TABLE OF CONTENTS

1. Methodology

2. Background

3. The Natural Resource Export Oriented Industrialization Policy of Trinidad and Tobago

4. WASA Development

5. Chronological Development of Industries in Point Lisas – Policy Implications

6. Acknowledgements
ABSTRACT

"The Economic Industrialization of Trinidad and Tobago, The Point Lisas Industrial Estate and the Policy of Industrial Water Use."

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The Point Lisas Industrial Estate is the largest such industrial estate in the Caribbean comprising of Iron and Steel, Methanol and Urea Plants. The project was undertaken in light of the growing demand for water in Point Lisas and its impact on the Water and Sewerage Authority (WASA), the country’s water service provider.

The consequence of this industrialization has seen dramatic declines in the water service level to the domestic population and the consequent scheduling of the water supply. The paper will examine actions taken by the government in its attempt to alleviate the water shortage in the country while maintaining the supply to the Point Lisas Industrial Estate. In addition, the impact of the arrangement on WASA’s financial position will also be discussed.

In 2002 the desalination plant was commissioned providing 109 MLD (Mega liters per day) to the current production. This supply is dedicated to providing a guaranteed water supply to those industries in Point Lisas
METHODOLOGY

The Point Lisas Industrial Estate is the largest such Industrial Estate in the English-speaking Caribbean, comprising of Iron and Steel, Methanol and Urea Plants. This project was undertaken in light of the growing demand for water in Point Lisas and its impact on the current water situation at the Water and Sewerage Authority (WASA), the country’s sole water service provider. The consequence of this industrialization has seen dramatic declines in the water service level to the domestic population and the consequent scheduling of the water supply.

This paper will examine the development of WASA in conjunction with the Trinidad and Tobago’s industrialisation policy. It would then seek to show the correlation between the two and the impact, which the establishment of the Point Lisas Industrial Estate has on the water production in Trinidad and Tobago. The relationship between the Government and the Authority would then be briefly examined within its structure in an effort to highlight the solutions the Authority has undertaken. The government’s involvement in its attempt to alleviate the chronic water shortage in the country while maintaining the supply to the Point Lisas Industrial Estate would be discussed incorporating the decision to build a Desalination Plant.

In an effort to provide a fair account of the impact of this arrangement, a brief review will also be given on WASA’s financial position with regards to the aforementioned concerns.
BACKGROUND

Trinidad and Tobago is situated in the southern Caribbean some 14 kilometres of the coast of Venezuela (Refer to Map of the Caribbean). The size of the island is approximately 1,864 square miles and its economy is dominated largely by the energy sector, which comprises of the oil industry, petrochemicals and gas industries. These entities are concentrated in an industrial estate located at Point Lisas in the southern part of the country (Refer to map of Trinidad) and hence the following presentation would address the water distribution concerns of this industrial estate specifically.

Although the country typically enjoys a tropical climate defined by two seasons namely the dry season and the wet season the Authority is still faced with the challenges of meeting consumers’ water demand. The table (1.0) below is an illustration of the different seasons which occur and their average time period determined by the meteorological office. However it should be noted that for WASA’s planning purposes the dry season is considered from January to June.

**TABLE 1.0 ILLUSTRATING SEASONS IN TRINIDAD AND TOBAGO**

<table>
<thead>
<tr>
<th>SEASONS</th>
<th>MONTHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Season</td>
<td>December – May</td>
</tr>
<tr>
<td>Rainy Season</td>
<td>June – December</td>
</tr>
</tbody>
</table>

*Average rainfall is 2,200 mm with wide variation occurring in the eastern northern range of 3,500 mm and 1,300 mm on the off – shore islands of the north west peninsula and the south west peninsula.

*March is usually the driest month.

*There exists a dry period usually lasting three weeks occurring in September to October. This period is referred to as “petite careme”.*
The Water Resources Management Strategy (WRMS) study indicates that the surface water availability of Trinidad is estimated at 3,600 MCM/year. This is approximately ten times the present potable water supply demand. Expressed per capita, the water availability in Trinidad and Tobago is approximately 2,500 cubic metres/year. Thus, according to the World Bank criterion (i.e. less than 1000 cubic metres per year), Trinidad and Tobago is not a water scarce country\(^1\). However, it is to be noted that the surface water availability is strongly influenced by seasonal variation. Hence although there is potential for surface water development due to seasonal variations an impounding reservoir has to be constructed.

The Water and Sewerage Authority established in 1965, is charged with the sole responsibility of providing water services to the country. The current water production is 950 MLd (Mega liters per day). The following table (1.1) gives and outline of how much of the water supply is derived from the different sources.

**TABLE 1.1 SOURCES OF WATER**

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>AMOUNT PRODUCED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Water</td>
<td>60%</td>
</tr>
<tr>
<td>Ground Water</td>
<td>30%</td>
</tr>
<tr>
<td>Desalination Plant</td>
<td>10%</td>
</tr>
</tbody>
</table>

The production sources of water are represented mainly by five (5) plants with the Caroni Water Treatment Plant (CWTP) being the largest. (See Map illustrating reservoirs)\(^2\) This plant has a capacity of producing 335 MLd and services primarily

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\(^1\) Surface water is not potable.
\(^2\) Four reservoirs are located in Trinidad and one in Tobago
customers of the Northern and Central locations of the country. However, there still exists a shortfall of 100 MLd between demand and supply resulting from the inadequacies of the infrastructure especially the distribution system (pipeline network, reservoirs, etc.) and the resulting high level of unaccounted for water.3

The following critical factors have been identified as hindrances in the anticipated progress of the Authority:

1. A high level of Unaccounted for Water (UFW) estimated between 45 – 60% even as high as 80% in some areas.
2. Production levels in the dry season can fall below 50% of rainy season levels and the majority of the country’s water resources rely heavily on surface water. Ground water production though, is usually more consistent.
3. A large industrial base with industries that have high demand for water. (See the Point Lisas Industrial Estate Table).
4. The price of water in Trinidad is one of the lowest in the hemisphere and has contributed negatively to WASA’s finances.
5. A poor maintenance strategy over the last twenty years (20) and the resulting deteriorating state of the Utility’s infrastructure.4
6. Low investment for most of the life of the utility and a major investment of US$ 200 million between 1999 – 2001 resulted in large interest payments (US$31 million) with very low returns.
7. An imbalance between demand and supply in 2002. Water production was 346 mm (cubic) and demand was 368 mm (cubic) a deficit of 22 mm (cubic).

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3 Grimes, Errol. Development of a Seawater Desalination Plant in Trinidad and Tobago.
GOVERNANCE OF WASA –
STRUCTURE OF THE AUTHORITY.

WASA is a statutory body with a Board of Commissioners headed by a Chairman whose appointment is sealed by the President on advice of the Prime Minister. WASA is governed by the Water and Sewerage Act (1965)

The Water and Sewerage Act (1965):
An Act to provide for the development and control of water supply and sewerage facilities in Trinidad and Tobago and matters of sanitation identified thereto; the promotion and the conservation of the proper use of water resources; and for the establishment of an Authority to administer the several purposes aforesaid and matters connected therewith.

Its Mission Statement reads:
“We are a Customer Service Business.
We shall deliver consistent, reliable, quality water and wastewater services.
We will achieve sustainable financial self-sufficiency.
We shall enable our employees to be motivated and well trained, providing a platform for future growth and delivery of excellence.
We shall improve the organization’s impact on the environment”

And its Vision states that the Authority strives
To be a high quality Water Utility Service Provider for the people of Trinidad and Tobago and thereafter be the Centre of Excellence within the Water Utility Sector in the Caribbean.

\[^4\] WASA has spent over TT$120 million for leak repairs to its mains and has accumulated operating expenses of TT$ 593 million.
At the time of inception, the Act provided for a Board of Commissioners comprising Chairman, Deputy Chairman and no fewer than five (5) and no more than nine (9) persons appointed by the Minister. The appointment of the Executive Management consisting of an Executive Director, Deputy Executive Director, a Secretary, a Treasurer and a Chief Accountant is made on approval of the responsible Minister.

The current Executive management structure consists of a Chief Executive Officer and six General Managers in the following divisions:\footnote{Previously the Water Resources Agency was also included as a division but this aspect of the Authority is currently being revised and should be absorbed either by the Ministry of Public Utilities or the Ministry of Environment.}

1. Business Services
2. Operations
3. Finance
4. Human Resources and Corporate Communications
5. Tobago
6. Corporate Services
The industrial development of Trinidad and Tobago can be traced to the discovery of oil in the nineteenth century and the significant role that petroleum has played in world industrialisation. The major oil companies at the time, Shell and Texaco, established oil refineries in the Point Fortin and Point-a-Pierre regions located in the southern part of the country. These oil industries were concentrated in one area and developed their own water resources, which also supplied surrounding areas.

Although Trinidad and Tobago’s economy at this time was benefiting largely from a prosperous oil industry the Government decided to channel its efforts into establishing export oriented industries situated in the North Eastern and North Western areas of the country. This resulted in the birth of the Macoya Industrial Estate, the Diamond Vale Industrial Estate and the O’mera Industrial Estate (Refer to the map illustrating Industrial Estates). These import substitution industries enjoyed protection from international competition. The low level of success of this industrialization policy was quite apparent by the 1970’s, that they were unable to fulfill their expectations in terms of increasing employment to acceptable levels. The result was that the country economy continued to rely on the income from its oil exports.

Fortunately due to the oil embargo imposed by the Arab countries as a result of the wars in the Middle East, OPEC was formed and this contributed to dramatic increases in oil prices. The Government was then able to benefit largely as the price of oil increased from between US$ 2.00 and US$ 3.00 to US$ 11.00 per barrel. A change in economic policy immediately followed and by the mid 1970s the Point Lisas Industrial Estate was able to expand, including Iron and Steel plants along with Fertilizer companies producing urea and ammonia, to their existing portfolio.
The macroeconomic planning framework and the decisions by the government to establish the Point Lisas Industrial Estate placed additional and unprecedented demands on the Water and Sewerage Authority to supply large quantities of water to these industries. By the early 1980s water demand in Point Lisas had reached 8 – 10 mgd placing a burden on the country’s production capacity. In response the Government set out to build the largest plant in the country, Caroni – Arena with a capacity of 44,909,090 cubic metres and a production of 272 MLD. The plant ensured a reliable supply to the Point Lisas industries but the continuous growth of the housing sector of the economy combined with high levels of “unaccounted for water” in the distribution system placed additional pressure on the existing supply. Hence the Authority was forced to examine further sources of water and the continued expansion of the Point Lisas Industrial Estate in the 1990s coupled with ongoing economic progress only heightened the problem.

The planning process was given high levels of priority in the mid nineties when recognition of the critical state of water supply had reached unacceptable levels due to a severe dry season. Water demand far exceeded supply and WASA was handicapped in its efforts to fulfill the existing demand along with an increase. This therefore resulted in drastic water shortages as the scheduling of services had to be increased in an effort to satisfy the industrial and domestic demand.

The importance of developing additional sources of water production was therefore seen as priority as effects on the consumers had reached crisis proportions. Furthermore, WASA found it increasingly difficult to supply a regular and uninterrupted service of water to the industries and the rest of the country. A feasibility study had shown a number of advantages in the establishment of a desalinated plant in the Pt. Lisas area.
THE DEVELOPMENT OF WASA

THE DESALINATION PLANT (DESLACOTT).

In 1999 the Government of the Republic of Trinidad and Tobago (GORTT) commissioned the Water and Sewerage Authority to enter into an arrangement with DESALCOTT (a joint partnership between Ionics of the USA and the local company Hafeez Kharmath) to build the first desalination plant in Trinidad and Tobago. The plant is capable of producing approximately 100 MLd to meet present and future needs identified by the projected exponential growth of the industrial estate. Interestingly, the agreement has also given the Authority the option of purchasing the plant after twenty (20) years.

The GORTT decision for WASA to enter the arrangement with DESALCOTT was based on the slogan at the time “Water for All” adopted in 2000. This was based on the assumption that the imbalance between demand and supply of water in the country could be reconciled if the Point Lisas Industrial Estate was served by a separate and distinct source, namely desalinated water. The expected result would have been that WASA could then make available Point Lisas’ current supply to its domestic customers as the water could be channeled to its distribution mains. This was therefore viewed as progressive since it increased the water supply to the Authority’s southern customers.

The technology utilised in establishing such a plant was very new to Trinidad. However, upon investigation it was most evident that many countries in the world considered it a feasible option for potable water as its long-term benefits far outweighed traditional methods, like construction of an impounding reservoir. The end result would then lie within the fact that the desalination plant at Point Lisas is the most effective short – term option. Its location and large volumes of water that it is able to generate, not to mention the short time frame for construction certainly
makes it quite attractive. Also as previously mentioned the opportunity cost of establishing such a facility means more water available for distribution to the domestic customers who are sometimes the most inconvenienced consumers. Hence although the costs are comparatively high it is still a viable means of resolving the water shortage issue faced by the Authority and its consumers.
MAP OF POINT LISAS INDUSTRIAL ESTATE
SHOWING DESAL PLANT
**POLICY IMPLICATIONS.**

Prior to the establishment of DESALCOTT, the Water and Sewerage Authority, delegated the responsibility for water resource in the country to one of its divisions, the Water Resource Agency. However, as indicated previously this division is currently being restructured. Nevertheless there exist numerous concerns with regards to setting up the desalination plant and these would be highlighted in the following section.

**FINANCIAL IMPLICATIONS.**

Over the last eight(8) years the Water and Sewerage Authority has been earning a revenue within the range of TT$ 270 million and TT$ 400 million (See Tariff Committee Economic Analysis). However, within this same time period a fluctuation of total expenditure is also noticed with steady increases each year. This has contributed to a large extent to WASA operating continuously at a loss since total expenditure always exceeded income (See Financial Revenue Graph).  

Water production has also increased consistently over the years with the largest increase seen in 2002 with the commissioning of the desalination plant. On average the cost of water production varies between 17% and 27% per cubic metre for WASA. Under the arrangement with DESALCOTT WASA pays $4.50 per cubic metre for water, which reflects a 350% difference in cost. The result is that the financially strapped utility is faced with an additional expense of TT$ 180 million per annum in its operating cost. Furthermore this issue is compromised by the fact that the Point Lisas Industrial Estate currently receives 12 mgd (million gallons per day) of the 22 mgd of water, which WASA has contracted from the desalination plant. This therefore results in a loss of 10 mgd of water being unaccounted for and WASA attracting a bill, which covers the 22 mgd of water produced.
Desalination water is inarguably very expensive when compared to traditional sources and has increased significantly WASA’s operating cost, while no additional revenue has been generated forcing the Authority to use almost half of its existing revenue to cover the cost of 10% of the water now produced. Industrial customers at Point Lisas Industrial Estate pay a special rate of US $1.19 per cubic metre while other commercial and industrial customers located outside of the Industrial Estate pay US $0.55. It is important to note though, that approximately forty (40) percent of the water produced by the Desalination plant is supplied to customers outside the estate who pay a lower rate.

Over 600 000 customers throughout Trinidad however, have been positively affected by the plant. Also approximately 10% of the total water produced is sourced from the desalination and its level is not affected by the dry season, as the plant is not seasonal in nature. Hence the total annual cost of desalination water, which is approximately US$30 million is justified as an additional cost to the Authority/Government. Although the arrangement to purchase the desalinated water from DESALCOTT attracts a cost of US 70.73 cents per cubic metre of water the improvement of technology will eventually drive the cost down, as mentioned earlier. Furthermore, it will allow the process to compete more effectively with some of the more traditional type sources and extend its application.7

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7 Grimes, Errol. The Development of a Seawater Desalination Plant in Trinidad and Tobago.
CONCLUSION

With respect to the aforementioned presentation it is the position of the Water and Sewerage Authority that the investment made towards building the desalination plant was essential. Although there exists a few problems with its operation especially with respect to the high cost of the water, its value should not be underestimated, as its service to the customers and industries is deemed invaluable.

As stated throughout the document the country suffers from a crisis situation where a regular and acceptable supply of water is continuously unavailable to the customers. Therefore it was necessary for the Authority to engage in the relevant activities to initiate the process of resolving these issues. No longer is it possible to rely on one source of water but the ingenuity of making use of all the water resources available should be employed despite the cost.

It therefore raises another issue whereby the cost of the production and distribution of water should be reflected in consumers’ bills. The Authority and the Government are forced to absorb an unsatisfactory proportion of this bill contributing to the continued deficits of the organisation. However, this is an issue to be dealt with by the Regulated Industries Commission (RIC) as this is the relevant body responsible for such actions.

Nevertheless with the growth of globalisation and expansion of the economic sector not neglecting basic human needs, it is important to provide a reliable supply of potable water to the citizens of the country. Hence cost should not be a priority unless it is concerned with adding new revenue to the Authority’s budget so that they can ensure each consumer has access to a regular and potable supply of water.
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