



# 2011 Minerals Yearbook

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## TANZANIA

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# THE MINERAL INDUSTRY OF TANZANIA

By Thomas R. Yager

In 2011, Tanzania played a significant role in the global production of gold, accounting for nearly 2% of the world's gold mine output (George, 2012). The country also was the world's only producer of tanzanite. Other domestically significant mining and mineral processing operations included cement and natural gas. Tanzania was not a globally significant consumer of minerals or mineral fuels.

## Minerals in the National Economy

In 2011, the manufacturing sector accounted for 9.3% of the gross domestic product, and mining and quarrying, 3.3%. The value of output in the mining sector increased by 2.1% in 2011 compared with 2.7% in 2010. At least 500,000 artisanal miners were estimated to produce colored gemstones, diamond, gold, and other mineral commodities (Bank of Tanzania, 2012a, p. 44, 50; Mrindoko, 2012).

## Government Policies and Programs

Tanzania is a signatory to the Kimberley Process Certification Scheme, which is a certification system established to reduce the trade in conflict diamond. Prior to 2010, the mining sector was regulated by the Mining Act of 1998, which, when enacted, simplified previous laws on mining and mineral trading.

In 2010, the Government passed the Mining Act of 2010, which increased royalties on gold and base metals to 4% from 3%, and on rough diamond and colored gemstones, to 6% from 5%. Royalties on uranium were set at 7%, and on other minerals, at 3%. The new legislation also required companies to list on a domestic stock exchange, allowed the Government to take a share in future mining projects, and restricted foreign participation in small-scale mining (Mining Journal, 2010; Thompson, 2010).

## Production

In 2011, gypsum production increased by 44%; limestone, by 37%; gold and silver, by 12% each; and natural gas, by an estimated 10%. Coal production also increased sharply. Diamond production decreased by 65% (table 1).

## Structure of the Mineral Industry

Tanzania's gold mines were privately owned; the Minjingu phosphate mines and the Nyanza salt mines were also owned by private investors. The Government held minority interests in the privately owned Kiwira coal mine and the Williamson diamond mine. Artisanal miners accounted for most of the country's colored gemstone production; crushed stone, diamond, and gold were also produced by artisanal miners.

## Mineral Trade

Gold exports increased in value to \$2.06 billion in the first 11 months of 2011 from \$1.34 billion in the same period in 2010. In the first 11 months of 2011, the share of gold in total exports was 51.1%; and colored gemstones, copper, diamond, silver, and other minerals combined, 1.4%. The Bank of Tanzania reported that imports of petroleum products increased in value to \$2.8 billion in the first 11 months of 2011 from \$1.86 billion in the same period in 2010. Petroleum products accounted for 32.6% of the value of total imports, and fertilizers, 1.8% (Bank of Tanzania, 2011, p. 40–41; 2012b, p. 40–41).

## Commodity Review

### Metals

**Cobalt, Copper, and Nickel.**—Barrick Gold Corp. of Canada (50%) and Xstrata plc of Switzerland (50%) had a joint venture for the exploration and development of the Kabanga nickel deposit in northwestern Tanzania. Resources at Kabanga were estimated to be 63.9 million metric tons (Mt) at a grade of 2.62% nickel; the deposit also contained cobalt, copper, and platinum. Barrick and Xstrata hoped to negotiate a Mineral Development Agreement with the Government and to obtain the approval of their environmental impact assessment and special mining license. The companies planned to make a decision on development at Kabanga by the end of 2012 (Barrick Gold Corp., 2012, p. 19, 187).

African Eagle Resources plc (AER) of the United Kingdom planned to complete a feasibility study on a new mine at the Dutwa nickel-cobalt laterite deposit by the end of 2012. Depending on the results of the studies, AER could start construction at Dutwa in 2013 and complete the new mine in early 2015. Production was expected to be about 20,000 metric tons per year (t/yr) of nickel. Resources at Dutwa were estimated to be 98.6 Mt at a grade of 0.93% nickel (Mining Review Africa, 2010; Engineering & Mining Journal, 2011; Thompson, 2011).

Continental Nickel Ltd. of Canada and its joint-venture partner IMX Resources Ltd. of Australia completed a preliminary economic assessment on a new mine at the Nachingwea nickel sulfide deposit in October 2011. Resources at Nachingwea were estimated to be 22.2 Mt at a grade of 0.86% nickel and 0.19% copper. The companies planned to complete a feasibility study on Nachingwea by the end of 2012. Depending on the results of the study, mining could start in the third quarter of 2015. Nickel production was expected to be about 11,600 t/yr in the first 4 years of mining and 15,600 t/yr in the remaining 8 years of the mine's planned life (Continental Nickel Ltd., 2011).

In 2011, Kibaran Nickel Ltd. of Australia engaged in drilling for nickel at Kagera in northwestern Tanzania. In October,

Kibo Mining plc of Ireland approved a 3-year exploration budget of \$8.4 million for the Haneti nickel project and the Itetemia and the Luhala gold projects (Thompson, 2011).

**Gold.**—Tanzania's gold output increased to an estimated 44,000 kilograms (kg) in 2011 from 39,448 kg in 2010, most of which was produced by the Bulyanhulu, the Buzwagi, the Geita, the Golden Pride, the North Mara, and the Tulawaka Mines. The six mines had a combined capacity to produce about 53,500 kilograms per year (kg/yr) of gold. Tanzania's resources amounted to about 1,700 t of contained gold, of which about 690 t was reserves (tables 1, 2, and 3).

African Barrick Gold plc (ABG) (Barrick, 75%) of the United Kingdom operated the Bulyanhulu, the Buzwagi, the North Mara, and the Tulawaka Mines. Copper was produced as a coproduct at the Bulyanhulu and the Buzwagi Mines. The Bulyanhulu Mine produced 8,150 kg of gold in 2011, which was nearly unchanged from 2010. Increased volumes of ore milled were offset by decreased ore grades and recovery rates. ABG planned to complete a feasibility study on increasing production at Bulyanhulu in 2012. Depending on the results of the study, production could increase at Bulyanhulu starting in 2014. The life of the mine was estimated to be more than 25 years (African Barrick Gold plc, 2012, p. 15, 30).

In 2011, production at the North Mara open pit mine decreased to 5,313 kg of gold from 6,623 kg in 2010 because of decreased ore grades and recovery rates. ABG completed a feasibility study on starting an underground mine at North Mara in 2011. Production could increase at North Mara by between 1,600 and 1,900 kg/yr at North Mara starting in 2015. The life of the mine was estimated to be more than 10 years (Hill, 2010; African Barrick Gold plc, 2012, p. 15, 34–35).

ABG produced 6,113 kg of gold at the Buzwagi Mine in 2011 compared with a revised 5,786 kg in 2010. Increased recovery rates and ore grades more than offset decreased volumes of ore milled. Production was limited by power supply disruptions. The life of the mine was estimated to be about 12 years (African Barrick Gold plc, 2012, p. 15, 32–33).

ABG and its joint-venture partner MDN Inc. of Canada produced gold at the Tulawaka open pit mine. Production at Tulawaka increased to 2,616 kg in 2011 from 1,870 kg in 2010. In 2011, the mine life at Tulawaka was extended to the end of 2012; Barrick and MDN planned exploration to extend the life further in 2012 (African Barrick Gold plc, 2012, p. 36–37).

In 2011, ABG completed a feasibility study on the Golden Ridge project, which was located about 50 kilometers (km) from the Buzwagi Mine. ABG planned to produce between 2,200 and 3,100 kg/yr at Golden Ridge starting in 2013 or 2014. The company decided to reevaluate options for mining at Golden Ridge after the study (Hill, 2010; African Barrick Gold plc, 2012, p. 10).

In 2011, Geita Gold Mining Ltd. (a subsidiary of AngloGold Ashanti Ltd. of South Africa) produced about 15,400 kg of gold at the Geita Mine compared with 11,100 kg in 2010. Increased ore grades more than offset decreased volumes of ore milled. The company planned to maintain production at about 15,600 kg/yr. AngloGold Ashanti also engaged in exploration at Geita in 2011 (AngloGold Ashanti Ltd., 2012, p. 67, 99).

Resolute Mining Ltd. of Australia owned the Golden Pride open pit mine. In fiscal year 2011, the Golden Pride Mine produced 3,823 kg of gold compared with 4,624 kg in fiscal year 2010. Decreased production was attributable to lower ore grades and volumes of ore milled. The mine's remaining reserves were estimated to be about 4.3 Mt at a grade of 1.6 g/t gold. Resolute engaged in drilling at the Far East prospect near the Golden Pride Mine and started a scoping study on the Nyakafuru project. The company planned to spend \$3.5 million on an updated resource assessment at Nyakafuru (Resolute Mining Ltd., 2011, p. 7, 11, 21, 25).

Shanta Gold Ltd. of the United Kingdom started mining ore at the New Luika Mine in November 2011; New Luika used ore from the Chunya project. The company planned to start gold production by the end of the third quarter of 2012 and to produce gold at the rate of about 2,300 kg/yr by the end of 2012. In August 2011, Shanta also completed a feasibility study on the development of the new Singida Mine. By 2013, the company planned to produce 1,400 kg/yr of gold at Singida. The capital costs of the project were estimated to be \$39 million. The life of the Singida Mine was estimated to be 10 years; contained gold resources were estimated to be about 27 t (Shanta Gold Ltd., 2011, 2012).

Ruby Creek Resources Inc. of the United States was awarded a mining permit for the Gold Plateau project in southern Tanzania in October 2011. The company planned to mine between 780 and 1,100 kg of gold from alluvial deposits in 2012 and to reach full production of between 1,600 and 2,300 kg/yr by the end of 2013 (Hansen, 2011).

Tanzanian Royalty Exploration Corp. of Canada and its joint-venture partner State Mining Company (Stamico) planned to start development on the Buckreef-Rwamagaza project in 2012. Resources at Buckreef-Rwamagaza were estimated to contain about 66 t of gold. Tanzanian Royalty also held the Kigosi project, which had resources that contained about 18 t of gold (table 3; African Mining, 2011b).

In April 2011, AER signed a joint-venture agreement with BrightStar Resources Ltd. of Australia to develop the Miyabi gold deposit, which had resources that contained nearly 16 t of gold. BrightStar subsequently initiated a drilling program at Miyabi (Thompson, 2011).

Peak Resources Ltd. of Australia engaged in soil sampling at the Igunga project in the third quarter of 2011. The company also entered into an option agreement for the Bunda project in the Lake Victoria goldfields (Andrews, 2012b).

MDN drilled at the Ikungu project in 2011. Helio Resource Corp. engaged in drilling at the SMP property in the Lupa Goldfield in southwestern Tanzania. Lake Victoria Mining Company Inc. of Canada started drilling at the Uyowa project in September; the company canceled its joint ventures with Otterburn Ventures Inc. of Canada for four of Lake Victoria's projects in July. Canaco Resources Inc. of Canada planned to complete an initial resource assessment at the Handeni project in the first quarter of 2012. Currie Rose Resources Inc. of Canada and Liontown Resources Ltd. of Australia drilled at the Jubilee Reef property. Rift Valley Resources Ltd. of Australia engaged in rock chip sampling at Buhemba South East, Golden Pride North, and Nyamagoma. Kibo Mining planned to explore at the

Itetemia and the Luahala projects, which had total resources that contained more than 16 t of gold (African Mining, 2011a; Mining Journal, 2011a; Thompson, 2011; Australia's Paydirt, 2012; MDN Inc., 2012, p. 6–8).

**Iron and Steel, Iron Ore, Titanium, and Vanadium.—**

In September 2011, Sichuan Hongda Company Ltd. of China signed an agreement with the state-owned National Development Corp. (NDC) to develop the Liganga iron ore deposits, which also contained titanium and vanadium. In December, NDC and Sichuan Hongda started a new resource assessment, which was expected to be completed in 12 months. The companies planned to produce 3 million metric tons per year (Mt/yr) of iron ore; mining was likely to start in 2013. Iron ore from Liganga was expected to be consumed in a new steel plant that NDC and Sichuan Hongda planned to complete by December 2015. Steel production was likely to be 1.25 Mt/yr (Mgwabati, 2011; Thompson, 2011; Ministry of Finance, 2012, p. 77–78).

**Niobium and Tantalum.—**In early 2011, Peak Resources engaged in drilling for niobium (columbium) and tantalum at the Ngualla Carbonatite project in western Tanzania. Peak Resources planned to focus on the southern rare-earth element (REE) deposit at Ngualla (Peak Resources Ltd., 2011).

**Industrial Minerals**

**Cement.—**Tanzania's cement production capacity amounted to about 3 Mt/yr. In 2011, Tanzania Portland Cement Company Ltd. (TPCC) was considering the expansion of its plant to 2 Mt/yr from 1.4 Mt/yr. The expansion depended on the resolution of local land disputes. Athi River Mining Ltd. of Kenya planned to complete a cement plant in Dar es Salaam with a capacity of 750,000 t/yr by June 2012. The company also planned to complete clinker and cement plants in Tanga with capacities of 1.2 Mt/yr and 750,000 t/yr, respectively, in early 2013. Dangote Cement plc of Nigeria planned to complete a new plant in Tanzania with a capacity of 1.5 Mt/yr by the third quarter of 2014 (International Cement Review, 2011; James, 2011; Athi River Mining Ltd., 2012).

Cement demand was estimated to be about 3.1 Mt in 2011. In 2010, cement prices were about \$130 per metric ton compared with those of neighboring landlocked countries that had higher power and transportation costs, such as Congo (Kinshasa) (about \$400 per metric ton), Burundi (about \$350 per metric ton), Rwanda (about \$300 per metric ton), and Uganda (nearly \$200 per metric ton) (Renaissance Capital LLC, 2011, p. 9, 34).

**Diamond.—**The Williamson Mine was Tanzania's leading diamond producer; Petra Diamonds Ltd. of the United Kingdom produced 21,250 carats from alluvial mining at Williamson in 2011. Petra completed the refurbishment of its main processing plant by the end of 2011. The company planned to reopen the expanded plant in early 2012. Petra planned to produce 600,000 carats per year starting in fiscal year 2014. Resources at Williamson were estimated to be 40 million carats. The estimated capital cost of the expansion was \$50 million (Petra Diamonds Ltd., 2011, p. 14–15, 24; 2012, p. 16).

**Gemstones.—**Tanzania produced a variety of gemstones that included amethyst, aquamarine, cordierite, emerald, garnet,

ruby, sapphire, spinel, tanzanite, and tourmaline. Tanzanite accounted for a majority of the value of domestic gemstone mining.

Merelani, which is located near Arusha, was the world's only source of tanzanite. Artisanal and small-scale miners operating in Blocks B and D of the Merelani deposit accounted for most of the country's tanzanite production. Kilimanjaro Mines Ltd. and Tanzanite Africa Ltd. operated medium-scale mines in Block A and the Block D Extension, respectively. By March 2009, only 30 of 382 mining operations were still in production in Block D and 20 of 323 mining operations were still in production in Block B. Sharp decreases in tanzanite prices resulting from the world economic crisis rendered most artisanal and small-scale mining operations subeconomic. As of early September 2011, many of the artisanal and small-scale mining operations were still shut down (Guardian, The, 2011).

Richland Resources Ltd. of Bermuda (formerly TanzaniteOne Ltd.) mined tanzanite in Block C; the company also cut high-quality tanzanite at its lapidaries in Tanzania. In 2011, Richland produced 476 kg of rough tanzanite compared with 441 kg in 2010; the company planned to increase production to 500 kg in 2012. Tanzanite mineralization was found at depths of 2,000 meters; the life of the mine was estimated to be at least 20 years (Thompson, 2011; Richland Resources Ltd., 2012, p. 8).

Richland also completed a new lapidary at Merelani in 2011 in response to the Government's export ban on tanzanite stones larger than 1 gram. The lapidary was producing at its full capacity of 45,000 stones per year by the end of 2011. By mid-2012, Richland planned to complete a new lapidary with a capacity of 200,000 stones per year (Richland Resources Ltd., 2012, p. 8, 12).

Tsavorite, which is a green grossular garnet that obtains its color from trace amounts of chromium and vanadium, was mined at Lemshuku. In the first quarter of 2011, Richland estimated that indicated resources at the Lemshuku-Shamberai tsavorite project were between 0.89 million and 2.17 million cubic meters at a grade of 1.6 carats per cubic meter tsavorite. Richland also commissioned a processing plant for pilot sampling at Lemshuku-Shamberai in 2011. The project was located about 20 km southwest of the tanzanite mines (Richland Resources Ltd., 2012, p. 12, 15).

**Phosphate Rock and Rare Earths.—**Small amounts of phosphate rock were mined at Minjingu by Minjingu Mines and Fertilizers Ltd; the company's production was constrained by power shortages in early 2011. Peak Resources completed a drilling program for phosphates and rare-earth elements (REE) at the Ngualla Carbonatite project at the end of November 2011. By the end of the first quarter of 2012, the company planned to complete an initial resource estimate for REEs. Peak Resources also planned to complete a prefeasibility study on a new mine by mid-2012, and a feasibility study, by mid-2013. Depending on the results of the study, mining of REEs could start by mid-2016 (Mole, 2011).

In September 2011, Montero Mining and Exploration Ltd. of Canada estimated that resources at the Wigu Hill project were 3.3 Mt at a grade of 2.6% light rare-earth minerals. Montero planned to open a small-scale mine at Wigu Hill by the end of 2012. The company planned to produce between



3,000 and 5,000 t/yr of rare-earth minerals (Montero Mining & Exploration Ltd., 2012).

### **Mineral Fuels and Related Materials**

**Coal.**—In 2011, Intra Energy Corp. Ltd. of Australia (formerly Atomic Resources Ltd.) and its joint-venture partner National Development Corp. (NDC) (owned by the Government of Tanzania) started a new coal mine at the Ngaka coalfield in Ruvumu District. Intra Energy and NDC planned to increase production to 3 Mt/yr by 2014. About 1.5 Mt/yr would be supplied to a new coal-fired power station with a capacity of 450 megawatts (MW) and about 1.5 Mt/yr would be exported. Resources at Ngaka were estimated to be 249 Mt (Thompson, 2011).

In September 2011, Sichuan Hongda signed an agreement with NDC to develop the Mchuchuma coal deposits in western Tanzania. In December, NDC and Sichuan Hongda started a new resource assessment, which was expected to be completed in 6 months. The companies planned to produce 3 Mt/yr of coal at Mchuchuma. NDC and Sichuan Hongda also planned to develop a new power station with a capacity of 600 MW by mid-2015 that would consume coal mined at Mchuchuma. About 300 MW of capacity from the new power station was expected to be consumed in the Liganga iron ore and steel project (Mgwabati, 2011; Thompson, 2011; Ministry of Finance, 2012, p. 77–78).

Uranex Ltd. of Australia (IMX Resources NL, 39.5%) completed a drilling program at the Songea coal project in December 2011. The company planned further drilling in 2012 (Sizer, 2012).

**Natural Gas.**—In 2011, Orca Exploration Group Inc. produced 869 million cubic meters of natural gas from Songo Songo Island compared with 790 million cubic meters in 2010. The capacity of Orca's gas processing plant was 1.17 billion cubic meters per year, and the pipeline, 1.05 billion cubic meters per year. In November, Orca announced plans to increase the capacity of its pipeline and plant to 1.45 billion cubic meters per year. The Government planned to construct a new processing plant and pipeline that would increase total capacity at Songo Songo to 2.07 billion cubic meters per year by the end of 2013. The completion of the Government's expansion depended on financing from the Chinese Exim Bank. Gas-fired power stations and TPCC's cement plant were the leading consumers of gas from Songo Songo (Orca Exploration Group Inc., 2012, p. 5, 8, 14, 19).

Etablissements Maurel et Prom SA of France operated the Mnazi Bay offshore gas project in the Rovuma Basin. Maurel et Prom (38.22%), Wentworth Resources Ltd. of the United Kingdom (25.4%), state-owned Tanzania Petroleum Development Corp. (20%), and Cove Energy plc of the United Kingdom (16.38%) produced 18 million cubic meters of natural gas at Mnazi Bay in 2010. Natural gas from Mnazi Bay was consumed at a power station with a capacity of 18 MW. Maurel et Prom was negotiating with the Government to supply 620 million cubic meters per year of gas to a new power station with a capacity of 300 MW (Wentworth Resources Ltd., 2011).

**Uranium.**—Mantra Resources Ltd. of Australia completed a feasibility study at the Mkuju River project in 2011. The study estimated that the Nyota property could support a new uranium mine with average production of 1,900 t/yr of uranium oxide ( $U_3O_8$ ) during an estimated 12-year mine life. The capital costs of the mine were estimated to be \$430 million. In June 2011, Mantra was purchased by state-owned JSC Atomredmetzoloto, which made Uranium One Inc. of Canada (JSC Atomredmetzoloto, 51%) the operator at Mkuju River. In November, Uranium One revised the resource estimate at Mkuju River to 182 Mt at a grade of 0.03%  $U_3O_8$  (Mining Journal, 2011b; Thompson, 2011).

In December 2011, Uranex completed a drilling program at Likuyu North, which is part of the Mkuju project in southern Tanzania. The company planned to complete an initial resource estimate in March 2012 and to engage in further drilling. Depending on the results of the drilling, Uranex could start a scoping study on Likuyu North by the second half of 2012. Uranex also announced plans to divest the Manyoni uranium deposit, which had contained resources of more than 13,000 t of  $U_3O_8$  (Sizer, 2012).

In December 2011, Uranium Resources plc of the United Kingdom completed a drilling program at Mtonya. East African Resources Ltd. of Australia engaged in drilling at its Eastern Rift project in the third quarter of 2011. Uranium Resources and East African planned further drilling at Mtonya and Eastern Rift, respectively, in 2012 (Uranium Resources plc, 2011; Andrews, 2012a).

### **Outlook**

Tanzania's production of cement, coal, diamond, gold, and natural gas is expected to increase in the near future. Cement output is likely to increase from 2012 through 2015 because of the opening of new plants. Coal production is expected to increase from 2012 through 2014. Diamond production is likely to increase starting in 2012. Increased gold output from the Bulyanhulu, the Buzwagi, and the North Mara Mines is likely to more than offset the shutdown of the Golden Pride and the Tulawaka Mines. Rare-earth mining is likely to start in late 2012. Depending on the results of feasibility studies, cobalt and nickel production could start in 2015.

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TABLE 1  
TANZANIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2007	2008	2009	2010	2011 <sup>e</sup>
Bauxite	5,003	20,601	122,920	130,000 <sup>e</sup>	130,000
Calcite	1,500	112	--	152	150
Cement, hydraulic thousand metric tons	1,630	1,756	1,941	2,312	2,409 <sup>3</sup>
Coal, bituminous	27,198	15,242	--	179 <sup>r</sup>	82,856 <sup>3</sup>
Copper, contained in concentrates and doré	3,275	2,852	2,319	5,326	5,073 <sup>3</sup>
Diamond <sup>4</sup> carats	282,786	237,676	181,874	80,498	28,378 <sup>3</sup>
Gemstones, excluding diamond: <sup>e,5</sup>					
Alexandrite kilograms	NA	15 <sup>3</sup>	1 <sup>3</sup>	-- <sup>3</sup>	--
Amethyst do.	270	200	150	160	160
Aquamarine do.	280	323 <sup>3</sup>	468 <sup>3</sup>	466 <sup>3</sup>	470
Cordierite (iolite) do.	310	-- <sup>3</sup>	-- <sup>3</sup>	--	--
Emerald do.	NA	11 <sup>3</sup>	19 <sup>3</sup>	--	--
Garnet do.	5,900	4,400	8,448 <sup>3</sup>	9,934 <sup>3</sup>	10,000
Ruby do.	2,700	2,000	1,500	1,600	1,600
Sapphire do.	1,300	1,000	750	800	800
Tanzanite do.	8,187 <sup>3</sup>	6,100	2,500	3,000	3,000
Tourmaline do.	NA	3,865 <sup>3</sup>	9,283 <sup>3</sup>	9,530 <sup>3</sup>	9,600
Other do.	1,280,000	1,840,000	1,040,000 <sup>r</sup>	1,220,000 <sup>r</sup>	1,550,000
Total do.	1,294,485 <sup>3</sup>	1,858,287 <sup>3</sup>	1,058,500 <sup>3</sup>	1,250,300 <sup>3</sup>	1,581,700 <sup>3</sup>
Gold do.	40,193	36,434	39,112	39,448	44,000
Gypsum and anhydrite, crude	52,759	55,730	8,105	26,918 <sup>r</sup>	38,659 <sup>3</sup>
Kaolin	1,020	13,926	18,624	42,649	43,000
Lime <sup>e</sup>	15,000	20,000	30,000	30,000	30,000
Natural gas <sup>6</sup> million cubic meters	558	569	668	808	890 <sup>3</sup>
Phosphate rock:					
Gross weight	8,261	28,684	20,000 <sup>r,e</sup>	17,180 <sup>r</sup>	18,000
P <sub>2</sub> O <sub>5</sub> content	2,500	8,600	6,000 <sup>r,e</sup>	5,200 <sup>r</sup>	5,400
Salt, all types	35,224	25,897	28,444	34,455 <sup>r</sup>	36,352 <sup>3</sup>
Silver, contained in concentrates and doré kilograms	12,381	10,388	8,231	12,040	13,524 <sup>3</sup>
Steel, semimanufactured	46,016	75,274	122,318	126,054	119,236 <sup>3</sup>
Stone, sand, and gravel:					
Aggregates	180,000 <sup>e</sup>	63,821	86,112	152,781	150,000
Dolomite <sup>e</sup>	169 <sup>3</sup>	170	170	170	170
Limestone, crushed	1,322,023	1,281,805	1,284,100 <sup>r</sup>	1,436,600 <sup>r</sup>	1,972,100 <sup>3</sup>
Marble	400 <sup>e</sup>	522	2,679	1,109	1,100
Pozzolanic materials	184,070	260,403	171,904	199,698 <sup>r</sup>	222,592 <sup>3</sup>
Sand <sup>e</sup>	8,400,000	8,500,000	8,500,000	8,500,000	8,500,000

<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. NA Not available. -- Zero.

<sup>1</sup>Table includes data available through January 10, 2013.

<sup>2</sup>In addition to the commodities listed, modest quantities of crude construction materials, including brick clay, are produced, but available information is inadequate to make reliable estimates of output.

<sup>3</sup>Reported figure.

<sup>4</sup>Diamond figures are estimated to represent 85% gem-quality or semigem-quality and 15% industrial-quality stones. Does not include smuggled artisanal production.

<sup>5</sup>Other precious and semiprecious stones produced include alexandrite, chrysoprase, emerald, kyanite, moonstone, opal, peridot, quartz, spinel, and tourmaline. Does not include smuggled artisanal production.

<sup>6</sup>Orca Exploration Group Inc. only in 2007, 2008, and 2009; Artumas Group Inc. also produced small amounts of natural gas.

TABLE 2  
TANZANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity
Cement		Tanzania Portland Cement Company Ltd. (TPCC) (HeidelbergCement AG, 69.3%)	Plant at Wazo Hill	1,400,000.
Do.		Tanga Cement Company Ltd. (Holcim Mauritius Investment Holdings Ltd., 62.5%)	Plant at Tanga	1,250,000.
Do.		Mbeya Cement Company Ltd. (LaFarge Group, 58%)	Plant at Mbeya	350,000.
Coal, bituminous		Intra Energy Corp. Ltd. and National Development Corp.	Ngaka Mine	300,000.
Do.		Kiwira Coal and Power Ltd. (Tanpower Resources Ltd., 85%, and Government, 15%)	Kiwira Mine <sup>1</sup>	150,000 run of mine; 93,000 washed.
Copper, in concentrates and dore		African Barrick Gold plc (Barrick Gold Corp., 73.9%)	Bulyanhulu Mine near Kahama	7,300.
Do.		do.	Buzwagi Mine	5,500.
Diamond	carats	Williamson Diamonds Ltd. (Petra Diamonds Ltd., 75%, and Government, 25%)	Williamson Mine near Shinyanga <sup>1</sup>	600,000.
Do.	do.	El Hillal Minerals Ltd.	Near Williamson Mine	24,000. <sup>c</sup>
Glass		Kioo Ltd.	Dar es Salaam	55,000.
Gold		Geita Gold Mining Ltd. (AngloGold Ashanti Ltd., 100%)	Geita Mine near Nyakabale	5,200,000 ore processing.
Do.	kilograms	do.	do.	20,700 gold.
Do.		African Barrick Gold plc (ABG)	Bulyanhulu Mine near Kahama	1,100,000 ore processing.
Do.	kilograms	do.	do.	9,400 gold.
Do.		do.	North Mara Mine in Tarime District	2,900,000 ore processing.
Do.	kilograms	do.	do.	6,100 gold.
Do.		do.	Buzwagi Mine	4,400,000 ore processing.
Do.	kilograms	do.	do.	10,100 gold.
Do.		Resolute Mining Ltd.	Golden Pride Mine near Isanga	2,400,000 ore processing.
Do.	kilograms	do.	do.	4,000 gold.
Do.		Pangea Minerals Ltd. [African Barrick Gold plc, 70%, and MDN Inc., 30%]	Tulawaka Mine	480,000 ore processing.
Do.	kilograms	do.	do.	3,200 gold.
Do.		Tangold Ltd.	Buhemba Mine, 47 kilometers southeast of Musoma <sup>1</sup>	1,300,000 ore processing.
Do.	kilograms	do.	do.	2,600 gold.
Lime		Athi River Mining Ltd. (ARM)	Plant at Tanga	40,000.
Natural gas	million cubic meters	Orca Exploration Group Inc.	Gasfield on Songo Songo Island	1,170.
Do.	do.	Etablissements Maurel et Prom SA, 38.22%, and Wentworth Resources Ltd., 25.4%	Gasfield at Mnazi Bay	100.
Phosphate rock		Minjingu Mines and Fertilizers Ltd.	Mine at Minjingu	100,000.
Salt		Nyanza Mines (Tanganyika) Ltd.	Nyanza Mines at Uvinza	60,000.
Silver	kilograms	African Barrick Gold plc (ABG)	Bulyanhulu Mine near Kahama	10,000.
Steel		MM Integrated Steel Mills Ltd.	Plant at Dar es Salaam	36,000 <sup>e</sup> rolled.
Do.		Aluminum Africa Ltd.	do.	33,000 <sup>e</sup> rolled.
Do.		Steel Masters Ltd.	do.	22,000 rolled.
Do.		MM Integrated Steel Mills Ltd.	do.	36,000 galvanized.
Do.		Aluminum Africa Ltd.	do.	33,000 galvanized.
Tanzanite		Richland Resources Ltd.	Mine at Merelani, Block C <sup>2</sup>	120,000 ore processing.
Do.	kilograms	do.	do.	1,400 tanzanite.
Do.	do.	Tanzanite Africa Ltd. (IPP Media Ltd.)	Mine at Merelani, Block D Extension	NA.
Do.	do.	Kilimanjaro Mines Ltd.	Mine at Merelani, Block A	NA.
Do.	do.	Small-scale and artisanal miners	Mines at Merelani, Blocks B and D	7,500. <sup>e</sup>

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Not operating at the end of 2011.

<sup>2</sup>Formerly the graphite processing plant at Merelani operated by Phoenix Minerals Ltd.



TABLE 3  
TANZANIA: GOLD RESOURCES AND RESERVES IN 2011

Project	Major operating companies	Tonnage (million metric tons)	Grade (grams per metric ton)	Contained gold (metric tons)
<b>Reserves:</b>				
Bulyanhulu <sup>1</sup>	African Barrick Gold plc (ABG) (Barrick Gold Corp., 73.9%)	28.2	11.7	331
Geita <sup>2</sup>	Geita Gold Mining Ltd. (AngloGold Ashanti Ltd., 100%)	55.8	2.6	147
North Mara <sup>1</sup>	African Barrick Gold plc (ABG)	35.6	3.0	108
Buzwagi <sup>1</sup>	do.	61.4	1.5	91
Golden Pride <sup>2</sup>	Resolute Mining Ltd.	4.3	1.6	7
Tulawaka	Pangea Minerals Ltd. [African Barrick Gold plc (ABG), 70%, and MDN Inc., 30%]	0.2	12.0	3
<b>Total</b>		<b>185.5</b>	<b>3.7</b>	<b>687</b>
<b>Resources:</b>				
Bulyanhulu	African Barrick Gold plc (ABG)	54.3	9.7	524
Geita	Geita Gold Mining Ltd.	140.0	2.8 <sup>3</sup>	391
North Mara	African Barrick Gold plc (ABG)	53.1	3.0	157
Buzwagi	do.	107.2	1.3	142
Nyanzaga	do.	82.9	1.5	127
Buckreef-Rwamagaza	Tanzanian Royalty Exploration Corp. and State Mining Co. (Satmico)	47.3	1.4	66
Golden Pride	Resolute Mining Ltd.	29.0	1.6	48
Nyakafuru	do.	19.4	1.7	33
Singida	Shanta Gold Ltd.	9.4	2.8	27
Golden Ridge	African Barrick Gold plc (ABG)	8.6	2.8	24
SMP	Helio Resource Corp.	17.9	1.3	24
Igurubi	Peak Resources Ltd.	8.0	2.8	22
Chunya	Shanta Gold Ltd.	26.3	1.5	38
Kigosi	Tanzanian Royalty Exploration Corp.	21.8	0.8	18
Imerwu, Lubando, and N'kuluwisi	Great Basin Gold Ltd.	8.6	2.0	17
Miyabi	African Eagle Resources plc	12.4	1.3	16
Itetemia	Kibo Mining plc	4.2	3.1	13
Kitongo	BrightStar Resources Ltd.	4.4	2.0	9
Tulawaka	Pangea Minerals Ltd.	1.3	6.7	9
Luhala	do.	1.9	1.9	3
<b>Total</b>		<b>658</b>	<b>2.6</b>	<b>1,710</b>

<sup>1</sup>Definitions of resources and reserves are based on National Instrument 43-101, as required by Canadian securities regulatory authorities.

<sup>2</sup>Definitions of resources and reserves are based on the Australasian Code for the Reporting of Identified Mineral Resources and Ore Reserves issued by the Joint Committee for the Australasian Institute of Geoscientists and the Australian Mining Industry Council.

<sup>3</sup>Note that, in most cases, the grade of resources is lower than the grade for reserves, but in this case, the grade of the less economic material is higher, leading to the paradox of a higher resource grade.

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