sciences Malaysia (ASM) is the result of collaborative discussions regarding the future of fuel cells and hydrogen energy with various stakeholders, including government agencies, industrial players, researchers and academia.
SOURCES

1. Electrolysis
   - Fresh Water
   - Riverine
   - Electric Supply
   - Sultan Idris Hydro Plant - Cameron High Lands
   - Paka - Lake Hydro Plant
   - M3/M2 - LNG Sarawak (200 nm Offshore Sarawak)
   - Petrogas - Hydrogen Recovery from Gas Reserves

2. LNG / Methane

- From Coal Sources
  - No Coal Source
SUPPLY CHAIN DISTRIBUTION

- PIPELINES
  - Bunker Points
  - Ports Storage Tank Farms
  - Sub Distributions - Districts
  - Depots - Kuching
  - Depots - Sarawak
  - Depot - Shah Alam

- ROAD TANKERS
  - Bintulu Industrial Gases - BASF
  - MOX - Malaysian Oxygen Corporation
  - Linde Gas - France
APPLICATIONS

Self Sustained Vessels
- Present Modalities
  - Desalination Plants
  - Electrolysis - Hydrogen
  - Compressors
  - Compressed Gas Storage
  - Safety
  - Range
  - Failure Modes / Ancillary Support
- Design Considerations Include Endurance
- Faster Implementation
- Port Primemovers
- Port Equipments
- Ship Port Interface Equipments
- Short Range - Pilot Boats and HBT
- 2 hours endurances
- Range

Non Self Sustained Vessels
Hydrogen energy & solar energy at a smaller extent identified as most viable long term renewable alternative to fossil fuel

Fuel cell as most viable energy conversion device for hydrogen especially in transportation

Malaysia taking steps to prepare itself for eventual diffusion of solar, hydrogen energy & fuel cells technologies to developing countries

Solar, hydrogen energy and fuel cells identified as priority research by Ministry of Science Technology and Innovation

2019 – Sarawak - RM10 million has been allocated for R&D in hydrogen development in the state

RM50 million for R&D projects that would include a study on hydrogen development so as to incubate developing technologies
SCORE — SARAWAK’S RENEWAL ENERGY CORRIDOR

80% Malaysia’s Energy Reform

Green Technology Powerhouse

Bakun – SEA – Largest Dam – with a catchment and containment area the size of 70,000sq km and 2nd Highest Verticle Face in the region. The project features a 205 m high concrete faced rockfill dam (the third highest dam of its type in the world) with a twin chute spillway of 15,000 m3/s total capacity. The power station comprises eight 300 MW nominal capacity generating units in a surface power station structure located at the base of the dam among the major 3.

Houses 2 Major Gateway Ports – Bintulu and Similajau – PART of BIMP EAGA Network East Asia Growth Area (Brunei, Malaysia, Indonesia and Phillipines)
SARAWAK CORRIDOR OF RENEWABLE ENERGY (SCORE)

Approximately 70,000 sq km
862,100 persons
INCUBATIONS STRATEGY TO PROMOTE HYDROGEN AS PREFERRED FUEL SOURCE

   A. National Malaysian University – Bangi
   B. Malaysian Technology University – Johor Bahru

   - Bipolar Plate (Graphite Plates)
   - Membrane Electrode Assembly (MEA)
   - PEM Fuel Cell Stack

3. SELFUEL – NATIONAL FUEL CELL INSTITUTE -

4. MALAYSIAN ASSOCIATION OF HYDROGEN ENERGY
Talking about Zero Emission Technology Innovations