

Present Environment of Japan's Coal Supply

Yoshimitsu MIMUROTO, Deputy General Manager

Shinzo SUGIUCHI, Senior Engineer

Koichi KOIZUMI, Senior Engineer

Atsuo SAGAWA, Senior Engineer

Kiminori MAEKAWA, Senior Engineer

International Cooperation Department

Introduction

The Asian economies, which had been burgeoning since the beginning of the 1990s, were severely hit by the currency crisis initiated in July 1997 from Thailand. The resultant economic stagnation had grave impacts on the Asian economies' energy supply and demand. Now that four years have passed since the currency crunch, Asia's economic trends are showing signs of recovery. It is a matter of vital importance from the viewpoint of Japan's energy security to examine the present and future environment of coal supply and demand.

Based on the latest data available, this report depicts today's environment of Japan's coal supply according to the following topics.

(1) Historical trends of coal supply and demand, etc.

Trends of world coal demand, production and trade, and coal import price

(2) World's coal supply and demand outlook

(3) Asia's energy supply and demand, and coal supply and demand

(4) Major producing countries' energy supply and demand, and coal supply and demand

(5) Present situation of Japan's coal supply and demand

(6) Position of coal in Japan's primary energy supply

(7) Others

Consolidation in the coal industry, present situation of Japan's coal resource development

1. Historical trends of coal supply and demand, etc.

1-1 Position of coal in the world's primary energy supply

As shown in Table 1-1, compared with other energy sources in terms of oil equivalent, the share of coal in primary energy supply has been on the decline in recent years. In addition, coal consumption itself has been shrinking lately.

By use, however, coal demand for power production is continuing to grow in absolute terms (Table 1-2). Overall coal demand itself hit its ceiling after reaching a peak in 1997. Today, coal demand is on the decline in all uses except power production.

Table 1-1 World's Primary Energy Supply by Fuel

(Unit: Million toe)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Annual average growth (01/90)
Oil	3,140 38.6%	3,138 38.5%	3,170 38.8%	3,141 38.2%	3,200 38.4%	3,247 38.1%	3,323 37.8%	3,396 38.4%	3,410 38.5%	3,481 39.2%	3,519 38.7%	3,511 38.5%	1.0%
Coal	2,266 27.9%	2,218 27.2%	2,204 27.0%	2,200 26.8%	2,219 26.7%	2,255 26.5%	2,336 26.6%	2,324 26.3%	2,280 25.8%	2,163 24.3%	2,217 24.4%	2,255 24.7%	0.0%
Natural gas	1,774 21.8%	1,806 22.2%	1,810 22.1%	1,849 22.5%	1,858 22.3%	1,914 22.5%	2,004 22.8%	1,992 22.5%	2,017 22.8%	2,069 23.3%	2,158 23.7%	2,164 23.7%	1.8%
Nuclear	453 5.6%	475 5.8%	479 5.9%	495 6.0%	504 6.1%	526 6.2%	545 6.2%	541 6.1%	551 6.2%	571 6.4%	585 6.4%	601 6.6%	2.6%
Hydro	498 6.1%	511 6.3%	509 6.2%	537 6.5%	541 6.5%	570 6.7%	579 6.6%	589 6.7%	596 6.7%	600 6.8%	617 6.8%	595 6.5%	1.6%
Total	8,131	8,148	8,171	8,222	8,322	8,512	8,787	8,841	8,853	8,884	9,095	9,126	1.1%

Note: BP Statistics cover commercial energies alone, with the renewables (e.g. firewood, charcoal) excluded.

Source: "BP Statistical Review of World Energy 2002," June 2002

Table 1-2 World's Coal Demand

(Unit: Million tons)

	1980	1985	1990	1995	1996	1997	1998	1999	Up/down (99/80)	Annual average growth		
										90/80	99/90	99/80
Steelmaking	632.8 22.5%	625.5 19.3%	614.9 17.3%	619.0 16.7%	614.9 16.2%	629.8 16.5%	587.3 15.7%	570.1 15.6%	-62.7	-0.3%	-0.8%	-0.5%
Power production	1,231.9 43.9%	1,465.1 45.2%	1,753.9 49.3%	2,079.5 56.0%	2,211.3 58.4%	2,253.5 59.0%	2,310.7 61.6%	2,327.3 63.6%	1,095.4	3.6%	3.2%	3.4%
Residential & commercial	181.1 6.5%	225.3 6.9%	216.9 6.1%	184.7 5.0%	179.9 4.7%	157.8 4.1%	119.4 3.2%	117.6 3.2%	-63.5	1.8%	-6.6%	-2.2%
Other uses	760.5 27.1%	927.6 28.6%	972.3 27.3%	826.9 22.3%	781.9 20.6%	776.0 20.3%	733.8 19.6%	642.8 17.6%	-117.7	2.5%	-4.5%	-0.9%
Total	2,806.3	3,243.5	3,558.0	3,710.1	3,788.0	3,817.1	3,751.2	3,657.8	851.5	2.4%	0.3%	1.4%

Source: IEA, "Coal Information 2001 with 2000 data"

1-2 Trade

As noted from Table 1-3, world trade until now has been expanding favorably at an annual rate of 4.5% on the average is exceeded. However, coals for the international market are not supplied in such large quantities, even though they are claiming an increasing share in coal output. The growth of the steaming coal trade reflects growing use of coal in power production by consuming countries.

Table 1-3 World's Coal Production and Trade

(Unit: Million tons)

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001	Annual average growth	
											01/80	01/90
Production	2,806	3,199	3,557	3,700	3,777	3,796	3,738	3,662	3,661	3,836	1.5%	0.7%
Trade	242	329	386	468	488	511	519	521	570	625	4.6%	5.1%
(trade/production)	8.6%	10.3%	10.9%	12.6%	12.9%	13.4%	13.9%	14.2%	15.6%	16.3%		
Steaming coal	112	177	215	273	294	311	333	336	389	442	6.8%	8.5%
Coking coal	130	152	172	195	194	200	187	186	181	183	1.6%	-1.2%

Source: IEA, "Coal Information 2002 with 2001 data"

1-3 Price

As shown in Fig. 1-1, per unit calorific value (1,000 kcal/kg) coal is cheapest and features the least price volatility among fossil fuels.

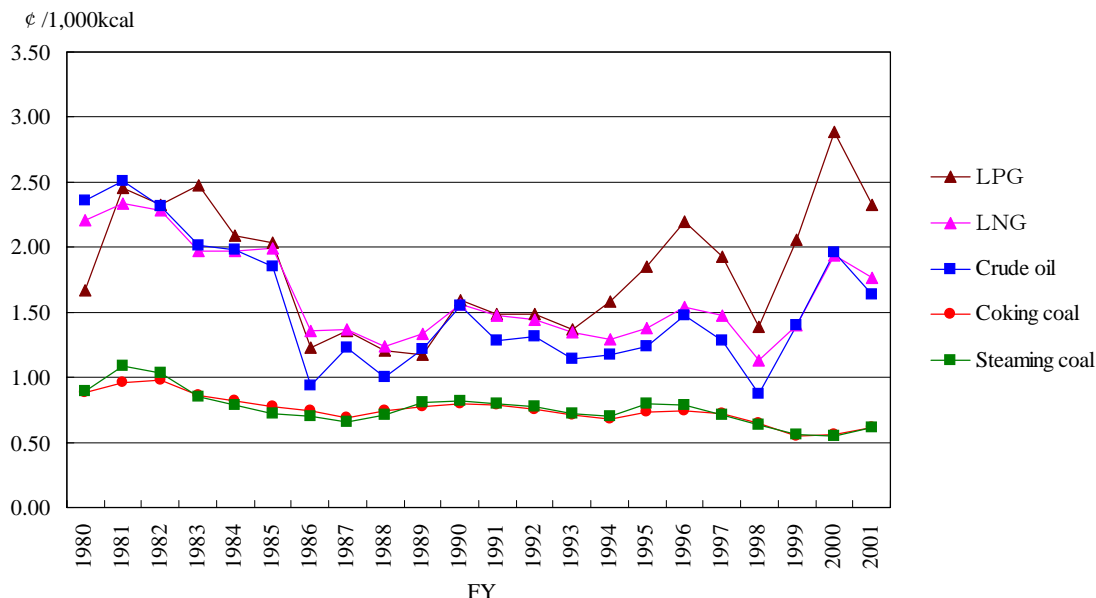
The price of coals which Japan procures from the international market has been stable, although in US\$ it has been on the decline since 1996 (Fig. 1-2). In the case of the Asian economies, the coal price becomes volatility-prone when converted into local currencies due to exchange effects.

2. World's Coal Supply and Demand Outlook

IEA, among others, predicts that coal will have a decreasing share in the world's primary energy supply in the years ahead. Nevertheless, the IEA also projects a rise in coal consumption (Table 2-1).

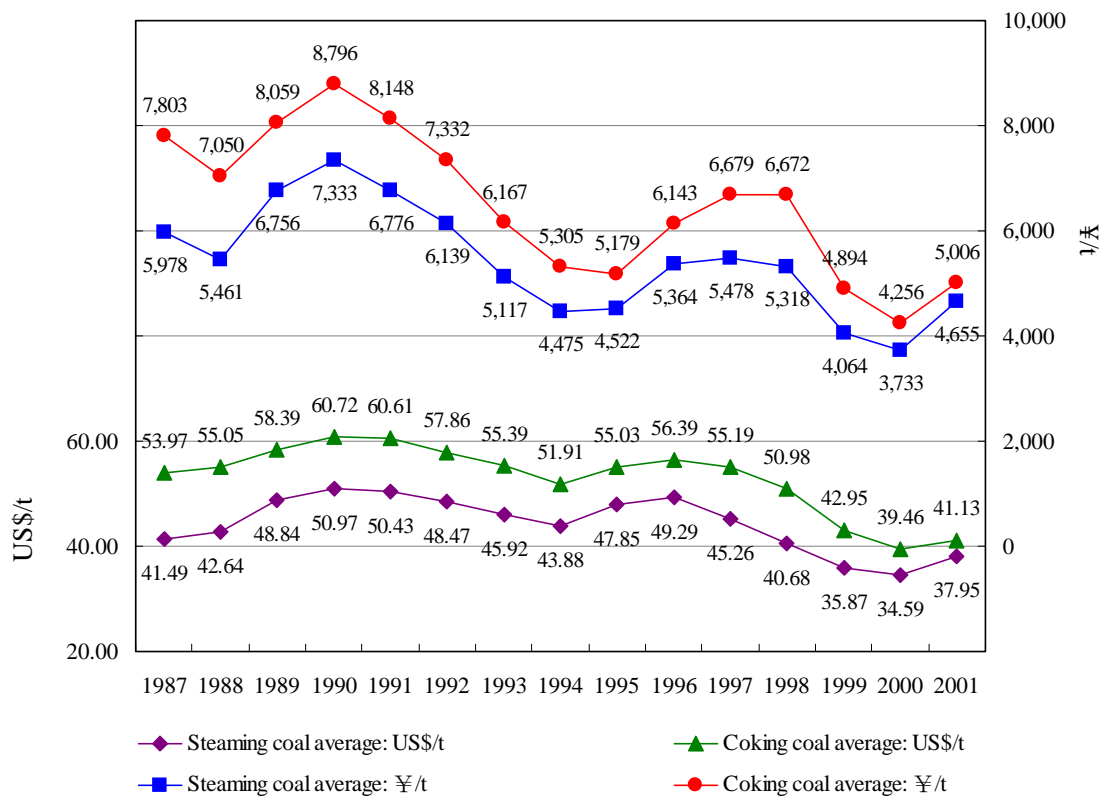
Electricity demand, which provides the basis for economic development, is expected to keep rising from now on, as shown in Table 2-2. In particular, the share held by Asia in the world's coal demand is likely to surpass 50% (Figs. 2-1 & 2-2).

Fig. 1-1 Energy Prices per 1,000 kcal CIF in Japan



Source: "Energy/Economy Statistical Handbook, 2003 Edition," edited by EDMC, IEEJ.

Fig. 1-2 Japan's Imported Coal (CIF) Prices



Source: The prices in US\$/t are quoted from IEA, "Coal Information 2002, with 2001 data," and those in ¥/t from "Japanese Trade Monthly Tables."

**Table 2-1 World's Primary Energy Consumption Outlook and Energy Mix
(Reference Cases of IEA and EIA)**

(Unit: Million toe)

	IEA						EIA							
	Actual		Outlook			Annual average growth (20/00)	Actual			Outlook				Annual average growth (20/99)
	1971	2000	2010	2020	2030		1990	1998	1999	2005	2010	2015	2020	
Oil	2,450 49.0%	3,604 39.3%	4,272 38.4%	5,003 38.0%	5,769 37.8%	1.7%	3,399 39.0%	3,775 39.5%	3,835 39.9%	4,370 39.5%	4,924 39.7%	5,518 39.7%	6,093 39.5%	2.2%
Natural gas	895 17.9%	2,085 22.7%	2,794 25.1%	3,531 26.8%	4,203 27.5%	2.7%	1,877 21.5%	2,129 22.3%	2,190 22.8%	2,651 24.0%	3,110 25.1%	3,674 26.4%	4,249 27.6%	3.2%
Coal	1,449 29.0%	2,355 25.7%	2,702 24.3%	3,128 23.8%	3,606 23.6%	1.4%	2,268 26.0%	2,250 23.5%	2,137 22.2%	2,409 21.8%	2,638 21.3%	2,842 20.4%	3,082 20.0%	1.8%
Nuclear	29 0.6%	674 7.3%	753 6.8%	719 5.5%	703 4.6%	0.3%	514 5.9%	615 6.4%	638 6.6%	678 6.1%	693 5.6%	698 5.0%	706 4.6%	0.5%
Renewables	177 3.5%	461 5.0%	610 5.5%	784 6.0%	984 6.4%	2.7%	668 7.7%	806 8.4%	834 8.7%	948 8.6%	1,048 8.4%	1,169 8.4%	1,278 8.3%	2.1%
Total	4,999	9,179	11,132	13,167	15,267	1.8%	8,724	9,568	9,623	11,053	12,413	13,902	15,410	2.3%

Note: The renewables include hydro.

Toe = tons oil equivalent.

EIA = Energy Information Administration of the U.S. Department of Energy

Source: IEA, "World Energy Outlook 2002", EIA, "International Energy Outlook 2002"

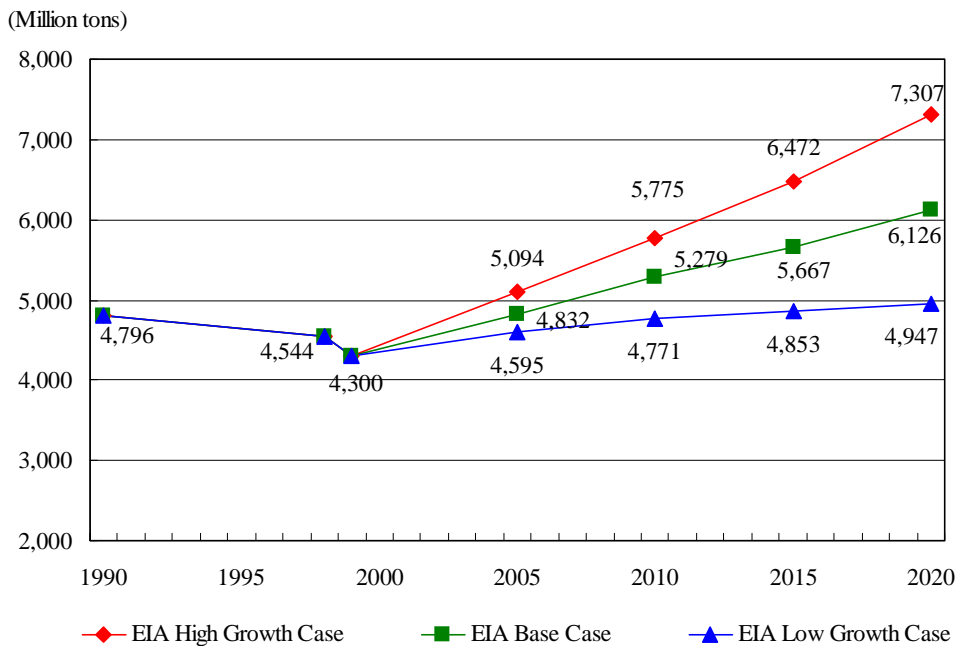
**Table 2-2 Power-Use Energy Consumption Outlook and Energy Mix
(IEA Reference Case)**

(Unit: Million toe)

	World				Annual average growth (30/00)	All Asia excluding Japan				Annual average growth (30/00)	
	2000	2010	2020	2030		2000	2010	2020	2030		
Energy inputs into power production	3,636	4,608	5,559	6,535	2.0%	896	1,377	1,963	2,612	3.6%	
Share of power use in primary energy consumption	39.6%	41.4%	42.2%	42.8%		38.7%	42.4%	45.1%	47.2%		
Power source mix	Coal	1,555 42.8%	1,851 40.2%	2,224 40.0%	2,656 40.6%	1.8%	642 71.7%	923 67.0%	1,283 65.4%	1,739 66.6%	3.4%
	Oil	310 8.5%	332 7.2%	329 5.9%	311 4.8%	0.0%	66 7.4%	75 5.4%	83 4.2%	84 3.2%	0.8%
	Natural gas	725 19.9%	1,170 25.4%	1,631 29.3%	2,032 31.1%	3.5%	76 8.5%	170 12.3%	298 15.2%	398 15.2%	5.7%
	Nuclear	674 18.5%	753 16.3%	719 12.9%	703 10.8%	0.1%	51 5.7%	96 7.0%	138 7.0%	180 6.9%	4.3%
	Hydro	228 6.3%	274 5.9%	327 5.9%	366 5.6%	1.6%	42 4.7%	67 4.9%	96 4.9%	117 4.5%	3.5%
	Renewabl	144 4.0%	228 4.9%	329 5.9%	466 7.1%	4.0%	18 2.0%	46 3.3%	65 3.3%	94 3.6%	5.7%
Primary energy consumption	9,179	11,132	13,167	15,267	1.7%	2,318	3,248	4,349	5,532	2.9%	

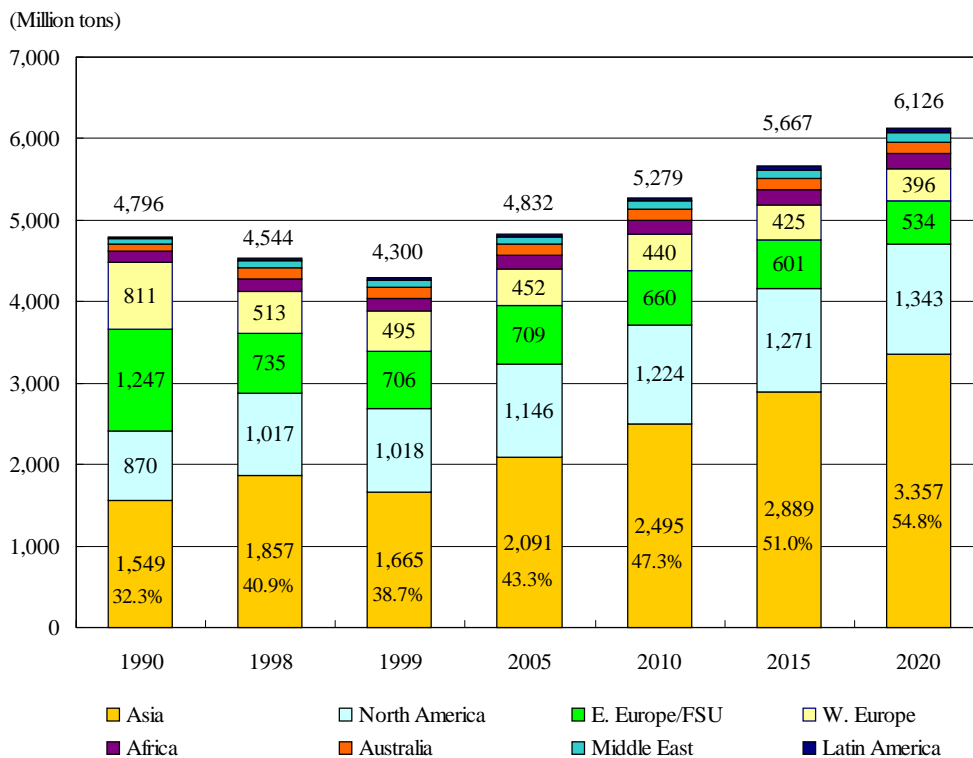
Source: Prepared from IEA, "World Energy Outlook 2002."

Fig. 2-1 World's Coal Demand Outlook



Source: EIA "International Energy Outlook 2002"

Fig. 2-2 World's Coal Demand Outlook (EIA, Reference Case)



Source: EIA "International Energy Outlook 2002"

Also, coal trade is projected to maintain its expanding trend in the coming years (Table 2-3). Australia will remain unchanged as the largest coal supplier to the world market even in the future, while Indonesia, South Africa and China are likely to become coal exporters of greater importance than at present. Latin American countries, notably Columbia and Venezuela, are also expected join the major coal suppliers to the world market.

Table 2-3 Coal Export Outlook from Major Producing Countries to Worldwide Markets (EIA, Reference Case)

(Unit: Million tons)

Exporting countries	Imports by region											
	Steaming coal				Coking coal				Total			
	Europe	Asia	America	Total	Europe	Asia	America	Total	Europe	Asia	America	Total
2000												
Australia	12.5	75.5	2.1	87.7	23.3	69.1	6.0	99.0	35.8	144.6	8.1	186.7
USA	5.3	3.9	14.0	23.2	19.6	2.1	8.1	29.8	24.9	6.0	22.0	53.0
South Africa	50.4	13.1	1.2	67.4	0.4	0.3	0.9	2.5	50.8	13.3	2.1	69.9
Russia	16.7	5.4	0.1	21.1	2.8	3.4	0.0	7.3	19.5	8.8	0.1	28.4
Poland	14.2	0.0	0.0	13.2	3.0	0.0	0.1	2.7	17.2	0.0	0.1	16.0
Canada	0.3	3.0	0.6	4.6	7.4	17.5	3.3	29.8	7.7	20.5	3.9	34.4
China	2.9	48.8	0.2	48.1	0.3	6.4	0.0	6.7	3.2	55.2	0.2	54.8
South America	27.6	0.0	13.6	42.1	0.4	0.1	0.1	0.6	27.9	0.1	13.7	42.7
Indonesia	4.1	42.2	2.2	54.3	0.5	9.6	0.0	10.2	4.5	51.8	2.2	64.4
Total	134.0	191.9	34.0	361.8	57.6	108.5	18.5	185.7	191.6	300.4	52.5	547.5
2010												
Australia	9.1	98.2	0.6	107.8	32.3	77.6	7.3	117.1	41.4	175.7	7.9	224.9
USA	2.8	6.1	7.8	16.7	12.2	1.2	14.1	27.4	15.0	7.3	22.0	44.2
South Africa	64.0	7.4	4.0	75.3	1.0	0.5	0.0	1.5	65.0	7.9	4.0	76.8
Russia	17.8	5.5	0.0	23.2	2.7	3.9	0.0	6.6	20.4	9.4	0.0	29.8
Poland	7.3	0.0	0.0	7.3	1.0	0.0	0.0	1.0	8.3	0.0	0.0	8.3
Canada	4.5	0.0	0.0	4.5	6.3	12.5	3.0	21.8	10.8	12.5	3.0	26.3
China	0.0	103.0	0.0	103.0	0.0	11.2	0.0	11.2	0.0	114.2	0.0	114.2
South America	33.0	0.0	31.6	64.6	0.0	0.0	0.0	0.0	33.0	0.0	31.6	64.6
Indonesia	6.9	59.8	0.0	66.7	0.5	8.3	0.0	8.7	7.3	68.0	0.0	75.4
Total	145.4	279.9	43.9	469.2	55.9	115.1	24.3	195.3	201.3	395.1	68.2	664.6
2020												
Australia	8.4	102.2	0.6	111.3	32.5	81.4	11.2	125.1	40.9	183.6	11.9	236.4
USA	1.7	6.8	6.5	15.1	11.0	1.3	16.4	28.8	12.8	8.1	23.0	43.8
South Africa	61.4	15.4	3.9	80.7	0.8	0.5	0.0	1.4	62.2	16.0	3.9	82.1
Russia	14.6	6.5	0.0	21.1	2.7	4.3	0.0	7.0	17.3	10.8	0.0	28.1
Poland	5.0	0.0	0.0	5.0	1.0	0.0	0.0	1.0	6.0	0.0	0.0	6.0
Canada	2.6	0.0	0.0	2.6	6.2	12.7	1.5	20.4	8.8	12.7	1.5	23.0
China	0.0	110.0	0.0	110.0	0.0	11.2	0.0	11.2	0.0	121.2	0.0	121.2
South America	45.4	0.0	32.7	78.1	0.0	0.0	0.0	0.0	45.4	0.0	32.7	78.1
Indonesia	0.0	76.0	0.0	76.0	0.4	8.3	0.0	8.7	0.4	84.4	0.0	84.7
Total	139.2	317.0	43.8	500.0	54.6	119.8	29.2	203.6	193.8	436.7	73.0	703.5

Source: EIA, "International Energy Outlook 2002"

3. Asia's Energy Supply and Demand, and Coal Supply and Demand

3-1 Past trends

3-1-1 Demand and others

In Asia, the total primary energy supply has grown higher than the world average. However, along with the world's trends, the share of coal in primary energy supply is falling. Recently, coal consumption has also been on the decline (Table 3-1).

Table 3-1 Asia's Primary Energy Supply by Fuel

(Unit: Million toe)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Annual average growth (01/90)
Oil	620 36.0%	650 36.4%	695 37.4%	723 37.1%	773 37.5%	814 37.4%	851 37.0%	883 37.9%	860 37.5%	902 40.0%	934 40.1%	928 38.9%	3.7%
Coal	826 48.0%	843 47.2%	866 46.5%	900 46.2%	945 45.8%	993 45.6%	1,056 46.0%	1,042 44.7%	1,009 44.0%	911 40.4%	927 39.8%	972 40.8%	1.5%
Natural gas	122 7.1%	133 7.4%	141 7.6%	150 7.7%	164 7.9%	174 8.0%	190 8.3%	200 8.6%	205 8.9%	223 9.9%	238 10.2%	249 10.5%	6.7%
Nuclear	65 3.8%	69 3.9%	71 3.8%	79 4.1%	84 4.1%	93 4.3%	98 4.3%	104 4.5%	109 4.7%	110 4.9%	113 4.9%	115 4.8%	5.3%
Hydro	87 5.1%	90 5.0%	87 4.7%	94 4.9%	96 4.7%	103 4.7%	103 4.5%	102 4.4%	112 4.9%	108 4.8%	118 5.1%	120 5.0%	3.0%
Total	1,720	1,784	1,861	1,946	2,062	2,177	2,297	2,331	2,295	2,256	2,330	2,384	3.0%

Note: BP Statistics cover only commercial energies, with the renewables (e.g. firewood, charcoal) excluded. The figures for "Total" include countries of Oceania except Australia and New Zealand.

Source: "BP Statistical Review of World Energy 2002," June 2002

Table 3-2 Asia's Coal Demand by Use

(Unit: Million tons)

	1980	1985	1990	1995	1996	1997	1998	1999	Up/down (99/80)	Annual average growth		
										90/80	99/90	99/80
Steelmaking	235.6 26.3%	272.7 21.8%	284.3 18.7%	371.4 19.4%	375.5 18.8%	388.8 19.6%	354.0 18.4%	337.4 18.1%	101.8	1.9%	1.9%	1.9%
Power production	204.1 22.8%	312.3 25.0%	490.2 32.2%	780.2 40.7%	856.3 42.8%	881.2 44.3%	911.0 47.3%	949.6 51.0%	745.5	9.2%	7.6%	8.4%
Residential & commercial	137.8 15.4%	182.1 14.6%	187.4 12.3%	138.9 7.2%	137.3 6.9%	116.1 5.8%	85.2 4.4%	81.1 4.4%	-56.7	3.1%	-8.9%	-2.8%
Other uses	316.8 35.4%	484.0 38.7%	561.3 36.9%	627.1 32.7%	630.7 31.5%	601.4 30.3%	575.5 29.9%	493.2 26.5%	176.4	5.9%	-1.4%	2.4%
Total	894.3	1,251.1	1,523.2	1,917.6	1,999.8	1,987.5	1,925.7	1,861.3	967.0	5.5%	2.3%	3.9%

Source: IEA, "Coal Information 2001 with 2000 data"

As shown in Table 3-2, Asia's coal demand turned downward after peaking in 1996-97, as if reflecting the world's trends. However, as shown in Table 2-2, Asia's coal needs for power production are expected to grow faster than the world average. Coal needs for power production have increased rapidly in recent years and are likely to keep rising. Coal demand destined for steelmaking, which decreased after reaching a peak in 1997, may turn upward if the Asian economy bounces back.

3-1-2 Trade

Table 3-3 shows the coal trade of the Asian economies, in which rapid expansion is noted of both imports and exports. Coals supplied from Asian economies to the international market are still limited in quantities, though claiming an increasing share in regional coal output. However, domestic consumption, calculated as the outcome of [(output + imports) – exports], is found to be larger than output. This means that the Asian economies are unable to satisfy their coal demand with regional production alone and that coal imports from outside the region are inevitable.

Table 3-3 Asia's Coal Output and Trade

(Unit: Million tons)

	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001	Annual average growth	
											01/80	01/90
Production	813.6	1,082.8	1,369.7	1,738.1	1,814.8	1,788.4	1,732.8	1,683.9	1,691.4	1,779.2	3.8%	2.4%
Exports (exports/production)	7.3 0.9%	10.0 0.9%	23.5 1.7%	63.4 3.6%	77.5 4.3%	81.5 4.6%	83.3 4.8%	96.8 5.7%	115.8 6.8%	163.4 9.2%	15.9%	16.1%
Imports	83.0	139.6	173.6	233.5	247.0	262.4	263.6	277.8	308.0	313.5	6.5%	4.9%
Domestic consumption	898.1	1,185.3	1,533.7	1,901.9	1,987.2	1,943.4	1,920.6	1,886.5	1,915.6	1,929.2	3.7%	-0.6%

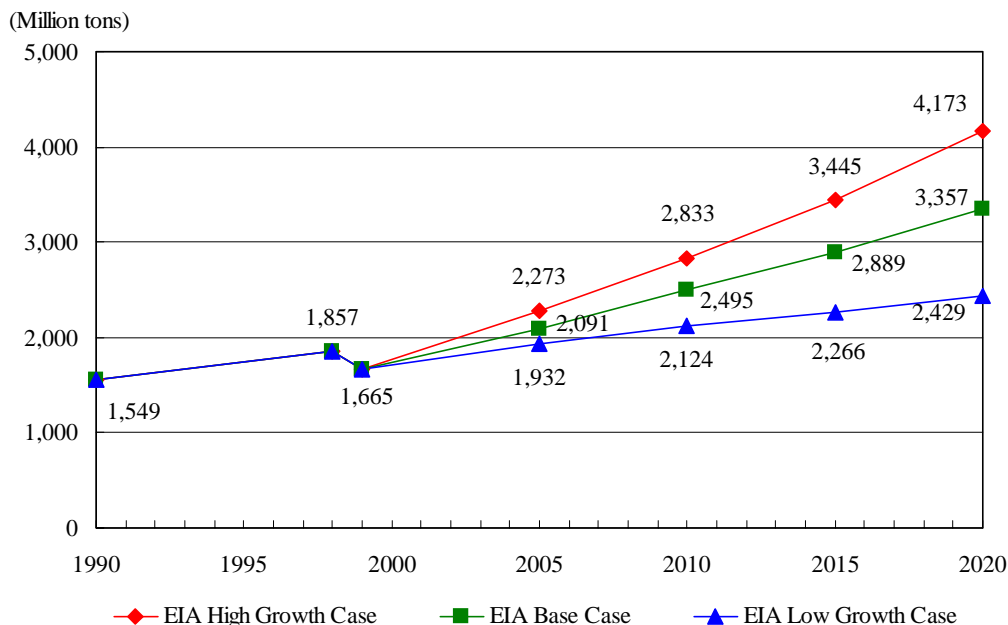
Source: IEA, "Coal Information 2001, with 2000 data"

3-2 Outlook

3-2-1 Supply and demand, etc.

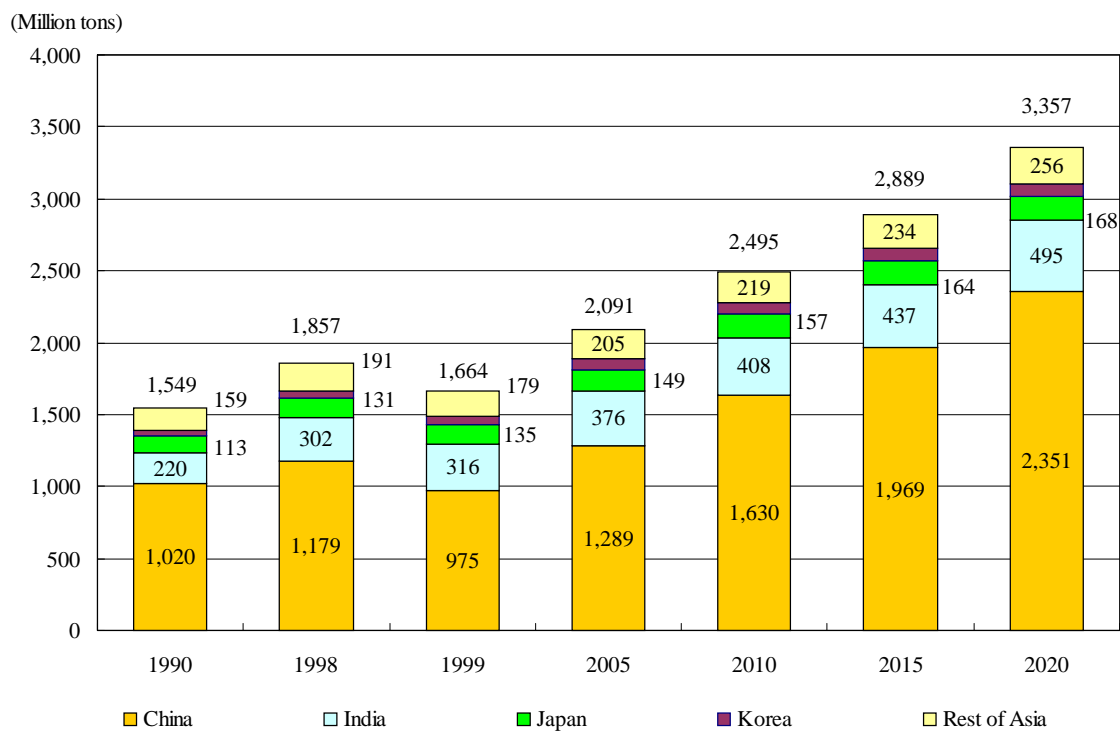
EIA predicts that Asia's coal consumption will keep growing although the share of coal in primary energy supply will decline (Table 3-4, Figs. 3-1 & 3-2). However, given the faster growth of Asia's energy consumption in a different projection (Table 3-4), our assumptions are that the coal share in primary energy supply will slip just a bit and that coal consumption will grow larger than predicted by the EIA.

Fig. 3-1 Asia's Coal Demand Outlook (EIA, Reference Case)



Source: EIA "International Energy Outlook 2002"

Fig. 3-2 Asia's Coal Demand Outlook (EIA, Reference Case)



Source: EIA "International Energy Outlook 2002"

Table 3-4 Primary Energy Consumption Outlook and Energy Mix for All Asia Excluding Japan

(Unit: Million toe)

	EIA (Reference Case)						IEEJ			
	Outlook					Annual average growth (20/99)	Outlook			Annual average growth (20/96)
	1999	2005	2010	2015	2020		1996	2010	2020	
Oil	699 39.1%	856 36.8%	1,048 36.7%	1,282 37.1%	1,510 36.9%	3.7%	556 33.8%	941 31.0%	1,429 30.7%	4.0%
Natural gas	161 9.0%	272 11.7%	354 12.4%	461 13.3%	575 14.1%	6.2%	115 7.0%	262 8.6%	450 9.6%	5.9%
Coal	774 43.3%	982 42.2%	1,179 41.3%	1,377 39.9%	1,613 39.5%	3.6%	907 55.1%	1,666 54.9%	2,536 54.4%	4.4%
Nuclear	40 2.3%	58 2.5%	73 2.5%	88 2.6%	111 2.7%	4.8%	35 2.1%	85 2.8%	117 2.5%	5.1%
Renewables	116 6.5%	164 7.0%	201 7.0%	244 7.1%	282 6.9%	4.3%	34 2.0%	82 2.7%	127 2.7%	5.7%
Total	1,788	2,329	2,857	3,452	4,089	4.0%	1,647	3,036	4,659	4.4%

Note: The renewables include hydro.

Source: Prepared from EIA, "International Energy Outlook 2002" and IEEJ, "The Asian Currency Crisis and Regional Energy Supply and Demand Outlook Up to 2020."

3-2-2 Trade

Coal exports to Asia are forecast to expand markedly in quantitative terms and occupy over 60% of the world's coal trade by 2020. In particular, Australian coals exported to Asia are projected to account for 47.2% of coals traded in Asia as of 2020. The positions after Australia are held by Indonesia and China, followed by South Africa (Table 3-5).

Table 3-5 Coal Export Outlook from Major Producing Countries to Asia (EIA, Reference Case)

(Unit: Million tons)

Exporting countries	2000			2010			2020		
	Steaming coal	Coking coal	Total	Steaming coal	Coking coal	Total	Steaming coal	Coking coal	Total
Australia	75.5	69.1	144.6	98.2	77.6	175.7	102.2	81.4	183.6
USA	3.9	2.1	6.0	6.1	1.2	7.3	6.8	1.3	8.1
South Africa	13.1	0.3	13.3	7.4	0.5	7.9	15.4	0.5	16.0
Russia	5.4	3.4	8.8	5.5	3.9	9.4	6.5	4.3	10.8
Poland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Canada	3.0	17.5	20.5	0.0	12.5	12.5	0.0	12.7	12.7
China	48.8	6.4	55.2	103.0	11.2	114.2	110.0	11.2	121.2
South America	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Indonesia	42.2	9.6	51.8	59.8	8.3	68.0	76.0	8.3	84.4
Total	191.9	108.5	300.4	279.9	115.1	395.1	317.0	119.8	436.7

Source: EIA, "International Energy Outlook 2002"

4. Major Producing Countries' Energy Supply and Demand, and Coal Supply and Demand

The figures shown below are based on the IEA, "Coal Information 2002, with 2001 data," among others sources.

4-1 Australia

In Australia, coal is responsible for around 40% of primary energy supply, but the share seems set for a gradual decline. Also, coal accounts for around 70% of total primary energy production, but the share is likely to diminish from now on in reflection of the considerable expansion of natural gas production.

In 2001 Australia's hard coal output reached 257.3 million tons, up a high 7.5% over the previous year. Because domestic coal demand is not growing so much as production, the greater part of incremental output is exported. According to the IEA projection, Australian coal exports will rise to 211 – 216 million tons by 2005. Then, with an annual growth of 1.7% on average in the years up to 2020, they will reach 262 million tons (steaming coal 143 million tons, coking coal 119 million tons).

4-2 China

In China, the share of coal in primary energy supply, which was once at the level of 60 – 70%, has been falling gradually. The share fell below 60% in 1997 and had dropped further to 57.4% by 2000. In its supply-demand projection made under the NEDO-auspice project, IEEJ also forecast that the coal share would keep falling little by little to around 55% by 2020. The decline in coal will be paired with a considerable rise in oil. Natural gas is likely to grow as well.

IEA states that coal output, up 5.1% from the previous year to 1,294 million tons in 2001, is on the acclivitous. Exports, which were 91 million tons in 2001, are expected to increase in the years up to 2020 to 95.7 million tons (steaming coal 86 million tons, coking coal 9.7 million tons). Domestic demand is expected to increase from 1,205 million tons in 2001 to 1,675 million tons by 2020.

4-3 Indonesia

In Indonesia, the share of coal in primary energy supply increased gradually to 9.4% in 2000. In view of the growing consumption expected at coal-fired power plants, the share is likely to remain on the increase.

In 2001, Indonesia's coal output totaled 92.5 million tons, up 20.8% over the previous year, and exports were 66.4 million tons, up 19.8%. Exports are expected to reach 72 – 73 million tons by 2005, and even 104.7 million tons (steaming coal 99.4 million tons, coking coal 5.3 million tons) by 2020. Domestic demand in 2020 is projected at 35 million tons, nearly double the 1999 level.

4-4 Canada

In Canada, coal occupied 12.1% of primary energy supply as of 2000, and this share is expected to shrink to 5.6% by 2020.

In 2001, Canada produced 34.2 million tons of hard coal, up 1.3% from 2000. Exports fell by 6.0% to 30.1 million tons. Exports in 2020 are forecast at 32.8 million tons (steaming coal 5.2 million tons, coking coal 27.6 million tons).

4-5 USA

In the U.S., coal accounted for 23.6% in primary energy supply in 2000. The share is expected to remain virtually flat, with 22.1% in 2020. According to the EIA, 52% of the U.S. generated output comes from coal-fired power plants. The strong likelihood is that this share will change little and stand at around 47% as of 2020.

In 2001, hard coal output amounted to 945 million tons, up 5.6% from the

previous year. Exports, on the decline since 1992 when the coal price plunged, slumped by 8.9 million tons (down 16.9%) from the previous year. This drop is attributable largely to the mounting domestic coal demand triggered by the energy crisis, which caused imports to rise by 6.6 million tons (up 58.6%) over the previous year. This trend continued well into 2002.

4-6 South Africa

In South Africa, coal, which accounted for 74.8% of primary energy supply in 2000, is the most important energy source. Coal also accounted for 87.6% of primary energy output in 2000.

In 2001 South Africa's coal production ended at 224.5 million tons, up a mere 0.1% or 0.3 million tons over the previous year. The country exports steaming coal only, of which shipments amounted to 69.3 million tons in 2001. Exports in 2020 are projected at 123.5 million tons (steaming coal 119.5 million tons, coking coal 4 million tons). This means that steaming coal exports are forecast to jump by as much as 50 million tons.

4-7 Russia

In Russian primary energy supply, coal ranks third after natural gas and oil, with its share standing at 18.0% as of 2000.

In 2001, Russia's hard coal production was 167.9 million tons, up 10.1% over the previous year. On the other hand, exports surged by 11.6% over the previous year to 41.0 million tons, the highest level in the past few years. According to the Russian government's policy, coal production (including lignite) will be increased to 300 million tons by 2020.

4-8 India

In India, coal accounted for 32.9% of primary energy supply in 2000 and thus serves as the principal energy source of major importance.

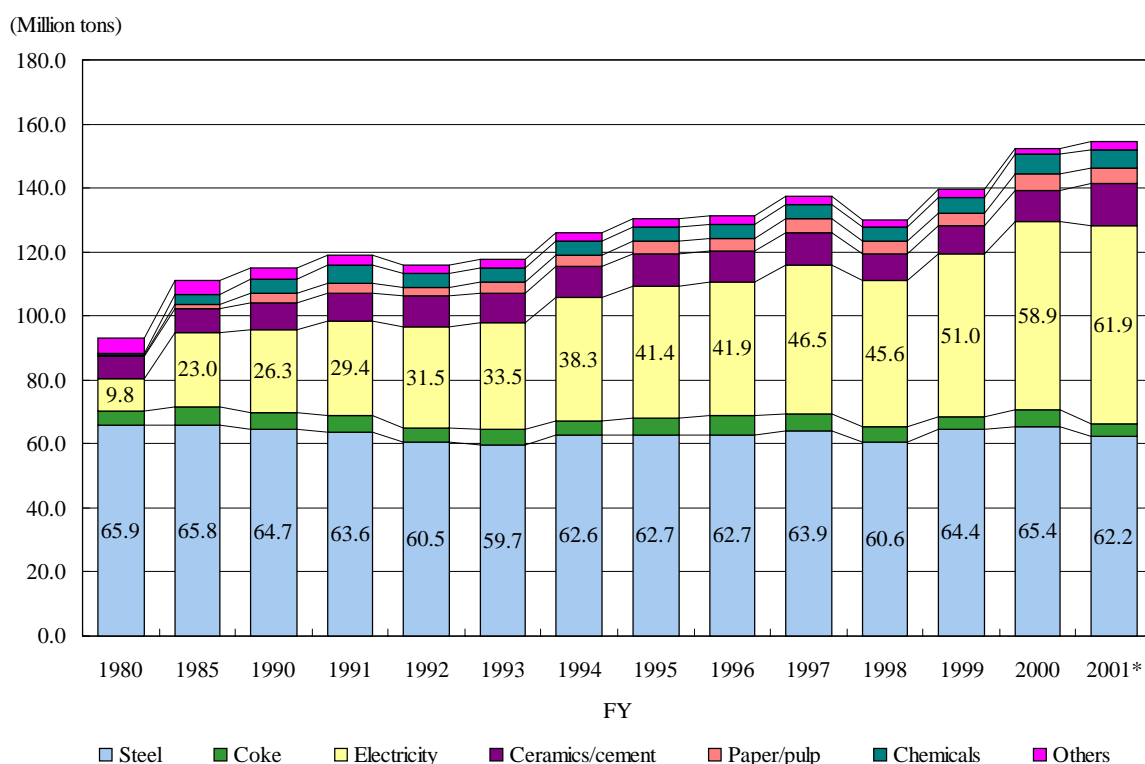
In 2001, India produced 312.5 million tons of hard coal, up 2.1% over the previous year. By coal rank, steaming coal increased by 8.8 million tons but coking coal dropped by 2.5 million tons. Domestic hard coal demand for 2020 is forecast at 480 million tons (steaming coal 434 million tons, coking coal 46 million tons).

5. Present Situation of Japan's Coal Supply and Demand

5-1 Japan's coal demand

Japan's coal consumption has long centered on the steel industry. However, recently growing coal needs for power production have been conspicuous (Fig. 5-1).

Fig. 5-1 Coal Demand by Consuming Industry



Note (*): Because "Energy Production, Supply and Demand Statistics Yearbook" was abolished in December, 2001, the value at the calendar year is indicated about 2001.

Source: "FY2000 Energy Production, Supply and Demand Statistics Yearbook", "Monthly Energy Production, Supply and Demand Statistics, in 2001."

5-1-1 Steel

In FY1973, when crude steel production peaked at 118.53 million tons, the steel industry's coal consumption amounted to 62.76 million tons (incl. 62.53 million tons of coking coal). In comparison to this, in FY2000, crude steel output totalled 106.90 million tons (up 9.1% over the previous year) and coal consumption was 65.41 million tons (incl. 60.62 million tons of coking coal), the latter according to "FY2000 Energy Production, Supply and Demand Statistics Yearbook." Focusing on coal consumption alone, few big differences are noted. However, there are drastic changes

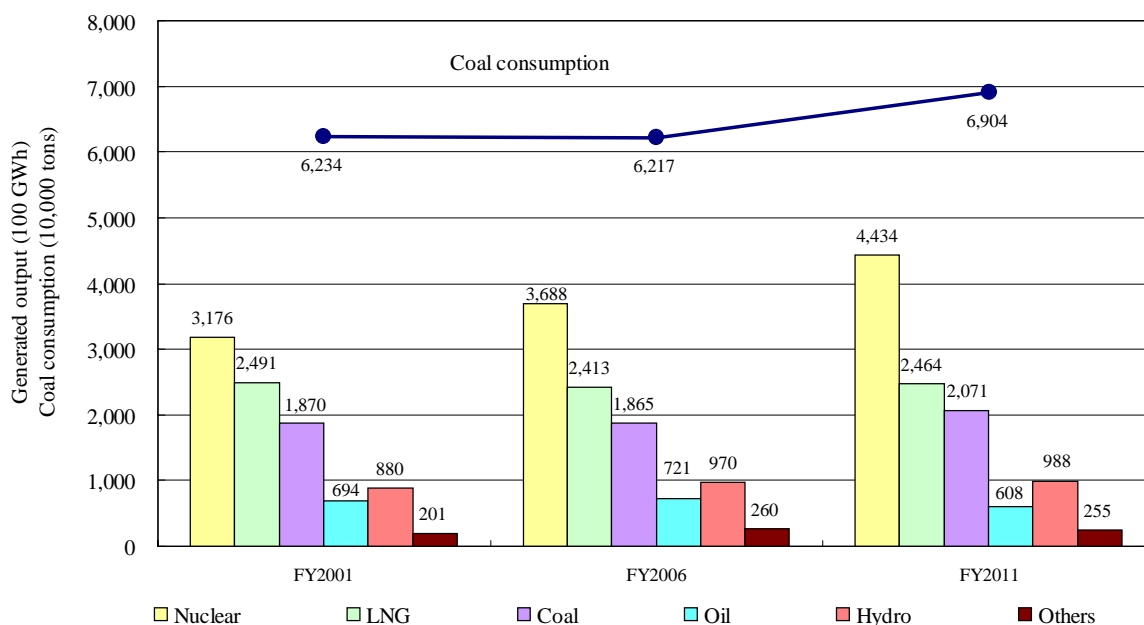
in the qualities of coals in use. Namely, coal ranks not falling in the category of coking coals (steaming coal, anthracite) have been in greater use than ever. Among coking coals, the so-called soft coking coals and non-caking coals, both poor in caking property, are becoming popular. Non-caking coals accounted for 65.0% of coking coals purchased in FY2000.

5-1-2 Electricity

The greater part of steaming coal demand comes from the power industry. Past records show that coal use in power production plunged sharply to 7.57 million tons in FY1975 from 25.94 million tons in FY1968 before the first oil crisis occurred. After the second oil crisis, new coal-fired power plants were built, which sent coal consumption soaring to 26.29 million tons in 1990, 41.41 million tons in 1995, and 62.34 million tons in FY2001.

According to the “Outline of FY2002 Electricity Supply Plan,” installed capacity of coal-fired power, 30.50 GW (13.2% of the total) at FY2001 yearend, is expected to reach 43.94 GW (16.2%) by FY2011 yearend backed by promotion of construction of coal-fired power plants. As a result, coal requirements are likely to increase to 69.04 million tons by FY2011 (Fig. 5-2).

Fig. 5-2 Planned Generated Output and Coal Consumption



Source: “Outline of FY2002 Electricity Supply Plan”

5-1-3 IPPs

During the four-year period from FY1996 to FY1999, a total of 6,727 MW was awarded to IPPs through bidding. Of this, coal-fired IPPs won 3,668 MW, or 54.5% of the whole (Table 5-1).

Table 5-1 FY1996-2001 Wholesale Power Supply Bidding Results

	Called	Tendered	Awarded		Including coal-fired		
	10 MW	10 MW	10 MW	No. of contracts	10 MW	Share	No. of contracts
FY1996	265.5	1,081.3	249.9	19	143.6	57.4%	7
FY1997	285.5	1,425.4	300.9	15	140.8	46.8%	6
FY1998	15.0	76.4	21.5	2	21.5	100.0%	2
FY1999	100.0	251.0	100.4	5	60.9	60.6%	2
FY2000	—	—	—	—	—	—	—
FY2001	—	—	—	—	—	—	—
Total	666.0	2,834.1	672.7	41	366.8	54.5%	17

Source: Prepared from "Coal & Power Report" and "Coal Yearbook 2001."

5-1-4 Ceramics/cement

Fuel switching to coal has taken place rapidly since the oil crisis. Coal consumption, a mere 710,000 tons in FY1978, inflated to 10.78 million tons by FY1981, when the cement industry virtually completed its fuel shifts to coal. Later, as a result of falling production of clinker and the introduction of oil coke, coal consumption dropped, standing at 6.04 million tons as of FY1986. Then, consumption rose gradually to 8.98 million tons in 1991. Since 1992, consumption has stayed at the 9-million-ton level. After recording 9.95 million tons in FY1997, the industry's coal use has been on the decline, remaining at 8.44 million tons in FY1998 and 8.56 million tons in FY1999. In FY2000, however, the cement industry consumed 9.91 million tons of coals, up 1.33 million tons over the previous year.

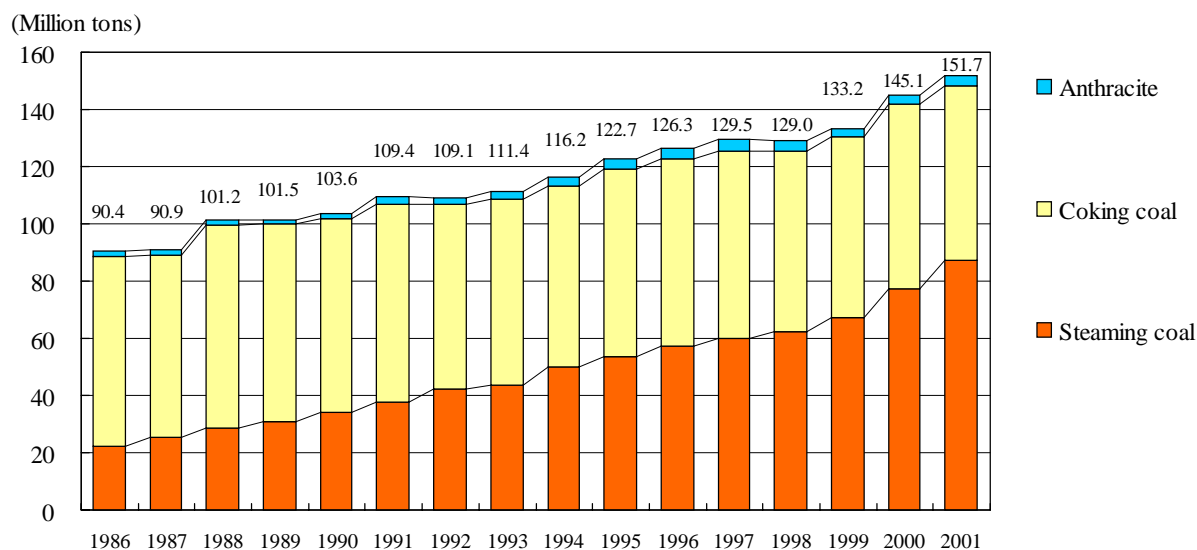
5-1-5 Others

Coal demand from general industries, centering mainly on chemicals and paper/pulp, continued to rise gradually throughout the 1980s due to replacement of existing boilers combined with the introduction of more efficient than ever coal boilers. Since the beginning of the 1990s, coal consumption has been flat or has tended to increase slightly. In FY2000, the chemical industry consumed 5.95 million tons (up 1.15 million tons over the previous year) and the paper/pulp industry consumed 5.06 million tons (up 1.03 million tons over the previous year).

5-2 Japan's coal imports

Japan's coal imports, 151.74 million tons in 2001, have grown by 61.35 million tons in the last 15 years (Fig. 5-3). The growth resulted from growing imports of steaming coal, because imports of coking coal and anthracite alike have been flat. As a result, the share of steaming coal in total coal imports rose to 57.62% by 2001.

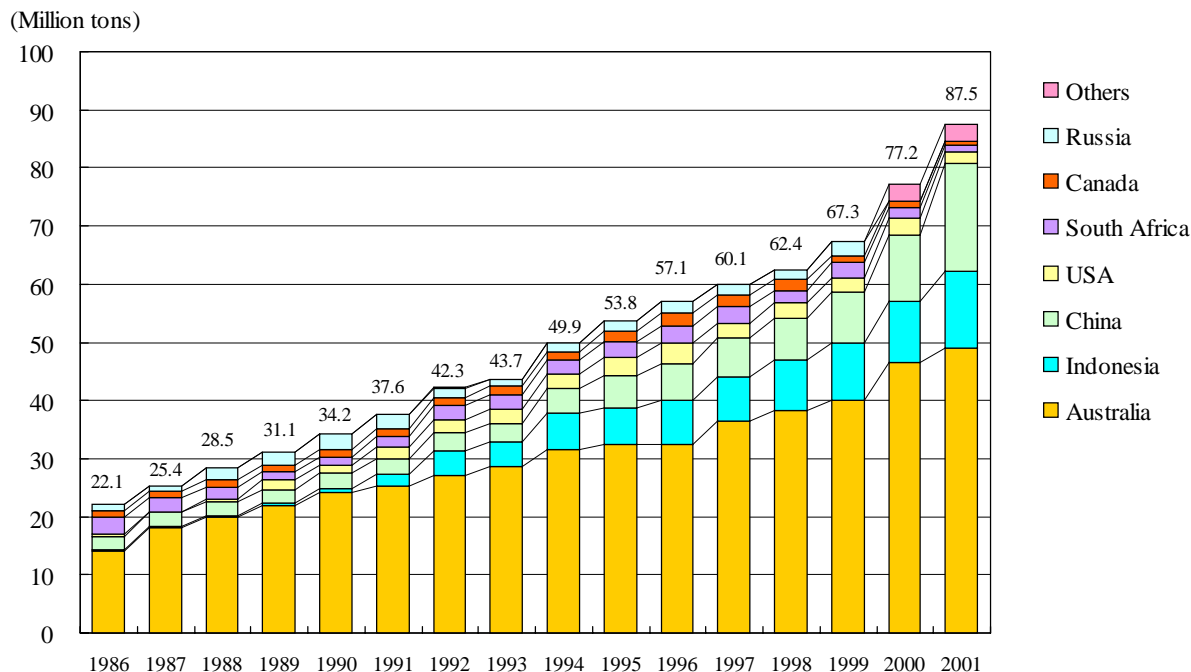
Fig. 5-3 Coal Imports by Coal Rank



Source: "Monthly Energy Production, Supply and Demand Statistics."

In absolute terms, steaming coal imports amounted to 87.45 million tons in 2001. In particular, imports from Australia showed a marked growth. Despite this, Japan's reliance on Australian steaming coal dropped a little from 63.4% in 1986 to 56.0% in 2001. On the other hand, imports from China and Indonesia have been growing. From China Japan imported 18.74 million tons in 2001 compared with 2.65 million tons in 1990. Over the same period, coal imports from Indonesia increased from a mere 660,000 tons to 13.17 million tons, accounting for 15.1% of Japan's total coal imports in 2001 (Fig. 5-4).

Fig. 5-4 Steaming Coal Imports by Supplying Country



Note: Imports from Russia from January 2000 onward are included in “Others.”

Source: “Monthly Energy Production, Supply and Demand Statistics.”

6. Position of Coal in Japan’s Primary Energy Supply

In its report entitled “Energy Policy from Now On” released in July 2001, the Advisory Committee for Resources and Energy described the position held by coal in Japan’s primary energy supply as follows:

Amid these conditions, Japan’s energy policy is required to meet a few basic targets, namely “to realize energy security while fulfilling the needs for environmental preservation and efficiency gains.”

The problem is the contradiction inherent in these targets. For example, in the process of pursuing further efficiency gains through liberalization, etc., which just started, CO₂ emissions can increase as a result of growing use of low-priced coal. On the other hand, CO₂-intensive coal is superior to natural gas in supply stability. Efficiency-oriented moves can hamper introduction of hydro and new energies, which are indigenous but high-cost. Also, such moves can discourage energy conservation. Given that energy-related environs are drastically changing as depicted below, how to achieve these targets concurrently is an extremely difficult question.

In recent years, the energy industries, including oil, electricity and town gas, have undergone specific moves toward liberalization and efficiency gains in progress through institutional reforms. Exposed to competition, which includes newcomers, companies have become more cost-conscious than ever. Along with these new situations, the selection of energy sources, for example, can prompt greater use of coal, already popularly introduced as an oil alternative, because coal is cheaper though more CO₂-intensive than rival energies. In such a case, the greater coal use could undermine efforts to fully meet the warming abatement target. Likewise, the shifts from indigenous non-fossil energies, like hydro and new energies, to imported cheaper fossil fuels, if any, can impede supply security as well. For these reasons, while recognizing that liberalization, among others, has already triggered intensifying moves toward efficiency gains, it is imperative to construct an energy policy capable of advancing the two targets, supply security and environmental conservation, met simultaneously.

After being hit by the oil crises twice, Japan has made utmost efforts to introduce alternative energies. Above all, as mentioned above, aggressive commitments were made to introduce nuclear power generation, which is a major power source in Japan today. Needless to say, safety must be secured as the major premise. Then, given the characteristic that nuclear power is CO₂-free on top of superior supply security, the fact remains unchanged that stepped-up efforts are needed for expanding nuclear power supply capacity as a matter of vital importance.

In reality, however, there are a falling number of nuclear power plant construction projects. In addition, given that growing use of cheaper coal is likely amid the liberalization/efficiency drives, it appears pragmatic to make such policy responses as (1) further expanding the use of less CO₂-intensive natural gas and (2) maximizing the use of CO₂-free indigenous new energies as much as possible.

This report goes on to make the following statement, which appears in “1. General Descriptions of the Standard Case” of “III. A Desirable Image of Energy Supply and Demand (Long-term Energy Supply and Demand Outlook) and Measures to Make It Real.”

Regarding supply, with generating fuels as the centerpiece, the likelihood is that introduction of non-fossil energies, notably nuclear, will not progress so much as assumed in the target case of our previous outlook. A considerable increase in cheaper-priced coal is more likely.

The subsequent “2. Specific Measures to Meet the Basic Targets” states:

..... If these measures fail to meet the basic targets of energy policy, to implement such options as fuel switching at power plants, etc. would become imperative. However, given coal’s unrivaled superiority in supply security among fossil fuels, it will not be enough to adopt a policy that can ax coal use excessively only for its heavy load on the environment.

On this point, the Energy Security Working Group highly evaluated the better supply security of coal as compared with other energies, and this ought to be taken into full consideration

Also, as part of CO₂ reduction efforts, the report suggests that measures to curb coal demand must be examined as follows:

..... In order to respond to the situation, fuel switching for power production, etc. (shifts in selected power sources to be newly built, etc.) appears imperative. To that end, cost gaps between low-priced coal and competing fuels should be filled by taking such actions as subsidies, regulation, taxation and voluntary efforts. Regretfully, the latest examination finished without identifying what policy measures could be effective. Therefore, from now on, in regard to specific measures to realize the aforesaid, their benefits, economic impacts, etc. must be subjected to in-depth examinations, based on which the most appropriate method should be selected. For the purpose of picking out one, examinations must be conducted with account taken of a wide range of factors, from international energy situations, including energy price trends, to domestic economic situations and the status of international talks about the global warming issue.

..... Meanwhile, some state that the utilization factor of nuclear power plants could be increased to 85% if the existing regulatory system continues. In such a case, nuclear power, if running as a baseload source instead of coal-fired power currently in operation, is expected to reduce CO₂ emissions by around 2 million t-C at maximum.

In addition, an appendix to the report, which was entitled “Energy-/Environment-related Taxation as A Measure for Global Warming Abatement,” contains the following statements on coal from energy security aspects:

(6) Relations to Energy Security (Relations to Conservation and New Energy Measures)

When the aim of taxation is to stimulate switching, one may propose a heavily natural gas-dependent tax system simply by arguing that coal is the dirtiest and natural gas is the cleanest among fossil fuels. However, given the outstanding superiority of coal in supply security among fossil fuels, the proposed taxation is not to be recommended from overall energy security aspects.

Therefore, in order to meet the target of stabilizing energy-originating CO₂ emissions in FY2010 at FY1990 levels while securing stable energy supply, it is essential to encourage energy conservation efforts as much as possible. At the same time, effective measures must be taken to introduce CO₂-free new energies, which are indigenous, to the greatest extent possible. Only when these measures fail to meet the target fully should taxation be considered as an additional option to them.

Tables 6-1, 6-2 and 6-3 show “Primary Energy Supply: Past and Future,” “Yearend Installed Capacities (Electric Utilities): Past and Future” and “Generated Output (Electric Utilities): Past and Future,” respectively. They are included in the Long-term Energy Supply and Demand Outlook attached to the report of the Advisory Committee for Resources and Energy.

Table 6-1 The Transition and Outlook of The Primary Energy Supply

(unit: million kiloliter of crude oil equivalent)

FY Item	1990		1999		2010			
					Standard case		Target case	
Total Primary Energy Supply	526		593		622		Around 602	
Form of Energy	Quantity	Shares %	Quantity	Shares %	Quantity	Shares %	Quantity	Shares %
Oil	307	58.3	308	52.0	280	45.0	Around 271	Around 45
Coal	87	16.6	103	17.4	136	21.9	Around 114	Around 19
Natural Gas	53	10.1	75	12.7	82	13.2	Around 83	Around 14
Nuclear	49	9.4	77	13.0	93	15.0	93	Around 15
Water	22	4.2	21	3.6	20	3.2	20	Around 3
Geothermal	1	0.1	1	0.2	1	0.2	1	Around 0.2
New energy	7	1.3	7	1.1	10	1.6	20	Around 3
Renewable*	29	5.6	29	4.9	30	4.8	40	Around 7

Note: Renewable includes New energy, Hydro, Geothermal.

Table 6-2 The Transition and Outlook of The Power Generating Capacity

(unit: 1,000kW)

FY Item	1990		1999		2010			
					Standard case		Target case	
End of the fiscal year power generating capacity	172,120		224,100		266,570		252,880~272,290	
Sector	Quantity	Shares %	Quantity	Shares %	Quantity	Shares %	Quantity	Shares %
Thermal power	104,080	60.5	134,340	59.9	153,430	57.6	146,700~162,200	57.0~59.6
Coal	12,230	7.1	24,880	11.1	44,100	16.5	31,550~44,130	12.3~16.2
LNG	38,390	22.3	56,770	25.3	67,020	25.1	66,060~66,960	24.6~26.1
Oil etc.	53,470	31.1	52,700	23.5	42,310	15.9	49,080~51,110	18.8~19.4
Nuclear	31,480	18.3	44,920	20.0	61,850	23.2	57,550~61,850	22.7~24.1
Hydro	36,320	21.1	44,330	19.8	50,710	19.0	48,100	17.7~19.0
General	19,310	11.2	20,020	8.9	20,700	7.8	20,690	7.6~8.2
Pumping	17,010	9.9	24,310	10.8	30,010	11.3	27,410	10.1~10.8
Geothermal	240	0.1	520	0.2	590	0.2	540	0.2

Table 6-3 The Transition and Outlook of The Electric Power Generation

(unit: billion kWh)

FY Item	1990		1999		2010			
					Standard case		Target case	
Quantity	7,376		9,176		10,292		Around 9970	
Sector	Quantity	Shares %	Quantity	Shares %	Quantity	Shares %	Quantity	Shares %
Thermal power	446.6	60.5	506.3	55.2	507.4	49.3	Around 468.0	Around 47
Coal	71.9	9.7	152.9	16.7	235.1	22.8	Around 159.9	Around 16
LNG	163.9	22.2	240.5	26.2	234.1	22.7	Around 254.9	Around 26
Oil etc.	210.8	28.6	112.9	12.3	38.3	3.7	Around 53.3	Around 5
Nuclear	201.4	27.3	316.5	34.5	418.6	40.7	418.6	Around 42
Hydro	88.1	11.9	89.3	9.7	96.6	9.4	95.2	Around 10
General	78.8	10.7	76.9	8.4	80.3	7.8	80.3	Around 8
Pumping	9.3	1.3	12.3	1.3	16.3	1.6	14.9	Around 1
Geothermal	1.5	0.2	3.4	0.4	3.7	0.4	3.7	Around 0.4
New energy	-	-	2.1	0.2	2.9	0.3	11.5	Around 1
Specific CO ₂ Emmission (g-c/kWh)	101.9		89.9		82.6		Around 73.6	

7. Others

7.1 Moves toward consolidation

Consolidation is under way in the world's mining industry. In 2000, the top ten mining companies produced a total of 852 million tons, which accounted for 23.4% of coal produced worldwide. Combined with coals produced by the state-run enterprises of India and China, the share reaches a high 60% of the whole. As of 2000, the top ten companies alone supplied 182.50 million tons to the world's coal market, which was 31.8% of coals available on the world market (Table 7-1).

The top ten companies hold dominating shares in coal output in all the major producing countries with the exceptions of China and India (Table 7-2). Above all, in South Africa, four companies, including Billiton, Anglo Coal, Glencore and Sasol Mining, accounted for 87% of coals produced in 2000 in the country. Consolidation is advancing in the U.S. too, where six companies were responsible for 51% of coals produced in 2000. These are Peabody, Arch Coal, Rio Tinto, BHP, RAG and Consol.

Table 7-1 Coal Production and Exports by World's Top Ten Companies (2000)

Company name	Nationality	Production (Million tons)	Exports (Million tons)	Export ratio to production
1. Peabody	USA	176.1	10.5	6.0 %
2. Rio Tinto	UK	132.0	25.4	19.2 %
3. Arch Coal	USA	106.3	4.0	3.8 %
4. RAG	Germany	97.0	7.0	7.2 %
5. Billiton	UK	68.6	34.0	49.6 %
6. Anglo Coal	UK	64.8	23.1	35.6 %
7. Consol	USA	63.1	9.0	14.3 %
8. BHP	Australia	54.1	35.0	64.7 %
9. Sasol Mining	South Africa	50.9	3.5	6.9 %
10. Glencore	Switzerland	39.1	31.0	79.3 %
Ten companies total		852.0	182.5	21.4 %
World's coal production & exports		3,638.7	573.6	15.8 %
Combined share of top ten in world's production		23.4 %	31.8 %	
10 + China & India		2,333.0	237.5	10.2 %
Combined share of 10 + China & India		64.1 %	41.4 %	

Source: IEA, "Coal Information 2001, with 2000 data [Part I, 6 Supply]"

Table 7-2 World's Top Ten Companies' Shares in Major Producing Countries' Coal Output (2000)

	S. Africa	USA	Australia	Columbia	Venezuela	Indonesia
Share of top 10	87 %	51 %	46 %	41 %	31 %	25 %

Source: IEA, "Coal Information 2001, with 2000 data [Part I, 6 Supply]"

In Australia, the top ten companies virtually monopolized coal exports in 2000 and 2001 and, when combined, their share stood above 80%. Particularly conspicuous is consolidation by the top four appearing in a list of leading companies each year. In 1999 and 2000 alike, the top four companies accounted for more than 55% of total coal exports from Australia (Table 7-3). Meanwhile, of Australian coal production, the world's top ten companies (BHP, Rio Tinto, Peabody (Xstrata), Glencore, etc.), when grouped, were responsible for 43% in 1998, 47% in 1999, 61% in 2000 and 70% in 2001. These figures give a clear idea of the advance of consolidation.

Table 7-3 Australian Coal Export Records of Top Ten Companies

(1,000t)

	2000			2001		
	Company	Exports	Share	Company	Exports	Share
1	BHP Coal	41,175	22.0%	BHP Billiton	49,590	25.5%
2	Rio Tinto	27,778	14.9%	Rio Tinto	42,018	21.6%
3	Glencore Coal Australia	18,186	9.7%	Enx Resources (Xstrata)	22,465	11.6%
4	MIM Holdings	17,570	9.4%	MIM Holdings	19,869	10.2%
5	Peabody Resources	13,488	7.2%	Anglo Coal Australia	15,759	8.1%
6	Anglo Coal Australia	7,559	4.0%	IDEMITSU KOSAN	6,316	3.2%
7	Exxon Coal & Minerals	7,510	4.0%	RAG Australia Coal	6,018	3.1%
8	Shell Coal Australia	7,178	3.8%	Australian Premium Coal	3,791	2.0%
9	IDEMITSU KOSAN	6,829	3.7%	Jellinbah Resources	3,471	1.8%
10	Billiton Coal Australia	4,845	2.6%	Wesfarmers Coal	2,958	1.5%
	10 companies total	152,118	81.5%	10 companies total	172,255	88.6%
	Australia's total exports	186,754	100.0%	Australia's total exports	194,374	100.0%

Source: Barlow Jonker, "Coal 2002"

7-2 Present Situation of coal resource development by Japan

Data on equity ratios, imports to Japan, etc. can be obtained from published materials. However, details of interests, typically equity-based operatorship and selling rights, cannot be ascertained without conducting specific surveys. (These data will not be disclosed according to contract terms with local firms). Generally speaking, selling rights are rarely limited by equity ratios. This means that selling rights can be gained regardless of the large or small scale of investments, which is not true of operatorship. Operatorship, if defined as being synonymous with management right, requires any Japanese firm to retain an appropriate equity ratio if the company hopes to conduct business operations in the way it wants. The membership of the board of directors in local producing companies abroad generally reflects the equity ratios of members eligible for such positions.

Table 7-4 presents the equity ratios, imports and other data on Japanese firms' overseas coal development projects (mines currently in operation), which were stated in "Coal Yearbook 2001."

Table 7-4 Details of Japanese Firms' Participation in Overseas Coal Development Projects (Mines Currently in Operation)

Mines in operation	Capital investment		FY2000 Japan's import-contracts (1,000t)	Share of Japan's imports in production	Production records: salable coals Australia: AFY 99-00	
	Japanese firms' equities	Japan's equities			O/C (1,000t)	U/G (1,000t)
Australia: NSW						
1 Hunter Valley	Ube Kosan 8.20%, Mitsubishi Corp. 8.20%	23.4%	Semi-soft coking	1,730	55.1%	5,296
	Nissho Iwai Corp. 5.69%, Joban Kosan 1.27%		Steaming coal	1,190		
2 Baal Bone	Sumitomo Corp. 5%	5.0%	Steaming coal	1,150	69.1%	1,186
3 Warkworth	Mitsubishi Corp. 22.75%	36.3%	Semi-soft coking	500	29.4%	5,857
	Nippon Steel Corp. 7.50%		Steaming coal	1,220		
4 Ulan	Mitsubishi Corp. 49%	49.0%	Steaming coal	1,500	30.4%	2,093
5 Wallarah	Nissho Iwai Corp. 20%	20.0%	Steaming coal	750	45.5%	1,647
6 Chain Valley	Nissho Iwai Corp. 20%	20.0%	Steaming coal	-	-	194
7 Muswellbrook	Idemitsu Kosan 100%	100.0%	Steaming coal	580	45.4%	1,277
8 Bayswater	Nisseki Mitsubishi 8.7%, Nippon Steel Corp. 6.4%	16.7%	Semi-soft coking	790	25.3%	4,207
	Nittetsu Corp. 1.6%		Steaming coal	273		
9 Bengalla	Mitsui & Co. 10.0%	10.0%				Operation started April '99.
10 Liddell	Mitsui Matsushima 32.5%	32.5%	Semi-soft coking	70	3.4%	2,062
11 Camberwell	Toyota Tsusho Corp. 40%, Mitsubishi Material 10%	50.0%	Semi-soft coking	905	70.3%	1,785
			Steaming coal	350		
12 Bulga/South Bulga	Nippon Steel Corp. 10%, Tomen Corp. 23.06%	56.8%	Semi-soft coking	790	27.0%	3,722
	Nisseki Mitsubishi 21.21%, Kawatetsu Corp. 2.57%		Steaming coal	1,050		3,102
13 Stratford	Itochu Corp. 10%	10.0%	Semi-soft coking	1,140	68.7%	1,659
14 Cumnock	Itochu Corp. 10%	10.0%	Semi-soft coking	950	51.7%	1,838
15 Dartbrook	Marubeni Corp. 15%, Showa Shell 3%	18.0%	Steaming coal	500	17.2%	2,901
16 Duralie	Kawatetsu Corp. 10%	10.0%				Production scale O/C 500,000 – 600,000 tons
17 Teralba West Wallsend	Marubeni Corp. 14+3%, Kokan Kogyo 3%	20.0%	Semi-soft coking	1,000	61.1%	1,319
			Steaming coal	1,200		2,284
18 Drayton	Mitsui & Co. 3.8%, Mitsui Mining 3.0%	6.8%	Steaming coal	1,170	23.8%	4,908
Australia: QLD						
19 Blackwater	Mitsubishi Corp. 15.53%	15.5%	Semi-soft coking	1,820	27.3%	6,656
20 Goonyella	Mitsubishi Corp. 15.53%	15.5%	Hard coking coal	1,320	13.8%	9,585
21 Peak Downs	Mitsubishi Corp. 15.53%	15.5%	Hard coking coal	880	13.3%	6,626
22 Saraji	Mitsubishi Corp. 15.53%	15.5%	Hard coking coal	1,210	27.4%	4,422
23 Norwich Park	Mitsubishi Corp. 15.53%	15.5%	Semi-soft coking coal	670	16.5%	4,052
24 Riverside	Mitsui & Co. 20%	20.0%	Hard coking coal	880	9.2%	Included Goonyella
25 Gregory	Mitsubishi Corp. 3.49%	3.5%	Hard coking coal	1,210	53.7%	2,962
			Semi-soft coking	380		
26 Collinsville	Itochu Corp. 25%	25.0%	Semi-soft coking	400	14.6%	2,734
27 German Creek East	Marubeni Corp. 9.39%	9.4%				Production scale O/C 1,000,000 tons
28 Oaky Creek	Sumitomo Corp. 15%, Itochu Corp. 10%	25.0%	Semi-soft coking	770	22.8%	357
			Hard coking coal	900		6,963
29 Cook	Tokyo Boeki 5%	5.0%	Hard coking coal	150	33.4%	449
30 Kestrel	Mitsui & Co. 20%	20.0%	Hard coking coal	900	54.7%	2,981
			Semi-soft coking	730		
31 North Goonyella	Sumitomo Corp. 100%	100.0%	Semi-soft coking	330	34.0%	2,444
			Hard coking coal	500		
32 Jellinbah East	Marubeni Corp. 15%, Nissho Iwai Corp. 15%	30.0%	Semi-soft coking	1,550	69.0%	2,246
33 Moura	Mitsui & Co. 45%	45.0%	Semi-soft coking	1,240	42.5%	4,604
			Steaming coal	715		
34 South Walker Creek	Mitsui & Co. 20%	20.0%	Semi-anthracite	1,150	44.1%	2,605
35 Moranbah North	Nippon Steel Corp. 5.00%, Tomen Corp. 3.75%	12.0%	Hard coking coal	1,300	57.6%	3,211
	Nitetsu Corp. 1.25%, Sumikin Bussan 1.00%		Semi-soft coking	550		
36 Coppabella	Nissho Iwai Corp. 7.5%, Marubeni Corp. 7.5%	20.0%	Semi-anthracite	1,000	39.2%	2,554
37 Foxleigh	Itochu Corp. 10%	10.0%	Semi-anthracite	450	110.1%	409
38 Hail Creek	Marubeni Corp. 5.3333%, Sumitomo Corp. 2.667%	8.0%	Hard coking coal	1,200 - 1,500	22 - 27%	Production scale O/C 5,500,000 tons
39 Blair Athol	EPDC 9.9513%, JCD 3.4167%	13.4%	Steaming coal	6,500	61.8%	10,523
40 Newlands	Itochu Corp. 25%	25.0%	Steaming coal	300	6.3%	4,784
41 Jeebropilly/New Hope	Mitsubishi Material 9.863%, Taiheiyou Kohatsu 1.760%	11.6%	Steaming coal	150	83.5%	180
42 Ensham	Idemitsu Kosan 47.5+37.5%	95.0%	Semi-soft coking	50	58.7%	3,492
	EPDC 10.0%		Steaming coal	2,000		
43 Ebenezzer	Idemitsu Kosan 100%	100.0%	Steaming coal	-	-	1,300
Indonesia						
44 Berau	Nissho Iwai Corp. 20%	20.0%	Steaming coal	-	-	3,266
45 BHP Kendilo	Mitsui & Co. 18.00%, Mitsui Mining 9.993%	28.0%	Steaming coal	700	68.2%	1,026
Canada						
46 Bullmoose	Nissho Iwai Corp. 10%	10.0%	Hard coking coal	1,300	72.7%	1,787

Source: Prepared from "Coal Yearbook 2001."

***Inherent problems related to statistics and points to be heeded:**

1. The tables and figures in this report were prepared on the basis of published documents, in which the latest data covered up to 2001 but not beyond. Due to the time lag, although appearing in Table 7-3, Peabody, Exxon and Shell have by now all pulled out from Australian operations.
2. Table 1-1 (BP Statistics) shows that coal consumption fell by 0.38%/year on average in 1990-2000 (down 0.55% in 1990-1999), which means lesser coal consumption in 2000 (or 1999) than in 1990. However, Table 1-2 (IEA Statistics) shows that coal consumption rose by 0.3%/year on average in 1990-1999, which means greater coal consumption in 1999 than in 1990.

Discrepancies of this sort can be best explained as follows:

- (1) Table 1-1 (BP Statistics) presents the data expressed in terms of tons oil equivalent (toe), while Table 1-2 (IEA Statistics) in terms of weight tons.
- (2) In recent years, steaming coal in use as hard coal has had a falling calorific value in relative terms.
- (3) The content of the statement in (2) tends to result in widening discrepancies between the data in toe and those in weight tons.

Incidentally, BP Statistics cover anthracite, bituminous coal, subbituminous coal, brown coal (production of which is on the decline) and lignite, which are commercially traded. IEA Statistics for their part, under their own category of so-called hard coal, cover only anthracite, bituminous coal and some subbituminous coal, which can be categorized into either steaming or coking coals, and exclude both brown coal and lignite.

3. Coal supply and demand trends are different from coal trade trends, which require special attention. In particular, Japan is easily affected by supply and demand at the trading stage (see Table 1-3).
 - (1) Trade/output = around 15%
 - (2) Annual average growth of output (1990-2000) = 0.2%
 - (3) Annual average growth of trade (1990-2000) = 4.1%

Contact: ieej-info@tky.ieej.or.jp