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RENEWABLE ENERGY INSTITUTE

Sustainable biomass procurement for Japan's bioenergy sector

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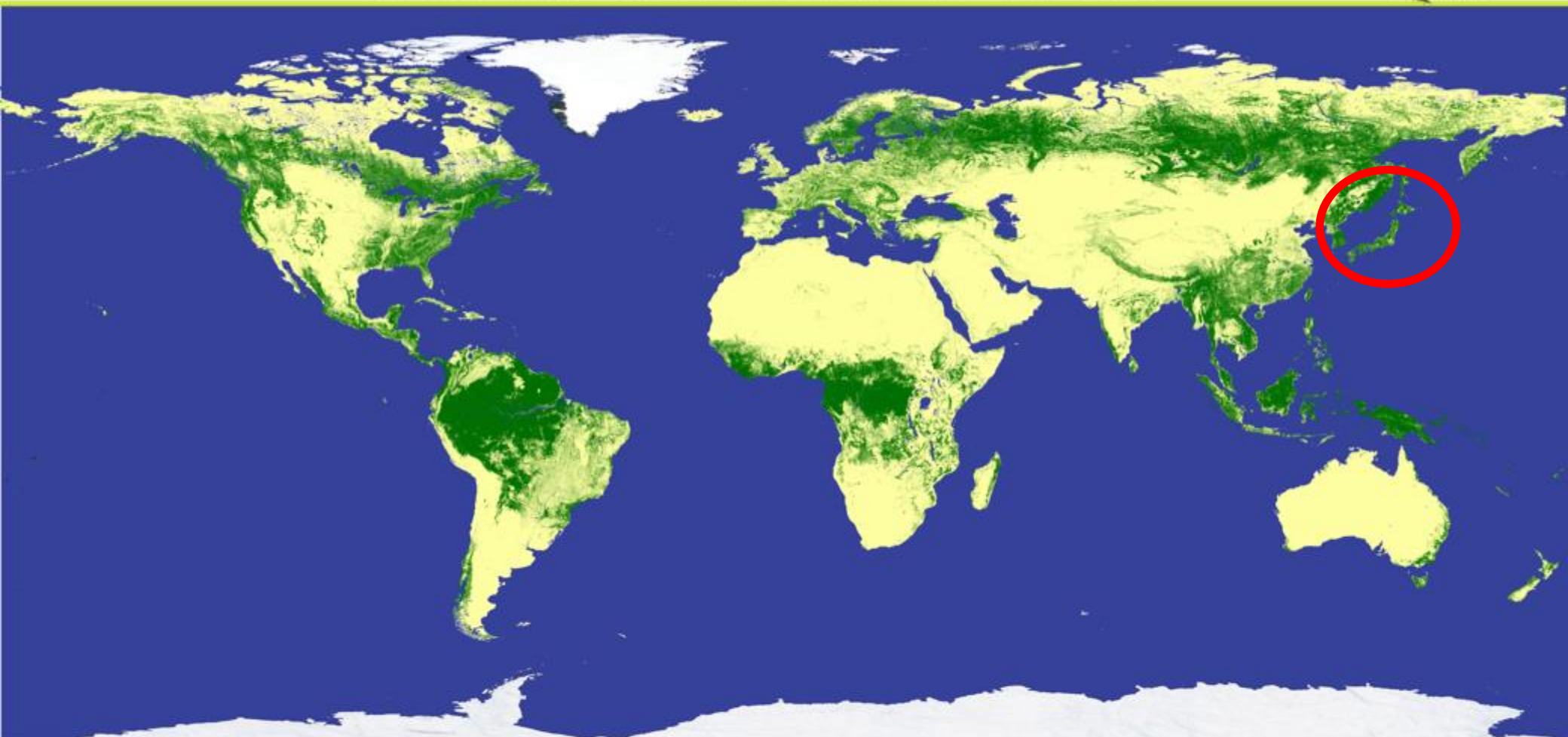
- Biomass resource in Japan
- Recent biomass market development
- Sustainability requirements
- Concluding remarks



BIOMASS RESOURCE IN JAPAN



PALSAR 10m Global Forest/Non-Forest Map 2009



©JAXA, METI Analyzed by JAXA

● : Forest ● : Non-Forest ● : Water

< Forest and agricultural area in Asia-pacific region >

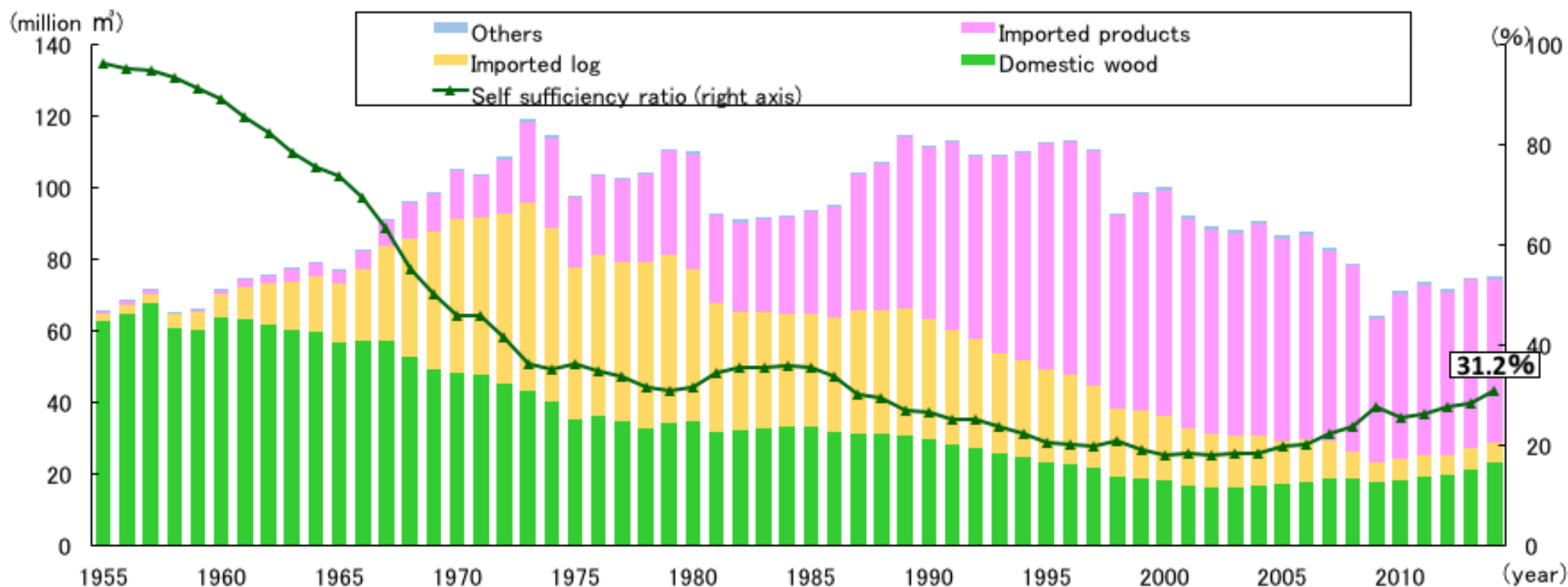
Country	Population (millions)	Forest area		Agricultural area	
		Million ha	ha/capita	Million ha	ha/capita
Canada	35.9	347	9.65	63	1.74
USA	319.9	310	0.97	406	1.27
Australia	23.8	125	5.24	366	15.37
Viet Nam	93.6	15	0.16	12	0.13
Indonesia	258.2	91	0.35	57	0.22
Malaysia	30.7	22	0.72	8	0.26
Thailand	68.7	16	0.24	22	0.32
China	1,428.4	208	0.15	529	0.37
South Korea	50.6	6	0.12	2	0.03
Japan	128.0	25	0.20	4	0.04

Source) FAOstat

Historical trend of wood supply



Photo) Forestry Agency, T. Aikawa

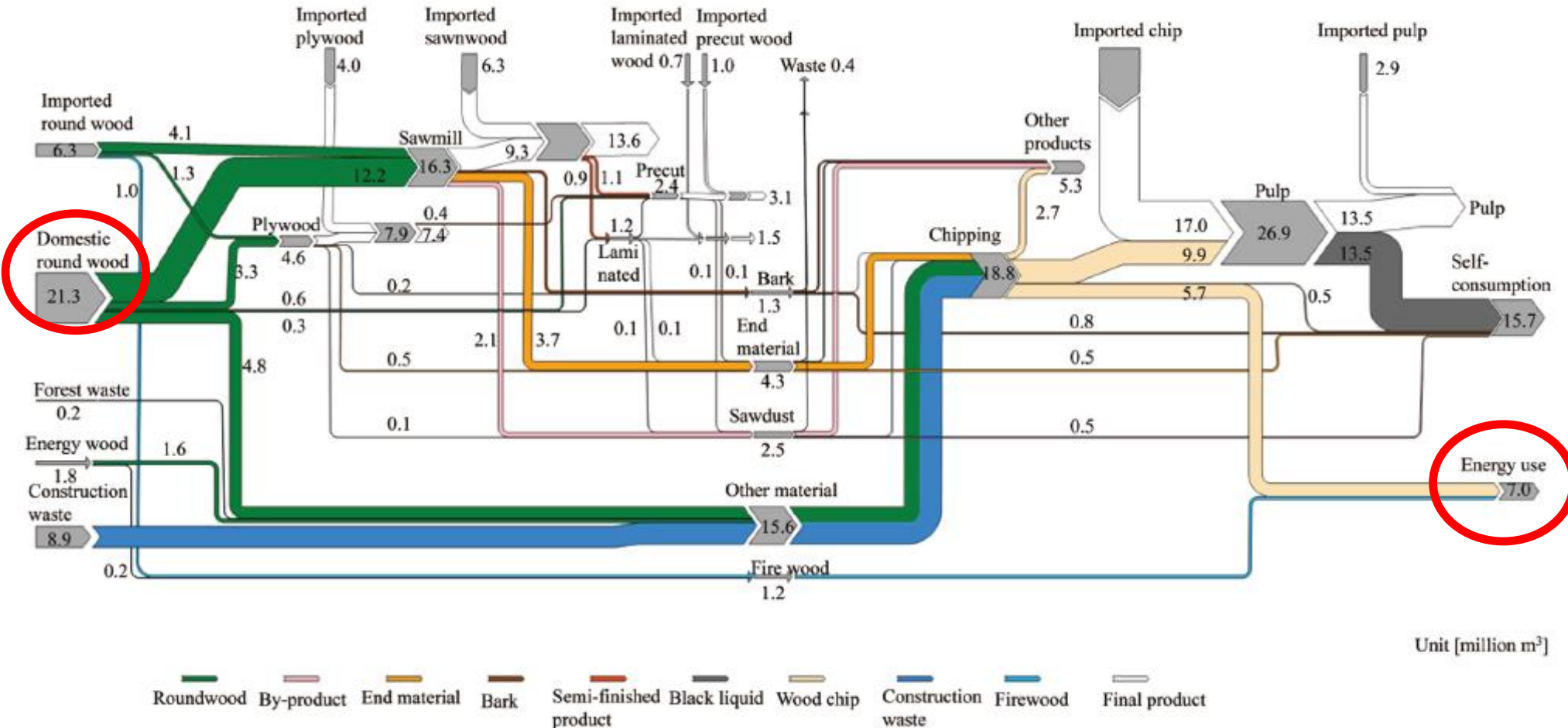


Source) Forestry Agency, Japan

Woody biomass flow



<Wood flow chart for Japan in 2014>



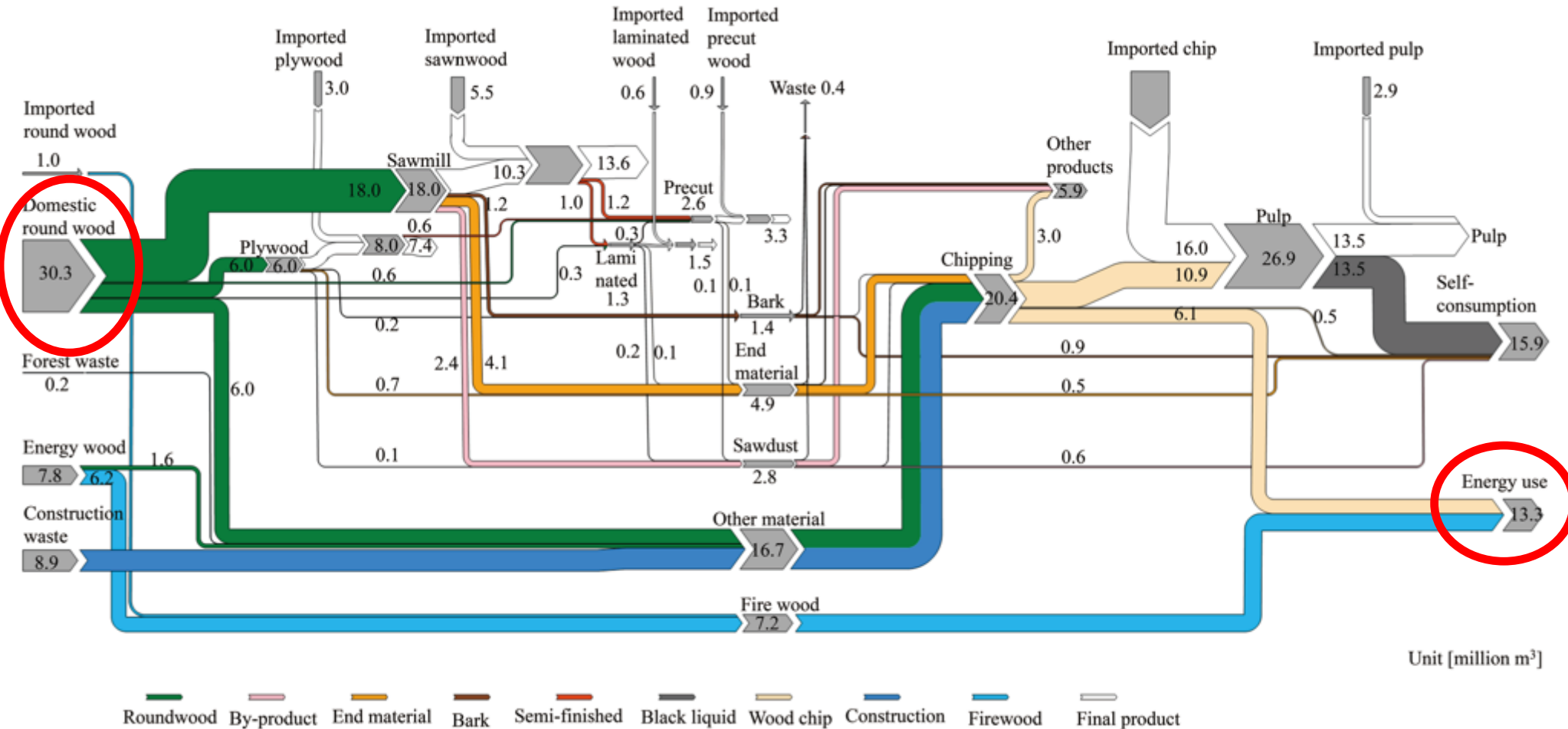
Source) Furubayashi et al. (2017)

Domestic round wood: 21.3m³ -> Energy use: 7.0m³

Woody biomass flow



<Wood flow chart for Japan in 2025>



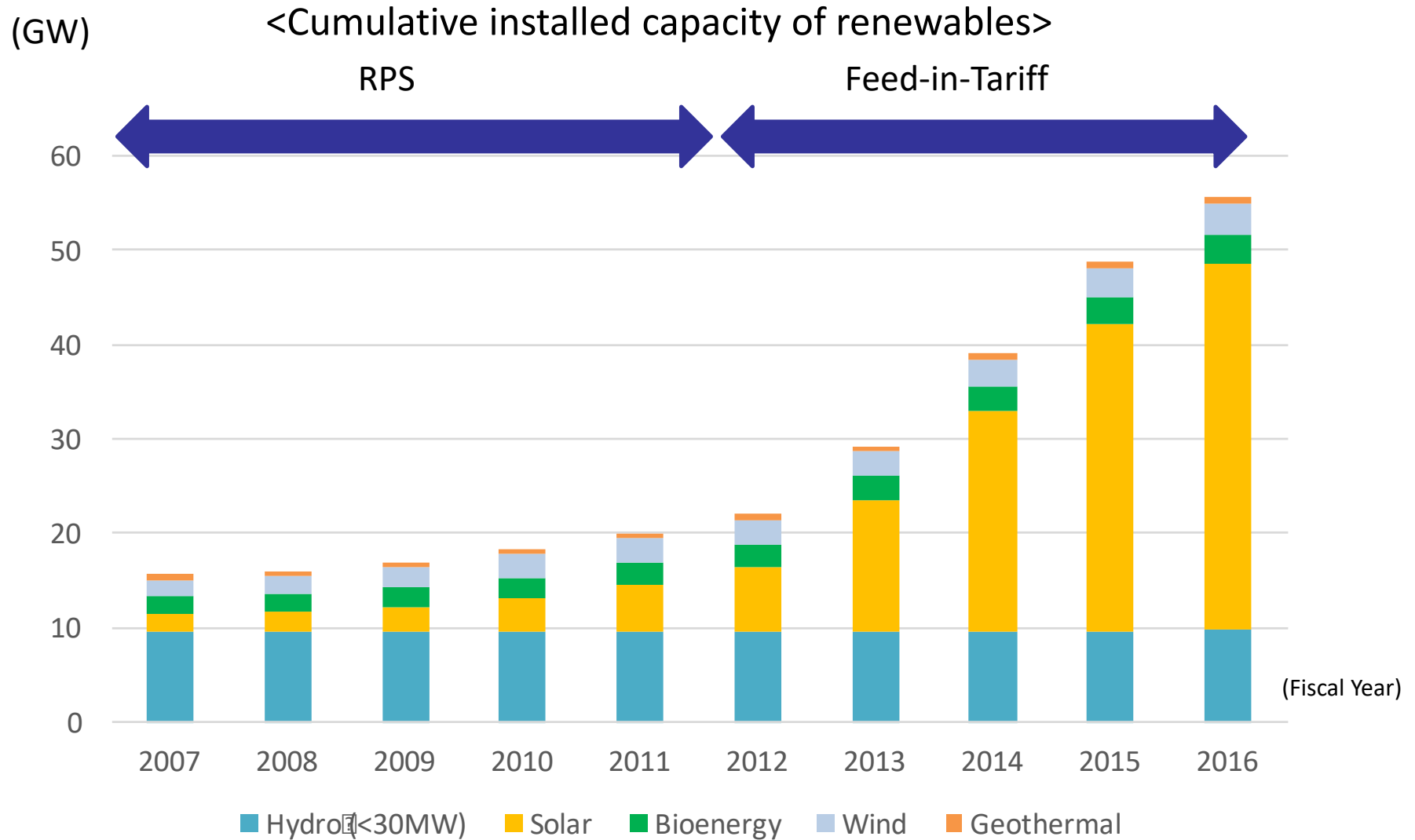
Source) Furubayashi et al. (2017)

Domestic round wood: 30.3m³ -> Energy use: 13.3m³



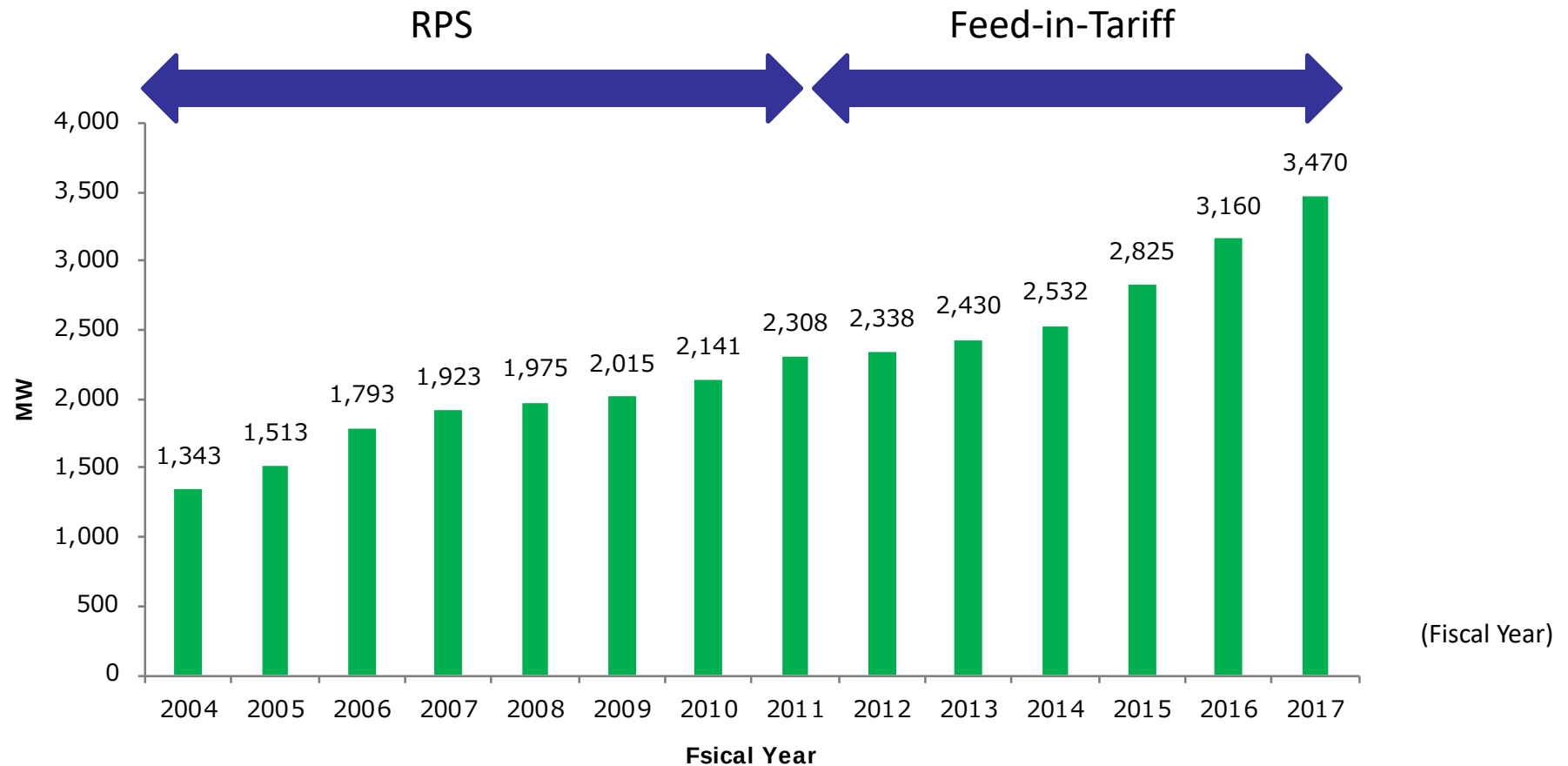
RECENT BIOMASS MARKET DEVELOPMENT

Rapid renewable development



Source) REI

<Cumulative installed capacity of biomass power>



Source) REI

■ Various technologies are deployed by size

- For smaller than 2MW , Japan's FIT is also trying to deploy small-scale CHP plants

<Three types of biomass generation in Japan>

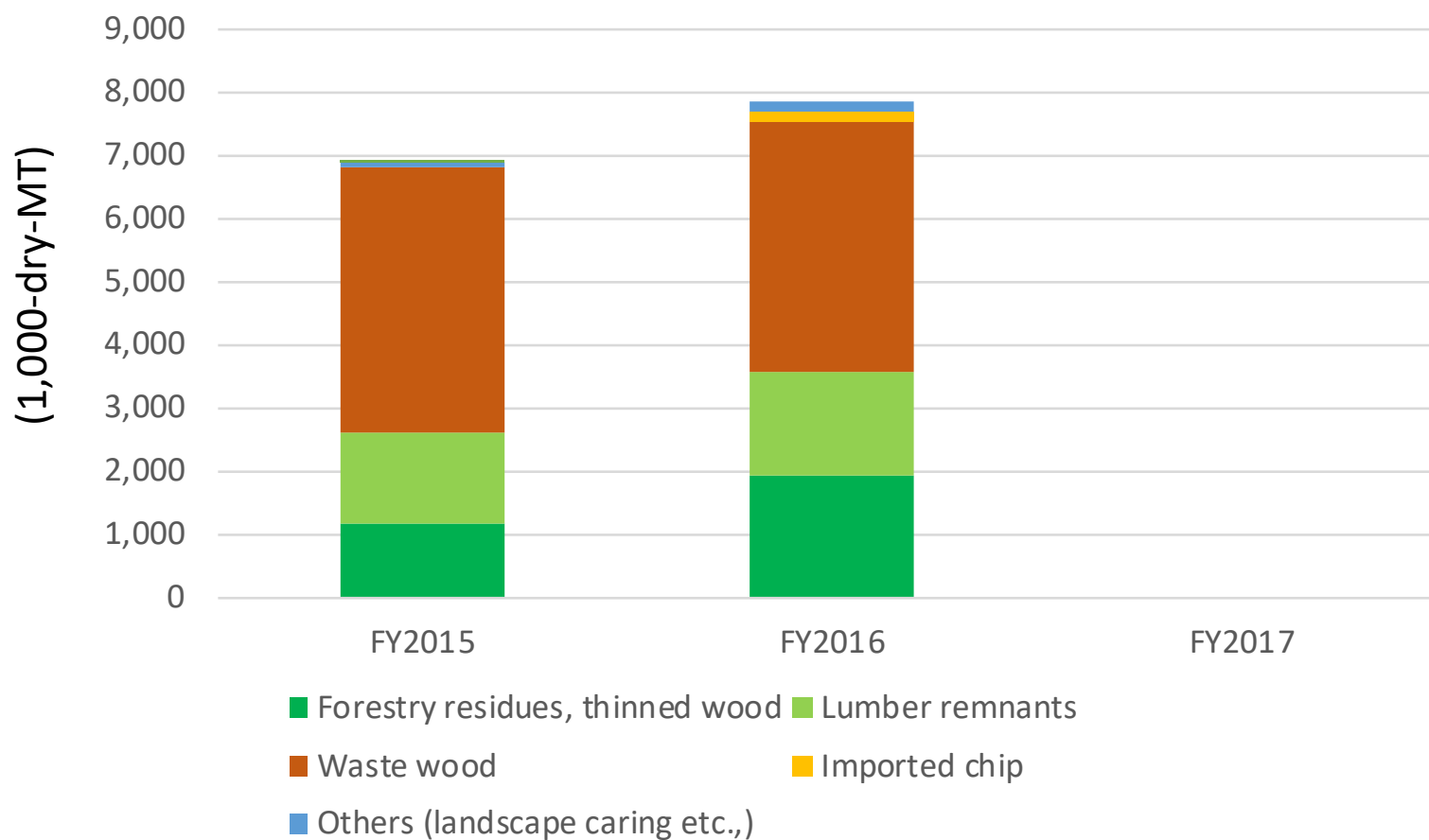
	Cofiring of existing coal plants	Dedicated/ co-firing biomass generation	Dedicated biomass generation
Total capacity*	200 - 4,000MW	20 – 200MW	2 - 10MW
Number of approved plants**	23	110	43
Biomass fuel	Wood pellet	Wood pellet, PKS (import)	Wood chip (domestic)
Boiler type	PCB	CFB	CFB, Stoker

Note) The capacity means rated output only of each coal-fired power plant without considering the biomass ratio.

Plant number is taken from the data of business plan approval reporting as of June 2018(ANRE/METI)

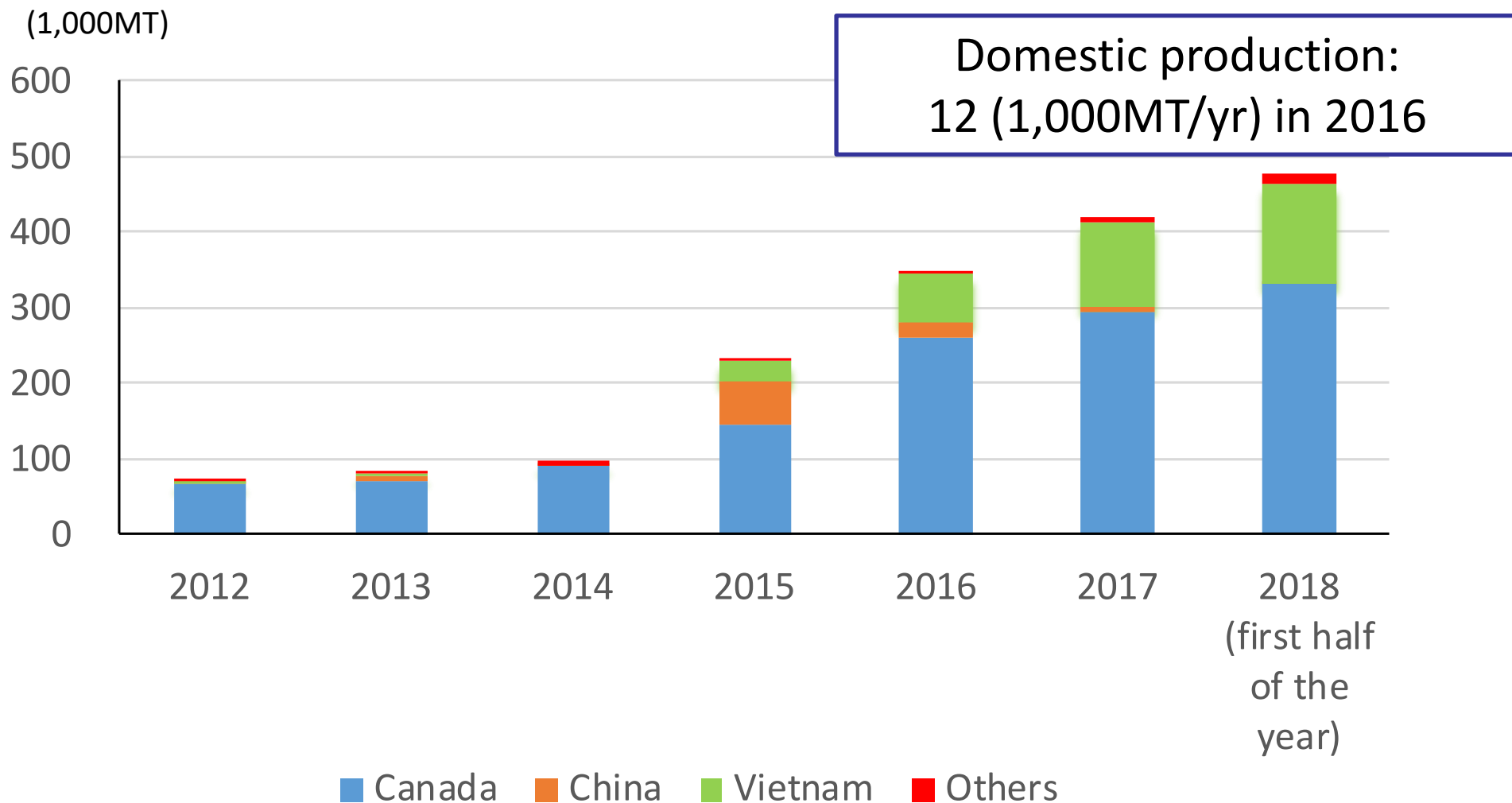
Source) By REI, from figures based on ANRE/METI Renewable Power Plant Certification Status

<Woodchip consumption by feedstock sources >



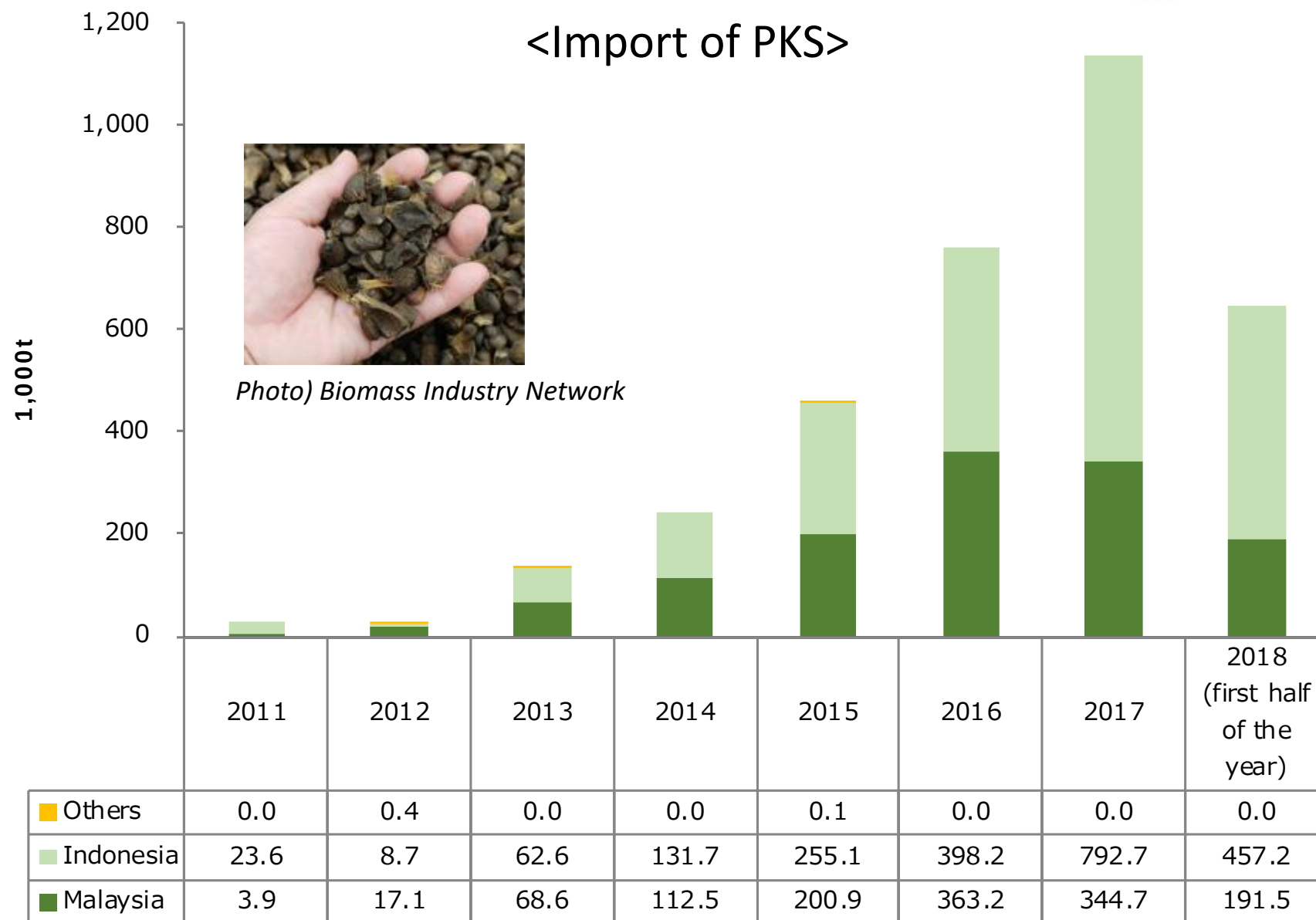
Source) Forest Agency

<Import of wood pellet>



Source) Trade statistics of Japan

PKS (Palm Kernel Shells)



Source) Trade statistics of Japan

■ High tariff was set to boost biomass utilization

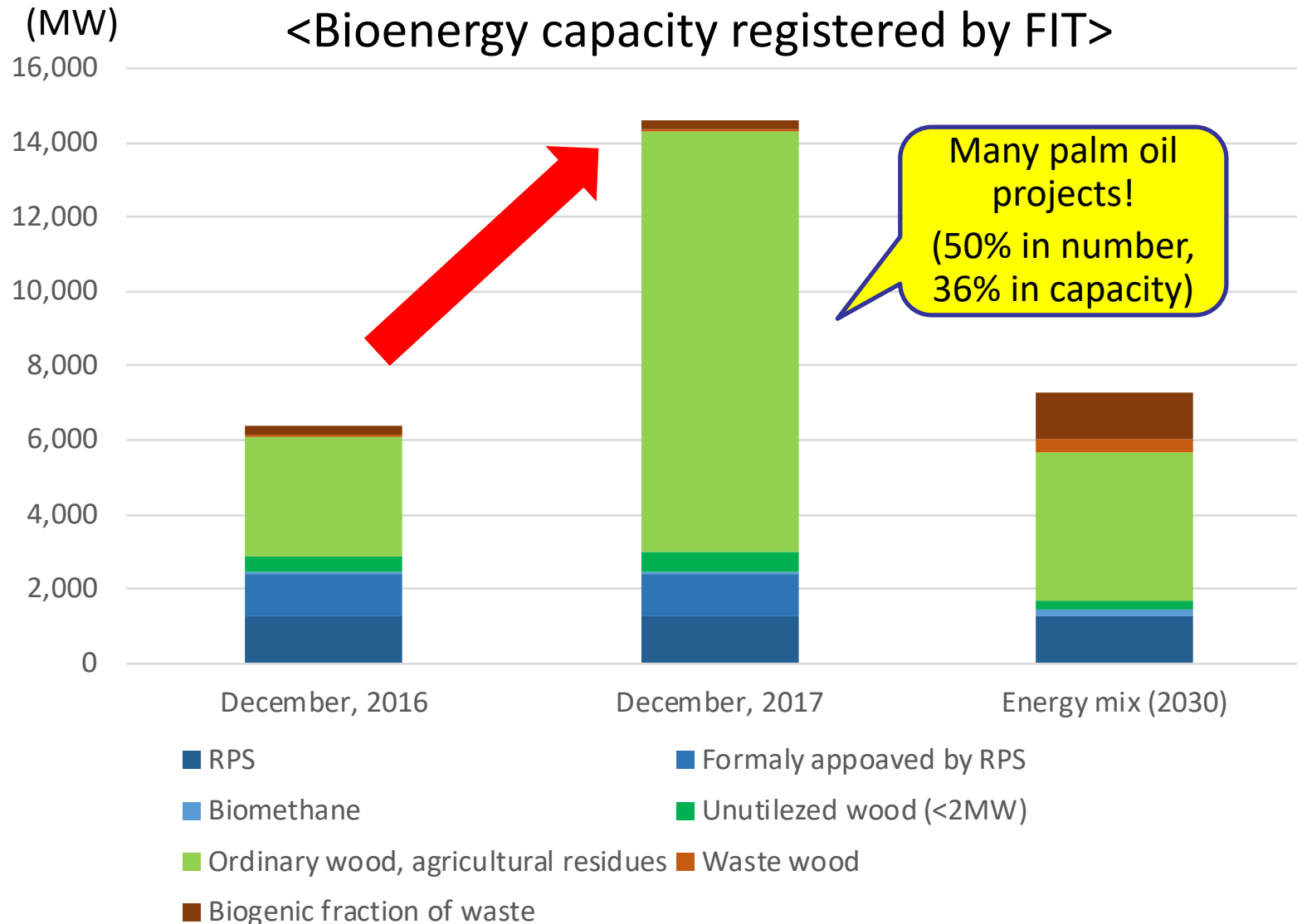
- 20 years purchase agreement with transmission operators

<FiT tariff for biomass generation>

FiT Category	Fuel	Tariff(JPY/kWh)
Bio-methane	manure, food waste	38
Unutilized wood	forest residues, thinned wood	32(>2MW), 40(<2MW)
Ordinary wood, Agricultural wastes	wood pellet, PKS	21 (>20MW) 24 (<20MW)
Waste wood	Landscape-caring, Demolished wood	13
Wastes	Municipality waste	17
Total		-

Source) FiT page, METI/ANRE website

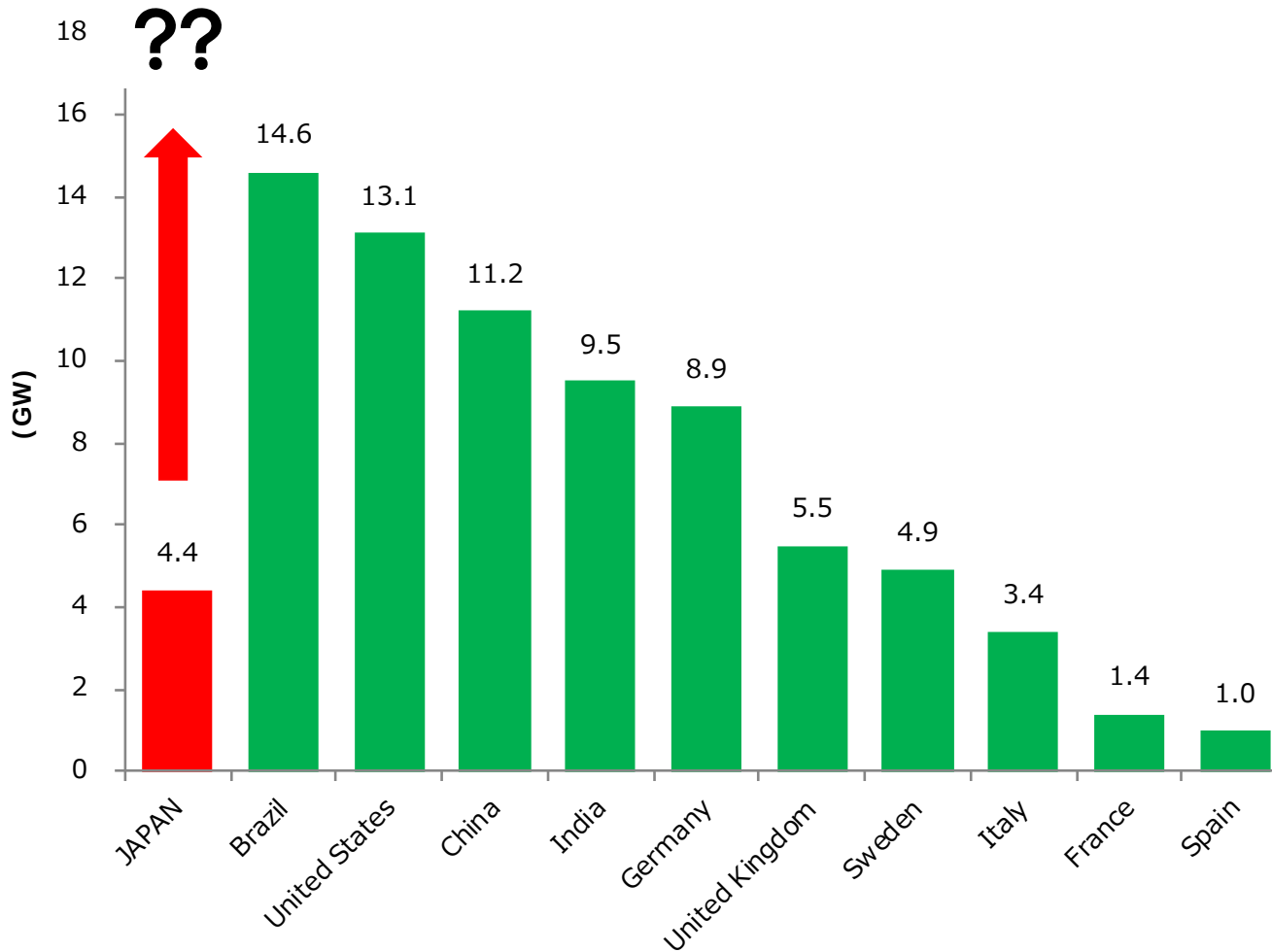
Skyrocketing registration



Source) FiT page, METI/ANRE website

Rapid growth in global market

<Cumulative Installed Capacity of Bioenergy (the end of 2017) >



Source) REN21 (2018) Global Status Report

Coal phase out in Japan?

- Increasing of co-firing in existing coal plants
- Banning poor energy efficiency coal plants development with co-firing

■ Case of Sumitomo at Sendai

- Changed their new coal power project with biomass co-firing to dedicated biomass plant



Photo) RIEF

<Coal plants approved by FIT for co-firing>

	Company name	MW
1	Chubu Electric Power Co., Inc.	4,100
2	Electric Power Development Co., Ltd.	2,000
3	TEPCO Fuel & Power, Inc.	2,000
4	Joban Joint Power Co., Ltd.	1,200
5	The Chugoku Electric Power Co., Inc.	1,000
6	The Chugoku Electric Power Co., Inc.	1,000
7	Kansai Electric Power Co., Inc.	900
8	Kansai Electric Power Co., Inc.	900
9	Hokuriku Electric Power Company	700
10	Hokuriku Electric Power Company	700
11	Electric Power Development Co., Ltd.	600
12	Shikoku Electric Power Co., Inc.	500
13	The Chugoku Electric Power Co., Inc.	500
14	The Chugoku Electric Power Co., Inc.	500
15	Electric Power Development Co., Ltd.	500
16	Electric Power Development Co., Ltd.	350
17	Nippon Steel & Sumitomo Metal Corporation	330
18	Joban Joint Power Co., Ltd.	250
19	Electric Power Development Co., Ltd.	250
20	Ube Industries, Ltd.	216



■ Auction

- Ordinary wood & agricultural residues
 - Larger than 10MW will be applied to the bid (total 180MW)
- Establishing a new category “Bio liquid fuel”
 - All projects will be applied to the bid (total 20MW)
 - Liquids other than palm oil will be judged by experts group?

■ Ensuring sustainable fuel supply

- Sustainability certification by the third party
- Contracts with local suppliers



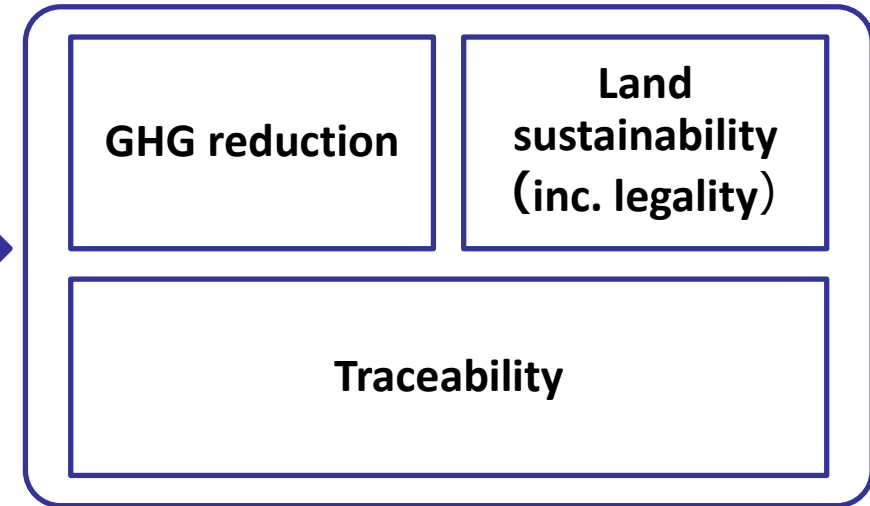
SUSTAINABILITY REQUIREMENT

What is sustainable criteria?

<Bioenergy fuel used for FiT >

Fuel type		Feedstock
Woody biomass (Chip, pellet)	Solid	Residues (forest, sawmill)
PKS	Solid	Agricultural residue
Palm oil	Liquid	Product ? Residue ?

<Three pillars of sustainability criteria>



<National standard>

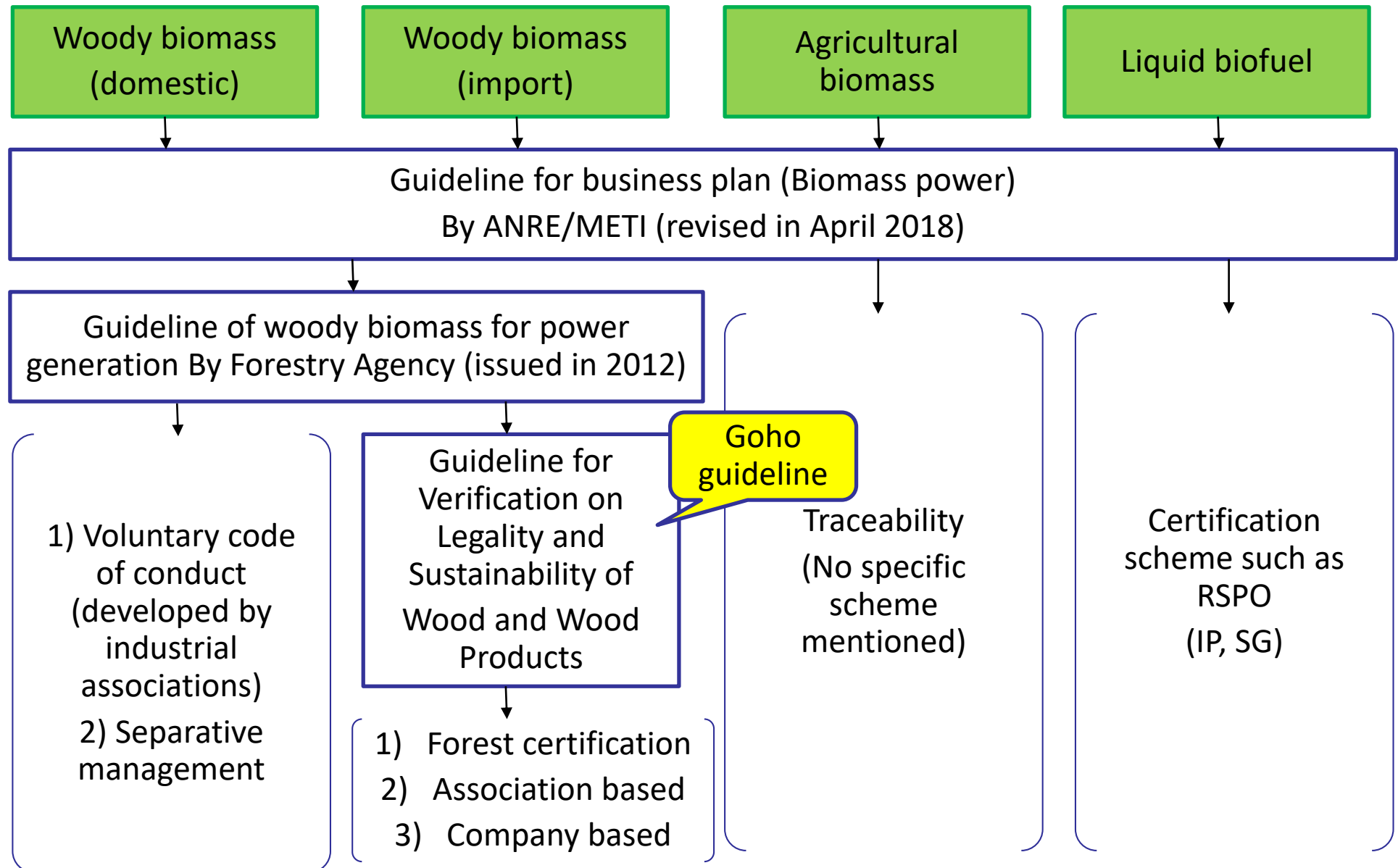


<Voluntary scheme>



What kind of scheme will be relevant for Japan / Asia?

Sustainability verification method in Japan



■ Stable procurement and sustainability are two major pillars of sustainability requirements for FIT

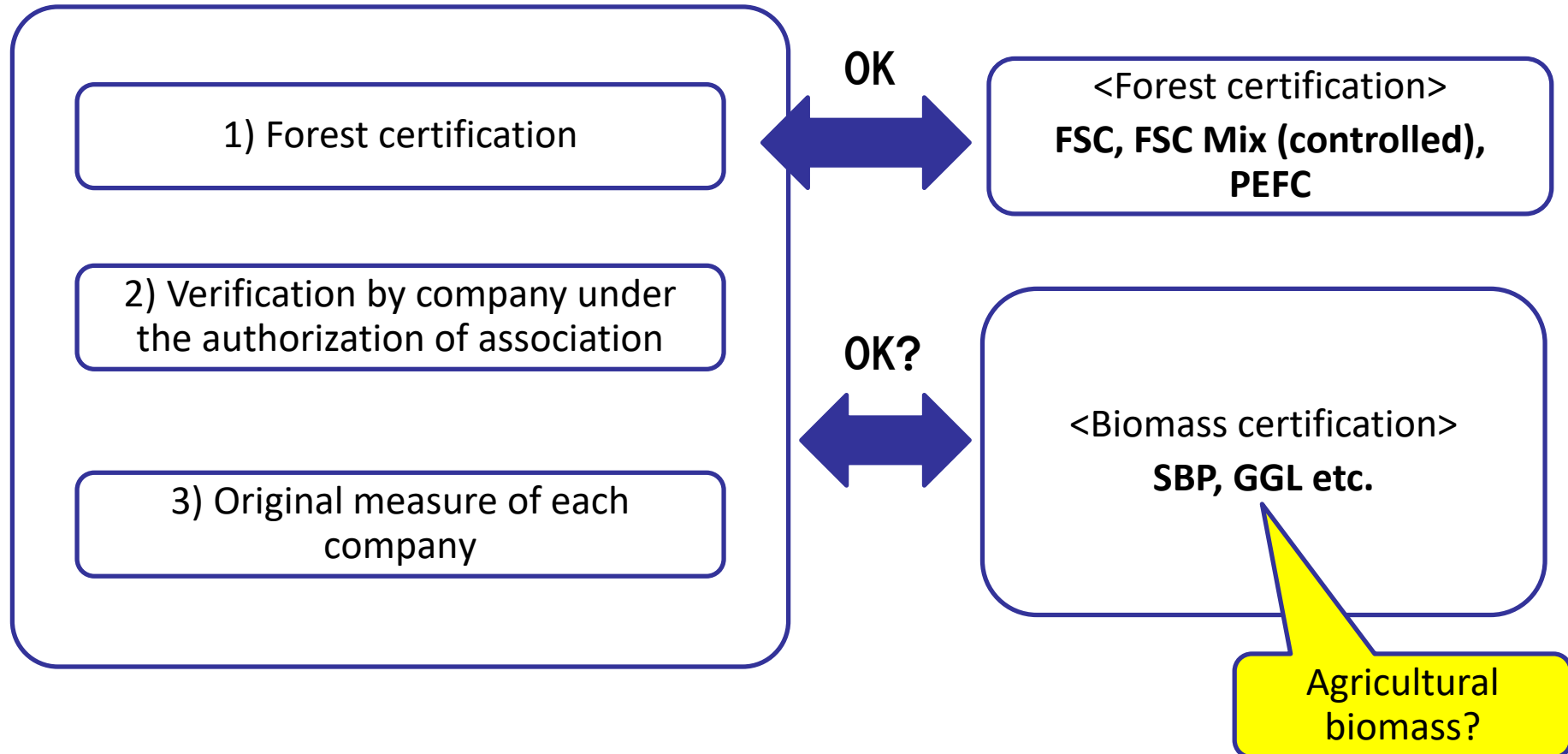
- GHG, iLUC are not covered

<Sustainability requirements by biomass type >

	Woody biomass			Agricultural biomass	Liquid biofuel
	Domestic		Import		
	Forest biomass (Un-utilized wood)	By-products (Ordinary wood)			
Stable procurement, avoiding influence on existing use	✓	✓	✓	✓	✓
Procurement plan, agreement with suppliers	✓	✓	✓	✓	✓
Checking by local government	✓	✗	✗	✗	✗
Sustainability	✓	✓	✓	✓	✓
Legality	✓	✓	✓	✓	✓
Land use, forest management	✓	✓	✓	✗	✓
Traceability	✓	✓	✓	✓	✓
GHG	✗	✗	✗	✗	✗
iLUC	✗	✗	✗	✗	✗

<Goho Wood Guideline>

<Voluntary scheme>



Voluntary scheme could be recognized ?



CONCLUDING REMARKS

Summary: Japan's sustainability requirements



- It's a responsibility for Japan to establish sustainable requirements so that we could expand the market
- Stable procurement and minimizing effects on existing utilization are regarded as most important
- To fulfill the requirements for sustainability, existing (voluntary) schemes are utilized
- Biomass specific certification schemes, such as SBP or GGL, could be used for woody biomass
- GHG analysis as well as monitoring & reporting, which are required by Japan's FIT might be covered by those voluntary schemes

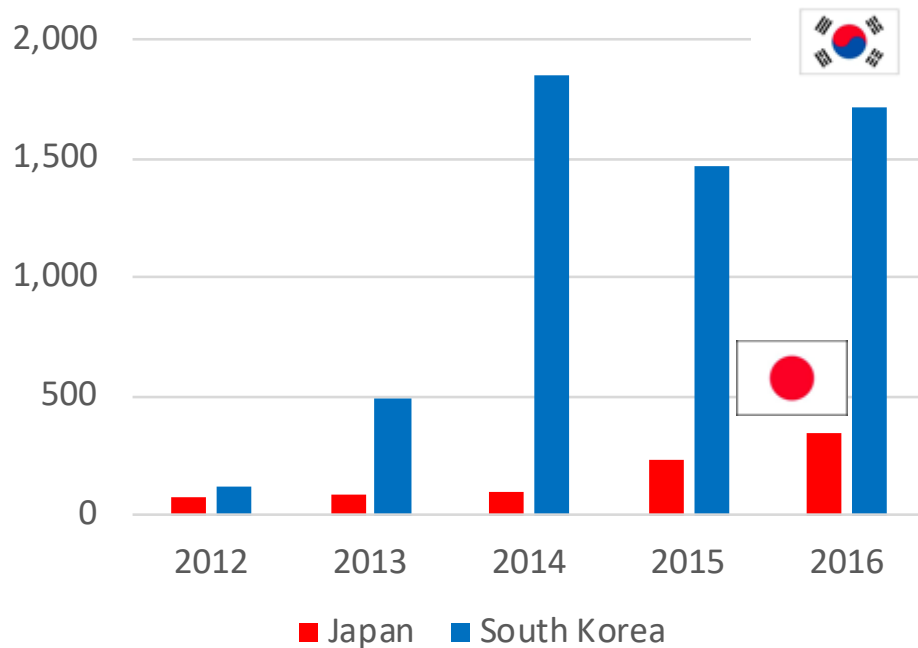
Realizing sustainable biomass deployment

■ Establish sustainable biomass trade framework for the Asia-Pacific region

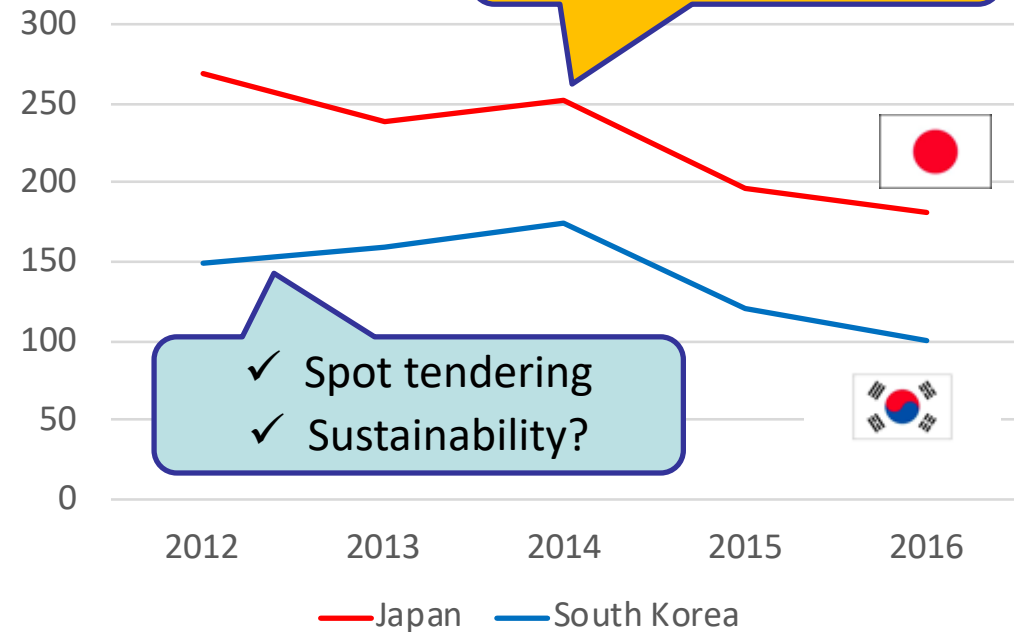
- Why not return to IEA Bioenergy task40!

<Wood pellet import in South Korea and Japan>

Amount (1,000t)



Price (USD/t)



Source) FAO stat



Thank you for your kind attention!

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