

Wood pellet production

12 May 2010

Nara, Japan

IEA Bioenergy ExCo65 workshop

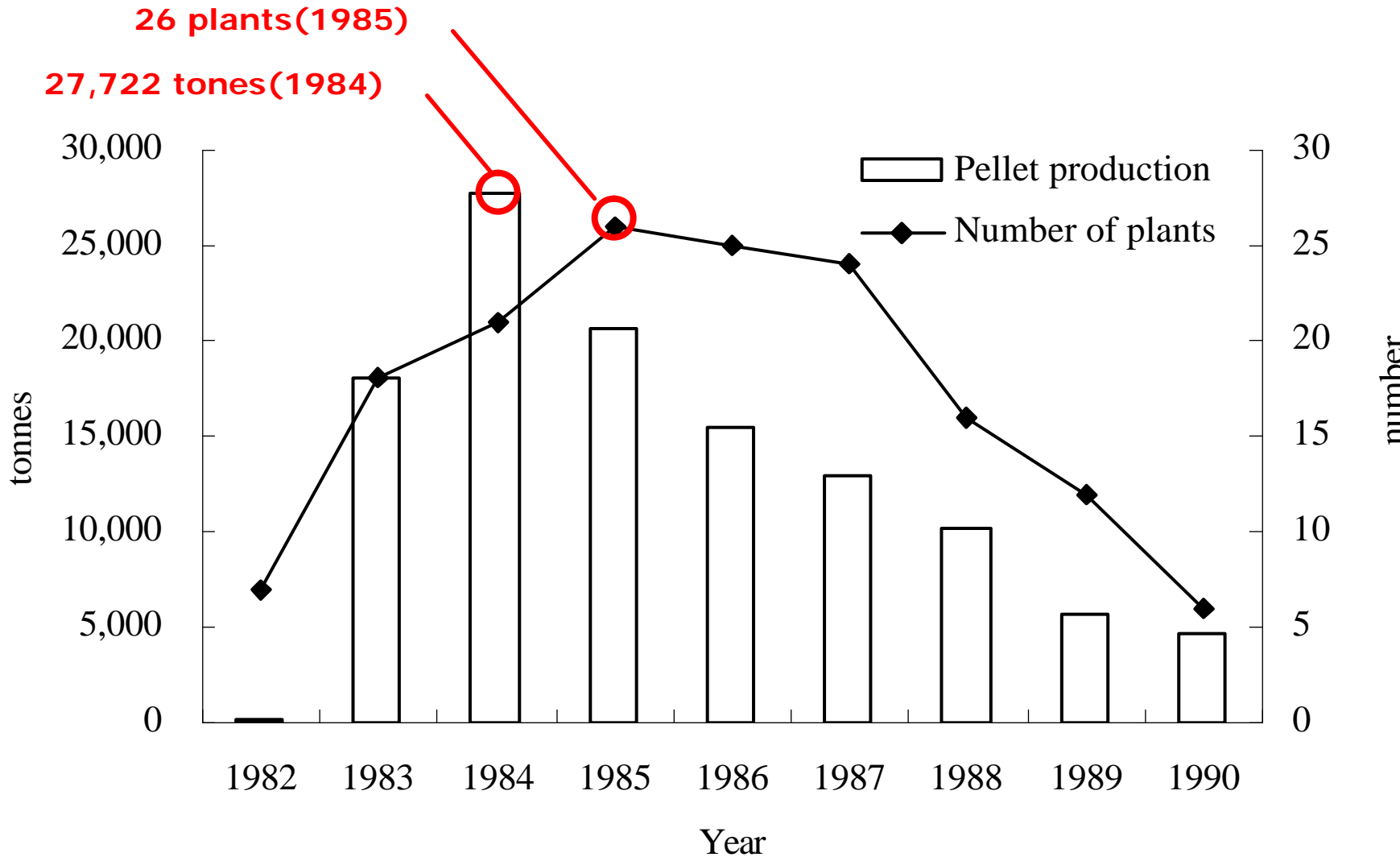
Ken'ichiro Kojima

Pellet Club JAPAN

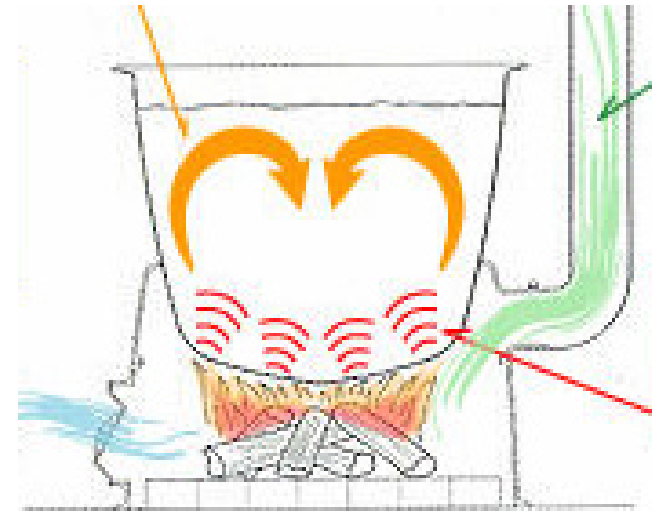
Wood Pellets installation in 1980's

- Pelletizing process: 1976, invented by Rudolf Gunnerman, Bio-Solar, woodex, USA
- Pellet utilization in Japan: 1981, green house (melon), Shizuoka pref., imported from USA
- Technological development in Japan: 1980, METI, technology from USA
- Domestic production: from 1982, started in Iwate/Aomori pref.
- Motivation: The first oil crises in 1979, Ogalite industry
- Records: until 1986, 30mills operation, main raw materials are bark, peak 27,772 ton/y
- Demands: stove, green house, hotel, hot spa
- After 1983: crude oil price fell
- Conclusion: couldn't establish solid biofuel market, political instrument (subsidy), underdeveloped boilers/stoves, fuel standardization,

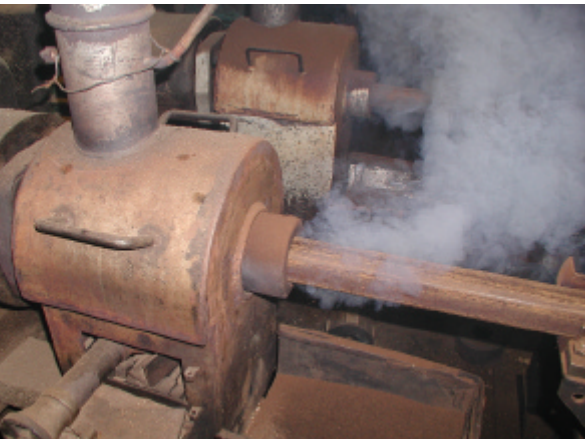
Pellet production (1982-1990)



What is "Ogalite"



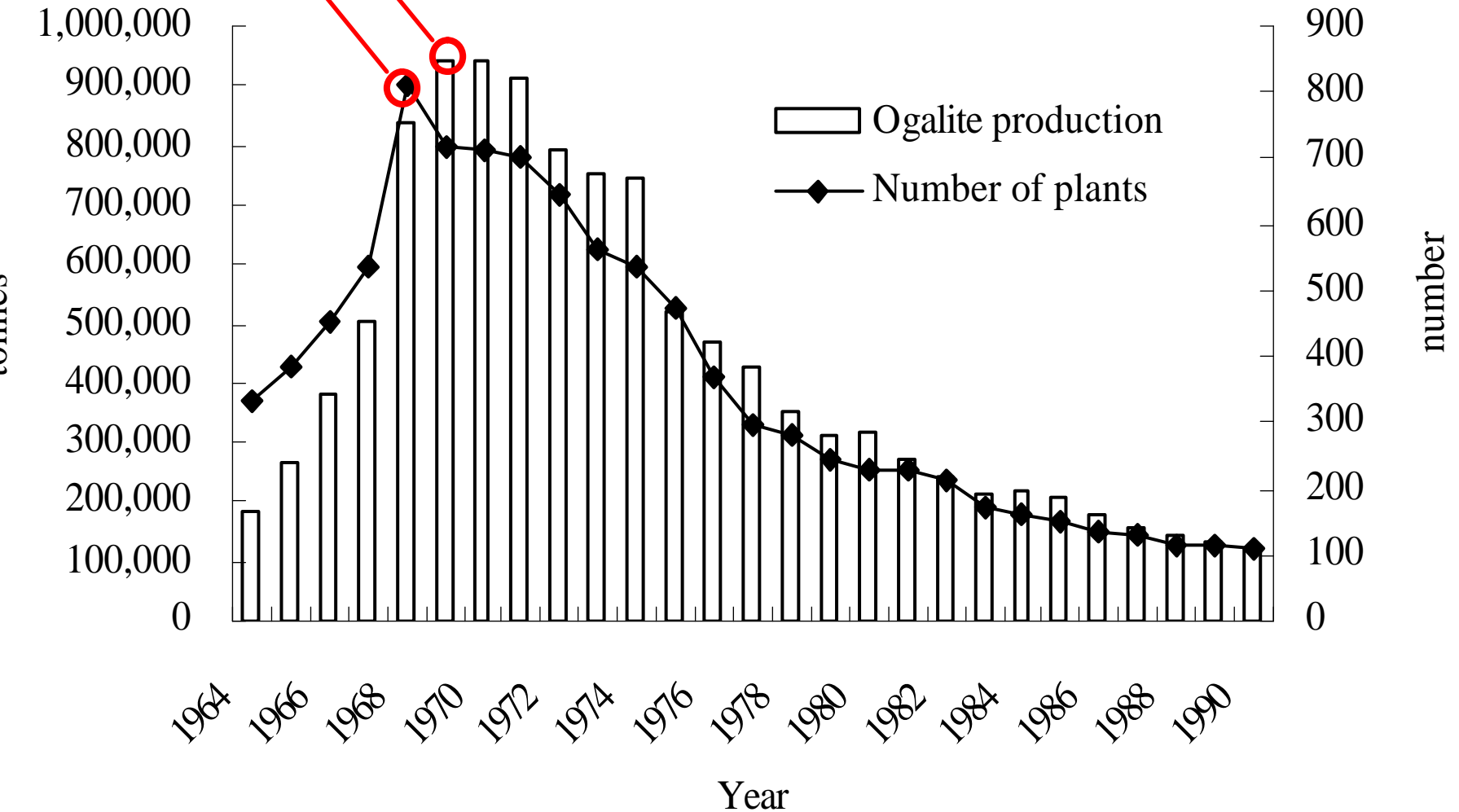
- one of a densified wood fuel
- invented by Kitamoto in 1954
- used be use for old type Japanese "Goemon-buro" baths
- abundant raw materials(sawdust)



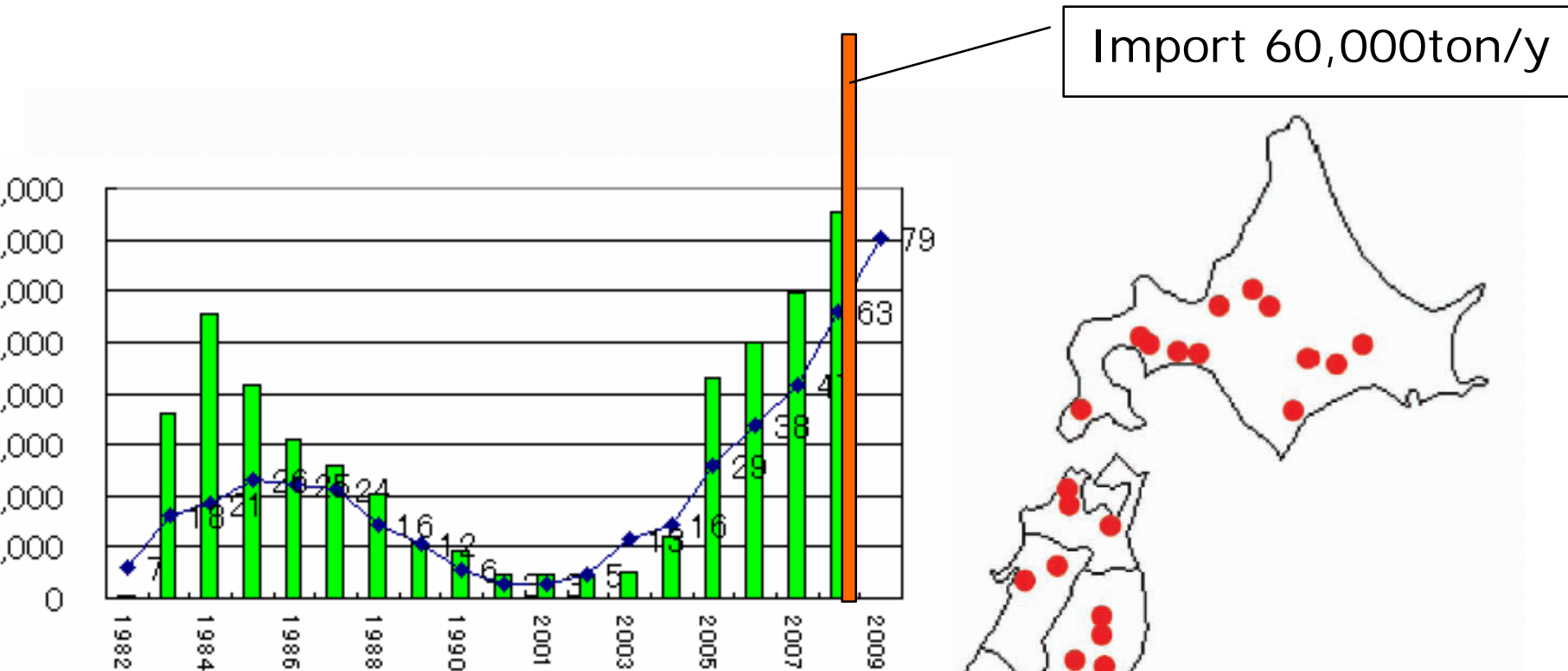
Briquette "Ogalite" production

5,000 tonnes(1969)

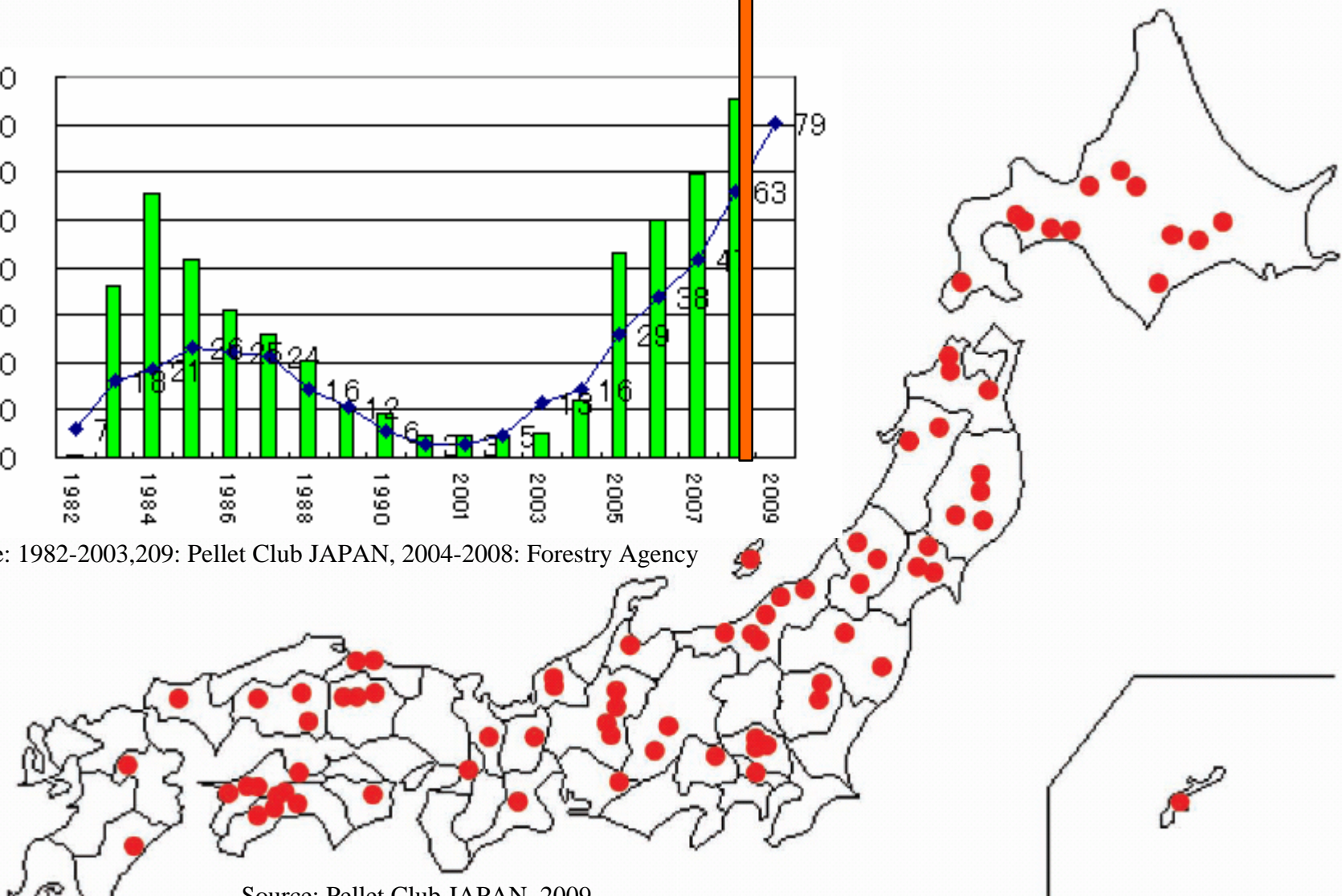
809 plants(1968)



Wood Pellets production in Japan



Source: 1982-2003,209: Pellet Club JAPAN, 2004-2008: Forestry Agency



Source: Pellet Club JAPAN, 2009

Raw materials for wood pellets (domestic mills)

Type of raw materials	Using ratio(%)	Mills
thinning woods, forest residues	29	13
saw dusts	18	19
Cuttings	17	16
Shavings	15	15
Bark	10	4
driftwoods in a dam, cutting trees from civil engineering work	9	10
roadside trees, pruned trees	2	4
TOTAL	100	81*

*including few materials in one mill

Capacity of mills and sort of pellets (domestic mills)

Capacity (ton/year)	Mills	Sort of pellets		
		Bark	White	Whole tree
<49	9		5	4
50-99	3		1	2
100-499	24		12	12
500-999	8	1	1	6
1,000-2,999	4	1	2	1
>3,000	3	2	1	
TOTAL	51	4	22	25

Sort of produced wood pellets (domestic mills)

Sort of pellets	Mills*	Share(%)
Bark	5	10
White	22	55
Whole tree	24	35
TOTAL (2008)	51	100

*sort is decided as a main products of each mill

Source: Japan Wood Pellet Association, 16th March 2009

Sales for purpose

Year	Sales (ton/year)	for Stove	for Boiler
2006	20,068	3,196 (16.5%)	16,872 (83.5%)
2007	25,375	3,189 (12.6%)	22,186 (87.4%)
2008*	38,700	5,800 (14.9%)	32,900 (85.1%)

*estimation, January 2009

Source: Japan Wood Pellet Association, 16th March 2009

Imported			for Boiler
2008*	60,000		60,000

*planned

Source: Press release, Kansai Electric Power CO.

Price of wood pellets (domestic mills) ex. transportation cost

Purpose	Sort of pellets	Price at mill(yen/kg)		
		high	middle	low
Stove	Bark	50	42	25
	White	46	37	36
	Whole tree	43	40	37
Boiler	Bark	33	28	24
	White	43	33	33
	Whole tree	38	34	31

*second semester of 2008(June-December)

Source: Japan Wood Pellet Association, January 2009

Pellet furnace equipments

Pellet stove

- Domestic manufactures: 16 (28 products)
- Imported: 7 (25 products)
- Sales number: 11,094 (total)

Pellet boiler(<500kW)

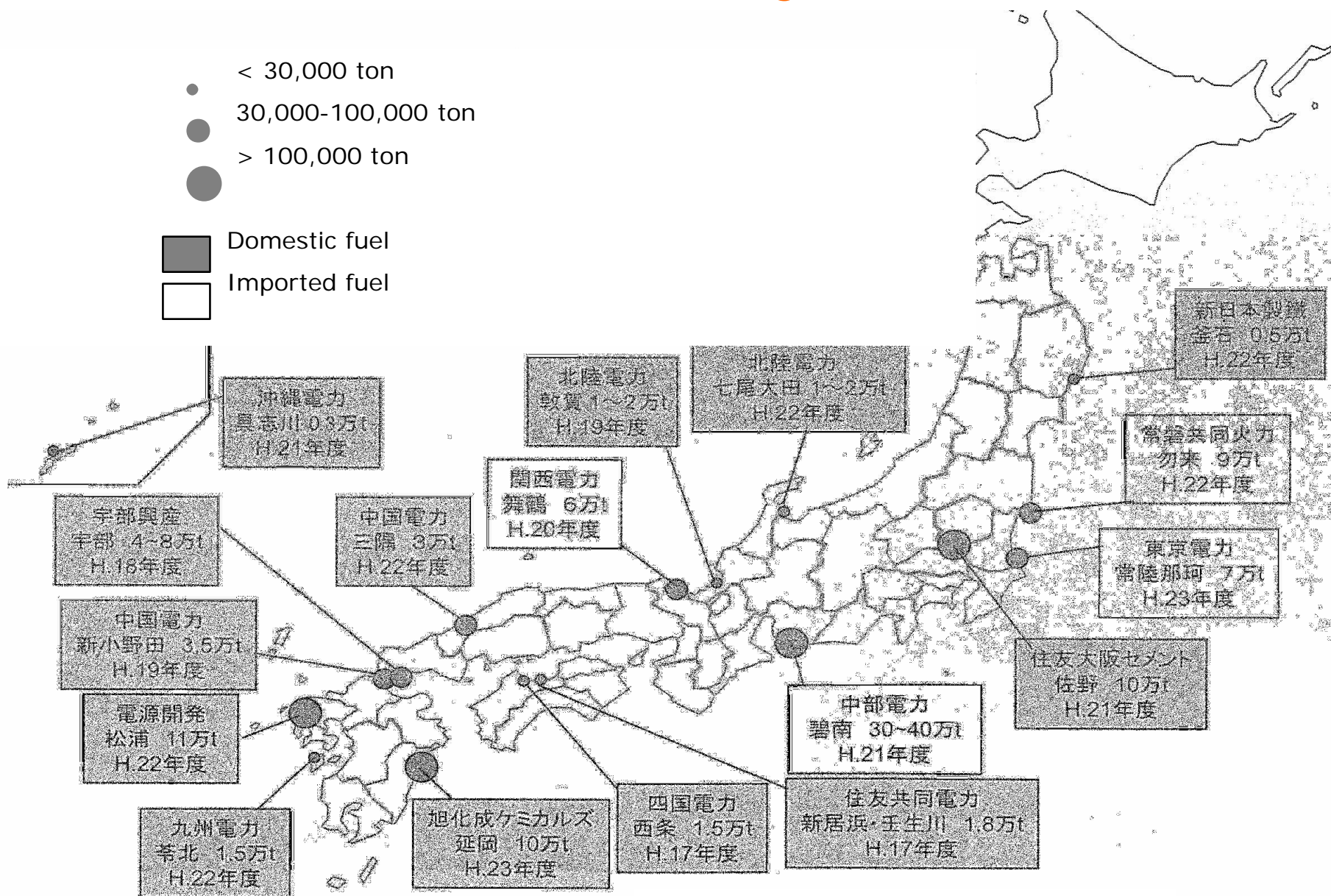
- Domestic manufactures: 5
- Imported: 2
- Installation number: 463 (total)

Greenhouse heater: 4 manufacturers

Cooling & heating device: 1 manufacture

Small steam boiler: 1 manufacturere

Co-firing



Conclusion

Overview

- Domestic mills increase rapidly, but small & low operation rates ? “Local production & Local consumption”
- Power companies & industrial power generations starting co-firing ? big scale, waste, imported
- Demand polarization into domestic & imported

Barriers

- Lack of raw materials ? waste
- No national standards (solid biofuel, equipment)
- Statistic
- Pellet is “Fuel” = METI, “Forest products” = MAFF
- Lack of political instruments (environmental tax etc.)

Sustainability

- Domestic resource ? up to “Forestry”

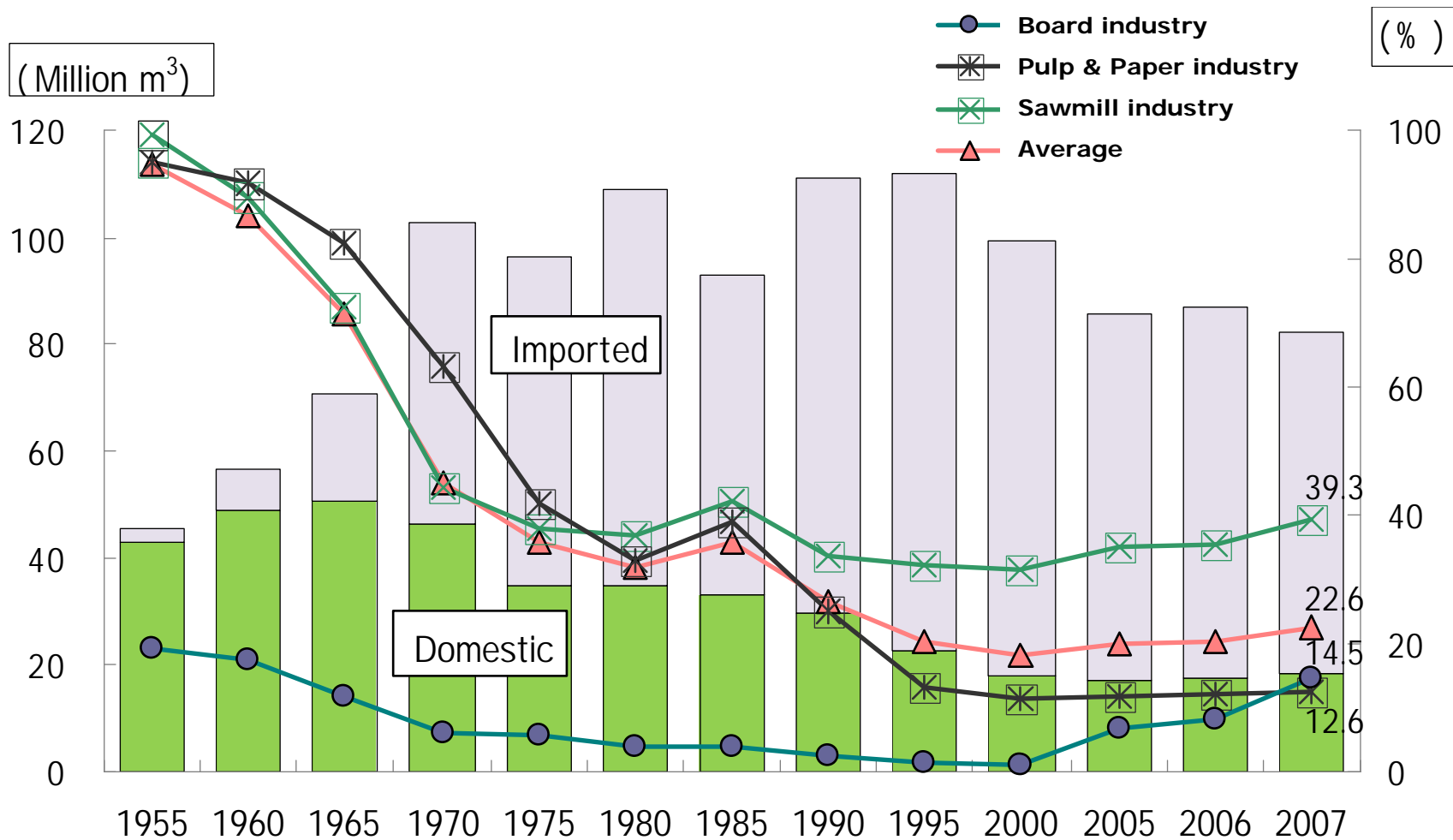
Resource potentials

Table 4. Modern fuelwood potentials in 2005 for selected countries.

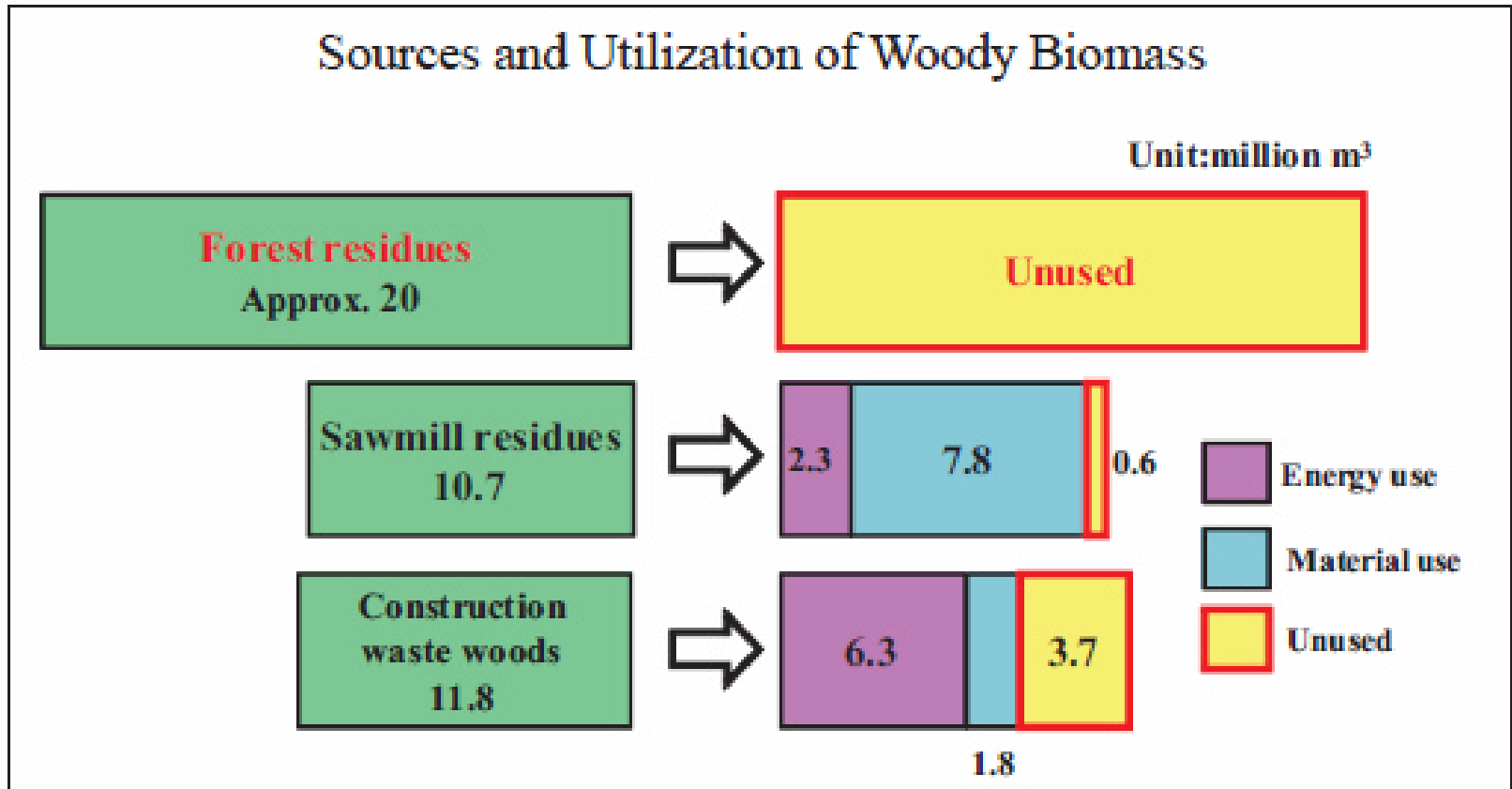
Country	mill. m ³		PJ		TWh	
	lower	upper	lower	upper	lower	upper
United States	158	304	1140	2191	317	609
Canada	44	108	316	774	88	215
China	70	104	503	747	140	208
Brazil	34	86	242	621	67	173
Russia	38	77	273	554	76	154
Germany	29	46	207	331	58	92
Sweden	21	42	149	305	41	85
Japan	27	36	196	262	54	73
Finland	17	35	122	253	34	70
France	19	30	136	218	38	61
Poland	14	24	99	170	28	47
Chile	13	23	94	166	26	46
Austria	7	12	52	86	14	24
Czech Republic	5	10	39	71	11	20
Latvia	5	9	37	62	10	17
Slovakia	3	5	22	37	6	10

Source: Working papers of Finnish Forest Research Institute 118; Global potential of modern fuelwood
 Original sheet: 13th July 2009 NAGANO, MARKKU PAANANEN, JAMK University of Applied Sciences

Timber imports in Japan

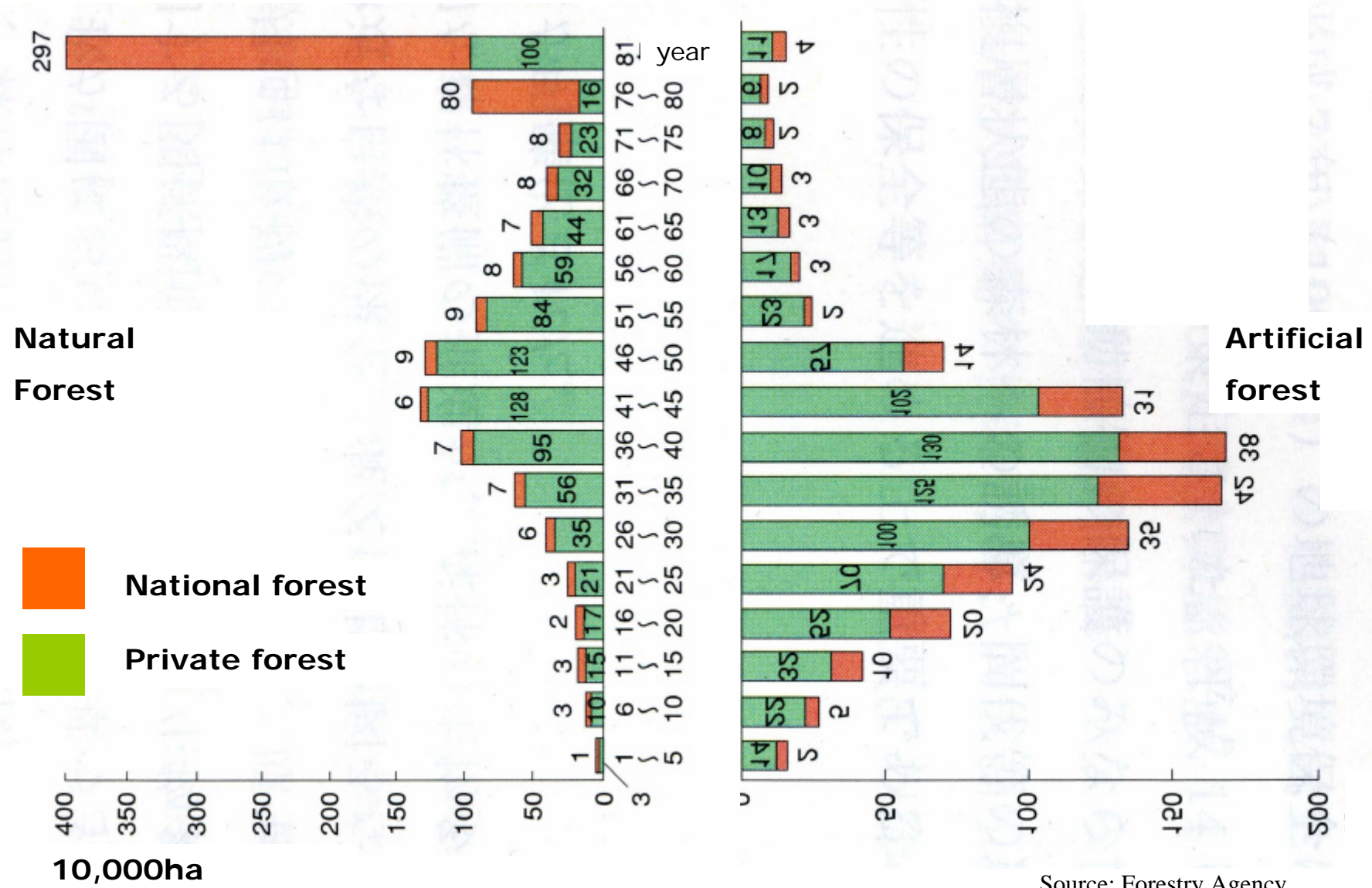


Resource capacity



Source: Forestry Agency "Annual Report on Trends in Forest and Forestry" Fiscal Year 2008

Age structure of our forest



Source: Forestry Agency

Structural Defect of Japanese Forestry

Price component of sawn timber



Source: Forestry Agency

Pellet demand for future

- Coal demand in the world
 - 2010: 5.1 billion ton
 - 2030: 7.8 billion ton
- Pellets demand in the world
 - 2007: 7 million ton
 - 2010: 15 million ton
 - 2015: 228 million ton?
 - 2030: 350-400 million ton?



Source: Bioenergy International No.44 (2010)

Our Bioenergy Future = Forestry

