TRINIDAD AND TOBAGO ELECTRICITY COMMISSION

BUSINESS PLAN

2011 – 2016

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1. EXECUTIVE SUMMARY:

This Business Plan is prepared by the Trinidad and Tobago Electricity Commission (T&TEC) for presentation to the Regulated Industries Commission (RIC) in support of the second determination on rates and miscellaneous charges.

The Plan reports on T&TEC's performance over the last five year period (2005- 2010) and lists its goals for the next five-year period (2011 – 2016). It describes the macro-environment that impacts T&TEC's current and future performance. The strategic context analysis spells out the key strategic issues facing T&TEC and the specific strategies it intends to adopt in pursuit of its goals.

Detailed descriptions are provided of projects which will improve the efficiency of the service. These are accompanied by specific milestones, relevant performance measures and projected timelines which will allow the RIC and the public to monitor the Commission's progress.

In support of the financial requirements for the efficient execution of the 5-year programme, the Commission has provided forecasts of the cost of investments,as well as operating and maintenance expenditure required for the period under review. Consistent with the T&TEC Act, rates are proposed to ensure sufficient revenue :-

(a) To cover operating expenses, including taxes, where applicable, and to provide adequate maintenance and depreciation, and interest payments on borrowings;
(b) To meet periodic repayments on long term indebtedness , such as T&TEC's debt to the National Gas Company of Trinidad and Tobago Limited (NGC) and other long-term loans. In the case of NGC a mechanism is still to be developed for the outstanding invoices for the period February to June 2010 amounting to approximately US$51M. An arrangement has to be finalised with the Ministry of Public Utilities for the debt owed representing outstanding invoices for the July 2005 to September 2009 period of $318.1Mn, proposed to be converted to a medium term loan at 3% with a tenure of 7 years.
(c) To create reserves to finance a reasonable part of future expansion.

It is important to note that T&TEC continues to be faced with the challenges of ageing infrastructure, future wage and salary increases, annual increases in fuel price and return on rate base ranging from 1% and 5.7% over the past 5 years. Plant and equipment upgrade of approximately $2.4Bn including improvements in accomodation of over $0.3Bn for customers and employees are planned over the 5-year period. In addition, the aforementioned sums are owed to NGC for unpaid bills for natural gas and contracted capacity payments totalling approximately $206M will become due to Trinidad Generation Unlimited (TGU) in 2011, increasing to approximately $700M in each subsequent year. The Power Purchase Agreement (PPA) with TGU (the Seller) and Alutrint and T&TEC (joint Buyers) requires the full payment of the PPA charges by the remaining Buyer (T&TEC) if the other joint Buyer (Alutrint) is not in a position to meet their contractual obligations.

The Business Plan for the second Rate Determination suggests an overall tariff increase of 0% in 2011, 27% in 2012, 3% in 2013 and 0% in subsequent years. No increase is proposed for items classified as Other Income. This, together with the already built-in lifeline rate in the 3-tiered residential tariff structure and measures taken by other organs of the state,will reduce the impact of these proposed increases on low income and vulnerable customers.This increase must be seen in light of the fact that there was no rate increase approval by the (RIC) for the 2010/2011 period. The latter, resulting in a 93% reduction in the 2010 surplus for the year (before net pension) to only $25M(unaudited)when compared to the net surplus in 2009 of $343M , representing a return on rate base of 5.15% and 0.31% respectively for 2009 and 2010, thereby proving the tariff to be uneconomical.

Notwithstanding the current proposed increase in tariff, it is also important to note that T&TEC's net income and cash flow projections for the relevant years are highly dependent on the Government of the Republic of Trinidad and Tobago's (GORTT's) mechanisms to deal with the excess power in the initial years of operation of the TGU power plant. TGU's latest commissioning schedule (2011-03-15) shows operation of phase 1-A(225MW) by August 2011, with full operation, (720MW) by January 2012. The effect of the new PPA on T&TEC's finances will be to increase conversion costs by approximately 60% between 2010 and 2012 (the first full year of operation).

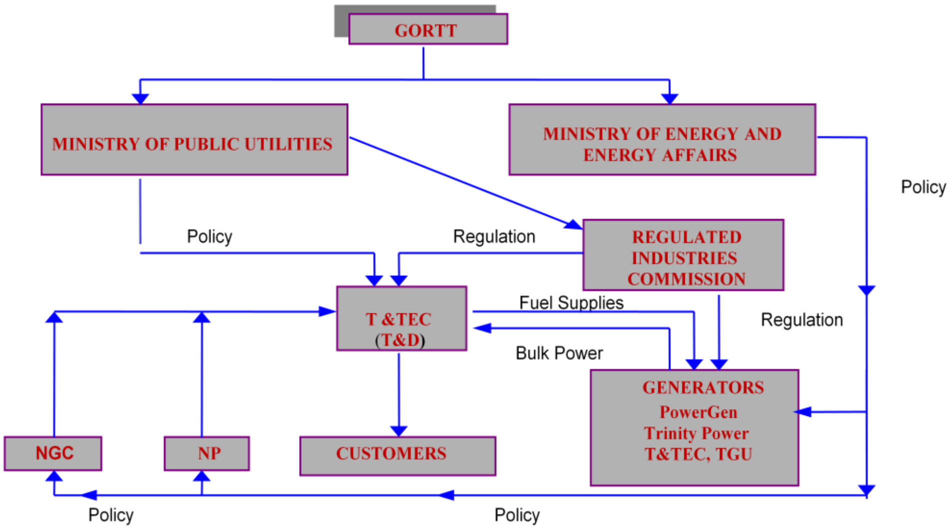
The Business Plan highlights T&TEC's strengths, weaknesses, efficiency improvements and financial and service performance over the past five (5) years. The data reflects the continued positive strides being made towards the improvement in operational efficiency and the quality of service with the use of emerging technologies, increasing payment options for customers and reducing outages, among other things. However, a lot more needs to be done in order to achieve the Commission's mandate to provide a safe and reliable supply of electricity. T&TEC has set realistic targets for the 2011 to 2016 period that would further propel its efficiency levels to greater heights.The need for capital investment to replace old, worn out assets with new, more efficient and technologically advanced equipment is critical to the achievement of this goal.

Given the aforementioned, adequate funding is necessary to achieve and sustain the levels of efficiency that will make T&TEC a world class utility that we all know can and must be accomplished.The approval of an economical tariff is therefore a major requirement for the achievement of T&TEC's objectives and this will not only benefit the Commission but the national economy. The tariff must be sufficient to provide a level of surplus that would allow for its contribution towards the funding of the capital programme.

The RIC now has the responsibility to ensure that the improvements made by T&TEC over the past five (5) years continue on a sustainable basis for the next period. This no doubt will be fulfilled as both entities endeavour to accomplish the common objective towards operational efficiency while minimising tariff increases to the customers.

2.0 OVERVIEW

2.1 ORGANIZATIONAL OVERVIEW



- T&TEC is a body corporate constituted under the provisions of the Trinidad and Tobago Electricity Commission Act, Chap. 54:70 (T&TEC Act) of the Laws of the Republic of Trinidad and Tobago. T&TEC is a fully owned state enterprise

- T&TEC is responsible for the design, construction, operation and maintenance of the country's electrical transmission and distribution network

- T&TEC is responsible for ensuring that the country's generation capacity is adequate to meet the national demand at all times. Generation capacity is acquired mainly through long term Power Purchase Agreements with Independent Power Producers

- T&TEC is regulated by the RIC which was created by an Act of Parliament in 1998. The RIC sets Performance Standards and Tariffs for T&TEC

In keeping with its mandate enunciated in the T&TEC Act, T&TEC has set itself the following Mission Statement.

Mission Statement
To provide a safe, reliable, high quality electricity supply, in an environmentally responsible manner, utilizing best practices, through empowered employees committed to excellence and customer satisfaction.

T&TEC has recognized and embraced its role in the socio-economic development of Trinidad and Tobago and its impact on the quality of life of all citizens and sees itself becoming the leading electric utility in the region through the delivery of superior customer service. It has therefore set itself the following Vision:

Vision Statement
Leadership in Energy Delivery, Excellence in Customer Service...enhancing the quality of life for all.

The pursuit of this Mission and Vision is however guided by the Core Values by which T&TEC has chosen to operate. These are as follows:

Core Values

- **Employees**
  - We value the health, safety and wellness of our employees
  - We are committed to creating an environment conducive to the development of a highly empowered and motivated workforce
  - We respect and appreciate the contribution of our employees and their representative bargaining units in achieving T&TEC's objectives

- **Customers**
  - We are accessible and responsive to our customers
  - We serve our customers with humility and value their comments
  - We are dedicated to providing excellent service

- **Leadership**
  - We value effective leadership
  - We encourage and foster teamwork, creativity, innovation and excellence
  - We encourage the continuous and holistic development of our employees

- **Ethical Conduct**
  - We value integrity, transparency, exemplary conduct, professionalism, accountability, honesty, respect, trustworthiness, equity, fairness and confidentiality

- **Social & Environmental Consciousness**
  - We are committed to nation building and the protection and preservation of the natural environment

- **Communication**
  - We encourage and foster open, effective, respectful and responsible communication

2.2. T&TEC's MACRO-ENVIRONMENT

The Business Plan for the period 2011-2016 has been influenced by issues in the external environment particularly in the political, economic, social and technological arena.

2.2.1 POLITICAL INFLUENCES:

Trinidad & Tobago has enjoyed a long history of political stability. The new Government which came into power in May, 2010 has signalled its intention to establish a gas utilisation and pricing policy which shall, inter alia, determine the availability and price of natural gas for the generation of electricity in the control period.

Fuel Pricing:

Fuel purchases and conversion to energy account for over 60% of T&TEC's operational costs and Government's plans to change these price structures can have serious consequences on T&TEC's financial viability.

Alternative Energy:

The new Government plans to provide incentives for research and development of alternative energy sources with a view to the establishment of an alternative energy industry. If this materialises it shall present a source of competition for T&TEC.

Trinidad Generation Unlimited (TGU):

The Government has decided not to pursue the construction of the Alutrint Smelter Plant (Alutrint). However, the construction of the TGU Power Station is almost completed. It is designed to generate 720MW of electricity. Although T&TEC shall not immediately require the 720MW of power from TGU, based on the signed contract between TGU, Alutrint and itself, T&TEC shall have to meet the full cost of all available power from the plant. Alutrint was expected to take 480 MW. It is T&TEC's view that GORTT should consider funding the construction of the transmission lines required to bring the additional power from TGU to the load centres and to meeting the cost of the unused capacity.

Power Purchase Agreements (PPAs):

In addition to the TGU 720 MW generating plant, there are on-going discussions with respect to the 1994 PPA with the Power Generation Company of Trinidad and Tobago Limited (PowerGen), with a view to negotiating a reduction in contracted capacity, escalation percentage and the base capacity price, while at the same time paving the way for the replacement of the Port of Spain Power Station which is to be decommissioned by 2018. Owning and operating new generation facilities requires significant capital outlays by T&TEC for which external financial support or some innovative financing mechanism may be necessary.

Public Sector Investment Programme (PSIP):

Through Government's PSIP, additional streetlights have been installed and several public facilities illuminated. Based on amendments to the T&TEC Act and Regional Corporations Act it is now the responsibility of the Ministry of Public Utilities to meet on an ongoing basis the operations and maintenance charges associated with public lights which normally would have fallen under the Municipal Corporations.

Debt to NGC:

Discussions are ongoing with the Government for the settlement of the debt owed to NGC as at September 2009 of US$318.1Mn. In addition, invoices for the period February to June 2010 of approximately $US51Mn remain outstanding.

Regulatory Regime:

The timely approval and implementation of revised tariffs are essential to ensuring that T&TEC's revenue stream is adequate to support efficient operations geared at meeting or surpassing standards of performance established by the RIC and or demanded by its customers. Timely RIC approval and Government support for the implementation of economic tariffs is an essential activity if T&TEC's financial viability is to be realised.

Funding related to the operations/purchase of power from the new power stations should also be included for consideration by the RIC in T&TEC's Rate Review Application for the new 5-year period.

2.2.2 ECONOMIC INFLUENCES:

In the aftermath of the recent global financial crisis, real Gross Domestic Product (GDP) growth continued to decline across most countries of the region, as the tourism industry continued to be negatively impacted. In addition to falling tourism receipts, regional economies are persistently challenged by dwindling workers' remittances and reduced foreign direct investment flows. The recovery prospects of regional economies remain closely linked to the speed and intensity of recovery in the United States and Europe.

Trinidad and Tobago's economy grew by 1.0 percent in 2010 following its 3.5 percent contraction in 2009. The expected growth was driven mainly by a 2.8 percent expansion in the Petroleum industry. Economic activity in the Non-Petroleum sector is, however, expected to remain flat in 2011 and beyond.

The weighted average buying rate for the United States (US) dollar increased steadily from TT$6.27 in July 2009 to peak at TT$6.40 by December 2010. The same trend also holds with respect to other trading currencies.This spells increasing cost for foreign plant, machinery and services as well as for payments denominated in other international currencies.

Inflation continues to be a major challenge as it hovers in double digit figures increasing in 2010 to a maximum of 16.2% ending the year at 13.4%. It has fallen in 2011 to 9.4%.

T&TEC in its expansion drive is cognisant of the global and local economic conditions and therefore exercises caution and prudence in incurring expenditure. A reduction in the country's export earnings may also impact the availability of foreign exchange for payments to foreign suppliers and contractors. T&TEC therefore considers inflationary pressures and the general slow-down of the economy whilst being more aggressive in its revenue collection and cost reduction efforts. Expenditure and commitments on 'ring-fenced' projects will therefore only be undertaken in future when the necessary funding from the project sponsor is made available.

T&TEC will also exploit other revenue-earning opportunities from its existing infrastructure. It will also focus on increasing and maintaining its productivity levels. It is also imperative that T&TEC seeks more innovative ways to become more efficient in the provision of a safe, reliable, and affordable electricity supply to its customers[1] .

2.2.3 SOCIO-CULTURAL INFLUENCES:

Over the recent years there have been changes in population spread, income distribution, social mobility and housing expansions. The population is more exposed to international media that creates demand for goods and services showcased on the international market. This has influenced lifestyle changes where people are now more IT oriented and have embraced modern communication technology. There is also now a growth in consumerism with customers demanding a higher quality of goods and services.

T&TEC's goal is to satisfy the demands of its customers through the provision of a reliable supply of electricity that readily facilitates digital operations across the country. General customer feedback and level of satisfaction with T&TEC's products and services will also be regularly captured through appropriate customer surveys and the information gathered used for service improvement planning.

[1] ***(from the perspective of the International Monetary Fund(World Economic Outlook April) and the Ministry of Finance (Review of the Economy September 2010)***

2.2.4 TECHNOLOGICAL INFLUENCES:

Developments in renewable energy technologies, high efficiency generators, computerisation, telecommunications, miniaturisation, compression technology and digitisation are impacting business operations globally.

T&TEC needs to keep abreast of new technological advances and to continually assess the opportunities and challenges associated with emerging technologies with the primary goals of increasing efficiencies, expanding business opportunities, enhancing customer satisfaction levels and increasing profitability.

Live line work, advanced metering infrastructure (AMI), industrial automatic meter reading (AMR), Geographic Information Systems (GIS), Geographic Positioning Systems (GPS), underground rural and commercial developments, distribution automation, enterprise wide software applications, communications technological developments, computerised planning and maintenance, cutting edge distribution equipment, alternative energy sources, distributed generation, energy conservation technology and tracking of vehicles systems are some of the more applicable technologies. This can be supported through the implementation of ISO 9001 Quality Management Systems, ISO 14001 Environment Management Systems and OHSAS 18001 Health and Safety Management Systems.

2.3 STAKEHOLDER ANALYSIS

There are several internal and external stakeholders to T&TEC with various levels of power, interest and predictability in terms of T&TEC's business operations. The stakeholder analysis reveals that the key stakeholders to be kept satisfied include the following:

- Government
- Board of Commissioners
- RIC
- Large Industrial Customers
- Trade Unions
- Management
- Employees
- Customers
- Media
- Energy converters
- Fuel Suppliers
- Factory Inspectorate
- Government Electrical Inspectorate
- Occupational Safety and Health Agency
- Environmental Management Agency
- Insurers
- Bankers
- Financial Regulators
- Foreign Suppliers
- Service Providers

2.4 RESOURCE AUDIT

There are several resources available to T&TEC. Some of these are owned while others are contracted. The available resources can be broadly categorised as physical resources, human resources, financial resources, and intangible resources. A 2007 assessment, on a scale of 1 to 10 on level of importance to T&TEC's core business and present condition of the particular resource with 10 being most important or being of optimum condition, follows:

2.4.1. PHYSICAL AUDIT

Factors	Importance	Condition
Transmission infrastructure	10	8
Distribution infrastructure	10	7
Communications infrastructure	10	8
Information Technology Infrastructure	10	7
Vehicles	10	8
Tobago Generation	10	9
Tools and Instruments	10	7
Materials and Spares	10	9
Database Systems	9	7
Buildings/Staff/Customer Accommodation	9	5
Furniture and Fittings	9	7
Protection Infrastructure	9	7
Metering Infrastructure	9	8
Land	8	7

This audit reveals that there is need for improvement in the quality of the physical assets owned by the Commission particularly its buildings and staff/customer accomodation infrastructure. All the assets listed are considered very important in T&TEC's business operations and it is prudent therefore, that steps be taken to urgently improve the present condition of these physical assets. The quality of accommodation is critical in building an empowered and motivated work force and a satisfied customer base. It is therefore important that efforts be made to enhance this infrastructure through rehabilitation or replacement as necessary. This is addressed in the projects outlined for the 2011 to 2016 regulatory period.

2.4.2. Human Resource Audit

Factors	Importance	Condition
Human Relations	10	5
Craft	9	7
Technician	9	7
Engineering	9	7
Design	9	6
Project Management	9	4*
Security	9	7
Staff Retention	9	9
IT skills	8	7
Clerical/Admin/Professional	8	8
Local Contractors	8	6
Foreign Contractors	8	8

This audit reveals there is need for improving the quality and effectiveness of the Commission's human resource capabilities especially in the areas of project management, design capabilities and human relation skills. The skills set of local contractors should also be enhanced through greater partnering with T&TEC and the encouragement of the establishment of parallel ISO 9001 quality management systems.

*Given the aforementioned, measures are being put in place to improve the project management capabilities:

- All CAPEX projects shall now form part of the reporting at monthly meetings.
- Managers are required to give an account of the progress of the projects on a monthly basis.
- Project section(s) will be established to monitor the progress of all projects.
- Each department has assigned a designated person to monitor all projects.
- The Commission will ensure that regular progress reports are done to mimimise delays and cost overruns.
- Any changes to the assigned project will be communicated with RIC at quarterly meetings.
- The Commission will strive to ensure that all projects are completed over the review period.

2.4.3 Financial Audit

Factors	Importance	Condition
Current Assets - cash in bank	10	3
Fixed Assets (land & buildings)	9	6
Customer Base	9	9
Current Assets – inventory	9	7
Financial Credibility	8	8

This audit reveals an urgent need to improve the financial performance of T&TEC especially in terms of its current assets - cash in bank. In this regard, the application of tariffs that covers the full economic cost of the service and the generation of additional sources of income are essential. Specific funding should be provided for all works on ring fenced projects. Efforts will continue to be made to reduce the debtors' balances particularly from the State sector.

2.4.4 Intangibles Audit

Factors	Importance	Condition
Safety Record	10	7
Public information/education	10	5
Customer Satisfaction	10	7
Pension Plan	9	9
Organization Stability	9	9
Disaster Management Skills	9	6
Customer Relations Management Skills	9	6
Networking	8	5
Positive Image	8	5
Community Outreach	8	5
Sports & Cultural Administration	8	8
Local/Regional Image	8	8
Advertising	7	6

This audit reveals a need for improvement in the Commission's public information and education programmes, customer relations management skills, disaster management skills and safety systems and procedures. Building the organisation's image through greater customer outreach programmes and networking is also considered necessary.

2.4.5 RISKS AND UNCERTAINTIES

- The recent change in Government and its concomitant change in policy and direction
- Vandalism of assets - greater monitoring through video surveillance.
- Interference of distribution network system and supply by frogs - use of specially designed arrestors.
- Encroachment to right of ways by private individuals - enforcement of the law
- Competition from natural gas - quality customer service.
- Unavailability of US Dollars for settlement of payments due to foreign suppliers/contractors
- Writing off debts, failure to enforce revenue recovery, in the award of contracts. Audits and policing of the Commission's accounting and procurement.
- Institutional risk - Large capital projects entail large-scale procurement, which can create vulnerability to leakages when documented processes are not followed.
- Financial Management- A continuing debt overhang can undermine the financial viability of the Commission- increase the revenue collection ratio.
- Diversion of resources away from maintaining substations and distribution lines can pose risks of asset deterioration and unreliable electricity supply.
- Timely identification and procurement of assets needed for maintaining the system network.
- Alternate Energy – Solar Power gives room for competition
- Tapping of distribution lines by customers and distribution utility staff can undermine equitable access to electricity.
- Enforcement of law for criminal offences
- Meter tampering and broken meter seals can pose risks from inaccurate billing of used electricity and provide opportunities for corruption.

2.5 STATE OF T&TEC'S ASSETS

2.5.1 STATE OF TRANSMISSION ASSETS

Overhead Lines

- The transmission network currently consists of approximately 1,297 km of Overhead Lines.
- Sixty- three (63) km of transmission, lines were installed over the last five (5) years.
- Over the next five (5) years, 42 km of transmission lines are scheduled to be upgraded.
- Poles, structures, insulators, guys and aerials are also scheduled to be overhauled over the next (5) years on twenty- five (25) circuits covering 374 km of lines.
- 13% of all faults on the overhead line network are as a result of vegetation contact. To reduce such incidents, twelve (12) month Line Clearing contracts are awarded on each circuit.

Underground Cables

- The underground transmission network currently consists of approximately 25 km of cable circuits.
- Most of these cables are located in the City of Port of Spain and are generally in excess of 40 years old.
- Over the next five (5) years, 24 km of cables are scheduled to be replaced using a combination of direct buried and duct bank systems.

Submarine Cables

- There are currently two (2) submarine cables between the islands of Trinidad and Tobago, each approximately 40 km long
- In September 2009 one (1) of these cables faulted . After the completion of repairs, it was returned to service in October 2010.

Substations

- There are currently twenty three (23) substations under the responsibility of the Transmission Division.
- Eight (8) of these substations were commissioned within the last five (5) years as follows:
    - Edward Street 33/12kV Substation
    - Wallerfield 132kV Substation
    - Union 132kV Substation
    - Reform 132kV Substation
    - Debe 132kV Substation
    - Brighton 66/12kV Substation
    - New Macoya 66/12kV Substation
    - Mt Hope 132/33/12kV Substation
- Major works planned for these substations over the next five years are as follows:-

Transformers

- There are currently thirty one (31) interbus transformers on the system
- Based on the results of predictive maintenance and condition monitoring, six (6) of these transformers are scheduled to be replaced over the next five (5) years at Westmoorings, Wrightson Road, Rio Claro and St. Mary's Substations
- Silica Gel Breathers on twenty six (26) transformers are to be replaced with maintenance free dehydrating units.
- Defective oil and temperature gauges are to be replaced on transformers at seven (7) substations

Circuit Breakers

- There are currently one hundred and fifty four (154) circuit breakers on the system
- Forty eight (48) oil and faulty gas and vacuum circuit breakers are to be replaced over the next five (5) years at various substations due to operational problems and the unavailability of spare parts.

Isolators

- There are currently two hundred and eighty five (285) isolators on the system
- Isolators at Bamboo 132kV, Bamboo 66kV, San Rafael, Fyzabad, Pt. Fortin, North Oropouche and Harmony Hall substations are scheduled to be changed out over the next five (5) years

Civil Works

- Replacement of fences, installation of oil sumps, repairs to switch houses, structures, grounds and driveways.

2.5.2 STATE OF DISTRIBUTION/TRANSMISSION ASSETS

Category	2005	2006	2007	2008	2009	2010
CIRCUIT KM OF OVERHEAD LINE ON SYSTEM						
132kV	123.25	171.65	171.65	255.3	255.3	279.9
66kV	314.67	449.69	449.69	482.4	482.4	512.2
33kV	575.8	575.8	575.8	575.8	576.9	578.9
12-2.3kV	2,319.56	2,396.44	2,397.32	6,552.38	7,056.12	6,681.89
Medium & LV	2,636.01	2,914.7	2,963.0	6,756.88	6,797.46	7,288.61
Total	**5,057.72**	**5,417.71**	**5,466.89**	**14,012.4**	**16,574.7**	**16,691.6**

CIRCUIT KM OF U/G CABLE ON SYSTEM

Category	2005	2006	2007	2008	2009	2010
132kV	0	0	0	0.78	1.57	1.57
66kV	12	6.63	6.63	6.73	8.95	9.09
33kV	113	119.63	113	113.5	113.56	113.56
12-2.3kV	1,143.32	1,143.32	1,149.09	1,501.42	1,532.34	1,557.9
Medium & LV	0.06	0.06	6.26	21.15	32.84	80.28
Total	**1,268.38**	**1,269.64**	**1,274.98**	**1,643.58**	**1,689.26**	**1,759.19**

(Please note that comparative data was not maintained prior to 2008 in the case of Distribution assets i.e 12kV and lower)

2.5.3. ACCOMMODATION

As part of its strategic plan, T&TEC has reviewed the state of its existing accommodation infrastructure with a view to adherence to OSH requirements and better satisfying the needs of its employees and customers and has developed a plan to 2030. The objective of the plan is to provide the necessary accomodation infrastructure for optimum operations of the Commission. The plan considers the following:-

- Increase in customers
- Business continuity after disasters
- Adherence to OSH requirements
- Ease of access to employees
- Financial constraints

Elements of the Plan and associated costs, for the first five (5) years include the following:

Year	Activity	Cost $M
2011	Upgrade Depot at Wrightson Road	5
2012	Construction of newAdministration Building at Wrightson Road	68
2013	Establish Depot at Roxborough Tobago	20
2013	Establish Depot at Felicity	20
2013	Establish depot at Charlieville	3
2013	Extension of Central Stores	10
2013	Establish new Depot and Sub Stores at Cove Industrial Estate Tobago	15
2013	Customer Service Centre South and Depot at Syne Village	30
2013	Construction of newAdministration Building at Tumpuna Road, Arima	68
2013	Refurbish Tobago Administration Building Service Centre	15
2013	Construction of new Administration Office South	68
2014	Establish Depot at Santa Cruz	20
2015	Construction of Administration Building at Cove	60
	TOTAL	**402**

The following challenges are expected:

- Availability and capacity of local contractors and labour to complete projects in a timely manner
- Simultaneous project management by T&TEC of several mega projects
- Continuing operations while existing facilities are being refurbished
- Escalation in costs

These are all included in the capital expenditure forecast for the Distribution Division in Section 3.5.20.

2.6. An Analysis of T&TEC's Strengths, Weaknesses, Opportunities and Threats

Strengths:

T&TEC's load forecasting capabilities are highly regarded and generation projects are proactively planned to meet forecasted load growths in a timely fashion. T&TEC provides a reliable and safe electricity supply and has generally been the best rated utility in Trinidad and Tobago over the years. T&TEC's staff is regarded as highly competent. Staff across the organization is continuously exposed to internal and external training programmes. T&TEC's technical training capability and the re-establishment of its training facilities are seen as avenues for generating more competent and knowledgeable staff.

Several new substations and transmission lines have been recently constructed while others are under construction to support the demands of growing communities. An Advanced Metering Infrastructure (AMI) project has been fully deployed which has resulted in the elimination of estimated bills and a reduction in the need for visits by T&TEC personnel to customers' properties. The fibre optic network system has been expanded to interconnect all substations and the microwave radio system was recently upgraded. An Automatic Meter Reading system for industrial meters is also in place. Video surveillance is being rolled out.

Several projects related to electricity distribution are currently being undertaken that are aimed at improving the quality of customer service. This includes Geographic Information System (GIS), Computerised Maintenance Management System (CMMS) and Distribution Automation. There are also management information systems that support organisational operations. T&TEC's internal administrative systems that support its business operations can stand the test of public scrutiny. ISO 9001:2008 certification of the Southern Distribution Area is also evidence of T&TEC's commitment to improve the quality of services it provides to its customers. The expected roll out of this system to other Areas and Divisions at T&TEC shall contribute to the creation of an organisational culture supportive of continuous improvement and improved customer satisfaction.

Strong financial management skills resident within T&TEC have contributed to the organisation's continued survival despite revenues being less than operational expenditure over long periods. Strong State support and Government guarantee of loans are also seen as positives in this regard.

Government debt over 30 days has decreased significantly and stood at $25.3M as at May 2011 down from $111.2M at December 2010. Other light and power debtors over 30 days amounted to $72.8M as at May 2011. Overall, total debt on active accounts has decreased from $359.1M in December 2010 to $275.2M as at May 2011.

T&TEC's extensive and growing communications network, wide geographic spread of transmission and distribution infrastructure, information technology infrastructure and staff capabilities are assets that can also be exploited to expand its revenue base.

The successful implementation of the National Streetlighting Programme with positive societal impact showcases T&TEC's presence and importance in a country where crime has become a widespread nightmare. The 2007 MORI Survey revealed that 91% of the population was of the opinion that this project has positively impacted the lives of citizens.

A customer survey conducted in 2010 by Caribbean Market Research Limited revealed a 78% customer approval rating of T&TEC's overall service.

T&TEC's strong pension plan, wide-ranging sports and cultural activities and quarterly "Watts Happening" magazine are highly regarded by its employees.

Customers can now reach T&TEC through the toll free 800-8832 number.

Weaknesses:

Improvements are required in the timely maintenance of streetlights, vehicles, poles, pole mounted transformers and general transmission and distribution infrastructure thereby positively impacting on the reliability and quality of electricity supply and customer service.

A few incidents of obsolete or inadequate infrastructure or inadequate planning at the distribution level sometimes resulting in load shedding are concerns to be addressed.

Delays in procurement and project implementation usually impact on the quality of service. Responses by T&TEC to various stakeholders are at times tardy. There are customer complaints with respect to voltage fluctuations and power outages perhaps linked to the age of the infrastructure.

T&TEC has experienced cash flow difficulties over the years. This situation was exacerbated by the funding of ring fenced projects with internally generated revenue resulting in a debt of approximately $2.3Bn (including interest) being accrued to the National Gas Company. This trend is likely to continue into 2011 and beyond unless economic tariffs are applied to all classes of customers and Government funding is provided to cater for ring fenced projects and other expenditure not covered by existing tariffs. The resulting weak balance sheet, negative cash flows and high debt are major limitations.

Camaraderie among management and staff can be improved with the adoption of better industrial relations practices. This may contribute to a higher level of trust between employees, their bargaining bodies and management. Clear organizational direction through effective leadership and communication along with the adoption and practice of appropriate core values are also viewed as prerequisites for improved organizational performance.

It is also perceived that organizational performance can be enhanced through proper succession planning and the establishment of an objective and appropriate performance and behaviour based management system.

The design of the existing electricity infrastructure makes it vulnerable to interference by animals, frogs, snakes, vegetation, high winds and lightning strikes.

Dependence on a mainly centralised generation system makes the country vulnerable to wide area blackouts in case of failure of generation infrastructure.

Dependence on natural gas (finite resource) as the main fuel source is also seen as a weakness which needs to be overcome.

Opportunities:

Government's support for renewable energy research and utilisation is aimed at diversifiction of generation infrastructure dependency on finite resources.

The provision of a 100% reliable and steady voltage electricity supply across the country is expected and a requirement that T&TEC is aiming to achieve and in so doing increase the level of satisfaction of its customer base.

It is also perceived that T&TEC's infrastructure and skills can be leveraged to provide a broader range of products or services to an expanding customer base alone or in alliance with partners.

Integrating backwards into more of T&TEC's own generation and/or sourcing alternate or cheaper sources of power are seen as important in assuring a reliable supply of electricity to customers.

Making a greater contribution as a corporate citizen through caring for the environment, marketing, public education and corporate communication are also opportunities for improving image and customer satisfaction. Restructuring of the debt portfolio and the receipt of subventions from the State are areas identified for exploring. The serving of new customers in the form of Distribution companies (DISCOS) and the provision of on line services to all customers with such capability are also options being considered. Moving to a smart grid and the use of demand side management can help in providing a better quality service and defer large generation investments. The provision of prepayment meters as an option can also help in reducing debt.

Threats:

Insufficient natural gas reserves, natural gas price increases, increasing generation costs, and increasing global competition and prices for electrical inputs are deemed as issues that must be guarded against for T&TEC's continued success.

Failure of centralised generation plants can result in widespread outages.

Government should also be influenced to make decisions that are favourable to T&TEC on issues such as tariff awards, fuel pricing and generation.

T&TEC faces possible legal action for damage to plant, equipment or appliances and injuries to members of public, if the quality of service to customers is not consistent with established Standards.

The escalation of crime across the country affects T&TEC's operations through physical actions against employees and customers, as well as through cable and transformer theft and current stealing. A direct consequence being considered is the expansion of the existing security detail assigned to 'hot spot' projects.

Natural and man-made disasters, industrial relations conflicts, growing traffic congestion, a limited pool of contractors and the loss of skilled employees to competitors are also seen as issues that need consideration. Interference of supply or damage to infrastructure from elements such as lightning strikes, high winds, landslips, flooding, frogs, snakes and other pests are also seen as major threats.

T&TEC has also been adversely affected by the cancellation of mega industrial projects for which investments in generation and supporting infrastructure were made or considered in long term decision making, as happened with respect to the Essar Steel Plant at Pt Lisas, the Alutrint Aluminum Smelter at La Brea and five proposed desalination plants.

A shortfall in revenue inflows to fully meet expenditure associated with the TGU power station as per contractual obligations between T&TEC, Alutrint and TGU, is also a threat to T&TEC's continued efficient operations .

2.7 KEY PROGRAMMES/PROJECTS UNDERTAKEN – (2005-2010)

The Distribution Division executed a number of projects over the period 2005 – 2010 based on the funds approved in the RIC's Final Determination 2006. The table below gives a comprehensive status report on each project.

Project Name	Project Description & Scope of Works	Benefits to be Derived	Project Status	Project Start Date	Completion / Projected completion Date
Barataria	Installation of one (1) 12.5/16 MVA transformer and three (3) pole mounted auto-reclosers	To reduce the load on the Near East 33kV Ring. To cater for load growth in the area.	Transformer installed. Completed	Aug. 2005	Jul. 2008
Diego Martin	Installation of 33kV GIS Switchgear and 12kV Switchboard. Construction of new 12kV Switch house.	To improve the reliability to customers supplied from this substation.	33kV switchgear to be installed. Civil works scope being finalized. Drawings in progress.	Set. 2007	Jun. 2011
Abbatoir	Replacement of 12kV Switchboard.	To improve the reliability to customers supplied from this substation.	Awaiting decision on use of land in the context of planned development of Eastern Port of Spain.	Sept. 2008	Jun.2011
Maraval	Installation of one (1) x 12.5/16 MVA transformer. Retrofit 12kV switchgear.	To supply the increasing load demands in the Haleland Park, Moka Area.	12kV switchgear was retrofitted. However no additional Transformer was installed. Civil contract awarded for new plinth.	Sept. 2007	Dec. 2010
Corinth	Refurbishment of the 12kV switchroom. Installation of 12kV switchboard.	To improve the reliability of the supply to customers in the area.	Two new New Korea 12.5/16MVA Transformers were installed in 2007. The design for the construction of a new Switch room was initiated in 2008 and a new 12kV TAMCO board was installed in 2010. The 12kV board was energized on 2010/10/03.	Jun-08	Nov. 2010

Rio Claro	Civil Works for Installation of a new 12kV switchboard.	To improve the reliability of the supply to customers in the area.	Completed	Jun-08	Sep. 2009
Rio Claro	Installation of a 7 panel 12kV switchboard at Rio Claro Sub Station.	To improve the reliability of the supply to customers in the area.	In 2007 works started on the construction of Switch room which was damaged by a fire at the Substation. In 2009 the A switch room was completed and a second Transformer was assigned to the Substation. Work is still in progress. No work was done on the installation of the Switchgear.	Aug. 2007	Dec. 2011
Santa Cruz	Extension of 12kV switch room. Installation of one (1) 33kV Circuit Breaker and two (2) 12.5/16 MVA transformers.	Provision of a second source of supply to the Santa Cruz Substation and improvement in reliability to surrounding customers and along Saddle Road, San Juan.	Completed	Jan. 2006	Jul-08
San Juan	Replacement of the 33kV outdoor switchgear. Installation of two (2) 12.5/16 MVA transformers.	Replacement of equipment in excess of 30 yrs old and improving reliability to customers around the Aranguez /Petit Bourg area.	Two 12.5/16MVA transformer installed. 33kV Switchgear to be procured. Civil works tender evaluated and contract awarded.	Jan. 2007	Dec. 2010
Bamboo	Extend the 12kV switchroom and replace the existing 12kV switchboard.	Replacement of aged equipment. To improve the reliability of supply to the Caroni Savannah Road, Bamboo area.	Completed	Jun-07	Oct. 2010

St. Augustine	Replacement of the two (2) 12.5/16 MVA transformers with two (2) 20/25 MVA transformers.	To supply the increasing load demand in the areas of Curepe and St. Augustine.	One Transformer has been installed to date.	Jan. 2007	Sept. 2011
Trincity	Replacement of the two (2) 12.5/16 MVA transformers with two (2) 20/25 MVA transformers.	To supply the increasing load demand in the areas of Trincity, Millennium Park and Eastern Main Road, Tacarigua.	One (1) Transformer has been installed. Second T/F to be relocated from Old Macoya Substation.	Jan. 2007	Jun-11
Fiver Rivers	Replacement of the two (2) aged 6 MVA transformers with two (2) 12.5/6 MVA transformers.	Replacement of aged equipment. To improve the reliability of supply to Five Rivers, Bonair West and Environs.	Completed	Sept. 2007	Jun-09
Felicity	Upgrade of the 12kV switchgear. Installation of two (2) 12.5/16 MVA transformer.	To improve the reliability of the supply and to cater for the increasing load demand in the Felicity area.	EMBD has written the Commission giving a commitment to make land available for the Substation. Final approvals have not yet been obtained.	Jun-09	Ongoing
Charlieville	Installation of switchhouse and new 12kV board (switchgear). Installation of two (2) 12.5/16MVA transformers and associated Civil works.	To improve the reliability of the supply and to cater for the increasing load demand in the Charlieville and Cunupia Areas.	Civil Works in progress. Equipment has been ordered. All equipment not available (12kV board, 12/16 MVA 66/12kV Transformer, etc.)	Jun-09	Ongoing
Brechin Castle	Commissioning of 12kV CB at BC and construction of 10km of HT conductors and neutral.	The major benefit is the improved system flexibility providing backup to Central S/S.	Completed	Jan. 2008	Nov. 2008

M5000	Installation and commissioning of a New Korea Electric 20/25MVA t/f and the commissioning of the t/f 66kV and 12kV circuit breakers.	The major benefit is the increased station capacity to allow for new feeders from the S/S and for additional system reliability.	Installation and commissioning are projected for 2011. Currently awaiting parts for Transformer.	Jan-09	Aug. 2011
Independence Square	Replacement of the obsolete 6.6kV switchgear with 12kV vacuum switchgear.	Improve safety of operating personnel. To improve the reliability of supply along Independence Square.	Technical specifications for switchgear are being prepared.	Jan. 2009	Jun. 2011
Pinto Road	Replace the existing 33/12kV 12.5/16 MVA transformers with 66/12kV 20/25 MVA transformers.	The 66kV supply is expected to be inherently more reliable.	Scope of Works for the Transmission Development is being prepared.	Jun-08	Ongoing
St. Mary's	Replacement of 12kV switchboard partially destroyed by fire.	Restoration of the reliability of the supply to customers in the area.	Completed.	Mar-08	Oct-10
St. James 33kV GIS Substation	Construction of switch room and installation of 12.5/16MVA transformer	Improve the reliability of electricity in St. James and environments.	Approval to invite tenders for switchgear granted.	Jan.-09	Sept. 2011
Establish the Orange Grove 66/12kV Substation	-	To reinforce and improve reliability of the electricity supply in Mt. Hope, St. Augustine, San Juan, Barataria, Tacarigua and the surroundings areas	Completed.	Jan-08	Sep-10

2.7.1 Distribution Projects – Substations

2.7.2 Distribution Projects - Overhead Line and Underground Network

Project Name	Project Description & Scope of Works	Benefits to be Derived	Project Status	Project Start Date	Completion Date
Barataria	Upgrade of 12kV line conductors to 199mm^2 AAAC.	Greater current carrying capacity for distribution.	Final 12kV feeder to be constructed. Line re-conductoring in progress.	Jan. 2008	Ongoing
Port of Spain	Installation of Duct Banks and Raceway System.	To minimize the excavation of roadways in the city.	Scope of Works prepared for Woodford Square and Richmond Street.	Jan. 2007	Dec. 2011
Couva	Upgrade of 12kV line conductors in the Calcutta Area.	Greater current carrying capacity for distribution	Completed	April 2009	Nov. 2009
St. Joseph/Maracas	Provision of an alternative supply to meet increasing load demands.	Improve Reliability.	In progress, 30% Completed.	June 2007	Ongoing

2.7.3 Other Achievements with respect to customers:

- Negotiated PPA with PowerGen for 208 MW of power that was added to the grid in 2007
- Negotiated PPA with TGU for 720MW Combined Cycle Power Station
- Over 63km of new HV Transmission Lines constructed as follows:
    - Bamboo/Mt Hope 132kV tower line
    - Mt Pleasant/Diamondvale 66kV Overhead line
    - Carenage/Mt Pleasant 66kV Overhead line
    - San Raphael 132kV Tower line
    - Pinto Road/Wallerfield 66kV Tower line
    - Reform/Debe 220kV Tower line
    - Debe/Union 220kV Tower line
    - Debe/Penal 132kV Tower line
    - Bamboo/East Dry River 132kV Tower line
    - Brechin Castle/Reform #3,#4 132kV circuits
- Upgraded the Bamboo Substation and constructed 8 new HV Substations as follows:
    - Edward Street 33/12kV substation
    - Wallerfield Substation
    - Union 132kV substation
    - Reform 132kV Substation
    - Debe 132kV Substation
    - Brighton 66/12kV Substation
    - New Macoya 66/12kV Substation
    - Mt Hope 132/33/12kV Substation
- Construction works ongoing at Gateway 132/33kV and Pinto Road 66kV Substations and Sea Lots/Gateway 132kV Cable Circuit
- Installed a new Fibre Optic Network approximately 800 km
- Replaced the Digital Microwave Radio System
- Relocated the Transmission Division & Public Lighting Department
- Executed the National Street Lighting Programme (installed over 92,000 new lights and over 10,000 poles, upgraded over 51,000 luminaires and illuminated over 175km of highways/main roads)
- Electrified 63 rural communities formally identified under the EC Rural Electrification Programme
- Illuminated over 100 recreation grounds/parks /public spaces
- Full deployment of Advanced Metering Infrastructure
- GIS mapping of infrastructure on going
- Upgrade of Customer Information System
- Implementation of a Human Capital Management and Global Payroll System

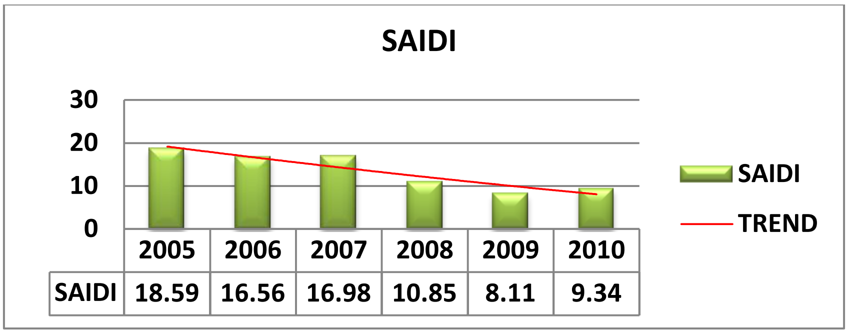
- ISO 9001 Certification of T&TEC's Southern Distribution Area was received on September 27, 2010. Roll out in other Areas has commenced.
- Total number of customers on supply: approximately 412,253
- 1,213 rural electrical jobs completed with an estimated 3,620 households benefitting during the period 2006 to 2010
- 20,347 poles replaced over the period 2006 – 2010
- 36.75% increase in hotline works in 2010 over 2007
- New distribution transformers - 1,541
- Installed and commissioned 64MW of additional power in Tobago
- Repaired damaged 33kV submarine cable servicing Tobago
- Tobago voltage increased to 66kV
- Quality of Service Standards established by the RIC consistently met which led to establishment of revised Standards
- New Strategic Plan and Direction formulated

2.8 KEY PERFORMANCE ACHIEVEMENTS - 2005 – 2010

2.8.1 Outage Durations:

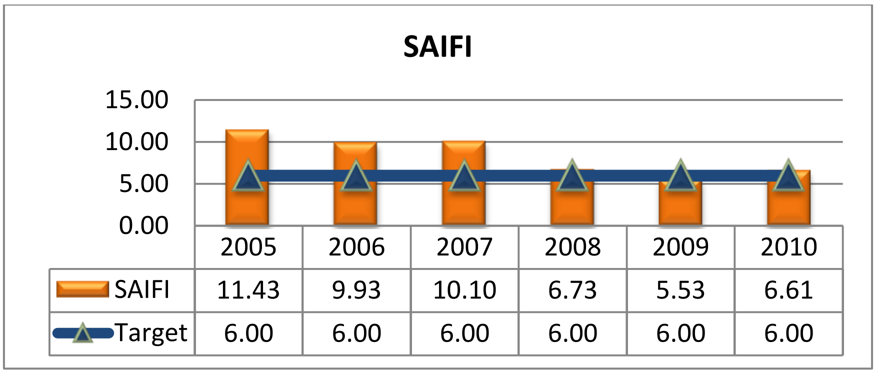
The average outage duration for any given customer per interruption has been on the decline falling from 1.63 hrs in 2005 to 1.41 hrs in 2010.

SAIDI Reliability Indicator 2005 – 2010



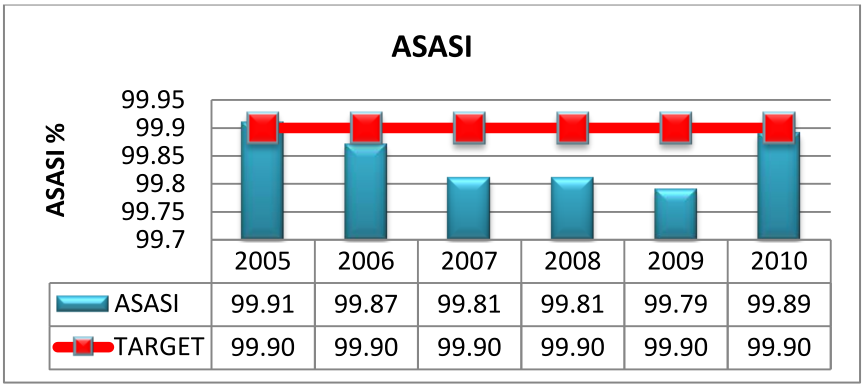
The average outage duration for each customer has been declining from 18.59 hrs in 2005 to 9.34 hrs in 2010.

SAIFI Reliability Indicator 2005 – 2010



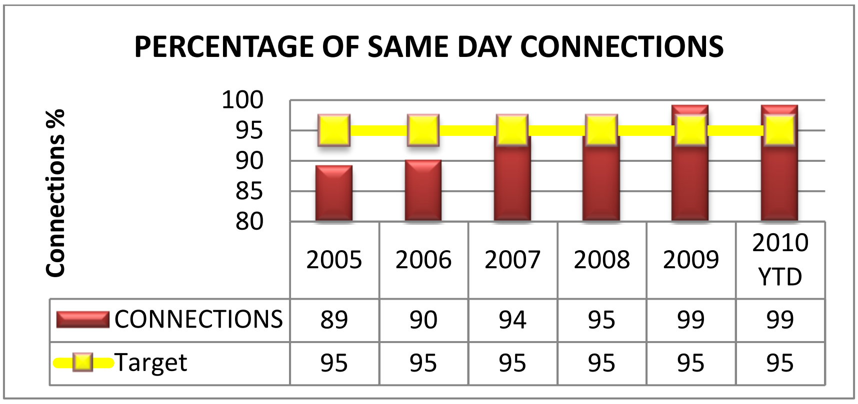
The average number of interruptions that a customer would experience has almost been halved from 2005 to 2010, dropping from 11.43 to 6.61.

ASAI Reliability Indicator 2005 – 2010



The overall reliability of the system has been relatively consistent, ensuring a supply to customers 99.89% of the time in 2010.

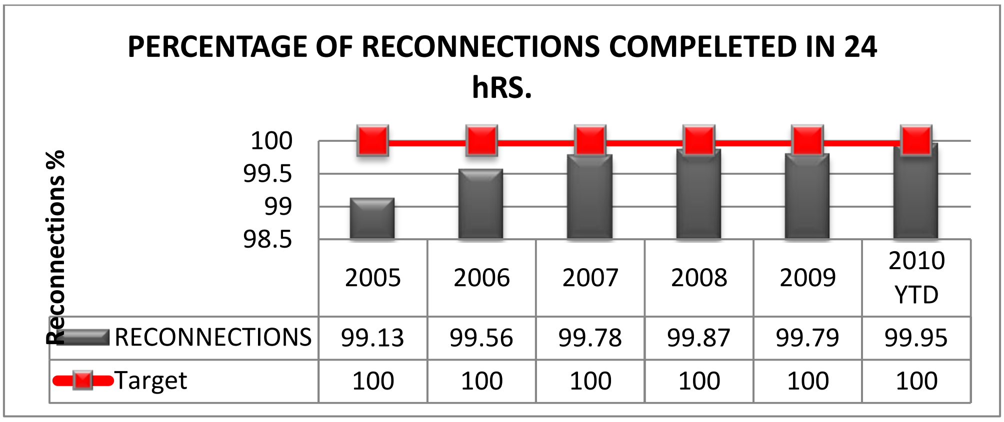
2.8.2 Percentage of Same Day Connections 2005 – 2010



	2005	2006	2007	2008	2009	2010 YTD
CONNECTIONS	89	90	94	95	99	99
Target	95	95	95	95	95	95

Over the years, there has been an increase in the number of same day connections. As can be seen in the above figure, T&TEC has surpassed its target of 95% same day connections with an actual performance of 99% at the end of 2010.

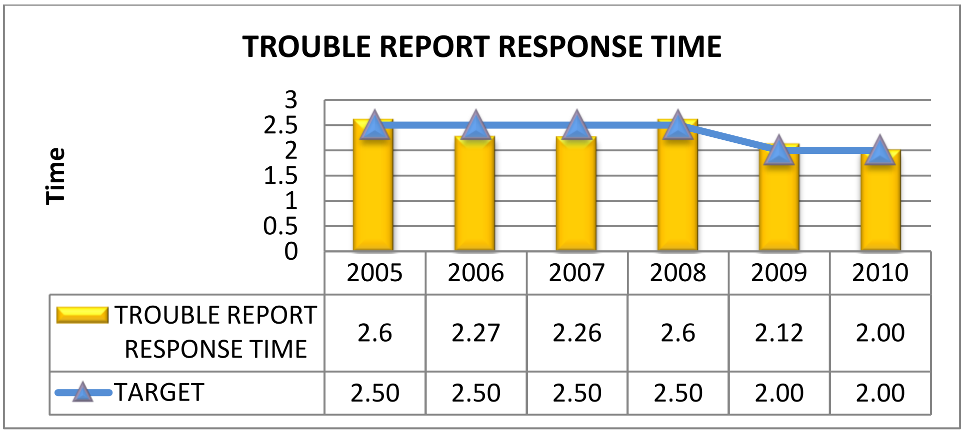
2.8.3 Percentage of Reconnections Completed in 24hrs 2005 – 2010



	2005	2006	2007	2008	2009	2010 YTD
RECONNECTIONS	99.13	99.56	99.78	99.87	99.79	99.95
Target	100	100	100	100	100	100

The Commission has been steadily improving regarding the reconnection of customers. Though falling slightly short of the 100% target, the Commission has maintained a high reconnection rate of 99.95% in 2010.

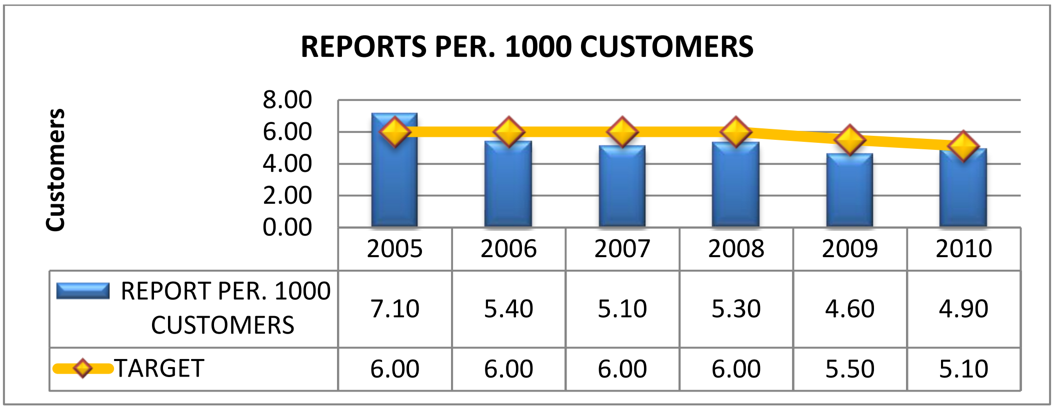
2.8.4 Trouble Report Response Time 2005 – 2010:



	2005	2006	2007	2008	2009	2010
TROUBLE REPORT RESPONSE TIME	2.6	2.27	2.26	2.6	2.12	2.00
TARGET	2.50	2.50	2.50	2.50	2.00	2.00

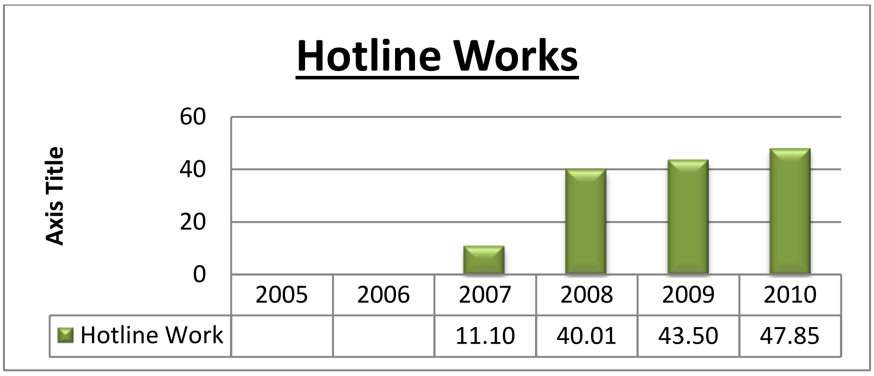
Average time to respond to a trouble report has also been on the decline falling from 2.6 hrs in 2005 to 2.00 hrs in 2010.

2.8.5 Trouble Reports per 1,000 Customers 2005 – 2010



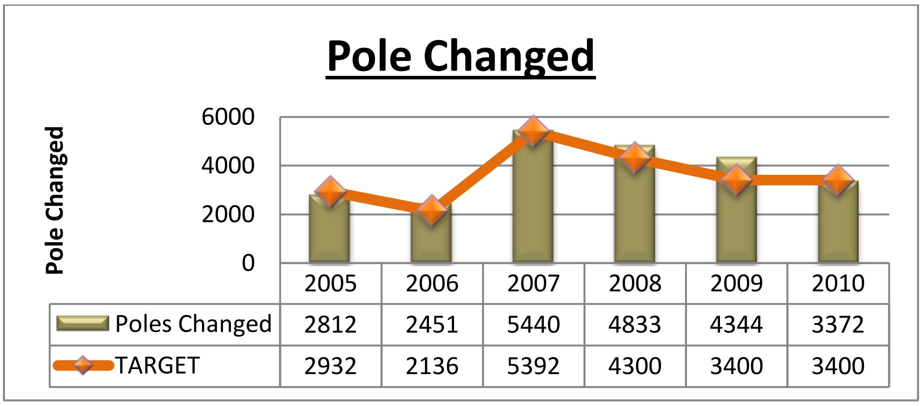
There has been a reduction in the number of trouble reports from 7.10 trouble reports per 1,000 customers to 4.90 trouble reports per 1,000 customers in 2010.

2.8.6 Hotline Works 2005-2010



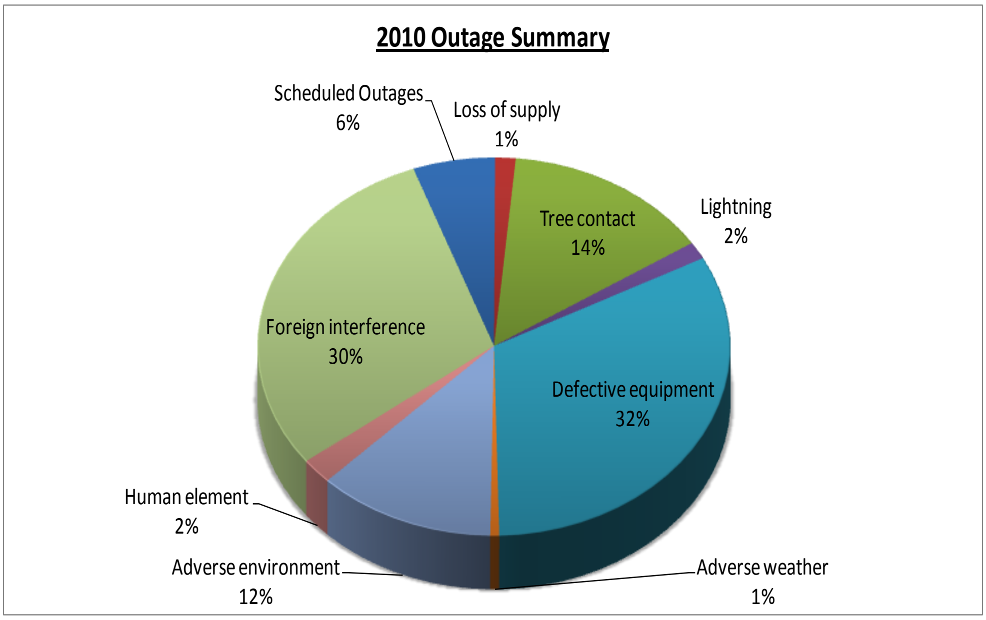
In an effort to reduce the number of outages to customers the Division introduced "Hotline" maintenance, that is, working on lines while they are still energised. As the years progressed, there has been a gradual increase in Hotline works reaching 47.85% in 2010.

2.8.7 Pole Replacement 2006 – 2010



The number of poles replaced has always surpassed the target set for the particular year, as can be seen in the graph above.

2.8.8 Outage Summary



Appendix X details the approach to be taken by T&TEC to effectively deal with the some of the major causes of outages.

2.9 Compliance under Guaranteed Standards including January to March 2010

Code	Service Description	Performance Measure	Jan -Mar 2010 Compliance Rates (%)	Change	2009 Compliance Rates (%)	Change	2008 Compliance Rates (%)	Change	2007 Compliance Rates (%)
GES1	Response and restoration time after unplanned (forced) outages on the distribution system.	Time for restoration of supply to affected customers	**99.9**	↑	**99.3**	↓	**99.5**	↓	**99.9**
GES2	Billing Punctuality (new customers)	Time for first bill to be mailed after service connection:							
		(a) Residential	**61.1**	↑	**49**	↓	**52.8**	↑	**49.4**
		(b) Non-Residential	**36.0**	↑	**23.3**	↑	**8.6**	↓	**10.5**
GES3	Reconnection after payment of overdue amounts or agreement on payment schedule	Time to restore supply after payment is made (All customers)	**99.9**	↑	**97.9**	↓	**99.9**	↑	**99.5**
GES4	Making and keeping appointments	Where required, appointments will be made on a morning or afternoon basis	**99.5**	↓	**99.7**		**62.8**	↓	**99.4**
GES5	Compensatory payment	(I) Time to credit compensatory payment after non-compliance	**N/A**		N/A		**N/A**		**N/A**
		(ii) Time to complete investigation, determine liability and make payment after receiving a claim.	**N/A**		N/A		**N/A**		**N/A**
GES6	Connection to supply:								
	Under 30 metres	Service drop and meter to be installed	**84.9**	↓	**98.2**	↓	**99.95**	↓	**99.9**
	30 to 100 metres	(a) Provision of estimate (subject to all documents being provided)	**100.0**	↑	**99.1**	↑	**68.6**	↓	**94.8**
	30 to 100 metres	(b) Complete construction (after payment is made)	**99.9**	↑	**97.2**	↑	**56.8**	↓	**80.5**
	100 to 250 metres	(a) Provision of estimate (subject to all documents	**100.0**	↑	**94.0**	↑	**56.7**	↓	**93.5**

Code	Service Description	Performance Measure	Jan -Mar 2010 Compli-ance Rates (%)	Change	2009 Compli-ance Rates (%)	Change	2008 Compli-ance Rates (%)	Change	2007 Compli-ance Rates (%)
		being provided)							
	100 to 250 metres	(b) Complete construction (after payment is made)	**99.8**	↑	**90.4**	↑	**69.1**	↓	**70.7**

Compliance under Overall Standards including January to March 2010

Code	Description	Required Performance Units	Jan -Mar 2010 Compli-ance Rates (%)	Change	2009 Compli-ance Rates (%)	Change	2008 Compli-ance Rates (%)	Change	2007 Compliance Rates (%)
OES1	Line faults repaired within a specified peri-od (for line faults that result in customers being affected)	100% within 48 hours	**100.0**	=	**100.0**	=	**100.0**	=	**100.0**
OES2	Billing punctuality	98% of all bills to be mailed within ten (10) work-ing days after meter reading or estimation	**100.0**	↑	**17.6**	↓	**41.5**	↓	**88.0**
OES3	Frequency of meter testing	10% of indus-trial custom-ers' meters tested for ac-curacy annual-ly.	**100.0**		**100.0**	=	**100.0**	=	**100.0**
OES4	Frequency of meter reading	(a) 90% of industrial meters should be read every month	**100.0**	=	**100.0**	=	**100.0**	=	**100.0**
		(b) 90% of residential and commercial meters read according to schedule	**100.0** **100.0**	=	**100.0**	=	**100.0**	=	**100.0**
OES5	System revenue losses (difference between energy received and energy for which reve-nue is derived)	7.5% of total energy delivered to customers	**100.0**	↑	**50.0**	↓	**100.0**		**0.0**

OES6	Response to customer que-ries/requests(written) (I)Time to response after receipt of queries	Within 5 working days	**84.5**		**0.0**	↑	**73.5**	↓	**89.0**
	(ii) Time to complete investigation and to communicate final position	Within 15 working days of inquiry	**91.3**		**0.0**	↓	**68.1**	↑	**52.0**
	(iii) Time to complete investigation and communicate final position if third party is involved (eg insurance claim.)	Within 30 working days after third party actions completed	**93.75**		**67.6**	↓	**75.4**	↑	**39.0**
OES7	Number of complaints to TTEC by type: (a) Billing queries	500 telephone and/or written complaints per 10,000 customers per annum	**N/A**		N/A		**N/A**		**100.0**
	(b) Voltage Fluctuations/Damage	300 telephone and/or written complaints per 10,000 customers per completed annum	**N/A**		**100.0**	=	**100.0**	=	**100.0**
	Street Lights/Poles/ Disconnections/Other	1000 tele-phone and/or written com-plaints per 10,000 customers per annum	**N/A**		**100.0**	=	**100.0**	=	**100.0**
OES8	Prior Notice of planned outages	At least 72 (3 days) advance notice of planned outages 100% of the time	**93.9**		**47.2**	↓	**48.0**	=	**48.0**
OES9	Correction of Low/high Voltage complaints	All voltage complaints to be responded to within 24 hours	**99.8**		**99.3**	↑	**98.9**	↓	**99.9**
		All voltage complaints to be rectified within 15 working dates.	**98.6**		**99.2**	↑	**96.8**	↓	**98**

2.10. Compliance under Guaranteed Standards including April to December 2010

Code	Service Description	Performance Measure	April -Dec 2010 Compliance Rates (%)	Change	2009 Compliance Rates (%)	Change	2008 Compliance Rates (%)	Change	2007 Compliance Rates (%)
GES1	Response and restoration time after unplanned (forced) outages on the distribution system.	Restoration of electricity within 10 hours after an unplanned outage on the distribution system(12 hours prior to 2010)	**99.3**	=	**99.3**	↓	**99.5**	↓	**99.9**
GES2	Billing Punctuality (new customers)	Time for first bill to be mailed after service connection:							
		(a) Residential	**71.2**	↑	**49**	↓	**52.8**	↑	**49.4**
		(b) Non-Residential	**26.0**	↑	**23.3**	↑	**8.6**	↓	**10.5**
GES3	Reconnection after payment of overdue amounts or agreement on payment schedule	Time to restore supply after payment is made (All customers)	**99.3**	↑	**97.9**	↓	**99.9**	↑	**99.5**
GES4	Making and keeping appointments	Where required appointments will be made on a morning or afternoon basis	**99.4**	↓	**99.7**		**62.8**	↓	**99.4**
GES5	Investigation of Voltage Complaints (prior to 2010 - OES 9)	(i)All voltage complaints to be responded to within 24 hours	**97.7**	↓	**99.3**	↑	**98.9**	↓	**99.9**
		(ii)All voltage complaints to be rectified within 15 working days.	**99.7**	↑	**99.2**	↑	**96.8**	↓	**98**
GES6	Response to customer billing and payment queries	Time for substantive reply within 15 days	**72.7**						
GES7	New Connection of supply	(i) Time for new connections to be made within 3 working days	**94.6**						
GES8	Payments owed under guaranteed standards	(i) Time for non-residential customers to be paid within 30 days	**100.0**						

Code	Service Description	Performance Measure	April -Dec 2010 Compliance Rates (%)	Change	2009 Compliance Rates (%)	Change	2008 Compliance Rates (%)	Change	2007 Compliance Rates (%)
		(i) Time for residential customers to be paid within 60 days	**100.0**						

Compliance under Overall Standards including April to December 2010

Code	Description	Required Performance Units	April -Dec 2010 Compliance Rates (%)	Change	2009 Compliance Rates (%)	Change	2008 Compliance Rates (%)	Change	2007 Compliance Rates (%)
OES1	Frequency of meter reading	(a) 90% of industrial meters should be read every month	**100.0**	=	**100.0**	=	**100.0**	=	**100.0**
		(b) 90% of residential and commercial meters read according to schedule	**100.0**						
OES2	Billing punctuality	98% of all bills to be mailed within ten (10) working days after meter reading or estimation	**100.0**	↑	**17.6**	↓	**41.5**	↓	**88.0**
OES3	Response to meter problems	Meter problems resolved within 10 working days	**90.6**	↓	**100.0**	=	**100.0**	=	**100.0**
OES4	Prior Notice of planned outages	(i) At least 72 hours (3 days) advance notice of planned outages 100% of the time	**95.3**	↓	**100.0**	=	**100.0**	=	**100.0**
		(ii) Duration for a planned interruption	**98.3**	↓	**100.0**	=	**100.0**	=	**100.0**

Code	Description	Required Performance Units	April -Dec 2010 Compliance Rates (%)	Change	2009 Compliance Rates (%)	Change	2008 Compli-ance Rates (%)	Change	2007 Compliance Rates (%)
		kept within the time specified in the notifica-tion							
OES5	Streetlight Maintenance	(i) Street lights repaired within 7 working days	**77.2**	↑	**50.0**	↓	**100.0**		**0.0**
		(ii) Highway lights repaired within 14 working days	**66.1**						
OES6	Response to customer queries/ requests(written) (I)Time to re-spond after re-ceipt of queries	Within 10 working days	**95.3**	↑	**82.6**	↑	**73.5**	↓	**89.0**
	(ii) Time to com-plete investiga-tion and to com-municate final position	Within 30 working days	**97.7**	↑	**67.5**	↓	**68.1**	↑	**52.0**
		Written com-plaints resolved	**81.2**	↑	**67.6**	↓	**75.4**	↑	**39.0**
OES7	Notifying customers of receipt of claim under guaranteed standards GES 1	Claims acknowledged within 10 working days	**100.0**		N/A		**N/A**		**100.0**

T&TEC continues to achieve over 90% compliance for most of the Guaranteed Standards. There is however a need to improve on billing punctuality for new residential and non-residential customers. With respect to Overall Standards high compliance rates were again achieved for most standards. OES 2 reflected significant improvement in 2010 with the introduction of the Ventyx system. OES 6 also showed improvement in 2010 as a result of fewer queries having to be responded to as customer confidence increased on the AMI and the then new rate increase and structure.

2.11 T&TEC'S FINANCIAL PERFORMANCE - 2006 – 2010

	Jan – Dec Actual 2006	**Jan – Dec Actual 2007**	**Jan – Dec Actual 2008**	**Jan – Dec Actual 2009**	**Jan – Dec Actual 2010 (Unaudited)**
Sales – MWh	6,654,768	7,399,510	7,536,282	7,297,063	7,908,586
Average Revenue per kWh –*cts*	25.52	28.18	30.00	33.98	34.61
INCOME	$'000	$'000	$'000	$'000	$'000
Sales of Electricity	1,698,476	2,085,311	2,260,519	2,479,225	2,665,221
Other Income	190,517	194,963	217,326	169,168	105,557
TOTAL INCOME	**1,888,993**	**2,280,274**	**2,477,845**	**2,648,393**	**2,770,778**
EXPENDITURE					
Generation	1,069,052	1,146,599	1,184,722	1,280,734	1,432,290
Transmission and distribution	280,233	304,243	478,283	435,963	450,770
Engineering	20,506	18,143	32,565	29,819	26,905
Administrative	109,644	87,771	135,289	120,681	164,918
Depreciation	221,184	255,032	257,256	281,264	454,353
Interest	156,651	209,562	147,777	157,166	216,247
TOTAL EXPENDITURE	**1,857,270**	**2,021,350**	**2,235,892**	**2,305,627**	**2,745,483**
Surplus for the year	**31,723**	**258,924**	**241,953**	**342,766**	**25,295**
Pension (cost)/income	(289,599)	(56,033)	44,622	(57,082)	33,735
Net Surplus/(Deficit)	(257,875)	202,891	286,575	285,684	59,030
Rate Base excl. Pension Cost	2,854,688	4,583,687	5,253,239	6,660,567	6,657,299
Return on Rate Base excl. Pension	(1.11)	5.65	4.61	5.15	0.38

2.11.1 INCOME STATEMENT BY RESOURCE CATEGORY

	Jan-Dec Actual 2006	Jan-Dec Actual 2007	Jan-Dec Actual 2008	Jan-Dec Actual 2009	Jan-Dec Actual 2010
Sales - kWh x 10	6,654,768,249	7,170,114,732	7,536,281,512	7,297,062,764	7,908,585,664
Average Revenue per kWh -*cts*	25.52	29.08	30.00	33.98	33.70
INCOME	$	$	$	$	$
Sales of Electricity	1,698,476,811	2,085,311,062	2,260,518,513	2,479,224,714	2,665,220,733
Other Income	190,517,467	194,962,522	217,325,772	169,168,417	105,556,228
TOTAL INCOME	1,888,994,278	2,280,273,584	2,477,844,284	2,648,393,131	2,770,776,961
EXPENDITURE					
Conversion Cost	511,779,483	502,572,339	543,058,606	575,784,615	598,930,031
Fuel	546,289,780	625,597,317	622,444,064	658,659,852	747,956,462
Wages	94,277,889	89,900,818	181,907,597	158,092,241	142,723,120
Salaries	159,567,556	163,246,870	266,439,294	231,514,869	248,275,004
Overtime	28,291,497	35,078,849	39,218,967	36,743,564	31,187,255
NIS	8,866,841	9,472,110	18,349,343	19,157,313	20,221,433
Pension	281,218,303	55,081,125	(70,992,665)	22,843,911	(60,174,584)
Employee Related Benefits	25,214,634	20,748,037	59,590,747	46,463,061	42,012,609
Rates, Taxes and Insurances	9,796,965	8,218,459	9,092,901	9,178,123	12,081,964
Materials	17,059,615	22,216,265	26,419,470	26,142,071	20,752,446
Services	109,714,142	107,289,922	120,018,293	176,659,157	272,924,385
Rents	315,810	310,608	677,074	1,225,845	1,069,110
Depreciation	221,183,807	255,031,703	257,255,906	281,263,740	454,351,659
Interest	156,715,289	210,054,933	147,666,368	157,198,491	216,273,396
H/Office Engineering Clearing	(19,470,325)	(23,303,591)	(25,906,276)	(34,673,852)	(33,671,521)
Vehicle Clearings	(3,950,367)	(4,131,849)	(3,969,740)	(3,544,241)	(3,165,633)
TOTAL EXPENDITURE	2,146,870,918	2,077,383,915	2,191,269,947	2,362,708,762	2,711,747,137
NET SURPLUS/(DEFICIT)	(257,876,640)	202,889,670	286,574,337	285,684,370	59,029,824

Note:

1) Employee related benefits in 2008 include adjustment to post retirement medical plan as per Actuary's report re IAS19 for $22M. In addition, there is an adjustment for accrued leave re IAS 19 of $10M.
2) Rents in 2008 include cost of rental of new property on Wrightson Road of $0.35M for three months and $0.82M for seven months in 2009.
3) Increase depreciation in 2007 was as a result of the effects of IAS 17 with respect to the commencement of Power Purchase Agreement (PPA) 2 amounting to $35M. The 2009 increase is due to the addition of $744M with respect to -the extension of PPA1and the transfer of an additional $300M from work in progress. In 2010 the increase is mainly due to transfers from work-in-progress amounting to $982M.
4) 2008 Wages include basic and allowance back pay of $84.9M.
5) 2008 Salaries include basic and allowance back pay of $96.2M.
6) The 2010 Income Statement reflects a typical calendar year's operation except for the inclusion of approximately $102M represented by $74M for the repair of the submarine cable, which formed part of the transmission cost and $28M for the additional usage of diesel arising therefrom.

2.11.2 FINANCIAL POSITION – 2006-2010

FINANCIAL POSITION January to December					
	2006 $' 000	2007 $' 000	2008 $' 000	2009 $' 000	2010 $'000
Non-current Assets	3,463,567	4,946,627	5,653,648	7,182,522	7,244,397
Current Assets	1,138,776	1,577,817	1,552,620	1,604,553	1,700,930
Total Assets	**4,602,343**	**6,524,444**	**7,206,268**	**8,787,075**	**8,945,327**
Equity	2,079,593	2,344,434	2,434,892	2,526,917	2,651,418
Accumulated Deficits	(1,297,565)	(1,094,674)	(808,099)	(522,415)	(462,108)
Borrowings	2,401,881	3,040,066	2,676,947	3,513,226	3,165,499
Trade and other payables	12,205,666	2,047,866	2,874,669	3,269,347	3,590,477

Note: 2010 are unaudited figures.

2.11.2.1 DEBTORS BALANCES DECEMBER 2010

	0-30 DAYS	31-60 DAYS	61-120 DAYS	120 DAYS & OVER	TOTAL AGED
	$	$	$	$	$
Public	36,693,942	14,555,219	19,705,493	76,995,097	147,949,752
Private	134,508,924	30,821,003	20,811,206	24,969,422	211,110,555
Total Active Accs	**171,202,866**	**45,376,222**	**40,516,699**	**101,964,519**	**359,060,307**

Public	21,005	5,049	19,993	(358,154)	(312,108)
Private	236,058	240,292	466,744	48,315,343	49,258,437
Total Inactive Accs	**257,063**	**245,341**	**486,737**	**47,957,189**	**48,946,329**

Total Aged Bal ance - All Accs	**171,459,929**	**45,621,563**	**41,003,436**	**149,921,708**	**408,006,636**

2.11.2.2 DEBTORS BALANCES MAY 2011

	0-30 DAYS	31-60 DAYS	61-120 DAYS	120 DAYS & OVER	TOTAL AGED
	$	$	$	$	$
Public	23,999,642	10,011,910	7,146,788	8,209,009	49,367,349
Private	153,034,900	37,789,870	14,037,901	20,951,826	225,814,498
Total Active Accs	**177,034,542**	**47,801,780**	**21,184,689**	**29,160,836**	**275,181,847**
Public	14,826	10,142	29,982	(355,949)	(301,000)
Private	425,879	134,683	297,539	51,962,971	52,821,071
Total Inactive Accs	**440,705**	**144,825**	**327,521**	**51,607,022**	**52,520,072**
Total Aged Balance - All Accs	**177,475,247**	**47,946,605**	**21,512,210**	**80,767,858**	**327,701,919**

Note:

Receivables for active accounts have decreased to a current balance of $275.18M representing a 23% reduction over the 2010 figure of $359.06M.

In spite of this reduction the Commission has the following plans in place to adequately manage receivables:

1) Communicate with the respective Ministries suggesting that each be responsible for the timely payment of all electricity bills under their portfolio.
2) Step-up the disconnection drive.
3) Introduce additional collection agencies.
4) Communicate regularly with the Ministries.
5) The introduction of Interactive Voice Response (IVR) system

2.11.3 RETURN ON RATE BASE - (2005-2010)

	Actual 2005 $'000	**% Change**	**Actual 2006 $'000**	**% Change**	**Actual 2007 $'000**	**% Change**	**Actual 2008 $'000**	**% Change**	**Actual 2009 $'000**	**% Change**	**Actual (Unaudit-ed) 2010 $'000**
Net Fixed Assets	2,248,922	8.54	2,440,901	61.76	3,948,420	14.63	4,526,189	33.60	6,046,777	(0.29)	6,029,453
Stores	129,994	76.05	228,858	92.55	440,672	13.05	498,193	(31.00)	380,390	(3.23)	368,486
1/8 Operating Expense	170,772	8.29	184,929	5.23	194,595	17.61	228,857	1.98	233,400	35.46	316,155
Rate Base	2,549,688		2,854,688		4,583,687		5,253,239		6,660,567		6,657,299
Surplus/(Deficit) for the year	(44,646)		31,723		258,924		241,953		342,766		25,295
Return on Rate Base	(1.75%)		1.11%		5.65%		4.61%		5.15%		0.38%

T&TEC continues to achieve less than the 8% return on rate base deemed to be a reasonable return given the 8% cost of capital.

2.11.3.1. SUMMARY OF FIXED ASSETS AS AT 31ST DECEMBER 2010

	Land $	Structures $	Transmission Assets $	Distribution Assets $	Meters $	Communication Equipment $	Computer Equipment $	Motor Vehicles $	Cove Power Plant $	Total $	Finance Lease $	Work In Progress (NBV) $	Total (NBV) $
Asset Base a@31st December 2009	9,999,127	23,2975,357	394,208,112	1,484,698,810	200,812,789	57,613,420	48,052,474	16,503,570	0	2,444,863,659	1690164,091	0	0
Capital Expenditure during the year													
Funded by:													
T&TEC	0	10,299,298	22,722,209	213,526,891	160,124,405	18,238,285	26,986,641	1,208,493	534,163,608	987,269,831	0	0	0
Government													
Capital Contributions-Residential										5,181,052*			
Capital Contributions-Non-Residential										34,780,643*			
Grants													
	9,999,127	**243,274,655**	**416930,321**	**1698,225,701**	**360,937,194**	**75,851,705**	**75,039,115**	**17,712,063**	**534,163,608**	**3,432,133,490**	**1,690,164,091**	**0**	**0**
Disposals during the year	0	0	0	0	0	0	0	0	0	0	0	0	0
Transfers / Other adjustments	0	0	0	0	0	0	0	0	0	0	0	0	0
Outperformance of regulatory assumptions													
Gross Regulatory Asset Base at December 31, 2010	**9,999,127**	**243,274,655**	**416,930,321**	**1,698,225,701**	**360,937,194**	**75,851,705**	**75,039,115**	**17,712,063**	**534,163,608**	**3,432,133,490**	**1,690,164,091**	**0**	**0**
Depreciation at December 31, 2009	12,775,469	110,377,221	320,785,445	605,367,565	95,328,362	60,067,642	96,548,931	96,537,216	0	1,397,787,851	2747,951,870	0	0
Provided during the Year	(1,758,292)	22,432,502	31,953,936	73,678,795	26,085,320	15,270,024	27,619,591	10,152,687	17,536,017	222,970,580	283,218,420	0	0
Disposals during year	0	0	0	0	0	0	0	0	0	0	0	0	0
Impairment	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation at December 31, 2010	11,017,177	132,809,723	352,739,381	679,046,360	121,413,682	75,337,667	124,168,522	106689,904	17536,017	1,620,758,431	3031,170,290	0	0
Closing Asset Base December 2010	11,757,420	220,842,154	384,976,385	1,624,546,906	334,851,874	60,581,680	47,419,524	7,559,376	516,627,591	3,209,162,910	1,406,945,671	1,413,345,000	6,029,453,581

Note:* Capital contribution for both residential and non-residential customers are already included in the capital expenditure for the year.

2.11.3.2. NET FIXED ASSETS ROLLED FORWARD (excluding Finance Lease)

	2011 $'000	2012 $'000	2013 $'000	2014 $'000	2015 $'000	2016 $'000
Opening Value(excl. Finance Lease and WIP)	3,209,163	3,450,234	3,737,301	3,980,522	4,087,927	4,133,233
Finance Lease						
CAPEX Additions	422,950	483,450	453,200	327,200	273,300	208,500
Less: Depreciation*	181,880	196,383	209,979	219,795	227,994	234,249
Less: Disposals	0	0	0	0	0	0
Closing Value	3,450,234	3,737,301	3,980,522	4,087,927	4,133,233	4,107,484

*** -** The depreciation is net of capital contribution**.**

2.11.4 OVERTIME PAYMENTS (Recurrent and Capital) - (2005 – 2010)

Year	Overtime Paid ($'000)	Percentage Overtime
2005	23,682.8	10.29
2006	28,291.5	9.83
2007	35,078.8	13.26
2008	39,219.0	14.14
2009	36,743.6	9.58
2010	31,187.3	8.13

2.11.5 T&TEC's Borrowings

T&TEC's existing loan portfolio comprises two Government Guaranteed loans and a Government advance as follows:

(i) Five hundred million dollar ($500M) Bond at an interest rate of 12.25% issued in 2001 to be fully repaid by 2021;

(ii) US seventy six point six million dollars ($76.6M) HSBC Loan at 4.13% for Tranche A and 5.725% for Tranche B for the Cove Power Station be fully repaid by 2021;

(iii) Government advance of $725M – no arrangements identified as yet by the Ministry of Finance for the repayment of this advance or its conversion to equity.

In addition to the above, T&TEC also owes the National Gas Company (NGC) approximately $2.3B (including interest) as at 30th April 2011. The Financial Statements also reflect the effects of a Finance lease loan payable of $1,480M as at 31st March 2011. This resulted from the accounting treatment of PowerGen's PPAs in accordance with International Accounting Standard (IAS) 17).

Additional borrowings of $600M are projected over the 2011 to 2016 period to partially fund the capital expenditure programme of $2.2Bn. The projected terms of this loan are:

- Interest of 10% per annum
- Tenure – 15 years with a 3 year moratorium.

Debt to NGC

Cabinet by Minute 1026 of April 29, 2010 agreed on the following mechanism to settle the arrears to the NGC as at September 2009:

- T&TEC's debt to the NGC as at 30th September 2009 amounting to US$318.1Mn be converted into a medium term loan.
- The loan to have a tenure of 7 years, at an interest rate of 3% per annum, no moratorium and semi-annual payments to commence on June 01, 2010
- NGC to facilitate the servicing of the loan by semi-annual dividend payments to the Ministry of Finance, equivalent in value to the required debt service payments
- The Ministry of Finance to provide the funding to T&TEC to service the debt
- T&TEC to keep current with monthly natural gas purchases

A separate arrangement to be put in place for outstanding invoices from February to June 2010.

This arrangement however, is still to be endorsed by the present Government.

The amortisation schedules of i) and ii) showing repayments for the 2011 to 2016 period, and details of the debt to NGC are shown below.

$500M BONDS

Date	Principal Balance TTD	Interest Charged 12.25%	Principal Repayment TTD	Interest Repayment	Total Repayment	Total Interest Capitalised TTD	Total Balance on Principal and Interest Capitalised TTD
Sep-01	500,000,000.00	30,625,000.00				30,625,000.00	530,625,000.00
2011							
Mar-11	441,180,797.65	27,022,323.86	(21,008,609.41)	(27,022,323.86)	(48,030,933.27)		420,172,188.24
Sep-11	420,172,188.24	25,735,546.53	(21,008,609.41)	(25,735,546.53)	(46,744,155.94)		399,163,578.83
In 2011	**441,180,797.65**	**52,757,870.39**	(42,017,218.82)	(52,757,870.39)	(94,775,089.21)	**0.00**	**399,163,578.83**
L-T-D 2011	**500,000,000.00**	**735,437,537.19**	(315,129,141.15)	(521,144,817.21)	(836,273,958.36)	**214,292,719.98**	**399,163,578.83**
2012							
Mar-12	399,163,578.83	24,448,769.20	(21,008,609.41)	(24,448,769.20)	(45,457,378.61)		378,154,969.42
Sep-12	378,154,969.42	23,161,991.88	(21,008,609.41)	(23,161,991.88)	(44,170,601.29)		357,146,360.01
In 2012	**399,163,578.83**	**47,610,761.08**	(42,017,218.82)	(47,610,761.08)	(89,627,979.90)	**0.00**	**357,146,360.01**
L-T-D 2012	**500,000,000.00**	**783,048,298.27**	(357,146,359.97)	(568,755,578.29)	(925,901,938.26)	**214,292,719.98**	**357,146,360.01**
2013							
Mar-13	357,146,360.01	21,875,214.55	(21,008,609.41)	(21,875,214.55)	(42,883,823.96)		336,137,750.60
Sep-13	336,137,750.60	20,588,437.22	(21,008,609.41)	(20,588,437.22)	(41,597,046.63)		315,129,141.19
In 2013	**357,146,360.01**	42,463,651.77	(42,017,218.82)	(42,463,651.77)	(84,480,870.59)	**0.00**	**315,129,141.19**
L-T-D 2013	**500,000,000.00**	825,511,950.04	(399,163,578.79)	(611,219,230.06)	(1,010,382,808.85)	**214,292,719.98**	**315,129,141.19**
2014							
Mar-14	315,129,141.19	19,301,659.90	(21,008,609.41)	(19,301,659.90)	(40,310,269.31)		294,120,531.78
Sep-14	294,120,531.78	18,014,882.57	(21,008,609.41)	(18,014,882.57)	(39,023,491.98)		273,111,922.37
In 2014	**315,129,141.19**	37,316,542.47	(42,017,218.82)	(37,316,542.47)	(79,333,761.29)	**0.00**	**273,111,922.37**
L-T-D 2014	**500,000,000.00**	862,828,492.51	(441,180,797.61)	(648,535,772.53)	(1,089,716,570.14)	**214,292,719.98**	**273,111,922.37**
2015							
Mar-15	273,111,922.37	16,728,105.24	(21,008,609.41)	(16,728,105.24)	(37,736,714.65)		252,103,312.96
Sep-15	252,103,312.96	15,441,327.92	(21,008,609.41)	(15,441,327.92)	(36,449,937.33)		231,094,703.55
In 2015	**273,111,922.37**	32,169,433.16	(42,017,218.82)	(32,169,433.16)	(74,186,651.98)	**0.00**	**231,094,703.55**
L-T-D 2015	**500,000,000.00**	894,997,925.67	(483,198,016.43)	(680,705,205.69)	(1,163,903,222.12)	**214,292,719.98**	**231,094,703.55**
2016							
Mar-16	231,094,703.55	14,154,550.59	(21,008,609.41)	(14,154,550.59)	(35,163,160.00)		210,086,094.14
Sep-16	210,086,094.14	12,867,773.26	(21,008,609.41)	(12,867,773.26)	(33,876,382.67)		189,077,484.73
In 2016	**231,094,703.55**	27,022,323.85	(42,017,218.82)	(27,022,323.85)	(69,039,542.67)	**0.00**	**189,077,484.73**
L-T-D 2016	**500,000,000.00**	922,020,249.52	(525,215,235.25)	(707,727,529.54)	(1,232,942,764.79)	**214,292,719.98**	**189,077,484.73**

COVE FINANCING

HSBC - USD LOAN TRANCHE A

INTEREST RATE 4.130%

Date	Days	Principal Balance USD	Interest Charged 4.130%	Principal Repayment USD	Interest Repayment	Total Repayment	Total Balance on Principal and Interest Capitalised USD
2010	-						
15-Apr-10		64,928,792.90	0.00	(2,705,366.37)	0.00	**(2,705,366.37)**	62,223,426.53
15-Oct-10	183	62,223,426.53	1,306,328.99	(2,705,366.37)	(1,306,328.99)	**(4,011,695.36)**	59,518,060.16
In 2010		**64,928,792.90**	**1,306,328.99**	**(5,410,732.74)**	**(1,306,328.99)**	**(6,717,061.73)**	**59,518,060.16**
L-T-D 2010		**64,928,792.90**	**1,306,328.99**	**(5,410,732.74)**	**(1,306,328.99)**	**(6,717,061.73)**	**59,518,060.16**
2011	-						
15-Apr-11	182	59,518,060.16	1,242,704.03	(2,705,366.37)	(1,242,704.03)	**(3,948,070.40)**	56,812,693.79
15-Oct-11	183	56,812,693.79	1,192,735.16	(2,705,366.37)	(1,192,735.16)	**(3,898,101.53)**	54,107,327.42
In 2011		**59,518,060.16**	**2,435,439.19**	**(5,410,732.74)**	**(2,435,439.19)**	**(7,846,171.93)**	**54,107,327.42**
L-T-D 2011		**64,928,792.90**	**3,741,768.18**	**(10,821,465.48)**	**(3,741,768.18)**	**(14,563,233.66)**	**54,107,327.42**
2012	-						
15-Apr-12	183	54,107,327.42	1,135,938.25	(2,705,366.37)	(1,135,938.25)	**(3,841,304.62)**	51,401,961.05
15-Oct-12	183	51,401,961.05	1,079,141.34	(2,705,366.37)	(1,079,141.34)	**(3,784,507.71)**	48,696,594.68
In 2012		**54,107,327.42**	**2,215,079.59**	**(5,410,732.74)**	**(2,215,079.59)**	**(7,625,812.33)**	**48,696,594.68**
L-T-D 2012		**64,928,792.90**	**5,956,847.77**	**(16,232,198.23)**	**(5,956,847.77)**	**(22,189,045.99)**	**48,696,594.68**
2013	-						
15-Apr-13	182	48,696,594.68	1,016,757.84	(2,705,366.37)	(1,016,757.84)	**(3,722,124.21)**	45,991,228.30
15-Oct-13	183	45,991,228.30	965,547.51	(2,705,366.37)	(965,547.51)	**(3,670,913.88)**	43,285,861.93
In 2013		**48,696,594.68**	**1,982,305.36**	**(5,410,732.74)**	**(1,982,305.36)**	**(7,393,038.10)**	**43,285,861.93**
L-T-D 2013		**64,928,792.90**	**7,939,153.12**	**(21,642,930.97)**	**(7,939,153.12)**	**(29,582,084.09)**	**43,285,861.93**
2014	-						
15-Apr-14	182	43,285,861.93	903,784.75	(2,705,366.37)	(903,784.75)	**(3,609,151.12)**	40,580,495.56
15-Oct-14	183	40,580,495.56	851,953.69	(2,705,366.37)	(851,953.69)	**(3,557,320.06)**	37,875,129.19
In 2014		**43,285,861.93**	**1,755,738.44**	**(5,410,732.74)**	**(1,755,738.44)**	**(7,166,471.18)**	**37,875,129.19**
L-T-D 2014		**64,928,792.90**	**9,694,891.56**	**(27,053,663.71)**	**(9,694,891.56)**	**(36,748,555.27)**	**37,875,129.19**
2015	-						
15-Apr-15	182	37,875,129.19	790,811.66	(2,705,366.37)	(790,811.66)	**(3,496,178.03)**	35,169,762.82
15-Oct-15	183	35,169,762.82	738,359.86	(2,705,366.37)	(738,359.86)	**(3,443,726.23)**	32,464,396.45
In 2015		**37,875,129.19**	**1,529,171.52**	**(5,410,732.74)**	**(1,529,171.52)**	**(6,939,904.26)**	**32,464,396.45**
L-T-D 2015		**64,928,792.90**	**11,224,063.08**	**(32,464,396.45)**	**(11,224,063.08)**	**(43,688,459.53)**	**32,464,396.45**
2016	-						
15-Apr-16	183	32,464,396.45	681,562.95	(2,705,366.37)	(681,562.95)	**(3,386,929.32)**	29,759,030.08
15-Oct-16	183	29,759,030.08	624,766.04	(2,705,366.37)	(624,766.04)	**(3,330,132.41)**	27,053,663.71
In 2016		**32,464,396.45**	**1,306,328.99**	**(5,410,732.74)**	**(1,306,328.99)**	**(6,717,061.73)**	**27,053,663.71**
L-T-D 2016		**64,928,792.90**	**12,530,392.06**	**(37,875,129.19)**	**(12,530,392.06)**	**(50,405,521.26)**	**27,053,663.71**

COVE FINANCING

HSBC - USD LOAN TRANCHE B

INTEREST RATE 5.925%

Date	Days	Principal Balance *USD*	Interest Charged *5.925%*	Principal Repayment *USD*	Interest Repayment *USD*	Total Repayment *USD*	Total Balance on Principal and Interest Capitalised *USD*
2010	-						
15-Apr-10		12,562,971.16	0.00	(523,457.13)	0.00	**(523,457.13)**	12,039,514.03
15-Oct-10	183	12,039,514.03	362,615.11	(523,457.13)	(362,615.11)	**(886,072.24)**	11,516,056.90
In 2010		**12,562,971.16**	**362,615.11**	**(1,046,914.26)**	**(362,615.11)**	**(1,409,529.38)**	**11,516,056.90**
L-T-D 2010		**12,562,971.16**	**362,615.11**	**(1,046,914.26)**	**(362,615.11)**	**(1,409,529.38)**	**11,516,056.90**
2011	-						
15-Apr-11	182	11,516,056.90	344,953.89	(523,457.13)	(344,953.89)	**(868,411.02)**	10,992,599.76
15-Oct-11	183	10,992,599.76	331,083.36	(523,457.13)	(331,083.36)	**(854,540.50)**	10,469,142.63
In 2011		**11,516,056.90**	**676,037.25**	**(1,046,914.26)**	**(676,037.25)**	**(1,722,951.52)**	**10,469,142.63**
L-T-D 2011		**12,562,971.16**	**1,038,652.36**	**(2,093,828.53)**	**(1,038,652.36)**	**(3,132,480.89)**	**10,469,142.63**
2012	-						
15-Apr-12	183	10,469,142.63	315,317.49	(523,457.13)	(315,317.49)	**(838,774.62)**	9,945,685.50
15-Oct-12	183	9,945,685.50	299,551.62	(523,457.13)	(299,551.62)	**(823,008.75)**	9,422,228.37
In 2012		**10,469,142.63**	**614,869.10**	**(1,046,914.26)**	**(614,869.10)**	**(1,661,783.37)**	**9,422,228.37**
L-T-D 2012		**12,562,971.16**	**1,653,521.47**	**(3,140,742.79)**	**(1,653,521.47)**	**(4,794,264.26)**	**9,422,228.37**
2013	-						
15-Apr-13	182	9,422,228.37	282,235.00	(523,457.13)	(282,235.00)	**(805,692.13)**	8,898,771.24
15-Oct-13	183	8,898,771.24	268,019.87	(523,457.13)	(268,019.87)	**(791,477.00)**	8,375,314.11
In 2013		**9,422,228.37**	**550,254.87**	**(1,046,914.26)**	**(550,254.87)**	**(1,597,169.13)**	**8,375,314.11**
L-T-D 2013		**12,562,971.16**	**2,203,776.34**	**(4,187,657.05)**	**(2,203,776.34)**	**(6,391,433.39)**	**8,375,314.11**
2014	-						
15-Apr-14	182	8,375,314.11	250,875.55	(523,457.13)	(250,875.55)	**(774,332.69)**	7,851,856.97
15-Oct-14	183	7,851,856.97	236,488.12	(523,457.13)	(236,488.12)	**(759,945.25)**	7,328,399.84
In 2014		**8,375,314.11**	**487,363.67**	**(1,046,914.26)**	**(487,363.67)**	**(1,534,277.94)**	**7,328,399.84**
L-T-D 2014		**12,562,971.16**	**2,691,140.01**	**(5,234,571.32)**	**(2,691,140.01)**	**(7,925,711.32)**	**7,328,399.84**
2015	-						
15-Apr-15	182	7,328,399.84	219,516.11	(523,457.13)	(219,516.11)	**(742,973.24)**	6,804,942.71
15-Oct-15	183	6,804,942.71	204,956.37	(523,457.13)	(204,956.37)	**(728,413.50)**	6,281,485.58
In 2015		**7,328,399.84**	**424,472.48**	**(1,046,914.26)**	**(424,472.48)**	**(1,471,386.74)**	**6,281,485.58**
L-T-D 2015		**12,562,971.16**	**3,115,612.49**	**(6,281,485.58)**	**(3,115,612.49)**	**(9,397,098.07)**	**6,281,485.58**
2016	-						
15-Apr-16	183	6,281,485.58	189,190.49	(523,457.13)	(189,190.49)	**(712,647.63)**	5,758,028.45
15-Oct-16	183	5,758,028.45	173,424.62	(523,457.13)	(173,424.62)	**(696,881.75)**	5,234,571.32
In 2016		**6,281,485.58**	**362,615.11**	**(1,046,914.26)**	**(362,615.11)**	**(1,409,529.38)**	**5,234,571.32**
L-T-D 2016		**12,562,971.16**	**3,478,227.60**	**(7,328,399.84)**	**(3,478,227.60)**	**(10,806,627.44)**	**5,234,571.32**

NATIONAL GAS COMPANY

TTEC Invoice #	GAS SUPPLIED FOR MONTH	INVOICED TO TTEC (USD)	AMOUNT REC'D FROM T & TEC (USD)	ROYALTY TO TTEC (MMBTU)	ROYALTY TO TTEC (MCF)	ROYALTY TO TTEC (USD)	OWED BY TTEC including ROYALTY (USD)	OWED BY TTEC excluding ROYALTY (USD)	Amount OWED BY TTEC excluding ROYALTY (USD)	Annual Weighted Average	# OF DAYS OUT-STANDING	INTEREST CALCULA-TION (USD)	Applicable Year
25460	Jul-05	6,577,208		0	0	0	6,577,208	6,577,208	6,577,208	6.05%	1,482	1,660,444	2005-2009
25590	Aug-05	6,915,070		0	0	0	6,915,070	6,915,070	6,915,070	6.05%	1,451	1,709,630	2005-2009
25721	Sep-05	7,038,920		0	0	0	7,038,920	7,038,920	7,038,920	6.05%	1,421	1,704,860	2005-2009
25867	Oct-05	7,297,634		0	0	0	7,297,634	7,297,634	7,297,634	6.05%	1,390	1,729,800	2005-2009
26004	Nov-05	6,876,464		1,559,160	1,500,000	1,360,523	6,876,464	5,515,941	5,515,941	6.05%	1,359	1,278,539	2006-2009
26133	Dec-05	7,089,367		1,606,223	1,550,000	1,401,590	7,089,367	5,687,776	5,687,776	6.05%	1,331	1,290,438	2006-2009
26269	Jan-06	7,107,447		1,607,908	1,550,000	1,459,177	7,107,447	5,648,270	5,648,270	6.05%	1,200	1,250,917	2006-2009
26490	Feb-06	6,308,308		1,453,641	1,400,000	1,319,179	6,308,308	4,989,129	4,989,129	6.05%	1,270	1,078,948	2006-2009
26563	Mar-06	7,241,286		1,610,098	1,550,000	1,461,163	7,241,286	5,780,122	5,780,122	6.05%	1,239	1,219,052	2006-2009
70000147	Apr-06	7,021,814		1,557,153	1,500,000	1,413,117	7,021,814	5,608,697	5,608,697	6.05%	1,209	1,153,974	2006-2009
70000266	May-06	7,477,127		1,606,123	1,550,000	1,457,556	7,477,127	6,019,570	6,019,570	6.05%	1,178	1,206,595	2006-2009
70000414	Jun-06	7,331,065		1,555,432	1,500,000	1,411,554	7,331,065	5,919,511	5,919,511	6.05%	1,147	1,155,315	2006-2009
70000563	Jul-06	7,639,228		1,608,682	1,550,000	1,459,879	7,639,228	6,179,349	6,179,349	6.05%	1,117	1,174,644	2006-2009
70000712	Aug-06	7,507,083		1,609,468	1,550,000	1,460,593	7,507,083	6,046,490	6,046,490	6.05%	1,086	1,117,816	2006-2009

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70000835	Sep-06	7,197,252		1,559,818	1,500,000	1,415,535	7,197,252	5,781,717	5,781,717	6.05%	1,056	1,039,799	2006-2009
70000974	Oct-06	7,296,043		1,612,077	1,550,000	1,462,959	7,296,043	5,833,083	5,833,083	6.05%	1,025	1,018,885	2006-2009
70001141	Nov-06	7,138,847		1,554,722	1,500,000	1,410,910	7,138,847	5,727,937	5,727,937	6.05%	994	970,470	2007-2009
100000048	Nov-06	(2,530)		0	0	0	(2,530)	(2,530)	(2,530)	6.05%	994	(429)	2007-2009
70001270	Dec-06	7,240,004		1,619,424	1,550,000	1,469,627	7,240,004	5,770,377	5,770,377	6.05%	966	949,325	2007-2009
70001411	Jan-07	7,747,968		3,231,881	3,100,000	3,050,249	7,747,968	4,697,719	4,697,719	6.05%	935	747,439	2007-2009
70001763	Feb-07	7,116,203		2,916,276	2,800,000	2,752,381	7,116,203	4,363,822	4,363,822	6.05%	905	671,582	2007-2009
700001919	Mar-07	8,268,085		3,221,793	3,100,000	3,040,728	8,268,085	5,227,357	5,227,357	6.05%	874	776,481	2007-2009
70002089	Apr-07	8,201,262		3,116,854	3,000,000	2,941,687	8,201,262	5,259,575	5,259,575	6.05%	844	754,144	2007-2009
70002228	May-07	8,812,565		3,223,685	3,100,000	3,042,514	8,812,565	5,770,052	5,770,052	6.05%	813	796,747	2007-2009
70002371	Jun-07	8,452,510		3,118,444	3,000,000	2,943,187	8,452,510	5,509,323	5,509,323	6.05%	782	731,684	2007-2009
70002629	Jul-07	8,868,076		3,228,244	3,100,000	3,046,816	8,868,076	5,821,259	5,821,259	6.05%	752	743,547	2007-2009
70002657	Aug-07	8,841,587		3,224,086	3,100,000	3,042,893	8,841,587	5,798,694	5,798,694	6.05%	721	710,386	2007-2009
70002792	Sep-07	8,343,435		3,123,027	3,000,000	2,947,513	8,343,435	5,395,922	5,395,922	6.05%	691	633,914	2007-2009
70002922	Oct-07	8,652,850		3,224,926	3,100,000	3,043,686	8,652,850	5,609,165	5,609,165	6.05%	660	629,972	2007-2009

TTEC Invoice #	GAS SUPPLIED FOR MONTH	INVOICED TO TTEC (USD)	AMOUNT REC'D FROM T & TEC (USD)	ROYALTY TO TTEC (MMBTU)	ROYALTY TO TTEC (MCF)	ROYALTY TO TTEC (USD)	OWED BY TTEC including ROYALTY (USD)	OWED BY TTEC excluding ROYALTY (USD)	Amount OWED BY TTEC excluding ROYALTY (USD)	Annual Weighted Average	# OF DAYS OUT-STANDING	INTEREST CALCULA-TION (USD)	Applicable Year
100000101	Oct-07	(913,083)					(913,083)	(913,083)	(913,083)	6.05%	660	(102,549)	2007-2009
70003067	Nov-07	8,274,999		3,122,070	3,000,000	2,946,610	8,274,999	5,328,389	5,328,389	6.05%	634	575,170	2008-2009
70003196	Dec-07	8,210,086		3,208,245	3,100,000	3,027,941	8,210,086	5,182,145	5,182,145	6.05%	598	526,655	2008-2009
70003343	Jan-08	8,576,960		4,010,214	3,875,000	3,936,426	8,576,960	4,640,534	4,640,534	6.05%	569	448,129	2008-2009
70003483	Feb-08	7,773,173		3,752,103	3,625,000	3,683,064	7,773,173	4,090,109	4,090,109	6.05%	538	372,961	2008-2009
70003632	Mar-08	8,106,908		4,009,612	3,875,000	3,935,836	8,106,908	4,171,072	4,171,072	6.05%	508	358,727	2008-2009
70003768	Apr-08	7,958,658		3,879,899	3,750,000	3,808,509	7,958,658	4,150,149	4,150,149	6.05%	477	334,814	2008-2009
70003902	May-08	8,687,800		4,026,058	3,875,000	3,951,979	8,687,800	4,735,821	4,735,821	6.05%	447	357,766	2008-2009
70004052	Jun-08	8,428,161		3,883,031	3,750,000	3,811,583	8,428,161	4,616,577	4,616,577	6.05%	416	324,407	2008-2009
70004230	Jul-08	8,542,325		4,558,673	4,340,000	4,474,794	8,542,325	4,067,531	4,067,531	6.05%	388	266,541	2008-2009
70004374	Aug-08	8,757,880		4,501,193	4,340,000	4,418,371	8,757,880	4,339,509	4,339,509	6.05%	361	264,615	2008-2009

TTEC Invoice #	GAS SUPPLIED FOR MONTH	INVOICED TO TTEC (USD)	AMOUNT REC'D FROM T & TEC (USD)	ROYALTY TO TTEC (MMBTU)	ROYALTY TO TTEC (MCF)	ROYALTY TO TTEC (USD)	OWED BY TTEC including ROYALTY (USD)	OWED BY TTEC excluding ROYALTY (USD)	Amount OWED BY TTEC excluding ROYALTY (USD)	Annual Weighted Average	# OF DAYS OUT-STANDING	INTEREST CALCULA-TION (USD)	Applicable Year
70004515	Sep-08	8,457,422		4,371,486	4,200,000	4,291,050	8,457,422	4,166,372	4,166,372	6.05%	328	230,998	2008-2009
70004658	Oct-08	8,517,232		4,492,714	4,340,000	4,410,048	8,517,232	4,107,184	4,107,184	6.05%	299	207,843	2008-2009
70004822	Nov-08	7,725,733		2,455,742	2,375,100	2,410,557	7,725,733	5,315,176	5,315,176	6.05%	263	236,810	2009
70004962	Dec-08	7,500,243		800,025	775,000	785,305	7,500,243	6,714,939	6,714,939	6.05%	232	263,229	2009
70005106	Jan-09	8,514,040		701,598	775,000	781,510	8,514,040	7,732,530	7,732,530	6.05%	204	265,914	2009
70005260	Feb-09	8,093,836		664,828	700,000	740,552	8,093,836	7,353,284	7,353,284	6.05%	173	213,892	2009
70005428	Mar-09	9,356,177	(8,933,725.63)	801,153	775,000	892,405	422,452	-	-	6.05%	0	0	2009
70005554	Apr-09	8,953,930	(8,730,946.79)	1,550,247	1,500,000	1,726,820	222,984	-	-	6.05%	0	0	2009
70005709	May-09	9,581,542		1,602,296	1,550,000	1,784,798	9,581,542	7,796,744	7,796,744	6.05%	82	106,686	2009

TTEC Invoice #	GAS SUPPLIED FOR MONTH	INVOICED TO TTEC (USD)	AMOUNT REC'D FROM T & TEC (USD)	ROYALTY TO TTEC (MMBTU)	ROYALTY TO TTEC (MCF)	ROYALTY TO TTEC (USD)	OWED BY TTEC including ROYALTY (USD)	OWED BY TTEC excluding ROYALTY (USD)	Amount OWED BY TTEC excluding ROYALTY (USD)	Annual Weighted Average	# OF DAYS OUT-STANDING	INTEREST CALCULA-TION (USD)	Applicable Year
70005860	Jun-09	9,494,238		1,553,027	1,500,000	1,781,944	9,494,238	7,712,295	7,712,295	6.05%	51	65,466	2009
70005989	Jul-09	10,292,164		1,609,027	1,550,000	1,846,198	10,292,164	8,445,966	8,445,966	6.05%	20	28,043	2009
70006144	Aug-09	10,478,185		1,599,992	1,550,000	1,835,831	10,478,185	8,642,355	8,642,355	6.05%	0	0	2009
70006279	Sep-09	10,470,312		1,547,497	1,500,000	1,775,598	10,470,312	8,694,714	8,694,714	6.05%	0	0	2009
		411,441,099	(17,664,672.42)	116,449,874	112,320,100	112,872,742	393,776,426	282,877,474				35,251,035	
Approximate forex rate		6.307027655					6.307027655	6.307027655				6.307027655	
						711,891,506	2,483,558,809	1,784,116,051				222,329,252	
				Interest + Receivable as at Sept 30 2009								**318,128,509**	

Principal ($TT)	1,784,116,051
Interest ($TT)	222,329,252
Principal & Interest	**2,006,445,303**

TTEC Invoice #	GAS SUP-PLIED FOR MONTH	INVOICED TO TTEC (USD)	AMOUNT REC'D FROM T & TEC (USD)	ROYALTY TO TTEC (MMBTU)	ROYALTY TO TTEC (MCF)	ROYALTY TO TTEC (USD)	OWED BY TTEC Including ROYALTY (USD)	OWED BY TTEC Excluding ROYALTY (USD)	Amount OWED BY TTEC excluding ROYALTY (USD)	Annual Weighted Average	# OF DAYS OUT-STANDING	INTEREST CALCULA-TION (USD)	Applicable Year
70006987	Feb-10	8594,207		0	0	0	8594,207	8594,207	8594,207	6.05%	266	387,367	2010
									8594,207	6.05%	120	172,639	2011
70007129	Mar-10	9775,504		0	0	0	9775,504	9775,504	9775,504	6.05%	235	388,256	2010
									9775,504	6.05%	120	196,369	2011
70007278	Apr-10	9795,354		0	0	0	9795,354	9795,354	9795,354	6.05%	205	338,532	2010
									9795,354	6.05%	120	196,768	2011
70007408	May-10	10270,323		0	0	0	10,270,323	10,270,323	10,270,323	6.05%	174	300,495	2010
									10,270,323	6.05%	120	206,309	2011
70007573	Jun-10	9876,232		0	0	0	9,876,232	9876,232	9876,232	6.05%	143	236,870	2010
									9876,232	6.05%	120	198,392	2011
		48311,619	-	-	-	-	48,311,619	48,311,619				2,621,997	
Approximate forex rate							6.36544	6.36544				6.36544	
						-	307,524,713	307,524,713				16,690,166	

Interest + Receivable as at Apr 30 2011 **50,933,616**

Principal ($TT) 307,524,713

Interest ($TT) 16,690,166

Principal & Interest **324,214,879**

(ROE 6.307027655)

2.12 COMPARISON OF PERFORMANCE INDICATORS

2.12.1 Network Reliability and Efficiency Indicators

Indicator	Trinidad and Tobago						Car-ibbean (av-erage)	U.K	US (aver-age)	Aus	Best Practice Developed Countries
	2010	2009	2008	2007	2006	2005	2003	2001	2004	1996/97	
System Average Interruption Duration Index **SAIDI** (min)	534.00	486.60	651.00	1,018.80	993.60	1,115.40	N/A	N/A	381	163	120
System Average Interruption Frequency Index **SAIFI**	6.29	5.53	6.73	10.10	9.93	11.43	N/A	N/A	1.47	2.4	1.2
Customer Average Interruption Duration Index **CAIDI** (mins.)	84.6	88.0	96.7	100.8	100.1	97.6	N/A	N/A	187	95	100
Total system losses (%) (TTEC/RIC)	6.81/ 6.42	9.40/8.98	4.37/ 8.36	8.07/ 11.07	8.34	4.83	16.3	7.0	4.1	6.0	< 7

2.12.2 Administrative Indicators

Indicator	Trinidad and Tobago						Carib-bean (aver-age)	U.K	US	Aus	Best Practice Developed Countries
	2010	2009	2008	2007	2006	2005	2003/9	2001	2000	1996/97	
Sales per employee (US$)	152,342	143,948	136,847	126,337	102,901	103,719	244,632	N/A	N/A	334,896	N/A
Sales per employee (GWh)	2.90	2.9	2.9	2.8	2.5	2.9	1.33	N/A	N/A	4.98	N/A
Customers per employee	152.9	154.3	152.2	147.7	151.2	150.6	179	N/A	264	307	142

2.12.3 Quality of Service Indicators

Indicator	Trinidad and Tobago						Caribbean (average)	U.K	US	Aus	Best Practice Developed Countries
	2010	2009	2008	2007	2006	2005	2003	2001	2000	1996/97	
Consumption per Capital (kWh)	6,084	5,917	5,797	5,515	5,119	5,033					1,277
Service Coverage (%)	98.00	98.00	98.00	98.00	98.00	98.00	N/A	N/A	N/A	N/A	99.5

2.12.4 Financial and Economic Indicators

Indicator	Trinidad and Tobago						Carib-bean (aver-age)	U.K	US	Aus	Best Prac-tice De-veloped Countries
	2010	2009	2008	2007	2006	2005	2003	2001	2000	1996/97	
Average Revenue per kWh (US$)	0.055	0.054	0.052	0.050	0.045	0.042					N/A
Average Sales per kWh (US$)	0.053	0.050	0.047	0.045	0.041	0.036	0.195	N/A	0.06	0.06	N/A
Operating cost per customer (US$)	916.76	914.9	830.5	743.2	719.2	765.3	1201.98	N/A	N/A	376.84	1,827.1
Collection Peri-od(months)	2.9	2.9	3.2	3.0	3.0	2.2	N/A	N/A	N/A	N/A	< 3 months
Operating ratio	1.02	0.97	0.99	0.97	1.09	1.12	N/A	N/A	0.74	N/A	0.75
Working ratio	0.76	0.74	1.59	1.80	0.79	(0.11)	0.65	N/A	N/A	0.34	0.70
Debt service coverage ratio	0.86	1.0	0.9	0.8	0.7	0.94	N/A	N/A	2.35	N/A	2.25

2.13 KEY PROJECTS TO BE UNDERTAKEN 2011 – 2016

2.13.1 DISTRIBUTION

2.13.1.1 SUBSTATION UPGRADES

The Distribution Division plans to urgently upgrade the following substations:

(A) Point Cumana

This was affected by a fire in 2005 which caused damage to the 12kV board. As a result all four circuits were converted to two output circuits via autoreclosers. This has significantly affected the reliability of supply in the Pt. Cumana/Carenage Area. The new substation work is in progress and is expected to be completed in 2011 thereby resulting in a significant increase in reliability to the Pt. Cumana/ Carenage area.

(B) Diego Martin Upgrade

This 12kV board has been out of commission. A tender was completed to construct a new Switch room, commission a G.I.S 33kV board and a 12kV board. This is expected to be completed in the first quarter of 2012.

This upgrade would significantly improve the reliability of supply to the Diego Martin, Morne Coco and Diamond Vale areas.

(C) St. James

This tender was already approved for advertisement. With the increased load demand in the St. James area especially at 1 Woodbrook Place, there is an urgent need to upgrade this substation.

(D) Maraval

This substation has 1 – 6MVA Transformer. A new 12.5/16 MVA transformer has been assigned for this substation. Work is presently taking place at this substation to accommodate the new transformer.

This project shall be completed by September 2011 and will further improve the reliability of supply to the Maraval and Morne Coco Area.

(E) Master Substation

This substation consisting of cubicles shall be phased out over a period of 3-5 years. The construction of a new Switch room for a 12kV board to be energized at 6.6kV is planned. This would significantly assist with the change out of the underground 6.6kV cables to 12kV cables in the city of Port of Spain. This project should be completed over the next 8 years.

(F) St. Augustine

The change out of the 12kV board at St. Augustine substation and the installation of a new 33kV G.I.S board to replace the old 33kV Reyrolle Board are expected to be completed by the first quarter of 2012.

(G) O’Meara

Change out of transformer from 6 MVA to 12.2/16 MVA is expected to be completed by 2012. This would significantly improve the reliability of the supply to O’Meara and Mausica.

(H) Pinto Road

An upgrade of transformer capacity from 33/12kV to 20/25kV at Pinto Road is to be scheduled. This would significantly improve the reliability at Pinto Rd. and the reliability of supply to Arima in general.

(I) Syne Village

Change out of 12kV board at Syne Village substation. This would significantly improve the supply to Penal, Penal Rock Road and San Francique.

2.13.1.2 NEW SUBSTATIONS

(A) Saddle Road

The development process for Saddle Road Substation is expected to start in 2011 and be completed by 2013. This would significantly improve the supply to Maraval and St. Anns.

(B) Carlsen Field

A substation is to be established on the eastern side of the Solomon Hochoy Highway to cater for the increase in load growth to Preysal, Carlsen Field, Freeport and other areas.

(C) Felicity

The expected increase in housing in the Felicity area requires the urgent construction of a new substation in the Area. This would allow for a back-up supply to be provided for the Chaguanas and Ramsaran Street areas.

(D) Barrackpore

This substation is expected to be established by the year 2015 to allow for improvement in reliability of supply to Barrackpore, Rock Road, Clarke Road and other areas.

At present the St. Mary’s substation supplies this area and is the only supply to this section of Trinidad.

(E) Los Bajos

This substation is expected to be completed by 2012 and shall significantly improve the reliability of supply to the Buenos Aires and Santa Flora areas.

2.13.1.3 INSULATOR CHANGE-OUTS

A project to change out 20,000 insulators from porcelain to polymeric is expected to commence in 2011. This is expected to be done in areas where significant contamination has affected the porcelain resulting in regular faults.

Twelve thousand (12,000) tall polymeric insulators are to be installed at various locations in South, Central and East to eliminate the issue of animals stretching and causing short circuiting of the main line and pole/cross arm. This is expected to be completed in 2011.

Twenty thousand (20,000) metres of insulated conductor is being purchased to cover approximately 1m sections of the conductor over the insulators.

The above items are to be repeated by the 2nd half of 2011 and again in 2012. By that time over 40,000m of insulated conducted and an additional 40,000 polymeric insulators shall be installed on the system.

2.13.1.4 VEGETATION MANAGEMENT

There is a limited pool of approximately twenty-seven (27) contractors performing line clearing services in the Distribution Areas. These contractors have limited skill sets and lack adequate mobility and resources.

These contractors were assigned work employing the following:
- (i) Public Tender
- (ii) Quotes for Jobs
- (iii) Fixed Price

The majority of work is presently done via public tender.

All the contractors are constantly monitored and regular monthly meetings are held with them and any shortcomings on their performance are highlighted with a view to improving same. Strict performance penalties are being built into the vegetation management contracts which will be vigorously enforced.

In addition, initiatives will be undertaken to increase the quality and pool of contractors by offering appropriate training and assistance.

It should also be noted that the Commission will be making more widespread use of covered conductors.
Award of contracts are based on realistic values to clear the line based on T&TEC's manpower estimates.

The annual costs of vegetation management amount to approximately $14M.

2.13.1.5 INFRARED

This is expected to be fully completed in 2011, and shall be performed twice per year over the next five (5) years. This shall alleviate the regular issues of burst wires.

2.13.1.6 MATERIALS CONTROL

The specifications for materials are being constantly reviewed and the final inspection monitored closely.
Materials of an inferior quality resulting in high failure rates shall be significantly reduced over the next five years.

No	Project /Activity	Efficiency Improvement	Impediments to Performance
1	Implement Electronic Signatures in Supplies Workflow Tracking System	Reduction of time for tendering process and reduction of paper	Printing of hard copies still required for legal purposes; Cultural change required for daily use of system; Stable networking infrastructure critical.
2	Implement E-Procurement Initiative (E-Tendering & E-Auction)	Reduction of time for tendering process, lower material costs	IT Support, Revision of GI-Procurement, Training & Orientation of Staff
3	Consolidate Central and Arima Stores	Improvement in Stock Control and efficiency of Staff	Employee facilities; Staff rationalization
4	Create of Area Sub-Stores	Improvement in Stock Control	Staff training; Adequate storage space; PeopleSoft BU & Testing
5	Implement Bar Coding of Materials	Improve Stock Control – Storage, Dispatch and Cycle count	IT Support; Spec revisions; Training and orientation of staff.
6	Increase Covered Storage for Switchgear and Cables	Improved shelf life of stock, Resource optimization	Project Management
7	Implement PeopleSoft Replenishment Module	Improved stock control – increase turnover rate, reduce quantum of stock and incidence of stock outs	PeopleSoft System restrictions; T&TEC SOP’s; IT Support; Accurate forecast info.
8	Dispose of Obsolete /Scrap Materials	Free up expensive warehouse space, Increased turnover	Approvals to write off stock
9	Implement ISO 14001:2009 (Environment Standard)	Reduce, Reuse, Recycle through energy conservation and waste reduction	Cultural transformation; Infrastructural upgrades
10	Implement Vendor DB Management System	Consolidation of negotiating power; Management of database of reliable suppliers	Prior supplier association; IT Support
11	Implement Manufacturer and Product Prequalification Process	Reduce incidence of substandard materials	Revision of GI-Procurement

2.13.2 SUPPLIES

No	Key Performance Indicator	Performance Target
1	Maximum Stock Level	19 months
2	Reorder Point	15 months
3	Minimum Stock Level	6 months
4	Safety Stock	4 months
5	Lead Time	12 months
6	Annual Turnover Rate	0.75
7	Stock outs	10% reduction

2.14 TARIFF PROPOSAL

T&TEC is proposing that the existing tariff structure be maintained pending the completion of the Marginal Cost of Service Study presently being conducted by NERA Consulting (which is expected to be completed by September 2011) and the possible implementation of time-of-use rates. Increases of 0%, 27% and 3% are proposed for 2011, 2012 and 2013 respectively, largely due to the increase in conversion costs resulting from the addition of TGU to the grid. Estimated increases in salaries and wages have also impacted with the settlement of negotiations with the respective Trade Unions pending. Proposing this level of tariff increase is necessary to maintain a level of surplus that can be translated to a liquidity position, critical to meeting payments to creditors and debt servicing commitments as they fall due.

2.14.1 PROPOSED TARIFF 2011 TO 2016

	RIC Approved Rate 2009/10		Proposed Rate 2011		Proposed Rate 2012		Proposed Rate 2013		Proposed Rate 2014		Proposed Rate 2015		Proposed Rate 2016	
	$/ kWh	$/ KVA	$/ kWh	$/ KVA	$/ kWh	$/ KVA	$/ kWh	$/ KVA	$/ kWh	$/ KVA	$/ kWh	$/ KVA	$/ kWh	$/ KVA
Residential														
0 - 400 kWh	0.2600	-	0.2600	-	0.3302	-	0.3401	-	0.3401	-	0.3401	-	0.3401	-
401 - 1,000 kWh	0.3200	-	0.3200	-	0.4064	-	0.4186	-	0.4186	-	0.4186	-	0.4186	-
over 1,000 kWh	0.3700	-	0.3700	-	0.4699	-	0.4840	-	0.4840	-	0.4840	-	0.4840	-
Customer Charge	6.0000		6.0000		6.0000		6.0000		6.0000		6.0000		6.0000	
Commercial														
B	0.4150	-	0.4150	-	0.5271	-	0.5429	-	0.5429	-	0.5429	-	0.5429	-
Customer Charge	25.00	-	25.00	-	25.00	-	25.00	-	25.00	-	25.00	-	25.00	-
Industrial														
B 1	0.61	-	0.6100	-	0.7747	-	0.7979	-	0.7979	-	0.7979	-	0.7979	-
D1	0.20	50.00	0.1990	50.00	0.2527	53.00	0.2603	54.59	0.2603	54.59	0.2603	54.59	0.2603	54.59
D2	0.22	50.00	0.2180	50.00	0.2769	53.00	0.2852	54.59	0.2852	54.59	0.2852	54.59	0.2852	54.59
D3	0.18	42.50	0.1830	42.50	0.2324	53.98	0.2394	55.59	0.2394	55.59	0.2394	55.59	0.2394	55.59
D4	0.17	40.00	0.1670	40.00	0.2121	50.80	0.2185	52.32	0.2185	52.32	0.2185	52.32	0.2185	52.32
D5	0.16	37.00	0.1600	37.00	0.2032	46.99	0.2093	48.40	0.2093	48.40	0.2093	48.40	0.2093	48.40
E 1	0.15	44.50	0.1450	44.50	0.1842	56.52	0.1897	58.21	0.1897	58.21	0.1897	58.21	0.1897	58.21
E 2	0.15	44.00	0.1450	44.00	0.1842	55.88	0.1897	57.56	0.1897	57.56	0.1897	57.56	0.1897	57.56
E 3	0.15	43.00	0.1450	43.00	0.1842	54.61	0.1897	56.25	0.1897	56.25	0.1897	56.25	0.1897	56.25
E 4	0.15	42.00	0.1450	42.00	0.1842	53.34	0.1897	54.94	0.1897	54.94	0.1897	54.94	0.1897	54.94
E 5	0.15	41.00	0.1450	41.00	0.1842	52.07	0.1897	53.63	0.1897	53.63	0.1897	53.63	0.1897	53.63
Street Lighting (Annual Charge)														
S1-1	848.72	-	848.72	-	1,077.87	-	1,110.21	-	1,110.21	-	1,110.21	-	1,110.21	-
S1- 2	565.81	-	565.81	-	718.58	-	740.14	-	740.14	-	740.14	-	740.14	-
S1- 3	411.50	-	411.50	-	522.61	-	538.28	-	538.28	-	538.28	-	538.28	-
S1- 4	372.92	-	372.92	-	473.61	-	487.82	-	487.82	-	487.82	-	487.82	-
S2- 2	450.08	-	450.08	-	571.60	-	588.75	-	588.75	-	588.75	-	588.75	-
S2- 3	347.20	-	347.20	-	440.94	-	454.17	-	454.17	-	454.17	-	454.17	-
S2- 4(All SL)	282.91	-	282.91	-	359.30	-	370.07	-	370.07	-	370.07	-	370.07	-

Note:T&TEC is comfortable with rate B 1 remaining as proposed.

2.14.2 BILL IMPACT 2011-2016

	PRICE LIMITS AND AVERAGE BILLINGS													
	2010/20101 Implemented 1st September 2009													
	2010/2011		2011		2012		2013		2014		2015		2016	
	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)
RESIDENTIAL CUSTOMERS														
Up to 400 kWh	**0.2600**	**N/A**	**0.2600**	**N/A**	**0.3302**	**N/A**	**0.3401**	**N/A**	**0.3401**	**N/A**	**0.3401**	**N/A**	**0.3401**	**N/A**
401 - 1,000 kWh	**0.3200**	**N/A**	**0.3200**	**N/A**	**0.4064**	**N/A**	**0.4186**	**N/A**	**0.4186**	**N/A**	**0.4186**	**N/A**	**0.4186**	**N/A**
Over 1,000 kWh	**0.3700**	**N/A**	**0.3700**	**N/A**	**0.4699**	**N/A**	**0.4840**	**N/A**	**0.4840**	**N/A**	**0.4840**	**N/A**	**0.4840**	**N/A**
Customer Charge	$6.00		$6.00		$6.00		$6.00		$6.00		$6.00		$6.00	
Projected Household Bills - Bi-monthly														
Consumption Tier 1(400 kWh)	$126.50		$126.50		$158.79		$163.35		$163.35		$163.35		$163.35	
Consumption Tier 2(1,000 kWh)	$347.30		$347.30		$439.21		$452.18		$452.18		$452.18		$452.18	
Consumption Tier 3(1,600 kWh)	$602.60		$602.60		$763.44		$786.14		$786.14		$786.14		$786.14	
COMMERCIAL CUSTOMERS														
Rate B														
Price Limits	**0.4150**	**N/A**	**0.4150**	**N/A**	**0.5271**	**N/A**	**0.5429**	**N/A**	**0.5429**	**N/A**	**0.5429**	**N/A**	**0.5429**	**N/A**
Customer Charge	$25.00		$25.00		$25.00		$25.00		$25.00		$25.00		$0.00	
Projected Small Business Bills - Bi - monthly														
Consumption Level (1,000 kWh)	$506.00		$506.00		$634.86		$653.04		$653.04		$653.04		$624.29	
Consumption Level (2,000 kWh)	$983.25		$983.25		$1,240.97		$1,277.33		$1,277.33		$1,277.33		$1,248.58	
Consumption Level (3,000 kWh)	$1,460.50		$1,460.50		$1,847.07		$1,901.62		$1,901.62		$1,901.62		$1,872.87	

	PRICE LIMITS AND AVERAGE BILLINGS													
	2010/20101 Implemented 1st September 2009													
	2010/2011		2011		2012		2013		2014		2015		2016	
	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)
Rate B 1														
Price Limits	**0.6100**	**N/A**	**0.6100**	**N/A**	**0.7747**	**N/A**	**0.7979**	**N/A**	**0.7979**	**N/A**	**0.7979**	**N/A**	**0.7979**	**N/A**
Projected Small Business Bills - Bi - monthly														
Consumption Level (5,000 kWh)	$3,507.50		$3,507.50		$4,454.53		$4,588.16		$4,588.16		$4,588.16		$4,588.16	
Consumption Level (6,000 kWh)	$4,209.00		$4,209.00		$5,345.43		$5,505.79		$5,505.79		$5,505.79		$5,505.79	
Consumption Level (7,000 kWh)	$4,910.50		$4,910.50		$6,236.34		$6,423.43		$6,423.43		$6,423.43		$6,423.43	
INDUSTRIAL CUSTOMERS														
Rate D 1														
Price Limits	**0.1990**	**50.00**	**0.1990**	**50.00**	**0.2527**	**53.00**	**0.2603**	**54.6**	**0.2603**	**54.6**	**0.2603**	**54.6**	**0.2603**	**54.59**
Projected Small Industrial Bills - Monthly														
Consumption Level (7,030 kWh), (64 KVA)	$5,288.82		$5,288.82		$5,944.00		$6,122.32		$6,122.32		$6,122.32		$6,122.32	
Consumption Level (20,000 kWh),(112 KVA)	$11,017.00		$11,017.00		$12,639.19		$13,018.37		$13,018.37		$13,018.37		$13,018.37	
Consumption Level (119,060 kWh), (201 KVA)	$38,804.38		$38,804.38		$46,854.49		$48,260.12		$48,260.12		$48,260.12		$48,260.12	
Rate D 2														
Price Limits	**0.2180**	**50.00**	**0.2180**	**50.00**	**0.2769**	**53.00**	**0.2852**	**54.59**	**0.2852**	**54.59**	**0.2852**	**54.59**	**0.2852**	**54.59**
Projected Medium Industrial Bills - Monthly														
Consumption Level (289,000 kWh), (740 KVA)	$115,002.30		$115,002.30		$137,117.42		$141,230.94		$141,230.94		$141,230.94		$141,230.94	
Consumption Level (817,900 kWh),(1,880 KVA)	$313,147.53		$313,147.53		$374,996.36		$386,246.25		$386,246.25		$386,246.25		$386,246.25	
Consumption Level (1,431,600 kWh), (2,770 KVA)	$518,177.12		$518,177.12		$624,637.19		$643,376.31		$643,376.31		$643,376.31		$643,376.31	

	PRICE LIMITS AND AVERAGE BILLINGS													
	2010/20101 Implemented 1st September 2009													
	2010/2011		2011		2012		2013		2014		2015		2016	
	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)
Rate D 3														
Price Limits	**0.1830**	**42.50**	**0.1830**	**42.50**	**0.2324**	**53.98**	**0.2394**	**55.59**	**0.2394**	**55.59**	**0.2394**	**55.59**	**0.2394**	**55.59**
Projected Large Industrial Bills - Monthly														
Consumption Level (1,079,900 kWh), (2,774 KVA)	$362,654.80		$362,654.80		$460,571.60		$474,388.74		$474,388.74		$474,388.74		$474,388.74	
Consumption Level (1,768,962 kWh),(5,788 KVA)	$655,166.55		$655,166.55		$832,061.52		$857,023.37		$857,023.37		$857,023.37		$857,023.37	
Consumption Level (2,803,307 kWh), (5,316 KVA)	$849,775.46		$849,775.46		$1,079,214.83		$1,111,591.28		$1,111,591.28		$1,111,591.28		$1,111,591.28	
Rate D 4														
Price Limits	**0.1670**	**40.00**	**0.1670**	**40.00**	**0.2121**	**50.80**	**0.2185**	**52.32**	**0.2185**	**52.32**	**0.2185**	**52.32**	**0.2185**	**52.32**
Projected Large Industrial Bills - Monthly														
Consumption Level (1,079,900 kWh), (2,774 KVA)	$603,874.48		$603,874.48		$766,920.59		$789,928.21		$789,928.21		$789,928.21		$789,928.21	
Consumption Level (5,825,326 kWh),(10,238 KVA)	$1,593,824.57		$1,593,824.57		$2,024,157.21		$2,084,881.92		$2,084,881.92		$2,084,881.92		$2,084,881.92	
Consumption Level (11,924,877 kWh), (18,842 KVA)	$3,156,904.63		$3,156,904.63		$4,009,268.88		$4,129,546.94		$4,129,546.94		$4,129,546.94		$4,129,546.94	
Rate D 5														
Price Limits	**0.1600**	**37.00**	**0.1600**	**37.00**	**0.2032**	**46.99**	**0.2093**	**48.40**	**0.2093**	**48.40**	**0.2093**	**48.40**	**0.2093**	**48.40**
Projected Large Industrial Bills - Monthly														
Consumption Level (12,751 kWh), (4,500 KVA)	$193,821.18		$193,821.18		$246,152.90		$253,537.49		$253,537.49		$253,537.49		$253,537.49	
Consumption Level (30,135 kWh), (14,174 KVA)	$608,648.54		$608,648.54		$772,983.65		$796,173.16		$796,173.16		$796,173.16		$796,173.16	

	PRICE LIMITS AND AVERAGE BILLINGS													
	2010/20101 Implemented 1st September 2009													
	2010/2011		2011		2012		2013		2014		2015		2016	
	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)
Rate E 1														
Price Limits	**0.1450**	**44.50**	**0.1450**	**44.50**	**0.1842**	**56.52**	**0.1897**	**58.21**	**0.1897**	**58.21**	**0.1897**	**58.21**	**0.1897**	**58.21**
Projected Very Large Industrial Bills - Monthly														
Consumption Level (11,303,482 kWh), (25,498 KVA)	$3,189,715.77		$3,189,715.77		$4,050,939.03		$4,172,467.20		$4,172,467.20		$4,172,467.20		$4,172,467.20	
Rate E 2														
Price Limits	**0.1450**	**44.00**	**0.1450**	**44.00**	**0.1842**	**55.88**	**0.1897**	**57.56**	**0.1897**	**57.56**	**0.1897**	**57.56**	**0.1897**	**57.56**
Projected Very Large Industrial Bills - Monthly														
Consumption Level (35,079,900 kWh), (50,274 KVA)	$8,393,437.73		$8,393,437.73		$10,659,665.91		$10,979,455.89		$10,979,455.89		$10,979,455.89		$10,979,455.89	
Rate E 3														
Price Limits	**0.1450**	**43.00**	**0.1450**	**43.00**	**0.1842**	**54.61**	**0.1897**	**56.25**	**0.1897**	**56.25**	**0.1897**	**56.25**	**0.1897**	**56.25**
Projected Very Large Industrial Bills - Monthly														
Consumption Level (60,079,900 kWh), (75,775 KVA)	$13,765,347.63		$13,765,347.63		$17,481,991.48		$18,006,451.23		$18,006,451.23		$18,006,451.23		$18,006,451.23	
Rate E 4														
Price Limits	**0.1450**	**42.00**	**0.1450**	**42.0**	**0.1842**	**53.34**	**0.1897**	**54.94**	**0.1897**	**54.94**	**0.1897**	**54.94**	**0.1897**	**54.94**
Projected Very Large Industrial Bills - Monthly														
Consumption Level (80,079,900 kWh), (102,774 KVA)	$18,317,307.53		$18,317,307.53		$23,262,980.56		$23,960,869.97		$23,960,869.97		$23,960,869.97		$23,960,869.97	
Rate E 5														
Price Limits	**0.1450**	**41.00**	**0.1450**	**41.00**	**0.1842**	**52.07**	**0.1897**	**53.63**	**0.1897**	**53.63**	**0.1897**	**53.63**	**0.1897**	**53.63**
Projected Very Large Industrial Bills - Monthly														
Consumption Level (101,347,472 kWh), (226,368 KVA)	$27,572,942.16		$27,572,942.16		$35,017,636.54		$36,068,165.63		$36,068,165.63		$36,068,165.63		$36,068,165.63	

	PRICE LIMITS AND AVERAGE BILLINGS													
	2010/20101 Implemented 1st September 2009													
	2010/2011		2011		2012		2013		2014		2015		2016	
	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)
Rate E 1														
STREET LIGHTING														
Price Limits/Projected Bills - Annually														
Rate S1 - 1	$848.72	N/A	$848.72	N/A	$1,077.87	N/A	$1,110.21	N/A	$1,110.21	N/A	$1,110.21	N/A	$1,110.21	N/A
Rate S1 - 2	$565.81	N/A	$565.81	N/A	$718.58	N/A	$740.14	N/A	$740.14	N/A	$740.14	N/A	$740.14	N/A
Rate S1 - 3	$411.50	N/A	$411.50	N/A	$522.61	N/A	$538.28	N/A	$538.28	N/A	$538.28	N/A	$538.28	N/A
Rate S1 - 4	$372.92	N/A	$372.92	N/A	$473.61	N/A	$487.82	N/A	$487.82	N/A	$487.82	N/A	$487.82	N/A
Rate S2 - 2	$450.08	N/A	$450.08	N/A	$571.60	N/A	$588.75	N/A	$588.75	N/A	$588.75	N/A	$588.75	N/A
Rate S2 - 3	$347.20	N/A	$347.20	N/A	$440.94	N/A	$454.17	N/A	$454.17	N/A	$454.17	N/A	$454.17	N/A
Rate S2 - 4	$282.91	N/A	$282.91	N/A	$359.30	N/A	$370.07	N/A	$370.07	N/A	$370.07	N/A	$370.07	N/A

2.15 PROJECTED INCOME STATEMENT 2011-2016 INCLUDING RATE CHANGE

DESCRIPTION	Actual 2009	Actual 2010 (Unaudited)	Projected 2011	Projected 2012	Projected 2013	Projected 2014	Projected 2015	Projected 2016
Revenue - kWh	**7,297,062,764**	**7,908,585,664**	**8,121,000,000**	**8,708,000,000**	**9,218,000,000**	**9,599,000,000**	**9,900,000,000**	**10,272,000,000**
No. of Customers								
Revenue	$	$	$	$	$	$	$	$
Sale of Electricity	2,479,224,714	2,665,221,0773	2,692,561,728	3,578,148,227	3,858,205,456	4,016,016,955	4,152,495,757	4,318,955,741
Expenditure								
Generation	1,280,734,3230	1,432,289,986	2,002,300,326	2,510,367,354	2,627,033,797	2,636,812,702	2,630,654,286	2,739,705,900
Transmission and distribution	435,9632,531	450,770,154	471,641,237	374,480,585	443,991,675	538,961,423	489,610,774	438,306,427
Administrative and general	120,681,102	164,918,510	290,629,491	224,653,723	270,994,450	334,307,615	301,407,183	267,204,285
Depreciation	281,263,740	454,351,662	181,879,500	196,383,000	209,979,000	219,795,000	227,994,000	234,249,000
Engineering	29,818,884	26,905,0018	23,798,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000
	2,148,460,587	**2,529,235,330**	**2,970,248,554**	**3,330,884,663**	**3,576,998,923**	**3,754,876,740**	**3,674,666,243**	**3,704,465,612**
Surplus(Deficit) from operations	330,764,127	135,985,443	(277,686,826)	247,263,564	281,206,533	261,140,216	477,829,514	614,490,129
Interest and finance costs	(157,166,175)	(216,246,876)	(92,833,333)	(80,616,667)	(107,366,667)	(108,700,000)	(104,200,000)	(109,700,000)
Dividend from subsidiary	85,843,494	24,323,557	80,000,000	80,000,000	80,000,000	80,000,000	80,000,000	80,000,000
Other income	83,324,923	81,232,672	80,000,000	80,000,000	80,000,000	80,000,000	80,000,000	80,000,000
Net Surplus	342,766,369	25,294,796	(210,520,160)	326,646,898	333,839,866	312,440,216	533,629,514	664,790,129
Rate of Change in Operating Expenditure excl. Generation (%)		**10.67**	**(5.10)**	**(4.96)**	**3.89**	**4.70**	**(1.97)**	**(2.16)**

Note:

The surplus/(deficit) is before net pension income(cost).

2.15.1 INCOME STATEMENT BY RESOURCE CATEGORY

	Actual 2008	Actual 2009	Actual 2010(Unaudited)	Projected 2011	Projected 2012	Projected 2013	Projected 2014	Projected 2015	Projected 2016
Sales - kWh	7,536,281,512	6,600,480,991	7,908,585,664	8,121,000,000	8,708,000,000	9,218,000,000	9,599,000,000	9,900,000,000	10,272,000,000
Average Revenue per kWh -*cts*	30.00	37.56	33.70	33.16	41.09	41.86	41.84	41.94	42.05
INCOME									
Sales of Electricity	2,260,518,513	2,479,224,714	2,665,220,733	2,692,561,728	3,578,148,227	3,858,205,456	4,016,016,955	4,152,495,757	4,318,955,741
Other Income	217,325,772	169,168,417	105,556,229	160,000,000	160,000,000	160,000,000	160,000,000	160,000,000	160,000,000
TOTAL INCOME	**2,477,844,284**	**2,648,393,131**	**2,770,776,962**	**2,852,561,728**	**3,738,148,227**	**4,018,205,456**	**4,176,016,955**	**4,312,495,757**	**4,478,955,741**
EXPENDITURE									
Conversion Cost-PowerGen, Trinity Power	926,620,606	962,623,615	988,798,931	871,164,519	889,910,353	909,527,218	922,103,558	841,223,947	859,351,453
Conversion Cost - TGU			0	205,647,526	691,599,692	696,583,478	702,784,457	708,047,862	713,442,852
Conversion costs-Leases - IAS 17	(383,562,000)	(386,839,000)	(389,868,000)	(389,867,000)	(389,867,000)	(389,868,000)	(389,867,000)	(389,867,000)	(389,867,000)
Fuel(natural gas only)	622,444,064	658,659,852	747,956,462	925,488,281	928,857,309	1,020,923,101	1,011,924,687	1,081,382,477	1,166,911,595
Wages	181,907,597	158,092,241	142,723,120	180,723,120	161,277,126	161,277,126	245,468,694	185,468,694	185,468,694
Salaries	266,439,294	231,514,869	248,275,004	310,275,004	280,550,755	280,550,755	432,633,368	322,633,368	322,633,368
Overtime	39,218,967	36,743,564	31,187,255	30,000,000	29,500,000	29,000,000	28,500,000	28,000,000	27,500,000
NIS	18,349,343	19,157,313	20,221,433	20,500,000	22,061,000	22,515,000	22,894,000	23,272,000	23,643,000
Pension Cost	(70,992,665)	22,843,911	(60,174,584)	50,000,000	(55,000,000)	53,000,000	(48,000,000)	49,000,000	(45,000,000)
Employee Related Benefits	59,590,747	46,463,061	42,012,609	55,000,000	40,000,000	41,500,000	58,000,000	42,000,000	43,500,000
Rates, Taxes and Insurances	9,092,901	9,178,123	12,081,964	12,500,000	13,000,000	13,500,000	14,000,000	14,500,000	15,000,000
Materials	26,419,470	26,142,071	20,752,446	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000
Services	120,018,293	176,659,157	272,924,385	139,370,604	144,945,428	150,743,246	156,772,975	163,043,894	169,565,650
Rents	677,074	1,225,845	1,069,110	1,200,000	1,300,000	1,400,000	1,500,000	1,600,000	1,700,000
Depreciation	73,618,906	97,626,740	169,190,659	181,879,500	196,383,000	209,979,000	219,795,000	227,994,000	234,249,000
Depreciation-Leases - IAS 17	183,637,000	183,637,000	285,161,000	285,161,000	285,161,000	285,161,000	285,161,000	285,161,000	285,161,000
Interest	54,742,368	79,282,491	69,209,396	92,833,333	80,616,667	107,366,667	108,700,000	104,200,000	109,700,000
Interest-Leases - IAS 17	92,924,000.00	77,916,000	147,064,000	128,721,000	108,992,000	107,904,000	106,720,000	105,432,000	104,032,000
H/Office Engineering Clearing	(25,906,276)	(34,673,852)	(33,671,521)	(35,000,000)	(35,000,000)	(35,000,000)	(35,000,000)	(35,000,000)	(35,000,000)
Vehicle Clearings	(3,969,740)	(3,544,241)	(3,165,633)	(3,500,000)	(3,500,000)	(3,500,000)	(3,500,000)	(3,500,000)	(3,500,000)
TOTAL EXPENDITURE	**2,191,269,948**	**2,362,708,761**	**2,711,748,036**	**3,087,096,888**	**3,415,787,329**	**3,687,562,589**	**3,865,590,740**	**3,779,592,243**	**3,813,491,612**
NET SURPLUS/(DEFICIT)	**286,574,336**	**285,684,370**	**59,028,926**	**(234,535,160)**	**322,360,898**	**330,642,866**	**310,426,216**	**532,903,514**	**665,464,129**

Note:

1) The above Income Statement includes projected salary and wage increases in 2012 and 2015 and backpay in 2011 of $100M and 2014 of $170M.
2) The cost of a customer satisfaction survey of approximately $200,000 is included in the above projection.
3) The 12-month figures are based on calendar years.
4) The impact of IAS 17, Leases and IAS 19, employee benefits are included.
5) TGU’s conversion costs are based on station completion data provided in January 2011.
6) Gas costs are based on station completion data provided in January 2011.

2.15.2 COST OF CAPITAL

The cost of capital is calculated applying the Weighted Average Cost of capital approach as follows:

COST OF CAPITAL				
Short and Long Term Borrowings				
	Principal Outstanding @ 2010/12/31	**Interest Rate**	**Percentage of Total**	**Weighted Average Cost of Capital**
TTEC – Fixed Rate Bonds - 2021	$483,198,016	12.25%	46.13%	5.65%
TTEC – Floating Rate Bonds - 2011	$33,456,996	7.05%	3.19%	0.23%
HSBC Loan for Cove Generation at Tobago	$493,893,758	4.42%	47.15%	2.08%
Republic – Bankers Acceptance	$37,034,334	4.75%	3.54%	0.17%
TOTAL	**$1,047,583,105**		100.00%	**8.13%**

The cost of capital represents the financial cost of funding T&TEC's capital and recurrent expenditure. Therefore, in order to recover this cost the return on rate base ought to be at least equivalent to this cost.

3.0 MAIN SUBMISSION

3.1 Assessment of the likely operating environment -2011-2016

3.1.1 Political/Legal/Environmental Factors

Some of the Political/Legal/Environmental factors impacting T&TEC's business and their implications follow:

(i) Political Stability

Apart from an attempted coup in 1990, Trinidad and Tobago's democratic process remains intact with a history of free and fair General Elections constitutionally due every five years. The last General Election was held on May 24, 2010 and saw the installation of a coalition government (an amalgam of five political parties) termed 'The People's Partnership'.

Implications for T&TEC:

Immediately prior to and after elections, particularly General Elections, requests are usually made to T&TEC for the delivery of special electricity services to the public in a short time frame. In the recent past this included, the National Streetlighting Programme and the Rural Electrification Programme. An accelerated illumination of grounds of parks, recreational facilities and public spaces is now demanded. Changes in political administration also sometimes see different policies and programmes for the electricity sector being introduced, as well as a change of Members of the Commission (the Board). T&TEC must therefore be in a position to respond and adapt to this environment.

(ii) Energy Policy Initiatives

Recognising the continuous decline of the country's hydrocarbon resources, the government has signalled its intention to introduce a number of policy initiatives to guide the exploration, exploitation, utilisation and monetisation of the country's energy resources for current and future generations, while safeguarding and protecting the environment. Some of these policy initiatives are:

- Establishment of a gas utilisation and pricing policy based on a national consultation, which shall be initiated immediately
- Immediate re-establishment of a project evaluation unit with the necessary capacity to evaluate all gas-based projects with a view to ensuring that citizens are informed of the opportunity cost and the maximum benefits from such projects
- Comprehensive review, revision and updating of the laws, taxation, regulations and practices governing the energy industry, so that there shall be transparency and accountability in all matters. Before new energy-based industrial plants are given final approval, stakeholder consultations shall be required. The government shall immediately implement the Extractive Industries Transparency Initiative (EITI)
- Expansion of the skill sets for national development with a view of transferability to other sectors and the capacity of existing tertiary sector institutions to provide this shall be reviewed to determine a way forward for expanding capacity
- Development and implementation of a natural gas allocation policy to ensure national energy security
- Energy security by addressing the exploration and proving-up of new reserves in order to maintain a healthy reserves-to-production ratio
- Provision of incentives for research and development on alternative energy sources with a view to the establishment of an alternative energy industry

• Resolution of the issues of marginal field production, heavy oil recovery, tar sands and small operators in order to stimulate these sectors
• Continuation of the modernisation of the retail marketing sector
• Increase in the local content, participation and ownership in energy projects, throughout the value added chain and the services sector
• Resolution of outstanding issues of collaboration with other energy producers in the Caribbean and Latin American region, with special attention to Petrocaribe and CSME
• Revision and evaluation of the role, functions and overall management of the Ministry of Energy and its related agencies to determine the extent to which they satisfy the national energy needs and contribute to national development
• Proactively seek investment and partnership opportunities in third and fourth generation renewable energy alternatives. This shall link the energy policy, research and development initiative and provide new, high-value jobs for the people, while simultaneously contributing to the nation's energy security.

Specific directions for the energy sector includes aggressively supporting the use of alternative energy such as solar and wind energy and exploring the prospect of developing a regional effort for the long term sustainability of the country's energy supply. The Government has also mandated the Ministry of Energy to promote small energy based projects and production firms. Incentives for investments in alternative forms of energy are given through zero import duty and Value Added Tax (VAT) on solar and wind energy components, with 150% wear and tear allowance. A 150% tax allowance on energy audits and Accelerated Depreciation of 75% in the year of acquisition on the capital incurred by companies in the acquisition of smart energy efficient systems are also given.

Implications:

A strong electrical power industry is crucial to a thriving Trinidad and Tobago economy. T&TEC as a fully owned State Enterprise is expected to be supportive of the Government in the pursuit of its goals. As the engine of development in the industrial, services and social sectors of the economy, an adequate, safe, reliable and efficient electricity supply is of paramount importance in achieving a thriving economy and a sustainable future for all. T&TEC must also consider any modifications required in its current business operations to facilitate Government's promotion of alternative energy.

(iii) Government supported/initiated mega projects

Under the last Administration, several Government supported or initiated industrial projects were being planned or implemented within the regulatory period. These include the Tamana eTech Park, the Port-of-Spain Port development, the Tarouba Stadium, an Aluminum smelter at La Brea and five water desalination plants. The TGU 720MW power station was constructed to provide 450MW of power to the Alutrint Smelter Plant and the 270MW balance to the national grid. The Alutrint Smelter project has now been cancelled and there has been no further commitment with respect to the desalination plants. Other new industrial projects may however come on stream during the planning horizon.

Implications for T&TEC:

T&TEC's transmission infrastructure now has to be developed to cater for moving a much larger load than originally planned. Further, T&TEC shall not be initially able to fully utilize the 720MW of power from the TGU plant, but based on the signed contract between TGU, Alutrint and itself, T&TEC shall have to meet the full cost of all available power from the plant.

(iv) *PPAs, Fuel Pricing and Natural Gas Reserves*

The GORTT has in the past dictated the way forward in terms of the acquisition and ownership of new power generation in Trinidad and Tobago. The policy adopted in the past was for the acquisition of additional generation capacity through international competitive bidding for power purchases, where the plant belonged to the power producer. There has however been a recent deviation from that policy with respect to the establishment of a 64MW power plant in Tobago, which is owned and operated by T&TEC. The TGU plant is mainly government owned.

T&TEC and Alutrint, as joint buyers, signed an agreement with TGU in 2009 for the purchase of 720MW of power from its Union Estate power plant which is currently under construction. This plant is expected to deliver the first 225MW of power by August 2011 and the full 720MW by January 2012. There shall now be no aluminium smelter requiring 450MW of power. The infrastructure to use this excess capacity therefore needs to be established.

Additional power is planned by either the re-powering of the Port of Spain Power Station or the establishment of a new plant in Barataria to meet future demands. This may not materialise in this regulatory period.The provisions for start-up and mobilisation works shall however be required.

Fuel supply and pricing mechanisms for natural gas supplied by the NGC to T&TEC are also determined by the State. Trinidad and Tobago's natural gas supplies have however been on the decline as noted in the Ryder Scott 2009 and 2010 Reports.

Trinidad and Tobago's (T&T's) proven natural gas reserves have declined every year in the past decade. The country's reserve to production ratio has consistently trended downwards since 1998. The 2010 Ryder Scott findings show T&T's proven natural gas reserves declining to 14.4 trillion cubic feet (tcf) from 15.3 tcf in 2009 and that the country's proven gas reserves have fallen to ten years. Trinidad and Tobago uses its proven gas reserves at a rate of 1.5 tcf per year based on its current commitments and projects.

Implications for T&TEC:

Fuel purchases and conversion to energy impact heavily on T&TEC's operations as these costs presently account for approximately 60% of T&TEC's operational costs and any changes in these price structures may have serious consequences on T&TEC's operational costs and financial viability.

Competing uses for the limited natural gas supplies shall also quicken the depletion of this non-renewable resource. Giving consideration to the Ryder's Scott report and the new Government's policies, investments in alternate forms of energy to support power production must be considered. The ongoing Eastern Caribbean Natural Gas Pipeline project and possible impacts on local supply should also be considered.

Owning and operating new generation facilities by T&TEC requires significant capital outlays for which external financial support or innovative financing may be necessary.

(v) *Regulatory Regime*

The Regulated Industries Commission (RIC) through its Act sets tariffs, quality of service standards, customer service and performance targets and generally regulates and monitors the electricity sector. The RIC Determination No. 1 which covered the five year period June 01, 2006 to May 31, 2011 included a provision for annual adjustments. The State, however, influences the timing and extent of the implementation of tariffs approved by the RIC. In this regard, the RIC approved tariffs which were to be in effect from June, 01, 2006 were only implemented for commercial and industrial customers from November 2006 and from May 2008 for residential customers. The delay in the implementation of the RIC approved tariffs based on government directives resulted in a loss of revenue to T&TEC of an estimated $354Mn during the period June 2006 to April 2008. There has also been no approval for the 2010/2011 annual tariff adjustment. Further, expenditure associated with the Cove and TGU Power Plants were not considered in the RIC approved 2006 – 2011 tariffs, but are real costs now to be met.

The RIC has also revised the 2004 Quality of Service Standards to higher levels of performance with effect from April 2010. New Codes of Practice with respect to service delivery have also been approved for adherence by T&TEC.

The award for annual tariff adjustments on receipt of timely applications and justifications by T&TEC is also new to Trinidad and Tobago, having only been introduced in 2008. Consumers therefore now see annual changes in their electricity bills, and this contributes to some degree of dissatisfaction.

Implications for T&TEC:

Revenue shortfalls due to the limited implementation or non-implementation of the RIC's approved tariffs affect T&TEC's revenue stream and its ability to meet the performance standards established by its regulator, as the necessary funding is not available to facilitate needed infrastructure developments.

T&TEC must therefore meet the RIC's standards of performance, adhere to its Codes of Practice and satisfy its general reporting and information requirements as part of its responsibility in ensuring economic tariffs are approved. The lobbying of the Government for the timely implementation of the RIC approved tariffs is essential if T&TEC's financial viability is to be realised.

The issue of annual tariff increases may also have to be revisited in the context of its impact on T&TEC's image and Trinidad and Tobago's previous experience of no electricity rate increase for several years.

(vi) Occupational Safety and Health

The Occupational Safety and Health (OSH) Act 2004 is now in effect with the establishment of the OSH Authority and Agency.

Implications for T&TEC:

T&TEC now has greater responsibilities and reporting requirements under this Act with the possibility of facing penalties for non-compliance to the requirements of this new legislation.

(vii) Globalization and the CSME

The Caribbean's response to the international globalization process has been the establishment of the Caribbean Single Market and Economy (CSME). The CSME seeks to transform the individual markets of the Caribbean Community (CARICOM) into one integrated market thereby making irrelevant national borders especially in the area of movement of goods, services, labour and capital.

Implications for T&TEC:

The free movement of resources within the Caribbean is likely to have an impact upon the availability of qualified human resources and capital for local entities such as T&TEC. The social concerns of crime and poverty are likely to see an increase in emigration, perhaps by highly skilled individuals, from Trinidad and Tobago. Opportunities that never existed before may also become available such as industry model standardization issues related to levels of efficiency and service quality.

(viii) Environmental Concerns

Recent scientific reports confirm the twin-phenomenon of global warming and corresponding climate change. The planet is now warmer than before and is presenting a multiplicity of challenges particularly for developing island states such as Trinidad and Tobago and its Caribbean neighbours.

In the recent past, Caribbean countries have been challenged by severe weather conditions. Over the last few years, the region has been frequented with several hurricanes, tropical storms, tidal surges, coastal erosion and severe earthquakes. In Trinidad and Tobago, high-density rainfalls and high winds have directly led to severe flooding, landslides, damage to property and the loss of life. The dry season of 2010 proved the worst in 45 years and was accompanied by an upsurge in bush fires with the potential of damage to T&TEC's infrastructure. The reduction in water from the Coora Dam for cooling of the Penal Power Station was a cause for concern.

It is generally accepted that the impact of natural disasters is worsened by poor environmental management practices. In this regard, the degradation of the environment transcends national boundaries and accordingly, several International Conventions and Multilateral Environmental Agreements (MEAs) provide the basis for international co-operation in the management of the environment. Through this mechanism, small island states like Trinidad and Tobago get an opportunity to obtain recognition of their special needs and vulnerabilities in their search for a sustainable development path.

Based on these International Conventions and MEAs, the local Environmental Management Agency (EMA), through the EMA Act, sets standards of performance on matters relating to the environment which all stakeholders, including T&TEC, must satisfy.

The legislative framework is also rapidly evolving with new rules relating to noise and water pollution recently becoming law in Trinidad and Tobago. It is to be noted that, countries that invest heavily in environmental preservation are also demanding that their trading partners do the same or face economic sanctions.

Prior to its cancellation, the planned establishment of aluminum smelters in Trinidad and Tobago led to the formation of anti-smelter groups that have brought attention to various possible environmental threats from industrial plant operations and the improper use of natural resources. As a result, the society is now more aware of the potential negative impact of improper environmental management and business practices on human and environmental health.

Implications for T&TEC:

Given the magnitude of the implications related to global warming ,which is upon us, measures need to be urgently implemented to maintain various aspects of the present natural environment and, where applicable, aid in its restoration to a more pristine one.

T&TEC shall be compelled to adopt environmentally sound business practices. This shall include preventative maintenance of its transformer stock and taking steps to develop and utilize alternative sources of energy such as solar, wind and wave energy.

An international, national and organizational cultural mind-set is however necessary for meaningful change to be effected. It is therefore prudent that T&TEC be cognizant of these factors in its daily operations and proactively develop strategies and action plans.

The impact of natural and man-made disasters on business continuity is also now of greater significance than before and consequently, adequate disaster preparedness planning is essential to guard against potential consequences.

3.1.2 Economic Factors[2]

Economic Outlook

The global recovery has evolved better than expected, with activity recovering at varying speeds – tepidly in many advanced economies but solidly in most emerging and developing economies. Among advanced economies, the United States is off to a better start than Europe and Japan. Among emerging and developing economies, emerging Asia is in the lead. Growth is also solidifying in key Latin American and other emerging and developing economies but continues to lag in many emerging European and various Commonwealth of Independent States (CIS) countries. Sub-Saharan Africa is weathering the global crisis well, and its recovery is expected to be stronger than following past global downturns.

With the exception of Haiti, Caribbean economies for the most part either contracted or experienced lower rates of growth in 2009 when compared to 2008. Several economies including Barbados, Jamaica and Trinidad and Tobago contracted in 2009, whilst for a few others expansion of GDP slowed. For the region as a whole, real GDP is expected to grow by 4 percent in 2010 after contracting by 1.8 percent in 2009. Growth performance in 2010 is expected to vary considerably across the economies of the region, reflecting different initial conditions and policy responses to external economic factors.

In 2009, the economies of Barbados, Jamaica and Trinidad and Tobago contracted by 4.8 percent, 3.2 percent and 3.5 percent respectively. In contrast, the economies of Guyana, Suriname and the Netherlands Antilles grew by 2.3 percent, 2.5 percent and 0.8 percent respectively. Inflationary pressures abated considerably across regional economies softening from a high of 12.5 in 2008 to 6.6 in 2009. In 2009, average inflation rates varied widely from -2.13 percent in Aruba to 9.58 percent in Jamaica.

Unemployment rates trended upwards across the region as reduced levels of economic activity in 2009 triggered job losses especially in the distributive trades, construction and manufacturing sectors. Unemployment rates in 2009 ranged from 5.3 percent in Trinidad and Tobago to 14.2 in the Bahamas.

The fiscal position of regional economies continued to worsen in 2009 in the wake of declining current revenues. The underperformance of taxes particularly on international trade as well as lower royalty receipts from the energy sector contributed to dwindling revenues. The corporate collapse in 2009 of CL Financial in Trinidad and Tobago and the Stanford Groups of Companies in Antigua and Barbuda resulted in spillovers across the region.

Trinidad and Tobago's economy is expected to grow by 2.0 percent in 2011 following its1.0 percent growth in 2010, driven mainly by a 3.2 percent expansion in the energy sector.

GDP growth in the refining subsector, including from Atlantic LNG, the second largest energy sub-sector, moderated substantially from the 7.1 percent growth achieved in 2009 to a modest 1.7 percent in 2010. This sub-sector which grew by 16.4 percent in 2009 is forecasted to grow by a modest 2.2 percent in 2010.

Gas processing (propane, butane and natural gasoline) output is also expected to expand by 8.6 percent. In contrast, oil refining is expected to decline by 16.4 percent as a consequence of the refurbishment works being undertaken at the Point-a-Pierre refinery and the unexpected shutdown of the refinery in August 2010.

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[2] **From the perspective of the International Monetary Fund (World Economic Outlook April 201)0 and the Ministry of Finance (Review of the Economy September 2010).**

Among the other Petroleum sub-sectors, growth in the Petrochemicals sub-sector moderated from 8.7 percent in 2009 to grow by 3.9 percent in 2010. The rate of decline of output of the Service Contractors sub-sector slowed significantly from 60.1 percent in 2009 to 25.6 percent in 2010.

The performance of the Non-Petroleum sector during 2010 continued to be weak. Following on its 7.2 percent contraction in 2009, the sector is expected to record statistically negligible growth in 2010. Given this outcome, the Non-Petroleum sector's contribution to real GDP, is expected to fall to 55.7 percent in 2010, from 57.1 percent in 2009.

In the first quarter of fiscal 2010 (October to December 2009), the unemployment rate fell to 5.1 percent compared with 5.8 percent in the last quarter of fiscal 2009. The first quarter figure was notably higher than the 3.9 percent registered in the corresponding quarter of 2009.

Headline inflation rose to 14.1 percent (year-on-year) in July 2010 from 13.7 percent in June, measured by the 12-month increase in the Index of Retail prices which represents the highest year-on-year increase since October 2008. The prime contributor to this higher headline inflation was the considerable rate of acceleration in food prices of 33.3 percent in July from 31.1 percent in the previous month and from a minimum point of 2.7 percent in January. Core inflation, which filters out the impact of food prices, declined to 4.1 percent from 4.3 percent in the previous month.

Credit to the Private sector from the Commercial Banks began to contract in September 2009 and this narrowing has persisted right through to May 2010. Credit to the private sector expanded, on a year-on-year basis, by 6.6 percent to May 2009 but narrowed to 8.9 percent one year later.

In the circumstances, the Central Bank reduced the repurchase rate (repo) to 3.5 percent in December from 3.75 percent in October 2010, to help stimulate domestic demand. The repo rate in January 2010 stood at 5.0 percent.

Trinidad and Tobago's narrow money supply expanded by 31.4 per cent in May 2010, compared with an increase of 16.8 per cent in May 2009 on a year- on- year basis. Additionally, the broad money supply recorded a 12-month increase of 19.1 percent in May 2010 compared with an expansion 16.2 per cent in May 2009. During the twelve month period July 2009 to July 2010 the average buying rate of the United States dollar appreciated from $6.27 to $6.32. Within the same period, the selling rate increased from $6.34 to $6.38.

During fiscal 2010, the Central Government is expected to generate an overall fiscal deficit of $3,806.9 million or 2.9 percent of GDP. Total Revenue is projected to increase by $2,937.9 to $41,982.7 million or 32.4 percent of GDP and total Expenditure is projected to increase by $58.8 million to $45,789.6 million or 35.3 percent of GDP.

Central Government Debt is projected to increase by 14.5 percent to $28,952.12 million and Gross Public Sector Debt by 7.4 percent to $49,953.39 million. As a percentage of GDP, Gross Public Sector Debt is also anticipated to increase from 37.5 percent in fiscal 2009 to 38.5 percent in fiscal 2010.

Prices:

Inflationary pressures eased considerably during 2009, as headline inflation plummeted from a high of 15.4 percent, year-on-year, in October 2008, to a low of 1.3 percent in December 2009. This trend was, however, sharply reversed during the first seven months of 2010 as headline inflation climbed to 14.1 percent (year-on-year) by July 2010. The upward trend in 2010 is a direct result of a drought-induced rise in food prices, reinforced by sharp price increases for Transportation.

Annual average headline inflation declined from 12.0 percent in 2008 to 7.0 percent in 2009. Core inflation decelerated to an annual average rate of 4.1 percent in 2009, from an average of 6.2 percent in 2008. During 2010, inflationary pressures intensified once again with consumer prices rising to13.4 percent in December, compared to 1.3 percent for the corresponding period of 2009. Food price inflation, during 2010 was the primary contributor to this inflationary spiral. In contrast, core inflation remained relatively subdued in the early part of 2010, increasing marginally to 4. 3 percent in June from 4.2 percent in January. There was however a major jump to 4.7 percent in last quarter of 2010. Price increases in Transport and in Recreation and Culture were the main drivers of core inflation during this period.

Productivity

The All Items Productivity Index, which measures the productivity of all workers in all industries, reported a 1.3 percent increase in productivity during calendar 2009. Significantly less than the 7.2 percent increase achieved in 2008. The productivity of all workers in all industries remained unchanged during the first quarter of fiscal 2010, compared to the fourth quarter of fiscal 2009.

A contraction by 0.5 percent was however recorded during the second quarter of fiscal 2010. In overall terms, productivity in the energy sector grew in the first quarter of fiscal 2010, but declined in the second quarter. In the non-energy sector, declines in overall productivity were experienced in both quarters.

Exchange Rates/Foreign Exchange Market:

The period October to December 2009, was characterized by relatively tight conditions in the foreign exchange market as the energy companies continued to respond to falling energy prices. In the circumstance, the Central Bank intensified its intervention in the market by increasing its sales to authorized dealers by 146 per cent to US$560 million, as compared with US$227.5 million in the corresponding period in the previous year.

At the beginning of 2010, the recovery in energy prices, served to alleviate pressures in the foreign exchange market. The Central Bank reduced its intervention in the market selling US$620 million between January and June 2010, compared with US$963.6 million over the corresponding period in the previous year. The weighted average buying rate for the United States (US) dollar increased steadily from TT$6.27 in July 2009 to peak at TT$6.37 in December 2009. This rate has since fluctuated within a narrow band and stood at TT$6.38 per US dollar at the end of June 2010, compared with TT$6.31 at the end of June 2009. The rate at the end of December 2010 increased to TT$6.42.

Interest Rates

Interest rates continued to decline over the period October 2009 to May 2010. Commercial banks lowered their prime lending rates in response to three reductions in the repo rate between October 2009 and January 2010; the average prime lending rate fell by 125 basis points to 9.50 per cent by the end of June 2010. Between December 2009 and April 2010 demand loans fell from 11.7 per cent to 11.6 per cent; instalment loans fell from 13.8 per cent to 12.0 per cent; and the rate on new overdraft facilities fell from 17.04 per cent to 15.06 per cent.

During the period January to December 2010, the prime rate fell to 8.25 per cent from 9.75 per cent. During this period, other lending rates for demand, term, and overdraft fell to 9.50 per cent, 9.63 per cent and 9.50 per cent respectively. Also, the real estate mortgage rate fell from 9.90 per cent to 9.50 per cent in the period.

Implications for T&TEC:

T&TEC in its expansion drive must be cognisant of the global and local economic conditions and therefore exercise caution and prudence regarding large expenditure. A reduction in export earnings may also impact the availability of foreign exchange for foreign payments to suppliers and contractors. An increase in the exchange rate shall also make foreign inputs more expensive. Higher inflation shall also cause the cost of local inputs such as material and labour to further rise.

The fall in Government revenues and increase in its debt would also affect the availability of Government funding for special social sector projects for the electricity sector such as streetlighting, rural electrification and lighting of parks, recreation grounds and public spaces. Although the legislation now allows the receipt of Government subventions, economic conditions may see different strategies being adopted rather than the direct injection of funds into T&TEC by the Government.

The availability of relatively low interest rates (locally and internationally) may be capitalised upon. T&TEC must also be cognisant of the prevailing economic condition and its impact on foreign direct investment as well as investment by locals. In this regard, the latest findings of the Ryder Scott Report is relevant as unless new reserves are proven, this shall limit the establishment of new gas based industries. Inflationary pressures and the general slow-down of the economy must also be considered in its rate proposal.

T&TEC should also be more aggressive in its revenue collection and cost reduction efforts, only commencing ' ring-fenced' projects when the necessary funding is made available.

T&TEC should also exploit other revenue earning opportunities from its existing infrastructure and focus on increasing and maintaining its productivity levels.

It is also imperative that T&TEC be innovative in becoming more efficient while providing a safe, reliable, adequate and affordable electricity supply to all its customers.

World Demand for Electrical Components

The recent global economic crisis and falling world commodity prices has had the net effect of stabilizing world demand and prices for electrical components and raw materials which escalated during the period 2006 - 2008. Global economic recovery, already underway, is however likely to see returns to high commodity prices.

Implications for T&TEC:

Prudent management of inventories is necessary. Large investments may have to be delayed until there is confirmation and greater commitment on the part of investors.

Government Funding

In 2006, the Government agreed to fund several bulk power projects at an estimated cost of $1.124B. Of this sum, $33.7Mn was provided under the Government's Public Sector Investment Programme (PSIP) and $69Mn has been allocated in 2010/2011. The balance of the required funding was not provided to T&TEC primarily because of legal constraints at the time. However, based on their strategic importance, T&TEC continued work on the projects utilizing its internally generated funds which normally would have gone to the NGC for ongoing monthly fuel consumption. This resulted in a debt of $2.3Bn to the NGC as of April 2010.

Government agreed in April 2010 to the settlement of this debt through a loan to be financed by the Ministry of Finance, but the matter has not yet been finalised

Through the PSIP, additional streetlights have been installed and several public facilities illuminated. It is the responsibility of the Government to meet the operation and maintenance charges associated with these infrastructures on an ongoing basis.

Implications for T&TEC:

These above matters need to be addressed as a matter of urgency by the State to ensure adequate funding is provided in a timely manner to meet the associated costs. Funding related to the operations/purchase of power from the new power stations should also be included for consideration by the RIC in T&TEC's Rate Review Application for the period 2011 to 2016.

Tariff Structure

Prior to 2006, apart from the review of tariffs for only eighteen (18) of T&TEC's large industrial customers, the last tariff review for all classes of T&TEC's customers was in 1992. As a consequence, T&TEC has been operating with uneconomic tariffs for a significant period of time.

The RIC made its final determination on June 01, 2006 with respect to T&TEC's application for a rate review for all classes of customers of the electricity sector covering the period June 2006 to May 2011. New tariffs were not implemented until November 2006 for commercial and industrial customers and May 2008 for residential customers. This contributed to a loss in revenue of approximately $347Mn. Further, as mentioned earlier expenditure associated with the Cove and TGU Power Plants was not considered in the RIC approved 2006 – 2011 tariffs, but are now real costs to be met.

The tariff structure stipulates annual adjustments, resulting in increased electricity rates in May 2008, September 2008 and September 2009. The 2010 adjustment was not approved. Despite these tariff increases, local electricity customers continue to enjoy some of the lowest tariffs in the Caribbean. Customers are however generally unhappy with the annual rate increases as they have grown accustomed to no increases for several years.

Implications for T&TEC:

T&TEC should consistently meet the service and information requirements established by the RIC, and abide by its Codes of Practice as necessary.

Unless economic tariffs are implemented for all classes of its customers on a timely basis, T&TEC shall continue to be faced with sizable revenue shortfalls which shall impact negatively on its ability to maintain its standard of current service and its ability to invest in capital projects needed to further improve the quality of electricity and support services delivered to its customers.

To this end, Government should be asked to make good any shortfall in revenue to T&TEC as a result of the non implementation of the RIC approved tariffs as per its schedule.

3.1.3 Socio-cultural Factors:

Mid-year population estimates for 2010 indicate a 0.6 percent increase in the population of Trinidad and Tobago to 1,317,714 persons, from 1,310,106 persons in 2009. The provisional birth rate per thousand persons is expected to increase marginally in 2010, to 15.40 births, from 15.25 births in 2009. The provisional death rate for 2010 is however expected to remain stable at 7.68 deaths per thousand persons.

In recent years there have been changes in population spread, income distribution, social mobility and housing expansions. The population is also now more exposed to international media that creates demand for goods and services show-cased on the international market. This has influenced lifestyle changes where people are now more technologically oriented and have embraced several modern communication formats. There has also been observed a growth in consumerism with customers demanding higher quality of goods and services.

Growing traffic congestion on the nation's roadways has placed significant pressure on the working population's leisure time and has contributed to customers demanding more prompt and efficient service as they negotiate peak traffic cycles to pay bills and enter queries.

The construction boom of the mid-2000s, coupled with otherwise low unemployment figures, adversely affected the availability and price of skilled labour. There has been some reversal in the last 18 months as the boom has cooled. A general increase in criminal activity over the past decade has plagued the country with potential labour force implications. An aspect of crime has been an increase in 'current stealing' activity. T&TEC's workers, as with other utility companies, have also been violently assaulted and robbed while in the course of discharging their day to day functions in the field.

Government's social programmes such as the National Streetlighting Programme, National Social Development Programme, Rural Electrification Programme and Lighting of Parks, Recreation Grounds and Public Spaces are now more prevalent than before and also place greater demands and expectations on already scarce human and other limited resources.

Implications for T&TEC

The goals should be to meet or even surpass the demands of customers through the consistent provision of steady voltage electricity that readily facilitates digital operations across the country. Customer feedback and level of satisfaction should also be regularly captured through appropriate customer surveys and the information gathered used for service improvement planning. Appropriate management systems should also be developed and implemented that shall allow the delivery of consistent quality product and services across all distribution areas.

The adoption of modern technology to facilitate customer interfaces with T&TEC in the privacy of the customers' homes and offices, and quicker responses to trouble reports and restoration of supply after a power outage, are also demanded.

Further increases in the customer base, presently at 417,108 in December 2010 are also expected for which appropriate and suitable administrative support services should be planned and provided in a timely fashion in order to facilitate prompt and efficient service delivery. Frequent requests for extension of supply to new residential and industrial developments and areas not previously served are expected and accordingly adequate provisions should be made to allow for the necessary infrastructure developments.

It is expected that all streets, main roads and highways are adequately illuminated and all non-functional streetlights are repaired as soon as they malfunction. 'Current stealing' has been on the increase and requires adequate measures to minimise its spread. T&TEC's personnel and property as well as its infrastructure is now at greater risk, requiring national and community support and security measures to reduce the potential of negative consequences.

Adequate systems should be implemented to ensure that the natural environment is enhanced or preserved in a pristine state for the enjoyment of present and future generations. This should include the sustainable use of natural resources and promotion of alternate energy sources.

Projected resource requirements should also be proactively identified and adequate systems implemented to ensure the availability of adequate quantities and quality of physical and human resources for the implementation of planned work programmes. Programmes should also be implemented to facilitate increases in productivity of the work force.

Should incidents of crime continue to adversely affect T&TEC's operations, an increased investment in protective instruments and services shall become mandatory.

3.1.4 Technological Factors:

(i) Advances in Technology

Rate of change and obsolescence are rapid and the cost to stay abreast is high. Developments in fuel cell technology, hydrogen technology, computerization, telecommunications, miniaturization, compression technology and digitization are impacting business operations globally.

Implications for T&TEC:

T&TEC needs to keep abreast of new technological advances and to continually assess the opportunities and challenges associated with emerging technologies with the primary goals of increasing efficiencies, expanding business opportunities and increasing profitability. In addition, developments in equipment, materials, systems and procedures may be utilized with a view to delivering a more reliable and higher quality electricity service.

Live line work, advanced metering infrastructure, industrial automatic meter reading, Geographic Information Systems (GIS), Global Positioning Systems (GPS), underground residential and commercial developments, distribution automation, enterprise wide software applications, communications technological developments, computerised planning and maintenance, cutting-edge distribution equipment, alternate energy sources, distributed generation, energy conservation technology and vehicle tracking systems are some of the more applicable technologies.

(ii) Renewable energy

Trinidad and Tobago's electricity sector is totally dependent at this time on natural gas as fuel, primarily because of the country's natural resource endowments. Giving consideration to forecasted increases in load demand and the findings from the 2010 Ryder Scott Report, the continued full dependency on natural gas for power generation is risky. The use of renewable forms of energy benefits the environment as they contribute little or no pollution and shall help diversify dependence away from natural gas.

It is also noteworthy that one of the aims of the Clean Development Mechanism (CDM), which emerged from the 1997 Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCC) of which Trinidad and Tobago is a member, is a reduction in Greenhouse Gas Emissions. As such, the reduction in our national carbon footprint is deemed essential. Climate change is now recognised as an actual phenomenom requiring action by all countries to stem the negative impacts.

Implications for T&TEC:

T&TEC must encourage energy efficiency and conservation in addition to promoting the use of renewable energy sources. Combined cycle plants should also replace all gas turbine plants. Alternative sources of energy such as bio-fuel, wind-power, hydropower, wave power and solar energy should also be explored with the view of having a combination of the various technologies rather than placing sole reliance on natural gas. The technology and experience gained by the other countries in setting up wind turbines out at sea which is more aesthetically pleasing and environmental friendly to citizens, should also be explored.

3.2 STRATEGIC FOCUS FOR THE PERIOD 2011 – 2016

As T&TEC focuses on charting its course forward for the period 2011 to 2016, it has identified several challenges that must be addressed. These include:

- Financial viability challenges
- Availability of skilled human resources
- Anticipating and satisfying customer and stakeholder needs
- Ensuring that the necessary electricity infrastructure is in place to support the timely development of all sectors of the economy.
- Health, safety, environmental, quality and business continuity concerns
- Reinforcement of the organisations' value systems
- Availability of equipment
- The ability to improve reliability with time as it relates to load growth and the growth of the economy
- The need for improvement in accommodation infrastructure.

As a consequence, T&TEC has set itself the following strategic priorities over the next five years:

1. Availability of sufficient generation capacity.
2. A well developed, operated and maintained transmission and distribution and accommodation infrastructure.
3. Satisfied internal and external customers.
4. Financial viability and sustainability.
5. Health, safety, security, environmental, quality and business continuity consciousness and sensitivity.
6. A high performing, skilled, empowered, dedicated and motivated workforce with patterns of behaviour which reflect the organisation's core values.

The achievement of these strategic priorities is essential to T&TEC becoming a world-class utility, capable of delivering a high quality electricity supply and related services for the improvement of the quality of life for the entire populace of Trinidad and Tobago.

To this end, T&TEC has established six strategic objectives for the period 2011 – 2016 as follows:

Strategic Objectives:

1. To ensure that the necessary generation capacity is planned and developed to match the load demand with the desired reliability at all times.
2. To ensure that the transmission and distribution infrastructure is developed, operated and maintained to provide a safe reliable electricity supply to all customers.
3. To achieve the highest level of customer satisfaction through excellence in customer service.
4. To ensure that T&TEC attains financial viability through the application of economic tariffs, cost consciousness, and the promotion of a culture of revenue enhancement and protection.
5. To ensure that health, safety, security, environmental, quality and business continuity management systems are developed and integrated in all of T&TEC's business operations.
6. To ensure the development of a caring and service oriented organizational culture, that promotes trust, respect, open communication, empowerment of employees, teamwork and a recognition and reward system for employees' performance.

Vision of where T&TEC expects to be in five to ten years and how it intends to get there:

In keeping with its overall vision of "Leadership in Energy Delivery, Excellence in Customer Service ... enhancing the quality of life for all" T&TEC sees itself within the next five to ten years becoming an organisation of which all of its stakeholders shall take pride: A financially viable leading electric utility in the Caribbean Region operating a smart grid network, offering online payments and interface options, time of use billing and other electricity related services to a satisfied customer base through a highly motivated and empowered workforce.

From the Distribution perspective this shall include:

- Developing, operating and maintaining distribution infrastructure
- Satisfying customers demands and expectations
- Empowering its workforce
- Significantly improving reliability (upgrade of substations)
- Reduction of the amount of planned outages (increased hotline works)
- Restructuring of our vegetation management
- Increased focus on plant maintenance and plant equipment in a timely manner (to decrease the effects of aging plant)
- Establishing new substations to cater for load growth
- Establishing new feeders
- Reconductoring of feeders
- Implementation of GIS and Outage Management System
- Increase in Hotline works (less planned outages)
- Installation of a vehicle tracking system (safety of employees) as well as fast response.
- Acquisition of additional vehicles to further enhance our response.
- Interaction with the various Unions to arrive at an agreement that best suits the vision.
- Full compliance of all Areas with ISO 14001 and ISO 9001

3.3 IMPROVEMENTS IN SERVICE PLANNED FOR 2011-2016:

Over the period 2005-2010 T&TEC fully deployed its advanced metering infrastructure which has led to the elimination of estimated bills and an increase in revenue due to more accurate readings.

A depot was recently established in Curepe to provide more timely responses to customers along the East West Corridor. Offices and stores were relocated to more accommodative environments.

Concrete poles instead of wooden poles were used whenever available as these have a longer life span and are comparable in cost.

There was commencement of the establishment of a Distribution Automation System, a Computerised Maintenance Management System and a GIS system all to be fully deployed during the next review period.

Installation of video surveillance systems at critical substations, offices, main stores and service centres as an aid to detecting and preventing criminal activities and securing the Commissions assets.

Video conferencing facilities at offices to minimise travel time of officers in attendance of meetings was implemented.

ISO 9001:2008 Quality Management System certification at the Southern Distribution Area was achieved and shall be rolled out to other Areas/Departments during the next review period.

From the Distribution perspective improvements were as follows:

i. Purchasing of aerial lift trucks (aid in increasing hotline works)
ii. Addition of insulated conductors (to be used in forested areas)
iii. Expansion of substations (to cater for load growth)
iv. Installation of GPS in vehicles (to improve fleet management and employees' safety)
v. Acquisition of ISO 9000:2008 Certification
vi. Implementation of Flame Retardant Clothing (to improve Personal Protective Equipment (PPE))
vii. Regularization of legal documents required for supply
viii. Increase in Underground System Network
ix. Introduction of new materials to improve public's safety
x. Change out of ageing plant
xi. Upgrade of existing substations

3.3.1 Systemic Developments:

Establishment of New Depots

Depots at Santa Cruz, Chaguanas, and Syne Village shall be established in the next period (2016-2021) allowing faster response to customers.

GIS

The GIS data for the entire country shall be completed over the period leading to faster response to customer queries and surveys. Also, the outage management template shall be managed over this period.

GPS

Vehicles expected to be outfitted with GPS units which shall allow dispatch from Telecom Operators to the crews real time, which shall allow shorter routes to be chosen for faster response.

Hotline Work

The Commission is expected to increase the Area's Ariel Trucks fleet. This shall allow for the achievement of the targeted 60% of Hotline works and therefore reduce planned outages with the consequent increase in T&TEC's sales revenue since the majority of maintenance work is expected to be done while the customer is on supply.

Computerised Maintenance Management System (CMMS)

During the review period the Commission shall complete the implementation of the CMMS pilot project and expand the system to all Transmission and Distribution assets.

Fibre Glass Composite poles

The Commission shall explore the use of fibre glass composite poles in areas where the environment is harsh and corrosive.

Online Transmission Transformer Condition Monitoring

The Commission shall explore the feasibility of monitoring the condition of critical transmission transformers online

Summary of Distribution Projects

3.3.2 Distribution South:

- Connection of feeder Gulf View and La Romain 12kV Feeders
- Construction of St. Croix and Papourie Road 12kV Feeders
- Installation of 6MVA Transformer at Los Bajos
- Installation of GPS receivers in vehicles
- Construction of Erin and Carapal 12kV Feeders from Erin
- Installation of 12.5/16MA Transformer at St. Mary's Substation
- Changing of Polymeric pin-type insulators
- Architectural works on a new building at Reform – Distribution South
- Construction of switchhouse at Santa Flora Substation
- Change out of conductors on Penal, San Francique, Papourie and Siparia 12kV Feeders
- Replacement of left side of board with vacuum switchgear
- Replacement of oil Ring Main Units

3.3.3 Distribution Tobago:

- Establishment of depot in Roxborough
- Underground infrastructure development in Scarborough
- Administrative building in Scarborough

3.3.4 Distribution North:

- Abbatoir Substaion 12kV switchgear upgrade
- Upgrade of San Juan Substation
- Establish Invaders Bay 33/12kV GIS substation
- Upgrade St. James Substation
- Upgrade of Independence Square East, Central and West Substations
- Upgrade of Master Substation 12kV
- Upgrade of Overhead lines in San Juan
- Installation of Utility Duct Banks and Raceway System in Port-of-Spain
- New Area Office Building
- Upgrade of Mt. Pleasant Substation
- Connection of Maraval Feeder to Maracas feeder out of Santa Cruz
- Establish Substation at Maracas Bay on the North Coast
- Feeder Installation from Barataria to Morvant
- Cascade Substation Upgrade
- Maraval Substation Upgrade
- Laventille Substation

3.3.5 Distribution Central:

- Acquisition of land for Carlsen Field substation
- Establishment of Carlsen Field substation
- Upgrade of Savonetta Substation
- Construction of Arena Road 12kV Feeder from Carlsen Field Substation
- Construction of Mission Road 12kV Feeder from Carlsen Field Substation

- Construction of Perservance Road 12kV Feeder from Felicity
- Construction of Roopsingh Road 12kV feeder from Felicity
- Construction of new Beaucarro 12kV from Central Substation
- Construction of Trinity Lane 12kV Feeder from B.C. Substation
- Upgrade of 12kV feeders: Munroe Road, Penco Lands, Freeport, Carlson Field and Cunupia
- Establishment of depot in Charlieville

3.3.6 Distribution East:

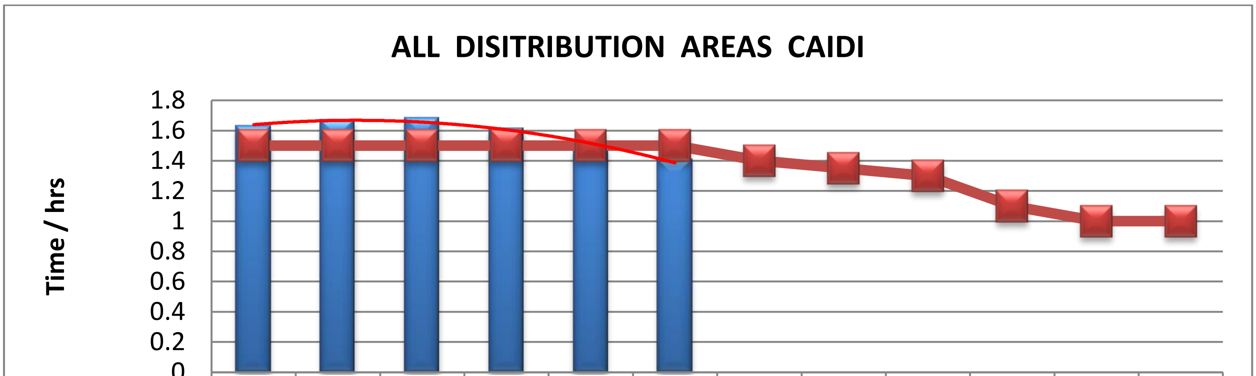
- Trincity S/S: New 12 kV Switchboard
- St. Augustine S/S: New 33/12 kV Transformer
- St. Augustine S/S: new 33 kV GIS Board
- St. Augustine S/S: New 12 kV Switch Room and 12 kV Switchboard
- Construct 12 kV feeder from Piarco S/S to CR Highway
- Construct new 12 kV feeder from Orange Grove S/S to Tunapuna load center
- Pinto Rd S/S: Upgrade 33/12 kV transformers
- Development works in Arima - Convert from overhead lines to underground lines in Arima

3.3.7 Additional infrastructure Improvement or Reliability

- It is proposed that new feeders should be established from Carlsen Field, Roopsingh Road feeder from the Felicity s/s, Buraro 12kV from Central, Macral Road from Claxton Bay, Adona Road from Charlieville, Trincity lane from B.C. Substation
- Protection against animal contact
- It is expected that 50,000 polymeric insulators as well as the associated taller pins that is 305mm pins shall be installed throughout the country

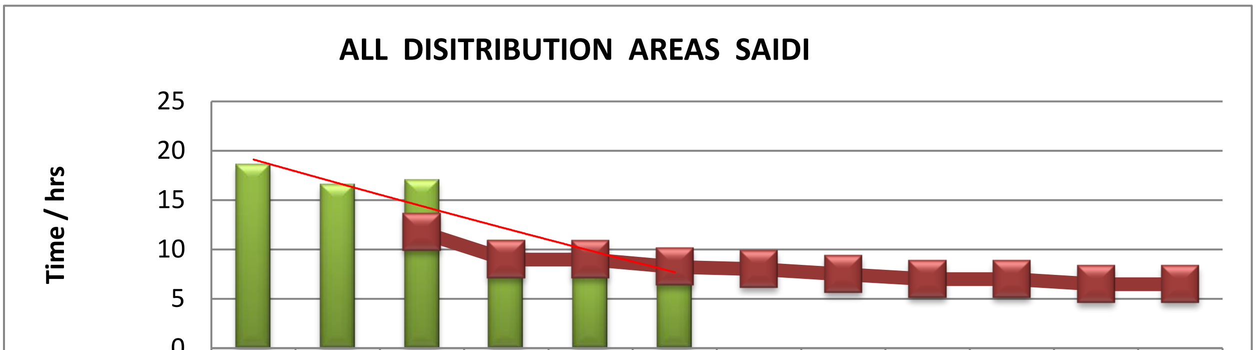
3.3.8 TARGETS 2011 - 2016

Figure 1: Projected CAIDI Reliability Indicator



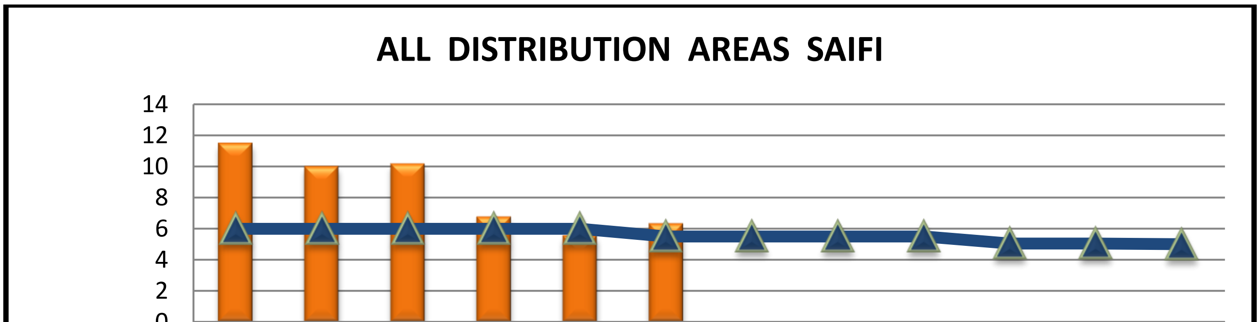
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CAIDI	1.63	1.67	1.68	1.61	1.47	1.41						
TARGET	1.50	1.50	1.50	1.50	1.50	1.50	1.40	1.35	1.30	1.10	1.00	1.00

Figure 2: Projected SAIDI Reliability Indicator



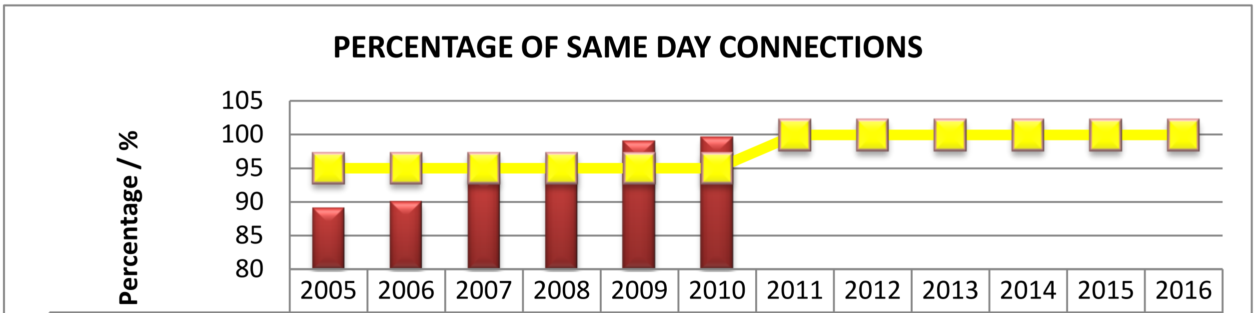
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SAIDI	18.59	16.56	16.98	10.85	8.11	8.9						
TARGET			11.76	9.00	9.00	8.25	8.00	7.50	7.00	7.00	6.50	6.50

Figure 3: Projected SAIFI Reliability Indicator



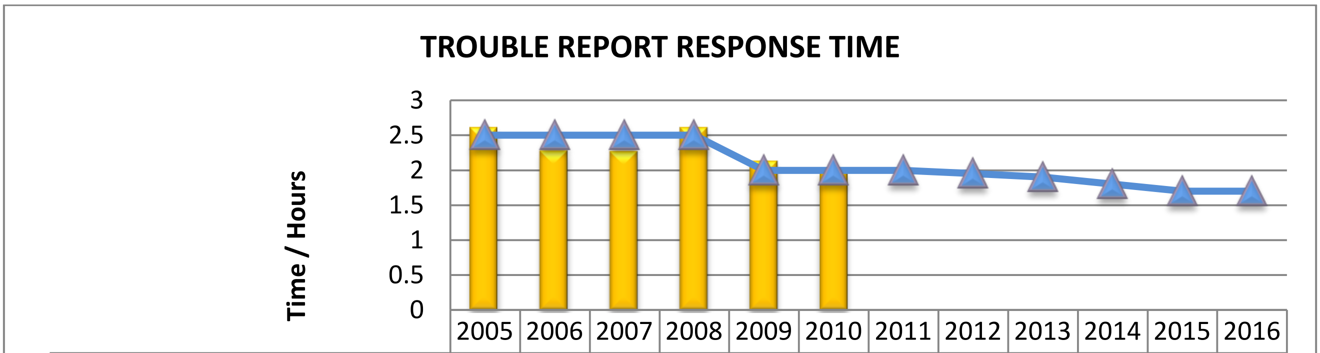
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SAIFI	11.43	9.93	10.10	6.73	5.53	6.29						
Target	6.00	6.00	6.00	6.00	6.00	5.50	5.50	5.50	5.50	5.05	5.05	5.00

Figure 4: Projected Percentage of Same Day Connections



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CONNECTIONS	89	90	94	95	99	99.5						
Target	95	95	95	95	95	95	99.95	99.95	99.95	99.95	99.95	99.95

Figure 5: Projected Trouble Report Response Time

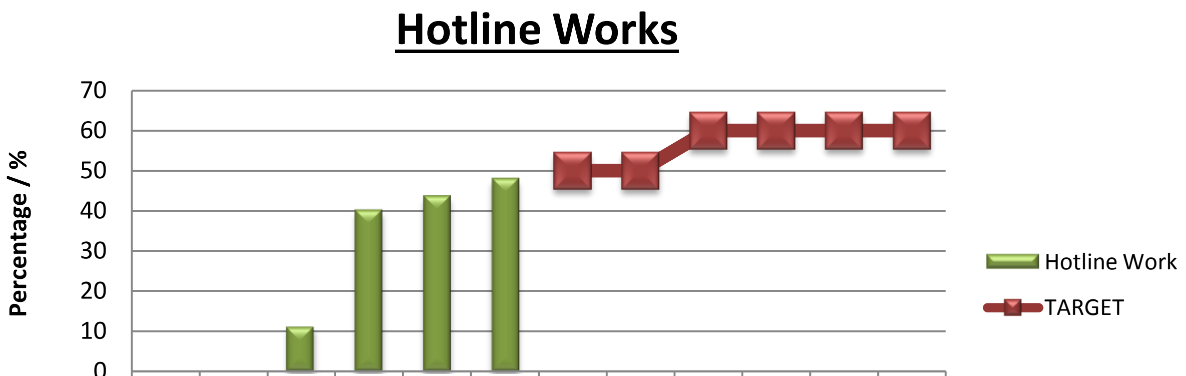


	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
TROUBLE REPORT RESPONSE TIME	2.6	2.27	2.26	2.6	2.12	1.99						
TOTAL	2.50	2.50	2.50	2.50	2.00	2.00	2.00	1.95	1.90	1.80	1.70	1.70

Figure 6: Projected Reports per 1000 Customers

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
REPORT PER. 1000 CUSTOMERS	7.1	5.4	5.1	5.3	4.6	5						
TARGET	6.00	6.00	6.00	6.00	5.50	5.10	5.00	4.50	4.50	4.00	4.00	4.00

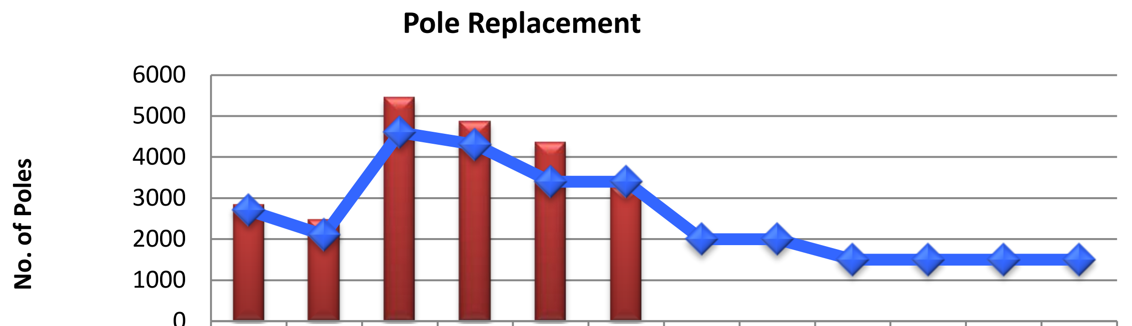
Figure 7: Projected Hotline Works



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Hotline Work			11.1	40.01	43.5	47.85						
TARGET							50	50	60	60	60	60

Note: This represents the percentage of hotline work done as a percentage of work that can be done applying the hotline approach. There was no analysis available of hotline work done prior to 2007.

Figure 8: Projected Pole Replacement



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Pole Replacement	2812	2451	5440	4859	4344	3253						
TARGET	2700	2100	4600	4300	3400	3400	2000	2000	1500	1500	1500	1500

3.3.9 METERING DEPARTMENT

- ISO 17025 Certification by end 2011
- Maintain AMI network availability > 98%
- AMR (Remote Industrial meter readings) >95%
- Implementation of a meter asset tracking system by 2012
- Implement electronic IMID by mid 2011
- Acquire additional working, office and storage space by 2012
- Adherence to RIC requirements
- To have 60% of AMI data backhaul moved to a T&TEC operated system by end 2012

Impediments:

- Controlling cost as new requirements are placed on the Department
- Behaviour of the AMI network since it is new technology being used by the Commission and its long term behaviour is unknown
- Complying with RIC requirements to be imposed on the Department
- AMI and AMR communications is dependent on a third-party
- Keeping up with improved technologies

Indicators:

- AMI Network availability

3.3.10 INFORMATION SYSTEMS

Efficiency improvements planned for the next 5 years.

1. Extend videoconferencing facilities to supervisory staff.
2. Development and implementation of more Web-enabled applications.
3. Re-examine and optimize staff utilization in the Applications Development and Operations Sections.
4. More effective use of technology in business strategies.
5. Establishment and maintenance of Service Level Agreements with internal and external customers.

Impediments

1. Obtaining and retention of IT staff.
2. Executive sign off on technological advances.
3. Buy-in from user departments outside of Administration Division in the use of technology.

Key Performance Indicators

1. Percentage uptime of servers.
2. Percentage uptime of network.
3. Processing deadlines to be met.
4. Response time to deal with IS customer issues at the Service Desk.

Performance against established Service Level Agreements

3.3.11 COMMERCIAL DEPARTMENT

EFFICIENCY IMPROVEMENTS PLANNED FOR THE NEXT 5 YEARS

COLLECTIONS AND PAYMENT PROCESSING	IMPEDIMENTS/COMMENTS
Foreign currency acceptance- Impl. date 2012 Introduction of two addition collection agents	 To be implemented within the next 12 months

The additional collection agents will provide greater convenience for customer payments and improve T&TEC's cashflow. This is estimated to cost approximately $700,000 per annum.

BILLING OF CUSTOMERS	IMPEDIMENTS/COMMENTS
Electronic bill presentment and transmission of bills via email Introduction of master billing	Required hosting of web services by the Commission, acquisition of customers email address Availability of resources for testing of module

The electronic bill presentment will provide additional convenience to customers who can have their bills mailed to them electronically thereby facilitating earlier payment. Costs have not yet been determined.

Master billing will be useful for e.g commercial and industrial customers and Ministries who may be responsible for paying the bills of several business units. One master bill will include a comprehensive list of all related business units for ease of payment. Costs have not yet been determined.

CUSTOMER SERVICE	IMPEDIMENTS/COMMENTS
Online application processing for new connections, transfers, meter checks, disconnection request, temporary supplies and repositioning of secondaries etc. Online access to meter data for all classes of customers Online submission of customer complaints	Required hosting of web services by the commission, availability of application development staff Required hosting of web services by the commission, availability of application development staff Required hosting of web services by the commission, availability of application development staff

Customers will benefit from the convenience of online applications for several services rather than having to visit our offices. The costs are still to be determined.

OPERATIONAL	IMPEDIMENTS/COMMENTS
Introduction of a document management system Electronic work order management system including electronic dispatch of work orders	Availability of financial and information system resources Scheduled for completion by end of 4th qtr 2011. Cost of $2m.

The former will allow for the digital storage of customer correspondence for ease of retreival and response to customer. Costs have not yet been determined.

The latter involves the dispatching of works/service orders to handheld device to facilitate disconnection, reconnection and change meters among other things thereby improving service to customers.

COMMERCIAL DEPARTMENT – KEY PERFORMANCE INDICATORS	IMPEDIMENTS
120 days and over	< 1%
Billing lag	8 Days
% of accounts billed on estimate versus actual	< 1% estimate, no more than 2 consecutive estimates

3.4 MAINTAINING SERVICE TO CUSTOMERS

3.4.1 Maintenance of Network and Assets:

3.4.1.1 Maintenance Philosophy – Maintenance Plan

Overhead Lines:

The condition of the Transmission and Subtransmission overhead lines are assessed through a series of planned inspections. Inspections are conducted at three levels as follows:-

- **Level I Inspection**
  - Identification of problems that can result in faults in the immediate future
- **Level II Inspection**
  - Identification of problems that can result in failure in the short to medium term
- **Level III Audit**
  - Designed to ensure that construction of the plant is in accordance with design standards

3.4.1.2 Substation Inspections

- Visual Inspections of electrical equipment are performed on each substation once every two (2) weeks
- Infrared Thermographic Inspections are performed on each substation once every three (3) months
- Civil Inspections are performed on each substation annually
- Condition Monitoring is done on Power Transformers to constantly assess various aspects of their performance including load currents and temperature. Additionally Dissolved Gas Analysis (DGAs) tests are performed annually to determine the integrity of electrical parameters such as their insulation properties. The results of these tests are interpreted to determine if any further corrective action is required.
- The following major maintenance projects are required over the review period to improve the reliability of the Transmission and Sub-transmission systems:
  - Pole replacement programme
  - Voltage correction
  - Vegetation management
  - Infrared thermographic scans

EQUIPMENT CLASSIFICATION	MAINTENANCE PRACTICE	
	FREQUENCY	**STRATEGY**
Battery Bank	Every two weeks	Schedule during the rainly/dry season throughout the year
Oil Circuit Breaker	Yearly	Schedule in the dry season
Gas Circuit Breaker	Yearly	Schedule during the rainy/dry season during the first half of the year
Vacuum Circuit Breaker	Yearly	Schedule during the rainy/dry season during the first half of the year
Power Transformer	Yearly	Schedule in the dry season
Current Transformer	Yearly	Schedule during the rainy/dry season throughout the year together with the primary apparatus in the same zone
Lighting Arrestor	Dependent on primary apparatus	Schedule during the rainy/dry season throughout the year together with the primary apparatus in the same zone
Isolator	Every five years	Schedule during the rainy/dry season throughout the year
Fault throw Switch	Every two years	Schedule during the rain/dry season throughout the year together with the primary apparatus in the same zone

3.5 KEY FORECASTS FOR THE PERIOD 2011 – 2016

3.5.1 Actual and Forecasts of Staff Levels, Customer Numbers and Energy Sales (2009 – 2016)

	2009	2010	2011	2012	2013	2014	2015	2016
Number of Employees	2,667	2,728	2,850	2,915	2,975	3,025	3,075	3,124
Number of Customers	408,826	417,108	426,883	436,202	445,730	455,475	465,441	475,628
Energy Sales(GWh)	7,297	7,908	8,121	8,708	9,218	9,599	9,900	10,272

Note: Staff increases are projected for Internal Audit, Quality Section, Pre-Qualification Department, Rates and Regulatory Department, Distribution and Public Lighting Department among others based on the Human Resource Plan.Sales to B1 customers of 2 GWh for each year are included however B1 customers are excluded.

3.5.2 CUSTOMER FORECAST BY RATE

Forecast – Total Number of Customers in each Rate Category														
Year	**Rate A**	**Rate B**	**Rate D1**	**Rate D2**	**Rate D3**	**Rate D4**	**Rate D5**	**Rate E1**	**Rate E2**	**Rate E3**	**Rate E4**	**Rate E5**	**Rate S**	**Total**
2010	**375,569**	**38,336**	**2,320**	**772**	**14**	**19**	**1**	**3**	**0**	**0**	**0**	**1**	**38**	**417,108**
2011	384,294	39,178	2,411	911	14	21	1	2	1	0	0	1	49	426,883
2012	392,690	39,979	2,506	932	14	22	1	2	1	0	0	1	54	436,202
2013	401,278	40,798	2,605	953	14	22	1	3	0	1	0	1	54	445,730
2014	410,060	41,633	2,707	975	14	22	1	3	0	1	0	1	58	455,475
2015	419,043	42,487	2,813	997	14	22	1	3	0	1	0	1	59	465,441
2016	428,231	43,359	2,913	1,020	14	22	1	3	0	1	0	1	63	475,628

Note : Rate B 1 actual for 2010 is 35 and 2011 to date is 42. B1 customers are not included in the forecast for 2011 to 2016. D1 customer numbers have been updated (May 2011) to reflect current data and supersedes any previous forecast submitted.

3.5.2.1 CUSTOMER FORECAST BY RATE – NEW CUSTOMER CONNECTIONS

Forecast – Total New Customer Connections in each Rate Category														
Year	**Rate A**	**Rate B**	**Rate D1**	**Rate D2**	**Rate D3**	**Rate D4**	**Rate D5**	**Rate E1**	**Rate E2**	**Rate E3**	**Rate E4**	**Rate E5**	**Rate S**	**Total**
2010	**375,569**	**38,336**	**2,320**	**772**	**14**	**19**	**1**	**3**	**0**	**0**	**0**	**1**	**38**	**417,108**
N/C	8,725	842	91	139	0	2	0	0	1	0	0	0	11	9,775
2011	384,294	39,178	2,411	911	14	21	1	2	1	0	0	1	49	426,883
N/C	8,396	801	95	21	0	1	0	0	0	0	0	0	5	9,319
2012	392,690	39,979	2,506	932	14	22	1	2	1	0	0	1	54	436,202
N/C	8,588	819	99	21	0	0	0	1	0	0	0	0	0	9,528
2013	401,278	40,798	2,605	953	14	22	1	3	0	1	0	1	54	445,730
N/C	8,782	835	102	22	0	0	0	0	0	0	0	0	4	9,745
2014	410,060	41,633	2,707	975	14	22	1	3	0	1	0	1	58	455,475
N/C	8,983	854	106	22	0	0	0	0	0	0	0	0	1	9,966
2015	419,043	42,487	2,813	997	14	22	1	3	0	1	0	1	59	465,441
N/C	9,188	872	110	23	0	0	0	0	0	0	0	0	4	10,197
2016	428,231	43,359	2,923	1,020	14	22	1	3	0	1	0	1	63	475,638

Note: N/C – new customer connections

3.5.3 **SALES FORECAST (2011 - 2016)**

Forecast - Total Sales to each Rate Category (GWh)														
Year	**Rate A**	**Rate B**	**Rate D1**	**Rate D2**	**Rate D3**	**Rate D4**	**Rate D5**	**Rate E1**	**Rate E2**	**Rate E3**	**Rate E4**	**Rate E5**	**Rate S**	**Total**
2011	2,412	773	512	1,368	460	892	1	321	401	0	0	870	109	8,119
2012	2,652	784	530	1,414	461	977	1	322	577	0	0	872	116	8,706
2013	2,853	784	549	1,461	460	985	1	484	0	653	0	870	116	9,216
2014	3,051	790	569	1,509	460	1,009	1	564	0	653	0	870	121	9,597
2015	3,256	809	589	1,559	460	1,009	1	571	0	653	0	870	121	9,898
2016	3,480	843	610	1,612	461	1,035	1	575	0	655	0	872	126	10,270

Note:-

1) Rate B 1 is forecasted to be 2 GWh for each year and should be added to the total.

2) Rate B figures have been updated (May 2011) and supersedes the data in the original forecast.

3.5.4 **MONTHLY DEMAND FORECAST (2011 – 2016)**

Forecast - Total Total of Monthly Demands of each Rate Category (MVA)														
Year	**Rate A**	**Rate B**	**Rate D1**	**Rate D2**	**Rate-D3**	**Rate D4**	**Rate D5**	**Rate E1**	**Rate E2**	**Rate E3**	**Rate E4**	**Rate E5**	**Rate S**	**Total**
2011	N/A	N/A	1,747	4,036	916	2,103	13	667	744	0	0	2,619	N/A	12,845
2012	N/A	N/A	1,806	4,154	916	2,314	13	667	1,068	0	0	2,619	N/A	13,557
2013	N/A	N/A	1,875	4,307	933	2,338	13	1,011	0	1,212	0	2,619	N/A	14,308
2014	N/A	N/A	1,944	4,448	933	2,398	13	1,180	0	1,212	0	2,619	N/A	14,747
2015	N/A	N/A	2,010	4,596	933	2,398	13	1,194	0	1,212	0	2,619	N/A	14,974
2016	N/A	N/A	2,079	4,735	933	2,458	13	1,200	0	1,212	0	2,619	N/A	15,248

3.5.5 SYSTEM LOSSES BY AREA 2011-2016

Year	Forecast - Losses in Each Area (GWh)					
	North	South	East	Central	Tobago	Total
2011	155	122	128	78	25	508
2012	164	131	136	84	27	542
2013	173	138	143	89	28	571
2014	181	145	151	94	30	601
2015	189	153	158	100	31	631
2016	199	161	166	106	33	665

3.5.6 UNIT SENT OUT 2011-2016

Year	Forecast - Total Units Sent Out (USO) to each Area (GWh)						Losses	
	North	South	East	Central	Tobago	Total	% USO	% Sales
2011	1,745	1,846	1,653	3,065	280	8,589	5.9	6.3
2012	1,846	2,117	1,761	3,202	300	9,226	5.9	6.2
2013	1,929	2,266	1,845	3,413	313	9,766	5.8	6.2
2014	2,021	2,346	1,924	3,573	331	10,195	5.9	6.3
2015	2,111	2,427	2,003	3,640	346	10,526	6.0	6.4
2016	2,216	2,519	2,090	3,740	367	10,932	6.1	6.5

3.5.7 FORECAST OF FUEL COSTS – 2011-2016

Year	Overall System Genera-tion Heat Rate (kJ/kWh)	Gas Con-sumption (MMBTU)	NGC Price * (US$/MMBTU)	Annual NGC Cost (TT$)	Diesel Cost (TT$)	TOTAL FUEL COST (Million TT$)	Remarks
2011	13,826	112,550,748	1.2386	892,188,291	33,300,000	925,488,281	Updated end of April 2011
2012	12,985	113,544,658	1.2757	927,057,309	1,800,000	928,857,309	Note 6
2013	13,093	121,187,986	1.3140	1,019,123,101	1,800,000	1,020,923,101	Note 7
2014	12,250	116,621,027	1.3534	1,010,124,687	1,800,000	1,011,924,687	Note 8
2015	12,250	121,009,890	1.3940	1,079,582,477	1,800,000	1,081,382,477	
2016	12,250	126,794,718	1.4358	1,165,111,595	1,800,000	1,166,911,595	

Note:

(1) 1 US$ = 6.4TT$

(2)* Mean Annual Price as per RIC Determination 2006.

(3) Heat Rate improves in 2011 with Cove going to base load by 3rd Quarter and TGU gas turbines starting operation.

(4) Heat Rate also improves in 2012 due to TGU's combined cycle start-up and first full year of Cove base load operation.

(5) Heat Rate improves in 2014 when new Transmission allows remainder of TGU's combined cycle power to be utilised.

(6) TGU combined cycle commissioning assumed January 2012, reducing gas usage.

(7) Anticipated load growth so more energy required.

(8) Reduction in gas as more energy can be exported from TGU with new infrastructure being completed by 2014.

(9) Diesel usage is based on the operation of three (3) 16MW diesel generators.

3.5.8 Forecast for Capacity and Energy Costs 2011 – 2016

Year	Contracted Capacity (MW)	Capacity Payment $	Energy Payment $	Total Conversion Cost $
2011	1,610	1,049,169,333	27,642,712	1,076,812,045
2012	1,880	1,551,554,905	29,955,141	1,581,510,045
2013	1,880	1,573,382,931	32,727,765	1,606,110,696
2014	1,880	1,595,756,658	29,131,357	1,624,888,015
2015	1,762	1,518,108,888	31,162,922	1,549,271,809
2016	1,762	1,539,213,760	33,580,545	1,572,794,305

Note: The planned decommissioning of the POS Power Station by 2015

3.5.9 Forecast For Conversion Costs - 2011 – 2016

Year	PowerGen (1994) Conversion Cost ($)	PowerGen (2005) Conversion Cost ($)	Trinity Power Conversion Cost ($)	TGU Conversion Cost ($)	Total Conversion Cost ($)
2011	590,713,470	135,996,411	144,454,638	205,647,526*	1,076,812,045
2012	606,392,128	137,758,451	145,759,774	691,599,692**	1,581,510,045
2013	622,865,138	139,564,541	147,097,539	696,583,478	1,606,110,696
2014	632,219,026	141,415,784	148,468,748	702,784,457	1,624,888,015
2015	548,036,402	143,313,308	149,874,238	708,047,862	1,549,271,809
2016	562,778,320	145,258,270	151,314,864	713,442,852	1,572,794,305

* – TGU's conversion cost assumes simple cycle start-up dates of July and October 2011.

** - TGU conversion cost assumes combined cycle start-up date of January 2012

3.5.10 ANNUAL PAYMENT AND LOAD SCHEDULE FOR POWERGEN 1994

Year	Contracted Capacity (MW)	Capacity Payment $	Energy Payment $	Excess Capacity (MW)	Excess Payment $	Total Conversion Cost $	% Change
2005	819	595,438,637	23,894,511	30	16,463,830	635,796,978	
2006	819	610,556,714	25,602,318	38	21,491,595	657,650,627	3%
2007	819	629,327,463	23,816,195	0	0	653,143,658	-1%
2008	819	643,657,538	22,853,841	0	0	666,511,379	2%
2009	819	651,628,526	23,356,239	0	0	674,984,765	1%
2010	819	659,089,115	25,698,723	28	15,151,334	699,939,171	4%
2011	742	575,655,981	15,057,489	0	0	590,713,470	-16%
2012	742	589,336,841	17,055,287	0	0	606,392,128	3%
2013	742	603,359,723	19,505,415	0	0	622,865,138	3%
2014	742	617,733,177	14,485,849	0	0	632,219,026	2%
2015	624	531,885,126	16,151,276	0	0	548,036,402	-13%
2016	624	544,584,712	18,193,608	0	0	562,778,320	3%

3.5.11 ANNUAL PAYMENT AND LOAD SCHEDULE FOR POWERGEN 2005

Year	Contracted Capacity (MW)	Capacity Payment $	Energy Payment $	Excess Capacity (MW)	Excess Payment $	Total Conversion Cost $	% Change
2005	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
2006	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
2007	208	85,189,466	5,223,317	none	0	90,412,783	
2008	208	123,557,530	7,243,357	none	0	130,800,887	45%
2009	208	119,099,866	6,959,374	none	0	126,059,240	-4%
2010	208	120,380,763	7,177,065	none	0	127,557,828	1%
2011	208	129,845,904	6,150,507	none	0	135,996,411	7%
2012	208	131,454,181	6,304,270	none	0	137,758,451	1%
2013	208	133,102,665	6,461,877	none	0	139,564,541	1%
2014	208	134,792,360	6,623,423	none	0	141,415,784	1%
2015	208	136,524,299	6,789,009	none	0	143,313,308	1%
2016	208	138,299,535	6,958,734	none	0	145,258,270	1%

3.5.12 Annual Payment and Load Schedule for Trinity Power

Year	Contracted Capacity (MW)	Capacity Payment ($)	Energy Payment ($)	Excess Capacity (MW)	Excess Payment $	Total Conversion Cost ($)	% Change
2005	210	130,674,935	5,591,358	On Demand	425,747	136,692,040	
2006	210	131,991,083	5,513,104	On Demand	284,479	137,788,666	1%
2007	210	131,762,523	5,368,377	On Demand	157,404	137,288,303	0%
2008	210	135,253,283	5,817,657	On Demand	63,077	141,134,017	3%
2009	210	134,633,629	5,721,051	On Demand	53,284	140,407,964	-1%
2010	210	135,394,360	6,014,175	On Demand	49,122	141,457,658	1%
2011	210	138,817,097	5,637,541	On Demand	0	144,454,638	2%
2012	210	139,981,295	5,778,479	On Demand	0	145,759,774	1%
2013	210	141,174,598	5,922,941	On Demand	0	147,097,539	1%
2014	210	142,397,734	6,071,015	On Demand	0	148,468,748	1%
2015	210	143,651,448	6,222,790	On Demand	0	149,874,238	1%
2016	210	144,936,504	6,378,360	On Demand	0	151,314,864	1%

3.5.13 Annual Payment and Load Schedule for TGU 2011 – 2016

Year	Contracted Capacity (MW)	Capacity Payment $	Energy Payment $	Excess Capacity (MW)	Excess Payment $	Total Conversion Cost	% Change
2011	450	204,850,351	797,175	-	-	205,647,526	
2012	720	690,782,588	817,105	-	-	691,599,692	110%
2013	720	695,745,946	837,532	-	-	696,583,478	1%
2014	720	700,833,387	1,951,070	-	-	702,784,457	1%
2015	720	706,048,015	1,999,846	-	-	708,047,862	1%
2016	720	711,393,009	2,049,842	-	-	713,442,852	1%

3.5.14 T&TEC's Hourly System Peak Demand (MW)

Year	Actual Demand (MW)	Forecast Demand (MW)
2005	1,057	1,062
2006	1,070	1,104
2007	1,132	1,129
2008	1,181	1,153
2009	1,182	1,317
2010	1,222	1,254
2011		1,287
2012		1,371
2013		1,442
2014		1,497
2015		1,541
2016		1,587

3.5.15 Total Operating Costs - 2011 – 2016

YEAR	**2011 $'000**	**2012 $'000**	**2013 $'000**	**2014 $'000**	**2015 $'000**	**2016 $'000**
Generation	2,002.3	2,510.4	2,627.0	2,636.8	2,630.7	2,739.7
Transmission and Distribution	471.6	374.5	444.0	539.0	489.6	438.3
Administrative	290.6	224.7	271.0	334.3	301.4	267.2
Depreciation	181.9	196.4	210.0	219.8	228.0	234.2
Engineering	23.8	25.0	25.0	25.0	25.0	25.0
Total	**2,970.2**	**3,331.0**	**3,577.0**	**3,754.9**	**3,674.7**	**3,704.4**

3.5.16 Projected Recurrent Overtime Percentage (Capital and Recurrent) 2011-2016

Year	**Percentage Overtime**
2008	14.14
2009	9.58
2010	8.13
2011	8.0
2012	7.5
2013	7.0
2014	6.5
2015	6.0
2016	5.0

T&TEC will continue to aggressively manage overtime to maintain this downward trend (which started in 2008) until it achieves its overtime objective of 5% no later than 2016. In particular the following approaches are to be taken:

1. Perform more hotline work, thereby eliminating the need to perform overtime work to minimise the effect of loss of supply and revenue to the Commission.
2. Leave to be closely controlled so that there would be less need to complement staff due to employees being absent.
3. Continuous maintenance work to be conducted to improve reliability of supply. This would result in less unplanned outages requiring crews to respond and in some cases work overtime.
4. More crews to be placed on shift system as may be required to maintain continuous service to avoid the need to call out crews.
5. Management to monitor staff to ensure overtime is worked only when absolutely necessary.

3.5.17 Energy Consumption Summary Forecasts - 2011 – 2016 (GWh)

	2010 Actual	2011 Forecast	2012 Forecast	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast
Residential	2,263	2,412	2,652	2,853	3,051	3,256	3,480
Commercial	764	773	784	784	790	809	843
Industrial	4,771	4,827	5,156	5,465	5,637	5,714	5,823
Street lighting	110	109	116	116	121	121	126
Total	7,908	8,121	8,708	9,218	9,599	9,900	10,272

Note1- Rate B 1 is forecasted to be 2 GWh for each year and is included with Industrial.

3.5.18 T&TEC's Planned vs Actual Capital Expenditure, 2005 – 2009

Year	Revotes ($M)	New Funds ($M)	Total Budget ($M)	Actual ($M)	Divergence ($M)	Divergence (% of Budget)
2005	138	470	608	205	403	66
2006	353	523	876	468	408	47
2007	334	1,125	1,459	603	856	59
2008	542	1,033	1,575	774	801	51
2009	830	1,094	1,924	1,101	823	43

The main reasons for the shortfall in expenditure were:

- The delays in the procurement/tendering procedure
- The lack of human resources
- The weather

3.5.19 Summary of T&TEC's Forecast Capital Expenditure - 2011 – 2016

Category	2011 $M	2012 $M	2013 $M	2014 $M	2015 $M	2016 $M	Total $M
Distribution	178.0	297.3	351.2	200.3	216.8	195.3	**1,438.9**
Transmission	47.2	71.3	56.9	26.1	18.0	N/A	**219.5**
Transmission and Sub-Transmission	24.65	111.65	99.0	29.7	32.2	22.5	**319.7**
Public Lighting	11.0	15.0	17.0	0.0	0.0	0.0	**43.0**
Generation Interface	0.0	0.6	4.0	19.5	24.2	10.2	**58.5**
Communications	23.5	19.5	18.0	13.5	5.5	4.0	**84.0**
Protection & SCADA	6.0	6.0	6.0	6.0	6.0	6.0	**36.0**
System Planning & Control	0.6	0.6	0.6	0.6	0.6	0.0	**3.0**
Engineering	0.0	0.0	0.6	15.0	15.0	0.0	**30.6**
Information Systems	25.8	15.5	15.5	15.5	15.5	15.5	**103.3**
Supplies	0.0	0.0	10.0	0.0	0.0	0.0	**10.0**
TOTAL	**316.75**	**537.45**	**578.8**	**326.2**	**333.8**	**253.5**	**2,346.5**

3.5.20 Distribution Projects 2011 – 2016

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com pletio n Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com-pletio n Date**	**Type Of Capital Expendi-ture**
Connection of feeders in La Romain	Construction of Overhead lines to connect Gulf view Feeder with La Romain 12kV Feeder	To facilitate load transfer between the Gulf View and La Romain feeder, thereby increasing reliability.	0.8	Q3											Enhance-ment
Relocation of feeder	Relocation of Cap-de-Ville 12kV from Columbus Bay to Icacos using covered conductors	To increase maintainability and reliability of feeder	1	Q1											Enhance-ment
Feeder construction in St. Croix	Construction of St. Croix and Papourie Road 12kV feeder	To facilitate a balanced three phase load and transfer between the St. Croix and Papourie Rd 12kV feeder , thereby increasing reliability	0.5	Q4											Enhance-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
Syne Village substation	Installation of 12kV board at Syne Village substation	To replace existing old and electri-cally deterio-rated board with new board capa-ble of facili-tating auto reclosing and good electri-cal integrity.			1	Q2									Replace-ment
Santa Flora Upgrade	Installation of 6MVA Trans-former at Los Bajos	To comple-ment the ex-isting 3MVA transformer capacity at Santa Flora substation and meet increased load demand as a result of the new Desalination plant			2	Q3									Enhance-ment
Installation of GPS receivers in vehicles	Installation of GPS receivers in vehicles	To better manage crew availability	2												Other
Erin feeder construction	Construction of Erin Feed-er and the	To maximise the available capacity of			0.8	Q3									Enhance-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
	Carapal 12kV feeder from Erin	the 6MVA transformer to be in-stalled at Los Bajos													
St. Mary's Substation Upgrade	Installation of two 12.5/16MVA transformer at St. Mary's Substation	To meet in-creased load demand			3	Q2									Growth
Upgrade of pin type insu-lators	Changing of polymeric pin-type insu-lators	To increase reliability of feeder	2.5	Q4											Enhance-ment
Santa Flora Substation	Construction of switchhouse at Santa Flora Substation	To establish a proper dis-tribution sub-station			1.5	Q4									Enhance-ment
Changeout of conductors	Changeout of conductors on the Penal 12kV San Francique; Papourie; Siparia	Only on Pe-nal and Papourie Rd 12kV feeders necessary to meet feeder load demand.			1	Q3									Replace-ment
Phillipine Substation	To replace left side of board with vacuum switchgear	To replace existing old and electri-cally deterio-rated LHS of board with					3	Q4							Replace-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
		new board capable of facilitating auto reclos-ing and good electrical integrity.													
Refurbish-ment of RMU's	Replace oil ring main units(Distribution South)	To replace existing old and electri-cally deterio-rated units.			1		1	Q4							Replace-ment
New Sub-station	Establishment of new 33/12kV Sub-station at #2 Junction Rochard Road Barrackpore	To improve reliability			10	Q4					10				Growth
New Depot	Establish depot at Roxborough	Increased access to Commis-sion's facili-ties, quicker response times to trouble re-ports			2	Q4	18	Q4							Enhance-ment
Studley Park Substation	Complete Studley Park Substation	Increased reliability of supply to customers on									16.5	Q1			Growth

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
		Windward side of island													
Development in Scarborough	Underground infrastructure development in Scar-borough	Increased reliability of supply to customers in the town, improved aesthetics									5	Q4			Enhance-ment
Conversion in Scarborough	Convert Scarborough from 33kV to 66kV	Necessary as part of the proposed 66 kV ring in Tobago											8	Q4	Enhance-ment
Administra-tive building in Cove	Construction of Adminis-trative build-ing in Cove	Increased space to allow proper storage of materials, vehicle parking, of-fice space for employees									30	Q4	30	Q4	Enhance-ment
Barataria 12 kV Substation	Construct 12kV switch-house, Instal-lation of two 12.5/16MVA transformers and a 12 kV switch board with provi-	To cater for load growth in the area									8	Q4	5	Q4	Growth

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
	sion for four feeders														
Diego Martin Substation Upgrade	Installation of two 12/16MVA Transformers, 33 kV GIS Switchgear and 12 kV Switchhboard . Construction of new 12/33kV Switch house.	To cater for load Growth and improve the reliability to customers in the Diego Martin, Maraval and Petit Valley areas	0.35	Q4	4	Q4	2.65	Q2							Growth
Abbatoir Substation 12kV Switch-gear upgrade	Replacement of 12kV Switchboard	To improve reliability to customers supplied from this substation									2	Q4	6	Q4	Enhance-ment
San Juan	Replacement of the 33kV outdoor Switchgear. Upgrade of 12kV Switchroom	Replacement of equipment in excess of 30 yrs old and improv-ing reliability to customers around the Aranguez Area/Petit	2.5	Q4	2.5	Q4									Enhance-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
		Bourg Area													
St. James 33/12kV Sub-station Up-grade	New 12kV switchboard to be installed at One Woodbrook Place. 33kV outdoor switchboard to be in-stalled. Two 33/12kV transformers to be in-stalled.	Improve the reliability of electricity in St. James and environments	3.3	Q4	1.7	Q4									Growth
Independence Square Cen-tral and West	Replacement of the obso-lete 6.6kV switchgear with 12kV vacuum switchgear	Improve safety of the operating personnel. To improve the reliability of supply along Independ-ence Square.			5	Q4	10	Q4	10	Q4					Enhance-ment
Master Substation 12Kv	Upgrade to 12kV by in-stallation of 33/12kV transformer and 12kV	To meet growing load demands on the North East Ring and Port of	5	Q4	5	Q4	5	Q4	10	Q4	10	Q4			Growth

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
	Switchboard segment	Spain North Area.													
Saddle Road Substation	Construct new switch house, install 12kV and 33kV Switchboards, install two 33/12kV transformers	Improve the reliability of electricity in St. Clair and Environ-ments									10	Q4			Growth
San Juan	Upgrading Overhead lines from single phase to three phase and increas-ing size of conductors to $199mm^2$ AAAC in the Petit Bourg Area	Greater cur-rent carrying capacity for distribution									0.5	Q4			Enhance-ment
Port of Spain	Installation of Utility Duct Banks and Raceway Sys-tem. In coor-dination with GOTT - UdeCott - Genevar and	To upgrade ageing cables to meet fu-ture load de-mands and minimize the need for ex-cavation of roadways in	3	Q4	3	Q4	3	Q4	3	Q4	3	Q4	3	Q4	Replace-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
	other Utilities as part of an overall modi-fication of the city of Port of Spain.	the city													
New Area Office - Distribution North	To establish a new multi functional Area Office and Service Centre at Benbow off Wrightson Road	This forms part of the overall plan to create op-erating cen-tres within the Area at strategic lo-cations to decentralize the Area op-eration as it relates to the improved response to our custom-ers require-ments.	8	Q4	42	Q4	18	Q4							Enhance-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Type Of Capital Expenditure**
Upgrade Depot	Wrightson Road	Increased access to Commission's facilities, quicker response times to trouble reports	5	Q4											Enhancement
New Depot	Establish depot at Santa Cruz	Increased access to Commission's facilities, quicker response times to trouble reports					10	Q4	10	Q4					Enhancement
Independence Square East Substation	Changeout of Independence Square East Substation 12kv Board	Upgrade of switchgear to 12kV For the improvement of reliability of supply to the Eastern part of Port of Spain and to meet future load demand in this sector of									2	Q4	2	Q4	Growth

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com pletio n Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com-pletio n Date**	**Type Of Capital Expendi-ture**
		the City.													
Mt. Pleasant Upgrade	Upgrade of Mt. Pleasant S/S and new Transformer installation	To improve reliability of supply in the North Chaguaramas Area with back to other parts of Chaguaramas including Carenage and to meet load demands for future devel-opments in the Chaguaramas area as a whole.					4	Q4	4	Q4					Growth
Maraval Feeder connection	Link Maraval Area to the Maracas Feeder out of Santa Cruz	This link is required to in prove the reliability of supply by providing an alternative											2	Q4	Enhance-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	Com-pletion Date	Cost ($M)	Completion Date	Cost ($M)	Completion Date	Cost ($M)	Completion Date	Cost ($M)	Completion Date	Cost ($M)	Com-pletion Date	Type Of Capital Expendi-ture
		source of supply where none now exist in the Northern sectors of Maraval and Santa Cruz.													
New Sub-station North Coast	Establish Substation at Maracas Bay on the North Coast	Facilities and equipment are required to meet existing and future load demands in this area.					2	Q4	5	Q4	5	Q4	5	Q4	Growth
Feeder Installation	Build a direct link feeder from Barataria to Morvant	To provide back of supply in this sector of the distribution system									2	Q4			Enhance-ment
Cascade Sub-station Up-grade	Upgrade Cascade Sub-station. Switchhouse, Transformers, switchgear 12 and 33kV	To upgrade all facilities and equipment to meet existing and future load demands in this area.									5	Q4	7	Q4	Growth
Maraval Substation Upgrade	Upgrade Maraval Sub-station.	To upgrade all facilities and equip-	2	Q4	5	Q4	5	Q4							Enhance-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
	Switchhouse, Transformers, switchgear 12 and 33kV	ment to meet existing and future load demands in this area.													
New Sub-station	Establishment of Felicity substation	To cater for expected in-crease in load due to significant housing de-velopments			15	Q4									Growth
New Substation	Acquisition of land for Carlsen Field substation	To cater for expected in-crease in load due to signif-icant housing develop-ments	1.5	Q4											Growth
New Sub-station	Establish Carlsen Field substation	To cater for expected in-crease in load due to signif-icant housing develop-ments					15	Q4							Growth
Substation Upgrade	Change out of board at Pt. Lisas 12kV	Required to replace equipment damaged by fire in 2006					3	Q1							Replace-ment
Substation Upgrade	Upgrade of 66/12kV	To cater for load growth							6	Q4					Growth

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com pletio n Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com-pletio n Date**	**Type Of Capital Expendi-ture**
	Transformers and 12kV Board at M5000 Sub-station	and to pro-vide back up for Pt. Lisas Substation													
Substation Upgrade	Installation of 2nd 66/12kV Transformer at Savonetta Substation	To cater for load growth in the Savonetta area - Indus-trial as well as domestic			1.5	Q2									Growth
New Feeder	Construction of Arena Road 12kV Feeder from Carlsen Field Substation	Feeder ex-pected to provide im-proved relia-bility to cus-tomers east of the Solo-mon Hochoy Highway					0.75	Q4							Growth
New Feeder	Construction of Mission Road 12kV Feeder from Carlsen Field Substation	Feeder ex-pected to provide im-proved relia-bility to cus-tomers east of the Solo-mon Hochoy Highway					0.75	Q4							Growth
New Feeder	Construction of Persever-ance Road	To cater for expected in-crease in load			0.75	Q4									Growth

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expenditure**
	12kV Feeder from Felicity	due to significant housing developments													
New Feeder	Roopsingh Road 12kV feeder from Felicity	To cater for expected increase in load due to significant housing developments			0.75	Q4									Growth
New Feeder	Construction of new Beaucarro 12kV from Central Substation	Feeder expected to relieve load from existing feeders out of BC, Central, Couva S/S and cater for housing developments (EMBD, etc)	1	Q4											Growth
New Feeder	Construction of Caratal Road 12kV feeder from Claxton Bay	To cater for expected increase in load and system re-enforcement									0.5	Q2			Growth - Dependant on relocation of existing T/F at Endeavor S/S

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
New Feeder	Construction of Adjoda Road 12kV Feeder from Charlieville Substation	To provide supply to new industrial development in Caroni					0.75	Q3							Growth - Dependant on Readi-ness of Cus-tomer
New Feeder	Construction of Trinity Lane 12kV Feeder from B.C. Sub-station	To provide supply to new industri-al develop-ment in Brechin Cas-tle	0.75	Q4											Growth - Dependant on Readi-ness of Cus-tomer
Feeder Upgrade	Upgrade 12kV feeders: Munroe Road, Penco Lands, Free-port, Carlson Field and Cunupia	To provide increased capacity for system rein-forcement	2	Q3											Enhance-ment - De-pendant on availability of cable and materials
New depot	Establish depot in Charlieville	To provide improved customer service					3	Q4							Enhance-ment
Trincity S/S: New 12 kV Switchboard	Commission 12 kV Switchboard		1	Q2											Growth

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	Com-pletion Date	Cost ($M)	Completion Date	Cost ($M)	Completion Date	Cost ($M)	Completion Date	Cost ($M)	Completion Date	Cost ($M)	Com-pletion Date	Type Of Capital Expendi-ture
St. Augustine S/S: New 33/12 kV Transformer	2nd 33/12 kV Transformer to be com-missioned.		1	Q4											Growth
St. Augustine S/S: 33 kV GIS Board	To replace old 33 kV switchgear				2	Q2									Replace-ment
St. Augustine S/S: New 12 kV Switch Room and 12 kV Switch-board	New Vacuum Switchboard to replace old switchboard				3.5	Q1									Growth
Piarco S/S: New 12 kV Feeder	Construct 12 kV feeder from Piarco S/S to CR Highway	Better reliability for the Oropune and Maloney areas			2	Q1									Enhance-ment
Omeara S/S: Change 33/12 kV transformer	Upgrade 6 MVA to a 12.5/16 MVA transformer				2	Q2									Enhance-ment
Orange Grove S/S: New 12 kV Feeder	Construct new 12 kV feeder from Orange Grove S/S to Tunapuna load centre	Better relia-bility in the Tunapuna and Macoya areas	1.5	Q3											Enhance-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com pletio n Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com pleti on Date**	**Cost ($M)**	**Com-pletio n Date**	**Type Of Capital Expendi-ture**
Pinto Rd S/S: Upgrade 33/12 kV transformers	Upgrade and replace 6 MVA trans-formers at Pinto Road S/S to 12.5/16 MVA	Improve reliability in the Arima, Santa Rosa areas			3	Q3									Enhance-ment
Development works in Arima	Convert from Overhead lines to underground lines in Arima		3	Q4	3	Q4	4	Q4							Enhance-ment
New Sub-station	Acquisition of land for new substa-tion; Estab-lish new sub-station be-tween Curepe and Tunapuna; Construct Overhead lines for sub-station												20	Q2	Growth
Orange Grove Depot	To establish an Operating Centre in the Macoya Area	Better customer service			1	Q3									Enhance-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	Com-pletion Date	Cost ($M)	Completion Date	Cost ($M)	Completion Date	Cost ($M)	Completion Date	Cost ($M)	Completion Date	Cost ($M)	Com-pletion Date	Type Of Capital Expendi-ture
New Depot	Establish new depot and Sub Stores at Cove Indus-trial Estate Tobago						15	Q4							Enhance-ment
New Depot	Customer service centre South and Depot at Syne Village	Increased access to Commis-sion's facilities, quicker re-sponse times to trouble reports					30	Q4							Enhance-ment
New Building-Distribution East	Tumpuna Road Arima	To provide accommoda-tion for in-crease staff and facilitate easy depar-ture of crew from com-pound	8	Q4	30	Q4	30	Q4							Enhance-ment
New Building	Distribution South	To provide accommoda-tion for increase staff and facilitate easy depar-ture of crew from compound			8	Q4	20	Q4	40	Q4					Enhance-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
New Depot	Customer service centre South and Depot at Felicity	Increased access to Commis-sion's facili-ties, quicker response times to trouble reports			20	Q4									Enhance-ment
Refurbish-ment of Building	Administra-tion building and service Centre Tobago	To provide accommoda-tion for in-crease staff and facilitate easy depar-ture of crew from compound					15	Q4							Enhance-ment
Installation of fuse gear on 12kV Sys-tem			34		34		34		34		34		34		Enhance-ment
Overhead line Ext under $50,000			14.5		14.5		14.5		14.5		14.5		14.5		Growth
Service con-nections for new custom-ers	See note below.		9.2		9.2		9.2		9.2		9.2		9.2		Growth

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
Preliminary Surveys and Investigations			5.8		5.8		5.8		5.8		5.8		5.8		Growth
Overhead line Trans-formers			10.1		10.1		10.1		10.1		10.1		10.1		Growth
Underground Extensions less than $50,000			10.4		10.4		10.4		10.4		10.4		10.4		Growth
Ring main Unit			3.6		3.6		3.6		3.6		3.6		3.6		Growth
Underground Transformers			12		12		12		12		12		12		Growth
Installation of Non Transformer type meters			7.56		7.56		7.56		7.56		7.56		7.56		Growth
Installation of Trans-former type meters			4.3		4.3		4.3		4.3		4.3		4.3		Growth
Pole Replacement			2.2		2.2		2.2		2.2		2.2		2.2		Enhance-ment
Voltage Correction			7.2		7.2		7.2		7.2		7.2		7.2		Enhance-ment

			2011		2012		2013		2014		2015		2016		
			Cost ($M)	**Com-pletion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Completion Date**	**Cost ($M)**	**Com-pletion Date**	**Type Of Capital Expendi-ture**
S/Lighting Extensions less than $50,000			1.45		1.45		1.45		1.45		1.45		1.45		Growth
TOTAL			**178.01**		**297.3**		**351.2**		**200.3**		**216.8**		**195.3**		

Note: The policy of T&TEC is that customers are provided one (1) pole extension free of charge. Two (2) or more pole extensions require the customers to pay a capital contribution

3.5.21 TRANSMISSION PROJECTS 2011 - 2015

Circuit Name	Circuit Summary	Vulnerability	Recommendation	Expected outcome	Cost ($M) Year 2011	2012	2013	2014	2015	Category
Rio Claro-Tabaquite	The circuit is constructed mainly on pole as a single circuit line. The construction caters for aerial. A significant amount of pole structures are corroded and many spans of aerial r are either corroded or missing	The circuit is susceptible to lightning strikes , rotten poles and vegetation. It experienced eleven (11) faults between October 2006 and October 2009, 33 percent of which were due to fallen aerial conductors.	The work required is to overhaul the circuit by replacing the defective poles, guys, insulators, corroded aerial and re-stringing the missing aerial. The earthing for the aerial conductor will also be improved	Reduction in the number of forced outages by improved lightning protection, pole replacement and vegetation management.	2.0 (3Qr)					Replacement
North Oropouche-Toco Link #2	The circuit is constructed mainly on poles as a single circuit line. The construction caters for aerial. There are a	The circuit is susceptible to lighnting strikes, decay and vegetation. It experienced (30) faults between October 2006 and October 2009, 16 percent of which were due to lightning. An additional 16 percent of	The work required is to overhaul the circuit by replacing the defective poles, guys, insulators, corroded aerial and re-stringing the missing aerial. The earthing for the aerial	Reduction in the number of forced outages by improved lightning protection, pole replacement and vegetation management.		1.5 (2Qr)				Replacement

	significant number of corroded pole structures, guys and several spans of phase and aerial conductor. Several spans of aerial conductor are also missing	the faults were due to the adverse environment that caused the hardware to corrode prematurely.	conductor will also be improved							
San Rafael-Sangre Grande (to be converted to the San Rafael/Wallerfield and Wallerfield/ Sangre Grande)	The circuit is constructed mainly on pole structures as a single circuit line. The construction caters for aerial. There are a significant number of corroded pole structures, guys and several spans of	The circuit is susceptible to lightning strikes , rotten poles and vegetation. It experienced twenty (20) faults between October 2006 and October 2009, 15 percent were due to burst aerial. An additional 15 percent were due to lightning.	The work required is to overhaul the circuit by replacing the defective poles, guys, insulators, corroded aerial and re-stringing the missing aerial. The earthing for the aerial conductor will also be improved	Reduction in the number of forced outages by improved lightning protection, pole replacement and vegetation management.	1.9 (3Qr)					Replacement

	aerial conductor. Several spans of aerial conductor are also missing									
North Oropouche-Toco Link #1	The circuit is constructed mainly on tower structures as a single circuit line. The construction caters for aerial There are a significant number of corroded strings of insulators, tower peaks and aerial conductor, guys and several spans of aerial conductor. Several spans of aerial conductor are also	The circuit is susceptible to lighnting strikes, abnormal wear and vegetation. It experienced thirty one (31) faults between October 2006 and October 2009, 16 percent were due to burst aerial conductor, 25 percent were due to lightning and an additional 19 percent were as a result of adverse conditions that caused the hardware to corrode prematurely.	The work required is to overhaul the circuit by replacing the defective tower parts, guys, insulators, corroded aerial and re-stringing the missing aerial. The earthing for the aerial conductor will also be improved	Reduction in the number of forced outages by improved lightning protection, tower refurbishment and vegetation management.	2.0 (4Qr)	4.0 (3Qr)				Replacement

	missing									
Brechin Castle/Harmony Hall #1 and Brechin Castle-Penal	The circuit is constructed mainly on tower structures as a double circuit line. The construction caters for aerial. There are a significant number of corroded strings of insulators and aerial conductor together with several spans of missing, aerial conductor and tower members	The circuit is susceptible to lightning strikes and abnormal wear. It experienced ten (10) faults between October 2006 and October 2009, 40 percent of which were due to corroded hardware and aerial conductor. The spraying of sugar cane in the previously agricultural lands caused the fittings on the insulator to corrode prematurely.	The work required is to overhaul the circuit by replacing the insulators and corroded aerial together with the re-stringing of the missing aerial. The earthing for the aerial conductor will also be improved	Reduction in the number of forced outages by improved lightning protection and tower/line hardware refurbishment.	6.0 (3Qr)	4.0 (2Qr)	1.0 (2Qr)			Replacement

Point Lisas/Longdenville	The circuit is constructed mainly on tower structures as a double circuit line. The construction caters for aerial. There are a significant number of corroded strings of insulators and aerial conductor together with several spans of missing, aerial conductor and tower members. The de-energised circuit is in a dilapidated condition with fallen conductors at several locations	The circuit is susceptible to lightning strikes and fallen conductors due to decay. The reliability of the underbuilt 12 kV cirucit is also adversely affected by its poor state as failure of the spare circuit has resulted in several 12 kV outages. Spraying of sugar cane on the lands previously used for agricultural purposes caused the fittings on the insulator to corrode prematurely.	The work required is to overhaul the circuit by replacing the insulators and corroded aerial together with the re-stringing of the missing aerial. The earthing for the aerial conductor will also be improved. The spare circuit has to be fully reconstructed	Reduction in the number of forced outages on the circuit and underbuilt 12 kV circucits by improved lightning protection and tower/line hardware refurbishment.	2.0 (2Qr)	2.0 (2Qr)				Replacement

Bamboo/San Rafael Nos.1&2	The circuit is constructed mainly on tower structures as a double circuit line. There are a significant number of corroded fittings with several missing tower members. The tower legs are exposed. The water that settles in the area during the rainy season and this results premature deterioration	The circuits are susceptible to abnormal wear due to the terrain that they traverse. Their performance is critical to the relibility of supply to the Far East Ring.	The work required is to overhaul the circuit by replacing the corroded fitting, bolts and missing members together with raising the level of the concrete encasing the towers' footing	Maintained reliability of supply to the Far East Ring by tower/line hardware refurbishment.	3.1 (1Qr)		3.1 (2Qr)			Replacement
Bamboo/ Point Lisas Nos. 1&2	The circuits are constructed mainly on tower structures as a double circuit line. The construction	The circuits are susceptible to abnormal wear due to the terrain that they traverse. Their performance is critical to the reliability of supply to the transmission system.	The work required is to raise the level of the concrete encasing the towers' footing	Maintained reliability of supply to the transmission system by tower/line hardware refurbishment.		5.0 (3Qr)				Replacement

	caters for aerial. The tower legs are exposed. The water that settles in the area during the rainy season and this cause premature deterioration									
Bamboo/ Point Lisas Nos. 3&4	The circuits are constructed mainly on tower structures as a double circuit line. The construction caters for aerial. The tower legs are expose the water that settles in the area during the rainy season and this cause premature deterioration	The circuits are susceptible to abnormal wear due to the terrain that they traverse. Their performance is critical to the reliability of supply to the transmission system.	The work required is to raise the level of the concrete encasing the towers' footing	Maintained reliability of supply to the transmission system by tower/line hardware refurbishment.			5.0 (2Qr)			Enhancement

Bamboo/Wrightson Road Nos. 2&3	The circuits are constructed mainly on tower structures as a double circuit line. The construction caters for aerial. There are a number spans of missing aerial and tower members The tower legs are expose the water that settles in the area during the rainy season and this cause premature deterioration	The circuits are susceptible to lightning and abnormal wear due to the terrain that they traverse.	The work required is to overhaul the circuit by replacing corroded bolts, missing members and aerial conductors together with raising the level of the concrete encasing the towers' footing	Reduction in the number of forced outages by improved lightning protection and tower/line hardware refurbishment.	1.8 (2Qr)					Replacement/Enhancement
Bamboo/Barataria Nos. 1&2	The circuits are constructed mainly on tower structures as a double circuit line. The construction	The circuits are susceptible to lightning and abnormal wear due to the terrain that they traverse.	The work required is to overhaul the circuit by replacing corroded bolts, missing members and aerial conductors together with raising the level of concrete encasing	Reduction in the number of forced outages by improved lightning protection and tower/line hardware refurbishment.	2.1 (3Qr)					Replacement/Enhancement

	caters for aerial There are a number spans of missing aerial and tower members The tower legs are exposed. The water that settles in the area during the rainy season and this cause premature deterioration		the towers’ footing							
Penal/Gulf View	The circuit is constructed of both pole and lattice structures as a single circuit line. The construction does not cater for aerial. There are a significant number of corroded pole structures	The circuit is susceptible to lightning strikes and decay. It experienced ten (10) faults between October 2006 and October 2009 of which twenty percent (20%) were due to lightning and ten percent (10%) to disassembly.	The work required is to overhaul the circuit by replacing the defective poles, insulators, corroded aerial and re-stringing the missing aerial. The lattice structure segment of the circuit will have to be re-designed to cater for aerial conductor. The earthing for the aerial conductor will also be	Reduction in the number of forced outages by improved lightning protection and pole replacement.	1.8 (4Qr)					Replacement

	and apex design for the phase conductor on the lattice structures together with guys		improved							
North Oropouche/ Toco Distribution	The circuit is constructed mainly on pole structures as a single circuit line. The construction caters for aerial. There are a significant number of corroded pole structures, guys and several spans of phase and aerial conductor. Several spans of aerial conductor are also missing	The circuit is susceptible to lighnting strikes, abnormal wear and vegetation. It experienced experienced forty three (43) faults between October 2006 and October 2009, 11 percent of which were due to lightning, eleven (11%) percent due to adverse conditions that caused the hardware to corrode prematurely and 7 percent due to burst aerial conductor.	The work required is to overhaul the circuit by replacing the defective poles, guys, insulators, corroded aerial and re-stringing the missing aerial. The earthing for the aerial conductor will also be improved	Reduction in the number of forced outages by improved lightning protection, pole replacement and vegetation management.		2.0 (2Qr)				Replacement

Brechin Castle/ Desalcott	The circuit is constructed on pole structures as a single circuit line. The construction caters for aerial conductor and the circuit traverses the Industrial Estate in central Trinidad. There are a significant number of corroded poles that may result in the failure of the circuit	The circuits is susceptible to abnormal wear due to the terrain that they traverse. It experienced very few trips, however maintenance is required to maintain a reliable supply to customers.	The work required is to overhaul the circuit by replacing the defective poles and guys	Maintained reliability of supply by pole and guy replacement.			0.2 - 2Qtr			Replacement
Brechin Castle/Point Lisas Nos. 3&4	These circuits are constructed on tower structures as a double circuit line. The construction caters for aerial conductor.	The circuits is susceptible to abnormal wear due to the terrain that they traverse. It experienced very few trips, however maintenance is required to maintain a reliable supply to customers.	The work required is to overhaul the circuit by replacing the defective insulators and fittings	Maintained reliability of supply by insulator and line hardware replacement.		3.5 - 3Qtr				Replacement

	There are a significant number of corroded strings of insulators, tower peaks and aerial conductor									
Brechin Castle/Point Lisas Nos. 1&2	These circuits are constructed on tower as a double circuit line. The construction caters for an aerial. There are a significant number of corroded strings of insulators, tower peaks and aerial conductor. In addition, the conductor has to be upgraded from Wolf to Osprey.	The circuits is susceptible to abnormal wear due to the terrain that they traverse. It experienced very few trips, however maintenance is required to maintain a reliable supply to customers. Also, there would be increased transmission capacity between Brechin Castle and Point Lisas.	The work required is to overhaul the circuit by replacing the defective insulators and fittings	Maintained reliability of supply by aerail, insulator and line hardware replacement.		2.0 -4th Qtr				Replacement

Rio Claro/ Mayaro	The circuit is constructed mainly on pole structures as a single circuit line. The construction caters for aerial conductor and the circuit traverses the forested areas in south east Trinidad. A significant amount of pole structures are corroded and many spans of aerial conductor are either corroded or missing	The circuit is susceptible to lighnting strikes, decay and vegetation.	The work required is to overhaul the circuit by replacing the defective poles, guys, insulators, corroded aerial and re-stringing the missing aerial. The earthing for the aerial conductor will also be improved	Reduction in the number of forced outages by improved lightning protection, pole replacement and vegetation management.	5.6- 3rd Qtr					Replacement

Five Rivers/ O’Meara	The circuit is constructed mainly on pole structures as a single circuit line. The construction caters for aerial. A significant amount of pole structures are corroded and many spans of aerial conductor are either corroded or missing	The circuit is susceptible to lightning strikes and rotten poles.	The work required is to overhaul the circuit by replacing the defective poles, guys, insulators and re-stringing the missing aerial and re-designing the circuit for aerial conductor. The earthing for the aerial conductor will also be improved	Reduction in the number of forced outages by improved lightning protection and pole replacement.	1.9- 1st Qtr					Replacement
Replacement of 132 kV Isolators at Bamboo and San Rafael	These isolators are essential for proper isolation of equipment to be worked upon and the safety of personnel switching on the equipment in these substations.	The isolators are susceptible to the development of hotspots due to mechanical/operational defects.	Our department intends to replace these isolators and repair their structures during 2010 and 2011	Reduction in the number of hotspots which develop on the assets.	2.2- 2nd Qtr	1.2- 3rd Qtr				Replacement

	These isolators are approaching the end of their useful life and are experiencing a lot of problems which affect the reliability of our system									
Replacement of 33 and 66 kV Isolators at Bamboo, Fyzabad, Pt Fortin, North Oropouche and Harmony Hall	These isolators are essential for proper isolation of equipment to be worked upon and the safety of personnel switching on the equipment in these substations. These isolators are approaching the end of their useful life and are experiencing a lot of problems which affect the	The isolators are susceptible to the development of hotspots due to mechanical/operational defects.	Our department intends to replace these isolators and repair their structures during 2010 and 2011	Reduction in the number of hotspots which develop on the assets.	2.0- 4th Qtr	2.0- 3rd Qtr				Replacement

	reliability of our system									
Replacement of 33 and 66 kV circuit breakers (48) at various substations	At many of our substations, there are oil circuit breakers, faulty gas and vacuum circuit breakers. These breakers decrease the reliability of our stations due to their many operating problems	The circuit breakers are susceptible to unplanned mehanical/operational defects which result in unplanned outages and present a safety hazard.	Our department intends to replace these faulty breakers over a four (4) year period, starting 2010 with the purchase of the breakers	Reduction in the number of unplanned outages and increased security of personnel.	5.5	5.1	5.1	2.1		Replacement
Replacement of silica gel breathers on 26 transformers with a maintenance free dehydrating unit	Moisture ingress into a transformer adversely affects the insulation and causes its eventual failure. Therefore, it is essential	Transformers are susceptable to moisture ingress.	Due to the importance of this equipment, it is proposed that maintenance free dehydrating breathers be installed on our transformers; this would have a high initial cost but very low recurrent	Reduction in the cost of maintenance activities to achieve moisture control.	0.5- 4th Qtr					Replacement/Enhancement

	that a very low level of moisture is maintained in the air space at the top of the conservator tank to avoid deterioration of the insulating properties of the oil.		cost. The maintenance free breathers would be purchased in 2010 and installed in 2011 on all 26 transformers.							
Replacement of the cable between POS and Belmont on the Belmont/ POS 33 kV circuit	This circuit supplies power to the Belmont substation which feeds many distribution customers. Due to the age of this cable, it is susceptible to age related failures hence decreases the reliability of this ring	The cable is susceptible to decay due to age.	Due to the importance of these circuits in this ring, it is being recommended that the cable between Belmont and POS on this circuit be replaced as this section of the line decreases the reliability of the ring	Reduction in the number of forced-outages by replacement of faulty cables.		8.0- 4^{th} Qtr				Replacement

Pinto Rd –/Five Rivers 33 kV circuit	The circuit is constructed mainly on pole structures as a single circuit line. The construction caters for aerial. A significant number of pole structures and hardware are corroded and many spans of aerial conductor are either corroded or missing	The circuit is susceptible to lightning strikes and pole deterioration	Upgrade circuit and install aerial conductor	Reduction in the number of forced outages by improved lightning protection and pole replacement			2.2- 2nd Qtr			Replacement/Enhancement
Pinto Rd /O’Meara 33 kV circuit	The circuit is constructed mainly on pole structures as a double circuit with the Malabar – Pinto Rd 66 kV line.. A significant number of pole	The circuit is susceptible to lightning strikes and decay.	The work required is to overhaul the circuit by replacing the defective poles, guys, insulators and re-stringing the missing aerial and re-designing the circuit for aerial conductor. improved	Reduction in the number of forced outages by improved lightning protection and pole replacement.	2.1- 3rd Qtr					Replacement/Enhancement

	structures and hardware are corroded and many spans of aerial are either corroded or missing									
Wrightson Rd /WestMoorings # 1 66 kV circuit	The circuit is constructed mainly on poles as a double circuit with the Mucurapo - POS 33 kV line.. A significant number of poles and hardware are corroded and many spans of aerial are either corroded or missing. Also, the conductor needs to be upgraded (6km) from 500 A to 750A due to	The circuit is susceptible to lightning strikes. It has a number of rotten poles and hotspots.	The work required is to overhaul the circuit by replacing the defective poles, guys, insulators and re-stringing the missing aerial and upgrading the line conductor to 750A. The earthing for the aerial conductor will also be improved	Reduction in the number of forced outages by improved lightning protection, pole replacement and conductor upgrade.			5.5			Replacement

	the loading in the outer west ring.									
Wrightson Rd /WestMoorings # 2 66 kV circuit	The circuit is constructed mainly on pole structures as a double circuit with the PATT - POS 33 kV line. A significant number of pole structures and hardware are corroded and many spans of aerial conductor are either corroded or missing. Also, the conductor needs to be upgraded (6km) from 500 A to 750A due to the loading in the outer west ring.	The circuit is susceptible to lightning strikes. It has a number of rotten poles and hotspots.	The work required is to overhaul the circuit by replacing the defective poles, guys, insulators and re-stringing the missing aerial and upgrading the line conductor to 750A. The earthing for the aerial conductor will also be improved	Reduction in the number of forced outages by improved lightning protection, pole replacement and conductor upgrade.			5.5	1.0		Replacement

Belmont/ Casacade and POS/Cascade	The existing Belmont – Cascade 33 kV is very old and unreliable so it is being replaced. Based on studies done by System Planning, it was determined that a POS – Cascade circuit would be required to increase the reliability of the supply in this part of the city.		The work required is to design, construct and commission this double circuit line from Belmont substation to Cascade substation.	Increased reliability in this part of the city.		3.0- 4th Qtr				Enhancement
Bamboo/ Orange Grove Diversion	Currently the circuit is traversing the property of customers and has to be diverted along the roadway.		.		4.2- 4th Qtr					Line relocation customer request

Upgrade the existing battery systems by installing a redundant battery system at 18 transmission substations: Bamboo 132 & 66, Wrightson Road, Fyzabad, Toco Link, Harmony Hall, Point Fortin, St. Mary's, Brechin Castle 66, Pinto Road, North Oropouche, Westmoorings, Mt Pleasant, San Rafael, Rio Claro		The substations are susceptible to protection maloperations if the single battery bank fails. There have been isolated incidences of outages due to failed battery banks however the outages caused are wide spread and involve a large number of customers.	Install an additional battery system at substations with change over switches. Each battery system will energise half of the equipment at each substation	Reduction in the number of outages caused by failed battery systems.		3.2- 2nd Qtr	3.0- 2nd Qtr			Security of supply
Replace Damaged or defective VTs at Bamboo 66 kV, Wrightson Road, Fyzabad, Harmony Hall, Point Fortin, Rio Claro, San Rafael	Damage to the ceramic insulation and oil leaks on the VTs	The protection systems which utilise the defective VTs are susceptible to protection failure.	Replace damage VTs	Reduction in the number of protective system failures by replacement of defective VTs.		1.0- 4th Qtr	0.2- 4th Qtr			Replacement
Replace Damaged or defective CTs at Bamboo 66 kV, Wrightson Road, Fyzabad, Harmony Hall, Point Fortin, Rio Claro, San Rafael	Damage to the ceramic insulation and oil leaks on the CTs	The protection systems which utilise the defective CTs are susceptible to protection failure.	Replace damage CTs	Reduction in the number of protective system failures by replacement of defective CTs.		0.4- 4th Qtr	0.2- 4th Qtr			Replacement

Replace power cables at Bamboo and Westmoorings Substations	The cable between the inter-bus transformers and the lower voltage bus have experience some failure. These are 400 mm2 cables.	The cables are susceptible to decay due to age.	Replace the length of 66 kV cables for the 132/66 kV inter-bus transformer #1 at Bamboo and the 33 kV cables for the inter-bus transformers at Westmoorings transformers	Reduction in the number of forced-outages by replacement of faulty cables.			0.9				Replacement
Improvement of the lighting of Toco Link, Barataria, Wrightson Road, Harmony Hall, Point Fortin, Pinto Road, North Oropouche, St Mary’s, San Rafael, Mt Pleasant, Bamboo 66 & 132, Fyzabad, Rio Claro and Westmoorings substation switchyard	The lighting at these substations are installed on poles with either overhead triplex or underground cable for the supply	The substations are susceptible to criminal activity.	Provide SLD with drawing of the layout for each substation to facilitate design of the light to provide adequate levels of lighting at substations	Reduction in criminal activity at the substations.	1.0- 4th Qtr	1.0- 4th Qtr					Enhancement

Replace defective oil and winding at Bamboo 66 kV, Wrightson Road, Fyzabad, Harmony Hall, Point Fortin, Rio Claro, San Rafael	There oil and winding temperature gauges are non functional as a result the temperature of the transformers under full load conditions cannot be monitored	The transformer paper insulation is susceptible to degradation of the paper insulation due to overheating.		Reduction in the rate of degradation of paper insulation in transformers.		2.0- 3rd Qtr				Replacement
Replace 66/33 transformers at Rio Claro, St Mary's, Wrightson Road and Westmoorings substations	The DGA values of the transformers are showing sign of degradation of the paper insulation	The transformers are susceptible to failure.	Procure 6 transformers	No forced outages due to failure of the transformers		15.0	15.0	15.0	10.0	Replacement
Replace 33kV cables in The City Of Port of Spain	The cabes targeted are in excess of forty years old and have exceeded their useful life.	The cable is susceptible to decay due to age.	The work required is to replace approx. 3x 24 km of underground cables using a combination of direct buried and duck bank system	Reduction in the number of forced-outages by replacement of faulty cables.		2.0	0.0	8.0	8.0	Replacement
Total					**47.2**	**71.3**	**56.9**	**26.1**	**18.0**	

3.5.22 Transmission and Sub-Transmission Developmental Projects

Project No.		Brief Justification	Project Description	Expenditure (MnTTD)							Estimated Completion Date
				2011	**2012**	**2013**	**2014**	**2015**	**2016**	**TOTAL**	
1	S2	Establishment of a transmission interface of two transformer feeders between Union Estate Substation and Debe 132 kV Substation to permit the import of the rated generating capacity of TGU Power Station in Union Estate.	Expansion of Union Estate 220 kV Substation	0.0	8.0	4.0	1.0	0.0	0.0	**13.0**	**Q 4- 2013**
2	S1		Establishment of Gandhi Village 220/132/12 kV Substation	0.0	25.0	50.0	1.5	0.0	0.0	**76.5**	**Q1-2014**
3	T1		Establishment of a Union Estate – Gandhi Village 220 kV Double Circuit	0.0	15.0	16.0	2.0	0.0	0.0	**33.0**	**3 years from acquisition of R.O.W**
4	T2		Establishment of a Gandhi Village – Debe 132 kV Double Circuit	0.0	0.8	1.0	0.2	0.0	0.0	**2.0**	**Q1-2014**
5	S29	Works associated with the completion of the Bamboo – Gateway 132/33 kV transmission interface, necessary for the enhancement of the transmission capacity into	Decommissioning of the Port-of-Spain 33 kV dual busbar switchboard at Port-of-Spain Power Station	1.4	2.0	2.0	2.0	2.0	0.6	**10.0**	**Q4-2016**

Project No.		Brief Justification	Project Description	Expenditure (MnTTD)							Estimated Completion Date
				2011	2012	2013	2014	2015	2016	TOTAL	
6	C8	Port-of-Spain	Establishment of the Cable Section of the Bamboo – Gateway 132 kV Transmission Interface	12.0	31.0	0.0	0.0	0.0	0.0	**43.0**	**Q4-2012**
7	T14	Enhancements to existing transmission system to enhance system security for the import of the rated generating capacity of TGU Power Station in Union Estate.	Establishment of a Reform – Debe 132 kV Double Circuit	0.0	10.0	6.3	1.5	0.0	0.0	**17.8**	**Q1-2014**
8	T3			0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	
9	S35		Installation of a Second 132/66 kV transformer at Penal Power Station	0.0	2.4	0.5	0.0	0.0	0.0	**2.9**	**Q4-2013**
10	S30		Enhancement of the Capacity of the 220/132 kV transformers at Brechin Castle Substation	0.00	1.0	0.0	0.0	0.0	0.0	**1.00**	**Q4-2011**
11	T10	Works concomitant with the commissioning of the Bamboo-Gateway 132/33 kV transmission interface for splitting the heavily loaded	Construction of a New 33 kV Circuit from Barataria to Morvant	0.0	0.0	0.0	1.0	1.0	2.0	**4.0**	**Q4-2017**

Project No.		Brief Justification	Project Description	Expenditure (MnTTD)							Estimated Completion Date
				2011	2012	2013	2014	2015	2016	TOTAL	
12	T12	Northeast Subtransmission Ring into five smaller more manageable rings and assigned to transmission buses so as to improve the utilization of the transmission capacity.	Construction of a 33 kV double circuit from Belmont Substation to Cascade Substation via Lady Young Road.	0.00	0.0	0.00	1.0	1.0	1.85	**3.85**	**Q4-2017**
13	C3		Establishment of a second Port-of-Spain-Keate Street 33 kV circuit	0.0	0.0	0.00	0.00	2.00	5.00	**7.0**	**Q4-2017**
14	C6		Establishment of a second Port-of-Spain-Edward Street 33 kV circuit	0.0	0.0	1.20	1.20	1.20	0.0	**3.60**	**Q4-2015**
15	C9		Miscellaneous Cable and Line Works to Effect Disaggregation of the North East Ring	0.0	0.0	0.0	1.0	1.0	1.0	**3.0**	**Q4-2016**
16	T6	Necessary increases in capacity in the Harmony Hall – Penal 66 kV Subtransmission System to meet growing demand	Reconductoring of the Penal – Philippine 66 kV Circuit	0.0	0.0	1.1	1.1	0.0	0.0	**2.2**	**Q4-2014**
17	T7		Reconductoring of the Harmony Hall – Buen Intento 66 kV Circuit	0.0	0.0	1.1	1.1	0.0	0.0	**2.2**	**Q4-2014**
18	T5		Reconductoring of the Penal – Gulf View 66 kV Circuit	0.0	3.3	0.0	0.0	0.0	0.0	**3.3**	**Q4-2012**

Project No.		Brief Justification	Project Description	Expenditure (MnTTD)							Estimated Completion Date
				2011	2012	2013	2014	2015	2016	TOTAL	
19	T15		Reconductoring of the Harmony Hall – Lady Hailes 66 kV Circuit	0.0	0.0	1.1	1.1	0.0	0.0	**2.2**	**Q4-2014**
20	T4			0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	
21	S31			0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	
22	S38			0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	
23	S6	Works to reconfigure and reinforce the Five Rivers Subtransmission Ring in response to demand growth	Refurbishment of Pinto Rd. Substation	1.0	0.8	0.2	0.5	0.5	2.0	**5.0**	**Q4-2016**
24	S11	Works for the reinforcement of the Inner West Subtransmission Ring in response to demand growth		0.0	0.0	0.00	0.0	0.00	0.0	**0.0**	
25	S3			0.0	0.0	0.0	0.00	0.00	0.0	**0.0**	
26	C10		Cutting in of Saddle Rd. Substation on the Gateway-Carmaille Rd. 33 kV circuit	0.0	0.0	0.0	0.0	1.0	0.0	**1.0**	**Q4-2015**
27	C2		Establishment of a Saddle Rd – St. James 33 kV Circuit	0.0	0.0	0.0	0.0	5.00	5.00	**10.00**	**Q4-2016**
28	C10		Establishment of a New 33 kV Dual Circuit Cable Interface between Gateway and Saddle Road Substations.	0.0	0.0	0.0	0.0	5.00	5.00	**10.00**	
											Q4-2016

Project No.		Brief Justification	Project Description	Expenditure (MnTTD)							Estimated Completion Date
				2011	2012	2013	2014	2015	2016	TOTAL	
29	S17	Works to reconfigure and re-inforce the Near East Subtransmission Ring in re-sponse to demand growth								**0.0**	
30	S10									**0.0**	
31	S4	Works required to establish a 66 kV subtransmission Ring East of Cove Power Station which will unload the existing 33 kV ring.								**0.0**	
32	T8		Establishment of Cove – Milford, Cove – Studley Park 66 kV Circuit and upgrade of Milford S/S	10.0	8.0	1.0	0.0	0.0	0.0	**19.0**	**Q1-2014**
33	T16	Works to achieve improved security of supply to northeast Trinidad.	Establishment of a 132 kV Double Circuit from the Pt. Lisas – Bamboo 132 kV Inter-face to San Rafael Substation	0.0	1.5	10.5	10.5	10.5	0.0	**33.0**	**Q4-2015**
34	T17	Improved security of supply to Piarco International Airport and WASA Caroni Arena Water Treatment Plant.	Establishment of a San Rafael – Piarco 66 kV Circuit	0.25	2.25	2.5	3.00	2.00	0.0	**10.0**	**Q4-2015**
37	S15			0.0	0.0	0.00	0.0	0.0	0.0	**0.00**	

Project No.		Brief Justification	Project Description	Expenditure (MnTTD)							Estimated Completion Date
				2011	**2012**	**2013**	**2014**	**2015**	**2016**	**TOTAL**	
38	S14			0.0	0.0	0.00	0.0	0.0	0.0	**0.00**	
39	S32	Voltage Profile Improvement	Installation of a 33 kV Station capacitor bank at Galeota Sub-station	0.0	0.6	0.5	0.0	0.0	0.0	**1.1**	**Q4-2013**
40	C4			0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	
Transmission and Subtransmission Project Totals (MnTTD)				**24.65**	**111.65**	**99.0**	**29.7**	**32.2**	**22.5**	**319.7**	

3.5.23 PUBLIC LIGHTING DEPARTMENT 2011 - 2015

PAYMENT OF CAPITAL AND RECURRENT EXPENDITURES BY THE MINISTRY OF PUBLIC UTILITIES

The National Street Lighting Programme was conceptualised in 2005 with an objective of illuminating the nation's highways, major roadways and secondary roadways. The initial project encompassed the following scope:

- (i) Install approximately 82,000 new streetlights and associated overhead lines and underground hardware;
- (ii) Upgrade of street lamps from 70 Watts to 150 Watts luminaires;
- (iii) Illuminate approximately 80km of new highways and primary roads;
- (iv) Address the streetlighting needs of new housing developments; and
- (v) Ensure that areas prone to criminal activities are adequately lit.

Subsequent to the completion of this initial phase an expansion of the programme was embarked to include:

1. Ongoing street light installations and upgrades;
2. Illumination of Recreation Grounds and Parks;
3. Illumination of RHA facilities;
4. Illumination of Taxi Stands and Transit Hubs;
5. Illumination of Police Station Grounds;
6. Illumination of Public Spaces.

Based on an amendment of the T&TEC Act and the Regional Corporation's Act, the Ministry of Public Utilities assumed responsibility for meeting the operations and maintenance charges associated with public lighting from August 2009.

The funding of the capital expenditures for all of the illumination projects are made via the Ministry of Public Utilities PSIP and NSDP programmes.

The Commission normally utilizes street lights for the illumination of roadways, RHA facilities, taxi stands, police stations and public spaces. Therefore, the funding of the recurrent expenditures (energy and maintenance charges) for all such facilities utilizing street lights is derived from billings to the Ministry of Public Utilities in keeping with the S2 tariff structure for street lighting.

Recreation grounds do not normally utilize street lights and as such these facilities are metered. The energy component of the recurrent expenditure for recreation grounds is thus derived from monthly billings in keeping with the characteristic of service for each particular ground. Typical tariff structures used are Rates B, B1, and D1. The maintenance component of the recurrent expenditure for recreation grounds is derived from direct billing to the Ministry of Public Utilities for maintenance works that have been executed on the various lighting systems.

Project Name	Project Description	Vulnerability	Recommendation	Expected outcome	Cost ($M)				
					Year				
					2011	2012	2013	2014	2015
S/HHWY	Refurbishment of 2 x 17 km of Street lighting Installation along the Solomon Hochoy Hwy from Chaguanas to San Fernando	This installation was done more than 22 years ago and has not been overhauled. Many of the street lighting columns have been struck by vehicles and replaced by distribution poles. In addition many of the undergrond circuits have been destroyed either by vandals or by natural ageing.	The work require is a complete rebuild of the infrastructure	Improved reliability of the lighting, improved serviceability and aesthetics	10.0	10.0	14.0		
C/R HWY 01	Refurbishment of 4km of Street Lighting Installation from Uriah Butler Hwy to Barataria Interchange.	This Installation was done temporarily about 10 years ago when the third lane of the highway was added. However the permanent solution was not implemented.	The work required is a complete rebuild of the infrastructure to include recent additions to the road works.	Improved reliability of the lighting, improved serviceability and aesthetics	1.0	3.0			

BTHWY	Refurbishment of 2km of Street lighting along the Beetham Highway from the Barataria Interchange to the Central Market.	The original infrastructure was installed over 40 years ago has not been overhauled since. Failed underground cable has been replaced by unsightly overhead triplex. And damaged street lighting columns has been replaced by distribution poles.	The work require is a complete rebuild of the infrastructure	Improved reliability of the lighting, improved serviceability and aesthetics		2.0	3.0		
TOTAL					**11.0**	**15.0**	**17.0**	**0.0**	**0.0**

3.5.24 GENERATION INTERFACE PROJECTS

Project Name	Project Description & Scope of Works	Strategic Goal	Associated Assumptions	Associated Challenges	Cost ($M)						
					Year						
					2011	2012	2013	2014	2015	2016	Total
Additional Generation Capacity – Barataria Power Station Site Acquisition. **ONLY Site Acquisition Costs are considered as only those costs are associated with the period 2011 t0 2016.**	Acquisition of Barataria site for the establishment of the Barataria Power Station that is required by **2018**. • Secure Cabinet Approval for Site. • Develop Terms of Reference. • Hire Consultant. • Develop **ownership model** & prepare RFI. • Develop Specification s. • Develop	Improved reliability through generation expansion.	• There is no competing use of the site. • Site is on State Lands. Therefore no purchase of land required.	• Unclear financing and ownership framework.				0.6	5.3	10.2	**16.1**

	prequalification documents. • Invite tenders. • Evaluate and award tender. • Negotiate PPA. • Establish and Commission Power Plant in 2018										
Wind Energy Pilot Project – 4 x 1.4 MW wind turbines commissioned (2 @ Toco & 2 @ Mayaro)	Development of wind energy pilot projects in the Toco and Mayaro areas along the east coast of Trinidad: • Develop renewable energy policy. • Develop a "Feed-In" tariff & codes for electrical connection. • Acquire	To develop renewable energy pilot projects to promote the T&TEC's commitment to green energy. Associated with this wind energy pilot project are other private renewable energy projects in	• Required wind speeds are available.	•		0.6	4.0	18.9	18.9		**42.4**

	funding approval. • Perform wind study. • Secure wind farm sites. • Develop specification • Prepare PPAs • Develop 3 MW winds farms @ Toco & Mayaro.	the field of (i) Waste to Energy (POS); Tidal Kinetic (Tobago); and (iii) Solar (nationwide).									
				Total	**0.0**	**0.6**	**4.0**	**19.5**	**24.2**	**10.2**	**58.5**

3.5.25 COMMUNICATIONS PROJECTS

Project Name	Project Description & Scope of Works	Strategic Goal	Associated Assumptions	Associated Challenges	Cost ($M) Year 2011	2012	2013	2014	2015	2016	Total
Fibre Optic System Expansion	Further extension of the existing fibre optic network to connect all of the substations in the South East Ring: • Install additional **multiplexers in the South East Ring.** • **Install Fibre** & Commission **South East** fibre optic ring.	Improved communication systems development in order to increase reliability of all systems supported by this infrastructure.	• No additional expansion required in South East Trinidad.		1.5	1.5	1.0				**4.0**
Microwave System Expansion	Further expansion the Microwave System from Trinidad to Tobago: • Commission Microwave link:	Improved communication systems development in order to increase reliability of all systems supported by this	• The required line of sight is available thus allowing the creation a Microwave Link from Trinidad to Tobago possible.		7.0	3.0	3.0	3.0			**16.0**

	i. Install new radios & wave guides. ii. Transfer to new system. iii. Remove old system	infrastructure.									
Spreadspectrum Wireless Communications System Installation.	Application of WiMAX telecommunications technology that that provides wireless transmission of data using a variety of transmission modes, from point-to-multipoint links to portable and fully mobile internet access at up to 10 Mbps broadband speed. This technology may be used for data transfer for AMI and Distribution SCADA systems in cases where all other form of communication is unavailable.	Improved communication systems development in order to increase reliability of all systems supported by this infrastructure.			5.0	5.0	5.0	2.5	2.5	1.0	**21.0**

Trunk Mobile Radio System Upgrade	Replacement of obsolete two-way system.	Improved communication systems development in order to increase reliability of all systems supported by this infrastructure.			5.0	5.0	5.0	5.0			**20.0**
Video Surveillance and Video Conferencing Systems Expansion.	Further expansion the Video Surveillance and Video Conferencing Systems: • Identification of Substations and Conference Room sites. • Installation of Communications.	Improved communication systems development in order to increase reliability of all systems supported by this infrastructure.			3.0	3.0	2.0	1.0	1.0	1.0	**11.0**
Acquisition of field test equipment, office equipment and sundry requirements.	The acquisition of field test equipment, office equipment and sundry requirements.	Improved work processes through the supply of the required tools and equipment.			2.0	2.0	2.0	2.0	2.0	2.0	**12.0**
				Total	**23.5**	**19.5**	**18.0**	**13.5**	**5.5**	**4.0**	**84.0**

3.5.26 PROTECTION & SCADA PROJECTS

Project Name	Project Description & Scope of Works	Strategic Goal	Associated Assumptions	Associated Challenges	Cost ($M)						
					Year						
					2011	2012	2013	2014	2015	2016	Total
Distribution SCADA Implementation along with change-out of Protective Relays and SCADA devices at various substations.	Implementation of Distribution SCADA is completed. Distribution SCADA would allow for the monitoring of data; and the remote control of circuit breakers, switches, tap changers and capacitor banks. The SCADA Section, along with Open Systems International (OSI), shall manage the rollout of	Improved reliability of the distribution systems through the introduction of automation in distribution systems.	• Success of the pilot project in Malabar, O'Meara & Pinto Rd. S/Ss. • Policy to prioritise load centre developed.		4.0	4.0	4.0	4.0	4.0	4.0	**24.0**

	SCADA/DA Architecture: • Upgrade of substation SCADA hardware. • Install SCADA. • Install automated switchgear. • Install wireless pole mounted communication devices. • Install Ethernet MUX cards for SCADA WAN • Install Distribution Management System. • Commissioning of SCADA system.										

Acquisition Protection Systems Equipment & other Field Test Equipment.	Purchase of test equipment and instruments for both the field and bench testing applications, together with software and support.				2.0	2.0	2.0	2.0	2.0	2.0	**12.0**
				Total	**6.0**	**6.0**	**6.0**	**6.0**	**6.0**	**6.0**	**36.0**

3.5.27 SYSTEM PLANNING & CONTROL PROJECTS

Project Name	Project Description & Scope of Works	Strategic Goal	Cost ($M)						
			Year						
			2011	2012	2013	2014	2015	2016	Total
Substation Load Monitoring.	Installation of ION IEDs on all substation 12 kV boards. It facilitates the remote access to both real-time and trend data Commission-wide: • Dispatch Intelligent Electronic Devices (IEDs) to the Protection & SCADA department for installation. • Install IEDs at 12 existing substations and 7 new 12 kV boards. • WAN expansion for Ethernet connectivity. • Graphical Unit Interface (GUI) development.	Improved collections of system load and disturbance data which can be used as inputs to system studies.	0.6	0.6	0.6	0.6	0.6	0.0	**3.0**
		Total	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.0**	**3.0**

3.5.28 ENGINEERING DIVISION PROJECTS

Project Name	Project Description & Scope of Works	Strategic Goal	Cost ($M)						
			Year						
			2011	2012	2013	2014	2015	2016	Total
Construction of New Mt. Hope 4 Storey Building.	The construction of a new 4 storey building which is to be constructed at the old Mt. Hope substation site as part of T&TCE's Engineering Centre. This new building would house the System Planning & Control, Communications and Generation Interface departments. While the new Outage Management and Distribution Control Centre as well as the Protection & SCADA department offices would remain in the old building. • Clear old Mt. Hope S/S site. • Award tender to contractor. • Prepare land for layout & complete drawings. • Survey site. • Get Town & Country approvals. • Prepare scope of works & go out to tender. • Complete foundation works. • Complete civil works. • Complete electrical works. • Complete final aesthetic works and landscaping	Improved work processes as the necessary accommodations are constructed.	0.0	0.0	0.6	15.0	15.0	0.0	**30.6**
		Total	**0.0**	**0.0**	**0.6**	**15.0**	**15.0**	**0.0**	**30.6**

3.5. 29 CAPITAL EXPENDITURE FORECAST - INFORMATION SYSTEMS/SUPPLIES

PROJECT NAME	PROJECT DESCRIPTION & SCOPE OF WORKS	BENEFITS TO BE DERIVED	2011	2012	2013	2014	2015	2016
Interactive Voice Response	Upgrade of System - hardware & software; payment by credit cards; automated calling out to customers.	More reliable system after upgrade; another payment method being offered to customers; improvement in customer service.	0.3	0.0	0.0	0.0	0.0	0.0
Distribution Asset Analysis (DAA)	The provision of hardware and software to support the implementation of an island-wide tracking of the utilisation of distribution assets.	Actual AMI meter reads will assist in the determination of the usage and sizing of transformers and overhead lines.	10.0	0.0	0.0	0.0	0.0	0.0
Computer Equipment	Acquisition of PCs, printers, scanners and spares	PCs for replacement to support upgraded systems, for new assignments, etc.	3.5	3.5	3.5	3.5	3.5	3.5
Software Licences	Purchase of new and additional software licences as required.	Compliance	3.0	3.0	3.0	3.0	3.0	3.0
Server Acquisition and Upgrade	Purchase of new servers for small systems	To facilitate the growth of the databases and files and new versions of software, the servers may be upgraded (with additional processors, disks, memory, etc.) or replaced.	3.0	3.0	3.0	3.0	3.0	3.0
Networking Equipment	Acquisition of Networking Equipment and spares, e.g., routers, hubs, etc.	Network equipment for replacement, to support upgraded systems and for new assignments, etc.	3.0	3.0	3.0	3.0	3.0	3.0
Disaster Recovery	Preparation of site; purchase & installation of backup equipment	Cutover to backup system with no loss of data – business continuity.	3.0	3.0	3.0	3.0	3.0	3.0
TOTAL			**25.8**	**15.5**	**15.5**	**15.5**	**15.5**	**15.5**

Note: The DAA like the Outage Management System formed part of the AMI suite which will be fully implemented soon after the GIS is itself implemented by March 2012. It is therefore expected that by June 2012 both modules will be deployed.

3.5.30 – CAPITAL EXPENDITURE FORECAST – SUPPLIES

PROJECT NAME	PROJECT DESCRIPTION & SCOPE OF WORKS	BENEFITS TO BE DERIVED	2011	2012	2013	2014	2015	2016
Extension of Central Stores		Improved accommodation and retrieval of inventory.			10			
TOTAL			**0**	**0**	**10**	**0**	**0**	**0**

4.0 PUBLIC SUMMARY

The most critical issue confronting T&TEC is that of the uneconomic rates at which it sells its electricity services to customers in the Residential (Rate A), Commercial (Rate B) and Street Lighting Categories. This issue strikes at the heart of T&TEC's inability to achieve desired levels of profitability and ultimately, viability. T&TEC must be able to:

- Continue to meet the growing demands for electricity. The forecast shows that over the next 5 years (2011-2016) increase in demand is expected to be at an average of 5% per annum.
- Continue to deliver a quality supply of electricity and service to its customers.
- Develop its infrastructure
- Do its part to ensure that the GORTT's Plans for the development of the nation are realised.

It is therefore essential that T&TEC be allowed to charge rates that cover its costs of operations and generate a fair rate of return.

4.1 WHAT T&TEC WOULD LIKE TO DELIVER :

4.1.1. SUBSTATION UPGRADES:

Increased reliability of supply can be achieved if several substations are upgraded to meet the future demands of customers in the following areas within the next 5 years:

Point Cumana	-	2011
Syne Village	-	2012
San Juan	-	2012
St. James	-	2012
Laventille	-	2012
St. Augustine	-	2012
O'Meara	-	2012
Savonetta	-	2012
Pinto Road	-	2012
Maraval	-	2013
Diego Martin	-	2013
Abbatoir	-	2013
Mt. Pleasant	-	2014
Ind. Square	-	2014
Master (POS)	-	2015
Cascade	-	2016

4.1.2 NEW SUBSTATIONS:

An expected increase in residential and commercial customers indicates the urgent need for the development of new substations in several areas. New Substations shall not only improve the reliability of the supply in these areas, but shall provide a back-up supply which shall enhance the Commission's switching operations in the event of interruptions and maintenance work.

The Commission would like to construct new substations at the following locations over the next 5 years:

Los Bojos - 2012

Felicity - 2012

Invaders Bay - 2013

Carlsen Field - 2013

Maracas Bay - 2015

Barrackpore - 2015

4.1.3 NEW FEEDERS:

The Commission would like to construct new overhead lines as follows:

Carlsen Field, Roopsingh Road feeder from the Felicity s/s,

Buraro 12kV from Central,

Macral Road from Claxton Bay,

Adona Road from Charlieville,

Trincity lane from B.C. Substation

Construct 12 kV feeder from Piarco S/S to CR Highway

Construct new 12 kV feeder from Orange Grove S/S to Tunapuna load center

Gulf View and La Romain 12kV Feeders

St. Croix and Papourie Road 12kV Feeders

Erin and Carapal 12kV Feeders from Erin

Barataria to Morvant

Maraval Feeder to Maracas feeder out of Santa Cruz

4.1.4 NEW DEPOTS:

Charlieville

Roxborough

Santa Cruz

Felicity

Cove Industrial Estate

4.1.5 INSULATOR CHANGE-OUTS

A project to change out 20,000 insulators from porcelain to polymeric is scheduled to be undertaken in 2011. This insulator change-out shall be conducted in areas where significant contamination has affected the porcelain resulting in regular faults.

4.2 FINANCIAL PROJECTION 2011 -2016

	Projected 2011	Projected 2012	Projected 2013	Projected 2014	Projected 2015	Projected 2016
Sales - kWh	8,121,000,000	8,708,000,000	9,218,000,000	9,599,000,000	9,900,000,000	10,272,000,000
Average Revenue per kWh -*cts*	33.16	41.09	41.86	41.84	41.94	42.05
INCOME						
Sales of Electricity	2,692,561,728	3,578,148,227	3,858,205,456	4,016,016,955	4,152,495,757	4,318,955,741
Other Income	160,000,000	160,000,000	160,000,000	160,000,000	160,000,000	160,000,000
TOTAL INCOME	**2,852,561,728**	**3,738,148,227**	**4,018,205,456**	**4,176,016,955**	**4,312,495,757**	**4,478,955,741**
EXPENDITURE						
Conversion Cost-PowerGen, Trinity Power	871,164,519	889,910,353	909,527,218	922,103,558	841,223,947	859,351,453
Conversion Cost - TGU	205,647,526	691,599,692	696,583,478	702,784,457	708,047,862	713,442,852
Conversion costs-Leases - IAS 17	(389,867,000)	(389,867,000)	(389,868,000)	(389,867,000)	(389,867,000)	(389,867,000)
Fuel(natural gas only)	925,488,281	928,857,309	1,020,923,101	1,011,924,687	1,081,382,477	1,166,911,595
Wages	180,723,120	161,277,126	161,277,126	245,468,694	185,468,694	185,468,694
Salaries	310,275,004	280,550,755	280,550,755	432,633,368	322,633,368	322,633,368
Overtime	30,000,000	29,500,000	29,000,000	28,500,000	28,000,000	27,500,000
NIS	20,500,000	22,061,000	22,515,000	22,894,000	23,272,000	23,643,000
Pension Cost	50,000,000	-55,000,000	53,000,000	-48,000,000	49,000,000	-45,000,000
Employee Related Benefits	55,000,000	40,000,000	41,500,000	58,000,000	42,000,000	43,500,000
Rates, Taxes and Insurances	12,500,000	13,000,000	13,500,000	14,000,000	14,500,000	15,000,000
Materials	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000
Services	139,370,604	144,945,428	150,743,246	156,772,975	163,043,894	169,565,650
Rents	1,200,000	1,300,000	1,400,000	1,500,000	1,600,000	1,700,000
Depreciation	181,879,500	196,383,000	209,979,000	219,795,000	227,994,000	234,249,000
Depreciation-Leases - IAS 17	285,161,000	285,161,000	285,161,000	285,161,000	285,161,000	285,161,000
Interest	92,833,333	80,616,667	107,366,667	108,700,000	104,200,000	109,700,000
Interest-Leases - IAS 17	128,721,000	108,992,000	107,904,000	106,720,000	105,432,000	104,032,000
H/Office Engineering Clearing	(35,000,000)	(35,000,000)	(35,000,000)	(35,000,000)	(35,000,000)	(35,000,000)
Vehicle Clearings	(3,500,000)	(3,500,000)	(3,500,000)	(3,500,000)	(3,500,000)	(3,500,000)
TOTAL EXPENDITURE	**3,087,096,888**	**3,415,787,329**	**3,687,562,589**	**3,865,590,740**	**3,779,592,243**	**3,813,491,612**
NET SURPLUS/(DEFICIT)	**(234,535,160)**	**322,360,898**	**330,642,866**	**310,426,216**	**532,903,514**	**665,464,129**

4.2.1 ASSUMPTIONS

1) Income from the sale of electricity to Residential, Commercial, Industrial and Street Lighting customers has been projected in accordance with the proposed 27% and 3% rate increase for the 2012 and 2013 and 0% in 2014 to 2016.

2) An exchange rate of TT$6.40/US$1 has been factored in to the projection.

3) Salaries and wages for the 2011 to 2016 include increases expected for O.W.T.U., S.S.A. and E.P.A employees.

4) A fuel charge rate of 1.2386 US$/MMBTU has been used in the calculation of natural gas cost for 2011, with a 3% annual escalator.

4.3 HOW T&TEC PLANS TO IMPROVE ITS EFFICIENCY IN KEY PERFORMANCE AREAS

4.3.1 Outage Durations:

The average outage duration for any given customer per interruption has been on the decline falling from 1.63 hrs in 2005 to 1.41 hrs in 2010. T&TEC expects to reduce the duration of outage experienced per interruption to 1 hr by 2016.

The average outage duration for each customer has been declining from 18.59 hrs in 2005 to 8.9 hrs in 2010. The target for 2016 is 5hrs.

The average number of interruptions that a customer would experience in a year has almost been halved during the period 2005 to 2010, dropping from 11.43 to 6.29 interruptions. The target for 2016 is 5 interruptions per customer.

The overall reliability of the system has been relatively consistent, ensuring a supply to customers 99.89% of the time in 2010. The aim is to improve that reliability by 2016.

4.3.2 Percentage of Same Day Connections

Over the years, there has been an increase in the number of same day connections. T&TEC has surpassed its target of 95% same day connections with an actual performance of 99.5% at the end of 2010. The aim is to improve on this performance during the period 2010 – 2016.

4.3.3 Percentage of Reconnections Completed in 24hrs

The Commission has been steadily improving it performance regarding the reconnection of customers. Though falling slightly short of the 100% target, the Commission has maintained a high reconnection rate of 99.9% in 2010. The target for 2016 is 100%.

4.3.4 Trouble Report Response Time

The average time to respond to a trouble report has also been on the decline, falling from 2.6 hrs in 2005 to 1.99 hrs in 2010. T&TEC has set a target of 1.7hrs to be reached in 2016.

4.3.5 Trouble Reports per 1,000 Customers

There has been a reduction in the number of trouble reports from 7.1 trouble reports per 1,000 customers in 2005, to 5 trouble reports per 1,000 customers in 2010. The aim is to bring this figure down to 4 trouble reports per 1,000 customers by 2016.

4.3.6 Hotline Work

In order to reduce the number of outages to customers, T&TEC introduced “Hotline” work on certain maintenance jobs. Hotline work allows technicians to carry out maintenance work on power lines that are still energized. It is not necessary to interrupt the supply in order to do work on the line. Over the years, the Commission has increased its Hotline works, reaching 47.85% in 2010. The target is to undertake 60% of maintenance using “Hotline” work by 2016. This will be achieved by using the existing workforce and the acquisition of additional vehicles to create additional hotline crews.

4.3.7 Pole Replacement

The number of poles replaced has always surpassed the target set for the particular year. In 2005, 2,812 poles were replaced and in 2010, 3,253. The target set for 2016 is 1,500 poles.

4.3.8 Compliance under Guaranteed Standards

T&TEC continues to achieve over 90% compliance rate for most of the Guaranteed Standards. There is however a need to improve on billing punctuality for new residential and non-residential customers. With respect to Overall Standards high compliance rates were again achieved for most standards except billing punctuality, this time for monthly and bi-monthly billings after meter readings are obtained. In addition, prior notice of planned outages with a compliance rate of less than 50% is unacceptably low.

4.4 TARIFF PROPOSAL 2011 TO 2016

	RIC Approved Rate 2009/10		Proposed Rate 2011		Proposed Rate 2012		Proposed Rate 2013		Proposed Rate 2014		Proposed Rate 2015		Proposed Rate 2016	
	$/ kWh	$/ KVA	$/ kWh	$/ KVA	$/ kWh	$/ KVA	$/ kWh	$/ KVA	$/ kWh	$/ KVA	$/ kWh	$/ KVA	$/ kWh	$/ KVA
Residential														
0 - 400 kWh	0.2600	-	0.2600	-	0.3302	-	0.3401	-	0.3401	-	0.3401	-	0.3401	-
401 - 1,000 kWh	0.3200	-	0.3200	-	0.4064	-	0.4186	-	0.4186	-	0.4186	-	0.4186	-
over 1,000 kWh	0.3700	-	0.3700	-	0.4699	-	0.4840	-	0.4840	-	0.4840	-	0.4840	-
Customer Charge	6.0000		6.0000		6.0000		6.0000		6.0000		6.0000		6.0000	
Commercial														
B	0.4150	-	0.4150	-	0.5271	-	0.5429	-	0.5429	-	0.5429	-	0.5429	-
Customer Charge	25.00	-	25.00	-	25.00	-	25.00	-	25.00	-	25.00	-	25.00	-
Industrial														
B 1	0.61	-	0.6100	-	0.7747	-	0.7979	-	0.7979	-	0.7979	-	0.7979	-
D1	0.20	50.00	0.1990	50.00	0.2527	53.00	0.2603	54.59	0.2603	54.59	0.2603	54.59	0.2603	54.59
D2	0.22	50.00	0.2180	50.00	0.2769	53.00	0.2852	54.59	0.2852	54.59	0.2852	54.59	0.2852	54.59
D3	0.18	42.50	0.1830	42.50	0.2324	53.98	0.2394	55.59	0.2394	55.59	0.2394	55.59	0.2394	55.59
D4	0.17	40.00	0.1670	40.00	0.2121	50.80	0.2185	52.32	0.2185	52.32	0.2185	52.32	0.2185	52.32
D5	0.16	37.00	0.1600	37.00	0.2032	46.99	0.2093	48.40	0.2093	48.40	0.2093	48.40	0.2093	48.40
E 1	0.15	44.50	0.1450	44.50	0.1842	56.52	0.1897	58.21	0.1897	58.21	0.1897	58.21	0.1897	58.21
E 2	0.15	44.00	0.1450	44.00	0.1842	55.88	0.1897	57.56	0.1897	57.56	0.1897	57.56	0.1897	57.56
E 3	0.15	43.00	0.1450	43.00	0.1842	54.61	0.1897	56.25	0.1897	56.25	0.1897	56.25	0.1897	56.25
E 4	0.15	42.00	0.1450	42.00	0.1842	53.34	0.1897	54.94	0.1897	54.94	0.1897	54.94	0.1897	54.94
E 5	0.15	41.00	0.1450	41.00	0.1842	52.07	0.1897	53.63	0.1897	53.63	0.1897	53.63	0.1897	53.63
Street Lighting (Annual Charge)														
S1-1	848.72	-	848.72	-	1,077.87	-	1,110.21	-	1,110.21	-	1,110.21	-	1,110.21	-
S1- 2	565.81	-	565.81	-	718.58	-	740.14	-	740.14	-	740.14	-	740.14	-
S1- 3	411.50	-	411.50	-	522.61	-	538.28	-	538.28	-	538.28	-	538.28	-
S1- 4	372.92	-	372.92	-	473.61	-	487.82	-	487.82	-	487.82	-	487.82	-
S2- 2	450.08	-	450.08	-	571.60	-	588.75	-	588.75	-	588.75	-	588.75	-
S2- 3	347.20	-	347.20	-	440.94	-	454.17	-	454.17	-	454.17	-	454.17	-
S2- 4(All SL)	282.91	-	282.91	-	359.30	-	370.07	-	370.07	-	370.07	-	370.07	-

Note:T&TEC is comfortable with rate B 1 remaining as proposed.

4.5 BILL IMPACT 2011 - 2016

	PRICE LIMITS AND AVERAGE BILLINGS													
	2010/20101 Implemented 1st September 2009													
	2010/2011		2011		2012		2013		2014		2015		2016	
	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)
RESIDENTIAL CUSTOMERS														
Up to 400 kWh	**0.2600**	**N/A**	**0.2600**	**N/A**	**0.3302**	**N/A**	**0.3401**	**N/A**	**0.3401**	**N/A**	**0.3401**	**N/A**	**0.3401**	**N/A**
401 - 1,000 kWh	**0.3200**	**N/A**	**0.3200**	**N/A**	**0.4064**	**N/A**	**0.4186**	**N/A**	**0.4186**	**N/A**	**0.4186**	**N/A**	**0.4186**	**N/A**
Over 1,000 kWh	**0.3700**	**N/A**	**0.3700**	**N/A**	**0.4699**	**N/A**	**0.4840**	**N/A**	**0.4840**	**N/A**	**0.4840**	**N/A**	**0.4840**	**N/A**
Customer Charge	$6.00		$6.00		$6.00		$6.00		$6.00		$6.00		$6.00	
Projected Household Bills - Bi-monthly														
Consumption Tier 1(400 kWh)	$126.50		$126.50		$158.79		$163.35		$163.35		$163.35		$163.35	
Consumption Tier 2(1,000 kWh)	$347.30		$347.30		$439.21		$452.18		$452.18		$452.18		$452.18	
Consumption Tier 3(1,600 kWh)	$602.60		$602.60		$763.44		$786.14		$786.14		$786.14		$786.14	
COMMERCIAL CUSTOMERS														
Rate B														
Price Limits	**0.4150**	**N/A**	**0.4150**	**N/A**	**0.5271**	**N/A**	**0.5429**	**N/A**	**0.5429**	**N/A**	**0.5429**	**N/A**	**0.5429**	**N/A**
Customer Charge	$25.00		$25.00		$25.00		$25.00		$25.00		$25.00		$0.00	
Projected Small Business Bills - Bi - monthly														
Consumption Level (1,000 kWh)	$506.00		$506.00		$634.86		$653.04		$653.04		$653.04		$624.29	
Consumption Level (2,000 kWh)	$983.25		$983.25		$1,240.97		$1,277.33		$1,277.33		$1,277.33		$1,248.58	
Consumption Level (3,000 kWh)	$1,460.50		$1,460.50		$1,847.07		$1,901.62		$1,901.62		$1,901.62		$1,872.87	

	PRICE LIMITS AND AVERAGE BILLINGS													
	2010/20101 Implemented 1st September 2009													
	2010/2011		2011		2012		2013		2014		2015		2016	
	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)
Rate B 1														
Price Limits	**0.6100**	**N/A**	**0.6100**	**N/A**	**0.7747**	**N/A**	**0.7979**	**N/A**	**0.7979**	**N/A**	**0.7979**	**N/A**	**0.7979**	**N/A**
Projected Small Business Bills - Bi - monthly														
Consumption Level (5,000 kWh)	$3,507.50		$3,507.50		$4,454.53		$4,588.16		$4,588.16		$4,588.16		$4,588.16	
Consumption Level (6,000 kWh)	$4,209.00		$4,209.00		$5,345.43		$5,505.79		$5,505.79		$5,505.79		$5,505.79	
Consumption Level (7,000 kWh)	$4,910.50		$4,910.50		$6,236.34		$6,423.43		$6,423.43		$6,423.43		$6,423.43	
INDUSTRIAL CUSTOMERS														
Rate D 1														
Price Limits	**0.1990**	**50.00**	**0.1990**	**50.00**	**0.2527**	**53.00**	**0.2603**	**54.6**	**0.2603**	**54.6**	**0.2603**	**54.6**	**0.2603**	**54.59**
Projected Small Industrial Bills - Monthly														
Consumption Level (7,030 kWh), (64 KVA)	$5,288.82		$5,288.82		$5,944.00		$6,122.32		$6,122.32		$6,122.32		$6,122.32	
Consumption Level (20,000 kWh),(112 KVA)	$11,017.00		$11,017.00		$12,639.19		$13,018.37		$13,018.37		$13,018.37		$13,018.37	
Consumption Level (119,060 kWh), (201 KVA)	$38,804.38		$38,804.38		$46,854.49		$48,260.12		$48,260.12		$48,260.12		$48,260.12	
Rate D 2														
Price Limits	**0.2180**	**50.00**	**0.2180**	**50.00**	**0.2769**	**53.00**	**0.2852**	**54.59**	**0.2852**	**54.59**	**0.2852**	**54.59**	**0.2852**	**54.59**
Projected Medium Industrial Bills - Monthly														
Consumption Level (289,000 kWh), (740 KVA)	$115,002.30		$115,002.30		$137,117.42		$141,230.94		$141,230.94		$141,230.94		$141,230.94	

	PRICE LIMITS AND AVERAGE BILLINGS													
	2010/20101 Implemented 1st September 2009													
	2010/2011		2011		2012		2013		2014		2015		2016	
	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)
Consumption Level (817,900 kWh),(1,880 KVA)	$313,147.53		$313,147.53		$374,996.36		$386,246.25		$386,246.25		$386,246.25		$386,246.25	
Consumption Level (1,431,600 kWh), (2,770 KVA)	$518,177.12		$518,177.12		$624,637.19		$643,376.31		$643,376.31		$643,376.31		$643,376.31	
Rate D 3														
Price Limits	**0.1830**	**42.50**	**0.1830**	**42.50**	**0.2324**	**53.98**	**0.2394**	**55.59**	**0.2394**	**55.59**	**0.2394**	**55.59**	**0.2394**	**55.59**
Projected Large Industrial Bills - Monthly														
Consumption Level (1,079,900 kWh), (2,774 KVA)	$362,654.80		$362,654.80		$460,571.60		$474,388.74		$474,388.74		$474,388.74		$474,388.74	
Consumption Level (1,768,962 kWh),(5,788 KVA)	$655,166.55		$655,166.55		$832,061.52		$857,023.37		$857,023.37		$857,023.37		$857,023.37	
Consumption Level (2,803,307 kWh), (5,316 KVA)	$849,775.46		$849,775.46		$1,079,214.83		$1,111,591.28		$1,111,591.28		$1,111,591.28		$1,111,591.28	
Rate D 4														
Price Limits	**0.1670**	**40.00**	**0.1670**	**40.00**	**0.2121**	**50.80**	**0.2185**	**52.32**	**0.2185**	**52.32**	**0.2185**	**52.32**	**0.2185**	**52.32**
Projected Large Industrial Bills - Monthly														
Consumption Level (1,079,900 kWh), (2,774 KVA)	$603,874.48		$603,874.48		$766,920.59		$789,928.21		$789,928.21		$789,928.21		$789,928.21	
Consumption Level (5,825,326 kWh),(10,238 KVA)	$1,593,824.57		$1,593,824.57		$2,024,157.21		$2,084,881.92		$2,084,881.92		$2,084,881.92		$2,084,881.92	
Consumption Level (11,924,877 kWh), (18,842 KVA)	$3,156,904.63		$3,156,904.63		$4,009,268.88		$4,129,546.94		$4,129,546.94		$4,129,546.94		$4,129,546.94	
Rate D 5														

	PRICE LIMITS AND AVERAGE BILLINGS													
	2010/20101 Implemented 1st September 2009													
	2010/2011		2011		2012		2013		2014		2015		2016	
	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)	($/ kWh)	($/ KVA)
Price Limits	**0.1600**	**37.00**	**0.1600**	**37.00**	**0.2032**	**46.99**	**0.2093**	**48.40**	**0.2093**	**48.40**	**0.2093**	**48.40**	**0.2093**	**48.40**
Projected Large Industrial Bills - Monthly														
Consumption Level (12,751 kWh), (4,500 KVA)	$193,821.18		$193,821.18		$246,152.90		$253,537.49		$253,537.49		$253,537.49		$253,537.49	
Consumption Level (30,135 kWh),(14,174 KVA)	$608,648.54		$608,648.54		$772,983.65		$796,173.16		$796,173.16		$796,173.16		$796,173.16	
Rate E 1														
Price Limits	**0.1450**	**44.50**	**0.1450**	**44.50**	**0.1842**	**56.52**	**0.1897**	**58.21**	**0.1897**	**58.21**	**0.1897**	**58.21**	**0.1897**	**58.21**
Projected Very Large Industrial Bills - Monthly														
Consumption Level (11,303,482 kWh), (25,498 KVA)	$3,189,715.77		$3,189,715.77		$4,050,939.03		$4,172,467.20		$4,172,467.20		$4,172,467.20		$4,172,467.20	
Rate E 2														
Price Limits	**0.1450**	**44.00**	**0.1450**	**44.00**	**0.1842**	**55.88**	**0.1897**	**57.56**	**0.1897**	**57.56**	**0.1897**	**57.56**	**0.1897**	**57.56**
Projected Very Large Industrial Bills - Monthly														
Consumption Level (35,079,900 kWh), (50,274 KVA)	$8,393,437.73		$8,393,437.73		$10,659,665.91		$10,979,455.89		$10,979,455.89		$10,979,455.89		$10,979,455.89	
Rate E 3														
Price Limits	**0.1450**	**43.00**	**0.1450**	**43.00**	**0.1842**	**54.61**	**0.1897**	**56.25**	**0.1897**	**56.25**	**0.1897**	**56.25**	**0.1897**	**56.25**
Projected Very Large Industrial Bills - Monthly														
Consumption Level (60,079,900 kWh), (75,775 KVA)	$13,765,347.63		$13,765,347.63		$17,481,991.48		$18,006,451.23		$18,006,451.23		$18,006,451.23		$18,006,451.23	
Rate E 4														
Price Limits	**0.1450**	**42.00**	**0.1450**	**42.0**	**0.1842**	**53.34**	**0.1897**	**54.94**	**0.1897**	**54.94**	**0.1897**	**54.94**	**0.1897**	**54.94**
Projected Very Large Industrial Bills - Monthly														

	PRICE LIMITS AND AVERAGE BILLINGS													
	2010/20101 Implemented 1st September 2009													
	2010/2011		**2011**		**2012**		**2013**		**2014**		**2015**		**2016**	
	($/ kWh)	**($/ KVA)**	**($/ kWh)**	**($/ KVA)**	**($/ kWh)**	**($/ KVA)**	**($/ kWh)**	**($/ KVA)**	**($/ kWh)**	**($/ KVA)**	**($/ kWh)**	**($/ KVA)**	**($/ kWh)**	**($/ KVA)**
Consumption Level (80,079,900 kWh), (102,774 KVA)	$18,317,307.53		$18,317,307.53		$23,262,980.56		$23,960,869.97		$23,960,869.97		$23,960,869.97		$23,960,869.97	
Rate E 5														
Price Limits	**0.1450**	**41.00**	**0.1450**	**41.00**	**0.1842**	**52.07**	**0.1897**	**53.63**	**0.1897**	**53.63**	**0.1897**	**53.63**	**0.1897**	**53.63**
Projected Very Large Industrial Bills - Monthly														
Consumption Level (101,347,472 kWh), (226,368 KVA)	$27,572,942.16		$27,572,942.16		$35,017,636.54		$36,068,165.63		$36,068,165.63		$36,068,165.63		$36,068,165.63	
STREET LIGHTING														
Price Limits/Projected Bills - Annually														
Rate S1 - 1	$848.72	N/A	$848.72	N/A	$1,077.87	N/A	$1,110.21	N/A	$1,110.21	N/A	$1,110.21	N/A	$1,110.21	N/A
Rate S1 - 2	$565.81	N/A	$565.81	N/A	$718.58	N/A	$740.14	N/A	$740.14	N/A	$740.14	N/A	$740.14	N/A
Rate S1 - 3	$411.50	N/A	$411.50	N/A	$522.61	N/A	$538.28	N/A	$538.28	N/A	$538.28	N/A	$538.28	N/A
Rate S1 - 4	$372.92	N/A	$372.92	N/A	$473.61	N/A	$487.82	N/A	$487.82	N/A	$487.82	N/A	$487.82	N/A
Rate S2 - 2	$450.08	N/A	$450.08	N/A	$571.60	N/A	$588.75	N/A	$588.75	N/A	$588.75	N/A	$588.75	N/A
Rate S2 - 3	$347.20	N/A	$347.20	N/A	$440.94	N/A	$454.17	N/A	$454.17	N/A	$454.17	N/A	$454.17	N/A
Rate S2 - 4	$282.91	N/A	$282.91	N/A	$359.30	N/A	$370.07	N/A	$370.07	N/A	$370.07	N/A	$370.07	N/A

4.6 HOW T&TEC'S ENHANCEMENT PROGRAMMES WILL BENEFIT CUSTOMERS

- Over the period 2005- 2010 T&TEC fully deployed its advanced metering infrastructure which has led to the elimination of estimated bills and an increase in revenue due to more accurate readings.

- Concrete poles instead of wooden poles shall be used whenever suitable as these have a longer life span and are comparable in cost.

- The Geographic Information Sysem (GIS) has been introduced to enable crews to respond faster to customer complaints and to track fault reports. The system will also facilitate more efficient surveys.

- Vehicles will be outfitted with GPS units which will allow dispatch from Telecom Operators to the crews. The installation of GPS units in veheicles shall improve the Commission's fleet management and enhance employees's safety. The system will be programmed to select shorter routes which will reslt in quick reponse times.

- During the review period the Commission shall complete the implementation of the Computerized Maintenance Management System (CMMS) pilot project and expand the system to all Transmission and Distribution assets. This will significantly improve the quality and reliability of the supply to customers..

- Purchasing of additional aerial lift trucks shall increase the percentage of hotline works, thus reducing the need to interrupt the supply in order to undertake maintenance work.

- By increasing the installation of insulated conductors in forested areas, the probability of unplanned outages shall be drastically reduced.

APPENDIX I – CASH FLOW

FORECAST CASHFLOW 2011																	
	2011	Actual	Actual	Actual		Actual											
	TOTAL	JAN	FEB	MAR	1st QTR	APR	MAY	JUN	2nd QTR	JUL	AUG	SEP	3rd QTR	OCT	NOV	DEC	4th QTR
	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M
INTERNAL RECEIPTS																	
Light and Power	2,727.670	235.228	193.913	256.233	685.374	205.629	229.583	229.583	664.796	229.583	229.583	229.583	688.750	229.583	229.583	229.583	688.750
Other	81.009	3.940	21.984	2.707	28.631	5.270	6.718	5.203	17.191	5.267	5.664	3.297	14.229	10.204	7.002	3.752	20.958
V.A.T. Output	409.796	35.284	29.340	38.618	103.242	31.053	34.438	34.438	99.928	34.438	34.438	34.438	103.313	34.438	34.438	34.438	103.313
Total	3,218.475	274.452	245.237	297.558	817.247	241.952	270.739	269.224	781.915	269.288	269.685	267.318	806.292	274.225	271.023	267.773	813.021
OTHER FUNDING																	
Dividend & Debentures	102.305	22.955	0.000	34.350	57.305	0.000	0.000	15.000	15.000	0.000	0.000	15.000	15.000	0.000	0.000	15.000	15.000
Government Guaranteed Loan	375.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	375.000	0.000	0.000	375.000
Capital Contributions	85.603	1.268	1.611	1.638	4.517	0.915	10.021	10.021	20.958	10.021	10.021	10.021	30.064	10.021	10.021	10.021	30.064
TOTAL RECEIPTS	3,781.383	298.674	246.848	333.546	879.069	242.867	280.760	294.245	817.873	279.309	279.707	292.340	851.356	659.246	281.044	292.794	1,233.085
OPERATING PAYMENTS																	
Salaries	276.200	16.209	22.154	20.757	59.120	20.688	24.549	24.549	69.786	24.549	24.549	24.549	73.647	24.549	24.549	24.549	73.647
Wages	174.486	17.605	15.150	16.476	49.231	15.914	13.668	13.668	43.249	13.668	13.668	13.668	41.003	13.668	13.668	13.668	41.003
Backpay	100.000				0.000				0.000	0.000			0.000	40.000	20.000	40.000	100.000
Employee Related Benefits	122.717	10.174	8.871	10.764	29.809	11.561	10.168	10.168	31.898	10.168	10.168	10.168	30.505	10.168	10.168	10.168	30.505
Supplies - Local	127.137	13.453	12.433	11.732	37.618	11.079	9.805	9.805	30.689	9.805	9.805	9.805	29.415	9.805	9.805	9.805	29.415
- Foreign	167.995	25.173	41.749	3.786	70.708	12.309	10.622	10.622	33.553	10.622	10.622	10.622	31.867	10.622	10.622	10.622	31.867
Insurance Premium	14.092	0.000	0.000	0.000	0.000	0.000	0.000	11.274	11.274	0.000	0.000	1.409	1.409	0.000	0.000	1.409	1.409
Natural Gas	820.836	63.934	64.713	65.535	194.182	60.613	60.613	60.613	181.839	73.065	74.350	74.350	221.765	74.350	74.350	74.350	223.050
Diesel	72.222	11.129	0.047	14.957	26.133	5.121	5.121	5.121	15.363	5.121	5.121	5.121	15.363	5.121	5.121	5.121	15.363
Conversion Cost	1,076.166	0.000	78.165	155.057	233.222	0.000	160.457	83.032	243.488	90.732	90.870	100.140	281.742	108.499	106.433	102.783	317.714
Capital Projects	405.873	8.190	11.973	12.961	33.124	7.061	37.961	45.961	90.983	30.961	40.961	49.961	121.883	54.961	49.961	54.961	159.883
V.A.T. Input	341.350	10.172	13.456	27.935	51.563	5.675	41.094	30.680	77.448	31.453	33.166	35.907	100.525	37.910	36.850	37.053	111.814
Total Operating Payments	3,699.074	176.039	268.711	339.960	784.710	150.021	374.057	305.493	829.570	300.144	313.280	335.700	949.124	389.653	361.527	384.489	1,135.670
OPERATING SURPLUS/(DEFICIT)	82.309	122.635	(21.863)	(6.414)	94.359	92.846	(93.297)	(11.248)	(11.697)	(20.835)	(33.573)	(43.360)	(97.768)	269.593	(80.483)	(91.695)	97.415
FINANCE AND FIXED CHARGES																	
Debt Servicing - Principal	93.254	0.000	0.000	26.585	26.585	24.996	0.000	0.000	24.996	0.000	0.000	21.009	21.009	20.664	0.000	0.000	20.664
- Interest	68.149	0.000	0.000	27.223	27.223	5.438	0.000	0.000	5.438	0.000	0.000	25.736	25.736	9.752	0.000	0.000	9.752
NGC - Principal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FORECAST CASHFLOW 2011																	
	2011	Actual	Actual	Actual		Actual											
	TOTAL	JAN	FEB	MAR	1st QTR	APR	MAY	JUN	2nd QTR	JUL	AUG	SEP	3rd QTR	OCT	NOV	DEC	4th QTR
	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M
- Interest	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
Rent, Rates & Taxes	**2.814**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**
Interest on Bank Advances	**0.458**	0.042	0.042	0.000	**0.083**	0.042	0.042	0.042	**0.125**	0.042	0.042	0.042	**0.125**	0.042	0.042	0.042	**0.125**
Total Finance & Fixed Charges	**164.675**	0.042	0.042	53.808	**53.891**	30.476	0.042	0.979	**31.497**	0.042	0.042	47.724	**47.808**	30.459	0.042	0.979	**31.479**
TOTAL PAYMENTS	**3,863.749**	**176.081**	**268.753**	**393.768**	**838.601**	**180.497**	**374.099**	**306.472**	**861.067**	**300.186**	**313.322**	**383.424**	**996.932**	**420.112**	**361.569**	**385.468**	**1,167.149**
SURPLUS/(DEFICIT) on Operations	**(82.366)**	**122.593**	**(21.905)**	**(60.222)**	**40.468**	**62.370**	**(93.339)**	**(12.227)**	**(43.194)**	**(20.877)**	**(33.615)**	**(91.084)**	**(145.576)**	**239.134**	**(80.525)**	**(92.674)**	**65.936**
V.A.T. / GREEN FUND LEVY				40.996	**0.868**												
Less:Green Fund Levy	**3.107**	0.000	0.000	0.770	**0.770**	0.000	0.000	0.691	**0.691**	0.000	0.000	0.725	**0.725**	0.000	0.000	0.921	**0.921**
Less: V.A.T. to B.I.R.	**102.139**	31.472	0.000	35.591	**67.063**	0.000	31.373	0.000	**31.373**	0.000	0.000	3.703	**3.703**	0.000	(0.000)	0.000	**0.000**
Total V.A.T. / GREEN FUND LEVY	**105.246**	**31.472**	**0.000**	**36.361**	**67.833**	**0.000**	**31.373**	**0.691**	**32.064**	**0.000**	**0.000**	**4.428**	**4.428**	**0.000**	**(0.000)**	**0.921**	**0.921**
SURPLUS/(DEFICIT) AFTER VAT / GFL	**(187.612)**	**91.121**	**(21.905)**	**(96.583)**	**(27.365)**	**62.370**	**(124.712)**	**(12.918)**	**(75.258)**	**(20.877)**	**(33.615)**	**(95.512)**	**(150.004)**	**239.134**	**(80.525)**	**(93.595)**	**65.015**
NET INVESTMENT (PLACED)/REALISED																	
Net Investment (Placed)/Realised	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
NET INCREASE/(DECREASE) IN FLOW	**(187.612)**	**91.121**	**(21.905)**	**(96.583)**	**(27.365)**	**62.370**	**(124.712)**	**(12.918)**	**(75.258)**	**(20.877)**	**(33.615)**	**(95.512)**	**(150.004)**	**239.134**	**(80.525)**	**(93.595)**	**65.015**
Bank Balances-at start of period	**148.014**	148.014	239.135	217.230	**148.014**	120.647	183.017	58.305	**120.649**	45.391	24.514	(9.101)	**45.391**	(104.613)	134.521	53.996	**(104.613)**
Bank Balances-at end of period	**(39.598)**	**239.135**	**217.230**	**120.647**	**120.649**	**183.017**	**58.305**	**45.387**	**45.391**	**24.514**	**(9.101)**	**(104.613)**	**(104.613)**	**134.521**	**53.996**	**(39.599)**	**(39.598)**

Note:

1)The insurance paid in 2010 was actually over $12M but was misallocated in the cash flow. The increase in premium in 2011 is partly due the claim made with respect to the submarine cable and the general increase in premiums resulting from increases in natural disasters occurring worldwide affecting local premiums.

2)Borrowings of $375M is also included in the forecast at a rate of 10% for 15 years with a 3-year moratorium.

3) Rates of pay are in accordance with proposed salary increases for OWTU, SSA and EPA Agreements 2009 - 2011

FORECAST CASHFLOW 2012																		
2011		**2012**																
		TOTAL	**JAN**	**FEB**	**MAR**	**1st QTR**	**APR**	**MAY**	**JUN**	**2nd QTR**	**JUL**	**AUG**	**SEP**	**3rd QTR**	**OCT**	**NOV**	**DEC**	**4th QTR**
$M		**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**
	INTERNAL RECEIPTS																	
2,727.670	Light and Power	**3,470.804**	289.234	289.234	289.234	**867.701**	289.234	289.234	289.234	**867.701**	289.234	289.234	289.234	**867.701**	289.234	289.234	289.234	**867.701**
81.009	Other	**170.241**	5.483	14.978	14.978	**35.439**	14.978	14.978	14.978	**44.934**	14.978	14.978	14.978	**44.934**	14.978	14.978	14.978	**44.934**
409.796	V.A.T. Output	**520.620**	43.385	43.385	43.385	**130.155**	43.385	43.385	43.385	**130.155**	43.385	43.385	43.385	**130.155**	43.385	43.385	43.385	**130.155**
3,218.475	Total	**4,161.665**	338.102	347.597	347.597	**1,033.295**	347.597	347.597	347.597	**1,042.790**	347.597	347.597	347.597	**1,042.790**	347.597	347.597	347.597	**1,042.790**
	OTHER FUNDING																	
102.305	Dividend & Debentures	**100.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**
375.000	Government Guaranteed Loan	**225.000**	0.000	0.000	0.000	**0.000**	0.000	100.000	0.000	**100.000**	0.000	0.000	125.000	**125.000**	0.000	0.000	0.000	**0.000**
85.603	Capital Contributions	**120.256**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**
3,781.383	**TOTAL RECEIPTS**	**4,606.921**	**373.122**	**357.618**	**357.618**	**1,088.359**	**382.618**	**457.618**	**357.618**	**1,197.854**	**382.618**	**357.618**	**482.618**	**1,222.854**	**382.618**	**357.618**	**357.618**	**1,097.854**
	OPERATING PAYMENTS																	
276.200	Salaries	**294.588**	24.549	24.549	24.549	**73.647**	24.549	24.549	24.549	**73.647**	24.549	24.549	24.549	**73.647**	24.549	24.549	24.549	**73.647**
174.486	Wages	**176.012**	14.668	14.668	14.668	**44.003**	14.668	14.668	14.668	**44.003**	14.668	14.668	14.668	**44.003**	14.668	14.668	14.668	**44.003**
100.000	Backpay	**0.000**		0.000	0.000	**0.000**				**0.000**				**0.000**				**0.000**
122.717	Employee Related Benefits	**122.020**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**
127.137	Supplies - Local	**122.368**	10.197	10.197	10.197	**30.592**	10.197	10.197	10.197	**30.592**	10.197	10.197	10.197	**30.592**	10.197	10.197	10.197	**30.592**
167.995	- Foreign	**132.564**	11.047	11.047	11.047	**33.141**	11.047	11.047	11.047	**33.141**	11.047	11.047	11.047	**33.141**	11.047	11.047	11.047	**33.141**
14.092	Insurance Premium	**14.092**	0.000	0.000	0.000	**0.000**	0.000	0.000	11.274	**11.274**	0.000	0.000	1.409	**1.409**	0.000	0.000	1.409	**1.409**
820.836	Natural Gas	**926.880**	77.225	77.225	77.225	**231.675**	77.255	77.255	77.255	**231.765**	77.255	77.255	77.255	**231.765**	77.225	77.225	77.225	**231.675**
72.222	Diesel	**1.805**	0.150	0.150	0.150	**0.450**	0.151	0.150	0.150	**0.451**	0.151	0.151	0.150	**0.452**	0.151	0.151	0.150	**0.452**
1,076.166	Conversion Cost	**1,581.846**	109.730	106.743	121.868	**338.342**	127.975	130.549	119.833	**378.357**	130.947	131.146	144.523	**406.616**	156.588	153.606	148.338	**458.531**
405.873	Capital Projects	**476.000**	36.333	33.333	40.333	**110.000**	45.333	40.333	45.333	**131.000**	41.333	45.333	38.333	**125.000**	38.333	33.333	38.333	**110.000**
341.350	V.A.T. Input	**466.336**	35.045	34.147	37.466	**106.659**	39.137	38.773	37.915	**115.825**	38.982	39.612	40.569	**119.164**	42.374	41.177	41.137	**124.688**
3,699.074	**Total Operating Payments**	**4,314.511**	329.113	322.228	347.672	**999.014**	360.480	357.689	362.390	**1,080.560**	359.298	364.127	372.869	**1,096.294**	385.300	376.121	377.221	**1,138.643**
82.309	**OPERATING SURPLUS/(DEFICIT)**	**292.410**	**44.009**	**35.390**	**9.946**	**89.345**	**22.138**	**99.929**	**(4.772)**	**117.294**	**23.320**	**(6.509)**	**109.749**	**126.560**	**(2.682)**	**(18.503)**	**(19.603)**	**(40.789)**
	FINANCE AND FIXED CHARGES																	
93.254	Debt Servicing - Principal	**83.346**	0.000	0.000	21.009	**21.009**	20.664	0.000	0.000	**20.664**	0.000	0.000	21.009	**21.009**	20.664	0.000	0.000	**20.664**
68.149	- Interest	**65.723**	0.000	0.000	24.449	**24.449**	9.288	0.000	0.000	**9.288**	0.000	0.000	23.162	**23.162**	8.824	0.000	0.000	**8.824**
0.000	NGC - Principal	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**

FORECAST CASHFLOW 2012

2011		2012																
		TOTAL	JAN	FEB	MAR	1st QTR	APR	MAY	JUN	2nd QTR	JUL	AUG	SEP	3rd QTR	OCT	NOV	DEC	4th QTR
$M		$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M
0.000	- Interest	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
2.814	Rent, Rates & Taxes	**3.751**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**
0.458	Interest on Bank Advances	**0.250**	0.042	0.042	0.042	**0.125**	0.042	0.042	0.042	**0.125**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
164.675	Total Finance & Fixed Charges	**153.070**	0.042	0.042	46.437	**46.521**	29.994	0.042	0.979	**31.015**	0.000	0.000	45.109	**45.109**	29.488	0.000	0.938	**30.426**
3,863.749	**TOTAL PAYMENTS**	**4,467.581**	**329.155**	**322.270**	**394.109**	**1,045.535**	**390.474**	**357.731**	**363.369**	**1,111.575**	**359.298**	**364.127**	**417.978**	**1,141.403**	**414.788**	**376.121**	**378.159**	**1,169.069**
(82.366)	**SURPLUS/(DEFICIT) on Operations**	**139.340**	**43.967**	**35.348**	(36.491)	**42.824**	(7.856)	**99.887**	(5.751)	**86.279**	**23.320**	(6.509)	**64.640**	**81.451**	(32.170)	(18.503)	(20.541)	(71.215)
	V.A.T. / GREEN FUND LEVY																	
3.107	Less: Green Fund Levy	**3.012**	0.000	0.000	0.675	**0.675**	0.000	0.000	0.691	**0.691**	0.000	0.000	0.725	**0.725**	0.000	0.000	0.921	**0.921**
102.139	Less: V.A.T. to B.I.R.	**43.353**	0.000	0.000	15.292	**15.293**	0.000	8.846	0.000	**8.846**	8.771	0.000	7.112	**15.884**	0.000	3.330	0.000	**3.330**
105.246	**Total V.A.T. / GREEN FUND LEVY**	**46.365**	**0.000**	**0.000**	**15.967**	**15.968**	**0.000**	**8.846**	**0.691**	**9.537**	**8.771**	**0.000**	**7.837**	**16.609**	**0.000**	**3.330**	**0.921**	**4.251**
(187.612)	**SURPLUS/(DEFICIT) AFTER VAT / GFL**	**92.975**	**43.967**	**35.348**	(52.458)	**26.856**	(7.856)	**91.041**	(6.442)	**76.742**	**14.549**	(6.509)	**56.803**	**64.842**	(32.170)	(21.833)	(21.462)	(75.466)
	NET INVESTMENT (PLACED)/REALISED																	
0.000	**Net Investment (Placed)/Realised**	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
(187.612)	**NET INCREASE/(DECREASE) IN FLOW**	**92.975**	**43.967**	**35.348**	(52.458)	**26.856**	(7.856)	**91.041**	(6.442)	**76.742**	**14.549**	(6.509)	**56.803**	**64.842**	(32.170)	(21.833)	(21.462)	(75.466)
148.014	**Bank Balances-at start of period**	(39.598)	(39.598)	4.369	39.717	(39.598)	(12.741)	(20.597)	70.444	(12.742)	64.000	78.549	72.040	**64.000**	128.843	96.673	74.840	**128.843**
(39.598)	**Bank Balances-at end of period**	**53.377**	**4.369**	**39.717**	(12.741)	(12.742)	(20.597)	**70.444**	**64.002**	**64.000**	**78.549**	**72.040**	**128.843**	**128.842**	**96.673**	**74.840**	**53.378**	**53.377**

Notes 1) Rates of pay are in accordance with proposed salary increases for OWTU, SSA and EPA Agreements 2009 - 2011

2) Debt servicing comprises payments due in this period for the $500M and $200M Bonds and HSBC Tranche A and Tranche B Loan repayments.

3)Borrowings of $225M is also included in the forecast at a rate of 10% for 15 years with a 3-year moratorium.

FORECAST CASHFLOW 2013

2012		2013																
		TOTAL	JAN	FEB	MAR	1st QTR	APR	MAY	JUN	2nd QTR	JUL	AUG	SEP	3rd QTR	OCT	NOV	DEC	4th QTR
$M		$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M
	INTERNAL RECEIPTS																	
3,470.804	Light and Power	**3,742.460**	311.872	311.872	311.872	**935.615**	311.872	311.872	311.872	**935.615**	311.872	311.872	311.872	**935.615**	311.872	311.872	311.872	**935.615**
170.241	Other	**170.240**	5.483	14.978	14.978	**35.439**	14.978	14.978	14.978	**44.934**	14.978	14.978	14.978	**44.934**	14.978	14.978	14.978	**44.934**
520.620	V.A.T. Output	**561.368**	46.781	46.781	46.781	**140.342**	46.781	46.781	46.781	**140.342**	46.781	46.781	46.781	**140.342**	46.781	46.781	46.781	**140.342**
4,161.665	Total	**4,474.069**	364.135	373.630	373.630	**1,111.396**	373.630	373.630	373.630	**1,120.891**	373.630	373.630	373.630	**1,120.891**	373.630	373.630	373.630	**1,120.891**
	OTHER FUNDING																	
100.000	Dividend & Debentures	**100.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**
225.000	Government Guaranteed Loan	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
120.256	Capital Contributions	**120.256**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**
4,606.921	**TOTAL RECEIPTS**	**4,694.325**	**399.155**	**383.651**	**383.651**	**1,166.460**	**408.651**	**383.651**	**383.651**	**1,175.955**	**408.652**	**383.652**	**383.652**	**1,175.955**	**408.652**	**383.652**	**383.652**	**1,175.955**
	OPERATING PAYMENTS																	
294.588	Salaries	**294.588**	24.549	24.549	24.549	**73.647**	24.549	24.549	24.549	**73.647**	24.549	24.549	24.549	**73.647**	24.549	24.549	24.549	**73.647**
176.012	Wages	**176.012**	14.668	14.668	14.668	**44.003**	14.668	14.668	14.668	**44.003**	14.668	14.668	14.668	**44.003**	14.668	14.668	14.668	**44.003**
0.000	Backpay	**0.000**				**0.000**				**0.000**				**0.000**				**0.000**
122.020	Employee Related Benefits	**122.020**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**
122.368	Supplies - Local	**122.368**	10.197	10.197	10.197	**30.592**	10.197	10.197	10.197	**30.592**	10.197	10.197	10.197	**30.592**	10.197	10.197	10.197	**30.592**
132.564	- Foreign	**132.564**	11.047	11.047	11.047	**33.141**	11.047	11.047	11.047	**33.141**	11.047	11.047	11.047	**33.141**	11.047	11.047	11.047	**33.141**
14.092	Insurance Premium	**14.092**	0.000	0.000	0.000	**0.000**	0.000	0.000	11.274	**11.274**	0.000	0.000	1.409	**1.409**	0.000	0.000	1.409	**1.409**
926.880	Natural Gas	**1,019.300**	84.767	84.767	84.767	**254.300**	84.767	84.767	84.767	**254.300**	84.767	84.767	84.767	**254.300**	85.467	85.467	85.467	**256.400**
1.805	Diesel	**1.805**	0.151	0.151	0.151	**0.453**	0.150	0.150	0.150	**0.450**	0.150	0.151	0.151	**0.452**	0.150	0.150	0.150	**0.450**
1,581.846	Conversion Cost	**1,606.091**	111.761	106.682	121.124	**339.568**	130.344	132.965	122.051	**385.361**	133.371	133.573	147.199	**414.143**	159.486	156.449	151.084	**467.019**
476.000	Capital Projects	**401.181**	23.333	26.133	33.333	**82.800**	34.350	27.800	31.900	**94.050**	35.650	36.125	40.521	**112.296**	37.321	26.258	48.456	**112.035**
466.336	V.A.T. Input	**472.611**	34.531	34.190	37.436	**106.157**	38.971	38.382	37.360	**114.713**	39.620	39.722	42.425	**121.767**	43.893	41.778	44.303	**129.974**
4,314.511	**Total Operating Payments**	**4,362.632**	325.173	322.552	347.440	**995.166**	359.211	354.693	358.131	**1,072.036**	364.187	364.967	387.101	**1,116.255**	396.946	380.731	401.498	**1,179.175**
292.410	**OPERATING SURPLUS/(DEFICIT)**	**331.693**	**73.982**	**61.099**	**36.211**	**171.294**	**49.440**	**28.958**	**25.520**	**103.919**	**44.465**	**18.685**	**(3.449)**	**59.700**	**11.706**	**2.921**	**(17.846)**	**(3.220)**

FORECAST CASHFLOW 2013

2012		2013 TOTAL	JAN	FEB	MAR	1st QTR	APR	MAY	JUN	2nd QTR	JUL	AUG	SEP	3rd QTR	OCT	NOV	DEC	4th QTR
$M		$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M
	FINANCE AND FIXED CHARGES																	
83.346	Debt Servicing - Principal	**83.346**	0.000	0.000	21.009	**21.009**	20.664	0.000	0.000	**20.664**	0.000	0.000	21.009	**21.009**	20.664	0.000	0.000	**20.664**
65.723	- Interest	**58.672**	0.000	0.000	21.875	**21.875**	8.314	0.000	0.000	**8.314**	0.000	0.000	20.588	**20.588**	7.895	0.000	0.000	**7.895**
0.000	NGC - Principal	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
0.000	- Interest	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
3.751	Rent, Rates & Taxes	**3.752**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**
0.250	Interest on Bank Advances	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
153.070	Total Finance & Fixed Charges	**145.770**	0.000	0.000	43.822	**43.822**	28.978	0.000	0.938	**29.916**	0.000	0.000	42.535	**42.535**	28.559	0.000	0.938	**29.497**
4,467.581	**TOTAL PAYMENTS**	**4,508.402**	**325.173**	**322.552**	**391.262**	**1,038.988**	**388.189**	**354.693**	**359.069**	**1,101.952**	**364.187**	**364.967**	**429.636**	**1,158.790**	**425.505**	**380.731**	**402.436**	**1,208.672**
139.340	**SURPLUS/(DEFICIT) on Operations**	**185.923**	**73.982**	**61.099**	**(7.611)**	**127.472**	**20.462**	**28.958**	**24.582**	**74.003**	**44.465**	**18.685**	**(45.984)**	**17.165**	**(16.853)**	**2.921**	**(18.784)**	**(32.717)**
	V.A.T. / GREEN FUND LEVY																	
3.012	Less: Green Fund Levy	**3.012**	0.000	0.000	0.675	**0.675**	0.000	0.000	0.691	**0.691**	0.000	0.000	0.725	**0.725**	0.000	0.000	0.921	**0.921**
43.353	Less: V.A.T. to B.I.R.	**73.511**	2.801	0.000	21.611	**24.412**	0.000	14.924	0.000	**14.924**	15.503	0.000	12.371	**27.874**	0.000	6.301	0.000	**6.301**
46.365	**Total V.A.T. / GREEN FUND LEVY**	**76.523**	**2.801**	**0.000**	**22.286**	**25.087**	**0.000**	**14.924**	**0.691**	**15.615**	**15.503**	**0.000**	**13.096**	**28.599**	**0.000**	**6.301**	**0.921**	**7.222**
92.975	**SURPLUS/(DEFICIT) AFTER VAT / GFL**	**109.400**	**71.181**	**61.099**	**(29.897)**	**102.385**	**20.462**	**14.034**	**23.891**	**58.388**	**28.962**	**18.685**	**(59.080)**	**(11.434)**	**(16.853)**	**(3.380)**	**(19.705)**	**(39.939)**
	NET INVESTMENT (PLACED)/REALISED																	
0.000	**Net Investment (Placed)/Realised**	**(75.000)**	(75.000)	0.000	0.000	**(75.000)**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
92.975	**NET INCREASE/(DECREASE) IN FLOW**	**34.400**	**(3.819)**	**61.099**	**(29.897)**	**27.385**	**20.462**	**14.034**	**23.891**	**58.388**	**28.962**	**18.685**	**(59.080)**	**(11.434)**	**(16.853)**	**(3.380)**	**(19.705)**	**(39.939)**
(39.598)	**Bank Balances-at start of period**	**53.377**	53.377	49.558	110.657	**53.377**	80.760	101.222	115.256	**80.762**	139.150	168.112	186.797	**139.150**	127.717	110.864	107.484	**127.717**
53.377	**Should be equal to 4th Qtr Balance>>>**	**87.777**	**49.558**	**110.657**	**80.760**	**80.762**	**101.222**	**115.256**	**139.147**	**139.150**	**168.112**	**186.797**	**127.717**	**127.716**	**110.864**	**107.484**	**87.779**	**87.778**

Notes 1) Rates of pay are in accordance with proposed salary increases for OWTU, SSA and EPA Agreements 2009 - 2011

2) Debt servicing comprises payments due in this period for the $500M, HSBC Tranche A and Tranche B Loan and repayments.

FORECAST CASHFLOW 2014																		
2013		**2014**																
		TOTAL	**JAN**	**FEB**	**MAR**	**1st QTR**	**APR**	**MAY**	**JUN**	**2nd QTR**	**JUL**	**AUG**	**SEP**	**3rd QTR**	**OCT**	**NOV**	**DEC**	**4th QTR**
$M		**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**
	INTERNAL RECEIPTS																	
3,742.460	Light and Power	**3,895.536**	324.628	324.628	324.628	**973.884**	324.628	324.628	324.628	**973.884**	324.628	324.628	324.628	**973.884**	324.628	324.628	324.628	**973.884**
170.240	Other	**170.240**	5.483	14.978	14.978	**35.439**	14.978	14.978	14.978	**44.934**	14.978	14.978	14.978	**44.934**	14.978	14.978	14.978	**44.934**
561.368	V.A.T. Output	**584.332**	48.694	48.694	48.694	**146.083**	48.694	48.694	48.694	**146.083**	48.694	48.694	48.694	**146.083**	48.694	48.694	48.694	**146.083**
4,474.069	Total	**4,650.109**	378.805	388.300	388.300	**1,155.406**	388.300	388.300	388.300	**1,164.901**	388.300	388.300	388.300	**1,164.901**	388.300	388.300	388.300	**1,164.901**
	OTHER FUNDING																	
100.000	Dividend & Debentures	**100.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**
0.000	Government Loan	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
120.256	Capital Contributions	**120.256**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**
4,694.325	**TOTAL RECEIPTS**	**4,870.365**	**413.825**	**398.321**	**398.321**	**1,210.470**	**423.321**	**398.321**	**398.321**	**1,219.965**	**423.322**	**398.322**	**398.322**	**1,219.965**	**423.322**	**398.322**	**398.322**	**1,219.965**
	OPERATING PAYMENTS																	
294.588	Salaries	**294.588**	24.549	24.549	24.549	**73.647**	24.549	24.549	24.549	**73.647**	24.549	24.549	24.549	**73.647**	24.549	24.549	24.549	**73.647**
176.012	Wages	**188.012**	15.668	15.668	15.668	**47.003**	15.668	15.668	15.668	**47.003**	15.668	15.668	15.668	**47.003**	15.668	15.668	15.668	**47.003**
0.000	Backpay	**223.000**				**0.000**	30.000		95.000	**125.000**			50.000	**50.000**		48.000		**48.000**
122.020	Employee Related Benefits	**122.020**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**
122.368	Supplies - Local	**122.368**	10.197	10.197	10.197	**30.592**	10.197	10.197	10.197	**30.592**	10.197	10.197	10.197	**30.592**	10.197	10.197	10.197	**30.592**
132.564	- Foreign	**132.563**	11.047	11.047	11.047	**33.141**	11.047	11.047	11.047	**33.141**	11.047	11.047	11.047	**33.141**	11.047	11.047	11.047	**33.141**
14.092	Insurance Premium	**14.092**	0.000	0.000	0.000	**0.000**	0.000	0.000	11.274	**11.274**	0.000	0.000	1.409	**1.409**	0.000	0.000	1.409	**1.409**
1,019.300	Natural Gas	**1,010.600**	83.967	84.967	83.967	**252.900**	84.967	83.967	83.967	**252.900**	83.967	84.967	83.967	**252.900**	83.967	83.967	83.967	**251.900**
1.805	Diesel	**1.806**	0.151	0.151	0.151	**0.453**	0.150	0.150	0.150	**0.450**	0.151	0.151	0.151	**0.453**	0.150	0.150	0.150	**0.450**
1,606.091	Conversion Cost	**1,625.918**	112.847	107.696	125.385	**345.928**	131.693	134.352	123.283	**389.327**	134.763	134.968	148.787	**418.518**	161.249	158.169	152.727	**472.145**
401.181	Capital Projects	**340.930**	25.326	29.167	23.074	**77.567**	24.333	32.156	30.658	**87.147**	25.133	30.789	25.489	**81.411**	32.478	32.169	30.158	**94.805**
472.611	V.A.T. Input	**465.243**	34.873	34.827	36.416	**106.116**	37.701	39.123	37.238	**114.062**	38.132	39.161	40.289	**117.581**	43.206	42.698	41.580	**127.484**
4,362.632	**Total Operating Payments**	**4,541.140**	328.793	328.436	340.622	**997.852**	380.473	361.377	453.199	**1,195.048**	353.774	361.665	421.721	**1,137.160**	392.679	436.781	381.620	**1,211.081**

FORECAST CASHFLOW 2014																		
2013		**2014**																
		TOTAL	**JAN**	**FEB**	**MAR**	**1st QTR**	**APR**	**MAY**	**JUN**	**2nd QTR**	**JUL**	**AUG**	**SEP**	**3rd QTR**	**OCT**	**NOV**	**DEC**	**4th QTR**
$M		**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**
331.693	**OPERATING SURPLUS/(DEFICIT)**	**329.225**	**85.032**	**69.885**	**57.699**	**212.618**	**42.848**	**36.944**	**(54.878)**	**24.917**	**69.548**	**36.657**	**(23.399)**	**82.805**	**30.643**	**(38.459)**	**16.702**	**8.884**
	FINANCE AND FIXED CHARGES																	
83.346	Debt Servicing - Principal	**116.849**	0.000	0.000	21.009	**21.009**	20.664	0.000	0.000	**20.664**	0.000	0.000	21.009	**21.009**	20.664	33.502	0.000	**54.167**
58.672	- Interest	**91.876**	0.000	0.000	19.302	**19.302**	7.390	0.000	0.000	**7.390**	0.000	0.000	18.015	**18.015**	6.966	40.203	0.000	**47.169**
0.000	NGC - Principal	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
0.000	- Interest	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
3.752	Rent, Rates & Taxes	**3.752**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**
0.000	Interest on Bank Advances	**0.042**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.042	**0.042**
145.770	Total Finance & Fixed Charges	**212.519**	0.000	0.000	41.249	**41.249**	28.054	0.000	0.938	**28.992**	0.000	0.000	39.962	**39.962**	27.630	73.705	0.979	**102.316**
4,508.402	**TOTAL PAYMENTS**	**4,753.659**	**328.793**	**328.436**	**381.871**	**1,039.101**	**408.527**	**361.377**	**454.137**	**1,224.040**	**353.774**	**361.665**	**461.683**	**1,177.122**	**420.309**	**510.486**	**382.599**	**1,313.397**
185.923	**SURPLUS/(DEFICIT) on Operations**	**116.706**	**85.032**	**69.885**	**16.450**	**171.369**	**14.794**	**36.944**	**(55.816)**	**(4.075)**	**69.548**	**36.657**	**(63.361)**	**42.843**	**3.013**	**(112.164)**	**15.723**	**(93.432)**
	V.A.T. / GREEN FUND LEVY																	
3.012	Less: Green Fund Levy	**3.012**	0.000	0.000	0.675	**0.675**	0.000	0.000	0.691	**0.691**	0.000	0.000	0.725	**0.725**	0.000	0.000	0.921	**0.921**
73.511	Less: V.A.T. to B.I.R.	**98.707**	6.508	0.000	24.089	**30.597**	0.000	20.246	0.000	**20.246**	18.293	0.000	17.483	**35.777**	0.000	12.087	0.000	**12.087**
76.523	**Total V.A.T. / GREEN FUND LEVY**	**101.719**	**6.508**	**0.000**	**24.764**	**31.272**	**0.000**	**20.246**	**0.691**	**20.937**	**18.293**	**0.000**	**18.208**	**36.502**	**0.000**	**12.087**	**0.921**	**13.008**
109.400	**SURPLUS/(DEFICIT) AFTER VAT / GFL**	**14.987**	**78.524**	**69.885**	**(8.314)**	**140.097**	**14.794**	**16.698**	**(56.507)**	**(25.012)**	**51.255**	**36.657**	**(81.569)**	**6.341**	**3.013**	**(124.251)**	**14.802**	**(106.440)**
	NET INVESTMENT (PLACED)/REALISED																	
(75.000)	**Net Investment (Placed)/Realised**	**(125.000)**	(125.000)	0.000	0.000	**(125.000)**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
34.400	**NET INCREASE/(DECREASE) IN FLOW**	**(110.013)**	**(46.476)**	**69.885**	**(8.314)**	**15.097**	**14.794**	**16.698**	**(56.507)**	**(25.012)**	**51.255**	**36.657**	**(81.569)**	**6.341**	**3.013**	**(124.251)**	**14.802**	**(106.440)**
53.377	**Bank Balances-at start of period**	**87.777**	87.777	41.301	111.186	**87.777**	102.872	117.666	134.364	**102.874**	77.862	129.117	165.774	**77.862**	84.205	87.218	(37.033)	**84.205**
87.777	**Should be equal to 4th Qtr Balance>>>**	**(22.236)**	**41.301**	**111.186**	**102.872**	**102.874**	**117.666**	**134.364**	**77.857**	**77.862**	**129.117**	**165.774**	**84.205**	**84.203**	**87.218**	**(37.033)**	**(22.231)**	**(22.235)**

Notes
1) Rates of pay are in accordance with proposed salary increases for OWTU, SSA and EPA Agreements 2012 - 2014
2) Debt servicing comprises payments due in this period for the $500M and $200M Bonds and HSBC Tranche A and Tranche B Loan repayments.
3) Repayment of $600M loan commences in November.

FORECAST CASHFLOW 2015

2014		2015																
		TOTAL	**JAN**	**FEB**	**MAR**	**1st QTR**	**APR**	**MAY**	**JUN**	**2nd QTR**	**JUL**	**AUG**	**SEP**	**3rd QTR**	**OCT**	**NOV**	**DEC**	**4th QTR**
$M		**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**
	INTERNAL RECEIPTS																	
3,895.536	Light and Power	**4,027.920**	335.660	335.660	335.660	**1,006.980**	335.660	335.660	335.660	**1,006.980**	335.660	335.660	335.660	**1,006.980**	335.660	335.660	335.660	**1,006.980**
170.240	Other	**170.241**	5.483	14.978	14.978	**35.439**	14.978	14.978	14.978	**44.934**	14.978	14.978	14.978	**44.934**	14.978	14.978	14.978	**44.934**
584.332	V.A.T. Output	**604.188**	50.349	50.349	50.349	**151.047**	50.349	50.349	50.349	**151.047**	50.349	50.349	50.349	**151.047**	50.349	50.349	50.349	**151.047**
4,650.109	Total	**4,802.349**	391.492	400.987	400.987	**1,193.466**	400.987	400.987	400.987	**1,202.961**	400.987	400.987	400.987	**1,202.961**	400.987	400.987	400.987	**1,202.961**
0.000	**OTHER FUNDING**																	
100.000	Dividend & Debentures	**100.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**
0.000	Government Guaranteed Loan	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
120.256	Capital Contributions	**120.257**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**
4,870.365	**TOTAL RECEIPTS**	**5,022.606**	**426.512**	**411.008**	**411.008**	**1,248.530**	**436.008**	**411.008**	**411.008**	**1,258.025**	**436.009**	**411.009**	**411.009**	**1,258.025**	**436.009**	**411.009**	**411.009**	**1,258.025**
	OPERATING PAYMENTS																	
294.588	Salaries	**328.584**	26.549	26.549	27.549	**80.646**	27.549	27.549	27.549	**82.646**	27.549	27.549	27.549	**82.646**	27.549	27.549	27.549	**82.646**
188.012	Wages	**205.800**	17.100	17.200	17.150	**51.450**	17.100	17.200	17.150	**51.450**	17.100	17.200	17.150	**51.450**	17.100	17.200	17.150	**51.450**
223.000	Backpay	**0.000**				**0.000**				**0.000**				**0.000**				**0.000**
122.020	Employee Related Benefits	**140.020**	11.668	11.668	11.668	**35.005**	11.668	11.668	11.668	**35.005**	11.668	11.668	11.668	**35.005**	11.668	11.668	11.668	**35.005**
122.368	Supplies - Local	**117.660**	9.805	9.805	9.805	**29.415**	9.805	9.805	9.805	**29.415**	9.805	9.805	9.805	**29.415**	9.805	9.805	9.805	**29.415**
132.563	- Foreign	**127.468**	10.622	10.622	10.622	**31.867**	10.622	10.622	10.622	**31.867**	10.622	10.622	10.622	**31.867**	10.622	10.622	10.622	**31.867**
14.092	Insurance Premium	**14.092**	0.000	0.000	0.000	**0.000**	0.000	0.000	11.274	**11.274**	0.000	0.000	1.409	**1.409**	0.000	0.000	1.409	**1.409**
1,010.600	Natural Gas	**1,079.500**	89.292	91.292	89.292	**269.875**	89.292	91.292	89.292	**269.875**	89.292	91.292	89.292	**269.875**	89.292	91.292	89.292	**269.875**
1.806	Diesel	**1.806**	0.151	0.151	0.151	**0.453**	0.150	0.150	0.150	**0.450**	0.151	0.151	0.151	**0.453**	0.150	0.150	0.150	**0.450**
1,625.918	Conversion Cost	**1,550.027**	107.492	102.562	119.494	**329.548**	125.532	128.076	117.481	**371.089**	128.470	128.666	141.893	**399.030**	153.822	150.873	145.665	**450.360**
340.930	Capital Projects	**267.157**	15.500	19.450	25.654	**60.604**	20.333	21.159	25.123	**66.615**	20.658	21.659	23.752	**66.069**	19.989	20.547	33.333	**73.869**
465.243	V.A.T. Input	**452.422**	33.336	33.489	36.659	**103.484**	36.767	37.572	36.278	**110.617**	37.256	37.736	39.734	**114.726**	40.959	40.900	41.737	**123.595**
4,541.140	**Total Operating Payments**	**4,284.536**	321.515	322.788	348.044	**992.347**	348.817	355.094	356.392	**1,060.303**	352.571	356.349	373.026	**1,081.945**	380.955	380.606	388.380	**1,149.941**

FORECAST CASHFLOW 2015																		
2014		2015																
		TOTAL	JAN	FEB	MAR	1st QTR	APR	MAY	JUN	2nd QTR	JUL	AUG	SEP	3rd QTR	OCT	NOV	DEC	4th QTR
$M		$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M
329.225	**OPERATING SURPLUS/(DEFICIT)**	**738.070**	**104.997**	**88.220**	**62.964**	**256.183**	**87.191**	**55.914**	**54.616**	**197.722**	**83.438**	**54.660**	**37.983**	**176.080**	**55.054**	**30.403**	**22.629**	**108.084**
	FINANCE AND FIXED CHARGES																	
116.849	Debt Servicing - Principal	**160.102**	0.000	0.000	21.009	**21.009**	20.664	33.502	9.750	**63.917**	0.000	0.000	21.009	**21.009**	20.664	33.502	0.000	**54.167**
91.876	- Interest	**231.209**	**12.502**	**79.705**	16.728	**108.935**	6.466	38.528	14.625	**59.619**	0.000	0.000	15.441	**15.441**	6.037	41.177	0.000	**47.214**
0.000	NGC - Principal	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
0.000	- Interest	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
3.752	Rent, Rates & Taxes	**3.752**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**
0.042	Interest on Bank Advances	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
212.519	Total Finance & Fixed Charges	**395.063**	12.502	79.705	38.675	**130.882**	27.131	72.030	25.313	**124.474**	0.000	0.000	37.388	**37.388**	26.702	74.679	0.938	**102.319**
4,753.659	**TOTAL PAYMENTS**	**4,679.599**	**334.017**	**402.493**	**386.719**	**1,123.229**	**375.948**	**427.124**	**381.705**	**1,184.777**	**352.571**	**356.349**	**410.414**	**1,119.333**	**407.657**	**455.285**	**389.318**	**1,252.260**
116.706	**SURPLUS/(DEFICIT) on Operations**	**343.007**	**92.495**	**8.515**	**24.289**	**125.301**	**60.060**	**(16.116)**	**29.303**	**73.248**	**83.438**	**54.660**	**0.595**	**138.692**	**28.352**	**(44.276)**	**21.691**	**5.765**
	V.A.T. / GREEN FUND LEVY																	
3.012	Less: Green Fund Levy	**3.012**	0.000	0.000	0.675	**0.675**	0.000	0.000	0.691	**0.691**	0.000	0.000	0.725	**0.725**	0.000	0.000	0.921	**0.921**
98.707	Less: V.A.T. to B.I.R.	**127.729**	11.406	0.000	29.470	**40.876**	0.000	23.727	0.000	**23.727**	23.358	0.000	22.364	**45.722**	0.000	17.405	0.000	**17.405**
101.719	**Total V.A.T. / GREEN FUND LEVY**	**130.741**	**11.406**	**0.000**	**30.145**	**41.551**	**0.000**	**23.727**	**0.691**	**24.418**	**23.358**	**0.000**	**23.089**	**46.447**	**0.000**	**17.405**	**0.921**	**18.326**
14.987	**SURPLUS/(DEFICIT) AFTER VAT / GFL**	**212.266**	**81.089**	**8.515**	**(5.856)**	**83.750**	**60.060**	**(39.843)**	**28.612**	**48.830**	**60.080**	**54.660**	**(22.494)**	**92.245**	**28.352**	**(61.681)**	**20.770**	**(12.561)**
	NET INVESTMENT (PLACED)/REALISED																	
(125.000)	**Net Investment (Placed)/Realised**	**(170.000)**	0.000	0.000	0.000	**0.000**	(10.000)	0.000	(100.000)	**(110.000)**	0.000	(60.000)	0.000	**(60.000)**	0.000	0.000	0.000	**0.000**
(110.013)	**NET INCREASE/(DECREASE) IN FLOW**	**42.266**	**81.089**	**8.515**	**(5.856)**	**83.750**	**50.060**	**(39.843)**	**(71.388)**	**(61.170)**	**60.080**	**(5.340)**	**(22.494)**	**32.245**	**28.352**	**(61.681)**	**20.770**	**(12.561)**
87.777	**Bank Balances-at start of period**	**(22.236)**	(22.236)	58.853	67.368	**(22.236)**	61.512	111.572	71.729	**61.514**	0.344	60.424	55.084	**0.344**	32.590	60.942	(0.739)	**32.590**
(22.236)	**Should be equal to 4th Qtr Balance>>>**	**20.024**	**58.853**	**67.368**	**61.512**	**61.514**	**111.572**	**71.729**	**0.341**	**0.344**	**60.424**	**55.084**	**32.590**	**32.589**	**60.942**	**(0.739)**	**20.031**	**20.029**

Notes 1) Rates of pay are in accordance with proposed salary increases for OWTU, SSA and EPA Agreements 2012 - 2014

2) Debt servicing comprises payments due in this period for the $500M and HSBC Tranche A and Tranche B Loan repayments.

FORECAST CASHFLOW 2016																		
2015		**2016**																
		TOTAL	**JAN**	**FEB**	**MAR**	**1st QTR**	**APR**	**MAY**	**JUN**	**2nd QTR**	**JUL**	**AUG**	**SEP**	**3rd QTR**	**OCT**	**NOV**	**DEC**	**4th QTR**
$M		**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**
	INTERNAL RECEIPTS																	
4,027.920	Light and Power	**4,189.388**	349.116	349.116	349.116	**1,047.347**	349.116	349.116	349.116	**1,047.347**	349.116	349.116	349.116	**1,047.347**	349.116	349.116	349.116	**1,047.347**
170.241	Other	**170.240**	5.483	14.978	14.978	**35.439**	14.978	14.978	14.978	**44.934**	14.978	14.978	14.978	**44.934**	14.978	14.978	14.978	**44.934**
604.188	V.A.T. Output	**628.408**	52.367	52.367	52.367	**157.102**	52.367	52.367	52.367	**157.102**	52.367	52.367	52.367	**157.102**	52.367	52.367	52.367	**157.102**
4,802.349	Total	**4,988.037**	406.966	416.461	416.461	**1,239.888**	416.461	416.461	416.461	**1,249.383**	416.461	416.461	416.461	**1,249.383**	416.461	416.461	416.461	**1,249.383**
	OTHER FUNDING																	
100.000	Dividend & Debentures	**100.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**	25.000	0.000	0.000	**25.000**
0.000	Government Guaranteed Loan	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
120.257	Capital Contributions	**120.256**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**	10.021	10.021	10.021	**30.064**
5,022.606	**TOTAL RECEIPTS**	**5,208.293**	**441.986**	**426.482**	**426.482**	**1,294.952**	**451.482**	**426.482**	**426.482**	**1,304.447**	**451.482**	**426.482**	**426.482**	**1,304.447**	**451.482**	**426.482**	**426.482**	**1,304.447**
	OPERATING PAYMENTS																	
328.584	Salaries	**329.684**	27.549	27.249	27.549	**82.346**	27.349	27.149	27.549	**82.046**	27.549	27.549	27.549	**82.646**	27.549	27.549	27.549	**82.646**
205.800	Wages	**205.800**	17.100	17.200	17.150	**51.450**	17.100	17.200	17.150	**51.450**	17.100	17.200	17.150	**51.450**	17.100	17.200	17.150	**51.450**
0.000	Backpay	**0.000**				**0.000**				**0.000**				**0.000**				**0.000**
140.020	Employee Related Benefits	**122.020**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**	10.168	10.168	10.168	**30.505**
117.660	Supplies - Local	**117.660**	9.805	9.805	9.805	**29.415**	9.805	9.805	9.805	**29.415**	9.805	9.805	9.805	**29.415**	9.805	9.805	9.805	**29.415**
127.468	- Foreign	**127.468**	10.622	10.622	10.622	**31.867**	10.622	10.622	10.622	**31.867**	10.622	10.622	10.622	**31.867**	10.622	10.622	10.622	**31.867**
14.092	Insurance Premium	**14.092**	0.000	0.000	0.000	**0.000**	0.000	0.000	11.274	**11.274**	0.000	0.000	1.409	**1.409**	0.000	0.000	1.409	**1.409**
1,079.500	Natural Gas	**1,165.100**	97.117	95.517	95.517	**288.150**	98.117	97.017	95.517	**290.650**	97.117	96.517	97.517	**291.150**	97.117	98.517	99.517	**295.150**
1.806	Diesel	**1.806**	0.151	0.151	0.151	**0.453**	0.150	0.150	0.150	**0.450**	0.151	0.151	0.151	**0.453**	0.150	0.150	0.150	**0.450**
1,550.027	Conversion Cost	**1,573.403**	109.070	104.050	121.190	**334.311**	127.438	129.929	119.241	**376.609**	130.330	130.630	144.098	**405.059**	156.244	153.242	147.938	**457.424**
267.157	Capital Projects	**197.276**	16.659	15.789	13.451	**45.899**	20.133	19.125	17.897	**57.155**	14.125	16.458	18.921	**49.504**	15.478	16.451	12.789	**44.718**
452.422	V.A.T. Input	**458.287**	34.920	33.797	36.017	**104.734**	38.346	38.404	36.391	**113.142**	37.729	38.034	40.574	**116.337**	41.819	41.725	40.530	**124.074**
4,284.536	**Total Operating Payments**	**4,312.596**	333.162	324.348	341.621	**999.130**	359.229	359.569	355.765	**1,074.563**	354.696	357.135	377.965	**1,089.795**	386.052	385.429	377.628	**1,149.108**

FORECAST CASHFLOW 2016																		
2015		**2016**																
		TOTAL	**JAN**	**FEB**	**MAR**	**1st QTR**	**APR**	**MAY**	**JUN**	**2nd QTR**	**JUL**	**AUG**	**SEP**	**3rd QTR**	**OCT**	**NOV**	**DEC**	**4th QTR**
$M		**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**
738.070	**OPERATING SURPLUS/(DEFICIT)**	**895.697**	**108.824**	**102.134**	**84.861**	**295.822**	**92.253**	**66.913**	**70.717**	**229.884**	**96.786**	**69.347**	**48.517**	**214.652**	**65.430**	**41.053**	**48.854**	**155.339**
	FINANCE AND FIXED CHARGES																	
160.102	Debt Servicing - Principal	**179.542**	0.000	0.000	21.009	**21.009**	20.664	33.502	9.750	**63.917**	19.440	0.000	21.009	**40.449**	20.664	33.502	0.000	**54.167**
231.209	- Interest	**143.712**	0.000	0.000	14.155	**14.155**	5.573	35.178	14.000	**54.750**	23.328	0.000	12.868	**36.196**	5.108	33.502	0.000	**38.611**
0.000	NGC - Principal	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
0.000	- Interest	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
3.752	Rent, Rates & Taxes	**3.752**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**	0.000	0.000	0.938	**0.938**
0.000	Interest on Bank Advances	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**	0.000	0.000	0.000	**0.000**
395.063	Total Finance & Fixed Charges	**327.006**	0.000	0.000	36.102	**36.102**	26.237	68.680	24.688	**119.605**	42.768	0.000	34.815	**77.583**	25.773	67.005	0.938	**93.716**
4,679.599	**TOTAL PAYMENTS**	**4,639.602**	**333.162**	**324.348**	**377.723**	**1,035.232**	**385.466**	**428.249**	**380.453**	**1,194.168**	**397.464**	**357.135**	**412.780**	**1,167.378**	**411.825**	**452.434**	**378.566**	**1,242.824**
343.007	**SURPLUS/(DEFICIT) on Operations**	**568.691**	**108.824**	**102.134**	**48.759**	**259.720**	**66.016**	**(1.767)**	**46.029**	**110.279**	**54.018**	**69.347**	**13.702**	**137.069**	**39.657**	**(25.952)**	**47.916**	**61.623**
	V.A.T. / GREEN FUND LEVY																	
3.012	Less: Green Fund Levy	**3.012**	0.000	0.000	0.675	**0.675**	0.000	0.000	0.691	**0.691**	0.000	0.000	0.725	**0.725**	0.000	0.000	0.921	**0.921**
127.729	Less: V.A.T. to B.I.R.	**142.460**	15.713	0.000	31.335	**47.049**	0.000	26.423	0.000	**26.423**	24.346	0.000	25.205	**49.551**	0.000	19.437	0.000	**19.437**
130.741	**Total V.A.T. / GREEN FUND LEVY**	**145.472**	**15.713**	**0.000**	**32.010**	**47.724**	**0.000**	**26.423**	**0.691**	**27.114**	**24.346**	**0.000**	**25.930**	**50.276**	**0.000**	**19.437**	**0.921**	**20.358**
212.266	**SURPLUS/(DEFICIT) AFTER VAT / GFL**	**423.219**	**93.111**	**102.134**	**16.749**	**211.996**	**66.016**	**(28.190)**	**45.338**	**83.165**	**29.672**	**69.347**	**(12.228)**	**86.793**	**39.657**	**(45.389)**	**46.995**	**41.265**
	NET INVESTMENT (PLACED)/REALISED																	
(170.000)	**Net Investment (Placed)/Realised**	**(440.000)**	(50.000)	(140.000)	0.000	**(190.000)**	0.000	0.000	(75.000)	**(75.000)**	0.000	(125.000)	0.000	**(125.000)**	0.000	0.000	(50.000)	**(50.000)**
42.266	**NET INCREASE/(DECREASE) IN FLOW**	**(16.781)**	**43.111**	**(37.866)**	**16.749**	**21.996**	**66.016**	**(28.190)**	**(29.662)**	**8.165**	**29.672**	**(55.653)**	**(12.228)**	**(38.207)**	**39.657**	**(45.389)**	**(3.005)**	**(8.735)**
(22.236)	**Bank Balances-at start of period**	**20.024**	20.024	63.135	25.269	**20.024**	42.018	108.034	79.844	**42.020**	50.185	79.857	24.204	**50.185**	11.976	51.633	6.244	**11.976**
20.024	**Should be equal to 4th Qtr Balance>>>**	**3.237**	**63.135**	**25.269**	**42.018**	**42.020**	**108.034**	**79.844**	**50.182**	**50.185**	**79.857**	**24.204**	**11.976**	**11.978**	**51.633**	**6.244**	**3.239**	**3.241**

Notes 1) Rates of pay are in accordance with proposed salary increases for OWTU, SSA and EPA Agreements 2012 - 2014

2) Debt servicing comprises payments due in this period for the $500M and HSBC Tranche A and Tranche B Loan repayments.

APPENDIX II - COST OF SERVICE STUDY SUMMARY 2008 AND 2011-2016

SUMMARY OF RESULTS 2008

Line No.	Description	Total Company		Domestic Rate A	Commer-cial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1	Large Load Rate E5	Street Lighting
	OPERATING EXPENSES:	$		$	$	$	$	$	$	$	$	$	$	$
1	Bulk Power & Generation	1182062,357	AET & ET	365774,159	106882,152	21,887	95833,530	244692,909	57315,648	97267,831	1268,618	53834,361	142865,256	16306,441
2	Transmission	17490,306	AET & ET	5211,754	1522,916	315	1722,526	4040,611	804,991	859,081	36,529	720,692	2290,267	280,638
3	Distribution	313251,927	AED & DCL	202780,801	30653,540	3,920	21807,326	46449,414	4455,350	2988,738	8,896	175,180	556,603	3372,163
4	Administrative & General	130069,669	SAW	64303,867	12211,865	1,787	10456,369	22697,189	3673,492	3625,003	134,304	2644,811	8403,385	1917,651
5	Customer Accounts & Services	74069,064	CAS	62492,510	8055,086	0	2444,521	1021,949	15,593	23,990	1,199	2,400	1,199	10,616
6	Total Operating Expenses	1716943,323		700563,091	159325,559	27,909	132264,272	318902,072	66265,074	104764,643	1449,546	57377,444	154116,710	21887,509
	DEPRECIATION EXPENSES:													
7	Generation	185590,359	AET	55302,136	16159,728	3,345	18277,792	42875,087	8541,796	9115,742	387,612	7647,296	24302,120	2977,863
8	Transmission	1480,711	AET	441,222	128,929	27	145,827	342,074	68,150	72,729	3,093	61,013	193,892	23,759
9	Distribution	18488,859	AED, DCL, SP & MET	6816,814	1537,427	276	1831,613	3955,823	372,368	243,306	27	54	27	3731,126
10	Administrative & General	51777,796	SAW	25597,916	4861,268	711	4162,444	9035,238	1462,334	1443,032	53,463	1052,840	3345,198	763,374
11	Total Depreciation Expenses	257337,725		88158,088	22687,352	4,359	24417,676	56208,222	10444,648	10874,809	444,195	8761,203	27841,237	7496,122
	TAXES AND OTHER DUTIES:													

Lin e		Total		Domestic	Commer-cial	Commercial	Large Load	Large Load	Large Load	Large Load	Large Load	Large Load	Large Load	Street
No.	Description	Company		Rate A	Rate B	Rate B1	Rate D1	Rate D2	Rate D3	Rate D4	Rate D5	Rate E1	Rate E5	Lighting
12	Generation	263,445		78,501	22,939	5	25,945	60,861	12,125	12,940	550	10,855	34,497	4,227
13	Transmission	7755,873		2311,092	675,320	140	763,834	1791,762	356,964	380,949	16,198	319,583	1015,592	124,446
14	Distribution	95	AED,	34	10	0	14	30	3	2	0	0	0	2
			DCL & SP											
15	Administrative & General	902,947	SAW	446,399	84,775	12	72,588	157,564	25,501	25,165	932	18,360	58,337	13,312
16	Total Taxes & Other Duties	8922,360		2836,026	783,043	157	862,381	2010,217	394,593	419,056	17,681	348,798	1108,426	141,987
	COST OF PROVIDING ADEQUATE													
	MAINTENANCE & INTEREST PAYMENT													
	ON BORROWINGS :													
	(i) Maintenance Expenses:													
17	Generation	2660,115	AET	792,660	231,622	48	261,980	614,540	122,432	130,658	5,556	109,611	348,329	42,682
18	Transmission	9311,625	AET	2774,674	810,782	168	917,052	2151,172	428,568	457,364	19,448	383,688	1219,310	149,408
19	Distribution	94740,727	AED, DCL, SP & MET	53403,583	9162,161	1,345	8079,254	17406,229	1636,124	1067,824	12	25	12	3984,156
20	(ii) Interest Expenses	**157903,394**	RATE BASE ALLO-CATOR	70097,545	14337,626	2,431	13579,610	30611,539	4942,491	4851,003	177,905	3508,727	11149,916	4644,525
21	(iii) Loss / (Gain) on Exchange	(10126,439)	RATE BASE ALLO-CATOR	(4495,397)	(919,481)	(156)	(870,868)	(1963,136)	(316,965)	(311,098)	(11,409)	(225,017)	(715,051)	(297,856)
22	**Total Maintenance & Interest**	254489,422		122573,065	23622,710	3,836	21967,027	48820,344	6812,649	6195,752	191,511	3777,034	12002,516	8522,915
23	**TOTAL EXPENSES**	**2,237,692,831**		**914130,270**	**206418,665**	**36,261**	**179511,357**	**425940,855**	**83916,964**	**122254,260**	**2102,933**	**70264,479**	**195068,889**	**38048,533**
	PERCENTAGE RETURN ON RATE BASE:													
24	Rate Base	4777987,324		2121076,532	433841,187	73,566	410904,425	926272,343	149554,467	146786,159	5383,221	106170,309	337384,496	140538,336

Line No.	Description	Total Company		Domestic Rate A	Commer-cial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1	Large Load Rate E5	Street Lighting
25	Return at 8.0%	382238,986		169686,123	34707,295	5,885	32872,354	74101,787	11964,357	11742,893	430,658	8493,625	26990,760	11243,067
26	**TOTAL COST OF SERVICE**	**2619931,817**		**1083816,393**	**241125,960**	**42,146**	**212383,711**	**500042,642**	**95881,321**	**133997,153**	**2533,591**	**78758,104**	**222059,649**	**49291,600**
	REVENUE REQUIRE-MENTS :													
27	Total Cost of Service	2619931,817		1083816,393	241125,960	42,146	212383,711	500042,642	95881,321	133997,153	2533,591	78758,104	222059,649	49291,600
28	Less : Miscellaneous Revenues	205906,704		88899,275	20957,795	3,589	18573,717	45245,368	7740,100	0	0	5754,766	15498,325	3300,461
29	**Revenue required from Sales(with 8.0% Rate Base)**	**2414025,113**		**994917,118**	**220168,165**	**38,557**	**193809,994**	**454797,274**	**88141,221**	**133997,153**	**2533,591**	**73003,338**	**206561,324**	**45991,139**
30	Present Rates Revenue	2260518,513		**589601,827**	**281137,620**	**86,958**	**201424,103**	**512446,590**	**98470,493**	**210386,655**	**2465,708**	**83156,351**	**217174,313**	**64167,895**
31	**REVENUE SURPLUS / (DEFICIENCY)**	**(153506,600)**		**(405315,291)**	**60969,455**	**48,401**	**7614,109**	**57649,316**	**10329,272**	**76389,502**	**(67,883)**	**10153,013**	**10612,989**	**18176,756**
32	**PERCENT SURPLUS / (DEFICIENCY) %**	**(6.79)**		**(68.74)**	**21.69**	**55.66**	**3.78**	**11.25**	**10.49**	**36.31**	**(2.75)**	**12.21**	**4.89**	**28.33**
33	Number of Customers	399,092		359,231	36,822	2	2,038	852	13	20	1	2	1	110
34	Present Avg. Mthly Bill / Customer($)	N/A		136.77	636.25	3,623.25	8,236.18	50,121.93	631,221.11	876,611.06	205,475.67	3464,847.96	18097,859.42	48,612.04
35	Deficiency per Bill per Customer ($)	N/A		**(94.02)**	**137.98**	**2,016.71**	311.34	5,638.63	66,213.28	318,289.59	(5,656.92)	423,042.21	884,415.75	13,770.27
36	kWh Sold	7536281,512		2398345,448	700815,856	142,411	511311,672	1422761,244	379431,806	810509,458	2264,646	367634,579	851978,820	91085,572
37	Present Revenue per kWh (c)	30.00		24.58	40.12	61.06	39.39	36.02	25.95	25.96	108.88	22.62	25.49	70.45
38	Computed Cost per kWh (c)	32.03		41.48	31.42	27.07	37.90	31.97	23.23	16.53	111.88	19.86	24.24	50.49
39	**Gain / (Loss) per kWh Sold (c)**	**(2.03)**		**(16.90)**	**8.70**	**33.99**	**1.49**	**4.05**	**2.72**	**9.43**	**(3.00)**	**2.76**	**1.25**	**19.96**

SUMMARY OF RESULTS 2011

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1	La R
	OPERATING EXPENSES:	$		$	$	$	$	$	$	$	$	$	
1	Bulk Power & Generation	1,997,804,464	AET & ET	618,195,177	180,641,604	36,991	161,968,320	413,555,666	96,869,219	164,392,433	2,144,092	90,985,493	24
2	Transmission	30,063,056	AET & ET	8,958,177	2,617,651	541	2,960,748	6,945,168	1,383,652	1,476,624	62,788	1,238,755	
3	Distribution	301,256,600	AED & DCL	195,015,734	29,479,727	3,770	20,972,260	44,670,731	4,284,741	2,874,290	8,555	168,472	
4	Administrative & General	227,260,899	SAW	112,353,285	21,336,868	3,122	18,269,623	39,657,082	6,418,415	6,333,694	234,659	4,621,078	1
5	Customer Accounts & Services	106,326,579	CAS	89,708,368	11,563,124	0	3,509,124	1,467,014	22,384	34,438	1,721	3,445	
6	Total Operating Expenses	2,662,711,599		1,024,230,741	245,638,974	44,425	207,680,076	506,295,662	108,978,411	175,111,479	2,451,815	97,017,244	26
	DEPRECIATION EXPENSES:												
7	Generation	131,170,359	AET	39,086,087	11,421,268	2,364	12,918,260	30,302,978	6,037,116	6,442,765	273,954	5,404,907	1
8	Transmission	1,046,528	AET	311,844	91,124	19	103,067	241,769	48,167	51,403	2,186	43,122	
9	Distribution	13,067,437	AED, DCL, SP & MET	4,817,944	1,086,613	195	1,294,536	2,795,871	263,180	171,962	19	38	
10	Administrative & General	36,595,177	SAW	18,091,930	3,435,816	503	2,941,905	6,385,867	1,033,539	1,019,897	37,786	744,119	
11	Total Depreciation Expenses	181,879,500		62,307,806	16,034,821	3,081	17,257,768	39,726,485	7,382,001	7,686,027	313,945	6,192,187	1
	TAXES AND OTHER DUTIES:												
12	Generation	268,714		80,071	23,397	5	26,464	62,078	12,368	13,199	561	11,072	
13	Transmission	8,265,699		2,463,009	719,711	149	814,044	1,909,542	380,429	405,991	17,263	340,590	

SUMMARY OF RESULTS 2011

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1	La R
14	Distribution	101	AED, DCL & SP	36	11	0	15	32	3	2	0	0	
15	Administrative & General	2,003,648	SAW	990,564	188,117	27	161,073	349,636	56,587	55,841	2,068	40,741	
16	Total Taxes & Other Duties	10,538,162		3,533,681	931,236	180	1,001,597	2,321,288	449,386	475,033	19,893	392,404	
	COST OF PROVIDING ADEQUATE												
	MAINTENANCE & INTEREST PAYMENT												
	ON BORROWINGS :												
	(i) Maintenance Expenses:												
17	Generation	4,495,862	AET	1,339,675	391,464	81	442,773	1,038,634	206,922	220,826	9,390	185,253	
18	Transmission	9,923,717	AET	2,957,065	864,078	179	977,333	2,292,577	456,739	487,429	20,726	408,909	
19	Distribution	100,968,428	AED, DCL, SP & MET	56,914,022	9,764,428	1,433	8,610,337	18,550,413	1,743,673	1,138,017	13	27	
20	(ii) Interest Expenses	102,453,450	RATE BASE ALLOCATOR	45,481,830	9,302,772	1,577	8,810,943	19,861,877	3,206,867	3,147,507	115,431	2,276,589	
21	(iii) Loss / (Gain) on Exchange	(9,620,117)	RATE BASE ALLOCATOR	(4,270,628)	(873,507)	(148)	(827,325)	(1,864,979)	(301,117)	(295,543)	(10,839)	(213,766)	
22	**Total Maintenance & Interest**	208,221,340		102,421,965	19,449,235	3,123	18,014,062	39,878,522	5,313,085	4,698,235	134,721	2,657,012	
23	**TOTAL EXPENSES**	**3,063,350,601**		**1,192,494,192**	**282,054,266**	**50,809**	**243,953,502**	**588,221,957**	**122,122,883**	**187,970,774**	**2,920,374**	**106,258,847**	**28**
	PERCENTAGE RETURN ON RATE BASE:												
24	Rate Base	7,663,600,000		3,402,077,278	695,854,781	117,995	659,065,614	1,485,684,295	239,876,236	235,436,039	8,634,358	170,290,695	54
25	Return at 8.0%	613,088,000		272,166,182	55,668,382	9,440	52,725,249	118,854,744	19,190,099	18,834,883	690,749	13,623,256	4

SUMMARY OF RESULTS 2011

Line		Total		Domestic	Commercial	Commercial	Large Load	Large Load	Large Load	Large Load	Large Load	Large Load	La
No.	Description	Company		Rate A	Rate B	Rate B1	Rate D1	Rate D2	Rate D3	Rate D4	Rate D5	Rate E1	R
26	**TOTAL COST OF SERVICE**	**3,676,438,601**		**1,464,660,374**	**337,722,648**	**60,249**	**296,678,751**	**707,076,701**	**141,312,982**	**206,805,657**	**3,611,123**	**119,882,103**	**33**
	REVENUE REQUIREMENTS :												
27	Total Cost of Service	3,676,438,601		1,464,660,374	337,722,648	60,249	296,678,751	707,076,701	141,312,982	206,805,657	3,611,123	119,882,103	33
28	Less : Miscellaneous Revenues	179,734,000		77,599,330	18,293,860	3,133	16,212,821	39,494,251	6,756,260	0	0	5,023,280	1
29	**Revenue required from Sales(with 8.0% Rate Base)**	**3,496,704,601**		**1,387,061,044**	**319,428,788**	**57,116**	**280,465,930**	**667,582,450**	**134,556,722**	**206,805,657**	**3,611,123**	**114,858,823**	**31**
30	Present Rates Revenue	3,340,438,000		871,272,824	415,445,741	128,501	297,650,616	757,258,148	145,512,888	310,894,856	3,643,653	122,882,707	32
31	**REVENUE SURPLUS / (DEFICIENCY)**	**(156,266,601)**		**(515,788,220)**	**96,016,953**	**71,384**	**17,184,686**	**89,675,697**	**10,956,165**	**104,089,199**	**32,530**	**8,023,885**	
32	**PERCENT SURPLUS / (DEFICIENCY) %**	**(4.68)**		**(59.20)**	**23.11**	**55.55**	**5.77**	**11.84**	**7.53**	**33.48**	**0.89**	**6.53**	
33	Number of Customers	426,741		384,294	39,178	14	2,256	911	14	21	1	2	
34	Present Avg Mthly Bill / Customer($)	N/A		188.93	883.67	764.88	10,994.78	69,269.86	866,148.14	1,233,709.75	303,637.74	5,120,112.80	26,7
35	Deficiency per Bill per Customer ($)	N/A		(111.85)	204.23	424.91	634.78	8,203.05	65,215.27	413,052.38	2,710.82	334,328.53	
36	kWh Sold	8,121,000,000		2,584,426,199	755,190,150	153,460	550,982,880	1,533,149,212	408,870,833	873,394,564	2,440,353	396,158,293	91
37	Present Revenue per kWh (c)	41.13		33.71	55.01	83.74	54.02	49.39	35.59	35.60	149.31	31.02	
38	Computed Cost per kWh (c)	43.06		53.67	42.30	37.22	50.90	43.54	32.91	23.68	147.98	28.99	
39	**Gain / (Loss) per kWh Sold (c)**	**(1.93)**		**(19.96)**	**12.71**	**46.52**	**3.12**	**5.85**	**2.68**	**11.92**	**1.33**	**2.03**	

SUMMARY OF RESULTS 2012

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1
	OPERATING EXPENSES:	$		$	$	$	$	$	$	$	$	$
1	Bulk Power & Generation	2,504,730,704	AET & ET	775,057,053	226,477,906	46,377	203,066,432	518,491,972	121,448,976	206,105,644	2,688,138	114,072,304
2	Transmission	26,800,072	AET & ET	7,985,874	2,333,536	483	2,639,395	6,191,353	1,233,473	1,316,354	55,973	1,104,303
3	Distribution	242,370,456	AED & DCL	156,896,322	23,717,372	3,033	16,872,846	35,939,015	3,447,210	2,312,458	6,883	135,541
4	Administrative & General	175,670,428	SAW	86,847,979	16,493,188	2,413	14,122,238	30,654,533	4,961,371	4,895,883	181,389	3,572,048
5	Customer Accounts & Services	83,133,790	CAS	70,140,473	9,040,884	0	2,743,687	1,147,018	17,501	26,926	1,346	2,694
6	Total Operating Expenses	3,032,705,450		1,096,927,701	278,062,887	52,307	239,444,597	592,423,890	131,108,532	214,657,264	2,933,728	118,886,890
	DEPRECIATION EXPENSES:											
7	Generation	141,630,192	AET	42,202,904	12,332,027	2,553	13,948,393	32,719,409	6,518,529	6,956,527	295,800	5,835,907
8	Transmission	1,129,980	AET	336,711	98,390	21	111,285	261,048	52,008	55,502	2,360	46,561
9	Distribution	14,109,465	AED, DCL, SP & MET	5,202,138	1,173,262	211	1,397,765	3,018,820	284,166	185,675	21	41
10	Administrative & General	39,513,363	SAW	19,534,623	3,709,796	543	3,176,500	6,895,091	1,115,956	1,101,226	40,799	803,457
11	Total Depreciation Expenses	196,383,000		67,276,377	17,313,475	3,326	18,633,943	42,894,369	7,970,659	8,298,929	338,980	6,685,966
	TAXES AND OTHER DUTIES:											
12	Generation	274,088		81,673	23,865	5	26,993	63,320	12,615	13,463	572	11,294
13	Transmission	6,562,920		1,955,616	571,447	118	646,347	1,516,166	302,058	322,354	13,707	270,427
14	Distribution	80	AED, DCL & SP	29	8	0	12	25	3	2	0	0
15	Administrative & General	1,548,800	SAW	765,696	145,412	21	124,508	270,265	43,741	43,165	1,599	31,492
16	Total Taxes & Other Duties	8,385,889		2,803,014	740,733	144	797,860	1,849,776	358,417	378,984	15,878	313,213

SUMMARY OF RESULTS 2012

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1	La I
	COST OF PROVIDING ADEQUATE												
	MAINTENANCE & INTEREST PAYMENT												
	ON BORROWINGS :												
	(i) Maintenance Expenses:												
17	Generation	5,636,650	AET	1,679,607	490,795	102	555,123	1,302,179	259,427	276,858	11,772	232,260	
18	Transmission	7,879,377	AET	2,347,893	686,073	142	775,997	1,820,294	362,648	387,016	16,456	324,672	
19	Distribution	80,168,384	AED, DCL, SP & MET	45,189,425	7,752,903	1,138	6,836,561	14,728,927	1,384,467	903,579	10	21	
20	(ii) Interest Expenses	89,755,778	RATE BASE ALLOCATOR	39,844,994	8,149,823	1,382	7,718,950	17,400,275	2,809,421	2,757,418	101,125	1,994,438	
21	(iii) Loss / (Gain) on Exchange	(9,139,111)	RATE BASE ALLOCATOR	(4,057,096)	(829,831)	(141)	(785,959)	(1,771,731)	(286,061)	(280,766)	(10,297)	(203,078)	
22	**Total Maintenance & Interest**	174,301,079		85,004,822	16,249,763	2,623	15,100,673	33,479,945	4,529,902	4,044,105	119,067	2,348,313	
23	**TOTAL EXPENSES**	**3,411,775,418**		**1,252,011,914**	**312,366,858**	**58,400**	**273,977,073**	**670,647,980**	**143,967,510**	**227,379,281**	**3,407,654**	**128,234,382**	**34**
	PERCENTAGE RETURN ON RATE BASE:												
24	Rate Base	8,216,739,000		3,647,630,494	746,079,795	126,512	706,635,281	1,592,917,178	257,189,887	252,429,208	9,257,564	182,581,840	58
25	Return at 8.0%	657,339,120		291,810,440	59,686,384	10,121	56,530,822	127,433,374	20,575,191	20,194,337	740,605	14,606,547	4
26	**TOTAL COST OF SERVICE**	**4,069,114,538**		**1,543,822,354**	**372,053,242**	**68,521**	**330,507,895**	**798,081,354**	**164,542,701**	**247,573,618**	**4,148,259**	**142,840,929**	**39**
	REVENUE REQUIREMENTS :												
27	Total Cost of Service	4,069,114,538		1,543,822,354	372,053,242	68,521	330,507,895	798,081,354	164,542,701	247,573,618	4,148,259	142,840,929	39
28	Less : Miscellaneous Revenues	180,000,000		77,714,174	18,320,934	3,137	16,236,815	39,552,701	6,766,259	0	0	5,030,715	1

SUMMARY OF RESULTS 2012

Line		Total		Domestic	Commercial	Commercial	Large Load	Large Load	Large Load	Large Load	Large Load	Large Load	La
No.	**Description**	**Company**		**Rate A**	**Rate B**	**Rate B1**	**Rate D1**	**Rate D2**	**Rate D3**	**Rate D4**	**Rate D5**	**Rate E1**	**I**
29	**Revenue required from Sales(with 8.0% Rate Base)**	**3,889,114,538**		**1,466,108,180**	**353,732,308**	**65,384**	**314,271,080**	**758,528,653**	**157,776,442**	**247,573,618**	**4,148,259**	**137,810,214**	**3**
30	Present Rates Revenue	3,812,454,000		994,386,832	474,149,731	146,658	339,709,727	864,261,469	166,074,386	354,825,426	4,158,514	140,246,479	3
31	**REVENUE SURPLUS / (DEFICIENCY)**	**(76,660,538)**		**(471,721,347)**	**120,417,422**	**81,275**	**25,438,647**	**105,732,816**	**8,297,944**	**107,251,808**	**10,255**	**2,436,265**	**(1**
32	**PERCENT SURPLUS / (DEFICIENCY) %**	**(2.01)**		**(47.44)**	**25.40**	**55.42**	**7.49**	**12.23**	**5.00**	**30.23**	**0.25**	**1.74**	
33	Number of Customers	436,038		392,690	39,979	14	2,329	932	14	22	1	2	
34	Present Avg Mthly Bill / Customer($)	N/A		211.02	988.33	872.96	12,155.06	77,276.60	988,538.01	1,344,035.70	346,542.85	5,843,603.31	30,
35	Deficiency per Bill per Customer ($)	N/A		**(100.10)**	**251.00**	**483.78**	910.21	9,453.94	49,392.52	406,256.85	854.60	101,511.04	(1,1
36	kWh Sold	8,708,000,000		2,771,233,018	809,776,607	164,553	590,808,880	1,643,967,903	438,424,727	936,525,042	2,616,746	424,793,303	9
37	Present Revenue per kWh (c)	43.78		35.88	58.55	89.13	57.50	52.57	37.88	37.89	158.92	33.02	
38	Computed Cost per kWh (c)	44.66		52.90	43.68	39.73	53.19	46.14	35.99	26.44	158.53	32.44	
39	**Gain / (Loss) per kWh Sold (c)**	**(0.88)**		**(17.02)**	**14.87**	**49.40**	**4.31**	**6.43**	**1.89**	**11.45**	**0.39**	**0.58**	

SUMMARY OF RESULTS 2013

Line		Total		Domestic	Commercial	Commercial	Large Load	Large Load	Large Load	Large Load	Large Load	Large Load	La
No.	Description	Company		Rate A	Rate B	Rate B1	Rate D1	Rate D2	Rate D3	Rate D4	Rate D5	Rate E1	
	OPERATING EXPENSES:	$		$	$	$	$	$	$	$	$	$	
1	Bulk Power & Generation	2,621,135,190	AET & ET	811,076,940	237,003,207	48,533	212,503,711	542,588,291	127,093,178	215,684,167	2,813,066	119,373,684	3
2	Transmission	29,547,261	AET & ET	8,804,481	2,572,739	532	2,909,951	6,826,009	1,359,912	1,451,289	61,710	1,217,502	
3	Distribution	284,946,203	AED & DCL	184,457,346	27,883,659	3,566	19,836,796	42,252,203	4,052,760	2,718,673	8,092	159,351	
4	Administrative & General	211,907,065	SAW	104,762,654	19,895,341	2,911	17,035,320	36,977,835	5,984,784	5,905,787	218,806	4,308,876	
5	Customer Accounts & Services	99,544,903	CAS	83,986,627	10,825,610	0	3,285,307	1,373,446	20,956	32,241	1,611	3,225	
6	Total Operating Expenses	3,247,080,622		1,193,088,048	298,180,557	55,542	255,571,086	630,017,784	138,511,591	225,792,157	3,103,285	125,062,638	3
	DEPRECIATION EXPENSES:												
7	Generation	151,435,543	AET	45,124,698	13,185,799	2,729	14,914,069	34,984,641	6,969,821	7,438,141	316,278	6,239,938	
8	Transmission	1,208,211	AET	360,022	105,202	22	118,990	279,121	55,608	59,344	2,524	49,785	
9	Distribution	15,086,292	AED, DCL, SP & MET	5,562,293	1,254,489	225	1,494,535	3,227,820	303,840	198,530	22	44	
10	Administrative & General	42,248,954	SAW	20,887,046	3,966,633	580	3,396,415	7,372,453	1,193,216	1,177,466	43,624	859,082	
11	Total Depreciation Expenses	209,979,000		71,934,059	18,512,122	3,557	19,924,009	45,864,034	8,522,484	8,873,481	362,448	7,148,849	
	TAXES AND OTHER DUTIES:												
12	Generation	279,570		83,306	24,343	5	27,533	64,586	12,867	13,732	584	11,520	
13	Transmission	7,781,129		2,318,618	677,519	140	766,321	1,797,597	358,126	382,190	16,251	320,623	
14	Distribution	95	AED, DCL & SP	34	10	0	14	30	3	2	0	0	
15	Administrative & General	1,868,281	SAW	923,641	175,407	25	150,191	326,014	52,764	52,069	1,928	37,989	
16	Total Taxes & Other Duties	9,929,076		3,325,599	877,279	170	944,060	2,188,227	423,761	447,992	18,763	370,132	

SUMMARY OF RESULTS 2013

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1	La
	COST OF PROVIDING ADEQUATE												
	MAINTENANCE & INTEREST PAYMENT												
	ON BORROWINGS :												
	(i) Maintenance Expenses:												
17	Generation	5,898,607	AET	1,757,664	513,604	106	580,922	1,362,696	271,483	289,725	12,319	243,054	
18	Transmission	9,341,947	AET	2,783,709	813,422	168	920,038	2,158,177	429,963	458,853	19,511	384,937	
19	Distribution	95,049,241	AED, DCL, SP & MET	53,577,487	9,191,997	1,349	8,105,563	17,462,911	1,641,452	1,071,301	12	25	
20	(ii) Interest Expenses	116,048,823	RATE BASE ALLOCATOR	51,517,180	10,537,232	1,787	9,980,138	22,497,509	3,632,412	3,565,175	130,749	2,578,688	
21	(iii) Loss / (Gain) on Exchange	(8,682,156)	RATE BASE ALLOCATOR	(3,854,241)	(788,340)	(134)	(746,661)	(1,683,144)	(271,758)	(266,727)	(9,782)	(192,924)	
22	**Total Maintenance & Interest**	217,656,462		105,781,799	20,267,915	3,277	18,840,001	41,798,149	5,703,553	5,118,327	152,809	3,013,780	
23	**TOTAL EXPENSES**	**3,684,645,160**		**1,374,129,505**	**337,837,872**	**62,546**	**295,279,155**	**719,868,195**	**153,161,389**	**240,231,958**	**3,637,306**	**135,595,400**	**3**
	PERCENTAGE RETURN ON RATE BASE:												
24	Rate Base	8,739,788,000		3,879,825,953	793,572,637	134,565	751,617,223	1,694,316,740	273,561,700	268,497,973	9,846,868	194,204,365	6
25	Return at 8.0%	699,183,040		310,386,076	63,485,811	10,765	60,129,378	135,545,339	21,884,936	21,479,838	787,749	15,536,349	
26	**TOTAL COST OF SERVICE**	**4,383,828,200**		**1,684,515,581**	**401,323,683**	**73,311**	**355,408,533**	**855,413,534**	**175,046,325**	**261,711,796**	**4,425,055**	**151,131,749**	**4**
	REVENUE REQUIREMENTS :												
27	Total Cost of Service	4,383,828,200		1,684,515,581	401,323,683	73,311	355,408,533	855,413,534	175,046,325	261,711,796	4,425,055	151,131,749	4
28	Less : Miscellaneous Revenues	180,000,000		77,714,174	18,320,934	3,137	16,236,815	39,552,701	6,766,259	0	0	5,030,715	

SUMMARY OF RESULTS 2013

Line		Total		Domestic	Commercial	Commercial	Large Load	Large Load	Large Load	Large Load	Large Load	Large Load	La
No.	**Description**	**Company**		**Rate A**	**Rate B**	**Rate B1**	**Rate D1**	**Rate D2**	**Rate D3**	**Rate D4**	**Rate D5**	**Rate E1**	I
29	**Revenue required from Sales(with 8.0% Rate Base)**	**4,203,828,200**		**1,606,801,407**	**383,002,749**	**70,174**	**339,171,718**	**815,860,833**	**168,280,066**	**261,711,796**	**4,425,055**	**146,101,034**	**4**
30	Present Rates Revenue	4,010,255,000		1,045,978,461	498,749,973	154,267	357,334,838	909,101,822	174,690,800	373,234,782	4,374,270	147,522,867	3
31	**REVENUE SURPLUS / (DEFICIENCY)**	**(193,573,200)**		**(560,822,946)**	**115,747,223**	**84,094**	**18,163,120**	**93,240,989**	**6,410,733**	**111,522,986**	**(50,785)**	**1,421,833**	**(1**
32	**PERCENT SURPLUS / (DEFICIENCY) %**	**(4.83)**		**(53.62)**	**23.21**	**54.51**	**5.08**	**10.26**	**3.67**	**29.88**	**(1.16)**	**0.96**	
33	Number of Customers	445,541		401,278	40,798	14	2,403	953	14	22	1	3	
34	Present Avg Mthly Bill / Customer($)	N/A		217.22	1,018.74	918.26	12,391.97	79,494.74	1,039,826.19	1,413,768.11	364,522.48	4,097,857.42	32,
35	Deficiency per Bill per Customer ($)	N/A		**(116.47)**	**236.42**	**500.56**	629.88	8,153.29	38,159.13	422,435.55	(4,232.10)	39,495.36	(1,5
36	kWh Sold	9,218,000,000		2,933,535,365	857,202,660	174,190	625,410,686	1,740,249,900	464,101,876	991,374,350	2,770,001	449,672,102	1,0
37	Present Revenue per kWh (c)	43.50		35.66	58.18	88.56	57.14	52.24	37.64	37.65	157.92	32.81	
38	Computed Cost per kWh (c)	45.60		54.77	44.68	40.29	54.23	46.88	36.26	26.40	159.75	32.49	
39	**Gain / (Loss) per kWh Sold (c)**	**(2.10)**		**(19.11)**	**13.50**	**48.27**	**2.91**	**5.36**	**1.38**	**11.25**	**(1.83)**	**0.32**	

SUMMARY OF RESULTS 2014

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1
	OPERATING EXPENSES:	$		$	$	$	$	$	$	$	$	$
1	Bulk Power & Generation	2,630,892,138	AET & ET	814,096,104	237,885,431	48,713	213,294,738	544,608,029	127,566,272	216,487,032	2,823,537	119,818,042
2	Transmission	33,300,618	AET & ET	9,922,904	2,899,552	600	3,279,598	7,693,110	1,532,660	1,635,645	69,549	1,372,159
3	Distribution	343,115,452	AED & DCL	222,112,683	33,575,861	4,294	23,886,303	50,877,617	4,880,095	3,273,666	9,744	191,881
4	Administrative & General	261,415,484	SAW	129,238,635	24,543,544	3,592	21,015,328	45,617,066	7,383,026	7,285,572	269,926	5,315,571
5	Customer Accounts & Services	121,966,638	CAS	102,903,978	13,263,996	0	4,025,298	1,682,804	25,677	39,504	1,974	3,952
6	Total Operating Expenses	3,390,690,330		1,278,274,305	312,168,384	57,199	265,501,265	650,478,626	141,387,729	228,721,419	3,174,730	126,701,605
	DEPRECIATION EXPENSES:											
7	Generation	158,514,780	AET	47,234,167	13,802,203	2,857	15,611,264	36,620,086	7,295,643	7,785,856	331,064	6,531,640
8	Transmission	1,264,692	AET	376,853	110,120	23	124,552	292,169	58,208	62,119	2,642	52,112
9	Distribution	15,791,539	AED, DCL, SP & MET	5,822,316	1,313,133	236	1,564,401	3,378,712	318,044	207,810	23	46
10	Administrative & General	44,223,988	SAW	21,863,463	4,152,063	607	3,555,189	7,717,097	1,248,996	1,232,510	45,663	899,242
11	Total Depreciation Expenses	219,795,000		75,296,799	19,377,518	3,723	20,855,407	48,008,065	8,920,889	9,288,295	379,392	7,483,040
	TAXES AND OTHER DUTIES:											
12	Generation	285,161		84,972	24,830	5	28,084	65,878	13,125	14,006	596	11,750
13	Transmission	9,445,512		2,814,570	822,440	170	930,237	2,182,102	434,730	463,940	19,727	389,205
14	Distribution	116	AED, DCL & SP	41	12	0	17	37	4	2	0	0
15	Administrative & General	2,304,772	SAW	1,139,433	216,388	31	185,281	402,182	65,091	64,234	2,379	46,864
16	Total Taxes & Other Duties	12,035,561		4,039,017	1,063,670	206	1,143,619	2,650,199	512,949	542,183	22,702	447,819

SUMMARY OF RESULTS 2014

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1
	COST OF PROVIDING ADEQUATE											
	MAINTENANCE & INTEREST PAYMENT											
	ON BORROWINGS :											
	(i) Maintenance Expenses:											
17	Generation	5,920,564	AET	1,764,207	515,515	107	583,084	1,367,769	272,494	290,804	12,365	243,958
18	Transmission	11,340,188	AET	3,379,145	987,413	204	1,116,834	2,619,810	521,932	557,002	23,684	467,275
19	Distribution	115,380,258	AED, DCL, SP & MET	65,037,702	11,158,163	1,638	9,839,342	21,198,224	1,992,558	1,300,452	15	30
20	(ii) Interest Expenses	116,948,048	RATE BASE ALLOCATOR	51,916,370	10,618,881	1,801	10,057,471	22,671,835	3,660,559	3,592,800	131,762	2,598,670
21	(iii) Loss / (Gain) on Exchange	(8,248,048)	RATE BASE ALLOCATOR	(3,661,529)	(748,923)	(127)	(709,328)	(1,598,987)	(258,170)	(253,391)	(9,293)	(183,278)
22	**Total Maintenance & Interest**	241,341,010		118,435,895	22,531,051	3,623	20,887,404	46,258,652	6,189,373	5,487,667	158,533	3,126,656
23	**TOTAL EXPENSES**	**3,863,861,901**		**1,476,046,015**	**355,140,623**	**64,751**	**308,387,695**	**747,395,542**	**157,010,941**	**244,039,564**	**3,735,358**	**137,759,120**
	PERCENTAGE RETURN ON RATE BASE:											
24	Rate Base	9,252,159,000		4,107,281,161	840,095,917	142,454	795,680,862	1,793,646,239	289,599,284	284,238,695	10,424,142	205,589,616
25	Return at 8.0%	740,172,720		328,582,493	67,207,673	11,396	63,654,469	143,491,699	23,167,943	22,739,096	833,931	16,447,169
26	**TOTAL COST OF SERVICE**	**4,604,034,621**		**1,804,628,508**	**422,348,296**	**76,147**	**372,042,164**	**890,887,241**	**180,178,884**	**266,778,660**	**4,569,289**	**154,206,289**
	REVENUE REQUIREMENTS :											
27	Total Cost of Service	4,604,034,621		1,804,628,508	422,348,296	76,147	372,042,164	890,887,241	180,178,884	266,778,660	4,569,289	154,206,289
28	Less : Miscellaneous Revenues	180,000,000		77,714,174	18,320,934	3,137	16,236,815	39,552,701	6,766,259	0	0	5,030,715

SUMMARY OF RESULTS 2014

Line		Total		Domestic	Commercial	Commercial	Large Load	Large Load	Large Load	Large Load	Large Load	Large Load	L
No.	Description	Company		Rate A	Rate B	Rate B1	Rate D1	Rate D2	Rate D3	Rate D4	Rate D5	Rate E1	
29	**Revenue required from Sales(with 8.0% Rate Base)**	**4,424,034,621**		**1,726,914,334**	**404,027,362**	**73,010**	**355,805,349**	**851,334,540**	**173,412,625**	**266,778,660**	**4,569,289**	**149,175,574**	**4**
30	Present Rates Revenue	4,187,676,000		1,092,254,457	520,815,582	161,092	373,143,983	949,322,146	182,419,440	389,747,370	4,567,795	154,049,548	4
31	**REVENUE SURPLUS / (DEFICIENCY)**	**(236,358,621)**		**(634,659,877)**	**116,788,219**	**88,083**	**17,338,634**	**97,987,606**	**9,006,814**	**122,968,710**	**(1,494)**	**4,873,974**	**(**
32	**PERCENT SURPLUS / (DEFICIENCY) %**	**(5.64)**		**(58.11)**	**22.42**	**54.68**	**4.65**	**10.32**	**4.94**	**31.55**	**(0.03)**	**3.16**	
33	Number of Customers	455,262		410,060	41,633	14	2,481	975	14	22	1	3	
34	Present Avg Mthly Bill / Customer($)	N/A		221.97	1,042.47	958.88	12,533.39	81,138.64	1,085,830.00	1,476,315.80	380,649.62	4,279,154.11	33
35	Deficiency per Bill per Customer ($)	N/A		**(128.98)**	**233.77**	**524.30**	582.38	8,375.01	53,611.99	465,790.57	(124.46)	135,388.16	(
36	kWh Sold	9,599,000,000		3,054,784,766	892,632,712	181,390	651,260,271	1,812,178,215	483,284,216	1,032,350,009	2,884,491	468,258,029	1,
37	Present Revenue per kWh (c)	43.63		35.76	58.35	88.81	57.30	52.39	37.75	37.75	158.36	32.90	
38	Computed Cost per kWh (c)	46.09		56.53	45.26	40.25	54.63	46.98	35.88	25.84	158.41	31.86	
39	**Gain / (Loss) per kWh Sold (c)**	**(2.46)**		**(20.77)**	**13.09**	**48.56**	**2.67**	**5.41**	**1.87**	**11.91**	**(0.05)**	**1.04**	

SUMMARY OF RESULTS 2015

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1
	OPERATING EXPENSES:	$		$	$	$	$	$	$	$	$	$
1	Bulk Power & Generation	2,624,747,550	AET & ET	812,194,739	237,329,837	48,600	212,796,577	543,336,068	127,268,334	215,981,416	2,816,943	119,538,201
2	Transmission	31,350,201	AET & ET	9,341,720	2,729,725	565	3,087,512	7,242,524	1,442,892	1,539,845	65,476	1,291,792
3	Distribution	312,888,035	AED & DCL	202,545,238	30,617,931	3,916	21,781,993	46,395,455	4,450,174	2,985,266	8,885	174,977
4	Administrative & General	235,688,633	SAW	116,519,790	22,128,124	3,238	18,947,133	41,127,724	6,656,435	6,568,572	243,361	4,792,446
5	Customer Accounts & Services	110,315,273	CAS	93,073,652	11,996,898	0	3,640,764	1,522,047	23,224	35,730	1,786	3,574
6	Total Operating Expenses	3,314,989,691		1,233,675,139	304,802,516	56,318	260,253,980	639,623,819	139,841,059	227,110,829	3,136,451	125,800,990
	DEPRECIATION EXPENSES:											
7	Generation	164,427,848	AET	48,996,140	14,317,065	2,964	16,193,611	37,986,123	7,567,791	8,076,291	343,413	6,775,290
8	Transmission	1,311,869	AET	390,910	114,227	24	129,199	303,068	60,379	64,436	2,740	54,056
9	Distribution	16,380,610	AED, DCL, SP & MET	6,039,506	1,362,117	245	1,622,758	3,504,748	329,908	215,562	24	48
10	Administrative & General	45,873,673	SAW	22,679,035	4,306,947	630	3,687,809	8,004,967	1,295,587	1,278,486	47,367	932,787
11	Total Depreciation Expenses	227,994,000		78,105,591	20,100,357	3,862	21,633,375	49,798,907	9,253,665	9,634,775	393,544	7,762,180
	TAXES AND OTHER DUTIES:											
12	Generation	290,865		86,672	25,326	5	28,646	67,196	13,387	14,287	607	11,985
13	Transmission	8,580,622		2,556,850	747,132	155	845,059	1,982,295	394,923	421,459	17,921	353,567
14	Distribution	105	AED, DCL & SP	38	11	0	15	33	3	2	0	0
15	Administrative & General	2,077,951	SAW	1,027,298	195,093	28	167,047	362,602	58,685	57,912	2,145	42,252
16	Total Taxes & Other Duties	10,949,543		3,670,857	967,562	187	1,040,767	2,412,126	466,999	493,660	20,673	407,804

SUMMARY OF RESULTS 2015

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1
	COST OF PROVIDING ADEQUATE											
	MAINTENANCE & INTEREST PAYMENT											
	ON BORROWINGS :											
	(i) Maintenance Expenses:											
17	Generation	5,906,736	AET	1,760,087	514,311	106	581,723	1,364,574	271,858	290,124	12,336	243,388
18	Transmission	10,301,810	AET	3,069,729	896,999	186	1,014,570	2,379,924	474,141	506,000	21,516	424,489
19	Distribution	104,815,326	AED, DCL, SP & MET	59,082,447	10,136,453	1,488	8,938,391	19,257,184	1,810,107	1,181,375	13	28
20	(ii) Interest Expenses	112,035,645	RATE BASE ALLOCATOR	49,735,623	10,172,835	1,725	9,635,007	21,719,505	3,506,797	3,441,885	126,227	2,489,512
21	(iii) Loss / (Gain) on Exchange	(7,835,645)	RATE BASE ALLOCATOR	(3,478,453)	(711,477)	(121)	(673,861)	(1,519,037)	(245,261)	(240,722)	(8,828)	(174,114)
22	**Total Maintenance & Interest**	225,223,873		110,169,433	21,009,122	3,384	19,495,829	43,202,150	5,817,641	5,178,662	151,265	2,983,304
23	**TOTAL EXPENSES**	**3,779,157,107**		**1,425,621,021**	**346,879,557**	**63,752**	**302,423,951**	**735,037,002**	**155,379,364**	**242,417,926**	**3,701,933**	**136,954,277**
	PERCENTAGE RETURN ON RATE BASE:											
24	Rate Base	9,760,883,000		4,333,117,369	886,288,050	150,287	839,430,862	1,892,268,722	305,522,714	299,867,377	10,997,306	216,893,829
25	Return at 8.0%	780,870,640		346,649,390	70,903,044	12,023	67,154,469	151,381,498	24,441,817	23,989,390	879,785	17,351,506
26	**TOTAL COST OF SERVICE**	**4,560,027,747**		**1,772,270,411**	**417,782,601**	**75,775**	**369,578,420**	**886,418,500**	**179,821,181**	**266,407,316**	**4,581,718**	**154,305,783**
	REVENUE REQUIREMENTS :											
27	Total Cost of Service	4,560,027,747		1,772,270,411	417,782,601	75,775	369,578,420	886,418,500	179,821,181	266,407,316	4,581,718	154,305,783
28	Less : Miscellaneous Revenues	180,000,000		77,714,174	18,320,934	3,137	16,236,815	39,552,701	6,766,259	0	0	5,030,715

SUMMARY OF RESULTS 2015

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1	L
29	**Revenue required from Sales(with 8.0% Rate Base)**	**4,380,027,747**		**1,694,556,237**	**399,461,667**	**72,638**	**353,341,605**	**846,865,799**	**173,054,922**	**266,407,316**	**4,581,718**	**149,275,068**	**4**
30	Present Rates Revenue	4,332,225,000		1,129,956,583	538,792,945	166,653	386,024,060	982,090,576	188,716,141	403,200,558	4,725,465	159,366,986	4
31	**REVENUE SURPLUS / (DEFICIENCY)**	**(47,802,747)**		**(564,599,654)**	**139,331,277**	**94,015**	**32,682,455**	**135,224,777**	**15,661,219**	**136,793,242**	**143,747**	**10,091,918**	
32	**PERCENT SURPLUS / (DEFICIENCY) %**	**(1.10)**		**(49.97)**	**25.86**	**56.41**	**8.47**	**13.77**	**8.30**	**33.93**	**3.04**	**6.33**	
33	Number of Customers	465,202		419,043	42,487	14	2,561	997	14	22	1	3	
34	Present Avg Mthly Bill / Customer($)	N/A		224.71	1,056.78	991.98	12,560.98	82,087.14	1,123,310.37	1,527,274.84	393,788.78	4,426,860.73	34
35	Deficiency per Bill per Customer ($)	N/A		(112.28)	273.28	559.61	1,063.47	11,302.64	93,221.54	518,156.22	11,978.94	280,331.05	
36	kWh Sold	9,900,000,000		3,150,574,975	920,623,382	187,078	671,682,121	1,869,003,472	498,438,769	1,064,721,855	2,974,941	482,941,398	1,
37	Present Revenue per kWh (c)	43.76		35.87	58.52	89.08	57.47	52.55	37.86	37.87	158.84	33.00	
38	Computed Cost per kWh (c)	44.24		53.79	43.39	38.83	52.61	45.31	34.72	25.02	154.01	30.91	
39	**Gain / (Loss) per kWh Sold (c)**	**(0.48)**		**(17.92)**	**15.13**	**50.25**	**4.86**	**7.24**	**3.14**	**12.85**	**4.83**	**2.09**	

SUMMARY OF RESULTS 2016

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1
	OPERATING EXPENSES:	$		$	$	$	$	$	$	$	$	$
1	Bulk Power & Generation	2,733,554,305	AET & ET	845,863,605	247,168,151	50,614	221,617,884	565,859,619	132,544,138	224,934,748	2,933,717	124,493,559
2	Transmission	29,322,571	AET & ET	8,737,527	2,553,175	528	2,887,822	6,774,101	1,349,571	1,440,253	61,241	1,208,243
3	Distribution	281,463,972	AED & DCL	182,203,155	27,542,902	3,523	19,594,378	41,735,853	4,003,233	2,685,449	7,993	157,404
4	Administrative & General	208,943,304	SAW	103,297,429	19,617,082	2,871	16,797,062	36,460,658	5,901,080	5,823,188	215,745	4,248,612
5	Customer Accounts & Services	98,202,653	CAS	82,854,163	10,679,639	0	3,241,008	1,354,926	20,674	31,807	1,590	3,182
6	Total Operating Expenses	3,351,486,805		1,222,955,880	307,560,949	57,536	264,138,154	652,185,158	143,818,696	234,915,444	3,220,286	130,110,999
	DEPRECIATION EXPENSES:											
7	Generation	168,938,915	AET	50,340,346	14,709,853	3,045	16,637,881	39,028,270	7,775,413	8,297,864	352,835	6,961,169
8	Transmission	1,347,860	AET	401,635	117,361	25	132,743	311,383	62,035	66,204	2,815	55,539
9	Distribution	16,830,011	AED, DCL, SP & MET	6,205,199	1,399,487	251	1,667,278	3,600,901	338,959	221,476	25	49
10	Administrative & General	47,132,214	SAW	23,301,233	4,425,108	647	3,788,983	8,224,583	1,331,131	1,313,561	48,666	958,378
11	Total Depreciation Expenses	234,249,000		80,248,413	20,651,809	3,968	22,226,886	51,165,136	9,507,539	9,899,105	404,341	7,975,135
	TAXES AND OTHER DUTIES:											
12	Generation	296,682		88,405	25,833	5	29,219	68,539	13,655	14,572	620	12,225
13	Transmission	7,681,493		2,288,928	668,843	138	756,509	1,774,579	353,541	377,296	16,043	316,518
14	Distribution	94	AED, DCL & SP	34	10	0	14	30	3	2	0	0
15	Administrative & General	1,842,151	SAW	910,723	172,954	24	148,091	321,455	52,026	51,340	1,901	37,457
16	Total Taxes & Other Duties	9,820,420		3,288,090	867,640	168	933,832	2,164,603	419,224	443,211	18,564	366,200

SUMMARY OF RESULTS 2016

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1
	COST OF PROVIDING ADEQUATE											
	MAINTENANCE & INTEREST PAYMENT											
	ON BORROWINGS :											
	(i) Maintenance Expenses:											
17	Generation	6,151,595	AET	1,833,050	535,632	111	605,837	1,421,142	283,127	302,151	12,848	253,478
18	Transmission	9,222,325	AET	2,748,065	803,007	166	908,257	2,130,542	424,457	452,978	19,261	380,008
19	Distribution	93,832,149	AED, DCL, SP & MET	52,891,435	9,074,295	1,332	8,001,773	17,239,301	1,620,433	1,057,583	12	25
20	(ii) Interest Expenses	117,143,863	RATE BASE ALLOCATOR	52,003,298	10,636,661	1,804	10,074,311	22,709,797	3,666,688	3,598,816	131,983	2,603,021
21	(iii) Loss / (Gain) on Exchange	(7,443,863)	RATE BASE ALLOCATOR	(3,304,530)	(675,903)	(115)	(640,168)	(1,443,086)	(232,998)	(228,685)	(8,387)	(165,408)
22	**Total Maintenance & Interest**	218,906,069		106,171,317	20,373,691	3,298	18,950,010	42,057,695	5,761,708	5,182,843	155,717	3,071,124
23	**TOTAL EXPENSES**	**3,814,462,294**		**1,412,663,699**	**349,454,089**	**64,970**	**306,248,882**	**747,572,591**	**159,507,166**	**250,440,603**	**3,798,908**	**141,523,458**
	PERCENTAGE RETURN ON RATE BASE:											
24	Rate Base	10,284,059,000		4,565,369,207	933,792,424	158,342	884,423,726	1,993,692,904	321,898,502	315,940,043	11,586,754	228,519,175
25	Return at 8.0%	822,724,720		365,229,537	74,703,394	12,667	70,753,898	159,495,432	25,751,880	25,275,203	926,940	18,281,534
26	**TOTAL COST OF SERVICE**	**4,637,187,014**		**1,777,893,236**	**424,157,483**	**77,637**	**377,002,780**	**907,068,023**	**185,259,046**	**275,715,806**	**4,725,848**	**159,804,992**
	REVENUE REQUIREMENTS :											
27	Total Cost of Service	4,637,187,014		1,777,893,236	424,157,483	77,637	377,002,780	907,068,023	185,259,046	275,715,806	4,725,848	159,804,992
28	Less : Miscellaneous Revenues	180,000,000		77,714,174	18,320,934	3,137	16,236,815	39,552,701	6,766,259	0	0	5,030,715

SUMMARY OF RESULTS 2016

Line No.	Description	Total Company		Domestic Rate A	Commercial Rate B	Commercial Rate B1	Large Load Rate D1	Large Load Rate D2	Large Load Rate D3	Large Load Rate D4	Large Load Rate D5	Large Load Rate E1
29	**Revenue required from Sales(with 8.0% Rate Base)**	**4,457,187,014**		**1,700,179,062**	**405,836,549**	**74,500**	**360,765,965**	**867,515,322**	**178,492,787**	**275,715,806**	**4,725,848**	**154,774,277**
30	Present Rates Revenue	4,505,883,000		1,175,251,091	560,390,554	173,333	401,497,902	1,021,457,849	196,280,861	419,362,923	4,914,886	165,755,240
31	**REVENUE SURPLUS / (DEFICIENCY)**	**48,695,986**		**(524,927,970)**	**154,554,005**	**98,833**	**40,731,937**	**153,942,527**	**17,788,074**	**143,647,117**	**189,038**	**10,980,963**
32	**PERCENT SURPLUS / (DEFICIENCY) %**	**1.08**		**(44.67)**	**27.58**	**57.02**	**10.14**	**15.07**	**9.06**	**34.25**	**3.85**	**6.62**
33	Number of Customers	475,372		428,231	43,359	14	2,644	1,020	14	22	1	3
34	Present Avg Mthly Bill / Customer($)	N/A		228.70	1,077.04	1,031.74	12,654.37	83,452.44	1,168,338.46	1,588,495.92	409,573.87	4,604,312.22
35	Deficiency per Bill per Customer ($)	N/A		(102.15)	297.04	588.29	1,283.79	12,577.00	105,881.39	544,117.87	15,753.20	305,026.74
36	kWh Sold	10,272,000,000		3,268,960,216	955,216,503	194,107	696,921,086	1,939,232,694	517,167,983	1,104,729,586	3,086,727	501,088,287
37	Present Revenue per kWh (c)	43.87		35.95	58.67	89.30	57.61	52.67	37.95	37.96	159.23	33.08
38	Computed Cost per kWh (c)	43.39		52.01	42.49	38.38	51.77	44.73	34.51	24.96	153.10	30.89
39	**Gain / (Loss) per kWh Sold (c)**	**0.48**		**(16.06)**	**16.18**	**50.92**	**5.84**	**7.94**	**3.44**	**13.00**	**6.13**	**2.19**

SUMMARY OF BASES OF CLASSIFICATION

C1	Allocated per total distribution gross plant to component excluding specific assignment.
C2	Allocated per components of Substation and Customer Transformers in Distribution Electric Plant in Service
C3	Computed depreciation allocated to component as per C1.
C	100 % Customer component.
D	100 % Demand component.
E	100 % Energy component.
F	Interest and Finance charges. Not classified.
O	100 % Other Costs component
D/C	50 % Demand, 50 % Customer components.
S	Specific Assignment.
C4	Allocation of Generation Materials and Supplies plus Fuel Stores to Demand.
C5	Allocation of Transmission Materials and Supplies to Demand plus 40% of Communication Stores.
C6	Distribution Stores allocated to D,C and S on gross distribution investment excluding meters, plus 60% of Communication Stores. Meter Stores then added to Specific.
AET	Average and Excess Demand Transmission Level Allocator
AED	Average and Excess Demand Distribution Level Allocator
ET	Energy Allocator Transmission Level
DCL	Distribution Customers by Level Allocator
SAW	Salaries and Wages Allocator
CAS	Customer Accounts and Services Allocator
MET	Meter Investment and Expenses Allocator
CWC	Cash Working Capital Allocator
SP	Specific Assignments e.g. Expenses related to Street Lighting

APPENDIX III – RESIDENTIAL CONSUMPTION ANALYSIS FOR 2010

KWH RANGE	NO OF CUSTOMERS	% Total Customers	KWH-UNITS	% Total Units	KWH-COST	COST/KWH (Cents)
1 - 100	14,612	3.96	573,925.00	0.15	156,050.83	27.19
101 - 200	14,325	3.88	2,208,734.00	0.57	577,476.70	26.15
201 - 300	21,516	5.83	5,446,578.00	1.39	1,416,951.44	26.02
301 - 400	27,220	7.38	9,575,479.00	2.45	2,494,058.29	26.05
401 - 500	30,765	8.34	13,872,535.00	3.55	3,704,869.70	26.71
501 - 600	31,008	8.4	17,078,025.00	4.37	4,719,412.55	27.63
601 - 700	29,256	7.93	18,989,435.00	4.86	5,374,038.61	28.30
701 - 800	26,504	7.18	19,861,857.00	5.08	5,719,318.49	28.80
801 - 900	23,091	6.26	19,606,802.00	5.02	5,719,716.21	29.17
901 - 1000	19,842	5.38	18,829,513.00	4.82	5,551,263.00	29.48
1001 - 1100	17,066	4.62	17,902,327.00	4.58	5,361,290.82	29.95
1101 - 1200	14,297	3.87	16,426,085.00	4.2	5,018,776.40	30.55
1201 - 1300	12,227	3.31	15,278,603.00	3.91	4,747,972.56	31.08
1301 - 1400	10,538	2.86	14,235,112.00	3.64	4,484,458.82	31.50
1401 - 1500	8,717	2.36	12,664,859.00	3.24	4,037,907.76	31.88
1501 - 1600	7,495	2.03	11,611,060.00	2.97	3,741,117.85	32.22
1601 - 1700	6,537	1.77	10,792,299.00	2.76	3,508,350.33	32.51
1701 - 1800	5,565	1.51	9,738,204.00	2.49	3,190,998.05	32.77
1801 - 1900	4,830	1.31	8,935,695.00	2.29	2,949,493.87	33.01
1901 - 2000	4,179	1.13	8,145,505.00	2.08	2,704,445.68	33.20
2001 - 2100	3,525	0.96	7,222,753.00	1.85	2,411,494.61	33.39
2101 - 2200	3,118	0.84	6,703,787.00	1.72	2,249,385.04	33.55
2201 - 2300	2,883	0.78	6,493,772.00	1.66	2,188,282.71	33.70
2301 - 2400	2,513	0.68	5,902,669.00	1.51	1,998,680.06	33.86
2401 - 2500	2,240	0.61	5,496,082.00	1.41	1,867,704.51	33.98
2501 - 2600	1,934	0.52	4,934,003.00	1.26	1,682,317.11	34.10
2601 - 2700	1,746	0.47	4,625,963.00	1.18	1,581,451.17	34.19
2701 - 2800	1,623	0.44	4,462,894.00	1.14	1,529,553.67	34.27
2801 - 2900	1,428	0.39	4,071,344.00	1.04	1,400,651.28	34.40
2901 - 3000	1,310	0.35	3,863,206.00	0.99	1,332,446.22	34.49
3001 - 3100	1,136	0.31	3,463,243.00	0.89	1,197,335.91	34.57
3101 - 3200	1,047	0.28	3,301,251.00	0.84	1,143,958.58	34.65
3201 - 3300	965	0.26	3,132,937.00	0.8	1,087,776.69	34.72
3301 - 3400	882	0.24	2,963,449.00	0.76	1,030,986.13	34.79
3401 - 3500	840	0.23	2,897,960.00	0.74	1,010,085.20	34.86
3501 - 3600	817	0.22	2,901,186.00	0.74	1,012,980.82	34.92
3601 - 3700	754	0.2	2,751,645.00	0.7	962,312.65	34.97
3701 - 3800	705	0.19	2,642,207.00	0.68	924,436.12	34.99
3801 - 3900	586	0.16	2,255,454.00	0.58	791,153.98	35.08
3901 - 4000	552	0.15	2,183,821.00	0.56	767,091.77	35.13
4001 - 4100	496	0.13	2,011,434.00	0.51	707,452.58	35.17
4101 - 4200	441	0.12	1,828,824.00	0.47	644,030.88	35.22

KWH RANGE	NO OF CUSTOMERS	% Total Customers	KWH-UNITS	% Total Units	KWH-COST	COST/KWH (Cents)
4201 - 4300	446	0.12	1,899,757.00	0.49	669,832.09	35.26
4301 - 4400	391	0.11	1,705,495.00	0.44	602,025.15	35.30
4401 - 4500	373	0.1	1,659,945.00	0.42	586,577.65	35.34
4501 - 4600	363	0.1	1,651,097.00	0.42	584,043.89	35.37
4601 - 4700	312	0.08	1,460,685.00	0.37	517,217.45	35.41
4701 - 4800	286	0.08	1,362,712.00	0.35	482,336.44	35.40
4801 - 4900	280	0.08	1,366,916.00	0.35	484,890.92	35.47
4901 - 5000	291	0.08	1,440,159.00	0.37	511,324.83	35.50
5001 - 5100	233	0.06	1,176,105.00	0.3	417,916.85	35.53
5101 - 5200	237	0.06	1,220,925.00	0.31	434,204.25	35.56
5201 - 5300	224	0.06	1,175,996.00	0.3	418,542.52	35.59
5301 - 5400	214	0.06	1,144,330.00	0.29	407,566.10	35.62
5401 - 5500	205	0.06	1,133,412.00	0.29	404,029.92	35.65
5501 - 5600	186	0.05	1,032,364.00	0.26	368,210.68	35.67
5601 - 5700	137	0.04	774,232.00	0.2	276,327.84	35.69
5701 - 5800	161	0.04	925,252.00	0.24	330,429.24	35.71
5801 - 5900	166	0.04	993,802.00	0.25	355,126.74	35.73
5901 - 6000	166	0.04	987,776.00	0.25	353,193.12	35.76
6001 - 6100	151	0.04	913,700.00	0.23	326,895.00	35.78
6101 - 6200	148	0.04	910,031.00	0.23	325,759.47	35.80
6201 - 6300	135	0.04	843,118.00	0.22	301,963.66	35.82
6301 - 6400	115	0.03	729,990.00	0.19	261,586.30	35.83
6401 - 6500	112	0.03	722,145.00	0.18	258,905.65	35.85
6501 - 6600	108	0.03	707,323.00	0.18	253,717.51	35.87
6601 - 6700	102	0.03	678,079.00	0.17	243,341.23	35.89
6701 - 6800	87	0.02	586,919.00	0.15	210,722.03	35.90
6801 - 6900	93	0.03	636,730.00	0.16	228,708.10	35.92
6901 - 7000	95	0.03	660,219.00	0.17	237,251.03	35.94
7001 - 7100	96	0.03	676,956.00	0.17	243,369.72	35.95
7101 - 7200	78	0.02	557,257.00	0.14	200,413.09	35.96
7201 - 7300	77	0.02	558,012.00	0.14	200,766.44	35.98
7301 - 7400	58	0.02	426,846.00	0.11	153,641.02	35.99
7401 - 7500	78	0.02	581,041.00	0.15	209,213.17	36.01
7501 - 7600	67	0.02	505,797.00	0.13	182,186.89	36.02
7601 - 7700	62	0.02	474,483.00	0.12	170,970.71	36.03
7701 - 7800	51	0.01	395,171.00	0.1	142,439.27	36.04
7801 - 7900	55	0.01	432,092.00	0.11	155,804.04	36.06
7901 - 8000	52	0.01	413,962.00	0.11	149,317.94	36.07
8001 - 8100	65	0.02	523,291.00	0.13	188,807.67	36.08
8101 - 8200	41	0.01	334,120.00	0.09	120,590.40	36.09
8201 - 8300	35	0.01	288,510.00	0.07	104,158.70	36.10
8301 - 8400	40	0.01	333,953.00	0.09	120,602.61	36.11
8401 - 8500	42	0.01	354,736.00	0.09	128,144.32	36.12
8501 - 8600	48	0.01	410,466.00	0.11	148,320.42	36.13

KWH RANGE	NO OF CUSTOMERS	% Total Customers	KWH-UNITS	% Total Units	KWH-COST	COST/KWH (Cents)
8601 - 8700	39	0.01	337,149.00	0.09	121,859.13	36.14
8701 - 8800	38	0.01	332,710.00	0.09	120,290.70	36.15
8801 - 8900	26	0.01	230,166.00	0.06	83,237.42	36.16
8901 - 9000	32	0.01	286,221.00	0.07	103,533.77	36.17
9001 - 9100	32	0.01	289,534.00	0.07	104,759.58	36.18
9101 - 9200	25	0.01	228,864.00	0.06	82,829.68	36.19
9201 - 9300	30	0.01	277,525.00	0.07	100,464.25	36.20
9301 - 9400	26	0.01	242,925.00	0.06	87,958.25	36.21
9401 - 9500	34	0.01	321,399.00	0.08	116,401.63	36.22
9501 - 9600	23	0.01	219,614.00	0.06	79,555.18	36.23
9601 - 9700	31	0.01	299,335.00	0.08	108,459.95	36.23
9701 - 9800	24	0.01	234,227.00	0.06	84,887.99	36.24
9801 - 9900	30	0.01	295,608.00	0.08	107,154.96	36.25
9901 - 10000	25	0.01	258,982.00	0.07	93,899.34	36.26
10001 - 10100	24	0.01	241,256.00	0.06	87,488.72	36.26
10101 - 10200	26	0.01	263,846.00	0.07	95,699.02	36.27
10201 - 10300	20	0.01	205,018.00	0.05	74,376.66	36.28
10301 - 10400	23	0.01	237,997.00	0.06	86,356.89	36.28
10401 - 10500	18	0	188,131.00	0.05	68,276.47	36.29
10501 - 10600	23	0.01	242,498.00	0.06	88,022.26	36.30
10601 - 10700	15	0	159,614.00	0.04	57,947.18	36.30
10701 - 10800	13	0	139,742.00	0.04	50,742.54	36.31
10801 - 10900	9	0	97,735.00	0.03	35,495.95	36.32
10901 - 11000	19	0.01	219,042.00	0.06	79,565.54	36.32
11001 - 11100	14	0	154,633.00	0.04	56,178.21	36.33
11101 - 11200	14	0	156,033.00	0.04	56,696.21	36.34
11201 - 11300	18	0	202,518.00	0.05	73,599.66	36.34
11301 - 11400	14	0	159,013.00	0.04	57,798.81	36.35
11401 - 11500	12	0	137,473.00	0.04	49,977.01	36.35
11501 - 11600	11	0	126,858.00	0.03	46,123.46	36.36
11601 - 11700	17	0	198,047.00	0.05	72,019.39	36.36
11701 - 11800	19	0.01	223,307.00	0.06	81,217.59	36.37
11801 - 11900	15	0	177,671.00	0.05	64,628.27	36.38
11901 - 12000	8	0	95,555.00	0.02	34,763.35	36.38
12001 - 12100	4	0	48,203.00	0.01	17,539.11	36.39
12101 - 12200	6	0	72,767.00	0.02	26,479.79	36.39
12201 - 12300	8	0	98,103.00	0.03	35,706.11	36.40
12301 - 12400	12	0	148,148.00	0.04	53,926.76	36.40
12401 - 12500	8	0	99,552.00	0.03	36,242.24	36.41
12501 - 12600	10	0	125,295.00	0.03	45,619.15	36.41
12601 - 12700	10	0	126,489.00	0.03	46,060.93	36.41
12701 - 12800	8	0	102,010.00	0.03	37,151.70	36.42
12801 - 12900	5	0	64,328.00	0.02	23,431.36	36.42
12901 - 13000	8	0	103,529.00	0.03	37,713.73	36.43

KWH RANGE	NO OF CUSTOMERS	% Total Customers	KWH-UNITS	% Total Units	KWH-COST	COST/KWH (Cents)
13001 - 13100	8	0	104,331.00	0.03	38,010.47	36.43
13101 - 13200	5	0	92,154.00	0.02	33,578.98	36.44
13201 - 13300	6	0	79,388.00	0.02	28,929.56	36.44
13301 - 13400	10	0	133,451.00	0.03	48,636.87	36.45
13401 - 13500	3	0	40,342.00	0.01	14,704.54	36.45
13501 - 13600	3	0	40,641.00	0.01	14,815.17	36.45
13601 - 13700	7	0	95,468.00	0.02	34,805.16	36.46
13701 - 13800	6	0	82,589.00	0.02	30,113.93	36.46
13801 - 13900	10	0	138,465.00	0.04	50,492.05	36.47
13901 - 14000	7	0	97,569.00	0.02	35,582.53	36.47
14001 - 14100	5	0	70,280.00	0.02	25,633.60	36.47
14101 - 14200	3	0	42,431.00	0.01	15,477.47	36.48
14201 - 14300	8	0	114,016.00	0.03	41,593.92	36.48
14301 - 14400	4	0	57,376.00	0.01	20,933.12	36.48
14401 - 14500	10	0	144,425.00	0.04	52,697.25	36.49
14501 - 14600	4	0	58,188.00	0.01	21,233.56	36.49
14601 - 14700	11	0	161,127.00	0.04	58,802.99	36.49
14701 - 14800	3	0	44,346.00	0.01	16,186.02	36.50
14801 - 14900	4	0	59,423.00	0.02	21,690.51	36.50
14901 - 15000	3	0	44,813.00	0.01	16,358.81	36.50
15001 - 15100	6	0	90,218.00	0.02	32,936.66	36.51
15101 - 15200	7	0	106,150.00	0.03	38,757.50	36.51
15201 - 15300	5	0	76,266.00	0.02	27,848.42	36.51
15301 - 15400	2	0	30,706.00	0.01	11,213.22	36.52
15401 - 15500	4	0	61,816.00	0.02	22,575.92	36.52
15501 - 15600	4	0	62,163.00	0.02	22,704.31	36.52
15601 - 15700	2	0	31,321.00	0.01	11,440.77	36.53
15701 - 15800	3	0	47,205.00	0.01	17,243.85	36.53
15801 - 15900	4	0	63,433.00	0.02	23,174.21	36.53
15901 - 16000	3	0	47,859.00	0.01	17,485.83	36.54
16001 - 16100	6	0	96,293.00	0.02	35,184.41	36.54
16101 - 16200	5	0	80,765.00	0.02	29,513.05	36.54
16201 - 16300	2	0	32,496.00	0.01	11,875.52	36.54
16301 - 16400	2	0	32,714.00	0.01	11,956.18	36.55
16401 - 16500	3	0	49,390.00	0.01	18,052.30	36.55
16501 - 16600	4	0	66,197.00	0.02	24,196.89	36.55
16601 - 16700	2	0	33,297.00	0.01	12,171.89	36.56
16701 - 16800	3	0	50,349.00	0.01	18,407.13	36.56
16801 - 16900	3	0	50,639.00	0.01	18,514.43	36.56
16901 - 17000	3	0	50,766.00	0.01	18,561.42	36.56
17001 - 17100	2	0	34,115.00	0.01	12,474.55	36.57
17101 - 17200	2	0	34,307.00	0.01	12,545.59	36.57
17201 - 17300	5	0	86,260.00	0.02	31,546.20	36.57
17301 - 17400	1	0	17,370.00	0	6,352.90	36.57

KWH RANGE	NO OF CUSTOMERS	% Total Customers	KWH-UNITS	% Total Units	KWH-COST	COST/KWH (Cents)
17401 - 17500	2	0	34,857.00	0.01	12,749.09	36.58
17501 - 17600	1	0	17,532.00	0	6,412.84	36.58
17601 - 17700	2	0	35,282.00	0.01	12,906.34	36.58
17701 - 17800	2	0	35,468.00	0.01	12,975.16	36.58
17801 - 17900	3	0	53,598.00	0.01	19,609.26	36.59
17901 - 18000	1	0	17,991.00	0	6,582.67	36.59
18101 - 18200	1	0	18,188.00	0	6,655.56	36.59
18201 - 18300	6	0	109,596.00	0.03	40,106.52	36.59
18301 - 18400	3	0	55,071.00	0.01	20,154.27	36.60
18401 - 18500	2	0	36,940.00	0.01	13,519.80	36.60
18501 - 18600	2	0	37,142.00	0.01	13,594.54	36.60
18601 - 18700	4	0	74,651.00	0.02	27,324.87	36.60
18701 - 18800	1	0	18,783.00	0	6,875.71	36.61
18801 - 18900	3	0	56,614.00	0.01	20,725.18	36.61
18901 - 19000	3	0	56,921.00	0.01	20,838.77	36.61
19001 - 19100	1	0	19,089.00	0	6,988.93	36.61
19101 - 19200	2	0	38,288.00	0.01	14,018.56	36.61
19201 - 19300	1	0	19,296.00	0	7,065.52	36.62
19301 - 19400	3	0	58,111.00	0.01	21,279.07	36.62
19401 - 19500	2	0	38,945.00	0.01	14,261.65	36.62
19501 - 19600	1	0	19,507.00	0	7,143.59	36.62
19701 - 19800	1	0	19,713.00	0.01	7,219.81	36.62
19801 - 19900	1	0	19,843.00	0.01	7,267.91	36.63
19901 - 20000	1	0	19,900.00	0.01	7,289.00	36.63
20001 - 20100	1	0	20,031.00	0.01	7,337.47	36.63
20101 - 20200	4	0	80,532.00	0.02	29,500.84	36.63
20201 - 20300	2	0	40,488.00	0.01	14,832.56	36.63
20401 - 20500	2	0	40,907.00	0.01	14,987.59	36.64
20501 - 20600	2	0	41,029.00	0.01	15,032.73	36.64
20601 - 20700	3	0	61,964.00	0.02	22,704.68	36.64
20701 - 20800	1	0	20,728.00	0.01	7,595.36	36.64
20801 - 20900	1	0	20,800.00	0.01	7,622.00	36.64
20901 - 21000	1	0	20,936.00	0.01	7,672.32	36.65
21101 - 21200	1	0	21,141.00	0.01	7,748.17	36.65
21201 - 21300	1	0	21,265.00	0.01	7,794.05	36.65
21301 - 21400	2	0	42,688.00	0.01	15,646.56	36.65
21401 - 21500	1	0	21,448.00	0.01	7,861.76	36.65
21501 - 21600	2	0	43,096.00	0.01	15,797.52	36.66
21601 - 21700	1	0	21,620.00	0.01	7,925.40	36.66
21801 - 21900	1	0	21,842.00	0.01	8,007.54	36.66
21901 - 22000	1	0	21,911.00	0.01	8,033.07	36.66
22101 - 22200	1	0	22,193.00	0.01	8,137.41	36.67
22301 - 22400	1	0	22,311.00	0.01	8,181.07	36.67
22501 - 22600	2	0	45,155.00	0.01	16,559.35	36.67

KWH RANGE	NO OF CUSTOMERS	% Total Customers	KWH-UNITS	% Total Units	KWH-COST	COST/KWH (Cents)
22601 - 22700	1	0	22,669.00	0.01	8,313.53	36.67
22701 - 22800	2	0	45,503.00	0.01	16,688.11	36.67
22801 - 22900	1	0	22,800.00	0.01	8,362.00	36.68
23001 - 23100	1	0	23,005.00	0.01	8,437.85	36.68
23201 - 23300	1	0	23,240.00	0.01	8,524.80	36.68
23301 - 23400	2	0	46,704.00	0.01	17,132.48	36.68
23701 - 23800	1	0	23,735.00	0.01	8,707.95	36.69
23801 - 23900	1	0	23,870.00	0.01	8,757.90	36.69
23901 - 24000	1	0	23,978.00	0.01	8,797.86	36.69
24301 - 24400	1	0	24,340.00	0.01	8,931.80	36.70
24401 - 24500	2	0	48,921.00	0.01	17,952.77	36.70
24501 - 24600	1	0	24,537.00	0.01	9,004.69	36.70
24601 - 24700	1	0	24,639.00	0.01	9,042.43	36.70
25001 - 25100	1	0	25,003.00	0.01	9,177.11	36.70
25201 - 25300	2	0	50,460.00	0.01	18,522.20	36.71
25501 - 25600	1	0	25,514.00	0.01	9,366.18	36.71
25701 - 25800	1	0	25,770.00	0.01	9,460.90	36.71
25901 - 26000	1	0	25,962.00	0.01	9,531.94	36.71
26101 - 26200	1	0	26,108.00	0.01	9,585.96	36.72
26201 - 26300	2	0	52,531.00	0.01	19,288.47	36.72
26301 - 26400	1	0	26,340.00	0.01	9,671.80	36.72
26501 - 26600	1	0	26,595.00	0.01	9,766.15	36.72
26701 - 26800	1	0	26,795.00	0.01	9,840.15	36.72
26901 - 27000	2	0	53,903.00	0.01	19,796.11	36.73
27001 - 27100	1	0	27,079.00	0.01	9,945.23	36.73
27401 - 27500	1	0	27,421.00	0.01	10,071.77	36.73
27501 - 27600	2	0	55,168.00	0.01	20,264.16	36.73
27601 - 27700	1	0	27,645.00	0.01	10,154.65	36.73
28401 - 28500	1	0	28,440.00	0.01	10,448.80	36.74
28801 - 28900	2	0	57,640.00	0.01	21,178.80	36.74
29501 - 29600	1	0	29,513.00	0.01	10,845.81	36.75
29901 - 30000	1	0	29,960.00	0.01	11,011.20	36.75
30101 - 30200	1	0	30,155.00	0.01	11,083.35	36.75
30401 - 30500	1	0	30,450.00	0.01	11,192.50	36.76
30601 - 30700	1	0	30,644.00	0.01	11,264.28	36.76
30901 - 31000	1	0	30,960.00	0.01	11,381.20	36.76
31201 - 31300	1	0	31,240.00	0.01	11,484.80	36.76
31301 - 31400	1	0	31,360.00	0.01	11,529.20	36.76
31501 - 31600	1	0	31,573.00	0.01	11,608.01	36.77
31601 - 31700	1	0	31,686.00	0.01	11,649.82	36.77
32701 - 32800	1	0	32,720.00	0.01	12,032.40	36.77
33701 - 33800	1	0	33,718.00	0.01	12,401.66	36.78
34001 - 34100	1	0	34,031.00	0.01	12,517.47	36.78
34601 - 34700	1	0	34,640.00	0.01	12,742.80	36.79

KWH RANGE	NO OF CUSTOMERS	% Total Customers	KWH-UNITS	% Total Units	KWH-COST	COST/KWH (Cents)
36801 - 36900	1	0	36,874.00	0.01	13,569.38	36.80
38801 - 38900	1	0	38,800.00	0.01	14,282.00	36.81
39201 - 39300	1	0	39,280.00	0.01	14,459.60	36.81
40601 - 40700	1	0	40,690.00	0.01	14,981.30	36.82
40701 - 40800	1	0	40,720.00	0.01	14,992.40	36.82
40901 - 41000	1	0	40,994.00	0.01	15,093.78	36.82
44401 - 44500	1	0	44,457.00	0.01	16,375.09	36.83
47201 - 47300	1	0	47,280.00	0.01	17,419.60	36.84
48301 - 48400	1	0	48,334.00	0.01	17,809.58	36.85
49101 - 49200	1	0	49,100.00	0.01	18,093.00	36.85
74501 - 74600	1	0	74,514.00	0.02	27,496.18	36.90
99801 - 99900	1	0	99,808.00	0.03	36,854.96	36.93
107901 - 108000	1	0	107,920.00	0.03	39,856.40	36.93
TOTAL:	**369,067**	**100**	**390,831,158.00**	**100**	**123,701,367.67**	**31.65**

APPENDIX IV:

FORCAST METHODOLOGY

The *2011 Energy Sales and Peak Demand Forecast* presents the methodologies and results of the 2011 Forecast Study, giving a 10 year forecast of key customer, demand and energy statistics, including:

- Customer numbers, energy sales (GWh) and maximum demands (MVA), disaggregated according to rate category (Rates A, B, D1-D5, E1-E5 and S) and distribution area (Distributions North, South, East, Central and Tobago).
- Losses (GWh) and units sent out (USO) (GWh) disaggregated according to Distribution Area.
- System peak demand (MW).

The primary role of the *2011 Energy Sales and Peak Demand Forecast* is the provision of essential inputs for driving T&TEC's several financial and plant infrastructure expansion planning processes for the next 10 years, both at the distribution area and system levels; the principal planning processes being: budget preparation, corporate planning, substation forecasting, transmission and sub-transmission planning and generation expansion planning.

The *2011 Energy Sales and Peak Demand Forecast* continued to employ the econometric models introduced in 1993, for forecasting the total energy sales to Rates A and B customers. The total energy sales forecasting of Rates D1-D5, E1-E5 and S customers were achieved using specific trending/judgement models.

Projections of key exogenous economic variables were supplied by the Central Bank of Trinidad and Tobago (CBTT). Additional required historical data were obtained from sources both internal and external to T&TEC; the principal internal sources being from the Finance Division, Utilization Departments of each Distribution Area, Commercial, Street Lighting and Metering Services Departments. Externally, data were obtained through interviews with or written requests to large industrial users, private developers and governmental agencies and organizations responsible for either implementing major development projects or analysing and publishing national statistics; alternatively, the relevant data were obtained from T&TEC personnel who served on joint Committees established with these external agencies. These agencies, private developers and organizations included Central Statistical Office (CSO), Evolving TecKnologies and Enterprise Development Company (eTecK), Petroleum Company of Trinidad and Tobago, Point-a-Pierre (Petrotrin PAP) and Mittal Steel Pt. Lisas Ltd.

Naturally, the forecast would not be complete without the exercise of judgement in the final analysis, informed by the large volume of data furnished about the major stakeholders in the energy industry inclusive of the agencies listed above.

The *2011 Energy Sales and Peak Demand Forecast* reflects 1 major change when compared to previous forecasts – only the results of a Base Forecast is presented. The Commission is in the process of reviewing the econometric model hence the reason for the omission of a Conservative and Optimistic Forecasts.

Forecast error analyses conducted on previous forecasts have demonstrated acceptable levels of accuracy between forecasted and actual customer statistics. Notwithstanding this fact, Sub-Section 5.0 briefly discusses certain studies and model updates which need to be implemented, in order to confer even higher levels of accuracy. The challenge continues to be, to develop a comprehensive forcast, which is both accurate and sufficiently detailed,for use in the Commission's business and engineering planning processes.

METHODOLOGY FOR DEMAND FORECASTING

2011 Number of Customers Forecast -Rate A (Residential Customers)

1.0 Comments on the 2011 Number of Customers Forecast

1.1 Rate A (Residential Customers)

1.1.1 Number of Customers Forecasting Methodology

The forecasting of the number of Rate A customers in annual forecast studies is effected using the trending-judgement methodology described by the following 4 step process:

Step 1: For each distribution area, determination of the most recent historical growth rates for Rate A customers based on published number of Rate A customers data in T&TEC's *Quarterly Financial Reports.*

Step 2: For each distribution area, selection of growth rate projections to meet expected trends over the 10 year forecast window. Expected trends should reflect recent historical growth rates, modulated by increased growth rates, as necessary, to account for 'surges' in the release of new housing units.

Step 3: Computation of the (i) expected total number of Rate A customers by summing the projected number of Rate A customer of the 5 distribution areas and (ii) associated growth rate projections of the total number of Rate A customers.

Step 4: For each distribution area, calculation of projections of Rate A number of customers distribution ratio factors as percentages of the total number of Rate A customers. These
Rate A number of customers distribution ratio factors are required to disaggregate the total number of Rate A customers to the distribution areas.

1.1.2 2011 Number of Customers Forecast Analysis

The total number of Rate A customers has exhibited a declining growth rate over the last 3 year period of published *Quarterly Financial Reports* at 3.3 % in 2007, 3.1 % in 2008 and 2.4 % in 2009. Accordingly, a growth rate of 2.2 % is projected over the 10 year forecast window, this will translate to 384,294, 419,043 and 467,131 total number of Rate A customers in 2011, 2015 and 2020, respectively – refer to the 'Rate A' column of Table 3.5.2.

1.2 Rate B (Commercial Customers)

1.2.1 Number of Customers Forecasting Methodology

The forecasting methodology for the number of Rate B customers is similar to that for the number of Rate A customers described in Sub-Section 1.1.1.

1.2.2 2011 Number of Customers Forecast Analysis

Consistent with the last 3 year published growth rates of 1.3 % in 2007, 2.5 % in 2008 and 2.2 % in 2009, the mean growth rate value of 2.0 % is applied over the 10 year forecast window, this will result in 39,178, 42,487 and 47,036 total number of Rate B customers in 2011, 2015 and 2020, respectively - refer to the 'Rate B' column of Table 3.5.2.

1.3 Rates D1 and D2 (Small and Medium Industrial Customers)

1.3.1 Number of Customers Forecasting Methodology

The forecasting methodology for the number of Rate D1 and Rate D2 customers is similar to that for the number of Rate A customers described in Sub-Section 1.1.1.

1.3.2 2011 Number of Customers Forecast Analysis – Rate D1

The growth rates of Rate D1 customers have been declining over the last 2 year period at 5.7 % in 2008 and 3.9 % in 2009. Accordingly, a growth rate of 3.2 % is projected over the 10 year forecast window, with the expectation of 2,256, 2,561 and 3,006 total number of Rate D1 customers in 2011, 2015 and 2020, respectively – refer to the 'Rate D1' column of Table 3.5.2.

1.3.3 2011 Number of Customers Forecast Analysis – Rate D2

The total number of Rate D2 customers has maintained a constant growth rate of 2.2 % over the last 2 year period, 2008 and 2009. Accordingly, the same constant growth rate of 2.2 % is projected over the 10 year forecast window, with the expectation of 911, 997 and 1,117 total number of Rate D2 customers in 2011, 2015 and 2020, respectively – refer to the 'Rate D2' column of Table 3.5.2.

1.4 Rates D3 – D5 and E1 – E5 (Large Industrial Customers)

1.4.1 Number of Customers Forecasting Methodology

The large maximum demand range of new Rates D3 – D5 and E1 – E5 customers generally necessitates an upgrade of T&TEC's existing subtransmission/distribution system, this requirement, coupled with the need for the execution of legal Agreements, dictate commissioning lead times of the order of 1 – 4 years for these new customers; as such, the number of Rates D3 – D5 and E1 – E5 customers are known ahead of time.

1.4.2 2011 Number of Customers Forecast Analysis – Rate D3

T&TEC's Ventyx customer database system identified 14 Rate D3 customers as at September 2010. The 'Rate D3' column of Table 16 reveals that this number of Rate D3 customers is forecasted to remain unchanged over the 10 year forecast window. It is to be noted that even though representatives of the following possible new Rate D3/Rate D4 customers have written T&TEC's distribution areas about their future plans, firm commitments have not yet been communicated about the final load and realistic commissioning dates, and as such, these are not being considered commissioned during the 10 year forecast window:

- A WASA Desalination Plant in Distribution South.
- The existing Longdenville ABEL Plant upgrade plan to a maximum demand of 5 MVA.
- The existing Blue Waters Products Plant upgrade plan to a maximum demand of 9 MVA.

1.4.3 2011 Number of Customers Forecast Analysis – Rate D4

T&TEC's Ventyx customer database system identified 19 Rate D4 customers as at September 2010. The 'Rate D4' column of Table 16 reveals that this number of Rate D4 customers is forecasted to increase to 21, in 2011, with the commissioning of the:

- UTT Campus at Tamana InTech Park in Wallerfield with an initial demand of 2 MVA in 2011 and ramping up to a final demand 6 MVA in 2013.
- Air Liquid Plant with an initial demand of 2 MVA at the end of 2010 and ramping up to a final demand of 12.8 MVA in March 2011.

Thereafter, in 2012, the number of Rate D4 customers is shown to increase to 22 with the commissioning of the 'General Provision Plant', a traditional virtual plant, used in the annual forecast studies, to cater for (i) provisional new direct foreign investment in the energy sector and (ii) the expected natural increase demand in existing plants. This traditional virtual plant is represented by a 5 MVA demand block load in 2012, which increases by 5 MVA at 2 year intervals.

1.4.4 2011 Number of Customers Forecast Analysis – Rate D5

The 'Rate D5' column of Table 16 shows that Yara Trinidad Ltd will continue to be the only Rate D5 customer over the 10 year forecast window.

1.4.5 2011 Number of Customers Forecast Analysis – Rates E1, E2 and E3

In December 2010, there existed 3 Rate E1 customers: (i) Petrotrin, PAP, (ii) Methanol Holdings, AUM and (iii) Nu Iron. Based on Petrotrin PAP's latest total plant expansion ramp-up schedule, that is, 46 MVA in Q1-2011, 50 MVA in Q2-2011, 69 MVA in Q3-2011, 83 MVA in Q4-2011, 85 MVA in Q1-2012 and 101 MVA in Q4-2012, Petrotrin PAP will migrate to a:

- Rate E2 customer on attaining 50 MVA in Q2-2011, as its computed monthly energy consumption will be 27 GWh (Recall that the monthly energy consumption range for a Rate E2 customer is 25 GWh to 50 GWh).
- Rate E3 customer on attaining 101 MVA at the end 2012, as its computed monthly energy consumption will be 55 GWh (Recall that the monthly energy consumption range for a Rate E3 customer is 50 GWh to 75 GWh).

The ‘Rates E1, E2 and E3’ columns of Table 3.5.2 depict the corresponding changes in the numbers of these customers associated with the migrations of Petrotrin PAP and the commissioning of the CariSal Plant with an initial demand of 24.1 MVA in September 2013, ramping up to 45.7 MVA in September 2018, that is:

- In 2010, there were 3 Rate E1 customers, 0 Rate E2 customers and 0 Rate E3 customers.
- In 2011, with the migration of Petrotrin PAP from Rate E1 to Rate E2, there will now be 2 Rate E1 customers, 1 Rate E2 customer and 0 Rate E3 customers.
- In 2013, with the (i) migration of Petrotrin PAP from Rate E2 to Rate E3 at the end of 2012 and (ii) commissioning of the CariSal Plant in September 2013, there will now be 3 Rate E1 customers, 0 Rate E2 customers and 1 Rate E3 customer.

1.4.6 2011 Number of Customers Forecast Analysis – Rate E5

The ‘Rate E5’ column of Table 3.5.2 shows that Mittal Steel Pt. Lisas Ltd. will continue to be the only Rate E5 customer over the 10 year forecast window.

2.0 Comments on the 2011 Customer Energy Sales Forecast

The customer energy sales forecast when convolved with an energy charges forecast (in cents/kWh) over the same forecast window provides a forecast of revenues due to electricity energy consumption by all categories of customers, as such, the customer energy sales forecast is a principal input for revenue forecasting. Conservation measures were not taken into account in the forecast.

2.1 Rate A (Residential Customers)

2.1.1 Customer Energy Sales Forecasting Methodology

The forecasting of the total Rate A customer energy sales utilises an econometric model in accordance with the recommendations of a Study commissioned by T&TEC in 1993. The econometric model is basically a natural logarithmic equation, relating projected total customer energy sales, as the dependent variable, to projections of the following influential independent variables:

(i) Non-petroleum gross domestic product (NPGDP).

(ii) Rate A tariff price of electricity.

(iii) Number of Rate A customers.

The econometric model requires real values of items (i) and (ii) to Base 1982; these are derived from the corresponding nominal values using the Retail Price Index (RPI), obtained from the CSO website, as the deflator.

10 year projections of the nominal values of item (i) are provided by the CBTT, 10 year projections of item (iii) are determined as per Sub-Section 1.1.1, while 10 year projections of item (ii) are evaluated using the current RIC approved electricity energy charge rates (in cents/kWh) and T&TEC’s provided energy charge growth rates.

Following the determination of the total Rate A customer energy sales forecast, Rate A energy sales distribution ratio factors, are required to disaggregate the total Rate A customer energy sales forecast to the distribution areas. These distribution ratio factors are evaluated using the same trending-judgement methodology described in Sub-Section 1.1.1, except that the parameter being trended is the energy sales to Rate A customers instead of the number of Rate A customers.

In conclusion, the complete Rate A customer energy sales profile is forecasted using a combined econometric and trending-judgement model.

2.1.2 2011 Customer Energy Sales Forecast Analysis

Based on the aforementioned econometric methodology, total Rate A customer energy sales are expected to attain 2,412 GWh 3,051 GWh and 3,480 GWh in 2011, 2014 and 2016, respectively – refer to the ‘Rate A’ column of Table 3.5.3.

Based on the application of the trending-judgement model generated energy sales distribution ratio factors, the forecasted total Rate A customer energy sales, disaggregated according to distribution area, are also available.

2.2 Rate B (Commercial Customers)

2.2.1 Customer Energy Sales Forecasting Methodology

The 1993 Study articulated a similar econometric model for forecasting total Rate B customer energy sales; the influential dependent variables were:

(i) Private non-petroleum gross domestic product (PNPGDP).

(ii) Rate B tariff price of electricity.

(iii) Number of Rate B customers.

The 1993 Study specified the ratio of the nominal PNPGDP to constant (1985) market PNPGDP prices was to be the relevant deflator for converting nominal prices to real prices; 10 year projections of this PNPGDP deflator were to be sourced from the CBTT. However, based on an examination of the 2004 to 2009 Forecast Studies econometric processing files (this set of files being those files available to the forecaster), it became apparent that another deflator, equivalent to the ratio of nominal PNPGDP to the conservative PNPGDP, being produced by the Corporate Planner for the Conservative Forecast study, was being used. In light of the Corporate Planner's view that his generated conservative PNPGDP projections are not sufficiently rigorous to withstand technical scrutiny, the forecaster's only recourse was to use the RPI (the deflator for the Rate A econometric model – see Sub-Section 2.1.1) in the 2011 Forecast Study for the Rate B econometric model.

2.2.2 2011 Customer Energy Sales Forecast Analysis

Based on the aforementioned econometric methodology, total Rate B customer energy sales are expected to attain 734 GWh, 809 GWh and 1,001 GWh in 2011, 2015 and 2020, respectively – refer to the 'Rate B' column of Table 3.5.3.

Based on the Rate B customer energy sales trending-judgement model, the forecasted disaggregated Distribution Area's Rate B customer energy sales are also available.

2.3 Rates D1 and D2 (Small and Medium Industrial Customers)

2.3.1 Customer Energy Sales Forecasting Methodology

The 1993 Study advocated a 2 step process for deriving the forecasted combined Rates D1 and D2 total customer energy sales:

Step 1: Derivation of the forecasted combined Rates B, D1 and D2 total customer energy sales using an econometric model, whose influential dependent variables were:

(i) Private non-petroleum gross domestic product (PNPGDP).

(ii) Combined Rates B, D1 and D2 tariff price of electricity.

(iii) Sum of the numbers of Rates B, D1 and D2 customers.

Step 2: Subtraction of the forecasted total Rate B customer energy sales, determined in Sub-Section 2.2.1, from the results obtained in step 1.

Having determined the combined Rates D1 and D2 total customer energy sales, a mechanism is required to split the combined total energy sales to the total customer energy sales of each separate rate class; logarithmic-trending projection ratios, derived from historical energy sales to the 2 rate classes, constitute this mechanism.

Finally, the total customer energy sales, to each of the 2 customer rate classes, are disaggregated to the distribution areas by applying Rate D1 and Rate D2 energy sales distribution ratio factors, derived as per Sub-Section 1.1.1 methodology.

The execution of step 1, during the 2011 Forecast Study, produced a forecasted combined total Rates D1 and D2 customer energy sales profile, which was unrealistic, that is, the values were found to be initially high in 2011, then they decreased towards 2015 and finally they increased towards 2020. It became apparent to the forecaster, after having carried out an examination of the processing files of previous forecast studies, that this anomaly had been occurring since the 2006 Forecast Study. Since a cursory investigation of the econometric model, by the forecaster, has been unsuccessful in fixing the anomaly, the forecaster has employed the trending-judgement model only (not the recommended combined econometric and trending-judgement model) to forecast the combined Rates D1 and D2 total customer energy sales in the 2011 Forecast Study.

2.3.2 2011 Customer Energy Sales Forecast Analysis

Based on the trending-judgement model and logarithmic-trending projection ratios, total Rate D1 customer energy sales are expected to attain 512 GWh, 589 GWh and 702 GWh in 2011, 2015 and 2020, respectively – refer to the 'Rate D1' column of Table 17, while total Rate D2 customer energy sales are expected to attain 1,368 GWh, 1,559 GWh and 1,839 GWh at the same specified years – refer to the 'Rate D2' column of Table 3.5.3.

2.4 Rates D3 – D5 and E1 – E5 (Large Industrial Customers)

2.4.1 Customer Energy Sales Forecasting Methodology

The average peak demands of large industrial customers are in general predictable, thus, the forecasting of energy sales to large industrial customers is achieved by firstly forecasting the average peak demand and then deriving the energy sales forecast using the equation relating energy consumption, peak demand and α factor – see equations (1), (2), (3) and (4). Note that α factor is defined as the product of load factor and power factor

Thus the forecasting methodology for large industrial customers comprises the following steps:

Step 1: Sourcing, from the Commercial Department, the most recent 12 month historical records of monthly peak demands (kVA) and monthly energy consumptions (kWh), for each existing large industrial customer. Thus, for the 2011 Forecast Study, consistent with this step, monthly peak demands and energy consumptions were obtained for 14 Rate D3,19 Rate D4, 1 Rate D5, 3 Rate E1 and 1 Rate E5 customers, for the 12 months spanning October 2009 to September 2010.

Step 2: Computation of the average monthly peak demands, followed by projections of an adjusted average monthly peak demands, to account for known plant load expansion or curtailment, throughout the 10 year forecast window.

As an illustration of step 2 in the 2011 Forecast Study, the average monthly peak demand for Mittal Steel Pt. Lisas Ltd., between October 2009 and September 2010, was computed as 208,800 kVA. However, 204,300 kVA was projected as the adjusted average peak demand at each successive year of the 10 forecast year window, since Mittal Steel Pt. Lisas Ltd. has advised that their load demand will be reduced by 4,500 kVA, with the commissioning of the Air Liquid Plant at the end of 2010.

Step 3: Evaluation of the forecasted annual energy sales, for each large industrial customer, using equation (1). $\alpha\ factor_{avg}$ is the mean of the 12-monthly, $\alpha\ factor_{monthly}$,computed using equation (2).

$$kWh_{annual} = \alpha\ factor_{avg}\ x\ \ kVA_{pk}\ x\ time \qquad (1)$$

where:
$time$ = 8784 hrs for leap years, 8760 hrs for years other than leap years

$$\alpha\ factor_{monthly} = \frac{kWh_{monthly}}{kVA_{pk\ monthly}\ x\ time} \qquad (2)$$

where:
$time$ = 24 x 28 hrs for February 2010,
= 24 x 30 hrs for November 2009, April 2010, June 2010, September 2010,
= 24 x 31 hrs for October 2009, December 2009, January 2010, March 2010, May 2010, July 2010 and August 2010.

Step 4: Aggregation of the forecasted annual energy sales of the large industrial customers by rate category and distribution area.

2.4.2 2011 Customer Energy Sales Forecast Analysis – Rate D3

The ‘Rate D3’ column of Table 17 illustrates that the energy sales to Rate D3 customers are predicted to remain constant over the 10 year forecast window as no new Rate D3 customer is anticipated to be commissioned – refer to Sub-Section 1.4.2.

2.4.3 2011 Customer Energy Sales Forecast Analysis – Rate D4

The ‘Rate D4’ column of Table 17 reveals that the energy sales to Rate D4 customers are forecasted to increase from to 892 GWh, in 2011, to 1,058 GWh, in 2020. Contributions to this increase come from the following:

- In 2012: Ramping up of loads at the UTT Campus and Air Liquid Plant and commissioning of the ‘General Provision Plant’ – refer to Sub-Section 1.4.3.
- In 2013: Further ramping up of load at the UTT Campus.
- In 2014: Further ramping up of load at the ‘General Provision Plant’.
- In 2016: Further ramping up of load at the ‘General Provision Plant’.
- In 2018: Further ramping up of load at the ‘General Provision Plant’.

2.4.4 2011 Customer Energy Sales Forecast Analysis – Rates E1, E2 and E3

With reference to Sub-Section 1.4.5, the increases in customer energy sales forecasted in the ‘Rates E1, E2 and E3’ columns of Table 3.5.3 correspond to the plant ramp up schedules at:

- Petrotrin PAP.
- The CariSal Plant.

2.4.5 2011 Customer Energy Sales Forecast Analysis – Rate E5

During the 12 month period, October 2009 to September 2010, Mittal Steel Pt. Lisas Ltd. operated 1 arc furnace for 6 months and both arc furnaces for the other 6 months; the average peak demand usage at the plant being 208,800 kVA. This mode of operation was indicative of the prevailing volatile steel market during the 12 month period. Mittal Steel Pt. Lisas Ltd. had communicated in early October 2010 that they were planning to run 1 arc furnace during the months of October 2010 and November 2010, but were unable to predict the modes of operation beyond November 2010. As such, in the absence of a crystal ball, the same mode of operation is projected throughout the 10 year forecast window, therefore, 870 GWh represents annual energy sales to Mittal Steel Pt. Lisas Ltd. based on an average monthly peak demand of 204,300 kVA, that is, 208,800 kVA reduced by 4,500 kVA, the expected load curtailment at Mittal Steel Pt. Lisas Ltd. with the commissioning of the Air Liquid Plant at the end of 2010.

3.0 Comments on the 2011 Customer Demand Forecasts

The customer demand forecast when convolved with a demand charge forecast (in \$/kVA) over the same forecast window provides a forecast of revenues due to electricity demand usage by small and large industrial customers, as such, the customer demand forecast is a principal input for revenue forecasting.

3.1 Customer Demand Forecast Methodology – (Small Industrial Customer - Rate D1)

The kVA demand forecasts for Rate D1 customers, in a particular distribution area, were determined from equation (3):

$$kVA_{D1} = 12\,x\,\frac{kWh_{annual}}{\alpha\ factor_{D1} x\ time} \qquad (3)$$

where:
$time$ = 8784 hrs for leap years, 8760 hrs for years other than leap years.
kWh_{annual} is the energy sales to the D1 customers, in the particular area, determined as per Sub-Section 2.3.1.
$\alpha\ factor_{D1}$ are predetermined forecast values for Rate D1 customers, in the particular area.

3.2 Customer Demand Forecast Methodology – (Medium Industrial Customer - Rate D2)

The kVA demand forecasts for Rate D2 customers, in a particular distribution area, were determined in a similar manner to that described in Sub-Section 3.1, from equation (4):

$$kVA_{D2} = 12\,x\,\frac{kWh_{annual}}{\alpha\,factor_{D2} x\,time} \qquad (4)$$

3.3 Customer Demand Forecast Methodology – (Large Industrial Customers - Rates D3 – D5 and E1 – E5)

The kVA demand forecasts for large industrial customers were determined using the following 3 step procedure:

Step 1: Implementation of step 2 of Sub-Section 2.4.1 with the modification that the average monthly peak demands were computed using the most recent 9 monthly peak demands, not the most recent 12 monthly peak demands. Forecast error analyses conducted on previous forecasts have demonstrated that 9 monthly average peak demand projections produced demand forecasts which were more accurate than the forecasts produced using 12 monthly peak demand projections. Thus, for the 2011 Forecast Study, the average monthly peak demands were computed using the monthly peak demand records for the period January 2010 to September 2010.

Step 2: Aggregation of the forecasted average monthly peak demands of large industrial customers by rate category and distribution area.

Step 3: Multiplication of the result of step 2 by 12.

4.0 Comments on the 2011 System Peak Demand Forecast

System peak demand forecasts are a principal input to generation expansion planning studies. Since generation is the most capital intensive infrastructure for which T&TEC must plan, accuracy in forecasting the system peak demand is essential.

The system peak demand forecast was developed using the following 5 step procedure:

4.1 System Peak Demand Forecast Methodology

Step 1: Evaluation of energy losses (sum of technical and non-technical) in each distribution area by the application of known loss factors; these loss factors are expressed as percentages of the expected losses to the total distribution area energy sales, less the energy sales to the large industrial customers, in the distribution area.

Step 2: Summation of the energy loss forecasts and aggregate customer energy sales forecasts of each distribution area to produce the units sent out (USO) in each distribution area.

Step 3: Computation of each distribution area's non-coincident demand forecast using equation (5):

$$Non - coincident\ demand_{each\ area} = \frac{USO_{each\ area}}{LF_{each\ area}\ x\ time} \qquad (5)$$

where:
$time$ = 8784 hrs. for leap years, 8760 hrs. for years other than leap years.
$LF_{each\ area}$ are known distribution area load factors.

Step 4: Computation of each distribution area's coincident demand forecast equivalent to the product of known distribution area's coincidence factors and the results of step 3.

Step 5: Summation of the distribution areas' coincident demand forecasts to generate the system peak demand forecast.

4.2 2011 System Peak Demand Forecast Analysis

Table 22 illustrates that the system peak demand is forecasted to be 1287 MW, 1,541 MW and 1,817 MW in 2011, 2015 and 2020, respectively. Thus, the 2011 forecasted system peak demand is expected to be 1.28 % higher than the 2010 recorded system peak demand of 1222 MW.

5.0 <u>Comments on the System Loss Forecast</u>

System losses are calculated for the entire Commission based on a 2 step process:

Step 1: The total system energy loss forecasts (last column of Table 3.5.5) were computed by the application of the following total system energy losses percentage forecasts; these forecasts represent projections of system energy loss percentages historical trends.

Year	Loss as % of Total Sales less Sales to (D3-D5+E)
2011	9.89
2012	9.89
2013	9.95
2014	9.95
2015	9.96
2016	9.96

As an example, 571 GWh for 2013, was determined as follows:

(1.1)From Table 3.5.3, the total system energy sales was 9,195 GWh

(1.2)From Table 3.5.3, the total energy sales to the large industrial customers was (460 + 985 + 1 +484 +653 +870) = 3,453 GWh. Losses in supplying these high voltage industrial customers is deemed to be negligible.

(1.3)The total system energy sales less total energy sales to the large industrial customers = 9,195 – 3,453 = 5,742 GWh

(1.4)By application of the 9.95% from the above table, the total system energy losses = 9.95% x 5,742 = 571 GWh

Step 2

The energy losses in each area were determined by applying the ratio of the area's total energy sales less the energy sales to the large industrial customers to the system's total energy sales less the energy sales to the large industrial customers to the value computed in Step 1.

6.0 Comments on required Studies and Model Updates

Forecast error analyses, conducted on previous forecasts, have demonstrated acceptable levels of accuracy between forecasted and actual customer statistics. Notwithstanding this fact, certain studies and model updates need to be implemented, in order to confer even higher levels of accuracy.

6.1 Combined Rates B, D1 and D2 Total Customer Energy Sales Econometric Model Required Investigation

Sub-Section 2.3.1 made reference to the discovery by the forecaster that the econometric model, for forecasting the combined Rates B, D1 and D2 total customer energy sales, was producing unrealistic results. Furthermore, it became apparent to the forecaster, after having carried out an examination of the processing files of previous forecast studies, that this anomaly had been occurring since the 2006 Forecast Study. Since a cursory investigation of the econometric model, by the forecaster, had been unsuccessful in fixing the anomaly, the forecaster employed the trending-judgement model only (not the recommended combined econometric and trending-judgement model) to forecast the combined Rates D1 and D2 total customer energy sales in the 2011 Forecast Study.

Given that the econometric models were introduced by T&TEC in 1993, consistent with the recommendations of a study, which was commissioned by T&TEC and conducted by a consultant, it seems prudent that a more comprehensive study is now required to fix the combined Rates B, D1 and D2 total customer energy sales econometric model.

6.2 Sourcing of the Recommended Deflator for the Rate B and Combined Rates B, D1 and D2 Customer Energy Sales Econometric Models

Sub-Section 2.2.1 made reference to the discovery by the forecaster that the recommended deflator for the Rate B and combined Rates B, D1 and D2 customer energy sales econometric models, which was specified in the 1993 Study to be the ratio of the nominal PNPGDP to constant (1985) market PNPGDP prices, was not being used. In its place, another deflator, equivalent to the ratio of nominal PNPGDP to the conservative PNPGDP, being produced by the Corporate Planner for the Conservative Forecast study, was being used. Given the likelihood that the latter deflator is not a viable economic surrogate for the recommended deflator, it is suggested that the correct deflator should be sourced from the CBTT and used as recommended.

6.3 Required Forecasting Model for Rate B1 Total Energy Sales

The scope of the 1933 Study was the elucidation of econometric models for forecasting total energy sales to residential (Rate A), commercial (Rate B), small industrial (Rate D1) and medium industrial (Rate D2) customers.

The Rate B1 category, a new category created in 2007 and approved by the RIC, caters for commercial and small industrial customers with kVA demands in the range 50 kVA to 350 kVA and low load factors (less than 0.30). Since this new category, was created after the 1993 Study, a study is now required to illuminate which of the following model is appropriate for forecasting the total energy sales of Rate B1 customers:

- Trending-judgement model.
- Absorption into the existing combined Rates B, D1 and D2 customer energy sales econometric model with the application of a relevant split ratio.
- A separate econometric model with its own set of specified parameters (influential independent variables, deflator etc.).

Until such a study is conducted, the incorporation of Rate B1 customers into the forecast studies will continue to be ignored. It must be stated, though, that given the small number of customers and energy sales associated with this rate category, to date (T&TEC's *2009 4th Quarter Financial Report* records the total number and total energy sales of Rate B1 customers at 10 and 2 GWh, respectively), their omission thus far, would not have impacted negatively on the accuracy of the forecast studies done since 2007.

6.4 Required Updating of Econometric Model Elasticities

Elasticities are coefficients within the natural logarithmic equations of the econometric models, which mathematically conveys the degree of the responsiveness of the dependent variable – total customer energy sales – to changes in the influential independent variables – NPGDP, PNPGDP, price of electricity and number of customers. Since the econometric models represent dynamic systems where the relative influence of the independent variables can change with time, the 1993 Study had recommended that the elasticities were to be updated about every 5 years to ensure that the current influential trends are captured for each independent variable. The updating process takes the form of carrying out multiple regressions on historical time series data. The last time an updating exercise was done was in 2000. Delays in carrying out the updating will increase the risk that the accuracy of the output of the econometric models will slowly deteriorate.

APPENDIX V

Forecast for Cove Power Station Salaries and Wages Estimate for, 2011 – 2016

Item		2010 $	2011 $	2012 $	2013 $	2014 $	2015 $	2016 $
Fuel costs	Natural gas	0	12,942,109	26,660,408	27,459,586	28,600,758	29,458,754	30,342,110
	Diesel	82,855,628	33,300,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000
	Subtotal	**82,855,628**	**46,242,109**	**28,460,408**	**29,259,586**	**30,400,758**	**31,258,754**	**32,142,110**
Labour costs	Salaries	5,002,861	4,886,562	7,329,843	7,696,335	8,081,152	8,485,210	8,909,470
	Wages	726,409	910,591	1,365,887	1,434,181	1,505,890	1,581,184	1,660,244
	Employee related Benefits	544,111	458,057	687,086	721,440	757,512	795,387	835,157
	Pension costs	16,629	734,920	1,102,380	1,157,499	1,215,374	1,276,143	1,339,950
Material costs		1,180,145	12,500,000	13,125,000	13,781,250	14,470,313	15,193,828	15,953,520
Vehicle costs		0	0	12,000	12,600	13,230	13,892	14,586
Other expenses		5,059,819	5,312,810	5,578,450	5,857,373	6,150,242	6,457,754	6,780,641
TOTAL		**95,385,602**	**71,045,049**	**57,661,054**	**59,920,264**	**62,574,471**	**65,062,152**	**67,635,678**

Note: 1) Cove Power Plant is owned and operated by T&TEC.

2) It is assumed that gas is available in Tobago in June 2

<u>Assumptions:</u>

2 shift system from 2012 for the positions of

1. 2 Electrical Assistants
2. 2Mechanical assistants
3. 6 Mechanics

Additional Staff Required

1. 1 Clerk
2. 2 Electricians B
3. 2 Helpers

2 Labourers

APPENDIX VI

TRINIDAD AND TOBAGO ELECTRICITY COMMISSION

ASSET MANAGEMENT PLAN

GENERAL

Asset Management can be seen as a systematic process of effectively maintaining, upgrading and operating assets. It involves maintaining a desired level of service provided by the assets at the lowest life cycle cost, where the lowest life cycle cost refers to the best appropriate cost for rehabilitating, repairing or replacing an asset.

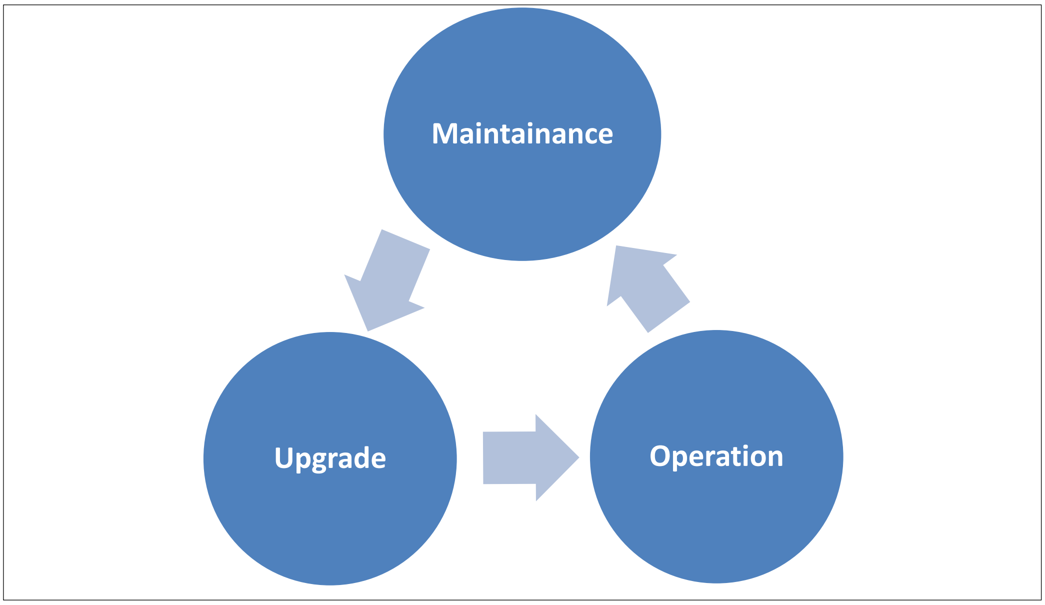


Figure 5: Asset Management

Asset Management utilizes the combination of engineering principles with sound business practice and economic rationale to provide the tools to facilitate a more organized and flexible approach to making decisions.

The main streams in Asset Management are:

- Identification of the need for the asset.
- Provision of the asset, including its ongoing maintenance and rehabilitation to suit continuing needs.
- Operation of the asset.
- Disposal of the asset when the need no longer exists, it is no longer appropriate for the asset to be retained or it is not economically viable to operate.

Asset Management proves to be efficient as it has several advantages:

- Prolonging asset life and aiding in rehabilitate/repair/replacement decisions through efficient and focused operations and maintenance.
- Meeting consumer demands with a focus on system sustainability.
- Setting rates based on sound operational and financial planning.
- Budgeting focused on activities critical to sustained performance.
- Meeting service expectations and regulatory requirements.
- Improving response to emergencies.
- Improving security and safety of assets.

Thus in essence the practice of Asset Management is important as it allows the efficient management of assets which will in effect sustain today and in the future.

ASSET MANAGEMENT PLAN – TRINIDAD AND TOBAGO ELECTRICITY COMMISSION

T&TEC's Asset Management Plan is broken down between Distribution and Transmission, as these Divisions are responsible for operating and maintaining the majority of the Commission's assets. Taken together, Distribution and Transmission assets account for almost 80% of the Commission's total asset base.

DISTRIBUTION ASSETS

The Distribution Division serves the needs of approximately 412,253 customers. The Division is mandated to achieve the six (6) strategic objectives, which are required to fulfil the mission of the organization.

The mission as stated:

"**To provide a safe, reliable, high quality electricity supply, in an environmentally responsible manner, utilizing best practices, through empowered employees committed to excellence and customer satisfaction.**"

The major assets of the Distribution Division include:

- Air Break Switches (ABS)
- Capacitor Banks
- Lightning Arresters
- Autoreclosers

- Circuit Breakers
- Insulators
- Transformers
- Conductors
- Fuse Cut-outs and Fuse Links
- Poles
- Vehicles
- Buildings (which include the Employees' Accommodation and Substations)

The Asset Management Plan has been structured according to the outlined key aspects for managing the aforementioned assets of Distribution Division:

1.0 Establishment of new distribution substations and associated infrastructure.

2.0 Upgrade of substation transformers and replacements

3.0 Upgrade of all substation circuit breakers.

4.0 Reduction in the number of trouble reports, voltage complaints, outages and improved system reliability.

5.0 Increased use of Underground Residential Distribution Systems and Covered Conductors

6.0 Geographical Information System (GIS) Mapping and Computerized Fleet Tracking.

7.0 Vehicle Fleet Upgrade, Maintenance and Management System.

8.0 Expansion of the Distribution Area's facilities.

9.0 ISO 9001:2008 Certification for all the Distribution Areas.

10.0 Project Execution.

1.0 ESTABLISHMENT OF NEW DISTRIBUTION SUBSTATIONS AND ASSOCIATED INFRASTRUCTURE

1.1 NEW SUBSTATIONS

An expected increase in residential and commercial customers signals the urgent need for the development of new substations in several areas. New substations shall not only improve the reliability of the supply in these areas, but shall provide a back-up supply which shall enhance the Distribution's switching operations in the event of interruptions and maintenance work.

The Distribution Division is planning to construct new substations at the following locations over the next 5 years:

- **Saddle Road**
  The development process for Saddle Road Substation is expected to start in 2011 and to be completed by 2013. This would significantly improve the supply to Maraval and St. Anns.

- **Carlsen Field**
  A substation is to be established on the eastern side of the Solomon Hochoy Highway to cater for the increase in load growth at Preysal, Carlsen Field, Freeport and other areas.

- **Felicity**
  The expected increase in housing in the Felicity area requires the urgent construction of a new substation in the Area. This would allow for a back-up supply to be provided to the Chaguanas and Ramsaran Street areas.

- **Barrackpore**
  This substation is expected to be established by the year 2015 to allow for improvement in the reliability of supply to Barrackpore, Rock Road, Clarke Road and other areas. At present the St. Mary's substation supplies this area and is the only supply to this section of Trinidad.

- **LLos Bajos**
  This substation is expected to be completed by 2012 and shall significantly improve the reliability of supply to the Buenos Aires and Santa Flora areas.

- **Invader's Bay**
  This substation is expected to be completed by 2013 and shall significantly improve the reliability of supply to the surrounding areas.

- **Maracas**

  This substation is expected to be completed by 2015 and shall significantly improve the reliability of supply to Maracas and Blanchisseuse.

1.2 NEW FEEDERS

In addition to new substations, new feeders will be established in order to facilitate the increased load demands, as well as to improve the reliability of the Distribution System:

- **Connection of feeders in La Romain –**
  Construction of Overhead lines to connect Gulf view Feeder with La Romain 12kV Feeder

- **Feeder Construction in St. Croix –**
  Construction of St. Croix and Papourie Road 12kV feeder

- **Erin feeder construction –**
  Construction of Erin Feeder and the Carapal 12kV feeder from Erin

- **Maraval Feeder connection –**
  Link Maraval Area to the Maracas Feeder out of Santa Cruz

- **Feeder Installation –**
  Build a direct link feeder from Barataria to Morvant

- **Feeder Construction in Arena Road –**
  Construction of Arena Road 12kV Feeder from Carlsen Field Substation

- **Feeder Construction in Mission Road–**
  Construction of Mission Road 12kV Feeder from Carlsen Field Substation

- **Feeder Construction in Perseverance–**
  Construction of Perseverance Road 12kV Feeder from Felicity

- **Feeder Construction in Roopsingh Road–**
  Roopsingh Road 12kV feeder from Felicity

- **Feeder Construction in Beaucarro–**

Construction of new Beaucarro 12kV from Central Substation

- **Feeder Construction in Claxton Bay–**
  Contruction of Caratal Road 12kVFeeder from Claxton Bay Substation

- **Feeder Construction in Claxton Bay-**
  Construction of Adjoda Road 12kV Feeder from Charlieville

- **Feeder Construction in Trinity Lane–**
  Construction of Trinity Lane 12kV Feeder from B.C. Substation

- **Feeder Construction in Piarco–**
  Contruction of 12kV feeder from Piarco substation to C.R. Highway

- **Feeder Construction in Orange Grove –**
  Contruction of new 12kV Feeder from Orange Grove to Tunapuna

2.0 Upgrade of major equipment on the distribution system

In addition to the establishment of new substations, the Distribution Division has identified several essential substation components (such as Transformers, 12kV Switchboards, Circuit Breakers and Insulators) that are in need of upgrade or replacement in order to ensure continuous reliable and efficient plant operation.

2.1 UPGRADE OF SUBSTATION TRANSFORMERS

SUB STATION	DISTRIBUTION TRANSFORMER	RATING	VOLTAGE
Rio Claro	1	12.5/16MVA	66/12kV
Tabaquite	1	12.5/16MVA	66/12kV
Syne Village	1	12.5/16MVA	33/12kV
Santa Flora	2	12.5/16MVA	33/12kV
Erin single transformer Substation	1	12 MVA	33/12kV
Rochard Road single transformer Substation	1	12 MVA	66/12kV
Scarborough	-	-	-
Studley Park	1	12.5/16MVA	66/12kV
Barataria	1	12.5/16MVA	33/12kV
Diego Martin	1	12.5/16MVA	33/12kV
Carmaille Road	1	12.5/16MVA	33/12kV
Chaguaramas	1	12.5/16MVA	33/12kV
St James	1	12.5/16MVA	33/12kV
Santa Cruz	1	12.5/16MVA	33/12kV
San Juan	1	12.5/16MVA	33/12kV
Mt Pleasant	1	12.5/16MVA	33/12kV
Chag West	2	12.5/16MVA	66/12kV
Charlieville	1	12.5/16MVA	66/12kV
Claxton Bay	1	12.5/16MVA	66/12kV

SUB STATION	DISTRIBUTION TRANSFORMER	RATING	VOLTAGE
Couva	1	12.5/16 MVA	66/12kV
Champs Fleurs	2	12.5/16MAV	33/12kV
O'Meara	1	12.5/16MVA	33/12kV
Five Rivers	1	12.5/16MVA	33/12kV
Piarco	1	12.5/16MVA	66/12kV

2.2 UPGRADE OF SUBSTATION 12 kV BOARDS

SUB STATION	TOTAL PANEL REQUIREMENT
Rio Claro	7 panel & 1 Aux
Tabaquite	
Syne Village	7 panel & 1 Aux
Santa Flora	7 panel & 1 Aux
Erin single transformer Substation	…
Rochard Road single transformer Substation	…
Scarborough	9 panel & 1 Aux
Studley Park	7 panel & 1 Aux
Barataria	7 panel & 1 Aux
Diego Martin	…
Carmaille Road	…
Chaguaramas	…
St James	…
Santa Cruz	…
San Juan	7 panel & 1 Aux
Mt Pleasant	7 panel & 1 Aux
Chag West	7 panel & 1 Aux
Charlieville	7 panel & 1 Aux
Claxton Bay	7 panel & 1 Aux
Couva	…
Champs Fleurs	9 panel & 1 Aux
O'meara	…
Five Rivers	8 panel & 1 Aux
Piarco	…

2.3 UPGRADE OF CIRCUIT BREAKERS

NO.	EQUIPMENT DESCRIPTION	LOCATION
1	Proposed Chaguanas East 66 kV Circuit Breaker @ Felicity Substation	Felicity Substation
2	Proposed Bus Section 66kV Circuit Breaker @ Felicity Substation	Felicity Substation
3	Proposed (Central) 66 kV Circuit Breaker @ Felicity Substation	Felicity Substation
4	Couva 66 kV Circuit Breaker @ Central Substation (Capital Works Order 0075)	Central Substation
5	Central 66 kV Circuit Breaker @ Chaguanas East Substation	Chaguanas East Substation
6	Proposed Transformer #1 66 kV Circuit Breaker @ M5000 Substation	M5000 Substation
7	Proposed Transformer #2 66 kV Circuit Breaker @ M5000 Substation	M5000 Substation
8	Proposed Transformer #1 66 kV Circuit Breaker @ Claxton Bay Substation	Claxton Bay Substation
9	Proposed Transformer #2 66 kV Circuit Breaker @ Claxton Bay Substation	Claxton Bay Substation
10	Proposed Transformer #1 66 kV Circuit Breaker @ Savonetta Substation	Savonetta Substation
11	Proposed Transformer #2 66 kV Circuit Breaker @ Savonetta Substation	Savonetta Substation
12	San Rafael 66kV CB @ Sangre Grande	Sangre Grande Substation
13	Piarco 66kV Circuit Breaker @ San Rafael	San Rafael Substation
14	San Rafael 66kV Circuit Breaker @ Piarco	Piarco Substation
15	O'Meara 33kV Circuit Breaker @ Five Rivers	Five Rivers Substation
16	Pinto Road 33kV Circuit Breaker @ Five Rivers	Five Rivers Substation

NO.	EQUIPMENT DESCRIPTION	LOCATION
17	Pinto Road 33kV Circuit Breaker @ O'Meara	O'Meara Substation
18	Five Rivers 33kV Circuit Breaker @ O'Meara	O'Meara Substation
19	WASA Brazil Arena 33kV Circuit Breaker @ O'Meara	O'Meara Substation
20	North Oropouche 33kV Circuit Breaker @ Toco Distribution	Toco Substation
21	Toco Link 33kV Circuit Breaker @ Toco Distribution	Toco Link Substation
22	St. Augustine 33kV CB @ El Socorro	El Socorro Substation
23	Barataria 33kV CB @ El Socorro	El Socorro Substation
24	33kV CB for Mathura S/S (Old CB presently bypassed)	Mathura Substation
25	Two (2) Transformer 33kV CBs @ Champs Fleurs	Champs Fleurs Substation
26	Lady Hailes 66kV Circuit Breaker @Gulf View Substation	Gulf View Substation
27	Penal 66kV Circuit Breaker @ Gulf View Substation	Gulf View Substation
28	Fyzabad Circuit Breaker @ Brighton	Brighton Substation
29	Guapo Circuit Breaker @ Brighton	Brighton Substation
30	Brighton Circuit Breaker @ Guapo	Guapo Substation
31	Mayaro Circuit Breaker @ Galeota	Galeota Substation
32	Galeota Circuit Breaker @ Mayaro	Mayaro Substation
33	St. Mary's Circuit Breaker @ Galeota	Galeota Substation
34	Petrotrin Circuit Breaker @ Guapo	Guapo Substation
35	Point Fortin Circuit Breaker @ Guapo	Guapo Substation
36	Rio Claro Circuit Breaker @ Mayaro	Mayaro Substation
37	Fyzabad Circuit Breaker @Santa Flora	Santa Flora Substation
38	Penal Circuit Breaker @ Santa Flora	Santa Flora Substation
39	Petrotrin Circuit Breaker @ Santa Flora	Santa Flora Substation

NO.	EQUIPMENT DESCRIPTION	LOCATION
40	Point Fortin Circuit Breaker @ Santa Flora	Santa Flora Substation
41	Santa Flora Circuit Breaker @Erin	Erin Substation
42	St James Circuit Breaker @ Boundary Street	Boundary Street Substation
43	Maraval Circuit Breaker @Boundary Street	Boundary Street Substation
44	POS Circuit Breaker @Boundary Street	Boundary Street Substation
45	Santa Cruz Circuit Breaker @ Cascade	Cascade Substation
46	Belmont Circuit Breaker @ Cascade	Cascade Substation
47	West Moorings Circuit Breaker @ Pt Cumuna	Pt Cumuna Substation
48	Carenage Circuit Breaker @ Pt Cumuna	Pt Cumuna Substation
49	Diego Martin Circuit Breaker @ Diamond Vale	Diamond Vale Substation
50	Mt Pleasant Circuit Breaker @ Carenage	Carenage Substation
51	Pt Cumuna Circuit Breaker @ Carenage	Carenage Substation
52	Alcoa Circuit Breaker @ Carenage	Carenage Substation
53	Mt Pleasant Circuit Breaker @ Chaguramas	Chaguramas Substation
54	West Moorings Circuit Breaker @ Chaguramas	Chaguramas Substation
55	Western Main Rd Circuit Breaker @ Chaguramas	Chaguramas Substation
56	POS#1 Circuit Breaker @ Wrightson Rd	Wrightson Rd Substation
57	POS#2 Circuit Breaker @ Wrightson Rd	Wrightson Rd Substation
58	Boundary Street Circuit Breaker @ Maraval	Maraval Substation
59	Carmaille Rd Circuit Breaker @ Maraval	Maraval Substation
60	PATT Circuit Breaker @ Mucurapo	Mucurapo Substation
61	St James Circuit Breaker @ Mucurapo	Mucurapo Substation
62	POS Circuit Breaker @ Mucurapo	Mucurapo Substation
63	66/33kV TF#1	West Moorings Substation
64	66/33kV TF#2	West Moorings Substation
65	Pt Cumuna	West Moorings Substation

NO.	EQUIPMENT DESCRIPTION	LOCATION
66	Diego Martin	West Moorings Substation
67	Chaguaramus	West Moorings Substation
68	Chaguaramus	Mt Pleasant Substation
69	Carenage	Mt Pleasant Substation

2.4 INSULATOR CHANGE-OUTS

A project to change out 20,000 insulators from porcelain to polymeric is expected to commence in 2011. This is expected to be done in areas where significant contamination has affected the porcelain resulting in regular faults.

Twelve thousand (12,000) tall polymeric insulators are to be installed at various locations in South, Central and East to eliminate the issue of animals stretching and causing short circuiting of the main line and pole/cross arm. This is expected to be completed in 2011.

Twenty thousand (20,000) metres of insulated conductor is being purchased to cover approximately 1m sections of the conductor over the insulators.

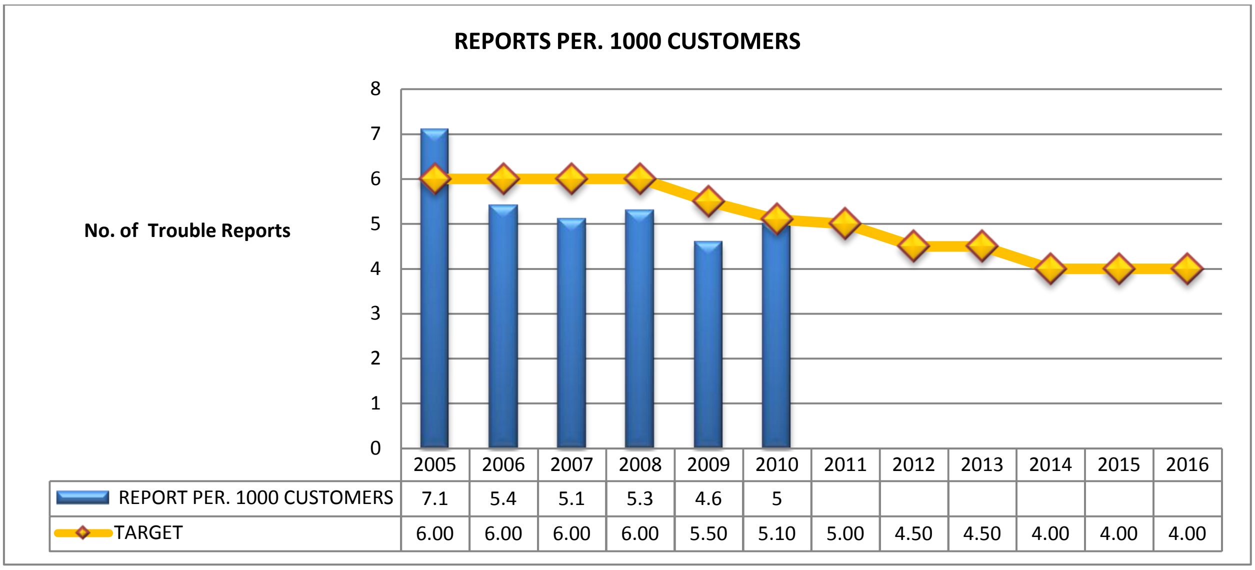
The above items are to be repeated by the 2nd half of 2011 and again in 2012. By that time over 40,000m of insulated conducted and an additional 40, 000 polymeric insulators shall be installed on the system.

3.0 REDUCTION IN THE NUMBER OF TROUBLE REPORTS, VOLTAGE COMPLAINTS, OUTAGES AND IMPROVED SYSTEM RELIABILITY

The Distribution Division, and by extension the Commission, has a vision of a reduced number

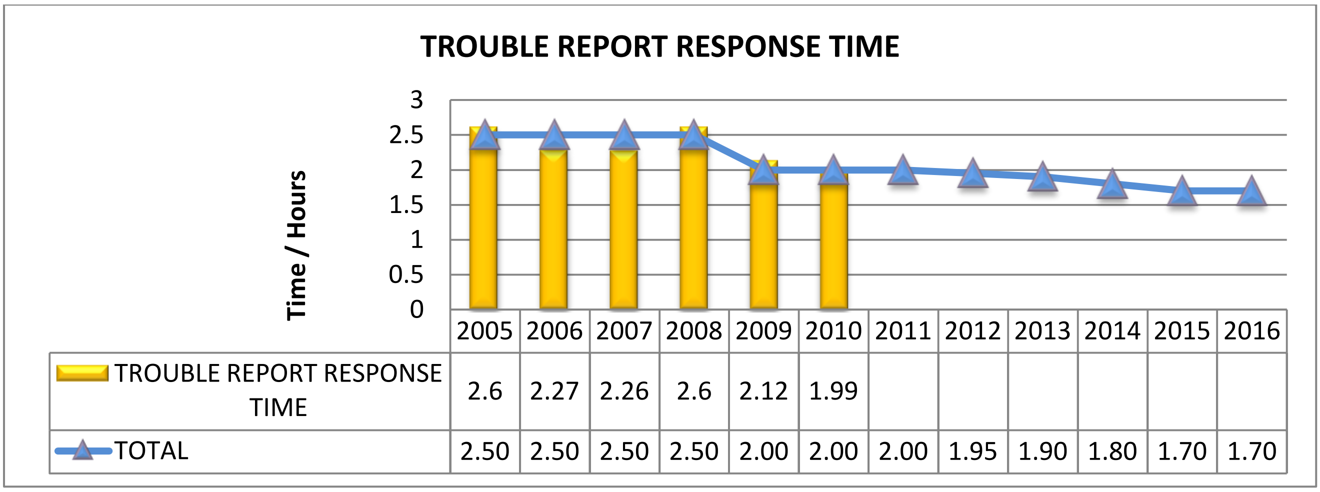
of trouble reports and a reduction in trouble report response times as shown in the projections below:

Projected Reports per 1000 Customers



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
REPORT PER. 1000 CUSTOMERS	7.1	5.4	5.1	5.3	4.6	5						
TARGET	6.00	6.00	6.00	6.00	5.50	5.10	5.00	4.50	4.50	4.00	4.00	4.00

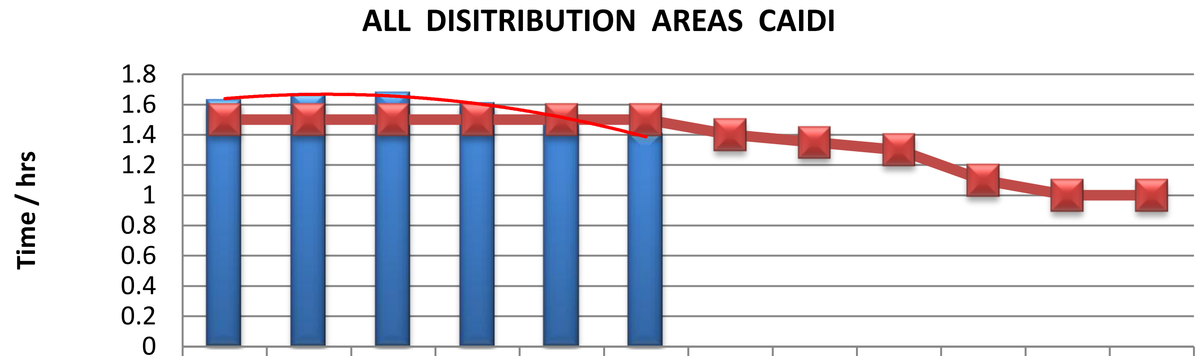
Projected Trouble Report Response Time



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
TROUBLE REPORT RESPONSE TIME	2.6	2.27	2.26	2.6	2.12	1.99						
TOTAL	2.50	2.50	2.50	2.50	2.00	2.00	2.00	1.95	1.90	1.80	1.70	1.70

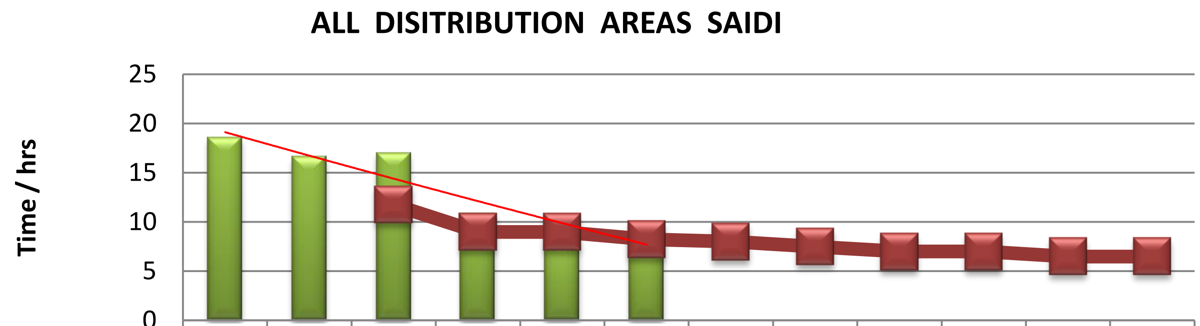
This reduction in the number of trouble reports per 1,000 customers as well as the trouble report response time is expected to significantly improve the system's reliability which can be gauged by the projected reliability indicators (CAIDI, SAIDI AND SAIFI) as shown below:

Projected CAIDI Reliability Indicator



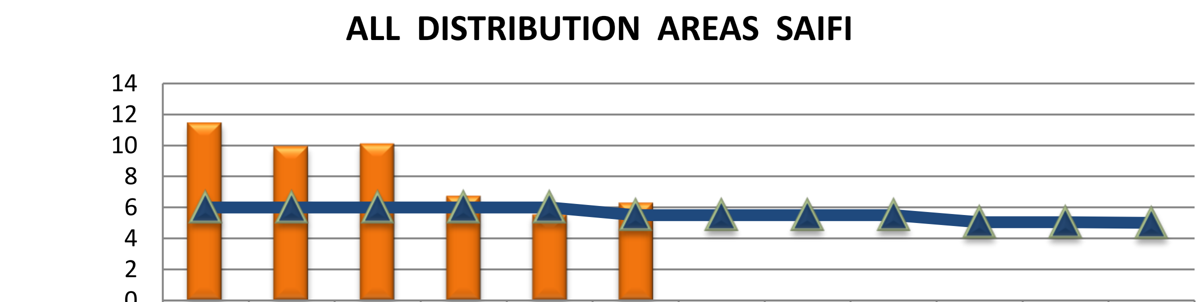
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CAIDI	1.63	1.67	1.68	1.61	1.47	1.41						
TARGET	1.50	1.50	1.50	1.50	1.50	1.50	1.40	1.35	1.30	1.10	1.00	1.00

Projected SAIDI Reliability Indicator



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SAIDI	18.59	16.56	16.98	10.85	8.11	8.9						
TARGET			11.76	9.00	9.00	8.25	8.00	7.50	7.00	7.00	6.50	6.50

Projected SAIFI Reliability Indicator

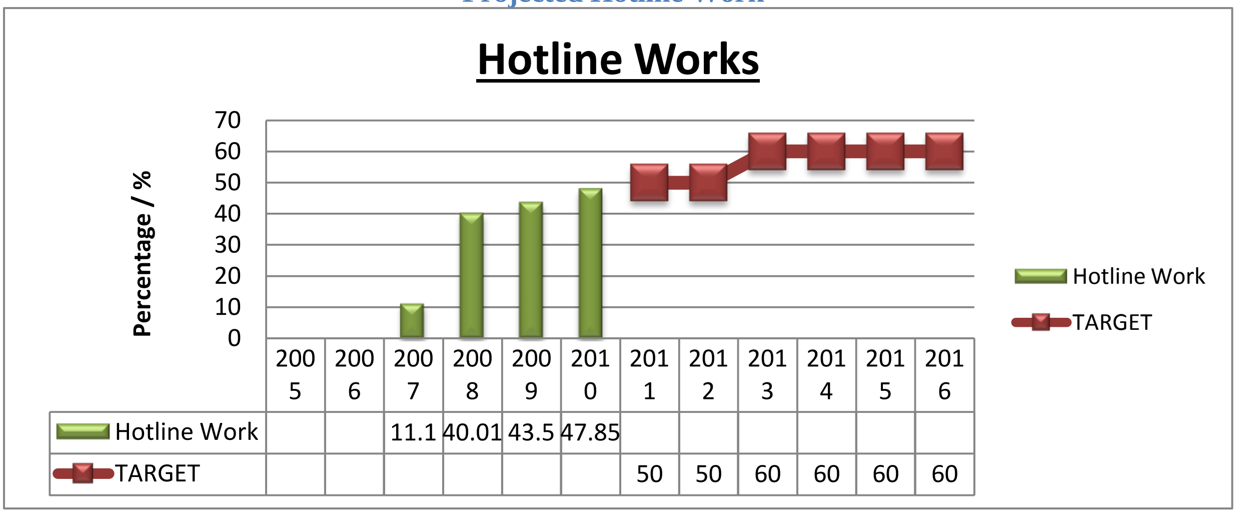


	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SAIFI	11.43	9.93	10.10	6.73	5.53	6.29						
Target	6.00	6.00	6.00	6.00	6.00	5.50	5.50	5.50	5.50	5.05	5.05	5.00

The improvement of the reliability statistics would be attributed to the following:

3.1 INCREASED HOTLINE WORKS

Projected Hotline Work



The Commission is expected to increase the Area's Arial Trucks fleet (discussed further in Section 7.0). This shall allow for more Hotline works and therefore reduce planned outages since the majority of maintenance work is expected to be done while the customer is on supply.

3.2 VEGETATION MANAGEMENT (TREE TRIMMING)

This is being looked at more closely in 2011. Distribution Division has several ongoing contracts for line clearing but in order to improve the impact of tree trimming on the Distribution lines, new contractors are being encouraged to bid for line clearing contracts. Alongside this, continuous auditing of line clearing will be conducted to assess the performance of contractors engaged.

3.3 INFRAREDS

Infrared Scans form a very crucial part of Distribution Division's Predictive Maintenance Programme. This is expected to be fully completed in 2011, and shall be performed twice per year over the next five (5) years. This shall alleviate the regular issues of burst wires, particularly due to burnt taps.

3.4 ANIMAL FAULT PREVENTION

An animal fault refers to a fault which occurs when an animal such as a bird, frog, snake or rodent etc. make contact between the two different potentials, for example between the 12kV line and ground.

There are five main methods used to prevent these faults:

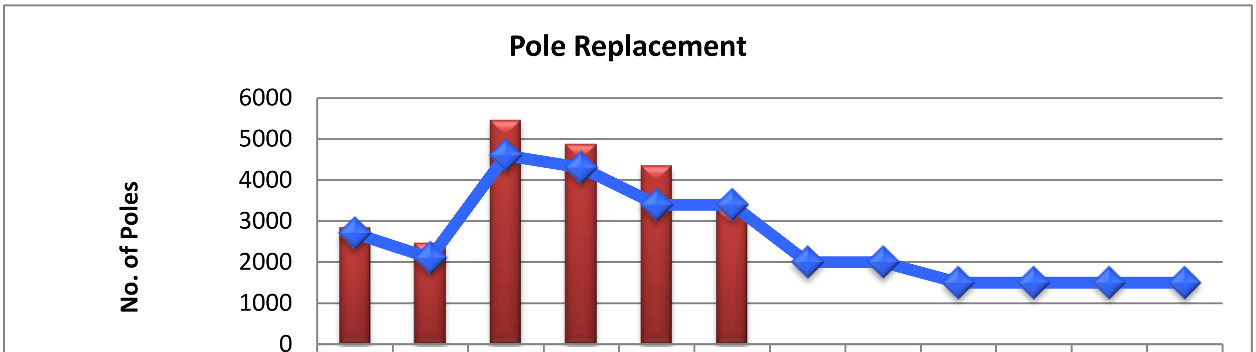
- The use of a combination of a tall pin and short insulator
- The use of a combination of a tall insulator and short pin
- The use of animal guards
- The use of overhead line covers

3.5 POLE INSPECTION AND REPLACEMENT

All 12kV Feeders in the Distribution System are inspected as per each Area's Inspection Schedule. Based on these inspections a priority to each pole is assigned. Priorities are as follows:

- 1 – Attend to immediately
- 2 – Attend to within 48 hours
- 3 a – Attend to within 3 months
- 3 b – Attend to within 6 months
- 4 – Re-inspect in 1 year

These priorities dictate the time allotted for pole replacement. This is a vital part of preventative maintenance as consequences of fallen poles can be devastating. The following shows the pole replacement figures thus far and the projection:



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Pole Replacement	2812	2451	5440	4859	4344	3253						
TARGET	2700	2100	4600	4300	3400	3400	2000	2000	1500	1500	1500	1500

3.6 INCORPORATION OF MANUFACTURER'S GUIDE IN DISTRIBUTION DIVISION'S MAINTENANCE PROGRAMME

Manufacturer's Guides include instructions which guide on the proper way to use, assemble and maintain equipment. These guides also aid in the prevention of warranties becoming null and void.

The incorporation of Manufacturer's Guides within the Commission's Maintenance Programme is vital for the Commission's Maintenance Operations.

3.7 INTRODUCTION OF DISSOLVED GAS ANALYSIS SENSORS IN THE TRANSFORMERS

The oil of the Transformer can be comparable to blood for living organisms. By analyzing the gas content of the oil, the condition of transformer can be ascertained. Hence, potential issues can be detected before they result in failures in the transformer.

Distribution Division has intentions to include Dissolved Gas Analysis Testing within their routine maintenance schedule.

4.0 INCREASED USE OF UNDERGROUND RESIDENTIAL DISTRIBUTION SYSTEMS AND COVERED CONDUCTORS

4.1 UNDERGROUND RESIDENTIAL DISTRIBUTION SYSTEMS

The Distribution Division currently has approximately 1,557.9 km of 12 kV underground cables throughout Trinidad and Tobago. Most of these cables are located in the City of Port of Spain and are generally in excess of 40 years old. Over the next five (5) years, the majority of these cables are scheduled to be replaced using a combination of direct buried and duct bank systems. The works in the City of Port of Spain will include Wrightson Road by the Hyatt, the Fire Station as well as the Port of Port of Spain. The work which involves the development of Utility Corridors in the main City Areas through the installation of new underground infrastructure and the change out of existing infrastructure, would be in coordination with the Government of the Republic of Trinidad and Tobago (GORTT), UdeCott, Genevar and other utilities.

Apart from the works in the City of Port of Spain, Underground Development works are scheduled to take place in Arima and Scarborough.

The following outlined areas are the projects under the respective organizations that would be utilizing underground residential distribution systems:

EMBD:-

- Picton Housing Development
- Hermitage Development, Hermitage
- Woodland Housing Development, Woodland
- Reform Housing Development
- La Romain Development, La Romain
- Factory Road, Chaguanas
- Balmain
- Calcutta Rd #1
- Paul & George St. Esperanza
- Roopsingh Road
- Sonny Ladoo
- Waterloo

HDC:-

- Hubertstown, Guapo, Point Fortin
- Corinth Hills Housing Development
- Lakeview Housing Development
- Tarodale Housing Development
- Debe Housing Development II
- Pier Road Housing Development
- Buen Intento Housing Development, Princes Town
- Golconda Housing Development II
- Adventure Housing project,Tobago
- Edinburgh South Dev 13-20
- Exchange Infill
- Carlsen Field Phase 3C
- Lionsgate
- Exchange Infill 1+2
- Beverly Hills Phase 2
- View Fort
- Victoria Keyes
- Four Roads
- POSGH upgrade
- Fram Road -Phase 3 (EA1942/03)
- Malabar Site 1 (EA0702/07)
- Malabar Phase 3 (EA1031/07)
- Maracas, St Joseph (EA1919/07)
- Oropune Gardens, Phase 2 (EA1275/08)
- Oropune Housing Development, Phase IV- (EA1884/09)

Others:-

- TSTT- Corinth
- Rabindranath Rooplalsing
- Oil Mop Environment Serivces
- St Joseph Estate Ltd
- Mitra Indarsingh
- Krat Investments Ltd.
- Macoon Street, Mosque
- Debe Industrial Estate, Debe
- T&T Regiment
- Sivanan Ramdeen
- Leah Deslauriers (EA1200/06)
- R Sant & Co Ltd (EA0087/07)
- Learie Bruce-(EA1823/07)
- Motilewa Jinaki-Theodore -(EA1592/08)
- Pheonix Farms Limited-(EA2251/08)
- Hammocks Housing Development - (EA2395/08)
- Kingdom Builders- (EA2707/08)
- Gibraltar Properties Limited - (EA3100/08)
- Project Development Limited- (EA1274/09
- Syam Ramkissoon-(EAI575/09)
- Sylvester Engineering -(EA1921/09)
- Jai Housing Limited-(EA3243/09)
- HCL-The Crossings Phase 4B & 4C
- HCL-Zone 28, Trincity Business Park, Trincity Millennium Vision, Trincity.
- HCL- Santa Rosa Development
- HCL- Zone 14 & 15 Millenium Lakes, Trincity

4.2 COVERED CONDUCTORS

Apart from Underground Development Works, fully insulated covered conductors were used in projects that improved the reliability of supply of electricity to customers in Maracas and Morne Diablo (fishing depot). More conductors would be procured for use in the upgrade of the three (3) phase supply to Manzanilla and the linking of the Preysal-Edinburgh feeders.

5 GEOGRAPHICAL INFORMATION SYSTEM (GIS), MAPPING AND COMPUTERISED FLEET TRACKING

5.1 GEOGRAPHICAL INFORMATION SYSTEM (GIS)

In keeping with its quest for excellence in customer service and improved efficiency in the workforce, the Commission is currently in the process of developing a Geographical Information System (GIS).

GIS is a computer-based information system, which is used to input, store, manipulate, analyse and display geographically referenced data to aid in making decisions, planning and for management purposes.

The Distribution Division has been working with GIS consultants in order to develop the GIS model, develop data migration and integration procedures, streamline work flows for data collection and maintenance and develop custom tools for the data collection and mapping of the Transmission and Distribution (T&D) Assets, Field Inspections, Banner Interface, Facilities Management and Training.

The Geographical Information System is expected to benefit Distribution by facilitating:

- Better Customer Care – Meter Readers, Consumer Investigators and Emergency Crews will be able to locate customers and therefore improve responsiveness to customers' service needs.

- Improved Plant Maintenance – The status and condition of outside plant and equipment will be efficiently assessed, categorised and prioritised for maintenance based on location and criticality.

- Improved Facilities Management – A solid inventory of our Transmission and Distribution Assets; the location of these assets in relation to the environment and the performance of these assets will provide the necessary information needed to make decisions relative to maintenance or replacement of the plant.

It is intended that the GIS data would be amalgamated with a Global Positioning System (GPS) which would be installed in the Commission's vehicles. This combination system would be of crucial benefit to the Commission as it would allow minimum amount of information to be collected from a customer in determining his/ her exact location as well as allow dispatch from Telecom Operators to the crews. This shall improve the Commission's fleet management and enhance employee's safety. The system will be programmed to select shorter routes which will result in quick response times.

5.2 COMPUTERIZED FLEET TRACKING (GLOBAL POSITIONING SYSTEM)

The Trinidad and Tobago Electricity Commission is desirous of improving its fleet management system by introducing a GPS fleet tracking system that will provide Field Managers with the ability to monitor and track vehicles.

This GPS uses a web base application protected by user names and passwords. This system works by locating the vehicle via the GPS satellite and communicating the data back to a server via the GPRS network provided by a telecommunication provider.

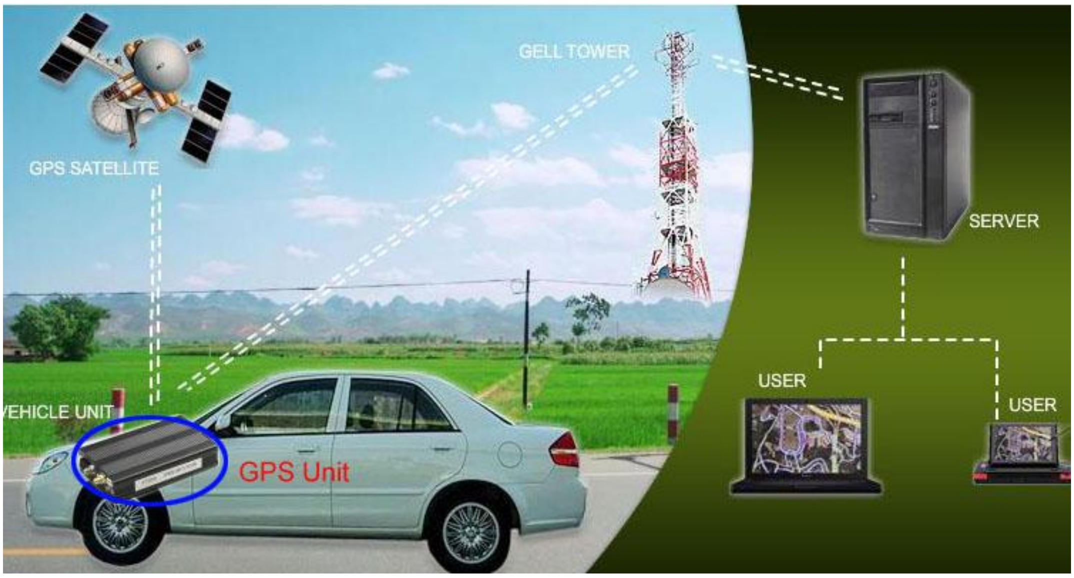


Diagram showing function of the GPS tracking system.

Three Main Features of the proposed GPS system are:

A. Live tracking
B. Reports
C. Dispatching & Navigation System.

A. LIVE TRACKING

- Speed and Location of each vehicle can be obtained instantaneously.

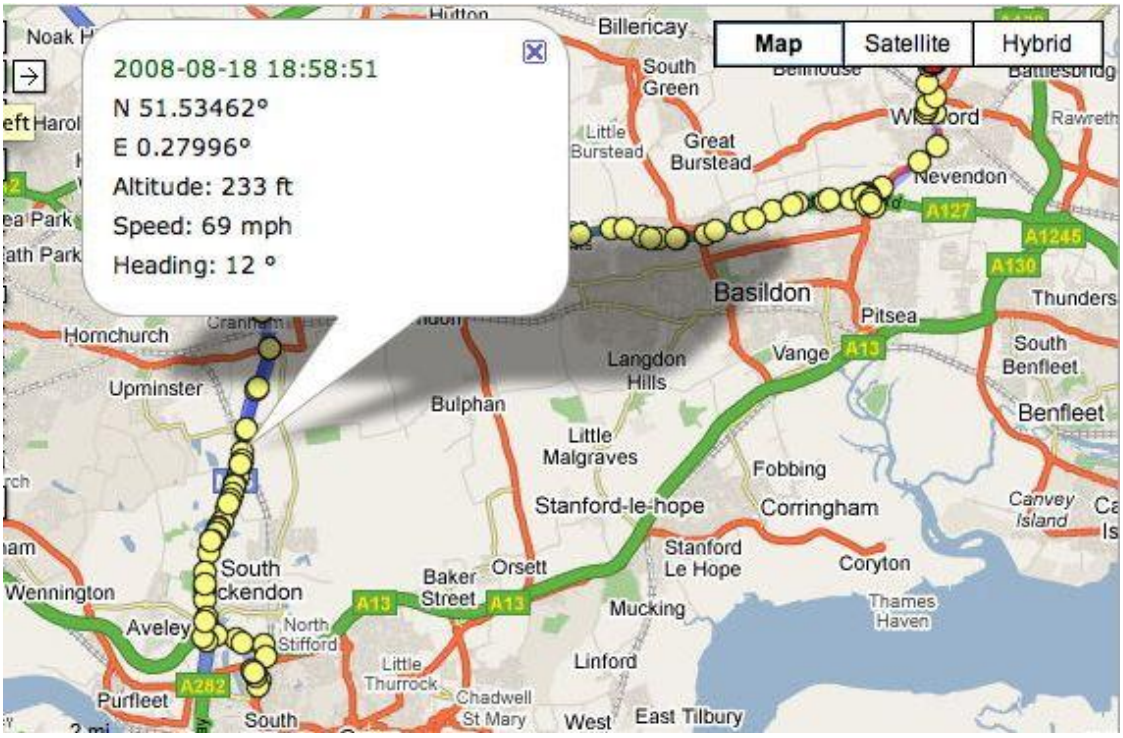


Figure showing example of screen shot providing speed of vehicle.

- A replay feature should be present to review the activity of any vehicle during a specified period

- Geofences can be set up. Flags can be set when entering or leaving these zones. Specific actions can be taken once these flags are set for e.g. send notification/ alarm to base, immobilise vehicle.

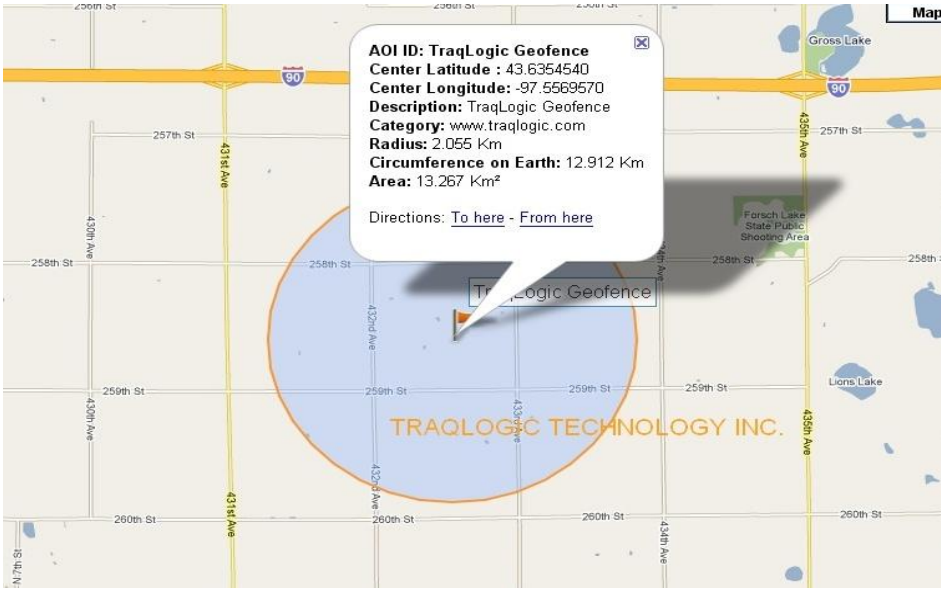


Figure showing example of Geofence

- Vehicle icon can be customised to represent different status for ease of monitoring.

- There are different map views, for example, a street map, satellite imagery, topography. All maps can be updated.

- Points of interest can be created as a layer and be added to the map view. For e.g. light poles, hospital, Police stations, gas stations, malls, most bars, etc.

Map showing points of interest.

- Notifications can be sent if:
    - Driver is speeding
    - Driver enters or exits a particular geozone.

- Turn by turn directions can be generated to get to a particular location.

B. REPORTS

Various reports can be generated such as:

- Information Reports
  - Geo-Fence report
  - Mileage report
  - Start/stop report
  - Notification reports.

Trinidad and Tobago Electricity Commission

Select all Start/Stop records for the vehicle `TCB 3456` between 2/8/2010 01:00 AM and 2/10/2010 01:00 PM

Total Rows (25)

Printed By: ttec

Print Date: 2/10/2010 11:04:56 AM

Registration No	Driver Name	Start Time	Starting From	Stopped Time	Ending At
TCB 3456		2/8/2010 9:01:43.553 AM	Richard	2/8/2010 9:02:21.397 AM	Richard
TCB 3456		2/8/2010 3:13:36.100 PM	Richard	2/8/2010 3:14:02.257 PM	Richard
TCB 3456		2/8/2010 3:14:14.930 PM	Richard	2/8/2010 3:14:15.773 PM	Richard
TCB 3456		2/8/2010 3:32:57.350 PM	Richard	2/8/2010 3:34:10.443 PM	Richard
TCB 3456		2/8/2010 3:34:37.897 PM	Richard	2/8/2010 3:36:54.663 PM	Richard
TCB 3456		2/8/2010 3:38:13.757 PM	Richard	2/8/2010 3:39:25.647 PM	Richard
TCB 3456		2/8/2010 3:39:53.663 PM	Tumpuna	2/8/2010 4:27:45.680 PM	Cumuto
TCB 3456		2/8/2010 4:27:46.350 PM	Cumuto	2/8/2010 4:28:51.320 PM	Cumuto
TCB 3456		2/8/2010 4:29:19.520 PM	Cumuto	2/8/2010 4:52:19.227 PM	Cumuto
TCB 3456		2/8/2010 4:54:44.320 PM	Cumuto	2/8/2010 5:26:35.850 PM	Maraj
TCB 3456		2/8/2010 5:31:45.40 PM	Maraj	2/8/2010 6:04:36.740 PM	Abercromby
TCB 3456		2/8/2010 6:10:23.507 PM	Abercromby	2/8/2010 6:16:43.227 PM	Riverside
TCB 3456		2/8/2010 6:36:36.490 PM	Riverside	2/8/2010 6:55:40.180 PM	Lal Beharry
TCB 3456		2/8/2010 7:24:28.350 PM	Lal Beharry	2/8/2010 7:29:00.460 PM	Backchain
TCB 3456		2/8/2010 7:37:41.897 PM	Backchain	2/8/2010 7:41:46.147 PM	Park
TCB 3456		2/8/2010 7:43:48.83 PM	Park	2/8/2010 7:45:52.617 PM	Savannah
TCB 3456		2/8/2010 7:46:28.270 PM	Savannah	2/8/2010 8:36:15.680 PM	Sunrise
TCB 3456		2/8/2010 8:40:52.117 PM	Sunrise	2/8/2010 9:03:05.100 PM	Sunrise
TCB 3456		2/8/2010 9:03:30.537 PM	Sunrise	2/8/2010 9:25:58.380 PM	Sunrise

Figure showing sample report.

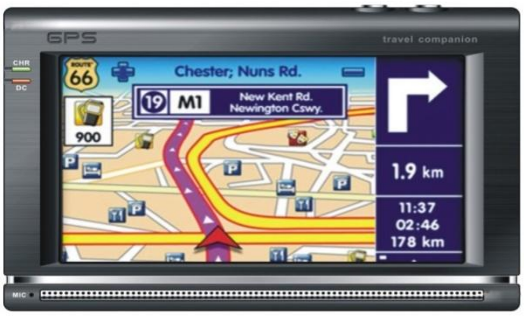
C. DISPATCHING & NAVIGATION SYSTEM

- A coloured screen terminal is to be provided so that messages can be sent to the vehicle from base and vice versa.

- This feature will allow for reports to be immediately dispatched to the crews and for the Foreman to type completed reports and send back information to the dispatcher.

- The message length is unlimited.

- Navigational map can be displayed on this screen.



Picture of screen (Not picture of actual touch screen terminal)

BENEFITS OF GPS VEHICLE TRACKING AND FLEET MANAGEMENT SYSTEM

This system can be advantageous to the Commission by:

1) Increasing efficiency and improve responses to trouble reports

   - Currently Trouble reports are handed out to the crews in the morning by the telecom operator. During the course of the day, additional trouble reports are communicated to the crews via radios. This method leaves room for communicating poor directions to the work site which causes delays and wastage of valuable time and resources.

   - However with a GPS system, accurate data can be given on a map accessible to the work crews from within the vehicle. When a customer calls to give a trouble report, the name and address of the customer can be linked directly to their metering unit and location on the map.

   - In the event of a road block or traffic, the system can recreate an alternative route to lead to the work site destination.

- Turn by turn audible directions can be provided.

- Field Managers can accurately monitor their crew and assign task to crews closest to the job site.

2) Increasing safety
   - There is a panic button within the vehicles that can notify the field managers of an emergency situation.

3) Recording History reports
   - All routes and activities for each vehicle are recorded for the last 2 years. Performance of each crew can be monitored and used as statistics.

7 VEHICLE FLEET UPGRADE, MAINTENANCE AND MANAGEMENT SYSTEM

7.1 TEN (10) YEAR PLAN FOR ACQUISITION AND DISPOSAL OF VEHICLES

The Commission's ten (10) year plan for acquisition of new vehicles includes:

- A ten (10) year plan for purchasing of new vehicles.
- A list of vehicles for disposal.

This is the ten (10) year plan for purchasing new vehicles:

DESCRIPTION	NORTH										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	TOTAL
3 TON CAB											
47ft BUCKET	1	2	2	1	1						7
55ft BUCKET	1	1	1	2	1						6
1 TON 4X4	2	1	1	1	1						6
30 TON LIFT		1		1	1						3
DERICK DIGGER		1				1	1				3
TOTAL	4	6	4	5	4	1	1				25

DESCRIPTION	**SOUTH**										
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**TOTAL**
3 TON CAB			2	2							4
47ft BUCKET			2	2							4
55ft BUCKET	2	2									
1 TON 4X4											
30 TON LIFT					2	2					4
DERICK DIGGER	1										1
TOTAL	**3**	**3**	**4**	**4**	**2**	**2**					**18**

DESCRIPTION	**CENTRAL**										
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**TOTAL**
3 TON CAB		2	1								3
47ft BUCKET	2			1							3
55ft BUCKET											0
1 TON 4X4				3	1						4
30 TON LIFT		1			1						2
DERICK DIGGER			1			1					2
TOTAL	**2**	**3**	**2**	**4**	**2**	**1**					**14**

DESCRIPTION	TOBAGO										
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**TOTAL**
3 TON CAB											0
47ft BUCKET		1	1	1							3
55ft BUCKET	1										1
1 TON 4X4	1										1
30 TON LIFT											1
DERICK DIGGER	1		1	1							3
TOTAL	**3**	**1**	**2**	**2**							**8**

DESCRIPTION	EAST										
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**TOTAL**
3 TON CAB		1		1	1	1	2				6
47ft BUCKET		3	3	1		2					9
55ft BUCKET	1		3								4
1 TON 4X4	1	1			1	1					4
30 TON LIFT	1										1
DERICK DIGGER		1			2						3
TOTAL	**3**	**6**	**3**	**5**	**4**	**4**	**2**				**27**

The table below identifies vehicles suggested for replacement:

Area	No. of Vehicles for Disposal	Description of Vehicles	Vehicle Registration Nos.	Total No. of Vehicles
North	3	1- 4x4 Single Cab, 1- Bucket Truck , 1- Open Tray Single Cab Toyota Hilux	TBJ 7326 TAY 6318 TAY 6318 TAY 6325	4
South	4	1 – 1 Ton 4x4, 2- Lift Trucks, 1- Aerial Lift Truck	TBK 4267 TAG 3782 TAO 2822 TBJ 7335 TBK 4269	5
East	10	5- Mazda T3500 Truck, 1- Mitsubishi 10 Ton with 55ft. platform, 2 – Isuzu PSR33 fitted with 47ft Platform 2- Mitsubishi L200 4WD double cab	TAY 6497 TBA 3828 TBA 3829 TBA 3830 TAY 6510 TBG 4837 TBG 4920 TBH 7951 TBJ 1387 TBJ 1388	10
Central	4	1- Int’l Wajax Lift, 1- Mazda T3500 3 Ton Lines Truck, 1 – Int’l Borer, 1 – Mail Van	To transfer two (2) vehicles: TBK 9420 – SLIU TBW 4092 – AMI TAO 3192 TAY 6503 TAN 5273 TAY 6313	9

			TAY 6329 TAY6334	
Tobago	3	3 – Lift Trucks	TAO 1064 TAO 1065 TAO 1066	3

6 EXPANSION OF THE DISTRIBUTION AREA'S FACILITIES

There is a need for improvement in the quality of the physical assets owned by the Commission particularly its buildings and staff/customer accommodation infrastructure. All the Commission's assets are considered very important its business operations and it is prudent therefore, that steps be taken to urgently improve the present condition of these physical assets. The quality of accommodation is critical in building an empowered and motivated work force and a satisfied customer base. It is therefore prudent that efforts be made to enhance this infrastructure through rehabilitation or replacement as necessary.

As part of its strategic plan, T&TEC has reviewed the state of its existing accommodation infrastructure with a view to adherence to OSH requirements and better satisfying the needs of its customers and has developed a plan to 2030. The objective of the plan is to provide the necessary accommodation infrastructure for optimum operations of the Commission.

The elements of the plan for the next three (3) years are as follows:

Year	Activity
2011	Upgrade Depot at Wrightson Road
2012	Construction of newAdministration Building at Wrightson Road
2013	Establish Depot at Roxborough Tobago
2013	Establish Depot at Felicity
2013	Establish depot at Charlieville
2013	Extension of Central Stores
2013	Establish new Depot and Sub Stores at Cove Industrial Estate Tobago
2013	Customer Service Centre South and Depot at Syne Village

2013	Construction of newAdministration Building at Tumpuna Road, Arima
2013	Refurbish Tobago Administration Building Service Centre
2013	Construction of new Administration Office South
2014	Establish Depot at Santa Cruz
2015	Construction of Administration Building at Cove
	TOTAL

8 ISO 9001:2008 CERTIFICATION FOR ALL THE DISTRIBUTION AREAS

The most widely used Quality Management System is ISO 9001:2008. T&TEC is moving in the direction of adopting ISO 9001:2008 into its daily operations across the Commission to improve the quality of service it delivers to its customers. This would provide a complete understanding of all operations from a customer's perspective and aid in the identification of improvement opportunities.

The incorporation of ISO 9001:2008 into the Commission promises to deliver the following benefits:

- International expert consensus on state of the art practices for quality management
- Build quality into products and services from design onwards
- Increase efficiency and effectiveness
- Model for satisfying customers and other stakeholder requirements.
- Model for continual improvement

Distribution South has recently received ISO Certification for three (3) years September, 27 2010 to September, 27 2013. As a direct consequence of the ISO 9001 Project Initiative there has been a marked reduction in the number of trouble reports per thousand customers at the Southern Distribution Area.

The year to date (March 31, 2011) number of reports per thousand customers at the Southern Distribution Area was 2.4 (the lowest among all Areas) compared to 3.6 across all Distribution Areas.

The year to date (March 31, 2010) number of reports per thousand customers at the Southern Distribution Area was 4.1 (the second highest among all Areas) compared to 3.9 across all Distribution Areas.

ISO 9001:2008 Certification is currently being implemented across all Distribution Areas.

9 PROJECT EXECUTION

Project Name	Project description	Benefits to be derived
DISTRIBUTION SOUTH		
Connection of feeders in La Romain	Construction of Overhead lines to connect Gulf view Feeder with La Romain 12kV Feeder	To facilitate load transfer between the Gulf View and La Romain feeder, thereby increasing reliability.
Feeder construction in St. Croix	Construction of St. Croix and Papouire Road 12kV feeder	To facilitate a balanced three phase load and transfer between the St. Croix and Papourie Rd 12kV feeder , thereby increasing reliability
Santa Flora Upgrade	Installation of 6MVA Transformer at Los Bajos	To complement the existing 3MVA transformer capacity at Santa Flora substation and meet increased load demand as a result of the new Desalination plant
Installation of GPS receivers in vehicles	Installation of GPS receivers in vehicles	To better manage crew availability
Erin feeder construction	Construction of Erin Feeder and the Carapal 12kV feeder from Erin	To maximize the available capacity of the 6MVA transformer to be installed at Los Bajos
St. Mary's Substation Upgrade	Installation of two 12.5/16MVA transformer at St. Mary's Substation	To meet increased load demand
Upgrade of pin type insulators	Changing of polymeric pin-type insulators	To increase reliability of feeder
New Building	Architectural works on a new building at Reform- Distribution South	To provide accommodation for increase staff and facilitate easy departure of crew from compound
Santa Flora Substation	Construction of switch house at Santa Flora Substation	To establish a proper distribution substation
Change out of conductors	Changeout of conductors on the Penal 12kV San Francique; Papourie; Siparia	Only on Penal and Papourie Rd 12kV feeders necessary to meet feeder load demand.
Phillipine Substation	To replace left side of board with vacuum switchgear	To replace existing old and electrically deteriorated LHS of board with new board capable of facilitating auto reclosing and good electrical integrity.
Distribution South	Replace oil ring main units	To replace existing old and electrically deteriorated units.

Project Name	Project description	Benefits to be derived
DISTRIBUTION NORTH		
New Area Office	To establish a new multi functional Area Office and Operating Centre at various locations - Distribution North	This forms part of the overall plan to create operating centres within the Area at strategic locations to decentralize the Area operation as it relates to the improved response to our customers requirements.
Independence Square East Substation	Change out of Independence Square East Substation 12kv Board	Upgrade of switchgear to 12kV For the improvement of reliability of supply to the Eastern part of Port of Spain and to meet future load demand in this sector of the City.
Mt. Pleasant Upgrade	Upgrade of Mt. Pleasant and new Transformer installation	To improve reliability of supply in the North Chagaramas Area with back to other parts of Chagaramas including Carenage and to meet load demands for future developments in the Chagaramas area as a whole.
Maraval Feeder connection	Link Maraval Area to the Maracas Feeder out of Santa Cruz	This link is required to in prove the reliability of supply by providing an alternative source of supply where none now exist in the Northern sectors of Maraval and Santa Cruz.
New Substation North Coast	Establish Substation at Maracas Bay on the North Coast	Facilities and equipment are required to meet existing and future load demands in this area.
Feeder Installation	Build a direct link feeder from Barataria to Morvant	To provide back of supply in this sector of the distribution system
Cascade Substation Upgrade	Upgrade Cascade Substation. Switch house, Transformers, switchgear 12 and 33kV	To upgrade all facilities and equipment to meet existing and future load demands in this area.
Maraval Substation Upgrade	Upgrade Maraval Substation. Switch house, Transformers, switchgear 12 and 33kV	To upgrade all facilities and equipment to meet existing and future load demands in this area.
Laventille Substation	Change out of the 12kV Board	To improve reliability of the Laventille /Barataria Area

Project Name	Project description	Benefits to be derived
DISTRIBUTION CENTRAL		
New Substation	Acquisition of land for Carlsen Field substation	To cater for expected increase in load due to significant housing developments
New Substation	Establish Carlsen Field substation	To cater for expected increase in load due to significant housing developments
Substation Upgrade	Installation of 2nd 66/12kV Transformer at Savonetta Substation	To cater for load growth in the Savonetta area - Industrial as well as domestic
New Feeder	Construction of Arena Road 12kV Feeder from Carlsen Field Substation	Feeder expected to provide improved reliability to customers east of the Solomon Hochoy Highway
New Feeder	Construction of Mission Road 12kV Feeder from Carlsen Field Substation	Feeder expected to provide improved reliability to customers east of the Solomon Hochoy Highway
New Feeder	Construction of Preservance Road 12kV Feeder from Felicity	To cater for expected increase in load due to significant housing developments
New Feeder	Roopsingh Road 12kV feeder from Felicity	To cater for expected increase in load due to significant housing developments
New Feeder	Construction of new Beaucarro 12kV from Central Substation	Feeder expected to relieve load from existing feeders out of BC, Central, Couva S/S and cater for housing developments (EMBD, etc)
New Feeder	Construction of Trinity Lane 12kV Feeder from B.C. Substation	To provide supply to new industrial development in Brechin Castle
Feeder Upgrade	Upgrade 12kV feeders: Munroe Road, Penco Lands, Freeport, Carlson Field and Cunupia	To provide increased capacity for system re-enforcement
New depot	Establish depot in Charlieville	To provide improved customer service

Project Name	Project description	Benefits to be derived
DISTRIBUTION TOBAGO		
New Depot	Establish depot at Roxborough	Increased access to Commission's facilities, quicker response times to trouble reports
Development in Scarborough	Underground infrastructure development in Scarborough	Increased reliability of supply to customers in the town, improved aesthetics
Administrative building in Scarborough	Complete the relocation of Administrative building from Scarborough to Cove- Distribution Tobago	Increased space to allow proper storage of materials, vehicle parking, office space for employees

Project Name	Project description	Benefits to be derived
DISTRIBUTION EAST		
Trincity S/S: New 12 kV Switchboard	Commission 12 kV Switchboard	
St. Augustine S/S: New 33/12 kV Transformer	2nd 33/12 kV Transformer to be commissioned.	
St. Augustine S/S: 33 kV GIS Board	To replace old 33 kV switchgear	
St. Augustine S/S: New 12 kV Switch Room and 12 kV Switchboard	New Vacuum Switchboard to replace old switchboard	
Piarco S/S: New 12 kV Feeder	Construct 12 kV feeder from Piarco S/S to CR Highway	Better reliability for the Oropune and Maloney areas
Orange Grove S/S: New 12 kV Feeder	Construct new 12 kV feeder from Orange Grove S/S to Tunapuna load center	Better reliability in the Tunapuna and Macoya areas
Pinto Rd S/S: Upgrade 33/12 kV transformers	Upgrade and replace 6 MVA transformers at Pinto Road S/S to 12.5/16 MVA	Improve reliability in the Arima, Santa Rosa areas
Development works in Arima	Convert from Overhead lines to underground lines in Arima	

Project Name	**Project description**	**Benefits to be derived**
AREA BLANKETS		
Installation of fuse gear on 12kV System		
Overhead line Ext under $50,000		
Service connections for new customers		
Preliminary Surveys and Investigations		
Overhead line Transformers		
Underground Extensions less than $50,000		
Ring main Unit		
Underground Transformers		
Installation of Non Transformer type meters		
Installation of Transformer type meters		
Pole Replacement		
Voltage Correction		
S/Lighting Extensions less than $50,000		

TRANSMISSION ASSETS

Objective

To manage the transmission and sub-transmission assets so as to maximise reliability and availability while minimising the whole-life cost, including network management, maintenance and replacement or disposal of each asset in the system.

The asset management programme includes, but is not limited to, the procurement, operation, maintenance, and disposal of assets.

Procurement

The need for the expansion of the transmission system is identified by system studies conducted by the Engineering Division. The recommendations resulting form these studies are considered for approval by the management's Performance and Reliability Committee. Once approved, budget estimates are developed for inclusion in the capital expenditure programme. The process followed for the actual procurement of the assets is dictated by the procedures laid down in the Commission's General Instruction A12/016 on tendering and purchasing.

<u>Stock Items</u>

For the procurement of stock items the standards and specifications for the asset to be procured is taken from the library of standards and specifications drawn up by the Standards and Specifications Committee.

<u>Non-Stock Items</u>

For non-stock items the department acquiring the asset is expected to develop the required standards and specifications for the item to be procured.

Network Management

T&TEC's standard planning criterion for its transmission and sub-transmission systems caters for a single event which results in the loss of a single component. In some instances however, such a design criterion could, after the first outage, leave the system in an insecure state. The occurrence of subsequent outages in any heavily loaded transmission interface could potentially lead to a catastrophic system failure due to cascading outages or a deficit in generating capacity.

In reality however, upon the occurrence of the first contingency, the system could once again be made secure in anticipation of the next contingency, by altering the economic dispatch of the generating units. In general therefore, this ability to modify the economic dispatch in response to security considerations should assure that the single contingency design criterion will achieve a satisfactory balance between the competing considerations of least-cost system design and operation, and acceptable levels of system security. At substations for example, two matched transformers are installed, each with a capacity in excess of the maximum load expected at that station. Once planning studies indicate that the load at the substation will exceed the capacity of any one transformer in year xxxx, a recommendation is made to militate against violation of the criteria. In some instances the design caters for double contingencies, where the load is considered to be of a critical or highly sensitive nature.

On a day to day basis the network is managed and controlled by the System Control section of the System Planning and Control Department. This section operates on a (three shift) twenty four basis and is staffed by a control engineer and operators. Through the System Control and Data Acquisition (SCADA) system, real time control and monitoring of all transmission and sub-transmission substations and lines is achieved. The System Control section manages power delivery from the independent power producers (IPP's) for transmission to various parts of the system. Its span of control also includes voltage, reactive power flow, and frequency control.

Maintenance Management

The reliability and availability of an asset depends on a well structured and well executed maintenance programme. Assets on the transmission and sub-transmission systems are maintained in accordance with the transmission maintenance programme developed in 2008 and updated annually. Assets are maintained in accordance with the manufacturer's recommendations. Where applicable however, these recommendations are modified by field experience and local environmental conditions.

Computerised Maintenance Management

Migration of the maintenance effort to a computerised maintenance management platform is being pursued. To this end the Commission has initiated a pilot project for a CMMS using the Maximo for Utilities software. The base Maximo system is scheduled for "go live" by the end of June 2011. Future expansion of the CMMS envisages the integration with other functioning software systems to maximise the functionality of the system and optimise the maintenance effort.

Asset Replacement / Disposal

Network components are replaced when one or more of the following conditions exist:

1. When the results of tests and/or inspections determine that failure of the component/equipment is likely.
2. When models become obsolete and replacement parts are not readily available.
3. When it is determined that the load on the component will exceed its rating.

When a decision is taken to retire an asset, approval is obtained from the General Manager using a disposal form. The method of disposal is expressly stated since some assets contains material that is hazardous to the environment and must be disposed of appropriately.

TRANSMISSION MAINTENANCE

The Transmission Maintenance Department is responsible for the upkeep of transmission assets in A1 condition and ensuring that they function at a high level of reliability. The role and functions of the department must conform to the

Commission's Vision and Mission statements and these should be understood by each employee to focus his/her efforts in achieving success. To further improve the focus and unity of the department, as well as the probability of implementing a successful maintenance programme, the goal of the department was defined as:

> *To continually research and use "best practice" maintenance strategies, technology and methods to eliminate or minimise any failures on the Transmission and Sub Transmission networks including violations of the single line out contingency design criteria.*

The goal was articulated to focus employees' efforts in maintaining Transmission's assets for improved performance of the system and a high level of reliability. Success is dependent on each individual having a good understanding of maintenance and its concepts. These concepts are varied, but common amongst all is the understanding of failure modes, failure rates and the establishment of maintenance activities to prevent the recurrence of failure. The Commission has been maintaining the transmission system for decades; therefore employees are cognizant of each asset's failure modes and their rates. However to ensure that important details are not missed, the maintenance procedure must involve a review of all failures to determine what failed, why it failed, when it failed, where it failed and the extent to which it failed. Maintenance practices should also be developed to prevent failure. To aid in achieving this, the goal was decomposed into the following:

- identify each asset installed on the Transmission System
- implement a system that monitors the work process to ensure there is compliance with standards
- establish a Schedule of Preventative Maintenance for each asset installed on the Transmission System
- implement quality control strategies to ensure there is compliance with financial and engineering standards
- identify all areas on the Transmission System that violate minimum clearances, present a risk of injury to persons or cannot sustain a single asset out contingency design criteria and execute projects that will restore the design criteria
- encourage further education of each employee through training, nurturing, self growth and employee welfare

1 ASSET MANAGEMENT

Asset management involves identifying and labelling each asset, collecting data, maintaining records, trending and tracking performance, depreciating the asset and establishing maintenance schedules.

Figure 1 provides the various classes of equipment that constitute the Asset Register.

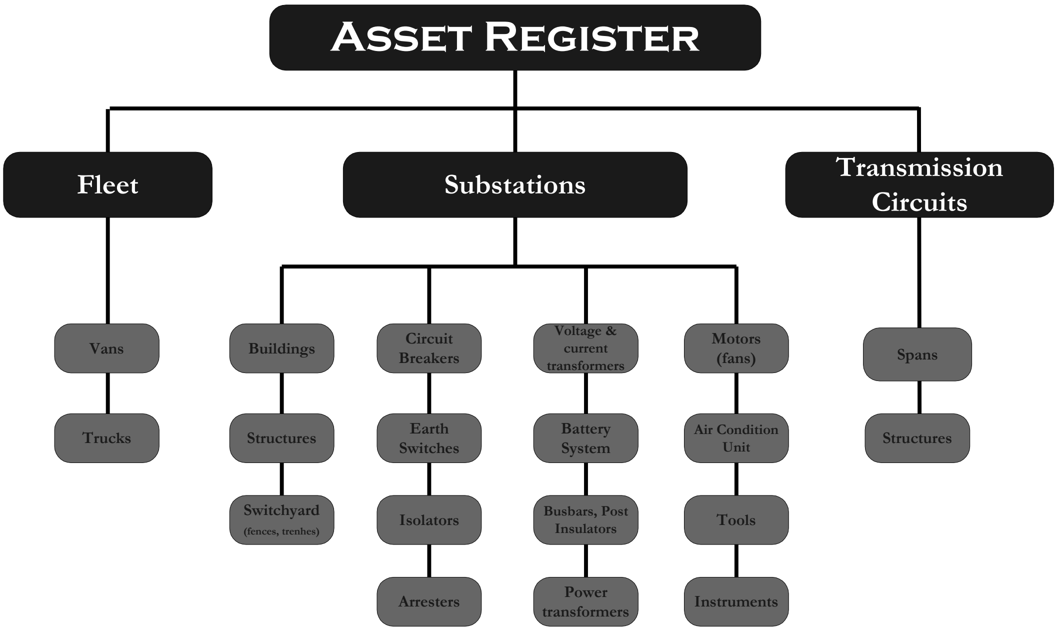


Figure 1: Components of the Asset Register

The data collected on the asset shall include *inter alia* location, year of manufacture, manufacturer, serial number, voltage rating, current rating, vector grouping, horse power, MVA rating, short circuit rating, gas pressure, type, cooling, length, size, tonnage, cost and other pertinent data. The labeling will involve assigning an ID to each asset using the system outlined below:

- the first two characters will represent the owner of the asset (i.e. department responsible for the equipment)
- the next two characters will represent the class of the equipment
- the next six characters will be an six-digit number

Figure 2 provides an example of an Asset ID used for a lightning arrestor.

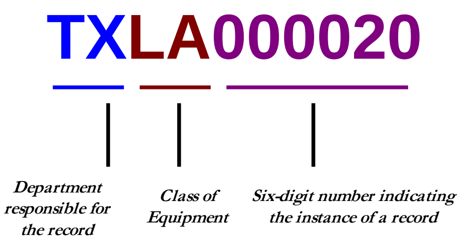


Figure 6: Framework for establishing the Asset ID

1.1. *ENGINEERING AND MAINTENANCE MANAGEMENT*

Engineering and Maintenance Management involves inspecting the asset, executing work schedules, providing timely and accurate feedback, operating within budget, troubleshooting problems, analysing trends, providing engineering solutions and conducting change-out or refurbishment of assets, as well as the use of predictive maintenance techniques to identify hidden failures.

1.1.1. Work Order Management System

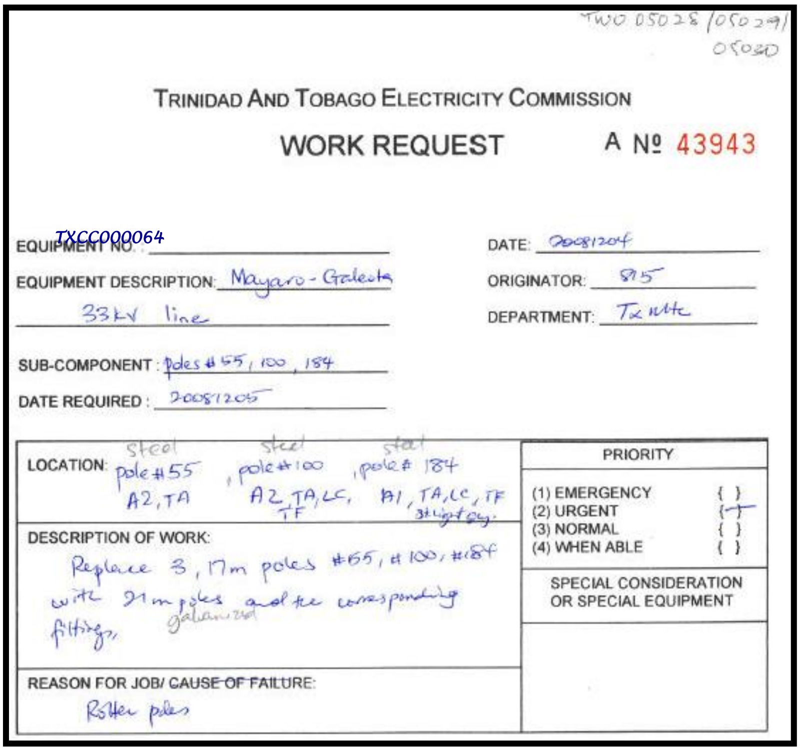
The Work Order is a communication tool that provides information on the asset, tasks to perform, when, how, who and any other relevant information that is required to successfully complete the work. When the Work Order is completed, it provides details on what was done and when, how much it cost, how long it took, who did it and any outstanding work.

1.1.2. Work Order Process

The success of Engineering and Maintenance Management is contingent on the proper documentation and processing of documents. The Work Order Management system currently being used for this purpose is described below:

1.1.2.1. Generating Work Orders

First a Work Request (*refer to Figure 3 for a sample Work Request form*) providing details of the asset to be worked on, work needed and scheduled dates should be completed. The Work Order will then be generated using specific descriptions that have been determined for the Work Needed/Problem, which is linked to the Work Plan and Special Equipment fields. Standardised terminology is applied to ensure that there is consistency throughout the Work Order Management System.



TWO 05028 / 05029 / 05030

TRINIDAD AND TOBAGO ELECTRICITY COMMISSION

WORK REQUEST A № 43943

EQUIPMENT NO: TXCC000064

DATE: 20081204

EQUIPMENT DESCRIPTION: Mayaro - Galeota 33kV line

ORIGINATOR: 815

DEPARTMENT: Tx Mtce

SUB-COMPONENT: Poles # 55, 100, 184

DATE REQUIRED: 20081205

LOCATION: steel pole #55 A2, TA, steel pole#100 A2, TA, LC, TF, steel pole# 184 A1, TA, LC, TF 3 light guy.

DESCRIPTION OF WORK: Replace 3, 17m poles #55, #100, #184 with 21m galvanized poles and the corresponding fittings.

REASON FOR JOB/ CAUSE OF FAILURE: Rotten poles

PRIORITY
(1) EMERGENCY { }
(2) URGENT {✓}
(3) NORMAL { }
(4) WHEN ABLE { }

SPECIAL CONSIDERATION OR SPECIAL EQUIPMENT

Figure 7: Sample Work Request Form

Work Order Field Descriptions

Field	Description
Asset ID	The unique identification given to each asset e.g. TXCB000141
Asset Name	The name by which the asset is referenced e.g. Malabar 66 kV Circuit Breaker @ Pinto Road
Location	Area at which the asset is positioned e.g. Pinto Road 66 kV Substation
Work Needed/Problem	Description of work to be done. (N.B standard descriptions are to be used)
Work Plan	Details of the critical steps required to address the Work Needed/Problem

Terminology

The Imperative Mood of the verb will be used in the Work Needed/Problem field.

Work Needed/Problem

<u>Standard Job Types (Preventative Maintenance)</u>

Reference is made to the type of job and the asset, for example:

1. Preventative Maintenance for Gas Circuit Breakers
2. Level I Ground Patrol
3. Line Clearing/Tree Trimming

<u>Emergency Works (Routine Maintenance)</u>

1. Repair hot spots colour phase asset side e.g. Repair hot spots on white phase (bus side) and blue phase (circuit breaker side)
2. Clean oil spill resulting from the leak on 132/66 kV Interbus Transformer #1

<u>Scheduled Works (Routine Maintenance)</u>

1. Routine works, for example:
    - Paint six (6) pole pieces used to cross cable over drain
2. Replacement of asset (not parts): replace existing type with new type, for example:
    - Replace S5/A1 pole #1238 with a G5/A1 Pole numbered as 1238
    - Replace 5′ chain link fence and concrete base with a 6′ concrete block fence and install barbed wire at the top

Work Plan

A work plan outlines the activities required to achieve the Work Needed/Problem (*refer to Figure 4 and Appendix I for the associated schedule*). Where there are no established schedules, a list of tasks will be provided (*as illustrated in Figure 5*).

TRINIDAD AND TOBAGO ELECTRICITY COMMISSION
TRANSMISSION MAINTENANCE DEPARTMENT
MAINTENANCE WORK ORDER

T&TEC

TWO 02474

DATE	TIME	SCH S/DATE	SCH E/DATE	RSCH S/DATE	RSCH S/DATE	REQUESTER	PERMIT	REQ. NO.
2008-02-20	11:05:00 AM	2008-06-26	2008-06-26	2008-03-31	2008-03-31	Vishwanath Maharaj		

Equipment No/Label: TXCB000106 — *AUTHORISED BY:* — *DATE:*

Equipment Description: Toco Distribution 33 kV Circuit Breaker @ North Oropouche

Location: N/A

Substation: North Oropouche Substation — Ring: Far East Ring

Work Needed/Problem: Preventative Maintenance for Oil Circuit Breakers

WORK PLAN:

See attached Preventative Maintenance Schedule for Oil Circuit Breakers

Employee	Number of Hours NT	1½	2T	3T
Foreman (1)	3.5			
T&D Technician				
Class A				
Class B				
Class C (1)	3.5			
Helper				
Driver (1)	3.5			
Labourer				
Trainee (2)	3.5			

MATERIAL DESCRIPTION:

SPECIAL EQUIPMENT:

Contact Resistance Test Set, Insulation Resistance Test Set, Dielectric Test Set

Purchase Order:

M.S.R.:

Contractor Cost:

OTHER WORK PERFORMED:

- Dropped oil tanks for each phase.
- Changed oil, serviced fixed and moving contacts.
- Washed the arc control device.

OTHER WORK NEEDED:

Top up bushing oil level on blue and red phases on the bus side as well as the blue phase on the line side.

DATE STARTED:	2008-04-01	TIME STARTED:	10:07	DATE COMPLETED:	2008-04-01	TIME COMPLETED:	14:32

	Print Name	Signature	Designation	Date
COMPLETED BY:	RONALD JOSEPH			2008-04-01
ENDORSED BY:				
APPROVED BY:	DALE RAMKISSOON			

ROUTING: 1 8121/8126 2 8122/8123 3 8120/8130 4 8124/8125

Figure 8: Sample Work Order with a standard Work Plan

T&TEC

TRINIDAD AND TOBAGO ELECTRICITY COMMISSION
TRANSMISSION MAINTENANCE DEPARTMENT
MAINTENANCE WORK ORDER

TWO 05020

DATE	TIME	SCH S/DATE	SCH E/DATE	RSCH S/DATE	RSCH S/DATE	REQUESTER	PERMIT	REQ. NO.
2008-12-02	2:50:33 PM	2008-12-02	2008-12-02			Anwar Ali		

AUTHORISED BY:		DATE:	

Equipment No/Label: TXVH000003

Equipment Description: TCF 8903

Location: N/A

Substation: N/A

Ring: N/ A

Work Needed/Problem: Routine Maintenance for Vehicles (after 25,000 km)

WORK PLAN:

- Service injector, conduct diagnostic test on engine check light, repair transmission
- Change engine oil and oil filter
- Replace fuel filter
- Replace air filter
- Check and adjust brakes
- Check battery (battery water level and battery terminals)

MATERIAL DESCRIPTION:

Employee	Number of Hours NT	1½	2T	3T
Foreman				
T&D Technician				
Class A				
Class B				
Class C				
Helper				
Driver				
Labourer				
Trainee				

SPECIAL EQUIPMENT:

Purchase Order: ____________

M.S.R.: ____________

Contractor Cost: ____________

OTHER WORK PERFORMED:

OTHER WORK NEEDED:

DATE STARTED:		TIME STARTED:		DATE COMPLETED:		TIME COMPLETED:	

COMPLETED BY: ____________ Print Name ____________ Signature ____________ Designation ____________ Date

ENDORSED BY: ____________ Print Name ____________ Signature ____________ Designation ____________ Date

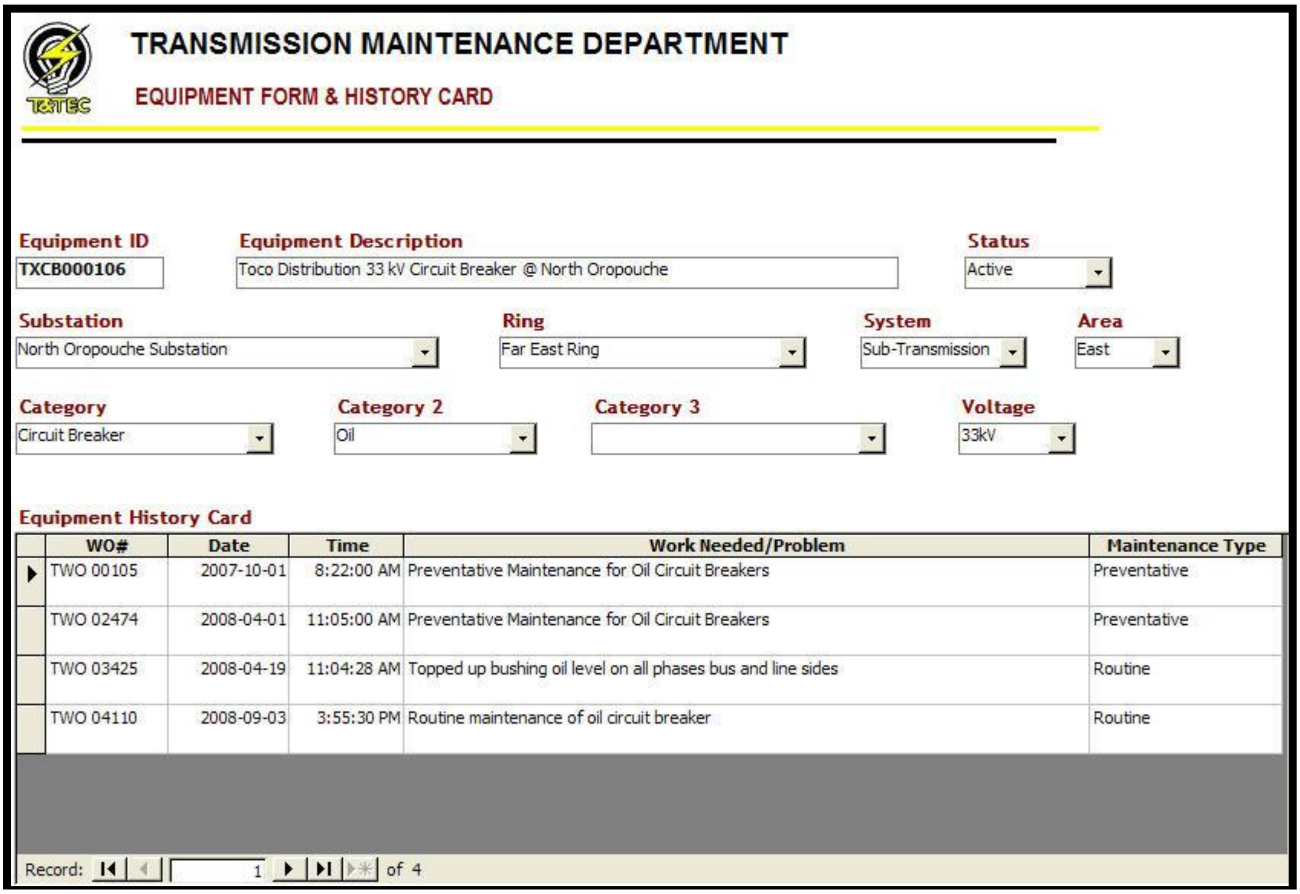
APPROVED BY: ____________ Print Name ____________ Signature ____________ Designation ____________ Date

ROUTING: 1 ____________ 8121/8126 2 ____________ 8122/8123 3 ____________ 8120/8130 4 ____________ 8124/8125

Figure 9: Sample Work Order with a breakdown of tasks in the Work Plan

History Card

Work done on an asset will be recorded in chronological order on the History Card (*refer to Figure 6 for a sample History Card*). The information will be taken directly from the following fields on the Work Order form: *Work Needed/Problem, Additional Work Performed, Works Not Performed, Cost* etc. The data will be used to analyse the performance of the asset and to schedule works to ensure the asset continues to function properly.


TRANSMISSION MAINTENANCE DEPARTMENT

EQUIPMENT FORM & HISTORY CARD

Equipment ID: TXCB000106

Equipment Description: Toco Distribution 33 kV Circuit Breaker @ North Oropouche

Status: Active

Substation: North Oropouche Substation

Ring: Far East Ring

System: Sub-Transmission

Area: East

Category: Circuit Breaker

Category 2: Oil

Category 3:

Voltage: 33kV

Equipment History Card

WO#	Date	Time	Work Needed/Problem	Maintenance Type
TWO 00105	2007-10-01	8:22:00 AM	Preventative Maintenance for Oil Circuit Breakers	Preventative
TWO 02474	2008-04-01	11:05:00 AM	Preventative Maintenance for Oil Circuit Breakers	Preventative
TWO 03425	2008-04-19	11:04:28 AM	Topped up bushing oil level on all phases bus and line sides	Routine
TWO 04110	2008-09-03	3:55:30 PM	Routine maintenance of oil circuit breaker	Routine

Record: 1 of 4

Figure 10: Sample History Card

Establishing Maintenance Schedules

The Planned Maintenance schedule will be developed for the assets installed on the system. This schedule will entail the following categories of work:

- Preventative Maintenance
- Predictive Maintenance
- Routine Maintenance

Figure 7 provides a brief description of the three (3) maintenance types.

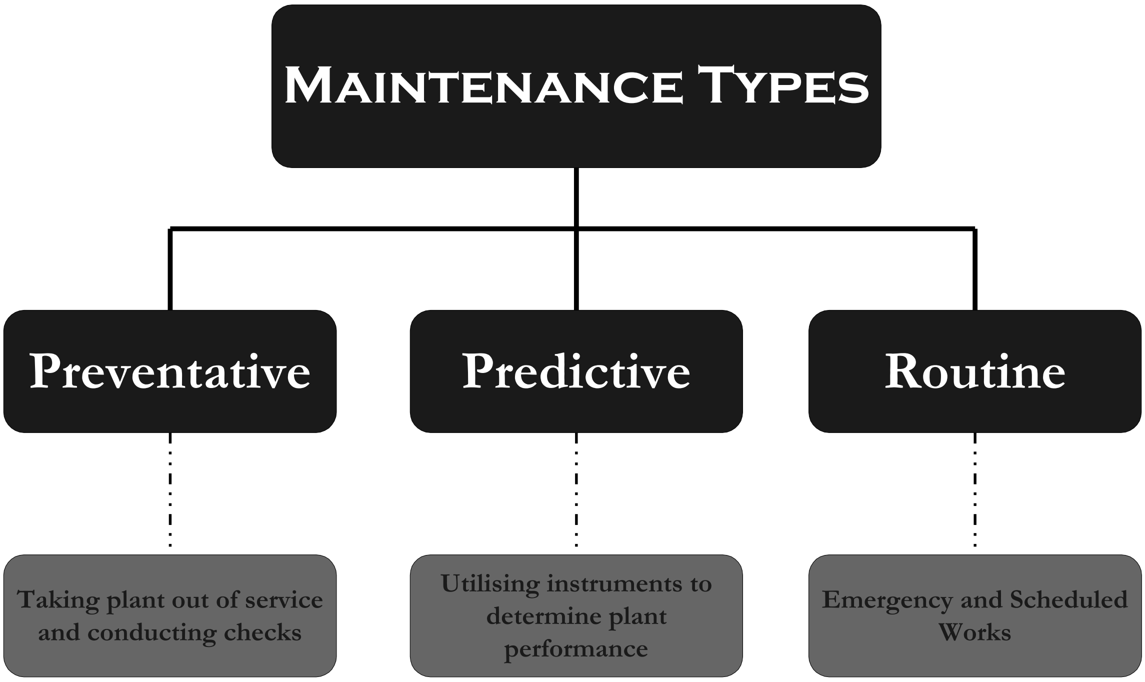


Figure 11: Maintenance Types

Preventative Maintenance

Preventative maintenance involves the execution of a group of tasks at fixed intervals to minimise the risk of failure of the asset.

Predictive Maintenance

Predictive maintenance involves the use of instruments to test the asset and identify hidden failures to allow the scheduling of repairs before the failure of asset occurs.

Routine Maintenance

Routine maintenance involves the execution of tasks as required to prevent failure of asset or to correct defects and return the asset to service.

Development of the planned maintenance schedule for the assets installed on the Transmission and Sub transmission systems requires that the work needed be clearly identified. The *Work Needed* will be used to identify the personnel, time and tooling requirements. Table 1 lists the work needed by asset type.

Table 1

Maintenance Category	Maintenance Class	Asset Type	Maintenance Schedule (Work Needed)	Work Plan
Preventative Maintenance	Preventative Maintenance	Circuit breaker	Preventative maintenance for gas, oil or vacuum circuit breakers[3]	Schedule of preventative maintenance for gas, oil or vacuum
Preventative Maintenance	Preventative Maintenance	Power transformers	Preventative maintenance for transformers[4]	Schedule of preventative maintenance for power transformers
Preventative Maintenance	Preventative Maintenance	Isolators	Preventative maintenance for motorised or non-motorised isolators[5]	Schedule of preventative maintenance for isolators
Preventative Maintenance	Inspection	Spans, structures	Level I Ground Patrol and Level II Ground Patrol[6]	Schedule of preventative maintenance for spans and structures
Preventative Maintenance	Preventative Maintenance	Battery systems	Preventative maintenance for battery chargers and batteries	Schedule of preventative maintenance for batteries
Preventative Maintenance	Preventative Maintenance	Auxiliary asset	Preventative maintenance for oil pumps, air compressors, fans, air conditioning units, tools and instruments	Schedule of preventative maintenance
Preventative Maintenance	Inspection	Circuit breakers, transformers,	Electrical Inspection	Schedule of preventative

[3] Refer to Appendices I, II and III
[4] Refer to Appendix IV
[5] Refer to Appendix V
[6] Refer to Appendix VI

Maintenance Category	**Maintenance Class**	**Asset Type**	**Maintenance Schedule (Work Needed)**	**Work Plan**
		battery chargers, isolators, auxiliary asset		maintenance for electrical inspections
Preventative Maintenance	Inspection	Building, fencing, switchyard, structures, trenches and air condition units	Civil Inspection	Schedule of preventative maintenance for civil inspections
Predictive Maintenance	Infrared scan	Spans, bus-bars, transformers, circuit breakers	Infrared scan for spans, bus-bars, transformers, circuit breakers	N/A
Predictive Maintenance	DGA	Power transformers	DGAs analysis of the main tank transformer oil	Schedule of maintenance for DGA sampling
Routine Maintenance	Servicing a connection	Conductor tap, splice and connection to a cable, isolator connection, bus-bar connection etc	Service bolted connection of red phase tap on pole 55	N/A
Routine Maintenance	Repairing oil leaks	Transformers	Repair four (4) oil leaks on transformer's main tank and four (4) on the fins	N/A
Routine Maintenance	Pressuring oil filled cable	High voltage oil filled cable	Pressure cable to 27 PSI	N/A
Routine Maintenance	Trouble shooting operating mechanisms	Transformers, circuit breakers, isolators	Trouble shoot operating mechanism to determine cause of isolator not closing mechanically	N/A
Routine Maintenance	Repairing holes	Fencing, building	Replace ten feet (10') of broken chain link fence wire on eastern side of compound	N/A
Routine Maintenance	Painting	Buildings, fencing, transformers, structures, circuit breakers	Paint exterior and interior surfaces of building including windows, doors and ceiling	N/A

1.1.3. Rules Governing the Management of Maintenance Operations

The integration of Planning and Engineering is of paramount importance to the successful maintenance of an asset. The rules governing the management of the maintenance operations and the requirements of the Planning and Engineering sections are detailed below:

- **Where the asset cannot be maintained as scheduled and the proposed rescheduled date is in the same month:**

  The engineers and senior foremen can collaborate among themselves to make the change

  The maintenance planner and senior engineer must be informed of the change immediately via e-mail or telephone

- **Where the asset cannot be maintained as scheduled and the proposed rescheduled date is in another month:**

  The "*Annual Maintenance Programme Change Request Form*" must be completed by the engineer and submitted to the maintenance planner

  The "*Annual Maintenance Programme Change Request Form*" must be approved and authorised by the maintenance planner and the senior engineer respectively

1.1.4. Responsibilities of the Planning and Engineering Sections

1.1.4.1. Planning

- Schedule maintenance on each piece of equipment installed on the Transmission and Sub transmission system
- Develop work plans that identify the tasks to be performed on each piece of equipment during a maintenance activity
- Assign the frequency with which each task has to be performed
- Prepare Maintenance Work Packages for each maintenance activity
- Keep records of all activities – maintain test/inspection results, work done, reports, etc
- Provide engineers with historical data for analysis
- Assist engineers with the preparation of tender/quotation documents, evaluation of bids and the award of contracts
- Prepare Purchase Orders and other payment documents
- Track expenditure
- Establish and maintain the filing system
- Purchase test sets and tools
- Prepare control and monthly reports

1.1.4.2. Engineering

- Verify that the maintenance packages are complete

- Review the asset history to ensure that the recommended maintenance activities meet or exceed the minimum level required to keep the asset operating in optimal condition
- Ensure that the maintenance personnel are cognisant of the operation of the asset and the method of performing the tasks involved in the maintenance process
- Verify that the Work Order form, the test results and any other forms in the maintenance package are thoroughly and accurately filled out
- Inform Control, the Distribution Area and industrial customers of the outage at least five (5) days in advance
- Verify that the maintenance activities are consistent with the manufacturer's recommendation and established engineering standards
- Verify that the test results are within acceptable limits and make recommendations for the upgrade/refurbishment and replacement of the asset as required
- Ensure that emergency repairs are conducted using sound engineering principles
- Verify that Work Orders for emergency repairs are completely and accurately filled out (cause of failure must be stated clearly)

1.1.5. Maintenance Projects (Routine Works)

Routine work that involves the same task in large quantities will be managed in a project format. Information on the work and the cost to repair or upgrade the transmission circuit will be divided into three categories:

- *Structural* includes all support structures and attachments such as poles, towers, cross arms, utility cables, earthing
- *Insulation* includes insulators, lightning protection, clearance to other objects, line clearing
- *Conduction* includes condition of the conductor, taps and joints

This information on the asset will be collected from ground inspections, collated and given a project ID identifying its period of execution and cost. The Project ID will take the format *TXMP0000* where:

- *TX* – transmission
- *MP* – maintenance project
- four-digit number (0000) uniquely identifies the project

Figure 8 on the following page demonstrates how the Project ID would be used in a maintenance project.

TRINIDAD AND TOBAGO ELECTRICITY COMMISSION
TRANSMISSION MAINTENANCE DEPARTMENT

T&TEC

TXMPJ0001

TITLE:	**BAMBOO-CARONI ARENA 66KV LINE RESTORATION AND UPGRADE**
DESCRIPTION:	**Replace corroded poles, re-design double circuit section of line to a singe circuit construction with an aerial, replace extension arm in area where line is double circuited with St. Augustine-El Socorro, install aerial and re-conductor line with osprey or flicker.**
Task 1.	*Replace sixty rotten poles and two hundred and twenty-two insulators and replace 17 km of three phases of Wolf conductor with Osprey and install 17 km of aerial conductor*

Execution Period:	March to July 2009
Material:	60 galvanize poles (21m) 180 horizontal line post insulators 42 tension insulators 51 kilometres of Osprey conductor
Material Cost:	\$0.72M for poles \$0.22M for insulators \$0.25M for conductor
Labour Cost:	\$120,000.00

Figure 12: Sample Project with an assigned Project ID

The procedure for the execution of projects of this nature is detailed below:

1. Conduct a Level II or III Ground Patrol
2. Identify and confirm the works
3. Identify and confirm the availability of materials and tools
4. Prepare the tender document and select the contractor(s)
5. Determine all risks that can result in loss of supply to customers on the ring associated with the circuit being maintained by:
   - Identifying any issues with single line contingency that can result in overload

- Identifying any issues where a loss of generation or ramping up of a large customer can result in overload
- Identifying hotspots or areas where conductors violate clearances to other objects, trees and any imminent faults on the other circuits in the ring that can result in failure when additional load is picked up during the outage

6. Establish dates for the outages after issues identified in 5 have been resolved.
7. Identify all miscellaneous issues that can delay the completion of the job or have an impact on the quality of the work and resolve:
   - existence of bees
   - difficulties in accessing the Commission's plant that is installed on the customer's premises or difficult locations
   - outage notices for customers
8. Determine the number of senior supervisors required for isolating and earthing the overhead line, issuing *Control Permits to Work* and directing the contractors as required to complete the maintenance works within the outage period.
9. Evaluate the success of the job, note the lessons learned and make the changes to improve the planning and execution of the job.

1.2. ENGINEERING RESEARCH AND PROJECT MANAGEMENT

Engineering Research and Project Management involves designing solutions to address situations where:

- minimum clearances are violated
- diversion of overhead lines is required
- single asset out deficiencies are to be corrected
- hot spots are to be repaired
- emergencies repairs are required on overhead lines

1.2.1. Emergency Repairs

Accurate documentation of the cause of failure and the operating conditions at the time of failure has played a major role in the evolution of maintenance processes. Research based on this documentation has revolutionised maintenance techniques by:

- encouraging the redesign of components to eliminate failures
- introducing inspection programmes to identify potential or hidden faults that can be corrected before failure occurs
- designing maintenance techniques that increase the mean time to failure

Emergency repairs must be treated akin to planned works. All findings and outstanding works when conducting repairs after failure must be properly documented on the Work Order which covers the repair works and the accompanying report should clearly identify the cause of the failure. This will allow a trend analysis to be conducted – the results of which can then be used to fashion a planned maintenance programme to eliminate the occurrence of these failures.

#	TASKS ASSIGNED	SD/ NSD[7]	PERIODICITY
A.	**Oil Circuit Breaker**		
a.	Check oil level in the bushing and replenish as required	SD	Bi-monthly
b.	Identify and report any leaks on the bushing	SD	Bi-monthly
c.	Check oil level of the main tank and replenish as required	SD	Bi-monthly
d.	Identify and report any leaks on the main tank	SD	Bi-monthly
e.	Test BDV (breakdown voltage) in oil	SD	Annually/after every trip within inspection cycle
f.	Inspect arc control chambers, baffle stacks, clean or replace parts as required	SD	Annually
g.	Check contacts touch and adjust accordingly	SD	Annually
h.	Check contact wipe and replace contacts accordingly	SD	Annually
i.	Inspect main contacts (fixed and moving) for projecting globules or burrs and smooth using a fine emery cloth	SD	Annually
j.	Check breaker stroke and overshoot	SD	Annually
Operating Mechanisms			
I	***Hydraulic Operating Mechanism***		
a.	Check hydraulic fluid level and replenish if necessary	NSD	Bi-monthly
b.	Check hydraulic fluid pressure	NSD	Bi-monthly
c.	Identify and report hydraulic fluid leaks if any	NSD	Bi-monthly
d.	Check hydraulic fluid pressure drop during duty cycle operation	SD	Annually
e.	Check auto-starting/stopping of hydraulic fluid pump	SD	Annually
f.	N_2 Priming Pressure Measurement	SD	Annually
II	***Pneumatic Operating Mechanism***		
a.	Check auto-starting/stopping of air compressor	SD	Annually
b.	Check air pressure drop during duty cycle operation	SD	Annually
B.	**Breaker Operation Checks**		
a.	Check circuit breaker's operating times open/close (Main, PIR, Auxiliary)	SD	Annually[8]
b.	Static Contact Resistance	SD	Annually
c.	Dynamic Contact Resistance (DCRM)[9] contact travel, contact speed, contact wipe, arcing contact length	SD	Annually
d.	Check duty cycle operation including rapid re-closing (0-0 3s-CO)	SD	Annually
e.	Check all operation lock-outs	SD	Annually
f.	Check all interlocks	SD	Annually
g.	Check status indication	SD	Bi-monthly

[7] SD – Shut Down; NSD – No Shut Down
[8] For All HV/EHV circuit breakers only
[9] For 400 kV BHEL, CGL make circuit breakers only

C.	**Measurement/Testing**		
a.	Measure close/trip coil currents	SD	Annually
b.	Check functionality of operation counter	SD	Annually
c.	Measure contact resistance of all busbar-to-bushing connections	SD	Bi-monthly
D.	**Control Cabinet**		
a.	Check tightness of all cable terminations in marshalling box	SD	Annually
b.	Check door sealing gasket and replace if necessary	NSD	Bi-monthly
c.	Repaint metallic surfaces (if required)	NSD	Annually
E.	**Structural**		
a.	Clean contamination from porcelain insulators	SD	Annually
b.	Inspect bushings for chips		
c.	Apply insulating varnish to porcelain chips or insulator cracks if required	SD	As Required
d.	Tighten slack bolts if required	SD	Annually
e.	Tighten all ground terminals	SD	Annually
F.	**Connections**		
	Check, clean and torque all busbar connections	SD	Annually
G.	**Spring**		
a.	Ensure that spring operates electrically	NSD	Bi-monthly
b.	Check for existence of handle	NSD	Bi-monthly
c.	Measure charging motor current	SD	Bi-monthly
d.	Check status indication	NSD	Bi-monthly
e.	Check the condition of sliding parts and pin rotating unit	SD	Bi-monthly
f.	Conduct visual check for mist and deformation	NSD	Bi-monthly
g.	Bathe in machine oil	SD	Bi-monthly

Appendix II: Preventative Maintenance Schedule for SF_6 Circuit Breakers

#	TASKS ASSIGNED	SD/ NSD[10]	PERIODICITY
A.	**SF_6 Circuit Breaker**		
a.	Check SF_6 gas pressures (wherever pressure gauges provided)	SD	Bi-monthly
b.	Conduct SF_6 gas leakage test	SD	Bi-monthly
c.	Dew Point measurement of SF_6 gas	SD	Bi-monthly[11]
	Operating Mechanisms		
I	***Hydraulic Operating Mechanism***		
a.	Check hydraulic fluid level and replenish if necessary	NSD	Bi-monthly
b.	Check hydraulic fluid pressure	NSD	Bi-monthly
c.	Check for hydraulic fluid leaks	NSD	Bi-monthly
d.	Check hydraulic fluid pressure drop during duty cycle operation	SD	Annually
e.	Check auto-starting/stopping of hydraulic fluid pump	SD	Annually
f.	N_2 Priming Pressure Measurement	SD	Annually
II	***Pneumatic Operating Mechanism***		
a.	Check auto-starting/stopping of air compressor	SD	Annually
b.	Check air pressure drop during duty cycle operation	SD	Annually
B.	**Breaker Operation Checks**		
a.	Check circuit breaker's operating times open/close (Main, PIR, Auxiliary)	SD	Annually[12]
b.	Measure Contact Resistance	SD	Annually
c.	Measure Dynamic Contact Resistance (DCRM)[13] contact travel, contact speed, contact wipe, arcing contact length	SD	Annually
d.	Check functionality during duty cycle operation including rapid re-closing (0-0 3s-CO)	SD	Annually
e.	Check all operation lock-outs	SD	Annually
f.	Check all interlocks	SD	Annually
g.	Check status indication	SD	Bi-monthly
C.	**Measurement/Testing**		
a.	Measure close/trip coil currents	SD	Annually
b.	Check functionality of operation counter	SD	Annually
c.	Measure contact resistance of all busbar-to-bushing connections	SD	Bi-monthly
D.	**Control Cabinet**		
a.	Check tightness of all cable terminations in marshalling box	SD	Annually
b.	Check door sealing gasket and replace if necessary	NSD	Bi-monthly
c.	Paint metallic surfaces (if required)	NSD	Annually
E.	**Structural**		
a.	Clean contamination from porcelain insulators	SD	Annually
b.	Inspect bushings for chips		
c.	Apply insulating varnish to porcelain chips or insulator cracks if required	SD	As Required
d.	Tighten slack bolts if required	SD	Annually
e.	Tighten all ground terminals	SD	Annually

[10] SD – Shut Down; NSD – No Shut Down
[11] At time of commissioning then after 6 months and 1½ years of commissioning and thereafter once in every two years
[12] For All HV/EHV circuit breakers only
[13] For 400 kV BHEL, CGL make circuit breakers only

Appendix II: Preventative Maintenance Schedule for SF_6 Circuit Breakers

#	TASKS ASSIGNED	SD/ NSD[10]	PERIODICITY
F.	**Connections**		
	Check, clean and torque all busbar connections	SD	Annually
G.	**Spring**		
a.	Ensure that spring operates electrically	NSD	Bi-monthly
b.	Check for existence of handle	NSD	Bi-monthly
c.	Measure charging motor current	SD	Bi-monthly
d.	Check status indication	NSD	Bi-monthly
e.	Check the condition of sliding parts and pin rotating unit	SD	Bi-monthly
f.	Conduct visual check for mist and deformation	NSD	Bi-monthly
g.	Bathe in machine oil	SD	Bi-monthly

Appendix III: Preventative Maintenance Schedule for Vacuum Circuit Breakers

#	TASKS ASSIGNED	SD/ NSD[14]	PERIODICITY
A.	**Vacuum Circuit Breaker**		
a.	Measure spring plate over travel when circuit breaker is in the closed position and consult manufacturer's instruction for allowable over travel. (Over travel is an indication of contact erosion.)	SD	Annually
b.	Perform ac high-potential test to check the condition of vacuum of arc interrupter	SD	Bi-monthly
	Operating Mechanisms		
I	***Hydraulic Operating Mechanism***		
a.	Check hydraulic fluid level and replenish if necessary	NSD	Bi-monthly
b.	Check hydraulic fluid pressure	NSD	Bi-monthly
c.	Check for hydraulic fluid leaks	NSD	Bi-monthly
d.	Check hydraulic fluid pressure drop during duty cycle operation	SD	Annually
e.	Check auto-starting/stopping of hydraulic fluid pump	SD	Annually
f.	N_2 Priming Pressure Measurement	SD	Annually
II	***Pneumatic Operating Mechanism***		
a.	Check auto-starting/stopping of air compressor	SD	Annually
b.	Check air pressure drop during duty cycle operation	SD	Annually
B.	**Breaker Operation Checks**		
a.	Check circuit breaker's operating times open/close (Main, PIR, Auxiliary)	SD	Annually[15]
b.	Measure contact resistance	SD	Biannually
c.	Measure Dynamic Contact Resistance (DCRM)[16] contact travel, contact speed, contact wipe, arcing contact length	SD	3 times per year
d.	Check functionality during duty cycle operation including rapid re-closing (0-0 3s-CO)	SD	Annually
e.	Check all operation lock-outs	SD	Annually
f.	Check all interlocks	SD	Annually
g.	Check status indication	SD	Bi-monthly
C.	**Measurement/Testing**		
a.	Measure close/trip coil currents	SD	Annually
b.	Measure contact resistance of all busbar-to-bushing connections	SD	Bi-monthly
c.	Check functionality of operation counter	SD	Annually
d.	Check SF_6 gas pressure	NSD	Bi-monthly
D.	**Control Cabinet**		
a.	Check tightness of all cable terminations in marshalling box	SD	Annually
b.	Check door sealing gasket and replace if necessary	NSD	Bi-monthly
c.	Paint metallic surfaces (if required)	NSD	Annually
E.	**Structural**		
a.	Clean contamination from porcelain insulators	SD	Annually
b.	Inspect bushings for chips	SD	Bi-monthly
c.	Apply insulating varnish to porcelain chips or insulator cracks if required	SD	As Required

[14] SD – Shut Down; NSD – No Shut Down
[15] For All HV/EHV circuit breakers only
[16] For 400 kV BHEL, CGL make circuit breakers only

Appendix III: Preventative Maintenance Schedule for Vacuum Circuit Breakers

#	TASKS ASSIGNED	SD/ NSD[14]	PERIODICITY
d.	Tighten slack bolts if required	SD	Bi-monthly
e.	Tighten all ground terminals	SD	Bi-monthly
f.	Measure contact resistance of all busbar to bushing connections	SD	Annually
g.	Undo busbar to bushing connections, service and torque	SD	Every 5 years
F.	**Connections**		
	Check, clean and torque all busbar connections	SD	Annually
G.	**Spring**		
a.	Ensure that spring operates electrically	NSD	Bi-monthly
b.	Check for existence of handle	NSD	Bi-monthly
c.	Measure charging motor current	SD	Bi-monthly
d.	Check status indication	NSD	Bi-monthly
e.	Check the condition of sliding parts and pin rotating unit	SD	Bi-monthly
f.	Conduct visual check for mist and deformation	NSD	Bi-monthly
g.	Bathe in machine oil	SD	Bi-monthly

Appendix IV: Preventative Maintenance Schedule for Transformers

#	TASKS ASSIGNED	SD/ NSD	PERIODICITY
a.	Visually inspect bushing for cracks, dirt etc	NSD	Bi-monthly
b.	Check bushing oil level	NSD	Bi-monthly
c.	Check oil level in conservator main tank	NSD	Bi-monthly or as required
d.	Check oil level in oil seal of breather	NSD	Bi-monthly
e.	Check oil level in OLTC conservator	NSD	Bi-monthly or as required
f.	Check cooler oil pumps	NSD	Bi-monthly
g.	Check recommended quantity and functionality of cooler fans	SD	Bi-monthly
h.	Verify all OLTC panel indications at switch house against the OLTC indicator on Transformer	SD	Annually
i.	Identify and report oil leaks in conservator main tank, fans and conservator (if any)	NSD	Bi-monthly
j.	Check condition of silica gel in OLTC breather and main tank	NSD	Bi-monthly
k.	Measure pump supply current (points to be tagged on first maintenance)	NSD	Bi-monthly
l.	Measure fan supply current (points to be tagged on first maintenance) i. Manual actuation (if fans or pumps are off turn on for 5 minutes) ii. Auto Starting	NSD SD	Bi-monthly Bi-monthly Annually
m.	Conduct electrical check/test: i. pressure relief device ii. Buchholz relay iii. OLTC surge relay Check the gaskets of the terminal box and replace if necessary	SD	Annually
n.	Marshalling boxes: i. Clean marshalling box ii. Check gaskets iii. Tighten terminations iv. Check for the presence of birds, pests and rust	SD S D SD SD	Annually Annually Annually Bi-monthly

Appendix IV: Preventative Maintenance Schedule for Transformers

#	TASKS ASSIGNED	SD/ NSD	PERIODICITY
o.	Test oil in transformer main tank for: i. Colour ii. Dielectric Break Down of oil in main tank iii. DGA iv. Oxidation Inhibitor v. IFT vi. Acid Number vii. Odour viii. P.P.M moisture (% saturation of water in oil) ix. Relative Saturation x. Expected RS xi. Specific gravity 60/60 xii. Visual examination including sentiment xiii. Power factor % at 25^{o}C	NSD NSD NSD NSD NSD NSD NSD NSD NSD NSD NSD NSD NSD	Bi-annually Annually Bi-annually Every 10 Years Every 10 Years Bi-annually Annually Annually Annually Annually Annually Annually Annually
p.	Regenerate silica gel in breather	NSD	As Required
q.	Top up oil level in oil seal of breather	NSD	As Required
r.	Conduct Power Factor testing for bushings	SD	Every 5 years
s.	Conduct electrical tests: i. Insulation PF/ Dissipation Factor Test ii. Transformer Turns Ratio Test iii. Insulation Resistance Test iv. Dielectric Absorption v. Polarisation Index (PI) vi. Step Voltage Test vii. Core Ground Test viii. Winding Resistance (commissioning & re-commissioning **only**)	SD SD SD SD SD SD SD SD	In 3 Years Every 3 Years Annually Annually Annually Annually Annually Annually
t.	Clean external surface of radiators	SD	Annually
u.	Clean all bushings	SD	Annually

Appendix IV: Preventative Maintenance Schedule for Transformers

#	TASKS ASSIGNED	SD/ NSD	PERIODICITY
v.	Maintain OLTC driving mechanism and shafts	SD	Annually
w.	Listen/check for abnormal noise on transformer	SD	Annually
x.	Dismantle and clean oil level gauge in transformer main tank	SD	Annually
aa.	Dismantle and clean oil level gauge in OLTC	SD	Annually
ab.	Record instantaneous and maximum oil and winding temperature and reset of maximum indicators	NSD	Bi-monthly
ac.	Check and calibrate OTI (Oil Temperature Indicator) and WTI (Winding Temperature Indicator)	SD	Every 5 Years
ad.	Replace oil in OLTC	SD	Every 2 Years or as required
ae.	Protective relays	SD	Annually
af.	Filter or degas main tank radiator oil	SD	Every 10 Years or as required
ag.	Measure impedance on ground connections	NSD	Every Six Months
ah.	Examine transformer main body and radiator fins for corrosion	NSD	Annually
ai.	Treat and recoat main tank and radiators with Hi Performance anticorrosive paint	SD	As Required

Appendix V: Preventative Maintenance Schedule for Isolators and Earth Switches

#	TASKS ASSIGNED	SD/ NSD	PERIODICITY
A.	**Operating Mechanism for Isolator and Earth Switch**		
a.	Check oil linkages including transmission gears	SD	Annually
b.	Check for existence of stopper bolts	SD	Annually
c.	Lubricate operating mechanism, hinges, lock joints on levers, bearings	SD	Annually
d.	Check functionality of locking mechanism	SD	Annually
e.	Check all interlocks	SD	Annually
B.	**Main Contacts**		
a.	Clean and lubricate isolator contacts	SD	Annually
b.	Where applicable, clean auxiliary switch contact and grease lightly with silicon grease	SD	Annually
c.	Check alignment of isolator	SD	Annually
d.	Measure contact resistance	SD	Annually
e.	Tighten slack bolts, nuts and pins etc (if any)	SD	Annually
f.	Visually inspect insulators for chips	SD	Annually
g.	Apply insulating varnish to porcelain chips or insulator cracks if required	SD	As required
C.	**Earth Switch**		
a.	Check and align earthing blades	SD	Annually
b.	Clean and lubricate contacts	SD	Annually
c.	Measure contact resistance	SD	Annually
d.	Check aluminium/copper flexible conductor	SD	Annually
e.	Check and measure earth impedance of earth connections of structure	SD	Annually
D.	**Marshalling Box**		
a.	Clean and lubricate auxiliary contacts	SD	Annually
b.	Clean and check terminal tightness	SD	Annually
c.	Check space heaters and illumination	NSD	Annually
d.	Check integrity of gaskets	NSD	Bi-monthly
e.	Check for operating handle and locking mechanism for isolator handle	NSD	Bi-monthly
f.	Check status indication	SD	Annually
g.	Check for the presence of birds, insects, rust on the control panel	NSD	Bi-monthly

Appendix V: Preventative Maintenance Schedule for Isolators and Earth Switches

#	TASKS ASSIGNED	SD/ NSD	PERIODICITY
a.	Check leakage current (Third Harmonic Resistive Current)	NSD	Bi-monthly
b.	Test counters	SD	Annually
c.	Conduct earth impedance test	SD	Bi-monthly
d.	Clean lightning arrestor insulator	SD	Annually
e.	Inspect for chips	SD	Bi-monthly
f.	Apply insulating varnish to porcelain chips or cracks if required	SD	As required

Appendix VII: Preventative Maintenance Schedule for Busbars, Jumpers, Connectors, Clamps, Switchyard Illumination etc.

#	TASKS ASSIGNED	SD/ NSD	PERIODICITY
a.	Measure earth impedance	NSD	Annually
b.	Check and clean station post insulators	SD	Every two years
c.	Check insulators for cracks	NSD	Bi-monthly
d.	Conduct infrared scan of all conductor joints and terminal connectors clamps	NSD	Bi-annually
e.	Inspect protection cabinet for lighting, birds and functionality in terms of remaining closed	NSD	Bi-monthly
f.	Check for presence of circuit directory (drawings) and covers on the alternating current/main supply panel	NSD	Bi-monthly
g.	Check for presence of circuit directory (drawings) and covers on the direct current/main supply panel	NSD	Bi-monthly
h.	Check status lights on protection panel	NSD	Bi-monthly
i.	Check switch house lights and replace as required	NSD	Bi-monthly
j.	Check perimeter lights and replace as required	NSD	Monthly
k.	Clean switchyard and switch house	NSD	Bi-monthly
l.	Paint switch house	NSD	As required
m.	Paint structures and equipments etc.	SD	As required
n.	Remove rust from structures (doors, windows) and equipments etc.	SD	As required
o.	Inspect switch house for defects	NSD	Bi-annually
p.	Conduct civil inspection	NSD	Bi-annually
q.	Check for presence of all signage at substation	NSD	Bi-monthly
r.	Check fencing for breach (holes)	NSD	Bi-monthly
s.	Check metering of the substation	NSD	As required

Level I Ground Patrols

This inspection is designed to collect data on those defects that can result in failure of a circuit in a short to medium term period. The following defects shall be recorded during this type of inspection:

#	Task	Frequency
a.	Vegetation violating the scope of the line clearing contract	Every 4 to 6 weeks
b.	Missing spans of aerial conductors	Every Inspection
c.	Rotten structures - advanced decay (dangerous)	Every Inspection
d.	Rotten hardware (arms, bolts, fittings etc.) – advanced decay (dangerous)	Every Inspection
e.	Violation of clearances to ground, structures or other conductors (buildings, object on line, sign boards, low conductors, abnormal sagging, etc.)	Every Inspection
f.	Defective insulators (broken, dirty, flashover, missing disk in string, mechanical fatigue, decay of metal parts etc)	Every Inspection
g.	Excessively leaning structures (dangerous) or exposure of foundation as a result of landslips	Every Inspection
h.	Guys (slack, missing, exposed anchor)	Every Inspection
i.	Thermographic scans	Every 6 Months

Level I (Post Fault) Ground Patrols

This inspection is intended to collect data after an overhead line circuit has faulted. The following information will be used in conducting this type of patrol.

- Relay – Faulted Phase
- Relay – Distances to Fault
- GPS Map – Location Consistent With Distance to Fault.

The overhead line shall be traced using this information paying particular attention to the faulted phase (s) and when available in the vicinity of the distance to the fault as indicated on the relay and the GPS Map.

Level II Ground Patrols

This inspection is intended to collect data on the condition of all components of the overhead line network and update any changes in asset as required. The following information shall be recorded:

#	TASK	PERIODICITY
2.	**Level II Ground Patrol**	***Every 2 Years***
a.	Missing spans of aerial conductors and aerial not bonded	Every Inspection
b.	Condition of structures	Every Inspection
c.	Aerial not providing 30° shielding	Every Inspection
d.	Condition of overhead line hardware (arms, bolts, insulators, fittings)	Every Inspection
e.	Missing earth rod/conductor	Every Inspection
f.	Ground earth resistance	Every Inspection
g.	Insufficient number of guys, missing guys, slack guys, incorrect sized span wire	Every Inspection
h.	Violation of clearances to ground, structures, building or other conductors	Every Inspection
i.	Excessive conductor sag	Every Inspection
j.	Structure numbering	Every Inspection
k.	Sinking of structure foundations/exposure of structure foundations due to landslips	Every Inspection
l.	Ultrasonic Inspection	Every Inspection
m.	Thermographic Scans	Every Inspection
n.	Corona Discharge Scan	Every Inspection
o.	Configuration (digital photo must be taken of changed assets)	Every Inspection
p.	Location of the phase on the circuit on each pole	Every Inspection

N.B. Any changes or additions to the line route must be updated using GPS with every inspection.

* Line clearing removed

* Defective hardware (broken insulators, dirty insulators, missing disk in strings)

Level III Ground Patrols

This inspection is intended to collect detailed data on all components of the overhead line system after commissioning or where no prior data has been collected for inventory purposes and adherence to the Commission's standards. The following information shall be recorded:

- Structure Number
- GPS Coordinates
- Manufacturer
- Year of Manufacture
- Purchase Price
- Location
- Structure Type
- Structure Height
- Structure Material
- Transmission Configuration
- Insulator Type 1
- Insulator Quantity 1
- Ground Rod Quantity
- Ground Resistance
- Earth Conductor Size
- Fly Guy Quantity
- Down Guy Quantity
- Span Wire Size
- 12 kV Configuration
- LV Configuration
- TSTT
- Pilot Cable
- TTEC Fibre Optic
- Cable TV
- Foundation Type
- Date Installed
- Circuit Name 1
- Phase Conductor Size
- Phase Conductor Configuration
- Aerial Conductor Size
- Span Length
- Phase Conductor Spacer Quantity
- Phase Conductor Damper Quantity
- Aerial Conductor Spacers Quantity
- Aerial Conductor Dampers Quantity
- Phase Conductor Splice Quantity
- Aerial Conductor Splice Quantity
- Lowest Height of Span
- 30° Shielding Adherence
- Number of junctions

APPENDIX VII

IMPACT OF COMPLIANCE WITH IAS 17
2005 - 2009 FINANCIALS PPA1

IAS 17- Finance Leases applies only to PowerGen assets as it was impracticable to determine the carrying value of plant leased from Trinity Power Limited as reliable information regarding the cost of construction of the plant was not available. The net book value as at December 2005 of Power Purchase Agreement (PPA) 1 was $704,770,205.00 and that of PPA 2 as at December 2007 (the first year introduced) was $1,015,614,819.00.

The effects of IAS17 are shown below:

	TT$'000	**TT$'000**
2005 Financial Statements		
Accumulated Deficit without Compliance		**(642,533.00)**
Accumulated Deficit with Compliance-1st PPA		**(1039,689.00)**
Increase in Accumulated Deficit		**(397,156.00)**
Impact on 2006 Financial Statements		
Reduction in Capacity cost (allocated to Loan payments)	228,026.00	
Reduction in Capacity cost (allocated to Interest payments)	55,531.00	
Deferred Income	27,577.00	
Interest expense	(55,531.00)	
Additional Depreciation	(176,193.00)	
Decrease in Accumulated Deficit		**79,410.00**
Impact on 2007 Financial Statements		
Reduction in Capacity cost (allocated to Loan payments)	240,795.00	
Reduction in Capacity cost (allocated to Interest payments)	42,761.00	
Deferred Income	27,577.00	
Interest expense	(42,761.00)	
Additional Depreciation	(176,193.00)	
Decrease in Accumulated Deficit		**92,179.00**
Impact on 2008 Financial Statements		
Reduction in Capacity cost (allocated to Loan payments)	254,280.00	
Reduction in Capacity cost (allocated to Interest payments)	29,277.00	
Deferred Income	27,577.00	
Interest expense	(29,277.00)	
Additional Depreciation	(176,193.00)	
Decrease in Accumulated Deficit		**105,664.00**
Impact on 2009 Financial Statements		
Reduction in Capacity cost (allocated to Loan payments)	268,519.00	
Reduction in Capacity cost (allocated to Interest payments)	15,037.00	
Deferred Income	27,577.00	
Interest expense	(15,037.00)	
Additional Depreciation	(176,193.00)	
Decrease in Accumulated Deficit		**119,903.00**
Overall movement in Accumulated Deficit		**-**

IMPACT OF COMPLIANCE WITH IAS 17
2010 - 2016 FINANCIALS-PPA1 ext

	TT$'000		**TT$'000**
Impact on 2010Financial Statements			
Reduction in Capacity cost (allocated to Loan payments)	232,284.00		
Reduction in Capacity cost (allocated to Interest payments)	56,282.00	288,566.00	
Deferred Income	-		
Interest expense	(56,282.00)		
Additional Depreciation	(250,140.00)	(306,422.00)	
(Increase)/decrease in Accumulated Deficit			**(17,856.00)**
Impact on 2011Financial Statements			
Reduction in Capacity cost (allocated to Loan payments)	249,705.00		
Reduction in Capacity cost (allocated to Interest payments)	38,860.00	288,565.00	
Deferred Income	-		
Interest expense	(38,860.00)		
Additional Depreciation	(250,140.00)	(289,000.00)	
(Increase)/Decrease in Accumulated Deficit			**(435.00)**
Impact on 2012Financial Statements			
Reduction in Capacity cost (allocated to Loan payments)	268,433.00		
Reduction in Capacity cost (allocated to Interest payments)	20,132.00	288,565.00	
Deferred Income	-		
Interest expense	(20,132.00)		
Additional Depreciation	(250,140.00)	(270,272.00)	
(Increase)/Decrease in Accumulated Deficit			**18,293.00**
Overall(increase)/decrease movement in Accumulated Deficit			**2.00**

IMPACT OF COMPLIANCE WITH IAS 17
2010 - 2016 FINANCIALS-PPA2

	TT$'000		TT$'000
Impact on 2010Financial Statements			
Reduction in Capacity cost (allocated to Loan payments)	10,520.00		
Reduction in Capacity cost (allocated to Interest payments)	90,782.00		
Deferred Income	-		
Interest expense	(90,782.00)		
Additional Depreciation	(35,021.00)		
Increase in Accumulated Deficit			**(24,501.00)**
Impact on 2011Financial Statements			
Reduction in Capacity cost (allocated to Loan payments)	11,441.00		
Reduction in Capacity cost (allocated to Interest payments)	89,861.00		
Deferred Income	-		
Interest expense	(89,861.00)		
Additional Depreciation	(35,021.00)		
Increase in Accumulated Deficit			**(23,580.00)**
Impact on 2012Financial Statements			
Reduction in Capacity cost (allocated to Loan payments)	12,442.00		
Reduction in Capacity cost (allocated to Interest payments)	88,860.00	101,302.00	
Deferred Income	-		
Interest expense	(88,860.00)		
Additional Depreciation	(35,021.00)		
Increase in Accumulated Deficit			**(22,579.00)**
Impact on 2013Financial Statements			
Reduction in Capacity cost (allocated to Loan payments)	13,531.00		
Reduction in Capacity cost (allocated to Interest payments)	87,772.00	101,303.00	
Deferred Income	-		
Interest expense	(87,772.00)		
Additional Depreciation	(35,021.00)		
Increase in Accumulated Deficit			**(21,490.00)**
Impact on 2014Financial Statements			
Reduction in Capacity cost (allocated to Loan payments)	14,714.00		
Reduction in Capacity cost (allocated to Interest payments)	86,588.00	101,302.00	
Deferred Income	-		
Interest expense	(86,588.00)		
Additional Depreciation	(35,021.00)		
Increase in Accumulated Deficit			**(20,307.00)**

Impact on 2015Financial Statements

Reduction in Capacity cost (allocated to Loan payments)	16,002.00		
Reduction in Capacity cost (allocated to Interest payments)	85,300.00	101,302.00	
Deferred Income	-		
Interest expense	(85,300.00)		
Additional Depreciation	(35,021.00)		
Increase in Accumulated Deficit			**(19,019.00)**

Impact on 2016Financial Statements

Reduction in Capacity cost (allocated to Loan payments)	17,402.00		
Reduction in Capacity cost (allocated to Interest payments)	83,900.00	101,302.00	
Deferred Income	-		
Interest expense	(83,900.00)		
Additional Depreciation	(35,021.00)		
Increase in Accumulated Deficit			**(17,619.00)**
Overall increase movement in Accumulated Deficit			**(149,095.00)**

APPENDIX VIII

OPERATING EXPENDITURE - January to December 2010

Conversion	**$**
Capacity	
PowerGen	
Normal Capacity Purchases	422464,599
Normal MW	
Excess Capacity Purchases	
Excess MW	
Trinity Power	
Normal Capacity Purchases	137113,595
Normal MW	
Excess Capacity Purchases	
Excess MW	
Energy	
PowerGen	
Energy Purchases	33263,225
MWh purchased	
Trinity Power	
Energy Purchases	6088,612
MWh purchased	
	598930,031
Fuel	
Fuel Purchases	747956,462
MMBTU Purchased	
Internal Generation	
Fuel	66055,533
Operations	3039,639
Supplies	3139,961
Rates, Taxes & Insurance	2690,392
Personnel - Basic	4208,414
Personnel - Overtime	1593,018
Personnel - Benefits	604,969
	81331,927
MWh Produced	
Number of Employees	
Sub Total	1428218,420
Transmission	
Head Office Engineering	(6896,064)
Materials & Supplies	5364,635
Repairs & Maintenance - Line & Pole	-
Repairs & Maintenance - Tools & Equipment	130,664
Repairs & Maintenance - Buildings	-
Repairs & Maintenance - Vehicles	-
Contracted Labour & Services	48709,538
Information Technology	(3,915)

Equipment & Rentals	2120,534
Logistics & Stores	-
Advertising	27,655
Promotion	31,044
Security	-
Rates, Taxes and Insurance	4391,655
Personnel - Basic	14463,551
Personnel - Overtime	3297,555
Personnel - Benefits	3729,417
Other Direct Costs	975,267
	76341,537
Network Length Kms	
Number of Employees	

Distribution

Materials & Supplies	17573,438
Repairs & Maintenance - Line & Pole	
Repairs & Maintenance - Tools & Equipment	501,164
Repairs & Maintenance - Buildings	-
Repairs & Maintenance - Vehicles	(809,109)
Contracted Labour & Services	27818,075
Information Technology	343,369
Equipment & Rentals	5188,726
Logistics & Stores	
Advertising	469,846
Promotion	785,815
Security	332,032
Rates, Taxes and Insurance	4131,236
Personnel - Basic	188260,297
Personnel - Overtime	20382,422
Personnel - Benefits	50965,884
Other Direct Costs	12726,328
	328669,522
Network Length Kms	
Number of Employees	
Sub Total Transmission & Distribution	405011,059

Administrative & General

Head Office Engineering	(29491,403)
Materials & Supplies	6848,632
Repairs & Maintenance - Tools & Equipment	621,267
Repairs & Maintenance - Buildings	3912,226
Repairs & Maintenance - Vehicles	993
Contracted Labour & Services	6520,063
Information Technology	8505,240
Equipment, Leases & Rentals	1752,018
Logistics & Stores	
Advertising	3790,387
Promotion	6771,688
Security	93,544
Fees & Consultancy	1944,113

RIC - Cess, Standards Scheme & Penalties	9560,390
[1] Street Lighting - Operations, Complaints, Crews	1477,479
[1] Meter Reading, Billings & Collection	20664,625
[1] Customer Service - Centres, Information Systems	22754,727
Hurricane Fund	63,823
Rates, Taxes and Insurance	9463,488
Personnel - Basic	159245,188
Personnel - Overtime	5914,675
Personnel - Benefits	(26947,333)
Other Direct Costs	26341,118
	239806,950
Number of Employees	
Sub Total	2073036,429
Depreciation	506189,081
Amortisation of Capital Contributions	(51837,422)
Interest & Finance Costs	193273,784
Loss/ (Gain) on Exchange	22973,092
Loss/ (Gain) on Disposal of Fixed Assets	-
Total Expenditure	2743634,964

APPENDIX IX

	Asset Management/Profile/Category Update						NEW @ 2010		
	PROFILE_ID	**CATEGORY**	**PROFILE DESCRIPTION**	**LIFE**	**MTHS**	**RATE**	**LIFE**	**MTHS**	**RATE**
1	FREELAND	FLAND	Land - Freehold	50	600	2	-	-	-
2	LEASELAND	LLAND	Land - Leasehold	50	600	2	-	-	-
3	BLDGSTRUC	BLDG	Building & Structures	30	360	3.33			
4	BOILERS	BOILS	Boilers	20	240	5		Deactivate	
5	POWER_STAT	PWSTN	Power Station				30	360	3.33
6	STEAM_ALT	STALT	Steam Turbo Alternators	20	240	5		Deactivate	
7	GAS_ALT	GTALT	Gas Turbo Alternators	10	120	10		Deactivate	
8	DIESEL_ALT	DIALT	Diesel Alternators	20	240	5			
9	CGR&SWITCH	CG&SW	Control Gear & Switchgear	25	300	4			
10	WATERPLANT	WTPLT	Water Treatment Plant	25	300	4			
11	AUXEQUIP	AUXEQ	Auxiliary Equipment	25	300	4		Deactivate	
12	TRANSWITCH	TRSWG	Transformers & Switchgear	25	300	4			
13	OH_LN_NWK	OHLNN	Overhead Lines Network	30	360	3.33			
14	UNDGRD_MNS	UNDMN	Underground Mains Network	40	480	2.5			
15	SUB_CABLES	SUBCB	Submarine Cables -Transmission	15	180	6.67			
16	METERS	METER	Meters	15	180	6.67			
17	STREETLGHT	STLGH	Streetlighting	20	240	5			
18	TEST_EQUIP	TEQP	Test Equipment	15	180	6.67			
19	PROTECTEQP	PROEQ	Protection Equipment	10	120	10			
20	SUPEREQUIP	SUPEQ	Supervisory Equipment	25	300	4			
21	ELECTRONEQ	ELEQP	Electronic Equipment	10	120	10			
22	MICROWAVE	MRSUS	Microwave Radio System Unit S/S	5	60	20			
23	FIBREOPTIC	FIBOP	Fibre Optic	20	240	5			
24	COMMEQUIP	COMEQ	Communication Equipment	5	60	20			
25	CONSULTSER	CSOSD	Consultancy Services Overseas System Development	20	240	5		Deactivate, 3yr impairment	
26	RADIODIGMW	RDMN	Radio Digital Microwave Network	25	300	4			
27	RADIOTEST	RADIO	Radio Test Equipment	10	120	10			
28	METER_EQP	MTREQ	Metering Equipment	4	48	25			
29	AIRCONEQP	AIRCN	Air Conditioning Equipment	10	120	10			
30	COMPEQP&HW	COEQP	Computer Equipment & Hardware	6	72	16.67	3	36	33.33
31	COMPSOFTW	COSOF	Computer Software	5	60	20			
32	FIREPROTEQ	FIREQ	Fire Protection Equipment	10	120	10			
33	F&F_DWELL	F&EDW	Furniture & Equipment - Dwelling	10	120	10	5	60	20
34	F&F_OFFICE	F&F	Furniture & Fixtures - Offices	10	120	10	3	36	33.33
35	ARTWORKS	ARTWK	Works of Art	20	240	5			
36	LGTOOL&EQP	LGTLS	Large Tools & Misc Equipment	10	120	10			
37	REFERBOOKS	REFMA	Reference Materials	5	60	20		Deactivate, Recurrent Exp @ 2011	
38	OFFICE_MAC	OFFMA	Office Machines	10	120	10			
39	SECURITYEQ	SEEQP	Security Equipment	10	120	10	3	36	33.33
40	STORE_EQP	STREQ	Stores Equipment Mechanical	20	240	5			
41	AUTOMOBILE	AUTO	Automobile	4	48	25			
42	NEW	NEW	AMI Meters		NEW				

APPENDIX X

Additional Proposals to Reduce Outages

An analysis was performed to determine the areas with the most outages in the Distribution System for the year 2010. Investigations revealed that the following areas (as shown in the Table 1 below) experienced the most outages for the aforementioned period.

Table 1: Outages within the Distribution Areas.

SOUTH		NORTH		CENTRAL		EAST	
Area	**Outages**	**Area**	**Outages**	**Area**	**Outages**	**Area**	**Outages**
Penal	203	Diego Martin	294	Cunupia	289	Sangre Grande	318
Princess Town	175	Port of Spain	246	Claxton Bay	252	St. Joseph	239
Siparia	129	Santa Cruz	224	Freeport	209	Arima	211
San Fernando	113	Maraval	205	Chaguanas	204	Manzanilla	181
Moruga	99	Laventille	151	Edinburgh	200	Toco	176
Libertville	98	St. James	141	Enterprise	162	Cumuto	155
Marabella	77	Morvant	123	Carlsen Field	135	Tamana	145
La Romain	76	San Juan	101	St. Mary	121	Valencia	120
Fyzabad	73	Petit Valley	96	Preysal	107	Wallerfield	109
Gasparillo	72	Carenage	87	Calcutta	104	Arouca	108

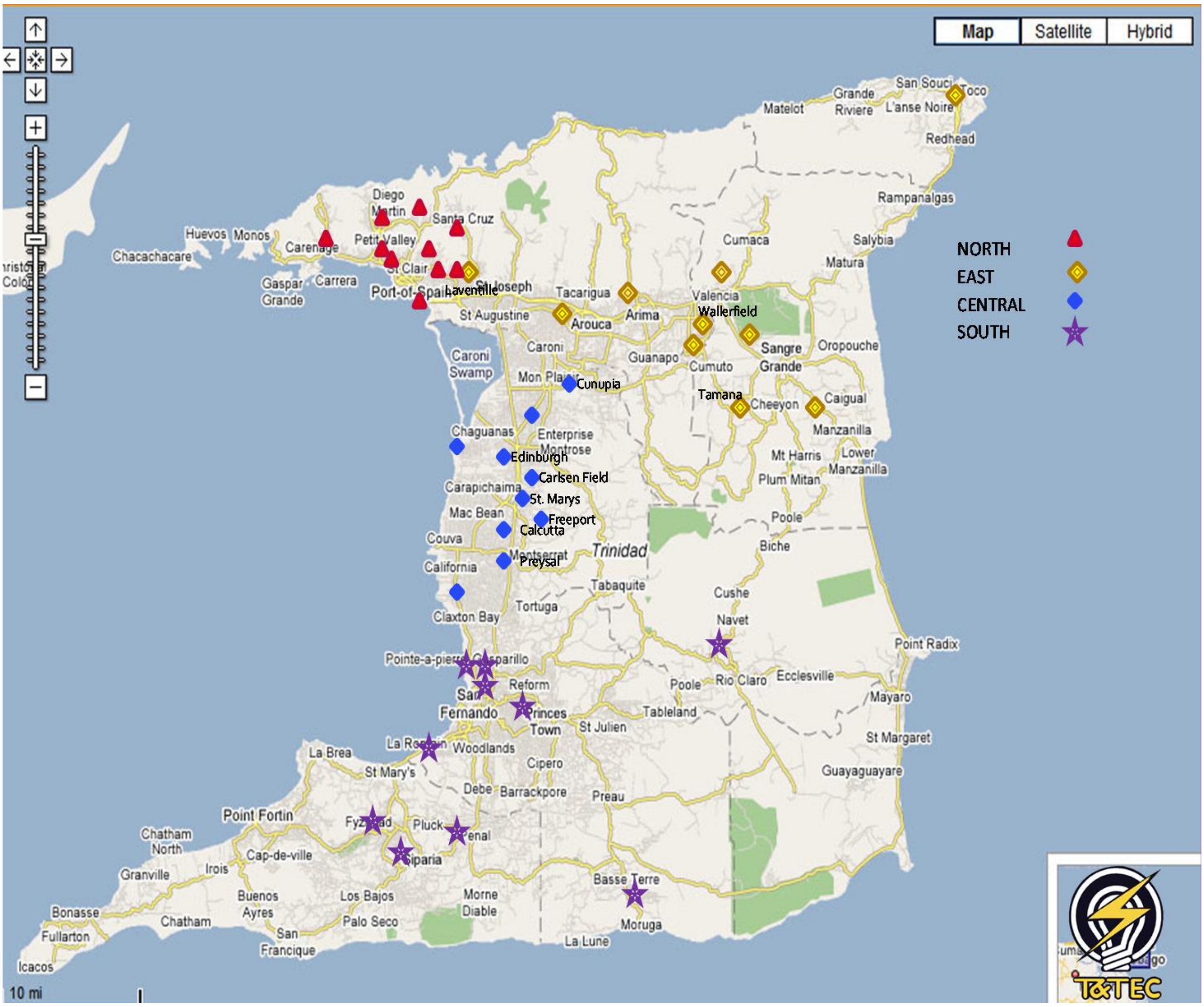
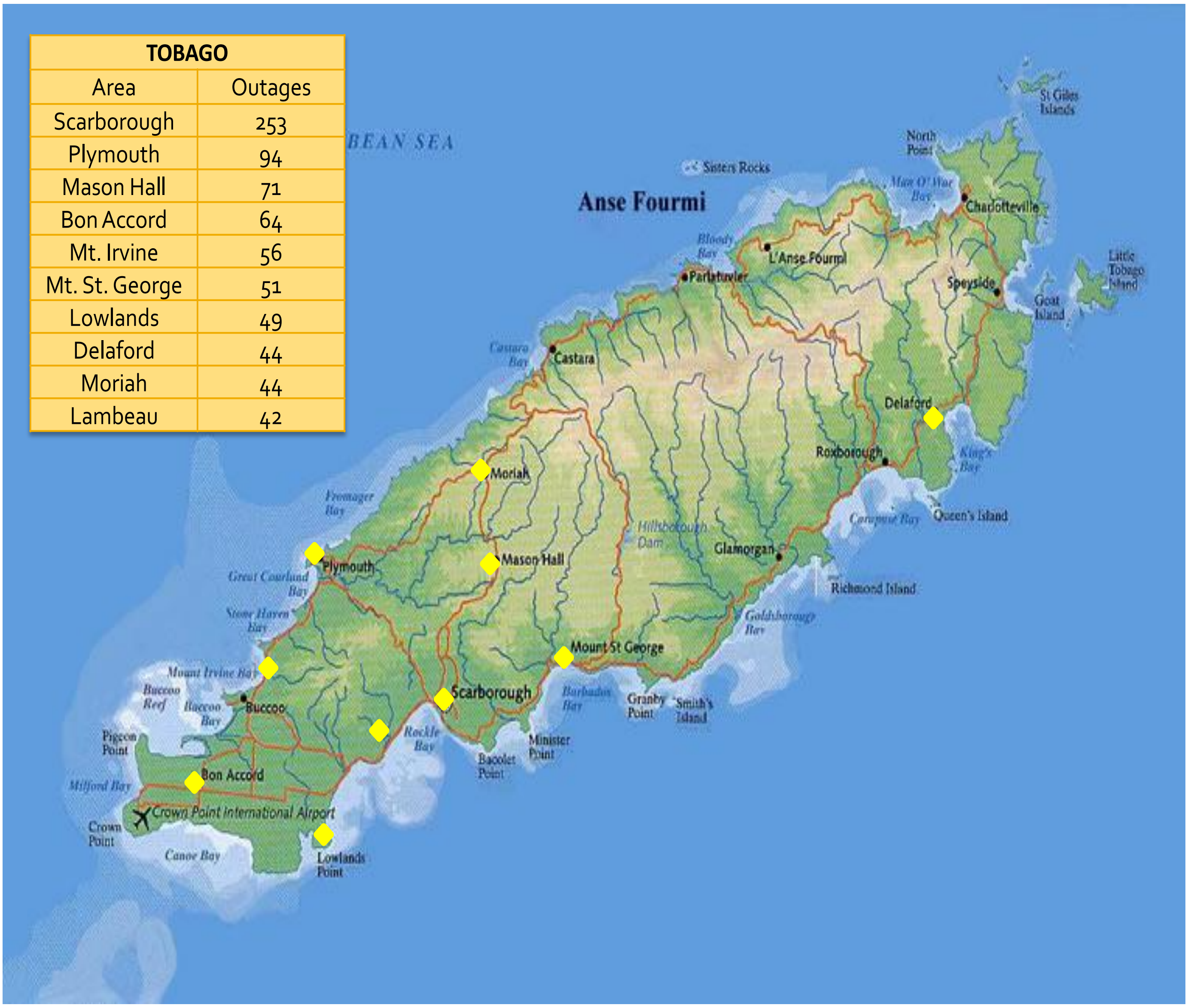


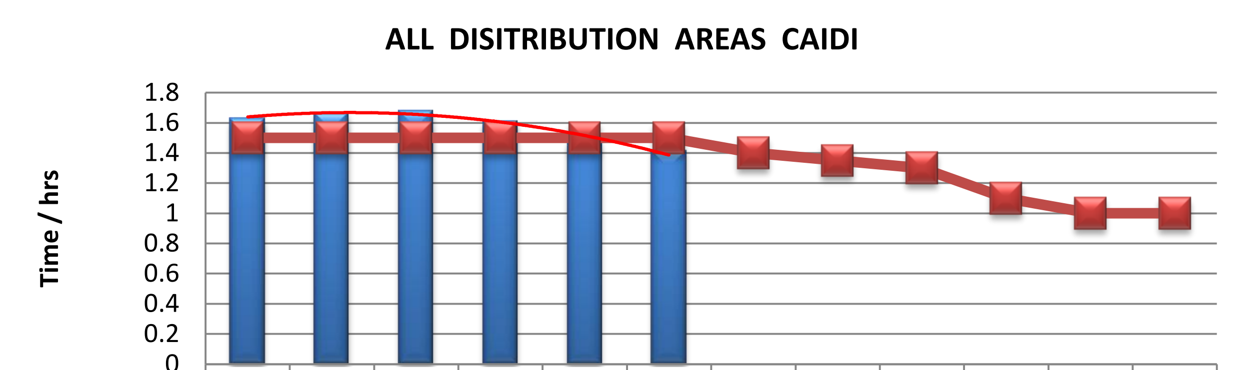
Figure 1: Map of Trinidad showing outage.



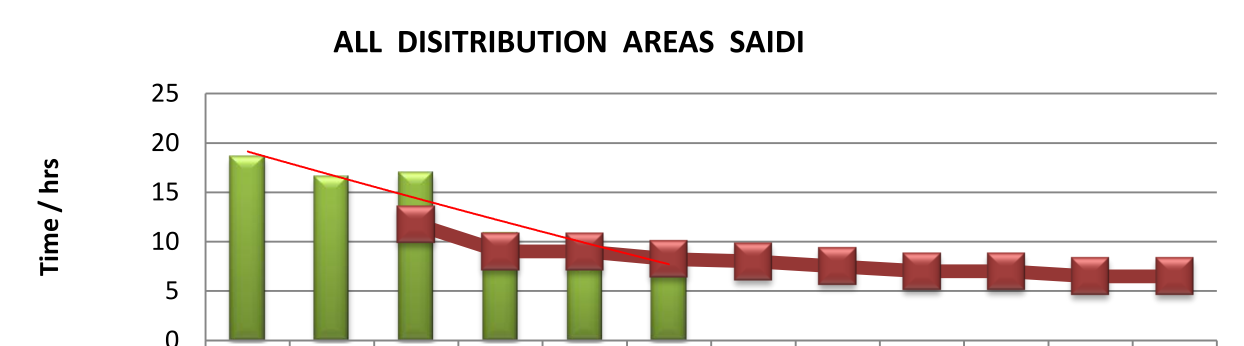
TOBAGO	
Area	Outages
Scarborough	253
Plymouth	94
Mason Hall	71
Bon Accord	64
Mt. Irvine	56
Mt. St. George	51
Lowlands	49
Delaford	44
Moriah	44
Lambeau	42

Figure 2: Outages in Tobago

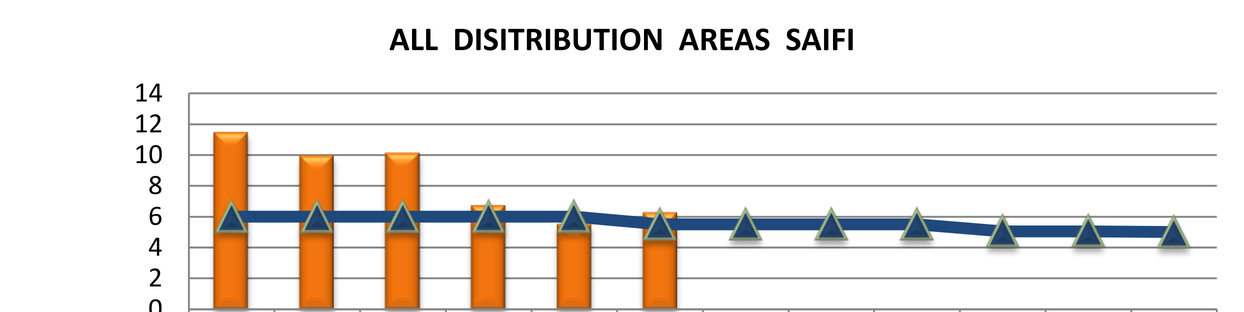
As a result of such high number of outages, it is imperative that measures be put in place in order to reduce the number of outages. The figure below shows the Statistics Reliability: SAIDI, SAIFI and CAIDI for the Areas for the period 2005 to 2010 and the targets set to 2016.



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CAIDI	1.63	1.67	1.68	1.61	1.47	1.41						
TARGET	1.50	1.50	1.50	1.50	1.50	1.50	1.40	1.35	1.30	1.10	1.00	1.00



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SAIDI	18.59	16.56	16.98	10.85	8.11	8.9						
TARGET			11.76	9.00	9.00	8.25	8.00	7.50	7.00	7.00	6.50	6.50



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SAIFI	11.43	9.93	10.1	6.73	5.53	6.29						
Target	6	6	6	6	6	5.50	5.50	5.50	5.50	5.05	5.05	5.00

Figure 3: Reliability Statistics of Distribution Areas for the period 2005 to 2010 and projections for the next five years

It is important to note that most of the outages were as a result of animals coming into contact with overhead lines as well as contact made by vegetation. For the purposes of improving the Commission's Reliability Statistics the following are to be done:

1. **Installation of Overhead Line Covers**
2. **Installation of Tall Insulators and Short Pins**
3. **Installation of Tall Pin and Short Insulators**
4. **Increase the use of Covered Conductors**
5. **Replacement of Porcelain Insulators with Polymeric Insulators**
6. **Pole Replacement**
7. **Line Clearing (Tree Cutting/ Trimming)**
8. **Infrared Thermographic Scans**
9. **Install new autoreclosers**
10. **Improve protection coordination**
11. **Improve on technology –GIS &GPS**
12. **Installation of a 2nd Transformer within each substation**
13. **Replace aging plant.**
14. **Substation Upgrades and New Substations.**

1. Installation of Overhead Line Covers

Overhead line covers is a form of insulation designed for the 12kV overhead conductors. Installation of these covers in strategic locations would result in the line being insulated at that point thus eliminating any line to ground or line to line faults at that point. It is proposed that approximately two feet of overhead be used over each pin type insulator as shown in the figure below.

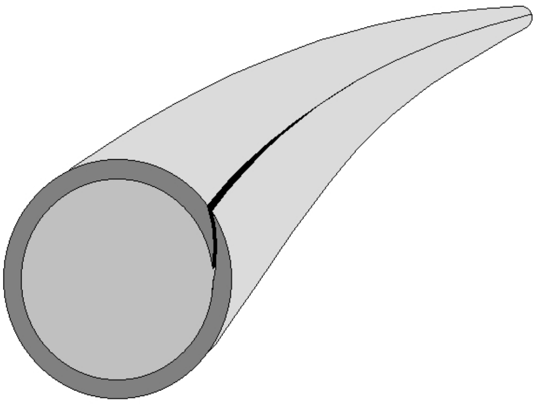


Figure 4: Overhead Line Cover Overhead Line Cover

Figure 5: Picture showing example of use of the

Table 2: Number of faults due to animals

DISTRIBUTION AREA	NUMBER OF FAULTS
North	16
South	29
Tobago	3
Central	11
East	12

Table 2 shows the number of faults that were found due to animals for the year 2010. The picture below shows a picture of a frog creating a fault on an overhead line.

Figure 6: picture of frog creating fault on an overhead line

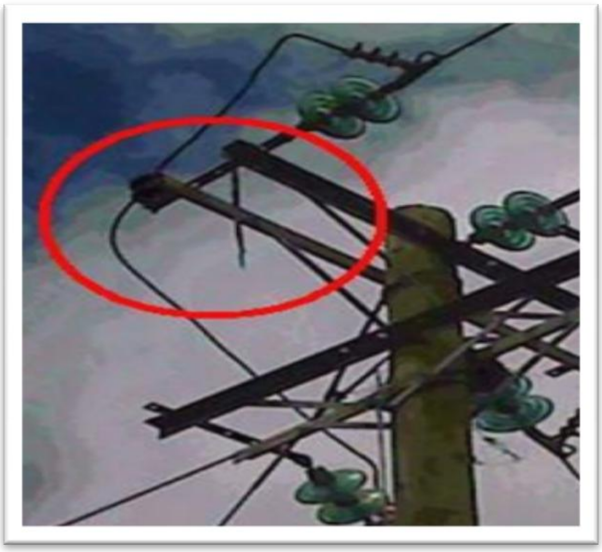


Figure 7 shows a snake which created a fault on the overhead line.

Figure 7: Picture of a snake hanging on a cross arm after shorting the line.

Over a period of 5 years, it is the Commission's plan to install over 100km of overhead line covers throughout the distribution area at an approximate cost of Eight Million TT dollars. It will directly aid in preventing and reducing the number of outages cause by animals (such as frogs and birds) and trees. As a consequence of this reduction in outage time, the reliability statistics, SAIDI, CAIDI and SAIFI will be reduced by approximately 20%; which will inherently lead to improving the reliability of the distribution system.

2. Installation of Tall Insulators and Short Pins

The use of a tall insulator effectively increases the insulation distance between the overhead line and ground. This increases the probability of animals such as frogs from making contact between the line and ground. The figure 8 shows a picture of this insulator.

To date the Commission's plan is to install 50,000 of these tall insulators over the next five years. Given that this is a new design, this would need to be monitored for impact on the reliability.

The cost of this venture is expected to be 4.5 Million TT dollars

Figure 8: Picture of tall insulator

3. Installation of Tall Pins and Short Insulators

The use of a tall insulator effectively increases the distance between the overhead line and the cross arm. This increases the probability of animals such as frogs from making contact between the line and ground. The figure 9 shows a picture of this insulator.

The Commission also plans to install 50,000 of this insulator and pin over the next five years. This new design would also need monitoring for impact on the reliability.

The cost of this venture is expected to be 4 Million TT dollars.

Figure 9: Picture of tall pin and short insulator

Once the above three methods are completed, this would significantly reduce faults due to animals such as frogs and birds, thus reducing outage time and resulting in the overall improvement of the reliability of the system.

The table below shows the areas in which these methods are intended to be used.

Table 3: Proposed Areas for Use of the Overhead Line Covers, Tall Insulators and Tall Pins.

Distribution Area	Locations	
South	Rock Road	Siparia
	Guapo	Libertville
	Craignish	Mon Repos, San Fernando
	Brickfield	Saunders Trace, Moruga
	St. John's	PCOL, Fyzabad
	St. Croix	Bonne Aventure, Gasparillo
Central	Mission Road	Chickland Road
	Arena Road	Rodney Road
	Edinburgh	Indian Trail
	Cedar Hill	Dow Village
	UTT	Cunupia
East	Las Lomas	Madras, Chin Chin
	Manzanilla	Ojoe Road
	Guaico	Cumuto
Tobago	Arnos Vale	Les Cateax
	Golden Lake	Plymouth
	Franklyn	Moriah
North	Santa Cruz	Barataria
	Carenage	Diego Martin

4. Installation of Covered Conductors

These conductors are fully insulated and bundled together in a triplex manner. The cores are aluminum and the cable is designed for overhead installation on poles. The figures 10 and 11 below show pictures of the fully insulated covered conductors.

Figure 10: Covered Conductors

Figure 11: Covered Conductors being used in Morne Diablo

Checks reveal the Areas have suffered frequent outages due to trees coming into contact with the overhead line. Installation of these covered conductors would significantly reduce faults due to trees and improve the reliability of supply to the areas.

Over the next five years, approximately 100km of covered conductors is intended to be installed at a cost of 9 Million Dollars

The Table 4 below shows the areas in which these conductors are intended to be used.

Table 4: Proposed Locations for the Use of Covered Conductors

Distribution Area	Project	Benefits
Central	Establishment of the Edinburgh and Preysal Link	To increase ease of maintenance and improve SAIDI, CAIDI and SAIFI
East	Fully Covered conductors are to be installed along the Maracas/ St. Joseph and Manzanilla Feeders.	The conductor along the Maracas feeder will serve as an alternative supply to the Maracas customers. The reconductoring of the Manzanilla feeder with the fully covered conductors will reduce the outages caused by animals and vegetation.
	Partially covered conductors are to be installed along the Arima By-pass road to Brasso Seco.	The partially covered conductors will reduce the occurrence of instantaneous outages caused by trees coming in contact with the energised conductors. To increase ease of maintenance and improve SAIDI, CAIDI and SAIFI.
North	St Ann's area, along Lady Chancellor road. To be used for overhead lines in close proximity within the City of Port of Spain	To increase ease of maintenance and improve SAIDI, CAIDI and SAIFI
South	Relocation of Cap-de-Ville 12kV Feeder from Columbus Bay to Icacos	To increase ease of maintenance and improve SAIDI, CAIDI and SAIFI
Tobago	Reconductoring of Arnos Vale Feeder	The Arnos Vale 12 kV Feeder from Courland S/S is passing through heavy vegetation, therefore to reduce the number of outages on this feeder, there is a proposal to change this line from bare conductors to fully insulated covered conductors, 3 km of these cables would be required. To increase ease of maintenance and improve SAIDI, CAIDI and SAIFI

5. Replacement of Porcelain Insulators with Polymeric Insulators

All porcelain insulators are to be replaced with polymeric insulators. Porcelain insulators are less reliable since they crack easily due to faults, occurring from the rusting and subsequent cracking of the insulator pins which usually occur at the seaside.

The cost of this venture is expected to be 3 Million

6. **Pole Replacement.**

This programme has been established to encourage the removal of wooden poles including leaning and rotten poles. This is a preventative measure by the Commission so as to prevent outages of the Distribution system by the de-energising of the lines by breaking or falling poles.

The total cost of this over the period is expected to be 40 Million.

7. **Line Clearing (Tree Trimming)**

Line clearing (tree trimming) is an important service whereby the overhead 12kV feeders are cleared of vines, tree branches and other vegetation which may come into contact with the energized feeders and consequently cause an outage. In the past, Contractors have been providing these services for the Commission and due to limited in-house resources, the Commission is reliant on continually contracting of Line clearing services.

At present, the Commission has invested approximately twelve million dollars in contracts towards line clearing services in the various Distribution Areas and is proposing to award an additional eight million dollars worth of contracts in the Eastern and Southern Distribution Areas.

Over the next five years a cost of 100 Million dollars will be expended on line clearing.

8. **Infrared Thermographic Scans**

Infrared thermographic scan is a form of predictive maintenance which would indicate potential problem areas along the Distribution System and enable the Distribution Areas to repair the defects before they lead to equipment failure, injury to persons and unscheduled outages. The Commission has been contracting these scans of both the Distribution System and Distribution Substations to a value of approximately five million dollars for next 5 year.

9. **Installation of New Auto Reclosers**

Over the next five year period it is expected that a total of 200 auto reclosers be installed on the system at a cost of 11.2 Million TT dollars.

The installation of these auto reclosers would result in the plant being divided into small segments. Thus the auto recloser would isolate any fault which occurs higher along the feeder, leaving rest of the feeder on supply. Therefore outages would be restricted to fewer customers.

10. **Protection Coordination**

It was observed that several outages could have been avoided provided that the protection coordination was properly setup.

As a result greater emphasis is to be followed over the next five years to ensure this is properly done.

11. Improve on technology - GIS & GPS

The Commission is in the process of collecting data to develop its GIS data base.

Once completed, this data will allow for

i) Accurate information on the location of customers.
ii) The exact status of the networks
iii) The information on the joint use cables by TSTT, flow and Trico on the Commission plant.

This would allow for the development of the outage management system which will allow for the immediate detection of outages and for the prompt dispatch of a crew to the site.

A GPS system is also being proposed which will allow for the dispatch of the report to the crew and the prompt response of the crew.

This project is expected to cost 10 Million dollars over the next five years.

12. Installation of a 2nd transformer within each substation.

The Commission plans to install a 2nd transformer in some of its substation to ensure additional reliability due to loss of supply.

There are substations in remote locations which results in difficulty to transfer customers whenever there is a substation transformer outage.

Over the next five year period, it is expected that a total of 50 transformers be acquired at an approximate cost of 50 Million TT dollars.

The follow table shows the substations which require a 2nd Transformer.

Distribution Area	Substation	
South	Syne Village	
	Santa Flora	
Central	Savonetta S/S	
	Charlieville S/S	
	Claxton Bay S/S	
East	Champs Fleurs S/S	
	O Meara S/S	
Tobago		
North	St. James S/S	
	Diego Martin S/S	
	Pt Cumana S/S	

This exercise is expected to cost 20 Million dollars.

13. Replacement of Ageing Plant

Throughout the system there have been failures due to aging plant especially in the Port of Spain Area.

Key projects that must be completed over the period are

i. Installation of new 12kV board at Independence Square Central, East and West.
ii. Change out of the old Master Substation 6.6kV board to a 12kV board
iii. Change out of the old Port of Spain 6.6kV underground system.
iv. Change out of the overhead lines in the City of Port of Spain with covered conductors.
v. Change out of the Pt. Lisas 12kV board.

Once completed this would significantly improve the reliability of supply.

Figure 13: Picture of old switchgear in POS.

Figure 14: Picture of Old switch gear after experiencing a fault

14. Substation Upgrades and New Substations

In addition to reducing the number of outages due to animals, vegetation and defective equipment, it is also important to upgrade and establish new substations as well as feeders. These works are geared towards decreasing CAIDI, SAIDI, SAIFI and increasing ASAI, in so doing improving the reliability of the Distribution System. The following shows the plan to improve system reliability for each Distribution Area:

Distribution South	
Project	**Justification**
Establishment of 66/12kV Barrackpore Substation	This will be done to provide a back-up supply in the event of problems arising from Syne Village Substaion, thus improving reliability in the area of Penal.Two new feeders will be created from this Substation. These new feeders will shorten & off load the existing Poui Trace & St Croix Road feeders and provide a back up to the Papourie, St Croix Road, Poui Trace and new Rochard Road feeders. The Papourie & Poui Trace feeders are heavily loaded and unable to serve as a back up to adjacent feeders.

Distribution South	
Project	**Justification**
Establishment of 33/12kV Los Bajos Substation	Two new feeders, the Carapal & Erin feeders will be established from this Substation. These will now shorten & off load the existing Santa Flora feeder and provide a back up to the Santa Flora & Cap De Ville feeders. This in turn will improve the reliability of the ring as it will back-up Penal and Fyzabad as well as the area of Siparia.
Upgrade of Syne Village Substation	To replace existing old and electrically deteriorated board with new board capable of facilitating auto reclosing and good electrical integrity. This will ensure a reliable supply to Rock Road, Penal, San Francique and Rochard Road.
Upgrade of Phillipine Substation	To replace existing old and electrically deteriorated board with new board capable of facilitating auto reclosing and good electrical integrity. This will ensure a reliable supply to Palmiste, Papourie Road, Debe and La Romain. Moreover, to provide a reliable back-up to Corinth Substation
Upgrade of Corinth Substation	A new 12kV switchboard installed to improve reliability to areas such as St. John's, Mon Repos and St. Clements. Moreover improving reliability of the ring connecting Phillipine Substation, Gulf View Substation, Lady Hailes Substation and Buen Intento Substation.

Project	Justification
Upgrade of Rio Claro Substation	Installation of a new 12kV switchboard as well as a 66/12 kV, 12/16 MVA transformer. This will in turn increase the capacity of the substation as well its reliability. In effect aiding the Libertville area.
Upgrade of Gulf View Substation	To replace existing old and electrically deteriorated board with new board capable of facilitating auto reclosing and good electrical integrity. This will ensure a reliable supply to Gulf View, Mosquito Creek, Bel Air and Cipero Road. Morover to provide a reliable back-up to Lady Hailes Substation, Corinth Substation, Phillipine Substation .
Upgrade of link between Reform Substation and Corinth Substation	To increase transfer capacity between these Substations, thus, one substation will be able to pick up load from other.
Connection of feeders in La Romain	To construct overhead lines to connect Gulf view Feeder with La Romain 12kV Feeder. This will be done to facilitate load transfer between the Gulf View and La Romain feeder, thereby increasing reliability
Construction of St. Croix and Papourie Road 12kV feeder	To facilitate a balanced three phase load and transfer between the St. Croix and Papourie Rd 12kV feeder , thereby increasing reliability

Distribution Central	
Project	**Justification**
Upgrade of Charlieville Substation	At the Charlieville substation there exists a 66/12kV 12/16MVA transformer, this transformer is simply teed-off the Bamboo-Endeavour 66kV circuit. Due to the current configuration, any fault on the 66 kV line from Bamboo substation to Endeavour substation will result on an outage to all customers on this supply. Furthermore, there are two feeders that are connected to the transformer via Auto-Reclosers. This project entails installation of cicruit breakers, switchboard, transformer, 66kV bus and two new feeders. By installing this board and the circuit breakers reliability and protection will be improved as each feeder will have their individual breaker. The two new feeders will also tie into existing feeders in the Cunupia area thereby providing back up supply and reducing outages for this area. In addition to this the design of the substation allows for load to be transferred between the Endeavour and Bamboo 66kV lines. This also allows for maintenance to be completed without the need for an outage, thus further improving reliability to the Cunupia area.
Upgrade of Claxton Bay Substation	At the Claxton Bay susbtation there exists a 66/12kV 6MVA transformer, which is connected to the Plaisance Park Feeder via an RMU and a pole mounted Auto-Recloser. This project involves the installation of circuit breakers, switchboard, transformer and feeders. These new feeders will shorten the length of the Plaisance Park feeder, and so enabling faster troubleshooting and reducing the amount of customers on that particular feeder. Hence, in the event of an outage less customers would be affected and reliability improved in the Claxton Bay area.
Upgrade of Savonetta Substation	The 12kv board in this station is currently fed from a single 66/12kV 16MVA transformer. This project entails the installation of a 2nd transformer. This will provide further reliability to the board and its feeders, thereby reducing the amount outages experienced by customers on these feeders and improving reliability in the Claxton Bay area.
Establishment of Carslen Field Substation	This new substation is intended to provide improved reliability for customers east of the Solomon Hochoy Highway. From this substation the Arena Road and Mission Road 12kV feeders will be constructed. This will shorten the Freeport feeder from Central Substation. Thus, enabling faster troubleshooting and reducing the amount of customers on that particular feeder. Hence, in the event of an outage, fewer customers would be affected and reliability improved in the Freeport area.
Establishment of Freeport Substation	This new substation is intended to improve reliability in the Freeport Area, by backing up Central substation. Furthermore, new feeders from this new substation will effectively shorten and tie into existing feeders from Central Substation. Thus, enabling faster troubleshooting and reducing the amount of customers on that particular feeder. Hence, in the event of an outage fewer customers would be affected and reliability improved in the Freeport area.

Project	Justification
Establishment of Felicity Substation	This new substation is intended to improve reliability in the Chaguanas area. It will essentially cut in the 66kV ring between Chagaunas East and Central substation. This substation when commissioned will take all the load from Chaguanas West substation. Chaguanas West presently, feeds the Ochard Gardens and Felicity 12kV feeders via Auto-Reclosers, an RMU and a single 6MVA transformer. The proposed Felicity substation will be a more reliable arrangement as it will have a switchboard being fed from two transformers and each feeder will have individual circuit breakers. From this substation the Perseverance and Roopsingh 12kV feeders will be constructed. These new feeders will tie into existing feeders thereby providing an alternative supply for customers on these feeders. In addition to this, these new feeders will also shorten existing feeders enabling faster troubleshooting and reducing the amount of customers on that particular feeder. Hence, in the event of an outage fewer customers would be affected and reliability improved in the Chaguanas area.

Distribution East	
Project	**Justification**
Upgrade of St. Augustine Substation	It is proposed that the switch houses be rebuilt, the change out of the 12kV board, the installation of a new 33kV G.I.S board to replace the old 33kV Reyrolle Board. This substation is presently heavily loaded and the proposed refurbishment works will improve the reliability of the supply to the St. Augustine, Curepe and Pasea areas.
Upgrade of O'meara substation	Change out of transformer from 6 MVA to 12.2/16 MVA. This would aid with the load demand to O'Meara and Mausica.
Upgrade of Pinto Road Substation	An upgrade of transformer capacity from 33/12kV to 66/12kV and replace 6 MVA transformers at Pinto Road S/S to 12.5/16 MVA. This would significantly improve the reliability of supply to Arima in general as well as the load demand of the area.
Upgrade of Trincity Substation	New 12 kV Switchboard to be installed at the Substation. This will improve the reliability in the Trincity area as well as the safety of personnel working at the substation.
New feeder from Piarco Substation	New 12 kV Feeder to the CR Highway. Better reliability for the Oropune and Maloney areas as well as the load demand of the area.
New Feeder from Orange Grove Substation	Construct new 12 kV feeder from Orange Grove S/S to Tunapuna load center. This will provide better reliability in the Tunapuna and Macoya areas
Development works in Arima	Convert from overhead lines to underground lines in Arima
New Substation Tunapuna	Acquisition of land for new substation; Establish new substation between Curepe and Tunapuna; Construct Overhead lines for substation

Distribution Tobago	
Project	**Justification**
Studley Park Substation	Currently the North-East side of Tobago, which includes places like Studley Park, Roxborough, Delaford, Speyside, Lucyvale, is getting supply via the Upper Windward feeder from Scarborough Substation. There is an increase in load demand in Tobago and this is trend is expected to continue over the following years. As such, there are plans to construct Studley Park Substation to take up the load in the North-East end of Tobago and by extension meet the load demands in Tobago. Studley Park Substation would be at 66 kV. Studley Park Substation would add more feeders in the system, thus reducing the length of feeders within Tobago. This would limit the number of customers out of supply and therefore, improve our Reliability Indicators - CAIDI, SAIDI, SAIFI and ASAI.
Upgrade of Scarborough Substation from 33 kV to 66 kV	The conversion of Scarborough Substation from 33 kV to 66 kV would correlate with the plans to convert the Tobago Transmission System from 33 kV to 66 kV. In order to facilitate the construction of Studley Park Substation, Scarborough Substation needs to be converted from 33 kV to 66 kV. By extension, this would aid in meeting the increase in load demands in Tobago.
Development in Scarborough	This would involve the continuation of underground infrastructure within Scarborough, the business hub of Tobago. Underground development within Tobago would increase reliability of supply to customers in the town and improve aesthetics.

Distribution North	
Project	**Justification**
Upgrade of Pt Cumana Substation	Currently this substation has 2 feeders protected by autoreclosers. A new 12 kV switchhouse has been recently constructed and a 12kV board is being installed to cater for 4 feeders and two transformer incomers. Also an additional 12.5 /16MVA transformer is being proposed to be placed in this substation. This would effectively increase reliability since the existing feeders would now be divided within the same area thus having fewer customers out of supply in the event of an outage. The additional transformer also caters for load growth.
Upgrade of Diego Martin Substation	This substation has 2 feeders protected by autoreclosers. A tender for construction of a 12kV switchhouse and 33kV switch house is in the process of being publicly advertised. A new 12kV switchboard with four feeders and 2 transformer incomers is proposed to be installed. This would enhance the reliability of the system since more feeders and being put in service thus having fewer customers on one feeder.
Upgrade of San Juan Substation	A new 12kV and 33kV switch house is to be constructed. The existing 33kV switchboard and 12kV switchboard is old and outdated. Thus replacing these gears would increase the reliability of these switchgears.
Upgrade of St. James Substation	A new 33kV switch house is proposed to be constructed and a new 12kV switchboard is to be installed. The existing switch house and switchgears are old and replacing these gears would improve the reliability of the system
Upgrade of Laventille Substation	A new 12kV switchboard is to replace the existing 12kV board. The existing switchboard is old and has oil circuit breakers. Replacing this switchgear to a new vacuum switchgear would increase the safety and reliability of the system.
Upgrade of Master Substation	The Master Substation is one of the oldest switchgear within the country. Its distributed power at 6.6kV. Changing out this switchgear to a 12kV system would increase reliability since other 12kV feeds within the city are readily available for back up. Also equipment for 12kV systems is also readily available.
Upgrade of Independence Square Central and West	This substation is a 6.6 kV substation. It is proposed that a 12kV switchboard be installed and a 12kV feed be taken for Edward Street Substation.
Upgrade of Barataria 12kV Substation	Presently this substation has 2 feeders protected by autoreclosers. Installation of a 12kV seven panel switchboard will result in more feeders being installed, thus having less customers on one feeder.
Upgrade of Saddle Road Substation	This Substation has no Transformer and the switchgear has oil circuit breakers. Installation of a Transformer and new vacuum switchgear effectively increase safety, reliability and cater for load growth.

Installation of Submarine Cables	The existing submarine cable between Trinidad Mainland and Monos Island only has 2 phases in operation. The Commission intends to replace this cable within the next month to avoid a situation where a generator would be necessary to supply the island due to failure of the existing cable. Another Submarine cable is proposed to be laid between Gaspar Grande Island and Monos Island thus creating a ring system between Monos Island, Gaspar Grande Island and Trinidad Mainland. These would effectively increase the reliability of supply to these island in the event one of the submarine cable fails. The Commission also intends to increase the reliability of Cronstadt and Carrera Island by creating a ring system between these Islands and Mainland. This can be done by replacing the defective cable between Trinidad Mainland and Cronstadt Island. Presently there is no link between Trinidad Mainland and Cronstadt Island. Cronstadt Island currently gets its power supply from Carrera Island which gets its supply from Trinidad Mainland.

APPENDIX XI

An analysis of the cost of converting from bi-monthly to monthly billing for residential and commercial customers of the Trinidad and Tobago Electricity Commission

INTRODUCTION

At April 30th 2011, there were a total of 419,918 active accounts in the Customer Information System of which 378,085 belonged to the residential class and 38,580 belonged to the Commercial class. This represents a total of 416,665 customers who are billed approximately every 60 days by the Commission. For the purposes of this analysis and in the interest of simplification of the process, we would work with a rounded figure of 415,000 accounts/bills per period.

COST ANALYSIS

The cost of billing can be subdivided into the following categories:

1. Material Cost: that is cost of paper (bills), envelopes and postage
2. Operational Costs: That is those associated with the manpower required to monitor the printing of the bills and the insertion of the bills into the envelopes.
3. Equipment costs: that is the cost of the machines used in the process such as Printers and inserters.

The estimated costs of billing Residential and Commercial customer monthly is as follows:

Material Costs

Bills: The Commission currently invites tender proposals for the supply of bills and envelopes on an annual basis. The quantity required is generally 3 million of each. This quantity caters for the billing of the approximately 400k customers 6 times per year. It also makes provision for additional bills that may be sent out to subsets of customers due to various circumstances and or spoilage that may occur as a result of software and or equipment malfunction etc.

The most recent tender proposals for bills and envelopes and recommendations of the tender evaluation is attached. It is estimated that the cost of materials will effectively double with monthly billing.

Postage costs are fixed and are based on the current rates attributable to the Trinidad and Tobago Postal Service. This cost is $1.00 per unit and is expected to double with the introduction of monthly billing.

Operational Costs

The operational costs or labour costs are expected to change in at least one area. That is, the cost associated with the insertion of the bills into the envelopes. The Commission currently has two person operating two machines that insert bills into the envelopes in preparation for dispatch to the post office. It has been estimated that these employees and the machines available can process up to 8,000 bills per day. At that rate it is expected that they can insert up to a total of approximately 160,000 bills per months based on a 22 workday month.

In order to process 416,000 bills per month, it is therefore anticipated that these resources need to be increased and faster machines (machine with a greater throughput) acquired.

The average cost of the associated personnel has been established at approximately **$143,704** per year (at today's labour rates). It is assumed that three personel should be able to manage and monitor the machinery (inserters)

Capital Costs

Finally, the increased workload would necessitate the acquisition of two additional pieces of equipment as well as infrastructure improvements as follows:

Estimated additional IS costs.

1 Printer	$375,000
1 Inserter	$250,000
Room renovations	$200,000
Total Capital Cost	**$825,000**
1 Operator (per year)	$143,704
Total IS Cost	**$968,704**

Cost Summary

The estimated costs of converting to monthly billing based on the lowest tendered price, where only the incremental costs are concerned are as follows:

Bills	$ 218,640.00
Envelopes	$ 290,700.00
Postage	$2,490,000.00
Incremental Labour	$ 143,704.00
Total	**$2,728,044.00**

Additionally, there will be an initial capital cost of $825,000.00.

Outsourcing Option

It is noteworthy, that on 11th February 201, The Commission received a proposal from Streamline Solutions Mailing Limited for the provision of services related to the insertion of bills into envelopes and submission to TTPOST. The cost of this service was quoted at a rate of 16 cents (VAT exclusive) per unit. In addition, Streamline Solutions quoted for the printing of the bills from an extract file supplied at the rate of 15 cents per unit and for the supply of both bills and envelopes at unit prices of 8.4 and 11.6 cents respectively.

Should the Commission decide to outsource this function therefore, the total cost to the Commission for monthly billing would be as follows:

Cost of Bills	415,000@0.084 -	34,860.00
Cost of Envelopes	415,000@0.116 -	48,140.00
Cost of Printing	415,000@0.15 -	62,250.00
Cost of inserting	415,000@0.16 -	66,400.00

The total monthly cost associated with this option is therefore $211,650.00 or 2,539,800.00 per annum.

The cost of postage regardless of the option chosen will be $4,980,000.00.

BENEFIT ANALYSIS

Conversion to monthly billing will definitely result in additional costs to the Commission. As seen above, there is expected to be both a Capital cost and an increase in the recurrent costs associated with the billing function.

There are however benefits to be gained by conversion of the billing for residential and commercial customers to monthly rather than a bi monthly schedule. These benefits will accrue in two main areas.

1.) Customer goodwill should increase especially among those on a fixed monthly income. This is so since it is expected that monthly bills will help these customers to better manage their bill payments and may even motivate them to conserve since the benefits of such action will accrue faster and would therefore be more visible.
2.) The recent change to the disconnection policy as a result of the adoption of the Code of Practice as enunciated by the Regulated industries Commission and the need to provide notice of delinquency to customers before disconnection has resulted in disconnection being undertaken only after the first bill has not been paid and customers have been advised on the subsequent bill that the accounts are due for disconnection. As the awareness of this change in policy grows, customers are likely to defer payments for longer periods past the due date as the threat of disconnection of supply is eliminated. It is anticipated therefore that a greater number of debts may occur past the zero to sixty day threshold. Conversion to monthly bills would reduce the period to the next bill and facilitate the notification of the unpaid balance sooner. It would therefore enable the Commission to engage disconnection action at an earlier period and thus theoretically provide greater control of outstanding debts. This improved management of the receivables should improve overall revenues. It is however difficult at this stage to quantify the perceived benefit with any degree of accuracy.

CONCLUSION

In conclusion, while there may be benefits to be achieved from conversion to monthly billing, these are at this time difficult to quantify whereas the cost associated with this change is patently obvious. The decision to convert therefore if adopted must be on the basis of increased customer satisfaction more so than quantifiable cost advantage.

APPENDIX XII

CARILEC
An Association Of Electric Utilities

Billing Categories	kVA	Belize (BEL)	Barbados (BL&P)	GRENLEC	Aruba (N.V. Elmar)	St. Lucia LUCELEC	Trinidad (T&TEC) Existing	Trinidad (T&TEC) Proposed 2012	Bermuda (BELCO)	Anguilla (ANGLEC)	Antigua (APUA)	Curacao (AQUALECTRA)
Tariff Survey -End of Year (Dec) 2010		1	2	3	4	5	6	6	7	8	9	10
		US$	US$	US$	US$	US$	US$	US$	US$	US$	US$	US$
Domestic Consumer using 100 kWh per month (note 1)		22.25	$30.96	94.71	25.24	24.26	4.53	5.63	59.25	35.71	38.01	35.49
Domestic Consumer using 400 kWh per month (note 1)		91.25	$119.86	368.84	97.46	115.79	16.72	19.34	127.80	137.27	151.29	151.95
Commercial Consumer using 2,000 kWh per month (note 2)	5kVA	467.50	$545.91	1,993.33	494.00	669.14	129.69	164.72	777.63	678.89	791.51	830.44
Commercial Consumer using 5,000 kWh per month (note 2)	10kVA	1,175.00	$1,319.78	4,983.33	1,232.83	1,672.86	324.22	411.80	1,888.49	1,694.44	1,955.72	2,076.10
Industrial Consumer using 10,000 kWh per month (note 2)	30kVA	2,300.00	$2,754.56	8,593.55	2,464.22	3,218.37	545.31	643.28	3,633.70	3,387.02	3,996.31	3,957.78
Industrial Consumer using 100,000 kWh per month (note 2)	275 kVA	21,700.00	$25,920.60	85,935.50	23,462.56	30,711.47	5,257.81	6,225.78	34,999.25	33,481.51	39,806.27	37,611.63
Fuel Surcharge - $/kWh (note 3)			0.1596	0.48	0.15	0.037	N/A	N/A	0.135	0.10	0.23	0.2108
Maximum Demand (MW)		80.6	167.5	28.78	122.0	59.2	1,222	1,222	122.8	15.3	51.00	128
Total Number of Consumers (accounts) - as at Dec 2010		77,046	122,109	43,699	40,238	59,859	417,108	417,108	35,668	7,520	31,356	71,510
Number of Employees (note 4)		294	522	250	155	260	2,667	2,667	325	92	165	364
Customer to employee ratio		262	234	175	260	230	156	156	110	82	190	196

Billing Categories	kVA	Bahamas (GB Power)	Cayman (CUC)	Bahamas (BEC)	Dominica (DOMLEC)	Nevis (NEVLEC)	Guyana (GPL)	Jamaica (JPSCo)	Montserrat (MUL)	GEBE St. Maarten	ST. Vincent (VINLEC)
Tariff Survey -End of Year (Dec) 2010		11	12	13	14	15	16	17	18	19	20
		US$	US$	US$	US$	US$	US$	US$	US$	US$	US$
Domestic Consumer using 100 kWh per month (note 1)		15.41	41.44		33.75	33.94		30.26			30.80
Domestic Consumer using 400 kWh per month (note 1)		62.88	147.31		156.02	123.12		140.08			128.72
Commercial Consumer using 2,000 kWh per month (note 2)	5kVA	359.85	744.00		860.69	625.20		690.97			724.94
Commercial Consumer using 5,000 kWh per month (note 2)	10kVA	881.00	1,825.06		2,147.16	1,560.23		1,400.68			1,812.36
Industrial Consumer using 10,000 kWh per month (note 2)	30kVA	1,836.50	3,626.84		3,918.95	3,118.63		2,896.03			3,208.07
Industrial Consumer using 100,000 kWh per month (note 2)	275 kVA	15,868.75	35,118.77		39,143.77	31,169.72		27,346.22			31,992.34
Fuel Surcharge - $/kWh (note 3)		0.15	0.228		0.1078	0.11		0.01			* 0.124
Maximum Demand (MW)		72.5	102.09		17	8		638.30			
Total Number of Consumers (accounts) - as at Dec 2010		19,336	26,004		33,986	6,737		570,801			39,907
Number of Employees (note 4)		186	199		212	86		1,624			311
Customer to employee ratio		104	131	0	160	78	0	351	0	0	128

Billing Categories	kVA	WEB Aruba	WEB Bonaire	BVIEC	EDF Martininque	EDF Guadeloupe	NVEBS (Suriname)	Provo Power Company Turks & Caicos	St. Kitts Electricity Department	Virgin Islands Water and Power Authority
Tariff Survey -End of Year (Dec) 2010		21	22	23	24	25	26	27	28	29
		US$	US$	US$	US$	US$	US$	US$	US$	US$
Domestic Consumer using 100 kWh per month (note 1)			35.71	23.40		11.55				
Domestic Consumer using 400 kWh per month (note 1)			135.28	90.90		46.20				
Commercial Consumer using 2,000 kWh per month (note 2)	5kVA		693.65	450.90		230.00				
Commercial Consumer using 5,000 kWh per month (note 2)	10kVA		1,726.49	1,125.90		590.10				
Industrial Consumer using 10,000 kWh per month (note 2)	30kVA		3,589.14	2,250.90		1,160.25				
Industrial Consumer using 100,000 kWh per month (note 2)	275 kVA		30,960.64	19,875.90		11,760.00				
Fuel Surcharge - $/kWh (note 3)			0.14821	0.1524						
Maximum Demand (MW)			12.47	29.00		260.00				
Total Number of Consumers (accounts) - as at Dec 2010			8,283.00	15,157.00		222,236				
Number of Employees (FTE)(note 4)			70	175		643				
Customer to employee ratio		0	118	87	0	346	0	0	0	0