

THE NGC GROUP OF COMPANIES CORPORATE QUARTERLY JOURNAL

GASCO news

VOLUME 28 | NO.2 | JULY 2018

From
plan



to
action



PRODUCED BY

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Remaining Relevant During Uncertain Times

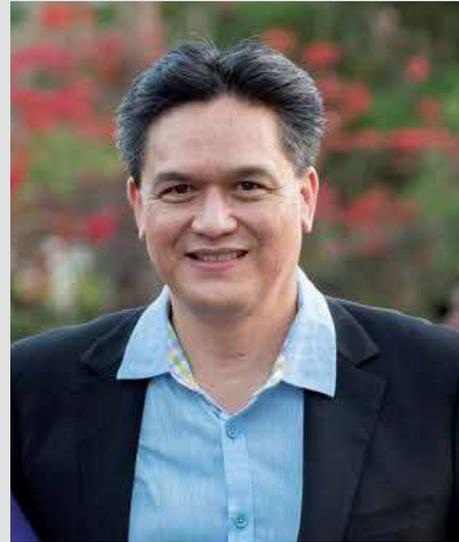
We are two quarters deep into 2018, and by every indication, this year will be one marked by achievement for The NGC Group (The Group). Having weathered a testing season in the oil and gas sector, and steering now past tentative recovery to an uncertain future, we can say with pride that The NGC Group has managed to overcome and keep our business alive and relevant.

In 2017, The Group's Strategic Plan to 2020 was finalised and activated. This Plan has since been held as the rulebook for strategy, business planning and decision-making, and its objectives considered targets held in common by all staff. In pursuit of those objectives, The NGC Group has been extremely busy over the past few months, but more importantly, quite productive.

Highlights

As outlined in previous issues of *GASCO News*, The Group's Strategic Plan is underpinned by four pillars. Some highlight achievements over the past year under each of those pillars are detailed below.

1. The first order of priority was to secure our current business. Revenues improved as gas supply stabilised, following completion of some critical negotiations with upstream and downstream companies. Progress was made on other supply initiatives, notably the study into monetisation of small and marginal fields, which was progressed past a key milestone. Molecular optimisation remained a centre of attention, and renewable energy assumed a bigger role in our business plan as a result.
2. To develop the organisation to meet the demands of an evolving sector, The Group filled several critical positions, and embarked on a Competency, Knowledge and Skills Development (CKSD) programme to identify strengths and address competency gaps among staff.
3. Local and international growth was a third area of focus. Phoenix Park Gas Processors Limited (PPGPL) has initiated expansion of its business portfolio to include LPG product trading, while NGC CNG Company Ltd (NGC CNG) is now extending its compressed natural gas (CNG) network to the sister isle. Concurrently, business partnerships with Grenada, Cuba, Guyana and Venezuela were advanced, and further afield, The Group continued to explore opportunities in Africa. In recognition of the



Mark Loquan, President, NGC

need to build our brand presence if we are to grow our business, we made presentations at international industry engagements, such as the World Gas Conference in Washington, DC.

4. As a state enterprise, we strengthened our commitment to make thoughtful and impactful contributions to society. Of note for 2018 were the NGC Bocas Lit Fest, which continued to stoke meaningful conversations and generate necessary discourse around diversification; the 2018 edition of NGC's National Heroes Project, which was launched in tribute to the late Dr. Pat Bishop; and the NGC/ NAAA Championship Series, which gave local athletes a stage to compete and excel. From a business standpoint, we began targeting the Light Industrial Commercial (LIC) sector for greater engagement, with a view to strengthening relationships with our consumer base, and supporting growth in the non-energy sector. We also resumed our Reforestation Programme, and are now just 48 hectares shy of our 315-hectare target.

This edition of *GASCO News* will detail some of these initiatives aimed at realising the objectives of The NGC Group's Strategic Plan. I take this opportunity to express gratitude to the Chairman and Board, all management and staff across The Group who have made this progress possible, and look forward to seeing where our efforts will take us in the months ahead. ■

Mark Loquan, President



On the World Stage –

Thoughts from the 2018 World Gas Conference

The World Gas Conference (WGC) is the largest global natural gas industry event. Held every three years in the country holding the presidency of the International Gas Union (IGU), the WGC 2018 took place in Washington, DC from June 25th to 29th. The event gathered 600 speakers and more than 12,000 attendees from 100 countries for five days of presentations, panel discussions, exhibitions and unrivalled networking.

Under the theme 'Fuelling the Future', the WGC 2018 sought to address "the most timely and topical, technical, commercial and strategic issues and opportunities facing the gas industry," in the areas of:

- Transmission, distribution and storage
- Strategy, pricing and regulation
- Environment and sustainability
- Markets and utilisation
- Exploration and production
- Marketing and communications
- Workforce development
- Liquefied Natural Gas (LNG)
- Research, development and innovation

Trinidad and Tobago, through The National Gas Company of Trinidad and Tobago Limited (NGC), is a charter member of the IGU and was invited to participate in the event. NGC President, Mark Loquan and NGC Geospatial Information Services (GIS) Analyst, Shane Wilson were the only speakers from Trinidad and Tobago at the WGC 2018.

Mr. Loquan represented the country in a panel discussion that focused on the 'Regional Challenges and Opportunities in the Americas,' while Mr. Wilson delivered a presentation on 'Developing an Energy Transition Pathway for a Low Carbon Fuel Distribution System for Decentralised Communities.'

MARK LOQUAN ON REGIONAL INTEGRATION

The panel in which Mr. Loquan participated focused on opportunities that exist for the Caribbean and Latin America to collaborate in natural gas. As a spokesperson for Trinidad and Tobago, Mr. Loquan's contributions were not limited to The NGC Group perspective, but spanned the national energy landscape.





Service and Expertise

As architects of the renowned Trinidad Gas Model of Development, Trinidad and Tobago, via The NGC Group, has much to offer emerging energy provinces by way of knowledge-sharing and support services. As Mr. Loquan explained, The Group is now leveraging new regional developments to expand its business portfolio and help incipient energy industries off the ground.

As conversations take place at the government level with Guyana, for instance, to determine avenues for partnership following significant oil and gas discoveries, NGC Group subsidiary, National Energy, is working to position this country as a logistical and transshipment hub. The ports managed by the company are being upgraded to cater to increased marine traffic and a broader range of service requirements. Once the Guyanese energy sector takes off, Trinidad and Tobago can serve as a convenient port of call for vessels en route to international markets. There may also be opportunities for The Group to offer consultancy services to the Guyanese government with respect to developing its reserves and infrastructure.



Mark Loquan, third from right, with WGC panelists

Jamaica is another target for partnership. A Memorandum of Understanding (MoU) has been signed with Petrojam, Jamaica's only petroleum refinery, with respect to a pilot project to convert 10 buses from a fleet of 600 to use liquefied petroleum gas (LPG). Outfitting a vehicle to use LPG requires roughly the same conversion technology as CNG, so NGC CNG Company Limited (NGC CNG) will be one of the key agencies involved in this project. Licensed converters from Trinidad and Tobago will be enlisted to assist with conversion in the pilot, opening opportunities for exporting local expertise as more vehicles are targeted.





LPG to fuel these buses could also be supplied by Trinidad and Tobago. Phoenix Park Gas Processors Limited (PPGPL) currently produces and supplies 15,000 barrels per day (bpd) of LPG to the Eastern and Northern Caribbean, and spot markets in Central and South America. In fact, the company is one of the primary suppliers of LPG in the region. The opening of a new LPG market in the Jamaican transportation sector gives PPGPL an opportunity to establish a new commercial relationship and strengthen regional integration.

Of course, collaboration runs both ways, with The NGC Group also standing to benefit from regional assistance. NGC recently finalised a commercial agreement with Global Petroleum Group (GPG), an oil and gas company currently undertaking exploration and appraisal activities off the south coast of Grenada. This agreement was the result of the Energy Sector Development Framework Agreement signed between the governments of Trinidad and Tobago and Grenada. With domestic gas supply falling short of demand in Trinidad and Tobago, gas finds by Grenada could provide welcome relief to local industry. Accessing gas from Venezuela’s Dragon Field also remains high priority and is steps closer to being realised following advancements in the negotiation process.

LNG Opportunities

The search for new sources of gas is not simply about increasing revenues for NGC, but is a matter of national consequence. Mr. Loquan noted that Trinidad and Tobago has some of the most competitive energy assets in the world, which are lamentably falling behind their full potential due to supply shortfalls. He spoke specifically about the LNG industry, mentioning that the cost of building and operating Trinidad and Tobago’s LNG facilities per tonne of product is five to seven per cent that of plants recently built in Australia.

Natural gas is currently utilised in only a handful of Caribbean countries, with Trinidad and Tobago being the only exporter. However, there are burgeoning opportunities in the LNG market as less than 20 per cent of projected LNG demand has been contracted. If natural gas is to penetrate new markets through LNG, however, it must be cost-competitive relative to dominant liquid fuels. This involves innovating technologies for cheaper transportation of LNG, especially where markets may be too small for the economics to make sense.

In that regard, The NGC Group is looking to partner with other entities on micro LNG projects and small-scale LNG transfers.

Challenges

Widening the natural gas market across the Caribbean is not without challenges. Using natural gas in place of other fuels in electricity generation and transportation would require capital investment to retrofit or replace existing infrastructure. The reality is that many Caribbean islands do not have the capital to implement the necessary changes, the credit rating to access external funding or the demand to justify the investment. There is also the risk of destructive hurricanes to consider in determining the feasibility of such investments. In addition, in the interest of greening energy consumption, some islands are opting to integrate renewable technologies to displace fossil fuels.

Nevertheless, there is still much room for collaboration and growth. Mr. Loquan indicated that Trinidad and Tobago will be hosting a meeting of the Gas Exporting Countries Forum later this year, and expects that meaningful conversation will be generated around the way forward for developing the regional natural gas industry.



T&T is the only Caribbean LNG exporter

Natural gas is currently utilised in only a handful of Caribbean countries, with Trinidad and Tobago being the only exporter. However, there are burgeoning opportunities in the LNG market as less than 20 per cent of projected LNG demand has been contracted.



Shane Wilson at WGC

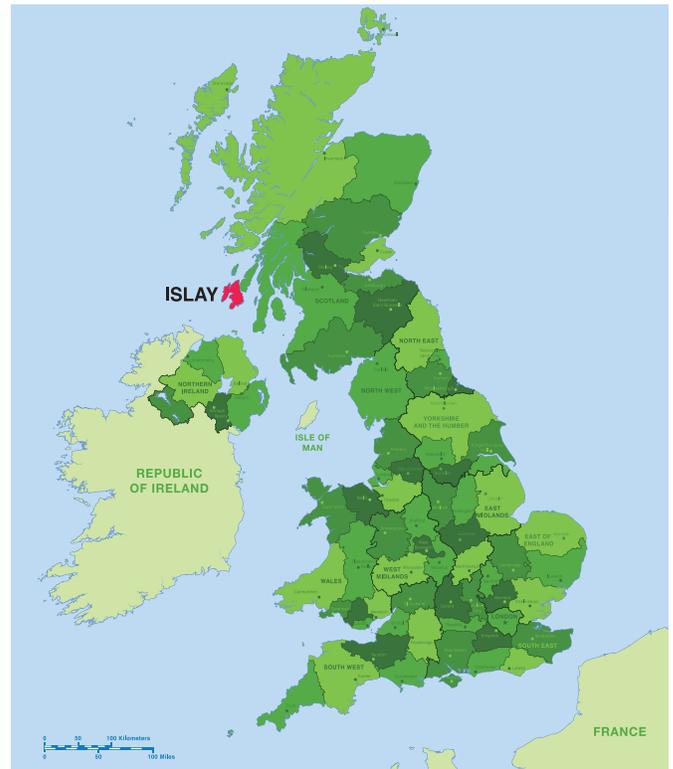


Figure 1 - Map of the United Kingdom showing the location of Islay

SHANE WILSON ON CONNECTING REMOTE COMMUNITIES

Access to isolated areas and promotion of new connection points were a keen focus of WGC sessions discussing transmission, distribution and storage.

In the interest of displacing coal and oil with cleaner burning fuels in the next few decades, there is a push for deeper integration of natural gas into energy markets in transportation, heating, industrial processes and electricity generation. This means increasing access to natural gas supply networks.

One of the challenges facing the industry has been connecting off-grid and small-scale markets, which cannot be easily or economically joined to centralised distribution networks via pipelines.

The Case of Islay

In his presentation at the WGC 2018, Shane Wilson described a conceptual framework for developing a decentralised fuel system for remote communities. The approach was demonstrated through a gas transition case study on the Isle of Islay (Islay), located off the west coast of the United Kingdom (Figure 1).



The island, with a population of 3,500 – 17 per cent of whom live in extreme poverty – is reliant on fuel oils, kerosene and diesel for industry, cooking/heating and transportation. For its relatively small population and fuel needs, the island is a good candidate to trial a project to transition toward natural gas. The biggest challenge is of course connecting the island with the supply network.

There are several technologies available for transporting natural gas to communities such as Islay which are far from national grids. However, the economic feasibility of applying these technologies is determined by volumes and distance to market, as illustrated in Figure 2.

Current industry trends indicate compressed natural gas (CNG) and LNG technologies are the commercially viable alternatives to pipelines for transporting natural gas to remote locations. Trucks, ferries, trailers and rail platforms could connect remote markets via a 'virtual pipeline'. The specific mode of transportation employed would depend on the project parameters, including proximity of supply to market, volumes needed, capital investment and infrastructure suitability.

For Islay, it was determined that CNG trailer technology would be best suited to local conditions, based on the quantity of gas required (market demand) and delivery cost.

Virtual Pipelines and Trinidad and Tobago

Mr. Wilson's presentation on the case of Islay was based on an actual study undertaken in the UK. The same principles can, however, be applied to the case of Trinidad and Tobago with the new evolving business environment. Although NGC's pipeline infrastructure is extensive, there are remote areas of Trinidad that may still be considered isolated from the network, not simply because of distance, but because of geography. Constructing new pipelines could disrupt sensitive ecosystems, for instance, or may require navigation of difficult terrain. The 'virtual pipeline' concept can therefore be a useful tool for bridging supply gaps in the future.

As an example, there are plans for the development of several business parks across Trinidad and Tobago. In May 2018, construction started on an Agro-Processing and Light Industrial Park in Moruga geared toward revitalising the agricultural sector. The park is expected to house industries involved in food and beverage processing and manufacturing. Given the location and intent of the park, consideration could be given to supplying natural gas to fuel operations using 'greener' transportation methods (relative to the environmental costs of building pipeline tie-ins). Use of a 'virtual pipeline' in the form of trailers hauling CNG, for example, would also eliminate the need to acquire land for pipeline construction and significantly

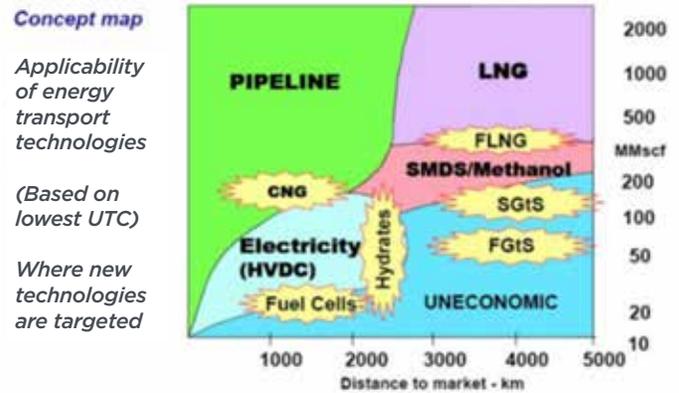


Figure 2 – Concept map showing applicability of energy transport technologies based on volumes and distance to market

reduce the time needed to connect new consumers.

The 'virtual pipeline' solution would perhaps be even more applicable for Tobago. The island has a motto of 'clean, green, safe and serene', and any development is undertaken with that philosophy in mind. Natural gas is already supplied via undersea pipeline to the Cove Eco-Industrial and Business Park, and the island will soon have its first CNG supply points in the form of mobile refuelling units (MRUs). With this technology in place, it would be much easier for new consumers, such as hotels needing gas for cooling, to access supply from mobile trucks or trailers, rather than a pipeline. Indeed, pipeline construction would be particularly disruptive in Tobago whose ecological capital is valuable to the tourism industry. In that regard, it could be determined that 'virtual pipeline' alternatives are the only practical way to connect new consumers around the island.

Another consideration in favour of 'virtual pipeline' technologies is that they can be easily demobilised if no longer needed. This means that projects with short life cycles can feasibly benefit from direct supply without the need for expensive infrastructure to be built, maintained and decommissioned. Mobile gas supply would also ensure projects can be started in much shorter time frames than would be obtained with pipeline connections.

Within the Caribbean region, there are plans to utilise the technology in Jamaica for industrial processes, and in Martinique and Guadeloupe for power generation. The technology can be seen as an innovative method for economically distributing natural gas to the Caribbean.

The World Gas Conference represented the perfect platform for showcasing the value proposition of The NGC Group. Undoubtedly, as The Group seeks to realise the objectives of its Strategic Plan to 2020, the WGC and like conferences will expedite the international growth of business and brand. ■



EXPANSION THROUGH DIVERSIFICATION –

The Africa Initiative

The Africa Initiative Begins

On January 29th 2007, the Honourable Patrick Manning, then Prime Minister of the Republic of Trinidad and Tobago, made an unprecedented announcement at the 8th Annual Meeting of the African Union held in Addis Ababa, Republic of Ethiopia. Mr. Manning, who had been invited to speak at the meeting, announced to African leaders, "Given this country's technological achievements in the energy sector, the

Government of Trinidad and Tobago has taken a decision to make our expertise in the sector available free of charge to a number of West African countries."

The initial countries named by Prime Minister Manning were Chad, Nigeria, Cameroon, Equatorial Guinea, Gabon, the Republic of Congo and Angola. According to Professor Andrew Jupiter, who was present at the



Mr. David Landreth-Smith,
Former Vice President,
Engineering, PPGPL



Mr. Alvin Dookie,
Vice President,
Business Development, PPGPL



Prof. Andrew Jupiter,
Former Permanent
Secretary, MEEI and
Former President,
National Energy

meeting, "Trinidad and Tobago's declaration resulted in an atmosphere of euphoria, as leaders lined up to speak with Mr. Manning." Immediately following the statement, Tanzania, Ghana and Benin expressed their desire to be included in the initiative, which would later become known as the Africa Initiative.

Professor Jupiter recalls, "The announcement was unexpected not only to the countries named, but also to the Trinidad and Tobago delegation. We were now required to visit each country to meet with government and energy industry representatives to assess their individual situations and determine how Trinidad and Tobago could offer assistance."

South-south collaboration had long been a dream and the Africa Initiative catapulted Trinidad and Tobago and African states closer towards realising the dream that could potentially lead to aggregation of energy resources, capital and know-how (Boopsingh and McGuire 2014). For the remainder of 2007 and throughout 2008–2009, there was an upsurge in interest from African nations and several study tours were conducted by various high-level delegations from African countries – Nigeria, Ghana, Mozambique, Cameroon, Uganda, Angola, Cote d'Ivoire and South Africa.

During the same period, teams from Trinidad and Tobago including representatives from the Ministry of Energy and Energy Industries, The NGC Group and the Energy Chamber of Trinidad and Tobago (Energy Chamber), also visited countries in West and East Africa to learn about these emerging energy territories and offer general advice on policy development. Areas of co-operation were also explored during these visits and in November 2011, a Technical Services Agreement (TSA) was signed between NGC, National Energy and the Tanzania Petroleum Development Corporation (TPDC).

Under the agreement, which lasted for three years, Phoenix Park Gas Processors Limited's (PPGPL's) David Landreth-Smith, former Vice President, Engineering at PPGPL and then Special Projects Advisor, was assigned to work closely with the TPDC. Mr. Landreth-Smith assisted the TPDC in negotiating the terms and conditions of their fixed price engineering, procurement and construction (EPC) contract with the China Petroleum Technical Development Corporation for the 532 km Gas Pipeline and Processing Plant Project, from Mtwara to Dar es Salaam. He also participated on the

TPDC tender evaluation committee and served as the Technical & Commercial Advisor. NGC received revenues for these services until the expiration of the TSA in 2013. In the period that followed, Trinidad and Tobago and several African countries involved in the initiative experienced economic and political changes. In some cases, new policies were introduced which impacted the direction of projects and caused some projects to be curtailed.

South-South Collaboration in a New Global Energy Landscape

Fast forward to 2018. The NGC Group has injected new life into the Africa Initiative with the signing of a marquee TSA between NGC and Empresa Nacional de HidroCarbonetos, E.P. (ENH), the national petroleum company of Mozambique. The TSA, which had been months under development, solidified The NGC Group's advancement into the emergent energy province of Mozambique in East Africa. Mozambique has partnered with The NGC Group to monetise its estimated 180 trillion cubic feet (tcf) of natural gas reserves for both LNG export and domestic use.

The agreement will see NGC providing technical support to ENH, utilising a wide range of this country's energy expertise, including advisory services for contract negotiations with multinational corporations (MNCs) and development of gas sales agreements. The ENH will also have access to engineering expertise related to pipeline design and maintenance, as well as infrastructure development, such as ports and industrial estates.

Speaking at the signing of this milestone document, Mr. Gerry C. Brooks, Chairman of The NGC Group, explained the significance of the TSA to the advancement of The Group's internationalisation strategy: "As we seek to transform our business and the energy sector, we must also look at diversifying our business and revenue streams beyond our shores by forging partnerships of mutual benefit. Our collaboration with Mozambique signals that NGC remains firm in our commitment to creating value and generating tangible returns for the development of the country and its people."

The signing of this TSA has generated new enthusiasm across The NGC Group, as it represents boundless opportunities for growth. Vice President, Business



Development at PPGPL, Alvin Dookie, is optimistic about the current and future prospects for the NGC Group and by extension, Trinidad and Tobago. In his opinion, the Africa Initiative is a means of extending the life of the Trinidad and Tobago Natural Gas Model through market and product development. He explained: "We have identified emerging provinces such as Ghana, Tanzania and Mozambique that have institutional capacity gaps; whereas Trinidad and Tobago has a track record of producing oil and gas – oil for over 100 years and gas for over 50 years. Therefore, we see a strategic fit between Trinidad and Tobago and these territories."

The NGC team has designed its marketing strategy to differentiate itself from other investors for whom Africa may merely represent an injection of finances. Commenting on The NGC Group's value proposition, Mr. Dookie indicated, "We bring not only capital, but also expertise and a track record of operational excellence." He also sees local content development as a major selling point: "Almost invariably, African delegations are always impressed by the number of Trinidad and Tobago nationals employed in our energy sector and they are interested in developing their people to take leadership roles in their countries."

This sentiment was echoed by Mr. Kwame Amoah Bah-Nuakoh, General Manager of the Ghana National Petroleum Corporation (GNPC), during his visit to Trinidad and Tobago in April this year. In his address at the Energy Chamber's business forum, Mr. Bah-Nuakoh expressed his hope that Trinidad and Tobago companies would invest in Ghana which currently enjoys positive economic conditions. He told the meeting, "Trinidad and Tobago is an old industry and we want to be able to harness our natural resources for the mutual benefit of the Ghanaian people."

The NGC Group provides an additional service by establishing linkages between local service companies and African organisations, a 'match-making' service of sorts. To this end, The Group collaborates with the Energy Chamber, The University of the West Indies, the University of Trinidad and Tobago and National Energy Skills Centre who can play a crucial role in equipping burgeoning energy industries with the skills and services necessary to grow and thrive.

Risk vs. Return

Through the Africa Initiative, and other ventures aimed at internationalising the brand, The NGC Group has

embarked on a transformative process to achieve its vision of being a leading player in the global energy business, similar to Petronas of Malaysia and Brazil's Petrobras. However, given the lengthy incubation period (five to seven years) and the sizeable capital outlays associated with gas development projects, the TSA serves as a means of bridging the gap during the early developmental stages. In Mr. Dookie's view, the TSA allows The NGC Group to reduce its risk and operating costs in the short term: "Through this transitional arrangement, all parties stand to benefit. The new gas province is guided through the development process while gaining vital experience and strengthening local capacity, and The NGC Group builds relationships geared towards optimising future opportunities while developing a new revenue stream."

Based on the project management methodologies resident within The NGC Group, we have the capacity to assess opportunities as they arise. Mr. Landreth-Smith, who is currently engaged as a consultant on NGC's Beachfield Condensate Storage and Compression Facility Project, opined, "The NGC Group should be very proud of instituting a project management methodology based on a stage gate approval process. Full economic scenario and risk analyses would allow The Group to obtain returns commensurate with its investment risk."

Positioning for Growth

The NGC Group has long been placed at the forefront of national economic development. Therefore, The Group is well poised to lead the thrust in expanding the energy sector into new domains. TSAs have been developed as a short-to-medium-term entry strategy, while the internal organisation is bolstered and re-organised where necessary, to capitalise on future opportunities and achieve The Group's long-term goals.

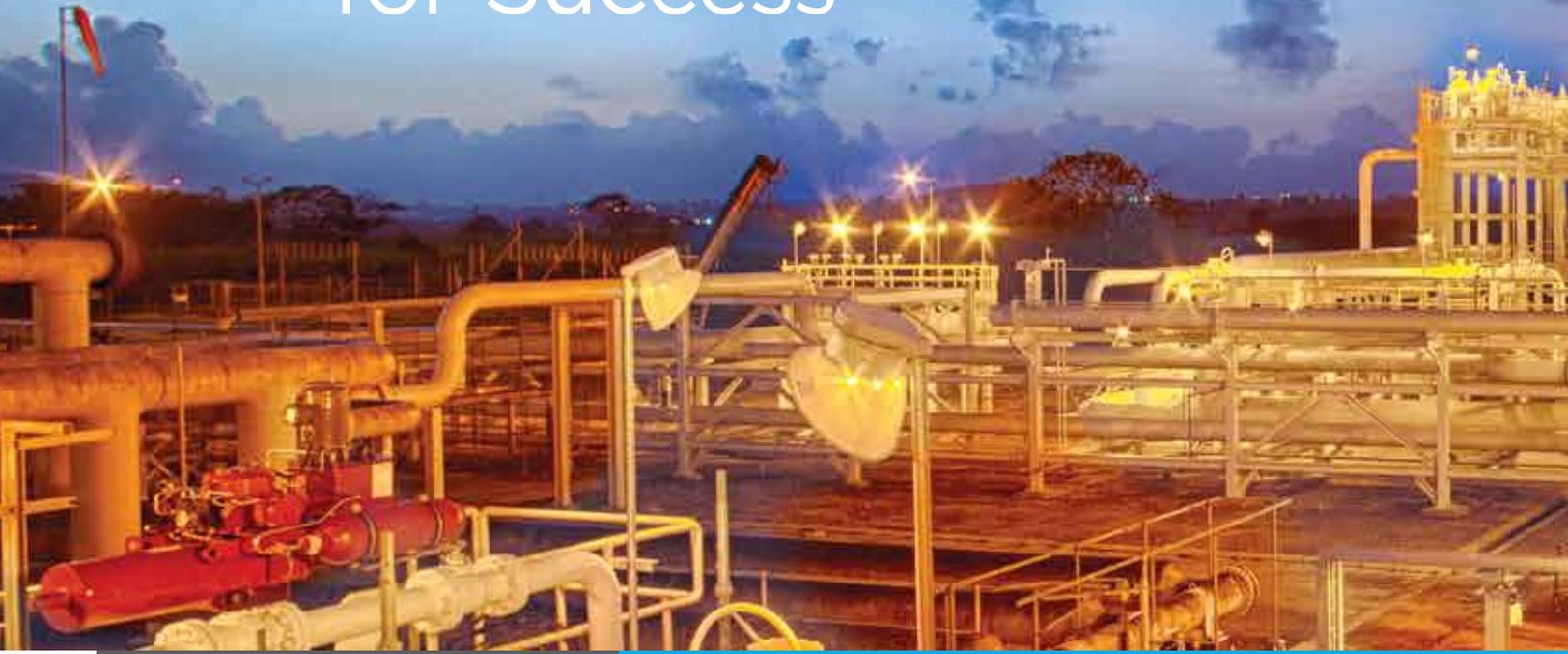
For his part, NGC President, Mark Loquan is optimistic about this new direction of business: "Our TSA with Mozambique is the first major connection from which we can grow an extensive partnership network on the African continent. In addition to Mozambique, Ghana and Tanzania, since 2007, NGC has hosted repeat visits and study tours from Uganda, Nigeria, Gabon and Kenya. The interest in NGC's business is clear; it gives convincing evidence of these nations' search for guidance, their acknowledgement of Trinidad and Tobago's expertise in oil and gas, and their desire to cooperate. With the right strategy and due diligence, the vision for South-South collaboration via the Africa Initiative can certainly be realised." ■

References

Boopsingh, Trevor M., & McGuire, Gregory. (2014). *From Oil to Gas and Beyond: A Review of the Trinidad and Tobago Model and Analysis of Future Challenges*. University Press of America, Inc.



Creating a Culture for Success



It is public knowledge that since 2014, natural gas production in Trinidad and Tobago has declined concurrently with oil and gas prices. As a natural gas processing and natural gas liquid (NGL) marketing business, these two factors have negatively impacted the earnings of Phoenix Park Gas Processors Limited (PPGPL). As a state company, this revenue shortfall has ramifications that go far beyond our fence line. Our shareholders, and the country as a whole, have lost significant revenues from dividends and taxation due to the falling profits.

To mitigate this impact, PPGPL has set about the intrepid strategy of expanding its NGL marketing operations into liquefied petroleum gas (LPG) product trading. At present, the company receives natural gas, removes the liquids, sends the dry gas downstream, fractionates the NGLs into propane, butane and natural gasoline, and sells these components 'free on board' (FOB) to customer vessels.

Product trading, better defined as physical commodity trading, is a different business proposition with its own unique risks.

A physical commodity is distinct from a paper instrument

which can also be traded. When speaking of 'product' or 'physical commodity' trading, it is understood to be trade in the actual product. That is, the seller physically owns and transports products, as opposed to simply 'owning' them on paper. In this case, PPGPL's focus is on LPG, but other industry examples are oil, gold or wheat. The term 'commodity' means that the value of these types of products is solely determined by quality and supply and demand. Unlike other consumables, commodities are unaffected by branding. Trading, of course, simply means buying and selling.

Therefore, for PPGPL, product trading involves forward integration to purchase, transport and deliver NGLs to customers' import facilities. In a nutshell, PPGPL intends to physically buy and sell LPG at a margin and thereby tap into an additional source of revenue. This market space is highly competitive and PPGPL's success will require different competencies. The company must not only change the 'what' of its business, but the 'how' as well.

The obvious benefit of product trading to PPGPL is that the revenue is delinked from indigenous gas supplies. The company can buy and sell product from anywhere, including local sources. Perhaps the less obvious benefit



is that revenues are also delinked from the commodity pricing fluctuations as income is derived from the margin between buying and selling. The challenge is that new uncertainties are introduced, such as the vagaries of the shipping industry, the credit risk of national entities, and the science of hedging changes in LPG pricing between buying and selling.

The issue to be wary of is culture. PPGPL's success at creating the right culture for the future iteration of the company will determine its sustainability. As Peter Drucker said, "culture eats strategy for breakfast."

Although PPGPL will be venturing into the product trading arena, it will still be required to maintain an asset-based business, which is an entirely different animal compared to a pure trading house. Therefore, a hybrid culture that fuses the strong risk management, governance, compliance, and operational safety focus of an asset-based organisation with the entrepreneurial, agile, aggressive and highly empowered culture of a commodity trader will be necessary.

The most important enablers that will allow such a hybrid culture to exist and the company to succeed are:

- A common understanding throughout the

organisation of the differences in culture between departments and why they are necessary;

- An ultra-high focus on client needs: each department must be very clear on who its customers are internally and externally and be committed to being sensitive to and meeting their needs. It must be easy to 'do business' within PPGPL and with PPGPL.
- A superior quality information system: the information necessary to make decisions must be readily available and in a form that does not need further manipulation before decisions can be taken. This information must flow seamlessly into the company - where external market data is needed - and between departments - where interdepartmental data is necessary. As complexity increases, time for decision-making decreases, and compliance and governance obligations remain, the company will need to find an automated way of collecting, analysing and presenting data.

There must be commitment to these cultural imperatives at all organisational levels if the company is to succeed in its product trading mission. The linchpin in the future success of PPGPL is not a change in strategy but a transformation of culture. ■



Possibilities for Partnership on LPG in Colombia

As part of Phoenix Park Gas Processors Limited's (PPGPL's) international growth initiative, project opportunities are being explored along the LPG value chain in the Caribbean and Latin American regions. Colombia is a producer of crude oil and natural gas. Through its state oil and gas company, Ecopetrol, the country was self-sufficient in its LPG production for domestic consumption up to 2016. However, a fairly recent deficit in the local LPG supply resulted in the importation of the product by a group of private companies. This importation necessitated the construction of a small LPG import and storage facility in Cartagena, a northern city on the coast of the Caribbean Sea.

The country has forecast a continued and growing deficit in domestic LPG supply. If this condition persists, there may be need for investment in additional LPG storage facilities. PPGPL was approached by a port facility regarding an opportunity to develop LPG import and storage facilities at Puerto Bahia in Cartagena. In late April 2018, ahead of a due diligence visit to Colombia, a meeting was held with His Excellency Alfonso Múnera Cavadia, Ambassador Extraordinary and Plenipotentiary of the Republic of Colombia, along with ProColombia (the investment promotion agency of Colombia) to discuss the status of their LPG supply.

Subsequent to this initial meeting, PPGPL hosted Ambassador Múnera and a delegation from the Colombian

embassy at its plant facility on May 8th, 2018. During his visit, PPGPL representatives delivered a presentation to the guests on its operations, safety and its production capacity. Ambassador Múnera and his team were given a driving tour of the PPGPL processing plant followed by a tour of the Point Lisas Industrial Estate.

Ambassador Múnera was duly impressed with the company's facilities and capabilities, as well as the development he witnessed during the tour of the estate. He further stated that based on what he viewed during the tour of PPGPL's plant facility, he was looking forward to the company doing business in Colombia. The Ambassador then committed to providing the necessary governmental and business assistance to make this goal a reality for the organisation.

As a result of Ambassador Múnera's promise, a PPGPL team was able to meet with key stakeholders in Colombia at the end of May as part of the necessary due diligence process. The team was afforded the opportunity to gain a deep understanding of the Colombian LPG sector, while interacting with the key representatives of their regulatory and planning framework.

Currently, PPGPL is continuing its evaluation of the LPG import and storage project opportunity in Cartagena, and the possibility of becoming a supplier of LPG to Colombia under the company's product trading initiative. ■



EN ROUTE – CNG Supply for Tobago

TOBAGO WILL SOON RECEIVE ITS OWN SUPPLY OF COMPRESSED NATURAL GAS (CNG).



CNG buses

NGC CNG Company Limited (NGC CNG), along with The National Gas Company of Trinidad and Tobago Limited (NGC) and other key stakeholders, have put everything in place for a temporary supply of compressed natural gas (CNG) to fuel five new Higer buses of the Public Transport Service Corporation (PTSC) at the Cove Eco Industrial Business Park. The buses are among 25 new compressed natural gas (CNG) buses procured by the PTSC in 2017 for use across Trinidad and Tobago.

Work on installing a mobile refuelling unit (MRU) for temporary CNG supply at Cove began in 2017. This involved meetings and discussions among NGC CNG, the Tobago House of Assembly (THA), the Eco Industrial Development Company of Trinidad and Tobago (EIDCOTT), the Ministry of Energy and Energy Industries (MEEI) and other key stakeholders with respect to the location of the MRU, access for PTSC buses to fill at Cove and requisite regulatory approvals.

Mobile Refuelling Unit

The MRU was shipped to Tobago in April 2018 and consists of an eight-foot compressor and dispenser module, as well as a 10-foot storage module. The compressor is driven by a natural gas engine, as opposed to the electric motor which is used at existing CNG stations in Trinidad. The compressor is designed to either use gas from the storage module or pull gas directly from a pipeline connection. The 10-foot storage module consists of 21 lightweight storage tanks, which will hold up to 1,500

CNG litres of gasoline equivalent. This volume can refill roughly 15 buses or 100 cars.

Approvals have already been obtained from the THA Land Management Department and the Environmental Management Authority (EMA). As at mid-July, key inspections by the MEEI and the Occupational Safety and Health (OSH) Agency are ongoing. A special CNG marketing licence (CML) to allow the MRU to dispense the fuel also needs to be secured. This will be requested from Cabinet.

The new filling facility will not be opened to the public. Discussions are continuing between the THA and the National Petroleum Marketing Company Limited (NP) to locate a new service station from which to supply CNG for public use.

New Buses for Tobago

The acquisition of CNG buses for Tobago is part of a larger upgrade to the PTSC fleet on the island. In early June, the PTSC introduced 10 new buses into the network. The additional CNG-fuelled five will be deployed once the MRU is operationalised.

These vehicles are expected to greatly improve the transportation network on the island. The availability of CNG in Tobago will be a significant step toward helping the island deliver on its catch phrase of 'clean, green, safe and serene,' as CNG combustion results in 30 per cent less emissions than conventional liquid fuels. ■



Cove Estate, Tobago

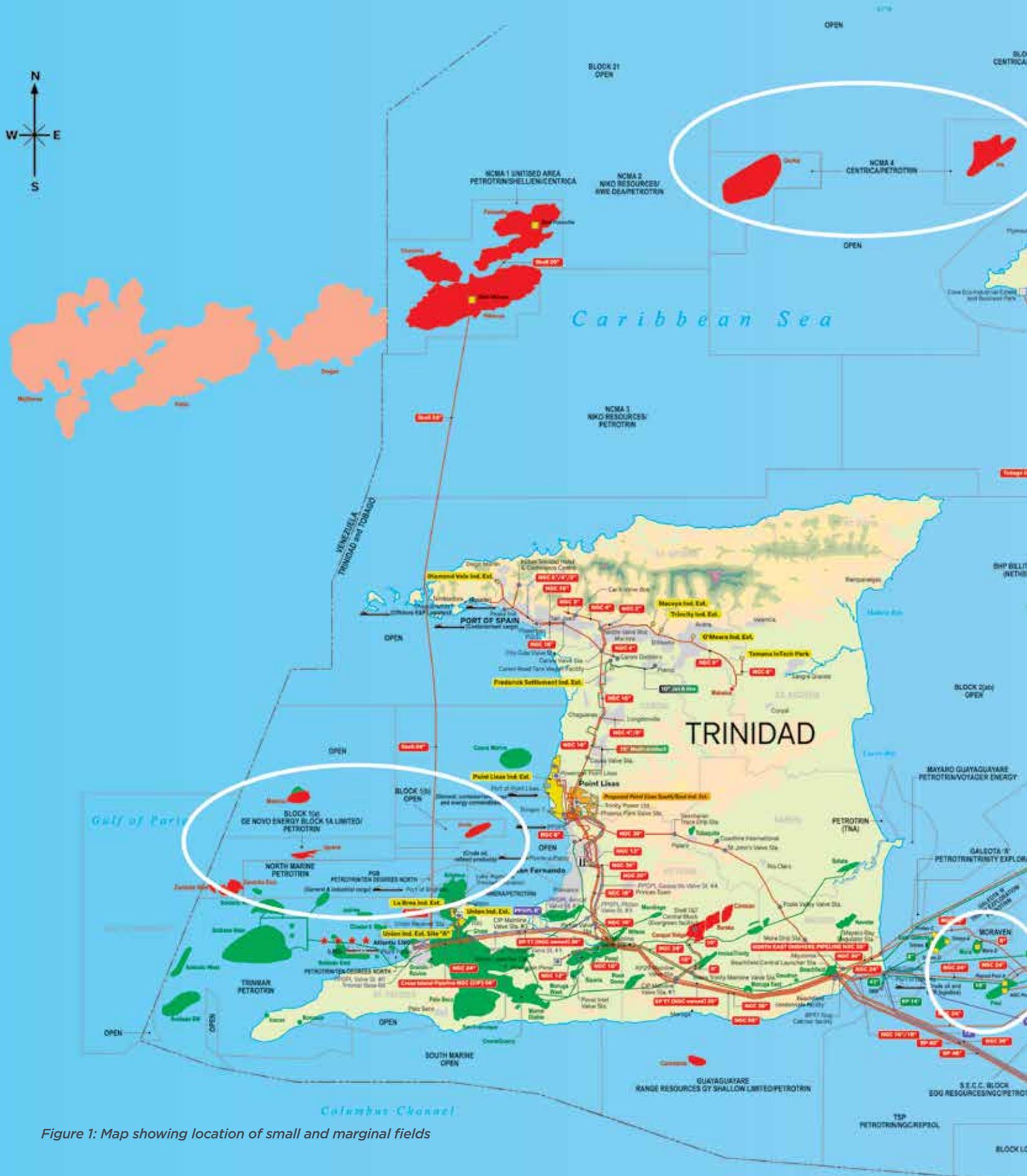


Figure 1: Map showing location of small and marginal fields

Developing Small and Marginal Fields

One of the primary objectives of NGC's Strategic Plan is to restore balance to the gas supply scenario in Trinidad and Tobago. With supply currently below demand, the Company has been looking at different ways to bridge the gap. Measures have included partnering with Venezuela to monetise the Dragon field, lobbying for renewable energy uptake so molecules could be diverted from electricity generation, collaborating with upstream operators to bring new fields into production and continue their exploration thrust.

Also receiving attention are small pools and marginal fields in Trinidad's offshore acreage (Figure 1). Marginal fields refer to fields that may be considered uneconomic or just marginally economically positive under current fiscal terms. NGC's intentions in this area have been shared at a number of business forums and the project has since progressed past a key milestone. This article takes a closer look at these fields and their potential to impact domestic supply.

Working in collaboration with the Ministry of Energy and Energy Industries (MEEI), NGC undertook a feasibility study of small pools and marginal fields. This study was the first phase in the larger project of getting these fields brought into production. It was completed in the second quarter of 2018.

Based on the team's preliminary analysis, it was estimated that some of these fields or small pools could be brought on stream as early as 2019/2020 if conditions favour their development. That is, with timely investment decisions and approvals, more thorough field evaluation and prompt mobilisation, Trinidad and Tobago could start receiving gas from select small pools and marginal fields in the near term.

By Definition

Accumulations of oil and gas may be found in subsurface reservoirs called fields. The size of a field is determined by the amount of hydrocarbons it contains. With respect to gas fields, reservoirs can hold trillions of cubic feet (tcf) of gas, or they can be considerably smaller (billions of cubic feet or bcf). For the purpose of this work, marginal field recoverable reserves sizes ranged from 40bcf to 700bcf.





The decision to develop a field is usually based on an economic case – the market value of the gas in the field must justify investment in its extraction. For this reason, large accumulations are generally prioritised for development, as more gas can be produced from them to offset overhead costs. However, as these fields mature and output declines, or in instances where it is not logistically feasible to develop larger reservoirs, producers may look to extract hydrocarbons from smaller fields.

In Trinidad and Tobago, proven gas reserves are declining after decades of gas extraction. With larger deposits being depleted, the quantum of gas held in small pools assumes greater relative importance. Also critical are pools with sizeable quantities of gas which have not been monetised because of their location and other technical or economic considerations.

Both small pools and marginal fields are valuable in the context of the current supply-demand imbalance, where available volumes cannot adequately meet downstream gas needs. For this reason, NGC initiated the study in 2017 to identify these fields and evaluate the economics and feasibility of monetising some of these offshore fields.

Challenges

Due to the infrastructural requirements of exploration and production, mobilisation and operational costs can be prohibitive when fields are far from shore or far from infrastructure. In addition, the deeper the well to be drilled to access gas, the more complex the field development, or the longer the pipeline needed to bring it ashore, the greater the costs for the producer. Also, fields in deeper water will have higher development costs. Many fields that are considered ‘marginal’ have these limitations. In the case of small pools of gas, the expenditure associated with seismic exploration, drilling, extracting and transporting gas can surpass the value of the product itself when it gets to market.

Often, the larger, multinational operators relegate small pools and marginal fields in their priority list, because the economics of developing a field are assessed relative to other opportunities that exist in their international portfolio. If more gas can be extracted at cheaper or comparable costs elsewhere and derive more value, then investment attention will be so directed.

Opportunities

Despite these challenges, NGC’s internal study identified possibilities for feasible development of some small pools and marginal fields in Trinidad’s offshore region. It was determined that fields located off the southeast

and east coast have greater probability of being successfully developed because of their proximity to existing infrastructure. An operator wishing to monetise a small pool or marginal field could potentially drill from platforms in nearby fields and access the supply network with short pipeline tie-ins, incurring minimal overhead costs.

This would of course require collaboration between infrastructure owners and operators. In some instances, the infrastructure owners may be larger producers focused on bigger projects, while the parties interested in developing the small pools or marginal fields may be smaller, independent operators. Such partnerships could occur through direct negotiation or may need to be brokered by the ‘landlord’ – the MEEI – but they are vital to the successful development of smaller fields.

There are also cases of fields being located in blocks leased to operators who are unwilling or unable to develop them. The MEEI will need to consider options such as sub-licencing or fiscal incentives to ensure able operators have the access and inclination to bring those pools into production. The MEEI can also encourage new operators from outside the region to participate in the gas development programme through ‘Invitations to Bid’ for marine acreage. The entry of international entities could help accelerate production by bringing more partners and potential investors. It would also be a means to introduce new methods and technologies for gas extraction that have proven successful in other regions.

Indeed, the application of more advanced exploration and production technologies would be of great value in the development of small pools and marginal fields. The use of ocean bottom node (OBN) seismic technology, for example, can make exploration and evaluation more effective, by increasing the resolution of the subsurface and reducing the need for exploratory/appraisal drilling to determine field size. Any technology or process improvement that can bring costs down for producers – such as cheaper wells, platforms, pipelines and subsea infrastructure – will enhance potential earnings and encourage investment.

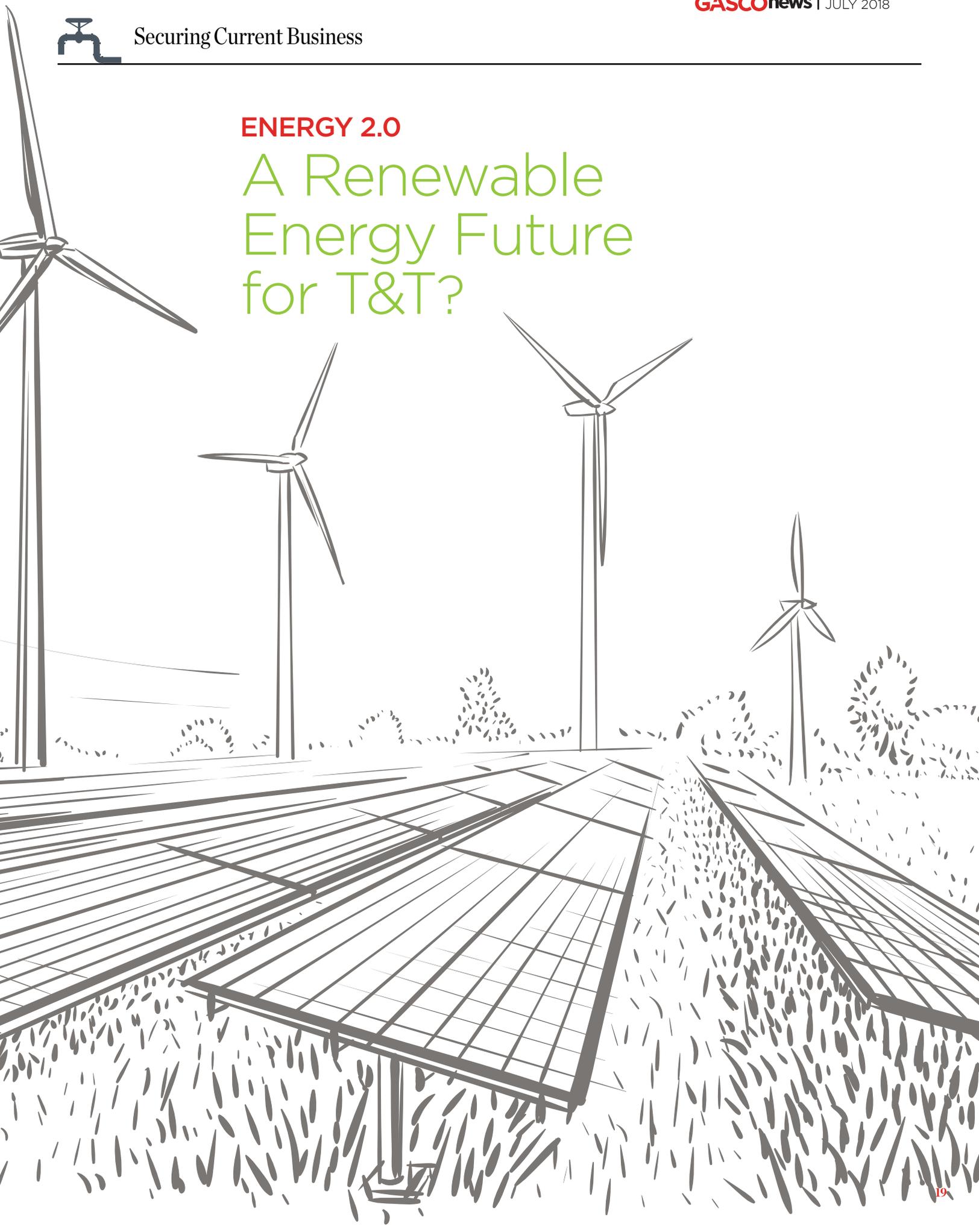
The Way Forward

The process of monetising a field, moving from appraisal and development to the final stage of production can take years, depending on the logistics and complexity of the project. NGC will continue to work very closely with the MEEI towards the development of small pools and marginal fields. The analysis indicates potential for early production in the near term, but timely investment decisions will be required. ■



ENERGY 2.0

A Renewable
Energy Future
for T&T?





Energy Evolving

The global energy landscape is in flux, with the world transitioning to a decarbonised future. Enthusiasm for such a future was highlighted in 2015 at the United Nations Climate Change Conference (COP21) held in Paris. The consensus was that more aggressive measures must be put in place to reduce the impact of rising greenhouse gas (GHG) emissions, which are influencing climate and air quality. Fossil fuels which dominate the world’s primary energy supply (Figure 1) contribute significantly to GHG emissions. In order to curb these emissions, there must be some measure of displacement by cleaner energy sources.

According to data collated by the Energy Institute in 2017, renewable energy (RE) currently contributes approximately four per cent of total primary energy, but statistical reports predicts the range to climb between nine to 33 per cent between 2035 and 2050, with greater power sector penetration in particular¹ as energy policies and economics dictate the pace of change.

As energy demand grows, 70 per cent of new primary energy use is projected to come from the power sector.² With RE already carving a niche for itself in electricity (Figure 2), growing demand makes room for RE to expand its market presence.

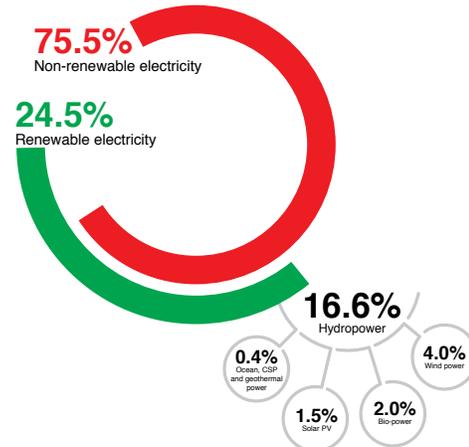


Figure 2: Estimated Renewable Energy Share of Global Electricity Production, End -2016

Source: Renewables Global Status Report REN21 2017

Renewable Energy in the Power Sector

Traditionally, coal and natural gas have led global fuel consumption in the power generation sector. However, with energy security and sustainability on the agenda, policies have been implemented in favour of RE deployment.

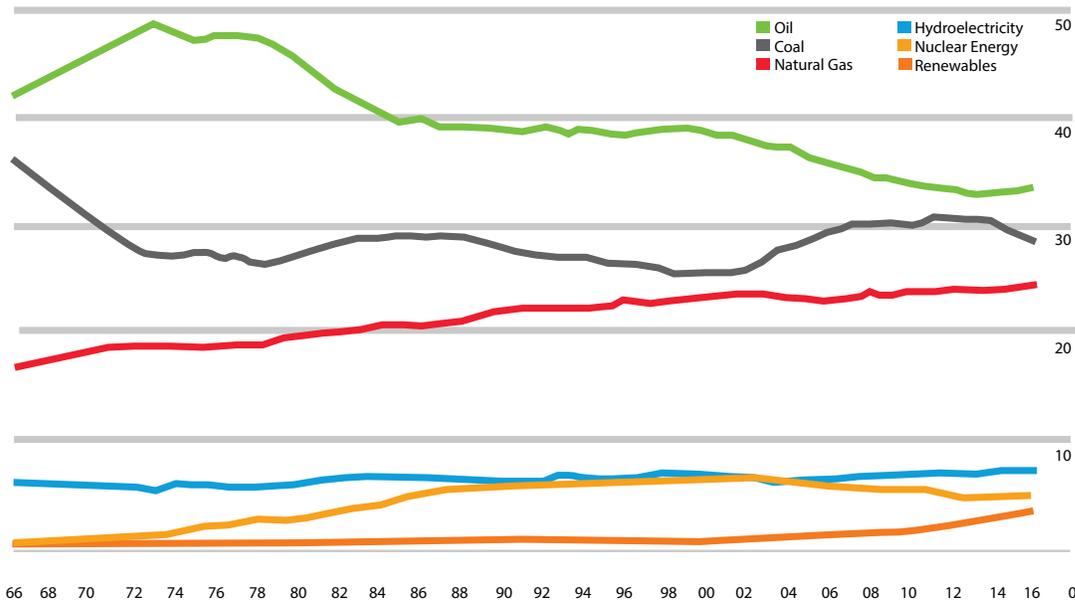


Figure 1: Shares of Global Primary Energy Consumption 2016

Source: BP Statistical Report 2017

¹ BP Energy Outlook 2017 and Energy 2050: Insights from the ground up, Scott Nyquist, November 2016
² BP Energy Outlook Report 2018



In 2016, renewables accounted for 55 per cent of new global power capacity investments.³ This represented 13 per cent less investment compared to 2015 figures, but yielded eight per cent more capacity.⁴

The fact that lower capital investments are financing higher installed capacities signals the improving cost-competitiveness of RE technologies. According to the International Energy Agency (IEA), the cost of solar photovoltaic (PV) technologies declined by 75 per cent, and wind installations by 50 per cent, relative to 2008 prices. For solar power, this translated into a US\$215 reduction in cost per megawatt hour (MWh) in 2016 compared to 2009.⁵

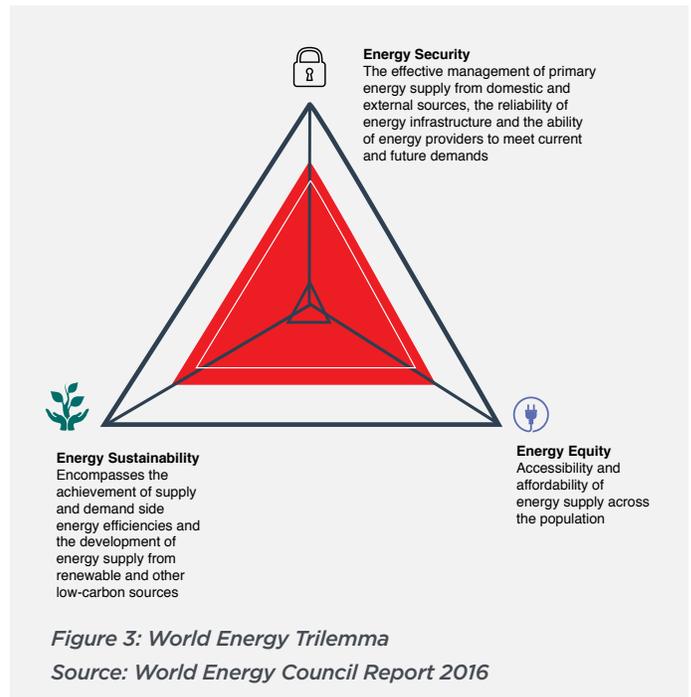
In addition to cost-competitiveness and the environmental advantages of renewable technologies, RE has other strategic benefits for power generation. The mobility of RE systems allows for decentralised energy setups that can cater to off-grid communities. Both emerging and developed economies have tapped into the concept of micro-grid and distributed energy systems. At the residential level, the 'prosumer' concept allows for a bilateral flow of energy where consumers can generate electricity to supply other parties such as the grid or neighbours within a community. This means RE can help make electricity more accessible across the population.

Figure 3 illustrates the dimensions of the World Energy Council's definition of energy sustainability. Balancing all three constitutes the 'world energy trilemma'. All told, renewable energy can help the world adequately meet these requirements.

That is not to say, however, that RE is without shortcomings. While RE use has expanded since 2008, issues associated with the intermittency of wind and solar resources have undercut the resources' full potential to take over the market. Experiences from Europe, the United States and China have shown that the inability to control weather conditions has affected the technologies' ability to meet peak demand scenarios, and instances of excess energy have caused markets to crash. As a consequence, the profitability of RE power providers is affected.

Storage of energy from renewable sources could help address this shortcoming. The cost of battery technology is projected to decline, particularly lithium ion batteries, which will help make RE more dependable for electricity generation.

Another barrier to uptake of RE is the land required for installation of requisite infrastructure. Many countries



with abundant renewable resources do not have the spare acreage to support utility-scale RE facilities. The solution being explored is construction of offshore power generation facilities, such as wind farms out in the ocean.

Applying Global Lessons to the Local Context

At the 2018 Energy Conference, Senator the Honourable Robert Le Hunte, Minister of Public Utilities, indicated that renewables are a 'sustainable energy' solution, and that the country is targeting 10 per cent electricity generation from RE by 2021. Meeting this target is especially important now that natural gas supply shortages are forcing an assessment of whether allocating gas to power generation is the best use of scarce resources.

In support of this target, the Ministry of Energy and Energy Industries (MEEI) has been spearheading several initiatives:

- Expressions of Interest (EOIs) invited for development of utility-scale RE power generation facilities;
- EOIs invited for a Waste-to-Energy plant at the Beetham landfill;
- Programme implemented for 30% government and state-enterprise fleets to be converted for CNG use by 2020, and for new acquisitions to be CNG or hybrid;

³ *Global Trends in Renewable Energy Investments 2017*

⁴ *UN Environment (UNEP), the Frankfurt School UNEP Collaborating Centre and Bloomberg New Energy Finance (BNEF) 2017*

⁵ *International Renewable Energy Agency – Renewable Power Generation Costs in 2017*



- Committee established to review the Feed-in Tariff Policy Framework document of 2014;
- The MEEI participated in the Technical Working Group for the development of a Caricom Regional Energy Efficiency Building Code;
- Wind Resource Assessment Programme to be revisited;
- Solar PV systems being installed in schools and community centres that serve as emergency shelters;
- Planning underway for solar LED light project for play parks;
- Preparations underway for a sustainable energy fair and LED walk in celebration of Caricom Energy Month 2018.

Group Efforts

Since diversification of Trinidad and Tobago's energy mix will help NGC's bottom line in a curtailment environment, support of the national RE agenda is now an objective of The NGC Group's new Strategic Plan. Several projects are already in the pipeline.

At present, solar photovoltaic technology accounts for less than two per cent of global electricity generation, but it is expected that utility and small-scale PV installations will capture 32 per cent of the electricity market share by 2040.⁶ National Energy has therefore been tasked with establishing the first solar panel manufacturing plant in the Caribbean region. The project involves development of a float glass facility in the initial phase to produce one of the components for PV panels. The success of this venture will determine progression to a second phase, where metallurgical silica and polysilicon plants will be constructed.

The intent behind constructing a local solar PV manufacturing facility is to position Trinidad and Tobago to service the anticipated demand for solar panels both locally and regionally. This enterprise will generate employment, increase national revenue and build competency within the local RE industry.

In addition to this solar undertaking, National Energy is working with an independent power producer (IPP) to potentially develop the country's first-ever wind farm project along the southeast coast of Trinidad and Tobago. Site feasibility tests are currently being conducted with a view to determining whether this project can be successfully commercialised.

Whereas National Energy is leading the infrastructural and business development initiatives, NGC is spearheading the education and public awareness campaign for The Group. Two specific initiatives are being advanced in 2018.

Firstly, NGC is partnering with the non-profit organisation IAMovement on a campaign to raise awareness in schools on themes such as climate change, energy efficiency and renewables. The objective is to shape an earth-minded generation that can lead positive change in the country's future energy consumption.

NGC is also collaborating with the University of Trinidad and Tobago (UTT) to conduct a resource assessment and PV system performance evaluation for the solar house that was constructed on UTT's Point Lisas campus in 2015. This house, which was outfitted with solar installations, was intended to serve as a model for RE technology use in the local context. NGC and UTT are now looking to capture data on solar irradiance and house performance to assess the economics of this off-grid system and its viability for larger-scale replication. Resources have already been mobilised with the procurement of requisite measurement devices. It is expected that the academic rigor of this study will add credibility to the solar initiative and build bankable value for other potential RE project developers.

Surmounting Barriers to RE Technology Diffusion

Although The NGC Group and other stakeholders are pushing forward with pilot RE initiatives, there are barriers that will need to be surmounted before RE can be implemented on a large scale in Trinidad and Tobago.

Economics and Markets

The cost of electricity in Trinidad and Tobago is still among the lowest in South America and the Caribbean region at US\$0.06 per Kwh.⁷ This is due to the power sector's acquisition of natural gas at a subsidised price. As long as this subsidy is renewed, RE will not be able to compete in the domestic electricity market.

Declining gas reserves are pushing prices upward for gas consumers and NGC, and by extension the government, can no longer afford to insulate the power sector from market pressure. Therefore, the electricity subsidy is being evaluated by the relevant authorities and electricity rate increases could be imminent. This makes it a perfect time for RE to penetrate the market.

To facilitate the diffusion of RE technology, there is also a need for policy change. Revisions must be made to the Regulated Industries Commission (RIC) Act, Chapter 54:73 and the Trinidad and Tobago Electricity Commission (T&TEC) Act Chapter 54:70, to allow independent power producers to supply power to the electricity grid. Feed-in tariff schemes, which offer financial compensation to RE producers that supply the grid, will also help incentivise adoption on a larger scale.

⁶ Bloomberg New Energy Finance - New Energy Outlook 2017

⁷ Current Barriers to Renewable Energy Development in Trinidad and Tobago, Zaffar Khan & Atiyah A. Khan



Auctions are an effective way to push RE implementation as competition drives prices down. Already practised in South America, Africa, Europe and the United States, auctions invite bids for development of RE projects, and can help government find contractors to deliver projects at the best possible price.

Questions have been raised concerning the energy demand to justify RE projects since the local energy system has an excess capacity and existing long-term agreements with IPPs using fossil fuels for power generation. Innovative solutions will be required for displacing excess fossil fuel capacity with clean energy sources.

Investment

Acquiring financing for renewable energy projects is another barrier to diffusion. Locally, lending agencies would consider RE projects high-risk ventures as scarce data is available to corroborate long-term project viability. Building a bank of local data – such as the NGC/UTT Solar House project aims to do – will help reduce the perception of risk around RE projects and justify investment. It is noteworthy, though, that international institutions such as the World Bank, Inter-American Development Bank, International Finance Corporation and European Development Fund have provided financial support to CARICOM countries in their RE pursuits. Bilateral assistance is also offered. In 2017, the government of the United Arab Emirates allocated US\$50 million in grants for renewable energy projects in Caribbean small island developing states (SIDS).⁸

Seeking joint venture partnerships with private investors and experienced non-governmental organisations (NGOs) is another useful method for acquiring funding. In the Caribbean, the NGO Carbon War Room initiated the 'Ten Islands Challenge' to assist countries in transitioning off fossil fuels.⁹ Islands such as Aruba, Anguilla, Bahamas, Belize, British Virgin Islands, Grenada and Turks and Caicos are involved in the programme. The International Renewable Energy Agency (IRENA) is another organisation offering to provide knowledge and support for countries in the Caribbean to promote a more sustainable energy profile. In 2014, IRENA launched its SIDS Lighthouses Initiative, to help participating countries develop and implement renewable energy roadmaps.¹⁰

Alternative business models for promoting RE adoption include community ownership projects, which have been implemented with success in countries such as Denmark and the United Kingdom. In this model, individuals and



Wind turbines

organisations communally invest in projects, and in return, receive annual interest payments.¹¹

Geography

It is estimated that a 1 megawatt (MW) solar PV power plant could require between 2.5 to 4 acres of land space. Wind farms can produce approximately 4MW per square kilometre. By extrapolation, it has been calculated that in order for Trinidad and Tobago to generate 10 per cent power from renewables, per its 2021 target, the country must allocate more than a fifth of its land space for RE installations.¹²

This could be a limiting factor for constructing utility-scale facilities, and site selection will be critical. Feasibility studies are needed to determine where such facilities can be installed to optimise output. Offshore applications for wind and solar and rooftop leasing within cities are viable alternatives to consider, as they would reduce the amount of land required to generate a similar quantum of electricity.

COLLABORATING FOR PROGRESS

The NGC Group is eager to move the national renewable energy agenda forward. However, there is considerable work to be done and collaboration is crucial. The Group commits to share information and lessons learnt to build the body of research on RE technology deployment and help our country achieve a more sustainable energy future. ■

⁸ <http://newenergyevents.com/wp-content/uploads/2017/02/UAE-Caribbean-Renewable-Energy-Fund-Guidelines.pdf>

⁹ *Renewable Energy World - The Global Transition to Renewable Energy - Can the Caribbean Lead the Way? Part 1: The Potential*

¹⁰ <http://islands.irena.org/>

¹¹ *Energy World February 2017 - Community Energy: Acting local with PV for Manchester schools*

¹² *EU Technical Assistance Facility for the Sustainable Energy for All Initiative 2017 report - Sustainable Energy Implementation Plan 2021/2030 for Trinidad and Tobago Draft 30 August 2017*



Appreciating Capital – Equipping Employees for Enterprise Success

NGC, and companies along the entire value chain, are navigating a Volatile, Uncertain, Complex and Ambiguous (VUCA) energy landscape. The challenges of this voyage have compelled NGC's Human Resource (HR) Division to re-examine its strategies for leading the company through change. With human capital assuming more importance in the business' bottom line - both as an agent of business innovation and as a commodity in itself - HR management becomes increasingly critical. Indeed, for any energy sector company, it is imperative to have an agile, versatile workforce capable of keeping pace with a constantly evolving industry.

NGC's HR Division has consequently developed and instituted an employee-focused campaign called the #Let's eEquip U Programme, which seeks to strengthen the employee body and build competency within the organisation in a number of ways.

Focus Groups

It is incumbent on an organisation in transition to attentively listen to the concerns of employees, build engagement and reorient their collective energy in the direction of the change. One of the interventions introduced by NGC to achieve this is an Employee Engagement Focus Group initiative. This intervention is aimed at connecting the old to the new, bridging realities and generating ideas, all in a bid to motivate and engage employees in a low morale environment.

The objectives of these focus group sessions are to provide:

- Guidance and suggestions to improve employee morale and engagement at NGC;
- An opportunity for employees' views to be heard about topics/issues that are affecting their productivity; and
- Feedback on upcoming employee initiatives and best strategies for roll-out.

The format of these sessions is open discussion among representative samples of employees from all levels of the organisation. To make it a conversation among equals, all hierarchy and titles are left at the door, including that of the President, who participates in the sessions. Discussion is moderated by an HR representative and is usually initiated with a parable or activity, followed by a series of questions and deliberations. Participants are encouraged to voice their opinions freely. At the end of each session, key actions are suggested for implementation and the outputs of the session are circulated to participants via the internal HR portal.

In the fourth quarter of 2017, two focus group sessions were held to discuss 'Improving Employee Morale and Engagement.' Two additional sessions in 2018 focused on 'Creating a Learning Organisation at NGC.'



To ensure that the conversation continues beyond these sessions, HR will be working with the Information Communication and Technology (ICT) Division to develop a collaboration tool that all employees could access and use to voice opinions and concerns. Feedback received from both live and virtual discussions will be used to help the organisation grow.

Building Strong Teams

Another initiative under the #Let's eEquip U Programme is the re-introduction of team-building exercises to assist with institutional strengthening. The intent of these exercises is to increase awareness of the role both leaders and individual members play in building strong teams and the collective impact on productivity. HR has scheduled these as three-day residential sessions to achieve the following objectives:

- To work with leaders to create a vision for their teams and to define the shared team values that everyone will commit to going forward;
- To challenge leaders and their teams to identify the required actions that they will collectively commit to, in order to enhance team effectiveness and productivity;
- To determine what support is required to address reoccurring/unresolved issues facing the team and to engage specialised services through our partnership agencies such as Families in Action (FIA) to bring about organisational healing; and
- To work with respective teams to develop a Team Charter and monitor their progress going forward.

At the end of the second quarter 2018, five team-building interventions have been completed. Team-building began in July 2017. The first group to participate in these interventions was the Executive Management Team (EMT) under the leadership of NGC President Mark Loquan. The theme of that inaugural session, 'Different Notes, One Sound', is being carried through all other team-building exercises for continuity and harmonious alignment across the organisation. It is anticipated that these interventions will extend into 2019.

CKSD: Strengthening our Technical Capability

In 2017, HR introduced a human resource development initiative known as Competency, Knowledge and Skills Development (CKSD). The CKSD initiative was driven by the need to understand the technical skills and competencies required by the various functions across the company and aimed to identify and bridge training gaps.

Getting the initiative off the ground required great collaboration among HR, line supervisors and employees

as the following activities were undertaken:

- Review of existing job descriptions (JDs) and development of new JDs
- Definition of competencies for technical jobs
- Development of competency maps
- Definition of the required proficiency levels for these competencies
- Determination of where the technical competency gaps reside
- Determination of training and development needs to close these gaps
- Development and alignment of employee development plans (EDPs)

An important part of addressing gaps was recognising the employees who have advanced levels of proficiency and expert knowledge in specific technical competencies. These employees were identified as mentors for knowledge sharing and transfer initiatives for others across the organisation. Knowledge sharing and transfer have numerous benefits, such as facilitating communication and information flows within and across divisions, which inevitably leads to the emergence of a learning organisation.

Knowledge management has been a focus within NGC since 2006 when the Information Services Department introduced 'Knowledge Cafés.' Knowledge Cafés, born and popularised in the UK, are forums that gather people to discuss topics of interest and come up with innovative solutions. NGC has benefited from these forums as employees at all levels and functional areas get an opportunity to understand the technical aspects of the business and industry, as well as an opportunity to collaborate across functional areas to solve business problems. Our Knowledge Café concept has now expanded across The NGC Group. Our strategic intent is to one day extend this concept across the Point Lisas Industrial Estate.

NGC Needs Its Human Resources More than Ever

The projects mentioned above have now redefined HR's role in the organisation. In response to a changing environment, HR must evolve into a strategic business partner. As NGC repositions and strengthens itself in this highly volatile and uncertain time, it needs its human resources more than ever to ensure that the organisation survives and sustains its key business operations into the future.

NGC's HR approach in these 'business unusual times' is to strengthen the organisation from within by retooling and equipping employees to support the strategic priorities of the organisation. The ultimate goal is to create an exceptional culture and a competitive work environment against the backdrop of the VUCA landscape and a business model that considers the value of people in its bottom line. ■



NGC Chairman Gerry C. Brooks delivers presentation at TTCIC Breakfast Meeting

Rekindling the LIC Relationship

In December 2003, *GASCO News*, Vol 16., No. 3, the achievement of a milestone was celebrated – NGC had connected 100 small customers. These ‘small’ customers were mainly in the light industrial, commercial and transportation sectors and were supplied with an average of 15mmscf/d of natural gas. Over the next few years, these small customers seemed to fade in importance. New connections were made without fanfare; contact with NGC was mainly through the orange-covered technicians reading meters and interactions with NGC’s accounting section on bill payments.

Fast forward 15 years to 2018. Today, these small customers, known collectively as Light Industrial Commercial (LIC) customers, now number 119 and are involved in a diverse set of activities including manufacturing of food and beverages, building material and glassworks, to name a few, and are supplied with 8mmscf/d of natural gas. Though small in scale relative to LNG, the petrochemical and the heavy industrial customers, the LIC sector is nonetheless important to NGC as a customer and to the nation.

As a state company, NGC is bent not only on fulfilling its mandate to create exceptional value from natural gas and energy businesses, but also on developing paths for job creation, increased economic activity, innovation and, by extension, national development. It is ardently pursuing a changed approach to its business relationship with its LIC clients – one where the crucial element of business success is securing customers not just through delivery of a competitively priced product, but also through the

cultivation of meaningful business relationships.

MAXIMISING VALUE AND CREATING OPPORTUNITIES

The rapid growth of the local natural gas sector and associated LNG and petrochemical industries has allowed Trinidad and Tobago to enjoy a measure of economic success. However, there have been thrusts toward diversifying the economy through the local light manufacturing sector. Supported by a government mandate to provide incentives to the sector, local manufacturing is poised for future growth (barring current foreign exchange restrictions).

According to the Central Bank of Trinidad and Tobago, in its *Review of the Economy* (2017), to further support local manufacturers, government, through the Ministry of Trade and Industry (MTI) has been conducting research on ways to expand the product range and improve technical capacity in the manufacturing sector. The MTI is also developing strategies to increase efficiency and productivity; address the constraints on doing business in Trinidad and Tobago; improve domestic value added; and facilitate more robust research, development and innovation.

As a state enterprise invested in national development, there are several reasons for NGC’s continued support of the LIC sector. For one, manufacturing has led to development – it is an essential part of economic growth and the service industry is dependent on manufactured



goods. However, foremost and most simply, manufacturing creates jobs. There are an estimated 19,000 people employed by the 119 firms using natural gas and this number can only grow. NGC wishes to see this number multiply.

HOW DOES NGC INTEND TO ENGAGE THE LIC SECTOR?

Collaboration and Cooperation

NGC's Commercial Group, specifically its LIC and Other Industries Department, is working toward creating a more synergetic and accessible relationship with its LIC customers. On its business agenda is the creation and execution of a plan of action to generate conversations, obtain feedback, encourage technical innovation and promote additional business within the sector.

Verlier Quan Vie, Vice President, Commercial Group, has given her team 'carte blanche' to create a new business relationship model with respect to the LIC group. "This plan will aid in the achievement of a better understanding of the LIC customers' expectations and foster improved working relationships", she noted. "It will help us classify LIC customers and identify the most effective methods and structures through which to ensure regular, timely, accessible, transparent and appropriate consultation and action."

NGC also sees value in collaborating with the local chambers as well as the Trinidad and Tobago Manufacturer's Association (TTMA), to improve business relations with its LIC core and encourage more local direct investment in the country. These organisations have longstanding relationships with the LIC sector and are all committed to promoting development, competitiveness and sustainable growth, especially in the LIC arena.

Leadership interface at chamber events, including that of NGC's current Chairman Gerry C. Brooks and President Mark Loquan, have all resulted in improved communication and business relations over the past two years.

A Burgeoning Online Relationship

Essential to this new chapter in the LIC story is the creation of an online portal dedicated to and exclusively for use by LIC customers. With a launch date scheduled for the latter part of 2018, the LIC customer portal will create a functionality that was lacking in this business relationship.

Areas of focus will include but are not limited to:

- Cost assessment for required pipeline infrastructure
- Automated application forms
- Process tracking to show the stage of the customer's

application in real-time

- An online help desk facility
- An online payment facility

Verlier Quan Vie extolled the virtues of this new relationship-building initiative. "The many benefits of online business include global access, 24 hours a day, seven days a week; enhanced client service through greater flexibility; cost savings; faster delivery of services; less paper waste; and an opportunity for our customers to manage their businesses from anywhere in the world."

Once launched, this portal will serve as a direct communication channel between NGC and its LIC customers and will allow for more effective management of customer relations. It is expected that improvement in NGC's service to the sector will enable these small businesses to operate more efficiently.

Dialogue and Exchange

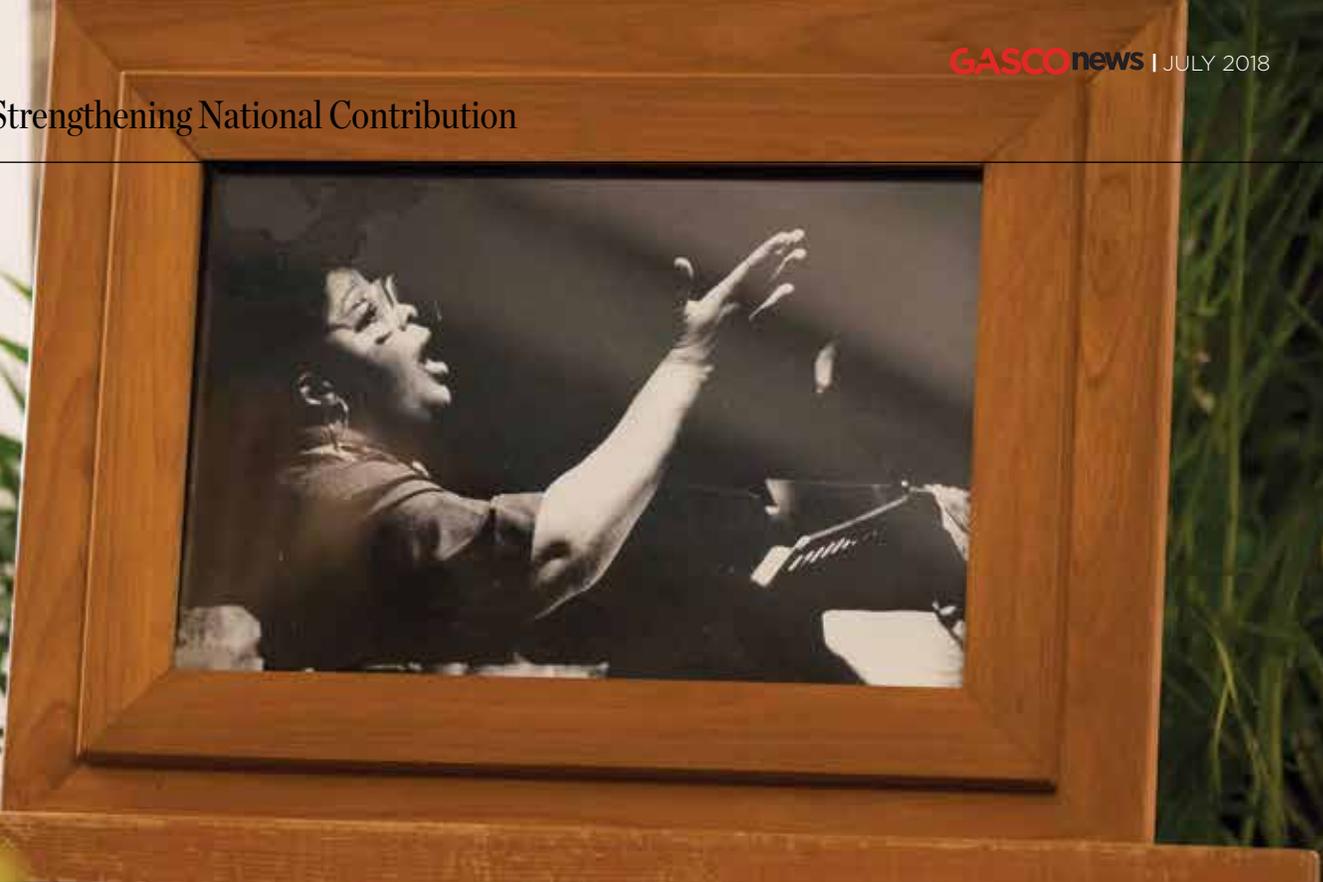
A third initiative planned to engage with LIC customers is a forum or meeting, gathering existing customers for information exchange and airing of concerns. At this LIC Forum, customers will have the opportunity to share their expectations of NGC as their supplier, and NGC will likewise be able to enlighten the sector on its business direction.

The planned forum may also be used as a lobbying platform for greener consumptive practices. In this sector with relatively low natural gas demand, renewable technologies could easier meet a significant percentage of energy needs as compared to larger consumers. Customers could also be encouraged to convert their business fleets to use CNG for its economic and environmental benefits. As a knock-on effect, given the large employment base of the LIC sector, transformative thinking about energy at the enterprise level could then be passed on to the wider population and have impact at the individual household level as well.

By facilitating dialogue, such a forum would simultaneously allow NGC to learn the particularities of its customers' businesses and tailor its services and engagement to suit. There is so much diversity among the LIC community, it is important for NGC to understand the individual needs of the sector subsets and plan accordingly.

STRENGTHENING AND SUPPORTING

For its actual and potential economic impact on society, the LIC sector fits perfectly within NGC's strategic thrust toward strengthening its national contribution. NGC's renewed focus on LIC is therefore not simply about building relationships for business interest, but supporting and strengthening a sector that adds significant value to the nation as a whole. ■



The iconic Pat Bishop

Until All Have Crossed – Honouring the Late Dr. Pat Bishop

NGC NATIONAL HEROES PROJECT

In 2017, NGC inaugurated an annual campaign to celebrate individuals who have, through their work and achievements, brought glory to our country, enriched our culture or helped define who we are as a people. The initiative, called the NGC National Heroes Project, is aligned to an important pillar of NGC's Strategic Plan, which challenges the company to strengthen its national contribution.

The overall project was designed to assume a different format each year, based on the individual being recognised. It is not merely honorific, but critically, has pedagogical intent. By publicly showcasing the lives of iconic Trinbagonians, the project is meant to educate our youth about our past and those who shaped our nation and identity. Only through education can their stories and achievements be preserved and carried across generations. It is also NGC's hope that these stories inspire a sense of pride in what we have been able to achieve as a people and present our youth with positive role models to emulate.

Trinidad and Tobago's first Olympic Gold Medalist, Hasely Crawford T.C., was the project's first honouree. In tribute to

Hasely, memorabilia and press reportage were assembled into a roving exhibition that was carried through the library circuit and told Hasely's story to hundreds. The narrative of the exhibit is now being compiled into a virtual exhibit, as well as a graphic novel depicting the lead-up to Hasely's gold medal win.

Dr. Patricia 'Pat' Bishop

Like Hasely Crawford, our 2018 honouree deserves the highest recognition for her contributions to society.

Dr. Patricia Alison Bishop, better known as 'Pat', was an eminent daughter of the soil, accomplished in numerous spheres of endeavour. She was a visual artist, musician, teacher, historian, intellectual and environmentalist. She was awarded both the Hummingbird Gold Medal and Trinity Cross for her contributions to culture.

Pat was born to parents inclined in the arts and was instructed in music from an early age. Throughout her academic career, she was heavily involved in both music and art, and went on to pursue studies in fine art at the University of Durham in the UK. She professed her real interest in music grew during that time, and upon



returning to Trinidad, she began working closely with choirs, steelbands and folk groups.

Over the years, Pat collaborated with several steel orchestras, as arranger and conductor. She toured extensively with Desperadoes Steel Orchestra for legendary performances at Carnegie Hall and the Apollo Theatre, among others. One of Pat's most notable contributions to music was her work with the Lydian Singers and her establishment of Lydian Steel, which was a completely literate steel ensemble. As an extension of that work, she served as a founding Director of the Music Literacy Trust, an entity established to build capacity in the pan fraternity.

Pat was also involved in environmental and social activism. As Manager of Environmental Education at the Solid Waste Management Company Limited, she created an anti-littering campaign around a fictitious litterbug named 'Charlie'. The associated community education programme, Neighbourhood Action Groups (NAG), encouraged citizens to 'Chase Charlie Away' through environmentally responsible behaviour. The programme was so successful that she went on to set up a NAG pilot project for 45 villages near New Delhi in India, and collaborated extensively on community environment education with colleagues in the Caribbean and as far away as Iran.

Art was another passion of Pat's and she produced several series of paintings over the course of her life. Her paintings are held by many corporations, including NGC, local and international art galleries and private collectors. Through her work, Pat encouraged artists in all walks to go back to 'first principles,' to move away from imitation and create original works that could stand apart from the crowd. This emphasis on creativity and innovation pervaded her own work and distinguished her as a truly visionary artist. In her art, Pat also proved to be a fierce patriot, vividly expressing her love of country and defending our traditional culture on canvas.

Pat Bishop passed in 2011 at the age of 71.

Launch and Programme of Events

On May 9th 2018, NGC, in collaboration with the PALM Foundation (which honours Pat's Art, Literature and Music), launched the second instalment of the National Heroes Project in celebration of the late Dr. Pat Bishop. The event was hosted at Killarney (Stollmeyer's Castle) and was attended by the Prime Minister, The Hon. Dr. Keith C. Rowley; Minister of Community Development, Culture and the Arts, The Hon. Dr. Nyan Gadsby-Dolly; and Speaker of the House of Representatives, The Hon. Bridgid Annisette-George, among others.



The Hon. Minister of Community Development, Culture and the Arts, Ms. Nyan Gadsby-Dolly, admires Pat's work

The event was centered around an exhibition of Pat's final series of paintings, 'She Sells Sea Shells by the Sea Shore'. Speaking at the event, NGC's President Mark Loquan drew parallels between Pat's philosophy and the ethos of the NGC National Heroes Project:

"I think in Pat's own words, the thread that runs through everything we will be doing as part of this year's instalment of the Project, defines our mission perfectly: 'Until all have crossed, none have crossed and some we have to carry.' Our job will not be complete until all our young people are civic-minded citizens with an appreciation for the people who made us."

He also spoke highly of the woman herself, praising her talent, achievement and service to country.

"Pat was a person of incomparable talent. She was no ordinary 'genius with a paintbrush' or 'gifted musician' – Pat distinguished herself in the arts at a time when very few women were doing so. That alone makes her a model for our girls and young women who continue the fight against stereotypes and gender oppression."

This year, the National Heroes Project will honour Pat's life and legacy through a varied programme of activities that reflect the versatility of Pat's career in art, music and literature. ■

One Moment Please



**TO REFLECT ON THE BEAUTY
THAT SURROUNDS US HERE IN
TRINIDAD AND TOBAGO**

*The magnificence of Castle Killarney (Stollmeyer's Castle) captured in this
photograph by Damian Luk Pat*



THE NGC GROUP OF COMPANIES
