# THE MINERAL INDUSTRIES OF AFRICA

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The 55 independent nations and other territories of continental Africa and adjacent islands covered in this volume encompass a land area of 30.4 million square kilometers, which is more than three times the size of the United States, and were home to 850 million people in 2003. For many of these countries, mineral exploration and production constitute significant parts of their economies and remain keys to future economic growth. Africa is richly endowed with mineral reserves and ranks first or second in quantity of world reserves of bauxite, cobalt, diamond, phosphate rock, platinum-group metals (PGM), vermiculite, and zirconium.

The mineral industry was an important source of export earnings for many African nations in 2003. To promote exports, groups of African countries formed numerous trade blocs, which included the Economic and Monetary Community of Central Africa, the Economic Community of the Great Lakes Countries, the Common Market for Eastern and Southern Africa, the Economic Community of Central African States, the Economic Community of West African States, the Mano River Union, the Southern African Development Community, and the West African Economic and Monetary Union. Algeria, Libya, and Nigeria were members of the Organization of the Petroleum Exporting Countries (OPEC). The African Union was formally launched as a successor to the Organization of African Unity in 2002 to accelerate socioeconomic integration and to promote peace, security, and stability on the continent.

In 2003, significant events in the mineral industries of Africa included the approval of World Bank funding for mineral development projects in Madagascar and Uganda, the expansion of the Mozambique Aluminum Company (Mozal) smelter in Mozambique, high rates of economic growth in Equatorial Guinea and Nigeria that were attributable to increasing mineral production, and the implementation of the Kimberly Process agreement on diamond certification.

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For mineral production statistics—

- · Algeria-Ministry of Energy and Mines,
- · Angola-Ministry of Mines and Ministry of Petroleum,
- · Botswana-Ministry of Mines,
- · Burkina Faso-Ministry of Mines, Quarries, and Energy,
- Burundi—Ministry of Energy and Mines,

• Côte d'Ivoire—National Corporation of Petroleum Operations,

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- · Egypt-Ministry of Petroleum,
- Eritrea—Department of Mines,
- · Gambia-Geology Department,
- Ghana—Minerals Commission,
- · Guinea-Ministry of Mines and Geology,
- Kenya—Ministry of Environment, Natural Resources, and Wildlife,
- · Lesotho-Department of Mines and Geology,
- · Malawi-Department of Mines,
- Mauritius—Ministry of Agriculture, Food Technology, and Natural Resources,
- Morocco-Ministry of Energy and Mines,
- · Mozambique-National Directorate of Mines,
- Namibia—Ministry of Mines and Energy,
- Niger-Ministry of Mines and Energy,
- Nigeria-Ministry of Solid Minerals Development,
- Rwanda—Ministry of Infrastructure,
- · Senegal-Ministry of Mines, Energy, and Water,
- · Seychelles-Ministry of Economic Planning,
- Sierra Leone—Director of Mines,
- South Africa—Department of Minerals and Energy, Mineral Economics Directorate,
- · Tanzania-Ministry of Energy and Minerals,
- · Uganda-Geological Survey and Mines Department,
- · Zambia-Mines Development Department,
- Zimbabwe-Chamber of Mines.

For basic economic data—the International Monetary Fund in the United States.

For minerals consumption data—

- British Petroleum plc,
- MEPS (International) Ltd.,
- U.S. Department of Energy in the United States,
- · World Bureau of Metal Statistics.

For exploration and other mineral-related information—the Metals Economics Group (MEG) in Canada.

### **General Economic Conditions**

In 2003, the real gross domestic product (GDP) of Africa grew by 4.3% after increasing by 3.5% in 2002. From 1998 to 2003, Africa's GDP grew at an average rate of about 3.5%. In 2003, Equatorial Guinea and Nigeria achieved the most rapid economic growth in Africa with GDP increases of 14.7% and 10.7%, respectively. The expansion of the crude petroleum industry was a major factor in the performance of the economics of Angola and Equatorial Guinea. Angola's economic growth slowed considerably because of a modest decline in crude petroleum production. In 2003, GDP increased by an average of 8% in African petroleum-exporting countries and by an average of 3.1% in African petroleum-importing countries. GDP growth

<sup>&</sup>lt;sup>1</sup>References that include a section mark (§) are found in the Internet References Cited section.

in African petroleum-exporting countries was expected to be 5.2% in 2004 and 8.3% in 2005. In petroleum-importing countries, GDP growth was expected to increase to 4.3% in 2004 and 4.5% in 2005 (International Monetary Fund, 2004b, p. 50, 206).

### **Investment Data and Political Risk**

A recent review of company investment plans for the period from 2002 to 2007 indicated the potential for the region to attract about \$80 billion in oil and gas development, of which more than 50% would be in Angola and Nigeria. Algeria, Chad, and Egypt were also likely to be substantial destinations for oil and gas investment. About \$38 billion of investment was planned for mining and mineral-processing projects. The most important destinations for mining and mineral-processing investments were expected to be, in order of value, South Africa, Mozambique, Ghana, Zambia, and the Democratic Republic of the Congo [Congo (Kinshasa)]. Copper projects were likely to be concentrated in Zambia; gold, in Ghana and South Africa; PGM, in South Africa and Zimbabwe; and titanium minerals, in Mozambique.

A recent study released by the Department of Minerals and Energy of the Republic of South Africa (2002§<sup>1</sup>) showed increased interest by mining companies in committing financial resources to mining projects in South Africa. The study reported that investment in newly committed mineral-related projects (in which funds have already been committed or are being expended) was \$5 billion in 2002, which was an increase of 54.4% compared with \$3.3 billion in 2001. Platinum accounted for 57% of the newly committed investment; gold, 31%; and other minerals, 12%. An additional \$21 billion was reported for potential mineral-related projects (feasibility level projects for which funds have not yet been committed) in South Africa. Gold accounted for 23% of the potential mineral projects.

Countries directly affected by wars, internal ethnic or political conflicts, and refugee displacements in 2003 included Angola, Burundi, the Central African Republic, Chad, the Republic of the Congo [Congo (Brazzaville)], Congo (Kinshasa), the Côte d'Ivoire, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierra Leone, Somalia, Sudan, Uganda, and Zimbabwe. During 2003, the Governments of the Central African Republic and Liberia were overthrown by rebel forces. A United Nations peacekeeping force was subsequently deployed in Liberia. The Government of Uganda completed the withdrawal of its military forces from Congo (Kinshasa).

### Legislation

Mineral regulations were implemented in 2003 in Congo (Kinshasa), which established a mineral exploration and mining lease process, imposed a set of environmental obligations, and increased opportunities for foreign investment in mining operations. Royalties were 4% on precious stones, 2.5% on precious metals, 2% on nonferrous metals, and 0.5% on iron and ferrous metals. Mining profits were taxed at the rate of 30%, and exploration and mining licenses were subject to annual fees (Mining Journal, 2003). On November 12, 2003, the Senegalese Parliament approved the new Mining Code. Among the provisions were incentives to attract foreign investors, which included total exemption from the corporate tax and other levies for companies that hold exploration permits. Prior to the new legislation, mining companies that conducted an environmental impact study and presented a program for restoration were granted mining licenses in forest areas. Under the new law, however, mining licenses were banned in these areas.

As part of the Nigerian Government's new 7-year mineralresource development program, the Ministry of Solid Minerals Development authorized a national solid mineral survey in 2003 and requested bids for an airborne geophysical survey. The Government stopped issuing exclusive prospecting licenses for gold, lead, tantalum, and zinc exploration, and the Ministry of Solid Minerals Development expected to revalidate existing leases and licenses.

Mineral royalty changes were proposed for South Africa and Zimbabwe. The Government of Zimbabwe planned to implement the collection of royalties from mining operations after January 1, 2004, to reduce corporate taxes for mining operations to 25% from 30%, and to exempt customs duties, import taxes, and sales tax refunds on all capital goods during the exploration phase of a mining project. In South Africa, a draft bill proposed a 1% royalty on some bulk commodities, 3% on gold, 4% on platinum, and 8% on diamond (Herald, The, 2003).

Additionally, the Empowerment Charter for the South African mining industry became law in May 2003. The Charter calls for historically disadvantaged South Africans to control 15% of mines within 5 years and 26% within 10 years. Black Economic Empowerment mining deals worth \$1.8 billion were concluded in 2003, and new giant Black Economic Empowerment companies, such as African Rainbow Minerals (ARM) and Mvelaphanda Resources, were shaping the new South African mining landscape. One of the prominent deals in 2003 was the creation of the world's fifth ranked gold producer through the merger of Harmony Gold Mining Company Ltd. and ARM.

In 2003, the Government of Libya proposed to privatize about 360 state-owned companies by 2008. The names of specific public sector companies were not divulged, but ownership changes in the chemical, iron, petroleum, and steel sectors were suggested. The Government of Mali was in the process of revising the Mining Code for the second time since the establishment of the Code in 1991.

### Exploration

Exploration activity, as defined by African exploration budgets reported by the MEG, increased significantly in 2003 in dollar and in percentage terms. The MEG reported a 46% increase in exploration budgets to \$374 million in 2003 from \$257 million in 2002, or to 17.1% of the world exploration budget in 2003 from 14.8% in 2002 (Metals Economics Group, 2003a, b). African gold and base-metals exploration expenditures were projected to increase slightly, diamond exploration expenditures were projected to increase by 44%, but the greatest increase in African exploration expenditures was projected for other minerals, mainly PGM. The exploration expenditures for PGM doubled from the 2002 level, which increased the African percentage of other mineral targets to 34% of the world total. Much of the increase can be attributed to exploration designed to support the announced expansion of the South African PGM industry.

Africa continued to represent a continent with new mineral production potential, but with a highly variable investment risk that was dependent upon location. Exploration in some parts of Africa increased in 2003 as the threat of civil unrest eased. Civil wars, internal ethnic or political conflicts, and refugee displacements continued to destabilize some African countries and constrained new investment in mineral exploration. Recent investment in some areas of Africa has been stifled by perceptions of long-term instability, increased incidence of HIV/AIDS, and a poor record of recent successful base-metal development. There were those, however, who expressed optimism over African potential (Hinde, 2001; Mining Magazine, 2002).

African countries that experienced the highest levels of exploration activity in 2003 were, in descending order of exploration activity based on the number of sites compiled by the USGS, South Africa, Mali, Ghana, Burkina Faso, Tanzania, Botswana, and Sierra Leone. Gold accounted for approximately 64% of the reported African exploration projects; PGM, more than 12%; diamond, about 10%; and base metals, about 8%. Exploration for gold was greatest in the sub-Saharan African countries of Ghana and Mali; gold exploration was also significant in Burkina Faso, South Africa, and Tanzania.

Since the implementation of new mining regulations, Congo (Kinshasa) has seen an increase in mineral exploration activity. Mineral exploration in Ghana in 2003 was encouraged by the Government, which expressed its support for the proposed merger of Ashanti Goldfields Company Ltd. and AngloGold Ltd. by agreeing to vote its 16.9% stake in Ashanti in favor of the merger and expressed its willingness to vote against any competing offer (Northern Miner, The, 2003). The Government also allowed five mining companies to apply for mining permits in Ghana's protected forest reserves (Sguazzin, 2003).

### **Commodity Overview**

Estimates for production of major mineral commodities for 2005 and beyond have been based upon supply-side assumptions, such as announced plans for increased production/ new capacity construction and bankable feasibility studies. No explicit consideration of any demand-side factors, such as price and economic growth, was made. The outlook tables in this summary chapter show historic and projected production trends; therefore, no indication is made about whether the data are estimated or reported and revisions are not identified. Data on individual mineral commodities in tables in the individual country chapters are labeled to indicate estimates and revisions.

The outlook segments of the mineral commodity tables are based on projected trends that could affect current (2003) producing facilities and on planned new facilities that operating companies, consortia, or Governments have projected to come online within indicated timeframes. Forward-looking information, which includes estimates of future production, exploration and mine development, cost of capital projects, and timing of the start of operations, are subject to a variety of risks and uncertainties that could cause actual events or results to differ significantly from expected outcomes. Projects listed in the following section are presented as an indication of industry plans and are not a USGS prediction of what will happen. The USGS provides no warranty, expressed or implied, as to the accuracy, reliability, or completeness of furnished data and is under no obligation to correct or update any forward-looking statements, whether as a result of new information or as future events take place.

### Metals

Africa's share of world base-metals production and consumption was modest. Mine production of bauxite, copper, gold, lead, and silver was less than that of 1990. The low level of consumption was the result of Africa's low level of industrialization. In 2003, Africa was a net exporter of aluminum, copper, iron ore, nickel, and zinc; its share of world steel consumption was about 2%. South Africa was the leading consumer of base metals and steel in Africa; it had 5% of the continent's population and accounted for the majority of Africa aluminum, copper, lead, nickel, tin, and zinc consumption (table 1).

Africa produced more than one-half of the world's cobalt mine output, more than one-quarter of the world's manganese mine output, and nearly one-quarter of the world's refined cobalt. South Africa was the world's leading producer of chromite and ferrochromium, gold, manganese ore, platinum, and vanadium and the world's second ranked producer of ferromanganese, palladium, rutile, and zircon.

Aluminum and Bauxite and Alumina.—*Production.*— African production of refined aluminum rose by nearly 6% compared with that of 2002. The increase was mostly attributable to the expansion of the Mozal smelter in Mozambique, which was completed in April 2003. In South Africa, production rose at the Bayside and the Hillside smelters (BHP Billiton Ltd., 2003a, p. 2; 2004, p. 3). Production shut down in Ghana because of a drought that forced power cuts at Volta Aluminium Company (VALCO). South Africa accounted for about 51% of African aluminum output; Mozambique, 28%; and Egypt, 14% (table 6). Kenya was the only African producer of secondary refined aluminum. Africa accounted for more than 4% of the world's aluminum production in 2003 (table 4).

African bauxite production fell by about 3% in 2003 from 2002. In Ghana, lower production was the result of problems with the rail system. From 1990 to 2003, Africa's share of world bauxite production fell to less than 11% from 16%. Guinea accounted for about 97% of African bauxite production; Ghana accounted for most of the remainder (table 5). In 2003, Guinea was the only African producer of alumina; its output was more than 730,000 metric tons (t), or 1% of world alumina production.

*Consumption.*—In 2003, Africa's share of world primary aluminum consumption was about 1%, and continental consumption rose by about 3% in 2003. South Africa accounted for about 50% of African primary aluminum consumption, and

Egypt, about 30% (World Bureau of Metal Statistics, 2004, p. 9).

*Outlook.*—The production of refined aluminum is expected to rise by an average of nearly 4% per year from 2003 to 2009. Expansion of the Hillside smelter could add 130,000 metric tons per year (t/yr) of new capacity in 2004 (BHP Billiton Ltd., 2003b). Aluminum Smelter Co. of Nigeria Ltd. is expected to reopen its smelter at Ikot Abasi in 2007 if privatization goes forward in 2006. Production is also expected to rise at the Mozal smelter. By 2009, Mozambique, which started producing refined aluminum in 2000, is expected to account for more than 25% of African refined aluminum production (table 6).

African bauxite production could increase to 26 million metric tons (Mt) by 2009 (table 5). In Guinea, Global Alumina Co. (GAPCO) plans to open a new bauxite mine in 2008 with a capacity of 8 million metric tons per year (Mt/yr). Production is also expected to increase at the Kindia Mine. The expansion of the Friguia alumina plant and the opening of new plants by GAPCO and the joint venture of Alcan Inc. and Alcoa Inc. could increase Guinea's alumina production capacity to 5.7 Mt/yr in 2008 from 700,000 t/yr in 2003. In Sierra Leone, the Moyamba Mine is expected to reopen in 2005.

**Copper.**—*Production.*—In 2003, Africa's mine production increased by 1% from 2002. Zambia was the leading producer in Africa; higher production from the Mufilira and the Nkana Mines and the reopening of the Chambishi Mine led to an increase in national copper output in 2003. Production increased in Congo (Kinshasa) because of rising output from the Dikilushi Mine. Production fell in South Africa. In 2003, Zambia accounted for 63% of African copper mine production; South Africa, 16%; and Congo (Kinshasa), 10%. African copper mine production was down sharply from its 1990 level (table 7). Africa's share of world copper mine output fell to 4% in 2003 from 14% in 1990 (table 4).

Africa's refined copper production fell by nearly 4% in 2003. In Congo (Kinshasa), Générale des Carrières et des Mines (Gécamines) reduced its production sharply because of aging equipment, lack of investment, shortages of fuel and spare parts, and transportation problems. Production also fell in South Africa. The increase in Zambian production was partially attributable to the Bwana Mkubwa electrowinning facility. In 2003, Zambia accounted for 76% of African refined copper production; South Africa, 19%; and Congo (Kinshasa), 2% (table 8). Egypt was the only producer of secondary refined copper; primary production accounted for most African production. From 1990 to 2002, Africa's share of world refined copper output fell to 3% from 8%.

*Consumption.*—In 2003, African consumption of copper remained nearly unchanged. Africa's share of the world's copper consumption was 1%. South Africa accounted for more than 50% of regional copper consumption, and Egypt, about 25%. Zambia and Zimbabwe consumed most of the remainder (World Bureau of Metal Statistics, 2004, p. 41).

*Outlook.*—Copper mine production is expected to more than double by 2009. Output is likely to increase sharply in Zambia because of the startup of the Kansanshi, the Lumwana, and the Mufalira Deep Mines, the reopening of the Chibuluma South

Mine in 2004, and the expansion of the Nkana Mine by 2006. Copper mine production in Congo (Kinshasa) is also likely to rise with the startup of the Kolwezi Tailings Project and the Lufna Mine in 2007 and higher production from the Dikulushi and the Lonshi Mines. In Mauritania, the Guelb Moghrein Mine is expected to start production in late 2005 (table 7).

The production of refined copper is expected to rise by an average of nearly 9% per year from 2003 to 2009. Zambia's output is likely to increase substantially because of the development of new copper projects. The opening of new copper mines and higher output by Gécamines coud increase the Congolese share of African production to 13% by 2009 (table 8).

**Gold.**—*Production.*—Africa's gold mine production was 587,000 kilograms in 2003, which was a decrease of 6% compared with that of 2002. Production was considerably less than that of 1990 because of the long-term decline in South African production (table 9). From 1990 to 2003, Africa's share of world gold mine production fell to about 23% from 32% (table 4).

The decrease in production was broad based in 2003 with output falling for most of Africa's leading gold producers. In South Africa, lower output was mostly attributable to the Klerksdorp and the West Wits Lane gold fields; production also fell at Central Rand, East Rand, Evander, and West Rand (Department of Minerals and Energy of the Republic of South Africa, 2004). Lower ore grades, operational difficulties, and the strengthening of the rand contributed to the decrease in South African production. In Ghana, higher production at the Bogosu, the Iduaprium, and the Tarkwa Mines was offset by lower production from the Bibiani and the Obuasi Mines and the closure of the Abore Mine. Mali's output fell by about onefifth because of lower production at the Morila, the Sadiola, and the Yatela Mines. Production fell slightly in Guinea because of lower output at the Lero and the Siguiri Mines. In Zimbabwe, output fell at the Freda-Rebecca, the Patchway, and the Renco Mines. Tanzania was the only leading producer to register an increase in gold production in 2003 because of the opening of the Buhemba Mine and higher output from the Geita, the Golden Pride, and the North Mara Mines.

In 2003, South Africa accounted for 63% of African gold production; Ghana, 12%; and Mali and Tanzania, 8% each. South Africa's share of continental gold production had fallen from 81% in 1995 and 89% in 1990 because of rising production costs associated with less accessible resources and higher production in Ghana, Guinea, Mali, and Tanzania (table 9).

*Outlook.*—The long-term decline in African gold production is likely to be reversed. Gold mine production is expected to rise by an average of less than 1% per year from 2003 to 2009. The decrease in South African production is likely to offset by broad-based increases in other African countries (table 9). Output would rise for most of the leading producers and largescale mines would open in numerous countries that had only artisanal and small-scale gold production in 2003.

South African output is likely to fall to 300 t in 2007; the appreciation of the rand against the U.S. dollar is expected to lead to mine closings. By 2009, South Africa's share of African

gold production could fall to 49%. The outlook for Ghana is an increase in production of more than 47% by 2007. The Wassa Mine is expected to open in 2004; the Chirano Mine, in 2005; the Ahafo Mine, in 2006; and the Akyem Mine, in 2007, and the expansion of the Tarkwa Mine could be completed in 2006.

By 2007, output in Tanzania is likely to rise to 66 t with the opening of the Tulawaka Mine in 2005 and the Buckreef Mine in 2006 and the increased capacity at the Bulyanhulu, the Geita, and the North Mara Mines. Production is expected to fall in 2009 because of the closure of the Golden Pride and the Tulawaka Mines. In Guinea, the expansion of the Siguiri Mine in 2005 and the Lero Mine in 2006 is expected to contribute to higher production; the Kiniero Mine is projected to close in 2009. The outlook for Mali is an increase to about 55 t of gold produced in 2007. The Kalana Mine is expected to open in 2004; the Loulo Mine, in 2005; and the Syama and the Tabakoto Mines in 2006. In 2009, the Morila Mine is expected to close (table 9).

By 2009, seven African countries that had only artisanal gold production in 2003 were likely to open large-scale gold mines. In Congo (Kinshasa), the Banro and the Moyo Mines were expected to start production by 2007, and the Kilo Mine, by 2009. Higher gold production in Zambia could be based on the opening of the Kansanshi copper mine in 2004 and the Boumwana Mine in 2007 and the reopening of the Dunrobin Mine in 2007. In Mauritania, the Guelb Moghrein copper mine is expected to start production in 2005, and the Tasiast Mine, in 2006 (table 9).

Other significant mine openings included the Mupane Mine in Botswana and the Samira Hill Mine in Niger in 2004; the Taparko Mine in Burkina Faso in 2005; and the Bakoudou Mine in Gabon in 2006. In Madagascar and Uganda, the World Banksponsored projects to increase reported artisanal gold production are likely to be completed in 2008 (table 9).

**Iron Ore.**—*Production.*—In 2003, the iron content of ore produced in Africa amounted to 33.3 Mt. South Africa's production rose because of higher output at the Sishen Mine. In Mauritania, output from Société Nationale Industrielle et Miniere rose by 11%. South Africa was the leading iron ore producer in Africa; its share of continental output amounted to 73%; Mauritania accounted for 21% of African production; and Egypt, 4%. In 1990, South Africa, Mauritania, and Egypt accounted for 60%, 21%, and 8%, respectively, of output (table 10).

*Outlook.*—The iron content of ore produced in Africa is expected to rise to 49 Mt in 2009 (table 10). Most of the increase could be attributable to the Faleme iron ore project in Senegal, which is expected to start production in 2009. By 2009, Senegal, which was not an iron ore producer in 2003, is projected to account for 24% of African iron ore production (table 10). In South Africa, the closure of the Thabazimbi Mine could be more than offset by the expansion of the Sishen South Mine.

**Iron and Steel.**—*Production.*—Africa's production of directreduced iron (DRI) and pig iron increased by about 5% in 2003. Production of DRI rose in Egypt and Libya; Egypt's production of DRI increased because of the increased use of existing capacity. In South Africa, higher pig iron production more than

the Mupane Minesteel consumption. It consumed 17.1 Mt of finished steeliger in 2004; theproducts in 2003 compared with 17.4 Mt in 2002 and 15.4 Mt inthe Bakoudou Mine1999 (MEPS (International) Ltd., undated§).

*Outlook.*—After falling by 1% by 2005, the production of DRI and pig iron is expected to rise by an average of less than 1% per year from 2005 to 2009. In South Africa, the output of pig iron is likely to rise to 6.5 Mt in 2005. Most of the increase in South Africa could be the result of byproducts from titanium heavy mineral sands developments. In Mozambique, pig iron production is expected to start in 2008 with the completion of the Corridor Sands project. Egypt's production of pig iron is expected to fall (table 11).

offset lower output of DRI. Tunisia's production of pig iron fell

because of the shutdown of El Fouladh-Société Tunisienne des

Siderurgie's blast furnace. From 1990 to 2003, South Africa's

During the same period, Egypt's share rose to 30% from 15%. Algeria and Libya accounted for most of the remainder in 2003

From 1990 to 2003, the share of DRI in total African iron

production rose to 38% from 19%. During the same period, the

share of DRI in total iron production in Egypt increased to 63%

from 39%; and in South Africa, to 20% from 13% (table 11).

In 2003, African production of crude steel increased by

the leading African producer, accounted for about one-half of

the increase in continental steel production; Egypt and Libya

accounted for most of the remainder. Zimbabwe's production

also increased. Tunisia's output fell because of the shutdown

furnace. South Africa accounted for 58% of regional crude steel

production; Egypt, 27%; Algeria, 7%; and Libya, 6% (table 12). Africa's share of world crude steel production amounted to

South Africa produced about 6.8 Mt of hot-rolled steel

products in 2003; Libya, 835,000 t; and Morocco, 802,000 t.

Other African producers of hot-rolled steel products included

Consumption.—Africa accounted for 2% of global finished

Algeria, Egypt, and Tunisia (International Iron and Steel

Institute Committee on Economic Studies, 2004, p. 52).

of El Fouladh-Société Tunisienne des Sidérurgie's blast

nearly 2% in 2003 (table 4).

2% compared with that of 2002. South Africa, which was

share of total African iron production fell to 51% from 66%.

(table 11). Africa's share of world iron production was 2%.

Crude steel production is expected to rise by an average of about 2% per year from 2003 to 2009. Most of the increase would occur in North African countries. In Algeria, restoration of capacity is expected to raise national steel production to 1.7 Mt by 2007. Libyan output is expected to approach full capacity by 2005. In Morocco, Société Nationale de Siderugie plans to build a new electric arc furnace at its Jorf Lasfar facility; the plant is likely to start production in 2005. Production is likely to rise in Zimbabwe as Zimbabwe Iron and Steel Company restores its capacity (table 12). African consumption of finished steel is expected to rise to 19 Mt by 2008 (MEPS (International) Ltd., undated§).

**Lead.**—*Production.*—In 2003, African lead mine production fell by 29% compared with that of 2002 and 41% compared with that of 2000. Output fell sharply in Morocco and South Africa, which were the two leading producers of lead ore in Africa, and increased in Algeria and Namibia. In Morocco, production declined because of the closure of the Touissit Mine, technical

problems experienced by Compagnie Miniere de Guemassa, and reduced availability of lead concentrate. South Africa's production fell because of the closure of the Maranda and the Perring Mines (BHP Billiton Ltd., 2003a, p. 2; 2004, p. 3). Namibia's production increased because of higher ore grades and debottlenecking operations at the Rosh Pinah Mine. South Africa accounted for 39% of African lead mine production; Morocco 37%; and Namibia, 18% (table 13). Africa's share of the world's lead mine production was about 3% (table 4).

In 2003, African production of primary refined lead fell by 13%; the decrease was attributable to lower lead mine production in Morocco. Morocco, which was the leading African producer of primary refined lead, accounted for 91% of continental output (table 14). Africa's share of world refined lead production was 2% in 2003.

South Africa accounted for 85% of African secondary refined lead output; Kenya, Morocco, and Nigeria accounted for the remainder of African secondary lead production. In 2003, African production of secondary refined lead rose by 5% compared with 2002 (table 15). The share of primary lead in total refined lead production in Africa fell to 52% in 2003 from 64% in 1995 and 72% in 1990 (table 14).

*Consumption.*—In 2003, continental refined lead consumption was 1% lower than that of 2002. Africa's share of the world's lead consumption was nearly 2%. South Africa accounted for about 55% of regional lead consumption, and Algeria, more than 15% (World Bureau of Metal Statistics, 2004, p. 82).

*Outlook.*—The decline in African lead production is likely to be reversed. After rising by nearly 53% by 2005, lead mine production is expected to remain nearly unchanged through 2009. African production could, however, still be less than that of 2000. Morocco's output is expected to recover by 2005. In South Africa, the expansion of the Black Mountain Mine in 2004 could increase production substantially. Tunisia's output is expected to fall with the closure of the Bougrine Mine (table 13). After falling by 22% by 2005, primary refined lead production is expected to rise by an average of 11% per year from 2005 to 2009; the expansion of Société des Fonderies de Plomb de Zellidja's refinery in Morocco could account for the increase (table 14). Secondary lead production is expected to rise by nearly 5% by 2005 because of higher output in Morocco and South Africa (table 15).

**Nickel.**—*Production.*—African mine production of nickel rose by 13% in 2003; nickel was produced almost exclusively in southern African countries. Production rose in Botswana, South Africa, and Zimbabwe; higher output in Botswana was attributable to the Phoenix Mine. In 2003, South Africa accounted for 48% of African nickel mine output; Botswana, 38%; and Zimbabwe, 14% (table 16). Minor tonnages of nickel were recovered as a byproduct of cobalt operations in Morocco. Africa's share of world nickel mine production was about 6.5% in 2003.

*Consumption.*—In 2003, African demand for refined nickel rose by 2% from 2002. Africa accounted for 3% of the world's nickel consumption. Within the region, South Africa accounted for most of Africa's nickel demand; the country produced 643,000 t of stainless steel in 2003 (World Bureau of Metal Statistics, 2004, p. 105).

*Outlook.*—After rising by about 4% by 2005, nickel mine production is expected to nearly double from 2005 to 2009. The startup of the Ambatovy nickel and cobalt mine in 2007 in Madagascar could account for the majority of the increase (Dynatec Corp., 2004). Madagascar, which did not mine nickel in 2003, could have a 37% share of African nickel mine production in 2009. In Cameroon, nickel production is expected to start in 2007 at Nkamouna. Increased capacity at the Nkomati Mine is likely to raise South Africa's output by nearly 50% by 2007. Production is also expected to increase in Botswana (table 16). By 2007, Africa's share of world nickel mine output could rise to nearly 10%.

**Platinum-Group Metals.**—*Production.*—In 2003, Africa's production of palladium and platinum increased by 12% compared with that of 2002. South Africa, which was the dominant producer of PGM in Africa, accounted for 97% and 95% of the production of platinum and palladium, respectively. In 2003, South African production rose because of higher output from the Marikana and the Voorspoed Mines (tables 17, 18). Africa's share of world platinum mine output was 59% in 2003 compared with 62% in 1990. From 1990 to 2003, Africa's share of global palladium mine production rose to 42% from 27%. Africa's share of world palladium output was lower than its share of platinum output because South African deposits of PGM tend to have higher ratios of platinum to palladium than Russian deposits.

*Outlook.*—African mine production of palladium is expected to increase by an average of 7% per year from 2003 to 2009, and platinum, by nearly 5% per year (tables 17, 18). In South Africa, higher PGM production could be partially attributable to the opening of the Everest South Mine and higher production from the Kroondal Mine. Higher output in Zimbabwe is likely to result from the expansion of the Ngezi Mine by 2006 and the opening of the Unki Mine by 2007.

Silver.—*Production.*—In 2003, African mine production of silver fell by nearly 15% compared with that of 2002. Output decreased in Morocco, which was the leading producer of silver in Africa, because of lower ore grades mined by Société Metallurgique d'Imiter. In South Africa, silver output from copper, gold, lead, nickel, PGM, and zinc mines fell (Department of Minerals and Energy of the Republic of South Africa, 2004). The Dikulushi Mine accounted for the increase in production in Congo (Kinshasa). Namibia's production also increased slightly because of higher ore grades and debottlenecking operations at the Rosh Pinah Mine. Morocco accounted for 52% of continental output; South Africa, 21%; Namibia, 12%; and Congo (Kinshasa), 9% (table 19).

*Outlook.*—The long-term decline in African silver production is likely to be reversed. Silver mine production is expected to rise by an average of 2% per year from 2003 to 2009. Production in Congo (Kinshasa) is expected to double because of higher production from the Dikulushi Mine in 2004 and new joint-venture projects started by Gecamines by 2009. In Ghana and Tanzania, silver output was expected to rise because of higher gold production. In Zambia, production is expected to restart as new copper mines opened. Production is expected to fall in South Africa (table 19). **Tin.**—*Production.*—In 2003, continental tin mine production rose by nearly 39%. Most of the increase was attributable to higher output in Nigeria. In Namibia, production resumed with the opening of the Falcon Mine. Production also increased in Rwanda and resumed in Burundi. In 2003, Nigeria and Rwanda accounted for 87% and 10%, respectively, of African tin mine output, and mining had ceased in South Africa and Zimbabwe. In 1990, South Africa and Zimbabwe each had a 28% share of continental tin production; Namibia, 22%; Rwanda, 13%; and Nigeria, 4% (table 20).

Rwanda and Nigeria produced small amounts of tin metal. Since 1990, Congo (Kinshasa), South Africa, and Zimbabwe have ceased tin metal production (table 21).

*Consumption.*—In 2003, continental consumption of tin metal fell by about 8%. Africa's share of the world's tin consumption was nearly 2%. In 2003, South Africa accounted for about three-fourths of Africa's tin demand (World Bureau of Metal Statistics, 2004, p. 122).

*Outlook.*—African tin production is likely to continue to decline because of lower output in Nigeria. In Uganda, production is expected to restart as small-scale tin mines reopen. Africa's share of tin metal production is likely to remain below 1% until at least 2009.

**Titanium.**—*Production.*—The titanium dioxide (TiO<sub>2</sub>) content of ilmenite produced in Africa amounted to 1.04 Mt in 2003. In South Africa, the Ticor Heavy Minerals Project started production in early 2003. South Africa accounted for 96% of regional output, and Egypt, 4% (table 27). Africa's share of world ilmenite production was 23% in 2003.

*Outlook.*—The  $\text{TiO}_2$  content of African ilmenite production is expected to rise to 1.6 Mt in 2007 and 2 Mt in 2009. The increase in South Africa's output would be attributable to the Ticor Heavy Minerals Project. Sierra Rutile Ltd. expected to reopen its mine in Sierra Leone in 2005. Tiomin Resources Inc. planned to start the Kwale Project in Kenya in 2007. In Mozambique, the Moma and the Corridor Sands Projects are likely to start in 2006 and 2008, respectively. Mozambique, which did not produce ilmenite in 2003, could account for 35% of African ilmenite production in 2009 (table 27).

In Madagascar, Rio Tinto plc has indicated that it could make a development decision on its mineral sands project near Tolagnaro in mid-2005. If the project were to proceed, then it could increase African production to nearly 2.5 Mt in 2009. In Malawi, the Chipoka, the Makanjira, and the Salima Projects may result in further increases in African ilmenite production, but whether these projects would be implemented by the end of 2009 is uncertain.

**Tungsten.**—*Production.*—In 2003, African production of tungsten in ore fell to 103 t from 169 t in 2002. Tungsten production resumed in Burundi and fell sharply in Rwanda. In Uganda, output was constrained by a lack of infrastructure (table 22). Congo (Kinshasa) and Zimbabwe ceased tungsten mining in 1991. Africa accounted for less than 1% of global tungsten mine production in 2003.

*Outlook.*—The expansion by Régie d'Exploitation et de Développement des Mines is expected to raise Rwanda's production of tungsten to about 170 t. Uganda's production is expected to increase sharply because of higher output from the Nyamuliro deposit (table 22). Africa is likely to remain a minor producer of tungsten through at least 2009 in spite of higher production.

**Zinc.**—*Production.*—Africa's mine production of zinc fell by 12% in 2003. In Morocco, technical problems experienced by Compagnie Miniere de Guemassa led to lower output. South African production fell because of the closure of the Perring Mine and lower output from the Black Mountain Mine (BHP Billiton Ltd., 2003a, p. 2; 2004, p. 3). Namibia's production increased because of the opening of the Skorpion Mine and higher ore grades and debottlenecking of operations at the Rosh Pinah Mine. Morocco accounted for 33% of African zinc mine production; Namibia, 28%; South Africa, 19%; and Tunisia, 17% (table 23). Africa's share of world zinc mine production was about 2% in 2003 (table 4).

In 2003, African production of zinc metal rose by 49%. The opening of the Skorpion Mine accounted for a majority of the increase. Production also rose in Algeria and South Africa (table 24). In spite of the increase in South Africa's output, its share of continental zinc metal production fell to 59% from 80% in 2003.

*Consumption.*—In 2003, continental refined zinc consumption was 10% lower than that of 2002. Africa's share of the world's lead consumption was nearly 2%. South Africa accounted for about two-thirds of regional lead consumption (World Bureau of Metal Statistics, 2004, p. 130).

*Outlook.*—After doubling by 2005, African zinc mine production is likely to rise by an average of 2% per year from 2005 to 2009. Most of the increase could be attributable to the Skorpion Mine and smelter project in Namibia by 2005 and possibly the Kipushi Mine in Congo (Kinshasa) by 2007. In South Africa, the expansion of the Black Mountain Mine in 2004 would increase production substantially. Production was likely to recover in Morocco. In Algeria, Oued Amizour is expected to be privatized by 2007, and Kheret Youcef, developed. The depletion of the Bougrine Mine in 2005 could cause Tunisia's share of African zinc mine production to fall to less than 1%. In 2009, Namibia could account for 49% of African zinc mine production, and Congo (Kinshasa), 11% (table 23).

Higher production from the Skorpion smelter in Namibia and the possible opening of a new smelter in Congo (Kinshasa) could increase regional production of zinc metal to 334,000 t in 2009. Namibia, which did not produce zinc in 2001, could account for 45% of Africa's zinc metal output in 2009, and Congo (Kinshasa), 15% (table 24).

### **Industrial Minerals**

Africa was a significant producer of several industrial minerals. In 2003, Botswana was the world's leading producer of diamond by value. Tanzania was the only producer of tanzanite in the world. Kenya, Madagascar, and Zambia were leading producers of ruby, sapphire, and emerald, respectively. South Africa accounted for more than one-half of reported global vermiculite production. Africa's consumption of sulfuric acid was mostly for agricultural purposes; this use reflected the continent's low level of industrialization. In recent years, cement consumption increased substantially in such countries as Mozambique and Tanzania because of new projects in the minerals industry.

**Diamond.**—*Production.*—In 2003, Africa's share of world diamond production by volume was 54% compared with 46% in 1995 and 44% in 1990. African diamond production increased by more than 12% in 2003. Production rose in Botswana, Congo (Kinshasa), Guinea, Sierra Leone, and South Africa and fell in the Central African Republic and Namibia (tables 4, 25).

Congo (Kinshasa) accounted for the majority of the increase in production by volume. The peace agreement and the Kimberley Process led to higher production by artisanal miners. In Botswana, diamond production increased because of higher output from the Damtshaa and the Orapa Mines. The main factors in higher South African production were the Kimberley and the Venetia Mines. In Namibia, higher production by Namdeb Diamond Corporation (Pty) Ltd. was more than offset by the closure of Namibian Minerals Corp. in late 2002 and lower production from the Diaz 12 and the Marshall Fork Mines. Botswana accounted for 38% of African diamond output by volume; Congo (Kinshasa), 34%; South Africa, 16%; and Angola, 6% (table 25; DeBeers Group, 2004, p. 48).

In 2003, the global value of rough diamond production amounted to \$8.6 billion, of which Africa accounted for more than 60%. Botswana accounted for 26% of the value of global rough diamond output; Angola, Congo (Kinshasa), and South Africa, 10% each; and Namibia, 5%. In 2003, South Africa, which was Africa's leading producer of polished diamond, produced about \$500 million of polished diamond from \$400 million of rough diamond. South Africa accounted for about 3% of the world value of polished diamond production (Even-Zohar, 2004).

In November 2001, the Kimberly Process established a certification system to reduce the trade of conflict diamonds, particularly from Angola, Congo (Kinshasa), and Sierra Leone. The Kimberly Process involved Government officials from more than 50 countries that produced, processed, and imported diamond; the European Union; the World Diamond Council; and nongovernmental organizations. At the end of July 2003, the following African countries had met the minimum requirements of the Kimberley Process Certification Scheme: Angola, Botswana, Burkina Faso, Central African Republic, Congo (Brazzaville), Congo (Kinshasa), Côte d'Ivoire, Guinea, Lesotho, Mauritius, Namibia, Sierra Leone, South Africa, Swaziland, Tanzania, and Zimbabwe.

*Outlook.*—The production of rough diamond is expected to rise by an average of 3% per year from 2003 to 2009. In Angola, the state-owned Empresa de Diamantes de Angola plans to increase its production capacity; Angola's share of African diamond production could rise to 16% in 2009. South Africa's production is likely to rise because of the opening of the Klipspringer Mine. By 2009, Namibia's diamond production could rise to nearly 2.5 million carats because of the expansion of Namdeb's operations (table 25). Other planned expansions include the Aredor Mine in Guinea and the Williamson Mine in Tanzania, and the Koidu Mine is expected to open in Sierra Leone in 2004. In 2005, European Diamonds plc has plans to start mining in Lesotho, and the Murowa Diamond Project is likely to start in Zimbabwe. Higher production in the Central African Republic, Côte d'Ivoire, and Liberia could result from increased political stability. Africa's share of world diamond production is expected to fall to 48% in 2007.

**Phosphate Rock.**—*Production.*—In 2003, the phosphorous pentoxide ( $P_2O_5$ ) content of African phosphate rock production fell to 12.6 Mt from 12.8 Mt in 2002. Output increased in Algeria, Togo, and Tunisia and fell in Morocco, Senegal, and South Africa. Morocco, which was the leading producer of phosphate rock in Africa, accounted for 59% of continental phosphate rock output; Tunisia, 19%; and South Africa, 8% (table 26). In 2003, Africa's share of world phosphate rock was about 29%.

*Outlook.*—The  $P_2O_5$  content of African phosphate rock production is expected to increase to 14.5 Mt in 2009. In Morocco, planned expansions by Office Cherifien des Phosphates could increase Morocco's production by 15%. Togo's production is likely to more than double by 2007 because of capacity expansions by International Fertilizer Group Togo; its share of African phosphate rock output could rise to 8% from less than 4%. In Senegal, production is expected to rise because of higher capacity at the Tobene Mine. Production is also expected to rise in Egypt and Tunisia. South African production is expected to fall (table 26).

### **Mineral Fuels**

Africa was a producer of mineral fuels; its share of world uranium production was nearly 20%. South Africa was a significant producer and exporter of bituminous coal. Most of Africa's natural gas production was in the northern part of the continent. Northern and western African countries were the most significant producers of crude petroleum. Niger was one of the world's leading producers of uranium. Africa's share of world mineral fuel consumption was modest.

**Coal.**—*Production.*—Regional coal production rose by 8% in 2003. Most of the increase was attributable to South Africa where higher production by Anglo American plc, Xstrata plc, and other companies more than offset lower production by Billiton SA Ltd. and Kumba Resources (Pty) Ltd. Output rose in Botswana and Niger and fell in Zambia and Zimbabwe; the fall in Zimbabwe's production was the result of shortages of foreign currency and spare parts. South Africa, which was the dominant coal producer in Africa, accounted for 98% of regional coal output; Zimbabwe, 1%; and others, 1% (table 28). More than 99% of South Africa's coal production was about 5%.

*Consumption.*—Africa accounted for nearly 4% of world coal consumption in 2003. South Africa accounted for 91% of African coal consumption. From 1997 to 2002, Africa's consumption of coal rose by about 6% (British Petroleum plc, 2004, p. 33).

*Outlook.*—After falling by 2% by 2005, African coal production is expected to increase by an average of 3% per year from 2005 to 2009. In Mozambique, the Moatize Project is expected to start production in 2009; Moatize could account for

the majority of the increase in African coal production. South African production could increase to 250 Mt by 2007; rising production would be partially attributable to the Greenside, the Kleinkopje, and the Kriel South expansions. The National Development Corporation of Tanzania plans to start production at Mchuchuma in 2008. Production is also expected to rise in Nigeria, Swaziland, Zambia, and Zimbabwe (table 28).

**Natural Gas.**—*Production.*—Regional production of dry natural gas increased by 2% in 2003. Nigeria accounted for most of the increase in output; production also increased in South Africa, Libya, and Equatorial Guinea. Production fell in Algeria and Côte d'Ivoire. In 2003, Algeria accounted for 52% of Africa's dry natural gas output; Nigeria, 26%; and Egypt, 15%. Nigeria's share of continental dry natural gas output was 5% in 1990 (table 29). Africa accounted for about 7% of world natural gas production.

*Consumption.*—The African continent consumed nearly 3% of the world's natural gas. Africa's consumption rose to 66.8 billion cubic meters in 2003 compared with 61.7 billion cubic meters in 2002 and 47.7 billion cubic meters in 1998. Egypt accounted for 37% of Africa's dry natural gas consumption; Algeria, 32%; and others, 31% (British Petroleum plc, 2004, p. 25).

*Outlook.*—African production of dry natural gas is expected to rise by 7% per year from 2003 to 2009. Algeria's output of natural gas is likely to increase because of new production from In Salah in 2004, In Amenas in 2005, and Gassi Touil in 2007. In Libya, production is likely to increase to 30 billion cubic meters in 2009; new sources of gas could include Wafa and the Western Libya Gas Project. Libya's share of African natural gas production is expected to rise to 10% in 2009 from 3% in 2003. Egypt is expected to nearly double its production of natural gas because of the development of projects that included the Egyptian Liquified Natural Gas Project and the Sapphire and the West Mediterranean fields (table 29).

The increase in Nigeria's production is attributable to the West African Gas Pipeline, which is expected to be operational in 2006 and the planned elimination of natural gas flaring. In Angola, production is expected to rise to 5 billion cubic meters in 2009 because of increased crude petroleum production and decreased natural gas flaring. The Temane Project in Mozambique and the Songo Songo Project in Tanzania are expected to be commissioned in 2004 (table 29).

**Petroleum.**—*Production.*—In 2003, African crude petroleum production increased by 5%. Algeria accounted for the majority of the increase; output also increased in Libya, Nigeria, and Sudan. The increase in Nigerian output was inhibited by civil unrest. In Sudan, production increased in blocks 1, 2, and 4. Nigeria accounted for 27% of regional crude petroleum production; Algeria, 20%; Libya, 19%; Angola, 11%; and Egypt, 8% (table 30). In 2003, Africa's share of world crude petroleum production amounted to almost 11% (table 4).

*Consumption.*—Regional consumption of petroleum products increased to 939 million barrels (Mbbl) in 2003 from 918 Mbbl in 2002 and 870 Mbbl in 1998. Africa accounted for about 3% of world petroleum products consumption. Egypt accounted for 21% of African consumption of petroleum products; South Africa, 20%; Algeria, 9%; and others, 50% (British Petroleum plc, 2004, p. 9).

*Outlook*.—African crude petroleum production is expected to rise by more than 7% per year from 2003 to 2009. Nigeria's output is likely to increase to 1.5 billion barrels in 2007. Sources of additional production would include the Bonga field in 2005 and the Agbami, the Bosi, the East Area Oil, the Erha, and the Eti/Assa fields in 2006 and 2007. In Angola, production is expected to more than double from development that is based on new deepwater discoveries in blocks 14, 15, 17, and 18. Nigeria's and Angola's shares of African crude petroleum production are expected to rise to 34% and 16%, respectively, by 2009. Sudan's output is expected to nearly triple by 2009 because of new production in blocks 3, 6, and 7. Production is also expected to rise substantially in Algeria and Libya. Sources of new Algerian output will include blocks 208 and 405a. Increases in Libyan production would included the al-Jurf field. In Chad, the Doba field is expected to reach full production by 2005 (table 30).

**Uranium.**—*Production.*—In 2003, African uranium production fell by 5% compared with that of 2002. Output fell in Namibia because of a decrease in ore processed from the Rossing Mine. Uranium production fell in South Africa because of lower ore grades at Vaal Reefs (Department of Minerals and Energy of the Republic of South Africa, 2004). Niger's production rose because of higher output by Société Miniere de l'Air and Compagnie Miniere d'Akouta (International Monetary Fund, 2004a, p. 16). Niger accounted for 53% of African uranium production; Namibia, 34%; and South Africa, 13%. In 1990, Niger's and South Africa's shares of continental production were 30% and 27%, respectively (table 31). Africa accounted for about 18% of the world's uranium production in 2003 (table 4).

*Consumption.*—South Africa was the only regional consumer of uranium in 2003. Africa accounted for less than 1% of the electricity generated by nuclear power (International Atomic Energy Agency, 2003).

*Outlook.*—After showing little change through 2007, continental uranium mine production is expected to rise by about 12% in 2009 (table 31). Output is expected to fall in South Africa where uranium is a byproduct of gold mining; the production of gold is likely to decline. Paladin Resources Ltd. of Australia is considering the development of the Kayelekera Project in Malawi, which could produce about 850 t/yr of uranium starting in 2008 or 2009. According to the International Atomic Energy Agency (2003), Africa's production of electricity from nuclear power could rise by 1% to 2% per year from 2002 to 2010.

### **Trade Review and Outlook**

Africa's current account deficit fell to 0.1% of the GDP in 2003 from 1.5% of the GDP in 2002. In 2003, sub-Saharan countries ran an average deficit of 2.4% of the GDP, and countries in the Arab Maghreb Union ran an average surplus of 7% of the GDP. Trade surpluses in oil-exporting countries were more than offset by trade deficits in oil-importing countries (International Monetary Fund, 2004b, p. 50).

Oil-importing countries had an average current account deficit of 1.9% of the GDP in 2003, and oil-exporting countries,

an average current account surplus of 4.8% of the GDP. The average current account deficit for oil-importing countries is expected to increase to 2.9% of the GDP in 2004 and to 3.3% of the GDP in 2005. Although Guinea, Mali, Mauritania, and Zambia were oil-importing countries, their terms of trade were expected to improve in 2004 because of higher prices for metal ores. Mozambique and Tanzania also depended heavily upon metal and metal ore exports, but were not expected to experience significant changes in their terms of trade. For oil-exporting countries, the surplus is predicted to rise to 8.6% of the GDP in 2004 and 10.2% of the GDP in 2005. Africa was expected to run a current account surplus of 0.4% of the GDP in 2004 and 0.7% of the GDP in 2005 (International Monetary Fund, 2004b, p. 50-51).

In 2003, mineral fuels accounted for more than 90% of the export earnings of Algeria, Angola, Equatorial Guinea, Libya, and Nigeria. Minerals and mineral fuels accounted for more than 80% of the export earnings of Botswana (in order of value, diamond, copper, nickel, and soda ash), Congo (Brazzaville) (petroleum), Congo (Kinshasa) (diamond, petroleum, cobalt, and copper), Gabon (petroleum and manganese), Guinea (bauxite, alumina, gold, and diamond), Sierra Leone (diamond), and Sudan (petroleum and gold). Minerals and mineral fuels accounted for more than 50% of the export earnings of Mali (gold), Mozambique (aluminum and petroleum products), Namibia (diamond, uranium, gold, and zinc), and Zambia (copper and cobalt). Gold was also a significant source of export earnings in Ghana, South Africa, and Tanzania. Diamond was a significant source of export earnings in the Central African Republic and South Africa as was iron ore in Mauritania and uranium in Niger.

### Environment

Deforestation for fuel use and land-intensive agricultural production continues to be a significant environmental issue in many African countries. Other causes of deforestation included artisanal production of gemstones and lime. The West African Pipeline Project, which was expected to be completed in 2006, could help mitigate the effects of deforestation in Benin, Ghana, and Togo and reduce the emissions of greenhouse gases. In 2003, natural gas was being flared by Nigeria; in the future, Nigeria expects to export natural gas to Benin, Ghana, and Togo. The Government of Nigeria has committed to ending the flaring of natural gas, which will also lead to decreased pollution.

The use of mercury by artisanal gold miners has led to serious air and water pollution in such African countries as Ghana, Kenya, Mozambique, South Africa, Sudan, Tanzania, and Zimbabwe. The Global Environment Facility, the United Nations Development Program, and the United Nations Industrial Development Organization began the Global Mercury Project in August 2002 to alleviate these problems. The Global Mercury Project has been providing cleaner technologies and training for miners, conducting health assessments, and helping institute Government regulatory capacities.

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TABLE 1

### AFRICA: AREAL EXTENT AND ESTIMATED POPULATION IN 2003<sup>1</sup>

	Area <sup>2</sup>	Estimated population <sup>3</sup>
Country	(square kilometers)	(millions)
Algeria	2,381,740	31.8
Angola	1,246,700	13.5
Benin	112,620	6.7
Botswana	600,370	1.7
Burkina Faso	274,200	12.1
Burundi	27,830	7.2
Cameroon	475,440	16.1
Cape Verde	4,033	0.5
Central African Republic	622,984	3.9
Chad	1,284,000	8.6
Comoros	2,170	0.6
Congo (Brazzaville)	342,000	3.8
Congo (Kinshasha)	2,345,410	53.2
Côte d'Ivoire	322,460	16.8
Djibouti	23,000	0.7
Egypt	1,001,450	67.6
Equatorial Guinea	28,051	0.5
Eritrea	121,320	4.4
Ethiopia	1,127,127	68.6
Gabon	267,667	1.3
Gambia, The	11,300	1.4
Ghana	239,460	20.4
Guinea	245,857	7.9
Guinea-Bissau	36,120	1.5
Kenya	582,650	31.9
Lesotho	30,355	1.8
Liberia	111,370	3.4
Libya	1,759,540	5.6
Madagascar	587,040	16.9
Malawi	118,480	11.0
Mali	1,240,000	11.7
Mauritania	1,030,700	2.7
Mauritius <sup>4</sup>	2,040	1.2
Mayotte	374	0.2
Morocco	446,550	30.1
Mozambique	801,590	18.8
Namibia	825,418	2.0
Niger	1,267,000	11.8
Nigeria	923,768	135.6
Reunion	2,517	0.8
Rwanda	26,338	8.3 2
Sao Tome and Principe	1,001	0.2
Senegal	196,190	10.0
Seycnelles	455	0.1
Sierra Leone	/1,/40	5.3
Somalia	637,657	9.6
South Africa	1,219,912	45.3
Sugan	2,505,810	33.5
Swaziland	1/,363	1.1
Taga	945,087	35.9
Tunicia	56,/85	4.9
I uiiisia Uganda	103,010	9.9 25 2
Ugaliua Wastern Sahara	236,040	25.3
western Sanara	200,000	0.3 ~
Zimbabwa	/52,014	10.4
	20,250,002	13.1
United States	0,537,005	201.0
World	9,029,091 NA	271.0 6 300 0
11 UTIU	INA	0,300.0

NA Not applicable.

<sup>1</sup>Includes data available through February 2004. Population rounded to no more than three significant digits.

### TABLE 1--Continued AFRICA: AREAL EXTENT AND ESTIMATED POPULATION IN 2003<sup>1</sup>

<sup>2</sup>Source: U.S. Central Intelligence Agency, World Factbook 2003.
 <sup>3</sup>Source: World Bank 2004, World Development Indicators Database, August.

<sup>4</sup>Includes Agalega Islands, Cargados Carajos Shoals (Saint Brandon), and Rodríguez.

<sup>5</sup>Includes the islands of Mafia, Pemba, and Zanzibar.

	Estimated	Estimated	Real GDP
	GDP	GDP	annual percentage
Country	(billions)	per capita	change <sup>4</sup>
Algeria	\$197.2	\$6,194	6.8%
Angola	32.0	2,201	3.4%
Benin	7.5	1,060	4.8%
Botswana	14.9	9,382	5.4%
Burkina Faso	14.1	1,163	8.0%
Burundi	4.7	692	-0.5%
Cameroon	29.9	1,770	4.5%
Cape Verde	2.4	5,200	5.3%
Central African Republic	4.6	1,156	-7.5%
Chad	9.3	1.155	9.7%
Comoros	1.0	1,638	2.1%
Congo (Brazzaville)	3.4	1.638	0.8%
Congo (Kinshasa)	32.9	581	5.6%
Côte d'Ivoire	25.5	1 413	-2.8%
Diibouti	14	1,758	3.5%
Egypt	256.6	3 813	3.1%
Equatorial Guinea	14 7	13,916	14.7%
Fritrea	43	964	3.0%
Ethiopia	46.8	677	-3.9%
Gabon	83	6 406	2.8%
Gambia The	2.5	1 772	6.7%
Ghana	2.5 14 7	2 250	5.2%
Guinea	16.0	1.876	1 2%
Guinea-Bissau	10.9	1,870	0.6%
Kenva	32.7	1 025	1.6%
Lasotho	52.7	1,025	2 20/
	4.0	5 1,000	5 2.00/ 5
	3.3	5 ( 100	<sup>5</sup> 2.0%
Libya	35.0	6,400	3.2%
Madagascar	13.1	//8	9.8%
Malawi	6.8	616	4.4%
Mali	10.1	850	6.0%
Mauritania	5.3	1,849	4.9%
Mauritius	13./	5	2./%
Mayotte	0.5	2,600	NA S
Morocco	120.6	3,889	5.5%
Mozambique	22.2	1,200	8.4%
Namibia	12.6	6,270	3.7%
Niger	9.6	816	5.3%
Nigeria	126.1	908	10.7%
Reunion	4.3	5,800	2.5%
Rwanda	10.6	1,164	0.9%
Sao Tome and Principe	0.2	1,420	4.5%
Senegal	17.0	1,678	6.5%
Seychelles	1.0	11,847	-5.1%
Sierra Leone	2.9	562	9.4%
Somalia	4.4	5 500	<sup>5</sup> 2.1% <sup>5</sup>
South Africa	466.4	10,045	1.9%
Sudan	68.0	2,025	6.0%
Swaziland	5.0	4,938	2.2%
Tanzania	21.6	602	7.1%
Тодо	7.2	1,372	2.7%
Tunisia	70.1	7,098	5.6%

### TABLE 2 AFRICA: GROSS DOMESTIC PRODUCT in 2003<sup>1-3</sup>

See footnotes at end of table

# TABLE 2--Continued. AFRICA: GROSS DOMESTIC PRODUCT (GDP) in 2003 <sup>1-3</sup>

	Estimated	Estimated	Real GDP
	GDP	GDP	annual percentage
Country	(billions)	per capita	change <sup>4</sup>
Uganda	\$34.8	\$1,390	4.7%
Western Sahara	NA	NA	NA
Zambia	9.2	830	5.1%
Zimbabwe	23.5	2,026	-5.2%
Total	1,939.2	2,255	4.3% 8
United States	10,625.7	36,519	3.0%
World	50,428.3	8,002	3.9%

NA Not available.

<sup>1</sup>Gross domestic product (GDP) based on purchasing-power-parity valuation of country GDP. <sup>2</sup>Source: International Monetary Fund, World Economic Outlook Database, September 2004.

<sup>3</sup>Table data compiled September, 2004; may be different than what is presented in previously written

individual country chapters.

<sup>4</sup>Compared with 2002.

<sup>5</sup>Source: U.S. Central Intelligence Agency, World Factbook 2004.

<sup>6</sup>1998 estimate.

<sup>7</sup>2002 estimate.

<sup>8</sup>Does not include Egypt, Liberia, Libya, Reunion, and Somalia.

TABLE 3
SELECTED SIGNIFICANT AFRICAN EXPLORATION SITES IN 2003

Country	Type <sup>1</sup>	Site	Commodity <sup>2</sup>	Company	Resource <sup>2, 3</sup>	Exploration <sup>4</sup>
Algeria	Е	Tirek-Amesmessa	Au	GMA Resources plc.	1.6 Moz Au	Extensive drilling.
Burkina Faso	Е	Essakan	Au	Orezone Resources Inc.	1.3 Moz Au	Do.
Central African Republic	Е	Bambari	Au	Axmin Inc.	Data not released	Do.
Côte d'Ivoire	F	Bonikro	Au	Equigold NL	630,000 oz Au	Do.
Egypt	F	Sukari	Au	Centamin Egypt Ltd.	1.5 Moz Au	Feasibility drilling.
Eritrea	Е	Bisha	Cu, Au, Ag	Nevsun Resources Ltd.	Data not released	Extensive drilling.
Ghana	F	Ahafo	Au	Newmont Mining Corp.	5 Moz Au	Feasibility drilling.
Do.	F	Akyem	Au	do.	7.6 Moz Au	Do.
Do.	F	Wassa area	Au	Golden Star Resources Ltd.	614,000 oz Au	Do.
Guinea	Е	Dinguiraye (LEP)	Au	Kenor ASA	Data not released	Extensive drilling.
Madagascar	F	Ambatovy	Ni, Co	Dynatec Corp.	2.3 Mt Ni, 210,000 t Co	Feasibility drilling.
Mauritania	Е	Tasiast	Au	Geomaque Explorations Ltd.	1.2 Moz Au	Extensive drilling.
South Africa	F	Burnstone	Au	Great Basin Gold Ltd.	4.35 Moz Au	Feasibility drilling.
South Africa	Р	Messina	PGM, Au	SouthernEra Resources Ltd.	14.8 Moz 5PGM+Au	Extensive drilling.
South Africa	Е	Sheba's Ridge	PGM, Au	Cluff Mining plc	Data not released	Do.
Senegal	Е	Bambaji	Au	Iamgold Corp.	do.	Do.

<sup>1</sup>E--Active exploration; F--Feasibility work ongoing/completed; P--Exploration at producing site.

<sup>2</sup>Abbreviations used in this table for commodities are as follows: Ag-silver; Au--gold; Co--cobalt; Cu--copper, Ni--nickel; PGM--platinum-group metals.

Abbreviations used in this table for units of measure are as follows: Moz--million troy ounces; Mt--million metric tons; oz--troy ounces; t--metric tons.

<sup>3</sup>Resources reported where available based on data from various public sources. Data have not been verified by the U.S. Geological Survey.

<sup>4</sup>Sites where extensive (greater than 10,000 meters) drilling or significant (more than \$5 million) expenditure have been reported.

TABLE 4 AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2003<sup>1</sup>

# (Thousand metric tons unless otherwise specified)

					Metals					
				Cobalt,					Lead,	Manganese
			Chromite,	mine output,	Copper,	Gold,	Iron and	l steel	mine output,	ore, mine
	Aluminum		mine output,	Co content	mine output,	mine output	Iron ore,		Pb content	output, Mn
Country	Bauxite	Metal <sup>2</sup>	gross weight	(metric tons)	Cu content	(kilograms)	gross weight	Steel, crude	(metric tons)	content
Algeria	ł	ł	ł	1	ł	365	1,378	1,051	1,108	ł
Angola	ł	ł	I	ł	I	I	I	I	ł	I
Benin	ł	I	1	1	1	20 <sup>e</sup>	1	1	1	1
Botswana	1	ł	:	1	28	8	1	1	1	1
Burkina Faso	ł	I	1	1	1	400	1	-	1	1
Burundi	I	ł	1	1	1	2,855	1	1	ł	1
Cameroon	ł	77 e	1	1	1	1,000 <sup>e</sup>	1	1	1	1
Cape Verde	ł	ł	1	1	1	1	1	1	1	1
Central African Republic	1	ł	:	1	;	2 e	I	1	1	I
Chad	I	I	I	1	I	I	I	I	I	I
Comoros	ł	I	I	ł	ł	1	I	ł	ł	ł
Congo (Brazzaville)	ł	I	:	1	:	30 °	1	1	1	1
Congo (Kinshasa)	1	I	1	12,000 <sup>e</sup>	53	20 <sup>e</sup>	1	40 <sup>e</sup>	1	1
Côte d'Ivoire	1	ł	1	1	1	1,313	1	1	1	ł
Djibouti	1	I	1	1	1	1	1	1	1	1
Egypt	1	195	1	1	1	1	2,500	4,400	1	8 e
Equatorial Guinea	ł	ł	;	ł	1	500 °	I	I	ł	I
Eritrea	1	I	:	1	:	1	1	1	1	1
Ethiopia	ł	I	:	I	;	5,300 °	I	I	ł	I
Gabon	I	I	I	I	I	70 e	I	I	I	873
Gambia, The	ł	I	1	1	1	I	I	I	ł	I
Ghana	495	16	ł	ł	ł	68,681	ł	ł	ł	480
Guinea	15,000	ł	I	ł	I	16,226	I	I	ł	I
Guinea-Bissau	I	I	I	I	I	I	I	I	I	I
Kenya	ł	7	I	1	I	1,500	1	I	ł	I
Lesotho	ł	I	1	I	I	I	I	I	I	I
Liberia	I	I	1	I	ł	20	I	I	I	I
Libya	ł	ł	I	1	I	ł	I	986	ł	I
Madagascar	ł	ł	45	ł	ł	10	ł	1	ł	ł
Malawi	ł	ł	ł	ł	ł	ł	ł	ł	ł	ł
Mali	ł	ł	I	1	I	45,535	I	I	ł	I
Mauritania	ł	ł	1	ł	1	ł	10,600	5	ł	I
Mauritius	ł	I	I	I	I	I	I	I	I	I
Morocco and Western Sahara	ł	ł	1	1,300	5	1,863	4	5	38,000	I
Mozambique	12	407	ł	ł	ł	63	ł	ł	ł	I
Namibia	ł	ł	I	ł	20	2,425	ł	ł	18,782	ł
Niger	I	ł	1	ł	1	28	1	ł	ł	1
Nigeria	1	ł	1	ł	1	50	ł	ł	250	ł
See footnotes at end of table										

TABLE 4--Continued AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2003<sup>1</sup>

(Thousand metric tons unless otherwise specified)

					MetalsCont	inued				
				Cobalt,					Lead,	Manganese
			Chromite,	mine output,	Copper,	Gold,	Iron and s	steel	mine output,	ore, mine
	Aluminun	r.	mine output,	Co content	mine output,	mine output	Iron ore,		Pb content	output, Mn
Country	Bauxite	Metal <sup>2</sup>	gross weight	(metric tons)	Cu content	(kilograms)	gross weight	Steel, crude	(metric tons)	content
Reunion	1	1	1	1	1	1	1	1	1	1
Rwanda	1	1	;	-	1	10 <sup>e</sup>	1	ł	1	1
Sao Tome and Principe	1	1	1	-	1	1	ł	1	1	ł
Senegal	ł	1	1	1	1	° 009	ł	1	1	ł
Seychelles	I	ł	I	ł	ł	ł	I	I	I	ł
Sierra Leone	I	1	1	1	I	е 	1	I	1	1
Somalia	1	ł	:		1	1	1	1	1	1
South Africa	ł	739	7,406	404 °	60	372,767	38,086	9,384	39,941	1,585
Sudan	I	1	47	1	1	5,000	I	1	1	ł
Swaziland	1	1	1	1	:	1	I	1	1	ł
Tanzania	ł	1	1	1	3	48,018	ł	ł	ł	1
Togo	I	1	1	1	I	1	1	I	1	1
Tunisia	1	1	:	1	1	1	164	86 °	5,000	1
Uganda	1	ł	1	-	1	5	1	7	1	1
Zambia	I	1	1	11,300 °	349	1	I	1	1	ł
Zimbabwe	1	1	637	62	3	12,564	367	152	1	ł
Total	15,500	1,440	8,130	25,000	551	587,000	53,100	16,100	103,000	2,950
Share of world total	10.4%	4.3%	52.6%	47.1%	4.0%	22.7%	4.6%	1.7%	3.2%	32.6%
United States	NA	2,700	:		1,120	277,000	46,400	93,700	460,000	1
Share of world total	NA	8.1%	:	-	8.2%	10.7%	4.0%	9.7%	14.1%	1
World total	148,000	33,400	15,500	53,200	13,700	2,580,000	1, 170, 000	932,000	3,260,000	9,040
See footnotes at end of table.										

TABLE 4--Continued AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2003<sup>1</sup>

(Thousand metric tons unless otherwise specified)

	Metals						Mineral fuels	
	Zinc.		Industrial mine	srals			Petroleum.	
	mine output,				Phosphate	Coal,	crude	Uranium,
	Zn content	Cement,	Diamond, natural	Graphite	rock,	anthracite and	(thousand 42-	U <sub>3</sub> O <sub>8</sub> content
Country	(metric tons)	hydraulic	(thousand carats) <sup>4</sup>	(metric tons)	gross weight	bituminous	gallon barrels)	(metric tons)
Algeria	5,201	9,000 0	:	ł	905	1	580,000	1
Angola	I	597	5,000 <sup>5,6</sup>	I	I	I	321,200	I
Benin	ł	250 °	:	ł	ł	ł	1	ł
Botswana	1	1	30,400 <sup>7</sup>	1	1	1,035	:	1
Burkina Faso	1	30 °	1	ł	2	1	:	ł
Burundi	1	1	1	1	1	1	:	I
Cameroon	ł	930 °	1	ł	ł	1	25,000 °	1
Cape Verde	1	1	:	1	1	1	1	1
Central African Republic	I	I	333	I	I	I	ł	I
Chad	ł	ł	ł	ł	ł	ł	1	ł
Comoros	I	I	1	I	I	I	:	I
Congo (Brazzaville)	1	1	:	1	1	1	87,600	ł
Congo (Kinshasa)	1	190 <sup>e</sup>	27,000	1	1	1	8,500 °	1
Côte d'Ivoire	I	650 °	230	I	I	1	7,537	ł
Djibouti	I	I	1	I	I	I	1	I
Egypt	I	26,639	I	I	1,500	58 °	221,219	ł
Equatorial Guinea	ł	ł	ł	ł	ł	1	95,000 *	1
Eritrea	ł	45	ł	ł	ł	ł	1	ł
Ethiopia	I	1,200	I	I	I	1	1	ł
Gabon	ł	350 °	1 e	ł	ł	ł	87,965	ł
Gambia, The	I	1	I	I	I	I	1	ł
Ghana	I	1,900	904	1	I	1	3,000 °	1
Guinea	ł	360	999	ł	ł	ł	1	ł
Guinea-Bissau	ł	ł	ł	1	1	1	1	ł
Kenya	ł	1,537	1	ł	1	1	1	ł
Lesotho	ł	1	2 e	1	1	1	:	I
Liberia	ł	25	40	ł	1	1	1	ł
Libya	ł	3,300	1	ł	1	1	543,000 °	1
Madagascar	ł	52	1	2,000 <sup>e</sup>	1	I	1	I
Malawi	ł	190	ł	ł	ł	14	1	ł
Mali	1	ł	1	1	1	1	:	I
Mauritania	ł	200 <sup>e</sup>	1	ł	1	1	:	ł
Mauritius	ł	1	1	ł	1	1	1	ł
Morocco and Western Sahara	70,000	10,400	1	1	22,877	(3)	, 06	1
Mozambique	1	362	:	1	1	37	:	ł
Namibia	60,500	I	1,481	I	I	I	1	2,751
Niger	1	40 <sup>e</sup>	:	I	I	183	1	3,707
See footnotes at end of table.								

AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2003<sup>1</sup> TABLE 4--Continued

(Thousand metric tons unless otherwise specified)

	Metals							
	Continued						Mineral fuels	
	Zinc,		Industrial mi	nerals			Petroleum,	
	mine output,				Phosphate	Coal,	crude	Uranium,
	Zn content	Cement,	Diamond, natural	Graphite	rock,	anthracite and	(thousand 42-	U <sub>3</sub> O <sub>8</sub> content
Country	(metric tons)	hydraulic	(thousand carats) <sup>4</sup>	(metric tons)	gross weight	bituminous	gallon barrels)	(metric tons)
Nigeria	1	2,100	1	1	:	10 <sup>e</sup>	<sup>3</sup> 000,867	:
Reunion	1	380 °	:	1	1	1	:	1
Rwanda	1	105	1	1	1	1	;	1
Sao Tome and Principe	1	1	:	1	1	1	:	1
Senegal	1	2,150	1	1	2,004	1	:	1
Seychelles	1	1	:	1	ł	1	1	ł
Sierra Leone	1	170	507	1	1	1	:	1
Somalia	1	1	:	1	1	1	1	1
South Africa	41,239	1	12,684	1	2,643	239,311	4,068	901
Sudan	1	320	1	1	1	1	110,000	1
Swaziland	1	1	:	1	I	300	:	I
Tanzania	1	1,186	213	ł	4	55	;	1
Togo	1	800 °	1	1	1,471	1	:	1
Tunisia	36,000	6,038	1	I	7,890	I	24,300	I
Uganda	I	505	1	I	I	I	1	I
Zambia	1	480	:	1	1	50	:	1
Zimbabwe	1	e00 <sup>e</sup>	:	7,675	95	2,872	:	1
Total	213,000	73,000	79,500	9,700	38,500	244,000	2,920,000	7,360
Share of world total	2.3%	3.7%	54.0%	0.6%	28.8%	6.0%	10.9%	18.2%
United States	738,000	94,300	1	I	35,000	893,000	2,070,000	1,010
Share of world total	7.9%	4.8%	:	1	26.2%	22.1%	7.7%	2.5%
World total	9,400,000	1,970,000	147,000	1,540,000	133,000	4,050,000	26,800,000	40,400
<sup>e</sup> Estimated; estimated data, U.S	. data, and world tota	ils are rounded to	o no more than three s	significant digits.	NA Not availab	le Zero or zer	o percent.	
<sup>1</sup> Totals may not add owing to i	ndependent rounding	Percentages ar	e calculated on unrou	nded data. Table	e includes data av	ailable as of Apri	1 2005.	
	o de la companya de l					to de la companya de		

<sup>2</sup>Primary and secondary production.

<sup>3</sup>Less than 1/2 unit. <sup>4</sup>Gemstones and industrial diamond.

<sup>5</sup>Did not include smuggled production. <sup>6</sup>Production was approximately 90% gem grade and 10% industrial grade. <sup>7</sup>Assumed to contain about 70% gem and near gem.

# TABLE 5 AFRICA: HISTORIC AND PROJECTED BAUXITE PRODUCTION, 1990-2009

### (Thousand metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Ghana	381	513	504	495	1,000	1,000	800
Guinea	15,800	15,800	15,700	15,000	16,000	16,000	24,000
Mozambique	7	11	8	12	12	12	12
Sierra Leone	1,430				1,000	1,000	1,000
Total	17,600	16,300	16,200	15,500	18,000	18,000	26,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

# TABLE 6 AFRICA: HISTORIC AND PROJECTED ALUMINUM PRODUCTION, 1990-2009

### (Thousand metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Cameroon	93	79	86	77	80	80	80
Egypt	179	180	189	195	200	200	200
Ghana	174	135	137	16			
Kenya <sup>1</sup>		2	2	2	2	2	2
Mozambique			54	407	510	510	510
Nigeria						50	190
South Africa	159	229	673	739	830	830	830
Total	605	625	1,140	1,440	1,600	1,700	1,800

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production. <sup>1</sup>Kenya produced secondary refined aluminum; primary production in all other African countries.

# TABLE 7 AFRICA: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 1990-2009

### (Metal content in thousand metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Botswana	25	25	35	28	25	25	25
Congo (Kinshasa)	509	29	21	53	90	130	180
Mauritania					5	30	30
Morocco	16	14	7	5	6	6	6
Namibia	28	23	6	20	25	25	25
South Africa	179	166	137	90	100	100	100
Tanzania				3	3	3	3
Zambia	519	316	249	349	586	800	800
Zimbabwe	14	9	2	3			
Total	1,290	582	457	551	840	1,100	1,200

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

### TABLE 8

### AFRICA: HISTORIC AND PROJECTED REFINED COPPER PRODUCTION, 1990-2009

### (Thousand metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	$2007^{e}$	2009 <sup>e</sup>
Congo (Kinshasa)	339	35	31	8	10	50	100
Egypt <sup>1</sup>	- 4	4	4	4	4	4	4
South Africa	133	124	126	93	105	105	105
Zambia	- 438	328	227	350	500	560	560
Zimbabwe	- 14	7	10	7			
Total	928	498	398	462	620	720	770

eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. --Negligible or no production. <sup>1</sup>Egypt produced secondary refined copper; primary production in all other African countries.

### TABLE 9 AFRICA: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 1990-2009

(Metal content in kilograms)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria				365	1,000	1,100	1,500
Benin		300		(1)	(1)	(1)	(1)
Botswana	46	86	4	(1)	(1)	(1)	(1)
Burkina Faso	7,800	1,319	553	400	1,200	3,500	3,000
Burundi	9	2,000		2,855	2,900	2,900	2,900
Cameroon	10	800	1,000	(1)	(1)	(1)	(1)
Central African Republic	241	97	15	(1)	(1)	(1)	(1)
Chad			120	(1)	(1)	(1)	(1)
Congo (Brazzaville)	7	10	10	(1)	(1)	(1)	(1)
Congo (Kinshasa)	9,300	1,180	69	20	20	8,000	19,000
Côte d'Ivoire	20	1,983	3,444	1,313	1,300	1,300	1,300
Equatorial Guinea	50	50	500	(1)	(1)	(1)	(1)
Eritrea		59	264				
Ethiopia	848	4,500	5,177	5,300	5,300	5,300	5,300
Gabon	80	70	70	(1)	(1)	(1)	(1)
Ghana	16,800	53,087	72,080	68,681	73,800	101,000	101,000
Guinea	6,340	7,863	13,104	16,226	19,000	29,000	27,000
Kenya	25	170	1,243	1,500	1,500	1,500	1,500
Liberia	600	800	25	(1)	(1)	(1)	(1)
Madagascar	216	38	5	10	400	800	1,000
Mali	5,200	3,996	28,717	45,535	47,000	55,400	55,400
Mauritania		1,196			300	5,000	4,700
Morocco	500	580	505	1,863	3,000	3,000	3,000
Mozambique	63	6,800	23	(1)	(1)	(1)	(1)
Namibia	1,610	2,394	2,417	2,425	2,600	2,600	2,600
Niger		1,000	25	28	4,200	3,100	3,100
Nigeria		5	52	(1)	(1)	(1)	(1)
Rwanda	2,160	26	10	(1)	(1)	(1)	(1)
Senegal			550	(1)	(1)	(1)	(1)
Sierra Leone	32	4					
South Africa	605,000	523,809	430,800	372,767	330,000	300,000	300,000
Sudan	100	3,700	5,774	5,000	5,000	5,000	5,000
Tanzania	3,500	320	15,060	48,018	59,000	66,000	58,000
Uganda		1,506	56	5	400	800	1,100
Zambia	129	91	600		780	3,680	3,680
Zimbabwe	16,900	23,959	22,069	12,564	8,000	5,000	5,000
Undistributed				2,500	5,600	6,800	6,800
Total	678.000	644.000	604.000	587,000	570,000	610.000	610,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production. <sup>1</sup>Included in "Undistributed."

# TABLE 10 AFRICA: HISTORIC AND PROJECTED IRON ORE MINE PRODUCTION, 1990-2009

### (Iron content in thousand metric tons)

Country	Average grade <sup>1</sup>	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	36%	1,470	1,100	820	500	560	620	690
Egypt	55%	1,330	1,120	1,045	1,380	1,400	1,400	1,400
Liberia	57% to 64%	2,490						
Mauritania	59% to 72%	6,800	7,000	7,500	6,890	7,000	7,000	7,000
Morocco		90	32	4	2	2	2	2
Nigeria	36%	138	62	9			100	150
Senegal								12,000
South Africa	62% to 65%	19,800	19,800	21,570	24,200	24,000	27,800	27,800
Tanzania	32%		14					
Tunisia	54%	154	122	98	97	120	120	100
Uganda	61% to 67%			3				
Zimbabwe		730	160	225	184	100	50	100
Total		33,000	29,400	31,300	33,300	33,200	37,000	49,000

eEstimated; estimated data are rounded to no more that three significant digits; may not add to totals shown. -- Negligible or no production.

<sup>1</sup>Direct shipping ore and concentrate.

# TABLE 11 AFRICA: HISTORIC AND PROJECTED IRON PRODUCTION, 1990-2009

### (Thousand metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	1.046	940	1.100	1.300	1.300	1.300	1.300
Egypt:			-,	-,- • •	-,	-,- • •	-,
Pig iron	1,100	1,062	1,400	1,700	1,100	1,100	1,100
Direct-reduced iron	710	850	2,110	2,900	2,900	2,900	2,900
Libya	500	963	1,500	1,340	1,400	1,400	1,500
Mozambique							200
Morocco	15	15	15	15	15	15	15
South Africa:							
Pig iron	6,893	6,055	6,300	6,234	6,500	6,500	6,500
Direct-reduced iron	1,067	1,262	1,530	1,542	1,700	1,700	1,700
Tunisia	140	162	196	36			
Zimbabwe	521	209	277	131	120	150	200
Total	12,000	11,500	14,400	15,200	15,000	15,000	15,000

eEstimated; estimated data and totals are rounded to no more that three significant digits; may not add to totals shown. -- Negligible or no production.

# TABLE 12 AFRICA: HISTORIC AND PROJECTED STEEL PRODUCTION, 1990-2009

### (Thousand metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	836	827	842	1,051	1,000	1,700	1,700
Angola	10						
Benin	8						
Congo (Kinshasa)	NA	NA	159	40			
Egypt	2,240	2,642	2,838	4,400	4,800	4,800	4,800
Ghana <sup>1</sup>					(2)	(2)	(2)
Kenya	20	20					
Libya	492	909	1,055	989	1,300	1,300	1,300
Mauritania	NA	NA	5	(2)	(2)	(2)	(2)
Morocco	7	7	5	(2)	650	650	650
Nigeria	220	36		(2)	(2)	(2)	(2)
South Africa	8,620	8,741	8,481	9,384	9,400	9,400	9,400
Tunisia	177	201	237	(2)	(2)	(2)	(2)
Uganda		12	7	(2)	(2)	(2)	(2)
Zimbabwe	580	210	258	152	100	200	400
Undistributed				103	200	260	260
Total	13,200	13,600	13,900	16,100	17,500	18,300	18,500

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production. NA Not available.

<sup>1</sup>Secondary.

<sup>2</sup>Included in "Undistributed."

# TABLE 13 AFRICA: HISTORIC AND PROJECTED LEAD MINE PRODUCTION, 1990-2009

### (Metal content in metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	1,100	1,383	818	1,108	900	900	900
Morocco	68,800	67,708	81,208	38,000	65,000	65,000	65,000
Namibia	18,000	16,084	11,114	18,782	20,000	20,000	20,000
Nigeria	NA	NA	165	250	250	250	250
South Africa	69,400	88,449	75,262	39,941	68,000	68,000	68,000
Tunisia	2,970	6,601	6,602	5,000	3,000	1,000	1,000
Total	160,000	180,000	175,000	103,000	157,000	155,000	155,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. NA Not available.

### TABLE 14

### AFRICA: HISTORIC AND PROJECTED PRIMARY REFINED LEAD PRODUCTION, 1990-2009

### (Metric tons)

Country <sup>1</sup>	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	1,000	800	6,100	6,100	6,000	6,000	6,000
Morocco	64,000	59,673	66,812	61,473	46,900	65,600	75,000
Namibia	35,100	26,752					
Total	100,000	87,200	72,900	67,600	53,000	72,000	81,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

### TABLE 15

### AFRICA: HISTORIC AND PROJECTED SECONDARY REFINED LEAD PRODUCTION, 1990-2009

### (Metric tons)

Country <sup>1</sup>	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	3,500	7,500					
Kenya	2,400	2,000	1,000	1,000	1,000	1,000	1,000
Morocco	2,000	2,600	3,000	3,000	3,500	3,500	3,500
Nigeria		4,000	5,000	5,000	5,000	5,000	5,000
South Africa	31,200	32,100	46,200	53,000	55,000	55,000	55,000
Total	39,100	48,200	55,200	62,000	65,000	65,000	65,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

<sup>1</sup>Egypt and Uganda also refine small quantities of secondary lead.

### TABLE 16

### AFRICA: HISTORIC AND PROJECTED NICKEL MINE PRODUCTION, 1990-2009

### (Metal content in metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Botswana	23,200	18,088	38,420	32,740	33,000	35,000	35,000
Cameroon						4,700	4,700
Madagascar						30,000	60,000
Morocco	NA	NA	84	126	150	150	150
South Africa	29,000	30,700	36,616	40,842	45,000	60,000	60,000
Zimbabwe	13,500	11,721	8,160	11,600	11,000	11,000	11,000
Total	65,700	60,500	83,000	85,300	89,000	140,000	170,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production. NA Not available.

# TABLE 17 AFRICA: HISTORIC AND PROJECTED PLATINUM MINE PRODUCTION, 1990-2009

### (Metal content in kilograms)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
South Africa	87,800	102,300	114,459	148,348	170,000	184,000	190,000
Zimbabwe	21	7	505	4,270	4,600	8,900	14,600
Total	87,800	102,000	115,000	153,000	175,000	193,000	205,000

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

# TABLE 18 AFRICA: HISTORIC AND PROJECTED PALLADIUM MINE PRODUCTION, 1990-2009

### (Metal content in kilograms)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
South Africa	38,300	51,000	55,818	70,946	81,700	96,000	99,000
Zimbabwe	31	17	366	3,449	3,700	7,700	11,900
Total	38,300	51,000	56,200	74,400	85,000	104,000	111,000

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

# TABLE 19 AFRICA: HISTORIC AND PROJECTED SILVER MINE PRODUCTION, 1990-2009

(	Metal	content	in	kilograms	)
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Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	2,500	2,000	1,400	1,700	1,700	1,700	1,700
Congo (Kinshasha)	84,000	900		35,500	56,000	56,000	70,000
Ethiopia	NA	NA	1,018	1,100	900	900	900
Ghana <sup>1</sup>	840	2,660	6,101	2,100	2,300	3,100	3,100
Mali	270	250					
Morocco	241,000	204,000	289,000	200,528	200,000	200,000	200,000
Namibia	92,100	69,000	9,287	45,100	45,000	50,000	50,000
South Africa	161,000	174,279	144,143	81,000	78,000	78,000	75,000
Sudan	NA	NA	NA	3,300	3,300	3,300	3,300
Tanzania			1,384	7,986	9,400	10,900	10,900
Tunisia	930	4,000	3,700	3,000	100	100	100
Zambia	17,000	8,676	4,710		9,100	10,800	10,800
Zimbabwe	21,200	15,640	3,799	747			
Total	621,000	481,000	465,000	382,000	406,000	415,000	426,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. --Negligible or no production. NA Not available.

<sup>1</sup>Silver content of exported doré gold.

# TABLE 20 AFRICA: HISTORIC AND PROJECTED TIN MINE PRODUCTION, 1990-2009

### (Metal content in metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Burundi	54	15	8	7	10	10	10
Cameroon	3	2					
Congo (Kinshasa)	100		50	52		20	20
Namibia	900	2		43	50	50	50
Niger	38	20	22	11	20	20	20
Nigeria	145	250	2,760	3,700	1,000	500	500
Rwanda	510	242	276	427	420	420	420
South Africa	1,140						
Tanzania	15	3					
Uganda	25	43			120	250	320
Zambia	1						
Zimbabwe <sup>1</sup>	1,120	10	1				
Total	4,050	587	3,120	4,240	1,600	1,300	1,300

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production. <sup>1</sup>Some artisanal tin may be produced, but production cannot be confirmed.

# TABLE 21 AFRICA: HISTORIC AND PROJECTED TIN METAL PRODUCTION, 1990-2009

### (Metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Congo (Kinshasa)	90						
Nigeria	130	259	25	25	30	30	30
Rwanda				200	200	200	200
South Africa	1,210						
Zimbabwe	838						
Total	2,270	259	25	225	230	230	230

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

### TABLE 22 AFRICA: HISTORIC AND PROJECTED TUNGSTEN MINE PRODUCTION, 1990-2009

### (Metal content in metric tons)

Country <sup>1</sup>	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Burundi		22		26	30	30	30
Congo (Kinshasa)	17						
Rwanda	84	47	108	57	170	170	170
Uganda	- 4	17		20	120	120	120
Zimbabwe	- 1						
Total	106	86	108	103	320	320	320

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Tungsten is believed to be produced in Nigeria, but information is inadequate for making production estimates.

### TABLE 23 AFRICA: HISTORIC AND PROJECTED ZINC MINE PRODUCTION, 1990-2009

### (Metal content in metric tons)

Country <sup>1</sup>	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	4,160	7,174	10,452	5,201	3,000	3,000	10,000
Congo (Kinshasha)	61,800	4,500					50,000
Morocco	18,800	79,947	103,064	70,000	107,000	107,000	107,000
Namibia	37,700	30,209	39,126	60,500	227,000	227,000	227,000
South Africa	75,000	70,241	62,703	41,239	67,000	67,000	67,000
Tunisia	3,960	44,244	41,247	36,000	20,000	2,000	1,000
Total	201,000	236,000	257,000	213,000	424,000	406,000	462,000

\*Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

<sup>1</sup>Nigeria also mines a small quantity of zinc.

### TABLE 24 AFRICA: HISTORIC AND PROJECTED ZINC METAL PRODUCTION, 1990-2009

### (Metric tons)

Country <sup>1</sup>	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	23,600	30,000	34,000	32,200	30,000	30,000	34,000
Congo (Kinshasha)	38,200					50,000	50,000
Namibia				47,436	150,000	150,000	150,000
South Africa	92,000	98,782	103,000	116,000	100,000	100,000	100,000
Total	154,000	129,000	137,000	196,000	280,000	330,000	335,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

<sup>1</sup>Nigeria also refines a small quantity of zinc.

# TABLE 25 AFRICA: HISTORIC AND PROJECTED DIAMOND MINE PRODUCTION, 1990-2009

### (Thousand carats)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Angola	1,130	2,900	4,349	5,000	7,000	13,000	15,000
Botswana	17,400	16,802	24,635	30,400	30,000	30,000	30,000
Central African Republic	381	530	464	333	400	460	460
Congo (Kinshasa)	19,400	22,024	15,900	27,000	28,000	28,000	28,000
Côte d'Ivoire	12	75	320	230	270	320	320
Gabon	1	1	1	1	1	1	1
Ghana	650	632	878	927	800	800	800
Guinea	127	365	369	666	740	740	740
Lesotho	NA	NA	2	2	2	290	300
Liberia	100	150	170	40	80	170	170
Namibia	763	1,382	1,552	1,481	2,000	2,000	2,500
Sierra Leone	78	214	77	507	730	770	770
South Africa	8,710	9,683	10,790	12,684	15,000	15,000	16,000
Tanzania	85	50	354	237	440	440	440
Zimbabwe		204	23		200	200	400
Total	48,800	55,000	59,900	79,500	86,000	92,000	96,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production. NA Not available.

# TABLE 26 AFRICA: HISTORIC AND PROJECTED PHOSPHATE ROCK PRODUCTION, 1990-2009

### (P2O5 content in thousand metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	333	500	265	280	310	310	300
Burkina Faso	NA	NA	NA	1	1	1	1
Egypt	286	207	317	400	440	440	440
Mali	2	1					
Morocco	6,910	6,399	7,200	7,400	7,740	8,400	8,500
Senegal	823	556	626	530	720	720	900
South Africa	1,200	1,101	1,083	1,030	900	780	780
Tanzania	8	2	2	1	1	1	1
Togo	840	930	490	530	760	1,200	1,200
Tunisia	1,860	2,181	2,500	2,370	2,460	2,460	2,500
Zimbabwe	52	45	25	37	30	30	20
Total	12,300	11,900	12,500	12,600	13,000	14,000	15,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production. NA Not available.

# TABLE 27 AFRICA: HISTORIC AND PROJECTED ILMENITE PRODUCTION, 1990-2009

### (TiO<sub>2</sub> content in thousand metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Egypt		30	40	40	40	40	40
Kenya						120	160
Mozambique						330	700
Sierra Leone	33				12	12	12
South Africa	567	890	954	1,000	1,090	1,090	1,090
Total	600	920	994	1,040	1,100	1,600	2,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

# TABLE 28 AFRICA: HISTORIC AND PROJECTED SALABLE COAL, 1990-2009

### (Thousand metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Botswana	793	898	947	1,035	900	900	900
Congo (Kinshasa)	100	10		1	2	20	20
Egypt		10	39	58	60	60	60
Malawi <sup>1</sup>	41	15	34	74	90	100	100
Morocco	526	650	31				
Mozambique	40	40	16	37	40	40	14,000
Niger	154	135	158	183	190	190	190
Nigeria	78	29	12	6	10	50	50
South Africa	175,000	206,210	224,118	239,311	235,000	250,000	250,000
Swaziland	151	172	178	300	300	400	400
Tanzania	52	43	79	55	80	80	1,600
Zambia	382	141	168	50	70	150	200
Zimbabwe	5,500	5,538	3,809	2,872	2,200	3,000	3,000
Total	183,000	214,000	230,000	244,000	239,000	255,000	271,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production. <sup>1</sup>Malawi was the only producer of lignite in 2003.

# TABLE 29 AFRICA: HISTORIC AND PROJECTED DRY NATURAL GAS PRODUCTION, 1990-2009

### (Million cubic meters)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	48,500	58,100	100,092	98,754	111,000	122,000	125,000
Angola	538	560	560		3,000	3,000	5,000
Congo (Kinshasa)				30	30	30	30
Côte d'Ivoire		36	1,146	1,457	1,500	1,900	1,900
Egypt	7,900	12,536	21,000	28,000	36,500	49,100	53,400
Equatorial Guinea			98	1,220	1,350	1,400	1,400
Gabon	150	150	99	79	80	80	60
Ghana				112	120	260	260
Libya	6,200	6,345	5,400	6,000	15,000	25,000	30,000
Morocco	37	22	44	42	40	40	30
Mozambique			1	2	2,200	2,200	3,100
Nigeria	3,230	5,000	21,945	50,000	50,000	57,000	60,000
Senegal	110	110	56	13	10	10	10
South Africa		1,980	2,088	2,500	2,500	3,000	3,000
Tanzania					375	375	375
Tunisia	200	250	1,600	1,750	2,100	2,300	2,200
Total	66,900	85,100	154,000	190,000	226,000	268,000	286,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

### TABLE 30

### AFRICA: HISTORIC AND PROJECTED CRUDE PETROLEUM, INCLUDING CONDENSATE, PRODUCTION, 1990-2009

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Algeria	444,000	438,730	476,288	580,000	600,000	600,000	620,000
Angola	174,000	232,800	273,000	321,200	571,000	620,000	700,000
Benin	1,416	654					
Cameroon	64,600	39,400	32,100	25,000	24,000	24,000	24,000
Chad					84,000	84,000	84,000
Congo (Brazzaville)	58,800	63,875	100,375	87,600	80,000	80,000	60,000
Congo (Kinshasa)	10,600	10,087	8,500	8,500	9,800	9,800	9,800
Côte d'Ivoire	770	2,000	2,578 <sup>r</sup>	7,537	13,000	20,000	24,000
Egypt	319,000	335,800	285,000	221,219	222,000	222,000	222,000
Equatorial Guinea		2,300	43,029	95,000	90,000	90,000	100,000
Gabon	100,000	133,000	118,625	87,965	85,000	85,000	80,000
Ghana			2,555	3,000	2,200	4,000	4,000
Libya	502,000	509,175	538,000	543,000	700,000	700,000	720,000
Morocco	114	36	97	90	90	90	90
Nigeria	660,000	740,000	783,000	798,000	1,350,000	1,500,000	1,500,000
Senegal	8	2	1				
South Africa			6,606	4,068	25,500	22,000	20,000
Sudan		730	67,152	110,000	183,000	274,000	290,000
Tunisia	36,500	32,690	28,207	24,300	18,000	18,000	17,000
Total	2,370,000	2,540,000	2,770,000	2,920,000	4,060,000	4,350,000	4,470,000

### (Thousand 42-gallon barrels)

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.

# TABLE 31 AFRICA: HISTORIC AND PROJECTED URANIUM PRODUCTION, 1990-2009

### (Metal content in metric tons)

Country	1990	1995	2000	2003	2005 <sup>e</sup>	2007 <sup>e</sup>	2009 <sup>e</sup>
Gabon	702	653					
Malawi							850
Namibia	3,214	2,006	2,714	2,036	2,100	2,100	2,000
Niger	2,681	2,970	2,898	3,143	3,150	3,150	3,150
South Africa	2,442	1,443	861	764	700	650	600
Total	9,040	7,070	6,470	5,940	6,000	5,900	6,600

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. -- Negligible or no production.