The Value of the Coastal Economy in The Bahamas at Risk from Offshore Oil Drilling

An Economic Analysis by Sea Change Economics, LLC
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Introduction/rationale

The health of the coastal and marine ecosystem and the health of the economy is intrinsically linked in The Bahamas. There are concerns that if The Bahamas were to attempt to diversify its economy through engaging in offshore oil drilling, this could potentially put numerous existing economic sectors at risk. Bahamas Reef Environmental Educational Foundation has hired Sea Change Economics to conduct this economic analysis to (a) assess the economic value of current economic sectors reliant on a healthy marine ecosystem, and (b) explore just how much offshore oil drilling would need to be worth in order to match the value generated by the current economy of The Bahamas.

Part 1: What's at risk?

The value of sectors at risk

Offshore oil drilling could potentially pose a direct threat to existing sectors of the economy in The Bahamas that are reliant upon marine ecosystems, for instance through damages resulting from an oil spill. Utilizing recent value statistics and appropriate economic multipliers, estimates for the total value and number of jobs that could be potentially threatened were generated.

Industries identified as contributing to the coastal economies of The Bahamas that were reliant in some way on pristine marine ecosystems include: commercial fishing; recreational fishing; tourism activities (which includes multiple economic industries such as hotels & lodging, travel, services, and food production), film & television, and research.

Each year, these sectors of the coastal economy of The Bahamas in aggregate generate $7,696,200,000 and support 122,257 jobs. (Note that it is unclear how many domestic jobs compared to foreign jobs are produced by the Research and Film & Television industries, so no job estimates were estimated for these sectors.)

Table 1: Value and employment estimates for sectors of The Bahamas coastal economy

Sector	Value	Employment
Commercial fisheries & aquaculture (including processing)	$91,050,780	9,300
Research	$852,394	-
Film & television	$514,686	-
Tourism (includes lodging, services, recreational fishing, & others)	$7,696,200,000	112,957
TOTAL	**$7,788,617,860**	**122,257**

How much oil is needed to match the risk?

Because there is no existing estimate of the amount of oil resources that may exist offshore within Bahamian waters, this analysis estimated how many barrels of oil would need to be produced annually to “break even” and match the value of the Bahamian coastal economy that could be at risk. These calculations utilize a range of possible oil prices drawn from different historical averages, and two values for possible royalty rates: a “low” and “high” rate, based on royalty rates specified from Bahamas Petroleum Company. For simplicity’s sake, this analysis assumes 100% of the value is derived from crude oil, ignoring (for example) any potential extractable gas that could provide additional revenue.

As these economic sectors rely on a healthy (pollution free) marine environment, this analysis equates risk with the total coastal economy value. For more discussion on this assumption, see Appendix I.

Table 2: Barrels of oil needed per year to match the value of current Bahamaian industries

Average oil price (per barrel)		Royalty % (low estimate)	Royalty % (high estimate)	Value of threatened industries ($ per year)	Barrels of oil needed to break even (low estimate)	Barrels of oil needed to break even (high estimate)
1 year average	49.70	12.50%	25.00%	7,788,617,860	1,253,628,854	626,814,427
5 year average	55.14	12.50%	25.00%	7,788,617,860	1,129,958,066	564,979,033
10 year average	77.20	12.50%	25.00%	7,788,617,860	807,106,821	403,553,410
20 year average	64.73	12.50%	25.00%	7,788,617,860	962,555,410	481,277,705

Putting these amounts in context
In 2015, just five countries provided 43% of total global offshore oil production: Saudi Arabia, Brazil, Mexico, Norway, and the United States. In 2019, the United States' offshore oil production alone produced 697,524,276 barrels of crude oil.

According to the calculations above, even with the highest royalty rate and highest price, in order to reach a "break even" level of revenue that is equal to the value of the current economic sectors at risk from offshore oil drilling, The Bahamas would need to produce 403,553,410 barrels of oil annually, over half (57.83%) of the offshore crude oil output the United States produces annually. Put another way, The Bahamas would need to produce more than 82 times the total barrels of oil spilled in the Deepwater Horizon oil spill event, each year.

This would mean The Bahamas would need to produce an average of 1,105,631 barrels per day, slightly more than the United Kingdom's total output (939,760 barrels per day), placing The Bahamas onto the list of top 20 oil producers globally.

Table 3: Top oil producing nations in 2019

	Country	2019 oil production (bbl/day)
World production	*80,622,000*	*10,798*
1	United States	15,043,000
2	Saudi Arabia (OPEC)	12,000,000
3	Russia	10,800,000
4	Iraq (OPEC)	4,451,516
5	Iran (OPEC)	3,990,956
6	China	3,980,650
7	Canada	3,662,694
8	United Arab Emirates (OPEC)	3,106,077
9	Kuwait (OPEC)	2,923,825
10	Brazil	2,515,459
11	Venezuela (OPEC)	2,276,967
12	Mexico	2,186,877
13	Nigeria (OPEC)	1,999,885
14	Angola (OPEC)	1,769,615
15	Norway	1,647,975
16	Kazakhstan	1,595,199
17	Qatar	1,522,902
18	Algeria (OPEC)	1,348,361
19	Oman	1,006,841
20	Libya (OPEC)	1,003,000
21	United Kingdom	939,760

Using an estimate of 12,500 barrels of oil per day as a single oil well's maximum capacity, the above calculations (using the highest royalty rate and highest price) would mean more than 88 wells would be needed, operating at 100% capacity every day of the year, to meet the "break even" level of oil production.

While modeling the price effects of changes in global supply are out of the scope of this analysis, note also that if The Bahamas were to bring that much more oil onto the global market it may very likely lower global prices due to an increase in supply, which in turn would lower any revenue received from oil production.

Appendix I: Risk value

The analysis presented above assumes that the totality of the value of current coastal economy industries would be disrupted in the event of an oil spill. In other words, the assumption is that if there were an oil spill, 100% of the coastal economy's value would be lost.

To examine how the calculations in this analysis change as this assumption is relaxed, Table 2 above was recreated in Table 3 with an additional "% of economy threatened" column added. Setting the value to 100% reproduces the original analysis - that is, it assumes 100% of the coastal economy's value is lost in the case of an oil spill - as well as calculating the same values for scenarios where only 50% and 10% of the current coastal economy's value is lost.

Table 4: Barrels of oil needed per year to match the value of current Bahamaian industries, with varying levels of risk to the existing coastal economy

Average oil price (per barrel)		Royalty % (low estimate)	Royalty % (high estimate)	% of economy value threatened	Value of threatened industries ($ per year)	Barrels of oil needed to break even (low estimate)	Barrels of oil needed to break even (high estimate)
1 year average	49.70	12.50%	25.00%	100%	7,788,617,860	1,253,628,854	626,814,427
5 year average	55.14	12.50%	25.00%	100%	7,788,617,860	1,129,958,066	564,979,033
10 year average	77.20	12.50%	25.00%	100%	7,788,617,860	807,106,821	403,553,410
20 year average	64.73	12.50%	25.00%	100%	7,788,617,860	962,555,410	481,277,705
1 year average	49.70	12.50%	25.00%	50%	7,788,617,860	626,814,427	313,407,214
5 year average	55.14	12.50%	25.00%	50%	7,788,617,860	564,979,033	282,489,516
10 year average	77.20	12.50%	25.00%	50%	7,788,617,860	403,553,410	201,776,705
20 year average	64.73	12.50%	25.00%	50%	7,788,617,860	481,277,705	240,638,852
1 year average	49.70	12.50%	25.00%	10%	7,788,617,860	125,362,885	62,681,443
5 year average	55.14	12.50%	25.00%	10%	7,788,617,860	112,995,807	56,497,903
10 year average	77.20	12.50%	25.00%	10%	7,788,617,860	80,710,682	40,355,341
20 year average	64.73	12.50%	25.00%	10%	7,788,617,860	96,255,541	48,127,770

Methodology

1. Estimated value of potentially affected industries

General discussion
Throughout this analysis, the most recent data has been used where possible. Reported dollar amounts from different years have been converted into 2019 dollars to account for inflation and currency appreciation/depreciation.

Where appropriate given data constraints, an economic multiplier was used to calculate the full value of contributions in a sector to the national economy. Economic multipliers signify the additional “indirect” spending that occurs as a result of the initial “direct” spending within a sector. For example, when a tourist spends money at a restaurant, some of that money goes to employees of the restaurant in the form of wages, which are then spent in other places of the economy - to purchase food, clothing, etc., further contributing to overall GDP. These multipliers vary based on the industry involved; for example, the same amount of money spent on tourism-related activities may circulate more or less than dollars spent in the manufacturing or finance sectors.

Additionally, there are important time components that were out of scope of this analysis to consider. For example, damages resulting from an oil spill could persist for years. Whether the appropriate oil drilling value comparison is the aggregate value of threatened industries for multiple years or a single year would require a more complex analysis involving varying recovery times of different sectors. For now, a single year-by-year comparison has been used. This analysis also did not consider whether there would be a time lag between when drilling starts and when the total realized revenue started flowing to The Bahamas; this would further lower the value proposition for the country than what is presented in this analysis.

Finally, note also that the approach taken in this analysis only includes direct economic contributions. There is therefore considerable additional value at risk, in the form of ecosystem services (also known as non-market values). For example, one study (Clavelle & Jylkka, 2013) estimated the annual value of the ecosystem goods and services to range from $5.28 – 5.91 million for Cross Harbour and $6.27 – 6.60 million for East Abaco Creeks.

Industries included
Starting with the U.S. National Oceanic and Atmospheric Administration’s Economics: National Ocean Watch as a guide (NOAA, 2019), and subsequently refined through information from The Bahamas Department of Statistics (Department of Statistics, 2019), a list of economic sectors that were reliant on ocean resources - and thus potentially affected by an offshore disaster like an oil spill - was gathered. The list included the following sectors and subsectors:

- Fisheries
    - commercial fishing
        - Aquaculture
        - seafood processing
    - fish hatcheries
    - seafood markets
- Tourism
    - eating and drinking establishments
    - hotels and lodging
    - airports
    - marinas
    - boat dealers
    - campsites and RV parks
    - scenic water tours
    - manufacture of sporting goods
    - amusement and recreational services
    - recreational fishing
    - charter boats
- Research & science activities
- Film & television
- Shipping

Tourism

The Bahamas Ministry of Tourism estimates that 60% of GDP (Gross Domestic Product) of The Bahamas is generated by tourism-related activities (Ministry of Tourism, 2020). The GDP of The Bahamas was $12,827,000,000 in 2019 (World Bank, 2019), and thus 60% of this figure results in a tourism-related value of $7,696,200,000.

In acknowledgement of the intended audience for this work, this analysis has chosen to rely on officially reported data where available, and so the Ministry of Tourism-generated calculation is the amount used in the analysis tables. For a more conservative estimate, the World Travel and Tourism Council estimates that, in 2019, 43.3% of The Bahamas GDP is derived from tourism-related activities (WTTC, 2019), which would instead produce a tourism-related value of $5,554,091,000.

Because the tourism sector value is an aggregated value of multiple individual industries within the economy (e.g. hospitality, restaurants, tour guides, etc.), no economic multiplier was applied to this value. In an ideal situation, disaggregated direct spending values for each of these industries would be available, and the indirect and induced economic impact amounts would be calculated through the use of industry-specific multipliers. It seems likely, however, that these amounts in aggregate would generate an approximate aggregate value close to 60% of The Bahamas GDP. In other words, the approximate estimate of 60% of the entire country's GDP likely captures the secondary economic spending that the initial revenue spent by tourists generates anyway.

Total employment in The Bahamas was 225,914 in 2019 (World Bank, 2019). The Bahamas Ministry of Tourism states that "Just under 50% of all persons in The Bahamas are directly employed in tourism" (Ministry of Tourism, 2019). Because this is not an exact number, this analysis also looks to the World Travel and Tourism Council 2019 estimate that 52.2% of jobs in the economy of The Bahamas flows from tourism activities. To maintain a slightly conservative estimate, this analysis therefore settles on using 50% of the total 2019 employment estimate in The Bahamas, which produces an estimate of 112,957 jobs directly employed in the tourism sector.

Commercial Fisheries

The commercial fishing sector of The Bahamas was estimated to generate an annual value of $69,727,402.53 in 2014 (Moultrie, 2016). The Bahamas Department of Statistics estimated that for the same year, agriculture, forestry and fishing in total contributed $93,000,000 to GDP (Department of Statistics, 2019). While unable to disaggregate this estimate, fishing is by far the dominant of the three categories in The Bahamas, and the two are of the same magnitude, inspiring confidence in both estimates. The $69.7 million figure for commercial fisheries is thus used. Using a Bahamas and fisheries-specific economic multiplier of 1.22 (Dyck & Sumaila, 2010), and converting to 2019 dollars, the final estimated economic contribution of commercial fisheries is $91,050,780.

Fisheries employment in The Bahamas is estimated to be 9,300, inclusive of all "upstream" jobs (e.g. processing, transportation, etc.) (Moultrie et al., 2016). In acknowledgement of the intended audience for this work, this analysis has chosen to rely on officially reported data where available. However, some studies have estimated that there could be, for example, as many as 40,000 reef fishers in The Bahamas (Teh et al. 2013). These may not have been included as it may include subsistence fishing or people whose primary occupations are not fishing; regardless, it should be noted here that employment statistics alone likely underestimate the importance of fishing activities to the people of The Bahamas.

Recreational Fisheries

It was estimated that in 2015 recreational fishing supported the employment of 18,875 people and contributed $411,241,547 to the economy (Maycock, 2016). However, given that recreational and sport fishing is a major tourism activity in The Bahamas, it is assumed in this analysis that all recreational fisheries value is already captured in the Tourism values calculated above.

Film & Television
Haas et al. (2017) utilized data from The Bahamas Film and Television Commission (BFTC) permitting records to estimate the economic expenditures associated with filming for documentaries, films, and television shows focused on elasmobranchs (sharks & rays). While an underestimate of the likely amount spent on all such marine-based programming, this is the only existing estimate found for such productions, which are reliant on a healthy marine ecosystem. The amounts in Haas et al. were reported in 2015 dollars, and have been converted to 2019 dollar values. Because no employment estimates exist for this sector, and it is unclear how many jobs would be produced for citizens of The Bahamas compared to foreign jobs merely spending revenue within the country, no job estimates have been estimated for this sector.

Research activities
Science and research bring in additional funds to the economy of The Bahamas, through both marine-focused research stations that exist within the country and through additional research projects from overseas institutions that require short-term in-country research trips. Haas et al. (2017) conducted online surveys to gather data on the size of the overall research budget for individual researchers and research organizations, and estimated the proportion spent within The Bahamas. These data were specifically focused on elasmobranchs (sharks & rays), and thus a conservative underestimate of the likely total amount generated by all marine-based research. The amounts in Haas et al. were reported in 2015 dollars, and have been converted to 2019 dollar values. Because no employment estimates exist for this sector, and it is unclear how many jobs would be produced for citizens of The Bahamas compared to foreign jobs merely spending revenue within the country, no job estimates have been estimated for this sector.

Shipping
Information related to the economic contribution of the shipping industry in The Bahamas were difficult to access. While The Bahamas Maritime Authority contributes an average of about $5 million per year[1], it is difficult to see how this revenue source would change except perhaps in the very short term in the event of an oil spill. Therefore, no economic contribution from the shipping sector was included in this analysis.

2. Oil price minimum value matrix

Historical oil prices
Spot prices (dollar per barrel) for crude oil were calculated for the average of the last year, the last 5 years, the last 10 years, and the last 20 years using daily Brent crude oil prices (U.S.

[1] http://www.tribune242.com/news/2020/mar/12/maritime-authority-takes-tax-contribution-to-96m/

Energy Information Administration, 2020a). The comparison to the U.S. Outer Continental Shelf oil production and the list of top producers was collected from (U.S. Energy Information Administration, 2020b).

Oil well estimates

The number of oil wells needed to produce the calculated “break even” amount of oil that would need to be produced to match the value of Bahamian industries at risk was estimated as part of this analysis.

A survey of the literature did not uncover a “typical” amount of oil produced per oil well. Instead, numbers were collected from two examples from existing Gulf of Mexico operations: the Atlantis deepwater oil and gas platform, which has 16 production wells and a production capacity of 200,000 barrels of oil per day, and the Thunder Horse deep-water oil and gas field, which has 25 wet-tree subsea wells and a production capacity of 250,000 barrels of oil per day (bopd) (Offshore Technology 2020a, 2020b). While there is likely variability involved, on average this translates into 12,500 bopd (200,000/16 wells) for Atlantis and 10,000 bopd (250,000/25 wells) for Thunder Horse.

To provide as conservative of an estimate as possible, this analysis has used the higher figure and assumes an additional oil well is required for every 12,500 bopd (or fraction thereof) produced.

Following (On Scene Coordinator Report, 2011), the number used as the total barrels of oil spilled during the Deepwater Horizon oil spill event was 4.9 million barrels of oil.

Royalty rate

The royalty rate is the percentage of total earnings from any oil transactions that The Bahamas would receive from any offshore oil producer operating within its waters.

The Royalties portion of the The Petroleum Act 2016, Section 30 (1) states: “Subject to such arrangements approved by the Minister in writing, and as set out in a licence or lease, every licensee and lessee shall pay to the Minister a royalty calculated...(b) on the selling value of petroleum as determined by mutual agreement between the Minister and the licensee or lessee”

Furthermore, section 30 (2) states: “For the purposes of subsection (I)(b), the selling value of any petroleum shall be such value

A. As may be stipulated by the Minister based on the average selling price of petroleum then prevailing in the market; or
B. as may be based upon other valuation parameters as determined by the Minister.”

This seems to indicate there is a degree of freedom for the Minister to settle upon a royalty rate for each license operator. Unfortunately, this makes identifying a specific royalty rate The

Bahamas will receive from the extraction of petroleum within its territory for use in this analysis slightly more difficult.

The original Petroleum Act (*Ch. 219)* of 1971 states in section 18 (1): “every licensee and lessee shall pay a royalty at a rate of not less than twelve and one-half per centum of the selling value at the well-head of the petroleum won and saved from the licensed or leased area.” Bahamas Petroleum Company’s own website, meanwhile, states: “The specific terms of the licence are confidential, but in the event of extraction of oil, the Act determines that the Company is to pay royalties at the rate detailed in the Act but increased to between 15% and 25% based upon the level of production.”[2]

Without knowing the confidential details of BPC’s agreement but taking the two rates stated above together, the analyses in this report utilized both a “high” and low” royalty rate, drawn from the extreme ends of the 12.5% - 25% range. While the rate is stated to change depending on the level of production, the most conservative estimates in this analysis assumes that The Bahamas receives the maximum royalty rate, 25%, for the entire production.

[2] https://www.bpcplc.com/our-operations/bahamas/licences/, last accessed August 8, 2020

Part 2: Case studies of recent oil market entrants

There are many promises and expectations surrounding the question of how the economy of The Bahamas could be changed if the country becomes an oil-producing nation. However, with oil prices at historic lows, a global energy transition underway and an increasingly crowded world market dominated by controlling interests, there is a great amount of uncertainty about whether The Bahamas can realistically expect to benefit from entering the field.

To explore this question, this analysis looked to other countries that have mostly recently become oil-producing nations as case studies. With the caveats that there are vastly important contexts and factors that this analysis will not cover and merely pegging a country's economic prosperity on its oil production is a gross oversimplification, an overview of economic metrics in other recent oil producers and how they have changed since production began could potentially be informative as these discussions continue.

Metrics used as points of comparison include: amount of oil produced (if any), GDP (for both pre- and post-oil production start date), and the employment-to-population ratio (as oil production is often cited as a source of potential jobs). The Bahamas will also be included, as a point of reference for the comparison.

Countries included

The list of countries considered "recent entrants" was assembled by sifting through a collection of news, reports, white papers, and academic publications to assemble a list of dates countries began oil production. This was cross-referenced with the list of members of the New Petroleum Producers Discussion Group, a discussion forum comprising a group of 30 oil-producing countries.[3]

Economic metrics

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[3] https://www.chathamhouse.org/about/structure/eer-department/new-petroleum-producers-discussion-group-project

Table 5: Case study country general statistics

Country	Country population (2019)	Employment to population ratio, 15+, total (%)			GDP (billion $)		
		At start of drilling	Today	% change since start	At start of drilling	Today	% change since start
Ghana	30,417,856	66.40%	64.86%	-1.54%	$32.20	$66.98	108.04%
Cyprus	1,198,575	-	58.47%	-	-	$24.57	-
Lebanon	6,855,713	-	44.09%	-	-	$53.37	-
Uganda	44,269,594	-	69.04	-	-	$34.39	-
Guyana	782,766	-	49.52%	-	$4.28	$4.28	n/a same year
Namibia	2,494,530	-	47.46%	-	-	$12.37	n/a hasn't started
Angola	31,825,295	74.65%	72.16%	-2.49%	$6.15	$94.64	1438.03%
The Bahamas	389,482	-	66.84%	-	-	$12.83	-

Table 6: Case study country oil production

Country	Offshore oil production			
	Year of discovery	1st year of commercial exploitation	1st year	Most recent year
Ghana	2007	2010	78 mb/d	200 mb/d
Cyprus	2011	hasn't started	n/a (exploratory)	n/a (exploratory)
Lebanon	n/a none found	2020*	n/a hasn't started	n/a hasn't started
Uganda	2010*	hasn't started	n/a hasn't started	n/a hasn't started
Guyana	2015	2019	120000 bpd	120000 bpd
Namibia	n/a none found	hasn't started	n/a hasn't started	n/a hasn't started
Angola	1968	1999		1,512 mb/d
The Bahamas			-	-

Ghana

Ghana's economy appears to have benefited from its offshore oil exploitation. Commercial production at Ghana's first commercial offshore oilfield began in mid-December 2010; meanwhile, export of goods and services grew from 29.5% in 2010 (the last year with almost no oil production) to 44.1% in 2011 and 48.% in 2012, largely as a result of export of crude oil (Aryeetey & Baah-Boatend, 2016). While approximately 50% of GDP comes from the services sector, there is concern that the rest of the country's economy is highly dependent on the export of just three commodities (gold, cocoa, and oil), making the economy vulnerable to swings in international prices. This has played out over the second half of the last decade, as the fall in oil prices since 2015 have reduced Ghana's oil revenue by half, despite expanding exploitation to two additional offshore oil fields in 2016 and 2017 (Central Intelligence Agency, 2020). Unsurprisingly, the COVID-driven oil price freefall has further increased the Ghanian government's budget shortfall to nearly a billion dollars ($USD), renewing calls for further diversification of the nation's economy.[4]

Angola

On paper, Angola appears to be the best case scenario for entering the global oil market: since the beginning of commercial oil production in 1999, GDP has grown from $6.15 billion to $94.64 billion, a 1438% increase. However, context is important, as the country scores very low on

[4] https://www.worldoil.com/news/2020/5/27/ghana-reconsiders-oil-s-role-in-its-economy-as-prices-fall

many human development indexes; the wealth from petroleum is more than half of the economy's value, yet that value has not accrued to the general populace. The CIA World Factbook summarizes the situation in Angola thusly: "More than a decade after the end of Angola's 27-year civil war, the country still faces a variety of socioeconomic problems, including poverty, high maternal and child mortality, and illiteracy. Despite the country's rapid post-war economic growth based on oil production, about 40 percent of Angolans live below the poverty line and unemployment is widespread, especially among the large young-adult population. Only about 70% of the population is literate, and the rate drops to around 60% for women." (Central Intelligence Agency, 2020) Like many economies heavily dependent on oil, Angola's GDP has slumped in recent years as oil prices have been on a steady decline.

Future & very recent countries (Cyprus, Guyana, Lebanon, Namibia)

Many of the countries included in the table above have undergone various stages of exploratory offshore drilling, but have yet to move into commercial production (or in the case of Guyana, and possibly eventually Lebanon, have started production but so recently there is no updated data available yet). As the debate continues in The Bahamas, these countries may be useful to watch to see how similar dynamics are playing out elsewhere, in particular:

- Cyprus - offshore gas fields discovered in 2011 & 2019; exploitation yet to commence
- Guyana - offshore discovery in 2015; commercial exploitation in December 2019
- Lebanon - began exploration drilling in February 2020
- Namibia - exploration ongoing; currently estimating commercial drilling in 2021 or later

Lebanon may be an especially important example to pay attention to, as the runaway expectations for the revenue offshore oil could bring seem to have thus far set the country up for massive disappointment.[5] Cyprus, meanwhile, is a unique example of geopolitical hurdles, as aggressive actions by Turkey towards any energy exploitation vessels have rendered the country unable to exploit offshore resources.[6]

Uganda

Uganda is a land-locked nation, and thus the oil discovered there is terrestrial-based drilling, not offshore drilling. Nevertheless, it may be an informative case study. Uganda has not yet begun commercial oil production; the first oil was discovered there 10 years ago, and commercial oil production is expected to start within the next few years. However, "within the next few years" has remained the story of Uganda for the past decade, and it is expected the timeline for moving to commercial extraction will be pushed further out yet again. Uganda may serve as a

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5 https://www.aljazeera.com/ajimpact/lebanon-offshore-gas-drill-huge-disappointment-200427182315344.html

6 https://www.offshore-technology.com/features/cyprus-and-turkey-the-battle-for-oil-and-gas-in-the-eastern-mediterranean/

cautionary tale of the potential delays that countries considering entering the global oil market could unexpectedly face, as contractual and tax disputes, differences between the government and international investors over the portion of oil production to be exported versus refined locally, disagreements over the export pipeline, and of course historically low global oil prices have all caused significant delays to what has been an ongoing promise of wealth to its citizens. (U.S. Energy Information Administration, 2020c).

Part 3: Analysis of Sovereign Wealth Fund & BPC Agreements

This supplementary report is to address BREEF's request that Sea Change Economics provide a review of The Bahamas Sovereign Wealth Act, and agreements Bahamas Petroleum Company (BPC) has made with the Government of The Bahamas relative to industry norms, to the extent possible given data limitations and confidentiality agreements.

The Sovereign Wealth Fund Act

The Sovereign Wealth Fund was established by Parliament in 2016, with 4 goals:

1. To save and invest surplus funds derived from oil, gas, minerals and other natural resources to provide a heritage for future generations of the citizens of The Bahamas
2. To support and increase savings for future generations
3. To enhance sustainable long term capital growth for The Bahamas
4. To support and promote any other strategic development objectives of The Bahamas

For the most part, the text of this legislation appears (to the very limited expertise of Sea Change Economics in this regard) to be a standard setup for a sovereign wealth fund. It includes limits on how much can be withdrawn each year, which entity controls what, the timing of particular disclosures, etc.

It is unclear (to this author) if "such funds may be derived from oil, gas, minerals and other natural resources due to the Government" includes the license fees BPC owes to the Government of The Bahamas per year, or if only actual revenues from resource extraction (e.g. selling oil) are to be deposited.

There are two points of note, both specific to the fact that this fund was created in tandem with updates to other oil extraction legislation in The Bahamas. The first is that the Act does define "exceptional circumstances" that will allow for additional withdrawals from the fund over the regular specified limit. Interestingly, the very first of these exceptional circumstances include "man-made environmental disasters or natural disasters" - which would almost certainly include oil spills. Because the intended source of revenue to this fund is the revenue received from offshore oil extraction, this would almost seem to structure this fund as additional insurance to The Bahamas, as funds that came from oil could be used in the event of an oil disaster. Unfortunately, this framing would also erode the intended use of this very fund, with payments intended for future generations instead being used as an emergency backstop.

Second, the text of the Act explicitly prohibits investment of the fund in Bahamas-related activities, a standard practice in sovereign wealth funds as a way to reduce investment risk and avoid potential corruption. There are no limits on investing in oil extraction outside of The Bahamas, however; in the interests of diversifying risk, it is perhaps worth asking whether the fund and the revenue going into the fund should both be reliant on the state of global oil prices.

BPC Agreements with the Government of The Bahamas
BPC currently owns (with 100% equity) five exploration licences: “Bain”, “Cooper”, “Donaldson”, and “Eneas” in Southern Bahamas; and “Miami” in Northern Bahamas. BPC has also made three additional 100% equity applications.

According to BPC, they (BPC) must pay an annual rental for each licence period in the amounts as agreed under each licence agreement, currently set at $250,000 per licence per year – and in BPC’s own words on its website, “...thus, for example, for four licences this would aggregate to $1,000,000 per annum.” Theoretically, this would mean BPC pays $1.25 million per year for its five licenses; however, given recent unpaid license fees were resolved, it seems unlikely this is the amount they owed (or, in the end, paid) per year.[7] Unfortunately, there is no further detailed information available about the specifics of BPC’s license agreements; they indicate they are confidential, and no outside information was able to be obtained.

The Royalties portion of the The Petroleum Act 2016, Section 30 (1) states: “Subject to such arrangements approved by the Minister in writing, and as set out in a licence or lease, every licensee and lessee shall pay to the Minister a royalty calculated...(b) on the selling value of petroleum as determined by mutual agreement between the Minister and the licensee or lessee”

Furthermore, section 30 (2) states: “For the purposes of subsection (I)(b), the selling value of any petroleum shall be such value

A. As may be stipulated by the Minister based on the average selling price of petroleum then prevailing in the market; or
B. as may be based upon other valuation parameters as determined by the Minister.”

This seems to indicate there is a degree of freedom for the Minister to settle upon a royalty rate for each license operator in the 2016 Petroleum Act.

The original Petroleum Act (*Ch. 219)* of 1971 states in section 18 (1): “every licensee and lessee shall pay a royalty at a rate of not less than twelve and one-half per centum of the selling value at the well-head of the petroleum won and saved from the licensed or leased area.” Bahamas Petroleum Company’s own website, meanwhile, states: “The specific terms of the licence are confidential, but in the event of extraction of oil, the Act determines that the Company is to pay royalties at the rate detailed in the Act but increased to between 15% and 25% based upon the level of production.” As stated above, there is no further detailed information available about the specifics of BPC’s license agreements, which remain confidential.

[7] http://www.tribune242.com/news/2020/may/07/bahamian-investors-cover-oil-explorers-licence/

Importantly, BPC states: “Though the Company four southern licences have been grandfathered to the old Petroleum Legislation; Bahamas Petroleum Company exploration project and operations will not be disadvantaged. The Company has been advised that where the provisions of the old legislation are disadvantages or silent on matters of importance to the project development and success, the Minister will rely on the updated provisions of the Petroleum Act 2016 and the Petroleum Regulations 2016.” In other words, BPC appears to have the ability to retain the provisions of its licenses under the older Petroleum Act, except in cases where it is “disadvantageous” and chooses to apply the 2016 Petroleum Act instead.

Finally, in a 2011 investor presentation (found on BPC’s website) titled “THE BAHAMAS: A GIANT OIL PROVINCE IN THE MAKING: Investor Presentation June 2011” (link here), contains the following slide (slide 11):

Why The Bahamas? Attractive Fiscal Terms

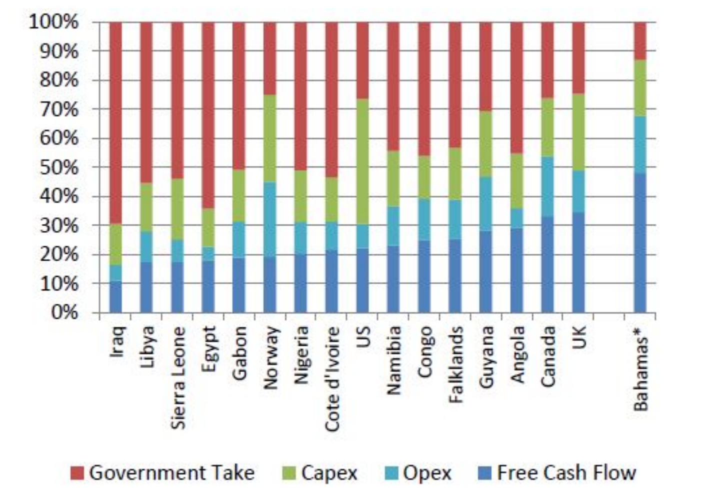
Royalty Rates and Leases terms:

Production Level	Royalty Rate
Oil Production, up to 75,000 bopd	12.5%
Oil Production, from 75,000 to 150,000 bopd	15.0%
Oil Production, from 150,000 to 250,000 bopd	17.5%
Oil Production, from 250,000 to 350,000 bopd	20.0%
Oil Production, in excess of 350,000 bopd	25.0%
Gas Production	12.5%

Rentals: $0.92 per acre per annum charged for the area of a lease, but these charges are deductible from royalty payments

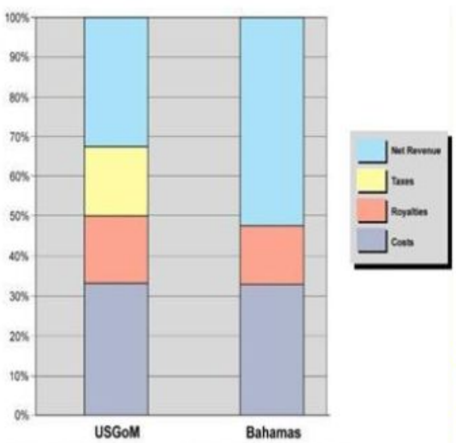
Income taxes: Nil in The Bahamas

E&P Project Revenues/ BOE – Sorted by Free Cash Flow



Source: Rystad Energy, FirstEnergy Capital (February 2011)
* Based on a single 600mmbbl discovery with production start-up in 2015
Revenue splits based on all projects in country over 2010 to 2025. $100/bbl Brent oil pricing
Fiscal regimes according to contractual framework for oil, condensate/NGL and natural gas

Comparison of Licensee Revenues – GoM vs. Bahamas



Comparison of licence revenues (as a proportion of gross sales revenue) between US federal deep water Gulf of Mexico and The Bahamas, assuming $90 oil price and $30/STB total costs (Moyes analysis) 2007

The increased potential return to the licence holder in The Bahamas is largely due to zero corporate income tax

Exploration licence - 12 years in total based on 3-year renewal periods

1) **Initial 3 year award**
2) **1st Renewal (years 4-6) @ 100% of acreage – renewal requires commitment to spud well before end of year 4**
3) **2nd Renewal (years 7-9) @ 50% - requires well drilled every 2 years**
4) **3rd Renewal (years 10-12) @ 50% - requires well drilled every 2 years**

Production licence – 30 years plus additional 10 years (subject to approval of extension)

BAHAMAS PETROLEUM COMPANY PLC.

A very similar slide also appears on slide 30 of an investor presentation (link here) from all the way back in October 2009 - only 2 years after BPC first acquired its five licenses. While not necessarily precisely the same as the specific details of the confidential agreement between BPC and the Government of The Bahamas, this breakdown of royalty rates based on production (in bopd - “barrels of oil per day”) is perhaps a close approximation indication of what the specifics of the agreement might look like.

Also of interest is the chart on the right of the slide. In terms of the proportion of costs of a project, the government proportion in The Bahamas appears to be much lower compared to the government proportion in projects in other countries - indicating the royalty rates and/or overall revenue sharing The Bahamas has agreed to is potentially lower than other comparable projects. The royalty rates for other countries listed in that slide remain approximately accurate today (Law Library of Congress 2015; EY 2020).

Finally, the slide notes there is a rental fee of $0.92 per acre per year charged for the area of a lease. It is unlikely this applies to BPC's current exploration agreements. It is known (from BPC's website, as stated above) that there is a $25,000 rental fee per license. Meanwhile, as each license area is more than 700,000 acres in size, this would translate to approximately $700,000 per license. Combining these two facts, it seems likely that the $0.92 per acre may only apply to exploitation (ie after exploration) licenses - although for the purposes of the cost analysis conducted previously as part of this report, this is moot given that "these charges are deductible from royalty payments".

Appendix 2: relevant details from Licence Q&A text, from BPC website (link)

What are the Act(s) governing petroleum activities in The Bahamas? What do they allow?

Bahamas Petroleum Company four southern licences, namely, Bain, Cooper Donaldson and Eneas, remains to be governed by The Petroleum Act ('the Act') 1971 Chp 219 and the Petroleum Regulations 1978 Chp 219.The Petroleum Act ('the Act') 1971 Chp 219, governs Petroleum exploration, making provisions for the granting of Permits, Licences and Leases. Additionally, the Act covers the level of Royalties and granting of all rights required by a licensee or lessee in order that petroleum may be searched for, bored for, gotten, stored, treated, converted, or carried away. The Act is further refined by the Petroleum Regulations 1978 Chp 219; which goes beyond simply defining the term of the licence to actually detailing the procedures and obligations for the licence and/or lease. For instance, where the Act speaks only to Petroleum exploration; the Regulations specifically deal with the Term and Renewal of Licences, Expenditure and Pooling of Expenditure as well as Abandonment, Completion and Suspension of wells; etc.

In 2016, that Bahamas Government recently introduced four new pieces of legislation to modernize and regulate the Petroleum Industry in the Bahamas.The Petroleum Act 2016, the Petroleum Regulations 2016, the Petroleum (Health and Safety) Regulations 2016 and the Petroleum (Environmental Protection and Pollution Control) Regulation 2016 were all passed by Parliament and became law. Though the Company four southern licences have been grandfathered to the old Petroleum Legislation; Bahamas Petroleum Company exploration project and operations will not be disadvantaged. The Company has been advised that where the provisions of the old legislation are disadvantages or silent on matters of importance to the project development and success, the Minister will rely on the updated provisions of the Petroleum Act 2016 and the Petroleum Regulations 2016.

Additionally, the new regulations that will govern exploration of Petroleum in the Bahamas are the Petroleum (Health and Safety) Regulations 2016 and the Petroleum (Offshore Environmental Protection and Pollution Control) Regulations 2016. The H&S Regulations address matters of health and safety in the operation of facilities for petroleum exploration and extraction in The Bahamas. The H&S Regulations also address different health and safety requirements and reflects best international standards and practice for the safe operations of petroleum facilities. Further, the OEPPC Regulations provides rules for offshore installations related to the monitoring and prevention of pollution and or damage to the marine environment, the Bahamas and surrounding areas.

When were the current Licenses awarded? And, what are the key terms and obligations?

Bahamas Petroleum Company was awarded five licences in 26 April 2007 for a twelve (12) year term, though the currency of the licence has to be renewed every 3 years – consistent with the Act and Regulations. A 2-year extension was granted to the first 3-year period in March 2008 after Bahamas Petroleum Company was requested to hold operations until The Bahamas/Cuba Delimitation agreement was assigned. Bahamas Petroleum Company accordingly deferred commencing seismic surveys in the awarded areas, with the first 2D survey not commencing until June 2010 and the 3D a year later in July 2011. Thus the renewal of the first ‘3’ year term was extended until 26 April 2012. Subsequently, the Government provided formal renewal of the Company’s four southern licences on 8 June 2015 with a further 12 month extension being provided on 17 March 2017. However, following discussions between BPC and the Government, on 8th February 2019, the Bahamas Government restated the renewal of the Second Exploration Period to have commenced on 1 August 2016 and to expire on 31 December 2020, with an obligation to commence the drilling of an exploration well by December 2020. These extensions were intended to reflect the delays imposed on the Company whilst the Government updated its Oil & Gas regulations, which came into force in July 2016.

The key requirements of the exploration licences currently held by the Company are as outlined below:

1. The licences give the Company the right to search for, bore for, and test to ascertain all or any petroleum lying or being within, under or throughout the licensed area as covered under each licence;
2. The Company is to pay annual rental for each licence period in the amounts as agreed under each licence agreement (currently determined by the Government to be $250,000 per licence per year) – thus, for example, for four licences this would aggregate to $1,000,000 per annum;

3. The Company was required to spend a minimum annual amount on exploring and prospecting for petroleum in the first three years of its licensed period (aggregate amount of $1,350,000) for which it was required to supply a bank bond to guarantee the extent of the work carried out – similarly for the second exploration period;
4. Over and above the Licence fees and supply of the Performance Bond, the Company is expected to bear the entire costs of operations on the licence, all exploration activities and, in the extent of success, all appraisal costs, all development costs, all production costs and the costs of mandated abandonment;
5. Following discussion with the Government, in February 2019, the Bahamas Government deemed the Company's southern licences valid and restated the renewal of the Second Exploration Period to have commenced on 1 August 2016 and to expire on 31 December 2020, with an obligation to commence the drilling of an exploration well by December 2020. The Government also determined the obligations and commitments under the licence to have been discharged in full to that point and that the licences remained in full force and good standing;
6. The Company as part of the continuing obligations under the licence is required to commence a second well by December 2022 (subject to subsequent renewals in accordance with the terms of the licences), and shall continue to conduct exploration drilling operations for the remainder of the term of the licence and any renewal periods with an interval of not more than two years between exploration wells.
7. Prior to the commencement of any exploration drilling, the Company must deliver to the Government:
    a. An Environmental Impact Assessment (EIA) detailing the environmental and ecological impacts that the exploration and drilling may have on The Bahamas, its marine environment and the surrounding seashores;
    b. An Environmental Management Plan (EMP) consisting of a Health and Safety Plan and an Emergency Response Plan for spills of oil and hazardous substances.
8. Following review and approval of the EIA and EMP, the Government will provide the company with an Environmental Authorisation (EA) as outlined in the Petroleum (Offshore Environmental Protection and Pollution Control) Regulations, 2016; the EA is a signed document authorising the Company to proceed with drilling the exploration well.
9. Where the Company applies for a renewal of the licences following the first 3 year licence period and has complied with the Petroleum Act, the Regulations and the terms and conditions of its licences, the Government shall renew the licences for a further period of three years as it relates to the whole of the original licensed areas, and thereafter may, renew the licences for two successive periods each not exceeding three years as it relates to fifty percent of the original total licensed area – net of any areas over which an application for a production lease has been made.
10. The Government may cancel the licences in the below cases:
11. It is satisfied that the licences were obtained as a result of willful misrepresentation by the Company in any material particular in the process of making application;

12. There is a failure on the part of the Company to keep accurate and complete records, books and accounts in accordance with section 15 of the Petroleum Act; or
13. There is a material breach of any of the terms and conditions contained in the licences.
14. The specific terms of the licence are confidential, but in the event of extraction of oil, the Act determines that the Company is to pay royalties at the rate detailed in the Act but increased to between 15% and 25% based upon the level of production. This effectively means the Government is an ‘equity’ holder in the licence being entitled to either revenues or the equivalent in produced crude oil up to the appropriate level of royalty directly from the stream of revenue or production. Thus if oil price and/or hydrocarbon production were to rise, the Government benefits would rise in direct proportion.
15. The Licensee and any contractor employed by the Licensee can import into The Bahamas exempted materials as defined by the Licence without the payment of customs duties, excise taxes, levies, other taxes or charges of whatever nature.

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