THE MINERAL INDUSTRY OF

TAIWAN

By Pui-Kwan Tse

For the past three decades, Taiwan has enjoyed the kind of growth that many countries envied, especially when most East Asian and Southeast Asian countries have experienced economic downturns. In 2001, weakening global demand for electronic products in the United States and Europe, which accounted for more than 30% of Taiwan's exports, had a major impact on the island's economy. In 2001, the gross domestic product (GDP) declined by 1.9% against the original forecast of 4% growth at the beginning of the year. Unemployment reached a historic high of 5.3% during the year. Overdue loan ratio had risen to 7.44% of the total loans in June. The Finance Ministry planned to consolidate weak financial institutions into large, stable banks through mergers or acquisitions. To reduce production costs, many of Taiwan's manufacturing producers, such as steel, shipbuilding, and textiles, moved their production to mainland China, taking advantage of its large market. Declining consumer confidence along with the stock market, private consumption, and fixed investment all contracted in 2001 (Financial Times, 2001; Taipei Journal 2001d; Far Eastern Economic Review, 2002).

The Taiwan authorities 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 $75 billion, of which $3.4 billion would be spent in public infrastructure projects in the next 3 years and would create 200,000 jobs. A new international airport will be built in central Taiwan, and an islandwide highway networks will be completed. The government will increase the research and development expenditures to 3% of the GDP. Facing competition from cheap labor in China and Southeast Asian countries, the manufacturing sector on the island needed to develop high-value products to survive. The government and the private sector will raise capital funds jointly for the new industries, such as semiconductor, image processing and display, digital related, and biotechnology. The Executive Yuan will invest up to 30% of its $3.0 billion development fund. The government will promote the development of the tourism, leisure, and entertainment industries as well as community services to create job opportunities. The most important one is the cultivation of talent (people) for the "electronic generation" by the establishment of a comprehensive life-long learning system to meet the future challenges of globalization and internationalization (Government Information Office, 2002).

The Legislative Yuan passed a revision of the Business Tax Law in 2001. The new law allowed a company greater flexibility in raising capital, strengthened shareholder protection, and encouraged business consolidations. Under the revised law, costs involving business consolidation can be offset for a period of 5 years (Taipei Journal, 2001a). The Legislative Yuan also passed the Financial Holding Company Law, which was implemented on November 1. The law allowed the financial institutions to diversify their services and to enable financial companies to survive the fierce competition following Taiwan's joining the World Trade Organization (WTO). Foreign financial institutions were allowed to conduct their operations on limited basis; however, after the island's accession to the WTO, foreign institutions would be allowed to operate fully, such as raising capital by listing shares on local stock exchange. Under the law, companies must have a minimum capitalization of $580 million and engage in at least two kinds of financial services such as banking, insurance, and venture capital. Also, financial institutions with assets valued at more than $8.7 billion must transform themselves into holding companies. In addition, the Government will provide tax incentives to encourage companies to form conglomerates (Taipei Journal, 2001c).

The Taiwan authorities submitted the revised environmental bill to the Legislature for approval in 2001. The first draft of the bill was submitted in 1988. The revised bill included the notion of protecting Taiwan's ecology and sustainable development. The bill is intended to provide the guidelines, policies, and principles of Taiwan's environmental beliefs (Taipei Journal, 2001b). Taiwan's Environmental Protection Agency (EPA) closed down 68 illegal smelting plants along the Erjen River, which runs through Tainan County and Tainan City. In the past 20 years, the river had been the disposal site for many secondary metal producers. The content of such metals as aluminum, copper, and lead in samples collected from the river exceeded the national standard. The amount of contaminated metal in some samples was a thousand times more than the acceptable level. More than 1,000 unemployed workers and plant owners petitioned the Legislative Yuan for compensation because the EPA demolished their plants (Taiwan Headlines, 2001b§[1]).

After 12 years of negotiations, Taiwan was granted approval to join the WTO in November 2001. The import duty on 465 items in 8 categories—construction equipment, farm machinery, furniture, liquors, medical equipment, paper products, pharmaceuticals, and toys—will be phased out to zero in the 30 months after accession. The tariffs on steel products will also be removed in 2005. Removing tariff barriers to open Taiwan's market to foreign products may cause temporary pain through a drop in government revenues and job losses in the agricultural sector for the island. Export-oriented industries, such as electronics, machinery, and textiles, will profit by gaining wider access to the global market. In 2001, Taiwan's total trade decreased by 8.5% to $226.6 billion. The value of exports and imports declined to $119.9 billion and $106.7 billion, respectively. Because of the economic slowdown, the value of mineral imports decreased by 9.1% to $12.5 billion, but the value of mineral exports increased by 9.4% to $1.9 billion.

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

Crude oil remained the leading imported commodity by value, followed by coal, natural gas, iron ore, marble, and kaolin (Ministry of Finance, 2001a, b).

China Steel Aluminum Corp. (CS Aluminum) [a subsidiary of China Steel Corp. (CSC)] and the British Virgin Islands-registered company Steel United International, in which CS Aluminum held 14%, planned to invest $37 million in an aluminum fabrication plant in Zhejiang Province, China. CS Aluminum will contribute about one-half the production facilities for the plant. A newly upgraded cold rolling mill will be transferred to the new plant. CS Aluminum produced about 110,000 metric tons per year (t/yr) of aluminum alloy from imported ingots, mainly from Australia and China (Metal Bulletin, 2001g, 2002c).

Owing to the slowdown in the construction sector, the demand for cement remained sluggish. Domestic cement output declined to 18.1 million metric tons (Mt) in 2001 from 24.7 Mt in 1993. Cement producers relocated their plants to the east coast because limestone mining rights on the west coast expired. Taiwan Cement Corp. shut down its Kaohsiung plant that led Asia Cement Corp., accounting for a 30% market share, to become the largest cement producer in Taiwan. According to the Taiwan Cement Association, the total cement output capacity was 24.4 Mt (6 Mt on the west coast and 18.4 Mt on the east coast) at yearend 2001. The Association estimated that domestic demand for cement for the next 3 years would remain at the level of 20 Mt/yr (Economic Daily News, 2001, p. 406).

Taiwan's steel producers believed that overseas expansion would be the future of the sector, which had used almost all available land space on the island and would have difficulties in finding space in the island for expansion. Many steel producers targeted the Chinese market in a bid to improve their profitability. The Chinese market is very large, but under the current regulations, companies from Taiwan have only been able to sell products indirectly through a third party. Many of Taiwan's companies set up overseas companies in Hong Kong and Singapore. Through these companies, Taiwanese companies established sole or joint-venture plants in China. Taiwan's Kao Hsing Chang Iron and Steel Corp., a cold roller and pipemaking company, formed a joint venture, China Oil Pipe Co., with China's largest state-owned oil company, China National Petroleum Corp. Kao Hsing Chang held 97% shares of the registered $20 million joint venture. Initially, the joint venture planned to build a 150,000-t/yr pipe mill in Zhangjiagang, Jiangsu Province, China, to produce welded pipe up to 60 inches in diameter at yearend 2002. The welded pipe will be supplied to the west to east pipeline project in China. Kao Hsing Chang planned to relocate its existing pipemaking facilities in Taiwan to the new site (Metal Bulletin, 2001c, 2002a).

Yieh Phui Enterprise Ltd. (a subsidiary of Yieh Group) planned to construct two hot-dip galvanized lines in Changzhou, Jiangsu Province. The two lines will have a combined capacity of 600,000 t/yr of steel products and will cost about $100 million. Yieh Phui had established two service companies, Changzhou Qiyang Building Materials Co. and Jiangsu Jieyang Engineering Co., in Changzhou to serve the computer, construction, and building industries in China. Galvanized sheets were supplied from its operations in Taiwan. Another of Taiwan's galvanized producers, Sheng Yu Steel Co., also planned to invest $100 million to construct a coated sheet mill in Bo Sea area, China. The construction was scheduled to begin in early 2002. The first phase was designed to produce 150,000 t/yr of coated sheet and would be completed in 20 months. Yieh United Steel Corp. (a subsidiary of Yieh Group) intended to invest $90 million to build a stainless steel cold-rolling mill in Shanghai (Metal Bulletin, 2001e, f).

In 2001, Taiwan's steel producers faced a big challenge to maintain competitiveness and the balance of their capital funds. Yieh Loong Enterprise Co. Ltd. (a joint venture between China Steel Corp. and Yieh Group) defaulted on interest payments on loans to its creditors. Yieh Loong reduced its slab imports from Japan and coil production because of reduced domestic orders. Its stainless steel sister company Yieh Hsing Enterprise Co. Ltd. restructured by layoffs and cut operation costs. Yieh Hsing shut down its cold-rolling and stainless steel production facilities in the second half of 2001 (Metal Bulletin, 2001d, h, 2002b).

Taiwan's only integrated steel producer, China Steel Corp., in which the government held a 40% share, underwent a series of cost-cutting measures following a downturn in demand for its products. The company planned to reduce its workforce to 7,500 from 8,600 in the next 4 years and diversified its investment into other sectors. The company invested $5.3 million in two biotechnology companies in Tainan. China Steel also considered building a 100,000-t/yr magnesium plant in Qinghai Province, China, to serve the automotive and computer industries in China. Officials from China Steel also discussed the potential of forming strategic alliances with Shanghai Baosteel Group Co. of China and Japan's NKK Corp. and Nippon Steel. The corporation also intended to restart the feasibility study on the construction of a 7.5-Mt/yr integrated plant, Taiwan Steel Corp., in Taiwan. SMS Demag was awarded a contract to supply a new cold-rolling mill to China Steel. The mill will have output capacity of 200,000 t/yr of silicon steel strip and is scheduled to be completed in 2003 (Metal Bulletin, 2001a, b).

Taiwan has very limited energy resources and relies on imports for most of its needs. The construction of the fourth nuclear powerplant project was put on hold in late 2000 because of the change of administration in the island and objections from environmental groups that cited the risk of radiation leakage and issues on handling nuclear wastes. Nearly one-half of Taiwan's power demand was in the northern part of the island, and only one-quarter of the electricity was generated there. The Taiwan authorities decided to invest $28 billion to construct the Kuantang industrial zone and Kuantang industrial harbor in Taoyuan County to handle 7 Mt/yr of imported liquefied natural gas (LNG). The LNG will be supplied to privately run powerplants in Changsheng, Hsintao, Kuokuang, and Tatan to generate about 5,980 megawatts of power for the northern part of the island (Taiwan Headlines, 2001a§).

Chinese Petroleum Corp. (CPC) was the dominant player in all upstream and downstream petroleum activities. Formosa Petrochemical Corp. (FPC) (a subsidiary of Formosa Plastics Group) commissioned its refinery in Mailiao, Yunlin County, which ended the CPC monopoly on domestic production and sale of diesel oil and gasoline in 2000. In July 2000, FPC's refinery began the throughput of 150,000 barrels per day, and the second and third units of 150,000-barrel-per-day capacity each were scheduled to begin throughput in 2001. Because of uncertain economic situation in the island, the throughput of the third unit was delayed until 2002. At yearend 2001, FPC accounted for about 30% of the domestic petroleum market. Formosa Plastics Group was well placed to be an integrated petrochemical company. FPC intended to invest $6 billion to build a petrochemical complex on Meishan Island, near Ningbo in Zhejiang Province. The complex would include a 1-Mt/yr ethylene cracker and a coal-fired powerplant, and would produce downstream products, such as acrylic acid, acrylic ester, acrylonitrile, and polyvinyl chloride units. FPC was waiting for the Taiwan authorities to lift the $50 million ceiling on investment restriction in China (Asian Chemical News, 2001e)

In 2001, the Legislative Yuan passed the Petroleum Law that might help to speed up the privatization of CPC. The Taiwan authorities planned to sell 51% of its shares in CPC by June 2001 but decided to extend the sale until 2004. Privatization was essential for the company to compete in the international market. Under the current situation, any decision, major or trivial, concerning the running of the company is subject to Legislative Yuan approval, which can be a long process. Facing competition from FPC, CPC intended to add downstream value to its cracking capability (Asian Chemical News, 2001a).

The Taiwan authorities announced that the discussion to merge the island's No. 7 and No. 8 petroleum cracker projects into one project had been called off (Asian Chemical News, 2001b). Tuntex Group's No. 7 project might be scrapped because the Ministry of Economic Affairs, under the pressure from environmentalists, rejected CSC's offer to build a large-scale steel complex in the proposed Bingnan industrial park in Tainan (Asian Chemical News, 2001d). CPC and Grand Pacific Petrochemical Corp. (GPPC) might shift the No. 8 cracking plant to China. Operating costs in China are much lower than those in Taiwan. If the cracking plant is built in China, GPPC will lead the project (Asian Chemical News, 2001c).

CPC's overseas affiliate, Oversea Petroleum and Investment Corp. (OPIC), and China National Offshore Oil Corp. (CNOOC) signed a cooperative exploration agreement in Taiwan. Under the terms of the agreement, OPIC and CNOOC formed a joint-venture company, Tainan-Chaoshan Petroleum Co., which was registered in the Virgin Islands. The joint venture will explore for oil in an area that covers 15,400 square kilometers in Taiwan Strait. Both sides will share the operating costs and the exploration results equally (Taiwan Headlines, 2002§).

References Cited

Asian Chemical News, 2001a, Frustration mounts: Asian Chemical News, v. 7, no. 314, p. 12.
Asian Chemical News, 2001b, Taiwan no. 7/8 C2 merger call off: Asian Chemical News, v. 7, no. 309, p. 30.
Asian Chemical News, 2001c, Taiwan no. 8 may shift to China: Asian Chemical News, v. 8, no. 339, p. 17.
Asian Chemical News, 2001d, Tuntex may scrap no. 7 cracker plan: Asian Chemical News, v. 8, no. 341, p. 18.
Asian Chemical News, 2001e, FPC starts C2 plan as Taiwan ends ban: Asian Chemical News, v. 8, no. 334, p. 24.
Economic Daily News, 2001, Cement, *in* Economic yearbook 2001: Economic Daily News, 1357 p.
Far Eastern Economic Review, 2002, Taiwan—The strait view: Far Eastern Economic Review, February 21, p. 49.
Financial Times, 2001, Taiwan reports surge in overdue loans: Financial Times [London], August 21, p. 4.
Government Information Office [Taiwan], 2002, Challenge 2008—The six-year national development plan: Government Information Office [Taiwan], May 21, 9 p.
Metal Bulletin, 2001a, China Steel to explore Baosteel tie-up: Metal Bulletin, no. 8613, October 4, p. 3.
Metal Bulletin, 2001b, Kuo visits Japan: Metal Bulletin, no. 8589, July 5, p. 12.
Metal Bulletin, 2001c, Taiwan pipemaker eyes Chinese joint venture: Metal Bulletin, no. 8622, November 5, p. 19.
Metal Bulletin, 2001d, Taiwan's Yieh Hsing prepares for major restructuring: Metal Bulletin, no. 8590, July 9, p. 18.
Metal Bulletin, 2001e, Taiwan's Yieh Phui mulls new galv lines in China: Metal Bulletin, no. 8585, June 21, p. 21.
Metal Bulletin, 2001f, Taiwanese firms set up new service centers in China: Metal Bulletin, no. 8575, May 17, p. 24.
Metal Bulletin, 2001g, Taiwanese interests back Al plant in China: Metal Bulletin, no. 8604, September 3, p. 6.
Metal Bulletin, 2001h, Yieh Hsing leases cold rolling and pipe mill: Metal Bulletin, no. 8616, October 15, p. 21.
Metal Bulletin, 2002a, Taiwanese mill picks site for Chinese pipe project: Metal Bulletin, no. 8639, January 10, p. 15.
Metal Bulletin, 2002b, Yieh Loong defaults on debt repayments: Metal Bulletin, no. 8664, April 11, p. 17.
Metal Bulletin, 2002c, CS Aluminium sets location for Chinese Al plant: Metal Bulletin, no. 8639, January 10, p. 5.
Ministry of Finance, 2001a, Monthly statistics of exports: Ministry of Finance, Directorate General of Customs, Statistical Department, December, variously paginated.
Ministry of Finance 2001b, Monthly statistics of imports: Ministry of Finance, Directorate General of Customs, Statistical Department, December, variously paginated.
Taipei Journal, 2001a, Amendment to company law ratified by legislature: Taipei Journal, November 2, p. 3.
Taipei Journal, 2001b, Evolution of Taiwan's environmental bill: Taipei Journal, June 15, p. 2.
Taipei Journal, 2001c, New financial holding company law: Taipei Journal, November 2, p. 3.
Taipei Journal, 2001d, Taiwan economy bottoms out, set for recovery: Taipei Journal, December 28, p. 8.

Internet References Cited

Taiwan Headlines, 2001a (May 29), Building of new energy zone begins, accessed June 4, 2001, at URL http://www.taiwanheadlines.gov.tw/20010604/20010604b2.html.
Taiwan Headlines, 2001b (July 18), EPA vows to close illegal plants, accessed July 18, 2001, at URL http://www.taiwanheadlines.gov.tw/20010718/20010718s2.html
Taiwan Headlines, 2002 (May 16), Mainland oil firm chief arrive in Taipei to sign cooperation pact, accessed May 16, 2002, at URL http://www.taiwanheadlines.gov.tw/20020516/20020516b5.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 COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1997	1998	1999	2000	2001
METALS						
Gold, primary	kilograms	9	9	13	9	2
Iron and steel, metal:						
Pig iron	thousand tons	8,870	9,374	9,020	10,927	14,384
Ferroalloys:						
Ferromanganese		12,130	12,532	--	--	--
Ferrosilicon		3,391	3,775	3,212	2,975	1,181
Steel, crude	thousand tons	15,478	17,192	16,027	17,302	17,336
Nickel, refined e/		10,500	9,700	10,000	10,000	11,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	21,522	19,652	18,283	17,572	18,128
Clays:						
Fire clay		5,045	2,967	3,703	3,666	5,641
Kaolin		80,000 e/	--	--	--	--
Feldspar		--	--	171	409	147
Gypsum, precipitated		2,317	2,221	1,747	1,884	1,006
Lime e/		650,000	800,000	800,000	800,000	800,000
Mica		7,806	7,750	6,966	6,862	9,733
Nitrogen, N content of ammonia		289,490	231,419	146,228	11,004	--
Salt, marine		62,484	7,425	76,916	69,521	66,150
Sodium compounds, n.e.s.:						
Caustic soda		204,470	230,620	329,640	481,290	500,000 e/
Soda ash e/		127,000	126,000	140,000	140,000	140,000
Stone:						
Dolomite	thousand tons	198	181	201	119	71
Limestone	do.	15,447	2,927	2,819	3,505	4,901
Marble	do.	18,071	17,519	17,755	17,831	20,475
Serpentine	do.	436	421	358	395	276
Sulfur		163,964	184,324	194,812	205,588	223,659
Talc		1,331	73	201	--	130
MINERAL FUELS AND RELATED MATERIALS						
Carbon black e/		103,450 2/	100,000	100,000	100,000	100,000
Coal, bituminous		98,203	79,310	91,673	83,380	--
Gas, natural:						
Gross	million cubic meters	849	870	848	742	849
Marketed e/	do.	780	790	780	670	780
Petroleum:						
Crude	thousand 42-gallon barrels	319	340	296	234	279
Refinery products e/	do.	233,000	227,000	230,000	240,000	250,000

e/ Estimated. -- Zero.
1/ Includes data available through August 30, 2002.
2/ Reported figure.

TABLE 2
TAIWAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2001

(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.	do.	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 Tungtzuchiao	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	10,000
Do.		Feng Hsin Iron and Steel Co. Ltd.	Taichung Hsien	1,000
Do.		Tang Eng Iron Work Co. Ltd.	Kaohsiung	288
Do.		Yieh United Steel Co.	do.	1,000
Sulfur		China Petrochemical Development Corp.	Taipei	50
Titanium dioxide		Dupont Far East Co. Ltd.	Guanyin	100

e/ Estimated.