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## Sudan

*With the completion of a major oil export pipeline in July 1999, Sudanese crude oil production and exports have risen rapidly over the past few years. Sudan's estimated oil reserves have doubled since 2001, with crude production reaching an estimated 345,000 barrels per day (bbl/d) in June 2004. Energy Minister Awad al-Jaz said in May 2004 that he expected crude production to reach 500,000 bbl/d in 2005.*

*Note: Information contained in this report is the best available as of July 2004 and can change.*



### GENERAL BACKGROUND

Sudan gained its independence from Egypt and the United Kingdom in 1956. The current government, led by General Umar Hassan Ahmad al-Bashir, came to power in 1989 after overthrowing a transitional coalition government. A new constitution was adopted on January 1, 1999. Multi-party presidential and parliamentary elections were held in December 2000, and President Bashir and his party won an overwhelming victory, tainted by a boycott by all main opposition parties. In October 2003, President Bashir ordered the release of all political prisoners and lifted the ban on Sudan's main opposition party, the Popular National Congress (PNC).

Despite considerable natural resources, Sudan is among the world's poorest countries. Traditionally, Sudan's economy has been mainly agricultural - a mix of

subsistence farming and production of cash crops such as cotton and gum arabic. With the start of significant oil production (and exports) beginning in late 1999, however, Sudan's economy is changing dramatically, with oil export revenues now accounting for around 73% of Sudan's total export earnings. Sudan no longer relies on expensive imported oil products, which has helped the country's trade balance, while foreign investment has started to flow into the country.

Sudan's economic performance has been strong over the past few years. In 2002, the country's real GDP grew by 5.0%, increasing to 5.6% in 2003 and forecast to reach 6.5% in 2004. Meanwhile, inflation has slowed dramatically over the past few years, from an average 110% between 1991 and 1996 to 8.3% in 2002 and 7.7% in 2003. Exports have grown sharply since 1999, when the oil

export pipeline was completed, although the country ran a current account deficit of \$727 million in 2003.

Despite its economic progress, Sudan still faces developmental obstacles, including a limited infrastructure and an external debt estimated to be around \$21 billion in 2003, representing a debt-to-GDP ratio of about 134%. Sudan's government has been negotiating the payment of its substantial debts to the International Monetary Fund (IMF) so that the nation can improve its relations with the institution. Sudan's debt to the IMF was rescheduled in 2002, and the IMF deferred Sudan's arrears payments so that the nation can give priority to repaying loans from the Arab Fund for Socioeconomic Development. Some of those funds will be used to finance a new hydroelectric dam in Merowe. As part of the rescheduling agreement, Sudan agreed to reduce its military spending as well as make the management of its oil revenues more transparent. Sudan also has been following IMF-approved macroeconomic policies which have resulted in an improved fiscal balance.

The United States has imposed economic sanctions against Sudan since November 1997, prohibiting trade between the two countries, as well as investment by U.S. businesses in Sudan. In February 2000, the sanctions were broadened to include a prohibition against U.S. citizens and companies conducting business with the Greater Nile Petroleum Operating Company (GNPOC), an international consortium of petroleum companies currently extracting oil from Sudan. The sanctions, however, did not apply to the foreign individual parent companies of GNPOC, which included (at the time) Calgary-based Talisman Energy, Malaysia's Petronas, and the Chinese National Petroleum Corporation (CNPC). Since the September 11, 2001 terrorist attacks on New York and Washington DC, U.S.-Sudanese relations appear to have improved somewhat, as the United States is attempting to encourage Sudanese cooperation in the war against terrorism. Sudan reacted unfavorably to the passage of the Sudan Peace Act in October 2002, which outlines stiff sanctions, ranging from a downgrading of diplomatic relations to a UN arms embargo, that could be imposed on the Sudanese government if it negotiates in bad faith with the country's main rebel force, the Sudan People's Liberation Army (SPLA), based in the primarily non-Muslim, non-Arab south of Sudan. In April 2004, however, President Bush decided not to impose additional sanctions under the Sudan Peace Act as part of a strategy aimed at encouraging the country's peace process.

Sudan's costly, bloody [21-year internal conflict](#) with the SPLA and other rebel movements has, over the past two decades, claimed (directly or indirectly through famine) as many as two million Sudanese lives. In May 2004, after two years of negotiations (starting with the July 2002 Machakos Protocol), the government and SPLA reached agreement on several major issues -- sharing of oil revenues (50/50), the application of Islamic religious law (will not be applied in the South), self-determination for the southern Sudan (a referendum on secession will be held after a transitional period of six years), etc. A final resolution of Sudan's civil war could greatly help the country's economy, lead to the lifting of various sanctions against the country, and encourage investment by foreign companies (including oil companies).

A new crisis in the western Sudanese region of Darfur has killed 10,000-30,000 people created nearly a million refugees in recent months. Pro-government militia groups have launched attacks against civilians, mainly non-Arab tribes, in the region, prompting the United States to call for a U.N. Security Council resolution and possible sanctions on the militia groups. In addition, U.S. Secretary of State Colin Powell visited Darfur in late June 2004. In early July, the African Union demanded that Sudan arrest and prosecute the militia groups, also known as the Janjaweed, and decided to send 300 African Union troops to Darfur. On July 3, Sudan agreed to disarm militias accused of "ethnic cleansing" in the region. The conflict in Darfur has complicated attempts at ending the country's larger civil war.

## OIL

As of January 2004, Sudan's estimated proven reserves of crude oil stood at 563 million barrels, more than twice the 262 million barrels estimated in 2001. As of June 2004, crude oil production was averaging about 345,000 barrels per day (bbl/d), up from 270,000 bbl/d during 2003. Crude oil production has been rising steadily since the completion of a major export pipeline in July 1999 and is expected by Energy Minister Awad al-Jaz to surpass 500,000 bbl/d by the end of 2005. It is possible that Sudanese production could reach 750,000 bbl/d by the end of 2006 if planned production increases at new and existing fields progress as planned. In August 2001, in recognition of Sudan's growing significance as an oil exporter, OPEC granted the country observer status at OPEC meetings.

Petroleum exploration in Sudan began in the early 1960s. The activity was originally concentrated offshore in the Red Sea. The only significant offshore discovery was Chevron's Suakin gas discovery in 1976. Chevron's exploration in the 1960s and 1970s led to several oil finds in southern Sudan near the towns of Bentiu, Malakal and Muglad. Chevron abandoned its concessions in Sudan in 1985, due to their location in an area where fighting was taking place between government and rebel forces. France's Total also suspended its onshore exploration activities, but retained the rights to its concessions. The Sudanese government sub-divided Chevron's concessions into smaller exploration blocks, and Canadian independent Arakis Energy (Arakis) acquired the portion of Chevron's concession north of the town of Bentiu in 1993.

### Greater Nile Oil Project

Arakis began development of the [Heglig and Unity fields](#) (Blocks 1, 2, and 4) within its [concessions](#), and started production on a small scale (around 2,000 bbl/d) in 1996; this oil was processed and consumed within Sudan. The remote location of the fields, approximately 930 miles from the Red Sea coast, meant that very substantial capital investment was required to transport the oil to a seaport. To attract the necessary capital and spread the risks, Arakis entered into a consortium in December 1996 with the Greater Nile Petroleum Operating Company (GNPOC), consisting of the China National Petroleum Corporation (CNPC, 40%), Petronas of Malaysia (30%), Sudanese national firm Sudapet (5%), and Arakis (25%, and the field operator). Pipeline construction from the fields to an export terminal near Port Sudan began in May 1998 on an accelerated schedule. Originally built to move 150,000 bbl/d, the pipeline's capacity reportedly can be expanded to 450,000 bbl/d. As of early 2004, the GNPOC produced around 270,000 bbl/d of "Nile Blend" crude, with output expected to reach 350,000 bbl/d by the end of 2004. Oil from these fields is generally light (high API gravity) and sweet (low sulfur), and is exported primarily to China and India. Recoverable reserves from the Heglig and Unity fields have been estimated at 660 million to 1.2 billion barrels.

Arakis' involvement in Sudan, even after the formation of the GNPOC consortium raised \$700 million, remained hindered by a lack of capital. U.S. sanctions against Sudan prevented investment in the project by U.S. corporations and individuals, and the high-risk nature of investment in Sudan also had an effect. In October 1998, Arakis agreed to be purchased by another Canadian independent, Talisman Energy, for \$277 million in Talisman stock. The Talisman acquisition provided an infusion of capital which allowed the project to be completed on schedule in 1999. In July 1999, the pipeline began filling with crude, and the first cargo of "Nile Blend" departed the export terminal in early September 1999.

In March 2003, Talisman -- under [pressure by human rights organizations](#) -- sold its 25% in GNPOC to India's national oil company, [ONGC Videsh](#), for \$770 million, leaving [Sweden's Lundin](#) as the only Western oil company with any equity in Sudan. Talisman -- and other western companies -- have left Sudan in recent years after being criticized heavily by human rights groups

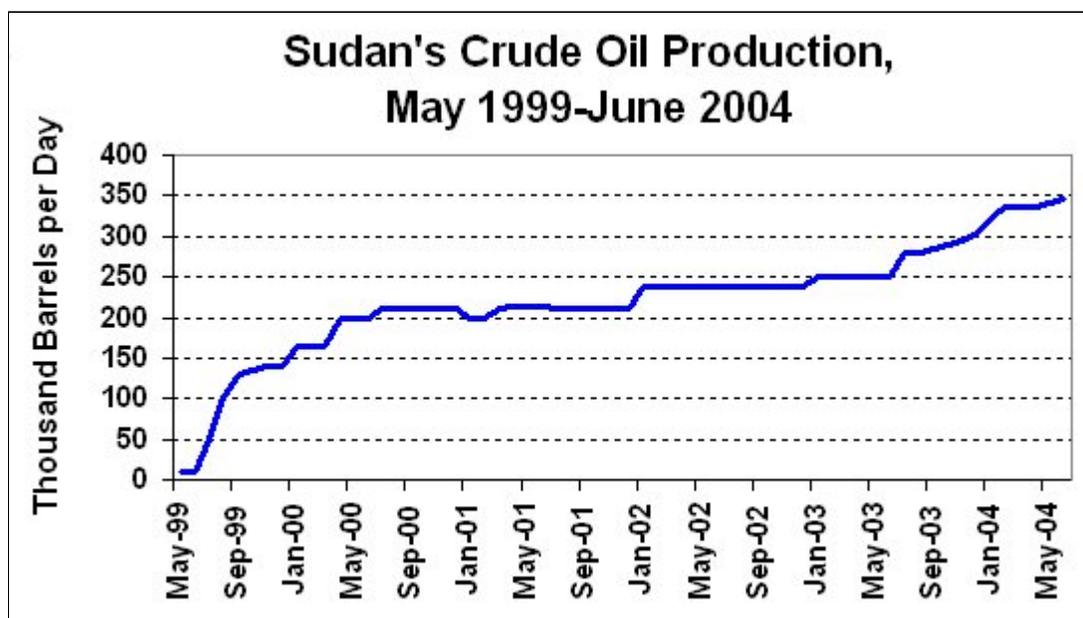
for cooperating with the Sudanese government. In turn, companies from Asia -- CNPC, Petronas, ONGC -- have taken their place. In August 2003, ONGC also acquired stakes in two Sudanese oil blocks, 5A and 5B, from Austria's OMV.

CNPC, the main stakeholder in GNPOC, has stated that it expects oil output at its Sudan fields should increase sharply by 2005. Block 3/7, for instance, which is located in the Malut Basin, is expected to begin production in 2005 at a rate of 170,000 bbl/d, increasing to 300,000 bbl/d by late 2006. CNPC holds a 41% stake in Block 3/7 and is the operator. Also, production at Block 6 started producing 60,000 bbl/d in late 2003, and is expected eventually to reach 170,000 bbl/d.

### Other Fields

Aside from Heglig and Unity, fields in the Muglad basin (part of a huge Cretaceous system which extends across central Africa and includes the Doba Basin in Chad plus oil fields in southern Sudan) produce crude oil with a 33° to 42° API range, with only 0.5% sulfur content. The crude is highly paraffinic, which requires heating to maintain flow in the pipeline. In April 2003, Lundin sold its 40.375% share in Block 5A to Petronas for \$142.5 million. Currently, Petronas, the ONGC, and Sudapet have stakes in the block, which contains the "Thar Jath" discovery, discovered in March 2001. Lundin currently maintains a 24.5% interest in Block 5B (in partnership with Petronas, Sudapet, and ONGC), in the southern part of the Muglad basin adjacent to Block 5A. Operations have not yet commenced in Block 5B, however, due to the security situation in the region.

In August 2003, it was announced that Petronas would take a stake in Sudan's Block 8, located in the Blue Nile Basin. A Pakistani company, Zafir, will explore in Block 9, while Sudan's Sudapet will be a minority stakeholder in both projects. Petronas currently has stakes in as many as eight Sudanese oil blocks -- 1, 2, 3, 4, 5A, 5B, 7 and 8.



In June 2004, Petrodar, a consortium made up of the China National Petroleum Company (41%), Petronas (40%), Sudapet (8%), Gulf Oil Petroleum (6%), and the Al-Thani Corporation

(5%), which was granted a production agreement by the Sudanese government in the Melut Basin in November 2000, awarded a \$239 million contract to Ranhill International of Malaysia and Petroneeds Services International of Sudan for development work on blocks 3 and 7. The blocks cover an area 44,700 square miles in size, and contain the Adar Yeil field, which produces 5,000 bbl/d. Also in June 2004, Petrodar two other companies (Nam Fatt of Malaysia and Bentinin of Italy) to build pumping stations for Melut. Finally, China's Petroleum Engineering and Construction

Group (CPECC) has been chosen to build a \$215 million oil terminal to service blocks 3 and 7.

In June 2000, Sudanese officials announced plans to begin oil exploration in northwest Sudan, the Blue Nile Basin in southeastern Sudan, and the Red Sea area in eastern Sudan. Oil exploration in Sudan previously was limited largely to the central and south-central regions, which, according to Khartoum officials, represent only 15% of national oil reserves. Sudanese Energy Ministry representatives place estimated total reserves in the country at 3 billion barrels and estimated proven reserves at 700 million barrels. Government spokesmen said that unnamed Japanese, European and Middle East companies had expressed interest in the new oil concessions. In early June 2004, Sudan's Energy Minister announced that oil exploration had begun for the first time in northern Sudan, on Block 9 in the Jazira region north of Khartoum.

Development of Sudan's oil resources has been highly controversial. Numerous international human rights organizations have accused the Sudanese government of financing wide-scale human rights abuses with oil revenues, including the mass displacement of civilians living near the oil fields. The SPLA has declared that it considers oil installations a "legitimate military target," as oil development has provided the Sudanese government the financial resources to expand its war effort. The SPLA says it destroyed the main oil well on the Heglig oil field in September 2002. In November 2001, southern rebels claimed to have ambushed an army convoy traveling near GNPOC facilities, and stated that such attacks would continue until "oil exploration, exploitation and development come to a halt." In August 2001, an attempt by rebels to blow up Sudan's oil export pipeline was thwarted, but rebels claimed to have killed 42 government soldiers in an attack earlier in the month, and also to have inflicted "extensive damage" to oil facilities at Heglig. The government and a representative of Talisman Energy both denied the latter claim.

### **Refining and Downstream**

Sudan has been self-sufficient in producing petroleum products (except jet fuel) since the June 2000 opening of the 50,000-bbl/d Khartoum Oil Refinery in the Jayli area, 30 miles north of Khartoum. The Khartoum refinery, built and jointly operated by CNPC, produces benzene and butane gas for domestic consumption and export, as well as gasoline for local consumption. A portion of the surplus gas eventually will be used in the production of electricity, according to government officials. Following the opening of the Khartoum refinery, the price of gasoline was reduced considerably throughout the country and the price of gas cylinders, which Sudanese use for cooking, dropped from \$5.30 to \$2.60. In June 2004, the Indian government approved plans by ONGC for a \$194 million project aimed at building a 450-mile petroleum products export pipeline running from the Khartoum refinery to Port Sudan. The project is to be completed in around 14-16 months.

The Sudanese government is planning to expand the capacity of its oil refineries at Khartoum and Port Sudan, to 100,000 bbl/d each. The Port Sudan facility, located near the Red Sea, is Sudan's smallest refinery and has a current capacity of 21,700 bbl/d. The Khartoum plant had crude refining capacity of 50,000 bbl/d as of January 1, 2004, but this reportedly increased to 70,000 bbl/d in late June 2004. CNPC is working to upgrade the facility (at a cost of \$340 million) and also to build a pipeline from the Fula oil blocks in Western Kordofan to the refinery. Aside from the Port Sudan and Khartoum facilities, Sudan has two other refineries -- El Gily, with a capacity of 50,000 bbl/d; and El Obeid, with a capacity of 10,000 bbl/d.

In March 2003, Petronas acquired Mobil Oil Sudan's oil distribution network for an undisclosed amount of money. Mobil Oil Sudan held a 20% share in the country's oil product market. Petronas also acquired three oil storage depots, at Port Sudan, Khartoum, and Gaili.

In August 2000, Sudan's National Petroleum Company announced plans to lay pipelines to supply Eritrea and Ethiopia with petroleum products from its Khartoum refinery. Eritrea has not yet benefited from Sudanese oil and relations between the two countries soured in April 2003 when Sudan accused Eritrea of supporting Sudanese rebels in the eastern part of Sudan. Although Eritrea denies the charges, future trade relationships are unlikely under the current climate.

Sudan has plans to export oil to fellow members of COMESA (the Common Market for Eastern and Southern Africa), including neighboring Kenya. Exports may be delayed, however, by concerns over human rights issues in Sudan, and some Kenyan officials have called for a boycott of Sudanese oil. In April 2002, Sudanese and Kenyan government officials announced that they are working on logistics for the construction of a new pipeline that would link oil fields in Sudan to the Kenyan port in Mombasa. Under COMESA, trade within the zone is not subject to tariffs, which means that Sudanese oil likely will be cheaper for COMESA members than other alternatives.

### **ELECTRICITY**

Sudan's electricity sector is plagued by poor infrastructure, frequent outages and a small customer base, problems that the Ministry of Energy and the state-owned National Electricity Corporation (NEC) have only begun to address in the last five years. Currently, Sudan has 728 megawatts (MW) of electric generation capacity, which includes roughly equal amounts of thermal (mainly oil) and hydropower capacity. The country's main generating facility is the 280-MW Roseires dam located on the Blue Nile river basin, approximately 315 miles southeast of Khartoum. The insufficiency of the country's generation fleet can be attributed mainly to a lack of expansion in the face of rising electricity demand, but has also been exacerbated by the reliance on hydropower generation, which varies depending on rainfall. In 2002, Sudan's total electricity generation was 2.4 billion kilowatt-hours (kwh). Electricity is transmitted by way of two interconnected electrical grids -- the Blue Nile Grid and the Western grid -- although together, they cover a small portion of the country. Regions not covered by the grid rely on small-scale diesel fired generators. In total, it is estimated that only 30% of Sudan's population has access to electricity, but the country has set a goal of increasing that to 90%, at a cost of \$3 billion, in coming years.

Underinvestment in the electricity sector due to a lack of funding is largely blamed for its deterioration during the 1990's. In 2000, the NEC launched the *Rehabilitation and Performance Improvement Program*, aimed at upgrading the existing electricity infrastructure in order to improve the adequacy and reliability of the electricity supply. This program is supported by a \$10 million loan from OPEC's Fund for International Development.

In response to Sudan's power shortage problems, projects are underway to add both fossil-fueled and hydropower generating capacity. The largest of these projects are the proposed Merowe and Kajbar hydroelectric facilities in northern Sudan. The 1,250-MW Merowe facility is to be located 250 miles north of Khartoum at the Nile River's fourth cataract. So far, Egypt has voiced no major objections to the project's planned diversion of Nile River flows. Construction is to begin this year, with completion scheduled for July 2008. In December 2003, the [French power firm, Alstom](#) agreed to a \$300 million contract to construct the dam, while Harbin Power of China signed an agreement to build seven substations and around 1,000 miles of transmission lines. In 2002, the Merowe project received major funding commitments from Saudi Arabia, Qatar, and other Arab investors, each of whom pledged loans of \$15 million or more. Two consortia met the October 2002 deadline to bid for the contract to build three packages of the civil works portion of the dam, which is estimated to cost \$1.9 billion. The consortia are a joint venture of China International Water & Electric and China National Water Resources & Hydropower Engineering Corporation, and a joint venture of Consolidated Contractors International Company (CCC) of Greece and Salini Costruttori of Italy.

The Kajbar Dam, located at the Nile's second cataract, is currently under construction, and will have a 300-MW capacity. An agreement to finance the Kajbar project was signed between Sudan and China in September 1997. Under terms of the agreement, China is financing 75% of the project (approximately \$200 million) and Sudan is to provide the remaining 25%. Environmental groups have expressed concern about Kajbar Dam, citing potential damage both to the Nile ecosystem and to the culture of the displaced Nubian residents of the area.

The director of the NEC said in April 2001 that Sudan and Ethiopia had agreed to link their power grids. A related report in April 2001 indicated that Ethiopia had agreed to export power to Sudan (and Djibouti). In September 2002, Ethiopian television reported that the two nations had agreed to do what was necessary to implement previously proposed development projects through joint use of Nile waters, though the report did not give details about what was expected from each nation.

*Sources for this report include: Africa Intelligence; Africa Oil and Gas; Agence France Presse; CIA World Factbook 2004; CountryWatch.com; Economist Intelligence Unit ViewsWire; Factiva; Global Insight; International Market Insight Reports; International Monetary Fund; MBendi; Panafrican News Agency; Petroleum Economist; Petroleum Intelligence Weekly; Reuters News Service; Suna News Agency; U.S. Energy Information Administration; World Bank; World Markets Research Centre.*

## **COUNTRY OVERVIEW**

**President:** Lt. Gen. Umar Hassan Ahmad al-Bashir (since 1989)

**Independence:** January 1, 1956 (from Egypt and the United Kingdom)

**Population (7/04E):** 39.1 million

**Location/Size:** Northern Africa, bordering the Red Sea between Egypt (on the north); Eritrea and Ethiopia (on the east); Kenya, Uganda and the Democratic Republic of Congo (on the south); and Libya, Chad and the Central African Republic (on the west) / 2,505,810 square kilometers (967,000 square miles), slightly larger than the combined size of Texas, New Mexico, Arizona, Nevada, California, Oregon, and Washington

**Major Cities:** Khartoum (capital), Juba, Kassala, Medani, Nyala, El-Obeid, Omdurman, Port Sudan

**Languages:** Arabic (official), Dinka, Bedawi, Nuer, Fur, Hausa, Zande, English, and various other Nilo-Saharan, and Afro-Asiatic languages

**Major Ethnic Groups:** Arab, Beja, Kinka, Fur, Nuba, Nubian, Nuer, Zande (Azande)

**Religion:** Muslim (Sunni, in north) 70%, traditional beliefs 25%, Christian 5% (mostly in south)

## **ECONOMIC OVERVIEW**

**Finance Minister:** Ahmed Hassan al-Zubeir

**Currency:** Sudanese dinar (SD)

**Market Exchange Rate (7/9/04):** US\$1 = 258.5 SD

**Gross Domestic Product (GDP) (2003E):** \$15.6 billion

**Real GDP Growth Rate (2003E):** 5.6% **(2004F):** 6.5%

**Inflation Rate (2003E):** 7.7% **(2004F):** 8.7%

**Current Account Balance (2003E):** -\$727 million

**Major Trading Partners (2002):** China, Japan, Saudi Arabia, South Africa, India, UK, Germany, Indonesia, Australia

**Merchandise Exports (2003E):** \$2.4 billion

**Merchandise Imports (2003E):** \$2.7 billion

**Merchandise Trade Balance (2003E):** -\$0.3 billion

**Major Export Products (2003):** Crude oil, sesame, livestock, cotton, gum arabic

**Major Import Products (2003):** Machinery and equipment, manufactured goods, oil products,

transport equipment, chemicals, wheat  
**Total External Debt (yearend, 2003E):** \$20.9 billion

## ENERGY OVERVIEW

**Minister of Energy and Mining:** Awad Ahmad al-Jaz  
**Proven Oil Reserves (1/1/04E):** 563 million barrels  
**Crude Oil Refining Capacity (1/1/04E):** 131,700 barrels per day (bbl/d) at three refineries: El Gily (50,000 bbl/d); Khartoum (50,000 bbl/d); Port Sudan (21,700 bbl/d); El Obeid (10,000 bbl/d)  
**Oil Production (2002E):** 240,000 bbl/d **(2003E):** 271,000 bbl/d **(6/04E):** 345,000 bbl/d  
**Oil Consumption (2003E):** 75,000 bbl/d  
**Net Oil Exports (2003E):** 196,000 bbl/d  
**Natural Gas Reserves (1/1/04E):** 3 trillion cubic feet (tcf)  
**Natural Gas Production (2002E):** None  
**Natural Gas Consumption (2002E):** None  
**Electric Generation Capacity (2002E):** 728 megawatts (55.6% thermal, 44.4% hydroelectric)  
**Electricity Generation (2002E):** 2.4 billion kilowatthours (kwh)  
**Electricity Consumption (2002E):** 2.4 billion kwh

## ENVIRONMENTAL OVERVIEW

**Minister of Environment and Urban Planning:** Maj. Gen. Adam al-Tigani Tahir  
**Total Energy Consumption (2002E):** 0.15 quadrillion Btu\* (<0.1% of world total energy consumption)  
**Energy-Related Carbon Dioxide Emissions (2002E):** 8.6 million metric tons (<0.1% of world total carbon dioxide emissions)  
**Per Capita Energy Consumption (2002E):** 4.5 million Btu (vs. U.S. value of 339.1 million Btu)  
**Per Capita Carbon Dioxide Emissions (2002E):** 0.26 metric tons (vs. U.S. value of 20.0 metric tons)  
**Energy Intensity (2002E):** 2,319 Btu/\$nominal -- PPP (vs. U.S. value of 9,348 Btu/\$nominal -- PPP)\*\*  
**Carbon Dioxide Intensity (2002E):** 0.13 metric tons of carbon dioxide/\$nominal -- PPP (vs. U.S. value of 0.55 metric tons/\$ nominal)\*\*  
**Fuel Share of Energy Consumption (2002E):** Oil (91.1%), Hydroelectricity (8.7%)  
**Fuel Share of Carbon Emissions (2002E):** Oil (100.0%)  
**Status in Climate Change Negotiations:** Non-Annex I country under the United Nations Framework Convention on Climate Change (ratified November 19th, 1993). Not a signatory to the Kyoto Protocol.  
**Major Environmental Issues:** Inadequate supplies of potable water; wildlife populations threatened by excessive hunting; soil erosion; desertification.  
**Major International Environmental Agreements:** A party to Conventions on Biodiversity, Climate Change, Desertification, Endangered Species, Law of the Sea, Nuclear Test Ban, Ozone Layer Protection and Whaling.

\* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar and wind electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

\*\*GDP based on CIA World Factbook estimates based on purchasing power parity (PPP) exchange rates

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Links to other U.S. government sites:

[CIA World Factbook - Sudan](#)

[U.S. State Department Travel Warning - Sudan - July 2004](#)

[U.S. State Department Statement on U.S. Sanctions Against Sudan](#)

[U.S. Department of the Treasury, Office of Foreign Assets Control, Sudan Sanctions Fact Sheet \(requires Acrobat Reader\)](#)

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[Human Rights Watch: "Sudan, Oil and Human Rights"](#)

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