Ministry of Petroleum & Gas
Sudanese Petroleum Corporation
Oil Exploration & Production Authority (OEPA)
Promotion Section

Investment Opportunities in Sudan E&P
2015
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Sudan is located in North East Africa. Due to its unique geographical location (Heart of Africa), Sudan has always been a trading and cultural bridge between Northern and Southern Africa as well as between the Arabian Peninsula and Africa, Particularly West and East Africa.

The Climate of Sudan varies from Desert, semi-desert and dry in the utmost North, semi-desert to Savanna in the central and Southern regions and Mediterranean in the Eastern areas.

Sudan topography is generally flat Plains, with highlands such as mountain ridges of the Red Sea and Jabal Marra. River Nile is the most dominant feature of Sudan geography, as the Nile basin constitutes most of the country area.

With richness and multiplicity, Sudan has abundant natural resources including but not limited to “Agriculture, Animal, Water, Minerals and Petroleum”, Oil and Gas is considered as one of the most important sectors in Sudan, with a considerable amount of hydrocarbon potentiality was under-explored, especially in frontier basins and it has a very significant forward linkage with the entire economy.
Ministry of Petroleum & Gas: Vision, Mission & Objectives

Vision:
Maximum utilization of petroleum and secure the supply of oil wealth products to customers through efficiently refining, transporting and distributing in a healthy and clean environment.

Mission:
Exploration, production, refining, transportation and distribution of oil wealth by acquiring technologies and knowledge based on international standards for quality and clean environment. The mission calls for building capacity of Sudanese human resources by developing training programs.

Objectives:
The Ministry is seeking strategically to achieve the following objectives:

- To ensure contribution of the petroleum sector to the national economy by acquiring revenues and enhancing the balance of payment and helping in reducing poverty.
- To secure optimum use of the latest technology.
- To expand exploration activities with the view of increasing reserves.
- To increase the oil production from the existing discoveries.
- To meet the domestic demand of oil products to achieve the self sufficiency.
- To conduct research and studies to enhance the production of hydrocarbons.
Why to Invest in Sudan E&P Sector?

Many international firms invested in Sudan because of the openness and encouraging investment strategy. The investment in Sudan is of a sufficient opportunities, which is attributed to:

1. The hydrocarbon potentiality with a considerable amount is under-explored.
2. The availability of the associated services’ providers and skilled labor.
3. The availability of infrastructure with a reasonable level of development.
4. An encouraging and flexible EPSA.
5. Distinguished strategic location in the heart of the African continent.
6. The availability of a modern and developed network of communication.

Hence, many opportunities are available for investment in this field. The Ministry of Petroleum and Gas is the sole gate of investment in Sudanese oil sector.
Sudan Sedimentary Basins

The formation of the Sudan basins began in the Late Jurassic and continued up to the Middle of the Miocene as a result of the larger regional structural system that extends across Central Africa to the West, to link up with the Atlantic Coast via the Benue Trough in Nigeria and embraces the Red Sea-Gulf of Aden plate boundary to the East within Sudan, and from East to West, there are many Rift Basins including the Blue Nile Basin, Khartoum Basin, the White Nile Basin, Melut Basin, Muglad Basin and Baggara Basin. To the South there are main branches of Muglad and White Nile Basins which are linked to Melut Basin, which extended Southward through Jonglei and Pibor Basins in South Sudan and linked with Anza Trough in Northern Kenya. This link was obscured later by the East African Rift System (Red Sea Basin), that has started to develop during Eocene – Oligocene time and has resulted in the opening of the Red Sea.
ABU GABRA NO1
FIRST PRODUCING OIL WELL
DEMOCRATIC
REPUBLIC OF SUDAN
COMPLETED AUGUST 9 1979.
Oil Exploration History

The petroleum exploration started by AGIP Company along the Sudanese Red Sea Coast in 1959. Early 1970’s, Sudanese Red Sea Coast became the target of many oil companies such as Union Texas, Texas Eastern and Chevron. Chevron was awarded a concession to explore for oil in East of Sudan.

Following the early discovery period, Chevron had signed a Concession Agreement in 1974 with the Government of Sudan to explore for oil. By end of 1976, one well was drilled in the North West of Muglad basin. During the first exploration efforts (1975-1980), which concentrated on the Muglad basin, several oil discoveries were made. In 1981, additional oil reserves in the North West of Muglad basin & Melut basin had been discovered. The exploration work had significantly shown steps forward during 1982, eighteen wells were drilled in the Muglad and the Blue Nile basins. Within the year 1983; a total of 24 wells were drilled which confirmed two oil discoveries in Muglad Basin.

Currently, there are 25 exploration & development Blocks, five operating companies with exploration and development field activities in Blocks 2, 4, 6, 17, 25 and 12A in Sudan. Up to date there is a significant amount of hydrocarbon reserves have been discovered in both offshore and onshore Blocks.
Sudan is considered as one of the top African countries with hydrocarbon potential. Nearly twenty hydrocarbon basins do exist that are basically categorized into; late Proterozoic-Paleozoic continental sag and Mesozoic-Cenozoic rift which are classified into; producing, under exploration and frontier basins.

Four basins are currently under exploration, some have proven petroleum systems with prominent discoveries e.g. Rawat, Red Sea and Blue Nile. However, other basins have proven petroleum systems but no notable discoveries been made yet e.g. Um Agaga, Khartoum and Mourdi Basins. Several frontier basins were identified in Northern and central Sudan based on gravity and sparse or even absent 2D seismic data e.g. Salima, Misaha and Gadarif basins.

However, there is substantial amount of hydrocarbon has been discovered in rift basins during the past five decades with total OIIP of more than 6,000 MMSTB and GIIP about 3,000 BSCF. The country’s speculative oil in place resource is approximately 24 BSTB.

Recently, few unconventional plays have been tested such as basement and tight sands. At the same time, some compelling evidences from recent studies indicated that the Upper Cretaceous of the Muglad basin might be working particularly in the central part, which is expected to add more resources.
Red sea basin sediments
Red Sea Blocks

The Red Sea Basin lies between the Precambrian basement outcrops of NorthEast Africa and West of Asia (Arabian Peninsula). It includes the marine area of the Red Sea and its Coastal plains. The Red Sea Basin originated as a result of the separation of Asia from Africa. Arching and uplift in the Late Eocene and subsequent extension, crustal attenuation and rifting in the Oligocene and Early Miocene were followed by sea floor spreading in the latest Miocene–Pliocene. The main Terminal (Port Sudan) is located within the area of Red Sea Blocks.

**BLOCK 13**

It is an onshore Block with an area of 8950.64Km². The Block consists of many sedimentary environments as lacustrine, alluvial fan, delta, fringing reef, lagoon, shallow marine sand and braided channel.

There were many exploration activities have been done in the Block i.e. gravity, magnetic, 518.9 Km 2D seismic and (3) exploration wells, (2) wells have Hydrocarbon shows. Based on the latest studies, (5) prospects and leads were identified.

**BLOCK 15**

It is an offshore Block with an area of 27807.814 Km². The offshore part could be subdivided into; a shelf area covered mostly by the offshore part of Tokar Delta, with a prominent shelf break going to deep water eastward. The water depth of the shelf is varying from very shallow to deep.

There were many exploration activities have been done in the Block i.e. gravity, magnetic, 3227.6 Km of 2D Seismic. The Hydrocarbon shows were encountered in the nearby Blocks.

**BLOCK 17**

It is an onshore Block with an area of 8950.64Km². The Block consists of many sedimentary environments as lacustrine, alluvial fan, delta, fringing reef, lagoon, shallow marine sand and braided channel.

There were many exploration activities have been done in the Block i.e. gravity, magnetic, 9152 Km of 2D Seismic and (11) wells in the offshore area, (8) wells have Hydrocarbon shows, (2) wells were tested (Proven HC). The Block is considered as a proven petroleum system with Hydrocarbon discoveries.

**BLOCK 20**

It is an offshore Block with an area of 8842.97 Km². There were many exploration activities have been done in the Block i.e. gravity, magnetic and 3227.6 Km of 2D seismic. The Hydrocarbon shows were encountered in the nearby Blocks.

**BLOCK 21**

It is an offshore Block with an area of 9791.91 Km².

There were many exploration activities have been done in the Block i.e. magnetic, gravity and 3748.9 Km of 2D seismic. The Hydrocarbon shows were encountered in the nearby Blocks.
Western basin sediments
Western Area Blocks

Block C

The Block is located in Muglad basin, with an area of 44,161.68 Km$^2$. The Block consists of many Sub-Basins (Um Dafug, Kundi, Tulus, Khadari, Rakuba, Hiba and Bahr El Arab). There were many exploration activities have been done in the Block i.e. Magnetic, Gravity, 12,000 Km 2D Seismic, 174 km$^2$ 3D Seismic, (10) exploration wells were drilled out of which (6) wells encountered Hydrocarbon shows. There are (19) key prospects and (14) leads delineated in the whole Block based on 2D seismic and around (39) Key prospects delineated based on Hiba 3D seismic.

The Block is close to many processing facilities (only 250 Km away).

Block 12B

The Block consists of South Wadi Howar Basin and Miedoub Sub-Basin (North of Muglad Basin). The Block’s area is 184,250 Km$^2$ and can be accessed from Khartoum through Elfashir and Nyala International Air ports besides roads and railway network.

The Block is considered as an extension of a productive oil region in Chad and Libya. South Wadi Howar Basin is analogous to the geology of the neighboring Kufra (SE Libya), Murdi (Chad) and Dakhla (SW Egypt).

These basins are quite virgin with very limited data. There are indications from recent gravity data that the South Wadi Howar basin can reach more than 5 Km depth.
Northern basin sediments
Northern Area Blocks

Block 14
The Block covers an area of 97,820.46 Km$^2$. The Block consists of two basins; Misaha and Murdi Basins. There were many exploration activities have been done in the Block i.e. Magnetic, Gravity, 12000 Km 2D seismic.

Block 18
The Block covers an area of 187,845.59 Km$^2$. The Block consists of three main sedimentary basins; Abyad, Salima and Gabgaba Basins. These Sedimentary Basins were delineated by gravity and magnetic (The Block covered by magnetic and gravity), indicates the depth of about 3 Km. The sedimentary fill ranges in age from shallow marine Silurian through continental Permo-Triassic, Jurassic, shallow marine late Cretaceous and marine Tertiary Carbonate and Cherts.

The configuration of these basins is similar to Misaha basin (Block 14) and Kom Ombo basin (Egypt) which is producing basin.
Eastern basin sediments
Eastern Area Blocks

Block 8:

The Block is located in East of Sudan covers an area of 60,297.77 Km². There were many exploration activities have been done in the Block i.e. Magnetic, Gravity, 7,525 Km 2D Seismic and (11) exploration wells all the drilled wells had encountered Hydrocarbon shows, in addition to three wells with discoveries.

The Block covers Blue Nile basin which was formed due to rifting during the Mesozoic era (250-66 Ma).

Blue Nile Basin is typically half graben.

Moreover, mixed Oil/Gas prone source rocks was detect from the drilled wells with high TOC values.

Al-Jebalyien Central Processing facility is around 30 Km from the Southern borders of the Block and the pipeline is crossing the Block area.

Block 10:

The Block is located in East of Sudan covers an area of 85,041.43 Km². This Block consists of Gedaref basin. There were many exploration activities have been done in the Block i.e. geological and gravity surveys and (4) regional seismic lines. The Block falls within vicinity of the two crude oil export pipelines and few hundred kilometers away from the marine terminal (Port Sudan).
Central basin sediments
Central Area Blocks

Block 9:
The Block is located in the central of Sudan covers an area of 126,090 Km². The Block consists of three basins; Khartoum, Atbara and Umm-Assala Basins. There were many exploration activities have been done in the Block i.e. Magnetic, Gravity, 7,400 km of 2D seismic, (8) wells have been drilled in Khartoum basin among them (4) wells had encountered good Oil shows and (2) wells were tested (confirmed Oil & Gas).

Block 11:
The Block is located in the Central part of Sudan about 1,200 km far from Port Sudan (marine terminal) covers 148,346.47 Km². Two crude oil export pipelines are crossing the Block. This Block consist of many Sub-basins, (UM Rawaba, Um Agaga and Darqil ).

In general, the Block has a high potential of hydrocarbons based on previous exploration, an active petroleum system is proven as indicated by Hydrocarbon shows in (2) wells. There are (6) leads and (17) prospects in the Block.
Southern basin sediments
Southern Area Blocks

Block 22
The Block is located in South of Sudan to the North East of Block 4 (producing Block) in Muglad basin, covers an area of 4,866.93 Km².

The Block is embedded by two gravity high. There were many exploration activities have been done in the Block i.e. Magnetic, Gravity, 950 Km 2D seismic and (2) exploration wells were drilled. The Block is adjacent to bamboo oil field which is a producing field.

Block 23
The Block located in South of Sudan to the South and South West of Block 4 (producing block) in Muglad basin, covers an area of 3,726.24 Km².

There is 545 Km2D Seismic have been acquired.

The Block is adjacent to producing fields like (Azraq and Shelungo, Haraz-Shaf, Canar, Diffra-Hamam, Balome).

Block 2AE
The Block is located in South of Sudan between Block 4 and Block 2A (producing Blocks) in Muglad basin and it covers an area of 3,503 Km².

There are (13) Wells drilled, some of them encountered hydrocarbon shows in Western and Eastern part of the Block.

There are (2) main proven hydrocarbon plays; Tertiary Play in EL-Mahafir Area and Cretaceous Play in the Eastern Part (Bamboo Area) and in the Western Part of the Block (Garaad-Koda Area).
Sudan is an emerging oil producer in Africa, where the oil revenues are significant contributor of the country’s economy. Oil production started in August 1999 with 40 KBOPD and has ascended gradually to 500 KBOPD from blocks 1, 2, 4, 3, 7, 5A and 6. However, the separation of the South Sudan has resulted in giving up 2/3 of production and the developed reserves to the new born country.

Different development methods of EOR/IOR were applied to increase and stabilize oil production, such as gas injection, water injection, cyclic steam stimulation (CSS), chemical injection (SEMAR) and nitrogen injection.

Mostly the oil is produced with the assistance of artificial lifting means, even though there are fields can produce naturally.

The total STOIIP in Sudan is 4.7 billion with average recovery factor is 22% Ultimate Recovery (UR) 1.03 billion. The properties of oil are varying from light to Heavy oil with API ranged from 43 to 17.
The EPSA regulates the relationship between the Government and the contractor when we deal with Oil and Gas industry in Sudan it has been developed through the time to be more flexible and inductor.

According to the EPSA, the Government of Sudan grants the contractor the exclusive right to conduct petroleum operations in the contract area including all supporting activities normally associated with them.

The contract duration ranges from 25 years for the exploration Blocks to 20 years for the development ones.

The exploration period is usually 6 years sub divided into a number of mandatory and optional commitment periods. A certain amount of work program with an estimated budget should be carried out during each period. The contractor have to relinquish 25% of the original area (not covered with oil discoveries) to the government at the end of each commitment period, According to the terms of the EPSA, the contractor will recover the costs & expenses pertaining to its petroleum operations at a negotiable percentage, and also permitted to import the equipments and materials that required for petroleum operations and shall be exempted from custom duties.

Farm in Opportunities

Exploration Production Sharing Agreements (EPSA) between the Government of Sudan and the investors provide the shareholders rights to assign all or a part of their equity to any interested investors whom can directly contact the shareholders or Sudapet.
Many technical support and services are essential to sustain and ease the hydrocarbon exploration and production activities. These services can be categorized as follows:

- **G & G services** include but not limited to: Seismic Acquisition and data Processing, Mudlogging, Wireline logging and Coring.

- **Drilling services** include but not limited to: Drilling, Work over, Drilling fluids.

- **Development services** include but not limited to: Mechanical Water Detection, Cyclic Steam Stimulation, Steam Flooding, Gas Injection, Well Testing, Field Developments Plans and Consultancy Services.

- **Production services** include but not limited to: Artificial Lift Systems, Production Chemicals and Down hole Tools.

- **Infrastructure services** include but not limited to: Maintenance, Engineering, Procurement, Construction, Commissioning services and Measurement & Validation of Metering Devices.
Health, Safety & Environment Management

Sudanese Petroleum Corporation is very proud by its commitment and adhering to health, safety and environmental standards. HSE policies were designed to achieve correct and safe work environment free of accidents in the oil industry, and to ensure the safety and health of employees and the community, and to protect the environment, prevent pollution and to support a sustainable society and economy.

General Policies

1. To intensify the control operation and circulated to all companies involved in the oil industry.

2. To set and develop regulations and policies related to health, safety and the environment that reflects the commitment of the companies working in the oil sector.

3. To protect the environment and natural resources without accidents and adherence to safety standards and apply them besides keeping up with the international one.

4. To build an effective management system for health, safety and environments an integrated part of the philosophy of the operating companies’ activities in oil sector and raise employees’ awareness toward the preservation of the environment and compliance with safety standards and controls.

5. To provide qualified staff and adequate resources, tools and equipment to perform the tasks as required.
Infrastructures

Pipelines

There are three crude pipelines, the first pipeline is from Heglig CPF (350 KBPD) to Bashayer-1 Marine Terminal which is described as the longest pipeline in Africa (1505 Km) with capacity of (450 KBPD), Bashayer-1 Marine Terminal capacity is (3.2 MBOPD). The second pipeline start from Al-Jebalyien CPF (300 KBPD) to Port Sudan (1400 Km) with capacity of (500 KBPD) sending the South Sudan crude oil to Bashayer-2 Marine Terminal (3.0 MBOPD) capacity. The third pipeline is Elfula CPF (100 KBPD) to Khartoum pipeline (720 Km) with the capacity of (200 KBPD).

Refineries

There are three refineries in Sudan. The largest one is Khartoum Refinery (KRC) with capacity of (100KBOPD) consists of two separated units for light and heavy oil refining. KRC is the main refinery that supplies Sudan with refined products. The second refinery is Elobaid refinery with capacity of (15 KBPD), and finally the Port Sudan Refinery with capacity of (25 KBPD); it was designed to refine the light Arabic crude oil. However, many studies were done to modify the refinery to use the Sudanese crude oil.

Moreover, there are other ancillary facilities i.e. Petroleum Laboratories, Petroleum Information Center (PIC) and Training Centers.
Flow-Chart for Promotion Procedures

Check Docs

- LOI in petroleum
  - Pre Qualification
    - Evaluation
      - Disqualify
        - Withdraw
        - Evaluation
          - Withdraw
          - Signing SA/EPSP
            - Withdraw
      - LOI in blocks
        - Questionnaire & EPSA Model
          - Negotiation
            - CA Signing
        - Data Room Entry
          - Tech. Meetings
Steps to Obtain a Concession

- Letter of intent from the company to the Ministry of Petroleum and Gas through Oil Exploration & Production Authority (OEPA).
- Submit Proper Pre-Qualification of the Company along with the Company’s profile & Legal, Financial & Technical documents for Evaluation.
- Permission of the technical Staff to review the preliminary data.
- A presentation by the Promotion Department of investment opportunities available.
- Further Detailed Data may be obtained under a Confidentiality Agreement.
- Draft EPSA Model will be given upon firm interest of the contractor.
- Submit Fiscal Parameters to OEPA.
Steps to Provide Services

- Intent letter of Investment Company to engage in oil and gas field services sector.
- Initial evaluation developed for the company.
- A presentation by the company’s legal, technical and financial potential for OEPA.
- are encouraged to contact the operators
- Interested companies present themselves and their Oil field Services provided to the operating companies to qualify & promote themselves.
- The government role is to ensure transparent and fair competition through policies and procedures.
The strategy of the Ministry of petroleum and Gas was set to intensify the exploration activities in the frontier basins as well as to look for advanced technologies for better developing of the producing fields, with simple procedures to acquire a concession or to provide a service.

Please, contact the promotion Section in the Ministry of Petroleum & Gas to start your E&P investment.
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