TRINIDAD AND TOBAGO:
FROM OIL TO NATURAL GAS

By T.M. Boopsingh*

ABSTRACT
This paper reviews some of the critical economic and financial aspects of the gas-based industrial development which has taken place in Trinidad and Tobago over the past two (2) decades. The review notes the persistent dependency of the Trinidad and Tobago economy on petroleum-based export earnings since World War II. It shows that while the economy is still dependent on petroleum (crude oil, petroleum products and natural gas) for export earnings, the dependency on oil (crude and petroleum products) has fallen considerably from its peak of more than 94% of total export earnings in the early 1980's. Price and production declines for oil have contributed in no small measure to that decline. Two distinct strategies and time periods which were critical to the financing and establishment of the gas utilising projects are identified. It then concludes that by the year 2000, oil will only be responsible for approximately 35% of total export earnings, with the earnings from gas-based industry generating a comparable percentage amount as the gas export output becomes considerably enhanced by the completion of the Liquefied Natural Gas (LNG) plant at Point Fortin. Some diversification in product output - LNG, Fertilisers and Methanol - also accompanies the shift in dependency from oil to gas, and non-petroleum exports are expected to reach their highest ever level of approximately 30% of total export earnings by the year 2000.

BACKGROUND
Trinidad and Tobago is a twin island state at the southernmost end of the chain of islands which comprise the West Indies. One and a quarter million people occupy the two islands which became one independent country in 1962. Heavily dependent on crude oil and refined petroleum products for its export earnings, crude oil production peaked in 1978 at an annual average production level of 228,000 barrels of oil per day, with oil accounting for almost two-thirds of government revenues, four-fifths of export earnings and representing one-quarter of Gross Domestic Product. Arising out of a fortuitous combination of new oil discoveries, which came onstream in 1972, and the sharp increases in oil prices in the next few years, approximately US$12,000 million was collected by the state as surplus windfall revenue over the period 1974-1985, this in a country whose total GDP was US$1,080 million in 1972. GDP now stands at approximately US$5,000 million.

The principal challenges for the country after independence in 1962 were typical of those facing any other developing country, namely; those relating to capital availability, technology acquisition, organisational development and management skills. However, of critical importance as it is for all the other West Indian territories, is the size of the islands, their populations and their markets. The limitations imposed by these factors on the usually fledgling domestic capital markets are therefore very relevant to the successful establishment and financing of energy development. As such, while the windfall income provided much needed domestic capital, the role of the foreign private sector, and particularly the petroleum companies in Trinidad and Tobago, continued, as it has since World War II, to be critical to the health of the economy.

The discovery of new oilfields in the late 1960's ended in 1975 but it was accompanied by a string of continuous gas discoveries. Oil production therefore

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went into decline from 1978. Figure 1 shows the data from 1978 to 1996.

However, gas continued to have a high exploration success ratio. As recently as 1994, Amoco announced that all three wells in a new exploration programme designed to meet reserve requirements for a LNG project were successful and had by themselves added almost 2 trillion cubic feet of gas reserves. Reserves are currently estimated at 18.0 TCF as shown in Table 1.

1.0 THE OIL BOOM PERIOD: 1975 - 1985

The existence of these large reserves of natural gas and the now domestically available capital thus became the basis on which a major industrial thrust was launched in order to provide a sustainable basis for export earnings well into the future. This has seen natural gas utilisation rates growing from approximately 100 million cubic feet per day in 1978, to almost 700 million cubic feet per day currently as shown in Figure 2.

The capital investments made in that first period as shown in Figure 3 amounted to approximately US$3.3 billion being invested in the energy sector alone, the bulk of which constituted investments in infrastructure and in the development of gas-based industries in order to create the domestic gas market for the substantial gas reserves which had been identified.

The Table shows a breakdown on this capital expenditure, with 54% of the US$3.3 billion as borrowings, more than two-thirds of this being from commercial sources. US$0.5 billion was obtained through financing in other areas such as trade and construction-related financing. The commercial debt itself was ascribed to in an approximate 55:45 ratio as a liability to the government/private sector. The equity from the private sector was about US$500 million of which approximately two-thirds (2/3) was in exploration and production upstream. Government equity of US$1 billion was thus the key to the establishment of the Point Lisas Estate.

Bud Fackrell, Amoco Trinidad’s Resource Development Manager, in an article on Trinidad and Tobago in the first edition (1995) of the Petroleum Economist’s World Gas Yearbook states that the following three “significant features of the evolution of the natural gas market (in Trinidad and Tobago) should be noted:

Most of the gas reserves were discovered while exploring for oil during the period when oil prices were high;

Market development involved significant levels of capital investment by the government on both plant and infrastructure;

The development of the industry was essentially demand-driven. Investment decisions in gas-based plants provided the basis for NGC (the National Gas Company) to seek new suppliers. Supply responded to demand;”

Apart from the pipeline infrastructure which brought gas to the site, the estate initially comprised three worldscale 350,000 tonnes per annum ammonia plants constructed under joint venture arrangements with Amoco and W.R. Grace, as well as worldscale Urea and Methanol Plants and a mini Iron and Steel Complex. A new electric power plant (300 mega watts),

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<table>
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<tr>
<th></th>
<th>PROVEN</th>
<th>DISCOUNTED PROBABLE</th>
<th>DISCOUNTED POSSIBLE</th>
<th>TOTAL GAS RESERVES</th>
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<tbody>
<tr>
<td>East Coast Marine Area</td>
<td>9,065</td>
<td>2,343</td>
<td>1,805</td>
<td>13,213</td>
</tr>
<tr>
<td>North Coast Marine Area</td>
<td>2,990</td>
<td>1,369</td>
<td>65</td>
<td>4,424</td>
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<tr>
<td>West Coast Marine Area</td>
<td>195</td>
<td>88</td>
<td>30</td>
<td>313</td>
</tr>
<tr>
<td>South Coast Marine Area</td>
<td>50</td>
<td></td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>Trinidad &amp; Tobago</td>
<td>12,300</td>
<td>3,800</td>
<td>1,900</td>
<td>18,000</td>
</tr>
</tbody>
</table>

All Gas reserves in Billion Cubic Feet (Bcf).
Source: Ministry of Energy & Energy Industries, Trinidad & Tobago

Table 1: Estimate of Natural Gas Reserves (Trinidad & Tobago)
as well as new dock and harbour facilities, and a gas collecting/compression offshore facility also constituted the investments related to the creation of the Estate. Figure 4 shows the impact of these investments as a share of energy exports in 1990.

Towards the end of this period, the Government of Trinidad and Tobago also purchased the Tesoro minority shareholding of a joint-venture oil producing company, the Trinidad-Tesoro Petroleum Corporation, and acquired as well some refining, land production and real estate assets from Texaco for a combined total of approximately US$300 million.

Figure 5 shows the data for the period 1986-1996 in which follow-up investments in the energy sector, now totalling approximately US$3.2 billion were made.

These investments exclude the capital required for gas production, transmission, liquefaction and shipping for LNG. What is noticeable about investments during this period is that Government equity contracted considerably to just US$200 million and while private equity rose only marginally from US$500 million to US$600 million, the extent of the debt commercially contracted through the private sector increased to almost double the amount in the previous period, to US$1.1 billion. Total debt financing for this second
Figure 2: Natural Gas Utilisation (1978 - 1996)

Figure 3: Capital Investment in Energy
US$3,300 Million (1975 - 1985)
Figure 4: Energy Sector Exports (1990)

Figure 5: Trinidad & Tobago Capital Expenditure on Energy (1986 - 1996)
Total Investment - US$3,200 Million
1975  - Expansion of offshore gas pipeline system. A 16-inch 26-mile offshore gas pipeline was built by the Government and project managed by Amoco. Exploration starts on four (4) new offshore blocks.


1978  - A joint venture (Government and W.R. Grace) 400,000 tonnes/year ammonia production facility commissioned (Tringen I).

1979  - A new power station (300 Mega Watts) commissioned by Trinidad and Tobago Electricity Commission (T&TEC) at Point Lisas Industrial Estate. New dock and harbour facilities commissioned (NEC).

1980  - A 100% state-owned, world-scale, mini-steel mill commissioned at Point Lisas (ISCOOTT).

1981  - Two offshore platforms commissioned to collect 100 million cubic feet of flared gas by National Gas Company (the Flare Gas Project). Onstream factor 90+%

1983  - A new 30-inch, 40-mile, cross-country gas pipeline and a 30-inch 40-mile offshore pipeline commissioned (NEC). A new 100% state-owned 450,000 tonnes/year Methanol facility commissioned by NEC. Onstream factor 90+%. New Offshore gas production facilities in the Cassia field commissioned by Amoco.

1984  - A 100% state-owned 534,600 tonnes/year Urea producing facility commissioned by NEC. Onstream factor 90+%

Table 2: Energy-based Industrial Developments (1975 - 1985)

period increased to US$2.4 billion or 75% of the total investment. The quantity of finance which has been generated from sources other than the conventional ones increased to US$800 million, some of this coming from, for example, cash flows from existing plants or Section 936 of the US IRS tax code. The 936 funds were used to form the backbone of the financing programme for a joint venture, 650 mmmscf/d liquids recovery/gas stripping plant between Conoco and the National Gas Company and the development of two gas-producing platforms by Amoco.

Tables 2 and 3 list the principal new projects undertaken during the two identified periods. Figure 6 shows the comparison between the data for the two periods.

A more careful analysis of the two periods will identify the years 1979-1983 as being representative of the first period and 1992-1996 as being representative of the second period, with almost 10 years elapsing during the two critical periods as the country sought to deal with the dramatic change in its economic fortunes. Figure 7 provides the export earnings data for the entire period since 1964, showing the increasing role of natural gas in generating hard currency.

2.0 REFORMS
Since it was by 1990 widely recognised that it is private capital which will constitute some 70%-80% of the investment funds required to meet the global energy needs of the future, the country’s experience showed that it possessed several important and overarching ingredients, which were critical in any recipe for success at further development of the natural gas industry in Trinidad and Tobago.

These ingredients were:

- An experienced and highly skilled human resource base;
- Reasonably good infrastructure;
1988 - Further expansion by 400,000 tonnes of ammonia production (Tringen II - Government and W.R. Grace). Onstream factor 90 + percent.

1990 - Trintomar gas producing platform brought on stream (Trintoc, Trinopoc and NGC).


1994 - Amoco brings onstream gas production from the the Flambuoyant and Immortelle platforms.


Table 3: Energy-based Industrial Developments (1986 - 1996)

- An excellent literacy and communication capability;
- Political stability;
- A known framework of law and its equitable application;
- Clear and non-arbitrary decision-making by the authorities;
- A record of economic success or reliably good prospects;
- Satisfactory interest and dividend levels and freedom of remittances and receipt of interest and principal;
- Appropriate taxation regimes; and
- Sufficiently attractive local rates of return.

In summary, the right enabling environment for the critically needed capital was now available in Trinidad and Tobago. It should be obvious that in these circumstances, the need for local private capital to be involved is helpful. This is a need which cannot be taken for granted, particularly in small and developing countries, given the size of investments in energy and the relatively small and non-risk taking nature of the domestic holders of capital in these countries.

Apart from capital, further energy development also needed to take into account some other obvious requirements which are complementary and closely intertwined with success at financing, but which differs
Figure 6: Capital Expenditure on Energy (1975 - 1996)
(a) Capital Investment in Energy from 1975 - 1985 (US$3,300 Million)
(b) Total Investment from 1986 - 1996 (US$3,200 Million)
depending on whether the development being contemplated is oil, gas, electricity or renewables. Thus, the following three factors were also seen as crucial:

- Access to markets,
- Access to technology, and
- Access to new management skills

During the later period, i.e., 1986-1996, there was the sale of the Iron and Steel Company, the government’s (51%) interest at one of the fertiliser complexes, 100% of the Urea Company, and the partial sale (45%) of the Methanol Company as well as 49% of the power-generating facilities on the island. Receipts from these sales totalled approximately US$450 million.

Policy reform in energy accompanied the divestments, affecting most directly, the state-owned oil sector, a sector which had never been dominant and now represents less than 15% of the energy sector in Trinidad and Tobago. Merging and rationalisation of the assets and systems of the two principal state oil companies was completed in 1995/96. Restructuring and the increasing use of private capital have followed. The restructuring involved the identification of the core petroleum assets, the stripping and sale of the non-petroleum activities, the privatisation of land-producing petroleum properties through farmouts and lease operatorships, as well as the sale/closure of spare and obsolete refining capacity. A US$400 million loan

![Graph: Trinidad & Tobago's Petroleum Earnings as a Percentage of Total Exports](image)
from the Inter-American Development Bank had been utilised to invest in new secondary recovery-producing activities but more particularly, to upgrade and modernise the core Refinery at Pointe-a-Pierre; this being the only refinery remaining in the islands and an important one in the southern Caribbean and a key to Petrotrin's (The Petroleum Company of Trinidad and Tobago) strategy to become an active and fit competitor in the international arena.

In the area of retail petroleum activities, no subsidies exist on gasoline and petroleum products except LPG. Deregulation and demonopolisation of the state-owned National Petroleum Marketing Company, a domestic retail monopoly, is now officially underway, an Amoco CNG filling station becoming the first new non-nationally owned retail outlet being opened in more than two (2) decades. The Government's plans to effect this demonopolisation has been recently announced.

### Table 4: Active Projects

<table>
<thead>
<tr>
<th>BY 1998</th>
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<tr>
<td>620,000 tpa Farmland/MissChem Ammonia Plant</td>
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<tr>
<td>550,000 tpa Methanol 4 Project</td>
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<tr>
<td>620,000 tpa Arcadian '04' Ammonia Plant*</td>
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<tr>
<td>500,000 tpa Cleveland Cliffs Iron Reduction Plant*</td>
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<tr>
<td>830,000 tpa Saturn Methanol Project*</td>
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<tr>
<td>BY 1999</td>
<td></td>
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<tr>
<td>400 mmcf/d LNG Plant for Point Fortin*</td>
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<td>1.5 Million tpa ISPAT Expansion Plant*</td>
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* Financial data for these plants are excluded from the 1986 - 1996 period.

### 3.0 CONCLUSIONS

Briefly the plants currently existing at the Point Lisas Industrial Estate are:-

- Four (4) World Scale Ammonia Plants² (5,550 MTD)
- Three (3) World Scale Methanol Plants (4,680 MTD)
- One (1) Urea Plant (1,620 MTD)
- One (1) Iron and Steel Mill
- One (1) Iron Carbide Facility³ (875 MTD)
- One (1) Natural Gas processing facility (12,000 bpd)

Table 4 is a listing of those projects either now underway or very likely to come on stream in the very near future.

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¹ These plants have continuously operated since commissioning with onstream factors in excess of 90% and are manned primarily by nationals of Trinidad and Tobago.

² Trinidad is the world's second largest exporter of ammonia.

³ Owned by Nucor, a leading Steel Corporation in United States and represents Nucor's first investment outside the United States.
As a consequence, natural gas growth is conservatively forecast to more than double current output by 2005 as shown in Figure 8.

Energy exports will be increasingly dependent on gas and gas-based chemicals as shown in Figures 9, 10 and 11. With Atlantic LNG on stream in 1999, the country has now positioned itself to be the regional centre for natural gas activity.

Thus, although a large foreign private sector presence in energy has been continuously evident in Trinidad and Tobago since the turn of the century, it required a concerted and directed effort, with many twists and turns, to effect the current transformation and modernisation of the domestic energy sector. While still heavily dependent on petroleum, albeit natural gas and crude oil, the economy has made significant progress at diversification as the switch to gas took place. The award of new acreage in eastern Venezuela in 1996 for exploration for the first time, and the award of deep-water, offshore blocks off the east coast of Trinidad have attracted much interest and many large companies and are showing very great potential for further resource identification. The country, therefore, now looks towards a period of extended growth with many opportunities for a greater and wider range of higher value-added activities with real possibilities for changing the face of the region’s economics within geographic reach.

Figure 8: Trinidad & Tobago’s Natural Gas Sales (1995 - 2005)
Figure 9: Trinidad & Tobago's Energy Sector Exports (2000)

Figure 10: Trinidad & Tobago's Energy Sector Exports (2000)
Figure 11: Trinidad & Tobago's Petroleum - Percentage Total Export Earnings

REFERENCES

1. Annual Reports - Central Bank of Trinidad and Tobago.

