

Picture showing PV Panels at the Ministry of Natural Resources



GUYANA ENERGY AGENCY

Annual Report 2017

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EXECUTIVE SUMMARY

Petroleum Products

5,563,733 barrels of petroleum-based products were imported in 2017 representing about 15,243 barrels per day. This represents a 0.3% increase when compared to 2016. Petroleum imports for the year were acquired at a cost, insurance and freight (CIF) value of US\$401,521,446, representing a decrease of 20.49% from that of the previous year.

The average cost per barrel of petroleum-based imports increased from US\$60.03 in 2016 to US\$72.17 in 2017, an increase of 20.23%. This upward trend also continued for the average unit CIF value for each petroleum product. There were increases of 16.41%, 18.60% and 21.74% in the average unit CIF value (US\$/bbl) for Mogas (gasoline), Gasoil (diesel) and Jet fuel/Kerosene respectively. In addition, the average unit CIF value for Fuel oil, Aviation Gasoline (avgas) and LPG (cooking gas) also increased by 31.23%, 6.18% and 9.11% respectively.

Retail prices for Mogas (gasoline), Gasoil (diesel) and Kerosene increased during 2017 by an average of 8.91%. Specifically, average retail price for gasoline and diesel increased by 9.13% and 13.40%, respectively. Also, the average retail price for domestic kerosene rose by 2.80% while the average retail price for cooking gas (LPG) decreased slightly by 0.09%.

Solar Energy

The renewable energy programme for 2017 resulted in the award of contracts for the installation of solar photovoltaic (PV) systems on the rooftops of 70 government buildings and the 400kW Solar PV Farm, totaling 1.36 megawatts (MW). These installations will result in annual energy savings of 1.86 gigawatt hours (GWh) or 1,200 barrels of oil equivalent per year; annual cost savings of approximately \$140 million; and environmental benefits in the form of avoided carbon dioxide emissions of about 1,116 tonnes per year.

GEA supervised the installation of solar powered freezers, solar PV Panels, solar fruit dryers and energy efficient cook stoves in the villages of Powaikoru (Region 1: 980Watts Solar PV Systems, 2 Solar powered freezers, 1 solar dryer), Moraikobai (Region 5: 2,060Watts Solar PV Systems, 2 Solar powered freezers) and Shulinab (Region 9: 1,960 Solar PV Systems, 6 Solar powered freezers, 2 solar dryers) with support from OLADE to the Village Council, Women's Group, Youth Group and the Communities.

Twenty (20) integrated 80-watt solar powered LED street lights were installed at Agatash Village, Bartica which will result in annual energy savings of about 7,008 kWh, resultant annual cost savings of about G\$350,400 and associated environmental benefits. The computed simple payback when compared to a similar installation using utility powered street lights is 6 years.

GEA also supervised the installation of twelve (12) integrated 80W solar powered street lights around the Stabroek Market Square and 750 energy efficient Light Emitting Diode (LED) bulbs around the eastern facade of the building.

GEA's engineers supervised the construction and installation of six solar-powered bus sheds located at Agricola, Land-of-Canaan, Friendship, Plaisance, Tuschen and Diamond. The Bus sheds feature solar-powered LED lights, sensors (to turn the lights on at nights and turn them off when there is no occupancy) and ports available to commuters for charging of mobile devices from renewable solar power.

GEA's Engineers provided technical support to the Guyana School of Agriculture for the supply and installation of three water heating systems (80 gallons solar water heater, DC powered water pump with 140-Watt solar module, 10 ampere charge controller, and water filtration system).

Hydropower

The Guyana Energy Agency (GEA) received funds under its 2017 work programme as part funding for the installation of the 20kW Hydropower Plant on the Hosororo Creek, Hosororo Village, Region One. The remaining funds are being sourced through the REETA Project from the German International Corporation (GIZ). In 2017, GEA invited bids twice through the National Competitive Bidding (NCB) procedures using open tendering, however uncompetitive bids were received. Approval was subsequently received for the project to be executed by the GEA. GEA therefore commenced procurement of goods and services while awaiting approval from GIZ. This project is expected to be completed in 2018.

GEA's engineers provided technical support to HECL and IDB in evaluating the Bids to conduct a geotechnical investigation at the Moco-Moco site. GEA's Engineers prepared a feasibility study for a proposed 1.5MW hydropower plant at Kumu, Region 9 along with review of a proposed rehabilitation and upgrade of the Moco-Moco hydropower plant to 0.7MW. The Engineer revised the design, updated the feasibility study and prepared tender-ready documents for the Kato Hydropower Project and supported HECL in the advancement of the Project. The Engineers also revised the design and updated the feasibility study for a proposed 1MW hydropower plant at Ikuribisi, Region 7, for supply to the Bartica grid. Work also commenced on reviewing a proposed a 12MW hydropower development at Tiger Hill on the Demerara River.

Wind Energy

In October 2015 Cabinet approved the establishment of an Inter-Agency Technical team comprising GEA, GPL, MPI and other technical experts as may be required to fully examine and make recommendations on a Wind Farm Proposal from the Guyana Windfarm Inc. (GWI) Cabinet further approved negotiations being entered with GWI to agree on the main financial and technical terms to be the subject of a Memorandum of Understanding (MoU) between the Government of Guyana and GWI, and a Power Purchase Agreement (PPA) between GPL and GWI. GEA worked during 2017 with MPI and the Project Developers to advance the project. A Confidentiality Agreement was signed between the parties which enabled the sharing of information between the key Agencies and a Wind expert, financed by GIZ/REETA, to advise the Government team.

After receiving the requisite approvals, GEA's Engineer decommissioned one wind monitoring mast installed at Kumu, Region 9 and relocated same to Quarrie, Region 9. The complete system including the tower, anemometers, wind vane and data logger were configured and data logging

commenced on November 23, 2017. The tower was also fitted with an aviation obstacle warning light as required by the Guyana Civil Aviation Authority.

Engineers of the Guyana Energy Agency identified potential locations/sites along Guyana's coast that can be demarcated for detailed wind resource assessment and consequently the development of utility scale (grid connected) wind farm/s totaling up to 26 MW (as suggested by the System Expansion Study).

Energy Efficiency

The Government's energy efficiency programme for 2017 resulted in a Contract for the replacement of inefficient lights and the installation of 10,427 light-emitting diode (LED) lamps, 3,766 occupancy sensors and 360 energy efficient outdoor lights at 46 government buildings. This intervention would result in annual energy savings of 0.93 GWh or 600 barrels of oil equivalent, with an estimated annual cost savings of \$54 million, and avoided carbon dioxide emissions of 558 tonnes per year.

GEA replaced 100 x 250 Watt inefficient High-Pressure Sodium Vapour (HPSV) lamps with 100 x 120 Watt energy efficient Light Emitting Diode (LED) lamps along the Timehri carriageway which will reduce energy consumption from the national grid by approximately 56,560 kWh while saving the Government of the Corporate Republic of Guyana G\$2,559,453 annually. The reduction of carbon dioxide emissions is estimated at 53,732 kg while the payback period for the lamps is 2.53 years.

The Government of Japan has provided grant financing to procure LED lamps for major roadways and municipalities throughout Guyana. During 2017, an Agreement was signed to facilitate the procurement of the lamps which resulted in the award of a Contract in November 2017 for the supply of 10,865 LED Street lamps to Guyana. These lamps are expected to be received and installed during 2018.

Licensing Activities

The Agency issued a total of 1,369 licences for 2016, inclusive of all categories of licences (Importing/Importing Wholesale/Wholesale, Export, Retail, Consumer Installation, Bulk Transportation Carriers, Storage). While there was significant outreach across the country (818 site visits as at end of December 2016), the site visits were 15% less than 2016 on account of the challenge of backlog of licenses earlier in 2016. However, one addition to the licensing scope of duties was the piloting of *Pop-Up* visits in areas such as Linden, Bartica and New Amsterdam, where persons were able to submit documentation to inspectors visiting the area and make payments through the bank rather than needing to visit the GEA Head Office.

National Standards for the requirements for the safe transport of Petroleum and Petroleum products by Road Tanker Wagon (RTW) GYS 512:2016 and Bulk Transportation Carrier (BTC) GYS 513:2016 Standards proposed by GEA were approved by GNBS.

Fuel Marking Programme

Under the Fuel Marking Programme, of the 12,882 total site visits conducted during the year, 2,253 sites were sampled at least once. There were 36 joint operations with Guyana Police Force (GPF), the Guyana Defence Force (GDF) and the Guyana Revenue Authority (GRA).

29 (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 2017, the percentage of sites found with significant dilution in at least one tank has progressively decreased from 34% in 2006 to 2% in 2017.

The Fuel Marking Programme recorded six (6) conviction in 2017. Compensation was accepted from four (4) individuals under *Section 33A Guyana Energy Agency Act 1997* as amended by *Section 8 Guyana Energy Agency (Amendment) Act 2011*.

Information Dissemination

GEA participated and facilitated many information dissemination and awareness activities which enabled interaction 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.

During 2017, GEA's Public Communications Officer conducted forty-five (45) presentation to schools reaching about 3,800 students across Guyana. GEA conducted 8 Presentations to Ministries, Agencies, Private Sector and NGOs, 4 Seminars and 2 Workshops on Sustainable Energy; broadcasted 657 Radio Advertisements, 88 Television adverts, 334 infomercials and 91 documentaries; published 75 print advertisements; and distributed 6,070 brochures, 1,160 booklets, and 250 posters.

Administration

The staff of the Agency benefited from training and workshops in several areas, through the conduct of 33 training programmes benefitting 115 Officers.

1.0 Energy & Energy Statistics Division

1.1 Petroleum-Based Imports

For the year 2017, the Division facilitated the importation of one hundred and seventy-four (174) shipments of petroleum-based products on behalf of the oil companies, an increase from one hundred and sixty-eight (168) shipments in the previous year. About fifty-seven percent of the shipments in 2017 were lifted from Petrotrin, Trinidad and Tobago, thirty-one percent of the shipments were lifted from Staatsolie, Suriname and the remaining twelve percent was sourced via third parties based in Antigua, St. Lucia, Martinique, USA and St. Croix.

TOTAL IMPORTS (BBLs)					TOTAL IMPORTS - OIL COMPANIES (BBLs)				
January-December	Product	2016	2017	% change	January-December	Product	2016	2017	% change
	Mogas	1,297,874	1,323,717	1.99%		Mogas	1,297,874	1,323,717	1.99%
	Gasoil	2,390,887	2,388,315	-0.11%		Gasoil	2,097,999	2,117,712	0.94%
	Kero	86,900	78,893	-9.21%		Kero	86,900	78,893	-9.21%
	Avjet	157,373	187,576	19.19%		Avjet	156,511	187,576	19.85%
	Fuel oil	1,407,290	1,378,196	-2.07%		Fuel oil	79,866	81,952	2.61%
	LPG	197,754	193,916	-1.94%		LPG	186,754	182,059	-2.51%
	LNG	-	3,082	-		LNG	-	-	-
	Avgas	8,970	10,037	11.90%		Avgas	1,188	1,950	64.23%
	Total	5,547,048	5,563,733	0.30%		Total	3,907,092	3,973,859	1.71%

The total petroleum imports recorded an overall increase of 0.30% in 2017 with a total of 5,563,733 barrels of petroleum-based products imported and an average of approximately 15,243 barrels per day. There were increases in the imports of Mogas (gasoline), Avjet (Jet Fuel), and Avgas (aviation gas) while imports for Gasoil (diesel), Kerosene, LPG (cooking gas) and Fuel oil decreased during this period.

Imports for the oil companies also rose marginally in 2017 with a total of 3,973,859 barrels of petroleum-based products imported and an average of approximately 10,887 barrels per day. There were increases in the imports of Mogas, Gasoil, Fuel oil, Avjet and Avgas while imports for Kerosene and LPG declined during this period.

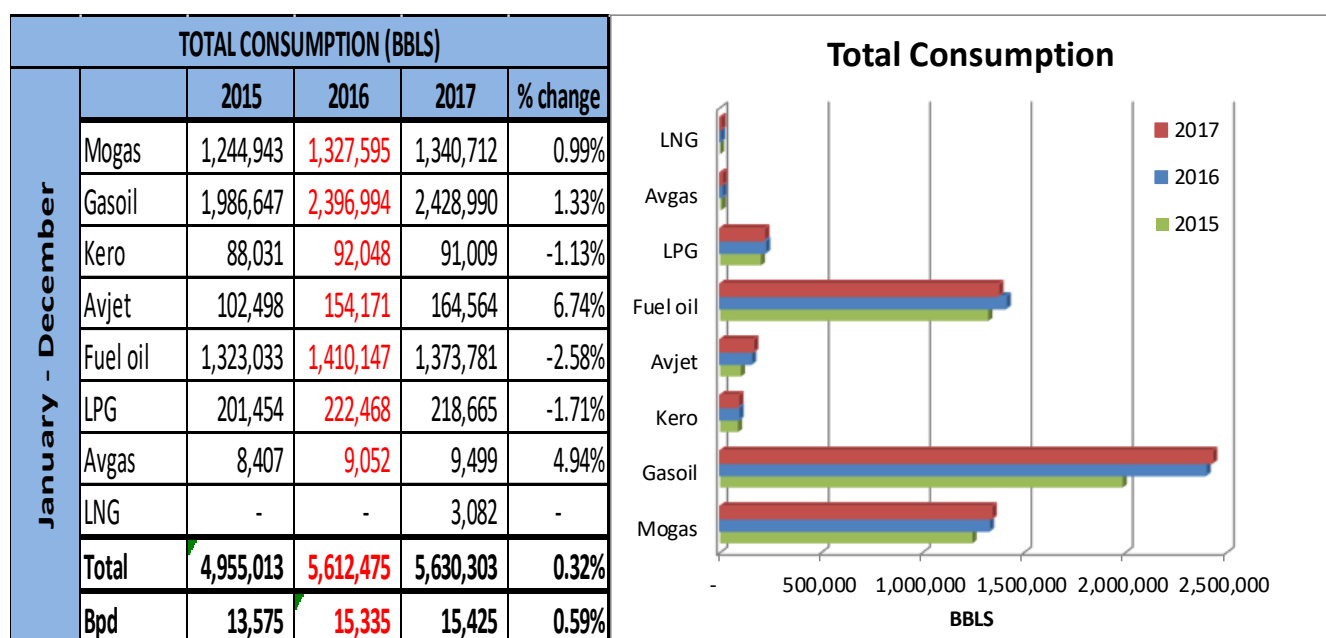
1.2 Consumption of Petroleum Products

Consumption of petroleum products was generally calculated based on opening stock, closing stock and import volumes for the year.

$$\text{Consumption} = \text{Opening stock} + \text{Import volumes} - \text{Closing Stock}$$

Sales data received from Guyoil, Rubis and SOL¹ as well as consumption data from Bosai Minerals Group (Guyana) Inc. (BOSAI) and Bauxite Company of Guyana Inc. (BCGI/RUSAL) were also incorporated in the calculation of total consumption.

A total of 5,630,303 barrels of petroleum-based products was consumed in 2017 with an average of 15,425 barrels per day. This represents a 0.32% increase when compared to 2016². There were also increases in the consumption of all products (gasoline, diesel, kerosene, jet fuel, fuel oil, cooking gas and aviation gasoline).



The increase in gasoline consumption for 2017 can be attributed to an increase in motor vehicle registration while the increase in jet fuel consumption may be indicative of increased flight travel at international airline carriers. Also, there were minor decreases in LPG and Kerosene consumption suggests less use of cooking gas and kerosene. In addition, there was a decrease in overall fuel oil consumption which may be attributed to contractions in the mining and quarrying sector and HFO consumption by GPL.

¹ Actual Sales data for Rubis and SOL for 2016 was also obtained and 2016 consumption for OMCs were updated

² Gasoil and Fuel oil purchased locally by GPL from the oil companies were discounted to avoid double counting. 2016 consumption for OMCs were adjusted.

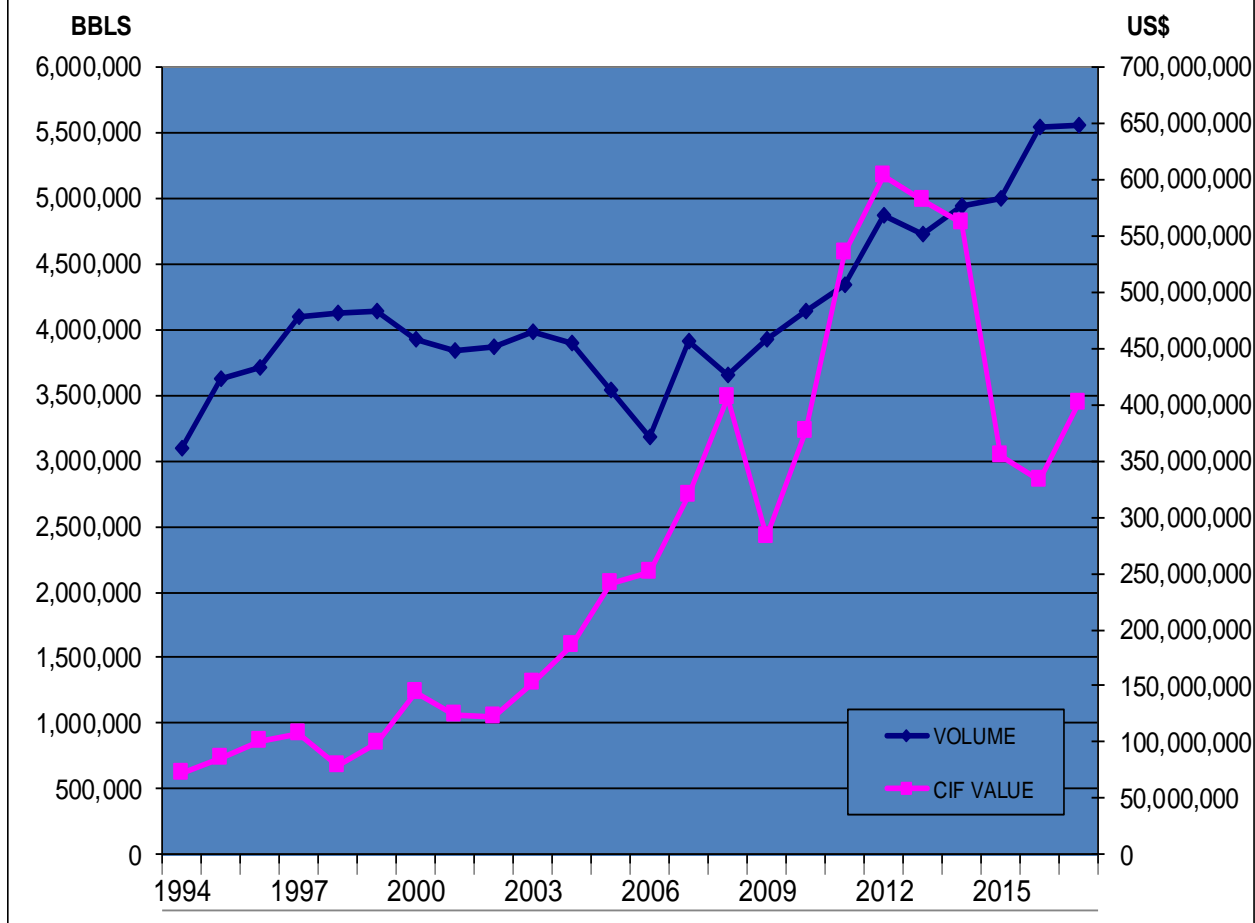
Notwithstanding a decrease in diesel fuel use from Trawlers' Association, there was an overall increase in diesel consumption with increases from the oil companies, GPL and new importers (Lynwill International and Atlantic Fuels). The increase in diesel volumes can be attributed to improvements in the rice industry and LFO consumption by GPL. Avgas consumption have also increased indicating more domestic travel. There was also use of liquid natural gas (LNG) by a local beverage company.

1.3 Acquisition Cost and Retail Prices

Petroleum imports for 2017, which amounted to 5,563,733 barrels, were acquired at a cost, insurance and freight (CIF) value of US\$401,521,446, representing an increase of 20.49% from the acquisition cost in 2016.

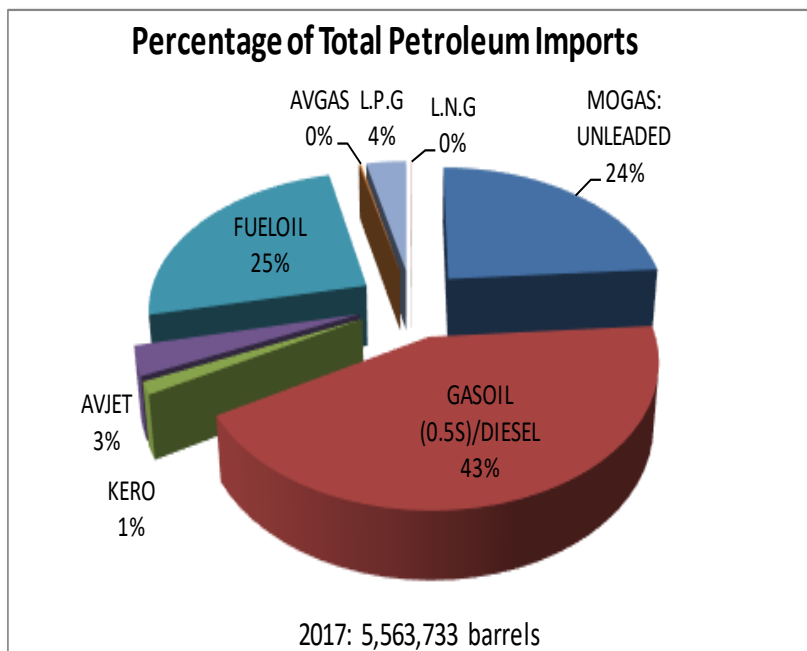
<u>TOTAL IMPORTS OF PETROLEUM PRODUCTS FOR</u>			
<u>PERIOD 1994 TO 2017</u>			
	VOLUME		CIF VALUE
	BBLS	LTRS	US\$
1994	3,095,728	492,181,436	72,067,912
1995	3,624,053	576,178,402	85,161,130
1996	3,711,893	590,143,846	100,696,609
1997	4,093,677	650,842,653	107,727,233
1998	4,125,765	655,944,238	78,539,499
1999	4,137,266	657,772,751	99,704,391
2000	3,924,614	623,963,783	143,277,974
2001	3,834,651	609,660,809	123,373,521
2002	3,865,505	614,566,203	122,643,684
2003	3,980,199	632,801,092	153,193,966
2004	3,901,760	620,330,288	185,702,255
2005	3,546,069	563,779,936	240,663,147
2006	3,179,925	505,567,690	251,594,083
2007	3,910,234	621,677,546	319,122,554
2008	3,660,583	581,986,208	405,960,936
2009	3,924,723	623,981,072	282,909,993
2010	4,137,931	657,878,518	375,951,700
2011	4,341,345	690,218,765	534,982,446
2012	4,867,748	773,910,151	604,000,602
2013 (revised)	4,726,150	751,397,875	582,281,795
2014	4,938,855	785,215,261	561,633,697
2015	5,001,497	795,174,539	355,201,732
2016	5,547,048	881,910,233	333,248,345
2017	5,563,733	884,562,863	401,521,446
TOTAL	99,640,953	15,841,646,157	6,521,160,650

Total Imports 1994 to 2017

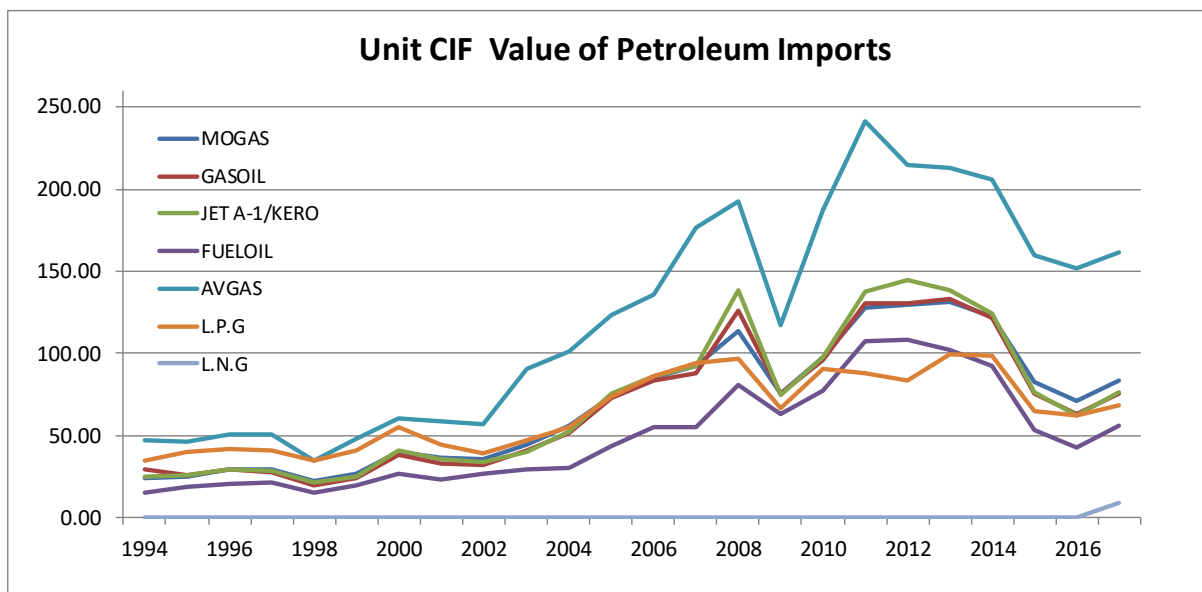


TOTAL IMPORTS BY PRODUCTS FOR THE YEAR

PRODUCTS	2017		
	VOLUME		C.I.F VALUE
	LTRS	BBLS	US\$
MOGAS: UNLEADED	210,454,182	1,323,717	110,144,394
GASOIL (0.5S)/DIESEL	379,711,748	2,388,315	179,489,175
KERO	12,542,985	78,893	5,970,411
AVJET	29,822,202	187,576	14,338,750
FUELOIL	219,115,697	1,378,196	76,747,498
AVGAS	1,595,809	10,037	1,618,886
L.P.G	30,830,220	193,916	13,184,537
L.N.G	490,020	3,082	27,794
TOTAL	884,562,863	5,563,733	401,521,446



For 2017, Gasoil was the most imported product representing 43% of total imports and a CIF value amounting to 45% of total acquisition expense³. Fuel oil and Mogas followed Gasoil reflecting 25% and 24% of total imports respectively with corresponding CIF values amounting to 19% and 27% of total acquisition costs, respectively. The remaining products (Kerosene, Avjet, LPG and Avgas) constituted no more than 9% of total imports and 9% of total acquisition costs.

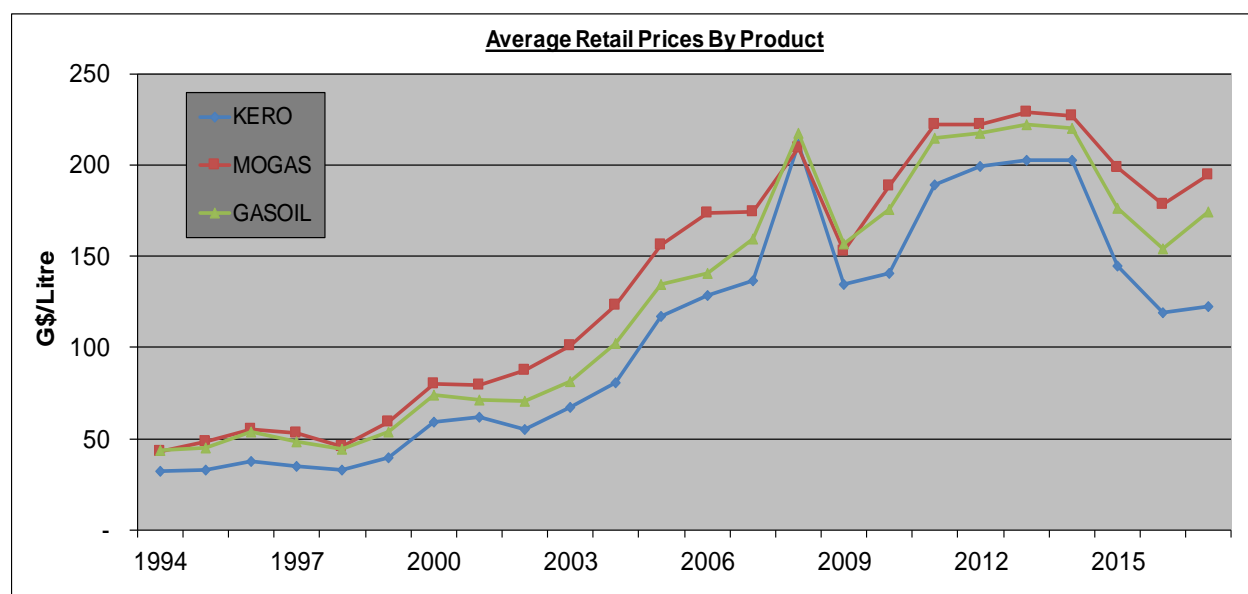


The average cost per barrel of petroleum-based imports increased from US\$60.03 in 2016 to US\$72.17 in 2017, an increase of 20.23%. This upward trend also continued for the average unit CIF value for each petroleum product. There were increases of 16.41%, 18.60% and 21.74% in the average unit CIF value (US\$/bbl) for Mogas (gasoline), Gasoil (diesel) and Jet fuel/Kerosene

³ Gasoil CIF value was estimated for volumes used by the Trawler Association, United Petroleum Inc. and Atlantic Fuels Inc. in 2016.

respectively. In addition, the average unit CIF value for Fuel oil, Aviation Gasoline (avgas) and LPG (cooking gas) also increased by 31.23%, 6.18% and 9.11% respectively.

According to the U.S Energy Information Administration (EIA), global petroleum and other liquid fuels inventory draws averaged 0.5 million barrels per day (b/d) in 2017, marking the first year of global inventory draws since 2013. It is anticipated that world liquid fuels supply growing by 0.2 million b/d in 2018 and 2019 respectively. Increased consumption, political factors as well as the OPEC's agreement to reduce production until the end of 2018, are expected to place upward pressure on prices. However, this scenario could partially be offset by production growth in non-OPEC countries and moderate the pace of the growth in prices. Import prices are predicted to range from US\$80 to US\$90 per barrel in 2018.



Retail prices for Mogas (gasoline), Gasoil (diesel) and Kerosene increased during 2017 by an average of 8.91%. Specifically, average retail price for gasoline and diesel increased by 9.13% and 13.40%, respectively. Also, the average retail price for domestic kerosene rose by 2.80% while the average retail price for cooking gas (LPG) decreased slightly by 0.09%.



1.4 Research

1.4.1 Arco Norte Electrical Interconnection Study

The Arco Norte project is a proposal for the creation of a system of electric energy transmission to link the power supply systems of French Guiana, Suriname, Guyana and the Brazilian States of Amapá and Roraima.

The Declaration of Paramaribo signed on June 28, 2017 confirmed the commitment of the countries and the recommendation for the formation of a high-level group to provide direction on the process of electricity interconnection. The Government representatives committed to incorporating to the extent possible the recommendations of the studies into the national energy planning systems of the countries.

One of the recommendation of the Component II of the Study was to further analyze the bilateral interconnections among the countries of Guyana, Suriname, and French Guiana.

The Arco Norte Study indicated the Guyana-Suriname interconnection would be the first regional transmission line to be developed, with a 230kV double circuit between Garden of Eden—Menckendam, with a thermal capacity of 2 x 500MW and total length of 431 km.



1.5 Solar Energy

1.5.1 Solar PV Systems for Public Buildings

The renewable energy programme for 2017 resulted in the award of contracts for the installation of solar photovoltaic (PV) systems on the rooftops of 70 government buildings and the 400kW Solar PV Farm, totaling 1.36 megawatts (MW). These installations will result in annual energy savings of 1.86 gigawatt hours (GWh) or 1,200 barrels of oil equivalent per year; annual cost savings of approximately \$140 million; and environmental benefits in the form of avoided carbon dioxide emissions of about 1,116 tonnes per year. See list of buildings and size of solar PV systems installed at each building below:

	Location	Size (kWp)		Location	Size (kWp)
1	State House	43	36	Queenstown Secondary School	10
2	Ministry of Finance	30	37	Ministry of Legal Affairs	10
3	Guyana School of Agriculture	13	38	Ptolemy Reid Rehab Centre	10
4	Stewartville Secondary School	12	39	GGMC	10
5	Ministry of Indigenous Peoples' Affairs Scholarship Hostel, Liliendaal	10	40	NCN (National Communications Network)	10
6	Hope Secondary School	10	41	Ministry of Health	10
7	Richard Ishmael Secondary	10	42	Kuru Kuru Training Center	10
8	West Demerara Secondary School	10	43	LTI (Linden Technical Institute)	10
9	Diamond Secondary School	10	44	Soesdyke Secondary School	10
10	Leonora Secondary	10	45	Covent Garden Secondary	10
11	Bladen Hall Secondary School	10	46	GLDA Head Office	10
12	Leguan Secondary School	6.5	47	NAREI	10
13	National Library	4	48	RDC Region 4	20
14	Guyana Forestry Commission	20	49	Mahaicony TVETC	20
15	Environmental Protection Agency	20	50	Fort Wellington Secondary	10
16	NCERD	20	51	Bushlot Secondary School	10
17	Culture Youth and Sport Office	10	52	GSA Head Office	10
18	Government Electrical Inspectorate – GEI	20	53	Bygeval Secondary School	10
19	Ogle International Airport	20	54	Buxton Secondary School	10
20	Guyana Industrial Training Center	10	55	RDC Region 5	10

21	Tutorial Secondary School	10
22	Cyril Potter College of Education	10
23	Ministry of Community	10
24	DPP	10
25	Forensic Lab	10
26	Police Training Center	10
27	Court of Appeal	10
28	Guyana Lands and Survey	10
29	GNBS	20
30	Central Housing and Planning Authority	10
31	Hydromet Head Office	20
32	Ministry of Natural Resources	20
33	Christ Church Secondary School	10
34	Guyana Post Office	20
35	Ministry of Business	10.00

56	Charity Secondary School	10
57	ETI (Essequibo Technical Institute)	10
58	Uitvlugt Secondary School	10
59	Patentia Secondary School	10
60	Vergenoegen Secondary School	10
61	Anna Regina Secondary	10
62	Cotton Field Secondary	10
62	Leonora Technical Institute	10
64	Upper Corentyne ITC	20
65	New Amsterdam TI	20
66	University of Guyana- Berbice Campus	50
67	Line Path Secondary	10
68	New Amsterdam Secondary	10
69	RDC Region 6	10
70	Berbice High School	10



Guyana Forestry Commission



Culture, Youth and Sport Office



Leonora Technical and Vocational Institute



Ministry of Communities and Government Electrical Inspectorate

1.5.2 Technical Support to the OLADE (Latin American Energy Organization) Energy Project

The Rural Energy Project, executed by the Latin American Energy Organization (OLADE) with funding from the Canadian International Development Agency (CIDA), in collaboration with the GEA, demonstrates the application of solar photovoltaic (PV) technology to enhance and accelerate the productivity of livelihood activities within three (3) rural communities in Guyana.

GEA supervised the installation of solar powered freezers, solar PV Panels, solar fruit dryers and energy efficient cook stoves in the villages of Powaikoru (Region 1: 980Watts Solar PV Systems, 2 Solar powered freezers, 1 solar dryer), Moraikobai (Region 5: 2,060Watts Solar PV Systems, 2 Solar powered freezers) and Shulinab (Region 9: 1,960 Solar PV Systems, 6 Solar powered freezers, 2 solar dryers) with support of OLADE to the Village Council, Women's Group, Youth Group and the Communities.



1.5.3 Solar-Powered Street Lights: Agatash, Bartica

Twenty (20) integrated 80-watt solar powered LED street lights were installed in September 2017 at Agatash Village, Bartica. This Demonstration Project, financed by the Government of Guyana, was completed at a cost of G\$3.97 million, translating into a unit cost of G\$198,500 installed. Based on the existing Street Lights Tariff, the 20 solar powered street lights will result in annual energy savings of about 7,008 kWh, resultant annual cost savings of about G\$350,400 and associated environmental benefits. The computed simple payback when compared to a similar installation using utility powered 80W LED lamps is 6 years. GEA will continue to monitor the installations and provide technical support and maintenance.



1.5.4 Stabroek Market Lighting

During the month of December 2017, the Guyana Energy Agency (GEA), through a project financed by the Government of Guyana, installed twelve (12) integrated 80W solar powered street lights around the Stabroek Market Square and 750 energy efficient Light Emitting Diode (LED) bulbs around the eastern facade of the building.

The integrated solar powered street lights are controlled by a light sensitive circuit to switch the lights on in the evenings and turn them off at dawn. As part of the energy conservation features

of the initiative, the technology dims the lights by 50% when motion is not detected and returns to 100% brightness when motion is detected.



The integrated solar powered street lights installed at a section of the Stabroek Market Square

The second component of the project was the replacement of the seven hundred and fifty (750) 13 Watts compact fluorescent (CFL) lamps that outlined the eastern façade of the Market, with 7-Watts LED bulbs.

Based on the existing Street Lights Tariff, the 12 solar powered street lights will result in annual energy savings of about 4,205 kWh, resultant annual cost savings of about G\$184,170 and 2,523 kg of avoided CO₂. The computed simple payback, when compared to a similar installation using utility powered 80W LED lamps, is 6 years. While the second component of the intervention will result in annual energy savings of about 19,710 kWh, resultant annual cost savings of about G\$1,321,950 and 11,826 kg of avoided CO₂. The computed simple payback is 1.6 years.



LED lights installed on the eastern façade

1.5.5 Solar Powered Bus Sheds and Independence Arch lighting

GEA's engineers supervised the construction and installation of six solar-powered bus sheds located at Agricola, Land-of-Canaan, Friendship, Plaisance, Tuschen and Diamond. The Bus sheds feature solar-powered LED lights, sensors (to turn the lights on at nights and turn them off when there is no occupancy) and ports available to commuters for charging of mobile devices from renewable solar power. The Bus shed at Agricola was constructed to provide support for a solar PV system to power enhanced LED lighting for the Arch.





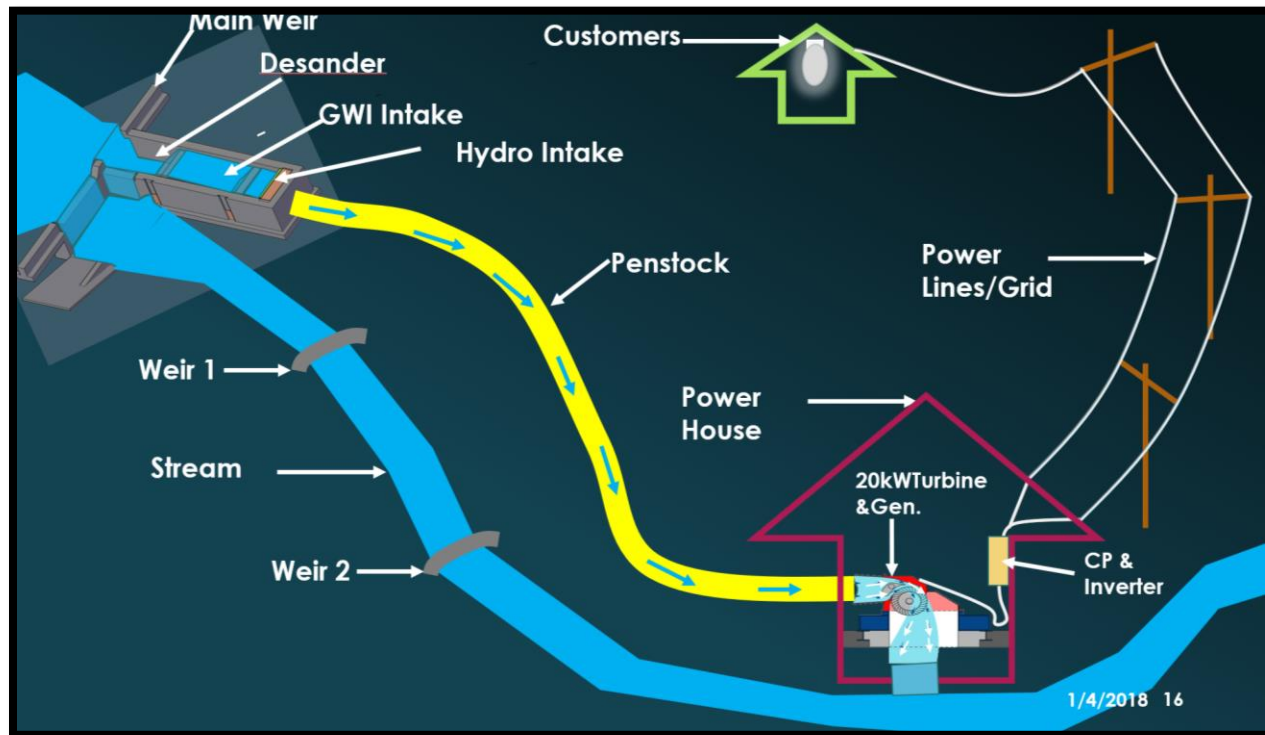
1.5.6 Supply and Installation of Three Water Heating Systems at the Guyana School of Agriculture (GSA) at the Cafeteria, Processing House and Plucking Unit

GEA's Engineers provided technical support to the Guyana School of Agriculture for the supply and installation of three water heating systems (80 gallons solar water heater, DC powered water pump with 140-Watt solar module, 10 ampere charge controller, and water filtration system).



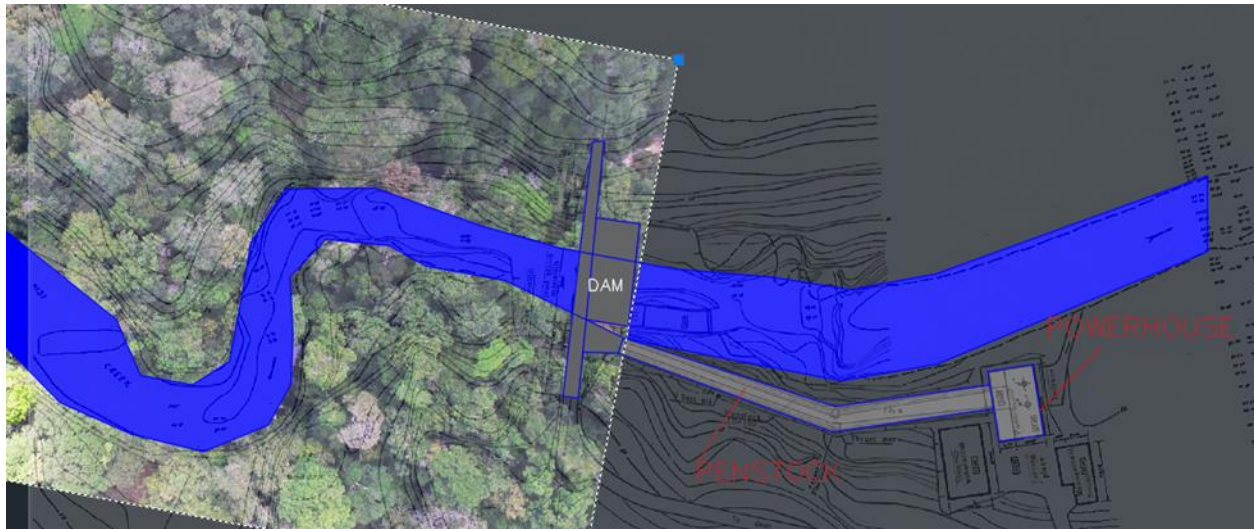
1.6 Hydropower

The Guyana Energy Agency (GEA) received funds under its 2017 work programme as part funding for the installation of the 20kW Hydropower Plant on the Hosororo Creek, Hosororo Village, Region One. The remaining funds are being sourced through the REETA Project from the German International Corporation (GIZ). In 2017, GEA invited bids twice through the National Competitive Bidding (NCB) procedures using open tendering, however uncompetitive bids were received. Approval was subsequently received for the project to be executed by the GEA. GEA therefore commenced procurement of goods and services while awaiting approval from GIZ. This project is expected to be completed in 2018.



GEA's engineers:

- Provided technical support to HECI and IDB in evaluating the Bids to conduct a geotechnical investigation at the Moco-Moco site. GEA's Engineers prepared a feasibility study for a proposed 1.5MW hydropower plant at Kumu, Region 9 along with review of a proposed rehabilitation and upgrade of the Moco-Moco hydropower plant to 0.7MW.
- Revised the design, updated the feasibility study and prepared tender-ready documents for the Kato Hydropower Project and supported HECI in the advancement of the Project.
- Revised the design, updated the feasibility study for a proposed 1MW hydropower plant at Ikuribisi, Region 7, for supply to the Bartica grid.
- Reviewed and proposed a 12MW hydropower development at Tiger Hill on the Demerara River.



Ikuribisi



Kato

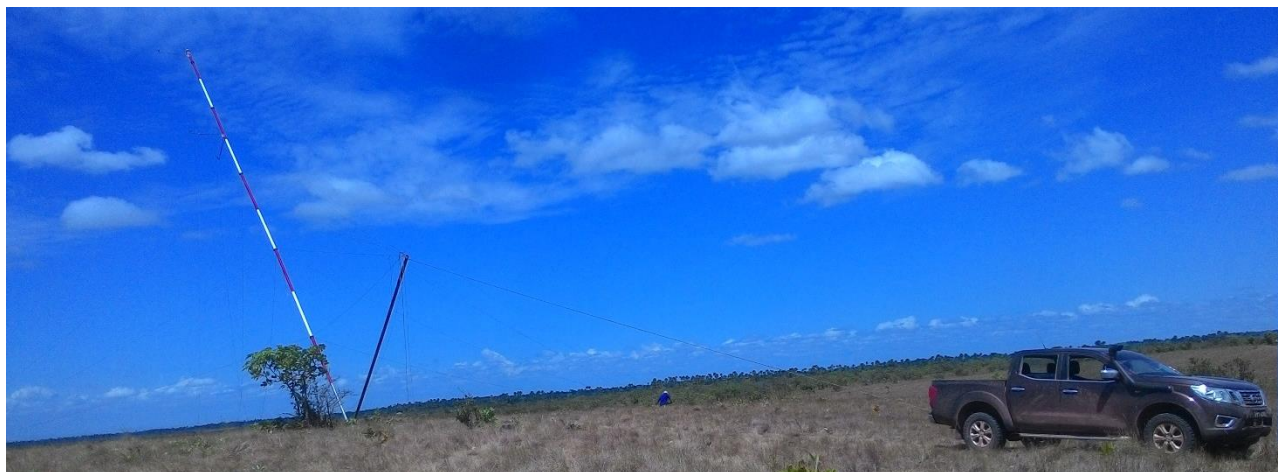
Twelve (12) visits were conducted at seven (7) potential hydropower sites in Guyana during the year 2017. The Table below depicts the sites visited, their location and the number of visits conducted at each site:

Name of Site	Location	Number of Site Visits
Hosororo	Region 1	1
Ikuribisi	Region 7	2
Kaieteur	Region 8	1
Kato	Region 8	2
Moco Moco	Region 9	2
Kumu	Region 9	2
Rockstone	Region 10	1

1.7 Wind Energy

1.7.1 Wind Tower Relocation

During the month of November 2017 and after receiving the requisite approvals, GEA's Engineer decommissioned one wind monitoring mast installed at Kumu, Region 9 and relocated same to Quarrie, Region 9. The complete system including the tower, anemometers, wind vane and data logger were configured and data logging commenced on November 23, 2017. The tower was also fitted with an aviation obstacle warning light as required by the Guyana Civil Aviation Authority.





Wind Tower

Installed at

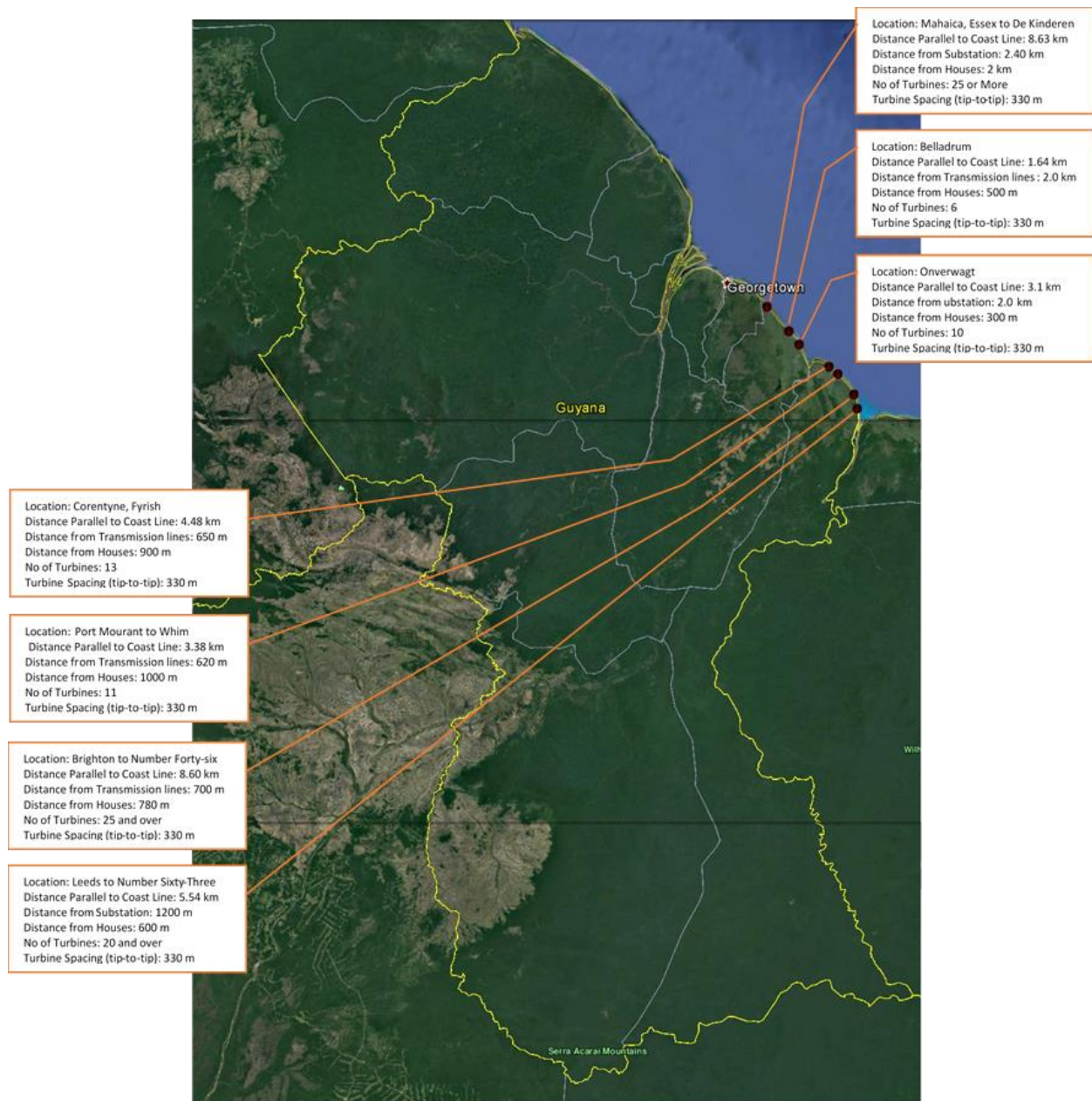
Quarrie

1.7.2 Wind Farm Site Identification

Engineers of the Guyana Energy Agency identified potential locations/sites along Guyana's coast that can be demarcated for detailed wind resource assessment and consequently the development of utility scale (grid connected) wind farm/s totaling up to 26 MW (as suggested by the System Expansion Study). In identifying these potential sites, the following factors were considered:

1. Understanding the wind resource
2. Distance from existing transmission lines
3. Land availability/requirements

GEA will next be seeking to determine ownership of the identified lands and steps necessary to identify them as zones for Wind Farm Development.



1.7.3 Hope Beach Wind Farm

In October 2015 Cabinet approved the establishment of an Inter-Agency Technical team comprising GEA, GPL, MPI and other technical experts as may be required to fully examine and make recommendations on a Wind Farm Proposal from the Guyana Windfarm Inc. (GWI) Cabinet further approved negotiations being entered with GWI to agree on the main financial and technical terms to be the subject of a Memorandum of Understanding (MoU) between the Government of Guyana and GWI, and a Power Purchase Agreement (PPA) between GPL and GWI. GEA worked during 2017 with MPI and the Project Developers to advance the project. A Confidentiality Agreement

was signed between the parties which enabled the sharing of information between the key Agencies and a Wind expert, financed by GIZ/REETA, to advise the Government team.

1.8 Energy Efficiency Interventions

1.8.1 2017 Energy Efficiency Programme

One of the Guyana Energy Agency's strategy to influence energy efficiency focuses on the area of conservation and careful use of energy through wise equipment choices and circumventing unnecessary energy consumption. The Government's energy efficiency programme for 2017 resulted in a Contract for the replacement of inefficient lights and the installation of 10,427 light-emitting diode (LED) lamps, 3,766 occupancy sensors and 360 energy efficient outdoor lights at 46 government buildings. This intervention would result in annual energy savings of 0.93 GWh or 600 barrels of oil equivalent, with an estimated annual cost savings of \$54 million, and avoided carbon dioxide emissions of 558 tonnes per year. See list of buildings below.

1	Vergenoegen Secondary School	24	Ministry of the Presidency
2	Uitvlugt Secondary School	25	Guyana National Bureau of Standards (GNBS)
3	Stewartville Secondary School	26	National Agricultural Research and Extension Institute, NAREI
4	Patentia Secondary School	27	National Scientific Forensic Laboratory
5	Cotton Field	28	Regional Democratic Council Building, Region 4
6	Charity Secondary School	29	Annandale Secondary School
7	Anna Regina Secondary School	30	Guyana School of Agriculture
8	Ministry of Business	31	Buxton Secondary School
9	National Centre for Educational Resource Development (NCERD)	32	Bladen Hall Secondary School
10	Guyana Forestry Commission	33	Ministry of Indigenous People's Affairs (Scholarship Hostel)
11	Guyana Lands & Surveys Commission	34	Environmental Protection Agency
12	Culture, Youth and Sport Office	35	Guyana Livestock & Development (Head Office)
13	Government Electrical Inspectorate	36	Bygeval Multilateral Secondary School
14	Hydromet Head Office	37	Regional Democratic Council Building, Region 5
15	Ministry of Natural Resources	38	Mahaicony Technical Vocational Educational Training Centre
16	Guyana Post Office	39	Skeldon line Path Secondary
17	Christ Church Secondary	40	New Amsterdam Multilateral School
18	Tutorial Secondary School	41	Berbice High School
19	Guyana Industrial Training Centre	42	Houston Secondary School

20	Queenstown Secondary School	43	Hydromet Doppler Station
21	Office of the Director of Public Prosecutions	44	Soesdyke Secondary School
22	Ministry of Communities	45	Covent Garden Secondary School
23	National Communications Network	46	Central High School



1.8.2 Energy Efficiency Street Lights

Over the last six years, GEA has been testing and reviewing Light Emitting Diode (LED) and Induction street lights.

LEDs are rapidly developing in light output, colour rendering, efficiency, reliability, and are free of hazardous substances such as mercury (Hg). They also convert energy to visible light efficiently. Based on its numerous advantages, even higher initial cost quickly pays for itself due to greatly reduced cost and reduced energy consumption and maintenance.

In September GEA replaced 100 x 250 Watt inefficient High-Pressure Sodium Vapour (HPSV) lamps with 100 x 120 Watt energy efficient Light Emitting Diode (LED) lamps along the Timehri carriageway which will reduce energy consumption from the national grid by approximately 56,560 kWh while saving the Government of the Corporate Republic of Guyana G\$2,559,453 annually. The reduction of carbon dioxide emissions is estimated at 53,732 kg while the payback period for the lamps is 2.53 years.



1.8.3 Japan Grant Funding: LED Street Lamps Project



Under a grant funding arrangement, the Government of Japan is providing finance and support to procure LED lamps for major roadways and municipalities throughout Guyana. During 2017, an Agreement was signed to facilitate the

procurement of the lamps which resulted in the award of a Contract in November 2017 for the supply of 10,865 LED Street lamps to Guyana. These lamps are expected to be received and installed during 2018.



1.9 Caricom Energy Month

CARICOM Energy Month (CEM) is now an annual feature that is celebrated simultaneously by CARICOM member states. CEM 2017 was observed in the month of November under the theme 'Re-thinking Energy: Shaping a resilient Community'.

During Energy Month, presentations were delivered to 8 schools (Charity Secondary, 8th of May Secondary, Arrora Secondary, Cottonfield Secondary, Anna Regina Secondary, Wakapoa Secondary, Abraham Zuhil, Johanna Cecilia Secondary) in the Essequibo county. School presentations are an on-going component of GEA's strategic plan, in keeping with part of its mandate relating to information dissemination. Students have an opportunity to interact with Officials of the Guyana Energy Agency. During these visits, students are encouraged to form 'Energy Champion' clubs and meet regularly to discuss the implementation of energy conservation measures in school and at home. Brochures, energy efficient lights and t-shirts are also distributed.



The Guyana Energy Agency held a series of awareness seminars in 2017 on renewable energy and energy efficiency to complement Government's ongoing Renewable Energy and Energy



Efficiency programme that entailed retrofitting public buildings with solar PV systems, energy efficient lighting and occupancy sensors. The target audience was representatives from Government entities. The purpose of the seminar was to increase insight on renewable energy and energy efficiency technologies as well as to disseminate information on energy management and establish a platform where a wide group of stakeholders can share experiences and address any key

challenges of the programme. The seminar held during CEM on November 23, 2017 was attended by 20 representatives from selected government entities.

GEA representative appeared on a 30-minute radio segment, "Let's Gaff", on 98.1FM to discuss energy issues, energy development, energy conservation and Energy Month.



Information on sustainable energy, renewable energy technologies, and energy conservation and efficiency measures were broadcasted via television and radio in the form of infomercials and notifications. GEA published information in the local newspapers on renewable energy technologies, energy conservation tips and activities sourced from GEA's "What is Energy?" booklet. This activity provides an opportunity to highlight key words such as Sustainable Energy,

Renewable Energy, Energy Efficiency, Energy Conservation, Fossil Fuels, Global Warming, and Climate Change to a young audience. Also, GEA printed and distributed nine (9) types Brochures on topics including lighting, appliances and solar water heaters and two (2) booklets (Guidelines for an Energy Efficient Home and What is Energy). A total of 300 Brochures, 10 Booklets and 7 Posters were distributed in November.

1.10 Information Dissemination and Awareness Activities

GEA participated and facilitated many information dissemination and awareness activities in 2017:

- Conducted 45 Sustainable Energy presentations to schools reaching about 3,800 students.
- Conducted 8 Presentations to Ministries, Agencies, Private Sector and NGOs.
- Conducted 4 Seminars and 2 Workshops on Sustainable Energy
- Broadcasted 657 Radio Advertisements
- Broadcasted 88 Television adverts, 334 infomercials and 91 documentaries
- Published 75 print advertisements
- Distributed 6,070 brochures, 1,160 booklets, and 250 posters.

GEA participated and facilitated many information dissemination and awareness activities which enabled interaction 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.

School presentations are a key component of GEA's strategic plan to disseminate information. It provides secondary school students with a practical understanding of energy and energy related issues, encourage interest, and behavioral changes, in relation to energy efficiency and conservation. During 2017, GEA conducted forty-five (45) reaching about 3,800 students across Guyana. The presentations are done in the form of viewing a ten-minute documentary followed by a power point on Sustainable Energy Initiatives and Conservation Practices. Each presentation concludes with a question and answer segment where students are given the opportunity to engage GEA Officers in discussions on energy and energy related issues. Questions pertaining to the presentation are asked by GEA's representatives and students are rewarded with tokens for correct answers.

2.0 Legal & Licensing Division

The Legal & Licensing Division serves to execute a primary function of the GEA through 'monitoring the performance of the energy sector in Guyana, including the production, importation, distribution and utilisation of petroleum and petroleum products' (s. 5(2)(c) **GEA Act cap 56:05**). This is exercised through the corroboration of the **Petroleum and Petroleum Products Regulations 2014** permitting the issuance of licences of the various categories (*import, wholesale, retail, bulk transportation carrier, storage, export, consumer installation*) and site and vehicle inspections to ensure safety and environmental compliance.

For the year 2017, the Licensing Division issued a total of 1,462 licences representing a 7% increase in licences issued from 2016.

	2017													2016	Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD	YTD	Growth
Importing Wholesale	1	1	8	4	1	6	3	5	1	2	1	1	34	25	36%
Export	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0%
Wholesale	0	0	1	1	1	5	0	5	1	0	0	0	14	9	56%
Retail															
Petrol Filling Stations	1	3	3	6	16	11	10	10	2	1	2	5	70	96	-27%
Others	26	32	55	47	52	43	41	60	35	36	29	17	473	425	11%
Consumer Installation	44	3	10	22	20	54	12	11	46	2	4	4	232	143	62%
Bulk Transportation Carrier															
Road Tanker Wagons	12	10	14	21	23	16	21	11	14	11	21	15	189	146	29%
Trucks	30	34	34	27	43	28	25	38	37	47	28	23	394	454	-13%
Fuel Barges	0	0	0	1	0	0	0	0	0	0	0	0	1	0	100%
Boats	0	2	8	5	11	4	3	2	8	3	7	2	55	70	-21%
Total	114	85	133	134	167	167	115	142	144	102	92	67	1462	1369	7%

Table Showing Licences Issued in 2017

3.0 Fuel Marking Division

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. Marking Officers supported a total of 329 bulk marking operations during 2017.

The Authentix representative provided the following oversight functions:

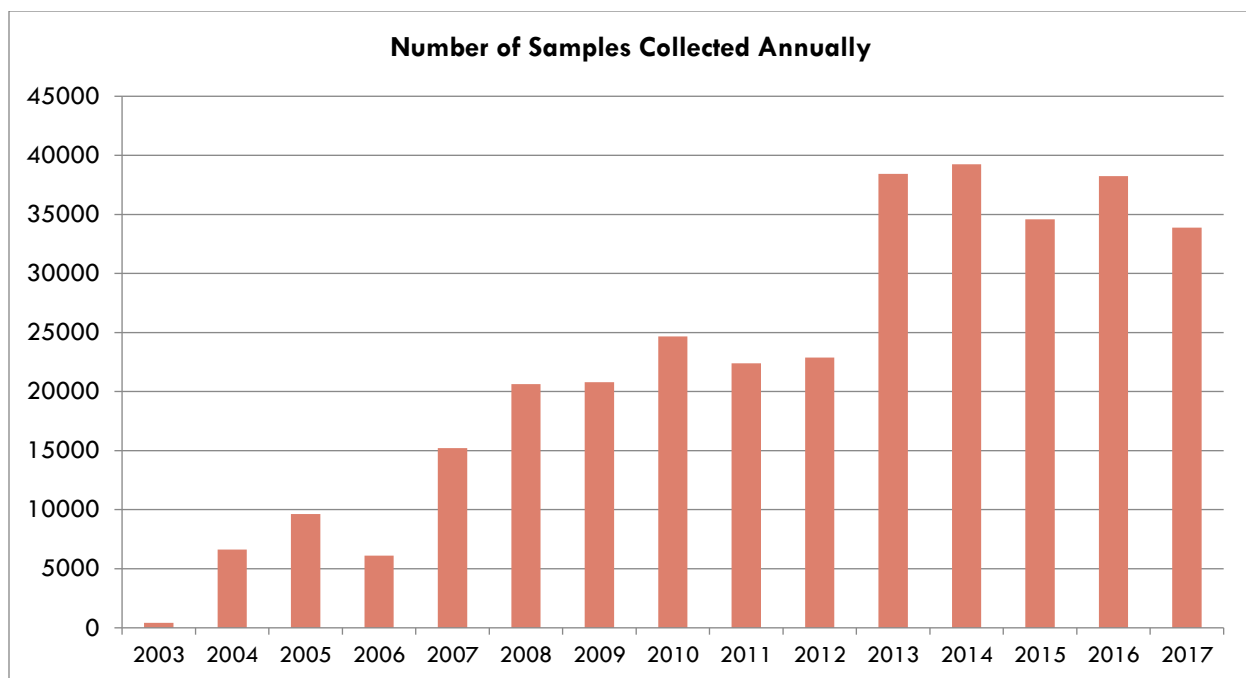
- Verifying marker concentrate received by GEA
- Supervision of the decanting of marker concentrate from drums
- Reconciling marker concentrates
- Auditing marker concentrates/ marking operations
- Assistance in repairing/maintaining the injectors



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.

3.1 Sample Analysis

The number of fuel samples collected/logged each year:



Samples collected continue to be fairly high when compared to the pre-2013 period. While samples collected never surpassed 25,000 samples in 2012 or before, it has been a common trend to record samples collected above 30,000 in the years after, including 2017.

The table below shows the breakdown of analyses by Region. 36,494 analyses were done in 2017.

Number of Quantitative Analyses by Region 2005 – 2017													
Region	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	79	40	1,134	157	20	55	59	273	-	20	41	2	3
2	4,130	1,557	870	613	1,173	1,920	1,408	1,673	2,250	1,894	1,261	2,663	1,502
3	1,188	908	1,473	3,386	3,927	3,741	2,419	3,479	4,167	2,727	1,926	2,582	2,524
4	1,183	1,111	809	2,212	1,848	4,420	3,289	4,595	5,291	5,189	3,866	6,112	6,011
5	403	225	151	354	420	1,160	827	1,479	1,274	710	500	1,134	870
6	1,596	165	476	618	376	627	829	931	1,167	919	659	1,673	1,078
7	338	195	290	561	170	286	140	295	354	377	1,982	2,279	2,369
8	11	61	227	95	76	130	12	135	25	62	72	77	36
9	-	-	-	-	5	93	1	64	-	53	94	122	93
10	168	744	9,457	12,457	12,236	15,839	15,858	12,770	24,671	30,452	24,505	26,517	22,008
Total	9,096	5,006	14,887	20,453	20,251	28,271	24,842	25,694	39,199	42,403	34,906	43,161	36,494

Number of Quantitative Analyses by Region

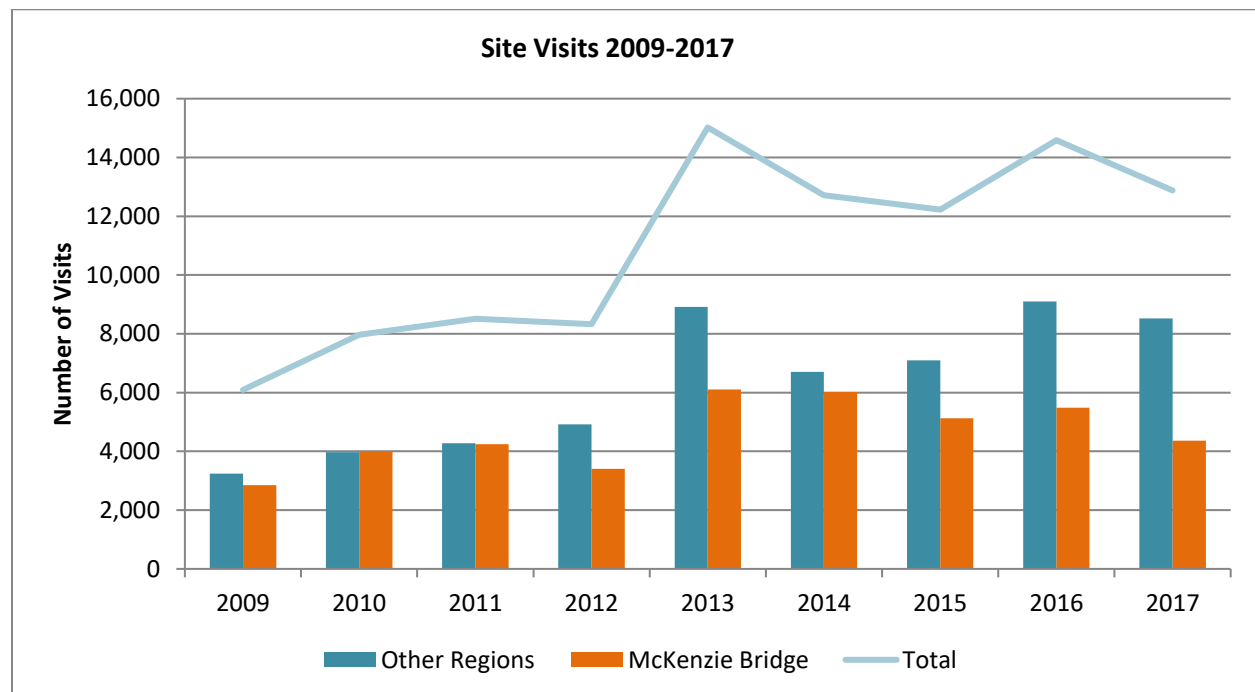
Notes:

1. Sampling for 2006 and 2007 was focused on smuggling “hot spots”
2. Sampling on a 24-hr basis commenced in 2007 at the McKenzie, Linden Bridge

A rigorous quantitative testing exercise continued in 2017 for samples taken across all regions despite a fall from the previous year by 15%. Noted declines occurred in Regions 2, 5, 6 and 10 over the same period. However, testing was generally similar over the years in Regions 3, 4 and 7. There were some issues with laboratory supplies that would have affected the ability to up the count in 2017. Again, since 2013 quantitative testing has been above the 30,000 mark.

3.2 Analysis by Site

12,882 site visits were recorded during 2017. Summary of site visits from 2009 to 2017 is illustrated below:



Visits by Area	2009	2010	2011	2012	2013	2014	2015	2016	2017
Other Regions	3,242	3,975	4,276	4,922	8,917	6,701	7,097	9,095	8,518
McKenzie Bridge	2,849	3,994	4,239	3,401	6,105	6,015	5,130	5,488	4,364
Total	6,091	7,969	8,515	8,323	15,022	12,716	12,227	14,583	12,882

The Linden checkpoint (McKenzie Bridge) saw the biggest drop i.e. 20% while the other areas combined saw only a 6% decline. It is evident that since peaking in around 2013, traffic from trucks taking fuel into the interior has generally declined. There were also staff turnover at the end of 2016 which were not filled until May/June of 2017 which contributed to a shortage of manpower in the unit. Nonetheless, total sites visited have shown a positive gradient over



the years.

The unit continued to pursue operations into the interior viz. the Cuyuni River as far as Tapir Landing, in Region 1 – Port Kaituma, Matthew's Ridge and Mabaruma – especially with the presence of GRA at Morawhanna, in Region 9 along Lethem, Aishalton and Marudi Mountain, and the Buckhall – Aranka trail where the passage of fuel has increased owing to mining operations along the route. Additionally, some operations were conducted in the lower Mazaruni River along the Takatu area.

Of the 12,882 total site visits conducted during the year, 2,253 sites were sampled at least once.

29 (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 2017, the percentage of sites found with

significant dilution in at least one tank has progressively decreased from 34% in 2006 to 2% in 2017.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
No. of Sites samples at least once	573	763	656	566	592	1,202	1,313	1,179	1,648	2,146	2,200	1,446	2,253	1,852
No. of Sites found with significant dilution in at least 1 tank	72	240	220	128	57	73	45	21	13	35	51	37	27	29
% of Sites found with significant dilution in at least 1 tank	13%	31%	34%	23%	10%	6%	3%	2%	1%	2%	2%	3%	1%	2%

3.3 Analysis of Test Results

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. Significant levels of adulteration were detected in only 2% of the samples analysed in 2014, 3% in 2015, 1% in 2016 and 2% in 2017.

Test Results (Quantitative Analyses)	03 Dec 2003 (Assessment Phase)		27 Jan 2004 (Post- Assessment)		2004		2005		2006		2007		2008	
0 – 50%	42	12%	28	6%	196	6%	855	9%	764	15%	1,169	8%	593	3%
51 – 70%	59	17%	32	7%	275	9%	1,234	14%	223	4%	343	2%	254	1%
71 – 90%	67	19%	89	19%	475	16%	2,576	28%	928	19%	8,204	55%	8,593	42%
91% & Over	188	53%	329	69%	2,110	69%	4,431	49%	3,091	62%	5,171	35%	11,013	54%
Total	356	100%	478	100%	3,056	100%	9,096	100%	5,006	100%	14,887	100%	20,453	100%
Test Results (Quantitative Analyses)	2009		2010		2011		2012		2013		2014		2015	
0 – 50%	701	3%	511	2%	167	1%	259	1%	303	1%	186	<1%	141	<1%
51 – 70%	767	4%	372	2%	164	1%	128	1%	137	1%	46	<1%	74	<1%
71 – 90%	12,654	62%	10,834	45%	10,990	49%	10,491	49%	29,734	79%	30,440	76%	25,003	76%
91% & Over	6,129	30%	12,612	52%	11,171	49%	11,867	49%	7,252	19%	9,270	23%	7,675	23%
Total	20,251	100%	24,329	100%	22,492	100%	22,745	100%	37,426	100%	39,942	100%	32,893	100%
Test Results (Quantitative Analyses)	2016		2017											
0 – 50%	357	<1%	254	<1%										
51 – 70%	73	<1%	52	<1%										
71 – 90%	30,322	78%	19,332	58%										
91% & Over	8,141	21%	13,807	41%										
Total	38,893	100%	33,445	100%										

Testing results have remained low for the 0% to 70% range, while a decline has been noted in the 71% to 90% range. There has been a doubling of testing results for the top '91% and Over' range.

Qualitative Analyses 2004-17													
2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
35	375	1,825	1,180	307	887	1,259	113	452	710	961	1,215	1,266	1,001

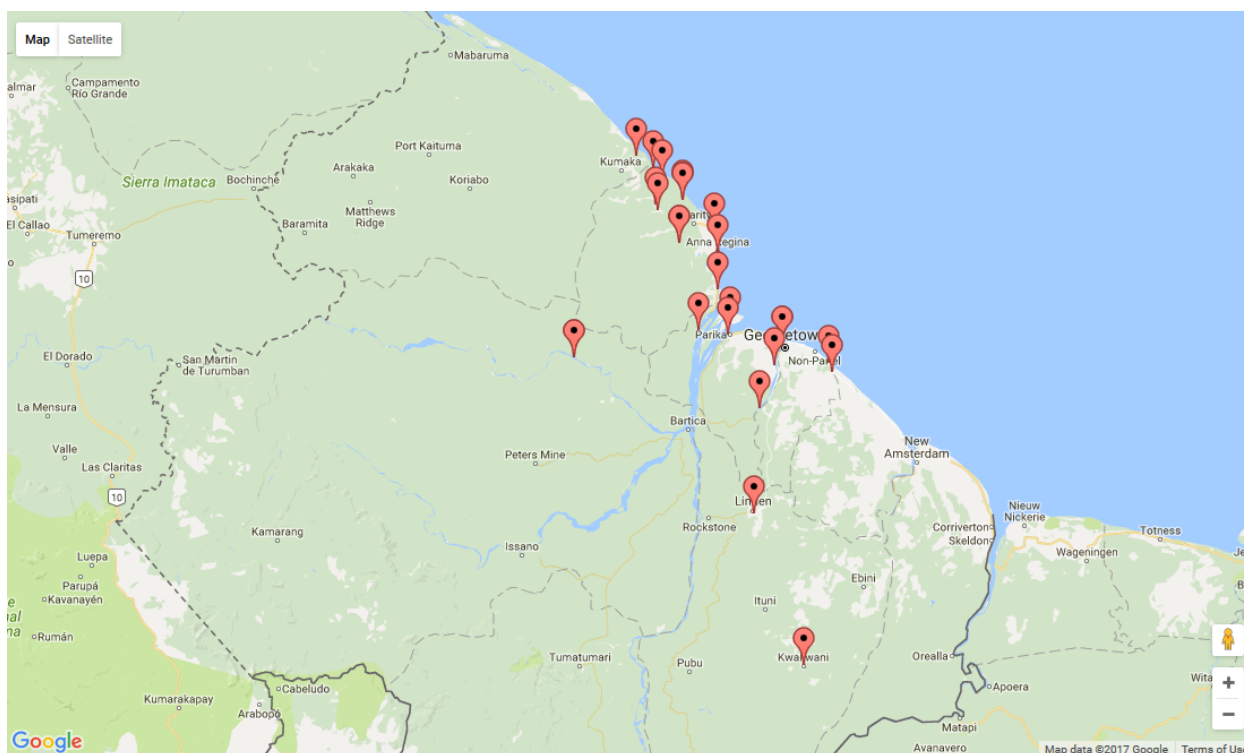
Qualitative testing continues to be above the thousand mark for the last three years of review. These testing done for the duty-free marker continues to be an integral part of the testing strategy of the Agency.

3.4 Incidents of Illegal Fuel

The incidents of illegal fuel detected in 2017 by the Inspectors totaled 29. Several major finds occurred in the Cuyuni area. In a few instances, it appears that foreigners are coming down the Cuyuni River with fuel selling at landings along the way.

Annual Incidents Recorded by Month 2009 – 2017													
Year	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	3	4	35
2014	2	2	1	3	2	1	0	3	2	3	11	21	51
2015	14	1	0	2	1	4	5	1	2	2	1	4	37
2016	3	2	2	2	3	3	4	2	5	1	0	0	27
2017	0	1	4	7	3	3	0	5	0	5	0	1	29

Locations of Incidents Recorded in 2016:



Joint Operations

A slight increase has been recorded for Joint Operations conducted with the Guyana Police Force (GPF), the Guyana Defence Force (GDF), and the Guyana Revenue Authority (GRA). Aerial reconnaissance continued with the GDF especially during the first half of the year while operations were increased with the GPF. Operations with the GRA were affected by the unavailability of their vessels.

Month	2017				2016				2015			
	GPF	GDF	GRA	Total	GPF	GDF	GRA	Total	GPF	GDF	GRA	Total
Jan	1	1	1	3	2	2	2	6	1	-	1	2
Feb	2	1	-	3	1	2	3	6	1	-	-	1
Mar	4	2	-	6	1	1	-	2	1	-	1	2
Apr	3	1	1	5	0	0	0	0	-	1	-	1
May	-	2	-	2	0	1	3	4	-	-	-	0
Jun	2	1	-	3	3	0	1	4	-	-	1	1
Jul	2	-	1	3	2	1	-	3	-	2	5	7
Aug	3	-	-	3	2	2	1	5	-	-	1	1
Sep	1	-	-	1	1	1	1	3	-	-	-	0

Oct	1	-	2	3	1	-	-	1	-	1	4	5
Nov	2	-	2	4	1	-	-	1	-	-	4	4
Dec	-	-	-	-	-	-	-	0	-	1	2	3
Total	21	8	7	36	14	10	11	35	3	5	19	27

3.5 Quantity of Illegal Fuel Seized

Total Fuel Seized Annually (UK GAL) 2005 – 2017												
2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3,011	8,001	21,793	33,560	33,443	21,242	10,273	6,004	2,931	3,785	6,200	19,721	11,355

The inspection unit would have had a number of seizures during the course of 2017 to bring in the final tally of fuel seized with some comparatively large seizures occurring in the Cuyuni River.

3.6 Volume Analysis

An additional metric to evaluate the performance of the Fuel Marking programme is a measure of gasoline, diesel and kerosene consumption (except for large duty-free consumers). For the oil companies, it is estimated that 3,929,880 barrels of petroleum-based products were sold in 2017 with an average of 10,767 barrels per day. This represents a 1.22% increase when compared to 2016. There

January - December		2015	2016	2017	% change
	Mogas	1,244,943	1,327,595	1,340,712	0.99%
	Gasoil	1,654,201	2,013,333	2,044,089	1.53%
	Kero	88,031	92,048	91,009	-1.13%
	Avjet	94,927	153,309	164,564	7.34%
	Fuel oil	83,775	84,106	81,320	-3.31%
	LPG	191,853	210,763	206,774	-1.89%
	Avgas	625	1,269	1,412	11.27%
	LNG	-	-	-	-
	Total	3,358,356	3,882,423	3,929,880	1.22%
	Bpd	9,201	10,608	10,767	1.50%

were increases in the consumption of gasoline, diesel, jet fuel, and aviation gasoline while consumption of fuel oil, kerosene and cooking gas declined for the year.

The increase in gasoline consumption for 2017 can be attributed to an increase in motor vehicle registration while kerosene consumption suggests less use of kerosene as a fuel for lighting and cooking. The increase in diesel consumption can be attributed to improvements in the rice industry

and LFO consumption by GPL. It may also presumably result from decreased availability of smuggled fuel due to the success of the monitoring and enforcement activities of the Fuel Marking Programme.

3.7 Prosecutions

For the year 2017, the Fuel Marking Programme recorded 6 convictions.

Compensation was accepted from four (4) individuals under *Section 33A Guyana Energy Agency Act 1997* as amended by *Section 8 Guyana Energy Agency (Amendment) Act 2011*.

4.0 Administration and Human Resource Division

At the beginning of 2017, the Agency had a staff complement of ninety-five employees and ended the year with ninety-six (96) employees.

The following positions were filled during the year:

- Accounts Clerk
- 3 Inspectors
- 1 Marking Officer
- Admin/Procurement Clerk
- Senior Marking Officer
- Human Resource Officer
- Head, Legal and Licensing Division

Resignations were received from:

- Marking Officer
- Office Assistant
- Head, Legal and Licensing Division
- Senior Investigator
- Investigator
- Head Marking Section
- Accounts Clerk I
- Human Resource Officer
- Admin/Procurement Clerk

4.1 Professional Development

		Actual Training for 2017	Target for 2017
Organize and install suitable capacity building and professional development programmes to provide employees with requisite knowledge and skills.	Number of training programmes	33	20
	Number of Officers trained	115	100

Training Summary

	Dates	Facilitator	Aim	Participants	Cost
1	January 9-30, 2017	OLADE	Electric Tariff Modeling	S. Wood, B. Constantine and L. DeSouza	Free
2	January 10-13, 2017	UNDP/CIPS	To develop and deploy a certified training course that will provide procurement officials with a better understanding of the principal of effective procurement.	S. Greene	Free
3	January 17-18, 2017	GPL	National Grid Code	M. Sharma and S. Wood	Free
4	January 16-19, 2017	UNDP/CIPS	To develop and deploy a certified training course that will provide procurement officials with a better understanding of the principal of effective procurement.	G. Cumbermack	Free
5	January 13, 2017	Ms. K. Mattai, Head, LLD	Revision on SoP	Dwayne Edwards, Vijay Hussain, Doron Julian, Doneeta Ramlakhan, John Rawlings, Earicka Richards, Cindy Williams, Nikita Sung and Simeon Butcher	Free
6	February 16, 2017	GAICO	Oil Spill Response Training	Dolwin Khan and Winston Setal	Free
7	February 24-28, 2017	Authentix	Certification in IAS Test	Simeon Butcher, Doron Julien, Dwayne Edwards, Paul Fraser, Shamica Isaacs, Nicholae Leacock, Quasen Nedd, Earicka Richards, Bernard Rodrigues, John Rwalins, Adrian Webster, Cindy Williams, Rolin Wilson and Doneeta Ramlakahan	Free
8	February 28, 2017	Ms. K. Mattai, Head, LLD	Overview of GEA's Regulations	Simeon Butcher, Doron Julien, Dwayne Edwards, Paul Fraser, Shamica Isaacs, Nicholae Leacock, Quasen Nedd, Earicka Richards, Bernard Rodrigues, John Rwalins, Adrian Webster, Cindy Williams, Rolin Wilson, Nikita Shung, Vijay Hussain and Doneeta Ramlakahan	Free
9	March – June 2017	ABE	Level 6 Diploma in HR Management	Terance Ram	\$105,450

10	March 15, 2017	OLADE	Network of Documentation Centres	Coleen Fletcher and Shevon Wood	Free
11	March 23-24, 2017	IIA	Risk Management & Tracking Audit Evidence	Yasoda Matabadal & Ryan Stephens	\$62,000
12	March 27-29, 2017	UNDP/CIPS	Public Procurement Modernization & Financial Management Strengthening	Seema Greene	Free
13	March 30-31, 2017	CARICOM - CROSQ	Regional Energy Efficiency Building Codes	Mr. Brian Constantine	Free
14	April 3, 2017	National Ozone Action Unit	Ammonia and Hydrocarbon	Everard Rampersad	Free
15	April 13, 2017	PAHO/WHO	Green Baseline Tool (BAT) Assessment	Mr. Micheal Danny & Arvind Parasram	Free
16	April 18, 2017	Guyana Fire Service	Fire Marshall Training	Rowena Wray, Frida Rampersaud, Yota Burgess, Lisa Nassy, Earicka Richards, Joslyn Nesbitt, Gaitri Khemraj & Terance Ram	\$30,000
17	May 8-12, 2017	OLADE	Energy Efficient Audits	Shevon Wood, Leon DeSouza, Brian Constantine, Arvind Parasram and Kenny Samaroo	Free
18	May 17, 2017	CROSQ	Energy Efficient Labelling Stander	Brian Constantine	Free
19	May 25-26, 2017	ECLAC	Launch of BIEE Programme	Shevon Wood	Free
20	June 19-20, 2017	OLADE	Energy Planning	Shevon Wood	Free
21	June 2-22, 2017	China	Strategy of Low Carbon Economic Development for developing countries	Leon DeSouza	PSM/China Scholarship
22	June/July 2017	Stephanie Fraser	Swimming for GEA Officers	Crystal Bascom, Ron Bynoe, Janella Charles, Marlon Croal, Telisha Joseph, Shareefa Munsammy, Mark Thomas, Kenny Samaroo, Brian Constantine, Dolwin Khan, Leon DeSouza, Gaitri Khemraj, Everard Rampersaud, Keith Williams	
23	July-December	New Guyana School	PMP Certification	Leon DeSouza, Winston Setal, Dolwin Khan	1,250,000

25	August 17 2017	OLADE	Meeting on New Regional Energy Training	Shevon Wood	Free
24	September	CEM Institute	CEM	Brian Constantine, Kenny Samaroo	1,314,600
25	September	IDB	Training for Evaluators	Seema Greene	Free
26	September		Green Climate Fund, concept note preparation	Leon DeSouza, Shevon Wood	Free
27	September 20-22	St. Vincent and Grenadines	Workshop on Investment-Grade Calculation, Analysis and Financial Modelling for Sustainable Energy Investments	Winston Setal & Tobia Dertman	Sponsored by GIZ
28	September 14	Trinidad	Discussion on Trinidad's National Compressed Natural Gas Initiative	Winston Setal, Kenny Samaroo	Free
29	Oct 23-24, 2017	Mariott	Compliance Assessment and Gap Analysis for UNFCCC	Gayle Best, Shevon Wood	Free
30	Oct 27	Sleepin Int'l Hotel	Face-to-Face Energy Efficiency Standards and Labelling Scheme Meeting	Brian Constantine	Free
32	Dec 2-Jan 27	Nations University	Investigation and Intelligence gathering	Keith Williams, Roshawn Heywood, Doneeta Ramlakhan, Shankar Ram, Rolin Wilson, Shamica Isaacs, Doron Julien, Dwayne Edwards, John Rawlins, Nicholae Leacock, Adrian Webster	\$279,918
33	Dec 7	Nations University	Emotional Intelligence	Geneva Cumbermack, Shanamay Daniels, Frida Mahatoo, Narisa Samuels, Yota Burgess, Maurice Cave, Tracy Brammer	\$100,000

4.2 Administration and Infrastructural Enhancement

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

5.0 Finance Division

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.

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 2014,
- 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).

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:

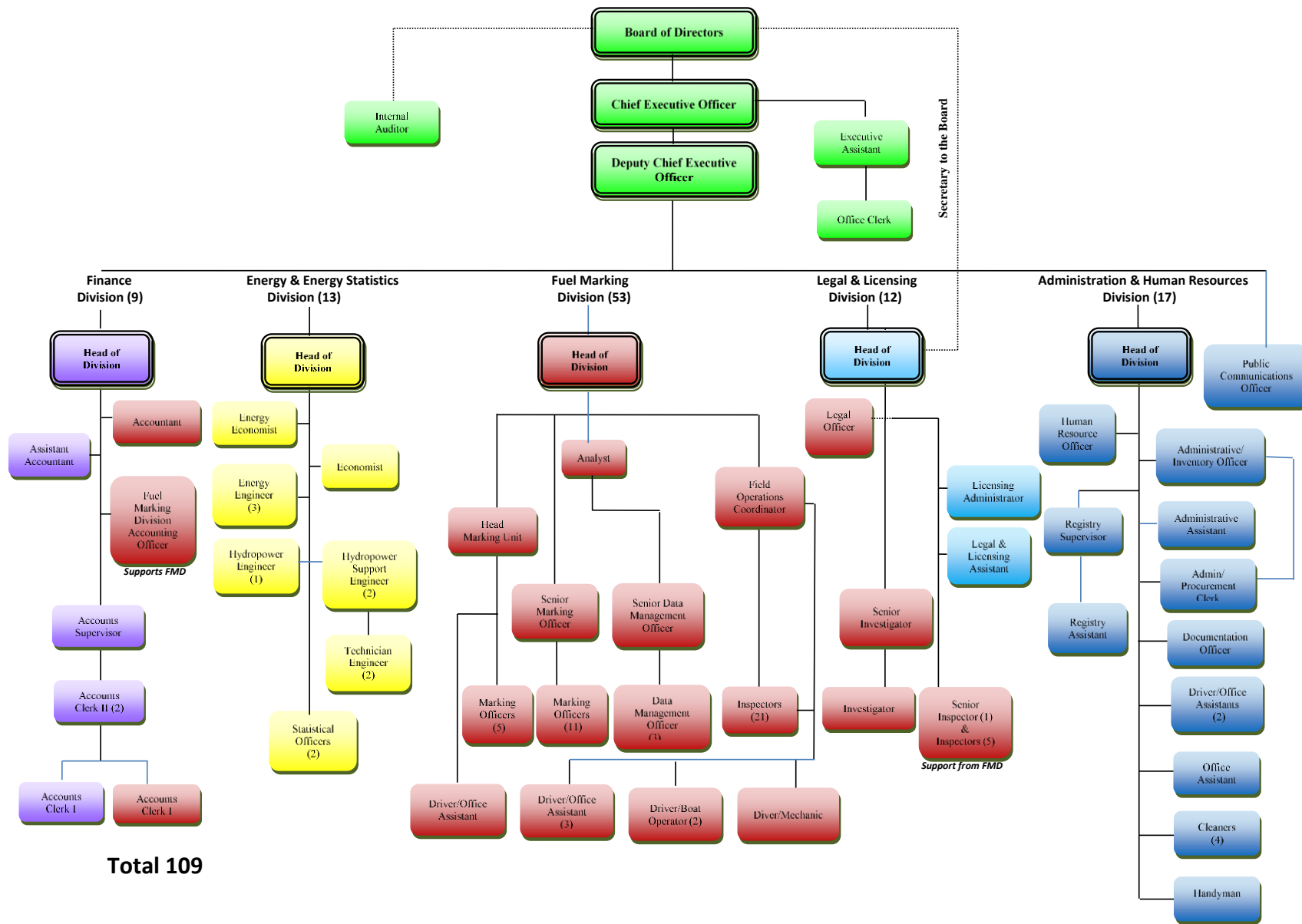
- to maintain and update the Agency's personnel files and other records;
- to aid in the recruitment, selection, replacement and continuous professional development of staff;
- to address staff concerns related to wages and salary administration, contract negotiation and separation procedures;
- to improve 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



Total 109