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# Short-Term Energy Supply/Demand Outlook

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## <Summary of the Report>

【Backgrounds】

　　The world economy continues to grow moderately, led by China and other emerging countries. On the other hand, the Japanese economy has experienced a sharp slump in both supply and demand due to the devastating damage inflicted by the Great East Japan Earthquake on stock and flow bases. Energy demand has also turned down because of a decline in economic activity, the order for restriction on the use of electricity and the increased awareness with regard to saving electricity.

　　This report presents forecasts on energy supply and demand in Japan for FY2011 and FY2012 in light of those circumstances. We assumed two scenario cases: (1) the "**September restart case**," in which nuclear power plants that are now out of operation due to regular checkups or for other reasons will be gradually restarted in September and later, and (2) the "**no restart case**," in which nuclear power plants that are now out of operation due to regular checkups or for other reasons and those which are scheduled to undergo regular checkups will not be restarted.

\* The forecasts were made in light of updated information on the basis of the "Analysis of Electricity Supply and Demand through FY2012 in the Case of Presence or Absence of Restart of Nuclear Power Generation" (June 13, 2011) by the Institute of Energy Economics, Japan.

【Major Conclusions】

**A. Economic Outlook for FY2011 and FY2012**

　　Although the Japanese economy is likely to experience a temporary slump due to the impact of the

Great East Japan Earthquake in **FY2011**, it is expected to gradually recover thanks to a pickup in production and governmental support for reconstruction. In the first half of FY2011, production will decline due to the suspension of the operation of production facilities and the disruptions of supply chains caused by the earthquake disaster, and private consumption will also fall as a result of the weakening of consumer sentiment due to worries over future prospects. However, in the second half, consumer sentiment is expected to recover and reconstruction demand is likely to emerge. Consequently, **real GDP** is expected to **grow 0.2%** from the previous year. While production activity will decline steeply in the first half because of the damage done to production facilities, the disruptions of supply chains and the restriction on the use of electricity, it is expected to recover steeply, led by the auto industry, as the damaged facilities are expected to be restored and reconstruction demand is expected to grow in earnest in the second half. Consequently, **the industrial production index** in the whole of FY2011 is projected to inch up **0.6%** from the previous year.

In **FY2012**, **the industrial production index** is projected to **rise 7.1%** from the previous year, as production activity is likely to continue growing on the back of an increase in exports to emerging countries, mainly in Asia, and a recovery in capital investment. **GDP** is projected to **grow 2.8%** from the previous year, with the economy as a whole back on the path of recovery due to increases in public investment and exports. **The CIF-based price of crude oil imports into Japan**\* is assumed to average **$112/barrel** in FY2011 and **$109/barrel** in FY2012 (compared with the average of $84/barrel for FY2010).

\*The assumptions were made in light of "Current International Oil and Gas Situation and Issues" (July 28, 2011).

**B. Outlook on Energy Supply and Demand in FY2011 and FY2012**

**<Primary Energy Supply and Carbon Dioxide Emissions>**

**"September Restart" Case**

In **FY2011**, **domestic primary energy supply in Japan** is expected to drop **3.8% from the previous year** due to a slump in production and economic activity caused by the earthquake disaster and electricity saving. The earthquake disaster will have a significant impact in the first half in particular, reducing production in the automobile and other machinery industries and weakening private consumption. Although an upturn in production activity and reconstruction demand are

expected in the second half, primary energy supply is expected to remain stagnant due to such factors as delay in the recovery in consumer sentiment. Energy-based **carbon dioxide emissions** are projected to **decline 1.2%** from the previous year as a fall in energy demand is likely to more than offset a rise in the ratio of thermal power generation resulting from a decrease in the capacity utilization rate for nuclear power generation.

In **FY2012,** **domestic primary energy supply** is projected to **grow 2.6%** from the previous year as production and economic activity are expected to recover due to post-earthquake reconstruction and a pickup in electricity supply capacity. Energy-based **carbon dioxide emissions** are forecast to **increase 1.8%** despite a rise in the capacity utilization rate for nuclear power generation due to the restart of closed nuclear power plants and the start of new plants, as energy consumption is expected to grow due to the recovery in production and economic activity.

**"No restart" case**

In **FY2011**, **domestic primary energy supply** is expected to drop **3.8% from the previous year** due to a slump in production and economic activity caused by the earthquake disaster and electricity saving required due to an electricity shortage. Energy-based **carbon dioxide emissions** are projected to **increase 3.2%** from the previous year as the consumption of fuel consumption is expected to grow due to the gradual shutdown of nuclear power plants.

In **FY2012**, **domestic primary energy supply** is projected to **grow 2.7%** from the previous year because of an increase in fuel demand for thermal power generation as well as a recovery in production and economic activity due to post-earthquake reconstruction. Energy-based **carbon dioxide emissions** are forecast to **surge 9.3%** as a result of a sharp increase in the consumption of fossil fuels for power generation due to the shutdown of all nuclear power plants as well as an increase in energy demand resulting from the recovery in production and economic activity. As for the breakdown of the increase in fossil fuel consumption in FY2012, coal consumption is projected to increase by 8.65 million tons compared with FY2010, oil consumption is forecast to grow by 28.13 million kL, and natural gas consumption is expected to expand by 19.46 million tons (in LNG equivalents). The value of imports is projected to increase by ¥3.6 trillion.

**<Final Energy Consumption>**

In **FY2011**, **final energy consumption in Japan** is projected to **decline 3.2%** from the previous

year. Final energy consumption is expected to drop 1.8% in the industrial sector due to the damage inflicted by the earthquake disaster on production facilities and concerns over electricity supply. In the consumer sector, final energy consumption is projected to decline 4.8% as a result of electricity saving and a pull-back from the previous year's high level attributable to the extreme heat waves. In the transportation sector, final energy consumption is forecast to drop 4.2% as a result of stagnant cargo movements caused by a slump in economic activity due to the earthquake disaster and a pull-back from the previous year's high level attributable to the extreme heat waves.

In **FY2012**, **final energy consumption** is forecast to grow 2.3% from the previous year thanks to a recovery in economic activity. In the industrial sector, final energy consumption is projected to increase 3.2% from the previous year given the recovery trend in overall industrial production, particularly in the general machinery and automobile industries. In the consumer sector, final energy consumption is projected to rise 1.6% from the previous year as awareness with regard to saving electricity is expected to weaken compared with the previous year because of a recovery in electricity supply capacity. In the transportation sector, final energy consumption is forecast to increase 1.2% as improvements in fuel economy and transportation efficiency are expected to be offset by a recovery in cargo movements.

*Our projections do not take account of the effects of the introduction of a global warming prevention tax, a full feed-in tariff system for renewable energy power generation and a domestic emissions trading system.

**<Energy Demand on a Sales Basis>**

**Electricity sales in Japan** in **FY2011** are projected to **decline 5.6%** from the previous year due to a slump in production activity caused by the Great East Japan Earthquake, the order for the restriction on the use of electricity, an increase in private power generation, increased awareness with regard to saving electricity and a pullback from the previous year's high level attributable to the extreme heat waves. In **FY2012**, electricity sales are forecast to **grow 4.0%** from the previous year as a result of a recovery in production activity and a weakening of awareness with regard to saving electricity resulting from a pickup in electricity supply capacity.

**Town gas sales** in **FY2011** are projected to **decline only 0.3% from the previous year** as an increase in sales of gas used as fuel for private power generation offsets negative factors such as a slump in economic activity and a pullback from the previous year's high level attributable to the extreme heat waves. In **FY2012**, town gas sales are projected to **grow 2.9%** from the previous year

due to a steady increase in contracts in the residential and commercial sectors, an increase in demand for town gas in the industrial sector following a recovery in industrial activity, and a fuel switch to gas from oil and other energy sources.

**Fuel oil sales** in **FY2011** are projected to **decline 1.2%** ("September restart" case), as a drop in fuel oil demand due to slumps in production and transportation demand and a pullback from the previous year's high level attributable to the extreme heat waves offset an increase in the operation of oil thermal power plants resulting from a decrease in the capacity utilization rate for nuclear power plants and an increase in sales of fuel oil C used as fuel for private power generation (In the "no restart" case, fuel oil sales are projected to **grow 2.2%** from the previous year due to an additional increase in sales of fuel oil C used for thermal power generation as an alternative to nuclear power generation). In **FY2012**, fuel oil sales are forecast to **decline 0.8%** ("September restart" case), as a sharp decline in sales of fuel oil C for power generation due to a fuel switch to gas and electricity and an increase in the operation of nuclear power plants is expected to offset a recovery in production activity and a pickup in cargo transport (in the "no restart case," fuel oil sales are projected to **grow 4.7%** from the previous year as a result of a sharp increase in sales of fuel oil C for thermal power generation as an alternative to nuclear power generation).

## C. Estimate of the Economic Impact of an Electricity Shortage in Summer 2012

The above estimates, both in the "September restart" case and the "no restart case," were made within a common macroeconomic framework. However, in the "no restart" case, even if thermal power plants are operated at full capacity, an electricity shortage of 7.8% against the maximum electricity demand will arise in the summer of 2012. In light of the need to secure the reserve rate of 5% required for stable electricity supply, electricity saving of 12.4% will become necessary[1].

The economic impact of the expected electricity shortage in the summer season (July-September) of 2012 is estimated to be equivalent to a decline of 5.6% in real GDP (on a quarterly basis; a decline of 7.7 trillion yen in the value of GDP) compared with the case of the absence of such electricity shortage. The activity of manufacturing industries (as measured by the industrial production index) is projected to show a substantial drop of 8.2%, with machinery-related manufacturing industries, which consume a large amount of electricity, hit particularly hard. The number of unemployed

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[1] "Analysis of Electricity Supply and Demand through FY2012 in the case of the presence or absence of the restart of nuclear power generation" (June 13, 2011)

people is expected to increase by 50,000 people.

For autumn and later, when the electricity shortage will be resolved, we assumed two scenarios cases. The "autumn recovery" case assumes that in the autumn season (October-December) and later, economic activity will recover sufficiently to increase electricity consumption to the normal level. In this case, the economic impact of the electricity shortage is estimated to be equivalent to a decline of 1.6% in annual GDP (a decline of ¥9.1 trillion in the value of GDP). In the "lingering impact" case, which assumes that a slump in economic activity in the summer season will have a lingering impact, the economic impact is estimated to be equivalent to a decline of 3.6% in annual GDP (a decline of ¥20.2 trillion in the value of GDP), greater than the impact in the "autumn recovery" case. As the impact on employment tends to appear with a time lag, the number of unemployed people is expected to increase gradually, rising to 200,000 by the end of FY2012.

*It should be kept in mind that if electricity saving efforts are made in ways that do not affect economic activity, the impacts described above will be moderated.

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Table 1  Overview

| | | FY2009 (Actual) | FY2010 (Actual) 1st half | FY2010 (Actual) 2nd half | FY2010 (Actual) Total | FY2011 (Forecast) 1st half | FY2011 (Forecast) 2nd half | FY2011 (Forecast) Total | FY2012 (Forecast) |
|---|---|---|---|---|---|---|---|---|---|
| Key economic indicators | GDP (Chained to year 2000, in billions of yen) | 526,442 (-2.4) | 266,853 (4.1) | 271,605 (0.6) | 538,458 (2.3) | 263,303 (-1.3) | 276,323 (1.7) | 539,626 (0.2) | 554,478 (2.8) |
| | Private demand | 382,853 [-3.8] | 194,545 | 196,230 | 390,774 [1.4] | 192,732 | 198,143 | 390,874 [0.2] | 399,243 [1.7] |
| | Public demand | 121,901 [1.1] | 59,243 | 62,870 | 122,113 [-0.0] | 59,957 | 65,654 | 125,611 [0.8] | 127,722 [0.4] |
| | External demand | 20,115 [0.3] | 13,467 | 13,229 | 26,696 [0.9] | 10,756 | 13,137 | 23,893 [-0.7] | 28,265 [0.6] |
| | Index of industrial production (Year 2005 = 100) | 86.1 (-8.8) | 94.6 (17.4) | 93.1 (1.7) | 93.9 (9.1) | 90.0 (-4.8) | 98.8 (6.1) | 94.4 (0.6) | 101.1 (7.1) |
| | Exchange rate (Yen/US$) | 92.8 (-7.6) | 88.9 (-6.8) | 82.5 (-8.6) | 85.7 (-7.7) | 83.0 (-6.7) | 83.0 (0.7) | 83.0 (-3.1) | 83.0 (0.0) |
| | Crude oil CIF price (US$/Bbl) | 69.1 (-23.2) | 79.0 (27.9) | 89.7 (17.5) | 84.4 (22.1) | 110.6 (39.9) | 112.5 (25.4) | 111.5 (32.2) | 108.8 (-2.4) |
| | Heating degree-days | 955 (6.2) | 78 (124.1) | 1,001 (8.8) | 1,079 (13.0) | 46 (-40.8) | 933 (-6.7) | 980 (-9.2) | 980 (-0.0) |
| | Cooling degree-days | 329 (-17.5) | 559 (70.2) | 0 (-75.0) | 559 (70.0) | 418 (-25.2) | 1 (1170.0) | 419 (-25.0) | 419 (0.0) |
| Key energy indicators | Primary energy supply | | | | | | | | |
| | September restart case (10^10kcal = KTOE) | 489,999 (-4.2) | 246,740 (6.8) | 262,093 (1.2) | 508,833 (3.8) | 229,988 (-6.8) | 259,527 (-1.0) | 489,515 (-3.8) | 502,435 (2.6) |
| | No restart case (10^10kcal = KTOE) | 489,999 (-4.2) | 246,740 (6.8) | 262,093 (1.2) | 508,833 (3.8) | 229,989 (-6.8) | 259,691 (-0.9) | 489,680 (-3.8) | 502,986 (2.7) |
| | Final energy consumption (10^10kcal = KTOE) | 329,423 (-2.8) | 162,016 (5.8) | 176,598 (0.2) | 338,613 (2.8) | 152,115 (-6.1) | 175,560 (-0.6) | 327,675 (-3.2) | 335,074 (2.3) |
| | Industrial sector | 154,852 (-3.5) | 77,579 (6.7) | 82,351 (0.2) | 159,930 (3.3) | 73,936 (-4.7) | 83,127 (0.9) | 157,063 (-1.8) | 162,022 (3.2) |
| | Consumer sector | 92,122 (-2.2) | 41,918 (6.3) | 53,226 (1.0) | 95,144 (3.3) | 38,605 (-7.9) | 51,962 (-2.4) | 90,567 (-4.8) | 92,025 (1.6) |
| | Transportation sector | 82,449 (-2.1) | 42,518 (3.5) | 41,021 (-0.8) | 83,539 (1.3) | 39,575 (-6.9) | 40,471 (-1.3) | 80,046 (-4.2) | 81,028 (1.2) |
| | Electricity sales (billion kWh) | 889.4 (-3.4) | 476.0 (9.1) | 466.1 (2.9) | 942.1 (5.9) | 430.4 (-9.6) | 458.8 (-1.6) | 889.2 (-5.6) | 924.7 (4.0) |
| | Town gas sales (million m³/10,000kcal) | 33,837 (-1.9) | 16,574 (8.3) | 18,789 (1.4) | 35,363 (4.5) | 16,171 (-2.4) | 19,073 (1.5) | 35,244 (-0.3) | 36,283 (2.9) |
| | Fuel oil sales | | | | | | | | |
| | September restart case (1,000kl) | 195,122 (-3.0) | 92,031 (2.4) | 103,917 (-1.3) | 195,948 (0.4) | 89,573 (-2.7) | 103,956 (0.0) | 193,528 (-1.2) | 191,906 (-0.8) |
| | No restart case (1,000kl) | 195,122 (-3.0) | 92,031 (2.4) | 103,917 (-1.3) | 195,948 (0.4) | 89,624 (-2.6) | 110,570 (6.4) | 200,194 (2.2) | 209,676 (4.7) |
| | CO₂ emissions (energy-based) | | | | | | | | |
| | September restart case (milion t.-C) | 1,075 (-5.5) | | | 1,123 (4.4) | | | 1,109 (-1.2) | 1,129 (1.8) |
| | (100 for FY1990) | 101.5 | | | 106.0 | | | 104.7 | 106.6 |
| | No restart case (milion t.-C) | 1,075 (-5.5) | | | 1,123 (4.4) | | | 1,158 (3.2) | 1,266 (9.3) |
| | (100 for FY1990) | 101.5 | | | 106.0 | | | 109.4 | 119.5 |

Sources: Actual results data prepared from various publications; forecasts by IEEJ

Notes:

1. Figures in parentheses indicate year-to-year percentage changes, except contributions to GDP growth.

2. Contributions to GDP growth may not add up to the total due to minor data deviations.

3. Industrial sector consumption includes non-energy uses.

4. The figure for town gas sales in the second half of FY2010 is an estimate because the results of utilities affected by the earthquake disaster are not available.

Table 2 Economic Impact of Electricity Shortage

| | | Jul.-Sept. 2012 | Whole of FY2012 | |
| --- | --- | --- | --- | --- |
| | | Summer | Autumn recovery | Lingering impact |
| Assumptions | Maximum electricity output (kW) | -12.4% | - | - |
| | Consumption reduction (kWh) | -4.2% | - | - |
| Demand reduction | Electricity demand (kWh) | -4.2% | -1.1% | -2.3% |
| | Industrial | -4.4% | -1.1% | -2.4% |
| | Household | -4.3% | -1.2% | -2.8% |
| | Commercial | -3.9% | -1.1% | -1.6% |
| | Transportation | -1.7% | -0.3% | -0.6% |
| Impact on GDP | Real GDP | -5.6% | -1.6% | -3.6% |
| | Real GDP (T. yen) | (-7.7) | (-9.1) | (-20.2) |
| | Manufacturing industry (IIP) | -8.2% | -2.2% | -4.8% |
| | Services industry (ITA) | -5.9% | -1.6% | -2.2% |
| | Number of jobless (10,000 people) | +4.9 | +9.8 | +19.7 |

**Introduction**

  This report presents forecasts on energy supply and demand in Japan for FY2011 and FY2012. Because energy demand can be positioned as "derivative demand" arising out of economic activities (more fundamental demand), it is important to start by evaluating economic trends. The world economy continues to grow moderately, led by China and other emerging countries. On the other hand, the Japanese economy has experienced a sharp slump in both supply and demand due to the devastating damage inflicted by the Great East Japan Earthquake on stock and flow bases. Energy demand has also turned down because of a decline in economic activity, the order for restriction on the use of electricity and the increased awareness with regard to saving electricity.

  This report is organized as follows: Chapter 1 presents an outlook on economic and production trends through the end of FY2012, based on which we have estimated energy supply and demand. Assuming the economic and production trends outlined in Chapter 1, Chapter 2 presents estimates of energy supply and demand and describes a breakdown of energy supply and demand by energy source (based on industrial statistics) and the domestic primary energy supply and final energy consumption (based on energy balance sheets). Chapter 3 presents estimates of the economic impact of the potential electricity shortage.

**1. OUTLOOK ON KEY ECONOMIC INDICATORS FOR FY2011 AND FY2012**

**1-1 Short-Term Outlook Framework** [Note]

  When estimating energy supply and demand for the given period, we studied the evolutions of various factors that would impact energy supply and demand, while using two econometric models -- a macroeconomic model and an energy supply and demand model.

  Concerning the major economic indicators on which our estimates are based, we made the following assumptions: The world economy will continue to grow, led by China and other emerging countries. The CIF-based price of crude oil imports into Japan is assumed to average $112/barrel in FY2011 and $109/barrel in FY2012 (compared with an average of $84/barrel for FY2010) (The assumptions were made in light of "Prospects for the International Oil and Gas Markets and Challenges for the Immediate Future" by Ken Koyama, July 28, 2011). As for the exchange rate, we assume the dollar to stay around 83 yen. Regarding ambient temperature that affects energy demand, particularly in the consumer sector, we assume the summer and winter averages over the past 10 years for FY2011 and FY2012. Regarding nuclear power generation, we assumed two scenario cases: (1) the "September restart case," in which nuclear power plants that are now out of operation due to regular checkups or for other reasons will be gradually restarted in September and later, and (2) the "no restart case," in which nuclear power plants that are now out of operation due to regular checkups or for other reasons and those which are scheduled to undergo regular checkups will not be restarted[1].

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[1] We estimated the increases in coal, natural gas and oil thermal power generation to be made by electric power utilities to cover an electricity shortage arising from the shutdown of nuclear power plants in light of electric power utilities'

It should be noted that, in principle, our forecasts do not take account of economic, energy and environmental policy measures now being considered by the government, since details such as the scale of those measures and the timing of their implementation have mostly been not fixed.

(Note) The estimates in this report are based on information made available by July 15, 2011.

## 1-2 Outlook on Macroeconomic Conditions and Industrial Activity

In FY2011, despite economic slowdown in the United States and Europe, the world economy is expected to continue growing moderately, led by China and other emerging countries. The U.S. economy is expected to grow slowly as negative factors such as a slowdown in the recovery in employment offset the firmness of personal consumption and exports to emerging countries. The European economy as a whole is also likely to post slow growth, with an increase in exports from Germany to emerging countries expected to be offset by negative factors such as the fiscal problems of countries in the region, such as Greece and Ireland. On the other hand, emerging countries are expected to maintain strong growth. In China, both investment and consumption are strong. Although inflation may lead to an economic slowdown, the Chinese economy is expected to continue growing, driven mainly by fixed asset investments.

In FY2011, Japan's real GDP is projected to grow only 0.2% from the previous year due to the impact of the earthquake disaster. In the first half of FY2011, the Japanese economy is expected to post a negative growth because of a slump in production activity, a weakening of consumer sentiment and a deterioration in the trade balance. In the second half, it is expected to recover strongly as a result of the restoration of damaged production facilities, economic revitalization due to reconstruction measures and an improvement in the trade balance.

Domestic private sector demand is expected to work to boost real GDP by 0.2 percentage point. In the first half of FY2011, private nonresidential investment is likely to grow from a year earlier thanks to investment for reconstruction, and in the second half, it is expected to record a stronger growth as reconstruction demand grows in earnest. Private consumption is expected to decline in the first half due to the weakening of consumer sentiment, and in the second half, it is likely to be slightly lower than a year before despite an improvement in consumer sentiment resulting from an economic recovery. Private residential investment is expected to grow thanks to the rebuilding of destroyed and damaged houses.

Public demand as a whole is projected to account for 0.8 percentage point of the GDP growth. Public capital formation is likely to increase sharply as public investment is expected to expand due to reconstruction policy measures. Government consumption is forecast to grow, as it did in the previous year, because of an increase in social security expenses and support measures

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past records of power plant operations while giving priority to coal, natural gas and oil thermal power in that order. The maximum annual average capacity utilization rate is assumed to be 85% for coal thermal power plants and 70% for LNG thermal power plants, while we assume that oil thermal power plants may be operated with no upper limits on capacity utilization if necessary to cover any supply shortage.

for the people affected by the earthquake disaster.

External demand as a whole is projected to work to boost real GDP by 0.7 percentage point. Although exports are expected to decline in the first half due to the impact of the earthquake disaster and the restriction on the use of electricity, a recovery is expected in the second half because of the restoration of facilities damaged by the disaster and governmental support for reconstruction. Imports are likely to grow sharply in the first half compared with a year before because of demand to offset a slump in domestic production and fuel demand for power generation. However, the growth is expected to slow down in the second half following a recovery in domestic production.

In FY2012, the Japanese economy is expected to get back on the pre-earthquake path of recovery thanks to an increase in exports due to the growth of the world economy and an improvement in consumer sentiment. Real GDP is projected to grow 2.8% from the previous year.

Domestic private sector demand as a whole is projected to account for 1.7 percentage point of the GDP growth. Private consumption is expected to grow due to an improvement in consumer sentiment stemming from economic recovery. Private residential investment is expected to grow, as it did in the previous year, due to continued reconstruction demand.

Public demand as a whole is projected to account for 0.4 percentage point of the GDP growth. As governmental support for reconstruction is expected to continue, public capital formation is projected to grow again in FY2012. Government consumption is projected to grow as a result of continued support for the people affected by the earthquake disaster.

External demand as a whole is expected to work to boost real GDP by 0.6 percentage point. Exports are forecast to increase sharply due to a recovery in domestic production capacity and strong exports to emerging countries. Imports are also likely to increase in line with the economic recovery.


**1-3 Outlook on Production by Industry**

In FY2011, the industrial production index is projected to rise 0.6% from the previous year, as a decline in production in the first half due to the impact of the earthquake disaster is expected to be made up for by an increase in the second half.

In the first half of FY2011, amid sluggish economic activity due to the earthquake disaster, production activity is expected to decline because of the damage done to production facilities, the disruptions of supply chains and the restriction on the use of electricity. In particular, automobile production is expected to decline sharply as the automobile industry is vulnerable to disruptions of supply chains. In the second half, production is expected to recover quickly as a result of the restoration of production facilities and supply chains and the growth of reconstruction demand. In particular, strong reconstruction demand is expected to result in an increase in cement production in a turnaround from the downward trend of recent years. The volume of automobile production is also expected to increase steeply in the second half to make up for a decline in the

first half.

In FY2012, the industrial production index is projected to rise 7.1% from the previous year. Production is expected to rise to the pre-earthquake level or higher on the back of the continued strength of exports to emerging countries, mainly in Asia, and an increase in production activity due to continued reconstruction demand and a recovery in domestic demand. Automobile production is projected to recover and surpass the pre-earthquake level. That is also likely to lead to an increase in production of raw materials such as crude steel and ethylene. Cement production is also projected to keep growing due to continued reconstruction demand.

## 2. OUTLOOK ON ENERGY SUPPLY AND DEMAND IN FY2011 AND FY2012
### 2-1 Outlook on Domestic Primary Energy Supply
### ("September restart" case)

In **FY2011**, domestic primary energy supply in Japan is expected to **drop 3.8% from the previous year** due to a slump in production and economic activity caused by electricity saving required due to a decline in electricity supply capacity. The earthquake disaster and electricity saving have had a significant impact in the first half in particular, reducing production in the automobile industry as well as other industries, which started to recover in the previous year, and weakening private consumption. Although production activity is expected to recover due to the restoration of production facilities and reconstruction demand is likely to grow in the second half, domestic primary energy supply is projected to remain stagnant due to such factors as delays in the recovery in consumer sentiment.

Among energy sources, coal supply is projected to decline 6.4% from the previous year due to a drop in steel production and the damage done to coal thermal power plants. Oil supply for power generation is expected to increase sharply due to a rise in the capacity utilization rate for oil thermal power plants intended to offset declines in the capacity utilization rates for coal thermal and nuclear power plants. Oil supply for private power generation by factories is also expected to increase in response to a decline in electricity supply capacity. However, oil supply in the transportation sector is expected to decline due to a pull-back from the previous year's high level attributable to the extreme heat waves and fuel efficiency improvement, and it is also likely to drop in the industrial sector in the first half due to the impact of the earthquake disaster. Consequently, oil supply in the whole of FY2011 is projected to decrease 1.4% from the previous year. Natural gas supply is forecast to grow 11.0% from the previous year as a result of a rise in the capacity utilization rate for LNG thermal power plants. Hydroelectricity supply is projected to decline 6.6% due to a pull-back from the previous year's high level attributable to the abundant availability of water (water availability in FY2011 is assumed at the average-year level). Nuclear electricity supply is forecast to plunge 29.9% from the previous year because of the shutdown of nuclear power plants due to the impact of the earthquake disaster and the government's request for shutdown. Given all of these factors, while the ratio of thermal power generation is expected to

rise as a result of a decline in the capacity utilization rate for nuclear power plants, energy-based carbon dioxide emissions are projected to drop 1.2% from the previous year due to a decline in energy consumption.

In **FY2012**, domestic primary energy supply is projected to **grow 2.6% from the previous year** as production and economic activity are expected to recover due to post-earthquake reconstruction. Coal supply is projected to increase 8.0% from the previous year due to a recovery in steel production and the restoration of damaged coal thermal power plants. Oil supply is expected to recover mainly in the transportation sector due to an increase in cargo movements following a recovery in production activity. However, oil supply for power generation is expected to decline sharply as a result of the restart of coal thermal and nuclear power plants. In addition, a fuel switch away from oil in the industrial sector is also expected to reduce oil supply. Consequently, overall oil supply is projected to fall 1.1% from the previous year. Natural gas supply is forecast to decline 1.5% despite an increase in supply for use as town gas due to a fuel switch from oil, as supply for power generation is expected to decrease as in the case of oil. Nuclear electricity supply is projected to grow 19.4% due to a rise in the capacity utilization rate following the restart of closed nuclear power plants and the launch of new plants. Given all of these factors, carbon dioxide emissions are projected to increase 1.8% from the previous year due to growth in energy consumption resulting from a recovery in production and economic activity and an increase in coal thermal power generation.

**("No restart" case)**

In **FY2011**, domestic primary energy supply in Japan is expected to **drop 3.8% from the previous year** due to a slump in production and economic activity caused by electricity saving required due to a decline in electricity supply capacity.

Among energy sources, coal supply is projected to decline 5.2% from the previous year due to a drop in steel production and a drop in the capacity utilization rate for coal thermal power generation caused by the damage done to coal thermal power plants. Oil supply is expected to decline in the transportation sector due to a pull-back from the previous year's high level attributable to the extreme heat waves and fuel efficiency improvement, and in the industrial sector, too, oil supply is likely to decline due to the impact of the earthquake in the first half. However, oil supply for power generation is expected to roughly double from the previous year due to a rise in the capacity utilization for oil thermal power plants resulting from declines in the capacity utilization rates for coal thermal and nuclear power plants. Consequently, overall oil supply in the whole of FY2011 is projected to increase 3.2%. Natural gas supply is forecast to grow 19.6% from the previous year as a result of a steep increase in LNG supply for power generation caused by a rise in the capacity utilization rate for LNG thermal power plants resulting from declines in the capacity utilization rates for coal thermal and nuclear power plants. Hydroelectricity supply is projected to decline 6.6% despite the usual level of water availability, due to a pull-back from the

previous year's high level attributable to the abundant availability of water. Nuclear electricity supply is forecast to plunge 61.3% from the previous year as nuclear power plants are expected to remain closed for a long period of time due to the impact of the earthquake disaster. Given all of these factors, energy-based carbon dioxide emissions are projected to rise 3.2% from the previous year despite a slump in production and economic activity, as the consumption of fossil fuels for power generation grows sharply.

In **FY2012**, domestic primary energy supply is projected to **grow 2.7% from the previous year** as production and economic activity is expected to recover due to post-earthquake reconstruction. Coal supply is projected to increase 12.4% from the previous year due to a recovery in steel production and the restoration of damaged coal thermal power plants as well as an increase in coal supply for power generation intended to make up for the shutdown of nuclear power plants. Oil supply is projected to grow 6.9% from the previous year because supply in the transportation sector is expected to recover due to an increase in cargo movements following an upturn in production activity and also because supply for power generation is expected to increase as in the case of coal. Natural gas supply is forecast to increase 7.1% from the previous year because of an increase in supply for use as town gas due to a fuel switch from oil and also because of an increase in supply for power generation as in the case of coal and oil. Nuclear electricity supply is projected to tumble 99.6% from the previous year. Given all of these factors, carbon dioxide emissions are projected to increase 9.3% from the previous year as energy consumption grows due to a recovery in production and economic activity and the consumption of fossil fuels for power generation increases. As for the breakdown of the increase in fossil fuel consumption in FY2012, coal consumption is projected to increase by 8.65 million tons compared with FY2010, oil consumption is forecast to grow by 28.13 million kL, and natural gas consumption is expected to expand by 19.46 million tons (in LNG equivalents). The value of imports is projected to increase by ¥3.6 trillion.

*Our projections do not take account of the effects of the introduction of a global warming prevention tax, a full feed-in tariff system for renewable energy power generation and a domestic emissions trading system.

**2-2 Outlook on Final Energy Consumption**

In **FY2011**, final energy consumption in Japan is projected to decline **3.2% from the previous year**. In the industrial sector, final energy consumption is expected to drop sharply in the first quarter, mainly in the automobile and steel industries, as a result of the disruptions of supply chains caused by the earthquake disaster and the restriction on the use of electricity. Although a recovery is expected in the second half, final energy consumption in the whole of FY2011 is expected to decline 1.8% from the previous year. In the residential sector, final energy consumption in the whole of FY2011 is projected to fall 5.1% from the previous year due to electricity saving required by an electricity shortage and a pullback from the previous year's high level attributable to the extreme heat waves. In the commercial sector, final energy consumption in the whole of FY2011 is forecast to

decline 4.5% due to a pull-back from the previous year's upsurge in air conditioning demand attributable to the extreme heat waves and a decline in service activity caused by the earthquake disaster. In the transportation sector, final energy consumption in the whole of FY2011 is forecast to drop 4.2% from the previous year as a result of a decline in cargo movements due to a slump in economic activity and a pull-back from the previous year's high level attributable to the extreme heat waves.

In **FY2012**, final energy consumption is forecast to grow in all sectors thanks to economic recovery. In the industrial sector, financial energy consumption is projected to increase 3.2% from the previous year given the recovery trend in overall industrial production, particularly in the general machinery and automobile industries. In the residential sector, final energy consumption is projected to rise 1.8% from the previous year as awareness of electricity saving is expected to weaken because of a recovery in electricity supply capacity. In the commercial sector, final energy consumption is forecast to grow 1.3% due to a recovery in service activity. In the transportation sector, final energy consumption is forecast to increase only 1.2%, with an increase in transportation demand due to a recovery in economic activity to be offset by improvements in fuel and transportation efficiency. Given all of these factors, **final energy demand in FY2012** is projected to **grow 2.3% from the previous year**.

**2-3 Outlook on Energy Sales**

**(1) Electricity**

In **FY2011**, electricity sales in Japan (by electric power utilities) are projected to **decline 5.6% from the previous year** due to a slump in production activity caused by the earthquake disaster, the order for the restriction on the use of electricity and requests for electricity saving in the summertime, a decline in electricity sales due to an increase in private power generation by factories and a pull-back from the previous year's high level attributable to the extreme heat waves.

In the residential sector, household electricity demand is projected to plunge 11.0% in the first half of FY2011 from a year earlier due to increased awareness with regard to saving electricity, the diffusion of energy-efficient home appliances due to the eco-point system for electrical home appliances and a pull-back from the previous year's high level attributable to the extreme heat waves. In the second half, household electricity demand is forecast to fall 5.2% from a year earlier due to a warmer winter than in the previous year and continued electricity saving efforts. In the whole of FY2011, household electricity demand is projected to decline 8.0% from the previous year.

In the industrial sector, production activity has slumped as a result of the damage to production facilities and the disruptions of supply chains that were caused by the earthquake disaster. In addition, there are moves to increase the capacity utilization rate for private power generation facilities in order to curb the purchase of electricity following the issuance of the order

for the restriction on the use of electricity and requests for energy saving. In the commercial sector, electricity demand is expected to decline due to stagnant service activity and a pull-back from the previous year's high level attributable to the extreme heat waves. In light of these factors, non-household electricity demand (total electricity sales minus household electricity demand) in the first half of FY2011 is forecast to tumble 8.9% from a year earlier. Electricity demand from large-scale industrial users is projected to plunge 9.4% from a year earlier due to a slump in production caused by the earthquake disaster and an increase in private power generation. In the second half, non-household electricity demand is projected to grow only 0.3% from a year earlier despite a recovery in production activity in the industrial sector, mainly in the automobile industry, and an upturn in service activity in the commercial sector, as an increase in private power generation is expected to reduce electricity sales. Electricity demand from large-scale industrial users in the second half is projected to grow only 1.1%. In the whole of FY2011, non-household electricity demand is forecast to fall 4.5% from the previous year, with demand from large-scale industrial users dropping 4.3%.

In **FY2012**, household electricity demand is projected to grow 3.9% from the previous year as a result of a weakening of awareness with regard to saving electricity following a recovery in electricity supply capacity. Non-household electricity demand is forecast to increase 4.1% from the previous year as production and service activity is expected to continue recovering. Electricity demand from large-scale industrial users is projected to grow 5.6% from the previous year as production, mainly for exports, is expected to recover to the pre-earthquake level. Given all of these factors, **total electricity sales in FY2012 (by electric power utilities)** is forecast to **increase 4.0% from the previous year**.

**(2) Town gas**

Town gas sales in Japan (by gas utilities) in **FY 2011** are projected to **decline 0.3% from the previous** year as a fuel switch from oil and an increase in sales of gas used as fuel for private power generation offsets negative factors such as a slump in economic activity due to the earthquake disaster and a pull-back from the previous year's high level attributable to the lower-than-usual spring temperatures and the extreme summer heat waves. Town gas demand in the residential sector in FY2011 is projected to be up 0.1% from the previous year, with a fuel switch to gas from oil offsetting the impact of the earthquake disaster and the pull-back from the previous year's high level attributable to the lower-than-usual spring temperatures in the first half. As a result of a slump in service activity due to the earthquake disaster and a pull-back from the previous year's upsurge in air conditioning demand attributable to the extreme heat waves, town gas demand in FY2011 is forecast to drop 0.6% in the commercial sector and drop 3.3% in the "other" sector (hospitals, public facilities, etc.), which is vulnerable to the effects of weather conditions. In the industrial sector, despite a sharp fall in production in the first half due to the earthquake disaster, town gas demand in the whole of FY2011 is forecast to remain unchanged compared with the previous year as a result of a fuel switch from oil and

an increase in private power generation.

In **FY2012**, town gas demand in the residential sector is projected to grow 0.6% from the previous year due to a steady increase in contracts and a recovery from the earthquake disaster. In the commercial sector, town gas demand is expected to post a steady increase in FY2012 thanks to a recovery in service activity and sales promotion efforts, with sales in the commercial sector increasing 1.3% from the previous year and sales in the "other" sector growing 1.1% In the industrial sector, town gas demand is projected to expand 5.0% from the previous year on the back of an increase in gas consumption under existing contracts due to growth in production following the recovery from the earthquake disaster and a fuel switch from oil. Given all of these factors, **overall town gas sales in FY2012** are forecast to **grow 2.9% from the previous year**.

**(3) Oil**

In **FY2011**, fuel oil sales are projected to **decline 1.2% from the previous year in the "September restart" case but grow 2.2% in the "no restart" case (only sales of fuel oil C vary case by case)**. Positive factors include an increase in the operation of oil thermal power plants and private power generation facilities resulting from a decrease in the capacity utilization rate for nuclear power plants, while negative factors include a drop in fuel oil demand due to a decline in production caused by the earthquake disaster and a decrease in demand for automobile fuels due to a pull-back from the previous year's high level attributable to the extreme heat waves.

Sales of gasoline, used mainly as automobile fuel, have basically followed a downtrend due to fuel efficiency improvements and shorter travel distances. In addition, a decrease in the use of car air conditioners due to a pull-back from the previous year's high level attributable to the extreme heat waves and the expiry of the special discounts of expressway tolls will also work to reduce gasoline sales. Consequently, gasoline sales in the whole of FY2011 are projected to decline 4.1% from the previous year. Diesel oil sales in FY2011 are forecast to drop 4.3% from the previous year due to a decline in transportation demand caused by the earthquake disaster.

Sales of naphtha, a raw material for petrochemical products, are projected to decline 1.6% in FY2011 from the previous year despite a moderate recovery in the second half, as ethylene production falls because of the earthquake disaster in the first half.

Kerosene sales in FY2011 are projected to decrease 4.0% from the previous year due to a fuel switch from kerosene to electricity and town gas in both consumer and industrial sectors as well as a pull-back from the previous year's high level attributable to the lower-than-usual spring temperatures and the impact of the earthquake disaster.

Sales of fuel oil A in FY2011 are projected to decline 1.5% from the previous year despite an increase in private power generation, as a fuel switch to town gas is proceeding quickly in the industrial and consumer sectors.

Sales of fuel oil C as power generation fuel in FY2011 are expected to jump 30.0% from the previous year in the "September restart" case as a result of an increase in the operation of oil thermal

power plants resulting from a decrease in the operation of nuclear power plants due to the earthquake disaster. In the "no restart" case, sales of fuel oil C in FY2011 are expected to surge 138.1% from the previous year as a result of an additional increase in demand resulting from a decrease in the operation of nuclear power plants. Sales of fuel oil C for other uses (mainly as fuels for industrial activity and ships) in FY2011 are forecast to rise 10.8% from the previous year in both the "September restart" and "no restart" cases thanks to a sharp increase in private power generation.

In **FY2012**, gasoline sales are projected to grow 1.0% from the previous year despite fuel efficiency improvement due to the diffusion of eco-friendly cars and a shift to fuel-efficient minivehicles, which will be offset by a recovery in transportation demand. Diesel oil sales are forecast to increase 1.0% as an improvement in transportation efficiency is offset by a recovery in cargo movements. Naphtha sales are projected to increase 2.9% in line with growth in ethylene production. Kerosene sales are expected to decline 0.6% despite an increase in demand due to economic recovery, as a fuel switch to electricity and town gas is ongoing in both consumer and industrial sectors. Sales of fuel oil A are projected to drop 2.9%, with a recovery in production and transportation activities offset by a fuel switch to town gas. Sales of fuel oil C in FY2012 are projected to drop 38.9% from the previous year in the "September restart" case due to an increase in the operation of nuclear power plants. In the "no restart" case, sales of fuel oil C as power generation fuel are expected to grow 54.4% due to an additional increase in fuel demand resulting from a decrease in the operation of nuclear power plants. Sales of fuel oil C for other uses are projected to drop 1.9% in both cases as a shift to other fuels continues as in the case of fuel oil A. Given all of these factors, **overall fuel oil sales in FY2012** are projected to **decrease 0.8% from the previous year in the "September restart" case but grow 4.7% in the "no restart" case**.

LPG sales in FY2011 are expected to fall 3.2% from the previous year due to the impact of the earthquake disaster. In FY2012, LPG sales are forecast to grow 1.6% from the previous year thanks to an increase in sales for use as industrial fuel and chemical raw materials.

## 3. ESTIMATE OF ECONOMIC IMPACT OF ELECTRICITY SHORTAGE IN SUMMER 2012

### 3-1 Required electricity saving

If closed nuclear power stations are not restarted, all nuclear power stations will be out of operation in May 2012. In that case, an electricity shortage of 7.8% against the maximum electricity demand will arise in the summer of 2012. In light of the need to secure a reserve rate of 5% required for stable electricity supply, electricity saving of 12.4% will become necessary[2]. However, this is a saving rate required for the peak demand hours of a weekday (kW basis). The average required saving rate in July to September (kWh basis) is around 4.2% if the time zones for which electricity saving is required are taken into consideration.

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[2] "Analysis of Electricity Supply and Demand through FY2012 in the Case of Presence or Absence of Restart of Nuclear Power Generation," Institute of Energy Economics, Japan (June 13, 2011)

**3-2 Economic Impact**

We estimated how much economic activity will be affected by the required electricity saving as indicated above based on a macroeconomic model and an energy supply-demand model. The economic impact in the summer season (July-September) of 2012, when an electricity shortage will arise, is estimated to be equivalent to a decline of 5.6% in real GDP (on a quarterly basis; a decline of 7.7 trillion yen in the value of GDP) compared with the case of the absence of such electricity shortage. The activity of manufacturing industries (as measured by the industrial production index) is projected to show a substantial drop of 8.2%, with machinery-related manufacturing industries, which consume a large amount of electricity, hit particularly hard. The number of unemployed people is expected to increase by 50,000 people.

For autumn and later, when the electricity shortage will be resolved, we assumed two scenarios cases. The "autumn recovery" case assumes that in the autumn season (October-December) and later, economic activity will recover sufficiently to increase electricity consumption to the normal level. In this case, the economic impact of the electricity shortage is estimated to be equivalent to a decline of 1.6% in annual GDP (a decline of ¥9.1 trillion in the value of GDP). In the "lingering impact" case, which assumes that a slump in economic activity in the summer season will have a lingering impact, the economic impact is estimated to be equivalent to a decline of 3.6% in annual GDP (a decline of ¥20.2 trillion in the value of GDP), greater than the impact in the "autumn recovery" case. As the impact on employment tends to appear with a time lag, the number of unemployed people is expected to increase gradually, rising to 200,000 by the end of FY2012.

**3-3 Impact on Industries**

The economic impact will vary significantly from industry to industry. The estimate of the impact of the electricity shortage based on the Input-Output Table for 2005 shows that machinery-related industries, whose export ratios are high, will be affected most. Raw materials-related industries (e.g., chemicals, steel and nonferrous metals), which consume a large amount of electricity during the production process, will also be considerably affected.

**3-4 Impact on Prices**

If all nuclear power stations are kept out of operation and thermal power generation is used as an alternative source of electricity supply to cover the ensuing shortfall, the value of imported fossil fuels used for power generation will increase by 3.6 trillion yen. If the cost increase is fully passed on to electricity rates, it will translate into a rise of 3.9 yen per 1kWh of electricity. That figure is equivalent to 38% of the rate of electricity for industrial use (special high-voltage electricity) in FY2010 (special high-voltage electricity) and 22% of the rate of electricity for service industries. If the additional cost is passed on to the prices of goods and

services manufactured and provided by industries, consumer prices are projected to rise 0.91% (based on the Input-Output Table for 2005). Prices of goods provided by manufacturing industries are projected to rise an average of 1.76%, while export prices are expected to increase 1.53%, raising concern over a possible decline in Japanese industries' international competitiveness.

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Table 1  Overview

| | | FY2009 (Actual) | FY2010 (Actual) 1st half | FY2010 (Actual) 2nd half | FY2010 (Actual) Total | FY2011 (Forecast) 1st half | FY2011 (Forecast) 2nd half | FY2011 (Forecast) Total | FY2012 (Forecast) |
|---|---|---|---|---|---|---|---|---|---|
| Key economic indicators | GDP (Chained to year 2000, in billions of yen) | 526,442 (-2.4) | 266,853 (4.1) | 271,605 (0.6) | 538,458 (2.3) | 263,303 (-1.3) | 276,323 (1.7) | 539,626 (0.2) | 554,478 (2.8) |
| | Private demand | 382,853 [-3.8] | 194,545 | 196,230 | 390,774 [1.4] | 192,732 | 198,143 | 390,874 [0.2] | 399,243 [1.7] |
| | Public demand | 121,901 [1.1] | 59,243 | 62,870 | 122,113 [-0.0] | 59,957 | 65,654 | 125,611 [0.8] | 127,722 [0.4] |
| | External demand | 20,115 [0.3] | 13,467 | 13,229 | 26,696 [0.9] | 10,756 | 13,137 | 23,893 [-0.7] | 28,265 [0.6] |
| | Index of industrial production (Year 2005 = 100) | 86.1 (-8.8) | 94.6 (17.4) | 93.1 (1.7) | 93.9 (9.1) | 90.0 (-4.8) | 98.8 (6.1) | 94.4 (0.6) | 101.1 (7.1) |
| | Exchange rate (Yen/US$) | 92.8 (-7.6) | 88.9 (-6.8) | 82.5 (-8.6) | 85.7 (-7.7) | 83.0 (-6.7) | 83.0 (0.7) | 83.0 (-3.1) | 83.0 (0.0) |
| | Crude oil CIF price (US$/Bbl) | 69.1 (-23.2) | 79.0 (27.9) | 89.7 (17.5) | 84.4 (22.1) | 110.6 (39.9) | 112.5 (25.4) | 111.5 (32.2) | 108.8 (-2.4) |
| | Heating degree-days | 955 (6.2) | 78 (124.1) | 1,001 (8.8) | 1,079 (13.0) | 46 (-40.8) | 933 (-6.7) | 980 (-9.2) | 980 (-0.0) |
| | Cooling degree-days | 329 (-17.5) | 559 (70.2) | 0 (-75.0) | 559 (70.0) | 418 (-25.2) | 1 (1170.0) | 419 (-25.0) | 419 (0.0) |
| Key energy indicators | Primary energy supply September restart case (10^10kcal = KTOE) | 489,999 (-4.2) | 246,740 (6.8) | 262,093 (1.2) | 508,833 (3.8) | 229,988 (-6.8) | 259,527 (-1.0) | 489,515 (-3.8) | 502,435 (2.6) |
| | No restart case (10^10kcal = KTOE) | 489,999 (-4.2) | 246,740 (6.8) | 262,093 (1.2) | 508,833 (3.8) | 229,989 (-6.8) | 259,691 (-0.9) | 489,680 (-3.8) | 502,986 (2.7) |
| | Final energy consumption (10^10kcal = KTOE) | 329,423 (-2.8) | 162,016 (5.8) | 176,598 (0.2) | 338,613 (2.8) | 152,115 (-6.1) | 175,560 (-0.6) | 327,675 (-3.2) | 335,074 (2.3) |
| | Industrial sector | 154,852 (-3.5) | 77,579 (6.7) | 82,351 (0.2) | 159,930 (3.3) | 73,936 (-4.7) | 83,127 (0.9) | 157,063 (-1.8) | 162,022 (3.2) |
| | Consumer sector | 92,122 (-2.2) | 41,918 (6.3) | 53,226 (1.0) | 95,144 (3.3) | 38,605 (-7.9) | 51,962 (-2.4) | 90,567 (-4.8) | 92,025 (1.6) |
| | Transportation sector | 82,449 (-2.1) | 42,518 (3.5) | 41,021 (-0.8) | 83,539 (1.3) | 39,575 (-6.9) | 40,471 (-1.3) | 80,046 (-4.2) | 81,028 (1.2) |
| | Electricity sales (billion kWh) | 889.4 (-3.4) | 476.0 (9.1) | 466.1 (2.9) | 942.1 (5.9) | 430.4 (-9.6) | 458.8 (-1.6) | 889.2 (-5.6) | 924.7 (4.0) |
| | Town gas sales (million m³/10,000kcal) | 33,837 (-1.9) | 16,574 (8.3) | 18,789 (1.4) | 35,363 (4.5) | 16,171 (-2.4) | 19,073 (1.5) | 35,244 (-0.3) | 36,283 (2.9) |
| | Fuel oil sales September restart case (1,000kl) | 195,122 (-3.0) | 92,031 (2.4) | 103,917 (-1.3) | 195,948 (0.4) | 89,573 (-2.7) | 103,956 (0.0) | 193,528 (-1.2) | 191,906 (-0.8) |
| | No restart case (1,000kl) | 195,122 (-3.0) | 92,031 (2.4) | 103,917 (-1.3) | 195,948 (0.4) | 89,624 (-2.6) | 110,570 (6.4) | 200,194 (2.2) | 209,676 (4.7) |
| | CO₂ emissions (energy-based) September restart case (milion t.-C) | 1,075 (-5.5) | | | 1,123 (4.4) | | | 1,109 (-1.2) | 1,129 (1.8) |
| | (100 for FY1990) | 101.5 | | | 106.0 | | | 104.7 | 106.6 |
| | No restart case (milion t.-C) | 1,075 (-5.5) | | | 1,123 (4.4) | | | 1,158 (3.2) | 1,266 (9.3) |
| | (100 for FY1990) | 101.5 | | | 106.0 | | | 109.4 | 119.5 |

Sources: Actual results data prepared from various publications; forecasts by IEEJ

Notes:

1. Figures in parentheses indicate year-to-year percentage changes, except contributions to GDP growth.

2. Contributions to GDP growth may not add up to the total due to minor data deviations.

3. Industrial sector consumption includes non-energy uses.

4. The figure for town gas sales in the second half of FY2010 is an estimate because the results of utilities affected by the earthquake disaster are not available.

Table 2 Macroeconomic Outlook

| | FY2009 (Actual) | FY2010 (Actual) | | | FY2011 (Forecast) | | | FY2012 (Forecast) |
|---|---|---|---|---|---|---|---|---|
| | | 1H | 2H | Total | 1H | 2H | Total | |
| Real GDP (Chained to Year 2000, in billion yen) | 526,442 (-2.4) | 266,853 (4.1) | 271,605 (0.6) | 538,458 (2.3) | 263,303 (-1.3) | 276,323 (1.7) | 539,626 (0.2) | 554,478 (2.8) |
| Private demand | 382,853 (-4.9) | 194,545 (3.0) | 196,230 (1.2) | 390,774 (2.1) | 192,732 (-0.9) | 198,143 (1.0) | 390,874 (0.0) | 399,243 (2.1) |
| Private consumption | 303,884 (-0.0) | 152,813 (1.9) | 153,651 (-0.2) | 306,464 (0.8) | 150,326 (-1.6) | 153,566 (-0.1) | 303,892 (-0.8) | 306,307 (0.8) |
| Private residential investment | 12,553 (-18.2) | 6,051 (-6.0) | 6,472 (5.8) | 12,524 (-0.2) | 6,254 (3.4) | 6,591 (1.8) | 12,845 (2.6) | 13,425 (4.5) |
| Private nonresidential investment | 70,604 (-13.6) | 35,348 (5.0) | 38,284 (3.7) | 73,632 (4.3) | 35,878 (1.5) | 39,643 (3.5) | 75,520 (2.6) | 79,113 (4.8) |
| Public demand | 121,901 (5.1) | 59,243 (1.4) | 62,870 (-0.9) | 122,113 (0.2) | 59,957 (1.2) | 65,654 (4.4) | 125,611 (2.9) | 127,722 (1.7) |
| Government consumption | 100,664 (3.5) | 50,796 (2.4) | 52,164 (2.2) | 102,960 (2.3) | 51,660 (1.7) | 53,339 (2.3) | 104,999 (2.0) | 105,977 (0.9) |
| Public investment | 21,031 (14.2) | 8,368 (-4.7) | 10,565 (-13.8) | 18,933 (-10.0) | 8,231 (-1.6) | 12,238 (15.8) | 20,469 (8.1) | 21,601 (5.5) |
| Net exports of goods & services | 20,115 (-5.7) | 13,467 (64.2) | 13,229 (11.1) | 26,696 (32.7) | 10,756 (-20.1) | 13,137 (-0.7) | 23,893 (-10.5) | 28,265 (18.3) |
| Exports of goods & services | 72,703 (-9.6) | 42,160 (25.4) | 42,916 (9.8) | 85,076 (17.0) | 41,520 (-1.5) | 44,062 (2.7) | 85,581 (0.6) | 92,807 (8.4) |
| Imports of goods & services | 52,589 (-11.0) | 28,692 (12.9) | 29,687 (9.2) | 58,380 (11.0) | 30,764 (7.2) | 30,924 (4.2) | 61,688 (5.7) | 64,543 (4.6) |
| Nominal GDP (billion yen) | 474,032 (-3.7) | 236,637 (2.0) | 239,099 (-1.2) | 475,737 (0.4) | 229,959 (-2.8) | 241,491 (1.0) | 471,450 (-0.9) | 482,488 (2.3) |
| Industrial production index (100 for 2005) | 86.1 (-8.8) | 94.6 (17.4) | 93.1 (1.7) | 93.9 (9.1) | 90.0 (-4.8) | 98.8 (6.1) | 94.4 (0.6) | 101.1 (7.1) |
| Tertiary industry activity index (100 for 2005) | 96.7 (-3.4) | 97.5 (1.6) | 98.2 (0.8) | 97.8 (1.2) | 96.4 (-1.1) | 99.1 (1.0) | 97.8 (-0.0) | 99.3 (1.6) |
| Domestic corporate goods price index (100 for 2005) | 102.6 (-5.2) | 102.9 (0.0) | 103.7 (1.3) | 103.3 (0.7) | 104.9 (1.9) | 105.8 (2.1) | 105.3 (2.0) | 106.9 (1.4) |
| Consumer price index (100 for 2005) | 100.0 (-1.6) | 99.6 (-0.9) | 99.7 (0.0) | 99.6 (-0.4) | 99.7 (0.1) | 99.8 (0.1) | 99.7 (0.1) | 100.0 (0.3) |
| Exchange rate (Yen/US$) | 92.8 (-7.6) | 88.9 (-6.8) | 82.5 (-8.6) | 85.7 (-7.7) | 83.0 (-6.7) | 83.0 (0.7) | 83.0 (-3.1) | 83.0 (0.0) |
| Crude oil CIF price (US$/Bbl) | 69.1 (-23.2) | 79.0 (27.9) | 89.7 (17.5) | 84.4 (22.1) | 110.6 (39.9) | 112.5 (25.4) | 111.5 (32.2) | 108.8 (-2.4) |

Sources: Actual results data prepared from various publications, forecasts by IEEJ

Notes: 1. Bracketed figures indicate year-to-year percentage changes.

2. GDP components may not add up to the total GDP due to minor data deviations.

## Table 3 Outlook on Industrial Activities

| | | FY2009 (Actual) | FY2010 (Actual) | | | FY2011 (Forecast) | | | FY2012 (Forecast) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1H | 2H | Total | 1H | 2H | Total | |
| Production (1,000 tons) | Crude steel | **96,449** (-8.6) | **55,424** (27.9) | **55,369** (4.2) | **110,792** (14.9) | **51,654** (-6.8) | **55,633** (0.5) | **107,287** (-3.2) | **112,490** (4.8) |
| | Ethylene | **7,219** (10.7) | **3,327** (-5.3) | **3,671** (-0.9) | **6,999** (-3.0) | **3,223** (-3.1) | **3,694** (0.6) | **6,917** (-1.2) | **7,184** (3.8) |
| | Cement | **58,378** (-11.4) | **27,194** (-5.4) | **28,857** (-2.6) | **56,051** (-4.0) | **26,526** (-2.5) | **29,598** (2.6) | **56,125** (0.1) | **58,011** (3.4) |
| | Paper/paperboard | **26,892** (-6.8) | **13,754** (3.2) | **13,587** (0.2) | **27,341** (1.7) | **13,337** (-3.0) | **13,656** (0.5) | **26,993** (-1.3) | **27,465** (1.8) |
| | Automobiles (1,000 unit) | **8,865** (-11.4) | **4,787** (24.1) | **4,207** (-16.0) | **8,994** (1.5) | **3,600** (-24.8) | **5,494** (30.6) | **9,094** (1.1) | **9,468** (4.1) |
| Industrial production index (100 for 2005) | Foods | **102.5** (1.8) | **107.5** (1.1) | **95.9** (-2.9) | **101.7** (-0.8) | **104.2** (-3.0) | **97.5** (1.7) | **100.9** (-0.8) | **102.7** (1.8) |
| | Textiles (excl. chemical fibers) | **66.8** (-14.4) | **66.4** (-0.5) | **67.7** (1.2) | **67.1** (0.3) | **60.7** (-8.7) | **68.0** (0.4) | **64.3** (-4.1) | **68.2** (6.1) |
| | Iron & steel | **81.0** (-11.1) | **94.4** (32.0) | **94.1** (4.0) | **94.2** (16.4) | **88.7** (-6.0) | **96.0** (2.1) | **92.4** (-2.0) | **99.7** (7.9) |
| | Chemicals (incl. chemical fibers) | **97.8** (2.9) | **98.0** (3.2) | **100.2** (-0.4) | **99.1** (1.3) | **96.8** (-1.2) | **103.8** (3.6) | **100.3** (1.2) | **106.3** (6.0) |
| | Ceramics, stone and clay products | **80.1** (-11.3) | **84.3** (11.1) | **86.9** (3.0) | **85.6** (6.8) | **84.3** (0.1) | **91.1** (4.9) | **87.7** (2.6) | **93.1** (6.2) |
| | Paper/pulp | **87.7** (-6.8) | **89.4** (2.8) | **88.5** (0.1) | **88.9** (1.4) | **86.9** (-2.8) | **89.0** (0.6) | **88.0** (-1.1) | **90.6** (3.0) |
| | Nonferrous metals | **84.0** (-5.3) | **89.9** (14.5) | **88.8** (-0.7) | **89.3** (6.4) | **83.1** (-7.5) | **96.8** (9.0) | **89.9** (0.7) | **98.8** (9.8) |
| | Transportation machinery | **84.3** (-11.0) | **94.0** (28.3) | **86.1** (-9.8) | **90.0** (6.7) | **77.0** (-18.1) | **107.0** (24.3) | **92.0** (2.2) | **98.5** (7.1) |
| | Electrical machinery and others | **82.5** (-13.0) | **95.9** (25.8) | **96.8** (9.0) | **96.3** (16.7) | **94.2** (-1.7) | **97.9** (1.1) | **96.0** (-0.3) | **102.5** (6.8) |
| | Industrial production total | **86.1** (-8.8) | **94.6** (17.4) | **93.1** (1.7) | **93.9** (9.1) | **90.0** (-4.8) | **98.8** (6.1) | **94.4** (0.6) | **101.1** (7.1) |

Sources: Actual results data prepared from various publications, forecasts by IEEJ

Notes:

1. Bracketed figures indicate year-to-year percentage changes.

2. "General and electrical machinery" covers general machinery, electrical machinery, information and telecommunications equipment, electronic parts and devices, precision machinery and metal products.

## Table 4 Outlook on Electricity Demand (Electric power utilities, by use)

| | | FY2009 (Actual) | FY2010 (Actual) | | | FY2011 (Forecast) | | | FY2012 (Forecast) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1H | 2H | Total | 1H | 2H | Total | |
| Electricity demand (billion kWh) | Household demand | **285.0** (-0.1) | **146.2** (10.2) | **158.1** (3.7) | **304.2** (6.8) | **130.0** (-11.0) | **149.9** (-5.2) | **279.9** (-8.0) | **290.8** (3.9) |
| | Industrial demand (incl. specified scale demand) | **604.4** (-4.9) | **329.8** (8.6) | **308.0** (2.4) | **637.9** (5.5) | **300.3** (-8.9) | **308.9** (0.3) | **609.2** (-4.5) | **633.9** (4.1) |
| | Total (incl. specified scale demand) | **889.4** (-3.4) | **476.0** (9.1) | **466.1** (2.9) | **942.1** (5.9) | **430.4** (-9.6) | **458.8** (-1.6) | **889.2** (-5.6) | **924.7** (4.0) |
| | (Regrouped) Large-scale industrial users | **280.9** (-6.3) | **153.9** (11.4) | **146.3** (2.5) | **300.2** (6.9) | **139.4** (-9.4) | **147.9** (1.1) | **287.3** (-4.3) | **303.4** (5.6) |
| | Chemicals | **26.7** (-10.9) | **14.2** (10.0) | **13.9** (0.7) | **28.1** (5.2) | **12.2** (-13.8) | **13.5** (-2.9) | **25.7** (-8.4) | **28.3** (9.9) |
| | Iron & steel | **46.3** (-9.7) | **26.5** (22.9) | **26.8** (8.5) | **53.3** (15.2) | **23.7** (-10.5) | **26.3** (-1.9) | **50.0** (-6.2) | **53.3** (6.6) |
| | Machinery | **69.5** (-8.8) | **38.7** (13.6) | **35.8** (1.2) | **74.6** (7.3) | **35.0** (-9.6) | **38.1** (6.3) | **73.1** (-1.9) | **76.7** (5.0) |
| | Total | **232.1** (-7.5) | **128.5** (13.4) | **122.9** (3.4) | **251.3** (8.3) | **116.3** (-9.5) | **124.7** (1.5) | **241.0** (-4.1) | **255.5** (6.0) |

Sources: Actual results data prepared from METI's "Monthly Electricity Survey and Statistics," forecasts by IEEJ

Notes:

1. Bracketed figures indicate year-to-year percentage changes.

2. The data include specified supplies by electric power utilities and exclude captive consumption. But captive consumption at Tobata Co-operative Thermal Power Company, Inc. and Oita Co-operative Thermal Power Company, Inc. is treated as specified supplies.

3. We estimated demand in and after FY2010 in accordance with the categorization before an institutional change to secure the continuity of the statistics.

## Table 5 Outlook on Town Gas Sales (by gas utilities)

| | | FY2009 (Actual) | FY2010 (Actual) | | | FY2011 (Forecast) | | | FY2012 (Forecast) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1H | 2H | Total | 1H | 2H | Total | |
| Town gas sales (million m³) | Household | **9,629** (-0.2) | **3,806** (3.0) | **5,993** (1.0) | **9,799** (1.8) | **3,765** (-1.1) | **6,043** (0.8) | **9,808** (0.1) | **9,868** (0.6) |
| | Commercial | **4,616** (-3.0) | **2,480** (5.0) | **2,285** (1.4) | **4,766** (3.2) | **2,463** (-0.7) | **2,275** (-0.5) | **4,738** (-0.6) | **4,798** (1.3) |
| | Industrial | **16,707** (-3.1) | **8,733** (11.0) | **8,911** (0.8) | **17,643** (5.6) | **8,483** (-2.9) | **9,167** (2.9) | **17,650** (0.0) | **18,533** (5.0) |
| | Others | **2,886** (1.2) | **1,555** (13.2) | **1,600** (5.8) | **3,154** (9.3) | **1,460** (-6.1) | **1,589** (-0.7) | **3,049** (-3.3) | **3,083** (1.1) |
| | Total | **33,837** (-1.9) | **16,574** (8.3) | **18,789** (1.4) | **35,363** (4.5) | **16,171** (-2.4) | **19,073** (1.5) | **35,244** (-0.3) | **36,283** (2.9) |

Sources: Actual results data prepared from METI's "Monthly Gas Industry Statistics," forecast by IEEJ

Notes:

1. Bracketed figures indicate year-to-year percentage changes.

2. Converted at 2. 1m3＝41.8605MJ (10,000kcal)

3. The figures for the second half of FY2010 are estimates because the results of utilities affected by the earthquake disaster are not available.

Table 6 Outlook on Fuel Oil Sales

(September restart case)

| | | FY2009 (Actual) | FY2010 (Actual) | | | FY2011 (Forecast) | | | FY2012 (Forecast) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1H | 2H | Total | 1H | 2H | Total | |
| Fuel oil sales (1,000 kl) | Gasoline | 57,597 (0.2) | 29,841 (2.5) | 28,356 (-0.5) | 58,197 (1.0) | 27,796 (-6.9) | 28,012 (-1.2) | 55,808 (-4.1) | 56,357 (1.0) |
| | Naphtha | 47,320 (10.4) | 22,138 (-0.7) | 24,529 (-2.0) | 46,668 (-1.4) | 21,332 (-3.6) | 24,597 (0.3) | 45,929 (-1.6) | 47,272 (2.9) |
| | Jet fuel | 5,283 (-6.9) | 2,778 (7.4) | 2,376 (-11.9) | 5,154 (-2.4) | 2,644 (-4.8) | 2,611 (9.9) | 5,255 (2.0) | 5,326 (1.4) |
| | Kerosene | 20,057 (-1.0) | 5,494 (10.7) | 14,838 (-1.7) | 20,332 (1.4) | 5,018 (-8.7) | 14,495 (-2.3) | 19,512 (-4.0) | 19,388 (-0.6) |
| | Diesel oil | 32,388 (-4.0) | 16,253 (4.0) | 16,611 (-0.9) | 32,864 (1.5) | 15,180 (-6.6) | 16,285 (-2.0) | 31,465 (-4.3) | 31,795 (1.0) |
| | Fuel oil A | 16,043 (-10.3) | 6,712 (-3.3) | 8,693 (-4.5) | 15,404 (-4.0) | 6,661 (-0.8) | 8,518 (-2.0) | 15,179 (-1.5) | 14,737 (-2.9) |
| | Fuel oil B/C | 16,434 (-29.0) | 8,816 (5.5) | 8,515 (5.4) | 17,330 (5.5) | 10,942 (24.1) | 9,439 (10.9) | 20,381 (17.6) | 17,030 (-16.4) |
| | For power generation | 7,211 (-43.8) | 3,252 (-17.9) | 2,912 (-10.5) | 6,164 (-14.5) | 4,472 (37.5) | 3,539 (21.5) | 8,011 (30.0) | 4,891 (-38.9) |
| | For other uses | 9,223 (-10.8) | 5,564 (26.6) | 5,603 (16.1) | 11,166 (21.1) | 6,470 (16.3) | 5,900 (5.3) | 12,370 (10.8) | 12,138 (-1.9) |
| | Total | 195,122 (-3.0) | 92,031 (2.4) | 103,917 (-1.3) | 195,948 (0.4) | 89,573 (-2.7) | 103,956 (0.0) | 193,528 (-1.2) | 191,906 (-0.8) |
| LPG sales (1,000 tons) | | 16,419 (-5.5) | 7,616 (-1.0) | 8,830 (1.2) | 16,446 (0.2) | 7,227 (-5.1) | 8,697 (-1.5) | 15,923 (-3.2) | 16,184 (1.6) |

(No restart case)

| | | FY2009 (Actual) | FY2010 (Actual) | | | FY2011 (Forecast) | | | FY2012 (Forecast) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1H | 2H | Total | 1H | 2H | Total | |
| Fuel oil sales (1,000 kl) | Fuel oil B/C | 16,434 (-29.0) | 8,816 (5.5) | 8,515 (5.4) | 17,330 (5.5) | 10,994 (24.7) | 16,052 (88.5) | 27,046 (56.1) | 34,796 (28.7) |
| | For power generation | 7,211 (-43.8) | 3,252 (-17.9) | 2,912 (-10.5) | 6,164 (-14.5) | 4,524 (39.1) | 10,154 (248.7) | 14,677 (138.1) | 22,661 (54.4) |
| | For other uses | 9,223 (-10.8) | 5,564 (26.6) | 5,603 (16.1) | 11,166 (21.1) | 6,470 (16.3) | 5,900 (5.3) | 12,370 (10.8) | 12,138 (-1.9) |
| | Total | 195,122 (-3.0) | 92,031 (2.4) | 103,917 (-1.3) | 195,948 (0.4) | 89,624 (-2.6) | 110,570 (6.4) | 200,194 (2.2) | 209,676 (4.7) |

Sources: Actual results data prepared from METI, "Monthly Resources and Energy Statistics" Petroleum Association of Japan, "Monthly Oil Statistics," and Japan LP Gas Association, "LP Gas Receipt and Delivery Monthly Report;" forecast by IEEJ

Note: Bracketed figures indicate year-to-year percentage changes.

Table 7 Outlook on Domestic Primary Energy Supply

(September restart case)

| | | FY2009 (Actual) | FY2010 (Actual) | | | FY2011 (Forecast) | | | FY2012 (Forecast) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1H | 2H | Total | 1H | 2H | Total | |
| Domestic primary energy supply (10^10kcal) | Coal | 107,593 (-8.1) | 56,985 (13.2) | 59,854 (4.6) | 116,839 (8.6) | 52,294 (-8.2) | 57,092 (-4.6) | 109,387 (-6.4) | 118,085 (8.0) |
| | Oil | 209,630 (-6.2) | 99,127 (1.9) | 112,130 (-0.2) | 211,257 (0.8) | 96,882 (-2.3) | 111,339 (-0.7) | 208,221 (-1.4) | 205,848 (-1.1) |
| | Natural gas | 90,259 (-2.6) | 45,352 (7.3) | 49,212 (2.6) | 94,564 (4.8) | 49,479 (9.1) | 55,496 (12.8) | 104,975 (11.0) | 103,404 (-1.5) |
| | Hydroelectricity | 16,961 (1.0) | 11,472 (18.9) | 7,042 (-3.7) | 18,514 (9.2) | 10,516 (-8.3) | 6,774 (-3.8) | 17,290 (-6.6) | 17,101 (-1.1) |
| | Nuclear | 58,876 (8.4) | 30,253 (7.2) | 30,423 (-0.7) | 60,676 (3.1) | 17,222 (-43.1) | 25,318 (-16.8) | 42,540 (-29.9) | 50,780 (19.4) |
| | Others | 6,680 (-5.0) | 3,551 (11.4) | 3,431 (-1.7) | 6,983 (4.5) | 3,595 (1.2) | 3,508 (2.2) | 7,103 (1.7) | 7,217 (1.6) |
| | Total | 489,999 (-4.2) | 246,740 (6.8) | 262,093 (1.2) | 508,833 (3.8) | 229,988 (-6.8) | 259,527 (-1.0) | 489,515 (-3.8) | 502,435 (2.6) |
| Real GDP (Chained to Year 2000, in billion yen) | | 526,442 (-2.4) | 266,853 (4.1) | 271,605 (0.6) | 538,458 (2.3) | 263,303 (-1.3) | 276,323 (1.7) | 539,626 (0.2) | 554,478 (2.8) |
| Energy intensity (primary energy supply/GDP) (100 for FY2000) | | 88.0 (-1.8) | | | 89.3 (1.5) | | | 85.7 (-4.0) | 85.6 (-0.1) |
| $CO_2$ emissions (energy-based) (milion t.-C) | | 1,075 (-5.5) | | | 1,123 (4.4) | | | 1,109 (-1.2) | 1,129 (1.8) |
| (100 for FY1990) | | 101.5 | | | 106.0 | | | 104.7 | 106.6 |

(No restart case)

| | | FY2009 (Actual) | FY2010 (Actual) | | | FY2011 (Forecast) | | | FY2012 (Forecast) |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1H | 2H | Total | 1H | 2H | Total | |
| Domestic primary energy supply (10^10kcal) | Coal | 107,593 (-8.1) | 56,985 (13.2) | 59,854 (4.6) | 116,839 (8.6) | 52,461 (-7.9) | 58,328 (-2.5) | 110,789 (-5.2) | 124,487 (12.4) |
| | Oil | 209,630 (-6.2) | 99,127 (1.9) | 112,130 (-0.2) | 211,257 (0.8) | 96,953 (-2.2) | 121,002 (7.9) | 217,955 (3.2) | 233,061 (6.9) |
| | Natural gas | 90,259 (-2.6) | 45,352 (7.3) | 49,212 (2.6) | 94,564 (4.8) | 50,011 (10.3) | 63,044 (28.1) | 113,055 (19.6) | 121,037 (7.1) |
| | Hydroelectricity | 16,961 (1.0) | 11,472 (18.9) | 7,042 (-3.7) | 18,514 (9.2) | 10,516 (-8.3) | 6,774 (-3.8) | 17,290 (-6.6) | 17,101 (-1.1) |
| | Nuclear | 58,876 (8.4) | 30,253 (7.2) | 30,423 (-0.7) | 60,676 (3.1) | 16,453 (-45.6) | 7,036 (-76.9) | 23,489 (-61.3) | 83 (-99.6) |
| | Others | 6,680 (-5.0) | 3,551 (11.4) | 3,431 (-1.7) | 6,983 (4.5) | 3,595 (1.2) | 3,508 (2.2) | 7,103 (1.7) | 7,217 (1.6) |
| | Total | 489,999 (-4.2) | 246,740 (6.8) | 262,093 (1.2) | 508,833 (3.8) | 229,989 (-6.8) | 259,691 (-0.9) | 489,680 (-3.8) | 502,986 (2.7) |
| Real GDP (Chained to Year 2000, in billion yen) | | 526,442 (-2.4) | 266,853 (4.1) | 271,605 (0.6) | 538,458 (2.3) | 263,303 (-1.3) | 276,323 (1.7) | 539,626 (0.2) | 554,478 (2.8) |
| Energy intensity (primary energy supply/GDP) (100 for FY2000) | | 88.0 (-1.8) | | | 89.3 (1.5) | | | 85.8 (-4.0) | 85.7 (-0.0) |
| $CO_2$ emissions (energy-based) (milion t.-C) | | 1,075 (-5.5) | | | 1,123 (4.4) | | | 1,158 (3.2) | 1,266 (9.3) |
| (100 for FY1990) | | 101.5 | | | 106.0 | | | 109.4 | 119.5 |

Sources: Actual results data prepared from IEEJ and Department of the Environment databases, and Cabinet Office's "Preliminary National Income Statistics;" Forecasts by IEEJ

Note: 1. Bracketed figures indicate year-to-year percentage changes.

2. "Others" include geothermal energy, new energies, etc.

Table 8 Outlook on Final Energy Consumption

| | | FY2009 (Actual) | FY2010 (Actual) 1H | FY2010 (Actual) 2H | FY2010 (Actual) Total | FY2011 (Forecast) 1H | FY2011 (Forecast) 2H | FY2011 (Forecast) Total | FY2012 (Forecast) |
|---|---|---|---|---|---|---|---|---|---|
| By sector (10^10kcal) | Industry | 154,852 (-3.5) | 77,579 (6.7) | 82,351 (0.2) | 159,930 (3.3) | 73,936 (-4.7) | 83,127 (0.9) | 157,063 (-1.8) | 162,022 (3.2) |
| | Consumer | 92,122 (-2.2) | 41,918 (6.3) | 53,226 (1.0) | 95,144 (3.3) | 38,605 (-7.9) | 51,962 (-2.4) | 90,567 (-4.8) | 92,025 (1.6) |
| | Residential | 51,623 (-0.5) | 21,287 (7.9) | 32,376 (1.5) | 53,663 (4.0) | 19,519 (-8.3) | 31,425 (-2.9) | 50,944 (-5.1) | 51,869 (1.8) |
| | Commercial | 40,499 (-4.3) | 20,632 (4.8) | 20,850 (0.2) | 41,481 (2.4) | 19,086 (-7.5) | 20,537 (-1.5) | 39,623 (-4.5) | 40,155 (1.3) |
| | Transportation | 82,449 (-2.1) | 42,518 (3.5) | 41,021 (-0.8) | 83,539 (1.3) | 39,575 (-6.9) | 40,471 (-1.3) | 80,046 (-4.2) | 81,028 (1.2) |
| By energy source (10^10kcal) | Coal, etc. | 34,443 (-4.4) | 18,276 (14.5) | 18,628 (0.8) | 36,904 (7.1) | 17,479 (-4.4) | 18,811 (1.0) | 36,290 (-1.7) | 37,932 (4.5) |
| | Oil | 175,702 (-2.4) | 81,844 (2.0) | 94,443 (-1.1) | 176,287 (0.3) | 77,083 (-5.8) | 93,314 (-1.2) | 170,397 (-3.3) | 171,970 (0.9) |
| | Town gas | 32,268 (-1.2) | 15,468 (7.6) | 18,023 (0.7) | 33,490 (3.8) | 14,643 (-5.3) | 18,193 (0.9) | 32,836 (-2.0) | 34,013 (3.6) |
| | Electricity | 83,578 (-3.4) | 44,815 (9.1) | 43,658 (2.7) | 88,473 (5.9) | 41,342 (-7.7) | 43,401 (-0.6) | 84,743 (-4.2) | 87,731 (3.5) |
| | Others | 3,432 (-7.4) | 1,614 (1.7) | 1,845 (0.0) | 3,459 (0.8) | 1,568 (-2.8) | 1,841 (-0.3) | 3,409 (-1.5) | 3,428 (0.5) |
| | Total | 329,423 (-2.8) | 162,016 (5.8) | 176,598 (0.2) | 338,613 (2.8) | 152,115 (-6.1) | 175,560 (-0.6) | 327,675 (-3.2) | 335,074 (2.3) |
| Real GDP (Chained to Year 2000, in billion yen) | | 526,442 (-2.4) | 266,853 (4.1) | 271,605 (0.6) | 538,458 (2.3) | 263,303 (-1.3) | 276,323 (1.7) | 539,626 (0.2) | 554,478 (2.8) |
| Industrial production index (100 for 2005) | | 86.1 (-8.8) | 94.6 (17.4) | 93.1 (1.7) | 93.9 (9.1) | 90.0 (-4.8) | 98.8 (6.1) | 94.4 (0.6) | 101.1 (7.1) |
| Heating deree days | | 955 (6.2) | 78 (124.1) | 1,001 (8.8) | 1,079 (13.0) | 46 (-40.8) | 933 (-6.7) | 980 (-9.2) | 980 (-0.0) |
| Cooling degree days | | 329 (-17.5) | 559 (70.2) | 0 (-75.0) | 559 (70.0) | 418 (-25.2) | 1 (1170.0) | 419 (-25.0) | 419 (0.0) |

Sources: Actual results data prepared form IEEJ database and others; forecasts by IEEJ.

Note: 1. Bracketed figures indicate year-to-year percentage changes.

2. Industrial sector consumption includes non-energy uses.

Table 9 Economic Impact of Electricity Shortage

| | | Jul.-Sept. 2012 | Whole of FY2012 | |
|---|---|---|---|---|
| | | Summer | Autumn recovery | Lingering impact |
| Assumptions | Maximum electricity output (kW) | -12.4% | - | - |
| | Consumption reduction (kWh) | -4.2% | - | - |
| Demand reduction | Electricity demand (kWh) | -4.2% | -1.1% | -2.3% |
| | Industrial | -4.4% | -1.1% | -2.4% |
| | Household | -4.3% | -1.2% | -2.8% |
| | Commercial | -3.9% | -1.1% | -1.6% |
| | Transportation | -1.7% | -0.3% | -0.6% |
| Impact on GDP | Real GDP | -5.6% | -1.6% | -3.6% |
| | Real GDP (T. yen) | (-7.7) | (-9.1) | (-20.2) |
| | Manufacturing industry (IIP) | -8.2% | -2.2% | -4.8% |
| | Services industry (ITA) | -5.9% | -1.6% | -2.2% |
| | Number of jobless (10,000 people) | ＋4.9 | ＋9.8 | ＋19.7 |

Note) *It should be kept in mind that if electricity saving efforts are made in ways that do not affect economic activity, the impacts described above will be moderated.

Figure 1 Impact on Production Value by Industry Based on Input-Output Table (Reduction rate; assuming that the impact will spread throughout industry)
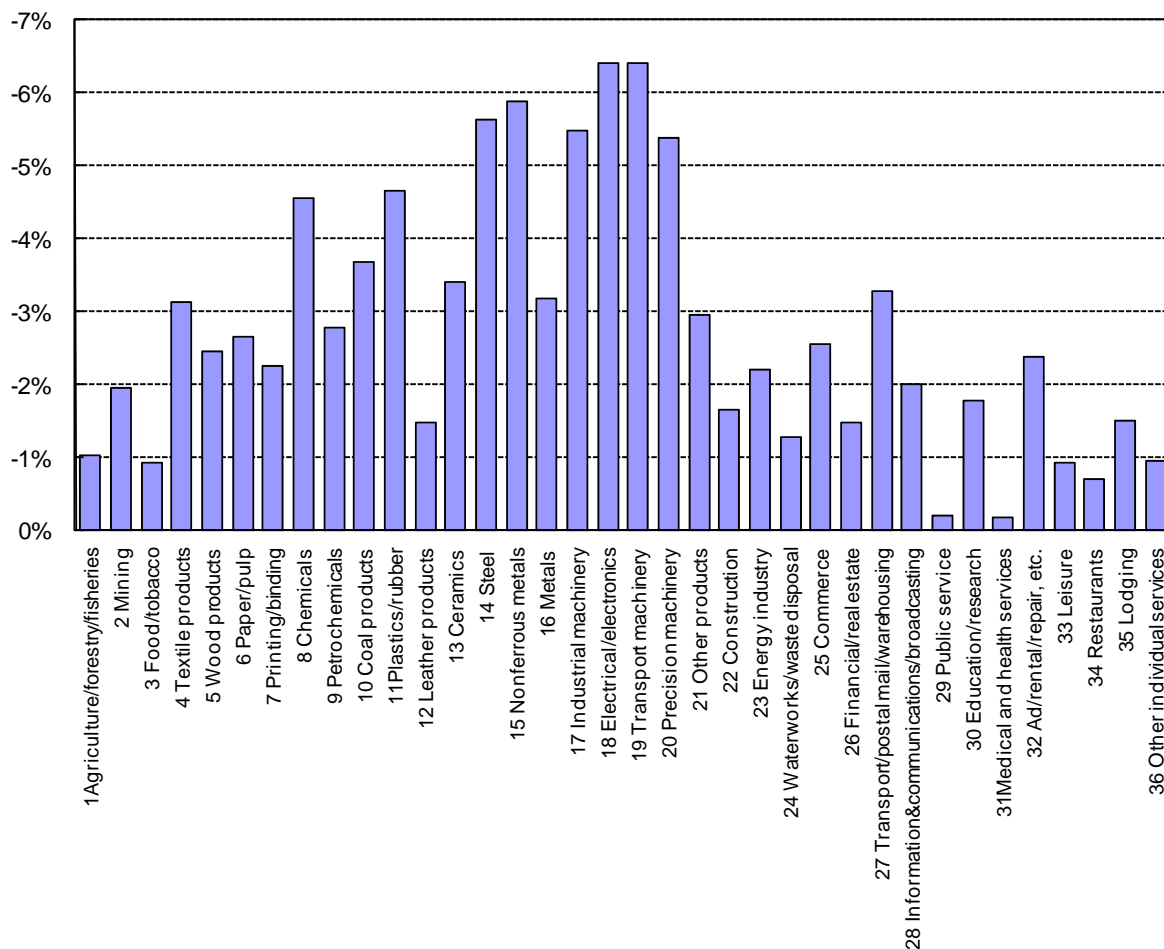
Figure 2 Impact of Additional Electricity Cost on Prices
(assuming that the impact will spread throughout industry)