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Short-Term Energy Supply/Demand Outlook
-- Forecast through FY2011 and Analysis on Effects of Crude Oil Price, Economic Growth and Ambient Temperature Changes –

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<Summary>

【Background】

The world economy is on a recovery track after the worst period following the financial crisis. In the Japanese economy, production and consumption have recovered rapidly on an export rebound and economic stimulus measures. But effects of economic stimulus measures have run their course in the United States and Europe. Particularly in Europe, the recovery pace is slowing on lingering budget risks. In Japan, manufacturing industries have recovered rapidly on the strength of growing exports to other Asian countries. Consumption has been supported by consumption-stimulating measures like the eco-point system and tax cuts/subsidies for eco-friendly vehicles, as well as summer heat waves. Energy demand has turned upward on the production rebound and high temperatures. At present, however, the economic recovery might have come to a lull on the expiration of consumption-boosting measures and the yen's appreciation.

Given such conditions, this report presents **forecasts on energy supply and demand in FY2010 and FY2011.** For FY2011, we have made energy supply and demand forecasts for the **"base case"** and analyzed effects of **crude oil price, economic growth and ambient temperature** changes on energy supply and demand.

【Key Conclusion】

(1) Outlook on Key Economic Indicators for FY2010 and FY2011

During FY2010, capital investment turned upward at last as production recovered on rising exports amid a world economy rebound. In the first half of FY2010, last-minute vehicle purchases before the termination of subsidies for eco-friendly vehicles were coupled with summer heat waves to substantially expand private consumption. But reactionary consumption drops are feared for the second half. The entire economy is on a moderate recovery path. Japan's **GDP** in FY2010 is expected to post

a real growth rate of 3.2% from the previous year due to a positive carryover (1.9%) in the January-March 2010 quarter. As for production, the **Index of Industrial Production** for FY2010 is predicted to score a sharp **8.5% increase** from the previous year as automobile and electrical machinery production expanded substantially thanks to consumption-stimulating measures in the first half before an expected sharp reactionary decline in the second half.

In FY2011, production will moderately expand on export growth and investment recovery, despite some reactionary demand decline on the expiration of economic stimulus measures. The **Index of Industrial Production** for FY2011 is likely to **increase 2.4%** from the previous year. Private sector consumption is expected to see a limited rise to a low level in reaction to sharp growth in the previous year, while residential investment is predicted to turn upward for the first time in seven years on the strength of the eco-point system. But the entire economy is likely to see a slower growth pace for both domestic and external demand. **GDP** in FY2011 is projected to **expand 1.4%**. For our outlook, the mean **CIF-based crude oil import price** (see note) in FY2011 is assumed at **$85/barrel** (against $81/barrel as estimated for FY2010), slipping below present levels.

Note: Based on "Prospects for the International Oil Market and Crude Oil Prices in 2011" by Ken Koyama (December 22, 2010).

(2) Outlook on Energy Supply and Demand in FY2009 and FY2010

<Primary energy supply and final energy consumption>

In FY2010, **final energy consumption** is projected to **increase 2.8%** from the previous year. Final energy consumption is expected to rise 3.9% in the industrial sector on production recovery, 2.6% in the consumer sector on a substantial increase in air-conditioning demand amid heat waves, and 1.1% in the transportation sector on heat waves and cargo traffic recovery. **Domestic primary energy supply**, including consumption in the energy conversion sector including electricity generators, is predicted to **increase 4.1%**. Energy-based **carbon dioxide emissions** are expected to **increase 3.7%** from the previous year on the energy consumption increase.

In FY2011, **final energy consumption** is projected to **decrease 0.2%** from the previous year in reaction to a sharp air-conditioning demand rise in the previous year, despite continuing economic recovery. The industrial sector is expected to expand final energy consumption 1.3% on a moderate production expansion. But the transportation sector is predicted to cut energy consumption 2.4% on improvements in fuel and transportation efficiencies. The consumer sector is projected to reduce energy consumption 0.9% on ambient temperature changes, despite a recovery in services. **Domestic primary energy supply** is predicted to **fall 0.1%** from the previous year. **CO_2 emissions** are expected to **drop by a small 0.8%** in reaction to last summer's heat waves and expanding nuclear power generation.

Note: Our outlook does not take into account a global warming prevention tax, a complete feed-in tariff system for purchases of all electricity generated with renewable energy, a planned domestic emissions trading system, and a planned expressway toll system reform.

<Sales-based energy demand>

In FY2010, **electricity sales** are expected to **increase 5.4%** from the previous year on a production recovery, a fuel switch from oil to electricity and an air-conditioning demand rise. In FY 2011**,** electricity sales are projected to **see limited growth of 0.2%** from the previous year as electricity demand in the consumer sector declines on ambient temperature changes, in spite of a continuing switch from oil to electricity under a moderate economic recovery.

In FY2010, **town gas sales** are expected to **increase 4.4%** from the previous year due to a sharp expansion in industrial gas demand and a rise in air-conditioning demand in the commercial/other sector. In FY 2011, town gas sales are predicted to **expand 2.2%** from the previous year on a firm gain in industrial and commercial demand, despite large negative effects of ambient temperature changes.

In FY2010, **fuel oil sales** are projected to **decrease 0.6%** from the previous year as a substantial demand fall on a fuel switch to electricity and town gas is partially offset by a slight increase in demand for automobile fuels (gasoline and diesel oil) under the economic recovery and summer heat waves. In FY 2011, fuel sales are estimated to **decrease 1.9%** from the previous year on a continued fuel switch and vehicle fuel efficiency improvements as well as the disappearance of the effects of summer heat waves.

(3) Evaluating Possible Impacts of Factors Affecting Energy Supply/Demand in FY2011

If t**he crude oil import price** is **$10/barrel higher** than in the base case, **growth will fall by 0.02 percentage point in real GDP and by 0.2 point in domestic primary energy supply**. Impacts on the industrial sector will be larger than on other sectors due to the economic slowdown. Higher crude oil prices will have greater adverse impacts on oil and town gas consumption, while working to boost electricity sales. This is because relative electricity price declines are expected to encourage households to switch from kerosene-based heaters to air-conditioners and prompt firms to switch from independent electricity generation to electricity purchases.

If the **real GDP growth rate** is 1.0 percentage point lower than in the base case, **domestic primary energy supply will decline by 0.5%.** An energy demand change would not be as large as an economic growth change. Among sectors, the industrial sector will be affected most. Among energy sources, town gas will be affected as industrial demand for town gas has increased over recent years.

If **the mean ambient temperature in summer (July to September)** is 1℃ higher than the

average-year level, **domestic primary energy supply will increase by 0.3%.** The higher temperature will boost energy demand in the commercial sector with greater air-conditioning demand faster than in the household sector. It will also increase energy demand in the transportation sector as greater air-conditioning demand in cars deteriorates fuel efficiency. With the higher temperature, electricity will post the largest demand growth among energy sources. Any town gas demand rise would be limited. But higher temperatures' impact on town gas demand has increased due to a diffusion of gas-based air-conditioners over recent years.

If **the mean ambient temperature in winter (January to March)** is 1℃ lower than the average-year level, annual **domestic primary energy supply will increase by 0.3%.** Reversing the higher summer temperature case, the lower winter temperature will have a greater impact on the household sector than on the commercial sector by expanding heating and hot-water demand. With the lower winter temperature, town gas and LPG will post the largest demand growth among energy sources.

【Summary Table】

		FY2008	FY2009 (Actual)			FY2010 (Forecast)			FY2011
		(Actual)	1st half	2nd half	Total	1st half	2nd half	Total	(Forecast)
Key economic indicators	GDP	**539,484**	**256,318**	**270,418**	**526,735**	**267,554**	**276,259**	**543,812**	**551,369**
	(Chained to year 2000, in billions of yen)	(-4.1)	(-6.6)	(2.1)	(-2.4)	(4.4)	(2.2)	(3.2)	(1.4)
	Private demand	**402,723**	**188,945**	**193,970**	**382,915**	**194,561**	**199,625**	**394,186**	**400,850**
		[-2.7]			[-3.7]			[2.3]	[1.4]
	Public demand	**116,011**	**58,453**	**63,440**	**121,893**	**59,208**	**62,983**	**122,191**	**121,898**
		[-0.2]			[1.1]			[0.1]	[-0.2]
	External demand	**21,336**	**8,205**	**11,885**	**20,091**	**13,501**	**13,209**	**26,710**	**28,313**
		[-1.2]			[0.3]			[0.9]	[0.1]
	Corporate goods price index	**108.3**	**110.5**	**106.0**	**108.3**	**102.9**	**102.8**	**102.9**	**103.1**
	(Year 2005 = 100)	(3.2)	(-0.0)	(0.0)	(0.0)	(-6.9)	(-3.1)	(-5.0)	(0.2)
	Consumer price index	**101.7**	**100.5**	**99.6**	**100.0**	**99.6**	**98.9**	**99.2**	**98.6**
	(Year 2005 = 100)	(0.4)	(-1.6)	(-1.6)	(-1.6)	(-0.9)	(-0.7)	(-0.8)	(-0.7)
	Index of industrial production	**94.4**	**80.6**	**91.4**	**86.0**	**94.3**	**92.3**	**93.3**	**95.5**
	(Year 2005 = 100)	(-12.7)	(-23.4)	(9.3)	(-9.0)	(17.1)	(1.0)	(8.5)	(2.4)
	Crude steel production	**121,511**	**43,329**	**53,119**	**96,449**	**55,424**	**54,634**	**110,058**	**111,909**
	(In thousands of tons)	(-0.0)	(-29.6)	(20.7)	(-20.6)	(27.9)	(2.9)	(14.1)	(1.7)
	Ethylene production	**6,520**	**3,514**	**3,704**	**7,219**	**3,327**	**3,837**	**7,165**	**7,359**
	(In thousands of tons)	(-13.7)	(1.2)	(21.5)	(10.7)	(-5.3)	(3.6)	(-0.8)	(2.7)
	Exchange rate	**100.5**	**95.4**	**90.2**	**92.8**	**88.9**	**83.0**	**86.0**	**85.0**
	(Yen/US$)	(-12.0)	(-10.0)	(-5.0)	(-7.6)	(-6.8)	(-7.9)	(-7.4)	(-1.1)
	Crude oil CIF price	**89.9**	**61.8**	**76.3**	**69.1**	**78.6**	**83.1**	**80.9**	**85.0**
	(US$/Bbl)	(15.4)	(-48.4)	(27.1)	(-23.2)	(27.2)	(8.8)	(17.1)	(5.1)
	Heating degree-days	**899**	**35**	**920**	**955**	**78**	**946**	**1,024**	**979**
		(-9.8)	(-2.2)	(6.6)	(6.2)	(124.1)	(2.8)	(7.2)	(-4.4)
	Cooling degree-days	**398**	**328**	**0**	**329**	**559**	**1**	**560**	**419**
		(-8.8)	(-17.6)	-	(-17.5)	(70.2)	(217.5)	(70.4)	(-25.2)
Key energy indicators	Primary energy supply	**511,426**	**230,951**	**259,048**	**489,999**	**249,040**	**261,277**	**510,317**	**509,596**
	(10^10kcal = KTOE)	(-4.9)	(-10.6)	(2.3)	(-4.2)	(7.8)	(0.9)	(4.1)	(-0.1)
	Final energy consumption	**338,952**	**153,196**	**176,227**	**329,423**	**163,136**	**175,650**	**338,786**	**337,959**
	(10^10kcal = KTOE)	(-6.4)	(-8.6)	(2.8)	(-2.8)	(6.5)	(-0.3)	(2.8)	(-0.2)
	Industrial sector	**160,461**	**72,686**	**82,166**	**154,852**	**78,581**	**82,374**	**160,955**	**162,979**
		(-8.9)	(-13.5)	(7.5)	(-3.5)	(8.1)	(0.3)	(3.9)	(1.3)
	Consumer sector	**94,236**	**39,431**	**52,691**	**92,122**	**41,987**	**52,519**	**94,506**	**93,622**
		(-4.4)	(-3.3)	(-1.4)	(-2.2)	(6.5)	(-0.3)	(2.6)	(-0.9)
	Transportation sector	**84,255**	**41,079**	**41,370**	**82,449**	**42,568**	**40,757**	**83,325**	**81,359**
		(-3.6)	(-3.8)	(-0.5)	(-2.1)	(3.6)	(-1.5)	(1.1)	(-2.4)
	Electricity sales	**920.8**	**436.2**	**453.2**	**889.4**	**476.2**	**461.3**	**937.5**	**939.4**
	(billion kWh)	(-3.6)	(-7.8)	(1.2)	(-3.4)	(9.2)	(1.8)	(5.4)	(0.2)
	Town gas sales	**34,505**	**15,299**	**18,539**	**33,837**	**16,574**	**18,758**	**35,332**	**36,098**
	(million m^3/10,000kcal)	(-3.9)	(-8.5)	(4.2)	(-1.9)	(8.3)	(1.2)	(4.4)	(2.2)
	Fuel oil sales	**201,060**	**89,875**	**105,059**	**194,934**	**91,755**	**101,963**	**193,718**	**190,040**
	(1,000kl)	(-7.9)	(-7.2)	(0.8)	(-3.0)	(2.1)	(-2.9)	(-0.6)	(-1.9)
	CO_2 emissions (energy-based)	**1,138**			**1,075**			**1,114**	**1,106**
	(million t-CO2)	(-4.1)			(-5.5)			(3.7)	(-0.8)
	(FY1990 ＝100)	**107.4**			**101.5**			**105.2**	**104.4**

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 grow th.

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

3. The industrial sector consumption includes non-energy uses.

【Effects of Economic Growth and Crude Oil Price Changes】

	Base Case				Sensitivity analysis [Gaps with base case (FY 2011)]			
					Crude oil price *		Economic growth	
	FY2008 (Actual)	FY2009 (Actual)	FY2010 (Forecast)	FY2011 (Forecast)	Higher price 95$/bbl	Lower price 75$/bbl	Lower growth GDP:0.4%	Higher growth GDP:2.4%
Real GDP growth (%)	-4.1	-2.4	3.2	1.4	▲0.02	＋0.02	▲1.0	＋1.0
Private demand [contribution to growth]	[-2.7]	[-3.7]	[+2.3]	[+1.4]	[-0.2]	[-0.2]	[-1.1]	[+0.7]
Public demand [contribution to growth]	[-0.2]	[+1.1]	[+0.1]	[-0.2]	[+0.1]	[+0.1]	[+0.0]	[+0.2]
External demand [contribution to growth]	[-1.2]	[+0.3]	[+0.9]	[+0.1]	[+0.2]	[+0.2]	[+0.1]	[+0.2]
Consumer price index (%)	0.4	-1.6	-0.8	-0.7	＋0.1	▲0.1	▲0.1	＋0.1
Industrial production index (%)	-12.7	-9.0	8.5	2.4	▲0.04	＋0.04	▲1.0	＋1.1
Crude oil CIF price $/bbl	90	69	81	* 85	＋10	▲10	-	-
Primary energy supply (%)	-4.9	-4.2	4.1	-0.1	▲0.2	＋0.2	▲0.5	＋0.5
Final energy consumption (%)	-6.4	-2.8	2.8	-0.2	▲0.3	＋0.3	▲0.5	＋0.5
Industrial sector (%)	-8.9	-3.5	3.9	1.3	▲0.4	＋0.4	▲0.6	＋0.6
Consumer sector (%)	-4.4	-2.2	2.6	-0.9	▲0.2	＋0.2	▲0.4	＋0.4
Transportation sector (%)	-3.6	-2.1	1.1	-2.4	▲0.2	＋0.3	▲0.3	＋0.3
Electricity sales (%)	-3.6	-3.4	5.4	0.2	＋0.04	▲0.04	▲0.5	＋0.6
Town gas sales (%)	-3.9	-1.9	4.4	2.2	▲0.3	＋0.4	▲0.6	＋0.6
Fuel oil sales (%)	-7.9	-3.0	-0.6	-1.9	▲0.5	＋0.5	▲0.5	＋0.5
LPG sales (%)	-6.9	-5.5	-0.2	0.3	▲0.2	＋0.2	▲0.6	＋0.6
CO_2 emissions (%)	-6.7	-5.5	3.7	-0.8	▲0.2	＋0.2	▲0.6	＋0.6

* Based on "Prospects for the International Oil Market and Crude Oil Prices in 2011" by Ken Koyama (IEEJ, December 22, 2010)

【Effects of Temperature Changes】

	1°C rise in summer (July-September)			1°C fall in winter (January-March)		
	Change in demand	% change		Change in demand	% change	
		Period on period	Year on year		Period on period	Year on year
Domestic primary energy supply (10^10kcal)	**1,431**	(1.1)	(0.3)	**1,285**	(0.9)	(0.3)
Final energy consumption (10^10kcal)	**584**	(0.7)	(0.2)	**846**	(0.9)	(0.3)
Industrial sector	**85**	(0.2)	(0.1)	**116**	(0.3)	(0.1)
Household sector	**81**	(0.9)	(0.2)	**531**	(2.8)	(1.0)
Commercial sector	**356**	(3.1)	(0.9)	**199**	(1.8)	(0.5)
Transportation sector	**61**	(0.3)	(0.1)	**-**	(0.0)	(0.0)
Electricity sales (million kWh)	**5,759**	(2.3)	(0.6)	**3,062**	(1.2)	(0.3)
Town gas sales (million m^3/10,000kcal)	**76**	(0.9)	(0.2)	**234**	(2.2)	(0.6)
Fuel oil sales (1,000kl)	**389**	(0.9)	(0.2)	**435**	(0.8)	(0.2)
LPG sales (1,000t)	**-58**	(-1.6)	(-0.4)	**116**	(2.5)	(0.7)

Note: The industrial sector consumption includes non-energy uses.

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