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Infrastructure and Energy Sector

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Traversing a Slippery Slope: Guyana's Oil Opportunity*

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August, 2020

Abstract

New oil-producing countries face the daunting challenge of transforming expected revenue windfalls into sustainable and inclusive economic development. Record discoveries and growing hydrocarbon reserves bring high prospects for economic development and social transformation, but success in these areas requires getting several key aspects of resource and institutional development right. In this paper, we focus on the case of Guyana, where oil production began in December 2019. We systematically lay out the context of hydrocarbon exploration and production in the country, examine the fiscal regime and projected revenues, address hurdles to developing a cohesive governance framework for the sector, and offer new policy perspectives on how Guyana can use oil revenues for a more sustainable development agenda.

Keywords: Economic Development; Oil Production; Institutions; Latin American and the Caribbean.

JEL classification: O10; Q35; Q40; O43; O54.

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1 Introduction

Many countries around the world have used hydrocarbon resources to realize energy independence and strong economic and social outcomes. However, for every success story, there are sobering lessons that serve as guides for new producers, such as Guyana, to heed key principles of petroleum sector governance, policy formulation, and social accountability.

In 2015, a consortium of three major oil companies made an offshore oil discovery in the Stabroek block - located about 120 miles off the country's coast - that is set to irrevocably change the development trajectory of Guyana.[1] Hopes are high that this once-in-a-lifetime opportunity could transform one of the poorest countries in Latin America and the Caribbean into one of the richest. However, the evidence suggests a note of caution since the discovery of natural resources has often been associated with weakened economic performance and an inability to translate natural resource rents into improved social and economic realities. Extractive sectors under weak institutional frameworks, coupled with commodity price volatility, have been linked to adverse outcomes, such as: reduced fiscal transparency, increased rent-seeking behavior, and patronage politics as coined in (Bhattacharyya and Holder, 2010); poor economic performance relative to lesser endowed economies (van der Ploeg, 2011), and slower progress towards economic and energy diversification. Furthermore, weak institutions have also contributed to less than efficacious fiscal planning and management (Gauthier and Zeufack, 2011) and violent conflicts and threats to democracy (Humphreys *et al.*, 2007). The reality is that most countries that experience a natural resource windfall seem unable to harness this for long-term, sustainable economic development and reduced inequality.

In order to reduce the adverse effects of hydrocarbon development in Guyana, the creation of a conducive policy and institutional ecosystem is essential. This framework can then foster the development of responsive, as well as preemptive, hydrocarbon governance strategies to mitigate risk and ensure value capture from these finite re-

[1]The Stabroek block currently comprises 26,800 square kilometers. Esso Exploration and Production Guyana Limited is the operator and holds a 45% interest in the Stabroek block. Hess Guyana Exploration Ltd. holds a 30% interest, and CNOOC Petroleum Guyana Limited holds a 25% interest.

sources (Balza and Espinasa, 2015). In this paper we outline how Guyana can mitigate the risks and maximize the opportunities of sustainably developing its hydrocarbon resources.

Given the nascency of hydrocarbon exploration and production in Guyana, the country is an ideal case to assess the relationship between institutions and the avoidance of the pitfalls that have plagued other resource-rich, yet underdeveloped countries. Guyana's less-than-ideal outcomes in other extractive sectors signals the urgency to develop state-of the-art management and regulatory frameworks for the oil and gas sector.

Significant challenges lie ahead; among them, the need to develop Guyanese technical capabilities, avoiding overreliance on volatile oil prices, adapting to potential changes in future hydrocarbon demand, and managing expectations surrounding immediate oil wealth. This planned petroleum development, coupled with the ongoing assessment of new discoveries, has led the Government of Guyana to focus on ramping up preparations to oversee the upstream sector (exploration, development and production), to develop policy and legislation, to build up internal capacity building, to promote governance and transparency, and to undertake financial and economic planning. Furthermore, Guyana needs to immediately develop its regulatory framework for optimal monitoring of the oil and gas sector.

The remainder of the paper is organized as follows. Section 2 provides an overview of the current macroeconomic health of the Guyanese economy. Section 3 describes the current state of the petroleum sector and the evolution of petroleum exploration activities, exploration rights and license areas, the chronology of the discoveries of significant hydrocarbon plays, and the potential role of petroleum exploitation in the Guyanese economy. Section 4 models and estimates Guyana's government share of total revenue. Section 5 examines the challenges and risks to value capture by the state, assessing the current governance and legal framework. Section 6 prescribes a set of policy actions to mitigate the onset of the resource curse and promote economic diversification and improved living standards guided by the experiences of other oil-producing countries. Finally, Section 7 contains concluding remarks.

2 Country in Perspective

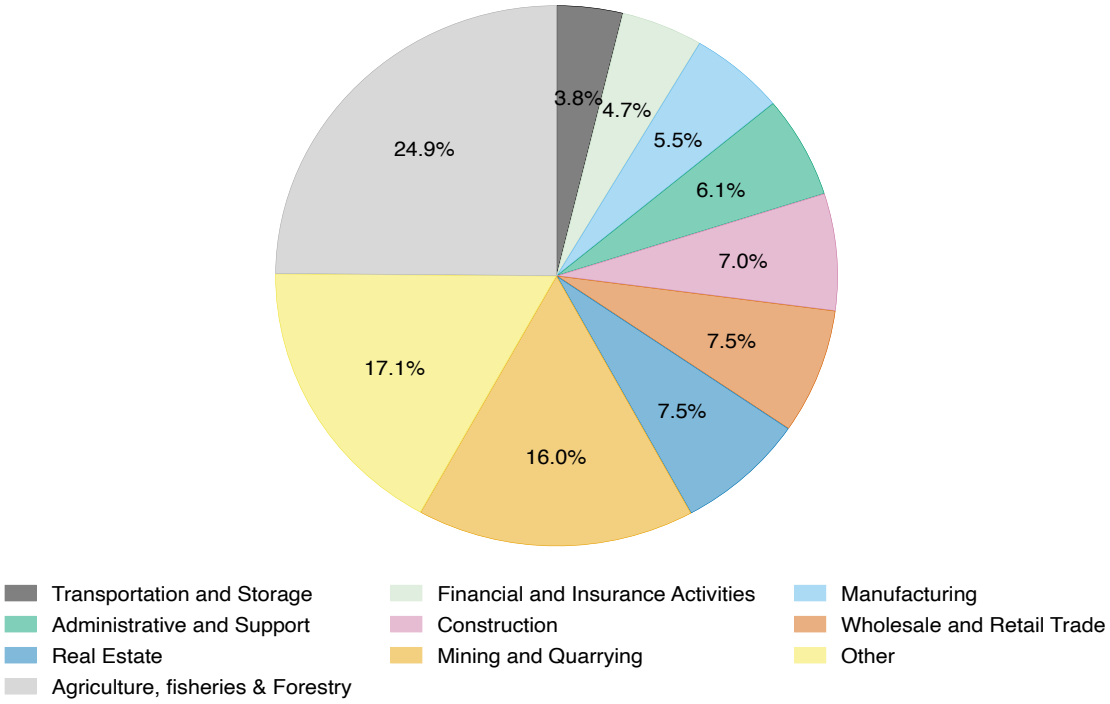
Guyana is a small, open, commodity-based economy which has sustained positive economic growth for over a decade. Guyana's population is approximately 782,000 with a GDP per capita of US$ 5,000, placing it 18th out of 26 borrowing member countries at the Inter-American Development Bank and last among the Country Department Caribbean (CCB)[2] group. In 2019, before the onset of the coronavirus pandemic, GDP grew by 4.7 percent, higher than in previous years of 2.1 percent in 2017 and 4.1 percent in 2018.[3] As a commodity exporter, Guyana has reaped mixed fortunes from price swings for its core export commodities. Agriculture and extractives are the twin engines of economic growth in Guyana; export earnings from these sectors have a multiplier effect on the rest of the economy through investment and domestic expenditure.

Extractives – gold, bauxite, diamonds, and timber – constituted 16 percent of total GDP and more than 66 percent of the commodity export basket in 2019 (Figure 1, Figure 2). The mining sector is made up of mostly gold and bauxite. Gold production alone accounted for almost 10 percent of GDP and 56 percent of total exports in 2019. These leading sectors were estimated to have relatively moderate growth in 2019.

[2]Regional grouping of the Inter-American Development Bank's Caribbean member countries that consists of the Bahamas, Barbados, Guyana, Jamaica, Suriname, and Trinidad and Tobago.

[3]Economic growth on re-based GDP series was estimated at 5.4% in 2019.

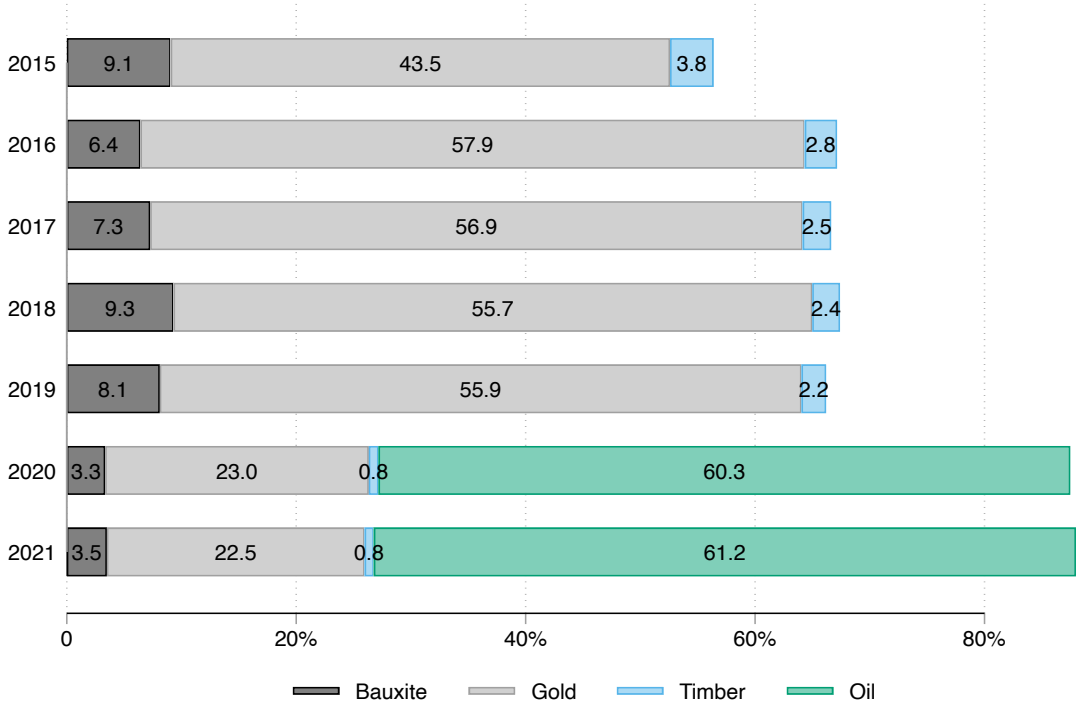
Figure 1: Sectoral contribution to GDP



Source: Authors' elaboration based on Bank of Guyana data

The paradigm shift in the economic fortunes of Guyana from the discovery of high-grade hydrocarbons in 2015 has created a new economic reality. Under this new economic scenario, oil exports as a share of total exports are expected to reach almost 56 percent in both 2020 and 2021, based on values of oil exports increasing from US$ 1.3 billion in 2020 to US$ 1.6 billion in 2021 (Figure 2). This is despite the coronavirus pandemic and an environment of low oil prices in the first half of 2020. The macroeconomic outlook over the medium term remains positive due to the increasing volumes of oil production expected from multiple offshore projects.

Figure 2: Extractives Exports as a Share of Total Exports



Source: IMF Article IV 2019, Bank of Guyana, and IMF – WEO (04/2020)

Oil production is expected to be the main driver of economic growth despite recent IMF downward revisions to the GDP growth estimate. In October 2019, the IMF estimated that GDP would grow by 85.6 percent in 2020. However, plummeting oil prices and the coronavirus pandemic have affected growth estimates around the world. In April 2020, the IMF updated Guyana's GDP growth estimate to 52.8 percent. This is remarkable considering that out of 26 countries in the region, all other countries are expected to have contractions varying between 1 and 15 percent. Non-oil GDP growth was estimated to be 4.8 percent before the coronavirus, which will surely be lower now (IMF, 2019).

Inflation and exchange rates have remained stable in recent years. Price levels have been historically stable with average annual inflation rates of 1.8 percent over the last ten years, increasing to 2.1% in 2019. Similarly, the official nominal exchange rate in Guyana has remained at 208.5 G$/US$ since April 2018. Previously, the official exchange rate was 206.5 G$/US$ since March 2014. However, the rigidity of Guyana's

exchange rate regime may not be ideal as the economy's exposure to oil price volatility increases, and the exchange rate can play an important role in absorbing external price shocks.

In terms of macroeconomic policy, the creation of the Natural Resource Fund (NRF) in early 2019 was an important development to mitigate the risks of Dutch Disease and promote transparency. It provides a hedge for inflationary and nominal exchange rate pressures since by design foreign currency receipts are expected to be saved abroad without influencing the domestic economy. Additionally, the NRF has explicit withdrawal rules that limit the size of the annual transfer to the budget. However, an important limitation of the current arrangement is the lack of a broader fiscal framework, including a medium-term expenditure framework and a fiscal rule. While a medium-term expenditure framework would strengthen planning, a fiscal rule would contribute to preventing the savings in the NRF from eroding due to greater debt-financed spending. The broader framework would strengthen the government's overall capacity for efficient spending and contain spending volatility.

The beginning of oil exploitation in 2019 raised the urgency with which institutional capacity and regulations had to be addressed, not only in the oil and gas sector. Oil production introduces a new set of challenges. The size of the expected oil-related windfall, in combination with existing development challenges, is expected to strain the current legal and regulatory framework, public finances, and potentially economic competitiveness in terms of price levels and the real exchange rate. Additionally, the new economic dynamics of oil production are likely to contribute to increased migration inflows, greater electricity demand, and greater housing demand in a geographic location where around 90 percent of the population resides in low-lying coastal areas. This introduces policy challenges for urban development, immigration policy, environmental risk management, and climate risk mitigation.

3 Hydrocarbon Development

3.1 History of exploration

Guyana has two main petroleum provinces: (i) the Guyana-Suriname Basin (Guyana Basin) is approximately 120,000 sq.km and is located in the country's Maritime Area, overlapping the coastal onshore basin fringe and the offshore basin (see figure 3), and (ii) the Takutu Basin, that measures 980 sq.km and is situated in south central Guyana and northern Brazil.

The Guyana Basin is part of the Guyana-Suriname Basin which is a cretaceous sedimentary basin geographically situated along the north-east coast of South America, extending across the Maritime Areas of Guyana, Suriname, and French Guiana (see map 1). The basin is bounded to the south by the Demerara Plateau and to the north by the Pomeroon Arch. Notably, most of the Guyana-Suriname Basin lies offshore where thicker sedimentary accumulations were preserved in deeper waters. The Guyana-Suriname Basin is considered a frontier basin in South America. It was last assessed by the United States Geological Survey (USGS) in 2000, which estimated the basin to have a mean of 13.6 billion bbls of oil and 32 trillion cubic ft of gas reserves.[4] [5] With 31 geologic provinces assessed, the USGS identified the Guyana-Suriname Basin as having the second highest resource potential among unexplored oil basins in the world (USGS, 2012).

Offshore petroleum exploration began in Guyana in the late 1950s and peaked in the late 1960s. Several companies drilled a combined nine wells between 1965 and 1975. Of these wells, only the Abary-1 well drilled in 1975 in the Kanuku license area found oil, which flowed as 37° API light oil, but encountered kicks that stopped further development. Exploration activity then decreased substantially from the mid-1970s. Through the latter part of the 1980s and into the 1990s, Mobil, Total, Guyana Exploration and BHP continued the exploration effort.

[4] For gas accumulations, all liquids are included as NGL (natural gas liquids). Undiscovered gas resources are the sum of nonassociated and associated gas.

[5] The USGS estimated in its assessment a 95% chance that the unexplored reserves in the Guyana-Suriname basin are at least 5,167 mmbo, a 50% chance that they are at least 12,494 mmbo, and a 5% chance that the basin holds 25,981 mmbo.

In 1990, Total drilled the offshore Arapaima-1 well, although it proved to be non-commercially viable. The most recent offshore activity occurred in mid-2000, when CGX Energy attempted to spud a well on its Eagle prospect. However, the rig was run off its location by Surinamese gunboats, which claimed that it was in Surinamese waters. This was part of a long-running dispute between the two countries over the maritime border. CGX was forced to move the rig and went on to drill its Horseshoe West prospect in the Corentyne block. The well also failed to encounter commercial quantities of oil or gas due mainly to the absence of a shale seal. The company also drilled three onshore wells during 2005 on its Berbice Block, through its operating stake in the ON Energy JV, but all three were dry holes. The border dispute between Guyana and Suriname ensued, and was settled by the United Nations International Tribunal of the Law of the Sea (ITLOS) in September 2007. Despite the increased operational certainty that the agreement provided for operators offshore Guyana, no further drilling took place offshore Guyana until 2012, when two wells were drilled.

Significant research has been completed to evaluate the potential for offshore petroleum resources. Three-dimensional (3D) seismic data gathered from multiple commercial proprietary surveys have been utilized to define and develop drillable prospects. In 2008, the ExxonMobil subsidiary Esso Exploration and Production Guyana Limited (EEPGL) began exploring the country's offshore territory. This led to a first discovery in May 2015, as well as subsequent findings of oil and associated gas, signalling a new cycle for Guyana's energy sector.

However, similar success has eluded onshore (terrestrial) exploration. Located deep in Guyana's interior and straddling the border with Brazil, the Takutu Basin, which is an intra-cratonic rift, separates the country into two distinct geological provinces (northern and southern). The Takutu basin is underexplored, with only five exploration wells drilled between 1981 and 1993 (three in Guyana, two in Brazil). The exploratory wells targeted the Apoteri Formation within basalt structures in what is known as the Rupununi Trough. All were dry holes, with the exception of Home Oil's Karanambo-1 well drilled in 1982 which encountered oil shows but was not developed.

3.2 Current offshore petroleum activities – The Player Scenario

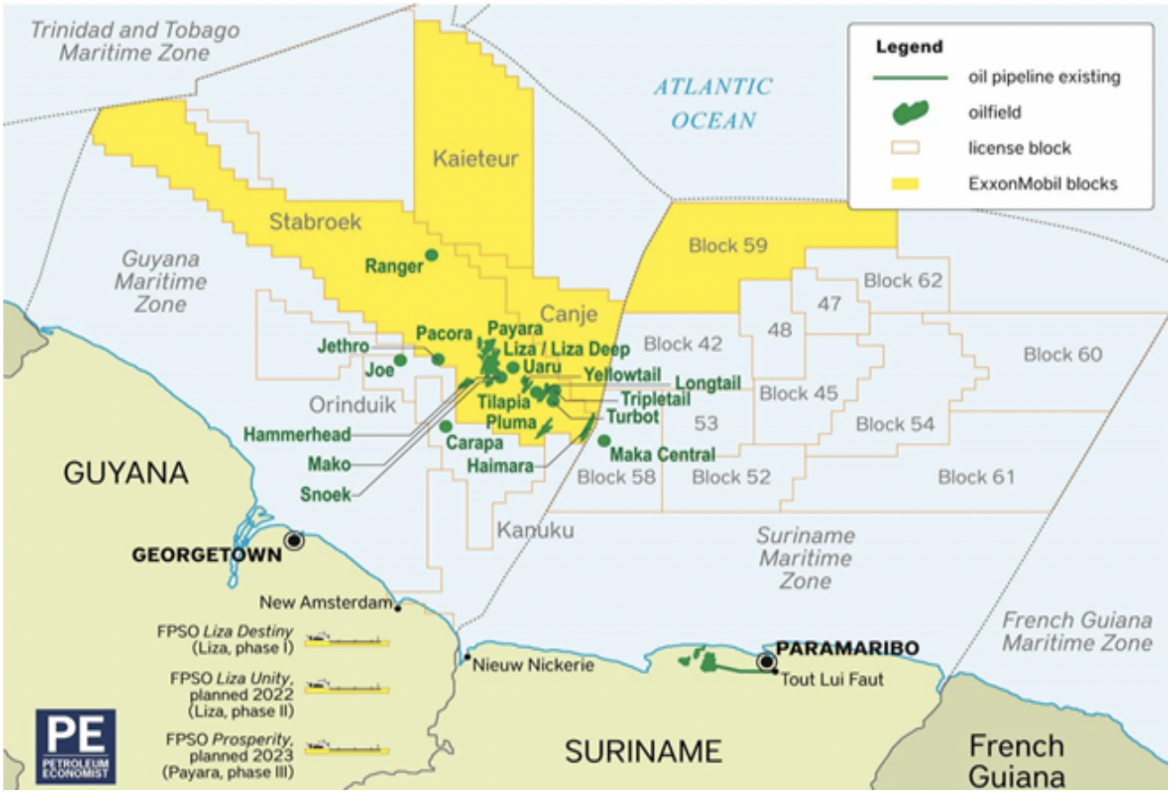
The number and composition of the oil companies that conduct petroleum activities on the Guyana-Basin have varied over time. In the beginning, only a few major international oil companies conducted exploration activities offshore, but today there are more than twelve companies involved in exploration, production and infrastructure. The amalgam of small firms and the presence of key oil majors improves the likelihood of discoveries that de-risk the basins by introducing many different projects, and various technologies.

It is expected that Guyana's huge deepwater oil discoveries will keep growing, with companies such as: Total SA, Repsol SA, in addition to ExxonMobil and Tullow Guyana BV, exploring for oil in Guyanese waters. Drilling activities have been approved in a fifth block, currently scheduled for February 2021. To date, Guyana has nine petroleum blocks under active leases, with exploratory activities already carried out in six. So far, three blocks have shown significant oil plays amid prolific discoveries (19) over the last five years, led by a consortium of three major oil companies – composed of ExxonMobil, Hess, and Nexen (a fully-owned subsidiary of the China National Offshore Oil Corporation, CNOOC), and Tullow Guyana BV (Annex). All licenses were allocated through bilateral negotiations and are at varying stages of exploration, drilling, development, and production.

The consortium was the only one to announce the production of hydrocarbons in 2019 from the now-producing Liza Phase 1 project in the Stabroek block. However, the emergence of a second potential production license area in Guyana's oil and gas sector could change the current projection following resource appraisal. The rest of the companies in other license areas are in the process of fulfilling the minimum work program established within the contract under the acquisition and processing of information, as well as the drilling of exploration wells.[6]

[6]The recent political impasse and low oil price outlook due to the COVID-19 pandemic and its adverse impact on global economic activity, are likely to slow the rate of capital outlay or delay the development of other offshore oil blocks in Guyana.

Figure 3: Map of offshore blocks and discoveries in the Guyana-Suriname Basin



Source: Petroleum-Economist

3.3 Understanding the fiscal regime and the Stabroek PSA

The laws framing Guyana's petroleum fiscal regime date back to the 1980s. The legislative framework is highly discretionary, leaving key fiscal terms to be defined in Production Sharing Agreements (PSAs) and lacks provisions for activities other than exploration and production. The fiscal regime was designed at a time when there was little information about the geological prospects in the country, and thus the authorities were interested in attracting investment in exploration activities. However, given the de-risking of the basin following recent discoveries and the growing interest of international oil companies in Guyana's petroleum sector, the authorities should consider reforming and modernizing the legal and fiscal framework for new investments in the sector.

The fiscal regime for upstream petroleum is mostly set out in PSAs, with key fiscal terms negotiated on a case-by-case basis.

The petroleum fiscal regime is governed by the Petroleum (Exploration and Production) Act 1986 (PEPA), which gives the government broad powers to grant petroleum prospecting and production licenses, and to negotiate PSAs, attaching conditions to these types of arrangements. While the PEPA provides for exploration and production activities, the Act and regulations lacks provisions for the processing and refining of petroleum products, pipelines and other modes of petroleum transportation, and petroleum marketing arrangements.

The PEPA also provides for the modification of tax laws in respect of a production license holder, whereby the licensee has entered into a PSA with the government. The Act confers authority to the Minister of Finance, subject to an affirmative resolution by the National Assembly, to exempt the licensee from the Income Tax Act (ITA), the Income Tax (In Aid of Industry) Act, the Corporation Tax Act, and the Property Tax Act. The Guyana Geology and Mines Commission's (GGMC) website contains a set of minimum fiscal terms for PSAs as follows: (i) a maximum cost recovery ceiling of 75 percent of the value of crude oil and natural gas produced and sold from the contract area; (ii) a minimum government share of oil profit of 50 percent on a per field basis; (iii) the tax obligations of the contractor under the ITA, Corporation Tax Act, and Property Tax Act shall be satisfied through the Government's share of oil profits; (iv) contractors and subcontractors shall be allowed to import capital goods, materials and supplies used solely for petroleum operations free of duty and other taxes; and (v) fuel shall attract a reduced Excise Tax of up to 10 percent in keeping with the solid minerals sector. The PEPA and subsidiary regulations provide for a competitive bidding procedure to grant petroleum prospecting licenses. However, the current practice is to grant prospecting licenses and negotiate PSAs on a first-come, first-served basis.

Table 1: PSA structures in Guyana offshore basin

License Area	Bonus US$M	Royalty rate	Cost recovery				Ring fencing	Withholding tax	Production Sharing (GoG/IOC)
			limit (%)	Royalty	CAPEX	OPEX			
Canje	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Corentyne	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Demerara	0	1%	75%	no	yes	yes	no	yes -paid by GoG	53/47
Kaieteur	0	1%	75%	no	yes	yes	no	yes -paid by GoG	50/50
Kanuku	0	1%	75%	yes	yes	yes	no	yes -paid by GoG	First 20,000 bbls (50/50); next 20,000 (52.5/47.5), next 20,000 (55/45), next 20,000 (57.5/42.5), above 80,000 (60/40).
Orinduik	0	1%	75%	yes	yes	yes	no	yes -paid by GoG	First 25,000 bbls (50/50); next 25,000 bbls (52.5/47.5); next 15,000 bbls (55/45); next 15,000 bbls (57.5/42.5); greater than 80,000 bbls (60/40).
Stabroek	18	2%	75%	no	yes	yes	no	yes -paid by GoG	50/50

Source: Authors elaboration based on Department of Energy

The agreements provide for a modest explicit royalty, which may be paid directly by the contractor or included in the government's share of oil profit. A portion of production (after royalty) can be retained by the contractor to recover costs (that is, "cost oil" or "cost gas"). The petroleum remaining after (royalty and) cost oil, including any surplus of cost oil over the amount needed for cost recovery, is termed "profit oil" or "profit gas" and is divided equally between the government and the contractor. In other words, the governments's share of oil profit is fixed at a rate of 50 percent. Finally, the contractor's corporate income tax liability is paid by the Minister responsible for petroleum on behalf of the contractor out of the government share of profits. The key fiscal terms of Guyana's PSAs are discussed below.

3.4 Royalties

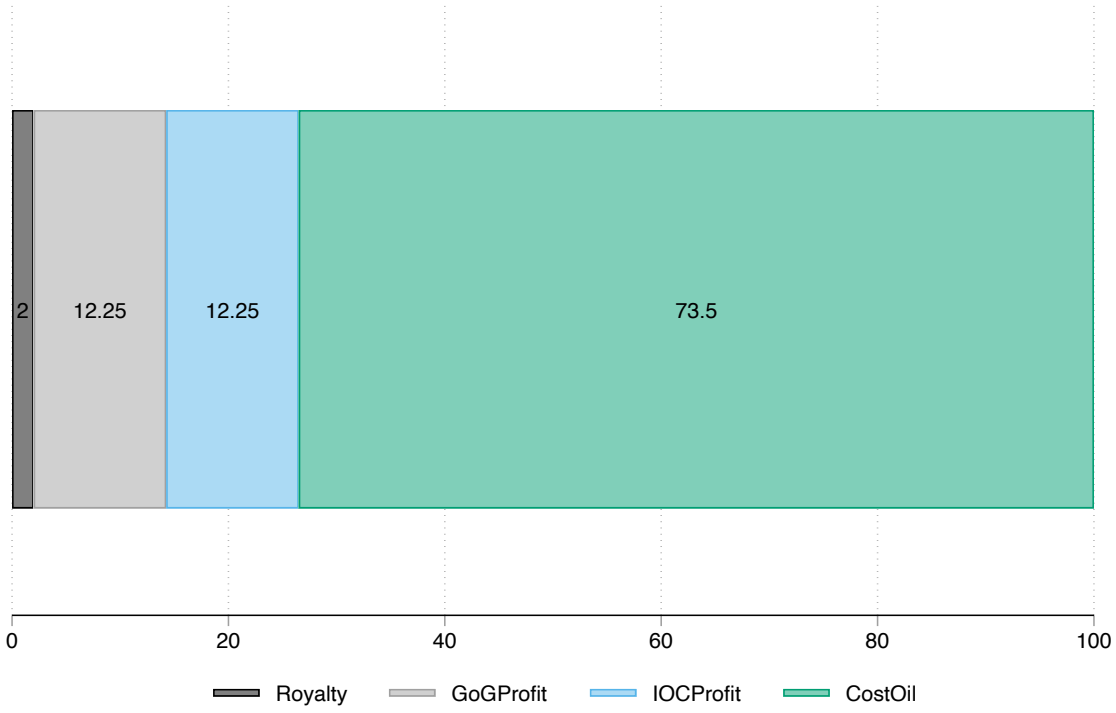
Royalties are stipulated in each PSA and may vary between agreements. The royalty rate for the Stabroek PSA was originally set at one percent and paid out of the government's share of profit. However, as part of a re-negotiation process in 2016, the royalty was taken out of the pay-on-behalf system and the rate increased to two percent on an ad-valorem basis. The re-negotiated royalty is levied on the gross value of all oil and gas produced and saved from the contract area. With rates set at modest levels, royalties have the advantage of ensuring early and dependable revenue for the government. However, they are insensitive to costs and, thus, to the underlying profitability of projects. If set at high rates, investors may perceive them as an implicit

depletion policy as they are likely to increase the marginal cost of extraction and reduce the range of feasible projects. This does not seem to be an issue in Guyana, however, as existing PSAs appear to enjoy royalty rates well below what is observed internationally.

3.5 Cost recovery limit

PSAs in Guyana limit the value of production (after royalty) that can be used to recover costs. The cost recovery limit in the Stabroek PSA is fixed at 75 percent, therefore with a cost recovery limit, the minimum government share is greater than zero with an implicit royalty is embedded in the scheme. For example, a 75 percent cost recovery limit combined with a fixed government share of profit of 50 percent guarantees that the government will always receive a minimum of 12.5 percent of the total production (that is, a share of 50 percent of the 25 percent profit petroleum remaining after cost recovery). Moreover, Figure 4 shows that since the Stabroek PSA also includes an ad-valorem explicit royalty of 2 percent, the combination of the explicit and implicit royalties yields an effective royalty rate of 14.25 percent which is more in line with international practice. The implicit royalty concept of course only applies when the cost recovery limit is in effect. Once recoverable costs fall below the cost recovery limit, the amount of profit oil to be divided between the contractor and the government increases.

Figure 4: Stabroek PSA regime structure



Source:Authors' elaboration based on Department of Energy.

PSAs include an accounting annex detailing the rules for cost recovery purposes. The accounting annex specifies which costs are allowed to be recovered, the rules for depreciating capital expenditures, and the treatment of certain expenses such as services provided by affiliated parties and financing costs. In the PSA framework in Guyana, exploration and development costs can be fully expensed for cost recovery purposes. Moreover, if cost oil is less than the recoverable costs in any given period, unrecovered costs can be carried forward, without interest, to subsequent periods without any limitation.

The treatment of interest expenses is unique and favors the contractors, and risks of excessive or abusive use of debt can have a detrimental impact on the amount of oil profits to be shared between the government and the contractor. According to the PSAs in Guyana, interest expenses, irrespective of the source of financing, are permitted to be recovered provided that such expenses are consistent with market rates. Moreover, interest payments are exempt from withholding taxes, providing yet

another incentive for contractors to finance their costs with debt. Services provided by affiliated companies, on the other hand, are recoverable as long as they are based on actual costs. The charges for related-party services should be no higher than the usual prices charged by the related company to third parties for comparable services under similar terms and conditions elsewhere, and must be fair and reasonable in the light of prevailing international oil industry practice and conditions.

It is common to have limitations on interest deductibility to reasonably protect the tax base. Some countries disallow interest expenses or limit the amount of debt permitted for cost recovery purposes through caps on debt to equity ratios or earning stripping rules. Other countries may prescribe that interest may be deductible only on borrowing to fund development costs or a maximum percentage of such costs. In Guyana, it is common to exempt petroleum and mining companies from withholding tax on interest payments.

3.6 Profit petroleum

The government's share of profit oil is fixed at 50 percent in the case of the Stabroek agreement, which is quite uncommon in modern PSAs. The main disadvantage of this type of sharing mechanism is that it does not provide an increasing share of profit oil/gas to the government linked to the profitability of projects. Most PSAs around the world usually have a formula in which the government share increases as a function of production, a combination of production and prices, the project's internal rate of return, or an economic variable such as the ratio of cumulative revenue to cumulative costs. Moreover, in many countries, the top tier government share of profit oil could be as high as 80 or 90 percent. Two common production sharing schemes are the daily rate of production (DROP) and the R-Factor. In the former, the government share of profit oil/gas increases with the daily rate of production from the field or contract, often with several tiers. Although the DROP is an imperfect proxy for project profitability, many countries have adopted this system. Under the R-Factor scheme, on the other hand, the government's profit share increases with the ratio of the contractor's cumulative revenues to cumulative costs (hence the term the 'R-Factor').

The R-Factor is commonly seen as an improvement over DROP, although critics point out that it does not recognize the time value of money.

3.7 Ring-fencing

The ring-fencing arrangement in a PSA framework can constrain the allocation of income and expenditure for profit sharing and tax purposes. With a tight ring-fence, the scope to consolidate income and expenditure across multiple fields is restricted. In the PSA framework in Guyana, the sharing of profit oil between the contractors and the government is done on a field-by-field basis. In principle, this ensures that government revenue from the contract area is calculated based on each field separately. However, this is undone by the PSA framework also allowing the contractor to allocate cost oil to any field within the contract area. This asymmetrical treatment of profit and cost oil is likely to benefit contractors with multiple fields within their contract areas at the expense of delaying government revenue. For example, a contractor with multiple fields can significantly reduce the amount of profit oil to be shared from a producing field by allocating cost oil from various fields under development to the producing field. This could have significant implications in terms of delaying government revenue, especially if a large, multi-field project is developed in phases.

3.8 Taxation

According to the GGMC's published minimum terms, the contractor's CIT liability is paid out of the government share (also known as pay-on-behalf system). In other words, the government share of profit oil/gas is inclusive of CIT and, therefore, the contractor does not have to make separate CIT payments. Moreover, since the CIT is included in the government share of profit oil, this implies a ring-fence around the contract area for CIT purposes. This type of arrangement is also called post-tax production sharing, as the profit oil sharing is inclusive of CIT. An advantage of this approach is that it provides a measure of fiscal stability for companies, while protecting the government from abusive CIT planning as companies do not gain from engaging in such activities. However, the effectiveness of the PSA in this respect does depend

on the specific accounting rules for allowable deductions for cost. When this type of production sharing is used, the government share of profit oil/gas is higher than what the share would be if the contractor were separately liable for CIT. In the case of Guyana, this implies that the fixed 50 percent share is relatively low. Given that the PEPA allows the Minister of Finance to exempt the holder of a PSA from most tax laws, it is unlikely that other taxes apply to the contractor.

4 What Does This Mean for the Guyanese Economy?

4.1 Model assumptions

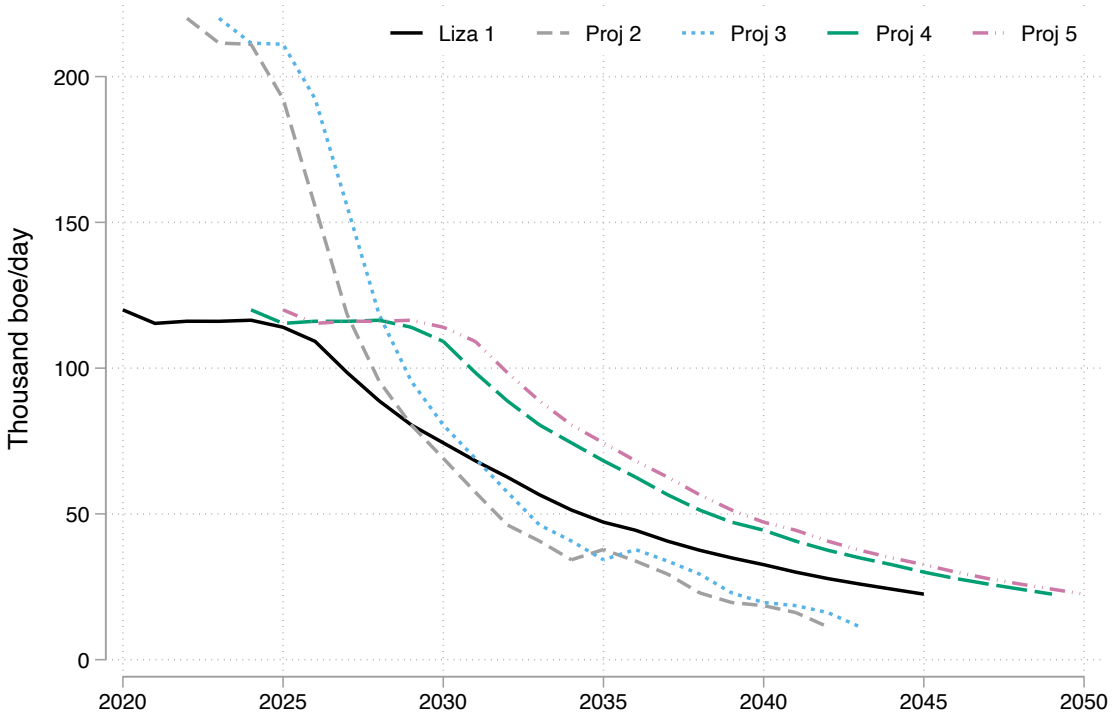
The Stabroek discoveries are expected to place Guyana among the largest oil-producing countries in the region. With the progression of Liza Phase 1 into the production phase, the planned development of the other projects requires some extrapolation of the economic parameters given the projected commissioning of 5 projects to achieve a publicized production level of 750,000 barrels of oil equivalent per day (boe/day) by 2025 (Figure 5, Figure 6).[7] The following assumptions consider project cost inflation and capital cost indexing or industry benchmarks to guide the construction of subsequent planned project models. The model does not include gas, given the expected use to improve crude recovery in current fields and new projects, and also, the potential for the development of gas-to-shore facilities and associated industries.

To date, the Stabroek field is estimated to hold more than 8 billion barrels of oil equivalent after 16 discoveries. The model assumes that each project will have a production life of 20 years with a two-year decommissioning period. The Liza Phase 2 (proj 2) is planned to commence production in 2022 at a capacity of 220,000 boe/day using the Liza Unity floating production storage and offloading (FPSO) facility; Payara (proj 3) also at a capacity of 220,000 boe/day is scheduled for 2023, using the Liza Prosperity FPSO. To meet forecasted production levels in 2025, the model assumes

[7] https://corporate.exxonmobil.com/News/Newsroom/News-releases/2019/0503_ExxonMobil_to_proceed_With_Liza_Phase_2_development_offshore_Guyana

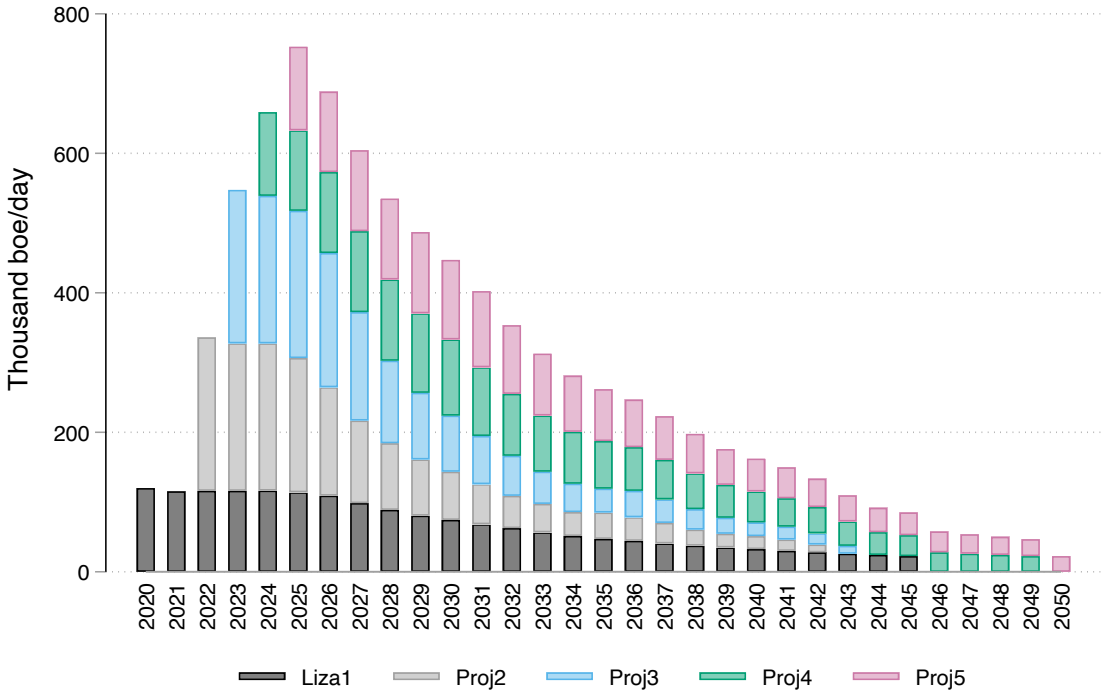
the two additional projects, proj 4 and 5, should share similar production profiles to Liza Phase 1 at 120,000 boe/day. The projects are assumed to have an immediate ramp rate to full production capacity which plateaus in the first year, then falls at an average decay rate of 0.62% p.a for projects 1,4, and 5; and 1.71% for projects 2 and 3. The planned production sequencing of crude production of approximately 750,000 boe/day in 2025, will make Guyana the fifth largest oil-producing country in Latin America and the Caribbean.

Figure 5: Production profiles



Source: Authors' calculations.

Figure 6: Aggregated production profiles



Source: Authors' calculations.

The model is built utilizing the cost parameters of the IMF's Fiscal Analysis of Resource Industries (FARI), and adjusted with more updated information on project characteristics and the new price outlook for the global oil market (Table 2). The values presented are in Adjusted Net Present value (APV)[8] terms. The IMF World Economic Outlook (WEO), April 2020 update, projected Brent crude of US$36.9/bbl for 2020, and US$39.5/bbl for 2021. The model assumes a US$48/bbl constant (based on late 2020 market) for Brent crude. No premium or discount has been modelled for crude oil from the Stabroek Block.

Table 2: Model parameters

Variable	**Assumption**
Price ($/bbl)	IMF WEO April 2020 Brent crude [$36.9/bbl - 2020, $39.5/bbl - 2021]. Average price US$54.4/bbl
Production (kbpd)	Daily production - Liza 1 (120 kboe/day), proj 2 (220 kboe/-day), proj 3 (220 kboe/day), proj 4 (120 kboe/day), proj 5 (120 kboe/day)
	Ramp rate – 100%
	Plateau duration – 1 year
	Decay rate – Liza 1, proj 4 and proj 5 [average -0.62%], proj 2 and proj 3 [average -1.71)
Cost (US$M)	See project economics Table 5

Source: Authors' elaboration

The model assumes project capital expenditures (CAPEX)[9], which includes seismic, drilling, exploration, appraisal and facilities costs, for Liza Phase 1 US$3.5 billion, Liza Phase 2 US$6.5 billion, Proj 3 US$6.5, Proj 4 US$3.5 billion, and Proj 5 US$3.5 billion. Operational expenditures (OPEX) are estimated at US$6-8/bbl. Based on the assessment of the Stabroek PSA in the previous section, all costs are recoverable without ring-fencing, while Corporate Income Tax (CIT) are paid by GoG on behalf of the IOC. Abandonment and decommissioning are also cost recoverable and amortized over the life of each project.

[8] Adjusted Present Value (APV), as against, Weighted Average Cost of Capital (WACC), offers considerable advantages in the valuation of financial flows for projects with high variability and uncertainty (Sabal, 2008).

[9] It is expected that the interconnection of successive wells to transfer natural gas form surplus to deficit wells to maintain or improve crude recovery will likely increase the CAPEX and OPEX requirement.

4.2 Results

With mobile capital, neutrality of the tax system can be interpreted with respect to the decision on where to invest, and the decision on how much to invest (Zodrow, 2010). For a given investment, without other locational differences, the discrete choice between two or more mutually exclusive locations depends on the average effective tax rate (AETR) (Devereux and Griffith, 2003). To incorporate this, the model uses a measurement known as the "government take" (or sometimes the AETR).

Since the government take is an essential tool for the comparison of fiscal regimes in extractives, it magnifies the importance of key fiscal mechanisms – royalties, bonuses, profit-sharing ratios, direct and indirect taxes, and equity participation towards maximum capture of rent (Balza and Espinasa (2015); Bindemann (1999). For Guyana, its fiscal regime translates to a pro-investment stance with its portion of income from investment project to total project revenue with an estimated government take of 51%.

Guyana's government share of total revenue sits at the lower end for state revenue capture but presents one of the most attractive PSAs in the region. Arguably, the discussions that arose for the comparative work of (West, 2020) continue to drive the GoG to develop a 'Model PSA' that better manages the trade-offs between Government take and investment promotion. Balza and Espinasa (2015) elaborated that for nascent oil-producing countries, a large government take can disincentivize or stop active field development since operators in extractive industries require a "minimum level of permanent investment to keep production going." However, by conforming to industry norms in the deployment of a wide range of rent capturing devices, such as direct and indirect taxes, Guyana can realize higher government take that also ensures a competitive advantage when considering regime locational differences in investment decisions.

GoG oil revenues[10] are projected to be US$300 million by the end of 2020 from the Liza Phase 1 project , but then rapidly rise to US$872 million in 2026 after cost recovery has been exhausted. The Liza Phase 1 project is projected to break even at US$18.6 per barrel, while considering decommissions provisioning, the break-even

[10]Cumulative and discounted. The IOC estimates include both profit and costs recovered.

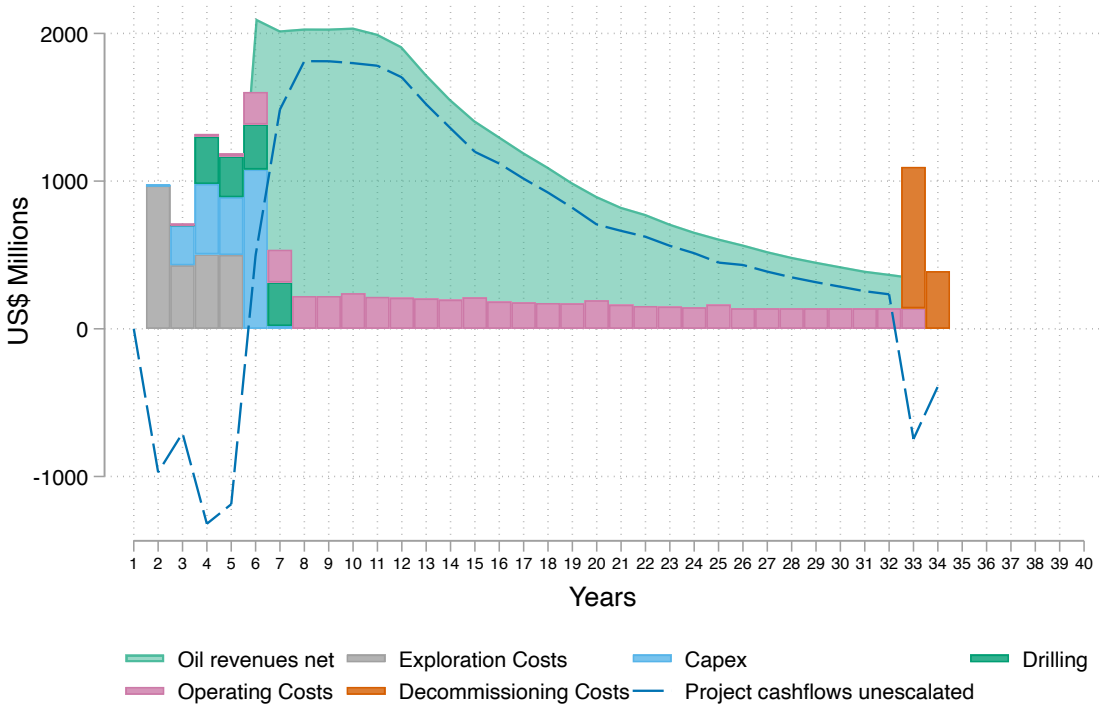
requirement increases to US$29.4 per barrel (see table 3). The overall revenue flow from Liza Phase 1 is projected to reach US$31.4 billon over the life of the project. Guyana is expected to net US$9.9 billon in revenue, while the operator's total income derived from production is US$8.8 billion over the life of the project.

Table 3: Liza Phase 1 Project Economics

Project economics	**USD mn $yr1**	**USD / bbl**
Oil Revenues Gross	31,486	48.0
Transport costs post-fiscal point	-	-
Oil revenues net	31,486	48.0
Exploration costs	2,404	3.7
Capex	2,237	3.4
Drilling	1,202	1.8
Operating costs	5,003	7.6
Decommissioning costs	1,348	2.1
Project costs	12,193	18.6
Project cashflow before decommissioning fund	19,293	29.4
Pre-tax IRR fully cycle	23.3%	
Pre-tax IRR FID onwards	32.0%	

Source: Authors' elaborations based on several sources.

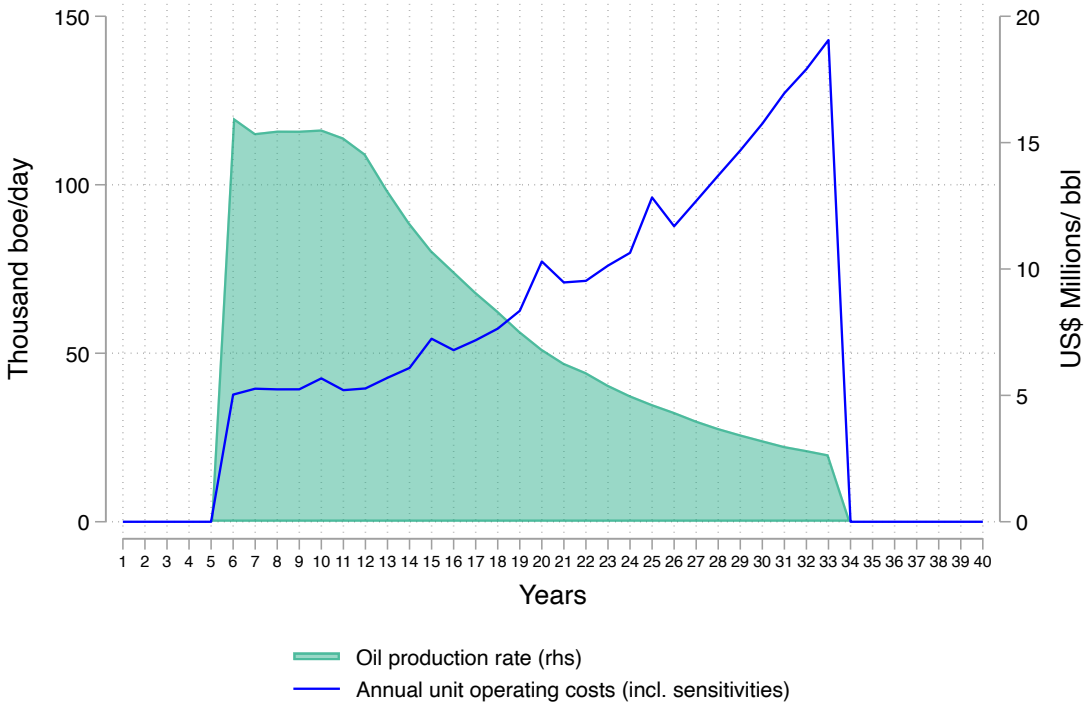
Figure 7: Liza phase 1 production, revenues, and costs



Year 1 = 2015.

Source:Authors' Estimates.

Figure 8: Liza phase 1 Production vs. unit operating cost



Source:Authors' Estimates.

Table 4: Table of Results and Average Effective Tax Rate (incl. participation) Liza Phase 1

		Undiscounted	**DiscRate1**	**DiscRate2**	**DiscRate3**
Discount rate	% real	0%	10.00%	12.50%	15.00%
Project cashflow before decommissioning fund	USD mn $yr1	19,293	4,505	3,053	1,984
Government revenues excluding participation	USD mn $yr1	9,924	2,889	2,244	1,772
SOC Net cash flow before tax	USD mn $yr1	-	-	-	-
Government revenues including participation	USD mn $yr1	9,924	2,889	2,244	1,772
Net cashflow after fiscal regime: IOC	USD mn $yr1	8,883	1,191	459 (77)	
Loan cashflows after IWT	USD mn $yr1	-	-	-	-
Investors (IOC + Lender)	USD mn $yr1	8,883	1,191	459	(77)
Average Effective Tax Rate (incl. participation)	% real	51%	64%	73%	89%
Project benefits	USD mn $yr1	16,532	6,311	5,108	4,177
Government share of total project benefits	% const	60%	46%	44%	42%

Source: Authors' calculations

Considering the sequencing of the targeted five projects by 2025 by the Stabroek operators, the expected windfall by the government progressively increases. In 2025, Guyana would receive a projected US$2.8 billion in oil revenues as part of its government take, which would ultimately accumulate to US$49 billion by 2054 (see table 6). While convention has tempered the relevance of forecasting over a protracted horizon and the notion that too many variables, both endogenous and exogenous, may be subject to change, Guyana as a new oil-producing country – despite debates about the "best deal" – is poised to drastically transform over the near and medium term.

This exercise excludes the likely commissioning of other projects beyond the 2025 horizon for the Stabroek license area, as well as, the development activities that may manifest into production from the other license areas. While the likelihood of adjustments to initial contract terms are probable, any improvement in Guyana's government take for all its active petroleum agreements will translate to greater windfalls to the country and further accelerate the transformative impact of responsibly managed hydrocarbon extraction. Thus, the impetus is on policy makers to undertake the necessary internal analyses to determine whether the current PSAs are adequately reflective of the country's position as one of the newest and largest oil plays in Latin America and the Caribbean.

Nevertheless, regardless of contract quality, avoiding (further) value leakages from inefficient institutional organisational organisation and regulatory oversight as a nascent oil-producing country should also be of high priority. Thus the next section introduces the case for the creation of an ideal governance and regulatory framework

for optimal value capture given Guyana's current levels of institutional capacity and in-place legislative frameworks.

Table 5: Liza (1,2), Proj 3, 4 and 5 project economics

Project economics	**USD mn $yr1**	**USD / bbl**
Oil Revenues Gross	154,801	48.0
Transport costs post-fiscal point	-	-
Oil revenues net	154,801	48.0
Exploration costs	2,404	0.7
Capex	15,160	4.7
Drilling	8,083	2.5
Operating costs	23,887	7.4
Decommissioning costs	9,342	2.9
Project costs	58,876	18.3
Project cashflow before decommissioning fund	95,925	29.7
Pre-tax IRR fully cycle	31.5%	
Pre-tax IRR FID onwards	35.8%	

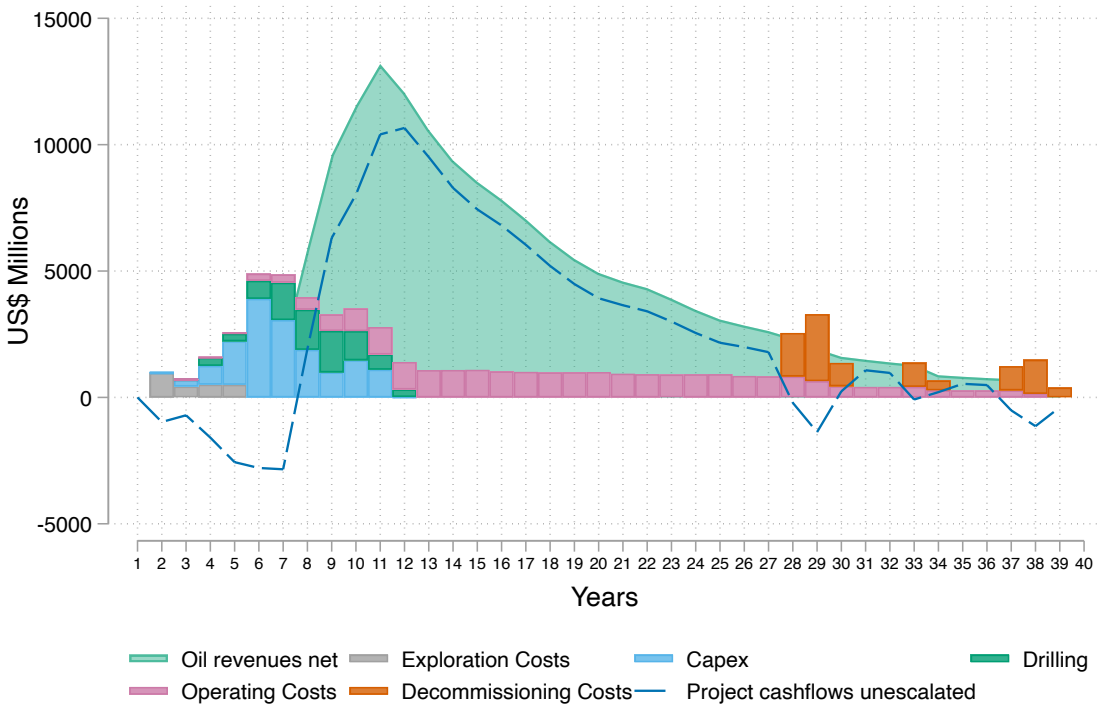
Source: Authors' elaboration

Table 6: Results and Average Effective Tax Rate (incl. participation) for five projects

		Undiscounted	DiscRate1	DiscRate2	DiscRate3
Discount rate	% real	0%	10.00%	12.50%	15.00%
Project cashflow before decommissioning fund	USD mn $yr1	95,925	23,445	16,691	11,830
Government revenues excluding participation	USD mn $yr1	48,963	13,017	9,831	7,539
SOC Net cash flow before tax	USD mn $yr1	-	-	-	-
Government revenues including participation	USD mn $yr1	48,963	13,017	9,831	7,539
Net cashflow after fiscal regime: IOC	USD mn $yr1	44,448	8,105	4,921	2,675
Loan cashflows after IWT	USD mn $yr1	-	-	-	-
Investors (IOC + Lender)	USD mn $yr1	44,448	8,105	4,921	2,675
Average Effective Tax Rate (incl. participation)	% real	51%	56%	59%	64%
Project benefits	USD mn $yr1	73,853	25,334	19,844	15,693
Government share of total project benefits	% const	66%	51%	50%	48%

Source: Authors' calculations

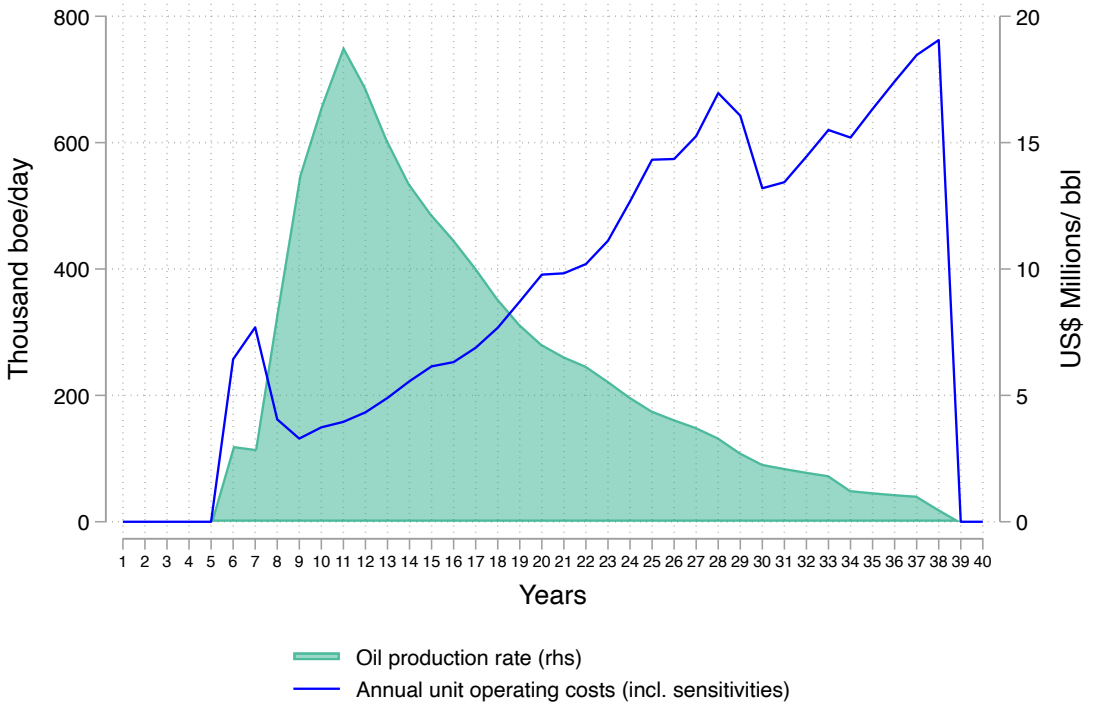
Figure 9: Five-project production, revenues, and costs



Year 1 = 2015.

Source:Authors' Estimates.

Figure 10: Five-project Production vs. operating cost



Source:Authors' Estimates.

5 Value Capture: Why Do Institutions Matter?

The exploitation of hydrocarbons and the later transformation of revenues into productive capital rely on a set of institutions, capable technicians, and a harmonized collection of policies that guide resource development (Mayorga Alba, 2009). To achieve the promised socioeconomic transformations and development outcomes, the hydrocarbon sector should be built upon a coherent, harmonized, and stable legal framework that fosters strong, transparent, and accountable institutions to ensure the greatest value capture. The well-defined interrelationships between institutions and legal frameworks, under which they operate, translate to better policy formulation for navigating the challenges and maximizing opportunities in the development of hydrocarbon resources (Balza *et al.*, 2014). The immediate need to rapidly build Guyana's regulatory and management framework for an optimal operation of the nascent oil and gas sector remains a significant yet attainable challenge.

The critical institutions, legislations, and the responsibilities along the decision-making value chain are impacted by the political stability, robustness of civil society participation, and the overall quality and availability of human capital resources (Boldbaatar, Kunz and Werker, 2019). For new oil-producing countries, such as Guyana, provisioning the scale of financial and technical resources required to develop nascent institutional capacities and the legal framework to optimally administer the petroleum sector is a daunting challenge. The rapid development of these success factors presents an attainable ceiling, given the wealth of country experiences of new and old producers around the world.

We now examine some of the legislative challenges of updating existing or introduce new laws and regulations that are the bedrock for building strong institutions.

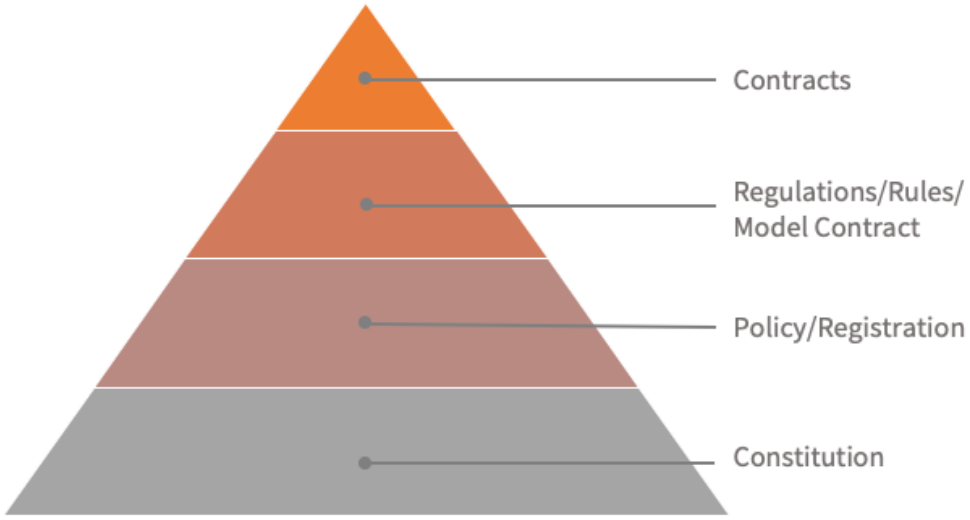
5.1 Regulatory challenges and areas for improvement

The legal framework for Guyana's oil and gas sector remains underdeveloped for adequate oversight along the value chain to maximize value capture by the state and wealth creation. Challenges that persist, in the context of the broader resource base, include how operators acquire and manage licenses, defining fiscal regimes, environ-

mental management, local content, the conduct of public officials active in the sector, information disclosure and accountability requirements, and developing a coherent revenue management framework.

Under the current legal framework, the government entities with roles in the oil and gas sector are largely dependent upon appropriations by the National Assembly and not flows of revenues from outside the government (e.g., a share of royalties and other fees from petroleum exploitation). Of course, an active petroleum sector that would produce significant revenues for the Government/governmental entities is a new development for Guyana. But thought should be given to whether changes in the existing legal regime in this regard are warranted, in the context of Guyana's decisions on the management of the revenues it will receive from licensed petroleum activities.

Figure 11: Typical hierarchy of laws and regulations for hydrocarbon sectors



Source: NRGI

The Petroleum Exploration and Production Act (PEPA) of 1986[11] is the central piece of legislation governing the Guyana upstream petroleum sector, including conservation and management, and the participation in it by private parties under agreements concluded with and licenses issued by the Minister. The PEPA provides for two types of petroleum-related licenses: prospecting licenses and production licenses. In its current form, the PEPA and other petroleum regulations give the subject Minister plenary authority over both policy making for, and all regulation of, the sector, with the Maritime Zones Act imposing overlapping authority of the President[12] for the issuance of additional licenses and letters of authority for offshore petroleum exploration and exploitation activities in the continental shelf and exclusive economic zones. There is significant overlap with other governmental bodies and their underlying Acts and regulations that creates disharmony in regulatory and policy functions within the oil and gas sector.

Table 7: Conflict map of existing legislations

	EPA Act	GEA 1997	GGMC Act 1979	Insurance Act 2016	Mart. Zones Act	OHS Act	PC Bill 2018	PEPA 1986	RAA
EPA Act		×	⊗	×	×		×	⊗	
GEA 1997	×		×		×		×	×	
GGMC Act 1979		×					×		
Mart. Zones Act	×	×					Δ	Δ	
PC Bill 2018	×	×	×	×	Δ			⊗	⊗
PEPA 1986	⊗		×	×	Δ		⊗		⊗
RAA								⊗	⊗

× : *Gap, conflict, and/or redundancy*
Δ : *Harmonised*
⊗ : *Other issues*

Source: Authors' elaborations

The original Guyana Energy Agency (GEA) Act, amendments to it since its 1997 enactment, and the GEA Regulations focus largely on the GEA's regulation of the importation of fuel, monitoring of legal and illegal fuel through the use of markers, the overall supply of fuel in Guyana, and the energy-related features of the supply of electricity in Guyana. Certain petroleum-related provisions of the GEA Act and the GEA Regulations, however, seem to parallel those of the Minister under the PEPA and that envisioned for a new Petroleum Commission of Guyana under the pending Bill for its creation and functions. And even as to some petroleum-related functions of the

[11] The Act also amplifies the definition of "petroleum" contained in the 1939 Petroleum (Production) Act, to provide a more comprehensive definition. It also expands the explicit definition of "Guyana" included in the Constitution and other laws to include – consistent with Guyana's accession to the Convention on the Law of the Sea – Guyana's internal waters, territorial sea, contiguous zone, continental shelf, continental margin and exclusive economic zone.

[12] The Minister, at any point in time, may or may not be the subject Minister under the PEPA.

GEA that do not strictly overlap with those provided for or envisioned in other laws, it is worth considering whether those GEA functions should be clarified and/or carried out by other government entities with regards to the regulation of the exploration and production of oil and gas.

For instance, the GEA Act uses the term "petroleum and petroleum products" throughout, but it does not define it. That term is defined in the GEA Regulations, however, to include any hydrocarbon-based fuel source whether in liquid or gaseous form. This definition, in combination with other provisions of the GEA Act and GEA Regulations, set the stage for GEA authority over aspects of the oil and gas exploration and production sector that may not be intended or that, in light of other laws, creates duplicative regulation at best and, at worst, disharmony.

Box 1. Challenges in Guyana's Environmental Management Framework for Hydrocarbons

The Environmental Protection Agency (EPA) is a semi-autonomous body corporate governed by the Environmental Protection Act of 1996 and brings under its jurisdiction functions concerning Guyana's natural environment and includes all land, water, sea, seabed, marine and coastal areas, and natural resources. The EPA plays a coordinating role in the preparation and implementation of cross-sectoral programs of environmental contents and to perform such other functions pertaining to the protection of the environment as may be assigned to it by the Minister by or under this Act or any other written law. Thus, it would be impossible to underestimate the EPA's authority over any environmental matter in Guyana, including areas of the sea that are claimed by Guyana and to which – under the Maritime Zones Act – its law extends.

The EPA Act's plenary authority over environmental matters is complex with certain key elements of the Act and its regulations fundamental to the regulation of the oil and gas sector. The EPA Act prohibits any public authority from giving any development consent in any matter where an environmental authorization is required. The EPA's issuance of an environmental authorization is a sine qua non for the Minister's ability to issue a license under the PEPA and the Presi-

dent's ability to issue a prospecting or production license or letter of authority under the Maritime Zones Act. The Minister's regulatory powers under the EPA Act clearly overlap with those of the Maritime Zones Act. While the Minister under the Maritime Zones Act is obligated to consult with the Minister with responsibility for the environment before making such regulations, the potential for overlapping regulations is clear. The regulatory powers of the EPA subject Minister also overlap with those of the subject Minister under the PEPA, and - unlike the Maritime Zones Act - there is no obligation for the PEPA Minister to consult with the EPA Minister before making regulations under the PEPA. And, in fact, the 1986 petroleum regulations include environment-related provisions that are rudimentary compared with the standards set forth in the 1996 EPA Act and the applicable regulations subsequently made under it.

The EPA Act and regulations made under it establish detailed principles and requirements for the protection of the environment that apply to any entity falling under the Act's jurisdiction, and an environmental permit issued under the EPA Act shall be subject to conditions which are reasonably necessary to protect human health and the environment. In addition, an environmental permit shall contain an implied condition that the developer shall have an obligation to use the most appropriate technology and to restore and rehabilitate the environment. The EPA is also prohibited from issuing an environmental permit unless it is satisfied that the developer can pay compensation for any loss or damage which may arise from the project or breach of any term or condition of the environmental permit.

There is significant overlap between the EPA Act, regulations and environmental authorizations issued under it, and the EPA's authority, on the one hand, and on the other hand the environment-related authority of both the Minister under the PEPA and Petroleum Regulations and the Minister under the Maritime Zones Act, in setting the environmental standards applicable to petroleum prospecting and production.

A real risk of disharmony exists between these principles and standards of the EPA Act and the standards in the PEPA and Petroleum Regulations. Specifically, the standard applicable to licensees under the PEPA is good oilfield prac-

tices, which is defined as all those things that are generally accepted as good, safe and efficient in the carrying on of prospecting for petroleum or, as the case may be, operations for the production of petroleum. It will be obvious that the term good oilfield practices may or may not equate to the principles established in the EPA Act and regulations made under it.

Another source of conflict is with the Guyana Geology and Mines Commission Act (GGMCA). The GGMC was created as a body corporate in 1979 and is empowered only with functions concerning minerals and mineral products, the enforcement of leases, permits, and licenses issued, and the collection of all rents, fees, royalties and other charges due, under the Mining Act of 1989. Although minerals is not defined in the GGMCA, it is defined in the Mining Act, as any ore or compound of any mineral, metal or and precious stone and includes any radioactive mineral, but does not include water or petroleum. Regarding the PEPA, certain legislative and regulatory functions for the petroleum sector were ultimately allocated to the GGMC after its original 1979 creation. No government agency or commission that has authority separate from political pressures currently has a legislative mandate to regulate in the petroleum sector. The GGMC has traditionally had a role in the sector, but - under the GGMCA and the PEPA- that role is very limited and does not provide the GGMC with autonomous regulatory powers or functions in the sector.

Clarification and rationalization of these apparent overlaps would certainly fall within "best practices," as duplicative regulation and a lack of clarity in the legal framework would discourage private participants from entering the Guyana petroleum sector, cause confusion for those who do enter it, and make effective regulation of sector participants difficult. A lack of clarification and overlapping functions also results in confusion and unhelpful competition between government entities. The rationalization of powers and functions between petroleum-related laws would also foster Guyana's ability to maximize staffing in the government entities with roles in the sector by individuals with the necessary skills and knowledge. Finally, as to a petroleum prospecting and/or production licensee's environmental obligations, the disharmonies between those standards under the EPA Act with those under the PEPA

are potentially disastrous for Guyana, particularly (but not only) if an oil spill were to occur.

6 Governance and Institutional Arrangements

The challenges of building government institutions are well known. A central theme in much of the literature on development is the importance of capacity building, particularly to equip countries new to oil, gas, or mining development for the specialized tasks of oversight. Yet if the goal is resource-led development, the kind of knowledge needed by states goes beyond technical information; they need an understanding of the kinds of organizational structures that are typical in the various extractive industries and the challenges that such structures present for oversight and value capture. Without sound knowledge of standard approaches to extractive industries governance, and how government interventions can fit into or modify them, government-driven efforts to make the sector work properly to achieve overall social and economic benefits may have limited and disappointing outcomes.

Responding to the challenges of sector organization benefits from knowledge of the ways other governments have designed their extractive sectors for oil and gas. The Norwegian approach has had a strong influence on current thinking. One of its key features is the separation of the policy, regulatory, and commercial functions. Instead of entrusting all functions to a single entity, this approach places them in separate institutions (Nakhle, 2017) (Doric and Dimovski, 2018).

The Norwegian Model

Norway offers a good example of governance and institutional design. Colloquially known as the "Norwegian Model", it is seen as a good example of better performance and high transparency in managing the petroleum sector (Al-Kasim, 2006). This model provided useful checks and balances, helped minimize conflicts of interest, and allowed each stakeholder to focus on critical tasks and duties. Norway is known for an

administrative system in which it assigns oil sector functions to three state-controlled institutions, each with its own distinct roles.

- First, the policy-making body is organized within the Ministry of Petroleum and Energy (MPE), which works with the country's political leadership in setting goals for the sector, plans for achieving the set goals, and oversees the process of exploration and production rights.
- Second, the regulator and technical advisory agencies: (i) the Norwegian Petroleum Directorate (NPD) which compiles data on all hydrocarbon activities on the Norwegian Continental Shelf (NCS), collects fees from oil operators, sets hydrocarbon regulations within its areas of responsibility, and advises the Ministry on technical matters; and (ii) the Petroleum Safety Authority (PSA) which is an "administrative authority" responsible for the technical and operational safety, emergency preparedness and working environment of all petroleum activities.
- Third, the commercial entity represented by the Norwegian National Oil Company (Equinor, formerly known as Statoil), which today carries out extensive oil operations both in Norway and abroad, and Petoro AS that manages the commercial aspects of the State's Direct Financial Interest (SDFI).

In practice, the Norwegian approach - often seen as the top performer - has not proved an easy one for other countries to adopt. Notwithstanding the very unique socio-economic set of the Nordic country, the model also argues against shared regulatory and policy-making functions by a single government entity. For new producers like Guyana, this approach encounters the challenge of limited indigenous capacity and an unoptimized institutional arrangement that in the short term leads authorities to consolidate technical knowledge across policy and regulatory roles that may be in conflict with each other and diminish transparency and accountability (Sovacool *et al* (2016); Vieyra and Masson (2014)).

For Guyana, provisioning the scale of financial and technical resources required to develop nascent institutional capacities and the legal framework to optimally administer the petroleum sector is a dynamic challenge given the changing domestic

needs. The multifaceted approach required for marshalling the cadre of interrelated institutions is extensive since strengthening efforts should not only focus on subject ministries or agencies but sister agencies that operate along the value chain or can influence decisions though overlapping legislations.

Lessons from Brazil

Reforms in the late 1990s to the governance framework of the oil and gas sector saw the formation of the National Petroleum Agency (ANP) that allowed for the separation of regulatory responsibilities from the business functions of PETROBRAS. This measure improved the transparency on how state resources were administered and how rights to exploration and extraction were allocated (Balza and Espinasa (2015); Trojbicz and Loureiro (2018)). The added benefit of this measure was the improved business focus of PETROBRAS and the subsequent access to international capital markets that brought financing, technological know-how, and transparency. The evolution of PETROBRAS from a bureaucratic state agent to capable offshore deepwater developer has allowed for greater bargaining power and value capture potential for the state in the oil and gas sector.

With the now independent and specialized regulator, ANP, under the Ministry of Mines and Energy, the regulatory, supervisory and procurement functions are now subsumed. This benefits the sector by establishing the rules of operation for the industry, enforcing laws and regulations, conducting bids for participation in the sector, and allocating contracts for petroleum exploration, development, and production on behalf of Brazil.

Lessons from Colombia

Colombia, in 2003, modified its legal framework governing hydrocarbons. The reform had three basic pillars: (i) remove the natural resources regulatory body function from the state-owned company (SOC), so that it could focus exclusively on its commercial operations; (ii) create the National Regulatory Agency (ANH as per its Spanish acronym), which would have as its sole purpose the management of the na-

tional reserves on behalf of the owner state; and (iii) open the prospective acreage for competition among private and state-owned companies under the supervision of the ANH.

The Colombian legal changes and practices that Guyana could benefit from include those achieved by the restructuring of the activities, which: (i) allowed for more transparency in the sector, clarifying roles and functions of existing stakeholders within the value chain, (ii) sought the implementation of concession contracts with clear rules, and (iii) improved the disclosure of information for private competitors.

Lessons from Mexico

Following almost eighty years of an oil industry closed to foreign investment and with the sole participation of the National Oil Company, Pemex, in 2013 Mexico implemented a sector-wide reform to open the energy sector. After severe legal changes, Mexico now has three entities responsible for the regulation of operations in the industry: (i) The independent regulatory agency for upstream activities is the National Hydrocarbons Commission (CNH as per its acronym in Spanish), and is responsible for the regulation of O&G exploration and production activities, as well as for the acreage bidding process; (ii) the Energy Regulatory Commission (CRE as per its Spanish acronym) regulates mid- and downstream operations and issues permits for the storage, transportation and distribution of oil, gas, oil products and petrochemicals; and (iii) the Agency for Safety, Energy and Environment (ASEA as per its Spanish acronym) is responsible to ensure health, safety and environmental standards and regulations in the O&G sector, including upstream, midstream, and downstream operations.

Guyana could consider Mexico's best practices regarding its regulatory framework: (i) as part of the energy reform, Mexico strengthened the CNH and the CRE and created the ASEA with well-defined, independent mandates and proper separation of spheres of influence to avoid conflicts of interests; (ii) having a licensing framework that by design promotes high levels of transparency and accountability.

Over the past years significant new oil and natural gas reserves have been discovered in Latin America and the Caribbean region. Such recent discoveries have quickly added new countries to the ranks as O&G producing nations.

Guyana's discovery is one more example of South America becoming a critical supplier to world oil markets. The best practices that have been established in successful petroleum-producing countries undoubtedly represent the international 'gold standard' in the sector. As an emerging country, Guyana can benefit from the experiences of such countries in developing best practices for managing petroleum resources and creating good governance model frameworks. But while such practices may work well for established, well-resourced producers, care must be taken to ensure the suitability of these practices for Guyana as an emerging producer with limited experience in regulating and administrating these types of activities. A classic International Monetary Fund study found that living conditions in oil-rich nations in sub-Saharan Africa were no better or worse than countries without oil (Marcel, 2016).

6.1 Guyana's governance framework

The creation of the Department of Energy (DE) in Guyana has been one of a series of steps to co-ordinate the institutional arrangements that manage the country's hydrocarbon resources, with a special focus on developing the sector and on the administration of current and future Petroleum Agreements. In the longer term, the DE is expected to evolve into a Ministry or more-independent Authority to consolidate the full spectrum of hydrocarbon-related responsibilities that are essential for effective and efficient coordination and regulation of the O&G sector. However, the development of the DE as a policy maker would require the formation of a suitable independent regulator, and potentially a commercial entity to act as 'the state administrator of equity interest' to market Guyana's share of production (Thurber *et al*, 2011).

From the onset of hydrocarbon discoveries, Guyana has drafted legislation aimed at creating a 'Petroleum Commission' to act as the sector regulator. However, the draft bill was not conducive to best practices and further increased the powers of the line minister and is currently under revision. The eventual progression of the DE and

the creation of the Petroleum Commission may require the ratification of overarching energy sector legislation, revisions to the PEPA 1986, and the Petroleum Commission Bill 2018 to ensure legal and operational integrity of the DE, its adjacent regulatory bodies, and the role of sister agencies and ministries.

Notwithstanding having the legal framework in place, Guyana faces additional bottlenecks in its ability to execute its role in the sector due to an inadequate supply of the sector-wide leadership, management and technical talent required. While the number of Guyanese with formal training in O&G policy, economics, management, law, and engineering has increased in recent times, the level of technical expertise and institutional leadership required to effectively ensure the maximization of economic and social returns from O&G resources remains at a nascent level.

Moreover, developing the capabilities to manage and regulate an oil producing contract will surely overlap with those required for other oil blocks currently under exploration, as well as other transcendental capacities to be handled by the government, such as rights (license) management, long-term gas commercialization, and marketing of the government's share of oil production. This situation increases the risks of delays and value erosion during oversight activities and heightens the probability of lower social returns.

Box 2. Building a strong independent regulator: The Petroleum Commission

The petroleum industry is a highly-specialized technical and commercial sector. Studies of the performance of petroleum producing countries demonstrate that the creation of a regulatory agency with a skilled, professional staff, who understand both the technical and commercial drivers of the sector is a key structural feature of countries that have successfully increased investment, production and revenues from their natural resources over time. It also has been widely recognized over recent decades that a key best practice for a country's petroleum sector is the separation of functions of policy making for the sector from the regulation of the sector.

The regulation of the sector is most effective, then, when regulatory action implements the country's policies based on technical and commercial consider-

ations and not changing political interests. The separation of the governmental functions – that is, the policy-making function from the regulatory function - creates the conditions for such regulation. The cases of Brazil, Colombia and Peru have employed specific legislative and regulatory measures to divide these functions between the Ministry and an independent regulatory agency (Balza and Espinasa (2015); Balza *et al.* (2014)).

To achieve this, Guyana may consider core precepts that hinge on institutional autonomy from political interference and dependencies on financial appropriations from the national budget.

6.2 Fiscal management and the social contract

Managing future oil revenue should be anchored by a transparent, rules-based fiscal framework that delinks the budget and the economy from the volatility of oil revenues. A fiscal responsibility law (FRL) can ensure that macro-economic goals and expenditure/saving of oil revenues are aligned and coordinated with relevant authorities such as the Ministry of Finance and the Central Bank.

Experiences of developing countries around the world that have successfully managed natural resource windfalls follow the principles based on the permanent income hypothesis. This model states that saving and withdrawals of the fund are dictated by smoothing the consumption dividend across different generations, which implies borrowing ahead of the windfalls, saving during the windfalls and drawing a constant dividend from accumulated assets in the fund after the windfall (Lusardi (1996); van der Ploeg and Poelhekke (2017))

However, developing economies face constraints even before natural resource income starts to flow, which then converge with the new macroeconomic reality of volatile commodity prices. Dubbed the 'myriad of short-run macro misery' by van der Ploeg and Poelhekke (2017), developing countries have dealt with lags and absorption constraints in getting the domestic economy ready to efficiently absorb extra consumer and investment demands. They are confronted with transient periods of unemployment and big swings in the real exchange rate and consequently, in the production

factors being reallocated between traded and non-traded sectors (Venables, 2016). Developing countries have a different set of policy levers available to them, such as access to concessional financing and grant aid, that usually begin declining after major resource discoveries as the economy is elevated into higher income classifications. Thus, the readiness to adequately and sustainably access international markets that have higher borrowing costs becomes a challenge in further ensuring the macroprudential health of the economy (Melina *et al.*, 2014).

These "Dutch disease bottlenecks" (van der Ploeg, 2011) (van der Ploeg, 2010) highlight the importance of sound medium- and long-run management of resource wealth to cope with the inevitable volatility in both resource production and commodity prices. They also suggest a necessary adjustment to the permanent income hypothesis—rather than placing windfall revenue abroad until there is enough capacity to sensibly invest in the domestic economy, it might be more appropriate to use the windfall to pay off debt, invest in infrastructure that increases growth dividends, and speed up the process of economic development. In this regard, Chile's fiscal institutions, based on its primary copper exports, offer three rules to construct a sound fiscal framework for domestic expenditure: (i) Every government must set a budget target; (ii) the target is phased in structural terms: deficits are allowed only if copper output falls short of trend; and, (iii) Ten-year trends are projected by two panels of independent experts, outside the political process (Frankel, 2012). If managed well, under this adjusted permanent income hypothesis fiscal framework Guyana's wealth and derived prosperity could be significant. This entails the strong bias towards efficacious fiscal spending and intergenerational wealth creation through an apportioned accumulation of savings (Segura, 2006).

Citizen's dividend: the case for cash transfers

Given Guyana's low Human Development Index (HDI) indicators, and its pressing development needs, there will inevitably be intense pressure to redistribute resources in real time. Some policy analysts have suggested an interesting option—handing a

portion of resource revenues directly to the public (Moss *et al.*, 2015).[13] Since Guyana has a comparatively small population relative to the size of proven resources, such a program can reap significant benefits, provided the imposition of several control measures and verification. Since the government subsequently taxes its citizens to finance its spending programs, the advantage is that the burden of proof for spending resource revenues is with the government.

In this regard, the NRF Bill currently designates the fund as "public" and sets out broad objectives (yet to be fully defined or programmed). The stated purpose of the fund is to manage the natural resource wealth of Guyana for the present and future benefit of the people in an effective way. The specific objectives of the fund are to avoid volatile public spending, protect economic competitiveness, transfer natural resource wealth fairly across generations, and use this wealth to finance national development priorities. Implementing such strategies that are partnered with controls that encourage work, such as Earned Income Tax Credit (EITC), a mechanism to reward labor market participation in the formal sectors can have substantial positive impacts on poverty reduction, elevation to middle class, and strong socioeconomic outcomes (Marr *et al.*, 2015). This also has the added benefit of strengthening citizen participation in how natural resources are managed and resulting funds are invested for the nation's development (Adedoyin *et al*, 2017).

A lesson from across LAC could therefore be to use cash transfers as a transparent, relatively cost-effective way to build the social contract between the government and citizens and immediately address pressing development challenges in Guyana. Developed in Brazil and expanded in Mexico, cash transfers are a much-tested mechanism by which the government pays a designated cohort—usually determined by income level—a set 'transfer' or cash payment each month into their bank account. Some programs are conditional and require certain actions of the recipient such as taking their children to school, or to a health clinic for regular check-ups. Other transfers are non-conditional and are simply awarded based on pre-determined criteria. Payments are usually given to the female head of a household, due to quantitative evidence that

[13]The authors provide an alternative mechanism to distribute oil rents through cash transfers as an instrument to mitigate some of the governance risks associated with oil revenues and the so-called resource curse.

shows that women are more likely to use extra income productively—to help their family and themselves (Fiszbein *et al.*,, 2009). Cash transfers aim to alleviate poverty in the short-term, through the redistribution of wealth, and in the long-term, by building up human capital among the poor through improved education, health and nutrition.

The cash transfer mechanism has a number of distinct advantages, but the banner headline is that it has a proven, and global, track record to reduce poverty, inequality and inter-generational indigence in a quick and efficient manner. In the recent past, cash transfers have done a better job at reducing poverty and inter-generational inequality than traditional social protection programmes (Ferreira and Robalino, 2011).

Local content and participation challenges

Beyond the immediate need to improve the quality of life of Guyanese citizens, for the medium term, the Government of Guyana may consider designing a formula to work with the private sector and civil society to upgrade and train workers for the petroleum sector. The value brought to the local, regional or national economy from an extraction project is referred to as local content. A push towards local content strives to ensure that a company is hiring local labor and procuring local goods and services from the host country. However, extractive industries traditionally functioned as enclaves that—when operating in developing countries—often bring staff, goods, and services from abroad, with limited spillover to the domestic private sector. They also have an unusually high capital to labor ratio compared with other industries. This means that they hire fewer employees per investment dollar than most businesses. Though there may be very high expectations for the extraction site itself to employ many individuals, the nature of the business is such to have few employees.

In this regard, an important development in the Guyanese economy is the formation of the Guyana Oil and Gas Association (GOGA). This association aims to protect, promote, and advance the responsible development of the oil and gas economy within Guyana. Given the small size of the existing civil service, and the lack of expertise in hydrocarbons, it is inevitable that international personnel will need to be hired to essentially run the national counterpart of powerful private companies.

Over the medium term, national personnel can shadow, and be trained by international experts, and a comprehensive plan for civil service training in the hydrocarbons industry can be developed to create a world-class, special-purpose, independent regulatory agency. Initially, international hires would include geologists, reservoir and petroleum engineers, petroleum financial assessment specialists, and lawyers who specialize in contracting for oil production (Balza and Espinasa (2015)). In this regard, the government could learn from Trinidad and Tobago's National Energy Skills Center (NESC) which was created with the aim of developing human capital to meet growth in the energy, construction, and other related sectors.

7 Concluding Remarks

It is undeniable that the fortunes of Guyana's hydrocarbon discoveries will usher in a paradigm shift that will reshape the country's development trajectory. With an estimated 8 billion barrels of oil and a projected fiscal windfall of US$49 billion in revenues over the next few decades, Guyana, an economy of approximately US$4 billion today, is poised to be a significant player in regional and international energy markets. However, the direction and magnitude of transformations will depend on a combination of cohesive policies and strong institutions to ensure the realization of optimal value capture from resource exploitation and mechanisms for benefit transfer to all segments of Guyanese society, for this generation and the next. Thus, the phrase "if managed well" must be affixed to discussions of how Guyana's exploitation of hydrocarbons can be a vehicle for inclusive growth and inter-generational wealth creation.

As a new oil-producing country in a turbulent global energy market, navigating the challenges and risks associated with overreliance on the petroleum sector should be designed as part of long-term development strategies. The recent price swings for crude oil on the market, triggered by both traditional sources of instability (the interplay among producers, and under-investment), and the new phenomena such as the novel coronavirus and the proliferation of renewable energy technologies, that will gradually displace the reliance on fossil fuels. Guyana, thus, has a very narrow window

to get what other countries in the past have struggled to get right over decades. It is then imperative that authorities embrace the lessons learnt by countries that have had successful hydrocarbon sectors and avoid the mistakes of those that have failed to create long-lasting value.

This paper has explored some of the lessons learnt by successful economies and has put forward cogent policy prescriptions for consideration by policy makers, academia, the private sector, and a wider range of stakeholder groups. With strong political will, successful countries have overcome challenges and established models of good governance within their extractive sectors. Guyana may consider the following several actions that can improve transparency and the realization of tangible outcomes from the development of its resources:

1. Defining, documenting and sharing integrated national Strategic and Operational Plans - Guyana's O&G eco-system has many actors (i.e.: local governmental agencies, local private sector, local unions, local citizen groups, foreign regulatory and marketing agencies, foreign private sector), all of whom have differing agenda and priorities. For success, Guyana must have a defined national integrated plan for its O&G sector with clearly established Key Performance Indicators (KPIs) and timelines for achievement, supported by operational and funding plans to support implementation. These plans will be used as the driver of the sector's development.

2. Transparently delineating the roles and responsibilities among and within government entities - The clear assignment of goals, roles and responsibilities has been identified and considered as one of the most valuable lessons learned by various countries. Good governance requires a clear separation between the roles and boundaries of policy making and regulation and the DE, GGMC Petroleum Division and the Environmental Protection Agency must enact this separation. Such separation supports a clear understanding of the different interests these entities must achieve and the required levels of autonomy. However, it is equally important that each understands how to work in tandem to achieve the intended integrated outcome of their decisions, how to avoid duplication of roles and functions, and how to set the boundaries when joint activities are essential.

3. Designing and implementing strong legal and regulatory frameworks - Some producing countries have successfully built strong state agencies to monitor the performance and compliance of operators. Building the capability and capacity of an independent state regulator will also be a key challenge for Guyana. However, this is important as the regulatory function must be defined and developed alongside the DE's evolution if the O&G sector is to reap the intended benefits.

4. Developing local talent in alignment with integrated national plans - Guyana's local content policy represents an excellent opportunity for Guyana to build national capacity. Local content policies have been adopted in many countries with excellent results wherever properly implemented. For success, however, a local content policy must be neutral and transparent to avoid bureaucratic delays or unintended interpretations by users.

5. Well-defined delivery models which promote strong planning project management principles as well as strong leadership, management, supervisory, technical and administrative capability - The O&G sector development will not be a success simply because clear policies, strategic or operations plans are in place. Success is dependent on the organizational success of the DE and the regulator, together with the organizational success of the other actors within the ecosystem. With emphasis on the DE and regulator, Guyana must embrace and implement a "gold standard" business model that aligns robust governance and leadership, HR talent, processes and systems with business and project planning and management. In other words, Guyana must move swiftly to develop a DE and regulator that are competent institutions capable of efficient, effective, and economic "gold standard" performance.

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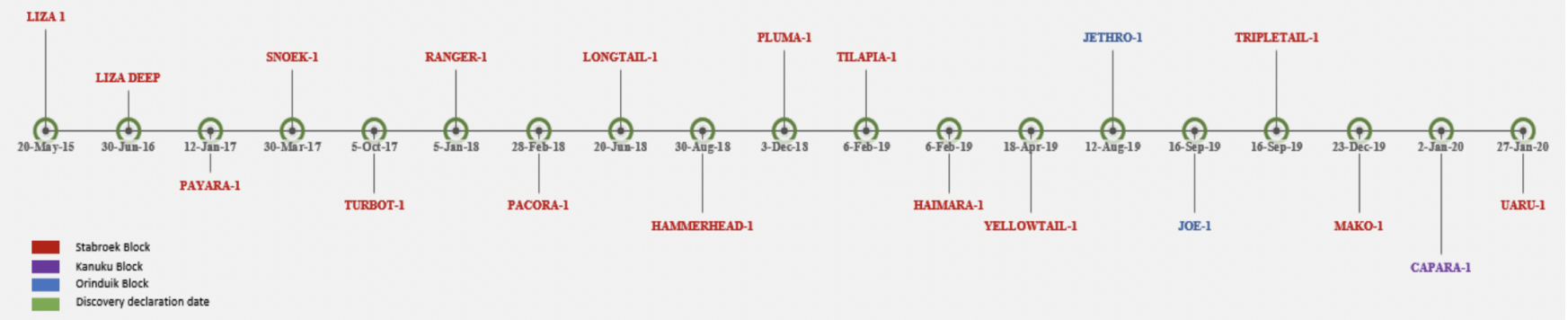
Annex

Figure 12: Timeline of oil discoveries



Source:Authors elaboration based on ExxonMobil Guyana, and Tullow Guyana B.V.