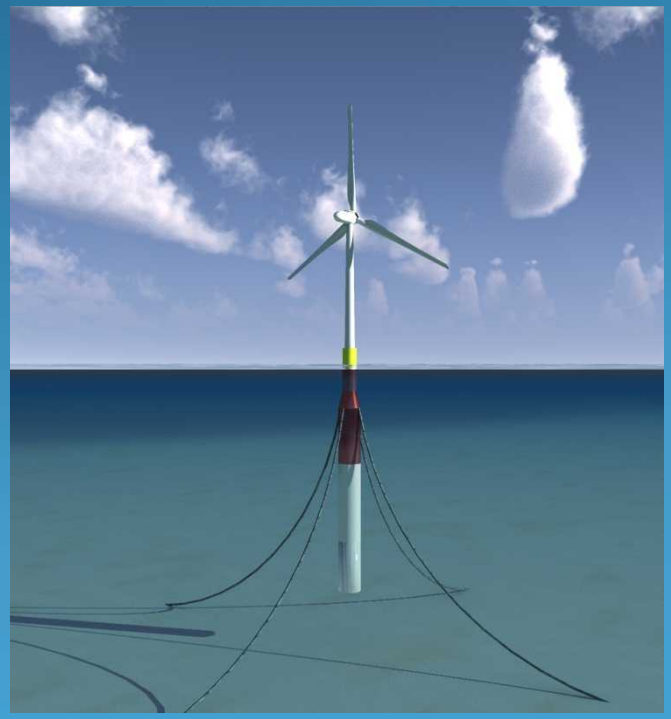
Brief overview of Japanese offshore wind projects and initiatives



Jiro Hiratsuka
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Ministry of the Environment

Discussion for the future energy and environmental policy

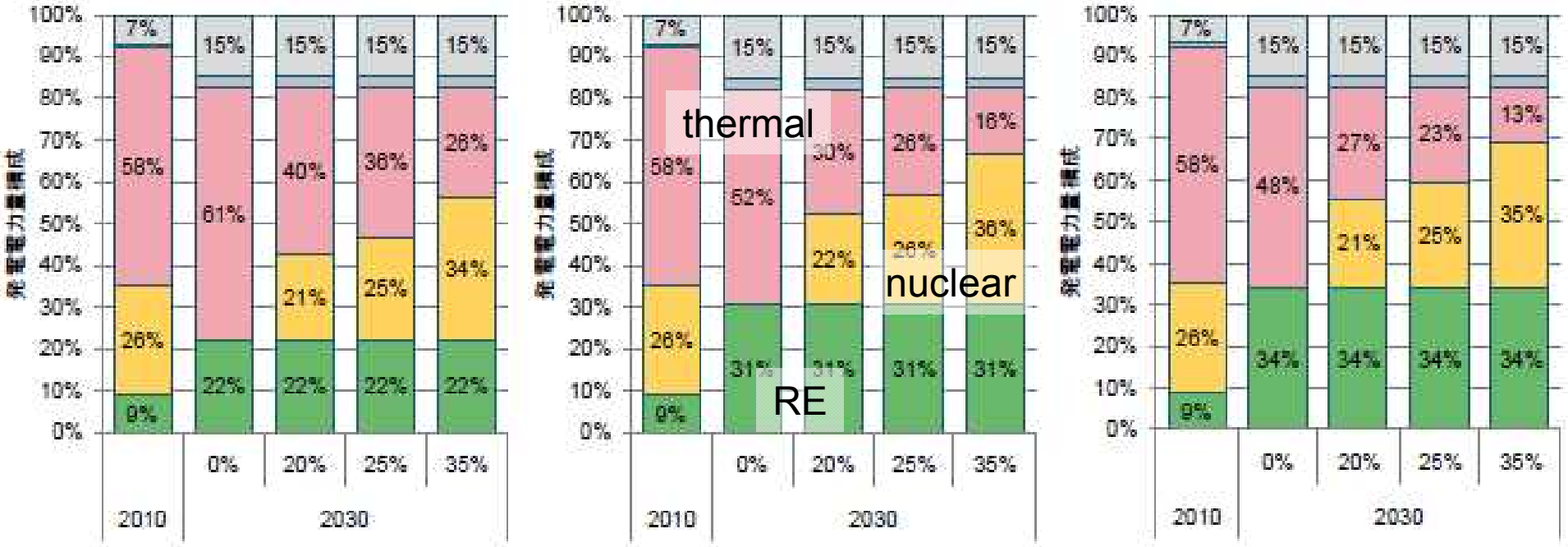
- In spring: options for the energy and environmental strategy in terms of nuclear power policy, energy mix and climate change will be prepared
- In summer: through national debate, the innovative energy and environmental strategy will be determined

Draft options of energy mix in 2030

	Nuclear	Renewable	Thermal power	Off-grid & cogeneration	CO_2 (vs 1990)
B	0%	35%	50%	15%	- 16%
C	20%	30%	35%	15%	- 23%
D	25%	25%	35%	15%	- 23%
E	35%	25%	25%	15%	- 28%
FY2010	*26.4%*	*10.5%*	*56.9%*	*6.2%*	*+ 6%*

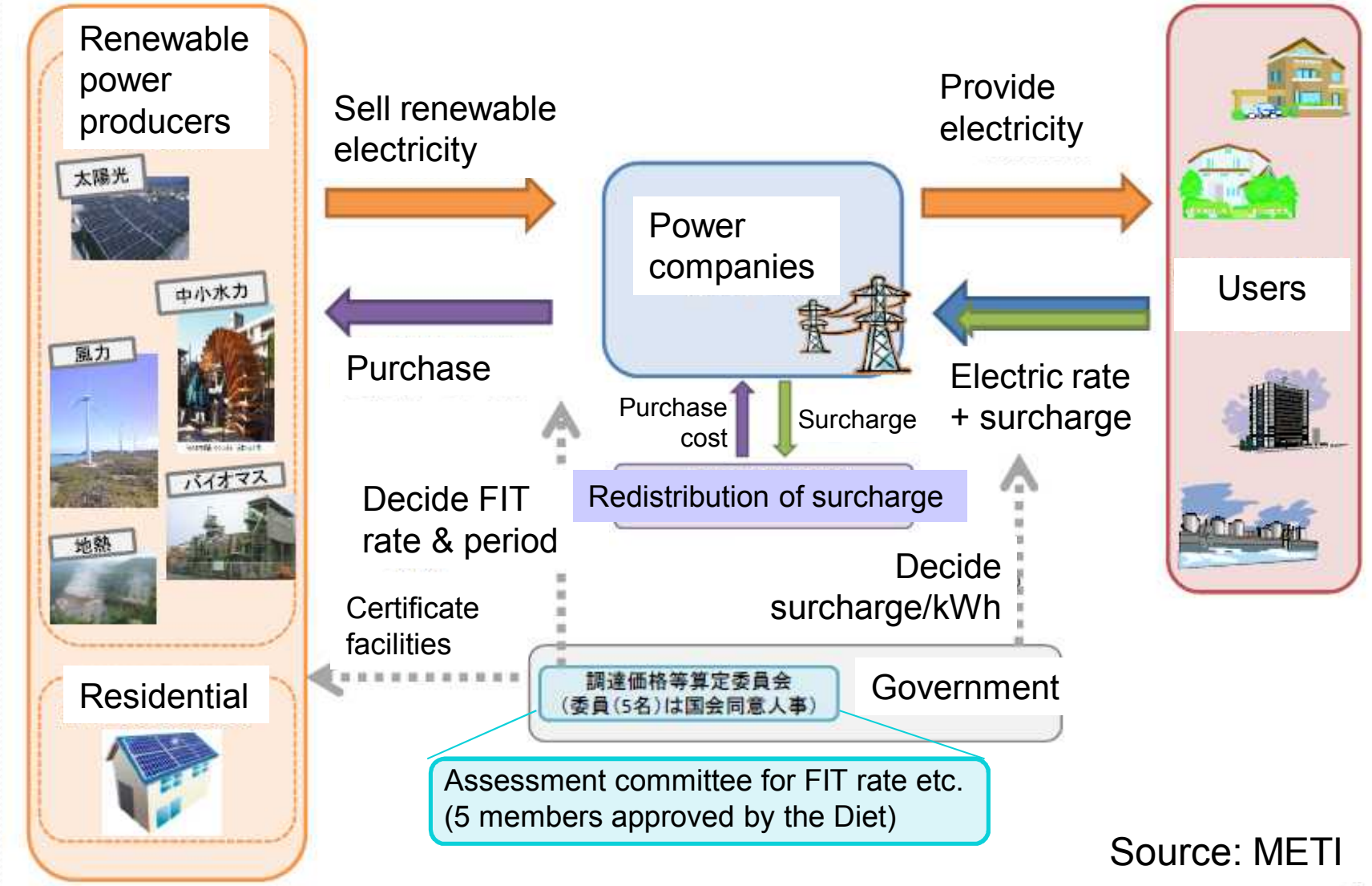
Expected RE introduction (GW)

	Present	2020	2030
Hydro	9.55	9.62 - 11.52	10.12 - 16.43
Geothermal	0.53	0.80	1.99 - 2.21
Biomass	4.09	4.59 - 6.53	4.59 - 6.82
PV	3.37	26.25 - 52.00	65.91 - 100.60
Wind (offshore)	2.44	7.50 - 11.50	21.30 (5.10) - 32.50 (8.80)
Ocean	0	0	1.50 - 3.49



Source: discussion materials for the Central Environment Council

Feed-in Tariff (FIT) from July 2012



Source: METI

Draft feed-in tariff rate and period proposed by the Assessment Committee on FIT Rate and Period

Source	Capacity or Category	Rate, tax incl. (JPY per kWh)	Period (year)
PV	≥ 10 kW	42.00 yen	20
	< 10 kW	42.00 yen	10
Wind	≥ 20 kW	23.10 yen	20
	< 20 kW	57.75 yen	
Geothermal	≥ 15000 kW	27.30 yen	15
	< 15000 kW	42.00 yen	
Hydropower	1000 - 30000 kW	25.20 yen	20
	200 - 1000 kW	30.45 yen	
	< 200 kW	35.70 yen	
Biomass	Biogas	40.95 yen	20
	Lumber, unused	33.60 yen	
	Lumber, general	25.20 yen	
	Waste biomass	17.85 yen	
	Lumber, recycled	13.65 yen	

(1 NOK ≈ 13.6 JPY)

Offshore wind turbines in Japan

- Three offshore wind power facilities
  - fixed-platform only (so as in the world)
    - Sakata City, Yamagata (2004): 10MW (2MW x 5 turbines)
    - Setana Town, Hokkaido (2004): 1.2MW (0.6MW x 2)
    - Kamisu City, Ibaraki (2010): 14MW (2MW x 7)

Offshore/Nearshore Wind turbines in Japan

Ministry of the Environment
Government of Japan

Choshi, Chiba / Kita-Kyusyu, Fukuoka

METI's demonstration projects

A 2MW offshore wind turbine and an observation tower respectively will be placed in 2012.

Setana, Hokkaido

A local government (Setana town) operates two 600kW nearshore wind turbines from April 2004.

Sakata Port, Yamagata

A private company (Summit Wind Power, Inc.) operates five 2MW nearshore wind turbines from Jan. 2004.

Kashima Port, Ibaraki

A private company (Wind Power Ibaraki, Inc.) operates seven 2MW nearshore wind turbines from June 2010. More eight 2MW wind turbines will be added in 2012, and an offshore wind warm of around 100 turbines is planned in the future.

Goto islands, Nagasaki

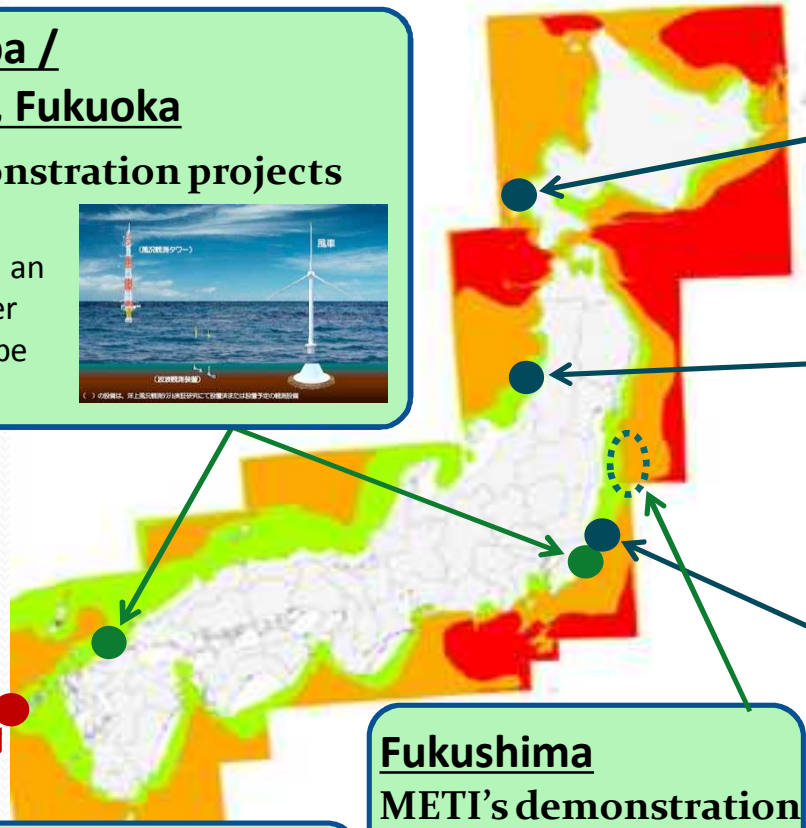
MOE's demonstration project

A 100kW offshore floating wind turbine (half size model) will be placed in 2012, then a 2MW offshore floating wind turbine will be placed in 2013.

Fukushima

METI's demonstration project

The first offshore floating wind farm is launched, consists of one 2MW wind turbine and a floating sub-station from 2013 as the first stage, and two 7MW wind turbine from 2013-2015 as the second stage.



Annual average wind speeds (80 meters above sea level)

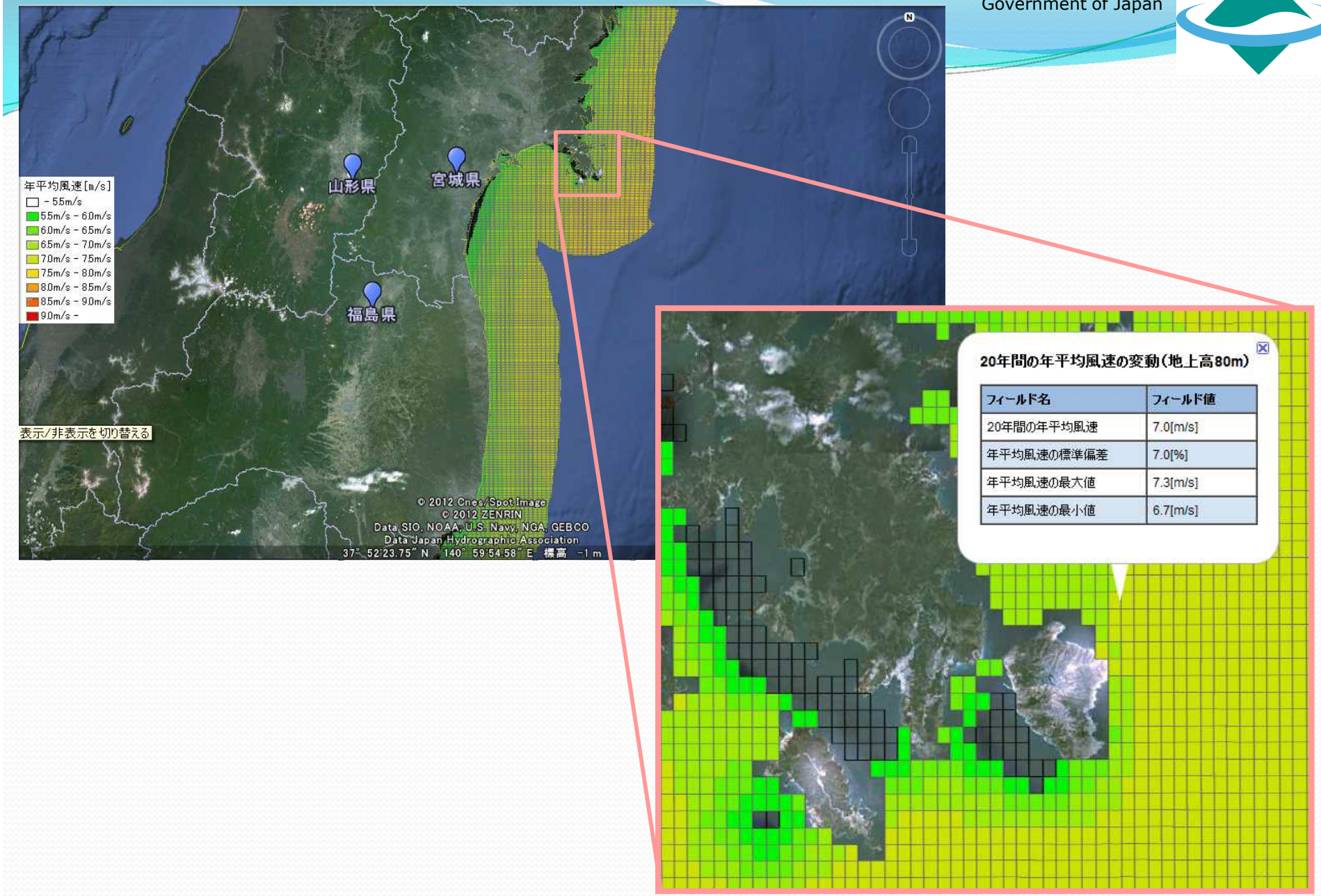
- >6.5 m/s
- >7.5 m/s
- >8.5 m/s

Source: Headquarters for Ocean Policy

Wind Map (Tohoku Region)

- MOE developed a wind database analyzing annual average wind speed and its variability (standard deviation) of the past 20 years (1991-2010) in Tohoku region, utilising the numerical weather simulation technology
- Wind Map (Tohoku region) links the wind database with map information and can be used via Google Earth (only in Japanese)

http://www.env.go.jp/earth/ondanka/windmap/


年平均風速[m/s]
- 5.5m/s
5.5m/s - 6.0m/s
6.0m/s - 6.5m/s
6.5m/s - 7.0m/s
7.0m/s - 7.5m/s
7.5m/s - 8.0m/s
8.0m/s - 8.5m/s
8.5m/s - 9.0m/s
9.0m/s -
山形県
宮城県
福島県
表示/非表示を切り替える
© 2012 Cnes/Spot Image
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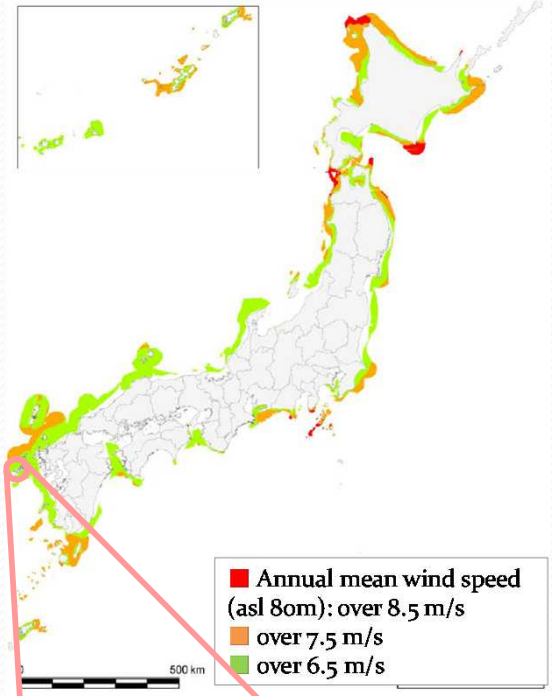
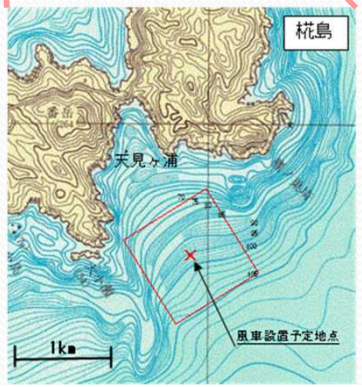
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data Japan Hydrographic Association
37° 52'23.75" N 140° 59'54.58" E 標高 -1 m
20年間の年平均風速の変動(地上高80m)
フィールド名
フィールド値
20年間の年平均風速
7.0[m/s]
年平均風速の標準偏差
7.0[%]
年平均風速の最大値
7.3[m/s]
年平均風速の最小値
6.7[m/s]

Floating offshore wind turbine demonstration project

- Background:
  - Japan has 6th largest sea space (as EEZ), thus large potential for offshore wind
  - Japanese sea generally has steep seabed
    → suitable for floating platform
    (depth > 50m)
- Objective: demonstrating the first full-scale (2MW) floating offshore wind turbine in Japan
- Duration: FY2010-2015
- Location: Kabashima Island, Nagasaki





Project work plan

FY2010-2011

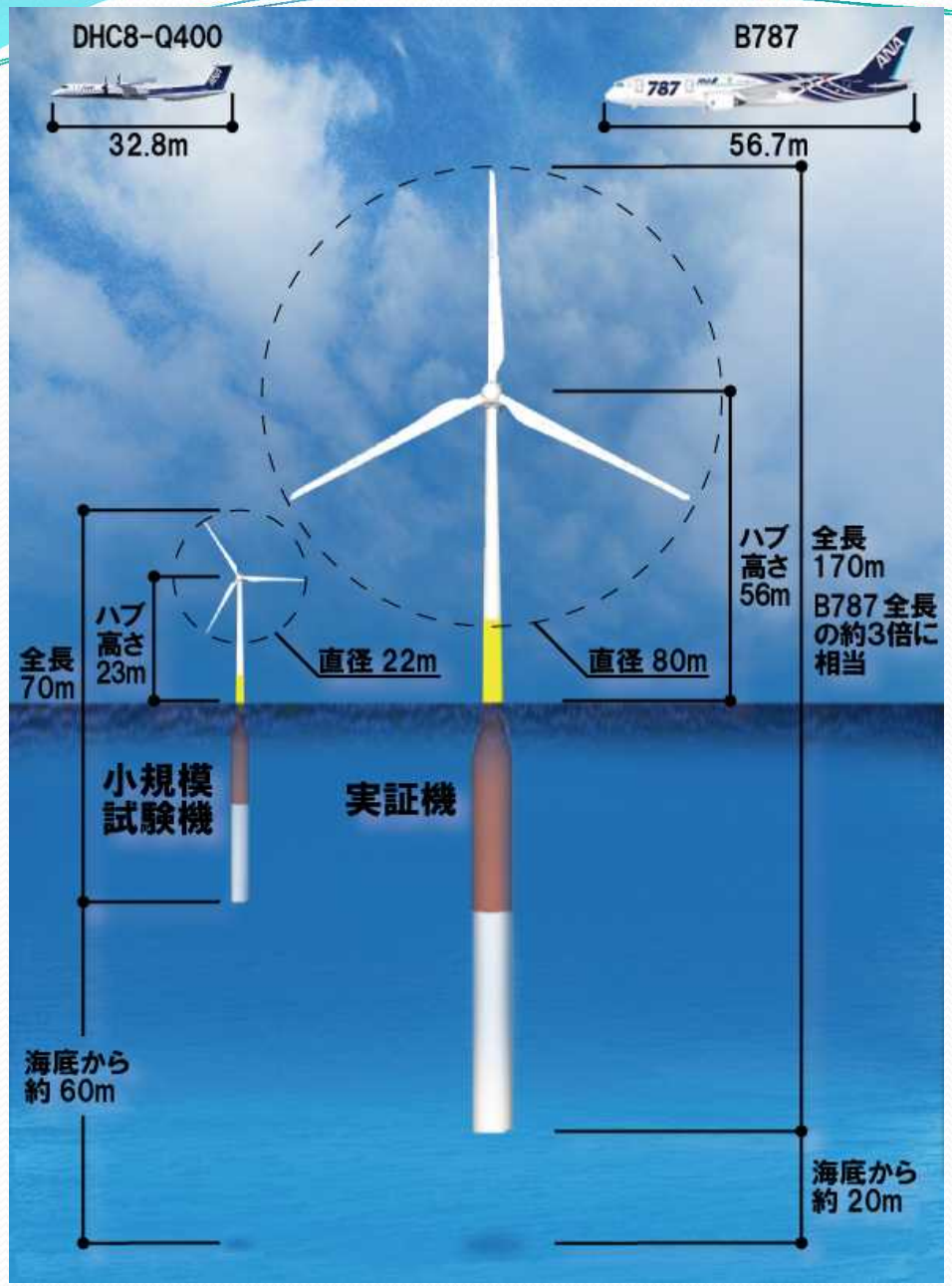
- Selected a candidate demonstration site
- EIA for floating offshore wind turbines
- Construction of 100kW floating structure and turbine
- Completed administrative procedure for 100kW
- Design of 2MW structure and turbine

FY2012

- Establishment and operation of 100kW (1 year)
- Construction of 2MW structure and turbine

FY2013-15

- Establishment and operation of 2MW (approx. 2 years)



- Downwind turbine
- Floating structure: steel + PC concrete
- Half-scale 100 kW turbine will be operational in this summer

Other projects and initiatives

- MLIT: Technical investigation in floating structure and anchorage
  - In consideration of Japanese circumstances e.g. typhoon, earthquake
  - Safety of FOWT and wind farm
  - Emergency preparedness and response
- Headquarters for Ocean Policy: "Action Plan for the Promotion and Utilization of Offshore Renewable Energy"
  - Demonstration sites in the real sea areas
  - Coordination with stakeholders for use of sea areas
  - Measures to reduce initial costs
  - Legal issues

Thank you for your attention