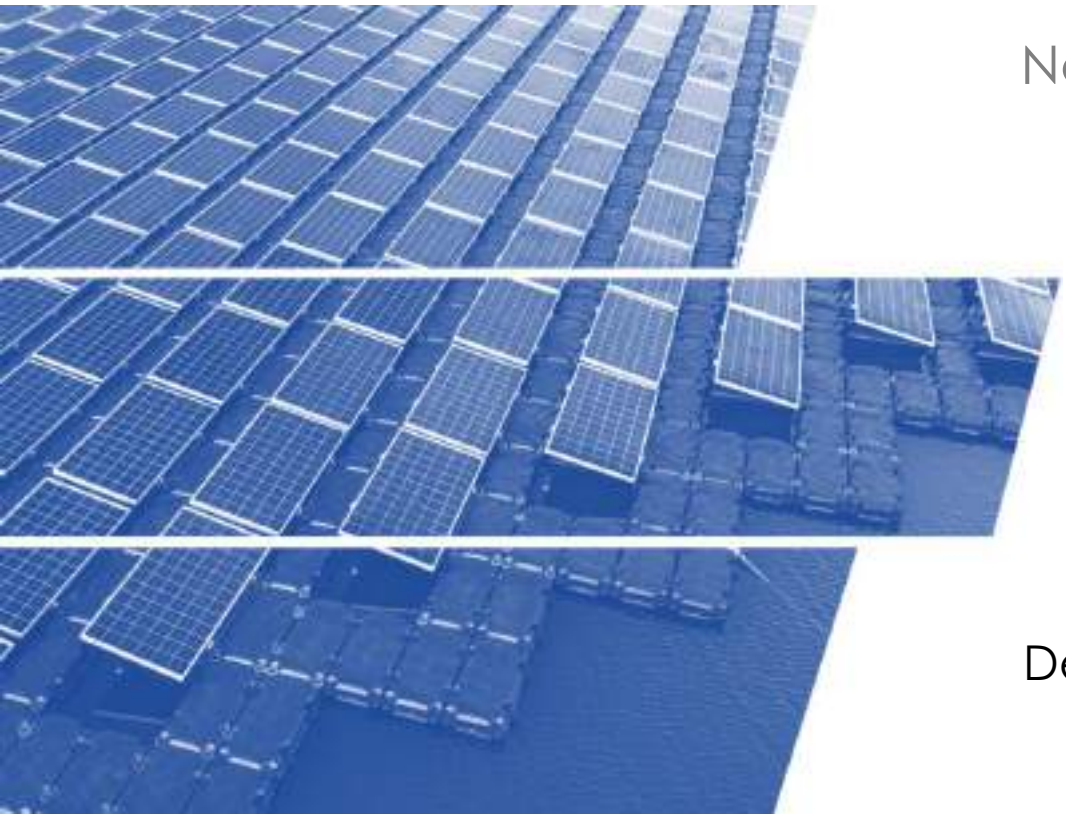
Saguling 60MW Floating Solar PV Power Plant

Saguling Reservoir, West Java Indonesia

ESIA: Volume 1-

Non-Technical

Summary



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CONTENTS

LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
AMDAL	Analisis Mengenai Dampak Lingkungan/ Environmental Impact Assessment
BOO	Build, Own and Operate
CESMP	Construction Environmental & Social Management Plan
COD	Commercial Operation Date
E&S	Environmental & Social
EDFI	European Development Financial Institutions
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement, and Construction
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management System
FPV	Floating Photovoltaic
GBVH	Gender Based Violence and Harassment
H&S	Health & Safety
IFC	International Finance Corporation
IP	Indonesia Power
KJAs	*Keramba Jaring Apung* (Floating Net Cage)
LRP	Livelihood Restoration Plan
O&M	Operational & Maintenance Company
OHTL	Overhead Transmission Line
RfP	Request for Proposal
RoW	Right of Way
SEP	Stakeholder Engagement Plan
TNI	*Tentara Nasional Indonesia* (Indonesia National Army)

1 INTRODUCTION

1.1 The Project

ACWA Power, through a competitive bid, has been awarded the right to develop the Saguling floating solar photovoltaic (PV) ('the Project') by PT PLN Indonesia Power (IP). The PV plant will have a capacity of 60MW_{ac} and will be developed on a Build, Own and Operate (BOO) basis under a PPA for 25 years from the Commercial Operation Date (COD).

According to the RfP documents, "*a Shareholder Agreement will be entered into between IP and the Selected Partner (ACWA Power) as the basis of the establishment of the Project Company and to govern the relationship between Shareholders during the implementation of the Project.*" The shareholding will translate to IP and ACWA Power holding an ownership of 51% and 49% respectively. It is noted that a Project Company has since been established, 'PT Indo ACWA Tenaga Saguling' registered in Indonesia with the Ministry of Labour and Human Resources ratification no. AHU-0026241.AH.01.01.Tahun 2023.

The Project Developer is seeking project finance from European Development Financial Institutions (EDFI). The EDFI operates in accordance with Environmental and Social (E&S) policies, which are designed to integrate the identification, assessment, and management of E&S risk associated with investment projects. As such, compliance with the International Finance Corporation (IFC) Performance Standards, the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines), and/or the relevant host country laws, regulations, and permits related to environmental and social issues is mandated. This approach aligns with the global initiative on sustainable development.

1.2 Requirements for E&S Assessment

1.2.1 National EIA

The project is subject to a national EIA study '*Analisis Mengenai Dampak Lingkunga'* otherwise known as AMDAL, in compliance with the national laws and regulations of Indonesia. The AMDAL is aimed to assess potential E&S impacts and develop appropriate management measures in line with the national requirements.

ACWA Power has appointed a local consultant to conduct the AMDAL process and secure the regulatory approval. It is understood that this process is currently ongoing.

1.2.2 Lenders' ESIA

An *Environmental and Social Scoping Report* was completed in August 2023, identifying the project's potential environmental and social risks and impacts. It outlined the terms of reference for the ESIA, including the scope and methodologies for baseline surveys and consultations, to assess impacts and define the required mitigation and management measures.

Subsequently, the ESIA was carried out in alignment with the lenders' requirements, focusing on the following key objectives:

- Provide an overview of the Project design, identification of sensitive receptors in the Project's area of influence، and assessment of Project alternatives.
- Assessment of baseline conditions prior to the development of the Project through review of available data and conducting surveys.
- Assessment of the project's environmental & social impacts for the construction and operational phases.
- Review of compliance obligations, including applicable Indonesian regulations and standards as well as international lender requirements.
- To engage with key stakeholders and project affected people to disclose Project information, study outcomes, gain lay knowledge about the local environmental & social context.
- Determination of applicable mitigation and management measures including monitoring requirements to be implemented to avoid or minimise potential impacts and maximise potential environmental and social gains.
- Consideration of alternatives that can be used for the project leading to reduced impacts and/or greater social and environmental gains.
- Prepare a framework from which the construction phase and operational phase respective environmental & social management systems and plans can be developed and implemented.

2 PROJECT DESCRIPTION

2.1 Key Project Information

Table 2-1 Key Project Information

PROJECT TITLE	Saguling Floating Solar PV, Indonesia
PROJECT DEVELOPER	ACWA Power
PROJECT COMPANY	PT Indo ACWA Tenaga Saguling
EPC CONTRACTOR	China Energy Engineering Group Co. Ltd.
O&M COMPANY/OPERATOR	A joint venture between First National Operation and Maintenance Co. Ltd (NOMAC) and an Indonesia Power subsidiary.
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2.2 Project Location

The Project site is located on the reservoir formed by the Saguling Dam, Bandung Barat Regency, West Java Province, about 26km west of Bandung City. The existing dam is owned and operated by PT Indonesia Power and is currently used alongside other infrastructure for the generation of hydro-electric power. The floating PV (FPV) arrays will be placed on the water surface of the reservoir with an OHTL running north towards the district of Cipatat.

The location of the project is provided in the following figure.

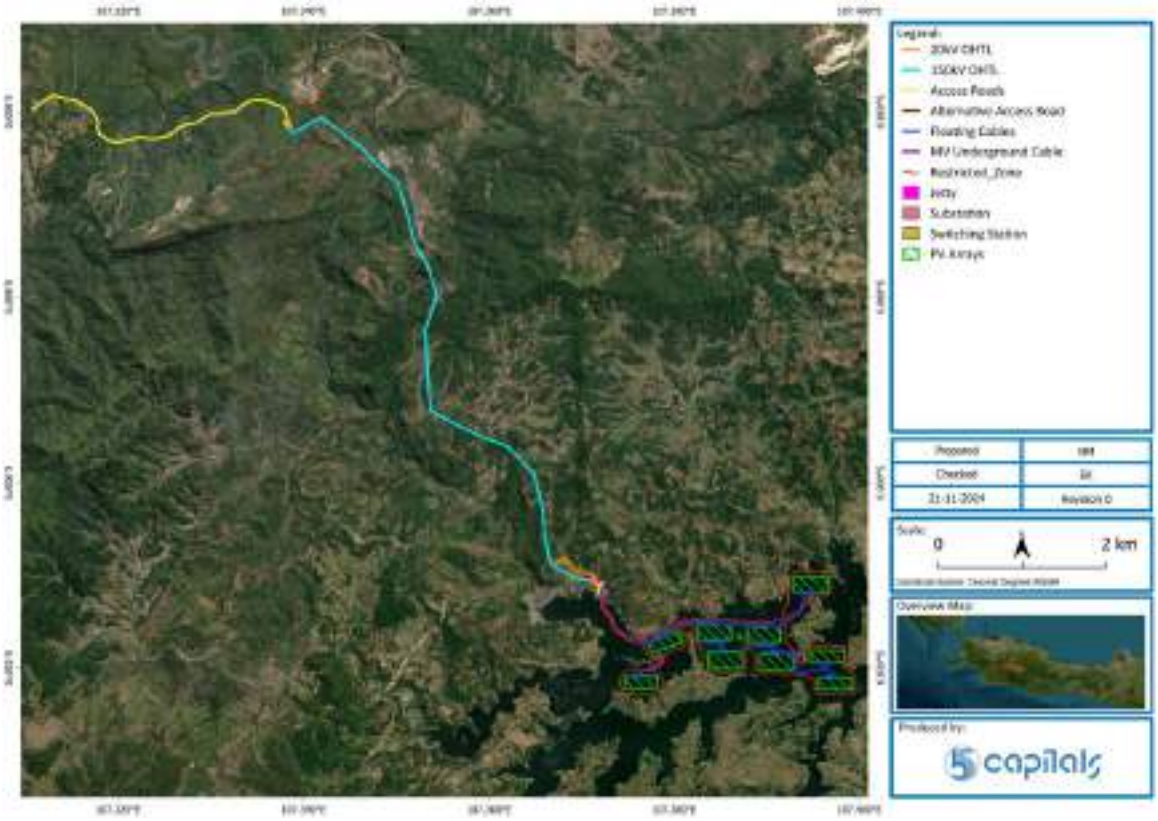

Figure 2-1 Project Location

2.3 Project Facilities

The table below includes the details of the key Project components.

Table 2-2 Project Components

COMPONENT	DESCRIPTION	REMARK
Floating solar PV	This will include 9 floating PV arrays	This will also include the establishment of a restricted zone around the FPVs (and cables) to prevent unauthorized boats from entering the area.
Floating cables	Rating: 20kV Length: 7.5 km Width: 2.5m	Approximately 300 m of the evacuation cables will be buried on land, and it will include a 1m safety buffer on each side (2m) where future land activities will be restricted.
Substation Area	150kV substation	The floating cable from the FPV will connect to this substation located northwest of the reservoir.
Access road connecting to the 150kV substation, and the jetty	Length: 200m Width: 6m	This road will be permanent with 2 layers of asphalt.

Component	Description	Remark
Jetty area	-	The jetty will be constructed for the construction and operational phase of the project.
20kV OHTL	Length: 800m	The EPC will request PT. PLN Distribusi to provide the electricity supply during the construction of the project. The electricity lines will be installed on existing OHTL towers and therefore there will be no additional land impacts.
150kV OHTL	Length: 8.5km No of towers: 23	This OHTL will extend northwards of the 150kV sub-station.
Switching station	150kV switching station	This switching station will be located west of the existing Rajamandala substation.
	Connection to the grid	The power from the switching station will be evacuated through two locations: one to an existing 500kV OHTL and the other to the existing Rajamandala substation.
Access road to the switching station	Length: 3.8km Width: 6m	This access road will connect to an existing local road that goes through Cihea village and land belonging to the Forest agency *Perhutani*. The access road will include the following elements: • 2.4km upgrading of an existing road through Cihea village. • 1.4km construction of a new asphalt access road.

2.3.1 Safety Features of the FPVs & Cables (Restriction Zones)

To ensure the integrity of the Project facilities and the safety of lake users, the following safety features will be put in place:

- Establishment of a restricted zone: This will be established around the FPV arrays and the cables to prevent unauthorised boats from accessing these areas. The restricted areas will include physical barriers such as buoys, floating barriers or nets which will delineate the Project zones and discourage unauthorised entry.
- Installation of markings and signs: This will include the installation of visible signs and markers on the PV floaters and cables to indicate their locations. These markers will be strategically placed at regular intervals along the perimeter of the floating Project components and along the water transportation routes commonly used by local transportation boats.
    - According to the EPC Contractor, the required signages will be located approximately 50-100m to the boundary of the FPV arrays.
- Navigation lights: These will be installed on the PV floaters and along the cables to enhance visibility, especially during the night. These lights will comply with maritime

regulations to ensure that they are easily recognisable by boat operators at the lake.

It is noted that the above measures will be established at the start of the construction phase and carried through for the entire operational phase of the Project. In addition to the above, the EPC Contractor will also establish restrictions in the following areas:

- Land-based facilities: including the sub-station, switching station area and the OHTL tower locations.
  - These restrictions will be within the boundaries of these facilities and therefore no additional land will be required for these zones.
- The laydown area (assembly area) will be restricted during construction, but it will be restored at the end of the construction phase.

Based on the above, the location of the water facilities restricted zones is provided in the figure below while those relating to the land-based facilities will be restricted to the boundaries of the Project facilities.

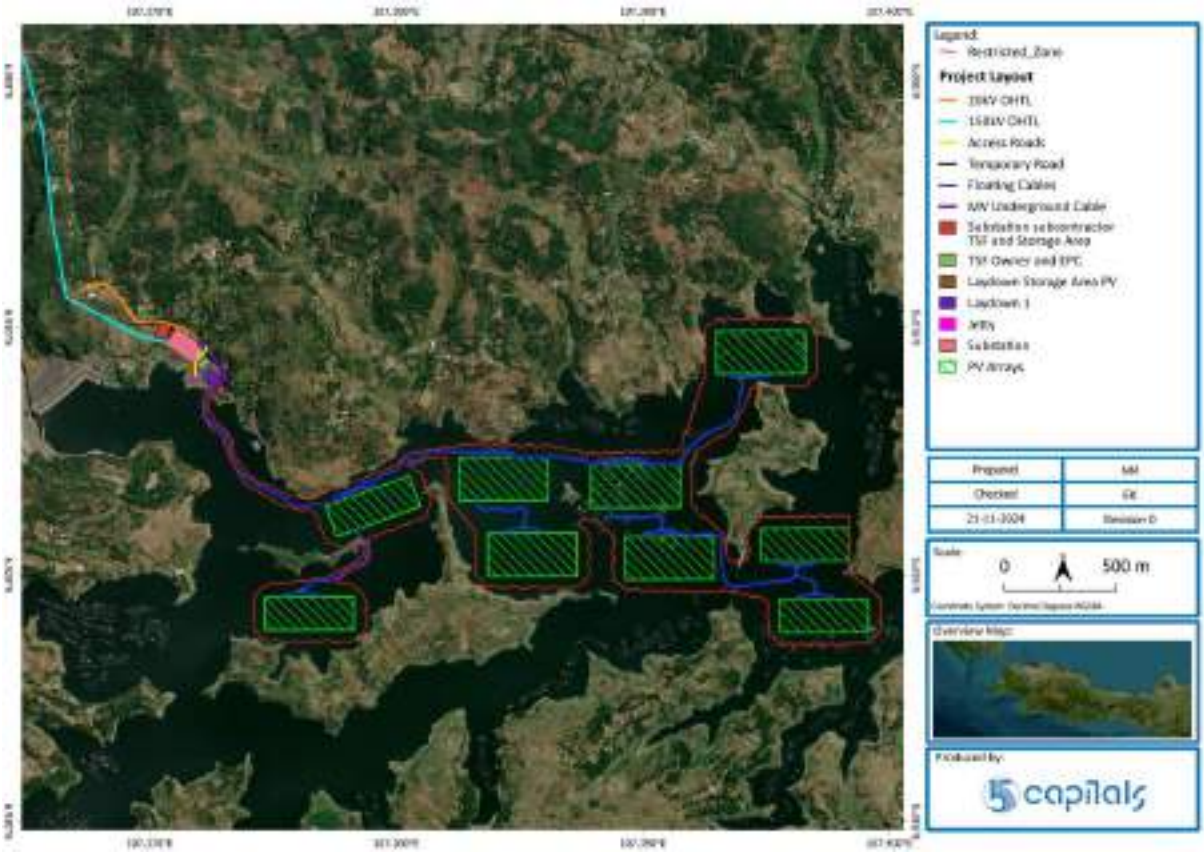

Figure 2-2 Location of restricted zones

2.4 Project Construction Requirements

2.4.1 Workforce

It is estimated that approximately 403 personnel will be engaged during the peak construction period of the FPV and the OHTL. This workforce will consist of a mix of Project Company, EPC Contractor, and sub-contractors' staff. Out of these 403 workers, it is projected that about 70% will be Indonesian nationals (based on availability of required skills), while the remaining 30% will be foreign nationals, likely Chinese, under the EPC Contractor and potentially the Owner's engineer(s).

2.4.2 Laydown Area

A temporary construction laydown area (also referred to as the assembly area) is set to be established north of the reservoir near the shoreline, as illustrated in the figure below. It is anticipated that, once construction is completed, the construction areas will be disassembled, and the laydown area will be restored to its original condition. The laydown area is expected to include office containers, storage areas, FVP assembly area etc.

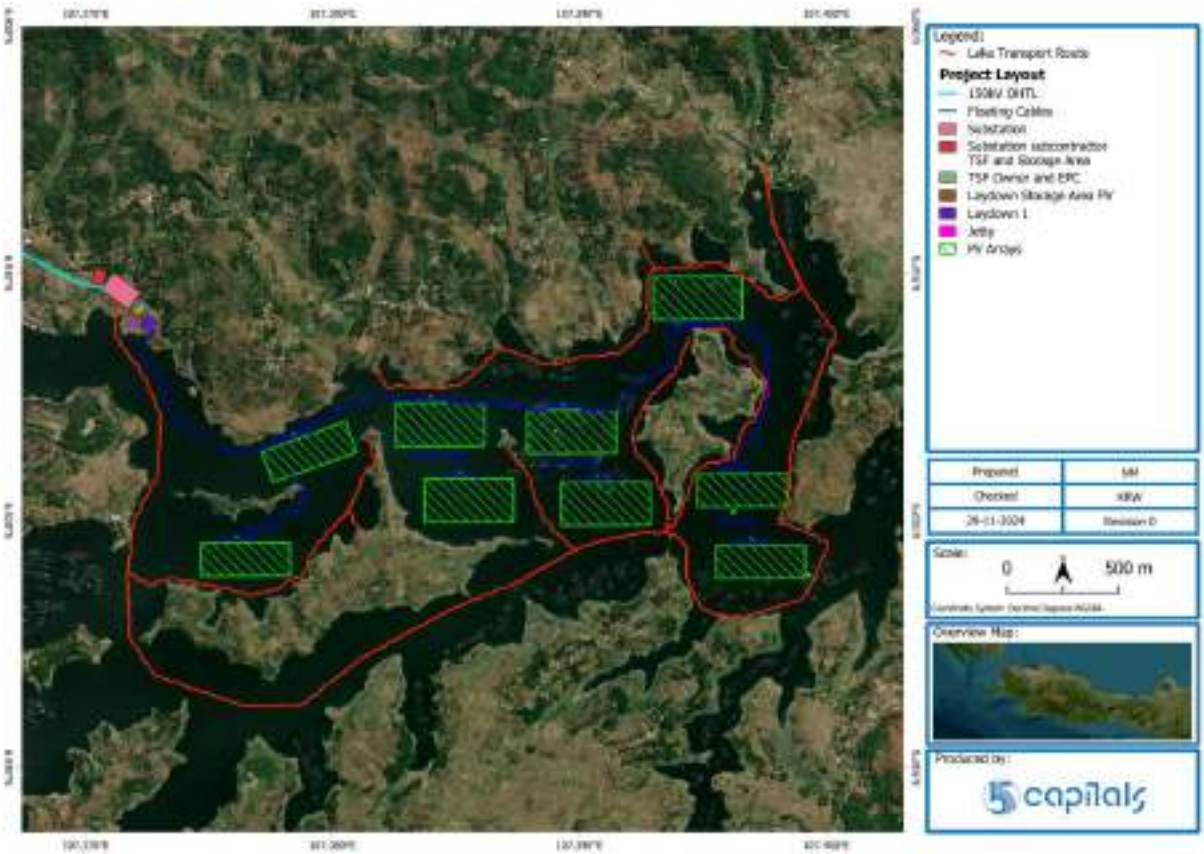

Figure 2-3 Proposed Location Of The Temporary construction laydown areas

2.4.3 Concrete Supply

Due to the nature of FPVs, the proposed Project will require a limited volume of concrete. As such, the concrete will be delivered through concrete mixers. The exact location for sourcing the concrete is not currently known, but it is expected to be obtained locally.

2.4.4 Accommodation Facilities

It is understood from the EPC Contractor that some worker accommodation and facilities will be located at the laydown area (assembly area). The on-site worker accommodation is expected to have a capacity of approximately 50% of the peak workforce, equivalent to 200 workers (out of the expected 403 workers).

The recruitment of local workforce is expected to reduce the necessity for workers to utilize on-site accommodation facilities, as they can commute from their homes. Additionally, some workers will have the option to reside in accommodation facilities in nearby towns such as Bandung city, Cipeundeuy, Cipatat, and Pandalarang districts. Transportation services will be provided to these workers.

2.5 Project Operational Requirements

2.5.1 Floating Solar PV

The duration of the PPA will be 25 years from the Project Commercial Operation Date (COD). The operations and maintenance of the FPVs will be undertaken by a joint venture between the First National Operations and Maintenance Company (NOMAC)[1] and a subsidiary under Indonesia Power (here in referred to also as the Operator).

The operational phase activities will include the following phases:

- Pre-project commercial operation phase (mobilisation): Which will include some Operator's staff working with the EPC Contractor to ensure that the required management systems, maintenance programs, organization and competent personnel are in place in accordance with the Project's timetable.
- Post Project COD: this will include operation and maintenance of the Project, including planned and unplanned maintenance activities.

[1] NOMAC is a wholly owned subsidiary of ACWA Power.

2.5.1.1 PV Panel Cleaning

Due to the seasonal high-intensity rainfall in Indonesia, panel cleaning is expected to be minimal. However, manual water-based cleaning will be carried out for the PV Panels using the water from the reservoir. The frequency of cleaning will be optimised, and it is anticipated that the PV panels may undergo a cleaning cycle of approximately once every two months, equivalent to 3-6 cleanings a year depending on wet seasons. It is understood from ACWA Power that the cleaning process will not include any use of detergents or chemicals.

2.5.1.2 Workforce

The number of O&M Company personnel is not known at this point. However, it is understood that the Project intends to maximise staffing for the Project from within Indonesia, emphasizing a commitment to local workforce development. The information provided to 5 Capitals reinforces this commitment by stating that no foreigners are expected to be employed during the operational phase, with potential exceptions for those involved in supervising the Operator.

2.5.2 OHTL & Switching Station

The OHTLs and switching station will be handed over to PLN at the end of the construction phase to own, operate and maintain.

2.6 Project Milestones

Based on the details provided by ACWA Power, the construction phase will take between 12 to 15 months. The breakdown of this timeline is as provided in the table below.

Table 2-3 Project Milestones (Tentative)

MILESTONE	SCHEDULED DATE
Signing of the PPA	June 2024
Financial Close	December 2024
Agreement of Limited Notice to Proceed (NTP) terms	February 2025
Start of Site Mobilisation for engineering & survey work	December 2024
Limited Notice to Proceed (LNTP) Contract Signing	December 2024
Notice to Proceed to include site mobilisation for the start of the construction phase.	February 2025
Commissioning Milestones	February 2026

3 Overview of Local Environment & Social Context

3.1 Landownership and Use

The land within the project footprint includes both formal land use (under private ownership) and informal land use on land owned by Indonesia Power and *Perhutani* (Forestry). Indonesia Power land is in areas where the sub-station, jetty, laydown areas, and sections of the OHTL will be constructed, while the forestry land is found along the OHTL and the switching station.

The impact on land will be limited to the Project footprint, encompassing the laydown/assembly areas, substation and switching station areas, footprint of the OHTL towers as well as the associated access roads.

Permanent land impact is foreseen at the substation, switching station, jetty, access road, and at the OHTL towers, while the impact at the laydown/assembly areas is anticipated to be temporary. It is expected that land use beneath the OHTL will be possible, albeit with some restrictions within the Right of Way (RoW), including limitations on the types of crops/trees that can be cultivated. This will impact both formal and informal landowners and users. LRP baseline surveys undertaken in October and November 2024 show that there will be no physical displacement from the construction of any of the Project facilities.

Furthermore, access to islands (owned by Indonesia Power) near the FPV installation, utilised for farming purposes, may experience temporary disruption during the floaters' installation. However, this scenario is deemed unlikely, as alternative access routes have been identified and consultations are on-going with local communities to determine their suitability. Additionally, the EPC Contractor will be required to undertake further consultations as per the SEP before the implementation of any access restrictions in the project area.

3.2 Reservoir Use

The West Java Governor regulation (*Pergub)* No.96 of 2022 defines zoning requirements in the Saguling reservoir, including the following areas:

- Floating net cage zone/ Zona keramba jaring apung
- Business zone/*Zona usaha*
- Transportation facilities (port) zone/*Zona transportasi (dermaga)*
- Sanctuary zone/*Zona suaka*
- Restricted zone/Zona bahaya (larangan)

Through consultations with local communities during socio-economic surveys, it has been ascertained that floating net cages activities are only allowed within the designated floating net cage zone and the sanctuary zone. However, these cages have also been established within the restricted zones, contrary to the law.

To address this, the Citarum Harum Program was established as the designated authority to oversee and coordinate the various efforts involved in the pollution control and ecosystem restoration in the watershed, including managing the presence of floating net cages in restricted zones.

Despite the program's implementation since 2018, fishermen who depend on aquaculture for their livelihoods continue to re-establish floating cages in the reservoir, including in restricted areas such as where the project will be located. Consultations with fishermen indicate they are aware of the restrictions, but enforcement remains lax.

Regarding the Project, approximately 95% of the FPV installations will be located within the restricted zone of the reservoir, with 5% of one of the FPV arrays being in the sanctuary zone.

3.2.1 Fishing Net Cages (KJAs)

During the surveys conducted in October and November 2024 as part of the Livelihood Restoration Plan (LRP), it was established that all the KJAs had already been relocated from the restricted zone where the project will be developed, and none were observed in the area. However, preliminary surveys undertaken by ACWA Power CLO in June 2024 had gathered data on the KJA operators within this zone. At the time, it was determined that 115 KJA owners were going to be affected by the relocation. The data collected by the ACWA Power's CLO was then used by the LRP social team to validate the list of affected KJA owners through consultations with both the KJA owners and local community leaders. It was confirmed that no additional KJA operators were identified, and the list remains at 115 affected owners.

Consultations undertaken with the KJA owners in October 2024 revealed that of the 115 owners operating in the restricted zone, 111 managed to relocate their KJAs, while 4 ceased operations due to an inability to afford the relocation costs. The four KJA owners have become casual labourers.

Of those that were able to relocate, 24 moved to Kampung Ranca Bugis in Sarinagen village which is still within the restricted zone and had approxiamtely 120 existing KJAs. The other 87 KJAs moved to Bunder in Tanjung Jaya in an area that had approximately 1,100 existing KJAs.

It is noted that the process of relocating and/or removal of KJAs from the restricted zone was conducted by KJA owners at their own cost. Consultations undertaken with the KJA owners in October/November 2024, revealed that they use motor boats during this process. For instance, four KJA petak/plots require 4 motor boats which each costing approximately IDR 500,000 (USD31).

3.2.2 Fishing Stalls

During consultations undertaken in October and November 2024 as part of the LRP, fishing stall owners voiced concerns about the relocation of KJAs in June 2024, which they relied on to attract feeding fish. They explained that the KJAs served as a food source for fish, indirectly supporting their fishing stalls operations. Consequently, they are worried that the relocation of the KJAs will have a potential impact on their businesses.

Based on the current design from October 2024, access to the fishing stalls will still be possible through the alternative routes provided under the project. However, these stalls may potentially lose anglers due to the restricted size of the boat navigation route near the project areas and the proximity of the project.

3.2.3 Traditional Fishing

Consultations undertaken as part of the LRP revealed that the traditional fishermen also relied on the operations of the KJAs to attract fish in their fishing area. The fishermen requested for the project to give them access to fish within the restricted project zone so that their livelihoods are not impacted. They stated that the establishment of the restricted zone around the project facilities would force them to travel further into the reservoir to find suitable fishing locations. This would result in increased fishing time and boat costs, with no assurance of an improved catch to compensate for the additional effort.

Although traditional fishermen will no longer have access to fishing in areas within the restricted project zones, they will still be able to fish outside of this zone, albeit with a reduced fishing area. However, the reduced fishing zone could result into reduced catch which may potentially impact their livelihoods.

Note: *Refer to the project specific Livelihood Restoration Plan for more details on the extent of the economic displacement for the project.*

3.3 Local Receptors

The ESIA identifies the main sensitive receptors within 1km radius of the FPV and the OHTL. These receptors, which fall within the defined Area of Influence (AoI), include residential, commercial, and agricultural areas. Th communities within the FPV AoI are include Saguling, Sarinagen, Rajamandala, and Cihea villages, while those along the OHTL are Saguling, Sarinagen, Rajamandala, and Cihea villages. The economic impacts of constructing the land and water-based project facilities are assessed in the project's specific LRP.

Details of the identified receptors, and potential impacts including mitigation measures are provided in ESIA Vol 2. A summary of these impacts and the key mitigations is provided below in Chapter 4.

4 SUMMARY OF MAIN ENVIRONMENTAL & SOCIAL IMPACTS

4.1 Biodiversity

BASELINE CONDITIONS

Indonesia's wet season occurs between November and April, leaving May through October typically dry. Biodiversity baseline studies were undertaken during both seasons to understand the existing biodiversity and ecosystem services in the area that may be affected by the project. Survey boundaries were determined by understanding both the potential Area of Influence (AoI) of the proposed project as well as the Ecologically Appropriate Area of Analysis (EAAA) for various species.

Flora and Habitat

Habitat mapping exercises and botany transect surveys were undertaken to understand land use and land cover and to identify biodiversity including rare and endemic floral species. The aquatic habitat makes up for the majority of habitat cover at 25.50% or 657.51Ha. Located in a largely disturbed area, the dominant terrestrial habitat cover is Agricultural Fields (25.49%) followed by Mixed Plantations (22.52%) whereas urban environments such as Open Areas (0.07%), PLN Facilities (1.40%) and Built-up Areas (2.85%) made up for the smallest proportions of habitat cover within the study area. Secondary Forests, areas that are left undisturbed to regenerate after the original Primary Forest trees were logged, was the only semi-natural habitat observed comprising 8.69% or 224.19Ha of the study area.

A total of 284 plant species from 94 different families were recorded during the survey. Fabaceae was the most dominant with 25 species, followed by Asteraceae with 20 species. Two species are classified as endangered species and five species as vulnerable based on the IUCN Red List. However, none of these species are naturally occurring but are deliberately introduced by the local community or the state government. A total of 91 alien/invasive flora species were recorded during the dry season surveys, a number of which provide benefits such as food for native fauna, fodder for livestock, providing habitats or playing a role in ecosystem restoration.

Surveys of the reservoir using drop down video did not observe any submerged aquatic macrophytes, with only one floating species recorded which is non-native.

Avifauna

The project site is located within the paths of two migratory routes. Avifauna Point Counts and Vantage Point Surveys were undertaken during the dry season, and Point Counts and incidental sightings were recorded during the wet season.

A total of 40 species were identified during avifauna surveys carried out in the wet season. None of the species recorded are of elevated conservation concern at the international level. However, 5 species are nationally protected under Indonesian regulations. The Dry season recorded significantly higher species diversity with a total of 87 species of birds representing 44 families. Among the species encountered within the study area were several of significant conservation concern, including 3 Vulnerable species (Javan Myna, Javan Trogon and Sangkar White-eye) where the Javan Trogon is also range restricted, and 11 nationally protected species. However, the majority of the species recorded are urban adapted species such as Spotted Dove, Collared Kingfisher, Scaly-breasted Munia, Olive-backed Sunbird, and Sooty-headed Bulbul.

Bats

The bat community (Megabats and Microbats) within the study area was surveyed during the dry season using passive recorders, mist nets and harp nets as well as engagement with the local community. The bat netting survey encountered 19 species divided into 6 families. All species captured during the trapping surveys are of Least Concern conservation status at the national and international levels with the exception of one megabat and one microbat; Leschenault's Rousette *Rousettus leschenaultia* (NT) and Javan Slit-faced Bat *Nycteris javanica* (VU).

Of the 5,2019 sound files, 25,413 (48.9%) recordings were detected as bat calls, which can be differentiated into 7 genera. However, only 2 were identified to species level as the research of bat sound analysis in Indonesia is very limited. Local stakeholder accounts confirm that fruit bats are hunted for sport and consumption.

Mammals (Non-Volant)

Mammal surveys during the wet and dry seasons were undertaken using a combination of transects, Sherman traps, camera trapping and consultations with the local communities. The surveys identified 12 species in the study area of which the Javan Slow Loris *Nycticebus javanicus* (CR), Sunda Pangolin *Manis javanica* (CR) and Long-tailed Macaque *Macaca fascicularis* (EN) are of elevated conservation concern. Of these species the Sunda Pangolin was confirmed solely through the interviews with the local community. All other species are of Least Concern or Data Deficient Status as per IUCN.

Herptiles

Herpetofauna surveys during the wet and dry seasons were undertaken through a combination of diurnal transects and nocturnal Visual Encounter Surveys. A total of 30 species from 13 families: 5 amphibian families and 8 reptile families were recorded during the dry season whereas the wet season identified a total of 8 species of amphibians and 21 species of reptiles. All species recorded during the survey are of low conservation status at the national and international levels.

Invertebrates

Invertebrate surveys were undertaken during the dry season through diurnal and nocturnal transects using sweep nets and light traps. The survey targeted two orders; Lepidoptera (butterfly, moth, skipper) and Odonata (dragonfly and damselfly) as species are among the insects of the region that are predominantly red listed. A total of 35 butterfly species from 11 families and 17 dragonfly species from 3 families were recorded; all species are of least conservation concern.

A survey of aquatic macroinvertebrates from the reservoir recorded very few species due to the silty substrate.

Significant Biodiversity Values (CHA)

A CHA Screening exercise was undertaken to inform the Scoping process of the project. A total of 66 species of concern were identified that warranted further investigation. Subsequently, literature review, stakeholder engagement and analysis were undertaken culminating in the CHA Report. While no species were found to trigger CH, a total of 20 species are classified as Significant Biodiversity Values (SBVs) which IFC standards require an outcome of No Net Loss (NNL). The SBV's are assessed within the ESIA as Sensitive Receptors (SRs) for which biodiversity mitigation measures will be in implemented throughout the different phases of the project.

IMPACT ASSESSMENT

Construction Phase

A comprehensive Biodiversity Impact Assessment was undertaken. Sensitive ecological receptors anticipated to occur within the area of influence were identified and evaluated against potential impacts arising from different phases of the project.

The construction phase of the project was initially predicted to have major to moderate impacts within the AoI including potential habitat loss, biodiversity loss, biodiversity displacement and deterioration of environmental quality. However, with the implementation of both general control measures as well as species-specific mitigation measures, residual impacts of the construction phase are predicted to be minimal.

Loss of benthic habitat of the waterbed will also occur due to the anchoring of mooring systems, albeit minor and localized. Increased turbidity during installation of anchors may cause localized impacts in the littoral zone only, due to the paucity of benthic fauna and absence of submerged aquatic vegetation throughout the reservoir. . Given the modified habitat of the Saguling reservoir, the relatively low diversity and abundance of benthic infauna sampled during the baseline surveys and current levels of pollution in the reservoir, the impact of habitat loss on these receptors is of low magnitude and negligible significance. The EPC contractor will ensure minimization of the built footprint within the littoral zone of the reservoir and minimize the construction buffer zone. The CESMP will also include continuous and regular water and sediment quality monitoring plan of the littoral, limnetic and benthic zones.

Habitat and biodiversity loss is anticipated to occur through clearing of agricultural and other modified habitats, excavation and earth works. Species such as Javan Slow Loris are nocturnal and strictly arboreal species and are particularly vulnerable to tree clearing activities. To mitigate the risk to this species, Loris Rescue Protocols will be prepared and implemented by a team of individuals experienced in loris handling procedures, so as to recover loris that may fall out of the trees. A Chance Find Procedure will be prepared for the project and will be implemented by Environmental Manager of EPC contractor team to provide general guidance on potential ecological triggers for work stoppage. Furthermore, a full-time Ecologist as part of EPC contractor team will ensure that biodiversity commitments of the construction phase are implemented.

To ensure NNL of habitat of other SBV species, the EPC contractor will commit to the restoration of habitat post-construction, in unused land areas that are not required for the operational maintenance. The Habitat Restoration Plan will provide the restoration measures that will be undertaken within residual zones in the project area via seeding, re-planting, and landscaping with high-value species such as fruit trees and other forage species, especially those important for Javan Slow Loris and will include the monitoring and reporting requirements of the plan.

To mitigate the risk of vehicular collision, strict speed controls will be implemented, and the driving and operation of heavy machinery will be restricted to daylight hours. Besides the biodiversity impacts of the construction phase environmental quality, may also decline due to light and noise pollution, and soil compaction/erosion. These impacts are expected to be minimal with the appropriate control measures outlined in the CESMP in place.

OPERATION PHASE

Operation of the FPV project may impact the aquatic environment through habitat loss and temperature stratification due to shading of the littoral and/or limnetic zones by the FPV arrays and Floating TLs. Furthermore, electrical underwater cables and mooring systems that drag on the floor of a water body due to movement caused by weather conditions, or changes in the water level, can lead to increased turbidity levels negatively affecting the habitat and aquatic organisms.

Habitat loss due to shading includes changes in algal growth due to variations in light, which subsequently alters the nutrient factors in the water. However, a reduction in algal growth and subsequently a reduction in potential blue-green algal blooms may be a benefit to reservoirs or lakes that experience eutrophication. Shading provided by the FPV array may, in the case of the Saguling Reservoir, provide a positive impact by limiting the amount of sunlight reaching the water surface thereby ameliorating conditions that result in algal blooms and contributing towards improvement in the water quality levels. To ensure that negative impacts, if any, can be tracked and mitigated, Operational Water Quality Monitoring as well as Plankton and Algae Monitoring Plans will be implemented. In addition, the hard substrate provided by the floating panels, chains and anchors will provide a new habitat for macroinvertebrates and shading for fish and is likely to increase biodiversity around the PV panel locations.

Operation of the project Overhead Transmission Lines (OHTL) is likely to fragment the landscape's existing habitats, reducing overall ecosystem connectivity and function. Within the forest area, the transmission line will require clearing of land around the line, creating a significant barrier for forest dependent species particularly arboreal species such as the Slow Loris. Species that cross the OHTL corridor are also susceptible to predation in the cleared landscape. Wildlife crossing features such as culverts and rope bridges will be installed at regular intervals as an alternate means of safe movement across the corridor. Tall to medium height trees and shrubs species (Bamboo (*Bambusa vulgaris*) or Tea Tree (*Melaleuca alternifolia*)) will increase habitat connectivity between sections of the forest, particularly for Javan Slow Loris.

FPV installations could potentially affect avian species, specifically water-feeding birds and surface divers that hunt at the surface and pursue fish and forage underwater. It Is currently under debate If the so-called 'lake effect' causes collision impacts on birds, with experts split on the matter. There is a lack of research on the causes and correlations of bird mortality at PV solar farms. Similarly, bats may be subjected to lake-effect impacts. Bats have been studied and shown to mistake smooth anthropogenic surfaces for water, displaying drinking behaviour when tested with glass, wood and plastic smooth panels. However, they did not collide with the objects. At this time, it is unclear if birds and bats are at risk from 'lake-effect' or possibly another phenomenon causing mortality at PV farms. Therefore, fatality monitoring will be undertaken post-commissioning which will entail carcass searches on floating panels of the FPV arrays, for a duration of 2 years until the risk to birds and bat is considered 'negligible' in consultation with the lenders.

The TL infrastructure for the project will include two lines, a 150kv and a 20kv OHTL. Larger-bodied birds which tend to prefer perching at high altitudes such as raptors, including eagles, have the highest risk for electrocution, as larger wingspans create the opportunity for span the distance between energized and ground components of power lines.

Electrocution from power infrastructure also threatens many mammal species. Roosting fruit bats and gliding mammals (flying squirrels, colugos) are also sometimes killed through electrocution. Expert stakeholder consultations with Professor Anna Nekaris, Primatologist, have confirmed that Javan Slow Loris and megabat mortalities due to OHTL electrocution has been widely recorded in Indonesia. Fruit bats are likely to be more susceptible to electrocution due to perching behaviour, large wingspans and reliance on visual cues rather than auditory cues.

In addition to electrocution, collision with OHTL's also poses a significant threat. Birds most susceptible to collisions include raptors, avifauna with poor manoeuvrability (e.g., egrets), fast fliers such as pigeons and quails, or waterbirds, such as ducks and rails. The Saguling Reservoir is located in between two migratory routes; the major route begins at the northern western tip of Java at the Merak Harbour, heads east toward Bogor, Puncak Pass onto Mount Burangrang and Mount Tangkuban Parahu. The minor route also begins at the Merak Harbour but heads southeast toward Mount Halimun and east towards Mount Puntang. Although the avifauna baseline surveys indicated that migratory traffic is not high, migratory birds using these routes could collide with towers or powerlines. Fruit bats are likely to be more susceptible to collision due to flight behaviour, large wingspans and reliance on visual cues rather than auditory cues. Bats roosting in forest edges may collide with the OHTL lines in flight towards the cleared OHTL corridor to rise above the canopy.

However, OHTL design interventions are proposed including the use of existing infrastructure corridors, appropriate insulators as well as adequate spacing of the live components. Implementation of mitigation measures such as inclusion of bird visual diverters to increase line visibility and fatality monitoring will further reduce the risk of collision and electrocution. The Fatality Monitoring of the OHTLs will be undertaken to include carcass searches and mortality rate calculations due to the OHTLs and will be continued for up to 2 years or until the risk to birds, bats and arboreal species is considered 'negligible' in consultation with the lenders. Thus, the residual significance is negligible to minor.

A BMP will be prepared which includes Species Action Plans (SAP) detailing the required species-specific mitigation measures, BMP Tables, and Biodiversity Monitoring and Evaluation Plan (BMEP) Tables to consolidate all biodiversity management actions and requirements in a single document.

4.2 Water Environment

The installation of anchoring system, other supporting structures and the use of tugboats to pull the FPVs into place after being launched in the reservoir can potentially result in the disturbance of sediment and muddy layers of the reservoir leading to the release of a small proportion of sediment from the reservoir bed. This will alter the reservoir bed potentially resulting in localised impacts to water chemistry associated with increase in suspended

sediment. In the absence of mitigation measures, plumes of fine suspended sediment would form and will result in a temporary localised increase in turbidity and reduction in light availability in shallow waters. Increased turbidity may cause resuspension of sulphides causing reduction in oxygen or resuspension of heavy metals from the sediment. As such, the project will develop and implement a Sediment Quality Management Plan.

During construction accidental release of hazardous materials would have an impact on the water quality with surface scum potentially developing on the water surface preventing oxygen from getting into and circulating in the water which in turn will affect aquatic receptors and their productivity. Although the risk is deemed low due to the limited volume of hazardous materials anticipated on site, the EPC Contractor will implement a Spill Response and Contingency Plan, Waste Management Plan, Hazardous Materials and Waste Management Plan.

Potential impacts from the operational phase will include contamination of surface water during cleaning of the FPV. However, this risk is considered low as ACWA Power has confirmed that the cleaning process will not include any detergents or chemicals. Additionally, the O&M will undertake water quality monitoring.

The installation of the panels will result in shading of the reservoir, and this could potentially block sunlight, which would likely negatively impact underwater phytoplankton and algae that rely on the sunlight for photosynthesis. This may have an indirect negative impact on the aquatic ecosystem due to decreased O_2 levels and increased CO_2 levels in the reservoir thereby affecting primary productivity. Shading of the reservoir will also reduce water evaporation and lower water temperature however such impact is expected to be limited to the floating PV project area. To determine the impacts, Water Quality and Primary Productivity will be monitored quarterly during the first 3 years of operation within the FPV area and surrounding areas to assess the functioning of the ecosystem. Monitoring will then transition to a biannual schedule in years 4 and 5 and will only continue thereafter if significant changes are observed at control sites or if there is a notable impact on ecosystem services.

4.3 Soil, Geology, Groundwater and Surface Water

SOIL EROSION AND ASSOCIATED SEDIMENTATION

During the construction phase, land-based activities will be limited to land clearance and earthworks, primarily at the assembly areas near the shoreline, the substation area, OHTL towers, and switching station.

The disturbance, displacement, and exposure of soil increase the risk of water driven soil erosion within the construction footprint. Soils with little to no vegetative cover (following earthworks) are particularly prone to erosion during periods of high rainfall and may result in sediment laden runoff entering drainage channels or flowing overland into the Saguling reservoir, potentially resulting in a localised temporary impact to water turbidity, suspended solids, and discolouration of the water.

Erosion and sedimentation impacts are not expected during operations.

CONTAMINATION OF RESIDENT SOIL AND GROUNDWATER

The Project's construction phase will involve the transportation, handling, storage, and use of certain materials, including fuel, paints, solvents, hydraulic fluids, and lubricants. While these chemicals and fuel will be stored in limited volumes on-site with suitable pollution protection, such as secondary containment, in the event of accidental release, spill or leakage, this may result in either direct or indirect pollution to soil and/or groundwater which could potentially expose human end-receptors to a host of risks, including health impacts.

Construction activities will also entail the generation of hazardous waste such as USED Oils, concrete washout water, untreated sewage, hazardous chemical containers, and soiled absorbents, of which the improper handling, storage and transfer may result in similar impacts.

During the operational phase, even fewer quantities of hazardous waste are expected to be generated and will be limited to activities such as the replacement of defective electronic equipment, transformer servicing and oil draining, and the generation of black and grey wastewater (sewage). In addition, spills and leakages can also occur due to failure or overflow of the wastewater treatment tank. Operation of the OHTL is expected to generate minimal waste.

4.4 Ambient Air Quality

The potential air quality impacts from the Project were found to be dust, gaseous emissions, odour, and volatile organic compounds (VOCs). The principal sources of these impacts are expected to be excavation and earthworks, vehicles, construction equipment, and wastewater equipment. These impacts could affect the workers and the residents.

Construction workers will have a high sensitivity to airborne dust from clearance and excavation processes. Residents near the construction works will be potentially affected by dust due to being near where heavier works will occur. The dust generated from excavations and earthworks typically consists of large diameter particles that settle rapidly and close to the source of generation. However, it is anticipated that any resulting impact will be minimal for the Project.

The principal sources of gaseous emissions will be during construction and will be from the combustion of fossil fuels from the operation of vehicles, construction equipment, and plant. Emissions may have an impact on the workers due to their proximity to the work being conducted. Residents may be affected along the transport corridor and OHTL route. As ambient air quality in the Project area is well below the established Indonesian and WHO standards, specific cumulative impacts at receptors are not expected.

There is potential for the release of odour to immediate surrounding areas from inappropriate containment and coverage of toilets and associated septic tanks. The expected range of impact from odour is likely to be within 100m from sources such as temporary toilets/septic tanks, therefore only potentially impacting one receptor, Saguling village.

Small quantities of fuels, paints, solvents, and other volatile substances are likely to be required during the construction of the Project, particularly the OHTL, FPV modules, and switching yard. The volumes of such volatile substances will be small, therefore no impacts to receptors outside of the laydown area and construction zones are expected.

4.5 Noise and Vibration

During the construction phase, the potential impacts are expected to be noise from construction activities at the laydown area, switchyard, OHTL, and access roads, as well as from the movement of vehicles on, and to and from the site.

The noise generating activities during the Project's construction phase will include the off-loading of materials and equipment, movement of construction equipment, site preparation, civil works, FPV construction areas, among other activities. In addition, stationary and mobile sources of construction noise have the potential to influence ambient noise levels within the vicinity of the project site and transit corridors. These above impacts predominantly relate to the preparation of areas, therefore are relatively short-term activities, which will only have short term impacts. During the positioning of the FPV modules on the lake, and during the placement and construction of the groundings, there is a likelihood of noise impacts from the tugboats on the reservoir.

The Project's construction phase will potentially entail vibration-generating machinery and equipment. This is expected to only be from the earthworks phase of the Project as most of the

construction works will emanate very little to no vibration. Impacts from vibration are not expected to be discernible over 500m away from the land-based facilities.

4.6 Traffic and Transportation

ROAD TRANSPORTATION

Potential impacts relating to traffic and transportation during construction include increased traffic congestion along public roads within the Project's transit corridor and access roads, due to the movement of project vehicles for the transportation of construction materials, equipment, and workers. This can potentially disrupt local transportation patterns, increase travel times, and potentially lead to economic losses. Furthermore, the higher volume of traffic, particularly on local roads where residents, including children, are unaccustomed to frequent traffic, raises the risk of road accidents. As such, close coordination will be required with the road transport authorities to manage the transport of materials for the Project, which will be detailed in a Traffic and Transportation Management Plan. In addition, a road safety campaign will be implemented in local communities along the access roads to raise awareness on the safety risks involved with increased traffic.

The number of vehicles during the operational phase are likely to be low, with access required for maintenance and servicing. It is expected that most of these vehicles will be light vehicles. However, the risk of road accidents will be managed by the O&M ensuring that all drivers have the required licenses and permits, and that they receive induction training.

WATER TRANSPORTATION

The installation of the FPV and the cables and the establishment of the restricted zone around these facilities will disrupt water transportation within the reservoir. It is noted that water transportation within the restricted zone (where the project facilities will be located), is prohibited due to safety reasons. However, the enforcement of this restriction has been lax.

Based on the consultations undertaken as part of the ESIA in December 2023 and the LRP in October/November 2024, the local communities use the reservoir to access the KJAs, fishing stalls, islands used for farming, Bunder market including other villages etc.

As such, the establishment of the restricted zone will have a direct impact on how the reservoir users and local communities' access different areas, and it could potentially result in added travel time and costs.

To mitigate against these impacts, the project has identified alternative water transportation routes and consultations are currently on-going with the local communities to determine their suitability and the required mitigations in cases where design changes are not possible.

4.7 Archaeology and Cultural Heritage

There is a known archaeological site located approximately 60m northwest of one of the FPV arrays. Sirtwo Island is recognised as a cultural heritage site under the status of 'cultural heritage potential object' in line with the Ministry of Education and Cultural Regulations No. 36 of 2023. Additionally, there are other cultural sites located outside of the FPV boundaries and 100m of the OHTL Right of Way (RoW). In addition to the known archaeological sites, there remains potential to uncover previously buried archaeology (chance finds) within the project footprint during the construction phase. As such, a Cultural Heritage Management Plan and a Chance Find Procedure will be prepared and implemented.

Impacts to intangible cultural elements (as identified in consultation with the West Bandung Regency Culture and Tourism Office) are expected to be minor and will be managed through the implementation of a Worker's Code of Conduct which will include measures relating to respect of local beliefs, customs, rituals and their general way of life.

During the operational phase, there will be no further excavations at the project site and as such, there is no risk of uncovering an item of archaeological importance at this phase. However, during maintenance activities, it will be important to ensure that the existing archaeological and tangible cultural heritage sites are not damaged by the O&M staff through unauthorised access. Cultural awareness training will also be provided to all the operational staff during the induction process.

4.8 Landscape and Visual Amenity

LANDSCAPE

The construction and operation phases of the Project will result in changes to the landscape character. The presence of construction vehicles and machinery, including tugboats, will be a distinct change to the baseline landscape character which is based around rural, farming and aquaculture communities. Once the Project is operational, the presence of floating PV Panels, the substation and transmission line will change the landscape character to that of more industrial / commercial feel.

CHANGES IN THE CULTURAL VALUE OF CULTURAL HERITAGE SITE

While direct impacts are not anticipated, multiple culturally and archaeologically important sites will be in the vicinity of the Project FPVs, substation and OHTL, and the change in visual amenity from these culturally important sites may influence the cultural value of the sites. Despite there being multiple culturally important sites in the vicinity, none are considered receptors particularly vulnerable to changes in visual quality from Project activities. The magnitude of impact for all cultural sites within the area is of minor significance. During operation, no additional cultural heritage impacts are expected beyond those assessed during the construction phase as the Project facilities will be static.

VISUAL

During construction, the visual envelope of Saguling village near the sub-station, laydown area, and the OHTL will be impacted, especially during the nighttime. The use of lighting across the site during the construction phase will introduce light spill & glare and result in a nighttime light haze likely to be visible for several kilometres along the reservoir shoreline. However, this impact will be temporary and any impacts from lighting are anticipated to be minimised by limiting works being undertaken during the night and by the on-site implementation of specific controls detailed in the CESMP.

Additionally, during construction there will be a significant number of tugboats on the reservoir that will be visible from the numerous villages and towns around the reservoir and have a notable change in the visual amenity of receptors.

During operations, the reflective surfaces of the floating PV panels may result in glint and glare impacts due to the reflection of light from the PV modules, however, this is of negligible significance.

4.9 Solid Waste and Wastewater Management

The construction of the FPV and OHTL will result in the generation of waste due to excavations, packaging waste, electronic waste, and hazardous waste. This will also include sanitary waste which will be managed through an integrated wastewater treatment system before being discharged.

During the operational phase, there will be relatively few waste streams, although maintenance waste may be generated in small quantities on a continued basis. The ESIA outlines the mitigation and management measures and the implementation of a Waste Management Plan.

4.10 Socioeconomics

The construction and operation of the FPV and OHTL is expected to positively influence the local, regional and national economy i.e., through employment and capacity transfer and direct procurement and supply of materials.

Negative impacts relating to the construction phase will include impacts on vulnerable groups such as through worker influx, and economic displacement (refer to chapter 3 above). The implementation of the LRP will address and mitigate the economic displacement resulting from the project construction. Other impacts will be managed in accordance with the requirements set in the ESIA.

In the operational phase, the project will further contribute to economic growth by enhancing power supply in Indonesia.

STAKEHOLDER CONSULTATION

A dedicated Stakeholder Engagement Plan (SEP) has been developed for the project, outlining the strategy and approach for engaging stakeholders during the construction and operational phases. The SEP defines methods to effectively manage and facilitate stakeholder engagement through the project lifecycle. It has been developed to align with the IFC Performance Standard 1, which provides detailed guidelines for stakeholder engagement requirements.

The SEP also includes a detailed grievance mechanism, which will be available to both Project workers and external parties. The grievance mechanism will be available to receive complaints or other concerns/comments and can be accessed for free, with no retribution to users. If necessary, methods have been inbuilt to retain the anonymity of the aggrieved. The responsibility and accountability of the grievance mechanism remains with the Project Company, but the implementation of the mechanism may be made by the EPC Contractor and O&M Company respectively during construction and operations.

4.11 Ecosystem Services

Commencement of the construction phase may result in the restriction of access to areas for farming, aquaculture and fishing cages which may have an economic impact on local communities. The extent of these impacts of land acquisition and relocation of fishing cages to the local community are detailed in the project specific Livelihood Restoration Plan (LRP).

The construction phase of the project is expected to impact species present at the site through habitat loss, clearing, excavation earthwork and general disturbance. Several taxa recorded during baseline surveys such as many bats, butterflies, primates and ground burrowing species provide the multiple ecosystem services. Specific mitigation measures for these impacts are outlined in the Biodiversity, Water Environment and Air Quality Chapters of the ESIA vol 2.

The Implementation of the Water and Sediment Quality Management Plan, prepared by the EPC Contractor prior to the commencement of construction, will mitigate impacts to the aquatic environment.

Several traditional, cultural practices are carried out by local communities that are located in specific areas present at the project site. While no construction activities are expected to occur in these areas, workers trespassing, unauthorised storage of project materials, anchorage of PV floaters etc could result in the potential degradation and destruction of these areas. As such, the mitigations, management and monitoring requirements within the ESIA will require to be implemented.

Operation Phase

During the operation phase of the Project, shading of aquatic habitats by the FPV arrays themselves, may result in habitat loss. This has the potential to negatively impact the aquatic flora or fauna that rely on light for photosynthesis, seeking prey and food production. However, this impact is deemed minor, as non-native farmed species such as Catfish, Carp and Tilapia are more resilient to poor conditions.

The impact of cleaning and maintenance activities of the PV arrays has the potential to impact the water quality, subsequently having an impact on habitats, the provision of freshwater for irrigation and the survival of fish species. It is understood from ACWA Power that the cleaning process will not include any use of detergents or chemicals, therefore contamination due to chemicals is unlikely. However, pollution of surface water may occur due discharges of the water used for cleaning into the waterbody. The Preparation of a Waste Management Plan and adherence to the Operational Mitigation Measures outlined in the Water Environment Chapter will help mitigate the above impacts and minimise the magnitude of the effects.

The OHTL has the potential to impact species that play a crucial role in ecosystem services due to the risk of electrocution/collision with the OHTL during operation. Mitigation measures include proposed OHTL design interventions including the use of existing infrastructure corridors, appropriate insulators as well as adequate spacing of the live components. Additionally, wildlife crossing features such as culverts and rope will be implemented to mitigate against habitat loss and fragmentation. Thus, the residual impact is negligible.

4.12 Community, Health, Safety and Security

The potential risks to communities will include safety, health and security risks, Gender Based Violence & Harassment (GBVH), Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH), and water related accidents. These risks will be managed through measures outlined in the ESIA and the implementation of appropriate plans, procedures, and policies, including the Emergency Preparedness and Response Plan, Influx Management Plan, GBVH policy etc.

The operational phase of the FPV include various risks that could result in impacts to public safety such as those related to the use of the reservoir for various socio-economic activities. Such risks may include collision of boats with the FPV arrays and cables, and unauthorised access to the restricted zones of the project. As such, the O&M will be required to undertake a comprehensive Occupational Health and Safety Risk Assessment before the start of the operational phase including developing and implementing the corresponding Community Health & Safety Management Plan and Emergency Preparedness and Response Plan.

Safety risks related to the OHTL, such as electrocution and electromagnetic field exposure, are considered negligible as the construction and operation of the OHTL will comply with the applicable Indonesian standards.

MILITARY TRAINING ON THE RESERVOIR

The access restrictions established by the project along the FPV arrays and floating cables, combined with periodic restrictions due to military training, must be closely coordinated to avoid confusion or contradictions in their implementation, as this could pose a safety risk to local communities who use the reservoir. To manage this risk, the EPC Contractor and the O&M will be required to undertake a Health & Safety Risk Assessment before the start of the construction and operational phases respectively. In addition, coordination with the military will be undertaken through the Project Company to ensure the safety measures implemented are aligned.

4.13 Labour & Working Conditions

Potential impacts relating to working conditions and occupational health and safety in the Project's construction and operational phases include unequal access to employment opportunities and benefits due to discriminatory and/or exploitative recruitment practices, poor working and living conditions, occupational health and safety incidents, forced labour, child labour, and workplace harassment, violence and other security incidents involving project workers.

The key supplementary plans that will be implemented for the management of construction-phase impacts on labour conditions and occupational health and safety include a dedicated Occupational Health and Safety Plan (to be informed by a H&S Risk Assessment), Emergency Preparedness and Response Plan, Worker Accommodation Plan and Supply Chain Management Plan, alongside the project-level Human Resource Policy, Human Rights Policy and Code of Conduct. An equivalent set of management plans and policies will be developed for labour related risks and impacts in the Project's operational phase.

MILITARY TRAINING ON THE RESERVOIR

The Indonesian Military (TNI) conducts periodic shooting training at the Saguling reservoir near the intake. This poses a safety risk to workers during the construction and operational phases if safety measures, such as halting work during the training sessions and strictly following TNI's instructions, are not implemented.

To address this, it is crucial that the EPC Contractor and O&M conduct a H&S Risk Assessment to identify the potential risks. Additionally, the Project Company will facilitate consultations with the military to ensure safety protocols are properly coordinated and implemented during the training sessions.

4.14 Influx Impact

In addition to the influx of workers in the area, the development of the FPV & OHTL may result in the in-migration of other people seeking direct or indirect opportunities from the Project such as opportunistic in-migrants seeking jobs from the Project, opportunistic traders aiming to take advantage of business opportunities encouraged by the Project and by the increased income of the local community and other migrants seeking to take advantage of the economic and development opportunities created in the area.

This may result to social conflict, increased competition on public services, health risks (relating to spread of communicable diseases and sexually transmitted diseases), GBVH, disruption of local culture, increase in crime, local inflation etc.

However, due to the location of workers accommodation facilities within the Project site and in larger cities, it is expected that workers and community interaction will be kept at a minimal and other impacts will be managed through the implementation of an Influx Management Plan, a Code of Conduct, Local Content Plan, Cultural Sensitization Training to guide staff on appropriate behaviour & interaction with local communities and purchase of goods & services.

4.15 Climate Affairs

The stationary sources used during the construction phase of the Project will primarily relate to temporary diesel generators, which will be located around the site in the EPC Contractor and sub-contractors' laydown areas. The estimated quantity of fuel required during the construction phase is 18,000L during the 12-15 months of the construction period. This translates to an estimated annual GHG emissions of 483.35 $tCO_{2\text{-eq.}}$ The volume of biomass to be removed is expected to be minimal due to the predominantly agricultural nature of land use and limited clearing of required forest areas. As such, the annual emission during construction is not expected to reach the IFC threshold value of significance of 25,000 tCO2e per year.

As a renewable energy project, there is essentially a neutral impact on GHGs when the project is generating, as it will not combust fossil fuels. It is estimated that over the 25-years operational period, the total net saving will be approximately 2.724 million $tCO_{2\text{-eq}}$ when compared to conventional grid energy source.

In relation to the project vulnerability to climate change, it will require continuous maintenance and coordination with Indonesia Power Saguling to ensure that the required management measures during extreme weather events are implemented to protect the project.

5 ENVIRONMENTAL & SOCIAL MANAGEMENT & MONITORING

Both the construction and operational phase of ESMS will need to incorporate mitigation and monitoring requirements established within Volume 2 of the ESIA as well as requirements set out by the State Committee on Ecology and Environmental Protection and the Lenders.

Volume 3 of the ESIA provides a framework for the development of the Environmental and Social Management System (ESMS) for the construction and operational phases of the Project. The framework has been developed to ensure that all Environmental & Social impacts identified for both construction and operational phases are appropriately identified and controlled through the development of a robust construction and operational phase ESMS. ACWA Power has developed an ESMS Implementation Manual for the Project Companies to ensure there is sufficient oversight of contractors and operators and ensure compliance, risk and opportunity management including monitoring.

In addition, there will be dedicated competent Project teams put in place by the EPC Contractor and the O&M Company overseen by the Project Company to ensure the implementation of the E&S mitigation measures.

The primary documents guiding the environmental and social management of the construction and operational phases will be the Environmental and Social Management Plans (ESMP) respective to construction and operational risks, impacts and compliance requirements.

5.1 Independent Auditing and Monitoring

The Project will be subject to periodic independent monitoring in accordance with the requirements of the lenders Environmental and Social Action Plan (ESAP). The scope of the independent audits will include the implementation of the project ESMS and will evaluate on-site activities and documented controls and monitoring efforts, with respect to the Project's compliance obligations.

APPENDIX A – PROJECT CONTACT INFORMATION

Table A-1 Project Contact Information

NAME	ASPECT	CONTACT DETAILS
ACWA Power	Indonesia local address and contact details	Address: Pondok Indah Office Tower 5. Jl Sultan Iskandar Muda Kav. V-TA Pondok Indah
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