PROJECT DESCRIPTION FOR SCOPING

400 MW Diesel Power Plant Project

Ingrid 3 Power Corporation

Barangay Puting Bato West, Calaca, Batangas

Submitted to:

Environmental Management Bureau – Central Office

June 2020

Leading in
Clean Initiatives.

An Environmental Report By:

LCI ENVI CORPORATION

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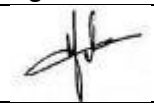
1	K.G. Bartolome	J.M. Lim		J.M. Lim		

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PROJECT DESCRIPTION

1 **Ingrid3 Power Corporation** (the "Proponent") will be developing a 400 MW diesel power plant (the "Generation Facility") in Barangay Puting Bato West, Calaca, Batangas. The Generation Facility is planned to be directly connected to the grid. Project connection options and final technology for the project are currently being studied and assessed.

2 **Table 1-1** provides some basic information regarding the proposed project, the Proponent, and the Environmental Impact Assessment (EIA) preparer.

Table 1-1: Basic Information on the Proposed Project, Proponent, and EIA Preparer

Project Name	**400 MW Diesel Power Plant Project**
Project Location	Brgy. Puting Bato West, Calaca, Batangas
Project Area	15.2 hectares
Project Type	Diesel Power Plant
Project Size/Capacity	400 megawatts
Project Proponent	**INGRID3 Power Corporation** Office Address: 4/F, 6750 Office Tower, Ayala Avenue, Ayala Center, Makati City Tel. No.: (02) 7730-6300 Authorized Representative: Atty. Rodrigo M. San Pedro, Jr. (Attorney-In-Fact)
EIA Preparer	**LCI Envi Corporation** Office Address: Unit 8L-M, Future Point Plaza 3, 111 Panay Avenue, South Triangle, Quezon City Tel. No.: (02) 8442-2830 / Fax No.: (02) 8961-9226 Authorized Representative: Engr. Jose Marie U. Lim (EIA Team Leader)

1.1 PROJECT LOCATION AND AREA

3 The project will be utilizing approximately 15.2 hectares of acquired private property adjacent to South Luzon Thermal Corporation (SLTEC) in Brgy. Puting Bato West, Calaca, Batangas.

4 The vicinity map of the proposed project site is shown in **Figure 1-1**. An aerial photograph of the location is shown in **Figure 1-3**.

5 Landmarks and structures observed in the vicinity of the proposed project site are listed in the table below.

Table 1-2: Landmarks and Structures Adjacent to the Proposed Project Site

DIRECTIONAL REFERENCE	ADJACENT LANDMARK OR STRUCTURE	BRIEF DESCRIPTION
North	Commercial area	Commercial area within Barangay Puting Bato West, across the project site
	Residential area	Residential area within Barangay Puting Bato West, approximately 150m from the project site
	Iglesia ni Cristo	The local elementary school of the barangay is also located within the vicinity, approximately 300m from the project site.
East	Vacant lot within Brgy. Puting Bato West	Vacant lot owned by Ingrid3 Power Corporation adjacent to the proposed project site.
	Balayan Distillery	Located about 150m from the proposed project site, along the shore Brgy. Talisay (adjacent barangay).
South	Residential area	Residential area adjacent to the project site.
	Balayan Bay	Located about 100m south of the project site.
West	Vacant lot owned by SLTEC	Adjacent to the proposed project site.
	Calaca Industrial Seaport Corp. (Industrial Park)	Home to companies such as Phoenix Petroleum, SLTEC, and Steel Asia, this industrial park is approximately 250m from the proposed project site.
	Calaca Power Complex	This industrial site houses Sem-Calaca Power Corporation, Southwest Luzon Power Generation Corporation, Calaca Bay Terminal Inc., HOLCIM Cement Calaca Terminal, Southbay Bulk Terminal, and DMCI Steel Fabrication Plant. The area is approximately 4.5km from the proposed project site.

1.1.1 Accessibility of the Project Site

6 The site can be accessed from Manila via SLEX. From SLEX, take Sta. Rosa and drive towards Tagaytay City via Santa Rosa-Tagaytay Road. Follow Madalunot Rd to Calaca-Lemery Highway. **Figure 1-2** presents the map to the project site**.**

1.1.2 Project Impact Areas

7 Identification of impact areas for the proposed project is guided by Annex 3 of the DENR Memorandum Circular No. 2010-14. **Figure 1-4** shows the preliminary delineation of the proposed project's impact areas.

8 As stated in the DENR guidelines, the direct impact area (DIA) is defined as the area where all the project facilities are proposed to be situated and where all operations are proposed to be undertaken. For this project, the DIA is initially delimited to consist of the 15.2-hectare site where

the diesel power plant components and facilities will be located and operated, as well as the areas to be traversed by the transmission line (project footprints).

9 In contrast, the indirect impact area (IIA) covers the extent of the potential project impacts on biophysical (land, water, and air quality) and socio-economic aspects. The IIA of this project covers the areas in the immediate vicinity of the project site, including Balayan Bay. The host local government units ("LGUs") of Barangay Puting Bato West and Municipality of Calaca, which are expected to benefit from the additional employment, business opportunities, taxes that may be contributed by the proposed project, in addition to power supply stability, are also within the IIA of the project.

10 The delineation of the project's impact areas may later be updated or defined in technical terms once the impact assessment has been conducted.

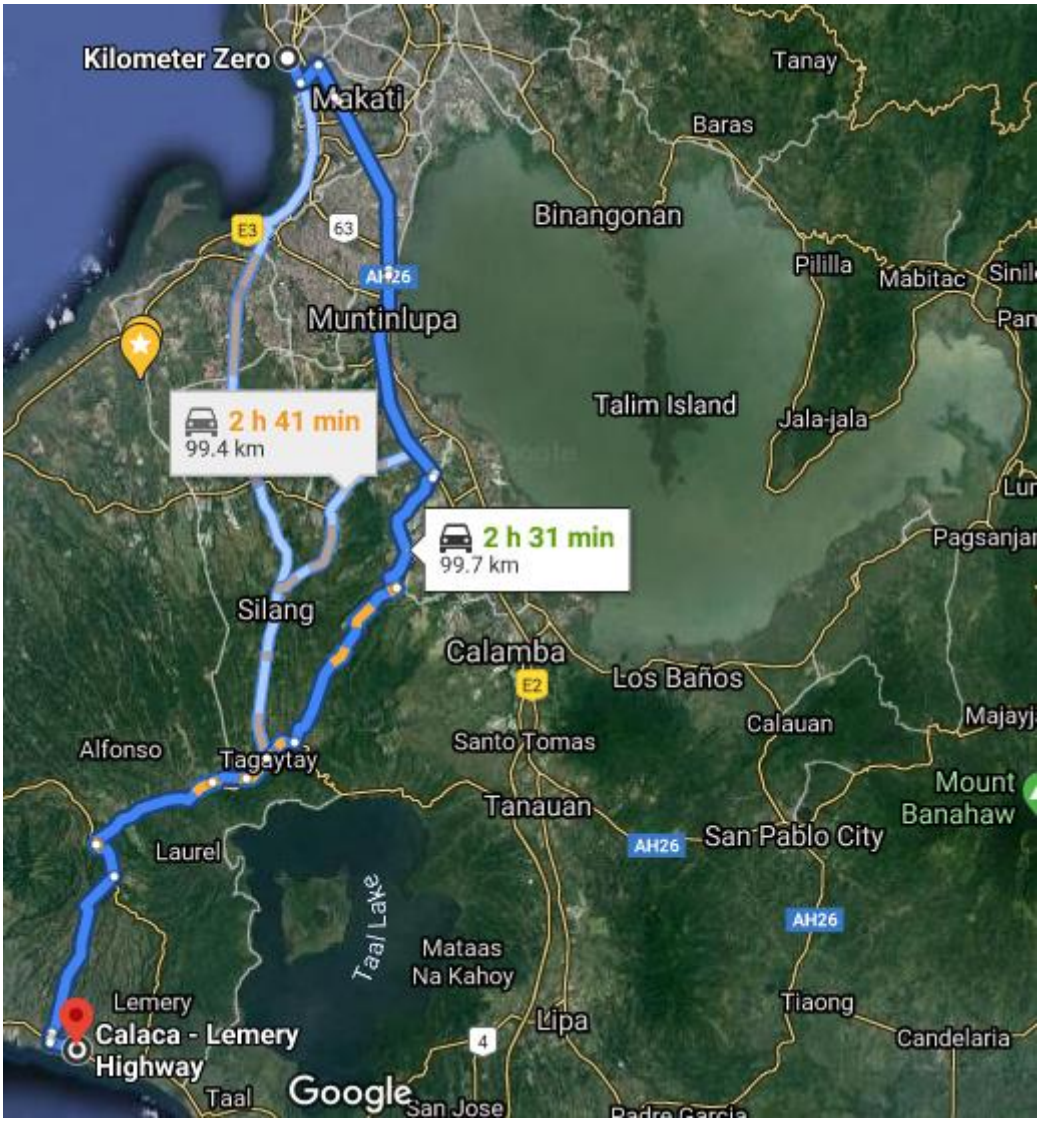
Figure 1-1: Vicinity Map of the Proposed Project Site

NOTE: Map provided by the Proponent

FIGURE NO.:	FIGURE TITLE:
1-1	**Vicinity Map of the Proposed Project Site**

PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
INGRID3 POWER CORPORATION	**400 MW DIESEL POWER PLANT PROJECT** Brgy. Puting Bato West, Calaca, Batangas	**LCI ENVI CORPORATION**

Figure 1-2: Accessibility Map of the Proposed Project Site

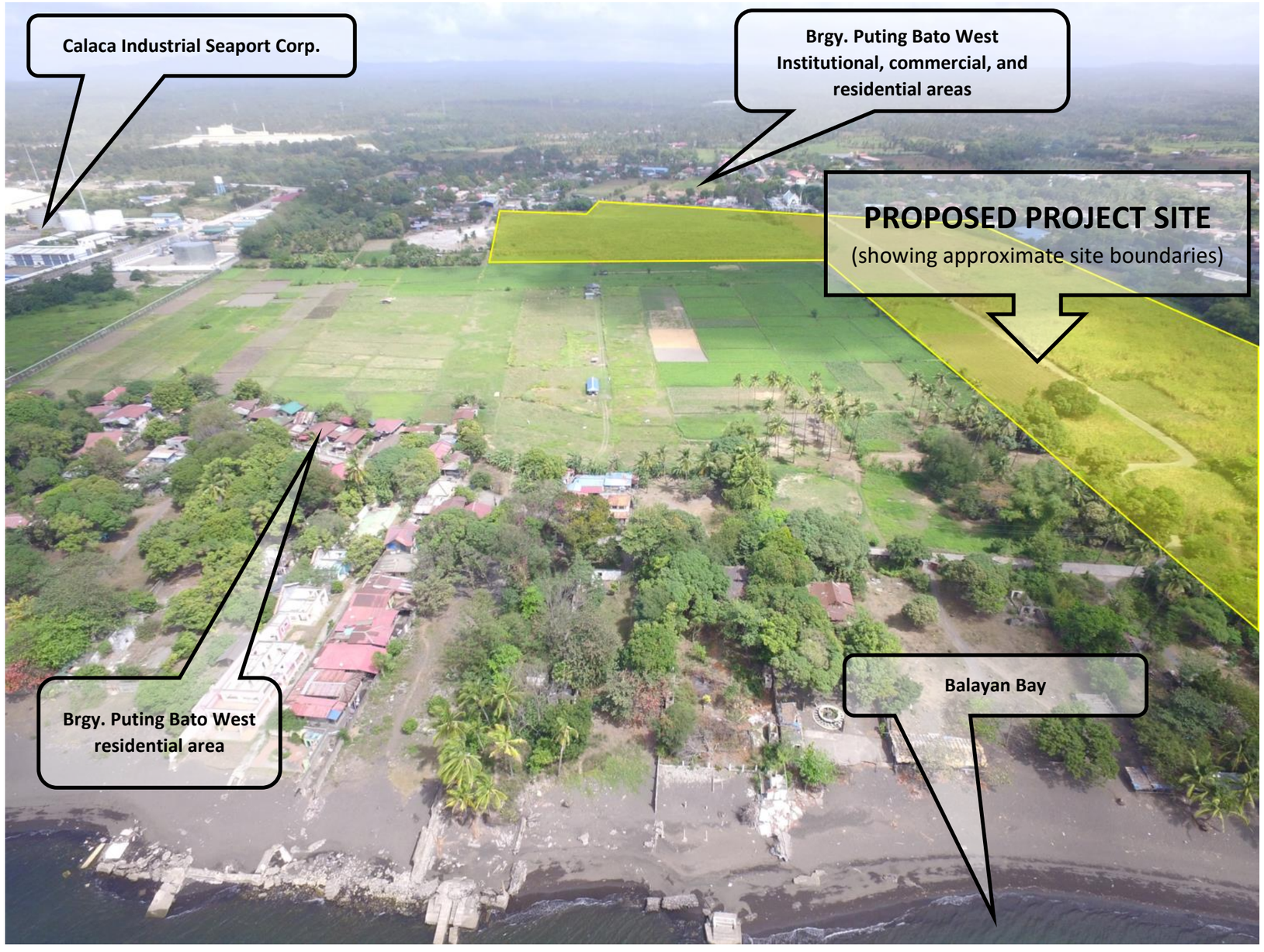


NOTE: Map generated by EIA Study Team using Google Earth

FIGURE NO.:	FIGURE TITLE:
1-2	**Accessibility Map of the Proposed Project Site**

PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
INGRID3 POWER CORPORATION	**400 MW DIESEL POWER PLANT PROJECT** Brgy. Puting Bato West, Calaca, Batangas	**LCI ENVI CORPORATION**

Figure 1-3a: Aerial Photograph of the Proposed Project Location

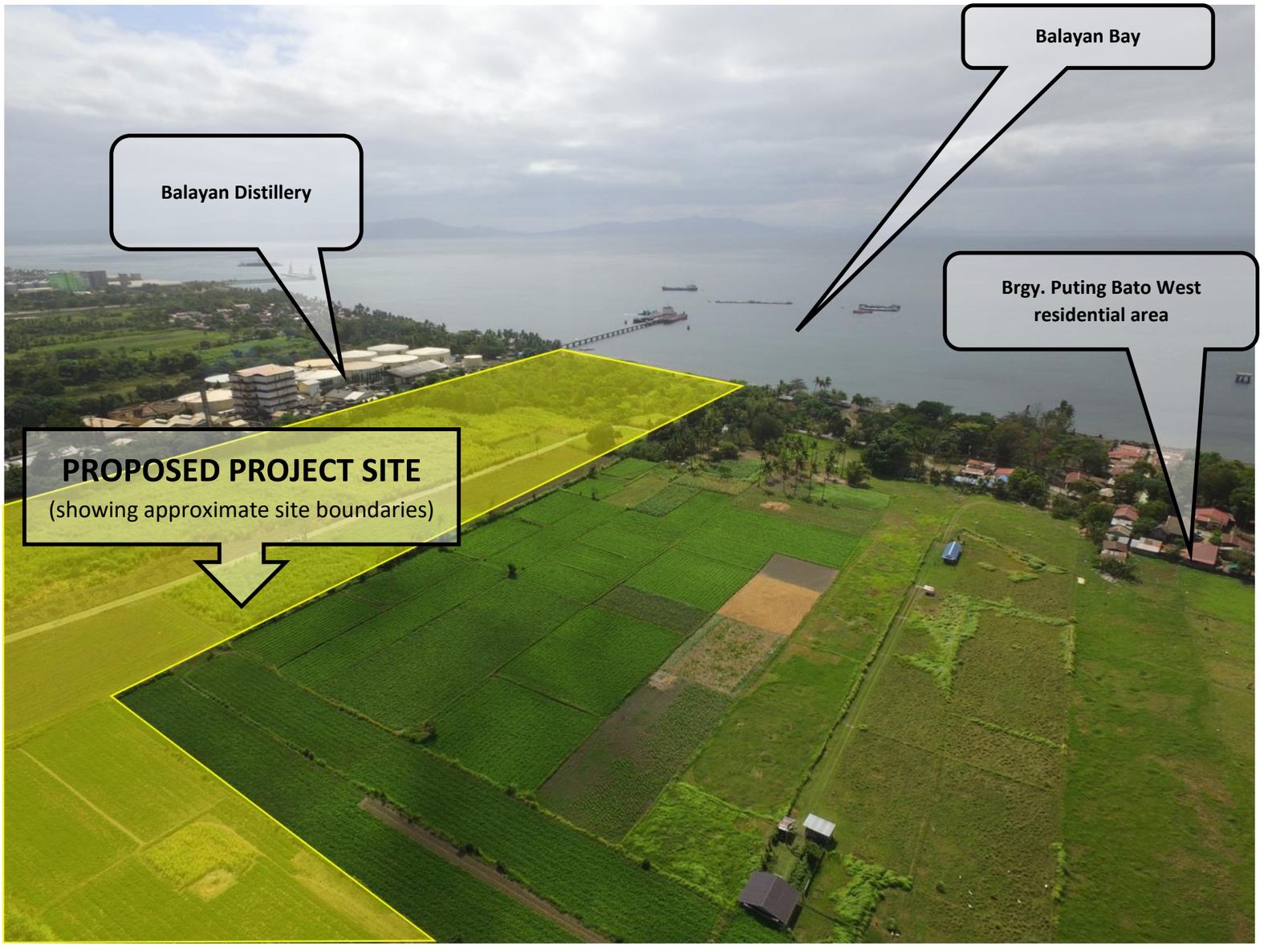


NOTE: Aerial photograph taken by LCI Study Team on February 13, 2018 using drone

FIGURE NO.:	FIGURE TITLE:
1-3a	**Aerial Photograph of the Proposed Project Location**

PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
INGRID3 POWER CORPORATION	**400 MW DIESEL POWER PLANT PROJECT** Brgy. Puting Bato West, Calaca, Batangas	**LCI ENVI CORPORATION**

Figure 1-3b: Aerial Photograph of the Proposed Project Location



NOTE: Aerial photograph taken by LCI Study Team on February 13, 2018 using drone

FIGURE NO.:	FIGURE TITLE:
1-3b	**Aerial Photograph of the Proposed Project Location**

PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
INGRID3 POWER CORPORATION	**400 MW DIESEL POWER PLANT PROJECT** Brgy. Puting Bato West, Calaca, Batangas	**LCI ENVI CORPORATION**

Figure 1-4: Direct and Indirect Impact Areas of the Proposed Project

LEGEND:

DIRECT IMPACT AREA
(Site where all project facilities are proposed to be constructed and operated; project footprints)

INDIRECT IMPACT AREA
(Contiguous areas that may be affected by the project)

NOTE: Map generated by EIA Study Team using QGIS

FIGURE NO.:	FIGURE TITLE:
1-4	**Direct and Indirect Impact Areas of the Proposed Project**

PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
INGRID3 POWER CORPORATION	**400 MW DIESEL POWER PLANT PROJECT** Brgy. Puting Bato West, Calaca, Batangas	**LCI ENVI CORPORATION**

1.2 PROJECT RATIONALE

11 The intended offtake for the Generation Facility is currently being studied and assessed. It is being considered for mid-merit/load following, peaking, or ancillary service application.

12 Ancillary services help sustain the transmission capacity and are essential to maintaining the power quality, reliability and security of the grid, through an Ancillary Services Procurement Agreement ("ASPA") with the National Grid Corporation of the Philippines ("NGCP") for a period of five years, which may be extended for another five-year period. These type of power plants help address sudden fluctuations in the frequency and the voltage of the transmission system that are typically brought about by the intermittent operation of renewable energy plants, unplanned outages of conventional power plants, as well as the daily operational cycle of large power consumers.

13 Mid-merit/load following and peaking plants, on the other hand, are operated with flexibility to respond to varying demand for electricity throughout the day. Operations are ramped up or down depending on the foreseen market demand.

1.3 PROJECT ALTERNATIVES

1.3.1 Site Selection

14 The site in Brgy. Puting Bato West was selected since INGRID3 Power Corporation already has authority over the project site. Furthermore, the proposed project site is already assigned as area for industrial development, according to the CLUP of Calaca. Presence of substations in the vicinity makes the area more ideal for a power plant development.

1.3.2 Technology/Design Selection

15 Modular power technology, such as diesel engines or gas turbines, is considered for the following reasons:

- Fast ramp rate and fast start capability: Modular power technology can start-up, synchronize, and reach its full capacity within seconds or a few minutes.
- Frequency triggered start-up/shutdown: At defined settings, it automatically starts when the frequency drops and automatically de-synchronizes from the grid and shuts down as soon as the grid frequency returns to the normal bandwidth.
- Frequency stability: When the frequency decreases below the minimum set-point, the modular power generator will supply the additional power, in order to maintain the grid's normal frequency. Conversely, when the system frequency increases above the maximum set-point, the modular power generator unit will automatically decrease its load.
- Zero minimum stable loading: It can operate at zero minimum load for extended periods.

16 **Figure 1-5** shows an illustrative and an actual sample of a modular power plant.

1.3.3 Resources

17 The use of diesel/gas for ancillary service and mid-merit purposes is particularly favored for the following reasons:

- Environmental impact: Diesel and gas are much cleaner compared to coal and bunker fuel oil, the use of which are proven to result in more carbon dioxide (CO_2) per kWH of energy than other methods; increased sulfur content in some types of coal and bunker fuel oil may also produce sulfur dioxide and eventually sulfuric acid that can cause acid rain.
- Availability: Diesel and gas fuel are obtained almost exclusively from crude oil/petroleum and availability of these are relatively stable.

Figure 1-5: Modular Power Plant Technology

Sample modular power plant layout illustration:

SOURCE: Hyundai

FIGURE NO.	FIGURE TITLE	
1-6	**Modular Power Plant Technology**	
PROJECT PROPONENT:	PROJECT TITLE & LOCATION:	REPORT PREPARER:
INGRID3 POWER CORPORATION	**400 MW DIESEL POWER PLANT PROJECT** Brgy. Puting Bato West, Calaca, Batangas	**LCI ENVI CORPORATION**

1.4 PROJECT COMPONENTS

18 The major components, auxillary facilities, and pollution control devices for the proposed project are summarized in the subsequent table.

Table 1-3: Proposed Project Components

Component	Description
MAIN PROJECT COMPONENTS	
• **Modular Diesel Generators**	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
• **Exhaust Gas 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 the top of the container through the rain cap assembly. Insulation and heat shields are fitted to the exhaust ducting to prevent operators contact with high temperature surface.
• **Fuel Supply System**	Consists of an internal fuel tank, fuel filters, fuel pump, injection pump and nozzles
• **Lubrication System**	Includes pump, strainer, and sump, all fitted internally within the engine block
• **Cooling System**	Uses cooling fluid where flow to the radiator is controlled by thermostat
AUXILLARY FACILITIES	
• **Service Water System**	For site facilities containers and on-site washing of equipment. Water supply line for equipment washing will be installed in line with the fuel pipeline using PVC pipe material.
• **Instrumentation and Control System**	A central PLC and SCADA system will automate all equipment controls and protections for plant start/stop, load management, and operations required for meeting appropriate 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**	A switching and metering station (switchyard) will be installed to provide all the necessary technical requirements for interconnection to the grid.
• **Transmission Line**	A 230 kV transmission line will be constructed to connect the power plant to the grid. Connection options are currently being studied and assessed.
• **Administration Building and Other Site Facilities**	Containerized and/or building facilities will be provided to function as control rooms, office/workshop stations, security/first-aid posts, and kitchen/toilet/locker/consumables storage areas, among others.
• **Fire Protection System**	Manually operated DCP & CO_2 fire extinguishers will be installed at strategic locations around the site.
POLLUTION CONTROL FACILITIES	
• **Exhaust**	An exhaust system will be installed. Exact design of system will depend on the result of the air quality study.
• **Oily Waste Water Treatment Equipment/Facility**	For treatment of oily wastewater generated during the process of equipment maintenance/washing to prevent the entry of unacceptable level of contamination to the site drainage system.

1.5 PROCESS/TECHNOLOGY

1.5.1 Major Components

19 Fuel burned inside the combustion chambers and produces mechanical energy that is converted into electrical energy as it drives directly coupled alternator and has the following built-in components:

- Air Intake System: This system supplies enough air to the engine for an effective internal combustion. It consists of pipes for the supply of fresh air to the engine intake manifold. Filters are provided to remove dust particles from air which are abrasive to the engine cylinders. The intake air is turbo-charged and cooled by charge air cooler for best results.

- Exhaust Gas System: This 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 the top of the container through the rain cap assembly. Insulation and heat shields are fitted to the exhaust ducting to prevent operators contact with high temperature surface. A silencer is incorporated in the system to reduce the noise level to within the acceptable limits.

- Fuel Supply System: This system typically consists of an internal fuel tank, fuel filters, fuel pump, injection pump and nozzles. Fuel is pumped from the fuel tanks through the fuel filters and then passed to the injectors and then to the injection nozzles. It should meet the minimum specifications on specific gravity, density, water content, heating value, and sulfur content, as required by law and acceptable to the engine requirements.

- Engine Oil Lubrication System: This system is comprised of the lubricating oil tank, oil pump, strainer, and sump, all fitted internally within the engine block. It aims to reduce the wear of the engine moving parts (e.g., piston, shaft, and valves) and cool the engine. In the lubrication system, the oil is pumped from the lubricating oil tank through the oil cooler where the oil is cooled by the cold water entering the engine. The hot oil after cooling the moving parts will be pumped to the lubricating oil tank.

- Cooling System: This system typically uses a cooling fluid that is factory filled with Valvoline HD anti-freeze and anti-corrosion coolant, in 50-50 water-coolant concentration where flow to the radiator is controlled by thermostat. Top-up requirement depending on need which requires assessment every 300 running hours.

20 Modular diesel engine units, at the very least, should meet the National Emission Standards for Source Specific Air Pollutants (NESSAP) requirement to ensure that the units will have minimal environmental impact. The company intends to use the units based on the specifications that will be presented.

1.5.2 Auxiliary Facilities

21 Support facilities for the power plant will include the following:

- Substation: A switching and metering station (switchyard) will be installed to provide all the necessary technical requirements for interconnection of the switchyard to the grid.

- Transmission Line: A 230 kV transmission line will be constructed to connect the power plant to the grid. Connection options are currently being studied and assessed.

- Instrumentation and Control System: The proposed project will be connected to a central programmable logic controller (PLC) and supervisory control and data acquisition (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.

- Administration Building and Other Site Facilities: Some of these will also be modular in design and specifically built based on purpose. Containerized and/or building facilities will be provided to function as control rooms, office and workshop stations, security and first-aid posts, and kitchen, toilet, locker, and consumables storage areas, among others.

- Service Water System: The proposed project will have a service water system for site facilities containers and on-site washing of equipment. Water supply line for equipment washing will be installed in line with the fuel pipeline using polyvinyl chloride (PVC) pipe material.

- Fire Protection System: To protect the facility in the event of fire or fire risks such as excessive heat or smoke, a fire protection system will be installed in accordance with the requirements of the Revised Fire Code of the Philippines.

1.5.3 Pollution Control Facilities

22 Pollution control facilities for the power plant will include the following:

- Exhaust: The proposed project will have exhausts to allow proper dispersion of emissions. Each smokestack can be accessed through the modular diesel engine unit's built-in ladder and Bi-Line system (fall arrester). Exhaust stack has a height of 5.6 meters (extendable up to 8.6 meters) from the ground with a circumference of 130 centimeters. Combination of exhausts to fewer but higher stacks is possible depending on the results of the air quality study.

- Oily Wastewater Equipment/Facility: Oily wastewater from the fuel and lube oil centrifuging unit and from lube oil, fuel, and water system leakages will be collected into the oily wastewater tank and will then be pumped into the Oil-Water Separator Treatment Plant. The volume capacity of the facility should be enough to treat the projected daily wastewater generation from the plant operations. The bottom sludge will be discharged periodically for disposal by a DENR-accredited treater. Additionally, an oil spill management plan will be put in place in case of emergency oil spills or leaks.

- Septic Tank: A reinforced concrete underground septic tank will be installed on-site for the proper treatment of domestic wastewater generated from facility operations.

- Solid Waste Management System: Solid waste materials generated will be classified as hazardous and non-hazardous wastes. Separate receptacles and storage areas will be designated for each type of waste identified at the project site. Non-hazardous domestic solid wastes will be further classified as compostable, recyclable, and residual and will be managed based on the local disposal regulations consistent with the Ecological Solid Waste Management Act of 2000 (Republic Act 9003). Hazardous wastes will be handled, transported, and managed by DENR-accredited hazardous waste treaters in accordance with the Toxic Substances and Nuclear Wastes Control Act 1909 (Republic Act 6969).

1.5.4 Plant Operation and Maintenance

23 The Generation Facility, which can be easily and abruptly ramped up or down depending on the need of the grid or of the market, is not expected to run continuously in its full load during its operations. Engines will either be run at partial load or will be kept offline until a huge power deficiency in the grid occurs. Proper occupational health and safety procedures will likewise be strictly observed.

24 Typical power unit operation and maintenance involve the following:

- At the onset, run engine's pre-lube pump to guarantee proper lubrication of bearing surfaces. Operate the pre-lube pump at regular intervals to keep engine in "ready to start" condition. Periodically check all auxiliary systems of engine to verify proper status for operation. Failure to properly pre-lube engine prior to starting can result in damage to internal components of engine and substantially reduce engine life.

- Start engine without any load connected to generator (by keeping its main circuit breaker in open condition) and bring up to operating temperature before applying load. Immediately after starting, verify lube oil pressure for normal range.

- Under normal circumstances, engine loads are generally restricted between 50 percent to 100 percent load for extended periods of time. Operation at lower loads can cause carbon formation and rapid deterioration of lube oil, while operation at high loads results in higher temperatures and pressures in combustion chamber and can lead to more frequent maintenance or replacement of components. Maintain correct lube oil and coolant levels and check pressure difference across inlet air filters, fuel filters, and lube-oil filters.

- Prior to shut down, unload engine and allow unit to cool down. Operate engine without load at rated speed for some time until exhaust temperature decreases to recommended level and then at low idle speed for about five minutes without load or as directed by manufacturer.

25 A detailed operation and maintenance manual will be used once the Project becomes operational.

1.6 PROJECT SIZE

26 The proposed power plant will have a total generation capacity of 400 megawatts. It is not expected to run continuously in its full load during its operations. Engines will either be run at partial load or will be kept offline until a huge power deficiency in the grid occurs.The total land area that will be utilized for the proposed project is approximately 15.2 hectares.

1.7 DEVELOPMENT PLAN, DESCRIPTION OF PROJECT PHASES, AND CORRESPONDING TIMEFRAMES

27 The tentative project development plan is presented in the next pages. The matrix indicates the expected duration of the different aspects of the proposed project's execution.

1.7.1 Pre-Construction

28 This phase primarily involves the conduct of preliminary site investigations and the acquisition of the necessary documents such as the ECC, tree cutting permits, building permits, and PTO before actual power plant construction. Acquisition of rights-of-way for the transmission lines shall also be done during this phase.

1.7.2 Construction

29 This phase mainly includes civil and earthworks; procurement, shipping, site delivery, and installation of power plant equipment; and construction of transmission line. Proper occupational health and safety procedures will be implemented to ensure the welfare of the workers. Target start of construction is 2nd Quarter of 2022.

1.7.3 Operation

30 The Generation Facility, which can be easily and abruptly ramped up or down depending on the need of the grid or of the market, is not expected to run continuously in its full load during its operations. Engines will either be run at partial load or will be kept offline until a huge power deficiency in the grid occurs. Proper occupational health and safety procedures will likewise be strictly observed.

1.7.4 Decommissioning/Abandonment/Rehabilitation

31 The proposed 400-MW Diesel Power Plant is not expected to be abandoned within the next 10 years of its planned operations. However, ceasing of the power plant operations may be necessary due to the following potential scenarios:

- Unsustainable business operations due to economic downturns;
- Changes in zoning and other related ordinances of the Municipality of Calaca;
- Transfer of operations to other sites;
- Accidents and emergencies (either natural or man-made) resulting to severe facility damage and/or loss of human life; and
- Closure order from government agencies.

32 As such, if the abovementioned scenarios happen, which could result to the partial or total closure of the power plant, an Abandonment Plan will be created and implemented by Ingrid3 Power Corporation.

Table 1-4: Tentative Project Development and Implementation Timeline

Activity	2020				2021				2022	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
EIA/ ECC Application										
Connection Point Assessment										
System Impact Study (SIS)										
Facilities Study (FS)										
LGU Endorsement										
Other Permitting Works (NCIP, BOC, etc.)										
Site Studies (geotech, flooding, etc.)										
TL Rights-of-Way										
RFP - EPC/Equipment Supply										
Construction Contracts										
Construction NTP										

1.8 MANPOWER

33 The estimated manpower requirement in each phase of the proposed project's implementation is specified in the following table. The Proponent will give priority to host community members or residents whose skills and experience match the project's specific needs.

Table 1-5: Manpower Requirement per Project Phase

PROJECT PHASE	ESTIMATED MANPOWER REQUIREMENT	TASKS TO BE PERFORMED	SKILLS REQUIREMENT
Pre-Construction	~30	• Conduct complete feasibility study • Prepare detailed engineering designs and drawings • Facilitate permit requirements and tender documents	Specialized technical skills/expertise on various engineering and scientific fields.
Construction	~110	• Perform civil, architectural, and electro-mechanical works	Engineers, project managers, skilled and non-skilled laborers
Operation	~60	• Oversee the entire operations of the proposed project, including emergency situations; Ensuring the safety and welfare of its personnel • Maintain conformity of the proposed project to relevant government regulations, including tax payments, ECC compliance, etc. • Promote and uphold a harmonious relationship with the host community	Management and administration skills; over-all knowledge on the operation including key environmental, labor, and local ordinances
Abandonment	~110	Implement the abandonment plan	As required

1.9 PROJECT COST

34 The indicative project cost is estimated at PHP 17,000,000,000.00 (17 Billion Pesos) that will include the following:

- Conduct of feasibility study, preparation of detailed engineering design, acquisition of necessary government permits and licenses;
- Site development;
- Leasing/construction of power plant components;
- Procurement of necessary equipment and materials;
- Environmental management and protection, pollution control facilities; and
- Environmental monitoring activities.

1.10 PRELIMINARY IDENTIFICATION OF ENVIRONMENTAL IMPACTS

35 To address the potential environmental impacts of the proposed project, an environmental management plan will be prepared, presenting the proposed mitigation and/or enhancement measures that can be employed during the different phases of the project development.

	Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact/s	Prevention/Mitigation/Enhancement Measures
	LAND			
CONSTRUCTION PHASE	**Cut and fill activities**	Land Use and Classification	Change/inconsistency in land use	▪ The proposed project site is situated within an industrial area; No land use change issues perceived
			Encroachment in an environmentally critical area (ECA)	▪ The proposed project site does not encroach an ECA
		Geology/ Geomorphology	Change in surface landform/terrain/slope	▪ Formulation and implementation of proper grading plan
			Change in sub-surface underground geomorphology	▪ Onsite excavations are expected to cause permanent but low level of disturbance ▪ Strict adherence to geotechnical study recommendations
	Site preparation and earthworks	Pedology	Soil erosion	▪ Implementation of appropriate soil erosion control measures
		Terrestrial Ecology	Vegetation removal and loss of habitat	▪ The proposed project is located within an industrial complex; No ecologically sensitive habitats observed
			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	Depletion water resources/ competition in water use	▪ Implementation of water conservation measures
	Mobilization of construction equipment and materials; Generation of construction wastes	Water Quality	Degradation of groundwater quality	▪ Formulation and strict implementation of waste management plan ▪ Water quality monitoring

	Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact/s	Prevention/Mitigation/Enhancement Measures
	AIR			
	Mobilization of construction equipment and materials	Air Quality and Noise Levels	Degradation of air quality	▪ Formulation and implementation of construction impact management plan ▪ Ambient air quality and noise level monitoring
	PEOPLE			
	Hiring of workers	Local Employment	Increase in local employment	▪ Prioritized hiring of qualified local residents; GAD sensitivity
	Increase in taxes and revenues	Local Economy	Improvement in local infrastructure and social services	▪ Diligent imbursement of taxes and revenues
	Accidents	Public Safety	Possible occurrence of construction-related hazards	▪ Provision of environmental health and safety training prior to construction
OPERATIONAL PHASE	**LAND**			
	Accidental oil spill	Pedology	Soil contamination	▪ Formulation and strict implementation of emergency management plan ▪ Soil quality monitoring
	WATER			
	Generation of domestic wastewater/ oily wastewater	Water Quality	Degradation of groundwater quality	▪ Provision of oily wastewater equipment or facility ▪ Formulation and strict implementation of waste management plan ▪ Water quality monitoring
	AIR			
	Utilization of fuel oils	Air Quality	Degradation of air quality	▪ Ambient air quality monitoring and emissions testing
	Use of modular generator engines	Noise Levels	Increase in ambient noise levels	▪ Proper operation and maintenance of environmentally acceptable equipment ▪ Provision of proper personal protective equipment (PPE) for plant personnel ▪ Ambient noise level monitoring
	PEOPLE			

	Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact/s	Prevention/Mitigation/Enhancement Measures
	Hiring of workers	Waste Management	Generation of sewage/solid waste	▪ Formulation and strict implementation of waste management plan
		Population	Change in population size and distribution	▪ Prioritized hiring of qualified local residents ▪ Coordination with the local public employment service office
		Social Services	Overburdening of public social services	▪ Prioritized hiring of qualified local residents
		Health	Introduction of disease between migrant and local workers	▪ Medical certificate as part of employment requirements ▪ Formulation and implementation of safety and health program ▪ Provision of health and sanitation facilities within the plant site ▪ Monitoring of occurrence of unusual health problems that may be associated with the project
	Operation of the power plant	Local Economy	Increased social and economic financial activities	▪ Positive impact; No mitigation required
		Public Safety	Fire hazard	▪ Provision of fire protection system
	LAND			
ABANDONMENT PHASE	**Decommissioning**	Pedology	Soil contamination	▪ Formulation and strict implementation of Abandonment Plan with emphasis on control of sedimentation and prevention of soil contamination
		Terrestrial Ecology	Increase in biodiversity due to rehabilitation activities	▪ Positive impact; No mitigation required
	Disposal of wastes	Groundwater Quality	Possible occurrence of spills and contamination	▪ Formulation and implementation of waste management plan

	Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact/s	Prevention/Mitigation/Enhancement Measures
	AIR			
	Demolition and abandonment activities	Air Quality and Noise Levels	Generation of dust and noise	▪ Watering during dismantling activities to minimize dust generation ▪ Proper vehicle maintenance ▪ Limiting noise-generating activities during daytime ▪ Ambient air quality and noise level monitoring
	PEOPLE			
	Decommissioning activities	Local Community	Possible local disturbance or damage through increased road traffic, noise, etc.	▪ Formulation and implementation of decommissioning impact management plan
	Hiring of workers for demolition and abandonment activities	Local Employment	Increase in local employment during abandonment; Development of new skills	▪ Prioritized hiring of qualified local residents
	Loss of jobs/employment	Local Economy	Reduction in service opportunities for local contractors with established contracts with the project (e.g., maintenance service providers, site transport services, etc)	▪ Formulation and implementation of Abandonment Plan ▪ Effective human resources management through consultative planning and communication
		Demography	Out-migration of affected project staff to seek job opportunities elsewhere	
NOTHING FOLLOWS				