



**Maritime Bureau
Ministry of Land,
Infrastructure, Transport
and Tourism (MLIT)**

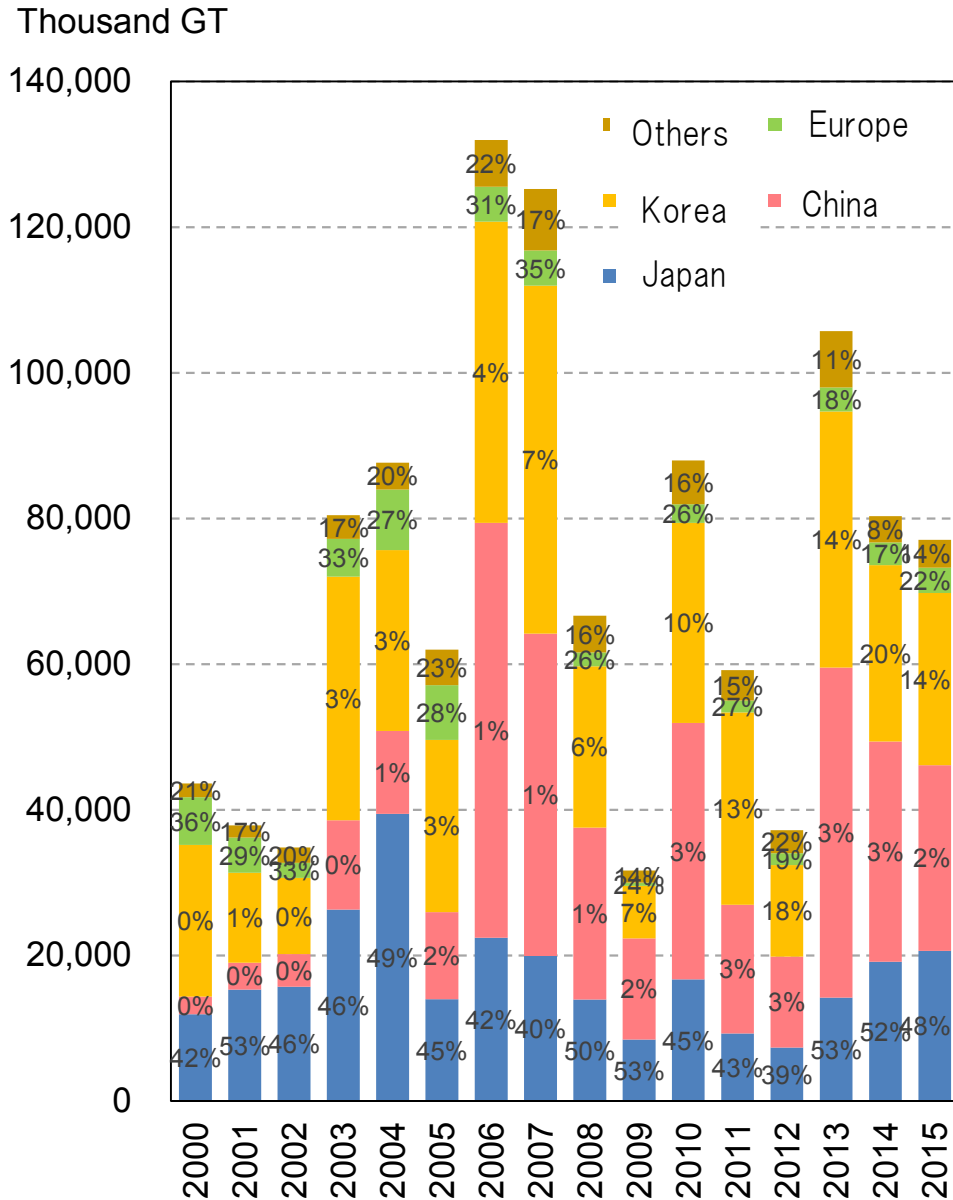
*Green Frontier in Maritime Industry
~Going for growth~*

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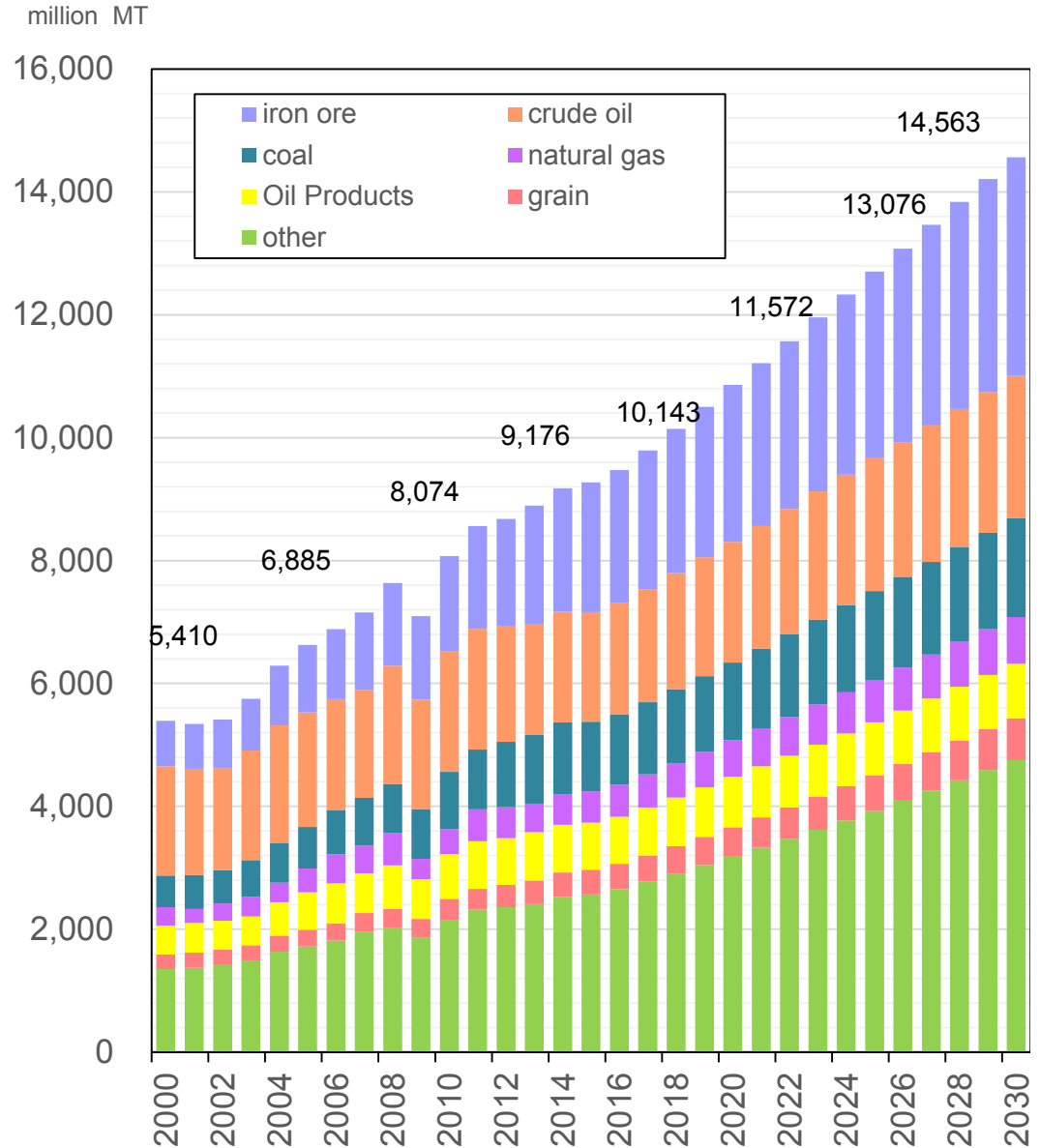
13th April, 2016
SEA JAPAN 2016
International Maritime Seminar
“Challenges for Maritime Innovation”
~ Green Technologies and IoT~



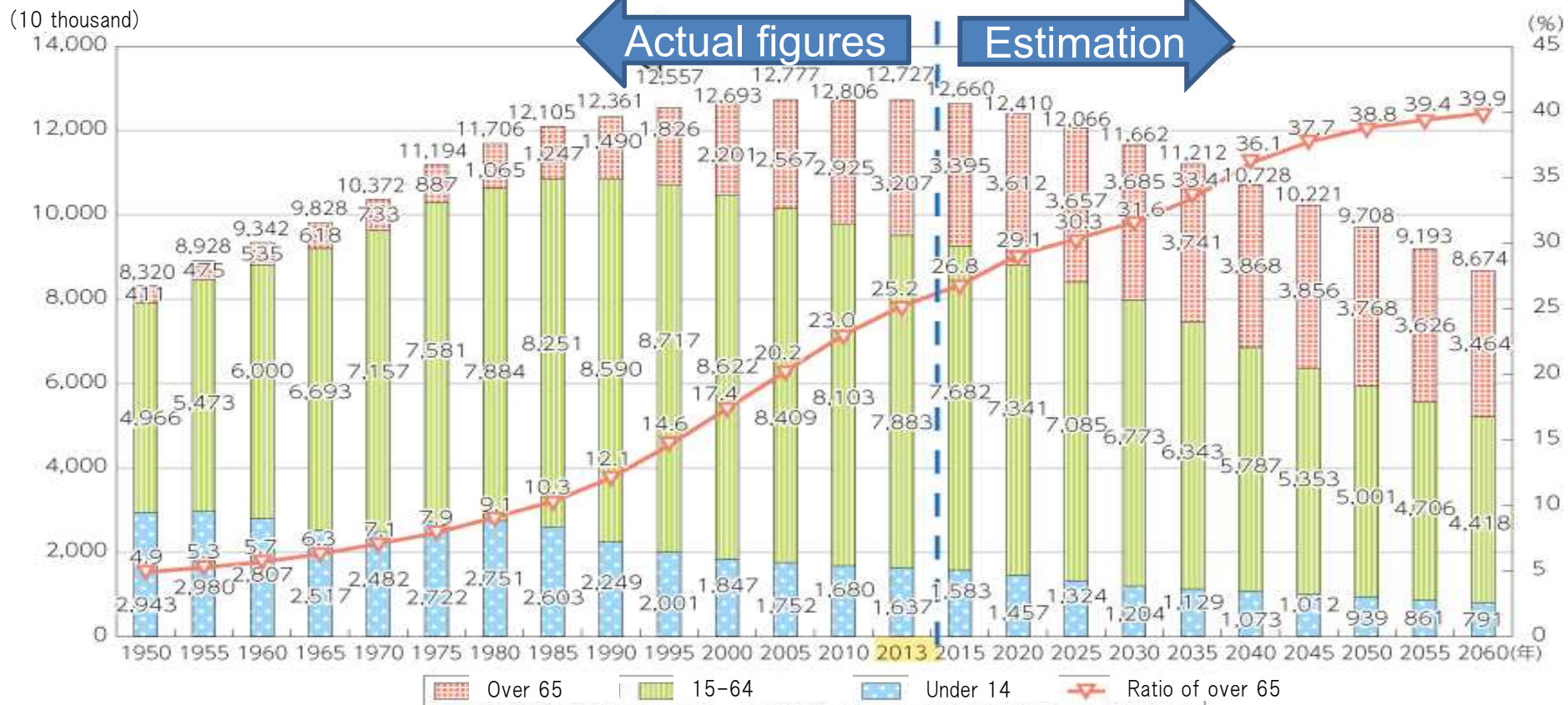
Share of new shipbuilding order



Seaborne Trade Cargo Volume



Population transition in Japan



- ✓ In order to continue the economy growth against the population decline, “productivity revolution” is needed in all industries.
- ✓ Though the productivity of Japanese shipbuilding industry exceeds that of China and South Korea, this industry should tackle the revision of productivity more and more.

- **“Four Driving Forces” are identified to be strengthened.**

Driving Force 1: Sophisticating products and services for customers

- ✓ Promotion of service utilizing IoT/big data
- ✓ Upgrade of abilities necessary for developing new types of vessels

Driving Force 2: Cultivating new business

- ✓ Entry to offshore industry and development of new business
- ✓ Creation of new demands such as liquefied hydrogen transport

Driving Force 3: Acquiring ultimate efficient manufacturing process

- ✓ Visualization of every process of shipbuilding

Driving Force 4: Upgrading human resources

- ✓ Training of engineers for design and of workers on site

- **Basic conditions need to be met to exercise Four Driving Forces.**

- ✓ Establishment of fair competitive market conditions on shipbuilding
- ✓ Early entry into force of Ship-recycling Convention
- ✓ Rational International technical regulations

Theme of this Seminar : “Green Technologies and IoT”

Driving Force 1: Sophisticating products and services for customers

Driving Force 2: Cultivating new business²

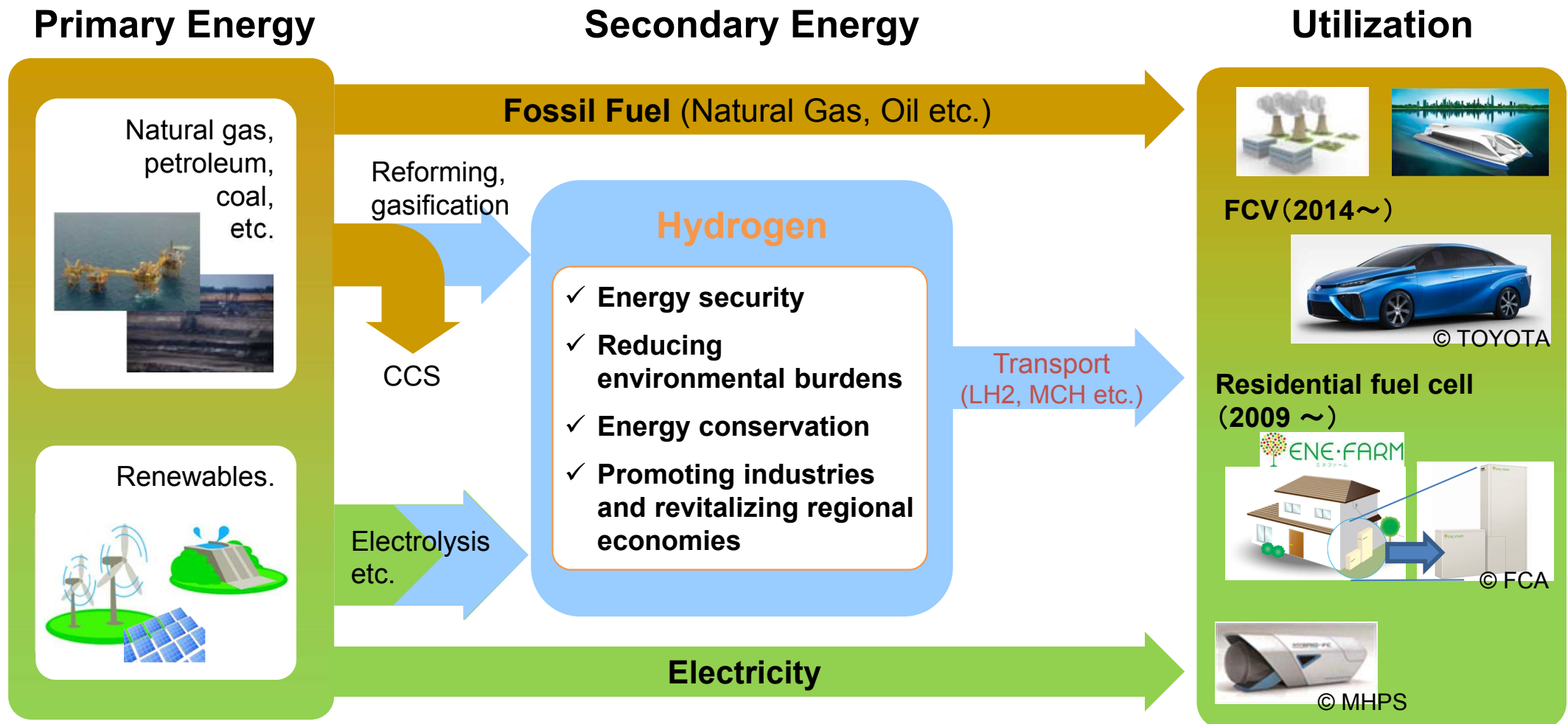
Driving Force 3: Acquiring ultimate efficient manufacturing process

Driving Force 4: Upgrading human resources

Focus of today’s presentation:

- Development of liquefied hydrogen transport technology
- Advanced vessels and operation/maintenance service

As for future secondary energy, **hydrogen is expected to play a central role**, as well as electricity and heat
-Strategic Energy Plan of Japan, April 2014



Building hydrogen supply chain

FY2015 – 2020

Demonstrate the whole supply chain of hydrogen produced from untapped overseas energy resources

Demonstrations on:

- Method(s) of **hydrogen production** from e.g. by-product hydrogen, brown coal (untapped overseas resources)
- **Transportation and storage** in the form of cryogenic liquid hydrogen or organic hydride
- **Power generation** using (imported) hydrogen



Production



Transportation and storage



Power generation

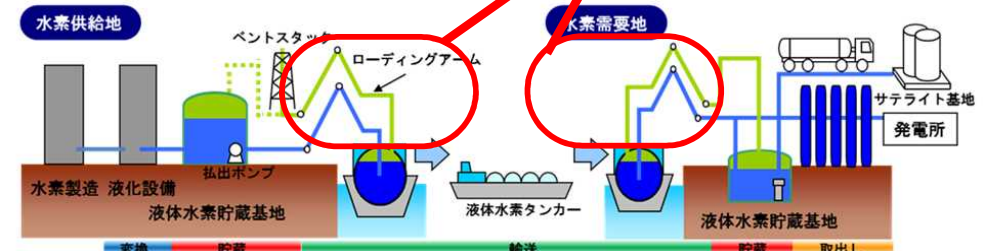
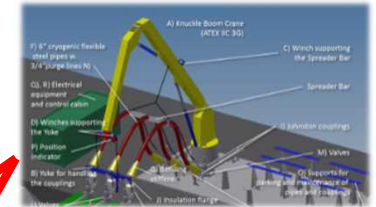
Development of loading system for LH2

FY2014 – 2018

Develop ship-shore loading system(s) for cryogenic liquid hydrogen

Key Issues:

- **R&D** (Emergency Release System, swivel joints etc.)
- **Procedures** for loading/offloading operations
- **Safety regulations and standards**



Recent Technological Developments

Development of maritime broadband

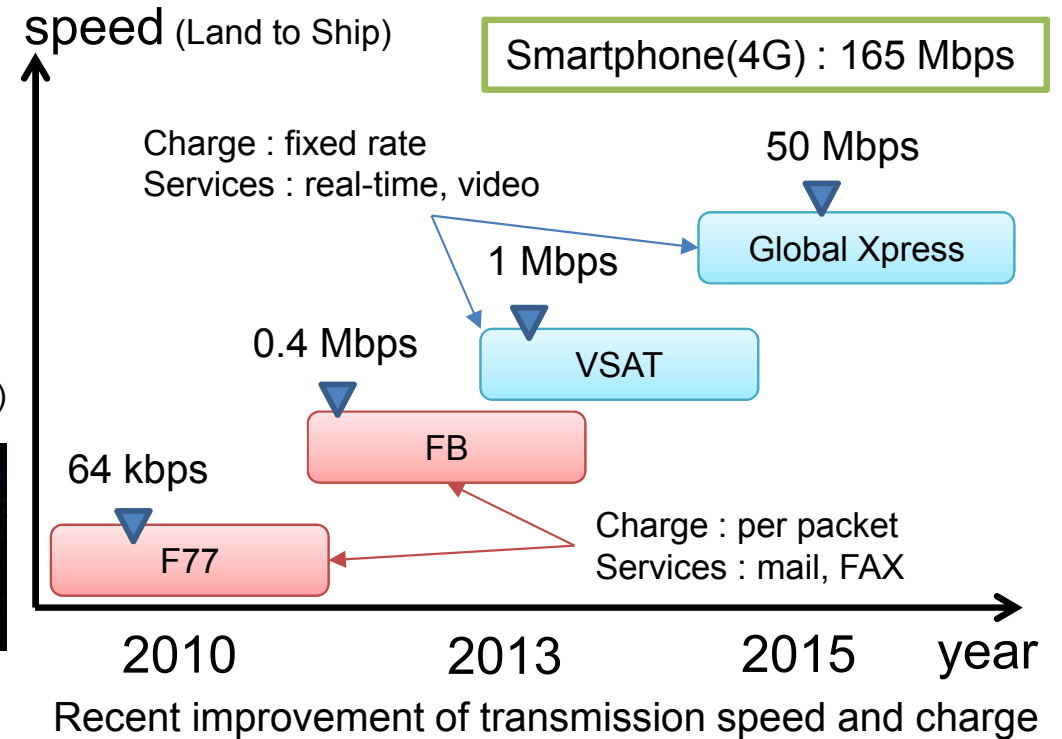
Maritime broadband has been rapidly developing. It is common to have real time and fixed-rate charged services same as land to land communication.

e.g.
On 31st March 2016, Inmarsat launched new high-speed broadband service for maritime sector.

Inmarsat (Global Xpress)



50Mbps(Land→Ship) / 5Mbps(Ship→Land)



Innovation utilizing IoT/bigdata on land

Important factors;

- Strategy: Viewpoint of user
- Cooperation beyond sector
- Speed

Amazon



©AMAZON

Google



©Google

From Hardware to Software

KOMATSU



©KOMATSU

SIEMENS

IBM

GE

From Software to Hardware

Maritime Innovation is Coming

Image of Innovation in Maritime Sector

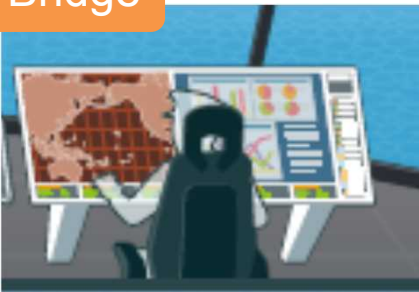
Acquiring Data

Vessels



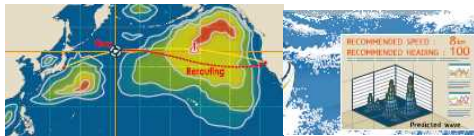
Operation support

Bridge



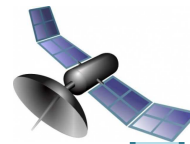
Machine-System monitoring

Engine



- ✓ Weather routing
- ✓ Avoidance of collision

- ✓ Trouble alert, preventive system
- ✓ On ship repairing support from land



Data

Monitoring Support

Smart operations using real time support from land



Data center

Data

Monitoring



Shipyard, Machinery Maker

- ✓ Feedback in design
- ✓ Effective maintenance

Our policy;

Support technology developments and promote their advanced utilization.

- ✓ Shipbuilding industry is a “growing” industry in the long term.
- ✓ In order to sustainably strengthen competitiveness of the Japanese shipbuilding and ship-machinery industries under the condition that the population will be decreasing, “productivity revolution” is indispensable.
- ✓ Japan, through effective collaboration by all maritime stakeholders, will keep committed to the realization of the further maritime innovation!

MLIT



Thank you very much for listening!

