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U.S. Energy Information Administration

Country Analysis Brief: Sudan and South Sudan

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Overview

South Sudan gained independence from Sudan in July 2011. Although most of the oil production capacity in those two countries is in South Sudan, the country is landlocked and remains dependent on Sudan's export pipelines and port. Civil unrest, disagreements over oil revenue sharing, and border disputes have curtailed oil production and investment in both countries.

South Sudan was officially recognized as an independent nation state in July 2011 following a referendum held in January 2011, when the South Sudanese voted overwhelmingly in favor of secession. Since the split, Sudan and South Sudan's oil production has declined because of continued domestic political instability and conflict between the two countries.

The unified Sudan began producing oil in 1999, and as a result, the country tripled its per capita income within a decade.[1] However, the secession of South Sudan significantly affected Sudan's economy because it lost 75% of its oil production fields to South Sudan. According to an International Monetary Fund country report, Sudan's government revenues and foreign exchange earnings fell by about one-half and two-thirds, respectively.[2] Sudan and South Sudan's oil sectors play a vital role in their economies and are closely linked; most of their producing assets are near or extend across their shared border. Although South Sudan now controls a substantial amount of the oil-producing fields, it is dependent on Sudan for transporting oil through its pipelines for processing and export. The transit and processing fees South Sudan must pay to Sudan to transport its crude oil are an important revenue stream for Sudan.[3]

Disruptions in oil production, disputes over oil revenue sharing, and lower oil prices have had a negative effect on both economies. In January 2012, South Sudan shut down virtually all of its oil production because of a dispute with Sudan over transit fees. The dispute was not resolved until April 2013 after protracted negotiations. In December 2013, a conflict between government forces and rebel factions led to a civil war in South Sudan. The peace agreement brokered in August 2015 provided a temporary reprieve, but fighting resumed in July 2016 and the security situation is still tenuous.[4]

Sudan has been more successful in weathering the downturn in oil prices in recent years by shifting to a more diversified economy. In addition, the partial lifting of U.S. sanctions on Sudan in October 2017 may provide more opportunities to attract additional foreign investment.[5] Prospects for South Sudan are less optimistic, given the uncertain outcome for the ongoing peace process, its dependence on crude oil for revenue in the lower oil price environment, weak investor confidence, and a lack of functioning infrastructure.

Figure 1: Map of Sudan and South Sudan

History

After gaining independence in 1956, the unified Sudan fought two civil wars. The second civil war ended with a Comprehensive Peace Agreement (CPA) between the Sudanese government and opposition forces in 2005, and the outcome of the 2011 referendum led to a newly created independent state: South Sudan. Border issues are a major source of tension between the two countries post-secession, and political dynamics in both countries pose significant security risks for the oil sector.

Sudan has experienced two civil wars since gaining independence in 1956. The second civil war ended with the help of international observers and led to the signing of the CPA by the Sudanese government and the rebel factions in the southern region in 2005. The CPA established guidelines for oil revenue sharing and a timeframe to hold a referendum for independence of the South. The southern region overwhelmingly voted for secession, and in July 2011, South Sudan became an independent nation-state that is separate from Sudan, with Juba and Khartoum as their respective capitals.[6]

Armed conflict in both countries has persisted in the post-referendum period, as unresolved issues on domestic and interstate relations still linger. Both countries still contest some areas around the demarcated border the CPA established. Disputes over the Abyei area and the Heglig oilfield in South Kordofan state have been particularly contentious, as the areas have strategic importance for the oil sector and agricultural resources that both countries rely on, adding another layer of complexity to the disputes.[7] In January 2012, South Sudan announced that it would shut its oil production over a dispute about oil transit fees. The dispute later turned violent, as the South Sudanese army–the Sudan People's Liberation Army (SPLA)–and Sudanese opposition forces took control of the oilfield for more than a week and destroyed critical infrastructure, which temporarily reduced Sudan's oil production by more than 50%. The conflict was resolved in November 2012 with support from the international community, and both governments reached an agreement on oil transit fees and on compensation for lost production.[8]

The cooperation agreements and implementation matrix, which states the timeframe to carry out the obligations stipulated in the cooperation agreements, paved the way for restarting oil production in April 2013. According to a Business Monitor Intelligence (BMI) Research report, South Sudan currently pays Sudan US $24.50/barrel, which consists of a US $9.50/barrel transit fee and a US $15/barrel fee to cover the cost of debt repayment that is shared between the two countries.[9] The drop of oil prices in 2014, however, has significantly lowered export revenues. Because South Sudan's Dar blend trades at a significant discount to Brent, a drop in the price of Brent could significantly affect South Sudan's fiscal position.[10]

Since the signing of the implementation matrix, the governments of Sudan and South Sudan shifted their focus from border conflicts to the mitigation of their respective domestic opposition factions. In September 2013, large-scale protests broke out around Sudan in response to cuts in fuel and basic commodities subsidies. The Sudanese security forces responded with violence, leading to hundreds of casualties.[11] Divisions within the South Sudanese government eventually led to a civil war that still continues as of January 2018. The domestic political dynamics and the security situations in both countries directly affected negotiations on oil production and transportation and will continue to be a potential risk for disrupting the countries' oil supplies and exports.

Petroleum and other liquids

Most of Sudan's and South Sudan's proved reserves of oil and natural gas are located in the Muglad and Melut Basins, which extend into both countries.

Natural gas associated with oil production is mostly flared or reinjected into wells, and neither country currently produces nor consumes dry natural gas.

According to BP's *Statistical Review of World Energy*, Sudan and South Sudan had 1.5 billion barrels and 3.5 billion barrels of proved oil reserves, as of January 1, 2017, respectively. Most of these reserves are located in the oil-rich Muglad and Melut basins, which extend into both countries. Oil and natural gas exploration in Sudan and South Sudan is limited outside of these basins because of the lack of evidence of prospective acreage and the persistent civil unrest affecting both countries.[12] Sudan has made efforts in the past few years to boost oil production levels by attracting new investment and awarding exploration licenses to develop several blocks, but progress has been slow.[13]

Natural gas associated with oil fields is mostly flared or reinjected. Despite proved reserves of 3 trillion cubic feet, natural gas development has been limited. According to the latest data provided by the National Oceanic and Atmospheric Administration (NOAA) and the World Bank's Global Gas Flaring Reduction Partnership (GGFR), Sudan emitted approximately 13.8 billion cubic feet (Bcf) of flared natural gas in 2016. From 2013 to 2016, Sudan was ranked 39th in the world for flared natural gas volume and intensity.[14]

Oil Sector Management

Prolonged sanctions against the unified Sudan allowed Asian national oil companies to dominate Sudan's and South Sudan's oil sectors. The China National Petroleum Corporation, India's Oil and Natural Gas Corporation, and Malaysia's Petronas hold large stakes in the leading consortia that operate oil fields and pipelines. Sudan and South Sudan's national oil companies, Sudapet and Nilepet, respectively, also hold small stakes in operations.

In Sudan, three main entities oversee activities in Sudan's petroleum sector: the Ministry of Petroleum (MOP) administers and manages the Sudanese oil sector; the Sudanese Petroleum Corporation (SPC), a fully state-owned arm of MOP, is responsible for exploration, production, and distribution of crude oil and petroleum products; and Sudapet, the national oil company, holds minority stakes in each of the international consortia operating in the oil-producing blocks.[15]

In South Sudan, the administrative structure largely mirrors Sudan's. The Ministry of Petroleum and Mining is responsible for managing South Sudan's petroleum sector. The National Petroleum and Gas Corporation (NPGC) is the main policymaking and supervisory body and reports directly to the president and national legislative assembly; it participates in all segments of the hydrocarbon sector and approves petroleum agreements on the government's behalf. The Nile Petroleum Corporation (Nilepet) is South Sudan's national oil company, and its activities mirror much of the responsibilities of its Sudanese counterpart. Nilepet oversees operations in the petroleum sector, and because of its limited technical expertise and financial resources, it holds minority stakes in production-sharing contracts with foreign oil companies.[16] South Sudan's Transitional Constitution, the 2012 Petroleum Act, and the 2013 Petroleum Revenue Management Act define the regulatory framework governing the hydrocarbon sector.[17]

Asian national oil companies (NOCs) dominate the oil sectors in both countries. The China National Petroleum Corporation (CNPC), India's Oil and Natural Gas Corporation (ONGC), and Malaysia's Petronas hold large stakes in the leading consortia operating in both countries: the Greater Nile Petroleum Operating Company, the Dar Petroleum Operating Company, and the Sudd Petroleum Operating Company. The lifting of U.S. sanctions against Sudan in October 2017 may provide opportunities for other foreign investors to enter the industry.

Table 1: Main oil companies in Sudan and South Sudan

Consortium/Subsidiary	Company	Country of Origin	Share (%)
Greater Nile Petroleum Operating Company (GNPOC)	CNPC	China	40
	Petronas	Malaysia	30
	ONGC	India	25
	Sudapet*	Sudan	5
Greater Pioneer Operating Company (GPOC)	CNPC	China	40
	Petronas	Malaysia	30
	ONGC	India	25
	Nilepet*	South Sudan	5
Dar Petroleum Operating Company (DPOC)	CNPC	China	41
	Petronas	Malaysia	40
	Nilepet	South Sudan	8
	Sinopec	China	6
	Tri-ocean Energy	Egypt	5
Sudd Petroleum Operating Company (SPOC)	Petronas	Malaysia	67.9
	ONGC	India	24.1
	Nilepet	South Sudan	8.0
Petro Energy Operating Company (PEOC)	CNPC	China	95
	Sudapet	Sudan	5
Petrolines for Crude Oil Ltd. (Petco)	Petco	Sudan	50
	Sudapet	Sudan	50

Source: Company websites, IHS Edin, IHS Markit, BMI Research

Crude Oil Production

Sudan and South Sudan have experienced frequent disruptions to oil production because of disputes over oil revenue sharing and armed conflict. Maturing oil fields and persistent violence, in conjunction with a lower oil price environment, have dampened investor confidence in spite of efforts to attract foreign investment.

Most crude oil in Sudan and South Sudan is produced in the Muglad and Melut basins. South Sudan's secession in 2011 substantially reduced Sudan's oil production capabilities, because most of the oil fields are located in South Sudan. Sudan brought online two small oil fields in Blocks 6 and 17 at the end of 2012, and the country is exploring offshore production in the Red Sea basin. However, progress in developing the Red Sea basin area has been slow.[18] In addition, Sudan's oilfields are reaching maturity and thus nearing depletion. Sudan is trying to mitigate declining output by using enhanced oil recovery (EOR) techniques, but the decline is expected to continue.[19]

The partial lifting of U.S. sanctions imposed on Sudan has led to a renewed push by the Sudanese government to attract foreign investment in the upstream sector. In November 2017, Sudan put up 15 blocks for direct negotiation, with a possible second round in February 2018.

Discussions of potential development projects between the government and State Oil Canada Ltd. and Russia-based Lukoil have been reported.[20]

In South Sudan, the ongoing civil war and political instability have undermined its ability to increase output to peak production capacity. Low investor confidence and the poor security situation pose serious obstacles to the government's ability to boost crude oil production, and they may need to rely on deals that are privately negotiated with smaller companies such as Nigeria-based Oranto, which secured a 90% stake in Block B3.[21] According to a recent study conducted by the World Bank Group on unsolicited proposals in infrastructure projects, privately negotiated transactions can face significant risk of cost overruns, delays in implementation, or early termination. Transactions that are privately negotiated, as opposed to transactions that use a competitive bidding process for procurement, are also more vulnerable than to allegations of corruption, whether perceived or real, which could complicate the execution of the project.[22]

South Sudan and, to a lesser extent, Sudan have experienced frequent disruptions to production because of disagreements over oil revenue sharing over the past few years. Damaged infrastructure and shut-in fields stemming from conflict have lowered overall production levels, and efforts to repair infrastructure or re-start production have been delayed. In 2016, combined production from both countries was 257,000 barrels per day (b/d)—lower than the peak production levels of 2010 when the unified Sudan produced approximately 486,000 b/d.[23] Crude oil production in Sudan and South Sudan averaged approximately 102,000 b/d and 150,000 b/d in 2017, respectively.[24] It is unlikely that either country will be able to increase production without significant improvements to the security situation or an increase in foreign investment.

Table 2: Sudan and South Sudan oil fields and operators

Country	Location	Main Fields	Blend	Operator
Sudan	Block 1	Unity, Toma, Munga	Nile	GNPOC
	Block 2	Heglig, Bamboo	Nile	GNPOC, Petrolines
	Block 4	Diffra, Neem	Nile	GNPOC
	Block 6	Fula, Hadida	Fula	Petro Energy
	Block 17	al-Barasaya	NA	Sudapet*
	Block 25	Rawat Central, Wateesh	NA	Sudapet
South Sudan	Block 1	Unity, Toma, Munga	Nile	GPOC
	Block 2	Heglig, Bamboo	Nile	GPOC
	Block 4	Diffra, Neem	Nile	GPOC
	Block 3 & 7	Palogue, Adar-Yale	Dar	DPOC
	Block 5	Mala, Thar Jath	Nile	SPOC

Source: IHS Markit, IHS Edin, Rystad, BMI Research
Note: Star Oil exited partnership in 2016, Sudapet now sole operator

Export oil pipelines, storage, and port

Sudan has two main export pipelines that travel north across the country to the Bashayer Marine Terminal, located about 15 miles south of Port Sudan. Most of Sudan's storage facilities for crude oil and refined products are also located at the Bashayer Terminal. The Bashayer Marine Terminal has a storage facility with a capacity of 2.5 million b/d and an export/import facility with a

handling capacity of 1.2 million b/d. The terminal is operated by the GNPOC. South Sudan currently does not have any significant storage capacity.[25]

South Sudan exports all of its crude oil via pipeline through Sudan. Plans for the construction of a separate pipeline have been reported that would allow South Sudan to export crude oil through neighboring Kenya or Djibouti via Ethiopia and avoid transit fees.[26] However, it is unlikely that the pipeline will be built, because production in South Sudan has been affected by the natural maturation of its fields and by disruptions.

Sudan and South Sudan produce three crude oil blends: Dar, Nile, and Fula. The Dar blend (25.0° API gravity, 0.11% sulfur) is a heavy paraffinic type of crude oil that has a high acid content and must be heated during transport to avoid congealing in ship tanks.[27] The Dar blend is produced at Blocks 3 and 7 in the Melut Basin, which is controlled by South Sudan.[28] The Nile blend (33.9° API gravity, 0.06% sulfur) is produced in the Muglad Basin at Blocks 1, 2, 4, and 5A; it is a medium, low-sulfur waxy crude oil and is a more attractive blend to refiners because of its high fuel and gasoil yields.[29] The Fula blend is a highly acidic crude oil that is produced in the Muglad Basin at Block 6 and is transported via pipeline to the Khartoum refinery, where it is processed for domestic use rather than for export.[30]

The Petrodar (PDOC) pipeline transports crude oil from Palogue and Adar Yale oil fields (Blocks 3E and 7E) in the Melut Basin to the Bashayer Marine Terminal in Port Sudan. The pipeline is approximately 850 miles long with a design capacity of 500,000 b/d, and it has several heating units to facilitate the movement of the Dar blend crude oil along the pipeline.[31]

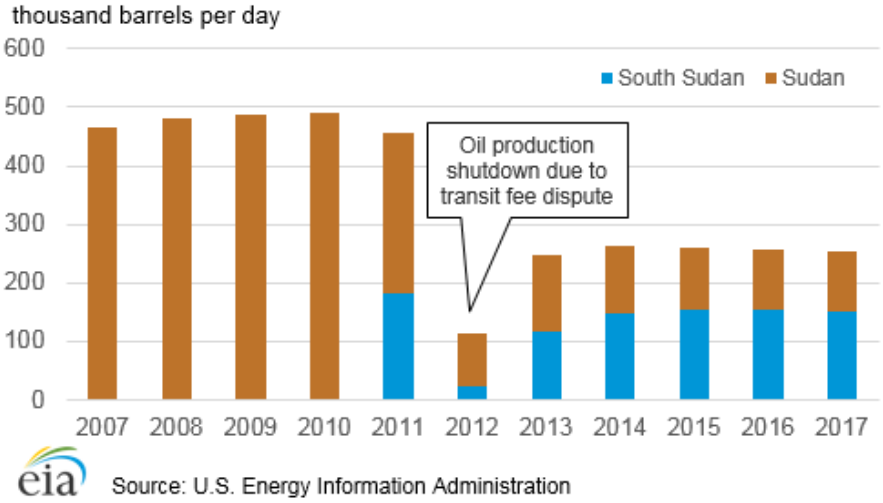
The Greater Nile Petroleum Operating Company (GNPOC) pipeline transports Nile blend crude oil from the Heglig oil fields (Blocks 2 and 4) in Sudan and the Thar Jath and Mala oil fields (Block 1 and 5A) in South Sudan to the Bashayer Marine Terminal in Port Sudan for export, and to two refineries in El-Obeid and Khartoum for refining and distribution to the domestic market. South Sudan's Thar Jath-Heglig section of the pipeline is approximately 100 miles and has a capacity of 200,000 b/d; the Heglig-Port Sudan section is approximately 930 miles long with a design capacity of 450,000 b/d.[32] In September 2014, ownership of the pipeline and facilities was fully transferred to a local Sudanese pipeline operator, Petrolines for Crude Oil Ltd. (PETCO).[33]

Table 3: Crude oil pipelines in Sudan and South Sudan

Operator	Start of pipeline	Destination	Crude oil blend type	Approx. length (miles)	Design capacity ('000 b/d)
Main crude oil pipelines					
DPOC	Block 3 and 7	Bashayer Terminal 2, Port Sudan	Dar	850	500
GNPOC	Heglig facilities	Bashayer Terminal 1, Port Sudan	Nile	1000	450
SPOC	Block 5A	Connects to Heglig facilities	Nile	60	200
CNPC	Block 6	Khartoum Refinery	Fula	450	200
Proposed crude oil pipelines					
--	South Sudan	Lamu (Kenya)	--	--	450
--	South Sudan	Djibouti via Ethiopia	--	--	--

Source: Company wesbites, IHS Markit, BMI Research, IHS Edin

Figure 2. Crude oil production in Sudan and South Sudan



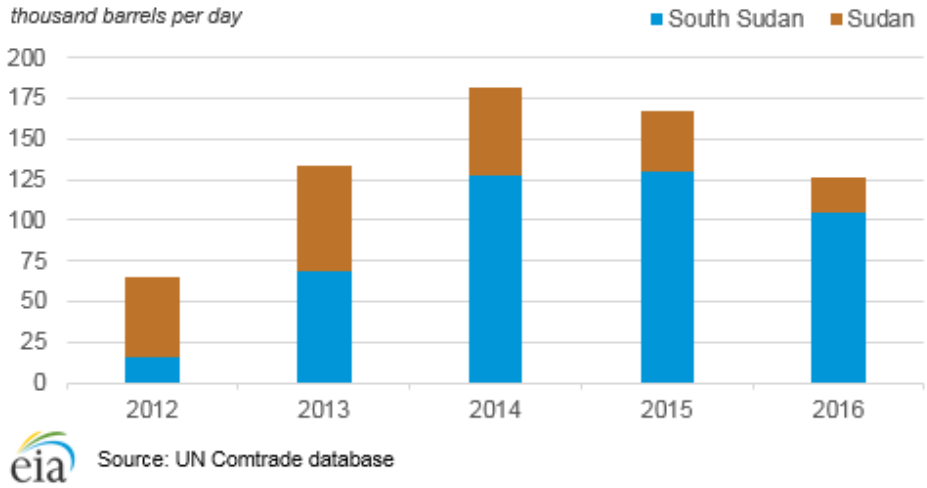
Crude oil exports

China is the leading export destination for crude oil from Sudan and South Sudan. In 2016, China accounted for 94% and 100% of Sudan's and South Sudan's crude oil exports, respectively.

Sudan and South Sudan export the Nile and Dar blends to Asian markets. All crude oil produced in South Sudan is exported via pipeline to Sudan for refining or export, because South Sudan has no refining capacity, and Sudan is the only country in the region with the refining infrastructure capable of processing these particular blends.[34] Crude oil is exported from Port Sudan to Asia via the Bab el-Mandeb Strait. Given the lack of alternative transit routes, Bab el-Mandeb is a strategically important chokepoint that if blocked or closed could lead to significant increases in shipping time and costs.[35]

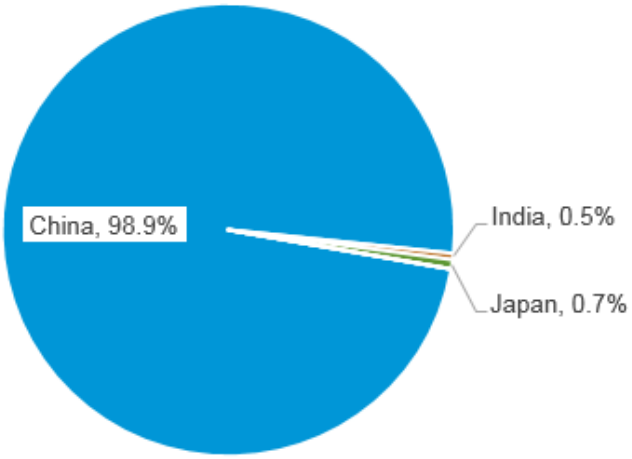
According to the United Nations international trade statistics database (UN Comtrade), Sudan and South Sudan exported a total of approximately 127,000 b/d of crude oil in 2016. Although this level is higher than the 65,000 b/d exported in 2012 during the production shutdown, it is lower than the 182,000 b/d exported in 2014. China is by far the largest export destination for Sudan's and South Sudan's crude oil, receiving almost 99% of total exports. India and Japan also import relatively small volumes of Sudan and South Sudan's crude oil.

Figure 3: Sudan and South Sudan Crude Oil Exports



eia Source: UN Comtrade database

Figure 4. Sudan and South Sudan total exports in 2016



eia Total exports: 127,000 barrels per day
Source: UN Comtrade database

Oil refineries

Sudan has two oil refineries and three topping plants (smaller, less complex refineries) with a total capacity of 143,700 b/d. However, the only active refineries are the Khartoum (al-Jaili) refinery and the El-Obeid topping plant.[36] The al-Jaili refinery, located approximately 45 miles north of Khartoum, is the country's largest, with a capacity of 100,000 b/d. The other full-conversion refinery is the Port Sudan refinery (21,700 b/d), and the three topping plants are El-Obeid (10,000 b/d), Shajirah (10,000 b/d), and Abu Gabra (2,000 b/d).[37]

The al-Jaili refinery initially came online in 2000 with a capacity of 50,000 b/d and was a 50/50 joint venture between the Ministry of Energy and Mining (MEM) and CNPC. It was later expanded in 2006, increasing total capacity to 100,000 b/d and creating two production lines that would allow the refining of both Nile and Fula blend crude oils. The expansion was notable for using the world's first delayed-coking unit, a unit required to process Fula crude oil because of its high acid and calcium content. Discussions between Sudanese and Chinese officials on a proposed

second expansion that could double the refinery's capacity have been reported, but no significant progress has been made.[38] Petronas signed a contract with MEM to expand the currently inactive Port Sudan refinery through a 50/50 joint venture and to add 100,000 b/d to its capacity, but development has been postponed as a result of rising costs.[39]

In South Sudan, two refineries were under construction: a 3,000 b/d refinery at Bentiu in the Unity State and a 10,000 b/d refinery at Thiangrial in the Upper Nile region. Plans to expand the Bentiu refinery to increase its capacity to 5,000 b/d have been reported. However, security issues have delayed the completion of the refineries, and it is unclear when or if the refineries will be operational.[40]

Table 4: Oil refineries in Sudan and South Sudan

Country	Refinery	Capacity ('000 b/d)	Status	Operator
Sudan	Khartoum (al-Jaili)	100	Operational	CNPC/Sudapet
	Port Sudan	21.7	Not operating	Sudapet
	El Obeid	10	Operational	Sudapet
	Shajirah	10	Not operating	Concorp
	Abu Gabra	2	Not operating	Sudapet
	Total Capacity	**143.7**		
Planned Refineries				**Operator and/or builder**
South Sudan	Unity State (Bentiu)	5	Under construction	Safinat (Russia)/Nilepet
	Upper Nile (Thiangrial)	10	Suspended	Government of South Sudan
Proposed Refineries				
Sudan	Port Sudan	100	--	--
	Khartoum (expansion)	100	--	--

Source: BMI Research, IHS Markit, PFC Energy, African Development Bank

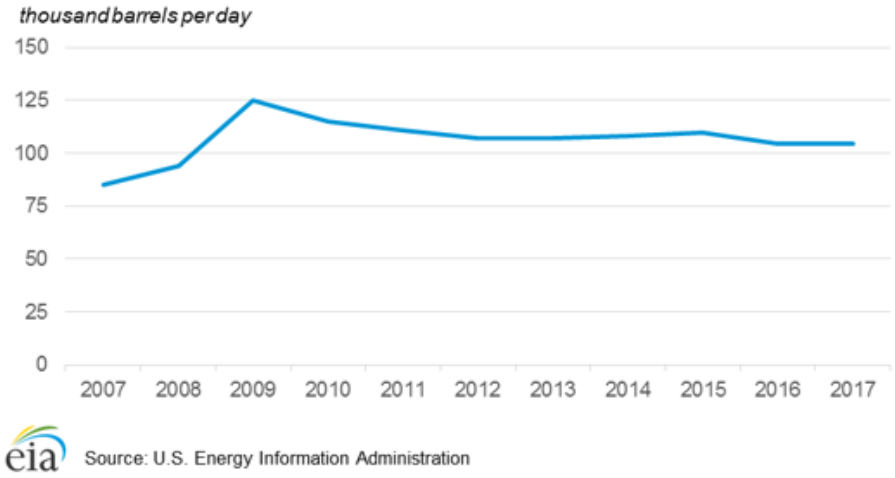
Note: The initial plan for construction at the Bentiu refinery in South Sudan was to build facilities with a capacity to process 3,000 b/d. Plans for expansion to increase capacity to 5,000 b/d have been discussed, but no progress has been made.

Liquids consumption

Oil consumption in Sudan and South Sudan peaked at 125,000 b/d in 2009 and has slightly declined to about 105,000 b/d in 2017.[41] Domestic consumption of petroleum products grew rapidly with increased industrialization, car ownership, and access to electricity in the 2000s; however, the persistent instability in both states has dampened consumption.

Petroleum consumption in Sudan has been met by domestically refined crude oil, although lower production levels over the past few years have led to an increase of imported petroleum products to meet shortfalls in domestic demand. According to the latest data from the International Energy Agency (IEA), diesel and fuel oil for electricity generation, followed by gasoline for transportation, make up a significant portion of Sudan's oil consumption, constituting 40% and 17% of total consumption in 2015, respectively. Diesel/fuel oil and gasoline make up an ever larger share of South Sudan's oil consumption at 73% and 10% in 2015, respectively, although in absolute terms, its oil consumption has been declining.[42]

Figure 5. Petroleum and other liquids consumption in Sudan and South Sudan



eia Source: U.S. Energy Information Administration

Electricity

Sudan

Total electricity generation in Sudan was 12.7 billion kilowatthours (kWh) in 2015, of which 66% was generated by hydropower.[43] Although power generation has continued to grow in the post-independence era, only 45% of the population had access to electricity in 2014, according to latest estimates from the World Bank.[44] Approximately 40% of the population had access to electricity in 2013, with urban populations benefitting from a substantially higher level of access than rural populations, according to the most recent estimates made by African Development Bank (AfDB). Those not connected to a grid rely on biomass or diesel-fired generators for electricity.[45] Sudan has two interconnected grids, the Blue Nile and Western grids, that cover a small portion of the country. An additional fourteen centers receive service from thermal generators and local distribution networks.[46]

Hydroelectricity is generated from seven dams: Roseires, Sinnar, Jebel Aulia, Khashm el-Girba, Merowe, Rumela, and Burdana. The Rumela and Burdana dams, located on the Upper Atbara and Setit rivers in eastern Sudan, were brought online in 2017 and are the most recent additions in hydropower generation. According to BMI Research reports, the two dams added 320 megawatts (MW) and 15 MW to total generation capacity, respectively.[47] Development of the Kajbar dam, located further north in the Nile Valley, has stalled. The dam was strongly opposed by local communities because of its potentially significant environmental impact, and no evidence of progress regarding its construction is evident. The Kajbar dam, along with two other proposed hydropower projects, the Dal and El-Shireig dams, are heavily financed by the Saudi government.[48]

Regarding nonhydropower generation, the 500 MW Kosti Thermal Power Plant that came online in 2016 is an oil-fired plant jointly sponsored by the Sudanese and Indian government that was constructed by India-based Bharat Heavy Electricals Ltd.[49] The Sudanese government is attempting to diversify its power generation mix by focusing on developing conventional thermal plants to meet domestic energy demand. However, the proposed projects are still at an early stage and rely heavily on Saudi financing. With the significant cuts in the Saudi budget as a result of lower oil prices, the future of these plants remains in doubt. Without diversification of its power generation mix, Sudan must rely heavily on hydropower to meet domestic demand, and will be especially vulnerable to weather patterns such as a severe or sustained drought.

South Sudan

South Sudan has one of the lowest electrification rates in the world, with only 5% of its population having access to electricity in 2014, according to the latest estimates from the World Bank. Total electricity generation was 310 million kWh in 2015.[50] Those connected to the power network experience frequent blackouts or forced load shedding, making citizens rely on standby generators to meet energy needs.[51] In April 2017, the AfDB approved a supplemental loan of US $14.57 million for a project approved in 2013 that supported the state-owned utility, the South Sudan Electricity Corporation, to strengthen and expand the country's electricity distribution networks.[52] AfDB project documents state that the additional financing was needed because the original grant underestimated project costs.[53]

According to BMI Research, five hydropower projects have been identified as potential opportunities for development: Fula Rapids (42 MW), Grand Fula (890 MW), Shukkoli (230 MW), Lakki (410 MW), and Bedden (570 MW). However, construction has been delayed because of low investor confidence and a lack of funding.[54]

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