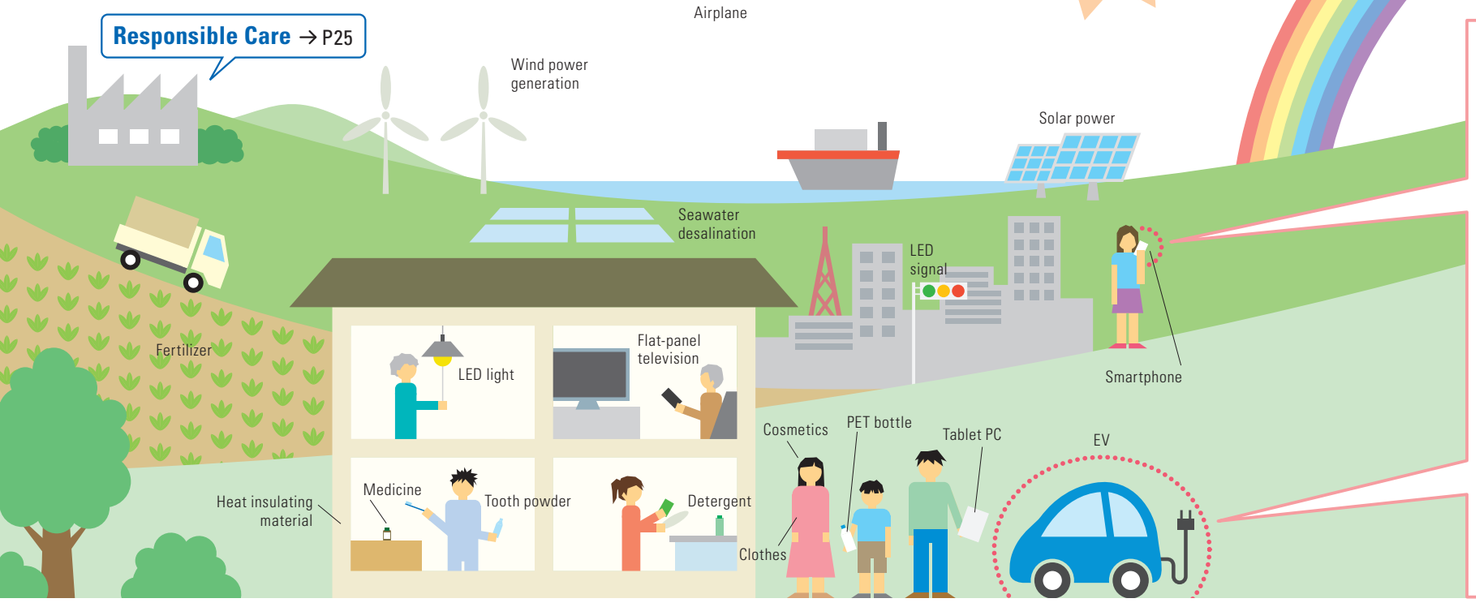
Chemical Industry of JAPAN 2012

Chemistry – Our Life, Our Future

Automobiles, cellular phones, home electric appliances, clothes…. There are a variety of things around us, most of which are produced by using the "power of chemistry" (that is, chemical reactions and chemical technologies). In fact, the presence of chemistry is much closer to us than many realize.
The chemical industry produces diversified products, from those which we directly use, to raw materials that other industries use by utilizing the power of chemistry. The industry, in particular, has helped strengthen advanced technologies and continues to create high-quality, highly original value-added products. The industry also invests a large amount of resources and money for research and development every year to create innovative technologies and products.
The constant evolution of Japan's chemical industry continues to support the country's manufacturing industry, and also helps to contribute to Japan's international competitiveness. At the same time, the chemical industry also works to create solutions for more global-scale issues, including issues of climate change, energy, safe food and water consumption, and environmental preservation.
The chemical industry is a very important industry which not only supports our daily lives and the development of new industries and economies, but also protects the future of the earth.

Note: Since the chemical industry is vast, with a wide range and scope of work, content may vary depending on different classifications. Therefore, in this brochure, we have conformed to Japan Standard Industrial Classification (second classification : chemical industry). Throughout the brochure, we have provided footnotes regarding these variances. For reference, the chemical industry in wider meaning is the "chemical industry" based on Japan Standard Industrial Classification based on the additions of the "plastic product manufacturing industry" and the "rubber product manufacturing industry".



Source: Ministry of Economy, Trade and Industry [White Paper on Industrial Infrastructure in 2012]

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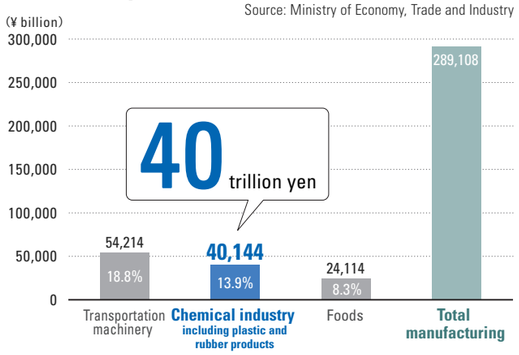
Chemical industry supports people's lives and industry

Raw materials	Intermediates			Primary products		
Water	Hydrogen	Soda ash	Propylene	Pigments	Dyes	Surfactants
Air	Nitrogen	Hydrochloric acid	Butylene	Industrial gas	Fertilizers	Agricultural chemicals
Salt	Oxygen	Nitric acid	Butadiene	Printing ink	Paints	Petrochemicals
Oil (Naphtha)	Chlorine	Sulfuric acid	Benzene	Synthetic fiber	Synthetic rubbers	Plastics
Natural gas	Carbonic acid gas	Phosphoric acid	Toluene	Cosmetics	Tooth-powder	Pharmaceuticals
Coal	Carbon oxide	Methanol	Xylene	Solvents	Fuel	Sterilizer
Ore	Inactive gas	Ethanol	Styrene	Bleach	Adhesives	Synthetic detergents
Animals and plants	Caustic soda	Ethylene		Oil and fat products	Photo-sensitive chemicals	

Japan's chemical industry viewed by figures and graphs

Value of shipments (2010)

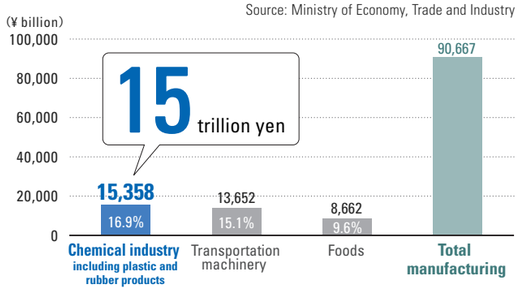
Source: Ministry of Economy, Trade and Industry



The chemical industry, on a broad scale, ships goods amounting to approximately 40 trillion yen, the 2nd largest in manufacturing industry.

Amount of value added (2010)

Source: Ministry of Economy, Trade and Industry

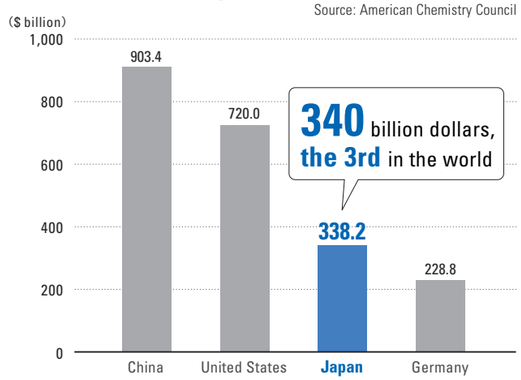


The total amount of value added by the chemical industry, on a broad scale, amounted to 15 trillion yen (the largest in manufacturing industry). It supports a wide range of industries as Japan's basic industry.

Note: Value added = Production amount minus cost for using raw materials, etc. minus domestic consumption tax, etc. minus depreciation cost.

Global chemical shipments (2010)

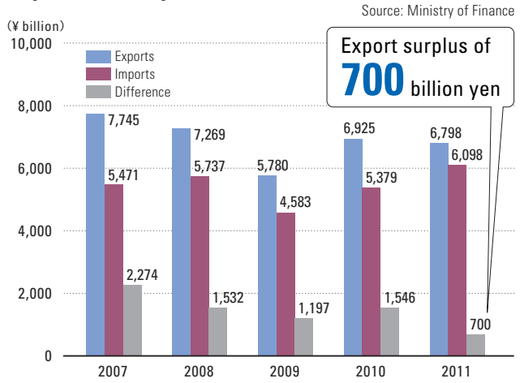
Source: American Chemistry Council



Japan's chemical industry ranks 3rd in global chemical shipments.

Exports and imports (2011)

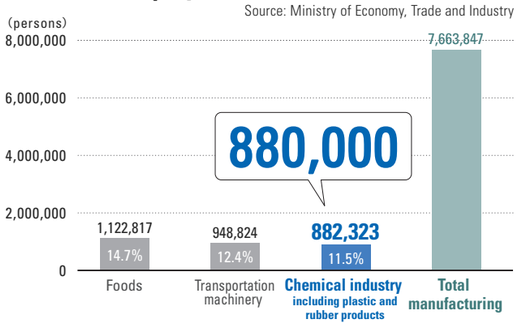
Source: Ministry of Finance



The chemical industry's exports have exceeded imports since 1991.

Number of employees (2010)

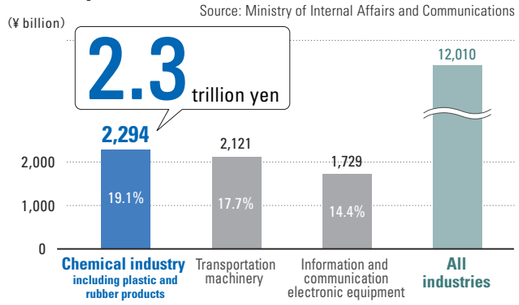
Source: Ministry of Economy, Trade and Industry



On a larger scale, the chemical industry employs 880,000 people, which is the 3rd biggest in manufacturing industries.

R&D expenditures (2010)

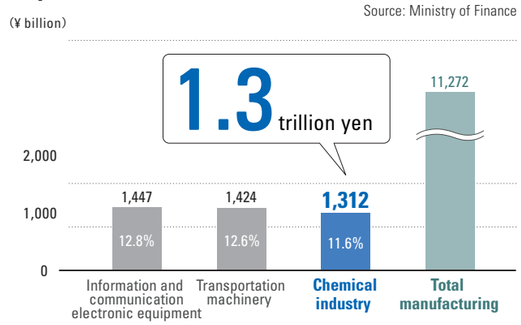
Source: Ministry of Internal Affairs and Communications



The chemical industry in wider sense invests 2.3 trillion yen in R & D. This makes it the No. 1 industry among all industries, accounting for 19% of the total. The chemical industry is an R&D-oriented industry.

Capital investment (2010)

Source: Ministry of Finance

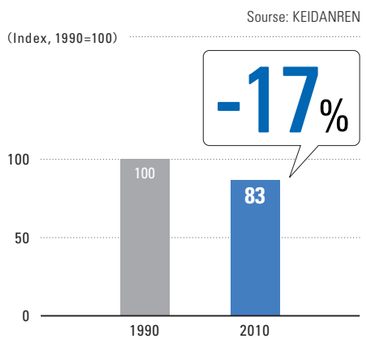


Capital investment by the chemical industry ranks 3rd in all industries with the amount of 1.3 trillion yen, which accounts for 12%.

Chemical industry contributes to the reduction of GHG

Energy efficiency efforts

Sourse: KEIDANREN

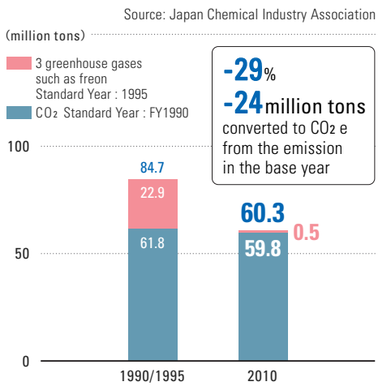


The energy efficiency has been improved by 17% from 1990.

Note: The energy efficiency is calculated by dividing the amount of consumed energy by the amount of production. The lower the value of this number, the more efficient the production is, with a lesser burden on the environment.

Reduction of GHG emissions under the voluntary action plan

Source: Japan Chemical Industry Association



Comparing with emission amounts back to the base year, 24 million tons of greenhouse gases equivalent (or 29%) have been reduced.

"Guideline for Calculating Contributing Amount of CO_2 Emission Reduction" has been published

http://www.nikkakyo.org/upload/3255_4801_price.pdf

Chemical Industry Looks to Minimize Chemical Risks

Aiming at Achieving WSSD 2020 Target

Chemicals can be used safely with adequate risk management. To protect the environment and health, the goal decided at the World Summit for Sustainable Development (WSSD) in 1992 was aimed to minimize the risk of chemicals by 2020. Toward achieving that goal, the global chemical industry is advancing its Global Product Strategy (GPS), an initiative to use chemicals properly, by minimizing the risk of chemicals across the entire supply chain. JCIA has been promoting the Japan Initiative of Product Stewardship (GPS/JIPS) to carry out the GPS in Japan. JCIA has done this in cooperation with downstream users, such as processors, assemblers and sales companies.

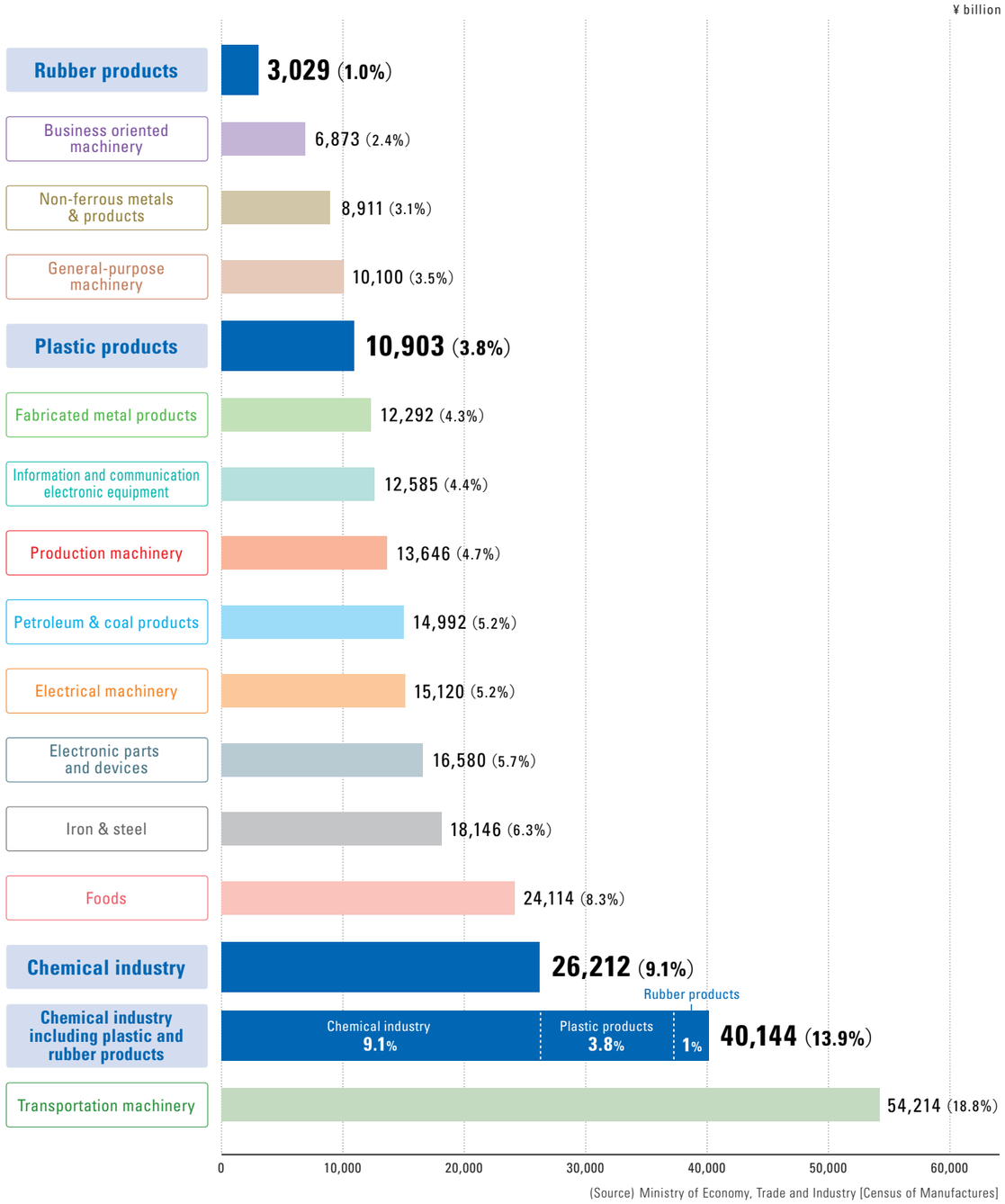
The upstream companies, such as manufacturers and distributors of chemicals, conduct risk assessments of these chemicals and properly manage them throughout the supply chain by providing safety information. The initiative has been underway in full-scale mode since April 2011, and we are working to provide the general public with the safety information of chemicals extensively through the website listed below. In preparation for 3rd Session of the International Conference on Chemicals Management (ICCM-3), which will be held in September 2012, JCIA will further promote the GPS/JIPS activities.

GPS Chemicals Portal: http://www.icca-chem.org/Home/ICCA-initiatives/Global-product-strategy/

1 Total production (shipments) of chemical industry amounts to 40 trillion yen

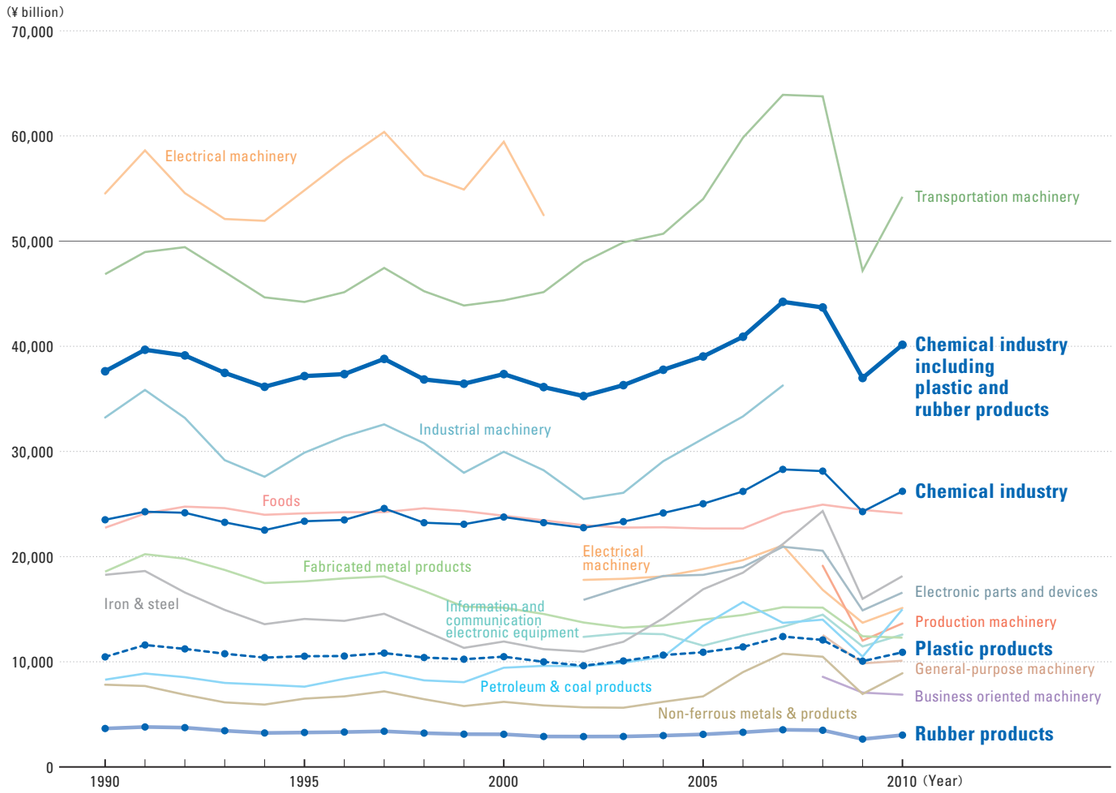
Chemical industry's total shipment value in 2010 amounted to 40 trillion yen, accounting for 13.9% of entire manufacturing industry.

Shipment value of chemical industry in manufacturing industries in 2010



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

Trend in shipment value



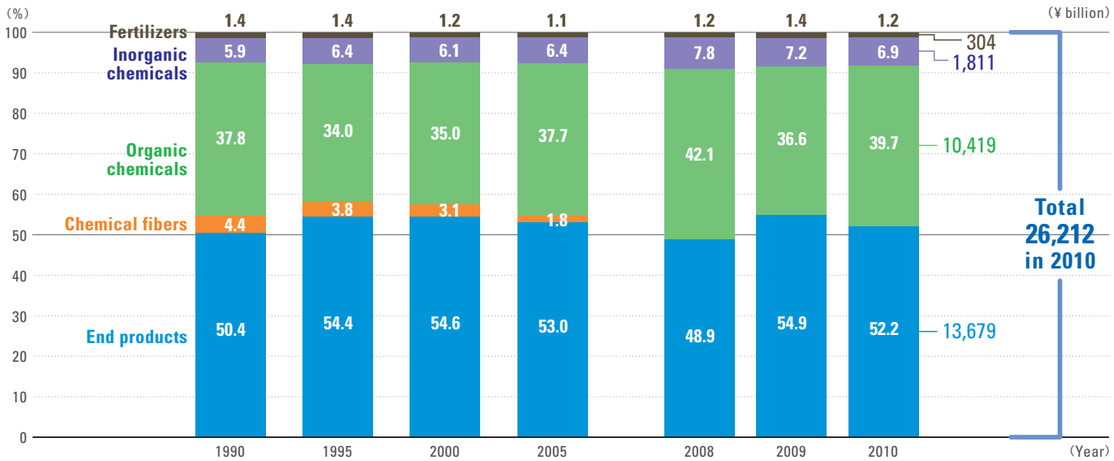
¥ billion

Industry \ year	Every 5th year				Recent three years			
	1990	1995	2000	2005	2008	2009	2010	
Chemical industry	23,503	23,363	23,762	25,027	28,131	24,276	26,212	9.1%
Plastic products	10,466	10,530	10,486	10,906	12,074	10,057	10,903	3.8%
Rubber products	3,656	3,275	3,107	3,099	3,488	2,649	3,029	1.0%
Chemical industry including plastic and rubber products	37,624	37,168	37,356	39,032	43,692	36,982	40,144	13.9%
Foods	22,748	24,117	23,888	22,678	24,942	24,448	24,114	8.3%
Petroleum & coal products	8,298	7,635	9,434	13,429	14,006	10,487	14,992	5.2%
Iron & steel	18,269	14,073	11,927	16,896	24,332	15,988	18,146	6.3%
Non-ferrous metals & products	7,822	6,496	6,191	6,712	10,480	6,940	8,911	3.1%
Fabricated metal products	18,574	17,646	15,143	14,016	15,149	12,427	12,292	4.3%
Industrial machinery	33,225	29,884	29,972	31,211	–	–	–	–
General-purpose machinery	–	–	–	–	12,541	9,849	10,100	3.5%
Production machinery	–	–	–	–	19,133	12,015	13,646	4.7%
Business oriented machinery	–	–	–	–	8,574	7,068	6,873	2.4%
Electrical machinery	54,529	54,831	59,449	18,812	16,838	13,713	15,120	5.2%
Information and communication electronic equipment	–	–	–	11,534	14,481	11,457	12,585	4.4%
Electronic parts and devices	–	–	–	18,265	20,560	14,889	16,580	5.7%
Transportation machinery	46,858	44,215	44,367	54,000	63,767	47,187	54,214	18.8%
Others	75,427	69,965	62,752	48,760	47,084	41,810	41,391	14.3%
Total manufacturing	323,373	306,030	300,478	295,346	335,579	265,259	289,108	100.0%

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

2 Chemical products that meet the needs of various fields

Trend of shipments composition in chemical industry

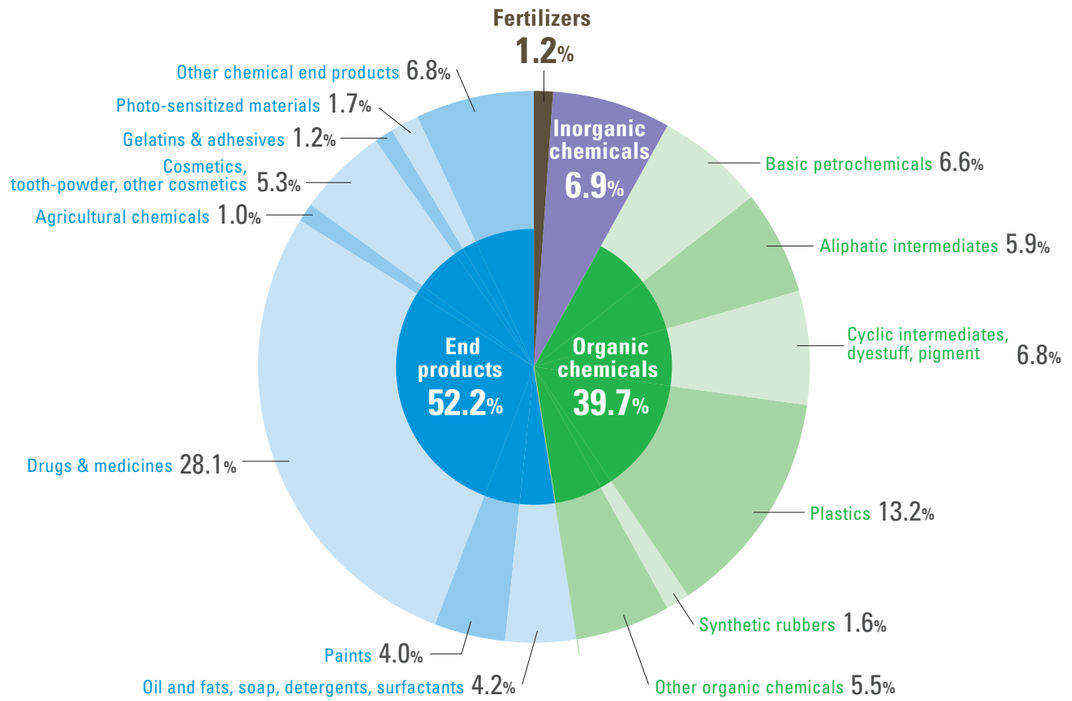


%

Industry \ year	Every 5th year				Recent three years		
	1990	1995	2000	2005	2008	2009	2010
Fertilizers	1.4	1.4	1.2	1.1	1.2	1.4	1.2
Inorganic chemicals	5.9	6.4	6.1	6.4	7.8	7.2	6.9
Organic chemicals	37.8	34.0	35.0	37.7	42.1	36.6	39.7
▶ Basic petrochemicals	5.1	2.6	2.9	6.3	7.4	4.4	6.6
▶ Aliphatic intermediates	4.5	5.5	7.1	6.1	7.4	5.1	5.9
▶ Cyclic intermediates, dyestuff, pigment	6.9	6.9	6.1	7.6	6.9	6.6	6.8
▶ Plastics	15.4	14.0	13.6	11.0	12.8	12.8	13.2
▶ Synthetic rubbers	2.3	1.7	1.5	2.0	2.1	2.0	1.6
▶ Other organic chemicals	3.6	3.3	3.8	4.7	5.5	5.6	5.5
Chemical fibers	4.4	3.8	3.1	1.8	–	–	–
End products	50.4	54.4	54.6	53.0	48.9	54.9	52.2
▶ Oil and fats, soap, detergents, surfactants	4.1	4.0	3.5	4.1	3.5	4.0	4.2
▶ Paints	4.9	4.6	4.1	3.7	3.9	3.8	4.0
▶ Drugs & medicines	21.9	25.7	27.0	28.0	25.1	30.5	28.1
▶ Agricultural chemicals	1.6	1.6	1.4	1.1	1.1	1.1	1.0
▶ Cosmetics, tooth-powder, other cosmetics	5.9	6.4	6.0	5.6	5.2	5.8	5.3
▶ Gelatins & adhesives	1.0	1.0	1.0	1.0	1.0	1.1	1.2
▶ Photo-sensitized materials	4.1	4.6	4.4	2.5	2.0	1.7	1.7
▶ Other chemical end products	6.9	6.6	7.2	7.0	7.1	6.8	6.8
Chemical industry	100	100	100	100	100	100	100
Chemical industry	62.5	62.9	63.6	64.1	64.4	65.6	65.3
Plastic products	27.8	28.3	28.1	27.9	27.6	27.2	27.2
Rubber products	9.7	8.8	8.3	7.9	8.0	7.2	7.5
Chemical industry in a broad sense (including palstic and rubber products)	100	100	100	100	100	100	100

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
(Note) 1. Statistics of facilities with more than four employees.
2. Chemical fibers have been moved to textile industry since 2008.

Composition of chemical products shipped in 2010



Major chemical industry indices with breakdown by product in 2010

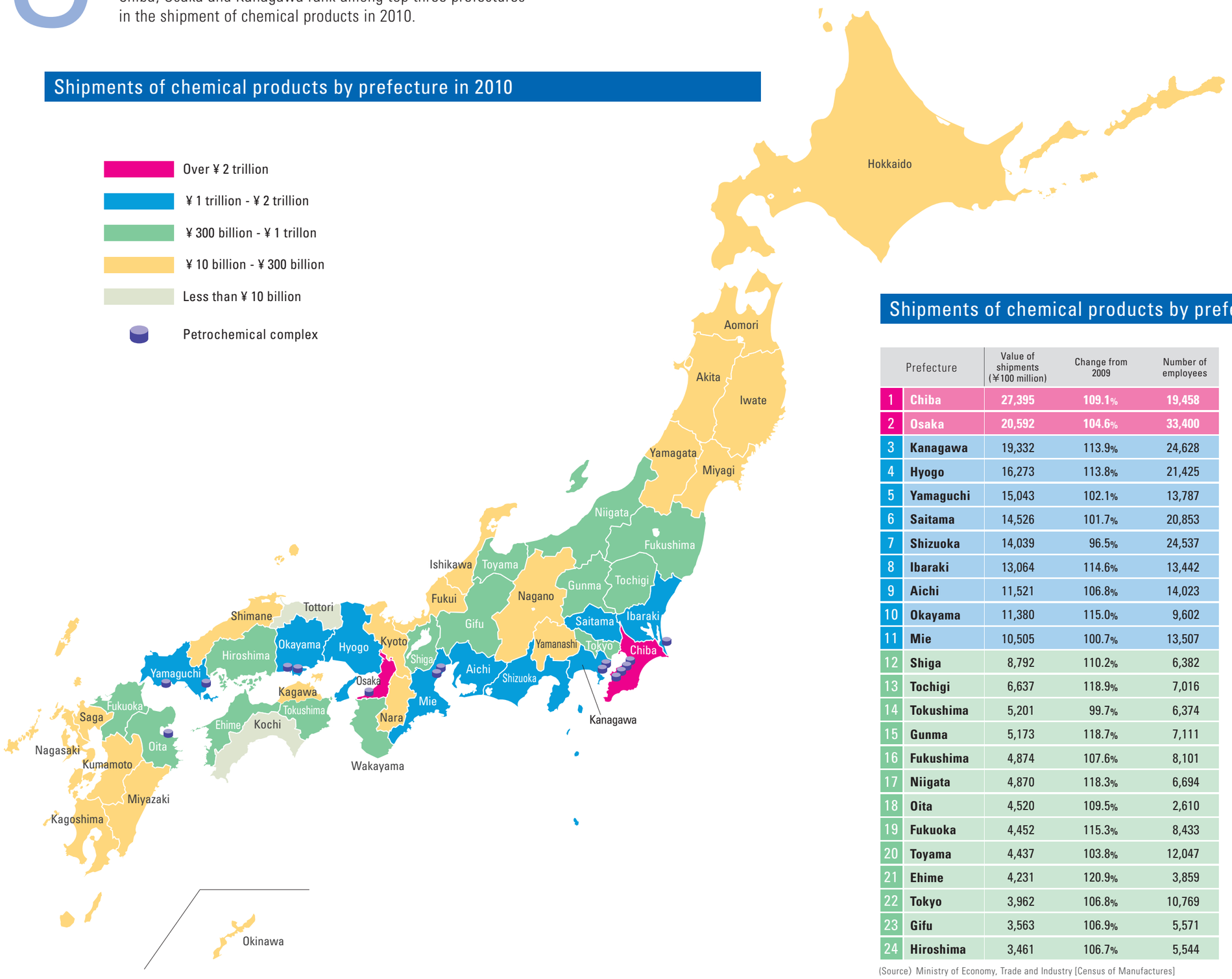
Industry	Major indices				Composition (%)			
	Number of establishments	Number of employees	Value of shipments (¥ billion)	Amount of value added (¥ billion)	Number of establishments	Number of employees	Value of shipments	Amount of value added
Fertilizers	150	4,219	304	79	3.2	1.2	1.2	0.8
Inorganic chemicals	816	33,155	1,811	622	17.2	9.6	6.9	6.1
Organic chemicals	740	87,797	10,419	2,758	15.6	25.5	39.7	27.1
▶ Basic petrochemicals	11	4,062	1,738	174	0.2	1.2	6.6	1.7
▶ Aliphatic intermediates	71	10,278	1,552	612	1.5	3.0	5.9	6.0
▶ Cyclic intermediates, dyestuff, pigment	151	15,087	1,792	495	3.2	4.4	6.8	4.9
▶ Plastics	228	32,492	3,468	944	4.8	9.4	13.2	9.3
▶ Synthetic rubbers	16	5,066	420	138	0.3	1.5	1.6	1.4
▶ Other organic chemicals	263	20,812	1,448	394	5.5	6.0	5.5	3.9
End products	3,036	219,797	13,679	6,721	64.0	63.7	52.2	66.0
▶ Oil and fats, soap, detergents, surfactants	269	15,164	1,101	499	5.7	4.4	4.2	4.9
▶ Paints	392	17,772	1,039	400	8.3	5.2	4.0	3.9
▶ Drugs & medicines	822	96,144	7,356	4,043	17.3	27.9	28.1	39.7
▶ Agricultural chemicals	67	4,247	266	106	1.4	1.2	1.0	1.0
▶ Cosmetics, tooth-powder, other cosmetics	440	32,009	1,385	816	9.3	9.3	5.3	8.0
▶ Gelatins & adhesives	144	6,302	312	120	3.0	1.8	1.2	1.2
▶ Photo-sensitized materials	57	10,723	446	113	1.2	3.1	1.7	1.1
▶ Other chemical end products	845	37,436	1,775	624	17.8	10.9	6.8	6.1
Chemical industry	4,742	344,968	26,212	10,180	100.0	100.0	100.0	100.0
Chemical industry	4,742	344,968	26,212	10,180	21.9	39.1	65.3	66.3
Plastic products	14,085	420,179	10,903	4,021	65.2	47.6	27.2	26.2
Rubber products	2,782	117,176	3,029	1,158	12.9	13.3	7.5	7.5
Chemical industry in a broad sense (including palstic and rubber products)	21,609	882,323	40,144	15,358	100.0	100.0	100.0	100.0

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

3 Shipments by prefecture

Chiba, Osaka and Kanagawa rank among top three prefectures in the shipment of chemical products in 2010.

Shipments of chemical products by prefecture in 2010



Shipments of chemical products by prefecture in 2010

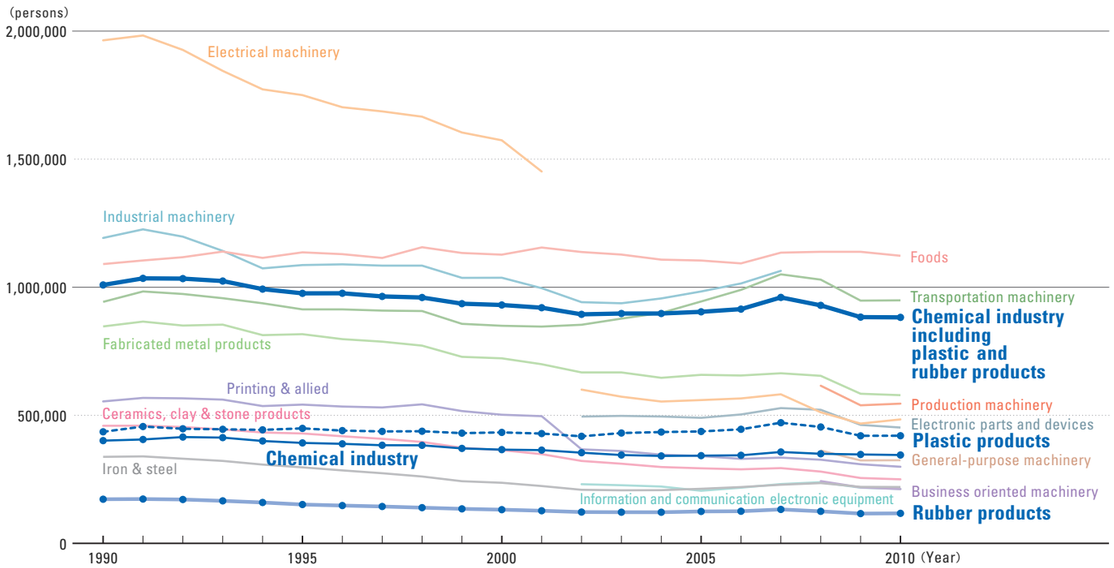
	Prefecture	Value of shipments (¥100 million)	Change from 2009	Number of employees
1	**Chiba**	**27,395**	**109.1%**	**19,458**
2	**Osaka**	**20,592**	**104.6%**	**33,400**
3	**Kanagawa**	19,332	113.9%	24,628
4	**Hyogo**	16,273	113.8%	21,425
5	**Yamaguchi**	15,043	102.1%	13,787
6	**Saitama**	14,526	101.7%	20,853
7	**Shizuoka**	14,039	96.5%	24,537
8	**Ibaraki**	13,064	114.6%	13,442
9	**Aichi**	11,521	106.8%	14,023
10	**Okayama**	11,380	115.0%	9,602
11	**Mie**	10,505	100.7%	13,507
12	**Shiga**	8,792	110.2%	6,382
13	**Tochigi**	6,637	118.9%	7,016
14	**Tokushima**	5,201	99.7%	6,374
15	**Gunma**	5,173	118.7%	7,111
16	**Fukushima**	4,874	107.6%	8,101
17	**Niigata**	4,870	118.3%	6,694
18	**Oita**	4,520	109.5%	2,610
19	**Fukuoka**	4,452	115.3%	8,433
20	**Toyama**	4,437	103.8%	12,047
21	**Ehime**	4,231	120.9%	3,859
22	**Tokyo**	3,962	106.8%	10,769
23	**Gifu**	3,563	106.9%	5,571
24	**Hiroshima**	3,461	106.7%	5,544
25	**Wakayama**	3,018	106.9%	4,806
26	**Fukui**	2,771	112.2%	3,568
27	**Kyoto**	1,981	106.0%	5,117
28	**Kumamoto**	1,800	118.3%	3,605
29	**Hokkaido**	1,613	99.9%	3,402
30	**Miyazaki**	1,534	117.0%	1,847
31	**Yamagata**	1,508	107.9%	2,336
32	**Saga**	1,487	104.3%	2,024
33	**Kagawa**	1,432	108.3%	3,352
34	**Nagano**	1,207	108.2%	2,083
35	**Ishikawa**	1,041	105.6%	1,540
36	**Nara**	852	110.6%	3,147
37	**Akita**	844	85.9%	1,417
38	**Miyagi**	807	92.9%	1,649
39	**Iwate**	667	97.1%	1,601
40	**Yamanashi**	558	103.3%	1,195
41	**Aomori**	342	99.6%	619
42	**Kagoshima**	268	102.2%	461
43	**Shimane**	227	137.1%	580
44	**Nagasaki**	120	118.7%	349
45	**Okinawa**	108	97.2%	824
46	**Kochi**	73	113.5%	201
47	**Tottori**	20	185.9%	72
	Total	**262,120**	**108.0%**	**344,968**

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

4 880,000 workers are employed

The number of employees in chemical industry accounted for 11.5% in entire manufacturing industry.

Changes in the number of employees by industry



persons

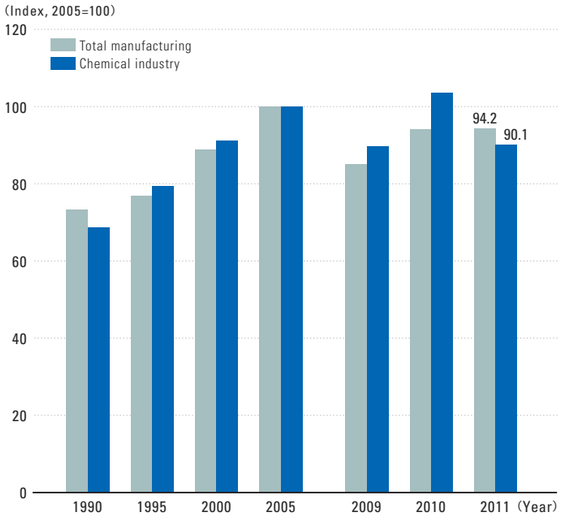
Industry \ year	Every 5th year				Recent three years			
	1990	1995	2000	2005	2008	2009	2010	
Chemical industry	401,076	392,109	365,953	342,481	349,748	347,103	344,968	4.5%
Plastic products	435,523	448,939	433,177	436,897	454,316	419,936	420,179	5.5%
Rubber products	172,284	151,601	131,532	124,613	125,088	116,266	117,176	1.5%
Chemical industry including plastic and rubber products	**1,008,883**	**992,649**	**930,662**	**903,991**	**929,152**	**883,305**	**882,323**	**11.5%**
Foods	1,090,403	1,136,236	1,127,177	1,104,292	1,138,327	1,125,413	1,122,817	14.7%
Printing & allied	554,155	541,688	502,184	340,890	326,476	308,878	299,038	3.9%
Ceramics, clay & stone products	459,040	429,023	363,997	293,013	280,263	255,159	250,001	3.3%
Iron & steel	337,811	296,824	236,525	213,056	235,300	220,518	219,983	2.9%
Fabricated metal products	846,915	816,694	722,425	657,942	654,160	584,127	578,559	7.5%
Industrial machinery	1,192,406	1,086,575	1,037,079	983,449	–	–	–	–
General-purpose machinery	–	–	–	–	362,465	323,766	324,636	4.2%
Production machinery	–	–	–	–	613,130	536,630	543,070	7.1%
Business oriented machinery	–	–	–	–	243,075	218,516	211,834	2.8%
Electrical machinery	1,939,729	1,750,103	1,573,683	559,413	511,670	476,765	483,979	6.3%
Information and communication electronic equipment	–	–	–	205,331	238,808	217,348	212,466	2.8%
Electronic parts and devices	–	–	–	490,140	521,471	462,543	452,169	5.9%
Transportation machinery	942,795	913,535	849,517	944,352	1,029,652	947,704	948,824	12.4%
Others	2,800,692	2,357,256	1,840,584	1,461,123	1,280,658	1,175,117	1,134,148	14.8%
Total manufacturing	11,172,829	10,320,583	9,183,833	8,156,992	8,364,607	7,735,789	7,663,847	100.0%

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

5 Labor productivity / Working hours

In 2011, the labor productivity index of chemical industry has dropped.

Index of physical labor productivity

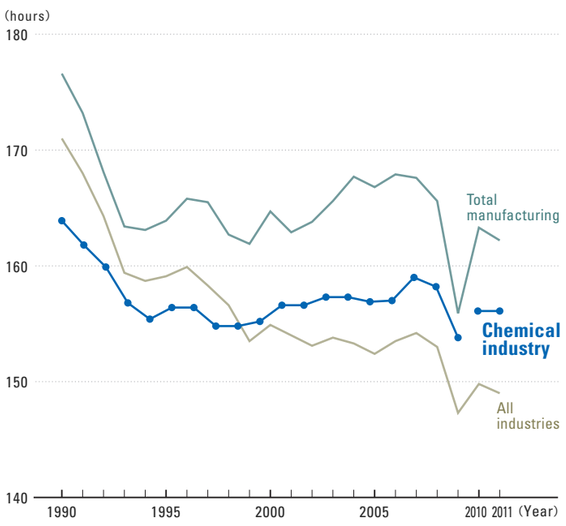


(Index, 2005=100)

Industry \ year		Total manufacturing		Chemical industry	
		Index	Increase rate	Index	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	2009	85.0	–16.0%	89.7	–7.0%
	2010	94.0	10.6%	103.5	15.4%
	2011	94.2	0.2%	90.1	–12.9%

(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)

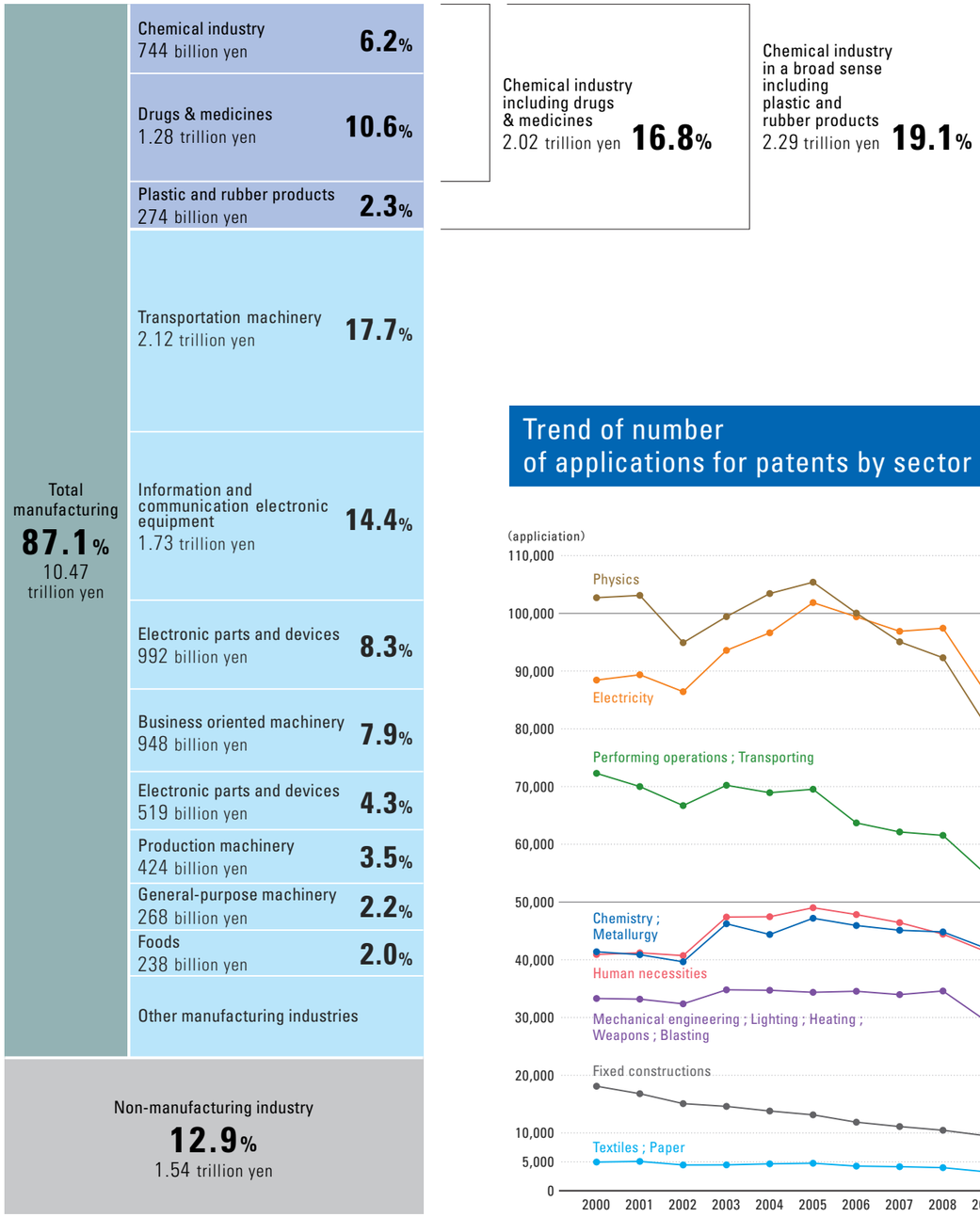
Industry \ year		All industries	Total manufacturing	Chemical industry
Every 5th year	1990	171.0	176.6	163.9
	1995	159.1	163.9	156.1
	2000	154.9	164.7	156.6
	2005	152.4	166.8	157.0
Recent three years	2009	147.3	155.9	153.8
	2010	149.8	163.3	156.1
	2011	149.0	162.2	155.9

(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.

6 2.3 trillion yen spent for research and development

Research and development expenditures of chemical industry amounted to 2.3 trillion yen, accounting for 19.1% of all industry R&D expenditures.

Ratio of R&D expenditures by industry in FY 2010

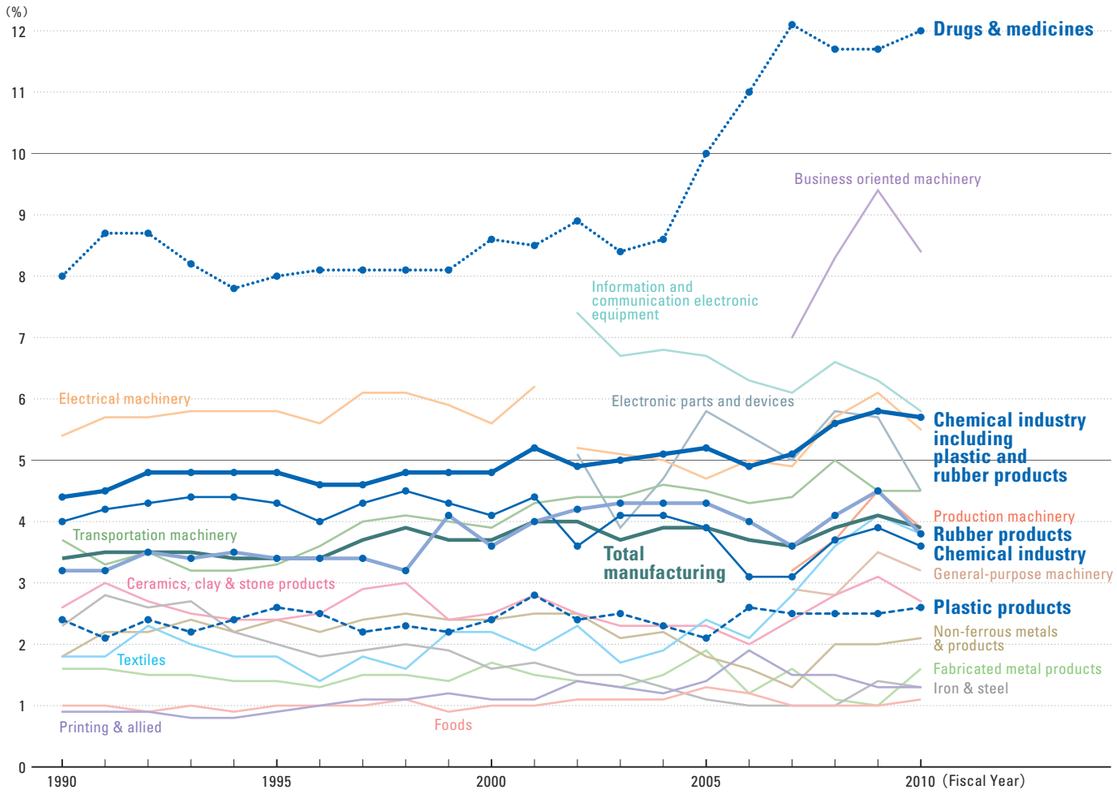


(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development]

Trend of number of applications for patents by sector

(Source) Japan Patent Office

Ratio of R&D expenditures to sales by industry



%

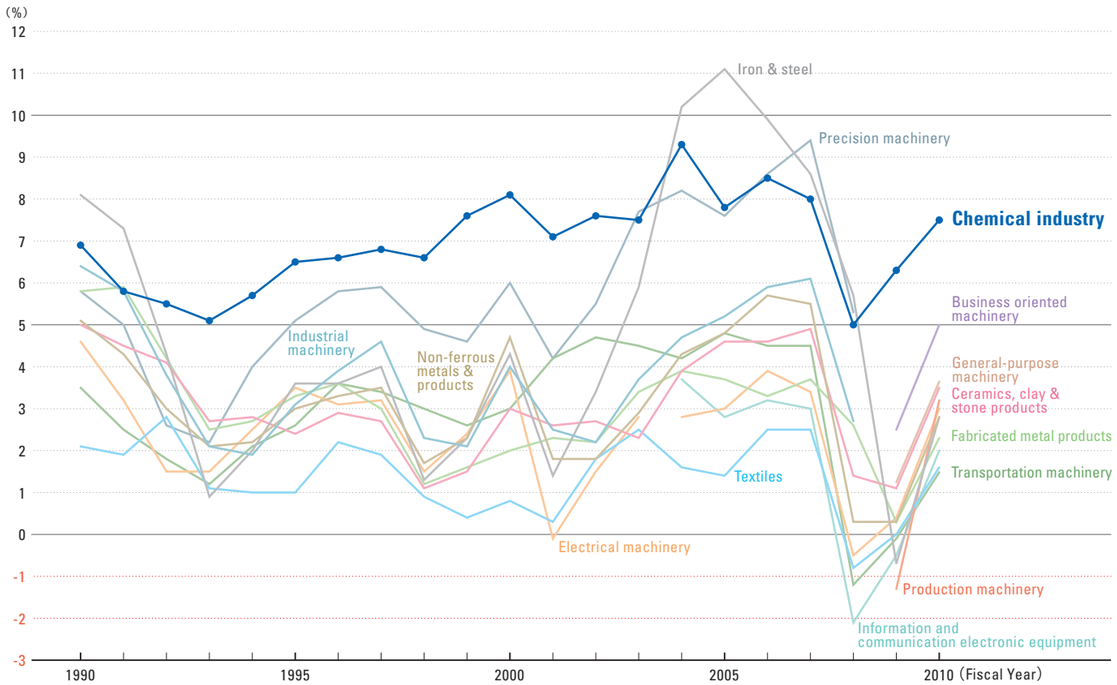
Industry \ fiscal year	Every 5th year				Recent three years		
	1990	1995	2000	2005	2008	2009	2010
Chemical industry	4.0	4.3	4.1	3.9	3.7	3.9	3.6
Drugs & medicines	8.0	8.0	8.6	10.0	11.7	11.7	12.0
Chemical Industry including drugs & medicines	4.9	5.3	5.4	5.9	6.3	6.5	6.4
Plastic products	2.4	2.6	2.4	2.1	2.5	2.5	2.6
Rubber products	3.2	3.4	3.6	4.3	4.1	4.5	3.8
Chemical industry including plastic products and rubber products	4.4	4.8	4.8	5.2	5.6	5.8	5.7
Foods	1.0	1.0	1.0	1.3	1.0	1.0	1.1
Textiles	1.8	1.8	2.2	2.4	3.6	4.1	3.8
Printing & allied	0.9	0.9	1.1	1.4	1.5	1.3	1.3
Ceramics, clay & stone products	2.6	2.4	2.5	2.3	2.8	3.1	2.7
Iron & steel	2.3	2.0	1.6	1.1	1.0	1.4	1.3
Non-ferrous metals & products	1.8	2.4	2.4	1.8	2.0	2.0	2.1
Fabricated metal products	1.6	1.4	1.7	1.9	1.1	1.0	1.6
General-purpose machinery	–	–	–	–	2.8	3.5	3.2
Production machinery	–	–	–	–	3.7	4.5	3.9
Business oriented machinery	–	–	–	–	8.3	9.4	8.4
Electrical machinery	5.4	5.8	5.6	4.7	5.7	6.1	5.5
Information and communication electronic equipment	–	–	–	6.7	6.6	6.3	5.8
Electronic parts and devices	–	–	–	5.8	5.8	5.7	4.5
Transportation machinery	3.7	3.3	3.9	4.5	5.0	4.5	4.5
Total manufacturing	3.4	3.4	3.7	3.9	3.9	4.1	3.9

(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development]
(Note) Drugs & medicines are excluded from the chemical industry.

7 Chemical industry ranks 1st in operating profit margin

Operating profit margin remains high compared to other manufacturing industries.

Trend of operating profit margin by industry



%

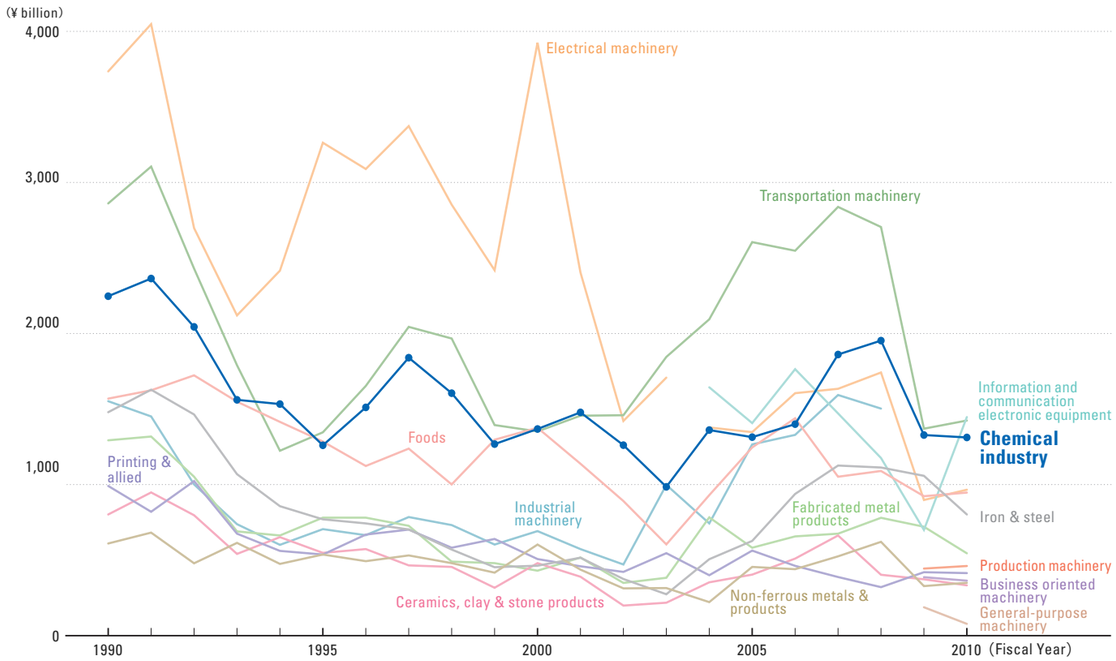
Industry \ fiscal year	Every 5th year				Recent three years		
	1990	1995	2000	2005	2008	2009	2010
Chemical industry	**6.9**	**6.5**	**8.1**	**7.8**	**5.0**	**6.3**	**7.5**
Textiles	2.1	1.0	0.8	1.4	-0.8	0	1.6
Ceramics, clay & stone products	5.0	2.4	3.0	4.6	1.4	1.1	3.5
Iron & steel	8.1	3.6	4.3	11.1	5.7	-0.7	2.8
Non-ferrous metals & products	5.1	3.0	4.7	4.8	0.3	0.3	2.8
Fabricated metal products	5.8	3.3	2.0	3.7	2.6	0.3	2.3
Industrial machinery	6.4	3.1	4.0	5.2	2.7	–	–
General-purpose machinery	–	–	–	–	–	1.2	3.5
Production machinery	–	–	–	–	–	-1.3	3.2
Business oriented machinery	–	–	–	–	–	2.5	5.0
Electrical machinery	4.6	3.5	3.9	3.0	-0.5	0.4	3.0
Information and communication electronic equipment	–	–	–	2.8	-2.1	-0.5	2.0
Transportation machinery	3.5	2.6	3.0	4.8	-1.2	-0.1	1.6
Precision machinery	5.8	5.1	6.0	7.6	5.3	–	–
Total manufacturing	4.8	3.3	3.8	4.5	1.5	1.5	3.2

(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]
(Note) Rubber & plastic products are excluded from the chemical industry.

8 Chemical industry ranks 3rd in capital investment

Plant investment by chemical industry accounted for 11.6% of all manufacturing industries.

Trend of plant investment by industry



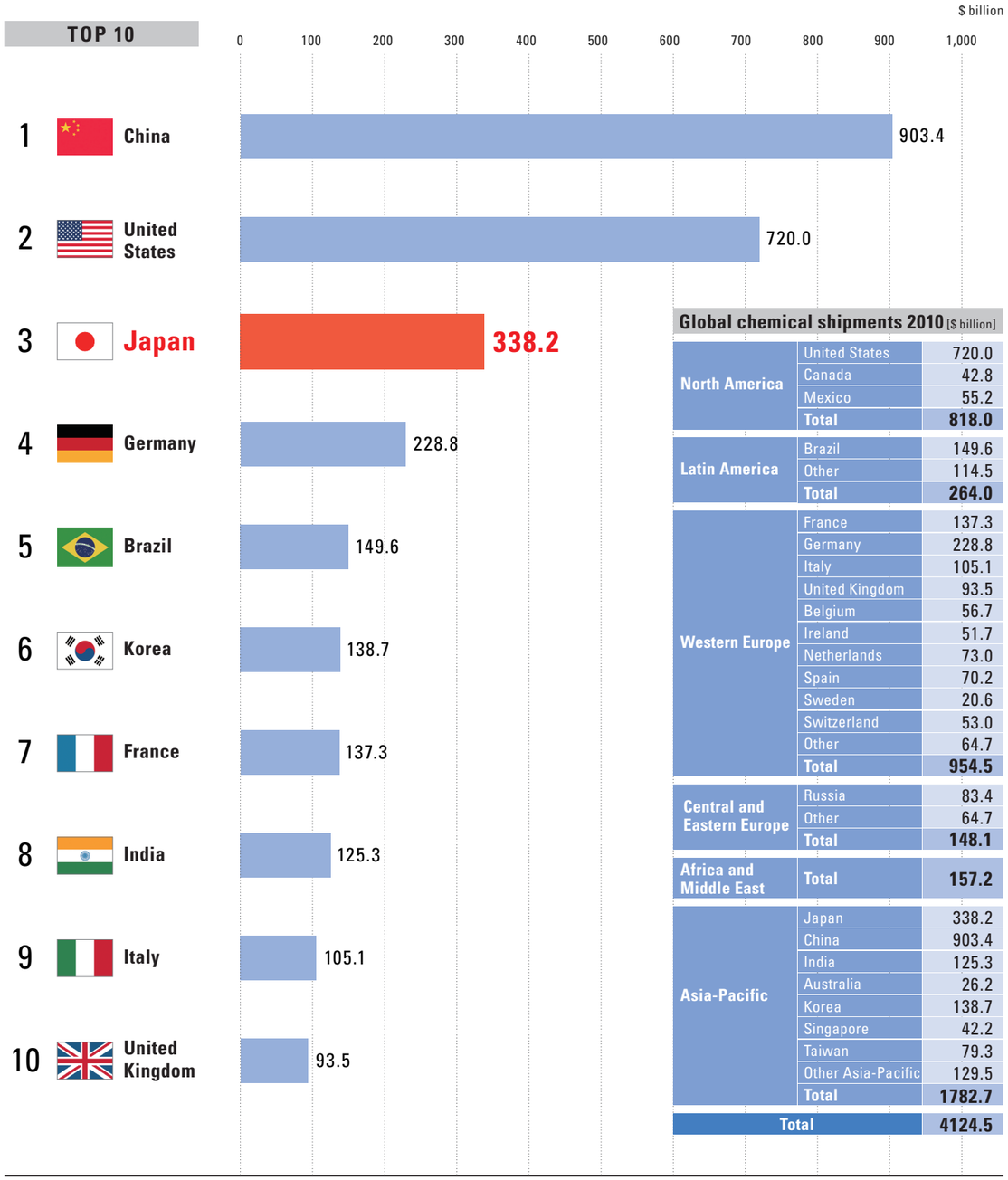
¥ billion

Industry \ fiscal year	Every 5th year				Recent three years			
	1990	1995	2000	2005	2008	2009	2010	
Chemical industry	**2,247**	**1,260**	**1,368**	**1,314**	**1,953**	**1,328**	**1,312**	**11.6%**
Foods	1,569	1,285	1,376	1,246	1,090	923	947	8.4%
Printing & allied	991	537	507	563	321	420	414	3.7%
Ceramics, clay & stone products	802	548	480	404	403	373	333	3.0%
Iron & steel	1,479	770	463	627	1,113	1,058	802	7.1%
Non-ferrous metals & products	610	537	603	455	621	328	350	3.1%
Fabricated metal products	1,293	781	430	582	780	721	545	4.8%
Industrial machinery	1,552	705	692	1,266	1,503	–	–	–
General-purpose machinery	–	–	–	–	–	188	78	0.7%
Production machinery	–	–	–	–	–	444	461	4.1%
Business oriented machinery	–	–	–	–	–	387	364	3.2%
Electrical machinery	3,737	3,265	3,927	1,347	1,742	898	966	8.6%
Information and communication electronic equipment	–	–	–	1,407	1,176	700	1,447	12.8%
Transportation machinery	2,861	1,346	1,352	2,605	2,705	1,370	1,424	12.6%
Others	2,291	1,840	1,032	784	576	1,754	1,828	16.2%
Total manufacturing	21,483	13,849	13,238	14,343	15,978	10,893	11,272	100.0%

(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]
(Note) Rubber & plastic products are excluded from the chemical industry.

9 Japan's chemical industry ranks 3rd in global chemical shipments

Shipments of chemical products by country in 2010



Global chemical shipments 2010 [$ billion]

North America	United States	720.0
	Canada	42.8
	Mexico	55.2
	Total	**818.0**
Latin America	Brazil	149.6
	Other	114.5
	Total	**264.0**
Western Europe	France	137.3
	Germany	228.8
	Italy	105.1
	United Kingdom	93.5
	Belgium	56.7
	Ireland	51.7
	Netherlands	73.0
	Spain	70.2
	Sweden	20.6
	Switzerland	53.0
	Other	64.7
	Total	**954.5**
Central and Eastern Europe	Russia	83.4
	Other	64.7
	Total	**148.1**
Africa and Middle East	**Total**	**157.2**
Asia-Pacific	Japan	338.2
	China	903.4
	India	125.3
	Australia	26.2
	Korea	138.7
	Singapore	42.2
	Taiwan	79.3
	Other Asia-Pacific	129.5
	Total	**1782.7**
Total		**4124.5**

(Source) American Chemistry Council

The world's leading chemical companies in 2010

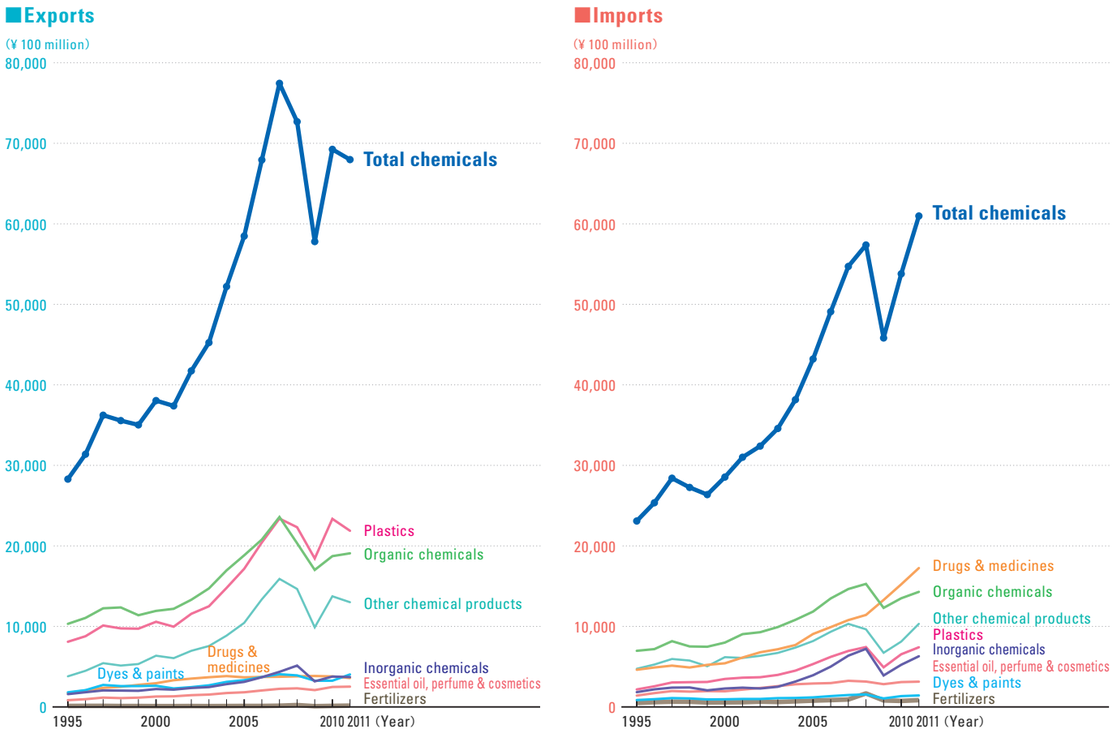
Ranking	Company	Country	Chemical sales			Chemical operating profits		
			2010 ($ million)	Change from 2009(%)	Chemical sales as of total sales	2010 ($ million)	Change from 2009(%)	Operating profit margin
1	**BASF**	Germany	70,391	34.9%	83.1%	7,197	291.0%	10.2%
2	**Dow Chemical**	U.S.	53,674	19.6%	100.0%	3,625	108.2%	6.8%
3	**Sinopec**	China	47,444	50.2%	12.1%	2,221	8.9%	4.7%
4	**Exxon Mobil**	U.S.	35,521	32.3%	9.6%	4,913	112.8%	13.8%
5	**Royal Dutch / Shell**	Netherlands	35,277	43.5%	9.6%	na	na	na
6	**Formosa Plastics**	Taiwan	34,663	30.0%	64.9%	3,810	118.1%	11.0%
7	**SABIC**	Saudi Arabia	33,712	46.0%	83.2%	11,490	85.8%	34.1%
8	**DuPont**	U.S.	31,312	20.6%	99.4%	4,578	85.0%	14.6%
9	**LyondellBasell Industries**	Netherlands	27,682	38.5%	67.3%	2,666	325.2%	9.6%
10	**Mitsubishi Chemical**	Japan	26,021	45.6%	72.1%	1,646	nm	6.3%
11	**Ineos Group Holdings**	Switzerland	24,817	32.2%	68.1%	2,194	66.6%	8.8%
12	**Total**	France	23,193	18.8%	11.0%	1,278	74.3%	5.5%
13	**Bayer**	Germany	22,522	21.1%	48.4%	1,380	95.7%	6.1%
14	**AkzoNobel**	Netherlands	19,414	5.4%	100.0%	1,578	44.8%	8.1%
15	**Mitsui Chemicals**	Japan	18,519	34.6%	100.0%	491	nm	2.7%
16	**Sumitomo Chemical**	Japan	17,377	24.1%	76.9%	923	256.2%	5.3%
17	**Evonik Industries**	Germany	17,167	28.6%	97.3%	3,126	47.1%	18.2%
18	**LG Chem**	South Korea	17,138	24.9%	100.0%	2,441	34.5%	14.2%
19	**Air Liquide**	France	16,890	16.0%	94.4%	3,132	15.9%	18.5%
20	**Reliance Industries**	India	14,828	14.4%	25.5%	2,090	10.4%	14.1%
21	**Toray Industries**	Japan	14,758	11.1%	84.1%	1,197	223.2%	8.1%
22	**Braskem**	Brazil	14,485	58.0%	100.0%	1,315	78.7%	9.1%
23	**Linde**	Germany	13,563	14.5%	91.2%	3,668	16.3%	27.0%
24	**PPG Industries**	U.S.	12,438	9.2%	92.7%	1,648	34.5%	13.2%
25	**Shin-Etsu Chemical**	Japan	12,056	15.5%	100.0%	1,700	27.3%	14.1%
26	**DSM**	Netherlands	12,001	15.1%	100.0%	1,164	146.6%	9.7%
27	**Asahi Kasei**	Japan	11,499	14.0%	63.1%	944	171.2%	8.2%
28	**Chevron Phillips**	U.S.	11,204	33.3%	100.0%	1,501	112.3%	13.4%
29	**Yara**	Norway	10,814	6.4%	100.0%	1,621	32.4%	15.0%
30	**Praxair**	U.S.	10,116	13.0%	100.0%	3,087	11.8%	30.5%

(Source) Chemical & Engineering News
(Note) 1.Drugs & medicines are excluded.
2.na=not available. nm= not meaningful.

10 Change of the amount of exports and imports

In 2011, while exports decreased, imports increased with resulting trade surplus of 700 billion yen.

Exports and imports of chemicals

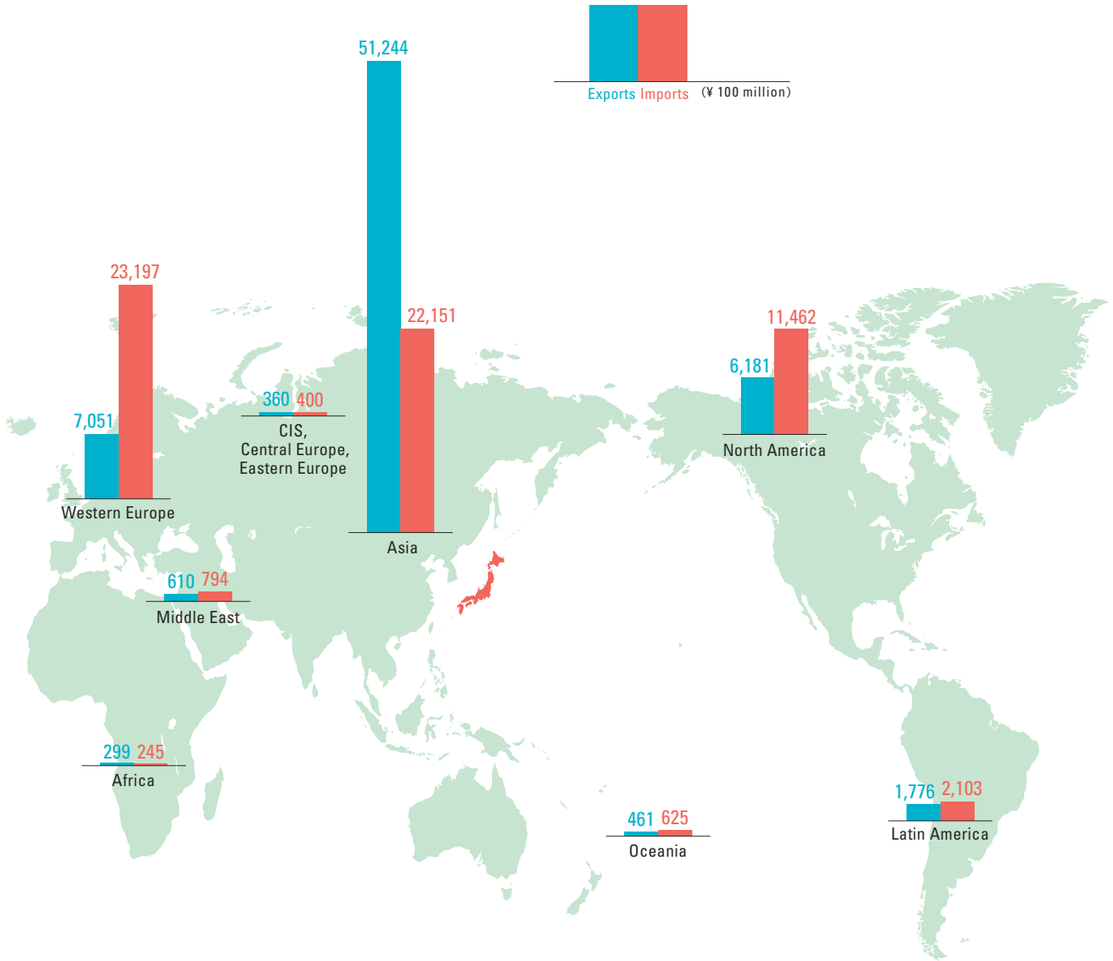


¥ 100 million

Exports						Articles	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
1995	2000	2005	2009	2010	2011		1995	2000	2005	2009	2010	2011
115	100	121	92	128	163	Fertilizers	496	570	783	807	745	841
1,589	2,221	3,109	3,175	3,772	3,710	Inorganic chemicals	1,834	2,287	3,935	3,907	5,237	6,294
10,317	11,927	18,832	17,015	18,728	19,080	Organic chemicals	6,969	7,993	11,843	12,302	13,496	14,295
8,091	10,575	17,157	18,441	23,360	21,878	Plastics	2,171	3,476	5,324	4,920	6,542	7,410
1,814	2,626	3,323	3,255	3,255	4,036	Dyes & paints	856	948	1,187	1,054	1,343	1,426
1,729	2,944	3,677	3,844	3,787	3,590	Drugs & medicines	4,615	5,149	9,060	13,286	15,226	17,250
838	1,292	1,820	2,091	2,479	2,520	Essential oil , perfume & cosmetics	1,410	1,944	2,909	2,827	3,087	3,137
3,800	6,361	10,442	9,886	13,743	13,004	Other chemical products	4,741	6,183	8,172	6,723	8,119	10,324
28,293	38,047	58,480	57,799	69,253	67,980	Total chemicals	23,092	28,550	43,212	45,826	53,794	60,976

(Source) Ministry of Finance [Trade Statistics]
(Note) Chemical fiber products are excluded from the chemical industry.

Exports and imports of chemicals by region in 2011



Exports and imports of chemicals by region

¥ 100 million

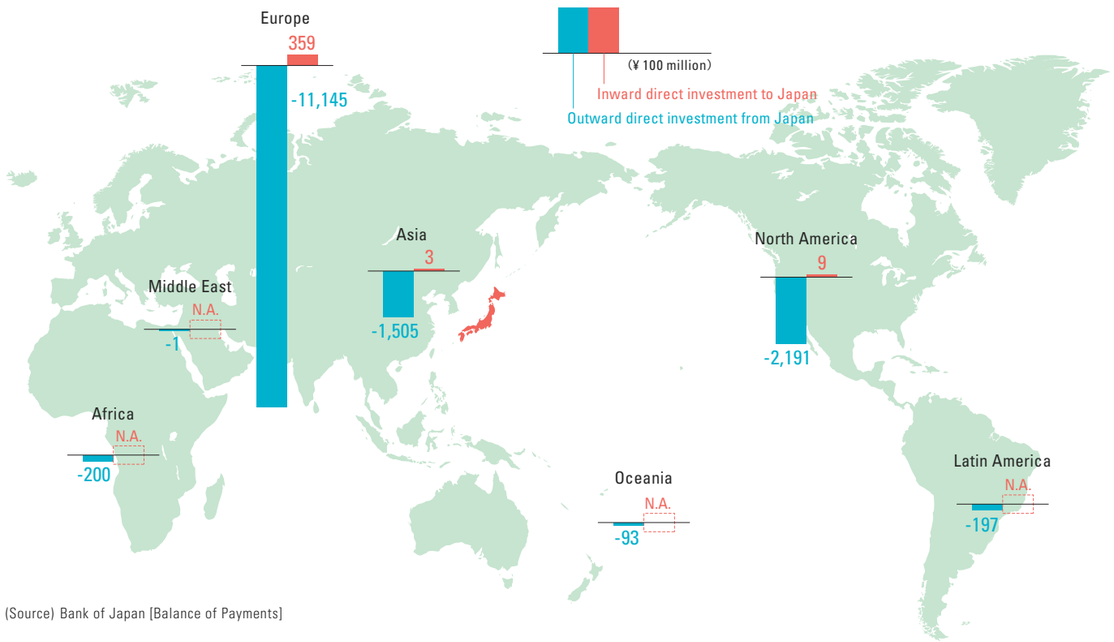
Exports						Region	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
1995	2000	2005	2009	2010	2011		1995	2000	2005	2009	2010	2011
17,203	22,742	40,150	42,089	51,799	51,244	Asia	3,894	6,414	12,974	12,714	17,474	22,151
191	224	364	523	580	610	Middle East	564	521	692	615	652	794
4,939	5,948	7,609	6,394	7,084	7,051	Western Europe	10,122	12,065	17,398	20,704	21,413	23,197
4,641	7,065	7,743	5,995	6,824	6,181	North America	7,040	8,198	9,364	9,072	11,190	11,462
661	1,402	1,629	1,770	1,819	1,776	Latin America	790	694	1,790	1,861	2,013	2,103
142	163	196	268	278	299	Africa	80	54	177	93	128	245
450	419	586	509	494	461	Oceania	455	457	520	491	595	625
66	84	204	251	374	360	CIS, Central Europe,Eastern Europe	147	147	298	276	330	400
28,293	38,047	58,480	57,799	69,253	67,980	Total	23,092	28,550	43,212	45,826	53,794	60,976

(Source) Ministry of Finance [Trade Statistics]
(Note) Chemical fiber products are excluded from the chemical industry.

11 Outward direct investment amounts to 1.5 trillion yen

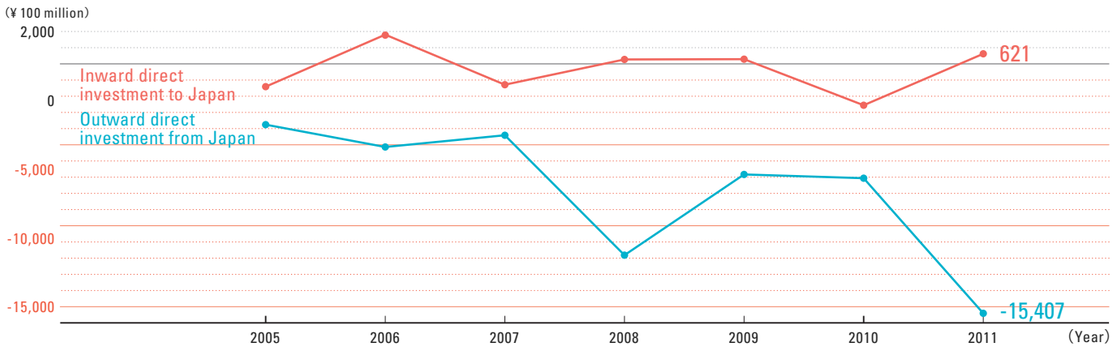
In 2011, outward direct investment of
Japanese chemical industry amounted to 1.5 trillion yen.

Outward direct investment of Japanese chemical industry and inward direct investment to chemical industry in Japan in 2011



(Source) Bank of Japan [Balance of Payments]

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



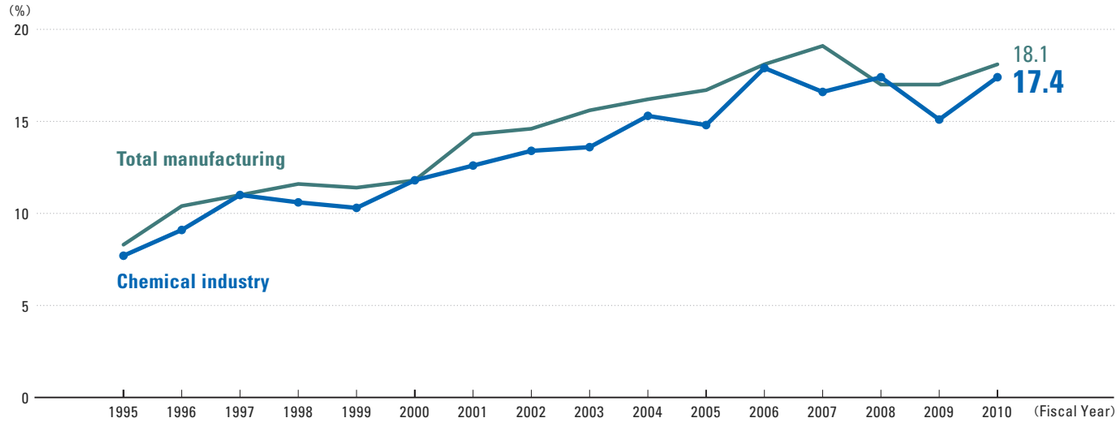
(Source) Bank of Japan [Balance of Payments]

(Note) 1. When there are no reports, it is indicated as "N.A.".
2. As regards to direct investment, there are "outward direct investment", in which Japanese companies make direct investment abroad, and "inward direct investment", in which overseas companies make direct investment in Japan. The amount of direct investment by Japanese chemical industry is the amount of "inflow of capital to Japan" from which "outflow of capital to overseas" is subtracted. Minus figures show the outflow of capital (outward direct investment is the implementation of investment by companies in Japan while inward direct investment is the repatriation of investment by overseas companies).
3. Drugs & medicines are included in the chemical industry.

12 Continued progress seen in overseas business activity

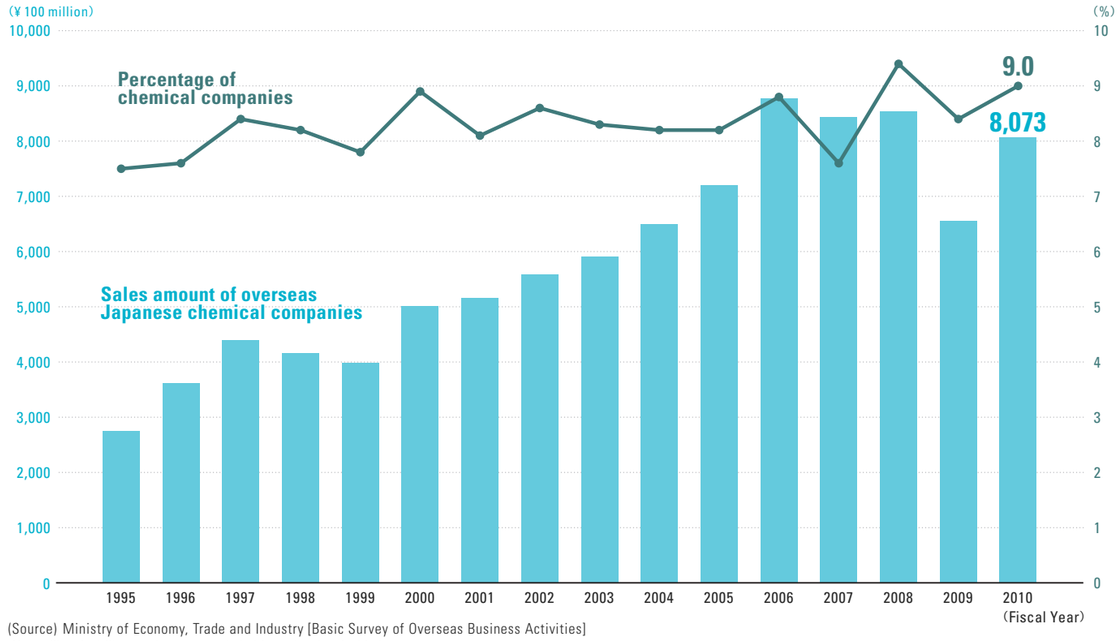
Overseas production of Japanese chemical industry
accounted for 17.4% in 2010.

Trend of overseas production of Japanese companies



(Source) Ministry of Economy, Trade and Industry [Basic Survey of Overseas Business Activities]
(Note) Chemical fiber products are excluded from the chemical industry.

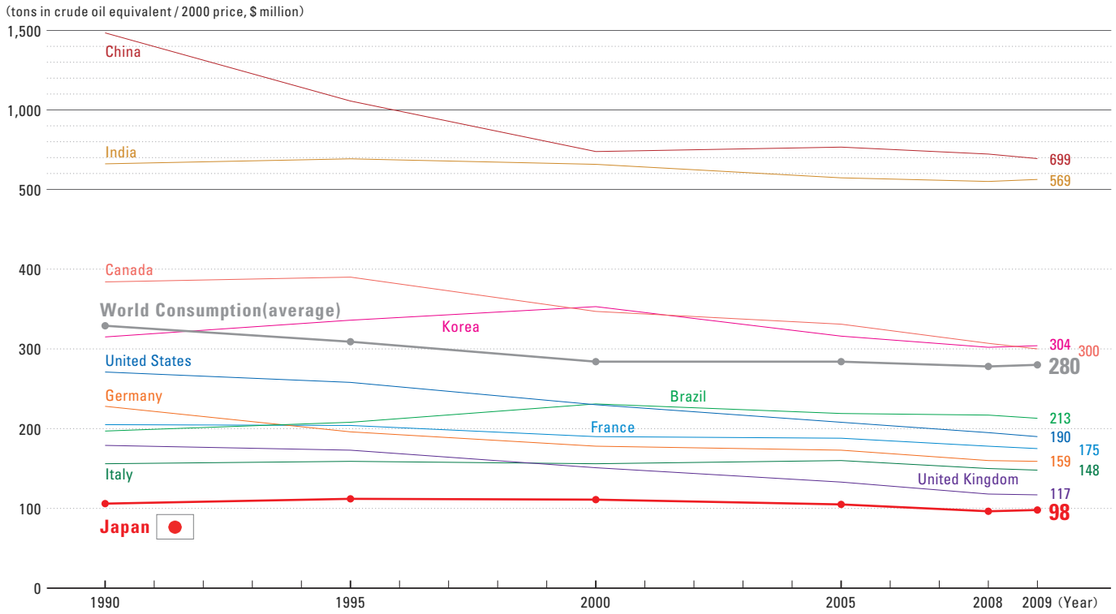
Sales of Japanese chemical companies based overseas and its percentage of all overseas Japanese manufacturing companies' sales



(Source) Ministry of Economy, Trade and Industry [Basic Survey of Overseas Business Activities]
(Note) Chemical fiber products are excluded from the chemical industry.

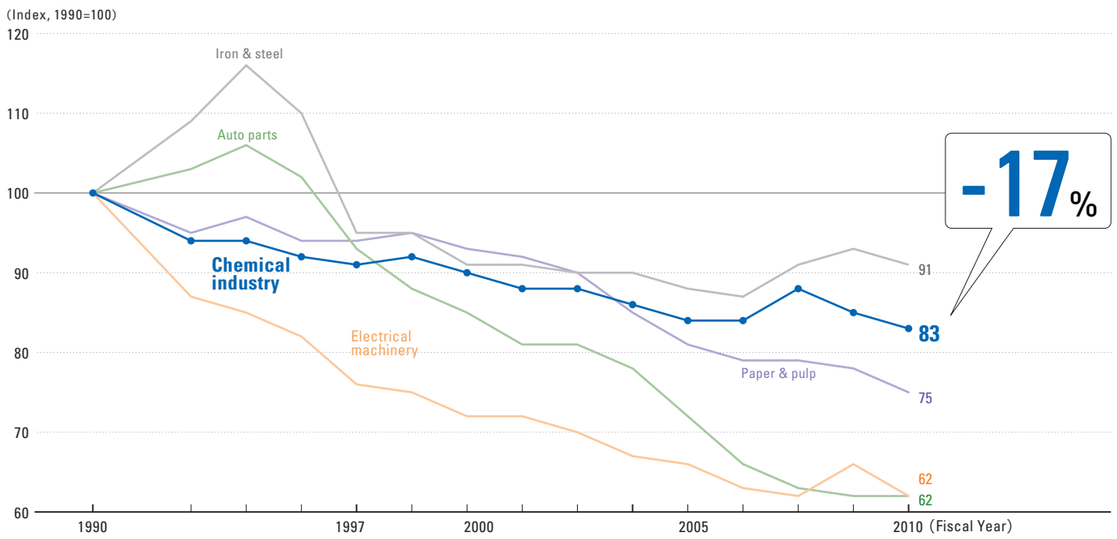
13 Efforts to conserve energy and prevent global warming

World's primary energy consumption per GDP



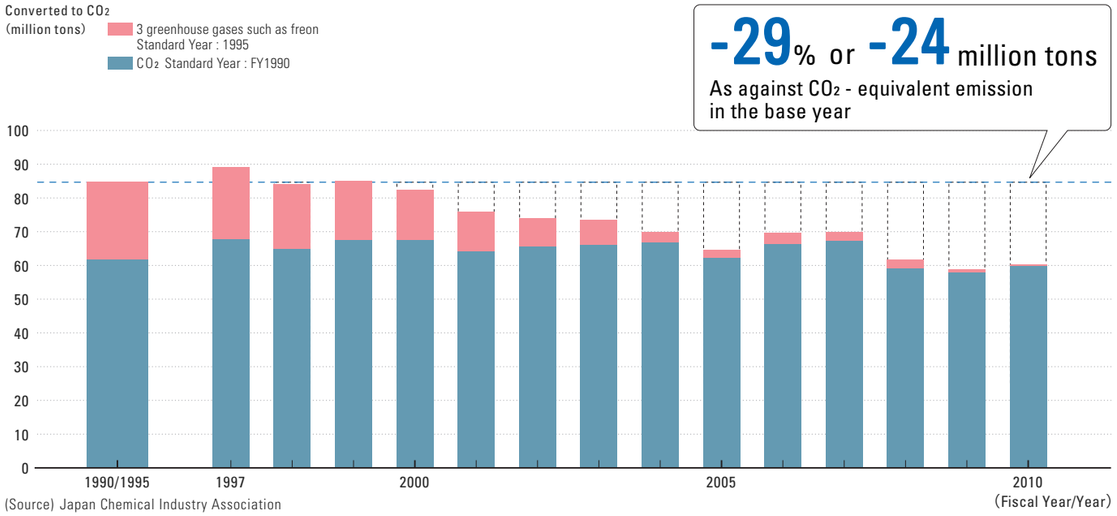
(Source) The Energy Conservation Center, Japan [Handbook of Energy & Economic Statistics in Japan]

Energy efficiency among major industries in Japan



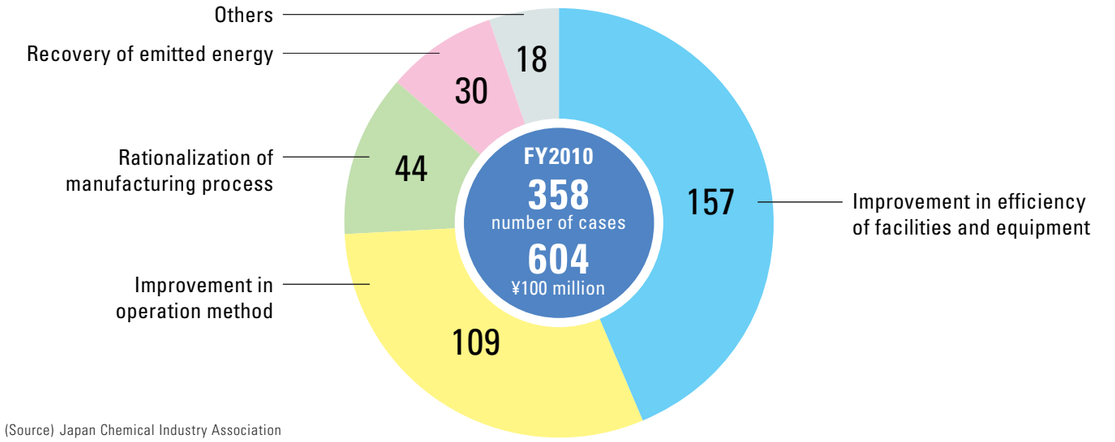
(Source) KEIDANREN [Results of the Fiscal 2011 Follow-up to the Keidanren Voluntary Action Plan on the Environment]

Greenhouse gases emissions under the voluntary action plan of chemical industry



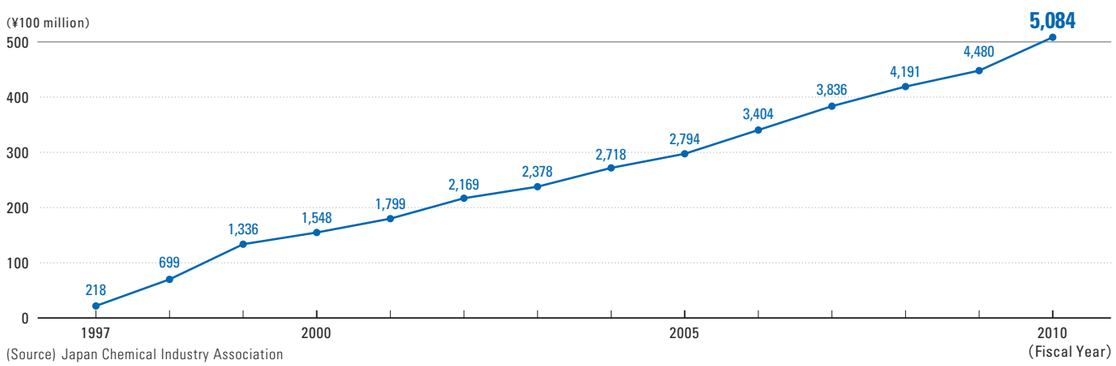
(Source) Japan Chemical Industry Association

Energy conservation capital investment (FY2010)



(Source) Japan Chemical Industry Association

Energy conservation capital investment (cumulative, FY1997-FY2010)



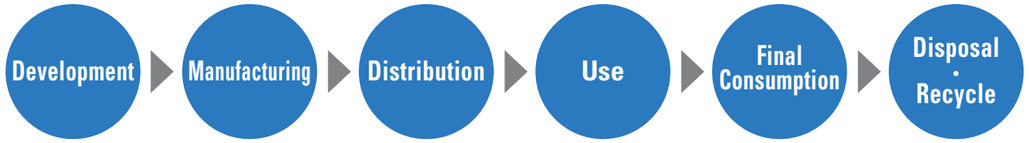
(Source) Japan Chemical Industry Association

Do You Know about Responsible Care?

Efforts of chemical industry to preserve health, safety and the environment

What is Responsible Care?

In the chemical industry, each company that handles chemicals voluntarily conducts an activity to preserve "environment/safety/health" in all the processes, from the development of chemicals to production, distribution, use, and final consumption, to disposal and recycling. Furthermore, the industry maintains dialogue and communications with the general public by disclosing the results of the activity. We call this activity "Responsible Care" (RC).



History of Responsible Care

1985 Responsible Care was initiated in Canada.

1989 International Council of Chemical Associations (ICCA) was established and global development of Responsible Care activity began.

1995 Japan Responsible Care Council (JRCC) was established in Japan Chemical Industry Association (JCIA) and activities concerning environment/safety/health were unified and revitalized in the chemical industry as a whole.

2001 JRCC started to promote Responsible Care activity in other Asian countries.

2006 Responsible Care Global Charter was approved.

2010 JRCC was integrated into JCIA, and its organization was changed to JCIA Responsible Care Committee.

Responsible Care Logo

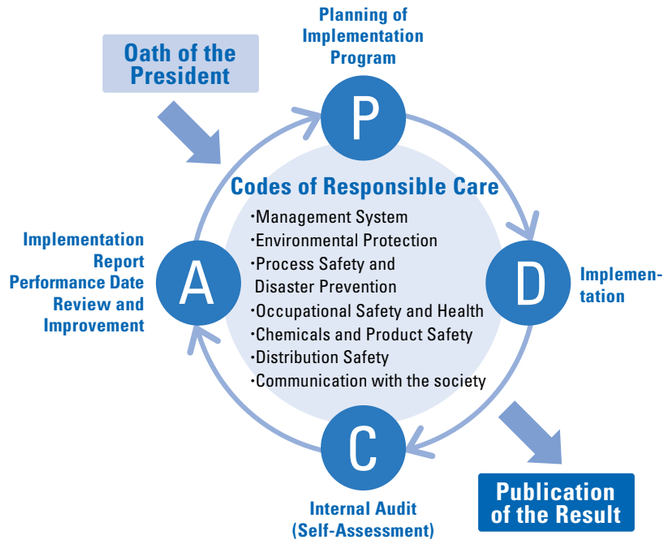
The logo, depicting a pair of hands and a model of a molecule, expresses the key message in handling chemical substances with care, and the ICCA has adopted the logo as an international mark to be used by corporations and associations that implement Responsible Care. Permission to use the logo has been 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, RC committee and RC committee members.

Responsible Care®
OUR COMMITMENT TO SUSTAINABILITY

Procedures for Implementing Responsible Care

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 must 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 public. Most of the member companies publish their own RC Report and CSR Report. Thereby making their activities and achievements known to the public.



Responsible Care Implementation Items

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

Environmental Protection
protecting nature and health globally

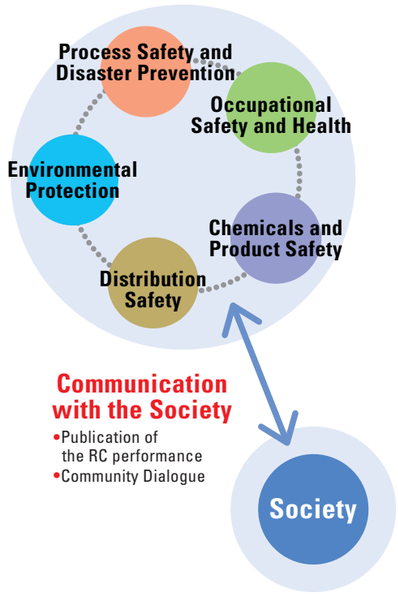
Process Safety and Disaster Prevention
striving to prevent disasters at industrial facilities and enacting countermeasures for natural disasters

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 handles these products, including customers

Distribution Safety
preventing accidents during the transportation of chemicals and protecting human safety and the environment

The RC Committee and its members publicly report the results of these efforts to promote interaction and **Communication with the Society**.



Dream Chemistry 21

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 its various 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 activities of this Committee will include "Dream Chemistry 21" Children's Chemical Experiment Show, "Dream Chemistry 21" Weekend Experiment Classroom, Chemical Experiments in the Classroom program, Chemistry Grand Prix, and support for the participation in the International Chemistry Olympiad.

JCIA

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