

# **The Mining Industry of Japan**



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## ***Mineral Resources Information Center (MRIC)***

*The Mineral Resources Information Center (MRIC) was established as a department of the Metal Mining Agency of Japan (MMAJ) in 1968. The MRIC collects, distributes and analyzes information related to nonferrous metal resources exploration and development in both Japan and around the world, on topics such as developments in the world mining industry, geological data, supply & demand statistics, mining law and mineral investment. This information is made publicly available in reports and on the Internet. The MRIC also organizes conferences and seminars on mining-related issues, and administers the MMAJ's 10 Overseas Offices. For further information on the MRIC and its various publications, please access the MMAJ's Internet homepage at:*

***<http://www.mmaj.go.jp>***

Cover Photo: A gold-silver bearing quartz vein at the Hishikari Mine (courtesy of Sumitomo Metal Mining)

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## Overview

The mining industry of Japan is made up of a small non-ferrous metal mining sector and a large world-class minerals processing sector. In 1970 there were 246 operating metal mines employing 34,000 people. In June 2001 Kamioka mine (Pb,Zn) was closed, so the above number has dwindled to 14 operating mines, among which the most significant ones are Toyoha (Pb,Zn) and Hishikari (Au,Ag), employing about 400 people in total. In contrast, Japan has developed a large-scale custom smelting sector to supply domestic and overseas manufacturing industries. A large portion of copper, lead, zinc and nickel ores, as well as primary aluminium are imported from overseas.

### SUPPLY & DEMAND OF NON-FERROUS METALS IN JAPAN

In 2001, domestic production of lead, zinc, copper and nickel slightly decreased by 3%, 1.5%, 0.8% and 4.3% respectively compared to the previous year. It was mainly because some lead and zinc smelters implemented maintenance works while some copper smelters faced difficult situation of concentrate feed. However, the historical low price of copper compelled major producers in Japan to declare reduced production in 2002 in harmony with the major mining houses in the world. Also, domestic consumption of these metals largely decreased by 5.4%, 6.2%, 14.8% and 21% respectively compared to the last year in the because Japanese economy slowed down in 2001, especially later half of the year. Above all, the IT (Information Technology) recession affected a lot to the consumption of nickel, copper and zinc. In contrast copper export temporarily jumped up in 2001 because of the sustainable demand in the Asian region.

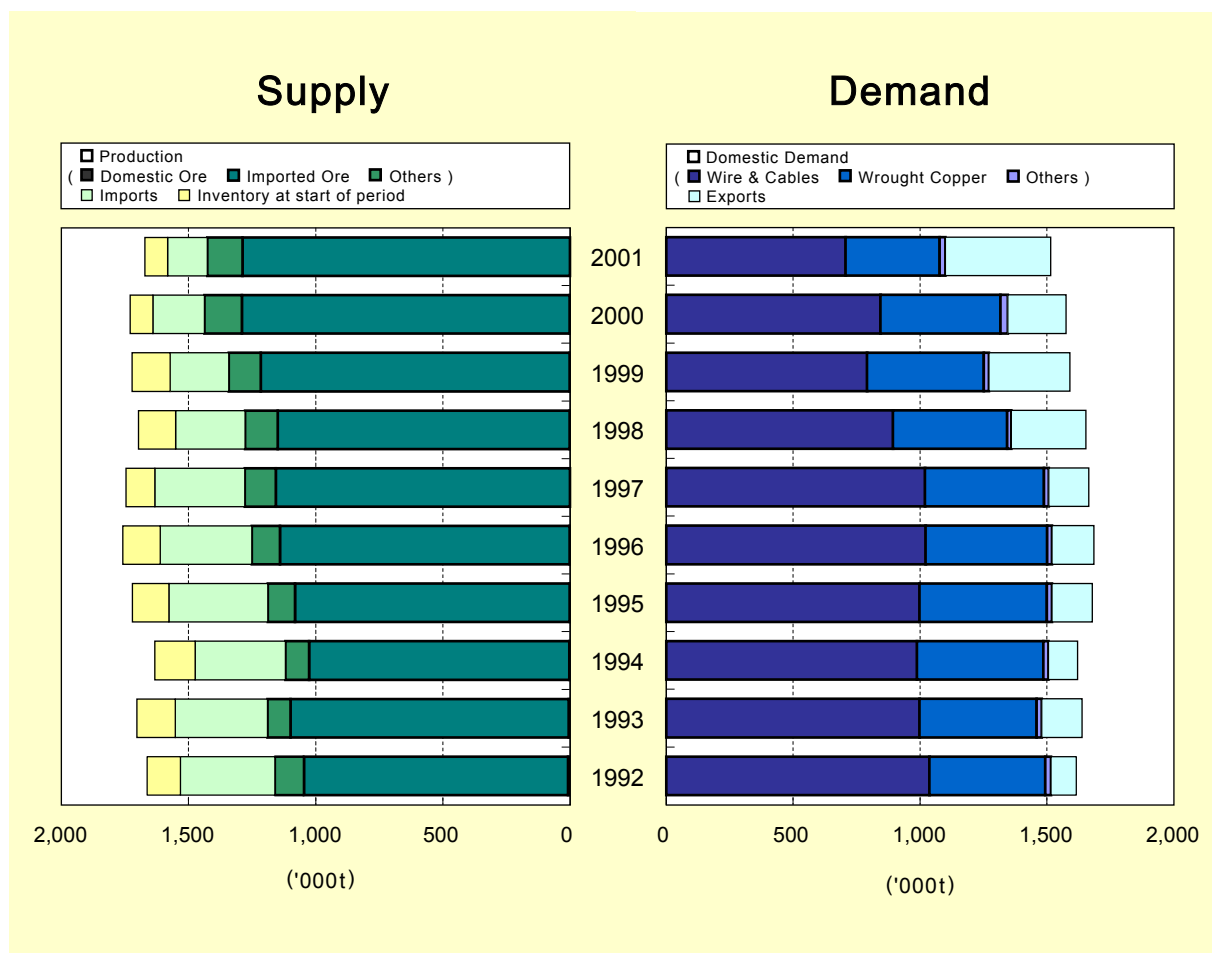
### CURRENT TOPICS

In the 1990's Japanese companies actively materialized equity participation in large mines development mainly in Chile and Indonesia in order to secure stable supply of metal concentrate. This trend still advanced in the recent years. Antamina mine in Peru kicked off its concentrate production in June 2001. Also, Sumitomo Metal Mining and others decided to join Rio Tuba nickel project in Philippines in order to obtain mixed sulfide to be refined, which would be generated with the latest hydrometallurgical technology. The only project, of which a Japanese company took majority, is Atakama Kozan operated by Nittetsu Mining in the Atakama desert of Chile. The mine finally started its production of copper concentrate in November 2002. However, recent trend of low metal prices cast shadows across overseas activities by Japanese companies. Rey de Plata mine in Mexico suspended its operation due to low lead and zinc prices. Also, Los Pelambres and Escondida, the both are giant copper mines in Chile partially invested by Japanese companies, reduced production from the beginning of year 2002. On the other hand, Japanese smelting companies planned to increase capacity of their overseas smelters such as Onsan in Korea, Gresik in Indonesia, Jinlong in China and Port Kembla in Australia so that they could strengthen their competitiveness. In the circumstances of such low metal prices due to the uncertain world economy the major mining houses developed further their M&A strategy; thus, the Japanese mining industry is also required to seek for effective operations. Following the alliance between Nippon Mining & Metals and Mitsui Mining & Smelting in copper industry, Sumitomo and Mitsui decided to form alliance in zinc industry. Such an alliance among the industry is expected to proceed further in coming years.

*The following brochure provides an overview of the current state of the Mining Industry of Japan.*

# Supply and demand of Non-ferrous Metals

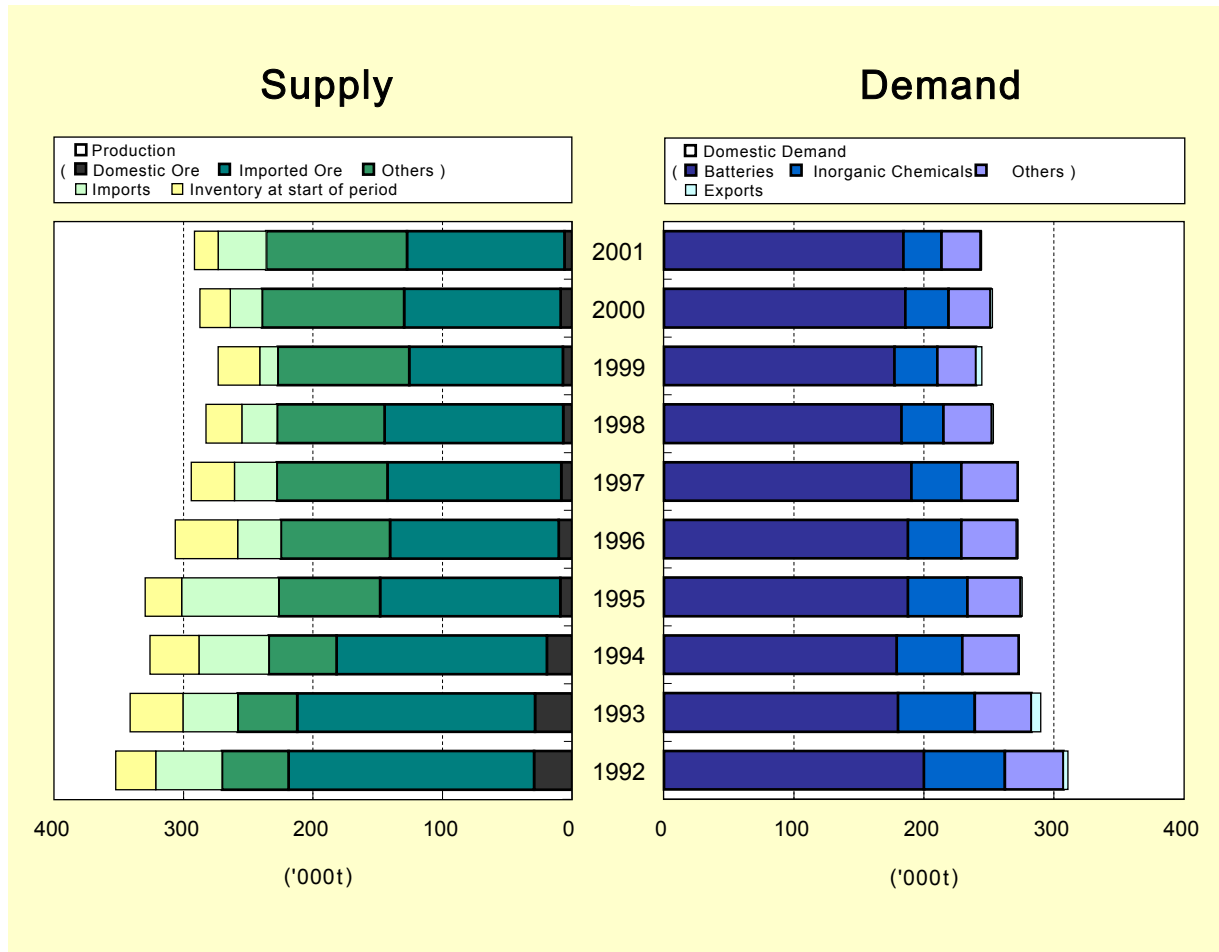
## Refined Copper



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN ('000t/y)</b>										
Supply Total	1,662.2	1,702.7	1,632.6	1,720.5	1,758.8	1,745.6	1,696.7	1,721.8	1,729.7	1,671.1
Inventory at start of period	130.8	150.3	158.5	143.3	147.5	113.5	146.0	150.1	89.4	89.3
Production	1,160.9	1,188.8	1,119.2	1,188.0	1,251.4	1,278.7	1,277.4	1,341.5	1,437.4	1,425.7
from: Domestic Ore	7.9	5.6	2.4	1.0	0.8	0.4	0.8	0.9	1.0	0.4
Imported Ore	1,038.3	1,093.5	1,023.1	1,080.2	1,139.7	1,156.9	1,148.5	1,214.3	1,289.1	1,286.8
Others	114.7	89.7	93.7	106.7	110.9	121.4	128.1	126.3	147.3	138.5
Imports	370.5	363.6	354.9	389.3	360.0	353.5	273.3	230.1	202.9	156.1
Demand Total	1,616.3	1,639.4	1,621.1	1,679.5	1,685.4	1,665.8	1,653.7	1,591.4	1,646.3	1,515.9
Domestic Demand	1,516.3	1,480.2	1,506.6	1,520.8	1,520.8	1,508.2	1,360.8	1,272.5	1,347.0	1,099.9
for: Wire & Cables	1,037.6	997.6	988.6	997.6	1,022.1	1,019.8	893.3	791.5	843.6	706.4
Wrought Copper	455.9	462.7	497.3	502.1	479.2	469.3	450.0	460.7	473.9	371.8
Others	22.7	20.0	20.7	21.1	19.4	19.0	17.4	20.3	29.4	21.7
Exports	100.0	159.2	114.4	158.7	164.6	157.7	292.9	318.9	229.4	416.0
Inventory at end of period	150.3	158.5	143.3	147.5	113.5	146.0	150.1	89.4	89.3	70.9
<b>WORLD ('000t/y)</b>										
Production	11,169.8	11,306.3	11,166.2	11,829.4	12,756.4	13,599.3	14,141.6	14,462.8	14,813.7	15,544.5
Consumption	10,761.2	10,971.7	11,639.2	12,167.3	12,414.4	13,080.2	13,339.0	14,023.5	15,103.9	14,561.5

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI  
World Metal Statistics, WBMS

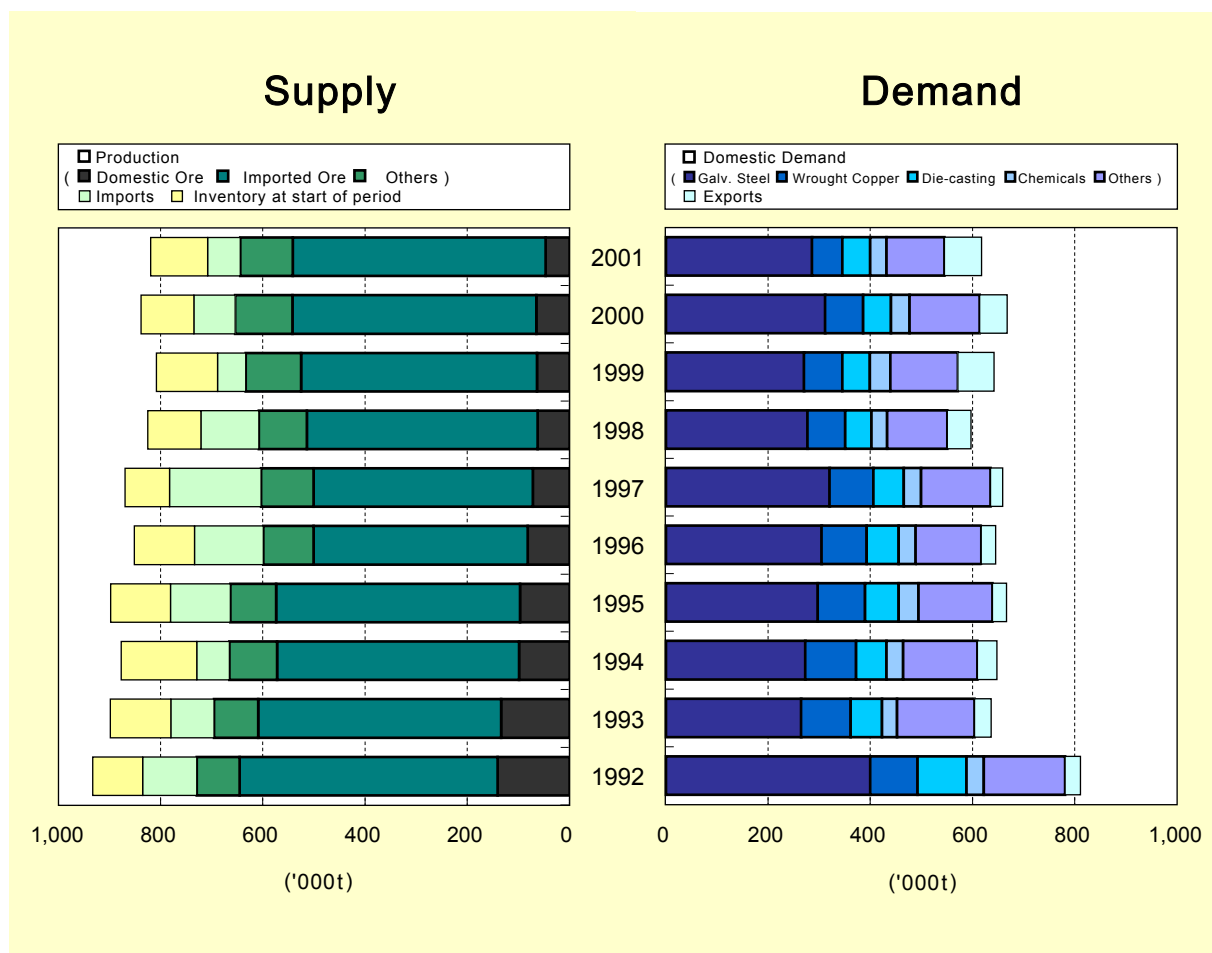
# Refined Lead



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN ('000t/y)</b>										
Supply Total	352.2	341.0	325.9	330.2	306.2	294.0	282.6	273.2	287.3	291.5
Inventory at start of period	30.8	40.8	37.8	28.3	48.2	33.4	27.6	32.2	23.4	18.3
Production	270.3	258.1	234.3	226.6	224.7	228.0	227.6	227.1	239.4	236.0
from: Domestic Ore	29.1	28.4	19.2	8.9	10.1	8.2	6.8	6.9	8.7	5.7
Imported Ore	189.7	183.8	162.5	139.2	130.4	134.1	137.8	118.6	120.8	121.7
Others	51.5	46.0	52.5	78.4	84.2	85.6	83.0	101.6	109.9	108.7
Imports	51.2	42.1	53.9	74.8	33.3	32.6	27.4	13.8	24.5	37.2
Demand Total	310.8	289.9	273.5	275.5	272.5	272.3	253.4	244.6	252.7	244.4
Domestic Demand	307.3	282.7	273.0	274.3	271.4	272.2	252.3	240.3	251.2	243.7
for: Batteries	200.0	180.1	179.1	187.8	187.7	190.3	182.7	177.2	185.7	184.2
Inorganic Chemicals	62.3	59.0	50.4	45.8	41.0	38.4	32.3	33.1	33.2	29.3
Others	44.9	43.6	43.5	40.7	42.7	43.5	37.3	29.9	32.2	30.1
Exports	3.6	7.2	0.5	1.2	1.1	0.1	1.1	4.4	1.6	0.7
Inventory at end of period	40.8	37.8	28.3	48.2	33.4	27.6	32.2	23.4	18.3	37.7
<b>WORLD ('000t/y)</b>										
Production	5,367.9	5,396.1	5,382.6	5,588.8	5,784.8	5,970.1	5,957.5	6,332.3	6,736.9	6,701.7
Consumption	4,928.6	5,073.9	5,183.1	5,597.1	5,758.3	6,044.2	6,081.6	6,144.0	6,388.2	6,433.5

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI  
World Metal Statistics, WBMS

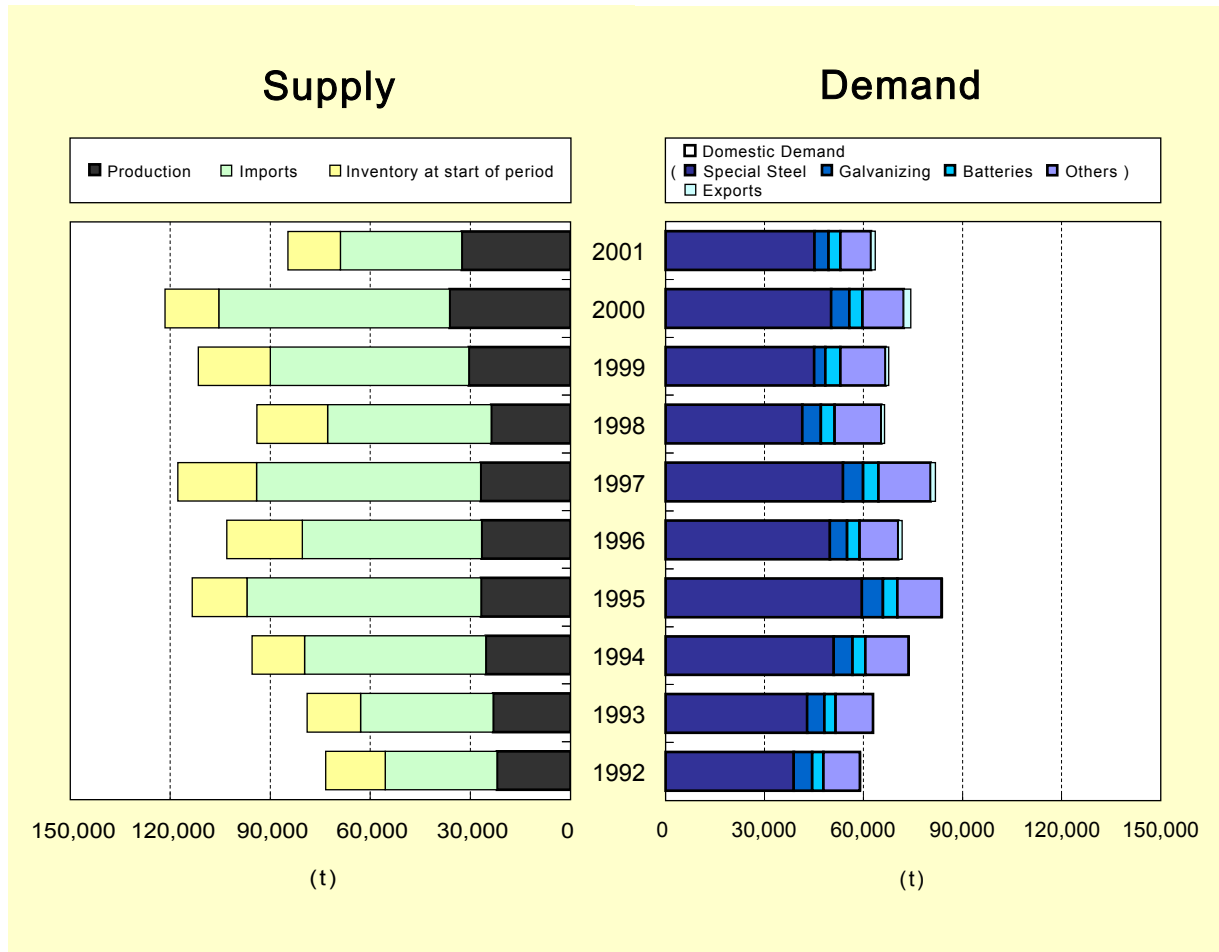
# Refined Zinc



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN ('000t/y)</b>										
Supply Total	932.7	898.8	877.2	897.9	851.6	869.9	825.4	808.2	838.4	819.4
Inventory at start of period	97.4	118.8	147.6	117.4	117.7	87.1	104.1	119.5	103.3	111.8
Production	729.5	695.7	665.5	663.6	599.1	603.1	607.9	633.4	654.4	644.4
from: Domestic Ore	140.6	133.7	98.3	96.4	81.6	71.2	62.2	63.0	64.8	46.6
Imported Ore	504.5	475.5	473.5	477.5	419.1	429.4	451.7	462.0	476.9	494.7
Others	84.4	86.4	93.6	89.7	98.4	102.5	94.0	108.4	112.7	103.1
Imports	105.8	84.2	64.2	117.0	134.8	179.7	113.4	55.3	80.8	63.6
Demand Total	717.8	636.3	648.1	666.7	645.6	659.0	597.1	642.3	667.6	617.9
Domestic Demand	687.6	603.9	609.4	638.8	617.1	635.4	550.4	571.4	614.1	545.1
for: Galvanized steel sheets	306.0	264.7	272.7	297.1	304.8	320.5	276.8	269.8	311.5	285.9
Wrought Copper	92.7	96.9	99.2	92.6	87.9	85.7	73.8	75.7	74.8	59.4
Die-casting	95.6	61.4	59.5	66.0	63.1	59.7	51.5	53.8	54.2	54.3
Inorganic Chemicals	34.1	29.5	32.8	38.8	32.9	33.4	30.6	39.9	36.4	32.2
Others	159.2	151.4	145.2	144.3	128.4	136.2	117.7	132.3	137.2	113.2
Exports	30.1	32.5	38.6	28.0	28.5	23.5	46.7	70.8	53.5	72.8
Inventory at end of period	118.8	147.6	117.4	117.7	87.1	104.1	119.5	103.3	111.8	113.6
<b>WORLD ('000t/y)</b>										
Production	6,808.3	6,970.0	6,977.3	7,263.5	7,445.0	7,722.6	8,022.6	8,436.2	9,185.7	9,136.6
Consumption	6,769.9	6,881.8	7,037.5	7,532.1	7,531.9	7,615.3	7,978.6	8,369.2	8,729.0	8,635.7

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI  
World Metal Statistics, WBMS

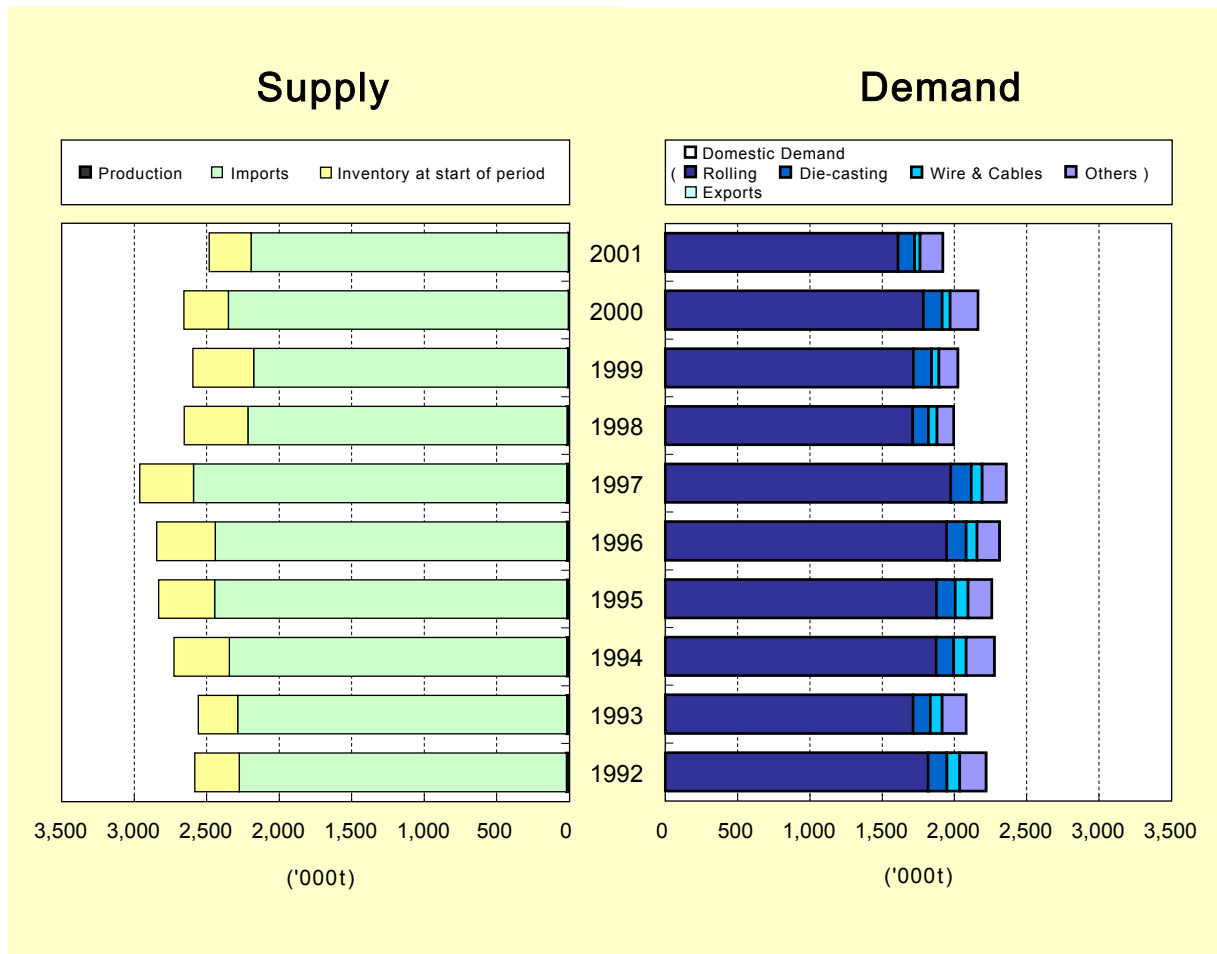
# Nickel



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN (t/y)</b>										
Supply Total	73,385	78,978	95,416	113,386	103,017	117,712	93,973	111,607	121,537	84,705
Inventory at start of period	17,881	16,063	15,740	16,434	22,601	23,621	21,184	21,645	16,107	15,785
Production	22,038	23,108	25,311	26,824	26,564	26,889	23,697	30,481	36,230	32,534
Imports	33,466	39,807	54,365	70,128	53,852	67,202	49,092	59,481	69,200	36,386
Demand Total	59,025	62,895	73,724	83,916	71,661	81,835	66,354	67,644	74,368	63,562
Domestic Demand	58,937	62,831	73,641	83,618	70,576	80,320	65,392	66,685	72,221	62,267
for: Special Steel	38,803	42,848	50,891	59,443	49,746	53,751	41,404	45,000	50,209	45,113
Galvanizing	5,682	5,249	5,809	6,430	5,258	6,116	5,624	3,459	5,449	4,312
Batteries	3,334	3,400	3,836	4,325	3,774	4,670	4,160	4,490	4,047	3,571
Others	11,118	11,334	13,105	13,420	11,798	15,783	14,204	13,736	12,516	9,271
Exports	88	64	83	298	1,085	1,515	962	959	2,147	1,295
Inventory at end of period	16,063	15,740	16,434	22,601	23,621	21,184	21,645	16,107	15,785	17,907
<b>WORLD ('000t/y)</b>										
Production	872.0	796.6	831.9	916.4	958.2	1,014.2	1,041.5	1,027.5	1,101.6	1,129.6
Consumption	809.9	824.0	910.0	1,025.4	935.2	992.1	992.2	1,059.0	1,146.3	1,150.4

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI  
World Metal Statistics, WBMS

# Aluminium

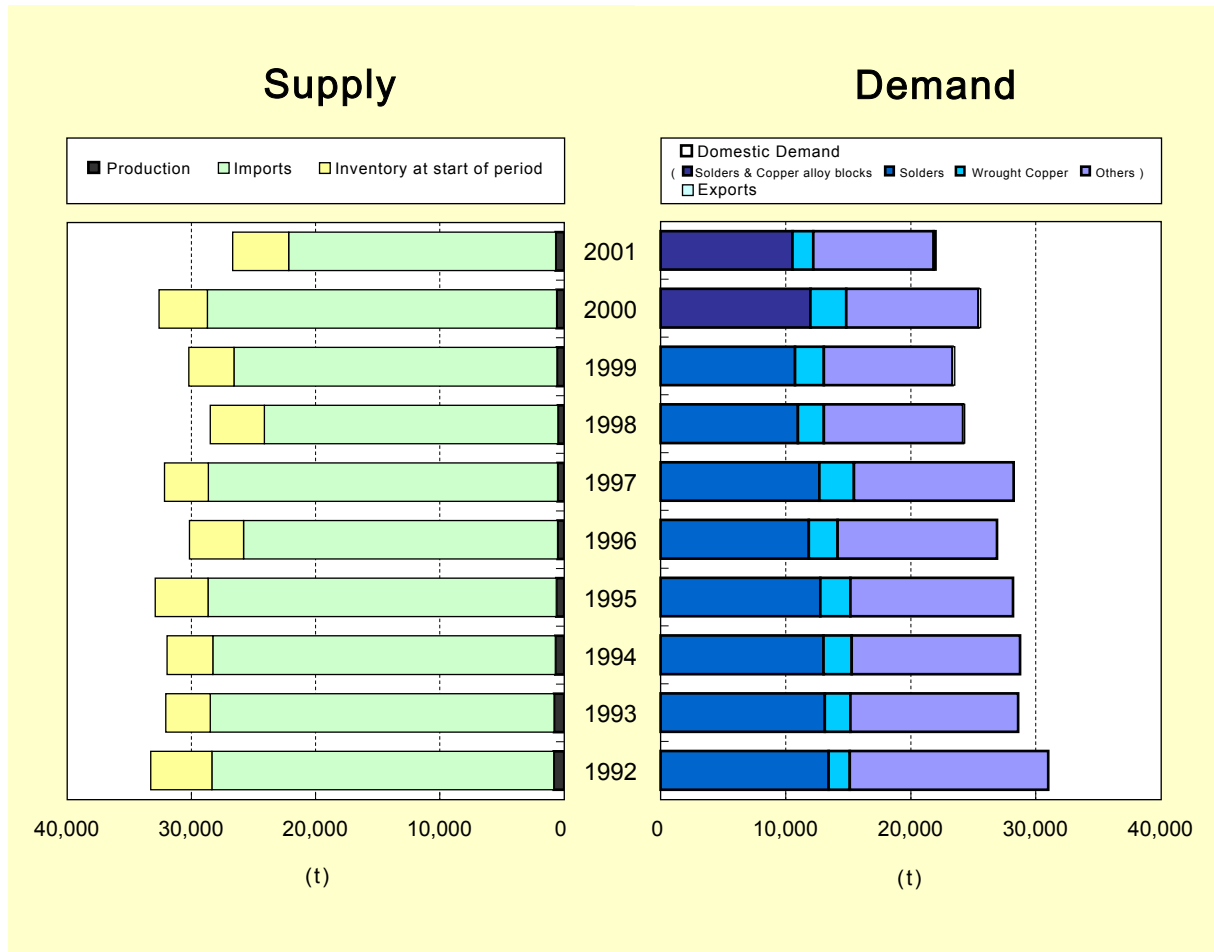


	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN ('000t/y)</b>										
Supply Total	2,581.8	2,558.7	2,725.7	2,831.5	2,845.0	2,961.7	2,654.8	2,595.6	2,656.7	2,482.7
Inventory at start of period	307.1	273.3	382.3	385.9	405.2	371.0	438.5	418.7	307.2	289.6
Production	18.9	18.3	17.0	18.0	17.0	16.7	16.3	10.9	6.5	6.6
Imports	2,255.9	2,267.1	2,326.4	2,427.5	2,422.8	2,574.0	2,200.1	2,166.0	2,343.0	2,186.5
Demand Total	2,219.6	2,081.6	2,278.7	2,262.1	2,313.4	2,359.4	1,996.4	2,025.5	2,163.9	1,922.1
Domestic Demand	2,217.7	2,080.1	2,276.6	2,259.0	2,311.6	2,357.9	1,995.6	2,024.4	2,162.4	1,920.2
for: Rolling	1,816.7	1,713.3	1,872.9	1,874.7	1,945.8	1,974.4	1,712.2	1,715.4	1,783.5	1,608.8
Die-casting	131.7	119.7	122.8	131.3	134.5	142.9	107.4	127.3	132.4	116.0
Wire & Cables	87.6	81.5	86.0	89.2	76.2	74.8	60.9	49.3	53.3	38.0
Others	181.7	165.6	194.9	163.8	155.0	165.8	115.1	132.4	193.2	157.3
Exports	1.9	1.5	2.2	3.2	1.8	1.5	0.8	1.2	1.4	2.0
Inventory at end of period	273.3	382.3	385.9	405.2	371.0	438.5	418.7	307.2	289.6	277.0
<b>WORLD ('000t/y)</b>										
Production	19,457.2	19,714.6	19,111.8	19,657.9	20,846.3	21,798.1	22,653.9	23,710.1	24,464.4	24,520.9
Consumption	18,512.8	18,166.2	19,761.8	20,547.5	20,650.4	21,797.0	21,825.4	23,357.6	24,871.3	23,526.6

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI  
World Metal Statistics, WBMS



# Tin



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN (t/y)</b>										
Supply Total	33,266.0	32,050.1	31,962.1	32,906.9	30,154.8	32,171.2	28,485.0	30,204.6	32,593.1	26,679.0
Inventory at start of period	4,906.2	3,581.2	3,679.4	4,257.7	4,358.6	3,529.3	4,359.5	3,642.8	3,874.0	4,509.7
Production	820.8	803.9	705.6	630.2	524.2	506.7	499.5	567.6	593.3	668.2
Imports	27,539.0	27,665.0	27,577.0	28,019.0	25,272.0	28,135.3	23,626.0	25,994.3	28,125.8	21,501.0
Demand Total	30,985.6	28,591.9	28,747.1	28,170.7	26,890.8	28,287.3	24,305.6	23,511.9	25,600.1	21,985.4
Domestic Demand	30,983.1	28,589.5	28,740.4	28,168.1	26,885.1	28,217.0	24,194.9	23,337.8	25,417.4	21,835.3
for: Solders & Copper alloy blocks	-	-	-	-	-	-	-	-	11,978.0	10,537.8
Solders	13,446.9	13,123.7	13,018.7	12,766.7	11,848.2	12,695.2	10,973.8	10,761.2	-	-
Wrought Copper	1,668.4	2,051.4	2,271.6	2,412.8	2,295.0	2,752.7	2,067.3	2,291.9	2,862.9	1,658.9
Others	15,867.8	13,414.4	13,450.0	12,988.6	12,741.9	12,769.0	11,153.7	10,284.7	10,576.6	9,638.6
Exports	2.4	2.4	6.7	2.6	5.8	70.2	110.7	174.1	182.7	150.0
Inventory at end of period	3,581.2	3,679.4	4,257.7	4,358.6	3,529.3	4,359.5	3,642.8	3,874.0	4,509.7	2,816.7
<b>WORLD ('000t/y)</b>										
Production	206.4	216.6	221.6	216.9	227.3	238.2	241.4	247.3	265.4	261.0
Consumption	225.3	239.0	240.7	240.1	238.8	243.7	241.7	249.0	275.9	268.0

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI  
World Metal Statistics, WBMS

# Gold

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN (t/y)</b>										
Supply Total	396.7	354.6	334.9	537.1	369.8	400.4	357.1	399.4	364.1	332.8
Production	108.0	108.8	102.8	113.1	127.5	136.1	129.9	147.7	146.1	155.8
from: Domestic Ore	9.3	10.6	8.3	9.0	7.9	7.5	6.7	8.3	8.3	6.5
Imported Ore	81.7	79.5	76.2	82.5	97.5	100.9	94.7	106.7	99.1	113.3
Others	16.9	18.7	18.3	21.7	22.1	27.6	28.5	32.7	38.6	36.0
Imports	195.1	176.3	176.3	263.2	135.6	118.9	85.9	108.4	72.9	43.2
Others	93.6	69.5	55.8	160.8	106.7	145.4	141.3	143.4	145.2	133.7
Demand Total	396.7	354.6	355.9	537.1	369.9	400.4	357.1	399.4	364.1	332.8
Domestic Demand	361.4	321.2	332.0	453.7	331.0	350.0	285.5	337.1	294.8	262.5
for: Art/ornaments	104.0	96.6	94.4	113.7	85.4	70.9	56.5	45.0	43.1	21.7
Electronic devices	45.4	51.5	42.1	47.6	67.2	84.7	78.8	82.5	106.1	70.9
Galvanizing	16.4	17.4	19.6	23.7	24.2	25.1	23.7	24.2	25.0	22.6
Dental	15.9	16.4	17.7	19.9	18.8	20.0	18.7	19.9	21.2	23.7
Personal holdings	92.4	89.4	90.4	170.0	79.4	86.7	52.7	110.7	52.4	73.6
Others	87.3	49.9	67.8	78.8	56.0	62.6	55.0	54.8	46.9	50.0
Exports	36.3	33.4	23.9	83.4	38.8	50.4	71.6	62.4	69.4	70.3

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI

# Silver

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN (t/y)</b>										
Supply Total	4,311.8	4,067.3	4,290.7	4,509.4	4,549.9	4,898.3	4,601.5	5,004.6	5,281.4	4,659.4
Inventory at start of period	1,377.6	1,180.4	1,159.6	1,121.7	1,084.2	1,065.4	1,074.2	1,034.9	986.6	1,190.9
Production	2,181.1	2,159.5	2,020.2	2,056.7	2,032.1	2,094.1	2,203.7	2,257.9	2,384.7	2,293.0
from: Domestic Ore	87.4	71.5	56.5	39.0	38.1	40.5	55.3	59.4	66.4	32.9
Imported Ore	1,395.1	1,349.3	1,189.1	1,221.8	1,264.3	1,315.8	1,432.1	1,474.3	1,493.9	1,443.9
Others	698.6	738.8	774.6	795.9	729.8	737.9	716.3	724.2	824.5	816.3
By-production	130.7	143.5	162.1	172.0	180.7	219.0	415.8	503.9	345.4	303.8
Imports	622.4	583.9	948.8	1,159.1	1,252.8	1,519.8	907.8	1,207.9	1,564.8	871.6
Demand Total	3,487.6	3,404.7	3,407.7	3,572.3	3,454.9	3,552.3	3,269.5	4,009.9	4,235.0	3,207.1
Domestic Demand	3,262.7	3,333.0	3,356.6	3,511.1	3,394.8	3,445.5	3,084.4	3,102.1	3,938.7	2,957.6
for: Silver nitrate for use in film	1,804.5	1,779.2	1,712.8	1,750.9	1,707.9	1,611.7	1,609.8	1,635.6	1,726.3	1,663.4
Other silver nitrate	246.0	238.0	286.1	338.9	283.6	288.2	249.6	275.0	335.2	150.4
Connectors	261.3	268.6	267.9	314.2	288.8	351.5	245.7	199.7	313.5	202.4
Solder	130.3	119.3	147.2	152.1	147.0	155.9	126.6	139.8	139.9	111.1
Others	820.7	928.0	942.6	955.0	967.5	1,038.2	852.7	852.0	1,423.8	830.3
Exports	224.9	71.7	51.2	61.2	60.0	106.8	185.1	907.8	296.3	249.5
Inventory at end of period	1,180.4	1,159.6	1,121.7	1,084.2	1,065.4	1,074.2	1,034.9	986.6	1,190.9	1,352.0

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI

# Magnesium

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>Japan (t/y)</b>										
Supply Total	45,305.2	44,133.7	50,114.9	50,851.2	45,241.9	47,508.0	45,003.0	49,804.0	43,452.8	38,230.6
Inventory at start of period	5,119.2	4,268.1	4,768.6	3,591.7	6,121.8	5,484.7	5,145.2	7,385.0	5,032.0	4,565.7
Production	7,119.4	7,471.2	3,412.2	-	-	-	-	-	-	-
Collection	12,978.0	13,214.8	19,008.6	11,767.0	8,175.2	10,934.2	7,807.4	7,731.6	-	-
Imports	20,088.7	19,179.5	22,925.5	35,492.5	30,944.9	31,089.1	32,050.5	34,687.4	38,420.8	33,665.0
Demand Total	40,016.0	38,230.8	41,841.1	45,935.2	50,037.3	54,081.3	51,650.2	49,141.5	51,053.6	52,680.0
Domestic Demand	40,004.2	38,178.4	41,822.2	45,743.6	49,963.9	53,887.0	51,628.2	49,107.7	50,907.4	52,559.0
for: Rolled Aluminium	17,156.7	15,869.8	17,778.5	18,493.2	18,518.7	18,680.9	16,925.9	18,052.3	17,768.0	15,766.7
Zr and Ti refining	12,984.6	13,122.7	14,311.0	17,140.8	21,639.4	24,800.5	24,458.3	19,645.5	19,692.6	25,294.2
Others	9,862.9	9,185.8	9,732.7	10,109.6	9,805.8	10,405.6	10,243.9	11,409.9	13,446.9	11,498.1
Exports	11.9	52.4	19.0	191.6	73.4	194.3	22.0	33.8	146.2	120.9
Inventory at end of period	4,268.1	4,768.6	3,591.7	6,121.8	5,484.7	5,145.2	7,385.0	5,032.0	4,565.7	4,870.9

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI

# Antimony

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN (t/y)</b>										
Supply Total	6,205.9	5,626.1	7,081.6	7,316.8	7,182.5	8,990.6	8,954.3	8,898.2	11,261.5	7,633.7
Inventory at start of period	326.0	344.0	238.1	446.5	330.3	333.9	314.8	207.6	232.8	262.0
Production	175.1	225.2	206.9	93.0	97.7	122.0	170.4	178.1	146.0	101.3
Imports	5,704.8	5,056.9	6,636.5	6,777.3	6,754.5	8,534.7	8,469.1	8,512.5	10,882.7	7,270.4
Demand Total	630.5	909.3	814.3	745.4	799.8	638.0	638.7	711.2	797.9	792.1
Domestic Demand	575.6	587.2	650.5	601.0	586.2	558.9	520.3	523.8	618.2	630.2
for: Batteries	249.5	232.8	218.8	245.2	265.2	258.6	209.9	158.4	192.3	203.8
Hardening alloy for Lead	102.4	111.6	140.9	101.4	46.2	57.9	72.7	98.4	98.9	99.1
Others	223.7	242.8	291.0	254.4	274.8	242.5	237.8	266.9	327.0	327.3
Exports	54.9	322.1	163.6	144.4	213.6	79.1	343.4	187.4	179.6	161.9
Inventory at end of period	344.0	238.1	446.5	330.3	333.9	314.8	207.6	232.8	262.0	394.7

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI

# Mercury

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN (t/y)</b>										
Supply Total	119.4	108.6	94.3	98.3	96.8	112.0	93.5	82.4	79.2	76.9
Inventory at start of period	88.9	92.8	83.2	81.2	84.6	95.6	85.5	70.6	71.1	65.1
Collection	4.7	3.7	4.8	3.3	3.6	2.6	1.1	1.4	1.2	0.7
Imports	25.8	12.2	6.3	13.8	8.6	13.8	6.9	10.4	6.9	11.0
Demand Total	84.5	70.5	72.1	40.0	70.2	30.5	24.2	18.8	52.0	26.9
Domestic Demand	81.8	64.0	53.6	38.4	25.6	24.3	19.2	11.7	13.1	10.4
for: Batteries	46.9	35.2	27.0	16.5	4.6	4.9	3.9	3.2	3.4	2.1
Others	34.9	28.8	26.6	21.9	21.0	19.4	15.4	8.5	9.7	8.3
Exports	2.6	6.5	18.6	1.6	44.6	6.2	4.9	7.1	38.9	16.5
Inventory at end of period	92.8	83.2	81.2	84.6	95.6	85.5	70.6	71.1	65.1	180.5

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI

# Cobalt

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN (t/y)</b>										
Supply Total	5,621.8	5,637.0	6,920.9	6,739.9	7,635.9	7,777.1	7,859.3	8,439.6	9,842.6	8,576.7
Inventory at start of period	1,241.4	1,436.8	1,110.2	1,111.1	914.4	857.2	821.7	802.6	662.8	750.8
Production	104.9	190.8	161.1	227.5	258.0	263.9	329.4	247.4	-	-
Imports	4,275.4	4,009.4	5,649.6	5,401.3	6,463.5	6,656.0	6,708.2	7,389.6	9,179.8	7,825.9
Demand Total	2,229.0	2,417.1	2,485.2	2,659.1	2,451.8	2,859.8	2,379.5	2,408.0	2,823.3	2,472.7
Domestic Demand	2,229.0	2,417.1	2,485.2	2,659.1	2,451.8	2,859.8	2,379.5	2,408.0	2,823.3	2,472.7
for: Special Steel	653.9	691.2	590.8	711.2	552.2	763.8	661.8	481.0	884.2	1,001.0
Magnetic materials	473.7	546.5	486.5	351.5	353.5	437.9	328.4	532.4	521.1	233.1
Catalysis	357.5	384.5	373.9	434.1	377.0	315.0	198.2	196.6	160.3	175.7
Others	743.8	794.9	1,034.0	1,162.4	1,169.0	1,343.1	1,191.0	1,198.0	1,257.8	1,063.0
Exports	-	-	-	-	-	-	-	-	-	-
Inventory at end of period	1,436.8	1,110.2	1,111.1	914.4	857.2	821.7	802.6	662.8	750.8	621.3

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI

# Tungsten

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN (t/y)</b>										
Supply Total	4,028.0	4,117.4	5,127.1	5,930.4	5,935.6	6,305.9	5,446.9	5,417.2	6,889.1	5,410.4
Inventory at start of period	720.9	639.9	576.1	671.8	929.7	843.3	824.5	601.4	579.7	667.8
Production	3,307.1	3,477.5	3,825.2	4,468.3	4,288.0	4,759.3	4,072.9	4,357.2	4,993.2	3,607.1
Imports	-	-	725.8	790.3	717.9	703.2	549.5	458.6	1,316.2	1,135.5
Demand Total	4,086.5	4,152.2	5,328.1	6,247.2	6,138.2	6,713.9	6,374.4	6,407.4	7,402.8	6,844.2
Domestic Demand	4,086.5	4,152.2	4,108.0	4,947.2	4,837.8	5,547.3	4,936.5	5,223.8	6,058.3	5,001.4
for: Ultra-hard alloys	3,391.5	3,490.5	3,367.7	4,054.4	4,040.5	4,785.3	4,240.1	4,473.4	5,117.7	4,153.7
Others	695.1	661.7	740.3	892.8	797.3	762.0	696.4	750.3	940.6	847.7
Exports	-	-	1,220.2	1,300.0	1,300.4	1,166.6	1,437.9	1,183.7	1,344.5	1,842.8
Inventory at end of period	639.9	576.1	671.8	929.7	843.3	824.5	601.4	579.7	667.8	640.4

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI

# Tungsten Ore

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>JAPAN (t/y)</b>										
Supply Total	2,046.7	1,952.9	1,050.6	1,020.2	818.5	2,036.7	4,557.3	6,415.3	3,970.9	2,463.0
Inventory at start of period	1,269.3	1,473.6	814.6	469.2	340.5	554.7	2,676.3	4,621.3	2,456.9	1,512.0
Production	60.4	20.2	-	-	-	-	-	-	-	-
Imports	717.0	459.0	236.0	551.0	478.0	1,482.0	1,881.0	1,794.0	1,514.0	951.0
Demand Total	1,484.1	1,392.4	1,693.5	825.2	632.2	614.5	1,159.4	2,055.4	2,602.1	2,074.8
Domestic Demand	1,484.1	1,392.4	1,693.5	825.2	632.2	614.5	1,159.4	2,055.4	2,602.1	2,054.8
for: Ferro-tungsten	96.1	66.7	76.7	69.1	48.2	28.1	38.1	43.2	71.5	83.8
Calcium-tungsten	379.5	177.4	431.3	513.9	454.4	453.1	337.2	389.6	559.7	477.9
Metallic Tungsten	1,000.2	1,131.4	1,185.5	242.2	129.6	133.2	747.3	1,622.6	1,929.2	1,476.1
Others	8.3	16.9	0.0	0.0	-	0.0	36.8	0.0	41.6	17.1
Exports	-	-	-	-	-	0.0	-	-	-	20.0
Inventory at end of period	1,473.6	814.6	469.2	340.5	554.7	2,676.3	462.3	2,456.9	1,512.0	859.7

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI

# Molybdenum

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
JAPAN (t/y)										
Supply Total	1,127.7	1,037.4	1,569.0	1,687.6	1,291.7	1,419.7	1,416.0	1,425.5	1,541.9	1,538.5
Inventory at start of period	367.8	269.5	353.3	252.1	291.3	320.5	536.2	544.6	374.4	423.8
Production	564.3	619.2	650.9	689.0	595.9	698.5	604.8	585.9	626.1	610.5
Imports	195.6	148.8	564.8	746.7	404.4	400.6	275.0	295.0	541.4	504.3
Demand Total	1,577.2	1,798.6	1,712.4	1,584.8	1,391.0	1,801.3	3,123.8	2,763.9	2,708.1	2,998.6
Domestic Demand	1,577.2	1,798.6	1,659.2	1,559.5	1,324.6	1,780.8	3,078.5	2,733.0	2,670.9	2,955.8
for: Special Steel	783.0	973.3	734.7	579.2	514.9	831.0	1,328.9	1,178.8	1,554.8	1,860.5
Plates & Rods	524.5	546.8	594.8	561.4	519.3	619.1	593.1	540.3	724.5	670.3
Others	269.8	278.5	329.7	419.0	290.4	330.7	1,156.5	1,013.9	391.6	425.0
Exports	-	-	53.2	25.2	66.4	20.5	45.3	30.9	37.2	42.8
Inventory at end of period	269.5	353.3	252.1	291.3	320.5	536.2	544.6	374.4	423.8	477.2

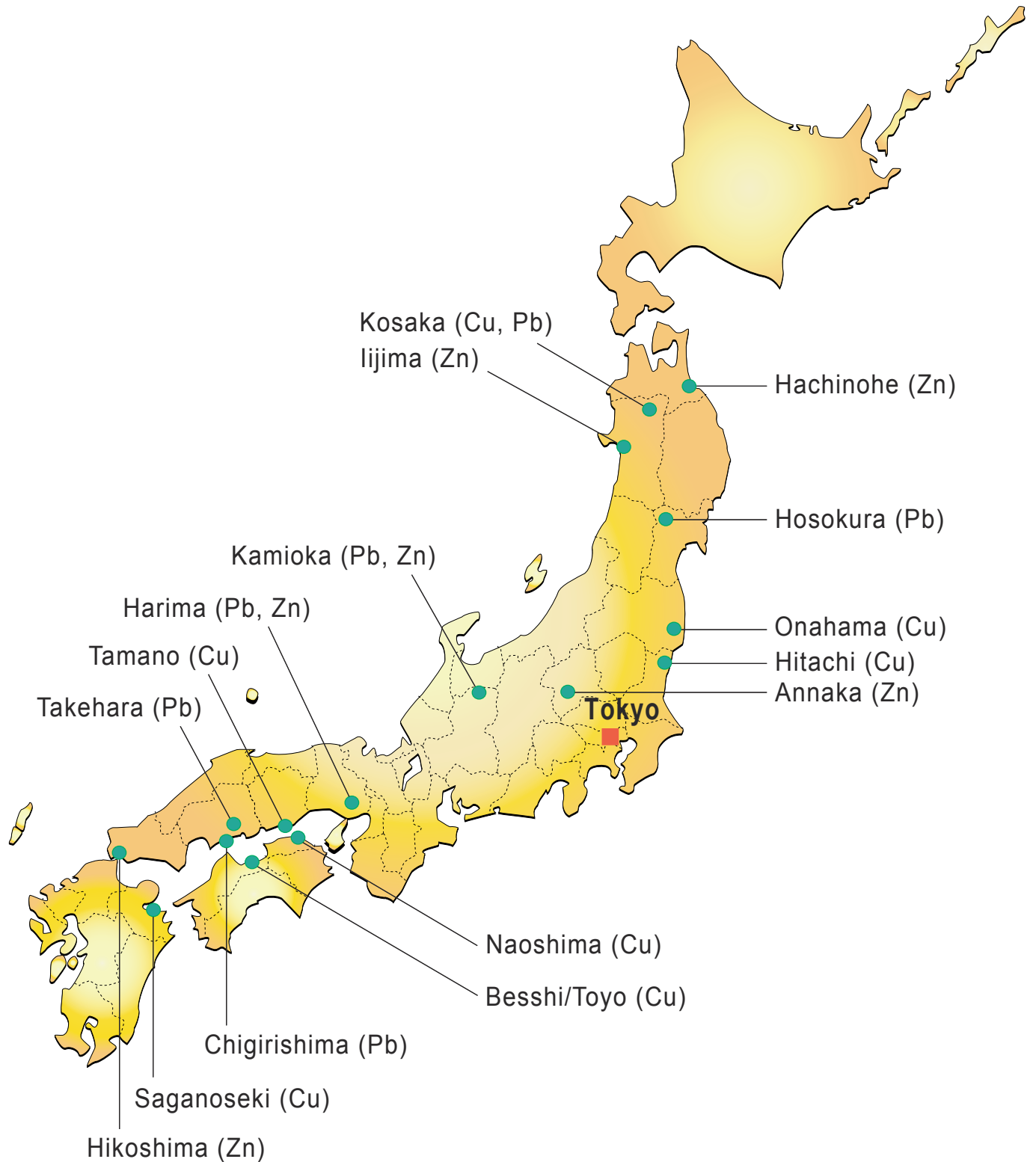
Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI

# Molybdenum Ore

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
JAPAN (t/y)										
Supply Total	22,934.5	25,848.7	25,966.3	28,669.4	28,204.7	33,607.9	32,867.6	28,283.6	34,638.9	34,792.0
Inventory at start of period	1,050.5	1,059.6	805.5	707.1	801.5	647.0	528.6	659.6	1,068.9	1,552.8
Production	-	-	-	-	-	-	-	-	-	-
Imports	21,884.1	24,789.1	25,160.9	27,962.3	27,403.2	32,960.9	32,339.0	27,624.0	33,570.0	33,239.2
Demand Total	9,865.4	6,863.4	7,135.7	6,150.0	6,711.5	7,417.5	5,198.5	8,940.2	11,624.7	11,192.2
Domestic Demand	9,865.4	6,863.4	7,111.6	6,050.3	6,389.8	7,317.1	4,919.9	8,808.0	11,513.5	11,157.5
for: Ferro-molybdenum	3,562.7	2,132.8	2,668.3	1,666.7	1,916.0	1,852.2	1,336.4	3,400.8	4,980.4	4,932.3
Metallic Molybdenum	616.0	665.6	754.2	869.3	677.9	632.6	403.1	291.1	574.5	536.2
Inorganic Chemicals	1,787.0	1,194.9	1,428.3	1,235.1	1,543.1	1,412.6	1,205.0	2,573.9	3,084.7	3,189.9
Others	3,899.7	2,870.1	2,260.8	2,279.2	2,252.7	3,419.8	1,975.5	2,542.2	2,873.9	2,499.2
Exports	-	-	24.0	99.7	321.7	100.4	278.6	132.2	111.3	34.7
Inventory at end of period	1,059.6	805.5	707.1	801.5	647.0	528.6	659.6	1,068.9	1,552.8	2,049.3

Source: Yearbook of Minerals & Non-ferrous Metals Statistics, METI

# Major Metal Smelters & Refineries



# Copper

Site	Company	Capacity (t/yr)			Employees
		Smelting	Refining	Process/Other	
Onahama	Onahama Smelting	348,000	258,000	reverberatory	547
Saganoseki	Nippon Mining & Metals	470,400	270,000	flash	394
Besshi/Toyo	Sumitomo Metal Mining	300,000	252,000	flash	612
Tamano	Hibi Kyodo Smelting	262,800	218,400	flash	160
Naoshima	Mitsubishi Materials	306,000	225,500	continuous	769
Kosaka	Kosaka Smelting	96,000	72,000	flash	524 *
Hitachi	Nippon Mining & Metals	36,000 (secondary)	182,400	flash	175
TOTALS		1,819,200	1,478,300		3,181

# Lead

Site	Company	Capacity (t/yr)	Employees
Chigirishima	Toho Zinc	120,000	159
Takehara	Mitsui Mining & Smelting	43,800	346
Kamioka	Kamioka Mining & Smelting	(secondary) 33,600	257 *
Harima	Sumitomo Metal Mining	30,000	295 *
Kosaka	Kosaka Smelting	25,200	524 *
Hosokura	Hosokura Smelting & Refining	(secondary) 22,200	177
TOTALS		274,800	1,758

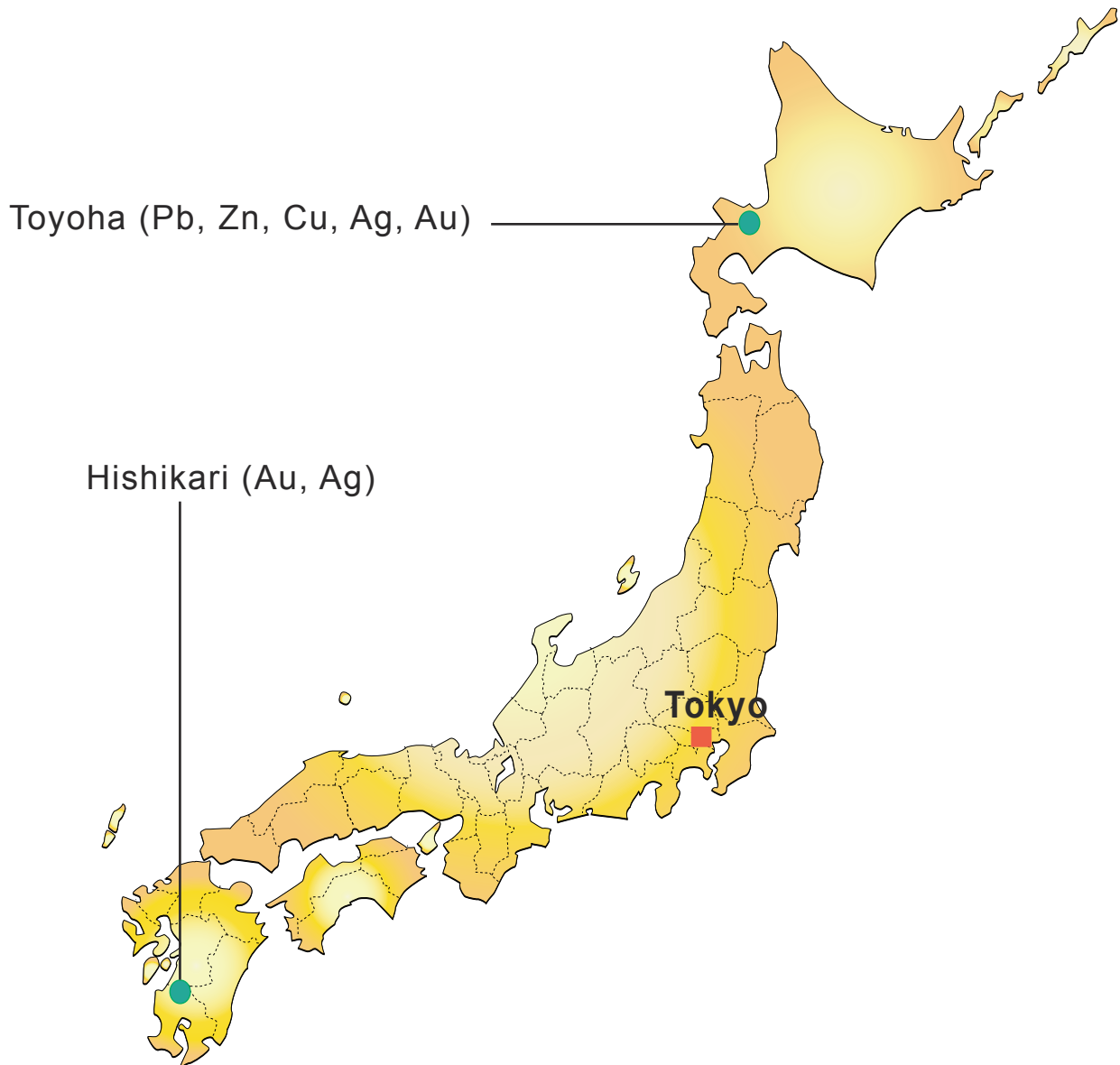
# Zinc

Site	Company	Capacity (t/yr)		Employees
		Electrolytic	Distillation	
Iijima	Akita Smelting	200,400		302
Annaka	Toho Zinc	139,200		392
Hachinohe	Hachinohe Smelting		155,400	344
Harima	Sumitomo Metal Mining		97,200	295 *
Hikoshima	Hikoshima Smelting	84,000		211
Kamioka	Kamioka Mining & Smelting	72,000		257 *
TOTALS		495,600	252,600	1,801

Notes: \* including employees of another metal

Sources: Capacities - Mining Handbook 2002FY, METI and MMAJ data as of 11/2002  
Employees - Mine/Smelter Directory 2002FY, ANRE, METI

# Major Metal Mines



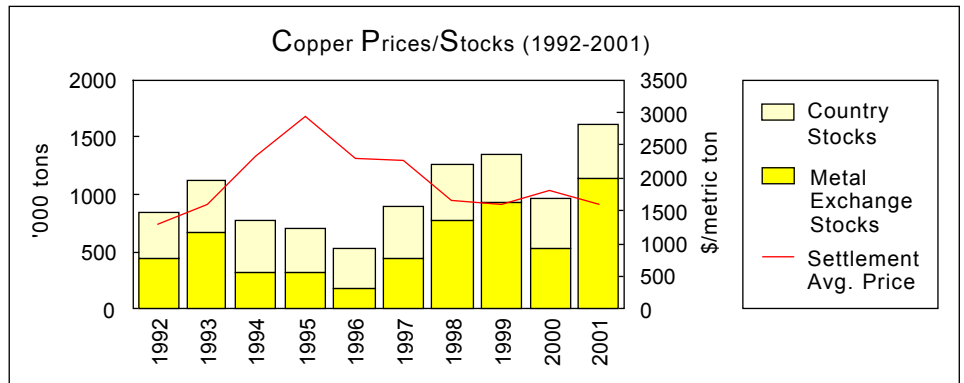
Mine	Prefecture	Commodities	Company	Staff	Ore Reserves
Hishikari	Kagoshima	Au, Ag	Sumitomo Metal Minig	202	5.2Mt @ 50g/t (260t Au)
Toyoha	Hokkaido	Zn, Pb, Cu, Ag, Au	Toyoha Mining	203	12Mt @ Zn 7.2% Pb 1.7% Cu 0.2% Ag 127g/t Au 0.2g/t

Sources: MMAJ data as of 11/2002 (Staff: Mine/Smelter Directory 2002FY, METI)

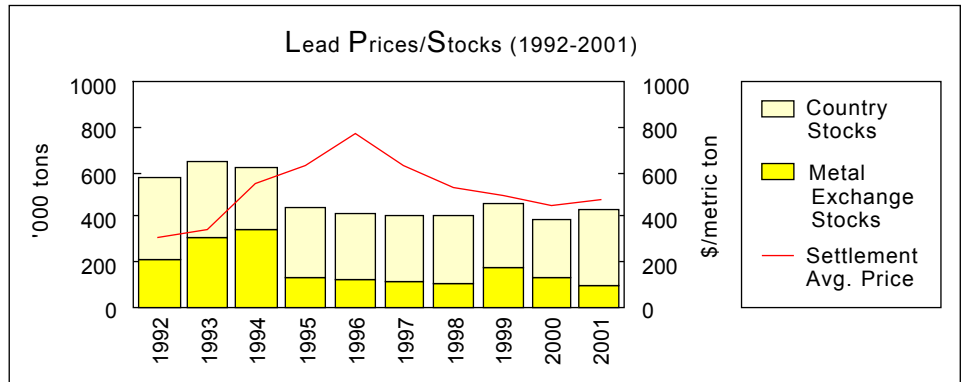


# Major Metal Prices/Stocks

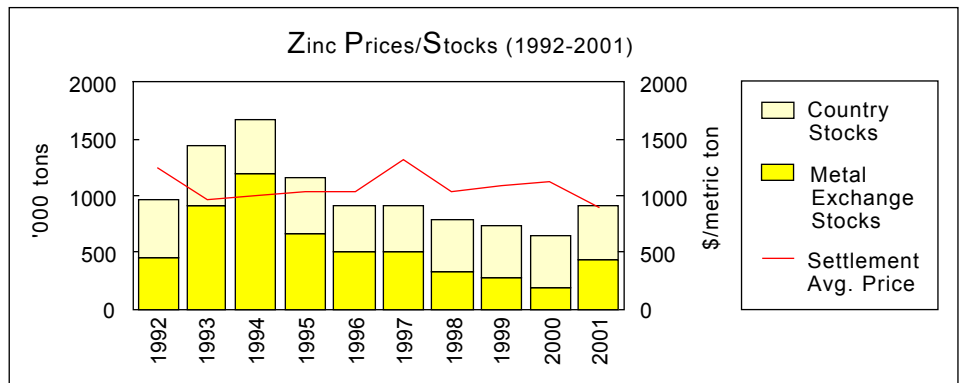
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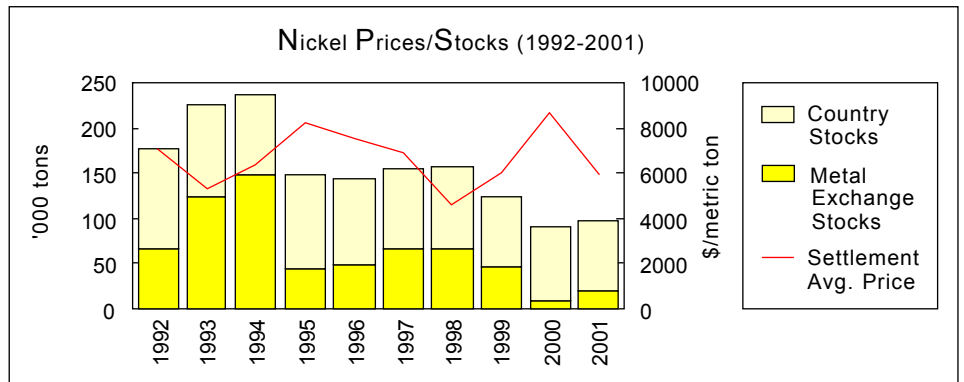
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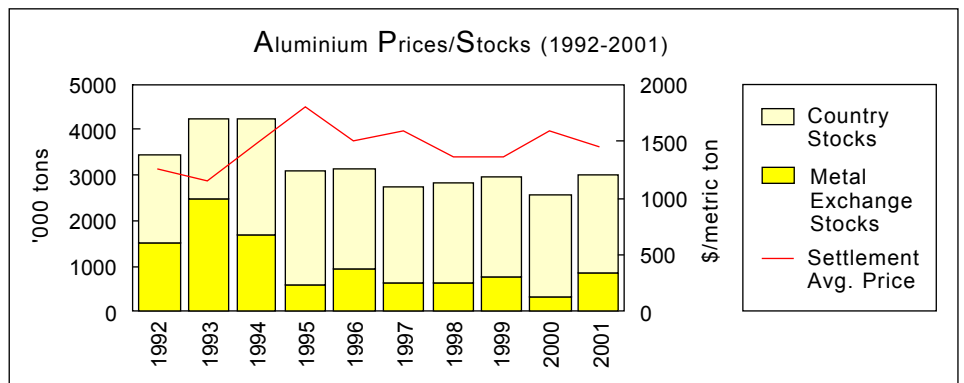
**Z<sub>n</sub>**



**N<sub>i</sub>**



**A<sub>l</sub>**



Source:  
World Metal  
Statistics  
Yearbook 2002  
(WBMS)

# Key Sector Contacts

## **Dowa Mining Co. Ltd.**

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## **Sumitomo Metal Mining Co. Ltd.**

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## **Metal Economics Research Institute of Japan**

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## **Japan Society of Newer Metals**

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## **National Institute of Advanced Industrial Science & Technology**

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## **Ministry of Economy, Trade & Industry Agency of Natural Resources & Energy**

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