



Strategic Energy Plan of Japan

Focus on Energy System Reform of
Japan and Building Smart Community

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Takao KASHIWAGI, PhD.

Distinguished Professor

TOKYO INSTITUTE OF TECHNOLOGY

The Great East Japan Earthquake

Growing Interest in Resilient Energy Infrastructure

- Many thermal power plants, as well as nuclear power plants, were damaged by Tsunami, and **severe electricity shortage** occurred in 2011.
- **Resilient Energy Infrastructure** is one of the main concerns in energy policy discussion.



Japan's Electricity Market Outline

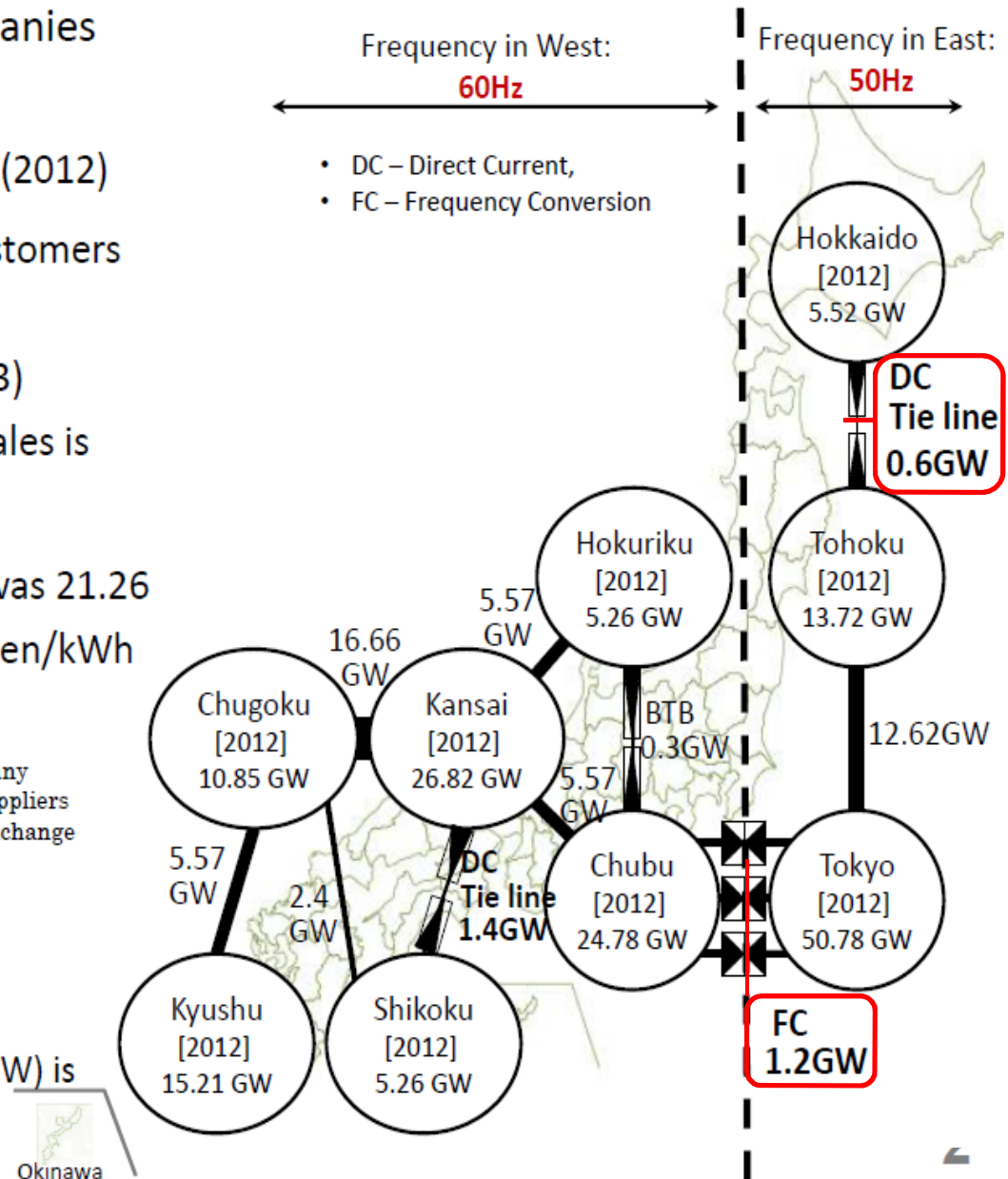
■ 10 Vertically Integrated Power Companies (EPCOs) and New Entrance (PPSs)

- Market volume: 1094TWh / 287 GW (2012)
- Retail competition for over 50kW customers (62% of the market in 2013)
 - Share of non-EPCOs: 4.2% (2013)
 - 1.3% of the total retail market sales is transacted at JEPX (2013)
- Average household electricity price was 21.26 yen/kWh before 3.11 (2011); 24.33 yen/kWh (2013) (24.81 yen/kWh in 1994)

*EPCO: Electricity Power Company
 *PPS: Power Producers and Suppliers
 *JEPX: Japan Electric Power Exchange

■ Frequency

- West Japan: 60Hz
- East Japan: 50Hz
- ◆ Hokkaido (peak demand: about 5.7 GW) is connected by DC line.



The 4th Strategic Energy Plan of Japan

Introduction

- As for Japan, which depends on most of fossil fuel from abroad, **energy security** is always **a significant issue**.
- This plan gives a direction of Japan's energy policies for **medium/long-term** (about next 20 years) . It declares a period from now to 2018-2020 should be **a special stage** to reform a variety of energy systems.
- GOJ will share distress of the affected people caused by the accident at **TEPCO's Fukushima Daiichi Nuclear Power Plant**, and achieve **the restoration and reconstruction** of Fukushima.
Japan's energy strategies, which were drafted before the Great East Japan Earthquake, should be reviewed **from scratch**, and GOJ should make efforts to **decrease dependency on nuclear power as much as possible**.
It is a starting point to reestablish Japan's energy policies .

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Principles of Energy Policy and Viewpoints for Reform -1

① Confirmation of basic viewpoint of energy policies (※3E + S)

※ Security , Economic Efficiency , Environment, & Safety

Global Viewpoint

- Developing energy policies with international movement appropriately
- Internationalizing energy industries by facilitating business overseas



Economic Growth

- Contribution to reinforce Japan's locational competitiveness
- Activating Japan's energy market through energy system reform

② Building multilayered and diversified flexible energy demand-supply structure

③ Establishing resilient, realistic and multi-layered energy supply structure, where each energy source can exert its advantage and complement others' drawbacks

④ Creating a flexible and efficient supply/demand structure where various players can participate and various alternatives are prepared by system reforms

Source : JETRO (as of Apr. 2014)

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Principles of Energy Policy and Viewpoints for Reform -2

Evaluation of each energy source

○Renewables (solar, wind, geothermal, hydroelectricity, biomass)

Promising, multi-characteristic, important, low carbon and domestic energy sources
Accelerating their introduction as far as possible for three years, and then keep expanding renewables

○Nuclear Power

Important base-load power source as a low carbon and quasi-domestic energy source, contributing to stability of energy supply-demand structure, on the major premise of ensuring of its safety, because of the perspectives;

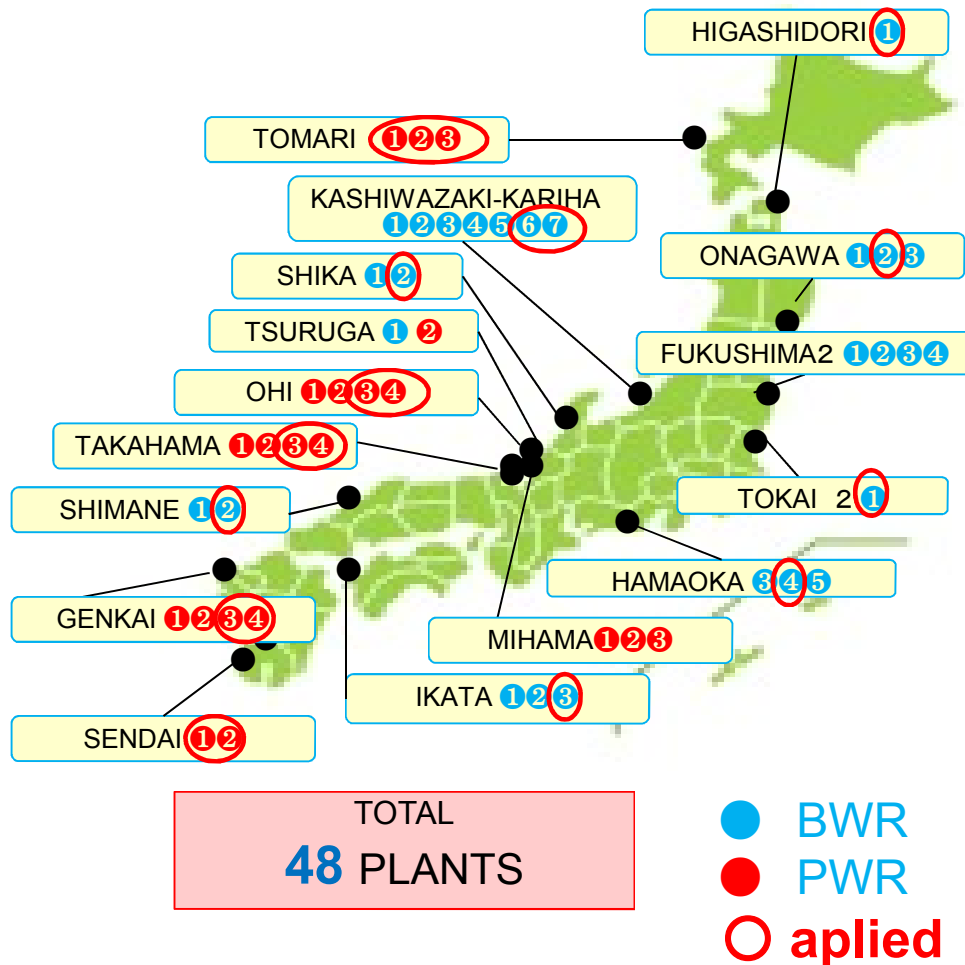
- superiority in stability of energy supply and efficiency,
- low and stable operational cost and
- free from GHG emissions during operation.

Dependency on nuclear power generation will be lowered to the extent possible by energy saving and introducing renewable energy as well as improving the efficiency of thermal power generation, etc

Source : JETRO (as of Apr. 2014)

Nuclear Power

Now, **20 Nuclear Power Plants** (**BWR 12 Plants**, **PWR 8 Plants**) submitted applications for their commercial power reactors' to conform to the said Requirements.



Company	Plant	Type	Application time		
			2013.7	2013.9	2014
Hokkaido	Tomari 1,2,3	PWR	○		
Tohoku	Higasidori 1	BWR			○
	Onagawa 2	BWR		○	
Tokyo	Kashiwazaki-Kariha 6,7	ABWR		○	
Chubu	hamaoka 4	BWR		○	
Hokuriku	Shika 2	ABWR			○
Kansai	Ooi 3,4	PWR	○		
	Takahama 3,4	PWR	○		
Chugoku	Shimane 2	BWR		○	
Sikoku	Ikata 3	PWR	○		
Kyusyu	Genkai 3,4	PWR	○		
	Sendai 1,2	PWR	○		
Nihongenden	Tohkai-Daini	BWR			○
Total	10 Companies	20 Plants	<applied>		

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Evaluation of each energy source

○Coal

Revaluating as **an important base-load power source** in terms of stability and cost effectiveness, which will be utilized while reducing environmental load (utilization of efficient thermal power generation technology, etc.)

○Oil

Important energy source as both an energy resource and a raw material, especially for the transportation and civilian sectors, as well as a peaking power source

○Natural Gas

Important energy source as a mainintermediate power source, expanding its roles in a variety of fields

○LP Gas

A clean and distributed energy source that can not only be utilized in everyday life but also in emergency situations

Source : JETRO (as of Apr. 2014)

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Policies on Energy Supply/Demand Structures

1. Promoting comprehensive policies for securing of resources

- Promoting multilayered “resource diplomacy” with natural resource exporting countries
- Facilitating diversification of supply sources and upstream development through risk money supply
- Promoting new styles of joint procurement such as comprehensive business partnership
- Establishing a stable and flexible LNG supply-demand structure with a long-term strategy that Japan would be a hub of a coming Asia LNG market
- Developing domestic seabed mineral resources such as methane hydrate and rare metals
- Promotion of recycling system for rare metals and reinforcement of reserve system

2. Realization of an advanced energy-saving society

● Enhancing energy efficiency in each sector

- Formulating energy efficiency indexes in order to facilitate energy-saving on each sector

● Realization of smart energy consumption through various options to end users

Source : JETRO (as of Apr. 2014)

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3. Accelerating Introduction of Renewable Energy: Toward Grid Parity in the Mid/Long Term

- **Strengthening the measures for expansion of wind and geothermal power** <Onshore Wind Power> <Offshore Wind Power> <Geothermal>
- **Promoting distributed energy systems with renewables**
 - <Woody Biomass> <Medium/Small size Hydro Power> <Solar Power>
 - <Thermal Energy from Renewables>
- **FIT**
- **Fukushima as a new hub of renewable energies' industries**

4. Re-establishment of nuclear policy

- **Efforts towards restoration and reconstruction of Fukushima**
- **Untiring pursuit of safety and establishment of stable environment for nuclear operations**
- **Steady approach to solve issues of nuclear power**
 - Drastic reinforcement of measures for achieving solutions and promotion concerning spent fuel management
 - Promotion of nuclear fuel cycle policy
- **Establishment of trust relationship with people, municipalities hosting nuclear facility sites and international community**

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5. Environmental arrangement for the efficient/stable use of fuel fossils

- Promoting the effective use of high efficiency coal/LNG-fired power generation
- Restructuring of the Market and Business Foundations for Petroleum and LP Gas Industries

6. Promotion of reforms in supply structure to remove market barriers

- **Electricity System Reform ✕**
- Promoting Reforms in Gas Systems and Heat Supply Systems

7. Enhancing resilience of domestic energy supply network

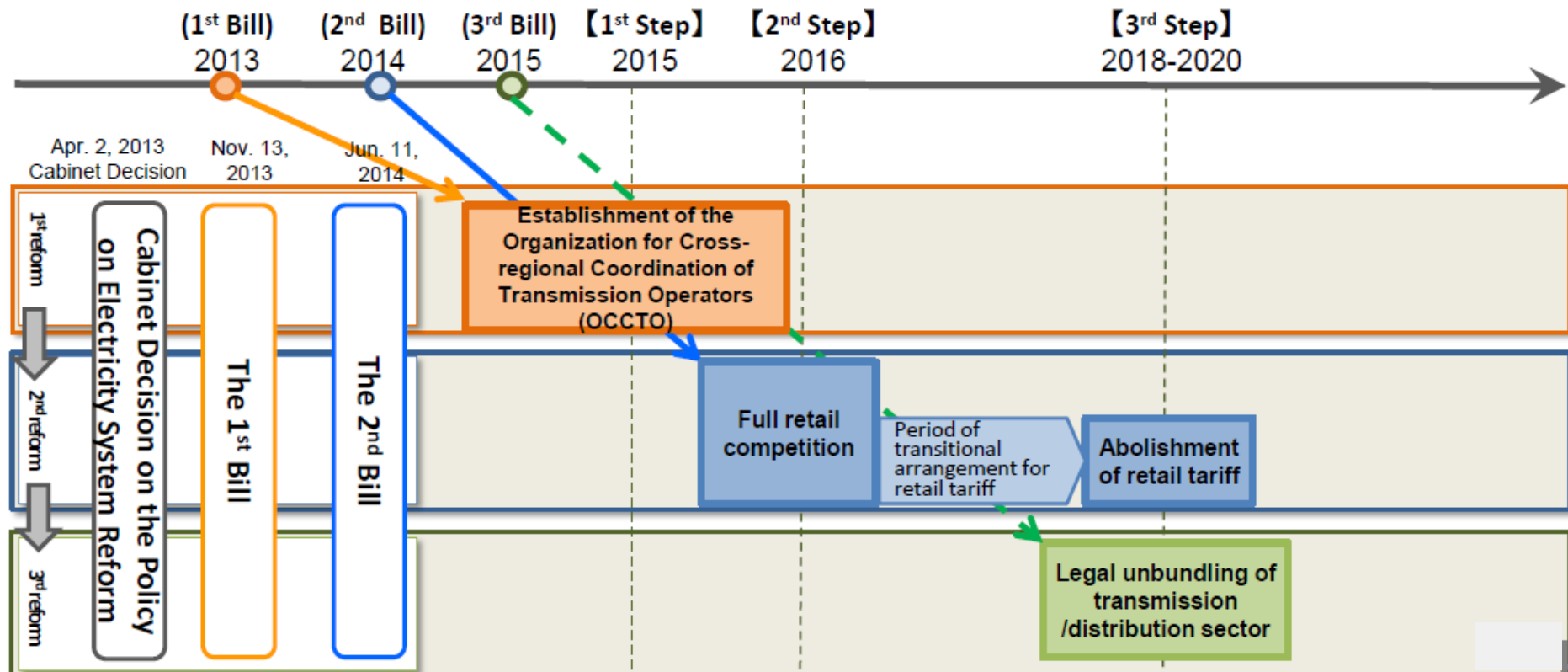
- Reinforcing oil and LP gas storage systems and promoting cooperation with oil-producing countries and neighboring countries
- Enhancing disaster response capability of refineries, service stations, as well as ensuring stable supply of petroleum products in everyday life

⚡ Electricity System Reform

- April 2, 2013, Cabinet decided the “Policy on Electricity System Reform” to realize three objectives in Japan’s market with a three-step approach.

3 Objectives

- (1) Securing a stable supply of electricity
- (2) Suppressing electricity rates to the maximum extent possible
- (3) Expanding choices for consumers and business opportunities



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8. Future of a secondary energy supply structure

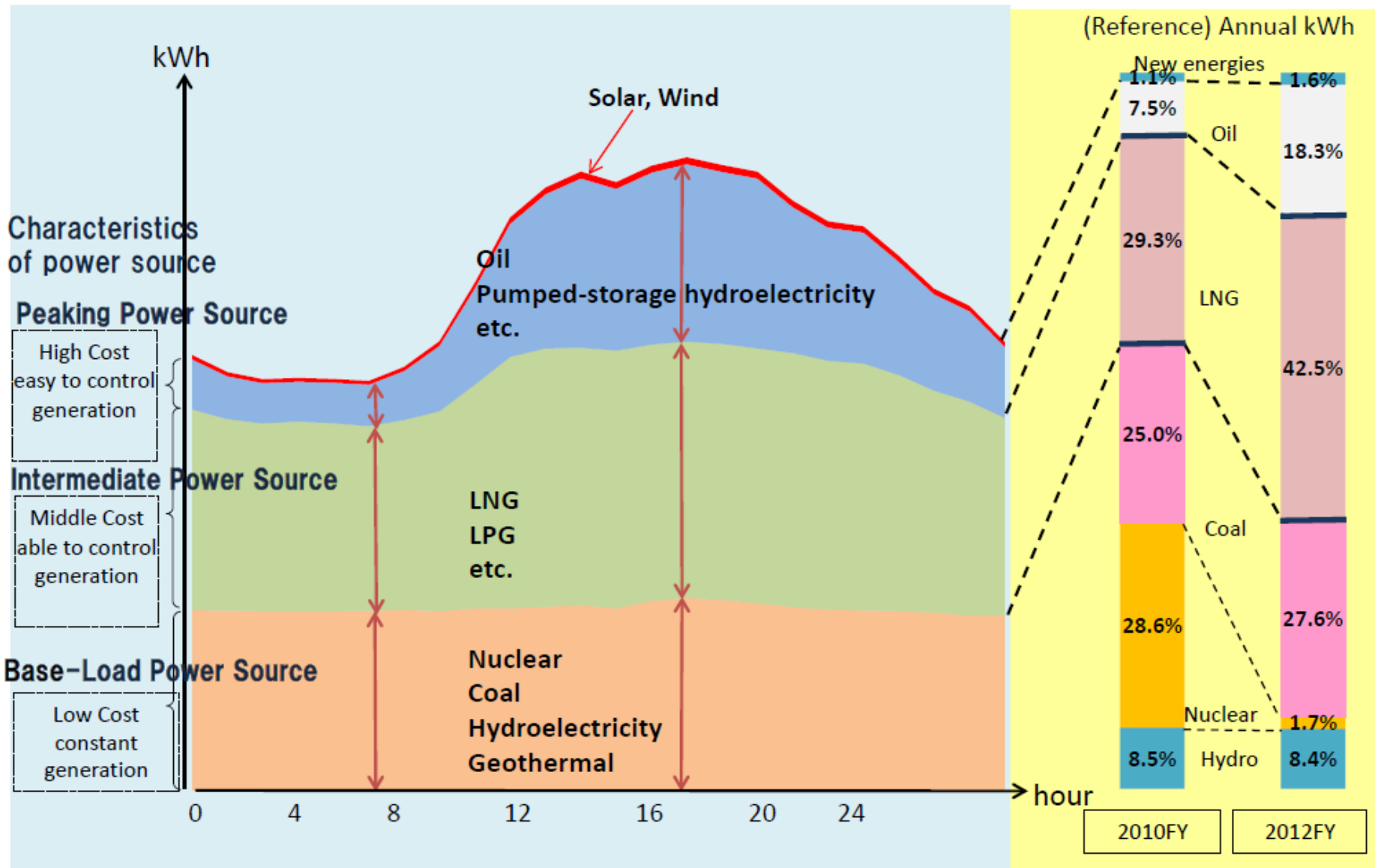
- Promoting co-generation and introduction of storage batteries
- Facilitating new technologies, which can use new energy sources, to introduce competition among energy sources in such new energy vehicles
- Realization of the “Hydrogen Society”

9. Energy leading Growth Strategy : creation of new energy enterprises etc,

- Big turnaround of industrial structure in energy sector
- Fostering new energy enterprises
- Creation of new energy markets and development of international energy markets

10. Strengthening comprehensive international energy cooperation

Constitution of Electric Power Supply Corresponding to Demand



Base-load Power Source: Low production cost that can be operated stably day and night regardless of the time

Intermediate Power Source: Production cost is next lowest to base-load source. Generation can be adjusted in accordance with electricity demand

Peaking Power Source: Easy to control generation in accordance with electricity demand while production cost is high

Smart Energy Network Concept

