36 MW POWERSHIP

PROJECT SUMMARY

Guyana Power & Light Inc. / the Government of Guyana

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1. INTRODUCTION

The Guyana Power and Light Incorporated is submitting this Project Summary to furnish the Environmental Protection Agency with all the required information for the processing of the Environmental Authorization application. The **Government of Guyana** has signed a contract on behalf of the GPL Inc., with **Urbacon Concessions Investments, W.L.L (UCI)** to charter a powership with a total installed capacity of 36 Megawatts (MWs) for a period of two years. This agreement includes the provision of operation and maintenance services, however fuel (Heavy Fuel Oil, HFO), will be supplied by GPL. As such, once operational the project will result in the generation of a more stable supply of electrical power to the Berbice area and to the national grid.

2. PROJECT DESCRIPTION

The Government of Guyann on behalf of the Guyana Power and Light Inc. has chartered for a period of two years the services of **Urbacon Concessions Investments, W.L.L (UCI)** to operate and maintain a powership with a total installed capacity of 36 Megawatts (MWs).

Powerships are utility-scale, integrated, flexible, and quickly deployable floating power plants. They utilize conventional reciprocating engine technology in combined cycle mode, with flexible capacities ranging from 30 MW to 470 MW, they can be fully customized depending on the host countries' requirements.

The chartered **36MW KARADENIZ POWERSHIP BARIS BEY** is currently installed and operational at a coastal site located in Everton, Berbice. The chosen site has adequate capacity for electrical connections to nearby substation and safe berthing or mooring of the ship. Subsequent to safe mooring, approximately 850 meters of overhead transmission lines was constructed and installed to facilitate the interconnection of the Powership between the point of intersection and existing **L21** Line. Finally, Fuel which is supplied by GPL is done so via Barge and through a "Bunkering" process. The Powership required minimal onshore infrastructure, since the Powership comes complete with all spares and consumables, a built-in workshop for

required repairs, a high-voltage substation (no new substation on-shore is required), and a built-in fuel storage to convert the fuel into energy. Moreover, all Hazardous waste produced during the generation process will be stored in tanks on the ship and will be removed and transported (Trucks) via a contractor to the Skeldon Energy Inc., where it will be incinerated. All domestic waste and effluent will be stored onsite until removal by local waste disposal companies. And further, all ancillary tasks will be managed by the Powership (i.e. Backup generation, Water treatment, Fire Safety, Sewage storage, etc.). Therefore, once fully operational, the chartered Powership will supply GPL with 36MW of electricity, depending on demand requirements.

2.1 Physical Location of Project:

The 36MW Powership is located at Everton Berbice, bordered by the community of Edinburgh in the Northeastern direction and the community of Village in the Southwestern direction. The Powership is moored on the coast within the Berbice River in Everton. See table below for coordinates.

Table 1. Coordinates for Karpowership

Projection	UNIVERSAL TRANSVERSE MERCATOR					
GEODETIC DATUM	WGS 84					
UTM ZONE	21 N					
	UTM COORDINATES (21 N)		*Decimal Degrees*		Degrees, minutes	
	EASTING	NORTHING	*Latitude*	*Longitude*	Latitude	Longitude
Powership AFT	441,601.19	684,468.46	*6.19209687*	*-57.52786728*	*6° 11.526' N*	*57° 31.672' W*
Powership MID	441,579.95	684,433.11	*6.19177686*	*-57.52805898*	*6° 11.507' N*	*57° 31.684' W*
Powership BOW	441,558.70	684,397.75	*6.19145686*	*-57.52825067*	*6° 11.487' N*	*57° 31.695' W*
P.01	441,665.00	684,511.00	*6.19248224*	*-57.52729090*	*6° 11.549' N*	*57° 31.637' W*
P.02	441,608.58	684,459.79	*6.19201853*	*-57.52780037*	*6° 11.521' N*	*57° 31.668' W*
P.03	441,598.85	684,443.59	*6.19187183*	*-57.52788825*	*6° 11.512' N*	*57° 31.673' W*
P.04	441,586.47	684,422.99	*6.19168543*	*-57.52799993*	*6° 11.501' N*	*57° 31.68' W*
P.05	441,577.68	684,408.36	*6.19155302*	*-57.52807923*	*6° 11.493' N*	*57° 31.685' W*
P.06	441,532.70	684,323.85	*6.19078811*	*-57.52848504*	*6° 11.447' N*	*57° 31.709' W*
ANC.01	441,584.53	684,704.44	*6.19423135*	*-57.52801999*	*6° 11.654' N*	*57° 31.681' W*
ANC.02	441,352.58	684,206.09	*6.18972125*	*-57.53011204*	*6° 11.383' N*	*57° 31.807' W*
New Bollard 1	441,675.65	684,440.81	*6.19184743*	*-57.52719400*	*6° 11.511' N*	*57° 31.632' W*
New Bollard 2	441,572.12	684,315.93	*6.19071683*	*-57.52812863*	*6° 11.443' N*	*57° 31.688' W*
Existing Bollard 1	441,675.65	684,440.81	*6.19184743*	*-57.52719400*	*6° 11.511' N*	*57° 31.632' W*
Existing Bollard 2	441,636.12	684,405.19	*6.19152483*	*-57.52755100*	*6° 11.491' N*	*57° 31.653' W*
Existing Bollard 3	441,562.24	684,316.94	*6.19072583*	*-57.52821800*	*6° 11.444' N*	*57° 31.693' W*
Tower 1	441,653.40	684,426.29	*6.19171586*	*-57.52739499*	*6° 11.503' N*	*57° 31.644' W*

Image 1. Map of Project Site

2.2 Distance of project from stipulated locations:

The closest town to the Project site is New Amsterdam, with an approximate distance of 5.2 km.

2.3 Feasible and reasonable alternatives:

Due to the electrical interconnection, onshore infrastructure and availability of a nearest substation, no other site was deemed suitable.

2.4 Settlement/ Indigenous Communities:

There are no known settlement/ Indigenous communities in proximity of the project site.

2.5 Land Dispute:

There are no Land disputes at the Project site.

2.6 General/ Predominant Land use currently:

The Project is situated on the Berbice river, however, the land on the Southwestern section of the site is an existing transmission line corridor and is reserved for this purpose. There are no commercial, Mixed use or Agricultural activities at this site.

2.7 Sensitive Receptors:

See attached table below.

Table 2: Proximity to various locations

	<50 meters	50m-100m	101m-500m	501m-1000m	>1km
Sensitive ecosystems e.g. Wetlands/Mangroves					
Protected Areas	NIL	NIL	NIL	NIL	NIL
Major Water Courses					
Threatened or endangered flora and fauna	NIL	NIL	NIL	NIL	NIL
Residences					
Place of Worship	NIL	NIL	NIL	NIL	NIL
Schools					
Hospitals					
River / Sea Defense					
Other – State	NIL	NIL	NIL	NIL	NIL

2.8 Baseline Information on the Physical, Ecological and Social Environment

Physical Environment:

The 36MW Powership is located at Everton Berbice, bordered by the community of Edinburgh in the Northeastern direction and the community of Village in the Southwestern direction. The Powership is moored within the Berbice River. See table #1 for coordinates.

2.8.1 Land:

The project is situated on the Berbice river, however, the land on the southwestern section of the project is the transmission line corridor (ROW) and it is predominately overgrown with weeds and shrubs.

2.8.2 Drainage and Access Roads:

While the Powership is in the Berbice River, the Transmission Line is connected in a transmission corridor bordered by a small number of drainage and irrigation canals. Additionally, within the compound where the ship is moored, there is a narrow unpaved road, leading to the site.

Ecological Environment:

The 36MW Powership is moored on the Coast of the Berbice River. The Onshore site is covered by weeds and vegetation. There is no significant wildlife present at the site.

2.8.3 Land use:

The project is situated on the Berbice river, however, the land on the southwestern section of the site is an existing transmission corridor (ROW), which was overgrown with weeds and vegetation. The land which is considered a (ROW) for electrical utility activities, was not used for any other purpose (i.e. Agricultural, Residential, Commercial or Mixed use).

2.8.4 River use:

The section of the Berbice River where the ship is moored was unoccupied prior to the ship's arrival. There were no commercial activities at the time of the project's commencement.

2.8.5 Flora at the Earmarked project site:

The project is situated on the Berbice river, however, the land on the southwestern section of the site (ROW) and surrounding area, is populated with flora such as:

- Varying grass varieties.
- Marine Flora at the site is unknown.

2.8.6 Biodiversity:

There is no critical biodiversity expected in this area and the land is of low value to mostwildlife. Marine life surrounding the project site is unknown.

Social Environment

2.8.7 Human Habitation:

There is no human habitation on the site.

2.8.8 Cultural and Traditional Use of project site:

There are no known cultural or traditional uses of the site.

3. PROJECT LAYOUT

3.1 Introduction of the KARADENIZ POWERSHIP BARIS BEY

The **KARADENIZ POWERSHIP BARIS BEY** is a utility-scale, integrated, flexible, and quickly deployable floating power plants. They utilize conventional reciprocating engine technology in combined cycle mode, with flexible capacities ranging from 30 MW to 470 MW, they can be fully customized depending on the host countries' requirements.

Image 3. Karaseniz Powership

Image 2. Image of Project site layout

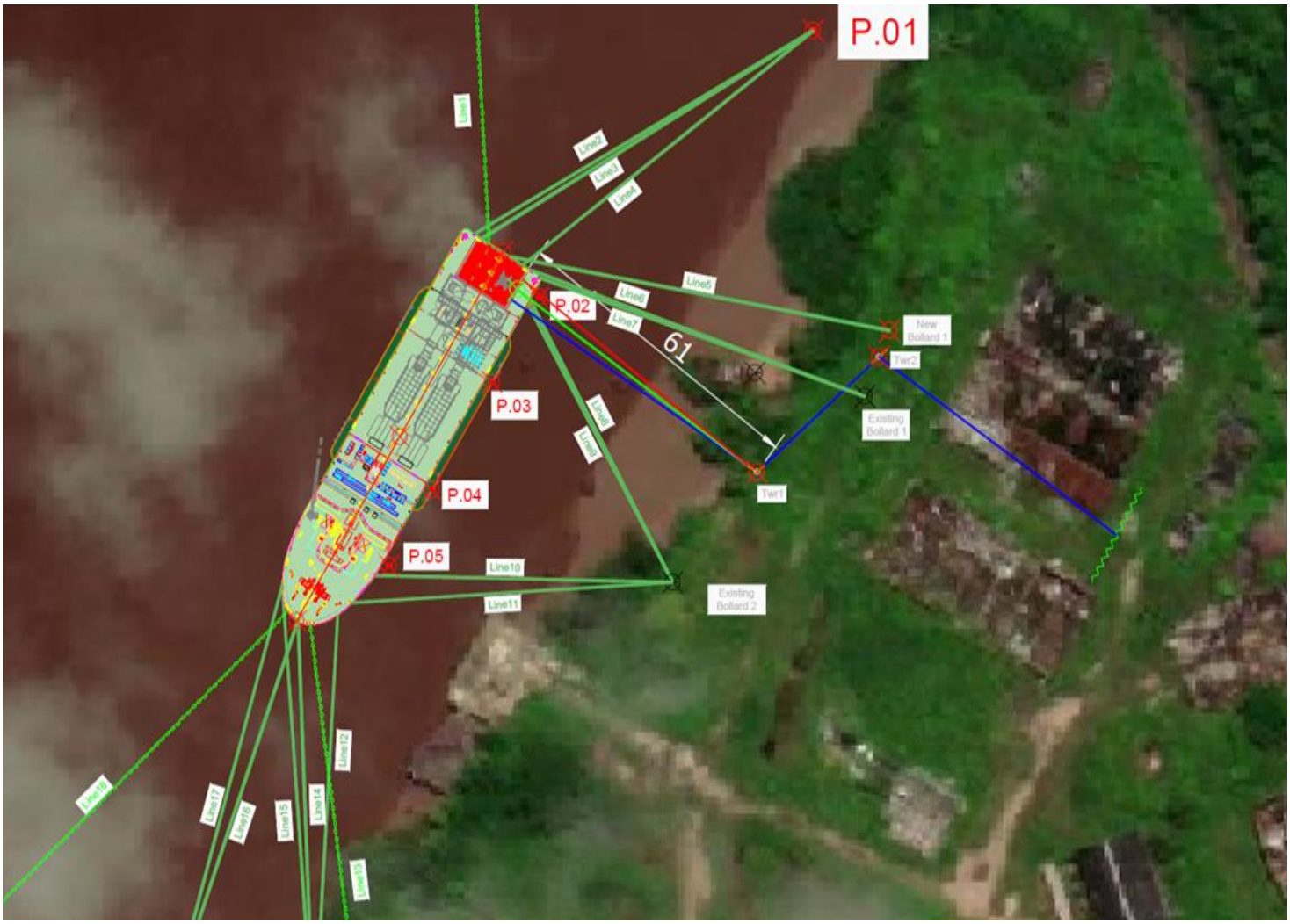


Table 4: Powership Specifications

SHIP'S NAME	KARADENIZ POWERSHIP BARIS BEY
EX NAME	NORMAND VESTER
IMO NUMBER	9166546
FLAG	LIBERIA
PORT OF REGISTRY	MONROVIA
OFFICIAL NUMBER	17988

CALL SIGN	D5NR5
MMSI	636017988
YEAR OF BUILT	1998
BUILT AT	ULSTEIN VERFT AS
HULL NUMBER	224
TYPE OF VESSEL / CLASS NOTATION	SPECIAL PURPOSE SHIP
L.O.A.	84,30m
LENGTH AS PER ITC 69	76,968m
BREADTH	21.8m
DEPTH MOULDED	7,60m
DEADWEIGHT (summer)	1675,975mton
SUMMER LOAD DRAUGHT	5,796m
AIRDRAFT (keel to compass deck)	33.88m
MAX AIRDRAFT (MinDraft to exhaust pipe)	34.105M
GROSS TONNAGE	6701
NET TONNAGE	2010
LIGHTSHIP	4738.75mtons

4.1 Equipment and Components on Powership:

4.1.1 Engines:

- X MAN 18V51/60 DF
- 2 X 18465 KW installed power (Max set point 18465 Kw). Total Gross output 36930 KW
- The facility operates with Heavy Fuel Oil (HFO).

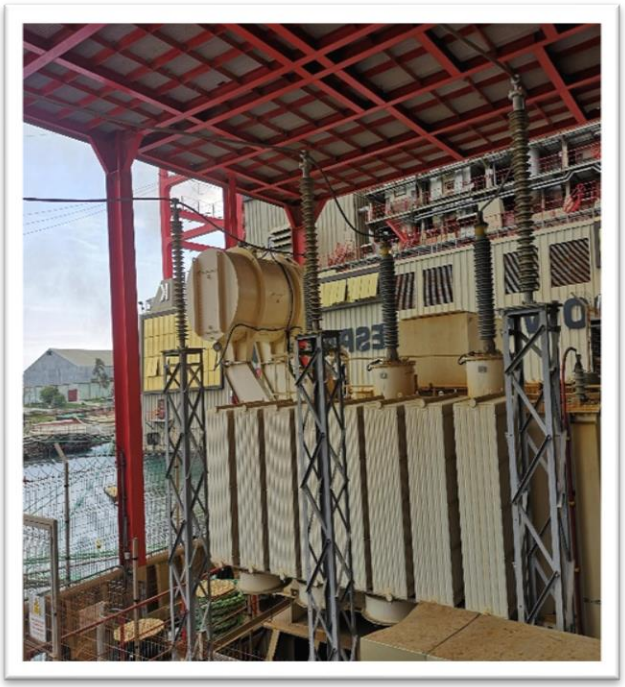
Image 4. Alternators

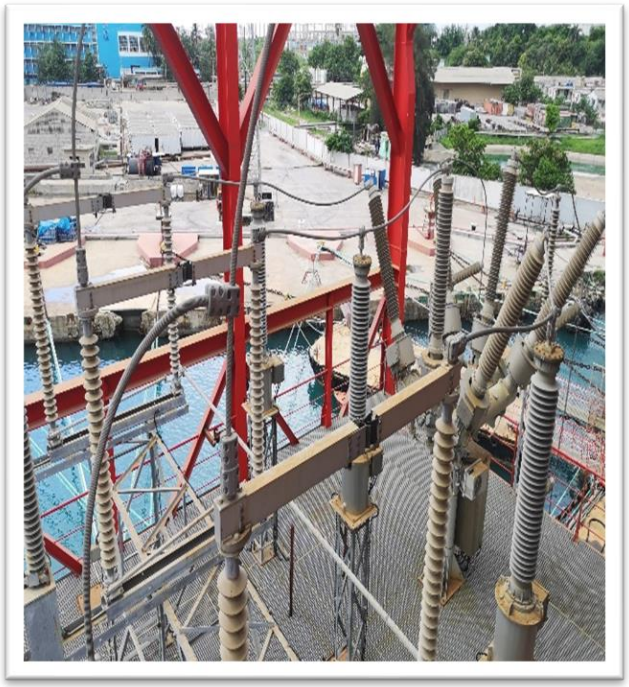
4.1.2 Alternators and Main Specifications:

Alternators :2 X ABB AMG 1600

- Output : 21,723 kVA
- Power : 18,465 kW
- Voltage: 15,000 V
- Frekans : 60 hz
- Power factor : 0,85
- Rpm : 514

Image 5. HV Switchyard





4.1.3 HV Switchyard:

Single Busbar System facility includes 1 unit of ONAN/ONAF 50 MVA power transformer, 1 unit of SF6 gas-insulated hybrid breaker, voltage transformers and 1 unit of double rotary isolator line disconnector connected to it.

4.1.4 MV/LV Room:

Our facility has 2-unit of 2000 kVA 15000/440 V dry-type Eltas brand transformers for internal use. These are connected to 1 unit of 15 kV mv busbar and 1 unit of 440 VLV busbar, which meet the internal power needs of our facility.

Image 6. Steam Generation Room

4.1.5 Steam Generation System:

- X Exhaust Gas Boiler KANGRIM / 10 BAR OPR. PRESSURE
- 1 Auxiliary Boiler ERENSAN HDR 400 / 8 BAR

Image 7. HFO/LO Separator

4.1.6 HFO/ LO Separator:

- x HFO GEA OSE80-0136-067 MODEL
- 2 x LO OSE20-0196-067 MODEL

Image 8. Compressors

4.1.7 Compressors:

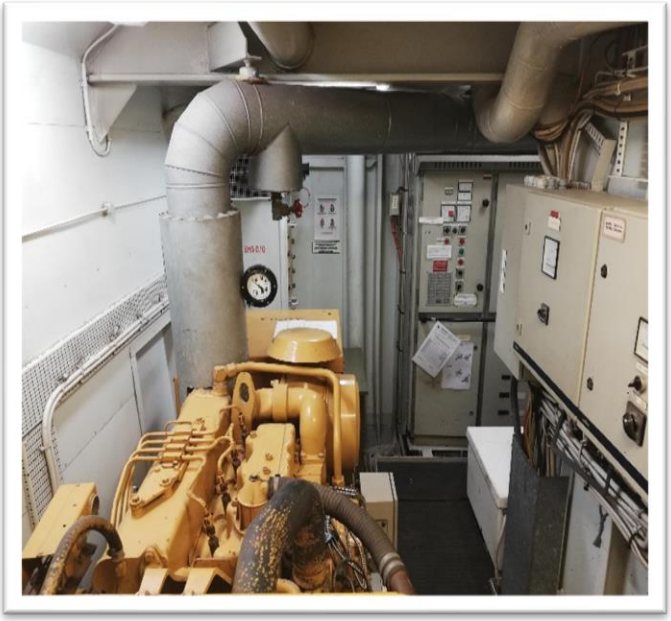
- x Start Air Compressor (30 bar)
- 1 Control Air Compressor (11 bar)
- 1 Service Air Compressor (10 bar)

Image 9. Fresh Water System

4.1.8 Fresh Water System:

- x Sondex FWG, 50m3/day capacity, Salinity max 0-5 ppm, apr0-7.81 µS/cm
- 1 Reverse Osmos Awuamatch, 60m3/day capacity, Salinity max 0-5 ppm, apr0-7.81 µS/cm

Image 10. Emergency Generators



4.1.9 Fresh Water System:

One (1) 850 kVA Blackstart generator and one (1) 880 kVA emergency generator on the ship side (A section away from the Power Plant), to energize the facility again due to any blackout of the facility.

4.1.10 Tank Capacity:

See the table below

Table 5: Tank Specifications

Type	% 100 m3	% 85 m3
HFO	1956,138	1662
MDO	124,3	105,6
LUBE OIL	168,2	142,9
DIRTY OIL	265,8	225,9
FW	464	394,4
BALLAST	4298,6	
SLUDGE	219,5	186,5
BILGE	99,8	84,8
BLACK and GREY W.	210,8	179,1

Please see attached supporting document with additional information on all tanks on Powership

Image 11. Control Room

4.1.11 Control Room:

All systems are monitored and controlled through GCP, CCP panels, and SCADA computers in the control room

4. PROJECT DESIGNS

4.1 Development stages from construction to closure:

The planned activities associated with all development stages from construction to closure are, but not limited to the following:

Table 8. Development stages from construction to closure

Project Stage	Activity
Stage 1 Early work	Minor land clearing at Project site and Along sections of Transmission Corridor
	Alteration and construction of access platform and ladder to access Powership
Stage 2 Installation of transmission Line and components to support transmission and distribution of electricity generated from 36MW Powership.	Civil/Construction works for constructing and installation of a section of transmission line.
	Equipment Installation of placement of Anchor Piles to stabilize Powership
Stage 3 Pre-commissioning and Commissioning.	Pre-Commissioning of Powership
	Commissioning of Powership
	Operation of Powership
Stage 4- End of Contract	The Powership has been charted for a period of 2 years. After this is completed, the Powership will depart the project site.

4.2 Waste production and Management:

Since the Powership will utilize Heavy Fuel Oil, (HFO), most of the oily waste known as Sludge, will come from generation and maintenance processes.

Quantity of Hazardous waste generated:

- Approx. Daily rate:1,26 m³ Sludge
- Monthly Rate: 37,8 m³ Sludge
- Yearly Rate: 453,6 m³ sludge

Table 9. Waste Management (Hazardous and Non-Hazardous Waste)

Waste Type	Source	Management/ Treatment	Quantity Of Waste Generated
Waste During Construction Process			
Transmission materials and Organic waste.	N/A	Small quantity of transmission Materials generated (Wires and Cables). Along with minor organic waste from weeding. Transmission materials were removed from site and returned to waste collection area at T&D Locations.	-
Waste during operation of facility			
Wastewater containing oily residues	Engines Workshop	From maintenance of generating engines and from the washing of parts in workshop would be directed to the oily water separator, where the waste will be removed via a suction truck and then transported to a Waste treatment facility, where it would be incinerated.	Dependent on the amountof lube oil used during maintenance. MARPOL Requirements.

Graywater and Sanitary Water	Sinks and Toilets	Removal via waste disposal company	No data currently available. MARPOL Requirements.
Sludge	Engines Oily Water separators	The generated Hazardous waste will be directed to either the oily water separator or to the concentrated sludge tank housed on the Powership. Subsequently, the waste will be removed via a suction truck and then transported to a Waste treatment facility, where it would be incinerated.	Approx: Daily: 1,26 m^3 Monthly: 37,8 m^3 Yearly: 453,6 m^3 MARPOL Requirements.
Oily Rags	Cleaning of Engine components Used for wiping parts in workshop.	All Oily rags will be stored on the Powership in designated bins and will be removed from the facility via Hazardous waste disposal company.	MARPOL Requirements.
Non-Hazardous Waste			
See attached Waste Management Plan			

4.3 Project Size

4.3.1 Capital Investment:

The Government of Guyana has signed a contract on behalf of the Power and Light Incorporated with Urbacon Concessions Investments, W.L.L (UCI) to charter a powership with a total installed capacity of 36 Megawatts (MWs) for a period of two years. The contract would include the following:

- Provision of operation and maintenance services
- GPL must pay approximately 43 million USD per year (Cost may vary due to output and availability).
- GPL will provide Heavy Fuel Oil (HFO) for the generation process.

4.3.2 Production Rate:

The installed capacity is 36MW, but this will vary based on the demand for electrical power.

Quantity of electricity production per month/year: 25920 MW / 315360 MW

4.3.3 Number of Employees projected for each stage:

The Powership currently consists of 36 Employees responsible for Generation.

4.4 Source of Utility Services:

It is a Powership, so the electricity for domestic use (parasitic load) is utilized from electricity generated for transmission. Initially, the project site will be supported with water supply from planned extended GWI service lines – from the nearest point to site. With the current remoteness of the site, cellular and wireless services will be used to facilitate all communication needs of the Project.

4.5 Project Duration

The project was entered into commercial operation by the 20th of May 2024. The Powership has been charted for an estimated execution duration of 2 years.

4.6 Decommissioning plan:

After the contract has expired, the Powership will disconnect all relevant connections, after which the ship departs.

5. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Table 10. Potential Environmental impacts and proposed Mitigation Measures

Receptor(s)	Source of Impact	Possible Effects of Impacton Human Life and Environment	Mitigation Measures
Installation of Transmission Line			
Soil	Minor Land clearing	N/A	No major land clearing
Air Quality	N/A	N/A	N/A
Noise Quality	N/A	N/A	N/A
Water Quality (Ground and Surface Water)	N/A	N/A	N/A
Flora and Fauna	Minor Weeding of grass and vegetation	N/A	No major land clearing
Operation of Powership			
Soil	Spillage from Sludge Transfer Process	Contamination of Soil and potential damage to ecosystems.	An EPA authorized waste transportation company will be utilized. Waste Transfer procedures established and implemented Availability of Spill Kits on Tanker Training of staff Use of spill collection pans

			during transfer. Use of Seals and Union at all connection points on transfer hose. Compliance with MARPOL Requirements.
Air Quality	Emission from Generating Engines via emission stacks.	Damage to ozone layer, increase greenhouse gases, contribute to global climate change.	See attached emission data MARPOL Requirements.
Noise Quality	Noise emission from Generating Engines	Noise pollution	All employees are fitted with noise protection PPE. Warning signs are mounted at various locations. Engines are housed in contained area within vessel. The control room and offices are used to reduce noise levels. No residence near vessel, so no impact to residents. MARPOL Requirements.
Water Quality	Spillage from Bunkering activities	Damage to Marine Flora and Fauna, Potential Effects to fishing industry. Impact on human health. Water pollution.	Establishment and implementation of Bunkering Plan. Transfer procedures established and implemented Availability of Spill Kits on Tanker Training of staff Use of spill collection pans during transfer.

			Use of Seals and Union at all connection points on transfer hose. Installation of Containment Boom during Bunkering activities. MARPOL Requirements.
Flora and Fauna (Marine)	Spillage from Bunkering activities	Damage to Marine Flora and Fauna, Potential Effects to fishing industry. Impact to human health.	Establishment and implementation of Bunkering Plan. Transfer procedures established and implemented Availability of Spill Kits on Tanker Training of staff Use of spill collection pans during transfer. Use of Seals and Union at all connection points on transfer hose. Installation of Containment Boom during Bunkering activities. MARPOL Requirements.

6. BORDERS AND BOUNDARIES

The Project does not cross-country borders or boundaries

7. MINUTES OF PUBLIC CONSULTATION/ MEETINGS HELD

No consultation was held.

8. A NON-TECHNICAL SUMMARY OF PROJECT

The Powership at Everton Berbice facilitates the generation of electricity and the storage of Heavy Fuel Oil. This process starts with the use of Heavy fuel oils (HFO), taken from fuel storage tanks via a fuel pipeline, where it passes through a fuel separator and heating mechanism before it travels to two engines. The two conventional engines then utilize this fuel by injecting small amounts at precise times within a cylinder. This cylinder contains compressed air, thus the combination of the air/ fuel mixture results in a spark that produces heat; this heat energy moves several pistons up and down. The up and down movement of these pistons is called a stroke, and the consistent strokes of the engine's pistons generates electrical energy or Electricity. This Electrical power is then fed to a grid and then to substations, and subsequently to consumer