

# JAPANESE SITUATION ON ENERGY EFFICIENCY AND RENEWABLE ENERGY POLICY IN A CHANGING CLIMATE

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- Among the total electricity generated in FY2012, renewable energy etc., accounted for approximately 10%, 8.4% of which was hydraulic power generation.
- The cost of renewable energy other than hydro is still prohibitive.

Composition of annual electricity generated in Japan



Note: "Etc." of "Renewable energy, etc." includes the recovery of energy derived from waste, refuse derived fuel (RDF) products, heat supply utilizing waste heat, industrial steam recovery, and industrial electricity recovery.

Source: Prepared based on the Agency for Natural Resources and Energy's "Outline of Electric Power Development in FY 2010"



Overcome energy challenges while reducing costs in procurement, distribution and consumption sectors.

## 1. Production (Procurement) Sector

<Diversify electricity source>

(1)Maximize introduction of renewable energy ①Deregulation

(E.g. Accelerate procedures for environmental assessments)

- <sup>(2)</sup>Promote wind and geothermal power, through enhancing grid, etc.
- (2)Restart nuclear power plants once safety is assured.
- (3)Introduce high-efficiency thermal power plants (coal and LNG) while considering the environmental impact

- (1)Procure low-cost LNG.
- (2)Promoting development of domestic energy sources including methane hydrate.

# **2. Distribution Sector**

- (1) Electricity market reform
- ①Full liberalization of generation and retail.

(2) Unbundling

- ③Nation wide transmission operation
- (2)Strict assessment of power rate (Cut down fuel cost)

# **3. Consumption Sector**

(1)Enhance competitiveness and promote energy efficiency by installing cutting edge and efficient facilities in industries.

- (2)Enhanced energy conservation by adding house/buildings, in the Top Runner Program.
- (3) Promote efficient energy management systems such as demand response.

#### Measurement in a changing climate 1. Smart community



- As output of renewable energy such as sunlight fluctuates greatly, issues such as insufficient wavelength adjusting power and an increase in voltage of the power network due to large influxes arise.
- After the earthquake disaster, saving energy and cutting back during peak hours became an urgent issue for power networks, and ensuring supply of energy during disasters also became a challenge. Those measurements are useful to tackle the climate change.
- The solution to these kinds of problems is an efficient system for energy, including electricity, heat, and transportation, otherwise known as a "smart community."



# Demonstration of Smart Communities in Japan



Starting in FY2011, large-scale smart community demonstration projects have been ongoing in 4 regions across Japan that constitute representative examples of various patterns, based on participation by many residents, local governments, and corporations.



# Measurement in a changing climate 2. Wind Power



- The number of wind power systems introduced in Japan is about 500. But 400 of them are small wind power systems having less than 5 turbines.
- In many cases they are on the edge of mountains. It is also a characteristic that there are many damages due to turbulence and lightning.
- In these regards, the efforts to develop more efficient wind power turbines to harness the wind effectively is important.



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• It takes almost 10 years from the start of construction to build transmission lines. During this period, acceptable capacity in the utility side may exceed the limit.

- By installing and using a large-scale storage battery reducing the fluctuation through out variable renewable energies on the main transmission network, thoroughly verify the maximum amount of renewable energy that can be installed. Install a large-scale storage battery of several ten thousand kW class, to develop and verify the technology necessary for control and maintenance of the storage battery for the whole grid system.
- This is the first time to demonstrate a large-scale storage battery connected to the main grid system. It is necessary to swiftly obtain the required technology and know-how for use in the electricity grid system to develop new measures for grid stabilization by using storage batteries, which is one of Japan's strong fields.
- → <u>Demonstration project for large-scale storage battery system to support renewable energy generation</u> <u>FY2012 reserves for economic crisis measures and local revitalization (second version): 29.59 billion yen</u>

	Contents of demonstration projects		
	Hokkaido Electric Power	Tohoku Electric Power	Chubu and Kansai Electric Power
Battery type	Redox flow battery	Lithium-ion battery	NAS battery, etc.
Capacity	Around 40,000 kW	Around 20,000 kW	Around 6,000 kW
Demonstration item	Measures for surplus power in wind power generation	Measures for frequency variation in wind power generation	Measures for grid system stabilization in solar power generation (Measures for frequency variation, surplus power)



NAS battery



Redox flow battery



- Establish the Organization for Cross-regional Coordination of Transmission Operators (OCCTO) by about 2015
- Main functions of OCCTO: Details are still being decided
  - 1. Aggregate and analyze the EPCO's supply-demand and grid plans, and order them to change them regarding tie lines
  - 2. Coordinate the supply-demand balancing and frequency adjustment by T/D sectors in each area
  - 3. Order EPCOs to reinforce generation and power interchanges under a tight supplydemand situation





The distributed energy system means the system to procure and manage electricity and heating by themselves in increments of individual demand side or region,

It is composed of cogeneration, electricity and heating generated from renewable energy, energy efficiency equipment and energy creating equipment including "Energy Management System".

Herewith, Japan will establish the energy system which is durable for disaster in increment of the region.

Renewable energy introduction promotion fund project (Green New Deal Fund) is conducted to support the introduction of renewable energy and to realize regional communities that are resilient to disaster.





1. To formulate a responsible energy policy aimed at <u>ensuring a stable supply of energy and lower energy</u> <u>costs</u>, the New Basic Energy Plan is being discussed in the Advisory Committee for Natural Resources and Energy from March 2013.

2. Based on the discussion in the committee, the Japanese government will <u>establish the New Basic</u> <u>Energy Plan by the end of this year.</u>



# Thank you for your kind attention