

Chemical Industry of Japan 2011



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, chemical 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 24 trillion yen to 37 trillion yen in 2009, 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 shipment (unit: trillion yen)	Amount of value-added (unit: trillion yen)	Number of employees (unit: 10,000 persons)
Chemical industry in a broad sense: "Chemical" +plastics+rubbers	37.0 (Ranks second 13.9%)	13.7 (Ranks first 17.1%)	88 (Ranks third 11.4%)
Chemical Industry	24.3 (Ranks third 9.2%)	9.2 (Ranks second 11.4%)	35 (Ranks ninth 4.5%)
Chemical industry in a narrow sense: "Chemical" -pharmaceuticals	16.9 (6.3%)	5.1 (6.3%)	25 (3.2%)
(Reference) Other industries	Transportation Machinery 47.2 Foods 24.4	Transportation Machinery 11.6 Foods 8.6	Foods 113 Transportation Machinery 95

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

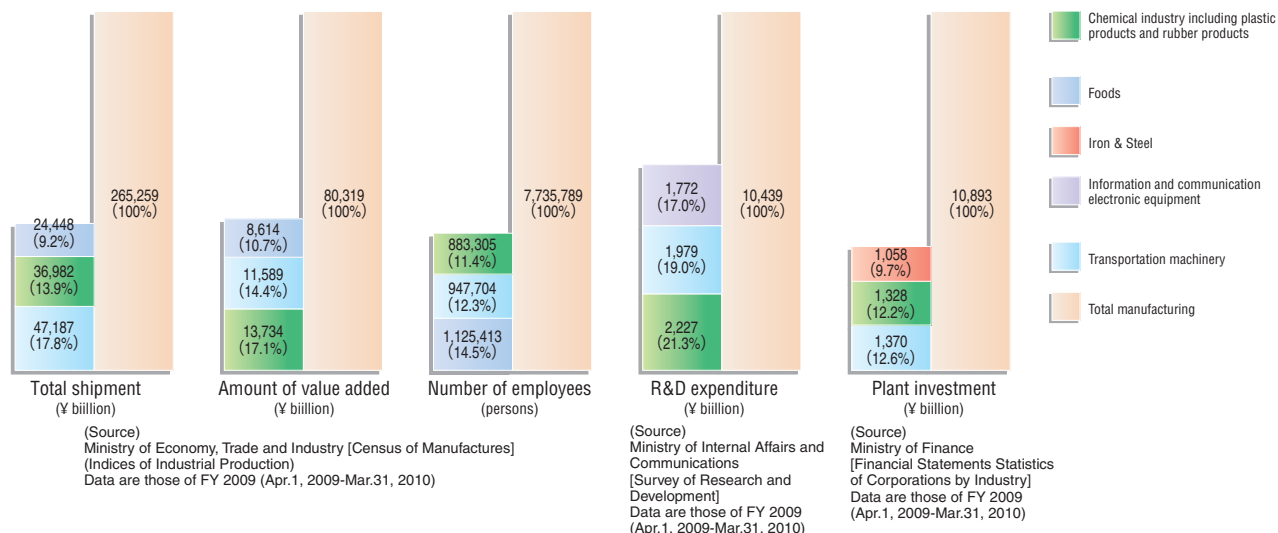
(Source)
Ministry of Economy, Trade and Industry
[Census of manufactures][Indices of Industrial Production released April 14, 2011],
[Basic Survey of Overseas Business Activities]
Ministry of Internal Affairs and Communications
[Survey of Research and Development]
Ministry of Finance [Financial Statements 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 [Labor Productivity Index of Industry]

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Highlights

Total shipments amount to approximately 37 trillion yen, which ranks second among all manufacturing industries. Total value-added amounts to approximately 14 trillion yen, which ranks first among all manufacturing industries. Chemical industry is an R&D-driven industry.

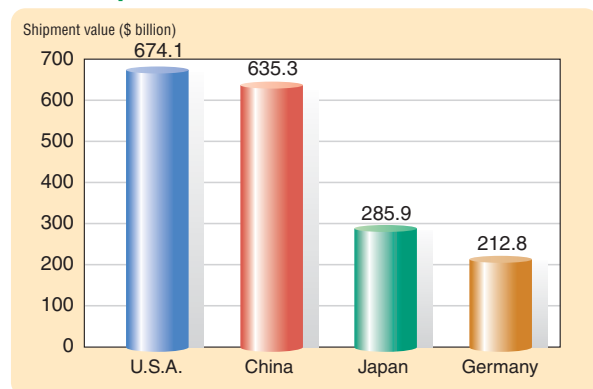


Exports by chemical industry continue to exceed imports.

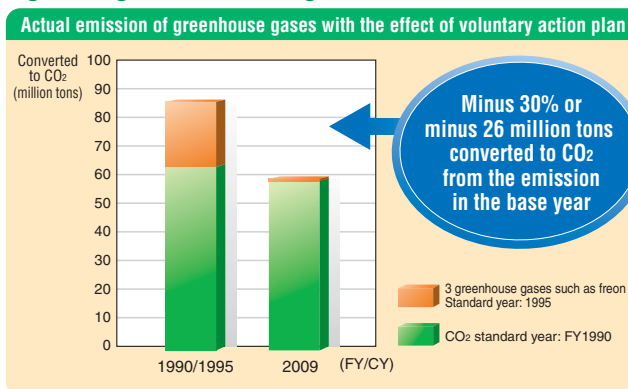
	2006	2007	2008	2009	2010
Export	6,793,864	7,745,339	7,268,831	5,779,928	6,925,266
Import	4,909,332	5,471,184	5,737,358	4,582,630	5,379,439
Difference	1,884,532	2,274,155	1,531,473	1,197,298	1,545,827

(Source) Ministry of Finance [Trade Statistics]

Japan-originated chemical companies total shipment ranks third.



Chemical industry is actively taking measures against global warming.

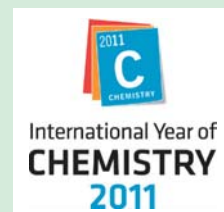


The International Year of CHEMISTRY 2011

The year 2011 marks "The International Year of Chemistry," an initiative of the United Nations, coinciding with the 100th anniversary of Madam Curie receiving the Nobel Prize for her efforts in chemistry. Under the unified theme of "Chemistry - our life, our future," nations around the world will join forces this year to carry out campaigns to enlighten and promote chemistry, with a focus on the following goals:

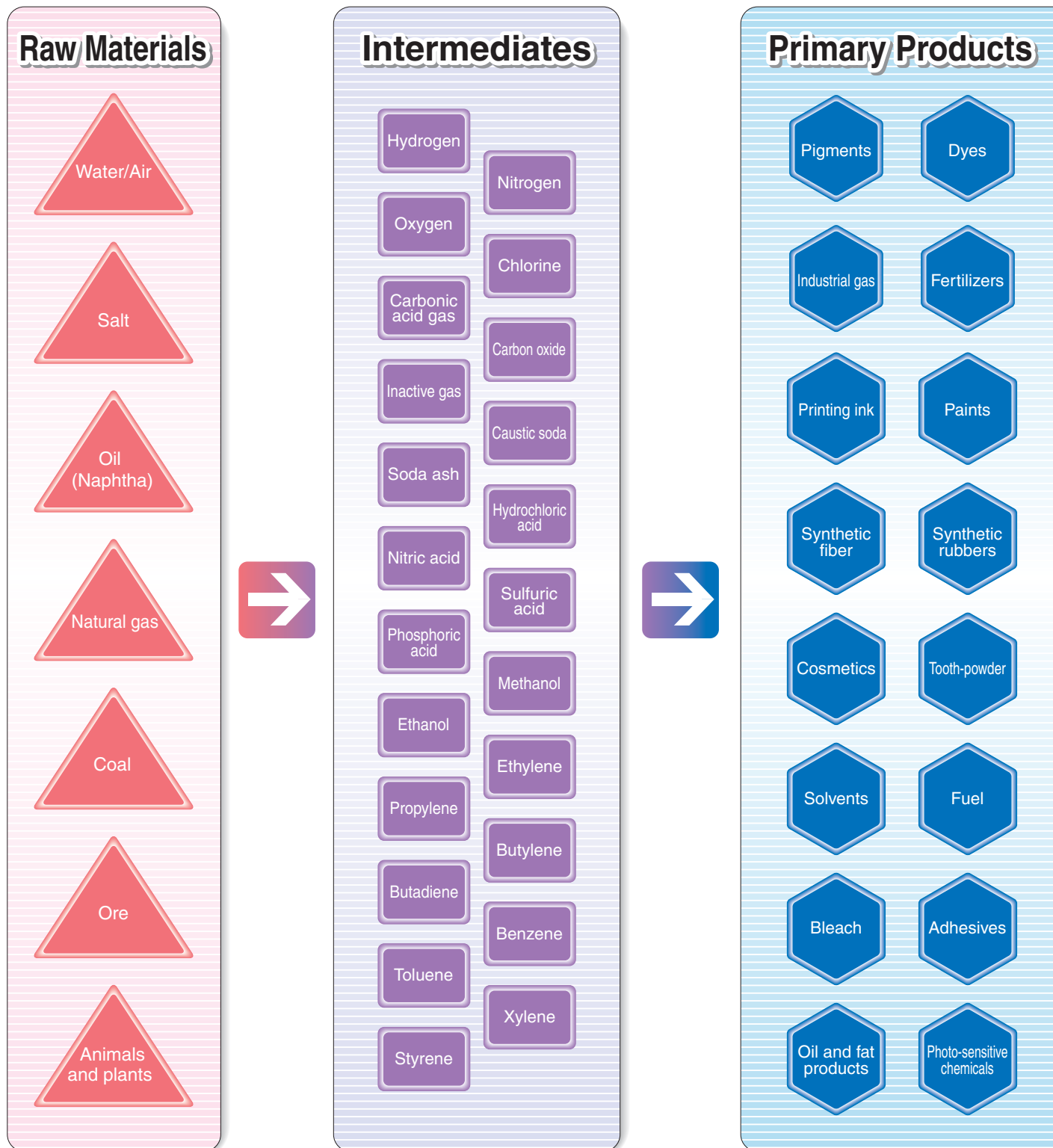
- To enhance the public's understanding and appreciation for chemistry
- To encourage our youth to find interest in chemistry
- To support a creative future through enthusiastic advances in chemistry and
- To provide more opportunities and support for women in chemistry

International Year of Chemistry : <http://www.chemistry2011.org/>
 International Year of Chemistry Japan Committee : <http://www.iyc2011.jp/>
 JCIA's International Year of Chemistry site : http://www.nikkakyo.org/upload_files/iyc2011/



Chemical industry and technology and social needs

Chemical industry supports our life and other industries.



Surfactants

Agricultural
chemicals

Petrochemicals

Plastics

Pharmaceuticals

Sterilizer

Synthetic
detergents



Chemical Products and Technology



New materials to cope with
"sick house" syndrome,
thermal insulation materials
modular bath



Plant breeding by
biotechnology,
plastic wrap



Form-memorizing apparels,
chemical fiber products



Solar generation,
fuel cells



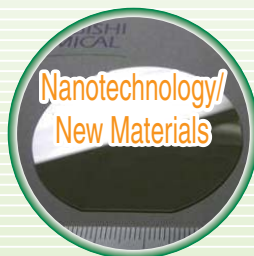
Green chemistry,
disposal of wasted chemicals



Materials for
cellular phone,
automobiles



Genomic medicines,
artificial kidney

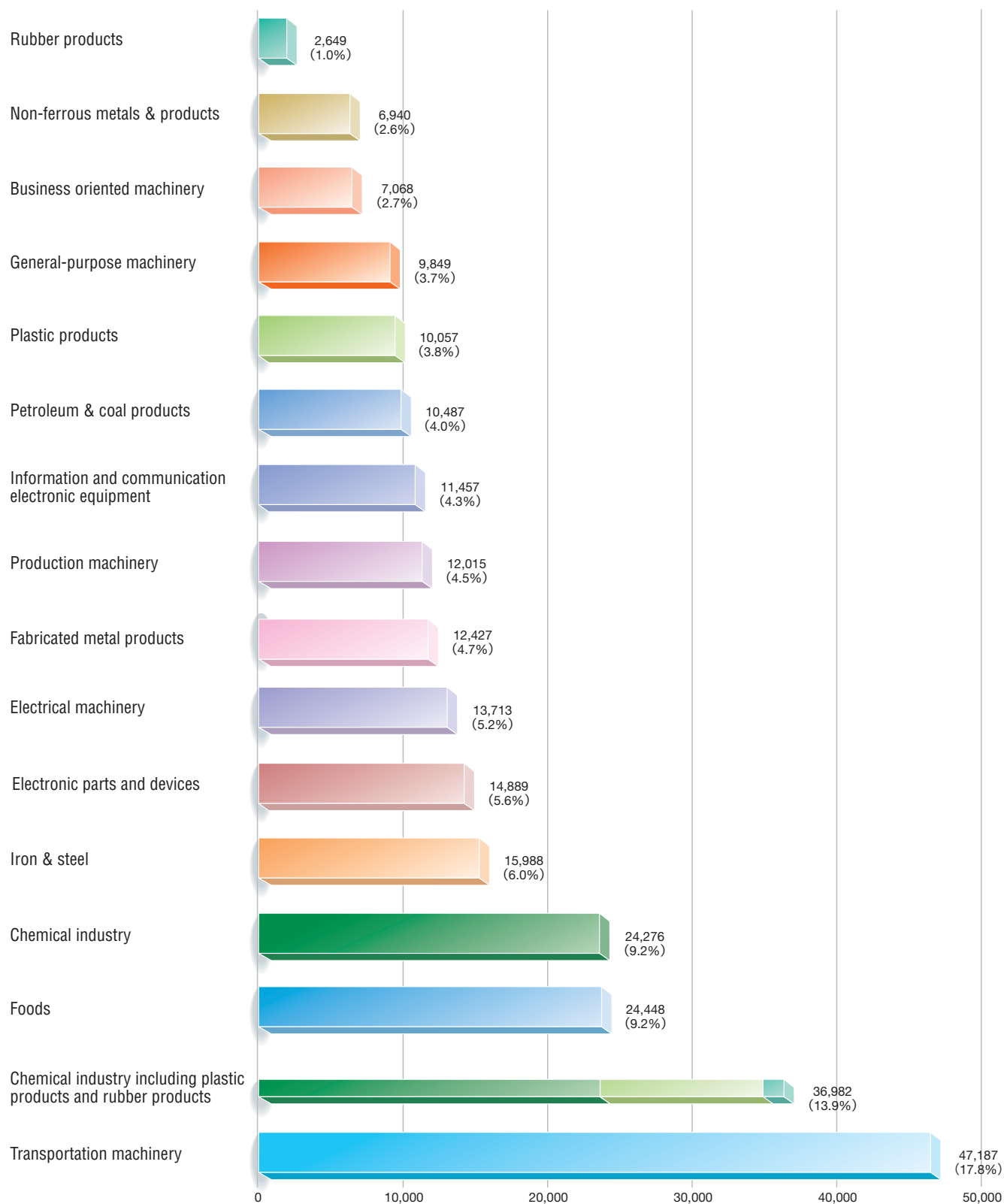


Materials for
organic electroluminescence,
light emitting diode

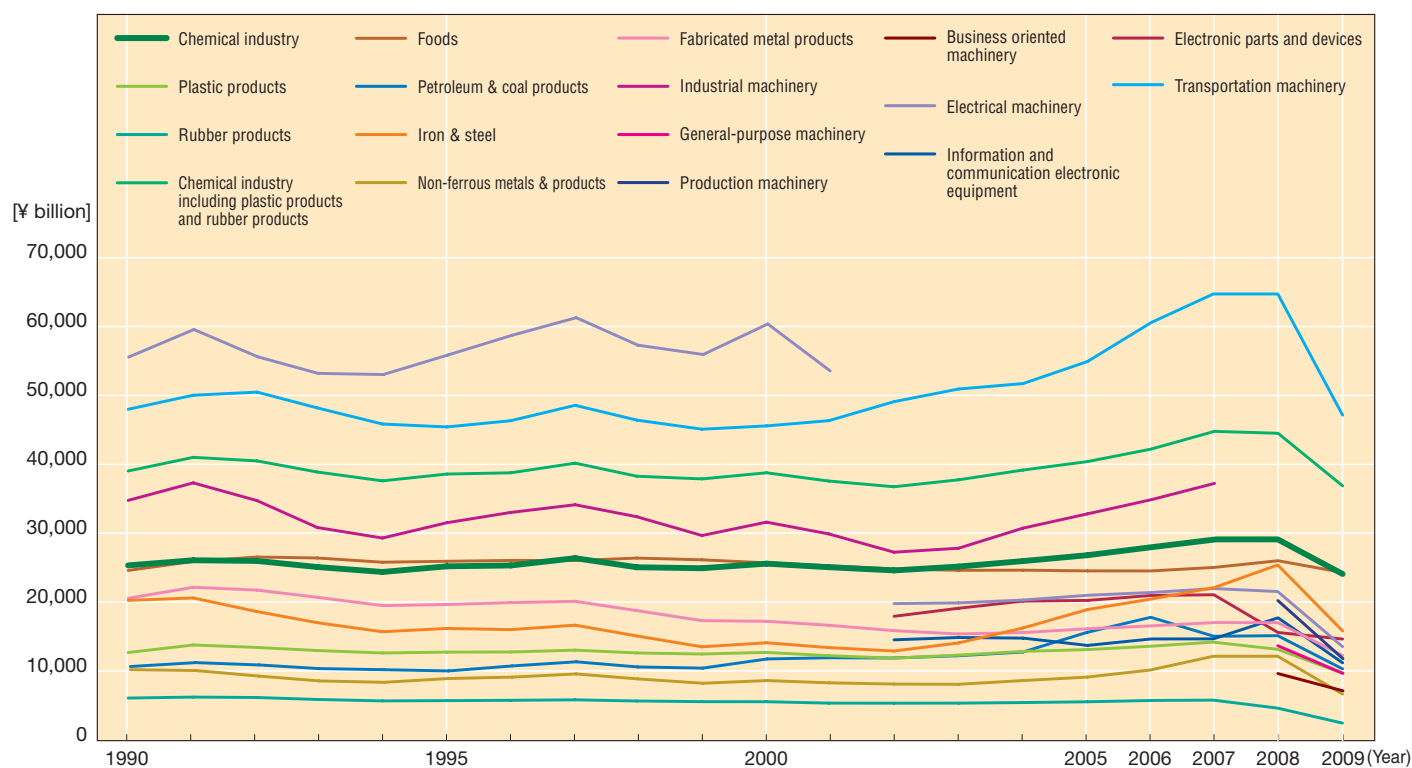
Total production (shipments) of chemical industry amounts to yen 24 trillion

Chemical industry's total shipment value in 2009 amounted to yen 24 trillion, accounting for 9.2% of entire manufacturing industry.

Shipment value of the chemical industry in the manufacturing industries in 2009 [¥ billion, %]



Trend in shipment value [¥ billion]



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

Industry	Year	Every 5th year				Recent three years			%
	1990	1995	2000	2005	2007	2008	2009		
Chemical industry	23,503	23,363	23,762	25,027	28,294	28,131	24,276	9.2%	
Plastic products	10,466	10,530	10,486	10,906	12,399	12,074	10,057	3.8%	
Rubber products	3,656	3,275	3,107	3,099	3,535	3,488	2,649	1.0%	
Chemical industry including plastic products and rubber products	37,624	37,168	37,356	39,032	44,227	43,692	36,982	13.9%	
Foods	22,748	24,117	23,888	22,678	24,196	24,942	24,448	9.2%	
Petroleum & coal products	8,298	7,635	9,434	13,429	13,701	14,006	10,487	4.0%	
Iron & steel	18,269	14,073	11,927	16,896	21,192	24,332	15,988	6.0%	
Non-ferrous metals & products	7,822	6,496	6,191	6,712	10,771	10,480	6,940	2.6%	
Fabricated metal products	18,574	17,646	15,143	14,016	15,189	15,149	12,427	4.7%	
Industrial machinery	33,225	29,884	29,972	31,211	36,273	—	—	—	
General-purpose machinery	—	—	—	—	—	12,541	9,849	3.7%	
Production machinery	—	—	—	—	—	19,133	12,015	4.5%	
Business oriented machinery	—	—	—	—	—	8,574	7,068	2.7%	
Electrical machinery	54,529	54,831	59,449	18,812	21,066	16,838	13,713	5.2%	
Information and communication electronic equipment	—	—	—	11,534	13,325	14,481	11,457	4.3%	
Electronic parts and devices	—	—	—	18,265	20,936	20,560	14,889	5.6%	
Transportation machinery	46,858	44,215	44,367	54,000	63,910	63,767	47,187	17.8%	
Others	75,427	69,965	62,752	48,760	51,970	47,084	41,810	15.8%	
Total manufacturing	323,373	306,030	300,478	295,346	336,757	335,579	265,259	100.0%	

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures] <http://www.meti.go.jp/english/statistics/tyo/kougyo/index.html>

(Note) 1. Statistics of facilities with more than four employees.

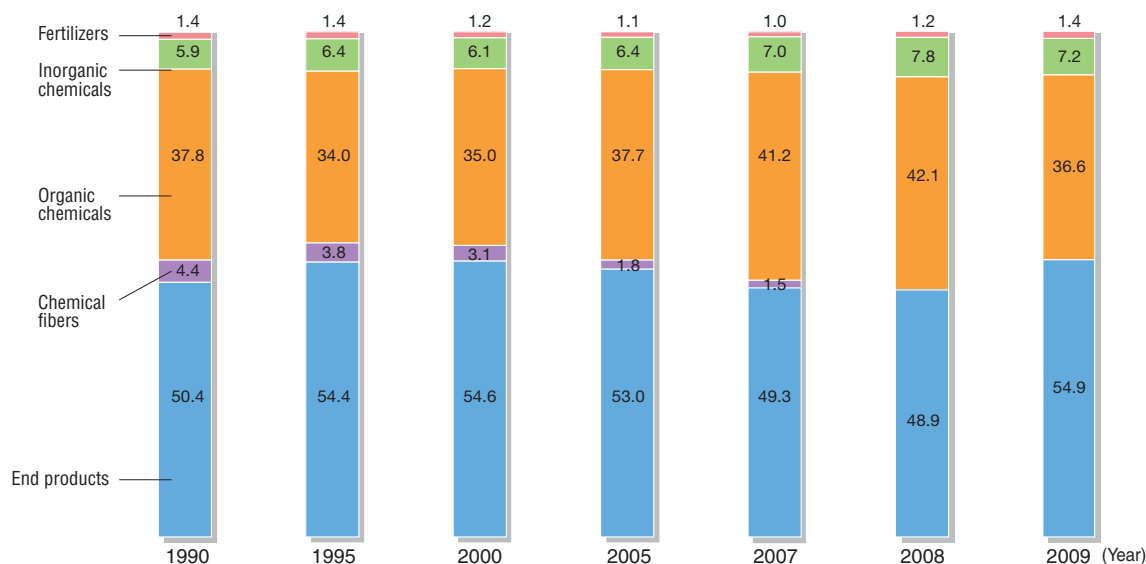
2. Electrical machinery was divided into electrical machinery, information and communication electronic equipment, and electronic parts and devices in 2002. Industrial machinery was divided into general purpose machinery, production machinery, and business oriented machinery in 2008.

3. Because "other revenues" have been added to the amount of total shipment since the survey conducted in 2007, the total shipment amount cannot be compared with that in 2006.

Chemical products that meet the needs of various fields

About half of the products that chemical industry produces are used as raw materials and intermediary products by other industries. At the same time, many end products are used in such products as automobiles, personal computers, home electronics, clothing, drugs & medicines, cosmetics, detergents, paints, film and other materials that help us enjoy a comfortable modern life.

Trend of shipment composition in chemical industry [%]



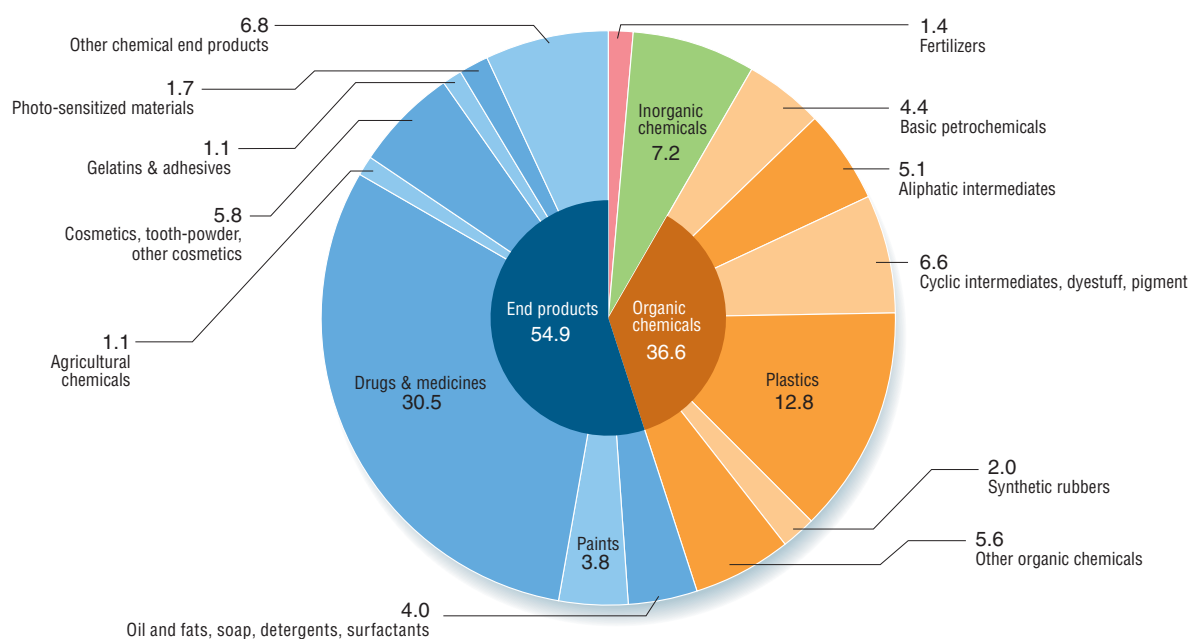
Trend of shipment composition in chemical industry [%]

Industry	Year	Every 5th year				Recent three years		
		1990	1995	2000	2005	2007	2008	2009
Fertilizers		1.4	1.4	1.2	1.1	1.0	1.2	1.4
Inorganic chemicals		5.9	6.4	6.1	6.4	7.0	7.8	7.2
Organic chemicals		37.8	34.0	35.0	37.7	41.2	42.1	36.6
▶ Basic petrochemicals		5.1	2.6	2.9	6.3	8.2	7.4	4.4
▶ Aliphatic intermediates		4.5	5.5	7.1	6.1	7.1	7.4	5.1
▶ Cyclic intermediates, dyestuff, pigment		6.9	6.9	6.1	7.6	7.6	6.9	6.6
▶ Plastics		15.4	14.0	13.6	11.0	11.9	12.8	12.8
▶ Synthetic rubbers		2.3	1.7	1.5	2.0	1.4	2.1	2.0
▶ Other organic chemicals		3.6	3.3	3.8	4.7	5.0	5.5	5.6
Chemical fibers		4.4	3.8	3.1	1.8	1.5	—	—
End products		50.4	54.4	54.6	53.0	49.3	48.9	54.9
▶ Oil and fats, soap, detergents, surfactants		4.1	4.0	3.5	4.1	3.4	3.5	4.0
▶ Paints		4.9	4.6	4.1	3.7	4.1	3.9	3.8
▶ Drugs & medicines		21.9	25.7	27.0	28.0	25.0	25.1	30.5
▶ Agricultural chemicals		1.6	1.6	1.4	1.1	1.0	1.1	1.1
▶ Cosmetics, tooth-powder, other cosmetics		5.9	6.4	6.0	5.6	5.0	5.2	5.8
▶ Gelatins & adhesives		1.0	1.0	1.0	1.0	1.0	1.0	1.1
▶ Photo-sensitized materials		4.1	4.6	4.4	2.5	2.6	2.0	1.7
▶ Other chemical end products		6.9	6.6	7.2	7.0	7.1	7.1	6.8
Chemical industry		100.0	100.0	100.0	100.0	100.0	100.0	100.0
Chemical industry		62.5	62.9	63.6	64.1	64.0	64.4	65.6
Plastic products		27.8	28.3	28.1	27.9	28.0	27.6	27.2
Rubber products		9.7	8.8	8.3	7.9	8.0	8.0	7.2
Chemical industry in a broad sense (including plastic products, and rubber products)		100.0	100.0	100.0	100.0	100.0	100.0	100.0

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
<http://www.meti.go.jp/english/statistics/tyo/kougyo/index.html>

(Note) 1. Statistics of facilities with more than four employees.
 2. Chemical fibers have moved to textile industry since 2008.

Composition of chemical products shipped in 2009 [%]



The major chemical industry indices with breakdown by product in 2009

Industry	Year	Major indices				Composition (%)			
		Number of establishments	Number of employees	Amount of shipment (¥ billion)	Amount of value-added (¥ billion)	Number of establishments	Number of employees	Shipment	Amount of value-added
Fertilizers		155	4,098	328	71	3.2	1.2	1.4	0.8
Inorganic chemicals		816	34,031	1,748	482	16.9	9.8	7.2	5.3
Organic chemicals		780	88,893	8,881	2,133	16.1	25.6	36.6	23.3
▶ Basic petrochemicals		10	2,758	1,073	94	0.2	0.8	4.4	1.0
▶ Aliphatic intermediates		72	9,316	1,249	262	1.5	2.7	5.1	2.9
▶ Cyclic intermediates, dyestuff, pigment		159	16,599	1,605	520	3.3	4.8	6.6	5.7
▶ Plastics		246	31,493	3,111	749	5.1	9.1	12.8	8.2
▶ Synthetic rubbers		19	6,554	476	154	0.4	1.9	2.0	1.7
▶ Other organic chemicals		274	22,173	1,368	355	5.7	6.4	5.6	3.9
End products		3,080	220,081	13,318	6,485	63.8	63.4	54.9	70.7
▶ Oil and fats, soap, detergents, surfactants		275	14,838	974	424	5.7	4.3	4.0	4.6
▶ Paints		415	17,504	921	322	8.6	5.0	3.8	3.5
▶ Drugs & medicines		829	96,878	7,399	4,106	17.2	27.9	30.5	44.8
▶ Agricultural chemicals		68	4,251	267	113	1.4	1.2	1.1	1.2
▶ Cosmetics, tooth-powder, other cosmetics		445	32,498	1,412	829	9.2	9.4	5.8	9.0
▶ Gelatins & adhesives		143	5,507	278	97	3.0	1.6	1.1	1.1
▶ Photo-sensitized materials		61	11,090	416	72	1.3	3.2	1.7	0.8
▶ Other chemical end products		844	37,515	1,651	522	17.5	10.8	6.8	5.7
Chemical industry		4,831	347,103	24,276	9,171	100.0	100.0	100.0	100.0
Chemical industry		4,831	347,103	24,276	9,171	21.7	39.3	65.6	66.8
Plastic products		14,590	419,936	10,057	3,577	65.4	47.5	27.2	26.0
Rubber products		2,891	116,266	2,649	986	13.0	13.2	7.2	7.2
Chemical industry in a broad sense (including plastic products, and rubber products)		22,312	883,305	36,982	13,734	100.0	100.0	100.0	100.0

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
<http://www.meti.go.jp/english/statistics/tyo/kougyo/index.html>

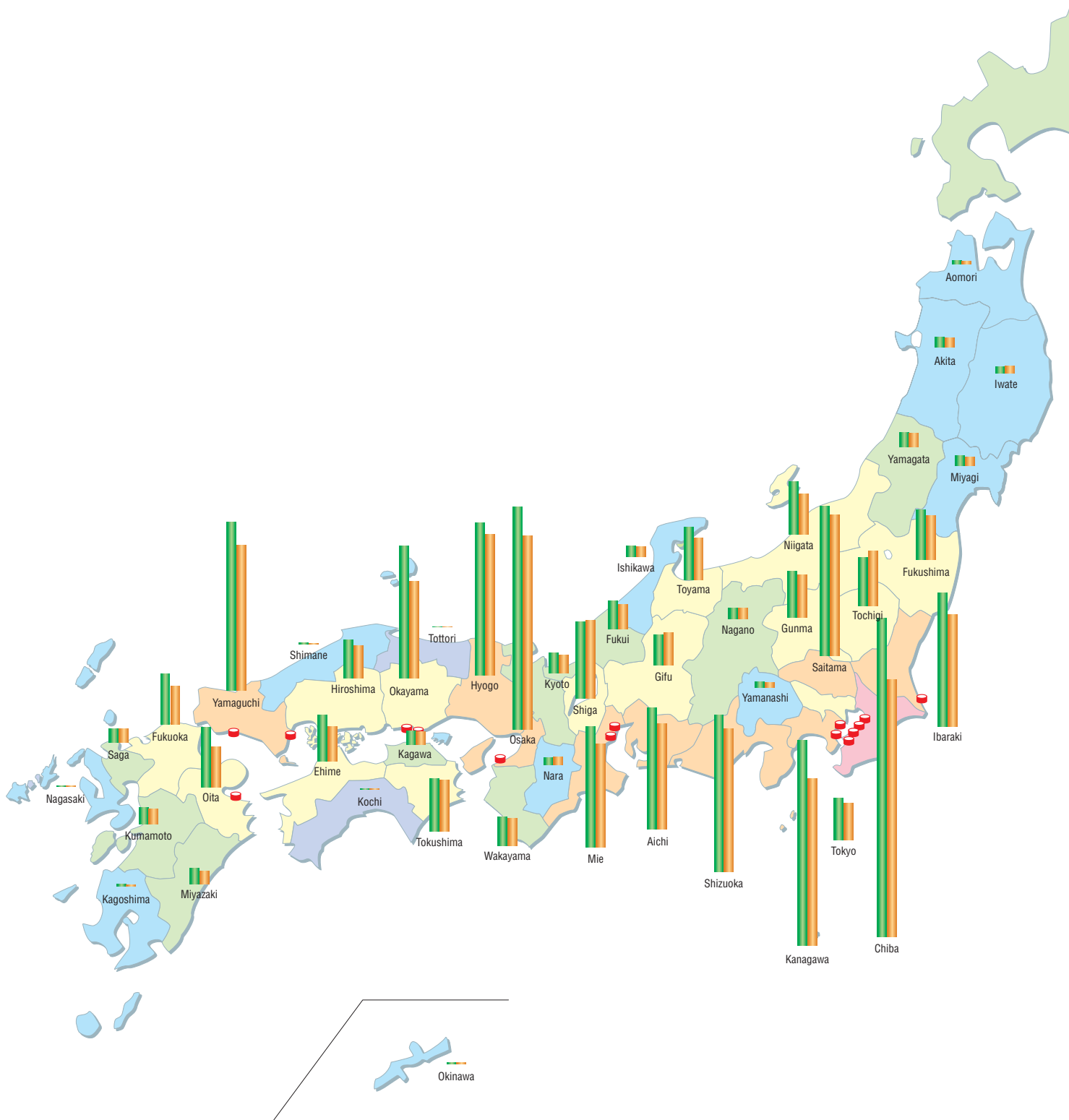
(Note) Statistics of facilities with more than four employees.

3



Shipment by prefecture

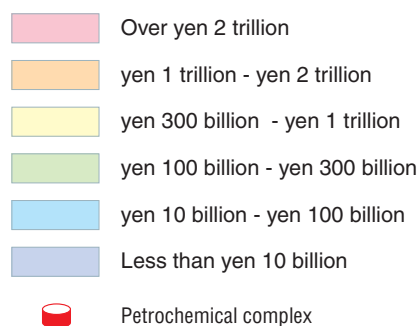
Chiba, Osaka and Kanagawa rank among top three prefectures in the shipment of chemical products in 2009.

Shipment of chemical products by prefecture in 2009





2008   2009



Shipment of chemical products by prefecture in 2009

	Prefecture	Shipment (¥100million)	Increase/decrease from previous year (%)	Number of employees
1	Chiba	25,105	77.5%	19,901
2	Osaka	19,695	87.2%	33,187
3	Kanagawa	16,973	81.4%	24,681
4	Yamaguchi	14,738	86.3%	14,345
5	Shizuoka	14,544	91.2%	24,387
6	Hyogo	14,303	92.2%	21,344
7	Saitama	14,282	93.8%	20,822
8	Ibaraki	11,402	84.1%	13,609
9	Aichi	10,788	87.5%	14,166
10	Mie	10,437	85.1%	13,389
11	Okayama	9,895	73.7%	9,642
12	Shiga	7,976	103.2%	6,400
13	Tochigi	5,580	113.2%	6,040
14	Tokushima	5,219	96.5%	8,491
15	Fukushima	4,531	89.3%	8,537
16	Gunma	4,358	92.8%	7,163
17	Toyama	4,273	79.5%	11,805
18	Oita	4,128	67.9%	2,213
19	Niigata	4,115	76.6%	6,780
20	Fukuoka	3,862	75.8%	7,603
21	Tokyo	3,711	86.7%	11,354
22	Ehime	3,501	74.9%	4,222
23	Gifu	3,333	107.5%	5,370
24	Hiroshima	3,242	83.5%	5,472

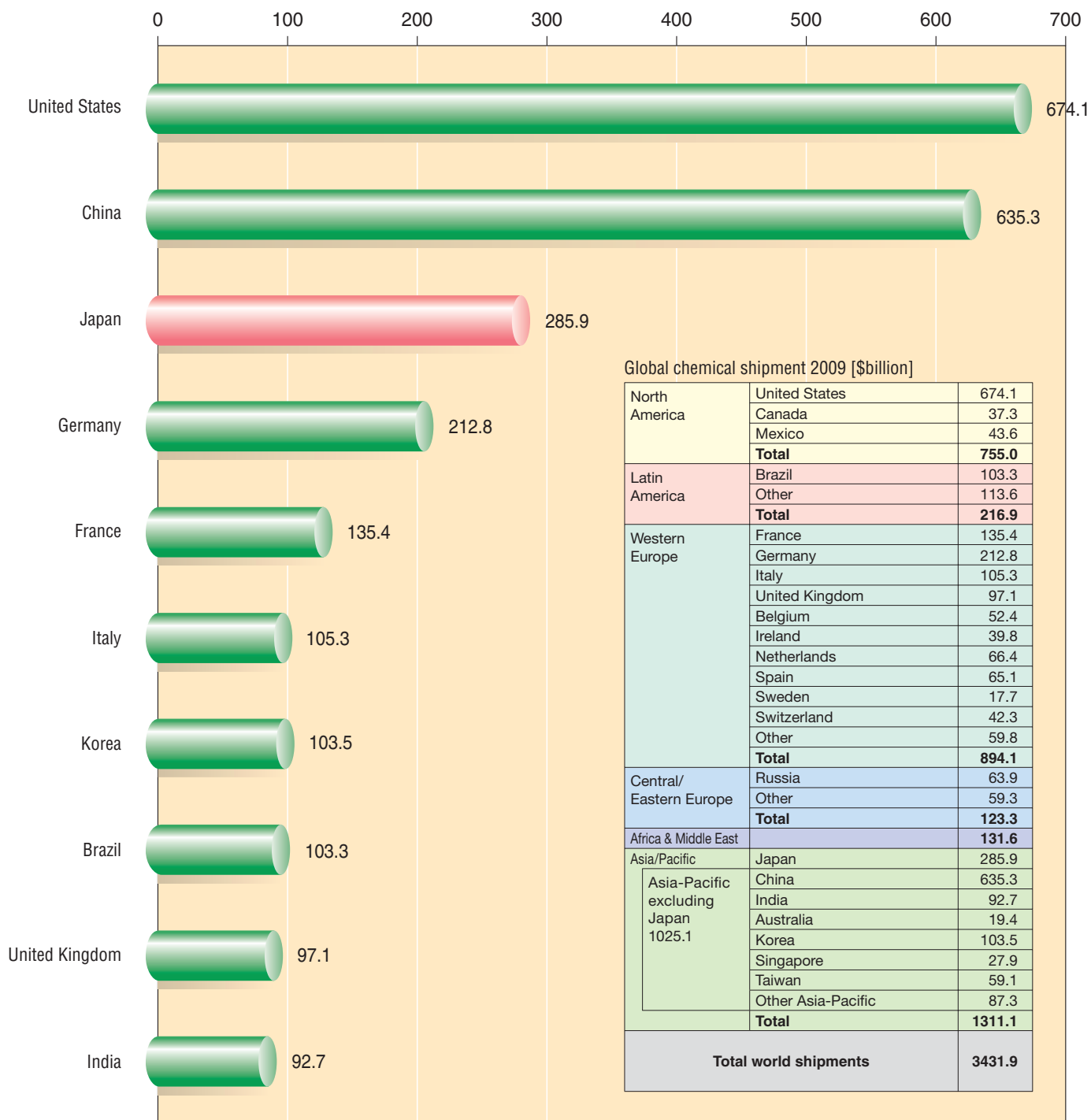
	Prefecture	Shipment (¥100million)	Increase/decrease from previous year (%)	Number of employees
25	Wakayama	2,822	98.0%	4,871
26	Fukui	2,469	87.1%	3,507
27	Kyoto	1,868	90.2%	5,200
28	Hokkaido	1,615	94.3%	3,360
29	Kumamoto	1,521	90.4%	3,691
30	Saga	1,427	101.6%	1,991
31	Yamagata	1,398	92.1%	2,850
32	Kagawa	1,323	96.2%	3,170
33	Miyazaki	1,311	83.4%	1,845
34	Nagano	1,116	101.0%	1,867
35	Ishikawa	986	93.0%	1,529
36	Akita	982	92.5%	1,403
37	Miyagi	869	86.2%	1,781
38	Nara	770	105.2%	3,156
39	Iwate	687	108.0%	1,591
40	Yamanashi	540	84.6%	1,258
41	Aomori	343	89.1%	654
42	Kagoshima	262	95.7%	452
43	Shimane	165	95.6%	530
44	Okinawa	111	101.4%	810
45	Nagasaki	101	91.5%	347
46	Kochi	65	73.7%	262
47	Tottori	11	44.4%	55
	Total	242,757	86.3%	347,103

(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

Shipment of chemical products by country in 2009 [\$ billion]



(Source) American Chemistry Council

The world's leading chemical companies in 2009

Ranking	Company	Country	Chemical sales			Chemical operating profits		
			2009 (\$ million)	Change from 2008 (%)	Chemical sales as of total sales	2009 (\$ million) ^(a)	Change from 2008 (%)	Operating profit margin ^(b)
1	BASF	Germany	54,817	-17.8%	77.6%	1,934	-47.0%	3.5%
2	Dow Chemical	U.S.	44,875	-22.0%	100.0%	1,741	-19.8%	3.9%
3	Sinopec	China	31,312	-13.4%	15.9%	1,993	nm	6.4%
4	Ineos Group ^(d)	England	28,600	-39.1%	100.0%	na	na	na
5	ExxonMobil ^(e)	U.S.	26,847	-30.1%	8.9%	2,309	-21.9%	8.6%
6	DuPont ^(d)	U.S.	25,960	-14.6%	99.4%	2,474	-11.8%	9.5%
7	Formosa Plastics Group ^(f)	Taiwan	25,437	-14.7%	61.9%	1,666	21.3%	6.5%
8	Royal Dutch /Shell ^(g)	Netherlands	24,586	-43.5%	8.8%	na	na	na
9	SABIC	Saudi Arabia	23,096	-32.9%	84.0%	5,910	-41.8%	25.6%
10	Total	France	20,521	-26.9%	11.2%	771	nm	3.8%
11	LyondellBasell	Netherlands	19,993	-40.0%	64.9%	616	nm	3.1%
12	Bayer	Germany	19,551	-13.0%	45.0%	741	-63.4%	3.8%
13	AkzoNobel	Netherlands	19,360	-9.9%	100.0%	1,145	13.9%	5.9%
14	Mitsubishi Chemical	Japan	16,742	-18.5%	62.4%	-67	def	def
15	Air Liquide	France	15,303	-8.7%	91.7%	na	na	na
16	Evonik	Germany	14,030	-13.5%	77.0%	2,232	0.1%	15.9%
17	Sumitomo Chemical	Japan	13,121	-12.4%	75.8%	243	nm	1.8%
18	Mitsui Chemicals	Japan	12,892	-18.8%	100.0%	-101	def	def
19	LG Chem	South Korea	12,625	8.1%	100.0%	1,752	69.0%	13.9%
20	Toray Industries	Japan	12,450	-9.0%	85.8%	347	8.5%	2.8%
21	Linde	Germany	12,447	-6.1%	79.7%	3,314	-1.6%	26.6%
22	Reliance Industries	India	12,240	4.8%	27.9%	1,788	24.4%	14.6%
23	PPG Industries	U.S.	11,390	-18.3%	93.1%	1,225	-19.4%	10.8%
24	DSM	Netherlands	10,962	-15.4%	100.0%	1,497	-1.0%	13.7%
25	Mosaic	U.S.	10,298	4.9%	100.0%	2,445	-13.8%	23.7%
26	Shin-Etsu Chemical ^(d)	Japan	9,782	-23.7%	100.0%	1,251	-49.7%	12.8%
27	Yara	Norway	9,763	-30.8%	100.0%	1,177	-30.7%	12.1%
28	Asahi Kasei	Japan	9,452	-7.5%	61.8%	326	nm	3.5%
29	Praxair	U.S.	8,956	-17.0%	100.0%	2,762	-4.5%	30.8%
30	Sasol	South Africa	8,954	10.5%	54.6%	-267	def	def

(Source) Chemical & Engineering News

<http://pubs.acs.org/cen/coverstory/88/8830cover.html>

(Note) Some figures converted at 2009 average exchange rates of \$1.00 U.S.=1.9976 Brazilian reals, 6.83 Chinese renminbi, 0.7176 euros, 48.33 Indian rupees, 93.68 Japanese yen, 1274.63 Korean won, 6.2908 Norwegian krone, 3.75 Saudi riyals, 1.086 Swiss francs, 33.02 Taiwan dollars.

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

(b) Chemical operating profit as a percentage of chemical sales.

(c) Chemical operating profit as a percentage of identifiable assets.

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

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

(f) C&EN estimates.

(g) Sales include chemical feedstock trading.

def = deficit.

na = not available.

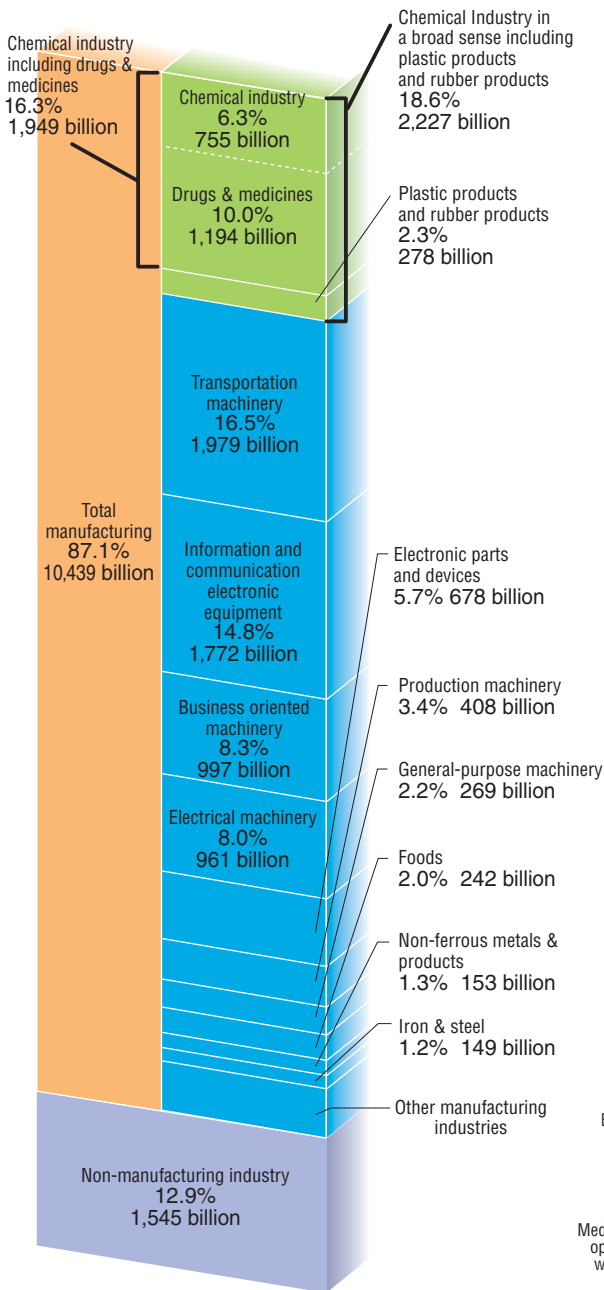
nm = not meaningful.

Drugs & medicines are excluded.

Yen 1.95 trillion spent for research and development

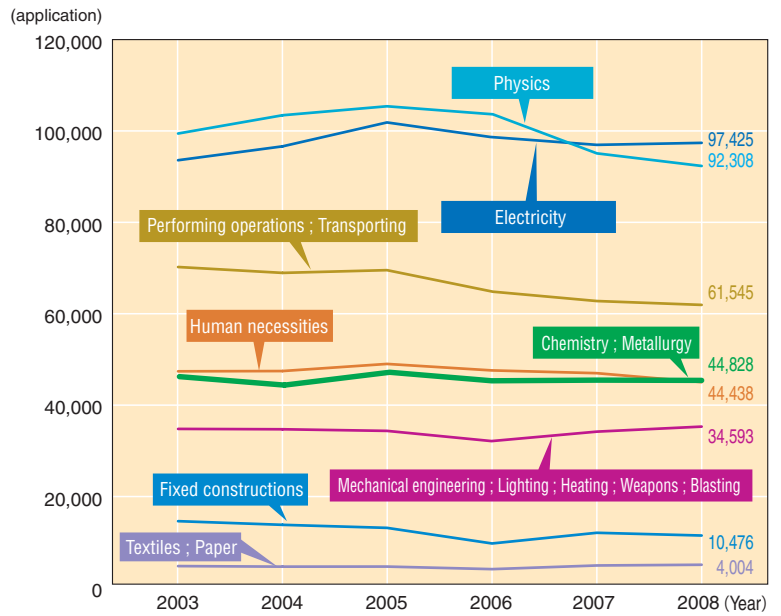
Research and development expenditures of chemical industry in FY 2009 (Apr.1, 2009-Mar.31, 2010) in Japan amounted to yen 1.95 trillion, accounting for 16.3% of all industry R&D expenditures. The percentage of research expenditures to sales was 6.5%.

Ratio of R&D expenditures by industry in FY 2009 [% , ¥billion]



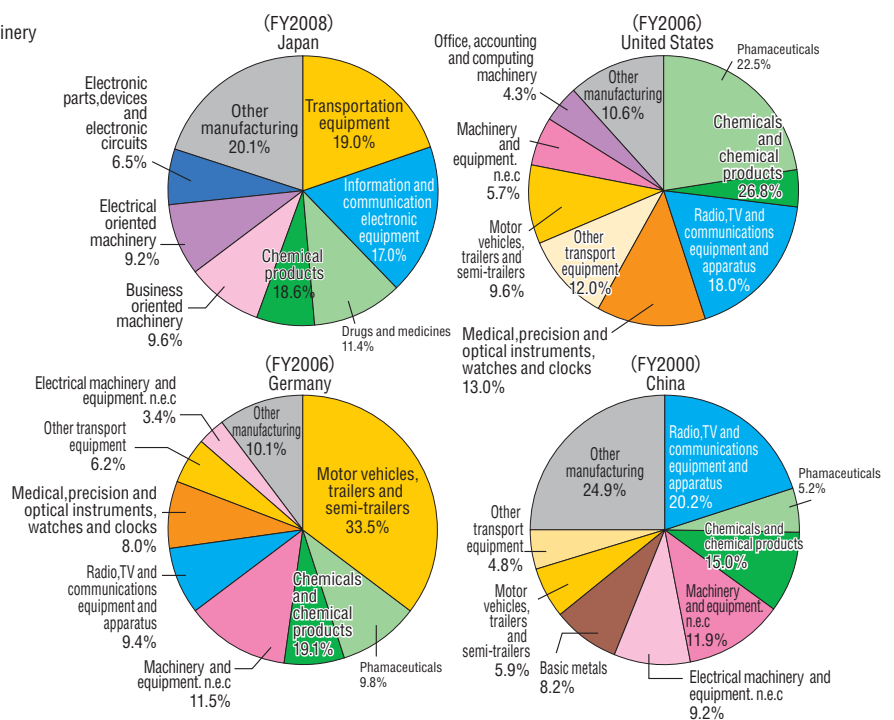
(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development] <http://www.stat.go.jp/english/data/kagaku/index.htm>

Trend of number of applications for patents by sector



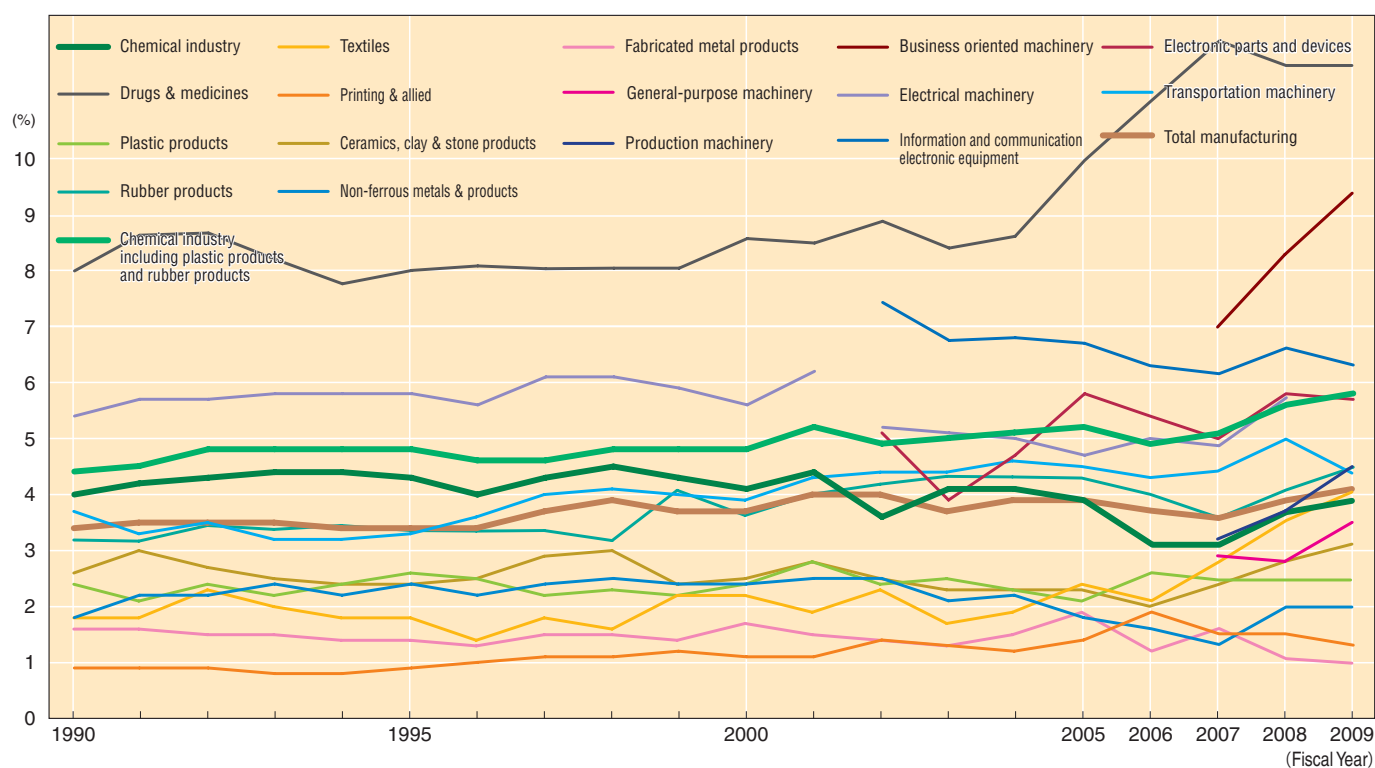
(Source) Japan Patent Office

Chemical industry R&D expenditures in major countries [%]



(Source) Ministry of Education, Culture, Sports, Science and Technology [Indicators of Science and Technology (2011)]

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		
		1990	1995	2000	2005	2007	2008	2009
Chemical industry		4.0	4.3	4.1	3.9	3.1	3.7	3.9
Drugs & medicines		8.0	8.0	8.6	10.0	12.1	11.7	11.7
Chemical industry including drugs & medicines		4.9	5.3	5.4	5.9	5.7	6.3	6.5
Plastic products		2.4	2.6	2.4	2.1	2.5	2.5	2.5
Rubber products		3.2	3.4	3.6	4.3	3.6	4.1	4.5
Chemical industry including plastic products and rubber products		4.4	4.8	4.8	5.2	5.1	5.6	5.8
Textiles		1.8	1.8	2.2	2.4	2.8	3.6	4.1
Printing & allied		0.9	0.9	1.1	1.4	1.5	1.5	1.3
Ceramics, clay & stone products		2.6	2.4	2.5	2.3	2.4	2.8	3.1
Non-ferrous metals & products		1.8	2.4	2.4	1.8	1.3	2.0	2.0
Fabricated metal products		1.6	1.4	1.7	1.9	1.6	1.1	1.0
General-purpose machinery		—	—	—	—	2.9	2.8	3.5
Production machinery		—	—	—	—	3.2	3.7	4.5
Business oriented machinery		—	—	—	—	7.0	8.3	9.4
Electrical machinery		5.4	5.8	5.6	4.7	4.9	5.7	6.1
Information and communication electronic equipment		—	—	—	6.7	6.1	6.6	6.3
Electronic parts and devices		—	—	—	5.8	5.0	5.8	5.7
Transportation machinery		3.7	3.3	3.9	4.5	4.4	5.0	4.5
Total manufacturing		3.4	3.4	3.7	3.9	3.6	3.9	4.1

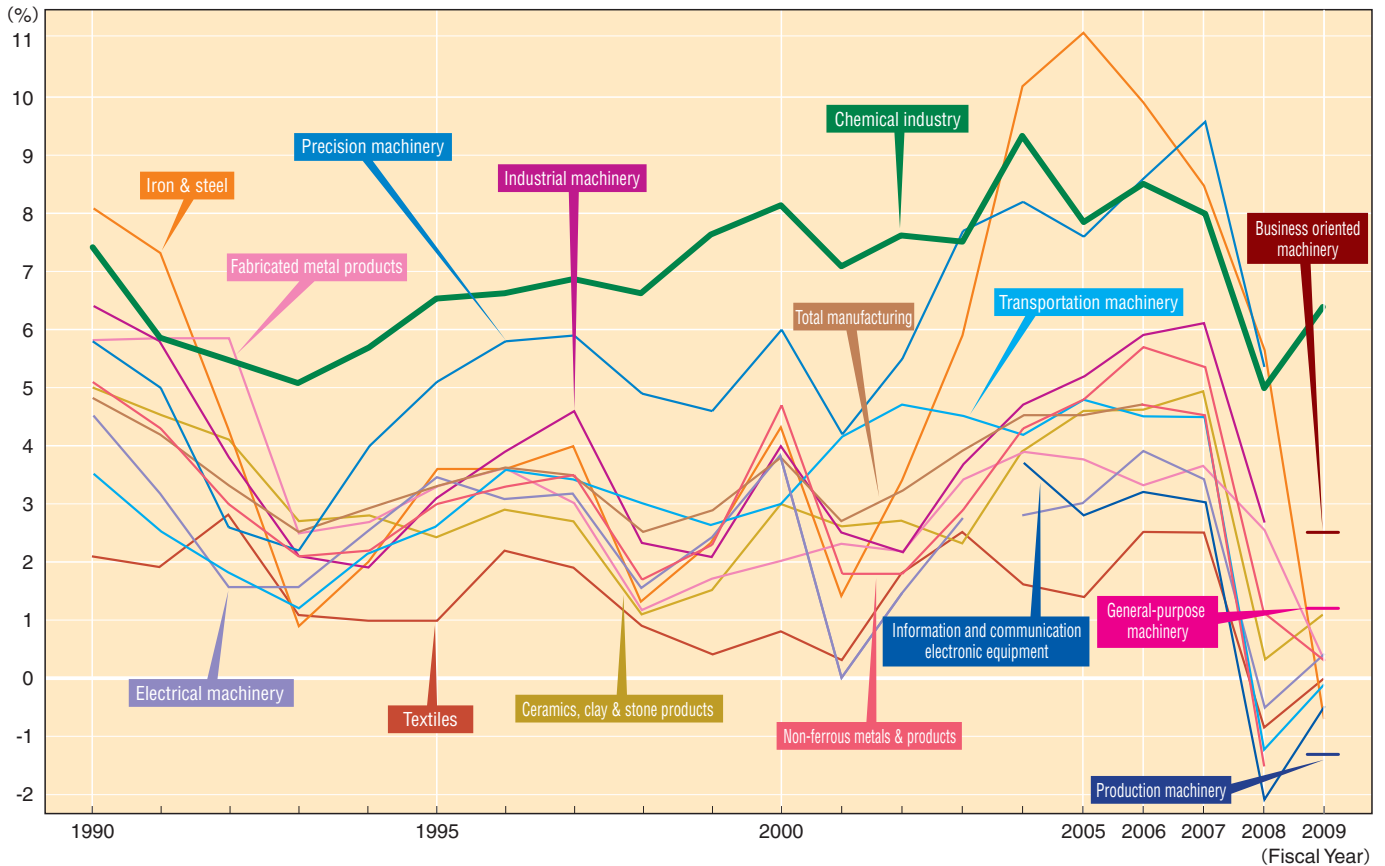
(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development]
<http://www.stat.go.jp/english/data/kagaku/index.htm>

(Note) Drugs & medicines are excluded from the chemical industry.

High ratio of operating profit

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		
		1990	1995	2000	2005	2007	2008	2009
Chemical industry		6.9	6.5	8.1	7.8	8.0	5.0	6.3
Textiles		2.1	1.0	0.8	1.4	2.5	-0.8	0.0
Ceramics, clay & stone products		5.0	2.4	3.0	4.6	4.9	1.4	1.1
Iron & steel		8.1	3.6	4.3	11.1	8.6	5.7	-0.7
Non-ferrous metals & products		5.1	3.0	4.7	4.8	5.5	0.3	0.3
Fabricated metal products		5.8	3.3	2.0	3.7	3.7	2.6	0.3
Industrial machinery		6.4	3.1	4.0	5.2	6.1	2.7	—
General-purpose machinery		—	—	—	—	—	—	1.2
Production machinery		—	—	—	—	—	—	-1.3
Business oriented machinery		—	—	—	—	—	—	2.5
Electrical machinery		4.6	3.5	3.9	3.0	3.4	-0.5	0.4
Information and communication electronic equipment		—	—	—	2.8	3.0	-2.1	-0.5
Transportation machinery		3.5	2.6	3.0	4.8	4.5	-1.2	-0.1
Precision machinery		5.8	5.1	6.0	7.6	9.4	5.3	—
Total manufacturing		4.8	3.3	3.8	4.5	4.5	1.5	1.5

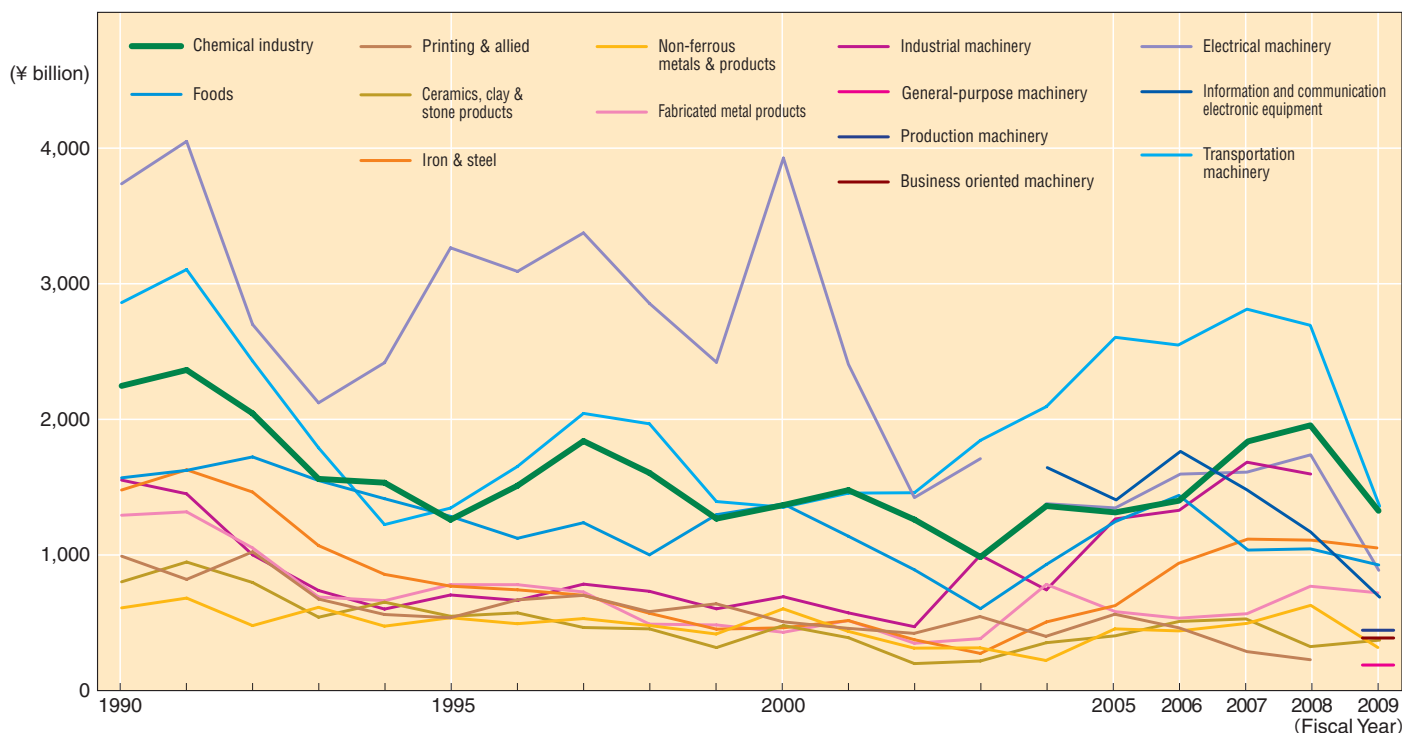
(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]

(Note) Rubber products & plastic products are excluded from the chemical industry.

Chemical industry ranks 2nd in plant investment

Plant investment by the chemical industry accounted for 12.2% 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			2009	
	1990	1995	2000	2005	2007	2008	2009		
Chemical industry	2,247	1,260	1,368	1,314	1,861	1,953	1,328	12.2%	
Foods	1,569	1,285	1,376	1,246	1,052	1,090	923	8.5%	
Printing & allied	991	537	507	563	388	321	420	3.9%	
Ceramics, clay & stone products	802	548	480	404	663	403	373	3.4%	
Iron & steel	1,479	770	463	627	1,126	1,113	1,058	9.7%	
Non-ferrous metals & products	610	537	603	455	525	621	328	3.0%	
Fabricated metal products	1,293	781	430	582	675	780	721	6.6%	
Industrial machinery	1,552	705	692	1,266	1,593	1,503	—	—	
General-purpose machinery	—	—	—	—	—	—	188	1.7%	
Production machinery	—	—	—	—	—	—	444	4.1%	
Business oriented machinery	—	—	—	—	—	—	387	3.6%	
Electrical machinery	3,737	3,265	3,927	1,347	1,634	1,742	898	8.2%	
Information and communication electronic equipment	—	—	—	1,407	1,471	1,176	700	6.4%	
Transportation machinery	2,861	1,346	1,352	2,605	2,838	2,705	1,370	12.6%	
Others	4,341	2,814	2,040	2,530	3,663	2,570	1,754	16.1%	
Total manufacturing	21,483	13,849	13,238	14,343	17,490	15,978	10,893	100.0%	

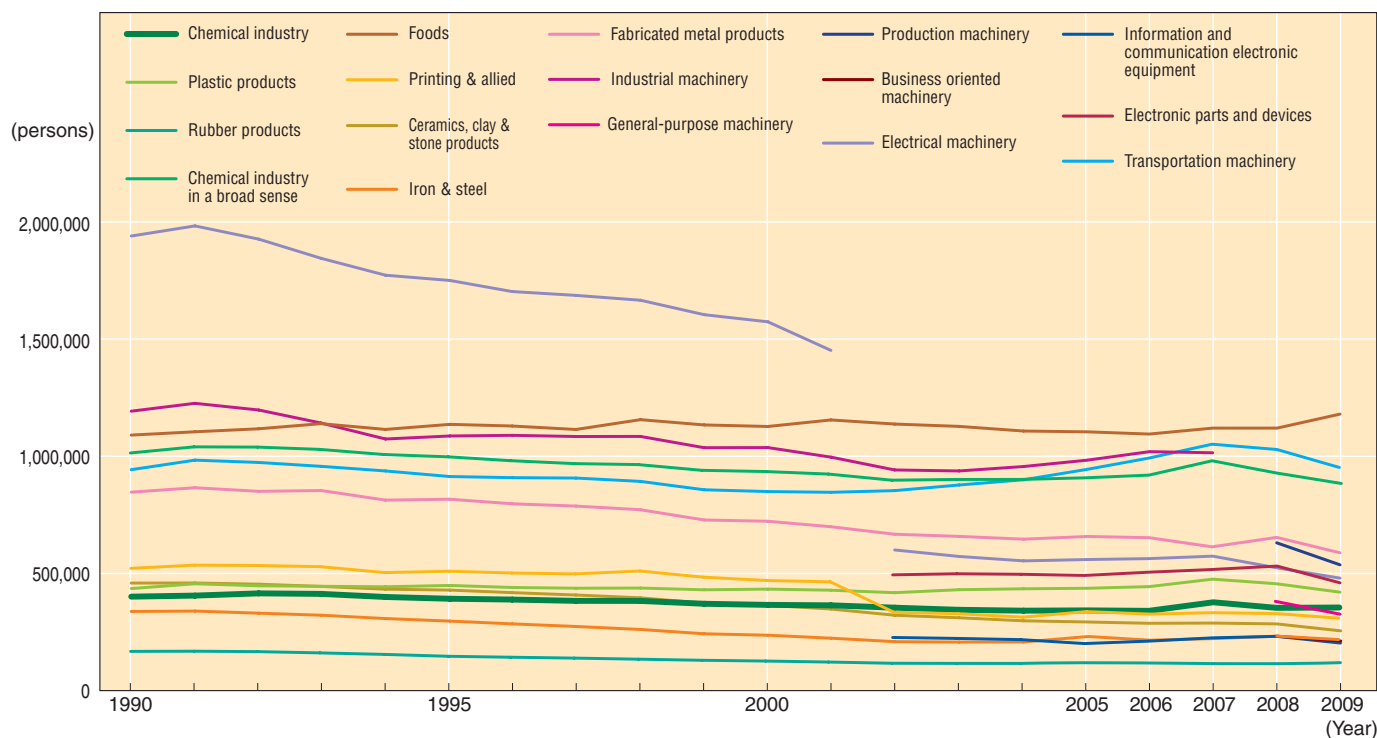
(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]

(Note) Rubber products & plastic products are excluded from the chemical industry.

350,000 workers are employed

The number of employees in the chemical industry accounted for 4.5% in entire manufacturing industry.

Changes in the number of employees by industry [persons]



Changes in the number of employees by industry [persons]

Industry	Every 5th year				Recent three years			
	1990	1995	2000	2005	2007	2008	2009	
Chemical industry	401,076	392,109	365,953	342,481	356,738	349,748	347,103	4.5%
Plastic products	435,523	448,939	433,177	436,897	471,035	454,316	419,936	5.4%
Rubber products	172,284	151,601	131,532	124,613	132,466	125,008	116,266	1.5%
Chemical industry in a broad sense	1,008,883	992,649	930,662	903,991	960,239	929,152	883,305	11.4%
Foods	1,090,403	1,136,236	1,127,177	1,104,292	1,135,051	1,138,327	1,125,413	14.5%
Printing & allied	554,155	541,688	502,184	340,890	334,796	326,476	308,878	4.0%
Ceramics, clay & stone products	459,040	429,023	363,997	293,013	293,815	280,263	255,159	3.3%
Iron & steel	337,811	296,824	236,525	213,056	228,860	235,300	220,518	2.9%
Fabricated metal products	846,915	816,694	722,425	657,942	664,082	654,160	584,127	7.6%
Industrial machinery	1,192,406	1,086,575	1,037,079	983,449	1,063,957	—	—	—
General-purpose machinery	—	—	—	—	—	362,465	323,766	4.2%
Production machinery	—	—	—	—	—	613,130	536,630	6.9%
Business oriented machinery	—	—	—	—	—	243,075	218,516	2.8%
Electrical machinery	1,939,729	1,750,103	1,573,683	559,413	581,924	511,670	476,765	6.2%
Information and communication electronic equipment	—	—	—	205,331	231,485	238,808	217,348	2.8%
Electronic parts and devices	—	—	—	490,140	528,095	521,471	462,543	6.0%
Transportation machinery	942,795	913,535	849,517	944,352	1,050,334	1,029,652	947,704	12.3%
Others	2,800,692	2,357,256	1,840,584	1,461,123	1,445,907	1,208,658	1,175,117	15.2%
Total manufacturing	11,172,829	10,320,583	9,183,833	8,156,992	8,518,545	8,364,607	7,735,789	100.0%

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

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

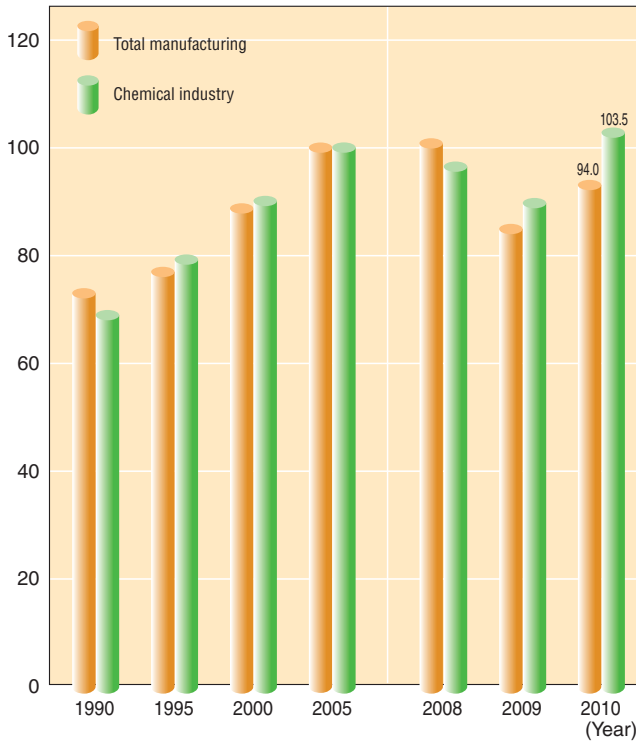
(Note) 1. Statistics of facilities with more than four employees.

2. Electrical machinery was divided into electrical machinery, information and communication electronic equipment, and electronic parts and devices in 2002. Industrial machinery was divided into general purpose machinery, production machinery, and business oriented machinery in 2008.

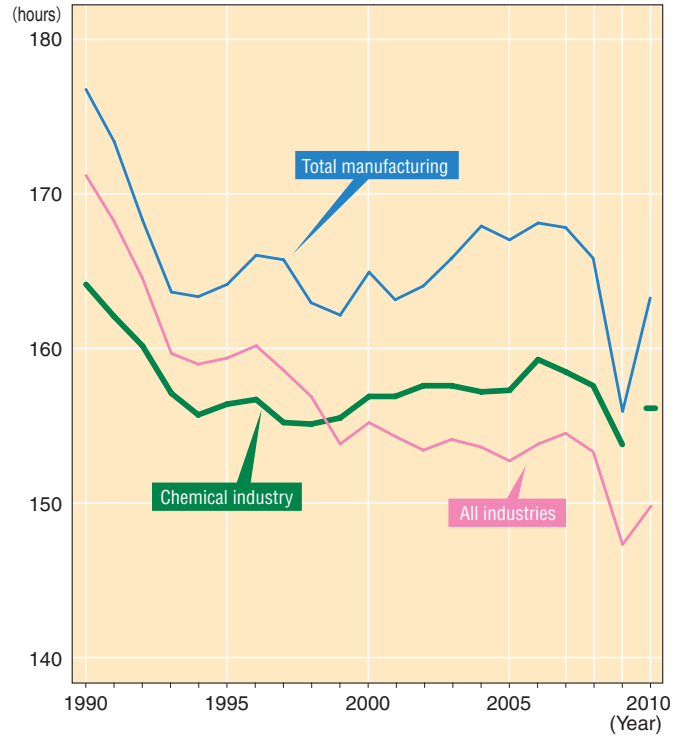
Labor productivity / Working hours

In 2010, the labor productivity of the chemical industry has improved.

Indices of physical labor productivity
[Index, 2005=100]



Working hours
(monthly average of total net working hours)



Indices of physical labor productivity
[Index, 2005=100]

Year	Industry	Total manufacturing		Chemical industry	
		Indices	Increase rate %	Indices	Increase rate %
Every 5th year	1990	73.3	2.8	68.6	4.6
	1995	76.8	4.6	79.4	8.2
	2000	88.8	6.6	91.2	2.1
	2005	100.0	1.8	100.0	△0.5
Recent three years	2008	101.2	△3.5	96.5	△5.7
	2009	85.0	△16.0	89.7	△7.0
	2010	94.0	10.6	103.5	15.4

(Source) Japan Productivity Center

(Note) Since 2010, petrochemical and coal product manufactures have been included in the chemical industry.

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

Year	Industry	All industries	Total manufacturing	Chemical industry
		1990	171.0	176.6
Every 5th year	1995	159.1	163.9	156.1
	2000	154.9	164.7	156.6
	2005	152.4	166.8	157.0
	2008	153.0	165.6	157.3
Recent three years	2009	147.3	155.9	153.8
	2010	149.8	163.3	156.1

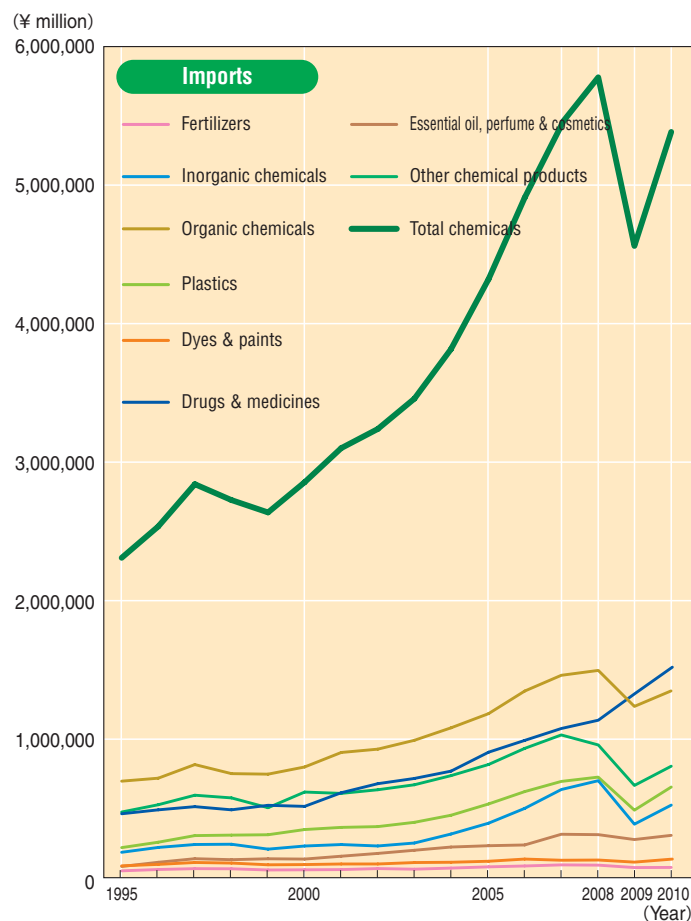
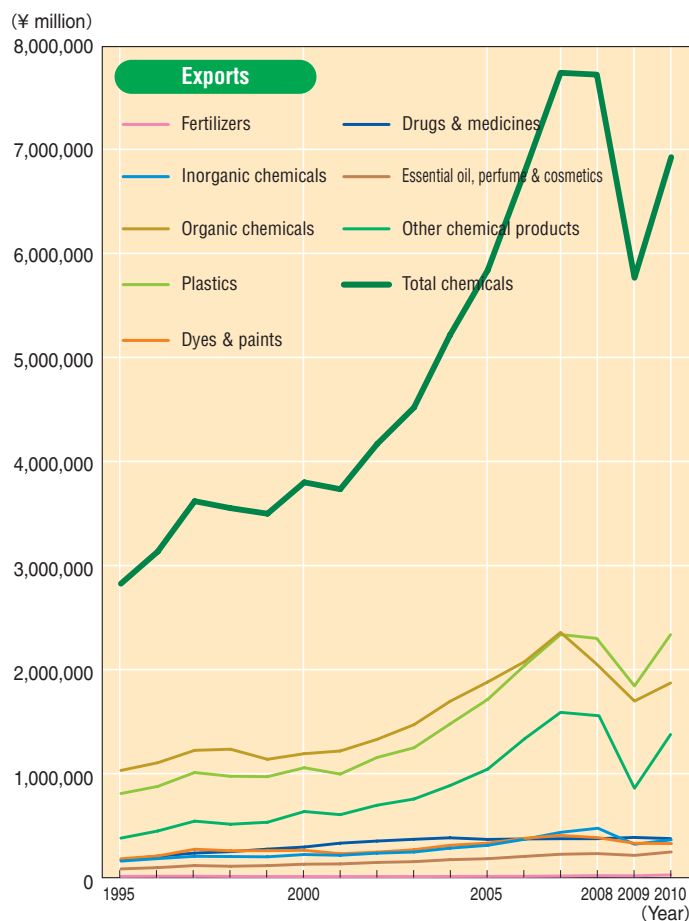
(Source) Ministry of Health, Labour and Welfare [Monthly Labour Survey]

(Note) Since 2010, petrochemical and coal product manufactures have been included in the chemical industry.

Exports / Imports

In 2010, both exports and imports increased with resulting trade surplus of 1.5 trillion yen, a consecutive surplus since 1991.

Exports and imports of chemicals [¥ million]



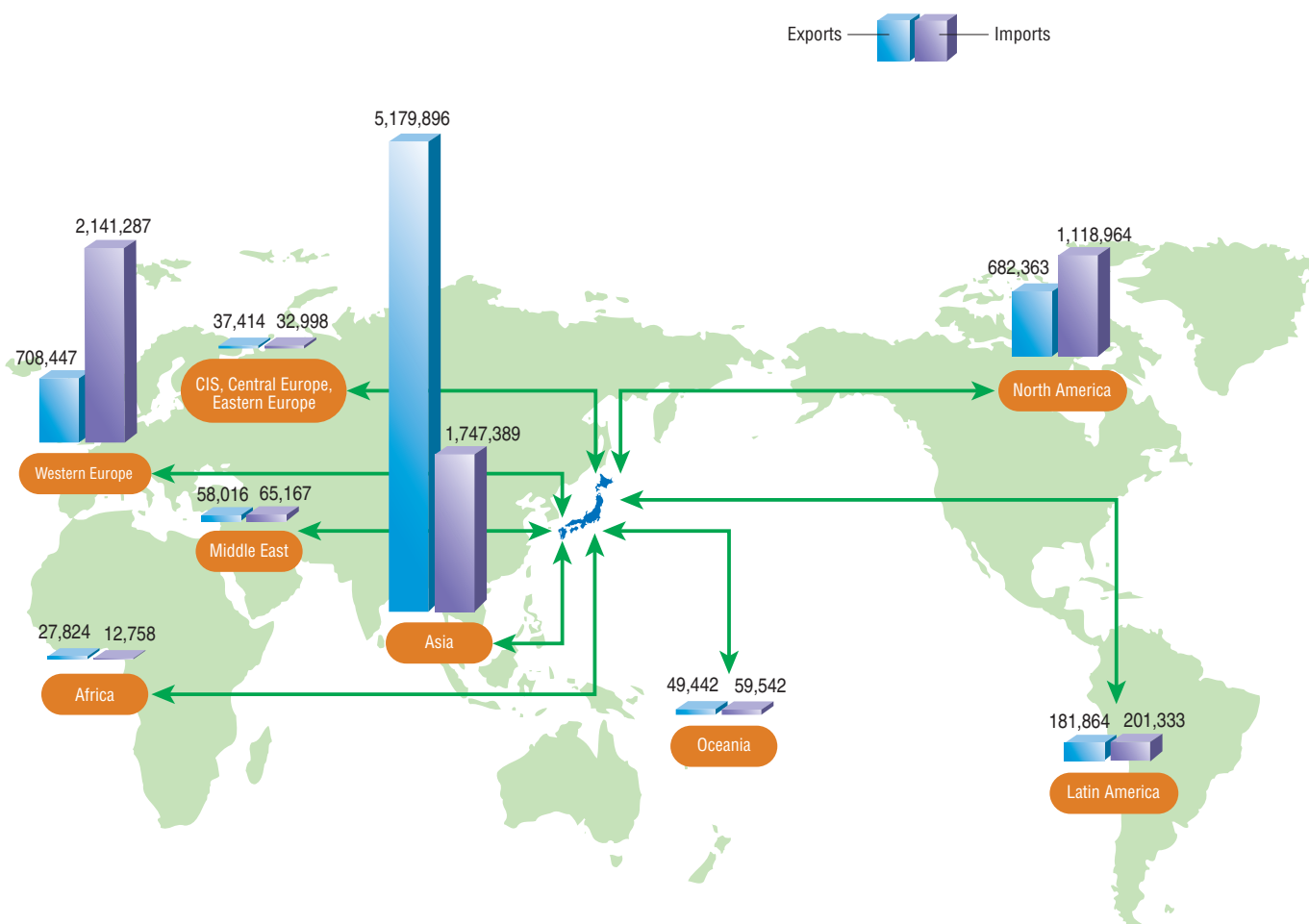
Exports and imports of chemicals [¥ million]

Exports						Articles	Imports					
Every 5th year		Recent three years					Every 5th year		Recent three years			
1995	2000	2005	2008	2009	2010		1995	2000	2005	2008	2009	2010
11,515	10,029	12,106	23,382	9,208	12,840	Fertilizers	49,566	57,025	78,275	167,938	80,713	74,484
158,905	222,143	310,854	513,260	317,493	377,226	Inorganic chemicals	183,410	228,712	393,477	721,101	390,731	523,731
1,031,703	1,192,727	1,883,168	2,032,843	1,701,512	1,872,788	Organic chemicals	696,878	799,250	1,184,334	1,528,198	1,230,234	1,349,574
809,104	1,057,477	1,715,683	2,231,691	1,844,108	2,335,967	Plastics	217,137	347,603	532,351	743,617	491,991	654,181
181,357	262,558	332,309	391,623	325,473	325,473	Dyes & paints	85,566	94,761	118,677	154,872	105,364	134,316
172,870	294,407	367,664	379,876	384,449	378,738	Drugs & medicines	461,522	514,885	905,966	1,142,372	1,326,601	1,522,579
83,787	129,205	182,022	230,834	209,090	247,886	Essential oil, perfume & cosmetics	141,030	194,430	290,912	315,032	282,713	308,713
380,036	636,115	1,044,232	1,465,321	988,595	1,374,349	Other chemical products	474,050	618,287	817,238	964,228	672,284	811,861
2,829,276	3,804,662	5,848,037	7,268,831	5,779,928	6,925,266	Total chemicals	2,309,160	2,854,954	4,321,230	5,737,358	4,582,630	5,379,439

(Source) Ministry of Finance [Trade Statistics]
http://www.customs.go.jp/toukei/info/index_e.htm

(Note) Chemical fiber products are excluded from the chemical industry.

Exports and imports of chemicals in 2010 by region [¥ million]



Exports and imports of chemicals in 2010 by region [¥ million]

Exports						Region	Imports					
Every 5th year		Recent three years					Every 5th year		Recent three years			
1995	2000	2005	2008	2009	2010		1995	2000	2005	2008	2009	2010
1,720,345	2,274,222	4,015,009	5,210,114	4,208,899	5,179,896	Asia	389,418	641,352	1,297,353	1,963,576	1,271,398	1,747,389
19,089	22,364	36,410	75,198	52,280	58,016	Middle East	56,390	52,104	69,160	119,085	61,535	65,167
493,871	594,826	760,854	873,062	639,432	708,447	Western Europe	1,012,152	1,206,525	1,739,797	2,131,087	2,070,392	2,141,287
464,140	706,503	774,313	794,523	599,500	682,363	North America	703,985	819,815	936,400	1,198,180	907,150	1,118,964
66,090	140,196	162,878	181,288	176,971	181,864	Latin America	78,952	69,417	179,025	192,836	186,070	201,333
14,203	16,262	19,578	31,778	26,810	27,824	Africa	7,990	5,397	17,657	19,219	9,340	12,758
44,983	41,909	58,602	66,265	50,940	49,442	Oceania	45,509	45,669	52,035	73,179	49,111	59,542
6,555	8,380	20,393	36,603	25,097	37,414	CIS, Central Europe, Eastern Europe	14,707	14,675	29,803	40,196	27,633	32,998
2,829,276	3,804,662	5,848,037	7,268,831	5,779,928	6,925,266	Total	2,309,160	2,854,954	4,321,230	5,737,358	4,582,630	5,379,439

(Source) Ministry of Finance [Trade Statistics]

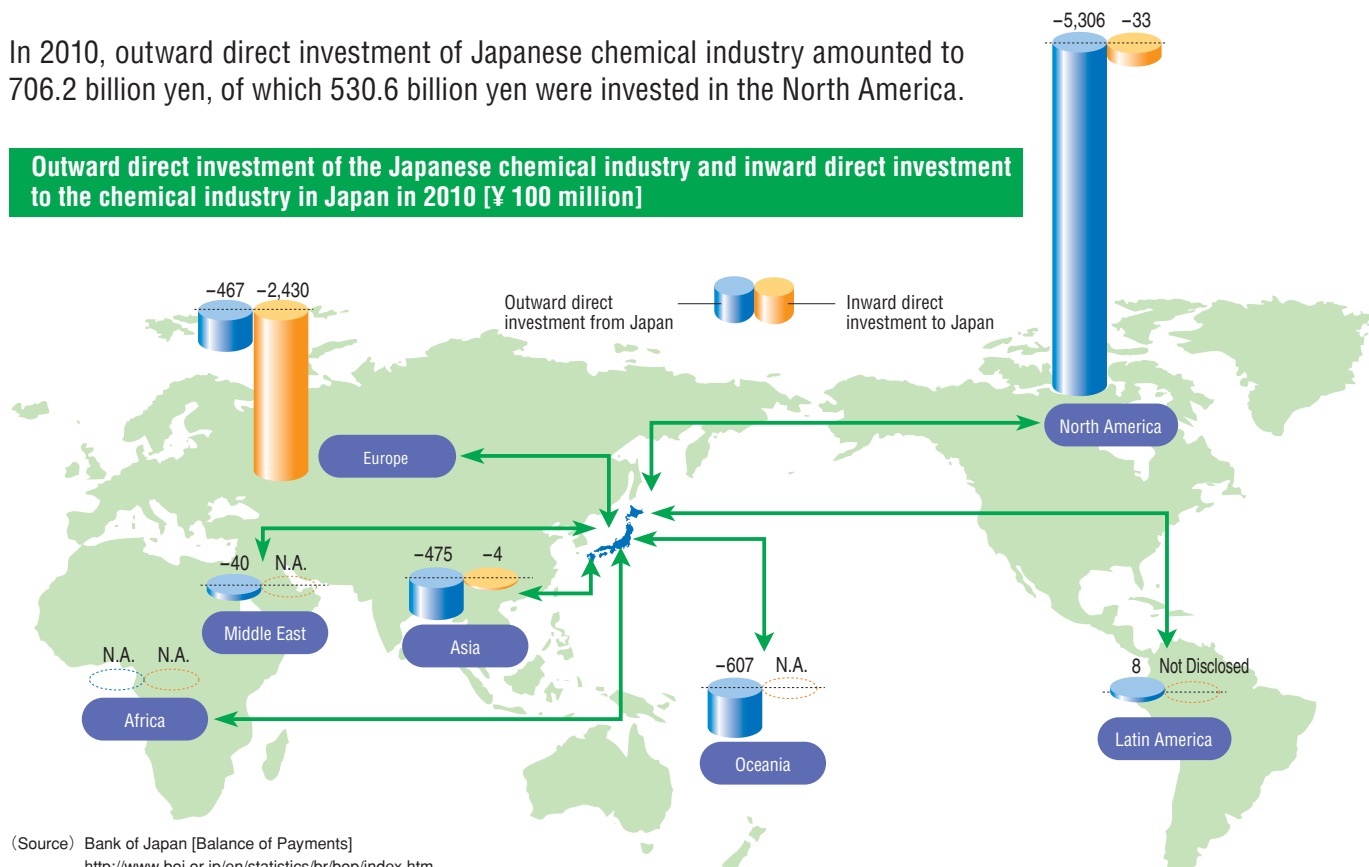
http://www.customs.go.jp/toukei/info/index_e.htm

(Note) Chemical fiber products are excluded from the chemical industry.

Outward direct investment amounts to yen 710 billion

In 2010, outward direct investment of Japanese chemical industry amounted to 706.2 billion yen, of which 530.6 billion yen were invested in the North America.

Outward direct investment of the Japanese chemical industry and inward direct investment to the chemical industry in Japan in 2010 [¥ 100 million]



(Source) Bank of Japan [Balance of Payments]

<http://www.boj.or.jp/en/statistics/br/bop/index.htm>

(Note)

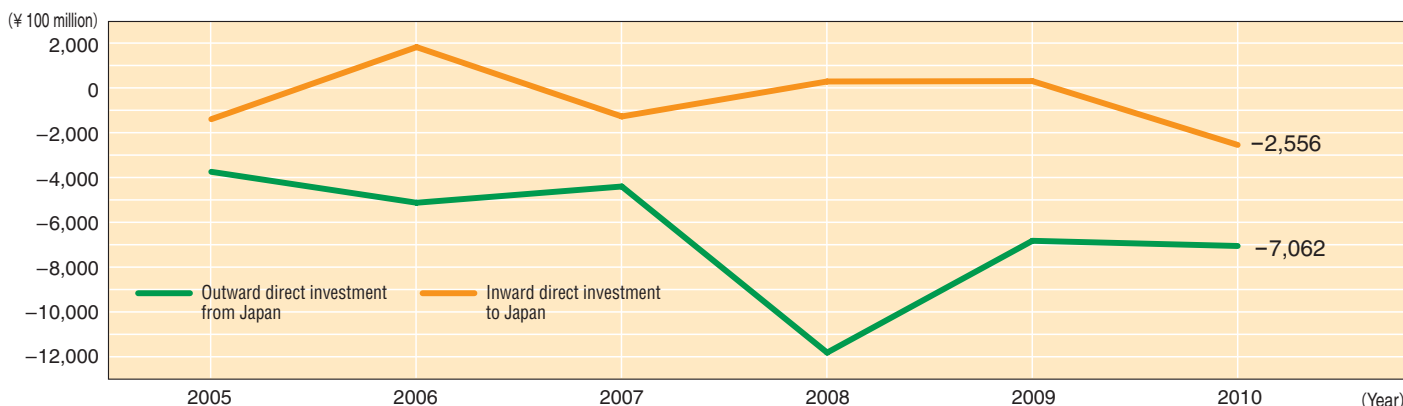
1. When there are no reports, it is indicated as "N.A."

2. 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.

3. Drugs & medicines are included in the chemical industry.

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



(Source) Bank of Japan [Balance of Payments]

<http://www.boj.or.jp/en/statistics/br/bop/index.htm>

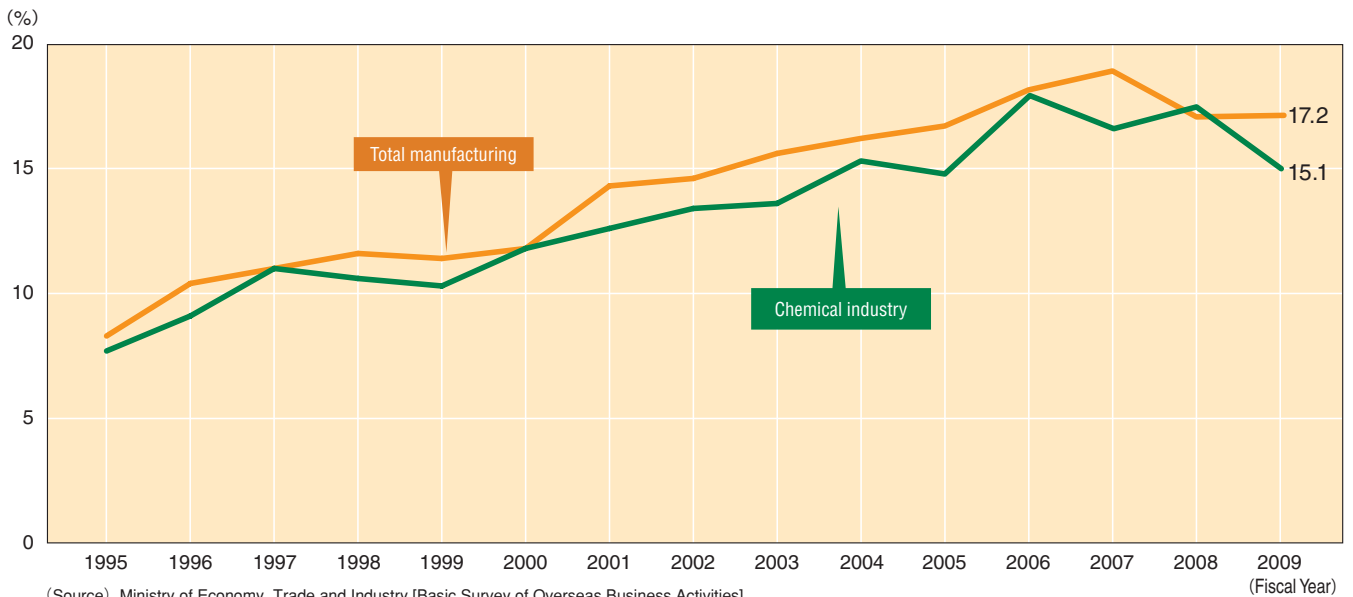
(Note)

Drugs & medicines are included in the chemical industry.

Continued progress seen in overseas business activity

Overseas production of the Japanese chemical industry accounted for 15.1% in 2009.

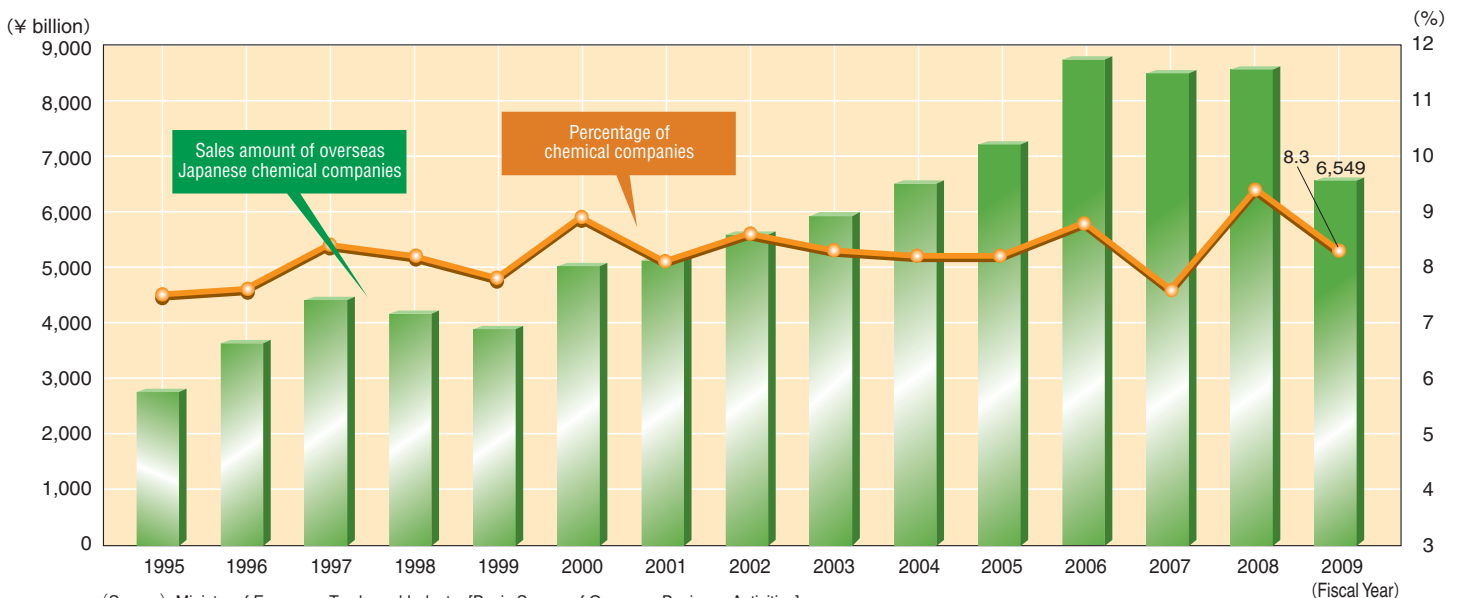
Trend of overseas production of Japanese companies [%]



(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 products are excluded from the chemical industry.

Sales of Japanese chemical companies based overseas and its percentage of all overseas Japanese manufacturing companies' sales [¥ billion]



(Source) Ministry of Economy, Trade and Industry [Basic Survey of Overseas Business Activities]
<http://www.meti.go.jp/english/statistics/tyo/kaigaizi/index.html>

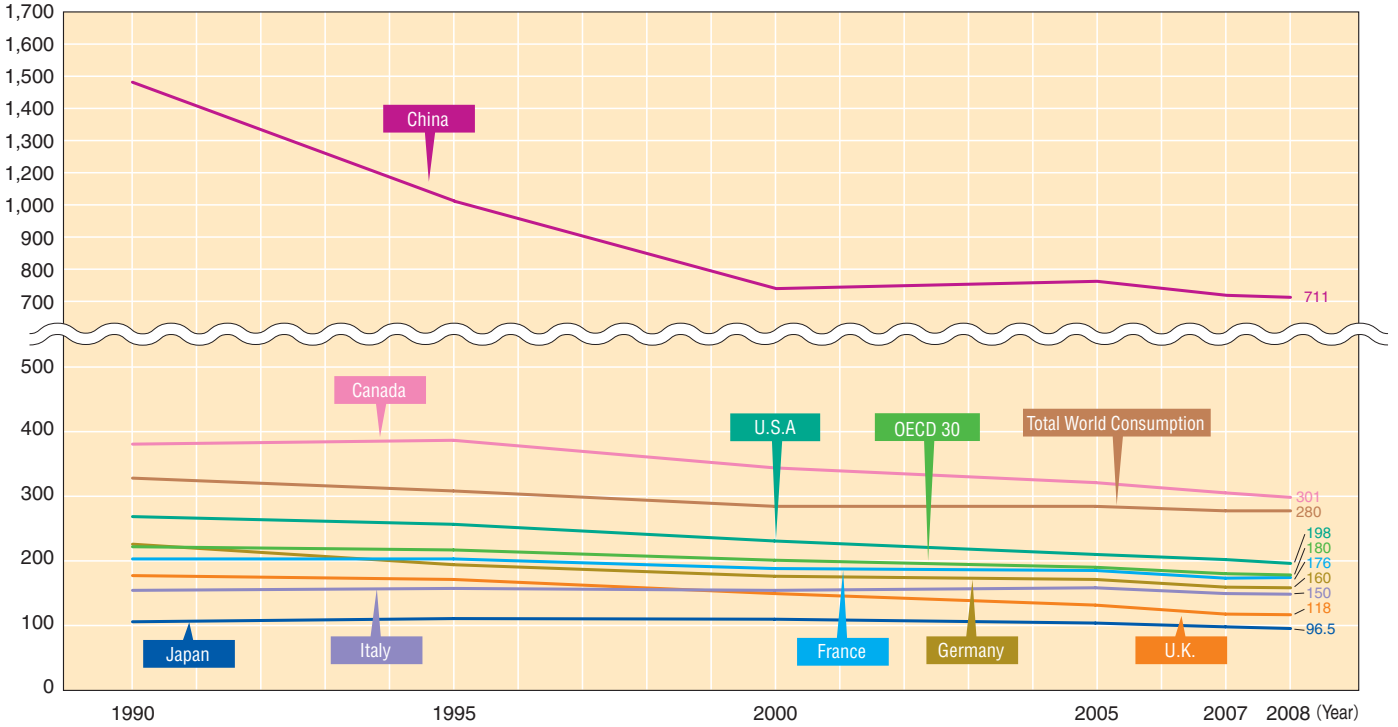
(Note) Chemical fiber products are excluded from the chemical industry.

Japan is an energy-saving superpower

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

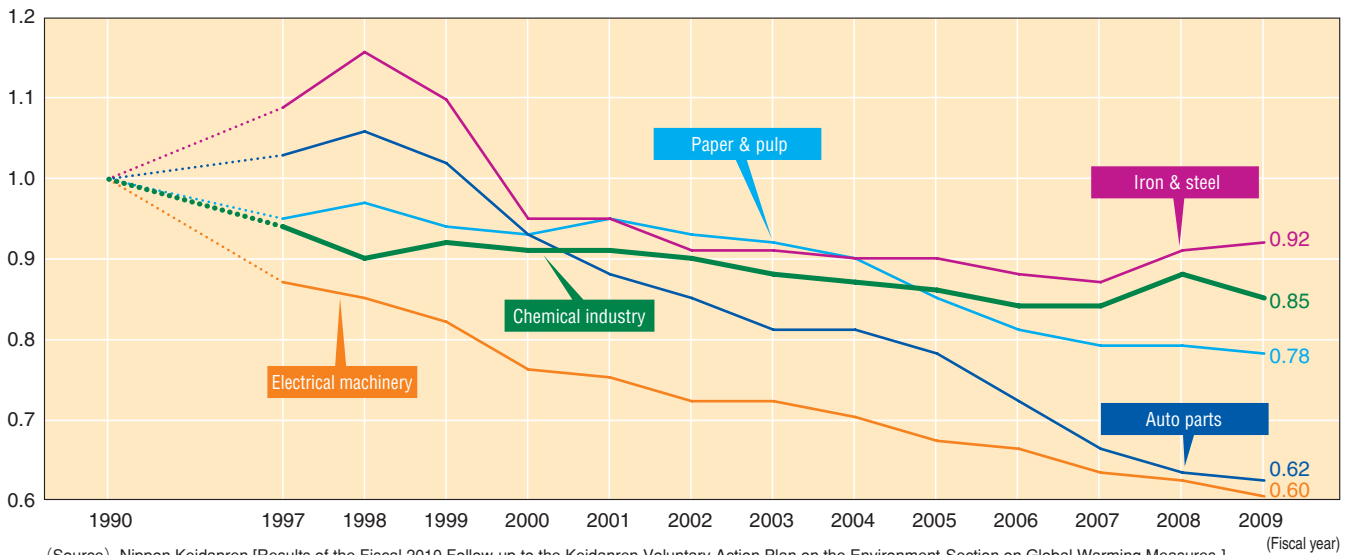
World's primary energy consumption per GDP

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



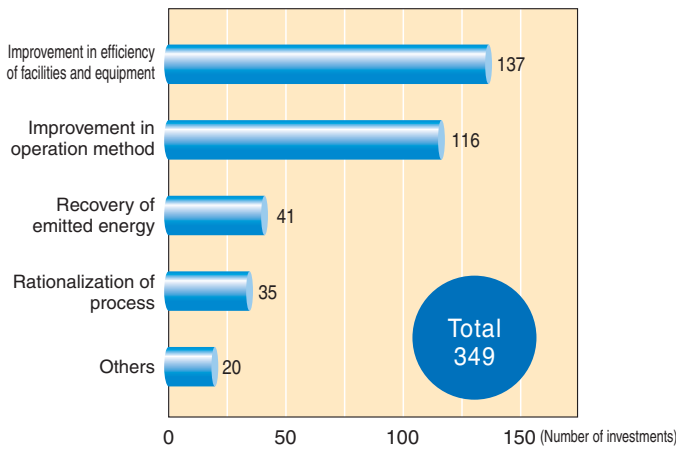
(Source) The Energy Conservation Center, Japan, [Handbook of Energy & Economic Statistics in Japan]

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



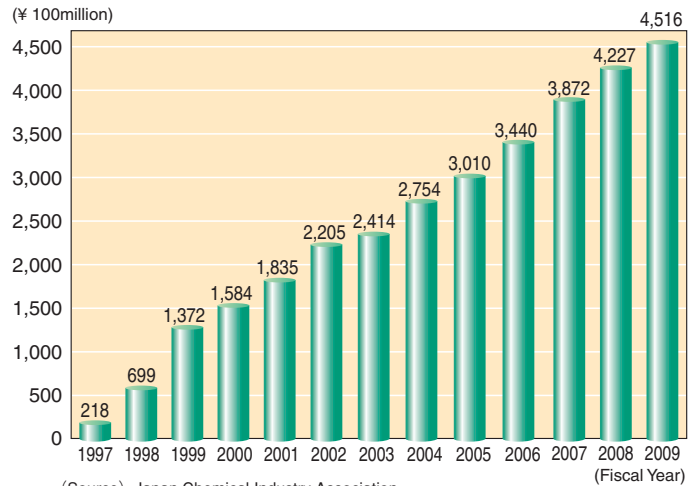
(Source) Nippon Keidanren [Results of the Fiscal 2010 Follow-up to the Keidanren Voluntary Action Plan on the Environment-Section on Global Warming Measures-] (Fiscal year)

Energy conservation capital investment (FY2009)



(Source) Japan Chemical Industry Association

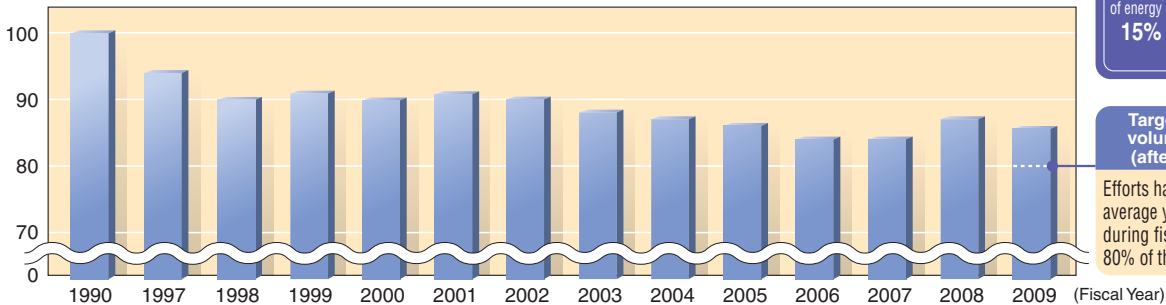
Energy conservation capital investment (cumulative)



(Source) Japan Chemical Industry Association

Trend of energy intensity index

Indicator
*Fiscal 1990 is set at 100



(Source) Japan Chemical Industry Association

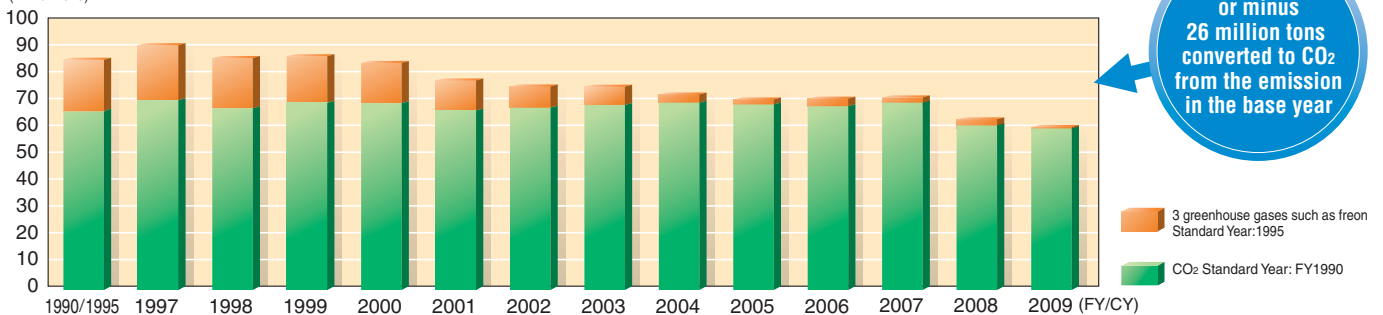
Energy Consumption Indicator Unit Trends
*An energy consumption unit is the amount of energy used to produce a product.
15% reduction versus fiscal 1990

Target reductions of the voluntary initiative plan (after reviewed in 2007)

Efforts has been made to reduce the average yearly energy consumption during fiscal years 2008 to 2012 to 80% of that in 1990.

Greenhouse gases emissions under the voluntary action plan of the chemical industry [million tons]

Converted to CO₂ (million tons)



(Source) Japan Chemical Industry Association

3 greenhouse gases such as freon
Standard Year: 1995
CO₂ Standard Year: FY1990

Minus 30% or minus 26 million tons converted to CO₂ from the emission in the base year

Do you know Responsible Care?

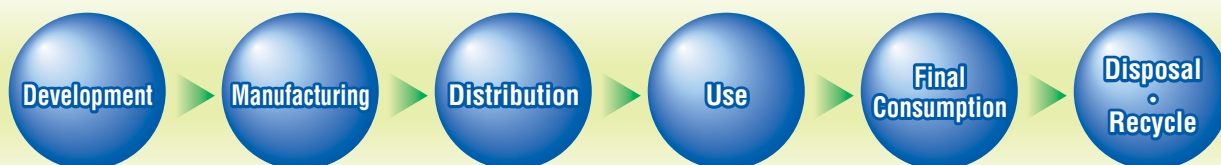
Efforts of chemical industry to preserve health, safety and environment

What is Responsible Care?

Chemical substances are vital and indispensable to our daily lives. However, if they are improperly handled, they can be hazardous and can damage human health and environment. Concerns about health, safety and the environment are increasing due to the escalation of global environmental problems, the expansion of industrialization and new problems arising from technological developments. It is no longer possible to ensure environmental and human health and safety through legislation, and all parties who deal in or

manage chemicals are required to take initiatives to protect health, safety and the environment.

The global chemical industry is working voluntarily to protect health, safety and the environment through every process from the development of chemical substances, their manufacture, distribution, use and final consumption to disposal or recycle as well as engaging in dialogue and communication with the public by openly disclosing performance. These initiatives are called "Responsible Care".



Responsible Care® (RC) was established in Canada in 1985. Since then, through the International Council of Chemical Associations (ICCA), which was established in 1989, RC has expanded significantly. Today, 54 countries and regions have adopted RC activities (as of April 2011). In 1995, the Japan Responsible Care Council (JRCC) was established within the Japan Chemical Industry Association (JCIA) by 74 corporations, primary companies engaged in

manufacturing and handling chemical substances. With the establishment of the JRCC, the environment, safety and health activities of each company were harmonized and further intensified to promote public understanding of the chemical industry. JRCC was combined with JCIA in May 2010 and has been reorganized as the Responsible Care (RC) Committee of JCIA. Ninety-four companies participate in the committee as members.

The Responsible Care Logo

The logo, depicting a pair of hands and a model of a molecule, express the key message in handling chemical substances with care, and the ICCA has adopted the logo as an international mark to be used by corporations and associations that implement Responsible Care. Permission to use the logo has been granted to chemical industry associations in all ICCA member countries, as well as the respective members of those associations.

In Japan, the Responsible Care logo can be used only by the JCIA, the RC Committee and the RC Committee members.



Responsible Care®
OUR COMMITMENT TO SUSTAINABILITY

Procedures for Implementing RC

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

The RC Committee compiles the RC Report on the activities and achievements of member companies and publishes it for the society.

Most of the member companies publish their own RC Report and CSR Report, while making their activities and achievements accessible to the society.



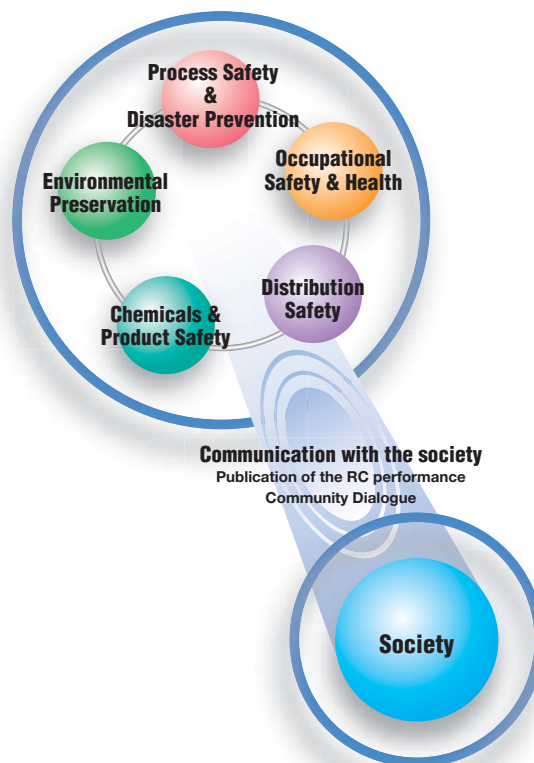
Responsible Care Implementation Items

The RC Committee and its members collectively take action in five principal areas:

- Environmental protection (protecting nature and health globally)
- Process safety and disaster prevention (striving to prevent disasters at industrial facilities and countermeasures for natural disasters)
- Occupational safety and health (protecting the safety and health of workers)
- Distribution safety (preventing accidents during the transportation of chemicals and protecting human safety and the environment)
- Chemicals and product safety (clearly identifying the properties and handling methods of chemical products and protecting health, safety and the environment of all persons who handle these products, including customers)

and

- The RC Committee and its members publicly report the results of these efforts to promote the following :
Interaction/communication with the society





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



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Photos are provided by courtesy of the member companies of the Japan Chemical Industry Association.