



# Namibia: Africa's next oil and gas frontier awaits

Featuring ReconAfrica



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## Executive summary

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Namibia is a relatively new, sparsely populated nation located in the south-western part of the African continent, known as the “land between two deserts”. The country has had high hopes of finding hydrocarbons within its boundaries, as it is situated between two oil and gas-rich nations and on trend with other significant oil and gas producers. Revenue from hydrocarbon development could improve the country’s balance sheet, create much-needed employment, support economic activity, significantly improve living standards of Namibian people, and help diversify the fragile economy. Its own oil and gas resources would also set Namibia on a path towards achieving energy independence, which is the focal point of the country’s Vision 2030.

Namibia is a stable democracy, with a strong rule of law, good institutional structure and an attractive fiscal regime, making it one of the easiest places in Africa to do business and an attractive environment for foreign capital. The legislative framework governing the oil and gas industry is modern and well developed. It has been specially established to promote hydrocarbon exploration and development in the country. Accordingly, government take is low early on, when risks for exploration companies are high, and it increases over time as companies recover their investment and begin to generate positive net cash flow. Key elements of the fiscal regime include a 5% royalty; a 35% Corporate Income Tax; and a progressive Additional Profits Tax (APT), levied in tiers once after-tax rate of return levels are achieved. Under US\$60/bbl oil, government take is estimated to range from ~40% to ~63%<sup>1</sup>, depending on the share of profits being reinvested and the extent to which the APT applies. Overall, Namibia’s petroleum fiscal regime compares favorably to the top producing nations in Africa and to other regimes globally.

In addition, the country has promising geology that is similar tectono-stratigraphically to prolific hydrocarbon regions on both sides of the Atlantic, including the Santos and the Campos basins in Brazil, the Kwanza basin in Angola, the Congo basin to the north, the Colorado basin in Argentina and the South Pelotas basin in Uruguay. A total of 111 giant oil and gas fields with recoverable reserves of nearly 260 billion barrels have been discovered along the South Atlantic margins<sup>2</sup>; except, so far, in Namibia.

Only 26 exploration and appraisal wells have been drilled offshore Namibia and a mere 12 wells onshore, implying negligible drilling density and hardly testing the country’s hydrocarbon potential. No commercial discoveries have been made to date; however, three petroleum systems and a diversity of plays have been identified in the offshore, with the majority of working plays being in the post-rift sequence. More drilling and seismic are required in order to better understand the country’s hydrocarbon potential.

In the meantime, supermajors, state oil companies, as well as independent exploration and production companies of all sizes have established positions in the region, intrigued by its potential. Most notably, in 2019, ExxonMobil added ~7 million net acres to its offshore position, increasing its holdings to nearly 10 million gross acres. The same year, Qatar Petroleum entered the country as part of its global joint venture with Total, who has been operating in Namibia since 1964. In early 2021, Qatar Petroleum also entered into a partnership with Shell, increasing its interest offshore Namibia to ~7 million gross acres. In total, more than

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<sup>1</sup> Source: “Kavango Basin Review & Global Benchmarking”, Wood Mackenzie, November 2020.

<sup>2</sup> Source: “Basin Evolution, Configuration Styles, and Hydrocarbon Accumulation of the South Atlantic Conjugate Margins”, Z. Wen et al., 2019.



20 operators are currently active in Namibia and over 50 petroleum exploration licenses have been awarded by the Ministry of Mines and Energy to date<sup>3</sup>.

Activity is expected to pick up later in 2021 and in 2022, with up to five wells being contemplated in the offshore. Total's much-anticipated Venus-1 exploration well, testing a multi-billion-barrel prospect in ultra-deep water, is one of them; it is tentatively scheduled to spud in the third quarter of this year. In addition, three stratigraphic wells are being drilled onshore this year, all by ReconAfrica, who believes to have discovered a new, deep rift basin. Success of any of these wells could attract additional interest to the unexplored and full of possibilities region.

There are many ways to participate in Namibia's potential exploration success. A number of supermajors, including ExxonMobil, Shell and Total are active in the area; their stocks may offer some exposure to Namibia, albeit on a diminished basis, as the country represents only a small part of these companies' global portfolios. Oilfield service companies that will be supporting drilling activities may also offer exposure to Namibia. Finally, a number of smaller, publicly traded and private companies, with a focus on Namibian exploration, are also present in the region. These companies include Africa Energy, Azinam, Chariot Oil & Gas, Eco Atlantic, Impact Oil, Maurel & Prom, Pancontinental Oil & Gas, ReconAfrica, Tower Resources, Tullow Oil and others. Companies with concentrated operations often carry higher risks, but also offer potentially higher returns. Drilling results could provide substantial potential catalysts for these names. Impact Oil, for example, has a 20% working interest in the offshore license containing the Venus prospect, expected to be tested later this year. ReconAfrica's 2021 work program includes the drilling of three stratigraphic wells in the onshore and acquiring 2D seismic data, with results anticipated over the course of the year.

Investing in Namibia, however, is not without risk. Frontier exploration is inherently highly risky. There are no guarantees that a discovery may be made. Sizable discoveries would be required to justify development, particularly in the remote offshore. Gas resources may be stranded due to limited local demand; oil would likely be commercialized first. Services and materials may need to be brought in from outside Namibia, which could take longer and cost more, until supply chain is developed in the country. The size of the potential prize, however, is likely to continue attracting oil and gas companies to the region.

In the second half of this report, we include a feature on Reconnaissance Energy Africa Ltd., who is one of the most active operators in the country and the one likely to generate exploration news in the near term. ReconAfrica is a small oil and gas exploration company with a potential mega-opportunity. ReconAfrica's team believes to have discovered a new, deep rift sedimentary basin in the largely unexplored areas of north-eastern Namibia and north-western Botswana. The team has secured petroleum licenses covering the entire basin and is well funded. Three stratigraphic wells are currently being drilled, looking for evidence of an active petroleum system across the basin and potentially assessing oil and gas-prone conventional targets. Preliminary results of the first well are promising, pointing to a working conventional petroleum system. Permian source rocks encountered in a nearby vintage well are of particular interest to the team, as they have generated prolific petroleum systems worldwide, including in the US Midland basin. These source rocks have provided about 8% of the world's discovered original reserves of oil and gas<sup>4</sup>, and are believed to be present in ReconAfrica's Kavango basin.

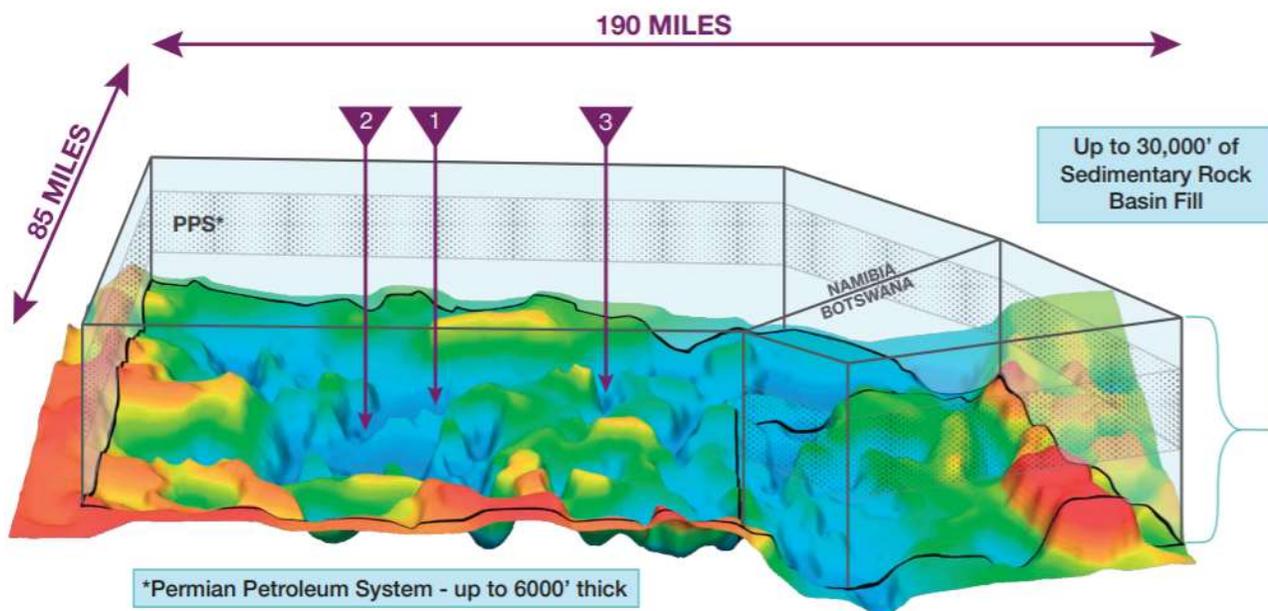
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<sup>3</sup> Sources: James A. Deckelman, 2021; Ministry of Mines and Energy of Namibia.

<sup>4</sup> Source: "Depositional Controls, Distribution, and Effectiveness of World's Petroleum Source Rocks", G.F. Ulmishek et al., 1991.

Based on available high-spatial-resolution aeromagnetic data, the company's highly experienced technical team estimates the basin to be about 190 by 85 miles in size and up to 30,000 feet deep, meaning that it could contain up to 30,000 feet (9,100 meters) of sedimentary fill (see Figure 1). The company completed structural and geological interpretations of magnetic inversion profiles, backfilling the basin with stratigraphic sections of Precambrian, Permian and Cretaceous sediments. The Permian-age petroleum system, which was encountered in an earlier well in the nearby Owambo sedimentary basin, was projected to be up to 6,000 feet thick (1,800 meters) at Kavango. Preliminary analysis indicates basin depths supportive of oil and gas thermal maturation levels, with expected oil proneness, which was evidenced by the first well. ReconAfrica believes the Permian petroleum system within the new Kavango basin is contiguous with South Africa's Karoo basin, containing Shell's 370-tcf Whitehill Permian resource play. In a recent study, Wood Mackenzie identified three world-class basins of similar age and tectonic origin thought to be analogous to the Kavango basin: the Midland Permian basin in the US; the Southern North Sea basin in the Netherlands and the UK; and the Doba basin in Chad, Africa.

Figure 1: Deep Kavango rift basin definition



Sources: Earthfield Technology, ReconAfrica.

Geochemical analysis, based on reasonably predicted source rock properties and various thicknesses, indicates that the Permian petroleum system within the Kavango basin has potential to have generated 66-120 billion boe of hydrocarbons within 1,641 sections of land alone, which represent about 12% of ReconAfrica's total acreage. Using a hypothetical scenario under a number of conservative assumptions detailed in the second half of this report, these 1,641 sections could contain ~1.9 billion boe of conventional technically recoverable resources. Assuming US\$60/bbl Brent oil price, we estimate a development this size could translate into a NAV of C\$24.46 per ReconAfrica share, implying significant potential upside to the stock's current trading levels. A ~3.8 billion-barrel recoverable resource could be worth C\$30.57 per share (see Figure 2). If the company is able to reduce dilution by finding alternate sources of funding instead of issuing new equity to finance its share of capital spending, the upside to the NAV per share could be even greater.

As a result of our analysis, we believe the stock carries high risk, but may also generate high potential return. The near-term potential catalysts that will drive ReconAfrica's share price performance include results of the three stratigraphic test wells, as well as of the seismic survey planned for later this year. Should these results be disappointing, the downside to the stock could be substantial and the company may cease to exist; hence, a going-concern statement is included in all of its disclosures. Using Monte Carlo simulation, we estimate that there is a ~3.3% probability of this outcome. Other investment risks include significant funding requirements, limited stock liquidity and first-mover risks.

Should the team, however, be successful in proving an economically viable, large resource base within the Kavango basin, the stock could be worth multiples of its current valuation.

**Figure 2: ReconAfrica's YE2021 NAV10 after-tax sensitivity to changes in oil prices and the size of the recoverable resource (in C\$ per diluted share)**

| NAV10 A/T per Dil. Share<br>(C\$) |               | Brent Oil Price (US\$/bbl) |                |         |         |
|-----------------------------------|---------------|----------------------------|----------------|---------|---------|
|                                   |               | \$50                       | \$60           | \$70    | \$80    |
| Recoverable<br>Resource (bbl)     | 250,000,000   | \$3.43                     | \$6.67         | \$9.86  | \$13.03 |
|                                   | 500,000,000   | \$5.37                     | \$10.60        | \$15.86 | \$20.97 |
|                                   | 1,000,000,000 | \$8.11                     | \$16.82        | \$25.51 | \$34.18 |
|                                   | 1,910,055,472 | \$11.43                    | <b>\$24.46</b> | \$38.47 | \$53.20 |
|                                   | 3,820,110,944 | \$14.68                    | <b>\$30.57</b> | \$49.56 | \$70.05 |

Source: Quester Advisors.

A commercial development, the first in Namibia, could also have a meaningful impact on the country and its people. Assuming US\$60/bbl Brent, a potential ~1.9 billion-barrel resource development that may ultimately be targeted by ReconAfrica and partner NAMCOR could generate ~US\$18 billion in government revenue<sup>5</sup> over its ~30-year life, which represents ~150% of the country's ~US\$12 billion GDP projected for 2021<sup>6</sup>. Once the project ramps up to full capacity and the up-front infrastructure investment is completed, it could generate more than US\$600 million per year in state revenue<sup>7</sup>. Over its life, revenue from the project could help eliminate the ~US\$6.7-billion public-sector debt the country has outstanding<sup>8</sup>. ReconAfrica's project alone could eliminate the need for Namibia to import oil and oil products, supporting the country on its path to energy independence, as well as generate significant exports, strengthening the nation's balance sheet.

In the Kavango region, the company's development could create the urgently needed employment for many years to come, as well as help develop infrastructure and services for the benefit of local communities. Finally, ReconAfrica's success could attract more interest to the region, which could bring additional investment and generate further benefits.

Any significant discovery, onshore or offshore, could be transformational for Namibia and its people.

Africa's next oil and gas frontier awaits.

<sup>5</sup> Including estimated royalties and taxes to be paid by ReconAfrica and net cash flow generated by NAMCOR, undiscounted.

<sup>6</sup> Source: IHS Markit.

<sup>7</sup> Project assumptions are detailed in the second half of this report.

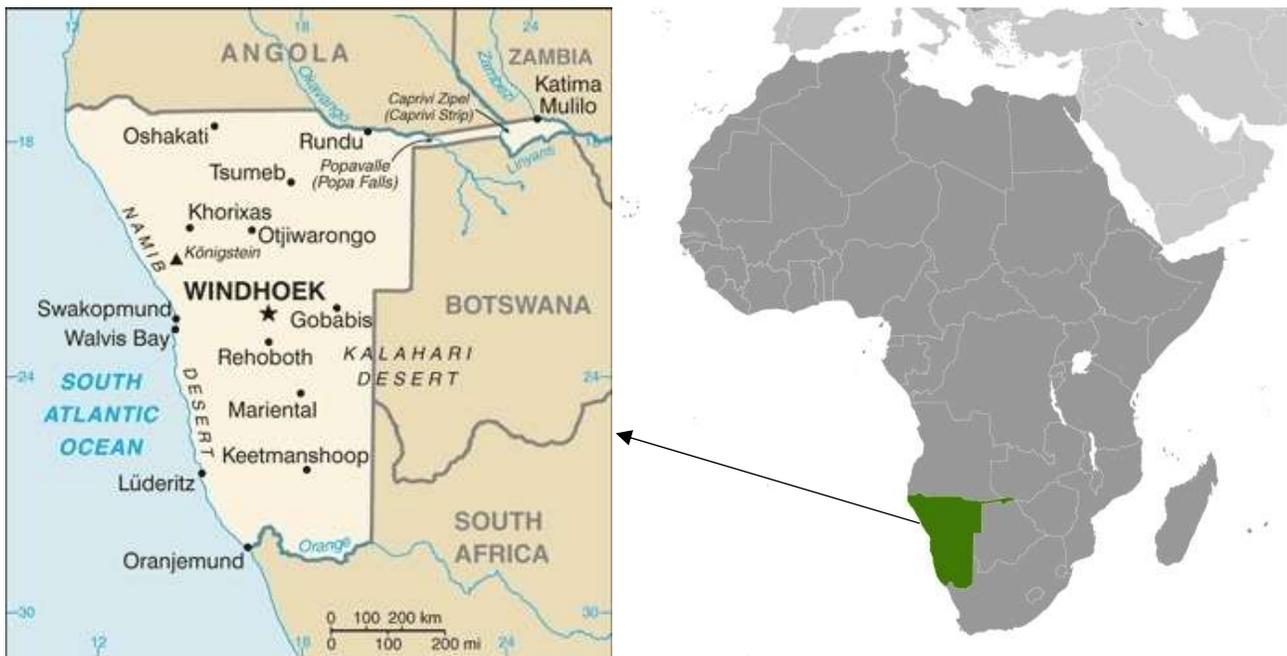
<sup>8</sup> Source: IHS Markit.

## Namibia: Africa's next oil and gas frontier awaits

### One of Africa's newest countries

The Republic of Namibia is a fairly new country on the African continent, having obtained independence from South Africa in 1990. The country is bordered by the Atlantic Ocean to the west, Angola and Zambia to the north, Botswana to the east and South Africa to the south (see Figure 3).

Figure 3: Map of Namibia



Source: CIA.gov.

Various ethnic hunter-gatherer groups have inhabited Namibia since the early days. In 1878, the British annexed the port of Walvis Bay and the Penguin Islands to what later became the Union of South Africa, a self-governing dominion of the British Empire and the historical predecessor to the present-day Republic of South Africa. A few years later, the German Empire established its rule over much of Namibia's mainland. It developed farming and infrastructure in the country, but left behind a bloody history. After the end of World War I, South Africa took over administration of the colony, as mandated by the League of Nations. Decades of racial classification and rules followed, until uprisings and demands for political representation by Namibian people finally led to South Africa ceding control of the territory in the late 20<sup>th</sup> century<sup>9</sup>.

Popularly known as the "land between two deserts", Namibia is the driest country in Sub-Saharan Africa and is sparsely populated (see Figure 4 and Figure 5). The large, arid Namib desert, after which the country takes its name, spans its Atlantic coast, while the Kalahari desert occupies the eastern part of the country.

<sup>9</sup> Sources: The CIA World Factbook, Wikipedia.



## Fragile economy and the need of foreign investment

The country's economy is heavily dependent on the extraction and processing of minerals for export, including diamonds, uranium ore, zinc, copper and gold. Mining accounts for approximately 12.5% of GDP, but provides more than 50% of foreign exchange earnings, which are used to purchase food items, fuel and petroleum products, construction materials, industrial equipment and pharmaceutical products. On an average year, the country imports about half of its cereal requirements; when there is drought, which has been the case over the last few years, food shortages become problematic in rural areas<sup>14</sup>.

In the third quarter of 2020, the country recorded a Current Account deficit of NAD479 million (~US\$33 million)<sup>15</sup>. In the last three years, there have only been two quarters when Namibia had a Current Account surplus<sup>16</sup>, a trend that is expected to persist at least in the near to mid-term<sup>17</sup>. Meanwhile, the country's external debt has been on the rise. Namibia's budget deficit is forecasted to widen to 12.5% of GDP in fiscal year 2020/2021, with the public-sector debt expected to reach NAD117.5 billion (~US\$6.7 billion), representing ~68.7% of GDP. Meanwhile, government revenue is projected to come in at NAD51.4 billion (~US\$2.9 billion), equivalent to ~30% of GDP<sup>18</sup>. These negative trends may be offset by a stronger growth outlook for South Africa and the region, the appreciating rand to which the Namibian dollar is pegged, low interest rates, stronger commodity prices, as well as an improvement in foreign investor interest towards emerging markets.

**Figure 6: Namibia's key economic indicators and forecasts**

| Key indicators                               | Units         | Historical | 2019    | 2020    | 2021    | 2022    | 2023    | 2024    | 2025    |
|--|---------------|------------|---------|---------|---------|---------|---------|---------|---------|
|  |               | data edge  |         |         |         |         |         |         |         |
| GDP  | US\$ billions | 2019       | \$12.5  | \$10.5  | \$12.0  | \$12.2  | \$12.5  | n/a     | n/a     |
| Net exports                                  | US\$ billions | 2019       | -\$1.5  | -\$1.7  | -\$1.6  | -\$1.7  | -\$1.8  | n/a     | n/a     |
| Exports of goods & nonfactor services growth | US\$ billions | 2019       | \$4.4   | \$3.0   | \$3.4   | \$3.4   | \$3.5   | n/a     | n/a     |
| Imports of goods & nonfactor services growth | US\$ billions | 2019       | \$5.9   | \$4.7   | \$5.0   | \$5.2   | \$5.3   | n/a     | n/a     |
| Real GDP growth                              | % change      | 2019       | -1.6%   | -7.5%   | 2.7%    | 2.0%    | 3.0%    | 3.0%    | 3.5%    |
| Domestic demand growth                       | % change      | 2019       | 0.5%    | -4.7%   | 3.5%    | 3.1%    | 3.4%    | 3.4%    | 3.7%    |
| Exports of goods & nonfactor services growth | % change      | 2019       | -2.0%   | -13.0%  | 4.0%    | 2.0%    | 3.0%    | 3.0%    | 3.0%    |
| Imports of goods & nonfactor services growth | % change      | 2019       | 2.4%    | -5.0%   | 3.7%    | 3.4%    | 3.9%    | 3.9%    | 4.2%    |
| Real per-capita GDP growth                   | % change      | 2018       | -3.5%   | -9.2%   | 0.9%    | 0.2%    | 1.2%    | 1.2%    | 1.7%    |
| Nominal per-capita GDP                       | US\$          | 2018       | \$5,026 | \$4,126 | \$4,638 | \$4,621 | \$4,668 | \$4,885 | \$5,107 |
| Current account balance                      | US\$ billions | 2019       | -\$0.2  | \$0.0   | -\$0.7  | -\$0.5  | -\$0.6  | n/a     | n/a     |
| Current-account balance as a % of GDP        | %             | 2019       | -1.7%   | -0.5%   | -6.2%   | -4.4%   | -4.4%   | n/a     | n/a     |
| Forex reserves                               | US\$ billions | 2019       | \$2.1   | \$2.2   | \$2.0   | \$2.0   | \$2.3   | n/a     | n/a     |
| Unemployment rate                            | %             | 2020       | 15.0%   | 15.0%   | 15.0%   | 15.0%   | 15.0%   | 15.0%   | 15.0%   |
| Exchange rate                                | NAD/US\$      | 2020       | 14.06   | 14.60   | 15.41   | 15.84   | 16.54   | 16.71   | 17.09   |
| Short-term interest rate                     | %             | 2019       | 7.6%    | 5.3%    | 4.3%    | 4.5%    | 4.7%    | 5.0%    | 5.0%    |
| Consumer price index change                  | %             | 2019       | 3.7%    | 2.2%    | 3.9%    | 4.1%    | 4.1%    | 4.1%    | 4.2%    |

Sources: IHS Markit, Quester Advisors.

<sup>14</sup> Source: The CIA World Factbook.

<sup>15</sup> Source: TradingEconomics.com.

<sup>16</sup> Source: TradingEconomics.com.

<sup>17</sup> Source: IHS Markit.

<sup>18</sup> Source: IHS Markit.

With a fragile economy, the Namibian government has been advocating for greater regional integration and working hard on strengthening ties with its neighbors and trading partners. It is an active member of the Southern African Development Community, the Commonwealth of Nations and the United Nations.

The country's economic outlook, however, is closely tied to that of South Africa, its largest trading partner. The Bank of Namibia generally follows the South African Reserve Bank's policy and the Namibian dollar is pegged to the South African rand. While IHS Markit recently increased Namibia's expected GDP growth rate for 2021 from 1% to 2.7% due to the stronger rebound of South Africa's near-term growth prospects, the general outlook for Namibia remains cautious due to the ongoing COVID-19 pandemic, a wide current-account deficit and rising external debt servicing costs.

In addition to working on growing trade with its neighbors, the government has also been focusing on diversifying its economy and attracting foreign investment, in order to bring in the much-needed revenue.

## Attractive place to do business

Namibia is a stable democracy, with a strong rule of law, good institutional structure (the establishment of which was supported by the United Nations after the country gained independence) and an attractive fiscal regime – all of which are important factors for appealing to foreign investors. In addition, to attract foreign capital, the government has made improvements in reducing red tape, making Namibia one of the least bureaucratic places to do business in the region. It is also in the top decile of Transparency International's rankings of African countries<sup>19</sup>.

As a result, in 2013, Bloomberg named Namibia the **top emerging market economy** in Africa and the 13<sup>th</sup> best in the world, **based on the ease of doing business, the perceived level of corruption and economic freedom**. The World Bank ranks Namibia 104<sup>th</sup> out of 190 economies worldwide in terms of ease of doing business<sup>20</sup>.

## A century of oil and gas exploration

One of the industries that the country has been actively trying to attract is oil and gas. It is not surprising that Namibia has had high hopes of finding hydrocarbons, considering it is located between two oil and gas-rich nations and on trend with other significant oil and gas producers (see Figure 7).

Angola, a member of OPEC and Namibia's neighbor to the north, is a well-established oil producer, second largest in Africa and 15<sup>th</sup> largest in the world, having produced ~1.5 million barrels of oil per day in 2019<sup>21</sup>. While South Africa, Namibia's neighbor to the south, has an oil and gas industry in earlier stages of development, the country recently reported significant gas and condensate discoveries.

If seismic and recent well data are to be believed, Namibia may hold significant hydrocarbon potential.

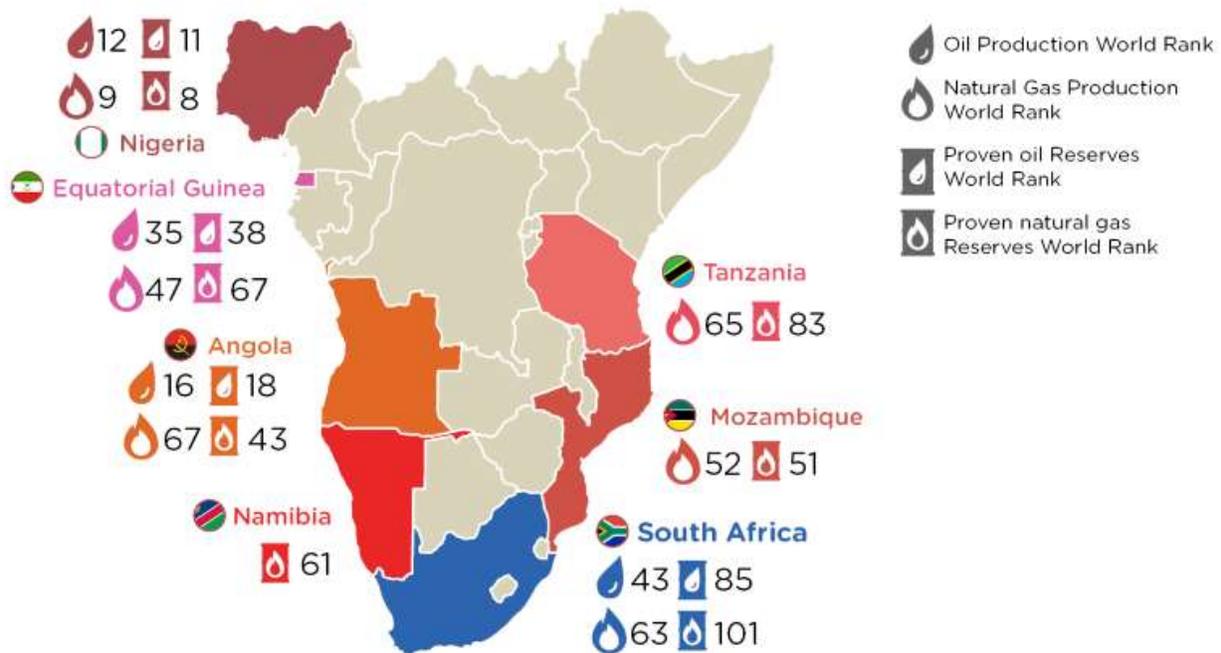
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<sup>19</sup> Based on the 2020 Corruption Perceptions Index.

<sup>20</sup> Sources: World Bank, DoingBusiness.org, IMF, Bloomberg.

<sup>21</sup> Source: U.S. Energy Information Administration, 2019 data.

Figure 7: Offshore oil and gas production and reserve rankings in southern Africa



Sources: Ebrahim Takolia, EnergyBoardroom.com (2017 data).

Namibia is not new to oil and gas exploration. The first onshore exploration well, Berseba-1, was drilled in the Nama basin of southern Namibia in 1928 by South West Africa Petroleum Corporation, reporting a gas blow-out at shallow depth while drilling, but not yielding a discovery. Offshore exploration commenced 46 years later, with ChevronTexaco spudding the Kudu 9A-1 well in the Orange basin, about 130 kilometers north of the border with South Africa<sup>22</sup>. (See Figure 13 for a map of Namibia’s sedimentary basins and Figure 8 for key wells drilled in Namibia.)

Over the last century, Namibia has gone through cycles of oil and gas exploration activity followed by prolonged periods of dormancy, due in large to the country’s complex and often violent political history prior to gaining independence. As a result, only 12 wells have been drilled onshore, mostly shallow and largely as part of a wide-ranging pursuit of minerals, yielding some hydrocarbon shows but no commercial discoveries, and hardly testing the country’s hydrocarbon potential.

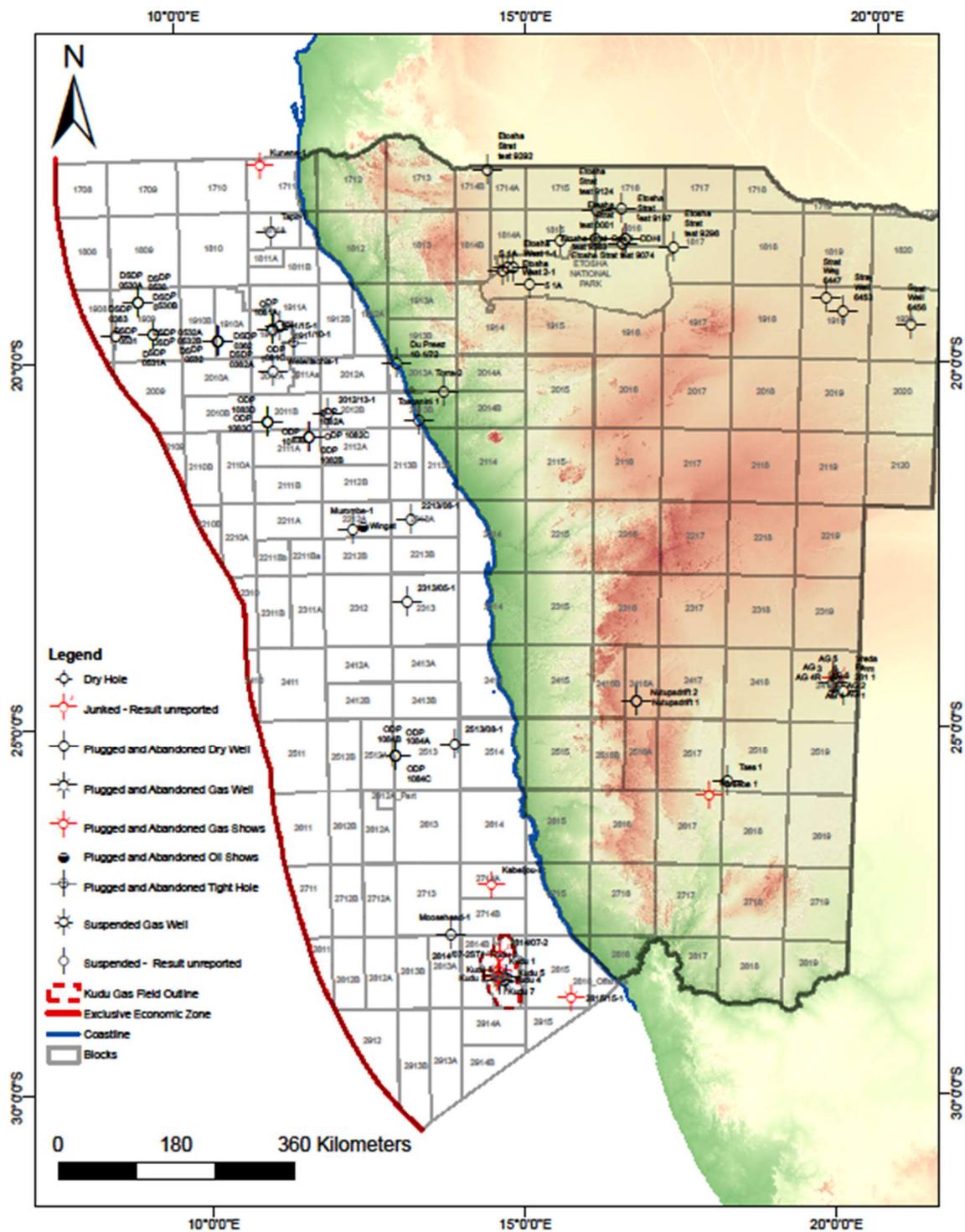
In the offshore, 20 exploration and six appraisal wells have been drilled<sup>23</sup>, resulting in only one discovery in 1974 at Kudu. The 1.3-tcf<sup>24</sup> Kudu gas and condensate field has since changed many owners, but remains undeveloped, due to its complex geology, financing challenges and commercial export issues.

<sup>22</sup> Source: “Namibia in the Spotlight Again”, A. Wanke, GEO ExPro, October 2019.

<sup>23</sup> Sources: NAMCOR, James A. Deckelman.

<sup>24</sup> 2C Contingent Reserves.

Figure 8: Key wells drilled in Namibia



Source: NAMCOR, August 2017.

It is worth mentioning three exploration wells drilled offshore by Brazil's HRT (now PetroRio) and its Portuguese partner GALP Energia in 2013 – Wingat-1 and Murombe-1 in the Walvis basin, and Moosehead-1 in the Orange basin (see Figure 8). While these wells were economically unsuccessful, geologically, they were significant in that they proved the presence of a widely spread working petroleum system, significantly de-risking the area's potential.

The Wingat-1 well, located in 1,005 meters of water, was drilled in 68 days by the semi-submersible Transocean Marianas, to a total depth of 5,000 meters. The main target was the Albian-age (Lower Cretaceous) carbonate platform, which was penetrated by the well, but its reservoir quality was much less developed than expected. However, two well-developed source rocks were penetrated, rich in organic carbon and both within the oil-generating window. Several small reservoirs saturated with light oil (38-42° API) were encountered and no water; however, the oil quantities were not commercial<sup>25</sup>. While the well was economically unsuccessful, it confirmed the source potential of the basin, proving for the first time that there is a working petroleum system that is mature and capable of generating oil.

**Figure 9: Semi-submersible Transocean Marianas**



Source: gCaptain.

Using the same semi-submersible rig, the partners then drilled a follow-up well at Murombe-1, about 15 kilometers to the west of the Wingat-1 location. The well was drilled in 62 days to a total depth of 5,729 meters, in 1,390 meters of water. Its primary target was the Barremian-age (Lower Cretaceous) basin-floor-fan turbidites, which showed a well-defined amplitude anomaly on 3D seismic; however, poor reservoir quality was encountered. The well's secondary target was the Santonian-age (Upper Cretaceous) confined channel complex, which ended up containing 36 meters of net sand within a gross interval of 242 meters; porosity was 19%, but the sands were wet. The same well-developed Aptian marine source rock in the oil window that was encountered in the Wingat-1 well was present above the deeper Murombe section<sup>26</sup>. While this well was also economically unsuccessful, having found no reservoir, it importantly reconfirmed the

<sup>25</sup> Sources: GALP Energia, HRT, NAMCOR.

<sup>26</sup> Sources: GALP Energia, HRT, NAMCOR.

evidence of source rock in the area, providing valuable information on the basin and the geological structures of the region.

Transocean Marianas then moved on to the third location, the Moosehead-1 well in the Orange basin. The well was drilled in 47 days to a total depth of 4,170 meters, in 1,716 meters of water. Its primary target was the Barremian-age (Lower Cretaceous) carbonate reservoir, within a four-way dip closure, mapped on 3D seismic. The well encountered approximately 100 meters of carbonates at the top of the primary target, however, with very low porosity. Wet gas shows were reported and increased in wetness with depth. At least two potential source rocks were penetrated, including the well-developed Aptian-age source rock<sup>27</sup>. While this well was also economically unsuccessful, it once again reconfirmed the evidence of source rock, particularly the Aptian-age source rock, this time in the Orange basin, 600 kilometers south of the first two wells, providing valuable geological information.

To date, eight basins have been identified onshore and offshore Namibia<sup>28</sup>; however, they remain largely unexplored. More drilling and seismic are required in order to better understand the country's hydrocarbon potential.

## Attracting increasing attention, particularly offshore

In the meantime, majors, supermajors and national oil companies have been increasing and consolidating their interest, particularly offshore Namibia that is estimated to hold significant potential. Most notably, in 2019, ExxonMobil added ~7 million net acres to its offshore position, increasing its holdings to nearly 10 million gross acres. The same year, Qatar Petroleum entered the country as part of its global joint venture with Total, who has been operating in Namibia since 1964. In early 2021, Qatar Petroleum also entered into a partnership with Shell, increasing its interest offshore Namibia to ~7 million gross acres. In total, more than 20 operators are currently active in Namibia. More than half of the offshore basin area is under title<sup>29</sup>, while only a fraction of the onshore area has been licensed.

The companies have been drawn by Namibia's political stability, strong legal system, well-developed institutions, promising geology, attractive petroleum fiscal regime and licensing system, and the country's general openness to foreign investment. Over 50 petroleum exploration licenses (PELs) have been awarded by the Ministry of Mines and Energy (MME) to date<sup>30</sup> (see Figure 10).

The larger players in the region include:

- ExxonMobil (interest in ~9.8 million gross acres offshore, in the Namibe and Walvis basins<sup>31</sup>);
- GALP Energia (interest in ~4.9 million gross acres offshore, in the Walvis and Orange basins);
- Qatar Petroleum (interest in ~7.0 million gross acres offshore, in the Orange basin);
- Shell (interest in ~3.1 million gross acres offshore, in the Orange basin); and
- Total (interest in ~4.0 million gross acres offshore, in the Orange basin).

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<sup>27</sup> Sources: GALP Energia, HRT, NAMCOR.

<sup>28</sup> Source: NAMCOR.

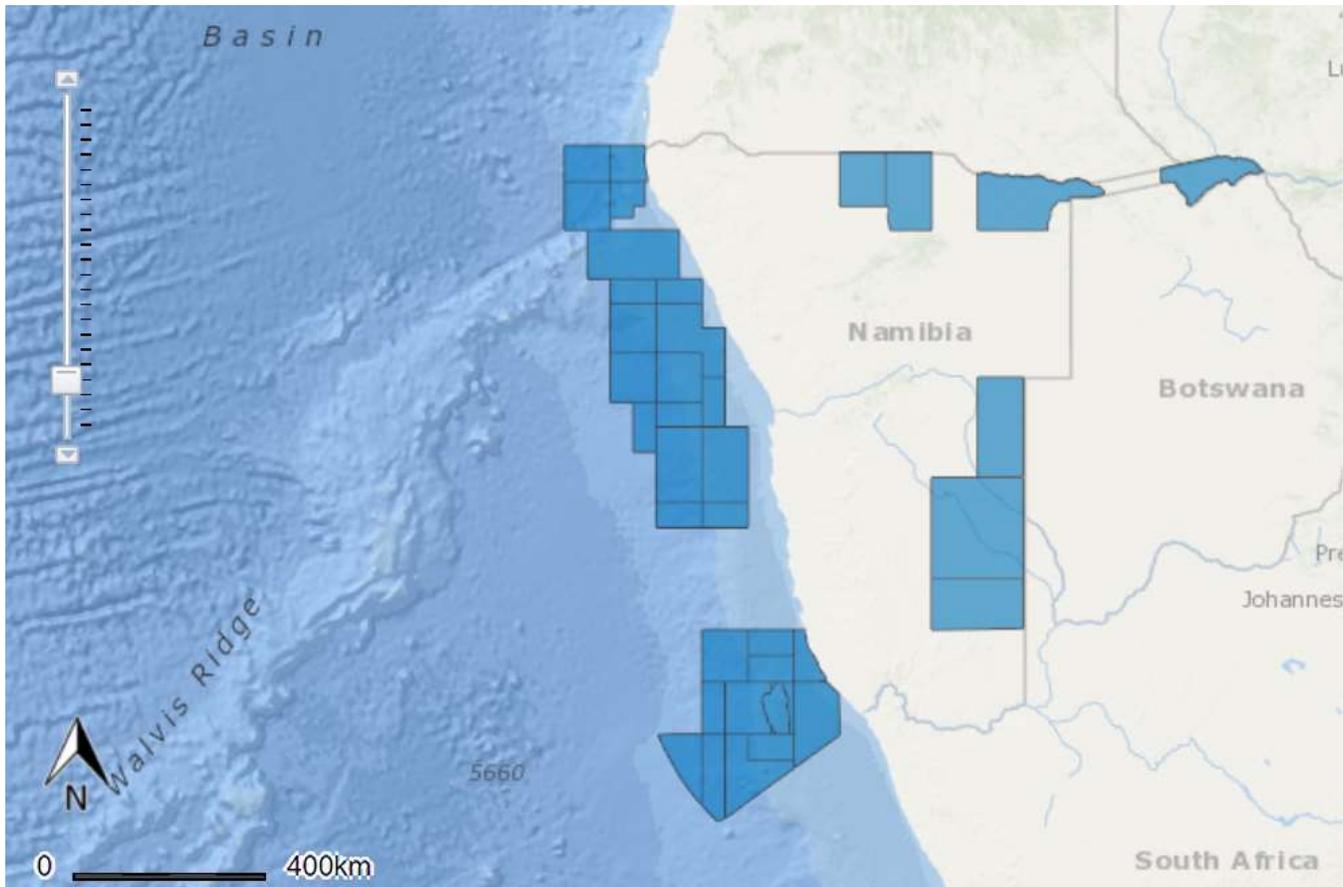
<sup>29</sup> Source: James A. Deckelman, 2021.

<sup>30</sup> Sources: James A. Deckelman, 2021; Ministry of Mines and Energy of Namibia.

<sup>31</sup> Quester Advisors' estimate; based on 7 million net acres in blocks 1710, 1711, 1810 and 1811A at a working interest of 85-90%; plus 2.8 million gross acres in the PEL-82 license.

These companies, particularly ExxonMobil, Total and Shell, have significant experience and expertise in executing large offshore projects around the world. They, in partnership with independent producers, will likely be driving any significant exploration and development activities in the offshore, where substantial capital investment is required.

**Figure 10: Acreage under title, offshore and onshore Namibia**



Source: James A. Deckelman, 2021.

Also, a number of independent exploration and production companies hold acreage onshore and offshore Namibia, including (but not limited to):

- Africa Energy (interest in ~4.3 million gross acres offshore);
- Azinam (interest in ~15.3 million gross acres offshore);
- Chariot Oil & Gas (interest in ~4.2 million gross acres offshore);
- Eco Atlantic (interest in ~5.6 million gross acres offshore);
- Impact Oil (interest in ~4.0 million gross acres offshore);
- Maurel & Prom (interest in ~5.5 million gross acres offshore);
- Pancontinental Oil & Gas (interest in ~7.0 million gross acres offshore);
- Reconnaissance Energy (interest in ~8.5 million gross acres onshore);
- Tower Resources (interest in ~5.8 million gross acres offshore); and
- Tullow Oil (interest in ~5.6 million gross acres offshore).

These companies continue to gather and analyze technical data across the basins. In addition, at least three stratigraphic wells are going to be drilled onshore this year, all by Reconnaissance Energy (or ReconAfrica, which is discussed in detail in the second half of this report). Up to five wells are also being contemplated offshore Namibia, potentially to be drilled in the second half of 2021 and in 2022, four in the Orange basin and one in the Walvis basin. Results of these wells will be closely watched by the industry, as the size of the prize could be substantial, with resource potential estimated in billions of barrels.

## Promising geology

As West Africa continues to be one of the most significant producing regions in the world, oil companies of all sizes have been turning their attention to the largely unexplored region offshore and onshore Namibia, with high hopes of finding oil and gas.

About 180 million years ago, during the Jurassic geological period, Africa and South America were a part of the same supercontinent that began to break up and drift apart (see Figure 11). Millions of years later, the rock strata of the conjugate margins on both sides of the South Atlantic remain very similar, as these rocks are believed to have been formed in the same way. As a result, many geologists today draw parallels between geological plays in West Africa and South America.

The Namibe sedimentary basin of southern Angola and northern Namibia is conjugate to the Santos basin offshore Brazil (see Figure 12). At the end of 2017, the pre-salt sequence in the Santos and Campos basins of Brazil was estimated to contain oil and gas reserves of ~15 billion barrels of oil equivalent (boe), with the estimate continuing to increase with more drilling<sup>32</sup>. (“Pre-salt” refers to reservoirs being located below a layer of salt, which can exceed 2,000 meters in thickness.) During the same period, the pre-salt fields were responsible for about half of the oil and gas production in the country, generating ~1.6 million barrels of oil equivalent per day (boe/d), including ~1.3 million barrels per day (bbl/d) of oil and liquids and more than 1.8 billion cubic feet per day (bcf/d) of natural gas. This production came from only 85 wells located at 15 fields, implying high average production per well of ~20,000 boe/d, with some wells initially producing as much as ~50,000 boe/d, generating robust economics. Petrobras has communicated a break-even price for its 3.3-billion-barrel Mero project in the pre-salt of ~US\$35 per barrel<sup>33</sup>.

The Namibe and the conjugate Santos basin have a similar syn-rift petroleum system and contain evaporites that were deposited in the transitional intercontinental rift stage. They also share these characteristics with the Kwanza basin in Angola and the Congo basin to the north that have yielded large oil and gas discoveries (see Figure 12). **A total of 111 giant oil and gas fields with recoverable reserves of nearly 260 billion barrels have been discovered along the South Atlantic margins<sup>34</sup>; except, so far, in Namibia.**

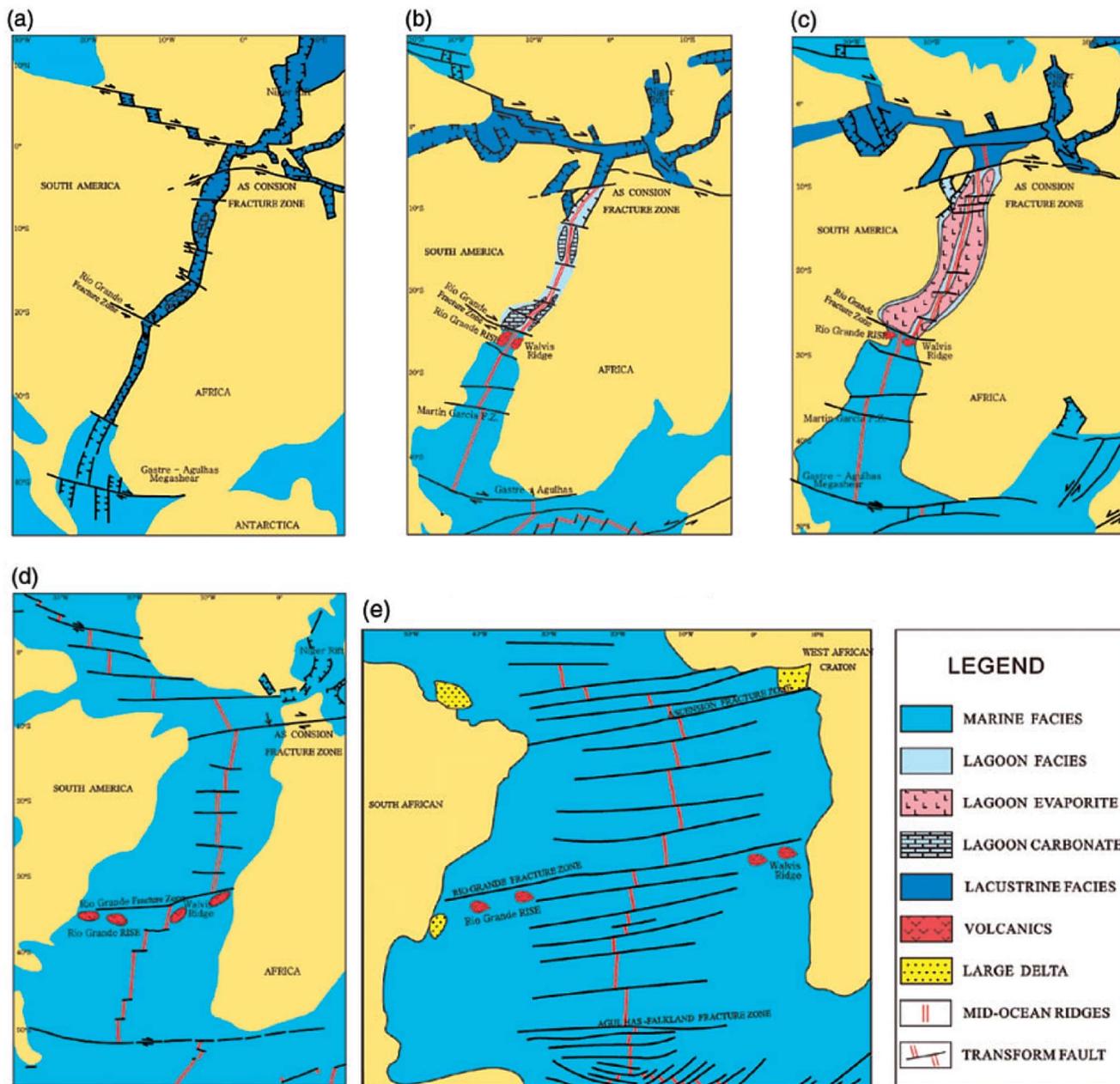
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<sup>32</sup> Source: Brazilian National Regulatory Agency of Petroleum, Natural Gas and Biofuels (ANP); year-end 2017 data.

<sup>33</sup> Sources: Brazilian National Regulatory Agency of Petroleum, Natural Gas and Biofuels (ANP); “Brazilian Pre-Salt: Petrobras is Betting its Future on Pre-Salt Assets, Promising to Rise its Production”, Deloitte.

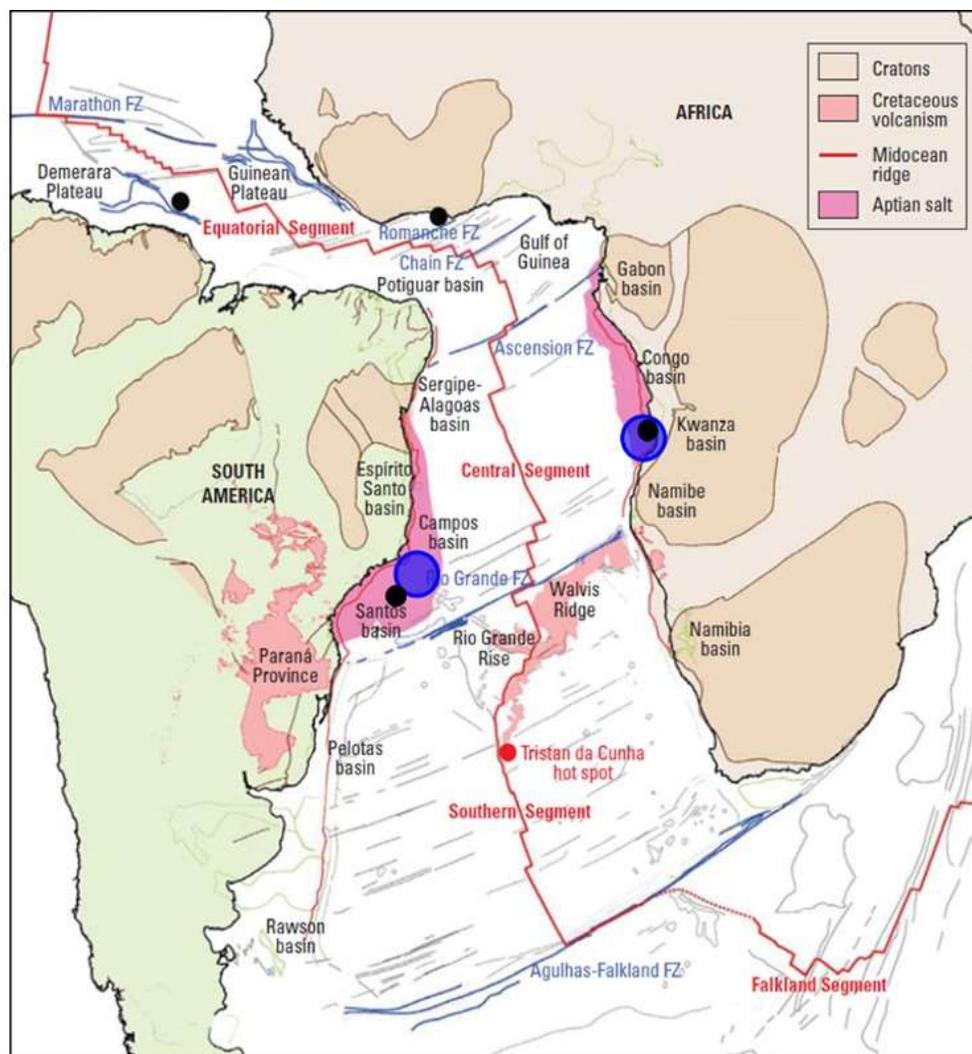
<sup>34</sup> Source: “Basin Evolution, Configuration Styles, and Hydrocarbon Accumulation of the South Atlantic Conjugate Margins”, Z. Wen et al., 2019.

Figure 11: Reconstruction of the prototype basins and paleogeography along the South Atlantic margins through time



Source: "Basin Evolution, Configuration Styles, and Hydrocarbon Accumulation of the South Atlantic Conjugate Margins", Z. Wen et al., 2019.

Figure 12: Tectonic map of the South Atlantic with fracture zones highlighted



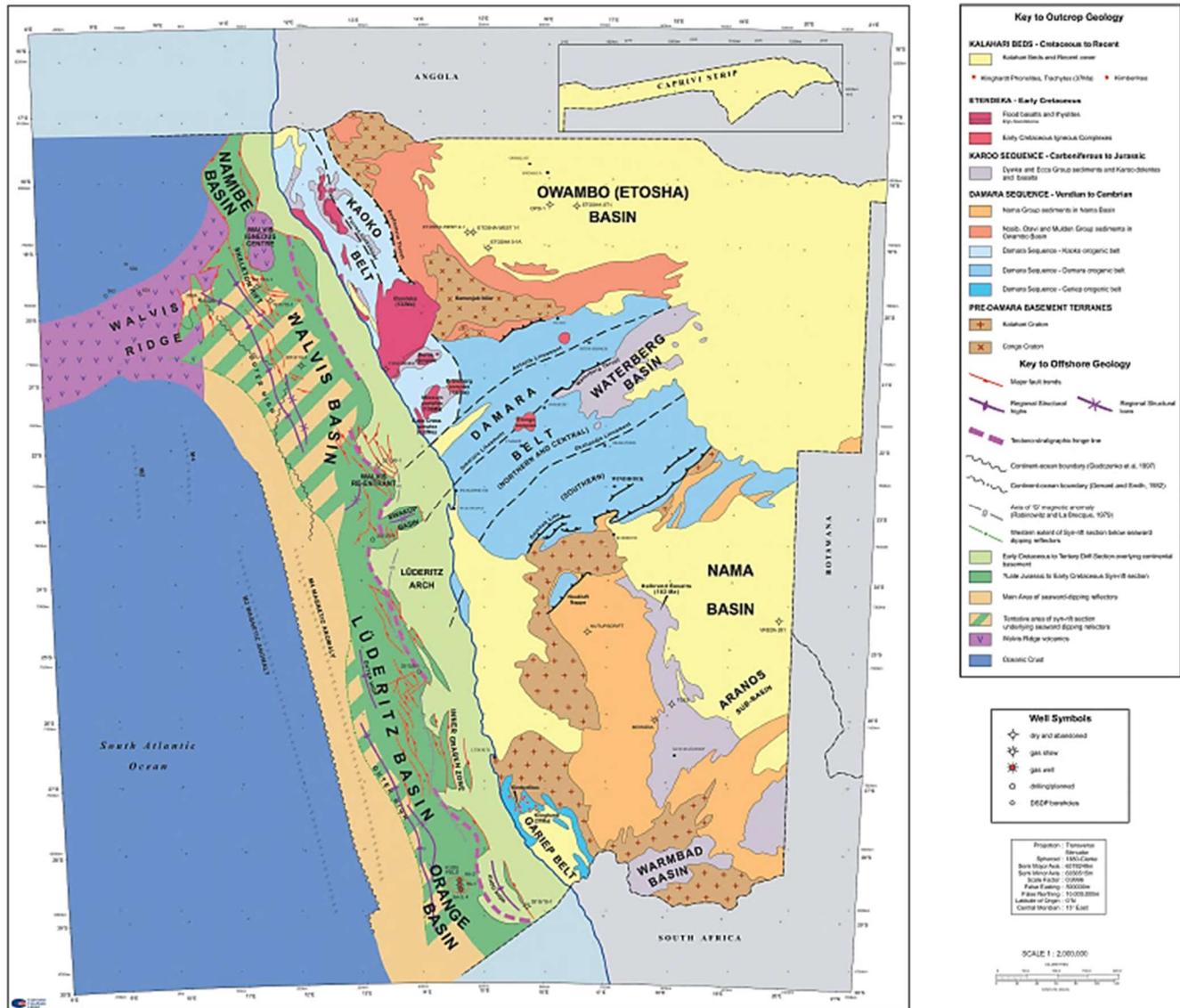
Sources: Bryant et al., 2012; "Angola, Kwanza Basin: Exploring Further and Deeper for Oil and Gas", G. Duval et al., GEO ExPro, Vol. 10, No. 6 – 2015. Note: The blue circles show the approximate locations of CCG's Santos and Kwanza basin surveys.

South of the volcanic Walvis Ridge, which marks the southern limit of the South Atlantic salt basin, lie the Walvis, the Lüderitz and the Orange sedimentary basins of Namibia (see Figure 13). While the continental margin here is characterized by a lack of salt in the transition from continental to marine environments, geochemical data from hydrocarbons recovered from early wells drilled in the Orange basin indicate the presence of oil similar in qualities to that in the salt basins north of the Walvis Ridge and in the conjugate prolific Campos basin in Brazil, pointing to similar source rock systems<sup>35</sup>. Geochemical analysis has also

<sup>35</sup> The Kudu and 2815/15-01 wells. Source: "Promising Giant New Hydrocarbon Frontier: The Namibian Continental Margin", GEO ExPro, December 2011.

proved that the lacustrine and marine source rocks that are prolific in the Brazilian margin also occur in the West African margin, including offshore Angola and Namibia<sup>36</sup>.

Figure 13: Namibia's sedimentary basins and major structural elements



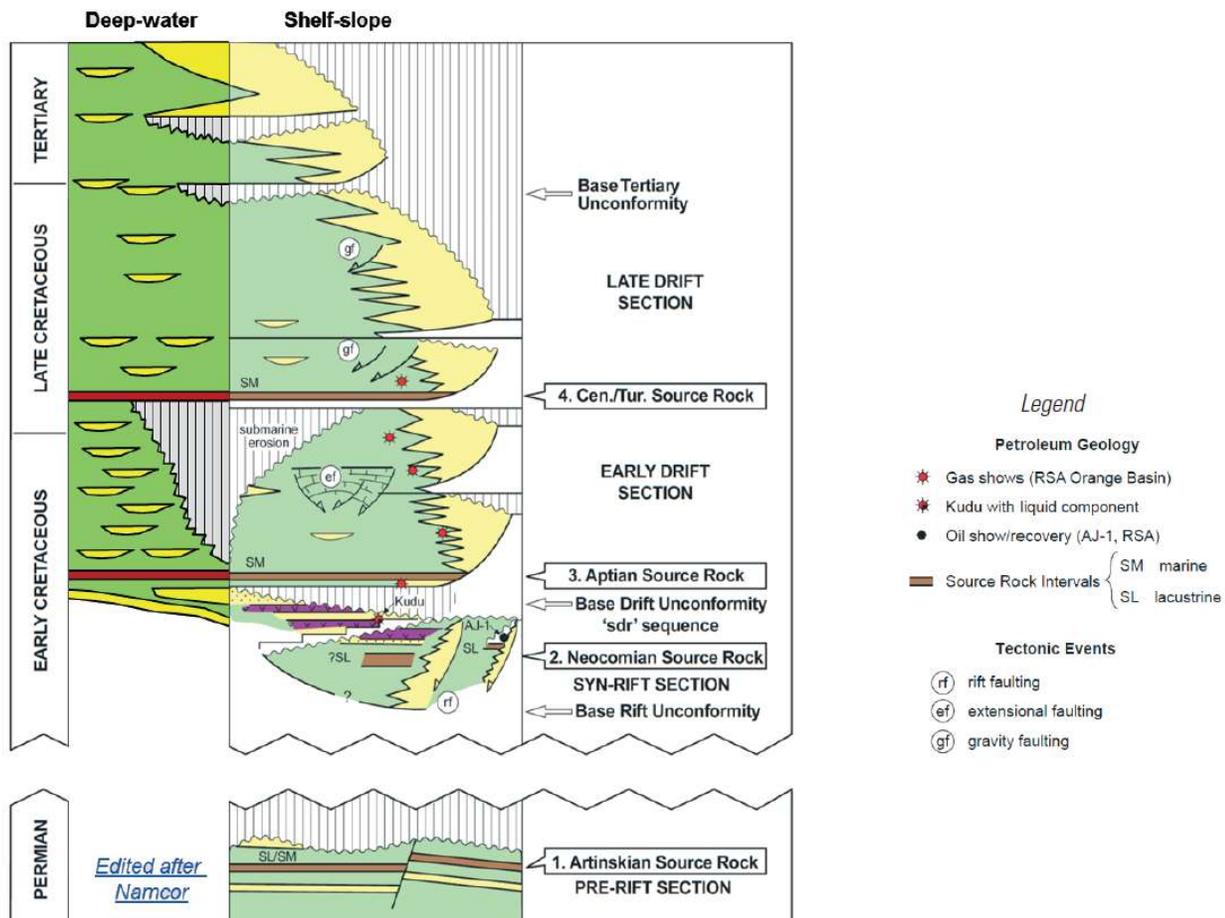
Sources: The Ministry of Mines and Energy of Namibia, NAMCOR, 2012.

<sup>36</sup> Source: "Promising Giant New Hydrocarbon Frontier: The Namibian Continental Margin", GEO ExPro, December 2011.

As shown in Figure 14, the basin fill offshore Namibia (and in adjoining areas) includes:

- A highly-deformed pre-rift Permian section;
- An early Cretaceous syn-rift section comprising alluvial and fluvial clastics, basalts, volcanoclastics and lacustrine sediments;
- An overlying early drift section containing marine shales and turbidite fan-channel systems; and
- A late Cretaceous/Tertiary late drift section comprising marine clastics and minor carbonates<sup>37</sup>.

**Figure 14: Generalized stratigraphy of offshore Namibia, showing key source rock intervals, general lithologies, sedimentary mega-sequences and tectonic events**



Sources: Bray et al., 2008; PGS, 2014.

**Three petroleum systems** have been identified to date through well control:

- **A syn-rift, Valanginian/Hauterivian-age petroleum system**, comprising algal-rich lacustrine source rocks (i.e. deposited in deep lakes). These rocks have potential to generate both oil and gas,

<sup>37</sup> Sources: Bray et al., 2008; James A. Deckelman, 2021.

and maturity maps indicate that this interval is likely mid-mature for oil generation across the whole Namibian margin<sup>38</sup>.

The source rocks were penetrated, for example, by the AJ-1 well in the South African portion of the Orange sedimentary basin, just across the Namibian maritime border, and were rich in organic matter, having TOC (total organic carbon) content of 3-5%. The well flowed high-quality light oil (36° API) to the surface<sup>39</sup>.

Similar lacustrine source rocks of Barremian/Aptian age have also been identified offshore Angola, in the prolific Lower Congo basin. Across the Atlantic, the syn-rift Upper Barremian/Lower Aptian-age Itapema source rocks of the Santos basin in Brazil are estimated to have sourced more than 45 billion barrels of recoverable oil<sup>40</sup>. The lacustrine Aptian/Barremian-age petroleum system is said to be responsible for 90% of the oil generated in the Brazilian margin north of the Rio Grande Rise<sup>41</sup>. Syn-rift lacustrine source rocks are also documented in the conjugate Colorado basin of Argentina<sup>42</sup>.

- **A post-rift, Aptian-age petroleum system**, comprising lacustrine to marine, oil-prone source rocks. These rocks appear to be prevalent over a vast area offshore Namibia. They were penetrated by the Kunete-1 well in the Namibe basin; the Wingat-1, Murombe-1 and 2213/06-01 wells in the Walvis basin; and the Kabeljou-1, Moosehead-1 and Kudu wells in the Orange basin.

At the Wingat-1 location, high-quality light oil (38-42°-API) was recovered, proving that the source rocks are thermally mature for oil generation. At the Kudu field, the Aptian source rocks (the Kudu shale) were up to 140 meters thick, with average TOC of 2-3%; they also formed the top seal at the Kudu gas/condensate field. These source rocks are interpreted to have been originally oil-prone, with the oil they generated having been cracked to gas<sup>43</sup>. The Moosehead-1 exploration well encountered 197 meters of Barremian/Aptian source rocks, which were reported as “dark-grey, high-gamma organic shale”, rich in organic matter, with calculated TOC values as high as 10%<sup>44</sup>. Similar source rocks were identified in the conjugate South Pelotas basin offshore Uruguay<sup>45</sup>.

- **A post-rift, drift Cenomanian/Turonian-age petroleum system**, comprising marine source rocks that are locally mature for oil generation in parts of the region (as shown in Figure 15). These source rocks were penetrated by the Kabeljou-1 and Moosehead-1 wells in the Orange basin; and the 1911/10-1, 1911/15-1 and 2012/13-1 wells in the Walvis basin<sup>46</sup>. The 2012/13-1 well on the shelf encountered TOC content of 5%; while the shales were thermally immature, there was a possibility

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<sup>38</sup> Sources: Bray et al., 1998; “From Basalt to Skeletons – the 200 Million-Year History of the Namibian Margin Uncovered by New Seismic Data”, McDermott et al, First Break, Volume 33, December 2015.

<sup>39</sup> Sources: Africa Energy’s corporate presentation; “Source Rock, Maturity Data Indicate Potential Off Namibia”, Oil & Gas Journal, August 10, 1998.

<sup>40</sup> Source: “The Role of Megaregional Seismic Data in Santos Basin Pre-Salt Exploration and Development”, James A. Deckelman et al., in press, AAPG Santos Basin Memoir, 2021.

<sup>41</sup> Source: “Promising Giant New Hydrocarbon Frontier: The Namibian Continental Margin”, GEO ExPro, December 2011.

<sup>42</sup> Source: James A. Deckelman, 2021.

<sup>43</sup> Source: Mello, 2013.

<sup>44</sup> Sources: Eastwell et al., Spectrum Geophysical, James A. Deckelman, company reports.

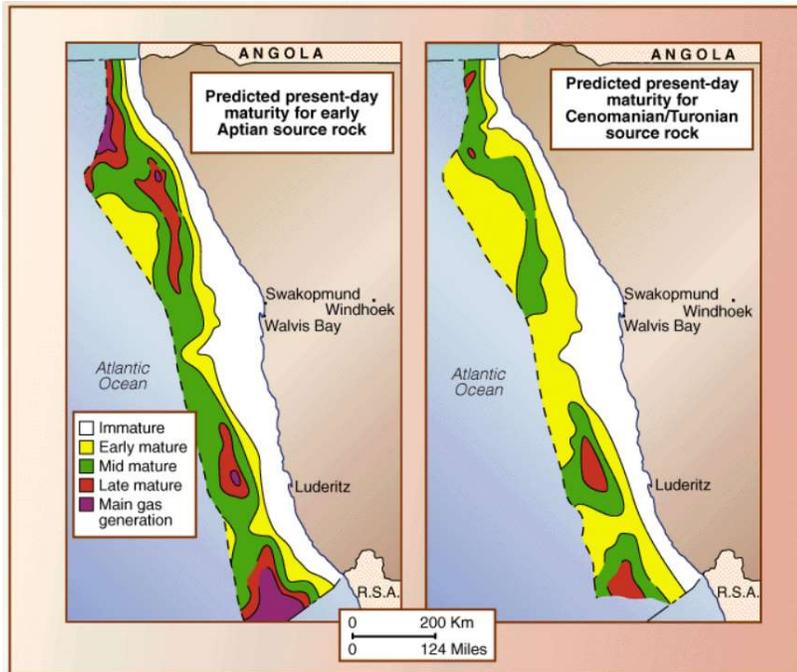
<sup>45</sup> Source: “The Petroleum Habitats and Exploration New Frontiers in the South Atlantic Basins”, World Petroleum Council, Expert Workshop Report, June 17, 2014.

<sup>46</sup> Sources: Company reports, Oil & Gas Journal.

that, where sufficiently buried, they could generate hydrocarbons<sup>47</sup>. Similar source rocks were also identified from a few wells in the south-eastern Brazilian margin<sup>48</sup>.

Seismic has identified a number of significant structures offshore Namibia; what will define the volumes of hydrocarbons will be the capacity of the source rocks.

**Figure 15: Source rock maturity offshore Namibia**



Source: Bray et al., 2008.

One of the most attractive features of the vast, largely unexplored region offshore Namibia is the **diversity of plays** that have been identified. Although the basins are similar tectono-stratigraphically, they each have different plays associated with them, with the majority of working plays being in the post-rift sequence.

- **Syn-rift Barremian-age carbonate play** has been identified by the industry. However, wells targeting it, including Moosehead-1 in the Orange basin and Kunete-1 in the Namibe basin, encountered low-quality reservoirs. Understanding carbonate systems can be difficult; however, as more exploration wells are drilled, the comprehension of the geology is bound to improve, allowing for better targeting of these reservoirs. Moosehead prospect's carbonate reservoir was estimated to contain more than four billion barrels of oil<sup>49</sup>; hence, companies are likely to continue advancing this potentially prolific type of play.

<sup>47</sup> Source: "Namibia: Frontier Exploration in West Africa", Pat Coole et al., GEO ExPro, Vol. 11, No. 3 – 2016.

<sup>48</sup> Source: "Promising Giant New Hydrocarbon Frontier: The Namibian Continental Margin", GEO ExPro, December 2011.

<sup>49</sup> Sources: HRT; "Promising Giant New Hydrocarbon Frontier: The Namibian Continental Margin", GEO ExPro, December 2011; "Namibia: Frontier Exploration in West Africa", Pat Coole et al., GEO ExPro, Vol. 11, No. 3 – 2016.

- **Syn-rift Barremian-age clastics plays** have been the focus of the industry in the early days of offshore exploration, mainly because they were located in shallow water. The Kudu gas/condensate field in the Orange basin is an example of one such play. Aeolian sands (i.e. pertaining to wind activity) constitute the reservoir rocks here, interbedded with volcanic rocks, in a low-relief, four-way-dip anticlinal structure. The Kudu 9A-1 exploration well encountered high-quality reservoir sands, with calculated average porosities of up to 22%<sup>50</sup>.
- **Post-rift Albian-age carbonate play** was targeted by the Wingat-1 well in the Walvis basin and the Tapir South-1 well in the Namibe basin. At the Tapir South-1 location, good-quality carbonate reservoirs were encountered, although without significant hydrocarbon shows<sup>51</sup>. At the Wingat-1 location, however, carbonate reservoirs were tight<sup>52</sup>.
- **Post-rift Albian-age (and younger) basin-floor fan/channel play** has been the focus of more recent activity, as it is thought to hold significant potential. Some 85 undrilled prospects and leads have been identified offshore Namibia, many of them in deep water and targeting the basin-floor fan/channel play<sup>53</sup>.

Fan/channel systems have been penetrated by several wells to date, including Tapir South-1 in the Namibe basin; Murombe-1, 1911/10-1, 1911/15-1 and 2012/13-1 in the Walvis basin; and 2513/08-01 in the Lüderitz basin. However, the play has barely been tested in the Orange basin, the locus of significant sand deposition by the Cretaceous paleo-Orange River system. The only well we know of that penetrated these types of reservoirs in the Orange basin was the Kabeljou-1 well, and it encountered wet sands and low permeability, with no commercial quantities of hydrocarbons, potentially related to a lack of seal and access to charge<sup>54</sup>.

The play is thought to have significant volume potential, given the large gross-rock volume of the basin-floor fans<sup>55</sup>. Most wells that have intersected fan/channel reservoirs found them to be of high quality, with thick gross and net pay. The Murombe-1 exploration well, for example, encountered 36 meters of net sand within a 242-meter gross interval, with average porosity of 15%<sup>56</sup>. Finding a working trapping mechanism and defining migration pathways from source to reservoir sandstones is key to future success of this play<sup>57</sup>. Its probability of geological success is estimated at less than 15%<sup>58</sup>.

It is this play that will be tested by **Total's** much-anticipated **Venus-1 exploration well** on Block 2913B in the Orange basin, tentatively scheduled to spud in the third quarter of this year. The ultra-deep-water wildcat will test a large, attribute-supported Cretaceous basin-floor fan, directly overlying

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<sup>50</sup> Sources: "Promising Giant New Hydrocarbon Frontier: The Namibian Continental Margin", GEO ExPro, December 2011; James A. Deckelman, 2021.

<sup>51</sup> Source: Chariot Oil & Gas.

<sup>52</sup> Source: Senergy Oil & Gas.

<sup>53</sup> Source: James A. Deckelman, 2021.

<sup>54</sup> Source: Chariot Oil & Gas.

<sup>55</sup> Sources: Company reports, Oil & Gas Journal, James A. Deckelman.

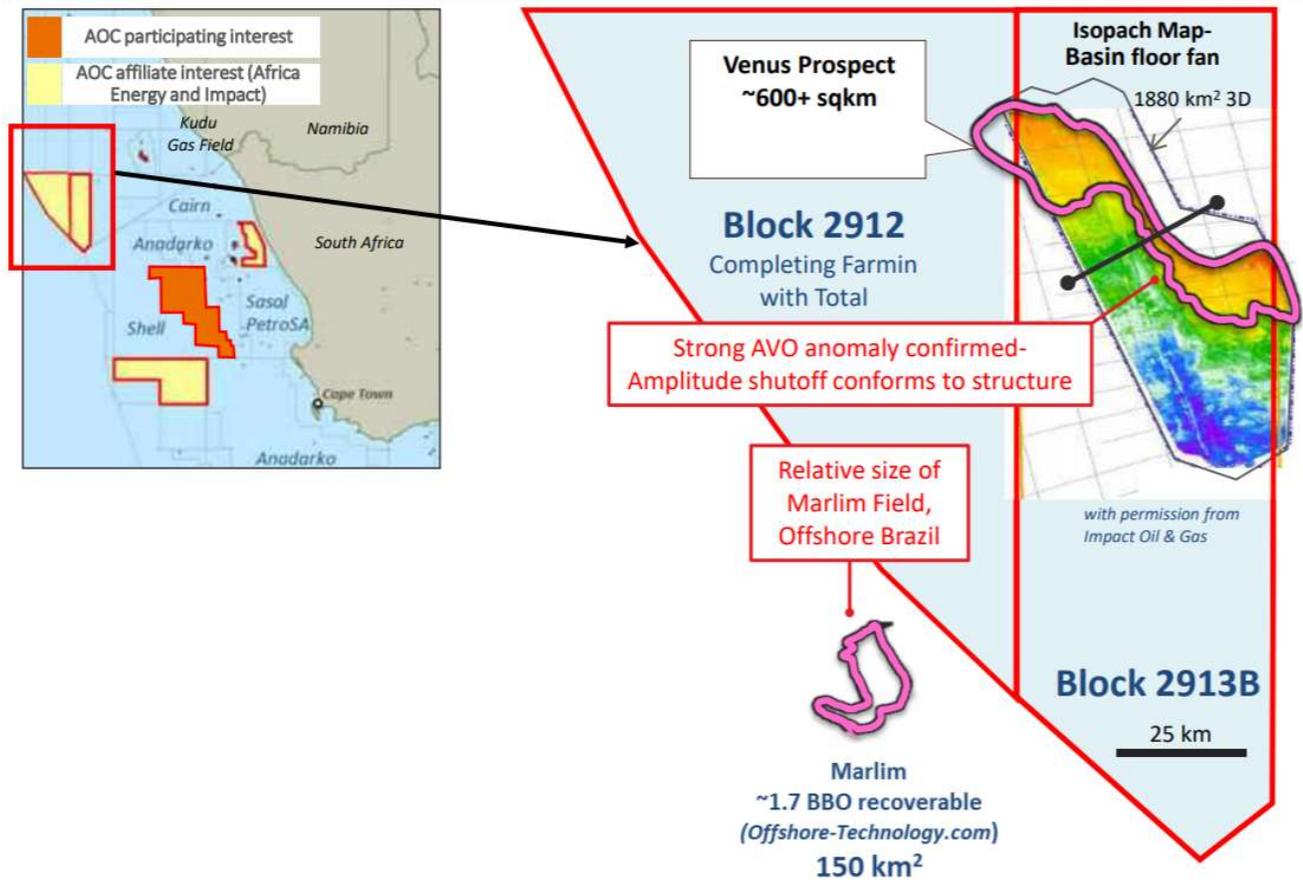
<sup>56</sup> Sources: HRT; "Namibia: Frontier Exploration in West Africa", Pat Coole et al., GEO ExPro, Vol. 11, No. 3 – 2016.

<sup>57</sup> Source: "Namibia: Frontier Exploration in West Africa", Pat Coole et al., GEO ExPro, Vol. 11, No. 3 – 2016.

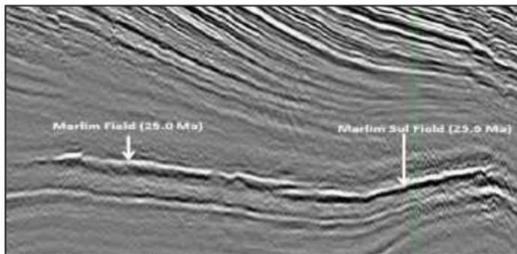
<sup>58</sup> Source: James A. Deckelman, 2021.

the Kudu shale, targeting a potential resource of at least two billion barrels of oil<sup>59</sup>. The company is well positioned to exploit the play upon the well's success, having significant acreage offshore southern Namibia and northern South Africa.

Figure 16: Venus-1 prospect overview

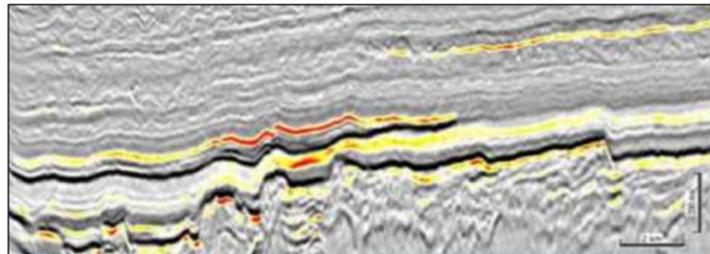


3D SEISMIC ON BASIN FLOOR FANS - OFFSHORE BRAZIL



Bruhn 2001

3D SEISMIC ON BASIN FLOOR FANS PROSPECT



With permission from Impact Oil & Gas

Sources: Africa Oil corporate presentation, Impact Oil & Gas, Bruhn 2001, Quester Advisors.

<sup>59</sup> Sources: Africa Oil, Impact Oil & Gas.

While there are differences between the development of the two South Atlantic margins and hence, their characteristics, there also appear to be many similarities, which have attracted many players to offshore Namibia, including the supermajors. Technological innovations in deep-water drilling and seismic imaging have advanced the geological understanding of the basins. More recent wells have successfully proven working petroleum systems, including mature source rocks and quality reservoirs. Unfortunately, finding adequate sealing and trapping mechanisms has been a challenge in many wells, resulting only in some hydrocarbon shows and no commercial discoveries. Despite the lack of economic success to date, two aspects keep Namibian geology attractive: a **diversity of identified plays** and the **unexplored nature of the basins, where large finds are possible**.

Namibia's territorial waters occupy a significant portion of West Africa's continental shelf, covering about 670,000 square kilometers. The area to 1,000-meter water depth is comparable in size to the combined offshore areas of Gabon, Congo, Zaire and Angola. In addition, about half as much lies in 1,000-2,500 meters of water<sup>60</sup>. The 26 exploration and appraisal wells drilled to date imply a very low density of less than 0.004 wells per 100 square kilometers. As such, the Namibian margin is largely unexplored and full of promise.

Progress in understanding the offshore basins has not been paralleled onshore. Four sedimentary basins have been identified onshore Namibia to date: the Owambo (Etosha) basin, the Waterberg basin, the Nama basin and the Warmbad basin<sup>61</sup> (see Figure 13). However, very little exploration has been done within these basins and minimal technical data is available, which means that the region could hold significant potential that hasn't been defined yet. As previously mentioned, only 12 wells have been drilled onshore, mostly shallow and largely as part of a wide-ranging pursuit of minerals, yielding some hydrocarbon shows but no commercial discoveries, and hardly testing the country's hydrocarbon potential. Considering that Namibia encompasses 825,615 square kilometers of land, drilling to date implies negligent density of less than 0.0015 wells per 100 square kilometers.

The same tectonic activity that influenced the forming of the offshore Namibia basins has also affected the geology of onshore regions (see Figure 11 and Figure 33). However, there is no continent-wide tectonically focused data set available beyond offshore West Africa, and hence, the onshore region's evolution is not well understood.

To advance the geological understanding of Africa's unexplored onshore basins, Dr. James Granath, a renown structural geologist (who is now a member of ReconAfrica's technical team), as part of his Big Picture project, mapped regionally connected structural systems. He used the GIS-based Exploration Fabric of Africa data (the "Purdy project") as a foundation, integrating understanding of the oceanic margins with the continental realm. The result was a detailed structural features map that can function as a framework for targeting and prioritizing both conventional and unconventional activity by operators and government organizations. This map identifies possible fairways of extensional basins and shears developed across the continent, including across Namibia, with many parts of the country still representing a blue-sky frontier for oil and gas exploration. Dr. Granath highlighted that onshore Namibia "could harbor extensive source, reservoir, and seal sections"<sup>62</sup>, which are the critical elements of petroleum systems' habitat.

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<sup>60</sup> Sources: "Namibia: Frontier Exploration in West Africa", Pat Coole et al., GEO ExPro, Vol. 11, No. 3 – 2016; "Source Rock, Maturity Data Indicate Potential Off Namibia", Oil & Gas Journal, August 10, 1998.

<sup>61</sup> Source: NAMCOR.

<sup>62</sup> Source: "Regionally Connected Structural Systems: the Power of the Big (Continental-Scale) Picture", James Granath et al., 2017.

While the depositional environment offshore is primarily marine, it is more diverse in the onshore. Onshore Namibia, there are evidence of restricted marine environment, particularly in western part of the country, and of continental lake (lacustrine) depositional environment, with terrigenous influences. These different types of depositional environments combined with structural elements of the region could generate a diversity of potential plays for companies to explore. There is also a possibility of stratigraphic plays in the onshore. Seismic data, which is currently very limited, would be critical to defining the different play types.

The only company we know of who is actively exploring onshore Namibia is ReconAfrica, featured in the second half of this report. The team believes to have discovered a new, deep rift basin in north-eastern Namibia and north-western Botswana and is currently drilling three stratigraphic wells to prove an active petroleum system across the region. If the company is successful, it may attract additional interest to the unexplored and full of possibilities region.

BP's former Executive Vice President of Exploration, Dr. Michael Daly, once remarked that onshore frontier basins will be one of the major sources of exploration potential going forward, with seismic and drilling being key to understanding these potentially prolific provinces<sup>63</sup>.

## Attractive fiscal regime and licensing system

The legislative framework governing the oil and gas industry in Namibia is modern and well developed. It has been specially established to promote hydrocarbon exploration and development in the country. Accordingly, government take is low early on, when risks for exploration companies are high, and it increases over time as companies recover their investment and begin to generate positive net cash flow.

There are four key pieces of legislation that govern the oil and gas industry and the economic benefits derived from petroleum exploration and production<sup>64</sup>:

1. The Petroleum (Exploration and Production) Act, 1991 (Act 2 of 1991);
2. The Petroleum Taxation Act, 1991 (Act 3 of 1991);
3. The Petroleum Laws Amendment Act, 1998 (Act 24 of 1998); and
4. The Model Petroleum Agreement (MPA), 2007.

Namibia's Ministry of Mines and Energy (MME) regulates the petroleum industry, ensuring that all legislation, regulations and policies are adhered to. The ministry promotes transparency and environmental and social responsibility. Environmental and ecological sustainability is an important part of the country's Vision 2030 and of the National Development Plans (NDPs) that are the main vehicles for achieving Namibia's long-term objectives<sup>65</sup>.

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<sup>63</sup> Source: "Future Trends in Global Oil and Gas Exploration", Dr. Michael C. Daly, September 23, 2013.

<sup>64</sup> Sources: Ministry of Mines and Energy of Namibia, NAMCOR.

<sup>65</sup> Source: "Environmental Rights and Justice Under the Namibian Constitution", Oliver C. Ruppel.

The petroleum fiscal regime is favorable to oil and gas exploration and development; it includes three key elements<sup>66</sup>, as summarized in Figure 17:

- 5% **royalty**;
- 35% **Corporate Income Tax**, allowing for a number of deductions; and
- Progressive **Additional Profits Tax (APT)**, levied in three tiers on after-tax net cash flows, once after-tax rate of return levels are achieved.

**Figure 17: Summary of Namibia's petroleum fiscal terms**

|                                      |  |
|--------------------------------------|--|
| <b>Royalty</b>                       | <ul style="list-style-type: none"> <li>• 5% of gross revenue, determined by the market value of oil and gas produced.</li> <li>• Producers have access to world pricing.</li> <li>• Paid for the benefit of the State Revenue Fund.</li> </ul>   |
| <b>Corporate Income Tax</b>          | <ul style="list-style-type: none"> <li>• 35% of taxable base/earnings, after deductions.</li> <li>• Allowed deductions include: royalties; all operating expenses; interest paid on loans and other debts; local G&amp;A; 100% of exploration expenditures when incurred; one-third of development expenditures in the year incurred, one-third in year 2 and one-third in year 3. There are no carry-forward limitation on losses.</li> <li>• Gains or losses from license sales (via direct or indirect ownership) are included in taxable income.</li> <li>• Paid for the benefit of the State Revenue Fund.</li> </ul> |
| <b>Additional Profits Tax</b>        | <ul style="list-style-type: none"> <li>• Progressive tax, levied in three tiers on after-tax net cash flows, once after-tax rate of return levels are achieved.</li> <li>• Specific terms vary from license to license.</li> <li>• Paid for the benefit of the State Revenue Fund.</li> </ul>  |
| <b>License fees</b>                  | <ul style="list-style-type: none"> <li>• License application fees, paid in Namibian dollars for the benefit of the State Revenue Fund.</li> <li>• Annual area rental charges, paid in Namibian dollars for the benefit of the State Revenue Fund.</li> <li>• Annual training fees, paid in Namibian dollars for the benefit of the Petrofund, the Petroleum Training and Education Fund.</li> </ul>  |
| <b>Customs duties</b>                | <ul style="list-style-type: none"> <li>• Company and its subcontractors are permitted to import all items required in petroleum operations, free of customs duties.</li> <li>• Such items include (but are not limited to) materials, equipment, supplies, vehicles, spare parts and chemicals.</li> </ul>   |
| <b>Mandatory state participation</b> | <ul style="list-style-type: none"> <li>• While there is no mandatory state participation in any upstream activity, the national oil company NAMCOR is typically invited to participate in agreements through a 10% carried interest.</li> <li>• NAMCOR's share of capital expenditures is carried by other partners during the exploration phase and sometimes into the development phase, depending on what is negotiated. After the carry period ends, the state company is responsible for its full share of capital spending.</li> </ul>   |

<sup>66</sup> Sources: Model Petroleum Agreement, 2007; Petroleum Taxation Act, 1991; Ministry of Mines and Energy of Namibia; NAMCOR.

Mandatory  
local content

- There are no mandatory local content provisions in the law.
- Companies are encouraged to hire and train local personnel and are asked to report their activities on a regular basis.

Repatriation of  
funds

- No restrictions in the law or the Petroleum Agreement.

Sources: Model Petroleum Agreement, 2007; Petroleum Taxation Act, 1991; Ministry of Mines and Energy of Namibia.

Namibia has an open licensing system in place since 1999, created to attract foreign investment. Domestic and international oil and gas companies can apply for acreage at any time, and terms are negotiated directly with the Ministry of Mines and Energy. The government has been working on expanding its technical database in order to de-risk exploration and attract the oil and gas industry.

Licenses are typically large, over a million acres in size. Three types of licenses may be issued<sup>67</sup>:

1. **Reconnaissance license** – issued for a period of up to six years, consisting of the initial period of up to two years and two additional periods of up to two years each. Each period has work commitments associated with it, including prospecting and technical work, established through negotiations. Upon completion of the term, the license is relinquished back to the government.
2. **Exploration license** – issued for a period of up to ten years, consisting of the initial period of up to four years and two additional periods of up to two years each, which may be extended by an additional year upon application. Each period has work commitments associated with it, including technical work and drilling commitments, established through negotiations. At the end of each period, some acreage relinquishment is typically required. Upon completion of the full term, the license is relinquished back to the government. More than 50 petroleum exploration licenses (PELs) have been awarded by the Ministry of Mines and Energy to date<sup>68</sup>; in addition, an active deals market also exists in Namibia.
3. **Production license** – issued upon a commercial hydrocarbon discovery for a period of up to 35 years, consisting of the initial period of up to 25 years and one additional period of up to ten years. Each period has work commitments associated with it, including technical work and drilling commitments, established through negotiations. There is no mandatory state participation. Upon completion of the full term, the license is relinquished back to the government.

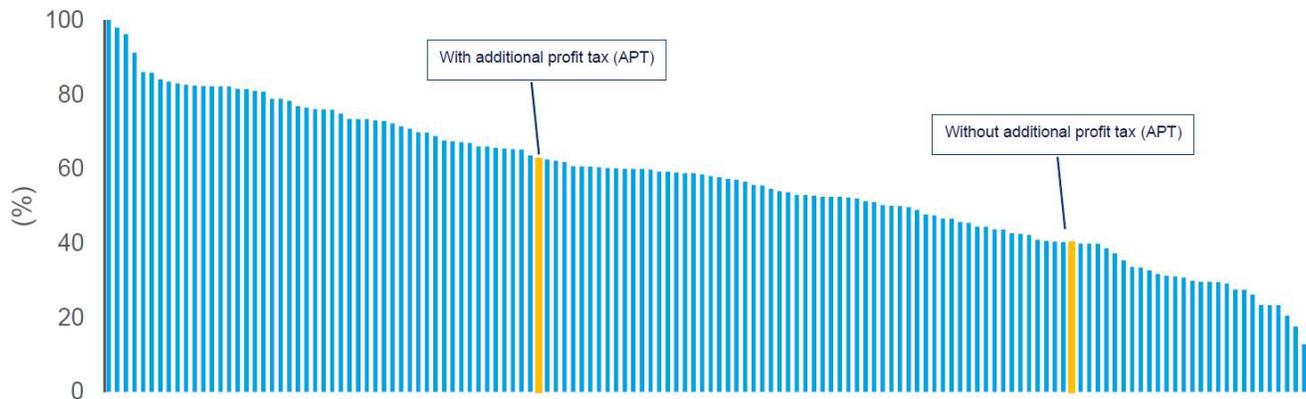
Namibia's national oil company, the National Petroleum Corporation of Namibia, or **NAMCOR**, can choose to participate in licenses, if offered during negotiations. While there is no mandatory state participation in any upstream activity, NAMCOR is typically invited to participate in agreements through a 10% carried interest. NAMCOR's share of capital expenditures is carried by other partners during the exploration phase and sometimes into the development phase, depending on what is negotiated. After the carry period ends, the state company is responsible for its full share of capital spending.

<sup>67</sup> Sources: Petroleum (Exploration and Production) Act, 1991; Ministry of Mines and Energy of Namibia; NAMCOR.

<sup>68</sup> Sources: James A. Deckelman, 2011; Ministry of Mines and Energy of Namibia.

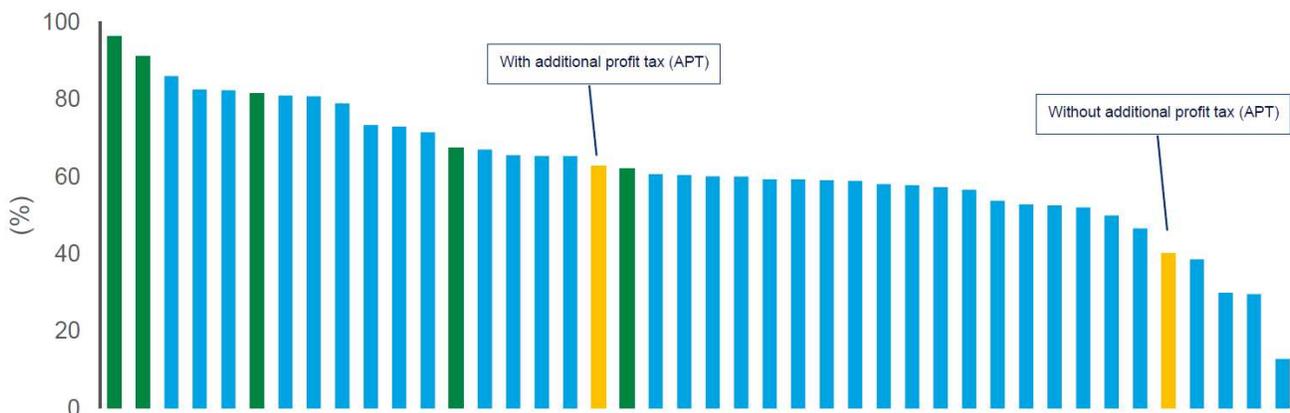
In case a dispute arises between the operator and the government that cannot be settled internally, Namibia’s law states that any unresolved dispute “shall be finally settled by arbitration in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law in force on the date on which [the] Agreement is signed”<sup>69</sup>.

**Figure 18: Global government take, % pre-share NPV10; Namibia shown in orange<sup>70</sup>**



Source: “Kavango Basin Review & Global Benchmarking”, Wood Mackenzie, November 2020.

**Figure 19: Africa government take, % pre-share NPV10; Namibia shown in orange, top five producing countries in Africa in green<sup>71</sup>**



Source: “Kavango Basin Review & Global Benchmarking”, Wood Mackenzie, November 2020.

<sup>69</sup> Sources: Model Petroleum Agreement, 2007; Ministry of Mines and Energy of Namibia.

<sup>70</sup> Key assumptions include: US\$60/bbl oil, 50-mmbbl oil development onshore, medium cost.

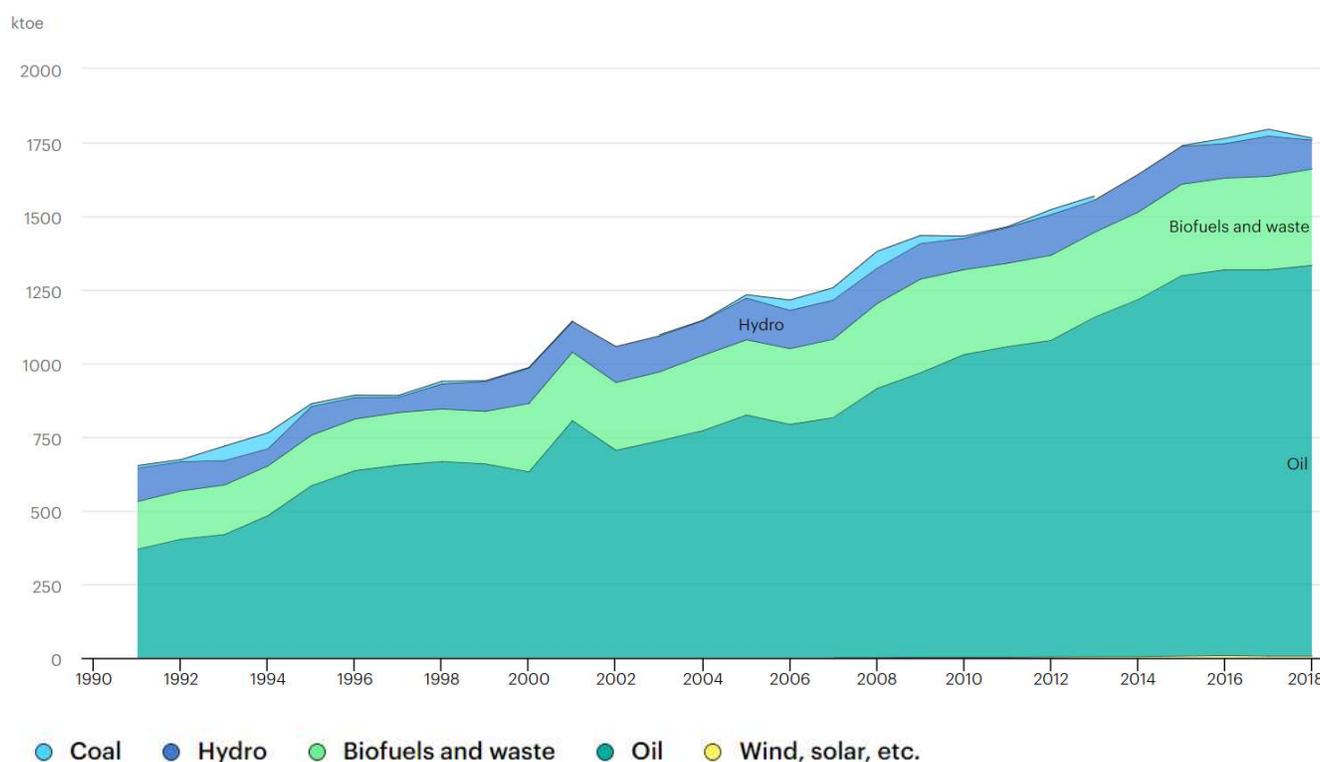
<sup>71</sup> Key assumptions include: US\$60/bbl oil, 50-mmbbl oil development onshore, medium cost.

In summary, Namibia has an attractive petroleum fiscal regime and licensing system in place, developed to promote investment. Under US\$60/bbl oil, government take is estimated to range from ~40% to ~63%<sup>72</sup>, depending on the share of profits being reinvested and the extent to which the Additional Profit Tax (APT) applies. In terms of being attractive to foreign investment, Namibia’s fiscal regime compares favorably to the top producing nations in Africa and to other regimes globally (see Figure 18 and Figure 19).

## Energy security and access to world markets

With a vast Atlantic coastline that spans 1,572 kilometers<sup>73</sup>, Namibia has access to open water and hence, world markets, should commercial deposits of oil or gas be discovered.

**Figure 20: Namibia's total energy supply from different sources**



Source: IEA, 2018 data.

With a small local population of about 2.7 million people<sup>74</sup>, more than half of which live in rural areas, Namibia’s internal energy demand is relatively modest. Nonetheless, the country is a net energy importer. Its own internal resources supply less than one-third of its needed energy requirements; the rest is imported,

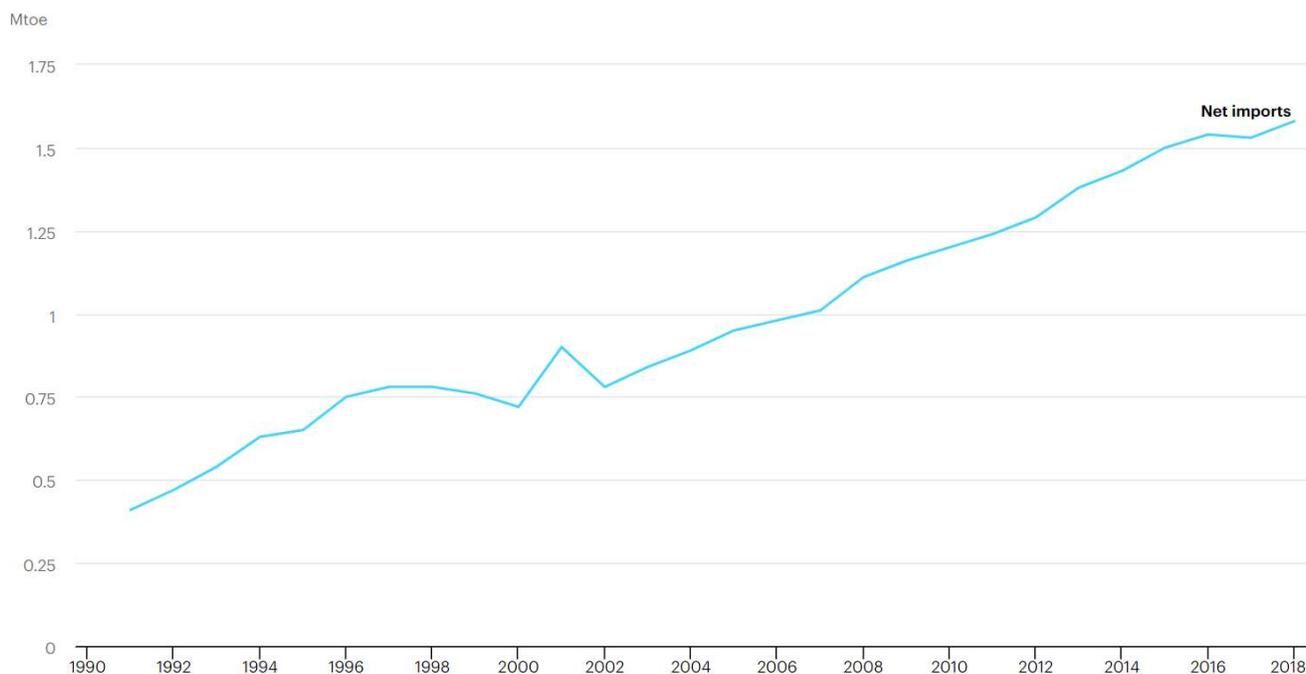
<sup>72</sup> Source: “Kavango Basin Review & Global Benchmarking”, Wood Mackenzie, November 2020.

<sup>73</sup> Source: The CIA World Factbook.

<sup>74</sup> Source: The CIA World Factbook, July 2021 estimate.

largely from South Africa<sup>75</sup>. Namibia's top energy sources are imported petroleum, locally generated hydropower, imported electricity and imported coal.

**Figure 21: Namibia's net energy imports**



Source: IEA, 2018 data.

Should commercial deposits of gas be found in the country, at least some of it is likely to be used locally, in gas-to-power generation, paving the way to the country's energy independence and improving Namibians' quality of life. According to the International Energy Agency (IEA), around a million Namibians lack access to electricity, and by 2030, 36% of Namibians will still not have access to modern energy under the business-as-usual scenario<sup>76</sup>.

Gas-to-power generation is part of the current plan for the stalled 1.3-tcf Kudu gas/condensate field development, which includes a 400-500-MW gas-to-power plant<sup>77</sup>. Approximately 400 MW of the power generated by the plant is expected to be used in Namibia<sup>78</sup>, which could significantly reduce the need to import electricity. Namibia's average electricity consumption rate was estimated at 4,160 GWh in 2018, while its production was 1,557 GWh during the year<sup>79</sup>. Using simple calculations that assume a 50% capacity factor, the difference of 2,603 GWh/year could be supplied by a ~594-MW power plant. Since 2018, Namibia's population is estimated to have grown by ~10%, the industrial and transportation sectors

<sup>75</sup> Sources: IEA, 2019; ThinkNamibia.org.na.

<sup>76</sup> Source: The International Energy Agency's World Energy Outlook 2018.

<sup>77</sup> Initially, an 800-MW plant was envisioned; however, due to financial constraints, the project is expected to be scaled down. Sources: Ministry of Mines and Energy of Namibia, public sources.

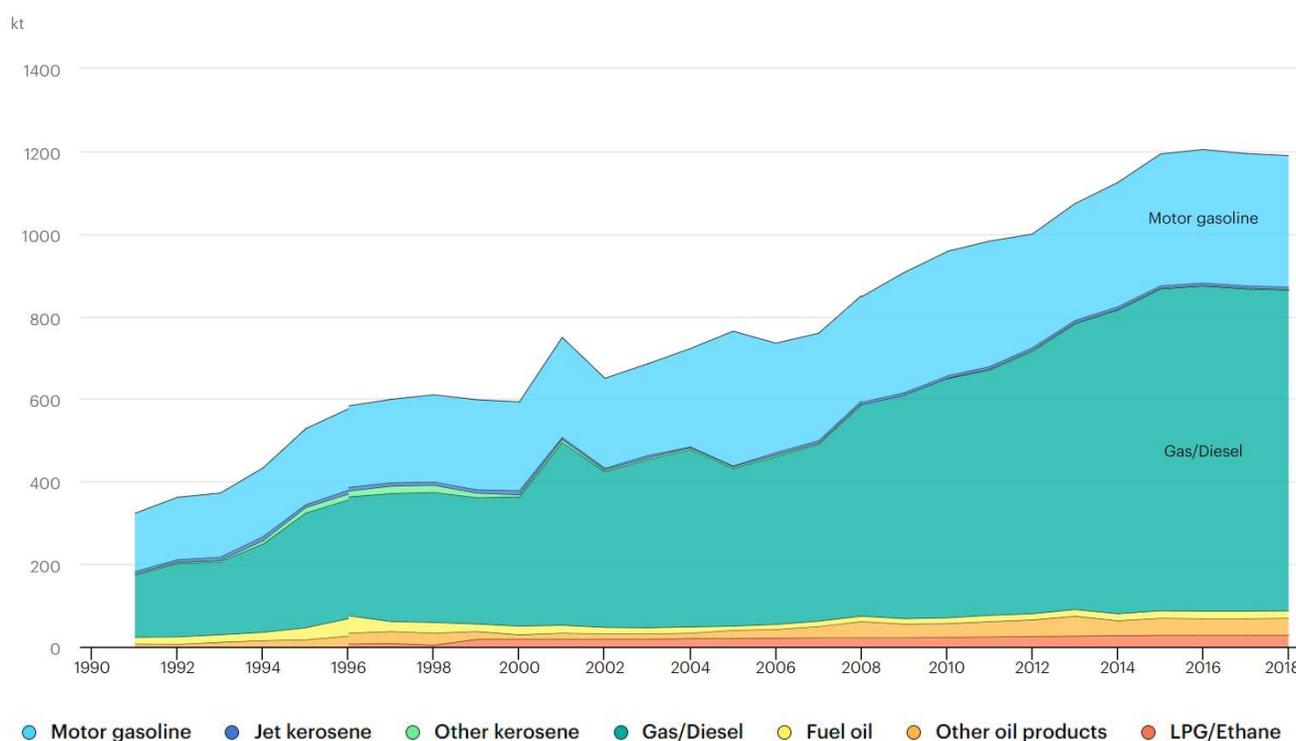
<sup>78</sup> Source: NAMCOR.

<sup>79</sup> Source: AFREC Africa Energy Database, 2018 edition.

continued to develop, and urbanization has increased<sup>80</sup>, which means that so has demand for power. However, a new 400-500-MW power plant could satisfy a large part of that demand, significantly reducing the country's reliance on imported electricity, supporting economic activity and improving the GDP.

If local oil deposits are discovered, oil could be used to produce fuels for local consumption or trade for them, as the country currently has no refining capacity of its own, eliminating the need for imports. In 2018, Namibia imported ~1,504 kilotons (kt) of oil products<sup>81</sup>, which is equivalent to ~33,000 bbl/d of mainly gas and diesel. Liquid fuels in general, and oil in particular, are widely used in Namibia's household and industrial sectors (see Figure 22). Diesel and petroleum are the most used liquid fuels in the country, particularly in the transport sector, representing ~57% of consumed oil products<sup>82</sup>.

**Figure 22: Namibia's final consumption of oil by product**



Source: IEA, 2018 data.

Once domestic demand is satisfied, oil and gas are likely to be exported. There are a number of industrial gas developments being discussed in South Africa in the coming years, including Liquefied Natural Gas (LNG) and Gas-to-Power facilities, which are expected to help the country transition from its over-reliance on coal. Recently found gas deposits offshore South Africa and any gas found in Namibia may be part of the solution. Additionally, excess Namibian gas may be sent for export to other neighboring countries and

<sup>80</sup> Source: World Bank.

<sup>81</sup> Source: AFREC Africa Energy Database, 2018 edition.

<sup>82</sup> Source: AFREC Africa Energy Database, 2018 edition.

worldwide; however, it would likely require investment in infrastructure, including compression facilities and pipelines.

Oil deposits found offshore would likely be commercialized using FPSOs (Floating Production Storage and Offloading vessels), as is the case in many offshore oil provinces around the world. ExxonMobil's Liza field development offshore Guyana is one such example, with the Liza Destiny FPSO expected to develop 500 million barrels of resources in the first phase. Total's Kaombo project offshore Angola is another, with two FPSO vessels expected to develop 658 million barrels of resources over the life of the project<sup>83</sup>.

Oil discovered onshore would likely be trucked and/or sent by rail to one of Namibia's two major ports, in Walvis Bay and Lüderitz, from where it would go to export. Despite the remote nature of much of the country, Namibia has some of the best-developed infrastructure on the continent, including seaports, airports, highways, railways and a modern electricity distribution grid, as it seeks to become a regional transportation hub, particularly to its landlocked neighbors<sup>84</sup>. The ports in Walvis Bay and Lüderitz are well positioned to service the oil industry.

The deep-water Port of Walvis Bay, strategically located half way down the coast of Namibia, with direct access to principal shipping routes, recently commissioned a new container terminal, increasing its capacity from 355,000 TEUs (Twenty-foot Equivalent Units) to 750,000 TEUs yearly. In addition, it has an integrated network of energy facilities that include oil terminals, shore stations, long-distance pipelines and storage tanks. After a recent expansion, the port can receive AFRA-size oil tankers with capacity up to 100,000 DWT (deadweight metric tons), or about 500,000-750,000 barrels. Storage facilities with capacity to hold about 470,000 barrels of oil and refined products are also available at the port<sup>85</sup>.

**Figure 23: Port of Walvis Bay container terminal and oil jetty view**



Sources: NAMCOR, Seetao.com.

The Port of Lüderitz caters for the southern part of the country and provides access to markets in the Northern Cape of South Africa. It could be utilized by the petroleum industry to ship cargo to South Africa, which has oil processing facilities, refineries and petrochemical plants. The deep-water Port in Saldanha Bay could be an important destination for Namibian oil, as it already handles significant oil imports and is a hub

<sup>83</sup> Source: Company reports.

<sup>84</sup> Sources: IHS Markit, AfricaNews.com.

<sup>85</sup> Sources: A1V2, NAMCOR, The US EIA.



for crude oil storage activity, boasting storage capacity of almost 60 million barrels. It can handle vessels up to Very Large Crude Carrier (VLCC) size. Major commodity shipping and trading companies have a presence here<sup>86</sup>.

While supply chain to commercialize potential oil and gas discoveries is not well developed in Namibia at this time, some key elements of it are in place, due in part to a well-established mining industry and the country's goal of becoming a major regional logistical hub.

## High hopes for oil and gas

Namibia has never produced oil or gas. However, the government has high hopes of finding oil and gas resources within its country's boundaries. Revenue from hydrocarbon development could improve the country's balance sheet, create much-needed employment, support economic activity, significantly improve living standards of Namibian people, and help diversify the economy. Oil and gas resources would also set Namibia on a path towards achieving energy independence, which is the focal point of the country's Vision 2030.

With exploration companies' budgets currently constrained, exploration activity has slowed and the timeline for getting to first oil or gas revenues has been extended. ReconAfrica is the only company we know of who is actively drilling in the country; theirs may be the first commercial barrels that we see produced, as soon as in 2023. Assuming US\$60/bbl Brent, a potential ~1.9 billion-barrel resource development that may be targeted by ReconAfrica and partner NAMCOR could generate ~US\$18 billion in government revenue<sup>87</sup> over its ~30-year life, which represents ~150% of the country's ~US\$12 billion GDP projected for 2021<sup>88</sup>. Once the project ramps up to full capacity and the up-front infrastructure investment is completed, it could generate more than US\$600 million per year in state revenue<sup>89</sup>. Over its life, revenue from the project could help eliminate the ~US\$6.7-billion public-sector debt the country has outstanding<sup>90</sup>. ReconAfrica's project alone could eliminate the need for Namibia to import oil and oil products, supporting the country on its path to energy independence, as well as generate significant exports, strengthening the nation's balance sheet.

In addition to ReconAfrica's drilling program, up to five wells are being contemplated offshore Namibia in the next 12 to 18 months, four in the Orange basin and one in the Walvis basin (see Figure 24). Results of these wells will be closely watched by the industry, as the size of the prize could be substantial, with resource potential estimated in billions of barrels.

In particular, Total's play-opening Venus-1 exploration well in Namibia's ultra-deep water is most anticipated, as it has the potential to be one of the year's largest discoveries. The wildcat will target at least two billion barrels of oil in a new, giant Cretaceous-fan play, close to the South African maritime boundary (see Figure 16). The seventh-generation Maersk Voyager drillship has been contracted to execute the drilling. If the well is successful, it is likely to attract much more attention to the area. So could exploration success in other

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<sup>86</sup> Sources: TRANSNET National Ports Authority; "Traders Look to South Africa's Saldanha Bay for Crude Storage as Supply Glut Looms", S&P Global, March 24, 2020.

<sup>87</sup> Including estimated royalties and taxes to be paid by ReconAfrica and net cash flow generated by NAMCOR, undiscounted.

<sup>88</sup> Source: IHS Markit.

<sup>89</sup> Project assumptions are detailed in the second half of this report.

<sup>90</sup> Source: IHS Markit.

Atlantic margin basins, including offshore Guyana and Suriname, for example, where a record 16 exploration wells are planned to be drilled in 2021<sup>91</sup>.

Any significant discovery, onshore or offshore, could be transformational for Namibia and its people.

**Figure 24: Calendar of upcoming events, milestones and potential catalysts**

| Date                       | Event  | Description  | Relevant companies   |
|----------------------------|--|--|--|
| Ongoing                    | Kavango basin stratigraphic well results, PEL-73, onshore Namibia                                  | The three stratigraphic wells are looking to prove that an active Permian-age petroleum system exists within the newly defined Kavango sedimentary basin onshore Namibia. The first of three wells recently finished drilling, with the second well expected to spud by late April.  | ReconAfrica 90% (operator), NAMCOR 10%   |
| H2 2021                    | Kavango basin 2D seismic results, PEL-73, onshore Namibia  | ReconAfrica is planning to acquire 450 kilometers of 2D seismic across the Kavango basin. Processing will tie well data to the seismic data and help significantly improve the geological understanding of the area and targeting by future wells.   | ReconAfrica 90% (operator), NAMCOR 10%   |
| Q3 2021 (tentative)        | Venus-1 exploration well spud, Block 2913B, Orange basin, offshore Namibia                         | The ultra-deep-water wildcat is targeting a potential resource of more than two billion barrels of oil in a Cretaceous basin-floor fan play. It will be one of the deepest wells ever drilled in Africa, in just over 3,000 meters of water, targeting one of the largest submarine fans ever tested by the industry. The seventh-generation Maersk Voyager drillship has been contracted to execute the drilling. | Total 40% (operator), Qatar Petroleum 30%, Impact Oil 20%, NAMCOR 10%                |
| H2 2021 - 2022 (tentative) | Spudding of an exploration well on PEL-39, Orange basin, offshore Namibia                          | The operator Shell is looking to drill one of three prospects: Graff, Cullinan or a third unnamed prospect, based on its interpretation of 7,500 sq.km. of new 3D seismic that was shot in 2019. Each well is targeting a different play type within the paleo-Orange River delta system and is located in ~2,000 meters of water, testing multi-billion-barrel potential.   | Shell 45% (operator), Qatar Petroleum 45%, NAMCOR 10%                                |
| 2022 (tentative)           | Spudding of the Gazania-1 exploration well, Block 2B, Orange basin, offshore northern South Africa | The Gazania-1 well will be targeting a 349 million-barrel prospect and is estimated to cost ~US\$21 million. The well is located in ~150 meters of water, updip from the syn-rift AJ-1 discovery made in 1988, just across the Namibian maritime border. The AJ-1 well penetrated algal-rich lacustrine source rocks, reporting TOC content of 3-5%, and flowed high-quality light oil (36° API) to the surface.   | Azinam 50% (operator), Africa Energy 27.5%, Panoro Energy 12.5%, Crown Energy 10%    |
| 2022 (tentative)           | Spudding of the Aurora-1 exploration well, Walvis basin, offshore Namibia                          |  | Maurel & Prom 42.5% (operator), Azinam 42.5%, NAMCOR 8%, Livingstone 4%, Frontier 3% |
| 2022 (tentative)           | Spudding of the Cairn-1 exploration well, Orange basin, offshore northern South Africa             | The Cairn-1 well is targeting a syn-rift play in the shallow water offshore northern South Africa.   | Tosaco Energy  |

Sources: Company reports, Oil & Gas Journal, IHS Markit, UpstreamOnline.com, EnergyVoice.com.

## Participating in Namibia's success

There are many ways to participate in Namibia's potential exploration success. A number of supermajors, including ExxonMobil, Shell and Total are active in the area; their stocks may offer some exposure to Namibia, albeit on a diminished basis, as the country represents only a small part of the companies' global portfolios. Total is thought to be most likely to drill the next big exploration well offshore Namibia, tentatively scheduled to spud in the third quarter of this year, as shown in Figure 24. Oilfield service companies that will

<sup>91</sup> Sources: Energy-pedia.com, Rystad Energy.

be supporting drilling activities may also offer a way to participate in the region's potential exploration success.

As previously mentioned, a number of smaller, publicly traded and private companies, with a focus on Namibian exploration, are also present in the region. These companies include Africa Energy, Azinam, Chariot Oil & Gas, Eco Atlantic, Impact Oil, Maurel & Prom, Pancontinental Oil & Gas, ReconAfrica, Tower Resources, Tullow Oil and others. Companies with concentrated operations often carry higher risks, but also offer potentially higher returns. Drilling results could provide substantial potential catalysts for these names. Impact Oil, for example, has a 20% working interest in the offshore license containing the Venus prospect, expected to be tested later this year. ReconAfrica is in the process of drilling three stratigraphic wells in the onshore and plans to acquire seismic data later this year, with results anticipated over the course of the year. The company is featured later in this report.

## Risks to consider

Investing in Namibia is not without risks. We highlight some of the challenges the country and the oil and gas industry may be facing.

- **Frontier exploration carries high risks.** Despite promising geology, no commercial discoveries have been made in Namibia to date, and there is no guarantee that any will be made in the future. As of today, Namibia remains largely unexplored, a frontier for oil and gas companies, full of possibilities, but also implying high exploration risks.
- **Sizable discoveries required to justify development, particularly offshore.** Offshore Namibia is thought to contain a significant prize, however, likely in deep and ultra-deep water, where conditions are harsh and development would be challenging and costly. As a result, a sizable discovery would likely have to be made to justify development, potentially in the 250-300 million-barrel range or larger for a stand-alone development.
- **Gas resources may be stranded; oil likely to be commercialized first.** As the stalled 1.3-tcf Kudu gas/condensate project attests, significant gas resources may be difficult to commercialize in Namibia due to small and fragmented regional gas markets. Oil resources are likely to be developed first, using FPSOs if offshore, similar to other offshore oil provinces around the world. Oil discovered onshore may be used internally and sold for export, as the country has access to open water and infrastructure to receive medium-sized oil tankers.
- **Undeveloped oil and gas service sector.** As Namibia currently has no hydrocarbon production, its oil and gas service sector is not developed. Should a commercial discovery of hydrocarbons be made, services and materials may need to be brought in from outside Namibia, which could take longer and cost more. Having said this, while the supply chain to commercialize potential oil and gas discoveries is not well developed in Namibia at this time, some key elements of it are in place, due in part to a well-established mining industry and the country's goal of becoming a major regional logistical hub.
- **Avoiding the "resource curse".** The so-called resource curse, also known as the paradox of plenty, refers to the paradox that countries rich in natural resources often do worse than countries

that lack such resources, reporting lower economic growth rates, greater volatility, more corruption, human rights abuses, authoritarian rule, and, in extreme cases, devastating civil wars<sup>92</sup>.

The logic is as follows. Significantly increased exports of resources can cause the local currency to appreciate, making other tradable goods less competitive. As imports become cheaper, undermining local producers and manufacturers, the country's employment suffers, causing a loss of skilled labor and manufacturing capabilities, further reducing local industry competitiveness. Government intervenes by increasing spending to create jobs, while in the process reducing spending in other important sectors and ramping up debt. Corruption can exacerbate these negative trends. Ultimately, the economy becomes less diversified and more dependent on resources, and hence, vulnerable to resource price volatility, which could disrupt government planning and debt service. Significant revenue volatility and unequal distribution of wealth can erode the rule of law and popular support, potentially causing conflict within the country<sup>93</sup>. Angola, Sudan, Nigeria, Congo and Venezuela are some examples of countries that are considered "resource-cursed".

The resource curse is not inevitable, however. Some of the key factors that affect it include the system of government in place, the quality of institutions and the manner in which resource income is spent. Transparency and accountability are considered among main remedies for it. Namibia is a stable democracy, with solid institutions in place and a strong rule of law, as previously discussed in this report. As a result, we believe it stands a good chance of beating this curse, as long as it remains vigilant of it.

- **Rising tide of low-carbon investing.** Values-based investing has been growing in popularity in recent years. There has been an increasing emphasis on investing in renewable sources of energy, rather than high-carbon sectors like hydrocarbons. As a result of the COVID pandemic and weak oil prices caused by reduced demand, oil and gas companies' budgets are constrained. The companies are experiencing increasingly more pressure from stakeholders, including major lenders on whom they depend for capital, to invest their cash flows into low-carbon sectors, reducing investment in conventional oil and gas development. Meanwhile, significant investment may be required to support exploration efforts in frontier basins like Namibia. As a result, we may see less dollars allocated to Namibian exploration by global players, causing oil and gas activity in the country to slow down. Having said this, with the country's promising geology and attractive fiscal terms, we do not expect exploration activity to cease altogether; instead, we see it potentially proceeding at a more measured pace going forward.

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<sup>92</sup> Source: "Escaping the Resource Curse", M. Humphreys et al., 2007.

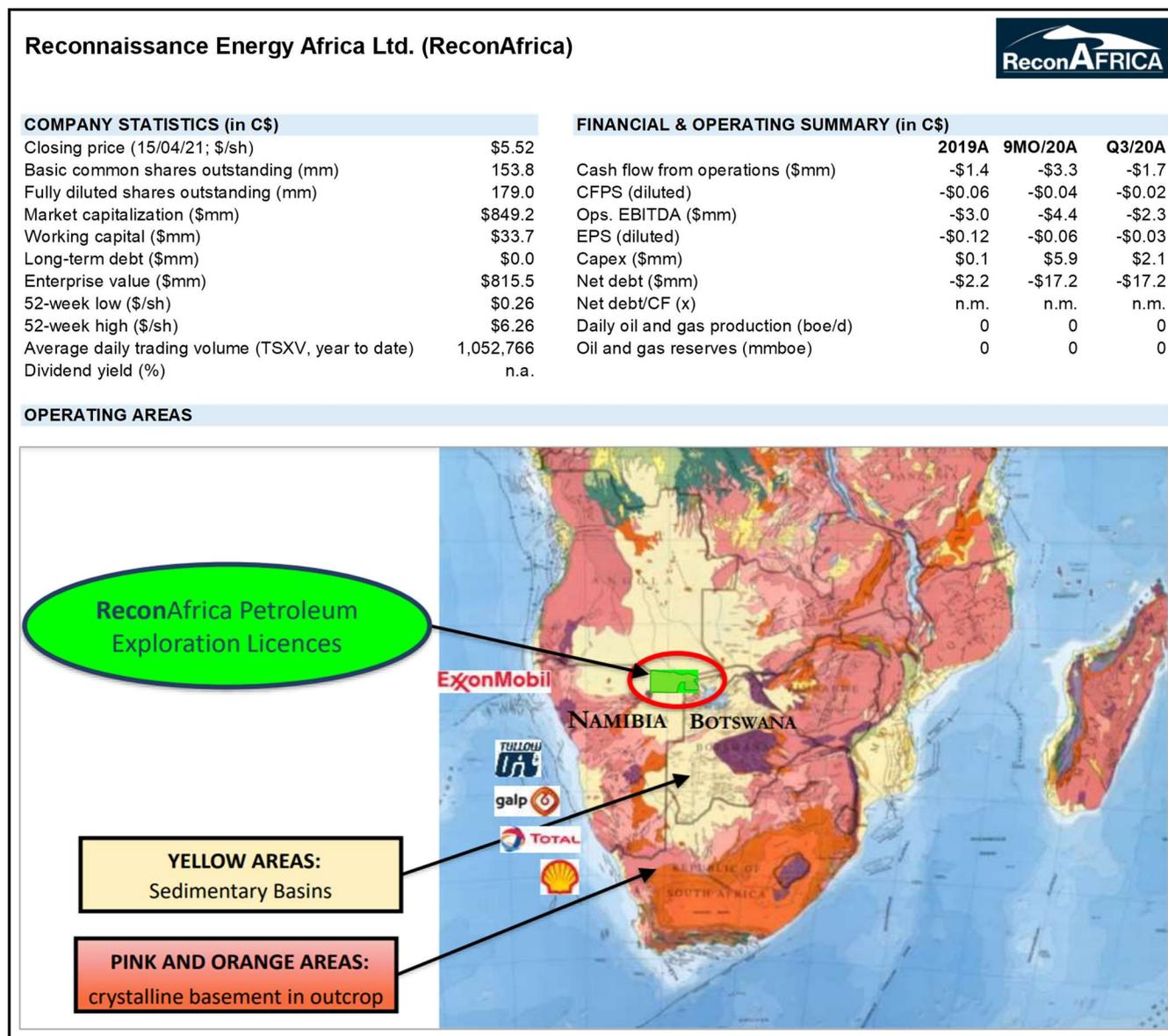
<sup>93</sup> Source: Wikipedia.

## ReconAfrica: A small company with a mega-opportunity

Note: All values are in Canadian dollars, unless otherwise indicated.

Reconnaissance Energy Africa Ltd. (ReconAfrica) is a junior, Canadian-domiciled public company focused on oil and gas exploration onshore Namibia and Botswana. At the time of writing of this report, the company's market capitalization was approximately C\$850 million.

Figure 25: ReconAfrica's snapshot



Sources: Quester Advisors, TSX Venture Exchange, ReconAfrica, SEDAR.



ReconAfrica's team believes to have discovered a substantial new sedimentary basin in the largely unexplored areas of north-eastern Namibia and north-western Botswana. The company secured petroleum licenses covering the entire basin and is now drilling the initial three stratigraphic wells in Namibia, which will be looking for evidence of an active petroleum system across the basin and potentially assessing oil and gas-prone conventional targets. Preliminary results of the first well are promising, with more than 660 feet (200 meters) of oil and gas shows encountered over three intervals in a stacked sequence of reservoir and source rock. Permian source rocks encountered in a nearby vintage well are of particular interest to the company, as they have generated prolific petroleum systems worldwide, including in the US Midland basin. These source rocks have provided about 8% of the world's discovered original reserves of oil and gas<sup>94</sup>, and are believed to be present in ReconAfrica's Kavango basin.

Should the company be successful in proving a new, prolific basin at Kavango, there could be significant upside to its valuation, as discussed later in this report. On the other hand, if the company is unsuccessful, the downside could also be substantial, making ReconAfrica's stock, in our opinion, a high-risk/high-return investment proposition.

## How it all began

Namibia, with its stable democracy, strong rule of law, and a favorable for oil and gas exploration fiscal and licensing regime attracted the attention of ReconAfrica's founder, Craig Steinke, back in 2013. When the government offered him access to tight-grid, high-quality aeromagnetic data collected over most of the country but never analyzed, he put together a highly experienced technical team to evaluate it. The team came back with a conclusion that they may have discovered a new, deep rift basin in north-eastern Namibia. This is when the idea of ReconAfrica was born.

Over the course of 2014, Mr. Steinke secured the land over the basin and brought in initial investors to help fund the company's exploration activities.

In the four years that followed, while oil prices were weak, the team continued to gather and analyze data around the Kavango basin, including well data from the nearby Owambo sedimentary basin to the west and across southern part of Africa.

In late 2018, through a series of transactions, which included a reverse takeover (RTO) by a British-Columbia-incorporated, publicly listed mining company, Lund Enterprises Corp., the present-day Reconnaissance Energy Africa was born. (ReconAfrica's current corporate structure is depicted in Figure 26).

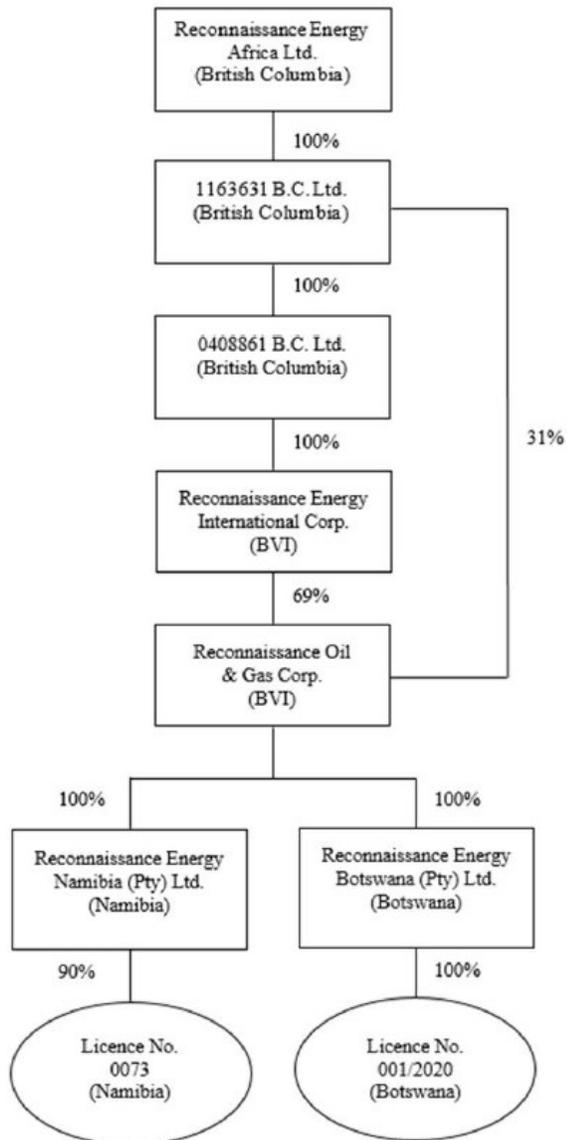
Today, ReconAfrica is one of the largest license holders in Namibia and one of the most active operators in the country. The company has a 90% operated interest in an exploration license covering 6.3 million acres of land in north-eastern Namibia, with NAMCOR holding the remaining 10% interest. In addition, ReconAfrica holds a 100% operated interest in a 2.2-million-acre petroleum license in north-western Botswana, with the two contiguous licenses covering the entire new basin. (Botswana is outside the scope of this report and hence, will not be discussed in detail.)

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<sup>94</sup> Source: "Depositional Controls, Distribution, and Effectiveness of World's Petroleum Source Rocks", G.F. Ulmishek et al., 1991.

The team's focus in the near term is to prove that an active petroleum system exists across the Kavango basin, which there are evidence of in the first well, and ultimately, establish commercial quantities of hydrocarbons. The company appears to have sufficient capital to fund its activities in 2021 and into 2022. Upon success, we see ReconAfrica taking on partners to help fund the basin's development, or under the right conditions, selling the company altogether to create value for its shareholders.

**Figure 26: ReconAfrica's corporate structure**



Source: ReconAfrica's 2019 AIF. Note: The above diagram sets out all of the company's subsidiaries as of July 27, 2020, their respective jurisdiction of incorporation and the company's direct or indirect voting interest in each subsidiary.

## The team

ReconAfrica has assembled a highly experienced and accomplished technical team with deep knowledge of petroleum systems around the world. Key members of the team include the following individuals; their brief biographies are provided in Figure 48 in the Appendix.

- **Bill Cathey, Geophysicist.** Mr. Cathey is President and Chief Geoscientist of Earthfield Technology. He has over 25 years of potential field interpretation experience, with clients including Chevron, ExxonMobil, ConocoPhillips and many other major and large independent oil and gas companies. Mr. Cathey performed the entire magnetic survey interpretation of the Kavango basin for ReconAfrica.
- **Shiraz Dhanani, Geophysicist, Advisory Committee.** Mr. Dhanani has over 40 years of experience with major oil companies, including BP and ExxonMobil. His expertise is in new-country access, initiating new-field oil and natural gas plays, as well as project and executive management, with a strong focus on Africa. As a former Technical Director of BP in Libya, Mr. Dhanani played an integral role in negotiating a multi-billion-dollar exploration and appraisal contract and initiated an extensive exploration drilling program to develop the assets. He is also credited for proving the viability of the Silurian black shales in Tunisia, through a successful drilling and appraisal program, and joint venturing and monetizing the asset to Anadarko in 2011.
- **Dr. James Granath, Director, Structural Geologist.** Dr. Granath has extensive knowledge in African petroleum exploration. His expertise lies in seismic interpretation and integration with structural analysis, fracture analysis, regional synthesis, and prospect and play evaluation. He had spent 18 years with Conoco, in research, international exploration and new ventures, and subsequently, advised many companies on structural geology and tectonics as applied to exploration problems, having worked on projects in some 40 countries around the world. Dr. Granath also advised ReconAfrica on tectonics and structural geology of the Kavango basin.
- **Dan Jarvie, Petroleum Systems Chemist.** Mr. Jarvie is President of Worldwide Geochemistry, LLC and a former Chief Geochemist of EOG Resources, one of the largest independent oil producer in North America. He is globally recognized as a leading analytical and interpretive organic geochemist, having evaluated petroleum systems around the world. His specialties include source rock characterization, particularly for resource assessments, and detailed source rock characterization for conventional petroleum system analysis, including bulk and compositional kinetic determinations, high resolution light hydrocarbon and fingerprinting analysis, pyrolysis and catalysis studies. Mr. Jarvie performed geochemical analysis of the Kavango basin source rocks for ReconAfrica.
- **Nick Steinsberger, SVP Drilling & Completions, Petroleum Engineer.** Mr. Steinsberger has 32 years of experience in petroleum engineering, drilling and completions, production, and surface facilities. He is considered a world leader in completions and well design. Mr. Steinsberger is overseeing ReconAfrica's drilling operations.
- **Dr. Ansgar Wanke, Geologist.** Dr. Wanke has over 20 years of experience in various fields, including regional mapping, geochemistry, hydro- and engineering geology, sedimentology and seismic stratigraphy. He joined the University of Namibia geology department in 2008, where he reviewed and designed several geology curricula, and headed the department in 2012-2016. Dr. Wanke supervised a number of research projects on Namibian offshore and onshore basins. He



performed paleogeographic reconstruction of ReconAfrica's Kavango basin and helped mature the idea of a new sedimentary basin in north-eastern Namibia and north-western Botswana.

The team is led by **Scot Evans**, who is the CEO of the company and a geologist by training. Mr. Evans is an energy industry leader with a combined 35 years of international experience with Exxon, Landmark Graphics and Halliburton. He previously served as VP of Halliburton's Integrated Asset Management and Technical Consulting organizations, where he grew production from 20,000 boe/d to more than 100,000 boe/d. Mr. Evans is an expert in new resource development.

Mr. Evans is joined by **Carlos Escribano**, who is the CFO of the company. Mr. Escribano is a Chartered Professional Accountant (CPA) with over 14 years of experience in senior-level financial management roles for publicly traded, multinational resource corporations. He has expertise in finance, accounting and administration, including debt and equity financing, financial reporting and compliance, budgeting and treasury.

The company's Board of Directors is headed by **Jay Park**. Mr. Park is a leading international oil and gas lawyer with 40 years of experience. He has advised E&P companies, governments, state oil companies and investors on upstream oil and gas transactions, contracts, laws and regulations in over 50 countries, including 17 African countries. Mr. Park has served as Director and/or Officer of a number of oil and gas companies with operations in Africa, including as Chairman of the Board and Director of Voyageur Oil and Gas, which explored the Borj El Khadra Sud block in Tunisia, farmed out to Anadarko; and as Director of Caracal Energy, with oil producing assets in the Doba basin of Chad, acquired by Glencore in 2014 for US\$1.3 billion.

In our opinion, ReconAfrica has assembled a first-class team that is the core of its story. Insiders, including Board members and management, own approximately 3% of the outstanding shares of the company and are also incentivized through option ownership. ReconAfrica's founder, Craig Steinke, holds approximately 5% of the outstanding shares.

## Core assets

The company's core assets include two petroleum licenses and a drilling rig.

### The Namibian petroleum agreement

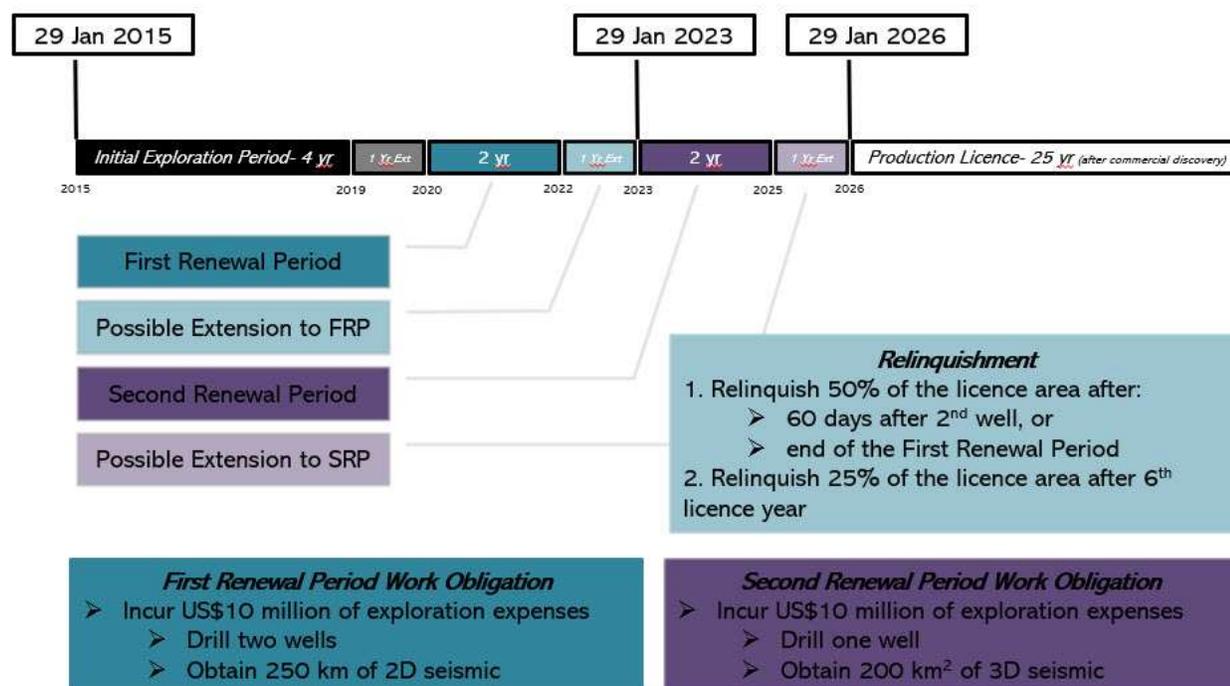
ReconAfrica has a petroleum agreement with the Ministry of Mines and Energy of Namibia (MME) and the national oil company NAMCOR, which was signed in January of 2015. This agreement entitles the company to a 90% operated interest in the petroleum exploration license PEL-73, covering about 6.3 million acres of land in north-eastern Namibia and encompassing blocks 1719, 1720, 1721, 1819, 1820 and 1821. In line with the country's environmental regulations, the area under the petroleum exploration license excludes all national parks, including the Khaudum National Park and the Bwabwata National Park.

The state oil company, NAMCOR, holds the remaining 10% carried interest in the license. NAMCOR's share of capital expenditures is carried by ReconAfrica until production; beyond that, the terms of the joint operating agreement are still being negotiated. After the carry period ends, the state company will be responsible for its full share of capital spending.

The exploration license covers all petroleum rights from surface to basement. It has completed its initial four-year term and is now in the first renewal period of two years, which expires on January 29, 2022. With extensions and renewals, the company has the right to continue exploration activities until January 29, 2026. Each of the two renewal periods carries a work program commitment of US\$10 million, plus US\$50,000 per year (adjusted for inflation) for the purposes of funding the education and training of Namibians. Once the company completes its drilling and seismic program this year, we believe it will have fulfilled its first-renewal-period obligations.

In accordance with the petroleum agreement, ReconAfrica must relinquish at least 50% of the exploration area covered by the license no later than either 60 days after the drilling of the second stratigraphic test well, or at the end of the first renewal exploration period, as agreed by the MME and the company. We expect the initial relinquishment requirement to be postponed to the end of the first renewal exploration period (January 2023) to allow the company to conduct additional exploration work. ReconAfrica will have to relinquish an additional 25% of the exploration area no later than 30 days before the end of the first renewal exploration period. Any areas that will be determined by the company to be potentially productive are excluded from the relinquishment requirements.

**Figure 27: PEL-73 terms summary**



Sources: ReconAfrica, Quester Advisors.

If a commercial discovery is made, the petroleum agreement entitles ReconAfrica to a 25-year petroleum production license (PPL) over the productive area, with the option of a ten-year extension. As is the case with all production licenses in Namibia, discussed earlier in this report, ReconAfrica's production license fiscal terms include a 5% royalty, a 35% Corporate Income Tax and a progressive Additional Profits Tax (APT). If an IRR of 15% is achieved, the APT is 21%; once IRR exceeds 20%, the APT increases to 25%; when IRR surpasses 25%, the APT rises to 28%. Therefore, the government take increases once the



company recovers its investment and begins to generate positive net after-tax cash flow. The commencement of the APT would be postponed if the company continued to reinvest capital into the area.

## The Botswanan petroleum license

Across the border in Botswana, ReconAfrica also holds a petroleum license covering about 2.2 million acres of land contiguous with PEL-73, with the two licenses encompassing what the team believes to be the entire new Kavango sedimentary basin. The license 001/2020 was issued by the Botswana Department of Mines and the Ministry of Mineral Resources, Green Technology and Energy Security (MMR) in June of 2020. It has been amended to exclude the entire core and buffer areas of the Tsodilo Hills, a UNESCO World Heritage Site.

The Botswanan petroleum license entitles the company to a 100% operated interest in all petroleum rights from surface to basement, with the initial exploration period of four years and options for renewals up to an additional ten years, in accordance with the Botswana Petroleum (Exploration and Production) Act. The minimum work program during the initial period is US\$432,000. If a commercial discovery is made, ReconAfrica has the right to enter into a 25-year production license, which may be extended for an additional 20 years. Royalties associated with the production license would be subject to negotiation; they typically range from 3% to 10%. The Corporate Income Tax rate is 22%.

Overall, the terms offered by Botswana are even more attractive than those of Namibia, as both countries try to attract foreign investment and promote oil and gas exploration within their borders.

ReconAfrica has also entered into a farm-out option agreement with a private company owned by Mr. Steinke, which entitles the farmee to acquire a 50% working interest in the license within three years, subject to certain conditions. Mr. Steinke has since assigned the option to Renaissance Oil Corp., a junior, Canadian-domiciled company operating in Mexico and looking to diversify its interests internationally. Mr. Steinke is a co-founder and major shareholder of Renaissance; he currently serves as CEO and Director of the company.

Botswana is outside the scope of this report and hence, will not be discussed in detail. Instead, this report will focus on the new Kavango hydrocarbon basin potential.

## The new Kavango basin potential

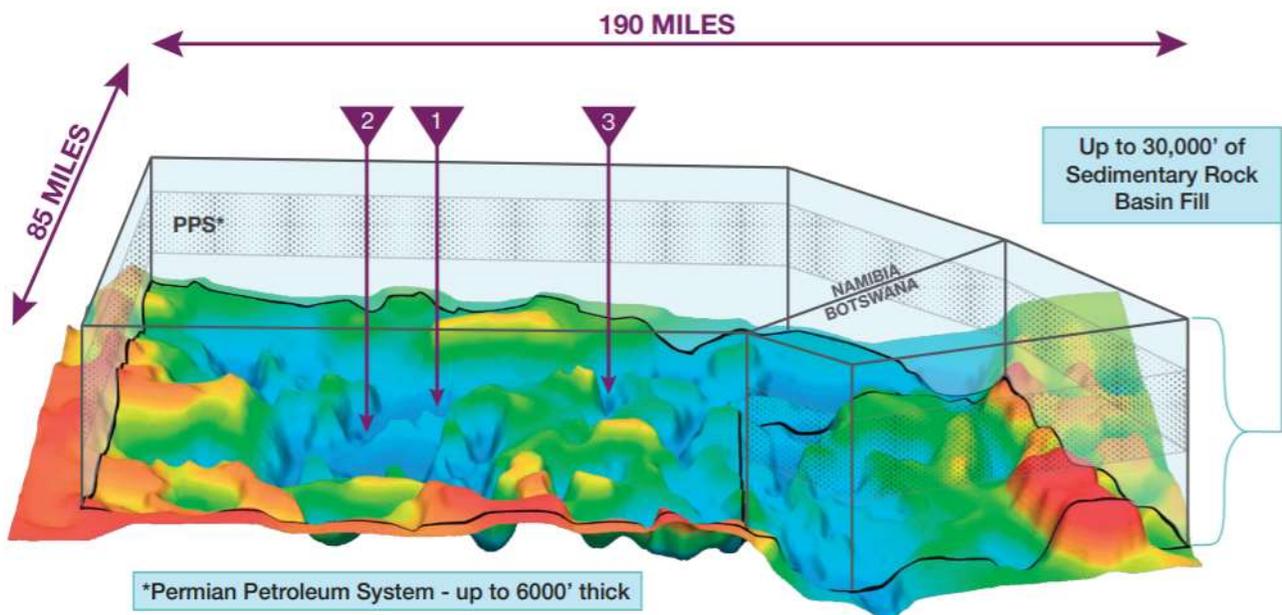
When Mr. Steinke purchased tight-grid, high-quality aeromagnetic data from the government of Namibia, he put together a highly experienced technical team to evaluate it. The data was collected in 1996 by BGM (now CGG) for the Geological Survey of Namibia; however, it was never analyzed, offering the ReconAfrica team a unique opportunity to be an early mover if something of geological interest was to be discovered.

The very-high-spatial-resolution aeromagnetic data was collected with high-sensitivity cesium vapor magnetometer flown over most of the country. Survey specifications included tight 200-meter line spacing, with orthogonal tie lines at 2,500-meter intervals. Flight altitudes were low, generally at 80 meters above ground levels. Magnetometer sample rates were 10 samples per second, with detection sensitivities of

better than 0.01 nanotesla (nT), implying very high resolution<sup>95</sup>. At the time, ReconAfrica’s team had noted that it was some of the best-quality data they had ever seen outside of Canada and the US.

Earthfield Technology was retained to analyze the data, which provided information on basin depth and basin floor definition. A potential deep rift basin was defined, about 190 by 85 miles in size and up to 30,000 feet deep, meaning that it could contain up to 30,000 feet (9,100 meters) of sedimentary fill (see Figure 28). The company completed structural and geological interpretations of magnetic inversion profiles, backfilling the basin with stratigraphic sections of Precambrian, Permian and Cretaceous sediments. The Permian-age petroleum system, which was encountered in an earlier well in the nearby Owambo sedimentary basin, was projected to be up to 6,000 feet thick (1,800 meters) at Kavango. Preliminary analyses indicate basin depths supportive of oil and gas thermal maturation levels, with expected oil proneness, which was evidenced by the first stratigraphic well that recently finished drilling.

Figure 28: Deep Kavango rift basin definition



Sources: Earthfield Technology, ReconAfrica.

Pioneer Oil and Gas Consulting, UES Namibia, Chronosurveys Lda and ReconAfrica’s technical team analyzed available log and core material from the Owambo and Waterberg sedimentary basins, which went into understanding the lithostratigraphy and depositional environments in the area. Data from almost 220 vintage wells across southern Africa was also reviewed by the company, with most wells targeting Permian-aged deposits, which were of particular interest to ReconAfrica.

Data from the Etosha Stratigraphic Test #1 wellbore (ST-1), located in the center of the Owambo sedimentary basin to the west of ReconAfrica’s acreage, provided valuable insight. Good-quality core and log data from the well was made available to the company by NAMCOR. The wellbore was drilled in 1964 by

<sup>95</sup> Sources: Earthfield Technology; “Integrated Exploration of the Owambo Basin, Onshore Namibia: Hydrocarbon Exploration and Implications for a Modern Frontier Basin”, T. Hoak et al., July 7, 2014.

a subsidiary of Texas Eastern to a depth of 6,163 feet, encountering about 620 feet of Karoo-aged Permian black shales, which, the team concluded, “may qualify as hydrocarbon source rocks”<sup>96</sup> (see Figure 29). In the team’s opinion, these shales correlated directly to the Permian Whitehill formation in the Main Karoo basin in South Africa (where TOC is up to 14% and recoverable reserves are estimated at more than 370 tcf of gas<sup>97</sup>), at significantly greater depths and higher thermal maturities.

**Figure 29: Core sample from the ST-1 well, depicting black shales at 1,489-foot depth**



Sources: Texas Eastern, NAMCOR, Pioneer Oil and Gas Consulting, UES Namibia, ReconAfrica.

The source rocks appear to be thermally immature at the ST-1 well location, as they are deposited at fairly shallow depth. However, they captured the team’s attention, as the Permian period was a time when sea levels rose substantially across the globe and basins were formed, leading to the deposition of organic, hydrocarbon-rich strata. Across the world, thick sections of deep marine and lacustrine sediments were formed, with the thickest deposits occurring in the deepest parts of the basins.

Permian source rocks have generated prolific petroleum systems worldwide, including in the US Midland basin, Russia’s Oural-Volga basin, the Southern North Sea basin, the North Caspian basin, the Vilyuy basin of Easter Siberia, the Rocky Mountain basins in Canada and the US, the Sichuan and Junggar basins of China, and the Cooper basin in Australia, to name a few.

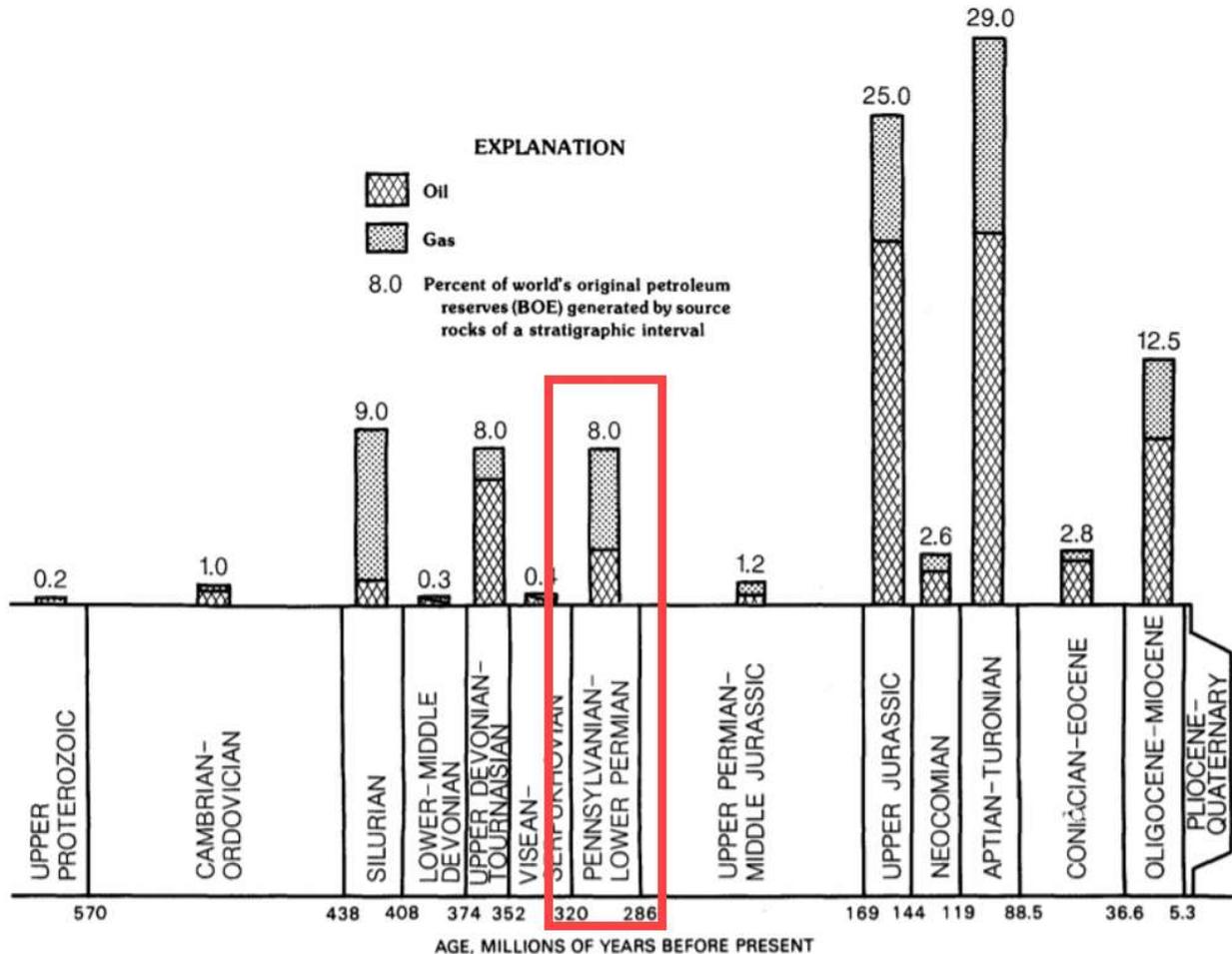
Permian-age source rocks have provided about 8% of the world’s discovered original reserves of oil and gas, with oil representing about 40% of the mix (see Figure 30)<sup>98</sup>.

<sup>96</sup> Sources: Pioneer Oil and Gas Consulting, UES Namibia.

<sup>97</sup> The U.S. Energy Information Administration estimate.

<sup>98</sup> Sources: “Depositional Controls, Distribution, and Effectiveness of World’s Petroleum Source Rocks”, G.F. Ulmishek et al., 1991; Quester Advisors.

Figure 30: Distribution of effective source rocks through geologic time, in percent of world's original petroleum reserves generated by these rocks



Sources: "Depositional Controls, Distribution, and Effectiveness of World's Petroleum Source Rocks", G.F. Ulmishek et al., 1991; Quester Advisors.

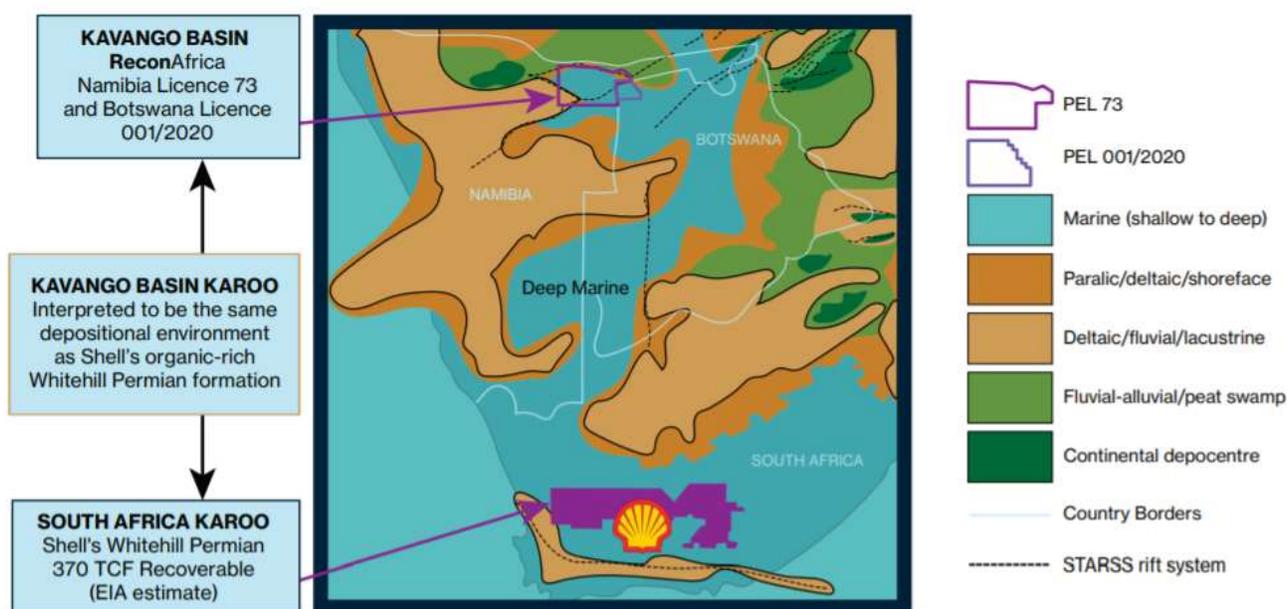
Karoo-aged basins cover large areas of Namibia, with outcrops occurring in southern, mid-northern and north-western parts of the country. The interpretation of the basin evolution and tectonic setting varies; however, they have continental and marine sediments occurring in successions, which is typical of many rift systems<sup>99</sup>. The basins were targeted for their coal potential in the 1980s; only recently have they been considered for their oil and gas exploration potential. The Permian strata contain not only coal seams, but also extensive organic shales, which correlate well with similar shales across the Gondwana supercontinent. These shales are known as the Whitehill formation in South Africa (e.g. Shell's 370-tcf play) and as the Irati shales in South America (e.g. the Paraná basin in Brazil)<sup>100</sup>. ReconAfrica believes the Permian petroleum system within the new Kavango basin is contiguous with South Africa's Karoo basin (see Figure 31).

<sup>99</sup> Source: "Hydrocarbons in Rift Basins: The Role of Stratigraphy", J. Lambiase et al., 1999.

<sup>100</sup> Source: "Namibia in the Spotlight Again", A. Wanke, GEO ExPro, October 2019.

Sedimentology and isotopic signatures in the Namibian Karoo-aged basins indicate restricted environments with repeated algal blooms, which are favorable conditions for the deposition of oil-prone source rocks<sup>101</sup>. It is the presence of such source rocks and hydrocarbon-bearing reservoirs that ReconAfrica is looking to prove as part of its three-stratigraphic-well drilling program that is currently underway. The company is targeting conventional hydrocarbon reservoirs with source rocks in the hydrocarbon prone deposits within the Karoo Group, including the Prince Albert, Whitehill and Collingham formations, and all of the Lower Ecca Group, which also occur in South Africa’s Karoo basin.

**Figure 31: Regional Karoo Permian depositional environment**

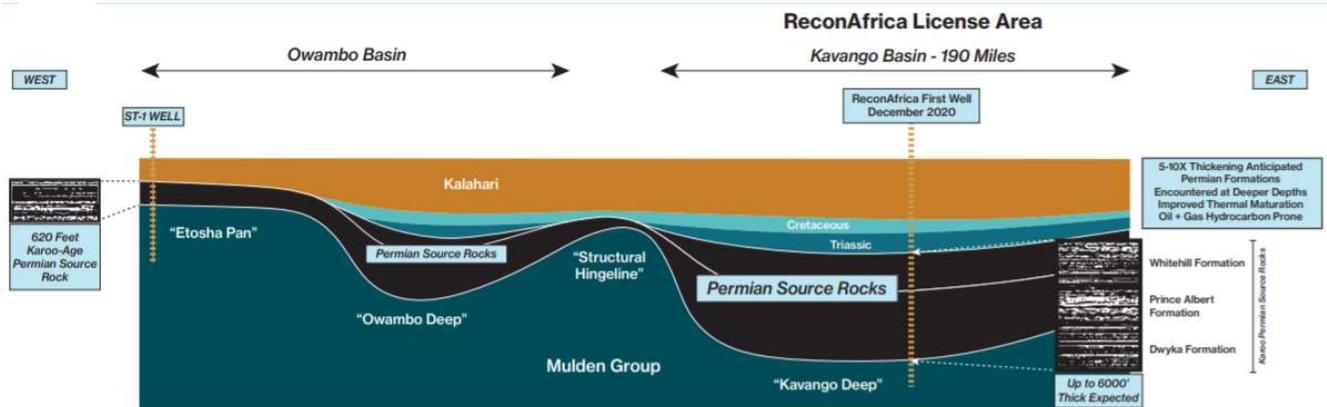


Source: ReconAfrica’s Technical Brief.

The aeromagnetic and regional data indicate that the Kavango basin is substantially deeper than the Owambo basin to the west (see Figure 32). The Permian petroleum system targeted by ReconAfrica is modelled to be deeper, thicker and more thermally mature than that encountered by the ST-1 well. The company expects the system to be hydrocarbon prone, and specifically, light-oil prone, which it is looking to prove with its ongoing exploration program. Preliminary results of the first well are promising, with more than 660 feet (200 meters) of oil and gas shows reported over three intervals in a stacked sequence of reservoir and source rock. The shows appear to be indicative of migrated, thermogenic petroleum, implying a working petroleum system. The company mentioned the presence of light oil and high-BTU gas in the press release, although detailed analysis of the quality of hydrocarbons as well as reservoir and source rock is still ongoing.

<sup>101</sup> Source: “Namibia in the Spotlight Again”, A. Wanke, GEO ExPro, October 2019.

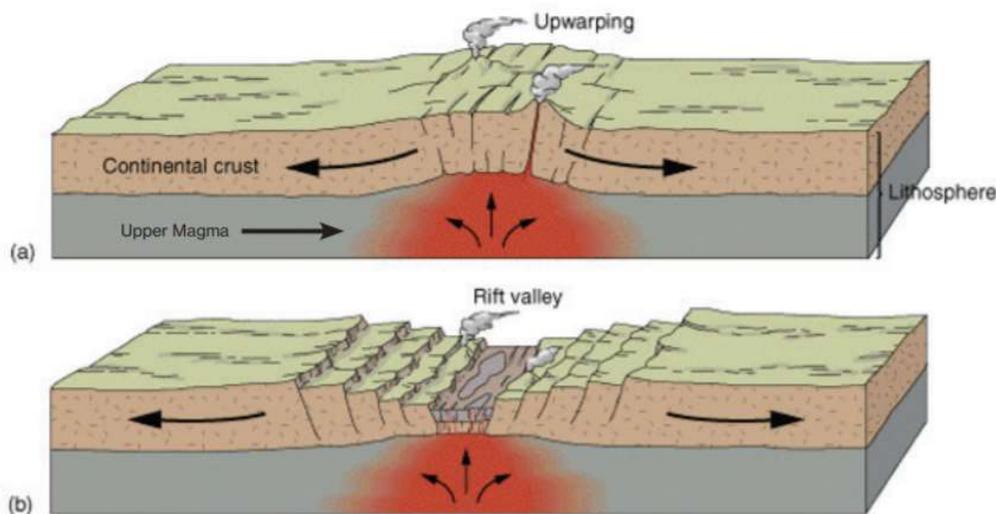
Figure 32: Modelled cross-section of the Owambo and Kavango sedimentary basins



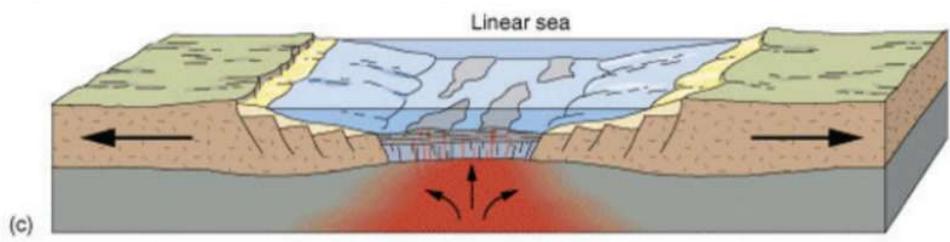
Sources: Dale Mitiska; ReconAfrica's Technical Brief.

Besides source rocks and quality reservoirs, the company is also looking for sealing and trapping mechanisms that would capture hydrocarbon accumulations. Regional work, including by Dr. James Granath and Dan Jarvie, confirms a rift basin at Kavango, as part of a larger regional rift system, influenced by the break-up and drifting apart of supercontinents, and in particular, the opening of the Atlantic Ocean during Jurassic and Cretaceous periods (see Figure 11 and Figure 33). Rift basins are well known as prolific hydrocarbon-bearing provinces worldwide<sup>102</sup>. The Kavango basin sits on the western extent of the Southern Trans-African Rift and Shear System (STARSS), which controls the development of the basin, including source rock deposition and hydrocarbon accumulation.

Figure 33: Formation of an intercontinental rift basin



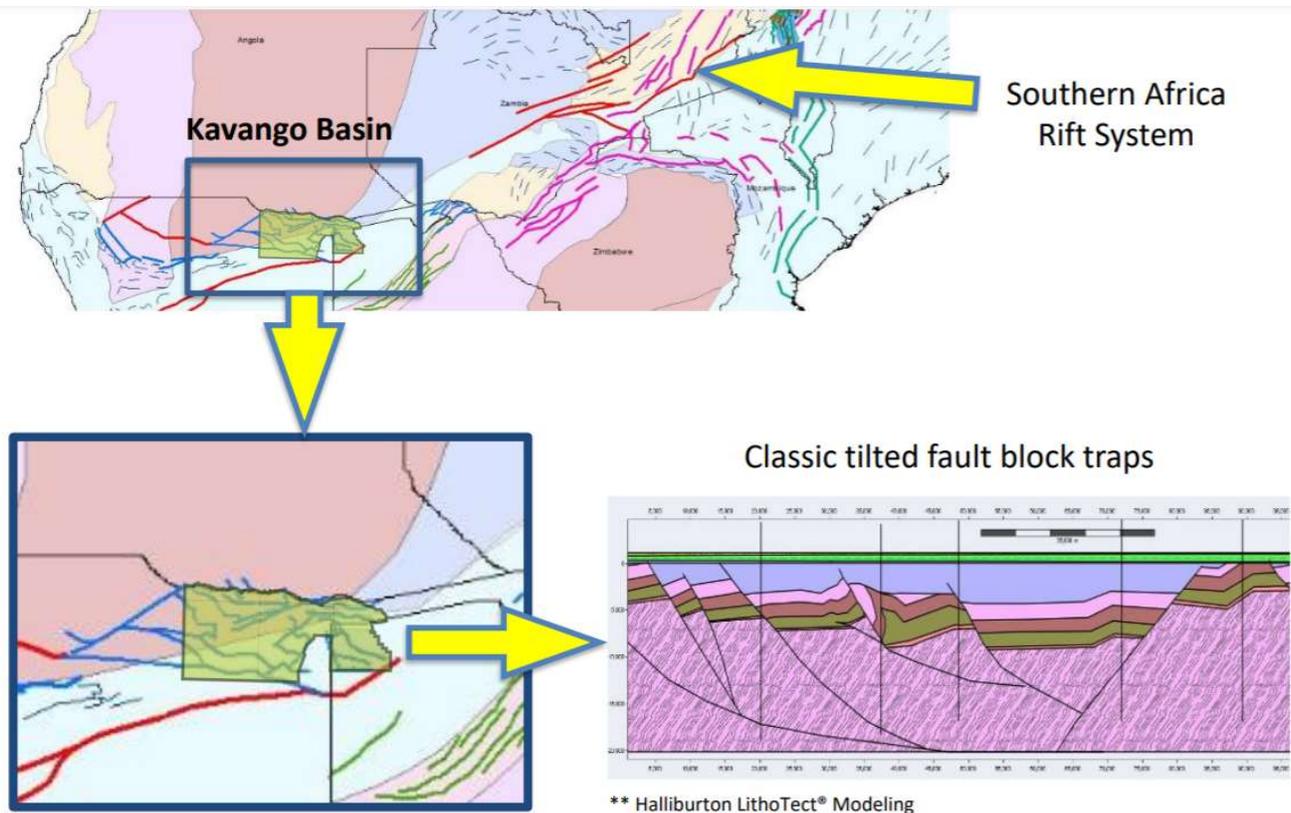
<sup>102</sup> Source: Morley, 1999.



Source: ReconAfrica's Technical Brief.

Structural development does significantly influence the occurrence and distribution of hydrocarbons within rifts. The Southern Trans-African Rift and Shear System (STARSS) has formed large conventional traps, which were mapped using Halliburton's LithoTect® advanced structural modeling, based on available regional data (see Figure 34). These classic tilted-fault-block traps overlaying potential source rock define the potential for hydrocarbon accumulations within the basin.

**Figure 34: The rift system creating conventional traps within the Kavango basin**



\* Granath and Dickson 2017

Sources: Granath and Dickson, 2017; Halliburton LithoTect Modeling; ReconAfrica's Technical Brief.

Basin structures should be better defined by seismic data, which ReconAfrica is planning to acquire later this year. The company has contracted Polaris Natural Resources Inc., one of Canada's most reputable seismic companies with vast international experience, to acquire 450 kilometers of 2D seismic. Polaris will use

environmentally friendly, low-impact seismic technology that has been successfully applied in over 15 projects in East Africa and was well accepted by local communities. Processing will tie well data to the seismic data and help significantly improve the geological understanding of the area and targeting by future wells.

Finally, Dan Jarvie conducted geochemical analysis of the predicted Permian source rocks within ReconAfrica's acreage to estimate their petroleum generation potential. Geological assessment suggested that marine and terrigenous organic matter would be present in the source rocks in the Kavango basin, which was thought to be contiguous with the prolific Karoo basin in South Africa (see Figure 31). Marine source rocks were encountered by the company's first stratigraphic well, while detailed core and log analysis to establish their characteristics is still ongoing. Geochemical data from a highly mature Permian section in the Karoo basin was used to estimate total organic carbon (TOC) and hydrogen content (HI), assuming slight oil proneness due to the expected deeper and thicker system at Kavango, arriving at average TOC of 3.75% and HI of 358 mg/g. These estimates produced total petroleum generation potential, expelled and retained, per section per foot of thickness.

Geological data from Namibia and Botswana was then used to predict net thickness of the Kavango basin source rock, arriving at an estimate of ~328 feet. Data from the work of Claire Geel et al. (2013) on Permian source rocks in the Karoo basin was utilized to estimate an alternate thickness of ~443 feet. A constant-heating-rate model (2°C/Ma, from 15°C to 300°C) was then applied to convert the source rock organic matter at kerogen conversion rates of 50% and 75%.

**Figure 35: Total petroleum generation potential of the Kavango basin source rocks**

| Total Petroleum Generation (Expelled and Retained) |                        |                        |                         |                        |                          |                        |
|--|------------------------|------------------------|-------------------------|------------------------|--------------------------|------------------------|
| Conversion   | Thickness in Feet      |                        |                         |                        |                          |                        |
|  | 200<br>(mmboe/section) | 300<br>(mmboe/section) | 328*<br>(mmboe/section) | 400<br>(mmboe/section) | 443**<br>(mmboe/section) | 500<br>(mmboe/section) |
| 50% Kerogen Conversion                             | 24                     | 37                     | 40                      | 49                     | 54                       | 61                     |
| 75% Kerogen Conversion                             | 37                     | 55                     | 60                      | 73                     | 81                       | 92                     |

\* net thickness from geological data  
 \*\* net thickness from Shell's Permian source rock section, Karoo basin, South Africa

50% Kerogen Conversion = ~ 0.84 vitrinite reflectance  
 75% Kerogen Conversion = ~ 1.10 vitrinite reflectance

| Total Petroleum Generation Potential over ReconAfrica's Kavango Basin Acreage (8.50 million acres) |                                   |                                   |                                   |                                   |                                   |                                   |
|--|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Conversion   | Thickness in Feet                 |                                   |                                   |                                   |                                   |                                   |
|  | 200                               | 300                               | 328                               | 400                               | 443                               | 500                               |
|  | 1641 sections*<br>(billion boe)** |
| 50% Kerogen Conversion   | 40                                | 60                                | 66                                | 80                                | 89                                | 100                               |
| 75% Kerogen Conversion   | 60                                | 90                                | 99                                | 120                               | 133                               | 150                               |

\* 1641 sections represents 12% of ReconAfrica total holdings of 13,671 sections  
 \*\* barrels of oil equivalent

50% Kerogen Conversion = ~ 0.84 vitrinite reflectance  
 75% Kerogen Conversion = ~ 1.10 vitrinite reflectance

Sources: Dan Jarvie, Worldwide Geochemistry LLC; ReconAfrica's Technical Brief.

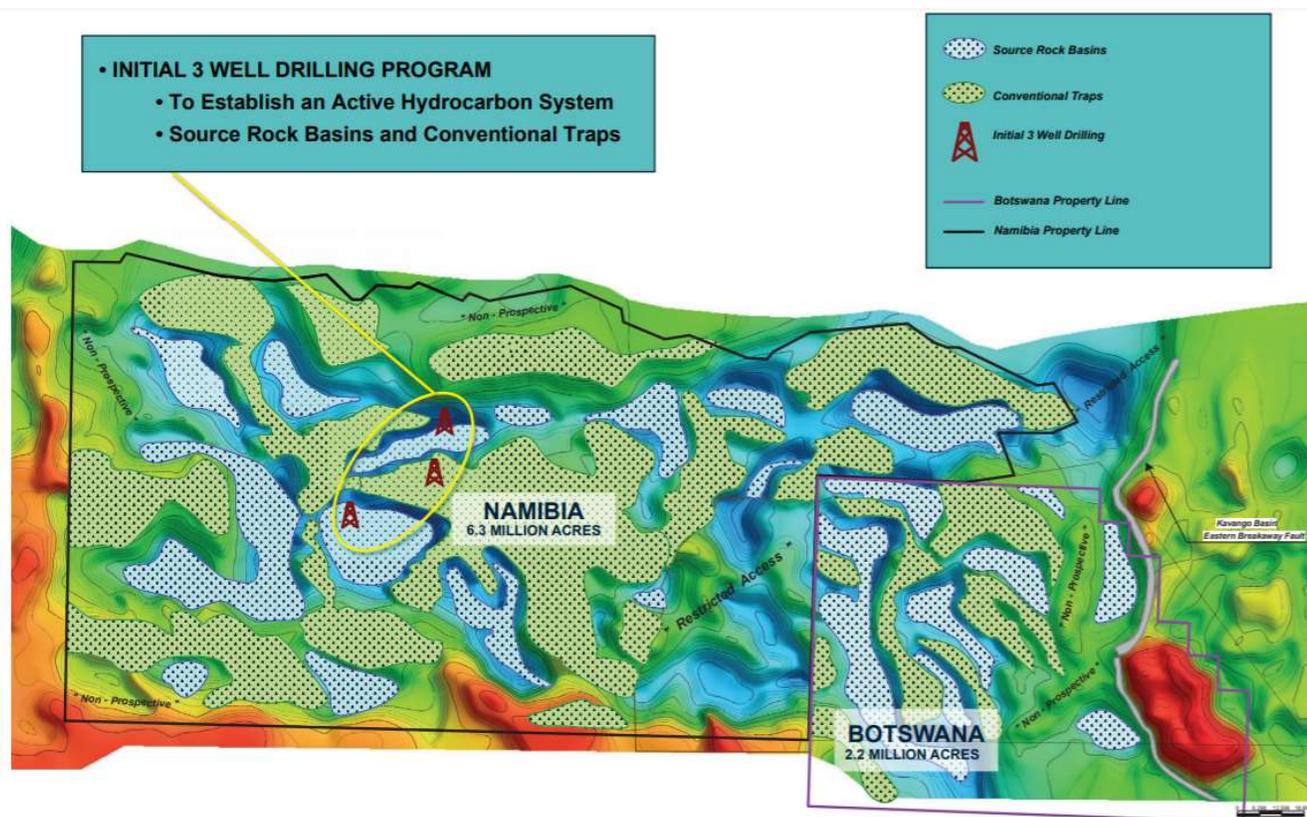
Based on reasonably predicted source rock properties and various thicknesses, Mr. Jarvie estimates that the Permian petroleum system within the Kavango basin has potential to have generated 66-120 billion boe

of hydrocarbons within 1,641 sections of land alone, which represent about 12% of ReconAfrica's total acreage (see Figure 35).

Whether we use the estimates at the low or the high end of the predicted range, it is clear that hydrocarbon generation potential of these source rocks could be significant. The next step is for ReconAfrica to prove that these source rocks do indeed occur in the Kavango basin, to confirm their properties, depth and thickness, which is exactly the goal of the three stratigraphic wells being drilled by the company.

The first of three stratigraphic wells, #6-2, was spudded on January 11, 2021 with the company-owned and operated drilling rig (discussed in the next section of this report). Water-based drilling fluid that is organic and biodegradable was utilized in drilling operations, supplied by Valence Drilling Fluids. The well had a targeted depth of 12,500 feet; it is unknown if this depth was achieved, but the company announced on April 6 that it completed drilling the well and gathering data. The top of the Permian section was expected to be reached at approximately 4,000 feet, with source rocks anticipated to be present in the lower intervals of the Permian section.

**Figure 36: ReconAfrica's play map of the Kavango basin**



Sources: Dr. James Granath, Earthfield Technology, ReconAfrica's Technical Brief.

The company collected extensive whole and sidewall core while drilling and conducted a full log suite of the zones of interest, with all data now undergoing a comprehensive analysis by ReconAfrica's technical team and expert consultants. A comprehensive state of the art logging program is being provided by Schlumberger. Core Laboratories is providing the analysis of potential reservoir rocks. GeoMark Research is

conducting geochemical analysis of source rocks and extracted liquids, including fingerprinting for key characteristics. Netherland Sewell & Associates Inc. is performing petrophysical analysis of the rocks and associated liquids, as well as additional geologic work. Preliminary results are promising, with the well encountering oil and gas shows over three different intervals in a stacked sequence of reservoir and source rock. The shows appear to be indicative of migrated, thermogenic petroleum, implying a working petroleum system.

Once operations are completed at the 6-2 well location, the rig will move to the second drilling location 16 kilometers to the north, where it will evaluate the petroleum systems discovered in the first well in an area of potential maximum thickness. The company may change its future drilling locations based on learnings from the previously drilled wells.

In late 2020, Wood Mackenzie, one of the world's leading natural resources research and consulting firms, released a report on sedimentary basins potentially analogous to ReconAfrica's Kavango basin. The study identified three world-class basins of similar age and tectonic origin: the Midland Permian basin in the US; the Southern North Sea basin in the Netherlands and the UK; and the Doba basin in Chad, Africa.

The study demonstrates how the Kavango basin may be analogous to the three basins in focus, but particularly to the sizable Midland Permian basin. A mature oil-producing region, the basin is of the same age as the Kavango and is thought to have been formed in a similar way, through rifting during the Permian period. For decades prior to the onset of the unconventional resource revolution, the Midland basin produced from low-cost conventional reservoirs, generating ~7% of global production in 1972. Similar conventional reservoirs are the focus of ReconAfrica's exploration. The Midland basin commenced production in the 1930s, and today it is still estimated to hold 23 billion boe of remaining liquid reserves and 26 tcf of remaining gas reserves. Should a working petroleum system be proved at Kavango, Wood Mackenzie believes that there could be "abundant opportunities for further exploration and appraisal", which would be facilitated by Namibia's attractive commercial terms <sup>103</sup>.

## Fit-for-purpose drilling rig

Motivated to advance its exploration program, ReconAfrica had held comprehensive discussions with a number of international drilling contractors. In order to keep the program on schedule and within budget, the company decided to purchase its own drilling rig and bring it to Namibia to execute its drilling program.

The Crown 750 rig, shown in Figure 37, is a modern, 1000-horsepower drilling rig, manufactured in the US but never used until now. It is equipped with two CAT 540-horsepower diesel engines, and combined with a 440,000-pound hook load, rated to drill approximately 12,000 vertical feet. The rig was purchased from Henderson Rigs for US\$1.8 million. For an additional cost of US\$1.2 million, it was upgraded with a best-in-class top-drive system (for faster drilling rates) and ancillary equipment to acclimate the rig for drilling in the Kalahari Desert (it now has ambient rating of 50-55°C).

The drilling rig, which the company has named Jarvie-1, has since been shipped by sea from the Port of Houston to the Port of Walvis Bay in Namibia, from where it was transported over land by way of the paved highway directly to the company's license area. Seidel Technologies, Inc. was retained to assist with the

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<sup>103</sup> Source: "Kavango Basin Review and Global Benchmarking", Wood Mackenzie, November 2020.

company's drilling program. The rig recently completed drilling the first of three stratigraphic wells and is preparing to move to the second location.

The company expects having its own custom-retrofitted rig to reduce drilling costs by as much as 60%, as well as allow it better control over the drilling schedule.

**Figure 37: The Jarvie-1 rig drilling at the 6-2 well location on PEL-73 in Namibia**



Source: ReconAfrica's website.

## Governance, environmental and social responsibility

In some ways, the company's governance appears to be at the level typical of start-ups, although it has been evolving recently. The Board of Directors includes only three members and could benefit from more diversity, independence and experience across various business disciplines. Structures and processes appear to be underdeveloped and policies may need updating.

On the other hand, ReconAfrica's disclosure is in good order and all reports and financial statements have been filed on time. The company appears to have sufficient capital to conduct its operations for the rest of the year and into 2022. There are no material legal actions outstanding against it.

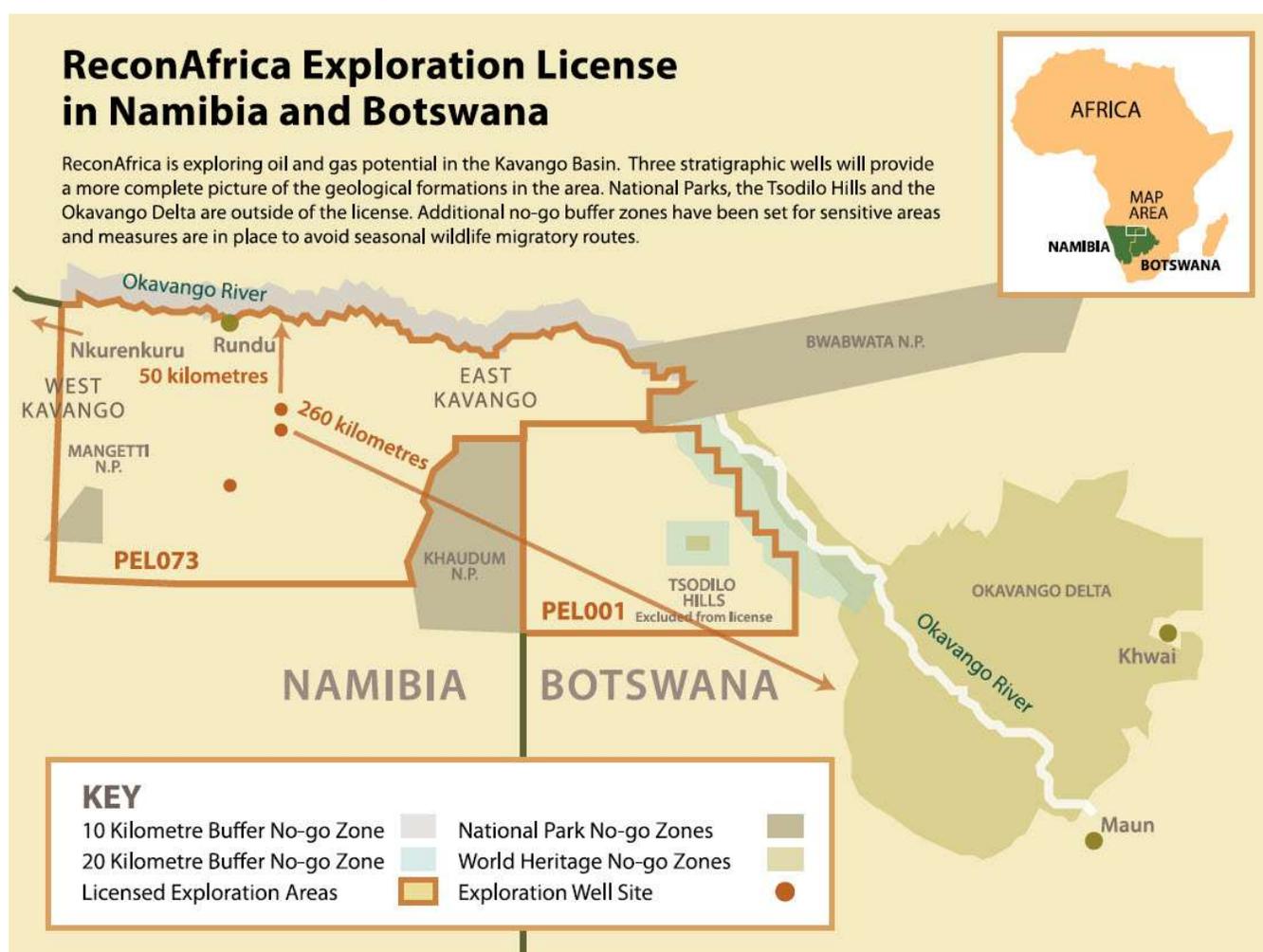
ReconAfrica's fast growth over the last few months has created a company with market capitalization of approximately C\$850 million, the largest in its peer group on the TSX Venture Exchange. It will be important for the company's governance structures and processes to continue evolving to keep up with its growth pace and growing stakeholder expectations.

Meanwhile, ReconAfrica's activities in Namibia have been the subject of some controversy and growing opposition from environmental groups, local activists and conservationists worldwide. The groups have accused ReconAfrica of environmental negligence and insufficient local community consultations prior to commencing its activities on the ground.

Concerns have been raised with regards to the company conducting operations in an environmentally sensitive area, particularly in close proximity to the Okavango Delta, which is viewed as a site of special ecological importance in Namibia due to its biotic richness. Fracking has been brought up as a major concern in that it could contaminate valuable groundwater supply. Namibia is the driest country in Sub-Saharan Africa and depends largely on groundwater. General concerns about drilling causing pollution that could damage the sensitive ecosystem have also been raised. Finally, some members of the nearby communities have voiced their concerns about being left out of public consultations.

From the company’s perspective, it has been following Namibian regulations and policies, as well as international best practices in its operations. Prior to commencing drilling, ReconAfrica completed a detailed environmental and socioeconomic study over its license area, as required by law, overseen by local environmental assessment experts Risk-Based Solutions (RBS) CC, the consulting arm of Foresight Group Namibia (FGN) (Pty) Ltd., and with participation of numerous well-recognized subject matter experts.

Figure 38: ReconAfrica's acreage and well locations in relation to select environmentally sensitive areas



Source: ReconAfrica.

The study highlighted that the proposed well locations are remote and are outside of environmentally sensitive areas, with the first well situated about 260 kilometers north-west of the Okavango Delta (as shown

in Figure 38). The areas occupied by national parks, the Tsodilo Hills protected site and the Okavango Delta have been excluded from the licenses. In addition, the company established “no-go” buffer zones around the sensitive areas, and put measures in place to monitor and to minimize disturbance to the local flora and fauna, supported by local experts and government organizations.

Exploration activities are planned to be highly localized, with well sites measuring approximately 250 meters in diameter. Despite the area possibly holding unconventional resource potential, ReconAfrica is only pursuing conventional resource development at this time, and hence, fracking, a technology applied to tight unconventional reservoirs, will not be utilized. In fact, the company’s rig is designed for conventional activity only. The economics of developing conventional reservoirs tend to be significantly more attractive than those of unconventional developments, and therefore, in any basin, conventional resources tend to be produced first, with the Kavango basin being no exception. Environmentally safe organic and biodegradable drilling fluid is being used by the company, preventing pollution of local water sources. Water quality is going to be closely monitored by the company as well as government organizations. Once operations at well sites are completed, the affected areas will be reclaimed to minimize surface disturbance.

Taking into consideration the results of the environmental study and the safety commitments made by ReconAfrica, an exploration license to drill up to eight stratigraphic wells has been issued to the company by the Ministry of Mines and Energy of Namibia (MME) and an Environmental Clearance Certificate by the Ministry of Environment, Forestry and Tourism (MEFT).

In response to concerns raised by the environmental community, the Office of the Petroleum Commissioner in the MME recently issued a press release confirming that no fracking permit was granted to ReconAfrica and “no such license is being contemplated”. MME has also stated that it is working closely with the company and the Ministry of Environment, Forestry and Tourism (MEFT) to ensure that all current and future activities are conducted in an environmentally sound manner, for the benefit of Namibia and its people.

The Ministry of Mineral Resources, Green Technology and Energy Security of Botswana (MMR) issued a similar press release, stating that it is “concerned about misleading information” pertaining to ReconAfrica’s activities in the country. The MMR has clarified that the license issued to ReconAfrica does not cover the core and buffer zones of the Okavango Delta and the Tsodilo Hills protected sites, which the government “treasures and values”. The ministry advised the public to “disregard misleading publications/articles” regarding ReconAfrica’s activities, specifying that hydraulic fracturing is not part of the company’s approved exploration program.

Both governments expressed their commitment to environmental protection and evidence-based decision making.

There were also concerns raised by environmental groups with regards to insufficient local community consultations prior to ReconAfrica commencing its activities on the ground in Namibia.

The regions in the vicinity of the company’s operations are sparsely inhabited, while areas along the Kavango River to the north have higher population concentration. The project area is home to approximately 16,000 people, living in a rural setting and generally unemployed. Unemployment rates across the Kavango regions are the highest in the country, ranging from ~36% to ~52%, and an estimated ~53% of all population live in poverty<sup>104</sup>.

ReconAfrica has been creating the urgently needed employment opportunities and generating revenue in the region, having committed to maximizing the use of local staff, goods and services. Approximately 90% of

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<sup>104</sup> Source: ReconAfrica’s Environmental Impact Assessment Report, June 2019.

staff at the company's 6-2 well location are local. The company has also been providing training programs to ensure the transfer of skills to the local Namibians to address unemployment in the region longer term.

In addition, ReconAfrica has implemented a community outreach program, through which it shares information on its activities on an ongoing basis. To create a greater positive impact in the area, the company has been addressing the urgent shortage of quality drinking water by drilling a number of community water wells. The company is also investing in local infrastructure and services for the benefit of local communities.

It is critical for ReconAfrica to conduct all activities in a safe manner; however, it is also important that the company continues to support the local economy, impacting local lives in a positive way. The company will need to strive for continuous improvement and ongoing engagement with local communities. If ReconAfrica is to succeed, it will have to continue demonstrating its responsible approach to resource development through actions and clear, transparent and consistent messaging. It will need to continue engaging with the broader communities, environmental groups and all levels of government, addressing any concerns along the way. We believe that building positive, productive relationships with all stakeholders will be critical to the company's success.

## 2021 outlook and funding requirements

A detailed capital budget was last presented in ReconAfrica's offering prospectus in August of 2020 and, to our knowledge, remains largely unchanged. Proceeds from the last public offering were intended to be utilized by the company within approximately 12 months, or by September 2021. The C\$20.3-million budget included the drilling of three stratigraphic test wells and acquiring 500-1,000 kilometers of 2D seismic. Beyond that, capital spending will be determined by the results of the company's three wells and seismic program. Once completed, we believe the current work program will satisfy the company's obligations under the first renewal period of its petroleum exploration license in Namibia.

**Figure 39: ReconAfrica's August 2020 - September 2021 capital budget (in C\$)**

### First well

|   |                    |
|---|--------------------|
| Mobilization of drilling rig to Namibia                         | \$936,110          |
| Drilling single stratigraphic test well (35 days / 12,000 feet) | \$2,942,060        |
| Mudlogging and communications (50 days)                         | \$133,730          |
| Wireline logging  | \$401,190          |
| Sampling and analysis   | \$133,730          |
| Geological and project management consulting                    | \$267,460          |
| Water supply well   | \$28,083           |
| Tubulars  | \$208,619          |
| <b>Sub-total</b>  | <b>\$5,050,982</b> |

### Second well

|   |             |
|---|-------------|
| Mobilization of drilling rig to Namibia                         | \$42,794    |
| Drilling single stratigraphic test well (30 days / 12,000 feet) | \$2,674,600 |
| Mudlogging and communications (50 days)                         | \$133,730   |
| Wireline logging  | \$401,190   |
| Sampling and analysis   | \$133,730   |
| Geological and project management consulting                    | \$267,460   |
| Water supply well   | \$28,083    |

|   |                     |
|---|---------------------|
| Tubulars  | \$208,619           |
| Sub-total   | \$3,890,206         |
| <b>Third well</b>   |                     |
| Mobilization of drilling rig to Namibia                         | \$42,794            |
| Drilling single stratigraphic test well (30 days / 12,000 feet) | \$2,674,600         |
| Mudlogging and communications (50 days)                         | \$133,730           |
| Wireline logging  | \$401,190           |
| Sampling and analysis   | \$133,730           |
| Geological and project management consulting                    | \$267,460           |
| Water supply well   | \$28,083            |
| Tubulars  | \$208,619           |
| Sub-total   | \$3,890,206         |
| <b>Seismic acquisition and processing (500-1,000 km)</b>        |                     |
| Program design  | \$267,460           |
| Mobilization and vibroseis                                      | \$936,110           |
| Acquisition of 2D seismic data                                  | \$1,471,030         |
| Processing of 2D seismic data                                   | \$668,650           |
| Sub-total   | \$3,343,250         |
| <b>Working capital</b>  | \$4,105,356         |
| <b>Total</b>  | <b>\$20,280,000</b> |

Sources: ReconAfrica's Short-Form Prospectus, August 12, 2020; Quester Advisors.

The company estimates that about three-quarters of the budget has been spent to date, as a large portion of the costs is up-front in nature. With the proceeds from the recent warrant exercise, ReconAfrica has about C\$36 million of non-restricted cash in the bank, likely providing it with sufficient capital for the remainder of 2021 and into 2022.

The company is currently in the exploration phase, with no source of operating revenue. Depending on the pace of its spending and the success of its current work program, ReconAfrica will likely require additional funding in 2022. Later in this report, we consider a ~1.9 billion-barrel resource development by the company over the course of ~30 years, which may require an up-front investment of ~US\$860 million in infrastructure, in addition to any other exploration and appraisal drilling ReconAfrica may decide to pursue. The company may once again turn to equity markets to access the funds. Alternatively, it may also try to access vendor or private equity financing and consider farm-out and partnership opportunities to fund its activities. Should ReconAfrica's exploration program be successful, additional funding options may become available to the company.

## Capital structure

The company currently has no debt on its balance sheet and about C\$36 million of non-restricted cash, which is mostly held in Canadian dollars, and, to a lesser extent, in US dollars in a major Canadian bank.

Since inception, ReconAfrica has raised approximately C\$75 million by issuing common shares and through exercise of warrants and options, priced at C\$0.20 to C\$1.00 per share. Its issued capital currently consists

of 153.8 million basic common shares. In addition, the company has 10.2 million stock options outstanding, with an average strike price of C\$0.66 per share; and 14.9 million warrants, with an average strike price of C\$0.56 per share. With the stock's recent price appreciation, all options and warrants are currently in the money and upon exercise, could provide the company with up to C\$15.2 million in additional proceeds. While the outstanding options and warrants have no forced conversion clauses, the company may create incentives for an early exercise in order to bring in capital.

**Figure 40: ReconAfrica's current estimated capital structure**

| <b>Instruments Outstanding</b> | <b># Outstanding<br/>(in millions)</b> | <b>Exercise<br/>Price<br/>(C\$/sh)</b> | <b>Remaining<br/>Contractual<br/>Life (yrs)</b> |
|--------------------------------|--|--|---|
| Common shares                  | 153.8                                  |  |   |
| Stock options                  | 10.2                                   | \$0.66                                 | 3.9   |
| Warrants                       | 14.9                                   | \$0.56                                 | 3.5   |
| Fully diluted shares           | 179.0                                  |  |   |

Sources: ReconAfrica, Quester Advisors.

## Major shareholders

The majority of ReconAfrica's stock is believed to be owned by retail shareholders and high-net-worth individuals, with institutions representing only a small part of ownership at this time. Most of the stock is estimated to be held in Canada and the United States, with the remainder thought to be owned by European investors.

As ReconAfrica's story continues to unfold, institutions will likely come to represent an increasingly larger part of share ownership, particularly as the company's funding needs grow.

After the recent warrant exercise, ReconAfrica's insiders, including Board members and management, own about 3% of outstanding shares. The company's founder Craig Steinke used to own 13.8% of the shares<sup>105</sup>, while one of the original investors David Elliott held just over 10%<sup>106</sup> prior to the equity issue in August of 2020. Since then, both have been diluted down and now own less than 5% of the outstanding shares each.

## Trading and stock liquidity

ReconAfrica's shares are listed on the TSX Venture Exchange (TSXV) under the symbol RECO. It has been one of the best performing stocks on the exchange in 2021, earning it the title of a Rising Star. Year-to-date, the stock price has appreciated by ~148.6%, having seen a low of C\$2.01 per share and a high of C\$6.26 per share, implying significant price volatility (see Figure 41). Meanwhile, the S&P/TSX Composite Index is up ~10.8% and the S&P/TSX Venture Composite Index is up ~7.2% during the same time period<sup>107</sup>. At the time of writing of this report, ReconAfrica had the highest market capitalization among junior energy companies listed on the TSXV of approximately C\$850 million.

<sup>105</sup> Source: ReconAfrica's Short Form Prospectus, dated August 12, 2020.

<sup>106</sup> Source: ReconAfrica's 2019 Management Information Circular, dated June 12, 2020.

<sup>107</sup> As of closing on April 15, 2021.



ReconAfrica's stock liquidity is limited at this time; year-to-date, about 1.1 million shares have traded on the TSXV each day, representing ~C\$4.0 million in value<sup>108</sup>.

The company's shares also trade on the OTCQX® Best Market in the United States under the symbol RECAF; and on the Frankfurt Exchange under the symbol 0XD.

**Figure 41: ReconAfrica's share price performance (in C\$ per share) and trading volume (in millions) on the TSXV over the last 12 months**



Source: TSX Venture Exchange, updated on April 15, 2021.

## Potential high-risk/high-return investment

Being in the exploration stage, ReconAfrica is generating negative cash flow from operations at this time, and hence, comparing it to its peers on a multiple basis is not meaningful.

We believe ReconAfrica, first and foremost, to be a story of opening up a new conventional basin in Namibia, which could be the source of first commercial production in the country. As a result, in order to get a sense of what the stock could be worth, we looked at the recoverable resource potential within the Kavango basin.

To do that, we engaged Dan Jarvie to take his analysis of source rock hydrocarbon generation potential of the Kavango basin one step further. Mr. Jarvie made a number of conservative assumptions to come up with a range of **potential technically recoverable resource estimates**, using the Monte Carlo simulation. These assumptions are summarized in Figure 42 and include the following.

- Total organic carbon content (TOC) of 0.75-5% and hydrogen content (HI) of 200-620 mg/g. (The Kavango basin source rock was constructed to be composed of marine source rock with terrigenous

<sup>108</sup> Based on VWAP from January 1, 2021 to April 15, 2021.

influence, but slightly oil prone, based on the South Africa Karoo basin data, which suggested TOC of 3.75% and minimum HI of 358 mg/g.)

- Transformation ratio (TR) of 30% (which is the extent of conversion of organic matter, related to thermal maturity of the source rock).
- Net thickness of source rock intervals of 200-400 feet (while geological data from Namibia and Botswana suggest net thickness of ~328 feet, and data from South Africa imply a thickness of ~443 feet).
- Expulsion of 10-60% (driven by the amount of hydrogen and carbon a source rock system can generate with maturation).
- Migration loss of 5% (due to short-distance migration).
- Hydrocarbon recovery of 50% for conventional reservoirs.
- Aerial extent of 1,641 sections, or about one million acres, representing ~12% of ReconAfrica's land holdings in north-eastern Namibia and north-western Botswana.

As **marine carbonate source rocks** were encountered in the first stratigraphic well, as predicted, we focused on the assumptions indicative of such rocks, highlighted in blue in Figure 42.

**Figure 42: Potential technically recoverable resource estimates and underlying assumptions for the Kavango basin – 200 vs. 400-foot source rock thickness scenarios**

| P50 COMPUTATIONS |         |       |    |        |       |          |      |            |       |                      |                |                                |          |                         |          |                       |                      |
|------------------|---------|-------|----|--------|-------|----------|------|------------|-------|----------------------|----------------|--------------------------------|----------|-------------------------|----------|-----------------------|----------------------|
| TOC wt%          | HI mg/g | S2    | f  | boe/af | a/sec | Thick ft | TR   | boe/af     | Expel | Expel (at TR) boe/af | Migration loss | Adj. for migration loss boe/af | Recovery | Recoverable boe/section | Sections | Total recoverable boe | Avg. recoverable boe |
| 0.75             | 200     | 1.50  | 23 | 35     | 640   | 200      | 0.30 | 1,324,800  | 0.10  | 132,480              | 0.05           | 125,856                        | 0.50     | 62,928                  | 1,641    | 103,264,848           |                      |
| 2.00             | 200     | 4.00  | 23 | 92     | 640   | 200      | 0.30 | 3,532,800  | 0.10  | 353,280              | 0.05           | 335,616                        | 0.50     | 167,808                 | 1,641    | 275,372,928           | 355,690,032          |
| 5.00             | 200     | 10.00 | 23 | 230    | 640   | 200      | 0.30 | 8,832,000  | 0.10  | 883,200              | 0.05           | 839,040                        | 0.50     | 419,520                 | 1,641    | 688,432,320           |                      |
| 0.75             | 358     | 2.69  | 23 | 62     | 640   | 200      | 0.30 | 2,371,392  | 0.30  | 711,418              | 0.05           | 675,847                        | 0.50     | 337,923                 | 1,641    | 554,532,234           |                      |
| 2.00             | 358     | 7.16  | 23 | 165    | 640   | 200      | 0.30 | 6,323,712  | 0.30  | 1,897,114            | 0.05           | 1,802,258                      | 0.50     | 901,129                 | 1,641    | 1,478,752,623         | 1,910,055,472        |
| 5.00             | 358     | 17.90 | 23 | 412    | 640   | 200      | 0.30 | 15,809,280 | 0.30  | 4,742,784            | 0.05           | 4,505,645                      | 0.50     | 2,252,822               | 1,641    | 3,696,881,558         |                      |
| 0.75             | 620     | 4.65  | 23 | 107    | 640   | 200      | 0.30 | 4,106,880  | 0.60  | 2,464,128            | 0.05           | 2,340,922                      | 0.50     | 1,170,461               | 1,641    | 1,920,726,173         |                      |
| 2.00             | 620     | 12.40 | 23 | 285    | 640   | 200      | 0.30 | 10,951,680 | 0.60  | 6,571,008            | 0.05           | 6,242,458                      | 0.50     | 3,121,229               | 1,641    | 5,121,936,461         | 6,615,834,595        |
| 5.00             | 620     | 31.00 | 23 | 713    | 640   | 200      | 0.30 | 27,379,200 | 0.60  | 16,427,520           | 0.05           | 15,606,144                     | 0.50     | 7,803,072               | 1,641    | 12,804,841,152        |                      |

| P50 COMPUTATIONS |         |       |    |        |       |          |      |            |       |                      |                |                                |          |                         |          |                       |                      |
|------------------|---------|-------|----|--------|-------|----------|------|------------|-------|----------------------|----------------|--------------------------------|----------|-------------------------|----------|-----------------------|----------------------|
| TOC wt%          | HI mg/g | S2    | f  | boe/af | a/sec | Thick ft | TR   | boe/af     | Expel | Expel (at TR) boe/af | Migration loss | Adj. for migration loss boe/af | Recovery | Recoverable boe/section | Sections | Total recoverable boe | Avg. recoverable boe |
| 0.75             | 200     | 1.50  | 23 | 35     | 640   | 400      | 0.30 | 2,649,600  | 0.10  | 264,960              | 0.05           | 251,712                        | 0.50     | 125,856                 | 1,641    | 206,529,696           |                      |
| 2.00             | 200     | 4.00  | 23 | 92     | 640   | 400      | 0.30 | 7,065,600  | 0.10  | 706,560              | 0.05           | 671,232                        | 0.50     | 335,616                 | 1,641    | 550,745,856           | 711,380,064          |
| 5.00             | 200     | 10.00 | 23 | 230    | 640   | 400      | 0.30 | 17,664,000 | 0.10  | 1,766,400            | 0.05           | 1,678,080                      | 0.50     | 839,040                 | 1,641    | 1,376,864,640         |                      |
| 0.75             | 358     | 2.69  | 23 | 62     | 640   | 400      | 0.30 | 4,742,784  | 0.30  | 1,422,835            | 0.05           | 1,351,693                      | 0.50     | 675,847                 | 1,641    | 1,109,064,468         |                      |
| 2.00             | 358     | 7.16  | 23 | 165    | 640   | 400      | 0.30 | 12,647,424 | 0.30  | 3,794,227            | 0.05           | 3,604,516                      | 0.50     | 1,802,258               | 1,641    | 2,957,505,247         | 3,820,110,944        |
| 5.00             | 358     | 17.90 | 23 | 412    | 640   | 400      | 0.30 | 31,618,560 | 0.30  | 9,485,568            | 0.05           | 9,011,290                      | 0.50     | 4,505,645               | 1,641    | 7,393,763,117         |                      |
| 0.75             | 620     | 4.65  | 23 | 107    | 640   | 400      | 0.30 | 8,213,760  | 0.60  | 4,928,256            | 0.05           | 4,681,843                      | 0.50     | 2,340,922               | 1,641    | 3,841,452,346         |                      |
| 2.00             | 620     | 12.40 | 23 | 285    | 640   | 400      | 0.30 | 21,903,360 | 0.60  | 13,142,016           | 0.05           | 12,484,915                     | 0.50     | 6,242,458               | 1,641    | 10,243,872,922        | 13,231,669,190       |
| 5.00             | 620     | 31.00 | 23 | 713    | 640   | 400      | 0.30 | 54,758,400 | 0.60  | 32,855,040           | 0.05           | 31,212,288                     | 0.50     | 15,606,144              | 1,641    | 25,609,682,304        |                      |

Sources: Dan Jarvie, Worldwide Geochemistry LLC, March 2021; Quester Advisors.

We then used the **hypothetical scenario** based on 200 feet of net marine source rock thickness for further modelling. (The actual thickness of the source rock encountered by the first well is being confirmed by the company through the ongoing comprehensive core and log analysis.) This scenario generated an average estimate of **conventional technically recoverable resource of ~1.9 billion boe**, implying a reasonable

recovery factor for the total petroleum system of ~3.8%<sup>109</sup>. For comparison, a recovery factor of ~13% is estimated by the US EIA for the Eagle Ford petroleum system, and ~3% for the Wolfcamp system<sup>110</sup>. (The Wolfcamp petroleum system was chosen for comparison as it contains Permian source rocks of marine origin (shale and carbonates) that source oil in conventional reservoirs. The Eagle Ford petroleum system was used as an example of a well-known system containing marine carbonate source rocks that also source oil in conventional reservoirs.)

We then used the technically recoverable resource estimate of ~1.9 billion boe, assuming the system's oil proneness due to its significant predicted burial depth and hence, hydrocarbon maturation, as a foundation for our financial model for the company.

In our model, we made the following assumptions.

- ReconAfrica will focus on light oil production and consume any gas co-produced with oil internally, including for power generation on site, or re-inject it into the reservoir.
- Development will commence in 2023 and gradually ramp up to peak production of ~250,000 bbl/d, limited by infrastructure and sales capacity. Production of ~250,000 bbl/d is equivalent to ~7.5 million barrels per month, or fifteen 500,000-barrel cargos. The Port of Walvis Bay is currently equipped to receive tankers of this size, with a maximum of two tankers able to be docked at the oil jetty at the same time, creating certain sales limitations. We assumed no major port infrastructure expansions will be undertaken.
- Oil will be trucked about 140 miles from site to railroad access at Grootfontein by way of an existing paved highway (see Figure 43). From Grootfontein, it will be shipped by rail to the deep Port of Walvis Bay, where it will be accumulated in tanks and sold in batches at world oil prices, less a 2% quality discount. We assumed the partners will need to invest ~US\$860 million over the course of the initial three to four years in infrastructure, including tankage, loading facilities and connecting pipe at the Grootfontein rail terminal and at the port.
- We assumed that NAMCOR will fund its 10% share of development capital expenditures. ReconAfrica will pay for 90% of the development costs and access the required funding by issuing equity at an average cost of C\$6.00 per share (see sensitivity analysis in Figure 45).
- We use US\$60/bbl Brent oil price in our model (and provide sensitivity analysis in Figures 44-46).
- We assume US\$25/bbl operating, selling and transportation costs, and US\$3/bbl G&A costs.
- Each exploration well will cost ~US\$10 million to drill, complete and tie-in, while a development well will cost ~US\$7 million.
- Each well will commence production (IP) at 1,500 bbl/d, declining by ~66% in the first two years and ultimately recovering (EUR) ~1.3 million barrels over its ten-year life, implying an IRR per well of ~135%.
- ReconAfrica will drill ~1,500 wells over the life of the project to recover ~1.9 billion barrels of oil.

We estimate that **the project** described above is **economic under Brent oil prices of ~US\$40/bbl or higher**.

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<sup>109</sup> Based on Dan Jarvie's average estimate of the Kavango basin source rock petroleum generation potential of ~50 billion boe, assuming 200-foot source rock interval thickness.

<sup>110</sup> Source: The US EIA, February 2021 data.



**Figure 45: ReconAfrica's YE2021 NAV10 after-tax sensitivity to changes in oil prices and new-equity prices (in C\$ per diluted share)**

| NAV10 A/T per Dil. Share<br>(C\$) |                                 | Brent Oil Price (US\$/bbl) |                |         |         |
|-----------------------------------|---------------------------------|----------------------------|----------------|---------|---------|
|                                   |                                 | \$50                       | \$60           | \$70    | \$80    |
| New Share<br>Issue Price (C\$)    | \$4.00                          | \$9.30                     | \$20.44        | \$32.72 | \$45.85 |
|                                   | \$5.00                          | \$10.47                    | \$22.67        | \$35.94 | \$50.00 |
|                                   | \$6.00                          | \$11.43                    | <b>\$24.46</b> | \$38.47 | \$53.20 |
|                                   | \$10.00                         | \$14.00                    | \$29.01        | \$44.76 | \$61.03 |
|                                   | No dilution, 10% debt financing | \$19.12                    | <b>\$38.26</b> | \$57.31 | \$76.31 |

Source: Quester Advisors.

The size of the potential recoverable resource is another important factor that will drive the company's net asset value. The larger the resource, the greater the upside to ReconAfrica's NAV per share, as shown in Figure 46. If net source rock intervals prove to be ~400 feet thick, for example, under the US\$60/bbl Brent oil price scenario, a ~3.8 billion-barrel recoverable resource could translate into the estimated value of ~C\$30.57 per ReconAfrica share. Under US\$70/bbl Brent, a ~1.9 billion-barrel recoverable resource could be worth ~C\$38.47 per ReconAfrica share, while a ~3.8 billion-barrel resource could be worth ~C\$49.56 per share, implying significant potential upside to the stock's current trading levels. The increases in net asset value per share are not proportionate to increases in recoverable resources due to forecasted significant up-front capital expenditures, the enormous dilution caused by these expenditures being funded through new equity issue, and certain limitations applied to sales capacity, pushing development of additional barrels and their value further out.

Assuming US\$60/bbl Brent, we estimate ReconAfrica's shares are currently pricing in a discovery of approximately 160 million recoverable barrels within the Kavango basin.

**Figure 46: ReconAfrica's YE2021 NAV10 after-tax sensitivity to changes in oil prices and the size of the recoverable resource (in C\$ per diluted share)**

| NAV10 A/T per Dil. Share<br>(C\$) |               | Brent Oil Price (US\$/bbl) |                |         |         |
|-----------------------------------|---------------|----------------------------|----------------|---------|---------|
|                                   |               | \$50                       | \$60           | \$70    | \$80    |
| Recoverable<br>Resource (bbl)     | 250,000,000   | \$3.43                     | \$6.67         | \$9.86  | \$13.03 |
|                                   | 500,000,000   | \$5.37                     | \$10.60        | \$15.86 | \$20.97 |
|                                   | 1,000,000,000 | \$8.11                     | \$16.82        | \$25.51 | \$34.18 |
|                                   | 1,910,055,472 | \$11.43                    | <b>\$24.46</b> | \$38.47 | \$53.20 |
|                                   | 3,820,110,944 | \$14.68                    | <b>\$30.57</b> | \$49.56 | \$70.05 |

Source: Quester Advisors.

We note that we excluded the remaining ~11,600 sections (~7.4 million acres) of land held by ReconAfrica in north-eastern Namibia and north-western Botswana from the model.

As a result of our analyses, we believe the stock represents a **potential high-risk/high-return investment, suitable for investors with very high investment risk tolerance.**

The **near-term potential catalysts** that will drive ReconAfrica's share price performance include results of the three stratigraphic test wells currently being drilled, as well as results of the seismic survey planned for later this year. Should these results be disappointing, **the downside to the stock could be substantial and the company may cease to exist**; hence, a going-concern statement is included in all of its disclosures. Using Monte Carlo simulation, we estimate the probability of this outcome to be ~3.3%. **Should**

**the team, however, be successful** in proving an economically viable, large resource base within the Kavango basin, **the stock could be worth multiples of its current valuation.**

We caution investors that our analyses and their conclusions in no way represent a recommendation to own or not own the stock. The analyses are meant to arm potential investors with sufficient information to make their own investment decisions, based on their own personal circumstances.

## Investment risks

There are a number of company-specific risks that investors should consider prior to investing in ReconAfrica; these are in addition to risks common to all oil and gas exploration and production companies (including volatility in commodity prices, economic conditions, capital availability and cost, risks inherent in exploration, development and exploitation activities).

We believe some of the major risks that ReconAfrica is exposed to include the following.

- **Going-concern risk in case of a lack of success.** In the case that ReconAfrica is unsuccessful in proving Kavango basin's significant potential, which is the main focus of its activities, the company may cease to exist, as the team may choose to not pursue any further business opportunities in Namibia or Botswana. Hence, a going-concern statement is included in all of its disclosures.
- **Significant funding requirements in the mid-term.** ReconAfrica appears to have sufficient capital to fund its expenditures for the remainder of 2021 and into 2022. Beyond that, the company will most likely require additional funding. Under the development scenario described in the previous section of this report, ReconAfrica may need to raise ~US\$550 million to fund its share of the up-front investment in infrastructure. We think the company may once again turn to equity markets to access the funds, which could dilute existing shareholders. Alternatively, it may also try to access vendor or private equity financing and consider farm-out and partnership opportunities to fund its activities. Should ReconAfrica's drilling program be successful, additional funding options may become available to the company.
- **First-mover risks.** Being a first mover has its advantages, including access to a larger opportunity set; however, we also see it as a significant risk to the company. ReconAfrica is a small company with a limited amount of resources, blazing the trail to first oil and gas production in Namibia. Despite the country's eagerness to support oil and gas exploration activity and the existence of fairly strong institutions, advancing projects may take longer than initially anticipated, consuming ReconAfrica's limited resources. The oil and gas service sector is also not well developed at this time, and neither is oil and gas infrastructure. As a result, there may be higher initial costs associated with drilling and completing wells and commercializing production.
- **Environmental responsibility risks.** Environmental concerns relating to ReconAfrica's proposed and perceived activities have been raised by international and local environmental organizations. Should these concerns be left unaddressed, they may have a negative impact on the company's operations on the ground, its ability to raise capital and its valuation as a public company.
- **Limited stock liquidity.** ReconAfrica's stock liquidity is limited at this time; about 1.1 million shares trade on the TSXV each day (year-to-date average), representing ~C\$4.0 million in value. Stock liquidity could be improved by implementing an active investor relations strategy, expanding investor



outreach and increasing story awareness through institutional and retail marketing, as well as proactively expanding buy-side and sell-side coverage.

## Meaningful impact

If ReconAfrica is successful in its exploration efforts and a commercial development of hydrocarbons, the first in Namibia, follows, it could have a meaningful impact on Namibia and its people.

Assuming US\$60/bbl Brent, we estimate that a ~1.9 billion-barrel resource development could generate ~US\$18 billion in government revenue<sup>111</sup> over its ~30-year life, which represents ~150% of the country's ~US\$12 billion GDP projected for 2021<sup>112</sup>. Under our assumptions summarized earlier in this report, once the project ramps up to full capacity and the up-front infrastructure investment is completed, the development could generate more than US\$600 million per year in state revenue. Over its life, revenue from the project could help eliminate the ~US\$6.7-billion public-sector debt the country has outstanding<sup>113</sup>.

ReconAfrica's project alone could eliminate the need for Namibia to import oil and oil products, supporting the country on its path to energy independence, as well as generate significant exports, strengthening the nation's balance sheet.

In the Kavango region, the company's development could create the urgently needed employment for many years to come, as well as help develop infrastructure and services for the benefit of local communities.

Finally, ReconAfrica's success could attract more interest to the region, which could bring additional investment and generate further benefits for Namibia and its people.

For these benefits to realize, it will be critical for ReconAfrica to continue demonstrating its responsible approach to resource development and build positive, productive relationships with all stakeholders.

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<sup>111</sup> Including estimated royalties and taxes to be paid by ReconAfrica and net cash flow generated by NAMCOR, undiscounted.

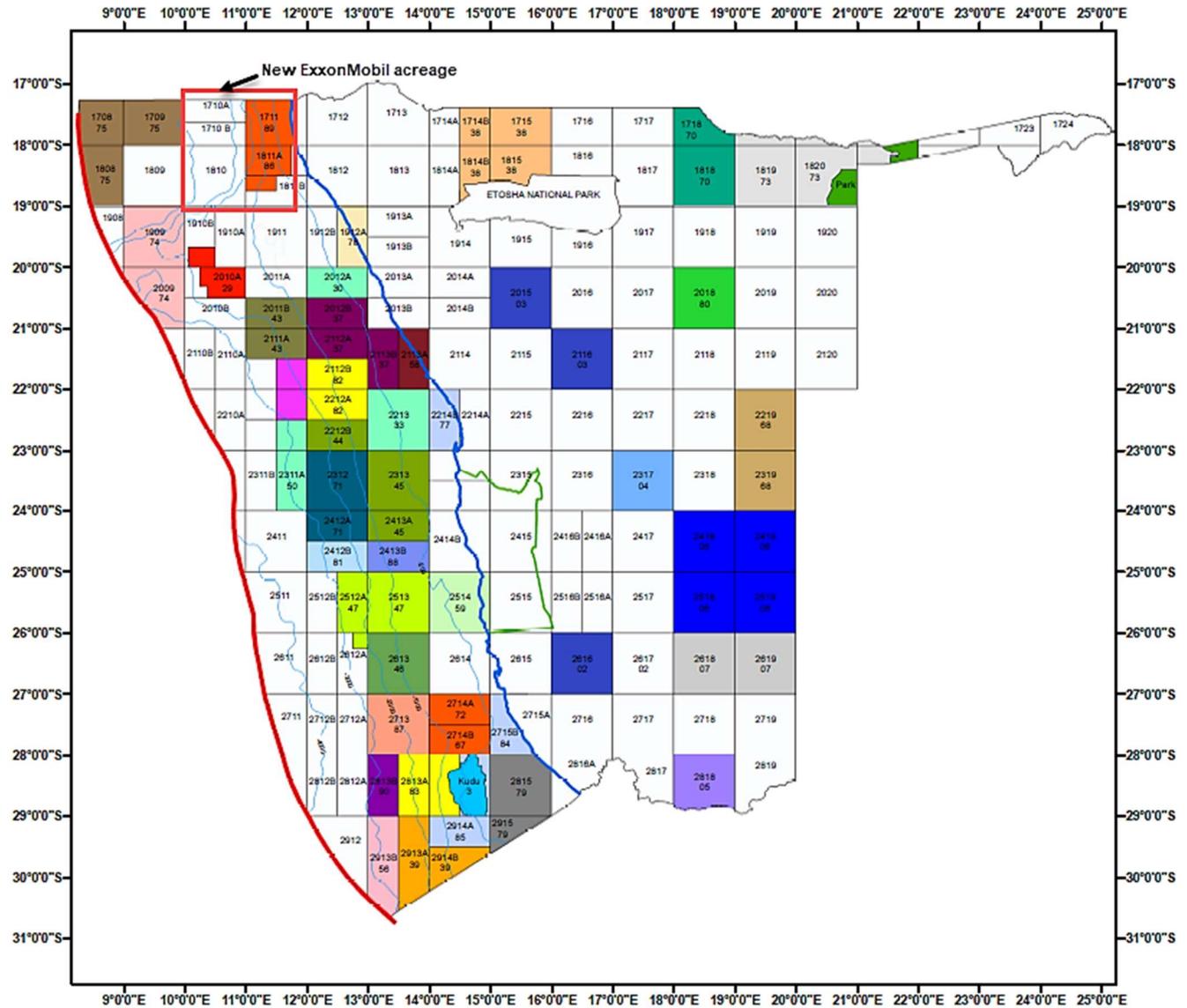
<sup>112</sup> Source: IHS Markit.

<sup>113</sup> Source: IHS Markit.

# Appendix

Note: All values are in Canadian dollars, unless otherwise indicated.  
 On the cover: Etosha Pan image; source: Britannica.com.

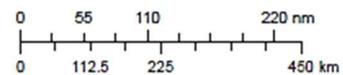
Figure 47: Namibia's hydrocarbon license map (as of August 2018)



For further information:

[www.namcor.com.na](http://www.namcor.com.na)  
[www.mme.gov.na](http://www.mme.gov.na)

Updated: 09 August 2018



## Legend

-  Limit Exclusive Economic Zone
-  Isobath
-  Shore line
-  Etosha national Park
-  World Heritage Zone



## Production License

-  (PL 3) BW Kudu / NAMCOR

## Exploration License

- |   |  |
|---|--|
|  (PEL 29) Jupiter Petroleum Namibia      |  (PEL 76, 77, 84, 85) Rhino resources |
|  (PELs 30, 33, 50) Eco Oil & Gas         |  (PEL 78) Global Oil and Gas          |
|  (PEL 34) Azinam / ECO                   |  (PEL 79) Windfire Petroleum          |
|  (PEL 37) Tullow / ONGC / Pancontinental |  (PEL 80) Methacarb Investments       |
|  (PEL 38) Hydrocarb Namibia Energy Corp  |  (PEL 81) Sungu Sungu                 |
|  (PEL 39) Shell Exploration & Production |  (PEL 82) Galp Energia / ExxonMobil   |
|  (PELs 43) Oranto Petroleum            |  (PEL 83) Galp Energia              |
|  (PELs 44, 45) Maurel & Prom Namibia   |  (PEL 87) Pancontinental Orange     |
|  (PEL 46) Cowan Oil and Gas Namibia    |  (PEL 88) Sezigyn Oil & Gas         |
|  (PEL 47) Serica Energy Namibia        |  (PEL 90) Calima Energy             |
|  (PEL 56) Total / Impact               |  |
|  (PEL 58) Nabirm Energy Services       |  |
|  (PEL 59) Lekoil E&P                   |  |
|  (PEL 67, 72, 86, 89) NAMCOR           |  |
|  (PEL 68) Alumni Expl East Namibia     |  |
|  (PEL 70) ACREP-Exploracao Petrolifera |  |
|  (PEL 71) Enigma Oil and Gas           |  |
|  (PEL 73) Reconnaissance Energy        |  |
|  (PEL 74) Tse Oil & Gas                |  |
|  (PEL 75) Camelot Investment Group     |  |

## Reconnaissance License

-  (02, 03) Tristone Africa Namibia
-  (04) Atlantic Petroleum
-  (05) Oshikoto Power
-  (06) Namibia E Source Petroleum
-  (07) CGP Energy

Sources: The Ministry of Mines and Energy of Namibia, NAMCOR.

**Figure 48: ReconAfrica’s directors, officers, technical team and founder – brief biographies**

### Board of Directors

**Jay Park QC**

Chairman

- Managing Partner of the law firm Park Energy Law.
- Leading international oil and gas lawyer with 40 years of experience.
- Has advised E&P companies, governments, state oil companies and investors on upstream oil and gas transactions, contracts, laws and regulations in over 50 countries, including 17 African countries.
- Served as Director and/or Officer of a number of oil and gas companies with operations in Africa, including as Chairman of the Board and Director of Voyageur Oil and Gas, which explored the Borj El Khadra Sud block in Tunisia, farmed out to Anadarko; and as Director of Caracal Energy, with oil producing assets in the Doba basin of Chad, acquired by Glencore in 2014 for US\$1.3 billion.
- Based in London, UK.

**Dr. James Granath**

Director

- Structural geologist with extensive knowledge in African petroleum exploration.
- Expertise in seismic interpretation and integration with structural analysis, fracture analysis, regional synthesis, and prospect and play evaluation.
- Spent 18 years with Conoco, in research, international exploration and new ventures.
- Subsequently, has advised many companies on structural geology and tectonics as applied to exploration problems, and has worked on projects in some 40 countries around the world.
- Based in Denver, Colorado, USA.

**Mark Gerlitz**

Director

- Principal of Canadian-based MonteLago Consulting, providing advisory services to the international energy industry.
- Over 20 years of experience advising states, national and international energy companies across the entire energy value chain.
- Expertise in financing, strategic planning, mergers and acquisitions, joint ventures, partnerships, farm-ins and other business combinations, energy marketing sales, as well as environmental, social and governance matters.
- Based in Calgary, Alberta, Canada.

### Officers

**Scot Evans**

CEO

- Energy industry leader with a combined 35 years of experience with Exxon, Landmark Graphics and Halliburton.
- Previously, served as VP of Halliburton’s Integrated Asset Management and Technical Consulting organizations, where he grew production from 20,000 boe/d to more than 100,000 boe/d.
- Experience in the US extends to the Delaware, Midland, Eagle Ford and Monterey plays, and internationally, in Algeria, Kuwait, India, Russia, Ecuador and Mexico.
- Expert in new resource development.



**Carlos Escribano**

CFO

- Over 14 years of experience in senior-level financial management for publicly traded, multinational resource corporations.
- Expertise in finance, accounting and administration, including debt and equity financing, financial reporting and compliance, budgeting and treasury.
- Chartered Professional Accountant.

**Nick Steinsberger**

SVP, Drilling & Completions

- Petroleum Engineer with 32 years of experience in petroleum engineering, drilling and completions, production, and surface facilities.
- Considered a world leader in completions and well design.
- Began his career with Mitchell Energy, where he designed and implemented the first slick water frac, which gave rise to the success of the Barnett shale; variations of this design are used in every shale completion worldwide. Based on its success in the Barnett, Mitchell Energy was sold to Devon Energy in 2002 for US\$3.1 billion.

**Anna Tudela**

Corporate Secretary & Chief Compliance Officer

- Over 30 years of experience working with public companies in the securities and corporate finance areas across Canada and the US.
- Experience in executing multi-billion-dollar transactions in Canada and internationally.
- Former VP, Diversity, Regulatory Affairs and Corporate Secretary of Goldcorp.
- Has advised numerous Boards on cross-culture issues and governance matters, including global governance of subsidiaries.
- An industry champion for Board diversity.

**Technical team**

**Geoff Anderson**

Exploration Geologist

- Petroleum geologist with over 17 years of experience in operational, developmental and exploration geology.
- Expertise in clastic and carbonate depositional environments, sequence stratigraphy and exploration model conceptualization, project development and economic evaluation modeling.
- Started his career at BlackRock Ventures, which was sold to Shell Canada for C\$2.4 billion in 2006. Also held a geologist role at North American Oil Sands Corporation that was sold to Statoil for US\$2.2 billion in 2007.

**Bill Cathey**

Geophysicist

- President and Chief Geoscientist of Earthfield Technology.
- Over 25 years of potential field interpretation experience, with clients including Chevron, ExxonMobil, ConocoPhillips and many other major and large independent oil and gas companies.
- Has authored or co-authored numerous articles on the uses of magnetic and gravity analysis, including the first paper that showed the relationship between salt and magnetic data (1987).

**Shiraz Dhanani**

Geophysicist

Advisory Committee

- Over 40 years of experience with major oil companies, including BP and ExxonMobil.
- Expertise in new-country access, initiating new field oil and natural gas plays, project and executive management, with a strong focus on Africa.



- Former Technical Director of BP in Libya. Played an integral role in negotiating a multi-billion-dollar exploration and appraisal contract; later initiated an extensive exploration drilling program to develop the assets.
- Also credited for proving the viability of the Silurian black shales in Tunisia, through a successful drilling and appraisal program, and later, joint venturing and monetizing the asset to Anadarko in 2011.

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**Scot Evans**

- See brief biography above.

CEO

Geologist

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**Dr. James Granath**

- See brief biography above.

Director

Structural Geologist

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**Daniel Jarvie**

Petroleum Systems Chemist

- President of Worldwide Geochemistry, LLC.
  - Globally recognized as a leading analytical and interpretive organic geochemist, having evaluated petroleum systems around the world. Specialties include source rock characterization, especially for resource assessments, and detailed source rock characterization for conventional petroleum system analysis, including bulk and compositional kinetic determinations, high resolution light hydrocarbon and fingerprinting analysis, pyrolysis and catalysis studies.
  - Former Chief Geochemist of EOG Resources, one of the largest independent oil producer in North America.
  - Provided independent geochemical analysis for Mitchell Energy in its exploration and development of the Barnett shale.
  - The author of many award-winning industry papers and research.
  - In 2010, awarded "Hart Energy's Most Influential People for the Petroleum Industry in the Next Decade".
- 

**Diana McQueen**

Senior Policy Advisor

- Senior Policy Advisor in the fields of Government, Indigenous Relations and Strategic Affairs.
  - Significant experience in governmental affairs, having held various Alberta provincial cabinet roles, including Minister of Energy, Minister of Environment & Water, Minister of Environment & Sustainable Resource Development/ Forestry and Climate Change, Minister of Municipal Affairs and Government House leader, and member of numerous committees such as Treasury Board, and Agenda & Priorities.
- 

**Claire Preece**

ESG Advisor

- Over 25 years of experience in Community and Environment Impact Assessments, environmental and socio-economic reporting, gender development and equity, strategy development, and stakeholder engagement in both private and not-for-profit sectors.
  - Implements ESG Sustainability reporting and compliance.
  - Experience in the oil and gas, LNG and mining sectors, as well as with international organizations, including the World Bank, International Finance
-



Committee (IFC), and The Canadian International Development Agency (CIDA).

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**Nick Steinsberger**

SVP, Drilling & Completions

Petroleum Engineer

- See brief biography above
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**Dr. Ansgar Wanke**

Geologist

- Over 20 years of experience in various fields, including regional mapping, geochemistry, hydro- and engineering geology, sedimentology and seismic stratigraphy.
  - Joined the University of Namibia geology department in 2008, reviewed and designed several geology curricula, and headed the department in 2012-2016.
  - Supervised a number of research projects on Namibian offshore and onshore basins.
- 

**Founder**

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**Craig Steinke**

- Founder, major shareholder, Director and CEO of Renaissance Oil, a junior, Canadian-domiciled public company focused on resource play in Mexico.
  - Over 25 years of extensive experience in the global oil and gas industry, specializing in large-scale, new-play development.
  - Has initiated and developed several successful resource companies, including Stormcat, Realm Energy and ReconAfrica.
  - Has been instrumental in acquiring and developing assets in some of North America's major oil and gas plays, such as the Powder River basin, Fayetteville, Marcellus and Montney, as well as key plays in numerous European sedimentary basins.
  - Educated in Petroleum Land Management.
- 

Sources: ReconAfrica, public sources, Quester Advisors.

Figure 49: ReconAfrica's most recent financial statements (as of September 30, 2020)

**RECONNAISSANCE ENERGY AFRICA LTD.**  
CONDENSED CONSOLIDATED INTERIM STATEMENTS OF FINANCIAL POSITION  
(Unaudited - Expressed in Canadian Dollars, unless otherwise stated)

|   | September 30,<br>2020 | December 31,<br>2019 |
|---|-----------------------|----------------------|
| <b>ASSETS</b>                                     |                       |                      |
| <b>Current Assets</b>                             |                       |                      |
| Cash  | \$ 18,278,054         | \$ 2,547,025         |
| Receivables                                       | 98,328                | 41,825               |
| Prepaid expenses                                  | 64,866                | 109,949              |
|   | <b>18,441,248</b>     | <b>2,698,799</b>     |
| Exploration and evaluation assets (Note 4)        | 7,387,316             | 5,649,599            |
| Equipment (Note 5)                                | 4,976,631             | -                    |
| <b>Total Assets</b>                               | <b>\$ 30,805,195</b>  | <b>\$ 8,348,398</b>  |
| <b>LIABILITIES AND SHAREHOLDERS' EQUITY</b>       |                       |                      |
| <b>Current Liabilities</b>                        |                       |                      |
| Accounts payable                                  | \$ 1,226,750          | \$ 234,318           |
| Promissory note payable (Note 7)                  | 37,537                | 287,354              |
|   | <b>1,264,287</b>      | <b>521,672</b>       |
| <b>Shareholders' Equity</b>                       |                       |                      |
| Share capital (Note 8)                            | 26,525,779            | 9,159,101            |
| Reserves (Note 8)                                 | 10,665,465            | 1,926,603            |
| Deficit   | (7,685,954)           | (3,275,518)          |
| Accumulated other comprehensive income ("AOI")    | 35,618                | 16,540               |
| <b>Total Shareholders' Equity</b>                 | <b>29,540,908</b>     | <b>7,826,726</b>     |
| <b>Total Liabilities and Shareholders' Equity</b> | <b>\$ 30,805,195</b>  | <b>\$ 8,348,398</b>  |

**RECONNAISSANCE ENERGY AFRICA LTD.**

**CONDENSED CONSOLIDATED INTERIM STATEMENTS OF NET LOSS AND COMPREHENSIVE LOSS**

(Unaudited - Expressed in Canadian Dollars, unless otherwise stated)

|   | Three months Ended<br>September 30, 2020 | Three months Ended<br>September 30, 2019 | Nine Months Ended<br>September 30, 2020 | Nine Months Ended<br>September 30, 2019 |
|---|--|--|---|---|
| <b>EXPENSES</b>   |  |  |   |   |
| Management and consulting                                   | \$ 880,227                               | \$ 32,548                                | \$ 1,481,793                            | \$ 32,548                               |
| Listing expense   | -  | 1,095,506                                | -                                       | 1,095,506                               |
| Marketing   | 545,032                                  | -  | 1,202,250                               | -                                       |
| Office and general  | 155,464                                  | 5,390                                    | 253,068                                 | 5,390                                   |
| Professional fees   | 142,336                                  | 122,181                                  | 364,913                                 | 224,818                                 |
| Share-based payments (Note 8)                               | 584,148                                  | -  | 1,077,649                               | -                                       |
| Transaction costs   | -  | 340,031                                  | -                                       | 340,031                                 |
|   | <b>2,307,207</b>                         | <b>1,595,656</b>                         | <b>4,379,673</b>                        | <b>1,698,293</b>                        |
| <b>Other Items</b>  |  |  |   |   |
| Interest expense  | 2,055                                    | 10,120                                   | 14,593                                  | 15,423                                  |
| Exchange loss   | 4,145                                    | 4,442                                    | 16,170                                  | 22,709                                  |
|   | <b>6,200</b>                             | <b>14,562</b>                            | <b>30,763</b>                           | <b>38,132</b>                           |
| <b>Net Loss</b>   | <b>2,313,407</b>                         | <b>1,610,218</b>                         | <b>4,410,436</b>                        | <b>1,736,425</b>                        |
| <b>Other Comprehensive Income</b>                           |  |  |   |   |
| Items that may be reclassified subsequently to net loss     |  |  |   |   |
| Translation adjustment                                      | 14,529                                   | 5,429                                    | (19,078)                                | 5,429                                   |
| <b>Comprehensive loss</b>                                   | <b>\$ 2,327,936</b>                      | <b>\$ 1,615,647</b>                      | <b>\$ 4,391,358</b>                     | <b>\$ 1,741,854</b>                     |
| <b>Basic and diluted loss per common share</b>              | <b>\$ 0.03</b>                           | <b>\$ 0.06</b>                           | <b>\$ 0.06</b>                          | <b>\$ 0.13</b>                          |
| <b>Weighted average number of common shares outstanding</b> |  |  |   |   |
| - basic and diluted   | 87,574,864                               | 27,909,600                               | 76,033,220                              | 13,582,400                              |

\*Basic and diluted loss per share and shares outstanding have been retrospectively restated to reflect the share consolidation

**RECONNAISSANCE ENERGY AFRICA LTD.**  
**CONDENSED CONSOLIDATED INTERIM STATEMENTS OF CHANGES IN EQUITY**  
 (Unaudited - Expressed in Canadian Dollars, unless otherwise stated)

|   | Share Capital      |                      | Reserves            | Deficit               | AOCI             | Equity               |
|---|--------------------|----------------------|---------------------|-----------------------|------------------|----------------------|
|   | Number             | Amount               |                     |                       |                  |                      |
| <b>Balance at December 31, 2018</b>         | 6,299,997          | \$ 620,185           | \$ -                | \$ (153,940)          | \$ -             | \$ 466,245           |
| Issuance of shares on reorganizations       | 32,412,418         | 4,537,739            | -                   | -                     | -                | 4,537,739            |
| Issuance of shares on RTO                   | 5,571,804          | 780,055              | -                   | -                     | -                | 780,055              |
| Issuance of shares for cash                 | 17,053,280         | 3,404,656            | -                   | -                     | -                | 3,404,656            |
| Share issue costs - cash (Note 10)          | -                  | (134,130)            | -                   | -                     | -                | (134,130)            |
| Share issue costs - warrants (Note 10)      | -                  | (24,348)             | 24,348              | -                     | -                | -                    |
| Net loss                                    | -                  | -                    | -                   | (1,736,425)           | -                | (1,736,425)          |
| Translation adjustment                      | -                  | -                    | -                   | -                     | 5,429            | 5,429                |
| <b>Balance at September 30, 2019</b>        | <b>61,337,499</b>  | <b>\$ 9,184,157</b>  | <b>\$ 24,348</b>    | <b>\$ (1,890,365)</b> | <b>\$ 5,429</b>  | <b>\$ 7,323,569</b>  |
| <b>Balance at December 31, 2019</b>         | <b>65,940,145</b>  | <b>\$ 9,159,101</b>  | <b>\$ 1,926,603</b> | <b>\$ (3,275,518)</b> | <b>\$ 16,540</b> | <b>\$ 7,826,726</b>  |
| Shares issued:                              |                    |                      |                     |                       |                  |                      |
| Private placements (Note 8)                 | 5,000,000          | 2,191,625            | 1,208,375           | -                     | -                | 3,400,000            |
| Public offering (Note 8)                    | 32,855,409         | 16,717,948           | 6,280,838           | -                     | -                | 22,998,786           |
| Issue costs - cash (Note 8)                 | -                  | (2,398,496)          | -                   | -                     | -                | (2,398,496)          |
| Issue costs - compensation options (Note 8) | -                  | (486,667)            | 486,667             | -                     | -                | -                    |
| Warrants exercise                           | 1,241,350          | 649,969              | (83,249)            | -                     | -                | 566,720              |
| Compensation option exercise                | 35,652             | 25,316               | (360)               | -                     | -                | 24,956               |
| Options exercise                            | 1,687,500          | 652,934              | (231,058)           | -                     | -                | 421,876              |
| Deposit on shares                           | -                  | 14,049               | -                   | -                     | -                | 14,049               |
| Share-based payments (Note 8)               | -                  | -                    | 1,077,649           | -                     | -                | 1,077,649            |
| Net loss                                    | -                  | -                    | -                   | (4,410,436)           | -                | (4,410,436)          |
| Translation adjustment                      | -                  | -                    | -                   | -                     | 19,078           | 19,078               |
| <b>Balance at September 30, 2020</b>        | <b>106,760,056</b> | <b>\$ 26,525,779</b> | <b>\$10,665,465</b> | <b>\$ (7,685,954)</b> | <b>\$ 35,618</b> | <b>\$ 29,540,908</b> |

\*Share capital outstanding has been retrospectively restated to reflect the share consolidation

**RECONNAISSANCE ENERGY AFRICA LTD.**  
**CONDENSED CONSOLIDATED INTERIM STATEMENTS OF CASH FLOWS**  
 (Unaudited - Expressed in Canadian Dollars, unless otherwise stated)

|  | Nine Months Ended<br>September 30, 2020 | Nine Months Ended<br>September 30, 2019 |
|--|---|---|
| <b>CASH FLOWS FROM OPERATING ACTIVITIES</b>                  |   |   |
| Net loss   | \$ (4,410,436)                          | \$ (1,736,425)                          |
| Items not involving cash:                                    |   |   |
| Listing expense (Note 5)                                     | -                                       | 1,095,506                               |
| Interest expense (Note 7)                                    | 14,593                                  | 15,423                                  |
| Deferred transaction costs                                   | -                                       | -                                       |
| Share-based payments (Note 8)                                | 1,077,649                               | -                                       |
| Unrealized foreign exchange                                  | (19,693)                                | -                                       |
| Changes in non-cash working capital items:                   |   |   |
| Receivables  | (56,503)                                | (1,698)                                 |
| Prepaid expenses   | 45,083                                  | 11,690                                  |
| Accounts payable   | 178,090                                 | (61,832)                                |
| <b>Net cash used in operating activities</b>                 | <b>(3,171,217)</b>                      | <b>(677,336)</b>                        |
| <b>CASH FLOWS FROM INVESTING ACTIVITIES</b>                  |   |   |
| Cash acquired in RTO   | -                                       | 2,442                                   |
| Acquisition of the Reconnaissance subsidiaries               | -                                       | 27,209                                  |
| Investment in equipment (Note 5)                             | (4,639,949)                             | -                                       |
| Investment in exploration and evaluation assets (Note 4)     | (1,232,039)                             | -                                       |
| <b>Net cash used in investing activities</b>                 | <b>(5,871,988)</b>                      | <b>29,651</b>                           |
| <b>CASH FLOWS FROM FINANCING ACTIVITIES</b>                  |   |   |
| Deposit on shares (Note 8)                                   | 14,049                                  | -                                       |
| Proceeds from private placement (Note 8)                     | 3,400,000                               | 3,404,656                               |
| Proceeds from public offering (Note 8)                       | 22,998,786                              | -                                       |
| Share issue costs (Note 8)                                   | (2,392,617)                             | (134,130)                               |
| Proceeds from the exercise of options (Note 8)               | 421,875                                 | -                                       |
| Proceeds from the exercises of warrants (Note 8)             | 566,720                                 | -                                       |
| Proceeds from the exercises of compensation options (Note 8) | 24,956                                  | -                                       |
| Promissory note (Note 7)                                     | (264,410)                               | -                                       |
| <b>Net cash provided by financing activities</b>             | <b>24,769,359</b>                       | <b>3,270,526</b>                        |
| Impact of exchange rate changes on cash                      | 4,875                                   | 12,415                                  |
| <b>Net change in cash</b>                                    | <b>15,731,029</b>                       | <b>2,635,256</b>                        |
| Cash, beginning of period                                    | 2,547,025                               | -                                       |
| <b>Cash, end of period</b>                                   | <b>\$ 18,278,054</b>                    | <b>\$ 2,635,256</b>                     |

The accompanying notes are an integral part of these condensed consolidated interim financial statements.

Sources: ReconAfrica's public disclosures, SEDAR.

**Figure 50: Glossary of terms and abbreviations**

| <b>Terms and Abbreviations</b> | <b>Definitions</b>                                |
|--------------------------------|---|
| ~                              | Approximately                                     |
| A                              | Actual number                                     |
| C\$                            | Canadian dollar                                   |
| E                              | Estimate  |
| NAD                            | Namibian dollars                                  |
| US\$                           | US dollar   |
| 1P                             | Proved reserves                                   |
| 2P                             | Proved + Probable reserves                        |
| 3P                             | Proved + Probable + Possible reserves             |
| b                              | Billion   |
| bbbl                           | Barrels of oil                                    |
| bbbl/d                         | Barrels of oil per day                            |
| boe                            | Barrels of oil equivalent                         |
| boe/d                          | Barrels of oil equivalent per day                 |
| bw/d                           | Barrels of water per day                          |
| Adj.                           | Adjusted  |
| Af                             | Acre foot   |
| API                            | The American Petroleum Institute gravity          |
| APT                            | Additional Profits Tax                            |
| A/T                            | After Tax   |
| bn                             | Billion   |
| B/T                            | Before Tax  |
| D                              | Darcy   |
| DWT                            | Deadweight metric tons                            |
| E&P                            | Exploration & Production                          |
| EIA                            | Environmental Impact Assessment                   |
| EIA                            | US Energy Information Administration              |
| EOR                            | Enhanced Oil Recovery                             |
| ESG                            | Environmental, Social and Governance              |
| EUR                            | Estimated Ultimate Recovery                       |
| FPSO                           | Floating Production Storage and Offloading vessel |
| G&A                            | General and Administrative expenses               |
| GDP                            | Gross Domestic Product                            |
| GW                             | Gigawatt  |
| GWh                            | Gigawatt hours                                    |
| H                              | Half of the year                                  |
| HI                             | Hydrogen content                                  |
| IEA                            | International Energy Agency                       |
| IP                             | Initial Production                                |
| IRR                            | Internal Rate of Return                           |
| kt                             | Kilotons  |
| LNG                            | Liquified Natural Gas                             |
| mcf                            | Thousand cubic feet                               |
| mcf/d                          | Thousand cubic feet per day                       |

| <b>Terms and Abbreviations</b> | <b>Definitions</b>                           |
|--------------------------------|--|
| mm                             | Million                                      |
| mo                             | Month  |
| MW                             | Megawatt                                     |
| n.a.                           | Not available                                |
| NAV                            | Net Asset Value                              |
| NGLs                           | Natural Gas Liquids                          |
| n.m.                           | Not meaningful                               |
| NOC                            | National Oil Company                         |
| NPV                            | Net Present Value                            |
| nT                             | Nanotesla                                    |
| PEL                            | Petroleum Exploration License                |
| PPL                            | Petroleum Production License                 |
| Q                              | Quarter of the year                          |
| RLI                            | Reserve Life Index                           |
| RTO                            | Reverse Takeover                             |
| Sec                            | Section                                      |
| SG&A                           | Selling, General and Administrative expenses |
| sh                             | Share  |
| t                              | Trillion                                     |
| tcf                            | Trillion cubic feet                          |
| TEUs                           | Twenty-foot Equivalent Units                 |
| TOC                            | Total Organic Carbon content                 |
| TR                             | Transformation Ratio                         |
| TSX                            | Toronto Stock Exchange                       |
| TSXV                           | TSX Venture Exchange                         |
| UPIIP                          | Undiscovered Petroleum Initially In Place    |
| VLCC                           | Very Large Crude Carrier                     |
| VWAP                           | Volume-Weighted Average Price                |
| wt%                            | Weight percent                               |
| YE                             | Year End                                     |
| Yrs                            | Years  |
| y/y                            | Year-over-year                               |

Source: Quester Advisors.

**Figure 51: Table of figures**

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Source: Quester Advisors.



## Important disclosures

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The recommendations and opinions expressed in this report accurately reflect the author's personal, independent and objective views about any and all the companies and securities that are the subject of this report.

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The author has virtually visited ReconAfrica's material operations. No payment was received from the company for the related costs.

For the entire duration of the project, the author was not a shareholder of the company.

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For investment advice, please contact your Financial Advisor.

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