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Assessment Report

Project Name: Asahan-3 HEPP

Installed Capacity: 174 MW

Country: Indonesia



Project Sponsor: PT. PLN (Persero)

Report Author: Joerg Hartmann, Jørn Stave, Deny Ramadhani

Report Date: August 5, 2025



Asahan-3 HEPP, 174 MW, Indonesia

Cover page photo: Asahan valley with the switchyard of the upstream Tangga power plant in foreground and the headworks of the Asahan-3 power plant in background.

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The findings in this report are based on an independent assessment conducted in compliance with the processes set out in the Hydropower Sustainability Assurance System.



Hydropower Sustainability Standard

About the HSS	The Hydropower Sustainability (HS) Standard is the normative document that sets out the performance requirements of the Hydropower Sustainability Certification System, a global labelling and certification scheme outlining the expectations for hydropower projects around the world. The HS Standard recognises hydropower projects for their environmental, social and governance (ESG) performance by setting minimum and advanced performance requirements for the sector and acknowledging projects for meeting these requirements. The HS Standard is aligned with the safeguards of key lenders (e.g. IFC and World Bank) and can be used to attract climate-aligned finance through green bonds certified by the Climate Bonds Initiative and support electricity sales to RE100 companies. The HS Standard is managed by the Hydropower Sustainability Alliance. The HS Alliance was established in October 2023 to act as the independent and multistakeholder standard-setting body that oversees the Hydropower Sustainability Certification System.
Intended users and uses	The HS Standard includes three separate stages: Preparation, Implementation and Operation. These reflect the different stages of hydropower development and have been designed to be used as standalone documents. Each reporting template provides an action plan to help project teams address any gaps against minimum (good practice) and advanced requirements (best practice). Official HS Standard assessments are carried out by Accredited Assessors, who take an evidence-based approach based on data triangulation. All findings are supported by objective evidence, which is factual, reproducible, objective and verifiable. The HS Standard is most effective when operators and developers commit to implement the recommendations provided and resolve identified significant gaps. Hydropower development and operation may involve public entities, private companies or combined partnerships, and responsibilities may change as the project progresses through its life cycle. It is intended that the organisation with the primary responsibility for a project at its particular life-cycle stage will have a central role in any HS Standard assessment.
Structure of the reporting template	The HS Standard comprises 12 sections that cover the environmental, social, governance and climate change impacts, both negative and positive, that arise from hydropower development and operation. Summary sections at the beginning of the report include: (A) Assessment Overview, (B) Project Details, (C) Performance against Minimum Requirements, (D) Performance against Advanced Requirements, (E) Environmental and Social Action Plan and (F) Abbreviations and Acronyms. The summary sections are followed by the 12 ESG sections where requirements for good and best practices are presented and project findings are provided. The report finishes with three appendixes that list the types of evidence used in the assessment.
Supporting resources	Additional guidance on the structure, content and history of the HS Standard can be found online at: www.hs-alliance.org
Version date	October 2023

A. Assessment Overview

Assessor(s)	Joerg Hartmann (Sustainable Water & Energy LLC), Jørn Stave (Multiconsult), Deny Ramadhani
Assessment objective	- Enhancing the company's reputation among stakeholders - Facilitating access to green financing opportunities - Strengthening stakeholder engagement and maintaining positive relationships with affected communities and relevant institutions - Demonstrating a strong commitment to sustainable development principles and international best practices
Assessment dates	December 11-17, 2024
Observer	Ismet Rahmat Kartono, INAHA
Assessment report date	August 5, 2025
Summary of key findings	The assessment of the Asahan-3 HEPP was conducted in December 2024. A draft report was presented to the proponent in April 2025, requesting additional documentation in order for the assessment to proceed. Over the following months, further information was provided through exchanges between the assessors and PLN, including a series of discussions and online meetings. Based on this supplementary evidence, the Preliminary Assessment Report was completed in August 2025. HSS-1: Asahan-3 HPP has a small footprint and a limited incremental impact on an already strongly altered river. The owner and operator PLN has significant experience regarding E&S management systems, and there are basic monitoring and management plans in place to address environmental and social compliance requirements and commitments. HSS-2: PLN has a large workforce and well-established human resource and OH&S policies and processes, that apply to the Asahan-3 project. There are no indications for any issues related to labour conditions and labour rights. HSS-3: The Asahan River carries pollutants and nutrients from its catchment, but the upstream waterbodies trap most of the sediments, and there are no significant impacts on the project. Water quality and turbidity were monitored during construction, with no significant impacts attributable to the project. Monitoring will continue into the operation phase. The project has been designed and will be operated with minimal impacts on water quality, erosion and sedimentation. PLN is committed to improving local community sanitation, and coordinating with stakeholders to reduce erosion from the catchment.

	HSS-4: Following significant delays caused by regulatory constraints relating to the land acquisition process, the construction of Asahan-3 HEPP resulted in economic displacement of about 500 landowners. Additional households will be economically displaced as the project goes into full operation due to river flow alterations affecting fishing communities and rafting businesses. PLN has managed the impacts caused by land acquisition and land use restrictions by providing cash compensations in accordance with government procedures. Project-affected communities have also been provided with replacement infrastructure (e.g., irrigation intake and canals), employment during construction, and a range of CSR initiatives / project benefits. PLN is conducting monitoring and has planned adaptive management measures to support vulnerable groups. The operation of Asahan-3 HEPP is not likely to cause public health risks, and public safety risks are low because of the small volume of water in the headpond and limited exposure of people downstream. HSS-5: The project did not require major resettlement, but three households were physically displaced as a result of land acquisition. The physically displaced households were provided with compensations in accordance with standard government procedures and were treated similar to economically displaced households (i.e., those who lost land and other assets except their residential structures). The resettles opted for cash compensations and have relocated to nearby locations within the community. HSS-6: The project is predominantly located in a forested landscape consisting of a mosaic of primary and secondary forest mixed with planted trees and crops. PLN has been issued with a license to use the forest for hydropower development by the Ministry of Environment and Forestry on the condition that temporary disturbed sites are restored, and that permanent loss of forest is compensated by off-site reforestation. These requirements, combined with the relatively small footprint of the project, suggest that negative impacts on terrestrial biodiversity can be mitigated and will be limited in the long term. There is, however, more uncertainty associated with the impacts on aquatic biodiversity due to permanent river diversion and run-of-river operation. The regulated flow regime is not based on a detailed assessment of environmental flow requirements, yet the minimum flow release is higher than originally proposed and corresponding to nearly 10% of the average pre-project flow. HSS-9: The project is owned and operated by PLN, a large state-owned corporation. PLN faces a number of challenges, including slow regulatory processes, financial constraints and a complex corporate structure. However, the organization is undergoing a reform process and adopting a modern ESG framework. HSS-10: As the project has only recently been commissioned, evidence on communications and consultation is mainly from the implementation stage. A Grievance Task Force (GTF) has been operational since commencement of construction in 2019. The GTF is responsible for grievance management as well as community outreach and is staffed with social scientists and Community Liaison Officers (CLOs) from the University of North Sumatra Research Institute (LP-USU). Despite many grievances recorded during the construction phase, the GTF has been very effective in helping to resolve cases and managing relations with the affected communities. The GTF services will be continued into operation stage although the exact modalities have not yet been formalised with the operations team (PLN Nusantara Power). The project Stakeholder Engagement Plan (SEP) provides an overview of relevant
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	stakeholders and has provisions for regular updates. PLN maintains good relations with government agencies and other institutions, and makes project information publicly available in accordance with the Public Information Disclosure Act of Indonesia. HSS-11: Asahan-3 is a run-of-river, diversion type hydropower project, relying on upstream storage and releases for its inflows. These inflows are exceptionally stable and predictable, allowing for a very high load factor. There are a number of environmental and social reasons to maintain flows in the bypass reach of approximately 10 km, minimum flows through that reach have been agreed, and there is monitoring to confirm whether environmental and social objectives of these flows are being achieved. HSS-12: Project emissions are very low, and the project will make a significant contribution to climate change mitigation by displacing coal-based generation in the Sumatran power grid. Although this has not been assessed in detail, the project should also be resilient to climate change, as it is downstream from Lake Toba which buffers any seasonal or even inter-annual variability of inflows, and general projections are towards increased precipitation. PLN is applying its general risk management framework to physical climate risks, which is planned to be applied to individual projects in due course.
Limitations of the assessment	Commercial Operations Date (COD) was reached on December 28, 2024. During the on-site assessment, the project had just entered trial operations. The construction supervision team (from PLN UIP SBU, the regional unit for northern Sumatra), the last contractor still on site (Mitsubishi/Voith), the owner's engineer (Nippon Koei), and the incoming operations team (from PLN NP) were engaged in commissioning the plant, handing over responsibilities, and developing operational plans and processes. Not all operational routines, strengths and weaknesses were therefore fully established at this point. Nevertheless, the assessment team concluded that enough evidence was available to evaluate the project against the Operations stage requirements of the HSS.

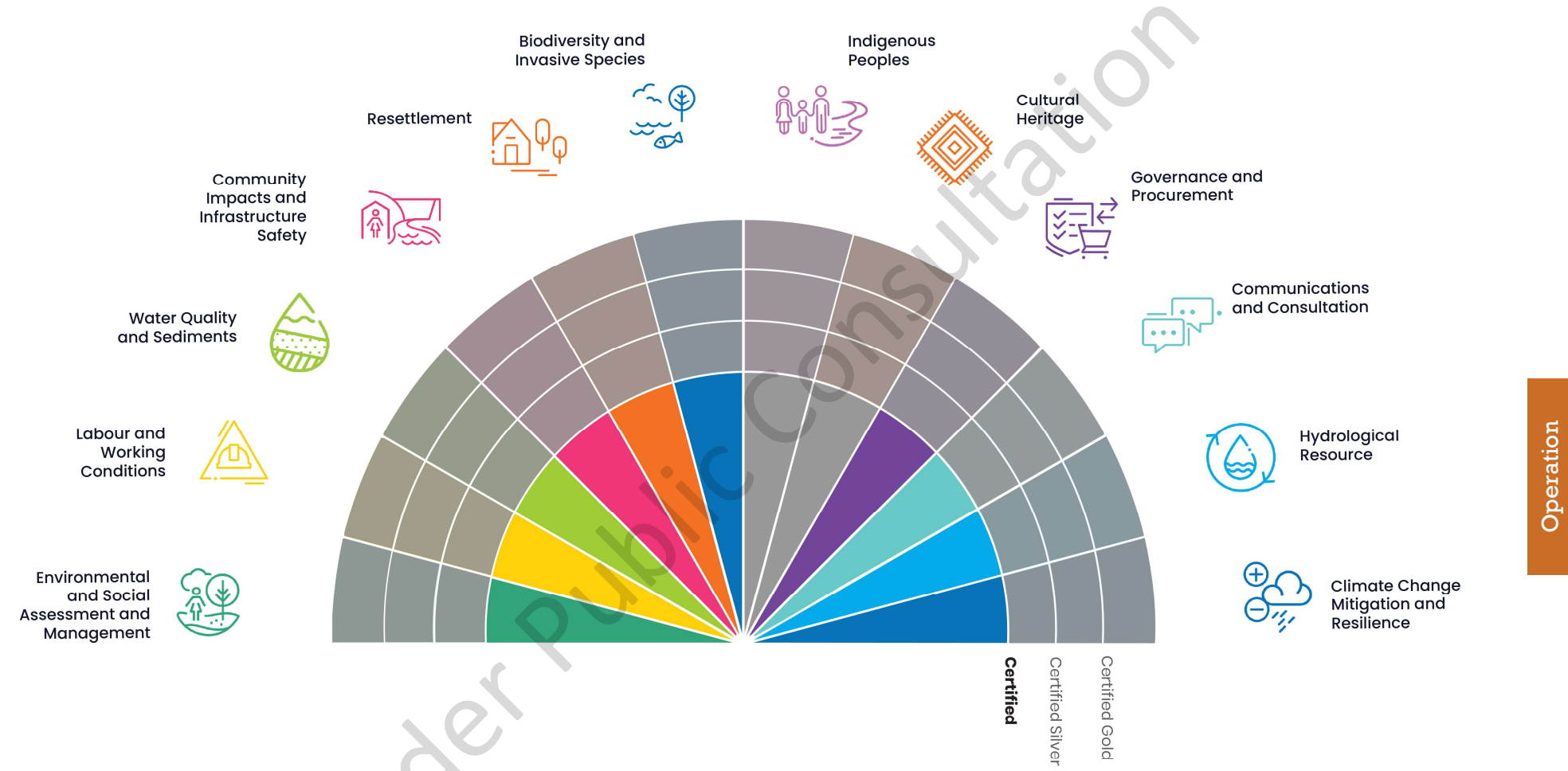


Figure 1 – Hydropower Sustainability Standard (HSS) Results Diagram

B. Project Details

Project name	Asahan-3 Hydroelectric Power Project (HEPP)
Country	Indonesia
Location	Meranti Utara village, Puntu Pohan Meranti subdistrict, Toba regency, Sumatera Utara (North Sumatra) province
Purpose	Hydroelectric power generation
Developer / Owner	PT. PLN (Persero)
Financer(s)	JBIC/JICA loan for JPY 27,642 million; PLN (approximately 50% each)
Installed capacity (MW)	174 MW
Construction start date (planned or actual)	28th March 2019 for main works
Commercial operations date (planned or actual)	19th December 2024
Annual average generation (GWh / year)	1,477 GWh/year
Associated infrastructure: road(s) (length)	15.6 km of road improvement, 12.4 km of new roads
Transmission lines and sub-stations (names, lengths and capacities)	30 km 150 kV transmission line between Asahan-3 substation and Simangkuk substation
Total cost (USD m)	USD 352 m (total construction cost)
Annual operating costs (USD m)	USD 2.1 m (0.5% of civil and metal construction cost, 1.5% of electrical construction cost)
Specific investment cost (USD m / MW)	USD 2.02 m / MW (= 2,023 USD/kW)
Levelised energy cost (USD / kWh)	0.0295 USD/kWh (= 2.95 US¢/kWh)
Dam type	Gated concrete weir
Dam height (m)	7.5 m
Dam length at crest (m)	58.25 m (weir length of sluiceway)
Units (number, type, MW)	2 units, vertical-shaft Francis type, 87 MW
Reservoir area at Full Supply Level (FSL) (km ²)	2 ha at FSL 264.6 m
Average net head at FSL (m)	184.9 m
Average flow (m ³ / s)	118.26 m ³ /s
Design flow (m ³ / s)	106.8 m ³ /s
Load factor	97.1%
Number of physically displaced households	3
Power density (W / m ²)	174 MW/30,000 m ² = 5,800 W/m ²
Emissions intensity (gCO _{2e} / kWh)	Not available
Contacts / website	https://web.pln.co.id/en/about-us/company-profile

Asahan-3 HEPP, 174 MW, Indonesia

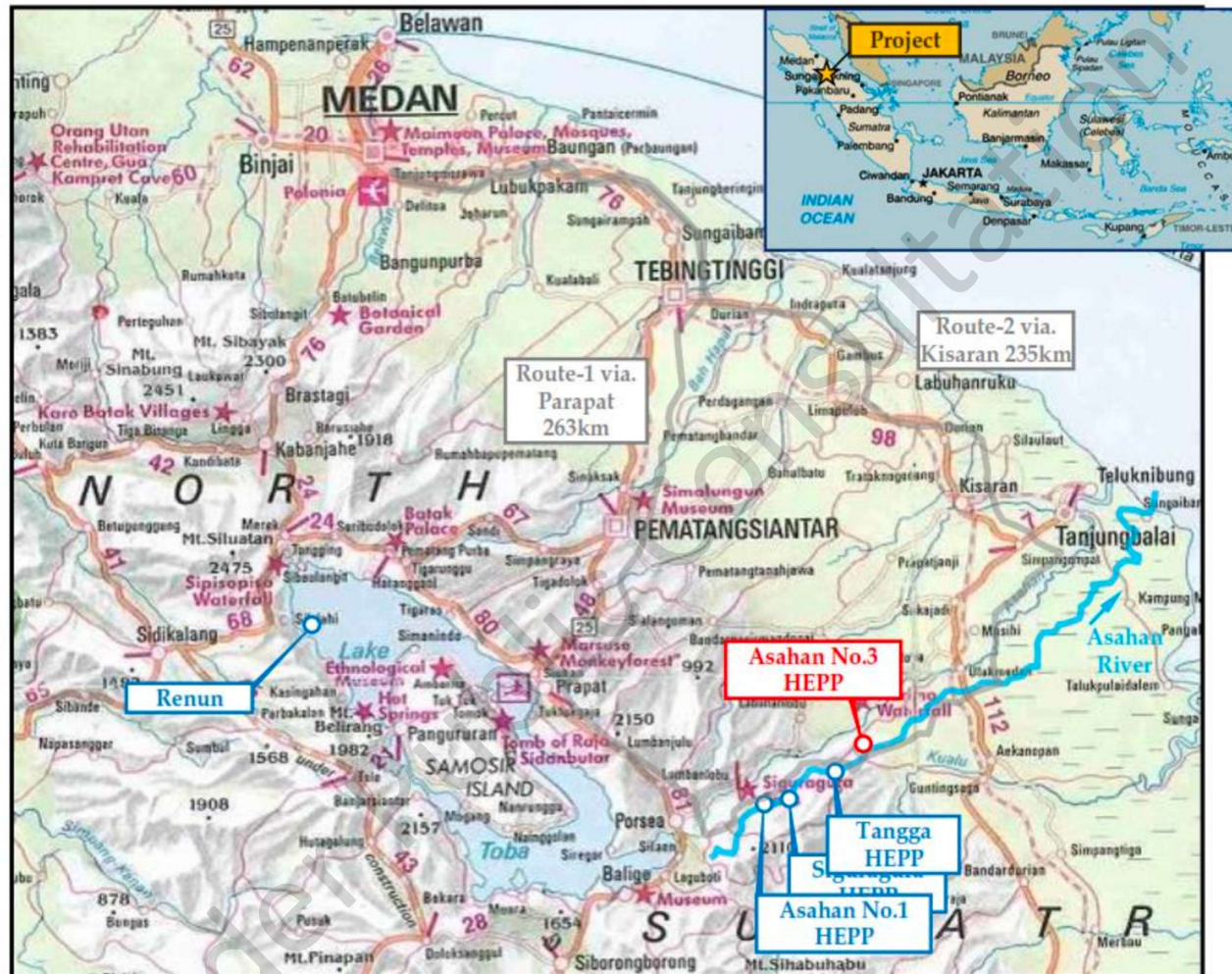


Figure 2 – Location of Asahan-3 HPP in North Sumatra Province. The Asahan River is the only outlet from Lake Toba, the largest volcanic lake on Earth, and flows in a north-easterly direction to the Strait of Malacca. Asahan-3 is located downstream of the existing projects Asahan-1 (commissioned in 2010) and Asahan-2 (consisting of two plants commissioned in 1983).

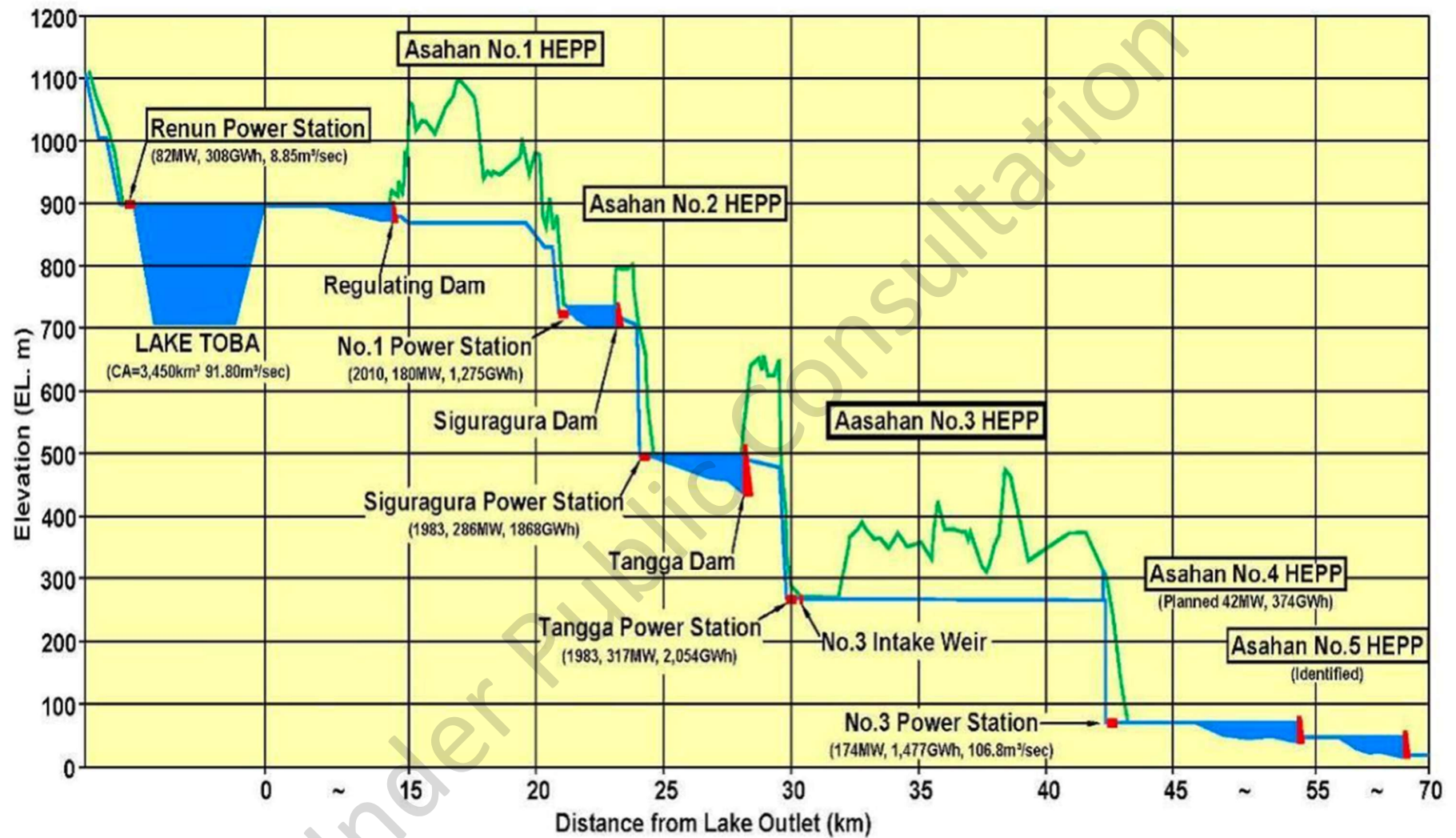


Figure 3 – Profile of Asahan Hydropower Cascade

Asahan-3 HEPP, 174 MW, Indonesia

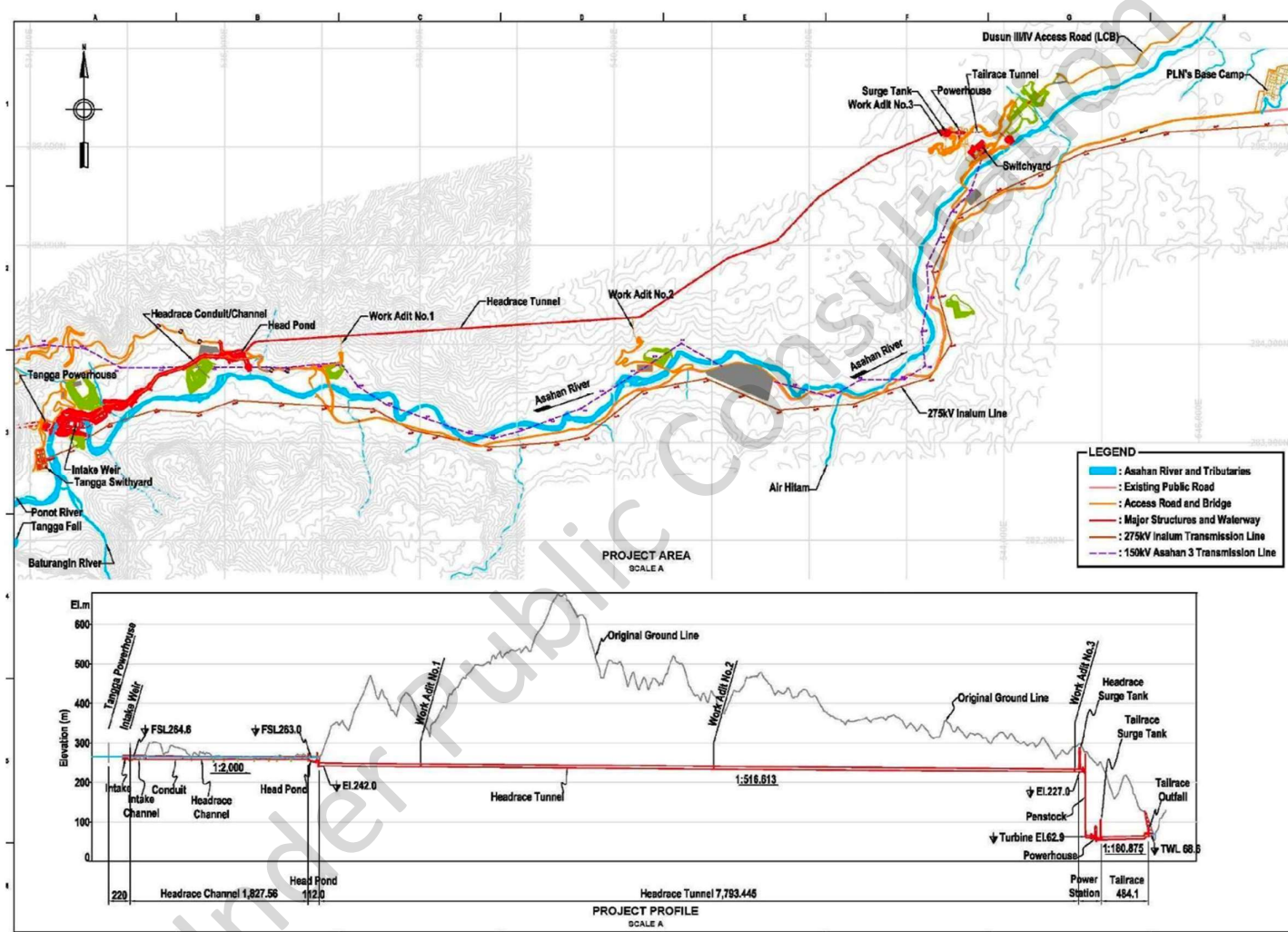


Figure 4 – Project Layout and Profile

B. Project Details

Asahan-3 HEPP, 174 MW, Indonesia

C. Performance against Minimum Requirements

There are no gaps against Minimum Requirements.

Under Public Consultation

D. Performance against Advanced Requirements

Performance against Advanced Requirements has not been assessed, due to a lack of documentary evidence.

Asahan-3 HEPP, 174 MW, Indonesia

E. Environmental and Social Action Plan (ESAP)

There are no gaps against Minimum Requirements.

Under Public Consultation

F. Abbreviations and Acronyms

AMDAL	Analisis Mengenai Dampak Lingkungan (Environmental Impact Assessment)
ANDAL	Analisis Dampak Lingkungan (Environmental Impact Statement)
BAPPENAS	Badan Perencanaan Pembangunan Nasional (National Development Planning Agency)
BMKG	Badan Meteorologi, Klimatologi, dan Geofisika (National Meteorology, Climatology and Geophysical Agency)
BWS	Balai Wilayah Sungai (Water Resource Management Agency for the Toba-Asahan River Basin)
CLO	Community Liaison Officer
CSR	Corporate Social Responsibility
DD	Data Deficient
EN	Endangered
E&S	Environmental and social
ESIA/ESMP	Environmental and Social Impact Assessment/Environmental and Social Management Plan
ESG	Environmental, social, governance
ESMS	Environmental and Social Management System
GRM	Grievance Redress Mechanism
GTF	Grievance Task Force
LC	Least Concern
LP-USU	University of North Sumatra Research Institute
MoEF	Ministry of Environment and Forestry
MoEMR	Ministry of Energy and Mineral Resources
MoSOEs	Ministry of State-Owned Enterprises
NT	Near Threatened
OH&S	Occupational Health & Safety
PLN	Perusahaan Listrik Negara (State Electricity Company)
PLN UIP SBU	PLN Unit Induk Pembangunan Sumatera Bagian Utara (North Sumatra development unit)
PLN NP	PLN Nusantara Power (generation subsidiary)
PT INALUM	PT Indonesia Asahan Aluminium Perusahaan (state-owned operator of Asahan aluminum smelter)
PUPR	Kementerian Pekerjaan Umum dan Perumahan Rakyat (Ministry of Public Works and Public Housing)
RTD	Rencana Tindak Darurat (Emergency Action Plan)
RKL	Rencana Pengelolaan Lingkungan (Environmental Management Plan)
RPL	Rencana Pemantauan Lingkungan (Environmental Monitoring Plan)
SEP	Stakeholder Engagement Plan
VU	Vulnerable
WRMP	Water Resources Management Plan



1 Environmental and Social Assessment and Management

Scope and Principle
This section addresses the plans and processes for environmental and social issues management. The principle is that negative environmental and social impacts associated with the hydropower facility are managed; avoidance, minimisation, mitigation, compensation and enhancement measures are implemented; and environmental and social commitments are fulfilled.

Background	
Identify the main environmental and social issues during operation	Land rehabilitation after construction; reduced river flows between intake and tailrace; local E&S effects of power plant operations (waste, noise, traffic, employment, procurement, etc.; improved regional power supply.
Identify the environmental regulator	Province of North Sumatra
Identify other regulators (e.g. on land, water use, Indigenous Peoples)	Water: Balai Wilayah Sungai (BWS), the water resource management agency for the Toba-Asahan river basin, which has been designated as a national strategic basin. Land: Ministry of Environment and Forestry (MoEF), for acquisition and change of use of public forest lands.
Summarise the ESIA regulatory requirements	In Indonesia, the environmental impact assessment (Analisis Mengenai Dampak Lingkungan, or AMDAL) is the process of studying the significant impacts of a proposed project, and includes an environmental impact statement (Analisis Dampak Lingkungan or ANDAL), an environmental management plan (Rencana Pengelolaan Lingkungan or RKL), and an environmental monitoring plan (Rencana Pemantauan Lingkungan or RPL). Documents are reviewed by an AMDAL commission and permits issued by the corresponding government agencies. They cover the preconstruction, construction and operation stages. PLN prepared a first ESIA/ESMP in 2004, a revised one in 2011, and a supplementary one (for additional land required for access roads, transmission lines etc) in 2021. Permits were issued by the province in 2012-2013 and in 2021. Six-monthly reporting is required.
Describe the non-physical cultural heritage in the project area	The province of North Sumatra has a population of approximately 15 million people of various ethnic origins. The area around the project is rural with rice, palm oil and other crops. Lake Toba where the Asahan River originates, is of particular aesthetic, cultural and scientific interest.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Systematic processes are in place to identify any ongoing or emerging environmental and social issues associated with the operating hydropower facility	✓	Beyond the initial identification of issues in the ESIA, the main processes to identify E&S issues are the environmental monitoring and reporting described in the RPLs (2012 and 2021), PLN's internal monitoring and reporting mechanisms (e.g. the compilation of data for the annual ESG Performance and Sustainability Reports), and the interaction with local communities (e.g. through the grievance mechanism as well as regular meetings with and reporting to district and provincial agencies).			
The processes utilise appropriate expertise	✓	PLN has significant internal E&S expertise, and there are dedicated units at the level of the project team, the operating subsidiary PLN Nusantara Power (PLN NP) and its regional office in Pandan, and the PLN holding. Additional expertise is contracted from the University of North Sumatra. During construction, the owner's engineer Nippon Koei and the contractors also provided E&S expertise.		Select.	Not assessed
Monitoring programmes are in place for identified issues	✓	PLN NP's 2025 ESMP includes some funding for monitoring and surveys, for example on biodiversity and on livelihoods and living standards of affected groups.			
MANAGEMENT					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Environmental and social management system is in place to manage measures to address identified environmental and social issues	✓	PLN and its subsidiaries have a number of E&S policies and ESMS in place. These appear to be different between different units of the PLN group, and between projects with foreign or domestic funding, which creates some uncertainty. PLN NP's integrated management system is certified against ISO 9001, ISO 14001, and several other standards. For the Asahan-3 HEPP, there is a short-term ESMP for 2025 and a medium-term ESMP for 2025-2030.	Processes are in place to anticipate and respond to emerging risks and opportunities	Select.	Not assessed
This management system is implemented utilising appropriate expertise (internal and external)	✓	See above.	Plans and processes are embedded within an internationally recognised environmental management system which is third party verified, such as ISO 14001	Select.	Not assessed
CONFORMANCE AND COMPLIANCE					
Processes and objectives in environmental and social management plans have been and are on track to be met with:			There are no non-compliances	Select.	Not assessed
• no major non-compliances	✓	There are no indications of major non-compliances. During the construction stage, some environmental standards (such as for noise and water quality) were not met on some occasions.			
• no major non-conformances	✓	There are no indications of major non-conformances.			
Environmental and social commitments have been or are on track to be met	✓	Corporate and project-specific commitments were made through the RKL/RPLs from the 2011 ESIA and the 2021 supplementary ESIA as well as	There are no non-conformances	Select.	Not assessed

Requirement is met: yes (✓) or no (✗)		

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	Not assessed

Summary of findings and other notable issues
The Asahan-3 HPP has a small footprint and a limited incremental impact on an already strongly altered river. The owner and operator PLN has significant experience regarding E&S management systems, and there are basic monitoring and management plans in place to address environmental and social compliance requirements and commitments.

Relevant evidence	
Interview	1-7, 10-22, 27, 28, 32, 33, 43-46, 55, 56, 59, 60, 71, 72
Document	1-3, 8-10, 26, 28, 30, 35, 42-47, 56, 67, 69-73, 77, 88, 94, 96, 104, 114, 117, 119-123, 128, 129, 131, 141, 143
Photo	4, 7, 29, 47-61



2 Labour and Working Conditions

Scope and Principle
This section addresses labour and working conditions, including employee and contractor opportunity, equity, diversity, health and safety. The principle is that workers are treated fairly and protected.

Background	
Labour requirements during operation (full-time equivalent)	The PLN group has approximately 38,000 employees, plus 13,000 as subsidiary employees and 103,000 as outsourced employees. The Asahan-3 HPP will be operated by a regional unit (based in Pandan, North Sumatra) of the generation subsidiary PLN NP, which operates over 20 GW of installed capacity across Indonesia. Its power plant team of 60 staff will be supported by specialists from the regional headquarter as well as by contractors for outsourced activities.
Applicable key human resources regulations	Law of the Republic of Indonesia No. 13 of 2003 regarding Manpower
Applicable key occupational health and safety (OH&S) regulations	Law No. 1 of 1970 regarding Work Safety Regulation No. 50 of 2012 regarding the implementation of Occupational Safety and Health Management Systems
Identify the regulator for labour law and OH&S	Ministry of Manpower

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
ASSESSMENT					
A periodically updated assessment has been undertaken of human resource and labour management requirements for the operating facility	✓	Towards the end of the construction period, PLN’s contractors demobilised most of their workforce. In December 2024, only the transmission line and electromechanical contractors still had significant personnel on site. Before taking over operational responsibility from PLN’s regional construction unit for North Sumatra (based in Medan), PLN NP evaluated	Identification of ongoing or emerging labour management issues takes broad considerations into account, and both risks and opportunities	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✕)		Findings and Observations	Requirement is met: yes (✓) or no (✕)		Findings and Observations
		workforce requirements and posted staff at Asahan-3 HPP during the handover period.			
The assessment included project occupational health and safety issues, risks, and management measures	✓	There has been no detailed project-specific assessment of operational OH&S issues, but this gap is not seen as significant, since PLN NP is familiar with operating hydropower plants, has appropriate OH&S directives, and the Asahan-3 HPP does not present unusual OH&S issues.			
Monitoring is being undertaken to assess if management measures are effective	✓	During construction, there was continuous monitoring and reporting of work safety and worker grievances. PLN has internal monitoring and reporting mechanisms that will be applied during the operation stage. There is also occasional workplace monitoring by government labour and safety inspectors, but their number is very limited.			
Ongoing or emerging labour management issues have been identified	✓	No specific labour management issues have been identified for the Asahan-3 HPP, and the operations team is fully staffed.			
MANAGEMENT					
Human resource and labour management policies, plans and processes are in place to address all labour management planning components	✓	PLN has several group-wide policies in place, including an Occupational Health, Safety, Security, and Environment (HSSE) Policy; Respectful Workplace Policy (against discrimination, violence and harassment); and Contractor Social	Processes are in place to anticipate and respond to emerging risks and opportunities	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		Policy (covering contractor employee welfare and safety). There are also Labor and Working Condition Management Guidelines (but it is unclear whether these apply to Asahan-3 HPP and other projects not financed by the World Bank (see also Section 1 on the scope of the ESMS manual). There is a large number of other corporate directives on issues such as OH&S in hydropower plants, electrical safety signage, disaster management, etc. PLN NP including the regional unit in Pandan is certified against ISO 45001 (OH&S) and follows ISO 30414 (internal and external human capital reporting).			
Human resource and labour management policies, plans and processes of contractors, subcontractors and intermediaries are in place	✓	During construction, contractors had contractual requirements regarding OH&S and work conditions, with appropriate reporting and supervision arrangements. A clinic has been operating in the main camp until recently, and may be re-opened to provide services to operational staff and local communities. No significant contracts have been concluded for the operation stage yet, but PLN has general requirements for such contracts, including a Contractor Safety Management System.			
CONFORMANCE AND COMPLIANCE					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Processes and objectives relating to human resource and labour management have been and are on track to be met with:			There are no non-compliances	Select.	Not assessed
• no major non-compliances	✓	There are no indications of major non-compliances.			
• no major non-conformances	✓	There are no indications of major non-conformances. There were two fatalities in the early stages of the civil works contract, but lessons learnt were applied, OH&S processes are adequate, and at the time of the on-site assessment there had been no lost-time injuries for 12 million work hours.	There are no non-conformances	Select.	Not assessed
Any labour related commitments have been or are on track to be met	✓	There are no indications otherwise. Reportedly, work satisfaction of PLN employees is relatively high, compared with other large public and private companies in Indonesia. PLN's Sustainability Report provides data on multiple labour-related performance issues, including OH&S, gender equity, training, etc. A Collective Bargaining Agreement with the trade unions is in place since 2022. However, labour and working conditions for outsourced workers are not at the same level as for PLN staff.			
OUTCOMES					
There are no identified inconsistencies of labour management policies, plans and practices with	✓	There are no indications of any inconsistencies. Indonesia has ratified most fundamental ILO conventions, and their implementation in the public sector is considered largely	Labour management policies, plans and practices are demonstrated to be consistent with	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✕)		Findings and Observations	Requirement is met: yes (✓) or no (✕)		Findings and Observations
internationally recognised labour rights		satisfactory. The courts have upheld labour rights in recent years. PLN has committed to the UN Compact principles, including those on labour and human rights.	internationally recognised labour rights		
List of significant gaps against Minimum Requirements			Number of Advanced Requirements met		
None			Not assessed		
Summary of findings and other notable issues					
PLN has a large workforce and well-established human resource and OH&S policies and processes, that apply to the Asahan-3 project. There are no indications for any issues related to labour conditions and labour rights.					
Relevant evidence					
Interview	1, 2, 3, 8, 9, 32, 34-47, 59, 68-71				
Document	21-26, 29, 31-37, 39, 48-64, 69, 75, 97, 132-139, 143				
Photo	5, 12, 16, 34-41, 44				



3 Water Quality and Sediments

Scope and Principle

This section addresses the management of water quality, erosion and sedimentation issues associated with the operating hydropower facility. The principle is that water quality in the vicinity of the operating hydropower facility is not adversely impacted by activities of the operator, that erosion and sedimentation caused by the project are managed responsibly and do not present problems with respect to other social, environmental and economic objectives, and that commitments to address water quality, erosion and sedimentation issues are fulfilled.

Background

Water Quality

Description of water quality	The surface water quality for the Asahan River has been evaluated against the quality standard provided in Government Regulation No. 82/2001 (Water Quality Management and Pollution Control). The river is classified as Class II following Government Regulation No.22/2001 (Implementation of Environmental Protection and Management, Annex VI: River Water Quality Standard and Similar Quality). Class II is suitable for recreation, freshwater aquaculture, and irrigation for agriculture. There are 4 monitoring locations for surface water, 1 upstream (Ponot Village), 2 in the bypass reach (Parhitean Village and Hula-huli Village) and 1 downstream (Tratak Village). Monitoring results from these locations show that water quality, during construction and post construction, has generally complied with the Class II River Quality Standard. Several parameters occasionally exceeded the quality standard, such as pH, BOD, COD, NH₃-N, T-P, and Oil and Grease; some of these higher values were also recorded upstream of the project area and are not attributable to the project. There were no recordable incidents of pollution or spill of hazardous waste from any of the construction activities. During construction, there was also water quality monitoring for ground water from the intake tunnel and leachate water from spoil banks. Monitored values for ground water met the quality standard except for occasional failure to meet the standard for pH. Monitored values of all parameters in leachate water draining were far below the quality standard.
Key water quality issues	The water in the Asahan River at the Asahan-3 HEPP intake originates from the large (1,140 km²) and deep (228 m average depth) Lake Toba upstream, with added flows from the intermediate catchment. Lake Toba water has a long residence time and limited mixing. The lake was originally oligotrophic but with increased nutrient loads - from aquaculture, agriculture including livestock, and wastewater, in that order – a process of eutrophication is ongoing, and algae blooms and fish kills have occurred. Without a reduction of pollution from aquaculture in particular, the value of the lake as a source of drinking water and for recreation will continue to decline.

	Pollution sources in the intermediate catchment include settlements, several large-scale industries (including pulp and aluminum) and hydropower installations.
Main influences on water quality	As described above, there are multiple human activities in the catchment affecting water quality in the Asahan River. However, the Asahan-3 project itself is not expected to contribute to water quality concerns.
Sedimentology	
Key sediment issues	The sediment load in the Asahan River is very low, due to the trapping of almost all sediment in Lake Toba and the upstream reservoirs. Monitoring of Total Suspended Solids during construction (at the locations indicated above) showed that values were generally below the quality standard value (50 mg/l), with occasional higher values not necessarily related to the project itself, but likely to originate from the intermediate catchment between the Asahan-3 and Tangaa projects. There were no significant landslides or ongoing erosion problems during construction that would have affected homes, facilities or farmlands. The project caused a loss of vegetation of a total of 155 ha, including 111 ha of plantation and 39 ha of natural forest.
Sediment load (tonnes/year)	14,044 t / year
Catchment area at the dam	The Asahan River as the main outlet of Lake Toba flows east into the Strait of Malacca. The surface area of the Asahan Toba watershed is 6,337 km ² including the upper watershed around the lake with 2,640 km ² and the lower watershed between the lake and the coast, with 3,697 km ² . Several government agencies are involved with managing the water and land resources of the watershed. There is erosion from degraded land in the watershed, but only a small part of that sediment reaches the Asahan-3 location.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
ASSESSMENT					
Ongoing or emerging issues have been identified in the following areas:			Identification of ongoing or emerging water quality issues takes into account both risks and opportunities	Select.	Not assessed
• water quality	✓	There were temporary increases in some parameters during construction. During operations, the project is not affected by the increasing nutrient load in the watershed, and will not significantly affect water quality if following standard pollution control processes and maintaining the agreed minimum river flows.			
• erosion and sedimentation	✓	There were only minor issues during construction, such as temporary			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		increase in turbidity. During operations, there may be minor increases in turbidity near the intake, tailrace, and spoil banks, but there are no reasons to expect significant erosion and sedimentation issues caused by the project or affecting the project. Any sediment accumulation in front of the intake weir can be easily flushed, even if land degradation in the intermediate catchment should continue or sediment is flushed from upstream dams.			
If management measures are required then monitoring is being undertaken to assess if management measures are effective for:					
• water quality	✓	Water quality monitoring during construction was quite extensive, with 3-monthly sampling in four locations for surface water (for physical, chemical and microbiological parameters), four locations for ground water (for pH, arsenic and sulphur, and two locations for leachate water (for arsenic, cadmium, hexavalent chromium, copper, lead and cyanide). Monitoring processes comply with regulations from the Ministry of Health, are included in the 2025 and 2025-2030 ESMPs (see section 1), and are expected to be continued as needed.	Identification of ongoing or emerging erosion and sedimentation issues takes into account both risks and opportunities	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• erosion and sedimentation	✓	Several government agencies including the Ecosystem Management Coordination Agency of Lake Toba Region (BKPEKDT), which was formed in 2006 by decree of the provincial governor, are working on watershed management and have their own monitoring and reporting processes. The only monitoring processes for PLN are regarding sediment deposition in the headpond, and slope stability and local erosion around project infrastructure.			
MANAGEMENT					
Measures are in place to manage the following identified issues:			Processes are in place to anticipate and respond to emerging risks and opportunities relating to:		
• water quality	✓	Wastewater and drainage water from the powerhouse, operations building and other components will be collected and treated as needed, chemicals adequately stored, standard spill prevention and treatment applied, and hazardous waste adequately disposed, following government regulations (such as the Regulation on the Procedures and Requirements for the Management of Hazardous and Toxic Waste, MoEF No.6 2021). The maintenance flow through the bypass reach should be sufficient to dilute any local pollution, and PLN's CSR (Corporate Social Responsibility) program will address	• water quality	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✕)		Findings and Observations	Requirement is met: yes (✓) or no (✕)		Findings and Observations
		local sanitation improvements, which should reduce coliform contamination.			
• erosion and sedimentation	✓	Measures directly under the responsibility of PLN include flushing of the headpond, attending to any slope stability or drainage issues that may emerge, and rehabilitating some land that was left unfinished by contractors. PLN is also planning to coordinate with other stakeholders to address broader issues in the watershed.	• erosion and sedimentation	Select.	Not assessed
CONFORMANCE AND COMPLIANCE					
Processes and objectives in place to manage each of the following have been and are on track to be met:			There are no non-compliances relating to:		
• water quality, with no major non-compliances	✓	There are no indications for major non-compliances regarding water quality.	• water quality	Select.	Not assessed
• water quality, with no major non-conformances	✓	There are no indications for major non-conformances regarding water quality.			
• erosion and sedimentation, with no major non-compliances	✓	There are no indications for major non-compliances regarding erosion and sedimentation.	• erosion and sedimentation	Select.	Not assessed
• erosion and sedimentation, with no major non-conformances	✓	There are no indications for major non-conformances regarding erosion and sedimentation.			
Commitments related to the following have been or are on track to be met:			There are no non-conformances relating to:		
• water quality	✓	PLN’s commitment to invest in community water supply and sanitation is on track to be met.	• water quality	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• erosion and sedimentation	✓	PLN's commitment to coordinate with other stakeholders regarding catchment management is on track to be met.	• erosion and sedimentation	Select.	Not assessed
OUTCOMES					
Negative water quality impacts arising from activities of the operating hydropower facility are avoided, minimised and mitigated	✓	The project design with a very short water residence time, an adequate maintenance flow in the bypass reach, and adequate operational processes and facilities should ensure minimal impacts on water quality.	Water quality in the area affected by the operating hydropower facility is of a high quality	Select.	Not assessed
			The facility has contributed or is on track to contribute to addressing water quality issues beyond those impacts caused by the operating hydropower facility	Select.	Not assessed
Erosion and sedimentation issues are avoided, minimised and mitigated	✓	The project components have been designed to minimize erosion and sedimentation issues. For example, the operations building is surrounded by tufa stone which is resistant to erosion, and the spoil banks have been built in terraces. There may be some minor local increases in turbidity.	Erosion and sedimentation associated with operating facility do not present ongoing problems for environmental, social and economic objectives of the facility or the project-affected areas	Select.	Not assessed
List of significant gaps against Minimum Requirements			Number of Advanced Requirements met		
None			Not assessed		
Summary of findings and other notable issues					
The Asahan River carries pollutants and nutrients from its catchment, but the upstream waterbodies trap most of the sediments, and there are no significant impacts on the project. Water quality and turbidity were monitored during construction, with no significant impacts attributable to the project. Monitoring will					

continue into the operation phase. The project has been designed and will be operated with minimal impacts on water quality, erosion and sedimentation. PLN is committed to improving local community sanitation, and coordinating with stakeholders to reduce erosion from the catchment.

Relevant evidence	
Interview	1-9, 11-21, 24, 27-28, 32-33, 40-41, 55-60, 71
Document	3, 8-18, 23, 26, 28, 42, 71-72, 91, 95, 101-102, 104, 111, 118, 121-122, 131
Photo	1,3, 10-12, 14, 20-26, 28, 30, 43, 46, 49-51, 56, 61-66

Under Public Consultation



4 Community Impacts and Infrastructure Safety

Scope and Principle

This section addresses how impacts of development of the hydropower facility on project-affected communities have been addressed, in cases where these commitments are well-documented against a pre-project baseline. These impacts include economic displacement, impacts on livelihoods and living standards, public health impacts, impacts to rights, risks and opportunities of those affected by the project, infrastructure safety risks and additional benefits that can arise from a hydropower facility. The principle is that livelihoods and living standards impacted by the project have been improved relative to pre-project conditions for project-affected communities, that commitments to project-affected communities have been fulfilled, and that life, property and community assets and resources are protected from the consequences of dam failure and other infrastructure safety risks. This section does not address requirements that relate to physical displacement or to Indigenous Peoples, which are addressed in Section 5 and 7. Other interested parties and groups are addressed in Section 10.

In the case of older projects, commitments to project-affected communities and project benefits refer to commitments made at the time of project development (if they were well-documented) as well as to more recent commitments.

Background

In the case of older projects, commitments to project-affected communities and project benefits refer to commitments made at the time of project development (if they were well-documented) as well as to more recent commitments.

Community Impacts and Benefits

Description of project-affected communities and how they are affected (distinguish between physically displaced (addressed in Section 5), economically displaced and other project-affected communities and include estimated number of people and households)	The project-affected communities are predominantly farmers, fishermen and local businesses (including rafting operators/community) in 6 villages in 3 sub-districts belonging to 2 regencies in North Sumatra Province: Tangga village in Aek Songsongan sub-district in Asahan Regency; Tangga Batu I village in Parmaksian sub-district in Toba Regency; and North Meranti, Ambar Halim, Pintu Pohan, and Halado villages in Pintu Pohan Meranti sub-district in Toba Regency. The Asahan-3 HEPP affects Tangga and North Meranti villages, while the other villages are along the transmission line to Simangkuk substation. The number of landowners affected by land acquisition and/or land use restrictions was 158 for the HEPP facilities, 77 for the tower foundations and 265 for the transmission line right-of-way, i.e., 500 in total. A large majority of these project-affected households were economically and not physically displaced. Three households were physically displaced as their residential structures were within the project footprint (covered under Section 5). The number of fishermen along the affected river reach has been estimated at 350 persons based on the assumption that 50% of the inhabitants in Tangga and North Meranti villages are practising fishing as a supplementary source of food and income. The river diversion also affects rafting operations and irrigation farming. The rafting activities are
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	community-based and involve roughly 80 persons (depending on seasonality and number of visitors), while the affected irrigation farmers are 64 families who used to rely on water abstraction from the Asahan River downstream of the HEPP intake.
Agencies relevant to land acquisition	The key agencies involved in land acquisition for the Asahan-3 HEPP included the MoEF (issuing license for using the forest estate on which the project is located), North Sumatra Provincial Governor (issuing location approval), MoEMR (authorising PLN to compensate farmers with land rights in the forest estate), Ministry of Agrarian Affairs and Spatial Planning / National Land Agency (issuing land certificates), and Asahan and Toba local government departments (involved in public appraisals).
Agencies relevant to livelihood restoration and project benefits	Mostly sub-district, regency and provincial government departments, i.e., Provincial Development Planning Agency, Fisheries Agency, Social Agency, Health Agency, Road Agency, etc.
Infrastructure Safety and Public Health	
Type of dam	Gated Concrete Weir
Dam height (m)	7.5 m
Probable maximum flood (m ³ / s)	5,277 m ³ /s
Design flood (expressed as estimated flood with return period)	1,409 m ³ /s (200 years period)
Spillway capacity (m ³ / s)	155.6 m ³ /s
Spillway height (masl)	263 masl
Headrace length (m)	1,815 m (headrace channel) + 7,796 m (headrace tunnel)
Headrace width (m)	9 m wide channel and 6.6 m diameter tunnel)
Headrace capacity (m ³ / s)	106.8 m ³ /s
Seismicity	North Sumatra is generally an area of high earthquake risk. Seismic surveys were reported in Technical Note No. 3 2007, and suggested that no fault structure is present in the area. The Great Sumatran Fault, oriented in NW – SE direction and with a high potential to generate large-scale earthquakes, is located to the southwest area at more than 70 km from the project.
Geology	The project is located to the southeast of the gigantic Toba caldera. Geological formations in the project area are a) quaternary deposits (riverbed deposit, talus deposit, terrace deposit and Toba tuffs; and b) the paleozoic Bohorok formation (pebbly mudstones). The dominant fault structures are in a NE – SW direction, generally small scale and found in the Bohorok formation. Geological investigations were undertaken along the waterway and powerhouse site and completed in 2007. Results were positive both for underground works and for the suitability of rocks for aggregate. This was confirmed during construction.
Dam safety regulatory authorities	The Dam Safety Committee for large dams, under the PUPR. While the Asahan-3 weir is not categorized as large, the Dam Safety Committee is aware of it since the project is associated with the large upstream Siguragura and Tangga dams.

Local presence/capacity of emergency services	Emergency services are provided and coordinated by Disaster Management Agencies at regency and provincial levels, and supported by Sumatera II River Basin Authority.
Potential safety risks in this context	Safety risks are low, due to the low volumes of stored water and limited downstream exposure of people along the river.
Degree of risk of dam failure and in what way	No specific dam break study was undertaken since - according to the Indonesian regulations - dam emergency action plans are only required for dams higher than 15 m. The Asahan 3 project is located downstream of one regulating dam and two cascade dams. The dam failure risks (flood, geological, and operational) are taken into account in the project design and operations (spillways, seismic safety factors, operational rules for cascade and coordination between cascade operators).
Population at risk of dam break (locations, numbers)	There has been no specific study regarding inundation and population at risk following a dam break.
Dam safety standards followed	- Indonesian Code for Building Material - Indonesian Concrete Code - Indonesian Loading Code for Buildings - Codes and Guideline for Small Dam Construction by PUPR
Agencies relevant to dam safety	Dam Safety Committee (see above) Sumatera II River Basin Organization, DG Water Resources, PUPR Directorate of Technical Development, DG Water Resources, PUPR
Other infrastructure safety issues	Safety on and near water: flood alarms along the Asahan River Electrical safety along transmission line: standard design and signage Road safety: limited additional traffic on public roads attributable to the project during operations
Description of key public health issues	There are no significant public health issues associated with the Asahan-3 HEPP operation stage. During the recent construction phase, noise and dust pollution was a major issue. There are some issues related to water supply and sanitation practices in neighbouring communities which PLN has identified as priorities in their CSR programme.
Agencies relevant to public health	Asahan and Toba Samosir regency health agencies

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
ASSESSMENT					
Community Impacts and Benefits					
Monitoring is being undertaken to assess if the following commitments have been delivered and if management measures are effective:			Identification of ongoing or emerging issues for project-affected communities takes into consideration both risks and opportunities, and	Select.	Not assessed
• commitments to project-affected communities	✓	The commitments to project-affected communities include compensations to those affected by land acquisition,			

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	employment of local workers during construction and operation, and support to irrigation farmers and rafting operators/community affected by reduced river flow. Some of these commitments have been fully delivered and are no longer subject to systematic monitoring. These include the compensations to economically displaced households, the provision of replacement infrastructure to the affected irrigation farmers (a new irrigation system supplied from the HEPP intake pond and a pedestrian bridge across the headrace canal to access the rice fields), and the recruitment of local labour during construction. Other commitments are still being detailed and not ready for monitoring, such as the release of additional compensation flow once a year to support rafting activities. Monitoring of community impacts and management measures has been conducted by the GTF, which includes a team of CLOs, and as part of the RPL and reporting to the Environmental Agency. The monitoring has included income levels, local employment, and public attitudes and perceptions.	interrelationships among issues	

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• commitments to project benefits	✓	As part of PLN’s commitment towards CSR, a range of community development actions has been supported and delivered during project preparation and implementation. These additional benefits include transport services for school children, provision of water storage tanks and water distribution, construction of a village office and meeting hall, distribution of solar lamps, and delivery of various trainings and capacity building programmes (including educational facilities and materials to local schools). PLN has also provided the communities with free medical access to PLN’s site clinic. Monitoring of the commitments to project benefits has been undertaken by the CLOs and has been included in the regular reporting to PLN management and authorities. PLN NP, through its CSR Division in the Pandan Regional Office, intends to continue engagement with - and monitoring of - the affected communities to facilitate access to community development funding in the operation stage.			
Ongoing or emerging issues relating to the following have been identified:				Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• issues that affect project-affected communities	✓	Economic displacement of fishermen along the Asahan River has been identified as a key issue since the first ESIA. The full impact of reduced river flow is now starting to materialise upon commissioning. This is recognised by PLN NP as a priority issue for operation phase E&S management.	Identification of ongoing or emerging issues relating to project benefits takes into account both risks and opportunities		
• delivery of project benefits	✓	There are no major ongoing issues related to delivery of project benefits. PLN NP intends to continue engagement with the affected communities to identify emerging issues for potential CSR funding.			
Infrastructure Safety and Public Health					
Ongoing or emerging issues relating to the following have been identified:			Identification of ongoing or emerging safety issues takes into account a broad range of scenarios and both risks and opportunities	Select.	Not assessed
• dam and other infrastructure safety	✓	Documentation shows that the PLN and their engineering consultants have assessed and identified several potential issues such as seismic risk, flood risk, fire protection, flood warning, etc. and taken these into account in the design and operations of the project.			
• public health issues associated with the operating hydropower facility	✓	There are no significant public health issues associated with the Asahan-3 HEPP operation stage. Continued access by the affected communities to PLN’s medical clinic has been identified as an issue but not yet resolved.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Routine monitoring of dam and infrastructure safety is being undertaken to identify risks and assess the effectiveness of management measures	✓	During construction some monitoring equipment was deployed including a seismic monitoring device in the tunnel area, and a landslide monitoring device. There is ongoing periodic monitoring of vertical and horizontal movements of the retaining wall above the headpond.			
If public health issues require management measures then monitoring is being undertaken to assess if management measures are effective	✓	Not relevant.	Identification of ongoing or emerging public health issues takes into account public health system capacities, access to health services, and health needs, risks and opportunities for different community groups	Select.	Not assessed
MANAGEMENT					
Community Impacts and Benefits					
Measures are in place to deliver commitments:					
• to project-affected communities	✓	Commitments not yet delivered to project-affected communities include release of compensation flows to support rafting activities and provision of employment opportunities for local workers during the operation phase. PLN has consulted with the rafting community throughout project preparation and implementation in order to explore opportunities for coexistence between the HEPP and rafting activities. PLN is committed to			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		releasing compensation flows during the annual shut-down of the units (for maintenance) such that rafting events can be organised during this time window. PLN NP intends to formalise this arrangement once the maintenance schedule has been approved by the Sumatra system dispatcher. PLN NP will also give priority to employing local people for some operation and maintenance services.			
• to project benefits	✓	PLN NP intends to retain the services of the GTF to help deliver project benefits and manage emerging issues. There will also be other staff dedicated to such issues, including from the regional CSR Division. Although no additional commitments have been made for the operation stage, PLN has processes in place to manage project benefits.			
Measures are in place to manage any identified issues relating to these commitments:					
• to project-affected communities	✓	As above.			
• to project benefits	✓	As above.			
If there are any formal agreements with project-affected communities, these are publicly disclosed	✓	There are no formal agreements with project-affected communities. Commitments to project-affected communities are documented in the			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		ESIA and RKL which have been publicly disclosed (see Section 10).			
Commitments to project benefits are publicly disclosed	✓	There are currently no ongoing commitments to project benefits. The already delivered commitments are considered to have been publicly disclosed through the direct involvement of the affected communities and beneficiaries in the planning and delivery of community development / CSR programmes, and through publication in project reports and social media.			
Infrastructure Safety and Public Health					
Dam and other infrastructure safety management plans and processes have been developed in conjunction with relevant regulatory and local authorities	✓	Project documentation shows that standards from national authorities (PUPR and Indonesian Standard / Standar Nasional Indonesia or SNI) have been followed, which is adequate for a project with low safety risks such as Asahan-3.	Processes are in place to anticipate and respond to emerging infrastructure safety risks and opportunities	Select.	Not assessed
These plans and processes provide for communication of public safety measures	✓	As required by Indonesian regulations, there were several rounds of public consultation before and during the construction phase. Signage and a flood alarm system have been installed.	Public safety measures are widely communicated in a timely and accessible manner	Select.	Not assessed
Emergency response plans and processes include awareness and training programmes and emergency response simulations	✓	During construction, PLN conducted a simulation of the Asahan-3 project to understand its safety risks, especially regarding the impact on the irrigation area. An emergency response plan is			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		not required for Asahan-3 by the regulators, but there are emergency response plans for the larger upstream dams, which are expected to be shared with the Asahan-3 team shortly; an emergency communications protocol with stakeholders including upstream dam operators is under preparation; a flood warning system is in place; as for all power plants, PLN will produce business continuity plans for Asahan-3 for major risks; and emergency drills are conducted regularly.			
Measures are in place to manage identified public health issues	✓	Not relevant.	Processes are in place to anticipate and respond to emerging public health risks and opportunities	Select.	Not assessed
CONFORMANCE AND COMPLIANCE					
Community Impacts and Benefits					
Processes and objectives in place to manage the following have been and are on track to be met:			There are no non-compliances relating to:		
• delivery of commitments to project-affected communities, with no major non-compliances	✓	No major non-compliances have been identified regarding delivery of commitments to project-affected communities.	• project-affected communities	Select.	Not assessed
• delivery of commitments to project-affected communities, with no major non-conformances	✓	No major non-conformances have been identified regarding delivery of commitments to project-affected communities.			
• project benefits, with no major non-compliances	✓	No major non-compliances have been identified regarding project benefits.	• project benefits	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✕)		Findings and Observations	Requirement is met: yes (✓) or no (✕)		Findings and Observations
• project benefits, with no major non-conformances	✓	No major non-conformances have been identified regarding project benefits.			
Commitments have been or are on track to be met relating to:			There are no non-conformances relating to:		
• project-affected communities	✓	Commitments are on track to be met relating to project-affected communities.	• project-affected communities	Select.	Not assessed
• project benefits	✓	Commitments have been met relating to project benefits.	• project benefits	Select.	Not assessed
Infrastructure Safety and Public Health					
Processes and objectives in place to manage the following have been and are on track to be met:			There are no non-compliances relating to:		
• dam and other infrastructure safety, with no major non-compliances	✓	There are no indications for major non-compliances regarding dam and other infrastructure safety.	• dam and other infrastructure safety	Select.	Not assessed
• dam and other infrastructure safety, with no major non-conformances	✓	There are no indications for major non-conformances regarding dam and other infrastructure safety.			
• public health issues, with no major non-compliances	✓	No major non-compliances have been identified regarding management of public health issues.	• public health	Select.	Not assessed
• public health issues, with no major non-conformances	✓	No major non-conformances have been identified regarding management of public health issues.			
Commitments have been or are on track to be met relating to:			There are no non-conformances relating to:		
• dam and other infrastructure safety	✓	There have been some landslides in the area, especially on public roads, and PLN have committed to keeping roads open through several mitigation action including re-vegetation of slopes.	• dam and other infrastructure safety	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• public health	✓	Commitments have been met relating to public health.	• public health	Select.	Not assessed
OUTCOMES					
Community Impacts and Benefits					
Livelihoods and living standards impacted by the project have been or are on track to be improved	✓	Commitments to project-affected communities have been or are on track to be met, but there is some uncertainty regarding improvement of livelihoods and living standards, because 1) no baseline studies had been conducted before the project and 2) PLN had not explicitly committed to and planned for restoring livelihoods and living standards (relative to pre-project conditions), beyond delivering the compensations for land acquisition in accordance with government procedures. PLN is also not required by government to provide compensations to the fishing community or to the rafting operators who may start to experience loss of income due to reduced river flow. This gap is not considered significant because 1) there are no indications of reduced income levels of the affected communities to date (or any significant grievances related to compensations), possibly because many have benefitted from employment and business	The measures put in place to improve livelihoods and living standards are on track to become self-sustaining in the long-term	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		opportunities during construction, and will benefit during operations, 2) a livelihoods and living standards survey among a representative sample of economically displaced households (farmers, fishermen and community rafting businesses) is being conducted in July 2025 and will be repeated annually, to identify people potentially vulnerable to declines in livelihoods and living standards, 3) results will be discussed with local governments and PLN is committed to responding to any declines with appropriate compensation and/or mitigation measures.			
Economic displacement has been fairly compensated, preferably through provision of comparable goods, property or services	✓	There is no indication that compensations to economically displaced communities have not been fair. The land acquisition process was subject to public appraisal and consent by the affected households. The landowners were also given the choice between cash compensation and in-kind compensation (but all opted for cash) in accordance with standard government procedures. Compensations of other economically displaced groups will be based on the results of social surveys.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Communities directly affected by the development of the hydropower facility and any other identified beneficiary of the facility have received or are on track to receive benefits	✓	The project-affected communities have received benefits, and PLN NP is also exploring opportunities for providing additional benefits during the operation phase.	Benefits are significant and sustained for communities affected by the project	Select.	Not assessed
Infrastructure Safety and Public Health					
Safety risks have been avoided, minimised and mitigated with no significant gaps	✓	PLN has identified and mitigated a number of potential safety risks for the local communities. The lack of a project-specific emergency response plan is a gap, but not significant given the low safety risks and the array of safety plans and processes adopted.	Safety risks have been avoided, minimised and mitigated with no identified gaps	Select.	Not assessed
			Safety issues have been addressed beyond those risks caused by the operating facility itself	Select.	Not assessed
Negative public health impacts arising from activities of the operating hydropower facility are avoided, minimised and mitigated	✓	There are no significant public health impacts associated with the Asahan-3 HEPP operation stage.	Where opportunities have been identified, measures to address public health issues beyond those impacts caused by the operating hydropower facility have been or are on track to be achieved	Select.	Not assessed

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	Not assessed

Summary of findings and other notable issues
Following significant delays caused by regulatory constraints relating to the land acquisition process, the construction of Asahan-3 HEPP resulted in economic displacement of about 500 landowners. Additional households will be economically displaced as the project goes into full operation due to river flow alterations affecting fishing communities and rafting businesses. PLN has managed the impacts caused by land acquisition and land use restrictions by providing cash

Asahan-3 HEPP, 174 MW, Indonesia

compensations in accordance with government procedures. Project-affected communities have also been provided with replacement infrastructure (e.g., irrigation intake and canals), employment during construction, and a range of CSR initiatives / project benefits. PLN is conducting monitoring and has planned adaptive management measures to support vulnerable groups.

The operation of Asahan-3 HEPP is not likely to cause public health risks, and public safety risks are low because of the small volume of water in the headpond and limited exposure of people downstream.

Relevant evidence	
Interview	2-8, 10-16, 20-26, 31-50, 52-71
Document	1, 4, 8, 9, 12, 14-18, 21, 28, 31-34, 35, 43-47, 48-49, 51-52, 67-72, 77, 85-87, 89-91, 97-99, 105, 107-110, 127, 130-131, 135, 136, 140-141, 142-143
Photo	3, 5-6, 12, 16, 19, 21, 31-33, 36-37, 39, 42, 45, 48-49, 50-51, 57, 61-63

5 Resettlement



Scope and Principle					
This section addresses how the physical displacement arising from development of the hydropower facility has been addressed, in cases where resettlement occurred and commitments are well-documented against a pre-project baseline. The principle is that the dignity and human rights of those physically displaced have been respected; that these matters have been dealt with in a fair and equitable manner; that livelihoods and standards of living for resettles and host communities have been improved; and that commitments made to resettles and host communities have been fully fulfilled. This section does not address those that are only economically displaced, who are addressed in Section 4.					
Background					
Did the project require or result in any physical displacement of people? Please state the evidence on which this determination is made.					
Yes, this section is relevant (for older projects, see note below)			Yes, it is relevant.		
No, this section is not relevant			N/A		
In the case of older projects, commitments to resettles and host communities refer to commitments made at the time of project development (if they were well-documented) as well as to more recent commitments.					
Description of physically displaced communities and how they are displaced (distinguish between permanently vs temporarily and include number of people and households)			Three households were physically displaced and compensated as their residential structures were within the project footprint. One household was compensated but did not have to move because of a change in project design.		
Name and number of settlements			N/A		
Agencies relevant to land acquisition			See Section 4.		
Agencies relevant to livelihood restoration			See Section 4.		
Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
ASSESSMENT					
Monitoring is being undertaken to assess if commitments made to resettles and host communities have been	✓	Commitments made to resettles were similar to those made to the economically displaced households, i.e. compensations for loss of land and assets in accordance with government	Identification of ongoing or emerging resettlement issues takes into account both risks and opportunities	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
delivered and if management measures are effective		procedures for land acquisition. Since only three households were physically displaced, no commitments were made to host communities. The resettles opted for cash compensations and have relocated to nearby locations within the community. No grievances related to resettlement have been recorded. Due to the very limited scale of resettlement and PLN's compliance with compensation commitments, the lack of monitoring (of commitments) is considered as a non-significant gap.			
Ongoing or emerging issues relating to resettlement have been identified	✓	The land acquisition and compensations to the physically displaced households were concluded many years ago. No major issues relating to resettlement have been identified.			
MANAGEMENT					
Measures to address resettlement are documented in a Resettlement Action Plan	✓	A Resettlement Action Plan (RAP) has not been prepared and was not required by government agencies or lenders. The land acquisition and resettlement process followed government procedures and was guided by Technical Note No. 9 (Part II – Land Compensation) and by public appraisals of land required for the HEPP and transmission line, respectively. This documentation is	Processes are in place to anticipate and respond to emerging risks and opportunities	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✕)		Findings and Observations	Requirement is met: yes (✓) or no (✕)		Findings and Observations
		considered appropriate and equivalent to a RAP.			
Measures are in place to deliver commitments to resettlees and host communities	✓	The commitments to resettlees have been delivered.			
Measures are in place to manage any issues relating to resettlement, including provision of grievance mechanisms	✓	There are no known issues relating to resettlement. PLN’s grievance mechanism, managed by the GTF, is considered appropriate to address potential issues relating to resettlement.			
Formal agreements with resettlees and host communities are publicly disclosed	✓	No formal agreements were made with resettlees and host communities beyond the commitment to provide compensations for land acquisition.			
CONFORMANCE AND COMPLIANCE					
Processes and objectives in the Resettlement Action Plan have been and are on track to be met with:			There are no non-compliances	Select.	Not assessed
• no major non-compliances	✓	No major non-compliances have been identified regarding resettlement.			
• no major non-conformances	✓	No major non-conformances have been identified regarding resettlement.	There are no non-conformances	Select.	Not assessed
Any resettlement related commitments have been or are on track to be met	✓	Resettlement related commitments have been met.			
OUTCOMES					
Resettlement has been and is being treated in a fair and equitable manner	✓	There is no indication that resettlement was not treated in a fair and equitable manner. No grievances related to resettlement have been	The measures put in place to improve livelihoods and living standards are on track to	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		recorded, and the land acquisition process was subject to public appraisals and consent by the physically displaced households.			
Resettles and host communities have experienced or are on track to experience a timely improvement in livelihoods and living standards relative to the pre-project baseline	✓	The four households compensated for physical displacement are individually known to PLN and were surveyed again in July 2025. Compensation led to improvements in the livelihoods and living standards for all of them. Socio-economic monitoring of the physically displaced households will be continued annually.			

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	Not assessed

Summary of findings and other notable issues
The Asahan-3 HEPP did not require major resettlement, but three households were physically displaced as a result of land acquisition. The physically displaced households were provided with compensations in accordance with standard government procedures and were treated similar to economically displaced households (i.e., those who lost land and other assets except their residential structures). The resettles opted for cash compensations and have relocated to nearby locations within the community.

Relevant evidence	
Interview	2-7, 32, 34-45
Document	12, 14-18, 21, 43-47, 67-72, 77, 96, 103, 135, 141, 143
Photo	3, 57, 61

6 Biodiversity and Invasive Species



Scope and Principle	
This section addresses ecosystem values, habitat and specific issues such as threatened species and fish passage in the catchment, reservoir and downstream areas, as well as potential impacts arising from pest and invasive species associated with the operating hydropower facility. The principle is that there are healthy, functional and viable aquatic and terrestrial ecosystems in the area that are sustainable over the long-term; that biodiversity impacts arising from the operating hydropower facility are managed responsibly; that ongoing or emerging biodiversity issues are identified and addressed as required; and that commitments to implement biodiversity and invasive species measures are fulfilled.	
Background	
Short description of the ecological region in the project area	The project area belongs to the Sumatran lowland rainforests ecoregion. The ecoregion is one of exceptionally high biodiversity with many endangered mammal species (including the Sumatran rhinoceros and the Lar gibbon) and over 450 species of birds. The dominant trees in the lowland rain forest are those of the Dipterocarpaceae family, including several tree species which are endemic to Sumatra.
Protected areas (national parks and reserves etc) and their distance from the project	The Asahan-3 HEPP (except 3 km of the transmission line) is situated in Tormatutung protection forest, a large forest estate under the MoEF. Unlike conservation forests, which are designated for biodiversity conservation, protection forests are intended mainly for catchment management. The nearest conservation area is Dolok Surungan Wildlife Reserve approx. 2 km south of the project site. Gunung Leuser National Park, which is the nearest national park, is at a distance of 120 km from the project area.
Critical habitats in the project area, including important bird areas, hotspots of endemism etc.	There are no known important bird areas or hotspots of endemism in the Asahan-3 HEPP project area. However, a critical habitat assessment as per international standards (e.g., IFC PS 6) has not been undertaken. The nearest Key Biodiversity Area (KBA) is Lake Toba which has been designated on the basis of its fish fauna, including the occurrence of the vulnerable (VU) fish species <i>Neolissochilus thienemanni</i> (known locally as “Ikan Batak” although this name is sometimes also used for other similar species).
# threatened species in the directly affected area: terrestrial	No threatened terrestrial species are identified in the ESIA. However, seven species of mammals occurring in the directly and indirectly affected area are identified as protected according to Regulation No. 7/1999 on Preserving Flora and Fauna Species, most of which are also listed as threatened species on the IUCN Red List: Mainland Serow <i>Capricornis sumatraensis</i> (Vulnerable, VU), Sambar <i>Rusa unicolor</i> (VU), Sun Bear <i>Helarctos malayanus</i> (VU), Agile Gibbon <i>Hylobates agilis</i> (Endangered, EN), Greater Slow Loris <i>Nycticebus coucang</i> (EN), Siamang <i>Symphalangus syndactylus</i> (EN) and Greater Oriental Chevrotain <i>Tragulus napu</i> (Least Concern, LC).
# threatened species: aquatic	The ESIA does not provide a complete list of threatened aquatic species. A fish species belonging to the genus <i>Neolissochilus</i> is known to occur in the affected reaches of Asahan River. This species was identified as <i>N. thienemanni</i> (VU) in a fishery survey for the Asahan-3 HEPP in 2007 (Technical Note No. 6) but was changed to <i>N. sumatranus</i> (Least

	Concern, LC) in the ESIA (2012). There are also fish belonging to the genus <i>Tor</i> in the Asahan River. According to the ESIA, these are <i>T. dourenensis</i> and <i>T. soro</i> , none of which are listed in the IUCN Red List, and <i>T. tambroides</i> (Data Deficient, DD). In recent years it has been suggested that <i>T. dourenensis</i> is synonymous with <i>T. tambra</i> (DD) and that <i>T. tambra</i> is the only currently valid species of mahseer in the rivers of Indonesia. Despite the complex and unresolved taxonomy, the <i>Tor</i> fish in Indonesia are generally considered to be threatened. There is also indication that the Near Threatened (NT) Shortfin Eel (<i>Anguilla bicolor</i>) occurs in the Asahan River.
Any other species of conservation importance	See above.
Migratory pathways	Sumatra is located along the East Asian-Australasian Flyway, one of the major bird migration routes in the world.
Invasive species: terrestrial	None identified
Invasive species: aquatic	Water hyacinth (<i>Eichhornia crassipes</i>)
Key threats to biodiversity	The key threat to terrestrial biodiversity in Sumatra is rapid deforestation and forest degradation, mainly due to palm oil and forestry plantations, logging, smallholder farming, roads, mining and fires. Aquatic biodiversity in the Asahan River is threatened by pollution from upstream agricultural activities and settlements as well as by river flow regulations and diversions associated with hydropower developments (including the existing Asahan-1, Asahan-2 and Asahan-3 HEPPs and the planned Asahan-4 HEPP).
Agencies involved in biodiversity conservation	Key biodiversity agencies include: - MoEF: At the national level, the ministry is the primary body responsible for managing and conserving the country's forests and biodiversity. - BKSDA (Natural Resources Conservation Agency): This agency under the MoEF is responsible for the conservation of biodiversity, including protection of endangered species and their habitats. There are regional offices in each province, including North Sumatra. - North Sumatra Province Forestry Service: At the provincial level, the North Sumatra Province Forestry Service is responsible for managing forests and related resources in North Sumatra.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
ASSESSMENT					
Ongoing or emerging biodiversity issues have been identified	✓	The biodiversity risks and impacts caused by the operation of Asahan-3 HEPP have been addressed in the ESIA and in the technical documentation prepared by Nippon Koei (Technical Note No. 2 – Integrated Reservoir	Identification of ongoing or emerging biodiversity issues takes into account both risks and opportunities	Select..	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		Operation Study and Technical Note No. 6 – Fishery Survey). The key biodiversity issues in the operation stage include reforestation (to compensate for the loss of trees that have been cleared) and management of aquatic biodiversity. The impacts of reduced downstream flows on the fish fauna have been identified and assessed but without conducting a comprehensive environmental flow assessment. This is considered a non-significant gap (see section 11).			
If management measures are required, then monitoring is being undertaken to assess if management measures are effective	✓	Monitoring of reforestation and aquatic biodiversity (abundance of Batak fish) is required in order to meet the licensing conditions issued by the MoEF and provincial Environmental Agency, respectively. Until recently, aquatic biota and terrestrial fauna have been monitored as part of the construction phase RPL. PLN NP is committed to continue such monitoring, and biodiversity surveys are being conducted in July 2025.			
MANAGEMENT					
Measures are in place to manage identified biodiversity issues	✓	In 2024, PLN adopted a modern Biodiversity and Land Restoration Policy. At the project level, management of biodiversity issues during the operation stage, according to the RKL, will include efforts to conserve the Batak fish (e.g., fish	Processes are in place to anticipate and respond to emerging risks and opportunities	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		cultivation) and to conduct reforestation, pending further guidance from the MoEF. Discussions of the results of ongoing surveys are planned with BKSDA and local government agencies, to define any necessary management measures.			
CONFORMANCE AND COMPLIANCE					
Processes and objectives in place to manage biodiversity issues have been and are on track to be met with:			There are no non-compliances	Select.	Not assessed
• no major non-compliances	✓	No major non-compliances have been identified regarding biodiversity and invasive species.			
• no major non-conformances	✓	No major non-conformances have been identified regarding biodiversity and invasive species.	There are no non-conformances	Select.	Not assessed
Biodiversity related commitments have been or are on track to be met	✓	In addition to the biodiversity related licensing conditions issued by the MoEF and the provincial Environmental Agency, PLN has committed to a number of principles in its Biodiversity and Land Restoration Policy, including a No Net Loss approach, collaboration with biodiversity stakeholders, support for conservation actions, and generally following best practices. As described above, specific management measures will be agreed with government agencies following the July 2025 and subsequent annual surveys.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
OUTCOMES					
Negative biodiversity impacts arising from activities of the operating facility are avoided, minimised, mitigated, and compensated	✓	Despite the lack of a detailed action plan for managing and monitoring operation stage issues, negative biodiversity impacts have so far been largely avoided and mitigated, or are likely to be successfully managed. The small footprint and the run-of-river design and operation of the Asahan-3 HEPP combined with the licensing conditions related to reforestation, minimum flow release, and aquatic biodiversity management are considered reasonable to avoid, minimise, mitigate, and compensate negative biodiversity impacts. The minimum flow release (arguably the most important mitigation measure in the operation stage) is significantly higher than what was originally proposed and required. The modified flow regime is likely to cause a reduction in aquatic biodiversity on a local scale, but this will be mitigated by temporary spilling and contribution from tributaries. The siting of Asahan-3 HEPP in a hydropower cascade with both natural and man-made barriers is favourable, as it minimises the incremental impacts from the project.	There are healthy, functional and viable aquatic and terrestrial ecosystems in the area affected by the hydropower facility that are sustained over the long-term	Select.	Not assessed
			The facility has contributed or is on track to contribute to addressing biodiversity issues beyond those impacts caused by the operating hydropower facility	Select.	Not assessed

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	Not assessed

Summary of findings and other notable issues
The Asahan-3 HEPP is predominantly located in a forested landscape consisting of a mosaic of primary and secondary forest mixed with planted trees and crops. PLN has been issued with a license to use the forest for hydropower development by the MoEF on the condition that temporary disturbed sites are restored, and that permanent loss of forest is compensated by off-site reforestation. These requirements, combined with the relatively small footprint of the project, suggest that negative impacts on terrestrial biodiversity can be mitigated and will be limited in the long term. There is, however, more uncertainty associated with the impacts on aquatic biodiversity due to permanent river diversion and run-of-river operation. The regulated flow regime is not based on a detailed assessment of environmental flow requirements, yet the minimum flow release is higher than originally proposed and corresponding to nearly 10% of the average pre-project flow.

Relevant evidence	
Interview	2-7, 19, 32, 34-45, 55, 56, 60
Document	1, 2, 8, 9, 12, 14-19, 28, 67, 69, 71, 72, 86, 87, 93, 96, 101, 104, 131, 135, 141, 143
Photo	8, 9, 13, 21, 25, 26, 29, 30, 43, 46, 47, 50, 57, 61



7 Indigenous Peoples

Scope and Principle

This section addresses the rights at risk and opportunities of Indigenous Peoples with respect to the hydropower facility, recognising that as social groups with identities distinct from dominant groups in national societies, they are often the most marginalized and vulnerable segments of the population. The principle is that the operating facility respects the dignity, human rights, aspirations, culture, lands, knowledge, practices and natural resource-based livelihoods of Indigenous Peoples in an ongoing manner throughout the project life.

Background

Are any of the affected people Indigenous Peoples? Please state the evidence on which this determination is made.

Yes, this section is relevant

[Click here to enter text.](#)

No, this section is not relevant

This section is not relevant, as none of the directly affected communities fall under the definition of Indigenous Peoples. The regional majority ethnic group with about 10 million members are the Batak, whose institutions are not separate from those of the dominant society or culture and who are not marginalized in Indonesia. Attitudes towards the project have not differed between ethnic groups.



8 Cultural Heritage

Scope and Principle

This section addresses cultural heritage, with specific reference to physical cultural resources, associated with the hydropower facility. The principle is that physical cultural resources are identified, their importance is understood, and measures are in place to address those identified to be of high importance. This section does not address non-physical cultural resources, which are addressed in Section 1 and/or in Sections 5 and 7 when relevant.

Background

Does the project affect any physical cultural resources? Please state the evidence on which this determination is made.

Yes, this section is relevant

[Click here to enter text.](#)

No, this section is not relevant

This section is not relevant, as no physical cultural resources have been identified as affected by the project, during the ESIA process or by stakeholders during the on-site assessment. Some graves were moved, with a special ceremony, but these were not considered important cultural heritage resources.

9 Governance and Procurement



Scope and Principle
This section addresses corporate and external governance considerations for the operating hydropower facility. The principle is that the owner/operator has sound corporate business structures, policies and practices; addresses transparency, integrity and accountability issues; can manage external governance issues (e.g. institutional capacity shortfalls, political risks including transboundary issues, public sector corruption risks); and can ensure compliance.

Background	
Key information on political context and public sector risks	PT Perusahaan Listrik Negara (Persero) or PLN, a 100% state-owned corporation, has a monopoly on electricity distribution and transmission, and a dominant role in electricity generation in Indonesia. PLN plays a key role in government strategies such as providing services across all parts of the country, including remote islands and rural areas, climate mitigation, and industrial development. PLN is financially dependent on government subsidies and equity injections, as costs and debts related to coal generation are high, and tariffs are not cost covering.
Key information on corporate ownership and governance	PLN is under the Ministry of State-Owned Enterprises (MoSOEs), with a Board of Commissioners and Board of Directors appointed by the ministry. The ministry is pursuing reforms to SOE governance, for example by making boards more independent, qualified and accountable, and by clarifying SOE's public service obligations. Additional oversight is provided by the MoEMR, Ministry of Finance, MoEF, and the National Development Planning Agency (BAPPENAS).
Details of the concession, if applicable	Asahan-3 HPP is directly owned by PLN and does not require a concession.
Key licenses or permits	Environmental permits are issued at the provincial level, in this case by the Province of North Sumatra. A water use permit (which also specifies the minimum environmental flow) is issued by PUPR. A permit to use public forest lands is issued by the MoEF. Construction permits are issued at the regency level.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Ongoing or emerging political and public sector governance issues have been identified	✓ As a key entity in the power sector, PLN is well aware of external governance issues at the central government level, such as political expectations to decarbonise while expanding supply and maintaining low	There are no significant opportunities for improvement in the assessment of political and public sector governance issues and corporate	Select. Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		tariffs. Relationships with local governments are not as active, but functional. Public sector governance can pose significant challenges for PLN. The Asahan-3 HPP was delayed for several years because of regulatory and land acquisition issues, including uncertainty about using land classified as forest land and a corruption case involving land acquisition by a local government official.	governance requirements and issues		
Corporate governance requirements and issues have been identified	✓	Key issues have been identified by government (including through regular audits); PLN's board, internal audit and related units; and outside observers such as the Asian Development Bank.			
Monitoring is being undertaken to assess if corporate governance measures are effective	✓	PLN tracks its performance internally and publishes Financial Statements as well as Annual, Sustainability, ESG Performance and Statistical reports that include performance indicators. It also reports to and is monitored by the MoSOEs and other government agencies.			
MANAGEMENT					
Processes are in place to manage the following:			Processes are in place to anticipate and respond to emerging risks and opportunities	Select.	Not assessed
• corporate, political and public sector risks	✓	PLN has a Risk Management Policy and System overseen by the Board of Directors, following the Statement			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		of Corporate Intent Integrated Risk Management No. 0070.P/DIR/2021 and Board of Directors Regulation No. 0016.P/DIR/2023, aligned with ISO 31000. Risks are classified into the categories Strategic, Financial, Operational, Project, and Compliance. In 2023, a risk maturity self-assessment reached the highest level yet.			
• compliance	✓	The compliance function is integrated with risk management. In 2023, a compliance maturity self-assessment reached the highest level yet. Compliance is also checked by government audits, including by the Supreme Audit Agency (BPK), and improved by cooperation with law enforcement agencies including the Corruption Eradication Commission (KPK). A whistleblowing mechanism has been established. PLN NP is preparing certification against ISO 37301 (Compliance Management System).			
• social and environmental responsibility	✓	Social and environmental issues are overseen by PLN's Sustainability Committee. CSR activities are aligned with ISO 26000 (Guidance on Social Responsibility). PLN has three significant CSR programmes; the Partnership and Community Development Program (PKBL), CSR			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		ProgramJIC, and the Mandiri Energy Village Program.			
• procurement of goods and services	✓	PLN's procurement framework is based on Board of Directors Decree No. 0620.K/DIR/2013 and General Guidelines for Procurement of Goods/Services, for efficient, effective, competitive, transparent, fair and reasonable, and accountable procurement. 'Value-for-Money' is emphasised. A 'Green Procurement Policy' was introduced in 2024. An increasing part of procurement is conducted on an e-procurement platform. In foreign-financed projects such as Asahan-3 HPP, financiers such as JICA provide procurement guidance and/or non-objections to procurement decisions. FIDIC formats were used for the four main contracts during construction, and a Standing Dispute Board helped resolve multiple claims of the civil works contractor.	Contractors are required to meet or have consistent policies as the developer	Select.	Not assessed
• grievance mechanisms	✓	PLN operates a general customer complaint mechanism as well as grievance mechanisms specific for individual investment projects, such as the GTF in the case of Asahan-3 HPP.			
• ethical business practices	✓	PLN staff are subject to a Code of Conduct and Business Ethics. PLN is implementing an Anti-Bribery Management System (SMAP) in all			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		units, is certified against ISO 37001, and has collaborated with Transparency International Indonesia. Senior management must submit State Officials Wealth Reports (LHKPN).			
• transparency	✓	PLN publishes a significant amount of information at the corporate level; however information on specific projects (for example, the ESIA's, ESMPs or monitoring reports for Asahan-3 HPP) can be more difficult to access (see Section 10).	Procurement processes include anti-corruption measures as well as sustainability and anti-corruption criteria specified in pre-qualification screening	Select.	Not assessed
Policies and processes are communicated internally and externally as appropriate	✓	In general, PLN policies and processes are communicated appropriately and accessible, for example, through corporate websites. However, because of the complex structure of PLN and the different policies and processes applied to different projects (e.g. depending on funding sources), it is not always easy for external stakeholders to follow which policies and processes apply to a particular project at a particular time.			
In case of capacity shortfalls, appropriate external expertise is contracted for additional support	✓	PLN regularly contracts external capacity. In the case of Asahan-3 HPP, the University of North Sumatra has been providing much of the social and environmental expertise during the construction stage.			
CONFORMANCE AND COMPLIANCE					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
The project has no major non-compliances	✓	There are no indications of major non-compliances.	The project has no non-compliances	Select.	Not assessed
OUTCOMES					
There are no significant unresolved corporate and external governance issues identified	✓	The complex structure of PLN with multiple subsidiaries and different management systems for different activities can be confusing for internal and external stakeholders, and detrimental for ESG performance. There is no indication, however, that this materially affects the Asahan-3 HPP.	There are no unresolved corporate and external governance issues identified	Select.	Not assessed
List of significant gaps against Minimum Requirements			Number of Advanced Requirements met		
None			Not assessed		
Summary of findings and other notable issues					
The project is owned and operated by PLN, a large state-owned corporation. PLN faces a number of challenges, including slow regulatory processes, financial constraints and a complex corporate structure. However, the organization is undergoing a reform process and adopting a modern ESG framework.					
Relevant evidence					
Interview	1-6, 11-24, 31-33, 43-45, 48-56, 57-69, 71				
Document	4-9, 13, 19-27, 35, 38, 40, 41, 66, 67, 69, 70, 73-81, 102-110, 114, 124-127, 130-143				
Photo	3, 34, 45, 48-61				

10 Communications and Consultation



Scope and Principle			
This section addresses ongoing engagement with project stakeholders, both within the company as well as between the company and external stakeholders (e.g. affected communities, governments, key institutions, partners, contractors, catchment residents, etc). The principle is that stakeholders are identified and engaged in the issues of interest to them, and communication and consultation processes maintain good stakeholder relations throughout the project life.			
Background			
Directly affected community-level stakeholders	Farmers, fishermen and local businesses (including the rafting community) in the six project-affected villages (Tangga, North Meranti, Ambar Halim, Pintu Pohan, Halado and Tangga Batu I) who have been displaced or affected by project construction and operation.		
Directly affected institutional-level stakeholders	Government agencies at sub-district (Aek Songsongan, Pintu Pohan Meranti and Parmaksian), district/regency (Asahan and Toba), province (North Sumatra) and central level, including MoEF, Environmental Agency (provincial and regency), Natural Resources Conservation Agency, PUPR, BAPPENAS, National Land Agency and the Provincial River Basin Organisation, as well as the other hydropower facility operators upstream on the Asahan River, i.e., BDSN (Asahan-1 HEPP) and INALUM (Asahan-2 consisting of Siguragura HEPP and Tangga HEPP).		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Ongoing or emerging issues relating to hydropower facility communications and consultation have been identified	✓ PLN has identified relevant issues relating to the operation of Asahan-3 HEPP that require stakeholder consultation and communications. This includes the need for continued engagement with fishermen and the rafting community affected by reduced river flow, communications and coordination with the other HEPP operators on the Asahan River (BDSN and INALUM), and periodic reporting on environmental management and	The stakeholder mapping takes broad considerations into account	Select. Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		performance (including minimum flow releases).			
Requirements and approaches are determined through a periodically updated assessment process involving stakeholder mapping	✓	An initial assessment and mapping of stakeholders was undertaken prior to project implementation (Technical Note No. 9) followed by a separate Stakeholder Engagement Plan (SEP) for the transmission line. The SEPs have now been handed over to the operations team (PLN NP), who will continue the consultations with the affected communities and the communications with government agencies and other institutional stakeholders.			
Effectiveness is monitored	✓	The effectiveness of communications and consultation has been monitored by the GTF staffed with social scientists and CLOs from the LP-USU. The CLOs have kept records of activities and outcomes. In addition, public attitudes and perceptions have been monitored on an annual basis during the construction phase, and this has provided an insight into the effectiveness of PLN's communications and consultation campaigns. There is an intention to retain the services of the GTF into the operation stage.			
MANAGEMENT					
Communications and consultation plans and processes are in place to	✓	The SEP includes plans and processes for communications and consultation with stakeholders at project level. In	Communication and consultation plans and processes show a high level	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
manage communications and engagement with stakeholders		addition, PLN has established procedures at corporate level for communications with and reporting to government agencies, and for public disclosure of project information, including sustainability and ESG performance reporting.	of sensitivity to communication and consultation needs and approaches for various stakeholder groups and topics		
They include an appropriate grievance mechanism	✓	The GTF is responsible for maintaining a project-level grievance redress mechanism (GRM). The GRM keeps track of all grievances received and how they have been addressed and resolved. Grievances are also captured and managed at corporate level through the PLN website and other channels where the public can submit requests and complaints.	Processes are in place to anticipate and respond to emerging risks and opportunities	Select.	Not assessed
They outline communication and consultation needs and approaches for various stakeholder groups and topics	✓	The SEP includes communications and consultation strategies for the different stakeholder groups.			
STAKEHOLDER ENGAGEMENT					
The project operation stage involves engagement with directly affected stakeholders	✓	PLN and the GTF have engaged with the directly affected stakeholders throughout the preparation and implementation stages, mainly on issues relating to the land acquisition process and the construction phase. This engagement is now being continued into the operation stage. Engagement with communities	Engagement is inclusive and participatory	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		appears to have been more active than with local government agencies.			
Engagement is:					
• appropriately timed and scoped	✓	The timing and scope of communications and consultation activities are adjusted according to stakeholder needs. There are no indications of delayed engagement.	Negotiations are undertaken in good faith	Select.	Not assessed
• often two-way	✓	Engagement activities allow for two-way communication. The affected communities and other stakeholders are generally outspoken and have often raised issues (including grievances) in a proactive manner.			
• undertaken in good faith	✓	Engagement activities are transparent and carried out in good faith.			
The business interacts with a range of directly affected stakeholders to understand issues of interest to them	✓	PLN interacts with project-affected communities and with local government agencies on a regular basis.	The assessment and management process for downstream flow regimes has involved appropriately timed and two-way engagement with directly affected stakeholders	Select.	Not assessed
Ongoing processes are in place for stakeholders to raise issues and get feedback	✓	Stakeholders are free to reach out to PLN either through the project-level GRM or through the PLN website. Feedback from stakeholders is also captured in community meetings and through correspondence with local government agencies.	Ongoing processes are in place for stakeholders to raise issues with downstream flow regimes and get feedback	Select.	Not assessed
Ongoing processes are in place for:				Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• environmental and social issues	✓	Adequate processes are in place (see above).	Feedback on how issues raised have been taken into consideration has been thorough and timely		
• project-affected communities	✓	Adequate processes are in place (see above).	Project-affected communities have been involved in decision-making around relevant issues and options	Select.	Not assessed
• resettles and host communities	✓	Adequate processes are in place (see above).	Resettles and host communities have been involved in decision-making around relevant issues and options	Select.	Not assessed
• Indigenous Peoples	✓	Not relevant			
• employees and contractors on human resources and labour management issues	✓	Adequate processes are in place (see Section 2 and Section 9).			
• management of climate risks	✓	There is no dedicated process for stakeholders to raise issues and get feedback on climate risks. However, such issues can be addressed through the regular communication channels. PLN has also established inter-agency communication with the other HEPP operators on the Asahan River (BDSN and INALUM) where climate risks and variability can be addressed.			
Channels of communication with Indigenous Peoples are maintained	Select.	Not relevant	Directly affected Indigenous Peoples have been involved in decision-making around relevant issues and options	Select.	Not relevant
These channels are:					
• appropriately timed	Select.	Not relevant			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• culturally appropriate	Select.	Not relevant			
• two-way	Select.	Not relevant			
A mutually-agreed disputes procedure is in place with Indigenous Peoples	Select.	Not relevant			
Public disclosure:					
• the business makes significant project reports publicly available	✓	PLN's annual ESG Performance and Sustainability Reports are available on the PLN website. Other significant project reports, such as the ESIA and the semi-annual environmental management and monitoring reports, are publicly available upon request to PLN or to the regulatory agencies (in accordance with the Public Information Disclosure Act of Indonesia). PLN has a well-defined procedure in place to facilitate such requests.			
• the business publicly reports on project performance, in some sustainability areas	✓	Project performance on environmental and social sustainability is reported in the semi-annual submissions to the Environmental Agency of North Sumatra. These reports are also shared with other local government agencies and can be accessed by the general public upon request (see above). Environmental and social performance is also publicly disclosed in the ESG Performance and Sustainability Reports at corporate level although the			
			The business publicly reports on project performance in sustainability areas of high interest to its stakeholders	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		Asahan-3 HEPP has not yet featured in these reports.			
• power density calculations, estimated GHG emissions, and / or the results of a site-specific assessment are publicly disclosed	✓	No, but this is a non-significant gap as the project is a run-of-river scheme with a very small intake pond and a calculated power density of 5,800 W/m².	The assessment of project resilience is publicly disclosed	Select.	Not assessed
CONFORMANCE AND COMPLIANCE					
Processes and objectives relating to communications and consultation have been and are on track to be met with:			There are no non-compliances	Select.	Not assessed
• no major non-compliances	✓	No major non-compliances have been identified regarding communications and consultation.			
• no major non-conformances	✓	No major non-conformances against PLN's communications and consultation processes and procedures have been identified.	There are no non-conformances	Select.	Not assessed
Communications related commitments have been or are on track to be met	✓	There are no indications that any communications related commitments were not met.			
List of significant gaps against Minimum Requirements			Number of Advanced Requirements met		
None			Not assessed		
Summary of findings and other notable issues					
As the Asahan 3 HEPP has only recently been commissioned, evidence on communications and consultation is mainly from the implementation stage. A GTF has been operational since commencement of construction in 2019 and is responsible for grievance management as well as community outreach, and staffed with social scientists and CLOs from the LP-USU. Despite many grievances recorded during the construction phase, the GTF has been very effective in helping to resolve cases and managing relations with the affected communities. The GTF services will be continued into operation stage although the exact modalities have not yet been formalised with the operations team (PLN NP). The project Stakeholder Engagement Plan (SEP) provides an overview of relevant stakeholders and has provisions for regular updates. PLN maintains good relations with government agencies and other institutions, and makes project information publicly available in accordance with the Public Information Disclosure Act of Indonesia.					

Asahan-3 HEPP, 174 MW, Indonesia

Relevant evidence	
Interview	2-24, 27, 28, 33-45, 48, 49, 52-70
Document	1, 8, 9, 12, 14-18, 28, 35, 43-47, 67, 70-77, 82-85, 96, 114, 123
Photo	3, 45, 49-51, 56, 57, 61



11 Hydrological Resource

Scope and Principle

This section addresses hydrological resource availability and reliability, reservoir management, and downstream flow regimes in relation to the operating hydropower facility. The principle is that power generation planning and operations take into account hydrological resource availability and reliability in the short- and long-term, that the reservoir is well managed taking into account power generation operations, environmental and social management requirements, and multi-purpose uses where relevant, and that issues with respect to downstream flow regimes are identified and addressed.

Background

Hydrology and flows

Average flow at dam (m ³ / s)	102.2 m ³ /s
Minimum monthly average flow (m ³ / s)	99.2 m ³ /s
Maximum monthly average flow (m ³ / s)	102.1 m ³ /s
Lowest observed flow (m ³ / s)	99.2 m ³ /s
Highest observed flow (m ³ / s)	109.7 m ³ /s
Design flow (m ³ / s)	111 m ³ /s
Affected river reaches (start/end and how affected)	Asahan-3 is a run-of-river project with a small headpond collecting flows from the tailrace of Tangga powerhouse directly upstream, any spills from Tangga dam, and the Ponot and Baturangin tributaries. The project diverts up to 111 m ³ /s from a reach of approximately 10 km to the tailrace. In that bypass reach, several tributaries contribute a total average flow of 4.8 m ³ /s. Flows through the bypass reach are occasionally augmented by spills and by shutdowns of the powerhouse or waterways. Asahan-3 does not provide peaking power; there are no significant flow alterations downstream of the tailrace.
Proposed downstream flow regimes for environmental or social objectives	From the Asahan-3 intake weir, the minimum discharge through the bypass reach is 4.15 m ³ /s consisting of 1.15 m ³ /s for irrigation and 3 m ³ /s for maintenance flow and habitat requirements of <i>batak</i> fish.

Reservoir

Reservoir length (km)	Asahan-3 has a small headpond of approximately 1 ha, from which water flows through a headrace channel of 1.3 km length, an intake pond with a total area of 2 ha and a length of 138 m (with a spillway back into the river), and a headrace tunnel of 7.8 km length.
Minimum operating level MOL (masl)	263 masl (intake pond)
Normal operating level (masl)	266.6 masl (intake pond)
Full supply level FSL (masl)	266.6 masl (intake pond)

Reservoir area at FSL (km ²)	2 ha (intake pond)
Reservoir area at MOL (km ²)	See above
Volume at FSL (million m ³)	102,000 m ³
Volume at MOL (million m ³)	72,000 m ³
Average retention time in days	N/A
Number of days for filling	N/A

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
ASSESSMENT					
Ongoing or emerging issues in the following areas have been identified:					
• hydrological resource availability and reliability	✓	The historic hydrology of the Asahan River is stable and well understood, thanks to the large natural storage in Lake Toba and the long record of observations, related to the Asahan hydropower cascade. Based on the water resources management plan (WRMP) for the Asahan-Toba River Basin, issues that may impact future water availability and reliability by reducing the outflow from Toba Lake are 1) the increasing need of water supply around the Toba Lake area, which has become a national tourism destination, and 2) vegetation cover degradation (29,121 ha of 87,303 ha in the catchment area were classified as highly degraded at the time of project preparation). Despite the understanding of ongoing changes, the project hydrological assessment	Issues that may impact on water availability or reliability have been comprehensively identified	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		was based on existing conditions only, with no projections of future conditions. For example, the runoff coefficient used for the hydrology calculations is fixed at 65%. Climate change was also not considered but has been recognized in the meantime (see Section 12).			
• reservoir management	✓	Asahan-3 is located downstream of three waterbodies in the cascade, Lake Toba, Siguragura reservoir and Tangga reservoir, and flows depend on the releases from these three waterbodies. An integrated reservoir operation study was undertaken to optimize design and operations of Asahan-3. Other uses of upstream water bodies such as recreation, fish farming, or floating solar PV are unlikely to have an impact on water availability.			
• downstream flow regimes	✓	4 purposes of downstream releases through the bypass reach have been identified, namely irrigation, <i>batak</i> fisheries, tourism/rafting and maintenance flow, and each one was studied to determine flow requirements. Irrigation in the bypass reach is small scale and managed by local farmers. The affected irrigation area consists of 4 blocks with areas ranging from 1.0-12.9 ha. The Asahan River is also	Scenarios, uncertainties and risks for water availability and reliability are routinely and extensively evaluated over the short- and long-term	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		used for canoeing and rafting, including annual competitions, as well as fishing (see Section 4). Water demand downstream of the tailrace may increase in the future (e.g. for Tanjung Balai City and the irrigation area in Leidong Asahan with 62,100 ha) but should not be affected by Asahan-3.			
If management measures are required then monitoring is being undertaken to assess if management measures are effective:					
• reservoir management	✓	To monitor the degradation of the Toba-Asahan basin and increased sedimentation in water bodies, North Sumatra province developed a Strategic Plan in 2006 and since then conducts periodic coordination with stakeholders. There is also coordination and data-sharing with the operator of the upstream reservoirs PT INALUM (see below).			
• downstream flow regimes	✓	The release of downstream flows is through a permanently open bottom outlet in the headpond weir and does not require monitoring. Surveys of aquatic biodiversity and livelihoods dependent on the river are ongoing as of July 2025 to monitor the impacts of the operational flow regime on downstream habitats and activities, as a basis for adaptive management over time.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Monitoring is being undertaken of hydrological resource availability and reliability	✓	Monitoring of hydrological data is undertaken by several stakeholders, i.e. BMKG (national meteorology and climatology agency), PT INALUM, PLN and Sumatera II River Basin Authority, and data availability is quite good. During project preparation, rainfall and discharge data since 1961 were available. Currently rainfall data are collected for a total of 22 stations, and river discharge data for a total of 12 stations, by BMKG and PT INALUM.	Identification of ongoing or emerging reservoir management issues takes into account both risks and opportunities	Select.	Not assessed
Inputs to this monitoring include:			Issues identification relating to downstream flow regimes takes into account both risks and opportunities	Select.	Not assessed
• field measurements	✓	Field measurements during project preparation covered topography, hydrometrics, geology, water quality, discharge, forest area and forest biodiversity, and fisheries. For current field measurements, see above.	An assessment has been undertaken that includes identification of the flow ranges and variability to achieve different environmental, social and economic objectives based on field studies as well as relevant scientific and other information	Select.	Not assessed
• appropriate statistical indicators	✓	Appropriate statistical indicators were used for flow predictions including low and high flow analysis during project preparation.			
• issues which may impact on water availability or reliability	✓	These issues are being monitored by various government agencies, including water abstractions from Lake Toba and catchment			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		conditions. Between the years 2000 and 2009, the proportion of the catchment area classified as forest declined from 22% to 17%.			
• a hydrological model	✓	The hydrological approaches used during project preparation were a Tank Model for low flow analysis, using verified discharge measurement data for the calibration, and the Nakayasu method for design flood analysis. The Sumatera II River Basin Authority is tasked with ongoing modelling of water resources in the basin.			
MANAGEMENT					
Measures are in place to guide generation operations that are based on:					
• analysis of the hydrological resource availability	✓	Generation operations are basically determined by releases from upstream reservoirs. PT INALUM operates an aluminum smelter and is thus focused on reliable baseload generation, which results in very stable inflows for the Asahan-3 project.	Planning of generation operations has a long-term perspective	Select.	Not assessed
• a range of technical considerations	✓	A range of technical considerations and risks were taken into account in designing the Asahan-3 project for baseload generation.	Planning of generation operations fully optimises and maximises efficiency of water use	Select.	Not assessed
• an understanding of power system opportunities and constraints	✓	The Asahan-3 project is specifically optimized for maximum load factor and generation. Other power	Planning of generation operations has the flexibility to adapt to	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		stations are used by PLN to follow the load in the regional power system.	anticipate and adapt to future changes		
Measures are in place to manage identified reservoir management issues	✓	Based on the 2019 Water Resources Law, the Directorate General of Water Resources of PUPR has the obligation to establish Water Resources Management Plans for strategic river basins. On this basis, the Sumatera II River Basin Authority formulated the 2022-2042 WRMP for the Asahan River Basin, which should be updated every 5 years, and lays out actions by PLN, local government, the river basin authority, and other stakeholders. The Integrated Management Plan for the Ecosystems in Toba Lake Region (EKDT) also contributes to catchment management by BPDAS Asahan Barumon and other agencies. Reservoir management is coordinated between key stakeholders in the river basin, i.e. Sumatera II River Basin Authority, Perum Jasa Tirta 1 (state-owned company for river basin management), PT INALUM and PLN.	Processes are in place to anticipate and respond to emerging risks and opportunities for reservoir management	Select.	Not assessed
Measures are in place to address identified downstream flow issues	✓	A new intake for irrigation requirements and a release pipe for minimum downstream releases	Processes are in place to anticipate and respond to	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		through the bypass reach have been installed. The new irrigation intake will improve irrigation management. A two-week full release window during annual powerhouse maintenance has been agreed to support rafting competitions, and will also serve to flush the bypass reach channel.	emerging risks and opportunities for downstream flow regimes		
Where formal commitments have been made to downstream flow regimes, these are publicly disclosed	✓	Formal commitments have been made 1) through discussions with irrigation groups, 2) through the regulatory process of establishing minimum flows, and 3) through discussions with rafting groups, including FAJI (Indonesian Rafting Federation). All commitments are publicly available, and 1) and 2) have already been implemented through project design measures.	Commitments are made in relation to downstream flow regimes that include the flow objectives; the magnitude, range and variability of the flow regimes; the locations at which flows will be verified; and ongoing monitoring	Select.	Not assessed
CONFORMANCE AND COMPLIANCE					
Processes and objectives in place to manage each of the following have been and are on track to be met:			There are no non-compliances relating to:		
• reservoir management, with no major non-compliances	✓	There are no indications for major non-compliances.	• reservoir management	Select.	Not assessed
• reservoir management, with no major non-conformances	✓	There are no indications for major non-conformances.			
• downstream flow regimes, with no major non-compliances	✓	There are no indications for major non-compliances.	• downstream flow regimes	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• downstream flow regimes, with no major non-conformances	✓	There are no indications for major non-conformances.			
Commitments relating to the following have been or are on track to be met:			There are no non-conformances relating to:		
• reservoir management	✓	The commitments relating to reservoir management are on track, although progress towards improved catchment conditions is slow.	• reservoir management	Select.	Not assessed
• downstream flow regimes	✓	The commitments relating to downstream flow regimes are on track.	• downstream flow regimes	Select.	Not assessed
OUTCOMES					
Downstream flow regimes take into account environmental, social and economic objectives	✓	Environmental, social and economic objectives have been taken into account in decisions on downstream flow regimes. As described, for the environmental objectives including fish habitat, a maintenance flow of 3.0 m ³ /s has been allocated, and the socio-economic objectives are accommodated through a combination of the maintenance flow, a separate allocation for irrigation of 1.15 m ³ /s, and an annual 2 weeks of full release. The limitations of these flows for some uses are recognized, and groups engaged with recreational rafting are also being supported by PLN to move water-related tourism to the	Downstream flow regimes and commitments are an optimal fit amongst environmental, social and economic objectives within practical constraints of the present circumstances	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		Ponot, Sampuran Harimau and Baturangin waterfalls.			
Where relevant, they also take agreed transboundary objectives into account	✓	Not relevant			

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	Not assessed

Summary of findings and other notable issues
Asahan-3 is a run-of-river, diversion type hydropower project, relying on upstream storage and releases for its inflows. These inflows are exceptionally stable and predictable, allowing for a very high load factor. There are a number of environmental and social reasons to maintain flows in the bypass reach of approximately 10 km, minimum flows through that reach have been agreed, and there is monitoring to confirm whether environmental and social objectives of these flows are being achieved.

Relevant evidence	
Interview	1, 2, 9, 15-18, 25-26, 31-42, 71
Document	3-5, 8-9, 12, 16-18, 69, 82, 85-88, 91-93, 95, 97-98, 102, 105, 111-113, 116, 118, 120-122, 131, 135, 140, 142, 144
Photo	1, 8-11, 13-14, 19, 21-26, 28, 30-31, 37, 41, 43, 46, 49, 51, 63-65



12 Climate Change Mitigation and Resilience

Scope and Principle	
This section addresses the estimation and management of the project's greenhouse gas (GHG) emissions, analysis and management of the risks of climate change for the project, and the project's role in climate change adaptation. The principle is that the project's GHG emissions are consistent with low carbon power generation, the project is resilient to the effects of climate change, and the project contributes to wider adaptation to climate change.	
Background	
Climate Change Mitigation	
Capacity (MW) (or additional capacity in case of expansion/ rehabilitation projects)	174 MW
Average reservoir area (representing area of flooded land, net of pre-impoundment water body) (km ²) (or additional reservoir area if any, for expansion/rehabilitation projects)	The net area of the headpond and intake pond is estimated to be less than 3 ha.
Power density (W / m ²)	5,800 W / m ²
Emissions intensity (gCO ₂ e / kWh)	Not estimated. CDM registration of the project was planned but not completed.
National and regional policies, plans and commitments relevant to mitigation	Indonesia has established several laws related to climate change, including those related to international commitments (1994 law regarding the UN Framework Convention on Climate Change, 2004 law regarding the Kyoto Protocol, 2016 law regarding the Paris Agreement); a number of governmental, presidential, ministerial and provincial regulations; and planning and strategy documents such as the 2021 Long-Term Strategy for Low Carbon and Climate Resilience 2050. There have also been regional government initiatives such as the 2012 North Sumatra Governor Regulation, a regional legal instrument that outlined the Provincial Action Plan for Reducing Greenhouse Gas Emissions (RAD-GRK) in North Sumatra for the period 2010–2020. Indonesia is one of the largest emitters of GHG globally, principally because of a high GHG intensity of power generation (based primarily on a rapidly expanding use of coal) and because of land use change. Its current Nationally Determined Contribution targets reductions in emissions across sectors, including increases in the share of low-carbon energy. PLN's latest ten-year Electricity Supply Business Plan (RUPTL) for 2025-2034 aims for increased generation capacity of 71 GW, 70% of which would be renewable capacity comprised of solar PV (17 GW), hydropower (16 GW), geothermal

	(5 GW) and other renewable sources. The Accelerated Renewable Energy Development (ARED) scheme is PLN's approach to rapidly expanding renewables, based on a 'green super grid' to transfer renewable power to demand centres. The Asahan-3 project is aligned with this scheme, although it was started earlier.
Climate Change Resilience	
Hydrological data available for the project site and the basin, and observed climate trends	As described in Section 11, hydrological and meteorological data availability is good. There has been some research into historic climate trends, showing increases in temperatures, evaporation and rainfall in the Lake Toba catchment area, of 0.003 °C, 1.4 mm, and 8.9 mm per year, between 1957 and 2020. Trends towards an increase in regional precipitation for Northern Sumatra from 1950-2020 are confirmed by other sources (e.g. https://climateknowledgeportal.worldbank.org/watershed/eap000001/trends-variability-historical).
Regional and basin-level climate models relevant to the project location, if any	The climate models underlying the World Bank Climate Knowledge Portal predict that the trend towards increasing precipitation in Northern Sumatra will continue into the future, under any emissions scenario. While short-term and seasonal variability may increase, total annual inflows are more relevant for the Asahan hydropower cascade due to the large volume and buffering capacity of Lake Toba. As part of project preparation Nippon Koei also conducted basin-level modelling for PLN, based on historic rainfall data (CHIRPS). At the national level, PLN itself has considered climate change projections based on two emissions scenarios (RCP 4.5 and RCP 8.5 from the IPCC 5th Assessment Report) and considered their impact on PLN's operations.
Any climate change predictions for the project location, and degree of consistency	See above. There has been a significant decrease of Lake Toba's water level over the past decades, which has been attributed to periodic ENSO related droughts until 1983, and then (after the regulation of the lake and use for hydropower generation since 1983) to a slower and controlled decrease.
National policies, plans and commitments relevant to adaptation and resilience	See above under Mitigation. Specifically for adaptation, the above-mentioned Long-Term Strategy for Low Carbon and Climate Resilience 2050 aims to reduce the impact of climate change on national GDP loss, through increasing resilience in four basic necessities (food, water, energy, and environmental health). For energy, the two highest priority impacts quantified in the Strategy are increased air conditioning and changing hydropower generation. The key adaptation actions are increased investment in renewables and climate proofing of infrastructure. PLN's 2023 Climate Policy also calls for 'reducing vulnerability to the impact of existing and future climate crises by mapping climate change-related risks including PLN's asset exposure to climate change-related risks'. At the regional level, a 2023 North Sumatra Governor Regulation outlines the Disaster Mitigation Plan (Rencana Penanggulangan Bencana/RPB) for 2023–2027, as a strategic framework for disaster risk reduction and management in the province. It emphasizes the integration of disaster mitigation efforts into regional development planning to enhance resilience against various hazards including climate change.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
ASSESSMENT					
Climate Change Mitigation					
If power density is below 5 W/m2, net GHG emissions (gCO2e) of electricity generation are calculated, independently verified and periodically updated	✓	Not required, since power density is much higher.	If a site-specific assessment is required, it incorporates a broad range of scenarios, uncertainties and risks	Select.	Not assessed
If power density is below 5 W/m2 and estimated emissions are above 100 gCO2e/kWh, a site-specific assessment of GHG emissions is undertaken and periodically updated	✓	Not required, since power density is much higher.			
Climate Change Resilience					
An assessment of the project's resilience to climate change is undertaken and periodically updated	✓	Since 2022 PLN has published annual corporate Climate-Related Disclosure Reports which include sections on climate risks. Similar information is provided in PLN's annual ESG Performance Reports. At the national level only minor impacts on hydropower generation are predicted. While there is a good general understanding of the impacts of weather events and climate change on hydropower plants,	Assessment of resilience incorporates sensitivity analysis, project specific hydrological modelling using recognised climate models	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		there have been only some pilot resilience assessments for other renewable projects, but no project-specific assessment for Asahan-3 HEPP. While this is a gap, it is not considered significant in the specific situation of this project because 1) the buffering capacity of upstream Lake Toba is extremely large, with a water volume of 244 km³ (larger than any hydropower reservoir globally), 2) the past and predicted future precipitation trend in the basin is increasing, 3) dam safety is a minor concern due to the small amount of water stored, 4) the key social and environmental impacts of the project are related to the reduced flows in the bypass reach, which should benefit from increased runoff. Increased rainfall may not fully translate into increased discharge because of factors such as increased evaporation from the lake surface, evapotranspiration from the catchment, and increased water abstractions that could also be partially due to climate change (e.g. increased water demand for irrigation). This can be determined			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		through future rainfall and discharge monitoring.			
The assessment:					
• incorporates an assessment of plausible climate change at the project site	✓	Climate change and other changes that could affect future runoff at the project site have not been considered in the hydrology report and the design of the project. However, for the reasons provided above, this is acceptable in this specific case.			
• identifies a range of climatological and hydrological conditions at the project site	✓	See above. Only historic climatological and hydrological conditions at the project site have been considered. However, for the reasons provided above, this is acceptable in this specific case.			
• applies these conditions in a documented risk assessment or stress test	✓	See above. There is no documented climate change risk assessment or stress test. However, for the reasons provided above, this is acceptable in this specific case.			
The risk assessment or stress test encompasses:					
• dam safety	✓	The intake weir is designed for historical flow conditions with a 200-year return period (with minor safety consequences in case of overtopping). As described in Section 4, while the intake weir is not considered a large dam, it is subject to approval from the	The project’s opportunities to provide adaptation services are considered on an ongoing basis	Select.	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		national Dam Safety Committee. Because of the large storage upstream resulting in low variability of flows, the small volume of water stored in headpond, and limited exposure of people along the downstream reach, the lack of consideration of climate change in the dam design is acceptable. The 50 km ² intermediate catchment between the Tangga and Asahan-3 projects is not buffered by any waterbodies, but any local floods from this catchment will be relatively small.			
• other infrastructural resilience	✓	A qualitative risk assessment has been conducted for other infrastructure components such as the access road and bridge to the powerhouse, which is acceptable.			
• environmental and social risks	✓	Regarding climate change communities are primarily concerned about a potential reduction of flow in the Asahan River, which would also affect fish habitat. Indications are that instead, flows are more likely to increase, thus mitigating impacts of the diversion of water by the project.			
• power generation availability	✓	Power generation could marginally benefit from increased runoff,			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		although the project already has a very high load factor.			
MANAGEMENT					
Climate Change Mitigation					
If GHG emissions estimates assume design and management measures, these measures are in place	✓	The emissions from this project are very minor and do not require any design and management measures for mitigation.	Management measures are in place to respond to risks and opportunities including offsetting emissions	Select.	Not assessed
			Plans are in place to monitor parameters used in GHG emissions estimates or to monitor GHG stocks	Select.	Not assessed
Climate Change Resilience					
Measures are in place to avoid or reduce identified climate risks	✓	No climate risks have been identified at this stage. Hydrological trends will be monitored, and if climate risks emerge at a later stage, may require changes to the project such as strengthening of the intake weir to increase resilience.	Measures take account of a broad range of risks and interrelationships	Select.	Not assessed
			Processes are in place to respond to unanticipated climate change	Select.	Not assessed
			Plans are in place to provide adaptation services if necessary	Select.	Not assessed
CONFORMANCE AND COMPLIANCE					
Climate Change Mitigation					
Processes and objectives relating to mitigation have been and are on track to be met with:					
• no major non-compliances	✓	There are no indications for major non-compliances with respect to mitigation.	There are no non-compliances	Select.	Not assessed
• no major non-conformances	✓	There are no indications for major non-conformances with respect to mitigation. The project reduces the average GHG emissions intensity,	There are no non-conformances	Select..	Not assessed

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		as planned by the Indonesian government and PLN.			
Mitigation-related commitments have been or are on track to be met	✓	PLN has adopted a commitment to contribute to the Nationally Determined Contribution (NDC) through the reduction of GHG emissions, and the Asahan-3 project contributes to this commitment. There are also commitments to resilience and to transparent climate-related communications.			
Climate Change Resilience					
Processes and objectives relating to resilience have been and are on track to be met with:					
• no major non-compliances	✓	There are no indications for major non-compliances with respect to resilience.	There are no non-compliances	Select.	Not assessed
• no major non-conformances	✓	There are no indications for major non-conformances with respect to resilience.			
Resilience-related commitments have been or are on track to be met	✓	PLN has made a general commitment to managing climate risks and creating a climate resilient company. There are no specific project-related commitments.	There are no non-conformances	Select.	Not assessed
OUTCOMES					
Climate Change Mitigation					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
The project's GHG emissions are demonstrated to be consistent with low carbon power generation	✓	The emissions from this project are very minor, given the absence of a significant reservoir, relatively small aboveground construction footprint, and a large amount of reliable generation.	Project net emissions are minimised or project operations facilitate system emissions reductions	Select.	Not assessed
Climate Change Resilience					
Findings of the climate change assessment indicate that the project is resilient to climate change	✓	There has been no project-specific resilience assessment, but it is plausible that the project is resilient, given the very large amount of storage upstream and the general trend towards gradually increasing precipitation. Also, at the corporate level PLN has recently introduced a general risk-based approach to physical climate risks, which is planned to be applied to individual projects in due course.	The project is resilient under a broad range of scenarios	Select.	Not assessed
			The project will contribute to climate change adaptation at a local, regional or national levels	Select.	Not assessed

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	Not assessed

Summary of findings and other notable issues
Project emissions are very low, and the project will make a significant contribution to climate change mitigation by displacing coal-based generation in the Sumatran power grid. Although this has not been assessed in detail, the project should also be resilient to climate change, as it is downstream from Lake Toba which buffers any seasonal or even inter-annual variability of inflows, and general projections are towards increased precipitation. PLN is applying its general risk management framework to physical climate risks, which is planned to be applied to individual projects in due course.

Relevant evidence

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Interview	1, 2, 7-9, 15-19, 25-26, 32, 58-60, 68-71
Document	1-4, 8-9, 12, 20, 24, 26, 31, 33-34, 69, 71-72, 86-87, 95, 97-98, 105, 111, 115-116, 131, 135
Photo	1, 8, 37, 51, 57, 62-64

Appendix 1 – Interviews

	Name	Institution	Position	Date	Location
1	Wendryk Pangaribuan	PT PLN (Persero)	Single Point of Contact	11-Dec	Jakarta
2	Parlindungan	PT PLN (Persero)	Manager UP SBU 4	12-Dec	Medan
3	Alfredo Pakpahan	PT PLN (Persero)	Senior Manager PLN UIP SBU	12-Dec	Medan
4	Widikdho	PT PLN (Persero)	PLN UIP SBU Asset and Land Manager	12-Dec	Medan
5	Effiaty Polapa	PT PLN (Persero)	PLN UIP SBU Licensing and Communication Manager	12-Dec	Medan
6	Yubel Sitompul	PT PLN (Persero)	Assistant Manager of PLN UIP SBU Licensing	12-Dec	Medan
7	Alefya Abrar	PT PLN (Persero)	Assistant Manager of Environment PLN UIP SBU	12-Dec	Medan
8	Bona Nababan	PT PLN (Persero)	PLN UIP SBU Construction Control Officer	12-Dec	Medan
9	Samuel Sihotang	PT PLN (Persero)	Assistant Manager Contract Control and Project Risk 2	12-Dec	Medan
10	Johan Tarigan	PT PLN (Persero)	PLN UIP SBU Licensing	12-Dec	Medan
11	Muara Sakti	North Sumatra Province	Planning, Research and Development Agency (Bappeda)	12-Dec	Medan
12	Ferry Kurniawan	North Sumatra Province	Planning, Research and Development Agency (Bappeda)	12-Dec	Medan
13	Muara Tua	North Sumatra Province	Planning, Research and Development Agency (Bappeda)	12-Dec	Medan
14	Binti	North Sumatra Province	Planning, Research and Development Agency (Bappeda)	12-Dec	Medan
15	Edy Suparjan	North Sumatra Province	Water Resources and Public Works Agency (SDABMBK)	12-Dec	Medan
16	Habibi	North Sumatra Province	Water Resources and Public Works Agency (SDABMBK)	12-Dec	Medan
17	Dony Hermawan	River Basin Office Sumatra II (BWS Sumut)	Water Resources Network Development	12-Dec	Medan
18	Novita Rahmadhani	River Basin Office Sumatra II (BWS Sumut)	Operation and Maintenance (SIPA Licensing)	12-Dec	Medan
19	Eva	River Basin Office Sumatra II (BWS Sumut)	Environmental Analyst	12-Dec	Medan
20	H. Supriyanto	Asahan Regency	Head of Bappeda	13-Dec	Asahan
21	Sori Muda Siregar	Asahan Regency	Head of Bappeda	13-Dec	Asahan
22	Sri Lusi M.	Asahan Regency	Secretary Asset Management (BKAD)	13-Dec	Asahan
23	Muhammad Syafiq	Asahan Regency	Secretary Development Planning, Research and Innovation (Bapperinda)	13-Dec	Asahan
24	Suratno	Asahan Regency	Secretary Public Works and Spatial Planning (PUTR)	13-Dec	Asahan

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25	Mangiring Simanjuntak	Nippon Koei	Consultant	13-Dec	Asahan
26	Helin Simatupang	Nippon Koei	Consultant	13-Dec	Asahan
27	Elperida Manihuruk	Regency (Kabupaten) Asahan	Head UPT Laboratory	13-Dec	Asahan
28	Ilham Syahbana	Regency (Kabupaten) Asahan	Head of Division Environmental Education (PPPLH)	13-Dec	Asahan
29	Candra Ardiansyah	PT PLN Nusantara Power		13-Dec	Asahan
30	Aswaldi	PT PLN Nusantara Power		13-Dec	Asahan
31	Yohannes RWS	Kabupaten Asahan	Public Works and Spatial Planning (PUTR)	13-Dec	Asahan
32	Kensuke Yamamura	Nippon Koei	Consultant (Resident Engineer)	17-Dec	Online
33	Jhonson Sirait	Regency (Kabupaten) Toba Samosir	Development Planning, Research and Development (Bappelitbangda)	14-Dec	Project Office
34	Parunungan Hutagaol	Local community stakeholders	Chairman of P3A	14-Dec	Project Office
35	Belsazar Siagian	Local community stakeholders	Head of Farmers Group	14-Dec	Project Office
36	Juniar Panjaitan	Local community stakeholders	Farmer	14-Dec	Project Office
37	Daniel S. Hutagaol	Local community stakeholders	Toba Parhitean Rafting	14-Dec	Project Office
38	Kepin Firdaus Siagian	Local community stakeholders	Former Worker on Project	14-Dec	Project Office
39	Bilson Panjaitan	Local community stakeholders	Landowner	14-Dec	Project Office
40	Ibnu Hajar Ganjang	Local community stakeholders	Fisherman	14-Dec	Project Office
41	Herianto Siagian	Local community stakeholders	Fisherman	14-Dec	Project Office
42	Benri Jason Hutagaol	Local community stakeholders	Rafting	14-Dec	Project Office
43	Saruhum Rambe	University of North Sumatra	Grievance Task Force	14-Dec	Project Office
44	Sri Alem Sembiring	University of North Sumatra	Grievance Task Force	14-Dec	Project Office
45	Zulkifli Lubis	University of North Sumatra	Grievance Task Force	14-Dec	Project Office
46	Mirwansyah	PT PLN (Persero)	HSE officer UPP SBU 4	14-Dec	Project Office
47	Manahan	PT PLN (Persero)	UPP SBU 4	14-Dec	Project Office
48	H.N.M Sitompul	Toba Samosir Regency	Local Revenue Management (Bappenda)	16-Dec	Toba
49	P. Samosir	Toba Samosir Regency	Local Revenue Management (Bappenda)	16-Dec	Toba
50	Ryandes Albiruni	PT PLN (Persero)	Team Leader Contract Administration and PMIS	16-Dec	Toba
51	Dhani Arifianto	PT PLN (Persero)	Project Control Officer	16-Dec	Toba
52	Jerry R. Simangunsong	Toba Samosir Regency	Local Revenue Management (Bappenda)	16-Dec	Toba
53	Frengky Pardede	Toba Samosir Regency	Department of Public Works	16-Dec	Toba
54	Masrina Silalahi	Toba Samosir Regency	Investment Office (DPMPTSPK)	16-Dec	Toba

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56	Ian Ricky	Toba Samosir Regency	Department of Environment	16-Dec	Toba
57	Jerry Wesly M.	Toba Samosir Regency	Department of Environment	16-Dec	Toba
58	M. Heru Kurnia	PT PLN (Persero)	Safeguard Management Technician	17-Dec	Jakarta
59	Fika Apririani Marinda	PT PLN (Persero)	Manager of OH&S, Environment, Security Systems and Governance	17-Dec	Jakarta
60	Vini Charloth	PT PLN (Persero)	Environmental Impact Management Manager	17-Dec	Jakarta
61	Hans Witharza	PT PLN (Persero)	Operational and Project Fraud Risk Management Officer	17-Dec	Jakarta
62	Sry Wahyuningsih	PT PLN (Persero)	Integrity Management Officer	17-Dec	Jakarta
64	Khaerul Muslimin	PT PLN (Persero)	Officer of Regulation and Policy Affairs Operations and Projects	17-Dec	Jakarta
65	Sidiq H.	PT PLN (Persero)	EPC Procurement Implementing Officer for EBT Power Plants	17-Dec	Jakarta
66	Grahita Muhammad	PT PLN (Persero)	Vice President of Corporate Communications	17-Dec	Jakarta
67	Pandhu Kusumawardana	PT PLN (Persero)	Communication Strategy Manager	17-Dec	Jakarta
68	Samuella Fernandez	PT PLN (Persero)	Assistant Manager Contract Control and Project Risk 2	17-Dec	Online
69	Alim Yuandia	PT PLN (Persero)	Contract Control and Project Risk Officer	17-Dec	Online
70	Bayu Rosida Sumantri	PT PLN (Persero)	Senior Power Plant Construction Technician	17-Dec	Online
71	Andi Krismanto Panggabean	PT PLN Nusantara Power	Team Leader PLN NP UP Pandan	17-Dec	Online
72	Yuki Fujita	JICA Indonesia Office	Representative	26-Dec	Online

Appendix 2 – Documents

Ref	Title	Author	Date
1	PT PLN (Persero) Sustainability Report	PT PLN (Persero)	2023
2	Peraturan Direksi PT PLN (Persero) Nomor: 0110.P/DIR/2023 tentang Kebijakan Strategis Perlindungan dan Pengelolaan Lingkungan Hidup	PT PLN (Persero)	2023
3	Environmental Impact Assessment (ANDAL) Asahan- Hydro Power Plant 174 MW (2x87 MW) and 150 kV Transmission Network to Simangkuk Main Station	PT PLN (Persero) Sumatera-I Network Development Main Unit	June 2012
4	Asahan No. 3 Hydropower Electric Power Plant Construction Project, JICA Loan: No. IP-532 Contract Document Between PT PLN (Persero) and Shimizu - Adhi Karya Joint Operation Lot I: Civil Works	FIDIC (International Federation of Consulting Engineers)	January 2019
5	Asahan No. 3 Hydropower Electric Power Plant Construction Project, JICA Loan: No. IP-532 Contract Document Between PT PLN (Persero) and Andritz Hydro Consortium Lot II: Metal Works	FIDIC (International Federation of Consulting Engineers)	September 2019
6	Asahan No. 3 Hydropower Electric Power Plant Construction Project, JICA Loan: No. IP-532 Contract Document Between PT PLN (Persero) and Mitsubishi Corporation Lot III: Electro-Mechanical Works	FIDIC (International Federation of Consulting Engineers)	September 2020
7	Buku 1/5 Dokumen Kontrak Asahan No.3 Hydroelectric Power Plant Construction Project:	PT PLN (Persero) Unit Induk Pembangunan Sumatera Bagian Utara	August 2022

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	Lot IV - T/L 150 KV P/S Asahan 3 - GI Simangkuk		
8	Keputusan Kepala Badan Pelayanan Perijinan Terpadu Provinsi Sumatera Utara tentang Ijin Lingkungan Kegiatan Pembangunan PLTA Asahan 3	Pemerintah Provinsi Sumatera Utara Badan Pelayanan Perijinan Terpadu	2013
9	Keputusan Gubernur Sumatera Utara tentang Kelayakan Lingkungan Hidup Rencana Kegiatan Pembangunan PLTA Asahan-3	Gubernur Sumatera Utara	2012
10	Sertifikat SNI ISO 14001:2015 PT PLN (Persero) UIP Sumatera Bagian Utara Scope: Ketenagalistrikan (Pembangkit, Gardu Induk, dan Transmisi)	PT. Multi Sertifikasi Indonesia	11 December 2024
11	Sertifikat SNI ISO 14001:2015 PT PLN (Persero) UPP Sumatera Bagian Utara 4 Scope: Ketenagalistrikan (Pembangkit)	PT. Multi Sertifikasi Indonesia	11 December 2024
12	Environmental Management and Monitoring Completion Report	Nippon Koei CO., LTD.	March 2024
13	Japan International Cooperation Agency (JICA) Guidelines for Environmental and Social Considerations	JICA	January 2022
14	Environmental Management Plan (RKL) for Asahan No.3 HEPP (154 MW) and 150kV Transmission Line	PT PLN (Persero) Proyek Induk Pembangkit & Jaringan Sumatera Utara dan Aceh	2004
15	Environmental Monitoring Plan (RKL) for Asahan No.3 HEPP (154 MW) and 150kV Transmission Line	PT PLN (Persero) Proyek Induk Pembangkit & Jaringan Sumatera Utara dan Aceh	2004
16	Environmental Management and Monitoring Report	Nippon Koei CO., LTD.	October 2021 to March 2022
17	Environmental Management and Monitoring Report	Nippon Koei CO., LTD.	October 2022 to March 2023

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18	Environmental Management and Monitoring Report	Nippon Koei CO., LTD.	April to September 2023
19	Biodiversity & Land Restoration Policy	PT PLN (Persero)	27 March 2024
20	Policy On Climate Change	PT PLN (Persero)	19 August 2023
21	Community Social Aspects Policy	PT PLN (Persero)	19 August 2023
22	Social Policy for Suppliers and Contractors	PT PLN (Persero)	27 March 2024
23	Environmental And Social Management System (ESMS)	PT PLN (Persero)	2024
24	Green Procurement Policy	PT PLN (Persero)	27 March 2024
25	Respectful Workplace Policy	PT PLN (Persero)	16 May 2023
26	Safety, Occupational Health, Security and Environment Policy	PT PLN (Persero)	27 March 2024
27	Peraturan Direksi PT PLN Nusantara Power tentang Perubahan Kedua Peraturan Direksi PT Pembangunan Jawa-Bali Nomor 0040.P/019/DIR/2022 tentang Organisasi dan Tata Kerja PT Pembangunan Jawa-Bali	PT PLN Nusantara Power	2024
28	Program Kerja Bagian Lingkungan PLN NP UP Pandan Bidang Lingkungan PLTA Asahan 3	PT PLN Nusantara Power - UP Pandan	2025
29	Rekapitulasi Program Pemeliharaan Tahun 2025 Proyeksi Ketetapan RKAU	PT PLN Nusantara Power	
30	Sertifikat SNI ISO 14001:2015 PT PLN Nusantara Power Scope: Pengelolaan Produksi Tenaga Listrik oleh Pembangkit Tenaga Termal, PLTA, dan Jasa Operasi & Pemeliharaan serta Pengelolaan Pelayanan Waduk di Kantor Pusat, UPDK dan UPK	LMK Certification	27 December 2023

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31	Peraturan Direksi PT PLN (Persero) tentang Pedoman Penyelenggaraan Penanggulangan Bencana PT PLN (Persero)	PT PLN (Persero)	2021
32	Keputusan Direksi PT PLN (Persero) tentang Penetapan SPLN U2.005: 2023 Rambu Keselamatan Ketenagalistrikan	PT PLN (Persero)	2023
33	Keputusan Direksi PT PLN (Persero) tentang Penetapan SPLN U1.013-2: 2023 Keselamatan dan Kesehatan Kerja (K3) Pembangkitan Tenaga Listrik Bagian 2: Pusat Listrik Tenaga Air (PLTA)	PT PLN (Persero)	2023
34	Edaran Direksi PT PLN (Persero) tentang Standar Prosedur Pengelolaan Keselamatan dan Kesehatan Kerja, Keselamatan Instalasi, dan Keselamatan Masyarakat Umum di Lingkungan PT PLN (Persero)	PT PLN (Persero)	2024
35	Grievance Task Force of PLTA Asahan 3 Project (2x87 MW) Quarterly Reports	Collaboration between Nippon Koei CO., LTD & Lembaga Penelitian Universitas Sumatera Utara	2020 - 2024
36	Monthly Safety Report	Shimizu - Adhi Karya JO	March, 2024
37	Monthly Progress Report for Engineering Services	Nippon Koei CO., LTD.	November 2024
38	Peraturan Direksi PT PLN Nusantara Power tentang Peraturan Pelaksana Susunan Organisasi PT PLN Nusantara Power Unit Pembangkitan Pandan	PT PLN Nusantara Power	2024
39	Labor And Working Condition Management Guideline	PT PLN (Persero)	31 May 2024
40	Struktur Organisasi Unit Pembangkitan Pandan Unit Layanan Pusat Listrik Plta Asahan	PT PLN Nusantara Power - UP Pandan	
41	Struktur Organisasi Unit Pembangkitan Pandan	PT PLN Nusantara Power - UP Pandan	
42	Environment Protection Plan Asahan No.3 Hydroelectric Power Plant Project	Shimizu - Adhi Karya JO	17 May 2019

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43	Public Appraisal Report for Transmission Line-1	KJPP Dasa'at, Yudistira dan Rekan	15 December 2023
44	Public Appraisal Report for Transmission Line-2	KJPP Muttaqin Bambang Purwanto, Rozak Uswatun dan Rekan	17 May 2024
45	Public Appraisal Report for Transmission Line-3	KJPP Muttaqin Bambang Purwanto, Rozak Uswatun dan Rekan	13 November 2023
46	Public Appraisal Report for Power Plant	KJPP Yanuar Bey & Rekan	31 May 2017
47	Technical Note No.9 Socialization and Land Compensation By Social Environment Expert	Nippon Koei CO. ,LTD.	October 2007
48	Hydro Safety Plan and Risk Assessment	PT. Andritz Hydro	6 September 2021
49	HSE Plan Asahan 3 - GI Simangkuk	PT. Hasta Prajatama	7 January 2022
50	Site Health, Safety and Environment Plan	Mitsubishi Corporation	23 April 2021
51	Hazard Identification, Risk Assessment and Control (HIRAC)	Shimizu - Adhi Karya JO	7 December 2018
52	Security, Safety and Health Plan Asahan No.3 Hydroelectric Power Plant Construction Project	Shimizu - Adhi Karya JO	1 November 2021
53	Emergency Network	Shimizu - Adhi Karya JO	September 2023
54	Urgent Questionnaire (Provisional Name) by the Director of the Development Office Regarding the Elimination of Accidents at Construction Supervision Sites		1 March 2023
55	Monthly Safety Committee Patrol Lot I: Civil Works	Nippon Koei CO., LTD.	22 April 2022
56	Recent Health and Safety Environment Concern	Nippon Koei CO., LTD.	11 April 2023
57	Monthly Safety Report March	Shimizu - Adhi Karya JO	28 March 2024

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58	Summary of Safety Report (Period 2019-2024)	Shimizu - Adhi Karya JO	30 March 2024
59	Corporate Safety Patrol on ASAHAN No.3 HEPP	Nippon Koei CO., LTD.	28 November 2022
60	Record of Safety Patrol by the Three Parties (SC-34)	Nippon Koei CO., LTD.	18 January 2022
61	Record of Safety Patrol by the Three Parties (SC-34)	Nippon Koei CO., LTD.	1 April 2022
62	Record of Safety Patrol by the Three Parties (SC-34)	Nippon Koei CO., LTD.	18 April 2022
63	Record of Safety Patrol by the Three Parties (SC-34)	Nippon Koei CO., LTD.	22 April 2022
64	Engineer's Drawing Approval/Comment (EDAC)	Nippon Koei CO., LTD.	2 Dcsemer 2023
65	GTF Announcement for Community for Water Impounding Intake - Headpond	Manajemen PLTA Asahan 3	
66	Dokumen Perencanaan Pembangunan T/L 150kV PLTA Asahan 3 - GI Simangkuk (Revisi 02)	PT PLN (Persero) Unit Induk Pembangunan Sumatera Bagian Utara	2023
67	List of Questionnaire/ Clarifications for the Fact-Finding Mission on Asahan NO.3 Hydroelectric Power Plant Project in Indonesia	JICA	
68	Drawings for Land Acquisition Revision 1	Nippon Koei CO., LTD.	August 2012
69	Asahan No.3 Hydroelectric Power Project Hydropower Sustainability Standard (HSS) Assessment Reply to the Request for Additional Evidence	PT PLN (Persero) Unit Pelaksana Proyek Sumatera Bagian Utara 4	2025
70	Program CSR PLTA Asahan 3 Tahun 2025	PT PLN Nusantara Power	
71	Environmental and Social Management Plan – Operation Phase	PT PLN Nusantara Power	2025
72	Matriks Rencana Pengelolaan Lingkungan Tahap Operasional Plta Asahan 3	PT PLN Nusantara Power	

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73	PT PLN (Persero) Website: https://web.pln.co.id	PT PLN (Persero)	
74	Prequalification and Bidding Documentation for Lot II: Metal Works	Nippon Koei CO., LTD. / PT PLN (Persero)	2010 - 2011
75	Engineer's Response: Contractor's Claim for Additional Cost & Time Due to Change Legislation-Employers Obligations for Provision of Compensation to Workers/Employees - Claim CW-01/C-031	Nippon Koei CO., LTD.	December 2022
76	Variation Specification for Covid-19: Supplemental Bills of Quantities & Term of Payment	Nippon Koei CO., LTD.	September 2023
77	Addendum Andal Dan Rkl-Rpl Tipe A Rencana Penambahan Lahan Seluas 129,862 Ha Untuk Pembangunan Access Road, Perubahan Jalur Transmisi 150 Kv Dari Switchyard Ke Gardu Induk (Gi) Simangkuk Dan Perubahan Utilitas Pendukung Lainnya Plta Asahan-3 Kapasitas 2 X 87 Mw Di Kecamatan Aek Songsongan Kabupaten Asahan, Kecamatan Pintu Pohan Meranti Dan Kecamatan Parmaksian Kabupaten Toba Provinsi Sumatera Utara Oleh Pt Pln (Persero) Uip Sumatera Bagian Utara	Gubernur Sumatera Utara	2021
78	Audit Report of PT PLN (Persero) Unit Induk Pembangunan Sumatera Bagian Utara Scope: Anti Penyuapan pada Seluruh Proses PT PLN (Persero) Unit Induk Pembangunan Sumatera Bagian Utara	PT. TUV NORD Indonesia	4 October 2024
79	Audit Report of PT PLN (Persero) Scope: Penerapan Sistem Manajemen Anti Penyuapan pada seluruh Proses Bisnis	PT. TUV NORD Indonesia	13 May 2024

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	semua Divisi/Satuan PT PLN (Persero) Kantor Pusat		
80	Notice Regarding Contract for Construction Works of Lot II (Metal Works) for Asahan No. 3 Hydro Electric Power Plant Construction Project (JICA Loan IP-532)	JICA	7 October 2019
81	Section 9 – Point 4: Evidence on transparency regarding procurement guidelines and processes	PT PLN (Persero)	2025
82	PLTA Asahan 3 - Stakeholder Salience	PT PLN (Persero)	
83	Rencana Pengelolaan Stakeholder (Stakeholder Management Plan) Jaringan Transmisi 150 kV PLTA Asahan 3 (2X87 MW)	TIM STP PLTA Asahan 3	October 2022
84	Grievance Task Force of Asahan 3 Hepp (Satuan Tugas Pengaduan Pembangunan PLTA Asahan 3)	PT PLN (Persero) Unit Pelaksana Proyek Sumatera Bagian Utara 4	
85	Minute of Meeting Pembahasan Acara Pelepasan Jalur Rafting Nightmare dan Extreme Sungai Asahan	PT PLN (Persero) Unit Pelaksana Proyek Sumatera Bagian Utara 5	17 October 2023
86	Field Investigation Report, Volume I Hydrology	Nippon Koei CO., LTD.	October 2007
87	Technical Note No. 2 Integrated Reservoir Operation Study (Final) by Reservoir Operation Analyst	Nippon Koei CO., LTD.	June 2007
88	Salient Features of The Project	PT PLN (Persero)	2025
89	Draft CDM Study Report	Nippon Koei CO., LTD.	June 2012
90	Prior Consideration of the CDM Form		14 April 2011
91	NK's Reply to the Clarification Request from Mr Deny	K. Yamamura	14 December 2024
92	Technical Note No. 1 Irrigation System	Nippon Koei CO., LTD.	December 2006

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93	Technical Note No. 6 Fishery Survey	Prof. Dr. Mukhtar Ahmad, MSc. (Faculty of Fisheries and Marine Science, University of Riau, Pekanbaru), Ir. Fauzi (Faculty of Agriculture, Riau Islamic University, Pekanbaru), Ir. Nurmatias, MSc. (Indonesia Marine and Fishery College, Lubuk Pakam)	May 2007
94	Peta Overlay HGU dengan Hutan	BAPPELITBANGDA	
95	Rencana Pengelolaan Sumber Daya Air Wilayah Sungai Toba-Asahan	Menteri Pekerjaan Umum dan Perumahan Rakyat	2022
96	Program Kerja Lingkungan PLTA Asahan 3 Tahun 2025 Compliance & Social	PT PLN Nusantara Power - UP Pandan	2025
97	Instruksi Kerja (IK) Pengoperasian Flood Warning System (Emergency Warning System)	PT PLN Nusantara Power - UP Pandan	2024
98	Operation and Maintenance Asahan No.3 Hydroelectric Power Plant Construction Project	Nippon Koei CO., LTD.	2025
99	Timeline Tanggap Darurat Asahan 3	PT PLN Nusantara Power - UP Pandan	2025
100	Keputusan Kepala Badan Koordinasi Penanaman Modal Republik Indonesia nomor SK.233/1/KLHK/2021	Menteri Lingkungan Hidup dan Kehutanan Republik Indonesia, Kepala Badan Koordinasi Penanaman Modal	2021
101	Terms of Reference (TOR) Pekerjaan Analisa Biodiversity PLTA Asahan 3	PT PLN Nusantara Power - UP Pandan	2025
102	Monitoring Bulanan Discharge DAM PLTA Asahan 3	PT PLN Nusantara Power - ULPLTA Asahan 3	2025
103	Terms of Reference (TOR) Pekerjaan Survey Sosial, Ekonomi dan Budaya PLTA Asahan 3	PT PLN Nusantara Power - UP Pandan	2025
104	PROGRAM KERJA URUSAN PELAKSANA LINGKUNGAN PLTA ASAHAN 3 (2025 - 2030)	PT PLN Nusantara Power - UP Pandan	2025
105	Kutipan Dokumen RTD Bendungan Pengatur Siruar, Bendungan Siguraguran Bendungan Tangga	PT INALUM - PT Surveyor Indonesia	2021
106	Persetujuan Rencana Kerja Anggaran Program CID Tahun 2025	PT PLN (Persero)	2025
107	Asahan III power plant resumes development, expected to operate by 2023	The Jakarta Post	March 11 2020
108	Toba Samosir regent stands trial for graft	The Jakarta Post	March 13 2015

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109	Corruption case involving power plant investigated	ANTARA News	September 18 2012
110	Corruption Risk Assessment (CRA) in Renewable Energy-Based Electricity Supply	Transparency International Indonesia	2024
111	Evaluation of Lake Toba's water level decline in Indonesia over the past six decades	Mohammad Syamsu Rosid et al. in Environmental Challenges 18 (2025) 101071	2025
112	Climate-Related Disclosure Report 2023	PT PLN (Persero)	2024
113	The Vulnerability of the Power Sector to Climate Variability and Change: Evidence from Indonesia	Kamia Handayani et al. in Energies 2019, 12, 3640; doi:10.3390/en12193640	
114	Environmental, Social, and Governance (ESG) Performance Report for 2023	PT PLN (Persero)	2023
115	Indonesia Long-Term Strategy for Low Carbon and Climate Resilience 2050	Government of Indonesia	2021
116	Effects of Climate change on temperature and precipitation in the Lake Toba region, Indonesia, based on ERA5-land data with quantile mapping bias correction on temperature and precipitation	Hendri Irwandi et al. in Nature Scientific Reports 13:2542 (https://doi.org/10.1038/s41598-023-29592-y)	2023
117	PUBLIC-PRIVATE PARTNERSHIPS BRIEFS: Indonesia: Asahan Hydroelectric Power Plant	IFC	2016
118	Improving the Water Quality of Lake Toba, Indonesia	World Bank Report No. AUS0000463	2018
119	Ex-ante Evaluation	JBIC (https://www.jica.go.jp/Resource/english/our_work/evaluation/oda_loan/economic_cooperation/c8h0vm000001rdjt-att/indonesia02_1.pdf)	n.d.
120	The Asahan Hydroelectric Power Generation Project	Koji Baba, JSCE The International Infrastructure Archives	n.d.
121	FEASIBILITY REPORT ON THE ASAHAN NO.1 AND NO.3 HYDROELECTRIC POWER DEVELOPMENT PROJECT - Summary	JICA	1982
122	Project for the Master Plan Study of Hydropower Development in Indonesia	JICA	2011
123	Annual Report 2023	PT PLN (Persero)	2024

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124	Resolving Hydropower Plant Construction Disputes through a Standing Dispute Board: A Case Study of Asahan 3 HEPP	Bayu Wisatrioda et al. in SIGn Jurnal Hukum Vol. 6 No. 2: October 2024 - March 2025	2024
125	River basin management planning in Indonesia: Policy and practice	Asian Development Bank	2016
126	To reform or not reform? Competing energy transition perspectives on Indonesia's monopoly electricity supplier Perusahaan Listrik Negara (PLN)	Indri Dwi Apriliyantia et al. in Energy Research & Social Science 118 (2024) 103797	2024
127	Notulen Pembahasan Program Pengelolaan SDA PLTA Asahan 3 - PLN NP dan Perum Jasa Tirta 1	PT PLN (Persero)	17-18 February 2025
128	BERITA ACARA PENGUKURAN MEDAN ELEKTROMAGNETIK TRANSMISSION LINE 150 kV P/S ASAHAN 3 - GI SIMANGKUK	PT PLN (Persero)	2024
129	RENCANA TATA RUANG WILAYAH PROVINSI SUMATERA UTARA TAHUN 2012 - 2032	PEMERINTAH PROVINSI SUMATERA UTARA	
130	Sertifikat Laik Operasi PLTA Asahan 3	PT PLN (Persero)	19 December 2024
131	UPDATE OF FEASIBILITY STUDY	Nippon Koei CO., LTD.	2022
132	Documentations of the recruitment and training process for security personnel conducted for Nusantara Power Asahan 3 Hydroelectric Power Plant	PT PLN (Persero)	2025
133	DATA PEKERJA HELPER MKP PLTA ASAHAN 3	PT PLN (Persero)	2025
134	HPI Asahan Security Guard Member Data 3 KTA and Diploma	PT PLN (Persero)	2025
135	Konsinyering Penyusunan Action Plan atas Gaps Assessment HSS PLTA ASAHAN 3 HEPP PROJECT (2 x 87 MW)	PT PLN (Persero)	2025
136	PENGUMUMAN HASIL LOLOS SELEKSI INTERVIEW CALON TENAGA KERJA	PT. MITRA KARYA PRIMA	2024

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	TENAGA PENDUKUNG TEKNIK (PTK) TAHUN 2024		
137	PENGUMUMAN HASIL LOLOS SELEKSI TES KESEHATAN CALON TENAGA KERJA STO TAHUN 2024	PT. MITRA KARYA PRIMA	2024
138	Tenaga kerja desember 2022	PT PLN (Persero)	2022
139	TIME LINE TANGGAP DARURAT ASAHAN 3	PT PLN NUSANTARA POWER	2025
140	O&M MANUAL VOLUME 4 FLOOD WARNING SYSTEM	Nippon Koei	2025
141	Program Kerja Lingkungan PLTA Asahan 3 (2025-2030)	PT PLN NUSANTARA POWER	2025
142	FORMULIR NOTULEN RAPAT Pembahasan RTD DAM Break	PT PLN NUSANTARA POWER PT Inalum	3 Juli 2025
143	Progres Closing GAP HSS Assessment PLTA Asahan 3	PT PLN NUSANTARA POWER	16 July 2025

Appendix 3 - Photographs



Photo 1: Lake Toba, origin of Asahan River, from ferry to Samosir island



Photo 2: Rice irrigation near Lake Toba



Photo 3: Meeting with Toba Regency administration, Balige



Photo 4: Simangkuk substation, end of transmission line from Asahan-3 HPP



Photo 5: Work safety signage at Simangkuk substation



Photo 6: Siguragura dam signage

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Photo 7: Toba Caldera UNESCO Global Geopark poster



Photo 8: Siguragura dam, part of Asahan-2 project, with no release of maintenance flow



Photo 9: Siguragura reservoir with Asahan-1 HPP in the background

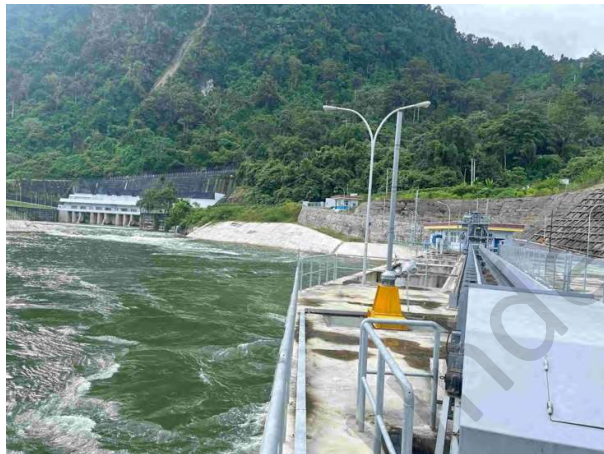


Photo 10: Asahan-3 Intake with upstream Tangga HPP, part of Asahan-2 project, in background



Photo 11: Headrace canal, view towards upstream

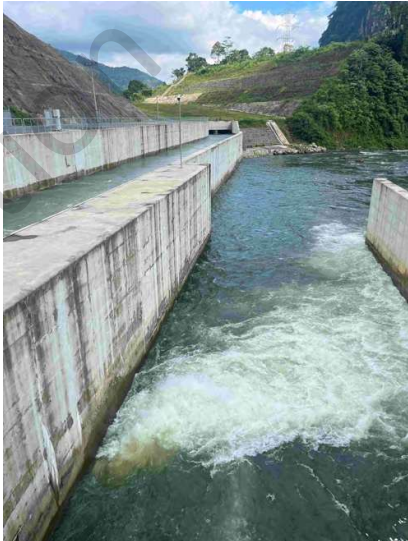


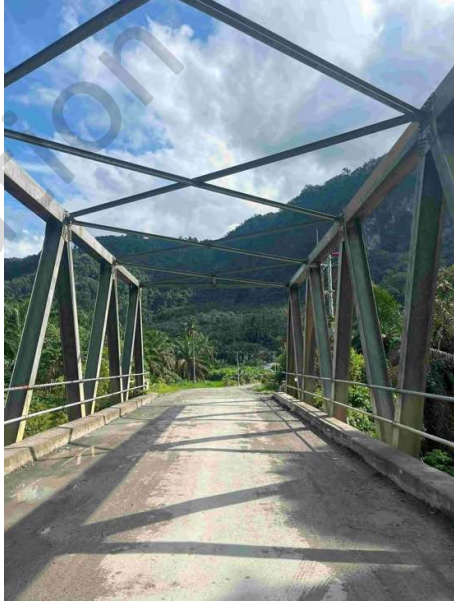
Photo 12: Discussion with project manager at intake

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Photo 3: Asahan canyon upstream of Asahan-3, now dry because of diversion by Asahan-2 project	Photo 14: Ponot waterfall and tourist site on an upstream tributary	Photo 15: Asahan-3 transmission tower
		
Photo 16: Alarms at intake	Photo 17: Cut to accommodate headrace canal	Photo 18: Cross drain along headrace canal

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Photo 19: Irrigation intake, right bank	Photo 20: Trashracks at intake	Photo 21: Outlet for maintenance flow
		
Photo 22: Start of headrace canal	Photo 23: Sluice gate trial operations	Photo 24: View across intake gates

		
Photo 25: Asahan River immediately below the intake during trial operation	Photo 26: Asahan River at bridge crossing with the old bridge in the background	Photo 27: New bridge across Asahan River
		
Photo 28: Spillway at end of headrace canal	Photo 29: Batching plant site, used for spoil disposal	Photo 30: Asahan river from bridge, residual flows

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Photo 31: Paddy field served by irrigation water from Asahan-3 HPP, with transmission line in background



Photo 32: Roadside shops



Photo 33: Roadside village



Photo 34: Asahan-3 HPP control and administration building



Photo 35: Switchyard next to control building



Photo 36: Control room displays

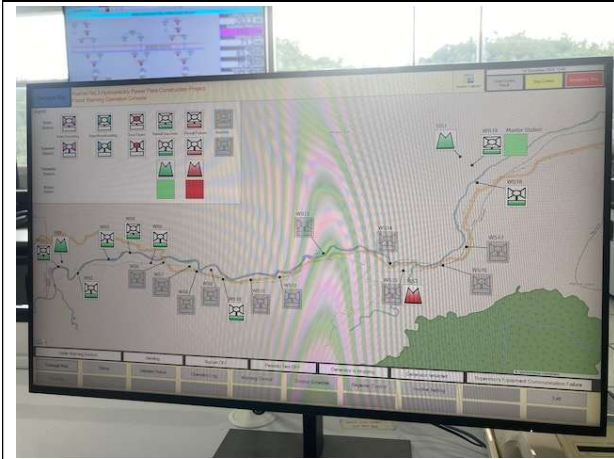


Photo 37: Map with flood warning alarms in control room



Photo 38: Powerhouse interior



Photo 39: Safety signage



Photo 40: Transformer bay in powerhouse



Photo 41: Tailrace tunnel exit

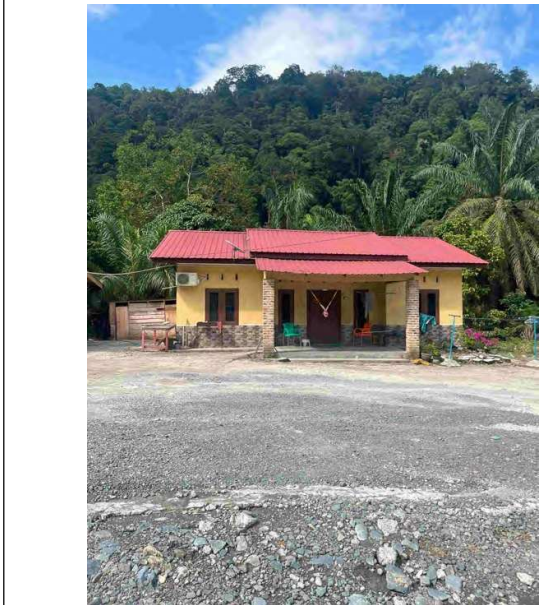


Photo 42: House on access road



Photo 43: Confluence of Asahan River residual flow from right and tailrace flow from left



Photo 44: Asahan-3 HPP model at PLN North Sumatra office in the provincial capital of Medan



Photo 45: Planning, Research and Development Agency, North Sumatra Province, Medan



Photo 46: Lower Asahan River approx. 25 km downstream of Asahan-3 HPP



Photo 47: EIA for downstream Asahan-4 HPP

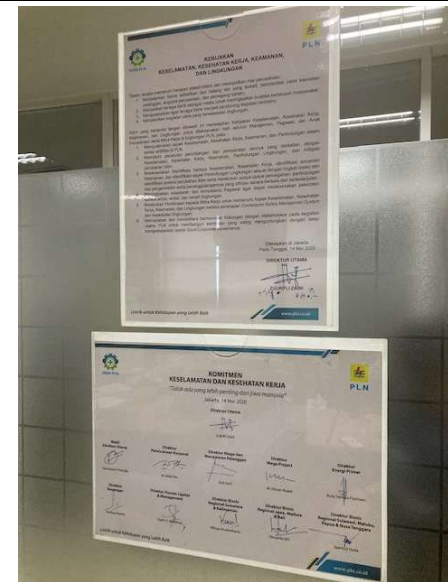


Photo 48: PLN occupational safety, health, security and environmental policies



Photo 49: Meeting with Bappeda North Sumatra, Medan



Photo 50: Meeting with Provincial Environmental Agency, Medan



Photo 51: Meeting with river basin authority, Medan



Photo 52: PLN whistleblower mechanism banner in Medan office



Photo 53: PLN North Sumatra zero accident commitment



Photo 54: PLN North Sumatra integrity management and alcohol policies, in Medan office

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Photo 55: PLN North Sumatra ISO 9001 certificate



Photo 56: Meeting with Public Works (PUPR), Medan



Photo 57: Meeting with PLN North Sumatra team, Medan



Photo 58: HSSE banners in PLN Medan office



Photo 59: Work safety banner in PLN Medan office



Photo 60: Government certificate for OH&S



Photo 61: Meeting in PLN corporate headquarters, Jakarta

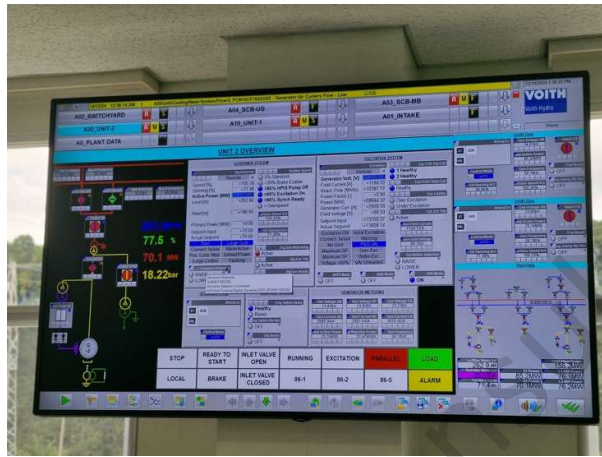


Photo 62: Integrated control system

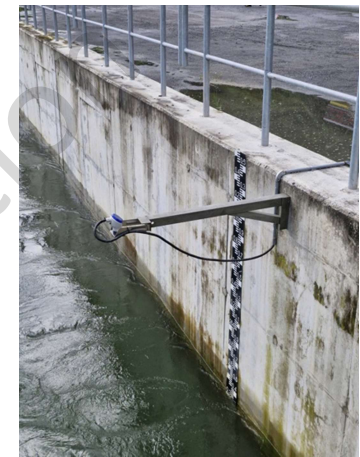


Photo 63: Automatic water level recorder

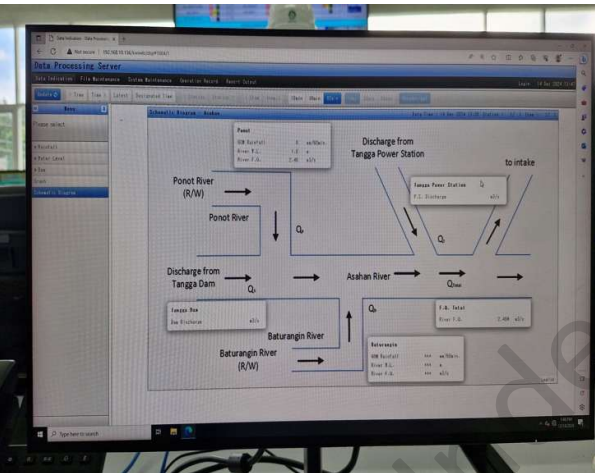


Photo 64: Inflow monitoring



Photo 65: Meeting with BWS Sumatera II regarding water allocation permit for Asahan 3



Photo 66: Headpond sand flushing gates