

**Update;  
Post Fukushima LNG Market  
in Japan**

**18<sup>th</sup> March 2013**

Osaka Gas Co.,Ltd.

Chikako Ishiguro  
cisiguro@osakagas.co.jp

# Contents

## 1. Changes in Energy Supply and Demand after Fukushima

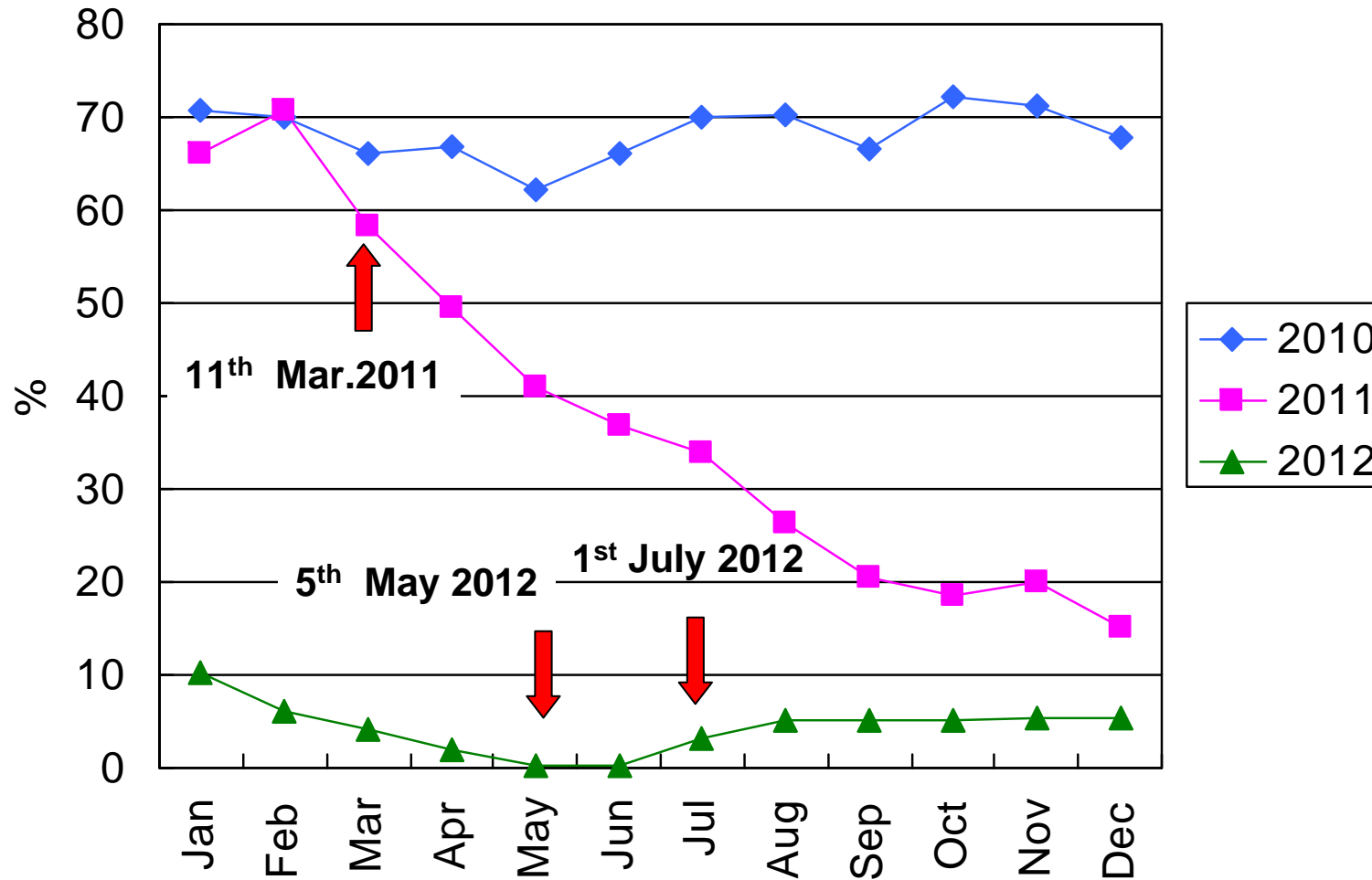
- New trends in supply and demand
- Changes in energy and nuclear policy
- Outlook for LNG demand

## 2. New Developments in the Energy Market

- Upward revision of thermal power capacity
- New development in electricity market
- Trends of renewable energy
- Development in natural gas supply infrastructure
- Discussion on LNG procurement and pricing

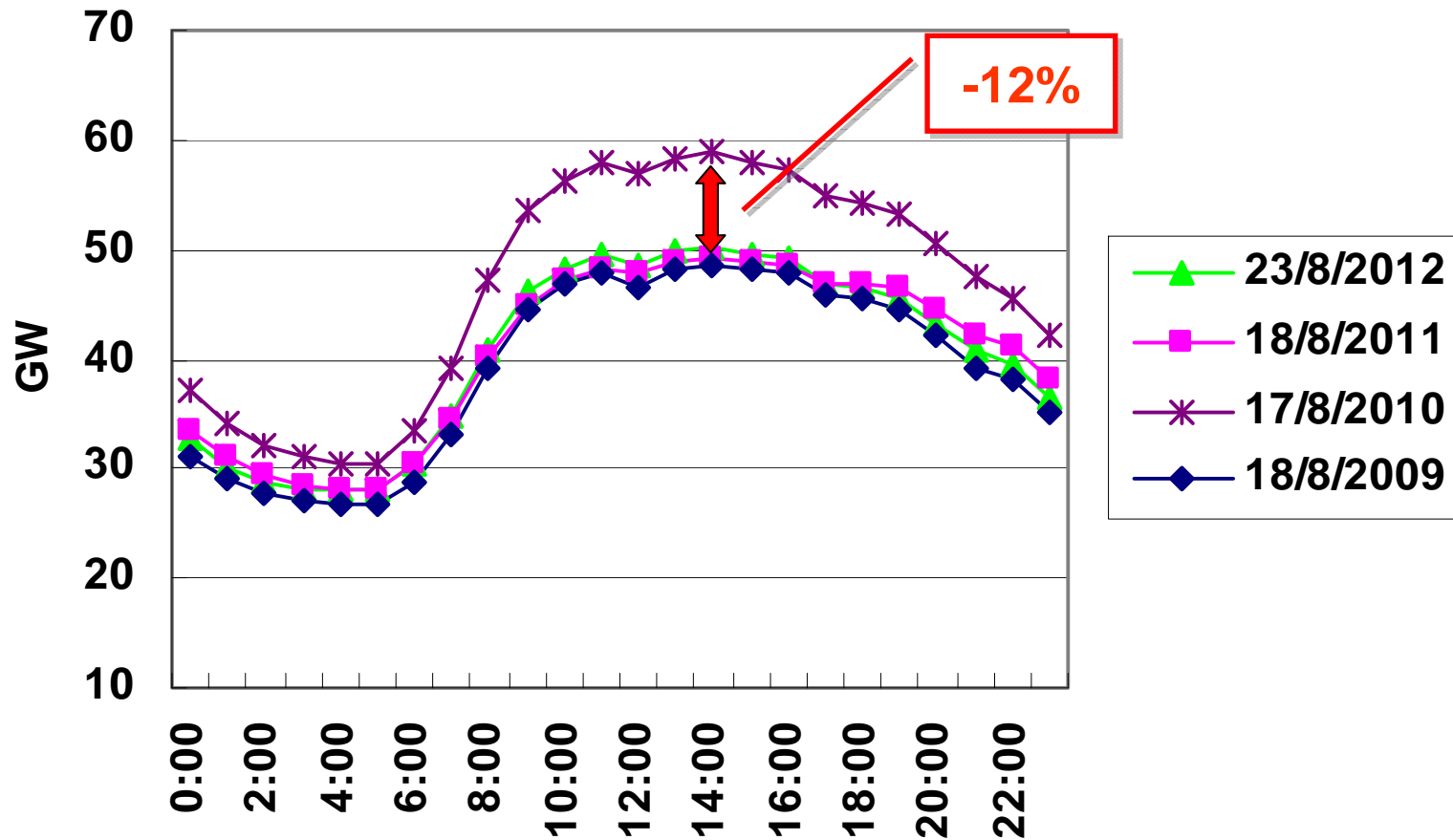
## 3. Conclusion

# Monthly Load Factor of Nuclear Power Plants



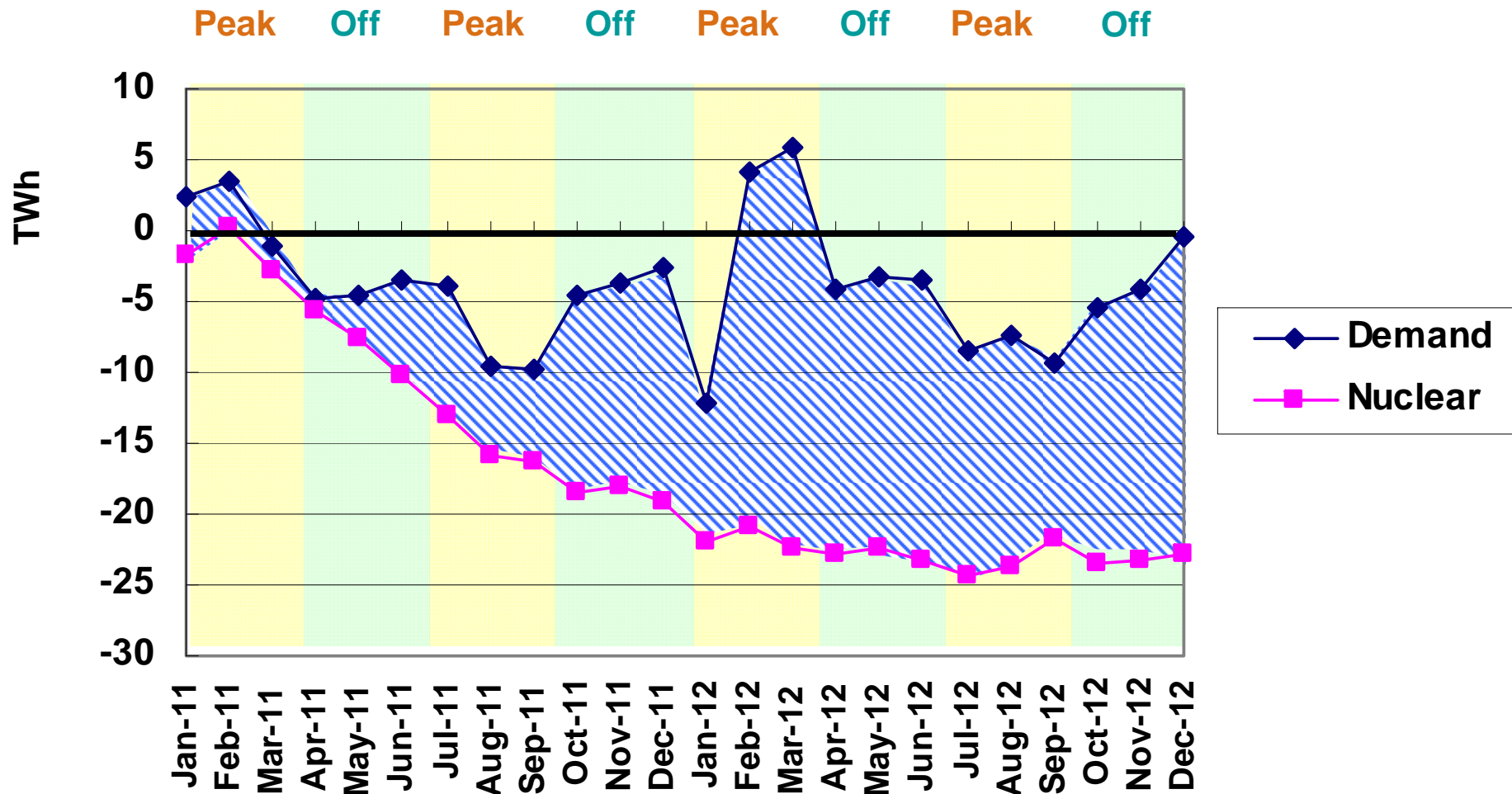
Source) Based on data from METI

# Daily Load Curve (Peak Day)



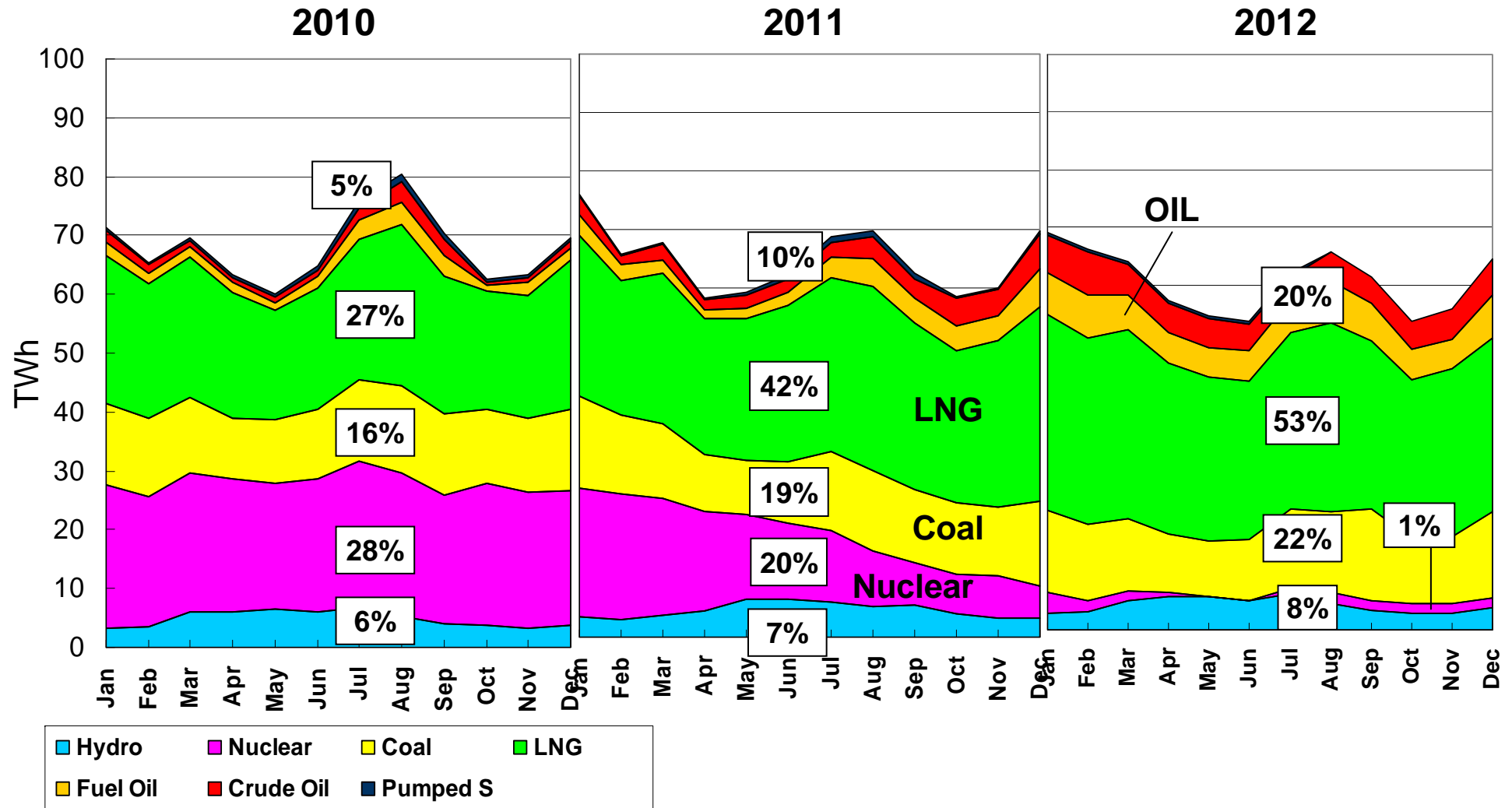
Source) Based on data from METI

# Comparison of Declines in Nuclear Output and Electricity Demand



Source) Based on data from METI

# Generation Volume by Power Source (10 EPCOs)



Source) Calculated data from METI

# LDP's Energy Policy

*New comprehensive energy policy has yet to be announced, but LDP's Manifesto was published with the following targets.*

1. Pursuing maximum deployment of renewable energy and maximizing energy conservation over the next three years.
2. Within three years, having all nuclear plants assessed for safety by the NRA, and restarting those found to be safe.
3. As a longer-term policy, achieving the best mix of sustainable power sources within 10 years.

# Policy Changes over Three Guiding Principles of Nuclear Power Generation

1. To strictly apply the stipulated rules regarding **forty year limitation** of the operation.  
→ probably to be unchanged
2. To restart the operation of nuclear power plants once the **Nuclear Regulation Authority gives safety assurance.**  
→ to be unchanged
3. **Not to plan the new and additional construction** of a nuclear power plant.  
→ probably to be revised

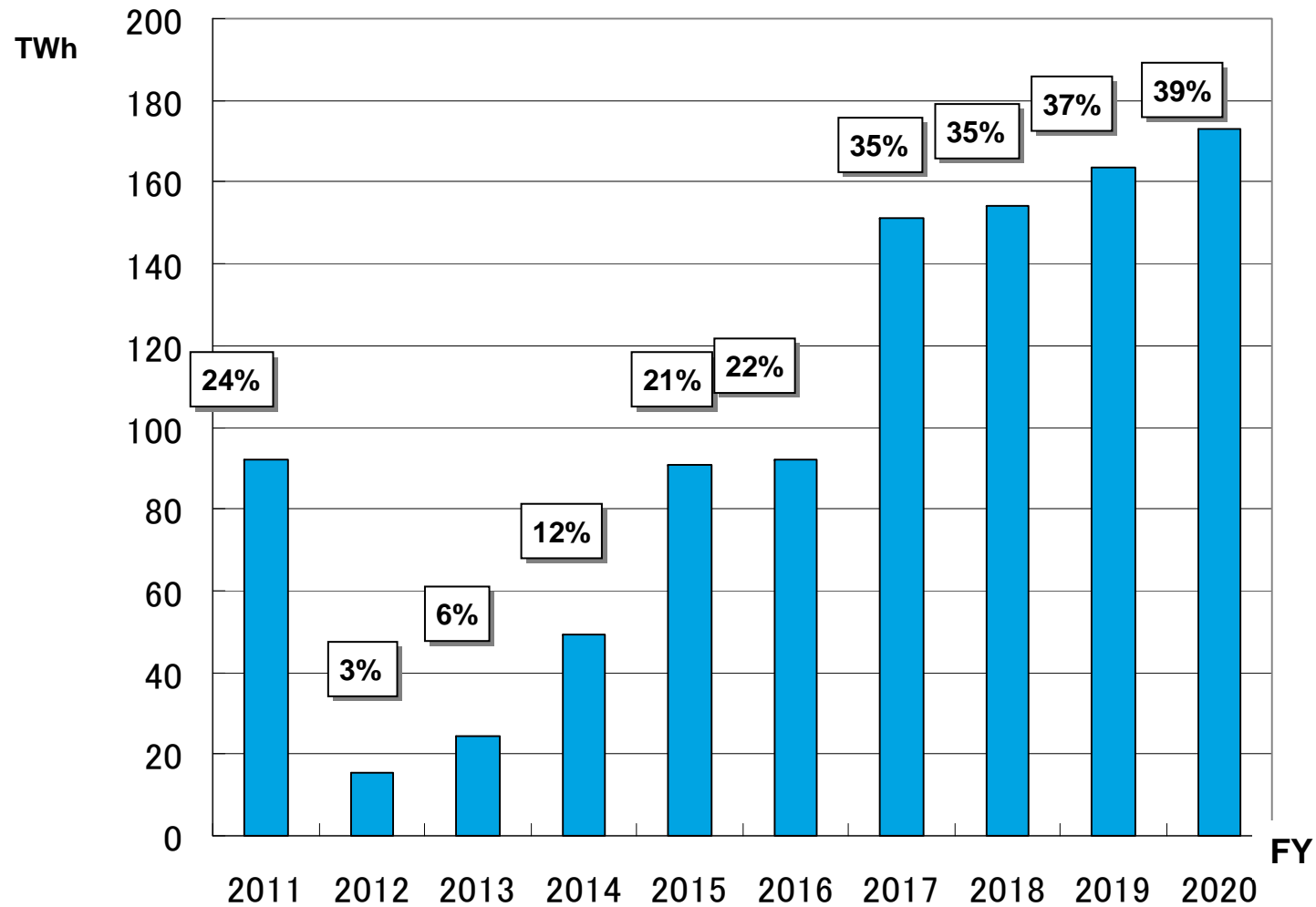


# Factors Affecting “Restarting Operation of Nuclear Power”

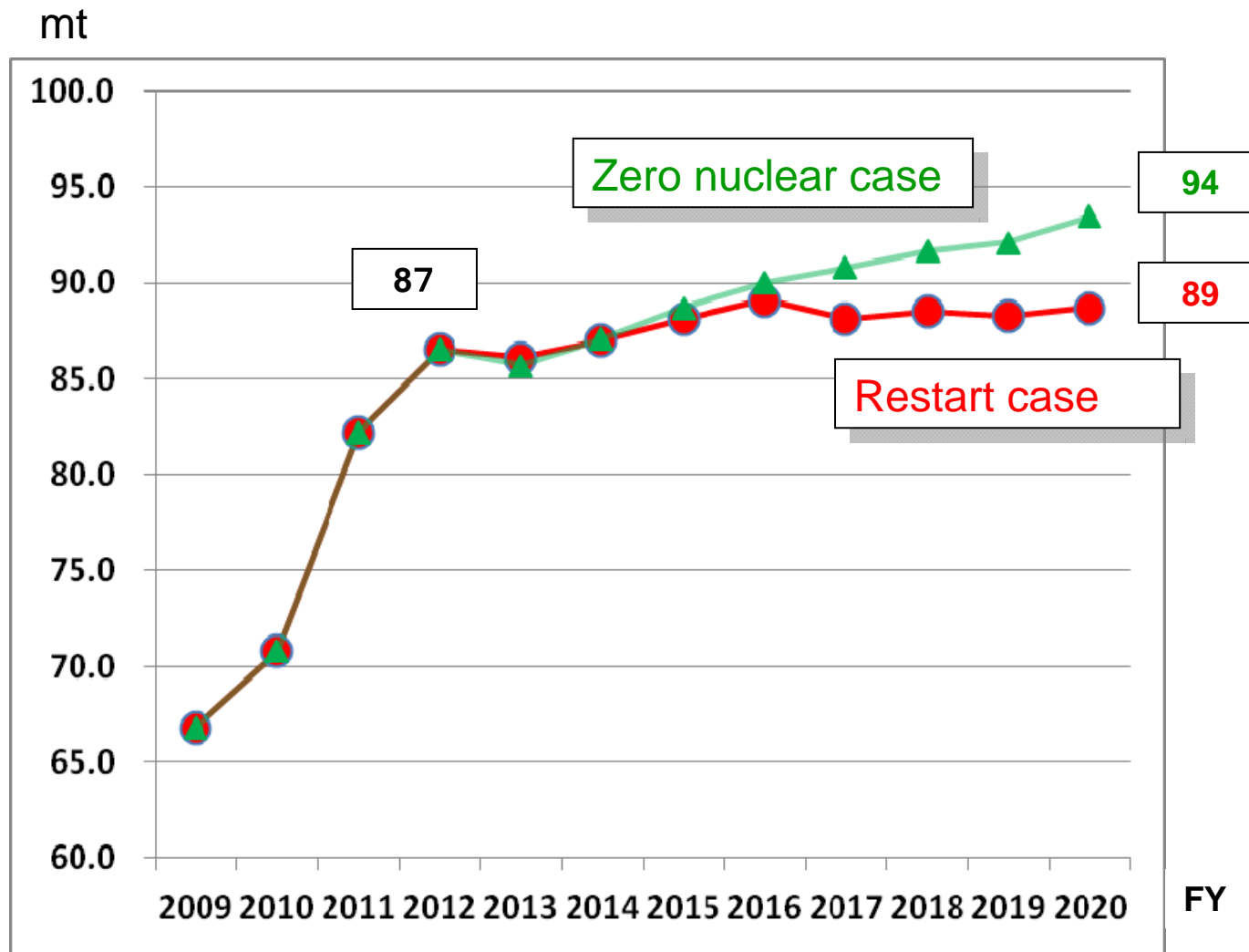
1. Result of next Upper House Election – LDP will win or lose ? (August 2013)
2. New Safety Standards for nuclear power stations by NRA (July 2013)
  - <measures against severe accident>
    - installing vent with filter
    - establishing secondary control center
    - replacing with non-combustible cable, etc.
  - <measures against earthquake and tsunami>
    - establishing anti-tsunami breakwater
    - establishing anti-seismic building
    - expanding the definition of “active faults”, etc.
3. Investigation of Active Faults
4. Agreements with Local Governments  
( including establishing “Emergency Preparedness” )

# Outlook for Nuclear Power Generation

Load factor of nuclear power plants



# Outlook for LNG Demand (FY)

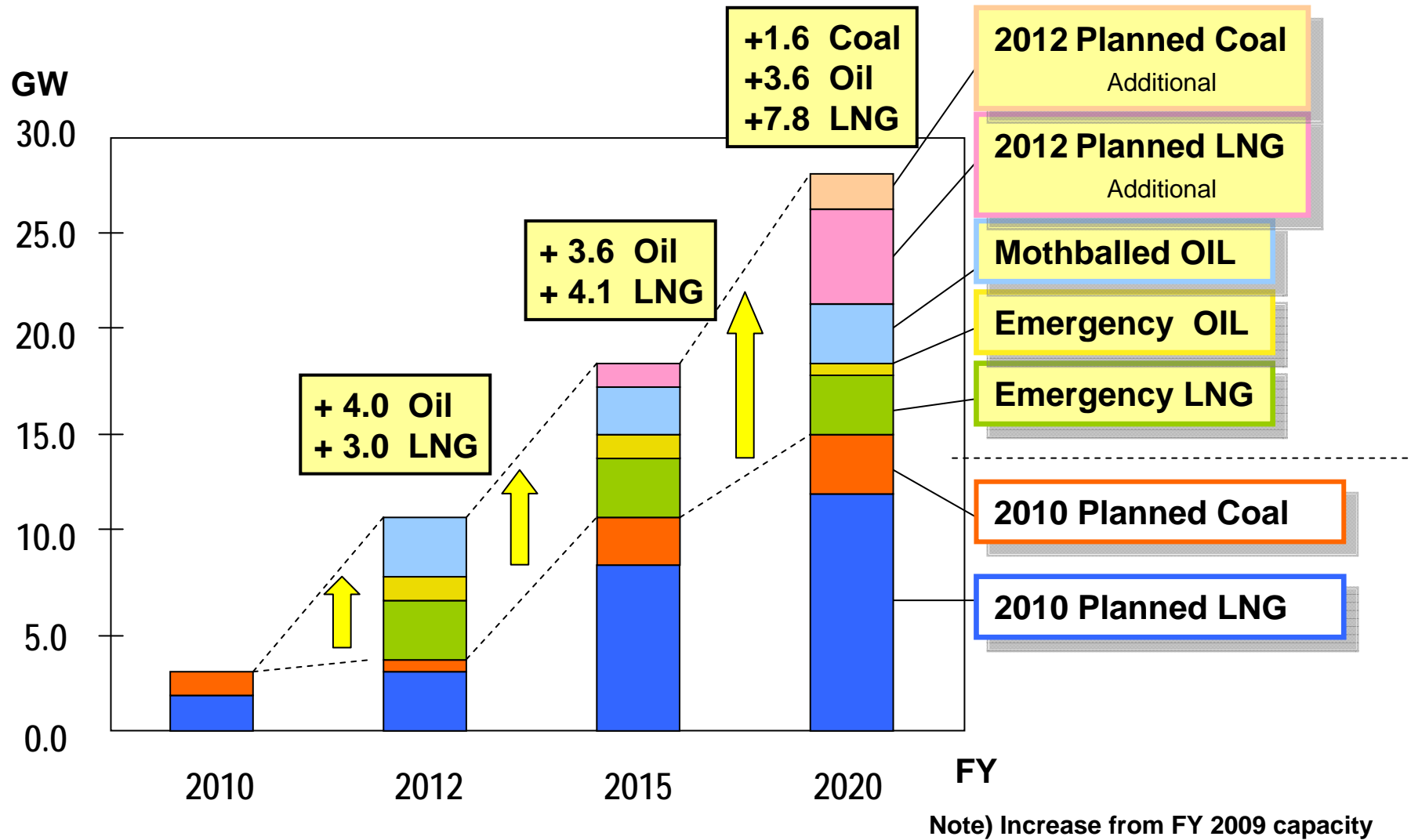


Not included storage volume

Source) Author's estimates as of March 2013

# New Developments in the Energy Market

# Upward Revision of Thermal Power Generation Capacity (EPCOs)



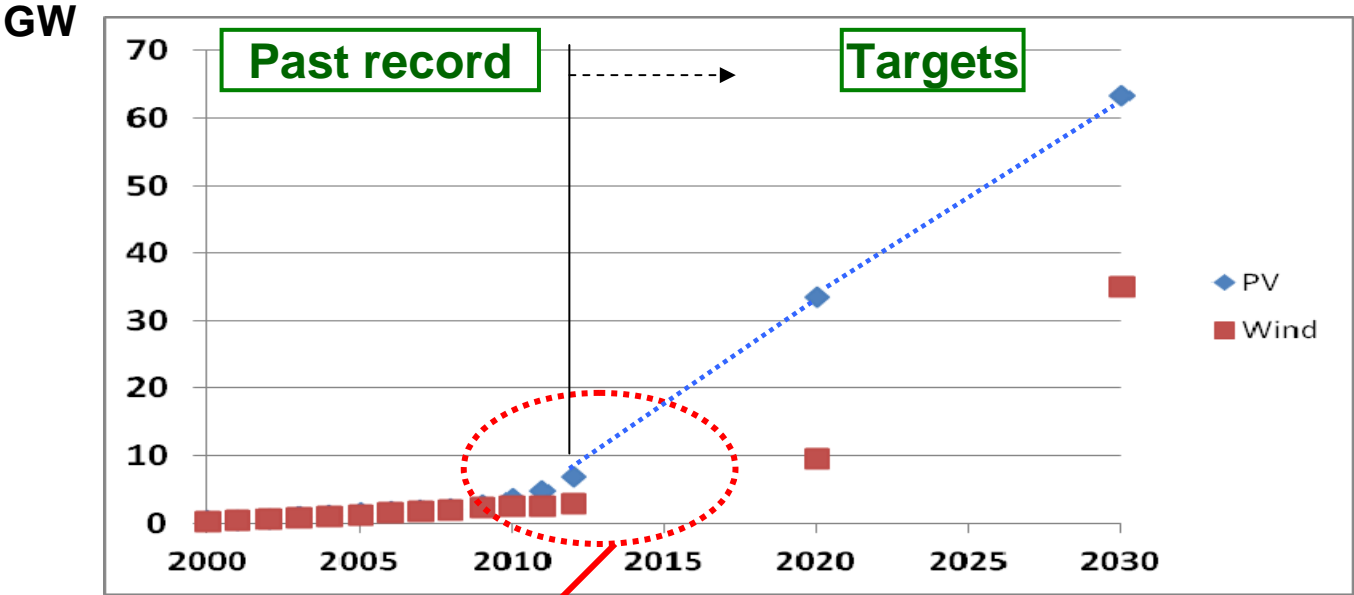
# New Trends and Changes in Electricity Market

<p>Short Term (2013-14)</p>	<ul style="list-style-type: none"> <li>- Electricity rate hikes by EPCOs</li> <li>- Commencement of tendering for building, expansion, and replacement of power generating facilities by EPCOs</li> <li>- Overhaul of FIT scheme for renewables</li> </ul>
<p>Mid Term (2015-17)</p>	<p>Electricity Market Reform</p> <ul style="list-style-type: none"> <li>- Establishment of wide-area grid operator</li> <li>- Creation of new regulator</li> <li>- Complete deregulation of retailing</li> <li>- Introduction of business-specific licensing system</li> <li>- Abolition of wholesale regulation and complete deregulation of power generation sector</li> </ul>
<p>Long Term (2018-20)</p>	<p>Electricity Market Reform</p> <ul style="list-style-type: none"> <li>- Unbundling of generation and transmission</li> <li>- Abolition of regulation of retail tariffs (fully distributed cost method)</li> <li>- Expansion of east-west power sharing capacity</li> </ul>

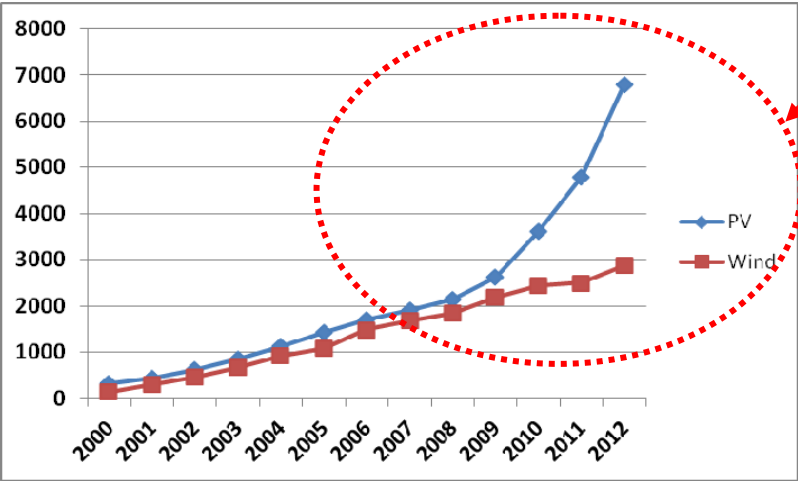
# Targets for Renewable Energy

	FY	2010	2020	2030
Photovoltaic	GW	3.6	33.5	63.3
	TWh	3.8 (0%)	35.2 (4%)	66.6 (7%)
Wind	GW	2.4	9.5	34.9
	TWh	4.3 (0%)	16.9 (2%)	66.3 (7%)
Geothermal	GW	0.5	1.1	3.1
	TWh	2.6 (0%)	7.5 (1%)	21.9 (2%)
Biomass	GW	2.4	4.0	5.5
	TWh	14.4 (1%)	23.6 (2%)	32.8 (3%)
Hydro	GW	21.6	22.2	23.8
	TWh	80.9 (8%)	101.2 (10%)	109.5 (11%)
Total (Share of total)	GW	29.7	70.0	131.6
	TWh	106.0 (10%)	184.4 (18%)	300.0 (31%)

# Photovoltaic and Wind Generation



**MW**

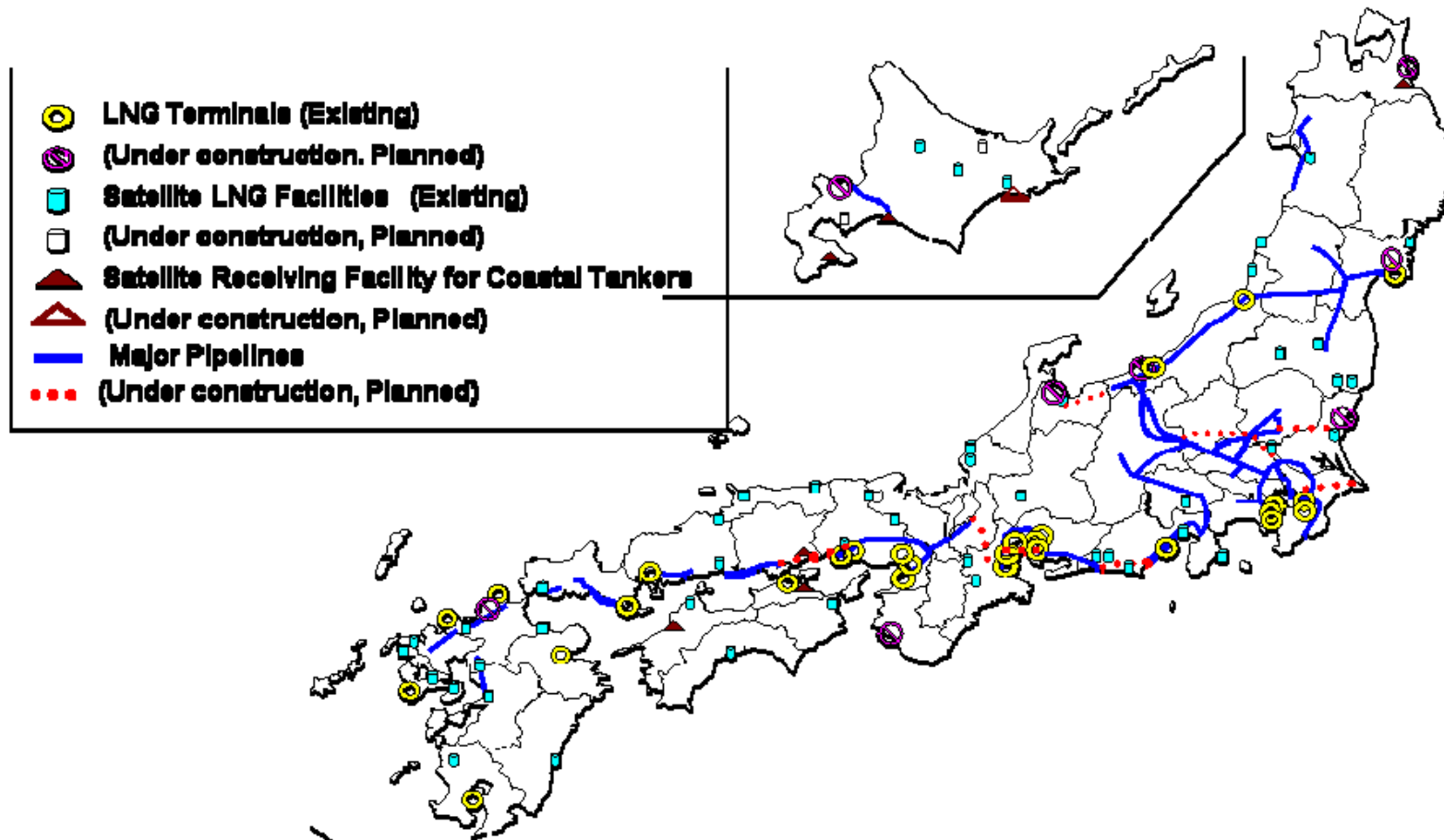


Note) These targets for renewable energy were set by the previous government.



# Development of Natural Gas Supply Infrastructure

## Natural Gas Supply Infrastructure



Source): Agency for Natural Resources and Energy., METI

LNG Terminal



# LNG New Regas Terminals (Large)

Project	Location	Start Operation	Owner			Consumers	
			E	G	O	E	G
Ishikari	Hokkaido	2012		○		○	○
Hachinohe	Aomori	2015			○	○	○
Shin-sendai	Miyagi	2016	○			○	
Soma	Fukushima	2018			○		○
Hitachi	Ibaragi	2015		○			○
Jyoetu	Niigata	2012	○			○	
Naoetsu	Niigata	2014			○		○
Toyama Shinminato	Toyama	2018	○			○	
Wakayama	Wakayama	2022	○			○	
Sakaide	Kagawa	2010	○			○	
Hibikinada	Fukuoka	2014	○	○			○
Yoshinoura	Okinawa	2012	○			○	

# LNG New Regas Terminals (Small)

Project	Location	Start Operation	Owner			Main Consumers	
			E	G	O	E	G
Kushiro	Hokkaido	2015			○		○
Yufutsu	Hokkaido	2011			○		○
Akita	Akita	2015		○			○

Note) Owner:

- E Electric Power Companies
- G City Gas Companies
- O Oil Companies

Main Consumer: E Large Power Generation

- G City Gas Distribution

( including large industrial consumers)

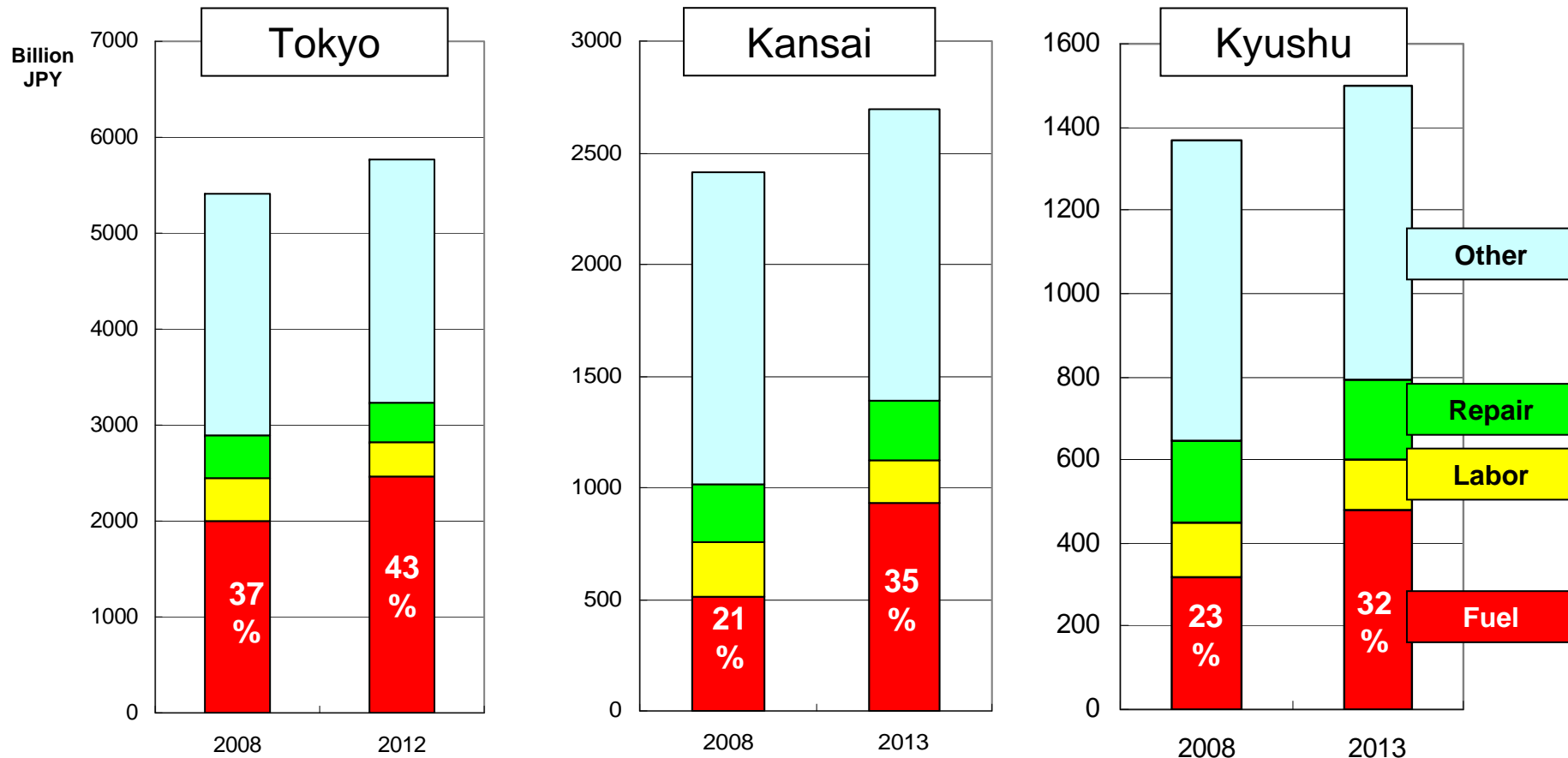
# Increase Rate of Electricity Prices

EPCO	Regulated Customers	Liberalized Customers	Status
Tokyo EP	8.46 %	14.9 %	From Sep. 2012
Kansai EP	11.83 %	19.23 %	Under Discussion
Kyushu EP	8.51 %	14.22 %	Under Discussion
Tohoku EP	11.41 %	17.74 %	Under Discussion
Shikoku EP	10.94 %	17.50 %	Under Discussion

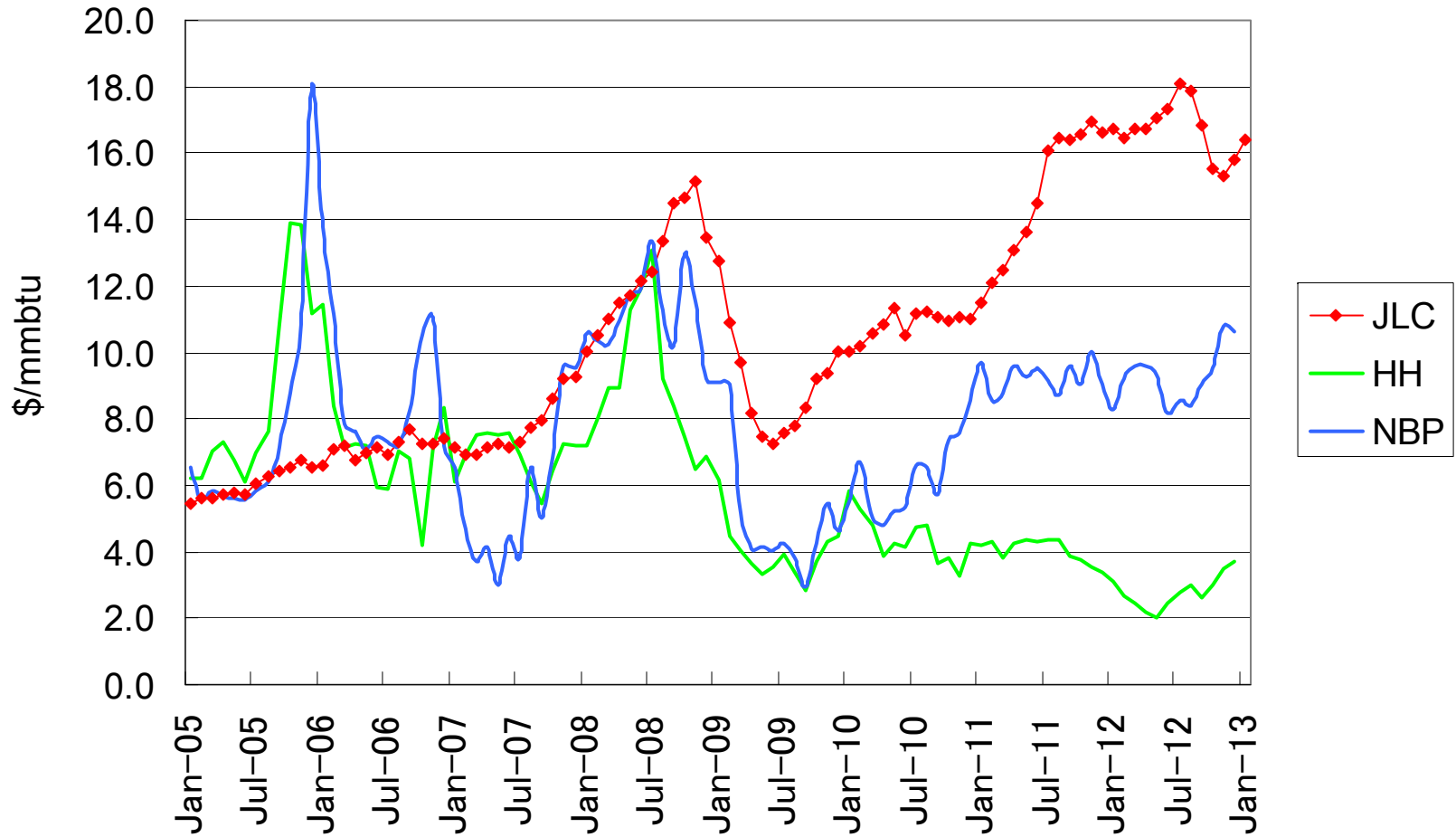
Note) Average increase rate in the sector

# Assumptions for Electric Rate Hike

EPCO	Tokyo	Kansai	Kyushu
<b>Nuclear Load Factor</b>	<b>43% → 22 -35%</b>	<b>77% → 35%</b>	<b>83% → 55%</b>
<b>Increase Rate of Fuel Cost</b>	<b>58%</b>	<b>87%</b>	<b>58%</b>



# Gas Prices in UK, US and Japan



# Discussions on LNG Procurement and Pricing

Can Japan continue to buy expensive LNG ?

No, because...

**Unsustainable price level** based on **Irrational Pricing**

Necessary Actions are...

Achieving **Competitive prices** against other fuels based on **Rational Pricing** which can properly reflect **Net-back Value** or **Supply and Demand** of natural gas

and

Re-introducing and expanding **Coal** and **Nuclear power** and Introducing **Pipeline Gas**

# Conclusion

- **New Long Term Energy Policy has to be set as soon as possible. Upper-house election scheduled for this August will be an absolutely crucial factor.**
- **Whatever be the new energy policy, utilization rate of nuclear plants during the next two decades will be substantially lower than the pre-earthquake level.**
- **LNG demand will remain high at more than 85 mt at least by 2020. Securing the volume while lowering costs is critical for the entire Japan's economy.**



Thank you for your attention

END