



2012 Minerals Yearbook

TAIWAN

THE MINERAL INDUSTRY OF TAIWAN

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Taiwan is an island with few mineral resources. Taiwan's economy was oriented towards exports, and the health of the economy was highly susceptible to conditions in the world markets. In 2012, the global economic conditions remained weak, especially in major industrialized countries in the Western World. Demand for Taiwan's goods from the Asian markets was weaker in 2012 than in 2011; however, these markets still accounted for 65% of Taiwan's total exports. China was the leading destination of Taiwan's goods and received 25.8% of the total value of exports; Hong Kong, 13.0%; the United States, 11.0%; Singapore, 6.7%; and Japan, 6.3%. About 36% of Taiwan's exports were electronic products in 2012, which was a decrease of about 4% from that of 2011. Metal products accounted for 17% of the total value of exports. Domestic demand for goods was flat, and, in response the output of the manufacturing sector decreased by 3.8%. Taiwan's gross domestic product (GDP) increased by 1.3% in 2012 compared with an increase of 4.0% in 2011. The output value of the mining and quarrying sector increased by 10.4% in 2012 but accounted for only a small share of Taiwan's GDP. The service sector grew by a modest 1.0%; however, it accounted for 69.0% of Taiwan's economy. Both Government and private-sector consumption increased by a modest 1.3%, and the spending contributed to growth of 0.84% (Ministry of Economic Affairs, 2013, p. 2; Ministry of Finance, 2013a, b; Taiwan Statistical Bureau, 2013, p. 3, 41).

Minerals in the National Economy

Taiwan's significant identified mineral resources 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 Taiwan's economy, was less than 1% of total industrial production. In 2011, the employment in the mining sector decreased to about 4,000 people (Taiwan Statistical Bureau, 2013, p. 13).

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. In 2012, the production value of the major mineral commodities was \$457 million, of which \$283 million was from natural gas and \$97 million was from marble. Besides natural gas and marble, sulfur was Taiwan'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 2012, the production of natural gas, mica, and sulfur increased significantly, but the output of silica sand decreased sharply (table 1; Taiwan Bureau of Mines, 2013).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Aluminum.—Without any primary aluminum production in Taiwan, aluminum product producers depended on imports of aluminum ingot and scrap to meet their needs. In 2012, Taiwan imported 337,411 metric tons (t) of unwrought aluminum, 430,464 t of aluminum alloys, and 126,851 t of scrap to meet domestic demand. Unwrought aluminum was imported from, in descending order of volume of imports, Australia, Iran, Tajikistan, the United Arab Emirates, Russia, and Bahrain. Aluminum alloy was from the United Arab Emirates, Bahrain, Russia, Australia, and Qatar, and aluminum scrap was from Mexico, Australia, Belgium, Colombia, Israel, the United States, and South Africa. Owing to increased demand for aluminum alloy on the island, CS Aluminum Corp., which was a subsidiary of China Steel Corp. (CSC), expanded its aluminum products output capacity to 167,000 metric tons per year (t/yr) in 2010 from 122,000 t/yr in 1998. The company started the second phase of its aluminum alloy production capacity expansion in 2011. The company's output capacity increased to 173,000 t in 2011. Once the expansion project is completed in 2014, the production capacity would be 319,000 t/yr (CS Aluminum Corp., 2013; Ministry of Finance, 2013b, p. 3-645–3-646).

Copper.—Without any refined copper production, Taiwan relied on imported copper to meet its demand. In 2012, Taiwan imported 435,534 t of refined copper, 458,242 t of copper alloys, and 93,767 t of scrap. Refined copper was mainly from, in descending order of volume of imports, Chile, Japan, Australia, Peru, and the Democratic Republic of the Congo [Congo (Kinshasa)], and copper alloy was from Japan, Russia, the Republic of Korea, and Ukraine. Because of surging demand for copper from the electronics sector, Taiwan's copper consumption was estimated to be about 1 million metric tons (Mt) in 2012 (Ministry of Finance, 2013b, p. 3-635–3-636).

Iron and Steel and Iron Ore.—Taiwan was the fifth-ranked iron and steel producer in Asia behind China, Japan, India, and the Republic of Korea. Owing to the decreased demand for

steel products and the sluggish global steel market, especially in Europe, in 2012, Taiwan's steel producers reduced their steel output in the first half of the year. Taiwan's downstream producers of steel products reduced their new orders, and CSC, which was the only integrated iron and steel producer in Taiwan, decided to halt the production of its plate mill for 20 days for annual maintenance (World Steel Association, 2013).

In 2012, Taiwan imported 18.4 Mt of iron ore, which was a decrease of 10.2% from that of 2011. Iron ore was mainly from Australia, 69.5%; Brazil, 26.6%; and Canada, 3.6%. Without any iron ore resources, CSC imported all its iron ore from overseas markets. During the past several years, the company tried to secure iron ore resources in Australia and other countries. CSC's subsidiary CSC Steel Australia Holding Pty Ltd. invested \$270 million to acquire a 3.68% share in ArcelorMittal Mines Canada's (ArcelorMittal Mines) Labrador Trough iron ore project in Canada. CSC and Pohang Iron and Steel Corp. of the Republic of Korea together held a 15% stake in ArcelorMittal Mines' iron ore project. CSC would receive 1 million metric tons per year (Mt/yr) of iron ore from ArcelorMittal Mines when it starts producing in 2013. This transaction was subject to Government approval in Canada and Taiwan. CSC sought eventually to increase its iron ore self-sufficiency to 15% during the next several years from its current level of 11.6% self-sufficiency (Ministry of Finance, 2013b, p. 3-115; Taiwan Iron and Steel Industries Association, 2013).

CSC invested \$6.7 billion to increase the company's output capacity to 20 Mt/yr in the next several years. The company's subsidiary Dragon Steel Corp. completed the construction of a 2.5-Mt/yr blast furnace in 2010, and the installation of a second 2.5-Mt/yr blast furnace was scheduled to be completed in early 2013. After completing the second phase expansion in 2014, Dragon Steel would have a crude steel output capacity of 6 Mt/yr. CSC and Dragon Steel together would have a total crude steel output capacity of more than 16 Mt/yr (South East Asia Iron and Steel Institute, 2013).

Industrial Minerals

Cement.—Owing to a lack of limestone resources and a limited market on the island, many of Taiwan's cement producers had gradually moved their production bases to China in the late 1990s and expanded their cement output capacities there. Most of Taiwan's cement producers were located in the eastern part of the island, which accounted for more than 80% of Taiwan's total output capacity. In 2012, Taiwan produced less than 16 Mt of cement and consumed about 12 Mt. Taiwan exported 4.8 Mt of cement to, in descending order of volume, Ghana, Malaysia, Indonesia, Mauritius, and Australia. Taiwan's cement consumption had decreased gradually to about 12 Mt in recent years from 28 Mt in the 1990s, and cement exports had increased. The Taiwan authorities planned to cap cement exports at 30% of the total output by 2015 to encourage cement producers to phase out old, inefficient plants (Ministry of Finance, 2013a, p. 3-121; Taiwan Cement Corp., 2013, p. 40).

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 2012, Taiwan imported 64.6 Mt of coal, which was a decrease of 3.0% from the amount imported in 2011; of that amount, 46.7 Mt was for power generation and 8.1 Mt was for iron and steel production. Thermal coal was imported mainly from, in descending order of volume, Australia, Indonesia, South Africa, Russia, and China. Taiwan consumed 64.1 Mt of coal in 2012 (Taiwan Bureau of Energy, 2013a).

Natural Gas and Petroleum.—With its limited mineral fuel resources, Taiwan produced only about 0.02% of its petroleum requirements and relied on imports to meet the remaining demand—mainly through long-term contracts with, in descending order of supply, Saudi Arabia, Kuwait, Angola, Oman, the United Arab Emirates, and Iran. The island produced about 6.7% of its liquefied natural gas (LNG) in 2012. Taiwan imported a total of 16.7 billion cubic meters of LNG from, in descending order of volume of imports, Qatar, Malaysia, and Indonesia, which accounted for 76% of the island's total LNG imports. Taiwan consumed 15.3 billion cubic meters of LNG, of which power generation accounted for 84.3% (Taiwan Bureau of Energy, 2013b).

Outlook

Taiwan's economic growth is heavily dependent on external trade. The slow economic recovery in the United States and other developed countries is expected to affect its exports. Trade and investments between Taiwan and China are expected to continue to increase in the years to come. Economic growth in Taiwan is expected to increase slowly during the next 2 years and to be more dependent on the economic growth in the Asia and the Pacific region. The service sector accounts for more than 70% of the GDP and, given Taiwan's limited mineral resources, the mining sector is expected to have only a minimal effect on its economy in the future. The growth of the manufacturing sector is likely to be led by the computer, electronics components, and telecommunication products sectors. Taiwan 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. Taiwan's economy has gradually been transforming from one that is led by a labor-intensive manufacturing sector to one that is led by a knowledge-intensive service sector. Taiwan authorities continue their efforts to promote Taiwan 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.

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TABLE 1
TAIWAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity		2008	2009	2010	2011	2012
METALS						
Iron and steel:						
Pig iron	thousand metric tons	9,750	7,939	9,358	12,940	11,800
Steel, crude	do.	19,222	15,566	20,498	22,879	21,083
Nickel, refined ^c		11,000	11,000	11,000	11,000	11,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	17,330	15,918	16,301	16,852	15,806
Fire clay		746	9	--	--	--
Lime ^c		450,000	450,000	460,000	460,000	450,000
Mica		3,179	557	--	1,455	6,844
Nitrogen, liquid		414,000 ^r	346,000 ^r	334,000 ^r	328,000 ^r	316,000
Silica sand		249,824	328,153	305,882	173,354	58,157
Sodium compounds, caustic soda		1,808,174 ^r	1,662,793 ^r	1,782,680 ^r	1,693,241 ^r	1,727,597
Stone:						
Dolomite	thousand metric tons	104	70	117	67	47
Limestone	do.	227	232	45	7	6
Marble	do.	25,811	24,146	25,118	24,351	22,524
Serpentine	do.	264	242	97	64	53
Sulfur		211,869	252,392	231,700	219,975	231,296
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural:						
Gross	million cubic meters	357	351	290	330	442
Marketed ^c	do.	310	310	250	280	390
Petroleum:						
Crude	thousand 42-gallon barrels	101	101	91	71	72
Refinery products	do.	443,200	410,000	445,000	405,000	425,000

^cEstimated; estimated data are rounded to no more than three significant digits. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through July 18, 2013.

TABLE 2
TAIWAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity ^c	
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	1,600	
Do.	do.	Hualien Hsien	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	2,000
Do.		China Steel Corp.	do.	9,900
Do.		Dragon Steel Corp. (China Steel Corp.)	Taichung	3,500
Do.		Hai Kwang Enterprise Corp	Kaohsiung	600
Do.		Tang Eng Stainless Steel Plant	do.	300
Do.		Yieh Hsing Enterprise Co. Ltd.	do.	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.	do.	1,200
Sulfur		China Petrochemical Development Corp.	Taipei	280

^cEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto.