



2006 Minerals Yearbook

TIN

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Tin has not been mined in the United States since 1993; consequently, the country is reliant on imports and recycling for its tin needs. In 2006, 25 firms consumed 90% of the reported primary tin used domestically. The major uses were as follows: electrical solders, 28%; metal containers, 21%; transportation, 14%; construction, 11%; and other, 26%. The estimated value of primary tin metal consumed domestically was \$394 million. Industry stocks at yearend increased by 46% compared with those at yearend 2005 (table 1). The Defense Logistics Agency (DLA), which manages the National Defense Stockpile (NDS), sold 8,400 metric tons (t) of pig tin from the stockpile during 2006.

Approximately 13,900 t of tin, most of it from old scrap, was recycled (table 5). About one-fifth of the tin consumed in the United States was recycled metal produced at 2 detinning plants and 86 secondary nonferrous metal processing plants. The recycling rate for steel cans was 63% compared with 63% in 2005, 56% in 1995, and 15% in 1988 (Steel Recycling Institute, 2007).

World tin mine output increased slightly from that in 2005, and world primary tin smelter production increased by about 7% compared with that of 2005 (tables 1, 9). Despite the production increases, industry analysts considered the world tin market in 2006 to be in a moderate supply deficit. As a result of the supply deficit, the composite tin price increased by 17% from that of 2005. Of the 20 countries in which tin was mined, the top five accounted for 93% of the total world tin production of 304,000 t. China was the leading producer (41% of world output), followed by Indonesia (30%), Peru (13%), Bolivia (6%), and Brazil (4%). World tin reserves were estimated to be 6.1 million metric tons (Mt), about 17 times the estimated annual world primary tin consumption of 350,000 t. Most tin reserves are in Asia and South America.

Legislation and Government Programs

In 2006, the DLA sold 8,400 t of tin under the basic ordering agreement (BOA) and the long-term negotiated contract formats. The effect of proposed NDS tin sales on domestic markets is assessed by the Market Impact Committee, which comprises several Federal agencies, including the U.S. Geological Survey (USGS).

The DLA Annual Materials Plan proposed amount of material to be sold each fiscal year is 12,000 t. The remaining inventory is stored at the Hammond, IN, depot. Under the BOA approach, the Defense National Stockpile Center (DNSC) posts the amount of tin it wants to sell on its Web site every Tuesday. Interested and qualified companies submit quotes, and the DNSC makes a determination to award by the end of that business day. The inventory of Government stockpile tin as of December 31, 2006, was 8,100 t.

Production

Mine.—Tin was not produced at any domestic mine in 2006. Until 1993, a few small tin mines had operated sporadically in the United States. However, the USGS canvasses confirm that there has been no primary domestic tin production since that year.

Secondary.—Industry analysts considered the United States to be the world's leading producer of secondary or scrap tin. Most secondary tin has been generated during manufacturing in the United States from various scrapped alloys of tin and recycled in those same alloy industries. Secondary tin from recycled fabricated parts has been used in many kinds of products and is a particularly important source of tin for the manufacture of solder and brass/bronze.

The Steel Recycling Institute, funded by the domestic steel industry, continues to promote the collection, preparation, and transportation of steel can scrap. The domestic recycling rate for steel cans, most of which are made from tinplate, was 63% in 2006, about the same as that in 2005 (Steel Recycling Institute, 2007).

Consumption

In 2006, consumption of primary tin increased by 36% compared with that in 2005 (tables 1, 2). Domestic consumption data for tin were developed by the USGS from a voluntary survey of tin consumers. Of the 151 firms to which a survey form was sent, 109 responded, including the major consumers. Data for the nonrespondents was estimated based on prior-year reporting.

The total number of metal cans shipped was 136 billion in 2006 compared with 134 billion in 2005. The Can Manufacturers Institute no longer provides a categorization by types of can (for example, aluminum versus steel). Steel (essentially tinplate and tin-free steel) dominated in the food, pet, and general line can markets, and aluminum held 100% of the beverage can market (Can Manufacturers Institute, 2006, p. 10).

The consolidation of the domestic steel industry continued. The major combination was the merger of Arcelor SA (Luxembourg, Luxembourg) with Mittal Steel Co. NV (Rotterdam, Netherlands), creating Arcelor Mittal Corp. The new entity has plants on most of the world's continents, including several tin mills in the United States, and has become the world's leading steel producer and maker of tinplate (Canmaker, The, 2006).

Major canmaker Ball Corporation (Broomfield, CO) announced that it had reached an agreement to buy U.S. Can Corporation's (Lombard, IL) operations in the United States and Argentina in a noncash deal valued at \$594 million. U.S. Can was the leading manufacturer of aerosol cans in the United

States and also made paint cans at 10 domestic plants. Ball was North America's second ranked maker of metal food cans, in terms of sales volume (American Metal Market, 2006a).

The steel can remains one of the most durable and leading applications for tin. Steel containers may have originated in Bohemia in the 14th century. In France, in 1809, a process was developed to package and preserve food in cans. In 1812, tinplated cans were introduced in the United Kingdom, and in 1938, the first steel beer can was made. Most steel cans are made from tinplate, which is a flat-rolled steel product that has a thin layer of tin on both sides of the steel substrate. The tin layer helps to prevent rusting and to protect food and beverage flavors. Steel cans account for more than 90% of food cans worldwide. More than 600 shapes, styles, and sizes of containers are used. In the past 20 years, the steel can recycling rate has risen sharply, and the amount and percentage of steel cans in municipal solid waste (MSW) has declined dramatically in the past 40 years because aluminum and plastic containers have replaced steel cans in the beverage industry. On an annual basis, steel cans account for 2.6 Mt or 1.1% of all domestic MSW. In 2003, the recycling rate for steel cans was 60%, and 1.5 Mt of steel cans was recycled in that year. The average steel can has one-third less steel than 20 years ago, and the tin coating has been reduced by 30% during the past 35 years (Waste Age, 2006).

Worldwide, more than 5 Mt of steel cans, mostly made from tinplate, was recycled in 2005, representing an average recycling rate of 65%, according to the International Iron & Steel Institute's Committee on Packaging. This rate has increased every year for the past 5 years (Canmaker, The, 2007).

A survey commissioned by ITRI Ltd. (Frogmore, United Kingdom) and conducted by Commodities Research Unit Ltd. (London, United Kingdom) and the World Bureau of Metal Statistics (WBMS) (Ware, United Kingdom) indicated that tin usage in solders throughout the world was considerably larger than previously estimated. Solder and tinplate have long been regarded as the "big two" applications for tin, but the new survey indicated that the global solder market was now more than twice the size of the tinplate sector. World tin usage of solder in 2005 was estimated to be 141,000 t, or 45% of total consumption, while tinplate usage was estimated to be 63,000 t, or 20% of the world tin market. The third ranked application, inorganic and organic tin chemicals, accounted for an estimated 48,000 t of tin, or 15% of the global market. Regional consumption patterns also emerged from the study. Asian producers of solder now dominate the global solder sector. About 100,000 t of tin went into solder making in Asia, and about one-half of that amount was used in China. The study also showed that 65% of China's solder sales were made to the electronics market (CRU Tin Monitor, 2006e).

An important use for tin is that of glassmaking. Molten tin in a large vat is used in the production of flat glass for car windshields and residential and commercial windows in the "float glass" process, now the dominant procedure for making flat glass since the process was introduced in the late 1960s. During 2006, two of the world's leading glassmakers merged. Pilkington plc (St. Helens, United Kingdom) merged with Nippon Sheet Glass Co. Ltd. (Tokyo, Japan). Nippon had been the world's sixth ranked glassmaker, but with this merger, it

moved to the position of second ranked, behind Ashai Glass Co. Ltd. (Tokyo, Japan). The \$5.6 billion merger, completed in June, resulted in a company with annual sales of \$7.4 billion, manufacturing operations in 26 countries and ownership or interests in 50 "flat glass" manufacturing lines worldwide (Glass Magazine, 2006).

Prices

The Platts Metals Week average composite price for tin metal increased by 17% compared with that of 2005. The London Metal Exchange (LME) remained the primary trading site for tin. Tin is one of only six metals traded on the LME. The other metals are aluminum, copper, lead, nickel, and zinc.

Foreign Trade

U.S. imports of refined tin, which supplied most domestic tin requirements, increased by 15% compared with those of 2005. Imports of tin in all forms (metal, ore and concentrate, scrap, and waste) remained duty free (tables 7, 8). The tin was held in U.S. warehouses by trading firms until sold to customers. Foreign-owned trading firms tended to dominate the marketing of imports. U.S. imports of tin came mostly from Peru, Bolivia, Indonesia, China, and the United Kingdom, in descending order. Refined tin exports were small compared with imports (table 6).

World Review

The WBMS recorded a calculated world market supply deficit of 3,600 t in 2006 after allowing for reported DLA stockpile tin deliveries. The WBMS reported world production of refined tin metal to be 373,000 t, a slight decline compared with that of 2005, and DLA deliveries totaled 9,300 t, bringing total availability to 382,000 t. The WBMS attributed most of the production losses to production declines in Indonesia, especially after the Indonesian Government's clampdown on illegal tin mining at the end of 2005. The WBMS calculated global tin consumption to be 386,000 t in 2006, an increase of 38,000 t compared with that of 2005. China and Japan each recorded a 16% gain, and the United States showed a 12% increase. The WBMS calculated world tin mine production to be 343,000 t, an increase of 3% compared with that of 2005, with China accounting for nearly all of the increase (Platts Metals Week, 2007).

Argentina.—Silver Standard Resources Inc. (Vancouver, British Columbia, Canada), which controls the world's leading published in-ground silver resources of any publicly traded silver company, announced progress in developing its Pirquitas Project in Argentina. Pirquitas also has tin and zinc, which Silver Standard plans to recover. Company officials estimated that 25% of the revenue stream at Pirquitas could come from tin (Resource World, 2006).

Australia.—BlueScope Steel Ltd. (Melbourne, Victoria) announced a restructuring program and the closure of its tin mill at Port Kembla. The facility, which reportedly operated at a loss, was Australia's only tin mill. The operation has two electroplating tinning lines with a capacity of 500,000 metric tons per year (t/yr) of tinplate. Officials also noted that demand

for BlueScope's tin mill products had been eroding in recent years (TIN World, 2006a).

BlueScope continued its assessment of a possible restart of the Renison Bell tin mine in Tasmania, provided the tin price returned to a sustainable level. Renison was closed in October 2005. The company expected to submit a development proposal and environmental plan for the redevelopment of the nearby Mount Bischoff tin mine to the Tasmanian government. The company also received encouraging reports from test work on its "Rentails" project to recover historical tailings at Renison (CRU Tin Monitor, 2006b).

Bluestone Tin Ltd. (East Perth, Western Australia) completed its acquisition of nickel miner Metal Exploration Ltd. and renamed itself Metals X Ltd. (Metal Bulletin Monthly, 2007). Bluestone reported a sharp increase in production at its Collingwood Tin Mine in Queensland during the quarter ending December 31. Ore throughput was 260% higher than in the previous quarter, and with ore grades increasing slightly to 1.21% tin, the tin content of the concentrates produced increased by 300% to 600 t for the quarter. Although production at Collingwood fell short of the target, the operation became profitable in December. Bluestone has been carrying out site work to install a new primary crusher at Renison, which would treat ore from both the Mount Bischoff and Collingswood mines (CRU Tin Monitor, 2007).

Bolivia.—The Government renationalized the Vinto tin smelter near Oruro in February. The smelter had been owned by Glencore International AG (Baar, Switzerland) since 2004. The nationalization was a first step towards the Government's declared goal of winning a larger share of Bolivia's mineral wealth (TIN World, 2007).

Unsettled conditions prevailed at the Huanuni tin mine during the autumn. After a disturbance in which 16 miners were killed, the Government sought to pacify the miners' cooperative by issuing a decree in which 4,000 workers were allowed to sign up as employees of Corporación Minera de Bolivia (Comibol) (La Paz), the Government-owned mining organization. The Government assumed control of Huanuni on October 31 and terminated the rights of the miners to work the Cerro Posokoni deposit at the site. The move was designed to ease the tensions between the cooperative's workers and Huanuni's official miners. Huanuni's management planned to increase the mine's processing capacity to 1,500 metric tons per day (t/d) of ore by mid-2007 from 800 t/d and to increase reserves and resources as part of a \$1.5 million drilling program. The new strategy would take effect in January 2007 and was implemented to keep the mine profitable while coping with the massive increase in the workforce and associated labor costs following the Government decree. The decree also included Government funding of \$10 million for the expansion plans, including increasing the Santa Elená concentrator capacity to 1,000 t/d of ore and building a new 500-t/d concentrator at the nearby Machacamamarca site. A mine expansion would benefit the Vinto tin smelter, which buys Huanuni tin concentrate. By mid-2007, Vinto could process more than 30,000 t/yr of concentrate if the Huanuni expansion proceeds; that, in addition to possible output increases at the Bolivar and Colquiri mine sites, would increase production of 99.97% refined tin to 15,000 t/yr from 12,000 t/yr (Metal Bulletin, 2006b).

At yearend, reports from Bolivia indicated that the Government intended to monopolize purchases of tin concentrate in the country to provide feedstock for the Vinto tin smelter it renationalized in February. Vinto still produced tin but at a much reduced rate, as its new Government managers undertook to understand and evaluate the operation. Industry observers thought that the Government's plan was for Vinto to buy all the tin concentrates produced in Bolivia. That strategy could mean that Glencore, which had owned the Vinto tin smelter until the nationalization, might also be stripped of the Colquiri tin mine if it failed to continue shipping tin concentrate to Vinto. Colquiri, operated by Glencore's Bolivian subsidiary Sywchi Wayra SA, supplied up to 50% of the tin concentrate processed by the Vinto smelter. Glencore had acquired the mine and smelter when it purchased Cia. Mineral de Sur (Comsur) in early 2005 (American Metal Market, 2007).

The Mines Company (China) announced that it was seeking to develop large-scale mining operations in Bolivia, starting with the country's leading tin mine, Huanuni. The mine, which produced about 4,000 t/yr of tin-in-concentrate, had been under the control of a court-appointed administration since 2002 (Platts Metals Week, 2006b).

Brazil.—Grupo Paranapanema (São Paulo), the leading tin producer in Brazil, announced that Brazilian mine production of tin, which fell to 11,000 t in 2005, could recover to more than 20,000 t/yr during the next few years. Annual tin production at Grupo Paranapanema's Mineracao Toboca subsidiary could rise to 10,500 t in 2007 from 5,700 t in 2005 and perhaps reach 14,000 t/yr in a second phase expansion. The Santa Barbara tin mines acquired by major Brazilian tin producer Companhia Siderurgica Nacional SA (CSN) in 2005 were expected to expand output to 3,600 t/yr from the 2006 level of 720 t/yr to meet CSN's tinplate requirements (CRU Tin Monitor, 2006a).

Grupo Paranapanema's new Rocha Sa tin property in the Amazon region was scheduled to begin production in October 2006 and produce 7,000 t/yr of tin. Grupo Paranapanema spent \$19 million on its tin properties in 2005, largely to develop Rocha Sa at the site of its Pitinga Mine (Platts Metals Week, 2006f).

Brazil's tin producers association, Sindicato Nacional da Industria da Extração do Estano, reported that refined tin output declined by 22% to 9,000 t. This was the lowest level of mine and refinery production since 1982 (CRU Tin Monitor, 2006e).

China.—The importance of China to the world tin industry was emphasized by a recent ranking of the world's leading tin smelters. The list included 4 Chinese smelters among the top 10, led by Yunnan Tin Co. Ltd. (Kunming, Yunnan Province). Among the world's top 10 tin smelters, those that operated in China and their ranking were Yunnan Tin., no. 1; Yunnan Chengfeng Nonferrous Metals Co. Ltd., no. 7; Liuzhou China Tin Co., no. 9; and Gejui Zili Metallurgy Co., Ltd., no. 10 (CRU International Ltd., 2006c).

Reports indicated that two of China's leading tin producers, Yunnan Tin and Liuzhou China were exploring the formation of a combined organization, to be called China Tin Group. The combined company could produce up to 60,000 t/yr of refined tin, based on current output (Metal Bulletin, 2006c). Yunnan Tin also announced that it had signed a deal to purchase a 67% stake in Gejui Zili. Yunnan Tin's 2006 output included products

from its Singapore Tin Industries Ltd. joint venture. Gejiu Zili (Huogudu, Zhadian Province), produced 9,000 t of tin in 2006 (CRU Tin Monitor, 2007).

Yunnan Tin was reported to be involved in a new joint venture with partner Singapore Tin Ltd. to set up a 36,000-t/yr integrated tin mining, smelting, and end-product operation on Bangka Island, Indonesia. The two firms planned to form the new producer PT Indo Yunnan Mineral Utama by acquiring and consolidating existing plants on Bangka Island (CRU Tin Monitor, 2007).

Yunnan Tin announced its association with joint-venture explorer, YTC Resources Ltd. (New South Wales, Australia). YTC sought to raise money to explore tin and copper-gold projects near its Orange, New South Wales, base. Tin exploration would be focused around old mining areas where tin and associated metals like silver and tungsten had been mined until the 1970s (CRU Tin Monitor, 2007).

China reduced the export rebate on various tin and tin alloy products to 8% from 13% effective September 15; these tin products included bars, extrusions, foil, granules, plates, powder, rods, sheets, and thread. The export tax rebate was removed for unwrought nonalloy tin, tin for solders, other tin alloys, and tin waste and scrap; the previous export tax rebate on all these items was 13%. Government officials in China thought that the domestic supply of tin materials would increase, and domestic prices would, consequently, decline (Platts Metals Week, 2006a).

Major expansions of tinplate capacity in China were underway. The leading development was the 50% increase of capacity at Hainan Haiwoo Tinplate Ltd. to 150,000 t/yr at its tin mill on Hainan Island (CRU Tin Monitor, 2006d).

India.—Tinplate Company of India (a Tata Group company) (Kolkata, West Bengal) announced plans to commission a new tinplate line at Jamshedpur by 2008, which was expected to cost \$45 million and increase capacity by 200,000 t/yr, bringing Tinplate's total capacity to more than 380,000 t/yr. The company anticipated that the new line would increase its share of the Indian market to 60% from 40% and increase exports to Asia and Europe. The expansion may be seen as a response to competitor GPT Steel Industries Limited's opening of a 180,000-t/yr tinplate line in March (CRU Tin Monitor, 2006d).

GPI Steel Industries' (Andheri, Mumbai) announced the startup of a new tin mill at Gandhi Dham. The facility had a 180,000-t/yr tinplate line that was operating at a reduced rate of 60,000 t/yr. GPT planned to expand capacity to 650,000 t/yr within 2 years. India reportedly consumed at least 300,000 t of tinplate in 2006, of which 160,000 to 200,000 t was imported. Tinplate Company of India produced nearly 110,000 t of tin in 2006, and Steel Authority of India's Rourkela tin mill produced about 30,000 t (Metal Bulletin, 2006a).

Indonesia.—PT Tambang Timah Tbk (Bangka), one of the world's leading tin mining and smelting companies, announced that it planned to reduce its 2006 tin output to 38,400 t, an 8% cut compared with that in 2005. Officials stated that the purpose of the reduction was to lower the company's stocks and to lift prices. Timah also announced that it planned to increase the transparency of Indonesian tin supplies by better publicizing its future tin production plans. About 80% of Timah's tin-in-concentrate supply reportedly came from illegal tin mining

operations. The Indonesian Government had a 65% interest in Timah (Platts Metals Week, 2006c).

In late 2006, Timah announced that it had produced 31,500 t of tin in the first 9 months of 2006, about 5% more than in the comparable period of 2005. Of Timah's output, 28% originated from the company's offshore dredging operations, with the remainder coming from inland production (CRU Week in the News, 2006d).

In May, the independent small-scale tin mining sector in Indonesia was affected by violent attacks on some of the suction boat operators that were working off the north coast of Bangka Island near the town of Belinyu. This area was the leading growth region in Indonesian "unconventional" mining in 2005. Reports indicated that the local government had temporarily closed down the region in response to the violence. The independent smelters association Association of Indonesia's Tin Industry suggested that the Belinyu district had accounted for about one-half of the members association's concentrate supply, and the destruction of or damage to hundreds of boats and platforms would cut their production substantially. The Government shut down more than 20 small independent tin smelters in October. The Government investigated their legality, and there was some uncertainty as to when and how many of them ultimately may be granted new operating licenses (CRU Tin Monitor, 2006a; CRU Week in the News, 2007).

State-controlled tin producer PT Timah TGK (Jakarta, Indonesia) proposed a plan to bring greater control of the 25 or more independent tin smelting operations that have sprung up since 2003, advocating proper registration of smelters with mining concessions and uniform application of a 3% royalty on all producers. In return for this proper registration, Timah could perform re-refining of independent smelters' tin, giving them access to the LME through registered Bangka and Mentok brands. Timah estimated that Indonesian refined tin production in 2006 was 110,000 to 120,000 t, with small private smelters accounting for 50,000 to 60,000 t of this total (CRU Week in the News, 2006a).

Japan.—Two major tinplate producers, Nippon Steel and Toyo Kohan Corp., formed an alliance to penetrate the domestic beer can market, currently dominated by aluminum. The firms agreed to procure tin jointly to reduce raw material costs, share production facilities, codevelop can stock that would compete with aluminum cans, and collaborate on overseas business. In addition to collaborations at the operational level, the firms have also agreed to cross-hold shares. Nippon Steel will hold a 1.9% stake in Toyo Kohan, while Toyo Kohan will hold a 0.15% stake in Nippon Steel. Nippon Steel's output of tinplate for the domestic market is 450,000 to 500,000 t/yr, and Toyo Kohan's output is 300,000 t/yr (Platts Metals Week, 2006d).

Researchers at Daido Metal Ltd. (Sakae Naka-Ku) announced the development of a copper-nickel-tin alloy with hard particles of molybdenum carbide to replace a leaded alloy in the piston pin bushings at the small end of connecting rods. The copper-base alloys traditionally used for those piston pin bushing applications have included a lead component, which needed to be removed owing to toxicity concerns. The hard particles were added to prevent adhesion to the steel shaft and to polish the surface of the steel shaft. The alloy composition is 91% copper, 6% tin, and 3% nickel. It is said to provide higher

tensile strength than the lead-containing alloy and to have good resistance to corrosion and excellent antiseizure properties (Advanced Materials & Processes, 2006).

Malaysia.—The investment holding company Malaysia Mining Corp. (MMC) announced its intention to sell its 30% stake in its tin smelting operation Malaysia Smelting Corp. (MCS) for \$29 million. MMC said that it had entered into a conditional sales agreement with Sword Investments Pte. Ltd. and Straits Trading Amalgamated Resources Pvt. Ltd. After the sale, MMC would no longer have any equity interest in MSC. The sale was part of MMC's strategy to dispose of its noncore assets; the company planned to use the proceeds to reduce debt and for working capital (Platts Metals Week, 2006e).

Mexico.—The scrap firm Organization Metalvert S.A. de C.V. (San Luis Potosi) reportedly was considering the restart of an idle tin smelter and was seeking feedstock for the project. Industry observers noted that the world tin concentrate market was tight, and it might be difficult to secure feedstock. San Luis Potosi also is home to the Metales Potosi S.A. tin smelter, which had been idle for years. There were no plans to restart the Metales Potosi smelter (American Metal Market, 2006b).

Peru.—The Energy and Mines Ministry reported that Minsur S.A. increased tin production to 42,100 t in 2005, a record level, with the Funsur refinery producing 36,700 t (CRU Week in the News, 2006b).

Russia.—Vostek announced plans to build an \$80 million float glass factory in the Tver region of Russia in partnership with Chinese development company Ronghua Group. Construction was scheduled to begin in March 2007, and China State Construction Engineering Corp. was to serve as the general contractor. The factory was expected to produce 500 t/yr of float glass. The float glass process uses considerable amounts of molten tin, a process in which the molten glass is floated over molten tin (Glass Magazine, 2007).

Singapore.—Singapore Tin Industries Pte. Ltd. (STI) (Singapore), a company specializing in refining tin, officially opened a new tin refinery on June 23, although the facility actually began limited production in March. STI was incorporated in 2005 through a joint venture between KJP International Pte. Ltd. (KJPI) (Singapore) and Yunnan Tin. STI's tin refinery was the first of its kind in Singapore, although it had been the home of many tin ventures over the years. Production from STI's twin lines was 36,000 t/yr of refined tin, or about 10% of the world's total refined tin capacity, placing STI among the world's top 10 producers of refined tin. The STI refinery uses the crystallization method of refining whereby crude tin is heated and crystallized, leaving the remaining metallic impurities behind and producing 99.99%-pure tin. The ownership partnership was designed to be synergistic, with KJPI sourcing and supplying the facility with crude tin, and Yunnan Tin contributing its advanced crystallization technology for the refining process (TIN World, 2006b).

STI is also constructing a smelting plant in Bangka, in collaboration with PT Bangka Global Mandiri International (Indonesia). Construction had started in August 2005, and completion was targeted for September 2006. The output capacity for the smelter was about 12,000 t/yr of tin. Indonesia, which produced about 90,000 t/yr of refined tin, was the world's

second ranked tin producer after China, supplying about 30% of the world's refined tin in 2005. STI hoped to achieve a vertically integrated operation by acquiring mining rights for tin concentrate. STI was seeking a trademark for its refined tin so that its ingots could be traded on the London Metal Exchange (TIN World, 2006b).

Thailand.—Sea Minerals Corp. completed a technical feasibility study on deep offshore mining of tin resources estimated to contain more than 50,000 t of tin. The majority shareholder in Sea Minerals, with an 84% stake, was Tongkah Harbour Plc (Bangkok), which had suspended tin production in April 2005 (CRU Tin Monitor, 2006c).

United Kingdom.—The Pilkington Group Ltd. (St. Helens), a major float glass producer, now part of Nippon Sheet Glass Co. Ltd. (Tokyo, Japan), announced that it had entered a joint venture with Al Hamed Enterprises (Abu Dhabi, United Arab Emirates) to build a \$200 million float glass facility in the Abu Dhabi Industrial Development Zone. The plant was expected to start operation in late 2008 (Glass Magazine, 2007).

Outlook

Domestic demand for primary tin is expected to increase moderately in the near term, at a rate of about 3% per year. That rate, however, could double in a few years if new applications—especially those in which tin is substituted for toxic materials, such as lead-free solders—find acceptance in the marketplace.

World tin reserves appear to be adequate to meet foreseeable demand. Secondary sources of tin are likely to remain an important component of supply, especially in the United States. NDS tin stocks are expected to be exhausted within about 2 more years at the current rate of sales, so domestic tin requirements will continue to be met primarily through imports.

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TABLE 1
SALIENT TIN STATISTICS¹

	2002	2003	2004	2005	2006
United States:					
Production, secondary, contained tin ^e metric tons	6,760	5,500	5,240	11,700 ^r	11,600
Exports, refined tin do.	2,940	3,690	3,650	4,330	5,490
Imports for consumption, refined tin do.	42,200	37,100	47,600	37,500	43,300
Consumption, contained tin:					
Primary do.	34,000	32,900	36,700	31,400 ^r	42,600
Secondary do.	5,830	4,510	7,990	9,170	11,900
Stocks, yearend, U.S. industry, contained tin do.	8,930	7,960	8,970 ^r	8,080 ^r	11,800
Prices, average, contained tin:					
New York, NY, market cents per pound	194.75	232.36	409.37	360.94	419.49
Platts Metals Week composite do.	291.97	339.78	547.30	483.05 ^r	565.12
London, United Kingdom do.	184.00	222.00	385.00	334.00	398.00
Kuala Lumpur, Malaysia do.	184.35	221.67	385.11	333.55	397.69
World, production, contained tin:					
Mine metric tons	235,000 ^r	259,000 ^r	301,000 ^r	299,000 ^r	304,000 ^e
Smelter:					
Primary do.	266,000	270,000 ^r	296,000 ^r	324,000 ^r	347,000 ^e
Secondary do.	14,200	11,900	11,700	20,200	19,100 ^e
Undifferentiated do.	70 ^e	200	200 ^e	200	--

^eEstimated. ^rRevised. -- Zero.

¹Data are rounded to no more than three significant digits, except prices.

TABLE 2
U.S. CONSUMPTION OF PRIMARY AND SECONDARY TIN¹

(Metric tons of contained tin)

	2005	2006
Stocks, January 1 ²	8,060 ^r	7,900
Net receipts during year:		
Primary	32,500 ^r	46,200
Secondary	5,790	6,150
Scrap	3,840	7,510
Total receipts	42,200 ^r	59,900
Total available	50,200 ^r	67,800
Tin consumed in manufactured products:		
Primary	31,400 ^r	42,600
Secondary	9,170	11,900
Total	40,600 ^r	54,500
Intercompany transactions in scrap	407	480
Total processed	41,000 ^r	55,000
Stocks, December 31 (total available less total processed)	9,120 ^r	12,700

^rRevised.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes tin in transit in the United States.

TABLE 3
U.S. CONSUMPTION OF TIN, BY FINISHED PRODUCT¹

(Metric tons of contained tin)

Product	2005			2006		
	Primary	Secondary	Total	Primary	Secondary	Total
Alloys, miscellaneous ²	W	W	W	W	W	W
Babbitt	554	W	554	637	W	637
Bar tin	709 ^r	W	709 ^r	936	W	936
Bronze and brass	1,240	1,960	3,200	1,590	2,560	4,150
Chemicals	8,360	W	8,360	12,900	W	12,900
Collapsible tubes and foil	W	W	W	W	W	W
Solder	9,640 ^r	7,040	16,700	12,900	9,140	22,000
Tinning	790	--	790	868	--	868
Tinplate ³	7,250	--	7,250	8,220	--	8,220
Tin powder	W	W	W	W	W	W
Type metal	W	W	W	W	W	W
White metal ⁴	W	W	W	W	W	W
Other	2,850 ^r	172	3,030 ^r	4,520	248	4,770
Total	31,400 ^r	9,170	40,600 ^r	42,600	11,900	54,500

^rRevised. W Withheld to avoid disclosing company proprietary data; included with "Other." -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includesterne metal.

³Includes secondary pig tin and tin acquired in chemicals.

⁴Includes pewter, britannia metal, and jewelers' metal.

TABLE 4
U.S. INDUSTRY YEAREND TIN STOCKS¹

(Metric tons)

	2005	2006
Plant raw materials:		
Pig tin:		
Virgin ²	6,200 ^r	8,920
Secondary	660	688
In process ³	863	1,670
Total	7,730 ^r	11,300
Additional pig tin:		
Jobbers-importers	278	316
Afloat to United States	80	230
Total	358	546
Grand total	8,080 ^r	11,800

^rRevised.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes tin in transit in the United States.

³Data represent scrap only, tin content.

TABLE 5
U.S. STOCKS, RECEIPTS, AND CONSUMPTION OF NEW AND OLD SCRAP AND TIN RECOVERED, BY TYPE OF SCRAP¹

(Metric tons)

Type of scrap	Gross weight of scrap						Tin recovered ^c		
	Stocks, January 1	Receipts	Consumption			Stocks, December 31	New	Old	Total
			New	Old	Total				
2005:									
Copper-base scrap:									
Ingot makers	4,140	68,300	17,200 ^r	51,300 ^r	68,500	3,960	W	2,130	2,130
Brass mills ²	--	W	W	--	W	--	1,740	--	1,740
Foundries and other plants	1,420	26,700	W	W	26,600	1,490	W	460	460
Total	XX	XX	XX	XX	XX	XX	1,740	2,590	4,330
Lead-base scrap	13,800 ^r	1,360,000	20,400	1,330,000 ^r	1,350,000 ^r	21,100 ^r	536 ^r	9,140 ^r	9,670 ^r
Tin-base scrap ³	W	W	W	W	W	W	W	W	W
Grand total	XX	XX	XX	XX	XX	XX	2,280	11,700 ^r	14,000
2006:									
Copper-base scrap:									
Ingot makers	3,960	65,200	17,200	48,500	65,700	3,500	W	2,040	2,040
Brass mills ²	--	W	W	W	W	W	1,830	W	1,830
Foundries and other plants	1,500	27,600	17,000	10,400	27,400	1,630	W	388	388
Total	XX	XX	XX	XX	XX	XX	1,830	2,430	4,250
Lead-base scrap	21,100	1,370,000	19,400	1,340,000	1,360,000	29,400	510	9,170	9,680
Tin-base scrap ³	W	W	W	W	W	W	W	W	W
Grand total	XX	XX	XX	XX	XX	XX	2,340	11,600	13,900

^cEstimated. ^rRevised. W Withheld to avoid disclosing company proprietary data. XX Not applicable. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Consumption is assumed to be equal to receipts.

³Includes tinplate and other scrap recovered at detinning plants.

TABLE 6
U.S. EXPORTS OF TIN IN VARIOUS FORMS¹

Year	Tinplate and terneplate				Tin scrap and other tin-bearing material except tinplate scrap ²	
	Quantity		Ingots and pigs		Quantity	
	(metric tons, gross weight)	Value (thousands)	(metric tons)	Value (thousands)	(metric tons, gross weight)	Value (thousands)
2005	252,000	\$188,000	4,330	\$30,500	32,800	\$51,200
2006	198,000	137,000	5,490	40,500	23,500	63,000

¹Data are rounded to no more than three significant digits.

²Includes rods, profiles, flakes, tubes, and pipes.

Source: U.S. Census Bureau.

TABLE 7
U.S. IMPORTS FOR CONSUMPTION OF TIN IN VARIOUS FORMS¹

Year	Miscellaneous, ² value (thousands)	Dross, skimmings, scrap residues, tin alloys, n.s.p.f. ³		Tinplate and terneplate		Tin compounds		Tinplate scrap	
		Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)
		2005	\$8,010	9,930	\$28,500	391,000	\$300,000	564	\$5,720
2006	23,000	7,750	34,300	495,000	371,000	440	4,320	10,300	2,530

¹Data are rounded to no more than three significant digits.

²Includes tinfoil, tin powder, flitters, metallics, manufactures, and n.s.p.f.

³Not specifically provided for.

Source: U.S. Census Bureau.

TABLE 8
U.S. IMPORTS FOR CONSUMPTION OF UNWROUGHT TIN METAL, BY COUNTRY¹

Country	2005		2006	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Belgium	34	\$356	18	\$205
Bolivia	5,400	43,400	8,160	71,000
Brazil	2,150	16,100	1,300	11,000
Canada	13	89	17	175
Chile	20	171	--	--
China	4,510	34,700	4,440	36,100
Hong Kong	--	--	99	865
Indonesia	5,220	37,200	4,600	36,200
Japan	--	--	40	356
Malaysia	1,530	12,200	245	1,820
Peru	18,300	138,000	21,600	184,000
Singapore	194	1,370	1,090	8,560
Thailand	45	358	210	1,960
United Kingdom	67	502	1,370	12,300
Other	23 ^r	191 ^r	63	609
Total	37,500	285,000	43,300	365,000

^rRevised. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

Source: U.S. Census Bureau.

TABLE 9
TIN: WORLD MINE PRODUCTION, BY COUNTRY^{1,2}

(Metric tons)

Country	2002	2003	2004	2005	2006 ^c
Australia	7,017 ^r	3,864 ^r	1,196 ^r	2,819 ^r	2,000
Bolivia	15,242	16,755	17,569	18,433 ^r	18,000
Brazil	12,063	12,217	12,202 ^r	11,739 ^r	12,000 ^p
Burma ³	456	606	526	708 ^r	700
Burundi	--	5	9 ^r	4 ^r	4
China ^c	62,000	102,000	118,000	126,000 ^r	125,000
Congo (Kinshasa) ^c	300 ^r	800 ^r	3,200 ^r	2,800 ^r	2,800
Indonesia	88,142	71,694	65,772	80,000	90,000
Kyrgyzstan ^c	300	--	--	--	--
Laos	366	360 ^c	400	100 ^{r, c}	70
Malaysia	4,215	3,359	2,745	2,857 ^r	3,000
Mexico	9	21 ^e	24	17	25
Nambia	-- ^c	43	15	--	--
Niger	11	11 ^c	3,100	3,100 ^c	3,100
Nigeria ^{c, 4}	790 ⁵	1,800	1,000	1,500	1,500
Peru	38,815	40,202	67,675	42,145	38,470 ⁵
Portugal	574 ^r	218 ^r	220 ^r	228 ^r	230
Russia ^c	1,300	2,000	2,500	3,000	3,000
Rwanda	197	192 ^e	300	300	300
Spain ^c	-- ^r	-- ^r	-- ^r	-- ^r	--
Thailand	1,130	793	586	129 ^r	165 ⁵
Uganda	--	1	2	2	2
Vietnam ^c	1,700	2,100	3,500	3,500	3,500
Total	235,000 ^r	259,000 ^r	301,000 ^r	299,000 ^r	304,000

^cEstimated. ^pPreliminary. ^rRevised. -- Zero.

¹World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through July 18, 2007.

³Includes content of tin-tungsten concentrate.

⁴Concentrate gross weight reported, estimated 62% tin content.

⁵Reported figure.

TABLE 10
TIN: WORLD SMELTER PRODUCTION, BY COUNTRY^{1,2}

(Metric tons)

Country	2002	2003	2004	2005	2006 ^c
Australia:					
Primary	791	597	467 ^r	594 ^r	600
Secondary ^c	300	300	300	300	400
Total ^c	1,090	897	767 ^r	894 ^r	1,000
Belgium, secondary ^c	6,000	5,000	5,000	7,000	6,000
Bolivia, primary	10,976	12,836 ^r	13,627	13,841 ^r	13,500
Brazil:					
Primary	11,675	10,761	11,512	8,986 ^r	9,000 ^p
Secondary ^c	250	250	250	250	250
Total	11,925	11,011	11,762	9,236 ^r	9,250
Bulgaria, secondary ^c	10	10	10	10	10
Burma, primary ^c	30	30	30	30	30
China, primary ^c	82,000	98,000	115,000	122,000 ^r	138,000
Czech Republic, secondary ^c	100	100	100	100	100
Denmark, secondary ^c	100	100	100	100	100
Greece, secondary ^c	150	100	100	100	100
Indonesia, primary	67,455	66,284	49,872	65,300 ^r	75,000
Japan, primary	659	662	707	754	853 ³
Malaysia, primary	30,887	18,250	33,914	36,924 ^r	32,000
Mexico, primary	1,748	1,769	1,775	1,700	1,700
Nigeria, primary ^c	26	25	25	25	25
Norway, secondary ^c	50	50	50	50	50
Peru, primary	35,828	39,181	41,613	36,733	40,405 ³
Russia:^c					
Primary	4,615 ³	4,100	4,570	5,000	4,980
Secondary	500	500	500	500	500
Total	5,120	4,600	5,070	5,500	5,480
Rwanda	70 ^e	200	200 ^e	200	--
Spain, secondary ^c	25	25	25	10	10
Thailand, primary	17,548	15,400	20,800	29,400	28,500
United States, secondary	6,760	5,500	5,240	11,700 ^r	11,600 ³
Vietnam, primary	1,565 ^r	1,915 ^r	2,356 ^r	2,510 ^{r,e}	2,500
Grand total	280,000 ^r	282,000 ^r	308,000 ^r	344,000 ^r	366,000
Of which:					
Primary	266,000 ^r	270,000 ^r	296,000 ^r	324,000 ^r	347,000
Secondary	14,200	11,900	11,700	20,200	19,100
Undifferentiated	70 ^e	200	200 ^e	200	--

^cEstimated. ^pPreliminary. ^rRevised. -- Zero.

¹World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Whenever possible, total output has been separated into primary (from ores and concentrates) and secondary (tin metal recovered from old scrap). This table reflects metal production at the first measurable stage of metal output. Table includes data available through July 18, 2007.

³Reported figure.