

PHOSPHATE ROCK

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: Phosphate rock ore was mined by 6 firms at 12 mines in 4 States and upgraded to an estimated 28.4 million tons of marketable product valued at \$ 2.7 billion, f.o.b. mine. Florida and North Carolina accounted for more than 85% of total domestic output; the remainder was produced in Idaho and Utah. Marketable product refers to beneficiated phosphate rock with phosphorus pentoxide (P₂O₅) content suitable for phosphoric acid or elemental phosphorus production. More than 95% of the U.S. phosphate rock mined was used to manufacture wet-process phosphoric acid and superphosphoric acid, which were used as intermediate feedstocks in the manufacture of granular and liquid ammonium phosphate fertilizers and animal feed supplements. Approximately 45% of the wet-process phosphoric acid produced was exported in the form of upgraded granular diammonium and monoammonium phosphate (DAP and MAP, respectively) fertilizer, and merchant-grade phosphoric acid. The balance of the phosphate rock mined was for the manufacture of elemental phosphorus, which was used to produce phosphorus compounds for a variety of food-additive and industrial applications.

Salient Statistics—United States:	2007	2008	2009	2010	2011^e
Production, marketable	29,700	30,200	26,400	25,800	28,400
Sold or used by producers	31,100	28,900	25,500	28,100	28,500
Imports for consumption	2,670	2,750	2,000	2,400	3,300
Consumption ¹	33,800	31,600	27,500	30,500	31,800
Price, average value, dollars per ton, f.o.b. mine ²	51.10	76.76	127.19	78.50	94.00
Stocks, producer, yearend	4,970	6,340	8,120	5,620	4,800
Employment, mine and beneficiation plant, number ^e	2,500	2,550	2,500	2,300	2,200
Net import reliance ³ as a percentage of apparent consumption	14	4	1	16	13

Recycling: None.

Import Sources (2007–10): Morocco, 92% and Peru, 8%.

Tariff: Item	Number	Normal Trade Relations 12-31-11
Natural calcium phosphates:		
Unground	2510.10.0000	Free.
Ground	2510.20.0000	Free.

Depletion Allowance: 14% (Domestic and foreign).

Government Stockpile: None.

Events, Trends, and Issues: In 2011, domestic production and consumption of phosphate rock increased from that of 2010 owing to increased phosphoric acid and fertilizer production. Export sales of phosphate fertilizers, primarily MAP, increased from that of 2010. U.S. imports of phosphate rock were estimated to have increased by nearly 1 million tons from those of 2010 because of imports of phosphate rock from Peru, where the leading U.S. phosphate fertilizer producer has a 35% stake in the only phosphate rock mine in that country.

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World phosphate rock production capacity was projected to increase by nearly 20%, from 215 million tons in 2011 to 256 million tons in 2015, with most of the increases occurring in Africa. The largest increase was expected from the Moroccan producer, which planned to increase annual production incrementally from about 27 million tons to 50 million tons by 2017. Other significant new mines were planned in Australia, Brazil, Namibia, and Saudi Arabia.

World consumption of P₂O₅ contained in fertilizers was projected to grow at a rate of 2.5% per year during the next 5 years, with the largest increases in Asia and South America.

World Mine Production and Reserves: Reserves for Australia and Brazil were updated with information from Government agencies in each country. Reserves in Canada were lowered to reflect the projected closure of the only phosphate rock mine in 2013. Based on a report issued jointly by the U.S. Geological Survey (USGS) and the Iraqi Ministry of Industry and Minerals in 2011, reserve data for Iraq were added. Reserves for Saudi Arabia are included in "Other countries"; however, production data were not available for a new mine that opened in that country in late 2010. Production and reserve data for India, Mexico, and Peru were added to the table because they were among the 20 leading producing countries.

	Mine production		Reserves ⁴
	2010	2011 ^e	
United States	25,800	28,400	1,400,000
Algeria	1,800	1,800	2,200,000
Australia	2,600	2,700	250,000
Brazil	5,700	6,200	310,000
Canada	700	1,000	2,000
China ⁵	68,000	72,000	3,700,000
Egypt	6,000	6,000	100,000
India	1,240	1,250	6,100
Iraq	—	—	5,800,000
Israel	3,140	3,200	180,000
Jordan	6,000	6,200	1,500,000
Mexico	1,510	1,620	30,000
Morocco and Western Sahara	25,800	27,000	50,000,000
Peru	791	2,400	240,000
Russia	11,000	11,000	1,300,000
Senegal	950	950	180,000
South Africa	2,500	2,500	1,500,000
Syria	3,000	3,100	1,800,000
Togo	850	800	60,000
Tunisia	7,600	5,000	100,000
Other countries	6,400	7,400	500,000
World total (rounded)	181,000	191,000	71,000,000

World Resources: Domestic reserve data were based on USGS and individual company information. Phosphate rock resources occur principally as sedimentary marine phosphorites. The largest sedimentary deposits are found in northern Africa, China, the Middle East, and the United States. Significant igneous occurrences are found in Brazil, Canada, Finland, Russia, and South Africa. Large phosphate resources have been identified on the continental shelves and on seamounts in the Atlantic Ocean and the Pacific Ocean. World resources of phosphate rock are more than 300 billion tons.

Substitutes: There are no substitutes for phosphorus in agriculture.

^eEstimated. — Zero.

¹Defined as phosphate rock sold or used + imports.

²Marketable phosphate rock, weighted value, all grades.

³Defined as imports – exports + adjustments for Government and industry stock changes.

⁴See Appendix C for resource/reserve definitions and information concerning data sources.

⁵Production data for China do not include small artisanal mines.