

# **Report**

## **The Japanese Energy Market**

**The State of Alaska, Japan Office**

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## **I - Overview on the Energy Market**

According to a report of “Energy in Japan 2003”, issued by the Agency of Natural Resources and Energy, as world energy demand continues to increase, resource-poor Japan faces the possibility of being seriously affected by future changes in the global energy situation. Japan is also required to reduce emissions of CO<sub>2</sub> produced by energy consumption in order to prevent global warming. In addition, Japan’s high energy prices must be reduced to enhance the international competitiveness of its industry

The following is summary of the Energy in Japan 2003.

Electric power is safe, clean and easy to use, and demand therefore continues to increase. The ratio of electricity consumption to the total primary energy supply grew from 25.8% in FY1970 to 41.6% in FY2001 and it is expected to increase strongly in the future. The transition from the use of oil to nuclear power and natural gas in the generation of electricity has made significant progress, and in FY2002 these were major power sources, with nuclear power supplying 31.2% and natural gas 26.6% of the nation’s electricity.

### **LNG**

At the time of the first oil crisis, natural gas supplied only 2% of nation’s energy needs. It now supplies 13% of Japan’s energy. Natural gas is expected to be used more extensively in future. But Japan’s natural gas reserves are poor and 97% of nation’s supplies are imported from overseas.

In FY2002, Japan imported 55.02 million tons of LNG, of which 31.8% from Indonesia, 19.8% from Malaysia, 13.1% from Australia, 12.1% from Qatar, 10.9% from Brunei, 8.4% from United Arab Emirates, 2.3% from U.S.A. and 1.6% from Oman.

### **COAL**

Today Japan is almost 100% reliant on imports for its coal, which provides 19% of the nation’s energy needs.

Global warming must be taken into consideration. At Kyoto Protocol in 1997, Japan made a commitment to reduce its total average greenhouse emission by 6% against 1990 levels between 2008 to 2012, and to control its CO<sub>2</sub> emissions (produced by energy consumption and accounting for 90% of greenhouse gas emissions) to FY1990 levels in FY2010.

At present, Japan and other advanced industrialized nations are engaging international cooperation programs and working to develop clean coal technologies (high-efficiency combustion, etc.), which will reduce the environmental impact of using coal. The introduction of these clean coal technologies is expected to significantly increase the use of coal as a clean energy source.

Total import of coal in FY2002 was 162.6 million tons, of which 56.5% from Australia, 19.1% from China, 11.9% from Indonesia, 5.8% from Canada, 4.3% from Russia, 0.25% from U.S.A., 0.25% from South Africa and 1.8% from Others.

## **OIL**

Japan is entirely reliant on imports for its supply of oil, which provides approximately 50% of its energy needs. Approximately 90% of Japan's oil is imported from the Middle East. Japan's high level of dependence on oil imports from the Middle East is expected to continue.

Japanese enterprises hold long-term drilling rights in oil-produced countries, and are involved in the surveying and development of oil fields and the production of oil, and export part of this oil to Japan.

Japan imported 241.9 million kl of oil in FY2002, of which 22.9% from United Arab Emirates, 22.4% from Saudi Arabia, 13.8% from Iran, 9.2% from Qatar, 6.9% from Kuwait, 5.7% from Oman, 4.0% from Indonesia, 1.6% from China and 13.5% from Others.

## **NUCLEAR POWER GENERATION**

Nuclear power generation is an important energy source in Japan. At present, nuclear power generation provides approximately one-third of all the energy generated in Japan.

Japan imported 300,000 short tons of uranium in FY1999, 28% from Canada, 17% from Australia, 15% from UK, 9% from US, 9% from Niger, 7% from South Africa, 6% from France, 1% from China and 8% from Others.

## **NEW ENERGIES**

New energies are not reliant on imports and are environmentally friendly. At present new energy sources provide only a small portion of the nation's energy needs, but active efforts are being made to promote them.

As of the end of FY2001, Japan had generated 45.2MW of solar electric power for the year, making an eight-fold increase over the figure recorded five years previously and bringing the nation into the position of the world's number one producer of solar power, with its share of 46%. As a second, Germany generated 19.5MW and 16.8MW by US.

Wind power generated 31.2MW in FY2001, representing roughly 22-fold increase from five years ago. Technological advances and increase of scale of wind power generation facilities have reduced costs and contributed to recognition of viability of recognition of wind power generation. Large-scale facilities continue to be established, predominantly in Hokkaido and Tohoku.

At present, new energy account for only approximately 1% of the primary energy supply, the goal is to increase this figure to approx. 3% in 2010.

Source: "Energy in Japan 2003", issued by The Agency of Natural Resources, METI, <http://www.enecho.meti.go.jp>

## II - Revised Long-Term Energy Supply and Demand Outlook

An advisory committee for energy for the Minister of Economics, and Trade Industry (METI) announced Japan's revised ten years long-term energy supply and demand outlook in 2001. Since then, METI has not revised its outlook. Accordingly, the following outlook is still effective.

### Revised Long-Term Energy Demand Outlook (Final Energy Consumption) July 2001

Unit: Million kl crude oil equivalent

	1999 Actual Share (%)	2010 Case I Share (%)	2010 Case II Share (%)	2010 Case III Share (%)
Industry	197 (49.0)	187 (45.8)	185 (46)	173 (45)
Commercial/Residential	105 (26.1)	126 (30.8)	120 (30)	116 (31)
Transportation	100 (24.9)	96 (23.4)	94 (24)	91 (24)
Total:	402 (100)	409 (100)	400 (100)	380 (100)

Case 1: Business as usual (no additional energy conservation measures) scenario

Case 2: Scenario with additional measures for energy conservation and development and introduction of new energy

Case 3: Scenario with no additional nuclear power plant will be constructed.

## Revised Primary Energy Supply Outlook July, 2001

Unit: Million kl crude oil equivalent

Item/year	1999 Actual	Revised Outlook for 2010 - Case 1	Revised Outlook for 2010 - Case 2	Revised Outlook for 2010 - Case 3
	Quantity (%)	Quantity (%)	Quantity (%)	Quantity (%)
Oil	308 (52.0)	280 (45.0)	271 (45)	261 (45)
Coal	103 (17.4)	136 (21.9)	114 (19)	126 (22)
Natural Gas	75 (12.7)	82 (13.2)	83 (14) 59 million tons	83 (14)
Nuclear	77 (13.0)	93 (15.0)	93 (15)	70 (12)
Hydro	21 (3.6)	20 (3.2)	20 (3)	20 (3)
Geothermal	1 (0.2)	1 (0.2)	1 (0.2)	1 (0.2)
New Energy Sources	7 (1.1)	10 (1.6)	20 (3)	19 (3)
Total Supply	593 (100)	622 (100)	602 (100)	580 (100)

Case 1: Business as usual (no additional energy conservation measures) scenario

Case 2: Scenario with additional measures for energy conservation and development and introduction of new energy

Case 3: Scenario with no additional nuclear power plant will be constructed.

### III - Current Long-Term LNG Contracts

Supply Sources	Import Started	Duration of Contract	Production Amount, Per Year, 10,000 ton	Buyers with Contract Amount, Per Year, 10,000 ton
<b>Alaska</b> Upstream Phillips Marathon Downstream Phillips (70) Marathon (30)	Nov., 1969	4/1989-3/2004 4/2004-3/2009 (extended)	130	TEPCO (98) Tokyo Gas (32)
<b>Brunei</b> Upstream Brunei Gov. Shell Total PCEB Jasra Pg Java Downstream Brunei LNG Brunei Gov. (50) Shell (25) Mitsubishi (25)	Dec., 1972	4/1993-3/2013	601 (to Japan) 70 (to Korea)	TEPCO (403) Tokyo Gas (124) Osaka Gas (74)
<b>U.A.E. – Abu Dhabi</b> Upstream ADNOC BP Total JODCO Downstream ADGAS ADNOC (70) Mitsui (15) BP (10) Total (5)	May, 1977	4/1994-3/2019	430	TEPCO (430)
<b>Indonesia – Badak</b> (Basic contract) Upstream VICO Group Total INPEX Downstream Pertamina (100%)	Aug., 1997	1/2000-12/2010	845	Kansai EPC (257) Chubu EPC (215) Kyushu EPC (156) Osaka Gas (130) Nippon Steel Corp (62) Toho Gas (25)

Supply Sources	Import Started	Duration of Contract	Production Amount, Per Year, 10,000 ton	Buyers with Contract Amount, Per Year, 10,000 ton
<b>Indonesia – Badak</b> (Increasing amount) Upstream VICO INPEX Total Unocal Downstream Pertamina (100%)	Aug., 1983	8/1983-3/2003 4/2003-3/2011 (extended)	363	Chubu EPC (170) Kansai EPC (91) Toho Gas (57) Osaka Gas (45)
<b>Indonesia – Badak IV – F train</b> Upstream Inpex Total Unocal Downstream Pertamina (100%)	Jan., 1994	1/1994-12/2013	231	Osaka Gas (127) Tokyo Gas (92) Toho Gas (12)
<b>Indonesia – Arun</b> (Increasing) Upstream Exxon Downstream Pertamina (100%)	Sep., 1978	1/1984-12/2004 1/2005-12/2009 (Extended)	351	Tohoku EPC (300) TEPCO (51)
<b>Indonesia – MCGC</b> Upstream Inpex Total VICO Unocal Downstream Pertamina (100%)	Mar., 1996	3/1996-12/2015	39	Osaka Gas (10) Nihon Gas (8) Hiroshima Gas (21)
<b>Indonesia – Arun</b> (Increasing) Upstream Exxon Downstream Pertamina (100%)	Sep., 1978	1/1984-12/2004 1/2005-12/2009 (Extended)	351	Tohoku EPC (300) TEPCO (51)

Supply Sources	Import Started	Duration of Contract	Production Amount, Per Year, 10,000 ton	Buyers with Contract Amount, Per Year, 10,000 ton
<b>Malaysia – I</b> Upstream Shell Carigali Downstream Malaysia LNG (100%)	Feb., 1983	2/1983-3/2003 4/2003-3/2018 (Extended) 10/1993-9/2013	760	TEPCO (480) Tokyo Gas (260) Saibu Gas (20)
<b>Malaysia – II</b> Upstream Shell Sarawak Downstream Malaysia LNG (100%)	June, 1995	6/1995-3/2015  6/1996-3/2016  10/1993-9/2013 5/1997-5/2017	210  95  16 15	Kansai EPC (42) Tokyo Gas (80) Osaka Gas (60) Toho Gas (28) Tohoku EPC (50) Shizuoka Gas (45) Saibu Gas (16) Sendai City Gas (15)
<b>Malaysia – III - Tiga</b> Upstream Shell Nisseki Sarawak Carigali Nisseki Malaysia Downstream Malaysia LNG Tiga Petronas (60%) Shell (15%) Nisseki Kaihatsu (10%) Sarawaku (10%) DGN (5%)	April, 2003	4/2005-3/2025  4/2004-3/2024  4/2002-3/2022  4/2003-3/2004 (One year spot)	50  160  48	Tohoku EPC (50)  Tokyo Gas Toho Gas Osaka Gas <hr style="width: 20%; margin: auto;"/> (160)  JAPEX (48)  TEPXO (54)
<b>Australia – North West Shelf</b> Upstream Australian NWS Joint Venture - Woodside Shell, BP Chevron BHP, MIMI Downstream NWS Joint Venture Woodside (1/6) Shell (1/6) BP (1/6) Chevron (1/6) BHP (1/6) MIMI(1/6)	Aug., 1989	8/1989-3/2009 4/1996-3/2009	733	TEPCO (118) Chubu EPC (105) Kansai EPC (113) Chugoku EPC (111) Kyushu EPC (105) Tokyo Gas (79) Osaka Gas (79) Toho Gas (23)

Supply Sources	Import Started	Duration of Contract	Production Amount, Per Year, 10,000 ton	Buyers with Contract Amount, Per Year, 10,000 ton
<b>Qatar</b> Upstream QP Total Exxon Mitsui & Co., Ltd. Marubeni Corp. Downstream QP (65) Total (10) Exxon (10) Mitsui & Co., Ltd. (7.5) Marubeni (7.5)	Jan., 1997	1997-2021  1999-2022  1998-2022	600	Chubu EPC (400)  Tohoku EPC (52) TEPCO (20) Kansai EPC (29) Chugoku EPC (12)  Tokyo Gas (35) Osaka Gas (35)  Toho Gas (17)
<b>Oman</b> Upstream Oman Government Shell Total Partex Downstream Oman LNG Oman Government (51%) Shell (30%) Total (5.54%) KOLNG (5%) Mitsubishi Corp. (2.77%) Mitsui & Co., Ltd. (2.77%) Partex (2%) Itochu Corp. (0.92%)	April, 2004	11/2000-10/2025	66	Osaka Gas (66)

Source: Ministry of Economy, Trade and Industry (METI)  
As of June, 2003

## IV - New LNG Development Projects

Supply Sources	Import Started	Duration of Contract	Production Amount, 10,000 ton/year	Buyers with Contract Amount, 10,000 ton/year
<b>Australia Expansion</b> Upstream Australian NWS Joint Venture – Woodside BP Shell Chevron BHP MIMI Downstream Australian NWS Joint Venture – Woodside (1/6) Shell (1/6) BP (1/6) Chevron (1/6) BHP (1/6) MIMI (1/6)	2004 (targeted)	4/2004-3/2029  4/2004-3/2034 (Osaka Gas- 100) 2006-2021 (Kyushu EPC – 50)	420 (5 trains)	Tokyo Gas (107.3) Toho Gas (29.7) Osaka Gas (100) Kyushu EPC (50) Tohoku EPC (40?) Chubu EPC (60?)
<b>Australia – Darwin            LNG – East Timor</b> Upstream Phillips Santos INPEX Petroz EMET Downstream Darwin LNG (100% owned by Phillips)	2006	1/2006-12/2022	300	TEPCO (200) Tokyo Gas (100)
<b>Sakhalin – II</b> Sakhalin Energy Investment Co. Royal Dutch/Shell MIMI	2007 (targeted)			TEPCO (150 plus 50?) Tokyo Gas (110?) Tohoku EPC (50?) Kyushu EPC (50?) Toho Gas (30?)

Source: Ministry of Economy, Trade and Industry (METI)  
 June, 2003

Under the long, continued Japanese economic recession, it is predicted that the increase of energy demand, especially electricity for industrial use, would be continue to be slow. Most companies and trading companies in the electric power industry are still hesitant about a positive future demand

According to an annual report of 2003 Ten Year Rolling Plan for Electric Power Plant Construction, the electric power companies predicted it's electricity demand will be increased by 1.3%, with the annual average from 8,241 kwh in 2003 to 9,463 kwh in 2012.

**References:**

“Energy in Japan 2003”, issued by the Agency of Natural Resources and Energy, Ministry of Economy, Trade and Industry.

“2003 Ten Year Rolling Plan for Electric Power Plant Construction”, issued by Agency of Natural Resources and Energy, METI.

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