USGS
science for a changing world

2010 Minerals Yearbook

NEW ZEALAND

U.S. Department of the Interior
U.S. Geological Survey

August 2012

The Mineral Industry of New Zealand

By Pui-Kwan Tse

The output of the mineral industry of New Zealand was small compared with that of its neighboring country Australia. The country had 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, diatomite, dolomite, limestone, perlite, phosphate rock, pumice, salt, silica, building and dimension stone, sulfur, and zeolite had been discovered in the country.

The Crown Minerals Act 1991 and the Crown Minerals Amendment Act 2003 set the broad legislative policy for the prospecting and exploring for and the 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 cover new technologies and resources. The Government also would evaluate Schedule 4 of the Crown Minerals Act 1991 that restricted 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 and add 14 more areas into the schedule. 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 Government would not tax the conservation fund based on mineral royalties. The bill to revise the Crown Minerals Act 1991 was initially scheduled to be submitted to the Parliament in December 2010; however, the Government decided to delay the submission of the bill until 2011 (Ministry of Economic Development, 2010, p. 1–20; 2011c).

In 2010, New Zealand's gross domestic product (GDP) increased by 1.5% compared with that of 2009. New Zealand's total exports were valued at $43.5 billion New Zealand dollars ($NZ) (US$32.2 billion), and its total imports were valued at $NZ42.4 billion (US$31.4 billion). Australia continued to be New Zealand's main import and export trading partner. The United States and China were also New Zealand's second and third ranked export markets, respectively. China and the United States were New Zealand's second and third ranked sources of imports, respectively. Mineral fuels accounted for 4.8% of the country's total export value, and aluminum and its products accounted for 2.8%. Mineral fuels were New Zealand's most valuable imported commodities and they accounted for 14.8% of the country's total import value (Reserve Bank of New Zealand, 2011, p. 12; Statistics New Zealand, 2011b, p. 3–35).

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 significant 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 production of coal, metals, and industrial minerals accounted for about 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, 2011c, p. 4).

Production

New Zealand's economy was constrained as a result of the slowdown of household spending that led to reduced activity in the manufacturing and retail sectors. Manufacturing sales fell by 7.1% driven largely by the decrease in the price of oil. Activity in the construction sector decreased by about 10% in 2010. Production of such mineral commodities as aluminum, bentonite, coal, dolomite, iron and steel, iron sand, sand, and silver increased by more than 10% compared with that of 2009. Mineral commodities for which production decreased significantly included limestone, perlite, pumice, and zeolite. Data on mineral production are in table 1 (Statistics New Zealand, 2011a).

Structure of the Mineral Industry

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

Commodity Review

Metals

Aluminum.—New Zealand Aluminum Smelters Ltd. was the sole primary aluminum producer in New Zealand. In May, the company replaced the transformer at its reduction line, which increased the power delivery level to 610 megawatts. Aluminum production increased to 343,335 metric tons (t) in 2010 from 271,902 t in 2009. A second new transformer was scheduled to be installed in 2011 and, as a result, aluminum production was expected to increase again in 2011. The New Zealand Government expressed its commitment to combating climate change and reducing greenhouse gas emissions in the country under the Kyoto Protocol. The Government set up an emissions trading scheme (ETS) under the Climate Change Response Act 2002. Industrial producers were required to participate in the scheme. The introduction of the ETS for industrial sector participants, such as aluminum producers, started on July 1, 2010. This was first aluminum smelter in the world to be exposed to a carbon cost for both its onsite emissions and indirect emissions (Ministry of Environment, 2008; New Zealand Aluminum Smelters Ltd., 2011, p. 1).

Gold.—New Zealand's gold production was dominated by Newmont Mining Corp. of the United States and OceanaGold Corp. The Martha goldfield is located in Waihi and was owned by Newmont Waihi Gold, which was a subsidiary of Newmont Mining. The Martha open pit mine had been scheduled to close in 2007 but Newmont Mining was evaluating ways to extend mining at the open pit to 2012 and was also actively exploring in another part of the region. Mining was started at an underground ore body (the Favona deposit) at the processing plant site in late 2006. In 2010, Newmont Mining's Waihi operation produced 3.4 t (reported as 108,000 troy ounces), which was lower than the 3.7 t (reported as 118,200 troy ounces) produced in 2009. The operation also produced 16.3 t (reported as 522,129 troy ounces) of silver. Newmont Mining joined with Glass Earth Gold Ltd. to explore a gold prospect located southwest of Whangamata and at the Wharekirponga prospect, which is located about 11 kilometers (km) north of the Waihi operation. The company planned to develop portals from the ramp of the Martha Mine's northwestern wall to assess the economic potential of gold and silver remaining below the pit floor (Gold and Minerals Gazette, 2011; Newmont Mining Corp., 2011, p. 27).

OceanaGold's Macraes gold projects in New Zealand included the Macraes open pit mine and the Frasers underground mine on the east coast of the South Island, and the Reefton open pit mine and a 1-million-metric-ton-per-year (Mt/yr) processing plant on the west coast of the South Island. The concentrate was sent by rail to the Macraes pressure oxidation facility for final processing. In 2010, the company produced a total of 8.4 t (reported as 268,602 troy ounces) of gold, which was a decrease of 10% from that of 2009. The company continued exploring for gold in these mining areas (OceanaGold Corp., 2011, p. 10–13).

Iron and Steel.—New Zealand Steel Ltd. (a subsidiary of BlueScope Steel Ltd. of Australia), which was located at Glenbrook, was the sole integrated steel producer in the country. Iron sand from the Waikato North Head site was pumped to the Glenbrook Mill by way of an 18-km-long underground pipe to the steel plant to produce 80% metallic iron, which was then transferred to an oxygen steelmaking furnace, then to a continuous caster, and then to a rolling mill to produce flat-rolled steel products. The ironmaking plant had an output capacity of 650,000 metric tons per year (t/yr). The iron ore was mainly titanomagnetite iron sand deposits that extend along 480 km of coastline from Kaipara Harbour south to Wanganui on the west coast of the North Island. Deposits at Taharoa and Waikato North Head were being mined. Production of Taharoa's iron sands was mainly for export to Asian countries.

Industrial Minerals

Cement.—New Zealand's cement industry was dominated by two producers—Golden Bay Cement and Holcim New Zealand Ltd. Holcim New Zealand discussed with its parent company (Holcim Ltd. of Switzerland) the possibility of building a new up-to-date technology plant to replace the existing cement plant at Weston, near Oamatu. The new plant would increase production capacity and reduce emissions. The decision about the new cement plant would be made in 2011. The Government amended the New Zealand Standard NZS 3132 in 2010 to allow an increase of mineral additions to 10% from 5%, which would reduce the clinker factor of general purpose cement. This change would reduce significantly the amount of carbon dioxide emission from cement production (Holcim New Zealand Ltd., 2011, p. 28).

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. 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. Coal accounted for about 4% of the country's total energy consumption. The Government owned about 50% of the country's coal resources. New Zealand exported nearly all its bituminous coal output from the South Island. Five underground and 16 opencast mines were operating in 2010 and about 59% of output was from 2 opencast operations at Rotowaro near Huntly and Stockton in the Buller field. New Zealand's coal production increased by 17% in 2010 compared with production in 2009. The increase was a result of the restoration of normal production levels of the mines at Rotowaro after labor problems were resolved. Although lignite accounted for 80% of the country's

coal resources, it accounted for only about 6% of the total coal output in 2010. Bituminous coal was produced in the West Coast region of the South Island. Subbituminous coal was mainly from the Waikato region of the North Island. Lignite was from the Southland region of the South Island. State-owned Solid Energy New Zealand Ltd. accounted for about 80% of the country's coal output. In 2010, New Zealand exported 2.3 Mt bituminous coal that went mainly to India and Japan, with a small quantity going to Brazil, Chile, China, South Africa, and the United States. The Huntly powerplant imported 0.26 Mt of coal. Coal accounted for about 4% of the country's total energy consumption (Ministry of Economic Development, 2011a, p. 2–4).

Pike River Coal Ltd. completed the construction of its Pike River coal mine, which is located about 50 km northeast of Greymouth on the west coast of the South Island, in 2010. A 2,300-meter (m) adit was built to reach the estimated recoverable resource of 18 Mt of low-ash coking coal, which is located under Department of Conservation-administered land, including in part of the Paparoa National Park. The company estimated that the area contained 58.5 Mt of coking coal. The coal seam thickness was 4 to 9 m. The mine began production in 2010 and the first coal shipment of 20,000 t went to India in February 2010. Two Indian customers agreed to take 55% of the Pike River Mine's coal output. The company also signed an agreement with Japanese steel mills to supply them with 22% of its coal output for 3 years. The company planned to produce about 800,000 t/yr of coking coal for 18 years. Coal would be transported from the underground mine by a 10.6-km-long slurry pipeline to a preparation plant for dewatering. 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 (Pike River Coal Ltd., 2010, p. 4–8; PricewaterhouseCoopers International Ltd., 2010, p. 1).

Natural Gas and Oil.—New Zealand's natural gas and oil were produced from 19 fields, all of which were located in the Taranaki Basin. Natural gas was produced from 13 fields. In 2010, New Zealand's oil production decreased by about 4% compared with that of 2009. The Maari project, which is located 80 km off the South Taranaki coast south of the Maui field and in which OMV New Zealand Ltd. (the operator) held a 69% equity interest, came onstream in February 2009. In 2010, the Maari field accounted for 31.1% of the country's oil production followed by the Pohokura field, 21.9%; the Tui field, 18.0%; the Maui field, 10.0%; and others, 19.0%.

The Government extended the tax exemption for exploration companies until December 31, 2014, to encourage exploration for offshore hydrocarbons in New Zealand territory. The Government offered the Offshore Reinga and Northland Block for exploration and awarded the Onshore Taranaki Kahili Block to Mosaic Oil NZ Ltd. and L&M Energy Ltd. jointly in 2010. In 2008, the Government had awarded nine exploration permits to a number of new and existing explorers; as a result, more exploration wells would be drilled in the next several years.

New Zealand was a net oil importing country, and oil import dependency peaked at 95% in 2006. In 2010, oil import dependency increased to 63% from 49% in 2009 as a result of a decrease in domestic oil production. About 59% of imported oil was from Middle Eastern countries and about 28% was from Asian countries, mainly Indonesia and Brunei. The Marsden Point Oil Refinery was the country's only oil refinery; it was operated by New Zealand Refinery Co. (Ministry of Economic Development, 2011b, p. 43).

Outlook

Most mineral production is consumed locally with the exception of aluminum, coal, gold, and amorphous silica. Coal, gold, and oil are the leading exported mineral commodities. The Government proposed to remove some restrictions on public areas where mineral exploration could lead to a significant contribution to the economy of New Zealand. The development of the mining sector in New Zealand, however, is constrained by the population's environmental awareness, 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

Gold and Minerals Gazette, 2011, Newmont Waihi aims to fill future production gaps: Gold and Minerals Gazette, August, p. 20.

Holcim New Zealand Ltd., 2011, Annual review for the year ending 2010: Christchurch, New Zealand, Holcim New Zealand Ltd., 37 p.

Ministry of Economic Development, 2010, Reviewing the Crown Minerals Act 1991: Wellington, New Zealand, Ministry of Economic Development, August, 47 p.

Ministry of Economic Development, 2011a, Introduction to New Zealand's coal resources: Ministry of Economic Development, August, 11 p.

Ministry of Economic Development, 2011b, New Zealand energy data file: Ministry of Economic Development, 164 p.

Ministry of Economic Development, 2011c, Outcome of Schedule 4 stocktake process: Wellington, New Zealand, Ministry of Economic Development, 1 p. (Accessed September 20, 2011, at http://www.med.govt.nz/templates/standardsummary_44101.aspx.)

Ministry of Environment, 2008, Factsheet 15—How the New Zealand emissions trading scheme works: Wellington, New Zealand, Ministry of Environment, September, 3 p.

Newmont Mining Corp., 2011, Annual report 2010: Denver, Colorado, Newmont Mining Corp., 186 p.

New Zealand Aluminum Smelters Ltd., 2011, NZAS 2010 sustainable development review: Southland, New Zealand, New Zealand Aluminum Smelters Ltd., 16 p.

OceanaGold Corp., 2011, Business review June 2011: Melbourne, Victoria, Australia, OceanaGold Corp., 45 p.

Pike River Coal Ltd., 2010, Annual review 2010: Wellington, New Zealand, Pike River Coal Ltd., 17 p.

PricewaterhouseCoopers International Ltd., 2010, Receivers' first report on the state of affairs of Pike River Coal Limited (in receivership): Christchurch, New Zealand, PricewaterhouseCoopers International Ltd., 8 p.

Reserve Bank of New Zealand, 2011, Monetary policy statement December 2010: Wellington, New Zealand, Reserve Bank of New Zealand, December 9, 33 p.

Statistics New Zealand, 2011a, Annual enterprise survey—2010 financial year: Wellington, New Zealand, Statistics New Zealand, 6 p.

Statistics New Zealand, 2011b, Global New Zealand international trade, investment and travel profile—Year ended December 2010: Wellington, New Zealand, Statistics New Zealand, 196 p.

Statistics New Zealand, 2011c, Gross domestic product—December 2009 quarter: Wellington, New Zealand, Statistics New Zealand, 24 p.

TABLE 1

NEW ZEALAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2006	2007	2008	2009	2010
METALS						
Aluminum metal, smelter:						
Primary		337,264	351,100	315,500	271,902 r	343,335
Secondary[e]		22,000	22,000	22,000	22,000	22,000
Total		359,264	373,100	337,500	293,902	365,335
Gold, mine output, Au content	kilograms	10,618	10,628	13,403	13,442	13,469
Iron and steel:						
Iron sand, titaniferous magnetite, gross weight	thousand metric tons	2,146	1,723	2,020	2,092 r	2,439
Pig iron[e]	do.	664	679	622	608	667
Steel, crude[e]	do.	810	845	799	765	853
Lead, refinery output, secondary[e]		7,000	7,000	9,000	13,000	9,000
Silver, mine output, Ag content	kilograms	27,221	10,568	18,269	14,264	16,095
INDUSTRIAL MINERALS						
Cement, hydraulic[e]	thousand metric tons	1,120 [2]	1,200	1,200	1,200	1,100
Clays:						
Bentonite		3,028	6,154	753	880	1,216
Kaolin, pottery		14,864	14,130	12,761	9,016	10,700 e
For brick and tile		46,667	55,645	34,650	40,740 r	30,192
Diatomaceous earth		142	14	14	10	95
Lime[e]		20,000	20,000	20,000	20,000	19,000
Marble[e]		15,000	15,000	15,000	15,000	14,000
Nitrogen, N content of ammonia[e]		120,000	125,000	125,000	125,000	120,000
Perlite		3,552	7,873	--	8,848	5,088
Pumice		303,659	354,903	174,729	159,357	118,249
Salt[e]		100,000	100,000	100,000	100,000	95,000
Sand and gravel:						
Silica sand, glass sand		58,705	86,461	48,575	43,458	113,231
Other industrial sand		2,433,165	1,896,343	1,160,543	1,453,793	1,726,236
For roads and ballast	thousand metric tons	23,981	23,782	20,889	15,471	14,769
For building aggregate	do.	8,518	9,601	9,743	8,064 r	7,448
Stone:						
Dolomite		1,626	62,770	16,962	52,000 r	86,399
Limestone and marl:						
For agriculture	thousand metric tons	2,326	2,180	1,918	2,020 r	1,686
For cement	do.	1,762	1,965	2,018	1,888	1,800
For other industrial uses	do.	944	947	874	664	1,054
Serpentine		41,000	45,648	4,494	14,197	43
Dimension		22,880	22,934	16,998	17,795 r	18,911
Zeolites		9,041	17,039	25,800	21,750	--
MINERAL FUELS AND RELATED MATERIALS						
Coal, all grades	thousand metric tons	5,768	4,835	4,909	4,563	5,330
Liquefied petroleum gas	thousand 42-gallon barrels	1,786	1,263	979	857 r	900 e
Natural gas:						
Gross production	million cubic meters	4,100	4,712	4,484	4,644	5,052
Marketed production	do.	3,900	4,310	3,994	4,097	4,432
Petroleum:						
Crude	thousand 42-gallon barrels	6,808	15,011	21,436	20,026 r	19,302
Refinery products[e]	do.	34,000	35,000	34,000	35,000	34,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through August 10, 2011.

[2]Reported figure.

TABLE 2
NEW ZEALAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities	Annual capacity[e]
Aluminum		Tiwai Point smelter [New Zealand Aluminium Smelters Ltd. (Rio Tinto Alcan, 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

[e]Estimated. Do., do. Ditto.