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PRESIDENT'S MESSAGE Disruption leads to clearer path at NGC Group Professor Gerry C. Brooks returns to the private sector **OPPORTUNITIES FOR GROUP GROWTH** Here to stay —),5 how NGC is staying relevant in a time of change Plying the Silk Road -NGC pursues business in China Challenged to change - what Chile can teach about greening energy **OPPORTUNITIES FOR REGIONAL ENERGY** Exploring the use of LNG and 8 methanol for fuel bunkering in T&T Developing 'LNG to power' projects in the Caribbean **OPPORTUNITIES FOR** THE NATIONAL COMMUNITY Lessons from an Olympian -Hasely on opportunities in sport $) \bigcirc$













Disruption leads to clearer path at NGC Group

HE word disruption is synonymous with disturbance and disorder. It suggests a break in flow, an interruption in routine or upheaval of the status quo. Even when interpreted through the lens of business and technology, these impressions of the word still hold – disruption in this context refers to radical and sometimes derailing change in an industry, markets or operating environment.

Given these associations, it is easy to take on a negative view of disruption. Forced change in any context can be difficult and uncomfortable to accommodate. However, even those thrown off course by disruption can find that in the same stroke, it can open new opportunities.

Turning change to chance

As an integrated gas player with ties to international markets, the NGC Group found itself reeling from systemic shocks in the past few years. These included the rise of shale gas, new producers and the subsequent slump in commodity prices. As a direct result, the Group had to recalibrate its business strategies. What may have been less obvious is that although disruption weakened our old model, some of the unsettling changes were beneficial, insofar as they created openings for the Group to grow in new directions.

For example, emerging energy producers in Africa created opportunities for the Group to market its expertise. The same can be said of Guyana, where a nascent energy industry can benefit from the lessons learnt and experience in Trinidad and Tobago – the Group has already begun to establish a presence on the ground with the opening of an office by National Energy planned for end of 2019.

Across the region, changing energy consumption patterns are favouring natural gas, which is encouraging for LNG exporters such as Trinidad and Tobago. For its part, the Group has been studying the markets – among them power and fuel bunkering – to determine where opportunities are incubating and how the Group can get involved.

The clean energy revolution is another disruption opening doors. China is in the midst of an energy reform, moving away from coal to cleaner-burning natural gas



Mark Loquan, President, NGC

and renewables. This change has resulted in increased LNG imports into China. NGC recognised such shifts in the market, and signed an MOU to begin cooperation on LNG and other emerging prospects with Beijing Rheingau Investment Corporation (Rheingau), an affiliate of the Chinese partner in Atlantic LNG Train 1.

Chile has also been forced to turn to renewable energy and energy efficiency, and its particular model for accelerating growth in this area can be very instructive for Trinidad and Tobago. That country's internal disruption can help us map our own course to a cleaner energy mix, and NGC and National Energy are closely examining opportunities for knowledge-sharing.

Of course, a salient outcome of recent disruptions in energy has been a refocused spotlight on the need for diversification of the national economy. Although this imperative has been ventilated for many years, definitive actions to move the country away from its heavy energy dependence have been slow to manifest. Within the NGC Group, the collective Corporate Social Responsibility portfolio aims to help, by creating opportunities to build capacity in other areas, such as the arts, culture and sport with a lens on sustainability.

Perspective

There is a quote that wisely affirms: "Not all storms come to disrupt your life; some come to clear your path." At the NGC Group, we have chosen to see and embrace the opportunities for growth in the change around us. After all, sometimes all that separates failure and success, is perspective.

Mark Loquan, President



Prof. Gerry C. Brooks, outgoing NGC Chairman

Professor Gerry C. Brooks returns to the private sector

N June 30th 2019, Professor Gerry C. Brooks officially resigned as Chairman of NGC and its subsidiary companies in the NGC Group. Appointed to the post in September 2015, Professor Brooks helped steer the Group through a period of disruptive change in the local and international energy sector.

Among his contributions at the helm of the NGC Board of Directors, Professor Brooks championed transformative thinking in the organisation, pushed for Group integration and the establishment of a shared services model to capture synergies, and worked assiduously alongside NGC's leadership team to secure and stabilise Trinidad and Tobago's gas supply. Under his tenure, the Group was able to realise significant cost reductions and improved margins; accelerate and complete new upstream and downstream contracts; reduce the multibillion dollar claims proffered against NGC; successfully execute the country's first energy IPO in 2015 and its successor, the 2017 APO; and explore and advance several strategic regional and international business opportunities in Venezuela, Grenada, Guyana, Ghana, Mozambique, Tanzania and China. Taken together, these projects have helped increase the Group's brand presence and recognition as an integrated energy player.

In 2018, Mr. Brooks was appointed Professor of Practice in Entrepreneurship and Innovation by The University of the West Indies (The UWI). Through this appointment, Professor Brooks is well-positioned to effect broad and meaningful change in support of the country's diversification efforts. As he demits office, Professor Brooks intends to not only turn his attention to building a family legal practice around mediation and arbitration, but he looks forward to working with The UWI and the youth of our country to build a stronger future for Trinidad and Tobago.

The NGC Group thanks Professor Brooks for his dedication and indelible contributions to the organisation and wishes him all the best in this new chapter.



Here to stay how NGC is staying relevant in a time of change Here to Stay – how NGC is staying relevant in a time of change | CONTINUED



NGC's presence in the value chain has enabled Trinidad and Tobago's industrialisation and development over the past four decades

OUBT around NGC's relevance is born of a misconception that NGC is "just a pipeline business" – an unnecessary go-between whose transactional fees inflate gas prices to downstream consumers. There are two things wrong with this impression.

Firstly, it is precisely NGC's presence in the midstream of the natural gas value chain — its intermediation — that enabled (and heavily financed) Trinidad and Tobago's industrialisation and development over the past four decades. Today, in a low-gas environment, the Company's role in the middle is perhaps even more important to industry as a free market without NGC would sell scarce gas to the highest bidder at the expense of smaller consumers.

Secondly, NGC is far from the company it was 40 years ago. Change — both reactive and anticipatory — has been a cornerstone of business strategy, particularly in the past four years. Whereas in its early history the Company was primarily a midstream player, today, NGC leads a group of companies with profitable investments along the entire value chain and additional business prospects incubating beyond Trinidad and Tobago.

NGC's ongoing evolution into a versatile energy player is more than a reflexive response to local and external market changes — it is the outcome of a thoughtfully architected sustainability strategy. The entire NGC Group is not looking to just outlast the storm but has longerterm ambitions of becoming a formidable global energy brand of indisputable value to country.

In pursuit of this goal, the organisation has been making fundamental changes in its business approach and structure, asking the question: How can we ensure we remain relevant?

THINKING IN SYSTEMS

The major challenge facing NGC's business model has been shrinking margins. It is by now a familiar story that maturing gas reservoirs in Trinidad and Tobago's offshore acreage are yielding less gas, making exploration and production more expensive for upstream companies. This has translated into reduced volumes and increased acquisition costs for NGC. In answer to this challenge, the Company began to look at avenues within its control to improve its bottom line.

Groupthink

NGC counts among its subsidiaries National Energy Corporation of Trinidad and Tobago (National Energy), Phoenix Park Gas Processors Limited (PPGPL) and NGC CNG Company Limited (NGC CNG). Although part of one NGC Group, each company had independent business units that often duplicated costs and efforts. The Group's leadership recognised that substantial savings could be achieved by implementing a shared services model, combining resources in areas such as ICT, communications, procurement and human resources to reduce operational costs and improve the consolidated balance sheet.

The process of streamlining and integration is underway. Group policies and procedures are being developed, events are jointly commemorated and suppliers are being approached for Group discounts (substantial savings have already been achieved in insurance through Group bargaining). However, one of the most significant achievements has been an entrenched "groupthink." Companies are no longer thinking of "self," but rather how their business initiatives and processes can be improved with collaboration across the NGC Group. For instance, NGC's value proposition in the campaign to market





Signing Ceremony for new gas contract, L to R: (Back) The Hon. Stuart Young, Minister of National Security and Minister in the Office of the Prime Minister; Sen. the Hon. Franklin Khan, Minister of Energy and Energy Industries; Dr. the Hon. Keith Rowley, Prime Minister of Trinidad and Tobago; Prof. Gerry C. Brooks, (then) Chairman NGC Group; (Front) Derek Hudson, (then) Vice President and Country Chairman of Shell Trinidad and Tobago; Mark Loquan, President NGC

energy expertise has been strengthened considerably with the inclusion of competencies resident in subsidiary portfolios. The best chance of success and sustainability lies with a unified NGC Group.

Sectoral collaboration

NGC, and the larger NGC Group, could not exist in its current iteration without its upstream and downstream partners. The Group's long-term viability therefore depends on the health of the entire energy ecosystem. An appreciation of this symbiotic relationship has led the Group to take a leadership role in addressing some of the immediate challenges facing the sector. NGC has been particularly active, working with upstream operators to devise feasible strategies for bringing more gas to market. At the same time, the Company has been dialoguing with downstream customers to align supply with demand.

With respect to gas pricing, NGC has been sensitive to the business environment and measured in its approach to new contract negotiation. Where contracts have ended or are close to expiration, NGC is intent on arriving at terms that are favourable to both the customers' and its own bottom line. If NGC were to demand businessas-usual margins on its contracts, its customers would suffer potentially lethal losses. The Company however understands its role in the system and has renewed a number of downstream contracts on mutually agreeable terms in the past year.

The global energy system

The world today is facing a shared existential threat in the form of climate change. For its contribution to greenhouse gas emissions, the energy sector must accept its share of the burden of change. As part of the system, the NGC Group proactively embarked on a programme of energy efficiency (EE) and renewable energy (RE) initiatives. These include education campaigns, RE industry development, introduction of an energy services company (ESCO) pilot project and a lobby for action at the national level.

The Group views this clean energy agenda through two lenses. On one hand, leading national initiatives will help the country meet its commitments to the global community in the matter of emissions reduction. This will in turn benefit the planet.

At the same time, reducing gas-powered electricity consumption will liberate more gas molecules for downstream use, shoring revenues and sustainability of the Group and its customers. In the process, the Group is cultivating new skillsets which can further strengthen its value proposition to international business partners.

RETOOLING

Remaining relevant involves constant introspection and adaptation. Methods and processes that worked

Here to Stay – how NGC is staying relevant in a time of change | CONTINUED

yesterday may be of little service today. With that understanding, the NGC Group's business transformation has been attended by internal restructuring to make it fit-for-purpose.

As an example, NGC has introduced new staff positions aligned with its business thrust. Business units were formed to identify and pursue opportunities for the Company in upstream E&P, downstream industry and LNG trading. A geologist was hired to explore the feasibility of monetising stranded and marginal fields to bolster supply, while a new energy marketing and trading team was consolidated to manage and expand commodity trading as a line of business. A department was even assigned responsibility for leading the Company's energy efficiency initiatives. Outside of the Commercial space, Supply Chain Management became an area of renewed focus. The justification for all these changes was simple - NGC cannot achieve its long-term objective of becoming a global player without outfitting for the changing landscape.

This restructuring extends to work processes as well. Technology is indispensable to modern business. The Group has long been operating with legacy systems, so upgrades and updates were vital to keeping the business relevant and efficient. The introduction of technologies such as drones and virtual reality into the operations function has already profited NGC in terms of cost savings and risk mitigation, and more widespread application of the technologies promises greater benefit. Leveraging the full potential of existing systems applications and products (SAP) software has also generated value. The Group made use of recently activated e-auction capability in the procurement function to facilitate realtime tendering for services, with considerable savings being achieved as a result.

Upgrading the human resource capability is another area receiving attention. NGC is undertaking a competency, knowledge and skills development exercise to manage talent, and map and bridge gaps regarding competencies necessary to meet organisational goals. Part of the exercise involves standardising job specifications so that any employee development achieved at NGC will make staff more marketable across the industry.

Alongside all these initiatives are a series of benchmarking assessments aimed at determining how the Company compares with other energy players, both locally and globally. Surveys in the areas of asset integrity, employee satisfaction and brand recognition were already completed with focused initiatives already being implemented. This emphasis on benchmarking speaks to a commitment to self-examination in the interest of self-improvement – a key to remaining relevant.

CULTURE

Among the most crucial prerequisites for business sustainability in the modern age are progressive thinking and innovative spirit. Many erstwhile giants of business have foundered due to shortcomings in this regard.

Transformative thinking must start at the level of leadership. Leaders must be attuned to the strategic direction of the company and be open to and facilitative of change. They must also encourage innovation within their teams. Without these attitudes and approaches, businesses can lose competitive edge.

For this reason, the NGC Group is investing time and effort in training its leaders. Not only must they have the mindset for change, but they must also be able to manage it effectively. Getting buy-in from staff is critical since the work of the organisation cannot progress without staff engagement.

The culture of the organisation is also changing. Where work units may have previously operated in silos, open communication and knowledge sharing are being encouraged, on the premise that an informed employee body is better equipped to perform and innovate in a changing environment. Information-focused 'Knowledge Cafés', podcasts, digital and social media platforms are just some of the new and revamped communication vehicles being utilised to share knowledge across the NGC Group.

Open communication is not just a new *internal* imperative. The NGC Group, through its leaders, is becoming more vocal and visible in the public sphere. The Group has recognised the need to add its voice to the national discourse around energy and the economy, given its centrality to both. This has manifested in its increased participation in conferences, media programmes, energy sector dialogue and government committees. The NGC Group is too valuable a player to remain on the sidelines of these conversations.

UNCHANGING COMMITMENT

There is no question that change is necessary to secure the future of NGC and the larger NGC Group. NGC has fully embraced the need for change as a premise for growth and will continue to build on its solid business foundations. Beyond seeking employee and company interests, its growth strategy ultimately pursues sustainability for the industry and country as a whole. Come what may, one thing is for certain — the organisation's commitment to expand and improve for the national good will remain a constant. Opportunities for Group Growth

Plying the Silk Road





China is moving away from pollutant coal towards cleaner energy sources

WW ITHIN just a few years of formalising its strategic intent to go global, NGC is well-positioned to make a name in international business. Since 2015, the Company and Group subsidiaries have signed partnership agreements with state entities in Venezuela, Grenada, Jamaica, Ghana and Mozambique, while advancing discussions on opportunities in Guyana, Chile, the USA and Tanzania.

In April 2019, the Company extended this internationalisation campaign into Asia, when NGC's President, Mr. Mark Loquan signed a Memorandum of Understanding (MOU) with Beijing Rheingau Investment Corporation (Rheingau) (a subsidiary of China Investment Corporation) of the People's Republic of China. Whereas NGC's other bilateral arrangements largely pivot around gas acquisition or exporting its technical and commercial expertise, this latest collaboration will explore several avenues for cooperation relative to the oil, gas and energy industry, beginning with LNG marketing and trading.



MOU for partnership: Mark Loquan, President NGC with Lu Yuling of the Beijing Rheingau Investment Corporation

¹ https://www.worldbank.org/en/news/feature/2018/06/11/helping-china-fight-air-pollution

WHY CHINA?

NGC's venture into China is both timely and promising thanks to three main factors:

1. China is moving away from coal

Coal has long dominated China's energy mix. In 2018, it accounted for two-thirds of total energy consumption¹ and projections indicate it will continue to be an important fuel in the coming decades.² That said, coal is the largest source of air pollutants and greenhouse gas emissions in the country.³ In some regions, thick smog consumes cities and poor air quality imperils the lives of hundreds of thousands of citizens.

To address the adverse health and environmental corollaries of coal combustion, the Chinese government initiated a 'war on air pollution' in 2013. This involved cutting down on coal consumption through a combination of energy efficiency initiatives and investment in cleaner energy sources.

One of the alternatives gaining ground in the restructured energy mix has been natural gas.

2. China's energy demand is increasing

Year-on-year growth in gas demand reached 18% in 2018.⁴ Although China has domestic production capacity, it has had to rely on pipeline gas from Central Asia and liquefied natural gas (LNG) imports to cover demand.

This appetite for natural gas will steadily increase in the coming years as the Chinese economy is among the fastest growing in the world. By International Energy Agency (IEA) estimates, per capita energy consumption will increase by 25% through to 2040, with average household electricity demand nearly doubling.⁵

Since natural gas and renewable energy sources are expected to meet more than half the country's electricity needs by 2040, increasing power demand translates into increasing demand for natural gas. Moreover, as China looks to clean up coal-fired operations, more industries – existing and new – will turn to gas. As a result, China's LNG imports are projected to rise. By 2025, the country could potentially require about 80 million tonnes of LNG



Chinese Premier Li Keqiang (right) holds a welcome ceremony for Prime Minister Keith Rowley from Trinidad and Tobago before talks in Beijing on May 14th, 2018

https://gbtimes.com/china-trinidad-and-tobago-sign-belt-and-road-memorandum

to service demand, a considerable increase over the 54 million tonnes purchased in $2018.^6$

3. China is open to international cooperation

A third factor is the Chinese government's ambitious strategy to expand international trade and cooperation. Launched in 2013, the Belt and Road Initiative (BRI) is aimed at strengthening transcontinental trade networks through the investment of Chinese capital in infrastructure such as railroads, bridges, highways and ports. Via the BRI, China has already assisted over 60 countries with infrastructure projects or investment financing.⁷

In May 2018, Prime Minister Dr. the Honourable Keith Rowley signed a Memorandum Of Understanding (MOU) with China on cooperation within the framework of the BRI.⁸ This MOU cemented a country-to-country partnership that will see China explore investment options in Trinidad and Tobago (such as the Phoenix Park Industrial Estate for which an MOU was signed in June 2018).⁹

² https://www.eia.gov/todayinenergy/detail.php?id=33092

³ https://www.worldbank.org/en/news/feature/2018/06/11/helping-china-fight-air-pollution

⁴ https://www.iea.org/gas2019/

⁵ https://www.iea.org/weo/china/

⁶ https://www.reuters.com/article/us-shanghai-Ing-conference-cnpc/chinas-Ing-imports-could-reach-110-bln-cubic-meters-by-2025-cnpc-idUSKCN1RF0UG ⁷ https://www.worldbank.org/en/topic/regional-integration/brief/belt-and-road-initiative

[®] http://country.eiu.com/article.aspx?articleid=836780667&Country=Trinidad%20and%20Tobago&topic=Pol_1

⁹ https://newsday.co.tt/2018/06/21/china-belts-tt/





LNG storage tanks, Shanghai

China's commitment to closer collaboration with Trinidad and Tobago per the BRI MOU paves the way for companies in both countries - even more so statebacked entities - to establish business relationships.

These three factors - China's transition from coal to gas, increasing demand for energy (and LNG by extension), and a framework for collaboration at the government level – opened the door for NGC to expand its portfolio into China.

WHY LNG?

NGC has an investment stake in two trains of Atlantic LNG. This shareholding entitles the Company to a certain number of equity LNG cargoes, some of which it has been independently marketing through its Energy Marketing and Trading division.

When it was determined that viable LNG market opportunities exist in China on account of the factors mentioned above, NGC began discussions with Rheingau and its parent company, the Chinese Investment Corporation (CIC).

NGC and CIC are shareholders in Atlantic's Train 1 facility. Based on the quantum of cargoes each is entitled to lift, both companies agreed it would be more commercially feasible to combine and jointly market these cargoes. Moreover, CIC is a sovereign wealth fund of the government of China and CIC has no direct expertise in LNG marketing and trading. Collaboration between both companies would therefore offer a positive value



proposition to both parties. Accordingly, with LNG prospects as a point of departure, NGC signed an MoU with CIC's subsidiary Rheingau on April 28th. The deal was struck three weeks after the global LNG2019 conference was held in Shanghai, and on the margins of China's Second Belt and Road Forum for International Cooperation, held in Beijing on April 27th.

However, per the terms of the MOU, the newly minted partnership would not be limited solely to LNG marketing. Both companies committed to exploration of other possibilities in energy cooperation. In fact, at LNG2019, CIC brokered meetings for NGC with other potential partners such as buyers, utilities and logistics companies. Without a doubt, the MOU with Rheingau cut a path into China for NGC and Trinidad and Tobago.

A PROMISING PARTNERSHIP

Prospective opportunities notwithstanding, LNG remains the immediate priority for this business collaboration. Since April, NGC and CIC have jointly lifted two cargoes and sold them on the spot market for favourable margins.

This augurs well for the future of the partnership, which according to NGC's Manager, Energy Marketing and Trading, Mitzi St. Rose, is a significant one for NGC:

"Tactically, this partnership allows us to convert our LNG experience into financial benefit for the Company. Strategically, it gives us an introduction into the Chinese market with access to more LNG buyers. Finally, and importantly for Trinidad and Tobago, this deal helps bolster our reputation as a desirable business partner, and a frontline player in the global LNG industry."



Challenged to change what Chile can teach about greening energy



When night falls, the Santiago skyline becomes a constellation of lights. Looking down from above, there is little to distinguish the Chilean capital from a North American metropolis, with its late-evening traffic diffusing into a sprawl of glass-fronted shopping centres, office complexes and urban housing. The only landmarks that give a sense of place are the snow-capped peaks of the Andean cordillera that preside over the city.



Challenged to change – what Chile can teach about greening energy | CONTINUED

The panorama of Santiago at night is breathtaking, but equally impressive is the ambition of the Chilean people to power this magnificent cityscape — and the rest of the country — chiefly with renewable energy by the year 2050. Perhaps more impressive still is that the South American nation is well on its way to achieving that goal. In June 2019, NGC President Mark Loquan and National Energy President Dr. Vernon Paltoo had the privilege of visiting Chile on the invitation of the Chilean Embassy in Port of Spain to learn about the country's comprehensive model for developing a successful renewable energy industry.

The Chilean Story

Although well-endowed with many natural resources, Chile has relatively few fossil fuel deposits and small domestic production capacity. Hydropower was a major source of energy in the twentieth century, along with firewood and biomass. The bulk of energy demand, however, was and still is met with imported oil, coal and natural gas.

In 2004, Chile's sole natural gas supplier, Argentina, cut gas flow to the country due to its faltering production. Chile was forced to seek alternatives, including switching to imported diesel oil to replace gas for electricity generation, which drove power prices up. The country suffered another major energy setback in 2008 when a severe drought reduced production capability from its hydropower facilities. It became clear that they needed to think seriously about their energy supply mix so as to ensure they would not be hamstrung by interruptions in supply due to natural phenomena or market disturbances.

The obvious solution was to increase its self-sufficiency in energy by mobilising the resources it did have in abundance. Chile's Atacama Desert — the world's driest with one of the highest levels of solar radiation — and its more than 6,000 kilometres of Pacific shoreline, could yield an inexhaustible supply of solar, wind and wave energy. The government therefore set about developing a framework to guide the country's energy restructuring. Several iterations of policy culminated with a comprehensive, long-term roadmap for energy development — Energy 2050 — which was launched in 2015.

Chile's energy goals

One of the principal goals of this plan is to generate 60% of Chile's power from renewable sources by 2035 and 70% by 2050. Considering that business-as-usual projections anticipate that demand will more than double by 2050, this is no small task. However, by 2018,



NGC President Mark Loquan and National Energy President Dr. Vernon Paltoo in Chile

the renewables share stood at around 40%, and the country's well-articulated energy plan seems on track to deliver targeted results.¹

The other goals outlined in the Energy 2050 policy are illustrated in Figure 1 (Goals to 2035) and Figure 2 (Goals to 2050).

What we can learn from Chile

For the NGC and National Energy Presidents the visit to Chile was extremely enlightening. At present, both companies are working closely with the Ministry of Energy and Energy Industries and the Ministry of Public Utilities to develop a similar roadmap for renewables and energy efficiency (RE/EE) in Trinidad and Tobago.

¹ Energy Policies Beyond IEA Countries: Chile 2018 Review (https://webstore.iea.org/energy-policies-beyond-iea-countries-chile-2018-review)



PRINCIPAL ENERGY GOALS - 2035



PRINCIPAL ENERGY GOALS - 2050



Figure 2: Goals to 2050⁵

Figure 1: Goals to 20354

Both Presidents agree that we can learn a lot from Chile's example.

The will to change

The first step in any process of remediation is acceptance of the problem and having the will to change.

Chile has been highly dependent on energy imports. In 2014, almost two-thirds of the energy used was purchased from abroad.² This figure is largely attributable to oil derivatives, used in the transportation and electricity generation sectors, but includes coal and natural gas. Chile's dependence on imports has made it vulnerable to external shocks, both in terms of price and supply. As long as the energy mix favoured imported fuels, the country's energy security would be at risk. The decision to diversify into renewable energy was therefore driven in part by a desire to take the control of its fortunes and future away from capricious external markets.

Another factor in the move toward RE was environmental

concern. Chile is particularly sensitive to the effects of climate change, due to its low-lying coastal areas, the reliance on meltwater from snow and ice, and the centrality of the hydrological cycle to power generation (in 2014, a third of power came from hydroelectric facilities).³ Among other things, global warming has been causing glacial retreat and severe droughts, disrupting water supply with knock-on effects across the power generation and industrial sectors. In response, the country strengthened its commitment to reduce its carbon emissions, which necessarily involved curtailing the use of fossil fuels in the power sector.

Trinidad and Tobago has similar imperatives to change. On the one hand, scarcer natural gas is a pebble in the shoe of downstream consumers, both because of rising prices and supply uncertainties. Although different initiatives are being pursued to bring more gas to market, it is in the country's interest to reduce gas consumption in the power sector. Generating power through renewables and reducing demand through greater efficiency will leave more gas for consumption in downstream manufacturing (i.e. it will improve energy supply security).

² https://data.worldbank.org/indicator/EG.IMP.CONS.ZS?locations=CL

³ Energy 2050: Chile's Energy Policy: http://www.energia2050.cl/wp-content/uploads/2016/08/Energy-2050-Chile-s-Energy-Policy.pdf

^₄ Ibid ⁵ Ibid

Challenged to change - what Chile can teach about greening energy | CONTINUED



Solar panels in Chile's Atacama Desert

Secondly, Trinidad and Tobago, as a small island state, is just as vulnerable to climate change as Chile. The intensification of hurricanes over the past few years has increased the risk of a debilitating storm hitting the islands, and erratic rainfall patterns have led to hotter dry seasons with more fires and acute water shortages.

On both these fronts, there is clear and pressing need for change. However, the country must first acknowledge that national sustainability is in jeopardy — as occurred in Chile. Thereafter, and most importantly, there needs to be a collective resolve to change our behaviours and attitudes with respect to energy consumption.

Involving the public

One of the most laudable aspects of Chile's Energy 2050 policy was the involvement of the Chilean public in the process. In the planning stages, consultations were held with people from all regions to determine the full spectrum of energy-related challenges that citizens faced. Among other things, this exercise generated a picture of the consumption habits of the public — what they needed energy to achieve (and how the existing system was failing them). As a result of this consultation, the outcome document was representative of and responsive to the needs of the Chilean public and received the necessary buy-in.

This has an important lesson for Trinidad and Tobago, particularly as it relates to energy efficiency. EE strategies target the end users of energy, seeking an adjustment in their consumption habits. Knowing exactly how people use energy will allow for the development of more targeted and effective interventions. For example, if a hypothetical 20% of the population spend half their electric bill on water heating, then subsidising more efficient heating systems might be a wiser investment than, say, solar lighting for a recreational facility that is rarely used. Moreover, to the extent that people need to participate in the process of change (for instance, agreeing to purchase a new water heater), they must first be convinced of the benefit — they must buy in to the idea. For this reason, esoteric policies that are far-removed from the day-today realities of citizens will not succeed — people need to see the direct impact on their lives. Involving the public in the process of planning for our energy future should therefore be a priority.

Building consciousness

One of the standout moments of the visit for both Presidents was the realisation of how attuned the Chilean public is to their country's RE/EE agenda. In conversation, one of their guides from the government of Chile informed them that she was constantly instructed by her pre-school toddler to turn off the lights when she left a room, to recycle and conserve water as she did her chores.

A critical part of Chile's encompassing roadmap is energy education, starting from the first point of entry into the school system. The country has rightly recognised that responsible energy behaviours must be conditioned from a young age. Children can also help influence the consumption patterns of their homes (as anyone who has lived with an insistent toddler can attest). At the higher levels, curricula have begun to include technical and vocational training around skillsets that will be needed for managing RE-based energy systems.

Chile has also achieved a heightened energy consciousness by making changes in areas of high visibility for the public. Chile is a global leader in energy efficiency labelling for appliances, with mandatory labelling for almost 30 products.⁶ This keeps EE top of mind in homes, offices and businesses. There are also strict energy efficiency standards in place for social housing (around 80% of the residential new build today)

⁶ Energy Policies Beyond IEA Countries: Chile 2018 Review, p 15 (https://webstore.iea.org/energy-policies-beyond-iea-countries-chile-2018-review)

Challenged to change – what Chile can teach about greening energy | CONTINUED

and private residential buildings (about 20% of the new build today).⁷ The population's direct interface with EE on a daily basis in familiar spaces goes a long way to ingraining a culture of responsible energy use.

Energy education is a cause that NGC is already championing in schools with other stakeholders, but there is much more that can be done, and relatively cheaply, on a wider scale. The Chilean model offers a useful example to follow.

Facilitative policies

Chile was the first country in the world to liberalise the electricity sector, starting privatisation of generation assets back in the 1980s.⁸ Although the state plays a regulatory role, particularly in the transmission and distribution sectors, practically all investment comes from the private sector.

Today, as prices of renewable technologies fall — solar in particular — more private companies are investing in Chile's generation sector. Investment is further encouraged by the fact that the country is rich in renewables, that policies and infrastructure exist to facilitate easy connection to markets and that the government's goals with regard to RE integration will bolster demand and business relevance well into the future. As it turns out, Chile is one of the first countries where wind and solar deployment accelerated based primarily on attractive economics.⁹

From the country's standpoint, having policies and structures that encourage investment has two major benefits. Firstly, there is more competition in the generation sector which drives prices down and benefits the end user. Secondly, the more companies invest, the greater the installed capacity for renewable energy and the guicker the country achieves its target energy profile. As Trinidad and Tobago explores options for RE integration into the energy mix, careful consideration must be given to the processes and policies governing investment of private capital, both local and foreign. National Energy's ttEngage portal, which was designed to simplify and expedite the process of investing in Trinidad and Tobago, can help facilitate RE deployment. However, legislation around the sale of electricity from independent producers to the national grid will need to be approved expeditiously.

Trinidad and Tobago can also look at more indirect ways to jumpstart RE and EE uptake. Chile's mandatory labelling of appliances has pushed the market towards more energy-efficient appliances. As more options become available, consumption of these products increases and



Chile is a global leader in energy efficiency labelling for appliances

energy demand goes down. The introduction of a carbon tax on industry in Chile has also encouraged some companies to switch fuels to cleaner burning options or replace equipment to make their operations less polluting. Such initiatives must be guided by policy, but can be relatively easy to implement.

An important first step has been the formulation of a Committee by Cabinet to study and make recommendations around RE and EE to guide a national action plan. The NGC Group has a presence and voice in these discussions thanks to the appointment of several employees to the Committee.

Additionally, National Energy and NGC have initiated a Super ESCO project with the assistance of a multilateral funding agency to assess and audit NGC's Light Industrial Consumers (LIC) customers. The objective is to recommend and implement measures that will improve energy usage and efficiency in their processes. The first phase of this exercise has been completed and the second phase of implementation is expected to commence in the coming months. This programme will ultimately result in reduced consumption of gas and reduction in emissions.

Taking example

Chile represents an exemplary case study on how to accelerate RE and EE deployment. The country has already made significant strides in the conversion of its energy matrix, impelled by market and environmental circumstances. As Trinidad and Tobago seeks to diversify its own energy mix, there are many solutions that can be borrowed from the Chilean model, especially with regard to the structure of its Energy 2050 plan. In its own undertakings, the NGC Group will continue to seek guidance in Chile's story, as well as a possible partnership around knowledge transfer in the near future.

 ⁷ Energy Policies Beyond IEA Countries: Chile 2018 Review, p 15 (https://webstore.iea.org/energy-policies-beyond-iea-countries-chile-2018-review)
 ⁸ Energy Policies Beyond IEA Countries: Chile 2018 Review, p 91 (https://webstore.iea.org/energy-policies-beyond-iea-countries-chile-2018-review)
 ⁹ Ibid



Exploring the use of LNG and methanol for fuel bunkering in T&T

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RINIDAD and Tobago is in a unique position to exploit the development of the Liquefied Natural Gas (LNG) and methanol fuel bunkering market in the region. The International Maritime Organisation (IMO) has progressively enforced strict sulfur emission regulations globally, resulting in shipping companies and vessel operators exploring new avenues to comply with future environmental emission standards.

In August 2012, the North American Emission Control Area (ECA) came into force. In January 2014, the US Caribbean ECA took effect, with anticipated expansion to ECAs in the Wider Caribbean Region (WCR) in the future (IMO, 2012). Moreover, according to the IMO, from January 1st 2020, the limit for sulfur in fuel oil used onboard ships operating outside designated emission control areas will be reduced to 0.5%.

The IMO decision to limit the sulfur content of ship fuel from January 2020, and the recently adopted resolution to reduce greenhouse gas (GHG) emissions by 50% by 2050, will change the future mix of ship fuels dramatically. This is according to DNV Global (2018), a leading provider of risk management and quality assurance services to the maritime, oil and gas, and power and



Figure 1: Global Marine Fuel Limits Source: U.S. Energy Information Administration (2018)¹

³ https://www.atlanticIng.com/about-us/history

renewables industries. Given that the vast majority of ships today use diesel engines, these new IMO rules have far-reaching implications for the international shipping trade, the cruise industry, and ship owners and operators in particular. To meet these new regulations, many ship operators with traditional propulsion plants and marine fuels may have to install expensive exhaust after-treatment equipment or switch to low-sulfur diesel or alternative fuels with properties that reduce engine emissions below mandated levels.

These new regulations have brought alternative fuels to the forefront as a means of achieving compliance. This is especially true given that the current and potential proliferation of ECAs is creating strong incentive for ship owners and operators to explore the use of alternative fuels to satisfy sulfur oxide (SOx) and nitrogen oxide (NOx) limits.

Among the proposed alternative fuels for shipping, DNV GL has identified LNG, liquefied petroleum gas (LPG), methanol, biofuel and hydrogen as the most promising solutions. LNG has already overcome the hurdles of international legislation, and methanol and biofuels are forecast to follow suit very soon.²

Given the above, this article will look at the potential of LNG and methanol in particular as potential alternative marine fuel options for bunkering in Trinidad and Tobago.

LNG and methanol supply in Trinidad and Tobago

Formed in 1995, Atlantic LNG Company of Trinidad and Tobago is one of the world's largest producers. Atlantic produces LNG from natural gas delivered from fields off Trinidad and Tobago, to its four-train liquefaction facility located in Point Fortin on the southwest coast of Trinidad. Altogether, the facility is capable of producing 100,000 cubic metres of LNG per day with a total production capacity of 15 million tonnes per annum.³ The National Gas Company of Trinidad and Tobago Limited (NGC) currently has 10% shareholding in Train 1 and 11.1% shareholding in Train 4.

Trinidad's methanol industry dates back to 1984, when Government-owned Trinidad and Tobago Methanol Company (TTMC) started up its first plant at Point Lisas. From that time, the industry has expanded to include six larger plants with an annual production capability of over six million metric tonnes of methanol.⁴

Additionally, in 2015, a Project Agreement was signed for the development of a Methanol to Petrochemicals Complex at Union Industrial Estate (UIE), at La Brea in Trinidad and Tobago. Caribbean Gas Chemical Limited (CGCL) will manage the facility, which will be the eighth

¹ https://www.eia.gov/todayinenergy/detail.php?id=37793

² https://www.dnvgl.com/expert-story/maritime-impact/alternative-fuels.html

⁴ http://www.energy.gov.tt/our-business/Ing-petrochemicals/petrochemicals/methanol/





NGC and National Energy will be examining the feasibility of this prospect for Trinidad and Tobago

methanol facility in Trinidad and Tobago. It will include a methanol plant with a capacity of one million tonnes per year. NGC has a 20% shareholding in the project.

These local producers of alternative fuels - including NGC, which has access to both LNG and methanol volumes due to its shareholdings - provide a viable opportunity for the NGC Group to explore and develop alternative fuel bunkering facilities at Trinidad and Tobago's ports. This will support the local maritime sector, and by extension the country's compliance with IMO MARPOL Annex VI legislation.

Alternative fuel bunkering potential in Trinidad and Tobago

With the IMO's decision on sulfur limits coming into force

in 2012, and further measures set to be implemented from January 2020, ports around the world are undertaking strategic initiatives to ensure compliance. Given the country's proximity to the Panama Canal, Trinidad and Tobago is strategically located to take advantage of the potential maritime traffic navigating through the Gulf of Paria and Caribbean Sea. These international vessels will have to comply with IMO regulations and will require low-sulfur fuel options. However, to provide the relevant support required by these vessels, it is critical that all requisite infrastructure be in place and operational.

As part of its mandate, National Energy Corporation of Trinidad and Tobago Limited (National Energy), a 100% wholly owned subsidiary of NGC, is responsible for the ownership and operation of marine and other infrastructural assets to facilitate the operations of all

downstream energy projects. Currently, National Energy owns and operates three port facilities in Trinidad and Tobago, namely the Savonetta Piers at Point Lisas, the Port of Brighton at La Brea and the Port of Galeota – Phase 1.

Recognising the potential opportunities that can arise from the maritime sector's transition towards the use of alternative fuels such as LNG and methanol, National Energy commenced an initiative to assess the prospect of establishing alternative fuel bunkering infrastructure at Trinidad and Tobago's port facilities. A team comprising representatives from the Ministry of Energy and Energy Industries (MEEI), NGC and National Energy will be examining the feasibility of this prospect for Trinidad and Tobago. Though the assessment of this opportunity is currently in the initial stages, there are several advantages that may be realised from such a project:

- Achievement of SOx and NOx compliance
- Access to markets for alternative fuel bunkering
- Boost in Trinidad and Tobago's social responsibility profile
- Achievement of national and regional energy efficiency targets by the reduction of GHG emissions

LNG as a potential alternative marine fuel

A key advantage of LNG as a fuel is the vast reduction in pollutants, compared to more traditional marine fuels such as Heavy Fuel Oil (HFO), Marine Diesel Oil (MDO) and Marine Gas Oil (MGO). LNG also allows heavy-duty natural gas engines to achieve significantly lower NOx and particulate emission levels than diesel. However, with LNG, bunkering ships would require larger, more expensive fuel storage and ports would need to invest in infrastructure to support LNG bunkering.

An increase in demand for this sustainable fuel encouraged ports around the world to develop LNG bunkering facilities. While Europe boasts many LNG bunkering ports, similar facilities are starting to flourish in Southeast Asia and in the US.

Options for LNG bunkering

There are three options for LNG bunkering. These include Truck-to-Ship (TTS), Terminal-to-Ship (TPS) and Shipto-Ship (STS) operations as highlighted on the following page.



Figure 2: Existing, planned and proposed LNG bunkering terminals Source: $DNV^{\rm S}$

⁵ http://www.shippingtech.it/presentazioniPST2012/GreenShippingSummit/GiacomoMeazzi.pdf

Table 1: Options for LNG Bunkering

Truck-to-Ship

With TTS, the LNG truck is connected to the ship on the quayside, generally using a flexible hose. This is the most widely used bunkering method, because of the still limited demand combined with the lack of infrastructure and the relatively low investment costs.

For capacity reasons, truck-to-ship bunkering is most suitable for smaller LNG-fueled vessels with limited bunker volumes like tugboats, inland vessels, coastguard vessels and smaller passenger vessels.

Advantages 🗂

1 Limited investment costs for operators.

Disadvantages

- Limited capacity of trucks: approximately 40-80 m³. This bunkering method is only suitable for bunkering quantities up to 50 tonnes and is therefore only suited to smaller-sized LNGfueled vessels.
- The presence of truck and bunker processes also impacts other quayside activities such as cargo and passenger handling.

- 2 Trucks can also be used for LNG distribution for other purposes.
- 2 Owing to the limited flow rate, bunkering takes about an hour (around 1,000 l/min).
 - A road connection with the preferred bunkering position is required and local safety requirements need to be met as with any bunker operation.

Terminal-to-Ship

LNG is either bunkered directly from an (intermediary) tank or small station, or from an import or export terminal. Pipelines from the terminal to the quay are needed if the LNG terminal is not directly situated at the berth.

Advantages 🖺

- Shore-ship bunkering is especially suitable for shipping services with a high frequency, limited demand, less strict timetables and limited vessel draft.
- 2 Shore-ship bunkering is generally a good option for ports with stable, longterm bunkering demand, especially in the case of co-use of LNG by other consumers.

Disadvantages

- It takes effort for a ship to get to the location of the bunker terminal (or pipeline).
- Limited berth access for larger LNG-fueled vessels can also be a barrier for shore-ship bunkering.



Table 1: Options for LNG Bunkering (continued)

Ship-to-Ship

Generally considered the most favourable option for LNG bunkering, especially for ships with a short port turnaround time.

STS can take place at different locations: along the quayside, at anchor or at sea. It is the most common bunkering method used for bunkering seagoing vessels with HFO and MGO. The capacity of bunkering vessels can range from 1,000 to 10,000 m³.

Given the high flexibility of bunkering vessels, ship-to-ship bunkering is suitable for all types of vessels and is expected to become the main bunkering method for ships with a bunker demand of over 100 m³. Ship-to-Ship bunkering is most suitable for large vessels such as Roll-on/Roll-off Passenger (RoPax) and Roll-on/Roll-off (RoRo) vessels, bulk carriers and container vessels.

Advantages 🗂

- 1 Flexibility of ship-to-ship bunkering is high with respect to capacity and bunkering location.
- 2 Because the bunker vessels are moored alongside LNG-fueled ships, this bunker method could permit simultaneous cargo handling if approved by the relevant authorities, such as the port authority.

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High investment costs.

2 Because LNG bunker vessels are regarded as vessels carrying dangerous cargo, entering nonpetroleum harbour areas has to be authorised.

Methanol as a potential alternative marine fuel

Methanol is also viewed as a promising alternative marine fuel to assist the shipping industry in meeting increasingly strict regulations as methanol can significantly reduce emissions of SOx, NOx and particulate matter.⁶ In recent years, demand has increased significantly for methanol's use in energy applications in the areas of land transportation, in marine fuels, power generation, fuel cells, and in cooking stoves.⁷

Some advantages of methanol as a marine fuel include:

- Available globally and could be 100% renewable as it can be produced from a variety of renewable feedstocks
- Compliant with increasingly stringent emissions reduction regulations
- Current bunkering infrastructure needs only minor modifications to handle methanol – methanol is similar to marine fuels such as heavy fuel oil (HFO), because it is liquid
- Infrastructure costs are relatively modest compared to potential alternative solutions such as LNG

 methanol also allows for small incremental investments in infrastructure capacity as the number of users grows
- Usually less expensive on an energy equivalent basis than competing fuels such as marine gas oil
- Shipping and chemical industries have a long history and ample experience in handling methanol safely
- Is biodegradable as most micro-organisms have the ability to oxidise it – therefore, the environmental effects of a large spill would be less than those of an equivalent oil spill

Methanol has been tested with positive results in heavyduty vehicles on land as it provides clean burning in the engine and produces low levels of soot in combustion, compared with diesel oil or HFO. Noteworthy applications of methanol in the maritime industry include the partnership of Stena, a leading engine manufacturer, Wartsila, Methanex and other industry partners in 2015, to convert one of the world's largest ferries, the *Stena Germanica*, to operate on methanol. In addition, Methanex's wholly owned subsidiary, Waterfront Shipping, welcomed seven new ships in 2016 with MAN ME-LGI dual-fuel engines that can run on methanol, HFO, MDO or MGO.⁸ However, the current uptake of methanol as a bunkering fuel has been slow in the shipping industry.

Conclusion

As the MEEI, NGC and National Energy continue to assess the potential opportunities that may exist for Trinidad and Tobago in the provision of alternative marine fuel bunkering facilities at its ports, there are several factors that will be taken into consideration. Differences in market, environmental restrictions, infrastructural shortcomings, availability of feedstock supply, investment and operating costs, feedstock prices, storage, land availability and safety shall be considered.

As the marine sector transitions, it is critical that we stand ready to take advantage of all opportunities that may knock on our door in the future.





MIL.

Opportunities for Regional Energy

Developing 'LNG to power' projects in the Caribbean

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LNG to power projects have been developed in Jamaica, the Dominican Republic and Puerto Rico

CARIBBEAN nations have great economic potential and opportunities for growth. However, most countries which use oil-based fuels face relatively high electricity prices and are exposed to further increases due to the volatility of oil prices. This high cost inhibits these economies from being competitive, and in instances where capacity is limited, prevents economic growth and impacts living standards.

Within the last decade, there has been significant growth in the global gas industry and natural gas is becoming the fuel of choice. The factors driving this growth are primarily: the relative price of natural gas, which is cheaper and less volatile than oil; the technological advancements in extracting hydrocarbons from shale through fracking; the reduction in the capital cost of developing liquified natural gas (LNG) plants; and the relative environmental benefits of using gas as opposed to oil or coal.

Natural gas is the cleanest burning fossil fuel, producing 45% less carbon dioxide (CO_2) emissions than coal and 30% less CO_2 emissions than oil when combusted. Using natural gas for power through 'gas to power' projects therefore mitigates some of the adverse effects associated with burning fossil fuels. This is particularly important for the Caribbean given its high susceptibility to the effects of climate change.

Developing gas to power projects is an integrated process requiring negotiation and investment along the entire energy value chain before the energy reaches the end user. Gas delivery to gas to power projects can be facilitated by either utilising a pipeline system between the source of production and power plant or by developing an LNG project to connect them. The latter results in 'LNG to power' projects.

Thus far, within the Caribbean, LNG to power projects have been developed in Jamaica, the Dominican Republic and Puerto Rico. Other gas-fueled industries have developed in these countries thanks to imported LNG. Studies performed for the Inter-American Development Bank (IDB) and other global institutions have also identified the potential for developing LNG to power projects in many of the other islands.

Challenges

Developing an LNG to power project can present many challenges. These include:

- The availability of a suitable site to locate the LNG receiving terminal and power plant
- The economic status of the country and the ability of the project promoters to secure financing
- Regulation and environmental permitting
- Competition from renewables
- Feasibility of the projects due to the relatively small energy demand in these countries

In selecting a suitable site for importing LNG, several factors need to be carefully considered. Some of the key factors are met-ocean conditions, water depth, marine traffic, and the approach to the shoreline. Each Caribbean territory will have unique challenges — as many of the islands are small land masses surrounded by shallow water or have steep cliffs near the coastline, finding a suitable site can be difficult. The unavailability of a suitable project site can be a restriction in the development of a project.



In some cases, stronger mooring facilities or dredging may be required to allow for the safe berthing of an LNG vessel, which can significantly increase project costs. Floating storage and regasification units (FSRUs) have been used in cases when the availability of an onshore site was a constraint.

An FSRU is an LNG vessel which can store and regasify LNG. They are either moored offshore or at a jetty and connected to the power plant via a pipeline. FSRUs also face specific constraints in determining their siting, which increase operational expenditure and lead to an increase in the price of power to the consumer.

The better the country's economic performance and creditworthiness, the easier it is to secure financing with favourable interest rates and attract investors. Small changes in the interest rate can affect the economic feasibility of a project. Project promoters also argue that once LNG to power projects are commissioned, there would be an expected improvement in economic performance. They use this to negotiate preferable terms for financing or to access grants for economic development. Many institutions such as the IDB may promote these projects due to the economic and environmental benefits.

Government regulation and environmental permitting can be a hurdle especially when new legislation is required. There are examples of projects where difficulty in obtaining environmental permits have led to significant project delays, and in some cases, cancellation. The regulations and environmental permitting requirements and processes must be carefully reviewed during the project evaluation stage. Where these are absent, the relevant government bodies should be consulted and encouraged to develop them.

Utilisation of renewable energy (RE) has been accelerating over the last few years due to cost reduction and as such. RE can now be competitive with LNG to power projects. In the Caribbean, there is high potential for solar, wind and geothermal energy, and many countries have legislated policies with set targets for power generation from renewable energy sources. However, there are some drawbacks with renewable energy. Solar power is only available during the day. Wind power is usually also limited at night. Geothermal power is still expensive and location-specific. Because of these drawbacks, many countries have or are in the process of drafting an integrated resource plan to promote a mix of renewable energy and natural gas from LNG for power. This combination provides some degree of energy security.

Opportunities in the Caribbean

The competitiveness of the gas and LNG Industry in Trinidad and Tobago, as well as its proximity to the islands in the Lesser and Dutch Antilles, Puerto Rico and the Dominican Republic, would favour the development of projects with gas sourced from Trinidad and Tobago. Current and projected increases in LNG production in the United States also make it a competitive source of gas for projects in the Caribbean.

The projects that have been developed thus far in Jamaica, Puerto Rico and the Dominican Republic were developed with berthing facilities designed to accommodate the standard-sized LNG carriers with capacity of 145,000-170,000 cubic metres. The storage tanks were also designed with a capacity to store a full standard-sized cargo. These pieces of infrastructure are expensive but were economically feasible for these projects due to the magnitude of the energy demand in these countries. The remaining countries have significantly lower energy demand and therefore this size of infrastructure would not likely be economically feasible. Smaller facilities built at a lower cost, use of smaller ships, demand aggregation and sharing of resources through collaboration and simultaneous project development are essential for developing new projects.

Small shipments can be done by either direct loading of small LNG carriers between 8,000-15,000 cubic metres at the liquefaction facility and transporting the LNG to the project, or by utilising a transhipment hub. A transhipment hub receives standard-sized LNG cargoes and then reloads the LNG into small shipments.

The transhipment hub is more expensive than direct loading and would require that more than one project be developed simultaneously to make them feasible. This further reinforces the need for collaboration and developing strategic partnerships to promote and develop projects.

Conclusion

There are many challenges in developing new LNG to power projects in the Caribbean, but these challenges are surmountable, especially through collaboration and strategic partnerships. Promoting and increasing the use of LNG to power to complement renewable energy projects and displace oil-based fuels in the Caribbean can unlock the potential for economic growth and help protect the environment, both of which would improve the livelihood of citizens.



Opportunities for the National Community

Lessons from an Olympian HASELY ON OPPORTUNITIES IN SPORT





Hasely's Olympic win

N the Corporate Communications Division at NGC's Head Office, hang two powerful pictures. In a place of honour is a framed photograph of an iconic moment in Trinidad and Tobago's history — a sprinter with arm raised in victory crosses the finish line as his competitors lurch forward trying in vain to outrun him. The date was July 24th, 1976; the moment — the country's first ever Olympic gold medal win. Nearby, hangs an even larger print of the same gentleman correcting the stance of young boys and girls who are poised to race during a session of NGC's signature track and field programme, "Right on Track" (ROT). He has the focused eye of an instructor looking to teach and improve.

These photographs tell two stories - one of glory, one of service. Both, however, highlight the greatness of their subject, Hasely Crawford TC. Although he rose to fame on the track, Hasely's work in the field with communities and young people after his win - especially as Head of Community Relations at NGC - makes him even worthier of celebration.



Hasely receives commemorative copy of comic book from Ron Adams, former VP Operations NGC (left) and Philip Julien, Founder and Chairman of Heroes Foundation

Lessons from an Olympian - Hasely on opportunities in sport | CONTINUED

In 2018, under the remit of its National Heroes Project, NGC partnered with the Heroes Foundation to produce a unique graphic novel that would chronicle Hasely's Olympic story. The comic book was completed and launched in 2019, with the title: *A Runner's Life: Lessons from an Olympian*. An inspiring narrative and important historical record, the book shares wise counsel on how to succeed in the face of adversity.

Although the story stops at the finish line in Montreal, the Olympian's work with youth and sport in Trinidad and Tobago following that victory can be just as instructive. As Hasely tells it, he is proof that sport can be a viable career path and an industry that adds value to the economy. This is of course a pertinent subject amid disruptive developments in the nation's breadwinning energy sector. The opportunities that exist must however be recognised and harnessed.

Opportunities for youth

Throughout his post-Olympic career, Hasely has worked closely with young people, starting with the Ministry of Sport and Youth Affairs then moving to NGC to lead its then Community Relations Department. Along the way, he saw a link between idle youth and delinquency, and noted the rehabilitative power of sport. By the time he started at NGC, crime had become a national issue and the Company resolved to help address the problem through corporate social investment in sport.

"The idea was simple — if young people had something to do, to occupy their spare time, they would participate less in nefarious activities. Moreover, for those children who may not have been academically inclined, sport could be a platform for building a viable career."

Among other initiatives, Hasely led the conceptualisation, development and implementation of NGC's ROT programme to provide fundamental skills training in track and field and basketball in schools and communities across the country. Besides being a productive extracurricular engagement for children, NGC's ROT programme helped unearth and polish some of the nation's athletic stars, among them, the country's second Olympic gold medallist, Keshorn Walcott.

"Many young people have found an avenue in sport to change the course of their lives. This was true for me, it was true for young Keshorn, and it can be true for any young person with the right attitude and opportunity. Programmes such as NGC's ROT provide that opportunity, whether to develop as a sportsman or woman, or simply to keep engaged in positive pursuits and stay on the straight and narrow."

Hasely sees another important dimension to such programmes.



Hasely coaching during NGC Right on Track session

"I remember a young lady in my area who had great physical potential to be a successful sportswoman. I had trained her for some time but then she stopped. Some years later I saw her again, decked out in nice clothes and heavy gold jewellery. I asked her what she was up to, and she said she was taking care of her "hero." As we conversed, I found out this "hero" was a well-known criminal getting coverage in press.

All our young people, not just our budding athletes, need positive role models, proper heroes to look up to. When you are involved in sport, you have a coach, you have peers pushing you to be better — you have positive influences all around."

Opportunities in coaching

As NGC's Head of Community Relations, Hasely oversaw a number of projects targeting youth empowerment in arts and culture, education and community development. However, since sport remained a pillar of investment for the Company, he continued to work on the sidelines of his former discipline and saw substantial room for developing young potential in the sport.

In Hasely's view, coaches have an extremely important role to play in athlete development, but many are themselves lacking in the requisite training to perform that role. He recalls that in the past, 17-day programmes were being used to train coaches in athletics. Once participants completed this training, they received certification.

"Seventeen days is not at all sufficient to become a coach," says Hasely. "In Europe, they would assign you to clubs to apprentice for years before you could qualify to coach athletes. When we started Right on Track, we took that need for qualified, practised coaches into account, and included components to address shortcomings in that regard."



Through NGC's ROT programme alone, almost 100 coaches have accessed professional development courses and even more have received training since NGC became a main sponsor of the activities of the National Association of Athletics Administrations (NAAA) in 2013. This investment in coaches translates to an investment in our athletes and should receive equal attention.

Besides having proper foundational training and experience, Hasely believes that coaches need to be attuned to what is best for the athletes in their charge. This sometimes means accepting that they are not adequately equipped to develop the athletes' full potential.

"I've seen many coaches hold on to athletes just because they do not want to let another coach get the credit for their development. It is a terrible injustice for athletes to have their personal development stifled due to pride and ineptitude on the part of their trainers. Coaches must learn to accept the limits of their abilities, and if they recognise that they cannot get their athletes past a certain point, they must be willing to pass them along to other coaches who could help. The athletes' welfare must come first."

Opportunities for the industry

Taking a broader view, athlete performance is ultimately tied to a national agenda to make a name for Trinidad and Tobago at the international level. In this regard, Hasely sees several opportunities for the country to build its track and field image.

Hasely believes more corporate outlay is needed to raise the calibre of athletes we produce.

"NGC's investment in sport is commendable and makes an impact, but there is so much more room for other corporate entities to get involved. For example, one of the most important aspects of athlete training and development is proper nutrition. Many of our talented young stars come from impoverished homes and cannot afford to feed themselves as well as they should. This is an area that deserves some investment attention."

As far as infrastructure is concerned, Hasely believes the country has enough facilities to meet its needs, but staffing is an issue.

"We have some world-class facilities in Trinidad and Tobago, but we do not have the requisite personnel to man them. We need to train more administrators and managers, in addition to coaches. We should bring in experts from abroad, learn from their experience, then apply what we learn to our local context to get maximum



value from our facilities. We can then look at marketing Trinidad and Tobago as a destination for sport tourism."

In terms of raising the country's profile from a performance standpoint, the Olympian divides the burden between trainers and athletes — both must put in the necessary preparation to achieve results. However, he adds that athletes can help improve their chances of medalling if they approach major competitions with due reverence.

"Many athletes today are focused on the money — they compete year-round in every competition they can enter. This is not a good approach. When I was preparing for the Olympics, I didn't participate in any event for months before. I wanted to ensure I remained mentally focused and physically fit. Competitions are draining and increase your chances of sustaining injury. Athletes who are serious about medalling at major events such as the Olympics should choose their races wisely and not just run for pittance if it can jeopardise their chance at glory on the biggest international stage."

On the future

Hasely Crawford's legacy is more than his medal - he has served his country and young people with genuine passion. As he continues on with NGC as a consultant in the area of Corporate Social Responsibility, he will without doubt deepen his impact, working to help Trinidad and Tobago seize every opportunity to grow the sport and its record of international and Olympic achievement. Whatever the future holds, Hasely's past will forever remain a source of pride and inspiration.

Read about his Olympic journey in *A Runner's Life: Lessons from an Olympian*, available online at the address: https://issuu.com/iugodigital/docs/heroes-foundation-a-runners-left-le?e=5528347/70128057



Watchful iguana, fondly nicknamed 'Iggy,' captured at NGC's Head Office by Sherwin Williams











- THE NGC GROUP OF COMPANIES