Guyana Energy Agency

2013 Annual Report

EXECUTIVE SUMMARY

A total of 4,742,592 barrels of petroleum-based products was imported in 2013 with an average of 12,993 barrels per day. This represents a 2.73% decrease when compared to 2012. Petroleum imports for the year were acquired at a cost, insurance and freight (CIF) value of US$549,807,036, representing a decrease of 8.36% from that of the previous year. Fifty-one percent (51%) or 1,597,341 barrels (4,376 bpd) of total imports were obtained under the PetroCaribe Agreement during 2013.

There were increases in the consumption of Mogas and LPG with reductions in the consumption of Diesel, Kerosene, Avjet, Fuel oil and Avgas. Consumption of mogas (gasoline) for the year 2013 increased by 0.88% compared to 2012. The increase in LPG consumption suggests more use of LPG as a cooking fuel in comparison to kerosene. Notwithstanding increases in diesel consumption from large duty-free consumers (specifically, Trawlers Association and BCGI), there was an overall decrease in Gasoil consumption. Gasoil (diesel) consumption recorded a 5.62% decrease in total volumes (including the large duty-free consumers) in 2013 when compared to 2012. This reduction continued for the oil companies; presumably, owing to a decline in the fishing sector. In addition, another factor may be the shift in imports originating from Trinidad and Tobago (Petrotrin) where the FOB price was relatively higher when compared to Venezuela (PDVSA). Avjet/Jet A-1 consumption is reflective of the withdrawal of two major carriers (Delta Airlines and EZJet). There was also a slight decrease in Avgas consumption. The minor decrease in Fuel oil consumption correlates with lower production observed in the bauxite industry during the first half of the year.

The average cost per barrel of petroleum-based imports decreased from US$123.06 in 2012 to US$115.93 in 2013, a decrease of 5.79%. This downward trend also continued for the average unit CIF value for each petroleum product with the exception of LPG and jet fuel/kerosene which increased by 1.65% and 19.21% respectively. There were decreases of 16.42% and 2.11% in the average unit CIF value (US$/bbl) for Mogas (gasoline) and Gasoil (diesel), respectively. The average unit CIF value for fuel oil and aviation gasoline (avgas) also decreased by 2.24% and 1.05%, respectively.

Engineers of the GEA conducted research in a number of areas: energy potential from rice husk, biomass energy potential from sawmills, measurement of energy consumption of refrigerators, air conditioners, energy efficient lights, occupancy sensors and passive solar lighting. Throughout the year, engineers visited a number of sites to learn about energy production, demand, potential and opportunities for developing project profiles which could then be used to secure project financing. GEA also supported the Office of the Prime Minister, Office of the President and the Ministry of Amerindian Affairs in the procurement of solar PV equipment for computer hubs and power supply to Amerindian villages.

GEA assisted Office of the Prime Minister (OPM) in the promotion and distribution of 507 solar cooking stoves, the construction and demonstration five (5) energy efficient wood stoves and the installation of two (2) bio-digesters in five (5) communities under the *Energy Access at community level for Millennium Development Goals (MDG) achievement in Hinterland area Project,* a United Nations Development Programme (UNDP) Project, implemented by Office of the Prime Minister

(OPM) which aims to provide energy services, electricity or cleaner fuels in rural areas to all Hinterland villages at the community level by 2015. GEA's Engineers also assisted with the installation of Solar PV systems and solar powered vaccine-storage freezers for Regions 1 and 7, inclusive of training of locals.

1,046 kW of solar photovoltaic capacity was documented as being the total installed capacity in Guyana producing an estimated 1,909 MWh of energy annually.

GEA kept the Amaila Falls Hydroelectric Project under review and worked with a private developer on the advancement of a draft power purchase agreement for the rehabilitation of the Tumatumari hydro station. Rehabilitation options for the Moco-Moco hydro plant were also explored. GEA provided support for the advancement of the Kato hydroelectric project. Hydropower potential was investigated at Hossorroro, Kumu, Wamakaru, Paruima and Teperu.

Wind measuring towers at Campbelltown, Region 8 and Yupukari, Region 9 were rehabilitated and re-operationalized to continue wind data collection. Wind data was also collected at GEA's Kingston Office and Head Office at Quamina Street, but the wind speeds averaged only about 2 m/s. The unit was subsequently installed at the University of Guyana with support from the Dean, Faculty of Technology. GEA's Engineers documented a total of 34.35 kW installed wind turbines across Guyana.

Guyana made significant strides in 2013 toward the realization of biofuels production with the commissioning of a bio-ethanol demonstration plant at the Albion Sugar Estate. The objectives of the facility is to demonstrate the production of fuel grade ethanol locally, provide fuel for future demonstration of the use of ethanol as a vehicle fuel, and to provide a facility for training of local personnel in bio-fuel technologies. GEA also offered support in the drafting of an Agro-Energy Policy.

With support from the Work Services Group, a total of 920 defective photosensors on street lights were replaced as part of GEA's efforts to conserve energy. The 920 photocells replaced in 2013 were procured at a unit cost of G$904 and would translate into annual energy savings of about G$56 million.

Over the last two years, GEA has been testing and reviewing Light Emitting Diode (LED) and Induction street lights. As part of a demonstration project in 2013, GEA commenced the process to procure 40 LED street lamps which will be installed in the first quarter of 2014 to replace existing 250Watt high pressure sodium (HPS) lamps with 60 Watt LED lamps resulting in estimated annual savings of about G$1.7 million. Based on a capital investment of G$3.1 million for procurement of the LED lamps and timer control, the project would have a simple payback period of 1.75 years.

As part of its energy conservation efforts, the GEA undertook Energy Consumption Assessments of 20 Government buildings in 2012 and expanded this to private sector and schools in 2013 for a total of 31 buildings assessed at the end of 2013. The energy conservation assessments were conducted and ratings for all installed equipment and lighting loads were recorded to understand the daily power demand and to make recommendations on energy conservation opportunities.

A written report identifying energy conservation opportunities, estimated costs and pay back calculations for the various recommendations would be prepared and submitted to the respective entities. As part of the assessment process, GEA provided support in the resolution of technical issues at Parliament Building, Guyana Forestry Commission and President's College.

The Guyana Manufacturing and Services Association (GMSA) undertook a project intended to assist local companies in the manufacturing and services sector to make the most efficient use of their energy applications and simultaneously employ the most effective methods of energy conservation. Ultimately, the project is expected to significantly reduce energy expenditures generated from lighting equipment and accessories, heating and cooling appliances/ equipment, motorized drives, electronic and other major energy consuming assets. GEA provided support the Steering Committee and also in recording live in-plant measurements.

GEA participated in several expos throughout the year and interacted with members of the public, students and various organizations to provide lectures, seminars, information brochures, press releases, newspaper pull-outs, radio and TV infomercials with energy conservation tips.

Energy week 2013 was celebrated across the Caribbean by CARICOM member states under the theme 'A Secure and Sustainable Energy Future Begins Now!'. As an annual feature, the Guyana Energy Agency planned and executed several activities to commemorate Energy Week. These included an Essay Competition, a series of radio quizzes, a Poster Board Activity, School Presentations, the launch of an Energy Activity Booklet and a National Energy Forum. The activities served to fulfill part of GEA's mandate by disseminating information essential to improving public awareness on sustainable energy, conservation and overall efficiency.

The number of licences issued by the Legal and Licensing Division was slightly lower than that of the previous year with 1,331 licences granted to importers, wholesalers, retailers, consumer installations and bulk transportation carriers of petroleum and petroleum products during 2013. Despite reminder letters, follow-up calls and further warning letters, some operators remained delinquent in completing the licensing process. GEA has been closely monitoring these operators to ensure compliance. The GEA was actively involved in researching and drafting Standards for Bulk Transportation of fuels. Work continued with Guyana National Bureau of Standards and Guyana Fire Service to finalize draft guidelines for the transportation of fuel using approved containers and drums.

Under the Fuel Marking Programme, a total of 15,022 sites were visited during the year. 2,146 sites were sampled at least once. 35 (2%) of the sites sampled at least once were found with *significant dilution (defined as more than 50%)* in at least one tank. From 2006 to 2013, the percentage of sites found with significant dilution in at least one tank has progressively decreased from 34% in 2006 to 3% in 2013.

With support from the Task Force on Fuel Smuggling and Contraband, chaired by the Minister of Home Affairs, the Fuel Marking Programme recorded two convictions, both of which were guilty pleas in 2013. One matter was dismissed for insufficient evidence as key prosecution witnesses who either resigned or whose services were terminated failed to present themselves for Court and give their evidence. Three other matters were withdrawn after the Defendants

paid compensation to the GEA under Section 33A Guyana Energy Agency Act 1997 as amended by Section 8 Guyana Energy Agency (Amendment) Act 2011. Nine new charges were filed in comparison with four that were filed in 2012, thirteen (13) in 2011, twenty-seven (27) in 2010, seven (7) in 2009 and three (3) in 2008. At the end of 2013, there were thirteen prosecutions engaging the attention of the Magistrate's Courts in Guyana.

The staff of the Agency benefited from training and workshops in several areas: aviation fuel handling and quality control, geographic information system, hydropower engineering, renewable energy, energy management for socio-economic development, energy assessments/audits, bio-energy, leadership, customer care, secretarial practice, fire safety, investigation skills, inventory management, database management and supervisory management.

1.0 Review of Activities: Energy & Energy Statistics Division

1.1 Petroleum-Based Imports

For the year 2013, the Division facilitated the importation of ninety-five (95) shipments of petroleum-based products on Guyana's behalf, a decrease from one hundred and one (101) shipments in the previous year. Forty-four (44) shipments were lifted under the Petrocaribe Agreement and fifty-one (51) were lifted from Petrotrin, Trinidad. It was observed that volumes shifted by 25 percentage points from PDVSA to Petrotrin in 2013 when compared to the previous year.

Year	PDVSA		Petrotrin	
	bpd	%	bpd	%
2011	3,978	46%	4,678	54%
2012	6,915	76%	2,212	24%
2013	4,376	51%	4,192	49%

Comparison of the quantity of fuel shipments (measured in barrels per day) imported from PDVSA and Petrotrin for the years 2011, 2012 and 2013

Specifically, under the Petrocaribe Agreement, 1,597,341 barrels (or approximately 4,376 barrels per day) were imported during 2013, representing a 32.86% decrease when compared to volumes in 2012[1]. This resulted in a deficit of 824 bpd (or a total volume of barrels 300,659) based on the supply quota of 5,200 bpd under the Agreement. The deficit began in August 2013 and continued throughout the rest of the year. This reduction in volume in 2013 was also accompanied by decreases in total shipment (FOB) value and long-term financing portion of 35.54% and 35.58% respectively.

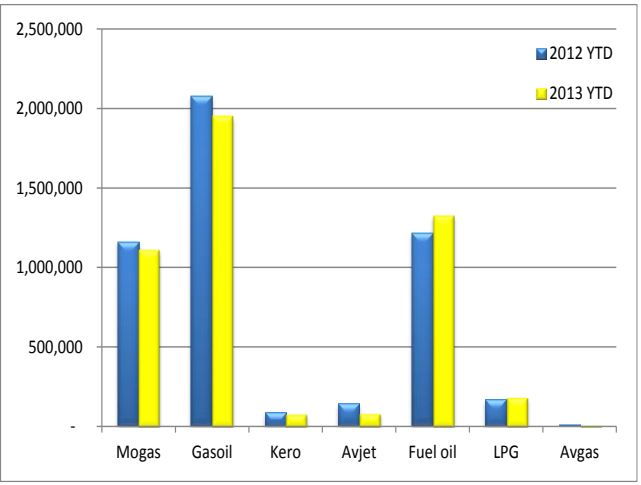
Year	No. of Shipments	PetroCaribe Imports (BBLS)	Total Shipment FOB Value US$	Financed Portion US$
2007	23	640,895	61,280,208.48	27,261,993.84
2008	39	1,419,868	157,368,354.55	80,096,309.65
2009	25	1,079,252	76,352,580.73	32,853,436.32
2010	25	1,022,907	89,233,164.90	44,836,346.06
2011	35	1,451,843	175,811,947.47	105,140,994.29
2012*	67	2,378,982	299,581,370.29	178,830,961.05
2013	44	1,597,341	193,100,300.02	115,206,051.20
Total	**258**	**9,591,088**	**1,052,727,926.44**	**584,226,092.42**

The significant reduction in the usual quantity imported was as a result of the delays experienced in July and August at the refinery in Curacao. There were significant delays in loading for laycans in July and August, ranging from 5 to 11 days, which led to cancellations of two (2) confirmed laycans in August.

[1] This comparison only considered shipments under the Petrocaribe Agreement and excluded those shipments treated on "spot" arrangements. When these "spot" shipments are included, the decrease amounts to 36.89%.

These delays affected fuel shipment schedules for the oil companies and contributed to a temporary supply disruption locally. The length of these delays has also led to high demurrage charges for the related shipments. Due to the delays experienced, the two private oil companies were cautious with nominations to Venezuela due to apprehension about a stock-out situation. This also contributed to the under-utilized quota.

TOTAL IMPORTS (BBLS)				
January-December		2012 YTD	2013 YTD	% change
	Mogas	1,162,969	1,110,801	-4.49%
	Gasoil	2,078,288	1,950,196	-6.16%
	Kero	91,079	79,798	-12.39%
	Avjet	144,222	82,770	-42.61%
	Fuel oil	1,216,777	1,325,315	8.92%
	LPG	169,892	183,786	8.18%
	Avgas	12,342	9,926	-19.58%
	Total	**4,875,568**	**4,742,592**	**-2.73%**



The total petroleum imports recorded an overall decrease of 2.73% with a total of 4,742,592 barrels of petroleum-based products imported and an average of 12,993 barrels per day. There were downward pressures on total imports due to decreases in the importation of Mogas, Gasoil, Avjet, Kerosene and Avgas while increases in import volumes were observed for Fuel oil and LPG. This trend was also observed at the market level with the oil companies.

1.2 Consumption of Petroleum Products

The Guyana Energy Agency utilised data on sales volume of petroleum products from the oil companies for the year 2013 which was used in the computation of consumption figures. For the remaining importers, consumption of petroleum products was calculated based on opening stock, closing stock and import volumes for the year.

(Consumption =*Opening stock* + *Import volumes* – *Closing Stock*).

A total of 4,760,364 barrels of petroleum-based products was consumed in 2013 with an average of 13,042 barrels per day. This represents a 1.63% decrease when compared to 2012[2]. There were increases in the consumption of Mogas, Fuel oil and LPG while consumption of Diesel, Kerosene, Avjet and Avgas declined for the year.

[2] Gasoil figure for 2012 was revised to discount quantity sold to GPL by the oil companies to avoid double counting.

The increase in gasoline consumption for 2013 can be attributed to an increase in motor vehicle registration while the rise in Fuel oil consumption correlates with GPL's ongoing transition towards fuel oil and general growth in the manufacturing and bauxite mining sectors. The increase in LPG consumption suggests more use of LPG as a cooking fuel in comparison to kerosene.

TOTAL CONSUMPTION (BBLS)					
January - December		2012	2012 (revised)	2013 YTD	% change
	Mogas	1,140,119	1,140,119	1,150,201	0.88%
	Gasoil	2,167,950	2,085,172	1,968,022	-5.62%
	Kero	91,122	91,122	75,601	-17.03%
	Avjet	138,787	138,787	85,302	-38.54%
	Fuel oil	1,190,973	1,190,973	1,275,935	7.13%
	LPG	180,565	180,565	194,298	7.61%
	Avgas	12,333	12,333	11,005	-10.77%
	Total	**4,921,849**	**4,839,071**	**4,760,364**	**-1.63%**
	Bpd	**13,448**	**13,222**	**13,042**	

Notwithstanding increases in diesel consumption from large duty-free consumers (specifically, Trawlers Association and BCGI), there was an overall decrease in Gasoil consumption. This is presumably, as a result of GPL's ongoing transition away from diesel and also owing to a decline in the fishing sector. In addition, another factor may be the shift in imports originating from Trinidad and Tobago (Petrotrin) where the FOB price was relatively higher when compared to Venezuela (PDVSA)[3].

Avjet/Jet A-1 consumption is reflective of the withdrawal of two major carriers (Delta Airlines and EZJet) while the decline in Avgas consumption can be attributed to moderated demand for hinterland transport that was observed during the first half of the year[4].

1.3 Acquisition Cost and Retail Prices

Petroleum imports for 2013, which amounted to 4,742,592 barrels, were acquired at a cost, insurance and freight (CIF) value of US$549,807,036, representing a decrease of 8.36% from acquisition cost in 2013.

Generally, for 2013, Gasoil was the most imported product representing 41% of total imports and a CIF value amounting to 46% of total acquisition expense[5]. Fuel oil and Mogas followed Gasoil reflecting 28% and 23% of total imports respectively with corresponding CIF values amounting to 25% and 22% of total acquisition costs, respectively. The remaining products (Kerosene, Avjet, LPG and Avgas) constituted no more than 8% of total imports and total acquisition costs.

The average cost per barrel of petroleum-based imports decreased from US$123.06 in 2012 to US$115.93 in 2013, a decrease of 5.79%. This downward trend also continued for the average unit CIF value for each petroleum product with the exception of LPG and jet fuel/kerosene which

[3] On average, the FOB price for Diesel from Petrotrin was 6.57% higher in 2013 when compared to the average price charged by PDVSA.

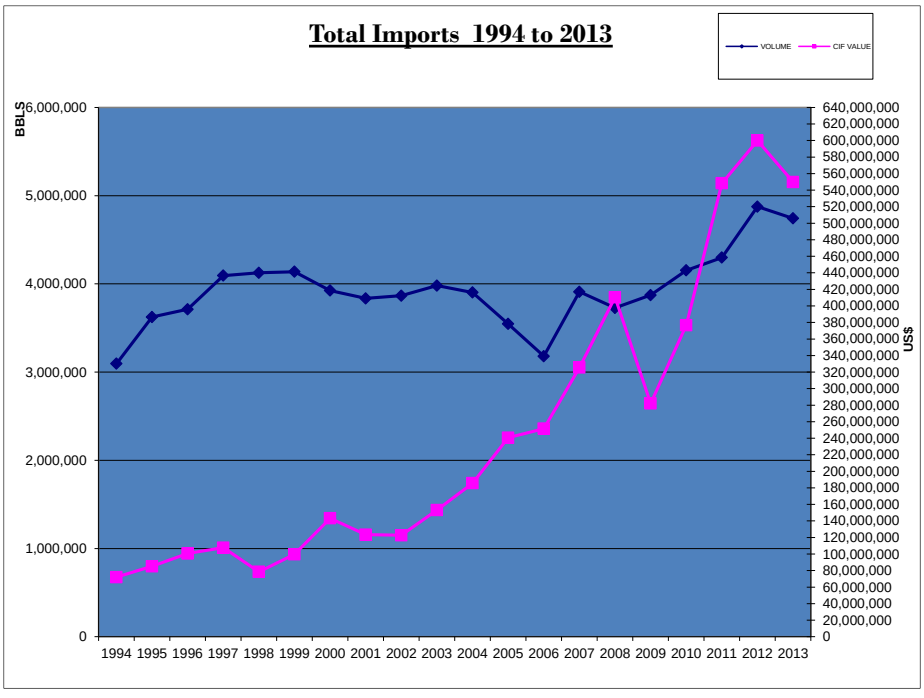
[4] Mid-year Report (2013), Ministry of Finance

[5] Gasoil CIF value was estimated for volumes used by the Trawler Association in 2013.

increased by 1.65% and 19.21% respectively. There were decreases of 16.42% and 2.11% in the average unit CIF value (US$/bbl) for Mogas (gasoline) and Gasoil (diesel), respectively. The average unit CIF value for fuel oil and aviation gasoline (avgas) also decreased by 2.24% and 1.05%, respectively.

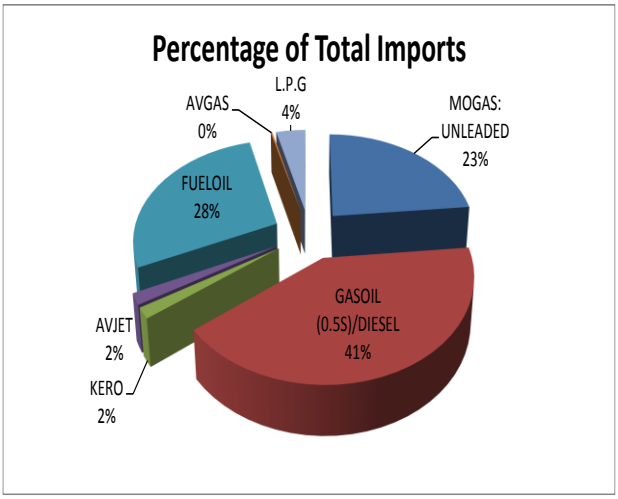
TOTAL IMPORTS OF PETROLEUM PRODUCTS FOR PERIOD 1994 TO 2013

	VOLUME		CIF VALUE
	BBLS	LTRS	US$
1994	3,095,728	492,180,508	72,067,912
1995	3,624,053	576,177,314	85,161,130
1996	3,711,893	590,142,732	100,696,609
1997	4,093,677	650,841,425	107,727,233
1998	4,125,765	655,943,000	78,539,499
1999	4,137,266	657,771,510	99,704,391
2000	3,924,614	623,962,606	143,277,974
2001	3,834,651	609,659,659	123,373,521
2002	3,865,505	614,565,043	122,643,684
2003	3,980,199	632,799,898	153,193,966
2004	3,901,760	620,329,117	185,702,255
2005	3,546,069	563,778,872	240,663,147
2006	3,179,925	505,566,736	251,594,083
2007	3,910,234	621,676,373	325,461,550
2008	3,727,410	592,609,734	410,442,230
2009	3,872,679	615,705,616	282,073,925
2010	4,152,412	660,179,527	376,761,853
2011	4,298,336	683,379,591	548,264,213
2012	4,875,568	775,102,847	599,946,823
2013	4,742,592	754,011,862	549,807,036
TOTAL	**78,600,336**	**12,496,383,970**	**4,857,103,034**



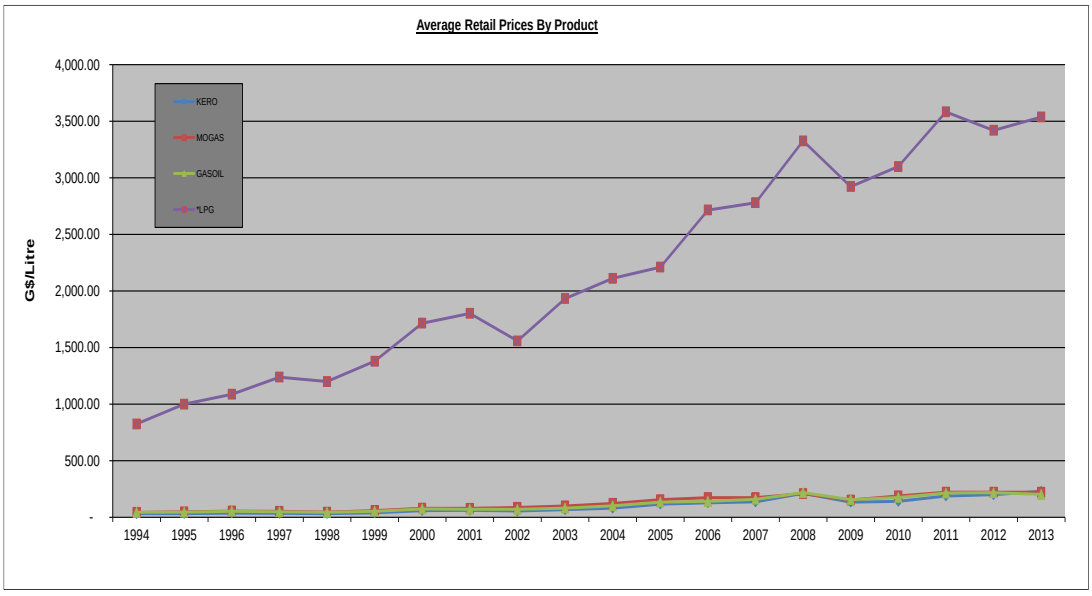
TOTAL IMPORTS BY PRODUCTS FOR THE YEAR

	2013		
PRODUCTS	VOLUME		C.I.F VALUE
	LTRS	BBLS	US$
MOGAS: UNLEADED	176,603,278	1,110,801	118,801,985
GASOIL (0.5S)/DIESEL	310,056,371	1,950,196	252,575,393
KERO	12,686,869	79,798	11,825,462
AVJET	13,159,379	82,770	10,692,233
FUELOIL	210,708,195	1,325,315	135,521,851
AVGAS	1,578,108	9,926	2,111,814
L.P.G	29,219,663	183,786	18,278,301
TOTAL	754,011,862	4,742,592	549,807,036



There were fluctuations observed throughout 2013 for most products (namely, Mogas, Gasoil, Kero/Avjet, LPG and Avgas) with a steady movement for Fuel oil. In addition, FOB prices peaked in February for Mogas, Gasoil and Fuel oil but fell significantly during the remainder of the year.

According to the US Energy Information Administration (EIA), the rise experienced earlier in the year was on account of a tightening in global oil markets, resulting mainly from a decline in Saudi Arabian oil production in the latter part of 2012 and positive expectations for China's demand for 2013. There were also new threats to energy infrastructure in the Middle East and North Africa that emerged in January 2013. Nevertheless, increased supply in the months that followed (particularly, from North America and some OPEC members [6]) contributed to dampening prices. Additionally, prices are expected to remain relatively low next year as the sanctions against Iran are eased following the conclusion of an interim nuclear deal in November 2013.



[6] Iraq, Nigeria, Angola and Saudi Arabia

Retail prices for Mogas (gasoline), Gasoil (diesel) and Kerosene increased during 2013 by an average of 2.24 percent. Specifically, average retail price for gasoline and diesel increased by 3.23% and 1.50% respectively. Also, the average retail price for domestic kerosene rose by 1.90% while the average retail price for cooking gas (LPG) increased by 3.43%.

1.4 Research

1.4.1 GEA's engineers continued data collection for the rice mills operating in Guyana to determine capacity, estimated volume of paddy milled, estimated rice husk production, current use/disposal practices for rice husk, energy demand, etc. to prepare estimates of energy potential of rice husk. A report on the energy potential for rice husk will soon be finalized.

1.4.2 In an effort to promote the use of biomass waste for electricity generation and other energy use, GEA's engineers have completed a data collection exercise to determine the extent of biomass waste generated from sawmills in Guyana and its potential as an alternative source of energy.

1.4.3 In keeping with the vision to provide reliable energy that is economically, environmentally and socially sustainable, the Guyana Energy Agency, on behalf of the Office of the Prime Minister and the Government of Guyana, with support from the Ministry of New and Renewable Energy of India and the High Commission of India, facilitated two scientists out of India from the 6 to 8 of May, 2013 to evaluate the possibilities of installing a system to generate energy (mainly electricity) from rice husk waste. Consultations were held with owner/operator of the rice mills, during which the Scientists assessed the energy potential from the waste produced and presented a few options for the millers' consideration.

1.4.4 Measurements of refrigerator energy consumption began with the installation of a "Fluke 1733" power analyzer to capture information on typical energy consumption of refrigerators. From data collected, the potential energy savings through the replacement of old/obsolete models of refrigerators with newer, energy efficient models will be investigated.

1.4.5 To promote the use of energy efficient technologies, occupancy sensors were installed at GEA's head office in an effort to reduce/eliminate lights being left on when the rooms/areas are unoccupied. The sensor can replace a manual switch and function to switch the lights on and off manually and/or automatically using pre-set timed automatic controls.

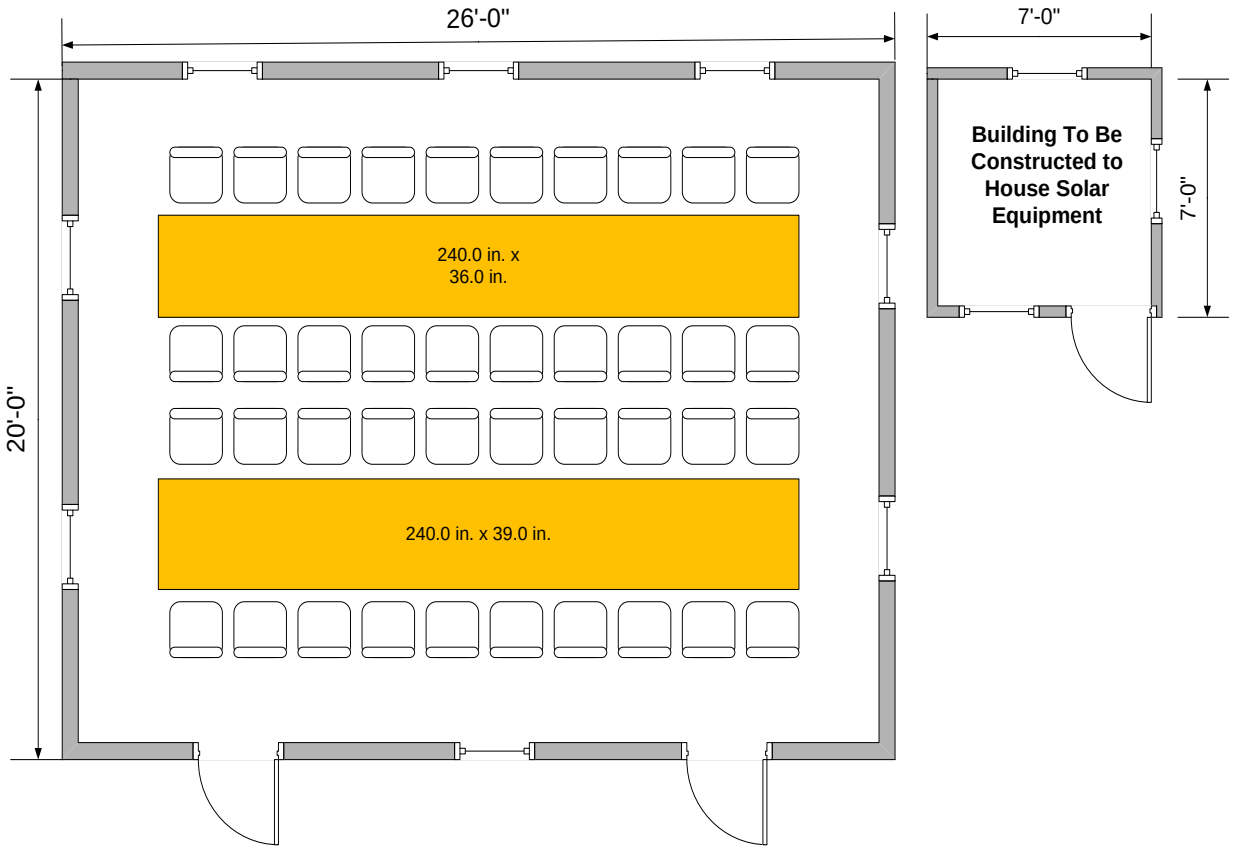
1.4.6 **Energy Needs Assessment at 47 Miles**

Based on a request made by the Chairman of 47 Miles Village to address energy needs, an Energy Needs Assessment of the Village was conducted by engineers of the GEA. Information such as present energy consumption, cost for energy services, economic activities of the village, population and number of households were collected. Health and school facilities were also assessed. Information gathered will be used to develop a project profile.

1.4.7 GEA's Engineers visited and learnt about the 20 kW Solar/Wind hybrid system installed at Bina Hill, Region 9, by the German Company, Eerepami, working in collaboration with the North Rupununi District Development Board (NRDDB).

1.4.8 Two of GEA's Energy Engineers conducted reconnaissance visits to Region 9 to identify suitable buildings that could house computer hubs in 19 villages and design suitable power supply systems based on power requirements and location of the hubs for a project conducted by the One Laptop per Family program and the Ministry of Amerindian Affairs. Pictures and schematics drawing with possible locations were produced for the 19 villages visited.

Katoonarib Village Office



1.4.9 **Design of backup lighting system at President's College**

Engineers from the Guyana Energy Agency conducted an energy assessment at the dormitories in President's College, East Coast Demerara. The objective of this assessment was to capture information relating to the energy demand and consumption in each dormitory at this institution. This information was captured by the agency's Fluke 1735 power quality analyzers which were installed and programmed to record each building's consumption over a seven (7) day period. From a walk-through assessment conducted, it was found that there was the existence of defective wiring at this institution which had resulted in damage to a number of lighting equipment (fluorescent lights). In an institute such as this, it is imperative that an alternative supply of electricity be available for lighting so that it provides safety for students, enables them to complete assignments/homework and projects in a timely manner and to study. A proposal was prepared by the Agency's engineers to have an alternative supply for lighting to the dormitories in the event of a power failure.

1.5 Energy Access Project

The *Energy Access at community level for Millennium Development Goals (MDG) achievement in Hinterland area Project,* a United Nations Development Programme (UNDP) Project, implemented by Office of the Prime Minister (OPM), aims to provide energy services, electricity or cleaner fuels in rural areas to all Hinterland villages at the community level by 2015. Some objectives of this projects were to:

- Promote and demonstrate the use of Solar Cookers
- Promote the use of Energy Efficient Cook Stoves identified and tested
- Install Bio-digesters for cooking purposes
- Implement a pilot project in two selected communities based on the results of an energy needs survey.

To date the Guyana Energy Agency (GEA) has assisted OPM in the promotion and distribution of 507 solar cooking stoves, the construction and demonstration of five (5) energy efficient wood stoves and the installation of two (2) bio-digesters in five (5) communities, namely Shulinab and Rupertee (Region 9), Powaikoru (Region 1), Kangaruma (Region 7) and Tuseneng (Region 8). Pilot projects were implemented at Kanuballi, Region 1 and Kako, Region 7. Kanuballi also received two 840Wp (6 x 140Wp modules) stand-alone solar PV systems. One system catered for lighting and a solar-powered vaccine-storage freezer for the Health Centre while the other was installed at the school for lighting, powering audio-visual equipment and a solar-powered freezer for the school's kitchen. The stand-alone PV system for the health centre was complemented with a 1500W inverter while the PV installation for the school was complemented with a 2400W inverter. Kako received a 1680Wp (12 x 140Wp Kyocera modules) solar PV system for lighting and a solar-powered vaccine-storage freezer for the Health Centre. This installation also featured a 2400W inverter for AC loads (television, microscope, etc.). The wiring at the Kako primary school was upgraded to accommodate more lighting in the school and socket outlets for audio-visual equipment. GEA also assisted in the training of a total of ten (10) persons to maintain and troubleshoot the systems in both villages. In addition, a total of fifteen (15) energy efficient cook stoves were constructed and demonstrated in both pilot communities.

Two of the many solar cookers seen in Powaikoru

Bio-digester at Shulinab

Wood Stoves

Testing the Kitchen's Energy Efficient Wood Stove

Testing Energy Efficient Wood Stoves

Picture showing completed installation of the Stand-alone PV system for the health centre

Vaccine freezer installed at the Kako Health Centre

1.6 The Energy Resource Institute (TERI)

The Government of Guyana (GoG), through the Office of Climate Change (OCC), has commenced implementation of Phase 2 of the Memorandum of Understanding (MoU) with The Energy Resource Institute (TERI). The main objective of Phase 2 activities is to build on previous work done under Phase 1 of the MoU and to conduct detailed work in priority areas as agreed between TERI and the GoG.

In particular, Phase 2 activities aim to:

1. Develop Best Practice Manual: Energy Management and Conservation for Guyana Rice Mills;
2. Conduct technical Studies of six (6) Sugar Plants (except Skeldon II);
3. Examine investment in Demand Side Management (installation of capacitor banks) for Guyana Water Inc.;
4. Examine the application of Gasifier Technology through piloting of case study for sawmills, medium scale industries; and
5. Pilot implementation study for street lighting for selected streets in Georgetown.

GEA's Engineers accompanied the TERI team to Wales Sugar Estate for an Energy Audit. During the Energy Audit, hourly monitoring of lights, pumps, evaporators, boilers etc. were conducted. The team consulted Plant Engineers who took them to various stages of the Plant to have a better understanding of the operations. Proposals were made on how to maximize efficiency and reduce fuel consumption at the Estate.

Moco – Moco

Representatives from The Energy Research Institute (TERI) visited the Moco-Moco Hydropower station with the aim of carrying out an assessment of the plant. The visit was facilitated by the Guyana Energy Agency (GEA) and was conducted by a team comprising of two representatives from TERI and GEA's Hydropower Support Engineers. The intake area, forebay, penstock, power house and substation were inspected.

Moco-Moco Hydro Power Plant

1.7 Wowetta Project

In March 2009, a rural electrification pilot project sponsored by the Canada International Development Agency (CIDA) and the Latin American Energy Organization (OLADE)/University of Calgary which sought to promote rural electrification within poor and isolated communities was initialized. The main objectives of the project were to:

- Incorporate rural stakeholders into the development of rural electrification strategies.
- Make use of lessons learnt from pilot projects carried out in isolated poor communities.
- Set up sustainable schemes for the provision of energy services to poor communities, using energy as a tool for development.

The Wowetta community in Region 9 (Upper Takutu-Upper Essequibo) was selected through a consultative process as the recipient for the project. The project provided the following:

1. 40 W solar panel, 92Ah battery and 2 lamps (a 7-watt lamp and a 15-watt lamp) to provide DC lighting for 49 households.
2. 5.8 ft^3 solar powered freezer with 2 x 130W panels for storage of perishables. A community shop was established using the freezer for ice-making, cooling beverages and storing meat.
3. 4 x 85 W solar panels with water pump to pump water from a community-dug well. This water will be stored in tanks for irrigation purposes.

4. Cassava chopper/grinder with a 2.5 HP motor. The cassava grater will produce commercial quantities of farine for sale to other communities. The group expects to process 1500 pounds per week at a retail value of $G100 per pound. A 10KVA diesel generator was used to power the cassava chopper/grinder.

5. US$2000 for the Joinery Project was provided as seed money. This money would cover the cost of the first few months of operation including the purchase of fuel and raw material such as fasteners, consumables, varnishes, glues, etc.

The project was geared at promoting productive works within the village and to encourage villagers to become business-oriented using sustainable mechanisms. Members had to contribute to a revolving fund which will be used in the future for maintenance of the systems. During 2013, a team of engineers from the GEA conducted a follow-up visit to Wowetta to learn about the success and challenges of the piloted project.

49 Solar Systems for Households

Checks were made on the 49 home solar systems that were installed. According to the Toshao, all of the systems are in working order with the exception of one, which failed due to a lightning storm in the village. Out of the 49 batteries that were supplied with the systems, 7 had failed. The working duration of the failed batteries was 3 years. Lamps were still in good working order and it was reported that 2 of the 15 watts lamps had failed. These batteries and lamps have since been replaced using the revolving fund contributed to the Wowetta Business Enterprise by members of the community. The team conducted repairs on the system that was damaged, restoring it to working order to the delight of the resident who was without lights for 5 months.

Resident and Toshao reconnecting the repaired panel

According to the Toshao, the members' contribution of GD $3,540 per month towards the revolving fund were completely paid out by only 4 members. The period for contribution is once

per month for a 4-year period and will come to an end in July 2013. He noted however that members are now showing dedication towards making their contributions.

Solar Power Water Pump

According to the Toshao, the water pump burnt in 2010 and the Guyana Energy Agency was contacted for assistance. The pump was part of a man-made well which was used for irrigation purposes. According to him the GEA collected the pump shortly after it was burnt with promise to repair and return it to the village. This promise never materialized and the interest in a community farm faded. He however acknowledged that the location was not ideal based on soil type and that the first and only crop fell short of expectations. The farm and well have since been abandoned and the solar panels (4 X 85 W) that were used to power the pump have been stored away. The Toshao, when asked if it might be possible to restore the farm, responded in the negative. According to him, the plot that was prepared for the farm was labour intensive and to convince members to commit to re-establishing it would not be simple. He however stated that the Business Community has enough funds to purchase a solar freezer which would be powered by the unused panels to complement the existing solar freezer at the community shop because of the demand for cold storage.

Solar-Powered Freezer

The solar-powered freezer which was installed at the community shop was found in working order. According to the Operator, the 2 batteries which were part of the system failed in February 2013 (after about 4 years of operation), and were replaced. The freezer is used for cooling beverages which is the most popular item in the community. The 2 x 130 watts panels were inspected and dust-buildup, which reduces the panels' efficiency, was visible. The dust was removed and the Operator was advised to repeat cleaning on a monthly basis, especially in the dry season.

Cassava Chopper with Generator

The motor for the cassava chopper was not found with the equipment. According to the Toshao, it was burnt in March 2013, and was sent to Brazil for repairs. According to him, the generator voltmeter was also damaged late last year. The voltmeter was the only indicator for the voltage level since the generator didn't come with a governor control. After it was burnt the operator's only indication of the voltage level was by listening for the sound they were familiar with. This may have contributed to the damage of the motor. Vibration was another issue with this system. The mounting bolts were not installed with shock absorber causing the engine and alternator to

move out of line. The Toshao was advised that this could lead to more serious damages and injuries and he should have the problem rectified before reuse.

Joinery Project

The joinery workshop was never built. According to the Toshao, the US $2,000 seed money that was provided for its establishment is within the accounts of the Wowatta Business Enterprise.

1.8 Solar Energy

1.8.1 Installation of Photovoltaic Equipment at GEA Head Office

Two 140 watts solar panels and two 200Ah batteries were installed at GEA Head Office to supply energy to the PBX telephone system and internet equipment. The installation reduces the need for fossil-based grid energy and provides renewable energy while helping to ensure productivity during power outages. The total size of the system is 680 Wp of solar panels and 800 Ah of battery capacity. The system daytime requirements are 1.2 Amps. At 75 % efficiency the solar system could generate approximately 2.8 kWh of energy per day. This installation brings the total standalone PV system installed at GEA head office to 1,680 Wp.

1.8.2 Documentation of Solar System Installations

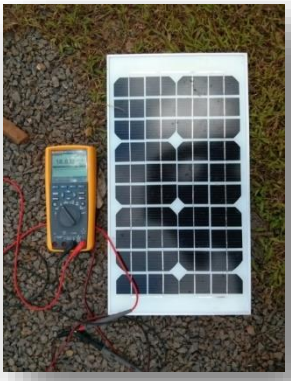
In an effort to track solar installations across Guyana, two new solar installations totaling 1,800 watts were identified in Region 9. A 1,000-watt solar system was documented in Aishalton village and an 800-watt solar system was documented in Maruranau. The systems are used to power three desktop computers, a printer and lighting system in Aishalton. In Maruranau, the system is primarily used for the internet. These installations bring the total documented photovoltaic systems in Guyana to 1,046 kW producing an estimated 1,909 MWh of energy annually.

1.8.3 **Assistance at Kamarang**

At the request of the regional health office (RHO) of Region 7, an inspection of two installations which featured the use of vaccine freezers were done to identify, and if possible, rectify the faults. In one of the installations, it was found that the wiring was not suitably sized. This resulted in a restricted supply of current to the freezer. A change out of the wiring was done by the GEA engineers, Kenny Samaroo and Brian Constantine. Inspection of the second installation found that the vaccine freezer wires were loosely connected at the terminals of the battery. This fault was also corrected by the engineers who ensured that the connections were tightened.

1.8.4 Energy Engineers from the Guyana Energy Agency visited Mahdia, Region 8 to investigate the issues in relation to previously distributed 15W solar PV panels. A total of eighty (80) 15W solar PV panels were located at the regional office in Mahdia.

Tests revealed that the panels were functional. GEA's engineers will review options for installing the panels at a suitable location.



1.8.5 **Solar Fence**

Engineers from the Guyana Energy Agency assisted the Guyana Livestock and Development Authority with the installation of a solar fence at its farm located at Agriculture Road, East Coast Demerara. The unit, which is a Zareba 30-Mile Solar Controller, will be used to contain and control livestock movement and manage their grazing habits.

1.8.6 Solar Photovoltaic Systems for Office of the President

The Guyana Energy Agency assisted Office of the President with the preparation of a tender document for the procurement of 100 x 3000 Watts complete solar systems and 25 x 1000 Watts complete solar systems to power computer hubs and other services in 2014.

1.8.7 National Park Commission

The National Park Commission is interested in installing a grid-tied photovoltaic system at its head office location. At the request of the Commission, the Guyana Energy Agency assisted with offering advice on the technical requirements, estimating the cost for installation, and reviewing quotes from suppliers. It was estimated that the proposed building can accommodate a 15.84 kW solar photovoltaic system on its roof and can produce about 20.89 MWh of energy annually.

1.9 Hydropower

1.9.1 Amaila Falls

The Government of Guyana, in the development of the Amaila Falls Hydroelectric Project, continued to pursue the development of the project

The Project comprises three main components: the Hydropower Facility to be located approximately 200km from Georgetown, the Electrical Interconnection which consists of the 230 kV transmission line and two substations located at Linden and Georgetown, and the Access Road which consists of the construction and upgrade of new and existing roads to provide access to the transmission line and Facility as aforementioned.

Hydropower Support Engineers, visited section 2 of the Amaila to gain an understanding of the progress of its development.

Section of road with lateritic surface

Section of road with white sand only

1.9.2 Tumatumari

GEA's Hydropower Support Engineers visited the Tumatumari hydropower site located in region 8 on the Potaro River estimated to have a total capacity of 34 MW. This was the first hydropower station in Guyana and utilizes water from the Tumatumari Falls on the Potaro River. It was constructed in 1957 by British Goldfields Limited and operated until 1959 when mining operations ceased. It was later re-commissioned by the Government of Guyana In 1969, to serve the Guyana National Service Camps at Tumatumari and Konowaruk. The components of the hydropower plant includes an embankment dam, a concrete overflow dam, and a 2-unit powerhouse with an installed capacity of 1,500 kW using (2 x 750 kW Francis turbines). Currently a Power purchase agreement (PPA) between the Government of Guyana and Mr. Lloyd Rose of Dynamic Engineering is under consideration to rehabilitate the hydropower plant.

Prior to the visit it was understood that proof tests were done in order to demonstrate that the main components of the hydropower plant were operable.

Electrical and Turbine components

Components of the Hydropower Plant

1.9.3 Hossorroro

GEA's Engineers visited the Hossororo Hydropower Site found on the Koriabo River. According to a study done by Montreal Engineering Company Limited in 1976, this site is

estimated to have a potential of 0.015MW. The dam, penstock and basin were inspected.

The visit was made during the dry season, as such, the river level was low but water was still flowing over the dam.

1.9.4 **Project profile for Kumu Falls**

GEA's engineers visited the Kumu waterfall, Region 9 to investigate its potential for hydropower development. The Kumu site is listed as a potential hydropower site of approximately 100kW. A resident who operates a business that provides recreational facilities for visitors to the Kumu River and site seeing tours stated that there are plans to build a hotel and conference center at the location. Power from a renewable source could be beneficial to the hotel and conference center once it could be obtained at a good price. A nursery and primary school is located approximately 5 km from the Kumu River and can also be an end user of the power produced.

GEA received approval to prepare a full feasibility study for this site and work has since commenced in this regard.

Measuring depths at different intervals

1.9.5 **Kato Visit**

In an effort to foster economic development and transform the economy of Kato, Paramakatoi and surrounding villages from subsistence to a cash economy, the Kato hydropower and irrigation project has been developed. It is a EURO $2.46M co-financed project by the European Union in which the Chiung river waterfall will be utilised for electricity generation. GEA's Hydropower Support Engineers accompanied a team of potential bidders along with representatives from the funding entity, European Union, to a site visit at Kato, Region 8.

The Kato project has three components:

1. Hydropower Power Plant – Co-financed by EU
2. Irrigation Agricultural Scheme – Co-financed by EU
3. Educative Facilities – Funded by Government of Guyana

The objective of the project is to:

1. administer permanent electricity supply to the villages of Kato and Paramakatoi.
2. displace the current generation of electricity with the 3.5kW and 16 kW diesel generators in Kato and Paramakatoi, respectively, and save 20 tons CO_2 annually.
3. facilitate irrigation for agriculture in Kato through the provision of electricity for irrigation water pumping.
4. facilitate the operation of a secondary and vocational school to be built in Kato.
5. facilitate productive use of electricity in the villages of Kato and Paramakatoi.

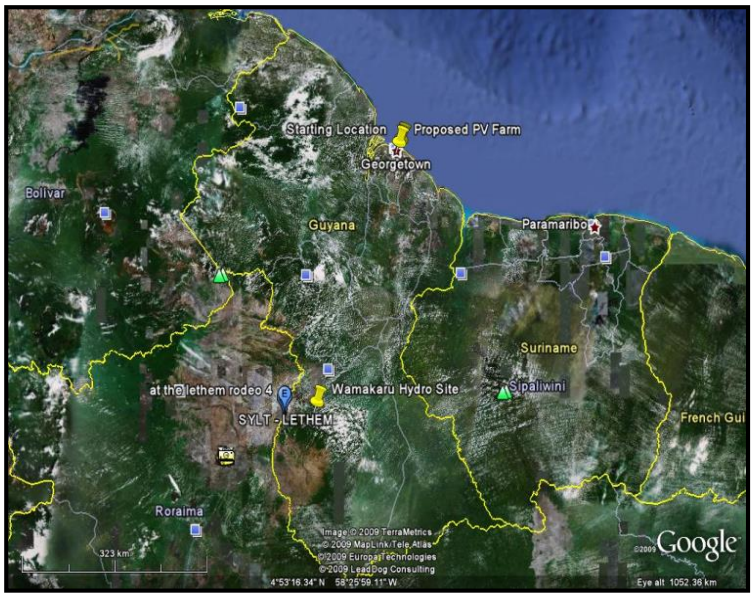
Also included in the project is an Irrigation weir and pumping station, 7,600 m^3 large irrigation water storage reservoir. The successful bidder is expected to design and build the project with an expected construction period of 18 months.

Proposed site for weir

Chiung falls

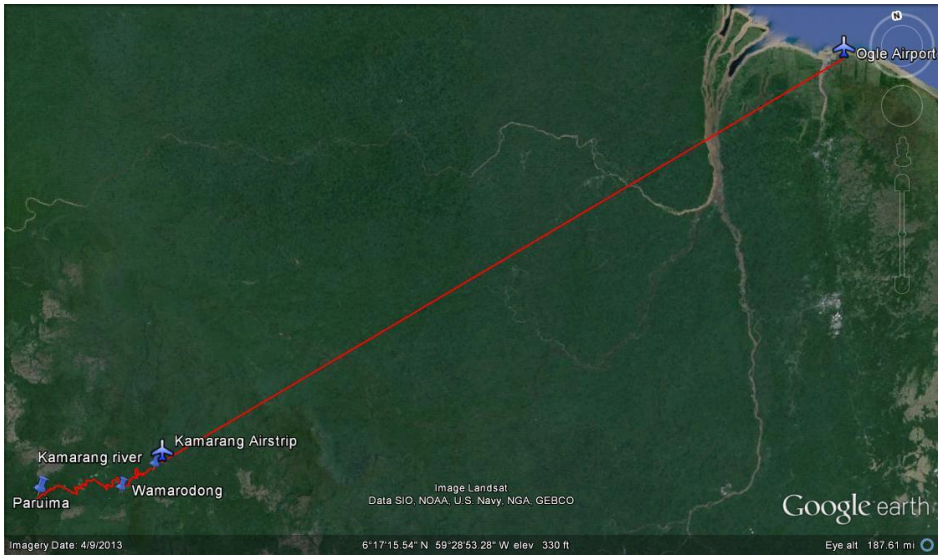
1.9.6 Feasibility Study of Wamakaru Hydropower Development Study

GEA is currently exploring options to update the Wakamaru Hydropower Feasibility Study. In 1980, the Government of Guyana negotiated and secured an $8 million loan from the International Bank for Reconstruction and Development (World Bank) to support a technical assistance project as a follow-up to the hydroelectric power survey of Guyana carried out in 1974-1976 with financing from the United Nations Development Program (UNDP), under the supervision of the World Bank. Montreal Engineering Company, Limited (Monenco) was the Consulting Engineer.



The Wamakaru site is located between 790 and 1575 feet near the north-eastern end of the Kanuku mountains, some 40 km (25 miles) north-east of Lethem and 17 km (10 miles) south-east of the village of Nappi. A power house of two 250 kW and three 750 kW generating units (total 2,750 kW) was initially contemplated.

1.9.7 Paruima visit



Route taken to Paruima

In response to a request made by the Honourable Prime Minister, Samuel A. A. Hinds, a reconnaissance visit was made to Paruima Village from the 25th- 29th of July, 2013 by GEA's Hydropower Support Engineers with the aim of assessing the hydropower potential of the area. Measurements were conducted on different streams in the vicinity of the village of Paruima.

1.9.8 GEA's Hydropower Support Engineers accompanied Hon. Prime Minister Samuel A.A Hinds, and his team to Dream Hole Mining Company, a small, privately-owned gold and diamond mining concession located in the Mazaruni Mining District, Region 7. On route, the team visited the Teperu hydro site, Bartica, which, according to past studies, has a potential of 15 kW. The team also visited the Kumarau Falls which has an estimated hydropower potential of 86 MW.

1.10 Wind Energy

1.10.1 Under the UAEP, wind speeds were monitored in the following areas: Orealla, Region 6, Jawalla, Region 7, Campbelltown, Region 8, Yupukari, Region 9. However, the wind speeds were not very attractive. The measuring towers and equipment were subsequently handed over to GEA.

The unit previously installed at Orealla, Region 6 was dismantled and handed over to Guyana Water Inc (GWI) to conduct wind measurements at their facility.

The tower at Jawalla, Region 7 was found collapsed but the data logger and anemometer appeared to be functional. GEA's engineers will re-visit the site in the first quarter of 2014 to repair the tower and continue data collection.

The wind measuring towers at Campbelltown, Region 8 and Yupukari, Region 9 were visited. The data loggers were restarted with the installation of new memory cards and batteries to recommence data collection; while alternate sites for data collection are contemplated.

1.10.2 GEA procured a wind measuring unit to measure wind speeds at its head office and other convenient locations to gain further experience, understanding of wind speed analysis and energy potential. Measurements were conducted at GEA's Kingston Office and Head Office at Quamina street, but the wind speeds average only about 2 m/s. The unit was subsequently installed at the University of Guyana with support from the Dean, Faculty of Technology.

1.10.3 GEA's Engineers documented installed wind turbines across Guyana. For each wind turbine located, attempts were made to contact the owner to gain information, such as, turbine size (watts), battery capacity (Ah) and system configuration (standalone, hybrid, system voltage, etc), system application (for example lighting, television, and other household appliances). The total installed capacity documented at the end of 2013 was 34.35 kW.

1.10.4 On Wednesday April 17, 2013, the Guyana Energy Agency, on behalf of the Honourable Prime Minister, received the following Turbomill from a consultant under the IDB/GMSA Energy Efficiency Project, who indicated that the Turbomill was a donation from WindStream Technologies. The system is capable of operating as a wind-solar hybrid system. Attempts to evaluate the wind potential of the unit uncovered that the charging circuit was not functioning. GEA is in contact with the supplier who has promised to send the relevant circuit boards.

1.11 Bio-Energy

1.11.1 Commissioning and Training of the Bioethanol Demonstration Plant

In pursuit of the development of cheap and alternative sources of energy, the Government of Guyana, with support from IDB, commissioned a Bioethanol Demonstration Plant at the Albion Sugar Estate, East Berbice, Corentyne. The objectives of this project were to:

1. demonstrate the production of fuel grade ethanol locally,
2. provide fuel for future demonstration of the use of ethanol as a vehicle fuel, and to
3. provide a facility for training of local personnel in bio-fuel technologies.

A 2-day training workshop was held with engineers, technicians and personnel from various governmental institutes and agencies across the country. Three engineers from the Guyana Energy Agency (GEA) attended the workshop.

Ethanol produced at the facility uses molasses as the feedstock. Yeast is added to enhance the fermentation process and during fermentation yeast converts sugars into alcohol and carbon dioxide by feeding on a series of increasingly complex sugars, essentially breaking the sugars down into other compounds. Two circulating pumps are used to continually mix the molasses and yeast. The fermentation process takes about 20 hours. The second part of the plant was designed by "Green Social Bioethanol" and produces hydrous ethanol at approximately 96% through a distillation process. The third part of the plant which was designed by White Fox, utilizes membrane technology for dehydration and produces anhydrous ethanol at 99.6% ethanol. This stage removes any impurities, mostly water, which may be present from the distillation process mentioned above. The production of ethanol from the distillation and dehydration processes is being done on average 12 hours/day (where the current rate of production is ≈ 42 liters/hour).

The ethanol produced from this plant, due to its quantity, will be used for testing purposes and as fuel for vehicles attached to the Ministry of Agriculture, whereby ethanol will be mixed with gasoline to form an E10 blend – 10% mixture of ethanol to 90 % of gasoline. This plant is expected to have a lifespan of approximately 30 Years.

During the year, GEA offered support in the drafting of an Agro-Energy policy.

1.12 Replacement of Photosensors

With support from the Work Services Group, a total of 920 defective photosensors on street lights were replaced as part of GEA's efforts to conserve energy. The photosensor should automatically switch on the street lamp in the evening as night approaches, and switch it off in the morning as daylight breaks. A defective photosensor, however, can keep the street light lit during daylight hours resulting in energy wastage; with an annual cost of G$60,958 per lamp based on current electricity tariffs. The 920 photocells replaced in 2013 were procured at a unit cost of G$904 and would translate into annual energy savings of about G$56 million.

1.13 Energy Efficient Street Lights

Over the last two years, GEA has been testing and reviewing Light Emitting Diode (LED) and Induction street lights. As part of a demonstration project in 2013, GEA commenced the process to procure 40 LED street lamps which will be installed in the first quarter of 2014.

The project, which involves the replacement of 250Watt high pressure sodium (HPS) lamps with 60 Watt LED lamps, will conserve energy, reduce energy costs, improve the quality of street lighting and provide an opportunity to assess the LED street lights. It is estimated that a 76 % reduction in annual cost and energy consumption would be achieved and 23,301.60 kg of CO_2 emissions would be avoided. It is also estimated that the LED's lamp lifespan is 5.7 years as compared to 2 years for the HPS, thus, a reduction in the frequency of replacement.

The estimated annual savings from the replacement of the HPS lamps with the LED lamps will be about G$1.7 million. Based on a capital investment of G$3.1 million for procurement of the LED lamps and timer control, the project would have a simple payback period of 1.75 years.

The GEA is working closely with the Street Light Division, Ministry of Public Works to ensure that lamps meet appropriate standards. This venture will afford the Street Light Division, the GEA and other stakeholders to gain a deeper understanding of the benefits and implication of efficient lighting technologies.

1.14 Energy Assessments/Audits

As part of its energy conservation efforts, the GEA undertook Energy Consumption Assessments of 20 Government buildings in 2012 and expanded this to private sector and schools in 2013 for a total of 31 buildings assessed at the end of 2013. The energy conservation assessments were conducted and ratings for all installed equipment and lighting loads were recorded to understand the daily power demand and to make recommendations on energy conservation opportunities. A written report identifying energy conservation opportunities, estimated costs and pay back calculations for the various recommendations would be prepared and submitted to the respective entities.

Power Quality Measurement

At the request of the Ministry of Public Works and Communication, the GEA conducted a power quality measurement at Parliament Building. The concern expressed was that "a high current was flowing in the neutral conductor". The fluke 1735 power logger was installed at the main utility panel for 4 days. It was found that one phase in the three phase system was unbalanced. An unbalanced phase would result in a high current in the neutral conductor and high level of harmonics. The fluke 1735 power logger was able to identify the unbalanced phase along with the harmonic level and other useful data that could be used to improve the quality of power at Parliament Building.

Below is a summary of the progress with the energy assessments:

		Assessment Completed	Energy Report Completed	Lighting Change-Out Completed	Follow-Up Visit Completed
1	Guyana Forestry Commission	X	X	X	
2	Guyana Lands & Surveys Commission	X	X	X	
3	Guyana Office for Investment	X	X	X	
4	Office of the Prime Minister	X	X	X	
5	Guyana Energy Agency	X	X	X	
6	Hydromet Doppler Radar Station, Timehri	X	X	X	
7	Hydromet Head Office, Brickdam	X	X	X	
8	Public Utilities Commission	X	X	X	
9	Guyana National Bureau of Standards	X			
10	Environmental Protection Agency	X	X	X	
11	Guyana Post Office	X	X	X	
12	National Centre for Educational Resource Development (NCERD)	X			
13	Regional Democratic Council Building, Region 4	X			
14	National Agricultural Research and Extension Institute, NAREI	X	X	X	
15	Guyana Livestock & Development (Head Office)	X	X		
16	Government Electrical Inspectorate	X			
17	Ministry of Amerindian Affairs (Scholarship Hostel)	X	X	X	
18	Public/Police Services Commission	X			
19	Guyana Livestock & Development (Hatchary)	X			
20	Ministry of Culture, Youth and Sport (Head Office)	X			
21	Caribbean Container Limited	X			
22	Demerara Mutrual Life/ Scotia	X			
23	Office of the President	X			
24	State House	X			
25	Red House	X			
26	Cara Lodge	X			
27	Farfan	X			
28	Guyana Livestock & Development (Farm)	X			
29	Guyana Civil Aviation Authority	X			
30	President's College	X			
31	Bishop's High School	X			

Power Studies Assistance to GFC

The energy assessment conducted at the Guyana Forestry Commissions in November, 2012 revealed that the mains transformer was undersized. The transformer was rated at 104 KVA and the peak power requirement during the study period was 117 kVA. The GFC sought GEA's assistance to measure the load and discuss the findings with GPL. A read-out of data obtained from the Fluke 1735 Power Meter was interpreted and handed over to GFC which resulted in GPL replacing the undersized transformer with a 167 kVA transformer.

Assistance to University of Guyana Student

A final year environmental studies student undertook a project titled "Energy Audit for Commercial Buildings" and requested the assistance of GEA to conduct measurements for her project. The student was invited to an energy assessment at NARI where she was exposed to a walk through assessment. She related that the exercise was rewarding and the experience would be beneficial to her project.

GMSA/IDB Energy Efficiency Project

The Guyana Manufacturing and Services Association (GMSA) undertook a project intended to assist local companies in the manufacturing and services sector, to make the most efficient use of their energy applications and simultaneously employ the most effective methods of energy conservation. The project was designed to address three (3) distinct but interrelated components of energy management:

1. Energy Conservation
2. Energy Consumption
3. Alternative Energy Sources

Ultimately, the project is expected to significantly reduce energy expenditures generated from:

1. Lighting equipment and accessories
2. Heating and cooling appliances/ equipment
3. Motorized drives
4. Electronic and other major energy consuming assets

Three Engineers from the Guyana Energy Agency assisted in recording live in-plant measurements using the agency's fluke 1735 data logger.

1.15 Energy Week

Energy week 2013 was celebrated across the Caribbean by CARICOM member states under the theme 'A Secure and Sustainable Energy Future Begins Now!'. As an annual feature, the Guyana Energy Agency planned and executed several activities to commemorate Energy Week. These included an Essay Competition, a series of radio quizzes, a Poster Board Activity, School Presentations, the launch of an Energy Activity Booklet and a National Energy Forum. The activities served to fulfill part of GEA's mandate by disseminating information essential to improving public awareness on sustainable energy, conservation and overall efficiency.

Essay Competion: Prior to Energy Week, GEA launched an Essay Competition for students at the second and third form levels on the topic 'The Role Sustainable Energy Plays in the Progress of Guyana's Low Carbon Development Strategy'. The topic was chosen in recognition of the importance of sustainable energy in a low-carbon economy and its role in transitioning towards a path of sustainable development.

Winners of the essay competition from left to right: Malika Griffith, Jennifer Ally and Ruth Manbodh

The agency received a total of fifteen (15) entries from four (4) secondary schools and three (3) winners were selected by a 4-member team of judges consisting of representatives from the OCC, UNDP, GEA and the education sector[7]. Prizes in the form of trophies and book vouchers were awarded at the Guyana Energy Forum by the Honourable Prime Minister, Mr. Samuel Hinds. The first place entry was submitted by Ruth Manbodh of the Bishops High, Jennifer Ally of the Bishops High gained the second place while Malika Griffith of the Brickdam Secondary secured third place.

Poster Board Activity:

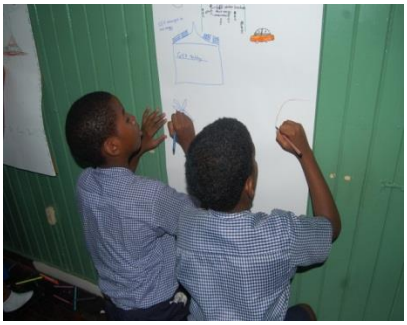
The GEA held a Poster Board Activity in its compound on November 12, 2013. Aptly titled, 'Express your Energy', the poster board activity had in attendance twenty six (26) students between the ages of nine to eleven (9-11) from grades four (4) and six (6) from ISA Islamic Academy, North Georgetown Primary, St. Margaret's Primary and Winfer Gardens Primary.

The students were encouraged to convey their interpretation of energy efficiency and sustainability through artwork and pictorial illustrations on the following themes: 'The Power of Hydro Electricity', 'Think Act Save' and 'How to be an Energy Champion'. The activity was non-competitive; therefore, students were not judged or ranked based on their illustrations. Rather, each school was awarded a 'Certificate of Participation while each student was awarded a token of appreciation as an honorary 'Energy Champion'.

[7] The entries were judged by Mrs. Ingrid Fung (Chief Judge), Ms. Shereeda Yusuf (representative of Office of Climate Change), Mr. George Wachira (representative of UNDP) and Ms. Shevon Wood, Economist, Guyana Energy Agency.

The goal of the Poster Board activity was to tap into the creativity of children by allowing them to express their views and perspectives (through art) on energy-related matters in a non-competitive environment. The posters created during the activity were displayed at the National Energy Forum.





Students expressing their energy through art

Media Interaction and Radio Quiz:

Leading up to Energy Week, representatives of GEA attended two radio morning-shows to publicize Energy Week 2013 and jump start the Radio Quiz. The two shows were the Early Morning Show on 98.1 (Wednesday November 6, 2013) which was hosted by Nerissa Mentore and the Courts Jump Start Programme hosted by Gordon Moseley on 94.1 FM (Thursday November 7, 2013). In addition to radio, the Agency also utilized the television and print medium to air and broadcast advertisements in the form of energy conservation and efficiency messages.

The radio Quiz jump started on the 'Courts Jump Start Programme' on Thursday November 7th and subsequently occurred daily on three radio stations from the 11th-15th November. Patrons were invited to tune in, learn and test their knowledge of energy efficiency and Conservation. During the series a total of twenty-four (24) questions were presented and correctly answered. Winners of the daily quiz were awarded CFLs and a t-shirt as prizes.

School Presentations: Two school presentations were conducted during energy week 2013. One was delivered at McKenzie High in Linden on Monday November 11th, 2013 and the other to New Amsterdam Multilateral in Berbice on Wednesday November 13, 2013.

National Energy Forum:

As a culmination of the week's activities, the GEA held its second National Energy Forum at the International Conference Centre on November 15, 2013. The forum was open to the public with specific invitations extended to various secondary schools, targeting the 4th-5th Form students.

Moderated by Michella Abraham-Alli, the programme got underway with a welcome address by Dr. Mahender Sharma, Chief Executive Officer, Guyana Energy Agency and the Honourable Prime Minister Mr. Samuel Hinds provided introductory remarks.

At the Forum, five stakeholders presented their individual works and involvement in the sector, followed by a question and answer segment. During this segment, invitees made recommendations and asked questions based on the presentations. In addition to an address from the CARICOM Secretariat, the following presentations were given:

i. "Implementing MoU between TERI and GoG"
ii. "IDB's Energy Portfolio in Guyana"
iii. "Sustainable Agriculture: The farming energy cycle"
iv. "Sustainable Energy Initiatives in Guyana"

There was a recorded attendance of one hundred and twenty nine (129) with representation from the following schools: the Bishops High, Brickdam Secondary, Presidents College, School of the Nations and St Joseph High. The goal of the Energy Forum was to continue dialogue and share information on ongoing activities among stakeholders in the Energy Sector (both the public and private).

Launch of the Energy Activity Booklet:

During the forum, the GEA also launched an 'Energy Activity Booklet', titled 'What is Energy?'. The booklet was prepared and designed for children in primary schools between Grades 4-6. Incorporating elements of Energy through the core subjects of English, Mathematics, Science and Social Studies, the booklet includes activities such as word searches, essay writing, math problems and science experiments. This Energy Activity Booklet, which will be made available on GEA's website, provides useful information on energy in a simple and illustrative manner.

1.16 Information Dissemination and Awareness Activities

Presentation at President's College

The Guyana Energy Agency facilitated a PowerPoint presentation at President's College. The presentation targeted 6th Form students preparing to write the CAPE Environmental Science examination in May/June 2013. The presentation was focused on Energy and the Environment with the following specific objectives:

1. Explain the importance of energy to society
2. Describe the limiting factors in the supply and use of energy from various sources
3. Describe the conventional generation and distribution of electricity
4. Discuss factors affecting electricity generating capacity and demand
5. Discuss various methods of energy conservation and improving energy efficiency
6. Outline the impacts of various forms of energy on the environment
7. Explain the total cost of energy use
8. Interpret data using appropriate charts, tables and graphs

UG Career Day

A team represented the Guyana Energy Agency at University of Guyana's annual Career Day. The main purpose of the Agency's participation was one of awareness and information dissemination. The team focused on energy efficiency and energy conservation methods which will in turn save money and achieve greater levels of energy conservation. Brochures and posters were also distributed.

Hydropower Lecture – Introduction to Hydropower Concepts

The Guyana Energy Agency, with support from the Caribbean Renewable Energy Development Programme CREDP-GIZ, invited engineers, technicians, students and interested persons to a lecture on hydropower concepts. This lecture was conducted by Mr. Sven Homscheid, Hydropower Specialist from Germany.

Eighty-two (82) persons attended this lecture with majority coming from the University of Guyana and other Governmental Agencies. Persons were impressed with Mr. Homschied's presentation especially in the aspect of sharing his experiences, organized approach and his knowledge of the concepts. It was beyond most persons' expectations and felt that the lecture was an excellent and timely one and Guyana Energy Agency should be commended on their efforts. Some persons indicated that they would love to attend more of these kind of lectures but was unsure what aspect of hydropower needed to be addressed in details and the frequencies of these lectures.

The topics presented were as follows:

1. What is hydropower
2. Hydropower classification
3. Brief history of the turbine
4. Hydropower and the environment
5. Hydropower physics
6. Electrical generators for turbines
7. Various turbine types
8. Elements of a hydropower site
9. Examples of hydropower sites

EPA Annual Green Walk 2013

Guyana Energy Agency participated in the World Environmental Day Annual Green Walk to help raise global awareness of the importance of food preservation in the world. The walk commenced at the Umana Yana and ended at the National Park. The theme was "Think. Eat. Save" and served to highlight the devastating effect of food wastage on the global population and the global environment. T-shirts with sustainable energy images were distributed to GEA's participants.

World Environmental day annual green walk

Biomass Energy Presentation

The Government of Guyana, through the Guyana Energy Agency and the Indian High Commission, hosted a presentation targeted at sawmillers, loggers, rice millers, engineers, technicians, students and interested persons to learn about India's experience with "Biomass Energy".

Dr. Prasad and Mr. S. K. Singh presented a lecture at the Cara Lodge Hotel which dealt with exploring options of utilizing Biomass Energy. Approximately 40 persons were in attendance including the Hon. Prime Minister Mr. Samuel Hinds, Chief Executive Officer of the Guyana Energy Agency Dr. Sharma, and First Secretary at the India High Commission, Mrs. Sengupta.

The presentation was a part of the Guyana Energy Agency's continuous effort to educate the general public and other stakeholders about the potential and uses of alternative sources of energy in Guyana.

Piloting Exercise of Kids E-Book

On Friday September 27, 2013 a piloting exercise was held in the Board Room of the Guyana Energy Agency. The exercise, done in the form of a focus group discussion, was organized to Pilot the Kids E-Book which was launched on November 15, 2013 at the Guyana Energy Forum.

In attendance were sixteen (16) children from grades five and six along with four (4) teachers. The schools represented were: St Margarets, St Angelas, Stella Marris and Mae's Primary. The booklet was created by the GEA to disseminate information to children about energy, to foster discussion within class rooms and to encourage further learning through an entertaining medium. The piloting exercise was done to

ascertain whether the booklet catered effectively to the core target group in relation to the activities it contains, appropriateness and comprehension of content. The feedback received was used to receive feedback to improve the final production.

ECLAC Training Manual Piloting Exercise

The Guyana Energy Agency hosted a piloting exercise of a training manual, on September 24th 2013, on behalf of United Nations Economic Commission for Latin America and the Caribbean (ECLAC). The exercise was facilitated by Ms. Charmaine Gomes, Sustainable Development Officer (ECLAC), and Ms. Elizabeth Emanuel, ECLAC Consultant. The manual was developed to apprise stakeholders of the methodologies that may be employed in removing fiscal and regulatory barriers to implementation of energy efficiency measures and renewable energy technologies.

The aim behind its creation is to seek to complement national initiatives in raising awareness of the barriers as well as build the capacity of energy experts in techniques that may be used in the removal of said barriers, thereby prompting greater energy efficiency, conservation and increased use of renewable energy technologies.

Presentation at GNBS

An initial meeting was held with Senior Officials of GNBS and GEA. The meeting was focused on establishing standards for CFL, LED and Photo Sensors and inspections by the GNBS at point of import and point of sale. The meeting was organized because of numerous complaints received by the GEA about the poor quality and short life span of the CFLs, LED lamps and photo sensors.

Engineers of the Guyana Energy Agency presented a Power Point Presentation to fourteen Inspectors from the Guyana National Bureau of Standards and a demonstration lighting board was set up to give the audience a better understanding of some lighting concepts.

Presentation and Demonstration to GNBS Staff

Presentation to Schools

Presentations, highlighting sustainable energy initiatives in Guyana, were delivered to students of forms three and four. The presentations commenced with showing the students a ten-minute documentary followed by a power point on Sustainable Energy Initiatives. In addition to highlighting alternative energy initiatives that Guyana has been embarking on, students were also given energy conservation tips and encouraged to practice behavioral changes (in their homes and school) in order to conserve and use energy efficiently. Students received brochures and tokens were awarded to those who correctly answered questions (based on the information presented).

#	School	Date	Location	Region	Avg. # of Students
1	Bishops High	Oct 18, 2013	Georgetown	4	88
2	Golden Grove Primary	Nov 01, 2013	East Coast Demerara	4	55
3	St Roses High	Nov 07,2013	Georgetown	4	220
4	McKenzie High	Nov 11,2013	Linden	10	304
5	New Amsterdam Multi	Nov 13,2013	Berbice	5	306
6	Annandale Secondary	Nov 20,2013	East Coast Demerara	4	200
7	Buxton Secondary	Nov 20,2013	East Coast Demerara	4	350
8	South Ruimveldt Sec.	Nov 21, 2013	Georgetown	4	120
9	Christ Church Secondary	Nov 21, 2013	Georgetown	4	250
10	Presidents College	Nov 25,2013	East Cost Demerara	4	85
11	Bladen Hall Multilateral	Nov 25,2013	East Cost Demerara	4	70




Some of the Students who benefitted from the Presentation

Litter Bins at National Park

The Agency accumulated eleven 45 gallons plastic drums from operation of GMS. The drums were prepared for use as garbage bins and a large sticker was pasted around the circumference to reflect the message – 'Think, Act, Save'. Ten were donated to the National Parks Commission for use within the park area and one was sent to the Linden base for use.

Summary of Advertisements and Brochures

Description	Year to Date	2013 Target
Number of Fuel Smuggling Ads in the Newspapers	42	60
Number of Fuel Smuggling Ads on the radio	1,176	400
Number of Energy/Conservation ads in the Newspapers	52	30
Number of Energy Conservation ads on TV	29	40
Number of Energy Conservation ads on the radio	1,138	400
Number of brochures printed	0	10,000
Number of booklets printed	1,684	1,684
Number of posters printed	41	60
Number of brochures distributed	10,690	5,000
Number of booklets distributed	424	1,000
Number of posters distributed	26	50
Number of infomercials	984[8]	40
Number of documentaries	168[9]	10
Hits on the GEA's website	19,183	30,000

[8] CNS Channel 6 airs the animated Infomercials six (6) times per day free of cost; while the Learning Channel airs them twice per day.

[9] CNS Channel 6 airs the 10 minutes 'Sustainable Energy' documentary once per day free of cost; while the Learning Channel airs it once a day on weekdays and twice per day on weekends (free of cost).

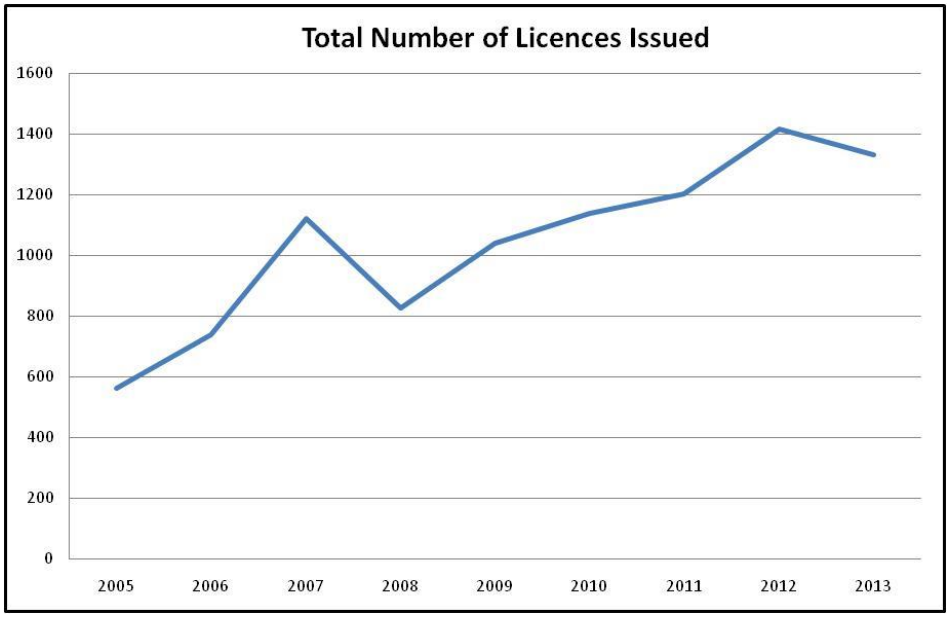
2.0 Legal & Licensing Division

The number of licences issued by the Division was slightly lower than that of the previous year with 1,331 licences granted to importers, wholesalers, retailers, consumer installations and bulk transportation carriers of petroleum and petroleum products during 2013. Despite reminder letters, follow-up calls and further warning letters, some operators remained delinquent in completing the licensing process. GEA has been closely monitoring these operators to ensure compliance.

Quarterly and periodic meetings have been established between the GEA, Environment Protection Agency and the Guyana Fire Service to foster greater collaboration and to ensure compliance.

		2013													2012 YTD	Total Growth %
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD		
Importing Wholesale		1	0	0	1	2	0	0	3	1	4	2	1	15	13	15%
Wholesale		0	0	0	1	0	0	1	0	1	3	0	0	6	13	-54%
Retail	Petrol Filling Stations	3	3	2	21	23	2	7	7	4	7	2	4	85	102	-17%
	Others	13	11	13	24	30	8	17	49	40	48	16	22	291	270	8%
Consumer Installation		1	6	3	16	80	17	7	22	26	6	4	9	197	281	-30%
Bulk Transportation Carrier	Road Tanker Wagons	14	17	14	10	19	15	17	2	7	9	12	16	152	135	13%
	Trucks	47	40	64	61	44	50	34	35	45	47	32	29	528	549	-4%
	Fuel Barges	0	0	0	1	1	0	0	0	0	0	0	0	2	3	-33%
	Boats	5	4	1	8	10	6	4	3	5	6	1	3	56	49	14%
Total		84	80	97	143	209	98	87	121	129	130	69	84	1331	1415	-6%

Table illustrating Licences issued from January to December 2013



Bulk Transportation Standards

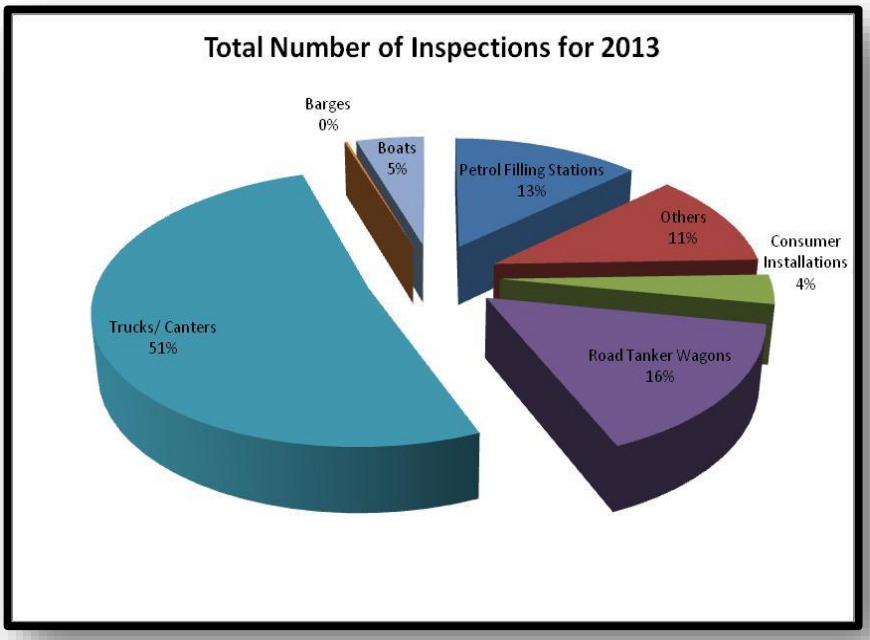
During 2013 the Division was actively involved in researching and drafting Standards for Bulk Transportation of fuels. Work continued with Guyana National Bureau of Standards (GNBS) and Guyana Fire Service (GFS) to finalize draft guidelines for the transportation of fuel using approved containers and drums.

Two standards were drafted by the Guyana Energy Agency for the purpose of targeting both bulk transportation carriers and road tanker wagons that are involved in the transport of petroleum and petroleum products. These standards were drafted after extensive research was conducted at various retailers and distributors, observations at terminals and during inspections of said vehicles. Additionally, precedents were obtained and best practices extracted and reviewed to ensure practicality and applicability to Guyana.

The drafted standards were submitted to both GNBS and GFS. A Technical Committee has been convened by GNBS with representation from relevant stakeholders.

2.1 Petrol Filling Station Inspections

The Division conducted a total of **965** inspections during the course of the year in an effort to ensure continued conformity with the '***GNBS Guidance For The Design, Construction, Modification And Maintenance Of Petrol Filling Stations***' and in pursuance of its mandate to ensure continued compliance with the relevant standards and Regulations.



2.2 Drafting

The Petroleum and Petroleum Products Regulations 2004, enacted under the Guyana Energy Agency Act 1997 cap 56:05, was revised to incorporate specific provisions relating to Bulk Transportation Carriers as well as other licensing related matters that have arisen over the years.

The development of the amended regulations involved a holistic review of the current processes employed at GEA and the identification of any existing gaps and areas for improvement and support. One such area included the introduction of electronic receipt of supporting documentation required for processing a licence. This was in accordance with and recommended by the Single Window Automated Processing System for Trade Transactions, a project under the purview of the Ministry of Trade, Industry and Commerce.

Further, penal provisions for breach of the respective regulations have now been explicitly stated based on precedent established through previous convictions. Additionally, as part of this review process, stakeholder consultations were held with sister agencies such as the Environemental Protection Agency (EPA) and the Guyana Fire Service along with other enterprises such as GUYOIL.

3.0 Review of Activities: Fuel Marking Division

Training of Inspectors was the hallmark in 2013. With the exception of 3 Inspectors recruited in December, all previous Inspectors received three separate training sessions including Surveillance training conducted with two separate batches in July and September. The training sessions have helped to motivate Inspectors and have provided new ideas and approaches to daily operations. In November, representatives from Authentix conducted training with the 'Field IAS test' which is critical in ensuring accuracy of field testing. Periodic training sessions were also conducted during the year in 'Effective Statement Writing'.

Title	Objectives	No of staff Trained	Contact days	Expected Outcomes
Needs Assessment Consultancy Session	Objective of making recommendations on the number and types of laboratories that should be included in the State of the Art Testing and Metrology Facility	1	1	Based on approved recommendations, identify the specifications for building(s), equipment and technical capabilities of personnel required in order for the facility to comply with the requirements of the ISO/IEC 17025 standard
Investigation and intelligence Gathering	To effectively gather evidence and information, protecting and maintaining evidence, effective interviewing techniques, statement writing, understanding court proceedings	14	14	Improved evidence collection, accurate information and intelligence gathering, improved report writing.
Supervisory Management	Participants were educated on the roles and functions of supervisors, how to assign tasks and follow-up with subordinates on delivery, conflict management and resolution	2	4	Improved ability to assign tasks and ensure completion. Better conflict management.

The Intelligence aspect of operations continues to be an area where the GEA has been progressing with an average of three tips being received per month. Operational control for the Fuel Inspection team was also improved in 2013 with the vacant post of Field Operations Coordinator being filled as of September 2013. This has allowed previous resources to be

realigned to ensure maximum efficiency in the operation control and execution of works related to the Inspection team.

Since implementation of the Fuel Marking Programme in 2003, the Division has, in keeping with the legislative mandate, utilised a marking system to add markers to petroleum products imported by every person under an import licence or import wholesale licence for the purpose of identifying such petroleum and petroleum products as having been legitimately imported. Legally imported fuel was bulk marked, a total of 190 bulk markings: 123 at the Georgetown terminals, 53 at the Berbice terminals and 14 at the Linden terminal.

Samples of petroleum and petroleum products were collected from a number of sites throughout Guyana and tests were conducted to determine the presence or proportion of the markers in the respective samples of petroleum products.

The Task Force on Fuel Smuggling and Contraband, under the chairmanship of the Minister of Home Affairs, provided a framework to foster cooperation and coordination among the following key enforcement entities: Guyana Police Force, Guyana Revenue Authority, Guyana Defence Force and Customs Anti-Narcotics Unit. GRA rendered assistance to the GEA in relation to the disposal of illegal fuel. The coordination efforts of the Task Force has positively influenced the efforts to combat fuel smuggling.

3.1 Sample Analysis

The number of fuel samples collected/logged each year is captured in the table below:

2003	2004	2005	2006	2007			2008			2009			2010			2011			2012			2013		
434	6,639	9,621	6,104	McKenzie Bridge	9,500	15,223	McKenzie Bridge	12,191	20,639	McKenzie Bridge	12,072	20,799	McKenzie Bridge	14,898	24,659	McKenzie Bridge	15,137	22,405	McKenzie Bridge	12,500	22,875	McKenzie Bridge	24,624	38,439
				Other	5,723		Other	8,448		Other	8,727		Other	9,761		Other	7,268		Other	10,375		Other	13,815	

Number of Samples Collected Annually

The number of fuel samples collected/logged in 2013 was 68% more than that collected/logged in 2012.

The table below shows the breakdown of analyses by Region. 39,199 analyses were done in 2013 compared to 25,694 analyses in 2012.

Number of Quantitative Analyses by Region										
Region	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
1	10	79	40	1,134	157	20	55	59	273	0
2	777	4,130	1,557	870	613	1,173	1,920	1,408	1,673	2,250
3	496	1,188	908	1,473	3,386	3,927	3,741	2,419	3,479	4,167
4	823	1,183	1,111	809	2,212	1,848	4,420	3,289	4,595	5,291
5	111	403	225	151	354	420	1160	827	1479	1,274
6	599	1,596	165	476	618	376	627	829	931	1,167
7	140	338	195	290	561	170	286	140	295	354
8	33	11	61	227	95	76	130	12	135	25
9	25					5	93	1	64	0
10	42	168	744	9,457	12,457	12,236	15,839	15,858	12,770	24,671
Total	**3,056**	**9,096**	**5,006**	**14,887**	**20,453**	**20,251**	**28,271**	**24,842**	**25,694**	**39,199**

Number of Quantitative Analyses by Region

Notes:

1. Database to track analyses was installed in July, 2004. Figures were not representative of ALL samples analysed for that year.
2. Sampling for 2006 and 2007 was focused on smuggling "hot spots"
3. Sampling on a 24-hr basis commenced in 2007 at the McKenzie, Linden Bridge

3.2 Analysis by Site

15,022 site visits were recorded during 2013 compared to 8,323 for 2012.

	2013	2012	2011	2010	2009
Other Regions	8,917	4,922	4,276	3,975	3,242
McKenzie Bridge	6,105	3,401	4,239	3,994	2,849
Total	**15,022**	**8,323**	**8,515**	**7,969**	**6,091**

Note: Each truck, boat, retail outlet etc. is counted as a site in this table.

35 incidents of illegal fuel were recorded in the year 2013 compared to 13 in 2012.

	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Total**
2009	1	3	3	1	6	4	7	6	6	4	3	2	46
2010	6	2	3	3	5	3	6	3	2	2	3	10	48
2011	7	0	2	3	1	1	2	1	1	2	1	0	21
2012	1	0	0	0	0	3	0	3	1	1	2	2	13
2013	1	2	3	3	7	2	3	2	6	0	2	4	35

Of the 15,022 total sites visited during the year, 2,146 sites were sampled at least once.

35 (2%) of the sites sampled at least once were found with *significant dilution (defined as more than 50%)* in at least one tank. From 2006 to 2013, the percentage of sites found with significant dilution in at least one tank has progressively decreased from 34% in 2006 to 2% in 2013. With more sites visited, the data suggests that more sites are dealing in legal fuel.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
No. of Sites sampled at least once	573	763	656	566	592	1202	1313	1,179	1,648	2,146
No. of Sites found with significant dilution in at least 1 tank	72	240	220	128	57	73	45	21	13	35
% of Sites found with significant dilution in at least 1 tank	13%	31%	34%	23%	10%	6%	3%	2%	1%	2%

Analysis of Site Results

Note: The "No. of Sites sampled at least once" does not capture trucks sampled at the McKenzie bridge.

3.3 Analysis of Test Results

Analysing progress from the inception of the Fuel Marking Programme in 2003, the table below shows test results for samples collected from 2003 to 2013. The *"Test Results" (Quantitative Analyses)* refer to the percentage of marker concentrate detected when the sample was analysed. A "correctly marked" sample should be at 100%.

The results of samples analyses over the years are categorized in the following four ranges:

0 to 50% : Significant dilution
51 to 70% : Some dilution
71 to 90% : Suspected dilution
91% and more : Legal

The table below shows that during the assessment phase (2003), 12% of the samples analysed were found to be significantly diluted. This decreased to 6% in the post-assessment phase and throughout 2004. From 2005 to 2007, the testing strategy was focused on areas with a high incidence of illegal activity. For this three-year period, the percentage of significantly diluted samples fluctuated from 9% to 15% and then to 8%. It is believed that this fluctuation was a direct result of the strategy used for sampling and would have a direct relationship with the number of samples analysed and the focus on areas with a high incidence of smuggling. The year 2008 can be characterized as a mixture of focused, planned and random sampling. The percentage of samples found with significant dilution was maintained at 3% in 2009. The year 2010 set another record with significant dilution reported as 2%, indicative of sustained reduction in the percentage of significantly diluted samples analysed. In 2011 and again in 2012, *significant levels of adulteration (defined as more than 50%)* were detected in only 1% of the samples analysed. With the analysis of 64% more samples in 2013, 1% of the samples analysed were found to be significantly diluted.

TEST RESULTS (Quantitative analyses)	03 Dec 2003 (Assessment Phase)		27 Jan 2004 (Post-Assessment)		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013	
0-50 %	42	12%	28	6%	196	6%	855	9%	764	15%	1,169	8%	593	3%	701	3%	511	2%	167	1%	259	1%	303	1%
51-70 %	59	17%	32	7%	275	9%	1,234	14%	223	4%	343	2%	254	1%	767	4%	372	2%	164	1%	128	1%	137	1%
71-90 %	67	19%	89	19%	475	16%	2,576	28%	928	19%	8,204	55%	8,593	42%	12,654	62%	10,834	45%	10,990	49%	10,491	49%	29,734	49%
91 % -	188	53%	329	69%	2,110	69%	4,431	49%	3,091	62%	5,171	35%	11,013	54%	6,129	30%	12,612	52%	11,171	49%	11,867	49%	7,252	49%
Total	356	100%	478	100%	3,056	100%	9,096	100%	5,006	100%	14,887	100%	20,453	100%	20,251	100%	24,329	100%	22,492	100%	22,745	100%	37,426	100%
Qualitative Analyses					36		375		1,825		1,180		307		887		1,259		113		452		710	

Test Results of Samples Analysed

Note: Duplicate quantitative analyses removed

3.4 Quantity of Illegal Fuel Seized

The table below compares the volume of illegal fuel seized from 2005 to 2011.

2005	2006	2007	2008	2009	2010	2011	2012	2013
(UK GAL)	(UK GAL)	(UK GAL)	(UK GAL)	(UK GAL)	(UK GAL)	(UK GAL)	(UK GAL)	(UK GAL)
3,011	8,001	21,793	33,560	33,443	21,242	10,272.6	6,004	2,931

3.5 Volume Analysis

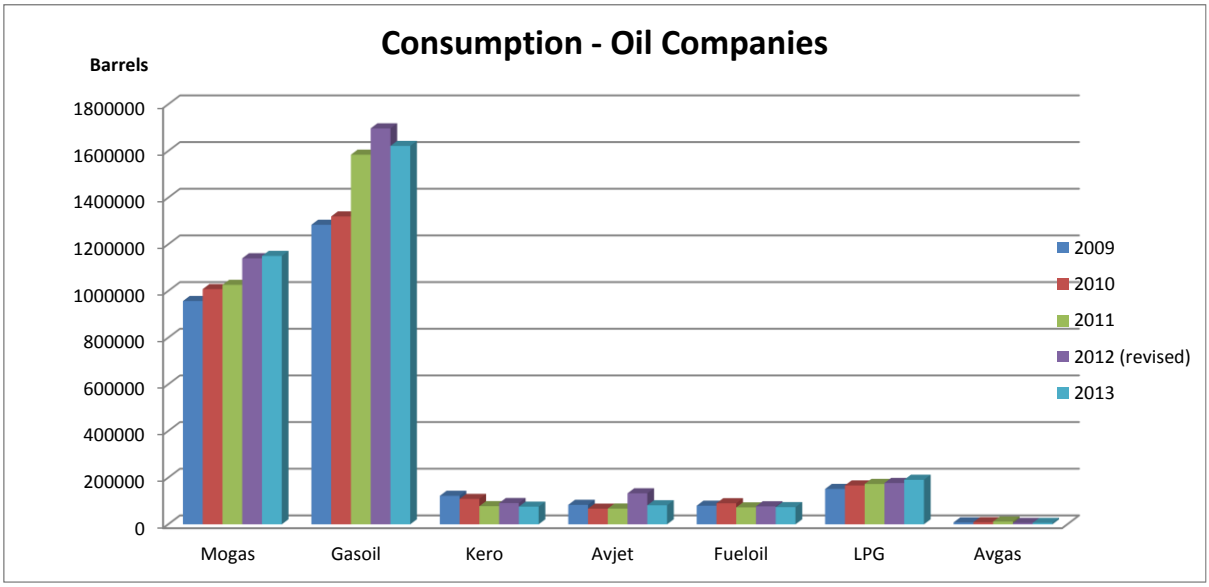
An additional metric to evaluate the performance of the Fuel Marking programme is a measure of gasoline, diesel and kerosene consumption (excluding large duty-free consumers). For the oil companies, it is estimated that 3,199,428 barrels of petroleum-based products were sold in 2013 with an average of 8,766 barrels per day. This represents a 3.67% decrease when compared to 2012[10].

TOTAL CONSUMPTION - OIL COMPANIES (BBLS)					
January - December		2012	2012 (revised)	2013	% change
	Mogas	1,140,119	1,140,119	1,150,201	0.88%
	Gasoil	1,779,673	1,696,895	1,621,640	-4.43%
	Kero	91,122	91,122	75,601	-17.03%
	Avjet	132,924	132,924	81,584	-38.62%
	Fuel oil	77,095	77,095	73,596	-4.54%
	LPG	177,133	177,133	190,806	7.72%
	Avgas	6,041	6,041	6,000	-0.69%
	Total	**3,404,107**	**3,321,329**	**3,199,428**	**-3.67%**
	Bpd	**9,301**	**9,075**	**8,766**	

There were increases in the consumption of Mogas and LPG with reductions in the consumption of Diesel, Kerosene, Avjet, Fuel oil and Avgas. The increase in LPG consumption suggests more use of LPG as a cooking fuel in comparison to kerosene.

Notwithstanding increases in diesel consumption from large duty-free consumers (specifically, Trawlers Association and BCGI), there was an overall decrease in Gasoil consumption. This reduction continued for the oil companies; presumably, owing to a decline in the fishing sector.

[10] Gasoil figure for 2012 was revised to discount quantity sold to GPL by the oil companies to avoid double counting. This was also applied for 2013.



In addition, another factor may be the shift in imports originating from Trinidad and Tobago (Petrotrin) where the FOB price was relatively higher when compared to Venezuela (PDVSA)[11].

Avjet/Jet A-1 consumption is reflective of the withdrawal of two major carriers (Delta Airlines and EZJet). There was also a slight decrease in Avgas consumption. The minor decrease in Fuel oil consumption correlates with lower production observed in the bauxite industry during the first half of the year[12].

3.6 Prosecutions

For the year 2013, the Fuel Marking Programme recorded two convictions, both of which were guilty pleas. Nine new charges were filed in comparison with four that were filed in 2012. One matter was dismissed for insufficient evidence as key prosecution witnesses, who either resigned or whose services were terminated failed to present themselves for Court to give their evidence. At the end of 2013, there were thirteen prosecutions engaging the attention of the Magistrate's Courts in Guyana. Three other matters were withdrawn after the Defendants paid compensation to the GEA under Section 33A Guyana Energy Agency Act 1997 as amended by Section 8 Guyana Energy Agency (Amendment) Act 2011.

[11] On average, the FOB price for Diesel from Petrotrin was 6.57% higher in 2013 when compared to the average price charged by PDVSA.

[12] Mid-year Report (2013), Ministry of Finance.

4.0 Review of Activities: Administration and Human Resource Division

At the beginning of 2013, the GEA had a staff complement of eighty-two (82) employees and ended the year with ninety (90) employees. The Agency filled the following 2 new positions in the organization's structure:

1. Public Communication Officer
2. Energy Engineer

The following 26 existing positions were filled during the year:

- 1 Legal Officer
- 1 Field Operations Coordinator
- 14 Inspectors
- 7 Marking Officers
- 2 Driver/Office Assistants
- 1 Accounts Clerk II

Resignations from the following 12 positions were received:

- 1 Accounts Clerk II
- 7 Inspectors
- 1 Senior Inspector
- 1 Driver/Office Assistant
- 2 Legal Officers

The services of persons who filled the following positions were terminated:

- 13 Inspectors
- 7 Marking Officers
- 1 Driver/Office Assistant

4.1 Professional Development

The staff of the Agency benefited from training in the following areas:

- ✓ *Single Window Automated Processing System* (SWAPS) for trade transactions in Guyana workshop was held with stakeholders at Regency Hotel. This workshop was made possible by the government of Guyana through the Ministry of Tourism, Industry & Commerce. The purpose of the workshop was to validate the data collected during discourses with identified working groups of participating agencies and the Private Sector by Crown Agents, consultants of the project. Prior to the workshop, a study was conducted of participating agencies procedures for processing import applications for trade transactions with a view of improving the current system.

- ✓ *Aviation Fuel Handling and Quality Control* course was held at Air Services Limited classroom and the Practical training at the Fuel Depot. The objective of the course was to provide participants with the knowledge, insights and skills necessary for the safe handling of aviation fuel at aerodromes according to civil aviation standards and best practices. The training was conducted by Dr. Ravin Appadoo of Aviation Fuel Solutions International Inc. Attending the workshop was participants from; Guyana Civil Aviation Authority, Air Services Limited, Rubis (Guyana) Inc and Guyana Energy Agency. The workshop was hosted by Air Services Limited and was attended by GEA's Mechanical Engineer and Licensing Administrator.

- ✓ *Introduction to Geographic Information System* (GIS) basic concepts, components and its use in decision making was held at Geo Tech Vision Incorporated, 36 Robb Street. The objective of the training was to allow participants to visualise, question, analyse, interpret, and understand data to reveal relationships, patterns, and trends. Attending the training were GEA's Mechanical Engineer, Inspector and Senior Inspector.

- ✓ *SWAPS Training of Trainers Workshop* was held at the Guyana Revenue Authority Training room. The objective was to assist participating agencies to be more efficient and productive in its use of resources, enhance greater compliance with government legislative and regulatory requirements and also enhance collaboration with other regulatory authorities. The workshop was facilitated by Centre for Policy Analysis and Institutional Development. Representatives came from ten regulatory entities namely; Guyana Energy Agency, Ministry of Agriculture (National Plant Protection Organization), Guyana Forestry Commission, Guyana Food and Drug Department, Guysuco, Guyana Revenue Authority Wharf & Container Scanner and Guyana Gold Board. GEA's Licensing Administrator attended.

- ✓ Training sessions were conducted with Inspectors of the Fuel Marking Division. The sessions were aimed at educating the Inspectors about the proper conduct of field exercises and the importance of properly executing their duties in contributing to successful prosecutions for the GEA. Particular emphasis was placed on compliance with the Standard Operating Procedures and statement writing. Following these training sessions, improvement in the areas covered have been noted.

- ✓ A GEA Officer attended a one day training in Fire Safety. The objective of the training was to enable participants to acquire the basic knowledge in Fire Protection so as to disseminate the importance of Fire Safety in their work places.

- ✓ The GEA facilitated a two-day training workshop on Aviation Fuel Management conducted by Dr. Ravin Appadoo, President, and Mr. Domenic Caccese, Training & Quality Assurance Consultant, both of Aviation Fuel Solutions International Inc. at GEA'S Boardroom. The objective of this follow up training was to review and train integral members of the aviation fuel industry in international standards in aviation fuel handling and safety, so as to equip such persons with the tools and techniques for more effective oversight in aviation fuel handling in Guyana. Entities that were represented at the training; Guyana Civil Aviation Authority, Air Services Limited, Sol (Guyana) Inc, Rubis (Guyana)

Inc, Environmental Protection Agency, Caribbean Aviation Maintenance Services, Guyana Oil Company Limited and Guyana Energy Agency. Attending the training were GEA's Licensing Administrator and Licensing Inspector.

- ✓ A 3-day training session on hydropower engineering was conducted by Mr. Maxwell Jackson and Mr. Jomo Gill, both lecturers at the University of Guyana, in the boardroom of the GEA. Two Hydropower Support Engineers, Two Energy Engineers, One Economist, and a Legal Officer, all of the Guyana Energy Agency, took part in the training session. The training was focused on:
    - Location and design of hydropower facilities
    - Logistics of transmitting hydropower electricity
    - Financial analysis in order to determine feasibility of projects and payback periods
    - Environmental planning and management of hydropower projects

- ✓ The following officers participated in a seminar titled "Leadership Excellence- Inspiring and motivating your team for peak performance": Head Finance, Legal Officer, Economist, Head Admin/HR, 2 Hydropower Support Engineers and 2 Energy Engineers. The theme of the workshop was "Inspiring and motivating your team for peak performance". It was sponsored by the Guyana Manufacturing and Services Association (GMSA) and delivered by Ms. Sandra Baptiste, an International Business and Communication Consultant, at the Regency Suites Hotel conference room.

- ✓ GEA's Hydropower Support Engineer and Legal Officer attended a workshop at Cara Lodge, organized by the Department of the Interior Offshore Energy Regulatory Regime through the Department of State, Energy Governance and Capacity Initiative on Environment Risk Mitigation. At this workshop, a team from the Office of International Programs, U.S. Bureau of Ocean Energy Management, Ms. Cheri Hunter, Mr. Gregory J. Kozlowski and Tershara Matthews made presentations.

- ✓ **Olade Online Training on Renewable Energy Generation:** This program was aimed primarily at officials from agencies and government organizations in the energy sector, public and private sector energy companies. GEA's Energy Engineers (2) and Hydropower Support Engineer participated in the course which comprises ten 1-hour interactive sessions each followed by a questionnaire. The course covered the following topics:
    1. Know the basics of renewable energy
    2. Identify options for power generation from renewable energy sources.
    3. Analyze the current energy framework and future prospects.
    4. Consider the importance of the use of renewable energies towards achieving the sustainable development concept.
    5. Propose measures to create conditions for the development and promotion of renewable energy.

6. Hydropower: State of technology (micro, small and large applications), market cost, examples.
7. Biomass: Applications, biomass power generation, state of technology, cost.
8. Wind energy: State of technology, applications, cost, market.
9. Other renewable sources of generation: Geothermal energy, tidal energy, fuel cells.
10. Universal access to energy, overview, appropriate energy option, main barriers.

- ✓ GEA's Senior Data Management Officer and Assistant Accountant benefited from a 4-day training session titled 'Supervisory Management' hosted by the Public Service Ministry.

- ✓ Members from the Energy and Energy Statistics (4 Engineers, 1 Technician, 1 Economist) from GEA benefitted from two (2) online training courses hosted by OLADE. The first course – "Energy Management for Socioeconomic Development I". The scope of the course included aspects to consider for the implementation of energy solutions in rural areas, evaluation of energy alternatives according to the characterizing aspects of the region and explore the social, environmental, technical, cultural and economic impact of the energy solutions in these areas. The second course - "Executive Development Program on Energy Planning" aimed to assist participants in updating and improving the knowledge and skills in energy planning issues and building local capacities to formulate relevant policies and effective measures that respond to the economic, environmental and social needs. GEA's Economist and Hydropower Support Engineer participated in this course and completed the final session of OLADE's Executive Development Program on Energy Planning with a face-to-face 5-day workshop held in Havana, Cuba.

- ✓ *GMSA/IDB ENERGY EFFICIENCY PROJECT WORKSHOP*: GEA's 2 Hydropower Support Engineers attended an Energy Efficiency Project Workshop organised by GMSA/IDB. The main presenter, Mr. Eaton Haughton, provided useful information for raising the awareness of participants on an establishment's energy management programme that saves money.

- ✓ A GEA Inspector, attended a training program titled 'Investigation and Intelligence Gathering'. The training was conducted by Intelliguard Specialist Security Service Inc. through the Institute of Distance and Continuing Education (I.D.C.E) University of Guyana and was aimed at equipping participants with the basic skills and techniques of proper Investigation and Intelligence Gathering.

- ✓ GEA's Documentation Officer and Office Assistant attended a one-day training on Effective Inventory Management hosted by the Consultative Association of Guyanese Industry Ltd (CAGI).

- ✓ Arthur Lok Jack Graduate School of Business conducted a workshop titled "Proposal Writing and Development'. Three of GEA's Engineers attended the workshop which was designed to train participants to write concise, clear and winning project proposals.

- ✓ **Energy Management/Efficiency Workshop:** The Guyana Manufacturing Services Association (GMSA) and the Inter-America Development Bank (IDB) hosted a one-day workshop which three energy engineers from the GEA attended. The intent of the project was to assist local companies, especially in the manufacturing and services sectors, to make the most efficient use of their energy applications and simultaneously, employ the most effective methods of energy conservation. Stakeholders were sensitized about the need to optimize efficiency of fuel and energy consumption. The facilitator, Energy Management Specialist/Energy Audit Regulator, Dr. Carl Duncan, said the program was executed to establish practices and measures that are needed for the adoption of energy efficiency activities within the local manufacturing and commercial sectors. Dr. Duncan made PowerPoint presentations to participants from Guyana Power & Light (GPL), Guyana Energy Agency (GEA), Sterling Products Limited (SPL), TCL Guyana Inc., Bank of Guyana, Brass Aluminium and Cast Iron Foundry (BACIF), and the National Milling Company of Guyana Limited (NAMILCO).

- ✓ **Online Course (Solar Energy: Theory and Concept):** One of GEA's Energy Engineers completed an online course offered by OLADE based on '*Solar Energy: Theory and Concept*'. The course comprised of ten 1-hour interactive online classroom sessions each followed by a questionnaire based on the content covered.

- ✓ Nineteen (19) Inspectors participated in a training session over a period of three weeks on the subject "Investigations and Intelligence Gathering", held in the boardroom of the GEA. The training addressed topics such as investigation and intelligence, analytic skills, beginning with critical thinking, reading, writing and preparing and presenting successful briefing, court testimony, searching practices and interview techniques.

- ✓ A training session was done by GEA's Legal Officer with all Inspectors on the following topics:
    - Statement Writing
    - The Chain of Custody
    - Cautioning Suspects on Site
    - Taking Photographs
    - Tendering, Admitting and Marking Evidence

- ✓ The economist from the Energy and Energy Statistics Division (EESD) from GEA completed two (2) weeks of training on Energy Information Management course at OLADE's Headquarters in Quito, Ecuador. The course entailed presentations and practical applications

in the following areas: energy balance methodology, energy balance analysis, estimation models and a review of the Energy Economic Information System (SIEE). Additionally, the instructor provided an overview of the National Energy Information System (SIEN) and its implementation requirements and database. Work was also done on parameterization, user management and data input for the SIEN.

- ✓ Five (5) engineers and the economist from the Energy and Energy Statistics Division (EESD) benefitted from two (2) online training courses: "Solar Energy: Practical Applications" and "Wind energy: Theory and Concepts", hosted by OLADE.

- ✓ GEA's Analyst, attended a one day Needs Assessment Consultancy Session held by HBS Consulting through the Guyana National Bureau of Standards. The objectives of the workshop were to make recommendations on the number and types of laboratories that should be included in the State of the Art Testing and Metrology Facility, and based on approved recommendations, identify the specifications for building(s), equipment and technical capabilities of personnel required in order for the facility to comply with the requirements of the ISO/IEC 17025 standard.

- ✓ *ECLAC WORKSHOP:* Economic Commission for Latin America and the Caribbean (ECLAC), in collaboration with the Guyana Energy Agency, held a three-day workshop on Innovative fiscal and regulatory incentives for energy efficiency and renewable energy initiatives. The workshop was attended by representatives of the Guyana Energy Agency, Guyana Power and Light, Office of Climate Change (OCC), Ministry of Agriculture, Institute for Applied Science and Technology (IAST), Guyana Public Hospital Cooperation (GPHC) and Hinterland Electrification Unit (HEU). Overseas representatives from Trinidad and Tobago, Grenada, St. Lucia, St. Vincent and the Grenadines and Curacao also participated.

- ✓ **Seminar on Energy Efficiency and Conservation:** GEA's Energy Engineer, attended a 10-day Seminar titled Energy Efficiency and Conservation in Central America and the Caribbean Regions in Japan. The objective of the program was to better understand energy efficient framework, policies and institutions of Japan (and other relevant countries) and clarify policies and institutions to effectively promote energy efficiency in the participant's own country.

- ✓ Five employees from the GEA took part in a one-day Fire Prevention Seminar held by the Fire Advisory Board in collaboration with the Guyana Fire Service, the Georgetown Chamber of Commerce & Industry held at the Everest Cricket Club Members Pavilion on Camp Road & Carifesta Avenue.

- ✓ **Hydropower Site Visits, Brazil:** A five man team from Guyana comprising three Engineers from the Guyana Energy Agency along with Senior Officials from the Ministry of Amerindian Affairs and the Environment Protection Agency (EPA) attended the Brazilian Energy Sector Workshop which was held from November 25th to 29th under the auspices of the Guyana-Brazil Joint Commission to Infrastructure Development.

- ✓ The Economic Commission for Latin America and the Caribbean (ECLAC), with support from the German Agency for International Cooperation (GIZ), implemented a project entitled 'Reducing the Carbon Footprint in the Caribbean through the Promotion of Energy Efficiency and the Use of Renewable Technologies.' The Sustainable Energy in the Caribbean Project sought to identify barriers and gaps that currently inhibit or stagnate the development of fiscal and regulatory systems, which is expected to provide greater incentives for the development of renewable energy and energy efficiency. Stakeholders who participated in the consultation meetings on January 16, 2013 included GEA, Ministry of Education, GPL, EPA, Ministry of Tourism, Ministry of Housing, Guysuco, Private Sector Commission, Guyana Manufacturing and Services Association, Guyoil and Farfan and Mendes. A final report was subsequently submitted.

4.2 Administration and Infrastructural Enhancement

During the year, the Division facilitated the procurement of goods and services based on the budget and workplan.

The following main infrastructural works were completed:

- Rebuilding of the outpost at Mckenzie, Linden
- Increase of space to accommodate the security officer.
- Repairs to GEA's base located on the Essequibo Coast

Reviews were conducted on the performance appraisal format to capture a more participatory approach, and to motivate staff and enhance productivity.

Maintenance works to the Agency's boats, outboard engines and vehicles were done.

The Agency also enhanced the aesthetics of the compound by adding potted plants. Hedges were also planted within the compound.

5.0 Review of Activities: Finance Division

Audits were finalized and the Final Audit Reports were received for the years 2008-2012.

The activities of GEA are financed from Government subventions and from revenue generation. Revenue was generated by the Agency from administrative fees (Agency Fees) for the marking and handling of fuel and from the issuance of licences to import, sell, store and transport petroleum and petroleum products. Due to the project-based self-financing nature of the Fuel Marking Programme, separate accounts are kept for its income and expenditure.

The GEA facilitated payments for fuel purchased under the PetroCaribe Agreement by the oil companies. The payments for fuel purchased from Venezuela are channelled through the GEA and were captured in the accounts to ensure that payments are made according to contractual obligations.

Appendix: Legislation, Mandate and Overview of the Divisions

Legislation

The GEA, a body corporate, was established in 1997 by the **Guyana Energy Agency Act 1997 (Act No. 31 of 1997)**. The GEA Act has been amended over the years to foster harmonization, increased monitoring, better regulation and greater enforcement in the energy sector.
The GEA falls under the purview of the Prime Minister as the Minister responsible for energy and electricity. GEA's organization structure consists of a Board of Directors, Chief Executive Officer, Deputy Chief Executive Officer, Secretariat and the following five Divisions:

i) Energy & Energy Statistics Division,
ii) Legal & Licensing Division,
iii) Fuel Marking Division,
iv) Administration/Human Resource Division, and
v) Finance Division.

The GEA's organization structure was revised during 2010 to accommodate the following new positions: Energy Economist, Energy Engineer, Hydropower Support Engineer, Licensing Administrator, Internal Auditor, Public Communications Officer, Human Resource Officer, [additional] Legal Officer, Field Operations Coordinator, Senior Investigator and Investigator.

The mandate and activities of the Guyana Energy Agency (GEA) are governed by the following legislation:

- Guyana Energy Agency Act 1997,
- Energy Sector (Harmonisation of Laws) Act 2002,
- Guyana Energy Agency (Amendment) Act 2004,
- Guyana Energy Agency (Amendment) Act 2005,
- Guyana Energy Agency (Amendment) Act 2011,
- Petroleum and Petroleum Products Regulations 2004,
- Hydroelectric Power Act and Regulations 1956,
- Hydroelectric Power (Amendment) Act 1988,
- Electricity Sector Reform Act 1999,
- Public Utilities Commission Act 1999,
- Electricity Sector Reform (Amendment) Act 2010, and
- Public Utilities Commission (Amendment) Act 2010.

The GEA Act of 1997 established the Guyana Energy Agency (GEA) as a body corporate. On March 31, 2004 the **GEA (Amendment) Act 2004** was assented to and published in an Extraordinary Issue of the *Official Gazette* which made provisions for the implementation of the fuel marking system, creation of offences and also for the grant and issue of the various classes of licences, viz- Import Licence; Wholesale Licence; Importing Wholesale Licence; Retail Licence; Bulk Transportation Carrier Licence; Storage Licence; and Consumer Installation Licence.
The core functions listed in section 5 of the principal Act are:

- to advise and make recommendations to the Minister regarding any measures necessary to secure the efficient management of energy and the source of energy in the public

interest and to develop and encourage the development and utilisation of sources of energy other than sources presently in use;

- to develop a national energy policy and secure its implementation;
- to carry out research into all sources of energy including those sources presently used in Guyana for the generation of energy, and securing more efficient utilization of energy and sources of energy;
- to monitor the performance of the energy sector in Guyana, including the production, importation, distribution and utilization of petroleum and petroleum products;
- to disseminate information relating to energy management, including energy conservation and the development and utilization of alternative sources of energy;
- to grant and issue licences relating to petroleum and petroleum products, including import licences, wholesale licences, importing wholesale licences, retail licences, bulk transportation carrier licences, storage licences and consumer installation licences;
- to utilise a marking system to add markers to petroleum and petroleum products imported by every person under an import licence or import wholesale licence for the purpose of identifying such petroleum and petroleum products as having been legitimately imported;
- to take samples of petroleum and petroleum products from any person at random throughout Guyana and carry out tests and examinations to determine the presence or level of the markers in the samples of the petroleum and petroleum products;
- to perform the necessary tests to determine whether the marker(s) is (are) in the required proportion and any further test necessary to determine whether the petroleum and petroleum products have been lawfully obtained, stored, possessed, offered for sale, blended or mixed with any substance that is not approved;
- to prosecute in the Magistrates' Courts persons who are in possession of petroleum and petroleum products bearing no markers or at a concentration contrary to that required;
- to prosecute in the Magistrates' Courts persons who import petroleum and petroleum products without an import licence or wholesale import licence;
- to prosecute in the Magistrates' Courts persons who purchase, obtain, store, possess, offer for sale, sell, distribute, transport or otherwise deal with illegal petroleum.

Section 6 of the Act further outlines several advisory functions of the Agency:

- to study and keep under review matters relating to the exploration for, production, recovery, processing, transmission, transportation, distribution, sale, purchase, exchange and disposal of energy and sources of energy;
- to report thereon to the Minister and recommend to the Minister such measures as the Agency considers necessary or in the public interest for the control, supervision, conservation, use and marketing and development of energy and sources of energy;
- to prepare studies and reports at the request of the Minister on any matter relating to energy or any source of energy, including research into alternative sources of energy, or the application of such research, and to recommend to the Minister the making of such arrangements as the Agency considers desirable for cooperation with governmental or other agencies in or outside Guyana in respect of matters relating to energy and sources of energy;

- to advise the Minister or assigned authority on matters relating to the administration and discharge of the functions of the *Electricity Sector Reform Act 1999*.

The Fuel Marking Programme was charged with the responsibility of ensuring that all gasoline, diesel and kerosene are properly marked at a known concentration at all legitimate import points and also collecting and testing samples of fuel from various parts of the country including wholesalers, retailers, distributors, transporters, commercial consumers and any person in possession of fuel for the relevant marker(s).

The **Petroleum and Petroleum Products Regulations 2004** were published in the October 23, 2004 Extraordinary Issue of the *Official Gazette*, providing the framework for the marking of petroleum and petroleum products, the licensing of sites and related offences.

On August 4, 2005 the **GEA (Amendment) Act 2005** was assented to and published in the *Official Gazette*. That Act clarified the definition of "*illegal petroleum*" and provided a definition for "*markers*".

The Guyana Energy Agency Act was further amended in 2011 to include provisions for the seizure and disposal of various items. Prior to the amendment, the GEA was required to transfer seized items to the GRA for disposal. Further, the amended Act, among other things, increased the limitation period from six months to seven years for the institution of charges and made provisions for settlement of matters out of court.

The Guyana Energy Agency continues to revise its regulatory framework to ensure procedural gaps are filled. Within the next year, GEA plans on implementing the amended **Petroleum and Petroleum Products Regulations 2013**, which is currently in the process of stakeholder review. The new Regulations aim to target provisions for licensing bulk transportation carriers and approved standards and specifications for petroleum products.

Energy & Energy Statistics Division

The Division's duties and responsibilities are:

- to ensure that petroleum products are readily available in the country;
- to manage the purchase and importation of petroleum and petroleum products;
- to facilitate payment arrangements between the Oil Companies, the Bank of Guyana and other petroleum importers;
- to collaborate with sector agencies on energy and related matters;
- to develop Guyana's Energy Policy and revise as necessary;
- to study and review matters relating to the exploration for, production, recovery, processing, transmission, transportation, distribution, sale, purchase, exchange and disposal of energy and sources of energy within and outside Guyana;
- to prepare studies and reports at the request of the Minister on any matter relating to energy;
- to develop and execute projects relating to alternative sources of energy;
- to update the country's energy data with respect to acquisition prices, wholesale prices and retail prices;
- to prepare and analyse energy demand and supply data;
- to supply petroleum information and analysis of the relevant energy data as required;

- to supply the **CEIS** and **OLADE** databases with energy information.

Legal & Licensing Division

The Division's duties and responsibilities are:

- to inspect all sites, motor vehicles, machinery and equipment for which a licence may be required under the Regulations;
- to grant/issue the relevant licences pertaining to-
    - importation of petroleum or petroleum products;
    - bulk transportation of petroleum or petroleum products;
    - storage of petroleum or petroleum products;
    - wholesale of petroleum or petroleum products;
    - retail of petroleum or petroleum products;
    - storage and own-use of petroleum or petroleum products.
- to suspend, cancel, cease licences in accordance with the regulations made under the **Guyana Energy Agency Act 1997** as amended by the **Guyana Energy Agency (Amendment) Acts 2004, 2005 and 2011;**
- to ensure that files for prosecution are completed promptly and dispatched to the Office of the Director of Public Prosecutions for advice;
- to oversee and coordinate the assignment of cases for prosecution;
- to prosecute in the Magistrates' Courts persons who are in possession of petroleum and petroleum products bearing no markers or at a concentration contrary to that required;
- to prosecute in the Magistrates' Courts persons who import petroleum and petroleum products without an import licence or wholesale import licence;
- to prosecute in the Magistrates' Courts persons who purchase, obtain, store, possess, offer for sale, sell, distribute, transport or otherwise deal with petroleum without the relevant licence (s);
- to coordinate the representation of the Agency in civil litigation;
- to prepare Amendments to the Legislation as required and work in collaboration with the Drafting Department of the Ministry of Legal Affairs regarding same;
- to provide management with the necessary legal guidance in execution of the Agency's overall mandate and in relation to other stakeholder agencies, where necessary.

Fuel Marking Division

The Division's duties and responsibilities are:

- to utilise the respective marking system to add markers to petroleum and petroleum products imported by every person under an import licence or import wholesale licence for the purpose of identifying such petroleum and petroleum products as having been legitimately imported, whether domestic or duty-free;
- to add the relevant covert proprietary chemical markers to petroleum and petroleum products at the concentration determined by the Minister by notice in the Gazette;
- to maintain the integrity of the marking system;
- to test the accuracy and monitor the effectiveness of the marking system;
- to take samples of petroleum and petroleum products from any site at random throughout Guyana and carry out tests and examinations to determine the presence or level of the markers in the samples of the petroleum and petroleum products;
- to perform the necessary laboratory tests to determine whether the marker(s) is (are) in the required proportion;
- to determine the composition and grade of petroleum and petroleum products and determine whether same have been blended or mixed with any substance that is not approved;
- to give testimonial evidence in the prosecution of offences under the Act;
- to provide, through the Analyst's Certificate, expert/scientific evidence as proof of the legality of petroleum and petroleum products.

Administration and Human Resource Division

The Division's duties and responsibilities are:

- to maintain and update the Agency's personnel files and other records;
- to aid in the recruitment, selection, replacement and continuous professional development of staff;
- to address staff concerns related to wages and salary administration, contract negotiation and separation procedures;
- to improve staff morale through cogent policies and remuneration;
- to manage and maintain the Group Pension, Group Life, Medical and National Insurance Schemes while ensuring that claims, benefits and queries are processed expeditiously and to the satisfaction of the staff;
- to handle all grievance procedures with the objective of reaching mutually acceptable solutions;
- to ensure that office supplies, equipment, and vehicles are adequately provided and maintained;
- to ensure that the Agency's edifices, facilities and compound are kept clean and properly utilized and maintained;
- to monitor the security services for reliability and adequacy in the execution of their duties;
- to develop and enforce the Agency's Policy Manual and Disciplinary Code;

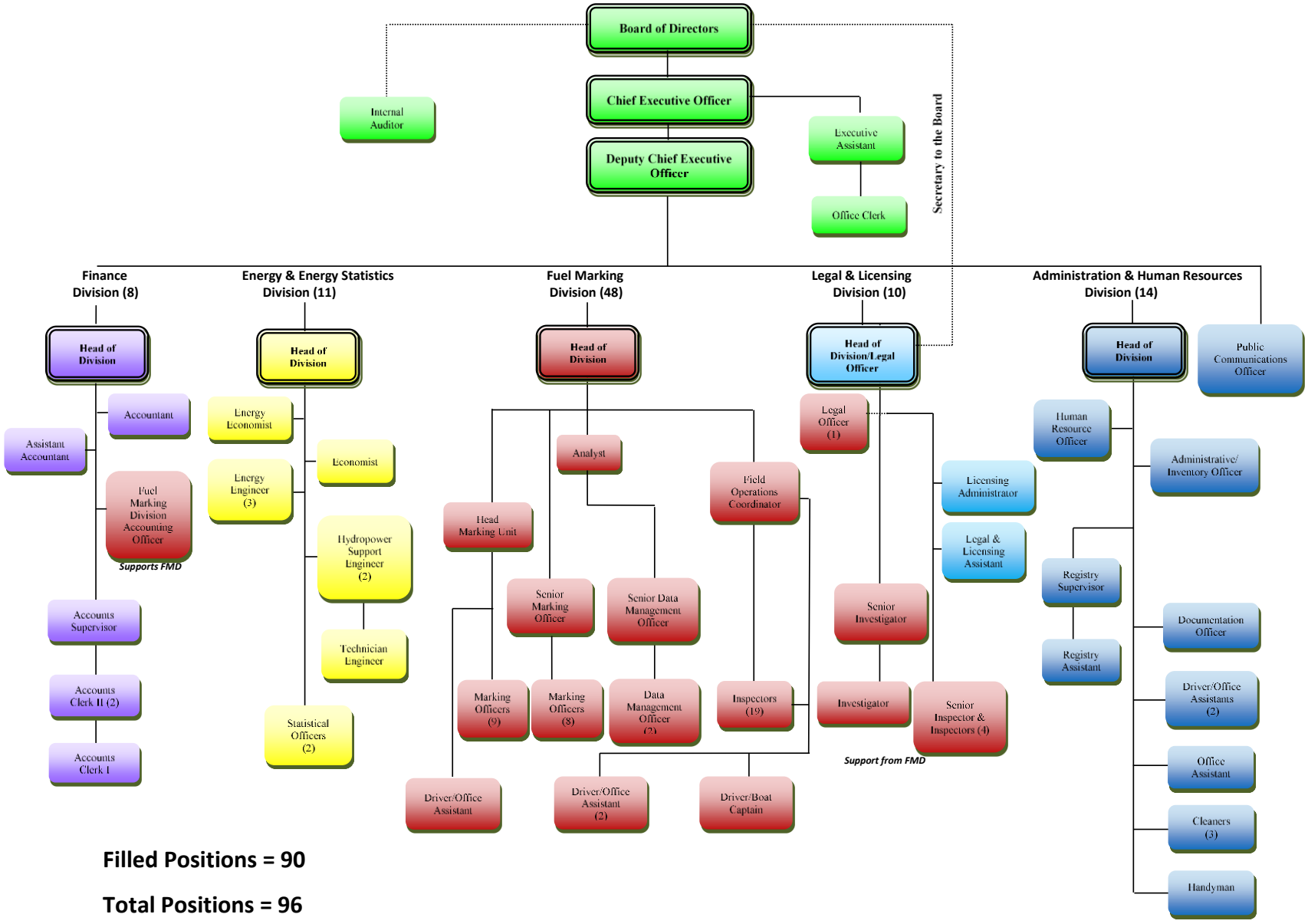
- to provide general support services to the officers of the Agency in the execution of their duties;
- to ensure adherence to health and safety regulations in the work environment;
- to manage the procurement, receipt and issue of stationery, stocks, office equipment and assets of the Agency and monitor use of same to prevent abuse of the Agency's resources.

Finance Division

The Finance Division is tasked with the responsibilities of the day to day management of the Agency's financial resources. The Division's duties and responsibilities are:

- to advise management on the Agency's financial matters, and where necessary, other agencies;
- to manage and maintain the Agency's income and expense accounts and all other accounting records;
- to prepare the Agency's financial statements;
- to prepare the Agency's budget documents;
- to prepare monthly wages and salaries and other allowances;
- to process payments;
- to ensure that goods and services procured by the Agency are so procured in compliance with the **Procurement Act** and other relevant guidelines;
- to verify the accuracy of bills and receipts provided and investigate suspicious or fraudulent bills/receipts;
- to maintain and update the Agency's asset register.

ORGANISATIONAL STRUCTURE FOR THE GUYANA ENERGY AGENCY



Filled Positions = 90

Total Positions = 96