



Caribbean Working Paper Series

**The Southern Caribbean Energy Matrix and the
Consequences of the Regional Push for Renewable Energy**

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TABLE OF CONTENTS

Summary	3
Introduction	3
The Geology is Right: The Guyana-Suriname Basin.....	3
The History of Oil and Gas in the Caribbean Energy Matrix	4
The Search for the Frontier Provinces	4
The Current State of Play in the Caribbean Energy Matrix.....	5
Guyana	5
Suriname.....	5
Trinidad & Tobago	5
The Domestic Socio-economic Impact of Oil & Gas.....	6
The Caribbean’s Future in Oil and Gas.....	8
The New Geopolitics of Caribbean Oil and Gas	9
Maritime Energy Disputes, Geopolitics, and Cooperation.....	10
The New Geopolitics of the Transition from Fossil Fuels	12
Energy Geopolitics in the Caribbean: An Overview.....	12
Geopolitics and Renewable Energy	14
Conclusion and Recommendations	16

Summary

The current energy landscape of the Southern Caribbean and Northern South America is complex. The Guyana-Suriname Basin (GSB) is emerging as the Holy Grail of new oil provinces. In trying to achieve cooperation in energy security and complete the transition from dependence on fossil fuels, there are game changing financial opportunities for the Southern Caribbean and Northern South America. Concurrently, there are serious challenges and impacts on domestic economies, political governance, energy security, geopolitics, regional and international cooperation, and environmental protections. Continued investment by the international oil companies (IOCs) in the GSB, and national oil company (NOC) investment in northern South America are the current exceptions to the global trend of a shift from fossil fuels to renewable energy. Oil and gas will be around for decades to come, but the warning signs are clear. We are witnessing a dress rehearsal for a structural decline in the oil and gas industry that can threaten traditional resource development models. Agencies in the GSB countries responsible for the petroleum sector, finance ministries involved in planning, and political leaders will need to adjust their goals and acknowledge the risks inherent in this volatile sector. It is important for them to understand the changes, work with different scenarios to support their planning, and update their policies and systems. A more fundamental re-evaluation of policy goals may also be necessary. The risks associated with fiscal dependence on the fossil fuel sector should be clearly understood. The old mantra of economic diversification is emphasized.

Introduction

This article examines the complex energy landscape of the Southern Caribbean and Northern South America with constant reference to larger global trends. As the region tries to achieve cooperation in energy security and complete the transition from dependence on fossil fuels, simultaneously there are game changing financial opportunities as the Guyana-Suriname Basin (GSB) morphs into the ‘Holy Grail’ of new oil province discoveries in the Southern Caribbean and Northern South America. Concurrently, there are also serious challenges and impacts on domestic economies, political governance, energy security, geopolitics, regional and international cooperation, and environmental protections.

The Geology is Right: The Guyana-Suriname Basin (GSB)

Why is the GSB so lucrative? Located on the northern coast of South America, recent discoveries in the deep-water Guyana-Suriname Basin now exceed 10 billion barrels of commercial, recoverable oil equivalent. Historically, exploration wells drilled on the shelf did not yield commercial hydrocarbon discoveries until the Zaedyus well offshore French Guiana in 2010 and the Liza 1 offshore well in Guyana in 2015. The GSB is a sedimentary basin encompassing the coastal area of French Guiana, Suriname, Guyana and the eastern part of Venezuela (Antillean Arch). Most of the Basin lies deep offshore. In 2001, the United States Geological Survey (USGS) assessed undiscovered conventional oil and gas resources within 31 geologic provinces along Central and South America and the Caribbean. It revealed that the GSB is the third ranking province in terms of oil resources, after the Santos and Campos Basins in Brazil, respectively. It is estimated to have undiscovered reserves of 13 billion barrels of oil and 32 trillion cubic feet of gas (USGS, 2001).

Today the geological similarities between the South American and African coastal areas, based on the theory of Plate Tectonics that explains the movement apart of continents, have prompted the contemporary energy companies to drill offshore and to test what is known as the ‘Atlantic Mirror Theory’. The oil reservoirs found on both sides of the Atlantic are thought to have formed 100 million years ago, when South America and Africa were joined. The Zaedyus well substantiated the Atlantic

Mirror Theory of continental drift replication since Ghana on the other side of the Atlantic had discovered its huge Jubilee field in 2007 (Stolte, 2013). However, in spite of various exploration farm outs under the Guyane Maritime license to Tullow and Royal Dutch Shell, subsequent appraisal wells offshore French Guiana were unsuccessful. Clearly, the geology of the GSB is uneven and is proving to be hit and miss depending on exploration locations.

The History of Oil and Gas in the Caribbean Energy Matrix

Historically, only Trinidad, Cuba, and Suriname were the oil producers of the Caribbean. In addition to these three, other countries such as Curacao, Aruba, and St. Croix also operated oil refineries. Trinidad rapidly emerged as the Caribbean's major oil producer. Its first well was drilled onshore in 1857. Commercial oil production began in 1908. Exports of crude oil began in 1910. Its first refinery was built in 1912. By 1930 oil production had increased to 10 million barrels per year. Its first refinery was built in 1912 and by 1940 the country's refining capacity was at 285,000 barrels per day. In 1954 offshore drilling began off the southeast coast and in 1971 when drilling began off the north coast of Trinidad natural gas was discovered. In 1999 Atlantic built what would be the first of 4 LNG (Liquefied Natural Gas) trains that would put the country ahead of most of the world in the monetization of natural gas. By the year 2000 Trinidad had become a natural gas economy, replacing oil as its main energy staple for economic growth. Utilizing the advantage of cheap natural gas, the government entered into a joint venture with local businessmen to establish the *Point Lisas Industrial Estate*. Today, the Estate is home to approximately 103 companies involved in a range of industrial activities. Ease of access to vast resources of natural gas transported by pipeline across the island has been a strong incentive for some of the world's leading manufacturers of ammonia, urea, methanol, other petrochemicals and steel to locate at Point Lisas. There is little doubt that much of Trinidad's energy fortune is due to its shared geology and proximity to Venezuela which has one of the world's largest deposits of oil and natural gas.

The Search for the Frontier Provinces

Beginning in 2015 there was a rush for the 'frontier provinces' of oil and gas in the Caribbean. Encouraged by the discoveries in Guyana that year, a number of international oil companies (IOCs) and state companies (NOCs) moved in to tie up acreage in bid rounds. The development of technology to facilitate the exploration and developing of hydrocarbon resources in deep water accelerated the interest shown in other countries of the Caribbean. In a 2012 report, the US Geological Survey of 31 priority geological provinces in South America and the Caribbean assessed the undiscovered conventional hydrocarbon potential at 126bn barrels of crude oil and 679trn cubic feet (tcf) of natural gas. In the Guyana-Suriname Basin (GSB) the crude oil potential was assessed at 13.6bn barrels and natural gas at 21tcf. Thirty-one geologic provinces were assessed in the study which represented at the time, a complete re-assessment of the South America–Caribbean region. Since that time, a series of world class discoveries made by US oil major ExxonMobil off the coast of Guyana is forcing the USGS to reassess its estimated petroleum reserves in the GSB which could see its previous estimates increasing. The whole area appears to be characterized by excellent quality reservoirs in deep and also shallow waters (USGS 2012). In 2021 the resource potential of the GSB is estimated at more than 18 billion barrels of oil equivalent or more than 1000 blocks in the Gulf of Mexico (OilNow, March 2021).

The Current State of Play in the Caribbean Energy Matrix

Since the drastic fall in global oil prices starting in 2014 there have been some potentially dramatic changes in the Caribbean's regional picture of oil and gas. In the big picture, Guyana has joined Trinidad and Suriname as oil exporters in the 15-nation CARICOM bloc of nations. Barbados also produces about 1,600 barrels of oil daily from a small collection on land wells and has signed a cross-border agreement with T&T that may have the potential, to make Barbados a natural gas producer as well.

The Guyana discovery has sparked deeper interest in the region with The Bahamas, Jamaica, Barbados and Grenada all moving to step up exploration. However, The Bahamas has now curtailed exploration out of fear of destruction to the environment that supports tourism—its major revenue earner. The regional picture is complicated by the global shift in exploration from mature fields and basins to new and emerging plays, the drop (3 million b/d or 20% of total consumption) in Chinese oil demand since the onset of the Coronavirus forcing a decline in crude oil prices, the challenge for exploration companies now faced with a global glut of oil, and the global movement to a lower-carbon and renewable energy future. These trends are all interconnected and can have an impact on the regional oil and gas picture (Bryan, 2018).

Guyana

There has been significant success in the discovery of more than 9 billion barrels of recoverable hydrocarbons in Guyana's deep water. ExxonMobil made its first lift of Guyana crude in January 2020 and the first lift for Guyana was during February 2020. In January 2021, Guyana recorded its 16th discovery in the Stabroek block of the GSB. By 2025 daily oil production could be 750,000 b/d and by the end of the decade, more than one million b/d of oil equivalent. Under the current Production Sharing Agreement (PSA) the IOCs have a 75% cost recovery with the remaining 25% profit equally split between the licensees and Guyana. The current royalty rate is 2%. There are some harsh realities. Guyana is new to the game of oil and gas production. Five years ago, it had no known oil reserves. Now it must race to provide the necessary legislation, institutional structures and management for oil.

Suriname

The Republic of Suriname could soon become the Caribbean and South America's newest energy power. In November 2019 the American company Apache and the French company Total announced the discovery of significant oil deposits offshore. The maritime geology is similar to that of neighbouring Guyana. The expected energy windfall could be substantial. It would be a game changer for a relatively poor nation of 600,000 people. Suriname intends to ramp up oil production in a big way. A swag of major petroleum discoveries was made since the start of 2020. In mid-November 2020 Suriname's national oil company and hydrocarbon regulator Staatsolie also announced its shallow offshore bid round. Eight blocks, totaling 13,524 square kilometers, in western offshore Suriname, and will start offshore crude oil production during 2025 (Smith, March 2021).

Trinidad and Tobago

T&T is the Caribbean's oldest and most mature oil and gas economy, but is moving aside for the new and larger resource player in Guyana and a potentially big player Suriname. Crude production remains low and there has not been a major oil discovery in more than a decade. Offshore drilling activity reveals more gas prone than oil rich plays. The only bright spark is the onshore discovery by Touchstone in the Ortoire block in November 2019. With respect to natural gas, currently, BHP has found significant gas offshore T&T and remains optimistic about the possibility of further discoveries.

T&T's energy sector remains challenged with natural gas curtailment, and plants at the massive Point Lisas industrial estate having shut down and others in difficult negotiations with the National Gas Company. Further, the outlook for crude refining is still cloudy give an uncertain future for the now mothballed legacy Petrotrin oil refinery.

The Domestic Socio-economic Impact of Oil & Gas on Guyana, Suriname & T&T

Guyana

Guyana is still a poor nation and the impact of an oil and gas windfall on the Guyanese economy can be convulsive. For 2020 it will be shown to have grown by 86 per cent, and the per capita income could more than double to US\$10,000. Rystad Energy estimates that national revenue will amount to more than US\$117 billion over the lifetime of the projects. As a recent IDB Quarterly Report (21 December 2020) pointed out, a parallel reality is that Guyana can plunge itself into more debt even with oil money. The IDB urges the government to exercise extreme caution regarding the portion it will spend. Oil money will give the government an opportunity to close budget financing gaps, avoid future debt accumulation, and retire expensive outstanding public debt. But budget financing needs to be monitored and not erode savings that could return the country to high indebtedness because of unexpected local or global developments such as pandemics and other natural or human induced disasters.

With the windfall, and a population of less than 800,000 inhabitants, Guyana could become one of the world's richest nations per capita. Obviously, it will not happen overnight. But a national sense of euphoria is high, and caution may be in short supply. The country is vulnerable to the many above ground pitfalls that could accompany the boom. The IOCs have to recover their investment and projected peak production is still some years away. The explosion of money might be difficult to absorb and to manage. The possibility of political and ethnic conflict is a constant threat particularly if the benefits of the windfall are distributed unevenly among the races. Inflation can rise stifling the development of other industries. The immediate danger is that any government will leverage now on future earnings taking on more debt. In fact, the Guyanese vice president revealed in February 2021 that a portion of the budget for 2021 will be financed through loans to pay off existing debt (Kaieteurnews, February 2021).

The looming pitfall in Guyana and other new oil provinces is the 'resource curse' or the 'paradox of plenty' where the destabilization of traditional economic sectors occur as the country becomes overly dependent on exports of a single commodity. Some poor but resource-rich countries tend to be less developed precisely because of the inflationary consequences of their resource wealth! In some circles oil is known as the excrement of the devil. The government must ensure that the country has all the provisions in place to earn its fair share of the windfall. The population can become frustrated at the lack of any immediate tangible benefits that they may have expected from the oil revenues. Managing public expectations is critical.

The key to Guyana's success is the effective management of the oil and gas sector. Unfortunately, the electoral and political impasse in 2019, when the then ruling government party delayed the counting of the election votes that eventually brought the opposition into power, also delayed the implementation of some institutional arrangements for the management of the sector for more than a year. The best laid plans are useless unless they are implemented! Oversight, transparency, and timely

information for the public about expected income flows and expenditures are best practices for the successful management of the sector. Government officials have stated that the essential hallmarks of the policy must be accountability, realistic targets, opportunities for capacity building, and incentives that allow Guyanese to benefit the most from their oil wealth. The country's political leaders have also emphasized that certain services should be reserved for Guyanese procurement since the bulk of the benefits cannot just go to the investors, and the people of Guyana must be given ample opportunity to share in the prosperity.

Suriname

The politics appear stable but yet uncertain, corruption is an issue, and the macroeconomic environment may be seen as risk factors for other investments. Suriname's oil boom is yet to come but the country is well poised to manage the windfall because of the experience nested in the technocrats and management since 1980 in the state oil company Statsoil for onshore oil exploration and production in Suriname.

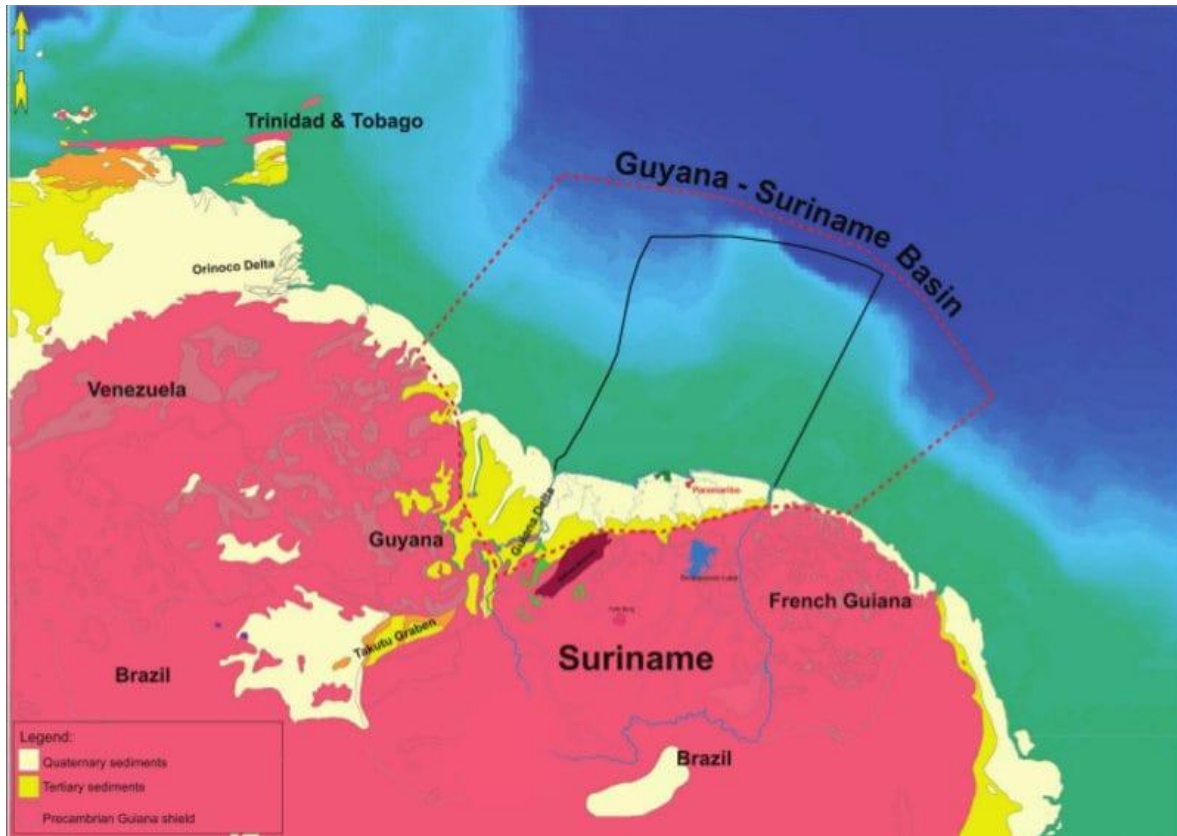
In general, while the recently elected (2020) governments in Guyana and Suriname are enthusiastic about their oil and gas future, there will be continuous challenges such as responsibility for oil spills, local content policies, corruption in the oil sector, and climate change. The new governments of both Guyana and Suriname are also trying to address the importance of accountability. In Guyana, the government is moving to put in place a new PSC (Petroleum Sharing Contract) for ongoing and future negotiations. But old deals will not be re-negotiated out of respect for the sanctity of contracts. Corruption is also on the agenda of the new administration in Suriname where in the past government administrations in all sectors dispensed political patronage and the oil industry became the primary employer of ruling party partisans. In both countries, the provisions of new "local content" policies must not open doors to further patronage and corruption.

But neither Guyana nor Suriname can take the future for granted. Globally, the shift to renewable energy (RE) is accelerating. Simultaneously, the oil price is constantly volatile, and the planet is awash with oil. Hydrocarbons will be with us for some decades to come, but the window for huge returns from oil production is closing at an accelerated rate. Both Guyana and Suriname will prosper if the resources are developed sooner rather than later, and the massive revenue *quickly* transforms their respective economies and improves the quality of life for their citizens. After so many years of stagnant economies, it may be necessary for the governments and people of both countries to develop a growth mentality.

The Caribbean's Future in Oil and Gas

Oil energy experts predict that during 2021 there will be a major increase in offshore drilling activity in the Southern Caribbean and northern South America led by Guyana, because of recent global increases in the price of crude, and because the oil and gas companies are searching for discoveries that can be quickly monetized for higher and faster returns.

Figure 1. The Guyana-Suriname Basin



Source: *OilNow 2021*

Guyana: In 2021, at its peak, Exxon will operate 6 drill ships in Guyana, simultaneously exploring, appraising discoveries, and drilling development wells to bring on the Liza Phase 2 and Payara fields. Production is currently 120,000 barrels of oil per day from Liza Phase 1; Phase 2 will add 220,000 per day (2022), and Payara will add another 220,000 (2024). There are at least 15 more fields to come on production after these from the Stabroek Block.

Suriname: In 2021 five exploration wells have been drilled already in sequence by Apache and Petronas, and every one of them was announced as hydrocarbon discoveries. Four went to Apache and one to Petronas. Exploration drilling is yet to start for blocks operated by Exxon, Equinor and Cairn. Further, Staatsolie has opened a bid round for shallow water blocks.

Trinidad and Tobago: There is no announced deepwater drilling in Trinidad for 2021 following the failure of the BHP Broadside well to forecast commercial quantities. But there is renewed activity

onshore Trinidad where Canadian oil and gas company Touchstone Exploration experienced a windfall in 2020 as a result of its drilling. Trinidad is facing the reality that its current deep-water and onshore wells deliver more natural gas than oil. Perhaps given the global thrust toward renewable energy, and the use of LNG as a transition fuel, that may be a blessing in disguise. However, the reality is that T&T is a mature oil producer, with over 100 years in the business. The geology is extremely complex, deep water exploration in T&T is very risky, and the chances of success are still low. But the country remains a major gas and LNG producer, and several development projects are underway to ensure new gas supply.

Venezuela: The oil industry has been moribund and in a near state of collapse because of decades of bad management, politicization of the industry, and international sanctions against the Maduro regime. Venezuela is among the world's top five oil producers, but the current energy situation is so stark that Caracas no longer publishes oil production or export statistics. The government is once more trying to attract the IOCs and some other National Oil Companies (NOCs) in efforts to revive the industry.

In sum, on the *positive* side, the Southern Caribbean (from Barbados down to Trinidad, Venezuela and to the “Three Guianas”) is oil and gas rich. In fact, it is a new axis of oil and gas development in the region. Trinidad and Tobago, Guyana, and potentially Suriname are the game changers for a new era in oil and gas geopolitics for the Caribbean region.

On the *negative* side, it is hard to avoid the conclusion that, given the Saudi induced oil collapse, the global glut in oil, the impact of Covid-19 on national economic sustenance and planning, and a world that seems to be moving toward recession and diminished global confidence, the Caribbean will not be immune from an economic shock that will require significant economic and social adjustments. Indeed, for all oil and gas producers in the Caribbean and elsewhere the loss of revenue is likely to be substantial. Lower oil prices are expected to put severe fiscal strain on a number of the most important producers. While Caribbean nations that import oil and gas are likely to benefit from lower prices this is not likely to compensate for the fall in visitor arrivals and attendant taxes for the tourism dependent countries. For the Caribbean energy exporters, in the current circumstance, oil and gas are no longer the panaceas for economic distress. Economic diversity is the prevailing mantra.

The New Geopolitics of Caribbean Oil and Gas

The oil and gas sectors are important elements of the Caribbean’s regional economies. It is also clear that the global energy landscape is changing dramatically characterized by high levels of uncertainty inherent in the system, as well as the enormous impact that energy has on development, security, the environment, the economy, and geopolitics. The oil in the GSB is the fluid substance that motivates Trinidad, Venezuela, Guyana and Suriname to further explore and drill. They all want a piece of the action, and actions speak louder than words. Reputedly the government of T&T is approaching the responsible global maritime jurisdiction bodies for approval to push its Exclusive Economic Zone (EEZ) to the borders of the GSB. Suriname, although it is part of the GSB, intends to move its offshore exploration closer to the lucrative Stabroek fields of Guyana.

Venezuela not to be outdone, ordered its Navy in 2020 to re-define the nation’s maritime boundaries and its EEZ. The seizure and subsequent release of 12 Guyanese fishermen and their boats by the Venezuelan navy in January 2021, in what the Guyanese assumed were within its own national maritime boundaries, but the Venezuelans said no, served to forcibly emphasize the point. Now that

the International Court of Justice (ICJ) has agreed that it can hear Guyana's objections to Venezuela's claim to two-thirds of the territory of Guyana, because of dubious Treaty obligations signed almost a Century ago, several independent Caribbean island states may also have to fight legal battles to maintain their maritime sovereignty. Decolonization in the Caribbean after World War II forced Venezuela to negotiate its maritime boundaries with several neighboring states including former colonial territories. For example, Great Britain ceded the Aves rock to Venezuela, now called Isla de Aves (Bird Island) off Dominica in the Eastern Caribbean. Will Venezuela now push its territorial claims based on this almost submersible strip of land?

Why would Venezuela want to grab a piece of Guyana? Since the 19th century, Venezuela has claimed a good part of what is now the Republic of Guyana as "zona en reclamación" attached to Venezuela's eastern border. What is the geographical reason to desire the Esequibo region as it is known? Primarily it is an emotional and nationalistic response. For many decades the area has remained under Guyanese control. But on occasion the issue is revived by different governments in Caracas when they deem it convenient for political reasons. There is also an economic rationale. The Esequibo is part of the Guiana Shield and the list of natural resources includes an extensive hydrographic network that includes a variety of rainforests, flooding and coastal flatlands, and littoral forests. But probably the most attractive feature from this natural environment would be its bauxite, diamond, manganese, gold, uranium, oil, and natural gas reserves.

From the perspective of geopolitics, the northern coast of the Esequibo would give Venezuela a much more consolidated exit to the Atlantic Ocean and the nation would gain 280 km of coastline, resulting not only in an expansion of its continental platform, but also of its sea limits, its adjoining areas, and exclusive economic zone. If the coastal band towards the Esequibo is expanded and combined with its occupation of the Isla de Aves and the Los Monjes archipelago, Venezuela will have the ability to control the southern Caribbean and expand its fishing and oil and gas resource zones. This would generate total maritime sovereignty over the Atlantic for 22.2 km, and customs jurisdiction for 44.4 km. By any measurement this also speaks of a huge advantage for Venezuela in terms of national security and defense.

Once more the devil is in the details. The chances of Venezuela making a successful claim before the International Court of Justice (IOJ) are slim. Raising the claim is traditionally the preserve of generations of politicians seeking to improve their popularity. There will be no war over the Esequibo particularly now that Guyana is gaining international interest and respect as a new petroleum power with the United States government, the U.S. military and the oil and gas lobbies in the U.S. keeping a watchful eye.

Maritime Energy Disputes, Geopolitics, and Cooperation

As maritime disputes increase, some recent bilateral agreements in the Caribbean seek to go beyond the cooperation established under bilateral delimitation treaties. They suggest a preference to design innovative legal frameworks in which different, sometimes diverging interests may be managed. One of the important regional initiatives to resolve differences about subsea petroleum rights, outside of an appeal to the Law of the Sea, concerns the Loran-Manatee natural gas field and the Plata Forma Delta that crosses the maritime boundary between Venezuela and Trinidad and Tobago. For the resources to be properly divided, the two nations negotiated for more than a decade to establish ownership. The field contains an estimated ten trillion cubic foot (Tcf) of natural gas sandstone reservoirs that spans the area around the two nations' borders. Venezuela and Trinidad and Tobago

allowed for various international gas companies to research and explore the gas contained within the field and, more particularly, which nations controlled the right to produce or sell the rights to production.

The Loran-Manatee agreement recognizes two particularly important issues with the development of subsea petroleum rights. First, the extensive research done demonstrates the importance of definitively establishing ownership interests prior to development for each field discovery to prevent future disputes. Second, it demonstrates the role that corporate entities can play in the development of subsea petroleum, establishing and gathering all the information about the different petroleum rights. It is certain that if requested, oil and gas companies can play a very important role in dispute resolution schemes in future disputed territories. By agreement in 2019, Trinidad will now proceed with exploration of its side of the Loran field using Shell Oil Company.

Figure 2. The Loran-Manatee Gas Field.



Source: Chevron.com

From another perspective, there is also a limit to geopolitical adventures when they do not achieve the intended outcomes. The late Venezuelan president Hugo Chávez once described oil as a geopolitical weapon. At that time, in the 1990s through the early 21st Century, the Venezuelan oil largesse was being dispensed throughout the hemisphere, by the PetroCaribe program of cheap oil for credit. For Venezuela it was bad management since politics has always trumped economics. In the long run PetroCaribe, morphed into a disaster for some of its Caribbean members. While there is little

doubt that the PetroCaribe program was an energy lifeline that helped to prevent some countries in the region from going into economic free fall in a time of austerity, it also proved to be an accelerator of debt for Caribbean countries. By 2015 more than one third of the external debt of the CARICOM members of PetroCaribe was owed to Venezuela.

That whole scenario is a forceful lesson for the region. *First*, oil and gas became proxies for geopolitics. *Second*, the PetroCaribe model of regional energy cooperation was not sustainable since it was based on the primacy of Venezuelan oil, the largesse that existed at the time, and the use of ideology as a strategy for regional cooperation. *Third*, it lulled the region into a false sense of energy security. When Caribbean governments and private sectors could have been looking to advance the cause of alternative forms of energy, the energy importing countries of the region sought to gain advantage through competing surges of mendicancy—resulting in frequent energetic cap-in-hand pilgrimages to Caracas! Only T&T, Barbados and Guyana were not part of that parade. PetroCaribe was not a model for the region’s energy future! Its legacy in the Caribbean demonstrates that we need a clear holistic vision of regional energy cooperation which would integrate our regional energy policy with trade, economic, environmental, security and foreign policies while broadening dialogue with producing and consuming countries alike.

The New Geopolitics of the Transition from Fossil Fuels to Renewable Energy

The common thread in global energy policy in the 2020s will be climate change. Consequently, the global energy system is undergoing a transition away from a nearly complete dependence on fossil fuels toward a greater reliance on clean and renewable energy sources. Because this low-carbon energy transition will fundamentally alter the relationship between energy producers and consumers, its geopolitical ramifications are now a key concern of global energy leaders. As part of the global economy, among the policy tools that can be leveraged to support small countries in managing the geopolitical consequences of an energy transition, regional foreign policy cooperation and diplomacy is one of the most important. It must advocate the strategic importance of fostering bilateral energy diplomacy with countries that can provide security of domestic energy supply, markets for the continuous monetization of hydrocarbon resources and support for economic diversification. These strategic relations in energy should extend also to joint investment and science and technology collaboration in order to have maximum value while the transition continues.

The notion of an ‘energy transition’ remains an inchoate concept. Classically understood to encompass shifts in the national supply of energy or the discovery of new energy resources, energy transitions are now also conceptualized to include transformations in the markets that deliver energy, in addition to conversions in end-use devices. The challenge for finding more fossil fuels lies in global environmental opposition to big projects as in the GSB, and the growing competitiveness of alternatives like wind and solar power that are often the cheapest sources of new electricity generation and a major employer in many countries. Oil and gas will be around for several decades. But even if there is industry ability to produce sweet crude and cleaner fuels in the transition toward a lower carbon world, will fossil fuels in the GSB and elsewhere eventually still become stranded assets?

Energy Geopolitics in the Caribbean: An Overview

A common definition of geopolitics is the manner in which a country’s size, position, and projection of its national attributes influence its power and relationships with other countries. Energy geopolitics is a bit more specific and directed toward an understanding of how energy shapes the grand strategies of oil producing and oil consuming countries. It is becoming more important in constructing

roadmaps of the future global order. It provides perspectives for identifying possible new nodes of international conflict and cooperation, and deficiencies in existing international structures. Energy geopolitics also draw attention to other geopolitical problems that could arise as countries make energy more central in their planning, as well as highlight the geopolitical implications of possible shifts away from fossil fuels.

Throughout 20th Century history, some Caribbean countries have played a vital role in the geopolitics of energy. During WW1 when the Royal Navy shifted from coal to oil, Trinidad was a key energy supplier and a heavily militarized country in defense of the oil of the British Empire. So too during WW2 when the United States constructed a number of army and air bases and a naval base in Trinidad to facilitate U.S. Air Force bomber runs to allied air bases in Dakar, Senegal and other parts of Africa. Other Caribbean islands such as Jamaica and Haiti, as well as Guyana and Suriname, also supplied strategic minerals such as bauxite for the war effort.

Historically the geopolitics of energy has been mostly about the thirst for oil, efforts to secure it, safeguard its shipment, holding it and monopolizing it if possible. Since oil and gas were thought to be exhaustible, and not widely available, they have often been the preserve of an oligarchy of producers. Oil importing nations have long assumed that the scarcity of oil makes them more vulnerable. But this notion of scarcity is waning, because of three developments. The *first* is the United States' shale revolution, which has transformed the country into the world's biggest combined producer of oil and gas. The *second* major change is evident in China as it attempts to move from an energy-intensive economy to a more service-led one. China has made spectacular progress in moderating its demand for coal and oil, slowing the rise in electricity consumption, deploying gas and renewable energies and arresting the growth of carbon-dioxide emissions. It remains the world's biggest importer of fossil fuels; but its experience with dirty air and its concerns about over-dependence on imported oil have made the country's authoritarian leaders more determined to subsidize investments on wind and sunlight (Chiu, 2017).

There is a disturbing nexus between geopolitics and climate change. New weather patterns will trigger social and economic upheaval. Climate change will cause more permanent global problems. In 2017, after Hurricane Irma hit Barbuda, the entire population of some 1,800 people had to be evacuated. In the Pacific scientists expect several low elevation islands to be eventually uninhabitable. Tens of thousands of people will have to be relocated. What are the geopolitical consequences of the unprecedented eradication of a state's entire territory? Currently, there are no international rules governing climate change refugees.

Climate change will also test the international system in unpredictable ways. It will transform global politics! As a result of climate change, the world of geopolitics will have to move toward a system that recognizes the diffusion of global power. If humanity confronts these challenges with success, it will be because leaders infused the global order with a sense of common purpose and recognized profound changes in the distribution of power. The big powers will have to work closely together, and other actors, such as sub-national governments, private companies, and nongovernmental organizations, and very rich individuals, will all have to play their part. The Paris agreement of 2015, though a milestone, still leaves a huge distance to travel before global warming can be stopped. To achieve that, trillions of dollars will have to be invested in wind and solar energy, batteries, electricity grids and a range of more experimental clean-energy sources.

It is difficult to speculate as to what can happen to energy supply, storage, and distribution in some states in the Caribbean. But managing climate change requires a fundamentally different and holistic approach that is quite different from the segmented manner in which most policymakers and governments currently think about it. We must also be aware that the only certainty in geopolitics is uncertainty.

Geopolitics and Renewable Energy (RE)

There are projections that Renewable Energy (RE) could account for 64 percent of electricity generation worldwide by 2050. Renewable energy sources like solar, wind, and hydroelectricity are steadily overtaking fossil fuels as the dominant means of power generation in some parts of the developed world. The transformation is being driven by cost-effectiveness. The space and satellite industries, which rely heavily on solar power drives the engineering. Solar panel producers have steadily achieved greater efficiencies in manufacturing and in generating more power from each individual solar cell. This has led to vast reductions in price, so that solar and wind power now have surpassed coal — and even natural gas — as the cheapest forms of power generation. But it will take decades for the transition to renewable energy to play out and it may never phase out fossil fuels completely (Tricks, 2018).

There is a thrust toward RE in the Commonwealth Caribbean. But at the present time renewables play a relatively minor role in the region's energy profile, although the conditions are ideal for leveraging wind and solar power. The RE movement has accelerated during the last five years in response to the volatility and high costs of energy as a result of imported oil dependency. Progress is being made. All CARICOM countries are required to have at least 47% renewables by 2027 as a target for energy transition. Jamaica was an early entrant in the clean energy stakes and was the first to install a privately owned wind power project in 2004. Jamaica's national energy policy continues its focus on the expansion of wind generation committing to being 50% renewable by 2030. Barbados has provided millions in support of a transition to solar energy though it is still in the early stages of its commitment to go to 100% renewable by 2030. Similarly, Guyana has developed a Green State Development Strategy (GSDS) that aims to replace all of the countries power supply with renewables by 2025.

The Caribbean holds enormous potential for energy transition with an abundance of the resources needed including volcanic geothermal, tidal and hydropower possibilities. Dominica aims to become the world's first climate resilient nation and is the leader in the use of renewable sources of energy among the countries of the OECS having 28% of its electricity generation by a combination of hydropower and wind. Unfortunately, the economic effects of COVID-19 now threaten to impede this momentum across the region as countries experience GDP declines and investment slowdown from the blows to tourism. There is an abundance of information regarding the potential for various forms depending on the country. However, with the exception of Suriname (where hydro accounts for half the energy supply) the development of RE in CARICOM is still in an early phase. RE projects require high initial capital, possible only through concessional financing or global venture funding as well as a good dose of luck for implementation and economic success. The small markets and the availability of cheap oil and gas at the present time are also limitations to rapid progress for RE.

There is a growing literature about the effect of fossil fuels on geopolitics. The world's concentrated deposits of oil, natural gas, and coal have helped determine the global balance of power over the past centuries, giving a small number of energy-rich states, many of them in the Middle East, tremendous influence. However, some scholars argue that renewable energy does not lend itself to the same kinds

of international oligopolies. They suggest that renewable energy sources are practically universal. Very few places in the world lack wind, sunlight, water and bioenergy of any kind. Completed infrastructure for generating wind, solar and hydropower, the predominant renewable energy sources, moreover, require no fuel — and, by extension, no fuel shipments — to operate once commissioned. Regardless of geography, these natural ingredients when harnessed will further level the energy geopolitical playing field. (Stratfor Worldview, 2018).

Compared with more traditional fuels such as natural gas and coal, renewable energies have a much higher potential for decentralized generation. As power generation becomes more dispersed regions may become more self-sufficient in energy, a process labeled “energy democratization”. In Africa and elsewhere, enhanced access to energy, via mini-grids and rooftop solar panels, could reduce energy poverty even as the global population is soaring. The beauty of the energy transition, enthusiasts believe, will be to give communities power over their energy, not turn countries into energy superpowers.

There will be winners and losers in the energy transition! For some countries the transition to RE will hit hard. Traditional oil exporters in our region such as T&T, Guyana, and Suriname, will have to invest some of their oil income into solar energy and become solar power producers as Saudi Arabia has ventured to do. With respect to the accompanying technological transition, in the past decade China has become the world's leader in the manufacture of clean energy products, including solar cells and batteries — of which it makes more than half of the global supply. It is also the world's biggest miner and supplier of rare earth materials, and the biggest provider of renewable energy capacity. China could be the main provider of energy products, services and technology to much of the world. Financial innovation is already enticing deep-pocketed investors to fund solar projects around the planet. Such initiatives require cooperation between governments and the private sector including oil companies that have seen the writing on the wall. Are Caribbean countries on board in pursuing such options?

Today more than 100 countries have identified RE as one of the prime ways of meeting their commitments under the Paris climate agreement. Must the transition to RE be slow? Not according to some new research. We tend to think of energy systems as far more static and stable than they really are. There is evidence that many countries have managed to grow without consuming more energy, have reduced their consumption of specific energy sources and have changed their energy mix in a decade or two. While energy is not immune from the disruptive forces that have transformed other industries, history does show that when change comes it can be swift and dramatic. The requirement is for the local private sector and government to proactively get involved in implementing this great opportunity for technology advancement (Tsafos, 2018). The region should push its advantage as a target for RE investment and engagement. It is an additional road to development as important as the benefits of digitalization and artificial intelligence (AI).

Caribbean countries also have to get on board the energy transition that will depend heavily on the green and blue economy. The ocean is the new economic frontier. It promises immense resource wealth, great potential for boosting economic growth, employment and innovation. Realizing the full potential of the ocean will demand responsible, sustainable approaches to its economic development. The blue economy concept tries to link the economic opportunities bestowed by the oceans and the urgent demand for improved environmental protection and restoration. Similar to the “Green Economy” concept the blue economy models aim for the improvement of human welfare and social equity and a sustainable ocean economy.

Fossil fuels will still have a firm place in the Caribbean's blue economy. Future regional energy demand and foreign exchange earnings depend a great deal on this sector for some time. Oil and gas companies will continue to invest in further exploration, but by shortening the transition from exploration to production, negotiating maritime boundaries and ensuring a stable political and regulatory environment for regional energy cooperation in the blue economy. The region's overall development in an offshore/blue economy will depend on hydrocarbons, but there will have to be options developed to minimize the risks associated with the offshore hydrocarbons industry and provide the opportunity for more sustainable blue economy activities to grow. Such options might include the application of marine protected areas, marine spatial planning, the use of ecosystem-based management, and integrated coastal management. The literature on the blue economy is replete with such recommendations (Bryan, 2021).

Conclusion and Recommendations

This article has stressed that energy dynamics in the southern Caribbean must always take account of global trends. The region does not exist in a vacuum. The world of fossil fuels has changed quite dramatically since the fall in oil and gas prices starting in 2014. Even after the fall, the Covid-19 pandemic struck a serious blow to oil demand at a time when the market was already oversupplied. The long-term effects on the world economy and energy demand, with respect to the extent of the impact and the recovery of national economies, will not be clear for quite some time in the future. What we have witnessed may just be a dress rehearsal for a structural decline in the oil and gas industry, and it raises serious questions about the risks versus rewards of traditional resource development models.

Continued investment by the IOCs in the GSB, and NOC investment in northern South America are the current exceptions to this global trend. Oil companies are reducing or cancelling their operation worldwide causing disruption. So, the warning signs for Southern Caribbean oil producers are clear. Agencies in the GSB countries responsible for the petroleum sector, finance ministries involved in planning, and political leaders will need to adjust their goals and acknowledge the risks inherent in this volatile sector. It is important for them to understand the changes, work with different scenarios to support their planning, and update their policies and systems. A more fundamental re-evaluation of policy goals should prompt government-wide reviews of oil sector objectives and of its potential to create long-term value for the country. The risks associated with fiscal dependence on the fossil fuel sector should be clearly understood. Economic diversification is the key to economic survival.

Further investment in the petroleum sector should be considered in relation to the potential returns it can generate in economic growth and revenues and also the negative impacts it could have on other national objectives, such as climate mitigation goals, environmental protection and fiscal stability. When petroleum agencies coordinate with finance, planning and environmental agencies, and when the objectives of the petroleum sector are thoughtfully embedded into the national development agenda, the resulting strategies will be more resilient and prepare these new producer provinces for the future.

There is an uncertain future for the big oil and gas projects in the GSB. There is growing competitiveness of alternatives like wind and solar power that are often the cheapest sources of new electricity generation and a major employer in many countries. Many of the employees in the traditional energy sector can be retrained in the skills required for the RE sector. Oil and gas will be

around for several decades. But even the IOCs are getting the picture and investing in forms of RE. So far, the low breakeven points for oil in Guyana, that should protect it even in a lower carbon world, will not be enough forever. Guyana and Suriname must endeavor to use their new wealth in ways that prepare them for a more diverse economic future, or they run the risk of repeating the mistakes of other oil states that have been damaged by the resource curse.

Finally with respect to the aspirations of some countries in the northern and western Caribbean to continue oil exploration, there is a harsh reality. Unless they can replicate the unusual and successful circumstances of the GSB, with access to abundant and fertile wells from where sweet crude that can be lifted and monetized rapidly for quick returns, their efforts may be in vain. An early understanding of this circumstance and negative possibility will help those countries to avoid wasting investments in resources that will not provide a suitable return.

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