



# 2009 Minerals Yearbook

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## TAIWAN

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# THE MINERAL INDUSTRY OF TAIWAN

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In 2009, owing to the global financial crisis, external demand for manufactured products was weak, especially in the first half of the year. The volume of exports increased as the year progressed. As a result of Government fiscal and monetary stimulus measures, private consumption and public investment gradually improved in the second half of the year. Because Taiwan's economy was oriented towards exports, the island's gross domestic product (GDP) contracted by 1.87% in 2009. Manufactured production decreased by 4.61%. Construction activity slowed by 6.7% compared with that of 2008. Because of the weak economy on the island, the activities of the service sector decreased by 0.22%. In 2009, exports of goods were valued at \$204 billion, which was a 20% decrease compared with the value in 2008. The decline was led by chemical, iron and steel, and nonferrous metal products exports. The value of imports also decreased to \$174 billion in 2009, or by 27.5% from that of 2008. Coal, oil, and raw materials were the major imported commodities. China was Taiwan's leading trade partner followed by Japan, the United States, and Hong Kong (Directorate General of Budget, Accounting, and Statistics, 2010, p. 3, 39-40).

## Minerals in the National Economy

Major minerals identified on the island included clay, coal, copper, dolomite, feldspar, gold, gypsum, natural gas, petroleum, serpentine, and talc. After several decades of mining, nearly all the recoverable coal, metallic minerals, and talc had been depleted. The output of the mining industry, which had a very small effect on the island's economy, was less than 1% of total industrial production (Directorate General of Budget, Accounting, and Statistics, 2010, p. 22).

## Production

The major mining activities in Taiwan were the production of dolomite, limestone, marble, natural gas, and petroleum. Natural gas and petroleum were produced on the western part of the island, and limestone and marble were mined on the eastern part of the island. Employment in mining and quarrying had steadily decreased since the early 1990s to about 3,000 in 2009. The production value of the major mineral commodities was \$284 million, of which \$124 million was from natural gas and \$106 million was from marble. Besides natural gas and marble, petroleum was the island's most valuable mineral commodity. Because Taiwan had no domestic primary aluminum, copper, lead, or zinc smelting capacity, downstream metal producers relied on imports of ingots and scrap to produce products from these metals. Owing to high labor costs, environmental problems, and weak domestic demand, the output of these industries had gradually decreased during the past several years, and companies had moved their manufacturing facilities to mainland China and Southeast Asian countries. In 2009, owing

to the financial crisis, the production of cement, iron, and steel decreased significantly but the output of silica sand and sulfur increased moderately (Bureau of Mines, 2010; Directorate General of Budget, Accounting, and Statistics, 2010, p. 13).

## Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

## Commodity Review

### Metals

**Aluminum.**—Without any primary aluminum production on the island, aluminum product producers depended on imports of aluminum ingot and scrap to meet their needs. Owing to high production costs and a shortage of raw materials, many aluminum producers either closed down their operations or moved their production facilities to China or countries in Southeast Asia. CS Aluminum Corp. (CS Aluminum), which was a subsidiary of China Steel Corp. (CSC), built a 35,000-metric-ton-per-year (t/yr) aluminum alloy plant in Ningpo, Zhejiang Province, China, in 2005. Owing to increased demand for aluminum alloy on the island, CS Aluminum expanded its aluminum products output capacity to 158,000 t/yr in 2008 from 122,000 t/yr in 1998. The company was expanding its rolling-mill output capacity by 15,000 t/yr to meet the domestic demand for alloy products in the electronics sector (CS Aluminum Corp., 2010).

**Iron and Steel.**—Taiwan was the 12th ranked crude steel producer in the world and the 5th ranked producer in Asia behind China, Japan, India, and the Republic of Korea. Owing to the increased prices of coking coal, iron and steel scrap, and iron ore and the weakness in the prices of steel products during the first half of the year, most of Taiwan's iron and steel companies faced financial losses in 2009. Many international iron and steel producers reduced their output if the quoted steel prices were lower than production costs. As a result, a shortage in the supply of steel products pushed prices of steel products higher in the second half of the year (World Steel Association, 2010).

Owing to weak demand for steel products, CSC shut down one of its blast furnaces for care and maintenance in 2009. As a result, CSC's pig iron and crude steel production decreased to about 7.9 million metric tons (Mt) and 8.4 Mt, respectively, in 2009 from about 9.7 Mt and 10.4 Mt, respectively, in 2008. CSC was the sole integrated iron and steel producer on the island. In 2009, the company imported 12.2 Mt of iron ore mainly from Australia, 72.7%; Brazil, 26.1%; and Canada, 1.2%; and 6.7 Mt of coking coal mainly from Australia, 81.9%; Canada, 10.5%; Indonesia, 5.3%; and others, 2.3% (China Steel Corp., 2010, p. 9-14).

CSC's subsidiary Dragon Steel Corp. (formerly Kuei Yu Steel Corp.) had an output capacity of 600,000 t/yr of H-beam

steel and 300,000 t/yr of steel billet, which were cast in a 150-metric-ton (t) twin-shell-type direct-current electric arc furnace (EAF) in Taichung. The EAF had an output capacity of 1 million metric tons per year (Mt/yr) of crude steel. CSC planned to construct two blast furnaces at the Dragon Steel site, each of which would be able to produce 2.5 Mt/yr of pig iron. The first blast furnace was scheduled to begin production in February 2010. SMS Siemag was contracted to supply two new carbon steel converters. The first converter would be put into operation in early 2010 and would have an output capacity of 2.2 Mt/yr of steel. A complete bin system for ferroalloys was included in the contract. Dragon Steel would supply hot-rolled products to CSC customers, and CSC would shift some production from hot-rolled to cold-rolled to improve the product mix. Dragon Steel's second blast furnace would start construction in 2010 and was scheduled to be put into operation at the end of 2012 (China Steel Corp., 2010, p. 27-29).

Owing to an increase in demand for coal and iron ore from China, the prices of coal and iron ore in international markets were expected to increase in the near future. CSC worked with its foreign counterparts to invest in coal and iron ore mines overseas to secure raw material for its domestic consumption. In 2006, CSC invested \$12.61 million for a 5% share in Australia's Q Coal Pty Ltd.'s Sonoma Coal Mine, which was located in Queensland. The coal mine produced coking and thermal coal. In December 2009, CSC agreed to pay \$94.6 million to obtain a 1% share in Brazil's NAMISA iron ore mine from Japan's Itochu Corp. and Sumitomo Metal Industries Ltd., which owned 16% and 2.64% of the Brazilian iron ore mine, respectively (South East Asia Iron and Steel Institute, 2010).

Yieh United Group and CSC discussed a sale of shares of the Tang Eng Stainless Steel Plant that were held by CSC. Yieh United Group's subsidiary Yieh United Steel Corp. was the leading stainless steel producer in Taiwan, followed by Tang Eng. The Taiwan authorities held the largest number of shares of both CSC and Tang Eng. During the year, Yieh United Group acquired a 38% share of Tang Eng through the stock exchange market. Yieh United Group would become the leading shareholder of Tang Eng and, as a consequence, would account for more than 60% of the stainless steel output capacity in Taiwan. Taiwan's Fair Trade Commission turned down the application filed by Yieh United Steel Corp. to merge with Tang Eng. Yieh United Steel Corp. expanded its investment in Vietnam. The company planned to invest \$3.5 billion to build a 7-Mt/yr steel plant in Da Nang, Vietnam. Yieh United Steel Corp. was the second steel company to build an integrated iron and steel plant in Vietnam (United Daily News, 2010).

### **Industrial Minerals**

**Cement.**—China resumed sand and gravel exports to Taiwan; however, the global financial crisis affected the construction sector on the island. The demand for sand and gravel decreased because much of the island's construction work was postponed in 2009. The delay of construction projects also led to the decrease in cement production. Owing to a lack of limestone resources and a limited market on the island, Taiwan cement producers had gradually moved their production base to China

in the late 1990s and expanded their cement output capacities there. Taiwan's leading cement producer, Taiwan Cement Corp. (TCC), was positioned to take advantage of the market in southern China and to be a high-end cement producer there. TCC's investment strategy in China was to make direct investments and to form joint ventures with local cement producers. TCC planned to invest \$800 million to double its cement production capacity in China by 2012. The total output capacity of TCC's cement plants in China was expected to increase to 52 Mt/yr in 2010 from 24 Mt/yr in 2009. The company planned to build new plants in each of the Provinces of Fujian, Guangdong, and Guangxi, and each plant would have two kilns. Another Taiwanese cement producer, Asia Cement Corp., also planned to expand its cement production capacity in China to 12 Mt/yr from 10 Mt/yr in 2010. Taiwan's other cement producers also planned to build cement plants in Vietnam (United Daily News, 2009).

### **Mineral Fuels**

**Coal.**—Taiwan had no domestic coal production and depended on imported coal to meet its demand for coal. Taiwan Power Co. was the leading coal consumer followed by the cement and iron and steel sectors. In 2009, Taiwan imported 58.5 Mt of coal, which was a decrease of 8.4% from the amount imported in 2008; of that amount, 52.8 Mt was for power generation. Steam coal was mainly from, in decreasing order of supply, Australia, Indonesia, and China, and coking coal was from Australia and Canada. The island consumed 60.4 Mt of coal in 2009 (Bureau of Energy, 2010a).

**Natural Gas and Petroleum.**—With its limited mineral fuel resources, Taiwan produced only about 1.8% of its natural gas and petroleum requirements and relied on imports—mainly through long-term contracts with Indonesia, Malaysia, and Qatar—to fill the gap. Liquefied natural gas (LNG) imports increased by about 8% per year during the past decade. State-owned Chinese Petroleum Corp. (CPC) was the sole LNG importing company. CPC's Taichung LNG receiving terminal was completed in 2007 and the second receiving terminal was completed in 2009. The LNG from the second receiving terminal would supply the Taoyuan powerplant. Domestic natural gas supply was expected to be depleted in 2012. Owing to an increase in domestic demand, Indonesia's LNG exports to Taiwan were expected to be reduced by 50% after the current contract expires in 2009. In 2009, Taiwan imported a total of 11.9 million liters of LNG from Indonesia, Malaysia, and Qatar, which accounted for 73% of total imports. Taiwan consumed 10.6 million liters of LNG, of which power generation accounted for 87.3%. Taiwan's LNG consumption for power generation was expected to continue to increase to a projected 16.0 Mt in 2015, of which power generation would account for 13.6 Mt (Bureau of Energy, 2010b, p. 27-28).

### **Outlook**

Taiwan's economic growth is heavily dependent on external trade. The slowdown in the economy of the United States and other developed countries in the West is expected to decrease

demand for its exports. Closer trade and investment between Taiwan and China is expected to offset the decline resulting from the economic slowdown in the West. Economic growth in Taiwan is expected to recover slowly during the next 2 years. The service sector accounts for more than 70% of the GDP and, given the island's limited mineral resources, the mining sector is expected to have only a minimal effect on the island's economy in the future. The growth of manufacturing is likely to be led by the computer, electronics components, and telecommunication products sectors. The island relies on imports of raw materials to support its iron and steel and nonferrous metals sectors. The rising prices of these raw materials could affect producers' profit margins, and tightened environmental regulations may force nonferrous metal and steel producers to relocate their production facilities to mineral-rich countries with lower labor costs. The island has been gradually transforming from a labor-intensive manufacturing sector to a knowledge-intensive service sector. The Taiwan authorities continue their effort to promote the island as a green island and to ease restrictions on economic ties with China, primarily in the areas of investment, tourism, trade, and transportation. Such changes would likely stimulate growth in the service sector.

## References Cited

- Bureau of Energy, 2010a, Coal supply and consumption: Taipei, Taiwan, Bureau of Energy, 2 p.
- Bureau of Energy, 2010b, Energy supply and consumption in 98: Taipei, Taiwan, Bureau of Energy, 7 p.
- Bureau of Mines, 2010, Annual statistical report of minerals 2009: Taipei, Taiwan, Bureau of Mines, 1 p.
- China Steel Corp., 2010, 2009 operation report: Kaohsiung, Taiwan, China Steel Corp., 113 p.
- CS Aluminum Corp., 2010, Company profile: CS Aluminum Corp. (Accessed July 7, 2010, at <http://www.csalu.com.tw/c/company.htm>.)
- Directorate General of Budget, Accounting, and Statistics, 2010, Monthly statistics of the Republic of China: Taipei, Taiwan, Statistical Bureau, no. 530, 66 p.
- South East Asia Iron and Steel Institute, 2010, CSC of Taiwan to invest in mining with foreign partnerships: South East Asia Iron and Steel Institute Newsletter, May, p. 7.
- United Daily News, 2009, Taiwan cement market: United Daily News, October 20. (Accessed October 20, 2009, at <http://udn.com/News/Mainland/MAI3/5203545.shtml>.)
- United Daily News, 2010, Yieh United starts steel plant construction in Vietnam: United Daily News, March 22. (Accessed March 22, 2010, at <http://udn.com/News/Finance/FIN1/5489442.shtml>.)
- World Steel Association, 2010, World crude steel output decreases by -8.0% in 2009: Brussels, Belgium, World Steel Association press release, January 22, 6 p.

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

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
<b>METALS</b>						
Iron and steel:						
Pig iron	thousand metric tons	9,854	10,500	10,550	9,750 <sup>r</sup>	7,939
Steel, crude	do.	18,567	19,203	20,883	19,222	15,566
Nickel, refined <sup>c</sup>		11,000	11,000	11,000	11,000	11,000
<b>INDUSTRIAL MINERALS</b>						
Cement, hydraulic	thousand metric tons	19,891	19,294	18,957	17,330	15,918
Fire clay		330	125	1,121 <sup>r</sup>	746 <sup>r</sup>	9
Lime <sup>c</sup>		443,879 <sup>2</sup>	440,000	450,000	450,000	450,000
Mica		8,608	4,841	3,387	3,179	557
Nitrogen, liquid <sup>c</sup>		794,933 <sup>2</sup>	800,000	800,000	800,000	800,000
Silica sand		125,208	91,308	193,135	249,824	328,153
Sodium compounds: <sup>c</sup>						
Caustic soda		570,000	570,000	570,000	570,000	570,000
Soda ash		140,000	140,000	140,000	140,000	140,000
Stone:						
Dolomite	thousand metric tons	174	61	94	104	70
Limestone	do.	252	351	210	227	232
Marble	do. *	24,070	25,493	26,452	25,811	24,146
Serpentine	do.	408	304	280	264	242
Sulfur		267,790	245,789	249,156	211,869	252,392
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Gas, natural:						
Gross	million cubic meters	548	463	417	357	351
Marketed <sup>c</sup>	do.	490	410	380	310	310
Petroleum:						
Crude	thousand 42-gallon barrels	203	148	112	101	101
Refinery products	do.	409,700	421,100	446,800	443,200 <sup>r</sup>	410,000

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>r</sup>Revised. do. Ditto.

<sup>1</sup>Table includes data available through June 10, 2010.

<sup>2</sup>Reported figure.

\*Correction posted on August 11, 2014.

TABLE 2  
TAIWAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity <sup>e</sup>
Cement		Asia Cement Corp.	Hsinchu	1,800
Do.		do.	Hualien	4,020
Do.		Chia Hsin Cement Corp.	Kaohsiung	1,860
Do.		Chien Tai Cement Co. Ltd.	do.	1,720
Do.		Lucky Cement Corp.	Tungao	2,000
Do.		Southeast Cement Corp.	Kaohsiung	1,090
Do.		do.	Chutung	1,400
Do.		Taiwan Cement Corp.	Hualien City	1,600
Do.		do.	Hualian County	5,600
Do.		do.	Suao	3,400
Do.		Universal Cement Corp.	Kaohsiung	1,550
Marble		Taiwan Marble Co., Ltd.	Panchiao	15
Nickel		Taiwan Nickel Refinery	Kaohsiung	14
Petroleum:				
Crude	thousand 42-gallon barrels per year	Chinese Petroleum Corp.	Chuhuangkeng and Tungtzechiao	850
Refinery products	do.	do.	Kaohsiung	570
Do.	do.	do.	Taoyuan	200
Do.	do.	Formosa Plastics Group	Yunlin	450
Steel		An Feng Steel Co. Ltd.	Kaohsiung Hsien	2,000
Do.		China Steel Corp.	Kaohsiung	13,000
Do.		Dragon Steel Corp. (China Steel Corp.)	Taichung Hsien	900
Do.		Tang Eng Stainless Steel Plant	Kaohsiung	300
Do.		Yieh Hsing Enterprise Co. Ltd.	Kaohsiung Hsien	450
Do.		Yieh Phui Enterprise Co. Ltd.	do.	1,300
Do.		Yieh United Steel Co.	do.	1,000
Do.		Feng Hsin Iron and Steel Co. Ltd.	Taichung Hsien	1,200
Sulfur		China Petrochemical Development Corp.	Taipei	280

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto.