



CHEMICAL INDUSTRY OF JAPAN 2004

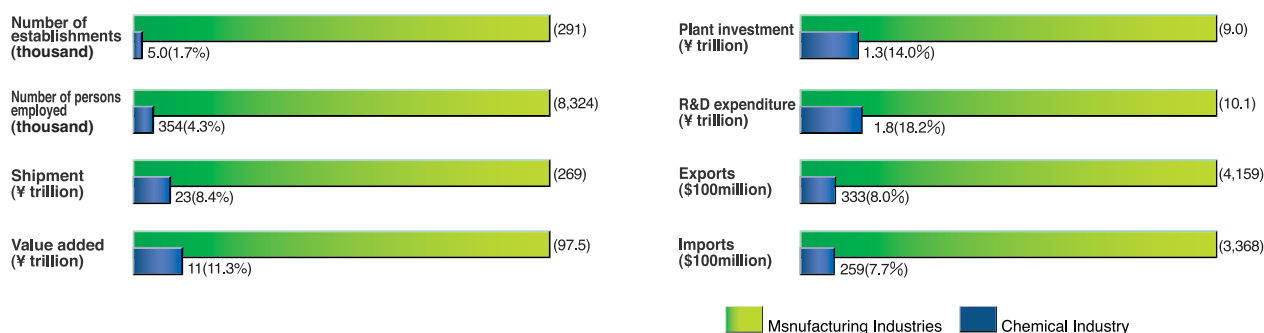
Supporting our wealthy and comfortable life,
the chemical industry,
which is living together with nature,
fosters the dream of mankind.



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■ Japan's chemical industry vs. all manufacturing industries in 2002



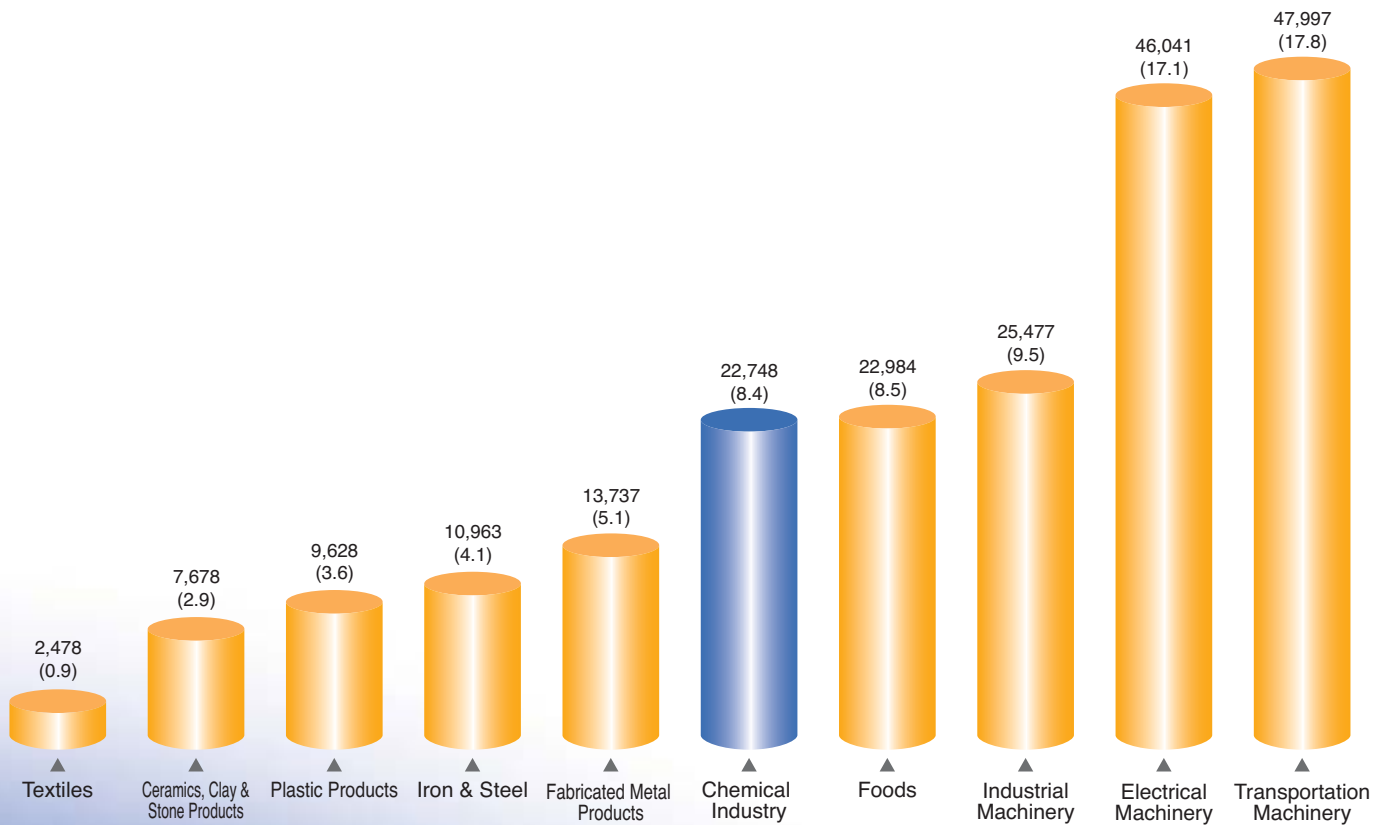
(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
 Ministry of Internal Affairs and Communications (MIC), Statistics Bureau [Survey of Research and Development]
 Ministry of Finance [Financial Statements Statistics of Corporations by Industry]
 Ministry of Economy, Trade and Industry [White Paper on International Economy and Trade]

(Note) Data of plant investment and R&D expenditure are those of FY 2002.(Apr.1,2002-Mar.31,2003)

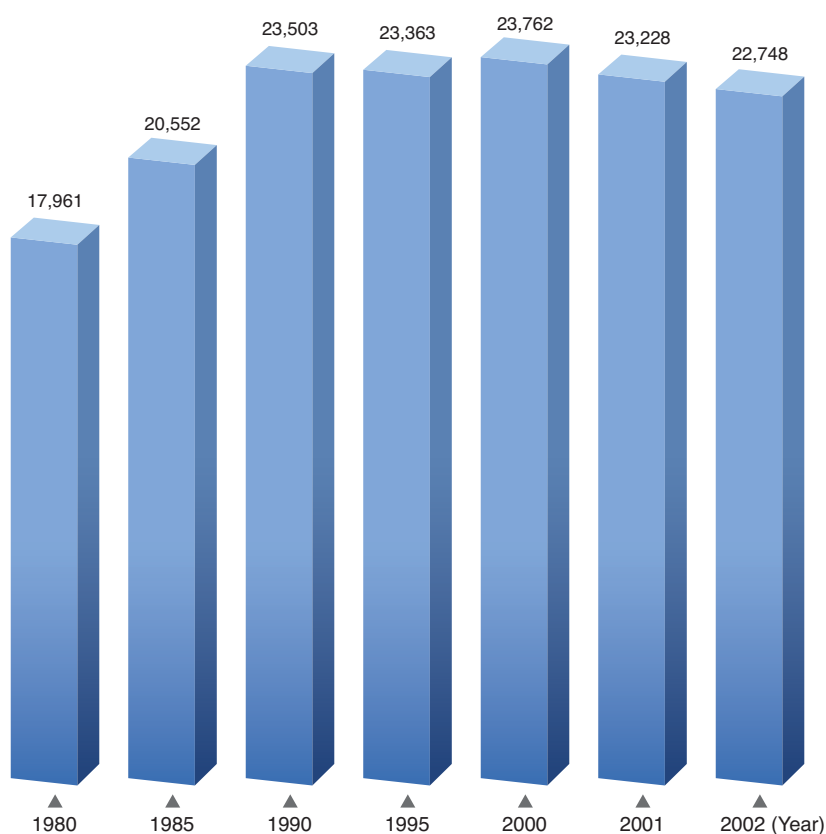
1 Total Production (Shipments) of Chemical Industry Amounts to approx. Yen 23 Trillion

Chemical industry's shipment value in 2002 amounted to approx. 23 trillion yen, accounting for approx. 8.4% of entire manufacturing industry.

■ Shipment value of the chemical industry in the manufacturing industries in 2002 [¥ billion, %]



■ Trends in shipment value [¥ billion]



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

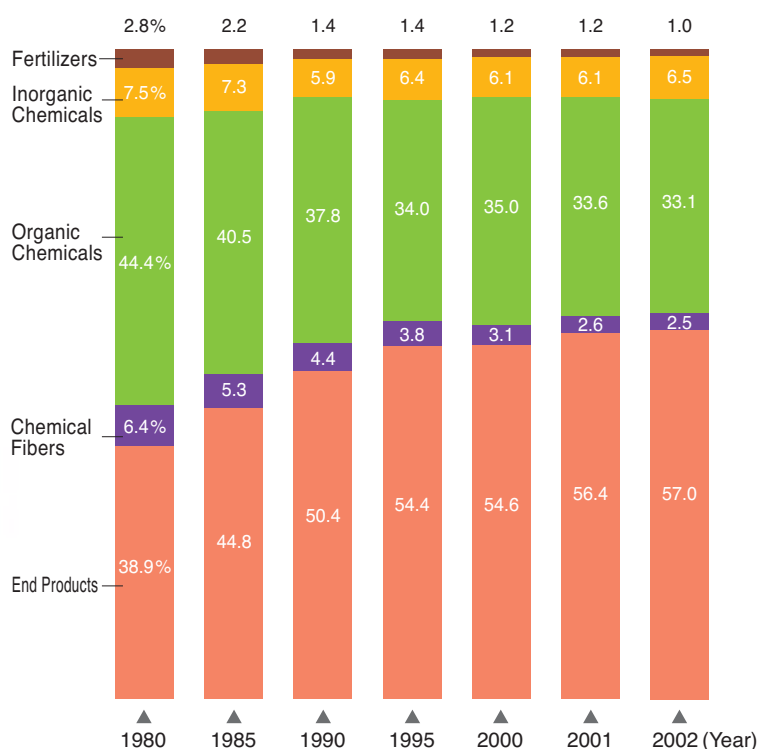
Year	Every 5th Year				Recent Three Years			
	1980	1985	1990	1995	2000	2001	2002	
Chemicals	17,961	20,552	23,503	23,363	23,762	23,228	22,748	8.4%
Foods	22,196	20,542	22,748	24,117	23,888	23,454	22,984	8.5
Textiles	7,781	8,087	7,838	4,230	3,008	2,737	2,478	0.9
Plastic Products	—	8,052	10,466	10,530	10,486	9,995	9,628	3.6
Ceramics, Clay & Stone Products	8,304	8,772	10,724	10,169	8,860	8,397	7,678	2.9
Iron & Steel	17,864	17,754	18,269	14,073	11,927	11,202	10,963	4.1
Fabricated Metal Products	10,311	13,094	18,574	17,646	15,143	14,545	13,737	5.1
Industrial Machinery	17,361	24,190	33,225	29,884	29,972	28,210	25,477	9.5
Electrical Machinery	22,160	40,842	54,529	54,831	59,449	52,466	46,041	17.1
Transportation Machinery	24,897	36,179	46,858	44,215	44,367	45,152	47,997	17.8
Others	63,289	67,254	76,640	72,973	69,616	67,281	59,630	22.1
Total	212,124	265,321	323,373	306,030	300,478	286,667	269,362	100.0

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
(Note) Statistics of facilities with more than four employees

2 Chemical Products That Meet the Needs of Various Fields

Various products that chemical industry produces are used as raw materials and intermediary products by other industries. The many end products include pharmaceuticals, cosmetics, detergents, paint, film and other materials that help us enjoy a comfortable modern life.

■ Trend of shipment composition in chemical industry [%]

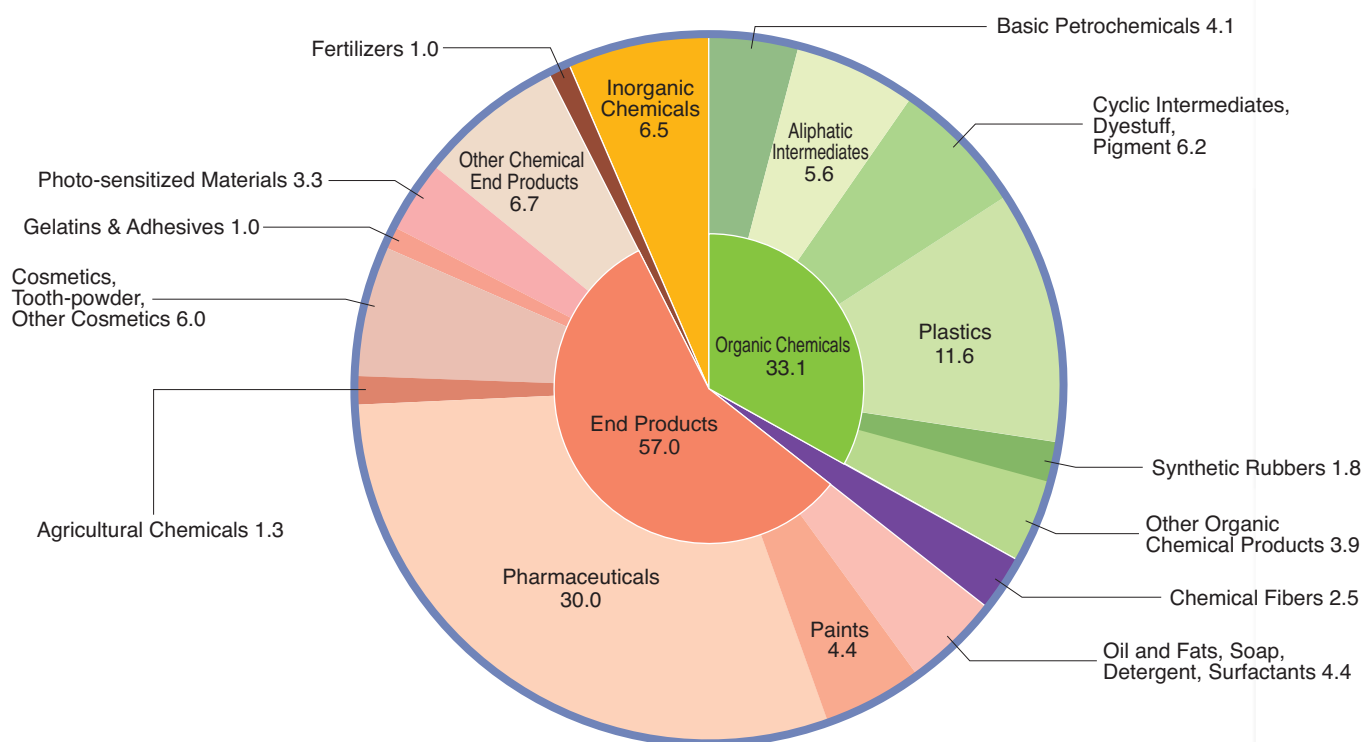


■ Trend of shipment composition in chemical industry [%]

Industry	Year	Every 5th year				Recent three years		
		1980	1985	1990	1995	2000	2001	2002
Chemical Industry		100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fertilizers		2.8	2.2	1.4	1.4	1.2	1.2	1.0
Inorganic Chemicals		7.5	7.3	5.9	6.4	6.1	6.1	6.5
Organic Chemicals		44.4	40.5	37.8	34.0	35.0	33.6	33.1
▶ Basic Petrochemicals		10.9	6.2	5.1	2.6	2.9	4.2	4.1
▶ Aliphatic Intermediates		6.1	5.5	4.5	5.5	7.1	5.7	5.6
▶ Cyclic Intermediates, Dyestuff, Pigment		9.2	7.4	6.9	6.9	6.1	6.4	6.2
▶ Plastics		11.1	14.2	15.4	14.0	13.6	11.9	11.6
▶ Synthetic Rubbers		2.2	2.4	2.3	1.7	1.5	1.4	1.8
▶ Other Organic Chemicals		5.0	4.7	3.6	3.3	3.8	4.1	3.9
Chemical Fibers		6.4	5.3	4.4	3.8	3.1	2.6	2.5
End Products		38.9	44.8	50.4	54.4	54.6	56.4	57.0
▶ Oil and Fats, Soap, Detergent, Surfactants		3.5	3.8	4.1	4.0	3.5	4.1	4.4
▶ Paints		4.3	4.9	4.9	4.6	4.1	4.2	4.4
▶ Pharmaceuticals		14.1	18.6	21.9	25.7	27.0	29.2	30.0
▶ Agricultural Chemicals		1.8	2.2	1.6	1.6	1.4	1.5	1.3
▶ Cosmetics, Tooth-powder, Other Cosmetics		4.1	5.2	5.9	6.4	6.0	6.0	6.0
▶ Gelatins and Adhesives		0.8	0.9	1.0	1.0	1.0	1.0	1.0
▶ Photo-sensitized Materials		2.3	3.6	4.1	4.6	4.4	4.0	3.3
▶ Other Chemical End Products		4.6	5.7	6.9	6.6	7.2	6.4	6.7

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
 (Note) Statistics of facilities with more than four employees

■ Composition of chemical products shipped in 2002 [%]



■ The major chemical industry indices with breakdown by product in 2002

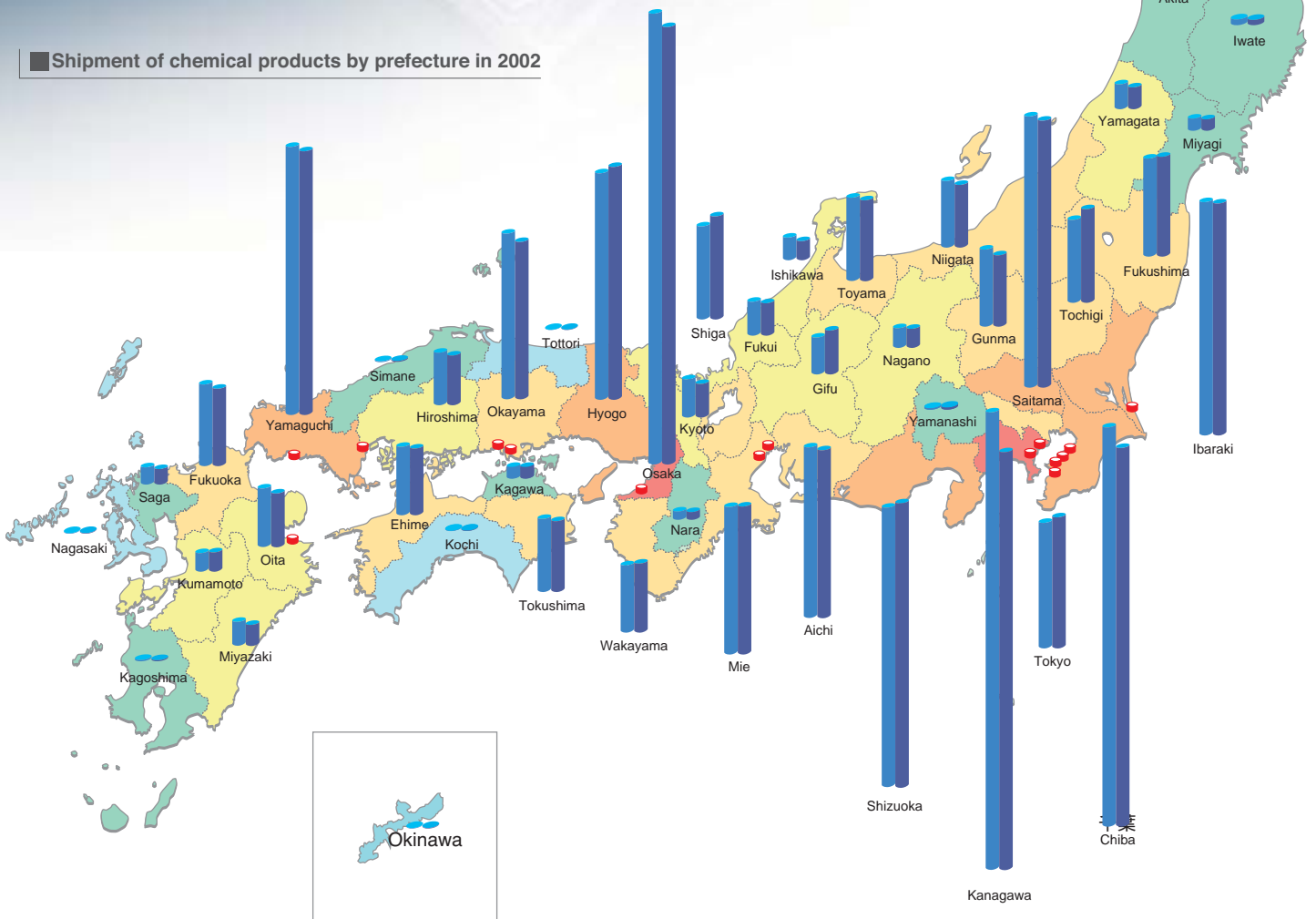
Item	Major Indices (numerical value)				Composition (%)			
	Number of Facilities	Employee Force (Persons)	Shipment (in Yen billion)	Value Added (in Yen billion)	Number of Facilities	Employee Force	Shipment	Value Added
Chemical Industry	5,045	353,980	22,748	11,024	100.0	100.0	100.0	100.0
Fertilizers	160	4,350	226	69	3.2	1.2	1.0	0.6
Inorganic Chemicals	762	31,699	1,468	586	15.1	9.0	6.5	5.3
Organic Chemicals	722	80,906	7,521	2,932	14.3	22.9	33.1	26.6
▶ Basic Petrochemicals	13	3,328	934	239	0.3	0.9	4.1	2.2
▶ Aliphatic Intermediates	74	9,406	1,268	575	1.5	2.7	5.6	5.2
▶ Cyclic Intermediates, Dyestuff, Pigment	179	15,703	1,406	631	3.5	4.4	6.2	5.7
▶ Plastics	193	30,278	2,628	935	3.8	8.6	11.6	8.5
▶ Synthetic Rubbers	17	5,812	402	203	0.3	1.6	1.8	1.8
▶ Other Organic Chemicals	246	16,379	883	349	4.9	4.6	3.9	3.2
Chemical Fibers	64	14,385	574	193	1.3	4.1	2.5	1.7
End Products	3,337	222,640	12,959	7,244	66.1	62.9	57.0	65.7
▶ Oil and Fats, Soap, Detergent, Surfactants	307	15,209	993	536	6.1	4.3	4.4	4.9
▶ Paints	445	19,473	994	364	8.8	5.5	4.4	3.3
▶ Pharmaceuticals	961	96,233	6,814	4,365	19.0	27.2	30.0	39.6
▶ Agricultural Chemicals	72	4,610	288	95	1.4	1.3	1.3	0.9
▶ Cosmetics, Tooth-powder, Other Cosmetics	409	28,782	1,363	852	8.1	8.1	6.0	7.7
▶ Gelatins and Adhesives	154	5,450	229	92	3.1	1.5	1.0	0.8
▶ Photo-sensitized Materials	77	15,628	748	341	1.5	4.4	3.3	3.1
▶ Other Chemical End Products	912	37,255	1,531	599	18.1	10.5	6.7	5.4

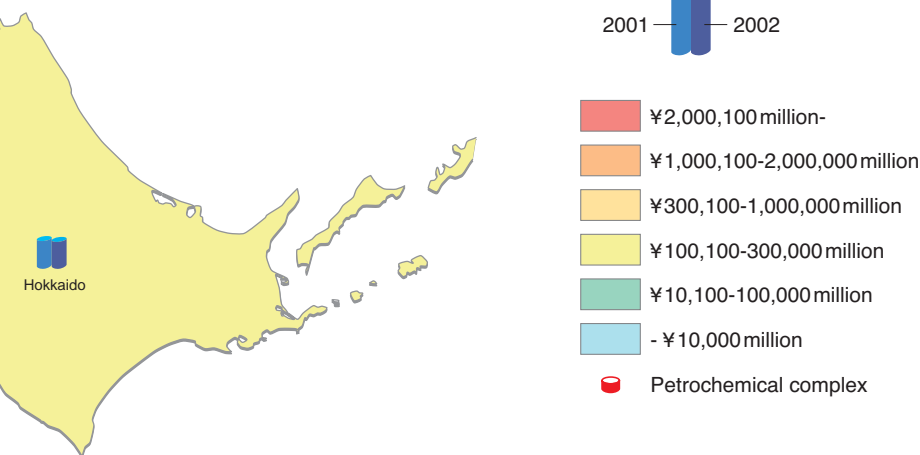
(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
(Note) Statistics of facilities with more than four employees

3 Shipment by Prefecture

Osaka and Kanagawa shipped more than 2 trillion yen each.

■ Shipment of chemical products by prefecture in 2002





■ Shipment of chemical products by prefecture in 2002 (ranking)

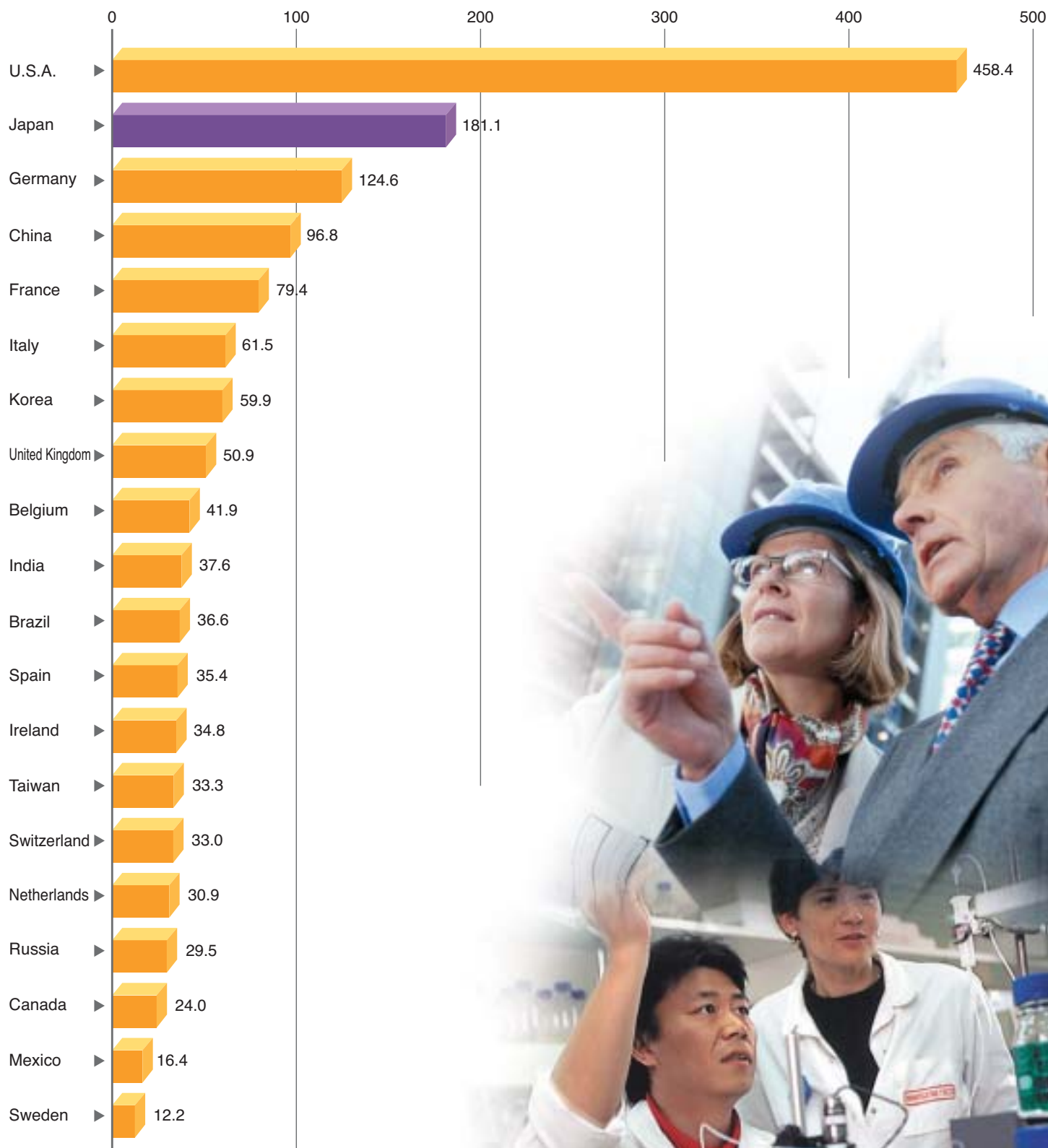
Prefecture	Shipment	Increase/decrease from previous year	Employee force
1.Osaka	22,579	97.3	39,519
2.Kanagawa	21,518	91.4	28,599
3.Chiba	19,172	94.9	17,941
4.Shizuoka	14,702	101.8	24,311
5.Saitama	13,810	98.5	20,211
6.Yamaguchi	13,643	98.4	14,821
7.Hyogo	12,068	102.8	20,027
8.Ibaraki	12,022	99.5	12,613
9.Aichi	8,745	98.5	16,502
10.Okayama	8,200	95.0	10,081
11.Mie	7,727	100.3	11,448
12.Tokyo	6,861	104.3	16,596
13.Shiga	5,435	110.6	6,633
14.Fukushima	5,268	101.9	7,939
15.Tochigi	4,946	112.5	5,028
16.Toyama	4,305	97.4	11,056
17.Fukuoka	4,120	95.0	7,842
18.Gunma	3,814	92.8	5,700
19.Tokushima	3,783	97.0	7,614
20.Wakayama	3,692	102.7	4,955
21.Ehime	3,574	97.6	5,400
22.Niigata	3,369	94.4	6,616
23.Oita	2,914	92.3	2,280
24.Hiroshima	2,706	94.8	5,601

Prefecture	Shipment	Increase/decrease from previous year	Employee force
25.Gifu	2,409	108.4	4,713
26.Kyoto	1,879	88.9	5,333
27.Fukui	1,818	95.8	4,465
28.Hokkaido	1,420	97.5	3,469
29.Yamagata	1,297	89.1	2,681
30.Miyazaki	1,243	89.8	2,265
31.Kumamoto	1,156	103.6	3,288
32.Ishikawa	1,141	86.3	1,629
33.Nagano	1,140	97.3	2,026
34.Saga	955	91.5	1,686
35.Kagawa	765	99.7	2,731
36.Miyagi	752	95.7	1,576
37.Nara	616	95.6	2,794
38.Iwate	468	94.8	1,402
39.Yamanashi	312	137.2	948
40.Akita	304	82.5	835
41.Aomori	288	97.5	482
42.Kagoshima	170	93.0	559
43.Shimane	155	111.9	457
44.Nagasaki	76	71.2	306
45.Okinawa	68	113.8	635
46.Kochi	56	116.3	276
47.Tottori	21	199.8	91
Total	227,483	97.9	353,980

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
(Note) Statistics of facilities with more than four employees

4 Japan's Chemical Industry, the World's Second Biggest in Shipments after the U.S.A.

■ Shipment of chemical products by country in 2002 [\$billion]



(Source) Guide to the Business of Chemistry (American Chemistry Council)



■ The world's leading chemical companies in 2002

Ranking	Company	Chemical Sales			Chemical Operating Profits ^a		
		Chemical Sales (\$ million)2002	Change from 2001	Chemical Sales as % of Total Sales	Chemical Operating Profits(\$ million)	Change from 2001	Operating Profit Margin ^b
1	Dow Chemical (U.S.A.)	27,609.0	-0.7%	100.0%	1,165.0	-6.6%	4.2%
2	DuPont (U.S.A.)	26,706.0	-0.2	99.9	na	na	na
3	BASF (Germany)	25,272.4	0.3	83.0	2,022.2	67.6	8.0
4	Total (France)	18,262.3	-3.3	18.8	734.6	-29.0	4.0
5	Bayer (Germany)	17,750.8	6.6	63.4	532.3	-51.1	3.0
6	ExxonMobil (U.S.A.) ^c	16,408.0	2.9	8.0	830.0	-5.9	5.1
7	Royal Dutch/Shell (U.K./Netherlands)	15,207.0	6.7	8.5	534.0	450.5	3.5
8	BP (U.K.)	13,064.0	13.5	7.3	515.0	302.3	3.9
9	Degussa (Germany)	11,122.6	-0.8	100.0	444.3	-9.4	4.0
10	Akzo Nobel (Netherlands)	9,429.4	-0.6	71.2	764.8	5.6	8.1
11	ICI (U.K.)	9,202.8	-4.7	100.0	745.2	26.2	8.1
12	Mitsui Chemicals (Japan)	8,410.7	10.5	100.0	450.9	33.2	5.4
13	SABIC (Saudi Arabia)	8,006.9	18.3	88.1	1,942.9	37.1	24.3
14	China Petroleum & Chemical (China)	7,926.2	20.2	20.2	625.3	29.7	7.9
15	Dainippon Ink & Chemicals (Japan)	7,682.5	5.8	100.0	320.7	31.0	4.2
16	General Electric (U.S.A.)	7,651.0	8.2	5.8	1,125.0	-29.5	14.7
17	Mitsubishi Chemical (Japan)	7,615.4	4.6	50.5	285.1	646.1	3.7
18	Air Liquide (France)	7,468.7	-5.1	100.0	1,098.2	-1.4	14.7
19	Sumitomo Chemical (Japan)	7,259.2	12.7	81.8	290.9	65.3	4.0
20	Huntsman Corp. (U.S.A.)	7,200.0	-15.3	100.0	na	na	na
21	Norsk Hydro (Norway)	6,903.5	-7.8	33.8	278.1	25.2	4.0
22	Shin-Etsu (Japan)	6,369.0	27.7	100.0	916.2	39.1	14.4
23	Rhodia (France)	6,255.7	-9.1	100.0	331.8	285.7	5.3
24	BOC (U.K.)	6,036.9	-23.3	100.0	751.4	-36.3	12.4
25	PPG Industries (U.S.A.)	5,996.0	1.1	74.3	729.0	24.4	12.2
26	Clariant (Switzerland)	5,993.4	-5.5	100.0	443.2	9.4	7.4
27	DSM (Netherlands)	5,891.7	-18.1	93.5	462.3	-17.3	7.8
28	Reliance Industries (India)	5,625.3	22.3	41.4	602.3	18.0	10.7
29	Equistar Chemicals (U.S.A.)	5,537.0	-6.3	100.0	-44.0	nm	def
30	Chevron Phillips (U.S.A.)	5,473.0	-8.9	100.0	41.0	nm	0.7

(Source) Chemical & Engineering News July 28,2003

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

b Chemical operating profit as a percentage of sales.

c Profits and profitability ratios are after-tax.

def = deficit.

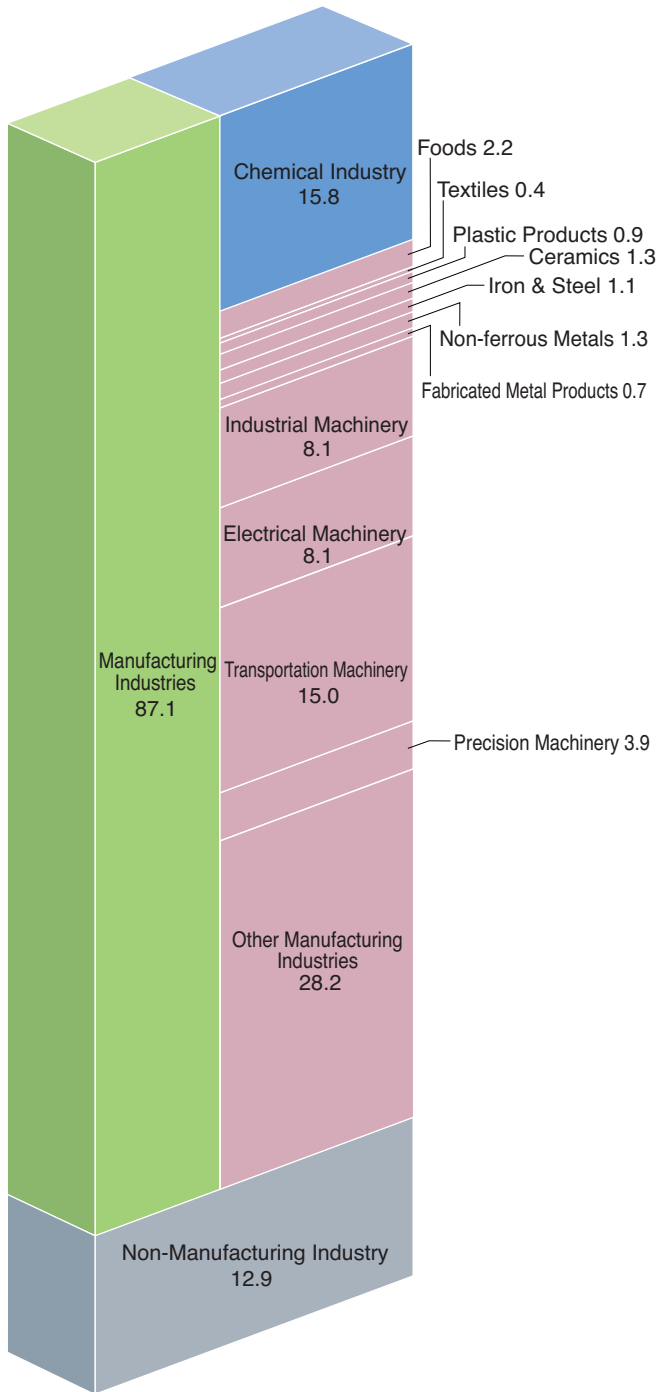
na = not available.

nm = not meaningful.

5 About Yen 1,800 Billion Spent for Research and Development

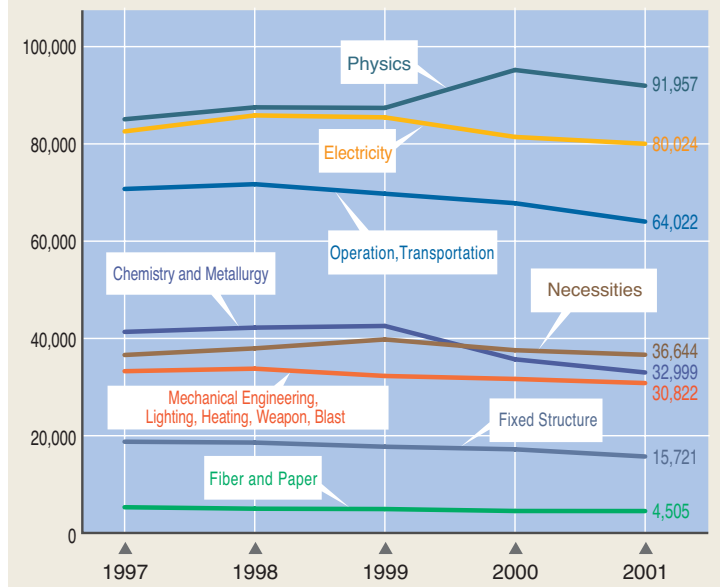
Research and development expenditures of the chemical industry in FY 2002 (Apr.1, 2002-Mar.31, 2003) in Japan amounted to approx.1,800 billion yen, accounting for 16% of all industry R&D expenditures. The percentage of research expenditures to sales was 5.2%, which was high comparable to precision machinery and electrical machinery.

Ratio of R&D expenditures by industry in FY 2002 [%]



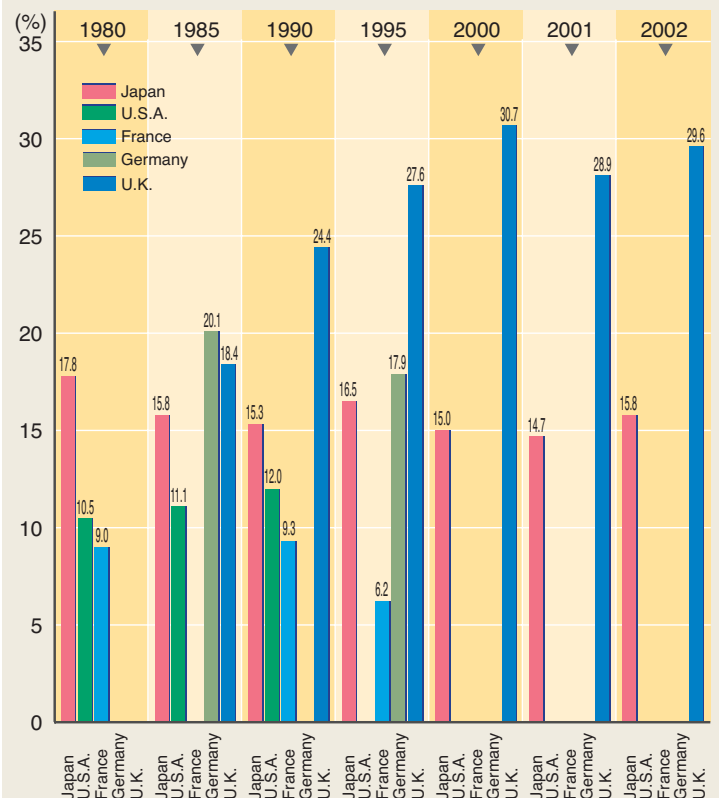
(Source) Ministry of Internal Affairs and Communications (MIC), Statistics Bureau [Survey of Research and Development]

Trend of number of applications for patent by sector



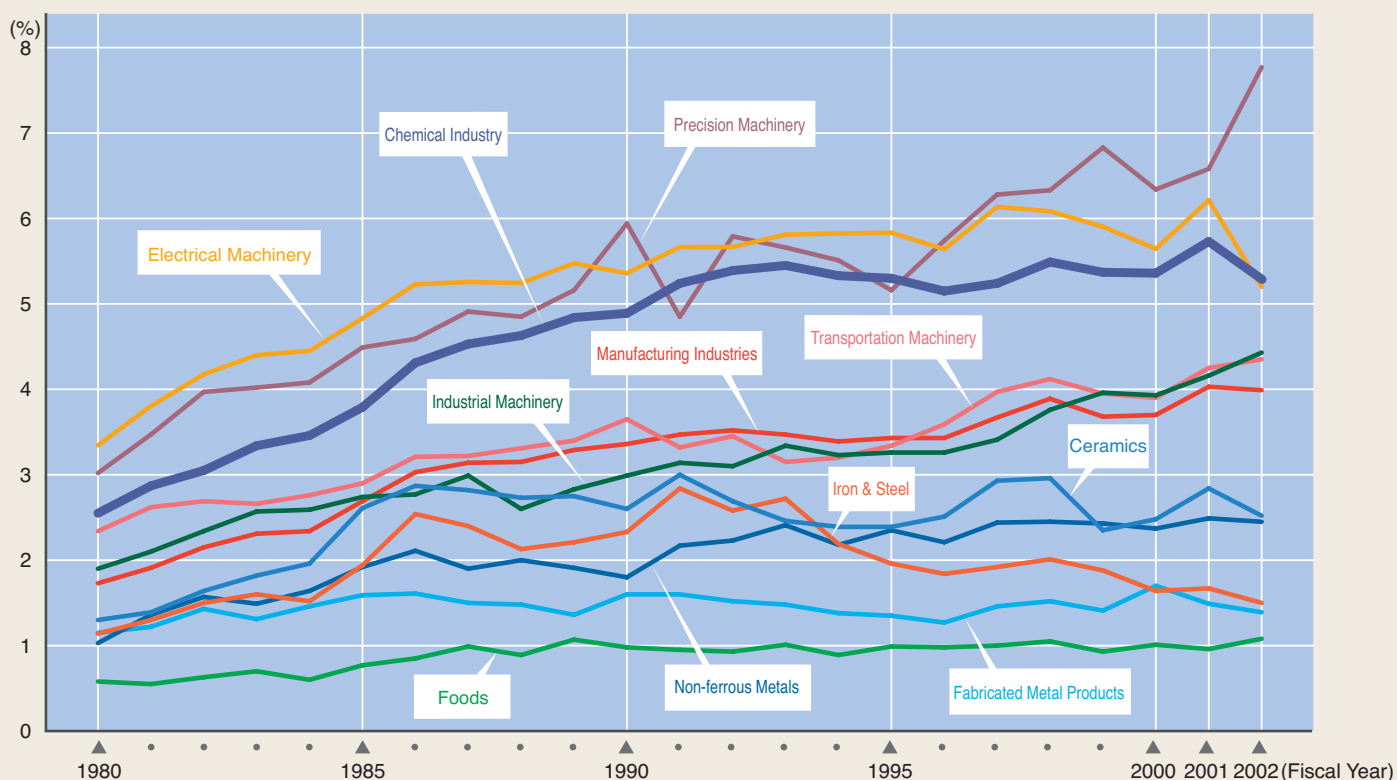
(Source) Japan Patent Office [Japan Patent Office Annual Report]

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 [%]



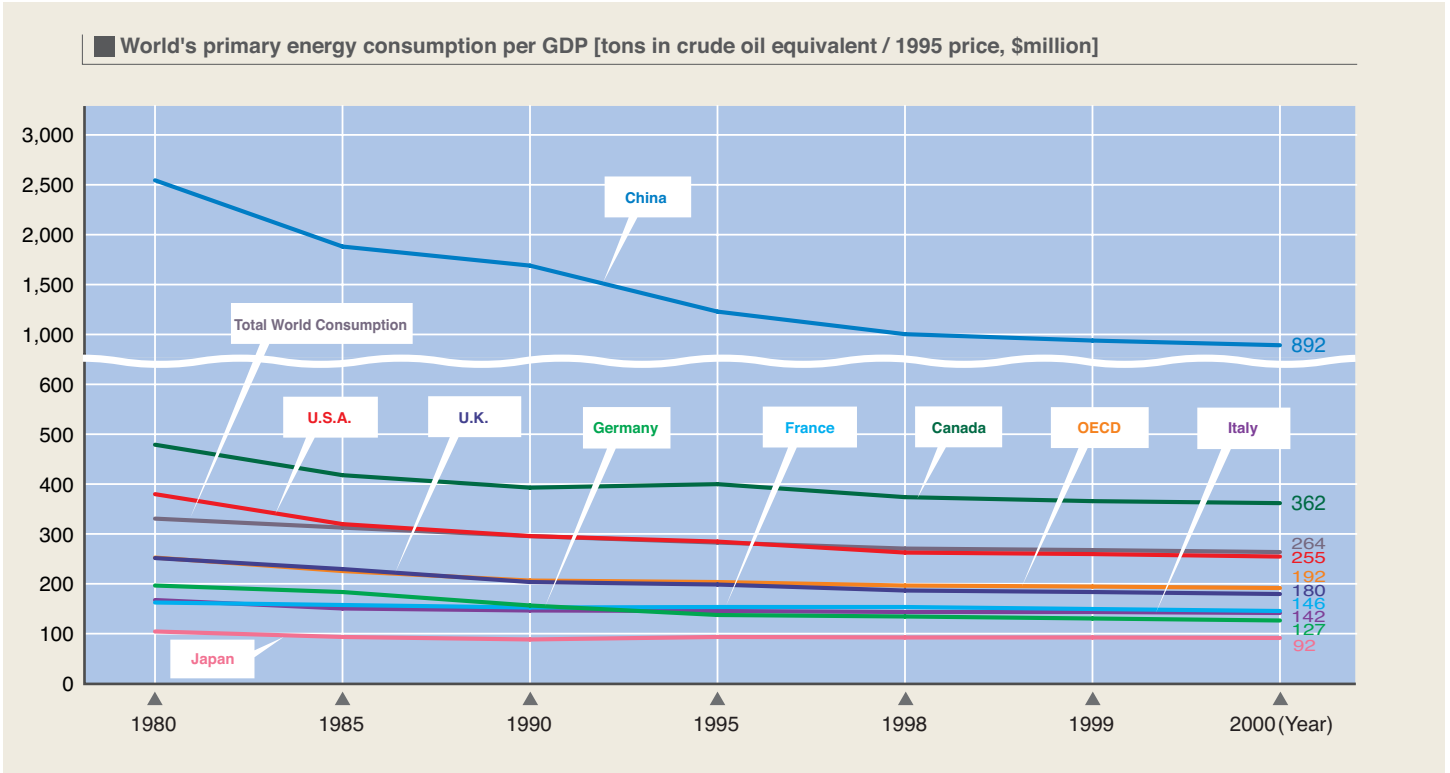
Ratio of R&D expenditures to sales by industry [%]

Industry	Fiscal Year	1980	1985	1990	1995	2000	2001	2002
Chemical Industry		2.55	3.79	4.89	5.30	5.36	5.73	5.24
Foods		0.58	0.77	0.98	0.99	1.01	0.96	1.08
Ceramics		1.30	2.61	2.60	2.39	2.48	2.84	2.52
Iron & Steel		1.14	1.94	2.33	1.96	1.64	1.67	1.50
Non-ferrous Metals		1.03	1.92	1.80	2.35	2.37	2.49	2.45
Fabricated Metal Products		1.15	1.59	1.60	1.35	1.70	1.49	1.39
Industrial Machinery		1.90	2.74	2.99	3.26	3.93	4.16	4.43
Electrical Machinery		3.35	4.82	5.36	5.83	5.64	6.21	5.20
Transportation Machinery		2.34	2.90	3.65	3.34	3.90	4.25	4.35
Precision Machinery		3.02	4.49	5.94	5.16	6.34	6.58	7.77
Total Manufacturing		1.73	2.69	3.36	3.43	3.70	4.03	3.99

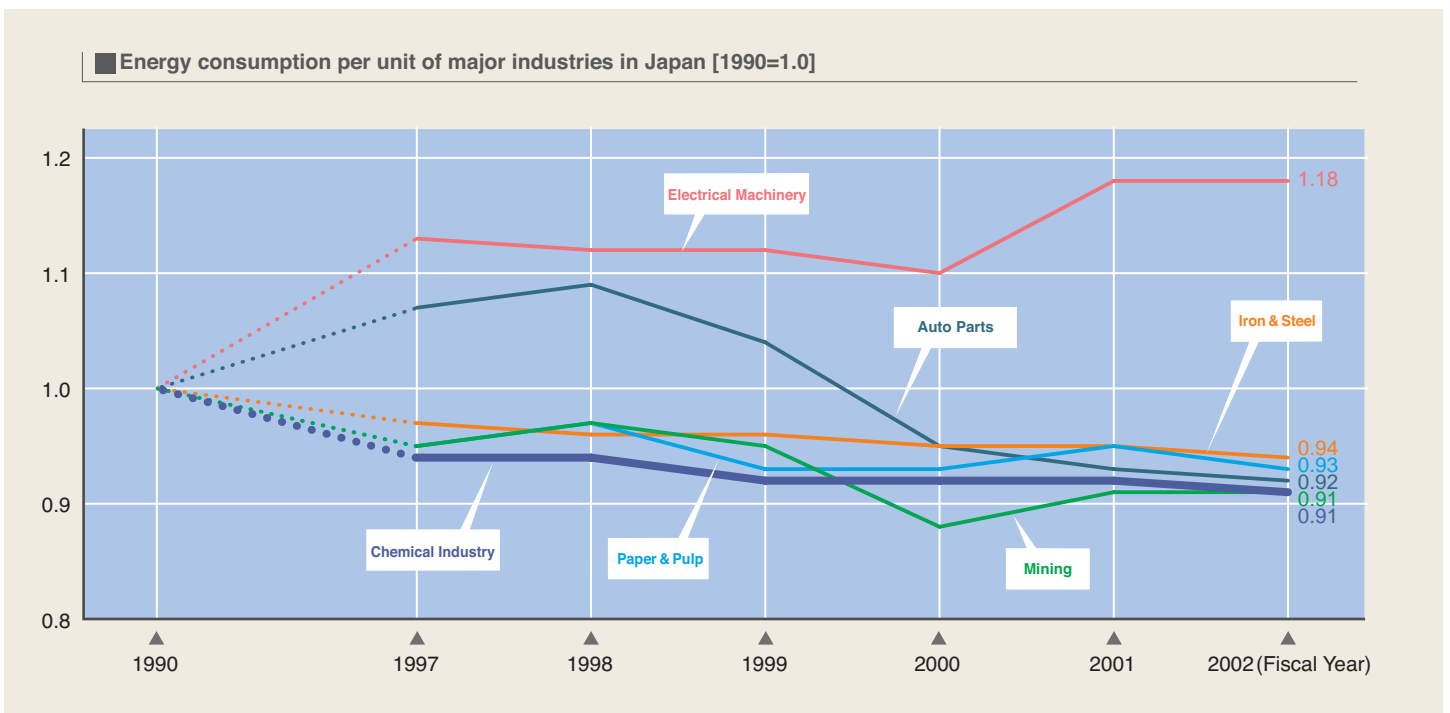
(Source) Ministry of Internal Affairs and Communications (MIC), Statistics Bureau [Survey of Research and Development]

6 Japan Is An Energy-Saving Superpower

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



(Source) The Energy Conservation Center, Japan [Energy and Economic Statistics Handbook]



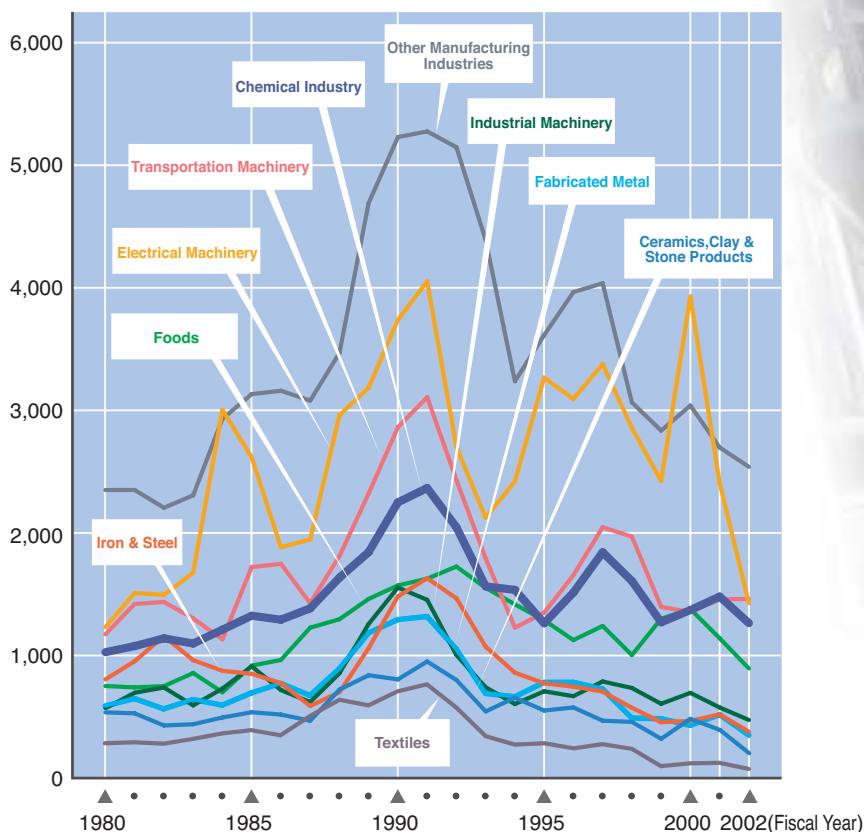
(Source) Nippon Keidanren [Results of the Fiscal 2003 Follow-up to the Keidanren Voluntary Action Plan on the Environment, Section on Global Warming Measures]

7 Chemical Industry Ranks High in Plant Investment



Plant investment by the chemical industry accounted for approx. 14% of all manufacturing industries.

■ Trend of plant investment by industry [¥ billion]



■ Trend of plant investment by industry [¥ billion]

Fiscal Year	Every 5th Year				Recent Three Years			
	1980	1985	1990	1995	2000	2001	2002	
Chemical Industry	1,024	1,322	2,247	1,260	1,368	1,478	1,261	14.0%
Foods	748	914	1,569	1,285	1,376	1,138	891	9.9
Textiles	273	391	710	275	113	120	69	0.8
Ceramics, Clay & Stone Products	533	534	802	548	480	390	199	2.2
Iron & Steel	802	848	1,479	770	463	516	375	4.1
Fabricated Metal Products	588	695	1,293	781	430	517	349	3.9
Industrial Machinery	567	908	1,552	705	692	573	471	5.2
Electrical Machinery	1,229	2,615	3,737	3,265	3,927	2,406	1,423	15.7
Transportation Machinery	1,170	1,719	2,861	1,346	1,352	1,456	1,459	16.1
Others	2,351	3,135	5,233	3,614	3,037	2,697	2,542	28.1
Total Manufacturing	9,286	13,082	21,483	13,849	13,238	11,292	9,039	100.0

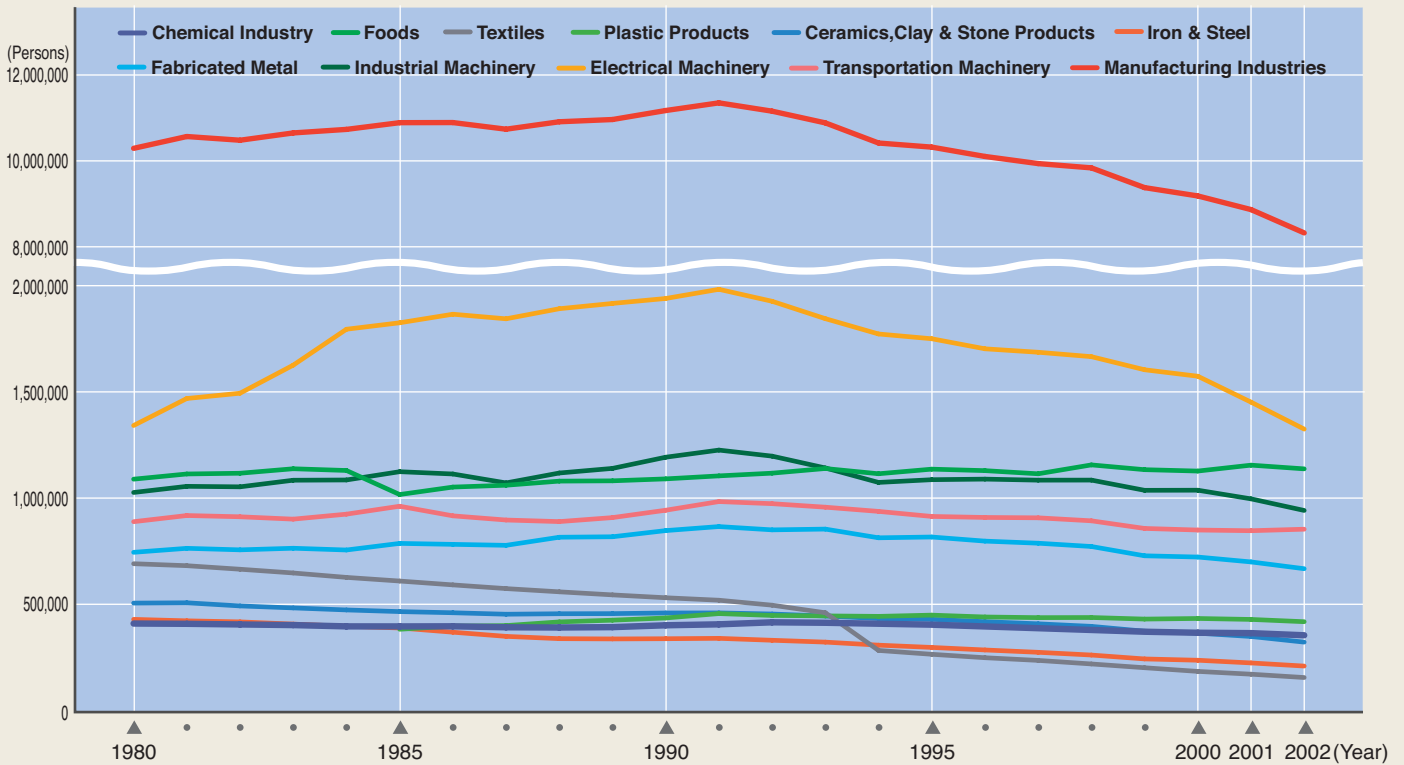
(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]

8

About 350,000 Workers Are Employed

The number of employees in chemical industry accounted for approx. 4.3% in entire manufacturing industry.

Changes in the number of employees by industry



(Source)Ministry of Economy, Trade and Industry [Census of Manufactures] (Note) Statistics of facilities with more than four employees

Changes in the number of employees by industry

Industry	Year	Every 5th Year				Recent Three Years			
		1980	1985	1990	1995	2000	2001	2002	
Chemical Industry		409,338	395,748	401,076	392,109	365,953	364,068	353,980	4.3%
Foods		1,089,035	1,016,731	1,090,403	1,136,236	1,127,177	1,155,025	1,137,521	13.7
Textiles		691,018	609,462	530,736	264,528	184,004	170,812	155,071	1.9
Plastic Products		—	382,247	435,523	448,939	433,177	428,645	417,945	5.0
Ceramics, Clay & Stone Products		505,585	465,483	459,040	429,023	363,997	348,286	321,735	3.9
Iron & Steel		428,957	388,357	337,811	296,824	236,525	223,817	209,087	2.5
Fabricated Metal Products		744,546	786,604	846,915	816,694	722,425	699,422	667,367	8.0
Industrial Machinery		1,026,377	1,124,229	1,192,406	1,086,575	1,037,079	996,373	941,689	11.3
Electrical Machinery		1,341,722	1,825,314	1,939,729	1,750,103	1,573,683	1,451,804	1,326,340	15.9
Transportation Machinery		888,840	961,590	942,795	913,535	849,517	846,331	853,472	10.3
Others		3,166,500	2,934,184	2,996,395	2,786,017	2,290,296	2,181,637	1,939,382	23.3
Total Manufacturing		10,291,918	10,889,949	11,172,829	10,320,583	9,183,833	8,866,220	8,323,589	100.0

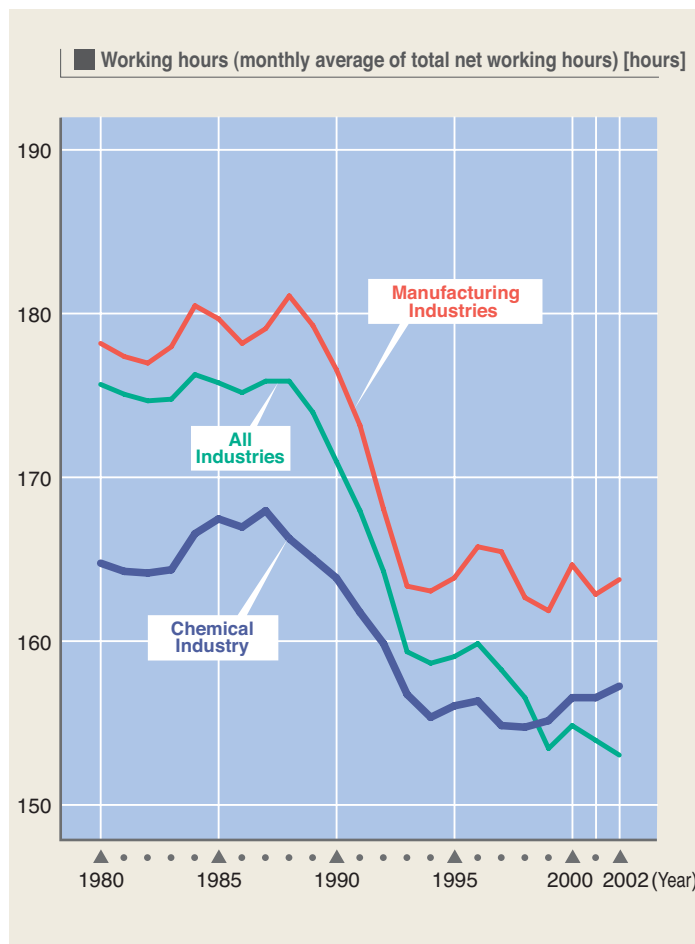
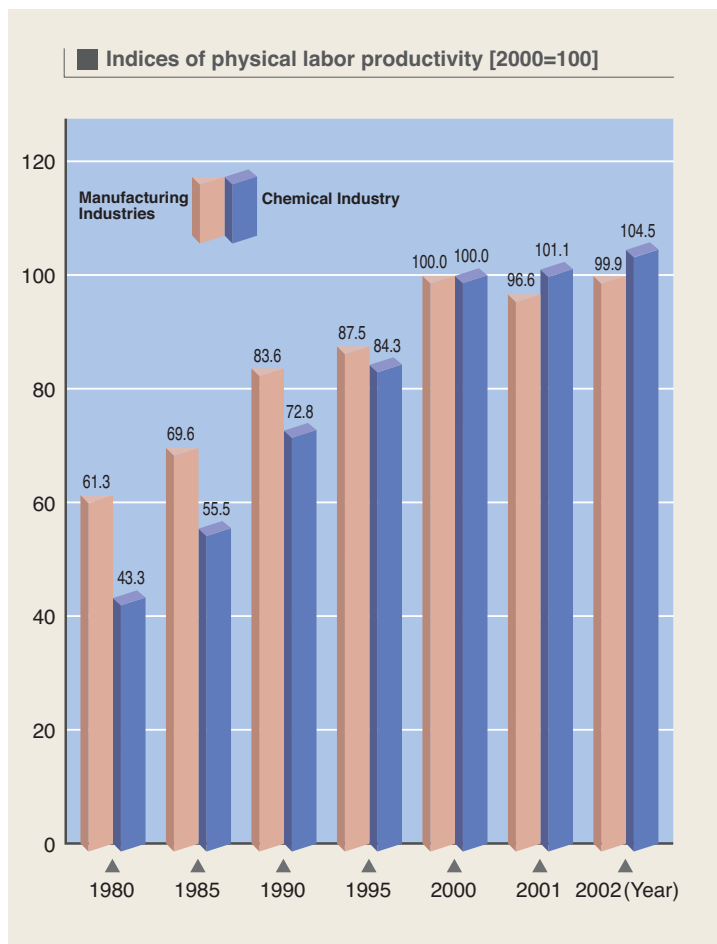
(Source)Ministry of Economy, Trade and Industry [Census of Manufactures] (Note) Statistics of facilities with more than four employees

9 Labor Productivity / Working Hours

CHEMICAL INDUSTRY OF JAPAN 2004



Labor productivity and working hours in the chemical industry.



Indices of physical labor productivity [2000=100]

Year	Industry	Manufacturing Industries		Chemical Industry	
		Indices	Increase rate %	Indices	Increase rate %
Every 5th Year	1980	61.3	3.5	43.3	△0.2
	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
Recent Three Years	2000	100.0	6.3	100.0	2.6
	2001	96.6	△3.4	101.1	1.1
	2002	99.9	3.4	104.5	3.4

(Source) Japan Productivity Center for Socio-Economic Development

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

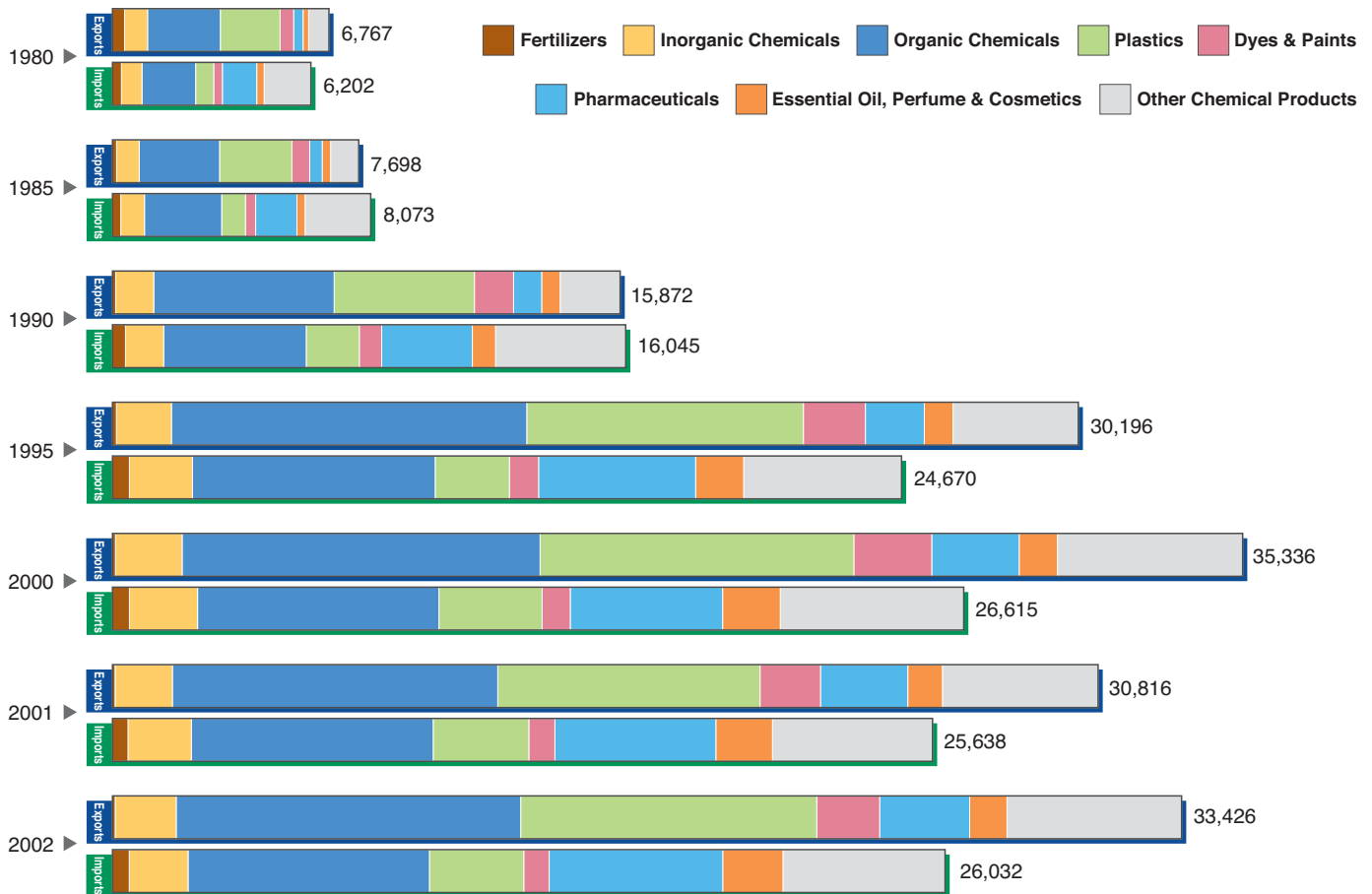
Year	Industry	All Industries	Manufacturing Industries	Chemical Industry
		1980	175.7	178.2
1985	175.8	179.7	167.5	
1990	171.0	176.6	163.9	
1995	159.1	163.9	156.1	
Recent Three Years	2000	154.9	164.7	156.6
	2001	154.0	162.9	156.6
	2002	153.1	163.8	157.3

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

10 Trade

The trade surplus amounted to approx. \$7.4 billion in 2002, the 12th consecutive year of surpluses.

Exports and imports of chemical products [\$ million]

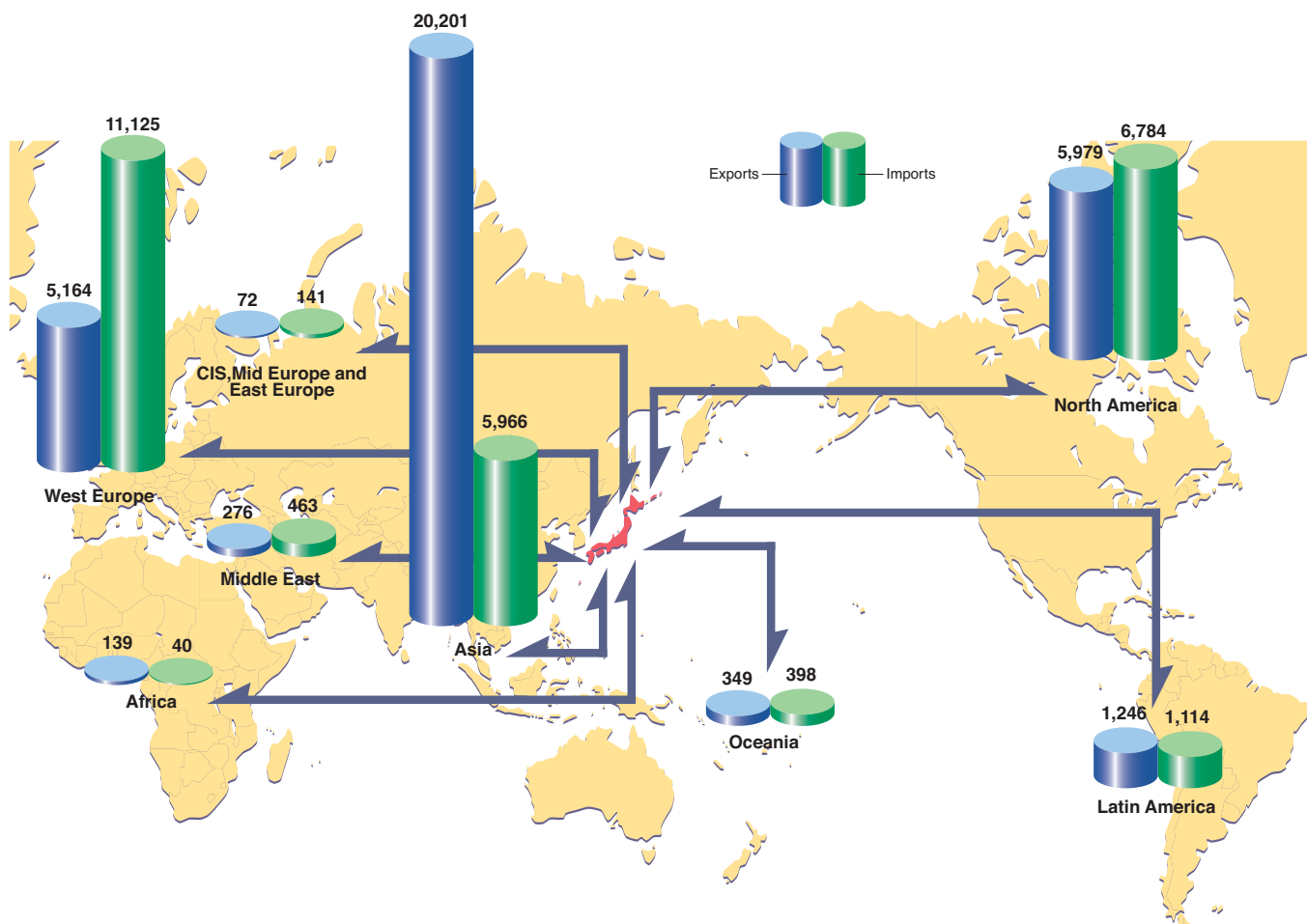


Exports and imports of chemical products [\$ million]

Exports								Product	Imports							
Every 5th year			Recent three years						Every 5th year				Recent three years			
1980	1985	1990	1995	2000	2001	2002	2002		1980	1985	1990	1995	2000	2001	2002	2002
377	127	101	122	93	81	84	0.3%	Fertilizers	279	258	405	527	529	484	523	2.0%
719	708	1,188	1,720	2,084	1,792	1,907	5.7	Inorganic Chemicals	642	742	1,194	1,974	2,131	1,981	1,840	7.1
2,276	2,512	5,640	11,110	11,191	10,172	10,771	32.2	Organic Chemicals	1,679	2,411	4,457	7,587	7,546	7,561	7,545	29.0
1,867	2,261	4,386	8,649	9,810	8,201	9,257	27.7	Plastics	563	744	1,660	2,321	3,226	2,991	2,951	11.3
425	558	1,224	1,938	2,436	1,891	1,968	5.9	Dyes & Paints	272	319	700	914	880	815	794	3.0
295	391	879	1,843	2,733	2,728	2,812	8.4	Pharmaceuticals	1,074	1,292	2,834	4,908	4,764	5,033	5,426	20.8
174	263	579	897	1,198	1,084	1,167	3.5	Essential Oil, Perfume & Cosmetics	231	252	725	1,502	1,803	1,770	1,884	7.2
636	879	1,876	3,917	5,790	4,867	5,460	16.3	Other Chemical Products	1,462	2,054	4,069	4,937	5,736	5,004	5,070	19.5
6,767	7,698	15,872	30,196	35,336	30,816	33,426	100.0	Total Chemical Products	6,202	8,073	16,045	24,670	26,615	25,638	26,032	100.0

(Source) Ministry of Economy, Trade and Industry [White Paper on International Economy and Trade]

■ Exports and imports of chemical products in 2002 by region [\$ million]



■ Exports and imports of chemical products in 2002 by region [\$ million]

Exports								Region	Imports							
Every 5th year				Recent three years					Every 5th year				Recent three years			
1980	1985	1990	1995	2000	2001	2002			1980	1985	1990	1995	2000	2001	2002	
3,024	3,161	8,641	18,376	21,123	17,831	20,201	60.4%	Asia	574	665	2,425	4,171	6,013	5,800	5,966	22.9%
257	169	283	243	264	247	276	0.8	Middle East	28	153	602	611	490	457	463	1.8
881	1,125	3,183	5,226	5,462	5,249	5,164	15.4	West Europe	2,081	2,651	6,510	10,814	11,219	11,012	11,125	42.7
845	1,532	2,605	4,945	6,563	5,715	5,979	17.9	North America	2,730	3,667	5,500	7,511	7,630	6,955	6,784	26.1
272	219	282	703	1,302	1,189	1,246	3.7	Latin America	194	347	584	839	647	807	1,114	4.3
158	114	138	152	151	130	139	0.4	Africa	67	70	69	85	50	46	40	0.2
302	286	384	480	393	383	349	1.0	Oceania	240	99	202	481	430	421	398	1.5
1,029	1,091	357	70	78	74	72	0.2	CIS, Mid Europe, East Europe	288	420	153	157	136	141	141	0.5
6,767	7,698	15,872	30,196	35,336	30,816	33,426	100.0	Total Chemical Products	6,202	8,073	16,045	24,670	26,615	25,638	26,032	100.0

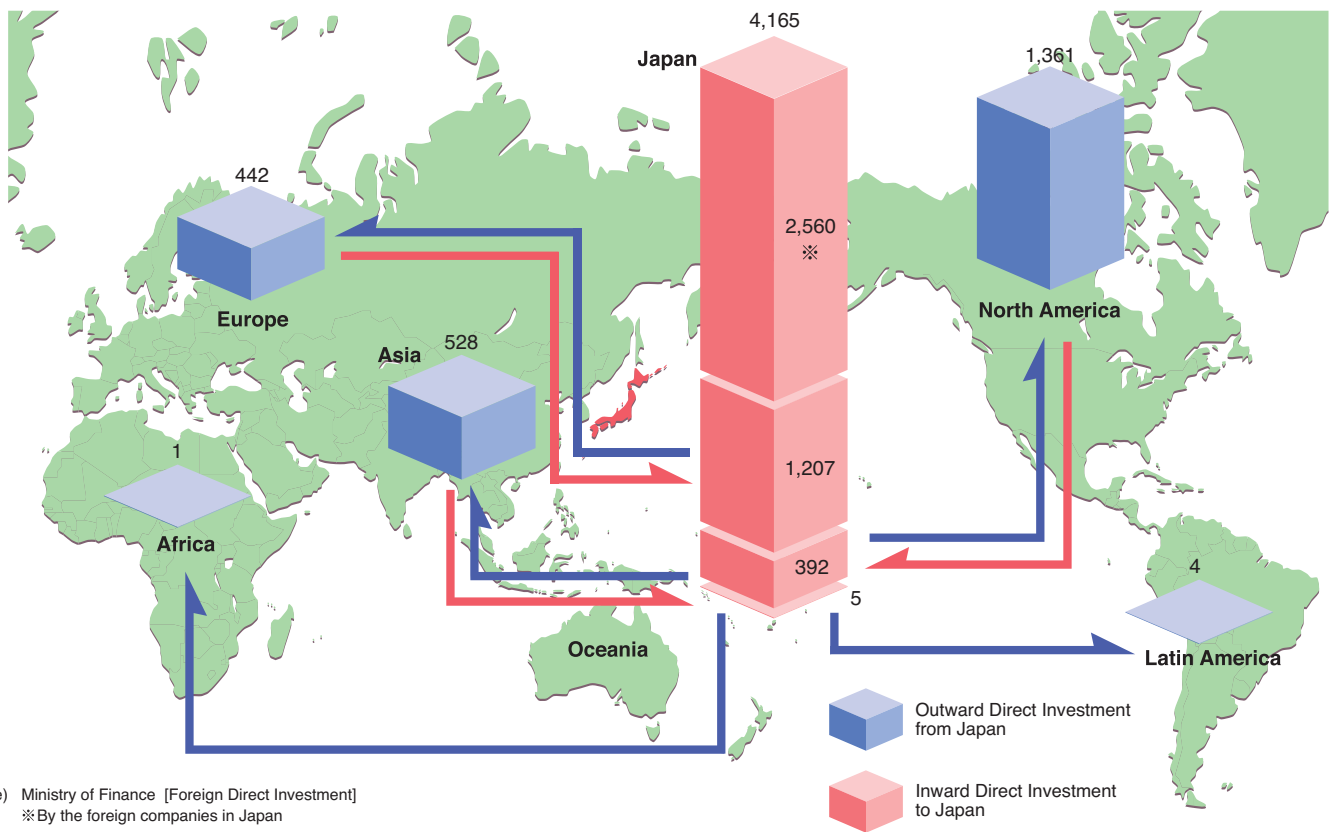
(Source) Ministry of Economy, Trade and Industry [White Paper on International Economy and Trade]

11

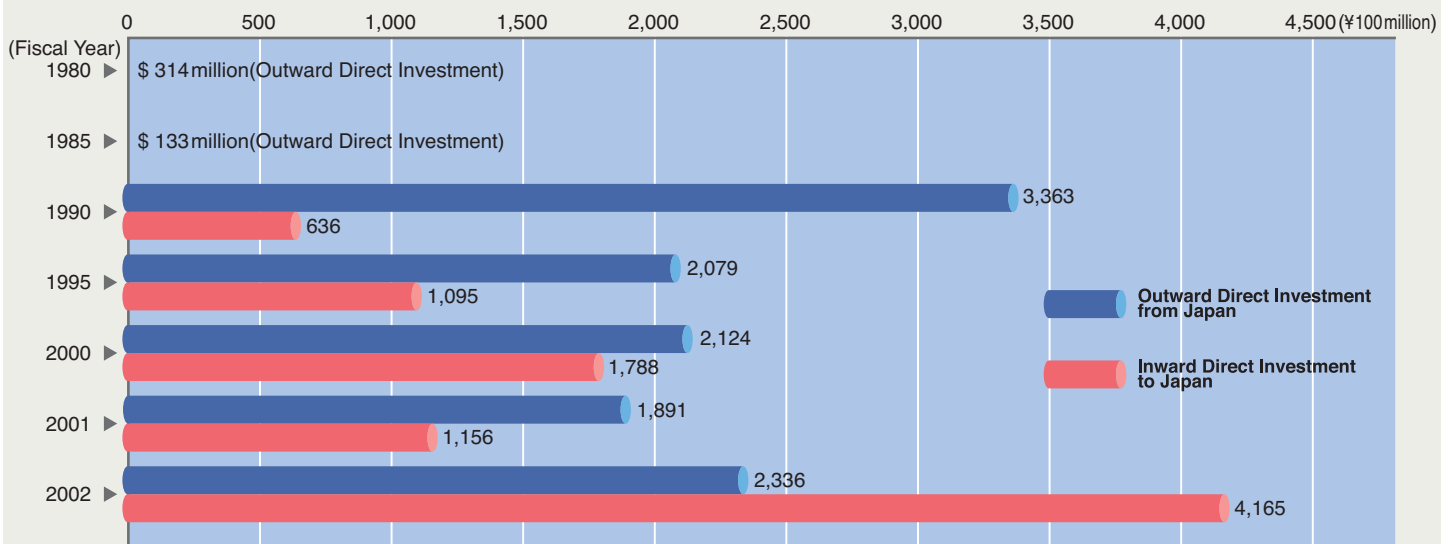
Direct Overseas Investment Amounts to Yen 230 Billion, While Direct Domestic Investment Amounts to Yen 420 Billion

Inward direct investment increased substantially in FY 2002 because of mergers and acquisitions, etc.

■ Outward direct investment of the Japanese chemical industry and inward direct investment to the chemical industry in Japan in FY 2002 by region [¥ 100million]



■ Actual outward direct investment of the Japanese chemical industry and inward direct investment to the chemical industry in Japan [¥ 100million]



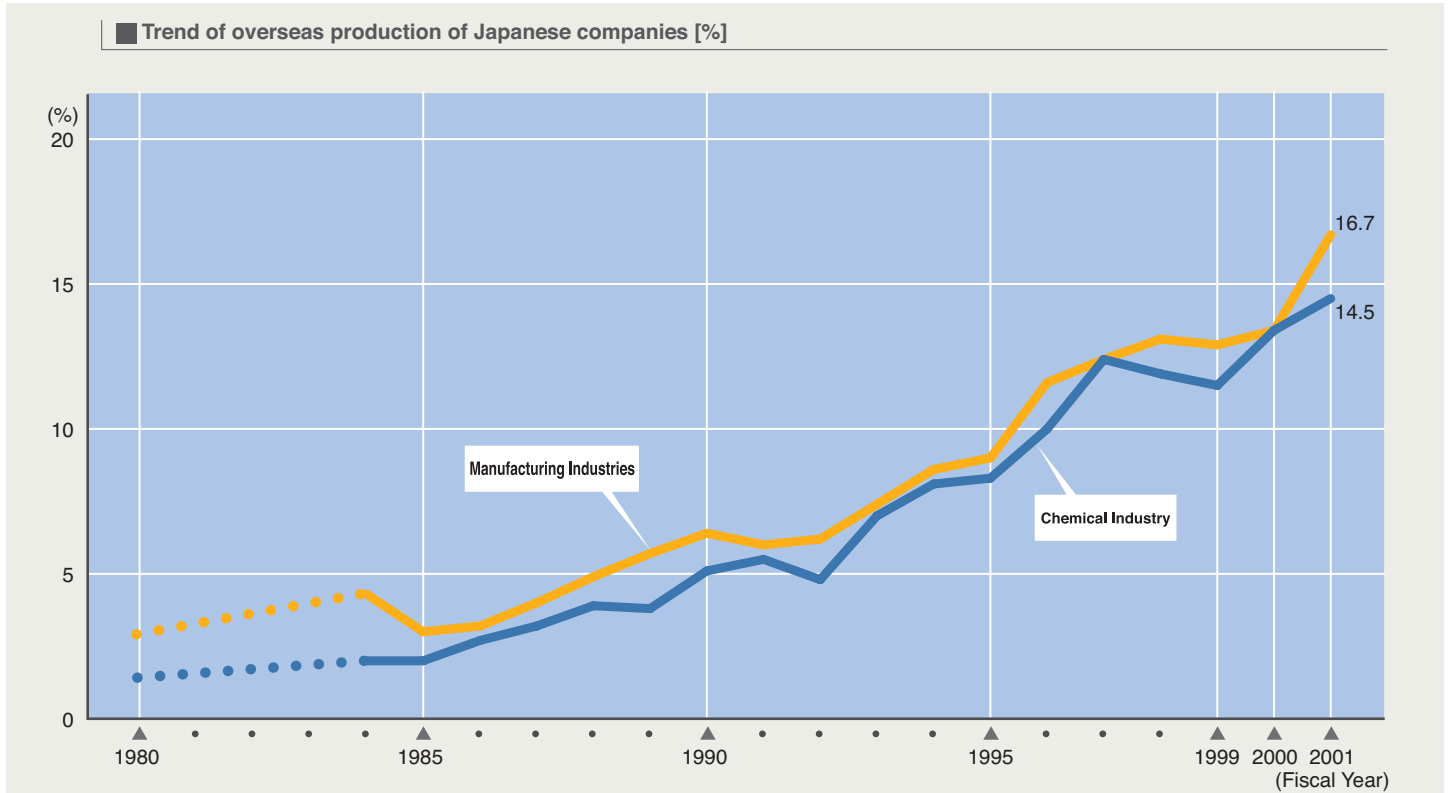
(Source) Ministry of Finance [Foreign Direct Investment]

12 Overseas Business Activities

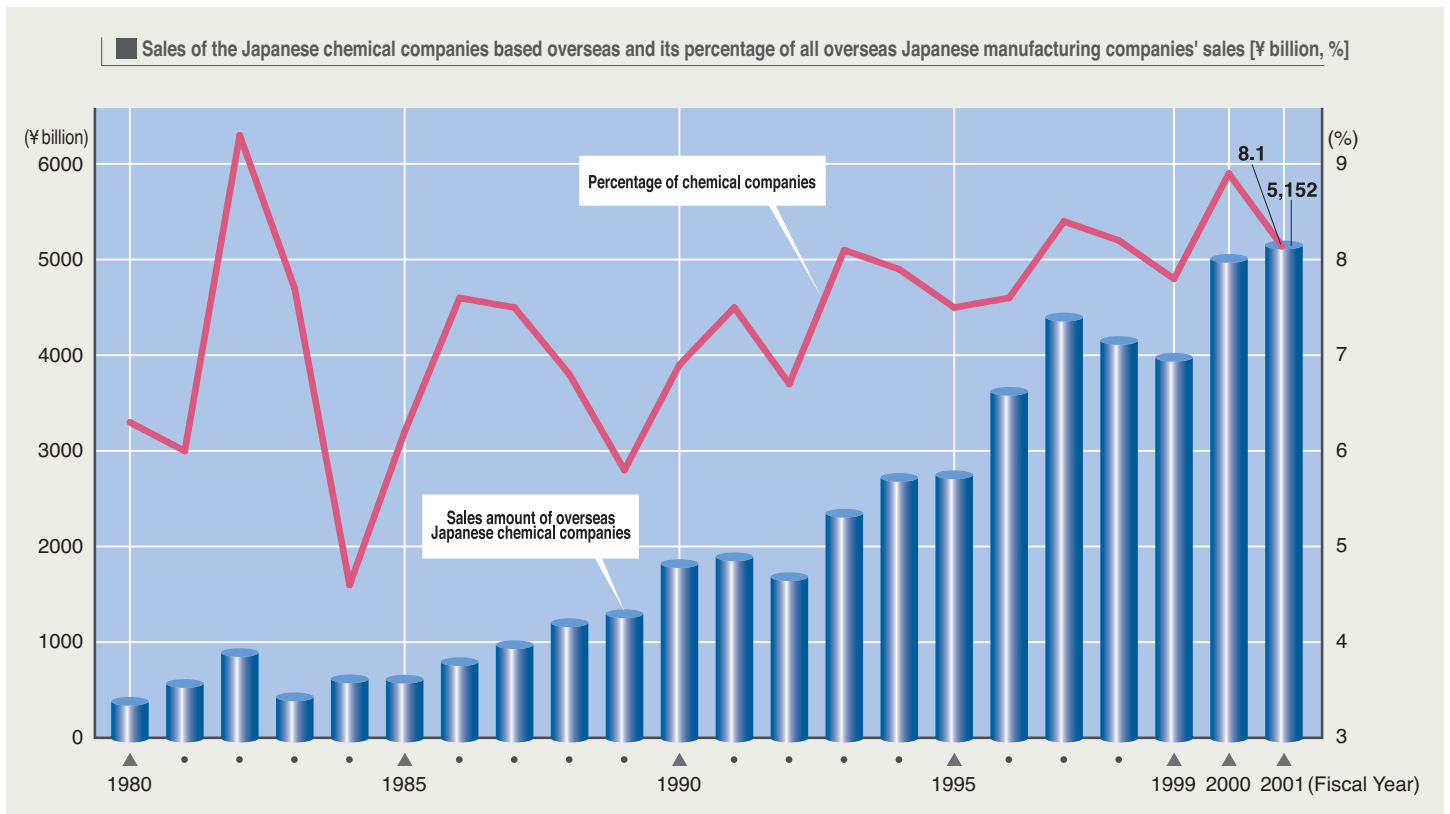
CHEMICAL INDUSTRY OF JAPAN 2004



Overseas production of the Japanese chemical industry has increased to more than 14 %.



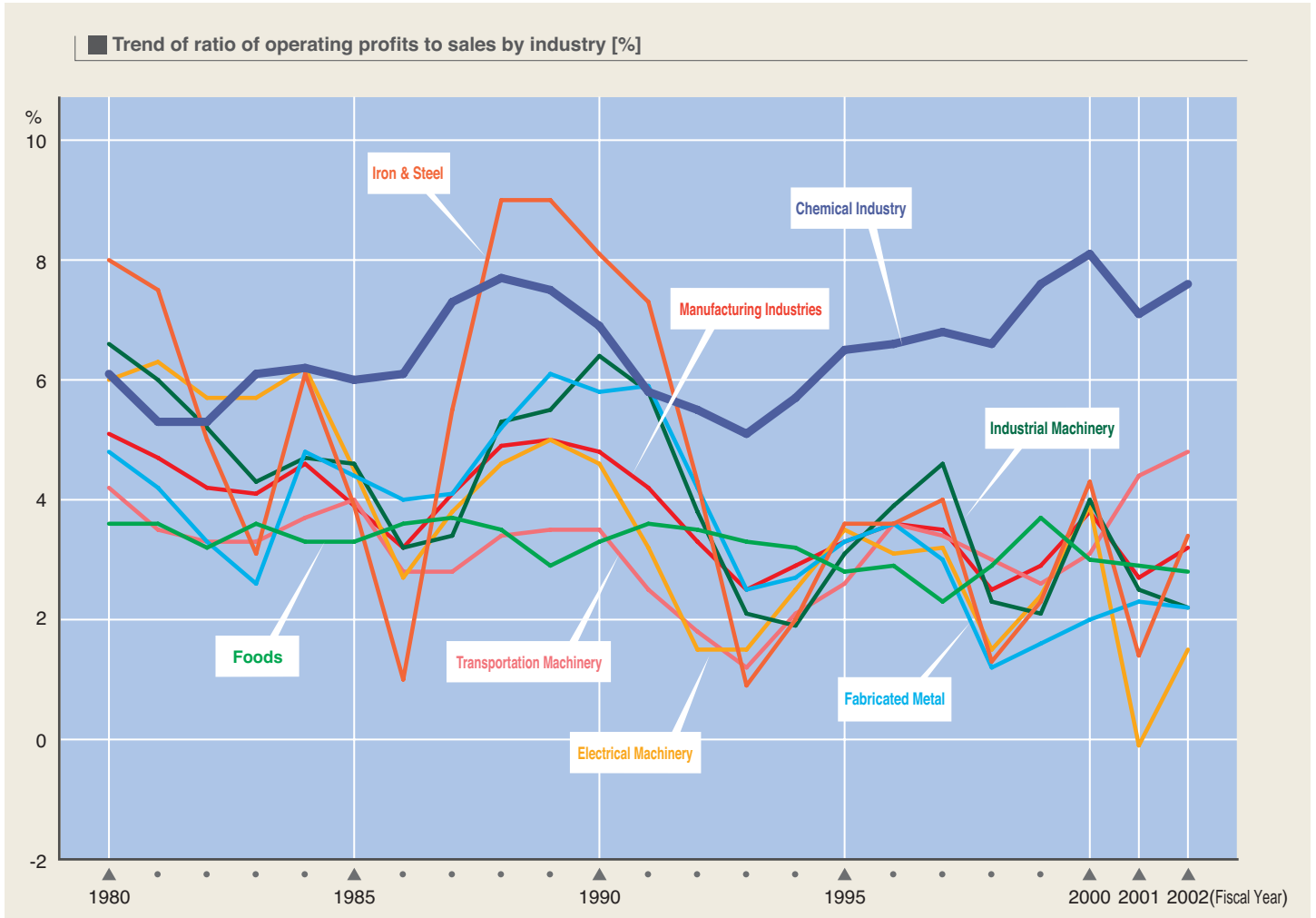
(Source) Ministry of Economy, Trade and Industry [Basic Survey of Overseas Business Activities]



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

13 Operating Profit Ratio

Operating profit ratio to sales remained high at approx. 7.6%.



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

Fiscal Year	Every 5th year				Recent three years		
	1980	1985	1990	1995	2000	2001	2002
Chemical	6.1	6.0	6.9	6.5	8.1	7.1	7.6
Foods	3.6	3.3	3.3	2.8	3.0	2.9	2.8
Iron & Steel	8.0	3.9	8.1	3.6	4.3	1.4	3.4
Fabricated Metal Products	4.8	4.4	5.8	3.3	2.0	2.3	2.2
Industrial Machinery	6.6	4.6	6.4	3.1	4.0	2.5	2.2
Electrical Machinery	6.0	4.5	4.6	3.5	3.9	△0.1	1.5
Transportation Machinery	4.2	4.0	3.5	2.6	3.1	4.4	4.8
Total Manufacturing	5.1	3.9	4.8	3.3	3.8	2.7	3.2

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

Summary of Major Indices

CHEMICAL
INDUSTRY
OF JAPAN 2004



Major indices in 2002

Industry	Item	Number of Facilities	Number of Employees (Persons)	Total Shipment (Yen billion)	Amount of Value Added (Yen billion)	Plant Investment (Yen billion)	R&D Expenditures (Yen billion)
Chemical Industry		5,045	353,980	22,748	11,024	1,261	1,834
Foods		35,739	1,137,521	22,984	8,794	891	250
Textiles		9,260	155,071	2,478	1,080	69	51
Plastic Products		16,809	417,945	9,628	3,910	—	108
Ceramics, Clay & Stone Products		15,285	321,735	7,678	3,779	199	146
Iron & Steel		4,589	209,087	10,963	3,780	375	130
Fabricated Metal Products		36,667	667,367	13,737	6,167	349	78
Industrial Machinery		34,424	941,689	25,477	10,042	471	939
Electrical Machinery		22,380	1,326,340	46,041	14,578	1,423	940
Transportation Machinery		12,266	853,472	47,997	14,233	1,459	1,738
Others		98,384	1,939,382	59,630	20,072	2,542	3,867
Total Manufacturing		290,848	8,323,589	269,362	97,459	9,039	10,081

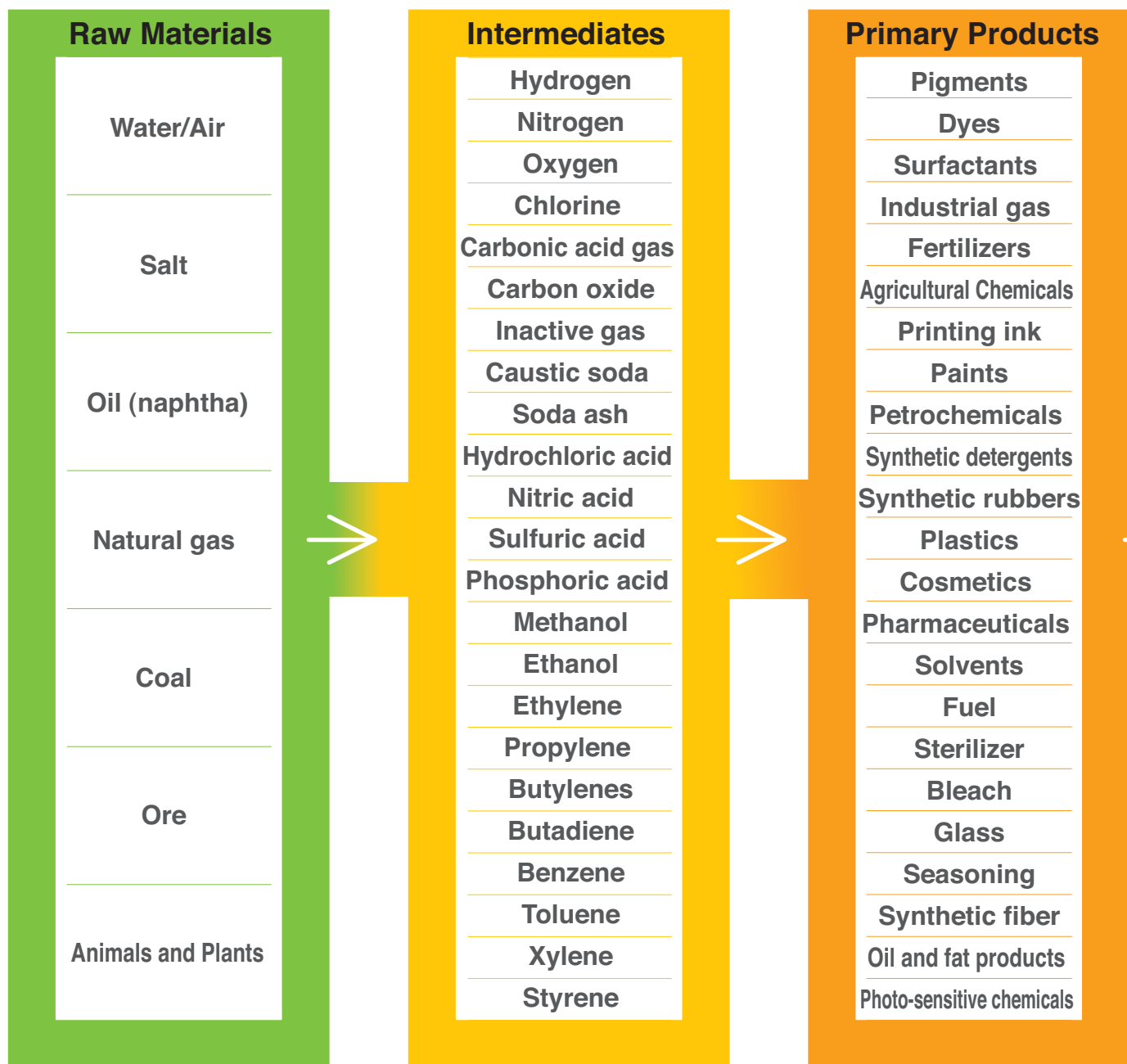
Ratio of chemical industry to all manufacturing industries [%]

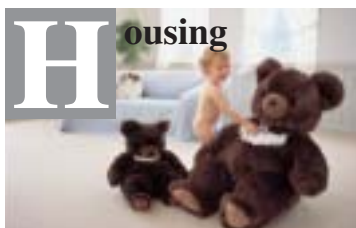
Industry	Item	Number of Facilities	Number of Employees	Total Shipment	Amount of Value Added	Plant Investment	R&D Expenditures
Chemical Industry		1.7%	4.3%	8.4%	11.3%	14.0%	18.2%
Foods		12.3	13.7	8.5	9.0	9.9	2.5
Textiles		3.2	1.9	0.9	1.1	0.8	0.5
Plastic Products		5.8	5.0	3.6	4.0	—	1.1
Ceramics, Clay & Stone Products		5.3	3.9	2.9	3.9	2.2	1.4
Iron & Steel		1.6	2.5	4.1	3.9	4.1	1.3
Fabricated Metal Products		12.6	8.0	5.1	6.3	3.9	0.8
Industrial Machinery		11.8	11.3	9.5	10.3	5.2	9.3
Electrical Machinery		7.7	15.9	17.1	15.0	15.7	9.3
Transportation Machinery		4.2	10.3	17.8	14.6	16.1	17.2
Others		33.8	23.3	22.1	20.6	28.1	38.4
Total Manufacturing		100.0	100.0	100.0	100.0	100.0	100.0

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
 Ministry of Finance [Financial Statements Statistics of Corporations by Industry]
 Ministry of Internal Affairs and Communications (MIC), Statistics Bureau [Survey of Research and Development]
 (Note) Data of plant investment and R&D expenditures are those of FY 2002.

Chemical Industry Supports Our Life and Other Industries, Protects the Earth and Realizes Our Dream

Chemical Industry and Technology and Social Needs





Housing

New materials to cope with "sick house" syndrome, ultra light/ultra hard new materials, fire retardant new materials, heat-resist (heat accumulating) materials



Food

Plant breeding by biotechnology, factorization of agriculture, highly functional packaging film materials/systems, super enzymes



Clothes

Allergy-free apparels, waterproof and ventilation apparels, form-memorizing apparels



Resources & Energy

Solar generation, fuel cells, use of biomass, high-level oil-chemicals technology



SOCIAL NEEDS



Transportation Telecommunication Electronics

Display materials (LCD, PDP, POP, EL, etc.), clean automobiles, ultra lightweight automobiles, cellular phone materials, optical fiber



Environment

Green chemistry, measures to cope with global warming, water treatment/water production, prevention of atmospheric pollution (SO_x, NO_x, VOC, etc.), biodegradable polymers, measures to cope with endocrine disrupters issue



Medical Treatment/Health

Biotechnology, prevention of infection in hospitals, genomic medicines

Nano Technology New Materials

Carbon nano-tube, CMP slurry

Information Disclosure

PRTR, risk communications, MSDS

Global Activity

ICCA(The International Council of Chemical Associations) activity

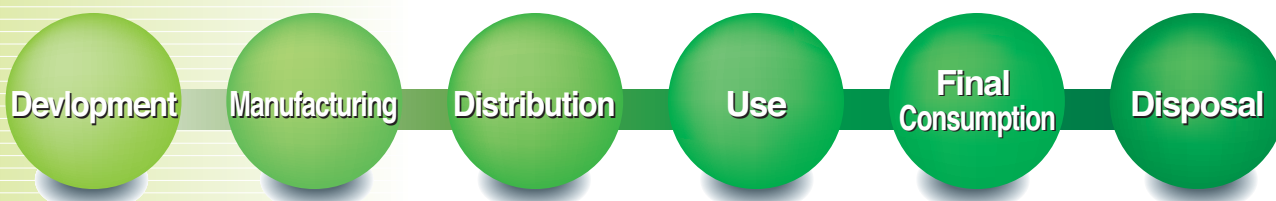
About Responsible Care

What is Responsible Care?

Chemical substances are 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 have 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's 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).



Responsible Care Logotype



レスポンシブル・ケア[®]

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 companies of chemical industry associations recognized by the ICCA.

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

**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 five 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)
- **Operational 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)



Chemistry and chemical products play an extremely important role in many aspects of daily living. From clothes (chemical fibers, etc.), food (agricultural chemicals, fertilizers, etc.) and houses (construction materials such as carpet and wall papers) to computers and automobiles, they all could not exist in their present forms without chemical products and technology.

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 Chemical Society of Japan; The Society of Chemical Engineers, Japan; The Association for the Progress of New Chemistry; and The Japan Chemical Industry Association), which together with academic centers and with the support of the Ministry of Education, Culture, Sports, Science and Technology and the Ministry of Economy, Trade and Industry, has engaged in its campaign activity since 1993.

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.

For further details, please access
<http://www.nikkakyo.org/English/publications/index.php3> and
<http://www.kagaku21.net/en/>



JAPAN CHEMICAL INDUSTRY ASSOCIATION

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