Feb 9, 2021

Integrated Project for Development of NH3 fuel Ship with Fuel Supply Chain

ITOCHU Corporation
Marine Department

ITOCHU

I am One with Infinite Missions

1. Introduction

Founded : 1858 (incorporated 1949)

as of Apr 1, 2020

Number of employees : 4,319

Number of offices: 94 (oversea) & 9 (domestic)

Financial position (2019) : Net Profit J.Yen 501 Billion

Website: http://www.itochu.co.jp

- Machinery Company
- Textile Company
- Metals & Minerals Company
- Energy & Chemicals Company
  - ITOCHU ENEX Co., Ltd.
- Food Company
- General Products & Realty Company
- ICT & Financial Business Company
- The 8th Company
- Urban Environmental & Power Infrastructure Department
- **Marine Department**

Business Activity

- Ship Trading / Finance
- Ship Owning
- Investment of LNGC & Off-shore unit

: Internal partnership for NH3 fuel value chain

2. Integrated Project

Joint Development for Pilot Project

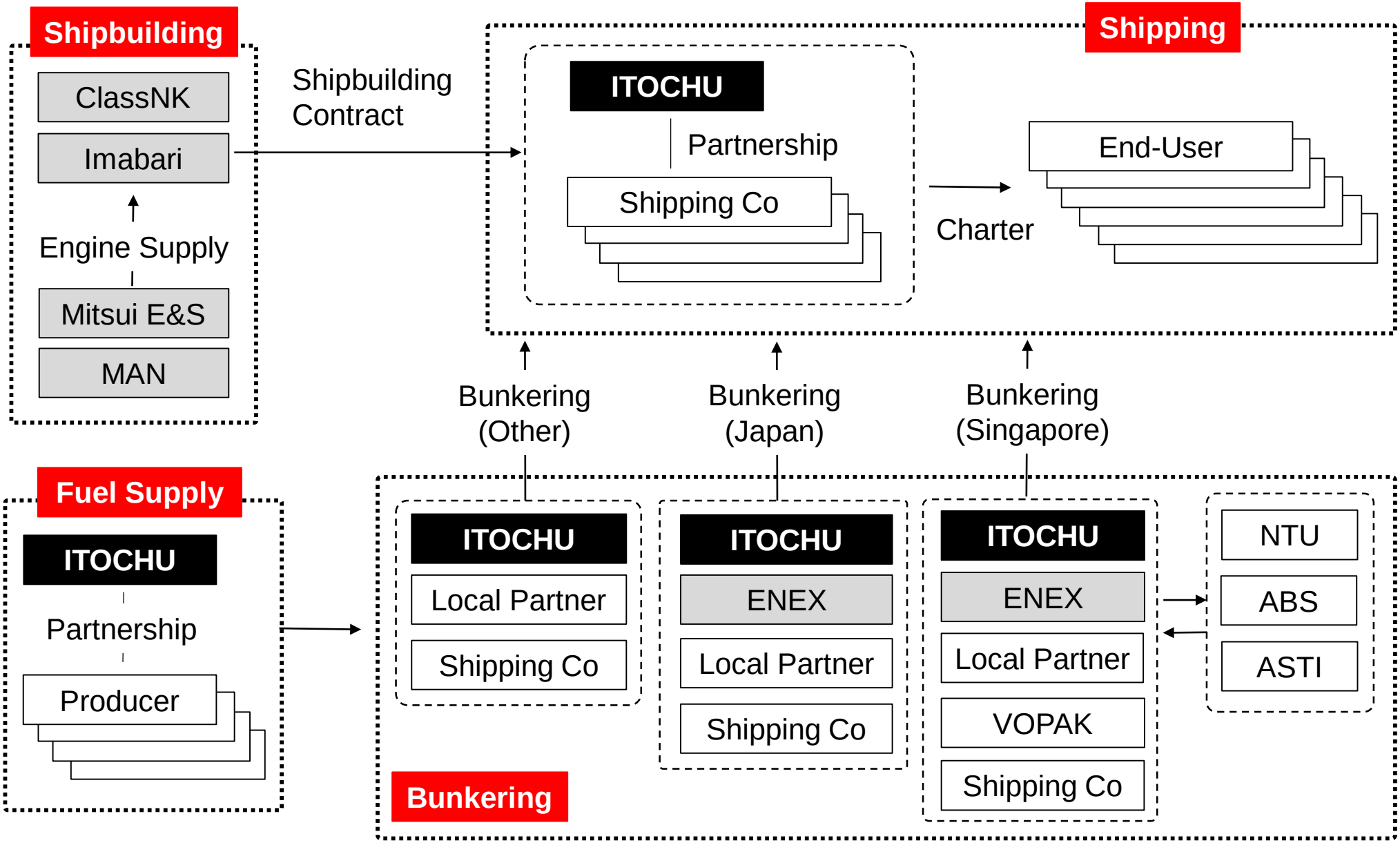
- Joint Development of Pilot Project with ammonia fuel
- Joint Development of Ship design with ammonia fuel engine
- Ship type to be determined based on potential partners

Company	Role
Imabari	Development of ships equipped with Ammonia-fueled Engine
MAN	Development of an Ammonia-fueled Engine
Mitsui E&S Machinery	Support for MAN's development & Supply of Ammonia-fueled Engine
ClassNK	Safety assessment with developing guidelines
ITOCHU ENEX	Setting up an ammonia fuel distribution network
ITOCHU	Materialization of the integrated project(s) with potential partners

Additional partner(s) for "Pilot Project" to be required for development:-

- **Shipper & Shipping Company**
- **Ammonia Producer**
- **Industrial partner(s) related to Fuel Supply Chain**

3. Integrated Project with partnership



4. Establishment of NIHON SHIPYARD

Name	:	NIHON SHIPYARD CO., LTD.
Business	:	Design & Sales of all commercial ships (except LNGC)
Office	:	Tokyo / Yokohama / Marugame / Imabari
Share ratio	:	51% Imabari / 49% JMU
Opening	:	January 2021

After Jan 2021, marketing for newbuilding with NH3 fuel shall be made under the name of NSY, but based on actual construction of ship at shipyard under Imabari group or JMU group at their option.

It means that work flow of NH3 fuel ship after 2021 to be as follows : -

5. Target for Pilot Project

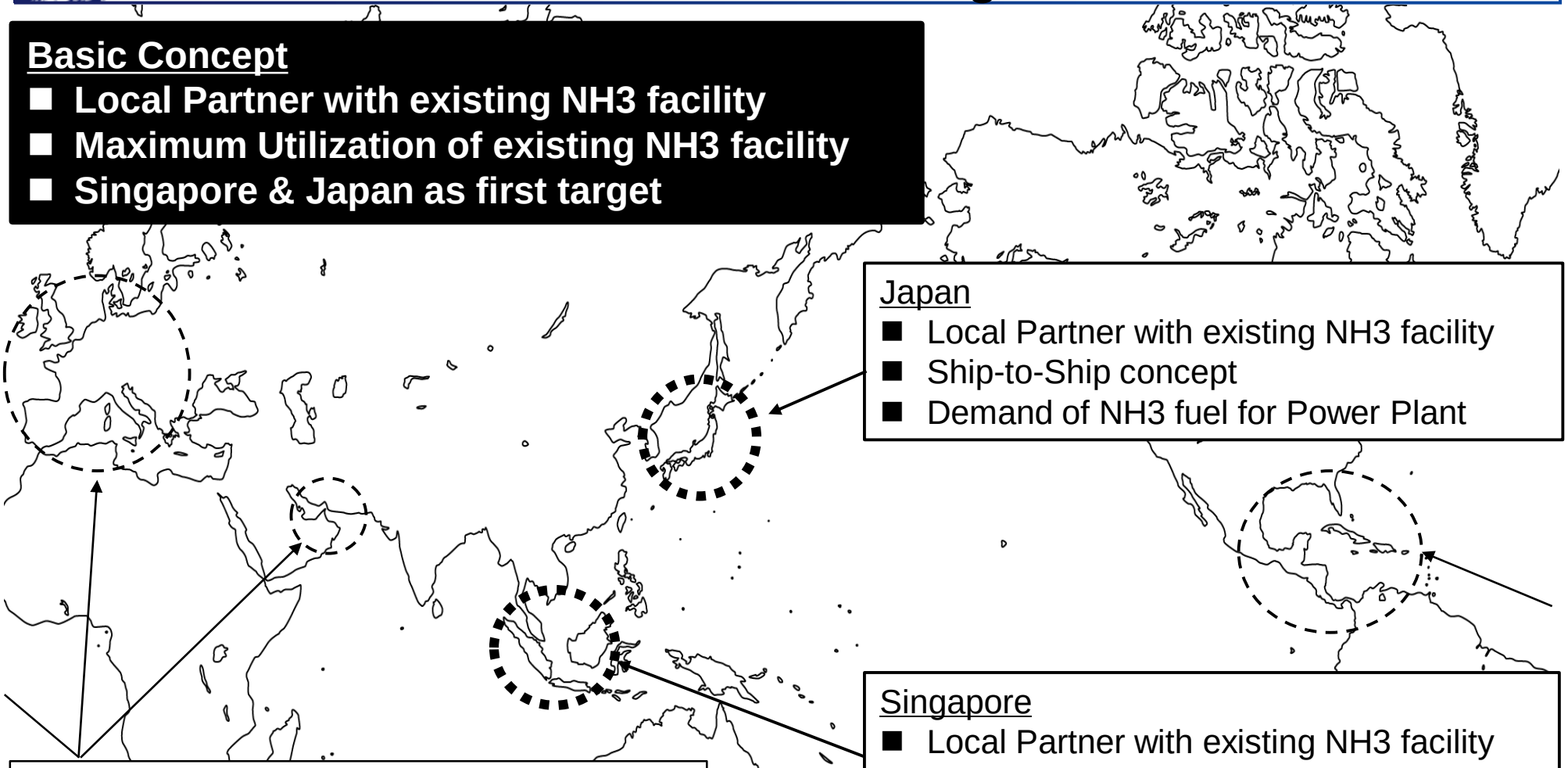
Item	Plan
Concept	■ Dual Fuel (NH3 & LSFO)
Ship Type	■ To be determined after discussion with potential shippers among :- • Bulk Carrier (Cape and/or Kamsarmax type) • Tanker (VLCC and/or MR)
Number	■ 10 units in total (for arrangement of supply chain)
Delivery	■ 2025 – 2026 for 10 units (but subject to Rules below)
NH3 Bunkering	■ Limited Bunkering Ports for NH3 fuel such as :- • Singapore • Japan • Others
Rules	■ Alternative Design Approval under SOLAS to be considered

Key Factor is “COST & RULES”, which require : -

- **Support from Shippers**
- **Establishment of rules & regulation for ship design & bunkering**
- **Economical Incentive for Shippers & Ship owners**

6. Idea of Global NH3 Bunkering Network

Basic Concept
- **Local Partner with existing NH3 facility**
- **Maximum Utilization of existing NH3 facility**
- **Singapore & Japan as first target**



Japan
- Local Partner with existing NH3 facility
- Ship-to-Ship concept
- Demand of NH3 fuel for Power Plant

Singapore
- Local Partner with existing NH3 facility
- Ship-to-Ship concept
- Joint study with NTU / ABS / ASTI

Malaysia
- Under discussion with potential partners

Europe / Middle East / USA
- Under discussion with potential partners
- Bunkering at Production site (or nearby)
- Ship-to-Ship or Shore-to-Ship

7. Target for NH3 Procurement

Item	Target
NH3 specification	■ Current specification (but subject to further study)
NET CO2 Emission	■ NET CO2 Emission to be less 1-CO2-ton against production of 1-NH3-ton ■ Producer's Statement how to achieve such level to be required ■ Expecting "Certificate of Blue NH3" at later stage
Terms	■ Multiple years basis with INDEX link
Price INDEX	■ Price INDEX as NH3 fuel to be introduced

Commercial Terms for NH3 fuel to be discussed through development of Pilot Project for 10units, which might be benchmark for next projects.

8. Key for decarbonisation

Development

Introduction

Expansion

International

Safety Rules (Ship)

Emission Control (EEDI / EEXI / CII)
- Long Term Plan including rules & regulations for Newbuilding / Existing ships

Linkage with Country's Responsibility
- Compliance with the IMO global regulations
- Reliable and objective standards supported by survey and certification as to ship performance

Incentive
- End-User & Ship-owner from IMRF

Carbon Levy
- To be required if no "Incentive"

Local

Safety Rules (Bunkering)

Incentive (End-User)

Incentive (Ship-owner)

Carbon Levy

"COST & REGURATION" is KEY for decarbonisation

THANKS