Current status of offshore activities
(exploration and exploitation of natural ocean resources)

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Global Offshore Oil and Gas Production

OECD and Non-OECD petroleum and other liquid fuels consumption, Reference case, 1990-2040 (million barrels per day)

Non-OECD petroleum and other liquid fuels consumption by region, Reference case, 1990-2040 (million barrels per day)

Source: U.S. Energy Information Administration
International Energy Outlook 2014

Source: Maritime Bureau, MLIT

Source: International Energy Agency
World Energy Outlook 2008
Diversified Offshore Activities

- Subsea Gas Development -

- Offshore Production and Liquefaction
  - Prelude project

- Offshore Production (Onshore Gas Liquefaction)
  - Icthys project
3 Diversified Offshore Activities
— Onboard Gas Liquefaction and Regasification —

○ Onboard Liquefaction
FLSO

○ Onboard Regasification
FSRU・MOL・Uruguay

Source: Asia/World Energy Outlook 2014
Diversified Offshore Activities
— Ultra Deep Water Drilling and Exploration —

Ultra Deep Water Drilling Rig

Exploration Vessel

High Spec
Max. Operating Water Depth 12,000ft
Max. Drilling Depth 40,000ft
Dual Derick etc.

Source: Offshore MAGAZINE (2013 May)

High Spec
Streamer Cables
Max. Lengths 12,000m
Diversified Offshore Activities
– Subsea Production Technology –

Subsea factory

BOP

ROV

Gas Compression System

Pipe line

Statoil

Allinvent

Petrobras

NKT Flexibles
Sakhalin project

Piltun-Astokhskoye-A platform in North sea (旧Molikpaq)

Kanumas project

Exploration area
Diversified Offshore Activities
– Ocean Renewable Energy –

- Tidal power generation
- Offshore wind power generation (Megasite Kashima)
- Wave power generation
- Tidal power generation
- Ocean thermal energy conversion
- Offshore floating wind power generation (Nagasaki - Fukushima)
- Ocean current power generation

Nagasaki
Fukushima/4 column Semi-Sub
Fukushima/3 column Semi-Sub
Fukushima/advanced spar
Diversified Offshore Activities
— New Resources Development —

Marine resource exploration system
high-speed data link using satellite
highly-efficient subsea system by ROV
AUV multi operation system
cross-ministerial Strategic Innovation promotion Program
“Next-generation technology for ocean resource exploration”

methane hydrate
sea-floor hydrothermal deposit
cobalt-rich crust
Keywords of Offshore Activities

- Deep Water · Arctic
  - Ultra Deep Water Drilling Rig
  - Sakhalin project

- Ocean Renewable Energy
  - Offshore Wind power generation (Megasite Kashima)
  - wave power generation
  - tidal power generation
  - ocean current power generation

- Sleeping Resources in EEZ
  - methane hydrate
  - cobalt-rich crust
E&P: Exploration and Production Companies

- In order to enlarge oil and gas production, Invest for ocean development project.
- Start world class LNG project as operator.

Engineering Companies

- Spread top level technology and know-how about onshore LNG plant to offshore area.
- Enter into new technology field including FLNG and Subsea.

Offshore Related Companies

- Maintain high shares for FPSO.
- Enter into new field-FLNG, Ultra Deep Water etc.
Maritime Transport

• Take a proactive stance in working on owning and operation business of FPSO, FSRU and drillship, while making use of know-how and expertise of energy handling with LNG carriers and tankers.
• Enter into new field EPC and facility operation.

Shipbuilding Companies

• Japanese companies get on base overseas expansion by investment abroad. They are accumulating know-how and track record about designing and construction of drillship and FPSO etc.

Japanese companies are planning business expansion in growing offshore field, utilizing the synergy effect between offshore business and their main business.
12  Forward Japanese company’s growth in offshore field

Statement for Promotion
Marine Industry
Japan Economic Federation 2015.3.17

Action for promotion marine industry

(1) ocean resource / energy development in EEZ
(2) ocean resource / energy development overseas

Reinforcement the foundation of marine development

Driving forward human resource development

Councilors’ Opinion
Headquarters for Ocean Policy Councilors’ Meeting 2015.5.26

① Creating / promoting of new marine industries
② Promoting utilization sea area
③ Conservation of marine environment
④ Offshore industrial human resource development

Offshore industrial human resource development

building frameworks for industry-academia-government collaborations doing such as,

① Making curriculum based on Industrial needs
② Conducting overseas internship etc.
The need for the development of human resource to support the offshore industrial growth

Offshore engineers who will constitute the foundation of offshore industrial growth are needed.

The number of offshore engineers in Japan

Now

About 2,000

(according to 23 offshore related companies hearing)

2030

About 10,000

In order to increase the number of engineers to 10,000 for 15 years, about 9,000 engineer should be trained. (considering retirement)

About 600 engineers trained a year.

Per 1 year

About 600

designing

construction

operation
Necessary point of view to develop human resource

- Overseas marine engineering and merchant marine universities produce many offshore engineers.

<Marine engineering and merchant marine universities in Japan>

| Marine engineering and merchant marine university | 9 Universities | 785 persons | 85 persons |
| Resources university | 7 Universities | 380 persons | 60 persons |

Foundation of Engineer Training system

To forward offshore industrial promotion, universities need to establish a system to train 600 engineers who match Industry needs.

- To train human resource that have a thorough knowledge about international political economy, law and local customs etc. is necessary.
(Nikkei newspaper) The number of venture companies related to the University of Tokyo approaches 200. Total Enterprise Value exceed 1 trillion yen.
In Japan, the articulated knowledge on the offshore development has not been established. We must learn and build industrial knowledge by industry–academia collaboration.

The road map is essential to identify the technology development and the number of offshore engineers.

The knowledge should include not only engineering expertise but also the knowledge regarding international economy, policy and culture since it has an international nature.

It is appropriate to establish executive organization promoting cooperation between industries and universities.