



**GOVERNMENT OF TRINIDAD AND TOBAGO
MINISTRY OF ENERGY AND ENERGY INDUSTRIES**

KEYNOTE ADDRESS

by

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It is my pleasure to deliver this keynote address at this most renowned Conference that has grown from strength to strength, it is Premier in the Caribbean. I look forward to this as it presents an opportunity to showcase the state of the domestic energy sector and to outline plans for the year ahead.

Trinidad and Tobago (T&T) is a small but influential energy producing country. Natural gas production currently stands at 3.6 Bcf per day and oil production at a low of 66,000bopd. Investment in the industry which had reached a low has picked up as upstream companies have committed to spend up to US\$10Bn over the next five (5) years.

In 2019, the upstream companies plan to drill fourteen (14) exploration wells compared with five (5) exploration wells in 2018. Shell proposes to drill one (1) well in Block 5d, BPTT one (1) each in Jasmine, Ginger and Coconut development areas, EOG two (2) wells in the Mentos and BHP, two (2) wells in Block 23 (a) and one (1) well in TTDA14, with the other explorations well being drilled by Touchstone and some of the Lease Operators and Farm-outs. An estimated sixty-six (66) development wells are projected for 2019 with approximately two-thirds being undertaken by Trinity, Lease Operators, Farm-outs and Incremental Production Sharing Contracts. The impact of the planned development activity will result in increased oil and gas production.

Natural gas production is projected to increase to 3.9Bcf per day in 2019, as new developments such as the BPTT Angelin Field comes on stream and production from Shell's Field in the East Coast Marine Area (ECMA), Starfish and Dolphin and De Novo's Iguana Field are optimized. Near term developments include Shell's Colibri project on the North Coast comprising Block 22 and NCMA 4, and on the East Coast

Block 5c. Discussions on a Gas Sales Contract for the Dragon Gas Field are in train as well as the development plans for cross-border fields with Venezuela, the Loran-Manatee and the Manakin-Cocuina.

Oil production has been declining steadily, but is projected to stabilize and increase in 2019. The Lease Operators, Farm-outs and Incremental Production Sharing Contracts have projected that their oil production will be maintained at 2018 level at approximately 8,000bopd. The new state-owned company Heritage Petroleum Company Limited which acquired the Petrotrin petroleum assets has also projected that oil production from its land and marine acreage would average of 30,000 bopd based on increased work-overs and a new drilling programme. The total production including equity production is projected at 40,000 bopd. In the near term, the company will be pursuing the development of the resources in its South-West Soldado acreage. In this regard, Heritage Petroleum has been reviewing 3D seismic on the block in order identify potential exploration prospects. Trinity Exploration and Production Limited is also gearing up to bring oil production on stream from its TGAL Field in the Galeota Block by first quarter 2020. It is estimated that production from this development could reach 5,800 bopd by 2024. In December 2018, BHP declared commerciality for its Ruby Field in Block 3a. Preliminary estimates indicate that production could reach as high as 10,000 bopd. The outlook for oil production in T&T is now therefore very promising and the South West Soldado Field and Ruby Field offers the best opportunity at this time to revitalize oil production in this country. Indeed, based on current information it is not an exaggeration that the future of the oil industry in T&T hinges largely on the future of the Heritage Petroleum Company.

Energy has and continues to be the main driver for the development of our economy, notwithstanding initiatives being undertaken with diversification. In that context, T&T and other energy producers as so aptly demonstrated by the Honourable Prime Minister in his presentation to the nation, is subject to the volatility of the global oil and gas markets.

Energy prices have been extremely volatile over the last three (3) years. Oil prices (WTI) which has been relatively stable over the period 2010 to 2014 dropped to US\$48 per barrel by 2015. This represented a decline of 49% from the average price for the period 2010 to 2014. The situation continued to deteriorate and in 2016, the WTI oil price fell to as low as US\$26 per barrel. There was an improvement in 2017, in which the WTI price averaged US\$50 per barrel and this continued with an average price of US\$65 per barrel in 2018, notwithstanding the collapse at the end of the year. Henry Hub gas prices also fluctuated with highs and lows. However, following a steep fall in 2016, prices have exceeded US\$3.00 per MMBtu annually.

The oil and gas industry is cyclical, with boom and bust cycles of high and low prices. The downside is that the industry pulls back on investment during the low price periods. It has been suggested that investment is at an all-time low in the global industry and this will have implications for future supply.

On the positive side, innovation doesn't stop during low price periods. Indeed it appears to be the order of the day, companies focus their efforts on efficiency in bringing oil and gas to market at lower cost. Some of these efforts focus on improving current processes, such as drilling longer laterals, and fracking more efficiently as in shale and tight oil and gas wells. While the US may have taken the lead in the advancement of such techniques other countries such Saudi Arabia and

Russia are all testing and using horizontal drilling and fracturing as the technology of the future.

The oil and gas industry has also seen a trend in the use of digital technologies including sensors, data analytics and automated systems to lower costs and improve efficiency. Digital technology has been around for some time and its adoption has only been accelerated due to downturns in the industry. It has been predicted that digital technologies have the potential by 2050, to increase production by four (4) per cent and reduce costs by thirteen (13) per cent.

The industry has also seen the development of new technology solutions that improve its capabilities in deep and ultra-deep waters. There have been advances in technologies for deep-water drilling, floating production, subsea wells tie-ins and tiebacks and hub design among others.

However, geophysical and geological data are the foundation information on which successful projects are built. They provide critical insights into structure, rock properties and in situ reservoir characteristics, which guide well placement, completion and production optimization strategies.

Seismic technologies have advanced from the reflective seismography which first revolutionized petroleum exploration in the 1920s to the today's advanced seismic technologies like Ocean Bottom Seismic and (Independent Simultaneous Source) technology, and processing technologies, like Full Waveform Inversion and Finite Difference Modelling. The development of these improved technologies have resulted in quantum leap in the quality of the reservoir image produced and in a process which is efficient and cost effective.

T&T oil and gas industry stands to benefit from the application of technology. We have already seen the positive impact of the introduction of advanced seismic technology.

In 2013, BPTT conducted a Columbus basin seismic survey which was designed to progress resources and to discover new prospects in existing and future major gas fields. The 1,000-sq km (386-sq mi) high-density, 3D, ocean-bottom sensor programme was the first commercial use of the Independent Simultaneous Source (ISS) technology with seabed acquisition. The application of the advanced technology was instrumental in adding significant proved reserves to its Angelin Gas Field beyond its original estimate of 1.5Tcf.

From March 2014, until mid-February 2015, BHP conducted a staggering 20,000-square-kilometre 3D-seismic survey in the deep-water blocks for which they had successfully signed production sharing contracts in 2012, and 2013. The survey was the largest undertaken by an international oil company globally, covering an area nearly four (4) times the size of T&T's land mass, and utilized the ultra-capacity vessels Ramform Titan and Ramform Atlas. The results of the survey were instrumental in identifying gas prospects and ultimately discoveries in Block TTDA5 and more recently in TTDA14. The application of seismic technologies was also utilized by BHP in isolating hydrocarbon deposits in Block 3a to the extent that the company is now in a position to develop these resources.

The use of advanced seismic technology is now widespread throughout the industry and has given a new lease on life in the domestic oil and gas industry particularly the so called mature fields. All of the energy companies have been re-appraising their portfolios with some degree of success. In fiscal 2018, upstream companies

drilled in excess of fifty (50) wells with a fair degree of success. This augurs well for the industry and the future.

Armed with the new geological data, the Ministry of Energy and Energy Industries (MEEI) has been re-evaluating marginal gas fields with the objective of producing hydrocarbons in these fields. A study undertaken by the MEEI estimates reserves of these fields in the region of three (3) to five (5) Tcf. One of the challenges faced in developing these fields is the cost of the infrastructure associated with their development. However, the problem is not unsurmountable. Hub design has come a long way and solutions can be found. In the case of facilities that are underutilized, tiebacks can cause the reserves in marginal fields to be economically produced. However, if such facilities are not available the operator or operators can establish a common hub from which such fields can be produced.

There is an extensive infrastructure network in our domestic energy sector. As Minister, I strongly advocate among upstream companies the collaborative development/operation of hub infrastructure either through joint ventures or accommodation of multiple operators by a third party. Such arrangements will allow for the economic development of marginal gas fields.

The majority of these fields are in acreage held by upstream companies under licence or contract. Accordingly, the MEEI will be engaging the companies on a strategy for the development of these resources.

In 2019, the Ministry hopes to issue new acreage arising from our shallow water bid round for blocks in the marine areas of the north, east and west coast of Trinidad, namely: NCMA 2, NCMA 3, Block U (c), Block 4(c), Lower Reverse L and Block

1(b) in the Gulf of Paria. There has been a strong interest by the major upstream companies and we look forward to a positive outcome. The contract arrangements for these blocks will be based on the new model Production Sharing Contract in which royalty will now be paid by the contractor. This is keeping with Government's philosophy that the state must be assured a steady stream of revenue which this modification ensures.

Thereafter, the MEEI will be considering the launch of a new deep-water bid-round. The Ministry proposes to re-invite nominations on the available open deep-water blocks, which in 2017 had engendered interest in nine (9) blocks. The bid-round will be informed by advanced seismic data currently in the Ministry's possession and the results of a multi-client survey commissioned by the Ministry.

The survey which is named the Caribbean Atlantic Deep Margin Deep Imaging Seismic Survey is for the acquisition of 2D seismic data over the Tobago basin, offshore T&T. The shooting of prime lines (full fold) started on January 8, 2019 and is 50% completed. The survey comprises two components, one local and the other regional. The local component of the survey will be conducted in the deep-water blocks on the North West Marine Area off Tobago and covers 2,059 kilometres. The regional component encompasses the marine areas of Trinidad and Tobago, Grenada, St Vincent and Barbados and will cover 11,500 kilometres. The conduct of the regional survey is a testimony to the interest shown by major oil and gas companies in the Caribbean in the search for new hydrocarbon resources.

In the longer term, the Ministry is excited about prospect of acquiring new marine acreage. T&T, as a coastal state, is a signatory to the UN Convention for Law of the Sea, and we are currently seeking to delineate the outer limits of our continental

shelf, beyond two (200) hundred nautical miles in accordance with Article 76 of the Convention. The delineation of T&T's continental shelf beyond its EEZ would put this country in a position to exploit the natural resources to be found on that extended portion of its continental shelf. We submitted our claims to the Commission in April 2009 and are currently preparing to defend our claim to the UN Sub-Commission when called upon to do so, which we expect could be later this year.

Our claims to the United Nations Commission on the Limits of the Continental Shelf, if successful, would extend our maritime jurisdiction seawards to the outer edge of our continental margin. This would be major development as it would extend our boundaries to areas in close proximity to the Guyana-Suriname Basin in which major hydrocarbon discoveries have already been made.

While the UN Commission approves the claim submitted by each country it does not determine ownership. T&T will therefore have to engage in negotiations with Barbados, Guyana, Suriname and French Guiana to apportion ownership. This country therefore has an opportunity to increase its access to potential oil and gas resources. However, opportunities are like sunrises, if you wait too long you miss them. You can therefore be assured that we will pursue this matter aggressively.

The global focus on clean energy has given rise to the view that oil and gas are endangered commodities. But the history of the oil and gas industry has been one of continuous challenges, matched by adaptation and innovation. The oil and gas sector has, from its outset, always been wide open to innovation and every kind of modern technology. Technological advances have constantly shaped and re-shaped every stage of our industry, from exploration right through to final usage.

The modern collection and analysis of seismic data, for instance, is far removed from the rudimentary methodology employed in early oil and gas exploration. Floating production storage and offloading (FPSO) and floating liquefied natural gas (FLNG) vessels are just a few of new developments that demonstrate the advancement by the industry.

Other technological improvements such as the development of horizontal drilling and hydraulic fracturing (or fracking) techniques has allowed the commercial exploitation of the massive unconventional oil and gas resources. As a consequence, the US to whom T&T once supplied up to 75% of its imported LNG is now a major exporter of LNG.

In a world, where energy consumption is set to increase by around a third or so by 2040, according to BP 2018 Energy Outlook, there has to be an accommodation between fossil fuels and renewables. What is required is the application of research and development to meet the growing global energy needs in a cost effective and efficient manner whether in unconventional oil and gas, or in renewables like wind and solar energy.

It has been reported that the oil and gas industry does see not competition from other sources of energy as a threat, but as a driver for competition. In this regard, technology is being pursued and applied primarily to enhance the industry's efficiency and competitiveness, which translates into higher returns.

Therefore, there should be no reason why the oil and gas sector should be on a collision course with renewables, with world emissions restraint, or major changes in energy use or the pattern of energy demand. Indeed, many energy companies have

been diversifying their portfolios to support the global energy push to a cleaner and greener future. Technology is evolving at an extremely rapid rate. Artificial intelligence applications and the new possibilities of digital technology represents the new frontier of technology. As these technologies become established and systems such as carbon capture, storage hydrogen utilization, and electricity storage become commercially viable, these will not provide setbacks, but rather exciting new opportunities in combination with the hydrocarbon sector.

The Government of the Republic of Trinidad and Tobago (GORTT) views renewables as complementary energy sources to oil and gas. In this regard, we have set a target of 10% renewable power generation by 2021. Pursuant to this objective we have embarked on a Waste to Energy Project and a Utility Scale Renewable Energy Power Generation Project. We have issued RFPs in respect of both projects and have had positive responses to date. The deadlines for submission are February 26, 2019 for the Utility Scale Renewable Energy Power Generation Project and May 31, 2019 for the Waste to Energy Project.

The production of electricity from renewables has seen a dramatic fall in costs. The International Renewable Energy Agency (IRENA) has reported that over the last decade the cost of generating power from onshore wind has fallen 23% and 73% from photovoltaics. Technological advances have made power generation from renewables competitive with that generated by fossil fuels. IRENA has reported that the cost of generating power from onshore wind is US\$0.06 per kilowatt hour and US\$0.10 per kilowatt hour from solar photovoltaics. This compares with the average cost of US\$0.047 charged by T&TEC. As a result of new technological developments the cost of generating power from renewables is predicted to continue to fall.

In face of the competition from renewables and movement to clean energy, oil and gas companies will need to increase their investment in research and development. Historically, oil and gas spend approximately one per cent of net revenue on research and development. However, this is changing, and oil and gas companies are increasing their investment in new technologies.

These new technologies are shaping the industry's operations, unlocking resources previously considered unattainable, and resulting in improvements in efficiency and productivity, while reducing the impact of operations and products on the environment.

The sheer scale of the portfolio and investments of oil and gas companies in new technologies is a major indicator of their commitment. It is a testimony to the industry's continuous efforts to overcome contemporary threats, armed with technology and taking a long-term view rather than short-term.

As a Government, we share the same view with the industry and sees innovation as a means of ensuring the relevance of this industry. We do have operating in T&T upstream companies that have the same outlook and are committed to ensuring the industry is competitive. Therefore, we are of the view that the domestic energy sector is on solid footing.

In confronting the future, it is those companies that innovate and invest that will remain competitive and so meet the challenges of the ever changing energy landscape.

In closing, I wish to congratulate the Energy Chamber for staging yet another successful Conference, and I wish all participants an enriching experience not only from the Conference's deliberation but also the from the sight and sounds of our lovely twin island Republic.

I thank you