

Chemical Industry of Japan 2008



Introduction

The chemical industry is frequently described as difficult to understand by people outside of the industry. Numerous definitions describing the chemical industry are used, but among the most comprehensive is the following: "It is the industry that manufactures various products from various raw materials for various purposes by using primarily chemical technologies. However, like steel, those which are categorized separately are excluded." (Mr. Yoshiro Tokuhisa, "Is There A Future for The Chemical Industry?" published by Nikkei Inc.)

Broadly defined that way, the scope of the chemical industry changes depending on what is categorized separately from among manufacturing industries that primarily use "chemical technologies." Although there are a variety of opinions, the statistics on which major charts and tables of this brochure are based conform to the category "17 - Chemical Industry" of the Standard Industrial Classification for Japan (second classification). Its contents are described in detail on Page 7.

Even among published government statistics, the definition of the chemical industry could differ due to differences in the purposes for compilation and use by ministries and agencies. For example, in the trade statistics of the Ministry of Finance, synthetic rubbers, artificial fibers, and materials for photos and movies are excluded from the "Chemical Industry" category and radioactive elements are included because the ministry uses the unified classification under an international treaty.

Moreover, there are cases in which pharmaceuticals are not considered chemical products. An example is the ranking data of the world's chemical companies compiled by Chemical & Engineering News (published in the United States) on Page 12.

Meanwhile, there are separate classifications for "plastic products" and "rubber products," which are classified as downstream industries by the Standard Industrial Classification

for Japan. In any case, total shipments by the chemical industry increased from 26 trillion yen to 41 trillion yen in 2006, making the industry the second most important industry in manufacturing after transportation and the machinery manufacturing industry.

Shipment figures, value-added, and number of employees in the chemical industry under three representative definitions are as follows:

	Amount of value-added (unit: trillion yen)	Amount of shipment (unit: trillion yen)	Number of employees (unit: 10,000 persons)
Chemical industry in a broad sense: "Chemical"+plastics+rubber	16.8 (Ranks first 15.6%)	40.9 (Ranks second 13%)	91 (Ranks fourth 11.1%)
Chemical industry	11 (Ranks third 10.2%)	26.2 (Ranks third 8.3%)	34 (Ranks eighth 4.2%)
Chemical industry in a narrow sense:"Chemical"-pharmaceuticals	6.8 (6.3%)	19.3 (6.1%)	25 (3.0%)
(Reference) Other industries	Transportation Machinery 16.8 Industrial Machinery 12.9	Transportation Machinery 59.8 Industrial Machinery 33.3	Foods 109 Industrial Machinery 101 Transportation Machinery 99

** The statistics used in this brochure basically conform to the Standard Industrial Classification for Japan (second classification): "Chemical Industry."

(Source)
Ministry of Economy, Trade and Industry
[Census of manufactures], [Basic Survey of Overseas Business Activities]

Ministry of Internal Affairs and Communications
[Survey of Research and Development]

Ministry of Finance [Financial Statements Statistics of Corporations by Industry]

Ministry of Education, Culture, Sports, Science and Technology
[Annual Report on the Promotion of Science and Technology]

Ministry of Health, Labour and Welfare [Monthly Labor Survey]

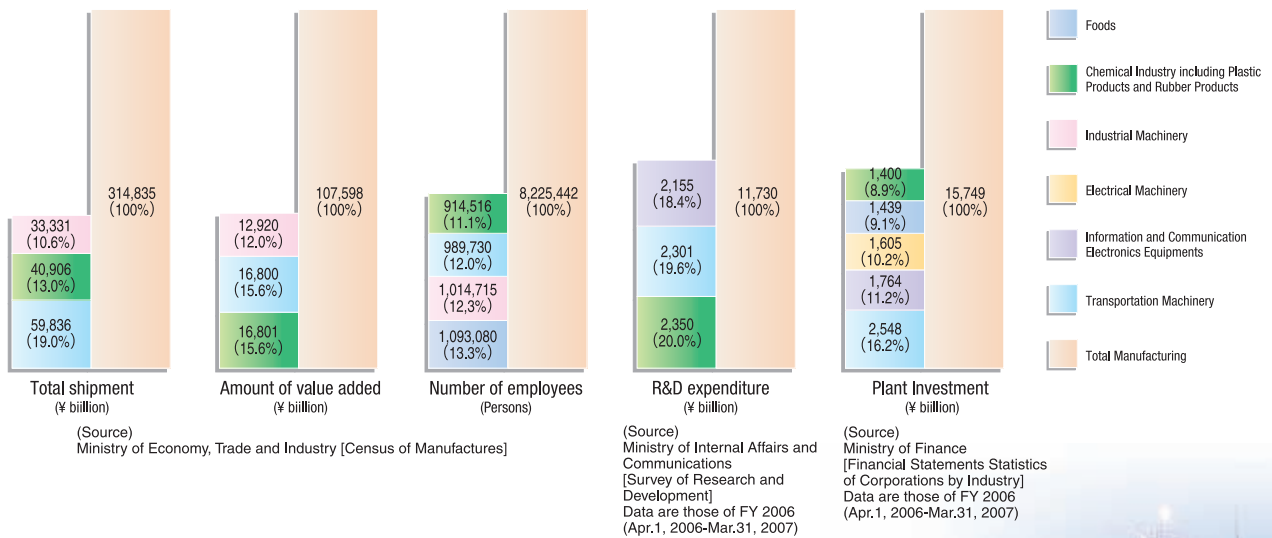
Japan Productivity Center for Socio-Economic Development

Contents

	Chemical Industry and Technology and Social Needs	3
1	Total Production (Shipments) of Chemical Industry Exceeds Yen 26 Trillion	5
2	Chemical Products That Meet The Needs of Various Fields	7
3	Shipment by Prefecture	9
4	Japan's Chemical Industry, The World's Third Biggest in Shipments after The U.S.A. and China	11
5	Yen 2 Trillion Spent for Research And Development	13
6	Operating Profit Ratio	15
7	Chemical Industry Ranks High in Plant Investment	16
8	340,000 Workers Are Employed	17
9	Labor Productivity/Working Hours	18
10	Exports/Imports	19
11	Outward Direct Investment Amounts to Yen 440 Billion, While Inward Direct Investment Amounts to Minus Yen 130 Billion	21
12	Overseas Business Activities	22
13	Japan Is An Energy-Saving Superpower	23
	Do Your Know Responsible Care? Efforts of Chemical Industry to Preserve Health,Safety and Environment	25

Highlights

Total shipments amount to approximately 41 trillion yen, which ranks second among all manufacturing industries. Total value-added amounts to approximately 17 trillion yen, which ranks first among all manufacturing industries. Chemical industry is an R&D-driven industry.



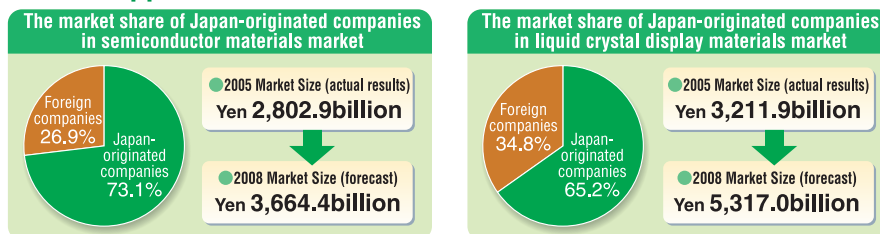
Exports by chemical industry continue to exceed imports.

	2003	2004	2005	2006	2007
Export	4,525,005	5,221,194	5,848,037	6,793,864	7,746,719
Import	3,458,279	3,816,181	4,321,230	4,909,332	5,465,021
Difference	1,066,726	1,405,013	1,526,807	1,884,532	2,281,698

¥ million

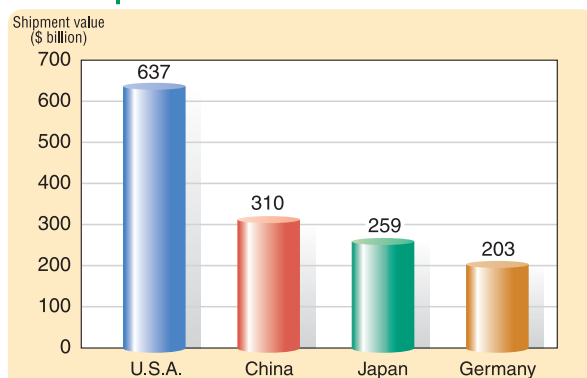
(Source) Ministry of Finance [Trade Statistics]

The Japanese chemical industry supports the manufacturing of electric appliances all over the world.



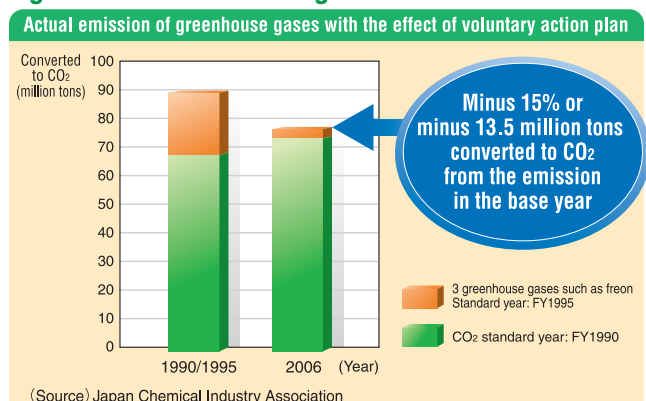
(Source) "2007 White Paper on Manufacturing" of Ministry of Economy, Trade and Industry (METI). METI compiled the white paper based on "2006 Semiconductor Materials Data Book (Electronic Journal)" and "2006 Liquid Crystal-related Market - Current Situation and Future Prospect (Fuji Chimera Research Institute)".

Japan-originated chemical companies total shipment ranks third.



(Source) American Chemistry Council

Chemical Industry Is Actively Taking Measures against Global Warming.

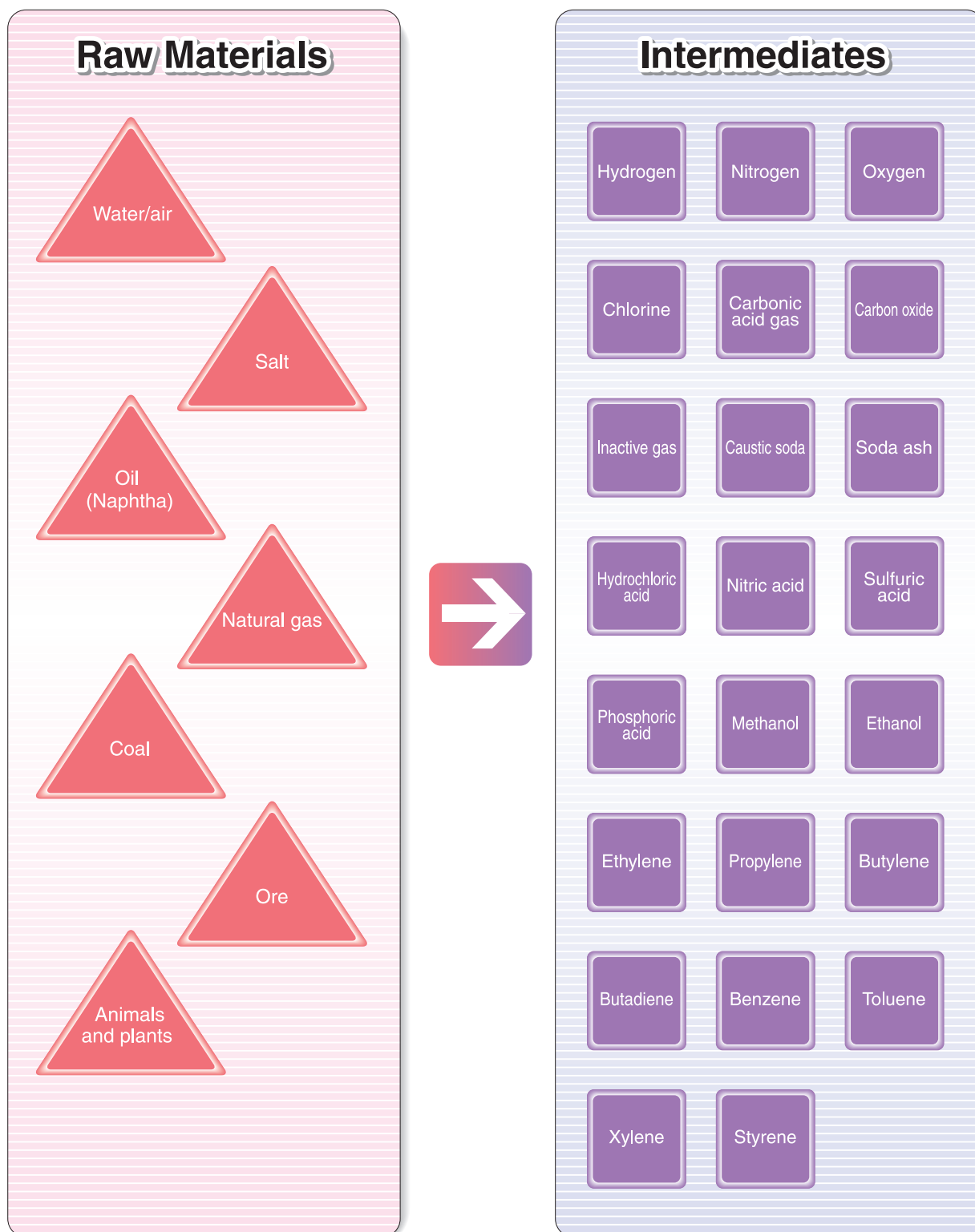


(Source) Japan Chemical Industry Association



Chemical Industry and Technology and Social Needs

Chemical Industry Supports Our Life and Other Industries.



Primary Products



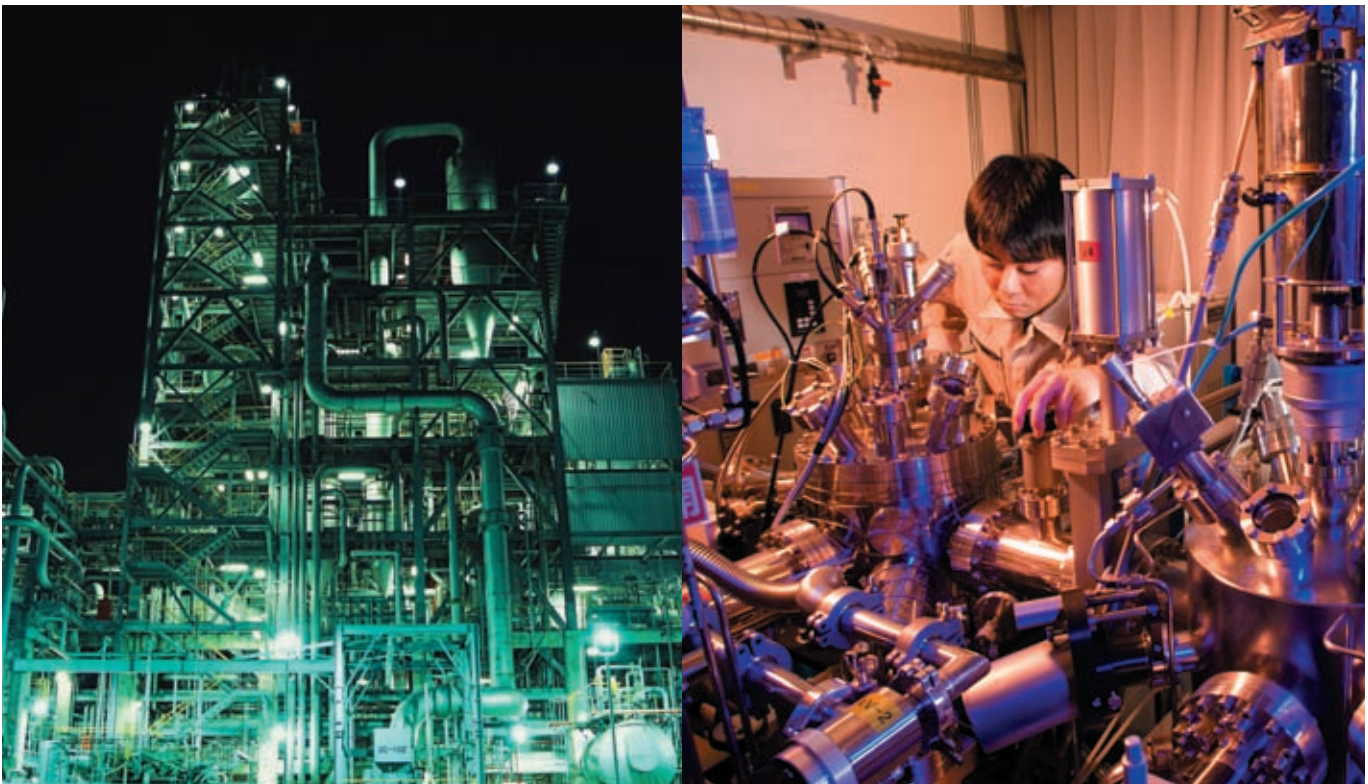
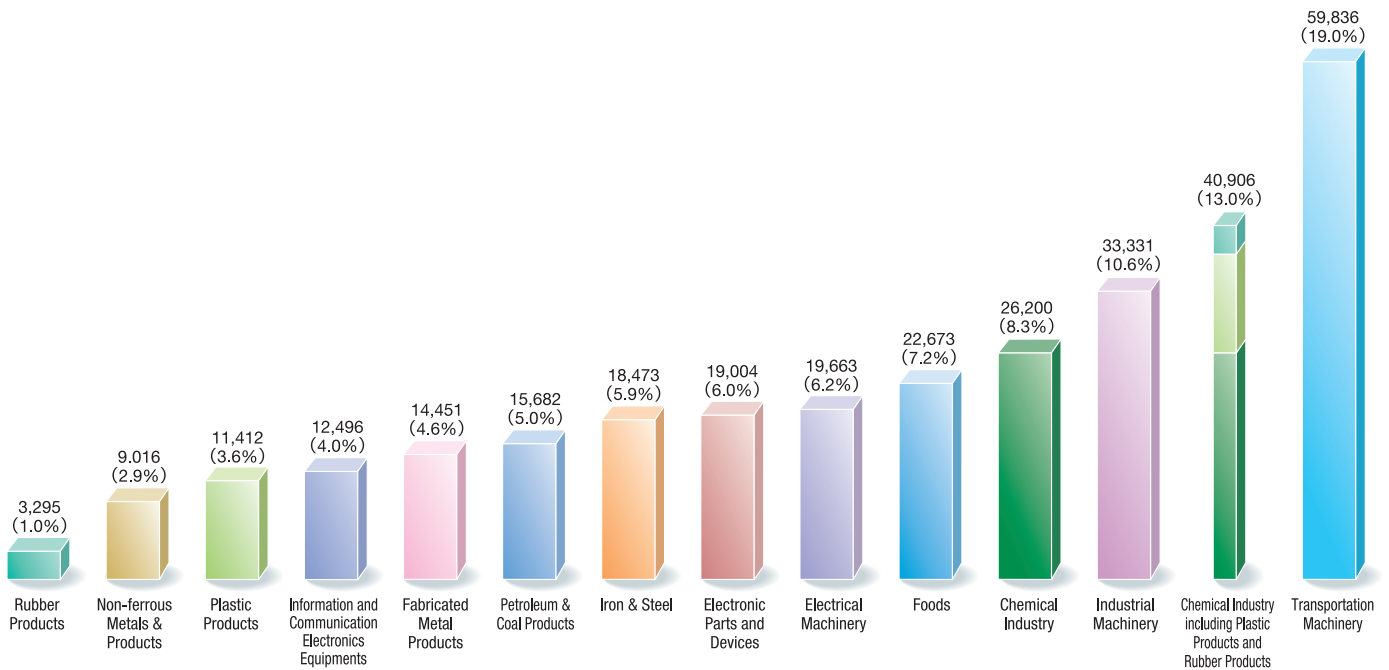
Chemical Products, Technology and Activities That Meet The Needs of Various Fields



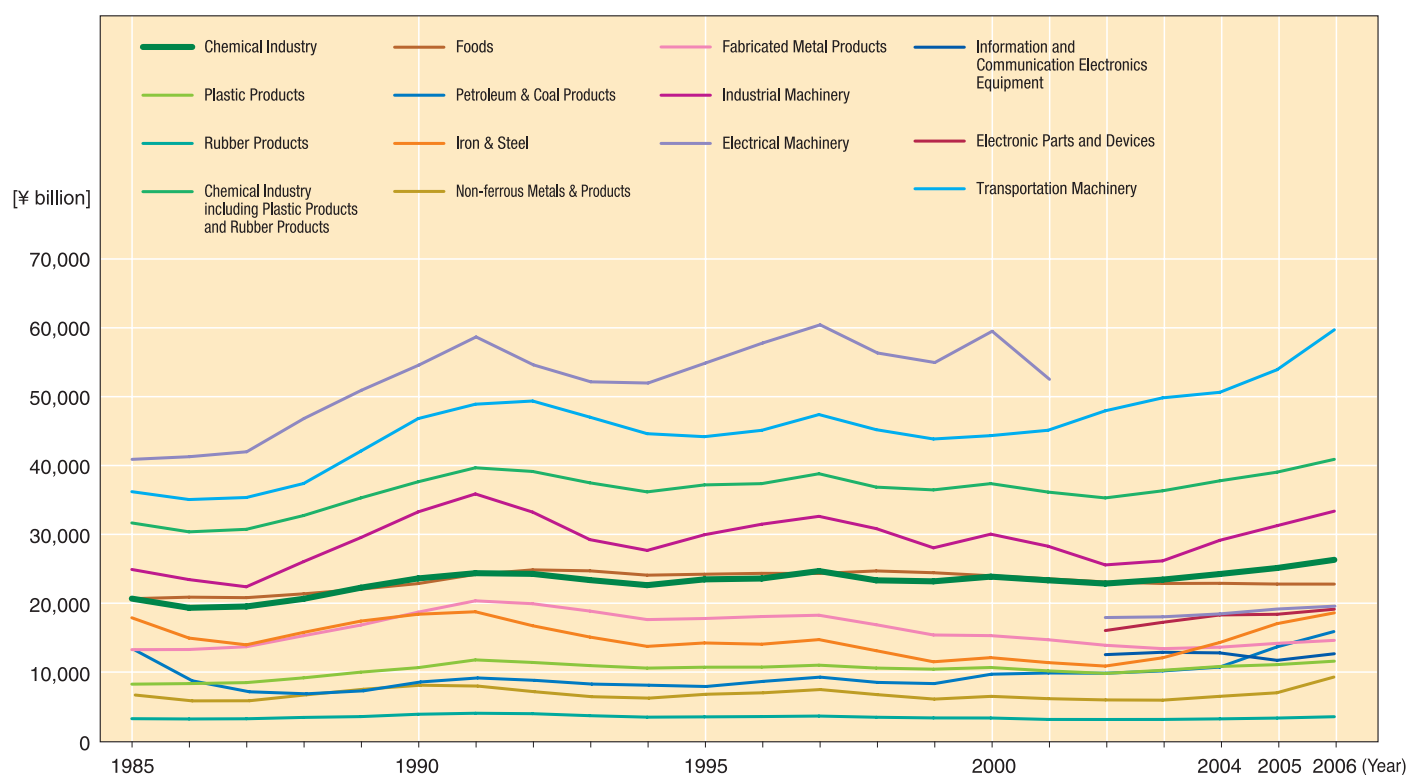
Total Production (Shipments) of Chemical Industry Exceeds Yen 26 Trillion

Chemical industry's total shipment value in 2006 amounted to the record high at yen 26 trillion, accounting for 8.3% of entire manufacturing industry.

Shipment value of the chemical industry in the manufacturing industries in 2006 [¥ billion,%]



Trend in shipment value



Shipment value of the chemical industry in the manufacturing industries [¥ billion]

Industry	Year	Every 5th year				Recent three years			
		1985	1990	1995	2000	2004	2005	2006	
Chemical Industry		20,552	23,503	23,363	23,762	24,149	25,027	26,200	8.3%
Plastic Products		8,052	10,466	10,530	10,486	10,636	10,906	11,412	3.6%
Rubber Products		3,008	3,656	3,275	3,107	2,982	3,099	3,295	1.0%
Chemical Industry including Plastic Products and Rubber Products		31,612	37,624	37,168	37,356	37,767	39,032	40,906	13.0%
Foods		20,542	22,748	24,117	23,888	22,789	22,678	22,673	7.2%
Petroleum & Coal Products		12,948	8,298	7,635	9,434	10,475	13,429	15,682	5.0%
Iron & Steel		17,754	18,269	14,073	11,927	14,141	16,896	18,473	5.9%
Non-ferrous Metals & Products		6,384	7,822	6,496	6,191	6,193	6,712	9,016	2.9%
Fabricated Metal Products		13,094	18,574	17,646	15,143	13,454	14,016	14,451	4.6%
Industrial Machinery		24,190	33,225	29,884	29,972	29,074	31,211	33,331	10.6%
Electrical Machinery		40,842	54,529	54,831	59,449	18,120	18,812	19,663	6.2%
Information and Communication Electronics Equipment		—	—	—	—	12,622	11,534	12,496	4.0%
Electronic Parts and Devices		—	—	—	—	18,163	18,265	19,004	6.0%
Transportation Machinery		36,179	46,858	44,215	44,367	50,700	54,000	59,836	19.0%
Others		61,774	75,427	69,965	62,752	49,977	48,760	49,303	15.7%
Total Manufacturing		265,321	323,373	306,030	300,478	283,476	295,346	314,835	100.0%

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]

<http://www.meti.go.jp/english/statistics/tyo/kougyo/index.html>

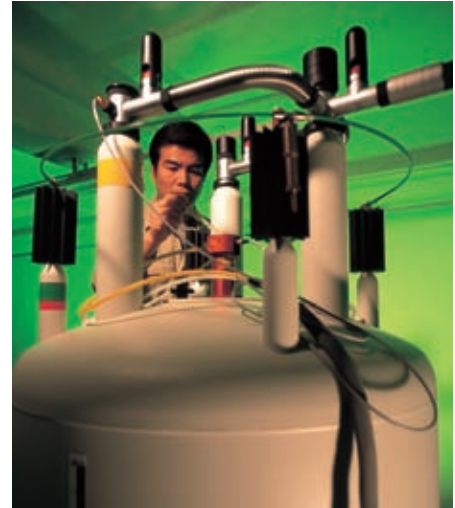
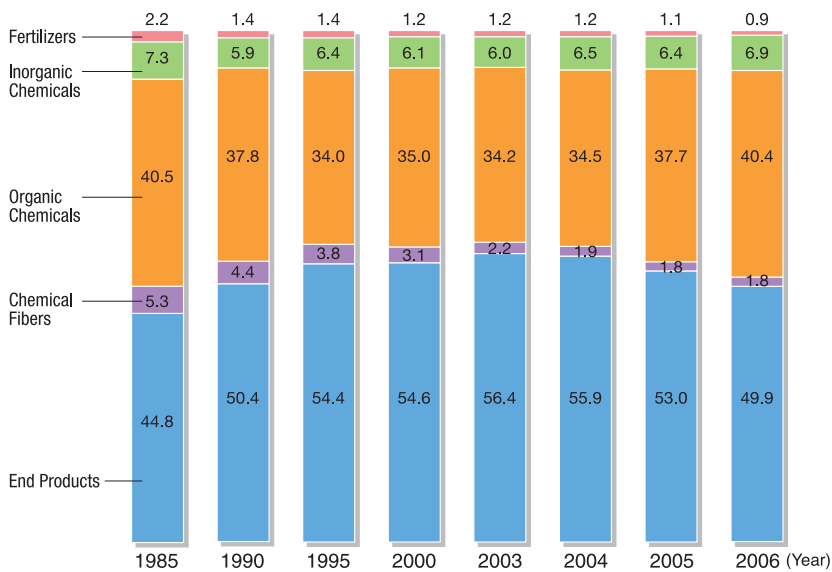
(Note) Statistics of facilities with more than four employees

Electrical machinery was divided into electrical machinery, information and communication electronics equipment, and electronic parts and devices in 2002.

Chemical Products That Meet The Needs of Various Fields

Products that chemical industry produces are used as raw materials and intermediary products by other industries. At the same time, many end products include drugs & medicines, cosmetics, detergents, paints, film and other materials that help us enjoy a comfortable modern life.

Trend of shipment composition in chemical industry [%]



Trend of shipment composition in chemical industry [%]

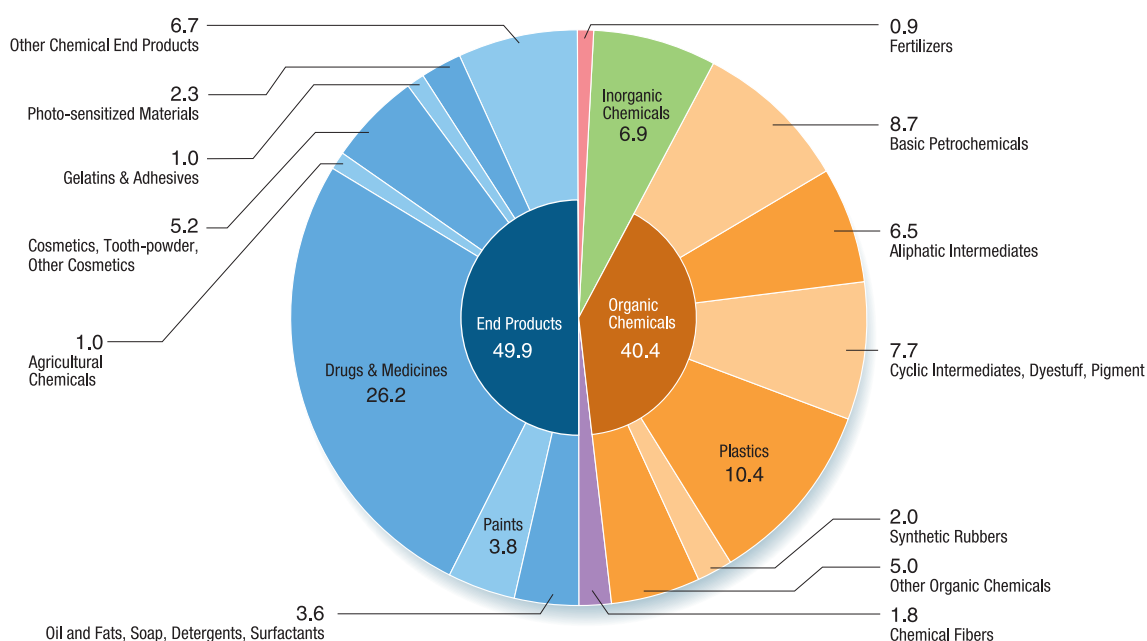
Industry	Year	Every 5th year				Recent three years		
		1985	1990	1995	2000	2004	2005	2006
Fertilizers		2.2	1.4	1.4	1.2	1.2	1.1	0.9
Inorganic Chemicals		7.3	5.9	6.4	6.1	6.5	6.4	6.9
Organic Chemicals		40.5	37.8	34.0	35.0	34.5	37.7	40.4
▶ Basic Petrochemicals		6.2	5.1	2.6	2.9	5.0	6.3	8.7
▶ Aliphatic Intermediates		5.5	4.5	5.5	7.1	5.4	6.1	6.5
▶ Cyclic Intermediates, Dyestuff, Pigment		7.4	6.9	6.9	6.1	6.3	7.6	7.7
▶ Plastics		14.2	15.4	14.0	13.6	11.7	11.0	10.4
▶ Synthetic Rubbers		2.4	2.3	1.7	1.5	1.3	2.0	2.0
▶ Other Organic Chemicals		4.7	3.6	3.3	3.8	4.8	4.7	5.0
Chemical Fibers		5.3	4.4	3.8	3.1	1.9	1.8	1.8
End Products		44.8	50.4	54.4	54.6	55.9	53.0	49.9
▶ Oil and Fats, Soap, Detergents, Surfactants		3.8	4.1	4.0	3.5	4.2	4.1	3.6
▶ Paints		4.9	4.9	4.6	4.1	4.1	3.7	3.8
▶ Drugs & Medicines		18.6	21.9	25.7	27.0	29.9	28.0	26.2
▶ Agricultural Chemicals		2.2	1.6	1.6	1.4	1.1	1.1	1.0
▶ Cosmetics, Tooth-powder, Other Cosmetics		5.2	5.9	6.4	6.0	5.8	5.6	5.2
▶ Gelatins & Adhesives		0.9	1.0	1.0	1.0	1.0	1.0	1.0
▶ Photo-sensitized Materials		3.6	4.1	4.6	4.4	3.4	2.5	2.3
▶ Other Chemical End Products		5.7	6.9	6.6	7.2	6.5	7.0	6.7
Chemical Industry		100	100	100	100	100	100	100.0
Chemical Industry		65.0	62.5	62.9	63.6	63.9	64.1	64.0
Plastic Products		25.5	27.8	28.3	28.1	28.2	27.9	27.9
Rubber Products		9.5	9.7	8.8	8.3	7.9	7.9	8.1
Chemical Industry in A Broad Sense (including Plastic Products, and Rubber Products)		100	100	100	100	100	100	100

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]

<http://www.meti.go.jp/english/statistics/tyo/kougyo/index.html>

(Note) Statistics of facilities with more than four employees

Composition of chemical products shipped in 2006 [%]



The major chemical industry indices with breakdown by product in 2006

Industry	Number of establishments	Number of employees	Amount of shipment (¥ billion)	Amount of value-added (¥ billion)	Composition(%)			
					Number of establishments	Number of employees	Shipment	Amount of value-added
Fertilizers	150	4,040	233	65	3.1	1.2	0.9	0.6
Inorganic Chemicals	745	32,512	1,818	645	15.4	9.5	6.9	5.9
Organic Chemicals	708	79,429	10,585	3,138	14.7	23.1	40.4	28.5
▶ Basic Petrochemicals	15	4,557	2,281	584	0.3	1.3	8.7	5.3
▶ Aliphatic Intermediates	68	9,674	1,703	591	1.4	2.8	6.5	5.4
▶ Cyclic Intermediates, Dyestuff, Pigment	171	15,693	2,018	610	3.5	4.6	7.7	5.5
▶ Plastics	188	25,355	2,736	728	3.9	7.4	10.4	6.6
▶ Synthetic Rubbers	18	5,813	529	209	0.4	1.7	2.0	1.9
▶ Other Organic Chemicals	248	18,337	1,318	417	5.1	5.3	5.0	3.8
Chemical Fibers	57	9,395	480	157	1.2	2.7	1.8	1.4
End Products	3,164	218,422	13,084	6,988	65.6	63.5	49.9	63.6
▶ Oil and Fats, Soap, Detergents, Surfactants	275	14,280	939	454	5.7	4.2	3.6	4.1
▶ Paints	421	18,418	998	341	8.7	5.4	3.8	3.1
▶ Drugs & Medicines	885	93,837	6,876	4,230	18.3	27.3	26.2	38.5
▶ Agricultural Chemicals	70	4,194	264	106	1.5	1.2	1.0	1.0
▶ Cosmetics, Tooth-powder, Other Cosmetics	428	29,678	1,373	863	8.9	8.6	5.2	7.9
▶ Gelatins & Adhesives	157	5,406	272	99	3.3	1.6	1.0	0.9
▶ Photo-sensitized Materials	62	13,212	597	238	1.3	3.8	2.3	2.2
▶ Other Chemical End Products	866	39,397	1,765	658	18.0	11.5	6.7	6.0
Chemical Industry	4,824	343,798	26,200	10,994	100	100	100	100
Chemical Industry	4,824	343,798	26,200	10,994	20.3	37.6	64.0	65.4
Plastic Products	15,731	445,334	11,412	4,399	66.2	48.7	27.9	26.2
Rubber Products	3,217	125,384	3,295	1,408	13.5	13.7	8.1	8.4
Chemical Industry in A Broad Sense (including Plastic Products, and Rubber Products)	23,772	914,516	40,906	16,801	100	100	100	100

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]

<http://www.meti.go.jp/english/statistics/tyo/kougyo/index.html>

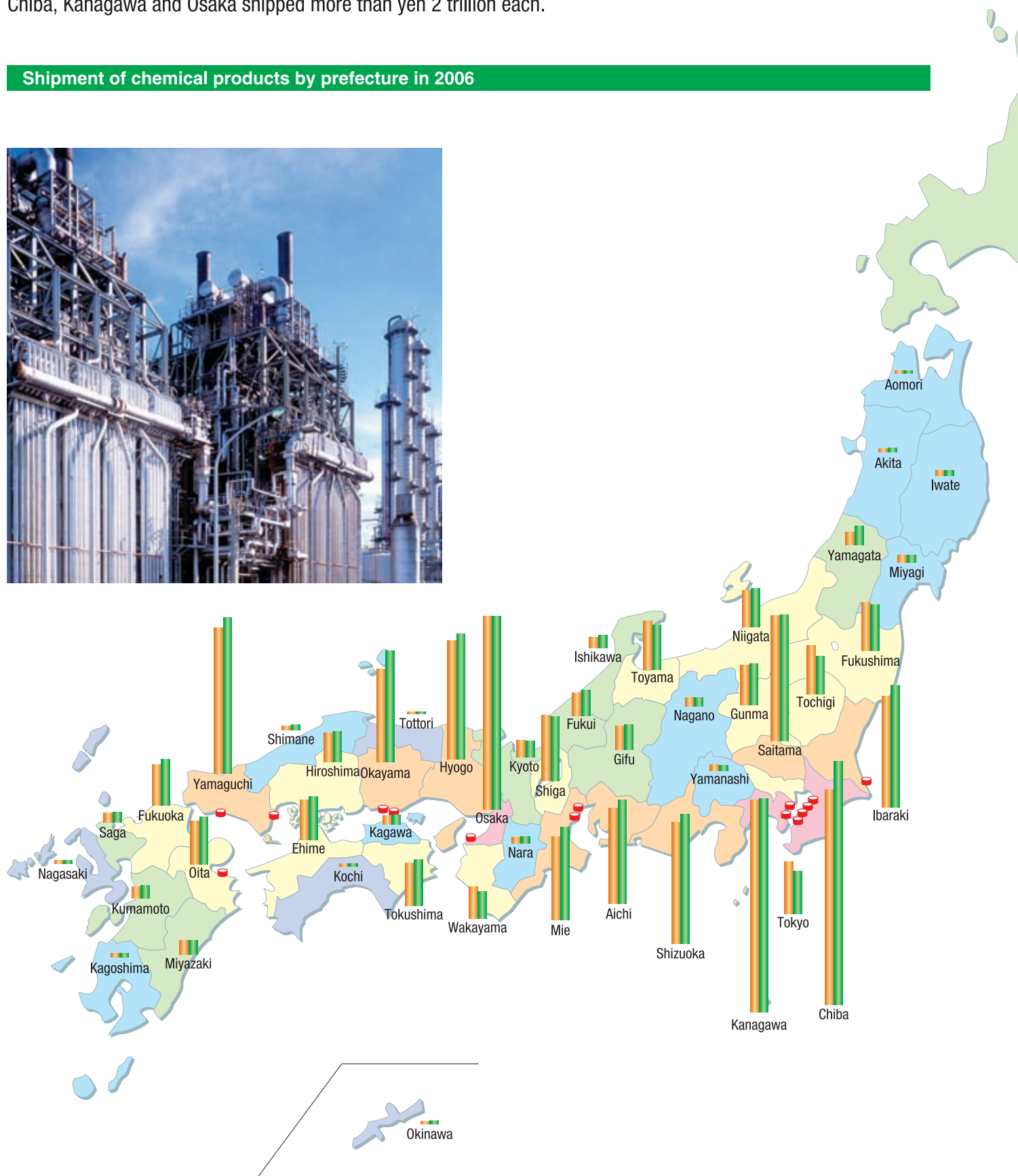
(Note) Statistics of facilities with more than four employees

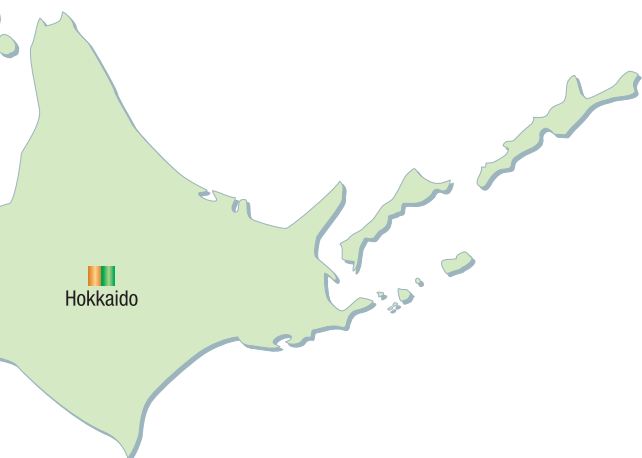
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Shipment by Prefecture

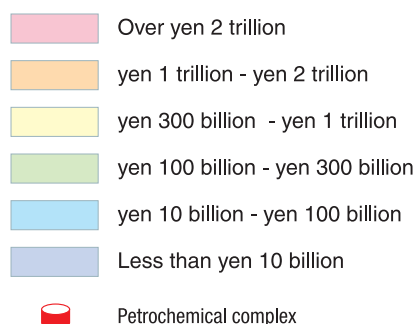
Chiba, Kanagawa and Osaka shipped more than yen 2 trillion each.

Shipment of chemical products by prefecture in 2006





2005  2006



Shipment of chemical products by prefecture in 2006

	Prefecture	Shipment (¥100million)	Increase/decrease from previous year(%)	Number of employees
1	Chiba	26,861	113.3	18,741
2	Kanagawa	23,597	100.6	26,382
3	Osaka	21,333	100.0	34,170
4	Yamaguchi	17,156	107.0	13,622
5	Shizuoka	14,311	106.5	22,804
6	Saitama	13,940	100.6	21,286
7	Hyogo	13,780	105.7	20,589
8	Ibaraki	13,428	109.7	12,639
9	Okayama	12,286	119.5	10,370
10	Aichi	11,416	108.2	15,677
11	Mie	10,235	111.0	12,136
12	Shiga	7,036	97.9	6,608
13	Oita	5,257	110.2	2,181
14	Fukushima	5,105	96.9	8,227
15	Tokushima	5,102	108.4	8,010
16	Fukuoka	4,935	111.2	7,105
17	Toyama	4,892	91.0	11,040
18	Ehime	4,786	109.9	3,941
19	Tokyo	4,657	81.0	12,884
20	Gunma	4,555	103.7	6,377
21	Niigata	4,323	107.2	6,735
22	Tochigi	4,175	77.2	5,712
23	Hiroshima	3,371	105.4	5,432
24	Wakayama	2,995	84.4	4,387

	Prefecture	Shipment (¥100million)	Increase/decrease from previous year(%)	Number of employees
25	Fukui	2,826	113.0	4,236
26	Gifu	2,803	105.2	4,854
27	Yamagata	2,119	147.3	2,969
28	Kyoto	1,787	97.1	5,026
29	Miyazaki	1,606	101.0	2,344
30	Kumamoto	1,447	113.3	3,553
31	Ishikawa	1,432	119.0	1,565
32	Hokkaido	1,353	99.3	3,571
33	Saga	1,127	108.2	1,694
34	Kagawa	980	104.3	2,741
35	Nagano	968	99.3	2,071
36	Miyagi	827	105.1	1,744
37	Nara	700	103.6	3,240
38	Yamanashi	625	94.2	1,407
39	Iwate	525	107.8	1,403
40	Akita	403	128.2	1,206
41	Aomori	308	96.9	527
42	Shimane	187	122.4	502
43	Kagoshima	171	93.3	560
44	Nagasaki	94	97.0	270
45	Okinawa	78	101.5	832
46	Kochi	74	104.8	310
47	Tottori	23	108.3	118
	Total	261,995	104.7	343,798

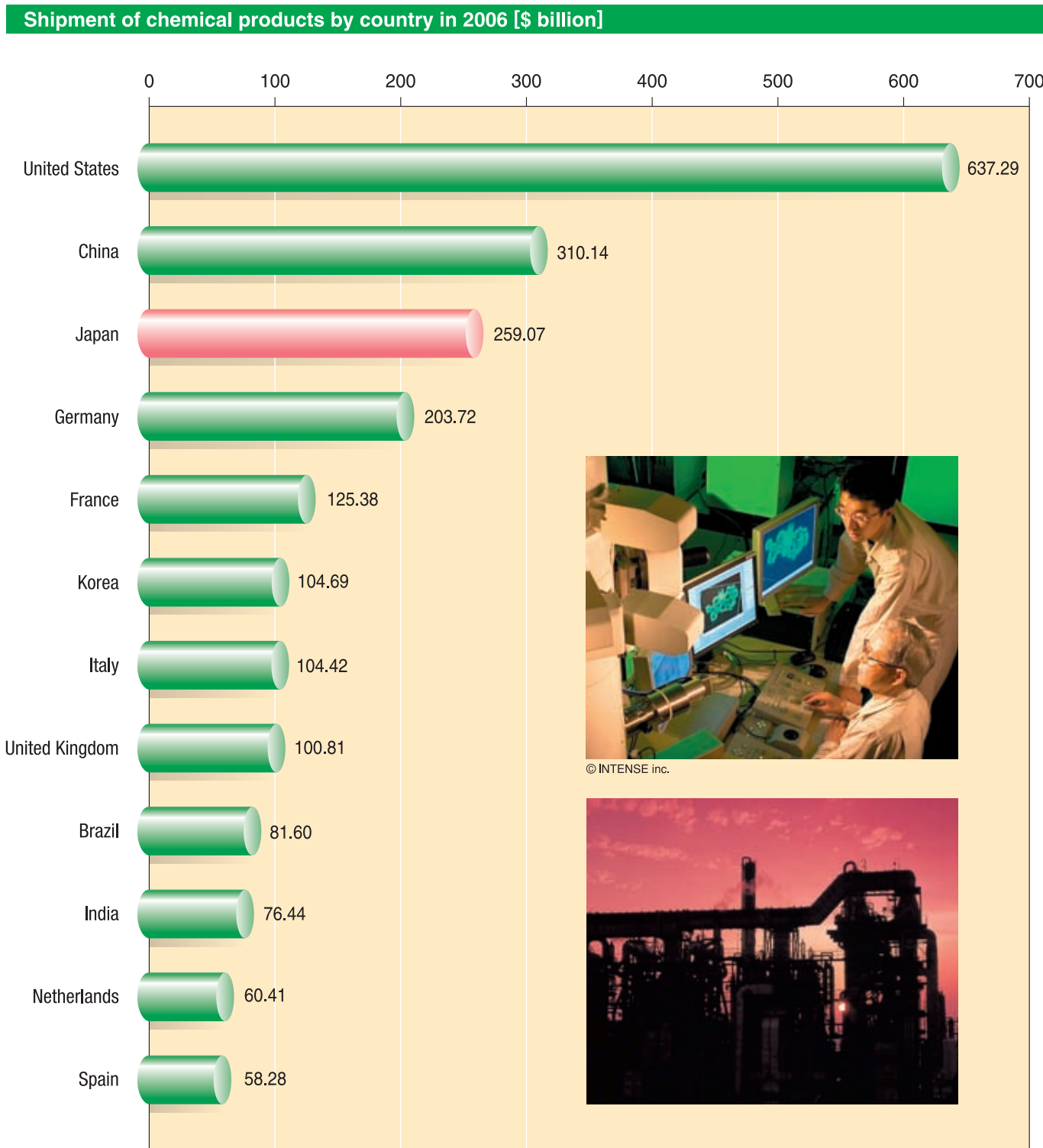
(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]

<http://www.meti.go.jp/english/statistics/tyo/kougyo/index.html>

(Note) Statistics of facilities with more than four employees

Japan's Chemical Industry, The World's Third Biggest in Shipments after The U.S.A. and China

Japan-originated chemical companies total shipment ranks third.



(Source) American Chemistry Council

The world's leading chemical companies in 2006

Ranking	Company	Chemical Sales [\$ million]			Country	Chemical Operating Profits [\$ million] ^(a)		
			Changes from 2005	Chemical Sales as of Total Sales			Changes from 2005	Operating Profit Margin
1	BASF	49,516	12%	75%	Germany	4,550	-12%	9%
2	Dow Chemical	49,124	6	100	U.S.	4,771	-12	10
3	Royal Dutch Shell	36,306	4	11	U.K./Netherlands	702	-42	2
4	Exxon Mobil ^(b)	34,098	9	9	U.S.	4,382	11	13
5	Ineos Group ^(c)	33,366	169	100	U.K.	1,161	N.A.	3
6	DuPont ^(d)	28,928	3	100	U.S.	3,598	4	12
7	China Petroleum & Chemical	27,783	32	21	China	2,162	21	8
8	Total	24,012	-14	12	France	1,526	-10	6
9	Formosa Plastics Group ^(e)	21,012	13	60	Taiwan	2,303	-3	11
10	Bayer	19,926	-4	55	Germany	1,980	-23	10
11	SABIC	19,749	4	86	Saudi Arabia	8,407	2	43
12	Lyondell	19,507	5	88	U.S.	686	-54	4
13	Mitsubishi Chemical (Japan)	18,671	10	83	Japan	753	-13	4
14	Mitsui Chemicals (Japan)	14,513	15	100	Japan	788	56	5
15	Degussa	13,718	-7	100	Germany	687	-30	5
16	Basell	13,185	23	100	Netherlands	778	-19	6
17	Akzo Nobel	12,586	6	73	Netherlands	1,214	39	10
18	Sumitomo Chemical (Japan)	12,112	12	79	Japan	661	1	5
19	Air Liquide	12,096	5	88	France	2,127	8	18
20	Chevron Phillips	11,839	11	100	U.S.	1,443	54	12
21	Toray (Japan)	11,668	9	88	Japan	774	9	7
22	Shin-Etsu Chemical (Japan)	11,217	16	100	Japan	2,072	30	18
23	Huntsman	10,624	-18	100	U.S.	629	-36	6
24	DSM	10,528	2	100	Netherlands	1,015	0	10
25	Petrochina	9,386	8	11	China	635	55	7
26	LG Chem ^(f)	9,344	23	72	South Korea	540	-26	6
27	Reliance	9,344	29	40	India	1,194	14	13
28	Solvay	9,280	17	79	Belgium	908	7	10
29	ICI	8,931	-17	100	U.K.	925	-9	10
30	PPG Industries	8,808	11	80	U.S.	1,371	29	16

(Source) Chemical & Engineering News July 23, 2007 Issue

http://pubs.acs.org/subscribe/journals/cen/85/i30/toc/toc_i30.html

(Note) Financial figures converted at the 2006 average exchange rates of \$1.00 U.S. = 2.173 Brazilian reals, 0.542 British pounds, 1.134 Canadian dollars, 7.97 Chinese renminbi, 0.796 euros, 45.19 Indian rupees, 116.31 Japanese yen, 6.4095 Norwegian crowns, 6.767 South African rands, 954.32 South Korean won, 3.7504 Saudi riyals, 1.2532 Swiss francs, 32.51 Taiwanese dollars.

(a) Operating profit is sales less administrative expenses and cost of sales.

(b) Profits and profitability ratios are after-tax.

(c) C&EN estimates.

(d) Sales include as significant amount of nonchemical products.

(e) Includes group companies., Nan Ya Plastics, Formosa Plastics, Formosa Chemicals & Fibre, and Formosa Petrochemical; estimess were used for chemical operating income and capital expenditures of Formosa Petrochemical.

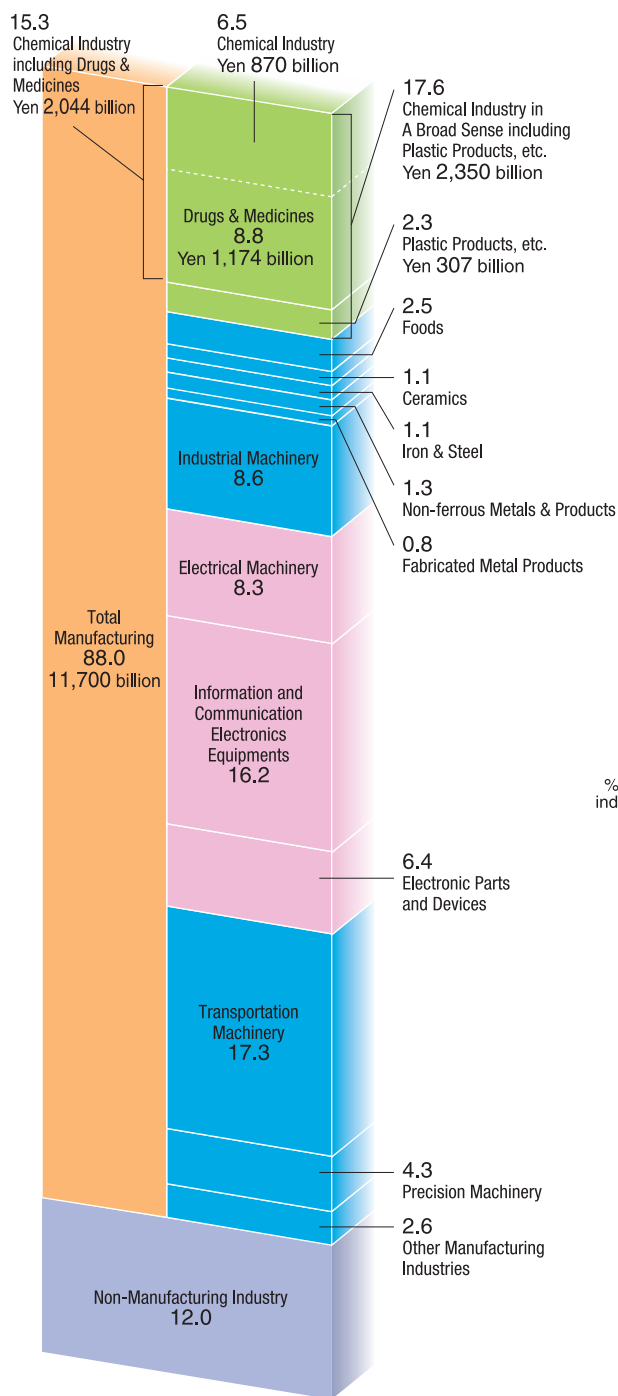
(f) Consolidated data: data in 2005 were nonconsolidated.

Drugs & medicines are excluded.

Yen 2 Trillion Spent for Research And Development

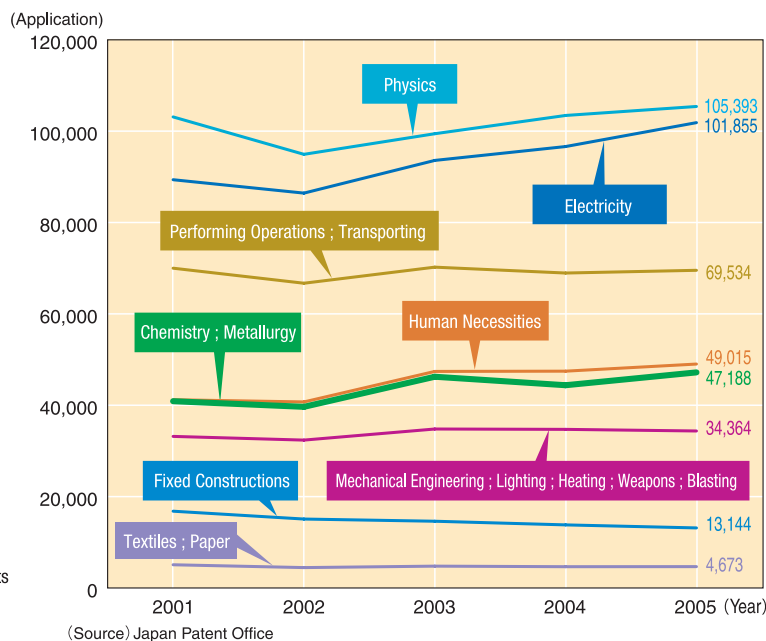
Research and development expenditures of chemical industry in FY 2006(Apr.1, 2006-Mar.31, 2007) in Japan amounted to yen 2 trillion, accounting for 15.3% of all industry R&D expenditures. The percentage of research expenditures to sales was 5.3%.

Ratio of R&D expenditures by industry in FY 2006 [%]

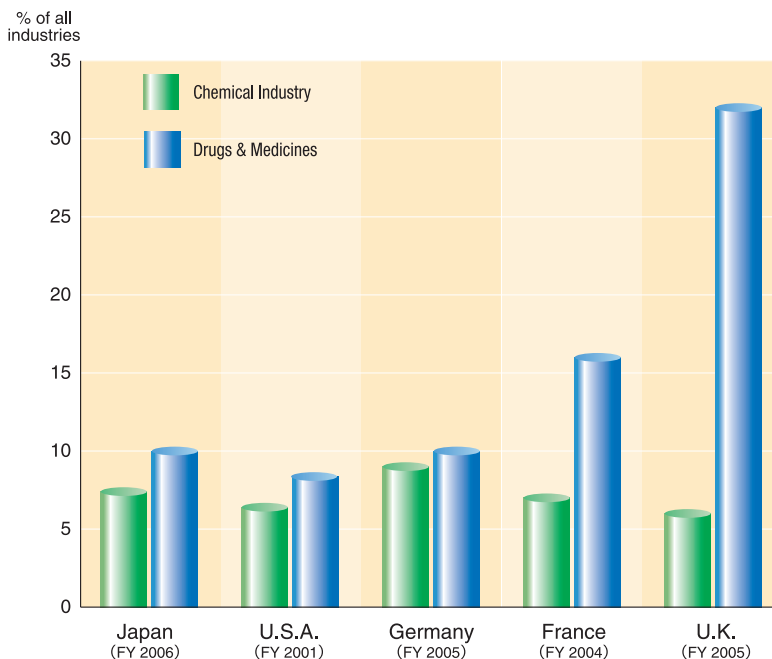


(Source) Ministry of Internal Affairs and Communications
[Survey of Research and Development]
<http://www.stat.go.jp/english/data/kagaku/index.htm>

Trend of number of applications for patents by sector

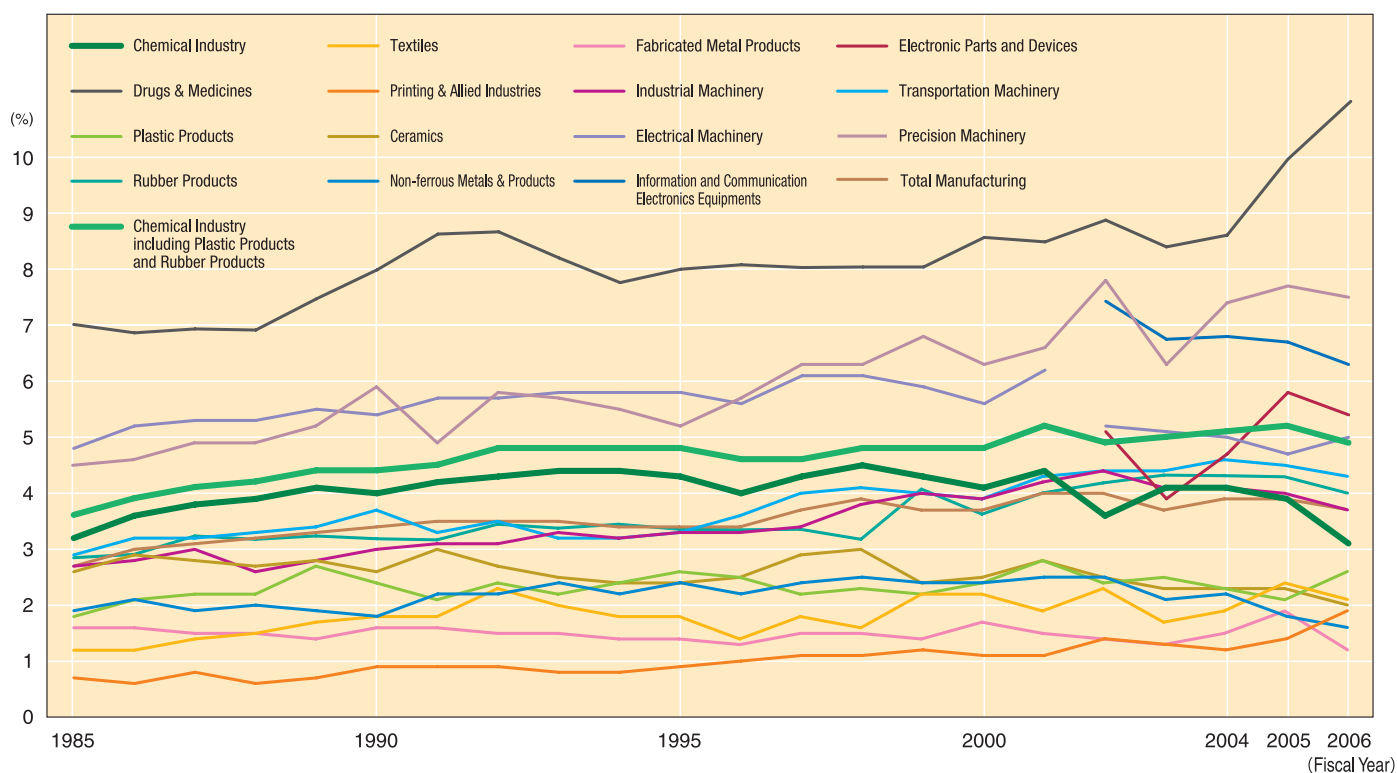


Chemical industry R&D expenditures in major countries



(Source) Ministry of Education, Culture, Sports, Science and Technology
[Annual Report on the Promotion of Science and Technology]

Ratio of R&D expenditures to sales by industry



Ratio of R&D expenditures to sales by industry [%]

Industry	Fiscal Year	Every 5th year				Recent three years		
		1985	1990	1995	2000	2004	2005	2006
Chemical Industry		3.2	4.0	4.3	4.1	4.1	3.9	3.1
Drugs & Medicines		7.0	8.0	8.0	8.6	8.6	10.0	11.0
Chemical Industry including Drugs & Medicines		4.0	4.9	5.3	5.4	5.6	5.9	5.3
Plastic Products		1.8	2.4	2.6	2.4	2.3	2.1	2.6
Rubber Products		2.9	3.2	3.4	3.6	4.3	4.3	4.0
Chemical Industry including Plastic Products and Rubber Products		3.6	4.4	4.8	4.8	5.1	5.2	4.9
Textiles		1.2	1.8	1.8	2.2	1.9	2.4	2.1
Printing & Allied Industries		0.7	0.9	0.9	1.1	1.2	1.4	1.9
Ceramics		2.6	2.6	2.4	2.5	2.3	2.3	2.0
Non-ferrous Metals & Products		1.9	1.8	2.4	2.4	2.2	1.8	1.6
Fabricated Metal Products		1.6	1.6	1.4	1.7	1.5	1.9	1.2
Industrial Machinery		2.7	3.0	3.3	3.9	4.1	4.0	3.7
Electrical Machinery		4.8	5.4	5.8	5.6	5.0	4.7	5.0
Information and Communication Electronics Equipments		—	—	—	—	6.8	6.7	6.3
Electronic Parts and Devices		—	—	—	—	4.7	5.8	5.4
Transportation Machinery		2.9	3.7	3.3	3.9	4.6	4.5	4.3
Precision Machinery		4.5	5.9	5.2	6.3	7.4	7.7	7.5
Total Manufacturing		2.7	3.4	3.4	3.7	3.9	3.9	3.7

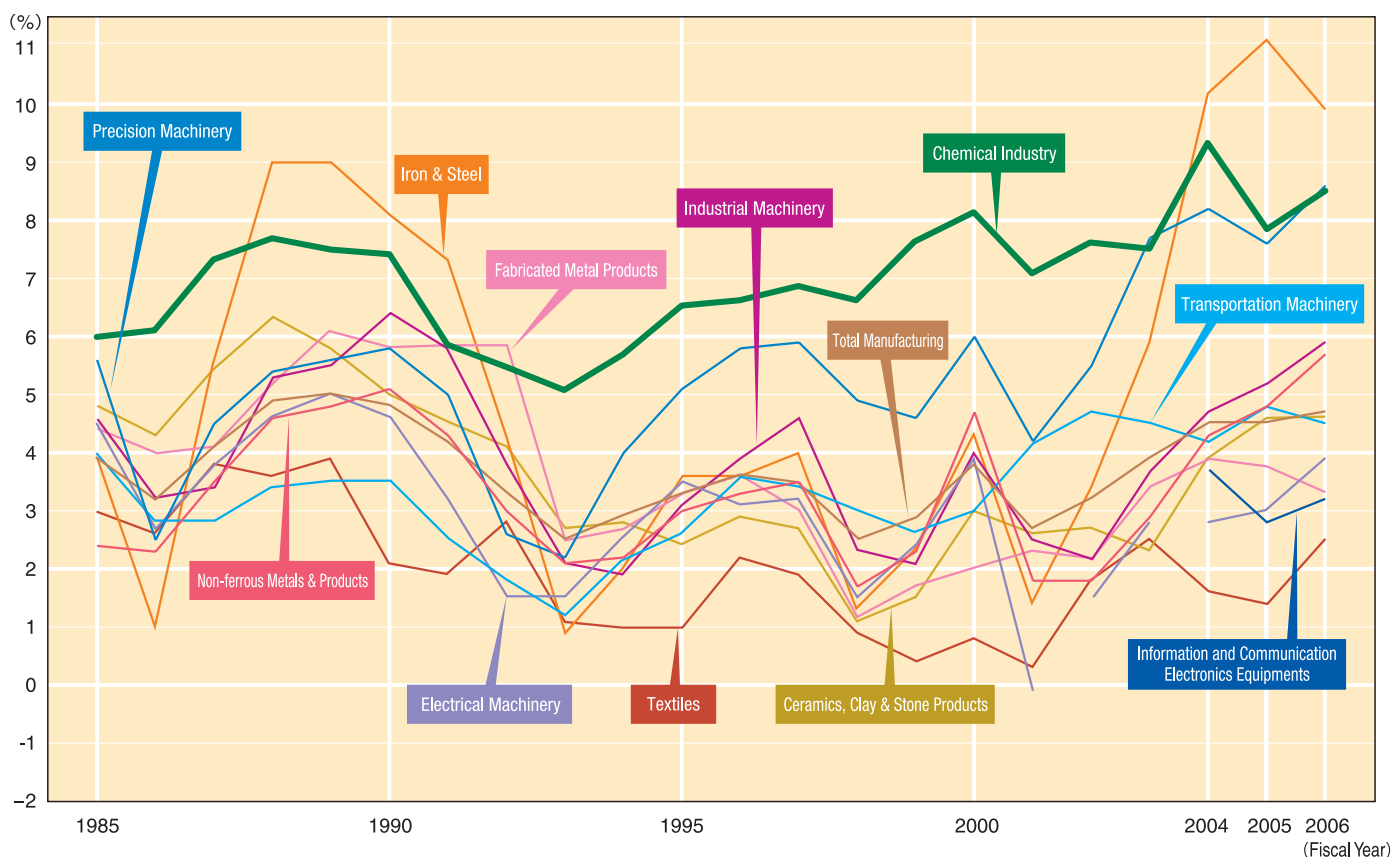
(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development]

<http://www.stat.go.jp/english/data/kagaku/index.htm>

(Note) Drugs and medicines are excluded from Chemical Industry. Electrical machinery was divided into electrical machinery, information and communication electronics equipment, and electronic parts and devices in 2002.

Operating profit ratio to sales remains high compared to other manufacturing industries.

Trend of ratio of operating profits to sales by industry



Trend of ratio of operating profits to sales by industry [%]

Industry	Fiscal Year	Every 5th year				Recent three years		
		1985	1990	1995	2000	2004	2005	2006
Chemical industry		6.0	6.9	6.5	8.1	9.3	7.8	8.5
Textiles		3.0	2.1	1.0	0.8	1.6	1.4	2.5
Ceramics, Clay & Stone Products		4.8	5.0	2.4	3.0	3.9	4.6	4.6
Iron & Steel		3.9	8.1	3.6	4.3	10.2	11.1	9.9
Non-ferrous Metals & Products		2.4	5.1	3.0	4.7	4.3	4.8	5.7
Fabricated Metal Products		4.4	5.8	3.3	2.0	3.9	3.7	3.3
Industrial Machinery		4.6	6.4	3.1	4.0	4.7	5.2	5.9
Electrical Machinery		4.5	4.6	3.5	3.9	2.8	3.0	3.9
Information and Communication Electronics Equipments		—	—	—	—	3.7	2.8	3.2
Transportation Machinery		4.0	3.5	2.6	3.0	4.2	4.8	4.5
Precision Machinery		5.6	5.8	5.1	6.0	8.2	7.6	8.6
Total Manufacturing		3.9	4.8	3.3	3.8	4.5	4.5	4.7

(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]

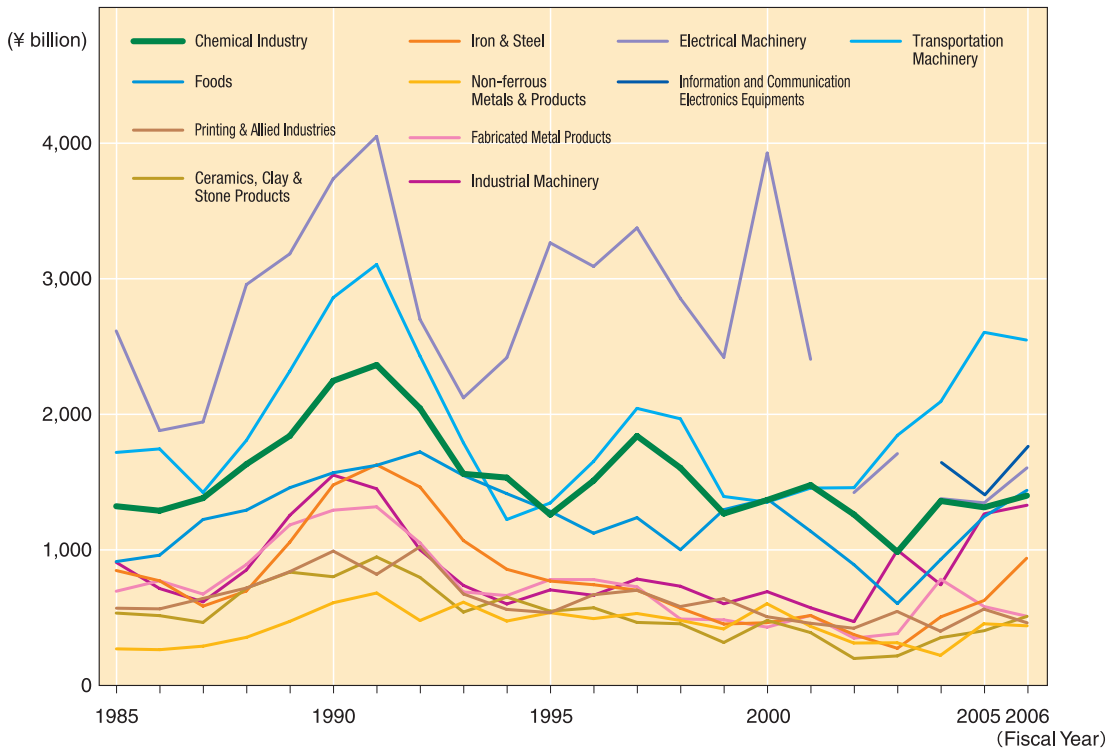
<http://www.mof.go.jp/english/e1c002.htm>

Chemical industry includes plastic products and rubber products. Information and Communication Electronics Equipment includes electronic parts and devices.

Chemical Industry Ranks High in Plant Investment

Plant investment by the chemical industry accounted for 8.9% of all manufacturing industries.

Trend of plant investment by industry



Trend of plant investment by industry [¥ billion]

Industry	Fiscal Year	Every 5th year				Recent three years			
		1985	1990	1995	2000	2004	2005	2006	
Chemical Industry including Plastic Products and Rubber Products		1,322	2,247	1,260	1,368	1,361	1,314	1,400	8.9%
Foods		914	1,569	1,285	1,376	930	1,246	1,439	9.1%
Printing & Allied Industries		570	991	537	507	400	563	462	2.9%
Ceramics, Clay & Stone Products		534	802	548	480	353	404	510	3.2%
Iron & Steel		848	1,479	770	463	506	627	938	6.0%
Non-ferrous Metals & Products		270	610	537	603	222	455	440	2.8%
Fabricated Metal Products		695	1,293	781	430	783	582	657	4.2%
Industrial Machinery		908	1,552	705	692	743	1,266	1,329	8.4%
Electrical Machinery		2,615	3,737	3,265	3,927	1,378	1,347	1,605	10.2%
Information and Communication Electronics Equipments		—	—	—	—	1,644	1,407	1,764	11.2%
Transportation Machinery		1,719	2,861	1,346	1,352	2,094	2,605	2,548	16.2%
Others		2,686	4,341	2,814	2,040	2,568	2,530	2,656	16.9%
Total Manufacturing		13,082	21,483	13,849	13,238	12,982	14,343	15,749	100.0%

(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]

<http://www.mof.go.jp/english/e1c002.htm>

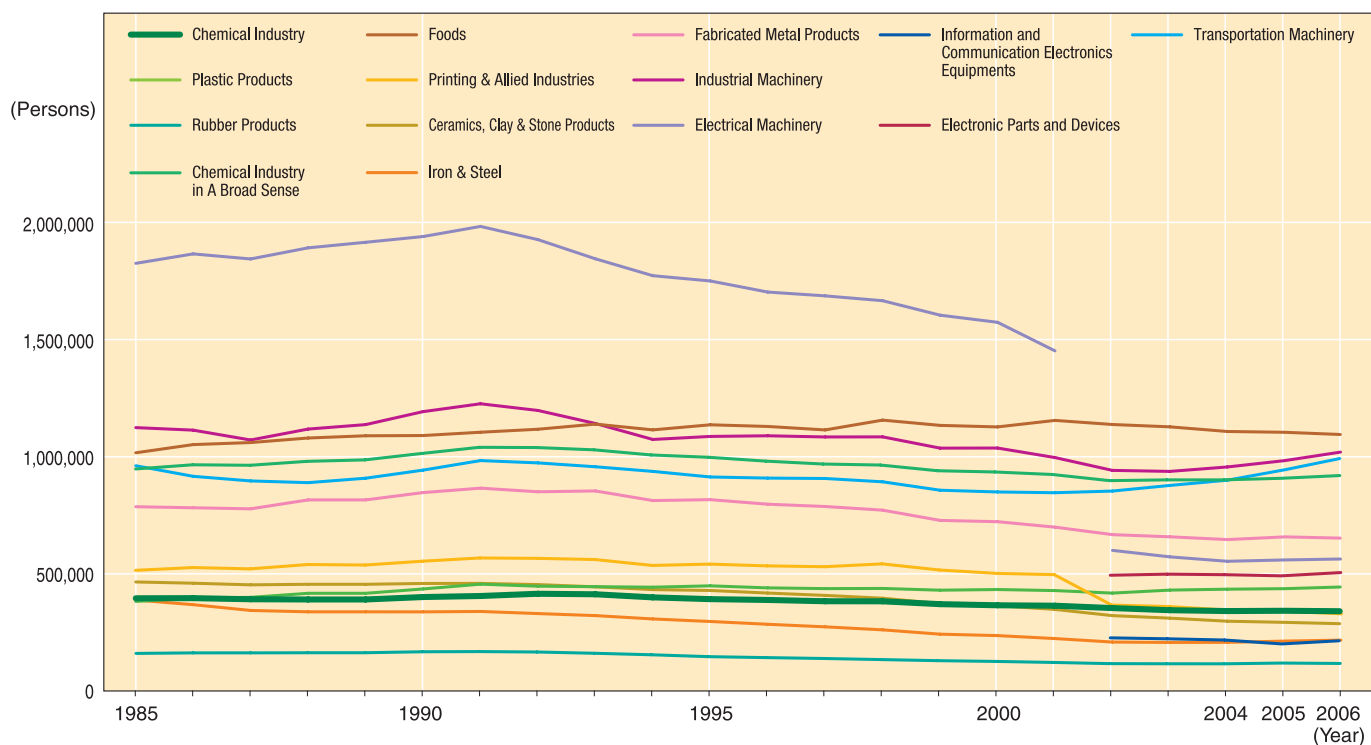
Chemical industry includes drugs & medicines plastic products and rubber products.

Information and Communication Electronics Equipment includes electronic parts and devices.

340,000 Workers Are Employed

The number of employees in the chemical industry accounted for 4.2% in entire manufacturing industry.

Changes in the number of employees by industry



Changes in the number of employees by industry [persons]

Industry	Year	Every 5th year				Recent three years			
		1985	1990	1995	2000	2004	2005	2006	
Chemical industry		395,748	401,076	392,109	365,953	341,298	342,481	343,798	4.2%
Plastic Products		382,247	435,523	448,939	433,177	434,591	436,897	445,334	5.4%
Rubber Products		165,315	172,284	151,601	131,532	121,484	124,613	125,384	1.5%
Chemical Industry in A Broad Sense		943,310	1,008,883	992,649	930,662	897,373	903,991	914,516	11.1%
Foods		1,016,731	1,090,403	1,136,236	1,127,177	1,107,720	1,104,292	1,093,080	13.3%
Printing & Allied Industries		515,213	554,155	541,688	502,184	346,175	340,890	329,830	4.0%
Ceramics, Clay & Stone Products		465,483	459,040	429,023	363,997	298,011	293,013	289,032	3.5%
Iron & Steel		388,357	337,811	296,824	236,525	207,712	213,056	219,858	2.7%
Fabricated Metal Products		786,604	846,915	816,694	722,425	646,343	657,942	655,361	8.0%
Industrial Machinery		1,124,229	1,192,406	1,086,575	1,037,079	956,253	983,449	1,014,715	12.3%
Electrical Machinery		1,825,314	1,939,729	1,750,103	1,573,683	553,688	559,413	565,858	6.9%
Information and Communication Electronics Equipments		—	—	—	—	221,808	205,331	217,312	2.6%
Electronic Parts and Devices		—	—	—	—	495,296	490,140	503,244	6.1%
Transportation Machinery		961,590	942,795	913,535	849,517	899,805	944,352	989,730	12.0%
Others		2,863,118	2,800,692	2,357,256	1,840,584	1,481,430	1,461,123	1,432,906	17.4%
Total Manufacturing		10,889,949	11,172,829	10,320,583	9,183,833	8,111,614	8,156,992	8,225,442	100.0%

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]

<http://www.meti.go.jp/english/statistics/tyo/kougyou/index.html>

(Note) Statistics of facilities with more than four employees

Electrical machinery was divided into electrical machinery, information and communication electronics equipment, and electronic parts and devices in 2002.

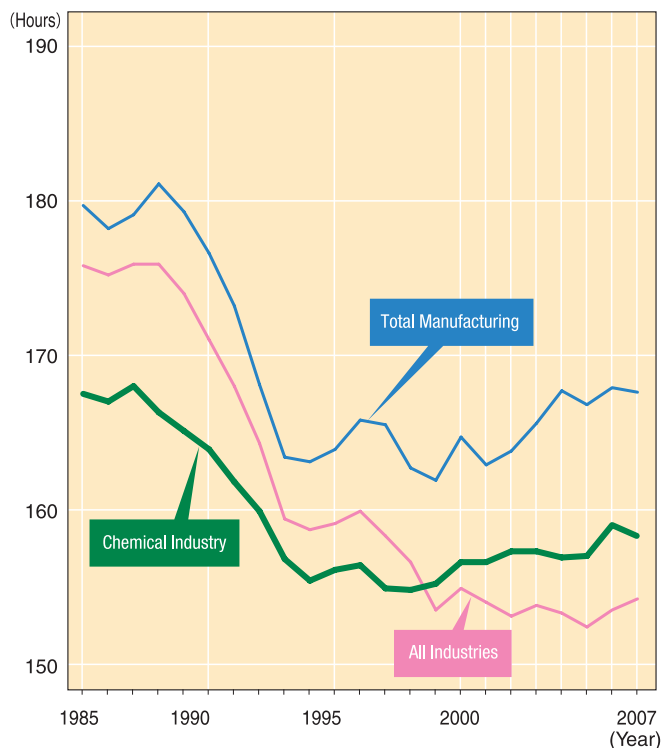
Labor Productivity / Working Hours

Labor productivity of the chemical industry has decreased for two consecutive years.

Indices of physical labor productivity [Index, 2000=100]



Working hours (monthly average of total net working hours)



Indices of physical labor productivity [Index, 2000=100]

Year	Industry	Total Manufacturing		Chemical Industry	
		Indices	Increase rate %	Indices	Increase rate %
Every 5th year	1985	69.6	2.8	55.5	3.5
	1990	83.6	2.7	72.8	4.6
	1995	87.5	4.4	84.3	8.1
	2000	100	6.3	100	2.6
Recent three years	2005	113.2	1.3	112.5	0.4
	2006	116.8	3.2	111.0	△1.3
	2007	119.1	2.0	109.5	△1.4

(Source) Japan Productivity Center for Socio-Economic Development

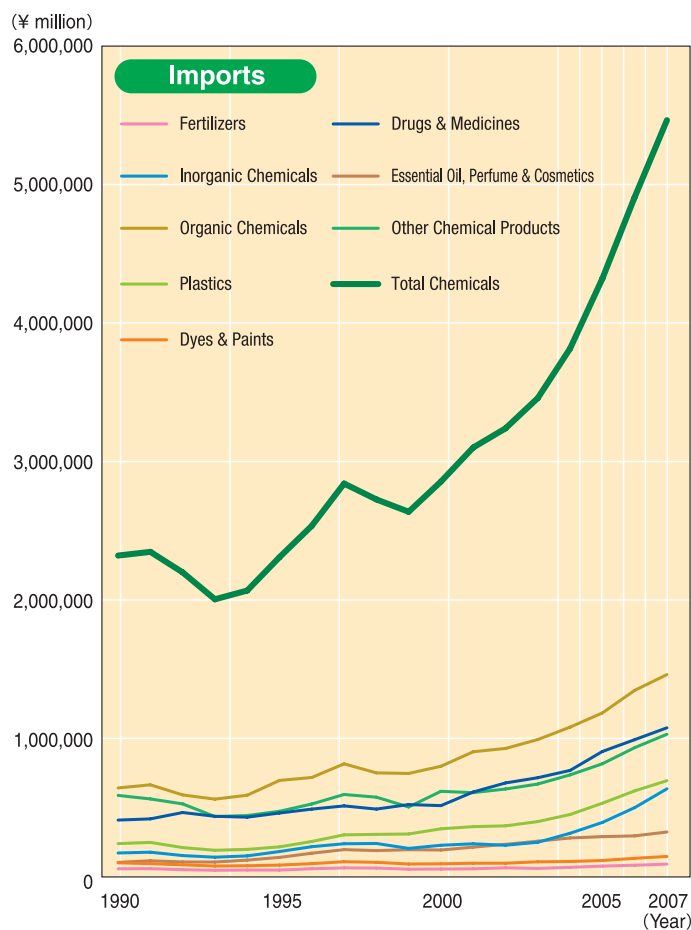
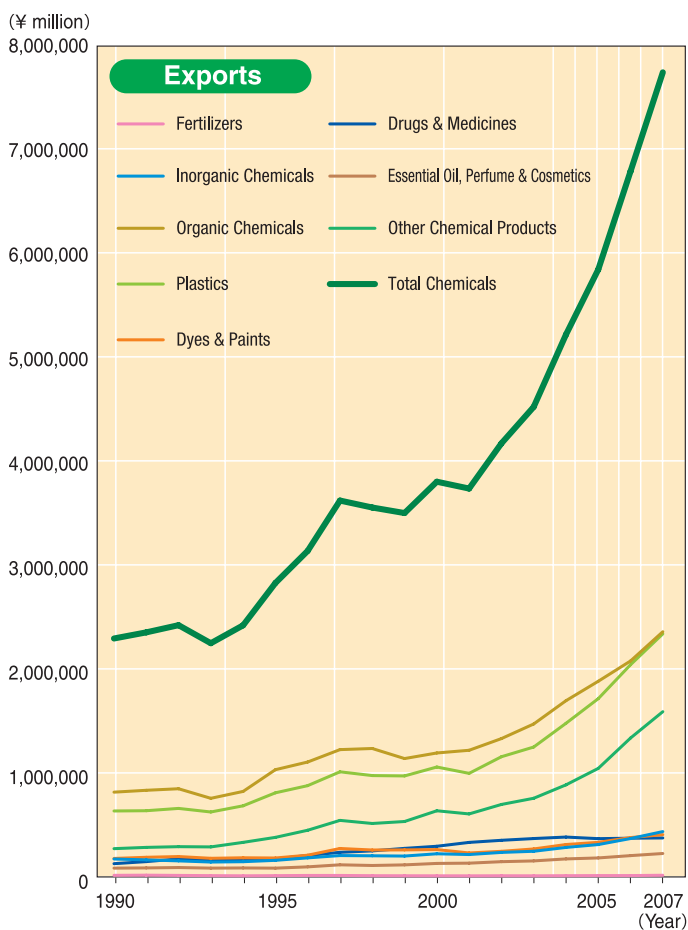
Working hours (monthly average of total net working hours) [hours]

Year	Industry	All Industries	Total Manufacturing	Chemical Industry
		1985	175.8	179.7
Every 5th year	1990	171.0	176.6	163.9
	1995	159.1	163.9	156.1
	2000	154.9	164.7	156.6
Recent three years	2005	152.4	166.8	157.0
	2006	153.5	167.9	159.0
	2007	154.2	167.6	158.2

(Source) Ministry of Health, Labour and Welfare [Monthly Labour Survey]

In 2007, both export and import increased with trade surplus of 2.3 trillion yen, a consecutive surplus since 1991. In particular, increase of export to and import from Asian countries was remarkable.

Exports and imports of chemicals



Exports and imports of chemicals [¥ million]

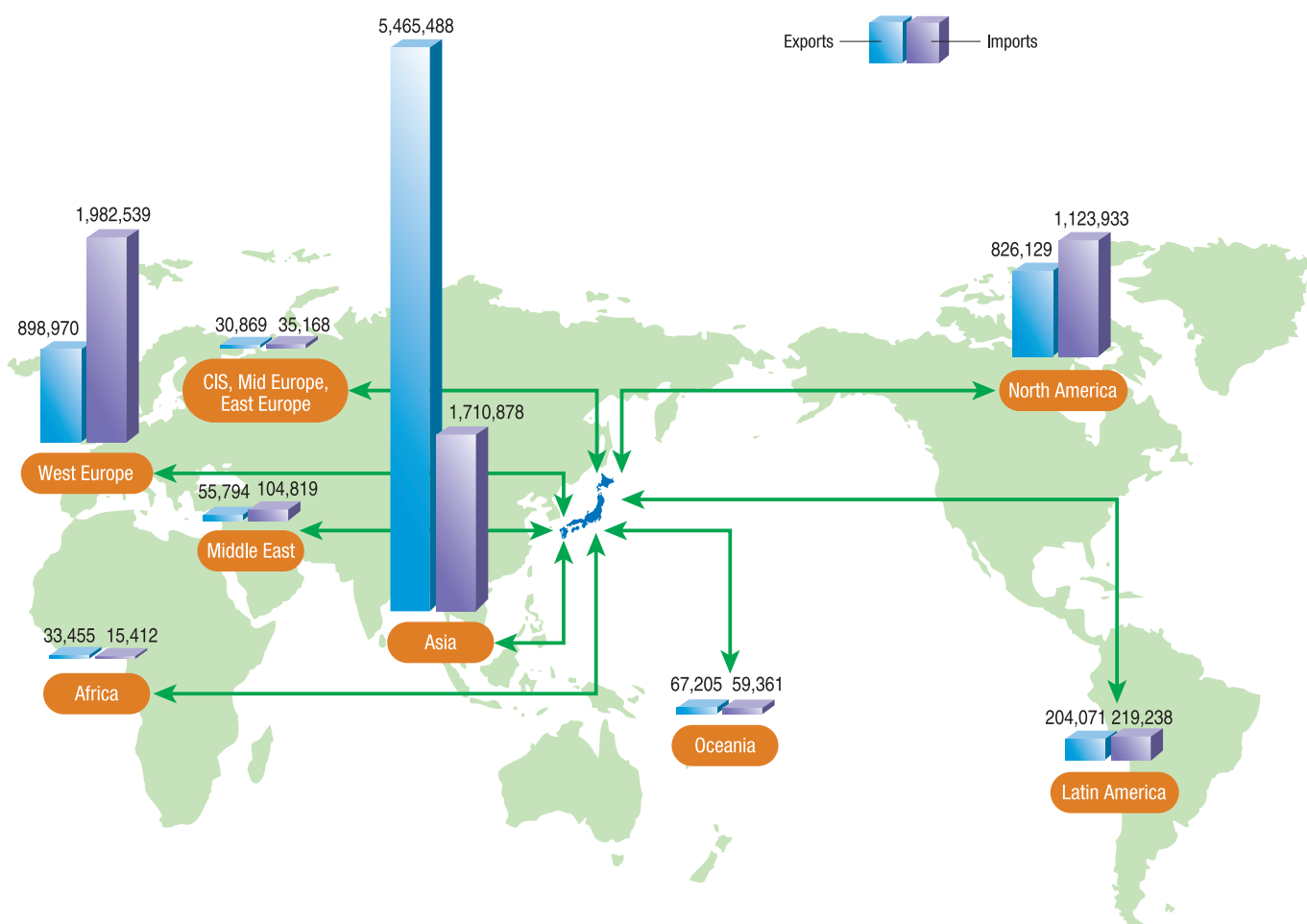
Exports						Articles	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
1990	1995	2000	2005	2006	2007		1990	1995	2000	2005	2006	2007
14,504	11,515	10,029	12,106	12,231	15,236	Fertilizers	58,742	49,566	57,025	78,275	84,610	92,488
171,922	158,905	222,143	310,854	368,927	435,785	Inorganic Chemicals	172,927	183,410	228,712	393,477	500,326	636,499
815,437	1,031,703	1,192,727	1,883,168	2,078,802	2,360,216	Organic Chemicals	642,518	696,878	799,250	1,184,334	1,347,363	1,461,146
634,210	809,104	1,057,477	1,715,683	2,042,533	2,339,604	Plastics	240,549	217,137	347,603	532,351	621,503	695,066
177,009	181,357	262,558	332,309	378,119	406,285	Dyes & Paints	101,669	85,566	94,761	118,677	134,501	147,806
126,735	172,870	294,407	367,664	372,115	374,416	Drugs & Medicines	410,580	461,522	514,885	905,966	991,234	1,077,034
83,863	83,787	129,205	182,022	204,376	224,722	Essential Oil, Perfume & Cosmetics	105,074	141,030	194,430	290,912	296,330	324,472
271,333	380,036	636,115	1,044,232	1,336,762	1,590,455	Other Chemical Products	588,753	474,050	618,287	817,238	933,465	1,030,510
2,295,013	2,829,276	3,804,662	5,848,037	6,793,864	7,746,719	Total Chemicals	2,320,813	2,309,160	2,854,954	4,321,230	4,909,332	5,465,021

(Source) Ministry of Finance [Trade Statistics]

http://www.customs.go.jp/toukei/info/index_e.htm

(Note) Chemical fiber is excluded from Chemicals in the data.

Exports and imports of chemical products in 2007 by region [¥ million]



Exports and imports of chemical products by region [¥ million]

Exports						Region	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
1990	1995	2000	2005	2006	2007		1990	1995	2000	2005	2006	2007
1,223,341	1,673,875	2,208,365	3,917,030	4,688,426	5,465,488	Asia	340,871	376,015	624,309	1,247,989	1,501,963	1,710,878
39,893	20,847	20,956	34,858	41,452	55,794	Middle East	84,633	56,846	52,150	69,266	90,113	104,819
457,958	491,648	583,471	748,866	832,555	898,970	West Europe	904,979	969,285	1,137,027	1,642,583	1,799,979	1,982,539
370,409	458,870	695,985	762,307	803,115	826,129	North America	784,185	682,190	781,045	889,036	1,019,637	1,123,933
40,110	65,321	139,206	162,053	170,991	204,071	Latin America	84,455	78,928	68,777	178,752	194,158	219,238
6,889	3,328	16,056	19,467	24,953	33,455	Africa	431	2,349	5,166	17,178	15,408	15,412
64,290	44,103	41,420	57,765	60,780	67,205	Oceania	36,680	44,956	44,592	49,861	50,183	59,361
57,489	10,740	8,196	19,499	26,034	30,869	CIS, Mid Europe, East Europe	22,443	15,288	14,623	29,460	34,820	35,168
2,261,805	2,779,713	3,713,655	5,721,844	6,648,306	7,581,980	Total	2,259,687	2,226,126	2,727,688	4,124,125	4,706,261	5,251,348

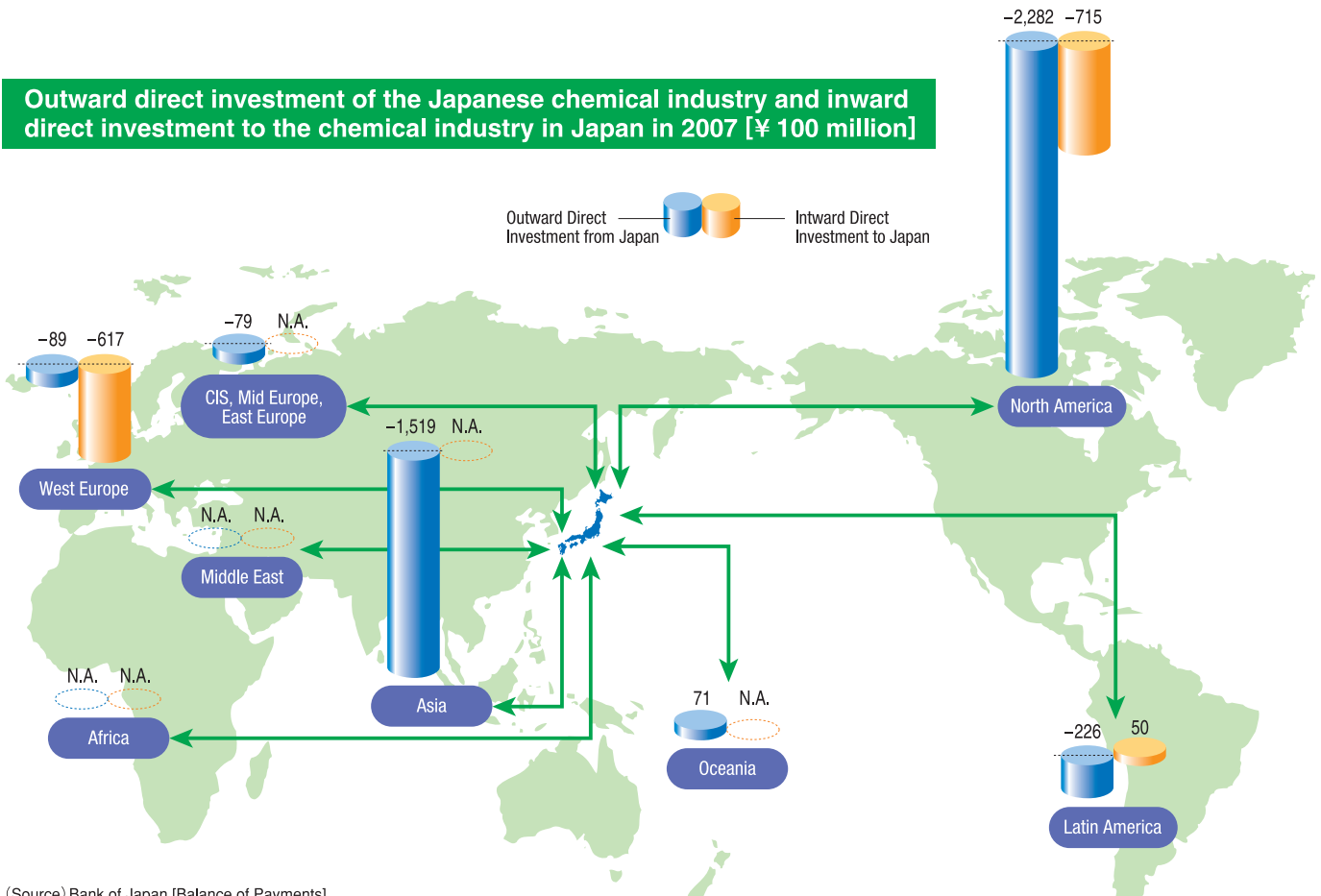
(Source) Ministry of Finance [Trade Statistics]

http://www.customs.go.jp/toukei/info/index_e.htm

(Note) Chemical fiber is excluded from chemical products in the data.

Outward Direct Investment Amounts to Yen 440 Billion, While Inward Direct Investment Amounts to Minus Yen 130 Billion

Outward direct investment of the Japanese chemical industry and inward direct investment to the chemical industry in Japan in 2007 [¥ 100 million]



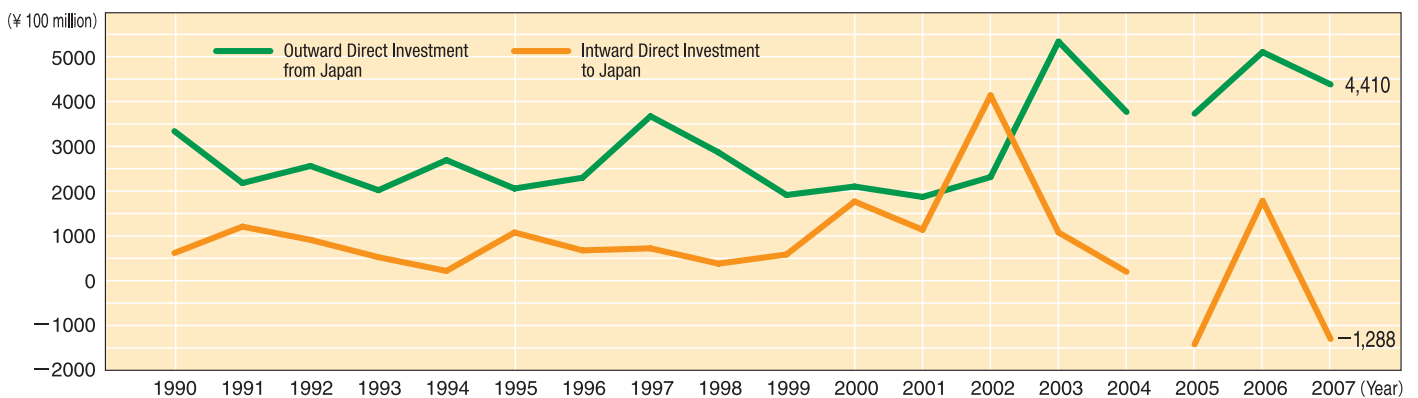
(Source) Bank of Japan [Balance of Payments]

<http://www.boj.or.jp/en/theme/research/stat/bop/bop/index.htm>

(Note) The figures of outward and inward direct investments show the figures of the inflow of capital to Japan subtracted by the outflow of the capital from Japan.

By the way, the inflow of the capital to Japan in Japan's direct investment abroad shows the figures of the return on investment.

Actual outward direct investment of the Japanese chemical industry and inward direct investment to the chemical industry in Japan



(Source) Ministry of Finance [Foreign Direct Investment]

<http://www.mof.go.jp/english/e1c008.htm>

Bank of Japan [Balance of Payments]

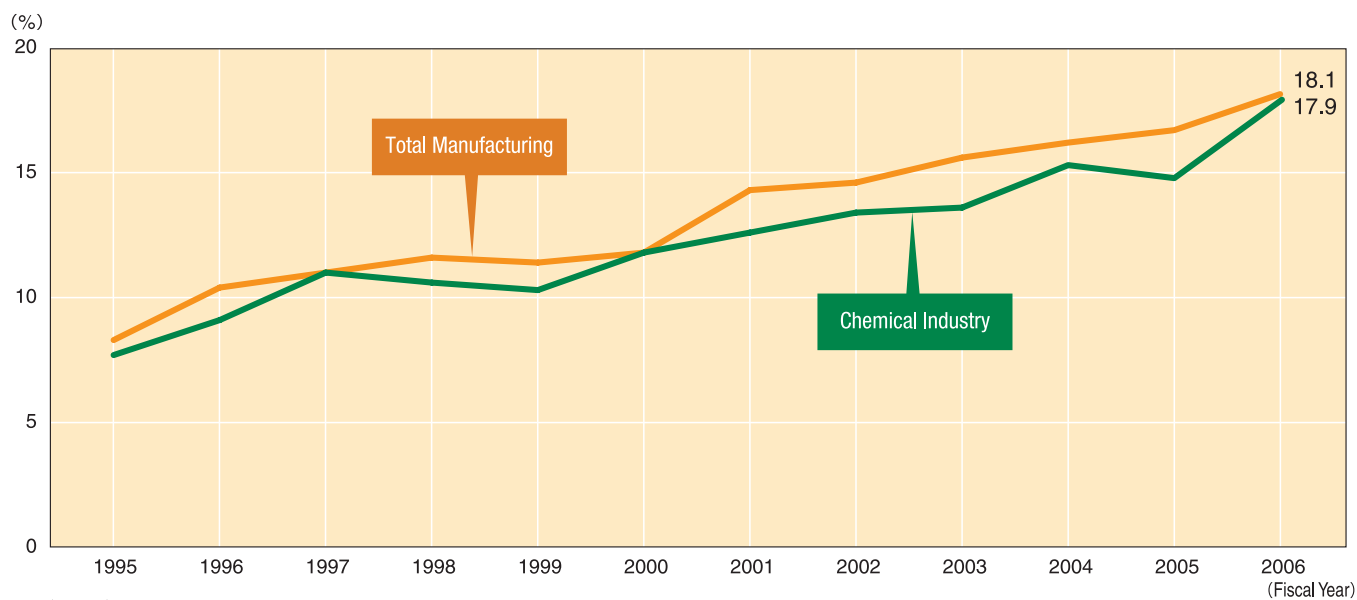
<http://www.boj.or.jp/en/theme/research/stat/bop/bop/index.htm>

Fiscal years from 1990 to 2004 and calendar year from 2005 to 2007

Overseas Business Activities

Overseas production of the Japanese chemical industry has amounted to 18%.

Trend of overseas production of Japanese companies

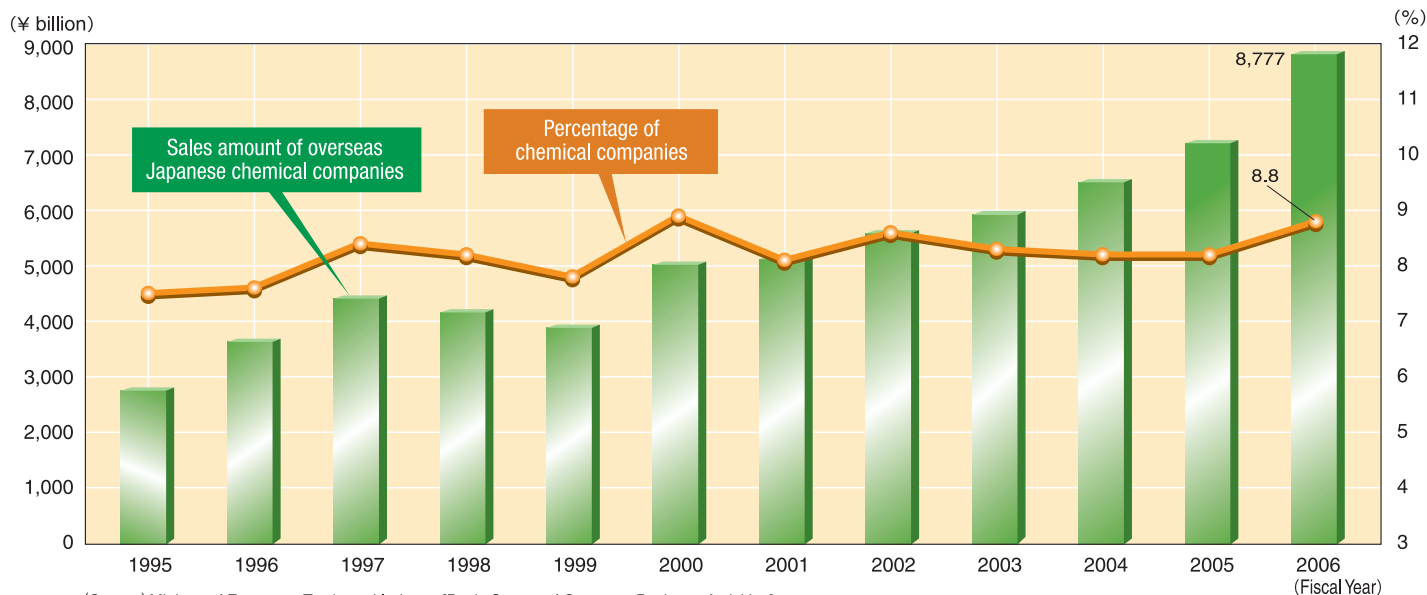


(Source) Ministry of Economy, Trade and Industry [Basic Survey of Overseas Business Activities]

<http://www.meti.go.jp/english/statistics/tyo/kaigaizi/index.html>

(Notes) Chemical fiber is excluded under Chemical Industry in the data.

Sales of Japanese chemical companies based overseas and its percentage of all overseas Japanese manufacturing companies' sales



(Source) Ministry of Economy, Trade and Industry [Basic Survey of Overseas Business Activities]

<http://www.meti.go.jp/english/statistics/tyo/kaigaizi/index.html>

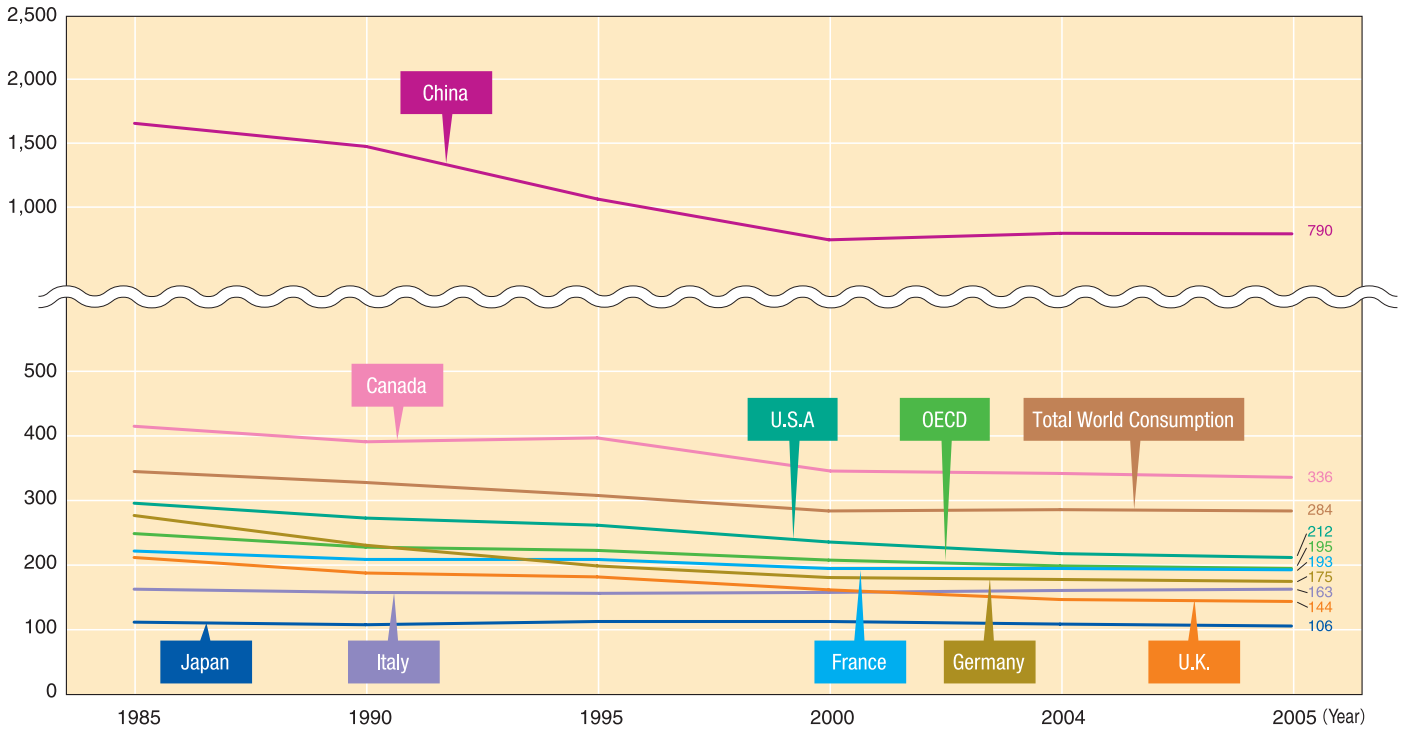
(Note) Chemical fiber is excluded under the chemical industry in the data.

Japan Is An Energy-Saving Superpower

Japan uses the least energy per GDP of all advanced countries.

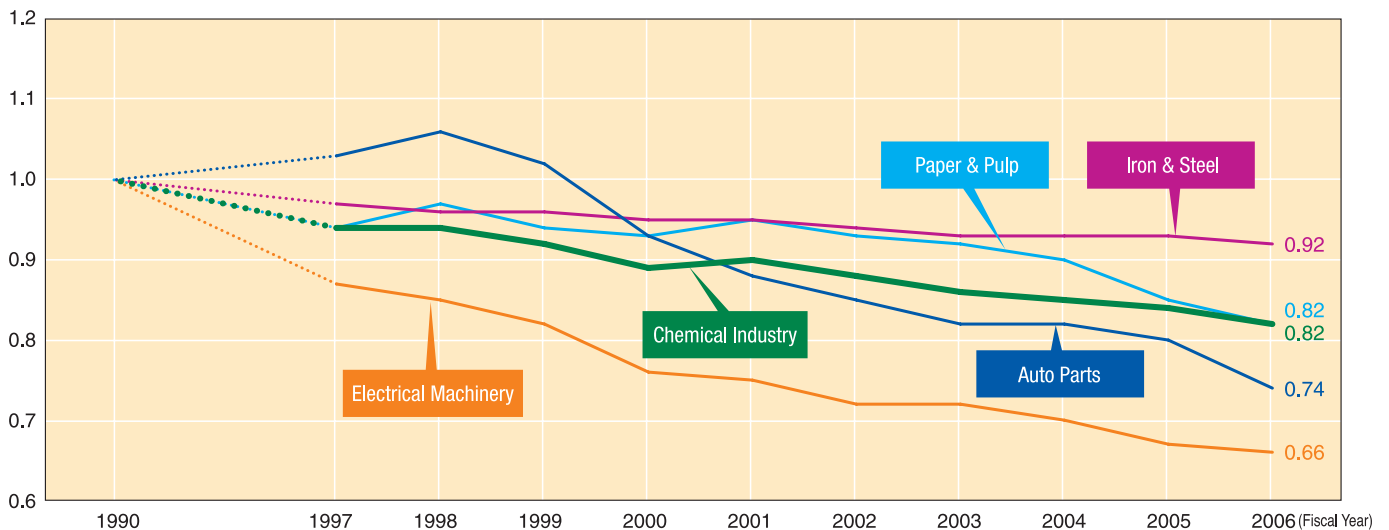
World's primary energy consumption per GDP

(Tons in crude oil equivalent / 2000 price, \$ million)



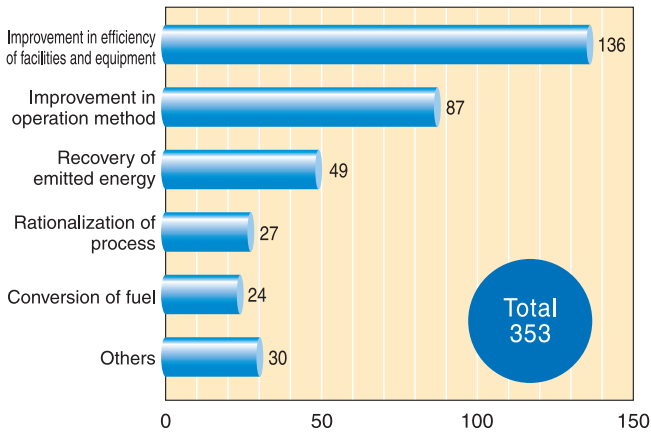
(Source) The Energy Conservation Center, Japan, [Handbook of Energy & Economic Statistics in Japan]

Energy consumption per unit of major industries in Japan [Index, 1990=1.0]



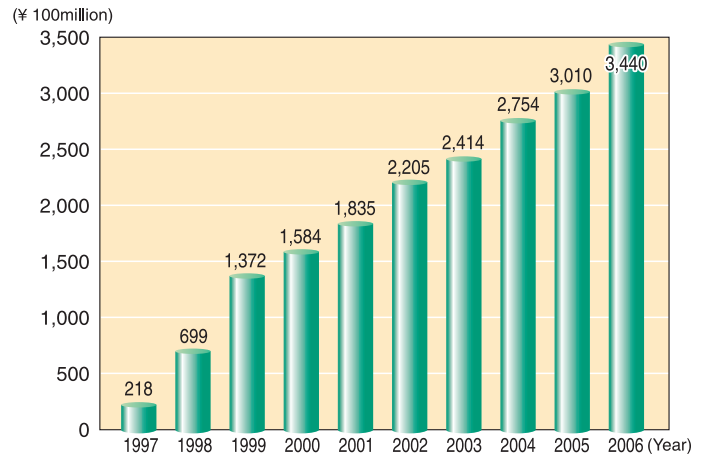
(Source) Nippon Keidanren [Results of the Fiscal 2007 Follow-up to the Keidanren Voluntary Action Plan on the Environment-Section on Global Warming Measures-]

Energy Conservation Investment (Fiscal Year 2006)



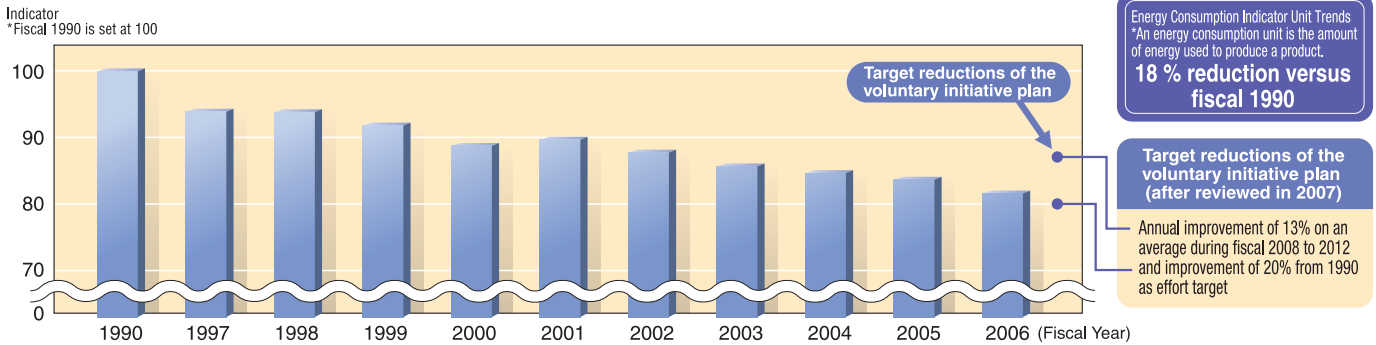
(Source) Japan Chemical Industry Association

Energy Conservation Capital Investment (Cumulative)



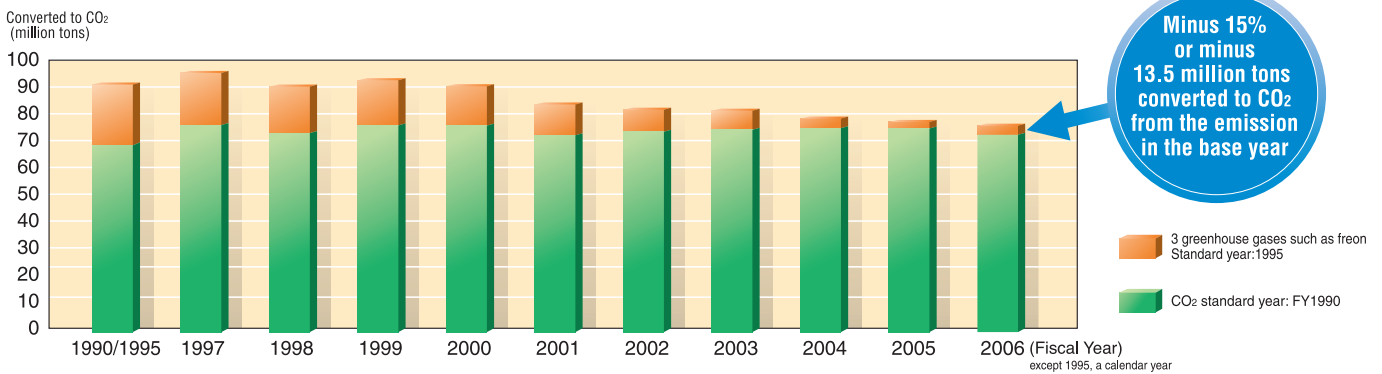
(Source) Japan Chemical Industry Association

Energy Consumption Indicator Unit Trends



(Source) Japan Chemical Industry Association

Greenhouse Gases Emissions Under The Voluntary Action Plan of The Chemical Industry



(Source) Japan Chemical Industry Association

Do You Know Responsible Care? Efforts of Chemical Industry to Preserve Health, Safety and Environment

Responsible Care Logotype

The logotype used to promote Responsible Care is authorized by the International Council of Chemical Associations (ICCA) as an international trademark for use by companies and organizations that implement Responsible Care programs.

Permission to use the logotype is granted to member associations recognized by the ICCA and their members.

In Japan, the Japan Chemical Industries Association (JCIA), the Japan Responsible Care Council (JRCC), and member companies of the JRCC are exclusively authorized to use the logotype.

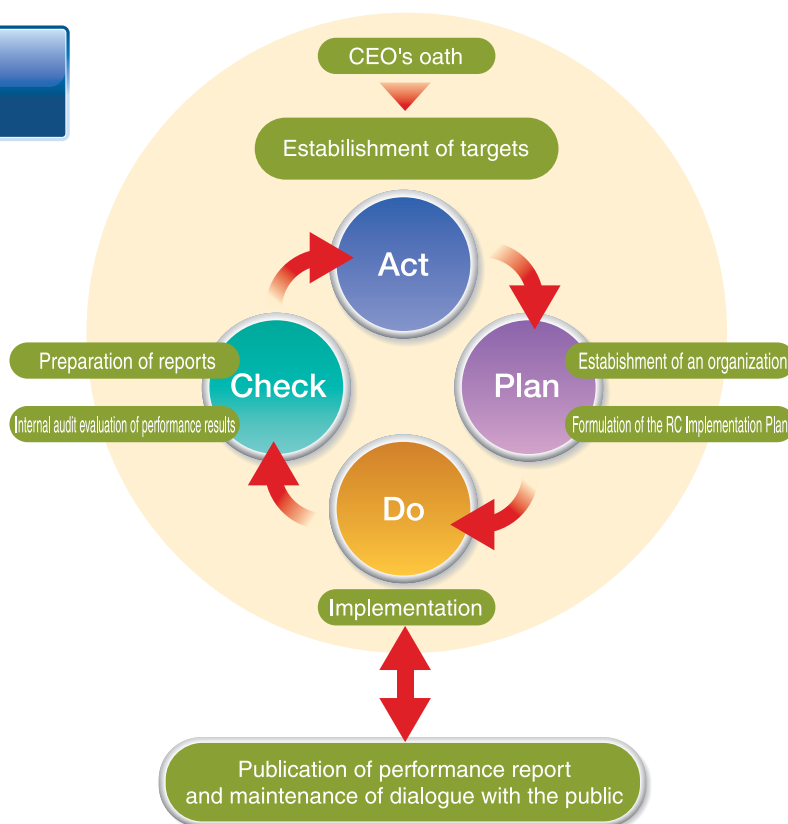


Procedures for Implementing RC

Member companies of JRCC implement RC in accordance with the Codes and Guidelines for the Implementation of Responsible Care.

RC should be implemented in accordance with the Plan-Do-Check-Act (PDCA) cycle.

Member companies of JRCC should present their implementation plans and performance results to the JRCC annually by submitting a Responsible Care Implementation Plan, a Responsible Care Implementation Report, and a Responsible Care Internal Audit Certificate.



Main Activities of Responsible Care

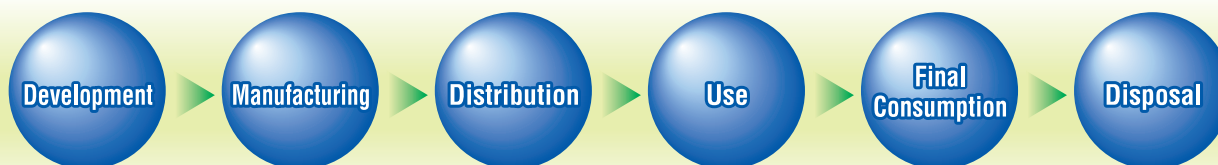
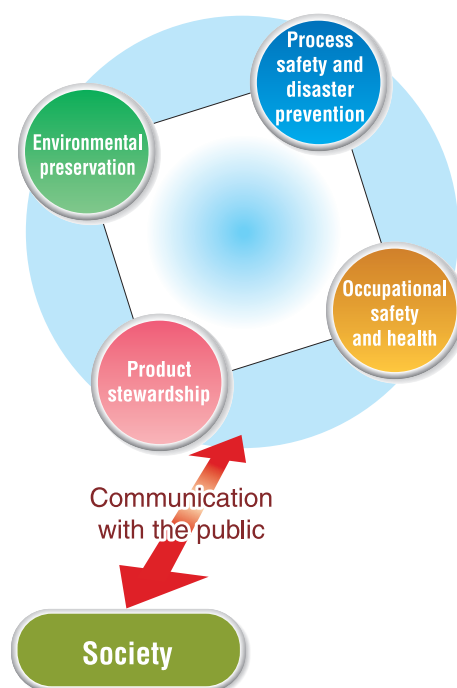
Responsible Care is a Voluntary Initiative with company's commitment to improve all aspects of Environment, Health and Safety and to communicate with the public about activities and achievement to ensure transparency on the following four considerations.

RC is a set of voluntary activities based on a public commitment by companies engaged in the manufacture or handling of chemical substances. RC covers all aspects of performance related to the manufacture and handling of chemical substances.

- Environmental preservation (Protecting human health and preserving the natural environment)
- Process safety and disaster prevention (Preventing disasters at facilities and minimizing damage in case of disaster)
- Occupational safety and health (Protecting the safety and health of workers)
- Product stewardship (Providing information relating to the properties and handling procedures of chemical products to protect the safety and health of all people handling the products and the environment)

RC requires companies to publicize their performance and maintain dialogue with the public; the approach aims to promote communications with the public and foster a better understanding of the role of companies that manufacture and handle chemical substances.

RC is a set of activities aimed at preserving the environment and ensuring safety and health in all stages of chemical substance life cycles from development and manufacturing to distribution, use, final consumption, and disposal. (product stewardship)



What is Responsible Care?

Chemical substances-necessary and important to modern daily life. However, sometimes these substances can turn dangerous, becoming hazardous to human health and safety and the environment when handled improperly.

The task of preserving the environment and ensuring the health and safety of humans has increased in step with the rise of global environmental problems and the rapid industrialization of developing countries. Adding to this situation the potential hazards linked to advanced technology has made it difficult to ensure the ecological soundness and safety of chemical operations and

products simply by imposing laws and regulations. Thus, it is increasingly more important for companies that deal with chemical substances to undertake voluntary measures to ensure environmental preservation and human safety and health.

Reflecting this trend, the world chemical industry started an initiative that promotes a voluntary management system aimed at preserving the environment against and ensuring the safety from chemical substances throughout the product's life cycle, from development through disposal. This initiative has been named "Responsible Care" (RC)

As a representative of the Japanese chemical industry and an important member of the global chemical industry, the JCIA promotes Responsible Care initiatives in cooperation with the ICCA. In 1990, the JCIA drew up "The Guiding Principles for the

Improvement of Environmental, Health, and Safety Conditions." With the objective of promoting the implementation of the program in Japan, the JCIA established the Japan Responsible Care Council (JRCC) in 1995.



Chemistry and chemical products play an extremely important role in many aspects of daily living. To raise the awareness and understanding of such chemical technology and products, the Japan Chemical Industry Association has established the "Dream Chemistry 21" Organizing Committee. The "Dream Chemistry 21" campaign aims at promoting the importance of chemical technology and the usefulness of chemical products, particularly by appealing to young people's interest in the wonders of chemistry, and at the same time, fostering internationally active chemists.

The typical activities include "Dream Chemistry 21" Summer Holiday Children's Chemical Experiment Show, "Dream Chemistry 21" Weekend Experiment Classroom, Chemistry Experiment in the Classroom program, and Nationwide Senior High School Chemistry Grand Prix Contest for the participation in International Chemistry Olympiad.



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