Current status of offshore activities

(exploration and exploitation of natural ocean resources)

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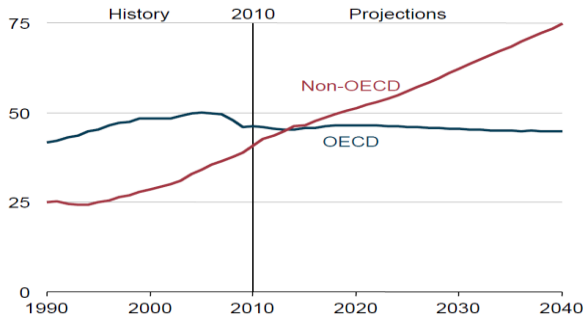
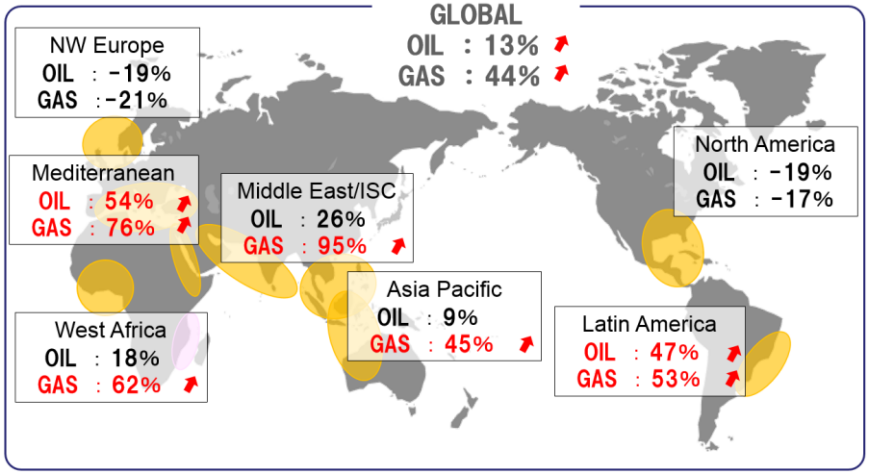
1 Global Offshore Oil and Gas Production

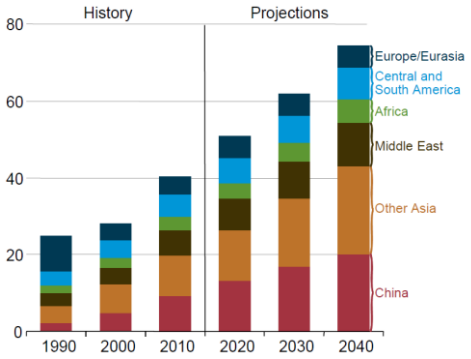
OECD and Non-OECD petroleum and other liquid fuels consumption, Reference case, 1990-2040 (million barrels per day)



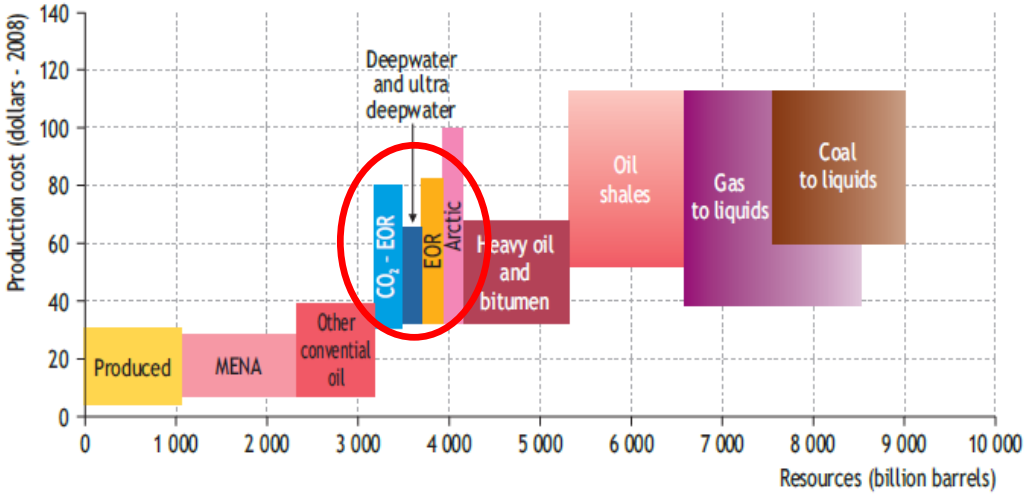


Source : Maritime Bureau, MLIT

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

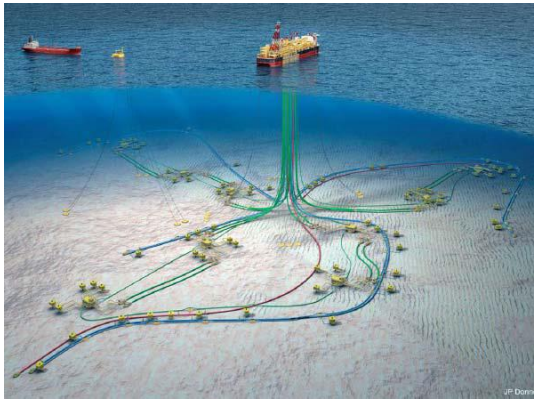


Source : International Energy Agency
World Energy Outlook 2008

2 Diversified Offshore Activities – Subsea Gas Development –

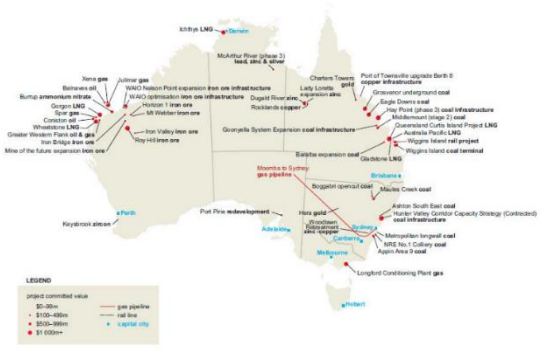
○ Offshore Production and Liquefaction

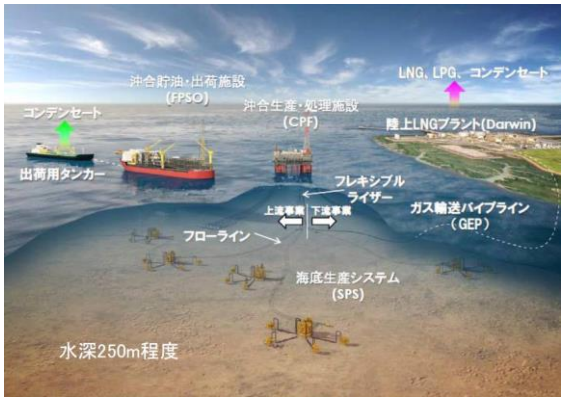
Prelude project



○ Offshore Production (Onshore Gas Liquefaction)

Icthys project

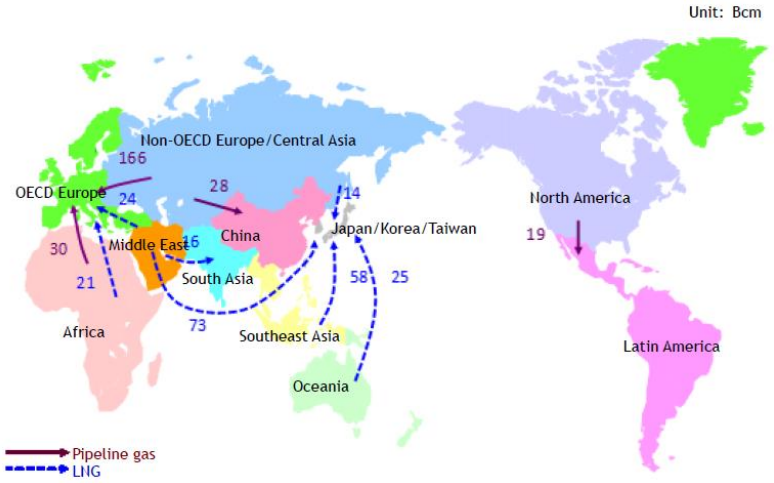




3 Diversified Offshore Activities – Onboard Gas Liquefaction and Regasification –

○ Onboard Liquefaction

FLSO



○ Onboard Regasification

FSRU・MOL・Uruguay

Source: Asia/World Energy Outlook 2014

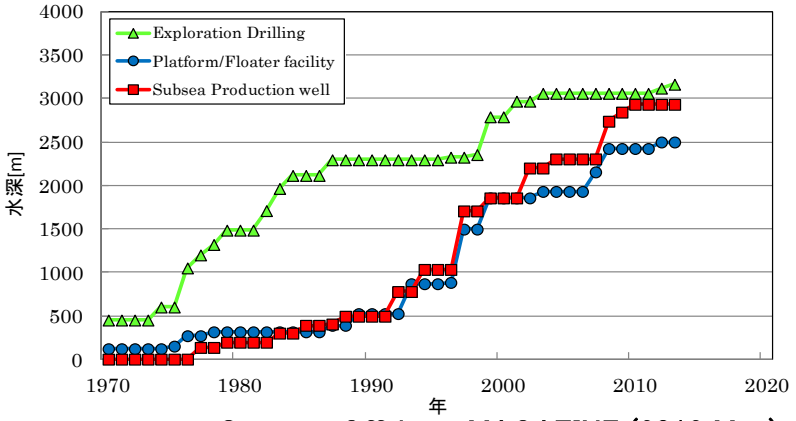
4 Diversified Offshore Activities – Ultra Deep Water Drilling and Exploration–

Ultra Deep Water Drilling Rig

Aker Kvaerner's H-6 rig

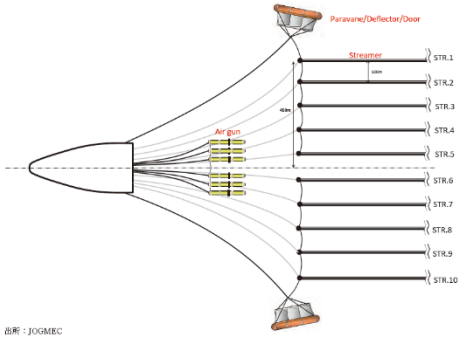
High Spec

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



Source : Offshore MAGAZINE (2013 May)

Exploration Vessel



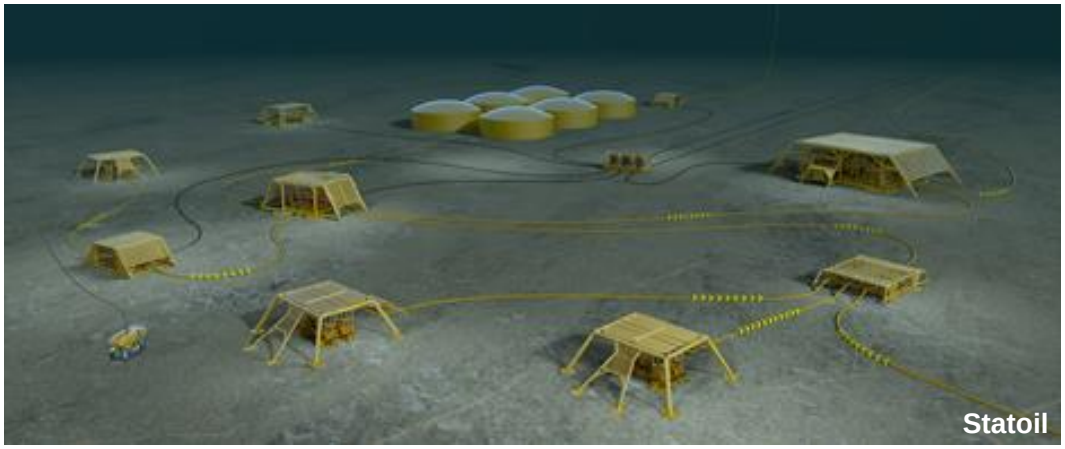
出所：JOGMEC

High Spec
Streamer Cables
Max. Lengths 12,000m

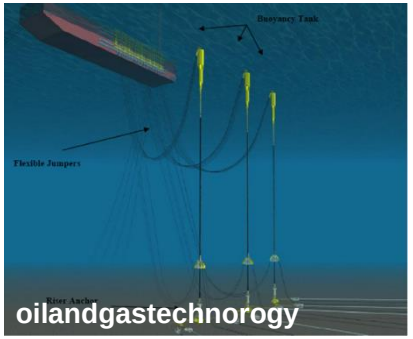
Diversified Offshore Activities
– Subsea Production Technology –

BOP

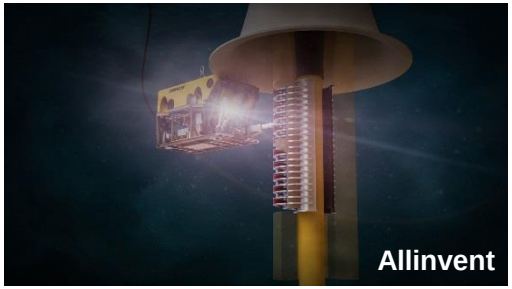
Subsea factory



Riser

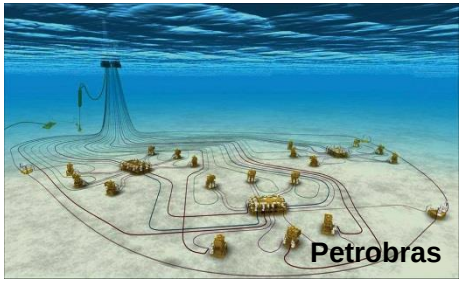


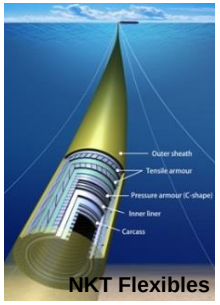
ROV



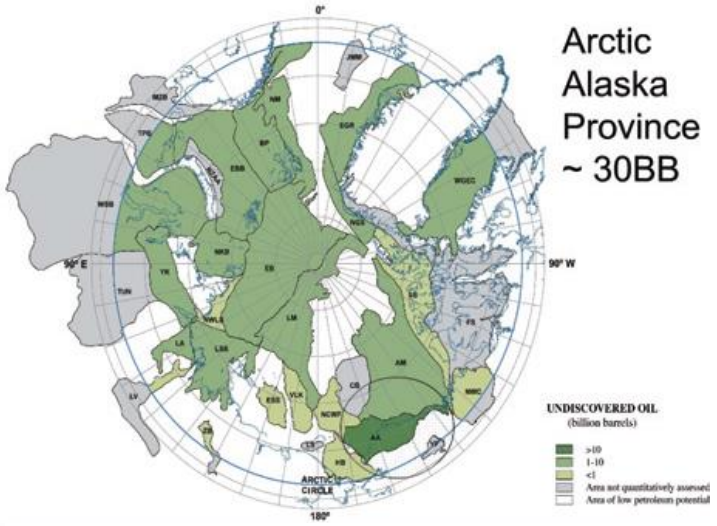
Gas Compression System

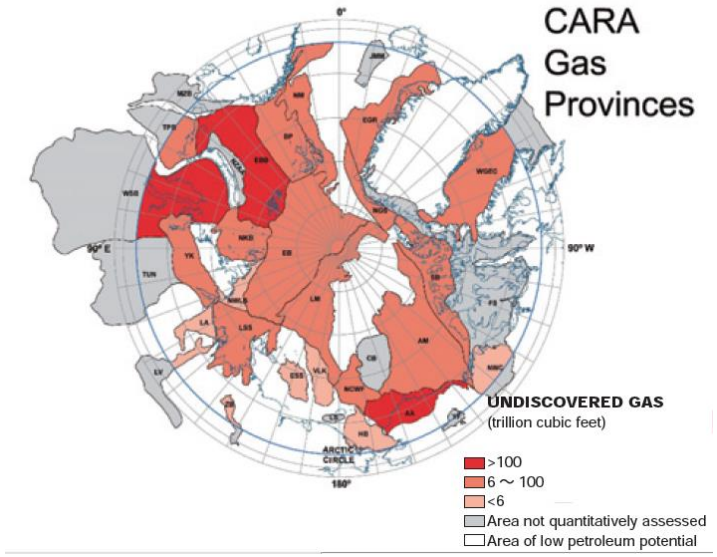
Pipe line





Diversified Offshore Activities
– Offshore Development in Arctic Ocean –



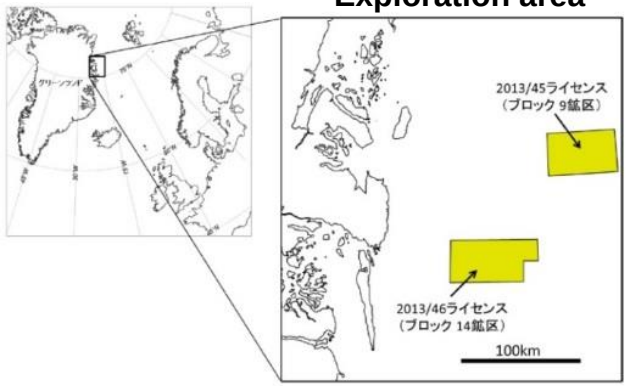


Sakhalin project

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)

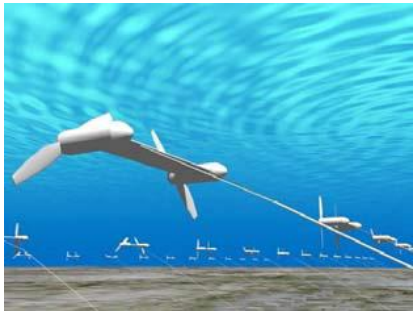
wave power generation

tidal power generation

tidal power generation

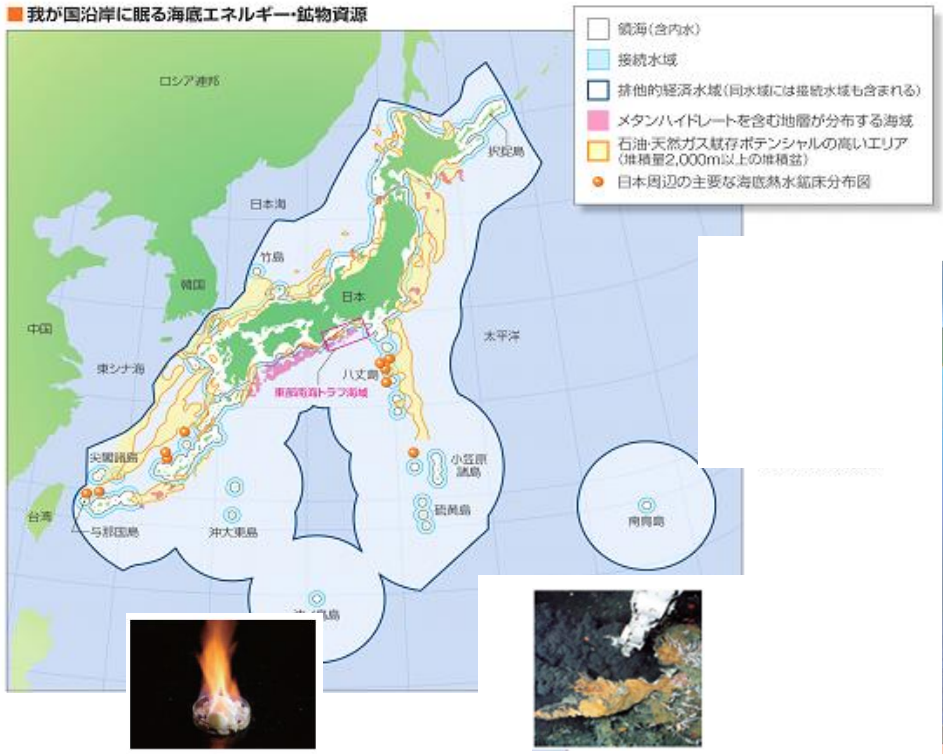
ocean thermal energy conversion

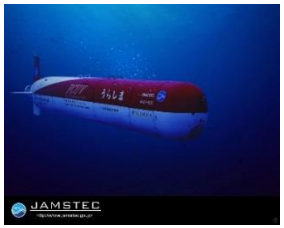
offshore floating wind power generation（Nagasaki・Fukushima）

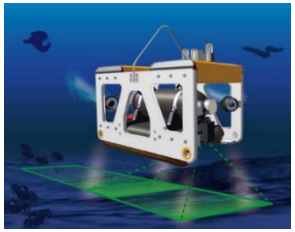


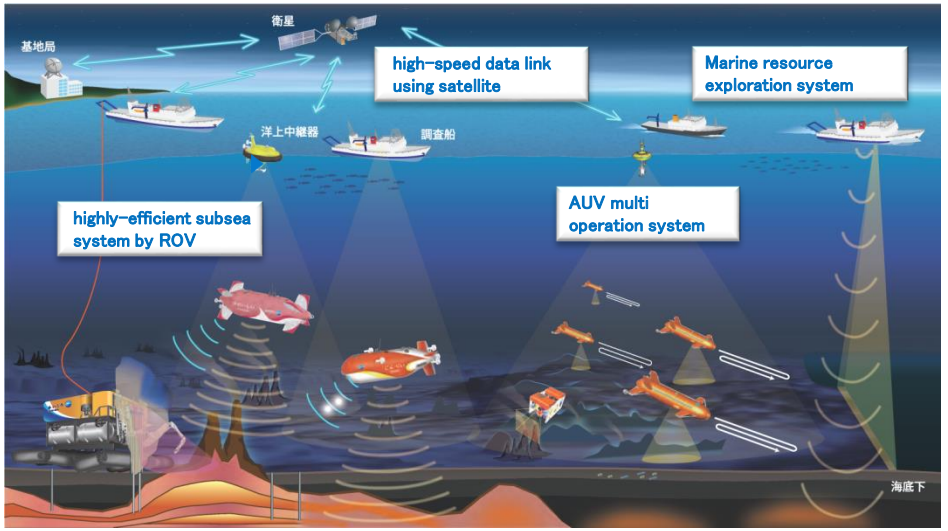
ocean current power generation

Diversified Offshore Activities
– New Resources Development –

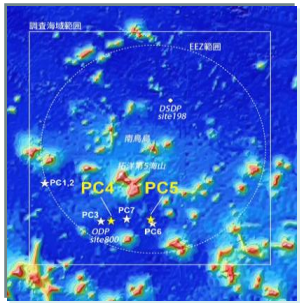








methane hydrate



sea-floor hydrothermal deposit

cobalt-rich crust

cross-ministerial Strategic Innovation promotion Program
“Next-generation technology for ocean resource exploration”

Keywords of Offshore Activities

Deep Water・Arctic


Ultra Deep Water Drilling Rig


Sakhalin project

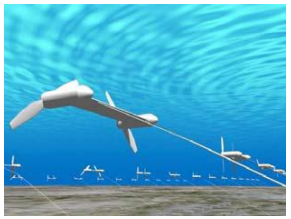
Ocean Renewable Energy


Offshore Wind power generation (Megasite Kashima)

wave power generation

tidal power generation

ocean current power generation



Sleeping Resources in EEZ

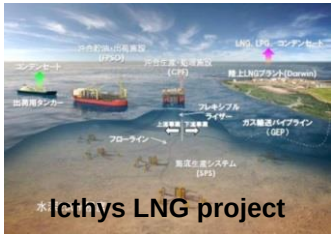
methane hydrate

cobalt-rich crust

10 Offshore Activities in Japanese Companies

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.**

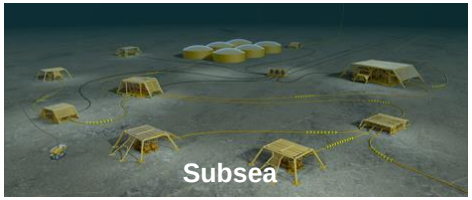


※Icthys LNG project

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.**


FLNG



Offshore Related Companies

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

11 Offshore Activities in Japanese Companies

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

Training engineers and operators.

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,

①Making curriculum based on Industrial needs
②Conducting overseas internship etc.

13 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 ）

×5

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

14 Necessary point of view to develop human resource

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

＜Marine engineering and merchant marine universities in Japan＞

	graduate	Into offshore company
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 of 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.

15 （Reference）

(Nikkei newspaper) The number of venture companies related to the University of Tokyo approaches 200. Total Enterprise Value exceed 1 trillion yen.

東大ベンチャー200社突破

企業価値1兆円超

東京大学の特許や人材を生かして創業した「東大関連ベンチャー企業（VB）」が200社を突破、合計の企業価値が1兆円を超えた。同大産学連携本部の調査で、関連VBの株式上場などで東大の特許収入は2013年度に過去最多の6億円超になった。大学の知的財産を活用した産業創出は政府の成長戦略の一つで、「知」で稼ぐ動きはさらに広がりそうだ。

東大が関連VBの規模を算出したのは初めて。大学の特許や研究成果をもとに起業した「大学発VB」に、①学生が創業②教員が役職員を兼務③東大系ベンチャーキャピタル（VC）が出資――の事例も加えた。

4月上旬時点でミクシィ、バイオ食品のユーグレナ、医薬品のペプチドリームなど上場企業16社、非上場208社の計224社だった。5年前の約2倍だ。上場16社の時価総額は計9600億円超。非上場会社は直近のVCからの資金調達額を基に企業価値をはじき、合わせて約1兆3千億円となった。

東大の特許ライセンス収入は、VBから特許使用料として受け取った新株予約権の売却分も含め、13年度に6億1千万円超と5年前の約3倍に増加した。同年度に東大は共同・受託研究費として大企業などから347億円を得ており、東大関連VBは成果を事業化する際の器にもなる。

米グーグルや中国の検索大手、百度（バイドゥ）などによる東大関連VB買収事例も出ており、グローバル市場での注目度も高まっている。

能な「大学の知財を移転したVB」に限ると東大は68社、最大級とされるたただ海外と比べると依然格差は大きい。比較可学関連VBは停滞している。年間の設立数は05年の約250社をピークに減っている。

日本全体では近年、大700社を超える。米カリフォルニア大学は

Summary
～direction of training offshore engineers～

- 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.