

Chemical Industry of Japan 2010



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 28 trillion yen to 44 trillion yen in 2008, making the industry the second most important industry in manufacturing after transportation and the machinery manufacturing industry.

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

	Amount of value-added (unit: trillion yen)	Amount of shipment (unit: trillion yen)	Number of employees (unit: 10,000 persons)
Chemical industry in a broad sense: "Chemical +plastics+rubber"	15.4 (Ranks second 15.2%)	43.7 (Ranks second 13.0%)	93 (Ranks third 11.3%)
Chemical industry	10.0 (Ranks second 9.8%)	28.1 (Ranks second 8.4%)	35 (Ranks eighth 4.2%)
Chemical industry in a narrow sense: "Chemical" -pharmaceuticals	5.8 (5.8%)	21.1 (6.3%)	26 (3.1%)
(Reference) Other industries	Transportation Machinery 15.7 Foods 8.7	Transportation Machinery 63.7 Foods 24.9	Foods 114 Transportation Machinery 103

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

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

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

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

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

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

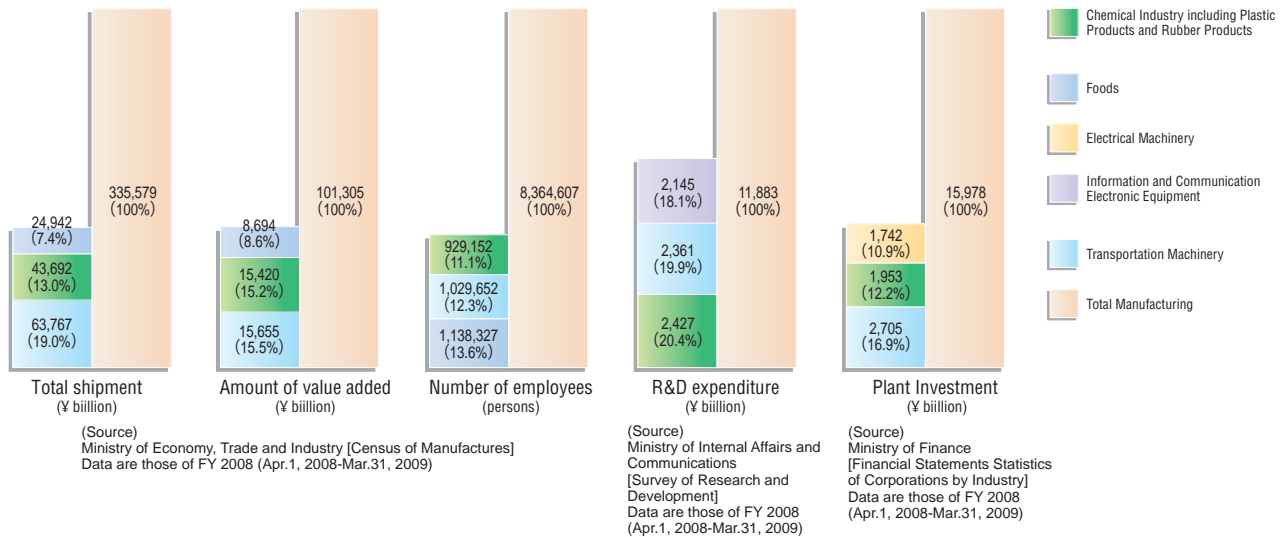
Japan Productivity Center

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Highlights

Total shipments amount to approximately 44 trillion yen, which ranks second among all manufacturing industries.
 Total value-added amounts to approximately 15 trillion yen, which ranks second among all manufacturing industries.
 Chemical industry is an R&D-driven industry.



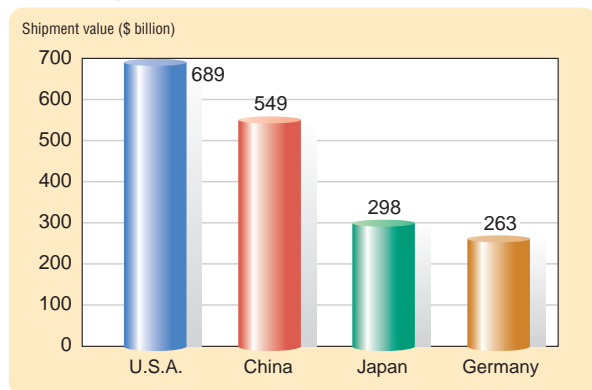
Exports by chemical industry continue to exceed imports.

	2005	2006	2007	2008	2009
Export	5,848,037	6,793,864	7,745,339	7,268,831	5,779,928
Import	4,321,230	4,909,332	5,471,184	5,737,358	4,582,630
Difference	1,526,807	1,884,532	2,274,155	1,531,473	1,197,298

¥ million

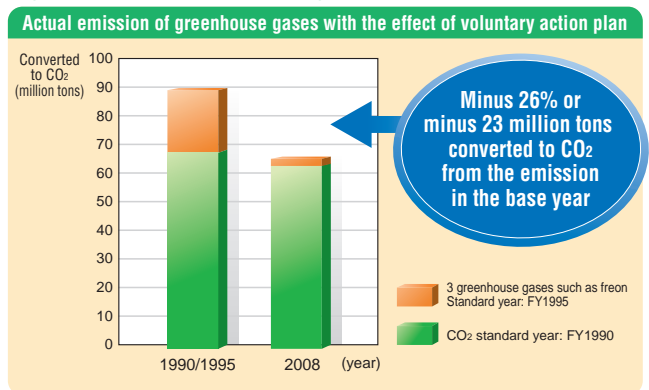
(Source) Ministry of Finance [Trade Statistics]

Japan-originated chemical companies total shipment ranks third.



(Source) American Chemistry Council
 "Guide to the Business of Chemistry 2009"

Chemical Industry Is Actively Taking Measures against Global Warming.



(Source) Japan Chemical Industry Association

About Chemical Vision Study Group

With a changing global demand structure following the worldwide financial crisis, greater attention to issues of global warming, and increased international competition by newly-built plants in the Middle East and China, the chemical industry is focusing on the future of its surrounding environment. Under these circumstances, it has become increasingly important to deepen the understanding of the future direction of the chemical industry and to overcome new issues through cooperation between the government and private sector in fields including research and development. Therefore, the Ministry of Economy, Trade and Industry conducted a study group to research how to manage various issues that surround the chemical industry, including: global warming, globalization, evolving business models, corporate collaboration, research and technology developments, and human resource management. The Ministry compiled the research into the "Chemical Vision Study Group Report".

(Reference) "Chemical Vision Study Group Report" <http://www.meti.go.jp/report/data/g100430aj.html>

(Source) "2010 Manufacturing Products White Paper"

Chemical Industry and Technology and Social Needs

Chemical Industry Supports Our Life and Other Industries.

Raw Materials

Water/air

Salt

Oil
(Naphtha)

Natural gas

Coal

Ore

Animals
and plants



Intermediates

Hydrogen

Oxygen

Carbonic acid gas

Inactive gas

Soda ash

Nitric acid

Phosphoric acid

Ethanol

Propylene

Butadiene

Toluene

Styrene

Nitrogen

Chlorine

Carbon oxide

Caustic soda

Hydrochloric acid

Sulfuric acid

Methanol

Ethylene

Butylene

Benzene

Xylene



Primary Products

Pigments

Dyes

Industrial gas

Fertilizers

Printing ink

Paints

Synthetic fiber

Synthetic rubbers

Cosmetics

Tooth-powder

Solvents

Fuel

Bleach

Adhesives

Oil and fat products

Photo-sensitive chemicals

Surfactants

Agricultural
chemicals

Petrochemicals

Plastics

Pharmaceuticals

Sterilizer

Synthetic
detergents



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



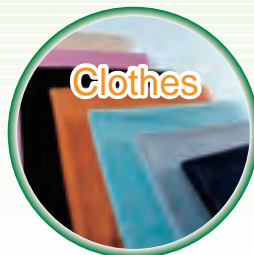
Housing

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



Food

Plant breeding by
biotechnology,
plastic wrap



Clothes

Form-memorizing apparels,
chemical fiber products



Resources
and Energy

Solar generation,
fuel cells



Environment

Green chemistry,
disposal of wasted chemicals



Transportation/
Telecommunication/
Electronics

Materials for
cellular phone,
automobiles



Medical
Treatment/
Health

Genomic medicines,
artificial kidney



Nanotechnology/
New Materials

Materials for
organic electroluminescence,
light emitting diode



Information
Disclosure

PRTR,
risk communications,
MSDS



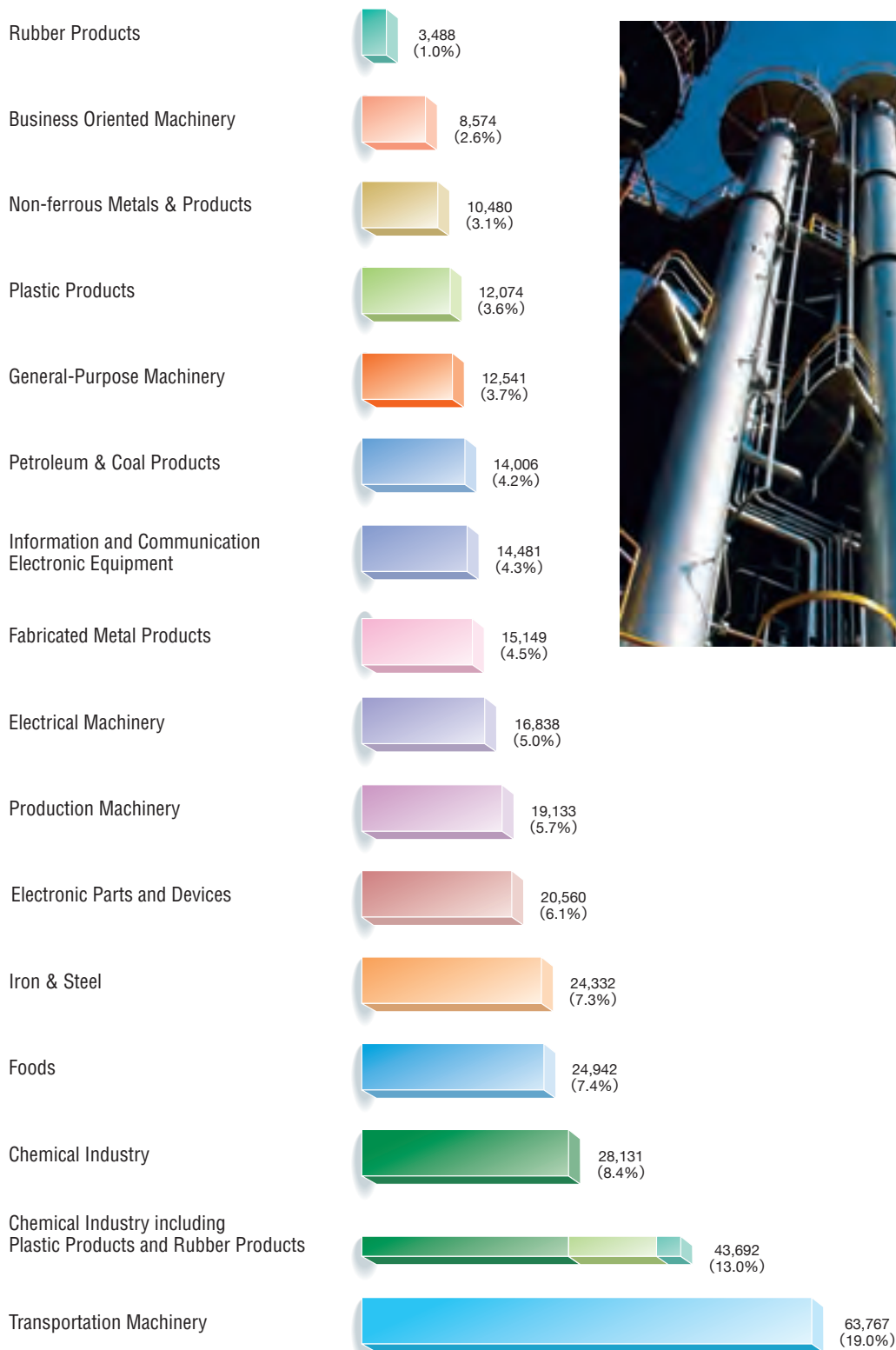
Global

ICCA HPV Initiative
(The International Council of
Chemical Associations)

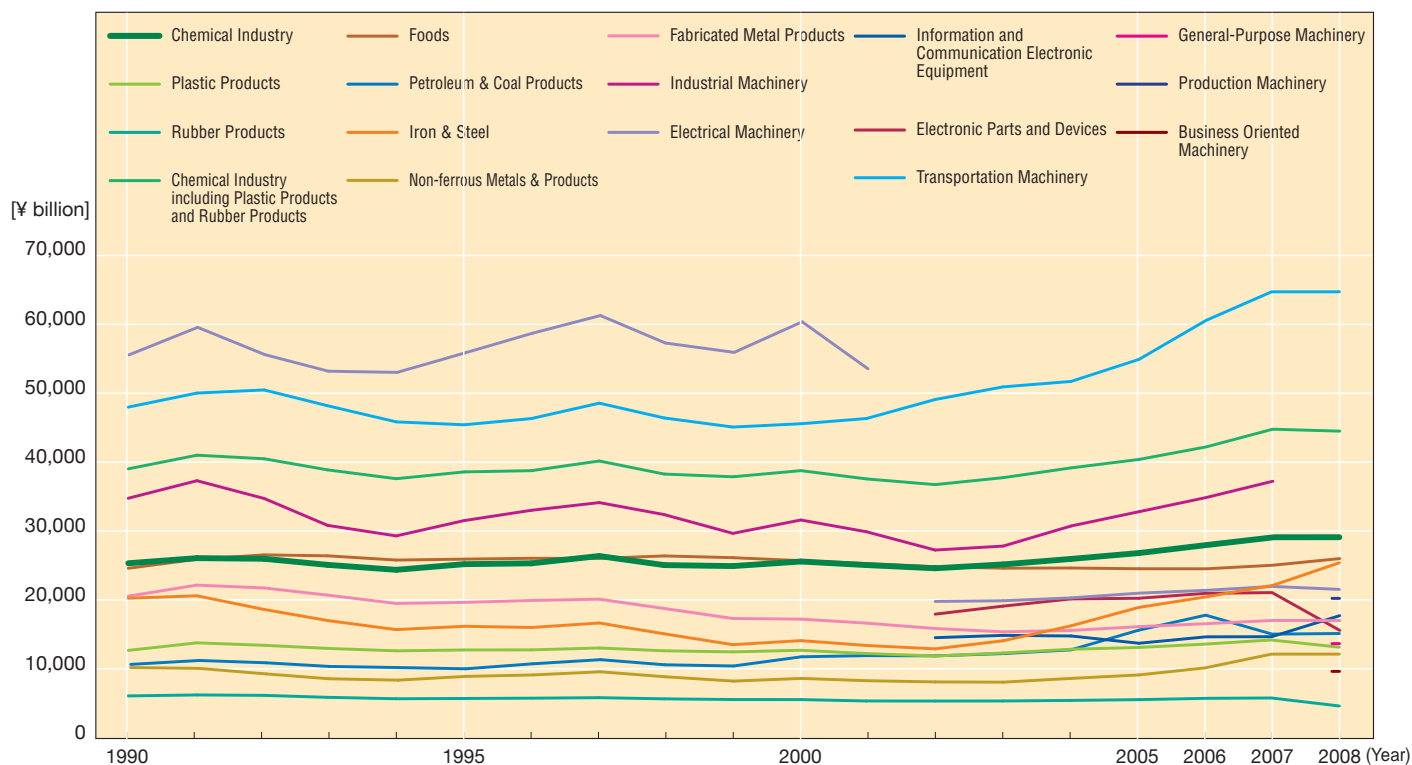
Total Production (Shipments) of Chemical Industry Amounts to Yen 28 Trillion

Chemical industry's total shipment value in 2008 amounted to yen 28 trillion, accounting for 8.4% of entire manufacturing industry.

Shipment value of the chemical industry in the manufacturing industries in 2008 [¥ 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	2006	2007	2008	
Chemical Industry		23,503	23,363	23,762	25,027	26,200	28,294	28,131	8.4%
Plastic Products		10,466	10,530	10,486	10,906	11,412	12,399	12,074	3.6%
Rubber Products		3,656	3,275	3,107	3,099	3,295	3,535	3,488	1.0%
Chemical Industry including Plastic Products and Rubber Products		37,624	37,168	37,356	39,032	40,906	44,227	43,692	13.0%
Foods		22,748	24,117	23,888	22,678	22,673	24,196	24,942	7.4%
Petroleum & Coal Products		8,298	7,635	9,434	13,429	15,682	13,701	14,006	4.2%
Iron & Steel		18,269	14,073	11,927	16,896	18,473	21,192	24,332	7.3%
Non-ferrous Metals & Products		7,822	6,496	6,191	6,712	9,016	10,771	10,480	3.1%
Fabricated Metal Products		18,574	17,646	15,143	14,016	14,451	15,189	15,149	4.5%
Industrial Machinery		33,225	29,884	29,972	31,211	33,331	36,273	—	—
General-Purpose Machinery		—	—	—	—	—	—	12,541	3.7%
Production Machinery		—	—	—	—	—	—	19,133	5.7%
Business Oriented Machinery		—	—	—	—	—	—	8,574	2.6%
Electrical Machinery		54,529	54,831	59,449	18,812	19,663	21,066	16,838	5.0%
Information and Communication Electronic Equipment		—	—	—	11,534	12,496	13,325	14,481	4.3%
Electronic Parts and Devices		—	—	—	18,265	19,004	20,936	20,560	6.1%
Transportation Machinery		46,858	44,215	44,367	54,000	59,836	63,910	63,767	19.0%
Others		75,427	69,965	62,752	48,760	49,303	51,970	47,084	14.0%
Total Manufacturing		323,373	306,030	300,478	295,346	314,835	336,757	335,579	100.0%

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

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

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

Electrical machinery was divided into electrical machinery, information and communication 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.

Chemical Products That Meet The Needs of Various Fields

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

Trend of shipment composition in chemical industry [%]



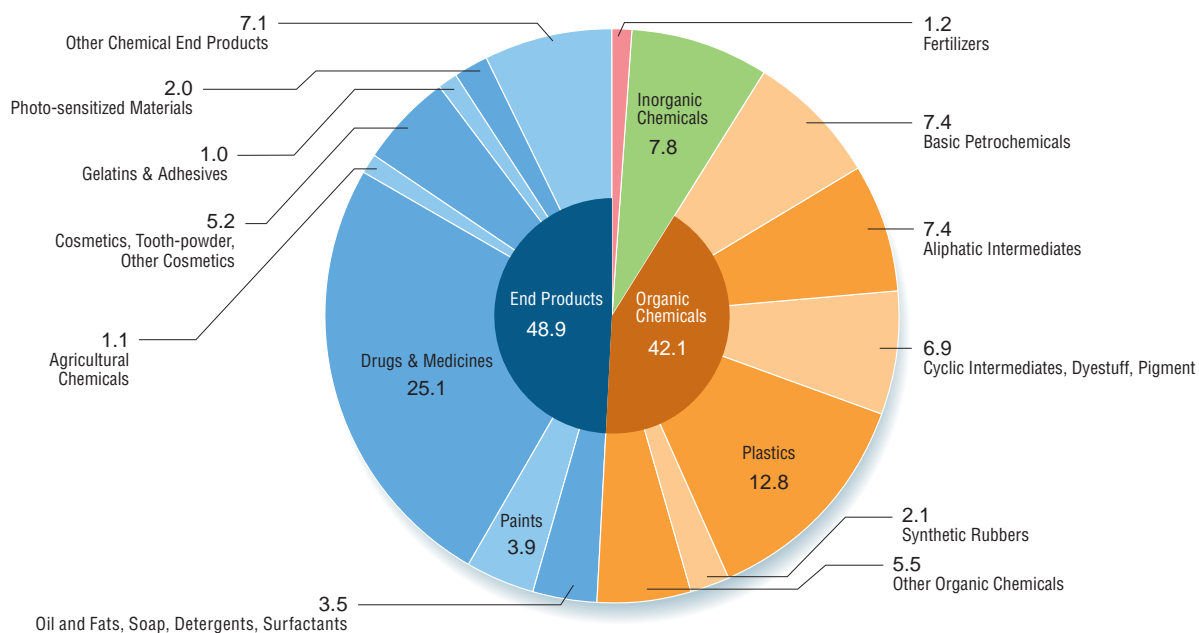
Trend of shipment composition in chemical industry [%]

Industry	Year	Every 5th year				Recent three years		
		1990	1995	2000	2005	2006	2007	2008
Fertilizers		1.4	1.4	1.2	1.1	0.9	1.0	1.2
Inorganic Chemicals		5.9	6.4	6.1	6.4	6.9	7.0	7.8
Organic Chemicals		37.8	34.0	35.0	37.7	40.4	41.2	42.1
▶ Basic Petrochemicals		5.1	2.6	2.9	6.3	8.7	8.2	7.4
▶ Aliphatic Intermediates		4.5	5.5	7.1	6.1	6.5	7.1	7.4
▶ Cyclic Intermediates, Dyestuff, Pigment		6.9	6.9	6.1	7.6	7.7	7.6	6.9
▶ Plastics		15.4	14.0	13.6	11.0	10.4	11.9	12.8
▶ Synthetic Rubbers		2.3	1.7	1.5	2.0	2.0	1.4	2.1
▶ Other Organic Chemicals		3.6	3.3	3.8	4.7	5.0	5.0	5.5
Chemical Fibers		4.4	3.8	3.1	1.8	1.8	1.5	—
End Products		50.4	54.4	54.6	53.0	49.9	49.3	48.9
▶ Oil and Fats, Soap, Detergents, Surfactants		4.1	4.0	3.5	4.1	3.6	3.4	3.5
▶ Paints		4.9	4.6	4.1	3.7	3.8	4.1	3.9
▶ Drugs & Medicines		21.9	25.7	27.0	28.0	26.2	25.0	25.1
▶ Agricultural Chemicals		1.6	1.6	1.4	1.1	1.0	1.0	1.1
▶ Cosmetics, Tooth-powder, Other Cosmetics		5.9	6.4	6.0	5.6	5.2	5.0	5.2
▶ Gelatins & Adhesives		1.0	1.0	1.0	1.0	1.0	1.0	1.0
▶ Photo-sensitized Materials		4.1	4.6	4.4	2.5	2.3	2.6	2.0
▶ Other Chemical End Products		6.9	6.6	7.2	7.0	6.7	7.1	7.1
Chemical Industry		100	100	100	100	100	100	100.0
Chemical Industry		62.5	62.9	63.6	64.1	64.0	64.0	64.4
Plastic Products		27.8	28.3	28.1	27.9	27.9	28.0	27.6
Rubber Products		9.7	8.8	8.3	7.9	8.1	8.0	8.0
Chemical Industry in A Broad Sense (including Plastic Products, and Rubber Products)		100	100	100	100	100	100	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.
 Chemical fibers moves to textile industry from 2008.

Composition of chemical products shipped in 2008 [%]



The major chemical industry indices with breakdown by product in 2008

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		153	4,175	351	89	3.1	1.2	1.2	0.9
Inorganic Chemicals		834	35,373	2,188	663	16.7	10.1	7.8	6.6
Organic Chemicals		794	88,690	11,843	2,542	15.9	25.4	42.1	25.5
▶ Basic Petrochemicals		11	3,774	2,096	275	0.2	1.1	7.4	2.8
▶ Aliphatic Intermediates		77	10,767	2,068	572	1.5	3.1	7.4	5.7
▶ Cyclic Intermediates, Dyestuff, Pigment		164	16,357	1,944	397	3.3	4.7	6.9	4.0
▶ Plastics		251	29,811	3,608	694	5.0	8.5	12.8	7.0
▶ Synthetic Rubbers		20	6,666	582	170	0.4	1.9	2.1	1.7
▶ Other Organic Chemicals		271	21,315	1,547	434	5.4	6.1	5.5	4.4
End Products		3,226	221,510	13,748	6,673	64.4	63.3	48.9	67.0
▶ Oil and Fats, Soap, Detergents, Surfactants		281	14,548	990	395	5.6	4.2	3.5	4.0
▶ Paints		432	19,048	1,090	306	8.6	5.4	3.9	3.1
▶ Drugs & Medicines		865	94,340	7,066	4,128	17.3	27.0	25.1	41.4
▶ Agricultural Chemicals		72	4,534	309	128	1.4	1.3	1.1	1.3
▶ Cosmetics, Tooth-powder, Other Cosmetics		458	32,083	1,455	881	9.1	9.2	5.2	8.8
▶ Gelatins & Adhesives		157	5,623	290	92	3.1	1.6	1.0	0.9
▶ Photo-sensitized Materials		67	12,161	552	170	1.3	3.5	2.0	1.7
▶ Other Chemical End Products		894	39,173	1,997	574	17.9	11.2	7.1	5.8
Chemical Industry		5,007	349,748	28,131	9,967	100.0	100.0	100.0	100.0
Chemical Industry		5,007	349,748	28,131	9,967	20.6	37.6	64.4	64.6
Plastic Products		16,107	454,316	12,074	4,160	66.1	48.9	27.6	27.0
Rubber Products		3,248	125,088	3,488	1,293	13.3	13.5	8.0	8.4
Chemical Industry in A Broad Sense (including Plastic Products, and Rubber Products)		24,362	929,152	43,692	15,420	100.0	100.0	100.0	100.0

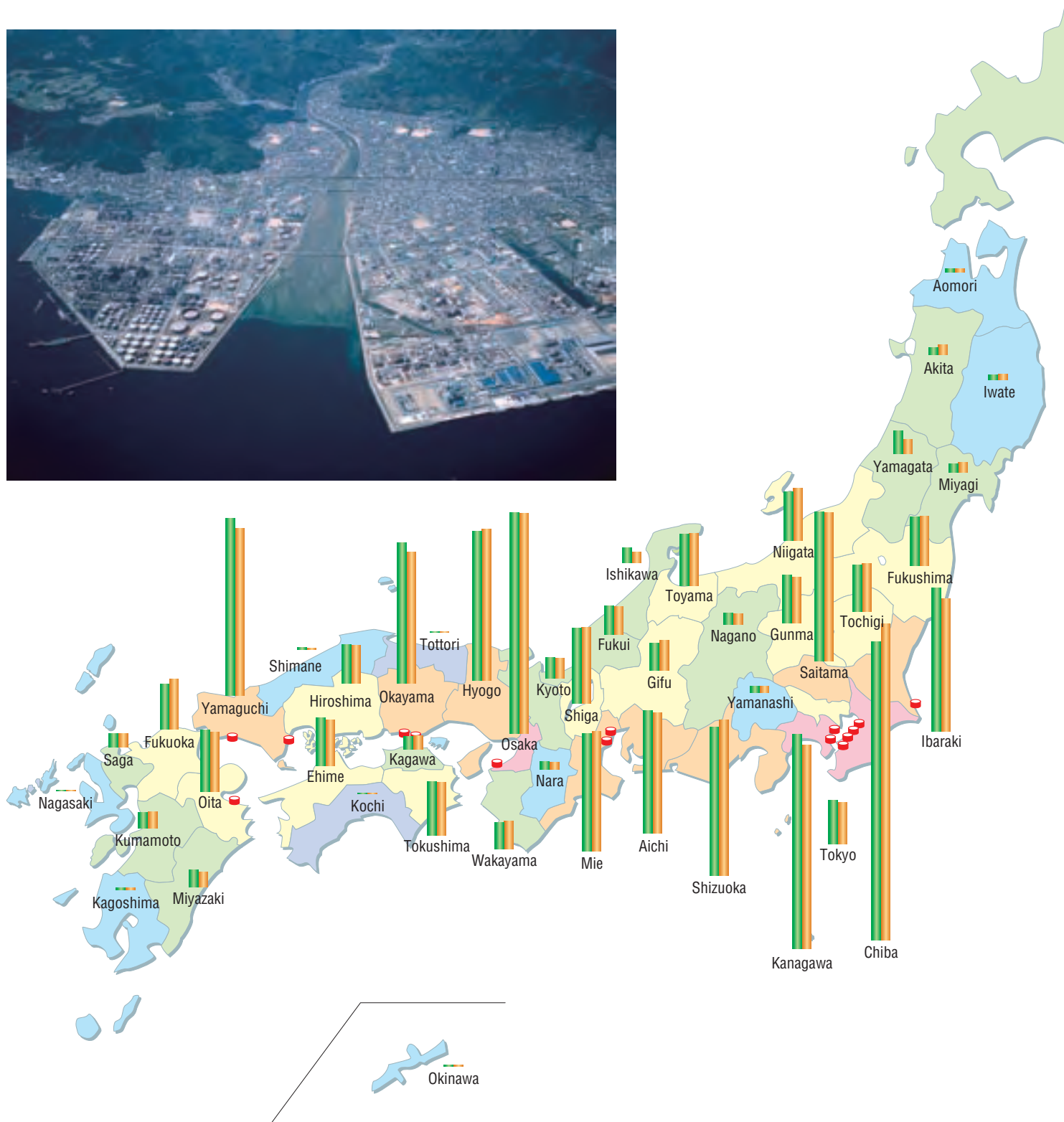
(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
<http://www.meti.go.jp/english/statistics/tyo/kougyo/index.html>

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



Shipment by Prefecture

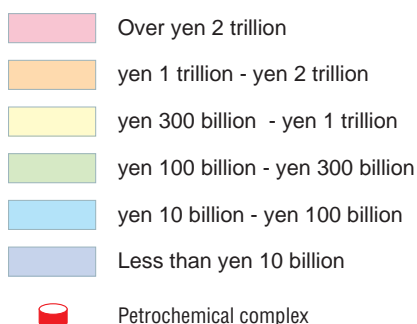
Chiba, Osaka and Kanagawa shipped more than yen 2 trillion each.

Shipment of chemical products by prefecture in 2008





2007  2008 



Shipment of chemical products by prefecture in 2008

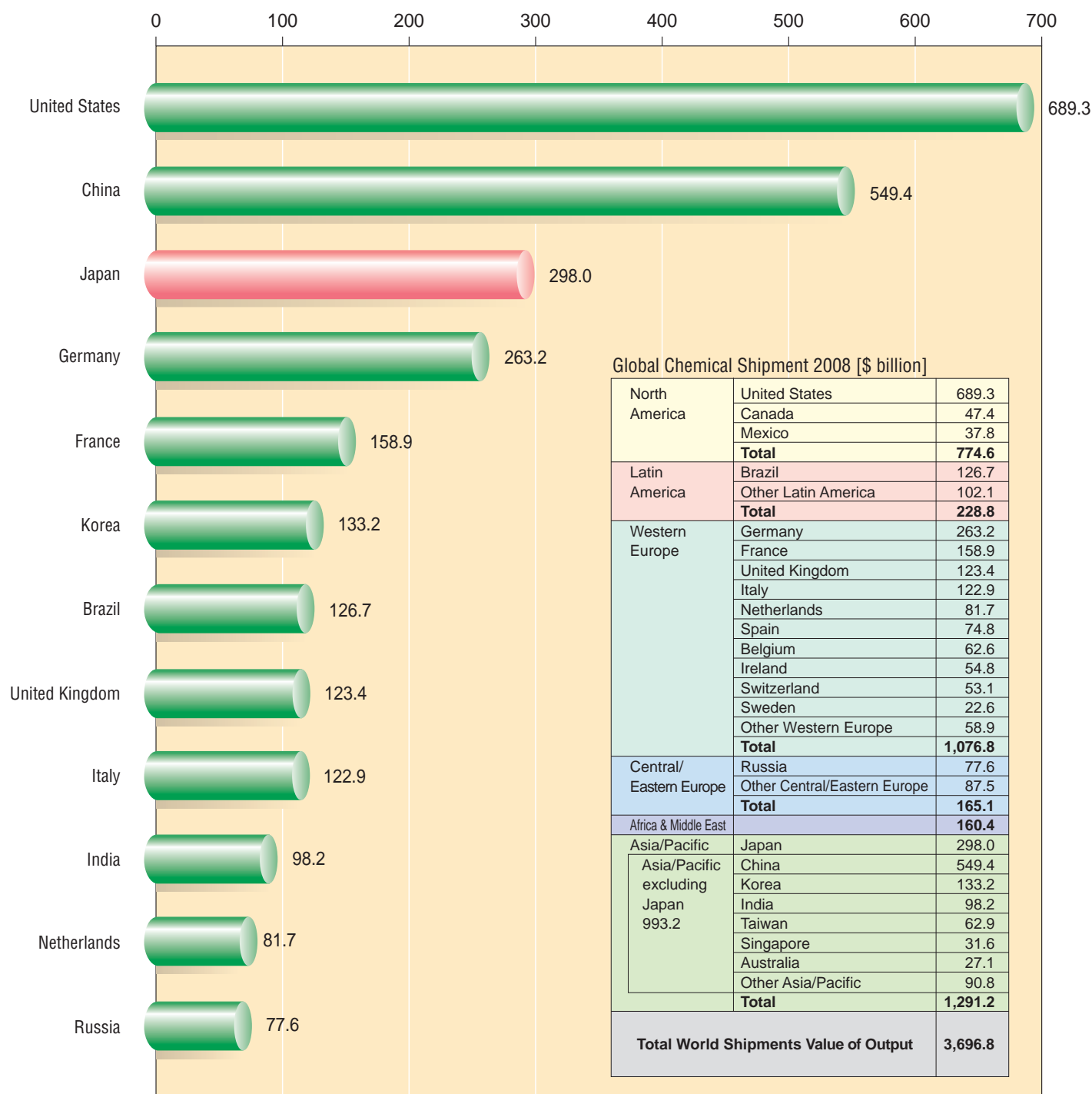
	Prefecture	Shipment (¥100million)	Increase/decrease from previous year (%)	Number of employees
1	Chiba	32,387	106.0%	19,667
2	Osaka	22,576	99.6%	34,223
3	Kanagawa	20,847	95.0%	25,578
4	Yamaguchi	17,076	94.2%	14,166
5	Shizuoka	15,948	104.6%	24,232
6	Hyogo	15,508	101.7%	21,117
7	Saitama	15,226	99.6%	21,545
8	Ibaraki	13,563	92.4%	13,550
9	Okayama	13,430	93.2%	9,420
10	Aichi	12,328	98.5%	15,054
11	Mie	12,266	102.1%	12,352
12	Shiga	7,730	100.5%	6,590
13	Oita	6,084	96.6%	2,235
14	Tokushima	5,409	97.6%	8,784
15	Toyama	5,375	102.5%	11,648
16	Niigata	5,370	107.7%	6,887
17	Fukuoka	5,094	111.3%	7,624
18	Fukushima	5,072	101.3%	8,290
19	Tochigi	4,928	103.7%	6,105
20	Gunma	4,696	95.5%	6,930
21	Ehime	4,676	95.8%	4,388
22	Tokyo	4,279	96.1%	11,903
23	Hiroshima	3,881	99.0%	5,900
24	Gifu	3,102	109.6%	5,169

	Prefecture	Shipment (¥100million)	Increase/decrease from previous year (%)	Number of employees
25	Wakayama	2,881	103.7%	4,870
26	Fukui	2,835	96.7%	3,549
27	Kyoto	2,071	96.4%	5,071
28	Hokkaido	1,712	110.0%	3,497
29	Kumamoto	1,683	105.6%	3,688
30	Miyazaki	1,572	88.0%	1,787
31	Yamagata	1,518	64.4%	3,122
32	Saga	1,405	103.7%	1,701
33	Kagawa	1,375	109.2%	2,960
34	Nagano	1,105	95.8%	1,882
35	Akita	1,062	139.6%	1,423
36	Ishikawa	1,060	71.7%	1,600
37	Miyagi	1,008	117.9%	1,831
38	Nara	731	94.0%	3,189
39	Yamanashi	639	99.8%	1,391
40	Iwate	637	111.9%	1,550
41	Aomori	386	103.8%	640
42	Kagoshima	274	125.9%	552
43	Shimane	173	77.4%	561
44	Nagasaki	110	102.7%	311
45	Okinawa	110	99.1%	870
46	Kochi	88	98.8%	253
47	Tottori	25	107.6%	93
	Total	281,307	99.4%	349,748

(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 2008 [\$ billion]



(Source) American Chemistry Council

The world's leading chemical companies in 2008

Ranking	Company	Chemical Sales [\$ million]			Country	Chemical Operating Profits [\$ million] ^(a)		
			Change from 2007	Chemical Sales as of Total Sales			Change from 2007	Operating Profit Margin ^(b)
1	BASF	70,485	0.9	76.8	Germany	3,857	-38.9	5.5
2	Dow Chemical	57,514	7.5	100.0	U.S.	2,172	-44.1	3.8
3	Ineos Group ^(d)	47,000	na	100.0	England	na	na	na
4	LyondellBasell	38,420	90.7	75.8	Netherlands	-3,079	nm	def
5	Exxon Mobil ^(e)	38,388	4.2	8.4	U.S.	2,957	-35.2	7.7
6	SABIC	34,407	17.8	85.6	Saudi Arabia	9,769	-11.5	28.4
7	Sinopec	33,795	0.6	15.6	China	-1,921	nm	def
8	DuPont ^(d)	30,387	4.0	99.5	U.S.	2,806	-32.4	9.2
9	Total	29,676	1.7	11.2	France	-85	nm	def
10	Formosa Plastics Group ^(f)	27,476	-0.7	51.1	Taiwan	1,322	-66.3	4.8
11	Royal Dutch / Shell	26,325	3.9	5.7	Netherlands	na	na	na
12	Bayer	23,741	-0.9	49.0	Germany	2,143	-14.3	9.0
13	AkzoNobel	22,703	50.9	100.0	Netherlands	1,063	-9.6	4.7
14	Mitsubishi Chemical	18,614	-0.5	66.2	Japan	-642	nm	def
15	Air Liquide	17,706	9.6	91.8	France	na	na	na
16	Evonik	17,147	8.6	73.4	Germany	2,356	-0.6	13.7
17	PetroChina	15,950	7.9	10.3	China	-90	nm	def
18	Yara	15,750	54.4	100.0	Norway	2,361	55.4	15.0
19	Mitsui Chemicals	14,388	-16.7	100.0	Japan	440	-41.1	3.1
20	Linde	14,013	3.3	75.1	Germany	3,560	4.5	25.4
21	PPG Industries	13,935	39.0	87.9	U.S.	1,519	7.7	10.9
22	DSM	13,692	6.2	100.0	Netherlands	1,598	3.0	11.7
23	Sumitomo Chemical	13,571	-12.8	78.5	Japan	-199	nm	def
24	LG Chem	13,553	28.3	100.0	South Korea	1,202	24.0	8.9
25	Chevron Phillips	12,646	0.9	100.0	U.S.	401	-51.1	3.2
26	Toray Industries	12,398	-9.0	87.1	Japan	290	-66.7	2.3
27	Reliance Industries	12,161	-0.4	31.2	India	1,580	-3.6	13.0
28	Shin-Etsu Chemical ^(d)	11,614	-12.8	100.0	Japan	2,253	-18.9	19.4
29	Praxair	10,796	14.8	100.0	U.S.	2,892	13.1	26.8
30	Huntsman	10,117	4.8	100.0	U.S.	228	-56.5	2.3

(Source) Chemical & Engineering News August 3, 2009 Issue

(Note) Financial figures converted at the 2008 average exchange rates of \$1.00 U.S. = 1.8327 Brazilian reals, 6.95 Chinese renminbi, 0.679 euros, 43.39 Indian rupees, 103.39 Japanese yen, 5.6365 Norwegian crowns, 8.248 South African rands, 1098.71 South Korean won, 3.75 Saudi riyals, 1.0816 Swiss francs, 31.52 Taiwanese 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 chemical assets.

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

(e) Profits and profitability ratios are after tax.

(f) C&EN estimates.

(g) Fiscal year ended March 19, 2008.

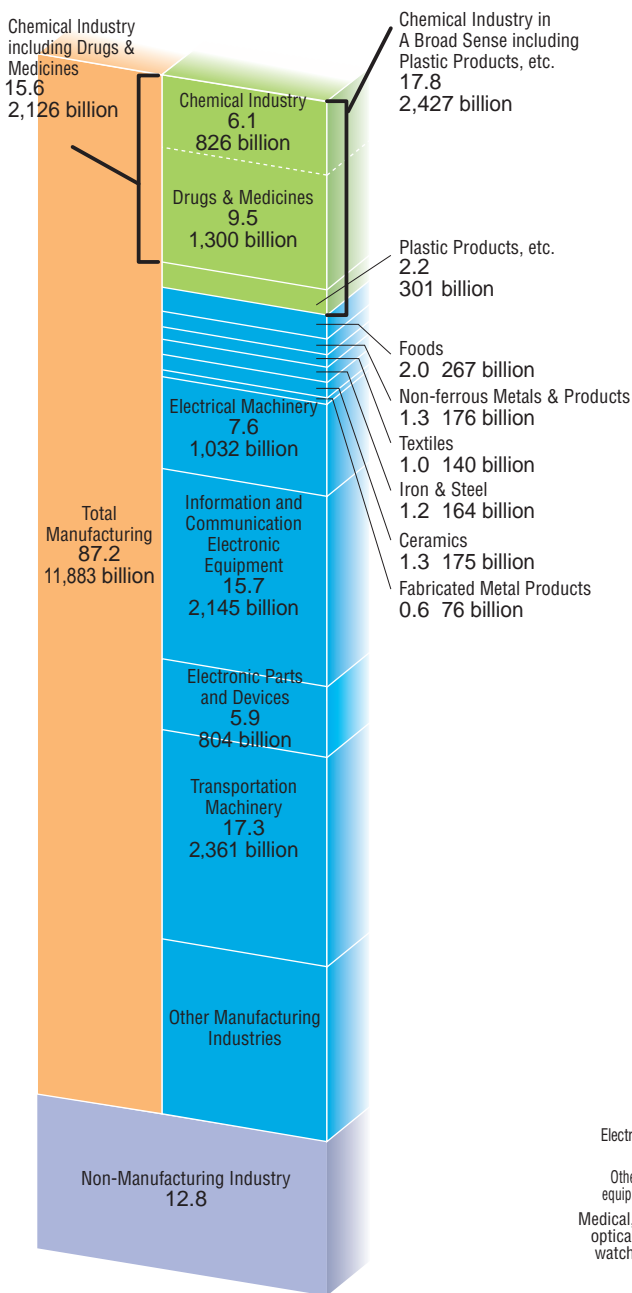
def = deficit, na = not available, nm = not meaningful

(Note) Drugs & medicines are excluded.

Yen 2.12 trillion Spent for Research And Development

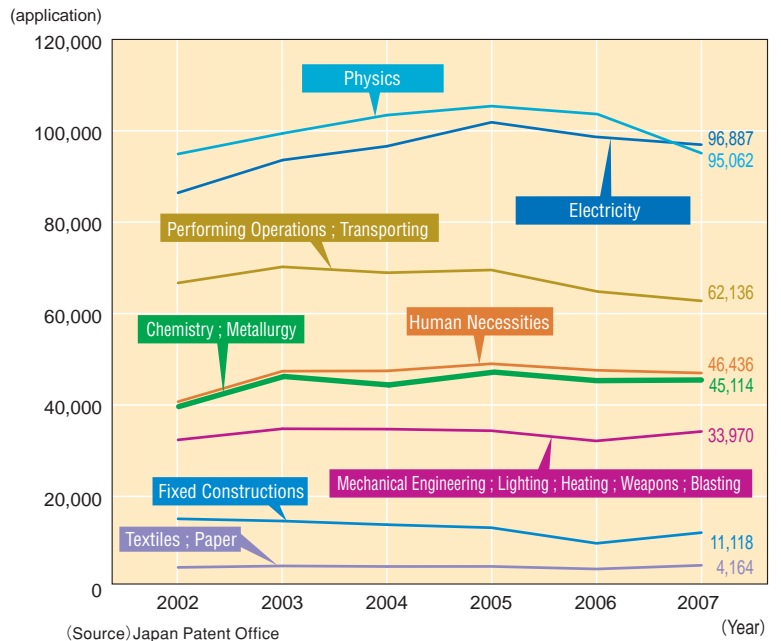
Research and development expenditures of chemical industry in FY 2008 (Apr.1, 2008-Mar.31, 2009) in Japan amounted to yen 2.12 trillion, accounting for 15.6% of all industry R&D expenditures. The percentage of research expenditures to sales was 6.3%.

Ratio of R&D expenditures by industry in FY 2008 [%]

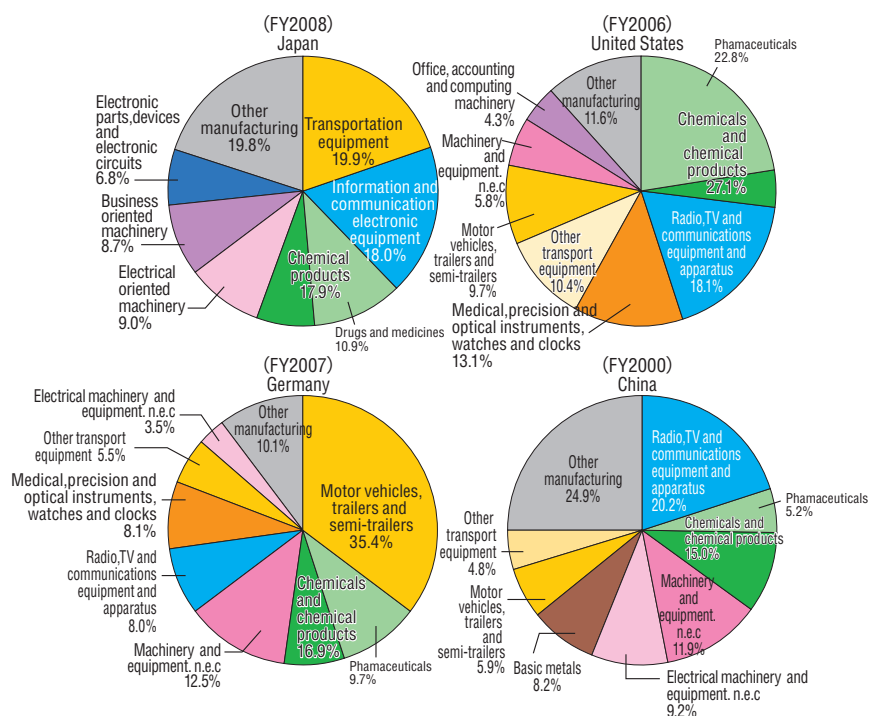


(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development] <http://www.stat.go.jp/english/data/kagaku/index.htm>

Trend of number of applications for patents by sector

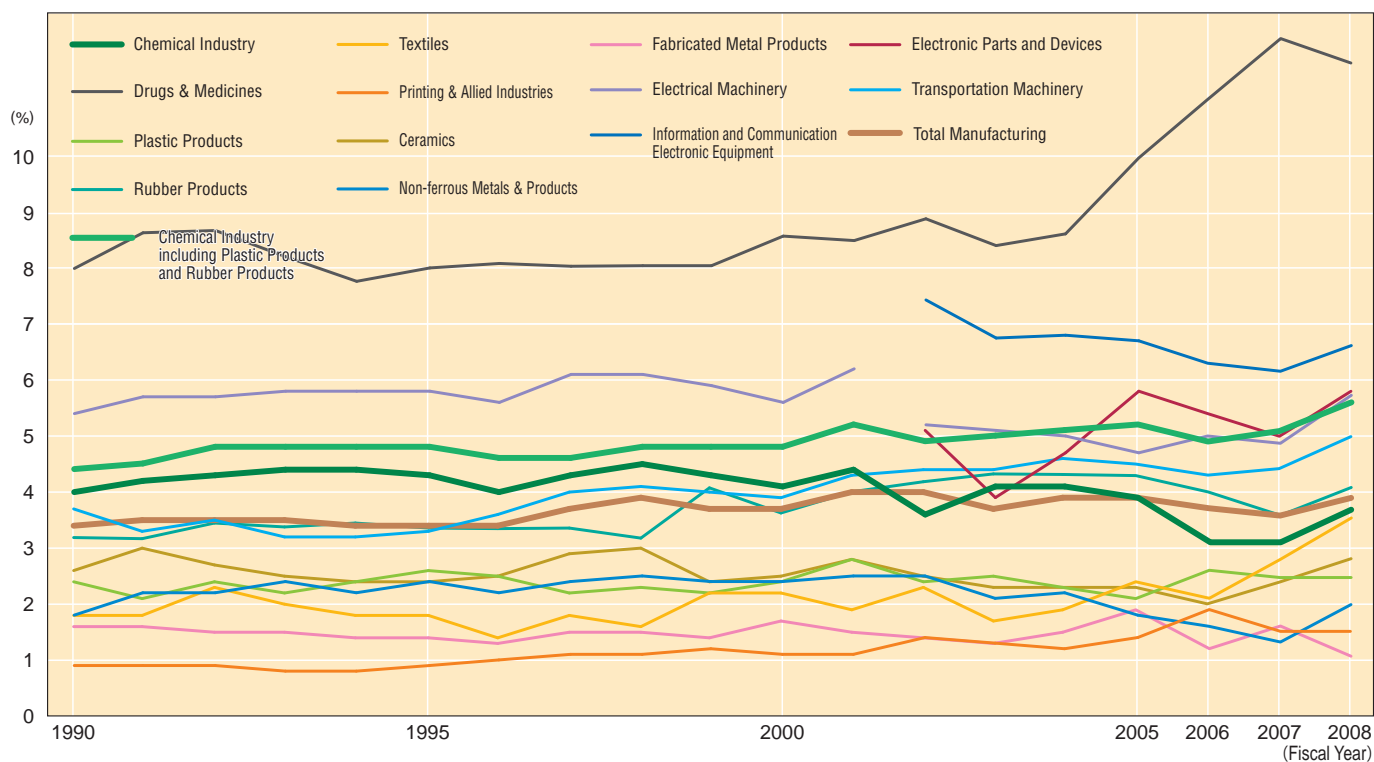


Chemical industry R&D expenditures in major countries [%]



(Source) Ministry of Education, Culture, Sports, Science and Technology [Indicators of Science and Technology (2010)]

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	2006	2007	2008
Chemical Industry		4.0	4.3	4.1	3.9	3.1	3.1	3.7
Drugs & Medicines		8.0	8.0	8.6	10.0	11.0	12.1	11.7
Chemical Industry including Drugs & Medicines		4.9	5.3	5.4	5.9	5.3	5.7	6.3
Plastic Products		2.4	2.6	2.4	2.1	2.6	2.5	2.5
Rubber Products		3.2	3.4	3.6	4.3	4.0	3.6	4.1
Chemical Industry including Plastic Products and Rubber Products		4.4	4.8	4.8	5.2	4.9	5.1	5.6
Textiles		1.8	1.8	2.2	2.4	2.1	2.8	3.6
Printing & Allied		0.9	0.9	1.1	1.4	1.9	1.5	1.5
Ceramics		2.6	2.4	2.5	2.3	2.0	2.4	2.8
Non-ferrous Metals & Products		1.8	2.4	2.4	1.8	1.6	1.3	2.0
Fabricated Metal Products		1.6	1.4	1.7	1.9	1.2	1.6	1.1
Electrical Machinery		5.4	5.8	5.6	4.7	5.0	4.9	5.7
Information and Communication Electronic Equipments		—	—	—	6.7	6.3	6.1	6.6
Electronic Parts and Devices		—	—	—	5.8	5.4	5.0	5.8
Transportation Machinery		3.7	3.3	3.9	4.5	4.3	4.4	5.0
Total Manufacturing		3.4	3.4	3.7	3.9	3.7	3.6	3.9

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

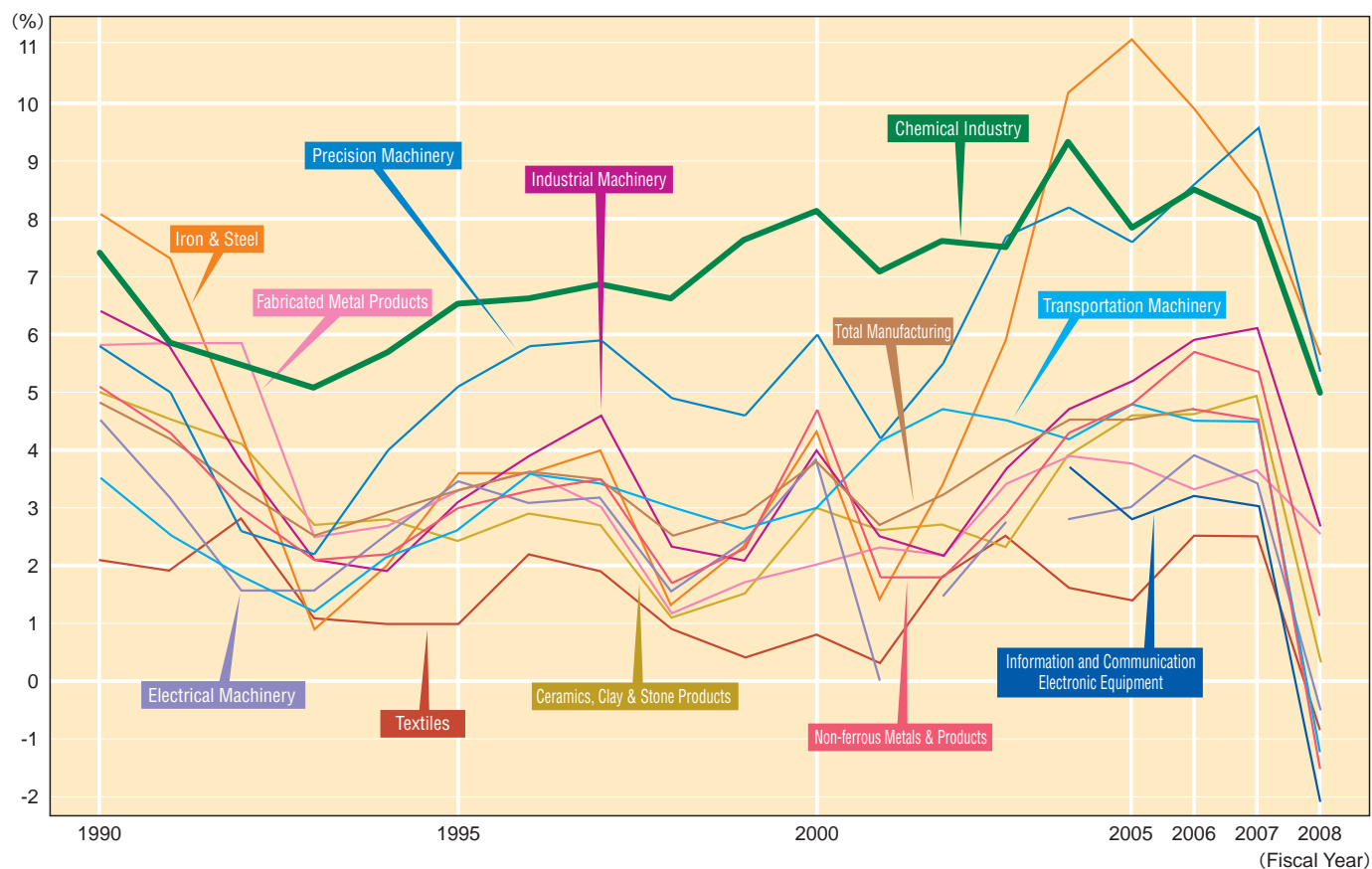
<http://www.stat.go.jp/english/data/kagaku/index.htm>

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

Operating Profit Ratio

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	Every 5th year				Recent three years		
	1990	1995	2000	2005	2006	2007	2008
Chemical industry	6.9	6.5	8.1	7.8	8.5	8.0	5.0
Textiles	2.1	1.0	0.8	1.4	2.5	2.5	-0.8
Ceramics, Clay & Stone Products	5.0	2.4	3.0	4.6	4.6	4.9	1.4
Iron & Steel	8.1	3.6	4.3	11.1	9.9	8.6	5.7
Non-ferrous Metals & Products	5.1	3.0	4.7	4.8	5.7	5.5	0.3
Fabricated Metal Products	5.8	3.3	2.0	3.7	3.3	3.7	2.6
Industrial Machinery	6.4	3.1	4.0	5.2	5.9	6.1	2.7
Electrical Machinery	4.6	3.5	3.9	3.0	3.9	3.4	-0.5
Information and Communication Electronic Equipments	—	—	—	2.8	3.2	3.0	-2.1
Transportation Machinery	3.5	2.6	3.0	4.8	4.5	4.5	-1.2
Precision Machinery	5.8	5.1	6.0	7.6	8.6	9.4	5.3
Total Manufacturing	4.8	3.3	3.8	4.5	4.7	4.5	1.5

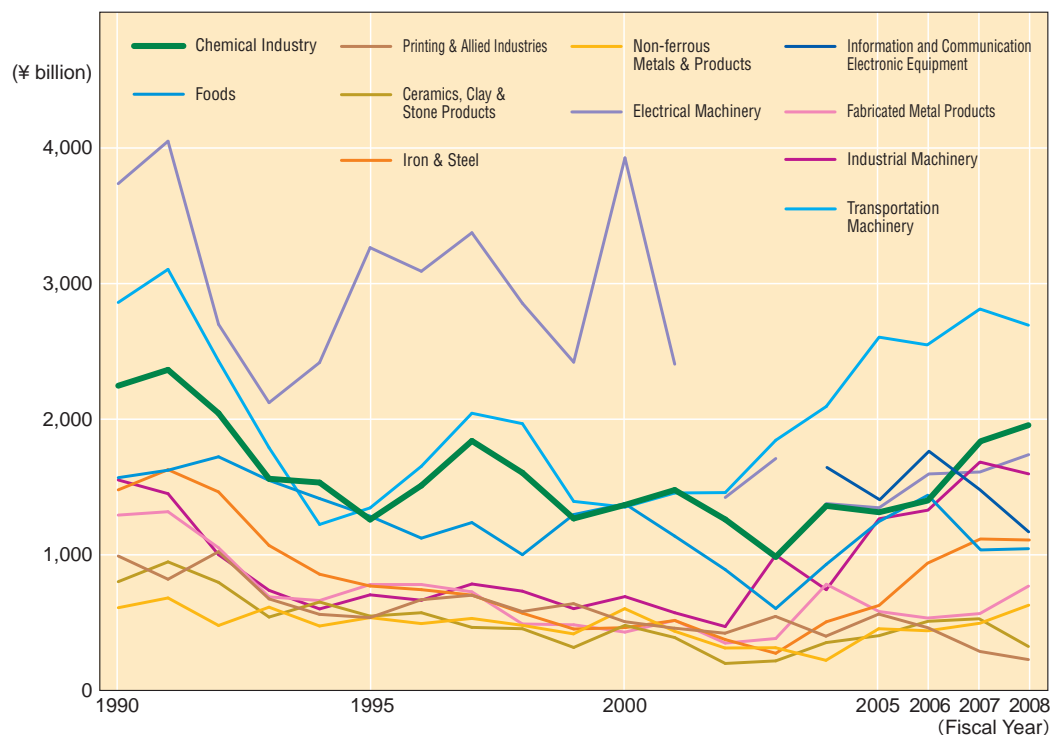
(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]
<http://www.mof.go.jp/english/e1c002.htm>

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

Chemical Industry Ranks High in Plant Investment

Plant investment by the chemical industry accounted for 12.2% of all manufacturing industries.

Trend of plant investment by industry [¥ billion]



Trend of plant investment by industry [¥ billion]

Industry	Year	Every 5th year				Recent three years			
		1990	1995	2000	2005	2006	2007	2008	
Chemical Industry including Plastic Products and Rubber Products		2,247	1,260	1,368	1,314	1,400	1,861	1,953	12.2%
Foods		1,569	1,285	1,376	1,246	1,439	1,052	1,090	6.8%
Printing & Allied Industries		991	537	507	563	462	388	321	2.0%
Ceramics, Clay & Stone Products		802	548	480	404	510	663	403	2.5%
Iron & Steel		1,479	770	463	627	938	1,126	1,113	7.0%
Non-ferrous Metals & Products		610	537	603	455	440	525	621	3.9%
Fabricated Metal Products		1,293	781	430	582	657	675	780	4.9%
Industrial Machinery		1,552	705	692	1,266	1,329	1,593	1,503	9.4%
Electrical Machinery		3,737	3,265	3,927	1,347	1,605	1,634	1,742	10.9%
Information and Communication Electronic Equipments		—	—	—	1,407	1,764	1,471	1,176	7.4%
Transportation Machinery		2,861	1,346	1,352	2,605	2,548	2,838	2,705	16.9%
Others		4,341	2,814	2,040	2,530	2,656	3,663	2,570	16.1%
Total Manufacturing		21,483	13,849	13,238	14,343	15,749	17,490	15,978	100.0%

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

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

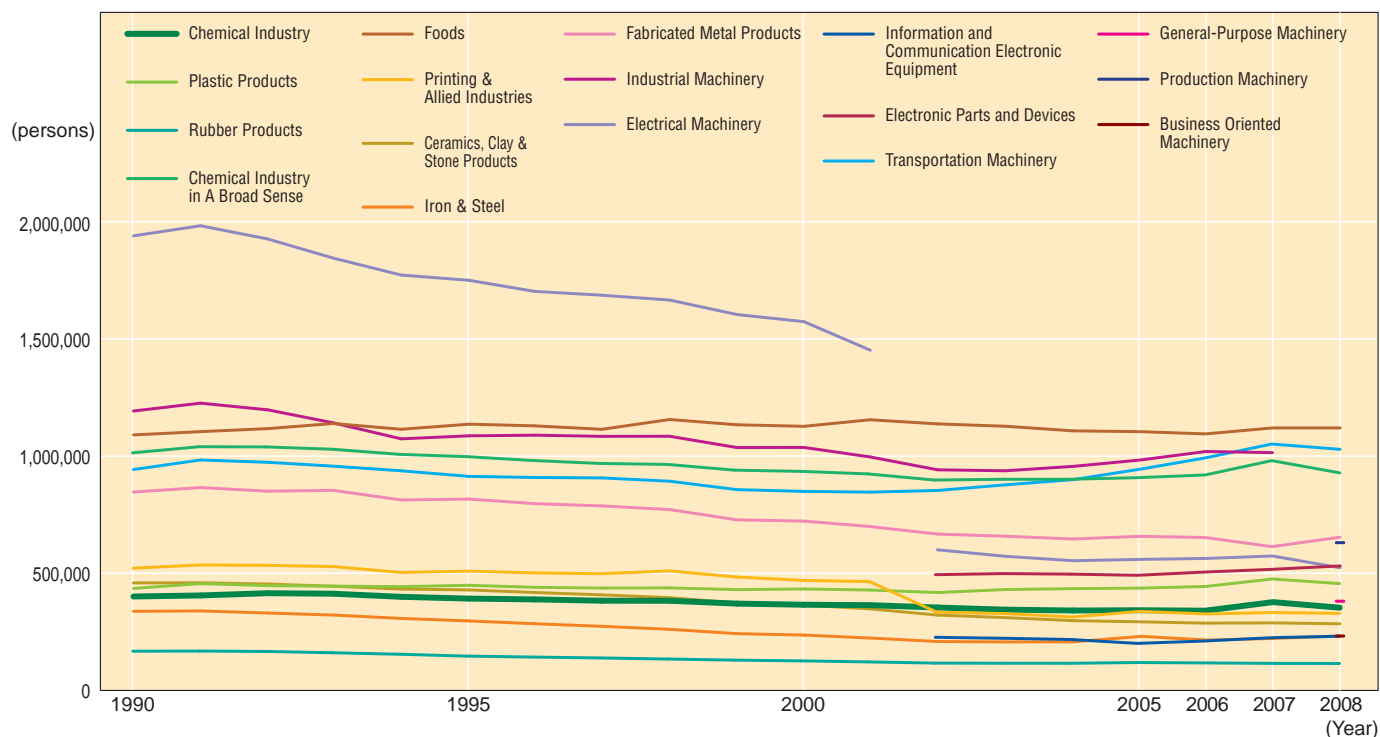
Chemical industry includes drugs & medicines plastic products and rubber products.

Information and Communication Electronics Equipment includes electronic parts and devices.

350,000 Workers Are Employed

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

Changes in the number of employees by industry [persons]



Changes in the number of employees by industry [persons]

Industry	Year	Every 5th year				Recent three years			
		1990	1995	2000	2005	2006	2007	2008	
Chemical Industry		401,076	392,109	365,953	342,481	343,798	356,738	349,748	4.2%
Plastic Products		435,523	448,939	433,177	436,897	445,334	471,035	454,316	5.4%
Rubber Products		172,284	151,601	131,532	124,613	125,384	132,466	125,008	1.5%
Chemical Industry including Plastic Products and Rubber Products		1,008,883	992,649	930,662	903,991	914,516	960,239	929,152	11.1%
Foods		1,090,403	1,136,236	1,127,177	1,104,292	1,093,080	1,135,051	1,138,327	13.6%
Printing & Allied Industries		554,155	541,688	502,184	340,890	329,830	334,796	326,476	3.9%
Ceramics, Clay & Stone Products		459,040	429,023	363,997	293,013	289,032	293,815	280,263	3.4%
Iron & Steel		337,811	296,824	236,525	213,056	219,858	228,860	235,300	2.8%
Fabricated Metal Products		846,915	816,694	722,425	657,942	655,361	664,082	654,160	7.8%
Industrial Machinery		1,192,406	1,086,575	1,037,079	983,449	1,014,715	1,063,957	—	—
General-Purpose Machinery		—	—	—	—	—	—	362,465	4.3%
Production Machinery		—	—	—	—	—	—	613,130	7.3%
Business Oriented Machinery		—	—	—	—	—	—	243,075	2.9%
Electrical Machinery		1,939,729	1,750,103	1,573,683	559,413	565,858	581,924	511,670	6.1%
Information and Communication Electronic Equipment		—	—	—	205,331	217,312	231,485	238,808	2.9%
Electronic Parts and Devices		—	—	—	490,140	503,244	528,095	521,471	6.2%
Transportation Machinery		942,795	913,535	849,517	944,352	989,730	1,050,334	1,029,652	12.3%
Others		2,800,692	2,357,256	1,840,584	1,461,123	1,432,906	1,445,907	1,208,658	15.3%
Total Manufacturing		11,172,829	10,320,583	9,183,833	8,156,992	8,225,442	8,518,545	8,364,607	100.0%

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

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

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

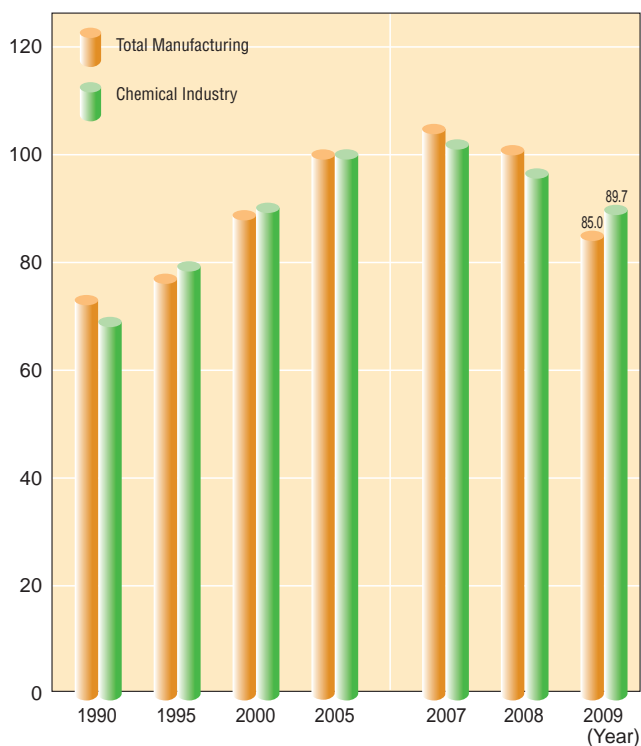
Electrical machinery was divided into electrical machinery, information and communication electronics equipment, and electronic parts and devices in 2002.

Industrial machinery was divided into general-purpose machinery, production machinery, and business oriented machinery in 2008.

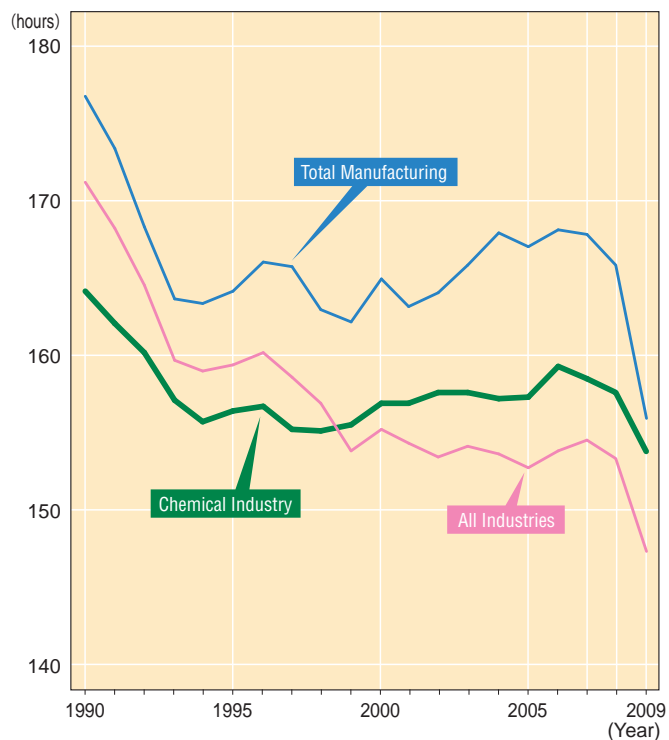
Labor Productivity / Working Hours

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

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	2007	104.9	2.0	102.3	1.3
	2008	101.2	△3.5	96.5	△5.7
	2009	85.0	△16.0	89.7	△7.0

(Source) Japan Productivity Center

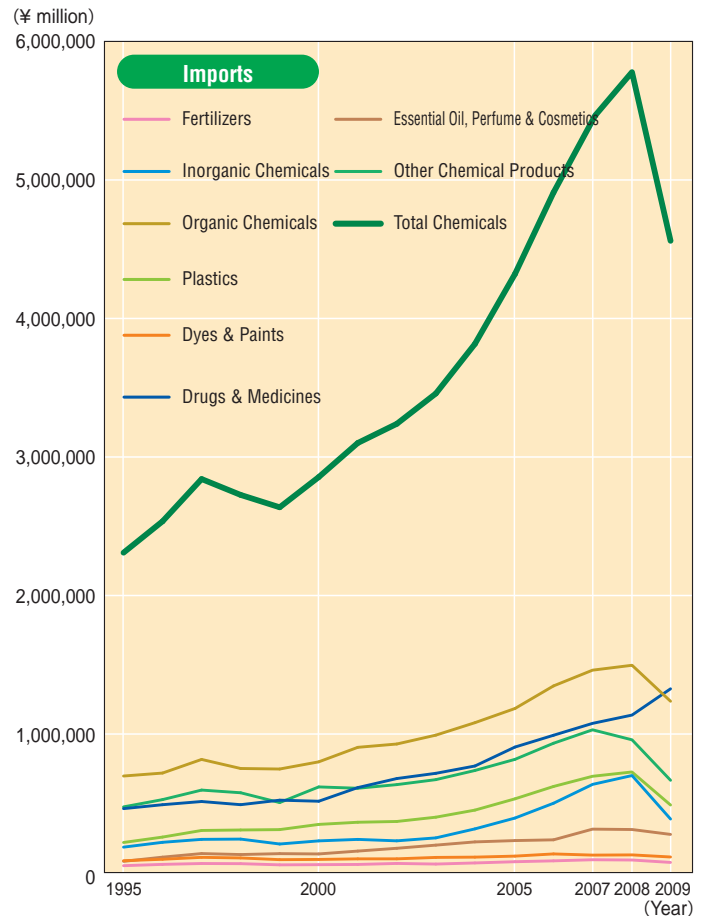
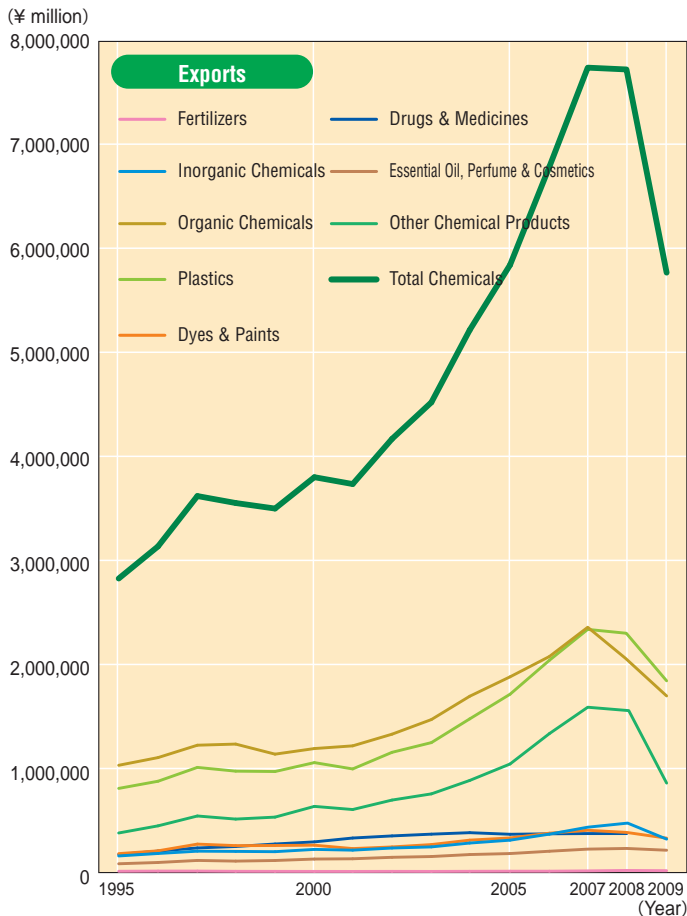
Working hours
(monthly average of total net working hours) [hours]

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
	2007	154.2	167.6	158.2
Recent three years	2008	153.0	165.6	157.3
	2009	147.3	155.9	153.8

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

In 2009, both export and import decreased with trade surplus of 1.2 trillion yen, a consecutive surplus since 1991.

Exports and imports of chemicals [¥ million]



Exports and imports of chemicals [¥ million]

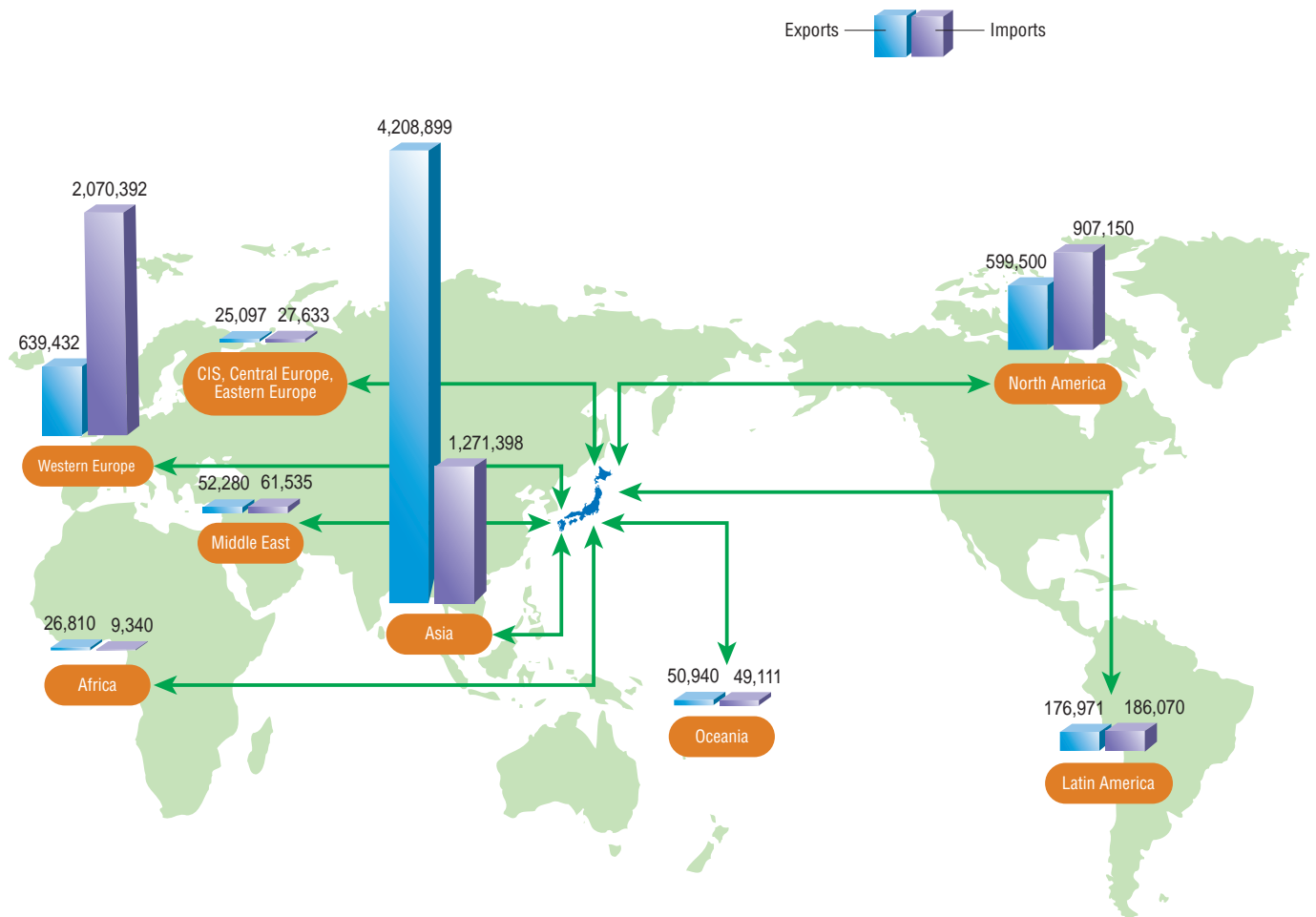
Exports						Articles	Imports					
Every 5th year		Recent three years					Every 5th year		Recent three years			
1995	2000	2005	2007	2008	2009		1995	2000	2005	2007	2008	2009
11,515	10,029	12,106	15,236	23,382	9,208	Fertilizers	49,566	57,025	78,275	92,522	167,938	80,713
158,905	222,143	310,854	435,877	513,260	317,493	Inorganic Chemicals	183,410	228,712	393,477	636,711	721,101	390,731
1,031,703	1,192,727	1,883,168	2,358,995	2,032,843	1,701,512	Organic Chemicals	696,878	799,250	1,184,334	1,464,388	1,528,198	1,230,234
809,104	1,057,477	1,715,683	2,339,365	2,231,691	1,844,108	Plastics	217,137	347,603	532,351	695,088	743,617	491,991
181,357	262,558	332,309	406,235	391,623	325,473	Dyes & Paints	85,566	94,761	118,677	147,819	154,872	105,364
172,870	294,407	367,664	374,417	379,876	384,449	Drugs & Medicines	461,522	514,885	905,966	1,078,431	1,142,372	1,326,601
83,787	129,205	182,022	224,704	230,834	209,090	Essential Oil, Perfume & Cosmetics	141,030	194,430	290,912	324,460	315,032	282,713
380,036	636,115	1,044,232	1,590,510	1,465,321	988,595	Other Chemical Products	474,050	618,287	817,238	1,031,765	964,228	672,284
2,829,276	3,804,662	5,848,037	7,745,339	7,268,831	5,779,928	Total Chemicals	2,309,160	2,854,954	4,321,230	5,471,184	5,737,358	4,582,630

(Source) Ministry of Finance [Trade Statistics]

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

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

Exports and imports of chemical products in 2009 by region [¥ million]



Exports and imports of chemical products in 2009 by region [¥ million]

Exports						Region	Imports					
Every 5th year		Recent three years			1995		Every 5th year		Recent three years			
1995	2000	2005	2007	2008			2009	1995	2000	2005	2007	2008
1,720,345	2,274,222	4,015,009	5,589,667	5,210,114	4,208,899	Asia	389,418	641,352	1,297,353	1,772,504	1,963,576	1,271,398
19,089	22,364	36,410	57,652	75,198	52,280	Middle East	56,390	52,104	69,160	105,002	119,085	61,535
493,871	594,826	760,854	915,065	873,062	639,432	Western Europe	1,012,152	1,206,525	1,739,797	2,088,653	2,131,087	2,070,392
464,140	706,503	774,313	842,382	794,523	599,500	North America	703,985	819,815	936,400	1,171,827	1,198,180	907,150
66,090	140,196	162,878	205,337	181,288	176,971	Latin America	78,952	69,417	179,025	219,549	192,836	186,070
14,203	16,262	19,578	33,640	31,778	26,810	Africa	7,990	5,397	17,657	16,138	19,219	9,340
44,983	41,909	58,602	68,297	66,265	50,940	Oceania	45,509	45,669	52,035	61,786	73,179	49,111
6,555	8,380	20,393	33,300	36,603	25,097	CIS, Central Europe, Eastern Europe	14,707	14,675	29,803	35,724	40,196	27,633
2,829,276	3,804,662	5,848,037	7,745,339	7,268,831	5,779,928	Total	2,309,160	2,854,954	4,321,230	5,471,184	5,737,358	4,582,630

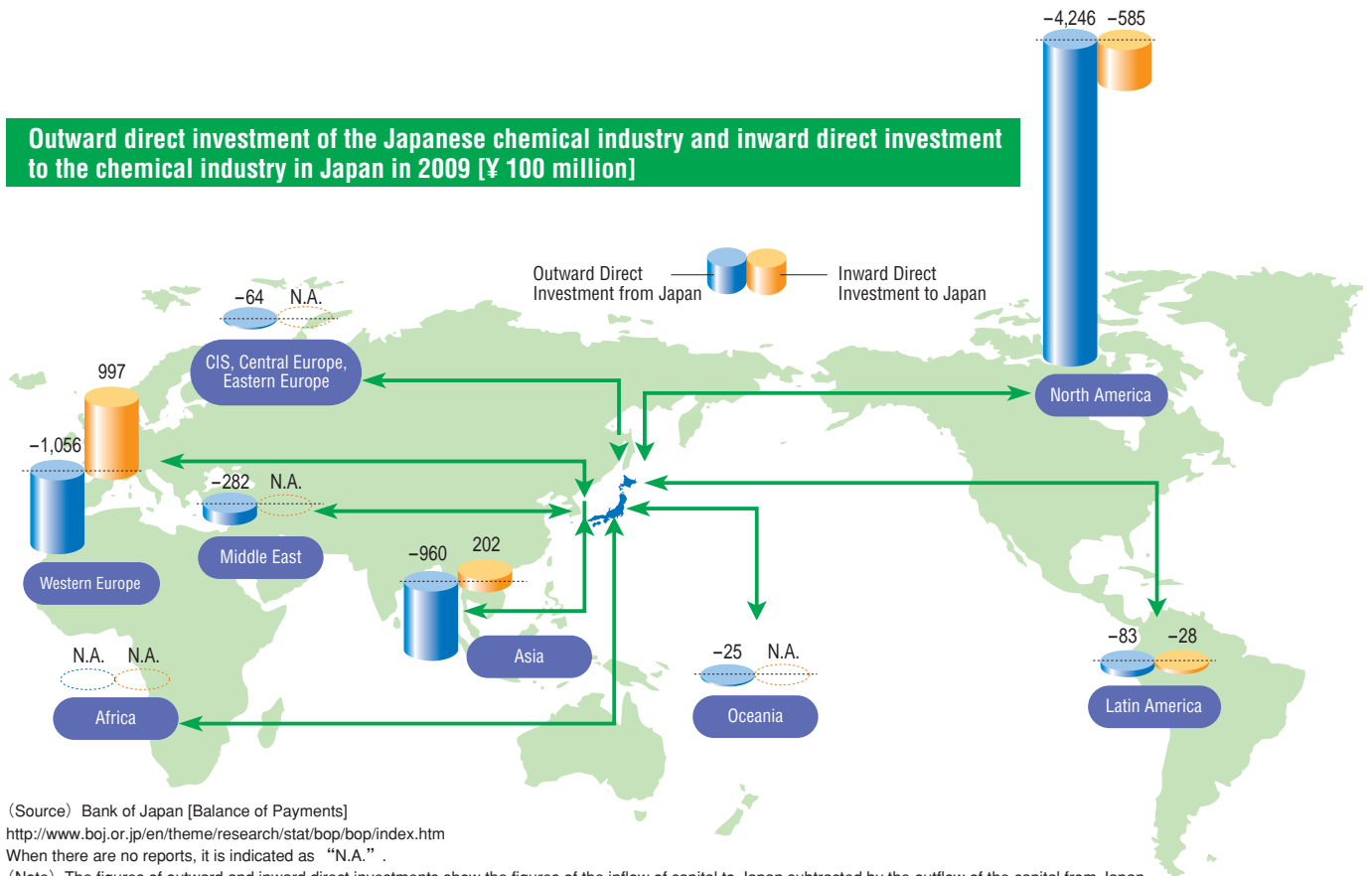
(Source) Ministry of Finance [Trade Statistics]

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

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

Outward Direct Investment Amounts to Yen 680 Billion, While Inward Direct Investment Amounts to Yen 29 Billion

Outward direct investment of the Japanese chemical industry and inward direct investment to the chemical industry in Japan in 2009 [¥ 100 million]



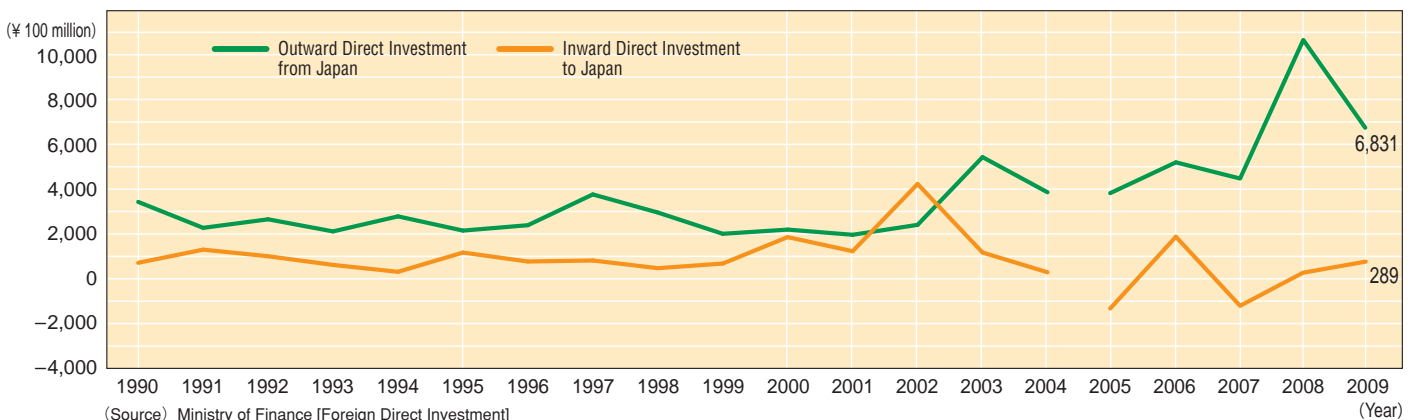
(Source) Bank of Japan [Balance of Payments]

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

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

(Note) The figures of outward and inward direct investments show the figures of the inflow of capital to Japan subtracted by the outflow of the capital from Japan. By the way, the inflow of the capital to Japan in Japan's direct investment abroad shows the figures of the return on investment.

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



(Source) Ministry of Finance [Foreign Direct Investment]

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

Bank of Japan [Balance of Payments]

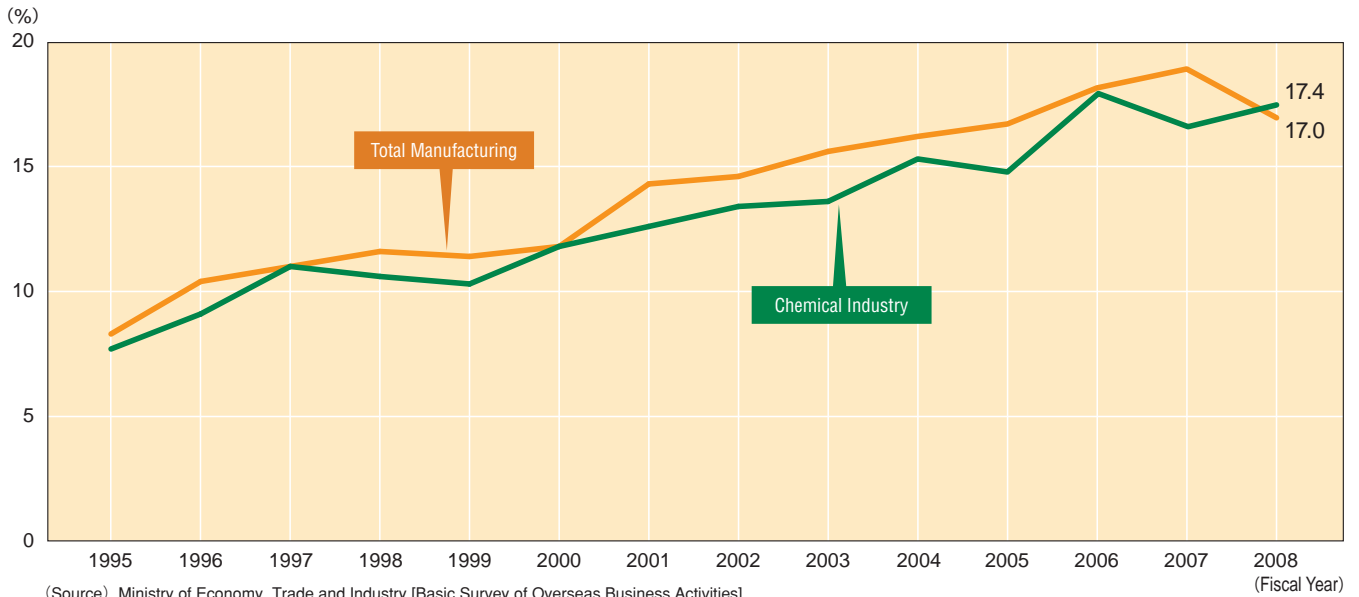
<http://www.boj.or.jp/en/theme/research/stat/bop/bop/index.htm>

Fiscal years from 1990 to 2004 and calendar year from 2005 to 2009

Overseas Business Activities

Overseas production of the Japanese chemical industry accounted for 17.4% in 2008.

Trend of overseas production of Japanese companies [%]

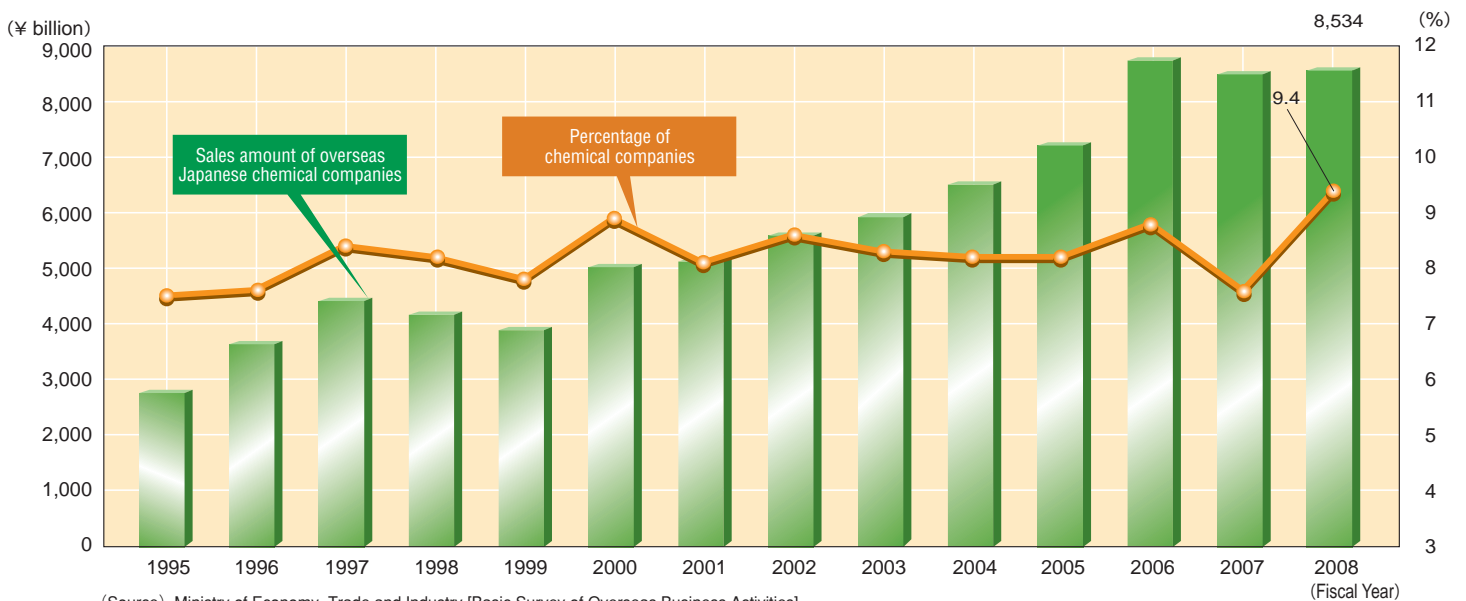


(Source) Ministry of Economy, Trade and Industry [Basic Survey of Overseas Business Activities]

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

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

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

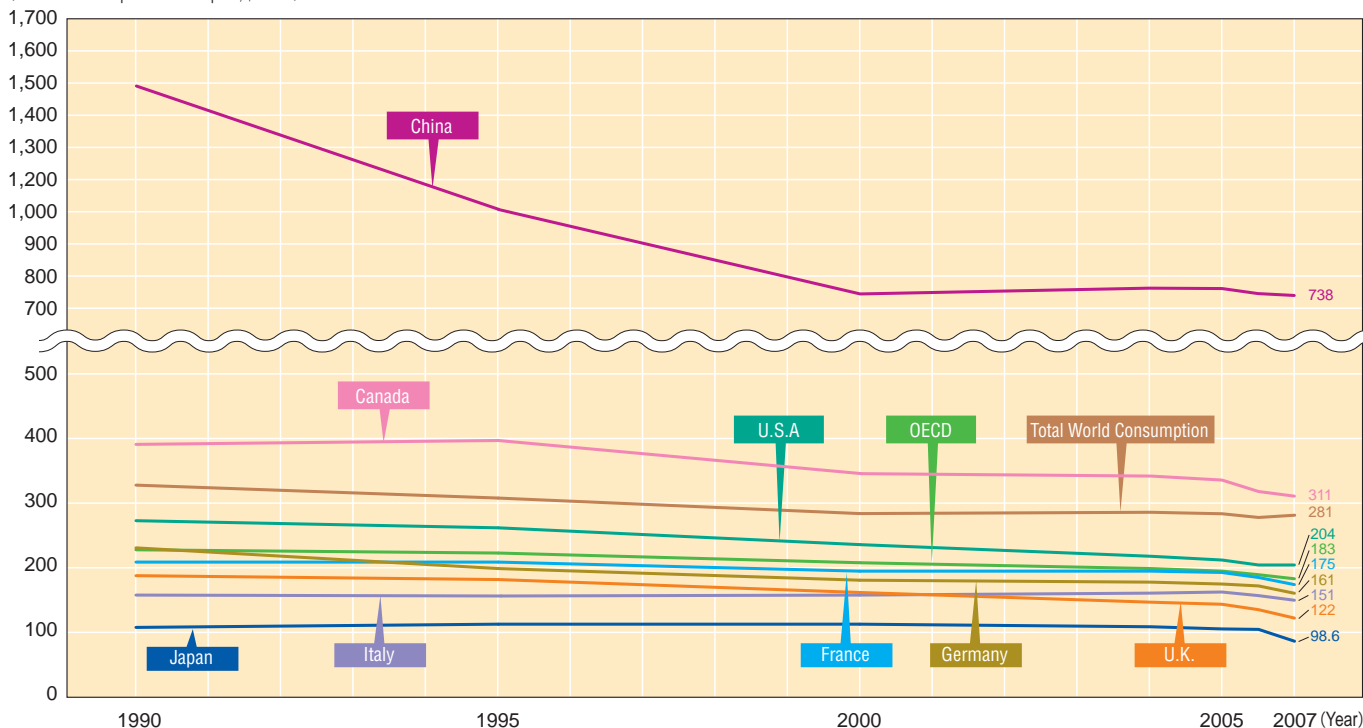
(Note) Chemical fiber is excluded under the chemical industry in the data.

Japan Is An Energy-Saving Superpower

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

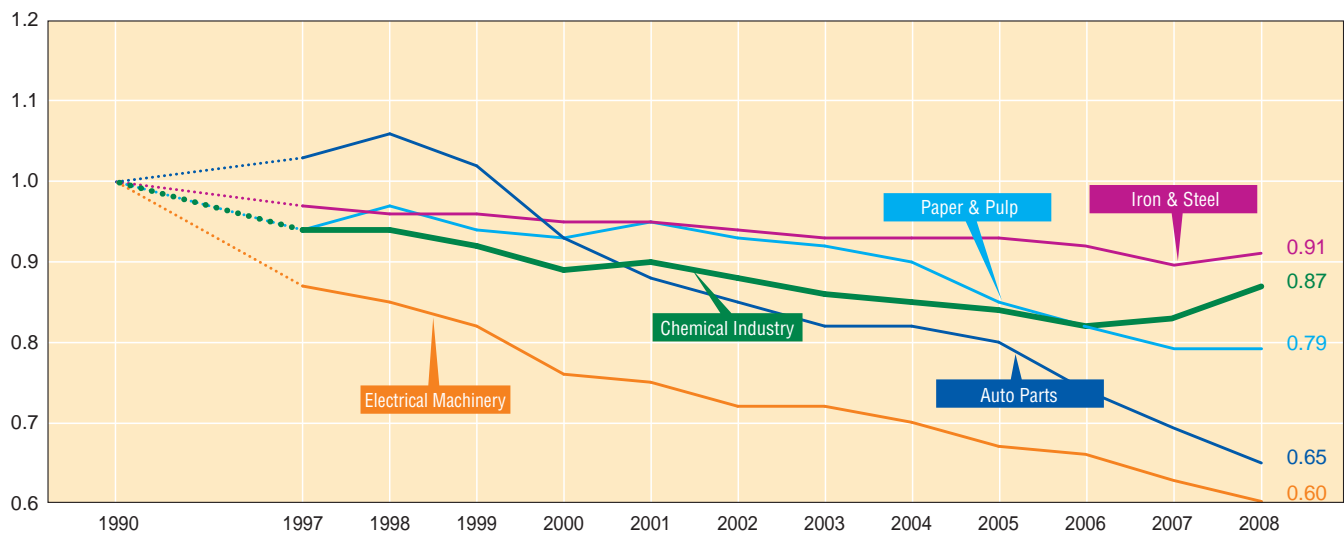
World's primary energy consumption per GDP

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



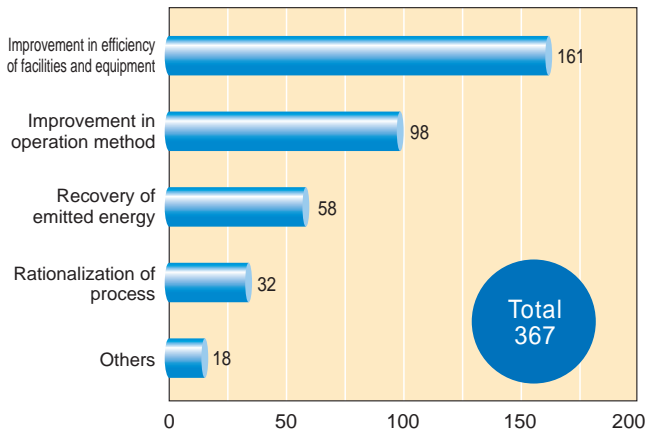
(Source) The Energy Conservation Center, Japan, [Handbook of Energy & Economic Statistics in Japan]

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



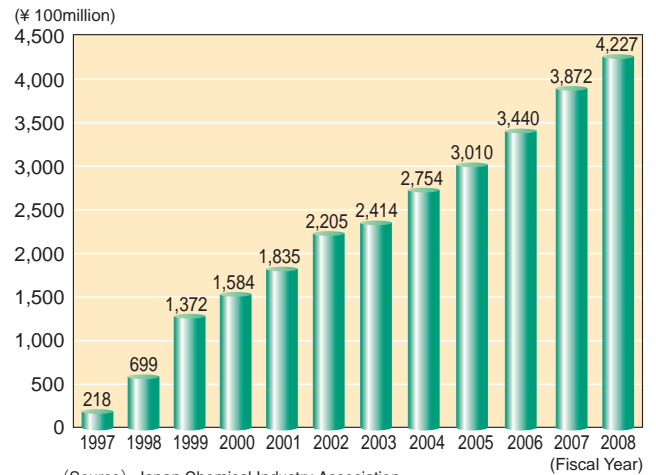
(Source) Nippon Keidanren [Results of the Fiscal 2009 Follow-up to the Keidanren Voluntary Action Plan on the Environment-Section on Global Warming Measures]

Energy Conservation Capital Investment (FY2008)



(Source) Japan Chemical Industry Association

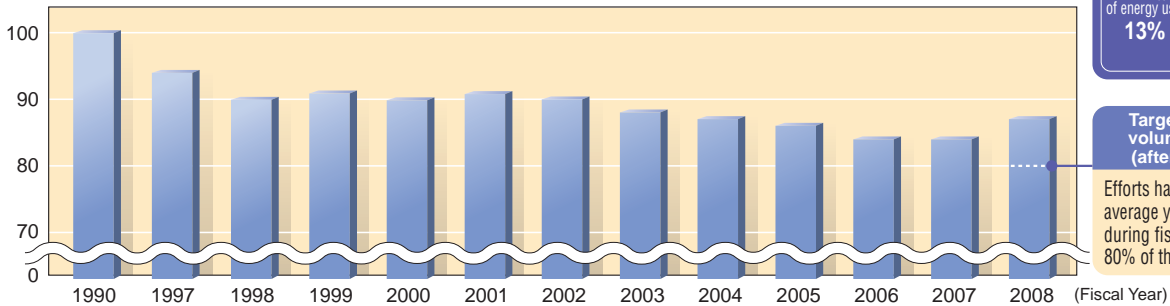
Energy Conservation Capital Investment (Cumulative)



(Source) Japan Chemical Industry Association

Energy Consumption Indicator Unit Trends

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.

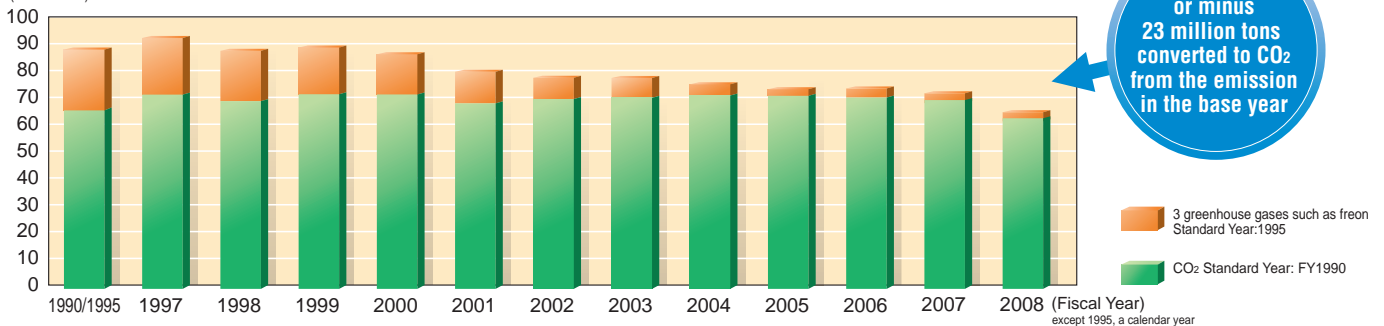
13% reduction versus fiscal 1990

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)



Minus 26% or minus 23 million tons converted to CO₂ from the emission in the base year

3 greenhouse gases such as freon
Standard Year:1995

CO₂ Standard Year: FY1990

(Source) Japan Chemical Industry Association

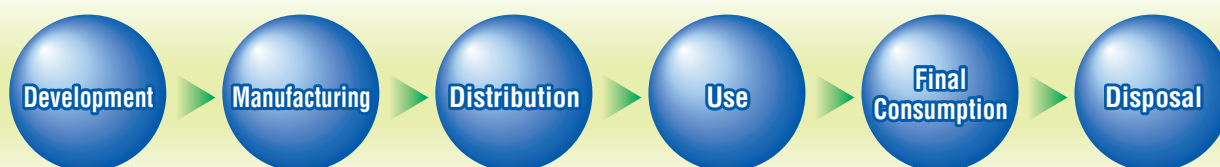
Do You Know Responsible Care? Efforts of Chemical Industry to Preserve Health, Safety and Environment

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 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, 53 countries have adopted RC activities (as of April 2010). 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-seven 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

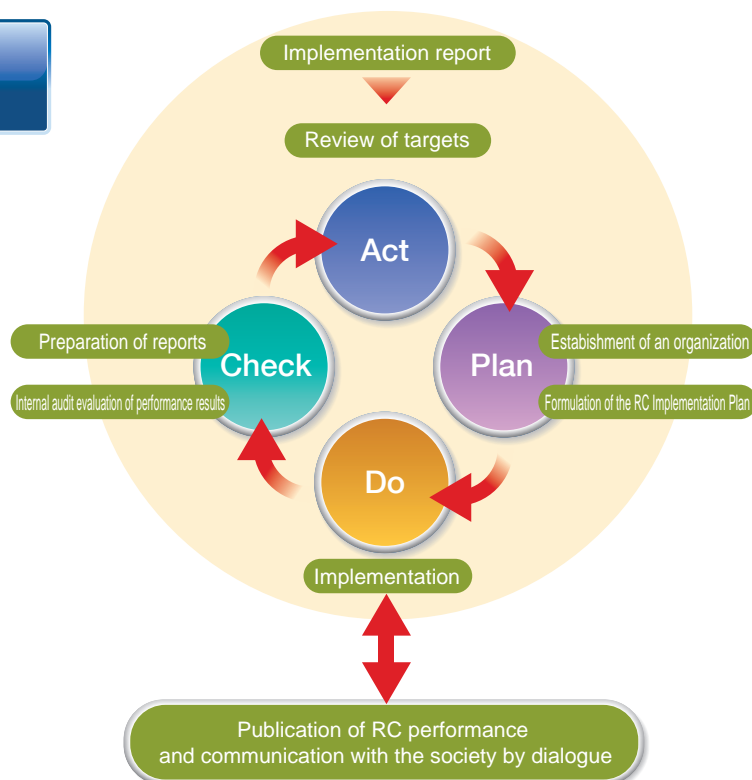
Member companies of the RC Committee implement RC in accordance with the Codes and Guidelines for the Implementation of Responsible Care.

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.



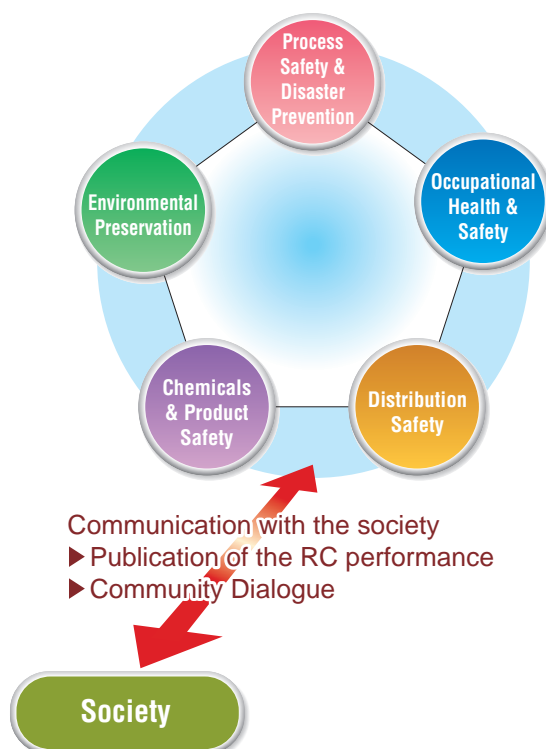
Responsible Care Implementation Items

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)
- Occupational safety and health (protecting the safety and health of workers)
- 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)
- Distribution safety (preventing accidents during the transportation of chemicals and protecting human safety and the environment)

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" Summer Holiday 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.