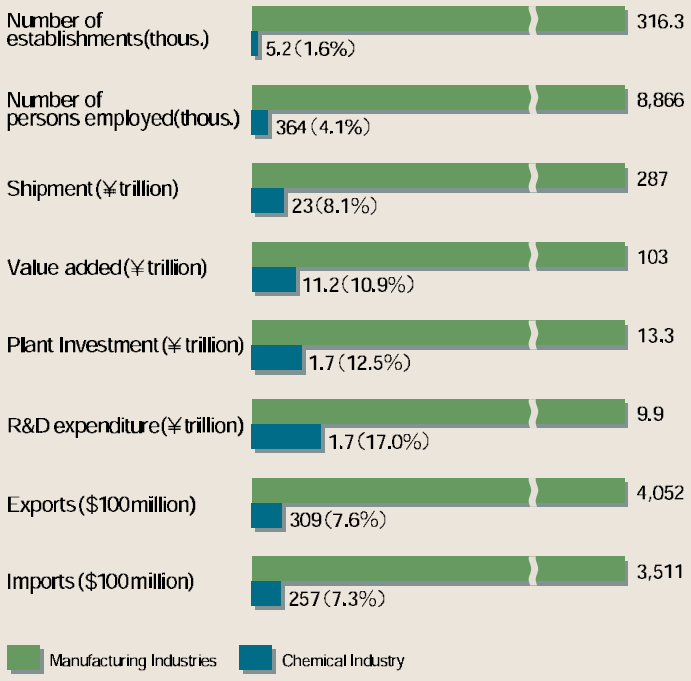
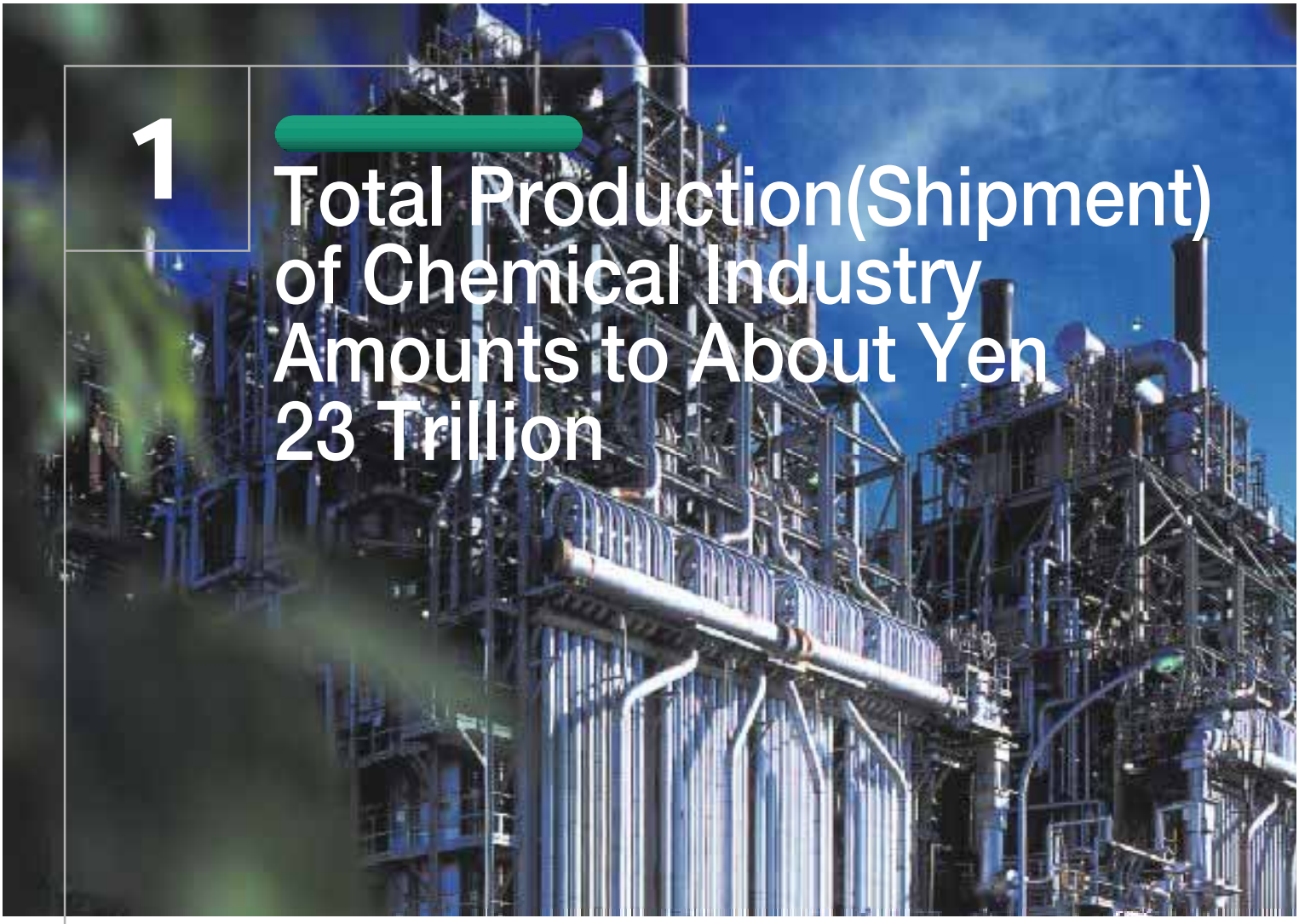
2003 CHEMICAL INDUSTRY OF JAPAN IN GRAPHS

夢・化学-21

Contents

■The Japanese Chemical Industry vs. Manufacturing Industries (2001)

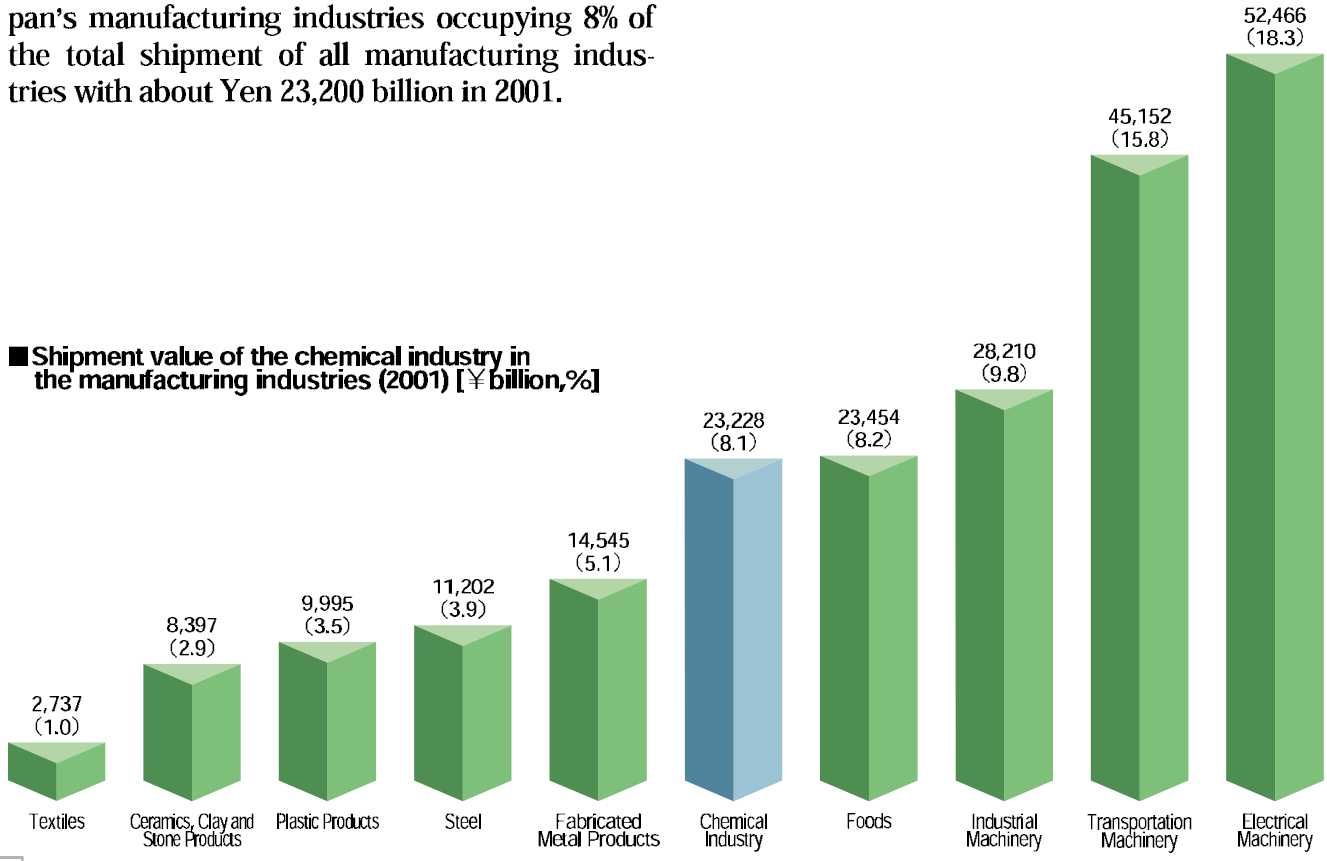


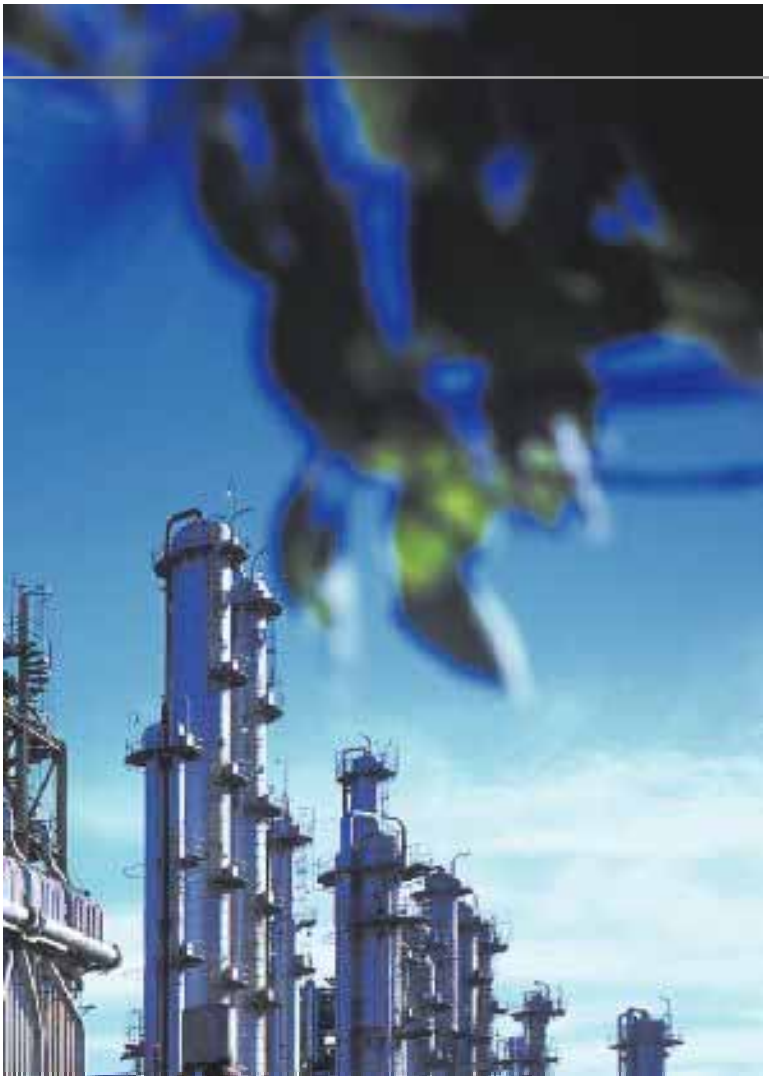


1 Total Production(Shipment) of Chemical Industry Amounts to About Yen 23 Trillion

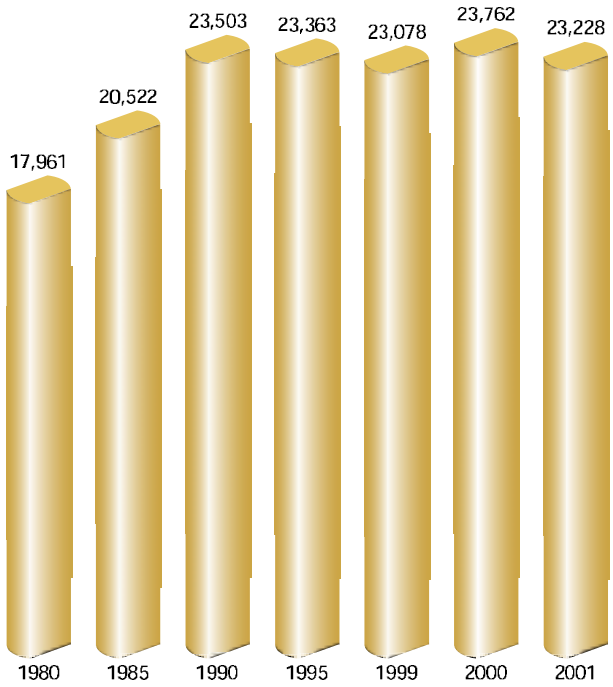
Chemical industry plays an important role in Japan's manufacturing industries occupying 8% of the total shipment of all manufacturing industries with about Yen 23,200 billion in 2001.

■ Shipment value of the chemical industry in the manufacturing industries (2001) [¥billion,%]





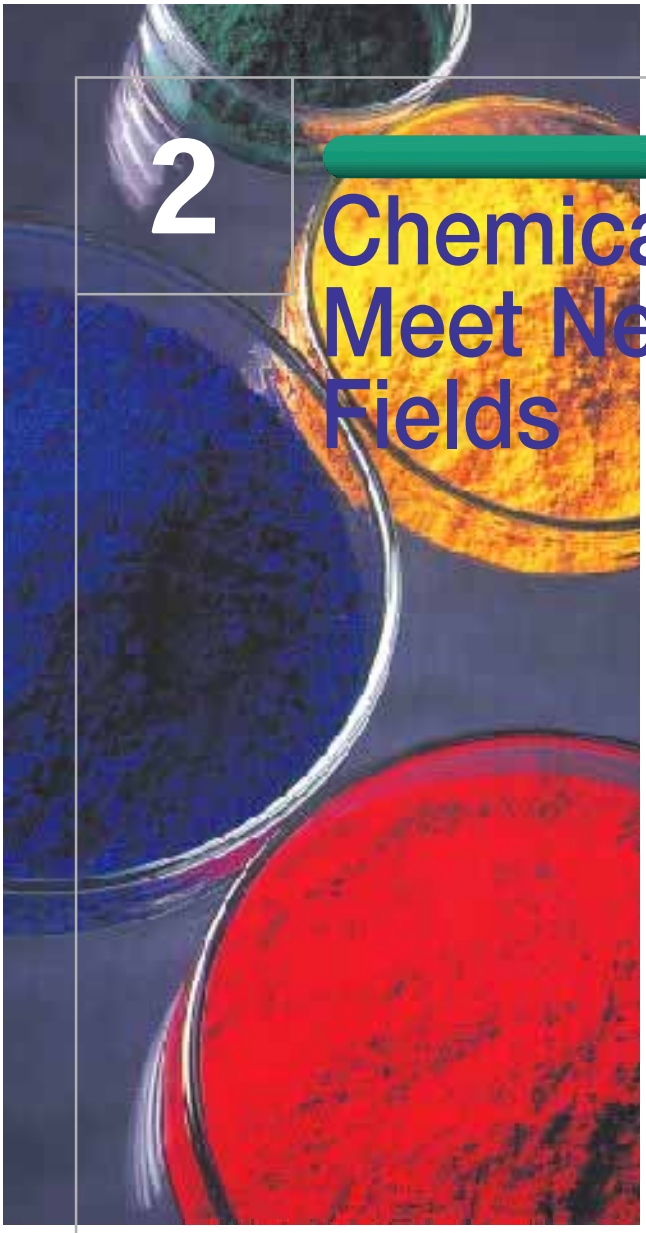
■Trends in shipment value (1980-2001) [￥billion]



■Trend of Shipment by Industry in Manufacturing (1980-2001) in Yen 1 billion

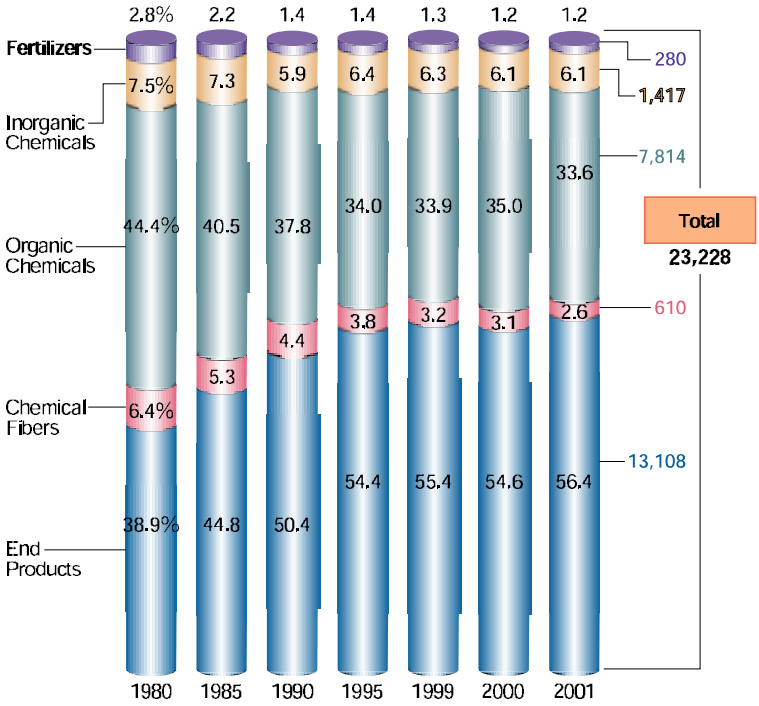
	Every 5th year				Recent three years			
	1980	1985	1990	1995	1999	2000	2001	
Chemicals	17,961	20,522	23,503	23,363	23,078	23,762	23,228	8.1%
Foods	22,196	20,542	22,748	24,117	24,334	23,888	23,454	8.2
Textiles	7,781	8,087	7,838	4,230	3,236	3,008	2,737	1.0
Plastic Products	—	8,052	10,466	10,530	10,243	10,486	9,995	3.5
Ceramics, Clay and Stone Products	8,304	8,772	10,724	10,169	8,818	8,860	8,397	2.9
Steel	17,864	17,754	18,269	14,073	11,322	11,927	11,202	3.9
Fabricated Metal Products	10,311	13,094	18,574	17,646	15,238	15,143	14,545	5.1
Industrial Machinery	17,361	24,190	33,225	29,884	27,972	29,972	28,210	9.8
Electrical Machinery	22,160	40,842	54,529	54,831	54,905	59,449	52,466	18.3
Transportation Machinery	24,897	36,179	46,858	44,215	43,877	44,367	45,152	15.8
Others	63,289	67,254	76,640	72,973	68,426	69,616	67,281	23.5
Total	212,124	265,321	323,373	306,030	291,450	300,478	286,667	100.0

(Source) Ministry of Economy, Trade and Industry "Census of Manufactures"
(Note) Facilities with over four employees



2 Chemical Products That Meet Needs of Various Fields

■Changes in shipment composition (1980-2001) [%, ¥billion]



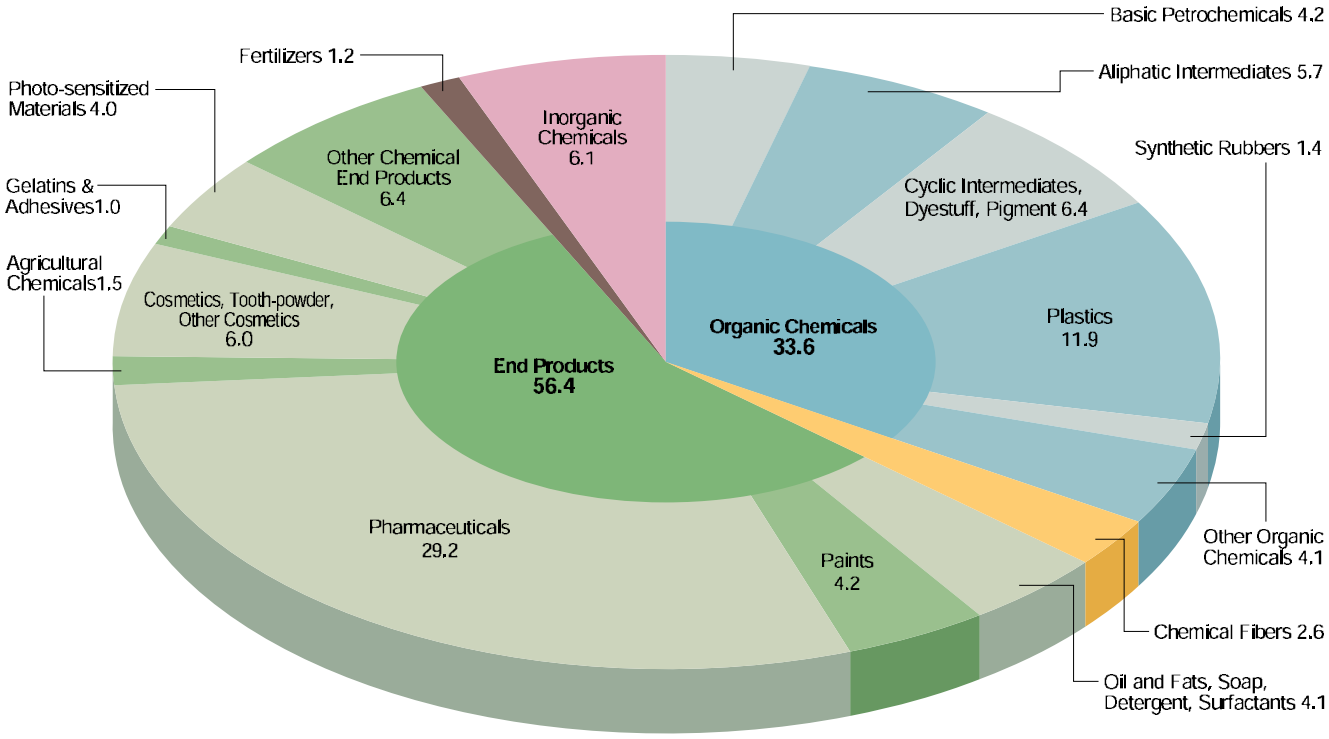
■Trend of Shipment Composition in Chemical Industry (1980-2001) in %

	Every 5th year				Recent three years		
	1980	1985	1990	1995	1999	2000	2001
Chemicals Industry	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fertilizers	2.8	2.2	1.4	1.4	1.3	1.2	1.2
Inorganic Chemicals	7.5	7.3	5.9	6.4	6.3	6.1	6.1
Organic Chemicals	44.4	40.5	37.8	34.0	33.9	35.0	33.6
●Basic Petrochemicals	10.9	6.2	5.1	2.6	3.0	2.9	4.2
●Aliphatic Intermediates	6.1	5.5	4.5	5.5	6.0	7.1	5.7
●Cyclic Intermediates, Dyestuff, Pigment	9.2	7.4	6.9	6.9	6.5	6.1	6.4
●Plastics	11.1	14.2	15.4	14.0	12.6	13.6	11.9
●Synthetic Rubbers	2.2	2.4	2.3	1.7	2.1	1.5	1.4
●Other Organic Chemicals	5.0	4.7	3.6	3.3	3.8	3.8	4.1
Chemical Fibers	6.4	5.3	4.4	3.8	3.2	3.1	2.6
End Products	38.9	44.8	50.4	54.4	55.4	54.6	56.4
●Oil and Fats, Soap, Detergent, Surfactants	3.5	3.8	4.1	4.0	4.2	3.5	4.1
●Paints	4.3	4.9	4.9	4.6	4.1	4.1	4.2
●Pharmaceuticals	14.1	18.6	21.9	25.7	27.6	27.0	29.2
●Agricultural Chemicals	1.8	2.2	1.6	1.6	1.5	1.4	1.5
●Cosmetics, Tooth-powder, Other Cosmetics	4.1	5.2	5.9	6.4	6.3	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	4.3	4.4	4.0
●Other Chemical End Products	4.6	5.7	6.9	6.6	6.3	7.2	6.4

(Source) Ministry of Economy, Trade and Industry "Census of Manufactures"
(Note) Facilities with over four employees

Wide-ranging chemical products are used as raw materials and intermediates in various industrial activities as well as used in our daily life as such end products as pharmaceuticals, cosmetics, synthetic detergents, paints and photo films, thereby supporting our affluent and comfortable life.

■Shipment value ratio of chemical products (2001) [%]



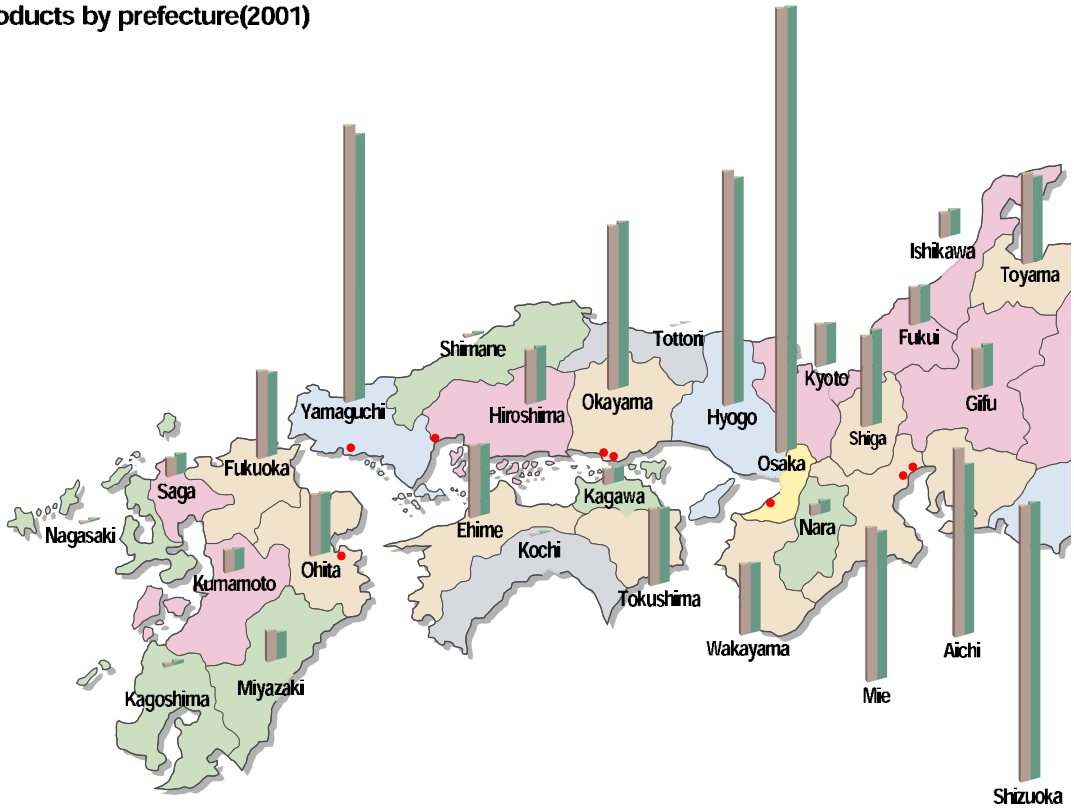
■Major Indices of Chemical Industry and Their Composition (2001)

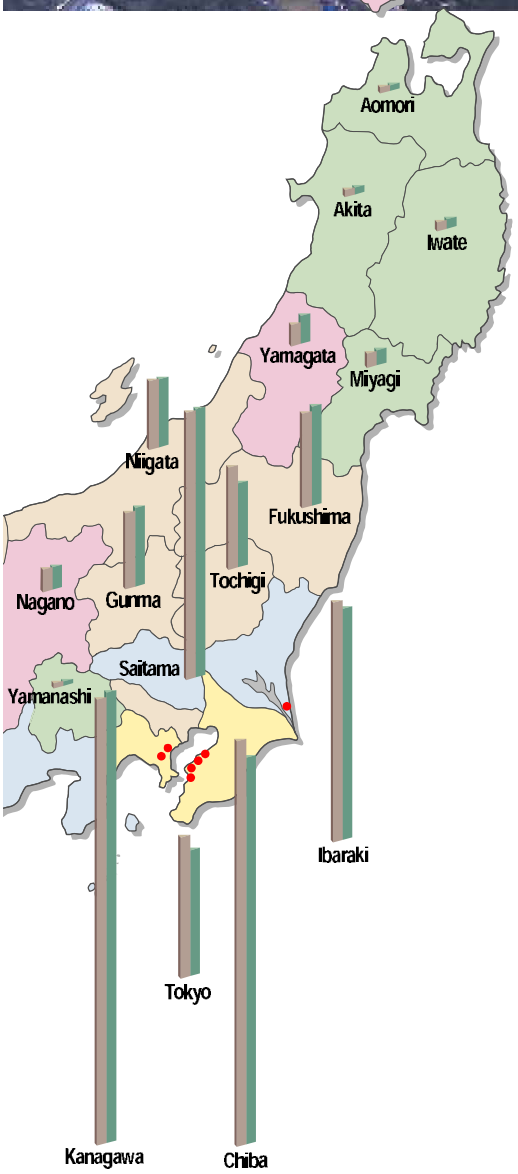
	Major Indices (numerical value)				Composition (%)			
	Number of Facilities	Employee Force (persons)	Shipment (in Yen 1 billion)	Value Added (in Yen 1 billion)	Number of Facilities	Employee Force	Shipment	Value Added
Chemicals Industry	5,152	364,068	23,228	11,249	100.0	100.0	100.0	100.0
Fertilizers	171	5,288	280	98	3.3	1.5	1.2	0.9
Inorganic Chemicals	777	31,058	1,417	600	15.1	8.5	6.1	5.3
Organic Chemicals	721	85,779	7,814	2,991	14.0	23.6	33.6	26.6
●Basic Petrochemicals	12	3,167	978	285	0.2	0.9	4.2	2.5
●Aliphatic Intermediates	83	11,235	1,313	578	1.6	3.1	5.7	5.1
●Cyclic Intermediates, Dyestuff, Pigment	175	17,053	1,485	651	3.4	4.7	6.4	5.8
●Plastics	190	32,156	2,762	983	3.7	8.8	11.9	8.7
●Synthetic Rubbers	14	4,315	320	158	0.3	1.2	1.4	1.4
●Other Organic Chemicals	247	17,853	956	336	4.8	4.9	4.1	3.0
Chemical Fibers	72	14,476	610	207	1.4	4.0	2.6	1.8
End Products	3,411	227,467	13,108	7,352	66.2	62.5	56.4	65.4
●Oil and Fats, Soap, Detergent, Surfactants	315	15,636	956	505	6.1	4.3	4.1	4.5
●Paints	463	19,478	976	345	9.0	5.4	4.2	3.1
●Pharmaceuticals	986	96,691	6,781	4,400	19.1	26.6	29.2	39.1
●Agricultural Chemicals	77	5,581	338	119	1.5	1.5	1.5	1.1
●Cosmetics, Tooth-powder, Other Cosmetics	413	29,637	1,395	856	8.0	8.1	6.0	7.6
●Gelatins and Adhesives	161	5,579	237	90	3.1	1.5	1.0	0.8
●Photo-sensitized Materials	76	16,622	931	444	1.5	4.6	4.0	3.9
●Other Chemical End Products	920	38,243	1,496	592	17.9	10.5	6.4	5.3

(Source) Ministry of Economy, Trade and Industry "Census of Manufactures"
(Note) Facilities with over four employees

3 Chemical Production by Region

■Shipment of chemical products by prefecture(2001)





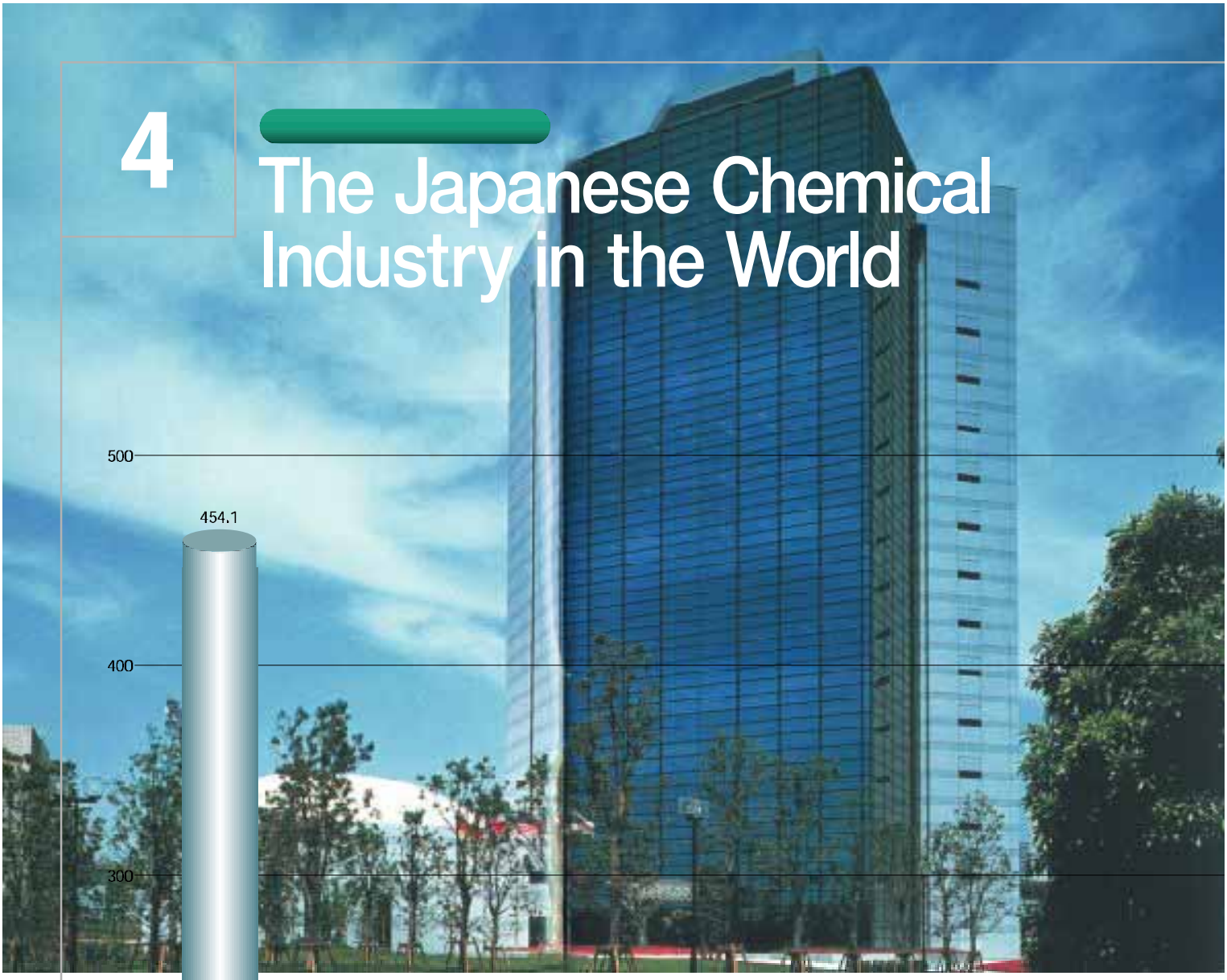
■Shipment of Chemical Industry by Prefecture (2001) in Yen 100 million, % and person

Prefecture	Shipment	Increase/decrease from previous year	Employee force
1.Kanagawa	23,539	101.0	30,886
2.Osaka	23,208	99.9	40,689
3.Chiba	20,202	95.3	18,939
4.Shizuoka	14,442	100.2	24,112
5.Saitama	14,014	100.3	20,555
6.Yamaguchi	13,859	96.0	15,602
7.Ibaraki	12,087	96.4	12,884
8.Hyogo	11,744	96.0	20,241
9.Aichi	8,879	90.3	17,123
10.Okayama	8,634	100.7	10,704
11.Mie	7,702	95.7	12,108
12.Tokyo	6,577	89.0	16,488
13.Fukushima	5,172	104.7	8,104
14.Shiga	4,916	103.8	6,793
15.Toyama	4,419	94.0	10,924
16.Tochigi	4,397	82.3	5,098
17.Fukuoka	4,338	95.2	8,281
18.Gunma	4,107	103.7	6,382
19.Tokushima	3,900	97.9	7,801
20.Ehime	3,661	97.6	5,251
21.Wakayama	3,596	97.2	4,866
22.Niigata	3,569	99.4	7,415
23.Oita	3,156	97.9	2,506
24.Hiroshima	2,855	101.7	5,736

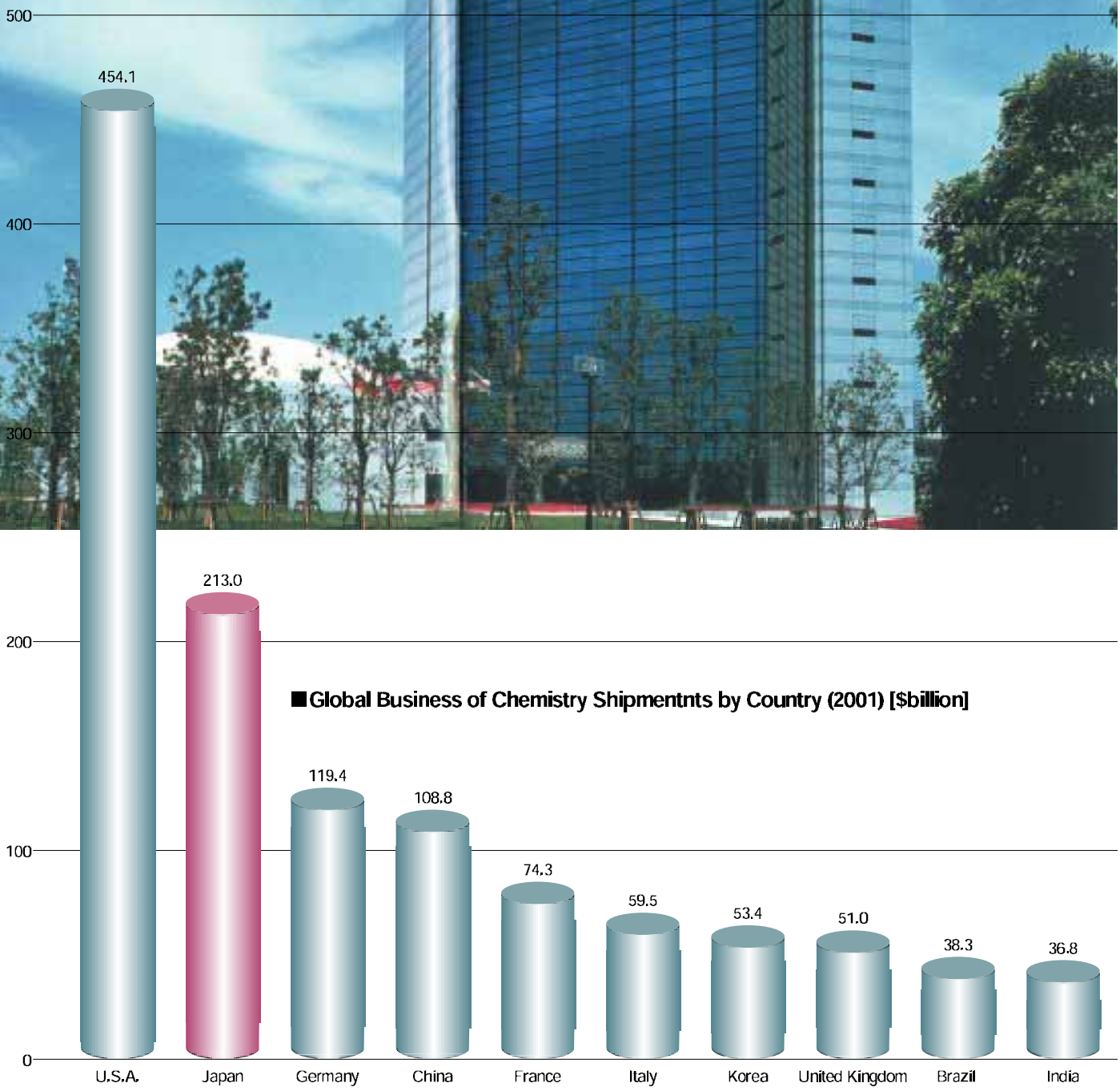
Prefecture	Shipment	Increase/decrease from previous year	Employee force
25.Gifu	2,223	104.6	4,570
26.Kyoto	2,114	95.4	5,610
27.Fukui	1,897	96.9	4,332
28.Hokkaido	1,456	101.9	3,602
29.Yamagata	1,456	129.3	2,714
30.Miyazaki	1,384	86.7	2,498
31.Ishikawa	1,322	100.2	1,584
32.Nagano	1,172	98.9	2,053
33.Kumamoto	1,116	94.7	3,222
34.Saga	1,044	108.3	1,704
35.Miyagi	786	103.8	1,727
36.Kagawa	767	95.0	2,765
37.Nara	644	116.1	2,671
38.Iwate	494	105.6	1,342
39.Akita	369	102.3	657
40.Aomori	295	91.7	340
41.Yamanashi	228	83.1	896
42.Kagoshima	183	105.9	576
43.Shimane	138	103.2	449
44.Nagasaki	107	101.7	339
45.Okinawa	60	99.6	554
46.Kochi	48	125.9	289
47.Tottori	11	62.8	86
Total	232,284	97.8	364,068

(Source) Ministry of Economy, Trade and Industry "Census of Manufactures"
(Note) Facilities with over four employees

4 The Japanese Chemical Industry in the World



■Global Business of Chemistry Shipmentnts by Country (2001) [$billion]



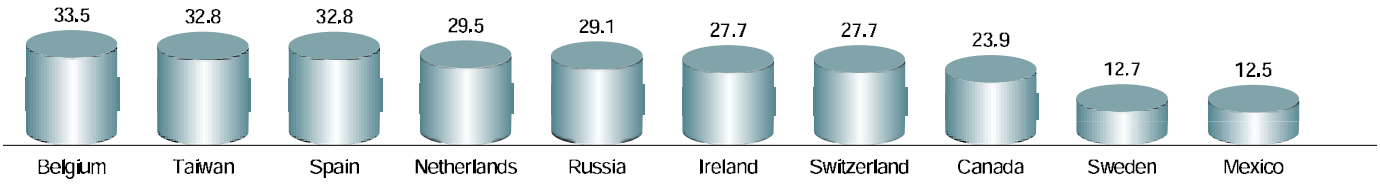
(Source) Guide to The Business of Chemistry (American Chemistry Council)
Source : American Chemistry Council

Japan's chemical industry boasts the world's No. 2 position in shipment after the US.

■ **The biggest of the world´s leading chemical firms (2001)**

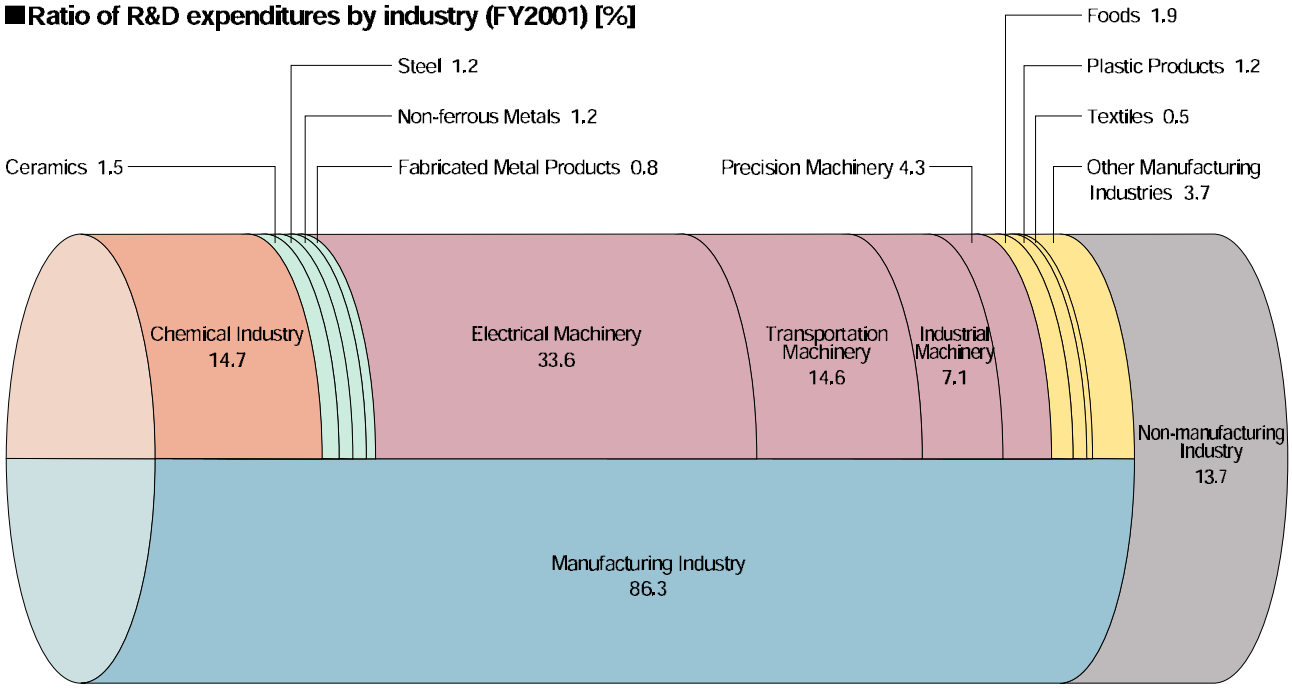
Ranking	Company (Country)	Total turnover of chemicals			Operating profits from chemicals			Total turnover	Ranking in 2000
		2001 (in $1 million)	Change (from 2000 To 2001)	Share of chemicals in total turnover	2001 (in $1 million)	Change (from 2000 To 2001)	Share of chemicals in total turnover	2001 (in $1 million)	
1	Dow Chemical (U.S.A.)	27,805.0	20.8%	100.0%	1,247.0	-45%	4.5%	27,805.0	3
2	DuPont (U.S.A.) b	26,787.0	-5.7	96.7	6,844.0	113.4	25.5	27,689.0	2
3	BASF (Germany)	24,725.4	-6.3	85.0	-108.3	nm	nm	29,093.6	1
4	Bayer (Germany)	18,299.7	-2.4	67.5	1,038.4	-41.4	5.7	27,102.2	5
5	TotalFinaElf (France) c	17,510.1	1.9	18.6	980.2	-27.0	5.6	94,280.7	6
6	ExxonMobil (U.S.A.) b	15,943.0	-25.9	7.5	882.0	-24.0	5.5	213,488.0	4
7	Shell (U.K./Netherlands)	14,250.0	-12.6	8.0	97.0	-91.3	0.7	177,281.0	8
8	Degussa (Germany) c	11,568.7	-17.1	100.0	435.1	-21.5	3.8	11,568.7	7
9	BP (U.K.)	11,515.0	2.4	6.6	128.0	-83.2	1.1	174,218.0	10
10	ICI (U.K.)	9,249.4	-17.1	100.0	771.6	19.1	8.3	9,249.4	9
11	Akzo Nobel (Netherlands)	9,126.6	-1.1	72.3	685.7	-14.1	7.5	12,631.3	11
12	Huntsman Corp. (U.S.A.)	8,500.0	6.3	100.0	na	--	--	8,500.0	15
13	Mitsui Chemicals (Japan) d	7,836.5	1.4	100.0	348.6	-22.3	4.4	7,836.5	14
14	Mitsubishi Chemical (Japan) d	7,500.0	-5.8	51.2	39.4	-88.1	0.5	14,644.6	13
15	Dainippon Ink & Chemicals (Japan) d	7,476.1	0.4	92.8	252.1	-32.9	3.4	8,059.4	18
16	General Electric (U.S.A.)	7,069.0	-9.1	5.6	1,596.0	-17.0	22.6	125,913.0	16
17	Henkel (Germany)	6,940.5	7.4	59.4	856.7	59.6	12.3	11,691.3	21
18	SABIC (Saudi Arabia)	6,784.0	6.8	88.8	1,442.3	-26.0	21.3	7,683.5	22
19	DSM (Netherlands)	6,754.3	-4.7	94.7	410.0	-31.9	6.1	7,134.7	20
20	Sumitomo Chemical (Japan) d	6,636.7	-5.2	79.2	181.2	-47.6	2.7	8,376.7	12
21	Rhodia (France)	6,516.2	6.5	100.0	14.3	-96.5	0.2	6,516.2	24
22	Air Liquide (France)	6,495.6	10.1	87.1	1,054.5	14.6	16.2	7,455.2	26
23	Chevron Phillips (U.S.A.)	6,010.0	-21.3	100.0	-431.0	nm	--	6,010.0	17
24	PPG Industries (U.S.A.)	5,933.0	-5.5	72.6	586.0	-31.8	9.9	8,169.0	29
25	Equistar (U.S.A.)	5,909.0	-21.2	100.0	-44.0	nm	--	5,909.0	19
26	China Petroleum & Chemicals (China)	5,907.9	-13.0	16.1	-84.6	nm	--	36,770.2	25
27	Clariant (Switzerland)	5,843.9	-6.7	100.0	373.6	-44.4	6.4	5,843.9	30
28	Teijin (Japan) d	5,777.1	26.6	76.1	148.0	320.6	2.6	7,596.0	--
29	Air Products & Chemical Corp. (U.S.A.)	5,466.8	4.4	95.6	864.9	-3.5	15.8	5,717.2	37
30	Formosa Plastics (Taiwan)	5,434.0	2.9	65.8	620.9	-29.1	11.4	8,263.4	43

(Source) Chemical & Engineering News JULY 29,2002
NOTE: a Operating profit as a percentage of chemical sales. b Operating profits after tax. c Pro forma for 2000. d Fiscal year ended March 31.
na = not available. nm = not meaningful.



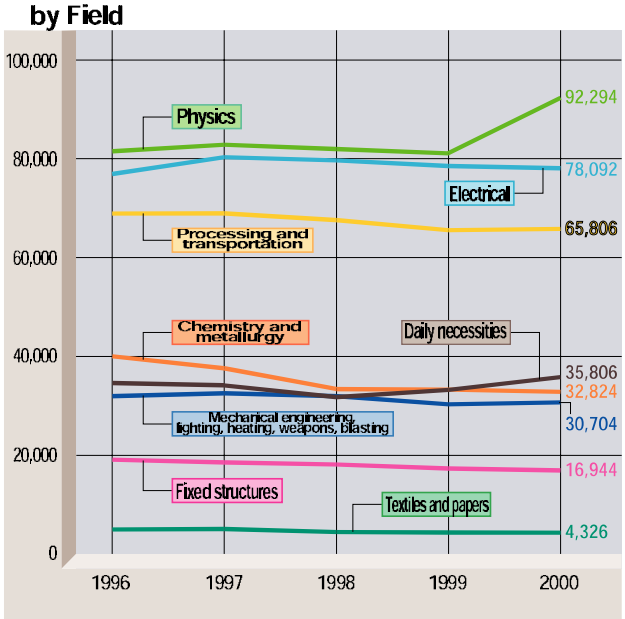
5 About Yen 1,680 Billion Spent for Research and Development

■Ratio of R&D expenditures by industry (FY2001) [%]



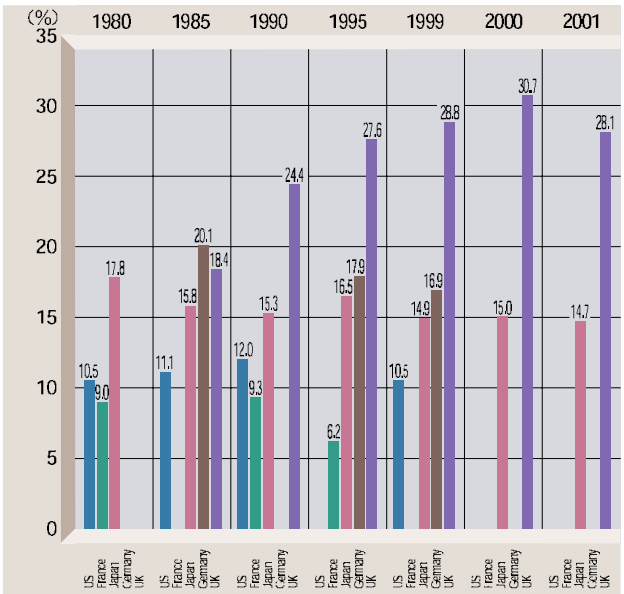
(Source) Ministry of Public Management, Home Affairs, Posts and Telecommunications, Statistics Bureau "Survey of Research and Development"

■Trend of the Number of Applications of Patents by Field



(Source) Japan Patent Office "Japan Patent Office Annual Report"
(Note) This graph is made with standard dates of publishing horizontally and number of disclosed applications vertically.

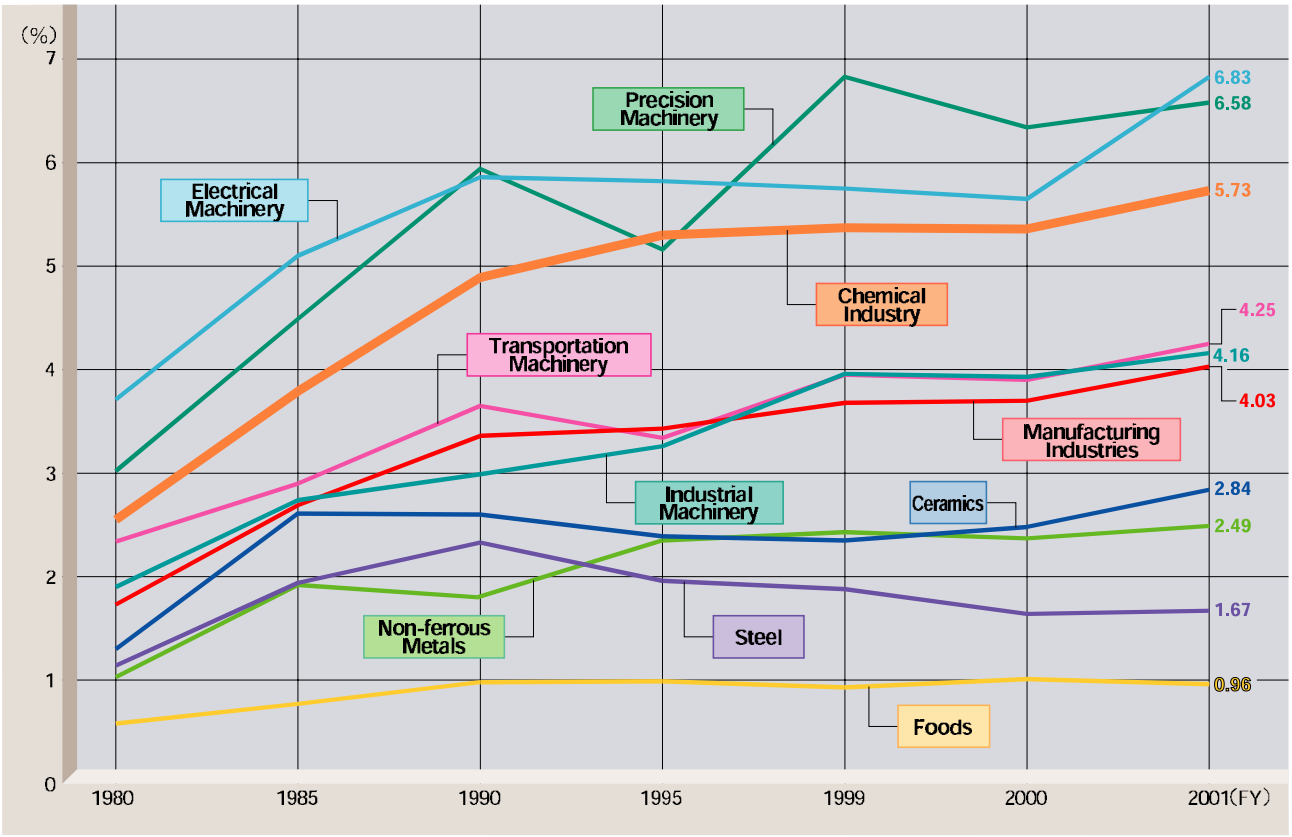
■R&D expenditures by the chemical industry in the major countries [%]



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

Investment in research and development by chemical industry in fiscal 2001 amounted to about Yen 1,680 billion or about 15% of that of all industries. A high ratio of investment in research of development to total turnover at about 6% has been kept together with precision machinery and electrical machinery industries. The number of patent applications has been at around 30,000 cases.

■Trend of Ratio of Investment in R&D to Total Turnover (FY1980-2001) in %



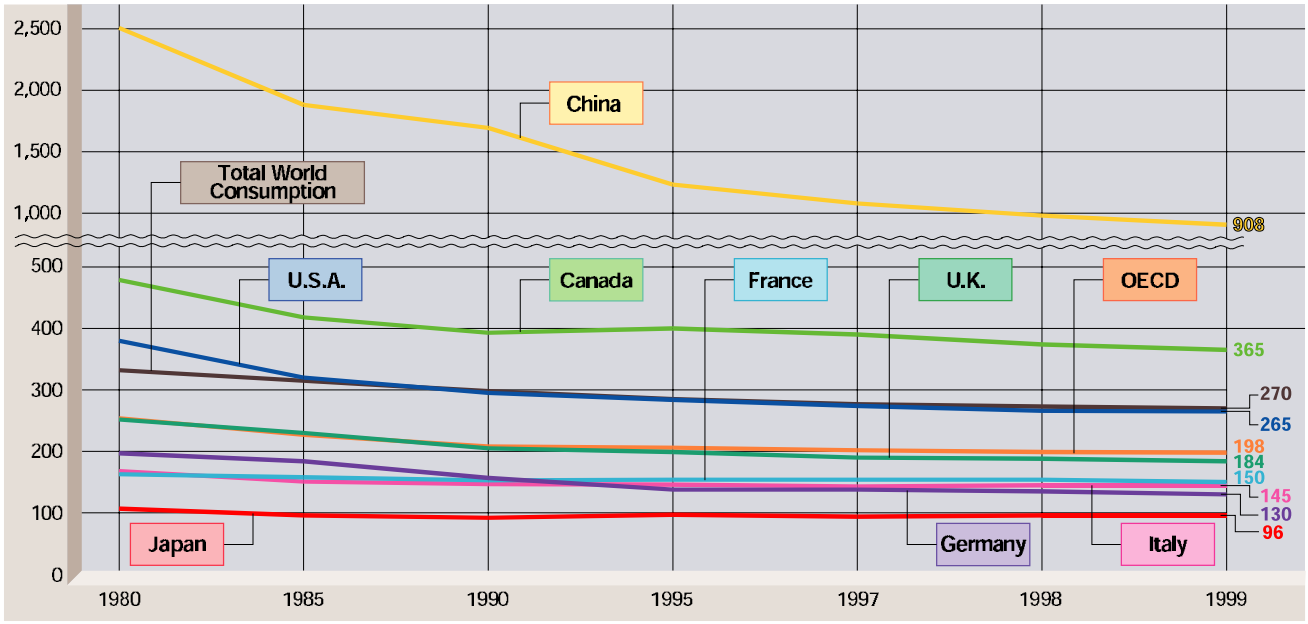
■Trend of Ratio of Investment in R&D to Total Turnover (FY1980-2001) in %

	1980	1985	1990	1995	1999	2000	2001
Chemical Industry	2.55	3.79	4.89	5.30	5.37	5.36	5.73
Foods	0.58	0.77	0.98	0.99	0.93	1.01	0.96
Ceramics	1.30	2.61	2.60	2.39	2.35	2.48	2.84
Steel	1.14	1.94	2.33	1.96	1.88	1.64	1.67
Nonferrous Metals	1.03	1.92	1.80	2.35	2.43	2.37	2.49
Machinery	1.90	2.74	2.99	3.26	3.96	3.93	4.16
Electrical Machinery	3.71	5.10	5.86	5.82	5.75	5.65	6.83
Transportation Machinery	2.34	2.90	3.65	3.34	3.95	3.90	4.25
Precision Machinery	3.02	4.49	5.94	5.16	6.83	6.34	6.58
Total Manufacturing	1.73	2.69	3.36	3.43	3.68	3.70	4.03

(Source) Ministry of Public Management, Home Affairs, Posts and Telecommunications, Statistics Bureau "Survey of Research and Development"

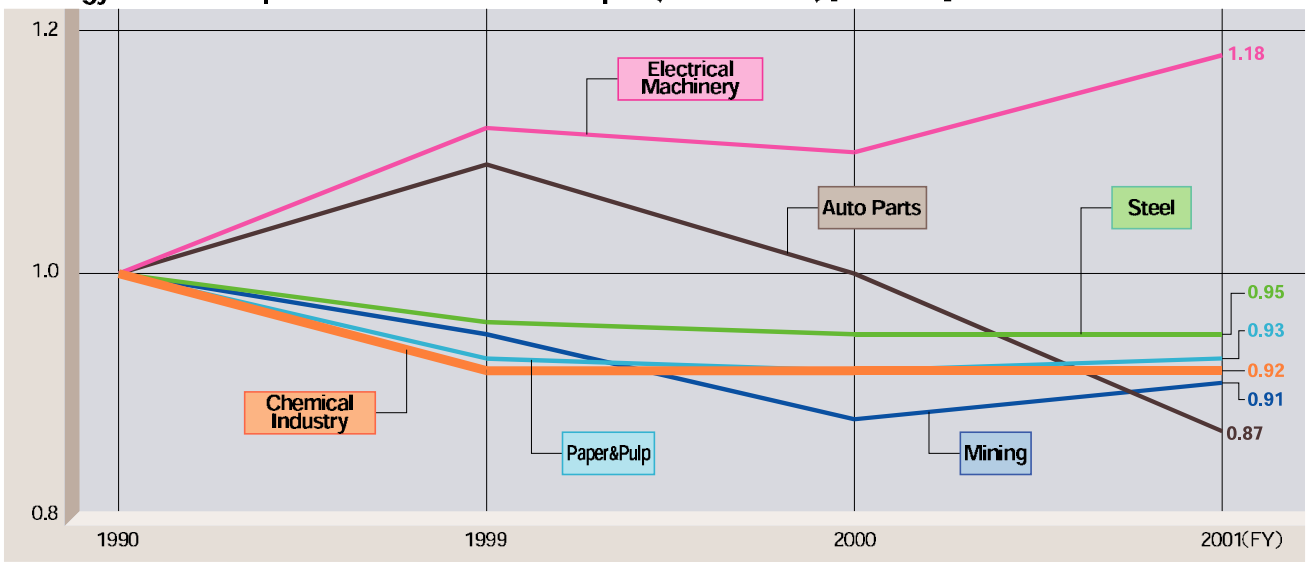
6 Energy

■Energy cousumption of the main countries (1980-1999) [tons in terms of crude oil equivalent / GDP, $million]

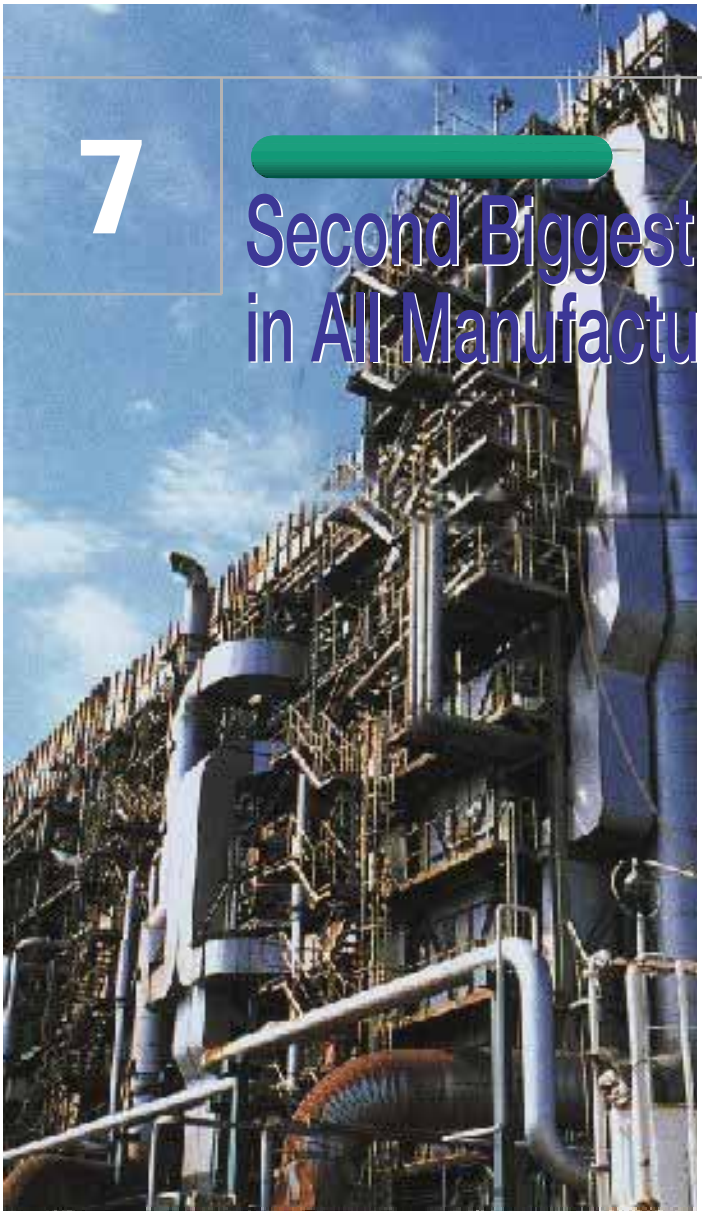


(Source) The Energy Conservation Center, Japan "Energy/Economic Statistics Summary"
- Japan's energy consumption in 1999 was smaller than that in 1973 by 24% and bigger than that in 1990 by 5%.
- Japan's consumption per GDP is about less than 50% of that of OECD average and, hence, its efficiency of energy use ranks high.

■Energy unit consumption of main industries in Japan (FY1990-2001) [1990=1.0]

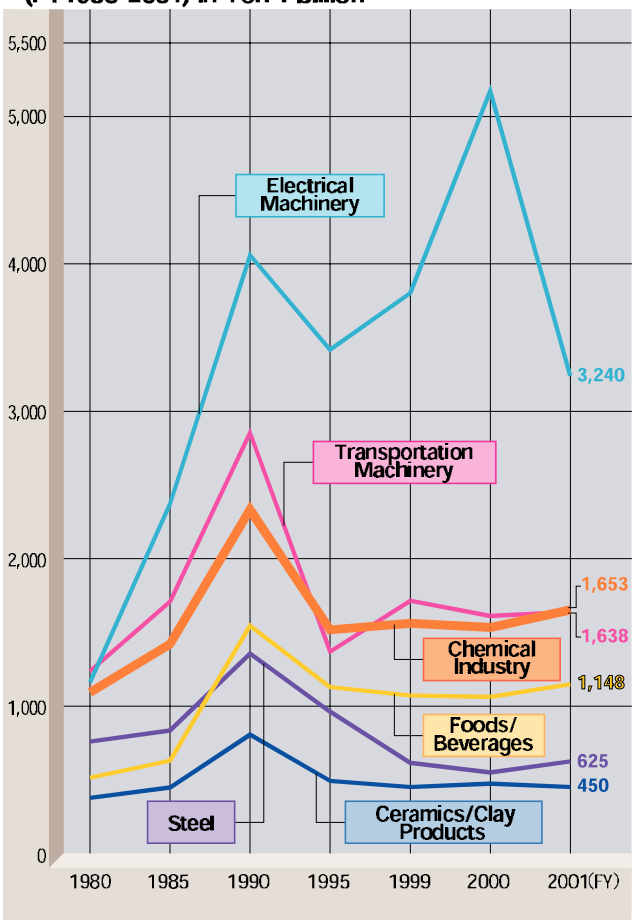


(Source) Results of the 5th Follow-up to the Keidanren Voluntary Activity Plan on the Environment—Selection on Global Warming—



7 Second Biggest Plant Investment in All Manufacturing Industries

■Trend of Plant Investment by Manufacturing Industry (FY1980-2001) in Yen 1 billion



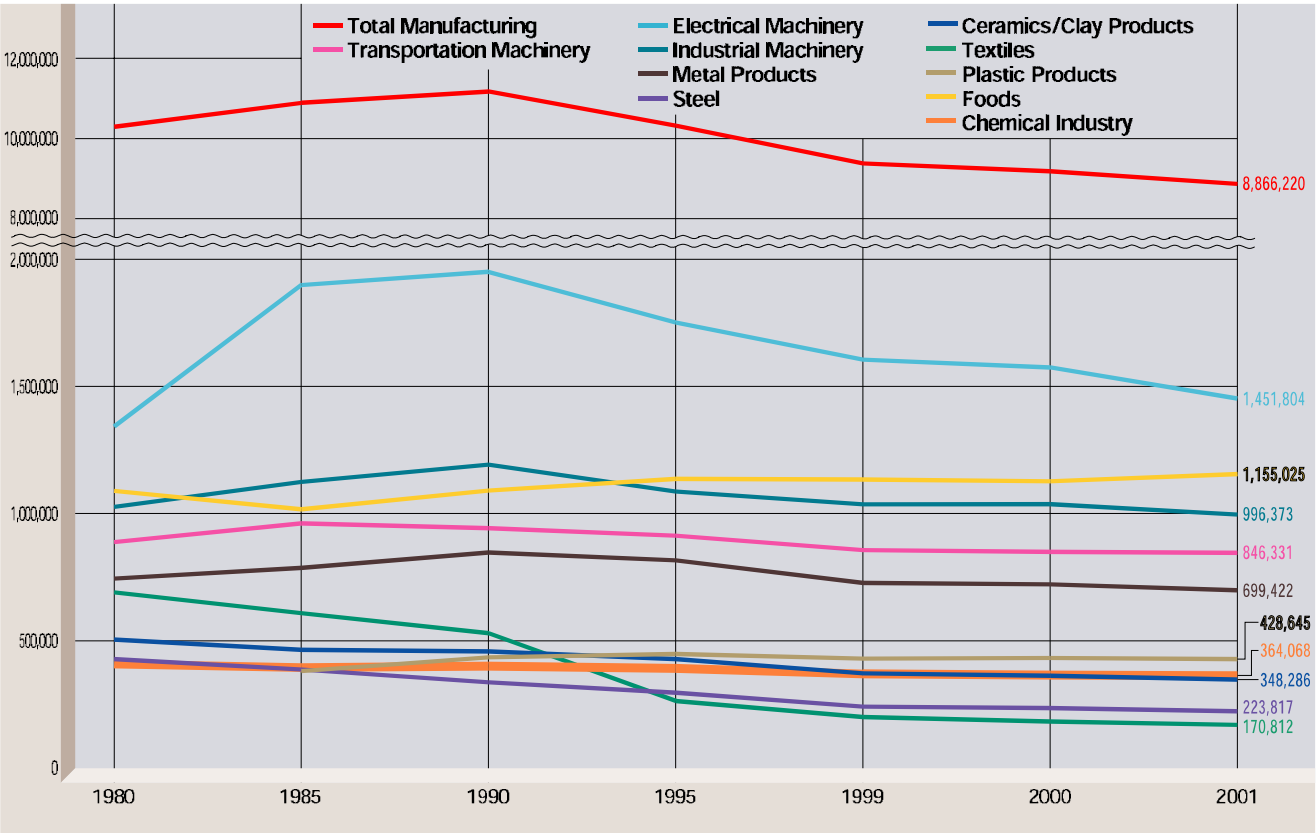
■Trend of Plant Investment by Manufacturing Industry (FY1980-2001) in Yen 1 billion

	Every 5th Year				Recent three Years			
	1980	1985	1990	1995	1999	2000	2001	
Chemical Industry	1,093	1,420	2,333	1,517	1,561	1,533	1,653	12.5%
Food/Beverages	515	629	1,546	1,128	1,072	1,062	1,148	8.6
Ceramics/Clay Products	377	447	806	492	450	473	450	3.4
Steel	759	834	1,356	962	615	550	625	4.7
Electrical Machinery	1,160	2,372	4,059	3,417	3,802	5,174	3,240	24.4
Transportation Machinery	1,236	1,708	2,854	1,370	1,714	1,612	1,638	12.3
Others	2,611	3,262	7,014	4,462	4,466	4,326	4,516	34.0
Total Manufacturing	7,751	10,672	19,968	13,347	13,680	14,730	13,271	100.0

(Source) Economic and Social Research Institute, Cabinet Office "Business and Investment Survey of Incorporated Enterprises"

8 About 360,000 People Are Engaged in Chemical Industry

■Trend of Number of Employees in Manufacturing by Industry (1980-2001) in persons



■Trend of Number of Employees in Manufacturing by Industry (1980-2001) in persons

	Every 5th Year				Recent three Years			
	1980	1985	1990	1995	1999	2000	2001	
Chemical Industry	409,338	395,748	401,076	392,109	370,694	365,953	364,068	4.1%
Foods	1,089,035	1,016,731	1,090,403	1,136,236	1,133,749	1,127,177	1,155,025	13.0
Textiles	691,018	609,462	530,736	264,528	201,232	184,004	170,812	1.9
Plastic Products	—	382,247	435,523	448,939	430,349	433,177	428,645	4.8
Ceramics/Clay Products	505,585	465,483	459,040	429,023	373,225	363,997	348,286	3.9
Steel	428,957	388,357	337,811	296,824	242,616	236,525	223,817	2.5
Metal Products	744,546	786,604	846,915	816,694	728,199	722,425	699,422	7.9
Industrial Machinery	1,026,377	1,124,229	1,192,406	1,086,575	1,036,606	1,037,079	996,373	11.2
Electrical Machinery	1,341,722	1,825,314	1,939,729	1,750,103	1,604,147	1,573,683	1,451,804	16.4
Transportation Machinery	888,840	961,590	942,795	913,535	857,039	849,517	846,331	9.5
Others	3,166,500	2,934,184	2,996,395	2,786,017	2,399,894	2,290,296	2,181,637	24.6
Total Manufacturing	10,291,918	10,889,949	11,172,829	10,320,583	9,377,750	9,183,833	8,866,220	100.0

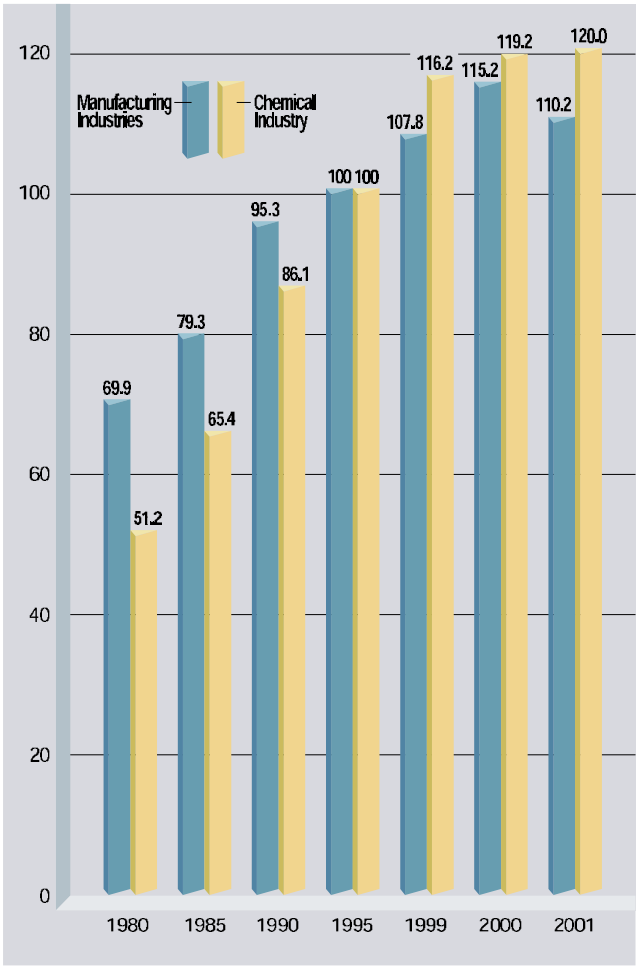
(Source) Ministry of Economy, Trade and Industry "Census of Manufactures"
(Note) Facilities with over four employees

9

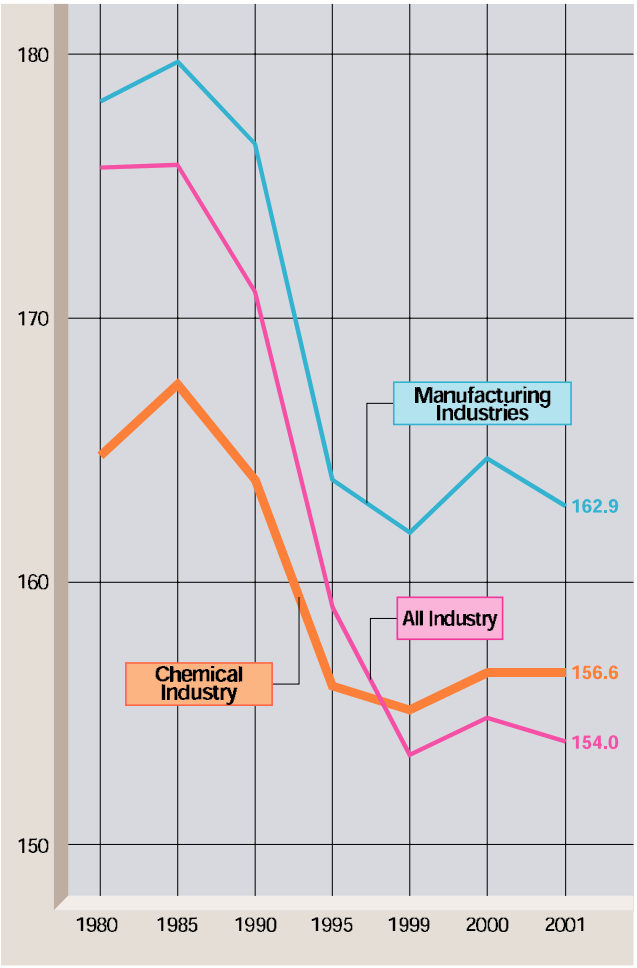
While Labor Productivity Increases, Working Hours Remains Unchanged

Although labor productivity decreased about 4% in total manufacturing in 2001, that of chemical industry slightly increased by 0.7%. As to working hours, though they turned to decrease in total industry and manufacturing, those of chemical industry were unchanged.

■Indices of physical labor productivity (1980-2001)[1995=100]



■Working hours (monthly average of total net working hours) (1980-2001) [hours]



■Indices of physical labor productivity (1995=100)

		Manufacturing		Chemical Industry	
		Indices	Increase rate %	Indices	Increase rate %
Every 5th year	1980	69.9	3.4	51.2	△0.2
	1985	79.3	2.7	65.4	3.5
	1990	95.3	2.8	86.1	4.7
	1995	100.0	4.5	100.0	8.1
Recent three years	1999	107.8	3.2	116.2	8.6
	2000	115.2	6.9	119.2	2.6
	2001	110.2	△4.3	120.0	0.7

(Source) Japan Productivity Center for Socio-Economic Development "Productivity Index" (over 30 employees)
(Note) Triangle mark shows negative increase.

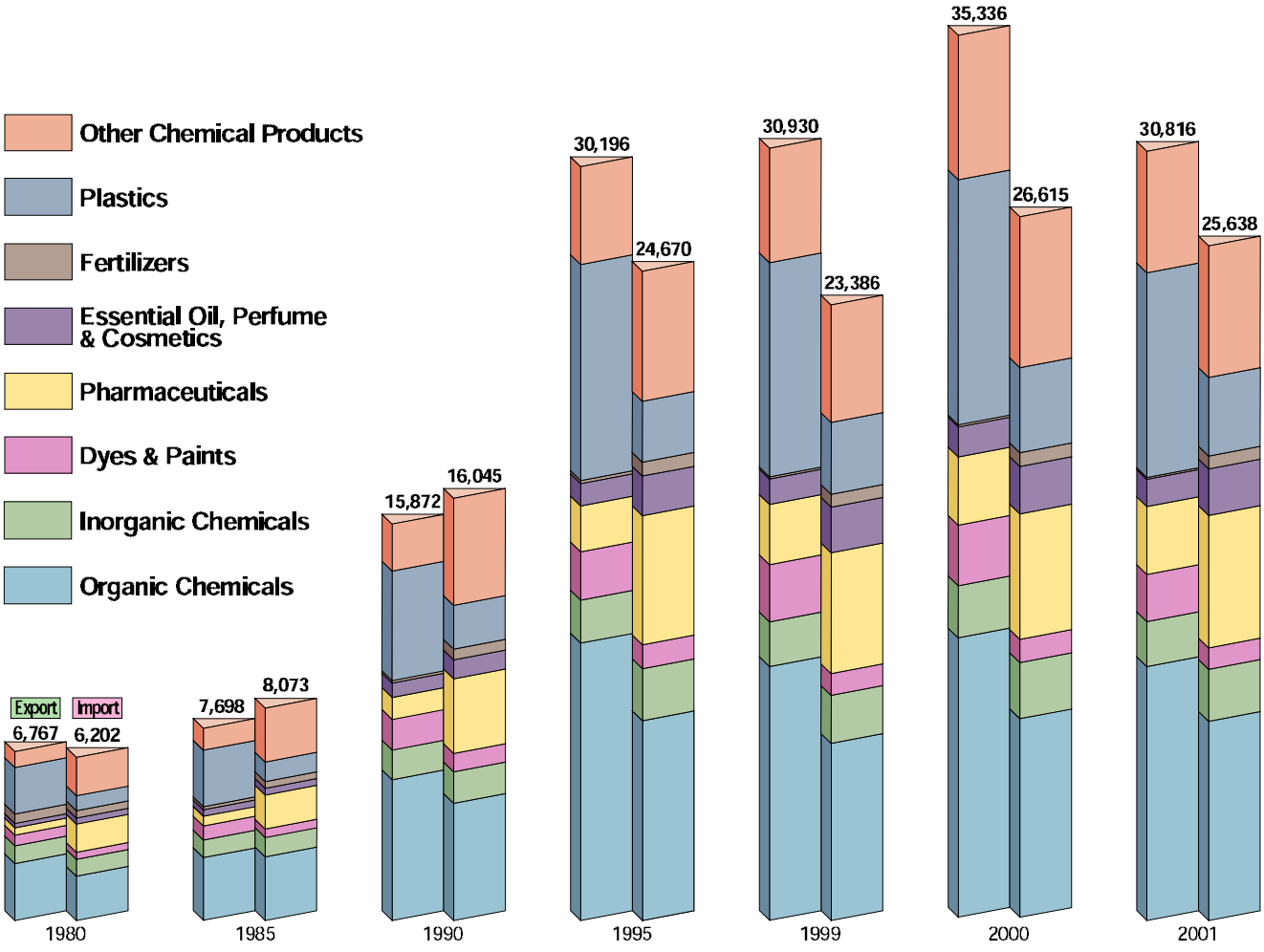
■Working hours (monthly average of total net working hours) (hours)

		All Industry	Manufacturing	Chemical Industry
Every 5th year	1980	175.7	178.2	164.8
	1985	175.8	179.7	167.5
	1990	171.0	176.6	163.9
	1995	159.1	163.9	156.1
Recent three years	1999	153.5	161.9	155.2
	2000	154.9	164.7	156.6
	2001	154.0	162.9	156.6

(Source) Ministry of Health, Labor and Welfare "Report of Monthly Labour Survey" (over 30 employees)

10 Foreign Trade by Product / Region

■Exports and imports of chemical products (1980-2001) $million



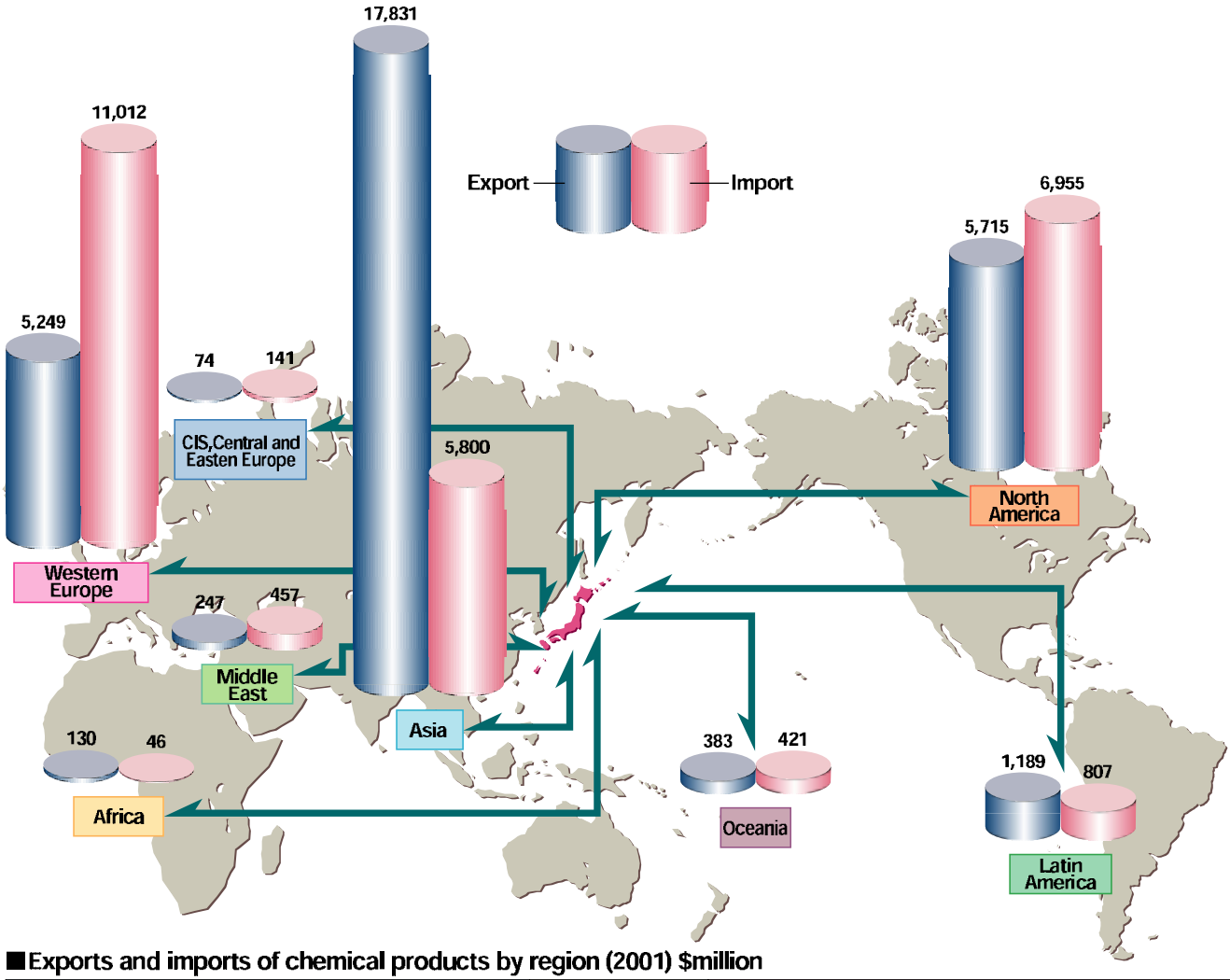
■Exports and imports of chemical products (1980-2001) $million

Export								Product	Import							
Every 5th year				Recent three years					Every 5th year				Recent three years			
1980	1985	1990	1995	1999	2000	2001			1980	1985	1990	1995	1999	2000	2001	
2,276	2,512	5,640	11,110	10,174	11,191	10,172	33.0%	Organic Chemicals	1,679	2,411	4,457	7,587	6,730	7,546	7,561	29.5%
719	708	1,188	1,720	1,788	2,084	1,792	5.8	Inorganic Chemicals	642	742	1,194	1,974	1,822	2,131	1,981	7.7
425	558	1,224	1,938	2,286	2,436	1,891	6.1	Dyes and Paints	272	319	700	914	822	880	815	3.2
295	391	879	1,843	2,411	2,733	2,728	8.9	Pharmaceuticals	1,074	1,292	2,834	4,908	4,601	4,764	5,033	19.6
174	263	579	897	1,015	1,198	1,084	3.5	Essential Oil, Perfume and Cosmetics	231	252	725	1,502	1,732	1,803	1,770	6.9
377	127	101	122	92	93	81	0.3	Fertilizers	279	258	405	527	487	529	484	1.9
1,867	2,261	4,386	8,649	8,574	9,810	8,201	26.6	Plastics	563	744	1,660	2,321	2,729	3,226	2,991	11.7
636	879	1,876	3,917	4,589	5,790	4,867	15.8	Other Chemical Products	1,462	2,054	4,069	4,937	4,461	5,736	5,004	19.5
6,767	7,698	15,872	30,196	30,930	35,336	30,816	100.0	Total Chemical Products	6,202	8,073	16,045	24,670	23,386	26,615	25,638	100.0

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

Chemical product trade, which had turned to decrease in 2001, amounted to about $30.8 billion in export and about $25.6 billion in import. The surplus amounted to about $5.2 billion or 11th consecutive surplus.

■Exports and imports of chemical products by region (2001) [$million]

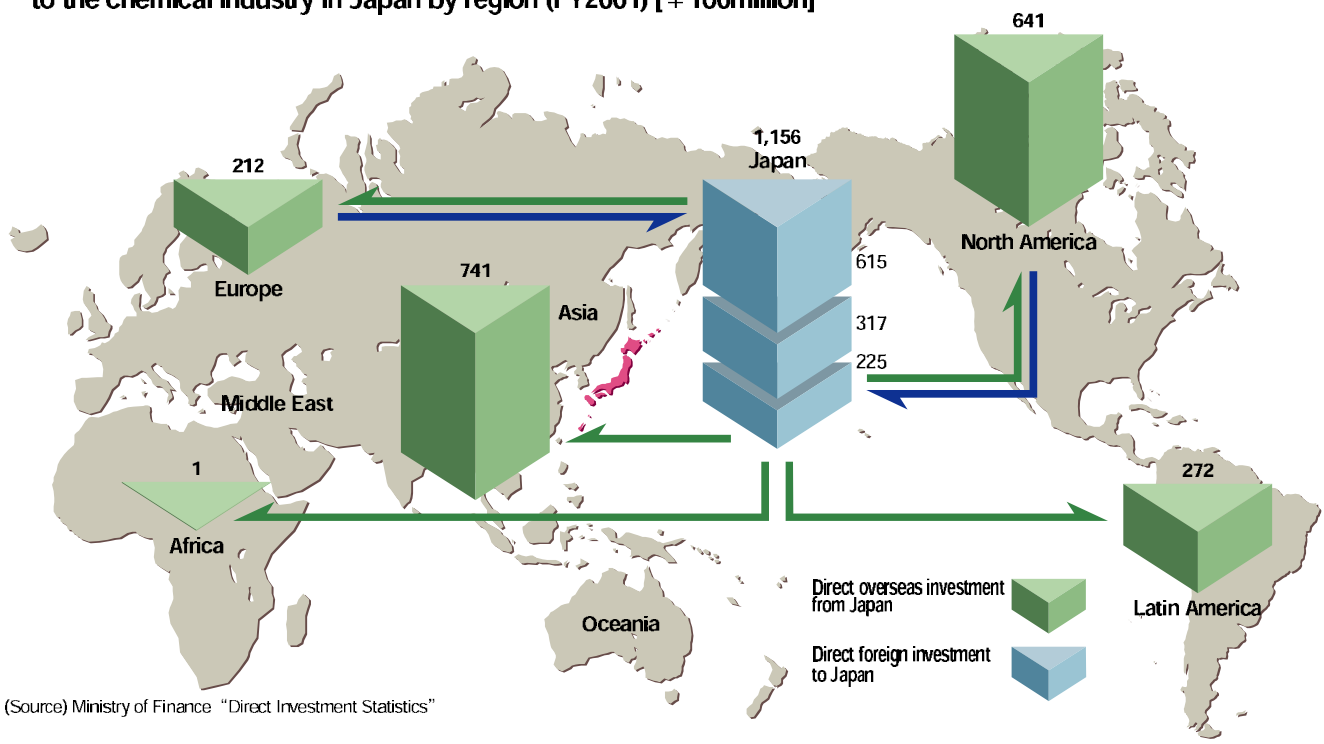


■Exports and imports of chemical products by region (2001) $million

Export								Region	Import							
Every 5th year				Recent three years					Every 5th year				Recent three years			
1980	1985	1990	1995	1999	2000	2001			1980	1985	1990	1995	1999	2000	2001	
3,024	3,161	8,641	18,376	17,478	21,123	17,831	57.9%	Asia	574	665	2,425	4,171	4,591	6,013	5,800	22.6%
257	169	283	243	280	264	247	0.8	Middle East	28	153	602	611	431	490	457	1.8
881	1,125	3,183	5,226	5,387	5,462	5,249	17.0	West Europe	2,081	2,651	6,510	10,814	10,573	11,219	11,012	43.0
845	1,532	2,605	4,945	5,953	6,563	5,715	18.5	North America	2,730	3,667	5,500	7,511	6,666	7,630	6,955	27.1
272	219	282	703	1,194	1,302	1,189	3.9	Latin America	194	347	584	839	596	647	807	3.1
158	114	138	152	136	151	130	0.4	Africa	67	70	69	85	43	50	46	0.2
302	286	384	480	432	393	383	1.2	Oceania	240	99	202	481	379	430	421	1.6
1,029	1,091	357	70	70	78	74	0.2	CIS, Mid Europe, East Europe	288	420	153	157	107	136	141	0.6
6,767	7,698	15,872	30,196	30,930	35,336	30,816	100.0	Total Chemical Products	6,202	8,073	16,045	24,670	23,386	26,615	25,638	100.0

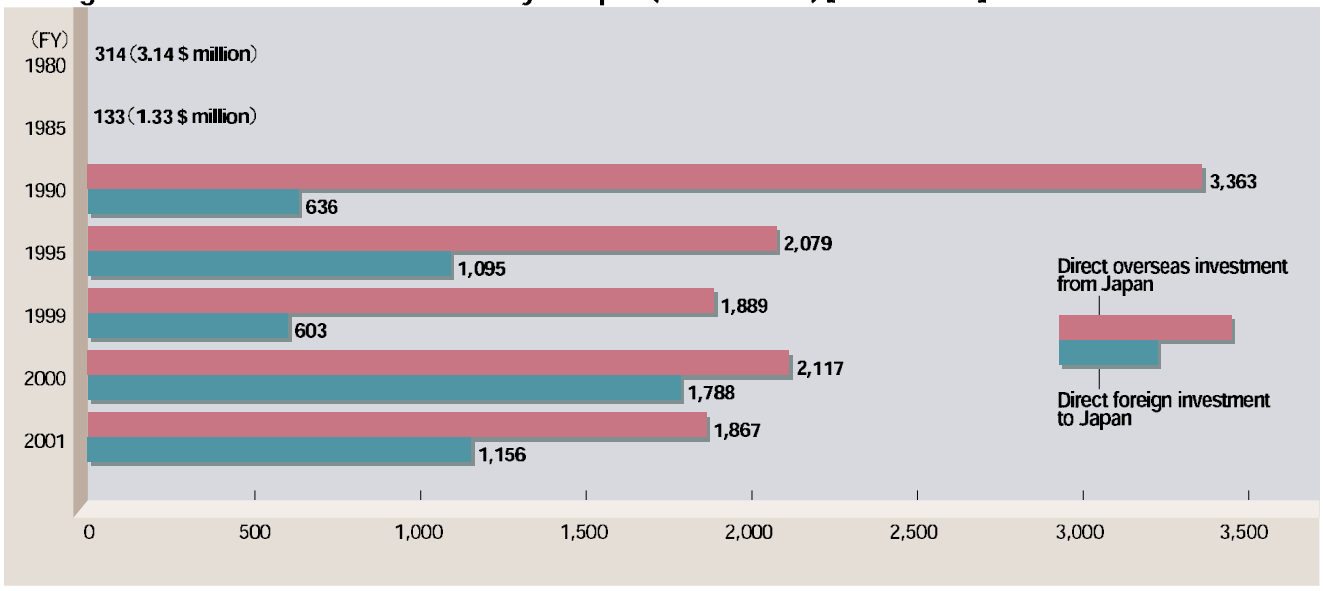
11 Overseas Investment Amounts to About Yen 190 Billion

■Direct overseas investment of the Japanese chemical industry and Direct foreign investment to the chemical industry in Japan by region (FY2001) [￥100million]



(Source) Ministry of Finance "Direct Investment Statistics"

■Actual direct overseas investment of the Japanese chemical industry and direct foreign investment to the chemical industry in Japan (FY1980-2001) [￥100million]

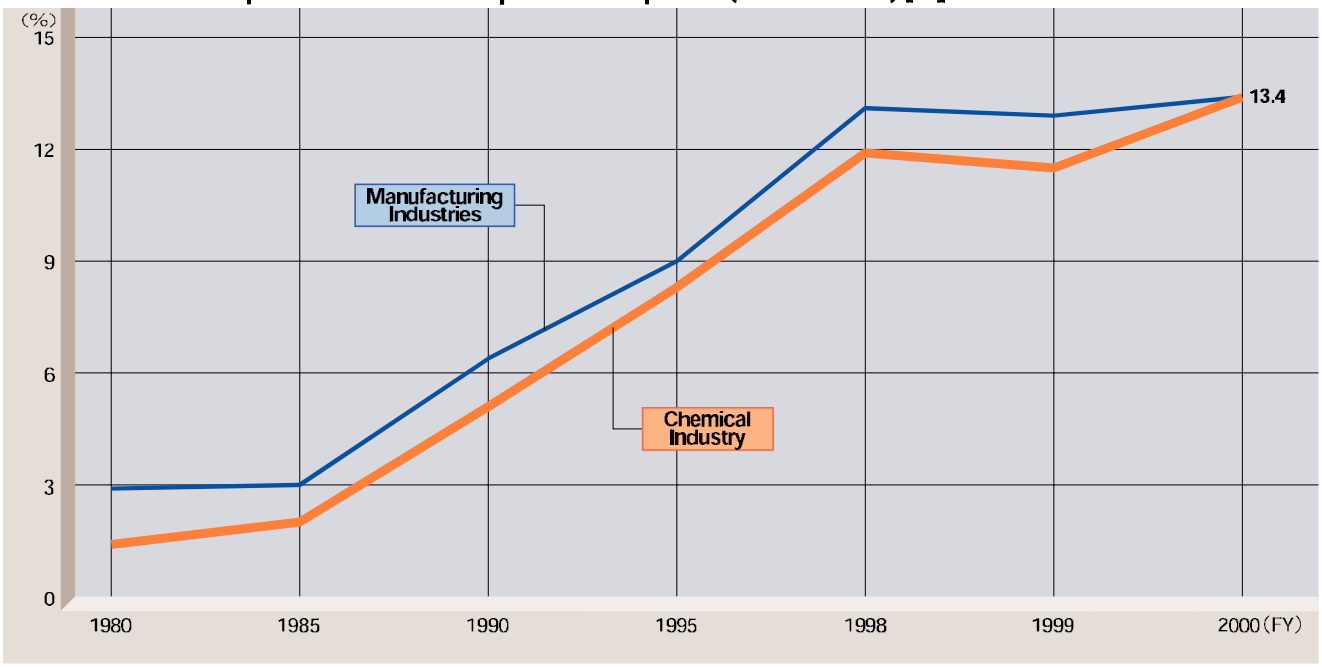


(Source) Ministry of Finance "Direct Investment Statistics"

12 Overseas Business Development

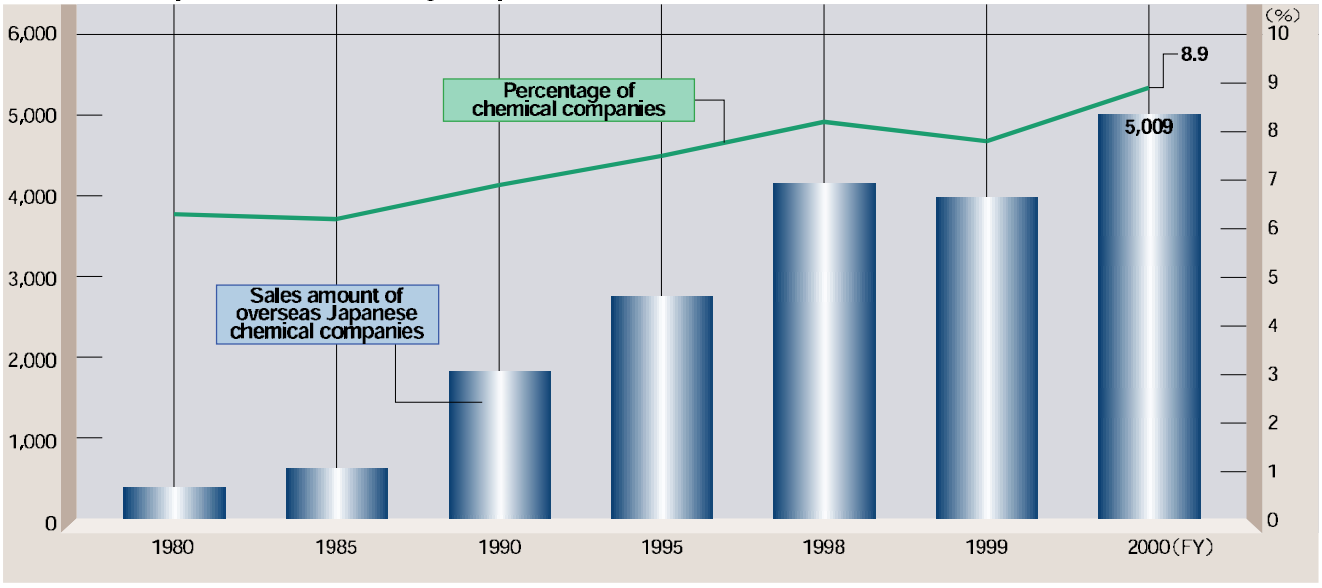
The ratio of overseas production of chemical industry was about 13% in fiscal 2000 or at similar level with that of total manufacturing. The total turnover of overseas subsidiaries of chemical industry occupies about 9% of that of total manufacturing.

■Trend of overseas production ratio of Japanese companies (FY1980-2000) [%]



(Source) Ministry of Economy, Trade and Industry "Basic (Trend) Survey of Overseas Business Activities"

■Sales amount of overseas Japanese chemical companies and its percentage of all overseas Japanese manufacturing companies (FY1980-2000) [¥billion,%]

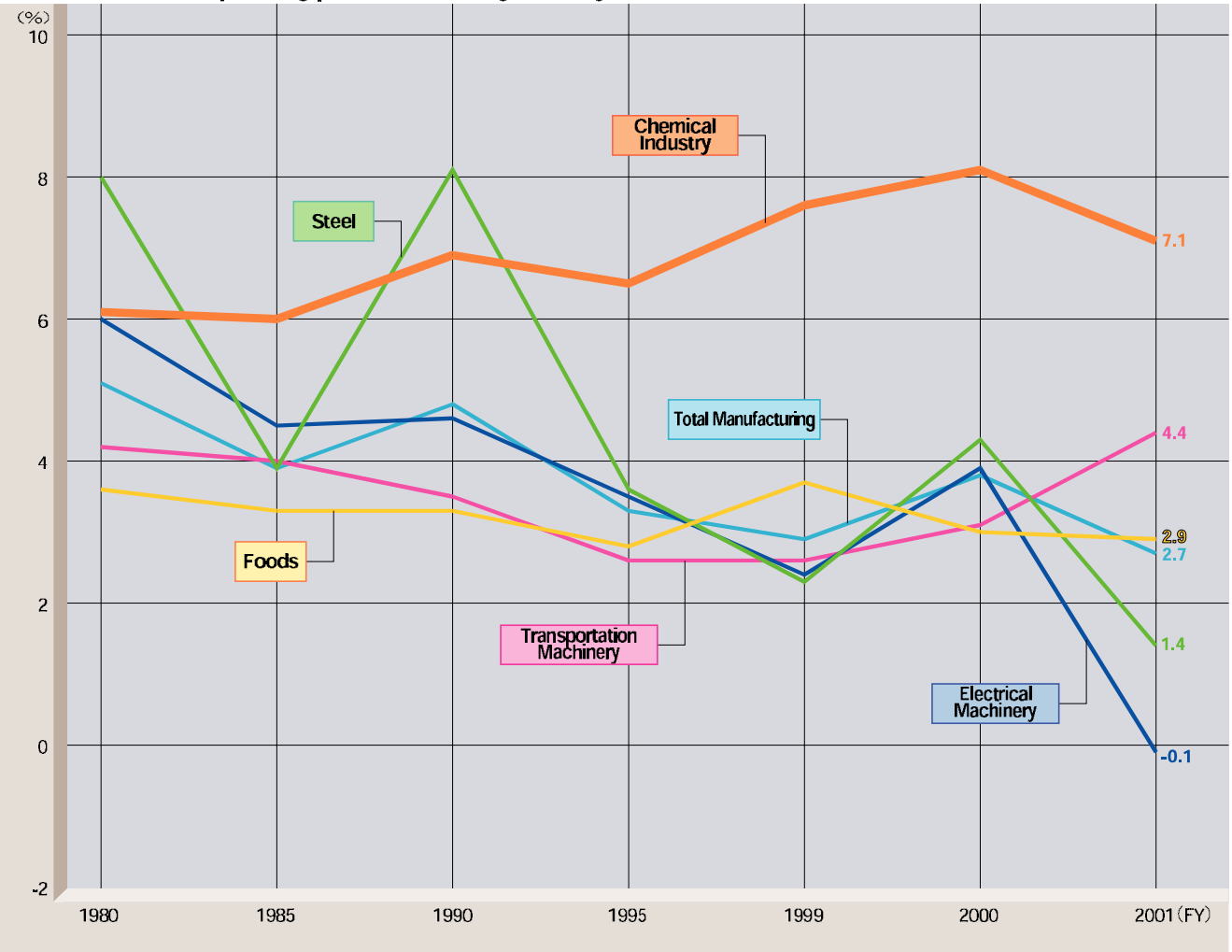


(Source) Ministry of Economy, Trade and Industry "Basic (Trend) Survey of Overseas Business Activities"

13 Continuously High Operating Profit

Although operating profit of chemical industry decreased from 8% in fiscal 2000 to 7% in fiscal 2001, it is still high among all manufacturing industries.

■Trend of ratio of operating profits to sales by industry (FY 1980-2001) %



■Trend of ratio of operating profits to sales by industry (FY 1980-2001) %

	Every 5th year				Recent three years		
	1980	1985	1990	1995	1999	2000	2001
Chemical	6.1	6.0	6.9	6.5	7.6	8.1	7.1
Foods	3.6	3.3	3.3	2.8	3.7	3.0	2.9
Steel	8.0	3.9	8.1	3.6	2.3	4.3	1.4
Electrical Machinery	6.0	4.5	4.6	3.5	2.4	3.9	−0.1
Transportation Machinery	4.2	4.0	3.5	2.6	2.6	3.1	4.4
Total Manufacturing	5.1	3.9	4.8	3.3	2.9	3.8	2.7

(Source) Ministry of Finance "Financial Statements Statistics of Corporations by Industry"
(Note) Ratio of operating profit = (operating profit/sales) x 100

Position of Chemical Industry in Manufacturing

■Major Indices (2001)

	Number of facilities	Number of employees (persons)	Total shipment (Yen 1 billion)	Amount of value added (Yen 1 billion)	Plant investment (Yen 1 billion)	R&D investment (Yen 1 billion)
Chemical Industry	5,152	364,068	23,228	11,249	1,653	1,682
Foods	37,491	1,155,025	23,454	8,992	1,148	223
Textiles	10,456	170,812	2,737	1,192	196	58
Plastic Products	17,767	428,645	9,995	4,056	—	134
Ceramics and Clay Products	16,420	348,286	8,397	4,105	450	168
Steel	4,922	223,817	11,202	3,956	625	135
Metal Products	39,626	699,422	14,545	6,493	336	93
Industrial Machinery	36,874	996,373	28,210	10,941	689	815
Electrical Machinery	24,396	1,451,804	52,466	16,095	3,240	3,852
Transportation Machinery	12,684	846,331	45,152	12,470	1,638	1,676
Others	110,479	2,181,637	67,281	23,757	3,295	1,048
Total Manufacturing	316,267	8,866,220	286,667	103,305	13,271	9,885

■Ratio of Chemical Industry in Manufacturing Industries (%)

	Number of facilities	Number of employees	Total shipment	Amount of value added	Plant investment	R&D investment
Chemical Industry	1.6	4.1	8.1	10.9	12.5	17.0
Foods	11.9	13.0	8.2	8.7	8.6	2.3
Textiles	3.3	1.9	1.0	1.2	1.5	0.6
Plastic Products	5.6	4.8	3.5	3.9	—	1.4
Ceramics and Clay Products	5.2	3.9	2.9	4.0	3.4	1.7
Steel	1.6	2.5	3.9	3.8	4.7	1.4
Metal Products	12.5	7.9	5.1	6.3	2.5	0.9
Industrial Machinery	11.7	11.2	9.8	10.6	5.2	8.2
Electrical Machinery	7.7	16.4	18.3	15.6	24.4	39.0
Transportation Machinery	4.0	9.5	15.8	12.1	12.3	17.0
Others	34.9	24.6	23.5	23.0	24.8	10.6
Total Manufacturing	100.0	100.0	100.0	100.0	100.0	100.0

(Source) Ministry of Economy, Trade and Industry "Census of Manufactures", Economic and Social Research Institute, Cabinet Office "Business and Investment Survey of Incorporated Enterprises", and Ministry of Public Management, Home Affairs, Posts and Telecommunications, Statistics Bureau "Survey of Research and Development"
(Note) The figures of plant investment and R&D investment are from fiscal 2001.

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

Chemical Industry and Technology and Social Needs

Raw Materials

Water/air	natural gas
animals and plants	coal
salt	ore
oil (naphtha)	

Intermediates

Hydrogen	inactive gas	phosphoric acid	butadiene
nitrogen	caustic soda	methanol	benzene
oxygen	soda ash	ethanol	toluene
chlorine	hydrochloric acid	ethylene	xylene
carbonic acid gas	nitric acid	propylene	styrene
carbon oxide	sulfuric acid	butylenes	

Primary Products

Pigments	printing ink	cosmetics	glass
dyes	paints	pharmaceuticals	seasoning
surfactants	petrochemicals	solvents	synthetic fiber
industrial gas	synthetic detergents	fuel	oil and fat products
fertilizers	synthetic rubbers	sterilizer	photo-sensitive chemicals
agricultural chemicals	plastics	bleach	

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 and Energy

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

Transportation/Telecommunication/ Electronics

Display materials (LCD, PDP, 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 (SOx, NOx, VOC, etc.), biodegradable polymers, measures to cope with environmental hormone 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 activity