



自然エネルギー財団  
RENEWABLE ENERGY INSTITUTE

WBA Webinar Series:  
Opportunities for biomass deployment in Asia  
August 29th, 2023

# Sustainable Bioenergy: A Critical Enabler to Decarbonizing the Japanese Economy

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Director, Japan Woody Biomass Association

# About Renewable Energy Institute (REI)

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RENEWABLE  
ENERGY  
INSTITUTE



MASAYOSHI SON  
Founder and Chairperson

Policy  
research

**Establishing a society  
Based on renewable energy**

Advocacy

International  
networking



TOMAS KÄBERGER  
Executive Board Chairman

# REI's activities on bioenergy



CMT Biomass Pellets Trade & Power  
(Tokyo, May 2023)

IEA Bioenergy Asian Workshop  
(Tokyo, September 2018)



Argus Biomass Asia  
(Singapore, February 2023)



Indonesia and Japan Biomass Workshop  
(Jakarta, February 2023)

# REI's proposal for the 2035 energy mix

## <Summary>

- With updated regulation and deployment policy measures, it is possible to install 280GW of solar PV (3.5 times) and 60GW of wind (13 times) by 2035.
- More than 80% of electricity demand can be met by renewable sources. CO2 emission from the power sector and fossil fuel costs will be decreased by 73% and 4 trillion JPY annually, respectively.
- Generation costs (LCOE) of renewables in 2030 are predicted to drop dramatically (solar: ¥5/kWh, onshore wind: ¥6.6/kWh, offshore wind: ¥10/kWh), which are less costly than nuclear, coal with CCS, and coal cofiring with ammonia.

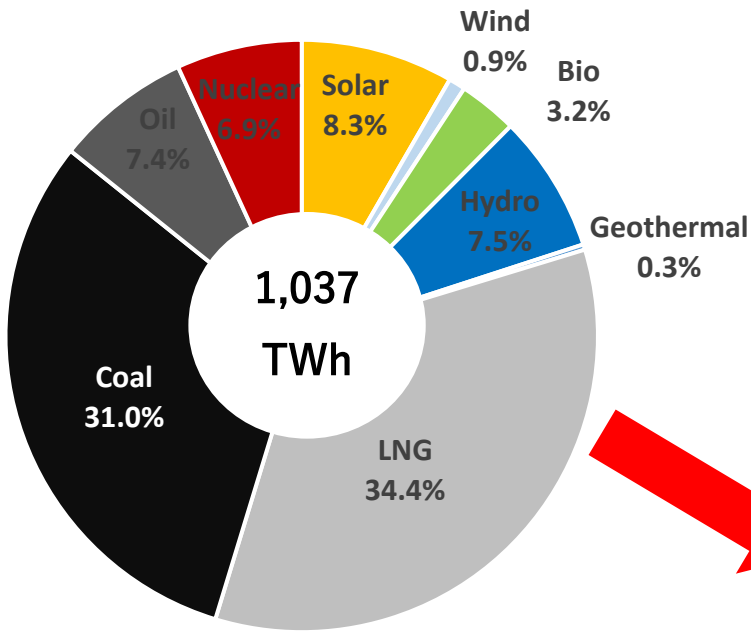
**The first report in Japan, which shows the possibility that renewables can supply 80% of electricity in 2035, correspond to the IPCC 6<sup>th</sup> Assessment Report.**

English short version is available.



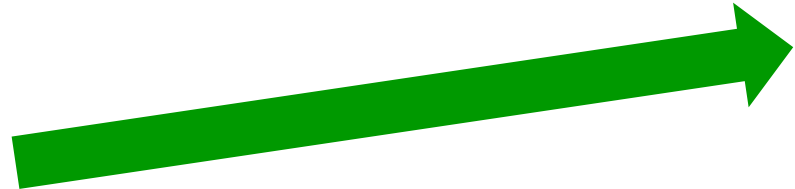
# Towards decarbonizing the power sector with renewable energy

FY2021



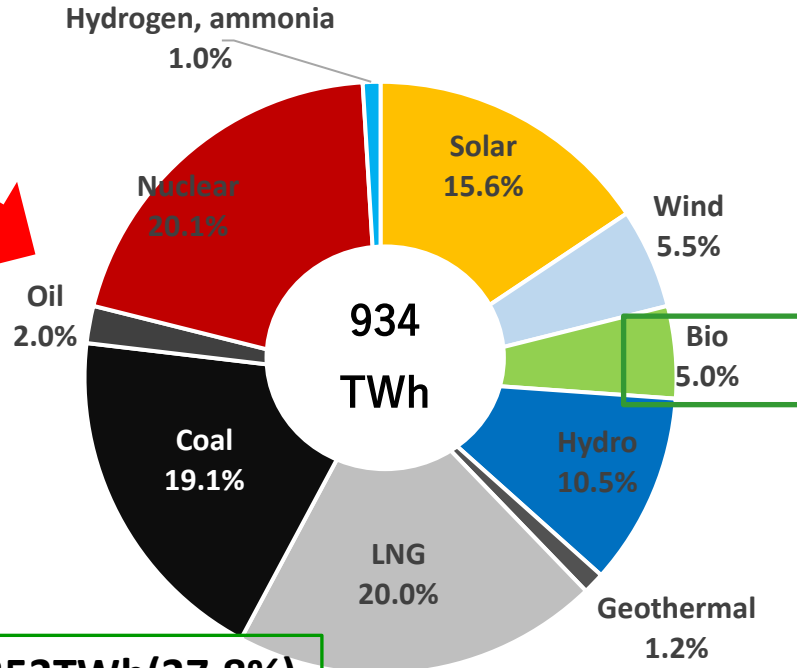
All renewables: 210TWh(20.3%)

All renewables: 353TWh(37.8%)

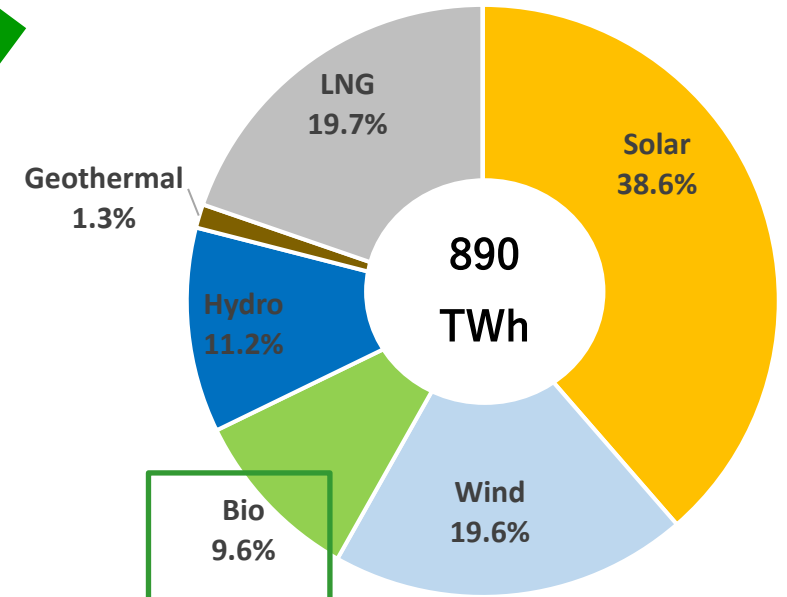


FY2030

(METI Energy Basic Plan)



FY2035  
(REI's Decarbonizing mix)



All renewables: 714.5TWh(80.3%)

# Biomass power towards 2035

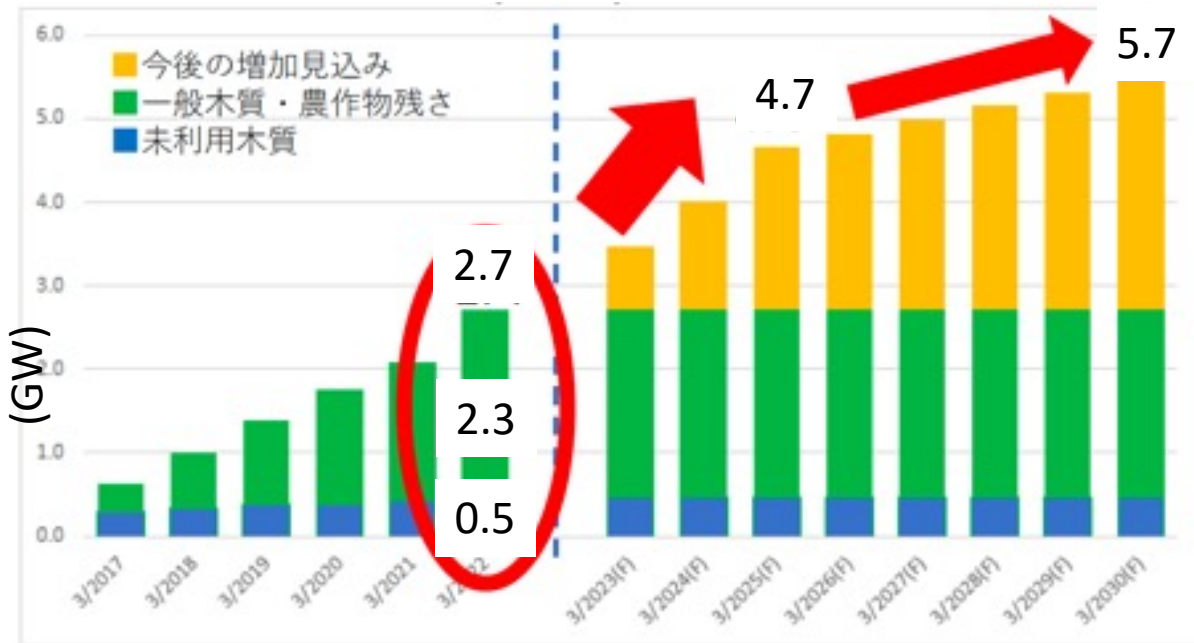
## ■ FIT projects go to the plateau in the late 2020s

- Higher fuel price-> flexible operation (less operational hours)

## ■ Coal conversion will be deployed towards 2035

- Policy measures and business initiatives (RE100, biomass conversion, black pellet etc.)

<BPA's forecast to 2030>



Source) BPA

<Biomass generation in REI's 2035 mix>

	Capacity (GW)	Capacity factor (%)	Electricity generation (TWh)	
Methane	0.16	0.6	0.8	FIT (47TWh)
Unutilized woody biomass	0.55	0.75	3.6	
Ordinary wood, agricultural residues	5	0.65	28.5	
Demolished wood, wastes, including formaly RPS	3.5	0.45	13.8	
Auto producers + conversion of exsiting coal plants	-	-	39	Non-FIT
Total	9.2	-	85.7	

Source) REI

# Policy tools for transition other than FiT (power and heat sector)

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## ■ Energy Conservation Act

- Main policy tool to improve energy efficiencies by sector
- Non-fossil fuel utilization
  - Suggested targets for major five industries are presented by METI
  - Total 10 millions of coal would be replaced by low-carbon fuels (ex. biomass)

## ■ Long-term decarbonized power plant auction

- Public support for CAPEX to ensure power generation capacities as well as enhance transition
  - Capacity(kW)-based subsidy for 20 years.
  - Annual biting amount will be 3-6GW/yr. Starts from FY2023 with 4GW (including 1GW of 100% conversion)

## ■ Carbon pricing mechanism

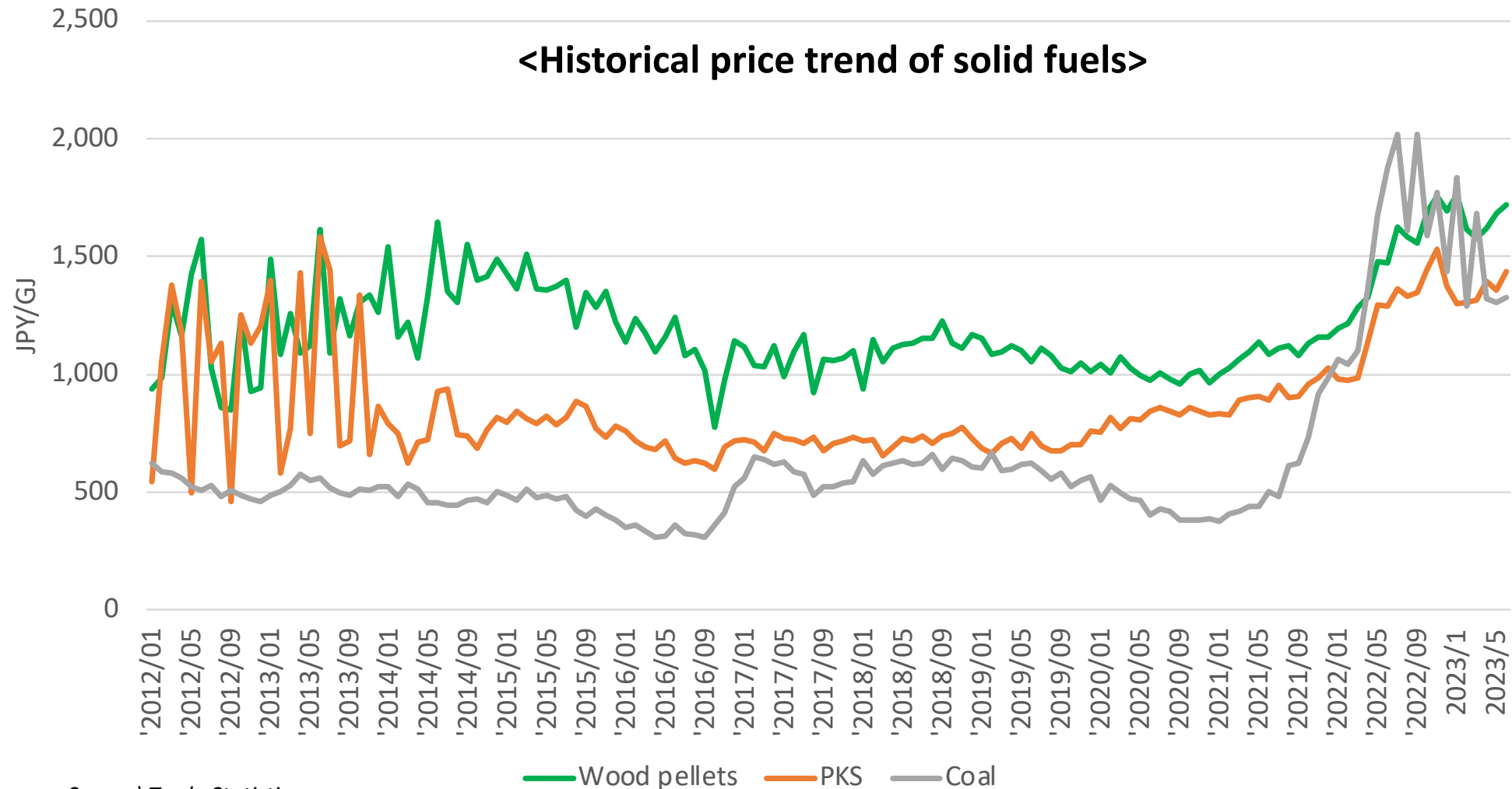
- Voluntary GHGs emission trading scheme (from FY2023)
- Levy on fossil fuel importers (from FY2028)
- Paid auction of electricity producers (from FY2033)



# Energy crisis and economic competitiveness of biomass

## ■ Coal price have overtaken biomass!

- Upward trend in prices of both wood pellets and PKS is observed



Source) Trade Statistics



# Biomass conversion without subsidies

## ■ Demand increase for renewable electricity (ex. RE100)

- Corporate users face pressures from investors and costumers (greening supply chain)
- IPPs that have retail business are the first movers

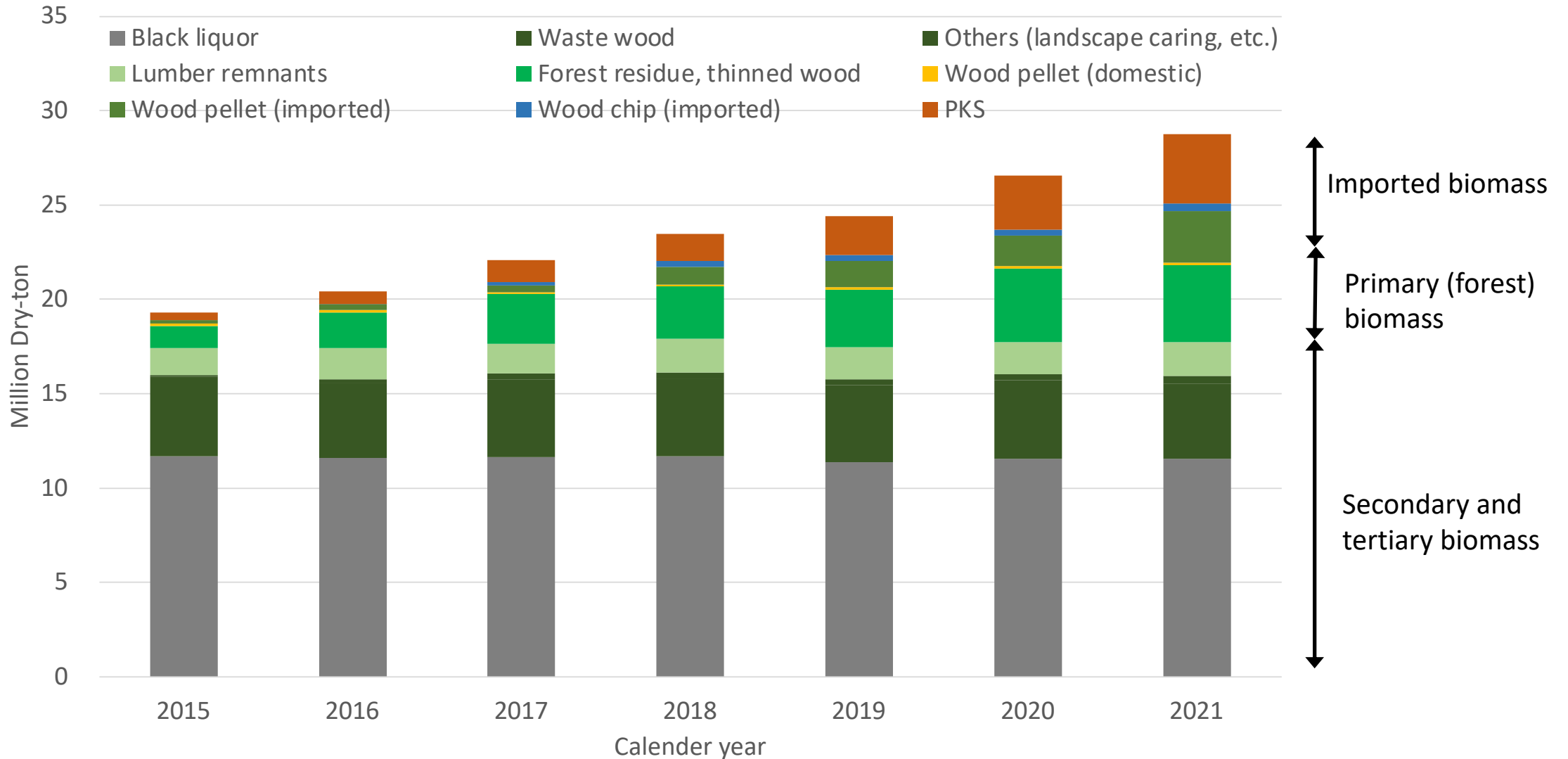
### <Announced biomass conversion projects>

Company		Place		Cpacity
Name	Business	City	Prefecture	MW
Erex	Power generation and retailing	Itoigawa	Niigata	149
Daiwa House	Construction, power retailing	Hibikinada	Fukuoka	112
Shunan Power	IPP	Hibikinada	Fukuoka	300

Source) Developed by REI based on various sources

# Secondary and tertiary biomass is still dominant, but..

<Development of solid biomass consumption in Japan>

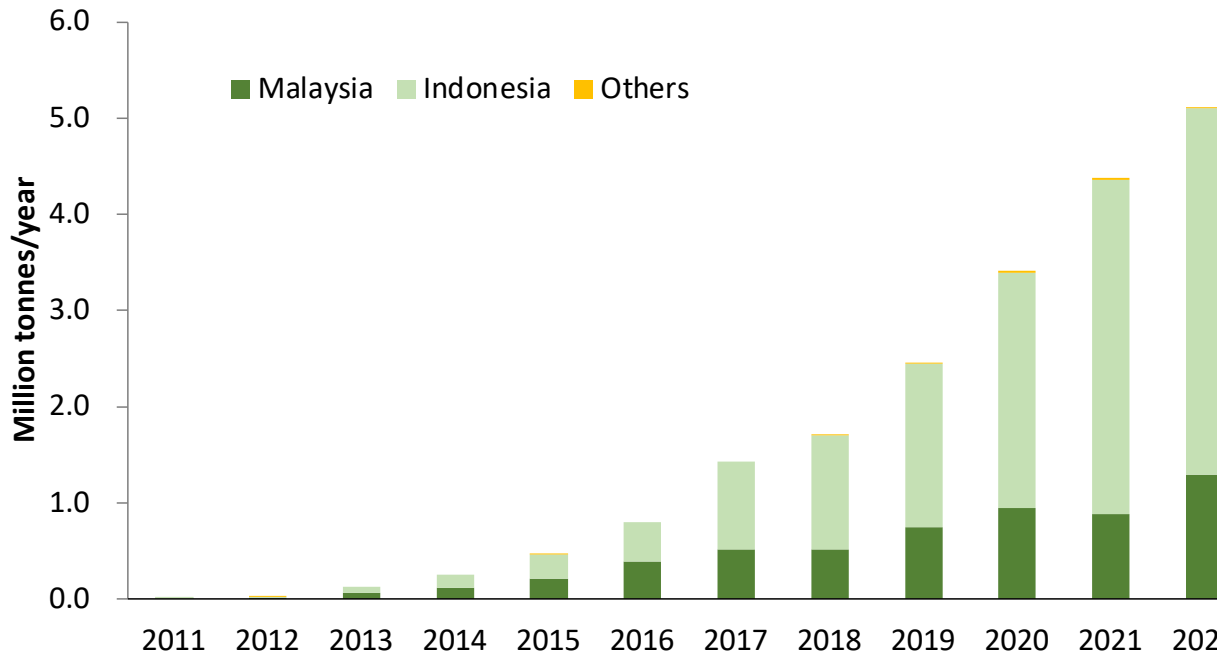


# Rapid growth of biomass imports

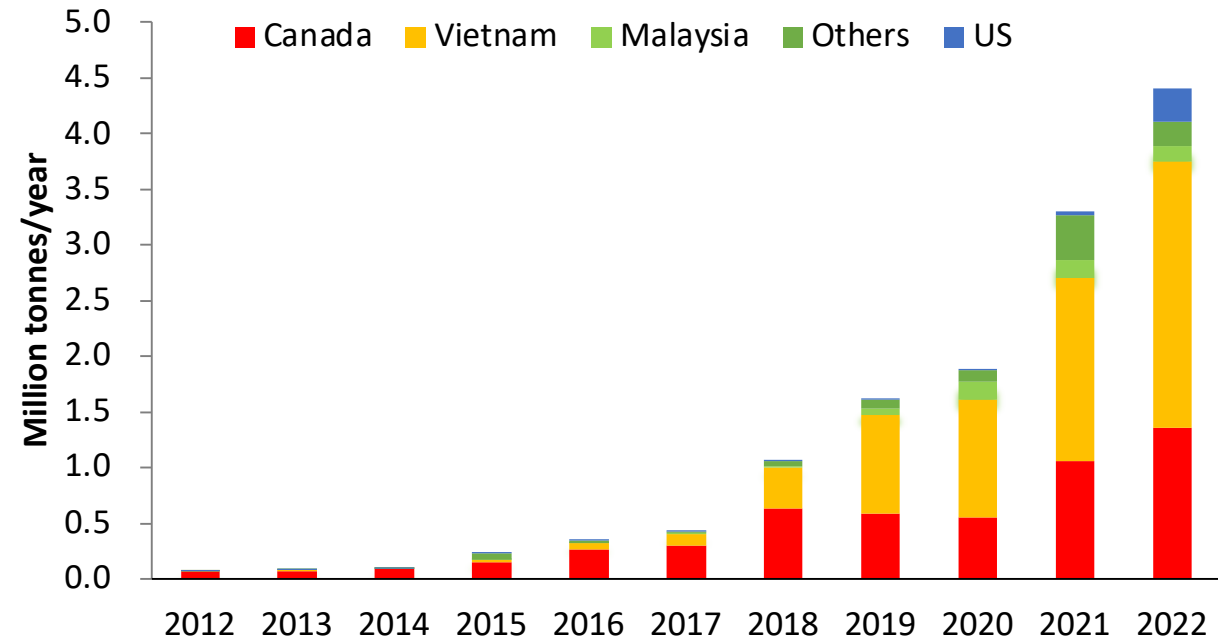
## ■ Sharp increase in both PKS and wood pellets

- Will “new” fuels, such as husks, expand fuel availability?

### <PKS (Palm Kernel Shell)>



### <Wood pellets>



Source) Trade statistics

**Rapid increase of imported biomass has triggered sustainability discussion**

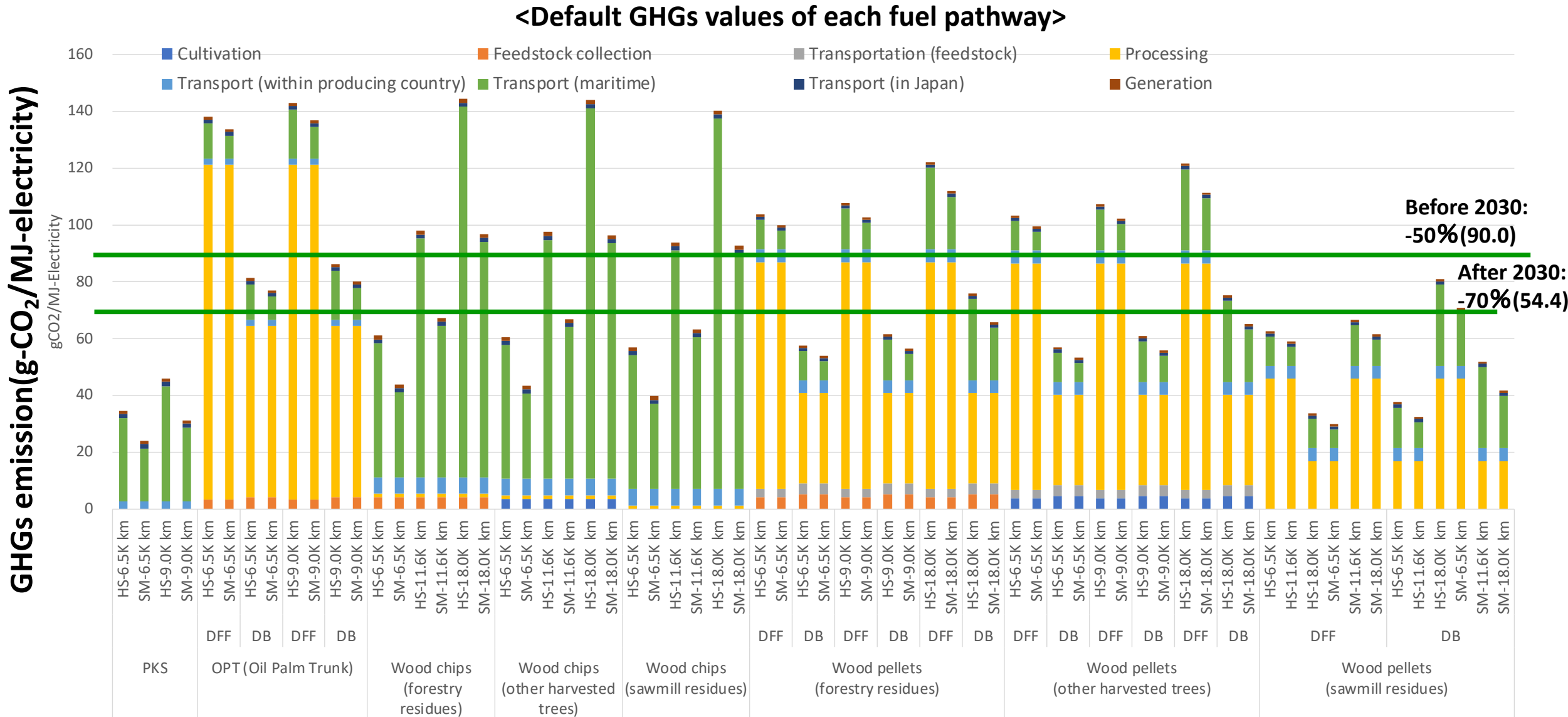
# Sustainability criteria for FiT

## <Main items of sustainability criteria for the FiT>

Issues to be ensured	
Environment	Restricting land conversion
	Reduction of pollution and emissions including GHG
	Conservation of biodiversity
Social, labor	Appropriate land right: Ensuring right of land use by operators
	No child labor, no forced labor
	Ensuring workers' health and safety
	Ensuring workers' rights of association and collective bargaining
Governance	Compliance with laws (outside Japan)
	Provision and disclosure of information
	Certification renewal/cancellation
Ensuring supply chain	
Third party verification	

**The first comprehensive sustainability criteria in Asia**

# Default values of GHGs



Note) DFF: Dried with fossil fuel, DB: Dried with biomass, HS: Handy size, SM: Supramax, Efficiencies are 25% for PKS and OPT, while 30.0% for woody biomass  
 Source) REI's own illustration, based on data presented from 3<sup>rd</sup> Interim Report of Biomass Sustainability WG (April 2023)

# Approval of certification schemes

## <Agricultural biomass>

Palm oil



PKS, OPT



New!

2022 ver.  
Part 4-1, 2, 3

## <Woody biomass>



## <Schemes that can be used for GHGs calculation>

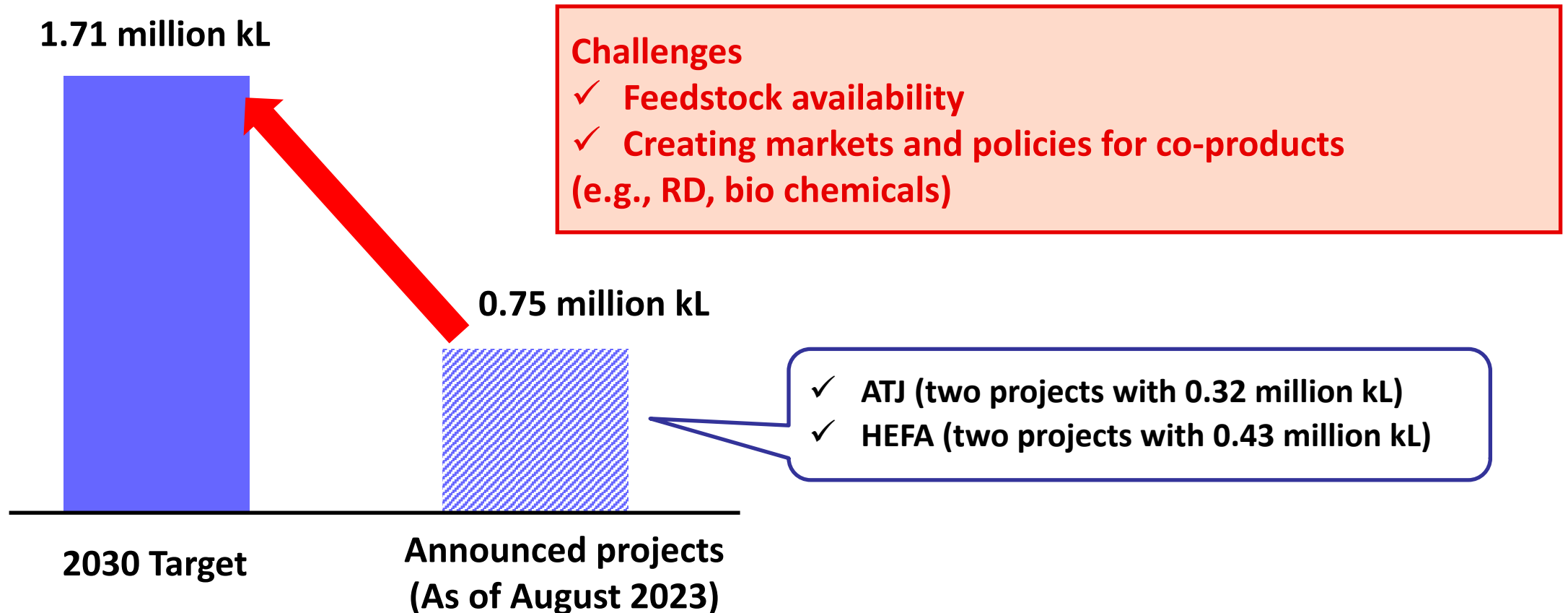


Approved soon!?

# SAF could be the enabler of bioeconomy?

- Japan will have SAF mandate for 10% of international aviation fuel
  - Oil refineries accounted commercial-scale projects, which will start production in 2025.

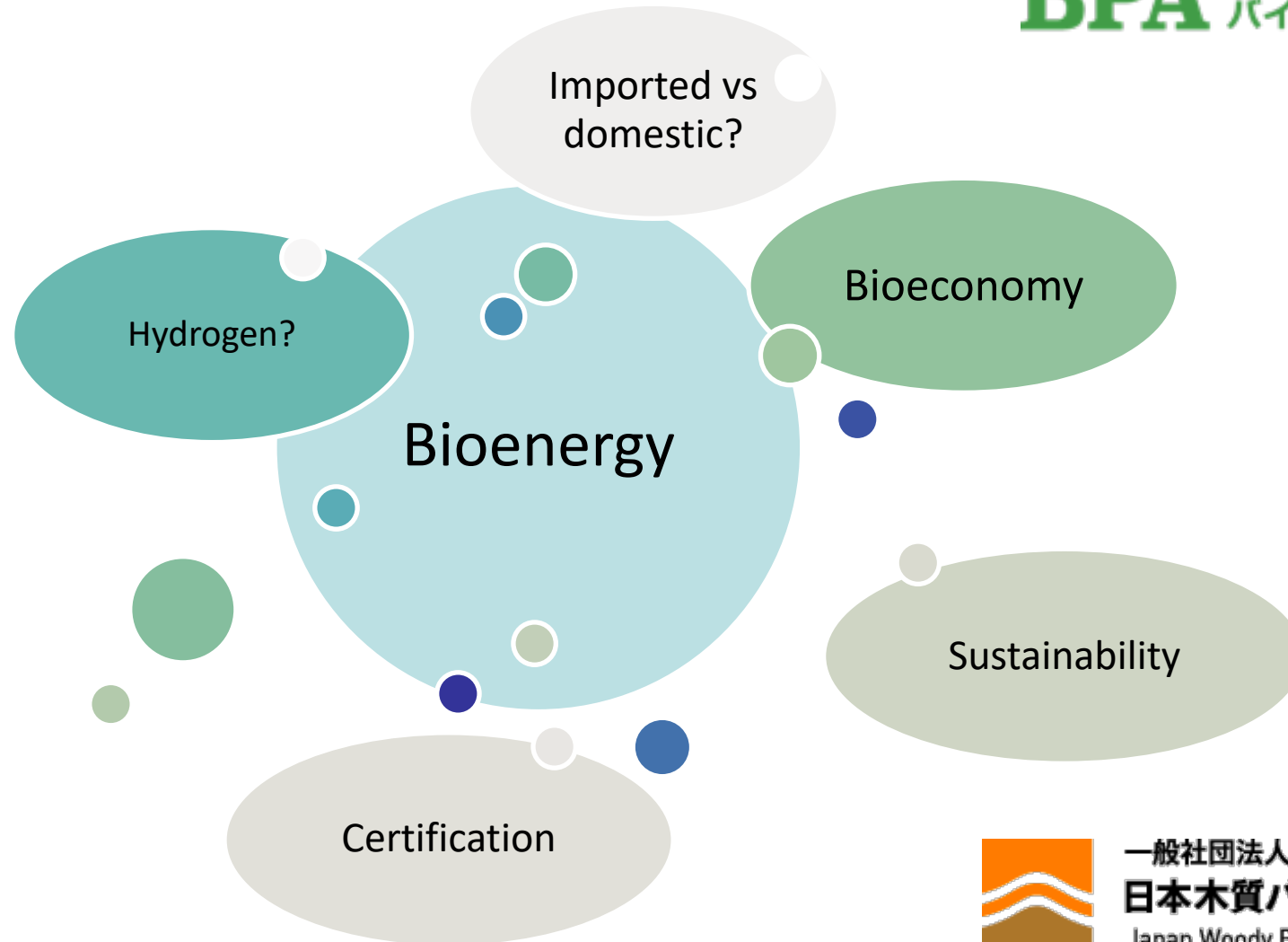
## <Japan's SA production status>



# How can we work together for “co-innovation” ?



**BPA** 一般社団法人  
バイオマス発電事業者協会



 一般社団法人  
日本木質バイオマスエネルギー協会  
Japan Woody Bioenergy Association





Thank you for your kind attention!

谢谢你

고마워요

Terima kasih

Cảm ơn

ขอบคุณ ครับ

ありがとう！

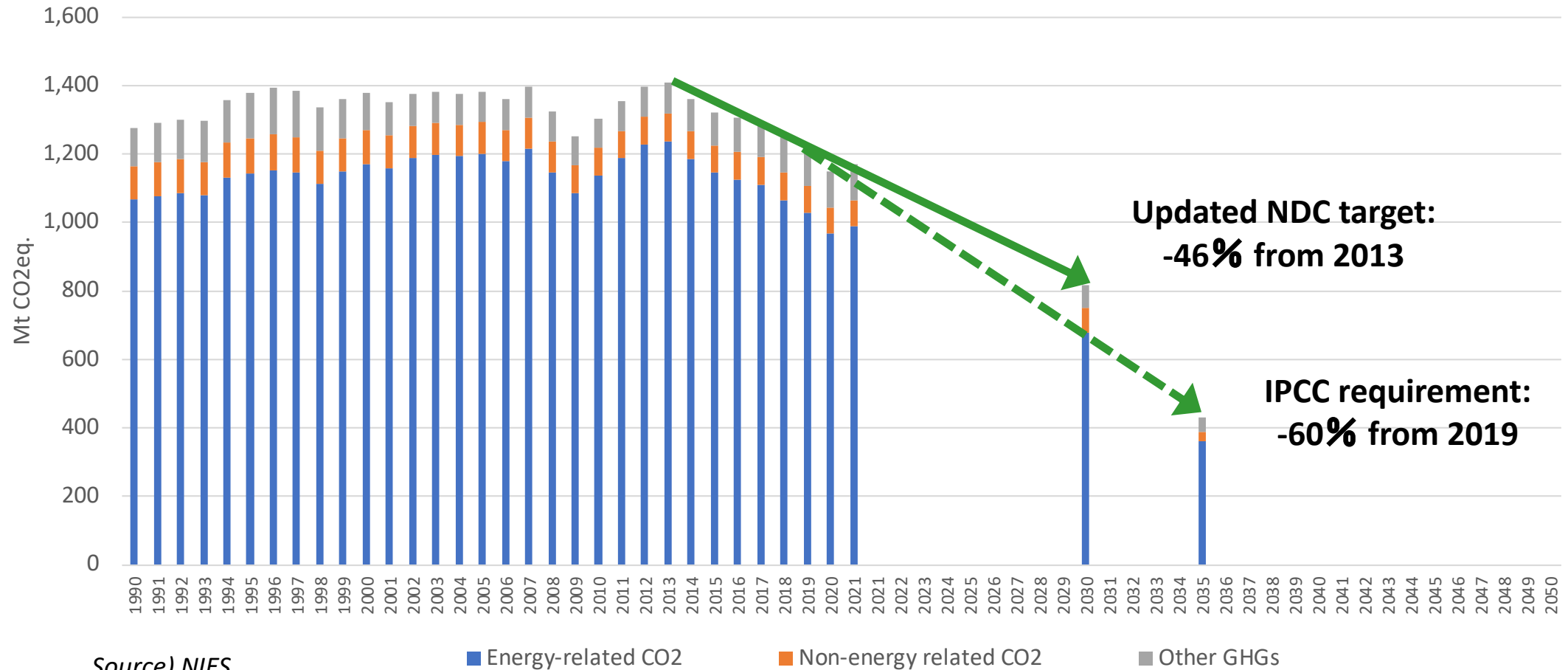
Takanobu Aikawa, Ph.D  
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Renewable Energy Institute, Tokyo

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# RESERVED SLIDES

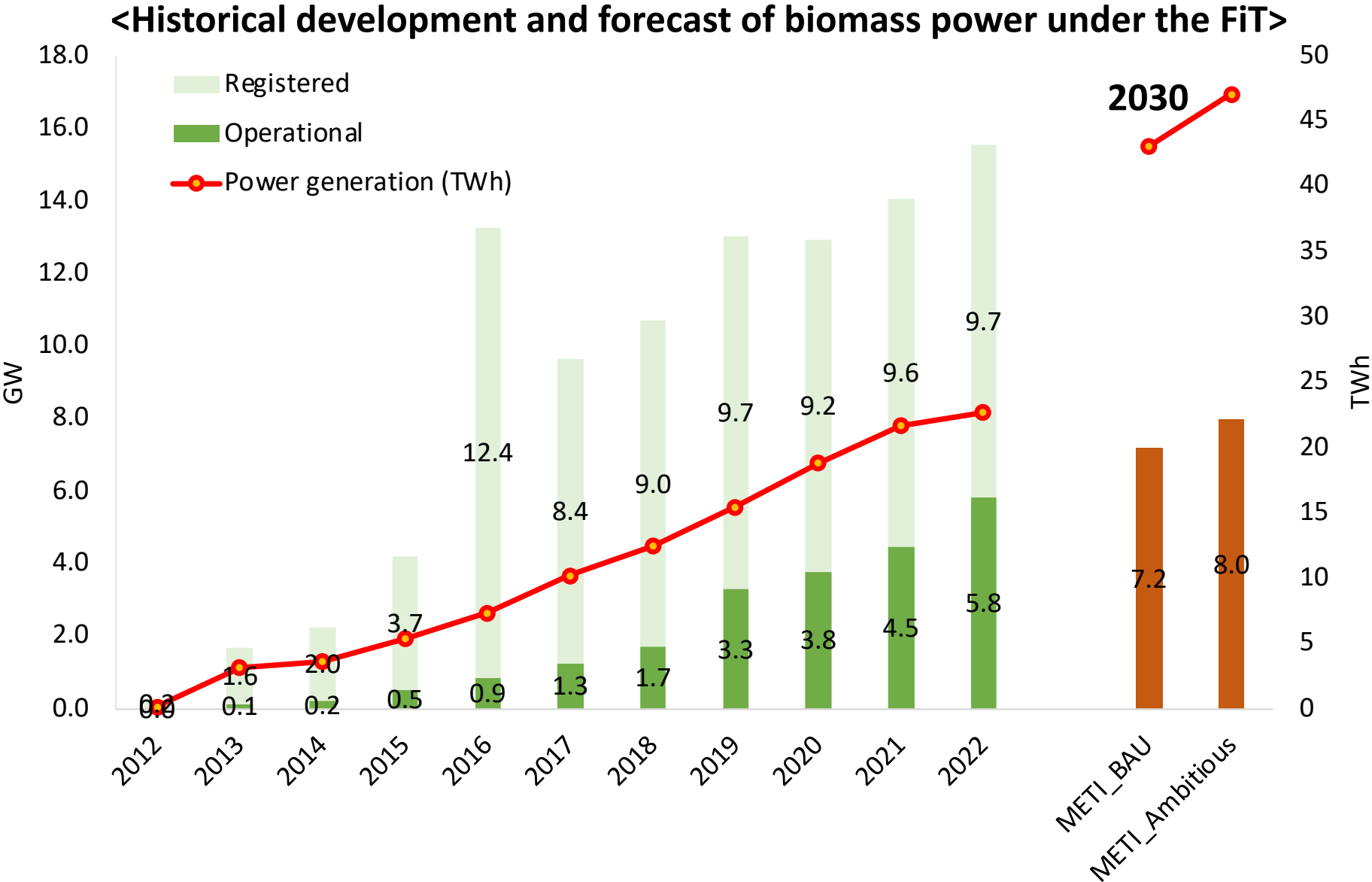
# Need to acceleration of GHGs reduction

## <GHGs emission development in Japan>



**G7 commits power sector predominantly decarbonized by 2035**

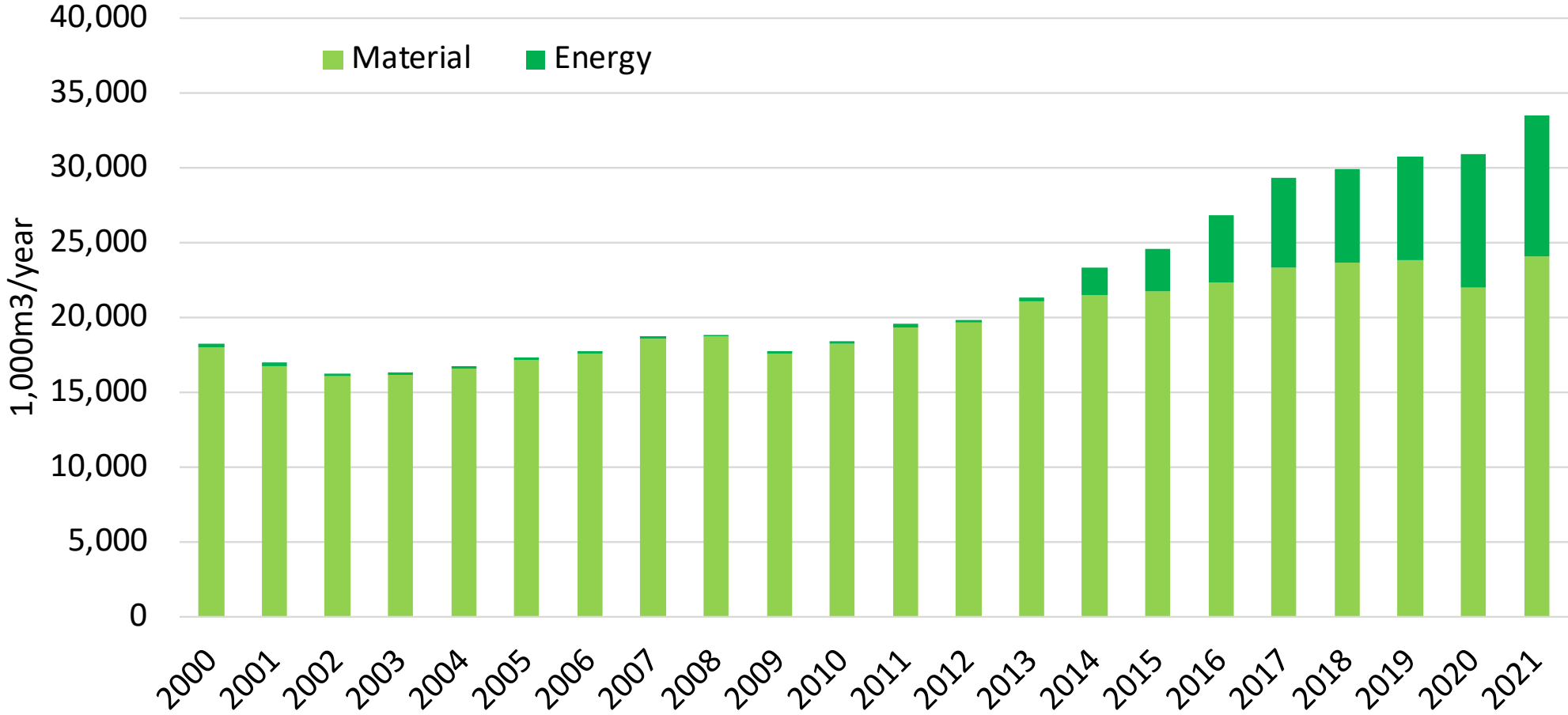
# Biomass power growth under the FiT



Source) Created by REI, based on METI's data

# Domestic wood supply

<Historical Development of Domestic industrial wood supply>



Source) Forest Agency

**Recent growth comes from energy use**

# Sustainability criteria for FiT

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**The first comprehensive sustainability criteria in Asia**

# FiT tariff development

## <FiT tariff for bioenergy (JPY/kWh) >

(1JPY=0.22TWD)

Category	Example	2012-2016	2017	2018-2019	2020-
Bio-methane	Manure, food waste	39	39	39	39
Unutilized wood	Forest residues, low-quality log	32	40 (<2MW)*	40	40
			32	32	32
Ordinary wood, agricultural residues	Wood pellet, PKS, EFB	24	24	21	Tender
			24(<10MW)		24(<10MW)
Liquid biofuel	Palm oil	24	24	21	Tender
			24	Tender	Tender
Waste wood	Demolished wood	13	13	13	13
Wastes	Municipality waste	17	17	17	17

\*Note: The category of smaller than 2MW in unutilized wood was introduced in FY2015.

**Setting proper incentives is always challenging.**