

OVERVIEW OF ENERGY AND REGULATORY STRUCTURE OF JAPAN

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1. Overview

Japan's Electricity Market Outline

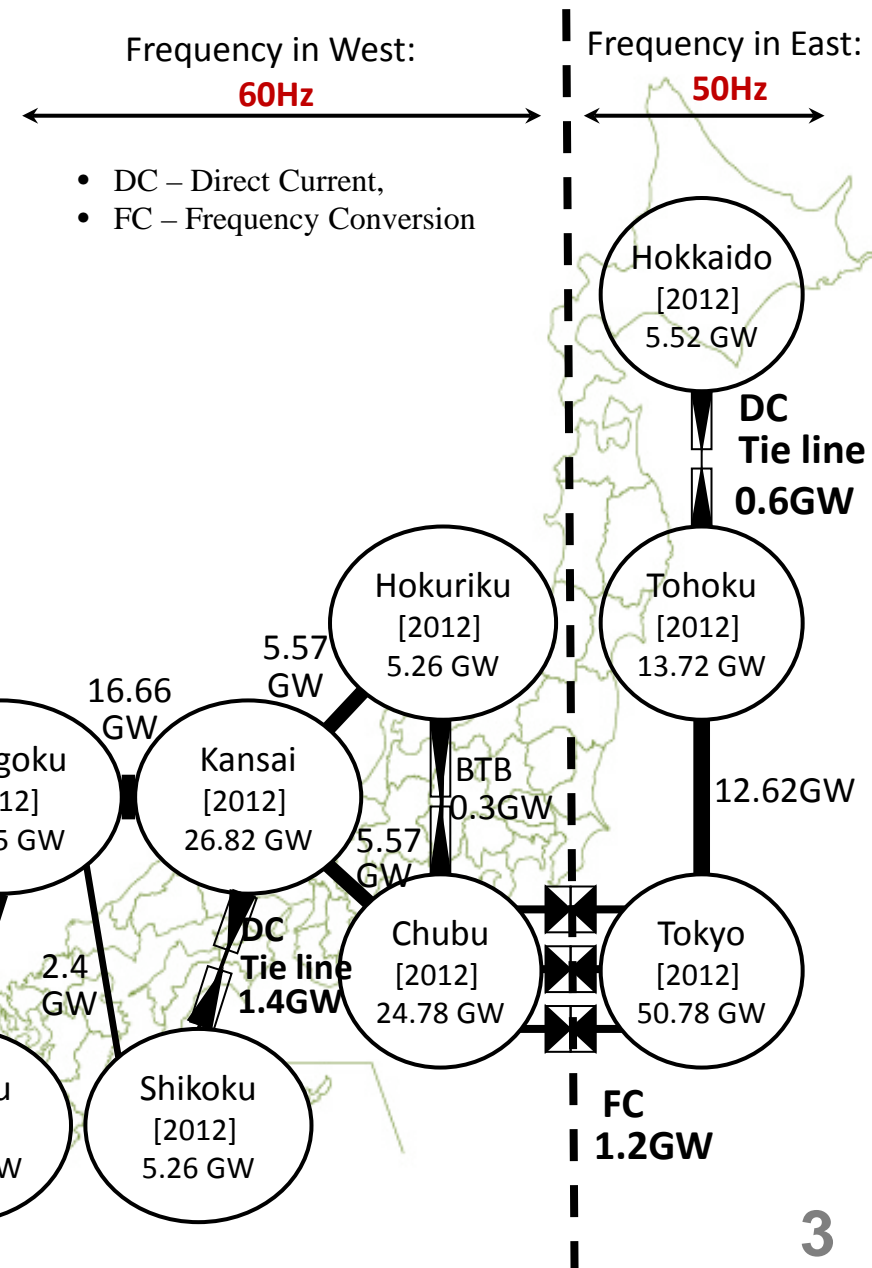
■ 10 Vertically Integrated Power Companies (EPCOs) and New Entrance (PPSs)

- 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.



History of Electricity Market Reforms in Japan

No competition in the electricity market before 1995:
10 vertically integrated EPCOs dominated and controlled the market.



METI embarked on a series of reforms...

No.	Year enforced	Overview
1	1995	<ul style="list-style-type: none">• Opened the IPP (Independent Power Producer) market• Allowed specified-scaled and vertically integrated power generators
2	2000	<ul style="list-style-type: none">• Introduced partial retail competition (over 2,000kW in 2000 [26%], over 500kW in 2004 [40%])• Introduced regulation of third party access to grid lines
3	2005	<ul style="list-style-type: none">• Expanded retail competition (over 50kW [62%])• Established the wholesale power exchange (JEPX) and its supporting body for transmission in wider areas• Improved regulation of third party access to grid lines, and introduced accounting separation of transmission/distribution sector
4	2008	<ul style="list-style-type: none">• Modified the rule of wheeling rates

Japan's Gas Market Outline

- Many gas suppliers, unlike electricity market

➤ 3 business types of gas supplier

Type of Business	Number of Companies	Ratio of Sales	Numbers of Users
General Gas Utility Business	209	65%	ca.29million (53%)
Community Gas Utility Business	1,452	0.7%	ca. 1.4million (3%)
LPG Business	21,052	34.3%	ca.24million (44%)

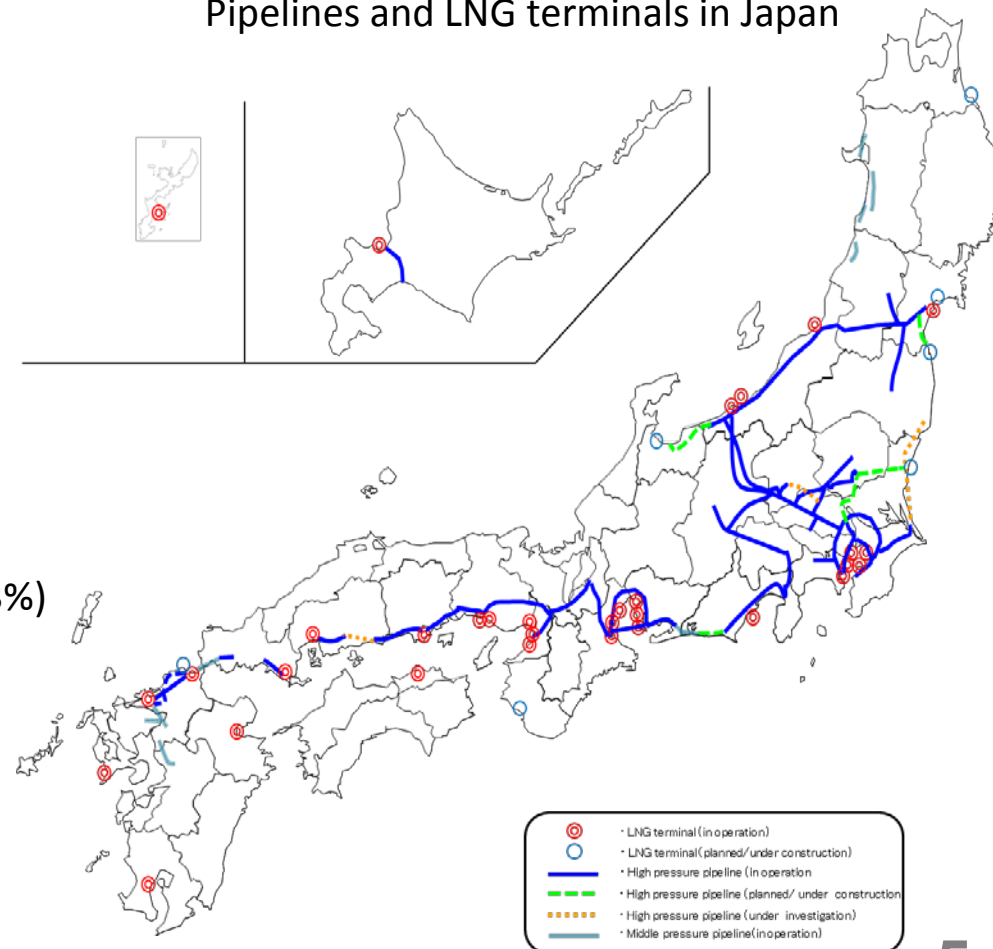
➤ Market volume (sales volume) (2013)

- Gas market : ca. 36.2 billion m³
 - General Gas Utilities : ca. 33.4 billion m³ (92.3%)
 - New Entrants : ca. 2.8 billion m³ (7.7%)
- LNG market : ca. 1.6 billion m³

- Retail competition for over 100,000 m³ customers (65% of the market)
 - Share of New Entrance: 15% (2012)

- Gas pipelines are diversified, and not connected nationally
- Self-regulation for LNG terminals

Pipelines and LNG terminals in Japan



Source: Compiled by the Agency of Natural Resources and Energy based on data provided by relevant companies

History of Gas Market Reform in Japan

No competition in the gas market before 1995:

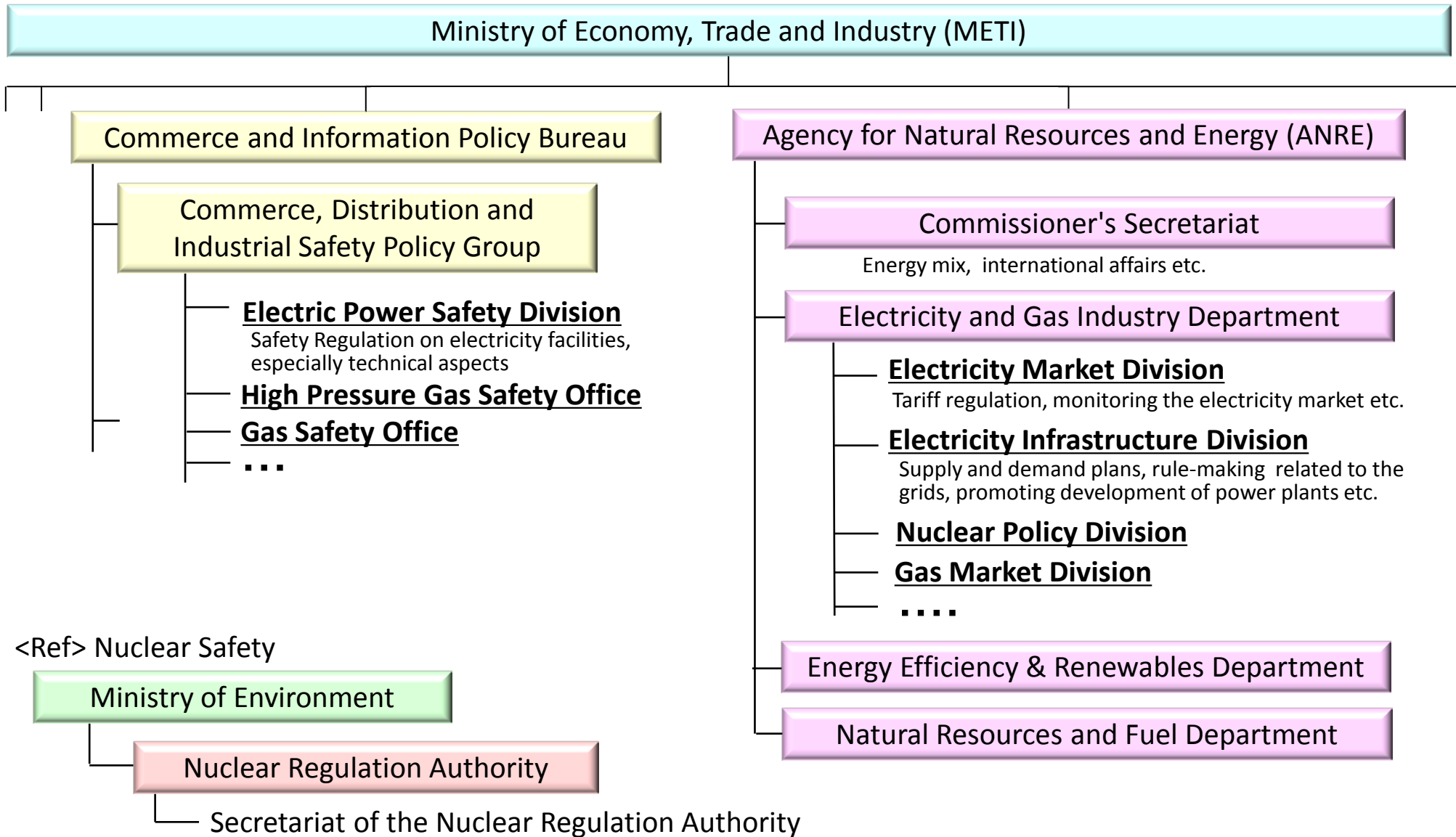


METI embarked on a series of reforms...

Deregulation of the gas retail market began in 1995, 5 years earlier than for electricity.

No.	Year enforced	Overview
1	1995	<ul style="list-style-type: none">Introduced partial retail competition (over 2 million m³ [47%])
2	1999	<ul style="list-style-type: none">Expanded retail competition (over 1million m³[52%])Introduced regulation of third party access of pipelines for 4 big gas companies
3	2004	<ul style="list-style-type: none">Expanded retail competition (over 500,000 m³ in 2004 [56%])Improved regulation of third party access to pipelines, and introduced accounting separation of transportation sectors for all of General Gas Utility Business
4	2007	<ul style="list-style-type: none">Expanded retail competition (over 100,000 m³ in 2007 [63%])

Current Organizational Structure for Electricity and Gas Regulation



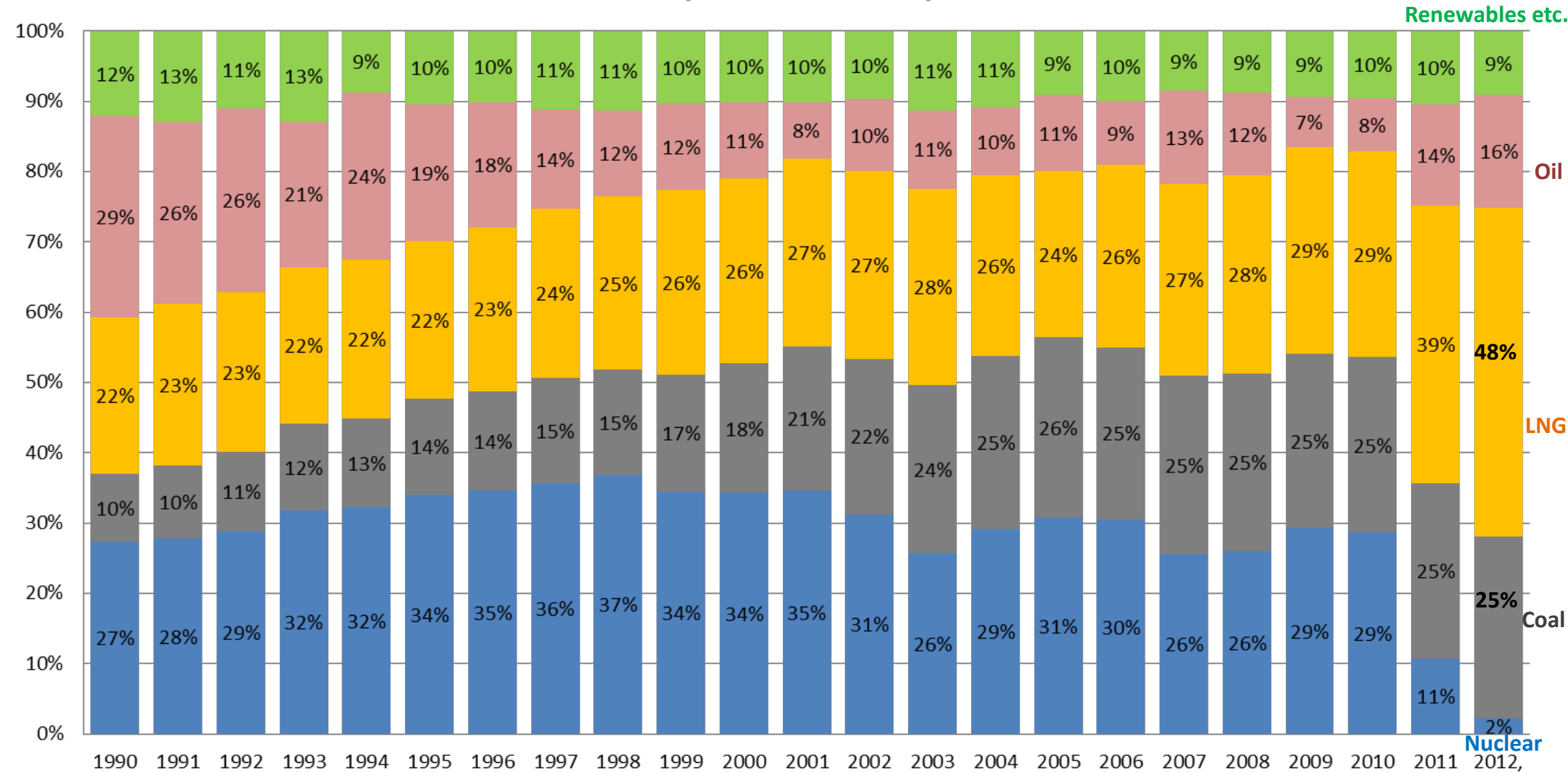
<Ref> There are some “Ministerial Meetings” related to energy issues, such as tightening electricity supply and demand etc. .

2. Current situations and Strategic Energy Plan

Current Energy Mix in Japan

- Increase in LNG compensates for the decline in nuclear power.

Electricity Generation by Fuel

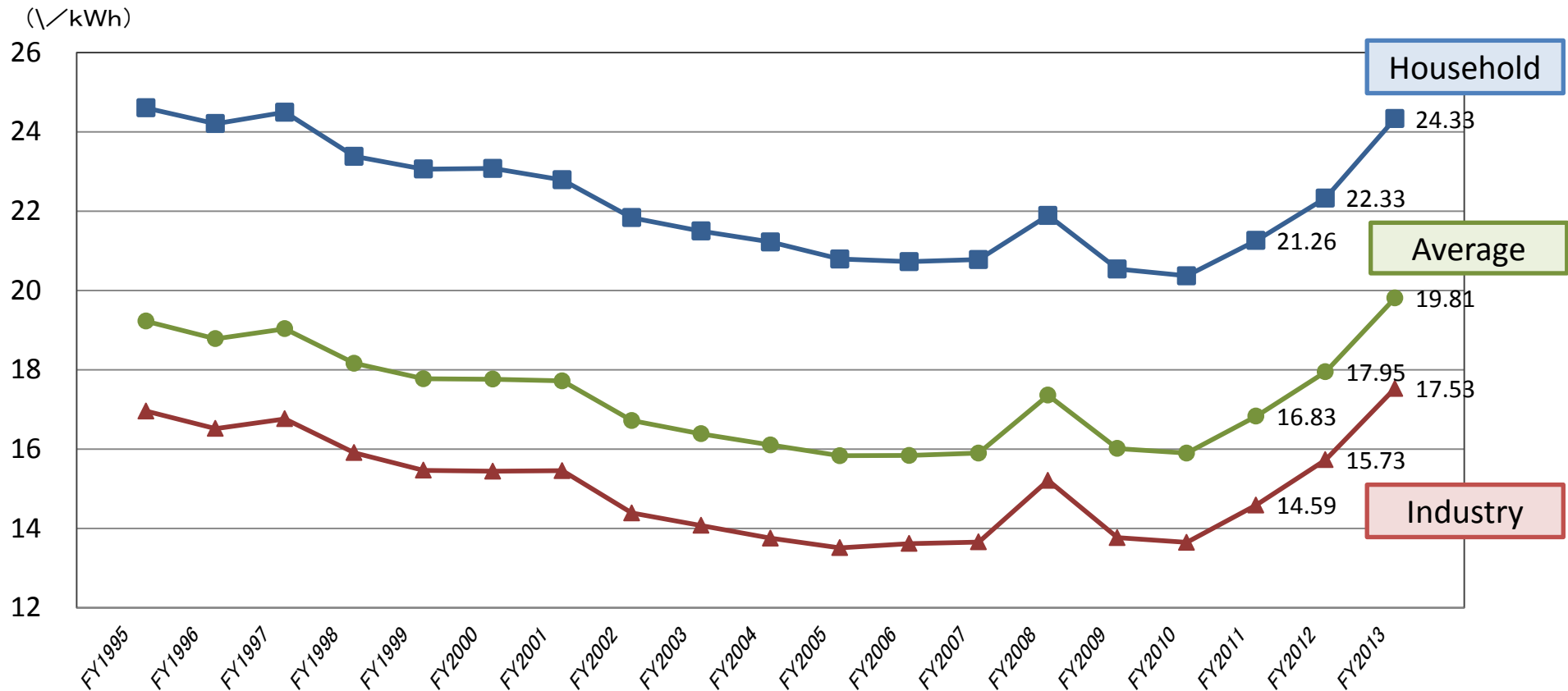


Source: Compiled by METI based on "Outline of Electric Power Development in FY 2010" etc.

Increase in Electricity Retail Price

- Following the Great East Japan Earthquake (3.11), the electricity price has risen steadily due to rate revisions from the increase in the cost of fossil fuels as a result of the suspended Nuclear Power Plants, and the rising renewable power energy promotion surcharge (FIT).

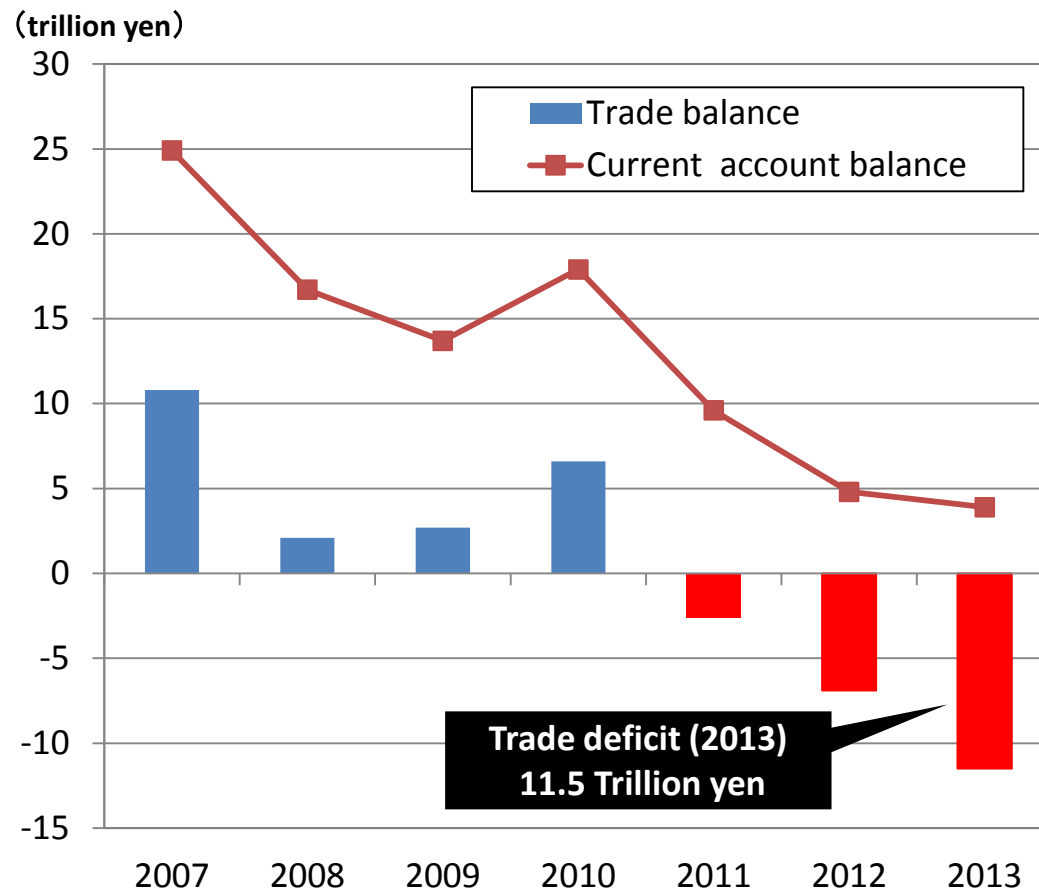
Trend of Electricity Retail Price by 10 EPCOs



Fuel Import Costs Heavily Impact Japanese Economy

- In 2011, due to the increase in fuel import costs, Japan recorded a trade deficit for the first time in 31 years. The trade deficit for 2013 is **11.5 trillion yen**.
- Lowering fuel import costs is an urgent task for the Japanese government.

Changes in trade balance and current account balance

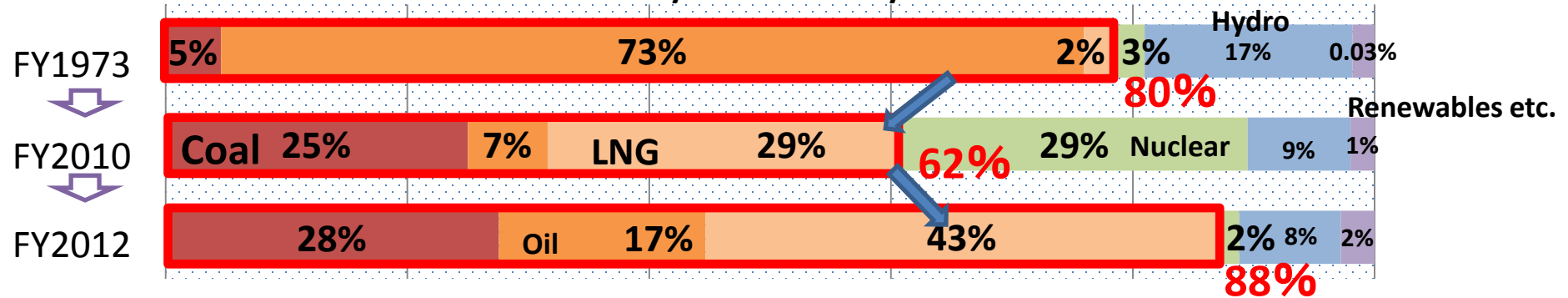


	(trillion yen)		
	2010	2013	Difference
Trade Balance	6.6	- 11.5	- 18.1
Net Import Costs			
LNG	3.5	7.1	+3.6
Crude Oil	9.4	14.2	+4.8
Petroleum Products	2.4	3.7	+1.3
Coal	2.1	2.3	+0.2

Energy Security ?

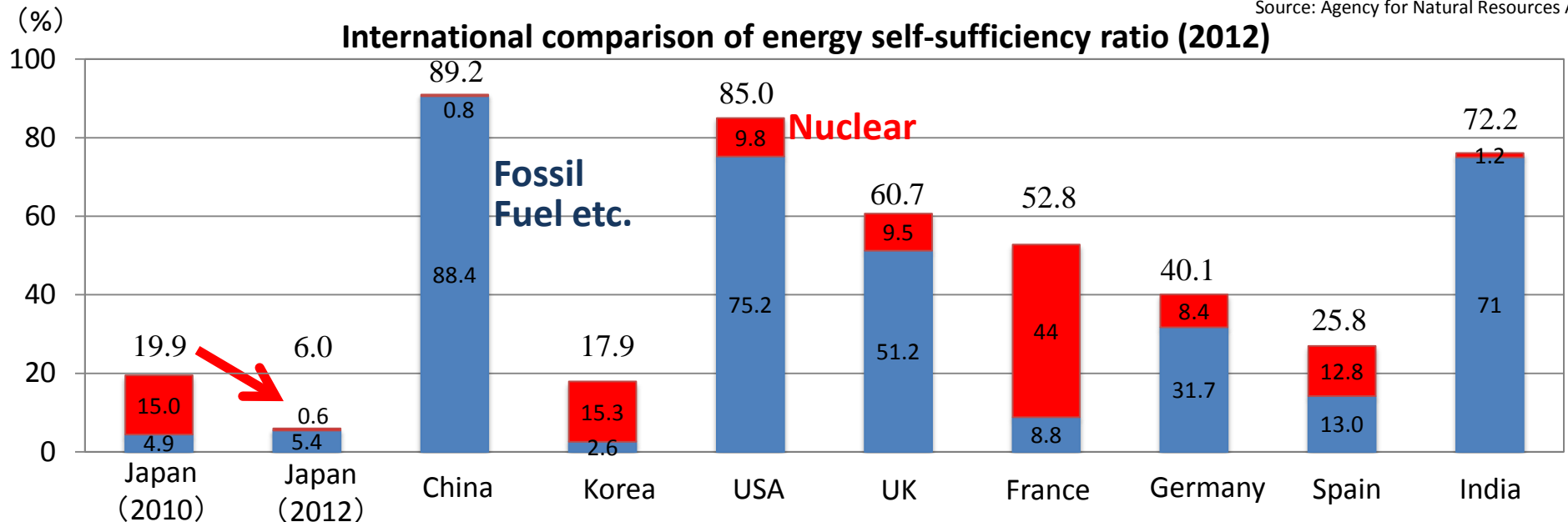
- Dependency on fossil fuel in the power supply is higher than that of the 1st oil shock. Almost all fossil fuel in Japan is imported from abroad.
- Improving the self-sufficiency ratio in the energy supply is necessary to ensure energy security.

Electricity Generation by Fuel



Source: Agency for Natural Resources Agency.

International comparison of energy self-sufficiency ratio (2012)



Sources: IEA Energy Balance of OECD, Non-OECD Countries 2012, 2013

Strategic Energy Plan of Japan (April 11, 2014)

Basic Viewpoint of Energy Policies (3E + S)

- Stable Supply (**E**nergy Security)
- Cost Reduction (**E**conomic Efficiency)
- **E**nvironment
- **S**afety

Global Viewpoint

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

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Economic Growth

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

Building multilayered, flexible and efficient energy supply/demand structure

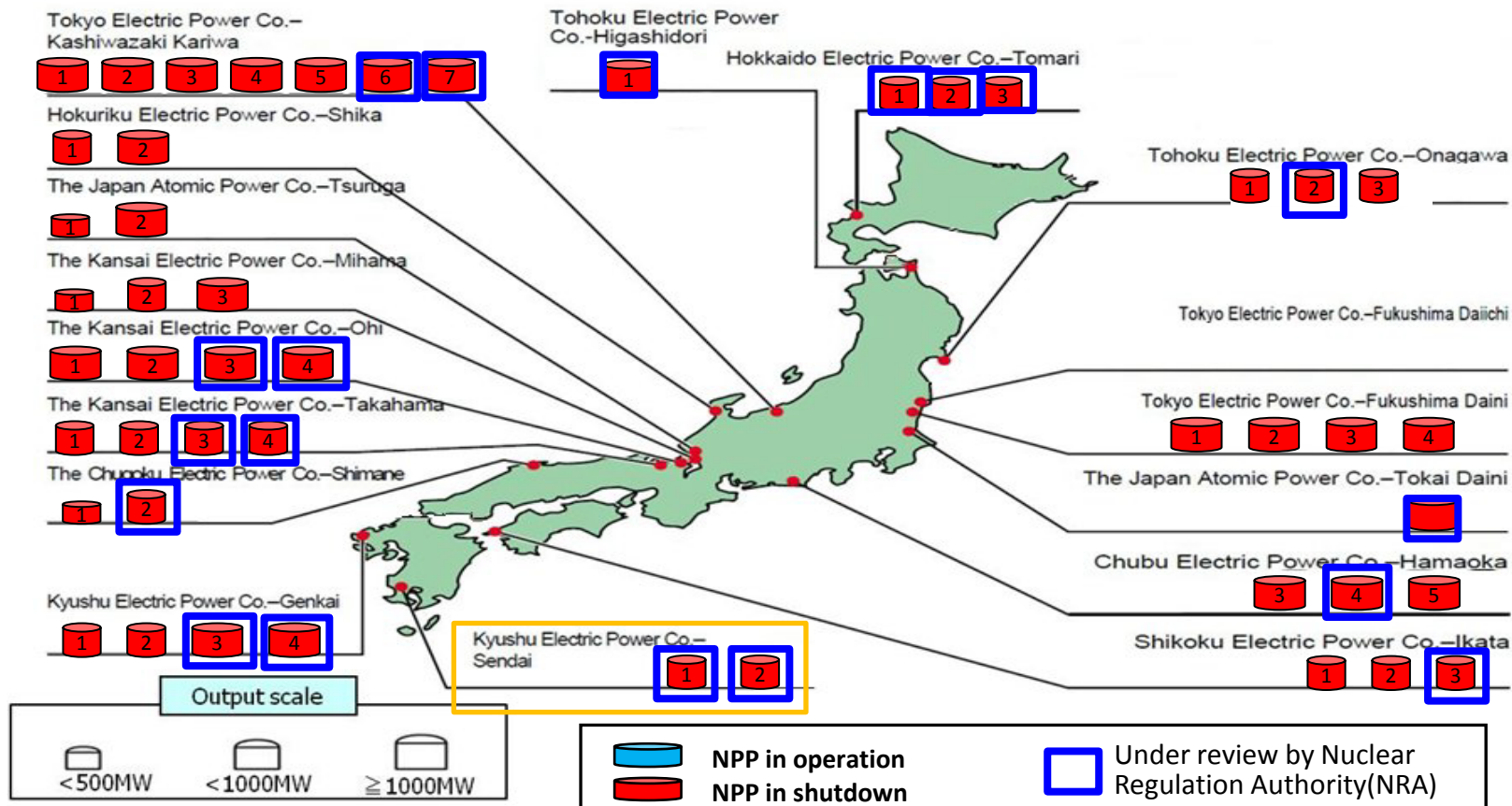
- Establishing resilient, realistic and multi-layered energy supply structure, where each energy source can exert its advantage and complement others' drawbacks.
- Creating a flexible and efficient supply/demand structure, where various players can participate and various alternatives are prepared through market reforms.

Nuclear

- All units (in red) are in a state of temporary shutdown as of February 24, 2014.
- 19 units (in blue squares) are under review for restart by the Nuclear Regulation Authority in accordance with its new safety regulation.

Re-establishment of Nuclear Policy

- ✓ Efforts toward reconstruction of Fukushima
- ✓ Pursuing the world's highest level of safety and stable environment for nuclear operations



Renewables

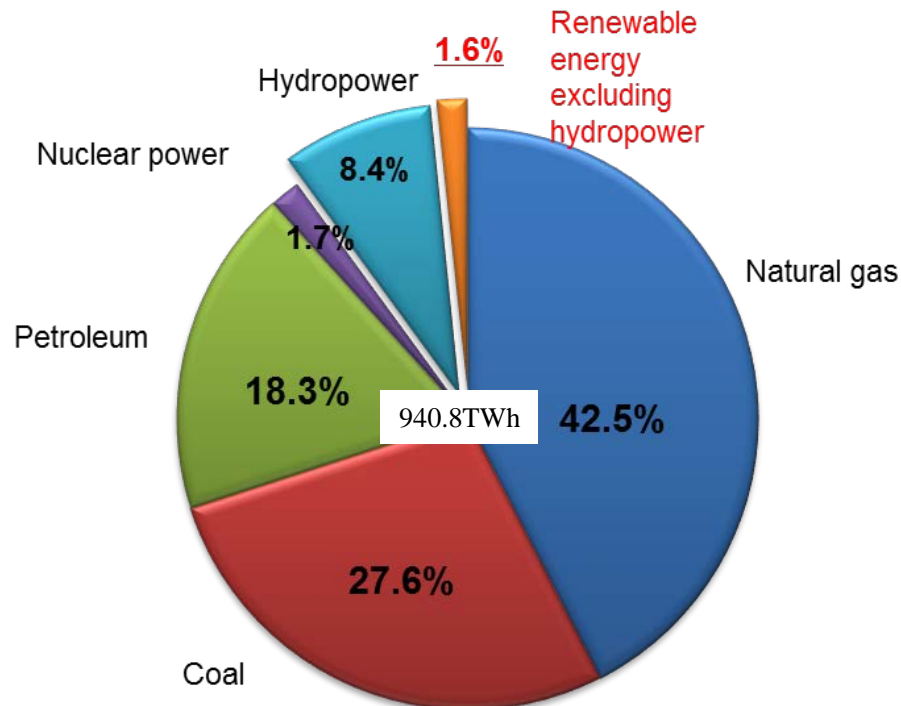
- Although RES is increasing after introducing Feed-in Tariff scheme in 2012, the share of RES excluding hydro is under 2%.
- There are some already existing challenges on grids especially for tie lines.



Accelerating Introduction of Renewable Energy : Toward Grid Parity in the Mid/Long term

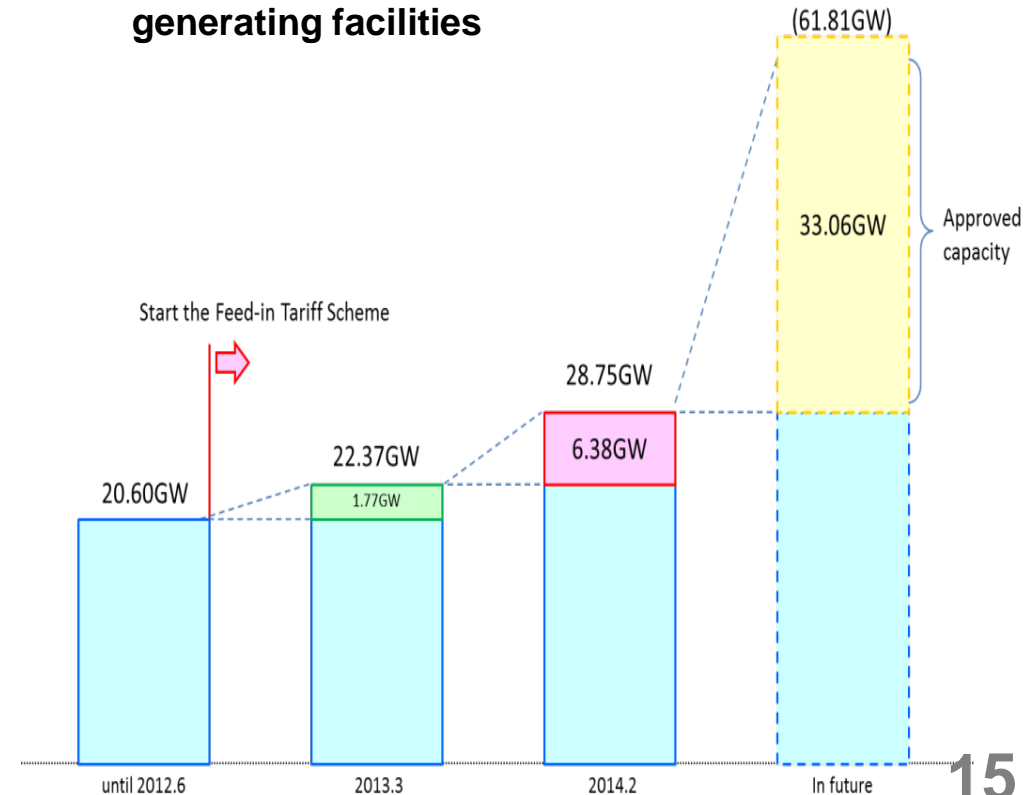
- ✓ Appropriate implementation of FIT, improvement of environmental assessment procedures, R&D, enhancement of grids, etc.

Composition of annual electricity generated in Japan
FY 2012



Source: ANRE,METI

Combined total capacity of renewable energy
generating facilities



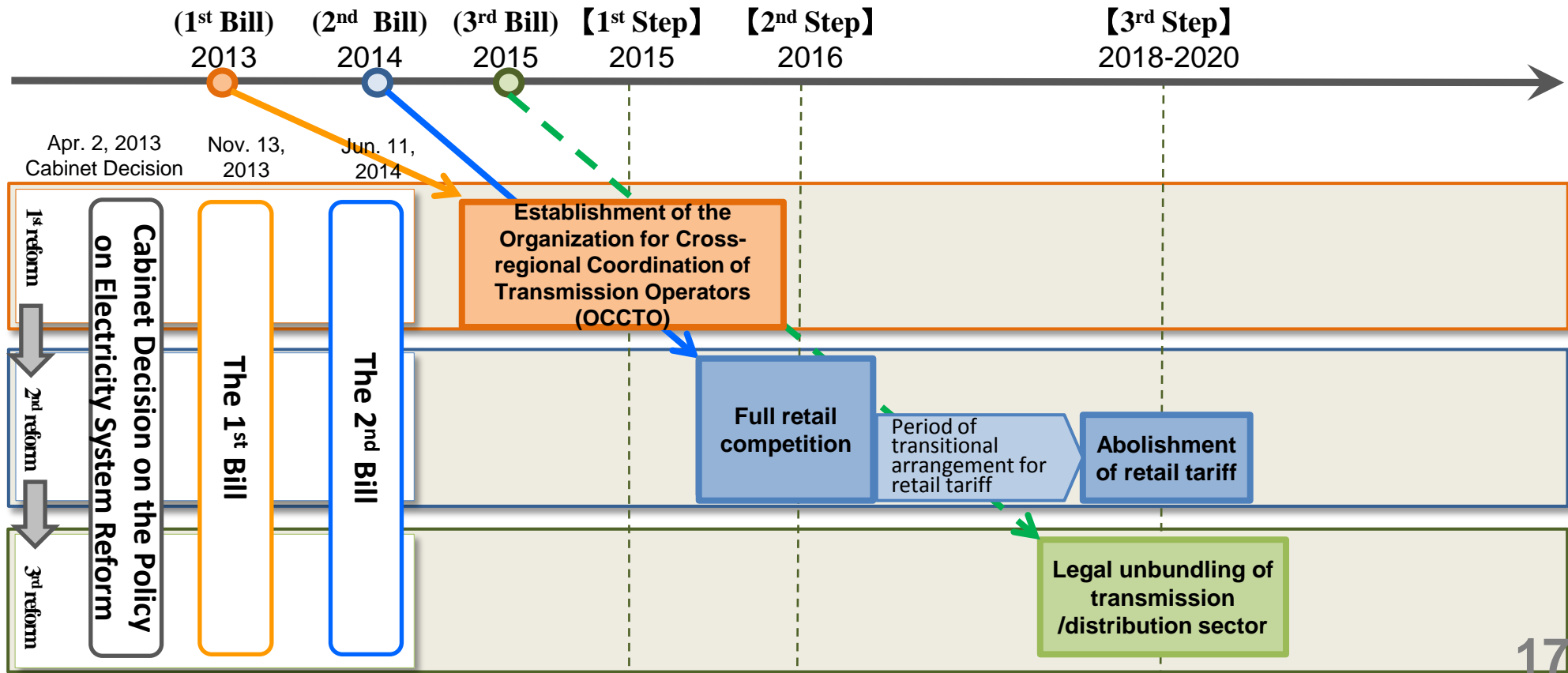
3. Market Reform

Electricity Market Reform in Japan: Roadmap

- 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



(※At around 2015: Transition to new regulatory organizations)

Electricity Market Reform in Japan: 3 Steps

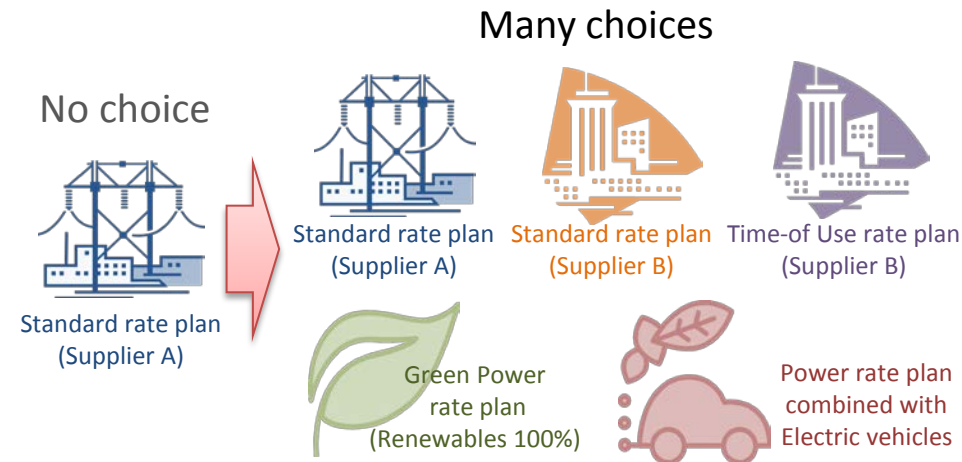
1st step: Establish the OCCTO in 2015

(OCCTO : Organization for Cross-regional Coordination of Transmission Operators)

- ✓ Aggregate and analyze EPCOs' supply-demand plans, and order to change EPCO's plans such as tie lines construction.
- ✓ Order EPCOs to reinforce generation and power interchanges under a tight supply-demand situation.

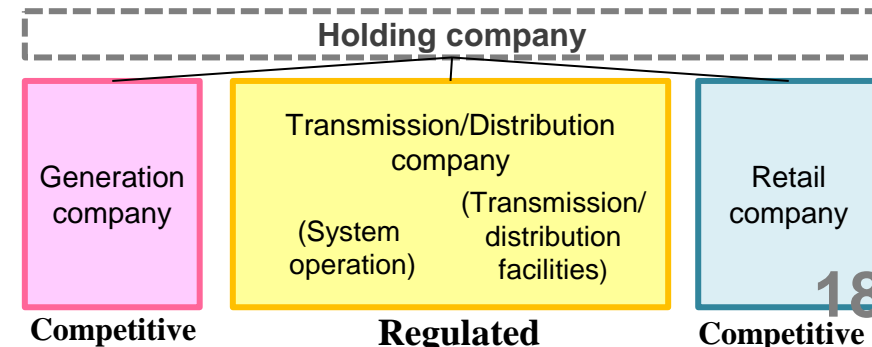
2nd step: Full Retail Competition in 2016

- ✓ Expand retail competition to the residential sector, opening new market.
- ✓ However, maintain regulated tariffs to 10 big EPCOs until around 2018-2020.
- ✓ Provide the last resort service of supply, and secure a stable supply in isolated islands at a price comparable to the mainland.



3rd step: Unbundle the T/D sector at around 2018-2020

- ✓ Ensure fair third-party access to grid, through legal unbundling of transmission/distribution sectors of big EPCOs.



Gas Market Reform in Japan

- On November 12, 2013, the Gas Market System Subcommittee was established for discussing on the Gas Market Reform.

4 Objectives

- (1) Enhancing new services and new business
- (2) Suppressing gas rates to the maximum extent possible through competition
- (3) Promoting construction of gas infrastructure
- (4) Securing consumers' interests and safety

Direction of the Reform (under discussion)

- ✓ Expansion of the scope of retail deregulation
 - Full retail competition
 - Abolishment of retail tariffs
- ✓ Improvement of accessibility to gas infrastructure
 - Improvement of third party access to LNG terminals

1. New Energy Mix

2. Security of supply in the fully liberalized market

- ✓ Nuclear
- ✓ Capacity mechanism

3. New regulatory authority

- ✓ Desirable relationship between the government and the regulatory authority, in order to secure stable power supply
- ✓ Measures to ensure independency

4. Grid investment

Thank you !!