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Economic and Energy Outlook of Japan for FY2024

Despite improvements of energy consumption per GDP and progression towards decarbonization, the CO_2 reduction pace lags behind the target

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Summary of economic and energy outlook [Reference Scenario]

Macro economy | Real GDP growth rate will continue to rise, but at a slower pace Inflation will continue.

Real GDP for FY2024 will increase for the fourth year in a row but the rate of increase is decelerating (+1.0%). For the third year in a row, the consumer price index will exceed 2%; inflation will continue. Led by automobile production, the index of industrial production will rise for the first time in three years led by automobile and will reach its highest level since FY2020 (+1.2%).

Energy supply and demand | Total primary energy supply will decrease slightly for the second year in a row. LNG imports will be about 30Mt lower than the record high of 89 Mt reached ten years ago in FY2014. The CO_2 reduction will continue but it is lagging behind its target.

Total energy consumption will decrease three years in a row due to a fall in ethylene production and a rise in energy prices, the result of the subsidy program for fuel prices being phased down (-0.6%). With progress in energy savings led by higher energy prices and a continuous relatively high increase of the tertiary industries and non-energy intensive industries, the primary energy supply per GDP will decline reaching less than 80% of the FY2013 ratio (-1.5%). LNG imports will fall lower than 60Mt for the first time since FY2005. The additional LNG imports that were required after the Earthquake are no longer needed because of nuclear power plants restart, the addition of solar PVs, and the start-up of newly installed coal-fired power plants.

For the third year in a row, CO_2 emissions will decrease. The decrease from FY2023 will be of 2.0% down to 909 Mt. However, that level represents a change of only 26.4% from FY2013, compared to the 29.2% required to be in line with the Paris agreement target, which is to cut emissions cut by 45% by FY2030 from FY2013.

Energy sales | Electricity sales will slightly rise. City gas sales will increase for the first time in three years but remain lower than FY2022. Total fuel oil sales will decrease for the third year in a row and be less than 60% of the record high in FY1999.

Electricity sales will be 0.1% slightly higher than FY2023. Reflecting a production recovery in iron and steel, automobile, and service industries, and despite some energy savings resulting from higher electricity prices, overall sales for power services will grow (+0.3%). Sales for lighting services will, however, slightly decrease (-0.1%), primarily due to a penetration of higher efficiency appliances and energy-saving actions brought by higher electricity prices and a cooler summer than in the previous year, despite a colder winter.

City gas sales will increase slightly (+0.1%). While sales to the commercial sector and other sectors will decrease, slight increases in sales to the household and increases in sales to the general industry will contribute to the overall increase in city gas sales. However, gas sales except for the general industry will be lower than FY2022 due to progression of energy-savings while city gas prices are lower.

Fuel oil sales will decrease by 1.2% primarily because less will be used for power generation and as feedstock of ethylene. Other factors include fuel switching and energy savings, the result of higher oil prices brought by the removal of the fuel subsidy program. Gasoline will slightly fall with improved fuel efficiency and diffusion of HVs despite the recovery of transportation demand. Diesel oil will fall due to problems in logistics for 2024.

Renewable power generation | The FIT power generation capacity will reach 107 GW by the end of FY2024.

The installed renewable energy-based power generation capacity (including capacity subject to FIT contract expiration) will reach 107 GW by the end of FY2024. While the addition of residential solar and biomass will accelerate, the expansion pace for non-residential solar will be decelerating. Even so, non-residential solar will reach at 64.1GW in FY2024. Wind capacity will accelerate and reach 6.8 GW due to growing pressures to get FIT brought by setting operation deadline and expiration date for non-operating plants. Renewable power generation in FY2024 will total 212.1 TWh (including 98.8 TWh for solar PV, 44.5 TWh for small and medium-sized hydro plants, 51.6 TWh for biomass, 13.3 TWh for wind), accounting for 21.1% of Japan's total power generation. With the inclusion of large-scale hydro, renewable power generation will account for 24.6%.

Table 1 | Summary of Reference Scenario

		Historical				Projection		Year-over-year		
		FY2013	FY2020	FY2021	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024
Energy	Primary energy supply (Mtoe)[1]	490.5	415.5	430.1	416.5	413.0	410.7	-3.2%	-0.8%	-0.6%
	Oil[2] (GL)	234.5	170.0	175.1	172.8	169.4	166.7	-1.3%	-2.0%	-1.6%
	Natural gas[2] (Mt of LNG equiv.)	90.1	78.4	73.9	70.4	66.3	60.7	-4.7%	-5.9%	-8.3%
	Coal[2] (Mt)	194.6	174.6	184.6	177.1	172.6	173.7	-4.1%	-2.5%	0.6%
	Nuclear (TWh)	9.3	37.0	67.8	53.5	82.8	113.7	-21.0%	54.6%	37.5%
	Renewable electricity[3] (TWh)	118.5	196.8	208.1	221.2	237.5	247.5	6.3%	7.4%	4.2%
	FIT generation (TWh)	76.5	158.1	169.3	185.2	199.2	212.1	9.4%	7.5%	6.5%
	Self-sufficiency ratio	6.5%	11.3%	13.3%	12.6%	14.8%	17.0%	-0.7p	2.1p	2.2p
	Electricity sales[4] (TWh)	(871.5)	820.9	837.1	822.2	820.6	821.6	-1.8%	-0.2%	0.1%
	City gas sales[5] (Billion m^3)	39.82	39.51	41.15	40.24	39.83	39.86	-2.2%	-1.0%	0.1%
	Fuel oil sales (GL)	193.6	152.0	153.8	150.8	148.9	147.1	-1.9%	-1.3%	-1.2%
	Energy-related CO_2 emissions (Mt)	1,235	967	987	958	928	909	-2.9%	-3.2%	-2.0%
	(Changes from FY2013)	-	-21.7%	-20.1%	-22.5%	-24.9%	-26.4%	-2.4p	-2.5p	-1.5p
Prices	Crude oil, import, CIF ($/bbl)	110	43	78	103	85	91	32.6%	-17.5%	6.9%
	LNG, import, CIF ($/MBtu)	16.2	7.5	12.1	18.0	12.2	12.2	48.8%	-32.1%	0.1%
	Steam coal, import, CIF ($/t)	108	80	162	361	204	167	122.7%	-43.5%	-18.2%
	Coking coal, import, CIF ($/t)	135	105	195	338	256	211	73.4%	-24.4%	-17.6%
Economy	Real GDP (JPY2015 trillion)	532.1	528.8	543.6	551.8	560.5	566.2	1.5%	1.6%	1.0%
	Industrial production (CY2020=100)	111.7	99.7	105.2	104.9	104.2	105.4	-0.3%	-0.7%	1.2%
	Balance of trade (JPY trillion)	-13.8	1.0	-5.7	-22.0	-7.7	-5.5	288.7%	-65.1%	-29.1%
	Fossil fuel imports (JPY trillion)	28.4	10.6	19.9	35.3	26.9	25.6	77.1%	-23.7%	-4.9%
	Exchange rate (JPY/$)	100.0	106.0	111.9	135.0	144.8	140.0	20.6%	7.3%	-3.3%
	Cooling degree days	511	442	407	506	614	416	24.4%	21.2%	-32.2%
	Heating degree days	1,024	863	966	850	902	971	-12.0%	6.2%	7.6%

Notes:

1. Mtoe = 10^{13} kcal
2. Conversion factors for oil: 9,145 kcal/L; Natural gas: 13,016 kcal/kg; Steam coal: 6,203 kcal/kg; Coking coal: 6,877 kcal/kg since FY2013. Conversion factors for oil: 9,139 kcal/L; Natural gas: 13,068 kcal/kg; Steam coal: 6,203 kcal/kg; Coking coal: 6,866 kcal/kg since FY2018.
3. Including large hydro 30 MW or more. 4. Figures in parentheses are old statistical figures. 5. Conversion factor: 1 m^3 = 10,000 kcal

Topic |

1 Impacts of the subsidy program for fuel prices

The subsidy program to lower fuel prices will be extended until April 2024 and will be phased down after May. If the subsidy program for fuel prices was extended to the end of FY2024, energy prices would lead to lower commodity prices, drive up economic growth and spur industrial production. On the other hand, the subsidy program would have pushed upward energy consumption and CO_2 emissions. As such, the program could be interpreted as temporarily delaying energy savings and postponing reductions in CO_2 emissions. An extension of the subsidy program for fuel prices would also have substantially increase government spendings. The challenge will be to introduce appropriate phase-out measures to minimize the negative effects of the subsidy while recognizing there will be, as in the past, fluctuations in fossil fuel prices. In addition, it is important to reduce energy expenditures by enhancing efficiencies through assistance programs for energy savings in the short term and supply energy through domestic energy such as restart of nuclear power generation and acceleration of install of renewable energy in the middle to long term. Combining and implementing such short, middle and long-term measures are essential in the development of an exit strategy for the subsidy program.

2 Impacts of the progresses of nuclear plant restarts

We assessed the impacts of nuclear power generation on 3Es – economy efficiency, energy security and environment. In the High Case compared to the reference scenario, one more plant would return to operation in FY2024. In such Case, the cost of fossil fuel imports would be reduced by JPY100 billion, the self-sufficiency rate would be improved by 0.8 points, and CO_2 emissions would be reduced by 4 Mt. Considering what each nuclear power plant can contribute to the 3Es, a smooth restart of the plants would be benefits.

Figure 1 | Effect of the nuclear power generation [FY2024, compared with the Reference Scenario]

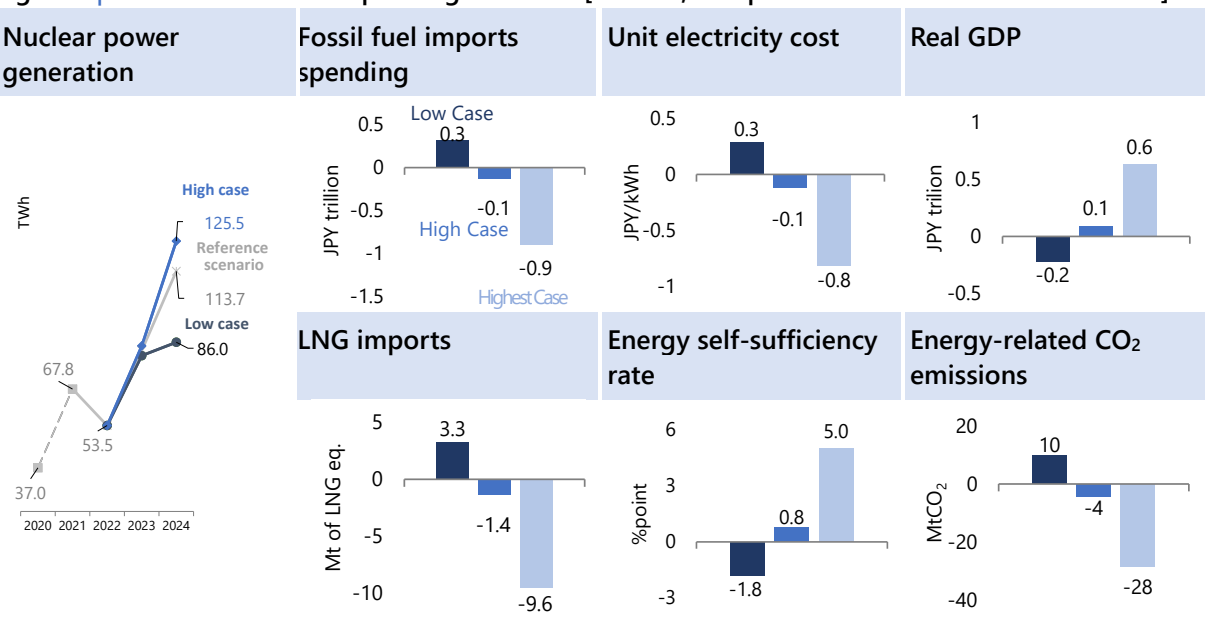

Table 2 | Macroeconomic indicators

	Historical				Projection		Year-over-year		
	FY2013	FY2020	FY2021	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024
Real GDP (JPY2015 trillion)	532.1	528.8	543.6	551.8	560.5	566.2	1.5%	1.6%	1.0%
Private demand	408.1	389.3	398.5	409.3	409.2	414.2	(2.0%)	(-0.1%)	(0.9%)
Private consumption	306.0	285.3	290.4	298.1	298.6	302.0	2.7%	0.2%	1.1%
Private residential investment	21.5	18.9	18.9	18.3	18.6	18.6	-3.4%	1.9%	-0.4%
Private non-residential investment	82.0	85.5	86.9	89.9	90.0	92.1	3.4%	0.1%	2.3%
Public demand	131.2	143.3	145.2	145.2	146.7	147.8	(-0.0%)	(0.3%)	(0.2%)
Government consumption	103.1	114.0	117.7	119.3	120.1	120.8	1.4%	0.7%	0.6%
Public investment	28.1	29.4	27.5	25.9	26.6	26.9	-6.1%	2.9%	1.3%
Net exports of goods and services	-7.4	-4.1	0.5	-1.9	4.3	3.9	(-0.5%)	(1.3%)	(-0.1%)
Exports of goods and services	85.1	92.4	103.9	108.8	112.1	114.4	4.7%	3.1%	2.0%
Imports of goods and services	92.5	96.5	103.4	110.7	107.9	110.5	7.1%	-2.6%	2.4%
Nominal GDP (JPY trillion)	512.7	539.0	553.6	566.5	597.0	614.8	2.3%	5.4%	3.0%
Balance of trade (JPY trillion)	-13.8	1.0	-5.7	-22.0	-7.7	-5.5	288.7%	-65.1%	-29.1%
Exports	70.9	69.5	85.9	99.2	105.0	107.8	15.5%	5.9%	2.6%
Imports	84.6	68.5	91.5	121.3	112.7	113.3	32.5%	-7.0%	0.5%
Fossil fuels	28.4	10.6	19.9	35.3	26.9	25.6	77.1%	-23.7%	-4.9%
Oil	18.7	5.8	11.2	17.8	15.5	15.9	58.3%	-13.0%	2.9%
LNG	7.3	3.2	5.0	8.9	5.9	5.2	77.6%	-34.0%	-11.4%
Current account (JPY trillion)	2.4	16.9	20.1	8.3	24.9	28.7	-58.9%	201.2%	15.4%
Domestic corporate goods price index (2020=100)	99.4	99.9	107.0	117.2	119.6	120.1	9.5%	2.1%	0.4%
Consumer price index (2020=100)	95.2	99.9	100.0	103.2	106.1	108.5	3.2%	2.8%	2.3%
Unemployment rate (%)	3.9	2.9	2.8	2.6	2.6	2.4	[-0.2p]	[+0.0p]	[-0.2p]

Notes: GDP components may not add up to the total GDP due to stock changes and minor data deviations.
( ) stands for contributions. [ ] stands for changes from the previous year.

Table 3 | Production activities

		Historical				Projection		Year-over-year		
		FY2013	FY2020	FY2021	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024
Production	Crude steel (Mt)	111.5	82.8	95.6	87.8	88.0	88.5	-8.2%	0.2%	0.5%
	Ethylene (Mt)	6.76	6.04	6.10	5.48	5.47	5.32	-10.2%	-0.3%	-2.8%
	Cement (Mt)	62.4	56.1	55.7	51.5	48.7	48.7	-7.6%	-5.3%	-0.2%
	Paper and paperboard (Mt)	26.7	22.7	24.0	23.3	22.3	22.0	-3.0%	-4.4%	-1.2%
	Automobiles (Million units)	9.91	7.97	7.55	8.10	8.90	9.29	7.4%	9.9%	4.3%
Production indices	Mining and manufacturing (2020=100)	111.7	99.7	105.2	104.9	104.2	105.4	-0.3%	-0.7%	1.2%
	Food and tobacco	103.6	99.6	99.2	98.5	97.7	97.6	-0.6%	-0.8%	-0.1%
	Chemicals	107.2	99.3	105.2	102.6	100.1	101.4	-2.5%	-2.4%	1.3%
	Non-ferrous metals	110.9	100.0	106.8	105.5	103.7	104.2	-1.2%	-1.7%	0.5%
	Machinery	111.3	100.0	106.7	108.6	109.1	111.5	1.8%	0.5%	2.2%
Tertiary industry activity index (2015=100)		100.8	95.3	97.5	99.6	101.8	103.1	2.2%	2.2%	1.3%

Notes: Chemicals include chemical fibers.
Machinery includes general machinery, electrical machinery, information and telecommunications equipment, electronic parts and devices, precision machinery and metal products.

Table 4 | Primary energy supply

	Historical				Projection		Year-over-year		
	FY2013	FY2020	FY2021	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024
Primary energy supply (Mtoe)	490.5	415.5	430.1	416.5	413.0	410.7	-3.2%	-0.8%	-0.6%
Coal	126.1	110.7	118.9	114.0	111.0	111.6	-4.1%	-2.6%	0.5%
Oil	214.4	155.4	160.0	157.9	154.8	152.4	-1.3%	-2.0%	-1.6%
Natural gas	117.3	102.5	96.6	92.0	86.6	79.4	-4.7%	-5.9%	-8.3%
LNG imports (Mt)	87.7	76.4	71.5	70.5	64.0	58.5	-1.3%	-9.2%	-8.6%
Hydro	16.6	16.2	16.3	16.0	16.7	16.3	-2.1%	4.5%	-2.3%
Nuclear	1.9	7.9	14.5	11.5	17.6	23.9	-20.8%	53.1%	36.0%
New energy, etc.	14.1	22.7	23.9	25.1	26.3	27.2	5.2%	4.9%	3.3%
Self-sufficiency rate	6.5%	11.3%	13.3%	12.6%	14.8%	17.0%	-0.7p	+2.1p	+2.2p
Primary energy supply per GDP (FY2013=100)	100.0	85.2	85.8	81.9	79.9	78.7	-4.6%	-2.4%	-1.5%
Energy-related CO_2 emissions ($MtCO_2$)	1,235	967	987	958	928	909	-2.9%	-3.2%	-2.0%
Change from FY2013	-	-21.7%	-20.1%	-22.5%	-24.9%	-26.4%	2.4p	2.5p	1.5p

Notes: New energy, etc includes solar photovoltaics, wind, biomass, solar heat, and geothermal, etc.
Self-sufficiency rate is based on IEA standard.

Table 5 | Electricity sales and power generation / purchase mix (electric utility use)

	Historical				Projection		Year-over-year		
	FY2013	FY2020	FY2021	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024
Electricity sales (TWh)	(871.5)	820.9	837.1	822.2	820.6	821.6	-1.8%	-0.2%	0.1%
Lighting service	284.3	278.0	278.1	270.3	268.9	268.5	-2.8%	-0.5%	-0.1%
Power sercice	(587.2)	543.0	559.0	552.0	551.7	553.1	-1.2%	-0.1%	0.3%
Extra-high and High voltage	(545.8)	506.7	523.3	516.9	516.5	518.2	-1.2%	-0.1%	0.3%
Low voltage	(41.3)	36.2	35.7	35.1	35.2	34.9	-1.8%	0.4%	-0.9%
Electricity generated and purchased (TWh)	(963.5)	920.3	945.5	916.7	914.8	915.9	-3.0%	-0.2%	0.1%
Hydro	(8%)	9.5%	9.5%	9.6%	10.0%	9.8%	0.1p	0.4p	-0.2p
Fossil fuels	(89%)	74.0%	70.1%	70.0%	65.1%	60.5%	-0.1p	-4.8p	-4.7p
Coal	(30%)	27.8%	27.7%	28.0%	27.7%	27.9%	0.2p	-0.3p	0.3p
LNG	(44%)	38.6%	33.8%	33.0%	29.0%	24.4%	-0.8p	-4.0p	-4.5p
Oil, etc.	(15%)	7.5%	8.6%	9.0%	8.5%	8.1%	0.5p	-0.5p	-0.4p
Nuclear	(1%)	4.0%	7.2%	5.8%	9.0%	12.4%	-1.3p	3.2p	3.4p
Renewables (excluding hydro), etc.	(2%)	12.5%	13.2%	14.6%	15.8%	17.3%	1.3p	1.3p	1.4p
Electricity prices (JPY/kWh)	(20.8)	20.5	22.2	29.5	24.7	26.7	32.6%	-16.1%	7.9%
Lighting service	18.1	26.0	27.9	33.9	24.4	27.7	21.6%	-27.9%	13.2%
Power sercice	(20.5)	17.5	19.0	27.3	24.9	26.2	43.9%	-8.9%	5.4%

Notes: Figures in brackets are based on old statistical definitions, and discontinuous with other values.
"Electricity sales" is for electricity utility use, and does not include own use and specified supply.
"Electricity generated and purchased" is only for general electric utilities in FY2013, and its figures since FY2016 are estimated values.
Hydro includes pumped, and LNG includes city gas.

Table 6 | City gas sales (gas utilities)

	Historical				Projection		Year-over-year		
	FY2013	FY2020	FY2021	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024
City gas sales (Billion m^3)	39.82	39.51	41.15	40.24	39.83	39.86	-2.2%	-1.0%	0.1%
Residential	9.55	10.02	9.91	9.34	9.32	9.33	-5.8%	-0.2%	0.1%
Commercial	4.49	3.65	3.70	3.82	3.86	3.81	3.2%	1.1%	-1.4%
Industrial	22.73	22.76	24.37	23.92	23.47	23.57	-1.9%	-1.9%	0.4%
Manufacturing	20.90	17.43	18.91	18.28	19.85	18.28	-3.3%	8.5%	-7.9%
Electric utilities	1.83	5.33	5.46	5.63	5.29	5.29	3.2%	-6.1%	0.0%
Others	3.04	3.08	3.16	3.16	3.17	3.14	0.0%	0.4%	-0.9%
City gas prices(JPY/m^2)	(115.2)	83.3	96.0	143.8	119.4	132.3	49.7%	-16.9%	10.7%
Residential	193.8	165.4	175.0	222.0	204.7	217.6	26.9%	-7.8%	6.3%
Commercial	112.0	85.75	95.55	143.4	118.1	130.9	50.1%	-17.7%	10.9%
Industrial	81.71	52.23	65.18	114.9	88.04	101.0	76.2%	-23.3%	14.7%
Others	106.7	78.05	88.01	133.6	104.2	117.1	51.8%	-22.0%	12.3%

Notes: Converted at 1 m^3 = 41.8605 MJ (10,000 kcal). Figures in brackets are earlier statistical definitions.

Table 7 | Fuel oil / LPG sales and crude oil throughput

	Historical				Projection		Year-over-year		
	FY2013	FY2020	FY2021	FY2022	FY2023	FY2024	FY2022	FY2023	FY2024
Fuel oil sales (GL)	193.6	152.0	153.8	150.8	148.9	147.1	-1.9%	-1.3%	-1.2%
Gasoline	55.5	45.5	44.5	44.8	44.5	44.2	0.6%	-0.5%	-0.7%
Naphtha	45.7	40.3	41.7	38.2	38.1	37.6	-8.2%	-0.3%	-1.3%
Jet fuel	5.1	2.7	3.3	4.0	4.3	4.5	21.6%	6.1%	5.6%
Kerosene	17.9	14.5	13.5	12.2	12.0	11.9	-9.4%	-2.1%	-1.1%
Diesel oil	34.1	32.0	32.1	31.7	31.6	31.3	-1.3%	-0.3%	-0.9%
Heavy fuel oil A	13.4	10.2	10.1	10.4	10.2	10.0	2.8%	-2.2%	-1.9%
Heavy fuel oils B and C	21.9	6.6	8.5	9.5	8.2	7.6	10.7%	-13.1%	-7.1%
For electric utilities	14.4	2.8	4.4	5.1	4.1	3.6	14.3%	-19.6%	-12.3%
For other users	7.5	3.9	4.1	4.4	4.2	4.1	6.8%	-5.5%	-2.1%
LPG sales (Mt)	15.5	12.9	13.4	14.0	13.3	12.8	4.4%	-5.1%	-3.6%
Crude oil throughput (GL)	200.4	139.3	147.5	156.2	151.3	151.1	5.9%	-3.2%	-0.1%

Table 8 | Effects of differing nuclear power generation [FY2024]

		Low Case	Reference Scenario	High Case	Highest Case	Changes from Reference		
						Low	High	Highest
Nuclear assumptions	Restarted nuclear reactors	12	16	17	27	-4	+1	+11
	Power generation (TWh)	86.0	113.7	125.5	193.4	-27.7	+11.8	+79.6
	Share in generation and purchases	8.7%	11.5%	12.6%	19.5%	-2.8p	+1.2p	+8p
Economy	Electricity unit cost[1] (JPY/kWh)	10.86	10.59	10.48	9.83	+0.27	-0.11	-0.76
	Fuel cost	6.81	6.55	6.43	5.78	+0.27	-0.11	-0.76
	FIT purchasing cost	4.05	4.05	4.05	4.05	-	-	-
	Total fossil fuel imports (JPY trillion)	25.95	25.63	25.50	24.73	+0.32	-0.13	-0.91
	Oil	15.95	15.91	15.90	15.85	+0.03	-0.01	-0.06
	LNG	5.49	5.20	5.08	4.35	+0.29	-0.12	-0.85
	Trade balances (JPY trillion)	-5.70	-5.45	-5.35	-4.76	-0.25	+0.10	+0.70
	Real GDP (JPY2011 trillion)	565.98	566.19	566.29	566.82	-0.22	+0.09	+0.62
Energy and environment	Primary energy supply							
	Oil (GL)	167.1	166.7	166.6	166.0	+0.4	-0.1	-0.8
	Natural gas (Mt of LNG eq.)	64.0	60.7	59.3	51.1	+3.3	-1.4	-9.6
	Self-sufficiency rate	15.2%	17.0%	17.7%	22.0%	-1.8p	+0.8p	+5.0p
	Energy-related CO_2 (Mt)	919	909	905	881	+10	-4	-28
	Changes from FY2013	-25.6%	-26.4%	-26.7%	-28.7%	+0.8p	-0.3p	-2.3p

1. Sum of fuel cost, FIT purchasing cost and grid stabilising cost divided by total power generation.

The full text will be available later.

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