GUYANA POWER & LIGHT INC.

DEVELOPMENT AND EXPANSION PROGRAMME 2012 - 2016

November 2011

Table of Contents

E	XECUTIVE S	SUMMARY	4	ŀ
1	METHOD	OLOGY TO PLAN	1	1
2	1.1 STRATEG	REVIEW OF 2010 ACHIEVEMENT SIC PLAN 2012-16	12 1	4
3	OPERATI	NG STANDARDS & PERFORMANCE TARGETS	2	25
			-	-
4.	DEVELO	PMENT & EXPANSION PROGRAMME	2	7
	4.1	DEMAND FORECAST	27	
	Table 4.1.1	PROJECTED DEMAND AND ENERGY	28	
	Table 4.1.2	REGIONAL FORECAST	29	
	Table 4.1.3	GPL 15-YEAR FORECAST	29	
	4.2	PLANNED RETIREMENTS AND GENERATIONADDITIONS, DBIS.	29	
	Table 4.2.1	CAPACITY FORECAST WITHOUT ADDIDTIONS, DBIS	30	
	Table 4.2.2	PROPOSED CAPACITY ADDITIONS, DBIS	31	
	4.3	ESSEQUIBO GENERATION EXPANSION	31	
	4.4	USE OF RENEWABLE SOURCES OF ENERGY	31	
	4.5	PLANS TO MEET GENERATION NEEDS OVER 15-YEAR FORECAST	32	
	4.0	GENERATION MAINTENANCE PLAN - 2012	33 25	
	4.7	T&D EXPANSION & MODERNIZATION PLAN	22 27	
	Table 4.7 Table 4.7	I&D EXPANSION PLAN, CAPITAL COST	3/ 20	
	1 able 4.7.1	NETWORK MAINTENANCE PLAN - 2012	38 20	
	4.0 1 Q 1		20	
	4.0.1		39 40	
	4.0.2 Table 4.8.2		40	
	1 abie 4.0.2	LOSS REDUCTION I ROJECTIONS	40	
5		OPERATIONS		10
3	5 1	SALES & DEVENUE COLLECTION	4 40	IU
	J.1 Table 5-1	GROSS GENERATION AND SALES	40	
	5.2	PLANS TO REGAIN INDUSTRIAL CUSTOMERS	41	
	53	PLANS FOR PROVIDING ELECTRICITY FOR DEVELOPMENT	41	
	5.5	AND REDEVELOPMENT PROJECTS IN LIRBAN AREAS	41	
	5.4	SUMMARY OF WORK PLAN	41	
	5.5	GEOGRAPHIC REPRESENTATION OF TRANS FACIL - DEM	4J 46	
	5.5	GEOGRAFINE REFRESENTATION OF TRANS. FACIL DEM	40	
6	OPERAT	ING COSTS AND CAPITAL EXPENDITURES		17
Ŭ	6.1	ACCOUNTS SUMMARIES	47	
	Table 6.1	PROFIT & LOSS ACCOUNT	47	
	Table 6.2	CASHFLOW STATEMENT	48	
	14010 012			
7	PROJECT	ED CAPITAL EXPENDITURE	4	19
	Table 7.1	SUMMARY OF CAPITAL EXPENDITURE (US\$)	49	
	Table 7.2	SUMMARY OF CAPITAL EXPENDITURE (G\$)	49	
8	FUNDING	G	4	19
	8.1	SOURCE OF FUNDING	49	
	TABLE 8.1	SUMMARY & SOURCES OF FUNDING	49	
	TABLE 8.2	DEBT/EQUITY RATIO	50	
9	TARIFF	FRENDS & TARIFF REBALANCING	5	50
	TABLE 9.	1 TARIFF REBALANCING PLAN	50	
			_	
1() DEMAND	SIDE MANAGEMENT	5	;1
	10.1	BENEFITS OF DSM	52	

11	HUMAN RESOURCES	52
12	IMPACT OF PROGRAMME ON NATURAL AND SOCIAL ENVIRONMENT	53
13	RISK AND MITIGATION	53
	13.1 Loss Reduction	53
	13.2 Fuel Prices	54
	13.3 Market size	54
14	CONTINGENCY	54
	13.1 Generation	4
	13.2 Transmission & Distribution	4
15	COST BENEFIT ANALYSIS OF INVESTMENT PROJECTS	55

Executive Summary

The next five years would in many ways define the Guyana Power & Light of the future as three transformative projects are expected to be completed. These projects, the Infrastructure Development Project, the Amaila Falls Hydroelectric Project and the Essequibo Interconnection, are expected to:

- Equip the company with the distribution capacity to meet demand efficiently over the medium term;
- Integrate all the load centers in Essequibo, Demerara and Berbice into a national grid;
- Provide a modern control and data acquisition system to manage the sophisticated grid of the future;
- Enable GPL to utilize a large source of "green" power.
- Position the Company to dramatically reduce its dependence on fossil fuel based generation and the attending price volatilities;
- Significantly improve the system stability, reliability and quality of supply.
- Allow consolidation of reserve capacity and the delivery of a high quality supply to all consumers in keeping with the Company's standard.

The Company's Strategic Plan continues its focus in the seven areas listed below:

- Optimizing revenue.
- Minimizing cost of operations.
- Improving Customer Service (CS).
- Achieving a sustainable financial position.
- Enhancing Corporate Governance Framework and Practices.
- Enhancing Skills and Competencies of Employees and Contract workers.
- Achieving national objectives.

This Development & Expansion Programme details specific annual targets covering appropriate areas of the Company's operations over the next five years which will ensure that the strategic objectives, Customer Service Standards (CSS) and Operating Standards and Performance Targets (OS&PT) are achieved consistently.

Achievement of the Customer Service Standards (CSS) and the OS&PT consistently is enshrined in the Strategic Plan and this Development & Expansion Programme outlines the actions that would be taken to realize the targets set therein.

The critical Infrastructure Development Project (IDP), financed by the China Exim Bank, has slipped by six months due to design work required for scope changes. The Project is now expected to be completed by the end of June 2013 (according to CMC's work programme although the completion date according to contract would be September 2013). The scope changes include:

• Additional substation bays to split transmission lines at Good Hope, Columbia and Golden Grove and the inclusion of the Kingston substation modification;

- Use of OPGY for all new transmission lines;
- Update of the SCADA system to a modern version capable of fully automatic operation;

As a result of the scope changes the project cost has been increased to US\$41.4M, with GPL assuming responsibility for US\$2.5M of the works and CMC the remaining US\$38.9 (utilizing the entire US\$5M provisional sum). GPL has assumed responsibility for the preparatory works associated with the substations (access roads, revetments and backfilling) and clearing of the transmission line routes. GPL had originally agreed to dredge the Demerara river channel to install the 69Kv cable for the West Demerara link and retains this responsibility.

The IDP is critical to;

- Improve supply quality and reliability to meet the CSS and OS&PT.
- Reduce technical losses which would result in a reduction in power demand, allowing GPL to meet its overall loss Standard, release feeder capacity and improve power quality.
- Reduce operating cost by implementing an optimized merit order system, reduce overall reserve requirements and prepare the network adequately for the advent of hydro.

While the 15.6MW added to the Demerara system in 2011 helped to realize a complete reliance on base-load generating equipment for base-load duties, the performance of the distribution network would have eroded the overall supply reliability expected. Many of the problems experienced on the network relate to the fact that most feeders are loaded close to their thermal limit with connections and switches failing. Unseasonal rainfall has also had an impact on network performance as vegetation management is no longer a seasonal challenge.

The Wartsila capacity in Demerara has increased to 80.3MW but it should be recognized that 44MW installed between 1994 and 1997 have exceeded 75% of their useful life. In fact the first 11MW installed in 1994 are just three years from retirement.

It should be noted that under the conditions specified by the International Monetary Fund (IMF) through the Poverty Reduction and Growth Facility (PRGF), the Government of Guyana is required to meet a minimum threshold of concessionality attached to any new loan. Specifically, the grant element of any new loan must be in excess of 35%. This has severely limited GPL's ability to secure loans since May 2003 when it became a public entity. Funding from debt in this Development & Expansion Programme is via loans to GPL from Government with resources coming from the China Exim Bank and or PetroCaribe resources on highly concessional terms.

Completion of the Transmission, Sub-station and Control sub-projects will result in the integration of the West Demerara and the Essequibo Coast and Islands in the transmission system, provision of feeders to complete the Georgetown frequency standardization, the interconnection of the Demerara, Berbice, Essequibo Coast and Islands systems, the installation of Sub-stations to offload feeders operating above 80% of their thermal capacity in Demerara and Berbice (Serving the West Coast, East Bank, East Coast and Corentyne Coast) and are expected to be completed by June 2013. The Contractor (China National Machinery Import & Export Corporation) has indicated that all the equipment would be in Guyana by the end of January 2012.

Since most feeders in Demerara are approaching their thermal limit, a priority order for the implementation of the transmission and Sub-station sub-projects has been determined. This

priority order places the completion of the Versailles and Edingburg Sub-stations and their transmission interconnection as most urgent.

The generation plan seeks to achieve GPL's strategic objective of ensuring that production in Demerara and Berbice from renewable and efficient HFO sources are optimized. The strategic transmission plan seeks the interconnection of all the load centers in the three Counties and the installation of sub-stations (where this is economically feasible) while the loss reduction plan embraces a number of strategies to reduce primary and secondary distribution losses, fraud proofing the network in specific high-risk areas while improving service quality and continuing the initiatives directed at electricity theft, defective meters and billing accuracy and integrity.

With power being wheeled efficiently to load centers and new feeders being provided, investment in LV distribution upgrade becomes very important, to improve power / service quality and reduce technical losses as most of the low voltage (LV) network requires conductor upgrade and therefore accounts for most of the technical losses (calculated at 7.6%). But while huge investments have been and are being made in generation and T&D, the system must be operated automatically in an optimal manner to further improve service quality, reliability and minimize operations cost and this requires a new Central Control Center with modern SCADA capability and system management applications that is able to manage the national grid automatically.

The Company's financial viability depends heavily on sustained loss reduction, both technical and non-technical. This Programme therefore dedicates significant resources to reducing losses in each of the five years including the implementation of new initiatives to make the network more fraud-proof. A new US\$5M facility from the IADB, to be disbursed over four years from 2011, would be directed largely at technical loss reduction. In fact, it would partly be used to implement a pilot project incorporating high voltage distribution in an area where there is wholesale theft of electricity directly from the LV mains. All the critical areas of non-technical loss reduction are targeted for investment including metering, electricity theft and fraud proofing the network.

While most of the development focus is on addressing the infrastructural requirements to improve service quality and losses while reducing operating cost, the benefits of Demand Side Management (DSM) (including Energy Efficiency [EE]) cannot be overstated as it can postpone or reduce the level of investment needed in both generation and T&D and also allow Consumers to reduce their power consumption without affecting their quality of life by equipping them with the knowledge to use power more effectively and efficiently. Making energy efficient appliances affordable and accessible to the average customer is a challenge and this Programme details an approach that can make this possible. The Demand Side Management (DSM) plan is an annual one in this Programme and limited in scope due to resource constraints. It should be recognized that the Guyana Energy Agency has been tasked with leading the national DSM (and EE initiatives) and would benefit from grant resources available to the country for appropriate activities. GPL would largely confine its activities therefore to public education.

The Programme projects investment of US\$91.7M over five years (it should be noted that US\$28.6M would have been disbursed on the transmission sub-projects by 2011 making the overall investment US\$120.3M) with financing mainly from debt, undistributed dividends and retained earnings. US\$43.9M is being financed by debt on concessional terms while US\$42M is being financed from undistributed dividends and retained earnings. The investments are as follows:

- 1) US\$15.98M in generation to:
 - Convert the 22MW Wartsila plant at Kingston to 60Hz.
 - Install two used 3MW Wartsila 8R32 units at Versailles.
 - Prepare for and complete the frequency conversion of the Essequibo Coast by adding a used 3MW 60Hz, HFO unit at Anna Regina and converting the existing 4MW capacity there to 60Hz.
 - Install a used 2MW HFO unit at Bartica in a new plant at a suitable location particularly to address the issues of operating cost, noise nuisance and flooding.
 - Install two new 600kVA gensets in Leguan and one similar set in Wakenaam to position GPL to commence a 24-hour service in 2012.

It is projected that generation from renewable or HFO sources will increase to 93% in 2012 from 79% in 2011. Production from HFO fired capacity cost approximately 77% less than from diesel fired Units. The increase in HFO fired capacity and ultimately an almost complete reliance on renewable sources of power is the company's strategic generation plan for this Programme, in an environment of volatile fossil fuel prices.



Typical Daily Load Curve in Demerara showing reliable capacity

- 2) US\$15.3M in transmission lines to integrate all the load centers in Demerara, Berbice, and Essequibo, reinforce one existing transmission interconnection and also interconnect the islands of Leguan and Wakenaam. This would allow:
 - Bulk power to be wheeled efficiently.
 - Use of HFO or renewable capacity as prime sources of power.
 - Reserve capacity to be consolidated (reduced by 15.25MW).
 - Closure of small dispersed diesel fired generating capacity.
 - Reinforcing of the interconnection between Sophia and the Kingston substation to reduce losses when hydropower becomes available.

- Installation of substations strategically, to provide distribution outlets to off-load feeders and provide network capacity for growth.
- Integration of Essequibo in the grid to allow access to more efficient and cost effective generation and eventually green power from hydro.
- 3) US\$19.96M in substations to provide outlets at thirteen (13) new locations through 69/13.8KV substations. This would:
 - Result in the length and load of most major circuits in Demerara, Berbice and Essequibo Coast being reduced by up to 65%.
 - Provide automatic means of regulating primary distribution voltage.
 - Improve the quality of supply by improved voltage management, reduce the frequency of outages resulting from feeder trips, reduce planned maintenance outages and improve dispatch management.
- 4) US\$7.8M will be expended on non-technical loss reduction over the next five years. This includes;
 - Installation of 30,000 pre-paid meters to replace post-paid meters, using the split meter technology.
 - Redesign of the distribution network in high risk areas to HV distribution.
 - Use of co-axial service lines.
- 5) US\$20.9M will be spent on technical loss reduction activities, targeting a 1.35% reduction of losses and compensation at various sub-stations to cater for an N-1 condition (embraced as the minimum planning criteria) when hydropower is available. This is in addition to the US\$35.3 mentioned above for transmission and sub-stations which are also technical loss reduction initiatives. This investment will help to:
 - Improve voltage regulation.
 - Reduce the number of consumers affected due to feeder trips and planned maintenance activities.
 - Improve system management when restoring service.
 - Increase capacity to meet growing demand.
 - Improve network design to reduce access to establish illegal connections.
- 6) US\$3.91M will be spent to connect 23,200 new consumers. This growth in new services recognizes the significant housing development taking place, particularly in Demerara. The projection caters for a new rural electrification programme to serve 4,000 consumers in 2013.
- 7) US\$2.738M is projected to be spent on the electrification programme in 2013, as mentioned above. The continuous expansion of numerous housing schemes and the number of requests for electricity has established the need for another electrification programme.
- 8) US\$1.69M will be spent on capacity building, specifically the acquisition of articulated utility vehicles This will:
 - Provide tools and equipment to T&D to improve their capability and productivity.
 - Position the company to commence live line maintenance in a limited way.

- Allow for a more rapid response to emergencies.
- 9) US\$2.74M will be spent on buildings in Demerara and Berbice to:
 - Provide accommodation to reduce the dependence on rented facilities.
 - To improve working conditions for staff and improve customer service facilities.
 - Improve the image of the company.

While the activities mentioned above are critical for GPL's financial viability this Programme also focuses critically on:

1) **Customer Service** - The new Customer Service Standards (CSS) which took effect from January 2011are expected to evolve over time to match the best North American standards. The existing CSS are valid until the end of 2012 and new Standards (improved) will be submitted by GPL for the period 2013-2014.

In addition to the Customer Service Standards, the Operating Standards and Performance Targets (OS&PT) for the life of this Programme have been included. These are also expected to evolve over time like the CSS.

The mechanisms implemented by GPL to meet the CSS and the OS&PT continue to be periodically reviewed and modified, so as to ensure that internal processes are adequate to consistently meet these Standards and Targets and to track performance routinely. While GPL's network has been expanded by over 35% over the past six years and continues to expand, the number of Commercial Offices has not changed since 1997 when the Leguan office was opened making ready access to GPL services a problem.

The Company therefore proposes over the next five years to:

- Engage private operators to provide the same services GPL now provide at its Commercial Offices.
- Vastly expand the number of payment centers available to make financial transactions with GPL hassle free.
- Provide more information on energy efficiency by assisting Consumers to calculate the benefits of using energy appliances.
- Fostering a relationship between Consumer Representatives and the Private Sector to ensure energy efficient appliances are more available, affordable and accessible.
- Expanding the initiatives to foster behavioral change to impact DSM through debating competitions.
- Improving communication with customers and expanding customer care training for Staff and Contractor's personnel.
- Achieving full ISO 9001 2008 certification in 2012.
- 2) Financial Management Installation of three additional modules, procurement and inventory, fixed asset management and Human Resources (including payroll) which will:

- Allow for the efficient management of procurement and inventory activities.
- Maintenance of adequate stock levels to sustain maintenance activities.
- Ensure all the company's assets are accounted for.
- Provide a modern HR application that would meet the Company's needs for management information in improve its HR operations.
- 3) Market Development There is no doubt that market development is critical when one considers that GPL has committed to 140MW from the Amaila Falls Hydro project. The demand forecast of almost 849 GWH for 2015 assumes that 52.5 GWh will come from current off-grid demand (25% of forecasted off-grid demand that would access GPL service). The forecasted growth of almost 10.48% for 2015 from 2014 and 18.28% for 2016 from 2015 seems optimistic but GPL expects that the projected reductions in tariff in 2015 (and rebalancing) coupled with supply reliability will serve as growth catalysts. It should be noted that GPL will have to guarantee an annual cash flow for the guaranteed 140MW from Amaila, which implies that the lowest tariff will be derived if all the energy is used.
- 4) Internal Efficiencies The following initiatives are included in this programme:
 - US\$1,690,000 investment in specialized equipment and tools coupled with advanced training to improve T&D maintenance capability.
 - Implementation of Demand Side Management (including EE initiatives) to facilitate prudent use of power.
 - Completion of a benchmarking exercise to ensure an acceptable level of productivity.
 - Full ISO 9001 2008 certification by 2012. This would ensure written procedures are available for all activities and those are complied with.
 - Expanded use of electronic documentation to reduce use of paper.
 - Implementation of the applications mentioned above to optimize inventory and asset management and HR operations.
 - Expanded use of the KRONOS time and attendance system to manage overtime.

The Programme, as mentioned before, projects expenditure of US\$91.7M over the next five years. Major sources of financing will include 48% from debt and 46% from undistributed dividends. The Programme is heavily front-loaded, for obvious reasons, with 84% of the expenditure occurring within the first three years.

US\$63.9 M will be spent on loss reduction with a total reduction in losses of 6.15% projected over the next five years. This level of projected loss reduction is conservative for regulatory reasons. Non-technical losses are projected to reduce from 15.8% at the end of 2011 to 11.2% at the end of 2016 while technical losses are projected to reduce from 14.65% at the end of 2011 to 13.15% at the end of 2016. The non-technical loss reduction plan includes all activities which have yielded results to date and new initiatives based on field intelligence. The projections are considered conservative.

Overall supply quality including voltage and frequency regulation, SAIFI and SAIDI would see significant improvements by June 2013 when the transmission and substation facilities are completed and maintenance activities are optimized. The West Coast of Demerara would benefit in 2012 as the priority facilities are completed. The improvements can be seen in the SAIFI and SAIDI projections.

1. METHODOLOGY TO PLAN

The Guyana Power and Light Inc. (GPL) current five-year Development and Expansion Programme (2012 – 2016 D&E Programme) and Annual Programme (2012) have been prepared in accordance with the requirements of the company's Licence (Amended October 4th, 2010), the Public Utilities Commission Act 1999, the Electricity Sector (Technical Standards) Regulations 2008 and the Electricity Sector Reform Act (ESRA) 1999 and Amendment 2010.

Section 38 (2) of the ESRA and its 2010 amendment sets out the details that ought to be captured in the GPL's sustainability programme. Specifically, the Act states:

"The sustainability programmes developed and maintained by a public supplier shall contain detailed descriptions of and data on -

- (a) the plans and projections through which the public supplier will achieve and sustain the customer service, engineering and technical standards necessary for the public supplier's efficient, coordinated and economical supply of electricity under the terms of its licence (see pages 18 25);
- (b) the benefits to be accrued to consumers of the service rendered, and the engineering and technical standards to be achieved and maintained, by the public utility as a result of the implementation of the programmes, and the rationale therefore (see page 26);
- (c) a development and expansion programme setting forth the plans and projections through which the public supplier will develop and expand its facilities and services to be provided to consumers (see page28);
- (d) the operating costs and capital expenditures of the programmes (see page 47);
- (e) the sources and amounts of revenues necessary to finance the programmes, including the proposed or actual costs, terms and sources of any debts or equity financing commitments necessary to carry out the programmes and any bids actually, or anticipated to be, received by the public supplier (see page 48);

- (f) the debt to equity ratio tolerances to be maintained by the public supplier in implementing the programmes (see page49);
- (g) the timing, amounts and terms of any issuance of securities contemplated by the public utility for the financing of the programmes and the persons to whom they will, or are anticipated to, be offered or issued; Will be provided as appropriate.
- (h) the impact the programmes are expected to have upon the natural and social environment (see page 52);
- (i) the extent to which the programmes facilitate the use of alternative forms of electricity generation using renewable resources and commercial feasibility thereof. (see page 31);
- (j) any other aspects of the programmes which the Minister may direct; and
- (k) planned acquisition of new generating capacity; (See Page 31)
- (l) loss reduction strategies; (See Page 39)
- (m)plans to regain industrial customers; (See Page 41)
- (n) plans for providing electricity for development and redevelopment projects in urban areas; (See Page 41)
- (o) cost-benefit analysis for each investment project; (See Page 54) and
- (p) consistent with any applicable regulations, the following items
 - i. a maintenance programme for the inspection, repair, replacement and upgrade of the supplier's works; (See Pages 33-35 & 38)
 - ii. a programme for the promotion of technical efficiency and economy in its supply of electricity and in the consumption of electricity by consumers; (See Page 50) and
 - iii. a report on the public supplier's compliance with any technical standards required under the regulations. (Note: the two Regulations under ESRA, The Technical Standards and Wiring Regulations have not been enacted into Law as yet)

1.1 Review of 2011 Achievement

	2011 work programme	
Generation	15.6MW Extension - Kingston 11 Plant	
	Frequency conversion - 22MW Wartsila Kingston 1 Plant	
	2 x 500kW Genset - Leguan	
	500Kw Genset - Wakenaam	
Transmission Lines	Transmission Line between Versailles and Edinburg Substations	
	Transmission Line between Versailles and Kingston Substations, inclusive of submarine cable	
5	Transmission Line between New Georgetown and New Sophia	
.0	Transmission Line between New Sophia and Onverwagt	
Substations	Versailles Substation	
3	Edinburgh Substation	
0	Diamond Substation, including tie-in Lines 1 And 2 (69kV)	
Å.	New Georgetown	
N	New Sophia Substation	
S.	Extended Sophia Substation	
	Good Hope	
	Mahaicony (Columbia) Substation	
.Ö	Onverwagt	
C Distribution	Georgetown Frequency Conversion (Phase 11)	
-5	LV network upgrade (Fraud proofing included)	
Ö	Distribution automation	
DSM -	Demand Side Management, energy efficiency Initiative	
Non Tec Loss Reduction	Replace 8,000 meters with pre-paid meters	
ROGRAMME 2012	Coaxial cable use (Service Drops)	Page 12 of s
Nemsenices	14,200 new services	1 age 12 01 0
Buildings	s Complete new T&D building - Sophia	

Generation:

- The generation plan included completion of the 15.6 MW expansion of the new Kingston Wartsila Plant. This was completed and the plant went into commercial operation on October 1st.
- Frequency conversion of the Kingston 1 Plant had to be deferred to 2012 due to financing difficulties. Continued high fuel prices eroded the company's financial position.
- Financial difficulties again prevented the additional gensets from being procured for Leguan and Wakenaam. Bids were received and the evaluation completed but no contract was awarded.

Transmission lines & Substations:

As mentioned before, necessary changes in the scope of works resulted in a delay of this project and while the designs were completed and equipment ordered, no significant work on the ground was completed. GPL expects to advance the site development and access works (preliminary works) and the transmission lines route clearing by the end of 2011. CMC has advised that all the equipment should leave China by the end of 2011.

Distribution:

- The Phase 11 frequency conversion of the Georgetown 50Hz network has to be done in conjunction with the Kingston 1 plant conversion so this has also been deferred to 2012.
- Financing for the pilot project to fraud proof the network in a high-risk area has been secured with procurement of necessary equipment and supplies to be advanced by the end of 2011.
- Distribution automation would be progressed in 2011 with an order placed for four (4) remote operated pole mounted breakers.

Demand Side Management (DSM):

• GPL continued its public education campaign through interaction with consumers at various trade fairs, jobs expositions and other fora.

Non-Technical Loss Reduction:

- GPL expects to replace 4,140 post-paid electro-mechanical and electronic meters with prepaid meters by the end of the year. The instances where the pre-paid meter has replaced the post-paid meter include meter tampering and where the consumer has volunteered. GPL has not used the amendment in ESRA to enforce the pre-paid meter on post-paid customers as expert advice suggests there could be legal challenges.
- HV distribution, as mentioned above, is now included in the IADB financing with orders for equipment expected to be in place by end of the year. This is also true for coaxial cables.

New Services:

• By the end of 2011 GPL expects to have established over 6,700 new services, far above the 4,200 forecasted in the work plan. By the end of September 5,484 new services had been established.

Buildings:

• Work on the new T&D building at Sophia is continuing incrementally. The Metering Department now occupies a section of the ground floor and the stores building that have been completed.

Capacity building:

GPL will procure four (4) bucket trucks in 2011. These should arrive by December. Overall losses were projected to reduce by 1.4% for the year but are now expected to reduce by 1% only as technical losses continue to climb. Generation is expected to increase by 4% in 2011 over 2010. According to the 2011 forecast, fuel expenditure was expected to be G\$16.5B, at a weighted average cost (CIF) of US\$79.89 per bbl and profit after tax of G\$1.7B. Actual fuel costs are expected to be G\$23.3B at a weighted average cost of US\$122.42 per bbl resulting in a loss of \$4.6B.

2. STRATEGIC PLAN 2012-16

The strategic business objectives of the company have been disaggregated into Key Performance Indicators (KPI) with annual targets to form the five-year strategic plan, as detailed below. The current D&E Programme is a function of this 2012 - 16 Strategic Plan.

GPL is a regulated state-owned electricity utility that enjoys a monopoly in the transmission, distribution and sale of electricity on the Coast where 90% of the population resides in Guyana. As at the end of December 2011, GPL expects to have over 161,000 customers, 797 permanent, 209 temporary and contracted employees and projected revenue of US\$137M of which 79% will be applied to fuel.

Present Electricity Supply	Medium Term Electricity Supply
Mainly thermal:	Proposed Renewable energy projects
• Installed Capacity: 195.4 MW : 94.3MW	• Hydro (starting 2015)—140 MW
Heavy Fuel Oil (includes 10 MW of IPP);	Bagasse (extended use of
101.1MW diesel	co-generation)—10 MW
Total Availability : 120.4 MW:	
110.4 MW owned (33 MW is either	Key Challenges:
110.4 MW owned (33 MW is either over 30 years old or high speed Units);	Key Challenges: High customer tariffs due to:
 110.4 MW owned (33 MW is either over 30 years old or high speed Units); Total Peak Demand: 102.1 MW 	Key Challenges: High customer tariffs due to: • Total dependence on fossil fuel, high
 110.4 MW owned (33 MW is either over 30 years old or high speed Units); Total Peak Demand: 102.1 MW Self Generation: Estimated at 42MW 	 Key Challenges: High customer tariffs due to: Total dependence on fossil fuel, high and volatile fuel prices.
 110.4 MW owned (33 MW is either over 30 years old or high speed Units); Total Peak Demand: 102.1 MW Self Generation: Estimated at 42MW Fuel Mix: 79% HFO; 21% diesel in 2011 	Key Challenges: High customer tariffs due to: • Total dependence on fossil fuel, high and volatile fuel prices. • High losses - technical & commercial

GPL has a balance sheet US\$188M in assets. In 2011 79% of GPL's generation is expected from HFO (production from HFO being 77% cheaper than diesel). With a 140 MW hydropower project achieving commercial operation in November 2015, GPL will need fossil fuel for 4% of its electricity supply but this is expected to reduce to 0.4% in 2016. As a state-owned entity, GPL's key objective is to deliver reliable electricity at the lowest sustainable price and without requiring Government support for its operations. This requires optimized efficiency in the production, transmission and distribution of power while prudently managing revenue collection, reducing technical and commercial losses and minimizing other costs, particularly employment as this is the largest non-fuel expenditure. Debt is being financed by low interest Government loans, with the resources actually coming from the China Exim Bank and the IADB.

S	W	0	ΓА	na	lys	sis	
					_	_	

Strengths	Weaknesses
a. GPL has low level interest bearing debt that	a. High level of technical and commercial
accounts for 41% of assets;	losses currently at 30.3%;
b. Generation overwhelmingly coming from	b. Limited pool and sustained of skills pose a
HFO fired capacity;	problem to improving efficiencies;
c. Staff is competitively remunerated	c. Financing limited only to concessional
compared to Private Sector.	sources and internal resources.
d. Funding secured for major capital projects.	
	1
Opportunities	Threats
2 Hydro financial close should occur by O1	 Dick of rice in fuel prices can adversely

a.	Hydro financial close should occur by Q1-
	2012 with construction starting shortly
	after. Completion of hydro by Q4 2015 will
	lower electricity cost and attract self-
	generators to the grid;

- Expanded and strengthened grid will reduce losses, operating costs and improve reliability;
- c. Capital program fully funded from concessional resources;
- d. ISO 9001 can improve the quality of CS.
- e. Connection of 23,200 new customers by 2016 with secure metering will reduce electricity theft;
- f. Competitive staff compensation and incentives coupled with new infrastructure and modern equipment will result in improvements in productivity and attitude.

l occur by Q1-	a.	Risk of rise in fuel prices can adversely	
ting shortly		impact costs and tariffs before 2015;	
by Q4 2015 will	b.	Threat of strike action as GPL right sizes its	
tract self-		workforce following investments;	
	c.	Implementation delays for capital projects	
l grid will		could raise operating costs and deter self -	
sts and improve		generators.;	
	d.	Loss of key employees via migration could	
d from		impact operations.	
	e.	Changes in global weather patterns could	
uality of CS.		result in severe water shortages for the	
customers by		hydro.	
will reduce			
ition and			
v infrastructure			
result in			
ty and attitude.			

Vision: Guyana Power & Light Inc. aims to be Guyana's premier service provider, meeting and exceeding where possible the expectations of its stakeholders.

Mission: To provide an expanding customer base with electricity services which are technically, financially and environmentally sustainable, achieving best practice and acceptable international norms, delivered by our people performing in accordance with Company values to the highest ideals of work excellence and integrity.

Strategic Objectives:

- 1. Optimize revenue
- 2. Minimize cost of operations
- 3. Improve Customer Service (CS)
- 4. Achieve a sustainable financial position
- 5. Enhance Corporate Governance Framework and Practices
- 6. Enhancing Skills and Competencies of Employees and Contract workers
- 7. Achieve national objectives

See strategies and targets for each below.

Strategic Objectives (in black), Strategies and associated Targets

1	I. Optimize Revenue:	2012	2013	2014	2015	2016
а	Maximize collection of billing (% of Billing collected)	99.5	99.5	99.5	99.5	99.5
•	(i) Maximize collection of billing (% of Government billing collected)	100	100	100	100	100
	(ii) Maximize collection of billing (% of Non – Government billing collected)	99	99	99	99	99
b	Maximize level of power billed (GWh)	467.4	509.0	554.4	625.8	743.9
•	(i) Convert illegal electricity consumers to GPL's customers (GWh)	.03	.05	.035	0.01	0.01
	(ii) Regularize customers with bypass or tampering (GWh)	2.0	1.50	1.0	0.8	0.8
	(iii) Replace defective meters and bill accordingly (GWh)	1.2	1.1	1.0	1.0	1.0
с.	Optimize growth:					
	(i) Expand customer base (# of new customers added in yr.)	6,900	4,800	3,500	4,200	3,800
	 (ii) Increase uptake in recently served areas (No. of new connections) 	2,500	2,300	2,200	1,600	1,000
	(iii) Net growth (MWH) (Combination of natural growth and loss	31,39	34,74	42,63	31,25	48,10
	reduction)	1	7	6	6	4
	(iv) New Consumers (MWh)	3,726	2,522	1,890	2,268	2,052
d.	Expand overall revenue by optimizing price, volume and tariff mix (US\$ M)	175	189	204	218	200
	(i) Annual increase in volume (US\$, over previous year)	38	14	15	14	(18)
	Mix of customers					
	(ii) Residential	19.8	7.9	7.9	8.7	-6.2
	(iii) Commercial	7.9	3.1	3.2	4	2
	(iv) Industrial	4.1	1.6	1.6	2.1	6
e.	Maximize collection of arrears from past customers – Number of Accounts.	1440	1450	1460	1470	1480

	 (i) Pursue Inactive Customers – Number of demand letters. 	800	830	860	890	920
	 (ii) Maximize legal action and enforcement – Number of cases filed in Commercial Court. 	480	498	516	534	552
f.	Ensure strong disincentives to Electricity Theft (i) Prosecute consumers found tampering/Bypass	450	450	350	300	250
	(ii) Prosecute individuals with illegal connections	500	450	400	350	300
g	Maximize number of prepaid meters installed in place of Post-paid ones.	6,000	6,000	6,000	6,000	6,000

		2012	2013	2014	2015	2016
a.	Reduce Employment Numbers (number at end of year)	985	895	906	860	845
b.	Control Employment Costs (annual US\$ K)	12,700	12,142	12,353	12,482	12,236
	(i) Basic Pay	8,001	7,649	7,782	7,863	7,708
	(ii) Overtime	1,270	1,214	1,235	1,248	1,224
	(iii) Allowances	2,159	2,064	2,100	2,122	2,080
	(iv) Employers Contribution	762	728	741	749	734
	(v) Others	508	486	494	499	489
c.	Reduce total technical and commercial losses (%)	28.65	26.15	24.85	24.35	24.15
	Reduce technical losses (total % remaining at end of period)	14.65	13.75	13.15	13.05	13.15
	Reduce commercial losses (total % remaining at end of period)	14.0	12.4	11.7	11.3	11.0
d.	Control Generation Costs (US \$K)	126,910	142,995	162,250	163,910	149,233
	(i) Maximum use of cheaper sources of generation (HFO/Renewable/LFO mix)	88/5/7	94/5/1	94/4.5/1.5	70/29/1	8/91/1
	 (ii) Maximum availability of engine relative to weighted capacity 	70%	75%	75%	75%	75%
	 (iii) Ensure contract for O&M is managed to optimize value for money 	As per contract	As per contract	As per contract	As per contract	As per contract
	Availability	92%	92%	92%	92%	92%
	Lube oil Consumption (g/kWh)	0.15	0.15	0.15	0.15	0.15
	Fuel Efficiency (BTU/kWh)	8312	8312	8312	8312	8312
	(iv) Optimize dispatched Power	Merit	Merit	Merit	Merit	Merit
		order	order	order	order	order
		system	system	system	system	system
f.	(i) Ensure fuel is procured at the lowest cost at all times	Ensure the contractual terms with Staatsolie are met	Ensure the contractua I terms with Staatsolie are met	Ensure the contractua I terms with Staatsolie are met	Ensure the contractua I terms with Staatsolie are met	Ensure the contractua l terms with Staatsolie are met
	 (ii) Ensure overhauls are done on schedule, reduce emergency procurement of spares, reduce downtime, maximize availability, minimize maintenance costs. 	Meet Generation SAIFI & SAIDI	Meet Generatio n SAIFI & SAIDI	Meet Generatio n SAIFI & SAIDI	Meet Generatio n SAIFI & SAIDI	Meet Generatio n SAIFI & SAIDI
g.	Optimize other controllable Costs (US\$K)	10,270	9,887	9,452	9,522	9,594

(i) Transmission & Distribution	2,540	2,155	2,177	2,243	2,311
(ii) Administrative	7,730	7,732	7,275	7,279	7,283

3	3. Improve Customer Service (CS)	2012	2013	2014	2015	2016
a.	Meet Customer Service Standards & OS&PT.					
b.	Implement ISO 9001: 2000 Quality System	Full certification	Maintain certification	Maintain Certification	Maintain Certification	Maintain Certification
c.	Customer Satisfaction: Improve Image of GPL as first class utility via improving Customer Service, increase efficiency, and optimize tariffs.	65%	70%	75%	75%	80%
d.	% of calls answered at Call Center	95%	95%	95%	95%	95%
e.	Increase collection outlets	5	5	5	5	5

4	I. Achieve Sustainable Financial Position	2012	2013	2014	2015	2016	
a.	Ensure that revenue collected is sufficient to co	over all co	sts includi	ng CAPEX	and deb	t	
	service.						
b.	Ensure that GPL is creditworthy to attract private investment in a 165 MW hydroelectric						
	project at a projected capital cost in excess of US\$830 M without Government guarantees.						
с.	Complete audited accounts and hold Annual Shareholders Meeting within 6 months of year						
	end.						
d.	Manage GPL finances and to justify	_					

concessional financing.

Ensure compliance with conditionalities.

5. Enhance Corporate Governance Framework and Practices

- a. Reports are submitted to Board and Sub-Committees on a timely basis.
- b. Ensure Financial Statements are audited within stipulated time frames.
- c. Ensure tenders for goods and services are in keeping with the Procurement Act.
- d. Ensure Internal Audit recommendations are implemented.
- e. Assist the Board in its annual self evaluation.

6. Enhancing Skills and Competencies of Employees and Contract Workers

a. Determine or identify the skills and competencies required for each job.

b. Periodically asses the level at which each employee is performing.

c. Provide advice and/or feedback to the employee on performance, career development and their future aspirations.

d. Facilitate requisite training/attachments/development interventions.

e. Utilize teamwork and 'special assignment' strategies

f. Seek out and provide opportunities for coach/mentor interactions.

7. Achieve National Objectives

- a. Promote conservation of electricity by promoting/educating economic use and avoiding wastage
- b. Maximize use of **renewable** fuel to minimize generation costs and minimize fuel import bill
- c. Optimize tariffs and maximize efficiencies (low technical and commercial losses, high collections)

- d. Ensure regulatory compliance with electricity laws and GPL's license
- e. Expand national grid to other parts of country to allow economies of scale and lower avg. costs

Functional Strategies over 5 year period (with reference to Objective Strategies)

2012

Management/Overall Coordination

- 1. Manage all capital projects to ensure delivery on time and within budget, as appropriate.
- 2. Ensure that key skills are developed and retained.
- 3. Achieve full certification of ISO 9001 2008 Quality system
- 4. Ensure internal communications are adequate and efficient to support achievement of CSS & OS&PT.

Commercial

- 1. Ensure Customer Service Standards are met consistently.
- 2. Optimize tools available in CIS to direct loss reduction field efforts.
- 3. Work pro-actively, using Legal means to recover balances on inactive accounts.

Finance

- 1. Manage cash flows in accordance with budget and to optimize working capital.
- 2. Secure funding for capital projects, where necessary and ensure timely financial reports.
- 3. Ensure efficient procurement process in compliance with procedures, and adequate, reliable and efficient inventory management system.
- 4. Install additional modules of the state-of the art financial package (Oracle financials) to replace semi-manual operations.

IT

- 1. Ensure ongoing training to fully utilize CIS capabilities.
- 2. Optimize and maintain Local and Wide Area Network performance to ensure ready access to mission critical systems (e.g. CSS & OS&PT).
- 3. Manage Hardware and software infrastructure to ensure 99.9% system availability.
- 4. Facilitate training of personnel who are required to use CIS or any other application in the Company's efforts to meet CSS and OS&PT.
- 5. Optimize security and integrity of corporate systems.
- 6. Introduce bill payment kiosk.

Loss Reduction

- 1. Implement the Strategic Loss Reduction Plan (SLRP).
- 2. Replace 6,000 meters with pre-paid meters.
- 3. Meter 6,900 New Services.
- 4. Continuously review the benefit of various initiatives to focus field activity.

HR/Admin

- 1. Continuously review employee attendance to determine appropriate actions to limit overtime cost.
- 2. Maintain and manage continuous training programs.
- 3. Complete new T&D Building Sophia.
- 4. Complete right-sizing review for implementation in 2012

Projects -

Manage the following sub-projects effectively to ensure completion by Milestones indicated.

- 1. Frequency conversion of Wartsila Kingston 1 Plant 11MW Phase 1 to be completed by Q4
- 2. Versailles 6MW HFO plant, 55% complete Q4
- 3. Install 2 x 600kVA gen-sets in Leguan Q4
- 4. Install 600kVA gen-set in Wakenaam Q3
- 5. Complete Transmission line between Versailles and Edingburg sub-stations Q4
- 6. Complete Submarine cable crossing Kingston Versailles Q4
- 7. 69kV line from Sophia to Onverwagt 80% complete (80 km) Q4
- 8. Complete 69Kv line from Sophia to New Georgetown Substation Q4
- 9. Complete Versailles & Edingburg substations Q4
- 10. Diamond sub-station, including two tie lines 75% complete Q4
- 11. New Georgetown Sub Station 80% complete Q4
- 12. New Sophia Sub Station 75% complete Q4
- 13. Extend Sophia sub-station, completed Q4
- 14. Good Hope Sub Station, 60% complete Q4
- 15. Columbia (Mahaica) Sub Station, 60% complete Q4
- 16. Onverwagt sub-station expansion, 90% complete Q4
- 17. Williamsburg Sub Station 45% complete Q4

Operations

- 1. Georgetown frequency conversion Phase 11 (8MW) Q4
- 2. LV network upgrade 100kM of network to be upgraded Q4
- 3. Install 2 remote controlled re-closers Q3
- 4. Complete maintenance programme Q4

2013

Management/Overall Coordination

- 1. Manage all capital projects to ensure delivery on time and within budget, as appropriate.
- 2. Ensure that key skills are developed and retained.
- 3. Ensure internal communications are adequate and efficient to support achievement of CSS & OS&PT.
- 4. Undertake review of CSS & OS&PT internal procedures and update as necessary.
- 5. Complete quarterly review of Divisional performance based on work programmes.

Со	mmercial
1.	Ensure Customer Service Standards and met consistently. Complete review of procedures
	and recommend changes as necessary, July 5 th and Dec. 15 th .
2.	Optimize tools available in CIS to direct loss reduction field efforts.
3.	Work pro-actively, using Legal means to recover balances on inactive accounts.
Fin	ance
1.	Manage cash flows in accordance with budget and to optimize working capital
2.	Secure funding for capital projects, as necessary and ensure timely financial statements
	reports
3.	Ensure efficient procurement process in compliance with procedures, and adequate,
	reliable and efficient inventory management system
IT	
1.	Optimize and maintain Local and Wide Area Network performance.
2.	Manage Hardware and software infrastructure to ensure 99.9% system availability.
3.	Optimize security and integrity of corporate systems
Los	as Reduction
1.	Replace 6,000 meters with pre-paid meters.
2.	Meter 4,800 New Services.
3.	Implement the Strategic Loss Reduction Plan (SLRP).
-	
4.	Continuously review the benefit of various initiatives to focus field activity.
4. HR	Continuously review the benefit of various initiatives to focus field activity. /Admin
4. HR 1.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program.
4. HR 1. 2.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan.
4. HR 1. 2. 3.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss
4. HR 1. 2. 3.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4
4. HR 1. 2. 3. 4.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4.
4. HR 1. 2. 3. 4. Pro	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. ojects
4. HR 1. 2. 3. 4. Pro 1.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. Djects Complete frequency conversion of Wartsila Kingston 1 Plan – Q1
4. HR 1. 2. 3. 4. Pro 1. 2.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. Djects Complete frequency conversion of Wartsila Kingston 1 Plan – Q1 Complete Versailles 6MW HFO plant – Q2
4. HR 1. 2. 3. 4. Pro 1. 2. 3.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. Ojects Complete frequency conversion of Wartsila Kingston 1 Plan – Q1 Complete Versailles 6MW HFO plant – Q2 Install used 3MW HFO unit at Anna Regina – Q4
4. HR 1. 2. 3. 4. Pro 1. 2. 3. 4.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. jects Complete frequency conversion of Wartsila Kingston 1 Plan – Q1 Complete Versailles 6MW HFO plant – Q2 Install used 3MW HFO unit at Anna Regina – Q4 Install used 2 MW HFO Unit at Bartica – Q4
4. HR 1. 2. 3. 4. Pro 1. 2. 3. 4. 5.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. Origets Complete frequency conversion of Wartsila Kingston 1 Plan – Q1 Complete Versailles 6MW HFO plant – Q2 Install used 3MW HFO unit at Anna Regina – Q4 Install used 2 MW HFO Unit at Bartica – Q4 Complete new Sophia to Onverwagt OHTL (80 km) – Q1
4. HR 1. 2. 3. 4. Pro 1. 2. 3. 4. 5. 6.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. jects Complete frequency conversion of Wartsila Kingston 1 Plan – Q1 Complete Versailles 6MW HFO plant – Q2 Install used 3MW HFO unit at Anna Regina – Q4 Install used 2 MW HFO Unit at Bartica – Q4 Complete new Sophia to Onverwagt OHTL (80 km) – Q1 Place orders for materials for OHTL extension from Edingburg to Parika – Q2
4. HR 1. 2. 3. 4. Pro 1. 2. 3. 4. 5. 6. 7.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. ojects Complete frequency conversion of Wartsila Kingston 1 Plan – Q1 Complete Versailles 6MW HFO plant – Q2 Install used 3MW HFO unit at Anna Regina – Q4 Install used 2 MW HFO Unit at Bartica – Q4 Complete new Sophia to Onverwagt OHTL (80 km) – Q1 Place orders for materials for OHTL extension from Edingburg to Parika – Q2 Place order for submarine cable and accessories for crossing from Parika to Leguan – Q2
4. HR 1. 2. 3. 4. Pro 1. 2. 3. 4. 5. 6. 7. 8.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. Ojects Complete frequency conversion of Wartsila Kingston 1 Plan – Q1 Complete Versailles 6MW HFO plant – Q2 Install used 3MW HFO unit at Anna Regina – Q4 Install used 2 MW HFO Unit at Bartica – Q4 Complete new Sophia to Onverwagt OHTL (80 km) – Q1 Place orders for materials for OHTL extension from Edingburg to Parika – Q2 Place order for submarine cable and accessories for crossing from Parika to Leguan – Q2 Place order for materials for transmission line across Leguan – Q2,
4. HR 1. 2. 3. 4. Pro 1. 2. 3. 4. 5. 6. 7. 8. 9.	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. Ojects Complete frequency conversion of Wartsila Kingston 1 Plan – Q1 Complete Versailles 6MW HFO plant – Q2 Install used 3MW HFO unit at Anna Regina – Q4 Install used 2 MW HFO Unit at Bartica – Q4 Complete new Sophia to Onverwagt OHTL (80 km) – Q1 Place orders for materials for OHTL extension from Edingburg to Parika – Q2 Place order for submarine cable and accessories for crossing from Parika to Leguan – Q2 Place order for submarine cable and accessories for crossing from Leguan to Wakenaam – Q2. Place order for submarine cable and accessories for crossing from Leguan to Wakenaam – Q2.
4. HR 1. 2. 3. 4. Pro 1. 2. 3. 4. 5. 6. 7. 8. 9. 10	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. Ojects Complete frequency conversion of Wartsila Kingston 1 Plan – Q1 Complete Versailles 6MW HFO plant – Q2 Install used 3MW HFO unit at Anna Regina – Q4 Install used 2 MW HFO Unit at Bartica – Q4 Complete new Sophia to Onverwagt OHTL (80 km) – Q1 Place order for materials for OHTL extension from Edingburg to Parika – Q2 Place order for submarine cable and accessories for crossing from Parika to Leguan – Q2 Place order for submarine cable and accessories for crossing from Leguan to Wakenaam – Q2, Place order for materials for transmission line across Wakenaam – Q2 Place order for materials for transmission line across Wakenaam – Q2
4. HR 1. 2. 3. 4. Pro 1. 2. 3. 4. Pro 1. 2. 3. 4. Pro 1. 2. 3. 4. 5. 6. 7. 8. 9. 100 11	Continuously review the benefit of various initiatives to focus field activity. /Admin Maintain and manage continuous training program. Implement rationalization plan. Complete new building in New Amsterdam for Networks, Commercial Services and Loss Reduction. – Q4 New building in Middle Street 10% complete – Q4. ojects Complete frequency conversion of Wartsila Kingston 1 Plan – Q1 Complete Versailles 6MW HFO plant – Q2 Install used 3MW HFO unit at Anna Regina – Q4 Install used 2 MW HFO Unit at Bartica – Q4 Complete new Sophia to Onverwagt OHTL (80 km) – Q1 Place order for materials for OHTL extension from Edingburg to Parika – Q2 Place order for submarine cable and accessories for crossing from Parika to Leguan – Q2 Place order for submarine cable and accessories for crossing from Leguan to Wakenaam – Q2, Place order for materials for transmission line across Wakenaam – Q2 Place order for materials for transmission line across Wakenaam – Q2 Place order for submarine cable and accessories for crossing from Leguan to Essenuibo

Coast – Q2

12. Place order for materials for transmission line along Essequibo Coast - Q2

13. Complete New Diamond Sub Station – Q1

14. Complete New Georgetown Sub Station – Q1

15. Complete extended Sophia sub-station – Q1

16. Complete New Good Hope Sub Station – Q1

17. Complete New Mahaicony (Columbia) Sub Station – Q1

18. Complete expansion of Onverwagt sub-station – Q1

19. Complete SCADA – Q2

20. Place order for materials and equipment for Parika sub-station – Q1

21. Place order for materials and equipment for Leguan sub-station – Q4

22. Place order for materials and equipment for Wakenaam sub-station - Q4

23. Place order for materials and equipment for two Essequibo Coast sub-stations - Q4

24. Complete new Williamsburg sub-station - Q2

25. Linden Sub Station 40% complete – Q4

26. Implement electrification programme – 4,000 lots. – Q4

Operations

- 1. Complete upgrade of 180kM of LV network Q4
- 2. Install 12 remote controlled re-closers Q4
- 3. Complete Georgetown frequency conversion Q1
- 4. Introduce 700 alternative structures (steel and concrete) Q4.

2014

Management/Overall Coordination

- 1. Manage all IPP obligations (hydro) to ensure delivery on time and within budget.
- 2. Ensure that key skills are developed and retained.
- 3. Maintain certification with ISO 9001 Quality system.
- 4. Ensure internal communications are adequate and efficient to support achievement of CSS & OS&PT.

Commercial

- 1. Ensure Customer Service Standards are met consistently. Complete review of procedures and recommend changes as necessary, July 5th and Dec. 15th.
- 2. Optimize tools available in CIS to direct loss reduction field efforts.
- 3. Work pro-actively with Legal to recover balances on inactive accounts.

Finance

- 1. Manage cash flows in accordance with budget and to optimize working capital.
- 2. Secure funding for all capital projects and ensure timely financial statements reports.
- 3. Ensure efficient procurement process in compliance with procedures, and adequate,

reliable and efficient inventory management system.

Loss Reduction

- 1. Replace 6,000 meters with pre-paid meters
- 2. Meter 3,500 New Services
- 3. Implement the Strategic Loss Reduction Plan (SLRP).
- 4. Continuously review the benefit of various initiatives to focus field activity.

ΙT

- 1. Optimize and maintain Local and Wide Area Network performance.
- 2. Manage Hardware and software infrastructure to ensure 99.9% system availability.
- 3. Optimize security and integrity of corporate systems

HR/Admin

- 1. Maintain and manage continuous training program.
- 2. Complete new Middle Street building.
- 3. Complete Company right-sizing review.

Projects

- 1. Complete submarine cable crossing Parika to Leguan Q4
- 2. Complete transmission line across Leguan Q4
- 3. Complete submarine cable crossing between Leguan and Wakenaam Q4.
- 4. Complete transmission line across Wakenaam Q4.
- 5. Complete Parika sub-station Q3
- 6. Complete Leguan Sub-station Q4
- 7. Complete Wakenaam Sub-station Q4
- 8. Complete Linden Sub-station Q3.
- 9. Complete cable crossing between Wakenaam & Essequibo Coast Q4.
- 10. Complete transmission line across Essequibo Coast Q4
- 11. Complete frequency conversion of Anna Regina power plant. Q4

Operations

- 1. Complete 80Km of LV network upgrade Q4.
- 2. Complete Essequibo Coast network frequency conversion Q4.
- 3. Employ 2,100 alternative structures Q4
- 4. Complete distribution load balancing Q4
- 5. Complete Leguan network voltage upgrade Q4

Ma	anagement/Overall Coordination
1.	Ensure that key skills are developed and retained.
2.	Maintain certification of ISO 9001 Quality system.
3.	Ensure internal communications are adequate and efficient to support achievement of CSS
	& OS&PT.
Со	mmercial
1.	Ensure Customer Service Standards are met consistently. Complete review of procedures
	and recommend changes as necessary, July 5 th and Dec. 15 th .
2.	Optimize tools available in CIS to direct loss reduction field efforts.
3.	Work pro-actively with Legal to recover balances on inactive accounts.
Fir	ance
1.	Manage cash flows in accordance with budget and to optimize working capital
2.	Secure funding for all capital projects and ensure timely financial statements reports
ΙT	
1.0	Optimize and maintain Local and Wide Area Network performance.
2.1	Nanage Hardware and software infrastructure to ensure 99.9% system availability.
3.0	Optimize security and integrity of corporate systems
Lo	ss Reduction
1.	Replace 6,000 meters with pre-paid meters
2.	Meter 4,200 New Services
3.	Implement the Strategic Loss Reduction Plan (SLRP).
HR	/Admin
1.	Maintain and manage continuous training program
2.	Implementing staff right-sizing plan.
Ор	erations
1.	Employ 2,200 alternative structures.
2.	Complete 40km LV network upgrade.

2016

Management/Overall Coordination

- 1. Ensure that key skills are developed and retained.
- 2. Maintain certification of ISO 9001 Quality system.
- 3. Ensure internal communications are adequate and efficient to support achievement of CSS & OS&PT.

Со	mmercial
1.	Ensure Customer Service Standards are met consistently. Complete review of procedures
	and recommend changes as necessary, July 5 th and Dec. 15 th .
2.	Optimize tools available in CIS to direct loss reduction field efforts.
3.	Work pro-actively with Legal to recover balances on inactive accounts.
Fin	nance
1.	Manage cash flows in accordance with budget and to optimize working capital
2.	Secure funding for all capital projects and ensure timely financial statements reports
I T	
1.0	Optimize and maintain Local and Wide Area Network performance.
2.1	Manage Hardware and software infrastructure to ensure 99.9% system availability.
Lo	ss Reduction
1.	Replace 6,000 meters with pre-paid meters
2.	Meter 3,800 New Services
3.	Implement the Strategic Loss Reduction Plan (SLRP).
HR	/Admin
4.	Maintain and manage continuous training program
Ор	perations
1.	Upgrade 45km of LV network.
2.	Employ 2,500 alternative structures.

Monitoring, Review and Management of Plan

GPL will review and revise its strategic plan as appropriate semi-annually, based on reports presented by management to the Board of Directors and decisions of the Board. Management's detailed operating plans will be consistent with its strategic plan.

3. OPERATING STANDARDS AND PERFORMANCE TARGETS

The Availability Target is based on the ratio of declared capacity and available hours to installed capacity and hours in the period.

Category	Analysis and Projections							
Customer	Targets for System Avera	age Interruptio	n Frequency In	dex (SAIFI) a	and			
Interruptions	System Average Interrupt	ion Duration I	ndex (SAIDI)	proposed for 2	2012 - 2016	are:		
	SAIFI = <u>Total Numb</u> Total C SAIDI = <u>Total Custo</u> Total Cu	ber of Custome Sustomers Server mer Hours of I stomers Server	<u>r Interruptions</u> ed <u>nterruptions</u> d					
		2012	2013	2014	2015	2016		
	SAIFI	120	80	85	68	65		

Category	Analysis and Projections					
	SAIDI	180	120	115	103	98

Voltage Regulation	 The nominal voltage and frequency levels are indicated in paragraph 3.6 of the Standard Terms & Conditions. GPL will seek to maintain, in stable conditions voltages, of ±5% of the nominal voltage and ± 10% following a system disturbance. Since it is difficult to monitor the voltage delivered to each customer the Standard is based on number of voltage complaints and th time taken to resolve them. 							
		2012	2013	2014	2015	2016		
	100% of customer voltage complaints due to network reconfiguration, vegetation, upgrade of lines, additional transformer, etc.	60 days	45 days	30 days	30 days.	30 days		

Category	Definition of Target					
Meter Readings	Large Consumers – Maximum Demand ConsumersProduce Ninety-Seven percent (97%) of Maximum Demand Bills based on actual meter readingsDomestic and Small Business ConsumersProduce Ninety percent (90%) of non Maximum Demand Bills based on actual meter readings.					
		2012	2013	2014	2015	2016
	MD Cons. 97% 97% 97% 97% 97%					
	Non MD	90%	90%	90%	90%	90%

Category	Definition of Target									
Issuing of bills	Issue Non Maximum Demand Bills within ten (10) days of meter readingIssue Maximum Demand Bills within seven (7) days of meter reading									
	Days	2012	2013	2014	2015	2016				
	Non MD	Non MD 10 10 10 10 10								
	MD	7	7	7	7	7				
Category	Definition	of Target								
Accounts Receivable	The status of GPL accounts receivable is stated in its audited annual financial statements. The quoted figures are net of provision for doubtful debts. Unlike the figures in the financial statements the receivables as per the billing system include GEC's receivables.									
	Net	2012	2013	2014	2015	2016				
	Days	50	45	30	30	30				
Accounts Payable	While most of GPL's Creditors offer 30 days credit some of the largest ones actually offer up to sixty days. The determination of this target is from the invoice date.									
		2012	2013	2014	2015	2016				
	Days	30	26	26	26	26				

Losses	The level of losses at Dec. 2011 is projected at 30.3% of dispatched power with technical losses estimated at 14.5% and non-technical at 15.8%. The total projected losses as a percent of dispatched power are included below, along with the forecasted split: The Company expects to achieve these targets at end of the respective years.									
	2012 2013 2014 2015 2016									
	Technical (%)	14.65	13.75	13.15	13.05	13.15				
	Non-Technical (%)	14.0	12.4	11.7	11.3	11.0				
	Overall (%)	28.65	26.15	24.85	24.35	24.15				
Availability= Available capacity x Total Available HoursAverageInstalled capacity x Hours in the period										
		2012	2013	2014	2015	2016				
	Availability	75%	75%	75%	80%	80%				

4. DEVELOPMENT AND EXPANSION PROGRAMME 2012 - 2016

4.1 Demand Forecast

The demand forecast was done utilizing a median forecast done for the Amaila Falls hydro project. This forecast used an annual growth of 4.7 to 4.9%, except in 2015 when Linden consumers and 25% of the forecasted demand from self-generators were included. GPL has modified the Mercados forecast between 2012 and 2016 to reflect a more accurate loss position, connection of new consumers every year and the other indicators explained below:

(a) Natural growth

GPL used Mercados' median forecast which forecasted natural growth of between 4.7 and 4.9% per year. The forecast for 2015 includes all the demand in Linden and 25% of the forecasted demand from all the major self generators in Demerara and eighty former (Pre-2003) large GPL customers. The 2016 forecast includes a further 50% of the forecasted off-grid demand. No consideration has been taken of any new industrial development requiring significant power.

(b) New Customers

Net customer growth over this planning period has been projected at 23,200. This includes additions from recently served areas and from new housing developments. Average monthly use of 90kWh has been estimated for each new customer.

By 2013 another electrification project, targeting about 4,000 consumers would be necessary. This expectation is based on the rate at which housing expansion is being experienced and the addition of Linden to the national grid in 2014. With greater efficiency and reduced production costs being reflected in the tariffs, the customer base and demand will grow steadily.

(c) Loss Reduction

Progress in loss reduction and demand side management should result in reduced demand and increased sales. In the forecast, 40% of the recovery resulting from meter replacements and

electricity theft and all the reductions resulting from billing errors are flowing to increased sales while the other 60% recovery from meter replacements and electricity theft and all the technical loss reduction will result in reduced demand. 5% of all technical loss reduction (0.068%) is projected to come from demand side management initiatives.

(d) Tariff rebalancing

It has been established that Tariff A is being subsidized by almost 33% and that Tariffs B, C, D and all Government tariffs are providing this cross-subsidy. While progress on loss reduction has been projected each year of the programme, GPL intends to use the additional cash flow to continue to invest in loss reduction and to ensure any reasonable escalation in fuel prices above the forecasted annual increases of 8% can be met without recourse to tariff increases.

It is intended however that when hydropower is available commercially by November 2015 that a complete rebalancing will be done to reflect the actual economic tariff for each category. GPL will also, in 2015 introduce a new tariff category; call a high voltage industrial category, which will target users with a demand of 2.5 MVA and above.

(e) **Reduction in un-served energy**

A reduction in energy not served associated with generation shortfall and network unavailability. This will be achieved by having:

- Adequate reserve generation capacity to cater for planned maintenance and emergency repairs;
- New base-load plants to meet base-load needs more reliably;
- Shorter feeders with multiple alternative feeds and enhanced maintenance capability and coordination;

(f) Reduction in parasitic power consumption

The frequency standardization project in Georgetown will result in the removal of the frequency converters from their usual duty. The annual losses in the converters exceed 5GWh. The use of new generating plants for base-load operation would reduce the dependency on older plants using up to 6% (New plants use about 2.7%) of their generation for auxiliaries.

The results of this forecast for the entire system are included in the table below.

	2011	2012	2013	2014	2015	2016
Net Generation (MWH)	626,478	662,718	701,097	744,211	829,959	982,034
Sophia Aux. (MWH)	492	246	15	15	15	15
Converter losses (MWH)	4,135	2,067	-	-	-	-
Station Auxilary (MWH)	20,445	21,636	22,894	24,306	19,139	22,259
%	3	3	3.16	3.16	2.25	
Gross generation	651,550	686,667	724,006	768,532	849,112	1,004,309
% Growth	4.04	5.39	5.44	6.15	10.48	18.28

Table 4.1.1: Projected Demand and Energy.

Table 4.1.2. Regional Tolecast							
ESSEQUIBO	2010	2011	2012	2013	2014	2015	2016
Net Energy	31,855	33,163	35,480	37,811	40,337	42,378	45,003
Load factor -%	0.62	0.62	0.62	0.62	0.63	0.63	0.63
Peak	6.12	6.41	6.86	7.31	7.67	7.87	8.24
Gross Energy	33,257	34,821	37,254	39,702	42,353	43,437	45,453
Aux use	0.044	0.05	0.05	0.05	0.05	0.025	0.01
DEMERARA	2010	2011	2012	2013	2014	2015	2016
Net Energy	475,926	493,678	522,206	552,427	586,384	665,067	807,754
Peak	78	77	81	85	89	99	118
LF	0.72	0.76	0.765	0.77	0.775	0.79	0.8
Sop. Aux Use & Converter Losses	5,835	4,627	2,314	15	15	15	15
Gross energy	494,849	514,103	541,230	570,120	605,163	683,038	829,578
Aux Use	0.0275	0.032	0.032	0.032	0.032	0.027	0.027
BERBICE	2010	2011	2012	2013	2014	2015	2016
Net Energy	97,405	99,637	105,032	110,859	117,491	122,515	129,278
Peak	19	20	20	21	22	23	24
LF	0.60	0.60	0.62	0.62	0.62	0.62	0.62
Gross Energy	98,168	102,626	108,183	114,185	121,016	122,637	129,278
Aux use	0.0078	0.0300	0.0300	0.0300	0.0300	0.0010	0.0000
Total	626,274	651,550	686,667	724,006	768,532	849,112	1,004,309

Table 4.1.2: Regional Forecast

Table 4.1.3: GPL 1	5-Year Fored	ast						
Year	2012	2013	2014	2015	2016	2017	2018	2019
Growth	0.045	0.057	0.056	0.254	0.102	0.047	0.047	0.047
Net Energy (MWH)	686,667	724,006	768,532	849,112	1,004,309	1,103,590	1,155,144	1,209,642
Year	2020	2021	2022	2023	2024	2025	2026	2027
Growth	0.047	0.048	0.048	0.048	0.049	0.049	0.049	0.049
Net Energy (MWH)	1,267,042	1,327,596	1,391,443	1,458,543	1,529,446	1,604,111	1,682,893	1,765,544

The forecasted load factors are based on historical trends and the expectation of an accelerated growth in industrial demand, particularly when hydropower is available.

The DBEIS peak demand (except Bartica) is projected to grow to 128.5MW by 2015. It should be noted that the Off-Grid demand informing the demand forecast for 2015 is adding 7.5MW to the peak.

4.2 <u>Planned Retirements and Generation Expansion, DBIS</u>

The Generation Expansion Programme (GEP) is premised on the independent operation of the Demerara Interconnected System (DIS) and Berbice Interconnected System (BIS) until 2013 when the completion of the Sophia – Onverwagt transmission link would realize the Demerara-Berbice Interconnected System (DBIS). The GEP is also premised on the interconnection of the Leguan, Wakenaam and Essequibo Coast Systems by 2014.

The integration of the DIS and BIS in 2013 and three of the four isolated Essequibo Systems by 2014 would allow not only an optimum merit order dispatch to be derived from available generating capacity in the systems but also for reserve capacity to be shared. The integrated system coupled with the installation of new substations would improve system management,

stability and overall service quality, particularly voltage regulation. The Company would be able to dramatically reduce operating cost on the Islands of Leguan and Wakenaam.

Completion of the transmission link to Vreed-en-Hoop by 2012 along with the sub-stations there and Edingburg would allow for generation capacity at Versailles to be relegated to peaking and or reserve duty and the West Coast to be served by three feeders instead of one. The existing 13.8Kv link with GoE will be retained as an alternative source of power.

The Georgetown 60Hz standardization plan, which is expected to be completed by the first quarter of 2013 is premised on the 22MW Wartsila built plant at Kingston being converted to 60Hz, starting in the final quarter of 2012. The plant will be converted in two phases with each phase lasting approximately three months. During this period 11MW capacity would be unavailable which would create a deficit in generation capacity in Demerara, using the usual reserve criteria. The current plan is to use rented Cat modules to cover the shortfall.

The criterion for reserve capacity used is the size of the two largest units, resulting in a reserve of 15.6MW in the DIS and 11MW in the BIS. By November 2015, with the availability of 140MW of hydropower capacity, GPL would have to maintain adequate capacity in 2016 to cater for planned maintenance / inspection for a period of 1.5 months when no power will be delivered from the hydro. From 2015 a reserve capacity of 50MW is considered more appropriate as this would be adequate to power all the essential services and provide some semblance of supply (in addition to what can be dispatched from GuySuCo) to customers in the unlikely event that the double circuit transmission interconnection fails. Realistically, GPL will maintain all its generating capacity, where feasible.

Existing Capacity, MW	2012	2013	2014	2015	2016
DEMERARA					
Garden of Eden Power Station	7.00	7.00	7.00	0.00	0.00
Demerara Power (Kingston 1)	22.00	22.00	22.00	22.00	22.00
Demerara Power, (Kingston 11)	36.30	36.30	36.30	36.30	36.30
Demerara Power 1 (GoE)	22.00	22.00	22.00	22.00	22.00
Versailles Power Station	2.20	2.20	2.20	2.20	0
Mobile Units	6.00	6.0	0	0	0
Total Demerara	95.50	95.50	89.50	82.50	80.30
Reserve Capacity	15.00				
Peak Demand	81				
Excess (Shortfall)	(0.5)				
BERBICE	2012	2013	2014	2015	2016
Canefield					
No.3 Mirrlees Blackstone	5.0	5.0	5.0	5.0	5.0
No. 4 Mirrlees Blackstone	5.0	5.0	5.0	5.0	5.0
Mobile Units	3.0	3.0	0	-	
Onverwagt					
No. 5 & 6 General Motors	4.4	4.4	0	0	0
IPP	8.0	8.0	8.0	8.0	8.0
Total Berbice	25.40	25.40	18.00	18.00	18.00

Table 4.2.1: Capacity Forecast W/O Additions, DBEIS

Reserve Capacity	10.00				
Peak Demand	20				
Excess (Shortfall)	(4.6)	(5.6)			
Total DBIS	120.90	120.90	107.50	100.50	98.30
Total DBEIS				104.50	102.30
Diesel Fired Capacity (DFC)	22.60	22.60	9.20	2.2	0.0
Reserve Capacity		15.00	15.00	50.00	50.0
Net Capacity		105.90	92.50	54.50	52.30
Peak Demand		106	111.00	128.	149.0
Excess(Shortfall)		(0.10)	(18.5)	(73.5)	(96.7)

The forecast indicates that there is a need for 73.5MW of additional generating capacity by 2015, of which 24.6MW is for replacement capacity (Note that with hydro the reserve capacity has been increased to 50MW in 2015 and that peak has been projected to grow by 7.5MW due to self generators and Linden being served by GPL). The proposed additions are included in Table 4.2.2 below.

Table 4.2.2: Proposed Generation Addition, DBEISCapacity Additions, MW20122013

Capacity Additions, MW	2012	2013	2014	2015	2016
Hydro IPP	-	-	-	165.0	0
Versailles addition	-	6.0	-	-	-
Anna Regina	-	3.0	-	-	-
Bartica	-	2.0	-	-	-
New Additions	0.0	11.0	0	0	0
Total Available new Capacity	0.0	11.0	11.0	176.0	176.0
Excess(shortfall) – Demerara	(0.5)				
Excess (Shortfall) – Berbice	(4.6)				
Excess (Shortfall) – DBIS		5.9	(13.5)		
`Excess (Shortfall) - DBEIS				102.5	79.30
Diesel Fired Capacity to be used for peak	0.0	0.0	9.2	0	0

In Berbice, the completion of the Canefield 10MW upgrade and HFO conversion by 2011 coupled with a commitment from GuySuCo to provide between 8 - 12MW (out and in crop) will provide adequate capacity until 2014. Since the PPA between GPL & GuySuCo provides for a guarantee capacity of 8MW, this amount is reflected in the plan. The projected shortfall shown in 2014 would be met by rented mobile generating capacity.

4.3 <u>Essequibo Generation Expansion</u>

The expansion plan for Essequibo includes the installation in 2012 of two 600kVa gensets at Leguan and one similar unit at Wakenaam. In 2013 it is proposed to install a used 3MW HFO fired Unit at Anna Regina and a used 2MW HFO fired unit at Bartica.

4.4 <u>Use of Renewable Sources of Energy</u>

(a) Co-generation

Renewable energy has begun to make a contribution, albeit small, with the commissioning of the Skeldon 30MW co-generation facility since 2008. While operational and other difficulties since its

commissioning have severely limited the dispatch of power from the co-generation facility, GuySuCo is guaranteeing twenty-six weeks of co-generation operation from 2012.

(b) Hydro Power

The 165MW Amaila Falls Hydroelectric Project is expected to be completed by November 2015 with at least 140MW becoming available at the delivery points (Linden and Sophia). This project, with adequate compensation in the GPL network (which has been provided for in this Programme), should provide 91% of all GPL's energy requirements by 2016.

The contractor identified for the construction of the Amaila Falls hydropower project is projecting a forty-two month construction period. Work on the access road, which was financed by the Guyana Government, is well advanced.

Financial close is expected to occur by the first quarter of 2012 and construction is expected to start shortly after. With financial close, the tariff will be determined but this is not expected to exceed US\$0.11/kWh. Initiatives to reduce the tariff by buying down the equity during the early years would be limited by a minimum threshold for its equity set by Sithe.

The annual guaranteed energy is expected to be 900GWh but the potential would be about 1,200GWh. GPL will implement initiatives to develop the market to realize the best tariff as an annual cash flow has to be guaranteed to the IPP.

While it is critical that GPL employ initiatives to expand the market, such expansion has to be managed to ensure available generation and network capacity remain adequate and the Company is not forced into expensive short term fixes.

(c) Wind Power

Guyana Windfarm Inc. has been acquired by 360 Degree and they have indicated an interest in continuing to pursue a project at Hope Beach. They are considering a 20-25MW facility and have submitted a commercial proposal to GPL. No decision has been made regarding this proposal. It has been considered prudent not to include the wind farm in the projections.

4.5 PLANS TO MEET GENERATION NEEDS OVER 15-YEAR FORECAST

GPL's strategic long term generation plan is premised on the continued use of renewable sources of power to meet base-load generation needs. The development of a large hydropower facility by the Brazilians at Turtruba would assist GPL to meet its incremental power needs when the capacity at Amaila becomes inadequate by 2018. At this time, no expansion of the Amaila project is contemplated.

It would be recognized that the changes in global weather patterns would impact water availability for any hydro development, both positively and negatively. GPL would therefore continue to maintain a minimum of 50MW of fossil fuel capacity to fill capacity gaps.

4.6 **GENERATION MAINTENANCE PLAN – 2011**

4.6.1 GPL Owned – Wartsila Operated & Maintained

								2012						
WOGI 1		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total (hrs)
	Run hrs	142,433	143,071	143,755	144,424	145,106	145,768	146,460	147,142	147,803	148,495	149,155	149,839	
Eng No. 1	Type Maint.	,	2K	3K		4K	5K	,	6K	7K	,	8K	9K	
6163			142,800	143,800		144,800	145,800		146,800	147,800		148,800	149,800	
	Duration (hrs)		10	8		10	8		10	8		10	8	72
	Run hrs	142,371	143,019	143,701	144,362	145,054	145,714	146,398	147,090	147,749	148,433	149,103	149,785	
Eng No. 2	Type Maint.	1k		2K	3k		4K	5k		6K	7k		8K	
6164		141,996		142,996	143,996		144,996	145,996		146,996	147,996		148,996	
	Duration (hrs)	8		10	8		10	8		10	8		10	72
	Run hrs		647	1,331	1,991	2,683	3,344	4,026	4,718	5,380	6,062	6,731	7,415	
Eng No. 3	l ype Maint.	Comm		1K	2K		3K	4K		5K	6K		7K	
/39/	Duratian (has)			1,000	2,000		3,000	4,000		5,000	6,000		7,000	<u></u>
	Duration (nrs)	400.004	400 540	8	10	405 577	8	10	407.040	8	10	400.000	8	62
Eng No. 4	Run nrs Turne Meint	122,894	123,542	124,224	124,885	125,577	126,237	126,921	127,613	128,272	128,956	129,626	130,030	
Z10 NO. 4	rype maint.	3N 122 700		0N 122 700	/ N 124 700		0N 125 700	9N 126 700		10K	129 700		120 700	
1390	Duration (hrs)	8		123,790	8		10	8		10	8		288	350
WOGL2	Run hrs	113 966	114 604	115 278	115 938	116 610	117 262	117 944	118 122	118 782	119 454	120 114	120 796	000
Eng No. 1	Type Maint	110,000	8K	9K	110,000	10,010	11K	117,011	12K	110,102	1K	120,114	2K	
7651	Type Maint.		114 168	115,168		116,168	117,168		118 168		119,168		120 168	
1001	Duration (hrs)		10	8		10	8		504		10		120,100	550
	Run hrs	107.401	108.039	108.721	109.381	110.053	110.705	111.387	112.059	112,711	113.393	114.043	114.717	
Eng No. 2	Type Maint.	12K	,	1K	,	2K	3K	,	4K	5K	,	6K	7K	
7653		107,305		1,000		2,000	3,000		4,000	5,000		6,000	7,000	
	Duration (hrs)	48		8		10	8		10	8		10	8	110
	Run hrs	95,411	96,041	96,723	97,373	98,047	98,707	99,379	100,053	100,713	101,385	102,037	102,719	
Eng No. 3	Type Maint.	12K	1K		2K	3K		4K	5K		6K	7K		
7652		95,233	96,233		97,233	98,233		99,233	100,233		101,233	102,233		
	Duration (hrs)	504	8		10	8		10	8		10	8		566
	Run hrs	105,946	106,584	107,258	107,908	108,590	109,242	109,914	110,596	111,248	111,920	112,580	113,254	
Eng No. 4	Type Maint.	2K		3K	4K		5K	6K		7K	8K		9K	
7650		105,991		106,991	107,991		108,991	109,991		110,991	111,991		112,991	
	Run hrs	10		8	10		8	10		8	10		8	72
WOGI 3	Run hrs	18,395	19,042	19,734	20,404	21,096	21,765	22,457	23,149	23,819	24,511	25,180	25,872	
Eng No.1	Type Maint.	6K	7K		8K	9K		10K	11K	12k		1k	2K	
		17,929	19,000		20,000	21,000		22,000	23,000	24,000		25,000	26,000	
132184	Duration (hrs)	10	8		10	8		10	8	366		8	10	438
	Run hrs	17,876	18,523	19,215	19,885	20,577	21,246	21,938	22,630	23,300	23,992	24,661	25,353	
Eng No.2	Type Maint.	6K		7k	8K		9k	10K		11k	12K		1K	
132186	Duration (hrs)	17,990		19,000	20,000		21,000	22,000		23,000	24,000		25,000	
		10		8	10		8	10		8	336		8	398
	Run hrs	17,820	18,467	19,159	19,829	20,521	21,190	21,882	22,574	23,244	23,936	24,605	25,297	
Eng No.3	Type Maint.		6k	7k		8k	9K	10K		11K	12K		1k	
132185	Run hrs		18,408	19,000		20,000	21	22,000		23,000	24,000		25,000	
			10	8		10	8	10		8	366		8	428
		2,986	3,633	4,324	4,993	5,685	6,354	7,046	7,738	8,407	9,098	9,768	10,459	
Eng No.4		3K		4K	5K		6K	7K		8K	9K		10K	
210993		3,000		4,000	5,000		6,000	7,000		8,000	9,000		10,000	
		8		10	8		10	8		10	8		10	72
		2,960	3,607	4,298	4,967	5,659	6,328	7,020	7,712	8,381	9,072	9,742	10,433	
Eng No.5		3K		4K	5K		6K	7K		8K	9K		10K	
210994		3,000		4,000	5,000		6,000	7,000		8,000	9,000		10,000	
		8		10	8		10	8		10	8		10	72
	Total hrs	614	46	96	82	56	96	92	540	454	774	36	376	3,262

4.6.2	GPL – Owned & Operated
1621	Domorara

4.	.0.2.1		Den	ierard	1									
Location	Units	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mthly Running Hrs
Versailles	#1 Cat	Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs		Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs		Top Overhaul	Service & Repairs	400
	#2 Cat	Service & Repairs	Service & Repairs	Service & Repairs		Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs	Major Overhaul	Service & Repairs	Service & Repairs	Service & Repairs	400
	#3 Cat		Service & Repairs	Service & Repairs	Service & Repairs		Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs		Service & Repairs	400
	#6 GM	Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs	Top Overhaul	Service & Repairs	500						
Leonora	#1 Cat	Top Overhaul	Service & Repairs	Service & Repairs		Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs		Service & Repairs	Service & Repairs	400
	#2 Cat		Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs		Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs	400
	#4 Cat	Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs	Service & Repairs		Top Overhaul	Service & Repairs	Service & Repairs	Service & Repairs		Service & Repairs	400
Location	Units	Jan	Feb	March	April	Мау	June	July	August	Sept	October	Nov.	Dec.	Avg Mthly Running Hrs
GOE	#2 Crossley	Service & Repairs			200									
	#4 Crossley		Service & Repairs		Service & Repairs				Service & Repairs			Service & Repairs		200
	#5 Nigata	Our de la C	Major overhaul	Queries 0	Martan	Service & Repairs	Queries 0		Service & Repairs		Querrie a	Service & repairs	Our de la c	400
	#6 Nigata	Service & Repairs		Repairs	Major Overhaul		Repairs	Service *	Repairs		Repairs		Service & Repairs	400
	#9 Cat	Repairs Service &			Repairs Service &			Repairs	Service &		Repairs		Service &	150
	#11 Cat	Repairs			Repairs				Repairs				Repairs	150

4.6.2.2 Berbice

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CANEFIELD													
		4th	9th	1ST	12th	3rfD	14th	5th	16th	3rd	17th	7th	19th
	T - CM-internet	8,000 hrs @		1,000 hrs	10,000 hrs	500 hrs @	1,500 hrs @	12,000 hrs	1,000 hrs @	1,500 hrs	500 hrs @	500 hrs @	150,00 hrs
	Type of Maintenance	109,342	500 @ 109,842	@ 110,342	@ 111,342	111,842	112,842	MAJOK @ 112.242	114,342	@ 114,842	115,842	115,842	@ 117,342
NO. 3 MIRRLEES				22nd		24th		26th		26th		28th	
				1,500 hrs		1,500 hrs		500 @		14,000 @		1,500 @	
	Type of Maintenance			@ 110,842		@ 112,342		111,842		115,342		116,842	
		13th	2nd	15th	5th	18th	8th	20th	10th	21th	12th	2nd	14th
			1.000 hrs @	500 hrs @	1.000 hrs	500 hrs @	1.000 hrs @	500 hrs @	6.000 hrs @	1.000 hrs	1.500 hrs	500 hrs @	1000 @
	Type of Maintenance	500 hrs @ 149,398	149898	150,898	@ 151,398	152,398	152,898	153,898	154,398	@ 155,398	@ 155,898	156,398	157,398
NO. 4 MIRKLEES			22nd		27th		2045		20th			22nd	
			3000 hrs @		1500 hrs		6000 hrs @		1500 hrs @			500 hrs @	
	Type of Maintenance		150.398		@ 151.898		153,398		154.898			156.898	
NO. 10 CAT	T CM-i	500 h @ 12 714		1,0000 hrs		1,500 hrs		2,000 hrs		500 hrs @		1,000 hrs	
	Type of Maintenance	500 hrs @ 12,714		@ 13,214		@ 13,714		@ 14,214		14,714		@ 15,214	
NO. 11 CAT	Type of Maintenance		500 hrs @		1,000 hrs		1,500 hrs @		2,000 hrs @		500 hrs @		1,000 hrs
	**		11,500		@ 12,000		12,500		13,000		13,500		@ 14,000
NO 12 CAT				1.000 hrs		1.500 hrs		2.000 hrs		500 hrs @		1.000 hrs	
NO. 12 CAT	Type of Maintenance	500 hrs @ 11,500		@ 12.000		@ 12.500		@ 13.000		13.500		@ 14.000	
ONVERWAGT													
# 5 GM		04 & 30	20	09 & 30	20	11 & 31	18	07 & 27	16	03 & 26	19	12 to 30	19
	Type of Maintenance			4,000 &		350 &		2,000 &		350 &			
		350 & 1,400	350	350	700	1,400	350	350	-700	1,400	350	8,000	350
		102828 & 103178	103 523	104128	104 478	104828 &	105 528	105778 &	106.478	107178	107 528	107 779	108 129
		102020 & 105170	105,525	104120	104,470	105178	105,526	100120	100,470	10/1/0	107,520	107,777	100,127
# 7 GM		09 & 27	17	05 & 23	10	01 & 18	06 & 27	16	01 & 20	07 & 28	18	05	16
	Type of Maintenance			350 &									
	Type of maintenance	350 & 700	1,400 hr	4,000	350	350 & 700	1,400 & 350	2,000	350 & 700	350 & 1400	350	16,000	16,000
		15502 0 15022	16.000	16633 &	17.000	17583 &	18283 &	10.000	19233 &	19933 &	20, 522	20.002	20.002
		15583 & 15933	16,283	16883	17,235	1/933	18633	18,885	19583	20283	20,633	20,883	20,883
# 8 CAT		23	24	26	27	12	19	20	17	21	22	16	24
	Type of Maintenance	6,000	6,500	7,000	TOP	TOP	8,000	8,500	9,000	9,500	10,000	10,500	11,000
		12,171	12,671	13,171	13,671	13,671	14,171	14,671	15,171	15,671	16,171	16,671	17,171
# 9 CAT		06	08	09	09	09	11	12	13	12	15	7	12
	Type of Maintenance	10,000	10,500	11,000	11,500	12,000	12,500	13,000	13,500	14,000	14,500	MA	JOR
		41,368	41,868	42,368	42,868	43,368	43,868	44,368	44,868	45,368	45,868	46368	46368

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
ANNA REGINA		19th	9th	1st	12th	3rd	14th	5th	16th	6th	18th	8th	20th
		1000 Hrs (11 000	500 Hrs	12,000 Hrs	1000 Hrs	500 Hrs	500 Hrs	1000 Hrs	2000 Hrs	500 Hrs	500 Hrs	2000 Hrs	1000 Hrs
	Type of Service	Hrs)	(11,500 Hrs)	MAJOR	(13,000 Hrs)	(13,500 Hrs)	(14,500 Hrs)	(15,000Hrs)	(16,000 Hrs)	(16,500 Hrs)	(17,500 Hrs)	(18,000 Hrs)	(19,000 Hrs)
No. 1 D/G				22nd		24th		26th		27th		29th	
				500 Hrs		2000 Hrs		500 Hrs		1000 Hrs		500 Hrs	
	Type of Service			(12,500 Hrs)		(14,000 Hrs)		(15,500 Hrs)		(17,000 Hrs)		(18,500 Hrs)	
		12th	2nd	15th	5th	17th	7th	19th	9th	20th	11th	1st	13th
	Type of Service	12,000 Hrs MAJOR	500 Hrs	500 Hrs	2000 Hrs	1000 Hrs	500 Hrs	500 Hrs	1000 Hrs	2000 Hrs	500 Hrs	1000 Hrs	2000 Hrs
No.2 D/G	Type of Service	OVERHAUL	(12,500 Hrs)	(13,500 Hrs)	(14,000 Hrs)	(15,000 Hrs)	(15,500 Hrs)	(16,500 Hrs)	(17,000 Hrs)	(18,000 Hrs)	(18,500 Hrs)	(19,000 Hrs)	(20,000 Hrs)
			23rd		26th		28th		30th			22nd	
	Type of Service		1000 Hrs		500 Hrs		2000 Hrs		500 Hrs			500 Hrs	
D A DTICA			(13,000 Hrs)		(14,500 Hrs)		(16,000 Hrs)		(17,500 Hrs)			(19,500 Hrs)	
BARIICA		• • th		a eth	e eth		_th	a =th	* oth		eth	= ath	eth
No 4 Cat		20**		13	24		5	17	28		9	20**	9
	Type of Service	1000 HRS		500HRS	1000HRS		2000HRS	500HRS	1000HRS		500HRS	2000HRS	500HRS
No 5 Cat							24 th						16 th
	Type of Service						500HRS						1000HRS
No.6 Cot		9 th	20^{th}		3 rd	15 th	26 th		7 th	18 th	30 th		11 th
Noo Cat	Type of Service	500HRS	1000HRS		500HRS	2000HRS	500HRS		1000HRS	500HRS	2000HRS		500HRS
WAKENAAM													
		10th	7	6	2	22	19	17	17	16	15	12th	6th
No 1 Cat					MAJOR								
	Type of Service	500 HRS	1000HRS	500 HRS	OVERHALT	500 HRS	1000HRS	500 HRS	1000HRS	500 HRS	1000HRS	500 HRS	1000HRS
		500 1145	20001110	50011105	OVERTIAUL	50011105	10001110	50011105	10001110	50011105	10001110	500 11105	10001110
		5th	210	26th	23rd	16th	13th	11th	8th	5th	23rd	20th	11th
No 2 Cat			27th										
	Type of Service									MAJOR			
	Type of ber nee	1000 HRS	500 HRS	1000 HRS	500 HRS	1000 HRS	500 HRS	1000 HRS	500 HRS	OVERHAUL	500 HRS	1000 HRS	500 HRS
LEGUAN													
				1st			4th				3rd		
		11th	6th	26th	18th	16th	25th	23rd	15th	10th	27th	20th	14th
No 1 Cat			oui	1000 HPS	1011	101	1000 HPS	2014	10.00	100	500 LIDS	2011	
	Type of Service	1000 LIDC	500 LID C	500 LIDC	1000 LIDC	500 LIDC	500 LIDC	1000 LIDC	500 LID C	1000 LIDC	1000 LIDC	500 LID C	1000 LIDC
		1000 HKS	200 HK2	200 HKS	1000 HKS	200 HKS	200 HK2	1000 HKS	JUU HKS	1000 HKS	1000 HKS	200 HKS	1000 HKS
No 2 Cat									27th				
	Type of Service								500 HR				

4.6.2.3 Essequibo

4.7 T&D Expansion and Modernization Plan

Expenditure over the life of this Programme on T&D expansion and modernization is expected to be US\$57.8 million and will comprise of the following:

- Construction of a 69kV transmission link between Kingston and a new sub-station at Vreed-en-Hoop and terminating at a substation at Edingburg on the West Coast.
- Construction of new 69kV substations at Golden Grove (E.B.D.), Sophia and South Georgetown (New Georgetown Substation) and expansion of the existing sub-stations at Sophia and Kingston in Demerara.
- Construction of a 69 kV transmission line from Sophia to Onverwagt, with substations at Good Hope and Columbia (Mahaica) and upgrade of the Onverwagt substation.
- Construction of a second 69Kv transmission line between Sophia and Kingston.
- Construction of a new 69Kv sub-station at Williamsburg.
- Expansion of the 69kV network from Edingburg to Parika and further to Leguan, Wakenaam and the Essequibo Coast with sub-stations at Parika, Leguan, Wakenaam and two sub-stations on the Essequibo Coast.
- Construction and interconnection of a 25MVA substation at Linden.
- Completion of the frequency conversion and upgrade of the 50Hz system in Georgetown. This includes:
 - The replacement of 17MVA, 11KV, 50Hz transformers with 13.8KV, 60Hz transformers.
 - Extension of 18Km of primary circuits.
- Re-design of the distribution network in areas with sub-feeds to allow individual connections.

- Installation of new 60Hz feeders and the re-assignment of loads in Georgetown, East Coast (both lower and upper East Coast), East Bank, West Coast and on the Corentyne.
- Introduction of pole mounted breakers with auto-reclose capability for long feeders.
- Use of pole mounted breakers with remote close capability to provide alternative feeds.
- Installation of automatic compensation equipment to maintain a Power Factor of 0.98
- Phased upgrade of secondary networks to the current construction standard and to meet fraud proofing requirements.
- Use of concrete and tubular steel structures to reduce the long term maintenance burden presented by wooden poles.
- Acquisition of specialized vehicles and equipment for T&D.

The construction of the transmission links to Berbice and West Demerara will enable the GPL to rely on more efficient HFO fired or co-generation capacity to meet its power needs and also to consolidate its reserve. The extension of the transmission line to Edingburg and the construction of a 69 kV substation at this location will not only provide a better quality, more reliable and secure supply to the West Coast Demerara but also reduce technical losses.

The Williamsburg Substation will be designed to split the Canefield to Skeldon transmission line. This will improve the supply reliability to the Substation and the manageability of the transmission system. It would also allow GPL the opportunity to use a phase shifting transformer in the future, if necessary.

The plan to install substations is aimed at improving supply quality and available distribution network capacity but will also reduce technical losses. Shorter feeders and lighter loads would also allow for improved overall management, including maintenance and reduction in un-served energy due to line plant unavailability. The timing of construction of the various Substations is targeted at optimizing network capacity to meet current demand and expected growth over a ten-year period in an efficient and timely manner.

The link between Sophia and Onverwagt will be done in three sections, one from Sophia to Good Hope, the other from Good Hope to Columbia and the third from Columbia to Onverwagt. The three-section arrangement would allow for better management and the use of phase shifting transformers in the future.

The interconnection of Leguan, Wakenaam and Essequibo Coast to the national grid by 2014 would allow for access to hydropower.

Provision has also been made for moving bulk power from the Linden delivery point (for hydro) to interconnect with the existing 13.8Kv feeders. In fact, it is proposed to have two 69Kv tie lines between the hydro delivery point and a 13.8Kv distribution point with five (5) feeders.

The cost of the proposed expansion of the T&D System is included in the following table:

T&D Capital Investment Summary -US\$'000	2012		2013	2014	2015	2016			Total
Transmission Lines	\$ 3,161	Ş	7,581	\$ 4,555	\$	\$	\$-		15,297
Substations	\$ 5,520	\$	6,803	\$ 6,880	\$ 759	Ş		\$	19,962
Compensation	\$	\$		\$ 1,130	\$	\$		\$	1,130
Distribution	\$ 3,400	\$	4,895	\$ 3,700	\$ 3,500	\$	4,250	\$	19,745
Capacity building	\$ 390	\$	350	\$	\$ 950	\$		\$	1,690
Total	\$ 12,471	\$	19,629	\$ 16,265	\$ 5,209	\$	4,250	\$	57,824

 Table 4.7:
 T&D Expansion Programme, Capital Cost – US\$ '000

While major transmission and sub-station projects will be outsourced to overseas contractors, a key strategy of this Programme is the outsourcing of major distribution capital jobs to local Contractors. The ongoing engagement of Contractors in system improvement works and network extension has allowed the Contractors to not only improve and expand the skills available to them but also their compliment of tools and equipment.

GPL would continue to provide technical training to Contractor's personnel to further improve their competence. This can only accrue benefits to GPL over time. The objectives of promoting private participation in the T&D activities of the Company are the following:

- Improved efficiency in executing major T&D upgrades and network extension;
- Reduced outages to consumers;
- Improved reliability of the T&D system as more work can be done during outages;
- Reduction of Energy not Served due to T&D faults and maintenance activities;
- Reduction of costs;
- > Reduction of Capital Investments in specialized T&D tools and equipment.

Some of the main capital works that will be outsourced during the programme are the following:

- Rehabilitation of feeder backbone structures;
- Major network rehabilitation and system upgrades;
- Secondary network upgrade.
- Network expansion.
- Specific interventions targeting areas with high levels of emergency calls;
- Customer capital jobs and system extensions;
- Vegetation management.

As a result of outsourcing these capital works, the Company will be able to find the resources to continuously upgrading the tools and equipment available to T&D crews to vastly improve productivity.

This will lead to the following benefits:

- **4** Better training of remaining work force;
- **4** Better equipped crews;
- Quicker responses to emergency calls;

4 Improved efficiency.

The Company proposes to spend a total of US\$1,690,000 over this programme on T&D equipment and vehicles. Outsourcing will continue to build momentum in 2011 and increase progressively over the following years.

Year	2012		TOTAL DEMERARA	ANNA REGINA	TOTAL ESSEQUIBO	TOTAL BERBICE	TOTAL OVERALL
TARGE	T INDICATORS						
	ł	PRIM.	630	97	200	377	1,207
PO LE REPLACEMENT		SEC.	846	131	271	595	1,712
		PRIM.	369	101	260	458	1,087
POLEPLUMBING		SEC.	347	105	274	522	1,143
POLETREATMENT		PRIM.	1,740	1,267	2,827	2,441	7,008
		SEC.	2,483	1,900	2,894	3,275	8,652
OLD POLE REMOVAL		PRIM.	652	100	204	351	1,207
		SEC.	835	116	248	602	1,685
POLESTUBBING		PRIM.	125	35	119	137	381
		SEC.	168	33	94	158	420
ANCHOR BLOCK REPL	ACEMENT.	PRIM.	74	19	58	104	236
		SEC.	115	22	63	236	414
GUY REPLACEMENT		PRIM.	95	26	45	137	277
DEDIACEMENT DEFECT	NECDOSS ADMS	DRIM	168	24	46	244	458
REPLAC EMENT DEFEC II	IVE CROSS ARMS	PRIM.	663	204	357	403	1,473
INSULATOR REPLACEM	IENT	PRIM.	511	304	224	447	1,558
		DPIM	677	95	224	204	1,000
LINE/HARDWARE TRAN	SFER	SEC	897	120	204	294	1,175
		PRIM	8	3	5	9	1,043
LINE EXTENSION (KM)		SEC.	6	5	6	44	56
		PRIM.	5	-	0	1	6
LINE UPGRADEMENT (K	M)	SEC.	12	2	5	11	28
		PRIM.	35	-	5	2	41
LINE REIENSION (KM)		SEC.	44	1	6	19	68
SERVICE LINE REPLACE	EMENT (MIS)		8,711	1,700	3,425	6,462	18,598
INSTALLATIO N/REPLAC	CEMENT (GAB)	PRIM.	45	2	2	11	58
INSTALLATION/REPLAC	CEMENT (SPD)	PRIM.	40	13	13	11	64
INSTALLATIO N/REPLAC	CEMENT (RCO)	PRIM.	289	25	47	136	472
INSTALLATIO N/REPLAC	CEMENT (PMCO)		332	114	236	189	757
TRANSFO RMER MAINTI	ENANCE	SEC.	521	86	212	569	1,302
INSTALLATION OF ADD	DITIO NAL TRANSFO RMERS	SEC.	98	8	19	23	140
MAINTENANCE OF CAP	ACITOR BANKS		50	1	1	9	60
LUMPER SERVICINC/DE		PRIM.	580	42	161	693	1,434
JUMPER SERVICING/RE	FLACEVIENT	SEC.	479	82	225	906	1,610
SERVICE CONNECTION	@ CONSUMER		3,018	950	2,081	962	6,061
INSTALLATION OF ADD	DITIO NAL EARTHS		243	30	95	257	595
ROUTE CLEARING (KM)		PRIM.	91	5	22	5	119
		SEC.	63	27	45	14	123
LINE INSPECTION (KM)		PRIM.	371	143	467	155	993
		SEC.	329	188	504	278	1,111
C.E.O.F CARDS		SEC.	2,040	325	810	741	3,591

4.7.1 Network Maintenance Plan - 2012

The T&D maintenance programme is scoped to address known defects and defects reasonably expected to be uncovered in 2012. As mentioned before, outsourcing and investments to improved GPL's maintenance capacity and capability will serve to ensure that the targets are achieved.

In Demerara, network management is divided into four areas of control, Central is responsible for the network between Liliendaal and Rahaman's turn, South is responsible for the network south of Rahaman's turn and both transmission lines, East is responsible for the network between Liliendaal and Bygeval (Mahaica) while West is responsible for the entire West Demerara.

West Berbice has responsibility for the network in west Berbice and upper East Coast, east of Bygeval. East Berbice has responsibility for all network in that area while the Essequibo office has responsibility for Essequibo Coast, Leguan, Wakenaam and Bartica.

4.8 Loss Reduction

The reduction of losses, technical and non-technical, continues to be one of the key challenges facing the GPL despite continued reduction in non-technical losses. By the end of 2011 total losses (dispatched power less billed sales) is projected to be 30.3% of dispatched power. The strategies which will be employed in our Loss Reduction programme are expected to reduce losses to at least 24.15% by the end of 2016.

4.8.1 Non-Technical Loss Reduction

It has been confirmed that the single most effective strategy to reduce non-technical losses is ensuring that there is adequate, secure metering. The ITRON programme which is intended to include all installation where the consumption is 12,000 units and above annually, has achieved 2,176 installations by September 2011, accounting for 49.5% of sales.

For other consumers, the company will continue to depend primarily on pre-paid meters (split meter), which will deliver the double benefit of reducing losses while at the same time improving customer service. It should be noted that the pre-paid meter is essentially marketing itself and over 12,000 are expected to be in service by the end of 2011. It is expected that 30,000 pre-paid meters will be installed over the next five years, replacing post-paid electromechanical and electronic meters and a further 23,200 will be installed for new services.

GPL will continue to use the ITRON meters for all Maximum Demand (MD) and large non-MD installations. The US\$5M from the IADB for loss reduction will make additional resources available for the ITRON programme.

Our billing statistics, which indicate that just over 68,000 consumers use up to 75kWh per month, confirm that theft of electricity is not only a problem in un-served and recently served areas but chronic among other consumers. The introduction of split-meter pre-paid technology and its eventual universal application for single phase services, the fraud proofing of the distribution network and the use of co-axial cables for distribution in special cases should comprehensively address this problem.

The activities envisaged over the life of this Programme require a capital investment of US\$7.8M and include:

- ▶ Installation of 30,000 split-meters by the end of 2016.
- > Continuation of raids in areas mentioned before, where electricity theft is a problem.
- Prosecution all cases of illegal electricity extraction
- > Ongoing investigation of cases of zero and persistent low consumption

- Continued use of the Intelligence Unit to process and evaluate billing data to identify anomalies.
- Utilizing intelligence to identify and prosecute individuals involved in the "business" of meter tampering.

It should be noted that investments in the distribution network to prevent illegal connections, while having non-technical loss reduction value, has been charged to LV network upgrade (Technical loss reduction).

4.8.2 Technical Loss Reduction

T&D investment in technical loss reduction will be US\$56.1M over the life of this programme. The investment will address losses at the distribution level, within both the primary and LV network. An estimate of 1.35% reduction in technical losses is projected over the life of the programme.





5 **Operations**

5.1 Sales and Revenue Collection

Sales growth from 2012 to 2016 shows an increase based on the expectation that losses will be brought down from 30.3% in 2011 to 24.15% by the end of 2016 and that 2.1% will translate fully into Sales, 23,200 new consumers will access GPL service and that normal growth will be between 4.7 and 4.9%.

It is projected that the customer base will increase from 161,000 in 2011 to around 184,200 by the end of 2016. The projected increase in the customer base is largely as a result of new connections in recently served areas and the forecasted electrification programme in 2013.

An active campaign to reduce Receivables will continue and a cash collection rate of 99.5% (cash collections as a percentage of sales) has been assumed for the years 2012 to 2016. The target is based on historical collection trends over the past few years.

Table 5.1 Gross generation & Sales



5.2 PLANS TO REGAIN INDUSTRIAL CUSTOMERS

There is no doubt that industrial consumers expect:

- A reliable and efficient service.
- Attractive tariff.
- Power to be available to meet their growth.

The investments in generation, transmission, sub-stations, control facilities and loss reduction are all geared towards providing a reliable, least cost service. GPL expects to rebalance its tariffs once power is commercially available from the hydro.

Before hydro, industrial consumers would be able to access power that is more reliable but the tariff reduction which many will be looking for would not come until 2015. GPL is not projecting to lose more industrial consumers but expects that developers will be looking to GPL to meet their power needs.

5.3 PLANS FOR PROVIDING ELECTRICITY FOR DEVELOPMENT AND REDEVELOPMENT PROJECTS IN URBAN AREAS

- Georgetown The frequency standardization project in Georgetown will result in increased feeder capacity because of the higher distribution voltage. The new Georgetown substation will allow additional feeders to be available to serve the Georgetown load while the frequency conversion of the 22MW Wartsila built plant at Kingston would improve system reliability. It should also be noted that the new Kingston plant's capacity has been increased to 36.3MW.
- New Amsterdam New Amsterdam is served from Canefield and the construction of a new substation at Williamsburg will effectively off-load canefield so that more of the power delivered to Canefield can be directed to New Amsterdam. The

interconnection of the Demerara and Berbice systems will allow consumers in New Amsterdam to also access power from Demerara.

- Rose Hall The new substation at Williamsburg (which is contiguous to Rose Hall) will provide a vastly improved quality of service for consumers in Rose Hall. The new feeders will allow GPL to meet growth in the Town for at least ten years. The new feeder emanating from GuySuCo's Skeldon facility will ensure adequate network capacity to deliver power to meet growth in Corriverton.
- Corriverton Corriverton is being served by a feeder emanating from GuySuCo's new Skeldon factory. This allows access to generation and network capacity that would be more than adequate to meet the medium term needs of the Town. An alternative supply is also available from the No.53 Sub-station.

Through the life of this programme the generation needs of Berbice in general and its Towns in particular would be met from GuySuCo's Skeldon facility, Canefield power station (11MW of HFO fired Mirrlees capacity) and from Demerara.

Anna Regina - GPL's power plant on the Essequibo Coast is located at Anna Regina. In 2013 an additional 3MW will be added to the plant while the interconnection of the Essequibo Coast to the national grid in 2014, the conversion of the two 2MW Wartsila units and the construction of two sub-stations on the Coast would provide access to the additional generation and network capacity to meet any development needs in the Town.

5.4 SUMMARY OF WORK PLAN

	2012
Generation	Versailles 6MW HFO Plant
	Frequency conversion - 22MW Wartsila Kingston 1 Plant - Phase 1
	2 x 600kW Genset - Leguan
	600Kw Genset - Wakenaam
C	
💦 Transmission Lines	Transmission Line between Versailles and Edinburg Substations
<u> </u>	Transmission Line between Versailles and Kingston Substations, inclusive of submarine cable
	Transmission Line between New Georgetown and New Sophia
	Transmission Line between New Sophia and Onverwagt
Substations	Versailles Substation
	Edinburgh Substation
	Diamond Substation, including tie - lines 1 And 2 (69kV)
_ <u>~</u>	New Georgetown Substation
lains	New Sophia Substation
O	Extended Sophia Substation
<u> </u>	Good Hope
<u> </u>	Mahaicony (Columbia) Substation
	Onverwagt
	Kingston Substation
	Garden-of-Eden (metering, SCADA interconnection, etc.)
<u></u>	SCADA
	Extension & upgrade of No.53 Substation
	New Williamsburg Substation
Distribution	Georgetawn Frequency Conversion
<u> </u>	LV network upgrade (Fraud proofing included)
- Ö	Distribution automation
DSM -	Demand Side Management , energy efficiency initiative
Non lec Loss Reduction	Replace 6,000 meters with pre-paid meters
	Coaxiai cable use (Service Drops)
New Centers	
New Services	o ann uew services
	Complete any TPD hulding. Seeble
Buildings	
Cananity Building	Acquire T&D Equipment 9, Tepls
Capacity Dulloing	Medinie Liste Edulatione st Lanis

	2013
Generation	Frequency conversion - 22MW Wartsila Kingston 1 Plant - Phase 11
	3MW HFO Unit for Anna Regina
	2MW HFO Unit for Bartica
	Versailles 6MW HFO Plant
Transmission Lines	Transmission Line between Versailles and Edinburg Substations
	Transmission Line between Versailles and Kingston Substations, inclusive of submarine cable
	Transmission Line between New Georgetown and New Sophia
0	Transmission Line between New Sophia and Onverwagt
	Transmission line fom Edingburg to Parika
	Submarine cable from Parika to Leguan
<u> </u>	Transmission line across Leguan
	Submarine cable from Leguan to Wakenaam
	Transmission line across Wakenaam
	Submariine cable from Wakenaam to Essequibo Coast
	Transmission line along Essequibo Coast
- .	
Substations	Versailles Substation
	Edinburgh Substation
	Diamond Substation, including tie - lines 1 And 2 (69kV)
	New Georgetown Substation
<u></u>	New Sophia Substation
	Extended Sophia Substation
_ <u> </u>	Good Hope Substation
<u> </u>	Mahaicony (Columbia) Substation
	Onverwagt
-MARCHINE	Kingston Substation
	Garden-of-Eden (metening, SCADA interconnection, etc.)
	SCADA
	Leguari Substation
	Verkeinderin Substellich
	Two Essequido Coast Substations
	Vementsburg sou-station
Distribution	IV Network unerode (Stud presses included)
	Distribution automation
	Internation and allowed in the second s
	Erronienty Conversion - Essential Coast
	Trequency Concession - Casequino Const
DSM	Demand Side Management
Non Tec Loss Reduction	Replace 6.000 meters with pre-paid meters
	HV Distribution
	Coaxial cable use (Service Drops)
Electrification	Un-served Areas Electrification
New Services	4,800 new services
Buildings	New T&D Building New Amsterdam
	New Building Middle Street

	2014
Generation	Frequency Conversion - Anna Regina Wartsila Units
C	
Transmission	Transmission line from Edingburg to Parika
	Submarine cable from Parika to Leguan
÷.	Transmission line across Leguan
<u>0</u>	Submarine cable from Leguan to Wakenaam
	Transmission line across Wakenaam
	Submariine cable from Wakenaam to Essequibo Coast
ai	Transmission line along Essequibo Coast
	New transmission line - Kingston - Sophia
Compensation	5 MVAr capacitor bank - Canefield (13.8Kv)
	5 MVAr capacitor bank - Anna Regina (69Kv)
- ă	3 × 10MVAr capacitor bank - Kingston (69Kv)
Substation	Parika Substation
	Leguan Substation
<u></u>	Wakenaam Substation
_ <u>_</u>	Two Essequibo Coast Substations
<u> </u>	Linden Substation & inteconnection
	Expand Kingston sub-station
<u></u>	Expand Sophia sub-station
<u> </u>	
Distribution	LV network upgrade (fraud proofing included)
	Alternative structures
-	
DSM	DSM - Demand Side Management
Non Tec Loss Reduction	Replace 6,000 meters with prepaid meters
	HV Distribution
	Coaxial cable use (Service Drops)
New Services	3,500 new services
Building	INew building Mildle Street

	2015										
Substation	Parika Substation										
	eguan Substation										
	Nakenaam Substation										
	Two Essequibo Coast Substations										
La											
Distribution	LV network upgrade (fraud proofing included)										
Å	Alternative structures										
Te.											
Non Tec Loss Reduction	Replace 6,000 meters with pre-paid meters										
New Services	4,200 new services										
Capacity building	T&D Equipment										

	2016
Non Tec Loss Reduction	Replace 6,000 meters with pre-paid meters
New Services	3,800 new services
Distribution	LV network upgrade (fraud proofing included)
	Alternative structures

5.5 Geographic Representation of Transmission Facilities - Demerara



6 OPERATING COSTS AND CAPITAL EXPENDITURES

6.1 Accounts Summaries

Table 6.1.: Profit & Loss Account

	2012	2013	2014	2016		
	G\$'000	G\$'000	G\$'000	G\$'000	G\$'000	
OPERATING REVENUE						
Sales	36,120,796	39,336,892	42,848,731	46,180,114	42,884,665	
Miscellaneous Income	522,744	533,199	543,863	554,740	565,835	
	36,643,540	39,870,091	43,392,594	46,734,855	43,450,500	
OPERATING COSTS						
Generation Expenses						
Fuel	23,708,581	26,368,560	29,499,617	27,842,836	4,152,150	
Operations & Maintenance contract	1,305,952	1,636,813	1,722,581	1,573,318	929,108	
Repairs & Maintenance	695,024	595,024	535,522	556,943	579,220	
Purchased Power	433,885	438,098	441,504	4,685,709	25,979,942	
	26,143,442	29,038,495	32,199,224	34,658,805	31,640,421	
GROSS INCOME	10,500,098	10,831,595	11,193,370	12,076,050	11,810,079	
Other Expenses						
Employment costs	2,616,109	2,525,454	2,594,063	2.646.119	2.618.399	
T&D Repairs and Maintenance	523,183	448,183	457,147	475.433	494,450	
Depreciation	2,580,239	3,147,616	3,542,020	3,867,493	4,117,814	
Administration	1,592,299	1,608,222	1,527,810	1,543,089	1,558,519	
Rates	32,000	34,560	37,325	40,311	43,536	
Bad debts	452,403	590,053	642,731	692,702	428,847	
PUC Assessment & Licence	51,000	51,000	51,000	51,000	51,000	
	7,847,232	8,405,088	8,852,096	9,316,146	9,312,564	
Total Operating Costs	33,990,674	37,443,584	41,051,320	43,974,951	40,952,985	
Operating Profit	2,652,866	2,426,507	2,341,274	2,759,904	2,497,515	
Finance Observes						
	607 692	421 210	276 600	019 566	1 071 919	
Interest	007,662	431,219	276,690	916,500	1,071,616	
Taxation	2,045,184	200 657	380,995	118 520	149 329	
Net profit after taxation	1,960,184	1,794,631	1,683,588	1,722,818	1,276,368	
Dividends						
Accumulated (losses)/profits b/fwd	(6,871,245)	(4,911,062)	(3,116,431)	(1,432,842)	289,976	
ACCUMULATED (DEFICIT) / PROFI	(4,911,062)	(3,116,431)	(1,432,842)	289,976	1,566,344	
	2000	2010	2014	2012	2012	
	2009 G\$000	2010 G\$000		2012 G\$000	 G\$000	
Revenues	0,000	04000	0,000	04000	0,000	
Sales	36 120 796	39 336 892	42 848 731	46 180 114	42 884 665	
Miscellaneous Income	522,744	533,199	543,863	554,740	565,835	
Total Revenues	36,643,540	39,870,091	43,392,594	46,734,855	43,450,500	
Costs						
Generation expenses	26,143,442	29,038,495	32,199,224	34,658,805	31,640,421	
Employment costs	2,616,109	2,525,454	2,594,063	2,646,119	2,618,399	
T&D Repairs & Maintenance	523,183	448,183	457,147	475,433	494,450	
Administrative costs	1,675,299	1,693,782	1,616,135	1,634,399	1,653,055	
Bad Debts	452,403	590,053	642,731	692,702	428,847	
Depreciation	2,580,239	3,147,616	3,542,020	3,867,493	4,117,814	
Interest	607,682	431,219	276,690	918,566	1,071,818	
Total Costs	34,598,356	37,874,803	41,328,010	44,893,517	42,024,804	
Profit hoforo toxotica	2 045 494	1 005 282	2.064.584	1 9 4 4 9 2 9 9	1 405 600	
	2,045,184	1,395,288	2,004,584	110 500	140 200	
		200,007 1 704 621	1 683 589	1 722 819	1 276 369	
Dividends	-		-	-	-	
Accumulated (loss)/profit b/fwd	(6,871,245)	(4,911,062)	(3,116,431)	(1,432,842)	289,976	
Accumulated (loss)/profit c/fwd	(4,911,062)	(3,116,431)	(1,432,842)	289,976	1,566,344	

In accordance with GPL's Licence the Shareholder is entitled to a target rate of return on equity of 8% per annum.

	2012	2013	2014	2015	2016
	G\$'000	G\$'000	G\$'000	G\$'000	G\$'000
RECEIPTS					
Sales collections	35,759,588	38,943,523	42,420,244	45,718,313	42,455,818
Loans	3,457,350	3,561,332	2,833,866	201,103	-
Capital Contributions	329,859	717,772	775,193	837,209	904,185
Other Receipts	1,772,639	533,199	543,863	554,740	565,835
Customer Security Deposits	70,500	358,886	387,597	418,604	452,093
VAT Refunds	436,811	505,984	514,569	1,117,520	4,202,981
TOTAL RECEIPTS	41,826,746	44,620,695	47,475,332	48,847,490	48,580,912
PA VM ENTS					
Fuel	23 955 781	26 368 560	29 499 617	27 842 836	4 152 150
O&M Contract	1 305 952	1 636 813	1 722 581	1 573 318	929 108
Generation Maintenance	745.017	595 024	535 522	556 943	579 220
Purchased Power	433.885	438.098	441.504	4.685.709	25.979.942
Rental of Generators	122,420	,	,	, ,	- /- /-
R&M - T&D	1,208,322	448,183	457,147	475,433	494,450
Employment Costs	2,647,202	2,525,454	2,594,063	2,646,119	2,618,399
Administration Expenses	1,688,776	1,659,222	1,578,810	1,594,089	1,609,519
Rates & Taxes	47,000	34,560	37,325	40,311	43,536
Interest	286,525	242,349	276,690	918,566	1,071,818
Corporation & Property Taxes	85,000	200,657	380,995	118,520	149,329
Principal Loan Repayments	1,148,043	1,688,431	1,637,344	2,010,066	2,168,317
VAT	458,374	510,312	514,956	1,172,299	4,478,497
TOTAL PAYMENTS	34,132,297	36,347,664	39,676,556	43,634,207	44,274,287
Or and the search and had been former	7 (04 440	9 972 021	7 709 77(5 012 094	4 206 625
Operating cash surplus before Capex	7,094,449	8,273,031	7,798,770	5,213,284	4,300,025
CAPITAL EXPENDITURE					
Others - Non Technical	670,682	822,234	626,842	640,082	438,682
Generation, T&D & Metering	5,041,881	6,393,812	4,147,416	1,629,008	1,441,076
TOTAL CAPITAL EXPENDITURE	5,712,563	7,216,046	4,774,258	2,269,090	1,879,758
NET CASH BALANCE	1,981,886	1,056,985	3,024,518	2,944,193	2,426,867

Table 6.2: Cash Flow Statement

7. PROJECTED CAPITAL EXPENDITURE

It should be noted that the projected capital expenditure does not include interest but the financial statements above does.

Summary of Capital Expenditure						
	2012	2013	2014	2015	2016	Total
Generation	\$ 7,819,000	\$ 7,211,000	\$ 950,000	\$ -	\$ 	\$ 15,980,000
Transmission Lines	\$ 3,161,118	\$ 7,581,316	\$ 4,554,600	\$ -	\$ 	\$ 15,297,034
Substations	\$ 5,520,033	\$ 6,803,070	\$ 6,880,000	\$ 759,000	\$ -	\$ 19,962,103
Compensation	\$ -	\$ -	\$ 1,130,000			\$ 1,130,000
Distribution	\$ 3,400,000	\$ 4,895,000	\$ 3,700,000	\$ 3,500,000	\$ 4,250,000	\$ 19,745,000
DSM	\$ 225,000	\$ 200,000	\$ 255,000	\$	\$ -	\$ 680,000
Non-Technical Loss Reduction	\$ 1,000,000	\$ 1,580,000	\$ 1,685,000	\$ 1,740,000	\$ 1,800,000	\$ 7,805,000
New services	\$ 1,104,000	\$ 792,000	\$ 595,000	\$ 735,000	\$ 684,000	\$ 3,910,000
Buildings	\$ 350,000	\$ 1,494,000	\$ 896,000	0	0	\$ 2,740,000
Capacity building	\$ 390,000	\$ 350,000	0	\$ 950,000	0	\$ 1,690,000
Electrification		\$ 2,738,095		\$	0	\$ 2,738,095
Total	\$ 22,969,151	\$ 33,644,481	\$ 20,645,600	\$ 7,684,000	\$ 6,734,000	\$ 91,677,232

Table 7.1: Summary of Capital Expenditure, US\$

Table 7.2: Summary of Capital Expenditure, G\$M

Guyana Dollar (Millions)	2012	2013	2014	2015	2016	
Exchange Rate	206	208	210	212	214	Total
Generation	\$ 1,611	\$ 1,500	\$ 200	\$ -	\$ -	\$ 3,310
Transmission Lines	\$ 651	\$ 1,577	\$ 956	\$ -	\$ -	\$ 3,185
Substations	\$ 1,137	\$ 1,415	\$ 1,445	\$ 161	\$ -	\$ 4,158
Compensation	\$ -	\$ -	\$ 237	\$ -	\$ -	\$ 237
Distribution	\$ 700	\$ 1,018	\$ 777	\$ 742	\$ 910	\$ 4,147
DSM	\$ 46	\$ 42	\$ 54	\$ -	\$ -	\$ 142
Non- Technical Loss Reduction	\$ 206	\$ 329	\$ 354	\$ 369	\$ 385	\$ 1,643
New services	\$ 227	\$ 165	\$ 125	\$ 156	\$ 146	\$ 819
Buildings	\$ 72	\$ 311	\$ 188	\$ -	\$ -	\$ 571
Capacity building	\$ 80	\$ 73	\$ -	\$ 201	\$ -	\$ 355
Electrification	\$ -	\$ 570	\$ -	\$	\$ -	\$ 570
Total	\$ 4,732	\$ 6,998	\$ 4,336	\$ 1,629	\$ 1,441	\$ 19,135

8 FUNDING

8.1 Sources of Funding

Funding over the next five years will come from both internal and external sources. External sources include the IDB, the Exim Bank of China and Government of Guyana. The table below summarizes the sources and amounts of funding.

Table 8.1: Summary and Sources of Funding US\$

		0 .				
Source of Funding (US\$)	GPL	Debt	IPP	IDB	GOG	Total
Generation	\$ 5,925,000	\$ 10,055,000				\$ 15,980,000
Transmission Lines	\$ -	\$ 15,297,034				\$ 15,297,034
Substations	\$ 2,513,000	\$ 17,449,103				\$ 19,962,103
Compensation	0	\$ 1,130,000				\$ 1,130,000
Distribution	\$ 15,967,900	\$ -		\$ 3,777,100		\$ 19,745,000
DSM	\$ 485,000			\$ 195,000		\$ 680,000
Non- Technical Loss Reduction	\$ 7,805,000			\$		\$ 7,805,000
New services	\$ 3,910,000					\$ 3,910,000
Buildings	\$ 2,740,000					\$ 2,740,000
Capacity building	\$ 1,690,000					\$ 1,690,000
Electrification	\$ 1,000,000				\$ 1,738,095.24	\$ 2,738,095
Total	\$ 42,035,900	\$ 43,931,137	\$-	\$ 3,972,100	\$ 1,738,095	\$ 91,677,232
Percentage	46%	48%		4%	2%	

All new debt will be via concessional financing. The table below shows how different sources of funding affect the debt: equity ratio.

 Table 8.2 Debt / Equity Ratio

Tuble 0.2 Debe / Equity Runo										
Year	Debt	Equity								
2012	71%	29%								
2012	69%	31%								
2013	68%	32%								
2014	64%	36%								
2016	61%	39%								

9 TARIFF TRENDS AND TARIFF REBALANCING

Tariff rebalancing is recognized as necessary in order for the GPL to maintain and to recapture former industrial consumers, now self generating. A tariff study done in 2010 confirmed that Tariff A is being subsidized by the other tariff categories to the tune of 33%. No tariff rebalancing will be done until 2015, when hydropower is available commercially. At this time complete tariff rebalancing will be done by disproportionately reducing all tariffs. Based on a marginal cost approach, the study indicates that Tariff A should be increased by 25% while Tariffs B, C and D should be reduced by 17%, 17% and 29% respectively.

In keeping with the recommendation of the tariff study a new industrial tariff would be introduced in 2015 for consumers using 2.5MVA and above.

The tariff rebalancing forecast presented below is premised on:

- > The projected loss reduction targets being achieved;
- > Fuel prices not escalating significantly above 8% per annum
- Exchange rates not exceeding significantly the projected rates
- ▶ Hydro achieves commercial operation in Q4 2015.
- > GPL expanding the market to maximize dispatch from the hydro.

The forecasted tariff rebalancing plan is premised on GPL tariffs at December 31st 2011 and reflects the recommendations from the tariff study, financed by the IADB in 2010. The movements in tariff prior to hydro in 2015 are reflective of exchanges rate changes only.

Average Selling Price - US cents/kWh											
	2011	2012	2013	2014	2015	2015	2016				
Tariff					Q1 to Q3	Q 4					
Α	28.86	34.63	34.30	33.97	33.65	26.92	26.67				
Α	27.12	32.54	31.62	31.92	31.62	25.30	-				
В	37.03	44.44	43.18	43.59	43.18	32.39	32.08				
С	35.87	43.04	41.82	42.22	41.82	29.28	29.00				
D	33.12	39.75	38.62	38.99	38.62	27.04	26.78				
Е	25.96	31.15	30.27	30.56	30.27	24.21	23.99				
F						24.33	24.11				
GA	32.67	39.21	38.10	38.46	38.10						
GA	29.85	35.83	34.81	35.14	34.81						
GB	36.25	43.50	42.27	42.67	42.27						
GC	35.33	42.40	41.20	41.59	41.20						
GD	33.42	40.10	38.97	39.34	38.97						
GE	27.07	32.49	31.57	31.87	31.57						

Table 9.1Tariff rebalancing plan

The advent of hydropower in 2015 would allow for Government tariffs to be aligned (reduced) with the corresponding non-Government tariff category. It would also provide opportunities for industrial tariffs C and D to be reset at points which would attract large companies back to the grid with a price below their projected self generation cost.

10 DEMAND SIDE MANAGEMENT (DSM)

Demand Side Management (DSM) is the implementation of policies and measures which serve to control, influence and generally reduce electricity demand. DSM has been pursued internationally over the last two decades as an initiative to reduce demand growth while leveraging advantages to both Utilities and Consumers. It is recognized as a major solution in the fight against climate change and significant investment is being made by developed countries. In Guyana, it would support the Government's Low Carbon Development Strategy while allowing GPL to forego investments in generation and T&D.

DSM relies essentially on two pillars, behavioral change and technological intervention (Energy Efficiency). GPL has set the following objectives for DSM:

- Education of customers to ensure electricity use is managed prudently, i.e. basic tips are employed routinely in the home, factory or office.
- Ensure that various categories of customers are aware of the energy efficient appliances they can employ.
- ◆ The average school child is aware of what can be done to reduce electricity wastage.
- Energy efficient appliances are more common on the local market.
- ✤ The sale of energy efficient appliances increases from year to year.

The following are some of the initiatives that will be employed in the pursuance of DSM objectives.

- Continuing to provide information to consumers via flyers, radio, television and printed media regarding energy management and efficient use of electricity.
- Making the secondary school debating competition focusing on energy efficiency and behavioral change and their impact on electricity use, an annual event.
- Continuing to interact with consumers and the public at large at trade fairs country-wide and discussing ways to use electricity efficiently.
- Working with the GEA on the public education campaign to encourage use of energy star rated appliances.
- Actively pursue grant financing for an Energy Efficiency Action Plan, develop a street lighting standard, implement an energy efficient street lighting pilot project and develop a database to capture information that would facilitate future interventions.
- A public lighting standard will be pursued based on energy efficient lighting.
- The initiative to introduce pre-paid meters is in itself a technological intervention as consumers can now access information that facilitates conservation through more prudent use of power.
- GPL will develop a database, providing grant financing is available, and begin to populate it with the following information:

- a) End-use equipment for consumers by tariff category
 - i) Power demand
 - ii) Type of design Energy efficient or traditional
 - iii) Year of manufacture
 - iv) Typical hours of use
 - v) Operating Power Factor (where applicable)
- b) Energy efficient equipment available on the market
 - i) Manufacturer, specifications, construction standard, energy consumption and guarantees.
 - ii) Prices and availability including names and addresses of local and Regional distributors.
- c) Energy Efficiency Consultants / Service Providers available in the Region
 - i) Names and contact information.
 - ii) Experience and availability n

10.1 BENEFITS OF DSM

GPL recognizes that an effective DSM Programme is an essential part of its menu of activities to manage demand growth, improve service and ensure that customers receive a quality supply at a least cost price. It is recognized that:

- a) Investment in generation and networks can be deferred.
- b) Technical losses can be reduced due to reduced load on feeders, particularly the peak demand.
- c) Network faults can reduce and supply reliability can improve due to reduced load on feeders.
- d) Consumers can improve their standard of living and more can afford service if they can use power more efficiently.
- e) The company will reduce its greenhouse gas emissions.

Significant work needs to be done to develop a database which can allow important management decisions to be made including assessing the least-cost delivery of energy services based on a consideration of both the demand and supply sides.

11 HUMAN RESOURCES

Maintenance of the requisite core of skills to manage a modern integrated electricity system would be critical for GPL. It is recognized that a significant amount of training would be required at all levels, particularly in the technical areas, to manage and maintain a system that would take a quantum leap in the technology it employs. While large investments would be made in training, the company also recognizes the need to create the conditions to retain adequate skills. While every effort will be made to attract and retain the best and the brightest, GPL recognizes that it cannot compete with the attraction of overseas employment. GPL would continue to invest adequate resources to ensure that training is ongoing, timely, relevant and targeted to meet the direct needs of the company and contractors who will be engaged in capital works.

Multi-skilling continues to be pursued as technicians have replaced Journeymen, Operators, Electricians, etc. The drive to expose technical staff to a wide range of training will continue as the benefits derived to date are significant.

In the non-technical areas GPL will continue to provide opportunities for Accountants by maintaining the trainee Accountant programme. The skill pool in the country involving basic computer and accounting skills is very large and GPL would not need to intervene in any way.

12 IMPACT OF PROGRAMME ON NATURAL & SOCIAL ENVIRONMENT

All new generating facilities are to be constructed in strict compliance with the Environmental Protection Act while a number of the older facilities are to be retired or relegated to occasional use. More importantly, the use of renewable resources would have a net positive environmental impact. GPL has obtained the necessary permits for the construction of the various transmission lines and substations from the EPA. Similar approval will be pursued for the generation investments, which will be based on current technology for the largest units.

With respect to the social environment, GPL expects that the ready access to power legitimately, the significant investments in generation and networks to improve power quality, improved customer service and planned reductions in tariffs would impact positively on the social environment.

GPL is however conscious that the removal of illegal services, prosecuting persons caught stealing electricity and taking prompt steps to collect revenues would have some consequences. These measures are likely to generate some negative social impact, especially by the perpetrators of illegal activities. The more severe penalties provided for in the amendments to ESRA will hopefully serve as a deterrent. Public Relations initiatives to warn persons will be enhanced.

13 RISK AND MITIGATION

13.1 Loss Reduction

GPL has set itself realistic targets for loss reduction over the life of this Programme. The resources necessary to drive the various loss reduction initiatives, which are financed by internal cash-flows, are at risk of high fuel prices and the Company not meeting its loss reduction targets. The risk of not achieving the projected level of loss reduction however depends, not only on reversing the culture of electricity theft but more importantly on technological interventions to raise the bar, including completing the pre-paid programme and the LV network modifications (fraud proofing) and upgrade. While implementation of the pre-paid metering programme has its challenges, the reduction of electricity theft in a sustainable way presents a more substantial challenge. Use of the amendments to ESRA and the Evidence Act, vigorous and proactive policing by GPL and measures to reach out to communities to try to break the culture are initiatives designed to mitigate the risk of under-achievement.

11.2 Fuel Prices

The volatility of fuel prices on the world market remains an ever present risk. While cogeneration from GuySuCo would help to militate against the impact of high fuel prices in the short term, the plan to change the fuel mix urgently to reduce diesel use to a minimum is the optimal interim arrangement until the advent of hydro in 2015, which would obviously mitigate this risk significantly. GPL's plan to use the benefits of loss reduction to stabilize tariffs and attract self generators to the grid could be derailed if fuel prices increase significantly beyond the forecasted 8% per annum. The use of HFO fired equipment and renewable energy to meet most of the energy needs now has mitigated this risk somewhat as HFO prices are less volatile and cheaper than diesel.

13.3 Market Size

The risk of not expanding its market size would result in GPL having to pay for energy and capacity that it cannot use when hydro comes on line in 2015. Not being able to market all the energy in 2015 would result in the full benefits of lower cost energy not being realized by customers. GPL expects that with the advent of hydro, rebalanced and reduced tariffs (below the avoided cost of self generators) and stable supply, self generators will be attracted back to the grid.

14 CONTINGENCY

The debt financing envisaged for this five-year Programme has almost been fully secured, which means that the transmission, substation and control facilities will be constructed. Provision has been made in the financial projections for some capacity to absorb increased operating costs without derailing the capital programme.

There is a limit to any contingency arrangement as resources are constrained by a variety of factors.

14.1 GENERATION

GPL would have to continue to rely on HFO capacity to meet demand and energy needs should the commercial operation of hydro be delayed. There is always an option to inject mobile generation units to meet any shortfall, as has been done by GPL in the past. But the emergency generation addition would be based on additional high speed capacity.

14.2 TRANSMISSION & DISTRIBUTION

The T&D facilities which include all the transmission lines, substations and feeder upgrades are critical to reduce technical losses, reduce cost and improve supply quality. If the transmission lines are not constructed then the substations would not be constructed and GPL would have to take urgent measures to off-load feeders on the East and West Coast and in Georgetown.

About US\$1.6M would have to be spent to extend the Sophia F6 and F8 feeders and reassign loads among the F2, 6, 7 and 8 feeders to effectively off-load the F6 feeder. On the West Coast a second feeder would have to be extended from the Versailles power station to Leonora (Cost of

US\$1.1M). GPL would be able to fund the critical T&D works from its cash flow if the non-technical loss reduction targets are achieved and fuel prices stay within projections.

15 COST-BENEFIT ANALYSIS OF INVESTMENT PROJECTS

The transmission and sub-station projects have been grouped logically to calculate the cost-benefit analysis. The logical grouping is necessary as each group forms a compliment that is necessary to perform a desired function. The cost-benefit analysis has been done for a twenty-year period.

		Benefit	
Project	Cost (US\$M)	NPV	IRR
		(US\$M)	
Upgrade existing Sophia, build new G'town sub- station & interconnection	6.891	2.887	7%
Golden Grove Substation	3.102	3.852	12%
Vreed-en-Hoop Substation and Kingston interconnection.	6.528	11.387	14%
New Edinburgh (Leonora) Substation & transmission line from Vreed-en-Hoop.	4.212	3,205	9%
New Good Hope sub-station.	1.295	2.334	17%
New Columbia Sub-station	1.360	5.653	30%
Expand & Upgrade Onverwagt,			
New Sophia sub-station & Control Centre, Sophia to Onverwart 69 kV transmission line &			
SCADA	15.575	39.937	18%
2 x 600kW gensets for Leguan	0.15	0.015	10%
600Kw genset for Wakenaam	0.068	0.019	14%
Anna Regina interconnection, including interconnection of Leguan & Wakenaam and related works.	17.36	2.64	8%
Linden Interconnection.	4.5	5.95	56%
Williamsburg sub-station	1.995	1.347	9%
2 X 3MW Units for Versailles	3.0	2.889	38%
3MW Unit for Anna Regina	2.5	1.665	37%
Kingston Wartsila 22MW frequency conversion (50 – 60Hz)	7.685	9.895	14%