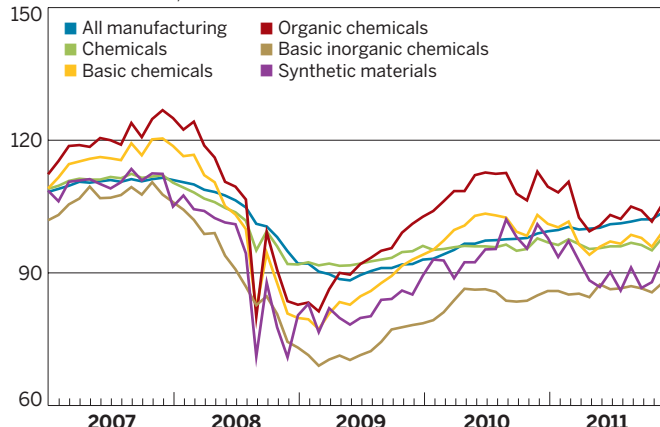


Output of basic, organic, and synthetic materials faltered in 2011

Production index, 2004 = 100



NOTE: Seasonally adjusted. SOURCE: Federal Reserve Board

Ammonium nitrate production in Canada in 2011:

1.2 million metric tons
(16.7% increase from 2010)

Ethylene production in millions of metric tons in 2011 in China:

15.3

In South Korea:

7.4

In Japan:

6.7

In Germany:

5.1

In Taiwan:

3.5

TOO QUIET AFTER THE STORM

After a rebound in 2010, chemical **PRODUCTION** hardly grew in 2011

FOR MOST SECTORS of the chemical industry, the largest chunk of postrecession recovery in chemical production occurred in 2010. In 2011, there was a broad leveling off—and in some cases a reversal—in the amount of chemicals made in many parts of the world.

In the U.S., for example, the Federal Reserve Board reports that the production index for chemicals grew only 0.4% in 2011; in 2010 the increase was 3.5%. Chemical

production figures for 2011 resemble ones from 2003 more closely than those from the prerecession boom year of 2007. The largest increases were in soaps and toiletries and synthetic dyes and pigments. The basic chemicals and organic chemicals indexes both decreased from 2010.

The strong production performance in 2010 improved plant capacity utilization, which had hit a low point of 64.7% in 2008. Despite anemic production, that push con-

Percent change in North American polypropylene production in 2011:

-4.8

Ten-year average growth rate for methanol production in China:

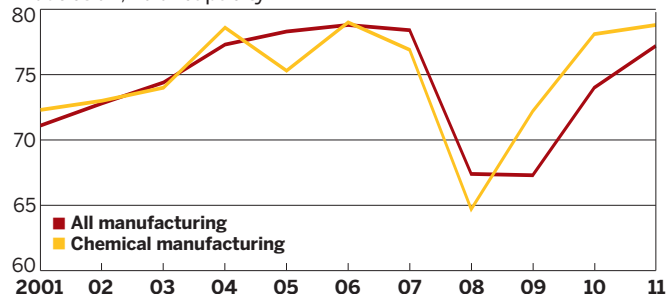
26.8%

Ten-year average growth rate for ethylene production in China:

12.3%

U.S. chemical manufacturing's capacity utilization continued on the upswing

Production, % of capacity



NOTE: As of December. SOURCE: Federal Reserve Board

tinued into 2011, when chemical manufacturers achieved 78.8% utilization—close to the high-water mark of 79.0% achieved in 2006. Running plants at high capacity lowers costs per unit of output, improves profit margins, and emboldens firms to raise prices.

Missing from C&EN's collection of production data this year are the U.S. inorganic and organic chemical output tables. Unlike the indexes tabulated by the Federal Reserve Board, these tables provided absolute production numbers for most of the important industrial chemicals.

The data for the inorganics table came from the U.S. Census Bureau's now discontinued Current Industrial Report program. According to a notice on the Census Bureau's website, the bureau "concluded it necessary to terminate and reduce some existing programs in order to secure funding for new programs and manage cyclical in-

creases for other data collection programs.”

The National Petrochemical & Refiners Association, now the American Fuel & Petrochemical Manufacturers, historically supplied information on high-volume organic chemicals such as benzene, ethylene, ethylene dichloride, and propylene for the U.S. organics production table. But that information is no longer distributed to the media.

However, statistics for U.S. plastics production continue to be available from the American Plastics Council. Polystyrene output jumped 8.2% from 2010 to 2011, likely because the trade association began including Mexican facilities. Otherwise, the highest growth rate, at 3.0%, was for polyvinyl chloride and copolymers. Output of high-density polyethylene nudged up by 1.4%. In contrast, low-density and linear low-density polyethylene production shrank, as did polypropylene output.

ANOTHER MODIFICATION for this year's edition of Facts & Figures is in European production. C&EN has stopped publishing production figures for all of Europe and instead presents only German production.

In past years, C&EN obtained European production figures for most products from the European Commission. Other sources were the Association of Petrochemical Producers in Europe and Euro Chlor. Now C&EN acquires only German production data from Statistisches Bundesamt, the Federal Statistical Office of Germany.

The primary reason for the switch is timeliness. Eurostat, the EC's database, releases prior-year data too late for the Facts & Figures issue, whereas German data for 2011 are available. Because Germany is by far the largest chemical producer in Europe, it is an adequate proxy for the continent overall.

The data are also more consistent over

the 11 years presented in Facts & Figures. The countries included in European data sets changed over time, and only data from 2005 onward include all 27 countries currently in the European Union. The German data, in contrast, allow a meaningful measurement of compound annual growth rates.

Over the past two years, as concerns about sovereign debt in Europe have grown, Germany has increasingly been a diamond in the European rough. Although overall production results for Germany in 2011 were mixed, on balance they have strengthened rather than weakened.

German production of some major products, such as ethylene and propylene, rose by less than 1% last year. Production of vinyl chloride, used to make polyvinyl chloride, was down 17.7%. Styrene, a raw material for polystyrene and other polymers, however, saw a strong increase of 9.2%.

German output of inorganic chemicals was uneven last year. Output of chlorine dropped by 4.1%, and its coproduct sodium hydroxide declined by more than 9%. Sulfuric acid production increased 4.7%.

German polymer production showed positive trends in 2011. Output of commodity polymers such as polyethylene, polystyrene, and polyurethanes rose modestly. Curiously, polyvinyl chloride production jumped 10.5% despite the decline in vinyl chloride output. German fertilizer production was weak, with urea output declining by close to 40%.

IN ASIA, South Korea's chemical output increased by 3.0% in 2011, whereas indexes of production in Japan and Taiwan were lower than in 2010. Companies in Japan had to cope with a massive earthquake and tsunami, power shortages, and a record-high currency through much of the year. Meanwhile, chemical makers in Taiwan

suffered from a series of industrial accidents that derailed production.

The negative signs abound in the yearly change column for a variety of chemicals made in Japan and Taiwan. Exceptions were acrylonitrile output in Japan and terephthalic acid production in Taiwan. Meanwhile, South Korea's manufacture of benzene, butadiene, and ethylene continued their decadelong increase, although increases in 2011 were smaller than average.

Output of the inorganic chemicals ammonia and titanium dioxide increased faster than average in Japan, while most other categories shrank, and by a faster rate than average.

South Korea's output of plastics was mixed. The country posted a 5.0% increase in low-density polyethylene production, but output of other plastics dropped. Fitting the trend for 2011, Japan and Taiwan saw rather significant decreases in plastics manufacture across the board. For example, polypropylene output in Taiwan sank by more than 11%, though in most previous years it increased.

Data sleuths looking for large numbers can peruse the output from China's basic chemicals industry. Production of methanol soared 41.5%, and benzene was up more than 20%. In inorganics, sodium hydroxide production jumped 18.2%. But output of the key manufacturing input ethylene increased by only 7.7%, down from its typical 12.3% growth rate.

In Canada, 2011 was a good year for fertilizer production, likely because of high agriculture commodity prices. Ammonium nitrate output grew 16.7%, and ammonia bumped up 7.5%. Both figures vastly exceed decadelong average growth rates. In plastics, Canada continued to roll back production of polyesters, but it did manage a 1.4% increase in polyethylene output last year.

CANADA PRODUCTION INDEX

Basic chemicals surged in 2011, but pharmaceuticals sank to its lowest level in a decade

PRODUCTION INDEX, 2004 = 100	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
All manufacturing	98.1	98.9	98.1	100.0	101.8	100.3	98.1	91.5	78.8	84.3	86.8	3.0%	-1.2%
Chemicals	93.2	97.2	99.9	100.0	98.3	99.5	95.9	89.9	82.2	86.0	86.7	0.8	-0.7
Basic chemicals	110.5	109.2	107.5	100.0	107.7	112.3	106.7	101.7	86.4	96.9	104.8	8.1	-0.5
Pharmaceuticals & medicines	92.2	105.4	110.5	100.0	97.3	108.6	91.2	97.6	101.7	103.8	91.2	-12.2	-0.1

SOURCE: Statistics Canada

U.S. PRODUCTION INDEX

The rate of chemical output growth in most sectors did not match that of overall manufacturing

PRODUCTION INDEX, 2004 = 100	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
Total index	96.4	96.5	97.7	100.0	103.3	105.5	108.2	104.3	92.4	97.4	101.4	4.1%	0.5%
Manufacturing, total	95.3	95.8	97.2	100.0	104.2	107.1	110.4	105.2	90.6	96.3	100.9	4.8	0.6
Nondurable manufacturing	97.1	98.2	98.4	100.0	102.5	103.1	104.3	98.1	90.5	92.5	94.0	1.6	-0.3
Chemicals	89.5	94.6	96.2	100.0	103.3	105.9	111.2	102.8	92.7	95.9	96.3	0.4	0.7
Basic chemicals	83.6	89.0	91.8	100.0	100.4	103.2	115.9	102.3	84.7	100.0	97.9	-2.1	1.6
Basic inorganic chemicals	92.2	100.1	99.8	100.0	103.1	98.4	107.0	92.0	73.1	83.6	86.1	3.0	-0.7
Alkalis & chlorine	57.7	84.8	85.9	100.0	112.8	97.0	97.1	85.8	59.0	79.8	77.6	-2.8	3.0
Synthetic dyes & pigments	93.7	104.7	105.2	100.0	102.5	103.5	114.7	102.7	83.9	97.8	102.4	4.7	0.9
Other basic inorganic chemicals	96.6	101.4	98.2	100.0	102.4	93.6	102.2	83.8	67.4	80.5	82.4	2.4	-1.6
Organic chemicals	79.3	83.1	87.6	100.0	99.3	105.2	119.9	107.2	90.8	108.9	104.4	-4.1	2.8
Synthetic materials (a)	97.0	98.7	96.6	100.0	107.1	104.9	110.5	94.0	81.6	94.7	91.0	-3.9	-0.6
Plastic materials & resins	94.5	98.6	94.8	100.0	109.7	107.5	114.9	97.3	86.3	99.5	95.1	-4.4	0.1
Artificial & synthetic fibers	114.8	100.9	102.4	100.0	94.9	94.6	88.6	76.5	58.0	74.1	70.0	-5.5	-4.8
Pharmaceuticals & medicines	89.9	96.2	99.6	100.0	103.9	108.2	109.5	107.0	100.6	93.2	91.9	-1.4	0.2
Soap, cleaning compounds & toiletries	84.3	91.2	89.5	100.0	108.0	113.7	123.5	114.9	104.5	105.5	118.5	12.3	3.5
Paint & coatings	95.2	94.9	93.7	100.0	97.4	93.2	89.0	79.1	64.3	70.3	68.3	-2.8	-3.3
Pesticides, fertilizers & other agricultural chemicals	88.9	91.8	95.9	100.0	103.8	108.2	99.6	86.2	90.5	94.4	92.6	-1.9	0.4

a Includes synthetic rubber. **SOURCE:** Federal Reserve Board

ASIA PRODUCTION INDEXES

Chemical output was down in Japan and Taiwan last year, but advanced in South Korea

PRODUCTION INDEX, 2004 = 100	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
JAPAN													
Mining & manufacturing	95.9	91.8	94.8	100.0	101.1	105.6	108.6	104.9	82.0	95.4	93.2	-2.3%	-0.3%
All chemicals (a)	97.1	97.1	98.6	100.0	100.6	100.3	95.5	102.3	85.8	93.6	90.1	-3.7	-0.7
Petrochemicals	93.6	94.5	97.4	100.0	101.0	99.0	102.2	92.1	85.0	92.5	87.8	-5.1	-0.6
Aromatics	88.9	91.7	96.9	100.0	104.6	104.4	107.7	97.8	97.2	101.4	98.3	-3.1	1.0
Soda-based chemicals	97.0	98.7	100.0	100.0	100.8	98.3	98.4	95.5	90.6	98.7	86.4	-12.4	-1.1
Inorganics, pigments & catalysts	93.5	95.5	97.6	100.0	101.2	99.5	100.6	98.1	70.0	83.7	78.2	-6.5	-1.8
Organic chemicals	93.6	93.9	99.3	100.0	101.4	98.8	102.7	90.0	87.1	92.5	87.1	-5.9	-0.7
Cyclic intermediates	94.9	96.6	97.6	100.0	97.0	95.4	96.4	83.1	76.8	86.0	78.2	-9.0	-1.9
Plastics	96.5	96.5	96.9	100.0	100.0	99.6	100.1	91.7	75.0	86.4	80.0	-7.4	-1.9
Synthetic rubber	90.1	94.1	97.6	100.0	100.6	99.4	102.3	102.1	80.2	98.4	99.3	0.9	1.0
Fertilizers	115.5	107.4	99.5	100.0	98.2	96.5	95.7	90.6	70.7	80.3	82.2	2.4	-3.3
SOUTH KOREA													
All manufacturing	79.4	85.9	90.5	100.0	106.2	115.4	123.6	127.3	126.6	148.6	159.2	7.0	7.2
Chemicals & chemical products	86.3	91.8	95.3	100.0	103.1	105.7	113.0	113.8	119.9	128.0	133.9	3.0	4.5
Rubber & plastic products	88.6	94.4	96.8	100.0	102.0	108.9	115.3	111.4	102.5	114.3	119.4	4.4	3.0
TAIWAN													
All manufacturing	76.2	83.0	90.9	100.0	103.7	108.3	117.4	115.5	98.2	136.7	143.8	5.1	6.6
Chemicals	65.4	73.8	85.3	100.0	104.0	98.1	99.4	90.4	109.0	118.9	111.3	-6.4	6.5
Basic chemicals	78.9	80.5	88.4	100.0	101.5	118.9	122.2	117.6	109.7	157.7	156.2	-0.9	7.1
Petrochemicals	72.1	80.9	92.1	100.0	102.6	104.4	123.8	117.2	120.6	140.3	159.3	13.5	8.2
Fertilizers	108.0	103.4	103.2	100.0	107.1	108.5	110.0	105.1	99.1	115.6	115.6	0.0	0.7
Man-made fibers	93.0	100.3	98.8	100.0	87.5	84.4	81.2	65.2	78.6	72.4	64.7	-10.7	-3.6
Plastics & resins	84.9	91.2	95.8	100.0	98.1	98.6	107.2	95.7	99.1	106.8	99.2	-7.1	1.6
Synthetic rubber	81.8	89.8	93.8	100.0	99.0	103.1	113.0	105.1	107.0	119.0	117.4	-1.4	3.7

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

PRODUCTION

ASIA ORGANICS

Industrial accidents in Taiwan and the earthquake in Japan last year took their toll, but South Korea saw modest growth

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
JAPAN													
Acetic acid	594	569	592	589	599	597	587	500	384	450	418	-7.1%	-3.5%
Acetone	476	472	492	539	546	531	593	491	477	521	471	-9.6	-0.1
Acrylonitrile	738	708	780	711	742	667	743	600	602	663	733	10.6	-0.1
Benzene (a)	4,261	4,313	4,551	4,758	4,980	4,874	5,245	4,581	4,259	4,764	4,413	-7.4	0.4
Butadiene	976	993	1,062	1,041	1,040	1,002	1,024	953	871	977	934	-4.4	-0.4
Butanol	472	476	519	506	513	537	537	482	436	520	341	-34.4	-3.2
Caprolactam	531	508	530	503	458	467	467	432	342	422	397	-5.9	-2.9
Cyclohexane	598	607	685	676	722	731	703	557	407	483	439	-9.1	-3.0
Ethylene	7,361	7,152	7,367	7,570	7,618	7,522	7,739	6,882	6,913	7,018	6,689	-4.7	-1.0
Ethylene dichloride	3,275	3,352	3,463	3,594	3,687	3,514	3,603	3,212	3,242	3,222	2,922	-9.3	-1.1
Ethylene glycol	787	733	814	786	841	763	754	629	581	596	581	-2.5	-3.0
Ethylene oxide	891	868	939	941	1,005	974	966	865	759	845	820	-3.0	-0.8
Octanol	262	302	306	307	279	280	270	259	267	286	259	-9.4	-0.1
Phenol	884	891	926	966	938	860	961	772	786	853	796	-6.7	-1.0
Phthalate plasticizers	369	377	382	357	315	279	281	246	172	212	194	-8.5	-6.2
Phthalic anhydride	259	262	262	257	239	175	179	176	134	159	146	-8.2	-5.6
Polypropylene glycol	294	299	314	346	339	344	343	308	240	284	265	-6.7	-1.0
Propylene	5,342	5,309	5,610	5,767	6,030	6,090	6,286	5,674	5,590	5,986	5,625	-6.0	0.5
Purified terephthalic acid	1,496	1,624	1,443	1,531	1,472	1,432	1,254	1,015	893	1,131	885	-21.8	-5.1
Styrene	3,004	3,016	3,201	3,345	3,392	3,295	3,533	2,851	2,996	2,939	2,739	-6.8	-0.9
Toluene (a)	1,423	1,548	1,584	1,634	1,676	1,633	1,637	1,437	1,415	1,393	1,340	-3.8	-0.6
Toluene diisocyanate	214	223	230	245	216	232	229	224	na	na	na	na	na
Xylene (a)	4,798	4,900	5,213	5,395	5,570	5,727	6,006	5,698	5,628	5,935	5,754	-3.0	1.8
p-Xylene	2,814	2,920	3,097	3,164	3,358	3,357	3,301	3,039	3,218	3,177	3,202	0.8	1.3
SOUTH KOREA													
Benzene	2,650	2,852	3,246	3,462	3,594	3,719	4,065	4,006	4,075	4,417	4,462	1.0%	5.3%
Butadiene	777	816	860	917	939	948	1,078	1,072	1,097	1,161	1,210	4.2	4.5
Ethylene	5,398	5,636	5,872	5,945	6,058	6,055	6,788	6,989	7,349	7,290	7,419	1.8	3.2
Propylene	3,273	3,557	3,753	3,892	3,945	4,172	4,669	4,772	5,205	5,333	5,377	0.8	5.1
Vinyl chloride	1,392	1,416	1,441	1,498	1,501	1,521	1,512	1,473	1,446	na	na	na	na
TAIWAN													
Acrylonitrile	292	339	352	379	386	418	451	360	412	458	416	-9.2%	3.6%
Benzene	1,070	931	998	1,088	1,204	1,180	1,606	1,550	1,558	1,708	1,554	-9.0	3.8
Butadiene	349	346	390	412	387	394	521	513	527	577	501	-13.2	3.7
Caprolactam	184	186	216	216	247	257	257	216	253	290	271	-6.6	3.9
Diethyl phthalate	280	257	243	239	204	211	244	189	224	122	97	-20.5	-10.1
Ethylene	2,584	2,393	2,679	2,864	2,890	2,888	3,666	3,623	3,852	3,929	3,522	-10.4	3.1
Ethylene glycol	1,036	939	1,169	1,459	1,413	1,343	1,795	2,014	2,039	2,139	1,994	-6.8	6.8
Propylene	1,410	1,462	1,752	1,995	2,012	2,105	2,835	2,663	2,881	2,976	2,601	-12.6	6.3
Purified terephthalic acid	3,217	3,705	4,079	4,620	4,597	4,400	4,437	4,096	4,406	5,163	5,304	2.7	5.1
Styrene	1,146	1,249	1,274	1,247	1,248	1,222	1,824	1,679	1,906	1,921	1,694	-11.8	4.0
Toluene	54	42	64	140	86	30	36	16	39	167	23	-86.2	-8.2
Vinyl chloride	1,452	1,557	1,718	1,763	1,783	1,609	1,810	1,633	1,773	1,758	1,685	-4.2	1.5

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

Most large-volume chemicals headed downward in 2011

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
Benzene	751	849	843	915	798	743	794	704	513	639	589	-7.8%	-2.4%
Butadiene	245	276	276	289	246	262	234	na	170	213	215	0.9	-1.3
Formaldehyde	179	212	245	269	na	236	195	165	176	158	158	0.0	-1.2
Propylene	882	956	938	939	737	833	917	771	591	660	601	-8.9	-3.8
Toluene	222	256	289	na	na	253	211	na	155	269	241	-10.4	0.8
Xylenes	271	294	336	351	na	na	na	na	179	222	241	8.6	-1.2

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

CANADA INORGANICS

Results for production were mixed in 2011

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
Aluminum sulfate	170	176	171	167	175	164	199	224	210	175	171	-2.3%	0.1%
Carbon black	215	215	205	223	235	225	na	na	198	228	233	2.2	0.8
Chlorine	1,054	1,095	994	1,057	1,008	929	601	570	486	466	446	-4.3	-8.2
Hydrochloric acid	143	151	153	149	142	155	138	154	130	128	120	-6.3	-1.7
Hydrogen peroxide	203	222	226	244	244	na	236	247	217	217	225	3.7	1.0
Nitric acid	1,054	1,143	1,105	1,219	1,147	1,180	1,132	821	887	885	987	11.5	-0.7
Sodium chlorate	1,082	1,055	1,129	1,183	1,169	1,111	1,073	1,072	865	1,007	1,030	2.3	-0.5
Sodium hydroxide	1,074	1,111	1,059	1,146	1,119	1,012	676	684	714	607	515	-15.2	-7.1
Sulfuric acid	3,846	3,887	3,465	3,933	3,743	3,823	3,833	4,098	3,412	3,755	3,837	2.2	0.0

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

GERMANY ORGANICS

Important products such as ethylene and propylene posted modest increases in 2011

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
Adipic acid	367	429	384	377	477	546	544	428	516	598	539	-9.9%	3.9%
Benzene	2,600	2,106	2,165	2,407	2,254	2,122	2,214	2,018	1,659	1,874	1,805	-3.7	-3.6
Butadiene	1,012	995	1,124	1,145	1,167	1,220	1,149	1,177	989	1,151	1,210	5.1	1.8
Cumene	871	879	983	1,000	977	1,014	889	883	820	960	940	-2.1	0.8
Ethylene	5,005	4,666	5,240	5,291	5,418	5,133	5,097	4,948	4,618	5,063	5,083	0.4	0.2
Ethylene glycol	265	239	266	277	309	299	314	na	na	216	234	8.3	-1.2
Ethylene oxide	858	717	792	874	887	864	967	925	834	1,016	956	-5.9	1.1
Formaldehyde	1,161	1,239	1,309	1,174	1,343	1,461	1,504	1,376	1,049	1,374	1,345	-2.1	1.5
Phthalic anhydride	251	270	232	259	226	241	228	206	280	293	284	-3.1	1.2
Propylene	3,463	3,456	3,651	3,655	3,574	3,406	3,492	3,634	3,636	3,905	3,917	0.3	1.2
Propylene glycol	311	300	329	348	368	374	379	383	351	381	382	0.3	2.1
Propylene oxide	735	777	861	1,048	949	909	923	876	759	814	752	-7.6	0.2
Styrene	958	830	1,226	1,669	1,048	921	1,052	1,081	853	954	1,042	9.2	0.8
Toluene	632	654	612	714	742	706	760	763	na	662	666	0.6	0.5
Vinyl chloride	2,118	2,189	2,118	2,240	2,224	1,971	1,888	1,822	1,646	1,829	1,506	-17.7	-3.4
p-Xylene	301	284	334	368	386	375	358	392	367	362	370	2.2	2.1

na = not available. **SOURCE:** Federal Statistical Office of Germany

GERMANY INORGANICS

Bellwethers such as chlorine and sodium hydroxide slumped in 2011

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2011-11
Carbon black	348	339	348	340	333	631	665	607	494	684	908	32.7%	10.1%
Chlorine	3,141	3,717	3,769	3,896	5,082	5,068	5,083	4,765	3,388	4,029	3,858	-4.2	2.1
Hydrochloric acid	1,488	2,002	1,874	1,974	2,099	2,161	2,285	2,189	1,875	2,326	1,898	-18.4	2.5
Hydrogen fluoride	139	137	123	182	180	185	173	187	182	196	185	-5.6	2.9
Hydrogen peroxide	217	219	212	229	232	244	252	252	na	na	208	na	-0.4
Phosphoric acid (P ₂ O ₅)	35	34	33	38	37	34	32	32	20	21	20	-4.8	-5.4
Sodium carbonate	na	na	2,675	2,575	2,679	2,587	2,596	2,656	2,291	2,539	2,668	5.1	na
Sodium hydroxide	3,428	3,792	3,821	4,113	4,182	4,210	4,317	4,413	3,332	3,631	3,301	-9.1	-0.4
Sulfuric acid	2,618	2,729	2,750	3,374	3,827	3,949	3,998	4,050	3,589	3,701	3,875	4.7	4.0
Titanium oxide (a)	17	23	23	67	72	28	33	35	28	36	40	10.5	8.7

a As TiO₂ in pigments. na = not available. SOURCE: Federal Statistical Office of Germany

JAPAN INORGANICS

Except for modest growth in ammonia, nitrogen, and titanium dioxide, inorganics output shrank

THOUSANDS OF METRIC TONS UNLESS OTHERWISE INDICATED	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2011-11
Ammonia	1,604	1,450	1,291	1,340	1,318	1,328	1,355	1,244	1,021	1,178	1,211	2.8%	-2.8%
Ammonium sulfate (a)	1,585	1,564	1,570	1,526	1,458	1,439	1,463	1,412	1,213	1,336	1,298	-2.8	-2.0
Carbon black	742	755	788	804	805	827	835	821	575	729	681	-6.6	-0.9
Chlorine, liquid	777	754	723	619	601	571	550	520	411	468	462	-1.3	-5.1
Hydrochloric acid	2,342	2,317	2,363	2,324	2,308	2,326	2,343	2,387	2,069	2,272	2,180	-4.0	-0.7
Hydrogen peroxide	159	167	176	196	197	221	218	214	175	216	181	-16.2	1.3
Nitrogen (mcm)	10,296	10,455	10,835	11,281	11,435	11,998	12,696	13,211	11,686	13,612	13,670	0.4	2.9
Oxygen (mcm)	10,373	10,720	11,250	11,278	11,371	11,766	12,407	11,941	8,763	12,254	11,838	-3.4	1.3
Sodium hydroxide	4,291	4,271	4,369	4,493	4,552	4,453	4,482	4,373	3,895	4,217	3,960	-6.1	-0.8
Sodium silicate	679	622	596	577	546	541	524	471	409	429	414	-3.5	-4.8
Sulfuric acid	6,727	6,763	6,534	6,444	6,546	6,843	7,098	7,227	6,396	7,037	6,416	-8.8	-0.5
Titanium dioxide	257	240	253	253	259	240	246	225	162	208	214	2.9	-1.8

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

CHINA BASIC CHEMICALS

Effort to raise ethylene production to meet domestic demand slowed in 2011

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2011-11
ORGANICS													
Benzene (pure)	1,988	2,131	2,408	2,556	3,061	3,441	4,069	4,034	4,638	5,530	6,658	20.4%	12.8%
Caprolactam	152	170	201	228	214	291	299	290	na	na	na	na	na
Ethylene	4,807	5,414	6,118	6,266	7,555	8,765	10,477	10,256	10,697	14,188	15,274	7.7	12.3
Methanol (refined)	2,065	2,110	2,989	4,406	5,356	7,623	10,764	11,263	11,334	15,740	22,267	41.5	26.8
INORGANICS													
Hydrochloric acid (31%)	4,705	4,926	5,276	6,007	6,582	7,306	7,476	7,571	8,035	8,390	8,410	0.2	6.0
Sodium carbonate	9,144	10,189	11,075	12,668	14,211	15,972	17,718	18,813	20,014	20,293	23,033	13.5	9.7
Sodium hydroxide	7,880	8,227	9,399	10,603	12,400	15,118	17,593	18,522	18,910	20,866	24,663	18.2	12.1
Sulfuric acid	26,963	29,674	33,191	38,249	44,621	48,603	53,907	51,101	59,584	70,601	74,166	5.0	10.6

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

U.S. PLASTICS

Polypropylene lagged in percent growth behind other resins last year

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
Polyethylene													
Low-density (a,b)	3,491	3,647	3,540	3,763	3,558	3,586	3,596	3,176	3,024	3,057	3,042	-0.5%	-1.4%
Linear low-density (a,b)	4,659	5,139	5,052	5,640	5,395	5,919	6,162	5,469	5,954	6,255	6,089	-2.7	2.7
High-density (b,c)	6,933	7,243	7,125	7,960	7,328	7,966	8,265	7,369	7,691	7,660	7,764	1.4	1.1
Polypropylene (d)	7,228	7,691	8,013	8,415	8,149	8,442	8,820	7,606	7,540	7,826	7,447	-4.8	0.3
Polystyrene (e)	2,773	3,025	2,900	3,062	2,854	2,807	2,728	2,368	2,207	2,293	2,482	8.2	-1.1
Polyvinyl chloride & copolymers (d)	6,467	6,939	6,669	7,251	6,921	6,758	6,625	5,663	5,785	6,358	6,547	3.0	0.1

a Density equal to 0.940 and below. b Data from 2001 include Canada. c Density above 0.940. d Data include Canadian and Mexican production. e Data include Canada and beginning in 2011 also include Mexico. **SOURCE:** American Plastics Council

GERMANY PLASTICS

Production of most polymers rose in 2011

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
Epoxy resins	121	212	200	236	246	278	279	246	243	283	263	-7.1%	8.1%
Polyamides	849	1,014	1,058	1,093	1,103	1,224	1,198	1,064	na	na	1,043	na	2.1
Polyethylene (high-density)	1,297	1,590	1,515	1,594	1,809	1,742	1,786	1,740	1,570	1,723	1,761	2.2	3.1
Polyethylene terephthalate	na	na	na	na	na	na	na	242	196	245	259	5.7	na
Polypropylene	1,300	1,755	1,664	1,791	1,830	1,905	1,928	2,006	2,012	na	1,973	na	4.3
Polystyrene (general purpose)	362	381	365	372	374	377	426	394	402	438	448	2.3	2.2
Polystyrene (expandable)	335	356	375	402	421	486	476	495	451	535	545	1.9	5.0
Polyurethanes	769	827	850	920	953	986	1,066	1,146	976	1,194	1,221	2.3	4.7
Polyvinyl chloride	1,378	1,529	1,524	1,630	1,653	1,609	1,564	1,516	1,421	1,578	1,744	10.5	2.4

na = not available. **SOURCE:** Federal Statistical Office of Germany

CANADA PLASTICS

Polyethylene, once again, saw a modest increase in 2011

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
Polyesters, unsaturated	115	113	139	100	90	81	62	53	33	38	35	-7.9%	-11.2%
Polyethylene (a)	3,035	3,330	3,083	3,587	3,366	3,594	3,736	3,282	3,131	3,182	3,226	1.4	0.6
Polystyrene (b)	186	195	183	207	198	195	83	na	na	na	na	na	na

NOTE: Some data are not 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

PRODUCTION

ASIA PLASTICS

Production of major plastics generally fell in Japan and Taiwan

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
JAPAN													
Polyethylene	3,294	3,176	3,165	3,238	3,240	3,166	3,232	3,089	2,805	2,964	2,834	-4.4%	-1.5%
Polyethylene terephthalate	1,243	1,211	1,076	1,195	1,126	1,110	1,104	1,052	760	912	833	-8.7	-3.9
Polypropylene	2,696	2,641	2,751	2,908	3,063	3,049	3,087	2,871	2,411	2,709	2,448	-9.6	-1.0
Polystyrene	1,810	1,837	1,801	1,824	1,734	1,745	1,749	1,596	1,245	1,385	1,275	-7.9	-3.4
Polyvinyl chloride	2,195	2,225	2,164	2,153	2,151	2,146	2,162	1,797	1,668	1,749	1,529	-12.6	-3.6
Epoxy resins	192	201	195	215	211	229	239	214	149	188	162	-13.8	-1.7
Phenolic resins	232	242	261	287	280	284	295	287	227	284	276	-2.8	1.8
Polycarbonate	370	386	409	411	431	413	418	347	280	369	301	-18.4	-2.0
Synthetic rubber	1,466	1,522	1,577	1,616	1,627	1,607	1,655	1,651	1,300	1,595	1,611	1.0	0.9
SOUTH KOREA													
Acrylonitrile-butadiene-styrene	932	1,120	1,143	1,105	980	1,077	1,145	1,056	1,192	1,243	1,966	58.2%	7.7%
Polyethylene, high-density	1,839	1,871	1,925	1,882	1,949	1,936	1,984	2,031	2,210	2,046	1,957	-4.3	0.6
Polyethylene, low-density	1,614	1,624	1,627	1,706	1,744	1,728	1,790	1,783	1,893	1,983	2,082	5.0	2.6
Polypropylene	2,485	2,622	2,811	2,930	3,013	3,040	3,240	3,391	3,756	3,931	3,899	-0.8	4.6
Polystyrene	1,354	1,361	1,427	1,176	1,093	1,009	1,072	1,014	952	1,089	1,114	2.3	-1.9
Polyvinyl chloride	1,238	1,244	1,278	1,306	1,184	1,203	1,161	1,164	1,142	na	na	na	na
TAIWAN													
Acrylonitrile-butadiene-styrene	985	1,078	1,105	1,166	1,215	1,274	1,324	1,130	1,245	1,365	1,207	-11.6%	2.1%
Polyester resin	204	219	212	185	168	162	168	144	114	120	116	-3.3	-5.5
Polyethylene, high-density	510	507	547	537	515	521	577	512	578	544	520	-4.4	0.2
Polyethylene, low-density	477	492	536	609	663	597	700	623	661	691	571	-17.4	1.8
Polypropylene	773	830	937	1,020	1,098	1,174	1,262	1,179	1,231	1,215	1,080	-11.1	3.4
Polystyrene	866	848	858	817	830	713	761	638	777	845	872	3.2	0.1
Polyurethane resin	170	189	193	214	195	191	184	169	164	205	187	-8.8	1.0
Styrene-butadiene rubber	81	78	69	108	96	102	112	102	93	101	104	3.0	2.5
Polybutadiene rubber	52	52	54	56	53	50	54	50	53	59	56	-5.1	0.7

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

Production of all noncellulosic fibers slipped in 2011, while cellulosic output was unchanged

												ANNUAL CHANGE	
THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2010-11	2001-11
NONCELLULOSIC FIBERS													
Nylon	1,019	1,112	1,115	1,142	1,082	1,023	937	732	592	616	592	-3.9%	-5.3%
Olefin	1,316	1,397	1,374	1,388	1,403	1,290	1,294	1,090	922	1,038	966	-7.0	-3.0
Polyester	1,474	1,494	1,391	1,492	1,403	1,304	1,235	1,065	911	1,098	1,094	-0.3	-2.9
CELLULOSIC FIBERS													
Acetate (a) & rayon	103	81	75	67	49	27	27	27	27	27	27	0.0%	-12.5%

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

JAPAN SYNTHETIC FIBERS

Despite a long-term decline, synthetic fiber production rose again last year

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2011-11
Man-made (a)	1,564	1,416	1,316	1,279	1,249	1,209	1,193	1,071	835	923	949	2.8%	-4.9%
Polyester (a)	628	564	528	520	496	483	465	435	309	347	338	-2.6	-6.0
Acrylic (b)	365	358	298	267	261	243	236	145	124	141	152	7.8	-8.4
Polypropylene (a)	117	114	116	120	125	127	127	125	107	114	121	6.1	0.4
Nylon (c)	162	126	121	121	118	118	117	112	74	93	95	2.2	-5.2

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

U.S. FERTILIZERS

Monoammonium phosphate production grew at a double-digit rate last year

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
NITROGEN PRODUCTS												2010-11	2011-11
Ammonia	10,455	11,306	10,475	9,164	8,945	7,209	7,888	8,226	7,609	8,572	8,814	2.8%	-1.7%
Ammonium nitrate	2,192	2,246	2,142	2,165	2,473	2,045	2,180	2,105	1,959	1,841	1,947	5.8	-1.2
Ammonium sulfate	2,353	2,405	2,595	2,669	2,676	2,706	2,597	2,809	2,357	2,598	2,743	5.6	1.5
Urea	3,678	4,477	4,443	3,095	3,086	2,284	2,603	2,436	2,340	2,320	2,260	-2.6	-4.8
Nitrogen solutions	9,143	7,985	8,863	7,781	8,062	7,022	8,549	8,545	7,628	8,353	8,834	5.7	-0.3
PHOSPHATE PRODUCTS													
Diammonium phosphate	10,049	10,825	9,991	10,404	9,988	9,474	8,202	8,018	6,745	7,419	6,845	-7.7%	-3.8%
Monoammonium phosphate	4,087	4,175	4,734	5,328	5,213	4,170	4,838	5,004	3,307	4,300	4,732	10.1	1.5
Phosphate rock	34,219	29,183	32,327	35,338	35,183	33,127	29,370	29,673	26,332	26,118	25,196	-3.5	-3.0
Phosphoric acid (P ₂ O ₅)	9,406	10,125	10,253	10,530	10,533	9,802	9,379	8,912	6,775	7,895	8,309	5.2	-1.2

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

CANADA FERTILIZERS

Production of agricultural chemicals surged in 2011

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2011-11
Ammonia	4,297	4,501	4,455	4,996	4,607	4,623	4,411	4,730	4,364	4,432	4,764	7.5%	1.0%
Ammonium nitrate	1,174	1,152	1,031	1,096	1,206	1,181	1,188	1,277	1,064	1,053	1,229	16.7	0.5
Urea	3,363	3,436	3,311	3,654	3,549	na	3,574	3,837	3,884	3,842	3,919	2.0	1.5

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

GERMANY FERTILIZERS

Production of fertilizers tanked in 2011

THOUSANDS OF METRIC TONS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2011-11
Ammonium sulfate	na	na	na	na	na	na	na	na	154	174	165	-5.2%	na
Anhydrous ammonia	2,522	2,560	2,803	2,741	2,789	2,718	2,746	2,819	2,363	2,677	2,698	0.8	0.7
Nitric acid	686	754	1,239	1,414	2,080	1,595	1,797	1,669	1,821	2,529	1,698	-32.9	9.5
Urea	na	na	na	na	na	na	na	na	798	717	432	-39.7	na

na = not available. SOURCE: Federal Statistical Office of Germany