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COUNTRY ANALYSIS BRIEFS

Sudan

Last Updated: September 2009

Background

Revenues from Sudan's increasing hydrocarbon exports represent over 95 percent of the country's total export revenues but further development is hindered by conflicts and sanctions.

Oil plays a major role in the Sudanese economy. In 2008, according to the International Monetary Fund, oil represented 95 percent of export revenues and 60 percent of government revenues. For South Sudan (Juba), oil represented 98 percent of total revenues for the year compared to Khartoum at 65 percent. In 2009, there were announcements of natural gas discoveries in Sudan but these have yet to be determined commercially viable.

According to the International Energy Agency (IEA), combustible renewables and waste accounted for 78 percent of Sudan's total primary energy consumption in 2006, followed by petroleum (22 percent) with hydroelectric power accounting for the rest. The large share of biomass in the energy mix represents a large population, located in rural areas with little or no access to the electricity grid, which relies heavily on biomass to meet heating and cooking needs.

Sudan has been involved in two major civil wars since 1955 that have impacted the country's economic development, particularly its natural resources. The first and longest of the two wars was between the northern Sudanese government in Khartoum and the Sudan People's Liberation Army (SPLA) in the south that ended with the signing of the Comprehensive Peace Agreement (CPA) in 2005.

Sudan's main oil producing region, Abyei, sits on the North/South Border. The CPA provides for an equal sharing of oil revenues between North and South with special administrative status given to Abyei -- which has since suffered some clashes. As a result, in 2009, the Permanent Court of Arbitration in the Hague ruled on an ongoing border dispute that would put two of Sudan's oilfields in the North rather than as part of the Abyei region. As part of the CPA, a referendum is scheduled for 2011 at which time the South will decide whether or not to secede, and the Abyei region would decide on which side to join.

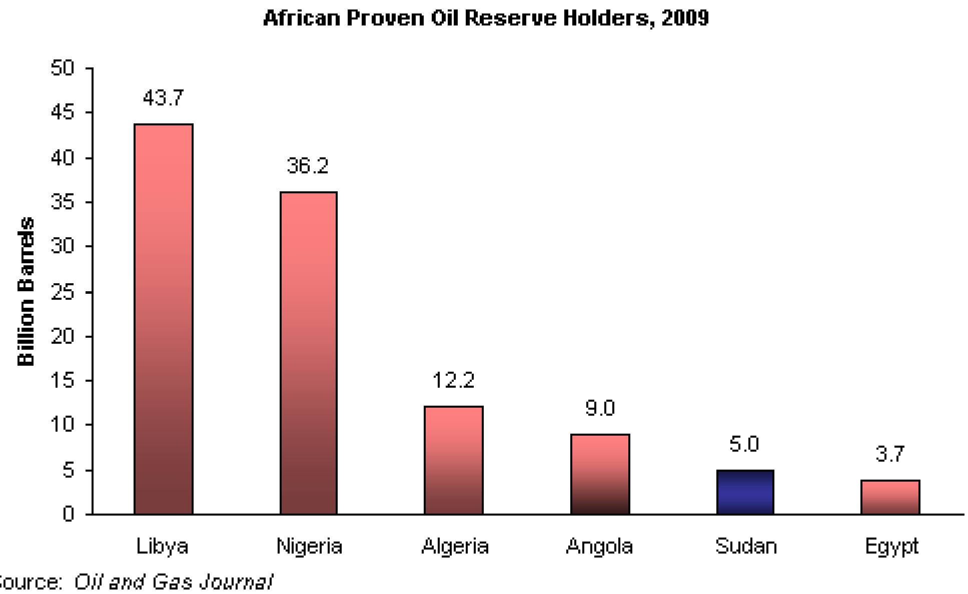
The second conflict in Darfur brought with it international condemnation, internally displaced populations and sanctions affecting the country as a whole. The conflict has prevented oil exploration in the Darfur region, and the sanctions have prevented some international investment.

The fighting itself has led to considerable infrastructure damage further limiting development.

Oil

Sudan is becoming a significant world oil producer and has been invited to join the Organization of Petroleum Exporting Countries (OPEC). Though not a member, Sudan currently maintains observer status.

According to *Oil and Gas Journal* (*OGJ*), Sudan had five billion barrels of proved oil reserves in January 2009 up from an estimated 563 million barrels in 2006. The majority of reserves are located in the south in the Muglad and Melut basins. Due to civil conflict, oil exploration has mostly been limited to the central and south-central regions of the country. Natural gas associated with oil production is mostly flared or re-injected. In 2009, there were announcements of natural gas discoveries in Sudan but these have yet to be determined commercially viable.



Exploration and development of Sudan's oil resources has been controversial. International human rights organizations have accused the Sudanese government of financing human rights abuses with oil revenues, including the mass displacement of civilians near the oil fields. Factional fighting in the South and rebel attacks on oil infrastructure have kept oil production and exploration from reaching full potential to date. China, the largest investor in Sudan, has had facilities in Sudan attacked while at the same time, the country has faced international condemnation for its investments in the country.

The United States prohibits U.S. nationals from engaging in any transactions or activities related to the petroleum or petrochemical industries in the entire territory of Sudan (including Southern Sudan). For information on full U.S. sanctions, please see the U.S. Treasury Department's Office of Foreign Assets Control. Sudan also faces sanctions from the United Nations and the European Union which include arms embargos, travel bans and restrictions on financial activities that may impede the peace process -- without specifically addressing the petroleum sector (the full list of U.N. sanctions can be found here).

Sector Organization

The Sudan National Petroleum Corporation (Sudapet) is active in Sudan's oil exploration and production. However, due to its limited technical and financial resources, Sudapet often develops joint ventures with foreign companies in oil projects but remains a minority shareholder. Foreign companies involved in Sudan's oil sector are primarily from Asia. They are led by the China National Petroleum Corporation (CNPC), India's Oil and Natural Gas Corporation (ONGC) and Malaysia's Petronas. Nilepet, South Sudan's national oil company, has also been involved in allocating licenses which has led to some conflict, specifically in southern blocks that were licensed by the northern government.

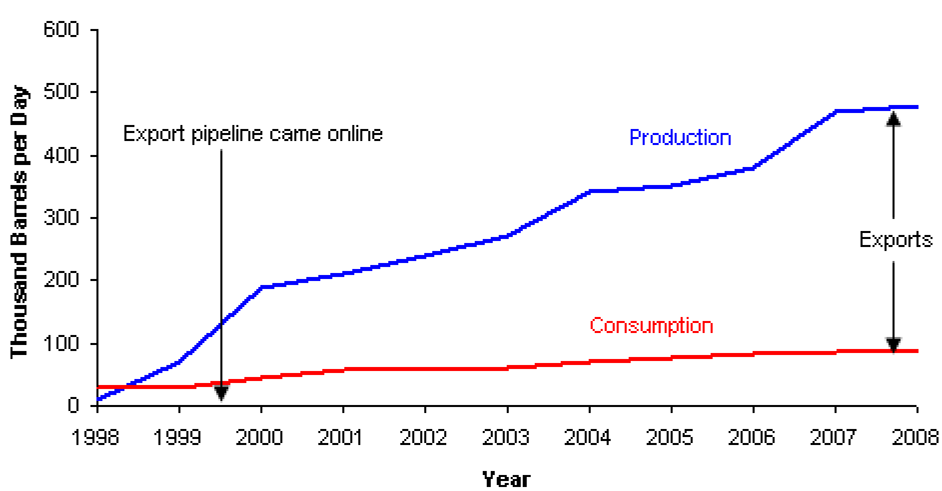
In October 2005, Sudan established the National Petroleum Commission (NPC) to bolster the development of the country's oil resources. To accomplish its mission, NPC allocates new oil contracts, and it ensures an equal sharing of oil revenues between the national government in Khartoum and the Government of South Sudan (GoSS). In addition, NPC is responsible for resolving duplicate oil contract issues in which the GoSS has allocated bolcks overlapping contracts previously granted by Khartoum.

Exploration and Production

Oil production began in the late 1990s and grew rapidly starting in July 1999 with completion of an export pipeline that runs from central Sudan to the Port of Sudan. In 2008, EIA estimates that crude oil production averaged 480,000 bbl/d. While this represents considerable growth over the past decade, recent production estimates reflect a decline in Nile Blend production that was not offset by increases in newer production of Dar crude.

Production is sourced from two major fields plus output from smaller areas that have recently come on-stream (detailed descriptions are listed below). The first and oldest development is the Greater Nile Oil Project covering Blocks 1,2, and 4 that in 2008 was the source of just over 210,000 bbl/d of Nile Blend. The second major field encompasses Blocks 3 and 7, operated by the Petrodar consortium, which produced around 200,000 bbl/d of Dar Blend. Other smaller sources Include Block 6 which produced around 40,000 bbl/d and Block 5a, another source of Nile blend, which produced approximately 25,000 bbl/d in 2008.

Sudan's Oil Production and Consumption, 1998-2008



Source: EIA

Blocks 1, 2, and 4 (Nile Blend)

In 1996, Canadian independent Arakis Energy (Arakis) began development of the Heglig and Unity fields (Blocks 1, 2, and 4). Because the fields are not located near the Red Sea coast, Arakis entered into a consortium with the Greater Nile Petroleum Operating Company (GNPOC) to raise investment for a 994-mile pipeline from the fields to the Suakim oil terminal near Port Sudan. In September 1999, the first cargo of crude departed the export terminal. Although GNPOC originally constructed the pipeline with throughput of 150,000 bbl/d, it has since been increased to 300,000 bbl/d, while maximum capacity is estimated at 450,000 bbl/d. The GNPOC joint venture is operated by CNPC (40 percent), with partners Petronas (30 percent), ONGC (25 percent) and Sudapet (5 percent).

In 2008, combined production from Blocks 1, 2, and 4 was estimated to be slightly over 210,000 bbl/d of Nile Blend, reflecting a decline from a 2006 peak of over 270,000 bbl/d and is expected to continue to decline in the short term.

Blocks 3 and 7 (Dar Blend)

In June 2004, Petrodar, a consortium of CNPC (41 percent), Petronas (40 percent), Sudapet (8 percent), Sinopec (6 percent), and Tri-Ocean Energy of Kuwait (5 percent) began development work on Blocks 3 and 7 located in the Melut Basin. The blocks contain the Adar Yale and Palogue oil fields, with estimated recoverable reserves of 460 million barrels. In November 2005, CNPC brought online the Petrodar pipeline linking the two blocks to Port Sudan. The pipeline has current throughput of 150,000 bbl/d and maximum capacity of 500,000 bbl/d. The project also includes a 300,000 bbl/d central processing facility at Al-Jabalayan and production facilities at Palogue.

In 2008, production from these two blocks was approximately 200,000 bbl/d of Dar Blend. Output should rise in the near-term from the Qamari field which came online in 2009 and is expected to ramp up production to 50,000 bbl/d by 2010. However, some analysts stated that full production increases might be delayed due to the lack of a connecting pipeline. The heavy and highly acidic quality of this crude makes it less marketable and it trades at a severe discount to Minas crude in Asian markets.

Block 5a

In April 2005, the Sudanese government signed an agreement with White Nile Petroleum Operating Company (WNPOC) for the development of the Thar Jath and Mala fields on Block 5a. First oil from the block came online in June 2006 at an initial rate of 38,000 bbl/d. In 2008, the field was still producing around 25,000 bbl/d, full capacity is estimated at 60,000 bbl/d. Oil from the field flows through a 110-mile pipeline to Port Sudan. WNPOC is a consortium of companies, which include Petronas (68.9 percent and operator), ONGC (23.1 percent) and Sudapet (8 percent).

Block 6

In November 2004, CNPC brought online its Fula field on Block 6 at a rate of 10,000 bbl/d. Current output on the block is 40,000 bbl/d of highly acidic crude, and is expected to increase. CNPC has constructed a pipeline that links the Fula field to the Khartoum refinery where it is processed largely for domestic use.

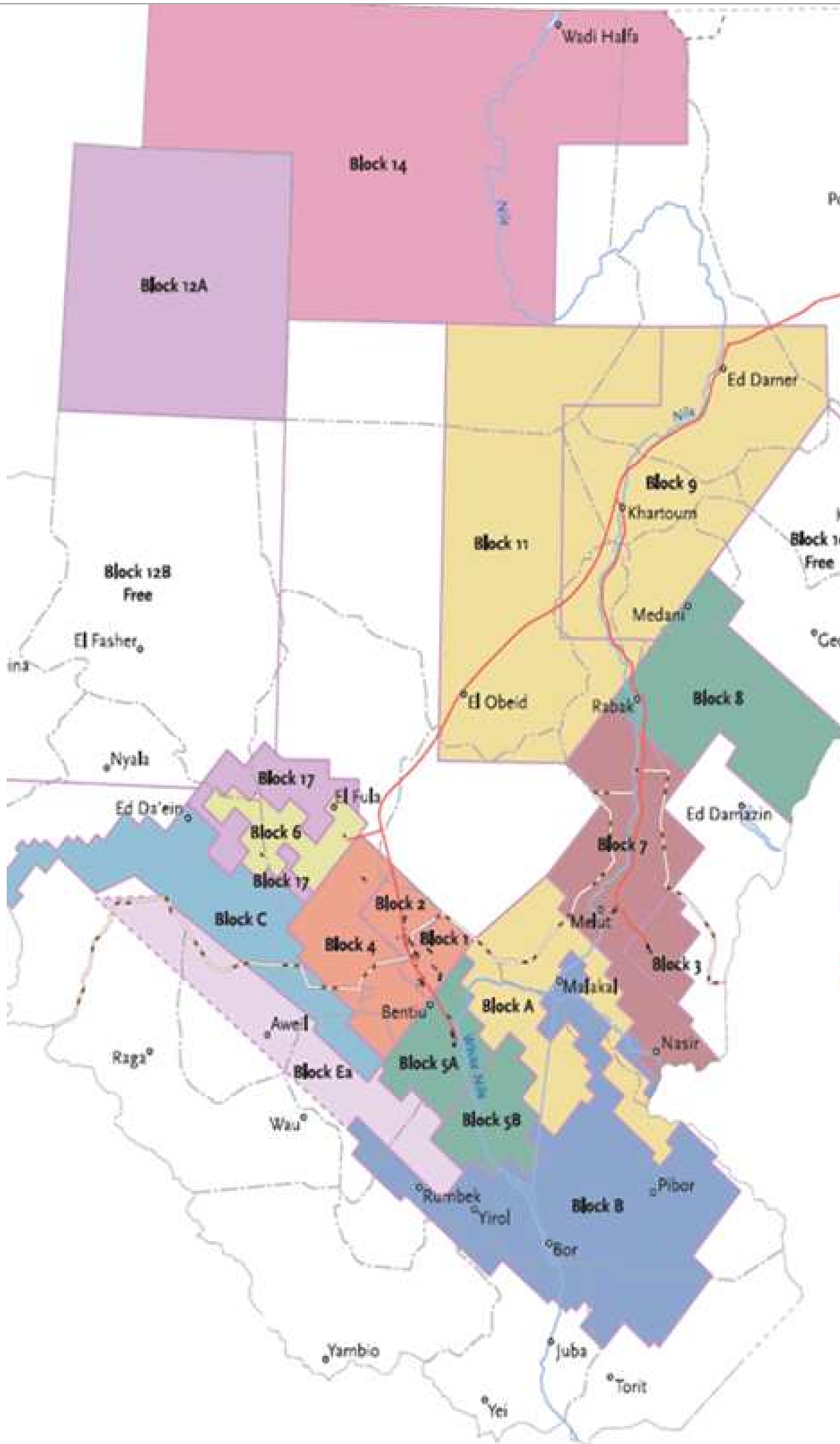
Other Blocks

Block B: Block B is located in southeastern Sudan and is licensed to Total. The company has faced several problems resulting from conflict in the area, licensing problems, and, more significantly, the existing consortium continues to seek a third partner to replace Marathon Oil, a U.S. company that was forced to pull out of its 32.5 percent interest as a result of U.S. sanctions.

Block 5B: Block 5B is located in the southern Muglad Basin and was initially under exploration by ONGC Videsh (23.5 percent stake) and Lundin (Sweden 24.5 percent) in partnership with Sudapet (13 percent), and Petronas (39 percent). In early 2009, two major stakeholders, ONGC and Lundin pulled out after negative drilling results. In August 2009, the National Petruleum Commision approved the participation of Ascom, a Moldovan firm in block 5B.

Block EA: According to the BBC, the NPC recently mapped out a new oil concession called EA. This block is a long narrow strip that runs along existing fields in the Muglad Basin.

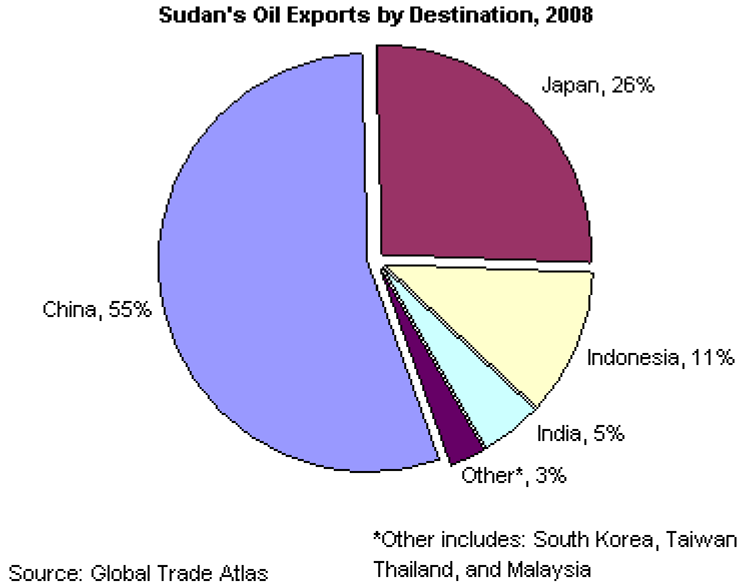
Map: Sudan Oil Blocks (click map for high resolution and more descriptive version)



Source: European Coalition on Oil in Sudan

Exports

In 2008, Sudan produced approximately 480,000 bbl/d and consumed 86,000 bbl/d, the remaining 394,000 bbl/d was exported to Asian markets. According to official trade statistics as reported to the Global Trade Atlas, Sudan exported the majority of its oil to China (214,000 bbl/d) followed by Japan (102,000 bbl/d) and Indonesia (43,000 bbl/d). Additional importers of Sudanese crude include India, South Korea, Taiwan, Thailand and Malaysia.



Sudan has two major oil streams, the Nile and Dar blends. Nile is a medium, sweet crude with an API of 44. Nile Blend is exported to Asian markets and trades at a discount to Indonesian Minas, the Asian benchmark crude. Dar blend is also exported to Asian markets and while production of this stream is growing, the heavy sour quality of this crude causes it to trade at a discount, often severe, to Minas crude.

Refining and Downstream

According to *OGJ*, Sudan's refineries in Khartoum and Port Sudan had total combined refining capacity of 121,700 bbl/d as of January 2009. The Khartoum refinery was expanded in 2006 from a capacity of 50,000 bbl/d to 100,000 bbl/d. The expansion allowed for the processing of both Nile and Fula blends of crude for domestic consumption as well as product exports.

The Port Sudan facility is located near the Red Sea and is Sudan's smallest refinery, with capacity of 21,700 bbl/d. In September 2005, a contract was awarded to Petronas to build a new refinery at Port Sudan. The refinery was to be designed to process the highly acidic Dar blend but this project has been postponed several times and the status is currently unknown.

Profile

Energy Overview

Proven Oil Reserves (January 1, 2009)	5 billion barrels
Oil Production (2008E)	480 thousand barrels per day
Oil Consumption (2008E)	86 thousand barrels per day
Crude Oil Refining Capacity (2007E)	121.7 thousand barrels per day
Proven Natural Gas Reserves (January 1, 2009E)	3 trillion cubic feet
Natural Gas Production (2006E)	None
Natural Gas Consumption (2006E)	None
Electricity Installed Capacity (2006E)	1.114 gigawatts
Electricity Production (2006E)	4.0 billion kilowatt hours
Electricity Consumption (2006E)	3.4 billion kilowatt hours

Total Per Capita Energy Consumption (2006E)	4.8 million Btus
Energy Intensity (2006E)	3,150 Btu per $2000-PPP**

Environmental Overview

Energy-Related Carbon Dioxide Emissions (2006E)	12.3 million metric tons
Per-Capita, Energy-Related Carbon Dioxide Emissions (2006E)	0.3 metric tons
Carbon Dioxide Intensity (2006E)	0.2 Metric tons per thousand $2000-PPP**

Oil and Gas Industry

Major Oil Ports	Port Sudan
Major Oil Fields	Adar Yale, Fula, Heglig, Mala, Palogue, Thar Jath, and Unity
Major Pipelines	994-mile pipeline from Heglig and Unity fields to the Suakin oil terminal 870-mile pipeline linking Melut Basin to oil export terminal near Port Sudan and a 110-mile pipeline linking the Thar Jath and Mala fields to Port Sudan.
Major Refineries (Oil and Gas Journal 2009)	CNPC Khartoum refinery includes El-Gili (50,000) and Conocorp (50,000); Port Sudan Refinery (21,700)

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power.
**GDP figures from Global Insight estimates based on purchasing power parity (PPP) exchange rates.

Links

EIA Links

EIA Country Profile Sudan

U.S. Government

CIA World Factbook - Sudan
USAID - Sudan
U.S. State Department Travel Warning - Sudan
U.S. State Department Consular Information Sheet - Sudan
U.S. Treasury Department Office of Foreign Asset Control

General Information

BBC Country Profile: Sudan
Darfur Information Center
European Coalition on Oil
International Monetary Fund - Sudan
U.S. Institute of Peace
United Nations Security Council Sudan Sanctions Committee
Washington Post World Reference: Sudan
Embassy of the Republic of Sudan

Oil and Natural Gas

China National Petroleum Company (CNPC)
Oil and Natural Gas Corporation (ONGC Videsh) India
PETRONAS (Malaysia)

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Oil and Gas Journal
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Contact Info

cabs@eia.doe.gov
(202)586-8800
cabs@eia.doe.gov