

Project Description for Scoping

Proposed Bohol Diesel Power Plant Capacity Expansion Project

Barangay Dampas, Tagbilaran City, Bohol

Submitted to:



ENVIRONMENTAL MANAGEMENT BUREAU
Department of Environment and Natural Resources
East Avenue, Central Diliman, Quezon City

Submitted by:



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1.0 BASIC PROJECT INFORMATION



PROJECT DESCRIPTION FOR SCOPING

Proposed Bohol Diesel Power Plant Capacity Expansion Project

SPC Island Power Corporation

Barangay Dampas, Tagbilaran City, Bohol

1.1 Project Information

Project Name	Bohol Diesel Power Plant Capacity Expansion Project
Project Location	Barangay Dampas, Tagbilaran City, Bohol
Project Type	Thermal Power Plant (Diesel-Fired)
Project Area	3,300 m ²
Project Capacity	Existing: 16.2 MW Proposed: 44.2 MW Total: 60.4 MW
Project Technology	High Speed Diesel Engine (Modular)

1.2 Profile of the Proponent

Name of Proponent	SPC Island Power Corporation
Proponent's Address	7F Cebu Holdings Center, Cebu Business Park, Cebu City
Authorized Signatory/ Representative	Mr. Cesar O. Villegas Senior Vice President – Operations & Business Development
Contact Details	Landline No.: (02) 8810-4474 Mobile No.: 09175133515 Fax No.: (02) 8893-4844 E-mail: covillegas@spcpower.com

SPC Power Corporation

SPC Power Corporation (SPC) is a publicly-listed company whose principal place of business is on the 7th Floor of the Cebu Holdings Center, Archbishop Reyes Avenue, Cebu Business Park, Cebu City. SPC (then named Salcon Power Corporation) began in 1994 with the purpose of providing design, development, construction, erection, installation, commissioning, rehabilitation, maintenance and operation of diesel, hydro, thermal and other power generating plants, and electricity distribution and related facilities. SPC started as a venture company owned by members of the Salcon Consortium which entered into a Rehabilitation, Operation, Maintenance and Management (ROMM) Agreement with the National Power Corporation (NPC) on March 11, 1994 for the purpose of undertaking the 203.8 megawatt (MW) Naga Power Plant Complex (Power Complex) in Colon, Naga, Cebu under the rehabilitate-operate-maintain-and-manage scheme.

SPC owns/co-owns, manages and operates the following power generation and distribution facilities:

- 28 MW Power Barge 104 (**SPC PB104**)
- 200 MW Kepco-SPC Coal Power Plant (**KSPC**)
- Mactan Electric Company, Inc. (**MECO**)
- Bohol Light Company, Inc. (**BLCI**)

SPC formed a 100% owned subsidiary, SPC Island Power Corporation, specifically for its diesel power generation projects.

SPC Island Power Corporation

SIPC was incorporated and registered with the SEC on June 26, 2001. It owns, manages and operates the following power generation facilities:

- 16.2 MW Bohol Diesel Power Plant (BDPP)
- 15.0 MW Panay Diesel Power Plant 1 (PDPP 1)
- 50.0 MW Panay Diesel Power Plant 3 (PDPP 3)
- MW Olango Diesel Power Plant (ODPP)

SIPC intends to expand the generation capacity of the Bohol Diesel Power Plant located in Barangay Dampas, Tagbilaran City, Bohol. From the existing capacity of 16.2 MW, an additional

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44.2 MW capacity is being proposed to increase the total plant capacity to 60.4 MW. The proposed project will supply ancillary services that will aid in sustaining the power quality, reliability and security of transmission capacity and energy in the Visayas Grid.

2.0 PROJECT DESCRIPTION

2.1 Project Location and Area

The proposed Bohol Diesel Power Plant Capacity Expansion Project of SIPC will be located in a 3,300m² lot within the compound of the existing Bohol Diesel Power Plant in Barangay Dampas, Tagbilaran City, Bohol. The location map and photos of the proposed Project is shown in **Annexes 1 and 2**.

The project site is accessible from Manila by air via Panglao International Airport and by sea via Tagbilaran Port. The site is about 3-minute ride from the Barangay Hall of Dampas, Tagbilaran City.

The direct impact areas (**DIA**) cover the areas where the proposed Project will be sited green areas/ buffers zone and other areas around the project site which may be exposed to ground level concentrations (GLCs) of potential pollutants. In terms of socio economic benefits, the DIA include the host local government units (**LGUs**): Barangay Dampas, City of Tagbilaran and Province of Bohol which are project beneficiaries for employment, business opportunities, taxes and benefits from the Department of Energy (**DOE**) Energy Regulations (**ER**) 1-94 of the Electric Power Industry Reform Act (**EPIRA**) Law as well as reliable power supply that contributes to the economic stability of the Region.

The indirect impact areas (**IIA**) include the receptor areas for effluent discharges and plant's air emissions that comply with the standards of the DENR. The IIA in terms of socio economic benefits, will expand to adjacent LGUs, Provinces in Region 7, the entire Visayas Region and the entire Country, which will benefit from the stable and reliable power supply that can contribute further to the economic stability of the country. The direct and indirect impact areas are shown in **Annex 3**.

2.2 Project Rationale

2.2.1 Shortage of Power Supply and Ancillary Services in the Visayas Grid

The DOE Demand-Supply Outlook for 2018 – 2040, as presented in **Figure 1**, shows an increasing power demand and reserve requirements in the Visayas Grid. Due to growing demand and increasing number of new consumers, the DOE determined the shortfall of the current supply for the future demand. The Visayas grid will be needing an additional 9,180 MW capacity by year 2040 considering a high GDP of 8% and reserve requirements of 25%, to meet the future demand and reserve requirements. Thus, SIPC decided to develop the proposed BDPP Capacity Expansion Project. The proposed project will provide reinforcement in the ancillary power capacity of the grid to sustain the power supply reliability, hence avoid expensive results of brownouts to industries and social inconvenience to the general public.

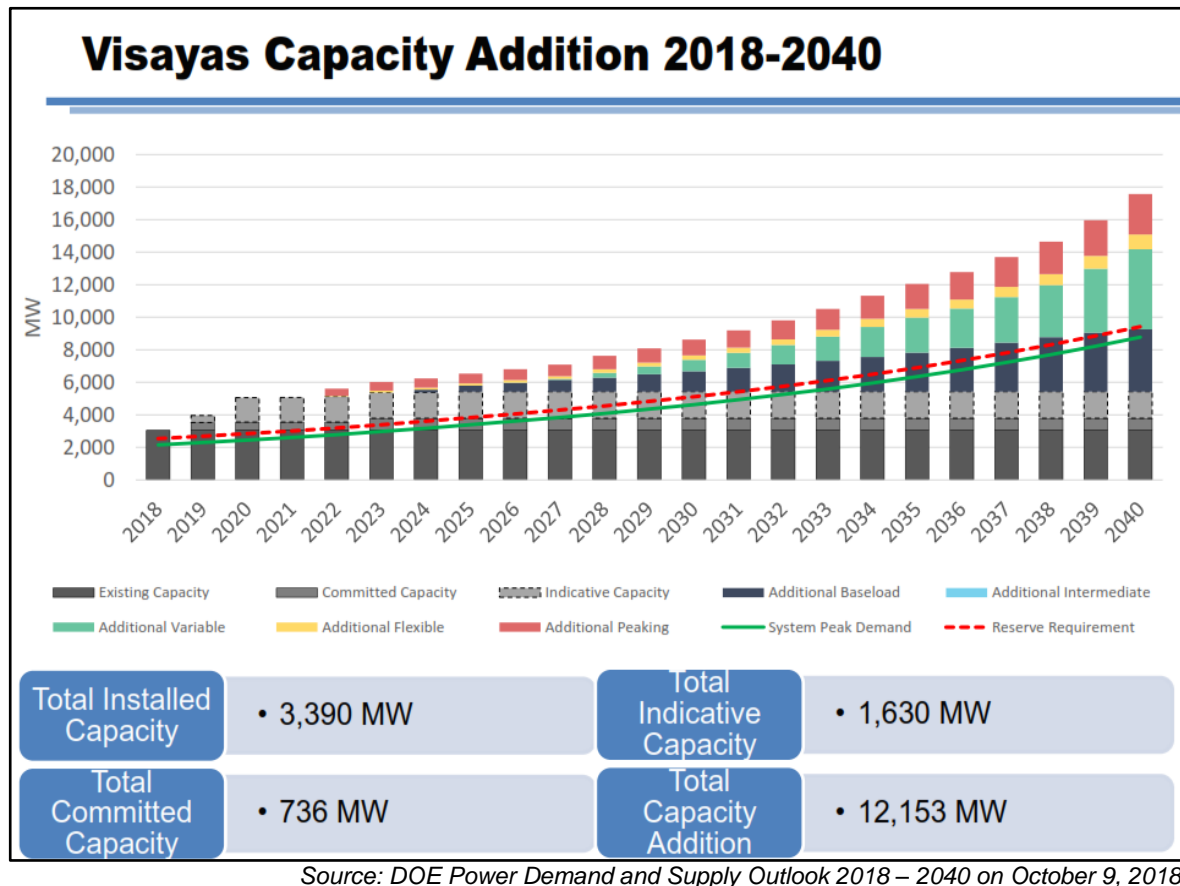


Figure 1. DOE Visayas Demand and Supply Outlook, 2018 – 2040

The proposed BDPP Capacity Expansion Project aims to provide Ancillary Services (**AS**) to the Visayas grid to help sustain the transmission capacity and energy that are essential in maintaining the power quality, reliability, and security of the grid. It will also address both frequency and voltage fluctuations brought about by the intermittent operation of the variable renewable energy power plants such as solar and wind power plants.

There are five (5) types of Ancillary Services required by every power grid system, namely:

- **Regulating Reserve**, which is a service that corrects for short-term changes in electrical imbalances that might affect the stability of the power system.
- **Contingency Reserve**, which is used to respond to an unexpected failure or outage of a system component, such as a generator, transmission line, circuit breaker, switch or other electrical element.
- **Dispatchable Reserve**, which is the generating capacity from qualified generating unit that are not scheduled for energy, regulating and contingency reserve in which they are readily available for dispatch to replenish the contingency reserve whenever a generating unit trips or a loss of single-circuit interconnection occurs.
- **Reactive Power Support**, which is an emerging concept for addressing variability and uncertainty on timescales longer than contingency and regulating reserves.
- **Blackstart Regulation**, which supplies electricity for system restoration in the unlikely event that the entire grid loses power.

Figure 2 – Figure 5 below illustrates basic principles on Ancillary Services, while **Figure 6** illustrates how the different reserves are utilized, depending on the kind of power disturbance experienced in the grid.

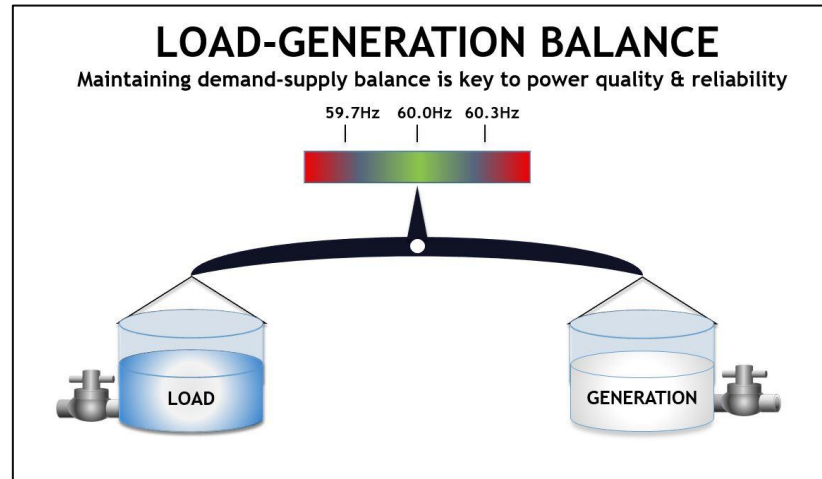


Figure 2. Load – Generation Balance

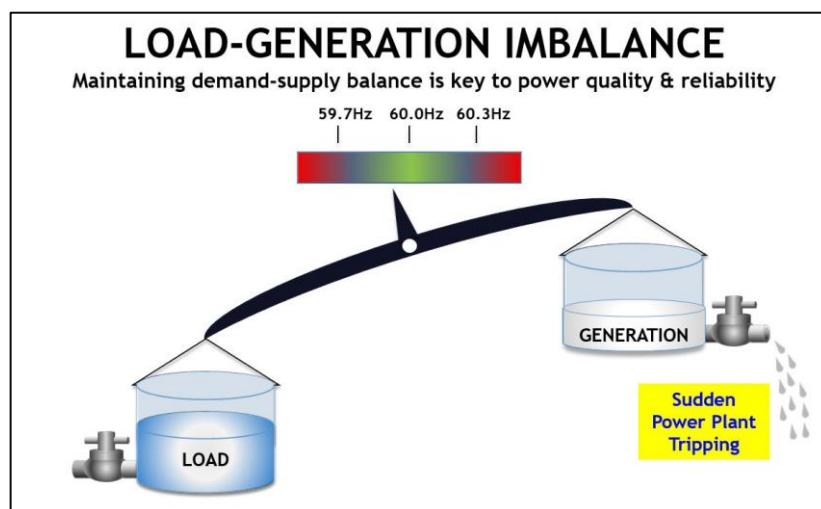


Figure 3. Load – Generation Imbalance (Sudden Power Plant Tripping)

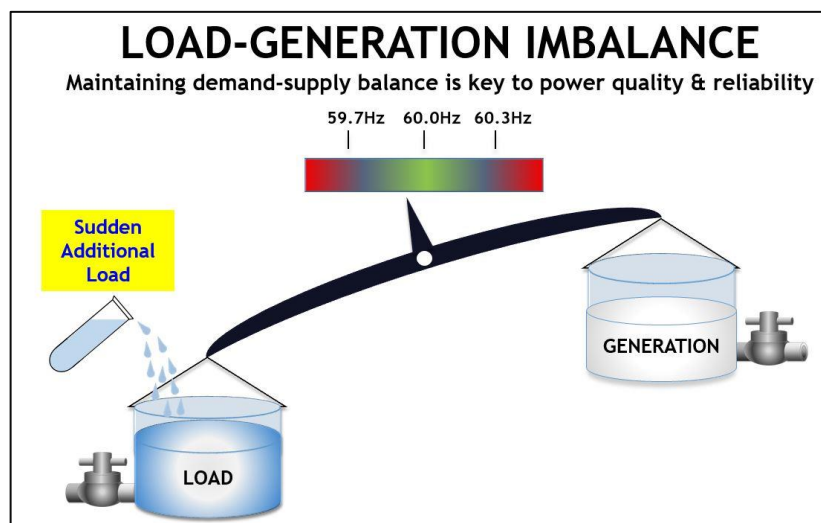


Figure 4. Load – Generation Imbalance (Sudden Additional Load)

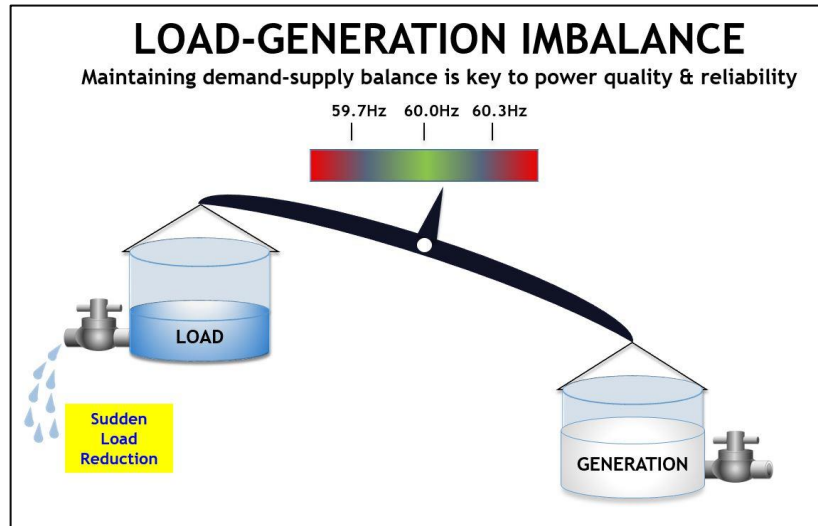


Figure 5. Load – Generation Imbalance (Sudden Load Reduction)

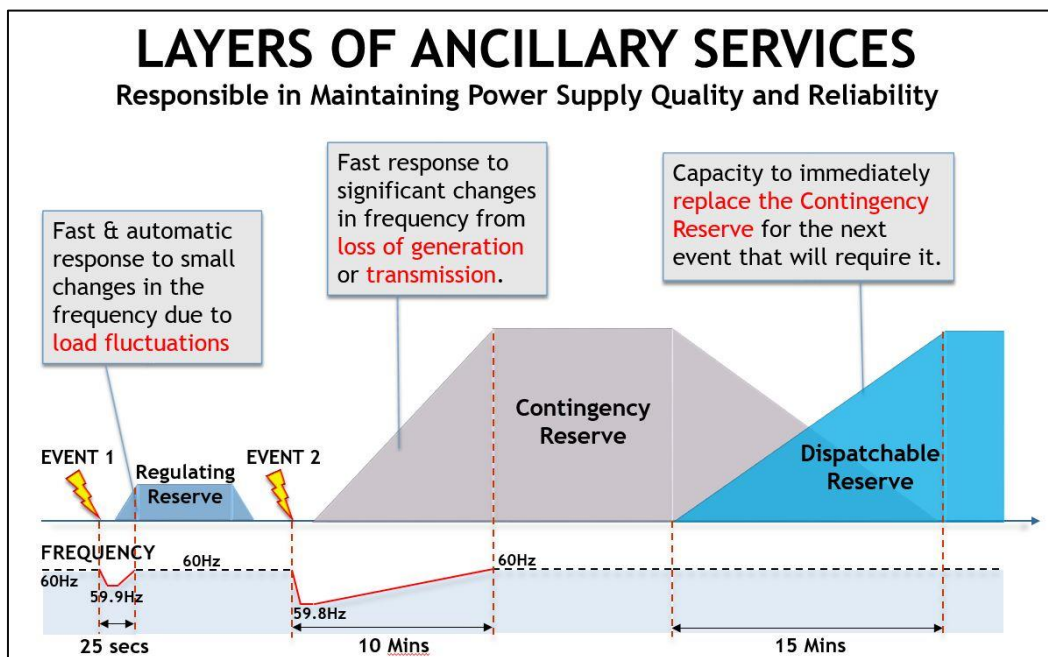


Figure 6. Layers of Ancillary Services

The proposed Project will also serve as Emergency Power Supply supporting power requirements in Bohol Region in case of scheduled National Grid Corporation of the Philippines (NGCP) maintenance works, transmission lines breakdown due to calamities and other unexpected events resulting to interruption and loss of power supply.

2.2.2 Socio-Economic Benefits

The project will provide significant contribution to the local and national economy as there will be opportunities for employment, local business growth, increased government revenues (through local and national taxes and permitting fees), and development assistance to the host community. Brisk business opportunities for the local suppliers around the area will come during the construction and operation phases of the project.

DOE ER 1-94 Fund

One centavo for every 1 kWh of electricity sold will go to a fund to be managed by the DOE. The fund will be used for local projects in the following categories and respective budget shares:

- Electrification fund (50%),
- Development and livelihood fund (25%), and
- Reforestation, Watershed Mngt., Health and/or Environmental Enhancement Fund (25%).

Increased Internal Revenue Allocation

The taxes collected from the proposed Project, which include property tax, remittance, and corporate income tax, would be an additional income for Barangay Dampas, Tagbilaran City and Bohol Province through the increased Internal Revenue Allocation (**IRA**).

Employment Opportunity

The proposed BDPP Capacity Expansion Project will generate additional jobs as it will require manpower for skilled and non-skilled works during construction phase and staff during operational phase. SIPC will require the contractors to prioritize hiring of qualified residents of Barangay Dampas and adjacent barangays in Tagbilaran City during project implementation. It is expected that the project will need about 40 workers during construction and 30 personnel during operation, excluding security and janitorial personnel. SIPC shall closely coordinate with the other employment service offices in hiring local personnel for the proposed Project.

Corporate Social Responsibility

The Tagbilaran City will benefit from the Corporate Social Responsibility (**CSR**) Programs of SIPC which include educational, environmental and health programs such as the following:

Education

- **Brigada Eskwela**

SIPC will support the improvement program of public elementary and secondary schools by providing assistance in repair, maintenance, and clean-up works and/or donating cleaning and other repair materials such as empty sacks, brooms, paints, brush, nails etc.

Community Development

- **Tree Planting Program**

SIPC acknowledges the importance of environmental aspect and caring for trees is the social responsibility of every individual. The tree planting program promotes awareness to the society and the climate change mitigation strategy to uplift the quality of the environment. SIPC will actively participate in tree planting program of the Tagbilaran City and/or will donate seedlings for tree planting activities.

- **Relief Assistance**

Medical Missions will be brought to various areas in Tagbilaran City. Services provided will be free medical consultation, medicine, and basic medical services to the host communities or survivors of natural disasters and calamities, nationwide.

2.3 Project Considerations

2.3.1 Site Selection

The proposed Project will be located within the compound of the existing Bohol Diesel Power Plant in Barangay Dampas, Tagbilaran City, Bohol. The proposed Project will utilize about 3,300m² of the total BDPP plant area of 3.20 hectares (**Figure 7**). The site for the proposed BDPP Plant Capacity Expansion Project has been studied to be technically, economically, and socially advantageous and therefore no other alternative site was considered. There are also no sensitive environmental resources such as protected areas, forests, mangroves, critical habitats, and endangered species that will be affected by the proposed BDPP Plant Capacity Expansion Project. In terms of land use classification, the area is already classified as an industrial.

Additional storage tank for diesel fuel will be installed inside the same compound to support the fuel requirements of the additional capacity.



Source: Google Earth modified by GEOSPHERE, 2020

Figure 7. Development Plan of the Bohol Diesel Power Plant Capacity Expansion

2.3.2 Technology Selection

SIPC will utilize multiple units of high speed diesel generating sets, grouped together to operate as two (2) large generating units of 30.1MW and 14.1MW respectively, which upon completion will look like the set-up shown in **Figure 8**, except, all the generating sets and auxiliary equipment will be contained inside a powerhouse. This set-up is commonly called a Modular Diesel Power Plant.



Figure 8. Modular Diesel Power Plant Set-Up

The following are the significant features of a modular diesel power plant, which SIPC primarily considered on its selection among other kinds of power plants appropriate for its specific purpose:

- Simple design layout of plant
- Easy to install
- Flexible operation
- Easy to maintain
- Occupies less space
- Less water requirement for cooling
- Much cleaner, environmental friendly

The proposed layout of the multiple diesel power generating sets is shown in **Figure 9**.

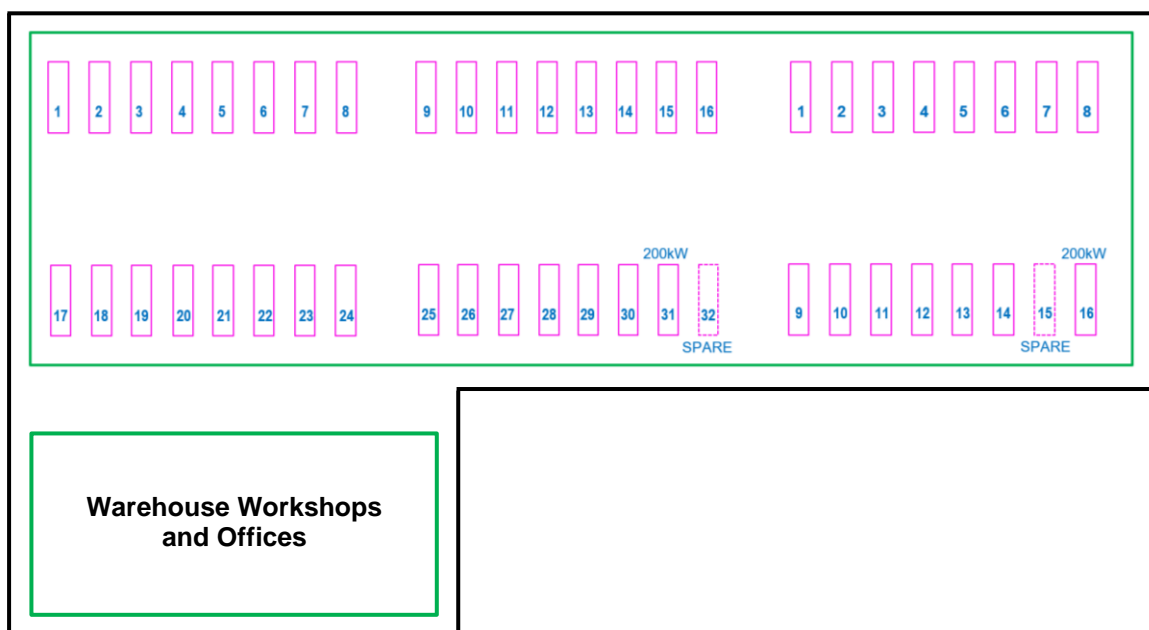


Figure 9. Proposed Layout of the Additional Generating Sets

Figure 10 and **Figure 11** shows the single line diagram connections of the Bohol Diesel Power Plant showing the current and expanded capacity configurations respectively:

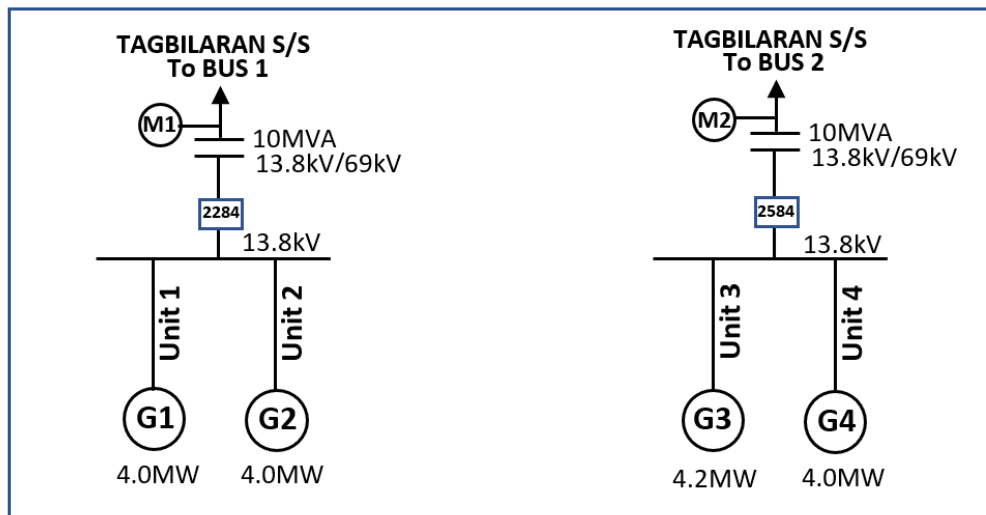
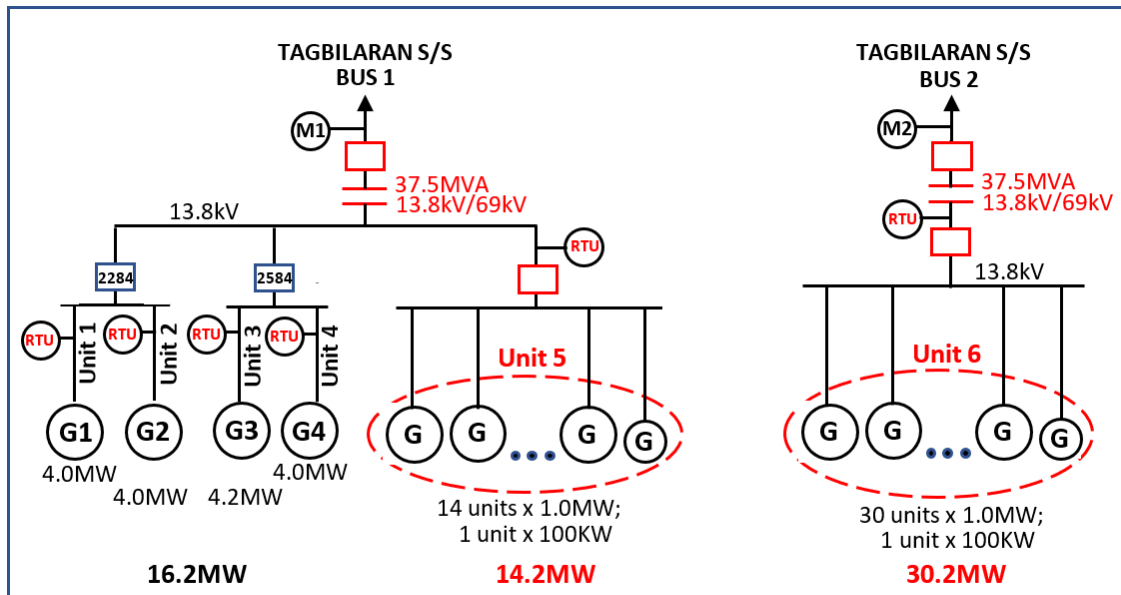


Figure 10. Existing Single-Line Diagram of BDPP (16.2MW)



Note: ALL RED COLORED FONTS & EQUIPMENT ARE NEW ITEMS.

Figure 11. Expanded Single – Line Diagram of BDPP (60.4 MW)

SIPC will utilize high speed 4-stroke diesel engine driven generating set (**Figure 12**), that is capable to quick start and to ramp-up to maximum power within 30 seconds, as required by the power grid to keep the stability of power supply – demand balance. The 4-stroke diesel engine is an internal combustion engine that has four distinct strokes (intake, compression, power and exhaust) to complete one operating cycle (**Figure 13**). During the intake stroke, air-fuel mixture is introduced to fill the power cylinder. The compression stroke compresses the air in the cylinder producing hot gas required to begin combustion. As the fuel reaches the end of its combustion, the power output is created. The final stroke is to eject the burnt gas to the atmosphere where exhaust stroke happens.



Figure 12. Typical High Speed Diesel Generating Set

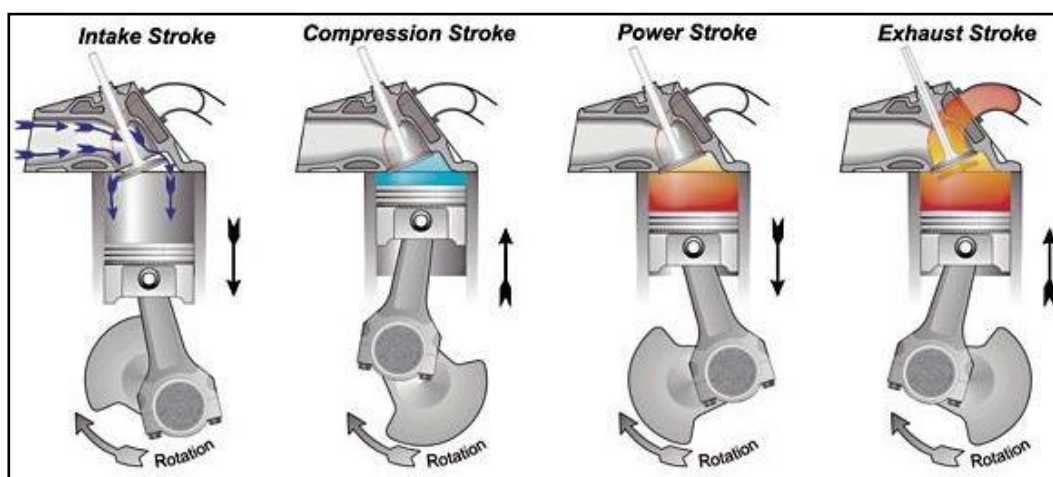


Figure 13. 4 – Stroke Diesel Engine Technology

2.4 Project Major Components

Table 1 presents the major components, support facilities and pollution control devices for the proposed Project.

Table 1. Project Major Components and Auxiliaries

COMPONENTS	SPECIFICATION / DESCRIPTION
Diesel Engine Generating Set	Combination of a diesel engine with an electric generator (often an alternator) to generate electrical energy.
Air Intake System	Supplies the correct amount of air needed to increase the combustion and the efficiency of an engine.

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Exhaust Gas System	The exhaust system consists of the exhaust ducting, exhaust silencer complete with spark arrestor and rain cap assembly. The exhaust gas exits the engine and passes through the exhaust ducting and exhaust out to the atmosphere through the smoke stack with rain cap assembly on top. Insulation and heat shields are fitted to the exhaust ducting to protect operators from contact with high temperature surface.
Fuel Supply System	<p>The proposed project will be supplied with diesel fuel from the storage tank, pumped to the powerhouse for distributions to all engines' respective built-in fuel tanks. Fuel delivery to the generator sets will be pressurized at 2 bar pressure through 3" main fuel lines and 2" branch lines.</p> <p>The engine fuel system consist of an internal fuel tank, racor filters, fine fuel filter, fuel pump, injection pump and nozzles. Fuel is pumped through the racor filters to the fine fuel filters and then passed to the injectors and then to the injection nozzles.</p>
Lubrication System	The engine oil lubrication system includes pump, strainer and sump all fitted internally within the engine block.
Water Cooling System	A one pump, two loop system is employed; i.e. the engine jacket is cooled by one radiator or heat exchanger and the aftercoolers are cooled by a separate radiator or heat exchanger.
Service Water System	The proposed Project will have a service water system for site facilities containers and washing the equipment at site. Water supply line for equipment washing will be installed in line with the fuel pipeline using PVC pipe material.
Instrumentation and Control System	The proposed Project will be connected to a central PLC and SCADA system that will automate all equipment controls and protections for plant start/stop, load management, and operations required for meeting regulating and contingency mode protocols. The SCADA will provide trending and data recording functions, as well as user HMO for the PLC and metering, fuel consumption information. The communication platform is Modbus.
Substation	69kV Gas Insulated Switchgear, 2 x 37.5MVA Transformer
Fire Protection System	The proposed Project will be provided with manually operated DCP & CO2 fire extinguishers that will be located on strategic locations around the site.
Smoke Stack	All smoke stacks leading the exhaust gas from the engine into the atmosphere are connected with flexible bellows connected to rigid pipes with rain cap assembly on top for safe and efficient emission.
Oily Wastewater Treatment System	Floor drain system all over the powerhouse will be installed for centralized collection of oily wastewater, which will be coursed through the existing oily wastewater treatment facility of BDPP.

2.4.1 Main Plant Component – Diesel Engine Generators

The specifications of each Diesel Engine Generating Sets used in the Project is provided in **Table 2**.

Table 2. Diesel Engine Generator Specifications

PARTICULARS	SPECIFICATIONS Diesel Generator (1.0 MW)
Engine Model	KTA50-G9
Governed Engine Speed	1800 RPM
No. of Cylinders	16 cylinders



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PARTICULARS	SPECIFICATIONS Diesel Generator (1.0 MW)
Bore and Stroke	Bore : 159 mm (6.25 in) Stroke : 159 mm (6.25 in)
Total Power Output Base Load (Continuous) Power	1,141 kW
Fuel Consumption (at 100%)	0.262 li/kWh
Air Intake Pressure Compression ratio	13.9 : 1
Piston Speed	1,875 ft/min (9.5 m/s)
Cylinder Block	16-cylinder, direct injection, 4-cycle diesel engine

The diesel fuel oil should meet the minimum specifications as required by law, acceptable to the engine requirement specifications, as presented in Error! Reference source not found..

Table 3. Parameter Limits of Diesel Oil

PARAMETER	LIMIT(S)
Specific gravity @ 60/60°F (ASTM D1298)	0.8654 max.
°API @ 60 °F (ASTM D 1298)	32.00 – 40.00
Density @ 15.5°C (ASTM D 1298)	0.8650 kg/L max.
Water Content, Vol.% (ASTM D95)	0.20% max.
Heating Value (ASTM D240)	19,200 Btu/lb min.
Sulfur Content, Wt. % (ASTM 129)	1.00% max.

2.5 Project Cost and Schedule

Project Cost

The proposed Bohol Diesel Power Plant Capacity Expansion Project and its components are estimated to cost approximately PhP 800,000,000.00

Project Schedule

The proposed Bohol Diesel Power Plant Capacity Expansion Project is targeted to begin construction within the 2nd quarter of 2020 and be ready for commercial operation by 2nd quarter of 2021.

2.6 Environmental Management Plan

SIPC is committed to minimize any negative potential impacts, which could arise from the implementation of the proposed Bohol Diesel Power Plant Capacity Expansion Project. Hence, formulating an Environmental Management Plan (EMP) to manage the Project's impacts during pre-construction, construction, operation and abandonment phase, adopt the best available proven control technologies and procedures, undergo a continuing process of review and positive action in the light of available monitoring results and continuing consultation with the local communities.

The mitigation measures are formulated to reduce the potential environmental impacts and enhance the beneficial impacts as a result of the Project. The Environmental Management Plan shown in Error! Reference source not found. below outlines the initial predicted impacts of the proposed Bohol Diesel Power Plant Capacity Expansion Project, with the corresponding Mitigation and Enhancement measures.

Table 4. Environmental Management Plan

ENVIRONMENTAL ASPECT	ENVIRONMENTAL COMPONENT LIKELY TO BE AFFECTED	POTENTIAL IMPACT	PREVENTION / MITIGATION / ENHANCEMENT MEASURES
CONSTRUCTION PHASE			
LAND			
Cut and fill activities Construction of the proposed Project	Land use and Classification	• Change/Inconsistency in Land Use	• The Project site is within the existing BDPP power plant compound and is consistent with the general land use of Tagbilaran City. Therefore there is no issue with the change in land use.
		• Encroachment to ECA	• The Project site has not encroached in an ECA.
	Geology/ Geomorphology	• Change in surface landform/terrain/slope	• Designate a competent person to prepare a proper grading plan including a cut and fill strategy.
		• Change in sub-surface underground geomorphology	• The excavations done at the site shall cause permanent but low level of disturbance. • Strict conformance to the recommendations of the geotechnical study
Site Preparation, and Earthworks	Pedology	• Soil erosion	• Construction of soil erosion control measures either by engineering structure or planting of grasses/trees. • Placement of excavated soil materials in appropriate stockpile areas with avoidance of stockpiling along drainage ways/creeks. • The soil stockpiles will be covered with plastic sheets/geotextile, or planted with grasses/ small shrubs for erosion control.
		Terrestrial Ecology	• Vegetation removal and loss of habitat
	• Threat to existence and/or loss of important local species		
	• Threat to abundance, frequency and distribution of important species • Hindrance to wildlife access		
WATER			
Water consumption during construction	Hydrology/ Hydrogeology	• Change in drainage morphology/inducement of	• The water requirement of the proposed Project will be supplied by the existing deepwell of BDPP.

ENVIRONMENTAL ASPECT	ENVIRONMENTAL COMPONENT LIKELY TO BE AFFECTED	POTENTIAL IMPACT	PREVENTION / MITIGATION / ENHANCEMENT MEASURES
		flooding/reduction in stream volumetric flow • Change in stream, lake water depth • Depletion water resources/competition in water use	• SIPC shall implement necessary measures to conserve water and reduce water usage.
Mobilization of construction equipment and materials Generation of domestic waste	Water Quality	• Degradation of groundwater quality	• Provision of containment structures and canals in the storage areas for oil and the motor pool area • Return of contaminated cans/containers of hazardous materials such as paints, thinners, wood preservatives and others to the supplier/producer for treatment and safe disposal • Regular monitoring of groundwater quality
AIR			
Mobilization of Construction Equipment and Materials	Meteorology/climatology Air Quality and Noise	• Change in local climate and local temperature • Degradation of Air Quality	• SIPC shall establish a buffer zone and native species shall be used for vegetation, as these would be expected to have good survival rate. • Will utilize the existing concrete paved roads leading to the BDPP; keep the road clear of dusty materials; spray the road with water or a dust suppression chemical so as to maintain the entire road surface wet; and immediately before leaving a construction site, every vehicle shall be washed to remove any dusty materials from its body and wheels; • Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • The working area of any excavation or earth moving operation shall be sprayed with water or a dusty suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet; • Exposed earth shall be properly treated by compaction or by vegetation planting within six (6) months after the last construction activity on the construction site or part of the construction site where

ENVIRONMENTAL ASPECT	ENVIRONMENTAL COMPONENT LIKELY TO BE AFFECTED	POTENTIAL IMPACT	PREVENTION / MITIGATION / ENHANCEMENT MEASURES
			the exposed earth lies; <ul style="list-style-type: none"> Any stockpile of dusty material shall be either covered entirely by impervious sheeting; placed in an area sheltered on the top and the three (3) sides; or sprayed with water or a dust suppression chemical so as to maintain the entire surface wet. Regular monitoring of ambient air (TSP) quality.
		<ul style="list-style-type: none"> Increase in ambient noise level 	<ul style="list-style-type: none"> Scheduling certain high noise emitting works to more acceptable times of day Use of the most environmentally acceptable equipment which is properly maintained and silenced Use of the least intrusive method of work Proper instruction and supervision of staff Acoustic screening Defective equipment/parts with abnormal noise and/or vibration will be either repaired or replaced Schedule use of equipment/machines emitting high noise like pile driver during day time operation while, minimize use during night time operation All employees working on site will be provided with proper ear protectors Conduct noise level monitoring
PEOPLE			
Implementation of livelihood projects	Local residents	<ul style="list-style-type: none"> Increase income for residents 	<ul style="list-style-type: none"> Positive Impact, no mitigation measures needed
Hiring of workers	Local residents	<ul style="list-style-type: none"> Increase in local employment 	<ul style="list-style-type: none"> Priority employment for qualified local residents without discrimination to women
Increase in taxes and revenues	Local community	<ul style="list-style-type: none"> Improvement in infrastructures and social services 	<ul style="list-style-type: none"> Diligent payment of taxes/revenues
Accidents	Local residents	<ul style="list-style-type: none"> Construction-related hazards 	<ul style="list-style-type: none"> Environment, health and safety training prior to construction

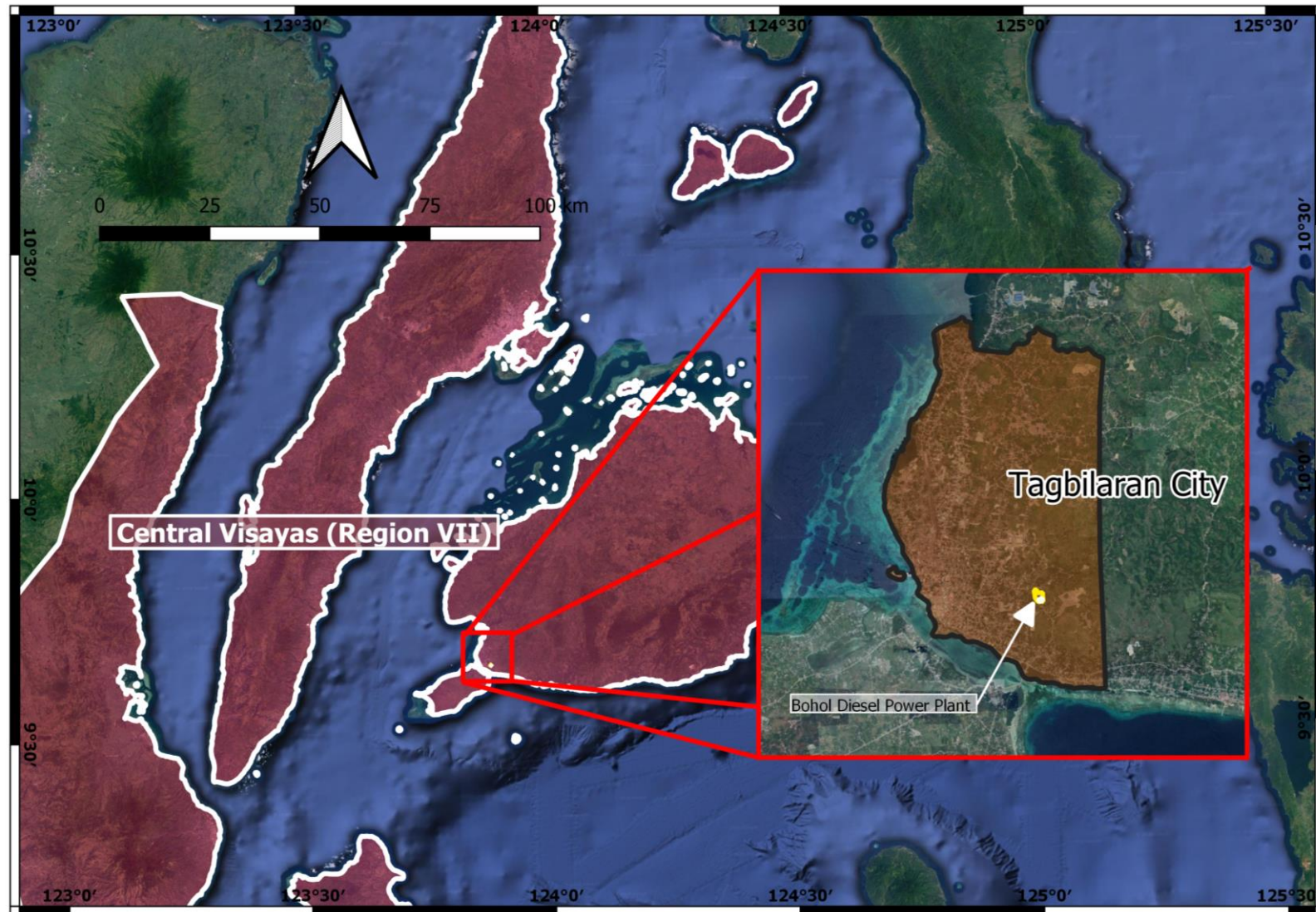
ENVIRONMENTAL ASPECT	ENVIRONMENTAL COMPONENT LIKELY TO BE AFFECTED	POTENTIAL IMPACT	PREVENTION / MITIGATION / ENHANCEMENT MEASURES
OPERATION PHASE			
LAND			
Foundation stability	Geology	<ul style="list-style-type: none"> Subsidence and Liquefaction 	<ul style="list-style-type: none"> Structural monitoring of buildings/facilities especially after each earthquake Formulation of detailed Emergency Preparedness and Response Plan
Accidental oil spill	Pedology	<ul style="list-style-type: none"> Soil contamination 	<ul style="list-style-type: none"> Provision of oil spill kit on-site. Regular monitoring of soil quality.
WATER			
Generation of domestic waste water Generation of oily wastewater	Water Quality	<ul style="list-style-type: none"> Degradation of groundwater quality 	<ul style="list-style-type: none"> Installation of Oily Wastewater Treatment System that will efficiently treat oily wastewater Installation of STP to treat the domestic wastewater generated Proper handling and storage of diesel, lubricants in covered areas with impermeable flooring and installation of proper bund walls Daily supervision of possible leaks or spillages in the fuel storage tanks Provision of oil spill kit on-site.
AIR			
Utilization of diesel for fuel	Air Quality	<ul style="list-style-type: none"> Degradation of Air Quality 	<ul style="list-style-type: none"> Conduct ambient air quality monitoring and stack emissions testing
Use of diesel generator engines	Noise Quality	<ul style="list-style-type: none"> Increase in ambient noise level 	<ul style="list-style-type: none"> Use of the most environmentally acceptable equipment which is properly maintained and silenced Acoustic screening It is advisable that electrically powered plant shall be preferred, where practicable, to mechanically powered alternatives. If mechanical powered plant will be used, it shall be fitted with suitable silencers and mufflers Defective equipment/parts with abnormal noise and/or vibration will be either repaired or replaced All employees working on site will be provided with proper ear protectors Conduct noise level monitoring

ENVIRONMENTAL ASPECT	ENVIRONMENTAL COMPONENT LIKELY TO BE AFFECTED	POTENTIAL IMPACT	PREVENTION / MITIGATION / ENHANCEMENT MEASURES
PEOPLE			
	Waste Management	<ul style="list-style-type: none"> Generation of sewage/solid waste 	<ul style="list-style-type: none"> Provision of STP, portalets and latrines, no litter signs, waste can Applying the hierarchy of measures: Reduce, Segregate, Re-use, Recycle and Dispose Proper disposal of non-recyclable wastes through an accredited contractor
Hiring of workers	Population	<ul style="list-style-type: none"> Change in population (size, distribution) In-migration 	<ul style="list-style-type: none"> Priority hiring of qualified local residents in coordination with the Municipal Gov't and host barangay Training program and skill transfer for local residents
	Social services	<ul style="list-style-type: none"> Overburdening of public social services 	<ul style="list-style-type: none"> Priority hiring of qualified local residents On-site medical clinic staffed by at least a doctor and a nurse Provision of an ambulance
	Health	<ul style="list-style-type: none"> Introduction of disease between migrant and local workers 	<ul style="list-style-type: none"> Clean bill-of-health as a condition for employment Medical check-up shall be part of the CSR program of SIPC to monitor the occurrence of unusual health problems that can be associated with the proposed Project. Provision of potable water, sanitary facilities and garbage bins for workers Provision of Medical clinic and a safety officer to monitor safe working conditions Provision of Medical/First Aid kits in all work places
Operation of the power plant	Local residents	<ul style="list-style-type: none"> Increased social and economic financial activity 	<ul style="list-style-type: none"> Positive impact, no mitigation required
	Workers and properties	<ul style="list-style-type: none"> Fire hazard 	<ul style="list-style-type: none"> Provision of fire suppression systems, fire detections systems, fire host stations and portable fire extinguishers
ABANDONMENT PHASE			
LAND			
Decommissioning	Pedology	<ul style="list-style-type: none"> Soil contamination 	<ul style="list-style-type: none"> The Abandonment Rehabilitation Plan shall be followed strictly with emphasis on the strategy of sustaining erosion/ sedimentation control within and adjacent vicinity of the power plant and rendering the Project area free of soil contamination
	Terrestrial Ecology	<ul style="list-style-type: none"> Increase biodiversity due to 	<ul style="list-style-type: none"> Positive impact, no mitigation needed

ENVIRONMENTAL ASPECT	ENVIRONMENTAL COMPONENT LIKELY TO BE AFFECTED	POTENTIAL IMPACT	PREVENTION / MITIGATION / ENHANCEMENT MEASURES
		retention of buffer zone	
WATER			
Disposal of waste	Groundwater Quality	<ul style="list-style-type: none"> Disposal of wastes may lead to possible impacts from spills and discharges of contaminants affecting groundwater quality 	<ul style="list-style-type: none"> Proper disposal of wastes. Collection of spills
AIR			
	Air Quality and Noise	<ul style="list-style-type: none"> Generation of noise Generation of dusts 	<ul style="list-style-type: none"> Proper maintenance of vehicles Use of noise suppressors/mufflers Limiting noisy activities during daytime Watering during dismantling to minimize dusts Conduct ambient air (TSP) and noise level monitoring
PEOPLE			
Hiring of workers for demolition and abandonment activities	Local residents	<ul style="list-style-type: none"> Increase in local employment during abandonment New skills developed for decommissioning may be marketable elsewhere 	<ul style="list-style-type: none"> Priority for qualified local residents
Loss of jobs/employment		<ul style="list-style-type: none"> Reduction in employment opportunities to include the staff of local contractors with long-standing service contracts with the project, for example, maintenance services, site transport services and franchised catering companies. 	
	Demographic	<ul style="list-style-type: none"> Out migration of affected project personnel to seek work elsewhere 	<ul style="list-style-type: none"> Six (6)-month notice prior to termination of contract to give ample time to look for next employment Effective management via consultation, planning and communications with affected workers Financial support within a human resources plan

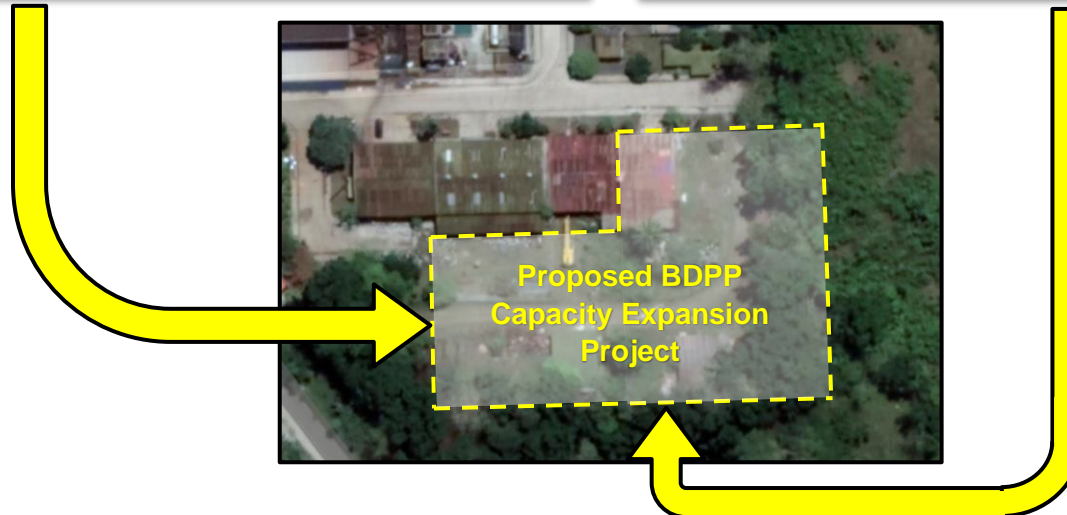
ENVIRONMENTAL ASPECT	ENVIRONMENTAL COMPONENT LIKELY TO BE AFFECTED	POTENTIAL IMPACT	PREVENTION / MITIGATION / ENHANCEMENT MEASURES
Decommissioning activities	Local Community	<ul style="list-style-type: none"> • Nuisance • Decommissioning activities may cause local disturbance or damage through increased road traffic, noise, etc. 	<ul style="list-style-type: none"> • Formulation and implementation of decommissioning impact management plan

Annex 1. Location Map of the Proposed Plant Capacity Expansion Project

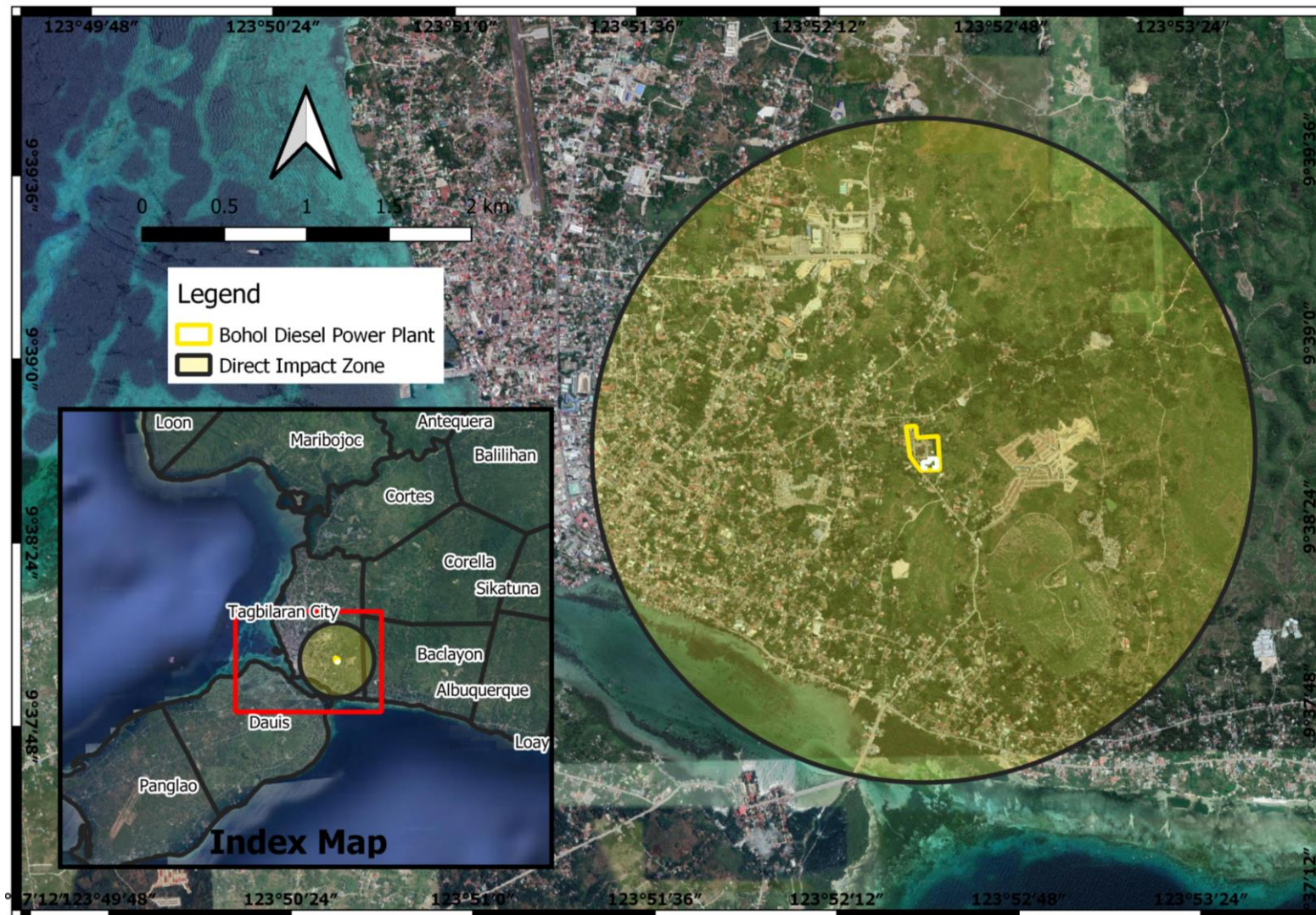


Source: Google Earth, modified by GEOSPHERE, 2019

Annex 2. Photos of the Proposed Project Site



Annex 3. Impact Areas of the Proposed Bohol Diesel Power Plant Capacity Expansion Project



Source: Google Earth modified by GEOSPHERE, 2020