

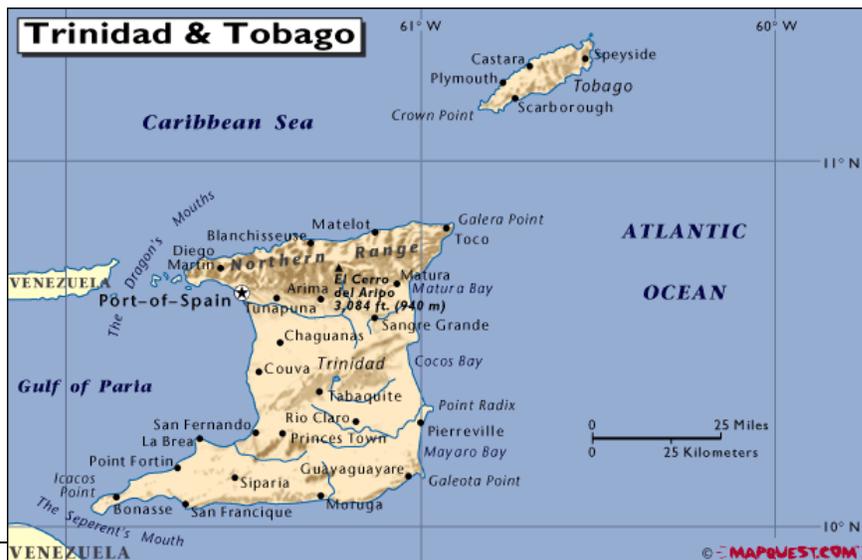
Trinidad LNG Project¹

Trinidad and Tobago's Atlantic Liquefied Natural Gas plant exported its first shipment of LNG on April 19, 1999 making Trinidad the 10th country in the world to establish a liquefied natural gas facility. The Atlantic LNG plant is the second to be constructed in the Western Hemisphere and has a nameplate capacity of 3 MMtpa. At a total cost of \$1 billion, this is the largest single foreign investment in the Caribbean and it is expected to open new doors and to promote T&T as a good destination for foreign investments. In March 2000, the Trinidad government has approved a two-train expansion that would triple the plant's capacity.

In a recent interview the Minister of Energy was asked: "How do you see the energy sector in the future in terms of contribution to employment, GDP, foreign exchange earnings?"

Minister: The energy sector will continue to be the primary catalyst for economic and industrial growth and development for the short, medium and long terms. What we have to do is establish the forward and backward linkages, which will allow the energy sector to support an even more vibrant manufacturing sector in this country. The availability of cheap natural gas will fuel other aspects of the manufacturing sector that will deepen and widen our industrial base. The level of contribution to GDP, foreign exchange earnings and employment will continue to occupy the premium place in the economy of Trinidad and Tobago at least, for the next fifteen years.

- *What did the government of Trinidad & Tobago do right to make this project succeed?*
- *How can forward and backward linkages be established to the LNG project that will promote additional growth in the economy of Trinidad and Tobago?*
- *How can the Trinidad & Tobago maximize the benefits from future foreign direct*



¹ This case study was prepared using publicly available information.

investments?

Background

Trinidad and Tobago is a twin-island Republic, with a population of 1.29 million people and a land area of 5,128 sq km., which became independent of the United Kingdom in 1962. It is a constitutional democracy with executive, legislative and judicial branches of government operating independently within a stable political environment. Trinidad and Tobago has earned a reputation as an excellent investment site for international businesses.

Successful economic reforms were implemented in 1995, and foreign investment and trade are flourishing. Persistently high unemployment remains one of the chief challenges of the government. The petrochemical sector has spurred growth in other related sectors, reinforcing the government's commitment to economic diversification. Prior to 1908, which saw the start of commercial crude oil production, the country's economy was based on sugar exports. Despite the fact that crude oil production is on the decline, Trinidad and Tobago's energy industry is a vibrant one. The GDP per capita was \$6,186.3 in 2000 (growth of 7.9%)

Energy Profile

Trinidad and Tobago is by far the Caribbean's largest producer of oil and gas, with 2001 oil production averaging about 119,000 barrels per day (b/d) and natural gas production of 1.1 billion cubic feet per day (bcf/d). The country's oil revenues alone accounted for about a quarter of the country's GDP as recently as 1997, though oil production is slowly declining. Oil revenues still constitute the largest earner of foreign exchange for the country. Crude oil reserves, at an estimated 686 million barrels, are expected to last only another decade. Natural gas reserves, however, at an estimated 23.4 trillion cubic feet (tcf), are expected to last for about 60 years. Significant gas discoveries occurred in 2000-2001. Gas is expected to surpass oil as the main revenue earner for the country in the near future.

Fossil Fuel Reserves, Production and Consumption in Trinidad & Tobago (01/01/2002)

	Proved Reserves	Production	Consumption
Oil	98 million t. (716 mmbbbls.)	6 MT/yr (119,000 b/d)	1.1 MT/yr (21,620 b/d)
Natural Gas	0.7 tcm (23.4 tcf)	11.4 bcm/yr (1.1 bcf/d)	9.3 bcm/yr (0.90 bcf/d)
Coal	None	None	None

Source: Energy Information Administration, BP World Energy, OGJ online

Trinidad has 1,253 MW of thermal generation capacity, mostly fueled by oil and gas. In 1998, the country generated about 4.9 TWh of electricity and consumed about 4.5 TWh with the difference recorded as the system loss.

Both gas and oil exploration activities in Trinidad and Tobago continue at a fast pace. Nevertheless, recent oil discoveries at best have only made up for the declining production in existing wells, with overall production declining steadily since its peak in 1981. The government has encouraged new exploration, based on estimates that deep-water blocks off the East Coast of Trinidad could contain up to 1 billion barrels of oil, but there also is a major effort underway to find additional oil onshore. In 2003, 7 exploration wells have been or will be drilled offshore² blocks. In addition, the Energy Ministry offered seven offshore

² The Trinidad Geological Research Centre, <http://www.kpagroup.com>

blocks, all located adjacent to blocks containing proven reserves, in a 2001 competitive bidding round. Another round is scheduled to commence in May of 2003 for 9 blocks

Trinidad and Tobago has become one of the major gas development centers in the world. Gas is used for electricity and petrochemical production, as well as heavy and light industry. Trinidad now has eight ammonia complexes (with a ninth under construction), five methanol units, a urea plant, and an iron and steel complex. Trinidad is the world's leading exporter of both ammonia and methanol. Large gas discoveries have been made recently. In May 2000, BP, in partnership with Spain's Repsol, made a 2 tcf find off the southeast coast of Trinidad. In October 2000, BP made the largest single energy discovery in Trinidad and Tobago's history, with a large find east of the southeast coast, equivalent to 630 million barrels of oil. BP is continuing its exploration program in the area, with the company estimating that the local gas basin's reserves at about 100 tcf. In June 2000, BHP Petroleum (subsidiary of Australia's BHP) announced that it made a second natural gas discovery off the northeast coast of Trinidad.

In June 2000, it was announced that U.S.-based Reema International would construct, own, and operate a Gas-to-Liquids (GTL) plant on Trinidad's western coast. It will cost an estimated \$300 million and will convert 100 Mcf/d of natural gas into 10,000 b/d of various petroleum products. Shell International Gas Ltd. is conducting a feasibility study for a GTL plant in Trinidad as well.

The LNG Project

The present LNG project had its genesis in 1992 when Cabot LNG Corporation, the largest LNG importer in North America, approached the National Gas Company (NGC) to discuss the possibility of purchasing natural gas from Trinidad and Tobago. The fact that the initiative was made by a gas buyer, immediately securing a market for the product and BP and British Gas' desire to find outlets for their gas reserves, combined with the active involvement by the NGC based on its mandate to source foreign investments for Trinidad & Tobago's energy sector made the LNG project worth investigating.

As a result, Cabot LNG Corporation, BP, British Gas Trinidad Inc. and the NGC signed a Memorandum of Understanding in late 1992 to investigate the feasibility of establishing an LNG export project based in Trinidad and Tobago.

Preliminary feasibility studies carried out between 1993 and 1994 confirmed the economic viability of the project as originally configured by the signatories. The project partners subsequently awarded contracts for preliminary process engineering and geotechnical studies in late 1994 and site preparation and infrastructure work commenced on the site of the proposed plant at Point Fortin.

In 1995, the Atlantic LNG Company of Trinidad and Tobago was formed. The shareholders are British Gas Trinidad LNG Limited, 26%, BP Amoco Trinidad (LNG) B.V 34%, Repsol LNG Port of Spain B.V 20%, Cabot Trinidad LNG Limited 10%, NGC Trinidad and Tobago LNG Limited 10%.

The Atlantic LNG development philosophy focuses on fast track development that is market driven. Utilizing proven technologies and equipment, the plant design is relatively small-scale but reliable, efficient and conforming to world class standards. From concept to initial production, the Atlantic LNG project took just six and a half years compared to the worldwide average development time of fourteen years for similar projects. The credit for this goes in part to the Government of Trinidad and Tobago and its management of the country's gas reserves.

The LNG plant was constructed at a cost of \$1 billion plant on a 120-acre site, which enjoys the benign marine environment of Trinidad's Gulf of Paria and its sheltered harbors. The



facility has its own harbor and jetty, which can accommodate LNG tankers ranging from 70,000 to 135,000 cubic meters in size. There is also an approach channel and a turning basin. East of the island is the Atlantic Ocean where the gas fields that supply the plant are located. BP Amoco Energy Company of Trinidad and Tobago supplies 452 MMcf/d of gas for the plant under a 20-year supply agreement. The NGC owns the pipeline constructed by BP Amoco, which transports natural gas to the plant.

Sales agreements to supply 3 MMtpa of LNG were signed with Cabot LNG Corporation and Enagas who will respectively purchase 60% and 40% of LNG produced. Cabot and Enagas will also supply carriers for shipment to Boston, Puerto Rico and Spain. BG Shipping has chartered two LNG carriers, the Methane Polar and the Methane Arctic, to one of the LNG buyers, Enagas, for deliveries to the Spanish market. The first shipment left the plant in April 1999 and was delivered to the North American market. The plant passed its performance tests and formal hand over of the plant by the contractor, Bechtel, took place in June 1999. Full commercial (take or pay) deliveries commenced in August 1999. The Atlantic LNG plant becomes only the second commercial LNG export plant in the Western Hemisphere in the last 30 years.

The natural gas cooling and conversion processes costs about \$1.50 per MMBtu. The LNG is priced based on a netback pricing arrangement, i.e., market price minus shipping, regasification and distribution cost. The market price for gas sold in Spain is linked to a basket of oil prices while the price for gas sold in the U.S. is linked to the U.S. natural gas market. The wholesale price of gas in the U.S. was about \$2.00 per MMBtu for most of the 1990s when the project decisions were taken. Gas prices in the U.S. soared to near \$10 per MMBtu in 2000 and then settled into a range of \$5 - \$6.

ALNG Expansion, Trains 2, 3 & 4

The Finance Minister and the President of Atlantic LNG signed an agreement for an expansion of the Atlantic LNG facility at Point Fortin, Trinidad, on March 13, 2000. Train 2 was completed in August 2002 and has commenced exports, while the third train will commence operations in the second quarter of 2003. Trains 2 and 3 will each have a production capacity of approximately 3.3 MMtpa, which is about 10% greater than that of Train 1. BG and its North Coast Marine Area Partners (NCMA) a partnership of BG, Petrotrin, the state-owned Trinidad oil company, Veba of Germany and AGIP of Italy, will supply 50% of the required gas for Train 2. The other 50% would be supplied by BP and for Train 3 (BP with 75% and BG with 25%). Table at the end provides a comparison of the Trains 2/3 project features and the Train 1. Talks began in late 2002 about the construction of a fourth LNG train at the site and are currently in the planning stages.

While 3.5 tcf of gas has been earmarked to support Train 1 production over a 20-year period, the 2-train expansion proposed to utilize some 7.7 tcf of gas over a similar 20-year period. Current proven and probable reserves of natural gas in Trinidad and Tobago are estimated at 23.4 tcf. BP estimates that a total of 100 tcf of gas will be found.

The largest share of total expansion output, 62%, has been committed to the Spanish conventional and power markets. The remaining 38% are slated to be sold into the United States market, principally to the southeast, through the refurbished Elba Island Terminal.

Sonat Energy Services, a subsidiary of the Houston-based El Paso, which is a major operator of natural gas pipelines in the southeast U.S., will purchase most of the output share of BG & its NCMA Partners from Point Fortin Exports Limited. El Paso will reactivate its Elba Island LNG import Terminal in Georgia, USA in order to take the Trinidad-produced LNG. The terminal had been dormant since 1980. Final approval to reactivate the terminal was granted by U.S. Federal Energy Regulatory Commission (FERC) on March 15, 2000.

Repsol and its affiliate, Enagas, will purchase most of the BP output share of Trains 2 and 3, increasing their take of Trinidad LNG from 1.2 MMtpa to 5 MMtpa. The Repsol product is destined for the Spanish market for use in both the conventional gas market and for power generation. Cabot, who currently takes 60% of Train 1 product, will also purchase LNG from the expansion.

The project is expected to cost about \$1 billion and will be funded by the shareholders. This means the expenditure of \$150 million on locally supplied goods and services between project start-up and the end of 2002, when construction is due to be completed. The first shipment is targeted for around August 2003. Until the ALNG project, it was not profitable to produce the dry gas from this area. The project will have far-reaching consequences and benefits for the economy since it creates the ability to produce plastic raw materials for many of the local companies. The country is committed to the maximization of locally produced inputs in projects of this nature and has been liaising continuously with Bechtel Ltd in order to maximize the local content of this expansion.

Train 3 was commissioned on April 28, 2003, a full 2 months ahead of schedule, signaling the completion of the 2-train expansion project which began in first quarter 2000. The 2-train expansion project cost US\$1.1 billion. Train 2 was also completed ahead of schedule on August 12, 2002. The expansion increases Atlantic's current LNG export capacity to about 9.9 MMtpa from 3.3 MMtpa in 2001. Thus Trinidad and Tobago moves up in the world LNG industry rankings to fifth after Algeria, Indonesia, Qatar, and Malaysia.

In April of 2001, shareholders (same as Train 1) agreed to undertake Front End Engineering and Design (FEED) work for consideration of a 4th train. Production is estimated to be 4.8 MMtpa – but the government is reported to be demanding a bigger share of revenues from the proposed Train 4. Hard bargaining by the government has already forced the project partners to move the startup date to mid 2005. Other concerns by the government was that with Train 4, the LNG industry would control about 80% of the country's current proved gas reserves thereby making Trinidad overly-dependent on gas export.

Impact of LNG on the Economy

Although the LNG project is itself significant by virtue of its size, this pales in comparison to the contribution of petrochemicals (ammonia, urea and methanol), which cumulatively contribute 4.5 to 5% of GDP per annum. The GDP would increase marginally in the value added in the petroleum sector and also marginal improvement in value added in finance, insurance and real estate.

The outlook for employment is not promising. The production of LNG is even more capital-intensive than other gas-based industries, and the industry traditionally uses minimal labor upon completion of the construction phase. While there will be openings for mid to highly qualified personnel, national employment levels will remain largely unaffected. In the short term, (during plant construction and site preparation), net employment will increase by approximately 3,000 people, but the employment created will not be permanent. Permanent employment for the plant is estimated at 140 persons, 90% of who will be citizens of Trinidad and Tobago.

The LNG plant is likely to exert some influence on the foreign exchange market. Given that LNG sales are tied into long-term take-or-pay contracts, the estimation of a revenue stream becomes predictable. Preliminary estimates point to the cumulative effect of LNG over twenty years, assuming three trains in production, at \$5.5 billion or \$6 billion. Indirectly, the LNG plant will impact positively upon government revenues via dividends and profits realized by the NGC (a minority partner in the project) and increased petroleum tax revenue from BP due to increased gas sales.

How Trinidad and Tobago Benefits

TRAIN 1	TRAINS 2, 3
Gas supplier: BP	Gas suppliers: BP & Repsol, BG, AGIP, VEBA & Petrotrin
Local Content: U.S.\$100m(minimum)	Local Content: U.S.\$150m(minimum)
	Establishment of an Environmental Chair at the University of West Indies (UWI) - U.S.\$100,000 per year for 7 years
Funding for NESC: U.S.\$ 8m initially and U.S.\$5m over 20 yrs	Funding for NESC's Trinidad and Tobago Institute of Technology - U.S.\$5m initially and U.S.\$3m over 20 years
All costs relating to training for 20 nationals to promote transfer of technology	All costs relating to on- the -job training of apprentices and professionals for periods of 6 months to 3 years
Preference to qualifying local contractors in the award of sub- contracts	Preference to qualifying local contractors in the award of sub- contracts
Sale of natural gas liquids (NGLs) to Phoenix Park Gas Processors Limited	Undetermined
Inclusion in plant design of technical capability to install equipment for ethane extraction	Supply of all available ethane to the Government of Trinidad and Tobago
Fiscal terms: Total relief from Corporation tax for a 10-yr period Total relief from customs duty and VAT on imports relating to plant construction only No withholding tax on dividends	Fiscal Terms: No tax holiday No withholding tax relief on dividends Normal customs exemptions No VAT relief