

The 4th Strategic Energy Plan of Japan

Summary

April 2014

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

I . Problems on Japan's Energy Supply/Demand Structure

1. Basic Problems

- Japan's energy supply would be easily affected by external factors due to its high dependency on overseas fossil fuel.
- Population decline and innovation in energy conservation technology have caused structural changes in Japan's medium/long-term energy demand
- Increased energy demand in emerging countries has led to a rapid increase in natural resources' prices and global greenhouse gas emissions

2. Problems exposed just before and after 3.11

- Concerns regarding safety of nuclear power plants and weak public confidence toward GOJ and utilities
- Due to an increase of fossil fuel imports, Japan faces further dependency on the Middle-East, a rise in electricity prices, a rapid increase of greenhouse gas emissions, and an outflow of national wealth
- Exposed structural defects, such as difference in electricity frequency between East and West in Japan, a lack of emergency system to deliver oil products
- New trend for energy saving by household and industries
- New trend in global energy supply structure such as energy independency of North America due to shale gas, emerging regional differences in energy prices

II . Principles of Energy Policy and Viewpoints for Reform

1. Principles of Energy Policy and Viewpoints for Reformation

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

Stable Supply (Energy Security)

Cost Reduction (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

- Establishing resilient, realistic and multi-layered energy supply structure, where each energy source can exert its advantage and complement others' drawbacks
- Creating a flexible and efficient supply/demand structure where various players can participate and various alternatives are prepared by system reforms
- Improving self-sufficiency ratio by developing and introducing domestic resources to minimize influence from overseas' situation

II . Principles of Energy Policy and Viewpoints for Reform

2. Evaluation of each energy source

(1) 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

(2) 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; 1) superiority in stability of energy supply and efficiency, 2) low and stable operational cost and 3) free from GHG emissions during operation.
- Dependency on nuclear power generation will be lowered as much as possible by energy saving and introducing renewable energy as well as improving the efficiency of thermal power generation, etc.
- Under this policy, we will carefully examine a volume of electricity to be secured by nuclear power generation, taking Japan's energy constraints into consideration from the viewpoint of stable energy supply, cost reduction, global warming and maintaining nuclear technologies and human resources.

Ⅱ . Principles of Energy Policy and Viewpoints for Reform

(3) Coal

- Reevaluating 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.)

(4) Natural Gas

- Important energy source as a main intermediate power source, expanding its roles in a variety of fields

(5) 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

(6) LP Gas

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

□ Energy Mix

- ✓ Energy mix will be shown soon after this plan, taking into consideration factors including restart of nuclear power plants and expansion of renewable energies, and so on

III. 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

(1) Enhancing energy efficiency in each sector

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

<residential & commercial sector>

- Introduction of complementary energy efficiency standards for buildings/houses

<transport sector>

- Promoting ITS which enables automatic driving system to improve fuel efficiency

<industry sector>

- Encouraging investment to replace more efficient facilities

(2) Realization of smart energy consumption through various options to end users

- Establishing a method of “Demand Response” through smart meters in all homes and all businesses

III. Policies on Energy Supply/Demand Structures

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

- Accelerating introduction as far as possible for three years from 2013, followed by continuous active promotion
- Establishing “Ministerial Level Meeting on Renewables” for policy coordination
- Pursuing a higher level of introducing renewables than the levels* which were indicated based on the former Strategic Energy Plans, and GOJ takes them into account in a next energy mix
- Operating FIT stably and appropriately, promoting regulatory reforms, R&D etc.

* *“the Foresights of Long-Term Energy Supply and Demand(Recalculated)” (Aug. 2008, METI)*

- *The ratio of renewables in total watt-hour in 2020: 13.5% (141.4 billion kWh)*

“the Shape of Energy Supply and Demand in 2030” (Jun. 2010, the document for Advisory Committee on Energy and Natural Resources)

- *The ratio of renewables in total watt-hour in 2030: approximately 20% (214 billion kWh)*

(1) Strengthening the measures for expansion of wind and geothermal power

<Onshore Wind Power>

- Shortening periods for environmental assessment, establishing regional/inter-regional grid for renewables, installing large storage cells, rationalizing regulations, and so on

<Offshore Wind Power>

- Promoting pilot projects for floating wind turbines technology in Fukushima and Nagasaki prefecture, and making the technology commercialized by 2018

<Geothermal>

- Reducing investment risk, shortening a period for environmental assessment, and promoting understanding of local people

III. Policies on Energy Supply/Demand Structures

(2) Promoting distributed energy systems with renewables

<Woody Biomass>

- Promoting the power generation and thermal usage of woody biomass, through forest /timber policies and the “Act for Promotion of Power Generation of Renewable Energy Electricity to take Harmony with Sound Development of Agriculture and Forest”

<Medium/Small size Hydro Power>

- Simplification of procedure on water rights by the amendment of the “River Act”

<Solar Power>

- Continuing supports for introduction for self-consumption in regions

<Thermal Energy from Renewables>

- Promoting introduction of thermal-supply facilities and pilot projects for multi-heat use

(3) FIT

- Examination of the system from various views; facilitating the maximum use of renewables as well as reducing cost burden, referring situations of other countries which have faced challenges of cost burden and strengthening grid systems

(4) Fukushima as a new hub of renewable energies' industries

- Constructing an AIST's new research center for renewables

(4) Re-establishment of nuclear policy

1) Efforts towards restoration and reconstruction of Fukushima

- Efforts towards restoration and reconstruction of Fukushima is a starting point to rebuild Japanese energy policies
- GOJ's playing more proactive role in the decommissioning of Fukushima Daiichi NPPs and the countermeasures for the contaminated water issue (CWI)
- GOJ's playing more proactive role in proceeding compensation, decontamination and operations of intermediate storage facilities
- Conducting necessary studies for the establishment of R&D center for decommissioning and of industrial cluster for the fabrication/maintenance around the Fukushima Daiichi site

2) Untiring pursuit of safety and establishment of stable environment for nuclear operations

- Shedding the "safety myth" and pursuing the world's highest level of safety for operations
- When the Nuclear Regulation Authority admits the conformity of a nuclear plant with the new regulatory requirements which have the world's highest level of safety, GOJ will follow the NRA's judgment and play a proactive role in restarting it
- Establishing an appropriate risk management system and implementing objective/quantitative risk assessments by nuclear power operators
- Examining a desirable business environment for nuclear power operators, under the liberalization of electricity markets.
- Discussing a revision of the domestic nuclear damage compensation system comprehensively
- Accelerating the necessary work towards a conclusion of CSC
- Supporting municipalities hosting nuclear facility sites to enhance their evacuation plans, and reinforcement of measures for the nuclear emergency response.

3) Steady approach to solve issues of nuclear power

a) Drastic reinforcement of measures for achieving solutions and promotion concerning spent fuel management

- GOJ's promoting to find proper solutions of geological disposal of high-level radioactive waste (HLW), securing reversibility and retrievability in HLW management for future generation
- GOJ's promoting study and research on alternative disposal options including direct disposal method
- GOJ's taking more initiative in explaining selection of candidate disposal sites from a scientific viewpoint and constructs a mechanism to build consensus in regions
- Facilitating construction and utilization of new intermediate storage facilities and dry storage facilities
- R&D for reduction and mitigation of volume and harmfulness of radioactive waste

b) Promotion of nuclear fuel cycle policy

- Strongly keeping a stable nuclear fuel cycle policy with the understanding and cooperation of located municipalities and international community, and holding flexibility to promote nuclear fuel cycle policy for mid- to long-term
- Continuing committing to the principle of not possessing reserves of plutonium, of which use is undermined on the premise of peaceful use, and conducting an appropriate management and utilization of plutonium considering an appropriate plutonium balance
- Promoting R&D of fast reactors, etc., through international cooperation with US and France etc.
- Reforming any aspects of Monju R&D thoroughly and placing Monju as an international research center to promote R&D for reduction of volume and mitigation of harmfulness of radioactive waste

4) Establishment of trust relationship with people, municipalities hosting nuclear facility sites and international community

- Carrying out attentive public hearings and public relations based on facts and scientific evidence
- Promoting measures supporting municipalities hosting NPPs in accordance with each regional situation
- Providing nuclear technology with enhanced safety based on lessons from the accident, and strengthening support for human resource and institutional development for countries newly introducing NPPs

III. Policies on Energy Supply/Demand Structures

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

1) Promoting the effective use of high efficiency coal/LNG-fired power generation

- Shortening a period for environmental assessment
- Developing next-generation high efficiency coal-fired power generation technologies (e.g., IGCC) and carbon capture and storage (CCS) technology
- Promoting exports of Japan's advanced coal/LNG-fired power generation

2) Restructuring of the Market and Business Foundations for Petroleum and LP Gas Industries

- Supporting business restructuring for a oil refining industry, SS and LP gas operators

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

1) Electricity System Reform

- Expanding cross-regional coordination of transmission operators, introduce full retail competition and legally unbundle transmission and distribution sectors
- Introducing a mechanism for Transmission System Operators to purchase load following power, an obligation to retailers for securing power supply and so on, to secure stable supply to end users under full competition

2) Promoting Reforms in Gas Systems and Heat Supply Systems

- Introducing a full competition in gas supply market, and reviewing a system to use gas supply infrastructure for new comers
- Overhauling a heat supply business to further promote effective use of heat

III. Policies on Energy Supply/Demand Structures

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
- Establishing an emergency response system to coordinate among public agencies
- Encouraging critical consumers(hospitals, etc.) to store petroleum products for emergency
- Enhancing resilience of the electricity/gas supply system

8. Future of a secondary energy supply structure

(1) Promoting co-generation and introduction of storage batteries

- Examination of a new dealing to introduce electricity from co-generation to the market

(2) Facilitating new technologies, which can use new energy sources, to introduce competition among energy sources in such new energy vehicles

- Aiming that a sale of new next-generation automobiles will reach at 50% through 70% in total new vehicles sale by 2030

(3) Realization of the “Hydrogen Society”

- Promoting residential fuel cells “Ene-farm” to 5.3 million in 2030
- Building 100 hydrogen refueling stations in 2015
- Commercialization of advanced technologies such as Hydrogen Power Generation
- Continuing R&D efforts for the technologies such as hydrogen production ,transport and storage.
- Making a roadmap to realize the “Hydrogen Society” in Spring 2014

III. Policies on Energy Supply/Demand Structures

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

(1) Big turnaround of industrial structure in energy sector

- Facilitating new entries by new servicers to energy markets through electricity/gas system reforms

(2) Fostering new energy enterprises

- Mitigating regulations for creation of comprehensive energy enterprises
- Promoting smart communities which would give a new energy supply service with other regional public services

(3) Creation of new energy markets and development of international energy markets

- Facilitating of Japan's advanced technologies such as storage batteries and fuel cells
- Promoting exports of energy related infrastructures such as efficient thermal power plants, nuclear power plants and technologies for renewables and energy conservation

10. Strengthening comprehensive international energy cooperation

- Contributing to multilateral energy cooperation frameworks such as the IEA and IAEA
- Utilizing EAS as a framework to secure energy security with ERIA
- Enhancing bilateral energy cooperation, especially Japan-US energy cooperation should be more comprehensive

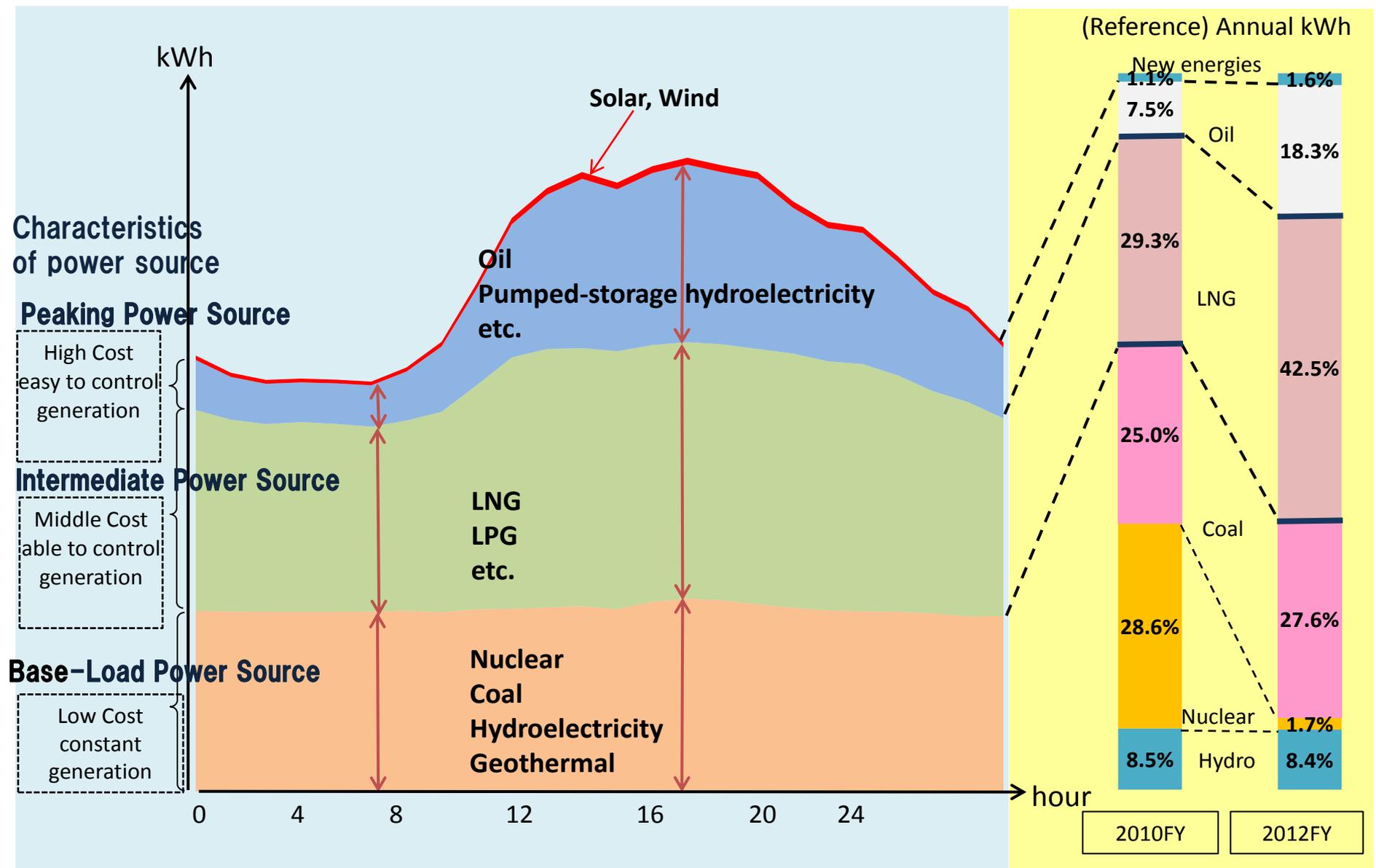
IV. Promoting strategic R&D

- Formulating a roadmap for technological development by next summer.
- Accelerating innovative technological development such as
 - lower-cost storage batteries and fuel cells
 - higher efficiency coal/LNG-fired power generation
 - technologies to reduce nuclear fuel waste and so

V. Communication with all levels of society on energy issues

- Sharing energy issues with all levels of Japan's society more
- Expansion of inter-active communication with various people

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