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Short-Term Energy Supply and Demand Outlook for Japan

- Analysis on Scenario through FY2013 -
(Summary)

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Point of Analysis

1. Energy supply and demand

- In **FY2012**, both primary energy supply and final energy consumption in Japan are expected to decrease for the second year in a row.
- In **FY2013**, energy demand in Japan **will remain roughly flat** compared with **FY2012**.

2. Nuclear power

- In the "Standard Scenario", it was assumed that 9 nuclear power plants will restart in **FY2013**, following the new safety standard that will be made by the Nuclear Regulation Authority.
- If **26 nuclear power plants** restart, **fossil fuel imports will be reduced by JPY1.1 trillion** and **CO_2 reduction will be 59 Mt** ("Restart Scenario").

3. Impact of increase in power tariffs

- Several electric utilities are planning to increase their power tariffs in **FY2013**.
- Higher power tariffs would increase cost of production. It is concerned that **an additional power tariff cost of about JPY50 billion** for the manufacturing sector in Japan may result in a factor for **shifting their plant activities overseas**.

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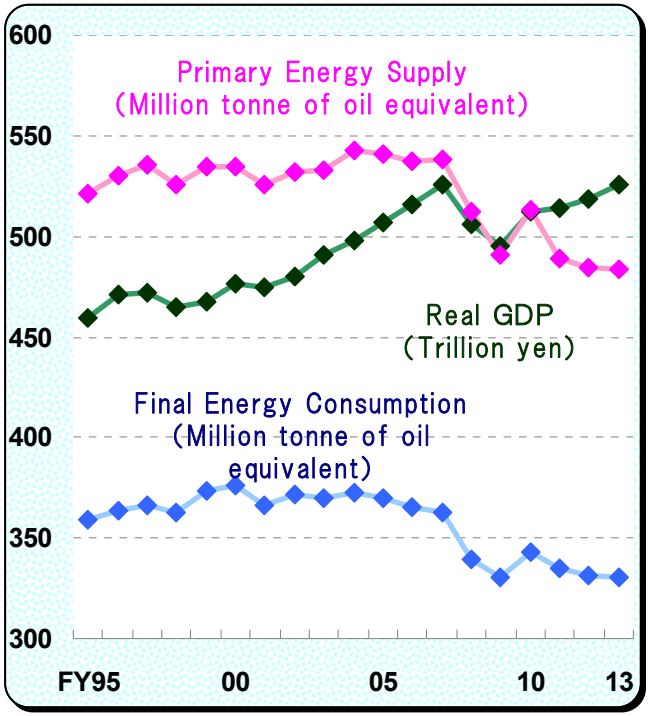
Energy supply and demand

- In **FY2012**, final energy demand is expected to decrease by 1.0% because of energy and electricity savings.
- In **FY2013**, overseas demand and a surge in consumer spending in anticipation of a consumption tax hike（from 5% to 8% in April 2014）will push up the Japanese economy. However, continuous energy savings will continue to put downward pressure on energy demand.

【Real GDP and Energy Supply/Demand】

		Actual		Forecast	
		FY2010	FY2011	FY2012	FY2013
Real GDP	Chained to Year 2005, trillion yen	512.3	513.7	518.5	525.9
	(year-to-year rare(%))	(+3.4)	(+0.3)	(+0.9)	(+1.4)
Final Energy Consumption	Million tonne of oil equivalent	343.3	334.7	331.2	330.6
	(year-to-year rare(%))	(+3.8)	(-2.5)	(-1.0)	(-0.2)
Primary Energy Supply	Million tonne of oil equivalent	513.3	489.3	484.2	483.9
	(year-to-year rare(%))	(+4.7)	(-4.7)	(-1.0)	(-0.1)

Sources: Historical data from IEEJ and Cabinet Office's, Forecasts from IEEJ



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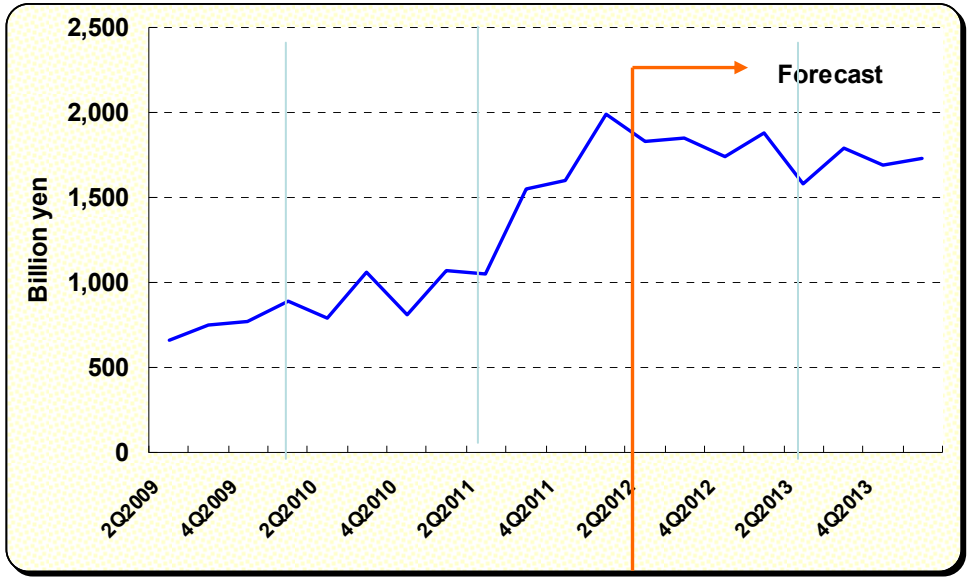
1-1(1) Fuel import for power generation

- Fuel import value for power generation amounted to JPY3.7 trillion and JPY6.2 trillion in **FY2010** and **FY2011**, respectively. It is expected to be JPY7.3 trillion in **FY2012**.
- Although some nuclear power plants are assumed to restart in **FY2013**, fuel import value for power generation is expected to be JPY6.8 trillion.

◆ Fuel import for power generation (estimated)



Source : IEEJ estimated

Fuel Import Value (for Power Gen)

【FY2010】:3.7 trillion yen
【FY2011】:6.2 trillion yen

《FY2012》(Compared with FY2010)
+3.6 trillion yen
(Total :7.3 trillion yen)

《FY2013》(Compared with FY2010)
+3.1 trillion yen
(Total :6.8 trillion yen)

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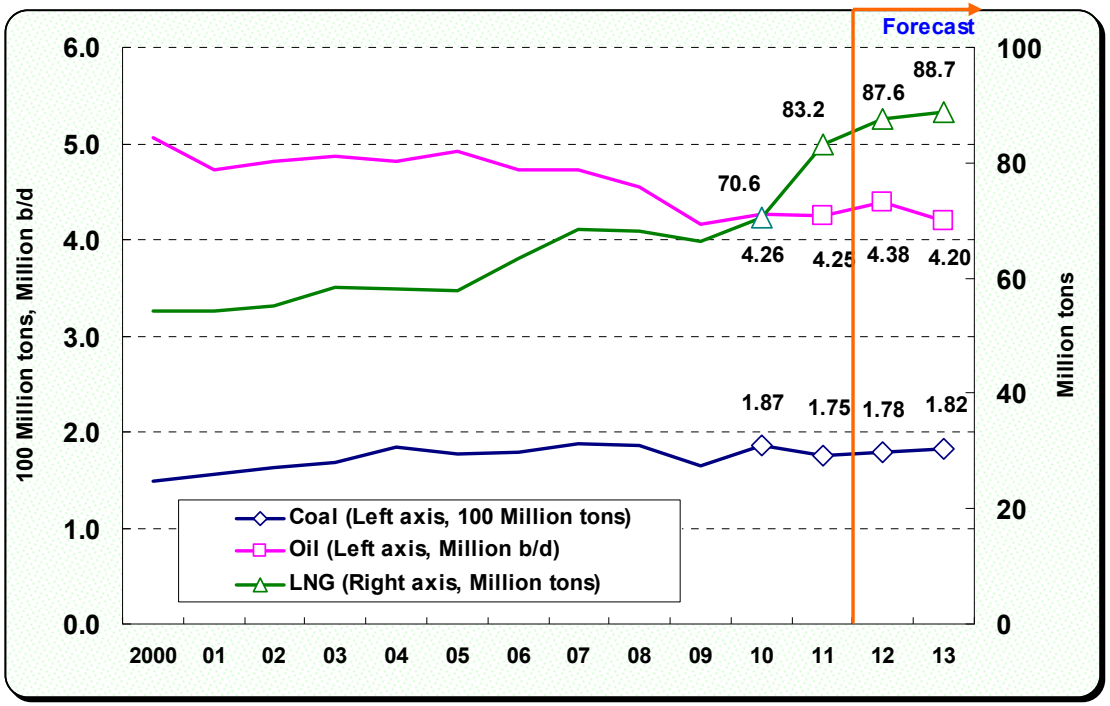
1-1(2) The amount of fossil fuel imports

- **Coal import** will be 178 Million tons (Mt) in **FY2012**. Economic recovery will push it further to 182 Mt in **FY2013**.
- **Oil import** will be 4.38 Million b/d (Mb/d) in **FY2012** with higher crude oil import because of the increased demand for type-C heavy fuel oil. Decrease in fuel demand will push it down to 4.2 Mb/d in **FY2013**.
- **LNG import** is estimated as 87.6 Mt in FY2012. It will increase to 88.7 Mt in **FY2013** because of higher demand for industrial use and increase in LNG fired power plants. It may further surge depending on the status of restart of nuclear power plants.

◆Fossil fuel imports



◆Changes of fossil fuel imports from FY2010

《FY2012》
Coal: - 8 Mt
Oil: +120 kb/d
LNG: +17.1 Mt

《FY2013》
Coal: - 5 Mt
Oil: +20 kb/d
LNG: +18.2 Mt

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Source：Historical data from Ministry of Finance. Forecasts from IEEJ.

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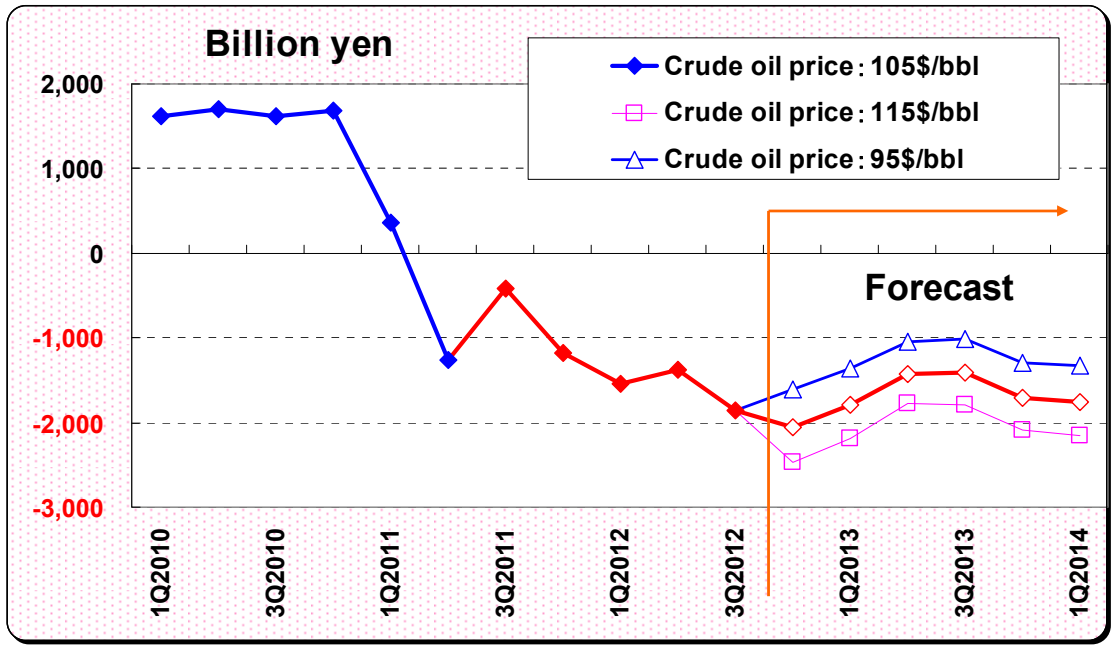
1-1(3) Worsening Trade Deficit

- Both export and import will increase because the world economy (Japanese and overseas) is recovering gradually in **FY2012**. Japan's trade deficit will remain unchanged from FY2011 due to the large amount of fuel imports and high fuel prices.
- In **FY2013**, recovery of overseas demand will increase Japanese exports. On the other hand, fossil fuel import value will remain high and the trade deficit will also remain high at 6.3 trillion yen.

◆Balance of trade



◆Export and Import

(Trillion yen)	Actual		Forecast	
	FY2010	FY2011	FY2012	FY2013
Export	67.8	65.3	63.4	63.6
Import	62.4	69.7	70.5	69.9
Fossil Fuels	18.1	23.1	24.2	23.4
Balace of Trade	5.4	▲ 4.4	▲ 7.1	▲ 6.3

FY2013

Oil price
-10 $
-4.6 trillion yen

Oil price
+10 $
-7.8 trillion yen

trade deficit
(3 years in a row)

Source : Historical data from Ministry of Finance, forecasts from IEEJ.

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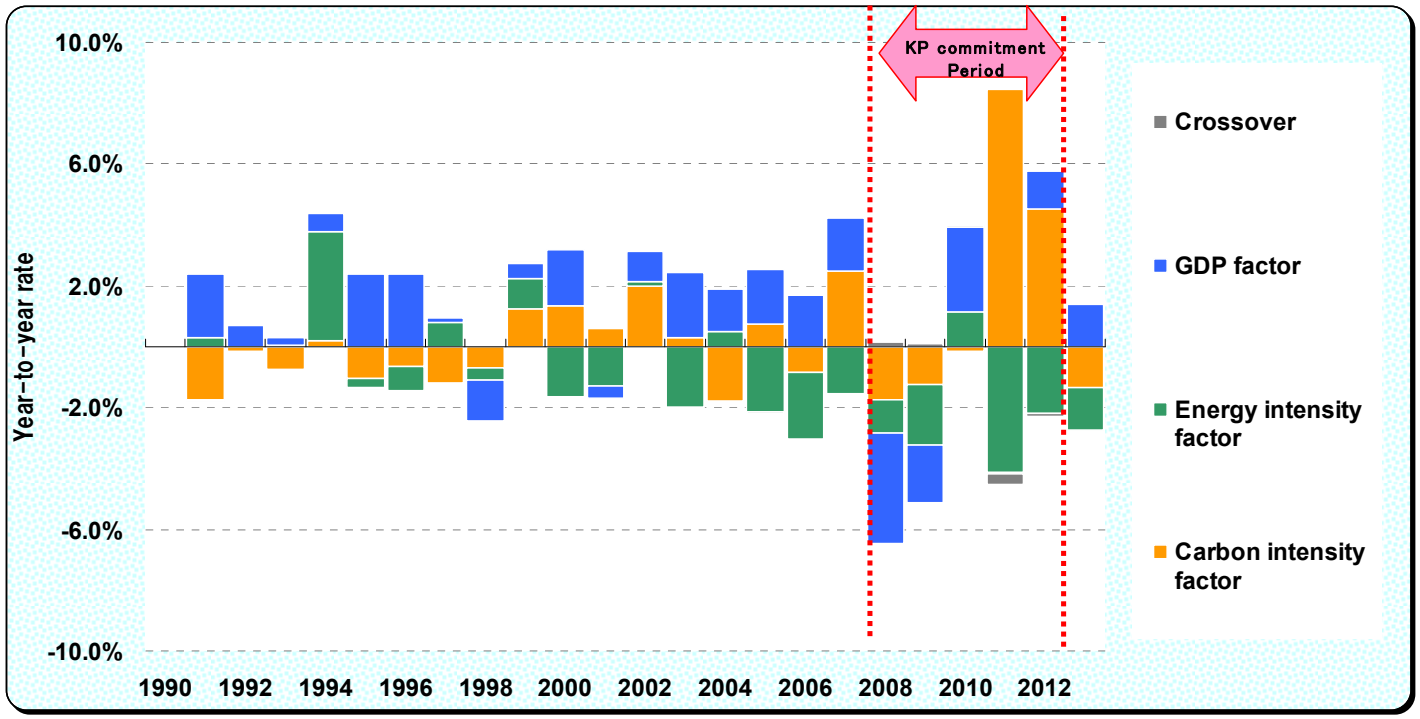
1-2 Breakdown of energy-related CO_2 emissions

- CO_2 emissions (energy-related) are expected to increase by 3.8% in **FY2012**, due to economic growth and low capacity factor for nuclear power. In **FY2013**, CO_2 emissions will decrease by 1.4% due to the restart of some nuclear power plants.
- Average energy-related CO_2 emissions in KP commitment period will be 6.8% higher than base year. However, the GHG emissions target will be achieved thanks to reduction of other GHGs and utilization of Kyoto mechanisms

◆Breakdown of energy-related CO_2 emissions



Source : Historical data from Ministry of Environment. Forecast from IEEJ.

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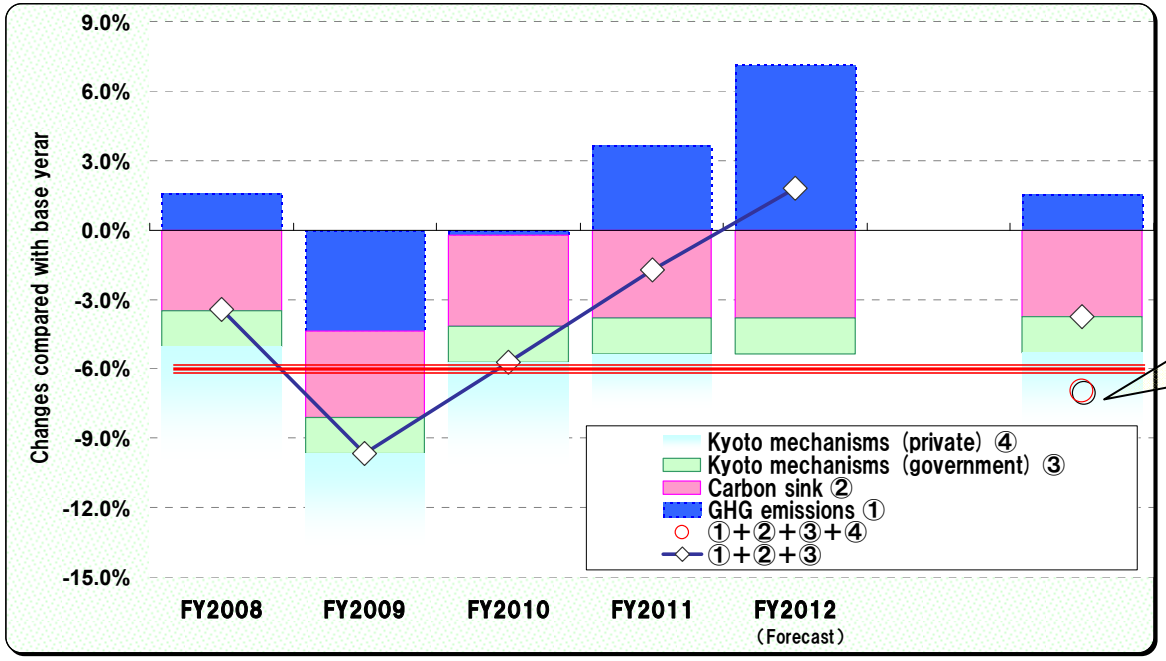
(Reference) Achievement of Kyoto Protocol Target

- At the end of **FY2011**, 4 year average (FY2008-11) of the GHG emissions were 9.2% lower than in base year, including carbon sink and Kyoto mechanisms.

- Assuming other GHG emissions at the same level as in **FY2011**, total GHG emissions in **FY2012** will be the highest of the KP commitment period (FY2008-12). However, KP target will be achieved thanks to the credit of Kyoto mechanisms.

◆Kyoto Protocol target



KP target will be achieved thanks to the credit of Kyoto mechanisms.

Note: KP means Kyoto Protocol

Source : Historical data from Ministry of Environment. Forecast from IEEJ.

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② Sensitivity analysis of nuclear power (assumption)

- Analysis on the impact of restart of nuclear power stations in **FY2013**, following the new safe standard which will be made by the **Nuclear Regulation Authority**.

Results

- Import value of fossil fuels
- Energy-related CO_2 emissions

（If nuclear power plants restart, they are expected to improve the reserve ratio and thus will ease the electric supply / demand balance.）

Scenarios (number of operating nuclear units)

Zero scenario, Standard scenario, Restart scenario and Reference scenario

・**Zero scenario**：None of nuclear power plants will be operating (0 unit)

・**Standard scenario**：Ohi unit 3 & 4, and several plants will restart in the latter half of **FY2013**（9 units）

・**Restart scenario**：Plants that have submitted the stress test will restart (26 units)

（Reference scenario：It is assumed that 26 units will operate at the beginning of FY2014.

＜Other assumptions＞

- ✓ Each scenario has 0 unit, 9 units and 26 units of operating plants at the end of FY2013, respectively.
- ✓ Nuclear power plants are categorized as follows in this sensitivity analysis.
  - ➢ Ohi unit 3・4（2 units）
  - ➢ Plants whose stress test reports were sent to the Nuclear Regulation Authority（7 units）
  - ➢ Plants that have submitted the stress test results (excl. plants that are 40 years or older and might have active faults beneath the power plants）（17 units）

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2-1 Sensitivity analysis of nuclear power (energy)

- As nuclear power plants restart, they will impact on gas and oil plants more than on coal plants that are used for middle and peak loads.
- Restart of nuclear power plants will also contribute to reduce CO2 emissions.

	FY2013			(Reference)
	Zero Scenario	Standard Scenario (9 units)	Restart Scenario (26 units)	26 units Full operation
Capacity factor	2.3%	8.8%	34.0%	51.8%
Coal	+0.3 Million ton (+0.2%)	–	-4.69 Million ton (- 2.6%)	-8.27 Million ton (- 4.7%)
Oil	+4.15 Million kL (+1.8%)	–	-12.2 Million kL (-5.2%)	-17.4 Million kL (- 7.4%)
Natural Gas	+1.26 Million ton (+1.4%)	–	-5.81 Million ton (- 6.4%)	-12.2 Million ton (- 13.3%)
CO_2	+15 Million ton (+1.3%)	–	-59 Million ton (- 4.9%)	-98 Million ton (- 8.2%)

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2-2 Sensitivity analysis of nuclear power (economy)

- Likelihood of restart of nuclear power plants is still uncertain.
- Uncertainty surrounding the restart of nuclear power plants will remain as a weight for the recovery of the Japanese economy.

	FY2013			(Reference)
	Zero Scenario	Standard Scenario (9 units)	Restart Scenario (26 units)	26 units Full operation
Capacity factor	2.3%	8.8%	34.0%	51.8%
GDP change rate	-0.03%	—	+0.12%	+0.22%
Fossil fuel import for power suppliers	+0.3 trillion yen	—	-1.1 trillion yen	-1.8 trillion yen
Increase of power rate	+0.3 yen/kWh	—	-1.2 yen/kWh	-2.0 yen/kWh

Note: Power rate for large customers is about 11 yen/kWh and power rate for households is about 21 yen/kWh in FY2010. (Source: Handbook of Energy & Economic Statistics in Japan)

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3-1 Impact of power tariffs increase (1)

- **For Industry**

  Power tariff increase for industry is being considered because of the heavier cost of fuel import. If power tariffs are raised, it will have a huge impact on the energy consuming industry.

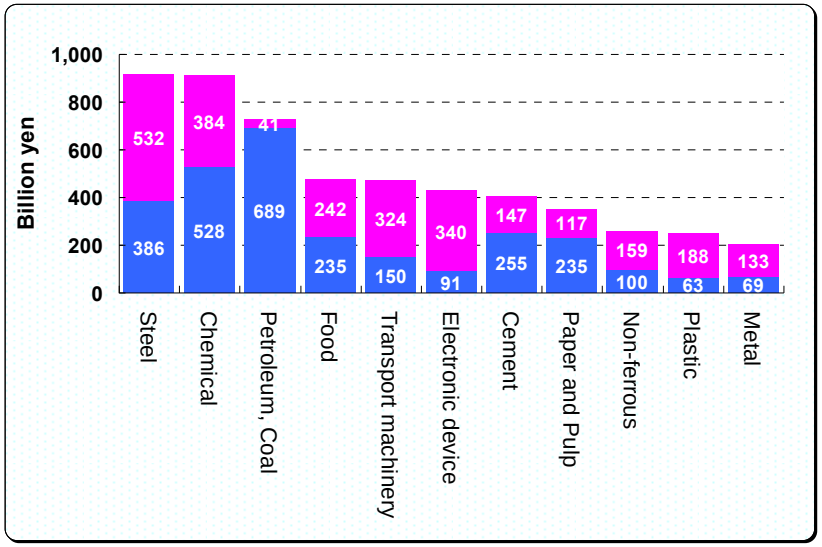
- **Impact**

  Steel industry paid 530 billion yen in **FY2010** for power. If the power tariffs increase by 15%, the additional cost will be 75 billion yen.

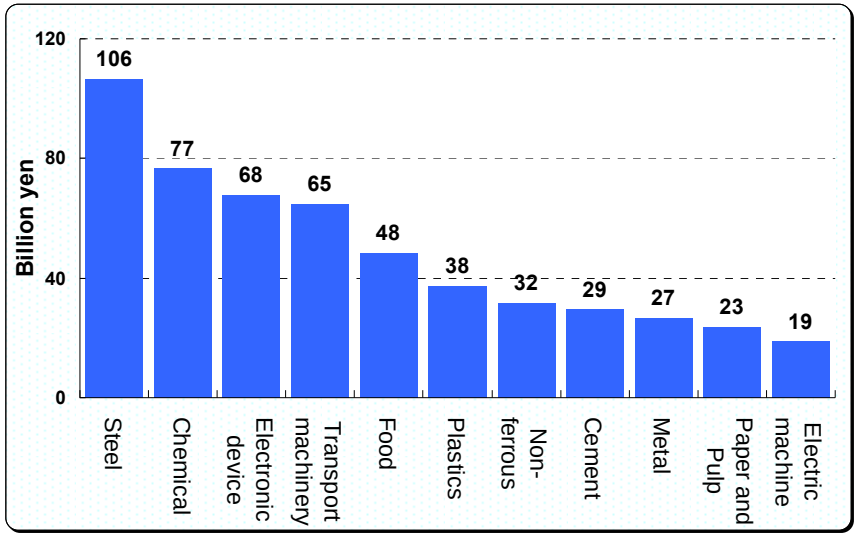
  For the manufacturing sector, the additional cost will amount to 500 billion yen.

(Estimation below (right) assumes 20% power tariff hike.)

◆Breakdown of energy and material cost (FY2010)



◆Increase of purchased electricity (20% up based on the FY2010)



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Source) Compiled and estimated by IEEJ using METI, Industry Statistics, etc.

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3-2 Impact of power tariffs increase (2)

- **For Industry (Operating income margin)**

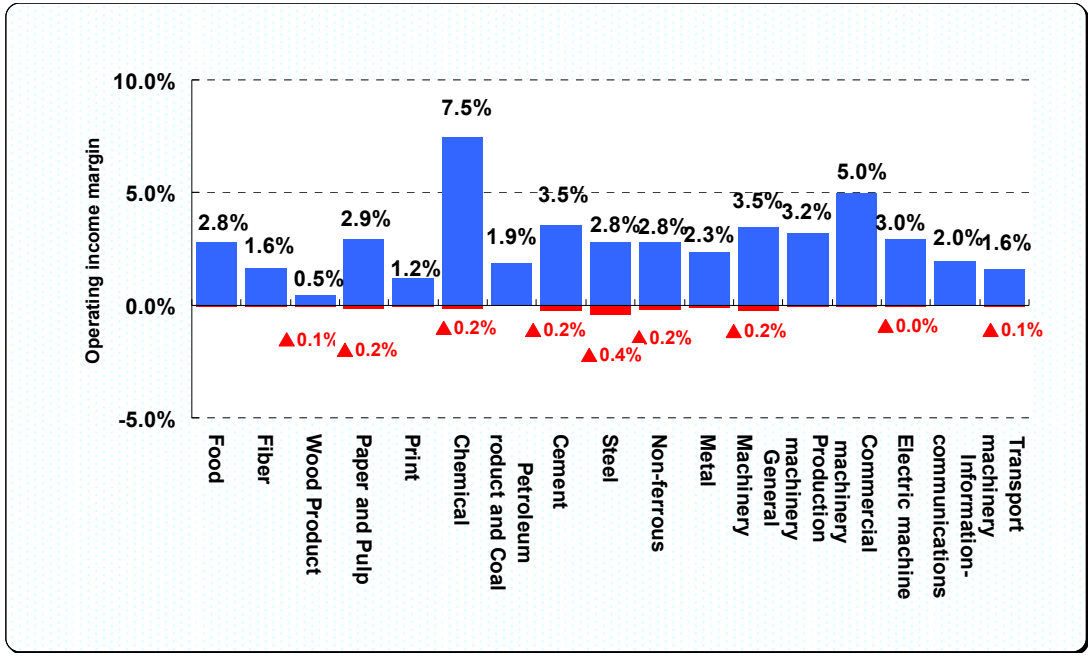
  If the power tariffs increase by **15%,** the operating income margin of the steel industry will decrease by 0.4%. Cement and general machinery industries will also suffer from 0.2% reduction of operating income margin.

  Higher power tariffs would deteriorate the Japanese industries' competitiveness.

- **For household (Electricity bill)**

  If power tariffs for households increase by **10%,** the annual additional payment per household will be about 8000 yen.

◆Operating income margin（FY2010）



Source: IEEJ estimates based on Financial Statements Statistics of Corporations by Industry

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