



2012 Minerals Yearbook

NEW ZEALAND

THE MINERAL INDUSTRY OF NEW ZEALAND

By Pui-Kwan Tse

The economy of New Zealand continued to grow at a modest rate in 2012, and the real gross domestic product (GDP) increased by 2.7%. The agriculture, construction, and trade sectors were the main contributors to the economic growth. The Canterbury sequence of earthquakes in late 2010 and early 2011 caused substantial physical damage to the city of Christchurch, and the cost of reconstruction was estimated to be \$30 billion. Reconstruction activities started slowly in late 2011 and continued in 2012; reconstruction of the city's infrastructure was expected to continue during the next several years. Residential and nonresidential construction increased in 2012 after a decrease in 2011 (Reserve Bank of New Zealand, 2013, p. 3–6; Statistics New Zealand, 2013a).

The output of the mineral industry of New Zealand was small compared with that of its neighboring country Australia. New Zealand has metallic mineral occurrences of antimony, bauxite, beryllium, chromium, copper, gallium, gold, iron, lead, lithium, magnesite, manganese, mercury, molybdenum, nickel, platinum-group metals, rare earths, silver, tin, titanium, tungsten, uranium, and zinc. Of these metallic minerals, only gold, iron, and silver were produced. Bentonite, clay, coal, diatomite, dolomite, limestone, perlite, phosphate rock, pumice, salt, silica, building and dimension stone, sulfur, and zeolites have also been discovered in the country (table 1).

New Zealand's total goods trade was NZ\$93.3 billion (US\$74.6 billion) in 2012. Exports were valued at NZ\$46.1 billion (US\$36.9 billion), which was a decrease of 3.4% from the value in 2011. Imports were valued at NZ\$47.2 billion (US\$37.8 billion), which was an increase of 0.7% from the value in 2011. Australia continued to be New Zealand's leading export destination, accounting for 21.5% of total exports. China remained New Zealand's second-ranked export market, receiving 15.0% of New Zealand's exports, followed by the United States, 9.2%; Japan, 7.0%; and the Republic of Korea, 3.4%. China continued to be New Zealand's leading source of imports, supplying 16.3% of New Zealand's imports, followed by Australia, 15.2%; the United States, 9.3%; Japan, 6.3%; and the Republic of Korea, 3.8%. Agricultural products were New Zealand's leading export commodity and accounted for more than 50% of total exports. Mineral fuels were New Zealand's leading nonagricultural commodity and accounted for 4.8% of the country's total export value; aluminum and its products accounted for 1.8%. Crude oil and oil products were New Zealand's most valuable imported commodities, accounting for 17.7% of the country's total import value. Iron and steel products were the most valuable metallic imports and they accounted for 2.0% of the country's total import value. Because it had no alumina refinery, New Zealand depended on imported alumina from Australia for its aluminum production (Statistics New Zealand, 2013b, p. 12, p. 82–87).

Government Policies and Programs

The laws that were in effect in 2012—The Crown Minerals Act 1991 (which was amended by the Crown Minerals Amendment Act 2013) and the Crown Minerals Amendment Act 2003—set forth the broad legislative framework for the prospecting for, exploring for, and mining of Crown-owned (meaning Government-owned on behalf of all New Zealanders) minerals within New Zealand's territorial area, which extends to 12 nautical miles off the New Zealand coast. The Ministry of Economic Development, through the Crown Minerals Group, is responsible for the overall management of all state-owned minerals in New Zealand. Crown-owned minerals include gold, petroleum, silver, uranium, and all minerals on or under Crown-owned land. In some cases, the Government also has rights to certain minerals on some private land. The Crown Minerals Group also advises on policy and regulations and promotes investment in the mineral sector. The royalty regimes for coal, nonfuel minerals, and petroleum are defined in the Government mineral program that is reviewed every 10 years.

In 2009, the Government announced that it would review the legislative, regulatory, royalty, and taxation arrangements for nonfuel minerals and petroleum. The changes that the Government proposed to consider would allow more flexibility on permit duration (to deal with operating challenges, such as the limit of 5 years for an exploration permit), set up a new permit class, and ensure that the regime is able to include new technologies and resources. The Government also would evaluate Schedule 4 of the Crown Minerals Act 1991, which restricts mineral-related activity in specified public conservation areas. Schedule 4 lands accounted for about 40% of public conservation land, or 13% of New Zealand's total land area.

The Government's review process was completed in 2010 and a proposed bill to revise the Crown Minerals Act 1991 was drafted. Under the draft bill, the Government would maintain the existing Schedule 4 areas. The Government and the Regional Council would perform joint technical studies on mineral prospective areas on the North Island and the South Island. The Ministry of Energy and Resources and the land-holding minister would approve jointly the mineral-related access to Crown land based on the economic, mineral, and national significance of the proposal. The bill would introduce a 2-tiered system for permit management. The Tier 1 permits relate to gold [other than alluvial gold, unless the royalty payment in the fifth and subsequent permit years exceeded NZ\$50,000 (US\$40,000)] and petroleum. The permits for coal, iron sand, silver, and other metallic minerals depend on whether or not specified royalty thresholds are reached. The Tier 1 permits require a hands-on coordination management and regulatory regime. The Tier 2 permits are for industrial rocks, and for small business and hobby mineral operations. The proposed amended bill would improve coordination between the Crown Minerals permitting regime and health and safety and environmental regulatory

functions for Tier 1 activities. The Crown Minerals Amendment Act 2013, which amends the Crown Minerals Act 1991, was enacted on May 24, 2013 (Parliament, The, 2013, p. 9–30).

Minerals in the National Economy

New Zealand's mineral resources were dominated by aggregate and gold, which together accounted for 80% of the total value of New Zealand's mineral resources. Gold, iron sand, and silver were major metallic commodities that made a notable contribution to New Zealand's economy. Production of other metallic minerals, such as bauxite, copper, lead, and zinc, could potentially be economically feasible if technologies and prices become favorable. Excluding the petroleum industry, the value of New Zealand's mineral sector accounted for less than 1% of the GDP. The total value of New Zealand's minerals and mineral fuel production accounted for about 2% of the GDP (Statistics New Zealand, 2013c, p. 2).

Production

Production of such mineral commodities as diatomaceous earth, dimension stone, dolomite, and perlite increased by more than 10% compared with that of 2011. Mineral commodities for which production decreased significantly included serpentine, silica sand, silver, and zeolite. Data on mineral production are in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities in New Zealand.

Commodity Review

Metals

Aluminum.—New Zealand Aluminium Smelters Ltd. was the sole primary aluminum producer in New Zealand. In 2011, New Zealand Aluminium completed the replacement of all transformers at its reduction line at the Tiwai Point smelter to increase the power delivery level. Owing to unfavorable market conditions, the company decided to shut down reduction line No. 4 in April. As a result, aluminum production decreased to 326,963 metric tons (t) in 2012 from 354,029 t in 2011. The company signed an 18-year electricity supply contract with state-owned Meridian Energy Ltd. in 2007 (before the global financial crisis that began in 2008), which was to come into force in 2013. The demand for aluminum decreased and price of aluminum also decreased during the past several years. As a result, New Zealand Aluminium faced a financial loss of \$50 million in 2012. The increase in electricity prices under the new contract placed a significant burden on the production costs of the smelter. Pacific Aluminium of Australia (a major shareholder of New Zealand Aluminium) held discussions with Meridian Energy to reduce the price of electricity supplied to the smelter in 2012. No agreement had been reached at yearend 2012. The smelter employed 750 people and accounted for an estimated 10.5% of the economy of the Southland region of the South Island. If no new agreement is reached, Pacific

Aluminium might consider shutting down the smelter in New Zealand (Stuff.co.nz, 2013).

Gold.—New Zealand's gold production was mainly from the Waihi area in the North Island and from the Otago region and along the west coast on the South Island. Hard rock gold mines were mined by Newmont Mining Corp. of the United States on the North Island and OceanaGold Corp. of Australia on the South Island. Newmont Waihi Gold, which was a subsidiary of Newmont Mining, mined the Favona, the Martha, and the Trio Mines in and around Waihi. The mine at Favona had been scheduled to close in 2011; however, the operation continued in 2012. Newmont Waihi Gold had received approval from the Government to mine the Trio deposit at the end of 2010. Construction of two development drifts that were 510 meters (m) and 790 m in length, respectively, began in 2010. The Trio ore bodies were situated between the Martha and the Favona Mines and would be accessed from the Favona portal. Waihi Gold Co. Ltd. (trading as Newmont Waihi Gold) planned to mine at the deepest level (350 m) and to work up towards the surface. Ore production at Trio began in mid-2012, and construction at Trio was scheduled to be completed in 2014. Once completed, the mine was projected to produce about 1 million metric tons per year (Mt/yr) of ore containing 6.2 t (200,000 troy ounces) of gold at an average grade of 6 to 7 grams per metric ton gold (Newmont Mining Corp., 2012, p. 2–10).

In 2011, Newmont Waihi Gold introduced a new underground exploration project in Waihi East, the “Golden Link” project, which was composed of the Correnso exploration project and the Martha exploration project. The Correnso project had the potential to be an underground mine that would replace the existing underground Favona and Trio Mines. As proposed, mining at Correnso would take place at a depth of 350 m, which is considerably deeper than the other mines in Waihi East. Mining at Correnso would start at the bottom of the ore body and progress up to the top of ore body, which would be about 130 m below the surface. The Golden Link project would extend Newmont Waihi Gold's mining operation to 2020. Newmont Waihi Gold submitted the Golden Link project for Government approval in 2012 (Waihi Gold Co. Ltd., 2012, p. 1–5).

Owing to a fire accident in the Trio gold mine in July and a shutdown of the mine for several days after the accident, gold production in the area of Waihi decreased in 2012 by about 37% to 1,864 kilograms. The production of silver in the area of Waihi also decreased significantly in 2012. The accident was caused by a truck engine fire and resulted in 28 workers being trapped in the underground mine (Ministry of Economic Development, 2013b).

Iron Ore and Iron and Steel.—New Zealand's iron ore deposits are iron sands, which are placer deposits formed from the erosion of andesitic and rhyolitic volcanic rocks. These iron sands occur in onshore dunes and beaches and in offshore marine sands along the coastline from Kaipara Harbor south to Wanganui on the west coast of the North Island. Iron sand concentrate from Taharoa, which contained about 57% iron, was exported to other countries in the Asia and the Pacific region. Iron sand from the Waikato North Head site was pumped to the Glenbrook steel plant of New Zealand Steel Ltd. (a subsidiary of BlueScope Steel Ltd. of Australia) by way of an

18-kilometer (km)-long underground pipe. The Glenbrook steel plant, which was the sole integrated steel producer in the country, had an output capacity of 650,000 metric tons per year (t/yr).

The Government granted Trans-Tasman Resources Ltd. an exploration license to explore for iron ore deposits off the west coast of the North Island from the Waikato River in the north to the Rangitikei River in the south. Iron sand in the area was vanadium-bearing titanomagnetite. The company submitted a mining permit application to the Government for extracting iron sand in the South Taranaki Bight. The application covered an area of 65.76 square kilometers within the existing prospecting license zone (Trans-Tasman Resources Ltd., 2013).

Industrial Minerals

Cement.—New Zealand's cement industry was dominated by two producers—Golden Bay Cement on the South Island and Holcim New Zealand Ltd., which was a subsidiary of Holcim Ltd. of Switzerland, on the North Island. The two companies had a combined output capacity of 1.4 Mt/yr; however, domestic cement demand was about 1.43 Mt/yr. Holcim planned to build a 2-Mt/yr plant at Weston (near Oamatu) to replace the existing wet kilns cement plant. Owing to the uncertainty of the international financial situation, Holcim postponed a decision on building a new plant until 2013. The new \$200 million plant would increase production capacity and reduce carbon dioxide emissions by 25% below its 1990 benchmark by 2015 (Global Cement, 2013).

Mineral Fuels

Coal.—New Zealand's coal resources were estimated to be 15 billion metric tons (Gt), of which about 8.6 Gt was economically recoverable. Coal accounted for about 4% of the country's total energy consumption. Bituminous coal resources are located in the West Coast region of the South Island; subbituminous coal resources are found mainly in the Waikato region of the North Island, as well as in the Otago, the Southland, and the West Coast regions of the South Island. Lignite resources are found in the Otago and the Southland regions of the South Island. The South Island lignite deposits accounted for 80% of the country's coal resources.

Pike River Coal Ltd. completed the construction of its Pike River Mine, which is located about 50 km northeast of Greymouth on the west coast of the South Island, in 2010. The company planned to produce about 800,000 t/yr of coking coal for 18 years. In November 2010, an explosion in the mine killed 29 people; the company was unable to continue normal operations thereafter and went into receivership. PricewaterhouseCoopers International Ltd. was appointed as the receiver under the terms of a General Security Deed dated May 21, 2010, and planned to put the assets of Pike River Coal up for sale. The sale of Pike River Coal to state-owned Solid Energy New Zealand Ltd. was completed in 2012. Solid Energy planned to secure the mine site and review the exploration plan to determine the coal resource. It might take several years before the company is able to determine whether the mine could be operated commercially.

The Government accepted the Royal Commission's recommendations on addressing systemic failures in the country's health and safety regulatory regime. The implementation of the recommendations would be in place by the end of 2013 (Berry, 2012; Ministry of Business, Innovation and Employment, 2012).

Bathurst Resources Ltd. had two coal operating mines on the South Island—the Cascade Mine, which is located near Westport, and the Takitimu Mine, which is located at Nightcaps in the Southland region. The Cascade open pit mine, which was part of the Buller coal projects, was operated by Bathurst Resources' subsidiary, Buller Coal Ltd.; the mine produced high-quality, low-sulfur coking coal. Bathurst Resources acquired the Takitimu coal mine in 2011 when it acquired the assets of Eastern Resources Group. The two mines (Cascade and Takitimu) had a total combined output capacity of 350,000 t/yr. In 2011, the Government granted Buller Coal the right to develop the Escarpment Block, which is located next to the Cascade Mine. The mine was estimated to contain about 3 Mt of high-quality coking coal and had an estimated life of 5 years. Three local environmental groups appealed to the Environment Court to block the development of this coal mine at Denniston Plateau in 2012. The Environment Court would announce the decision to permit coal mining at Denniston Plateau in 2013 (Bathurst Resources Ltd., 2013, p. 3–6).

Natural Gas and Oil.—New Zealand's natural gas and oil were produced from 19 fields, all of which are located in the Taranaki basin. In 2012, New Zealand's production of natural gas increased by about 14%, whereas production of oil decreased by about 15% compared with that of 2011. Natural gas production increased at the Mangahewa and the Maui fields, and the owner, Todd Energy Ltd., invested \$800 million to drill five wells to expand the output capacity at the Mangahewa field. Natural gas production in New Zealand was expected to increase during the next several years.

New Zealand was a net importer of oil. Nearly all domestically produced New Zealand oil was exported because New Zealand crude oil was low density, had low sulfur content, and attracted a premium price on the international market. Cheaper foreign oil was imported to refine at the Marsden Point refinery. About 59% of the imported oil was from Middle Eastern countries, and about 28% was from Asian countries, mainly Brunei and Indonesia. The Government extended the tax exemption for exploration companies until December 31, 2014, to encourage exploration for offshore hydrocarbons in New Zealand territory (Ministry of Economic Development, 2013a).

Outlook

Most mineral production in New Zealand is consumed locally, with the exception of aluminum, coal, gold, and amorphous silica. Coal and gold are the leading exported mineral commodities. Under the Crown Minerals Amendment Act 2013, some mineral exploration restrictions have been redefined on public areas where the mineral potential is significant and mineral production could contribute significantly to the economy of New Zealand. The development of the mining sector in New Zealand, however, is constrained by the population's concerns about the environmental issues

related to mining, the ecological sensitivity of the country, and New Zealand's location far from major industrial markets. Consistent with these trends, New Zealand's mineral development is expected to continue to increase only gradually.

References Cited

- Bathurst Resources Ltd., 2013, Quarterly activities and cash flow report 31 December 2012: Wellington, New Zealand, Bathurst Resources Ltd., January 31, 12 p.
- Berry, Michael, 2012, Pike River Coal sale completed: *Stuff.co.nz*, July 17. (Accessed October 4, 2012, at <http://www.stuff.co.nz/business/industries/7294998/Pike-River-Coal-salw-completed>.)
- Global Cement, 2013, Weston uncertainty ends in New Zealand: Global Cement, August 7. (Accessed October 25, 2013, at <http://globalcement.com/news/item/1859-weston-tension-ends-in-new-zealand?tmp=1>.)
- Ministry of Business, Innovation and Employment, 2012, Pike River implementation plan: Wellington, New Zealand, Ministry of Business, Innovation and Employment, December, 13 p.
- Ministry of Economic Development, 2013a, New Zealand energy quarterly: Wellington, New Zealand, Ministry of Economic Development, 8 p.
- Ministry of Economic Development, 2013b, New Zealand metal production: Wellington, New Zealand, Ministry of Economic Development, 1 p.
- Newmont Mining Corp., 2012, Newmont Waihi's gold: Denver, Colorado, Newmont Mining Corp., 28 p.
- Parliament, The, 2013, The Crown Minerals Amendment Act 2013: Wellington, New Zealand, The Parliament, May 24 reprint, 117 p.
- Reserve Bank of New Zealand, 2013, Monetary policy statement: Wellington, New Zealand, Reserve Bank of New Zealand, September, 35 p.
- Statistics New Zealand, 2013a, A good year for our economy: Statistics New Zealand. (Accessed September 30, 2013, at http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/yearbook/economy/national/gross-domestic.aspx.)
- Statistics New Zealand, 2013b, Analysis of NZ merchandise trade—Year to December 2012: Wellington, New Zealand, Statistics New Zealand, 208 p.
- Statistics New Zealand, 2013c, Gross domestic product—December 2012 quarter: Wellington, New Zealand, Statistics New Zealand, 22 p.
- Stuff.co.nz, 2013, Smelter still in talks over power price deal: *Stuff.co.nz*, April 13, 2013. (Accessed April 24, 2013, at <http://stuff.co.nz/southland-times/business/8545556/Smelting-still-in-talks-over-power-price-deal>.)
- Trans-Tasman Resources Ltd., 2013, Trans-Tasman Resources submits mining permit application: Wellington, New Zealand, Trans-Tasman Resources Ltd. press release, July 26, 1 p.
- Waihi Gold Co. Ltd., 2012, Golden Link project including the Correnso underground—Application to HDC for resource consent and AEE: Waihi, New Zealand, Waihi Gold Co. Ltd., June, 86 p.

TABLE 1
NEW ZEALAND: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity		2008	2009	2010	2011	2012
METALS						
Aluminum metal, smelter, primary		315,500	271,902	343,335	354,029	326,963
Gold, mine output, Au content	kilograms	13,403	13,442	13,494	11,761 ^r	10,164
Iron and steel:						
Iron sand, titaniferous magnetite, gross weight	thousand metric tons	2,020	2,092	2,439	2,357	2,395
Pig iron ^e	do.	622	608	667	659	669
Steel, crude ^e	do.	799	765	853	844	912
Lead, refinery output, secondary ^e		9,000	13,000	9,000	9,000	9,000
Silver, mine output, Ag content	kilograms	18,269	14,264	17,136	14,324	5,629
INDUSTRIAL MINERALS						
Cement, hydraulic ^e	thousand metric tons	1,200	1,200	1,100	1,200	1,200
Clays:						
Bentonite		753	880	1,216	--	--
Kaolin, pottery		12,761	9,016	10,700	21,545	11,578
For brick and tile		34,650	40,740	30,192	10,911	71,487
Diatomaceous earth		14	10	95	--	--
Lime ^e		180,000 ^r	175,000 ^r	170,000 ^r	175,000 ^r	175,000
Marble ^e		15,000	15,000	14,000	14,000	14,000
Nitrogen, N content of ammonia ^e		125,000	125,000	120,000	120,000	120,000
Perlite		--	8,848	5,088	--	3,598
Pumice		174,729	159,357	118,249	229,268	72,414
Salt ^e		100,000	100,000	95,000	95,000	95,000
Sand and gravel:						
Silica sand, glass sand		48,575	43,458	113,231	109,346	73,064
Other industrial sand		1,160,543	1,453,793	1,726,236	1,203,103	1,517,308
For roads and ballast	thousand metric tons	20,889	15,471	13,257	15,258 ^r	15,439
For building aggregate	do.	9,743	8,064	7,528	6,183 ^r	6,561
Stone:						
Dolomite		16,962	52,000	86,399	59,782	86,040
Limestone and marl:						
For agriculture	thousand metric tons	1,918	2,020	1,686	1,387 ^r	1,020
For cement	do.	2,018	1,888	1,800	1,705 ^r	1,797
For other industrial uses	do.	874	664	1,054	185	319
Serpentine		4,494	14,197	43	41,201 ^r	36,731
Dimension		16,998	17,795	18,911	140	8,614
Zeolites		25,800	21,750	--	3,523 ^r	--
MINERAL FUELS AND RELATED MATERIALS						
Coal, all grades	thousand metric tons	4,909	4,563	5,330	4,944	4,926
Liquefied petroleum gas ^e	thousand 42-gallon barrels	979 ²	857 ²	1,200	1,200	1,200
Natural gas:						
Gross production	million cubic meters	4,484	4,644	5,052	4,678	5,188
Marketed production	do.	3,994	4,097	4,432	4,003	4,559
Petroleum:						
Crude	thousand 42-gallon barrels	21,436	20,026	19,302	16,591	14,149
Refinery products ^e	do.	34,000	35,000	34,000	33,000	39,000

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through August 10, 2013.

²Reported figure.

TABLE 2
NEW ZEALAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities	Annual capacity ^c
Aluminum		Tiwai Point smelter [New Zealand Aluminium Smelters Ltd. (Pacific Aluminum, 79.36%, and Sumitomo Chemical Co., 20.64%)]	Southland, Invercargill	350
Cement		Golden Bay Cement (Fletcher Building Ltd.)	Portland	900
Do.		Holcim New Zealand Ltd.	Cape Foulwind, Westport	500
Coal		Stockton open pit mine (Solid Energy New Zealand Ltd., 51%, and Cargill Inc., 49%)	Buller, 35 kilometers northeast of Westport	2,500
Do.		Pike River underground mine (Pike River Coal Ltd.)	50 kilometers northeast of Greymouth	1,000
Do.		Spring Creek underground mine (Solid Energy New Zealand Ltd.)	Greymouth	1,000
Do.		Rotowaro open pit mine (Solid Energy New Zealand Ltd.)	Huntly	1,500
Do.		Huntly East underground mine (Solid Energy New Zealand Ltd.)	do.	500
Do.		New Vale open pit mine (Solid Energy New Zealand Ltd.)	50 kilometers northeast of Invercargill	300
Do.		Ohai open pit mine (Solid Energy New Zealand Ltd.)	Ohai	200
Do.		Terrace underground mine (Solid Energy New Zealand Ltd.)	Reefton	100
Gold	metric tons	Newmont Waihi Gold (subsidiary of Newmont Mining Corp.)	Waihi	5
Do.	do.	Macraes gold project (OceanaGold Corp.)	Otago	6
Do.	do.	Reefton gold project (OceanaGold Corp.)	Reefton	10
Iron and steel:				
Iron ore		New Zealand Steel Ltd. (BlueScope Steel Ltd. of Australia)	Taharoa, 150 kilometers south of Auckland	1,300
Do.	do.		Waikato North Head, 30 kilometers south of Auckland	1,000
Steel	do.		Glenbrook	650
Do.		Otahuhu Mill [Pacific Steel Group (Fletcher Building Ltd.)]	Auckland	300
Kaolin		Imerys Tableware New Zealand Ltd.	80 kilometers northwest of Whangarei	25
Petroleum, refinery	barrels per day	Marsden Point Oil Refinery (New Zealand Refinery Co., operator)	Marsden Point	95,000
Salt		Dominion Salt Ltd.	South of Blenheim	70
Silver	metric tons	Newmont Waihi Gold (Newmont Mining Corp.)	Waihi	30
Do.	do.	OceanaGold Corp.	Otago	1

^cEstimated. Do., do. Ditto.