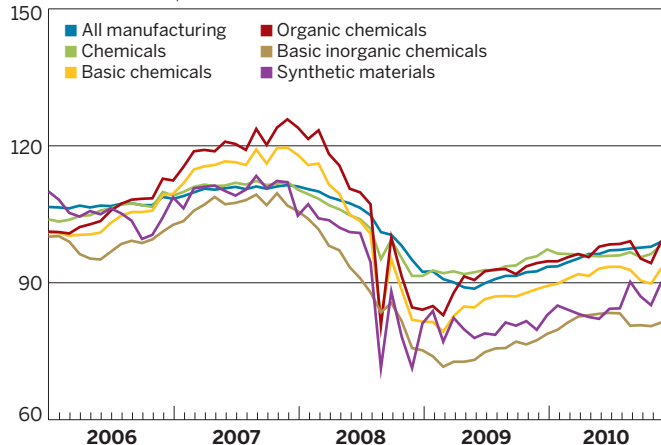


U.S. output rose again in all sectors

Production index, 2004 = 100



NOTE: Seasonally adjusted. SOURCE: Federal Reserve Board

U.S. major inorganic chemical production in 2000:

86.4
million
metric tons

In 2010:
63.0
million
metric tons

Change in U.S. soap, cleaners, shampoo production from 2000 to 2010:

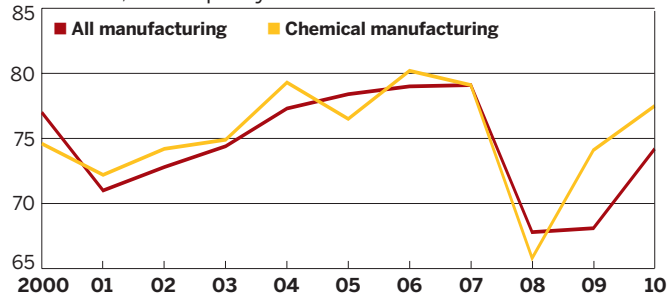
8.7%

Change in U.S. paints and coatings production from 2000 to 2010:

-24.7%

U.S. chemical manufacturing capacity continued to recover from 2008 low

Production, % of capacity



NOTE: As of December 2010. SOURCE: Federal Reserve Board

Increase in U.S. linear low-density polyethylene output between 2000 and 2010:

2.6
million
metric tons

Percent increase in polyethylene production in 2010 in Canada:

0.1
In U.S.:
2.3

Drop in U.S. ammonia fertilizer production over 10 years:

4.8
million
metric tons

OUTPUT RAMPS UP IN ALL REGIONS

Chemical **PRODUCTION** increased markedly over that in 2009, thanks to demand from developing economies

THE GLOBAL ECONOMIC recovery lifted all boats in the chemical industry in 2010, as it did for manufacturing industries as a whole. Chemical production was up for almost all categories of chemicals in the U.S., Canada, Japan, South Korea, Taiwan, and China. Statistics for European chemical production lag by a year, so 2010 data are unavailable, but output in 2009 mirrored the sharp decreases experienced in the U.S. that year.

Although businesses and consumers in

the developed economies of the U.S. and Europe mostly stayed on the sidelines during the recovery, developing economies such as China and Brazil began to ramp up manufacturing as early as midyear 2009. Those regions continued to boost demand for chemicals in 2010.

Proximity to China may explain why production indexes showed that growth in chemicals was stronger in Asia than in the U.S. and Canada. Japan upped its output of all chemicals by 9.0% in 2010 compared

with 2009. In South Korea the increase was 6.8%, and in Taiwan it was 9.0%. For the latter two countries, 2010 marked a record year for chemical production. In Japan, by contrast, chemical output would need to increase again by more than 9% to reach the record set in 2007.

In the U.S., overall chemical output nudged up 3.5%. It would need to tack on another 15.5% of improvements in production to reach 2007 levels, and that will likely take many years. The story in Canada was similar. Although a years-long decline in chemical output was reversed in 2010, it is about 15% below the high-watermark year of 2004. Still, Canadian plants' output grew 4.3% from the prior year.

U.S. output shot up for aniline, benzene, 1,3-butadiene, and cumene, all of which grew at double-digit rates. For inorganics, all but ammonium nitrate, hydrochloric and phosphoric acid grew more than 10% compared with 2009. Among plastics, production of

PRODUCTION

PVC and copolymers grew at just under 10%. And even nylon, olefin, and polyester fibers turned around a decadelong slide.

In Asia, production of acrylonitrile, benzene, and purified terephthalic acid increased almost 10%. In Japan, production

of hydrogen peroxide and nitrogen soared 23.4% and 16.5%, respectively. But Japan has slid to third place in the production of the building block chemical ethylene, after South Korea and China.

For its part, China expanded its output of

methanol, which it produces from abundant coal reserves, by 38.9%. Japan, South Korea, and Taiwan all boosted manufacturing of plastics, especially polypropylene in Japan, polystyrene in South Korea, and acrylonitrile-butadiene-styrene in Taiwan.

U.S. PRODUCTION INDEX

Most chemical categories rose, but alkalis and chlorine showed the strongest recovery

PRODUCTION INDEX, 2004 = 100	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Total index	99.7	96.3	96.5	97.8	100.0	103.3	105.5	108.3	104.3	92.7	97.6	5.3%	-0.2%
All manufacturing	99.1	95.2	95.7	97.2	100.0	104.2	107.0	110.4	105.2	91.0	96.3	5.8	-0.3
Nondurable manufacturing	100.0	97.0	98.2	98.4	100.0	102.5	103.1	104.3	98.1	90.1	93.5	3.7	-0.7
Chemicals	90.3	88.8	94.7	96.3	100.0	103.3	105.9	111.2	102.8	93.1	96.4	3.5	0.7
Basic chemicals	92.2	83.3	89.0	91.8	100.0	100.4	103.2	115.9	102.3	84.9	91.6	8.0	-0.1
Basic inorganic chemicals	95.7	91.7	100.1	99.8	100.0	103.0	98.3	107.0	92.1	74.7	81.5	9.2	-1.6
Alkalis & chlorine	68.6	57.6	84.8	85.9	100.0	112.8	96.9	97.1	86.6	63.2	71.2	12.6	0.4
Synthetic dyes & pigments	97.7	90.8	104.7	105.2	100.0	102.5	103.5	114.7	102.7	86.0	90.2	4.9	-0.8
Other basic inorganic chemicals	100.8	96.6	101.4	98.1	100.0	102.4	93.6	102.1	84.0	69.2	76.3	10.2	-2.7
Organic chemicals	90.9	78.9	83.1	87.6	100.0	99.2	105.2	119.9	107.2	90.0	96.6	7.4	0.6
Synthetic materials (a)	106.8	96.5	98.6	96.6	100.0	107.0	104.9	110.5	93.9	80.2	85.1	6.1	-2.2
Plastic materials & resins	102.6	94.2	98.5	94.8	100.0	109.6	107.4	114.8	97.0	84.6	89.2	5.4	-1.4
Artificial & synthetic fibers	127.4	114.5	100.9	102.5	100.0	94.9	94.6	88.7	76.4	57.6	64.7	12.3	-4.5
Chemical products	82.4	86.9	95.3	97.6	100.0	105.2	108.9	109.4	105.3	97.1	96.9	-0.2	1.6
Pharmaceuticals & medicines	82.9	89.2	96.3	99.7	100.0	103.9	108.2	109.6	107.0	101.0	102.0	0.9	2.1
Soap, cleaning compounds & toiletries	80.5	81.8	91.2	89.4	100.0	108.0	113.6	123.5	114.5	104.5	108.7	4.0	3.0
Paint & coatings	96.2	94.0	94.9	93.8	100.0	97.4	93.3	89.0	79.1	65.2	71.5	9.7	-2.9
Pesticides, fertilizers & other agricultural chemicals	96.5	88.9	91.7	95.9	100.0	103.7	108.2	99.6	86.1	93.7	93.7	0.0	-0.3

a Includes synthetic rubber. SOURCE: Federal Reserve Board

CANADA PRODUCTION INDEX

The manufacturing and chemical sectors reversed their long slide in 2010

PRODUCTION INDEX, 2004 = 100	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
All manufacturing	103.2	98.1	98.9	98.1	100.0	101.8	100.3	98.1	90.9	79.3	84.7	6.7%	-2.0%
Chemicals	91.1	93.2	97.2	99.9	100.0	98.3	99.5	95.9	91.4	82.0	85.5	4.3	-0.6
Basic chemicals	110.5	110.5	109.2	107.5	100.0	107.7	112.3	106.7	98.4	81.8	91.8	12.2	-1.8
Pharmaceuticals & medicines	70.7	92.2	105.4	110.5	100.0	97.3	108.6	91.2	93.8	103.3	107.3	3.9	4.3

SOURCE: Statistics Canada

ASIA PRODUCTION INDEXES

Manufacturing rebounded in Japan, South Korea, and Taiwan last year

PRODUCTION INDEX, 2004 = 100	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
JAPAN													
Mining & manufacturing	100.9	95.9	91.8	94.8	100.0	101.1	105.6	108.6	104.9	82.0	95.4	16.4%	-0.6%
All chemicals (a)	100.2	97.1	97.1	98.6	100.0	100.6	100.3	102.3	95.5	85.8	93.6	9.0	-0.7
Petrochemicals	98.1	93.6	94.5	97.4	100.0	101.0	99.0	102.2	92.1	85.0	92.5	8.8	-0.6
Aromatics	91.1	88.9	91.7	96.9	100.0	104.6	104.4	107.7	97.8	97.2	101.4	4.3	1.1
Industrial sodium chemicals	104.7	97.0	98.7	100.0	100.0	100.8	98.3	98.4	95.5	90.6	98.7	8.9	-0.6
Inorganic chemicals & dyes	98.1	93.5	95.5	97.6	100.0	101.2	99.5	100.6	98.1	70.0	83.7	19.5	-1.6
Organic chemicals	99.9	93.6	93.9	99.3	100.0	101.4	98.8	102.7	90.0	87.1	92.5	6.3	-0.8
Cyclic intermediates & dyes	98.7	94.9	96.6	97.6	100.0	97.0	95.4	96.4	83.1	76.8	86.0	11.9	-1.4
Plastics	102.2	96.5	96.5	96.9	100.0	100.0	99.6	100.1	91.7	75.0	86.4	15.2	-1.7
Synthetic rubber	97.9	90.1	94.1	97.6	100.0	100.6	99.4	102.3	102.1	80.2	98.4	22.7	0.1
Fertilizers	124.7	115.5	107.4	99.5	100.0	98.2	96.5	95.7	90.6	70.7	80.3	13.5	-4.3
SOUTH KOREA													
All manufacturing	79.2	79.4	85.9	90.5	100.0	106.2	115.4	123.6	127.3	126.6	148.6	17.4%	6.5%
Chemicals & chemical products	84.0	86.3	91.8	95.3	100.0	103.1	105.7	113.0	113.8	119.9	128.0	6.8	4.3
Rubber & plastic products	86.4	88.6	94.4	96.8	100.0	102.0	108.9	115.3	111.4	102.5	114.3	11.5	2.8
TAIWAN													
All manufacturing	83.8	76.2	83.0	90.9	100.0	103.7	108.3	117.4	115.5	98.2	136.7	39.3%	5.0%
Chemicals	57.3	65.4	73.8	85.3	100.0	104.0	98.1	99.4	90.4	109.0	118.9	9.0	7.6
Basic chemicals	77.6	78.9	80.5	88.4	100.0	101.5	118.9	122.2	117.6	109.7	157.7	43.8	7.4
Petrochemicals	59.7	72.1	80.9	92.1	100.0	102.6	104.4	123.8	117.2	120.6	140.3	16.4	8.9
Fertilizers	115.7	108.0	103.4	103.2	100.0	107.1	108.5	110.0	105.1	99.1	115.6	16.7	0.0
Man-made fibers	96.1	93.0	100.3	98.8	100.0	87.5	84.4	81.2	65.2	78.6	72.4	-7.9	-2.8
Plastics & resins	84.7	84.9	91.2	95.8	100.0	98.1	98.6	107.2	95.7	99.1	106.8	7.8	2.4
Synthetic rubber	79.4	81.8	89.8	93.8	100.0	99.0	103.1	113.0	105.1	107.0	119.0	11.3	4.1

a Excludes pharmaceuticals. SOURCES: Japan's Ministry of Economy, Trade & Industry; Korea National Statistical Office, Republic of Korea; Taiwan's Ministry of Economic Affairs

U.S. ORGANICS

All products grew, but aniline, benzene, 1,3-butadiene, and cumene grew at double-digit rates

THOUSANDS OF METRIC TONS UNLESS OTHERWISE INDICATED	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Aniline	846	865	921	969	1,034	964	930	978	1,009	845	1,064	25.9%	2.3%
Benzene (thousands of liters) (a,b)	9,156	7,271	8,130	7,926	8,781	7,574	7,642	7,979	6,359	5,772	6,862	18.9	-2.8
1,3-Butadiene (c)	2,009	1,721	1,869	1,901	2,204	2,046	1,987	2,047	1,633	1,427	1,580	10.7	-2.4
Cumene	3,741	3,186	3,503	3,397	3,736	3,509	3,559	3,702	3,386	2,705	3,478	28.6	-0.7
Ethylbenzene	5,967	4,642	5,412	5,578	5,779	5,251	5,286	5,538	4,104	4,110	4,240	3.2	-3.4
Ethylene	25,113	22,513	23,644	22,976	25,682	23,974	25,020	25,412	22,554	22,610	23,975	6.0	-0.5
Ethylene dichloride	9,911	9,336	9,328	9,994	12,163	11,308	9,732	9,562	8,973	8,121	8,810	8.5	-1.2
Ethylene oxide	3,867	3,343	3,447	3,660	3,772	3,166	3,445	3,415	2,903	2,579	2,664	3.3	-3.7
Propylene (d)	14,457	13,176	14,425	13,939	15,345	15,490	15,650	16,187	14,783	13,280	14,085	6.1	-0.3
Styrene	5,405	4,214	4,899	5,167	5,394	5,042	4,827	5,100	4,100	3,960	4,102	3.6	-2.7
Vinyl acetate	1,497	1,188	1,349	1,306	1,431	1,327	1,315	1,391	1,267	1,302	1,386	6.5	-0.8

a Production by tar distillers and coke-oven operators is not included. b Specification grades. c Rubber grade. d All grades.
SOURCE: National Petrochemical & Refiners Association

PRODUCTION

ASIA ORGANICS

The majority of organics grew strongly last year

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
JAPAN													
Acetic acid	675	594	569	592	589	599	597	587	500	384	450	17.2%	-4.0%
Acetone	508	476	472	492	539	546	531	593	491	477	521	9.2	0.3
Acrylonitrile	732	738	708	780	711	742	667	743	600	602	663	10.1	-1.0
Benzene (a)	4,425	4,261	4,313	4,551	4,758	4,980	4,874	5,245	4,581	4,259	4,764	11.9	0.7
Butadiene	1,044	976	993	1,062	1,041	1,040	1,002	1,024	953	871	977	12.2	-0.7
Butanol	461	472	476	519	506	513	537	537	482	436	520	19.3	1.2
Caprolactam	599	531	508	530	503	458	467	467	432	342	422	23.4	-3.4
Cyclohexane	673	598	607	685	676	722	731	703	557	407	483	18.7	-3.3
Ethylene	7,614	7,361	7,152	7,367	7,570	7,618	7,522	7,739	6,882	6,913	7,018	1.5	-0.8
Ethylene dichloride	3,431	3,275	3,352	3,463	3,594	3,687	3,514	3,603	3,212	3,242	3,222	-0.6	-0.6
Ethylene glycol	930	787	733	814	786	841	763	754	629	581	596	2.6	-4.4
Ethylene oxide	990	891	868	939	941	1,005	974	966	865	759	845	11.3	-1.6
Octanol	278	262	302	306	307	279	280	270	259	267	286	7.1	0.3
Phenol	916	884	891	926	966	938	860	961	772	786	853	8.5	-0.7
Phthalate plasticizers	396	369	377	382	357	315	279	281	246	172	212	23.3	-6.1
Phthalic anhydride	290	259	262	262	257	239	175	179	176	134	159	18.7	-5.8
Polypropylene glycol	304	294	299	314	346	339	344	343	308	240	284	18.3	-0.7
Propylene	5,453	5,342	5,309	5,610	5,767	6,030	6,090	6,286	5,674	5,590	5,986	7.1	0.9
Purified terephthalic acid	1,527	1,496	1,624	1,443	1,531	1,472	1,432	1,254	1,015	893	1,131	26.7	-3.0
Styrene	2,968	3,004	3,016	3,201	3,345	3,392	3,295	3,533	2,851	2,996	2,939	-1.9	-0.1
Toluene (a)	1,489	1,423	1,548	1,584	1,634	1,676	1,633	1,637	1,437	1,415	1,393	-1.6	-0.7
Toluene diisocyanate	214	214	223	230	245	216	232	229	224	na	na	na	na
Xylene (a)	4,681	4,798	4,900	5,213	5,395	5,570	5,727	6,006	5,698	5,628	5,935	5.5	2.4
p-Xylene	2,920	2,814	2,920	3,097	3,164	3,358	3,357	3,301	3,039	3,218	3,177	-1.3	0.8
SOUTH KOREA													
Benzene	2,834	2,650	2,852	3,246	3,462	3,594	3,719	4,065	4,006	4,075	4,417	8.4%	4.5%
Butadiene	808	777	816	860	917	939	948	1,078	1,072	1,097	1,161	5.8	3.7
Ethylene	5,439	5,398	5,636	5,872	5,945	6,058	6,055	6,788	6,989	7,349	7,290	-0.8	3.0
Propylene	3,409	3,273	3,557	3,753	3,892	3,945	4,172	4,669	4,772	5,205	5,333	2.5	4.6
Vinyl chloride	1,133	1,392	1,416	1,441	1,498	1,501	1,521	1,512	1,473	1,446	na	na	na
TAIWAN													
Acrylonitrile	186	292	339	352	379	386	418	451	360	412	458	11.2%	9.4%
Benzene	690	1,070	931	998	1,088	1,204	1,180	1,606	1,550	1,558	1,708	9.6	9.5
Butadiene	220	349	346	390	412	387	394	521	513	527	577	9.5	10.1
Caprolactam	171	184	186	216	216	247	257	257	216	253	290	14.6	5.4
Diocetyl phthalate	198	280	257	243	239	204	211	244	189	224	122	-45.5	-4.7
Ethylene	1,592	2,584	2,393	2,679	2,864	2,890	2,888	3,666	3,623	3,852	3,929	2.0	9.5
Ethylene glycol	612	1,036	939	1,169	1,459	1,413	1,343	1,795	2,014	2,039	2,139	4.9	13.3
Propylene	930	1,410	1,462	1,752	1,995	2,012	2,105	2,835	2,663	2,881	2,976	3.3	12.3
Purified terephthalic acid	3,140	3,217	3,705	4,079	4,620	4,597	4,400	4,437	4,096	4,406	5,163	17.2	5.1
Styrene	956	1,146	1,249	1,274	1,247	1,248	1,222	1,824	1,679	1,906	1,921	0.8	7.2
Toluene	26	54	42	64	140	86	30	36	16	39	167	328.2	20.4
Vinyl chloride	1,410	1,452	1,557	1,718	1,763	1,783	1,609	1,810	1,633	1,773	1,758	-0.8	2.2

a Petroleum and nonpetroleum sources. na = not available. SOURCES: Japan's Ministry of Economy, Trade & Industry; Korea National Statistical Office, Republic of Korea; Petrochemical Industry Association of Taiwan; Taiwan's Ministry of Economic Affairs

CANADA ORGANICS

Petrochemicals saw a robust recovery in 2010

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Benzene	859	751	849	843	915	798	743	794	704	515	638	23.9%	-2.9%
Butadiene	252	245	276	276	289	246	262	234	na	170	213	25.3	-1.7
Ethylene (a)	4,069	4,261	4,734	4,729	5,095	na	na	5,055	4,859	4,297	4,373	1.8	0.7
Formaldehyde	194	179	212	245	269	na	236	195	165	147	127	-13.6	-4.1
Propylene	934	882	956	938	939	737	833	917	771	591	660	11.7	-3.4
Toluene	218	222	256	289	na	na	253	211	na	166	274	65.1	2.3
Xylenes	312	271	294	336	351	na	na	na	na	256	292	14.1	-0.7

NOTE: Some data are not being released because of confidentiality requirements. **a** Data for 2008, 2009, and 2010 are C&EN estimates. **na** = not available. **SOURCE:** Statistics Canada

EUROPE ORGANICS

Petrochemical production took an enormous hit in 2009

THOUSANDS OF METRIC TONS	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	ANNUAL CHANGE,
												2008-09
Acetic acid	593	754	495	716	676	1,451	1,500	866	869	960	623	-35.1%
Acetone	1,307	1,325	404	1,011	1,235	1,567	1,336	1,536	1,559	1,529	1,381	-9.7
Benzene	3,705	4,565	6,670	6,817	6,535	7,931	7,089	6,052	6,110	5,107	4,929	-3.5
Butadiene	2,027	2,097	1,992	2,024	2,131	2,221	2,221	2,182	2,188	2,020	1,813	-10.2
1-Butanol	44	67	531	575	542	788	816	417	419	399	333	-16.5
Ethylbenzene	937	149	1,180	769	911	4,262	4,276	1,146	1,130	1,226	1,091	-11.0
Ethylene	19,362	19,444	19,674	20,159	20,686	21,408	21,600	21,191	21,818	19,968	18,768	-6.0
Ethylene dichloride	1,056	1,122	2,759	3,358	3,374	6,044	6,646	1,407	1,450	1,323	1,145	-13.5
Ethylene glycol	1,177	1,195	268	239	857	1,404	1,637	1,470	1,501	1,283	962	-25.0
Ethylene oxide	592	637	934	717	792	2,960	2,800	2,650	2,856	2,619	2,400	-8.4
Formaldehyde	947	954	2,463	3,299	3,295	4,017	4,057	1,076	1,210	1,175	1,058	-10.0
Methanol	869	1,148	2,030	1,844	2,009	2,878	3,248	2,395	2,100	1,589	1,558	-2.0
Phenol	na	na	689	797	724	2,375	2,332	2,355	2,446	2,353	1,980	-15.9
Phthalic anhydride	446	488	371	442	430	848	852	475	512	na	na	na
Propylene	13,153	13,330	13,352	14,107	14,708	15,187	15,532	15,353	15,675	14,758	14,430	-2.2
Propylene glycol	429	443	316	305	329	1,987	2,179	723	773	593	na	na
Propylene oxide	845	908	735	777	861	2,292	2,338	2,259	2,424	2,229	2,023	-9.2
Styrene	2,989	3,215	958	3,078	3,215	6,220	4,963	4,380	4,656	4,032	2,982	-26.0
Toluene	1,172	1,155	886	919	848	1,913	2,014	1,699	1,691	1,569	1,408	-10.3
Vinyl acetate	718	644	457	667	502	881	800	910	946	na	na	na
Xylenes	2,497	2,602	579	1,122	626	4,382	4,282	4,257	3,766	2,630	2,705	2.9

NOTE: Data for 2010 were not available by C&EN's deadline. Data from 2005 forward are for 27 countries in the European Union; between 2002 and 2005, for 25 countries; and prior to 2002, for 15 countries. Thus, 10-year comparisons are not meaningful. **na** = not available. **SOURCE:** European Union, Association of Petrochemical Producers in Europe

U.S. INORGANICS

Production of all inorganics rose, with majority showing double-digit gains

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Ammonium nitrate (a)	7,237	5,833	6,436	5,733	6,558	6,541	6,411	7,475	7,111	6,297	6,878	9.2%	-0.5%
Chlorine	12,698	11,487	11,681	10,359	12,326	10,275	10,331	10,789	9,680	8,518	9,735	14.3	-2.6
Hydrochloric acid	4,278	3,969	4,037	4,179	5,301	4,618	4,232	4,223	3,808	3,433	3,556	3.6	-1.8
Phosphoric acid (P ₂ O ₅)	11,330	10,472	11,146	11,324	11,511	11,447	10,700	10,957	9,213	8,655	9,378	8.4	-1.9
Sodium chlorate	853	792	721	668	556	523	558	560	551	381	485	27.4	-5.5
Sodium hydroxide	10,451	9,811	9,459	8,793	9,618	8,519	8,061	8,044	7,357	6,568	7,520	14.5	-3.2
Sulfuric acid (b)	39,584	36,338	36,062	37,373	38,021	37,183	35,909	36,049	31,614	29,139	32,511	11.6	-1.9

a Original solution. **b** Gross (new and fortified). **SOURCES:** Department of Commerce, Bureau of the Census

PRODUCTION

CANADA INORGANICS

Large-volume inorganics reported strong increases in 2010

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Aluminum sulfate	167	170	176	171	167	175	164	199	224	210	175	-16.7%	0.5%
Carbon black	229	215	215	205	223	235	225	na	na	198	228	15.2	0.0
Chlorine	1,079	1,054	1,095	994	1,057	1,008	929	601	570	486	466	-4.1	-8.1
Hydrochloric acid	155	143	151	153	149	142	155	138	154	130	128	-1.5	-1.9
Hydrogen peroxide	237	203	222	226	244	244	na	236	247	217	217	0.0	-0.9
Nitric acid	1,074	1,054	1,143	1,105	1,219	1,147	1,180	1,132	821	502	513	2.2	-7.1
Sodium chlorate	1,107	1,082	1,055	1,129	1,183	1,169	1,111	1,073	1,072	865	1,007	16.4	-0.9
Sodium hydroxide	1,094	1,074	1,111	1,059	1,146	1,119	1,012	676	684	714	687	-3.8	-4.5
Sulfuric acid	3,804	3,846	3,887	3,465	3,933	3,743	3,823	3,833	4,098	3,412	3,755	10.1	-0.1

NOTE: Some data are not being released because of confidentiality requirements. na = not available. SOURCE: Statistics Canada

EUROPE INORGANICS

Production of inorganics declined across the board in 2009

THOUSANDS OF METRIC TONS UNLESS OTHERWISE INDICATED	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	ANNUAL CHANGE, 2008-09	
												2008-09	2008-09
Carbon black	1,322	1,342	1,059	1,025	1,009	1,468	1,388	1,662	1,818	1,615	1,252	-22.5%	
Chlorine	9,219	9,697	9,265	9,222	9,525	10,396	10,382	10,315	9,734	10,116	9,058	-10.5	
Hydrochloric acid	2,098	2,050	2,608	4,142	3,784	5,165	6,002	3,071	3,531	3,121	3,024	-3.1	
Hydrogen (mcm)	2,252	2,196	5,553	7,519	8,962	10,690	11,251	6,526	8,000	9,000	8,000	-11.1	
Hydrogen peroxide	438	847	372	655	736	1,085	1,123	911	977	1,182	978	-17.3	
Nitrogen (mcm)	7,422	8,091	12,829	13,942	17,807	22,326	22,457	23,123	23,163	24,807	21,858	-11.9	
Oxygen (mcm)	5,592	5,965	12,678	19,026	22,554	27,112	27,824	27,754	28,525	29,558	23,741	-19.7	
Phosphoric acid (P ₂ O ₅)	995	692	2,463	3,921	3,574	4,304	4,257	703	671	638	426	-33.2	
Sodium carbonate	4,567	4,401	1,451	1,493	3,874	6,609	6,956	6,828	6,609	7,633	6,055	-20.7	
Sodium hydroxide	5,418	5,780	6,756	9,114	7,937	9,994	9,829	8,773	8,891	8,381	6,675	-20.4	
Sodium sulfate	2,237	2,314	1,806	2,951	3,082	3,406	3,565	3,221	3,103	2,831	2,490	-12.0	
Sulfuric acid (SO ₃)	7,109	6,598	8,157	13,835	12,746	16,584	16,609	9,739	9,577	9,313	7,851	-15.7	
Titanium oxides	433	538	na	440	419	588	602	623	626	614	473	-23.0	

NOTE: Data for 2010 were not available by C&EN's deadline. Data from 2005 forward are for 27 countries in the European Union; between 2002 and 2005, for 25 countries; and prior to 2002, for 15 countries. Thus, 10-year comparisons are not meaningful. mcm = millions of cubic meters. na = not available. SOURCES: European Union, Euro Chlor

JAPAN INORGANICS

Output of hydrogen peroxide and nitrogen exceeded recent highs

THOUSANDS OF METRIC TONS UNLESS OTHERWISE INDICATED	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Ammonia	1,715	1,604	1,450	1,291	1,340	1,318	1,328	1,355	1,244	1,021	1,178	15.4%	-3.7%
Ammonium sulfate (a)	1,749	1,585	1,564	1,570	1,526	1,458	1,439	1,463	1,412	1,213	1,336	10.1	-2.7
Carbon black	788	742	755	788	804	805	827	835	821	575	729	26.8	-0.8
Chlorine, liquid	847	777	754	723	619	601	571	550	520	411	468	13.9	-5.8
Hydrochloric acid	2,494	2,342	2,317	2,363	2,324	2,308	2,326	2,343	2,387	2,069	2,272	9.8	-0.9
Hydrogen peroxide	151	159	167	176	196	197	221	218	214	175	216	23.4	3.6
Nitrogen (mcm)	10,290	10,296	10,455	10,835	11,281	11,435	11,998	12,696	13,211	11,686	13,612	16.5	2.8
Oxygen (mcm)	10,655	10,373	10,720	11,250	11,278	11,371	11,766	12,407	11,941	8,763	12,254	39.8	1.4
Sodium hydroxide	4,471	4,291	4,271	4,369	4,493	4,552	4,453	4,482	4,373	3,895	4,217	8.3	-0.6
Sodium silicate	720	679	622	596	577	546	541	524	471	409	429	4.9	-5.0
Sulfuric acid	7,059	6,727	6,763	6,534	6,444	6,546	6,843	7,098	7,227	6,396	7,037	10.0	0.0
Titanium dioxide	270	257	240	253	253	259	240	246	225	162	208	28.4	-2.6

a For agricultural and nonagricultural use. mcm = millions of cubic meters. SOURCE: Ministry of Economy, Trade & Industry

CHINA BASIC CHEMICALS

Methanol and sulfuric acid led their sectors in output growth

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE		
												2009-10	2000-10	
ORGANICS														
Benzene (pure)	1,850	1,988	2,131	2,408	2,556	3,061	3,441	4,069	4,034	4,638	5,530	19.2%	11.6%	
Caprolactam	164	152	170	201	228	214	291	299	290	na	na	na	na	
Ethylene	4,743	4,807	5,414	6,118	6,266	7,555	8,765	10,477	10,256	10,697	14,188	32.6	11.6	
Methanol (refined)	1,967	2,065	2,110	2,989	4,406	5,356	7,623	10,764	11,263	11,334	15,740	38.9	23.1	
INORGANICS														
Hydrochloric acid (31%)	4,454	4,705	4,926	5,276	6,007	6,582	7,306	7,476	7,571	8,035	8,390	4.4	6.5	
Sodium carbonate	9,199	9,144	10,189	11,075	12,668	14,211	15,972	17,718	18,813	20,014	20,293	1.4	8.2	
Sodium hydroxide	7,123	7,880	8,227	9,399	10,603	12,400	15,118	17,593	18,522	18,910	20,866	10.3	11.3	
Sulfuric acid	23,888	26,963	29,674	33,191	38,249	44,621	48,603	53,907	51,101	59,584	70,601	18.5	11.4	

na = not available. SOURCE: China National Chemical Information Center

U.S. PLASTICS

Polyvinyl chloride and copolymers grew more rapidly than other resins last year

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE		
												2009-10	2000-10	
Polyethylene														
Low-density (a,b)	3,436	3,491	3,647	3,540	3,763	3,558	3,586	3,596	3,176	3,024	3,057	1.1%	-1.2%	
Linear low-density (a,b)	3,607	4,659	5,139	5,052	5,640	5,395	5,919	6,162	5,469	5,954	6,255	5.1	5.7	
High-density (b,c)	6,336	6,933	7,243	7,125	7,960	7,328	7,966	8,265	7,369	7,691	7,660	-0.4	1.9	
Polypropylene (d)	7,139	7,228	7,691	8,013	8,415	8,149	8,442	8,820	7,606	7,540	7,826	3.8	0.9	
Polystyrene (e)	3,104	2,773	3,025	2,900	3,062	2,854	2,807	2,728	2,368	2,207	2,293	3.9	-3.0	
Polyvinyl chloride & copolymers (d)	6,551	6,467	6,939	6,669	7,251	6,921	6,758	6,625	5,663	5,785	6,358	9.9	-0.3	

a Density 0.940 and below. b Data include Canadian production from 2001. c Density above 0.940. d Data include Canadian and Mexican production. e Data include Canadian production. SOURCE: American Plastics Council

EUROPE PLASTICS

The recession squeezed plastics volumes in 2009

THOUSANDS OF METRIC TONS	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	ANNUAL CHANGE,
												2008-09
Polyethylene	10,223	10,579	11,487	11,599	11,942	13,859	14,529	13,550	14,043	13,868	12,558	-9.4%
Polystyrene	675	331	2,410	2,550	2,540	1,790	1,859	na	na	na	na	na
Acrylonitrile-butadiene-styrene	971	1,038	466	793	495	811	891	690	742	682	475	-30.4
Polyvinyl chloride	3,209	4,893	5,681	6,531	6,694	6,485	6,594	7,008	6,885	7,375	5,940	-19.5
Epoxy resins	393	419	215	464	356	633	693	801	788	719	580	-19.3
Polypropylene	6,524	6,984	7,526	8,113	8,638	9,237	9,424	9,520	9,464	8,688	na	na
Polyamides	766	1,412	1,209	1,833	1,769	2,052	2,119	1,940	1,963	1,828	1,539	-15.8
Synthetic rubber	2,239	2,342	2,691	3,250	3,713	4,415	4,170	4,391	4,175	3,973	3,416	-14.0

NOTE: Data for 2010 were not available by C&EN's deadline. Data from 2005 forward are for 27 countries in the European Union; between 2002 and 2005, for 25 countries; and prior to 2002, for 15 countries. Thus, 10-year comparisons are not meaningful. na = not available. SOURCES: European Union, Association of Petrochemical Producers in Europe

PRODUCTION

CANADA PLASTICS

Polyethylene saw a tiny increase in 2010

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Polyesters, unsaturated	120	115	113	139	100	90	81	62	53	33	38	15.2%	-10.9%
Polyethylene (a)	2,751	3,035	3,330	3,083	3,587	3,366	3,594	3,736	3,282	3,881	3,885	0.1	3.5
Polystyrene (b)	203	186	195	183	207	198	195	83	na	na	na	na	na

NOTE: Some data are not being released because of confidentiality requirements. **a** Includes high-, low-, and linear low-density polyethylene. **b** Includes acrylonitrile-butadiene-styrene. **na** = not available. **SOURCE:** Statistics Canada

ASIA PLASTICS

Most plastics enjoyed some growth last year

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
JAPAN													
Polyethylene	3,342	3,294	3,176	3,165	3,238	3,240	3,166	3,232	3,089	2,805	2,964	5.7%	-1.2%
Polyethylene terephthalate	1,308	1,243	1,211	1,076	1,195	1,126	1,110	1,104	1,052	760	912	20.0	-3.5
Polypropylene	2,721	2,696	2,641	2,751	2,908	3,063	3,049	3,087	2,871	2,411	2,709	12.4	0.0
Polystyrene	2,024	1,810	1,837	1,801	1,824	1,734	1,745	1,749	1,596	1,245	1,385	11.2	-3.7
Polyvinyl chloride	2,410	2,195	2,225	2,164	2,153	2,151	2,146	2,162	1,797	1,668	1,749	4.9	-3.2
Epoxy resins	243	192	201	195	215	211	229	239	214	149	188	26.2	-2.5
Phenolic resins	262	232	242	261	287	280	284	295	287	227	284	25.1	0.8
Polycarbonate	354	370	386	409	411	431	413	418	347	280	369	31.8	0.4
Synthetic rubber	1,590	1,466	1,522	1,577	1,616	1,627	1,607	1,655	1,651	1,300	1,595	22.7	0.0
SOUTH KOREA													
Acrylonitrile-butadiene-styrene	777	932	1,120	1,143	1,105	980	1,077	1,145	1,056	1,192	1,243	4.3%	4.8%
Polyethylene, high-density	1,706	1,839	1,871	1,925	1,882	1,949	1,936	1,984	2,031	2,210	2,046	-7.4	1.8
Polyethylene, low-density	1,576	1,614	1,624	1,627	1,706	1,744	1,728	1,790	1,783	1,893	1,983	4.8	2.3
Polypropylene	2,413	2,485	2,622	2,811	2,930	3,013	3,040	3,240	3,391	3,756	3,931	4.7	5.0
Polystyrene	1,212	1,354	1,361	1,427	1,176	1,093	1,009	1,072	1,014	952	1,089	14.4	-1.1
Polyvinyl chloride	1,191	1,238	1,244	1,278	1,306	1,184	1,203	1,161	1,164	1,142	na	na	na
TAIWAN													
Acrylonitrile-butadiene-styrene	1,067	985	1,078	1,105	1,166	1,215	1,274	1,324	1,130	1,245	1,365	9.6%	2.5%
Polyester resin	198	204	219	212	185	168	162	168	144	114	120	5.3	-4.9
Polyethylene, high-density	306	510	507	547	537	515	521	577	512	578	544	-5.9	5.9
Polyethylene, low-density	273	477	492	536	609	663	597	700	623	661	691	4.5	9.7
Polypropylene	564	773	830	937	1,020	1,098	1,174	1,262	1,179	1,231	1,215	-1.3	8.0
Polystyrene	711	866	848	858	817	830	713	761	638	777	845	8.8	1.7
Polyurethane resin	185	170	189	193	214	195	191	184	169	164	205	25.0	1.0
Styrene-butadiene rubber	83	81	78	69	108	96	102	112	102	93	101	8.6	2.0
Polybutadiene rubber	50	52	52	54	56	53	50	54	50	53	59	11.3	1.7

na = not available. **SOURCES:** Japan's Ministry of Economy, Trade & Industry; Korea National Statistical Office, Republic of Korea; Petrochemical Industry Association of Taiwan; Taiwan's Ministry of Economic Affairs

U.S. SYNTHETIC FIBERS

All noncellulosic fibers bounced back, but cellulosic fibers remained unchanged

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
NONCELLULOSIC FIBERS													
Nylon	1,215	1,019	1,112	1,115	1,142	1,082	1,023	937	732	592	616	4.0%	-6.6%
Olefin	1,461	1,316	1,397	1,374	1,388	1,403	1,290	1,294	1,090	922	1,037	12.5	-3.4
Polyester	1,775	1,474	1,494	1,391	1,492	1,403	1,304	1,235	1,061	907	1,088	19.9	-4.8
CELLULOSIC FIBERS													
Acetate (a) & rayon	158	103	81	75	67	49	27	27	27	27	27	0.0%	-16.1%

a Includes diacetate and triacetate; excludes production for cigarette filters. **SOURCE:** Fiber Economics Bureau

JAPAN SYNTHETIC FIBERS

Production rebounded in 2010, with nylon showing strongest growth

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Man-made (a)	1,643	1,564	1,416	1,316	1,279	1,249	1,209	1,193	1,071	835	923	10.5%	-6.5%
Polyester (a)	665	628	564	528	520	496	483	465	435	309	347	12.3	-7.4
Acrylic (b)	377	365	358	298	267	261	243	236	145	124	141	13.7	-10.5
Polypropylene (a)	111	117	114	116	120	125	127	127	125	107	114	6.5	0.2
Nylon (c)	176	162	126	121	121	118	118	117	112	74	93	25.7	-8.3

a Sum of staple and filament. b Staple only. c Filament only. SOURCE: Ministry of Economy, Trade & Industry

U.S. FERTILIZERS

Ammonia, monoammonium phosphate, and phosphoric acid had the strongest recoveries last year

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE		
												2009-10	2000-10	
NITROGEN PRODUCTS														
Ammonia	13,438	10,455	11,306	10,475	9,164	8,945	7,209	7,888	8,226	7,609	8,600	13.0%	-4.4%	
Ammonium nitrate	2,873	2,192	2,246	2,142	2,165	2,473	2,045	2,180	2,105	1,959	1,841	-6.0	-4.4	
Ammonium sulfate	2,595	2,353	2,405	2,595	2,669	2,676	2,706	2,597	2,809	2,357	2,598	10.2	0.0	
Urea	4,742	3,678	4,477	4,443	3,095	3,086	2,284	2,603	2,436	2,340	2,320	-0.9	-6.9	
Nitrogen solutions	9,038	9,143	7,985	8,863	7,781	8,062	7,022	8,549	8,545	7,628	8,370	9.7	-0.8	
PHOSPHATE PRODUCTS														
Diammonium phosphate	12,670	10,049	10,825	9,991	10,404	9,988	9,474	8,202	8,018	6,745	7,419	10.0%	-5.2%	
Monoammonium phosphate	4,106	4,087	4,175	4,734	5,328	5,213	4,170	4,838	5,004	3,307	4,300	30.0	0.5	
Phosphate rock	36,088	34,219	29,183	32,327	35,338	35,183	33,127	29,370	29,673	26,332	26,118	-0.8	-3.2	
Phosphoric acid (P ₂ O ₅)	10,751	9,406	10,125	10,253	10,530	10,533	9,802	9,379	8,912	6,775	7,895	16.5	-3.0	

NOTE: Years ending on June 30. Figures are based on Fertilizer Institute surveys and might not represent the entire industry. SOURCE: Fertilizer Institute

CANADA FERTILIZERS

Only ammonia saw production increase in 2010

THOUSANDS OF METRIC TONS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Ammonia	4,888	4,297	4,501	4,455	4,996	4,607	4,623	4,411	4,730	4,364	4,432	1.6%	-1.0%
Ammonium nitrate	1,110	1,174	1,152	1,031	1,096	1,206	1,181	1,188	1,277	1,064	1,053	-1.0	-0.5
Urea	3,887	3,363	3,436	3,311	3,654	3,549	na	3,574	3,837	3,884	3,675	-5.4	-0.6

NOTE: Some data are not being released because of confidentiality requirements. na = not available. SOURCE: Statistics Canada

EUROPE FERTILIZERS

Production of nitrogen fertilizers slumped in 2009

THOUSANDS OF METRIC TONS	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE,
													2008-09
Ammonium nitrate	897	721	687	1,505	1,168	6,656	6,138	2,394	2,379	2,366	2,245	2,245	-5.1%
Ammonium sulfate	566	675	1,442	769	832	1,735	1,703	1,382	1,643	1,997	2,049	2,049	2.6
Anhydrous ammonia	2,213	2,078	2,362	9,394	4,752	12,364	13,187	3,907	4,120	4,125	3,640	3,640	-11.8
Nitric acid	264	153	600	612	2,378	6,581	6,326	849	906	922	1,025	1,025	11.2
Urea	600	725	214	947	767	2,407	2,822	2,560	2,525	2,412	2,345	2,345	-2.8

NOTE: Data for 2010 were not available by C&EN's deadline. Data from 2005 forward are for 27 countries in the European Union; between 2002 and 2005, for 25 countries; and prior to 2002, for 15 countries. Thus, 10-year comparisons are not meaningful. SOURCE: European Union