Keynote Address

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Good morning. First of all, I would like to take this opportunity to welcome you to Trinidad and Tobago (T&T) and I invite you to enjoy the sights and sounds that our wonderful country has to offer. It is a great honour to address you here today as we aim to examine and solidify the role of natural gas in a rapidly evolving energy mix.

Currently, natural gas makes up 22% of the global energy mix, which is by no means insignificant. Both global production and consumption continue to grow, with prices remaining strong. On the production side, 2017 saw growth in production from many gas producing countries, led by Russia, whose production increased by approximately 8% year on year. North America, Australia, Europe and Africa also increased throughout 2017. It must be noted that the majority of net production growth in some of these regions came from unconventional gas production, namely shale.

Growth in production was matched by increased consumption. Average global gas consumption has grown 1.9% per year since 2010. In 2017 alone, gas consumption experienced its strongest year on year growth, with an increase of 3.7% from 2016. China led the growth in consumption. Consumption growth has been enabled by developments in small scale LNG and investments in technologies such as floating LNG (FLNG), floating storage and regasification units (FSRUs) and trucked LNG. Consumers have been keenly receptive to a more liquid LNG market, with spot trading and non-long-term sales attracting more participants to the

market. Investments in liquefaction capacity, such as those taking place across North America and Africa, are indicative of the growth of industry, and increased market share for natural gas in turn.

No discussion about the global energy mix would be complete without considering the shift towards cleaner energy as we seek to mitigate the effects of climate change. Some people may think that the transition to a low carbon future signals the immediate end of prospects for fossil fuels. However, natural gas continues to remain relevant and increasingly important as a complementary input to infrastructure employing renewable energy alternatives to guarantee reliable and sustainable output to consumers. Natural gas is the fastest growing energy source other than renewable power and is also the only energy source among fossil fuels for which consumption is projected to grow. This projected increase in consumption factors significantly into key low carbon future states, including some of the most aggressive and drastic scenarios.

With that being said, one cannot ignore the writing on the wall. In order to maintain market share and to realize continued global gas growth, it is imperative that we adapt and address the issue of sustainability in our gas industries.

Achieving sustainability is not the only challenge to robust global gas growth. We must also be able to ensure that natural gas remains

competitive with other fuels. However, this must be carefully balanced with efforts to derive maximum value from our resources.

Additionally, we must be able to guarantee a security of supply, through investments in infrastructure and technology and by allowing for flexibility in LNG contracts. The issue of LNG contracts is one that needs careful consideration so that all parties involved are able to derive benefits commensurate with the quantum and character of the risks undertaken. Additionally there is the intrinsic value of State ownership of the basic resource and the returns such exploitation must of necessity bring to the people who own those resources.

Ladies and gentlemen, when I speak to you of the great potential and the challenges faced by the natural gas industry, I am not doing so as an outsider or an observer of the industry. I do so as an active participant with first-hand knowledge and a vested interest in securing the future of natural gas.

T&T is by no means a newcomer to the natural gas industry. In fact, we were among the pioneers of hydrocarbon exploration and production. We have been producing oil and gas for over a century.

Oil was first discovered in Trinidad in the late nineteenth century and commercial production started in 1908. It was not until 1953 that

associated gas was first commercially utilised for fuelling a power station at Penal in South, Trinidad. We were one of the first countries in the world to employ gas-powered turbines for electricity generation.

The critical point for the development of the gas industry was the discovery by Amoco in 1968 of large volumes of non-associated gas off the east coast of Trinidad. This discovery came during the period of the oil boom when buoyant oil prices provided the impetus for exploration investment.

Our government at the time recognized the tremendous potential of our resources and sought to monetize these resources for the benefit of its citizens. Market development was spurred by significant capital investments in plants and infrastructure by the State.
With the discovery of more gas reserves off the east coast of Trinidad in the 1970s, the Government of the Republic of Trinidad and Tobago (GORTT) began to implement strategies for the development of the natural gas sector.

The Point Lisas Industrial Estate (PLIE) was conceptualised to be established on the west coast of Trinidad to accommodate gas-based industries. The development of the industry was essentially demand driven. Investment decisions on gas-based plants served as a catalyst for

the National Gas Company to seek new suppliers. The National Gas Company of Trinidad and Tobago (NGC) was formed in 1975 and the PLIE development began. The 1980s saw the development of gas infrastructure and new gas-based industries, providing ammonia and methanol production.

The 1990s saw further gas sector development with the first train of Atlantic LNG (ALNG) delivering its first cargo in 1999. Also in the 1990s, a Direct Reduced Iron (DRI) steel plant was developed at Point Lisas Industrial Estate further diversifying the county's industrial base. By the late 1990s gas production exceeded oil production on a barrel of oil equivalence (boe) basis. This ushered in the change from an oil based economy to a largely gas based one. The government's focus changed as the country's natural gas endowment grew and there was decline in the oil sector. In 1981, a government white paper outlined steps needed to diversify the T&T economic output based on natural gas. Policies that favoured natural gas as a premium energy resource and as a potential generator of foreign exchange were supported.

The dawn of the twenty first century saw further development of the ALNG facility, additional ammonia and methanol plants and the construction of additional gas transportation infrastructure.

Today, the existing downstream gas consumption portfolio consists of LNG, ammonia (and derivatives), methanol, iron and steel, power and other industries, including Phoenix Park Gas Processors Ltd. The portfolio could consume up to around 4.3 Bcf/d of gas at full capacity utilisation.

LNG dominates the downstream portfolio and at full capacity utilisation would account for more than half of total consumption. Petrochemical producers are also significant gas consumers with ammonia (and derivatives) and methanol at 18% and 15% of total demand respectively. The power sector accounts for around 8% of demand with other buyers accounting for around 5%. It should be noted that these figures exclude internal upstream consumption and reinjection, which based on historical data, has averaged around 7% of gross production in T&T.

The ALNG facility in Point Fortin is by far the largest consumer of gas in T&T; it accounted for around 54.4% of gas consumption in 2017. The facility consists of four liquefaction trains with a total capacity of 14.8 million tonnes per year (MMT/y). The train sizes for plants 1-3, are relatively small by today's standard for greenfield plants, which are commonly of 4.5-5.0 MMT/y. Train 1 delivered its first LNG in April 1999, followed by Train 2 in 2002, Train 3 in 2003 and Train 4 in 2005.

Train 4 was the world's largest single liquefaction train when it was completed.

T&T has developed a major gas export industry both directly, in the form of LNG, and indirectly through gas-based petrochemicals (ammonia/urea, methanol). The sale of these products collectively account for approximately 80% of the gas consumption in T&T. T&T's competitive advantage in addressing these markets has been the low cost of the gas resource and the proximity to the world's largest market, the US, which was short on gas supply and had significant demand for LNG and gas-based petrochemicals.

However, these competitive advantages have been eroded over time. Incremental gas supply from T&T reserves has become more expensive to develop and the US market is now saturated with gas, bolstered by the rapid growth of shale gas, which can be developed at relatively low cost. Consequently, the US which was formerly a baseload consumer has now emerged as a major LNG exporter in direct competition with T&T. As T&T gas products are pushed out of the North American market they will have to travel further to reach new markets, which will add to the complexity of supply logistics, increase costs and reduce our competitiveness.

T&T exports are now competing for market share against products from other supplier countries, on price. T&T has a competitive edge predominantly to the extent that indigenous resources can be developed and delivered to regional markets at lower cost than those of competitors. Pricing for LNG is not within the control of T&T but the value extracted for the benefit of the country ought to depend on the efficiency of the value chain and the cost of exploiting the gas. In petrochemical markets, feedstock and logistic costs are a key competitive advantage. Understanding the new sources of supply and their cost position is important in determining present and future competition and potential target markets. Notwithstanding any and all of this, Trinidad and Tobago remains an encouraging location for the modern gas industry of the commercial world.

In addition to facing competition from a previous importer of our product, T&T is also suffering leakage of value of its products. Traders have begun using the system to their advantage. Through clever portfolio management, traders are able to benefit unfairly from our LNG production. As such, very little of the returns from high global LNG prices makes its way back to T&T. This cannot be allowed to continue and as such, the current system must be reviewed.

Ladies and gentlemen, I am sure that this problem of unfair benefit sharing is not unique to Trinidad and Tobago. There may be other countries among us who face this problem in one form or another. The GECF has a mandate to support the sovereign rights of its Member Countries over their natural gas resources and their ability to independently plan and manage the use of natural gas resources for the benefit of their people. As such, I would like to challenge the GECF to address this problem so that our people and others will no longer be deprived of their sovereign rights.

The global gas industry as a whole has its own challenges to face and must meet certain requirements to ensure robust growth in the future. The three main pillars are cost competitiveness, security of supply and sustainability.

As with any other industry or commodity, cost is a direct driver in decision-making. Natural gas must remain competitive with other fuel sources. For example, landed LNG costs must be reduced in order to compete with coal in Asia. This requires a multi-faceted approach, including technological innovation, process improvement and enhanced competition amongst suppliers.

Further, the development of gas markets in Europe is driving an evolution in gas pricing, with a shift away from oil-linked pricing to hub-based pricing. This has an impact beyond Europe as this market has become the market of last resort for LNG and thus has become an important marker in the LNG spot market pricing.

It is the dynamics of gas supply and demand, which are setting prices rather than the price of oil or its related products. LNG is linking what have traditionally been compartmentalised regional gas markets. Although LNG trade is relatively small compared to overall gas consumption, it links markets in a more dynamic way than pipeline gas and opens the world to gas supply on different commercial terms. The introduction of significant volumes of LNG priced on a US market (Henry Hub (HH)) basis, combined with the recent oil price drop has increased the options for gas buyers across the world.

I would like to encourage the GECF to work expeditiously to develop and implement the Gas Pricing Index, which I know many members have been working on assiduously. Now more than ever, the need for such a global reference price is evident, in order to protect both producers and consumers alike.

The second pillar is enabling gas supply security. While reserves and production may be plentiful, factors such as geopolitical rifts and failure of infrastructure can destabilize supply and limit consumers' access to gas. Many of the large global reserve holders, such as Saudi Arabia, have high domestic demand, which may preclude them from developing export projects. Others, such as Turkmenistan, have locational challenges to reach export markets.

Australia is leading the next wave of major LNG export expansion, while new capacity is also under construction in Papua New Guinea, Malaysia, Indonesia and Russia. Australia is projected to produce 85 MMT/y of LNG at 10 projects by 2020. We expect North America and East Africa to be key future LNG suppliers. By 2025, Poten projects North American (US and Canada) and East African (Mozambique and Tanzania) LNG exports to reach 69 MMT/y and 12 MMT/y respectively.

Global LNG demand has grown as the number of importing countries, largely to meet power generation needs, increased from 12 in 2000 to 29 countries in 2014. A combination of growing environmental and regulatory pressures, new LNG production capacity and competitive pricing are projected to drive a strong expansion of LNG imports. By 2040, LNG carriers are expected to move approximately 600 billion cubic metres (bcm) per year compared to 320 billion cubic metres (bcm) in

2015. Therefore LNG trade will more than double. Growth in LNG demand is anticipated in every major region, except North America (excluding Mexico) where robust growth in domestic shale gas production has almost eliminated imports.

Security of supply is imperative to support this anticipated demand and to guarantee that the product from the proposed expansions mentioned above can make it to their markets. Again, combatting this issue requires a multi-faceted approach. Investment in gas pipeline and storage infrastructure is crucial in being able to provide customers with a secure supply of product. Additionally, supply contracts must become less rigid in order to promote a more dynamic market with the ability to respond quickly to changes in market conditions. Finally, new technologies such as floating LNG and floating storage and regasification units must be invested in for greater market penetration.

Finally, as mentioned before, the issue of sustainability must be addressed by adoption of local air pollution policies, investment in research of low carbon technologies for gas and by finding solutions to the challenge of methane emissions. Without taking such steps, the natural gas industry will not be able to demonstrate its sustainability to cement its place in the energy mix as we move towards cleaner energy.

As we look ahead to the future, T&T will need to strengthen its drive to increase gas production from its depleting reserves, and continue its exploration efforts. Project and infrastructure investments into our upstream sector by major stakeholders is vital to our progress. Fortunately, our stakeholders understand the need for investment. The upstream companies have committed to spend over US$10Bn in exploration and development activities over the next five (5) years. In addition to boosting production, it is imperative that we seek the best value for our products. We must adapt to evolving market dynamics as we cope with the rise in shale gas production from the US, and the move towards a more liquid market.

ALNG was built predominantly to supply the North American gas market. However, the surge in unconventional natural gas production has converted the US into a potentially large LNG exporter rivalling Qatar and Australia, with over 200 MMT/y of potential supply at various stages of planning. Operators offshore Mozambique and Tanzania are reported to have discovered at least around 120 Tcf of gas reserves and plan to develop multiple LNG export trains. This represents added competition for market share.

On the downstream side, we must look towards investment in projects to extend the value chain. We have already begun to extend our operations

further downstream. An example of this is establishment of a methanol to di-methyl ether (DME) complex that would be located on fifty (50) hectares of land at the Union Industrial Estate in La Brea. Commercial operations are expected to commence in March 2019 and the complex is expected to produce 1,000,000 metric tonnes of methanol per annum and 20,000 metric tonnes of DME per annum. This DME facility will be the second major secondary downstream plant in the country.

On a regional scale, my CARICOM brothers and sisters, it will take a collective effort to protect each other's interests. As a region where the majority of countries are net importers of energy, the energy exporters must do their part to assist in bringing energy security to the region. Natural gas, in the form of small-scale LNG arrangements, can play a key role in bringing stability to the region.

Ladies and gentlemen, perhaps the ultimate pinnacle of regional cooperation is the recent signing of the agreement between Trinidad and Tobago and Venezuela for the development of the cross-border Dragon gas field, which is a part of the Mariscal Sucre gas complex and straddles Trinidad's North Western Coast and Venezuela's Caribbean Coast. This agreement will see gas from the Dragon field being transported to the Hibiscus platform, which is jointly owned by Shell and the Government of the Republic of Trinidad and Tobago, for processing right here in

Trinidad. The first tranche of Dragon's production is expected to yield about 150 million standard cubic feet of gas per day (mmscfd).

Ladies and gentlemen, the Dragon gas deal is a prime example the symbiotic relationship between Trinidad and Tobago and Venezuela, and an indication of cooperation among neighbours, but more importantly, among two GECF member countries.

Additionally, the Caribbean region is becoming a hotbed for hydrocarbon exploration. Recent success in exploration in Guyana has prompted interest in Suriname, Cuba, Barbados, Grenada and Guyana. These countries can benefit from Trinidad's experience in the hydrocarbon arena, while providing opportunities for T&T in many aspects of the hydrocarbon value chain. However, there must be cooperation in areas of policy development, and the reconfiguration of energy systems to facilitate such agreements.

The need for cooperation and collaboration extends beyond our region and applies to all of us on an international level. We are indeed fortunate to have an organization like the GECF to facilitate large-scale and international collaborative efforts. T&T, as a mature market participant, stands ready to assist market entrants and to pass on lessons learnt, as we are currently doing with countries such as Equatorial Guinea and Ghana

in West Africa and Tanzania and Mozambique further to the east. As a country, we have a vast network of human resources, with knowledge in technical areas and in the development of marketing and pricing models, and policies. Conversely, we are open to learning from other member countries as we move forward.

It is my hope that we can all move forward as an industry, strengthened by collaboration, as we face the challenges and changes coming our way. I look forward to lively and productive dialogue in today's panel discussions and I anticipate that we will leave here today all enriched in one way or another.

Thank you.