Short-term Energy Supply/Demand Outlook
Forecast through FY2006 and Analysis on the Effects of
Oil Prices, Economic Growth, and Temperatures

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The Institute of Energy Economics, Japan

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Energy Data and Modelling Center
Presentation Topics

- Outline of the Study
  Objectives, analytical procedures, model flow
- Current Status of Energy Demand
- Current Macroeconomic Status and Outlook
- Energy Supply/Demand Outlook
- Sensitivity Analysis
  Effects of crude prices, economic growth, temperatures
- Summary
Outline of the Study

Study Objectives:
To forecast energy supply/demand through FY2006 based on current economic environment and oil price trends, and also to evaluate the effects of uncertain factors in addition to a base case forecast.

Forecasting Method:
Econometric models (macroeconomics, energy S/D balance)
⇒ see next slide

Case Settings:
Base Case
Sensitivity analyses (for FY2006)
- Crude prices: High (+$10/Bbl) / Low (-$10/Bbl)
- Economic growth: High (+1%)/Low(-1%)
- Effect of temperatures: Summer (+1°C)/Winter (-1°C)
Factors defining future supply/demand and various causal relationships are captured quantitatively and consistently.
Current Status of Energy Demand

- Electricity Sales Volume
- Town Gas Sales Volume
- Fuel Oil Sales Volume
- Segments - Industry
  - Residential
  - Commercial
  - Transportation
Electricity sales are on the rise while being affected by temperatures.

Town gas sales have seen steady increases in large contracts for industrial and commercial sectors.

Fuel oil sales are almost flat with gasoline in an uptrend and fuel oil in a continuing decline.

Energy demand trends by types

Seasonally adjusted index: 100 for Year 2000

- **Electricity (Large-Industrial Use)**: Upward trend
- **Town gas (industrial use)**: Growing fast
- **Fuel Oil C (excluding power generation use)**: Declining

Trends in most recent 12 months

- **Year-on-year changes**
  - **Town Gas**: Declining
  - **Fuel Oil C (excluding power generation use)**: Slightly sluggish in FY2005
  - **Electricity (Large-Industrial Use)**: Slightly increasing

Sources: Those mentioned in previous slide and Petroleum Association of Japan “Monthly Oil Statistics” for energy demand. The Industrial Production chart is prepared from METI “Indices of Industrial Production, Shipment and Inventory”.

IEEJ: February 2006
Energy demand trends by types

- **Electricity (Lighting use)**
  - Seasonally adjusted index: 100 for Year 2000
  - Cool summer: Upward trend
  - Hot spell

- **Town Gas (Household use)**
  - Cool summer: Flat trend
  - Hot spell

- **Kerosene**
  - Slight decline

Trends in most recent 12 months

- Year-on-year changes:
  - Town Gas: Upward trend
  - Kerosene: Slight decline
  - Electricity (Lighting use): Slight decline

- Temperatures (Year-on-year changes):
  - Warm to cold winter
  - Cool to warm summer

Sources: Those mentioned in previous slides for energy demand. The temperature chart is prepared from Japan Meteorological Agency data.
[Commercial Demand] Electricity, Town Gas, Fuel Oil A

Energy demand trends by types

Seasonally adjusted index: 100 for Year 2000

- **Electricity** (for commercial, etc.): Upward trend
- **Town Gas** (for commercial, etc.): Hot spell, Fast growing
- **Fuel Oil A** (for commercial): Slight decline

Trends in most recent 12 months

- **Electricity**: Year-on-year changes
- **Town Gas**: Year-on-year changes
- **Fuel Oil A**: Year-on-year changes
- **Electricity & gas on identical trend**

Temperatures (Year-on-year changes)

- Warm to cold winter
- Cool to warm summer

Sources: Those mentioned in previous slides and EDMC (IEEJ) estimates for energy demand. The temperature chart is prepared from Japan Meteorological Agency data. **Note:** Electricity data includes demand under the deregulation program.
Demands of gasoline and gas oil as automobile fuels coincide with respective numbers of registered vehicles. In terms of unit fuel consumption, however, gasoline has been declining and gas oil increasing.
Current Macroeconomic Status

- General Macroeconomic Indicators
  (GDP, Prices, etc.)
- Industrial Materials Production,
  Other Manufacturing Activities, etc.
Economy is declared to have departed from the transitional slump, moving towards self-sustained recovery.
As inventory adjustment completes, electronic parts and devices show rapid recovery. Electrical machinery is also recovering due to increased exports to China.
(1) Crude Steel Production

2001 2002 2003 2004 2005

High-grade materials in good shape, commodity products to be adjusted

(2) Paper/Paperboard Production

2001 2002 2003 2004 2005

Paper production on the rise, paperboard is leveling off

(3) Cement Production

2001 2002 2003 2004 2005

Temporary upswing due to restoration construction

(4) Ethylene Production

2001 2002 2003 2004 2005

Domestic demand in high gear; capacity production to continue

Macroeconomic Outlook

- GDP and Demand Parameters, Price Indices
- Industrial Materials Production
- IIP, Service Activity Index, Transportation Indicators
### Outlook on Macroeconomic Indicators

#### [Base Case]

<table>
<thead>
<tr>
<th></th>
<th>Actual FY2004</th>
<th>Forecast FY2005</th>
<th>Forecast FY2006</th>
<th>Year-on-year Changes (%) FY2004</th>
<th>Year-on-year Changes (%) FY2005</th>
<th>Year-on-year Changes (%) FY2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal GDP (Trillion yen)</td>
<td>496.2</td>
<td>502.2</td>
<td>511.8</td>
<td>0.5</td>
<td>1.2</td>
<td>1.9</td>
</tr>
<tr>
<td>Real GDP (Trillion yen)</td>
<td>526.4</td>
<td>539.6</td>
<td>550.9</td>
<td>1.7</td>
<td>2.5</td>
<td>2.1</td>
</tr>
<tr>
<td>Private sector demand</td>
<td>393.8</td>
<td>405.5</td>
<td>414.5</td>
<td>[1.5]</td>
<td>[2.2]</td>
<td>[1.7]</td>
</tr>
<tr>
<td>Public sector demand</td>
<td>118.7</td>
<td>119.9</td>
<td>120.8</td>
<td>[-0.3]</td>
<td>[0.2]</td>
<td>[0.2]</td>
</tr>
<tr>
<td>Overseas demand</td>
<td>13.8</td>
<td>14.4</td>
<td>15.5</td>
<td>[0.5]</td>
<td>[0.1]</td>
<td>[0.2]</td>
</tr>
<tr>
<td>IIP (100 for 2000)</td>
<td>100.6</td>
<td>102.3</td>
<td>105.5</td>
<td>4.1</td>
<td>1.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Consumer Price Index (100 for 2000)</td>
<td>98.1</td>
<td>98.0</td>
<td>98.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Crude Oil Price ($/Bbl)</td>
<td>38.6</td>
<td>53.6</td>
<td>51.0</td>
<td>30.8</td>
<td>38.8</td>
<td>-4.9</td>
</tr>
<tr>
<td>Exchange Rate (yen/$)</td>
<td>107.5</td>
<td>112.2</td>
<td>115.0</td>
<td>-4.9</td>
<td>4.4</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Sources: Actual figures are from Cabinet Office “Preliminary National Income Statistics” and others. Forecasts are by IEEJ.

Note: Bracketed numbers are GDP growth contribution rates. A total of these may not add up due to minor deviations.

For FY2006, domestic demand will drive the economy to a 2% growth for the second consecutive year.
Outlook on Industrial Materials Manufacturing

[Base Case]

(1) Crude Steel Production, in Million Tons

(2) Paper/Paperboard Production, in Million Tons

(3) Cement Production, in Million Tons

(4) Ethylene Production, in Million Tons

Sources: Actual figures as mentioned in previous slide; forecast by IEEJ.

Note: All in fiscal year figures
For FY2006, as inventory adjustment for IT-related equipment completes, electronic parts and devices, electrical machinery, etc. are in excellent conditions. Registration of gasoline vehicles shows a steady increase.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Food products</td>
<td>96.0</td>
<td>95.7</td>
<td>95.6</td>
<td>-1.3</td>
<td>-0.3</td>
<td>-0.1</td>
</tr>
<tr>
<td>Non-ferrous metals</td>
<td>97.6</td>
<td>99.4</td>
<td>101.1</td>
<td>0.2</td>
<td>1.8</td>
<td>1.7</td>
</tr>
<tr>
<td>Metals and machinery</td>
<td>105.3</td>
<td>107.8</td>
<td>112.5</td>
<td>7.3</td>
<td>2.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Indices of industrial production</td>
<td>100.6</td>
<td>102.3</td>
<td>105.5</td>
<td>4.1</td>
<td>1.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Tertiary industry activity index</td>
<td>104.8</td>
<td>107.5</td>
<td>109.6</td>
<td>2.3</td>
<td>2.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Gasoline vehicles (in Millions)</td>
<td>65.53</td>
<td>66.68</td>
<td>67.73</td>
<td>2.3</td>
<td>1.8</td>
<td>1.6</td>
</tr>
<tr>
<td>Diesel vehicles (in Millions)</td>
<td>9.06</td>
<td>8.48</td>
<td>7.92</td>
<td>-6.7</td>
<td>-6.5</td>
<td>-6.5</td>
</tr>
</tbody>
</table>

Sources: METI “Indices of Industrial Production, Shipment & Inventory” and other relevant materials. Forecasts are by IEEJ.
Energy Supply/Demand Outlook

- Primary Energy Supply, Final Consumption
- Electricity, Town Gas and Fuel Oils Sales
Nuclear power plants whose operation had been suspended since FY2002 are gradually being brought back to operation.

[Latest additions of nuclear power plants]
- Jan. ‘05: Hamaoka No.5 (1.38 Million kW)
- Dec. ‘05: Higashidoori No.1 (1.1 Million kW)

[Planned launch of nuclear power plants]
- Mar. ‘06: Shika No.2 (1.36 Million kW)

[Nuclear Power Growth Rates]
- FY2004: +17.7%
- FY2005: +4.7%
- FY2006: +13.2%
Assumptions for Temperatures (Degree-days)

1st Half (April-September)
Cooling Degree-days

Average CDD for past 10 years
Heat spell
Cold summer

1996 2000 2005

Cooling degree-days (CDD) are a sum of temperatures above an assumed base level. Cooling degree-days increase as the number of warmer days increases.

2nd Half (October-March)
Heating Degree-days

Average HDD for past 10 years
JMA seasonal forecast factored in
Severe winter

1996 2000 2005

Heating degree-days (HDD) are a sum of temperatures below an assumed base level. Heating degree-days increase as the number of colder days increases.

Sources: Prepared from Japan Meteorological Agency data and IEEJ (EDMC) estimates. Actual data is used up to November 2005.

Notes: CDD: The cumulative sum of differences between mean temperatures for the days that were above 24 C and the base level of 22 C.
HDD: The cumulative sum of differences between mean temperatures for the days that were below 14 C and the base level of 14 C.
Outlook on Final Energy Consumption/Primary Supply

[Base Case]

- For FY2006, energy demand will mark a gradual increase due to recovery in production and other economic activities.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Real GDP</td>
<td>517 Trillion yen</td>
<td>526 Trillion yen</td>
<td>540 Trillion yen</td>
<td>551 Trillion yen</td>
</tr>
<tr>
<td>% change year/year</td>
<td>+2.3</td>
<td>+1.7</td>
<td>+2.5</td>
<td>+2.1</td>
</tr>
<tr>
<td>Primary Energy Supply</td>
<td>532 Million TOE</td>
<td>544 Million TOE</td>
<td>546 Million TOE</td>
<td>551 Million TOE</td>
</tr>
<tr>
<td>% change year/year</td>
<td>+0.0</td>
<td>+2.2</td>
<td>+0.5</td>
<td>+0.8</td>
</tr>
<tr>
<td>Final Energy Consumption</td>
<td>370 Million TOE</td>
<td>372 Million TOE</td>
<td>373 Million TOE</td>
<td>375 Million TOE</td>
</tr>
<tr>
<td>% change year/year</td>
<td>-0.6</td>
<td>+0.6</td>
<td>+0.4</td>
<td>+0.5</td>
</tr>
</tbody>
</table>

Source: Prepared from Cabinet Office data and EDMC(IEEJ) estimates. Forecasts are by IEEJ.

(FY = Fiscal Year, TOE = Tons oil equivalent)
# Domestic Primary Energy Supply

**[Base Case]**

<table>
<thead>
<tr>
<th>(in Million TOE)</th>
<th>Actual</th>
<th>Forecast</th>
<th>Year-on-year changes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal, etc.</td>
<td>119.9</td>
<td>121.2</td>
<td>118.6</td>
</tr>
<tr>
<td>Oil</td>
<td>256.3</td>
<td>254.7</td>
<td>251.4</td>
</tr>
<tr>
<td>Natural gas</td>
<td>78.4</td>
<td>80.3</td>
<td>81.0</td>
</tr>
<tr>
<td>Hydro-power</td>
<td>21.0</td>
<td>18.8</td>
<td>20.1</td>
</tr>
<tr>
<td>Nuclear</td>
<td>60.7</td>
<td>63.6</td>
<td>72.0</td>
</tr>
<tr>
<td>New energies</td>
<td>7.3</td>
<td>7.5</td>
<td>7.6</td>
</tr>
<tr>
<td>Total</td>
<td>543.7</td>
<td>546.1</td>
<td>550.7</td>
</tr>
<tr>
<td>CO2 (in Million t-C)</td>
<td>329</td>
<td>331</td>
<td>327</td>
</tr>
</tbody>
</table>

Source: IEEJ for both actual results and forecasts

For FY2006, coal supplies will decline in both industrial and utilities sectors. Natural gas will increase due to town gas demand. CO2 emissions will fall for factors including additions of nuclear power plants.
## Final Energy Consumption by Sector

### Base Case

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>177.8</td>
<td>178.1</td>
<td>178.6</td>
<td>-0.5</td>
<td>0.2</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td>54.0</td>
<td>54.6</td>
<td>55.1</td>
<td>2.6</td>
<td>1.1</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
<td>48.2</td>
<td>48.5</td>
<td>49.4</td>
<td>2.0</td>
<td>0.6</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td>91.8</td>
<td>92.1</td>
<td>92.2</td>
<td>0.9</td>
<td>0.4</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>371.8</td>
<td>373.3</td>
<td>375.3</td>
<td>0.6</td>
<td>0.4</td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>

Source: IEEJ for both actual results and forecasts

**For FY2006:**
- **Industry:** Machinery production proceeds actively while materials production declines slightly, resulting in a mild increase in energy demand.
- **Residential:** A combined effect of rebounds from higher cooling demand and lower heating demand in FY2005.
- **Transportation:** The increase in passenger vehicle units in operation is offset by reduction in trucks to level off over-all energy demand.
Outlook on Energy Sales

Electricity Sales
Grows in industrial use due to brisk production activity

**Forecast**
- **2004:** 3.9%
- **2005:** 1.2%
- **2006:** 1.8%

Town Gas Sales
Maintains high growth centered around industrial consumption

**Forecast**
- **2004:** 5.3%
- **2005:** 5.5%
- **2006:** 5.7%

Fuel Oils Sales
Continues to decline as the shift from oil advances in industries

**Forecast**
- **2004:** -1.4%
- **2005:** -0.6%
- **2006:** -1.2%

## Electricity Demand by Use

### [Base Case]

<table>
<thead>
<tr>
<th>(Billion kWh)</th>
<th>Actual FY2004</th>
<th>Forecast FY2005</th>
<th>Forecast FY2006</th>
<th>Year-on-year changes (%) FY2004</th>
<th>Year-on-year changes (%) FY2004</th>
<th>Year-on-year changes (%) FY2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting use</td>
<td>272.6</td>
<td>274.8</td>
<td>277.7</td>
<td>5.0</td>
<td>0.8</td>
<td>1.1</td>
</tr>
<tr>
<td>Non-lighting use</td>
<td>619.6</td>
<td>627.9</td>
<td>641.4</td>
<td>3.5</td>
<td>1.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Total</td>
<td>892.1</td>
<td>902.6</td>
<td>919.1</td>
<td>3.9</td>
<td>1.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Large-industrial use</td>
<td>288.6</td>
<td>292.4</td>
<td>298.0</td>
<td>2.4</td>
<td>1.3</td>
<td>1.9</td>
</tr>
<tr>
<td>Chemical</td>
<td>28.6</td>
<td>29.2</td>
<td>29.6</td>
<td>3.6</td>
<td>2.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Iron &amp; steel</td>
<td>53.6</td>
<td>53.1</td>
<td>52.6</td>
<td>1.6</td>
<td>-0.9</td>
<td>-0.9</td>
</tr>
<tr>
<td>Machinery and</td>
<td>72.0</td>
<td>74.0</td>
<td>76.9</td>
<td>5.1</td>
<td>2.8</td>
<td>3.9</td>
</tr>
<tr>
<td>Equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Actual results from METI “Monthly Electricity Survey & Statistics”. Forecasts are by IEEJ.

For FY2006: Residential: A combined effect of rebounds from higher cooling demand and lower heating demand in FY2005.

Industry: Steel production declines mainly in electric furnace, while machinery production goes on actively.
For FY2006, the share of nuclear power will rise due to comebacks of previously suspended plants and newly added plants, while the share of thermal power drops to 55% as coal, LNG, and oil-fired power lose ground.
**Town Gas Sales by Use**

[Base Case]

<table>
<thead>
<tr>
<th>(Billion m³)</th>
<th>Actual FY2004</th>
<th>Forecast FY2005</th>
<th>Forecast FY2006</th>
<th>Year-on-year changes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
<td>9.46</td>
<td>9.61</td>
<td>9.83</td>
<td>-2.5</td>
</tr>
<tr>
<td>Commercial</td>
<td>4.71</td>
<td>4.80</td>
<td>4.92</td>
<td>6.4</td>
</tr>
<tr>
<td>Industry</td>
<td>13.29</td>
<td>14.62</td>
<td>16.01</td>
<td>10.4</td>
</tr>
<tr>
<td>Others</td>
<td>2.68</td>
<td>2.75</td>
<td>2.84</td>
<td>9.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30.14</strong></td>
<td><strong>31.79</strong></td>
<td><strong>33.60</strong></td>
<td><strong>5.3</strong></td>
</tr>
</tbody>
</table>

Sources: Actual results from METI “Monthly Statistics on Gas Utility Industry”. Forecasts by IEEJ.

For FY2006:
- **Households:** Demands for heating and hot water supply to rise in comparison with warmer-than-normal winter of the previous year.
- **Commercial & others:** Demands for air-conditioning to decline in comparison with cooler-than-normal summer of the previous year, while demands for heating and hot water supply to rise for the same reason as above.
- **Industry:** Substantial upswing due to vigorous production activities in addition to increased fresh demands.
### Fuel Oil Sales by Product [Base Case]

<table>
<thead>
<tr>
<th>(Million KL)</th>
<th>Actual FY2004</th>
<th>Forecast FY2005</th>
<th>Forecast FY2006</th>
<th>Year-on-year changes (%) FY2004</th>
<th>Year-on-year changes (%) FY2004</th>
<th>Year-on-year changes (%) FY2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>61.5</td>
<td>61.9</td>
<td>62.5</td>
<td>1.5</td>
<td>0.7</td>
<td>0.9</td>
</tr>
<tr>
<td>Naphtha</td>
<td>49.0</td>
<td>49.3</td>
<td>48.8</td>
<td>1.1</td>
<td>0.7</td>
<td>-1.1</td>
</tr>
<tr>
<td>Kerosene</td>
<td>28.0</td>
<td>28.3</td>
<td>28.2</td>
<td>-3.9</td>
<td>1.1</td>
<td>-0.4</td>
</tr>
<tr>
<td>Gas oil</td>
<td>38.2</td>
<td>37.6</td>
<td>37.0</td>
<td>0.2</td>
<td>-1.5</td>
<td>-1.6</td>
</tr>
<tr>
<td>Fuel oil A</td>
<td>29.1</td>
<td>28.4</td>
<td>27.9</td>
<td>-2.2</td>
<td>-2.4</td>
<td>-1.8</td>
</tr>
<tr>
<td>Fuel oil B/C</td>
<td>26.6</td>
<td>25.2</td>
<td>23.5</td>
<td>-12.0</td>
<td>-5.1</td>
<td>-6.6</td>
</tr>
<tr>
<td>Power generation use</td>
<td>9.8</td>
<td>9.7</td>
<td>8.7</td>
<td>-21.5</td>
<td>-1.6</td>
<td>-10.3</td>
</tr>
<tr>
<td>Total</td>
<td>237.2</td>
<td>235.8</td>
<td>233.1</td>
<td>-1.4</td>
<td>-0.6</td>
<td>-1.2</td>
</tr>
</tbody>
</table>

Source: METI “Monthly Resources & Energy Statistics”. Forecasts by IEEJ.

For FY2006: Gasoline: A steady increase in passenger vehicle units in operation contributes to a mild growth.
Gas oil: Demand to decline due to the continuing downtrend in number of trucks in operation.
Fuel oil B/C: Demand for power generation to drop substantially due to the shift to nuclear power.
Sensitivity Analysis on Factors Affecting Energy Supply/Demand

- Effects of Crude Oil Price Changes
- Effects of Economic Growth Changes
- Effects of Temperature Changes
Base Case

FY2006: GDP growth = 2.1%; Crude oil CIF price(*) ≅ $51/Bbl

(*) Based on “Prospects for the World Oil Market and Crude Oil Prices for 2006” by Ken Koyama, Dec. 16, 2005

- Crude Price ≅ $61/Bbl (Base + $10)
- Crude Price ≅ $41/Bbl (Base - $10)

Effects of Economic Growth Changes

- GDP growth: Base + 1.0% point
  Base - 1.0% point

Effects of Temperature Changes

- Warm summer (Jul.-Sep.): Up 1°C
- Cold winter (Jan.-Mar.): Down 1°C
Greater impact is seen in industries and transportation (especially cargo transport) sectors that are sensitive to economic conditions and price changes. Fuel oil sales, being directly impacted by crude oil prices, show wider fluctuations.
Effects of Economic Growth Changes

[High Growth Case: 1% above Base]

Energy consumption does not change in proportion to GDP changes.
Greater effects are seen for fuel oil for industrial and cargo transport sectors and electricity sales for industrial sector.

[Low Growth Case: 1% below Base]
Effects of Temperature Changes

[1°C Temperature rise in summer (Jul.-Sep.)]

- Increase of 2.0 Million TOE
- Deviation from Base (%)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Increase</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary energy sup.</td>
<td>1.5</td>
<td>2.3</td>
</tr>
<tr>
<td>Final energy cons.</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Industrial sector</td>
<td>1.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Residential sector</td>
<td>2.3</td>
<td>1.6</td>
</tr>
<tr>
<td>Commercial sector</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>Transportation sect.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Town gas sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel oil sales</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summer months: Electricity demand increases sharply on cooling demand. For residential, cooling demand and hot water demand cancel out each other.

[1°C Temperature fall in winter (Jan.-Mar.)]

- Increase of 1.8 Million TOE

<table>
<thead>
<tr>
<th>Sector</th>
<th>Increase</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary energy sup.</td>
<td>1.2</td>
<td>3.3</td>
</tr>
<tr>
<td>Final energy cons.</td>
<td>1.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Industrial sector</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>Residential sector</td>
<td>0.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Commercial sector</td>
<td>1.5</td>
<td>1.4</td>
</tr>
<tr>
<td>Transportation sect.</td>
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</tr>
<tr>
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<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Fuel oil sales</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

Winter months: Town gas demand increases sharply on heating and hot water demand.
The effects on the Japanese economy are two fold; (a) direct impact via income transfer to oil-producing nations and price hikes, and (b) indirect impact via global economic slowdown.
The ratio of oil import value to nominal GDP has remained around 1% since late 1980s.

A price hike of $10/Bbl escalates oil import payments by ¥2.0 trillion (equivalent to 0.4% of nominal GDP).

Sources: Prepared from Ministry of Finance “Japan Trade Monthly Table”, Cabinet Office “National Accounts.”
Energy conservation and shift from oil have significantly progressed since the last two oil crises. Due to the yen’s appreciation, yen-denominated crude oil prices have not reached the high levels experienced in the past.

### Oil Import Value and Income Transfers

<table>
<thead>
<tr>
<th>Year</th>
<th>Crude Price (per bbl)</th>
<th>Income Transfers (Tril. Yen)</th>
<th>Ratio to nominal GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2003</td>
<td>$30</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>FY2004</td>
<td>$39 (+$9)</td>
<td>1.6</td>
<td>0.30%</td>
</tr>
<tr>
<td>FY2005</td>
<td>$54 (+$24)</td>
<td>5.7</td>
<td>1.10%</td>
</tr>
<tr>
<td>FY2006</td>
<td>$51 (+$21)</td>
<td>5.6</td>
<td>1.10%</td>
</tr>
</tbody>
</table>

Cumulative sum: 12.9 (Basis FY2003)

Sources: Prepared from IEEJ-EDMC “Energy Trend”, PAJ “Monthly Oil Statistics”. Forecasts are by IEEJ.

Income transfers are on the rise, with the 3-year drainage via income transfers amounting to nearly 13 trillion yen for FY2004 through FY2006.
While the greatest earnings ever were recorded, the impact of high oil prices is currently taking effect.
Effects of Income Transfers on Various Economies
(in the case of a $10/Bbl oil price hike)

<table>
<thead>
<tr>
<th>Region</th>
<th>1981 Billion US$</th>
<th>Ratio to nominal GDP</th>
<th>2004 Billion US$</th>
<th>Ratio to nominal GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>20</td>
<td>0.6%</td>
<td>40</td>
<td>0.3%</td>
</tr>
<tr>
<td>Latin America</td>
<td>7</td>
<td>0.8%</td>
<td>15</td>
<td>0.7%</td>
</tr>
<tr>
<td>Europe (Note)</td>
<td>□ 35</td>
<td>□ 1.1%</td>
<td>□ 38</td>
<td>□ 0.3%</td>
</tr>
<tr>
<td>Former USSR</td>
<td>-</td>
<td>-</td>
<td>24</td>
<td>2.9%</td>
</tr>
<tr>
<td>Middle East</td>
<td>53</td>
<td>13.2%</td>
<td>72</td>
<td>9.6%</td>
</tr>
<tr>
<td>Africa</td>
<td>12</td>
<td>2.2%</td>
<td>22</td>
<td>2.7%</td>
</tr>
<tr>
<td>Japan</td>
<td>□ 16</td>
<td>□ 1.4%</td>
<td>□ 19</td>
<td>□ 0.4%</td>
</tr>
<tr>
<td>Asia-Pacific</td>
<td>-</td>
<td>-</td>
<td>□ 38</td>
<td>□ 0.8%</td>
</tr>
<tr>
<td>[China as part of AP]</td>
<td>-</td>
<td>-</td>
<td>[ □ 11]</td>
<td>[ □ 0.7%]</td>
</tr>
</tbody>
</table>

Source: Estimated from BP “Statistical Review of World Energy”, World Bank/WDI data
Notes: Excludes Eastern Europe countries for Europe in 1981. The symbol “□” denotes negative values.

With fast-growing oil imports in recent years, the Asian Region is affected significantly by income transfers in terms of the ratio of an oil import value increment to GDP for a $10/Bbl oil price hike.
The long term trend in energy demand will be significantly affected by the advancement of energy-saving technologies and other factors. On the other hand, the short-term trend is largely impacted by factors like production activities or temperatures.

The Japanese economy in FY2006 will proceed along a healthy trend, but the growth in energy demand will remain modest:
- Residential: steady; industries: creeping up; transportation: flat
- Electricity and town gas to grow; oil to decline

While energy demand will increase, CO2 emissions will tend to decline due to factors including new additions of nuclear power plants or increased use of natural gas:
- Energy-conserving efforts to be fortified towards 2010

(to continue)
The effects of temperature changes on energy demand are significant particularly in the following areas:
- For summer months: commercial sector and electricity demand
- For winter months: residential sector and town gas demand

The effects of soaring crude oil prices on economy and energy demand will be minor in the short-term view.
- In the long run, fuel switching involving facility modifications or further energy saving measures may be promoted,

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