

# The Strategic Energy Plan of Japan

-Meeting global challenges and securing energy futures-  
(Revised in June 2010)

[Summary]

June, 2010

Ministry of Economy, Trade and Industry, Japan

# Strategic Energy Plan of Japan

The Strategic Energy Plan of Japan articulates the fundamental direction of energy policy in Japan, based on the Basic Act on Energy Policy.

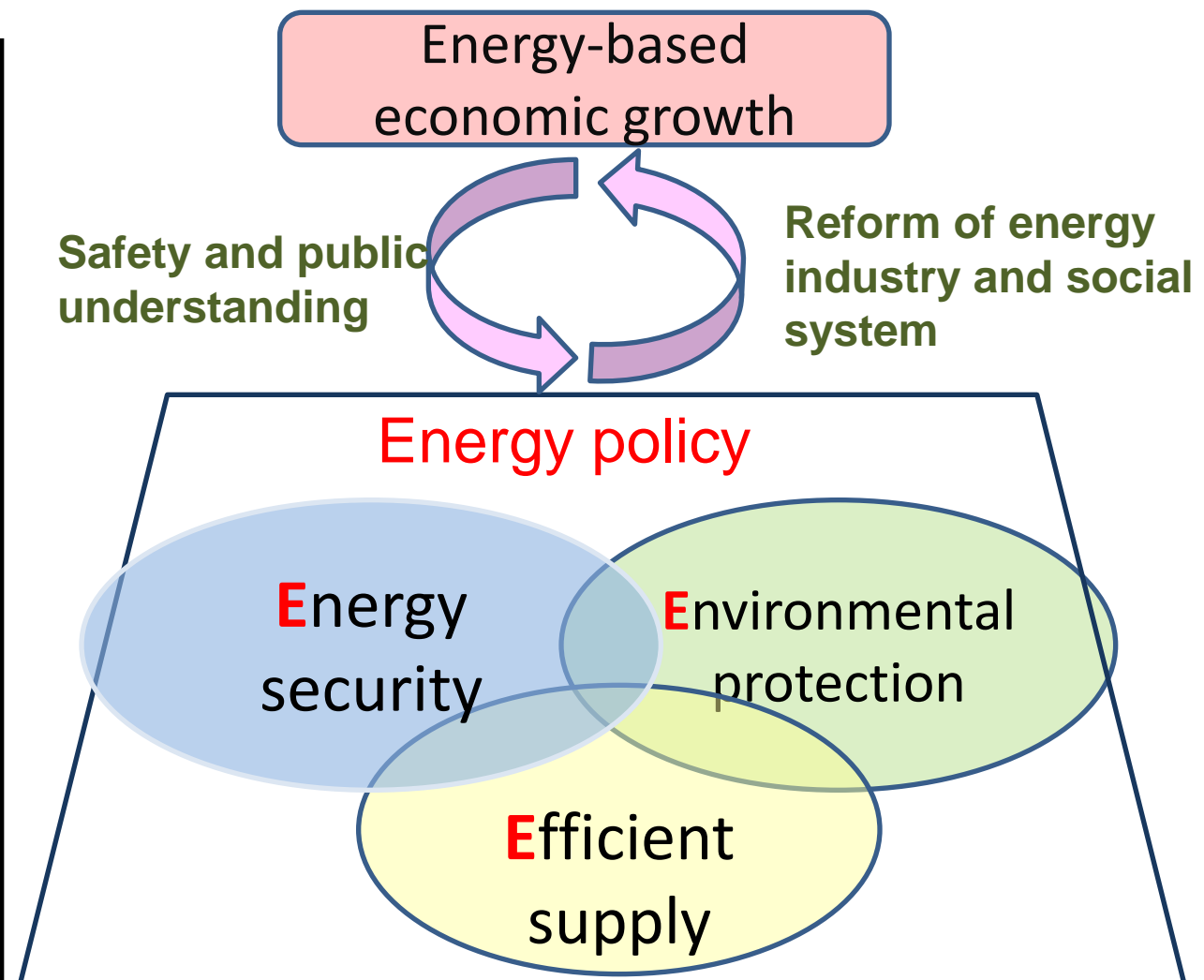
The Strategic Energy Plan of Japan is required to be reviewed at least every three years, and to be revised if needed. (Formulation: 2003, revision: 2007 and 2010)

## Basic point of view

○The basic point of view in energy policy is **energy security, environmental protection, and efficient supply.**

○In this revision, two new points of views were added. These are: **energy-based economic growth** and **reform of the energy industrial structure.**

○Japan will **fundamentally change its energy supply and demand system by 2030.**



- Formulating the revised Strategic Energy Plan of Japan is consistent with the "New Growth Strategy"
- Directing bold and quantitative policy targets and specific policy measures

# Ambitious targets toward 2030

◎ **Doubling the energy self-sufficiency ratio** (18% at present) **and the self-developed fossil fuel supply ratio** (26% at present) and as a result, raising its **“energy independence ratio”** (※) **to about 70%** (38% at present).

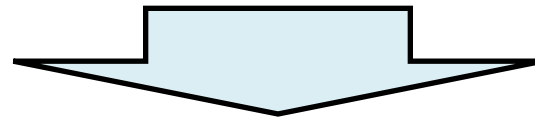
(※) The “energy independence ratio” is an indicator that combines the self-sufficiency energy with the self-developed energy supply divided by total primary energy sources. An average energy self-sufficiency rate among the OECD countries is almost 70%.

◎ Raising **the zero-emission power source ratio to about 70%** (34% at present).

◎ **Halving CO<sub>2</sub> emissions from the residential sector.**

◎ **Maintaining and enhancing energy efficiency in the industrial sector at the highest level in the world.**

◎ **Maintaining or obtaining top-class shares of global markets for energy-related products and systems.**



○ **Domestic energy related CO<sub>2</sub> emissions will be reduced by 30% or more in 2030** compared to the 1990 level, if we promote policies sufficiently.

○ **A 30% emissions reduction** means that about **a half of the reduction to be achieved from the current level to 2050 (▲80% compared to 1990) will have been realized in 2030.**

# Specific measures to achieve targets (supply side)

## Securing resources and enhancing supply stability

- Deepening strategic relationships with resource-rich countries through **resource diplomacy by the PM and ministerial level** and **public-private partnership with the relevant industrial sectors**
- Enhancing **support for risk money** for upstream concessions (JOGMEC, ODA, policy-based finance, trade insurance, etc.)
- Raising **self-sufficiency ratio of strategic rare metals** (including recycling and alternative materials development) to more than **50%**
- Enhancing development of domestic and overseas resources including methane hydrate and sea-floor hydrothermal deposits, etc.

## Independent and environment-friendly energy supply structure

### ○Expanding the introduction of renewable energy

- **Expanding the feed-in tariff system** (wind, middle-small size hydro, geothermal, and biomass in addition to photovoltaic)
- Strengthening support for introduction (R&D support, FS, initial cost support, tax reduction for introduction, etc.)
- Power grid stabilization and relevant deregulation

### ○Promoting nuclear power generation

- Building **9 new or additional nuclear plants** (with the overall plant capacity utilization rate at about **85%**) **by 2020** and **more than 14** (with the rate at about **90%**) **by 2030**
- Achieving long-term cycle operations and shortening operation suspensions for regular inspections
- Improving the power source location subsidy system (by considering measures to promote the construction and replacement of nuclear plants and place a greater weight on electricity output in calculating subsidies)
- Achieving the nuclear fuel cycle establishment including the development of “plutothermal” and fast breeder reactors
- International cooperation for nonproliferation and nuclear safety

### ○Advanced utilization of fossil fuels

- Requiring to **reduce CO2 emissions of the plants to the IGCC plant levels in principle**, when planning to construct new coal fossil power plants by the beginning of the 2020s.
- Accelerating the CCS (carbon capture and storage) technology development for an early commercialization (around 2020s), requiring **new coal thermal plants for future planning to be CCS-ready** and to be equipped with CCS technology by 2030, on the precondition of commercialization.
- Spreading its advanced clean coal technologies overseas and promoting further technology development and demonstration domestically.

### ○Enhancing electricity and gas supply systems

- Building **the world's most advanced next-generation interactive grid network as early as possible in the 2020s**
- Considering specific measures to double the electricity wholesale market in three years.

# Specific measures to achieve targets (demand side)

## Realizing a low carbon energy demand structure

### ○Industrial sector

- **Enhancing the world's most advanced energy efficiency** through introducing the most advanced technologies for replacing equipment
- Enhancing the energy conservation law operations, commercializing innovative technologies and enhancing support for fuel conversion, etc.

### ○Residential sector (i.e. households and offices)

- Making **net-zero-energy houses available by 2020** and realizing **net-zero-energy houses in average by 2030**.
- Setting **compulsory energy-saving standards for houses and compiling compulsory standardization targets**, timing and support measures within this year under the cooperation with the Ministry of Land, Infrastructure, Transport and Tourism (MLIT)
- Prevailing **highly efficient water heaters to the amount of 80-90% of all family units** in 2030
- Replacing **100% of lights with highly-efficient lights** (including LED and organic EL lighting) on **a flow basis by 2020** and on **a stock basis by 2030**

### ○Commercial sectors (i.e. offices)

- Realizing **net-zero-energy buildings in new public building by 2020** and realizing **net-zero-energy buildings in average by 2030**
- Introducing **new integrated standards for energy consumption at all buildings for implementation in two years**
- Enhancing support and regulatory measures (including top-runner standards) to diffuse energy-saving consumer electronics, energy-saving information technology equipment, heat pump water heaters, fuel cells, hybrid construction machines and other highly efficient equipment

### ○Transportation sector

- Raising **next-generation vehicles' share of new vehicle sales to up to 50% by 2020 and up to 70% by 2030** by mobilizing all possible policy measures (including 2020 fuel efficiency standards, introduction support measures and diffusion of battery chargers)

### ○Cross-sectional efforts

- Considering municipal-level energy use optimization policy measures

## Building next-generation energy and social systems

- Realizing the smart grid and smart communities by promoting an intensive cross-sectional mobilization of relevant policies, consideration of special zones, **demonstration projects both home and abroad**, and **strategic international standardization**.
- Promoting the development, installation of smart meters and relevant energy management systems (that can record detailed energy supply-demand data and control a variety of equipment), seeking to **introduce them for all users, in principle, as early as possible in the 2020s**
- **Diffusing fixed fuel cells and developing a hydrogen supply infrastructure**, including hydrogen stations for fuel cell vehicles

## Developing and diffusing innovative energy technologies

- **Drafting a new energy innovation technology roadmap** (within 2010) to accelerate the development of innovative energy technologies
- **Developing the public-private cooperation** arrangements for supporting the international diffusion of highly efficient and low carbon technologies
- **Building a new mechanism to appropriately evaluate how Japan's international diffusion of its technologies, products and infrastructure contributes to reducing global greenhouse gas emissions**

# References

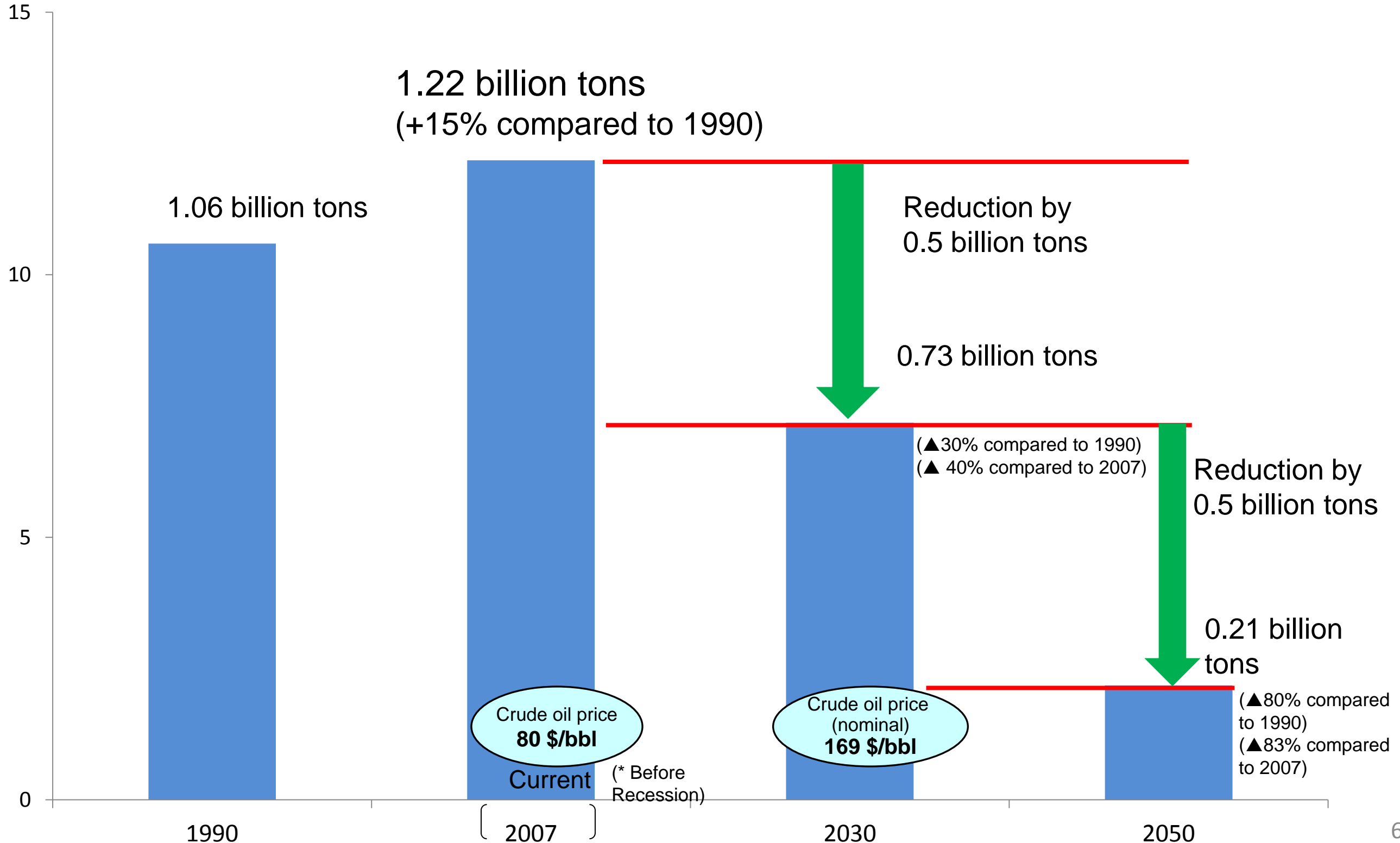
The following estimates are provided as a reference by the METI. They have not been the basis or the premise of the Cabinet decision in June 2010 on the “Strategic Energy Plan of Japan”. Tangible effects of each policy measures on CO2 emission reduction will have to be discussed on among relating ministries.

# Long-term CO2 emission reduction path

Ref.

- The long-term CO2 emission path provides an image that approx. 0.5 billion tons will be reduced from the current level in about 20 years until 2030. By that time, about a half of the reduction amount to be achieved by 2050 (▲80% compared to 1990) will have been realized.

0.1 billion tons of CO2





# Residential and commercial sector in 2030

Ref.

○ An estimate has been made with certain preconditions on business floor space and the number of households, while reflecting the following measures for the private sector listed in the energy basic plan.

## Major reduction measures

## Picture in 2030

private sector

- Energy conservation in houses and buildings ZEH will be realized in new houses, and ZEB will be realized in new buildings.
- High efficiency hot water supply devices (for households) Will be introduced in 80 to 90% of all households
- Highly efficient illumination Diffusion rate: 100% (stock base)
- Energy conservation in IT equipment (green IT) Diffusion rate: 100% (to be realized by 2020)
- Other energy saving home appliances, etc.

[Other major preconditions]

Business floor space: 1.79 billion square meters in 2007

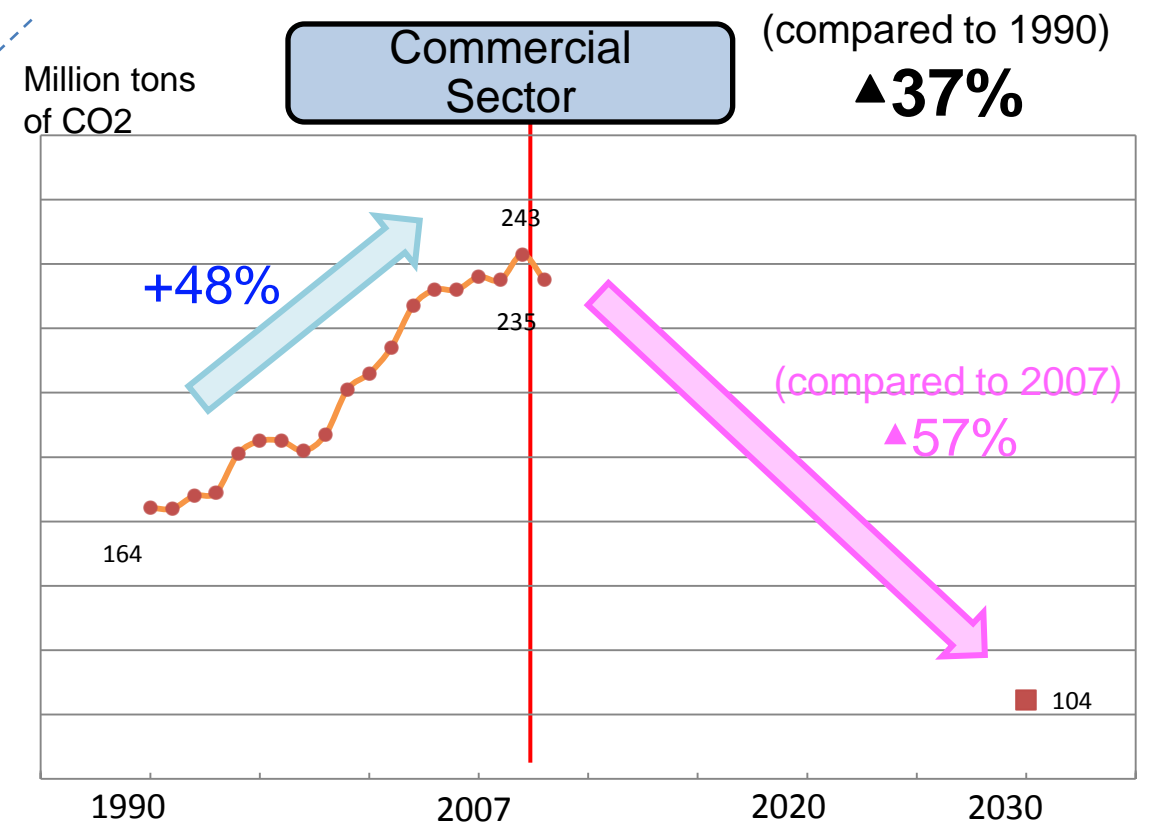
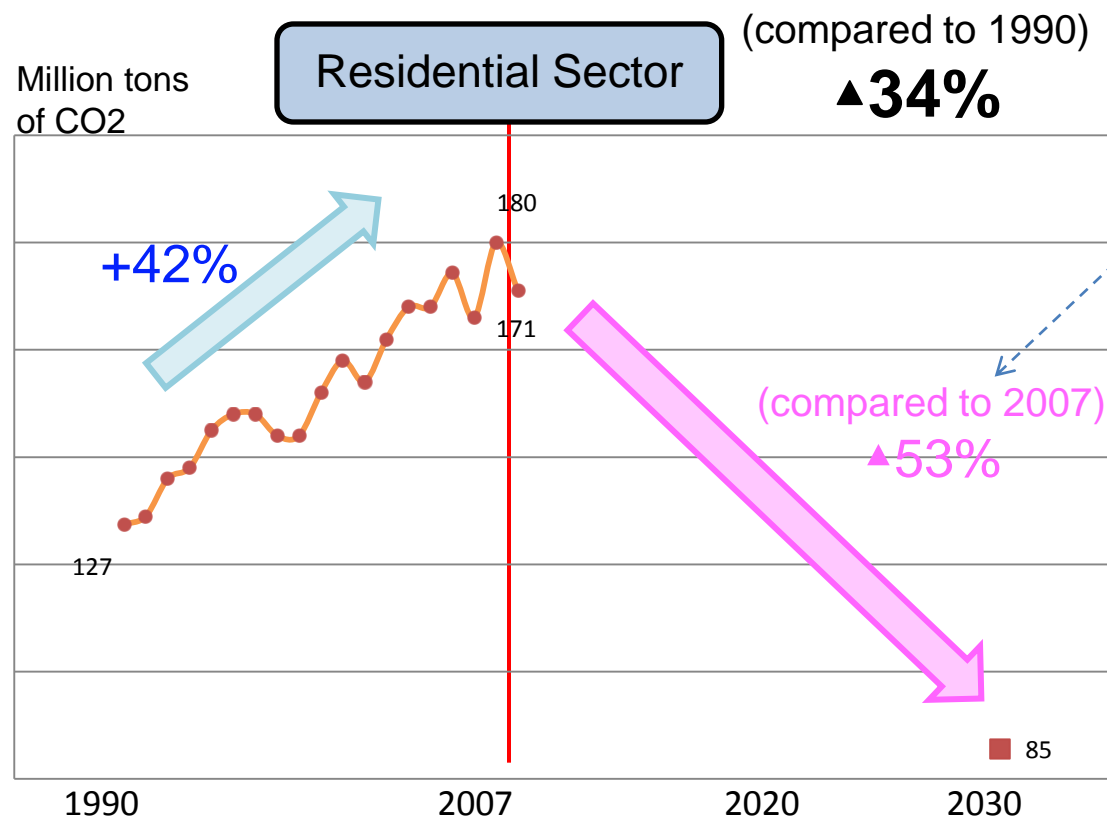
→ 1.92 billion square meters in 2030

Number of households: 51.71 million households in 2007

→ 52.42 million households in 2030

(Estimation result)

○ CO2 generated by energy consumption in “Living” **will be reduced to half** from the present state.





# Industrial and transportation sector in 2030

Ref.

○ An estimate has been made with certain preconditions on macro frames, while reflecting the following measures for the industrial and transportation sector listed in the energy basic plan.

## Major reduction measures

## Picture in 2030

Industrial sector

- Energy conservation in the manufacturing sector
- Innovative technological development
- Conversion to gas

State-of-the-art technologies will be introduced to the maximum extent when equipment is renewed.

- **13** next-generation coke ovens were introduced, etc.

Commercialization of **hydrogen reduction steelmaking, blast furnace gas CO2 separation and collection technology, etc.**

Ratio of gas in fuel consumption will **double**.

Transportation sector

- Diffusion and fuel efficiency improvement of next-generation automobiles
- Biofuel
- Modal shift

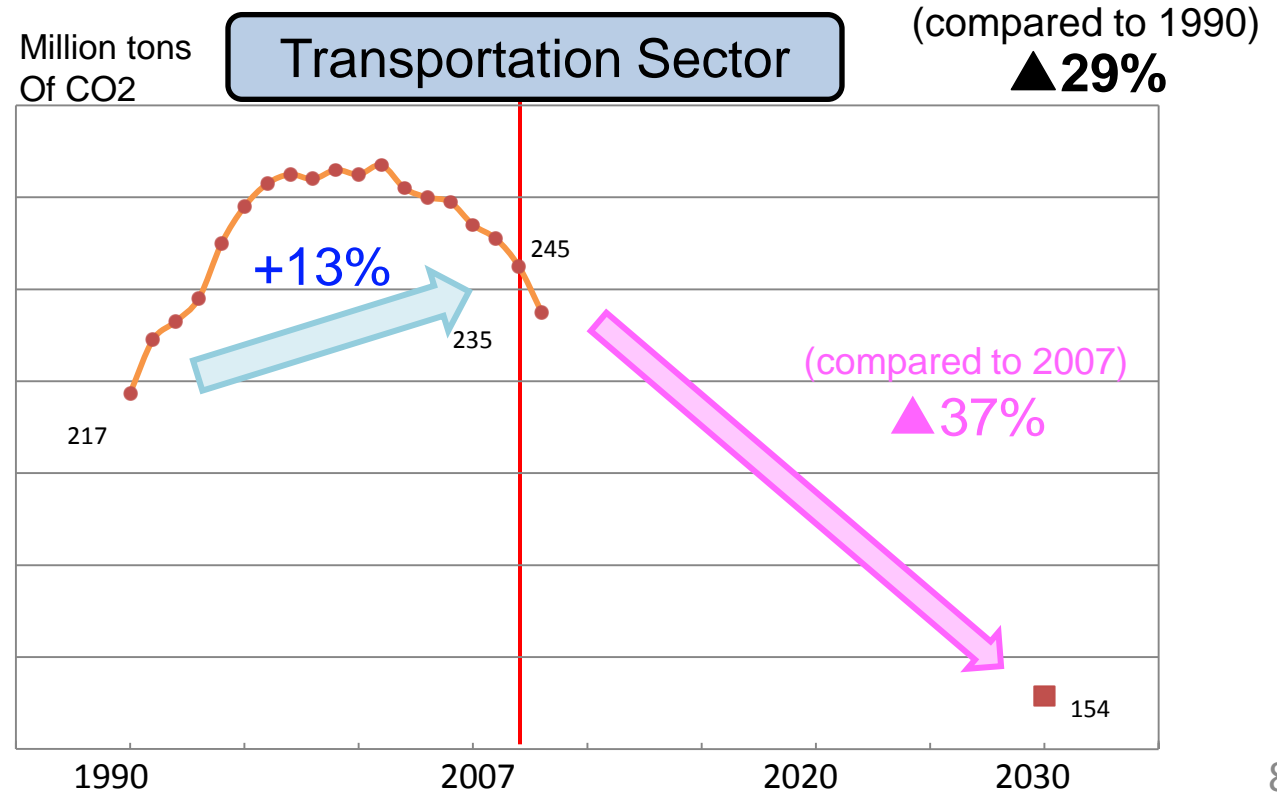
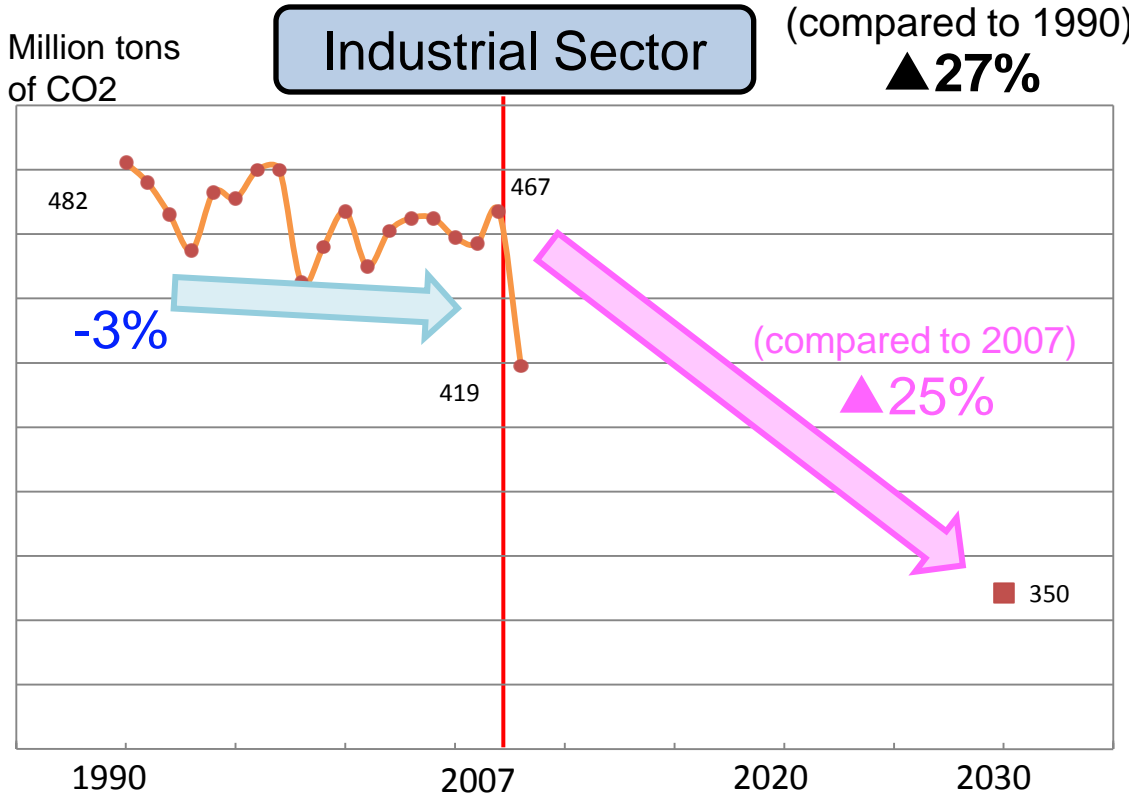
**70% of new cars** will be next-generation automobiles.  
 \* Currently, approx. 10% (Estimated on 2009 actual data after eco-car subsidy was implemented)

Introduction to transport fuel will be expanded to the maximum extent.

Share of Railroad and coastal shipping will increase in mid and long-distance transportation.

[Other major preconditions]  
 Crude steel production amount: 1215.1 billion tons in 2007  
 -> 1192.5 billion tons in 2030  
 Transportation demand: 1307.2 billion men kilometers in 2007 –  
 > 1303.6 billion men kilometers in 2030

(Estimated result)



# Balance of primary energy supply

Ref.

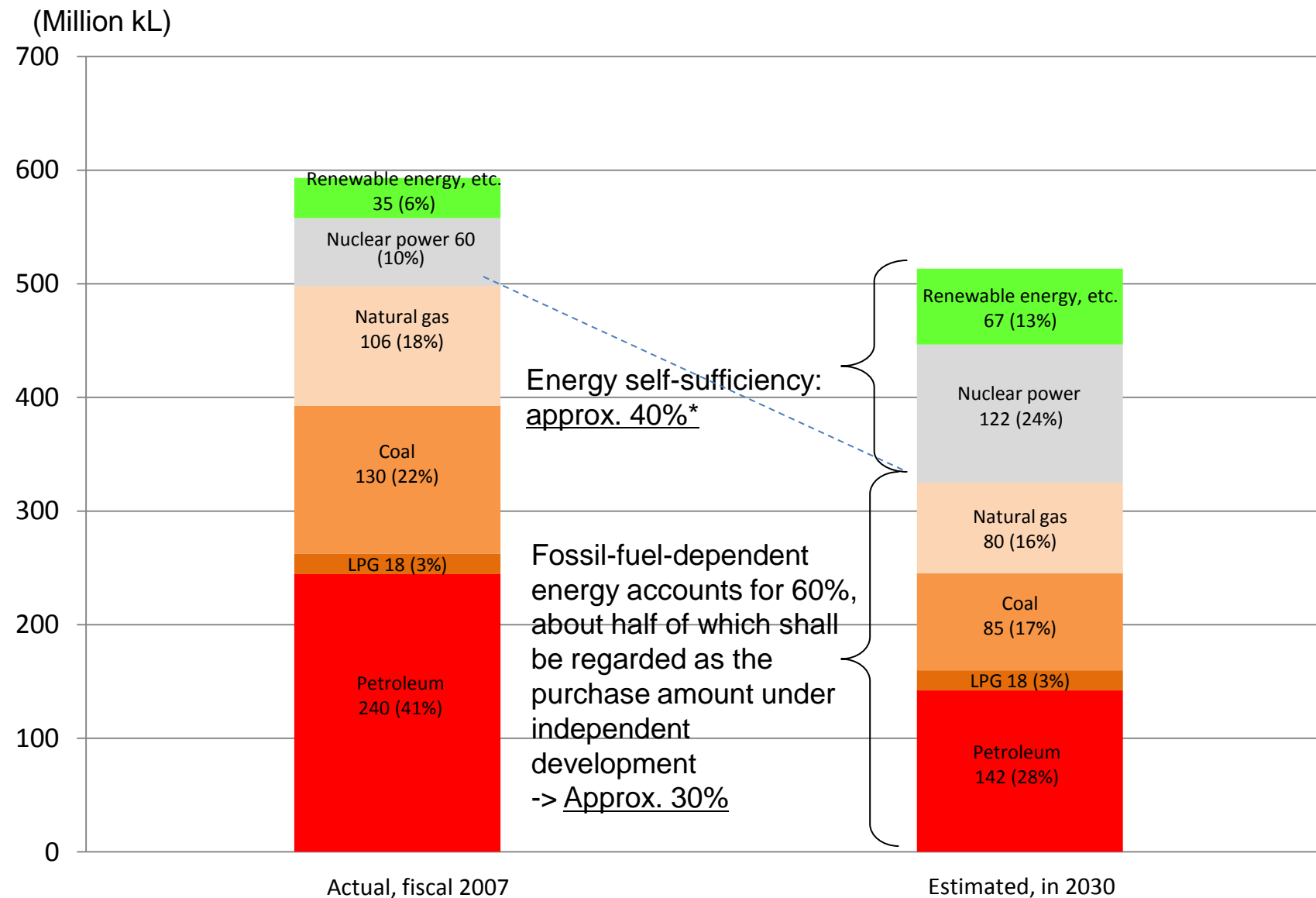
Sector of conversion

- Renewable energy
- Nuclear power

Implementation of feed-in-tariff system (depending on institutional design)  
 Building additional 14 plants, facility utilization rate 90%

(Estimation result)

○ Conventional energy self-sufficiency (18%, currently) will double. In addition, the energy independent ratio will become approx. 70% (38%, currently) by doubling the self-developed fossil fuel supply ratio (26%, currently).



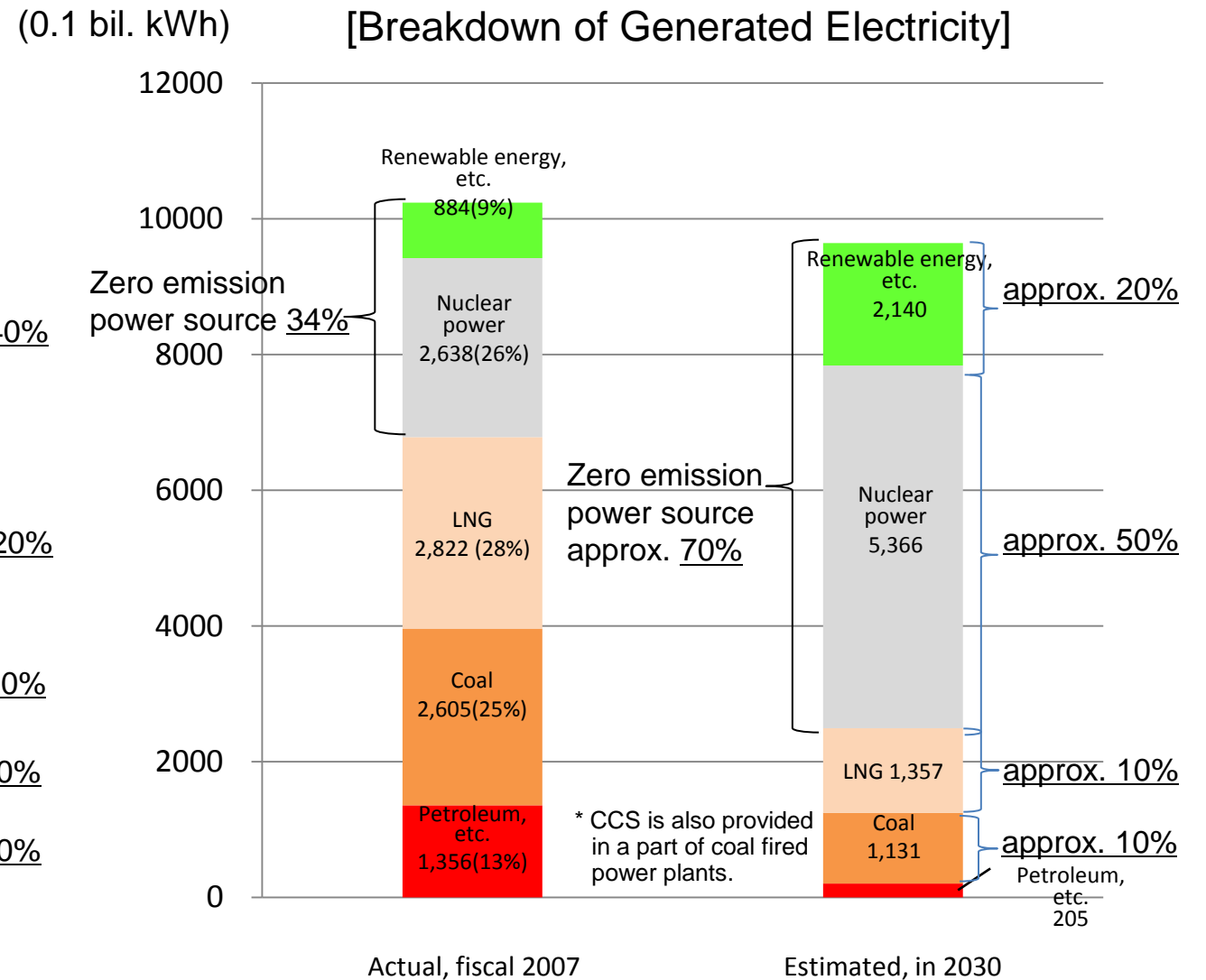
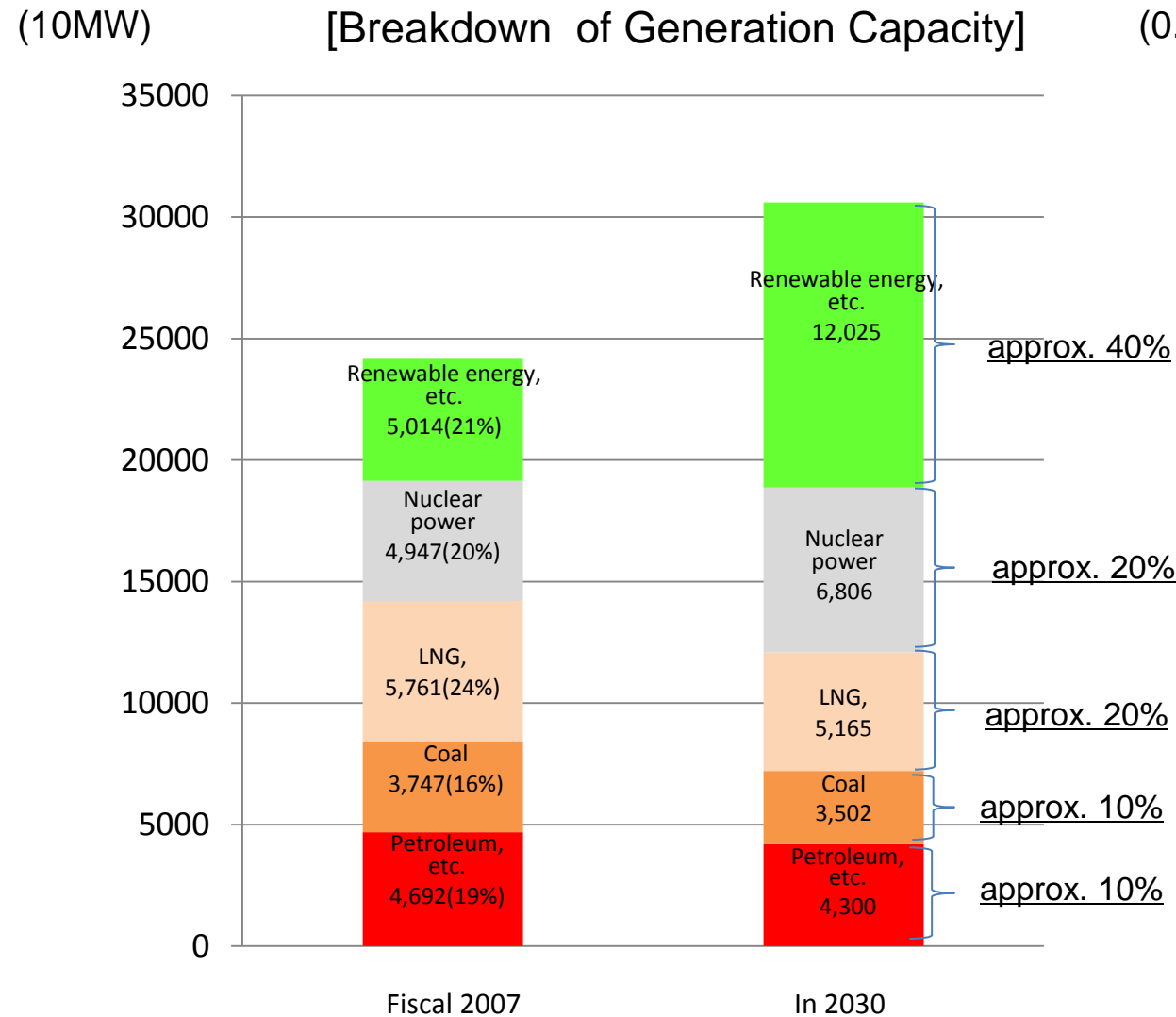
Energy self-sufficiency: approx. 40% + purchase of fossil fuel under independent development: approx. 30%  
 = independent energy ratio: approx. 70%

Energy self-sufficiency includes renewable energy, etc., nuclear power, and fossil fuel produced in Japan.

# Balance of power generation

○ Zero emission power source ratio will become approx. 70%\* (34% currently).

\* "Renewable energy, etc." in 2030 includes electricity generated in households, etc.



- This estimation is premised on considerable energy conservation, additional building (at least 14 plants) and increased facility utilization rate (approx. 90%) of nuclear power plants based on ensured safety while acquiring understanding and trust of the public on installation location, etc., as well as introduction of renewable energy to the maximum extent. Stability of the power system needs to be separately studied.
- Coal-fired thermal power plants assume that, in response to commercialization, CCS will be provided together with all power plants when they are replaced. It should be noted that the estimate may change depending on future technological development and securing of CO2 storage locations, etc.

# Total accumulated investment

Ref.

	Major reduction measures	Reduction amount (approx.)	Total investment amount
Private sector	○ Energy conservation of houses and buildings	59 million tons	50.3 trillion yen
	○ High efficiency hot water supply devices (for households)	19 million tons	4.6 trillion yen
	○ Highly efficient illumination	28 million tons	4.2 trillion yen
	○ Energy conservation in IT equipment (green IT)	30 million tons	6.0 trillion yen
	○ Other	30 million tons	11.4 trillion yen
Industrial sector	○ Energy conservation in the manufacturing division		
	○ Innovative technological development	39 million tons	6.6 trillion yen
	○ Conversion to gas		
<small>* Cost for the entire industrial sector</small>			
Transportation sector	○ Diffusion and fuel efficiency improvement of next-generation automobiles	54 million tons	13.6 trillion yen
	○ Biofuels		
Section of conversion	○ Renewable energy <small>* Photovoltaic, wind power, medium and small hydroelectric, geothermal, biomass</small>	60 million tons	26.1 trillion yen
	○ Nuclear power plants	160 million tons	5.6 trillion yen
	○ Improvement in efficiency in thermal power generation	25 million tons	2.5 trillion yen
<small>* Entire renewable energy (Assuming that buyback cost is approx. 8 trillion yen and system stabilization cost is approx. 18 trillion yen)</small>			

**Total:**  
**131 trillion yen**

If energy saving merit is taken into account:  
**62 trillion yen**

\* Total investment amount needed by 2030 has been roughly estimated. (Accumulation of differences in price from existing products. Provided that the price difference is assumed to be gradually decreased, in principle.)