

THE MINERAL INDUSTRY OF

TAIWAN

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After a year of economic downturns, Taiwan's economy steadily returned to a positive growth in 2002. The island's gross domestic product posted a gain of 3.54% to NT\$9.73 trillion (\$282 billion). Much of the recovery was based on the increase of exports and the expansion in manufacturing especially in electronics and information technology products. Information technology products increased by 11.4%; the metal sector, by 10.3%, machinery, by 5.8%; and chemicals, by 4.4%. The construction sector declined by 2.9%. Owing to the uncertainty of global and domestic economic recovery, private investment increased only moderately by 1.6%. The government investment and spending decreased by 10.9% and 0.9%, respectively, compared with those of 2001. In response to the slow growth in domestic demand and the ongoing enterprises' structural transition, the unemployment rate hit its highest point in 3 decades—5.2% (Ministry of Economic Affairs, 2003).

In 2001, the Taiwan authorities (the State Department) released a comprehensive 6-year national development plan in an effort to transform Taiwan into a "green silicon island." The total cost for the development plan was estimated to be \$77 billion; the Taiwan authorities would invest \$50 billion, and private investors, \$27 billion. The Industrial Development Bureau (IDB) identified biotechnology, industrial design, color image display equipment, nanotechnology, and precision and semiconductor-manufacturing equipment as being the types of emerging industries that Taiwan should consider developing in the near future. According to the IDB survey, only 25.3% of manufacturing products in 1992 was generated by highly skilled technical workers; by 2001, however, this figure had increased to 48.1%. The Council for Economic Planning and Development estimated that Taiwan would face a shortage of 200,000 highly skilled technical workers in the high-tech sector between 2001 and 2011. The traditional manufacturing sector was expected to have surplus workers because many companies relocated their production facilities to China and Southeast Asian countries to reduce production costs (Taipei Journal, 2002a; Taiwan Headlines, 2002d¹).

The Legislative Yuan passed the Financial Institution Merger Law and Financial Holding Company Law in 2001 to allow financial institutions to have flexibility to merge and to provide a wider range of financial services. It also passed the Financial Assets Securitization Statute in 2002. These new laws allowed companies greater flexibility in raising capital, strengthened shareholder protection, and encouraged business consolidations. In 2002, the Taiwan authorities used about \$4 billion of the financial restructuring fund to restructure 44 problematic financial institutions and established 16 asset management companies to assist the authorities in dealing with nonperforming loans and to restore the health of the troubled banking sector. Domestic banks wrote off a total of \$11.9 billion bad loans and sold \$3.3 billion of nonperforming loans to asset management companies in 2002 (Taiwan Headlines, 2003e§).

The Taiwan authorities planned to lift the bans on investments by foreign and overseas Chinese enterprises in such sectors as domestic transportation, financial services, insurances, power generating and distribution, and real estate in June 2003. The Ministry of Finance (MOF) submitted a tax reform proposal to the Legislative Yuan to eliminate the 10% tax on companies' undistributed earnings and to increase the business income tax to 30% from the current 25%. The MOF also proposed adding a minimum 5% business tax rate for all companies, which included those with total tax exemptions (Taiwan Headlines, 2002b§).

In 2002, the Taiwan authorities introduced a new pollution control tax on 126 chemicals produced in or imported into the island. The tax rate ranged from \$0.35 to \$3.05 per metric ton. Arsenic, lead, mercury, and cyanide were at the highest tax rates. The tax will be used for cleaning up polluted water and soil. The chemical producers in the island strongly opposed the new tax; the Environmental Protection Administration's survey, however, indicated that the petrochemical and refining sectors were responsible for a majority of the pollution cases. Industrial analysts believed that the new tax will add less than 1% to product costs. The new tax will have a greater impact on such large producers as Chinese Petrochemical Corp. (CPC) and Formosa Petrochemical Co. Producers that invest in equipment for pollution control or prevention are entitled to a maximum 20% rebate on their total tax income or their total investment. Producers are required to pay the tax in full initially and will be refunded the rebates at a later date (Asian Chemical News, 2002). To reduce pollution, the Taiwan authorities banned the use of plastic bags and polystyrene foam containers beginning in July 2002. The Taiwan Plastics Industry Association believed that the ban would harm Taiwanese polystyrene producers and would force them to relocate their production plants to China (Chemical and Engineering News, 2002).

After 12 years of negotiations, Taiwan was granted approval to join the World Trade Organization in November 2001 and became a member in January 2002. A bill to establish free trade zones was submitted by the authorities to the Legislative Yuan for approval in late 2002. Free trade zones will be set up near international airports and harbors. Commodities shipped into and circulated within zones will be exempt from tariffs and commodity and business taxes. Businesses in the zones will be fully autonomous. Products, however, will be subject to taxation if sold on the domestic market (Taipei Journal, 2002b). In 2002, Taiwan's total trade increased by 0.3% to \$243.6 billion. Values of exports and imports increased to \$130.7 billion and \$112.9 billion, respectively. Because of the economic slowdown, the value of mineral imports increased by 1.6% to \$12.7 billion, but the value of mineral exports increased by

¹References that include a section mark (§) are found in the Internet References Cited section.

21.0% to \$2.3 billion. Crude oil remained the leading imported commodity by value, followed by coal, natural gas, iron ore, marble, and kaolin (Ministry of Finance, 2002a, b).

In 2002, the Investment Commission of the Ministry of Economic Affairs (MDEA) approved \$3.85 billion for Taiwanese companies to invest in China; this amount accounted for 53.3% of the total investment funds. Most of the investments were concentrated in the coastal Provinces of Fujian, Guangdong, and Jiangsu. Base metals, chemicals, electronics manufacturing, precision machinery, and plastics were the top sectors. China Steel Aluminum Corp. (CS Aluminum) [a subsidiary of state-owned China Steel Corp. (CSC)] and a British Virgin Islands-registered company Steel United International, in which CS Aluminum held 14%, invested \$50 million to build a 35,000-metric-ton-per-year (t/yr) aluminum fabrication plant (Ningbo Huayang Aluminum Co. Ltd.) in Ningbo City, Zhejiang Province, China. The construction started in November 2002 and was expected to be completed by yearend 2003. CS Aluminum planned to expand its output capacity to 170,000 t/yr from 110,000 t/yr by renovating its aluminum alloy plant in Kaohsiung (Metal Bulletin, 2002b; China Scrap, 2002§). Without any primary aluminum production in the island, imports of aluminum ingot were expected to increase in the near future. In 2002, Taiwan imported 179,642 metric tons (t) of aluminum ingot; of that total, 75,844 t came from China; 48,363 t, from South Africa; 20,600 t, from India; and 17,026 t from Russia (Ministry of Finance, 2002b, p. 591).

A secondary aluminum producer Chen Jung Metals Co. maintained the output level at about 36,000 t/yr at its aluminum alloy plant in Kaohsiung. The plant had a design output capacity of 42,000 t/yr. The company exported about 50% of its output mainly to China and Japan. Aluminum scrap was imported from Europe and the United States. The company planned to build an alloy plant in Nanhai, Guangdong Province, China (Metal Bulletin, 2002c).

Owing to an increased demand for the construction sector in 2002, the production of cement increased slightly, and the cement price also increased. The Board of Directors of the Universal Cement Corp. approved the construction of a cement plant in Huizhou, Guangdong Province, China. The proposed cement plant will produce 1 million metric tons per year (Mt/yr), and its cost was estimated to be \$58 million (International Cement Review, 2003).

Taiwan's iron and steel sector faced difficulties in 2002. The U.S. Trade Representative imposed extra duty rates that ranged from 8% to 30% on imported steel products from Taiwan, and the import quota was initially set at 5.4 million metric tons (Mt). After appeal, the tariff rate was reduced to 24% from 30%, and the import quota increased to 5.9 Mt. China also imposed extra duty rates of 7% to 26% on nine steel products for alleged dumping in the Chinese market and restricted the volume of stainless steel products entering the Chinese market. Taiwan's steel producers believed that the dumping charge was unfair because approximately 80% of the steel products exported from the island to China were used in products for re-export. The reduction of Taiwan's exports of steel products to China had forced some Taiwanese steel producers in China to import semimanufactured steel products from Russia and Ukraine. The intent for imposing an import quota on Taiwan's steel products was to encourage Taiwanese steel producers to source China's semimanufacturing steel products; most of steel products produced in China, however, did not meet international standards (Metal Bulletin 2002a; Taipei Times, 2002§; Taiwan Headlines, 2002a§).

The debt-ridden state-owned steel company Tang Eng Iron Works Co., which was the oldest stainless steel plant in Taiwan, was forced to shut down permanently in 2002. The 61-year-old plant was among the more than 10 state-owned enterprises to be privatized since 1985. The Taiwan authorities and Tang Eng had difficulty implementing the privatization scheme. Tang Eng had an output capacity of 300,000 t/yr. Initially, the Tang Eng workers union hoped that CSC would take over the production facilities; that negotiation, however, broke down. Under the final agreement between the MDEA and Tang Eng, Tang Eng's various divisions became an individual corporate entity. The carbon and foundry facilities were acquired by Qin Yang Industrial Co. Although the carbon steel plant was shut down in early 2002, the production may be resumed after technical renovation. The machinery division was sold to an engineering company. The rolling plant was acquired by a Taiwanese-Japanese joint venture. The profitable stainless steel plant was allowed to stay in operation, but a buyer must be found by 2003 (Metal Bulletin, 2002d).

The Formosa Plastic Group (FPG) considered investing \$5 billion with China's Qingdao Iron and Steel Co. to build a 10-Mt/yr iron and steel plant in Qingdao, Shandong Province, China. FPG evaluated such a project to secure a supply of steel products for its Formosa Automobile Corp., which planned to expand its product line in China. The project would be divided into three phases and would take 10 years to be completed (Taiwan Headlines, 2003d§).

The Yieh Group merged its two subsidiaries, Yieh Phui Enterprise Co. Ltd. and Yieh United Steel Co. (Yusco), into one company, Yieh United Steel Corp. The reason for the consolidation was to reduce competition for raw materials and production costs. Yusco was the largest stainless steel producer in Taiwan and produced 1 Mt/y of stainless steel products. Yieh Phui faced financial loss in the past several years and closed down several of its production facilities. Both companies planned to build steel plants in China. Yieh Phui planned to construct two hot-dip galvanized lines in Changzhou, Jiangsu Province, China. The two lines will have a combined capacity of 600,000 t/yr of steel products and will cost about \$100 million. Yusco planned to invest \$120 million to build a 300,000-t/y stainless steel plant in Huangpu, Guangdong Province, China. Both projects were waiting for the approval of the Taiwan authorities (Metal Bulletin, 2002e; Steel Statistics Monthly, 2003).

CSC, which was the largest steel producer on the island, produced 10.4 Mt of steel products in 2002; this was an increase of 9.9% compared with that of 2001. About 70% of its output was sold in the domestic market. At yearend, prices of steel products in the domestic market increased by 30% compared with those of early 2002. Domestic downstream users urged CSC to reduce the domestic sale prices and to decrease the export volume on steel products that were used to produce fittings, nuts, and pipes. CSC agreed to reduce the ratio of export steel products to 25%, but did not reduce sale prices because it would be against the global market mechanism. CSC considered building a cold-rolled mill in Hainan Province, China (Taiwan Headlines, 2003a§).

CSC submitted a revised plan to the Taiwan authorities that proposed selling from 5% to 10% of its shares to foreign steel producers, 10% to local banks, and 10% CSC to employees; the Taiwan authorities would retain 40% of the total shares. Foreign steel

producers from Japan and the Republic of Korea would likely subscribe CSC shares through stock swaps (Southeast Asia Iron and Steel Institute Newsletter, 2002).

After 90 years, Taiwan's first salt producer, Taiwan Salt Industry Corp. (Taisalt), closed down its final solar evaporation salt field; the Chiku field was located in the Annan region of Tainan. The land area will become the Tainan Science-Based Industrial Park and the Szetsao Wild Animal Protection Park. For years, the company had been losing money on solar production of industrial salt. Taisalt will import industrial salt and will maintain the production of table salt through electro dialysis (Taipei Journal, 2003).

CPC's overseas affiliate, Oversea Petroleum and Investment Corp. and the China National Offshore Oil Corp. formed a joint-venture company, Tainan-Chaoshan Petroleum Co., which was registered in the Virgin Islands; it had initial capital of \$50 million. The joint venture will explore for oil in an area that covers 15,400 square kilometers in the southern part of Taiwan Strait. Both sides will share the operating costs and the exploration results equally. The initial study indicated that seven locations had potential oil resources (Taiwan Headlines, 2003b§).

CPC planned to invest \$574 million to establish a 1.68-Mt/yr liquefied natural gas (LNG) receiving terminal at Taichung Harbor in central Taiwan. Imported LNG will be supplied to the Ta-Tan thermal powerplant, which was under construction in Taoyuan County. The \$3.5 billion powerplant will consume about 1.3 Mt/yr of LNG. Tung Ting Gas Corp., along with a consortium group formed by Asia Cement Corp. and Royal Dutch/Shell Corp. of the Netherlands, also competed with CPC for the supply contract. The group planned to build an LNG receiving terminal in Taoyuan County in the vicinity of the Ta-Tan powerplant. CPC had a LNG receiving terminal at Yungan, Kaohsiung County. The Taiwan authorities planned to increase LNG consumption to about 19.8 billion cubic meters by 2010 (Taiwan Headlines, 2003c§).

The malfunction of the sulfur-removing equipment caused a serious explosion in CPC's Taoyuan refinery. Although no casualties were reported, residents near the refinery complained that this was the 17th industrial accident at the refinery, which also had been the main source of pollution in Taoyuan. Because of public safety concerns, residents and legislators demanded that the MOEA and CPC relocate the refinery. After several serious discussions, MOEA and CPC agreed to have a refinery relocation plan within 1 year that would outline the timetable and where the refinery would be moved. The estimated cost for the relocation of the refinery was \$5.76 billion and would affect the oil supply in northern Taiwan. It would have a negative impact on domestic and foreign investment (Taiwan Headlines, 2003f§).

References Cited

- Asian Chemical News, 2002, Taiwan pollution tax opposed: Asian Chemical News, v. 8, no. 358, p. 9.
Chemical and Engineering News, 2002, Taiwan's approach to the litter problem: Chemical and Engineering News, v. 80, no. 30, July 29, p. 19.
International Cement Review, 2003, Universal new plant: International Cement Review, issue 60, April, p. 3.
Metal Bulletin, 2002a, Chinese stainless quota hits Taiwanese: Metal Bulletin, no. 8724, November 14, p. 17.
Metal Bulletin, 2002b, CS Aluminium to up capacity: Metal Bulletin, no. 8697, August 8, p. 6.
Metal Bulletin, 2002c, Taiwanese Al alloy producer keeps output stable for 2002: Metal Bulletin, no. 8713, October 7, p. 25.
Metal Bulletin, 2002d, Tang Eng gets last minute reprieve: Metal Bulletin, no. 8704, September 5, p. 16.
Metal Bulletin, 2002e, Yieh United approves new stainless mill in China: Metal Bulletin, no. 8687, July 1, p. 24.
Ministry of Economic Affairs, 2003, [Untitled]: Monthly Bulletin of Statistics, April, p. 22.
Ministry of Finance, 2002a, Monthly statistics of exports: Ministry of Finance, Directorate General of Customs, Statistical Department, December, variously paginated.
Ministry of Finance, 2002b, Monthly statistics of imports: Ministry of Finance, Directorate General of Customs, Statistical Department, December, variously paginated.
Southeast Asia Iron and Steel Institute Newsletter, 2002, China Steel active on share-sale proposal: Southeast Asia Iron and Steel Institute Newsletter, December, p. 9.
Steel Statistics Monthly, 2003, Yieh United Group merges two subsidiaries: Steel Statistics Monthly, April, p. 40.
Taipei Journal, 2002a, Biotech competitiveness hinges on talent pool: Taipei Journal, November 8, p. 8.
Taipei Journal, 2002b, Taiwan to set up free-trade zone: Taipei Journal, October 11, p. 3.
Taipei Journal, 2003, Former salt monopoly thrives by diversifying: Taipei Journal, January 24, p. 8.

Internet References Cited

- China Scrap, 2002, CS Aluminum invests \$50 million to build a aluminum plant in Ningbo, November 15, 2002, accessed April 21, 2003 at URL <http://chinascrap.com/news/shownews.php?id=252>.
Taipei Times, 2002 (March 12), US steel tariffs should give Asia reason to pause, accessed July 22, 2002, at URL <http://www.taipetimes.com/news/archives/2001/11/16/story/0000111867>.
Taiwan Headlines, 2002a (September 30), CEPD plans higher public investment in three science park areas, accessed September 30, 2002, at URL <http://www.taiwanheadlines.gov.tw/20020930/20020930b4.html>.
Taiwan Headlines, 2002b (October 30), MOF to present tax reform proposals, accessed October 30, 2002, at URL <http://www.taiwanheadlines.gov.tw/20021030/20021030b2.html>.
Taiwan Headlines, 2002c (November 20), Steel group to evaluate impact of China quota system, accessed November 20, 2002, at URL <http://taiwanheadlines.gov.tw/20021120/20021120b5.html>.
Taiwan Headlines, 2003a (March 13), China Steel moving to increase domestic supply, accessed March 13, 2003, at <http://taiwanheadlines.gov.tw/20030313/20030313b4.html>.
Taiwan Headlines, 2003b (February 26), CPC and mainland company set to jointly tap undersea oil, accessed February 26, 2003, at <http://taiwanheadlines.gov.tw/20030226/20030226b3.html>.
Taiwan Headlines, 2003d (March 17), FPG to build steel plant in Qingdao, accessed March 17, 2003, at URL <http://taiwanheadlines.gov.tw/20030317/20030317b4.html>.
Taiwan Headlines, 2003e (February 19), Government to push banks to accelerate bad-debt write offs, accessed February 19, 2003, at URL <http://taiwanheadlines.gov.tw/20030219/20030219b2.html>.
Taiwan Headlines, 2003f (March 27), CPC to set up LNG/LPG terminal at Taichung Harbor, accessed March 27, 2003, at <http://taiwanheadlines.gov.tw/20030327/20030327b1.html>.

Taiwan Headlines, 2003f, (February 11), MOEA agrees to relocate Taoyuan oil refinery, accessed February 11, 2003, at <http://taiwanheadlines.gov.tw/20030211/20030211b1.html>.

Major Sources of Information

Mining Department, Ministry of Economic Affairs

15 Foochow Street

Taipei, Taiwan

Bureau of Mines

2 Chenkiang Street

Taipei, Taiwan

Major Publications

Council for Economic Planning and Development, Taipei: Industry of Free China, monthly.

Ministry of Economic Affairs, Department of Statistics, Taipei: Industrial Production Statistics, monthly.

Ministry of Finance, Department of Statistics, Taipei: Monthly Statistics of Exports and Imports.

Taiwan Provincial Bureau of Mines, Taipei: Reconstruction Statistics of Taiwan Province, Part III, The Mining and Quarrying Annual.

TABLE 1
TAIWAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity		1998	1999	2000	2001	2002
METALS						
Gold, primary	kilograms	9	13	9	2	--
Iron and steel, metal:						
Pig iron	thousand tons	9,374	9,020	9,971 ^r	10,316 ^r	10,524
Ferroalloys:						
Ferromanganese		12,532	--	--	--	--
Ferosilicon		3,775	3,212	2,975	1,181	--
Steel, crude	thousand tons	17,192	16,027	17,302	17,336	18,255
Nickel, refined ^c		9,700	10,000	10,000	11,000	11,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	19,652	18,283	17,572	18,128	19,363
Feldspar		--	171	409	147	--
Fire clay		2,967	3,703	3,666	5,641	2,083
Gypsum, precipitated		2,221	1,747	1,884	1,006	--
Lime ^c		800,000	800,000	800,000	800,000	800,000
Mica		7,750	6,966	6,862	9,733	6,595
Nitrogen, N content of ammonia		231,419	146,228	11,004	11,870 ^r	11,050
Salt, marine		7,425	76,916	69,521	66,150	56,720
Sodium compounds, n.e.s.:						
Caustic soda		230,620	329,640	426,040 ^r	466,630 ^r	508,760
Soda ash ^c		126,000	140,000	140,000	140,000	140,000
Stone:						
Dolomite	thousand tons	181	201	119	71	55
Limestone	do.	2,927	2,819	3,505	4,901	3,677
Marble	do.	17,519	17,755	17,831	20,475	23,736
Serpentine	do.	421	358	395	276	268
Sulfur		184,324	194,812	205,588	223,659	212,343
Talc		73	201	--	130	27
MINERAL FUELS AND RELATED MATERIALS						
Carbon black ^c		100,000	100,000	100,000	100,000	100,000
Coal, bituminous		79,310	91,673	83,380	--	--
Gas, natural:						
Gross	million cubic meters	870	848	742	849	887
Marketed ^c	do.	790	780	670	780	785
Petroleum:						
Crude	thousand 42-gallon barrels	340	296	234	279	321
Refinery products ^c	do.	227,000	230,000	240,000	250,000	260,000

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

¹Includes data available through July 30, 2003.

TABLE 2
TAIWAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2002

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity ^e	
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.	Kaohsiung	1,720	
Do.	Lucky Cement Corp.	Tungao	2,000	
Do.	Southeast Cement Corp.	Kaohsiung	1,090	
Do.	Taiwan Cement Corp.	Chutung	1,400	
Do.	do.	Hualien	1,580	
Do.	do.	Judung	1,220	
Do.	do.	Suao	3,400	
Do.	Universal Cement Corp.	Kaohsiung	1,550	
Marble	Taiwan Marble Co., Ltd.	Panchiao	10	
Nickel	Taiwan Nickel Refinery	Kaohsiung	14	
Petroleum:				
Crude	thousand barrels per year	Chinese Petroleum Corp.	Chuhuangkeng and Tungtzechiao	850
Refinery products	thousand barrels per day	do.	Kaohsiung	570
Do.	do.	do.	Taoyuan	200
Do.	do.	Formosa Plastics Group	Yunlin	450
Steel		China Steel Corp.	Kaohsiung	13,000
Do.		Feng Hsin Iron and Steel Co. Ltd.	Taichung Hsien	1,000
Do.		Yieh United Steel Co.	do.	1,000
Sulfur		China Petrochemical Development Corp.	Taipei	50
Titanium dioxide		DuPont Far East Co. Ltd.	Guanyin	100

^eEstimated.