SPECIAL **REPORT / 2020**

Power Gas Renewables Oil Nuclear

ANGOLA

INVEST IN THE ENERGY SECTOR OF **ANGOLA**

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AFRICA ENERGY SERIES

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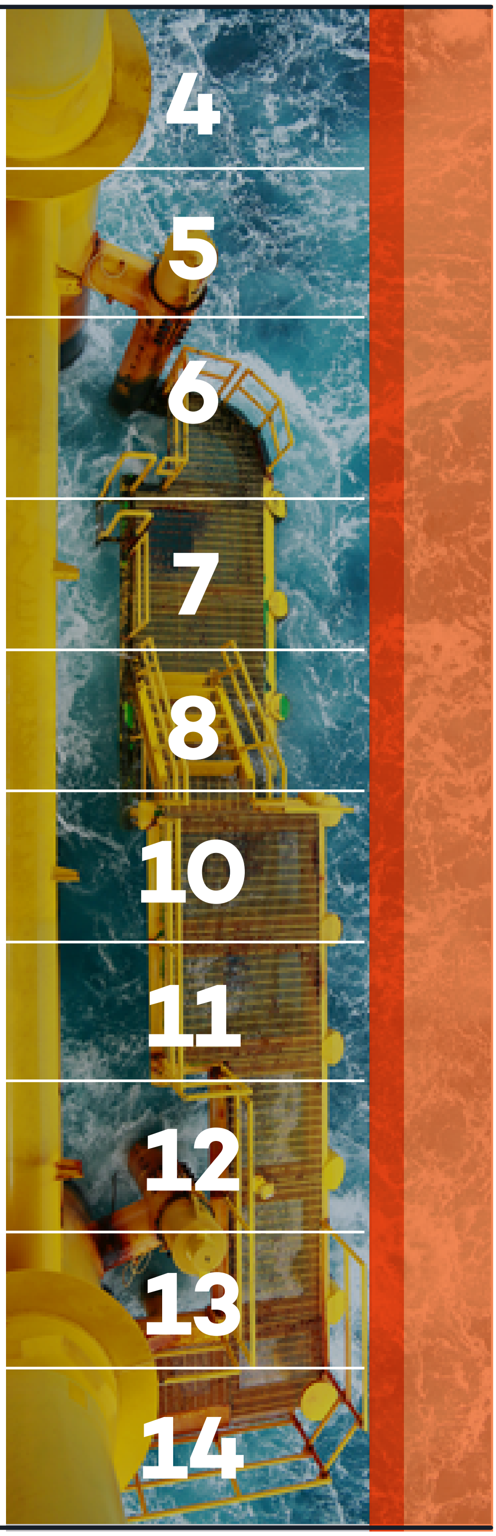


11.8%
BP

31%
CHEVRON

25.6%
ENI

11.8%
TOTAL

19.8%
SONANGOL

NEW GAS CONSORTIUM

The establishment of Angola's first upstream natural gas partnership and construction of a gas processing plant in Soyo are critical for leveraging the country's 11 trillion cubic feet of proven gas reserves.

Construction of a gas processing plant, with the capacity to process **400 million cubic feet** of natural gas per day, is set to commence at the end of the year, in the municipality of Soyo in Angola's Zaire province. The project is led by the New Gas Consortium (NGC), a consortium of companies established as a joint venture in November 2019 for the exploration and production of natural gas in Angola. **Operated by Eni in partnership with BP, Chevron, Total and Sonangol,** the consortium represents the first upstream natural gas partnership in Angola.

The construction of the plant is estimated to take two years and will occupy an area of 100 hectares in the village of Kivinca Nvemba. Initial developments will begin with a phase of public consultation, the removal of landmines in the area, project data surveys and an environmental impact study. It is estimated that at **least 3,000 jobs** will be created by the construction of the plant, **which will be reduced to 100 when the plant enters into operation.**

Once construction is completed, the Angola LNG plant will receive the bulk of the gas processed in the new facility, to be exported in liquid form to foreign markets. A portion of the gas may also be directed to the Soyo combined cycle power plant that is connected to the national grid. Angola LNG is an integrated project for the exploration of natural gas and potential development of non-associated gas, with a processing plant, a sea terminal and loading facilities. Its $12 billion gas-liquefying facility located in **Soyo is designed to process 1.1 billion cubic feet of natural gas per day and has the capacity to produce 5.2 million tons of LNG per year.** The company is comprised of same partners as the NGC and has been in operation since 2013.

What is the purpose of the NGC?

TO DEVELOP AND SUPPLY GAS TO ANGOLA'S SOYO LNG PLANT.

TO HELP MEET THE **DOMESTIC GAS NEEDS OF THE COUNTRY**.

TO SERVE AS **THE FIRST INDEPENDENT GAS FIELD** DEVELOPMENT IN ANGOLA.

From where will the gas be sourced?

INITIALLY FROM THE **QUILUMA AND MABOQUEIRO FIELDS.**

THE NGC WILL ALSO EXPLORE AND DEVELOP IN **THREE OTHER BLOCKS IN THE COUNTRY.**

What is the initial cost of investment?

$2 BILLION

What is the time to completion?

PRODUCTION ESTIMATED **TO START BY 2022.**

UPDATE: COVID-19 IN ANGOLA

The drop in global commodity prices induced by the outbreak of COVID-19 will reduce Angola's current production and likely pose challenges for alleviating its debt burdens.

Since the initial outbreak of COVID-19 in Angola in late March, sub-Saharan Africa's second largest oil producer has been fighting to contain the spread of the virus, **closing its borders from March 20 and implementing a countrywide lockdown from March 27**, in line with global health and safety restrictions.

While no projects have officially been put on pause, including the country's upcoming oil and gas licensing round, Angola's energy sector is anticipated to decelerate due to the drop in commodity prices, resulting in a reduced level of production and potential delays in final investment decisions, as projects are reevaluated against the new barrel price. **In accordance with recent production cuts issued by the Organization of Petroleum Exporting Countries, Angola's production is expected to decrease to 1.1 million barrels per day (bpd) starting in May, which serves as a reduction from the 1.3 to 1.4 million bpd that the country was producing in recent months.**

In response to current market volatility, the Angolan government has issued a state of emergency and is currently reviewing its national budget, reassessing its ambitious economic reform plan that provided for the privatization of state-owned assets and a **reduction in public debt to less than 60% of gross domestic product by 2022.** The revised budget will utilize a reference oil price of $35 per barrel maximum, as opposed to $55 per barrel utilized before the crisis. Pending final budget review, the country will also freeze 30% of its goods and services budget and suspend capital expenditures.

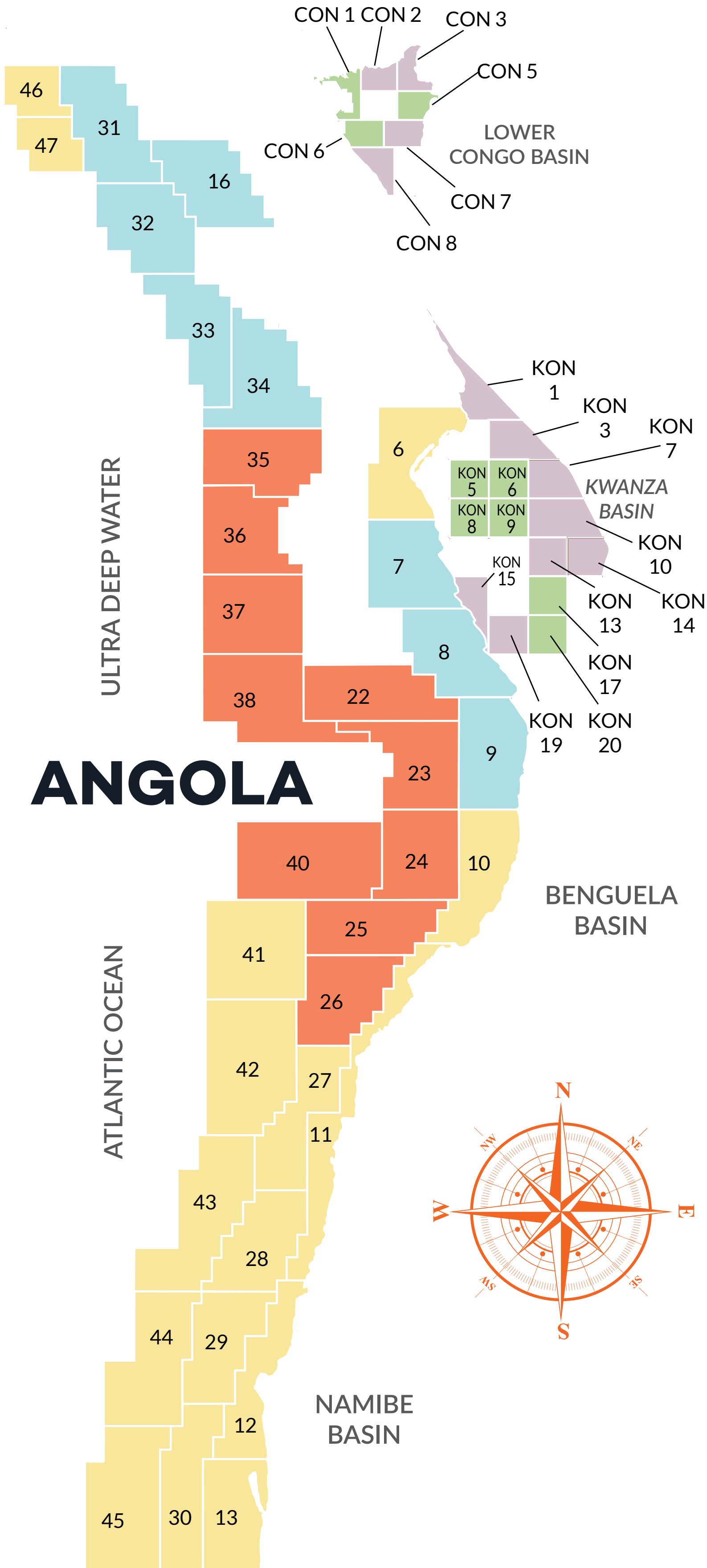
In addition to declining oil revenues, Angola is one of several African countries that carry substantial debt burdens. The country exports 60% of its oil to China, which has faced a severe drop in crude demand, causing shipments to be offloaded at a reduced price. Furthermore, **the Central African country uses oil as collateral for its $25 billion debt to China**, and in light of Moody's recent decision to place Angola on review for downgrade of its credit rating, may find cash injection and the stabilization of its reserves through borrowing to be difficult.

2019-2025 OIL & GAS LICENSING ROUND MAP

In 2020, three blocks in the Lower Congo Basin and six blocks in the Kwanza Basin will be allocated for public tender, as part of Angola's six-year licensing round strategy that extends to 2025.

KEY

Yellow	2019
Green	2020
Blue	2021
Purple	2023
Orange	2025



ENABLING BLOCK 0 EXPLORATION

Angola has launched a $60 million oil platform construction project to support exploration in Block 0.

In February, Angola launched its Lifua-A project, which targets the construction of oil platforms in the country's northern Cabinda province to support oil and gas exploration in the Takula-Block 0. **The project will be divided into three phases – Lifua A, B and C** – with the objective of developing gas and oil exploration platforms in the Takula field located in Block 0, which is currently being explored by Chevron, Eni and Sonangol. The field contains six wells, four of which are oil and gas producing. **Phase one of the project includes the installation of the first platform in the offshore Takula field,** which is due for completion in the first quarter of 2021. Lifua-A, B and C will enable the production of new platforms with smaller dimensions to facilitate water injection and oil exploration.

The Lifua project is estimated to cost approximately $60 million and create at least 400 jobs, specifically providing opportunities for the country's youth employment program.

To design and support the installation of a Sea Swift offshore platform solution for the Lifua-A field, Chevron awarded the contract to U.K.-based Aquaterra Energy. **The leader in offshore engineering solutions will manage the entire project through its in-house engineering and project management teams,** as well as utilize both Angolan fabrication and installation support.

Sea Swift is a minimum-facility offshore platform that enables high returns in shallow waters by minimizing build and implementation times and utilizing well conductors as the structural support for the topside. The conductor-supported platform, which will be installed in **60 m of water, provides a low-risk and low-cost solution** to reduced time to first oil and a lower capital investment. In addition to minimized build and implementation time, the type of platform was selected for its ability to be fabricated locally in Cabinda.

DOWNSTREAM DEVELOPMENTS

With current production meeting less than one-third of domestic oil consumption, Angola's refining capacity remains severely underserved. As a result, the country has set forth a strategy to develop its domestic refining sector and reduce its reliance upon and associated costs of imported fuel volumes, which currently make up 80 percent of its demand for refined petroleum products. Despite challenges that include prohibitively high capital investment, significant technical knowledge and environmental protection capacity, several new refineries are planned to commence operation from 2019 to 2025, as well as upgrades to existing infrastructure.

Luanda Refinery

Ownership: Sonangol (100 percent)

Capacity: **65,000 b/d**

As the only operating refinery in the country, the Luanda refinery meets only 20% of the market's needs. **In January 2019, Sonangol and Italian multinational Eni signed a $220 million** joint cooperation agreement to increase production to 1,200 tons by the end of 2021. **The first stage of the agreement includes maintenance and operational improvements,** while the second stage is the construction of an additional gasoline production unit, which would reduce the gasoline deficit in the market by 20%. In June 2019, **Eni awarded the $200 million Engineering, Procurement and Construction** contract for the construction of two refining process units to Kinetics Technology.

Cabinda Refinery

Ownership: Sonangol (100 percent)

Capacity: **60,000 b/d**

International tender for the Cabinda refinery began in 2017. While Sonangol awarded the contract to the United Shine consortium in June 2019, the contract was canceled due to the failure of the consortium to submit additional technical, commercial and financial studies to support the project's completion. **In January, Sonangol signed a partnership with Gemcorp for the construction of the refinery,** which will be divided into three phases, with the first phase due for completion in 2021. Phase one and two will produce **30,000 bpd respectively,** while phase three will aim to improve production specifications on gasoline, diesel, Jet A1, PLG, kerosene and fuel oil.

Lobito Refinery

Ownership: Unknown

Capacity: **200,000 b/d**

Work on the Lobito refinery initially began in 2012 with an estimated budget of $10 billion, but was put on pause in 2016 for the re-evaluation of its cost and viability.

Sonaref, a subsidiary of Sonangol, is currently in negotiations with a group of companies to establish a joint venture to operate the refinery, which is expected to be completed by the end of 2025.

Soyo Refinery

Ownership: Unknown

Capacity: **100,000 b/d**

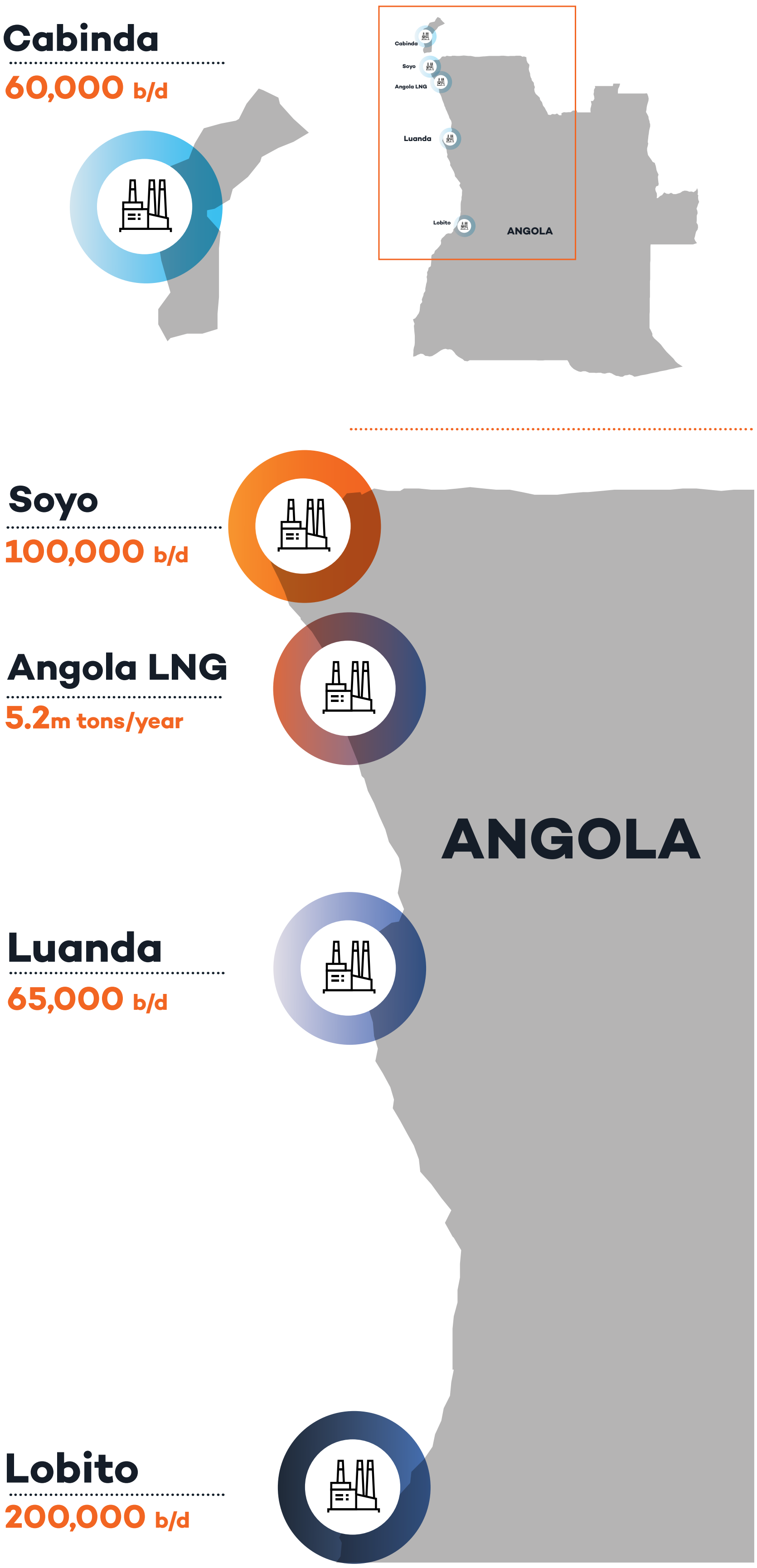
In February, the Ministry of Mineral Resources and Petroleum selected nine of the 31 proposals presented to the international public tender for the construction of the Soyo refinery: SRDC, Jiangsu Sinochem Construction, Quantem Consortium, CMEC, AIDA and VSF, Tobaka Investment Group, Atis Nebest - Angola, Satarem, Gemcorp Capital and CPP. **The nine proposals stipulate execution periods ranging from 16 to 40 months.** The announcement of the selected candidate for the refinery's construction has been postponed until the resolution of the COVID-19 outbreak.

Angola LNG Plant

Ownership: **Cabinda Gulf Oil Company (36.4%), Sonangol (22.8%), BP (13.6%), Eni (13.6%) and Total (13.6%)**

Capacity: **5.2 million tons/year**

Operating since 2013, the plant is a single train facility that produces liquified natural gas (LNG), propane, butane and condensate. The plant is supplied via a network of pipelines from offshore gas fields on blocks 14, 15, 17 and 18, and from non-associated gas fields Quiluma, Atum, Polvo and Enguia. Plant infrastructure includes LNG storage tanks and LNG loading jetty able to accommodate vessels up to 315m in length.



POWER PROJECTS IN-PROGRESS

The construction of several key natural gas and hydropower plants is currently underway, helping to meet the rising energy demand of Angola's growing and increasingly industrialized population.

In the past decade, energy consumption in Angola has skyrocketed, with **an annual growth rate of more than 15% due to higher living standards**, government efforts to expand electricity coverage and an increase in available generation capacity. Consumption remains most concentrated in the northern region, which contains the province and city of Luanda and the highest density of industries, services and inhabitants. Until 2025, demand is expected to grow at a substantial clip, with the overall **system load reaching 7,200 MW** – more than four times the current level – and **average consumption per capita is expected to grow to 1,230-kilowatt hours.** As a result, the government of Angola has launched the Angola Energy 2025 Vision that aligns with the National Development Plan 2018-2022 and centers on creating increased capacity and distribution capabilities, supported by private sector investment into several bankable projects.

Soyo I Combined-cycle Gas Power Plant

In the northern region, two 360 MW will be installed in addition to the 720 MW currently under construction at the Soyo I combined-cycle gas power plant, financed by the Chinese government and built by the China Machinery Engineering Corporation. The units will be able to operate in dual-fuel mode, meaning that liquified natural gas, butane or diesel can all be fed into the units to maximize production. Enacted in May 2018, **Presidential Decree 7/18 regulates the natural gas exploration, production, monetization and commercialization** and is set to encourage private investment in natural gas production that can supply the expanded Soyo facility.

Caculo Cabaça Hydroelectric Project

Phased construction of the Caculo Cabaça hydroelectric project began in August 2017 and is currently underway to build the tunnel for the diversion of the river in Caculo Cabaça, located in the province of Kwanza Norte. **The first turbine of a total four of the hydroelectric facility is expected to produce 1,000 MW by 2024.** With a total capacity of 2,170 MW, Caculo Cabaça will represent the largest hydroelectric facility in the country and the fourth project of its kind to be built along the middle Kwanza, following the Capanda and Laúca (Malanje) and Cambambe (Kwanza Norte) dams. Negotiations are currently in process to secure financing for the dam's electro-mechanical equipment, to be supplied by German manufacturers.

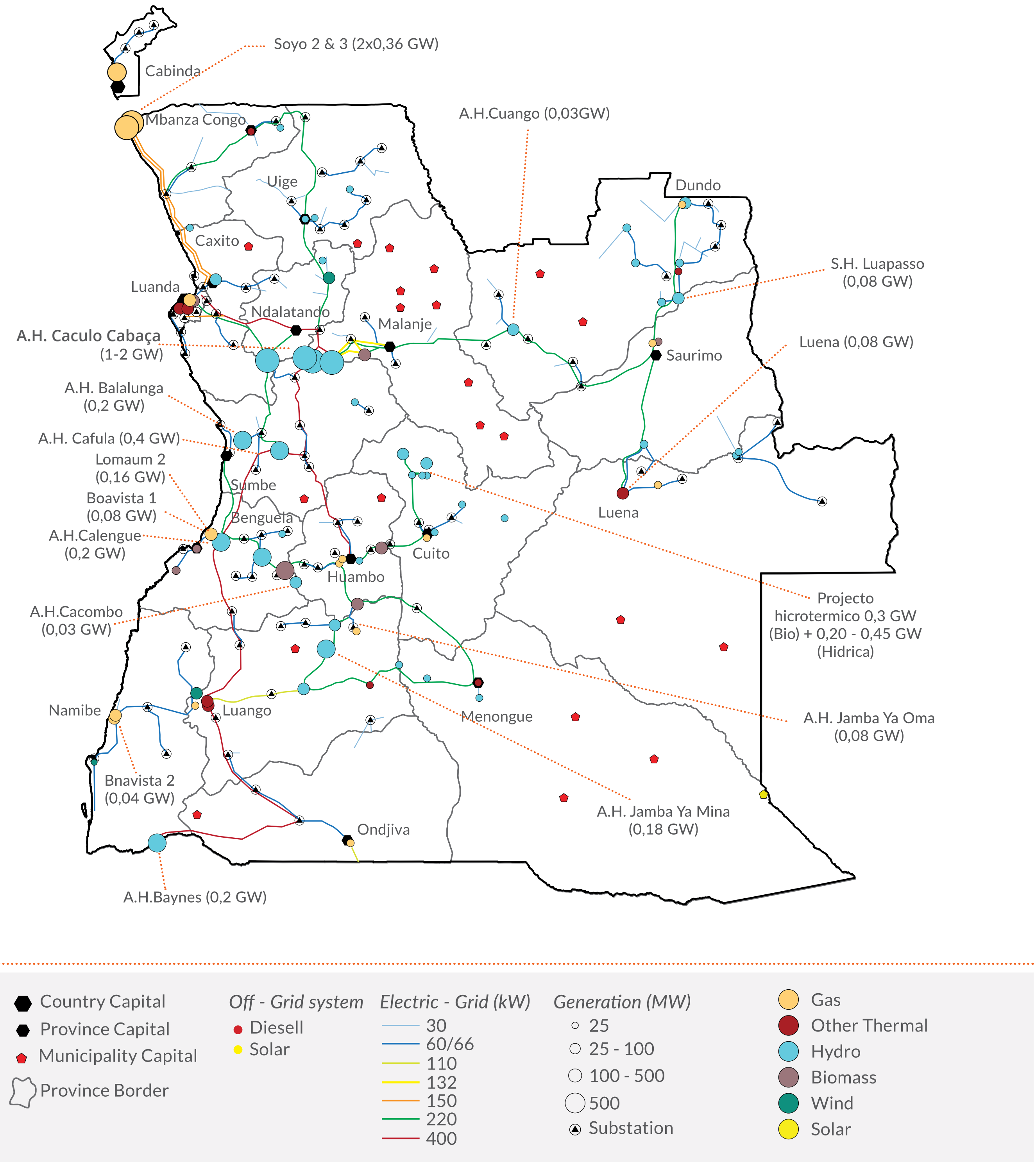
Laúca Hydroelectric Plant

The fifth turbine of the six planned at the Laúca dam went into commercial operation in July 2019, **increasing the plant's capacity to 1,670 megawatts.** With the remaining turbine planned to enter into operation in the first half of the year, the plant represents the largest civil engineering project in the country and the second-largest dam in Africa, with a **total capacity of 2,070 MW**. In conjunction with the hydropower plants of the Middle Kwanza (Cambambe and Capanda), the Mabubas and Lomaum hydroelectric plants, the Soyo combined cycle power plant and other thermal power plants, the Laúca hydroelectric plant has enabled the interconnection of 10 provinces throughout the country. Additionally, the increase in water capacity in the region is anticipated to aid in the expansion of the national electrical grid to southern Angola.

Baynes Hydropower Plant

Located on the Cunene River on the border between Angola and Namibia, the Baynes Hydropower project is estimated to produce between 400 and 600 MW upon completion. In March 2020, the Ministry of Energy and Water announced that bilateral agreements had been signed for the construction of the cross-border project, to begin in 2021. **The dam carries an estimated investment cost of $1.2 billion and a completion date scheduled for 2025**. The agreement will enable the launch of a public tender for the selection of a construction firm for the project, in line with the proposed timeline. Of the 600 MW to be produced by the plant, 300 MW will be directed to Angola and Namibia, respectively. The terms of this agreement were approved by the governments of both countries in November 2014, within the framework of a feasibility study completed in 2013.

PLANNED SOURCES OF POWER



DRIVING FRONTIER EXPLORATION

Nine on- and offshore blocks will be allocated for public tender in this year's licensing round, as Angola welcomes explorers to bid on competitive acreage.

In a bid to incentivize investment into frontier exploration, the National Agency of Petroleum, Gas and Biofuels (ANPG) is launching its second oil and gas licensing round as part of its six-year licensing strategy that began in 2019. This year, three blocks in the Lower Congo Basin and six blocks in the Kwanza Basin will be allocated for public tender. The majority of the blocks were previously offered in 2014, however, no licenses were awarded due to unfavorable fiscal terms and lack of exploration and production capacity from the companies that proposed bids. In 2021, eight blocks in the offshore shelf and deepwater Lower Congo Basin will be allocated for concessions via Public Tender and/or Limited Public Tender. Onshore acreage will be made available through Public Tender in 2023, including four blocks in the Congo Basin and eight blocks in the Kwanza Basin. Another Limited Public Tender will take place in 2025, with 10 pre-salt blocks offered in the deepwater Kwanza Basin, which has been shown to hold considerable quantities of gas.

In 2019, Angola launched its first oil and gas bidding round in eight years, listing nine blocks in the frontier Namibe Basin and one block in the Benguela Basin for public bidding, while 15 blocks were opened for direct negotiation. In December last year, the ANPG awarded Total with Blocks 20/11 and 21/09 in the Central and South-Central Kwanza Basin, in water depths ranging from 300 - 1,800 meters. Drilling to date in the two blocks has led to the Bicura, Cameia, Golfinho and Mavinga discoveries, and Total and its partners are continuing to unlock the full value of these prospects through the creation of a development hub. The national concessionaire also awarded Eni with operatorship of frontier Block 28, at water depth ranging from 1,000 - 2,500 meters and located in the unexplored Namibe Basin.

Terms and Conditions

Under the terms of the Presidential Decree 52/19, petroleum concessions are to be awarded through three mechanisms: public bidding, limited public bidding and direct negotiation. Public tender is derived from Presidential Decree 86/18 passed in April 2018, under which Sonangol is entitled to a 20% stake in research operations, in the case that it is not the operator of the block. Limited public bidding restricts bidding to a number of previously selected companies and applies to blocks and contract areas that have been returned to the State. Eligible bidders are selected from companies that have demonstrated knowledge, expertise and technical and technological competence operating in Angola. Under direct negotiation, successful companies must enter into a service-at-risk contract, meaning that the company bears all exploration costs, and in return, recovers costs through the sale of the oil or gas if exploration proves successful. These companies must also demonstrate relevant proven experience, expertise, technical and technological capabilities operating in Angola or other oil provinces.

Marginal Field Focus

The six-year concessions strategy serves to drive investment in frontier exploration and halt declining reserves by bringing in a new wave of explorers that will bring discoveries into production. Starting in 2025, exploration opportunities are expected to represent over 50% of Angola's production.

Angola's upcoming licensing rounds include a focus on the development of marginal fields, which refers to oil fields that do not produce enough net income to qualify as a commercial field experiencing a change in technical or market conditions. The development of marginal resources - estimated to contain approximately four million barrels - is a key element of the ANPG's efforts to boost production of existing resources, along with unifying development areas to maximize resource conversion in reserves, improving secondary recovery systems and developing additional resources in mature fields. For blocks in the research phase of development, the ANPG is focusing on renewing operating licenses to maximize geological potential and refining basin studies to intensify exploration activity both onshore and offshore. Through marginal field development, Angola aims to attract a greater diversity of exploration and production players that can operate smaller onshore and shallow water resource plays, including Angolan, African and international independents.

AGOGO COMES ONLINE

Currently producing 15,000 barrels per day, Eni's Agogo discovery has been estimated to hold up to one billion barrels of recoverable resources.

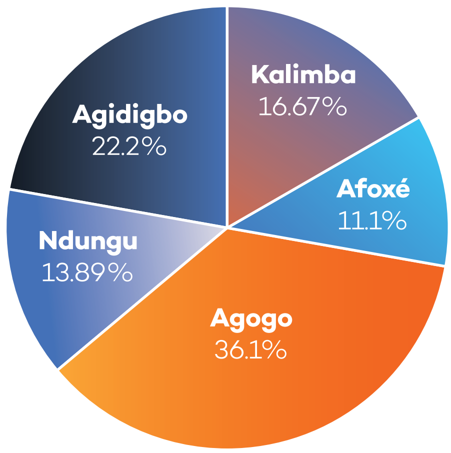
Following the successful drilling of the Agogo-3 well in February 2020, Eni has estimated its Agogo discovery to contain up to one billion barrels of oil, an 150% increase from its previous forecast of 650 million barrels of oil, with further upside to be tested in the northern section of the field with the drilling of new delineation wells.

Production at the Agogo oilfield began in January 2020, just nine months after its discovery, and currently stands at15,000 barrels per day. The record-setting time for the field to become operational can be attributed in part to the development of the Agogo field as a subsea tieback to the Floating Production Storage Offloading (FPSO) N'Goma, West Hub production center, located 15km from the oilfield. In the development of its discoveries, Eni has pursued a fast-tracked and phased model based on operational synergies utilized among existing infrastructure. Phased field setup includes an early production stage and the development of the full potential of the discovery through the creation of a development hub, following the completion of the appraisal campaign.

Between 2018-2019, Eni made five discoveries in Angola's deep offshore Block 15/06, inculding Kalimba (230-300 million barrels), Afoxé (170-200 million barrels), Agogo (one billion barrels), Ndungu (250 million barrels) and Agidigbo (300-400 million barrels). Block 15/06 represents the company's primary asset with the West Hub and East Hub projects, in which Eni has began operation at eight fields over four years and drilled 42 underwater wells. Eni accounts for an equity production of approximately 140,000 bpd in Angola, concentrating primarily in conventional and deep offshore. In addition to Block 15/06, Eni currently operates Block Cabinda Norte located onshore, and will increase its operated areas through Blocks 1/14 (offshore Lower Congo Basin), Cabinda Centro (onshore) and the recently awarded Block 28 (offshore Namibe Basin).

> *Our fast-tracked and phased development model is the key to bringing these discoveries on stream in a short time, thus enhancing the economic value of the initiative.*
>
> *The five discoveries together are estimated to contain up to 1.8 billion barrels of light oil in place with possible upside, and they further confirm the exploration potential of the block and the effectiveness of Eni's exploration skills and proprietary technologies.*
>
> ***Andrea Giaccardo, Managing Director,***
>
> ***Eni Angola***

Total Recoverable Resources, By Recent Discovery



Discovery	Agogo-1
Location	Block 15/06
Water Depth	1,700 m
Operator	Eni
Year Online	2020
Current production	15,000 BPD
Potential recoverable resources estimated	1 billion barrels

LEVERAGING EXISTING ASSETS

While attracting new entrants to the market remains a priority, several IOCs operating in Angola are doubling down on in-country investments through drilling campaigns and extensions of existing block licenses.

After a steady decline in crude oil production due to maturing fields, one of OPEC's largest African producers, Angola, is set to see a rise in production. **In February 2020, Angola recorded a production level of 1.39 million barrels per day (bpd), up 15.000 bpd from January 2020.** The current rise in production is expected to continue due in part to upcoming drilling campaigns and the leveraging of existing licenses. In an effort to yield new discoveries, Maersk Drilling was awarded contracts for a three-well exploration campaign by Total E&P. The project includes two wells offshore Angola in Block 32 and Block 48 and one well offshore Namibia and boasts the deepest water depth ever drilled offshore. The campaign carries an estimated duration of 240 days and includes two additional one-well options, demonstrating a commitment by explorers to tap into existing acreage and bring new discoveries into production.

In order to enable multi-well drilling campaigns, International Oil Companies are doubling down on investment in existing blocks through the extension of production-sharing agreements. Since the middle of 2019, several majors have extended existing block production licenses, reflecting a push to ramp up production. In addition to increasing its stake in a number of blocks through national oil company, Sonangol, the government of Angola has sought to create a regulatory environment that is increasingly conducive to exploration by making amendments to production-sharing terms and agreements.

Block 14

In February 2020, the Angolan National Agency for Petroleum, Gas and Biofuels (ANPG) signed a Memorandum of Understanding (MoU) with the consortium that owns and operates Block 14 to extend its exploration period until 2028. The consortium is comprised of Chevron (31%), Sonangol (20%), Eni (20%), Total Angola (20%) and Galp Energia (9%). The MoU amended the terms of the agreement by targeting an increase in crude production that will enable up to 65% of cost recovery in new exploration areas from April 1. Block 14 currently produces approximately 160,000 bpd of medium-light crude oil. The agreement also provided for the readjustment of the profit-sharing contract to an 80/20 proportion, and includes the drilling of an exploration well and six development wells. Cost recovery will increase to 72.5% following the drilling of the wells, and profit-sharing will shift to a 90/10 split. The agreement is directed at the areas of Tombwa-Lândana, Benguela, Belize, Lobito, Tomboco and Kui¬to, which will be merged into a new collective marketed area, known as Tombwa-Lândana, which will serve as a new focus of exploration for operators.

Block 17

In December 2019, Total signed an agreement with the ANPG to extend its license in Block 17 until 2045. The French supermajor, which carries a 35% interest, operates the block in partnership with Equinor (23.33%), ExxonMobil (20%), BP (16.67%). Under the extension contract, Sonangol acquires a 5% stake in the block and will acquire another 5% in 2036. Block 17 is the site of the Girassol field, the largest oil discovery ever to be made in Angola, and holds estimated reserves of 2.9 billion barrels, with a record of 17 discoveries made in 20 wells drilled. According to Sonangol, only 1,611 km2 of the block's acreage has been surveyed, which results in 67% of the acreage left unexplored. Three short-cycle brownfield projects are currently under development in Block 17, with the aim of adding 150 million barrels to its total production and 100,000 barrels to its daily production. Additional exploration campaigns are planned to unlock further resources, with two wells planned for drilling in 2020. Block 17 remains an integral player in Total's plans to boost its Angola production by 2023.

Block 15

In June 2019, the ExxonMobil-led consortium operating Block 15 signed a production-sharing agreement that extends block operations through 2032. In addition, the consortium approved a multi-year drilling program that will add 40,000 barrels to the block's current production and will be completed ExxonMobil as the operator. The project is expected to generate approximately 1,000 local jobs. New infrastructure technology will be deployed in the block, designed to increase the capacity of the existing subsea flow lines and increase output. Additional changes to the production sharing agreement include changes in ownership. Under the agreement, ExxonMobil carries a 36% stake and operates the block in partnership with BP (24%), ENI (18%) and Equinor (12%). As part of the agreement, Sonangol will receive a 10% equity interest in the block. ExxonMobil also holds stakes in three deepwater blocks covering nearly two million acres in Angola, which hold substantial development opportunities and a gross recoverable resource potential of approximately 10 billion barrels of oil equivalent. Block 15 has produced more than 2.2 billion barrels of oil since 2003.

ANGOLA OIL&GAS

Centro de Convenções de Talatona

Theme: A new Era for Growth and Prosperity in Angola

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Luanda Angola

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