date

ENVIRONMENTAL IMPACT STATEMENT

PROPOSED 23.1 MW SIPCOR DIESEL POWER PLANT

Barangay Manalo, Puerto Princesa City, Province of Palawan

This Environmental Impact Statement (EIS) is prepared by:

EnviSynergy Corporation
UB, 111 Paseo de Roxas Building, Legazpi Village,
Makati City, Philippines

and submitted to

SI Power Corporation
12 Mariveles, Mandaluyong, 1550 Kalakhang Maynila

Table of Contents

PROJECT INFORMATION SHEET

Proponent Details	
Name of Company	**S.I. P0WER CORPORATION**
Office Address	Mariveles, Mandaluyong, 1550 Kalakhang Maynila
Name of Authorized Representative for ECC Application	**Reinhard Joseph B. Manalo** Technical Services Engineer
Contact Detail	Email Address: Reinhard.manalo@powergroup.com.ph Telephone No.: 09985102291
Project Details	
Project Name	Proposed 23.1 MW SIPCOR Diesel Power Plant
Project Location	Barangay Manalo, Puerto Princesa City, Province of Palawan
Project Type	Other Thermal Power Plants (Diesel)
Project Components	Major: Diesel Engines, Alternators, Starting Air System, Lubricating Oil System, Water Cooling System, Fuel Supply System, Exhaust Gas System, Tank Farm, Electrical Control System, and Substation Minor/Ancillary: Staff House, Warehouse and Workshop, Water Treatment Facility, Material Recovery Facility
Project Capacity	Total Power Generating Capacity: 23.1 MW
Project Area	5,000 square meters (lot area)
Project Lifespan	15 years
Manpower Requirement	Construction Phase: ≈ 180 individuals O&M Phase: 18 employees
Project Cost	Php 1, 273, 000.00
Project Status	Proposal
ECC Application Type	New
EIA Preparer Details	
Name of Company	**EnviSynergy Corporation**
Office Address	UB, 111 Paseo de Roxas Building, Legazpi Village, Makati City, Philippines
Name of Authorized Representative	**Rodolfo A. Romarate II** Environmental Consultant / EIA Preparer (Registration No.: IPCO-0426 – Central and IPR4B-016 for Region IV B)
Contact Details	Mobile Nos.: 0917 536 3838 Email Address: rar@envisynergy.com Company Email Address: hello@envisynergy.com

Project Description Summary

This Environmental Impact Statement (EIS) is in compliance to the requirements for the acquisition of Environmental Compliance Certificate (ECC) for the Proposed 23.1 MW Diesel Power Plant Project of S.I. P0wer Corporation (SIPCOR). The proponent is set to construct and operate a Hybrid Power Plant in the Province of Palawan , this is a combination of Conventional Thermal Technology and Renewable Energy. It intends to supply a 20 MW contracted capacity for a 15-year term to Palawan Electric Cooperative (PALECO). As one of the major components of the thermal power plant, it will consists of three units of 7.7 MWe medium speed diesel engines , that are set to support in operating on heavy and light oil (engine type 12 DV 36 Turbocharged and intercooled, 4 stroke). The total installed thermal power generating scheme for this project is 23.1 MW.

The proposed project will be situated in Sitio Nacidoc, Barangay Manalo, Puerto Princesa City in the Province of Palawan. The project location as per the Proclamation 219 and 2152 , declaring that the entire province of Palawan as Game Refuge and Bird Sanctuary (Proc 219) and covers a portion as Mangrove Swamp Forest Reserve (Proc 2152).

Process Documentation of the Conduct of EIA Study

This Environmental Impact Statement (EIS) is the result of the Environmental Impact Assessment (EIA) conducted for the **Proposed 23.1 MW SIPCOR Diesel Power Plant** located at Barangay Manalo, Puerto Princesa City, Province of Palawan.

EIA Team

The Environmental Impact Statement was prepared by **EnviSynergy Corporation**. The members of the EIA team are as follows:

Rodolfo Romarate II	Project Manager, EIA Consultant
	Marine Ecology Specialist
	Air and Water Quality Specialist
Maraih Missy Pagkalinawan	Environmental Specialist
Sheila Mae Ancla	Senior Environmental Specialist

EIA Study Schedule

The overall schedule of activities conducted is presented in the table below.

Inclusive Dates	Activities Undertaken
April 24, 2023	Project Scoping with the Proponent
June 16, 2023	IEC
July 31, 2023 *(As advised by EMB-MIMAROPA)*	Public Scoping
	Technical Scoping
	Marine Ecology Assessment
	Ambient Air Quality and Noise Level Sampling
	Groundwater and Marine Water Quality Sampling
	Drafting of EIS
	1st Posting of Public Hearing Notice
	2nd Posting of Public Hearing Notice
	Public Hearing

EIA Study Area

The Direct Impact Areas (DIAs) of the project are delineated based on the results of the assessment of the project's impact on air, water, land and people. The following are some criteria applicable to the project based on the guidelines as per Section 10 of DAO 2017-15.

Environmental Component	Guidelines (As per Section 10 of DAO 2017-15)	Relevance to the Project
Air	Areas where maximum Ground-Level Concentrations (GLC) of emissions and noise levels higher than the ambient standards are predicted to occur.	Diesel operated power plants can emit air pollutants such as SOx, NOx, CO and particulates. For this environmental impact assessment will consider a 100 to 200 meter to radial area of influence in consideration to the nearest household in the area.

Environmental Component	Guidelines (As per Section 10 of DAO 2017-15)	Relevance to the Project
Water	The extent of the water bodies where the water quality is projected to exceed the ambient standards.	The nearest body of water is the Tandayang River, which is a heavily salt intruder river with vast mangrove riparian cover. In accordance with the DENR Administrative Order 2016-08, the parameters in consideration for the water quality assessment are temperature, pH, COD, Total Suspended Solids, Phosphate, Chloride, Chromium, Copper, Zinc, Arsenic, Cadmium, Lead, and Oil and Grease. While this administrative order refer the above-mentioned the general effluent standards, these shall be adopted upon the conduct of the assessment.
Land	Areas directly vulnerable to potential flooding or inundation that may be caused by the project. Areas where there will be disturbance of habitat and removal of vegetation.	The DIA for land shall be confined within the 5,000 sqm leased property as shown in ***Figure PD-1***.
People	Directly affected areas in terms of relevant socio-economic parameters.	The DIA for people is Barangay Manalo as the host community of the Project.

1 Introduction

1.1 Project Background

The 23.1MW Diesel Power Plant (hereinafter referred to as the **"Project**") of S.I. Power Corporation (hereinafter referred to as the **"Proponent"**). SI Power Corporation is set to construct and operate a Hybrid Power Plant in Palawan, through a project aimed at supplying a 20MW contracted capacity for a 15-year term to Palawan Electric Cooperative. The Hybrid Power Plant will utilize a combination of Conventional Thermal Technology and Renewable Technology with an Energy Storage System to provide both firm and additional capacity for the Power Station.

The thermal power generating scheme will consist of three units of 7.7 MWe medium speed diesel engines, which are designed to operate on both heavy and light fuel oil. These gensets will be provided by ABC Anglo Belgian Corporation NV and are equipped with engines of type 12 DV 36 Turbocharged and intercooled, 4 stroke. The total installed capacity of the thermal power generating scheme is 23.1 MWe, which will provide reliable and efficient operations.

The Renewable Technology section of the Hybrid Power Plant will consist of various technologies that will be integrated with the Energy Storage System to provide additional capacity for the Power Station. The generating units of both Thermal and Renewable sections will be equipped with all necessary electrical and mechanical equipment, ensuring reliable, efficient, continuous, and safe operations.

The integration of Conventional Thermal Technology and Renewable Technology with an Energy Storage System makes the Hybrid Power Plant a sustainable solution for meeting the power demands of Palawan Electric Cooperative. The Hybrid Power Plant will help reduce the reliance on fossil fuels, provide a stable power supply, and contribute to the reduction of greenhouse gas emissions.

1.2 The Proponent

SI Power Corporation is a company registered and incorporated in the Philippines. It is primarily engaged in the development, construction, and operation of power generation projects in the country. The initial focus of SI Power Corporation is solely on the construction of Thermal Power Plant. To reduce greenhouse gas emissions, we are now contemplating Diesel Power Plant Projects with renewable components which is solar.

SI Power Corporation has completed several power generation projects in the Philippines and has a portfolio of ongoing projects. The company aims to provide reliable and sustainable energy solutions that will contribute to the country's economic growth while minimizing the environmental impact of power generation.

2 Project Description

2.1 Project Location and Area

The project is located at Sitio Nacidoc, Barangay Manalo, Puerto Princesa City, Province of Palawan. (see ***Map PD-1***). As shown in ***Map PD-2***, the project site is located approximately 20.97 aerial kilometers north-east of the Puerto Princesa City Hall; approximately 24.35 aerial kilometers north-east of Puerto Princesa International Airport; and 2.07 aerial kilometers south-west of Manalo Barangay Hall.

Map PD- 1. Project Location

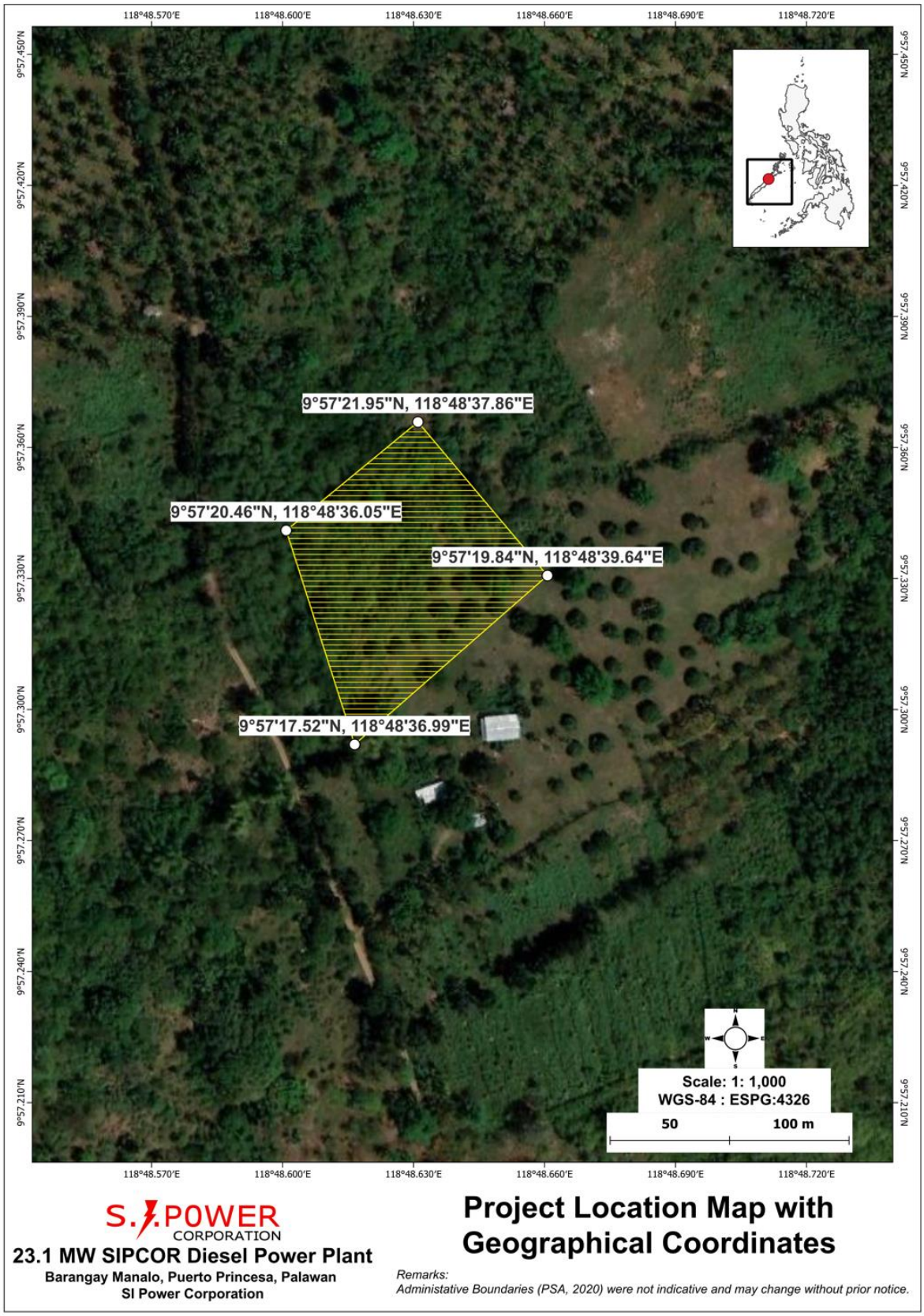
Map PD- 2. Project Location vis-à-vis Nearest Landmarks within the City

The project occupies a portion of the acquired lot area, which is about half a hectare (5,000 sq m). The site has a geographical feature of generally flat lying and increases its elevation towards the west covered with weeds, grasses, and few trees. The southwestern boundary is adjacent to a barangay road while the Puerto Princesa North Road is located downslope of the southeastern perimeter of the project site. In addition, the north section of the project site has a natural creek, and the west section of the site is a private property owned by a resident of Brgy. Manalo.

The geographic coordinates of the lot area are listed in ***Table PD-1*** and shown in ***Map PD-3***.

Table PD-1. Geographic Coordinates of the Project Site (WGS 84)

Corner	Latitude	Longitude
Diesel Power Plant		
Corner 1	10°19'47.19" N	124° 2'28.32" E
Corner 2	10°19'47.19" N	124° 2'28.48" E
Corner 3	10°19'46.90" N	124° 2'28.46" E
Corner 4	10°19’46.90” N	124° 2’28.29” E



Map PD- 3. Geographical Coordinates of the Project Site

2.1.1 Accessibility to the Project Site

The City of Puerto Princesa can be reached from Manila, the capital city, through a convenient one-and-a-half-hour flight from Ninoy Aquino International Airport or a 35-hour ferry journey from the Port of Manila to Puerto Princesa Port. From the City Proper, the project site is accessible by any means of land transport via northbound routes using the Puerto Princesa North Road. This would take about 45 minutes. The access road map is reflected in ***Map PD-4***.

2.1.2 Direct and Indirect Impact Areas

The Direct Impact Areas (DIAs) of the Project are delineated based on the preliminary assessment of the Project's impact on air, water, land, and people. The following are some criteria applicable to the Project based on the guidelines as per Section 10 of DAO 2017-15.

Table PD-2: Impact Areas and Guidelines for Assessment and Relevance to the Project

Environmental Component	Guidelines (As per Section 10 of DAO 2017-15)	Relevance to the Project
Air	Areas where maximum Ground-Level Concentrations (GLC) of emissions and noise levels higher than the ambient standards are predicted to occur.	Diesel operated power plants can emit air pollutants such as SOx, NOx, CO and particulates. For this environmental impact assessment will consider a 500 meter to 1 kilometer radial area of influence in consideration to the nearest household in the area.
Water	The extent of the water bodies where the water quality is projected to exceed the ambient standards.	The nearest body of water is the Tandayang River, which is a heavily salt intruder river with vast mangrove riparian cover. In accordance with the DENR Administrative Order 2016-08, the parameters in consideration for the water quality assessment are temperature, pH, COD, Total Suspended Solids, Phosphate, Chloride, Chromium, Copper, Zinc, Arsenic, Cadmium, Lead, and Oil and Grease. While this administrative order refer the above-mentioned the general effluent standards, these shall be adopted upon the conduct of the assessment.
	Areas directly vulnerable to potential flooding or inundation that may be caused by the project.	The DIA for land shall be confined within the 5,000 sqm leased property as shown in ***Figure PD-1***.
Land	Areas where there will be disturbance of habitat and removal of vegetation.	The DIA for land shall be confined within the 5,000 sqm leased property as shown in ***Figure PD-1***.

Environmental Component	Guidelines (As per Section 10 of DAO 2017-15)	Relevance to the Project
People	Directly affected areas in terms of relevant socio-economic parameters.	The DIA for people is Barangay Manalo as the host community of the Project.

On the other hand, the Indirect Impact Areas (IIAs) for air and land shall be initially delineated within the 500-meter to 1 kilometer radius from the project site depending on the extent from which the settlements are located. The IIA for water may be the area from the outer boundary or buffer zone to the point or area where the baseline environmental quality is calculated or monitored to be met. The IIAs shall be more accurately defined during post-ECC monitoring of the Project.

2.1.2.1 Compliance to DMO 2023-01

On January 13, 2023, the Department of Environment and Natural Resources (DENR) released Memorandum Order No. 2023-01, which introduced supplementary regulations for projects seeking an Environmental Compliance Certificate (ECC) that are situated within or near Protected Areas and/or Ramsar sites.

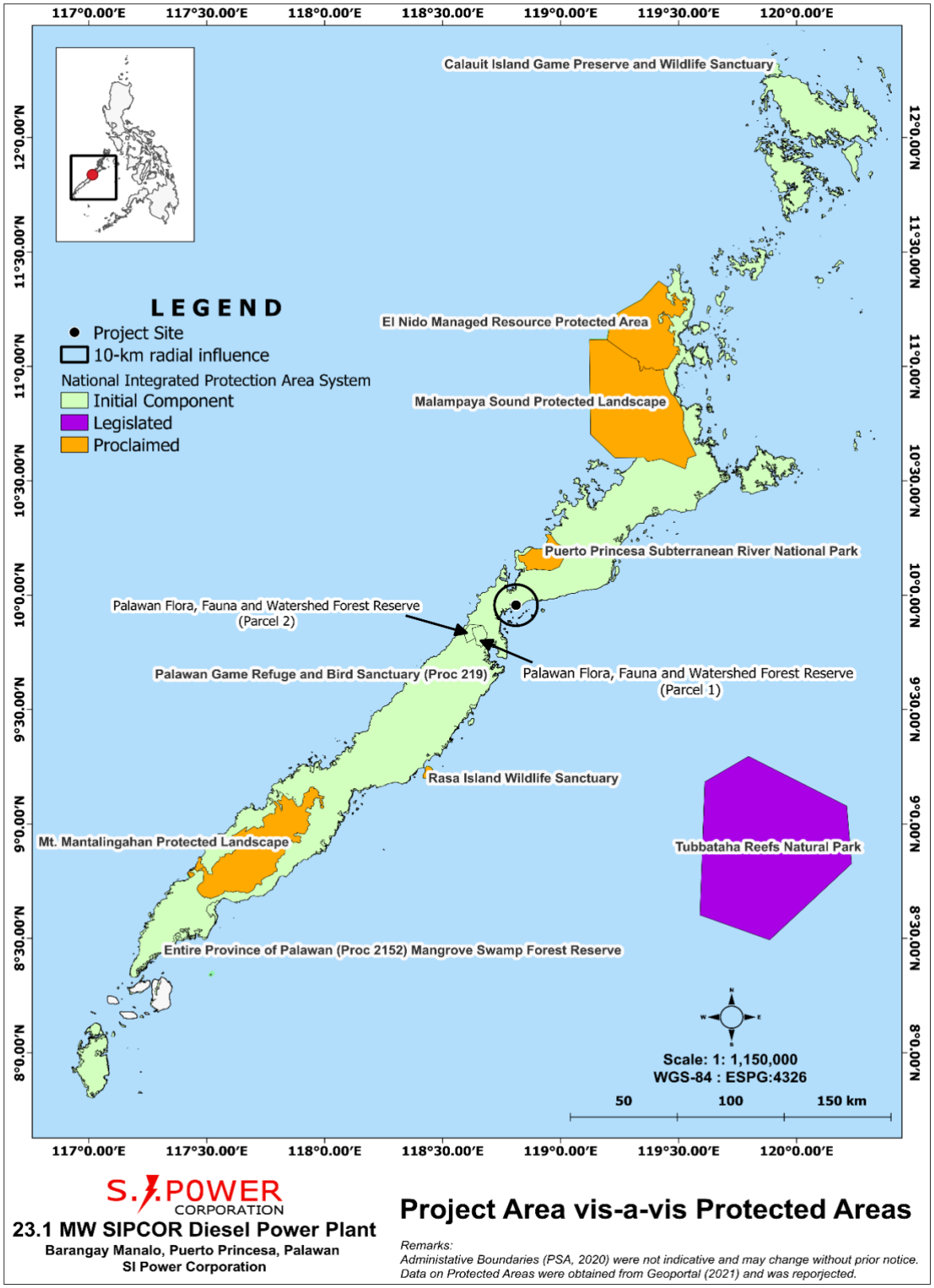
2.1.2.1.1 Identified Protected Area within the Province of Palawan

The Island of Palawan is home to several identified protected areas that are crucial for the conservation of its natural treasures. At present, there are 11 recognized protected areas within the province. Among them, two have achieved international renown for being designated as World Heritage sites and Ramsar Wetland Sites. These are listed in Table 1 and shown in Figure 1.

Table PD-3: Identified Protected Areas in the Province of Palawan

Protected Area	Legal Status	Type	Designation /Titles	IUCN	Governing Law/s	Area (hectares)
Calauit Island Game Preserve and Wildlife Sanctuary	Initial Component	Wildlife Sanctuary	National	Not Assigned	Proclamation No. 1578, s. 1976	3,701.62
El Nido Managed Resource Protected Area	Proclaimed	Managed Resource Protected Area	National	IV	Proclamation No. 342, s. 2000	91,954.96
Entire Province of Palawan (Proc 2152) Mangrove Swamp Forest Reserve	Initial Component	Mangrove Swamp Forest Reserve	National	Not Assigned	Proclamation No. 2152, s. 1981	55,471.17
Malampaya Sound Protected Landscape	Proclaimed	Protected Landscape	National	V	Proclamation No. 342, s. 2000	201,018.26
Mt. Mantalingahan Protected Landscape	Proclaimed	Protected Landscape	National	V	Proclamation No. 1815, s. 2009	121,886.57
Palawan Flora, Fauna and Watershed Forest Reserve (Parcel 1)	Initial Component	Watershed Forest Reserve	National	Not Assigned	Proclamation No. 2221, s. 1982	4,799.18
Palawan Flora, Fauna and Watershed Forest Reserve (Parcel 2)	Initial Component	Watershed Forest Reserve	National	Not Assigned	Proclamation No. 2465, s. 1985	3,240.29
Palawan Game Refuge and Bird Sanctuary (Proc 219)	Initial Component	Game Refuge and Bird Sanctuary	National	Not Assigned	Proclamation No. 219, s. 1967	1,088,181.26

Protected Area	Legal Status	Type	Designation /Titles	IUCN	Governing Law/s	Area (hectares)
Puerto Princesa Subterranean River National Park	Proclaimed	National Park	National Park in 1971 and area expanded in 1999 Palawan Biosphere Reserve in 1990 UNESCO World Heritage Site in 1999 National Geological Site in 2003 ASEAN Heritage Park in 2005 New Seven Wonders of Nature in 2011 Wetlands of International Importance (Ramsar Site) on June 30, 2012	II	Proclamation No. 212, s. 1999	21,908.63
Rasa Island Wildlife Sanctuary	Proclaimed	Wildlife Sanctuary	National	IV	Proclamation No. 1000, s. 2006	1,994.84
Tubbataha Reefs Natural Park	Legislated	World Heritage Site (natural or mixed)	Ramsar Wetland Site (November 12, 1999), UNESCO World Heritage Site (2009)	Not Applicable	Republic Act No. 10067, s. 2010, Proclamation No. 1126, s. 2006	451,600.56



Map PD- 4. Project Area vis-à-vis Protected Areas

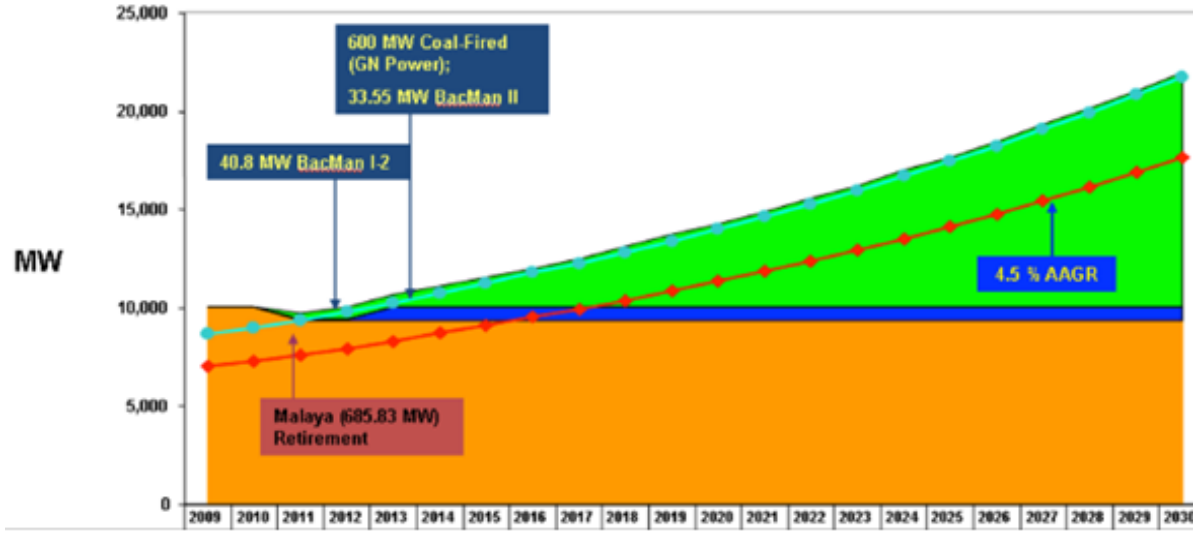
As shown in Table 2, you can find the estimated distances between the Proposed 23.1MW SIPCOR Diesel Power Plant, situated in Barangay Manalo, Puerto Princesa City, and the nearby Protected Areas and Ramsar Site. The power plant is located within the Palawan Game Refuge and Bird Sanctuary (Proc 219) and covers a portion of the "Entire Province of Palawan (Proc 2152) Mangrove Swamp Forest Reserve" within a 10-km radius, with the distance being approximately 0.36 km.

Table PD-4: Approximate Distance to the Project Site

Protected Area	Proximate Distance from the Project Area (km)
Calauit Island Game Preserve and Wildlife Sanctuary	280.46
El Nido Managed Resource Protected Area	127.05
Entire Province of Palawan (Proc 2152) Mangrove Swamp Forest Reserve	***0.36***
Malampaya Sound Protected Landscape	84.83
Mt. Mantalingahan Protected Landscape	128.49
Palawan Flora, Fauna, and Watershed Forest Reserve (Parcel 1)	18.30
Palawan Flora, Fauna, and Watershed Forest Reserve (Parcel 2)	18.16
Palawan Game Refuge and Bird Sanctuary (Proc 219)	***Within***
Puerto Princesa Subterranean River National Park	17.41
Rasa Island Wildlife Sanctuary	87.69
Tubbataha Reefs Natural Park	123.76

2.2 Project Rationale

The Department of Energy (DOE) has identified a significant increase in power demand in the Philippines, according to the Power Development Plan (PDP) for 2009-2030. Specifically, energy consumption in the Luzon Grid is expected to grow by 4.53 percent annually over the 2009-2018 timeframe. However, in 2010, actual energy consumption in Luzon had already increased by more than eight (8) percent, and it is estimated that an additional 1,200 MW of generating capacity needs to be built between 2012 and 2016 to meet the projected power demands. In response to this growing demand, the government has shifted its focus to tapping rivers as potential sources of power generation, taking advantage of the many lakes and rivers in the country.



Source: Power Demand and Supply Outlook 2020-2040, Department of Energy

Figure 1. Luzon Supply Demand Outlook

The thermal-solar hybrid system is important in power generation in the Philippines because it provides a sustainable and reliable source of energy that can complement the country's existing power infrastructure. The Philippines has been experiencing a rapid growth in energy demand over the past few years, and the traditional sources of energy, such as fossil fuels, are becoming increasingly expensive and unreliable. The government has recognized the need for renewable and sustainable sources of energy, and the thermal-solar hybrid system is an excellent option to provide a stable source of energy while reducing the country's reliance on non-renewable sources.

The hybrid system can also help to address the issue of intermittent power supply, which is a common problem in the Philippines. By integrating solar energy into the power grid, the system can provide power during peak demand hours and reduce the load on diesel generators. This can help to reduce the cost of electricity and improve the reliability of the power supply.

Moreover, the thermal-solar hybrid system can have a positive impact on the environment. The use of solar energy reduces the reliance on fossil fuels, which emit greenhouse gases and contribute to climate change. The hybrid system also reduces the emissions from diesel generators, which are known to be major contributors to air pollution. This can help to improve the overall air quality in the country and promote a healthier living environment for its citizens.

2.3 Project Alternatives

2.3.1 Facility Siting

No other project alternatives are being considered for the project site. Alternative arrangements and dimensions of facilities were considered during the planning and the chosen site was found to be the most suitable and practical considering the profile of the area and other development limitations.

2.3.2 Process Technology Options

This project will be connected and integrated to Solar Power Plant component with energy storage system. The Operational Process Technology to be implemented on the project consists of an Energy Management System (EMS) and Supervisory Control and Data Acquisition (SCADA) System. An Energy Management System monitors and controls the power fluctuation caused by the electric loads and renewable energies, balances the supply and demand within the power grid and economizes energy from Diesel and Solar Power Plant by controlling the outputs of the generators which makes the system a Hybrid set-up. Meanwhile, Supervisory Control and Data Acquisition System is used in centralized system to monitor, control, and record the parameters and activities of the entire Power Plant. Most control actions are performed automatically by Remote Terminal Units (RTUs) or by Programmable Logic Control (PLCs). SCADA system may allow operators to change the setpoints and enable alarm conditions to be displayed and recorded.

2.3.3 No Project Option

In the case that this project will not move forward, the following “No Project Scenario” will be experienced:

1. Energy Supply Constraints

Without the establishment of the diesel power plant, the region’s energy supply might become less stable. Reliance on the existing alternatives or external sources could be susceptible to disruptions caused by natural disasters, transmission issues, or even grid failures. This instability may lead to power outages and hinder economic activities, affecting businesses and residents.

2. Energy Security Risks

Given the geological set up of the Puerto Princesa, depending on limited or distant energy sources may make it vulnerable to geopolitical or supply chain disruptions. Relying on external energy providers might lead to uncertainties during times of conflicts or energy supply crises, potentially impacting the overall electricity stability of the city.

3. Potential Increase in Electricity Cost

Depending solely on the existing energy sources, especially when scarce, could result in higher electricity costs for consumers. Without this project, electricity tariffs might rise, impacting households, businesses, and other operations. This will potentially lead to inflationary pressures.

4. Missed Local Revenue and Development Opportunities

The establishment of this project will contribute to the local revenue through taxes and other contributions required by the relevant laws. These funds can be used to invest in the community's development projects, infrastructure, and social services. Furthermore, insufficient energy supply will hamper economic development deterring potential investments and job opportunities.

2.4 Project Components

Major and minor project components are discussed under this section.

2.4.1 General Project Components

The general components of the project are discussed in the ***Table PD-5***.

Table PD-5: Major Project Components and Specifications

Component	Details/Specification
Major Components	
Diesel Engine	The three units of land-based industrial gensets specified for the diesel power plant are critical components that generate electrical energy by converting the fuel's chemical energy into mechanical energy. These gensets are manufactured by ABC Anglo Belgian Corporation NV and are designed to operate under extreme conditions while providing reliable and efficient power generation.
Alternators	A total of 3 units of alternators will be included in the plant design. Alternators are a crucial component in a diesel power plant, as they are responsible for converting the rotational energy produced by the diesel engine into electrical energy that can be used to power various electrical loads. The Brushless synchronous generator with built-in compound excitor and automatic electronic voltage regulation is an advanced type of alternator that is designed to provide reliable and efficient power generation.
Starting Air System	Responsible for providing the necessary compressed air required to start the diesel engines. The specifications for the Starting Air system have been carefully selected to meet the project's requirements and ensure the efficient operation of the diesel power plant. One unit of the Starting Air system will be installed in the diesel plant. The Airbottle(s) will consist of 2 units of 1500 liters (dm3), 30 bar, complete with a manometer, shutting valve, and safety valve. These air bottles will store the compressed air needed to start the diesel engines, ensuring that the system is always ready to provide the necessary air pressure.
Lubricating Oil System	A vital component of the diesel power plant that ensures the proper lubrication of the engine's moving parts, reducing friction and wear, and extending the engine's lifespan. The specifications for the lubricating oil supply system have been carefully selected to ensure that the engine operates reliably and efficiently.
Water Cooling System	Crucial component of the diesel power plant, responsible for keeping the engine operating at a safe and efficient temperature. The specifications for the water-cooling system have been carefully selected to ensure the reliable and efficient operation of the engine.
Fuel Supply System	Essential component of the diesel power plant, responsible for providing a reliable and efficient fuel source to the engine. The specifications for the fuel supply system have been carefully selected to ensure that the engine can operate reliably and efficiently on either heavy fuel oil (HFO) or light fuel oil (LFO).

Component	Details/Specification
Electrical Control System	Essential component of the diesel power plant that ensures the reliable and efficient operation of the power generation system. The Generator Control Panel is responsible for controlling and monitoring the performance of the alternator and diesel engine. It is designed to withstand harsh environmental conditions, with a metal sheet construction that provides protection against dust and water, as well as ventilation and illumination.
Tank Farm	Responsible for storing and managing the fuel supply. The proposed diesel power plant will have a tank farm that will be bunded to ensure safety and prevent environmental contamination in case of spills or leaks. The bunded tank farm will include two 500 cubic meter capacity heavy fuel tanks (HFO), a light fuel oil (LFO) tank with a capacity of 60 cubic meters, a heavy fuel oil settling tank with a capacity of 60 cubic meters, and a heavy fuel oil service tank with a capacity of 60 cubic meters.
Support or Auxiliary Components	
Staff house	The diesel power plant will have a staff house that will provide comfortable living quarters for the plant's staff members. The staff house will be designed to provide a safe and secure environment for the employees while they are on duty at the power plant. It will also serve as a place for the staff members to rest and relax during their off-duty hours. The staff house will be equipped with all the necessary amenities such as bedrooms, bathrooms, a kitchen, and a dining area.
Warehouse & Workshop	The warehouse will have a size of about 6 X 6 meters, providing ample space for the storage of essential spare parts, tools, and equipment needed for the operation of the power plant. The workshop will also serve as a hub for the maintenance and repair of equipment, ensuring that the power plant operates at optimal performance. It will be staffed with skilled technicians and engineers who will conduct regular maintenance checks and repairs to prevent any potential issues that may affect the plant's operation.
Water Treatment Facility	The water treatment product will serve as make-up water for cooling system of diesel engine. The location of the facility will be near the tank farm.
Material Recovery Facility	The material recovery facility will be included in the plant’s component which serves as collection and sorting facilities for plant’s solid wastes before disposal. Material Recovery Facility will be constructed with dimension of 3 meters x 6 meters (3 compartments). Bio-degradable, non-biodegradable, and hazardous waste.

The site development plan of this project is presented in ***Map PD-3***.

2.4.2 Project Layout/ Perspectives

SI Power Corporation's project involves the construction of a diesel power plant with a capacity of 23.1 MW, aimed at providing a reliable source of energy to the local grid. The project will require the acquisition and development of a 0.5-hectare land area where the plant will be constructed, and a staff house will be built to accommodate the personnel who will operate the power plant.

The diesel power plant will be equipped with modern facilities, including a tank farm with various fuel storage tanks, an exhaust gas system, and an electrical control system comprising a generator control panel, neutral earthing, motor control panel, DC system, and a 13.8kV MV switchgear. These components will ensure safe and efficient power generation.

Additionally, the diesel power plant will be designed as a hybrid power plant, incorporating solar energy to complement diesel power during peak hours. This design will increase the efficiency and reliability of the power plant. The project will also have transmission lines complete with switches and protections for the interconnection between the power plant and the 69 kV line of NPC.

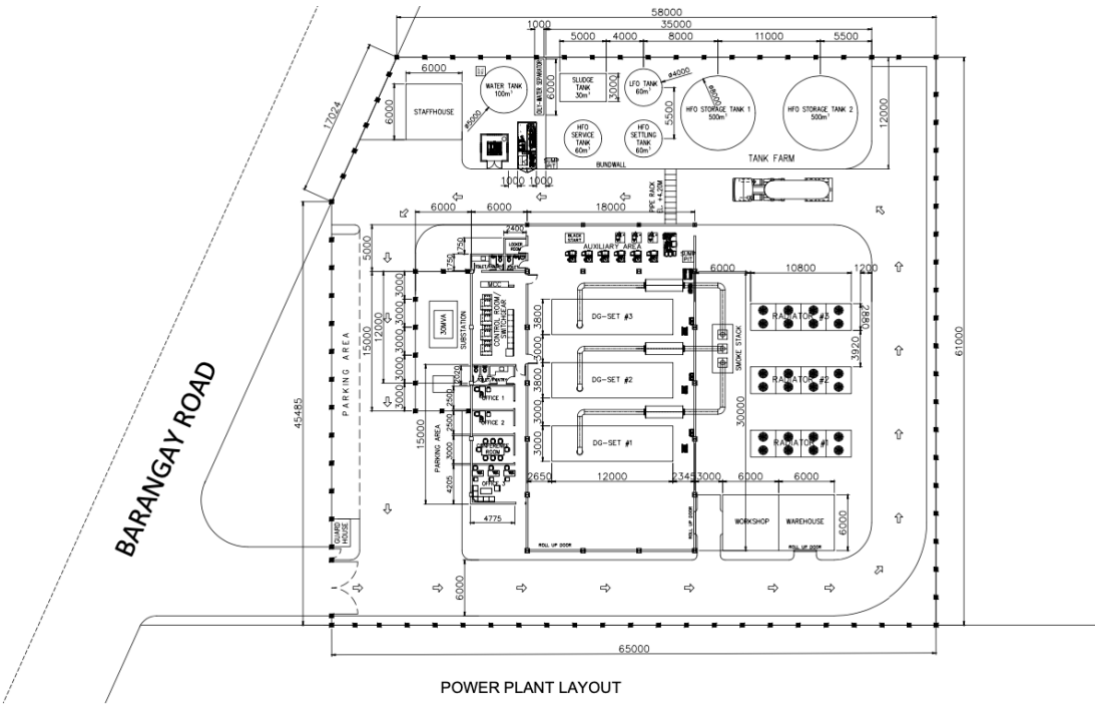


Figure 2. Power Plant Layout

Figure 3. Project Perspective

2.4.2.1 Diesel Engines

The three units of land-based industrial gensets specified for the diesel power plant are critical components that generate electrical energy by converting the fuel's chemical energy into mechanical energy. These gensets are manufactured by ABC Anglo Belgian Corporation NV and are designed to operate under extreme conditions while providing reliable and efficient power generation.

The engine type is 12 DV 36 Turbocharged and intercooled, 4 stroke, with a counter-clockwise sense of rotation when looking at the flywheel. The engine has 12 cylinders with a bore of 365mm and a stroke of 420mm. The swept volume per cylinder is 43.95 liters (dm3), and the total swept volume is 527.36 liters (dm3). The compression ratio is 15.5:1, and the nominal speed is 720rpm, with a minimum idling speed of 300rpm. The engine's torque is 103,450Nm, and the brake mean effective pressure is 24.7bar.

The engine's performance is dependent on various environmental factors, such as ambient air temperature, water temperature at intercooler inlet, barometric pressure, relative humidity, and derating. The engine can operate under these conditions while still providing reliable and efficient power generation. The requested engine power rating at the site, based on ISO 3046-1 at 720rpm, is specified to meet the project's requirements.

The lube oil consumption on ISO 3046-1 at full load is also specified for these engines. Furthermore, the fuel consumption according to ISO 3046-1 conditions is 0.208 liters/kWhe HFO. This information is crucial in determining the operational costs of the diesel power plant and its overall efficiency.

Figure 4. ABC Diesel Engine - 12DV36

2.4.2.2 Alternators

A total of 3 units of alternators will be included in the plant design. Alternators are a crucial component in a diesel power plant, as they are responsible for converting the rotational energy produced by the diesel engine into electrical energy that can be used to power various electrical loads. The Brushless synchronous generator with built-in compound excitor and automatic electronic voltage regulation is an advanced type of alternator that is designed to provide reliable and efficient power generation.

The manufacturer of the alternator is B.E.M. or an equivalent, which is known for producing high-quality and reliable electrical equipment. The type of the alternator is GH70L10O1V6, which is a brushless synchronous generator with a built-in compound excitor and automatic electronic voltage regulation. The nominal speed of the alternator is 720rpm, and the frequency is 60Hz, making it suitable for use in a diesel power plant.

The tension of the alternator is 13.8 kV and it is designed to comply with the standard rules of IEC34/VDE0530. The ambient air temperature for the alternator is 32°C, with a 5% derating, while the ambient height is 0.0m. The power factor of the alternator is 0.8m, and it is protected by an IP23 rating, which makes it suitable for use in harsh environments.

The insulation class of the alternator is H, and the temperature rise class is also H. The requested power on-site for the alternator is 7700kWe, with an overload of 1 hour every 12 hours. The execution of the alternator is double bearing with sleeve bearings, with one bearing insulated. The droop setting is included and ranges from 0-6%, and an anti-condensation heater is provided at 440V.

The alternator has 6xPT100 in stator windings and 1xPT100 per bearing, which are used for temperature monitoring. The terminal box is located on top of the stator and has an IP54 rating,

providing protection against dust and water ingress. Additionally, an air filter is provided on the alternator inlet to ensure that the air entering the alternator is clean and free from contaminants.

Figure 5. Diesel Engine and Generator Coupled

2.4.2.3 Starting Air System

The Starting Air system is an essential component of the diesel power plant, responsible for providing the necessary compressed air required to start the diesel engines. The specifications for the Starting Air system have been carefully selected to meet the project's requirements and ensure the efficient operation of the diesel power plant.

One unit of the Starting Air system will be installed in the diesel plant. The Airbottle(s) will consist of 2 units of 1500 liters (dm3), 30 bar, complete with a manometer, shutting valve, and safety valve. These air bottles will store the compressed air needed to start the diesel engines, ensuring that the system is always ready to provide the necessary air pressure.

An airdryer for the control air of the gensets will also be included in the Starting Air system, subject to PID review. The airdryer will help to remove moisture and impurities from the control air, ensuring that the air is dry and clean, which will help to protect the engine components and ensure reliable operation.

The Electro-compressor for the Starting Air system will consist of two units of ERVOR, G08ELD Aircooled, with a capacity of 93.0m3/h and 1bar air intake, with a pressure of 30/40 bar. These compressors will provide the necessary compressed air to start the diesel engines, ensuring that they can be started quickly and efficiently.

An Electric motor will also be included in the Starting Air system, with a voltage rating of 460V-3phase-60Hz, IP55, 22.0kW, and 1800RPM. This motor will drive the compressors and ensure that they provide the required amount of compressed air to start the diesel engines.

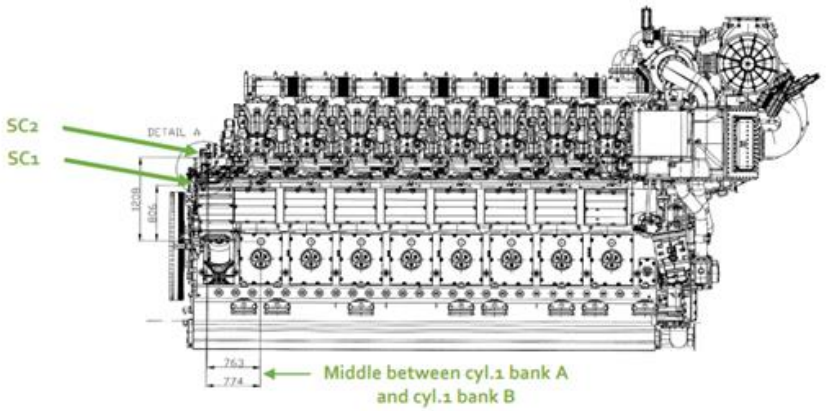


Figure 6. Starting Air System

2.4.2.4 Lubricating Oil System

The lubricating oil supply system is a vital component of the diesel power plant that ensures the proper lubrication of the engine's moving parts, reducing friction and wear, and extending the engine's lifespan. The specifications for the lubricating oil supply system have been carefully selected to ensure that the engine operates reliably and efficiently.

Each engine in the diesel power plant will have one set of lubricating oil supply system, consisting of a wet sump-extra deep system. The engine is equipped with a single lubrication pump that is responsible for circulating the lubricating oil throughout the engine. All the oil pipes can be arranged in the factory, ensuring that the system is ready for installation and use.

The lubricating oil supply system also includes an extra deep lube oil sump, an engine-driven lube oil pump, a lube oil pressure regulating valve, an automatic lube oil filter Boll&Kirch, a lube oil thermostatic valve built on the engine, a centrifugal lube oil filter mounted in the bypass on the engine, a crankcase breather, and a plate type lube oil cooler. The lubricating oil piping inside and outside the engine is also included in the system.

Additionally, the lubricating oil supply system has provisions for pre-lubrication and emergency lubrication, with a single emergency lubricating pump set for each engine, operating at 250/440 V AC - 60 Hz. The emergency lube oil pump also serves for pre-lubrication, ensuring that the engine is lubricated during start-up.

The lubricating oil filtration module, consisting of one per engine, is manufactured by Alfa Laval and includes a separator filter with a flow rate of 300 l/h and a power rating of 3.6 kW, a feeding pump with a flow rate of 300 l/h and a power rating of 0.4 kW, an 8 kW heating coil, and a 300 L sedimentation

tank. An electric control cabinet is also included in the system for viscosity and temperature control, assembling as one unit.

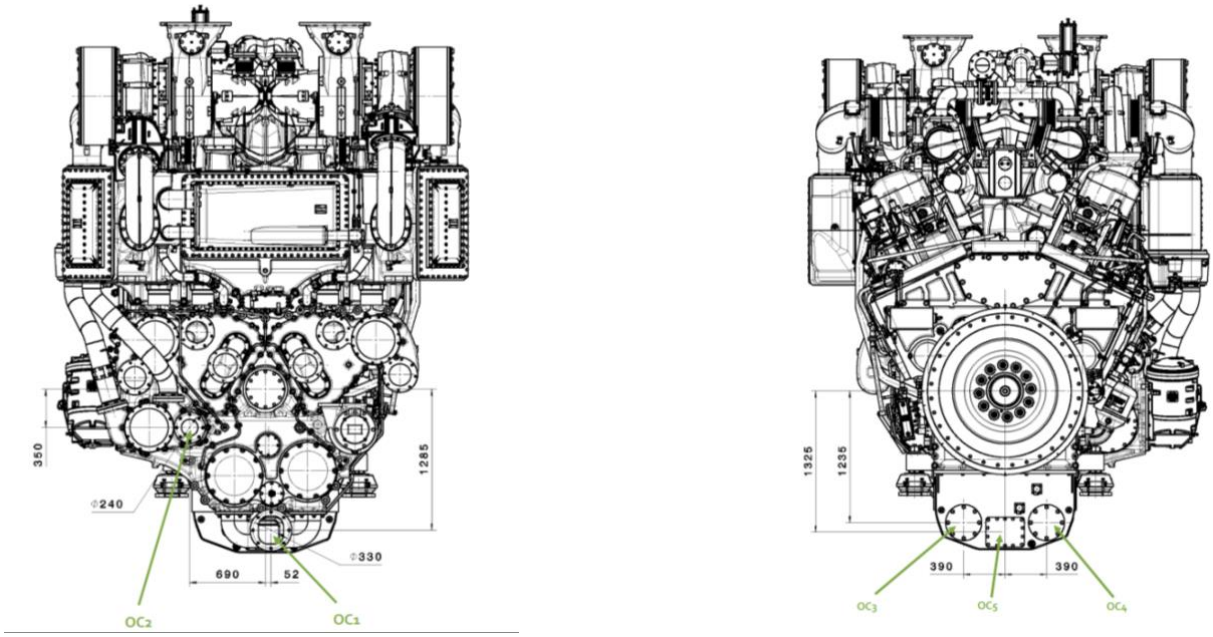


Figure 7. Lubricating Oil System

2.4.2.5 Water Cooling System

The water cooling system is a crucial component of the diesel power plant, responsible for keeping the engine operating at a safe and efficient temperature. The specifications for the water cooling system have been carefully selected to ensure the reliable and efficient operation of the engine.

Each engine in the diesel power plant will have a water cooling system installed, consisting of cylinder heads and top of the liners cooled in a closed circuit by treated water. The turbocharger will be cooled by means of lube oil. The water outlet temperature will be controlled by a thermostatic valve.

The water cooling system will include an engine-driven high-temperature (HT) soft water pump, with two units per engine, as well as an engine-driven low-temperature (LT) soft water pump. The system will have a double cooling circuit, with a soft water execution. Connections for preheating of the engine will also be included in the system.

Supplementary materials will be delivered as loose items, including electrical heating of engine cooling water at engine standstill, a circulation pump, and an electrical unit controlling the engine heating module.

The water cooling system will also include a table-type radiator with vertical airflow. The radiator will be equipped with one or more electrically driven fans, and it will be designed for double cooling circuit. The radiator's design will ensure that it provides efficient heat dissipation, helping to maintain the engine at a safe and efficient temperature.

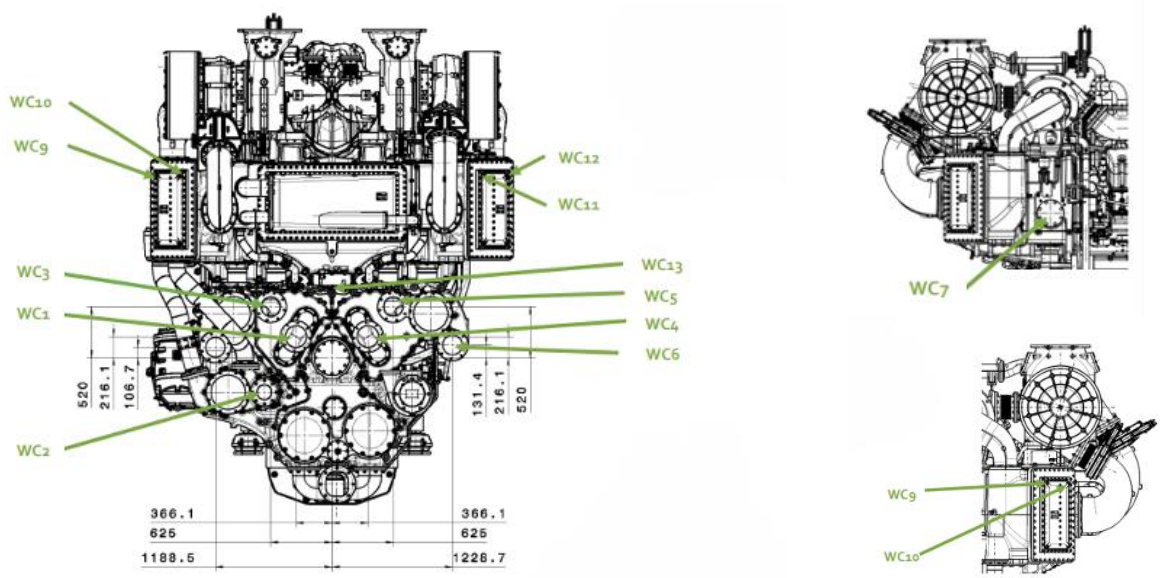


Figure 8. Water Cooling System

2.4.2.6 Fuel Supply System

The fuel supply system is an essential component of the diesel power plant, responsible for providing a reliable and efficient fuel source to the engine. The specifications for the fuel supply system have been carefully selected to ensure that the engine can operate reliably and efficiently on either heavy fuel oil (HFO) or light fuel oil (LFO).

To allow each engine to run on a different fuel, a switchover module from HFO to LFO will be installed per engine, with switchover on LFO needed for engine load below 25%. The fuel supply system will include a heavy fuel separator, consisting of three units for three engines, with a large potential discharge separator, a cast iron frame, and an inox bowl on a vertical spindle. The heavy fuel separator will be manufactured by Alfa Laval/Westfalia, with a type of S815 (or similar).

The heavy fuel separator will have a nominal capacity of 2300 kg/h per centrifugal separator and a heating capacity of 46 kW. The fuel density must be less than 991 kg/m3, and the fuel viscosity must be less than or equal to 380 cSt (50oC/122oF). The heavy fuel separator will also include an electric motor, a screw-type supply pump, an electric heating system for heating the oil from 50°C to 98°C, and a control and monitoring system with a micro-processor and memory chips. The fuel supply system will also include all necessary control valves, sensors, thermometers, and manometers, as well as a plate steel cabinet for a combined starter and power supply panel (48 V) and an intermediate tank for sludge.

In addition to the heavy fuel separator, the fuel supply system will include a fuel booster unit consisting of a double booster unit for two to three engines, with a total installed power of 70.2kW. The fuel booster unit will have a nominal capacity of 9000 kg/h per unit and a fuel density of less than 991 kg/m3 and fuel viscosity of less than or equal to 380 cSt (50oC/122oF). The fuel booster unit will include a suction strainer of 200 microns, a self-priming screw pump with pressure relief valve, a pressure control line and by-pass cooler, a pressurized and isolated deaerator vessel with heating coils, a circulation pump, an electrical fuel heater, and an automatic filter and separate manual by-pass filter.

The fuel supply system will also include a viscosity control system and an alarm cabinet for feeder and circulation pumps activation, low level in the deaerator tank, differential pressure over the automatic filter, viscosity alarms (high and low), electrical heater overheated, manometers before and after feeder pump and booster pump, thermometers after feeder pump and heater, and a flowmeter with local reading. A HFO-LFO switch-over valve will also be included in the fuel supply system.

The fuel supply system will also include a viscosity control system and an alarm cabinet for feeder and circulation pumps activation, low level in the deaerator tank, differential pressure over the automatic filter, viscosity alarms (high and low), electrical heater overheated, manometers before and after

feeder pump and booster pump, thermometers after feeder pump and heater, and a flowmeter with local reading. A HFO-LFO switch-over valve will also be included in the fuel supply system.

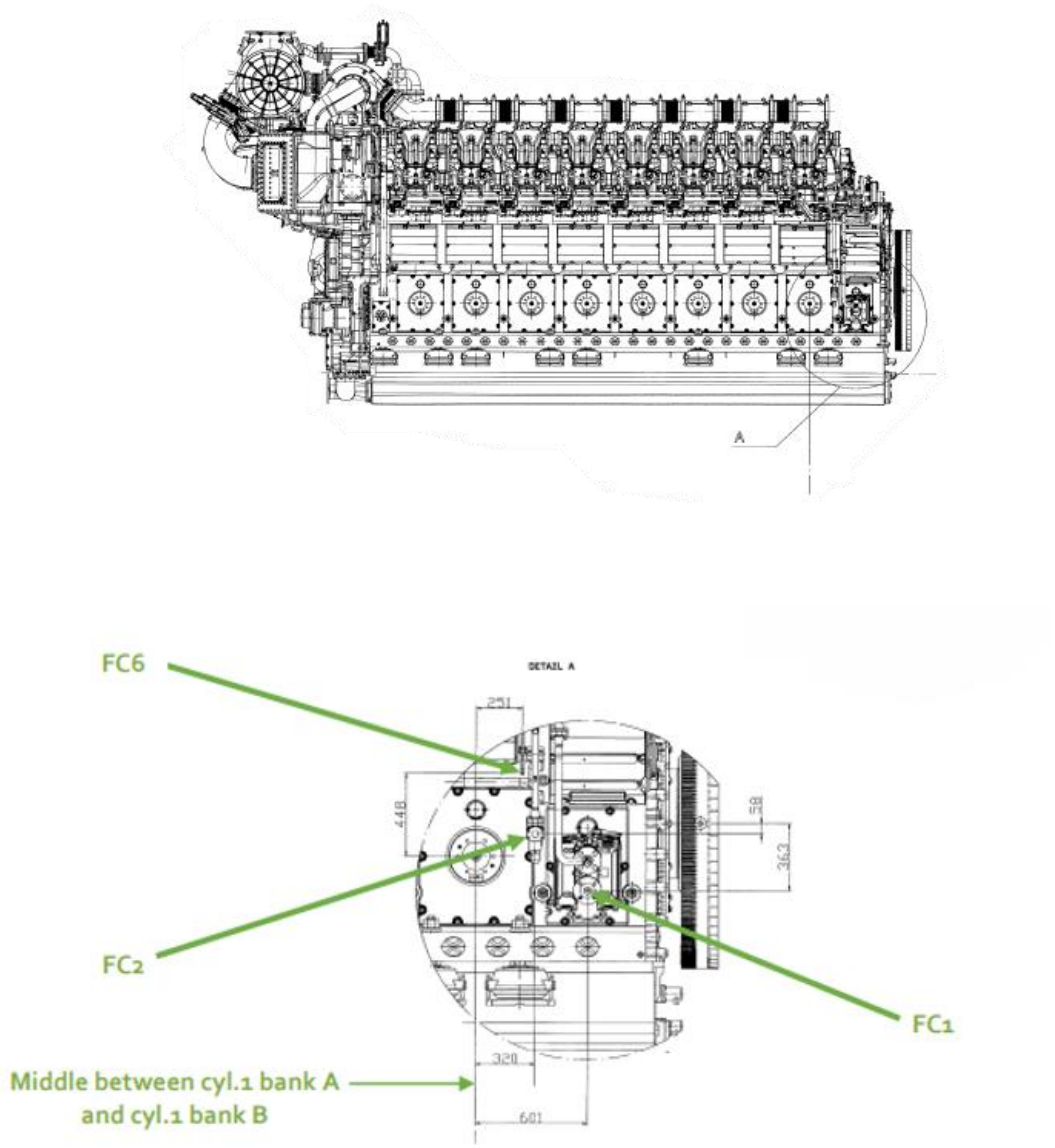


Figure 9. Fuel Supply System

2.4.2.7 Exhaust Gas System

The exhaust gas system is a critical component of the diesel power plant responsible for removing exhaust gases from the engine and expelling them into the atmosphere. The exhaust gas system's specifications have been carefully selected to ensure the safe and efficient operation of the diesel power plant.

The exhaust gas system will include insulated exhaust pipes between cylinders and turbine inlet, which will help reduce heat loss from the exhaust gases and prevent engine overheating. The system will also have a supplementary protection screen for the exhaust manifold, which will protect the engine from any potential debris or foreign material that might enter the exhaust system.

The exhaust gas system will also have an adaptation piece on the turbocharger and connecting flange to ensure a tight and secure connection between the turbocharger and the exhaust system. An intermediate transition piece from two to one exhaust line will also be included to help reduce the back pressure in the exhaust system and improve the engine's performance.

To compensate for the thermal expansion and contraction of the exhaust system, dilatation compensators will be installed. These compensators will help absorb any expansion or contraction that may occur due to temperature changes, ensuring the exhaust system remains structurally sound.

The exhaust gas system will also include exhaust silencers per bank, with a common exhaust silencer of DN700. The silencers will be of the spark arrestor type, with an attenuation of 35 Db, axial inlet, and central exhaust outlet. Counter flanges, seals, and bolts for the exhaust silencer will be provided, along with welded supports for the exhaust silencer. The exhaust silencers will help reduce the noise levels of the engine and comply with local regulations and requirements.

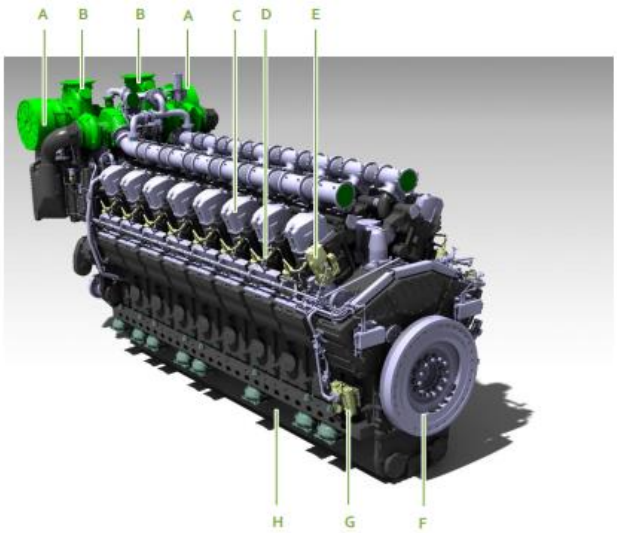


Figure 10. 16DV36 Engine (Front View)

2.4.2.8 Electrical Control System

The Electrical Control System is an essential component of the diesel power plant that ensures the reliable and efficient operation of the power generation system. The Generator Control Panel is responsible for controlling and monitoring the performance of the alternator and diesel engine. It is designed to withstand harsh environmental conditions, with a metal sheet construction that provides protection against dust and water, as well as ventilation and illumination.

The InteliSys NT controller is a sophisticated system that is capable of parallel operation, isochronous load and VAR load sharing, power management, and protection for the mains and alternator. The controller comes complete with internal synchronizer, bus-bar and generator side measuring, alarms and stops for the alternator, and engine control switch. It also features a PLC control part that allows for easy programming and monitoring of the power generation system.

The Neutral earthing system is designed to protect the electrical equipment and personnel from the hazards of electrical faults. It features an isolation switch, overcurrent relay, and neutral earthing resistor in an IP20 enclosure. It also includes a cable type current transformer for accurate measurement of the current.

The Motor Control Panel is responsible for controlling and protecting the motor-driven equipment in the power generation system. It includes an incoming panel with a maintenance switch and current transformers for measuring voltage and current. The panel also features feeder lines for each engine and common feeder lines for the powerhouse. Each line is equipped with indication lamps and selector switches for easy monitoring and control.

The DC system provides power to the control system of the diesel power plant. It includes an automatic battery charger with a capacity of 24 V DC x 186 A, warning lights, and fuses for the battery charger. It also features a set of DC distribution exits with circuit breaker double pole and a capacity of 36 A. The system is powered by lead-acid batteries with a capacity of 160AH.

Finally, the 13.8kV MV Switchgear is responsible for switching and protecting the electrical power supply in the power generation system. It consists of several types of VCBs, risers, and bus VTs that are designed to handle the high voltage and current in the power generation system. The switchgear is provided by Schneider Electric and features Easergy P3U30 Protection Relay for accurate and reliable protection of the power generation system.

Figure 11. GENERATOR SET ONTROL PANEL

2.5 Process Technology

2.5.1 Process Description

The Solar PV System works by having the solar PV panels convert the solar energy into electricity that is sent to the inverter. The inverter then converts the direct current (DC) electricity into alternating current.

However, solar energy production can vary depending on the weather, time of day, and other factors, which can lead to instability in the grid. This is where energy storage comes in. The excess solar energy generated during the day is stored in an energy storage system. On occasions when there is sudden cloud cover or other factors that cause the power to suddenly drop, the flywheel energy storage system reacts and releases the stored energy to support the intermittency of the pv generation plant and ensures a continuous supply of clean, renewable energy, regardless of the weather or time of day. Generally, Diesel will supplement Solar during all the aspect of plant operation. During the day, Solar will be prioritized while Diesel will take over during nighttime. An Energy Storage Device (Flywheel) will provide power to maintain frequency stability of grid. During this transition time when power supply will be shifted to Diesel component, an Energy Management System will execute the automatic function of changeover. Diesel Plant, which comprises of three (3) 7.7MW engines will be operated automatically via remote operation in Control Room. All parameters will be monitored thru control panels, monitors, and SCADA.

2.6 Project Size

Aside from the road networks, majority of the project area is allocated for the Main Power Building. This covers a total land area of 740 sq.m. The main power building will host most of the major project components. Other facilities will encompass a smaller, yet precise measured land area.

Table PD-6: Land Allocation for Project Components

Components	Area (square meters)
Main Power Building	“750”
Tank Farm	“550”
Chimney and Radiators	“700”
Roads	“1550”
Switchyard	“350”
Staff house, Warehouse & Shop	“550”
Water Treatment Plant	“150”
Parking and Guard House	“400”
Total	5,000 sqm

2.6.1 Project Demand

2.6.1.1 Power Supply

The power requirement needed by the project is tapped from the power source generated from the Diesel Power Plant. During operation, the plant's station load (auxiliary load) is foreseen to be estimated 1MW. The power supply will come directly from the plant. Equipment for station load includes fuel and oil centrifuges, fuel booster module units, starting air compressors, rotary and reciprocating pumps, instrumentations, and office and staff house utilities. A 300kVA standby emergency diesel genset (black start genset) will be available to provide power for essential equipment during emergency situations.

2.6.1.2 Water Supply

Water supply for this project will be coming from groundwater. A pumping station comprises of a deep well pump assembly will be available to provide water supply as requirement of the plant. A 100m3 storage tank will be use as storage for raw water. During operation of the plant, water will be primarily use for cooling of the engine. Since the cooling water circuit will operate in a closed loop, little cooling water make-up is anticipated. An estimated volume of 3.5m^3 of cooling water will be circulated on the diesel engines and their auxiliaries. The water consumption during normal operation of the plant will be coming from domestic and utility use which will be around 10m^3 a month.

2.7 Description of Project Phases and Corresponding Timeframes (Development Plan)

SI Power Corporation's development plan for the diesel power plant is carefully planned to ensure that the construction and operation are both efficient and effective. The construction phase will take approximately 10 months to complete, which includes site preparation, civil works, installation of equipment, and commissioning. During this phase, it is estimated that approximately 180 employees will be needed to work on the site.

After the construction phase, the commissioning and testing of the power plant will begin, with the aim of achieving commercial operation within 12 months from the Energy Regulation Commission's approval. During the operational phase, it is expected that the diesel power plant will require around 18 employees to operate and maintain the equipment.

Table PD-7 shows the project schedule:

Table PD-7: Project Schedule

Activities	Month												
	0	1	2	3	4	5	6	7	8	9	10	11	12
PSA Signing													
ERC Approval													
Permitting													
Site Development													
Equipment and Materials Procurement													
Delivery													
Construction Works													
Civil/Structural Works													
Electrical/Mechanical Works													
Substation/Switchyard Works													
Point to Point Connection													
Equipment Completion Certificate													
Issuance of Permit to Operate													
Testing and Commissioning													
Issuance of Certificate of Compliance													
Commercial Operations													

2.7.1 Pre-Construction

This phase primarily involves the conduct of comprehensive site investigations to gather data on the geological and environmental conditions of the site, which includes topography, soil composition, seismicity, hydrology, and climate. This data will be used to determine the feasibility of the site for the construction of the power plant and to identify any potential challenges or risks that may arise during the construction and operation of the power plant.

Additionally, the acquisition of necessary permits, licenses, and documents from local and national government agencies will be secured during this phase. These permits may include environmental compliance certificates, building permits, and other regulatory requirements needed for the construction and operation of the power plant

2.7.2 Construction Phase

The construction of a Diesel Power Plant involves a series of sequential activities that aim to create a functional and efficient power generation system. The initial step involves the development of a 0.5-hectare land and performing earthworks, such as site clearing, land grading, road construction, excavation for foundation and footings, fencing works, and other necessary land development activities that will meet the requirements of the Diesel Power Plant.

Once the land development activities are complete, the next step is the installation of the civil and structural components, such as the foundations of the major equipment, including the Diesel Engines, Generators, and their Auxiliaries, as well as the Tank Farm's foundations. SIPCOR will also construct the Staff House, Powerhouse, Control Building, Substation, and other civil and structural components essential for the Diesel Power Plant.

The next phase of the installation process involves the inclusion of electrical and mechanical equipment. After curing the foundation, SIPCOR will install the Diesel Generators, the Panel, and Switchgears, along with the Transformers, which will be interconnected using a series of enclosed wiring raceways. The Power Plant will be fully grounded to the earth and equipped with a Lightning Protection System. It will also feature a Supervisory Control and Data Acquisition (SCADA) System for automation of control, total data acquisition, and communication of the Power Plant.

The final phase of the installation process involves the installation of Transmission Lines complete with switches and protections for the interconnection between the Power Plant and the 69 kV line of NPC. This final phase ensures a stable and reliable flow of electrical energy from the Power Plant to the grid. Overall, the construction of a Diesel Power Plant is a complex process that involves a wide range of technical and scientific activities aimed at delivering an efficient and effective power generation system.

2.7.3 Equipment Installation

Once the initial construction works, such as earthworks and civil works, are done, engines and other major components will be installed simultaneously while the construction of the plant is ongoing.

Diesel Engine and its auxiliaries will be installed once arrived at the project site and all required permits and compliance are obtained and secured. Crane and other lifting hoists will be installed at site before the arrival of the diesel engine and its auxiliaries. Diesel engines and auxiliaries will be installed in accordance with the installation prescription document provided by the engine supplier. This will include step-by-step installation instructions from handling the diesel genset to positioning and fixing it to foundation and mounting. Before the diesel engine is delivered to the site, pertinent piping will be erected. Along with the piping, instrumentation and piping devices will also be installed. Furthermore, fuel tanks and other vessels will be constructed and installed ahead of delivery of diesel genset to the project site.

2.7.4 Testing and Pre-Commissioning

Before the Project operates, it must go through a pre-start-up and series of test operation activities, which will involve inspection and check-up of all major components. Moreover, completion of other plant-related activities is done during this phase, and training of operating staff onsite is conducted.

2.7.5 Operation Phase

A hybrid power plant system that incorporates both diesel and solar energy is a smart and efficient way to generate power while minimizing operating costs and reducing the carbon footprint. The diesel

power plant component is used as an auxiliary power source, which supplements the electricity supply from solar power when solar resources are not sufficient to meet the energy demand.

When solar radiation is available, the photovoltaic (PV) panels installed in the solar plant capture the sunlight and convert it into DC electricity. This DC electricity is then passed through a power conditioning unit (PCU) where it is converted into usable AC power for distribution and consumption.

However, solar energy is intermittent and varies with time of day and weather conditions, which means that during low solar radiation periods, the diesel power plant component is activated to meet the energy demand. The diesel generator set is started and provides the required power supply to maintain the power grid.

The power distribution system integrates both solar and diesel power sources and is controlled by a sophisticated energy management system that automatically switches between the solar power and diesel power sources based on real-time data from the solar PV system, energy demand, and grid conditions.

The use of hybrid power plant system is an efficient way to reduce the consumption of fossil fuel and lower the overall operating cost of the power plant. Additionally, hybrid power plants are environmentally friendly as they have a smaller carbon footprint compared to traditional fossil fuel power plants.

2.7.6 Abandonment Phase

The SI Power Corporation Diesel Power Plant is anticipated to remain operational for the next 10 to 25 years as planned. However, there may be situations that could necessitate the cessation of the plant's operations, such as unsustainable business operations due to economic downturns, changes in zoning and other related ordinances of the Municipality of Puerto Princesa transfer of operations to other sites, accidents and emergencies, and closure order from government agencies. Should any of these scenarios occur, resulting in partial or total closure of the power plant, SI Power Corporation will initiate an Abandonment Plan.

2.7.7 Roads

All roads built during the construction period will be used as access roads to the structures and facilities during the operational phase. Depending on the future use of the area, the access roads will be retained or removed during the abandonment of the project. In case of access road removal, all demolished materials will be disposed of in the designated landfill area to be given to interested parties while the sites will be revegetated or return to its conditions prior to the project operation.

2.7.8 Relocation and Termination Plans

The Diesel Power Plant is under a 15-Year Contract however, the lifetime of the power plant is anticipated to be "25" years or longer considering the regular preventive repair and maintenance vis-à-vis the normal wear and tear of the equipment and facilities. Plans for the termination of the project will be made later depending on the assessment and / or expected remaining lifetime of the project.

2.7.9 Restoration after Cessation of Project Operation

Considering that the expected lifetime of the project is "25" years or more, the plans for restoring the area will be prepared when the management already has a schedule for the project abandonment.

2.8 Pollution Control Measures

2.8.1 Construction Phase

2.8.1.1 Air Pollution Management

Diesel Power Plant is committed to continuously monitor and record the levels of Particulate Matter (PM), Sulfur Oxides (SOx), Nitrogen Oxides (NOx), and Carbon Monoxide (CO) emissions pursuant to DAO 2000-81 and MC 2016-008 of the DENR. A Permit to Operate will be secured from the in the case of requiring Generator set upon construction.

2.8.1.2 Storm Water Drainage

To prevent the potential release of sediments during the construction phase, the Proponent will establish suitable construction practices, and appropriate drainage and will ensure sufficient staff training, and monitoring of the site and environmental receptors. The Proponent will install drainage and mitigation measurements appropriate for the area being worked.

2.8.1.3 Wastes Management

Before the commencement of the construction activities, waste management areas shall be surveyed and inspected by the contractor or its nominated sub-contractor to ensure the quality of the area wherein management of solid waste will be conducted. Employees and transporters working with any of the subjects will receive appropriate training prior to actual waste, material handling, processing, and stockpiling.

To properly manage the waste materials, waste containers will be installed in the project area and will have signage of "Hazardous Waste" and "Non-Hazardous Waste" for the separation and sorting of waste. The collected waste will be stored in appropriate facilities (e.g. bins, stockpiles, secure compounds), with hazardous waste stored away from streams and rivers in secure areas.

A nominated Contractor Environment Officer will inspect each waste storage facility and disposal site established in the project site. A Notice to Proceed will be issued to the project if the site or facility is in accordance with the Waste Management Plan and any variations required by the Project Manager.

The Proponent will undertake regular collection and disposal of wastes (by contractor or authorized third party) to sites approved by local authorities. Hazardous waste will be disposed of according to appropriate best practices.

Waste segregation will occur at source to the maximum extent possible, separating reusable/recyclable material from non-hazardous waste (packing timber, steel, wire, cables, aluminum, bricks, plaster, roofing material, glass, clay/ sand/ gravel, concrete, insulation material, tiles, fiberglass, cured asphalt, paper, cardboard, plastic, food waste) and hazardous waste (waste oils, oil filters, oily rags, used absorbent, old chemical/paint/fuel/oil drums, batteries, acids, alkalis, welding rods, sewage sludge, and used tires).

Recycling facilities will be established that will collect all recyclable waste generated by the project (including batteries, tires, glass, paper, scrap metal, aluminum cans and timber) to manage the waste materials properly. Secure lids will be fitted to bins that store food waste to prevent scavenging by birds and animals.

2.8.1.4 Vehicle and Machinery Area

During the construction period, several pieces of equipment, machinery, and trucks will be operated on the construction site. If the machinery and vehicles have defects or problems, they will require repair in a designated maintenance area that is cemented and equipped with proper drainage and oil-absorbing materials. The proponent will establish a cemented area for vehicle and machinery repairs and maintenance activities.

2.8.1.5 Spoils Disposal Area

A spoils disposal area will be established during the construction phase of the project to manage the spoils from the excavation activities properly. It will be located at northwest side of the project site with a specified area. Spoils will be re-used by the proponent for the backfilling in low level areas, construction of roads, and for foundation preparation. These activities will be coordinated to barangay Local Government Unit. Excess spoils will be disposed to authorized disposal areas approved by local government. Surplus soils will be disposed of properly to avoid erosion and destabilization of the spoil disposal area, which could lead to sedimentation of water courses and the release of chemicals in the runoff. Gabions will be installed in the spoil disposal area to prevent erosion.

2.8.2 Operation Phase

Considering the nature of the project, the following pollution control measures during the operation phase shall be adopted.

2.8.2.1 Air Pollution Management

Diesel Power Plant is committed to continuously monitor and record the levels of Particulate Matter (PM), Sulfur Oxides (SOx), Nitrogen Oxides (NOx), and Carbon Monoxide (CO) emissions pursuant to DAO 2000-81 and MC 2016-008 of the DENR. For NOx and CO emissions, Engine Supplier certifies that the 3x 12DV-720rpm gensets will have emissions below DENR standard limits given the fact that the HFO-quality is within the contractual specifications. For PM and SOx emission, we will install wet scrubber if the emission test exceeds the DENR standard limit. Furthermore, a Permit to Operate will be secured from the Department of Environment and Natural Resources – Environmental Management Bureau and in accordance with the provisions of the Philippine clean Air Act of 1999.

2.8.2.2 Water Quality Management

A Wastewater Treatment Facility shall be adopted upon operation of the project.

Oil-Water Separator will be adopted in this project. An oil water separator is a piece of equipment used to treat wastewater, making it safe to discharge into an approved discharge point, such as a sewer. It removes oils, grease, and hydrocarbons, leaving only the non-hazardous water. The wastewater can then dispose of safely in drainage. A Gravimetric Oil-Water Separator will be constructed and installed for the plant water. It works using the principle of separation by gravity, based on the difference in specific gravity of oil and water through different stages. First, wastewater passes through filters to separate out the largest solids, it is funneled into the oil water separator to undergo treatment. After that, the wastewater travels across a series of chambers. These chambers help to separate oil, water, and sludge into distinct spaces. Water collected will be tested to verify if readily to be disposed based on the required quality set by DENR. Collected oil waste will be put to sludge tank for proper disposal.

2.8.2.3 Solid Wastes Management

For solid wastes, waste bins shall be placed in conspicuous areas within the facility to separate biodegradable, recyclable and residual wastes. Recyclable and scrap materials shall be sold to recyclers/scrap buyers while residual wastes shall be collected by the city garbage truck collector on a regular basis. This management plan shall consider the provision of Ecological Solid Waste Management Act of 2000 (RA 9003)

2.8.2.4 Hazardous Waste Management

The facility shall have its storage facility for identified hazardous wastes. All identifed hazardous wastes to be generated should be properly labelled and stored. Disposal of all hazardous wastes shall be conducted offsite and shall be subjected to the manifest system of the DENR. All necessary permits and/or clearances shall be secured prior to transport of the hazardous wastes from the facility to the identified treatment/disposal facility. EMB accredited hazardous wastes haulers and treaters shall be contracted for the transport and disposal of the hazardous wastes. All activities shall be properly documented.

2.8.3 Abandonment Phase

In the case of project abandonment, waste management measures will be adopted as stated in the succeeding section.

2.8.3.1 Waste Management

Hazardous materials that are no longer useful, needed or wanted are to be considered hazardous waste and shall be treated in accordance with the provision of the Toxic Substances and Hazardous and Nuclear Waste Control Act of 1990 (RA 6969). Other non-hazardous solid wastes shall be disposed into a Sanitary Landfill in accordance with RA 9003 and local ordinances.

2.8.4 Project's Impacts to the Protected Areas under Direct Influence

The location of the Proposed 23.1MW SIPCOR Diesel Power Plant within the Palawan Game Refuge and Bird Sanctuary and its proximity to the Proc 2152 Mangrove Swamp Forest Reserve raise significant concerns about potential environmental impacts.

Initially, these are the possible impacts that the project may pose to the environment where it is located:

1. Habitat Destruction: Both the Palawan Game Refuge and Bird Sanctuary and the Mangrove Swamp Forest Reserve are critical habitats for various species of wildlife, including birds, fish, and other flora and fauna. The construction and operation of a diesel power plant in this area could lead to habitat destruction, disrupting the natural balance and potentially driving some species out of their habitats.

2. Air Pollution: Diesel power plants are known to emit pollutants such as nitrogen oxides (NOx), sulfur dioxide (SO_2), particulate matter, and carbon dioxide (CO_2). These emissions can have adverse effects on air quality and contribute to global warming and climate change, which can further impact the delicate ecosystems of the nearby protected areas.

3. Water Pollution: The close proximity of the power plant to the mangrove swamp forest and other water bodies, especially the Tandayang River increases the risk of water pollution. Discharges of pollutants from the plant, including wastewater and cooling water, could contaminate the surrounding water sources, harming aquatic life and impacting the biodiversity of the area.

4. Noise and Light Disturbance: Power plants, especially when operational 24/7, can generate significant noise and light pollution. These disturbances can disrupt the natural behavior of wildlife in the protected areas, affecting their breeding patterns, migration routes, and overall well-being.

5. Impact on Endangered Species: Some species within the Palawan Game Refuge and Bird Sanctuary and the Mangrove Swamp Forest Reserve may be classified as endangered or vulnerable. The introduction of a diesel power plant in their vicinity could pose additional threats to their survival, further endangering their populations.

To mitigate these potential environmental impacts, comprehensive environmental impact assessments (EIAs) must be conducted prior to the construction of the power plant. Additionally, strict adherence to environmental regulations and the implementation of appropriate mitigation measures, such as advanced emission control technologies and proper waste management systems, would be essential to minimize the negative effects on the surrounding ecosystems. Environmental Impacts Mitigating Measures will be comprehensively discussed once the field assessment is delivered. Also, the project is an ancillary component of the hybrid facility in consideration of adopting alternative energy sources with lower environmental impacts, such as renewable energy options, as part of a sustainable and responsible approach to meeting the region's power needs.

2.8.5 Social Development Plan and Corporate Social Responsibility Plan

The Proponent is determined to protect and conserve the environment and remain in line with the principles of sustainability. Thus, the corporation intends to fund the total project cost as follows, seventy percent (70%) of the total project cost shall be funded through a loan to be secured from a reputable local bank and thirty percent (30%) of the total project cost shall be funded through internally generated funds.

Prior to the commencement of any activities relating to the construction and operation of the proposed project, a comprehensive social development plan will be developed and be discussed subsequent to the conduct of field assessment. Furthermore, corporate social responsibility plan will progress. ***Table PD-8*** below presents the different activities that could be implemented in coordination with the local government of Barangay Manalo, City Government of Puerto Princesa, DENR, Palawan Council of Sustainable Development, and other concerned agencies.

Table PD-8: Social Development Plan and Corporate Social Responsibility Plan

Activity	Responsible Community Member/ Beneficiary	Government Agency/ Non-Government Agency and Services	Proponent	Indicative Timeline	Source of Fund
Tree Planting Activity	Host Community/IPs	LGU- Barangay Manalo City Government PCSD DENR	SIPCOR	Semi-Annual	SDP/ CSR Fund
Stringent implementation of Solid Waste Management	Host Community/IPs	LGU- Barangay Manalo PCSD	SIPCOR	Weekly	SDP/ CSR Fund
Assistance on disaster risk reduction and climate change adaptation activities	Host Community/IPs	LGU- Barangay Manalo PCSD	SIPCOR	Monthly	SDP/ CSR Fund
Provide trainings, awareness, and livelihood programs.	Host Community/IPs	LGU- Barangay Manalo PCSD	SIPCOR	Semi-Annual	SDP/ CSR Fund

2.9 Manpower Requirement

The construction and operation of the diesel power plant by SI Power Corporation will provide job opportunities to the local community. During the construction phase, the project is expected to employ approximately 180 individuals at full blast. These workers will be involved in various aspects of the project, such as site development, civil and structural works, electrical and mechanical installation, and other related tasks.

Once the diesel power plant is operational, it will require a much smaller workforce, with an estimated 18 employees to run and maintain the power plant. These employees will be responsible for the daily operations of the power plant, including monitoring equipment, maintaining the facility, and ensuring that the plant operates efficiently and safely.

2.9.1 Hiring Policy

In the event of job vacancies, it shall be the policy of the proponent to hire qualified local applicants based on the following order of priority:

- First Priority: Qualified residents within Barangay Manalo,
- Second Priority: Qualified residents of any barangay within Puerto Princesa City, and
- Third Priority: Qualified residents of any cities/municipalities in Province of Palawan.

Applicants from other provinces or regions may only be entertained by the proponent in case there are no qualified local applicants from the aforementioned priority areas.

2.10 Indicative Project Investment Cost

The capital expenditure (CAPEX) for the 23MW Diesel plant is PHP 1,137 million, excluding VAT. The total project cost, including VAT, is PHP 1,273 million. Assuming a cooperation period of 15 years, the project has a projected internal rate of return (PIRR) of 6.6%, while the expected internal rate of return (EIRR) is 5.7%.