



# 2008 Minerals Yearbook

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## NEW ZEALAND

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# THE MINERAL INDUSTRY OF NEW ZEALAND

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New Zealand had more than 600 identified mineral occurrences in 25 different types of mineral deposits. New Zealand's mineral production included gold, iron sand, and silver; such industrial minerals as aggregate (crushed stone and gravel), building and dimension stone, clay, diatomite, feldspar, lime and limestone for agricultural and industrial uses, magnesite, marble, phosphate rock, salt, sulfur, and zeolite; and mineral fuels. The New Zealand mining industry is a small player in the international market compared with its neighboring country Australia.

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 in New Zealand. The Ministry of Economic Development, through the Crown Minerals Group, is responsible for the overall management of all state-owned minerals in New Zealand. The Crown Minerals Group also advises on policy and operational regulation and promotes investment in the mineral sector. The royalty regimes for coal, minerals, and petroleum are defined in the Government mineral program that is reviewed every 10 years. In 2007, the Crown Minerals (Minerals and Coal) Regulations 2007 were enacted to specify the reporting requirements for permit changes and for prospecting and exploration. The regulation took effect on February 1, 2008. The hybrid value-and-profit-based royalty was replaced with a royalty that was solely value based. Under the new law, the royalty for aggregate, coal, and industrial minerals is based on the number of metric tons sold (Ministry of Economic Development, 2008b, p. 30).

In 2008, New Zealand's total exports were valued at \$NZ42.9 billion (\$34.3 billion), and its total imports were valued at \$NZ48.9 billion (\$39.1 billion). Australia continued to be New Zealand's main import and export trading partner. The United States and Japan were 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 6.9% of the country's total export value; aluminum and its products, 3.3%; and iron and steel, 0.7%. Mineral fuels were New Zealand's most valuable imported commodities and they accounted for 17.7% of the country's total import value (Statistics New Zealand, 2009).

## 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 gross domestic product (GDP). The total value of New Zealand's minerals and mineral fuel production accounted for about 2% of the GDP. During fiscal year 2008 (July 2007 to June 2008), New Zealand's total exploration expenditure on minerals and coal was \$NZ38.16 million (\$30.53 million) and its petroleum expenditure was \$NZ1.56 billion (\$1.25 billion) (Ministry of Economic Development, 2008a, p. 14-16).

## Production

In 2008, production of such mineral commodities as gold, crude oil, silver, and zeolite increased by more than 10% compared with that of 2007. Mineral commodities for which production decreased significantly included bentonite, diatomite, dolomite, liquefied petroleum gas, pumice, serpentine, and silica sand. 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

**Gold.**—New Zealand's gold production was dominated by Newmont Mining Corp. of the United States and OceanaGold Corp. The Martha gold field is located in Waihi and is 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 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 2008, Newmont Mining's Waihi operation milled a total of 970,000 metric tons (t) of ore, which was nearly twice as much as the 500,000 t produced in 2007, and although the ore grade decreased to 4.8 grams per metric ton (g/t) in 2008 from 5.4 g/t in 2007, the recovery rate increased by 1%. Thus, as a result of the increased output and recovery rate, gold production increased to 4.5 t (144,000 troy ounces) in 2008 from 2.6 t (85,000 troy ounces). Newmont Mining joined with Glass Earth Gold Ltd. to explore a gold prospect southwest of Whangamata and at the Wharekiriponga prospect, which is located about 11 kilometers (km) north of the Waihi operation (Newmont Mining Corp., 2009, p. 11).

OceanaGold's Macraes gold project consisted of the Macraes open pit mine and the Frasers underground mine, which started production in January 2008. OceanaGold's Reefion gold project

was located about 7 km from Reefton on the west coast of the South Island and the project began operating in 2007. The Reefton project included four open pits—the Empress, the General Gordon, the Globe Progress, and the Souvenir—and a 1-million-metric-ton-per-year (Mt/yr) processing plant. The concentrate was sent by rail to the Macraes pressure oxidation facility for final processing. In 2008, gold production from Macraes increased by 26% to 5.7 t (183,680 troy ounces) and that from Reefton increased by 50% to 2.4 t (76,132 troy ounces). The ore grade through the mill from the Macraes Mine increased by 25% to 1.31 g/t and that from the Reefton Mine decreased by 5% to 2.47 g/t. OceanaGold planned to produce between 8.7 t and 9.3 t of gold in 2009 (OceanaGold Corp., 2009, p. 12-15).

**Iron and Steel.**—New Zealand’s iron ore is 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. Iron sand from Waikato North Head was used by New Zealand Steel Ltd. (a subsidiary of BlueScope Steel Ltd. of Australia) which was located at Glenbrook. New Zealand Steel was an integrated steel producer that had a steel output capacity of 650,000 t/yr; the steel was first transferred to a continuous caster and then to a rolling mill to produce flat-rolled steel products. BlueScope signed an agreement to sell its Taharoa operation on the North Island to Hong Kong-based Cheung Kong Infrastructure Holdings Ltd. for NZ\$250 million; however, the Government of New Zealand rejected the transaction because the Taharoa operation was considered to be on “sensitive land” and the sale would not produce any substantial and identifiable benefit to New Zealand. The production of Taharoa’s iron sands was mainly for export to China and Japan (BlueScope Ltd., 2008).

### **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. About 45 coal mines were in operation in New Zealand. 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. New Zealand exported nearly all its bituminous coal output from the South Island. Five underground and 20 opencast mines were operating in 2008 and about 63% of output was from 2 opencast operations at Rotowaro near Huntly and Stockton in the Buller field. State-owned Solid Energy New Zealand Ltd. accounted for about 80% of the country’s coal output. In 2008, the country exported 2.56 million metric tons (Mt), which was higher than the 2.01 Mt exported in 2007. The increase in the coal export volume was in response to increased external demand in the first three quarters of 2008. Coal exports went mainly to India and Japan, with a small quantity going to Brazil, Chile, China, South Africa, and the United States. New Zealand imported 607,000 t in 2008, which was lower than the

729,000 t imported in 2007. Imported coal was largely to supply the Huntly powerplant. New Zealand consumed more than 4 Mt of coal during the past several years. The power sector was the leading coal consumer followed by the steel sector (Ministry of Economic Development, 2009a).

Pike River Coal Ltd. started the construction of its Pike River coal mine at about 50 km northeast of Greymouth in the west coast of the South Island in 2006. A 2,300-meter (m) adit was built to reach the estimated recoverable resource of 18 Mt of low-ash coking coal, which was located under Department of Conservation-administered land, with part of it under Paparoa National Park. The mine was designed to produce 1 Mt/yr for 18 years beginning in 2010. The company estimated that the area contained 58.5 Mt of coking coal. The coal seam thickness was 4 m to 9 m. Coal would be transported from the underground mine by a 10.6-km-long slurry pipeline to a preparation plant for dewatering and electronic grading; it would be stockpiled and eventually trucked to rail-loading facilities for transport across the Southern Alps to Lyttelton, and then exported. Owing to technical difficulties, the first shipment of 60,000 t of coking coal would be delayed until the first quarter of 2010 from its originally scheduled delivery date of November 2009. Pike River signed contracts to deliver nearly all its coking coal output through March 31, 2010, to buyers in India and Japan at a cost of \$128 per metric ton (Pike River Coal Ltd., 2009).

Solid Energy decided to shut down the Terrace underground coal mine at the end of 2009. In recent years, the mine produced about 45,000 t/yr of thermal coal, and the operation struggled to remain profitable because of high production costs. The shutdown of the mine would not affect the Reefton distribution center, and the company planned to explore other prospects near the town and to consider resuming the operation of mining at Island Block, which contained about 5 Mt of coking coal resources. Solid Energy also decided to close down the Ohai opencast mine in Southland in 2009. Solid Energy continued reviewing some small coal mine operations throughout the country in the face of increasing production costs (Solid Energy New Zealand Ltd., 2009).

**Natural Gas and Oil.**—New Zealand’s natural gas and oil were produced from 21 fields, all of which are located in the Taranaki Basin. Natural gas was produced from 16 fields. In 2008, New Zealand’s oil production increased by more than 40% compared with that of 2007. The Tui field, which was owned by Australian Worldwide Exploration Ltd. (AWE) (the operator), Mitsui E&P New Zealand Ltd., Natural Gas Corp. Ltd., and Pan Pacific Petroleum, was put into operation in 2007. This field accounted for the major share of the country’s increased oil production. The Tui field produced 63% of the country’s total oil output followed by the Pohokura field, 21%; the Maui field, 7%; the Kapuni field, 2%; and others, 7%. 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, was scheduled to come onstream in 2009 and was expected to produce 50 million barrels of oil in its first year of operation. The Government extended the tax exemption on exploration companies until December 31, 2014, to encourage exploration for offshore hydrocarbons in New Zealand territory. The Marsden Point

Oil Refinery was the country's only oil refinery; it was operated by New Zealand Refinery Co. (Ministry of Economic Development, 2009b).

## Outlook

Owing to the global financial crisis, the economy of New Zealand is expected to slow down noticeably in the next several years. Most mineral production is consumed locally with the exception of aluminum, coal, gold, and amorphous silica. Coal, gold, and oil are the leading exported commodities. The development of the mining sector in New Zealand 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.

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TABLE 1  
NEW ZEALAND: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008	
<b>METALS</b>						
Aluminum metal, smelter:						
Primary	342,000	351,449	337,264	351,100 <sup>r</sup>	315,500	
Secondary <sup>c</sup>	21,500	21,500	22,000	22,000	22,000	
Total	363,500	372,949	359,264	373,100 <sup>r</sup>	337,500	
Gold, mine output, Au content	kilograms	10,151	10,583	10,618	10,628 <sup>r</sup>	16,274
Iron and steel:						
Iron sand, titaniferous magnetite, gross weight	thousand metric tons	2,329	2,207	2,146	1,723	2,020
Pig iron <sup>c</sup>	do.	650	652	664	679	600
Steel, crude <sup>c</sup>	do.	850	889	810	845	853
Lead, refinery output, secondary <sup>c</sup>		8,000 <sup>r</sup>	7,000 <sup>r</sup>	7,000 <sup>r</sup>	7,000 <sup>r</sup>	7,000
Silver, mine output, Ag content	kilograms	30,084	43,003	27,221	10,568	31,017
<b>INDUSTRIAL MINERALS</b>						
Cement, hydraulic	thousand metric tons	1,100	1,050	1,120	1,200 <sup>e</sup>	1,200 <sup>e</sup>
Clays:						
Bentonite		10,050	7,590	3,028	6,154	753
Kaolin, pottery		15,500	15,750	14,864	14,130	12,761
For brick and tile		57,350	41,170	46,667	55,645	34,650
Diatomaceous earth		240	20	142	14	14
Lime <sup>c</sup>		20,000	20,000	20,000	20,000	20,000
Marble <sup>c</sup>		15,000	15,000	15,000	15,000	15,000
Nitrogen, N content of ammonia <sup>c</sup>		124,000 <sup>r</sup>	120,000 <sup>r</sup>	120,000 <sup>r</sup>	125,000	125,000
Perlite		5,600	7,310	3,552	7,873	--
Pumice		280,950	245,080	303,659	354,903	174,729
Salt <sup>c</sup>		70,000	100,000	100,000	100,000	100,000
Sand and gravel:						
Silica sand, glass sand		60,080	65,350	58,705	86,461	48,575
Other industrial sand		1,753,140	1,574,050	2,433,165	1,896,343	1,160,543
For roads and ballast	thousand metric tons	21,720	24,712	23,981	23,782	20,889
For building aggregate	do.	11,362	10,921	8,518	9,601	9,743
Stone:						
Dolomite		12,000	--	1,626	62,770 <sup>r</sup>	16,962
Limestone and marl:						
For agriculture	thousand metric tons	1,913	2,594	2,326	2,180	1,918
For cement	do.	1,839	1,741	1,762	1,965	2,018
For other industrial uses	do.	561	891	944	947	874
Serpentine		60,880	62,320	41,000	45,648	4,494
Dimension		26,110	29,270	22,880	22,934	16,998
Zeolite		11,440	18,790	9,041	17,039	25,800
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Coal, all grades	thousand metric tons	5,154	5,267	5,768	4,835	4,909
Liquefied petroleum gas	thousand 42-gallon barrels	1,710	1,946	1,786	1,263 <sup>r</sup>	979
Natural gas:						
Gross production	million cubic meters	4,500	4,223	4,100	4,712	4,484
Marketed production	do.	4,114	3,911	3,900	4,310	3,994
Petroleum:						
Crude	thousand 42-gallon barrels	7,625	7,032	6,808	14,873	21,298
Refinery products <sup>e</sup>	do.	34,000	34,000	34,000	34,000	34,000

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

<sup>1</sup>Table includes data available through September 30, 2009.

TABLE 2  
NEW ZEALAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
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	3
Iron and steel:				
Iron ore		New Zealand Steel Ltd. (BlueScope Steel Ltd.)	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

<sup>e</sup>Estimated. Do., do. Ditto.

