



# 2010 Minerals Yearbook

---

## THAILAND

---

# THE MINERAL INDUSTRY OF THAILAND

By Lin Shi

The southeast Asian country of Thailand is one of the world's leading producers of cement, feldspar, gypsum, and tin (Carlin, 2011; Crangle, 2011; Tanner, 2011; van Oss, 2011). Thailand's identified mineral resources are plentiful, and its resources of industrial minerals are more abundant than its metallurgical minerals. Most of the identified minerals except potash have been exploited for domestic consumption and export.

## Minerals in the National Economy

The growth rate of the gross domestic product (GDP) of Thailand in 2010 was 7.8%, which was a significant increase from the negative 2.3% rate of growth in 2009. The unemployment rate was 1.0%, which was a decrease of 1.5% from that of the previous year. The inflation rate was 3.3%. Thailand's mining and quarrying sector was important in the country's economy but it was not a significant contributor to the GDP (Bank of Thailand, 2010).

## Government Policies and Programs

A Government stimulus package that was introduced in 2009 helped move the country's economy to positive growth in 2010. The Ministry of Industry is the principal Government agency that oversees the country's mining sector; the Ministry's Department of Primary Industry and Mines (DPIM) administers the Minerals Act and issues mining regulations. The DPIM also provides technical assistance to the metallurgical, mineral processing, and mining industries. The Department of Mineral Resources (DMR) drafts national mineral policies and provides technical assistance for geologic prospecting and mineral exploration (Department of Mineral Resources, 2011; U.S. Department of State, 2011).

## Structure of the Mineral Industry

Thailand's mineral industry was engaged in mining and processing metallic and industrial minerals and exploring for crude oil and natural gas. Most of the nonfuel mineral mining and mineral processing companies in Thailand were privately owned and operated. The Electricity Generating Authority of Thailand (EGAT) and several coal mining companies owned and operated most of the country's major coal exploration and mining businesses. The Petroleum Authority of Thailand (PTT), PTT Exploration and Production Public Company Ltd. (PTTEP) and its joint ventures, and major multinational oil companies owned most of the country's petroleum and natural gas exploration projects and exploitation businesses (table 2).

## Mineral Trade

Thailand's exports were valued at \$188.8 billion in 2010, which was an increase of 25% from the value in 2009, and

included iron and steel products, precious stones, refined fuels, and rubber and rubber products. Thailand's imports were valued at \$175.5 billion in 2010, which was an increase of 34% from the value in 2009, and included gold, silver, and steel products. Trade was important to Thailand's economy, and the country was a member of the World Trade Organization. In response to rising inflationary pressure, the Bank of Thailand began tightening its monetary policy in mid-July 2010. The Thai baht appreciated relative to the U.S. dollar, which caused a large surplus in Thailand's trade account. High-technology products, such as integrated circuits and parts, hard disc drives, electrical appliances, vehicles, and vehicle parts were Thailand's most valuable exports. Thailand's imports of mineral and mineral-related products included coal, electronic integrated circuits, iron and steel, machinery and parts, mineral chemicals, petroleum products, and vehicles. Thailand's traditional major markets were the Association of Southeast Asian Nations (ASEAN) member countries (Indonesia, Malaysia, the Philippines, Singapore, and Vietnam), Europe, Japan, and the United States. Growing export markets included Australia, China (including Hong Kong), India, the Middle East, and South Africa. The United States remained Thailand's third ranked single-country export market and its third ranked supplier of all goods. In 2010, the United States exported \$8,974 million worth of goods to Thailand, including \$1,534 million worth of semiconductors, \$208 million worth of steelmaking materials, \$204 million worth of petroleum products, and \$196 million worth of nonmonetary gold. Thailand's exports to the United States were valued at \$22,687 million in 2010 and included \$600 million worth of natural rubber, \$321 million worth of crude oil, \$95 million worth of iron and steel products, and \$34 million worth of tin. Thailand and the United States proposed the Thai-U.S. Creative Partnership in 2010, and the formal U.S. Agency for International Development (USAID) bilateral program that had ended in 1995 was also resumed in 2010 (U.S. Census Bureau, 2011a, b; U.S. Department of State, 2011).

## Production

In 2010, Thailand's mineral (including mineral fuels) production increased by 5.2%, and manufacturing (which included mineral-related manufacturing) increased by 13.9% from the previous year. Cement production increased by 8.6% to 36.5 million metric tons (Mt) from 33.6 Mt in 2009. Crude steel production increased by 13.7% to 4.15 Mt from 3.65 Mt (revised) in 2009. Tin production increased by 75.3% to 291 metric tons (t) from 166 t (revised) in 2009. Natural gas production increased by 12.2% to 29.6 million cubic meters, and crude oil production decreased by 0.7% to 55.9 million barrels compared with that of 2009 (Bank of Thailand, 2011a, b).

## Commodity Review

### Metals

**Copper.**—Australia-based PanAust Ltd. continued to explore for minerals in Thailand. Thailand-registered Puthep Co. Ltd., which was a joint venture between PanAust and Padaeng Industry Public Co. Ltd. of Thailand, operated the Puthep copper project. Located at Loei in northern Thailand and a short distance from PanAust's Vientiane office in Laos, the project comprised the PUT 1 and PUT 2 deposits. The two deposits are located 14 kilometers apart. A feasibility study was in progress at the PUT 1 deposit, which was Thailand's largest known copper deposit, and, in 2010, included a leach test. The company expected annual production of 25,000 to 30,000 t of copper concentrate and estimated that the mineral resource at PUT 1 was about 160 Mt at grades of 0.53% copper and 0.09% gold. Padaeng owned a 51% share in Puthep in 2010, and PanAust held the remaining 49% share through its wholly owned subsidiary PNA Pty Ltd. PanAust had the option to increase its interest further to a total of 60% or 70%; to exercise its right to a 70% holding, PanAust would need to obtain the approval of the Thai Government. Under the Thailand-Australia Free Trade Agreement, the Government of Thailand had a right to acquire a 10% interest (PanAust Ltd., 2011, p. 6).

**Gold.**—Kingsgate Consolidated Ltd. of Australia owned and operated the Chatree gold mine in central Thailand. In fiscal year 2010, which was the first full year of production after the mining lease was acquired in 2008, the company produced 4,125 kilograms (kg) of gold and 17,092 kg of silver from processing 2.7 Mt of ore. The company's exploration continued in the area surrounding the Chatree Mine, and the company expected to discover additional gold deposits to develop into future operations. Although the current focus was on near-surface deposits, new higher grade targets for potential underground operations had been identified. Kingsgate reported in June that the mine's ore reserves had increased to about 59,000 kg of gold and about 590,000 kg of silver in 61.7 Mt of ore. Mineral resources were about 130,000 kg of gold and about 1,200,000 kg of silver in 174 Mt of ore. A major expansion to the new Chatree North processing plant had begun and would be commissioned in 2011. The new additional unit would be built alongside the existing 2.3-Mt unit of the Chatree North plant, and when fully operational, the entire plant would increase the Kingsgate's combined annual ore processing capacity to more than 5 Mt and its annual gold production to about 6,200 kg (Kingsgate Consolidated, Ltd., 2011, p. 1–20).

**Iron and Steel.**—Among the southeast Asian nations, Thailand had the only blast furnace plant, and the region's steelmaking was generally done using electric arc furnaces (EAFs). The country's rolling mills had a much higher capacity than did its smelters, and it imported the high-grade steel used by the automotive, electrical, and electronics sectors. Thailand was setting up new projects to help cope with the steel supply shortfalls and to balance the country's steel-rolling and steelmaking capabilities. Thailand's Mill Con Steel Industries (MCSI) did not have its own steelmaking facility, so MCSI planned to invest about \$88 million in a melting shop and a

new EAF, which were expected to reduce production costs, as well as lessen the risk of raw material shortages for MCSI. In March 2010, Siam Yamato Steel Co., Ltd. started commercial operations at its No. 2 section mill in eastern Thailand. A Japanese company also invested in this mill to increase the mill's long-product capacity to 400,000 metric tons per year (t/yr). Tata Steel Thailand initiated a new mini blast furnace plant in Chonburi, east of Bangkok; the plant would have an annual capacity of 500,000 t. This mini blast furnace was expected to provide energy savings to the Chonburi steel plant, which had a 70-t EAF located adjacent to the blast furnace, and would also feed pig iron to the steel plants at Rayong and Sara Buri. The three steel plants had a combined annual melting capacity of between 1.3–1.4 Mt (South East Asia Iron and Steel Institute, 2010).

The Government's economic stimulus plan and the global economic recovery caused domestic steel demand and usage to reach a new record for the Thai steel industry. Steel consumption increased significantly (by 30%) to 14 Mt in 2010, which was the highest growth rate in the region; the increase was owing to the growth in demand in the domestic automotive and construction sectors. Iron scrap demand increased for the first time since 2005 to 4.3 Mt, which was an 18% increase from that of 2009. Steel imports increased by 56% and were used mainly by the manufacturing sector, especially by the automotive and appliance manufactures. Local steel production increased by 8% and was used mainly for construction. In 2010, the growth rate in the automotive sector was 53%, and that in the construction sector was 9%; as a result, the ratio of long-product demand to flat-product demand changed to 67:33 from 60:40 in 2009. A project to build an integrated blast furnace and steel mill in Thailand that was announced in 2007 was still on hold. Such global steel producers as ArcelorMittal of Luxembourg, Baoshan Steel of China, JFE Holdings Inc. of Japan, and Nippon Steel Corp. of Japan had expressed interest in joining the project, and the Thai Government was expected to make a decision soon on whether to proceed with the project (Vibulsrisajja and Nuntapong, 2010, p. 23; South East Asia Iron and Steel Institute, 2011).

The Canadoil Group, which had originated in Italy and was headquartered in Canada in 2010, was the world's leading steel pipe manufacturer and owned four manufacturing and fabrication facilities in Thailand. The company had invested \$330 million in Thailand in the past 10 years and, in September, had begun the construction of a metal and steel plate mill in Rayong that was scheduled to commence in 2012. The new facility would have a maximum annual capacity of 1.2 Mt in the first phase; one-half of the output would be used by the Canadoil Group and one-half would be used by the company's Japanese partners. The Canadoil Group spent \$600 million for the first phase of plant construction. The company had allocated another \$100 million to expand the Rayong facility to add an additional 600,000 t/yr of capacity, and the final decision for the expansion would likely be made at the end of 2013 or in early 2014. The Canadoil Group hoped to increase its total revenue to \$2 billion in 2013, of which \$1.5 billion would be generated in Thailand; by that time, the Rayong plate mill would have been in operation for 1 full year (Bangkok Post, 2010a).

**Zinc.**—Padaeng was engaged in milling and smelting zinc and producing zinc alloys. The company's Mae Sod Mine was located in the Mae Sod district of Tak Province; the company rehabilitated the mine and applied for a new mining lease for the concession in 2010. Padaeng's smelter was located in the Muang district of Tak Province, the roaster plant was located in Rayong Province, and the head office was located in Bangkok. Consumption of zinc in Thailand increased by 28% to 120,015 t, and the average annual price of zinc increased by 30.5% to \$2,161 from \$1,655 in 2009 (Padaeng Industry Public Co. Ltd., 2011, p. 1–15).

### **Industrial Minerals**

**Cement.**—In 2010, Asia Cement Plc of Thailand was appointed by Italcementi Group of Italy to be the exclusive distributor for TX Active in Thailand. TX Active was a photocatalytic cement product that was capable of reducing compounds present in the air, as well as reducing impurities on building surfaces. According to Asia Cement, TX Active cost 10% to 30% more than normal cement but it cut maintenance costs and reduced pollution. Italcementi was a major shareholder in both Asia Cement (held a 25% share) and Jalapathan Cement. Asia Cement's share of the Thai domestic cement market was between 14% and 15%, and the company produced between 25 to 26 Mt of cement in 2009 (Bangkok Post, 2010b).

**Potash.**—Italian-Thai Development Public Co. Ltd. (ITD) through its subsidiary Asia Pacific Potash Ltd. (APPC) owned Thailand's Somboon potash project and planned to develop the first Thai potash mine, which would have a production capacity of 2 Mt/yr during the 25-year life of the mine. About 1.6 Mt of the plant's output would be exported to the southeast Asian market and 0.4 Mt would be for domestic consumption. The mine is located in Udon Thani Province in northeastern Thailand. AAPC was expecting to obtain approval of its environmental impact assessment (EIA) report and to receive a mining license to begin construction of the mine in early 2012. This project would enable Thailand to become the only significant source of potash in Asia and the third ranked potash producer in the world after Canada and Russia (Vibulsrisajja and Nuntapong, 2010, p. 23; Bangkok Post, 2011).

### **Mineral Fuels**

**Coal.**—Banpu PCL, which was Thailand's leading coal producer, made a cash offer to purchase Australia's Centennial Coal Ltd. Centennial owned 10 coal mines in New South Wales, Australia, and was the world's leading coal exporter. About 35% of Centennial's coal was exported to power station customers in Europe and Japan. Banpu offered to pay \$1.8 billion to buy the company, which had about 400 Mt of coal reserves. Banpu already controlled about 19.9% of the Centennial Mine, and its offer in July to buy the remaining 80.1% stake at a price of A\$6.20 per share in cash was 40% more than Centennial's closing stock price on July 2, 2010. Banpu's intention was to use Australian coal to stabilize the company's coal mining activity, coal supply, and sales market (Creagh, 2010).

**Natural Gas and Petroleum.**—Coastal Energy Co.'s 2010 annual production increased by 31% compared with that of 2009 to an average of 9,670 barrels per day (bbl/d) of oil equivalent. The increase was partly owing to the start of production at the Bua Ban oilfield, which Coastal brought onstream in July (Coastal Energy Co., 2011). The MTJDA-B17 project, which was jointly operated by PTTEP (Thailand) and Petronas (Malaysia), started producing natural gas at a production rate of about 9.5 million standard cubic meters per day, which was enough to supply about 10% of Thailand's domestic demand. PTTEP International Co., Ltd. (PTTEPI), which was a subsidiary of PTTEP, and Petronas Carigali (JDA) Sdn. Bhd. (PC JDA) of Malaysia established Caligali-PTTEPI Operating Co. Sdn. Bhd., or CPOC, to operate the project. PTTEPI and PC JDA each held 50% interest in CPOC (PTT Exploration and Production Public Co. Ltd., 2010). Thailand's domestic crude oil production was far lower than domestic consumption of 700,000 bbl/d. In 2010, the Government promoted petroleum exploration and production by issuing 3-year exploration licenses to Carnarvon Petroleum, JSX Energy Co., Pearl Oil (Resources), and Shaanxi Yanchang Petroleum Co. to explore for petroleum in Thailand's exclusive economic zone; these companies would have priority for production licenses if they discovered potential reserves. The four companies were expected to invest a total of \$47 million in their exploration ventures. Increased oil prices encouraged companies to look for opportunities in Thailand. The Thai Government also encouraged domestic consumers to use more natural gas (Bangkok Post, 2010c).

### **Outlook**

Puthep Co. planned to complete further leach test work on the Puthep copper project in 2011. It also planned to finish its consultations with the community and to complete the environment and health impact assessment.

As a result of the increasing gold price, which caused the lower grade ore resources to become economically viable, Kingsgate plans to undertake further exploration and expansion at the Chatree Mine. The company's gold production in 2011 at the Chatree Mine is expected to be about same as in 2010 before a planned increase in annual production to 6,221 kg takes place and the expanded plant is operating at full capacity (Kingsgate Consolidated Ltd., 2011).

International iron and steel companies are expected to continue to invest in a hot-rolling steel mill in Thailand, where logistics facilities and a skilled workforce are more readily available compared with other locations in Asia, such as China, India, Indonesia, Malaysia, and Vietnam. Events outside of Thailand pose risks to the Thai steel sector and market, including the debt in the euro area, the slow economic recovery in the United States, and the effects of the tsunami that hit Japan in March 2011. Domestic political instability and high inflation could result in shortages of Thai steel products and could delay or decrease Government investment (South East Asia Iron and Steel Institute, 2010).

The World Bank upgraded Thailand's income categorization from a lower-middle income economy to an upper-middle

income economy in July 2011 owing to the country's progress in economic development. For the year 2011, the World Bank predicts economic growth in Thailand of more than 3.5% (World Bank, The, 2011).

## References Cited

- Bangkok Post, 2010a, Canadoil steel mill to hike revenue five-fold: Bangkok Post, June 18. (Accessed June 21, 2010, at <http://www.bangkokpost.com/business/economics/38962/canadoil-steel-mill-to-hike-revenue-five-fold>.)
- Bangkok Post, 2010b, Sales harden for Asia Cement: Bangkok Post, June 5. (Accessed August 26, 2010, at <http://www.bangkokpost.com/business/economics/36888/sales-harden-for-asia-cement>.)
- Bangkok Post, 2010c, World price helping local exploration: Bangkok Post, February 26. (Accessed May 19, 2010, at <http://www.bangkokpost.com/business/economics/33553/world-prices-helping-local-exploration>.)
- Bangkok Post, 2011, Buyers sought for 15% of potash project: Bangkok Post, September 6. (Accessed October 5, 2011, at <http://www.bangkokpost.com/business/economics/241311/buyers-sought-for-15-of-potash-project>.)
- Bank of Thailand, 2010, Thailand's economic condition in 2010: Bank of Thailand, 67 p. (Accessed November 10, 2011, at [http://www.bot.or.th/English/EconomicConditions/Thai/report/AnnualReport\\_Doc/AnnualReport\\_2010.pdf](http://www.bot.or.th/English/EconomicConditions/Thai/report/AnnualReport_Doc/AnnualReport_2010.pdf).)
- Bank of Thailand, 2011a, Table 2—Growth rate of domestic production in major sectors (calendar year): Bank of Thailand, 1 p. (Accessed June 29, 2011, at <http://www.bot.or.th/English/Statistics/Indicators/Docs/tab02.pdf>.)
- Bank of Thailand, 2011b, Table 3—Major non-agricultural products: Bank of Thailand, 3 p. (Accessed June 29, 2011, at <http://www.bot.or.th/English/Statistics/Indicators/Docs/tab03.pdf>.)
- Coastal Energy Co., 2011, Coastal Energy announces 2010 year end financial results: Coastal Energy Co., April 18. (Accessed August 31, 2011, at [http://www.easyir.com/easyir/customrel.do?easyirid=8280F68BE42B9E34&version=live&prid=745806&releasejsp=custom\\_164](http://www.easyir.com/easyir/customrel.do?easyirid=8280F68BE42B9E34&version=live&prid=745806&releasejsp=custom_164).)
- Carlin, J.F., Jr., 2011, Tin: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 170–171.
- Crangle, R.D., Jr., 2011, Gypsum: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 70–71.
- Creagh, Ben, 2010, Thai firm targets Australian coal: Mining Journal, July 9, p. 1.
- Department of Mineral Resources [Thailand], 2011, About us: Department of Mineral Resources. (Accessed June 28, 2011, at [http://www.dmr.go.th/ewtadmin/ewt/dmr\\_web/main.php?filename=About\\_En](http://www.dmr.go.th/ewtadmin/ewt/dmr_web/main.php?filename=About_En).)
- Kingsgate Consolidated Ltd., 2011, Annual reports 2010: Kingsgate Consolidated Ltd., 95 p. (Accessed July 1, 2011, at <http://www.kingsgate.com.au/investors/annuals-quarterlies.htm>.)
- Padaeng Industry Public Co. Ltd., 2011, Padaeng Industry Plc. annual report of year 2010: Padaeng Industry Public Co. Ltd., 90 p. (Accessed July 31, 2011, at <http://www.padaeng.com/media02-1.htm>.)
- PanAust Ltd., 2011, Thailand–Puthup annual review 2010: PanAust Ltd., 28 p. (Accessed June 30, 2011, at [http://www.panaustrian.com.au/sites/default/files/reports/PanAust2010Annual\\_Review\\_Web.pdf](http://www.panaustrian.com.au/sites/default/files/reports/PanAust2010Annual_Review_Web.pdf).)
- PTT Exploration and Production Public Co. Ltd., 2010, MTJDA-B17 Project has started producing natural gas: PTT Exploration and Production Public Co. Ltd., February 22. (Accessed February 23, 2010, at <http://www.pttep.com/en/newsDetail.aspx?ContentID=311>.)
- South East Asia Iron and Steel Institute, 2010, New developments in the iron and steel industry in ASEAN: South East Asia Iron and Steel Institute, July 2. (Accessed July 5, 2010, at [http://www.seaisi.org/news/news\\_view.asp?news\\_id=1965](http://www.seaisi.org/news/news_view.asp?news_id=1965).)
- South East Asia Iron and Steel Institute, 2011, Thailand steel industry in 2010: South East Asia Iron and Steel Institute, 2011, p. 35.
- Tanner, A.O., 2011, Feldspar: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 54–55.
- U.S. Census Bureau, 2011a, U.S exports to Thailand 2002–2010: U.S. Census Bureau. (Accessed October 4, 2011, at <http://www.census.gov/foreign-trade/statistics/product/enduse/exports/c5490.html>.)
- U.S. Census Bureau, 2011b, U.S imports from Thailand 2002–2010: U.S. Census Bureau. (Accessed October 4, 2011, at <http://www.census.gov/foreign-trade/statistics/product/enduse/imports/c5490.html>.)
- U.S. Department of State, 2011, Thailand: U.S. Department of State background note. (Accessed June 24, 2011, at <http://www.state.gov/r/pa/ei/bgn/2814.htm>.)
- van Oss, H.G., 2011, Cement: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 38–39.
- Vibulsrisajja, Napasagorn, and Nuntapong, Tummakajorn, 2010, Unfulfilled potential: Mining Journal, November 5, p. 23.
- World Bank, The, 2011, Thailand—Country brief: The World Bank. (Accessed February 10, 2012, at <http://www.worldbank.or.th/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/THAILANDEXTN/0,,contentMDK:20205569~menuPK:333304~pagePK:1497618~piPK:217854~theSitePK:333296,00.html>.)



TABLE 1  
THAILAND: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2006	2007	2008	2009	2010 <sup>e</sup>
<b>METALS</b>					
Antimony:					
Ore:					
Gross weight	2,980	--	--	--	--
Sb content	1,409	--	--	--	--
Metal, smelter	544	271	422	555 <sup>2</sup>	500
Copper, metal, refined:					
Primary <sup>c</sup>	25,300	11,900	--	--	--
Secondary <sup>c</sup>	1,750	814	438	490 <sup>2</sup>	490 <sup>2</sup>
Total	27,050	12,714	438	490 <sup>2</sup>	490 <sup>2</sup>
Gold kilograms	4,300	3,401	2,721	5,400 <sup>2</sup>	4,125 <sup>2</sup>
Iron and steel:					
Iron ore:					
Gross weight	264,289	1,554,860	2,029,100	1,400,800 <sup>2</sup>	969,937 <sup>2</sup>
Fe content <sup>c</sup>	132,000	779,000	855,000	800,000	485,000
Crude steel thousand metric tons	4,914	5,565	5,211	3,646 <sup>f</sup>	4,145 <sup>2</sup>
Lead, metal, refined, secondary	61,160	73,159	73,303	55,504 <sup>2</sup>	55,500
Manganese ore:					
Metallurgical-grade, gross weight, 46% to 50% MnO <sub>2</sub>	--	9,500	111,000	64,930 <sup>r,2</sup>	50,450 <sup>2</sup>
Mn content	--	4,550	52,700	31,200 <sup>f</sup>	24,200
Silver kilograms	11,800	7,727	5,465	15,300 <sup>2</sup>	17,092 <sup>2</sup>
Silicon, metal (gross weight)	--	--	--	NA	22,500
Tantalum, metal and oxide powder	230	142	158	50 <sup>2</sup>	50 <sup>2</sup>
Tin:					
Concentrate:					
Gross weight	225	149	235	210	370 <sup>e</sup>
Sn content	190	122	215	166 <sup>f</sup>	291 <sup>2</sup>
Metal, primary	27,540	23,104	21,860	19,423 <sup>2</sup>	20,000 <sup>e</sup>
Tungsten concentrate:					
Gross weight	546	923	1,112	950 <sup>2</sup>	950
W content <sup>c</sup>	303	477 <sup>f</sup>	617	600	600
Zinc:					
Ore:					
Gross weight	214,023	176,042	118,739	184,505 <sup>r,2</sup>	146,470 <sup>2</sup>
Zn content	32,100 <sup>e</sup>	32,921	17,811	34,000	25,529 <sup>2</sup>
Metal, primary	94,779	99,337	107,753	104,695 <sup>2</sup>	100,000
Alloy, Zn content	61,600	64,600	70,000	31,000	30,000
<b>INDUSTRIAL MINERALS</b>					
Barite	4,549 <sup>f</sup>	8,631	9,180	51,895 <sup>f</sup>	9,000
Cement, hydraulic thousand metric tons	39,408	35,668	31,651 <sup>r,2</sup>	33,562 <sup>f</sup>	36,496 <sup>2</sup>
Clays:					
Ball clay	1,003,267	563,353	1,499,993	1,000,000	1,000,000
Kaolin, marketable:					
Beneficiated, washed	157,900	159,186	162,215	160,000	160,000
Nonbeneficiated, unwashed	675,886	518,143	479,443	500,000	500,000
Filler	9,326	7,985	6,061	6,000	6,000
Diatomite	1,344	1,260	4,075	4,000	4,000
Feldspar	1,067,684	684,668	670,618	600,000	600,000
Fluorspar, crude, metallurgical-grade	3,240	1,820	29,529	120,340 <sup>r,2</sup>	20,000
Gemstones thousand carats	81	102	32	30	30
Gypsum thousand metric tons	8,355	8,643	8,500	8,679 <sup>r,2</sup>	9,985 <sup>2</sup>
Perlite	22,000	6,400	7,000	7,000	7,000
Phosphate rock, crude	900	3,550	3,675	3,000	3,000
Salt:					
Rock	1,008,251	1,134,931	1,211,581	1,200,000	1,200,000
Other <sup>c</sup>	100,000	100,000	100,000	100,000	100,000
Sand, silica, glass	861,847	844,071	495,848	500,000	500,000

See footnotes at end of table.

TABLE 1—Continued  
THAILAND: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2006	2007	2008	2009	2010 <sup>e</sup>
<b>INDUSTRIAL MINERALS—Continued</b>					
<b>Stone:</b>					
Calcite	625,950	672,580	823,706	750,000	750,000
Dolomite	899,512	1,108,425	1,353,763	1,200,000	1,200,000
<b>Granite:</b>					
Dimension stone	8,321	10,515	10,579	10,000	10,000
Industrial rock	4,463	5,229	5,190	5,000	5,000
<b>Limestone:</b>					
Dimension stone	201	233	233	200	200
For cement manufacture only	61,583	63,799	54,885	60,000	60,000
Construction and other uses	87,887	87,402	87,000	90,000	90,000
Marble, dimension stone and fragment	547,582	848,806	664,930	760,000	760,000
Marl for cement manufacture only	68,700	31,750	41,720	99,300 <sup>r,2</sup>	68,000 <sup>2</sup>
Quartz	2,897	4,924	3,290	4,000	4,000
Shale for cement manufacture only	5,590	4,769	4,026	4,000	4,000
Travertine	3,316	3,490	3,640	3,000	3,000
<b>Talc and related materials:</b>					
Pyrophyllite	131,843	415,420	106,600	200,000	200,000
Talc	4,374	3,508	3,264	3,000	3,000
Zirconium	--	1,023	--	--	--
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Coal, lignite	19,071	18,239	18,095	16,360 <sup>r,2</sup>	17,907 <sup>2</sup>
Natural gas, gross production	24,317	25,400	27,576	26,362 <sup>2</sup>	29,583 <sup>2</sup>
<b>Petroleum:</b>					
Crude	47,067	48,745	52,805	56,302	55,906 <sup>2</sup>
Natural gas condensate	27,466	28,778	31,157	30,625	31,730 <sup>2</sup>
<b>Refinery products:</b>					
Liquefied petroleum gas	45,475	48,759	53,842	57,531 <sup>r,2</sup>	66,180 <sup>2</sup>
Gasoline	57,172	54,739	53,142	55,678 <sup>r,2</sup>	54,986 <sup>2</sup>
Jet fuel	35,240	33,478	37,750	37,582 <sup>r,2</sup>	38,972 <sup>2</sup>
Kerosene	6,548	776	1,226	584 <sup>r,2</sup>	2,935 <sup>2</sup>
Distillate fuel oil	39,681	40,581	43,231	43,300 <sup>r,2</sup>	37,737 <sup>2</sup>
Residual fuel oil <sup>e</sup>	26,000	27,109 <sup>2</sup>	26,500	30,000	25,000
Unspecified <sup>e,3</sup>	3,600	3,626 <sup>2</sup>	3,600	4,000	3,000
Total <sup>e,4</sup>	214,000	209,000	219,000	229,000	229,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. do. Ditto. NA Not available. -- Zero.

<sup>1</sup>Table includes data available through June 30, 2011.

<sup>2</sup>Reported figure.

<sup>3</sup>Includes refinery fuel and refinery gains or losses.

<sup>4</sup>Data are rounded to three significant digits; may not add to totals shown.

Sources: Department of Mineral Resources, Mineral Statistics of Thailand; Department of Primary Industries and Mines; Ministry of Energy, Energy Policy and Planning Office; and U.S. Geological Survey Minerals Questionnaires, 2006–2010.

TABLE 2  
THAILAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Antimony	metric tons	Amco Thai Mining Co. (Hibino Metal Industry)	Antimony smelter, Ban Pin, Phrae Province	555
Do.		Other companies	Cascaded in different Thai Provinces	NA
Barite		Asian Mineral Resources Co. Ltd.	Loei, Mae Hong Son, Nakhon Si Thammarat, and Satun Provinces	60
Do.		P&S Barite Mining Co. Ltd.	Loei and Nakhon Si Thammarat Province	60
Cement		Asia Cement Co. Ltd.	Pra Phutthabath, Sara Buri Province	4,800
Do.		Jalaprathan Cement Co. Ltd. (Cement Francais S.A., 37%; Veatprapat Holding Co. Ltd., 19%; others, 44%)	Takli, Nakhon Sawan Province, and Cha-Am, Phetchaburi Province	2,350
Do.		Samukee Cement Ltd.	Pakchong, Nakhon Ratchasima Province	125
Do.		Saraburi Cement Co. Ltd. (CEMEX Asia Holdings Ltd., 99%)	Chalerm Phrakiat, Sara Buri Province	700
Do.		Siam Cement Industry Co. Ltd. (Bureau of the Crown Property, 30%; Thai Security Depository Co. Ltd., 6.94%; CPB Equity Co. Ltd., 5.6%; other financial institutions and the general public, 57.46%)	Kaeng Khoi, Phabudhabat, and Khao Wong, Sara Buri Province; Chaehom, Lampang Province; Thung Song, Nakhon Si Thammarat Province; and Ta Luang, Phra Nakhon Si Ayutthaya Province	23,200
Do.		Siam City Cement Co. Ltd. (SCCC) (Holcim Ltd., 33.7%; Rattanak family, 27%; other investors, 39.3%)	Kaeng Khoi, Sara Buri Province	14,500
Do.		TPI Polene Co. Ltd.	do.	9,900
Coal, lignite		Electricity Generating Authority of Thailand (EGAT) (Government, 100%)	Mae Moh, Lampang Province	20,000
Do.		Lanna Lignite Public Co. Ltd.	Ban Pakha, Lamphun Province	1,000
Copper		Thai Copper Industries Public Co. Ltd. (TCI)	Rayong Industrial Park	165
Feldspar, concentrate		Asia Mineral Processing Co. Ltd.	Provinces of Nakhon Si Thammarat and Trang	500
Fluorspar, concentrate		Asian Mineral Resources Co. Ltd.	Mae Hong Son Province	14
Gas, natural	million cubic meters per day	Esso Exploration and Production Khorat Inc.	Namphong, Khon Kaen Province	4
Do.	do.	TOTAL Exploration and Production (Thailand)	Bongkot in the Gulf of Thailand	15
Do.	do.	Unocal Thailand Ltd.	Baanpot, Erawan, Funan, Kaphong, Pladang, Satun, Pailin, Trat, all in the Gulf of Thailand	33
Gold	kilograms	Akara Mining Ltd. (Kingsgate Consolidated Ltd., 100%)	Chatree, Phichit Province	5,000
Gypsum		Vanich Gypsum Co. Ltd.	Khlong Prab, Mai Rieng, Thoong Yai Mai in Nakhon Si Thammarat Province and Surat Thani Province	8,500
Do.		Lotus Mines Co. Ltd.	Nakornsawan	NA
Do.		General Mining and Trading Co. Ltd.	Talad, Muang	NA
Iron ore, gross weight		P.T.K. Mining Co. Ltd.	Phu Ang, Loei Province	720
Lead, in concentrate		Kanchanaburi Exploration and Mining Co. Ltd.	Song Toh, Nong Phai, and Bo Ngam in Kanchanaburi Province	30
Petroleum, crude, including condensate	thousand 42-gallon barrels per day	Chevron Offshore (Thailand) Ltd.	Benjamas, Tantanawan, offshore in the Gulf of Thailand	35
Do.	do.	PTT Exploration and Production Public Co. Ltd. (PTTEP)	Arhit, Songkhla, Gulf of Thailand	20
Do.	do.	Thai Shell Exploration and Production Co. Ltd.	Sirikit in Kamphaeng Phet Province	24
Do.	do.	TOTAL Exploration and Production (Thailand)	Bongkot, offshore in the Gulf of Thailand	12
Do.	do.	Unocal Thailand Ltd.	Baanpot, Erawan, Funan, Gomin, Jakrawan, Kaphong, Pailin, Platon, Satun, Surat, Trat Plamuk, offshore in the Gulf of Thailand	38

See footnotes at end of table.



TABLE 2—Continued  
THAILAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Silicon, metal (gross weight)	metric tons	G.S. Energy Co., Ltd.	Ratchaburi silicon plant	25,000
Steel, rolled		The Bangkok Iron and Steel Works Co. Ltd.	Phrapradaeng, Samut Prakan Province	120
Do.		Bangkok Steel Industry Public Co. Ltd.	do.	300
Do.		Tata Steel (Thailand) Plc (Tata Steel Ltd., 67.11%; McDonald Investment, 6.5%; other investors, 26.39%)	Map Ta Phut, Rayong Province; Sriracha, Chonburi Province; Ban Mon, Sara Buri Province	1,700
Do.		Namheng Steel Co. Ltd.	Lop Buri Province	300
Do.		Sahaviriya Group Corp. Ltd.	Bang Saphan, Prachuap Khiri Khan Province	2,400
Do.		Siam United Steel Co. Ltd.	Rayong Province	1,000
Do.		G-Steel Plc (formerly Siam Ystrip Mill Plc)	Map Ta Phut, Rayong Province	600
Tantalum, metal powder and oxides	metric tons	H.C. Starck (Thailand) Co. Ltd. (H.C. Starck GmbH, 94.98%, and others, 5.02%)	do.	250
<b>Tin:</b>				
Concentrate		Numerous small companies	Nakhon Si Thammarat, Phangnga, Phuket, and Rayong Provinces	3
Refined		Thailand Smelting and Refining Co. Ltd. (Thaisarco) (Amalgamated Metal Corp., 75.25%, and other, 24.75%)	Phuket, Phuket Province	30
Tungsten, in concentrate	metric tons	SC Mining Co. Ltd. (Som Chai family, 100%)	Ban Pin, Phrae Province	650
<b>Zinc:</b>				
In concentrate		Padaeng Industry Public Co. Ltd. (PDI) (Bali Ventures Ltd., 21.7%; Thai Ministry of Finance, 13.81%; RAK Minerals & Metals Investments, 12.5%; and others, 52%)	Mae Sod district, Tak Province	65
Refined		do.	Smelter in Muang district, Tak Province; Roaster plant in Rayong Province	115

Do., do. Ditto. NA, Not available.