Hydropower Sustainability Standard

Add certification label (if the project is certified)

Assessment Report

Project Name: Santo Antônio HPP
Installed Capacity: 3,568 MW
Country: Brazil

SantoAntônio ENERGIA

Project Sponsor: Santo Antônio Energia (SAE) / Eletrobras
Report Author: Joerg Hartmann, Antônio Fonseca dos Santos, Vito Mandilovich
Report Date: September 19, 2025

Operation

Santo Antônio HPP, 3,568 MW, Brazil

Cover page photo: Aerial view of the dam from the right bank (source: SAE)

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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), Antônio Fonseca dos Santos (Kelowna Consultoria Ambiental e Sustentabilidade LTDA), Vito Mandilovich (EXP Consulting Consultoria)
Assessment objective	Obtain HSA Hydropower Sustainability Standard Certification
Assessment dates	June 30 – July 4, 2025
Assessment report date	September 19, 2025
Summary of key findings	**HSS-1:** Santo Antonio Energia (SAE) has a well-defined environmental & social management system (ESMS) to implement E&S license conditions (through the Plano Básico Ambiental, PBA) as well as corporate E&S commitments and voluntary actions. Negative impacts have been generally well managed, although there are some non-conformances and impacts whose successful mitigation and compensation is uncertain. The budget for mitigation and for benefit sharing has been very substantial. **HSS-2:** SAE provides good working conditions to its staff at the plant site and in São Paulo, in line with corporate commitments and national and international labour rights. Many employees work for contractors but enjoy similar conditions and protections as internal staff. OH&S performance is generally high, with a few opportunities for improvement. **HSS-3:** Before the Santo Antônio project was initiated there were concerns about a number of water quality and sedimentation issues, including the very high sediment load in the Madeira River and the history of mining with mercury in the catchment, and how these would interact with the reservoir. However, extensive monitoring results over the years of operation show that water quality (including mercury) levels have been satisfactory and not affected by the reservoir, and that the reservoir is passing through most of the sediment, with no unexpected accumulations. **HSS-4:** The project has compensated affected communities fairly, with relatively few disputes, and communities are also benefiting significantly from various project investments, increased local economic activity, and contributions to public budgets. Public health and safety risks have been well managed. There is some uncertainty over the sustainability of improvements in livelihoods and living standards, as there has been little follow-up monitoring. **HSS-5:** The resettlement program was extended several times and is presently almost concluded. Monitoring of the resettled families was conducted in 2013-2014 and again in 2021, showing that families compensated in-kind have either maintained or improved most of the living conditions. An additional survey will be conducted in Vila Nova de Teotônio. However, there was no monitoring of the families compensated in cash, causing some uncertainty over the long-term sustainability of their living standards and livelihoods. **HSS-6:** Comprehensive biodiversity assessments and continuous monitoring by the project indicate that aquatic and terrestrial ecosystems within the affected area remain largely healthy. SAE employs several strategies to minimise fish mortality and provide fish passage at the plant. However, certain endangered aquatic species, such as the Amazon River dolphin (Inia geoffrensis) and tucuxi

	(Sotalia fluviatilis), warrant identification of targeted conservation measures. SAE has allocated compensation to ICMBio and SEDAM to enhance infrastructure in Mapinguari National Park and support adjacent protected areas, alongside efforts to safeguard the reservoir's buffer zone. Additionally, voluntary biodiversity initiatives, such as the establishment of the Amazon Bioeconomy and Conservation Center (CBCA), are underway to promote restoration of vegetative cover in the upper Madeira region. **HSS-7:** No negative impacts of the project on Indigenous Peoples have been identified. While some activities with positive impacts have been delivered, the bulk of the support program has suffered bureaucratic delays, resulting in missed opportunities to improve the situation for IPs in the region. **HSS-8:** The project implemented a cultural heritage management program that salvaged and rehabilitated physical cultural heritage features, including historical industrial features that have shaped the region. It contributed to the dissemination of historical knowledge through various activities, exhibits and publications, and contributed to the archaeology department at the university and the railroad museum in Porto Velho. **HSS-9:** SAE and its parent company Eletrobras have good corporate governance structures and processes, adequate for operating in a public sector context with some challenges. Transition challenges related to the privatization of Eletrobras and the integration of SAE are also well managed. **HSS-10:** SAE and Eletrobras maintain a number of communication channels and engagement mechanisms, including functional grievance mechanisms, some of which are provided under the PBA. The project and Eletrobras as a company are generally transparent, but project-level sustainability information could be made more easily accessible. **HSS-11:** The project has an extensive hydrometric network as well as modelling and forecasting expertise. The reservoir is operated as a run-of-river facility and fluctuates between 428 km^2 during the wet season and 357 km^2 during the dry season, largely depending on the rainfall in the watersheds of the 4 main upstream tributaries (Beni, Madre de Dios, Mamoré and Guaporé). Operations are dispatched by the national system operator (ONS) on a daily basis, within the constraints of the Operating Licenses, and are coordinated with the upstream Jirau HPP, as well as with the National Water Agency – ANA, in order to obtain the maximum possible generation of energy while respecting flood protection limits. There are instances when this is not achieved, and water that could have been used for generation is spilled. There is limited flexibility to adapt operations to short-term and long-term changes in flows. The approval of the PACUERA is pending. **HSS-12:** The power density of the project is relatively high and the characteristics of the reservoir indicate low emissions risks, so that no detailed emissions estimates are required. The reforestation of the reservoir buffer zone absorbs significant amounts of GHG. The run-of-river type reservoir limits the ability to provide adaptation services to society, for example through water storage. Some initial climate resilience studies and plans have been undertaken by SAE, and will now be updated with a consistent methodology, across the Eletrobras hydropower fleet.
Limitations of the assessment	There were no notable limitations to this assessment.

Santo Antônio HPP, 3,568 MW, Brazil

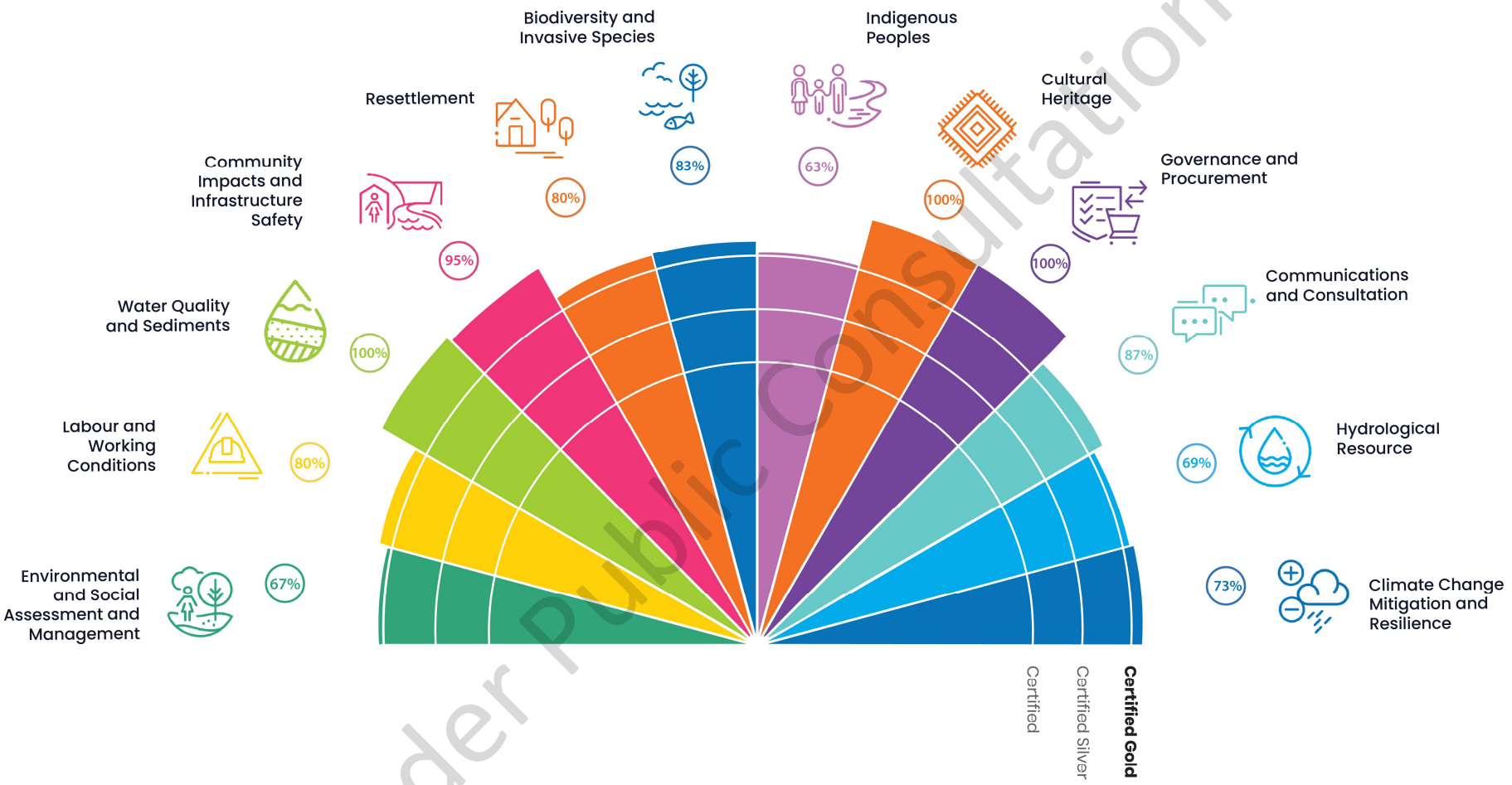

Figure 1 – Hydropower Sustainability Standard (HSS) Results Diagram

Operation

B. Project Details

Project name	Santo Antônio HPP
Country	Brazil
Location	Madeira River, Rondônia State
Purpose	Hydropower generation
Developer / Owner	Santo Antônio Energia, since 2023 99.7% owned by Eletrobras
Financer(s)	Originally financed by a consortium of banks led by BNDES, remaining debt restructured in 2023
Installed capacity (MW)	3,568 MW
Construction start date (planned or actual)	2008
Commercial operations date (planned or actual)	Start of commercial operations 2012, final turbines commissioned in 2017
Annual average generation (GWh / year)	16,908 GWh (during full operations between 2017 and 2024)
Associated infrastructure: road(s) (length)	The plant is close to national highway 364.
Transmission lines and sub-stations (names, lengths and capacities)	- 2,400 km line 525 kV from Porto Velho to Araraquara (270 km north of São Paulo, not included in the scope of this assessment because it serves not just the Santo Antônio HPP) - 21.2 km line 230 kV for the Acre-Rondônia system
Total cost (USD m)	BRL 21 billion (average exchange rate in 2008 USD 1 = BRL 1.84, in 2017 USD 1 = BRL 3.19)
Annual operating costs (USD m)	USD 69.9 million/year
Specific investment cost (USD m/MW)	n/a
Levelised energy cost (USD / kWh)	n/a
Dam type	Mainly earth embankment with a 187 m long concrete gravity dam in the central section; 4 independent power houses (PH 1 = 8 turbines, PH 2 and 3 = 12 turbines, PH 4 = 18 turbines); 1 main spillway (with 15 radial gates); 1 complementary spillway (with 3 radial gates)
Dam height (m)	60 m from foundation
Dam length at crest (m)	Total of 2.5 km
Units (number, type, MW)	50 bulb turbines at 71.6 MW each
Reservoir area at Full Supply Level (FSL) (km^2)	429 km^2 (wet season) 357 km^2 (dry season) including pre-project river surface of 142 km^2
Average net head at FSL (m)	13.9 m
Average flow (m^3 / s)	18,495 m^3/s
Design flow (m^3/s)	578.63 m^3/s per unit, for a total of 28,931.5 m^3/s

Load factor	54.1 %
Number of physically displaced households	505 households resettled, and approximately the same number of property owners compensated by cash or letters of credit towards the cost of a new property
Power density (W / m^2)	8.32 (3,568,000,000/ 428,620,000 = 8,32)
Emissions intensity (gCO_2e / kWh)	n/a
Contacts / website	https://santoantônioenergia.com.br

Santo Antônio HPP, 3,568 MW, Brazil

Figure 2 – Google Earth image of dam and city of Porto Velho

C. Performance against Minimum Requirements

There are no gaps against Minimum Requirements.

D. Performance against Advanced Requirements

(Note to user: filling in the Advanced Requirement is optional if there are gaps against the Minimum Requirements)

	Sections											
	1. Environmental and Social Assessment and Management	2. Labour and Working Conditions	3. Water Quality and Sediments	4. Community Impacts and Infrastructure Safety	5. Resettlement	6. Biodiversity and Invasive Species	7. Indigenous Peoples	8. Cultural Heritage	9. Governance and Procurement	10. Communications and Consultation	11. Hydrological Resource	12. Climate Change Mitigation and Resilience
TOTAL NUMBER OF REQUIREMENTS	6	5	11	21	5	6	8	5	6	15	16	15
NUMBER OF REQUIREMENTS MET	4	4	11	20	4	5	5	5	6	13	11	11
PERCENTAGE OF REQUIREMENTS MET	67%	80%	100%	95%	80%	83%	63%	100%	100%	87%	69%	73%

Note:

- A project must meet all Minimum Requirements on all relevant sections to achieve HS Certified label.
- To receive the HS Silver label, a project must meet all Minimum Requirements on all relevant sections AND meet at least 30% of the Advanced Requirements on each relevant section.
- To receive the HS Gold label, a project must meet all Minimum Requirements on all relevant sections AND meet at least 60% of the Advanced Requirements on each relevant section.

E. Environmental and Social Action Plan (ESAP)

There are no gaps against Minimum Requirements.

F. Abbreviations and Acronyms

ANA	Agência Nacional de Águas e Saneamento Básico
ANEEL	Agência Nacional de Energia Elétrica
APP	Área de Preservação Permanente
BNDES	Banco Nacional de Desenvolvimento Econômico e Social
CFURH	Compensação Financeira pela Utilização de Recursos Hídricos para Fins de Geração de Energia Elétrica
CLT	Consolidação das Leis Trabalhistas
ELETROBRAS	Centrais Elétricas Brasileiras S.A.
E&S	Environmental and social
ESIA	Environmental and Social Impact Assessment
FUNAI	Fundação Nacional dos Povos Indígenas
GCM	General Circulation Model
IBAMA	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis
INCRA	Instituto Nacional de Colonização e Reforma Agrária
MME	Ministério de Minas e Energia
NR	Normas Regulamentadoras de Segurança e Saúde no Trabalho
n/a	Not available or not applicable
PACUERA	Plano Ambiental de Conservação e Uso do Entorno de Reservatórios Artificiais
PAE	Plano de Ação de Emergência
PBA	Plano Básico Ambiental
OH&S	Occupational Health & Safety
ONS	Operador Nacional do Sistema
SAE	Santo Antônio Energia S.A.
SEDAM	Secretaria de Estado do Desenvolvimento Ambiental (Rondônia)
SEMA	Secretaria Municipal de Meio Ambiente (Porto Velho)
SGI	Sistema de Gestão Integrado
SINDUR	Sindicato dos Trabalhadores nas Industrias Urbanas do Estado de Rondônia

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	The main issues during operation relate to ongoing monitoring of E&S impacts in the project affected areas in line with the project's operations license, rehabilitation of surrounding areas used during the construction phase and protection of the reservoir buffer zone, aquatic ecology impacts, and support to communities. Many impacts are similar to or cumulative with the upstream Jirau HPP project.
Identify the environmental regulator	IBAMA - Brazilian Institute for Environment and Natural Resources: main regulator that issues the Operations Licence for the HPP and the 525 kV transmission lines SEDAM - State Secretariat of Environmental Development of Rondônia: regulation of the 230 kV transmission line to the Porto Velho substation SEMA – Municipal Environmental Secretariat of Porto Velho: regulation of minor project components such as the solid waste landfill
Identify other regulators (e.g. on land, water use, Indigenous Peoples)	ANA - National Water and Sanitation Agency FUNAI - National Foundation for Indigenous Peoples Regulators involved in land acquisition: IBAMA, Ministério Público, INCRA
Summarise the ESIA regulatory requirements	One ESIA for the Santo Antônio and Jirau HPPs was submitted to IBAMA in 2005 and two separate tenders were issued for the development of the projects. In 2007, IBAMA issued a Preliminary License for the project, followed by an Installation License in 2008 and an Operational License in 2011, renewed in 2016 for 10 years. The Operational Environmental Management Program (*Plano Básico Ambiental*, PBA) had 30 different E&S programmes; in the 2024 annual report to IBAMA, 9 of these were finalized, 1 was suggested for closure, 3 for a change in scope, 1 for a reduction in scope, and 16 will continue monitoring activities.
Describe the non-physical cultural heritage in the project area	The area has a long tradition of riverine settlements, with a history of resource extraction including rubber tapping; fishing and gold mining (*garimpo*) are still practiced upstream and downstream from the project. Unlicensed resource extraction such as logging and gold mining is now seen as environmentally damaging and is being suppressed by the authorities. Santo Antônio HPP is close to Porto Velho, the capital of Rondônia state with a population of approximately half a million people, in a rapidly urbanizing area.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
ASSESSMENT					
Systematic processes are in place to identify any ongoing or emerging environmental and social issues associated with the operating hydropower facility	✓	A key mechanism to identify issues is SAE's own monitoring and reporting to: • IBAMA on the implementation of the PBA and the conditions of the Operational License • ANA and ANEEL • SEDAM and SEMA There is also external supervision by: • Regulators, including technical analyses of SAE reports and site visits by IBAMA • Independent environmental monitoring against the Equator Principles, on behalf of the lenders External analyses (benchmarking) of the environmental and social management system (ESMS) were conducted by EY and TetraTech in 2022. Finally, the project is highly visible and well known, and issues are identified through engagement with local governments, community and civil society groups. There are multi-stakeholder working groups often led by IBAMA, for example on social programs and on fisheries, that meet when necessary.	Processes to identify ongoing and emerging environmental and social issues take into account broad considerations, and both risks and opportunities	✓	Ongoing E&S issues have been addressed throughout the operating period, in some cases with adjustments in scope of E&S monitoring and management. An example for an emerging ecological issue are concerns about populations of gilded catfish (dourada, *Brachyplatystoma rousseauxii,* see section 6), leading to research seminars and trials for breeding at Santo Antônio, and manual catch-and-release jointly by the Santo Antônio and Jirau projects. Examples for emerging social issues are the research on macrophytes and mosquitoes following complaints from the Paulo Leal community, and the request from the Nova Vila de Teotônio resettlement community for ongoing support, which led to additional annual cash payments of BRL 50,000 per family between 2019 and 2023, and further initiatives under discussion (see section 4). These initiatives are undertaken within the framework of regulatory oversight by IBAMA. There are also voluntary additional activities. For example, during the 2023/2024 drought the project

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
The processes utilise appropriate expertise	✓	Collectively, there is deep expertise in SEA/Eletrobras, their consultants and regulators regarding E&S issues in hydropower operations.			undertook additional animal and fish rescues in areas of the reservoir that had fallen dry, and helped extend water intakes for example for aquaculture ponds at the resettlement village of Nova Vila de Teotônio. During the 2014 and 2025 floods, the project provided support for isolated communities in the form of drinking water, fuel for boats, etc. Opportunities to increase cooperation and coordination with Jirau are also being explored. There have been several examples of complementary E&S activities in the past, but only a few joint ones. Increased cooperation can improve coherence and reduce costs.
Monitoring programmes are in place for identified issues	✓	16 of the 30 programs in the PBA are now focused on monitoring various aspects of the physical, ecological and social environment of the project. These monitoring programmes are supervised by and frequently discussed with IBAMA and adjusted when needed. Other agencies such as SEDAM, FUNAI and ICMBIO also track SAE's E&S performance. Additionally, there is annual independent monitoring of the project against the Equator Principles (which may be changed to a 2-year rhythm).			
MANAGEMENT					
Environmental and social management system is in place to manage measures to address identified environmental and social issues	✓	SAE has a systematic integrated management system in place, that covers management of environmental, social, health and safety, and corporate governance issues. The system is gradually being integrated into or replaced by Eletrobras' system. The largest parts of the E&S management measures are those agreed with IBAMA as conditions under the Operational Licence, and therefore subject to systematic monitoring, reporting and	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	There is confidence that emerging risks and opportunities will continue to be addressed, based on the long-term responsibility of the operator (with a concession until 2047), the policy commitments as a publicly owned project, the financial and technical resources, the above-described processes to identify risks and opportunities, and the history of the project adapting to changes in circumstances.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		management measures. This license will need to be renewed in 2026 for another 10 years, and discussions with IBAMA on a new PBA have started. There are no ESMPs for the other licenses (see above under Background), but specific activities require approval (e.g. environmental management during periodic clearance of vegetation under transmission lines). SAE's sustainability department has 25 permanent staff and between 50-60 contractors, for example for an 'Environmental Brigade' with 16 staff which is responsible, among other tasks, for the fish passage and fish hatchery.			
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	✓	SAE's ESMS was modelled after ISO 14001, as part of the company's integrated management system that has been operational over 11 annual cycles. An external analysis against ISO 14001 was undertaken in 2022 and the ESMS is also reviewed annually by the independent monitoring consultant. The ESMS is not yet formally externally certified against ISO 14001, which is a gap. However, given the multiple reviews and the fact that Eletrobras is rolling out ISO 14001 certification across its

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
					hydropower plants, it is not considered significant.
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	✓	There are no indications for any non-compliances. All PBA programs and license conditions have been finalized or are being complied with.
• no major non-compliances	✓	There are no indications for any major non-compliances. SAE has all necessary licenses; all '*termos de ajustamento de conduta*' (agreements with regulators for corrective action) have been closed; and regulators are not reporting any disagreements. The project is also properly registered in IBAMA's Federal Technical Cadastre of Potentially Harmful Activities and submits required reports.			
• no major non-conformances	✓	There are no indications for any major non-conformances. There were no significant work accidents, public health & safety incidents, or environmental incidents (categories A, B or C) in 2024 or 2025. (There were two category D incidents, a 'near miss' where oil was about to leak from a barge, and a minor oil spill in a powerhouse). Environmental incidents are among the KPIs by which SAE management performance is measured.			

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 commitments have been or are on track to be met	✓	There are no indications otherwise.	There are no non-conformances	✘	There are a number of pending lawsuits related to E&S issues, for example by fishermen claiming compensation; however these are not considered non-conformances as they have not been resolved yet. The last available report of the independent monitoring consultant (August 2024) and recent technical reports from IBAMA provide a number of observations that still need to be implemented and non-conformances that still need to be closed. Also, SAE's compliance system (IUS Natura) lists more than 4,000 legal requirements including E&S requirements, a number of which have not yet been analysed and implemented. These pending issues are a **significant gap** because some of them are categorized as potentially resulting in losses, and there has been no clear tendency towards a reduction in cases.
Environmental and social funding commitments have been or are on track to be met	✓	There are no indications otherwise. Funding commitments are budgeted under three budget lines, 1) basic operational budget for the sustainability department, 2) budget for regulatory measures under the PBA, and 3) CSR budget, under management by Eletrobras' communications department.			
OUTCOMES					
Negative environmental and social impacts associated with hydropower facility operations are avoided, minimised and mitigated	✓	All negative E&S impacts from the Santo Antônio project have been avoided, minimised and mitigated to a significant degree, as described in the following sections.	Negative environmental and social impacts associated with hydropower facility operations are avoided, minimised, mitigated and compensated	✘	As described in the following sections, not all E&S impacts of the project have been avoided, minimised, mitigated and compensated, which is a **significant gap**. The effectiveness of some measures such as fish passage (see section 6) and livelihood support (see sections 4 and 5) is difficult to
Land disturbance associated with development of the	✓	With approximately 22,000 workers on site during peak construction, land requirements were large. Almost all			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
hydropower project is rehabilitated or mitigated		land no longer required for operations has been successfully rehabilitated. Additionally, SAE has rehabilitated vegetation affected by third parties, for example by invasions into the buffer zone around the reservoir (Área de Preservação Permanente, APP).			evaluate. Because of slow or contradictory government processes, some E&S activities have started late, have not started yet, or have not been made official. For example, the support for Indigenous communities and for Rondônia state protected areas is delayed, and the plan for the management of areas around the reservoir (PACUERA) has not yet been approved, among other reasons because INCRA issued authorizations for land use in areas that were to be protected.
The operating hydropower facility or the corporate entity to which it belongs can pay for social and environmental commitments	✓	The total expenditure on E&S management since the start of construction has been BRL 2.6 billion. From commissioning until today, SAE has paid approximately BRL 1 billion in royalties, distributed between the State of Rondônia (25%), the municipality of Porto Velho (65%) and the federal government (10%). There are no indications for any issues regarding SAEs and Eletrobras' willingness and ability to pay for E&S commitments.			

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	4 out of 6

Summary of findings and other notable issues
SAE has a well-defined environmental & social management system (ESMS) to implement E&S license conditions (through the PBA) as well as corporate E&S commitments and voluntary actions. Negative impacts have been generally well managed, although there are some non-conformances and impacts whose successful mitigation and compensation is uncertain. The budget for mitigation and for benefit sharing has been very substantial.

Relevant evidence

Interview	1, 4, 5, 8-10, 14, 18, 29, 30, 40, 49, 50, 90
Document	1, 4, 10, 12-15, 17, 18, 35, 37, 40-56, 112-122, 140-145, 195, 196, 215-220, 222
Photo	42, 50, 51, 62, 63, 65, 66, 127, 132

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)	At the Santo Antônio plant in Porto Velho, there are currently 353 employees (about 50 of which are shift workers, mostly operators and firefighters) and several hundred contractor staff (mostly engaged in electromechanical maintenance, civil works, security and facility management). At the SAE office in São Paulo, there are currently 34 employees. At the end of 2024, Eletrobras with all subsidiaries had 7,710 workers (approximately 20% women and 80% men). Turnover has been relatively high since Eletrobras' privatization, and approximately 4,500 workers have joined voluntary retirement programs. There are no staff in the Eletrobras headquarters in Rio de Janeiro fully dedicated to the Santo Antônio HPP, but some part-time involvement.
Applicable key human resources regulations	Brazil has a comprehensive set of labour legislation consolidated in one set of regulations, the *Consolidação das Leis Trabalhistas* – CLT (Consolidated Labour Laws) Decree-Law 5452, 1943, and subsequent amendments. Every regular employment contract is subject to these regulations.
Applicable key occupational health and safety (OH&S) regulations	OH&S regulations are a part of the CLT, with a set of 37 regulations defined by the Labour Ministry, called *Normas Regulamentadoras de Segurança e Saúde no Trabalho* – NR (Standards for Work Safety and Health). The OH&S NR apply to all private and public companies and administrations governed by the CLT and are aligned with OHSAS 18001.
Identify the regulator for labour law and OH&S	Ministry of Labour and Social Security
Other relevant information	SAE and Eletrobras have collective agreements with SINTUR (*Sindicato dos Trabalhadores nas Industrias Urbanas do Estado de Rondônia*), the labour union representing electrical and municipal workers in Rondônia.

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	✓	After privatization of Eletrobras and integration of SEA into Eletrobras (see section 9), a review of human resource requirements was undertaken. No major changes in employee numbers resulted for the Santo Antônio project. Working conditions at SAE and at Eletrobras are very similar, but SAE employees are generally satisfied with the integration into Eletrobras as it opens up wider career opportunities. Eletrobras has systems in place to track and implement changes in labour-related regulations.	Identification of ongoing or emerging labour management issues takes broad considerations into account, and both risks and opportunities	✓	There are no indications otherwise. Issues related to the high turnover in Eletrobras after privatization appear to have been well identified and handled, largely through voluntary retirement programs. Modern workplace issues such as diversity and inclusion have been proactively identified and addressed. Complaints regarding discrimination can be submitted through a whistleblowing mechanism. A specific health issue identified for workers at Santo Antônio are respiratory problems during the dry season, with large-scale forest fires in the Amazon region. Malaria and dengue are both prevalent in Rondônia, but have not significantly affected workers.
The assessment included project occupational health and safety issues, risks, and management measures	✓	Ongoing OH&S issues at the power plant are identified through frequent job risk analyses (*Analise Preliminar de Risco*) or other processes, for more complex activities, as well as through training and incident analysis. The OH&S program is overseen by a Work Safety Committee (CIPA) with management and labour representatives, and there are monthly meetings with contractors and daily safety talks. Eletrobras' central OH&S team is also involved to improve processes. There are external inspections, by a consulting company contracted for the OH&S internal audit, annually by the independent			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		E&S monitoring consultants, since the last work fatalities (2 workers during fish rescue from turbines in 2021), by the Ministry of Labour and Social Security, and by the Rondônia state fire brigade.			
Monitoring is being undertaken to assess if management measures are effective	✓	A variety of human resource and OH&S statistics are continuously tracked and audited (for example, members and turnover differentiated by gender, age, ethnicity, region of origin, disabilities, education levels; indicators on staff satisfaction, development and retention; gender and worker/ management pay ratios). There are KPIs related to work accidents, and root cause analysis of such accidents are undertaken. Days lost related to OH&S issues have been declining. Staff satisfaction surveys are undertaken periodically. In 2021-2022, SAE achieved a Great Place to Work (GPTW) certification.			
Ongoing or emerging labour management issues have been identified	✓	Such issues are identified through a variety of mechanisms.			
MANAGEMENT					
Human resource and labour management policies, plans and processes are in place to address all labour management planning components	✓	SAE and Eletrobras have comprehensive labour management systems in place, based on policies applicable to the entire Eletrobras group, including an HR management policy (PO-SP.01-001), human rights	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	Eletrobras has policies and procedures in place against a number of workplace issues such as bullying or sexual harassment. Educational materials are available for issues such as women's emotional health.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		policy (PO-GN.05-003), OH&S policy, and Code of Conduct. Diversity, equity and inclusion are emphasized through several educational and promotional measures. Collective labour agreements are negotiated with trade unions, that go beyond legal and regulatory requirements. New hires undergo Basic Sustainability Training as part of their onboarding process, and all staff receive further training, based on regulatory requirements and performance reviews. There is a procedure for handling staff complaints. There is no need to provide housing as this is easily available nearby in Porto Velho; in fact the ability to live in a large city is an attraction to many staff, compared to more remote powerplants. Eletrobras' OH&S program is based on ISO 45001 and includes: • A risk management framework based on the Brazilian NR1 • Management measures to prevent unsafe conditions and behaviours • A program to manage critical occupational, operational, and investment project risks Work accidents are among the KPIs by which SAE management performance			A broad range of medical, psychological and other benefits is available for Eletrobras staff, for example extended parental leave programs, with high rates of return after leave and retention after one year. There are many training opportunities, with a total of 339,000 hours of training for staff in 2024. At SAE, benefits include transportation, moving allowance, funeral allowance, maternity and paternity leave, medical assistance, group life insurance, retirement fund, variable compensation, meal allowance, food allowance, gym discounts, daycare allowance, education allowance, and foreign language courses; these are being aligned with Eletrobras. Accident reports generally lead to changes in procedures and training, e.g. after the 2021 fatalities procedures for working in confined spaces were updated, and debris is now flushed out of the turbines before workers enter. Responses to emerging risks and opportunities are supported through constructive relationships with worker representatives in the work safety committee and the trade union, and with contractors and their staff.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		is measured. There are a number of procedures and work instructions, for example for hazard identification, work in enclosed spaces, diving, log boom clearing, or incident management. At the Santo Antônio project, there is a work safety team, an emergency brigade, an OH&S team, as well as 207 staff considered volunteer '*brigadistas*', i.e. trained in first aid and emergency response. There are regular safety talks. The work safety team carried out 531 inspections between January and June 2025, and any identified non-conformities result in corrective actions until issues are resolved. There are regular medical examinations as well as vaccination and health and traffic safety education campaigns. Software platforms such as SoftExpert, Moki and Obrasoft are used for OH&S management. There is a laboratory for testing of PPE.			
Human resource and labour management policies, plans and processes of contractors, subcontractors and intermediaries are in place	✓	The sustainability, procurement (see also section 9) and OH&S policies cover contractors and their staff. Contractors are required to promote labour rights, safe and healthy work conditions, and equity and inclusion, among other labour-related objectives. SAE supervises labour and			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		OH&S conditions of contractor staff, and these have access to similar working conditions, grievance mechanisms etc. as SAEs own staff. Eletrobras works with key contractors to improve their OH&S management programs and bring them into compliance with regulatory requirements. In 2024, 72 such contractors with a total of 5,500 staff working at Eletrobras facilities were covered, resulting in more than 2,000 corrective actions. The best contractors receive awards.			
CONFORMANCE AND COMPLIANCE					
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	✓	There are no indications for any non-compliances. There were observations from the Ministry of Labour and Social Security in 2024 regarding overtime, but these are not considered a non-compliance since they did not result in a fine, and changes have been made after discussions with management.
• no major non-compliances	✓	There are no indications for any major non-compliances.			
• no major non-conformances	✓	There are no indications for any major non-conformances.	There are no non-conformances	✕	Opportunities for OH&S improvements are frequently identified during work inspections and audits. These are not considered non-conformances against this requirement as long as there is a functioning resolution process. However, a number of high-risk action plans have not been closed within the target period of 30 days, and a
Any labour related commitments have been or are on track to be met	✓	There are no indications otherwise.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
					number of critical weaknesses were identified during the 2024 internal OH&S audit, which is a **significant gap**.
OUTCOMES					
There are no identified inconsistencies of labour management policies, plans and practices with internationally recognised labour rights	✓	There are no indications for any inconsistencies at Santo Antônio HPP.	Labour management policies, plans and practices are demonstrated to be consistent with internationally recognised labour rights	✓	Brazil has ratified all fundamental and most other ILO international labour conventions, labour rights are codified in the Consolidated Labour Laws, and are applied in the project with no non-compliances. ILO fundamental conventions are referenced in Eletrobras' Human Rights Policy. Staff reported a high level of work satisfaction, staff turnover is very low, and there have been no time-lost work accidents for over two years.

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	4 out of 5

Summary of findings and other notable issues
SAE provides good working conditions to its staff at the plant site and in São Paulo, in line with corporate commitments and national and international labour rights. Many employees work for contractors but enjoy similar conditions and protections as internal staff. OH&S performance is generally high, with a few opportunities for improvement.

Relevant evidence	
Interview	2, 10, 15, 16, 24, 27, 28, 33, 35-37, 42, 45, 46, 54, 56, 62, 65, 66, 70, 79-81
Document	6, 16, 18, 19, 153-159, 197, 198, 222-229
Photo	19, 26, 28, 29, 35, 41, 43-49, 53, 55-61, 64, 128

Santo Antônio HPP, 3,568 MW, Brazil

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 Madeira River, one of the largest globally, transports both pollutants and sediments originating from its extensive watershed. Post-reservoir filling monitoring shows that water quality was classified as "good" in the majority of samples, with only a limited number of results meeting the "acceptable" standard, one level below "good."
Key water quality issues	Prior to the initiation of the Santo Antônio project - and the Jirau project located just upstream - there were concerns regarding upstream mining activities, particularly gold mining that utilised mercury, and their potential impact on reservoir water quality. Concentrations of total mercury, organic mercury, and reactive mercury in surface water samples from the reservoir have been consistent with established data for the Amazon region, with measured total mercury levels remaining below thresholds outlined by CONAMA Resolution No. 430/2011 and Ministry of Health Ordinance Nº 2914/20011. Mercury concentrations in soil samples from drawdown zones, as well as in macrophytes and fish, also correspond to background values typical of the Amazon region and are within the limits recommended by regulatory frameworks such as CONAMA Resolutions Nº 420/2009 and 454/2012, and Mercosur Technical Regulation RDC Nº 42/2013.
Main influences on water quality	Seasonal fluctuations are primarily responsible for the observed temporal changes in water quality, with increased dilution and sediment transport during the rainy season. There is no evidence that the project has impacted water quality, which is largely attributable to the reservoir's short retention time and the relatively low level of human activity - including mining - in its vicinity.
Sedimentology	
Key sediment issues	The Madeira River is the largest sediment contributor to the Amazon with approximately 50% of the total sediment load. Key sediment issues are the transport of sediment through the reservoir reach, the quality of the sediments (see above regarding mercury contamination), and the stability of riverbanks.
Sediment load (tonnes/year)	Around 600 million tonnes/year
Catchment area at the dam	988,873 km²

Other information	The city of Porto Velho, the capital of Rondônia State with a population of approximately 500,000 residents, receives its water supply from the Madeira River through two intake stations: one situated within the Santo Antônio reservoir near the dam, and another located between the dam and the city. The section of the Madeira River extending from Porto Velho downstream to Humaitá (approximately 260 km) serves as a significant waterway for the transportation of soybeans and other agricultural commodities.

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:					
• water quality	✓	Mercury concentrations in surface water are the main issue of concern, due to its impact on the ichthyofauna and the local population with fish being an important food source and economic resource for the region. To date, Hg levels in fish generally fall within the range of variability found in the Madeira River basin since the early 1990s, when the first Hg data were available in fish. Of the 53 fish species sampled, 13 show total Hg concentrations above the limits established by Brazilian legislation (ANVISA 1998, 2013). Of these 13 species, 4 are considered of commercial value for human consumption: *B. vaillantii* (Piramutaba); *P. castelnaeana* (Apapá); *P. pirinampu* (Barba-chata) and *B. filamentosum* (Filhote). Concentrations in these species have generally decreased since reservoir filling.	Identification of ongoing or emerging water quality issues takes into account both risks and opportunities	✓	Water quality sampling addresses specific concerns, including the safety of drinking water, recreational water standards, and the suitability of fish for human consumption. The program utilizes 22 collection stations positioned along the Madeira River and its tributaries within the project's area of influence, as well as sampling points at two reservoir beaches (Jaci-Paraná and Teotônio) and at two water intake sites operated by the State Water and Sewage Company of Rondônia (CAERD). Furthermore, fish are analysed to assess the bioaccumulation of chemicals pollutants.

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	✓	Due to the large sediment load of the Madeira River, monitoring is required to track and understand the quantity of solids, reservoir sedimentation, riverbank and riverbed erosion, and downstream effects of sediment trapping and/or flushing.			
If management measures are required, then monitoring is being undertaken to assess if management measures are effective for:			Identification of ongoing or emerging erosion and sedimentation issues takes into account both risks and opportunities	✓	Sedimentological and bathymetric changes within the reservoir are being monitored, indicating overall stability in the affected sections. There is significant port infrastructure approximately 7 km downstream from the dam, primarily for loading of soybeans onto barges destined for the port of Itaituba in Pará State, prior to export. Maintaining navigability on the Madeira River is essential for the Brazilian agribusiness sector.
• water quality	✓	Through its PBA and as required by the environmental licenses, the project is implementing a Hydro-Biogeochemical Monitoring Program, a Limnological Monitoring Program, and an Aquatic Macrophyte Monitoring Program. A number of monitoring campaigns have been carried out since 2009, and currently 22 sampling stations are monitored on a quarterly basis, located in the area of influence of the project (8 in the Madeira River, 13 in tributaries, 1 in Lake Cuniã downstream). 10 physical, 37 chemical, and 7 biological variables (in the water and the macrophyte community) are analyzed at these points.			
• erosion and sedimentation	✓	Through its PBA and as required by the environmental licenses, the project is implementing a Hydrosedimentological Monitoring Program. Solid discharges (suspended sediment integrated vertically and			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		bedload) are sampled bimonthly at 4 stations in the fluviometric network (downstream of the Beni River, upstream of Jaci-Paraná, at São Carlos and Humaitá) and monthly at 2 stations (downstream of Caldeirão do Inferno and Porto Velho). 22 topobathymetric control sections in the reservoir and 23 sections downstream of the dam are defined in the PBA. These sections are used to track erosion and sediment deposition processes in a reach of about 120 km from the tail of the reservoir to the dam, and 260 km downstream to Humaitá. Bathymetric surveys are combined with sampling of the bottom sediment, for granulometric analyses in the reservoir and downstream the dam. Data on the evolution of sections with eroded or potentially unstable banks is collected and analysed at 16 surveyed points, including 4 points in communities (1 in São Sebastião, 2 in São Carlos, and 1 in Calama).			
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	✓	The Limnological Monitoring Program uses the Water Quality Index (WQI) developed by the American National	• water quality	✓	The project carries out real-time monitoring to assess water quality parameters using a multiparameter

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		Sanitation Foundation and adapted by Cetesb as well as the values recommended by Conama Resolution Nº 357/2005 in the 22 monitoring stations to track water quality. The main management measure is continued mechanical removal of macrophytes from the banks up to the Teotônio area, according to the Aquatic Macrophyte Control Work Plan.			probe upstream and downstream of the dam. A water quality management bulletin for the backwaters/tributaries in the reservoir, approved by IBAMA, defines potential actions to be taken if water quality parameters are not in accordance with objectives.
• erosion and sedimentation	✓	No specific management requirements for sediments have been established. Adjusting the reservoir's operational level for sediment flushing is neither currently mandated nor permitted and would necessitate an impact assessment approved by IBAMA. Monitoring in 2022 and 2023 revealed minimal morphological changes. Erosion was observed on the right bank immediately downstream of the dam, which has since been stabilized with riprap. Beyond the zone directly influenced by the project, no significant effects on hydrodynamics - including discharge, water velocity, or water levels - have been detected. Riverbank dynamics in the monitored segments have historically exhibited variability, predating the construction of the dams. For the 2022-2023	• erosion and sedimentation	✓	Regarding erosion and sedimentation control, the project's ability to address fluctuations in sediment load is limited; however, these issues are closely monitored and monitoring results are disclosed, enabling some adaptation to associated risks and opportunities.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		period, monitoring activities included surveys in several communities (São Sebastião, São Carlos, and Calama). During this interval, the Madeira River experienced a dry period, resulting in reduced sediment transport and erosion.			
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.	• water quality	✓	There are no indications for non-compliances.
• water quality, with no major non-conformances	✓	There are no indications for major non-conformances.			
• erosion and sedimentation, with no major non-compliances	✓	There are no indications for major non-compliances.	• erosion and sedimentation	✓	There are no indications for non-compliances.
• erosion and sedimentation, with no major non-conformances	✓	There are no indications for major non-conformances.			
Commitments related to the following have been or are on track to be met:			There are no non-conformances relating to:		
• water quality	✓	There have been no water quality related commitments.	• water quality	✓	There are no indications for non-conformances.
• erosion and sedimentation	✓	There have been no erosion and sedimentation related commitments.	• erosion and sedimentation	✓	There are no indications for non-conformances.
OUTCOMES					
Negative water quality impacts arising from activities of the operating hydropower facility are avoided, minimised and mitigated	✓	There is no detectable difference in water quality and other limnological parameters between upstream and downstream of the dam, in the main channel system of the Madeira River.	Water quality in the area affected by the operating hydropower facility is of a high quality	✓	The average water quality index has been "good" for most of the monitoring results, and overall, the creation of the reservoir did not significantly impact water quality.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		The river characteristics from before the dam have been maintained, which is attributable to run-of-river operations with short water residence time. There are also no indications of the influence of the reservoir on downstream tributary systems (Jatuarana II and Belmonte streams, Jamari River, and Lake Cuniã). In backwater areas of upstream tributaries to the reservoir, the influence of the transformation of lotic into lentic or semi-lentic conditions can be observed in some parameters. There was an increase in BOD after reservoir filling, due to the flooding of terrestrial biomass. However, the values have remained below the limit of CONAMA Resolution Nº 357/2005 (5 mg/L) in more than 97% of the samples.	The facility has contributed or is on track to contribute to addressing water quality issues beyond those impacts caused by the operating hydropower facility	✓	The project addresses water quality issues beyond possible impacts caused by operations, principally by monitoring possible mercury, heavy metal, and other pollution, which is very relevant as the river is the main source of water for approximately 500,000 people. Discussions with local communities through the Environmental Education Program help to address any other water quality issues.
Erosion and sedimentation issues are avoided, minimised and mitigated	✓	The 2023 bathymetric surveys show that the morphological changes in the upstream and downstream sections, for the most part, follow past deposition or erosion trends, depending on the local hydrodynamics at the monitoring sections. The Madeira River is establishing a new sedimentological equilibrium, after the construction of the dam and the extraordinary flood of 2014. River mining by dredging	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	✓	Erosion and sedimentation associated with the project does not present any significant problems for operations or for environmental, social, or economic objectives in the region. Navigability of the stretch between the dam and the confluence with the Amazon River, an important waterway, has not been affected according to bathymetric monitoring results.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		barges cause local changes through excavations in the bed and on the banks of the reservoir as well as in the stretch downstream of the dam.			

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	11 out of 11

Summary of findings and other notable issues
Before the Santo Antônio project was initiated there were concerns about a number of water quality and sedimentation issues, including the very high sediment load in the Madeira River and the history of mining with mercury in the catchment, and how these would interact with the reservoir. However, extensive monitoring results over the years of operation show that water quality (including mercury) levels have been satisfactory and not affected by the reservoir, and that the reservoir is passing through most of the sediment, with no unexpected accumulations.

Relevant evidence	
Interview	6, 18, 19, 23, 40, 51, 68
Document	8, 10, 11, 12, 15, 17, 35, 37, 38, 40–43, 72–75, 77, 78, 85, 124, 126, 134–138, 143, 160–168, 183, 216-220, 222
Photo	6, 7, 13, 19, 61-63, 117, 119, 121, 122

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)	All project-affected communities are within the municipality of Porto Velho, with an area of 34,100 km^2 and a population of 549,000 (IGBE 2021 estimate). By far the largest share of this population lives in the city of Porto Velho, the capital of the state of Rondônia, approximately 11 km downstream of the Santo Antônio dam. Several small towns and villages are located along the BR 364 highway which parallels the Madeira River (and the two reservoirs of Santo Antonio and Jirau) and links the city of Porto Velho with the state of Acre in the far west of Brazil, and the Bolivian border. Key groups of affected people are: • Users of the Madeira River, principally fishermen and gold miners (garimpeiros), affected by changes in the river. • Farmers and other residents affected by land acquisition (note that physically displaced people are covered in section 5), • People otherwise affected by construction and operation of the Santo Antônio HPP (in terms of community health and safety, infrastructure quality, employment and procurement, benefit sharing etc.).
Agencies relevant to land acquisition	IBAMA, Ministério Público, *Comitê de Sustentabilidade* (with a working group specifically on resettlement, the *Grupo de Acompanhamento Social*), INCRA

Agencies relevant to livelihood restoration and project benefits	See above, as well as EMBRAPA (Brazilian Agricultural Research Corporation)
Infrastructure Safety and Public Health	
Type of dam	Two earth dams (536m and 295m long) and one earth and rockfill dam (831m long)
Dam height (m)	55 m
Probable maximum flood (m^3/s)	N/A
Design flood (expressed as estimated flood with return period)	84,000 m^3/s for a 10,000-year return period (see below for update)
Spillway capacity (m^3 / s)	84,000 m^3/s with reservoir at maximum water level (72.5 masl)
Spillway height (masl)	48 masl
Headrace length (m)	n/a
Headrace width (m)	n/a
Headrace capacity (m^3/s)	n/a
Seismicity	The project area is in an area of low seismicity and low risk of reservoir-induced earthquakes. A Seismological Monitoring Program with 3 stations has been operational for 15 years and not detected any meaningful seismic events that could affect the project.
Geology	The foundation of the structures is composed by granitic rocks and migmatite gneiss. Seismic studies associated with local geological and topographic conditions identified no evidence of anomalies that could lead to foundation failures.
Dam safety regulatory authorities	ANEEL – Brazilian Electric Energy National Agency
Local presence/capacity of emergency services	There are emergency crews and a clinic inside the power plant, and specialized health and emergency services such as fire department and hospitals are all available in the city of Porto Velho.
Potential safety risks in this context	The most critical scenario for the reservoir operation is the rupture of the earth dam by overtopping. The main safety risk is the downstream population, including regions of the city of Porto Velho. A total of 5631 buildings were registered in the self-rescue region.
Degree of risk of dam failure and in what way	According to Federal Law nº 12.334/2010 and ANEEL Resolution 696/2015, Santo Antonio has been rated Risk Class B, as a result of the risk category and the potential associated damage, as follows: • Low Risk – considering the technical characteristics, including the fact that Santo Antonio is a run-of-river reservoir with a relatively low dam • High Potential Damage – considering the population and infrastructure downstream
Population at risk of dam break (locations, numbers)	The Dam Break study extended 259km downstream, where the flood wave produces a maximum variation of 36cm on the water level. The municipalities affected would be, in sequence, Porto Velho, Cujubim, São Carlos, Nazaré, Papagaio, Calama and Humaitá. Total population at risk is estimated to be around 17 thousand people.
Dam safety standards followed	• *"Projeto Civil de Usinas Hidrelétricas da Eletrobrás"* - Hydroelectric Power Plants Civil Engineering Criteria, Eletrobrás 2003

	• *"Guia Básico de Segurança de Barragens"* - Dam Safety Basic Guide issued by Comissão Regional de Segurança de Barragens de São Paulo, and Núcleo Regional de São Paulo do Comitê Brasileiro de Grandes Barragens (Brazilian Committee on Large Dams) • *"Guia de Segurança e Inspeção de Barragens"* -Dam Safety and Safety Inspection Guide issued by Secretaria de Infraestrutura Hídrica do Ministério da Integração Nacional, 2002 • *"Política Nacional de Segurança de Barragens"* Regulations defined by Federal Law 2.334, 2010 Resolution 696 de 15 December 2015 issued by SFG ANEEL
Agencies relevant to dam safety	ANEEL – Brazilian Electric Energy National Agency ANA – Brazilian Water Authority COEPDEC – Coordenadoria Estadual de Proteção e Defesa Civil de Rondônia COMPDEC – Coordenadoria Municipal de Proteção e Defesa Civil de Porto Velho Corpo de Bombeiros da Polícia Militar Polícia Rodoviária Federal Polícia Federal Superintendência Regional de Rondônia Polícia Civil do Estado de Rondônia Marinha do Brasil (Brazilian Navy) Exército Brasileiro (Brazilian Army) IBAMA – Superintendência de Rondônia CRH/RO – Conselho Estadual de Recursos Hídricos SEDAM – Secretaria de Estado de Desenvolvimento Ambiental CAERD – Companhia de Água e Esgoto de Rondônia CERON – Eletrobrás Distribuição Rondônia - Centrais Elétricas de Rondônia S.A Secretaria Municipal de Saúde de Porto Velho Polícia Militar – Secretaria de Segurança e Defesa da Cidadania
Other infrastructure safety issues	Electrical safety, safety on and near water
Description of key public health issues	Key background public health issues in the region included a historically high incidence of malaria, poor sanitation conditions including in the city of Porto Velho, and new diseases such as Covid-19. Construction of the Jirau and Santo Antonio HPPs led to a large population influx and displacement of populations, with potential health impacts through contagious diseases, sanitation issues, pressure on public health system capacities, and mental health and violence.
Agencies relevant to public health	Municipal Health Secretariat of Porto Velho (SEMUSA)

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**
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 interrelationships among issues		
• commitments to project-affected communities	✓	Key commitments to affected communities were related to land acquisition and other forms of economic displacement and addressed by programs under the PBA: Public Health (concluded), Support to Leisure and Tourism Activities (final report submitted), Resettlement (ongoing) and Support to Indigenous Peoples (ongoing). All programs are subject to monitoring and reporting to IBAMA. The Social Monitoring Group (GAS), a dialogue forum between the regulator, public agencies, affected communities and SAE, also ensures that all parties are heard in solving issues involving commitments to the communities.		✓	No additional affected groups (not covered by PBA measures) were identified during operations. For example, dredge mining outside the dam safety area could be continued. All PBA programs have monitoring components and reporting requirements, and there are examples where risks and opportunities were identified, and programs were adapted. For instance, the assessment included not only the owners and residents of affected areas, but also other occupants such as non-owner residents and workers, and this group was included in the commitments offered to affected communities.
• commitments to project benefits	✓	Project benefits are being or have been delivered to resettled families (as described in section 5), education facilities, basic sanitation, public security and planning support for			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		Porto Velho. On top of the commitments included in the PBA, which include monitoring, reporting and review mechanisms, the project also delivers benefits to all residents of Porto Velho municipality, Rondônia state and the nation (in the form of royalties, taxes etc.), beneficiaries of local employment and procurement, as well as to some other communities not directly affected (for example, four Indigenous Peoples, as described in section 7).			
Ongoing or emerging issues relating to the following have been identified:			Identification of ongoing or emerging issues relating to project benefits takes into account both risks and opportunities	✓	The project transfers funds to different levels of government such as Porto Velho municipality, but there is no practical way to assess the effectiveness of the use of those funds, as they are aggregated in the recipients' budgets. Issues related to project benefits were identified during the development of the programs and managed adaptively. For instance, it had been planned to build two new Emergency Care Units, in Jaci-Paraná and in Bairro Nacional. However, Porto Velho municipality chose to build such units with funds from the Ministry of Health, and resources were then reassigned to build a Family Health Unit in Bairro Nacional and the
• issues that affect project-affected communities	✓	Issues have been identified over the development of the programs in cooperation with authorities and community organizations. Mechanisms such as the required reporting to IBAMA and working groups, have served to bring up issues and identify solutions.			
• delivery of project benefits	✓	Most of the project benefits are part of PBA programs, subject to formal monitoring and reporting requirements during implementation and in some cases, for a certain amount of time afterwards. The calculation and transfer of royalties, taxes, fees and other regulated payments is monitored, but not their use by recipients. However,			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		the recipients such as the Porto Velho municipality are accountable for the use of these resources, and related information is published as required by Brazilian regulations. No issues have been identified concerning the transfer of funds to beneficiaries.			Emergency Care Unit and Municipal Specialties Center Alfredo Silva. Infrastructure investments made by SAE appear to be fully utilized and are beneficial to the communities.
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	✓	Risk assessment and monitoring covers several dimensions, such as hydrological, structural, seismic, and operational risks. As an input to the Emergency Action Plan, SAE conducted a Dam Break study in 2017, identifying possible failure modes, including a break of the upstream Jirau dam. The study revealed that the probability of a break of Santo Antônio dam is very low, and a flood wave caused by a possible break of Jirau dam can be discharged by Santo Antônio without causing a cascade failure. In addition, a hydraulic model was used to assess the propagation and damping of the hydrograms under different failure scenarios of the Santo Antônio dam in the 260 km stretch between the dam and the city of Humaitá, with the corresponding flood maps.
• dam and other infrastructure safety	✓	Internal and independent reports are prepared on a regular basis and have not indicated any risks for the structures. The reports are submitted to ANEEL, as required by regulation. No other significant public safety risks have been identified. Fishing boats occasionally enter the security zone downstream of the dam, but no incidents have been recorded.			
• public health issues associated with the operating hydropower facility	✓	The Public Health program was structured in two subprograms, for population health care and for epidemiological surveillance and vector control. Key issues identified were related to malaria control, proliferation of Mansonia mosquito, Leishmaniasis, and Covid-19.			
Routine monitoring of dam and infrastructure safety is being undertaken to identify	✓	Routine monitoring is undertaken according to a programme, with a total of 635 data-collection points.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
risks and assess the effectiveness of management measures		Field readings utilize mobile tablets equipped with DAMS App. Data is later analysed and managed by a computer software SIGA. This system is presently being migrated to Eletrobras' standard system, SYSDAM.			In 2021, SAE commissioned an update of the hydrological studies, which indicated a reduction of the 10,000-year recurrence design flood, from 84,000 m^3/s (which was used to design the spillway structure) to 76,793 m^3/s.
If public health issues require management measures then monitoring is being undertaken to assess if management measures are effective	✓	Monitoring was part of the Public Health program, which is now concluded. It indicated a reduction of malaria vectors during the construction of the project, while actions were implemented, and an increasing trend after the program was completed, although not to levels previously seen.	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	✓	Monitoring of public health issues was limited to the period established on the licensing conditionings, then discontinued. Unexpected issues were identified during the program, such as Mansonia mosquito proliferation, and were monitored and addressed. A detailed study was conducted on Mansonia mosquito, which was published in two books and now serves as a scientific reference in the field. Meanwhile, the public health system maintains its own permanent monitoring program.
MANAGEMENT					
Community Impacts and Benefits					
Measures are in place to deliver commitments:			Processes are in place to anticipate and respond to emerging risks and opportunities relating to project-affected communities and project benefits	✓	There are a number of examples for SAE addressing risks and opportunities, through adaptive management of PBA programs and through additional measures. After the 2014 floods there was an increase in Mansonia insects, and SAE developed an R&D program on the
• to project-affected communities	✓	The PBA included 13 social management programs, with 9 related to social impacts. Most commitments to affected communities have already been delivered, such as the resettlement program, the cultural heritage			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		preservation program, and the support to leisure and tourism activities. The Public Health program was closed after approval by IBAMA, and the remaining ones are either ongoing or pending closure approval. Programs addressed here in section 4 are public health, downstream communities (see also section 11), infrastructure recovery, and fisheries support. Other social programs are covered in sections 5 (Resettlement), 7 (Indigenous People), 8 (Cultural Heritage) and 10 (Communications).			topic. During the Covid pandemic, SAE also provided help to FUNAI, assisting the IPs during those difficult times with masks and alcohol gel. There have been disputes concerning compensations for resettled and economically displaced families, which were legally settled over time. There is also an open discussion about the effectiveness of fishponds installed by SAE, which is being addressed.
• to project benefits	✓	Commitments to project benefits are on track to being delivered, by a combination of regulated PBA programs, royalties and taxes, and voluntary local employment and procurement, ad-hoc agreements to support government agencies, cooperatives and other recipients on smaller-scale initiatives, as well as sponsorships from the project's annual administrative budget.			
Measures are in place to manage any identified issues relating to these commitments:					
• to project-affected communities	✓	Commitments to affected communities have been extended and/or revised a number of times, mostly in coordination with IBAMA, reflecting issues identified or new opportunities.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
• to project benefits	✓	As above			
If there are any formal agreements with project-affected communities, these are publicly disclosed	✓	Formal commitments have been disclosed through the formal licensing process and the associated documents such as the PBAs. Royalty payments are also disclosed.			
Commitments to project benefits are publicly disclosed	✓	As above			
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	✓	The project has a well-structured dam safety programme in place, and any issues can be identified in a timely manner. Annual inspections are conducted, and independent audits take place every 5 years, in line with regulations. In addition to a Dam Safety Plan, an Emergency Action Plan (PAE) was developed, in line with the requirements for its risk rating. The PAE contains detailed procedures for monitoring activities, communication plans, information flowcharts and decision-making trees with defined responsibilities, and was developed and submitted to ANEEL and relevant state agencies. Regular inspection reports and instrumentation results are analyzed by the team of experts in SAE and added to the database for regular structural analysis.	Processes are in place to anticipate and respond to emerging infrastructure safety risks and opportunities	✓	SAE's robust preventive maintenance programme and regular dam safety inspections are suitable to anticipate any emerging safety risks and opportunities. The stability of the structures is continuously analysed by the dam safety diagnose software. Moreover, SAE has arrangements with upstream plant Jirau to exchange any relevant safety concerns in real time. Although there are warning signs to prevent fishermen from getting close to the dam and spillway, it is not uncommon to observe dangerous behaviours. In such cases SAE staff will alert people on the boats and if necessary, call the local police.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
These plans and processes provide for communication of public safety measures	✓	The Emergency Action Plan defines processes for communication of public safety measures. SAE usually updates the emergency contact list on an annual basis, but so far there is no internal formal process for doing so. This is a non-significant gap since SAE is presently revising its procedures to include the revision of the emergency contact list every year, to be concluded by September 2025.	Public safety measures are widely communicated in a timely and accessible manner	✓	19 warning sirens are installed, to warn people located in the self-rescue zone (ZAS) which extends 10 km downstream of the dam. Sirens can be activated locally, by radio, and by satellite, and are tested regularly using an inaudible frequency in order not to cause concerns in the population. SAE also developed a free mobile App named 'Fique Seguro' (Stay Safe), that shows the present safety condition of the dam, messages from SAE, emergency phone numbers, explanations about the self-rescue zone, meeting points and escape routes. An online GPS map is also provided in the App, guiding the user to the closest meeting point in the region.
Emergency response plans and processes include awareness and training programmes and emergency response simulations	✓	Emergency response plans and processes include awareness and training programs and emergency response simulations for internal staff. Training and simulation for external stakeholders and communities is a governmental responsibility, in conjunction with SAE. The latest external simulation campaign was conducted in December 2023 and is programmed to be repeated every 3 years.			
Measures are in place to manage identified public health issues	✓	The primary responsibility for public health relies with the public sector, through the *Sistema Único de Saúde (SUS)*, and in particular the municipality's health service. SAE's Public Health program is completed and approved by IBAMA, and has delivered its commitments in full.	Processes are in place to anticipate and respond to emerging public health risks and opportunities	✓	The public sector health system is responsible for general monitoring of health and health services, including use of the infrastructure provided by SAE.
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**
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	✓	There are no indications for major non-compliances.	• project-affected communities	✓	There are no indications for non-compliances.
• delivery of commitments to project-affected communities, with no major non-conformances	✓	There are no indications for major non-conformances.			
• project benefits, with no major non-compliances	✓	There are no indications for major non-compliances.	• project benefits	✓	There are no indications for non-compliances.
• project benefits, with no major non-conformances	✓	There are no indications for major non-conformances.			
Commitments have been or are on track to be met relating to:			There are no non-conformances relating to:		
• project-affected communities	✓	There are no indications otherwise.	• project-affected communities	✓	There are no indications for non-conformances.
• project benefits	✓	There are no indications otherwise.	• project benefits	✓	There are no indications for non-conformances.
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.	• dam and other infrastructure safety	✓	There are no indications for non-compliances. As per regulations, SAE annually provides self-declaration regarding dam safety management and maintains all technical documentation available in the power plant for external supervision.
• dam and other infrastructure safety, with no major non-conformances	✓	There are no indications for major non-conformances.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
• public health issues, with no major non-compliances	✓	There are no indications for major non-compliances.	• public health	✓	There are no indications for non-compliances.
• public health issues, with no major non-conformances	✓	There are no indications for major non-conformances.			
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 are no indications otherwise.	• dam and other infrastructure safety	✓	There are no indications for non-conformances.
• public health	✓	SAE's Public Health program has delivered its commitments in full.	• public health	✓	There are no indications for non-conformances.
OUTCOMES					
Community Impacts and Benefits					
Livelihoods and living standards impacted by the project have been or are on track to be improved	✓	There are no indications for declines in livelihoods or living standards, such as project or government statistics, or records of grievances. For some livelihood activities such as fishing, monitoring data show stable or increasing yields. Infrastructure investments made by SAE appear to be fully utilized and are beneficial to the communities. The monitoring of malaria vectors showed a decrease during the construction of the project, showing the effectiveness of the measures applied by SAE (which could continue to be applied by the public sector health system). The project fosters local development with jobs and procuring services for its operation, and pays significant royalties and taxes.	The measures put in place to improve livelihoods and living standards are on track to become self-sustaining in the long-term	✗	Some measures have long-term effects (such as investments in economic infrastructure and livelihoods training). However, there is no systematic ongoing monitoring of the livelihoods and living standards of affected populations. Monitoring results for some people affected by physical displacement have shown that on average, their livelihood status stagnated or slightly improved after the construction of the project (see also section 5); however these data are not comprehensive and up-to date. This is a **significant gap**.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Economic displacement has been fairly compensated, preferably through provision of comparable goods, property or services	✓	There are no indications otherwise. Compensation was discussed and approved by IBAMA, after the recipients had accepted the compensation terms. Displaced people received either cash or in-kind compensation, on a case-by-case basis. They were offered a fair exchange for their land and assets (such as houses, crops and equipment). Some disagreements over valuation evolved to lawsuits but were eventually settled among the parts. The communities where economic displacement occurred, received significantly increased public investments and economic opportunities, which also helped to indirectly offset the effects of displacement.			
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 has provided shared benefits to local communities in terms of infrastructure, such as roads, health centres, and recreational areas, as well as economic opportunities, including to communities not significantly affected. Public budgets are significantly larger than they would be without the project.	Benefits are significant and sustained for communities affected by the project	✓	The benefits are very significant, with SAE as probably one of the largest sources of public investment in the region. Some of the benefits are sustained by definition, such as the royalties. Others will be sustained because SAE is required to contribute under the current operational license or will continue to contribute voluntarily, where SAE has an interest in maintaining good community relations and where its own workers are residing. Some benefits (for

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
					example for indigenous communities, see section 7, and protected areas, see section 6) are delayed.
Infrastructure Safety and Public Health					
Safety risks have been avoided, minimised and mitigated with no significant gaps	✓	No notable public safety incidents have occurred in relation to the project to date. After the 2014 flood, new flood studies were carried out, which concluded that the inflow design flood was actually lower than previously estimated, increasing the reliability of the spillway in managing incoming floods. Road safety and safety on and near water is mitigated with proper signing and education programs at schools.	Safety risks have been avoided, minimised and mitigated with no identified gaps	✓	No gaps have been identified.
			Safety issues have been addressed beyond those risks caused by the operating facility itself	✓	As a run-of-river facility, the project cannot support flood management on the Madeira River. The raising of some sections of the BR-364 road has resulted in improved road safety conditions. On occasion the project assists the local emergency services in case of emergencies outside the plant.
Negative public health impacts arising from activities of the operating hydropower facility are avoided, minimised and mitigated	✓	Monitoring of the Public Health program indicated no negative impacts from the operation of the plant.	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	✓	The two main contributions of the project to the health status in the area have been 1) the upgrade of living conditions, including access to modern health services, and 2) vector control, in particular for malaria, resulting in a decrease by 65% between 2010 and 2016. Both programs were well coordinated with IBAMA. Jirau HPP and the local health services, but now need to be maintained by the public sector.

Santo Antônio HPP, 3,568 MW, Brazil

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	20 out of 21

Summary of findings and other notable issues
The project has compensated affected communities fairly, with relatively few disputes, and communities are also benefiting significantly from various project investments, increased local economic activity, and contributions to public budgets. Public health and safety risks have been well managed. There is some uncertainty over the sustainability of improvements in livelihoods and living standards, as there has been little follow-up monitoring.

Relevant evidence	
Interview	12, 17, 22, 24, 42, 44, 63, 80-81
Document	2, 17, 20-33, 36, 39, 42, 127-133, 147-148, 177-181, 186-189, 191, 205, 215-220, 222, 223
Photo	12-15, 19-24, 30-33, 39-40, 58, 71, 87-91, 95, 98-110, 117-119, 129-131, 133-137

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 resettlees and host communities have been improved; and that commitments made to resettlees 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, the project required physical displacement of people, and the resettlement program is still active.
No, this section is not relevant	Click here to enter text.
In the case of older projects, commitments to resettlees 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)	People were permanently physically displaced from the following locations: Teotônio, Jaci-Paraná, Vila Amazonas, Lusitana, Cachoeira dos Macacos, Cachoeira de Santo Antônio, Engenho Velho, Morrinhos, São Domingos, Jatuarana, Porto Seguro and Joana D'Arc. Compensation of physically displaced people was carried out in the same manner as compensation of other people affected by land acquisition; either by in-kind or by cash compensation: (1) In-Kind Compensation, including transport to a new place, with new lands for production, housing and infrastructure, technical assistance and production subsidies, and (2) Cash Compensation, by cash payment or letter of credit equivalent to the value of affected assets, for those who preferred to resettle and rebuild their housing and livelihoods themselves. The initial in-kind Resettlement Program covered 499 households. During construction and operation this number increased due to the need to relocate people affected by the 80-cm raise of the operational level of the reservoir (from 70.5 to 71.3 masl), the updated protection water level of 77.1 masl as determined by ANA, and by the reach of the historic flash flood occurred in 2014. The final count of affected people was 2,021 from 505 households, who were **r**esettled in seven locations, as described below.

	2,086 properties were compensated in cash, covering an area around 97,000 ha, equivalent to 47 ha per property on average. The total amount spent on those processes was around R$ 480 million, equivalent to BRL 230,000 or USD 70,000 per property, on average. Compensation was either in the form of a direct cash payment or in the form of a letter of credit towards the cost of a new property. No precise records of individuals and households affected by physical displacement and compensated in this way were kept. However, SAE estimates that 40% of property owners opted for direct cash compensation, 10% for a letter of credit, and 50% for participation in the resettlement program.
Name and number of settlements	Seven resettlement areas were provided for the relocation of 505 families, namely Novo Engenho Velho (40 families), São Domingos (34 families), Riacho Azul (38 families), Vila Nova de Teotônio (46 families), Morrinhos (50 families), Santa Rita (135 families) and Parque dos Buritis (162 families), this last one being the only resettlement located in an urban area, as part of Jaci-Paraná.
Agencies relevant to land acquisition	ANEEL (for issuing DPU – Public Utility Declaration), SPU – Secretaria do Patrimônio da União, and INCRA
Agencies relevant to livelihood restoration	EMATER, PACTO RURAL e REATA (for technical, social and environmental assistance), PLENU'S (for monitoring of social reinsertion), CPPT CUNIÃ (for environmental education and social communication), MULTIPLIK (for social support and community organization)

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 resettlees and host communities have been delivered and if management measures are effective	✓	Monitoring of those families opting to be resettled by the project (in-kind compensation) was detailed and well designed. All monitoring results were reported to IBAMA. This program is close to being finalized, lacking only the signing of some land ownership titles by resettlees. The in-cash compensation program is long closed, and IBAMA confirmed that commitments had been delivered and monitoring was no longer necessary.	Identification of ongoing or emerging resettlement issues takes into account both risks and opportunities	✓	There is no evidence of ongoing issues for people who opted for in-cash compensation. There are a few ongoing issues for people who opted for in-kind compensation (see below). As per the on-site assessment, there were no outstanding lawsuits, since they were all settled. Stakeholders have multiple opportunities to raise emerging issues, including through legal action, the corporate grievance mechanism, and their local political representatives. SAE also funded additional measures imposed by the authorities, which
Ongoing or emerging issues relating to resettlement have been identified	✓	A number of issues emerged during program implementation (such as the raise of the operational level of the reservoir, updated protection water			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		level determined by ANA, and the historic flood in 2014) and the program was adjusted accordingly. There have been long delays in issuing land titles for resettled families, caused by uncertainties expressed by a few resettlees, but SAE has lent extensive support to families in this process.			increased the number of affected people compared with the initial PBA.
MANAGEMENT					
Measures to address resettlement are documented in a Resettlement Action Plan	✓	Formal resettlement plans were developed as part of the PBAs, approved by IBAMA and implemented in a participatory manner with affected populations, government agencies and specialized consulting firms. The resettlement program is virtually completed, except land regularization, through a specialized company, continuing the process of issuing a definitive title to resettled families. The few existing issues include a public civil action proposed by the residents of Joana D'Arc, while SAE claims the process to be completed.	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	A proposal for closure of the resettlement-related activities has been presented for approval by IBAMA. The resettlement working group is no longer active, and the monitoring program is no longer operational. However, SAE is available to support resettlees when needed, and has provided immediate response to inquiries, such as those related with legal documentation for resettled families.
Measures are in place to deliver commitments to resettlees and host communities	✓	Commitments to resettlees were delivered through compensation, social and other assistance, and livelihood restoration, by specialized staff.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		Resettlement communities were established in new areas. The main host community is the city of Porto Velho where many of the people who chose cash compensation resettled. Porto Velho received significant support from the project (see section 4).			
Measures are in place to manage any issues relating to resettlement, including provision of grievance mechanisms	✓	The Resettlement Plan is virtually completed, and only administrative work is still pending, related with issuing property titles to resettled families. The grievance mechanism will remain in place to respond to any further inquiries concerning resettles and host communities.			
Formal agreements with resettlees and host communities are publicly disclosed	✓	Information on resettlement options and programs has been easily available for affected people and the general public. Formal agreements with individual families are private. Minutes of Meetings of the resettlement working group are public.			
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	✓	There are no indications for non-compliances.
• no major non-compliances	✓	There are no indications for major non-compliances.			
• no major non-conformances	✓	There are no indications for major non-conformances.	There are no non-conformances	✓	There are no indications for non-conformances.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
Any resettlement related commitments have been or are on track to be met	✓	There are no indications of commitments that have not been kept.			
OUTCOMES					
Resettlement has been and is being treated in a fair and equitable manner	✓	All resettlement activities were performed in accordance with plans approved by the authorities, after discussions with the affected people, and there are no indications that any person has been treated in a non-equitable manner. Disagreements have been expressed by groups of resettled families along the program, and resolved. There are some remaining outstanding claims from families in Vila Nova de Teotônio related to the effectiveness of the fishponds delivered by the project, which are being addressed by SAE.	The measures put in place to improve livelihoods and living standards are on track to become self-sustaining in the long-term	✘.	A majority of resettled families have received assistance and at least maintained, if not improved their livelihoods and standard of living. Infrastructure provided by SAE, such as health centres and schools are fully operational, without continued SAE support. Communities have received and/or are receiving technical and financial support. Although tracking of livelihoods and living standards was limited to the period established by the license and discontinued after that, the on-site assessment revealed no signs of systemic abandonment of resettlement areas or systemic complaints by resettled people. However, there was no tracking of people choosing cash compensation, so that their outcomes are uncertain, which is a **significant gap**.
Resettlees 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	✓	Following the licence conditions, surveys were developed in 2013 and 2014 to evaluate the situation of the relocated population in Morrinhos, New Engenho, Santa Rita, São Domingos and Vila Nova de Teotônio. An independent diagnostic study in 2021 confirmed that overall, most of the living conditions of the resettlees were either maintained or improved. By requirement of IBAMA, a new Socioeconomic Diagnosis will be applied to Vila Nova de Teotônio after			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		the program is complete, but not for the other resettlement areas. Those people who opted for cash compensation have not been tracked. The limited coverage in the monitoring program (over time and of all affected people) is a gap. However, it is not considered significant at the level of minimum requirements, because - while individual families may have experienced declines in livelihoods and living standards, due to personal circumstances - there are no indications that there have been systemic failures in improving livelihoods and living standards.			

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	4 out of 5

Summary of findings and other notable issues
The resettlement program was extended several times and is presently almost concluded. Monitoring of the resettled families was conducted in 2013-2014 and again in 2021, showing that families compensated in-kind have either maintained or improved most of the living conditions. An additional survey will be conducted in Vila Nova de Teotônio. However, there was no monitoring of the families compensated in cash, causing some uncertainty over the long-term sustainability of their living standards and livelihoods.

Relevant evidence	
Interview	72-78
Document	17, 33, 42, 113, 115, 120-121, 127-133, 143, 172-173, 176, 188, 201, 209-212, 215-223
Photo	92-110

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 Madeira River is formed by an extensive network of rivers from Brazilian, Bolivian, and Peruvian territories, many of which originate in the high Andes. Notable among these are the Mamoré (the longest) and the Beni (the most voluminous), as well as the Guaporé and Madre de Dios rivers. The project region is dominated by dense forest formations, known locally as terra firme forests, with species such as the Brazil nut, tauari, muiracatiara, and angelim, as well as palms such as babassu, inajá and tucumã.
Protected areas (national parks and reserves etc) and their distance from the project	Mapinguari National Park, Serra dos Três Irmãos Ecological Station, Rio Vermelho State Forest, Jaci-Paraná Extractive Forest Reserve and Rio Madeira Environmental Protection Area, all contiguous to the Santo Antônio reservoir
Critical habitats in the project area, including important bird areas, hotspots of endemism etc.	The stratified vegetation of the Amazon supports the formation of diverse environments and ecological niches, utilised by numerous plant and animal species. Notable habitats include floodplains, streams, riparian forests, ravines, waterfalls, rapids, and beaches. The IBA/KBA Campos de Humaitá-Lábrea, situated to the west of the reservoir and primarily protected by Mapinguari National Park, has been designated for its significance to bird species that prefer open grasslands interspersed with rainforest.
# threatened species in the directly affected area: terrestrial	Turtles: Vulnerable: 1; No information: 1
# threatened species: aquatic	Aquatic Birds: Vulnerable: 11; Near Threatened: 24; Endangered: 2; Least Concern: 336; No Data: 90 Mustelids: Near Threatened: 1; Threatened: 1 Cetaceans: Threatened: 2 Crocodilians: Stable: 3; No Data: 1 Fish: Vulnerable: 1
Any other species of conservation importance	Given the project location in the highly biodiverse Amazon region, multiple species and ecosystems are considered important for conservation.
Migratory pathways	The rapids now covered by the Santo Antônio and Jirau reservoirs were previously a barrier to migration of some

	aquatic species. The Santo Antônio fish passage system is non-discriminate and allows all fish the possibility to migrate upstream, while Jirau's system is discriminate as it includes a manual step where fish are identified and selected to either migrate upstream or be returned downstream.
Invasive species: terrestrial	None identified
Invasive species: aquatic	*Oreochromis niloticus* (Tilápia)
Key threats to biodiversity	Habitat destruction due to deforestation for cattle farming and agriculture; gold mining activities in the river, reservoir, national park and surrounding areas; human settlements, including disorderly urban expansion due to the proximity of Porto Velho; illegal fishing, hunting and logging; hydropower, roads and other infrastructure
Agencies involved in biodiversity conservation	At the federal level, IBAMA (environmental regulator) and ICMBio (responsible for conservation, administers national parks). Conservation areas in the region also include some that are administered by the state of Rondônia (SEDAM) and by indigenous groups in cooperation with FUNAI.

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	✓	An assessment of biodiversity issues was undertaken during the preparation of the project, and this information has been substantially improved over time. There is some concern about vulnerable mammal species, including the giant armadillo and the giant anteater. The jaguar is classified as near threatened. Fish biodiversity is very high. The pink dolphin and the giant otter have recently had their conservation status redefined as endangered. Along the left bank of the reservoir is the Mapinguari National Park, and the reservoir is surrounded by an APP (Permanent Preservation Area).	Identification of ongoing or emerging biodiversity issues takes into account both risks and opportunities	✓	There are some examples of effective methodologies for identifying emerging biodiversity risks and opportunities, such as: • The need to rescue fish stranded within turbines, hydraulic conduits, and associated structures during turbine shutdowns or the closure of mechanical and physical barriers - such as spillway gates and stop logs – was identified early on and adopted as standard practice. • Recent concerns regarding fish passage effectiveness have prompted collaboration with IBAMA and Jirau HPP to develop comprehensive mitigation
If management measures are required, then monitoring is being undertaken to assess if	✓	There are 6 monitoring subprograms under the Fauna Conservation Program, for I - Terrestrial Mammals			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
management measures are effective		(Medium and Large Mammals, Small Non-Flying Mammals, and Bats); II - Aquatic and Semi-Aquatic Mammals; III - Terrestrial and Aquatic Birds; IV - Terrestrial Herpetofauna (Anurans); V - River Herpetofauna (Turtles and Crocodilians); and VI - EnRfauna. Vulnerable mammals, including giant armadillo, giant anteater, and jaguar, are monitored in the ecological corridor of the left bank. One condition of the operational license is that the project has to respect the boundaries of Mapinguari National Park, established by Law Nº 12,678/2012 (elevation 74 meters). The seasonal overlap of the reservoir with the park is authorized with compensation measures. Camera traps and other monitoring methods are used to track the biodiversity in the adjacent areas of the park. The Flora Conservation Programme in the APP includes 2 flora monitoring subprograms for I - Vegetational Succession and II - Flora Rescue. The Ichthyofauna Conservation Programme includes 5 subprograms for I - Taxonomic Inventory, II - Ecology and Biology, III - Ichthyoplankton, IV - Fishing Activity Monitoring, and V - Fish Transposition System Monitoring.			strategies, including catch and release campaigns. • Targeted programmes monitor most identified and migratory species, including the Amazon River dolphin or pink dolphin (*Inia geoffrensis*) and the tucuxi (*Sotalia fluviatilis*). Research indicates that habitat fragmentation caused by dam development is a threat to local populations of river dolphins and tucuxis, adversely affecting genetic diversity and overall population viability.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		Management measures and monitoring results are reported annually to IBAMA.			
MANAGEMENT					
Measures are in place to manage identified biodiversity issues	✓	A range of measures are in place to manage biodiversity issues in line with the project's operational phase PBA, including: • Fish passage (the fish transposition system on the right side of the dam is designed to imitate as closely as possible the conditions of the former Santo Antônio rapids). • Fish breeding at the Fish Reproduction Laboratory, directly related to the implementation of the Center for Conservation and Research in Migratory Fish (CCPPM), aimed at restocking while maintaining genetic diversity of migratory species (primarily piramutaba (*Brachyplatystoma* vaillantii). • Fish rescue (in 2023, 54 rescues from generating units were carried out, totaling 2,137 kg of various species released into the reservoir). • The Flora Conservation Programme for revegetation of the APP area and the Recovery of	Processes are in place to anticipate and respond to emerging risks and opportunities	✘	Relevant processes include comprehensive monitoring programmes and regular consultations with IBAMA and other agencies to review outcomes and adjust measures as necessary. For instance, in collaboration with Jirau HPP, a catch-and-release initiative for large catfish is currently being piloted to enhance the effectiveness of existing fish transposition systems. To address regional land use changes, the Amazon Bioeconomy and Conservation Center (CBCA) was established in 2021 through a collaborative effort involving the Amazônia+21 Institute and CES Rioterra. This initiative aims to advance research and facilitate technological dissemination focused on vegetation restoration. Over 400,000 seedlings representing 103 native Amazonian forest species have been planted to date on 1,000 ha in the Vila Nova de Teotônio resettlement area.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		Degraded Areas Programme for revegetation of areas used during construction have been implemented. A PACUERA (plan for conservation and use of areas surrounding the reservoir) which also covers environmental education and awareness, is due to be implemented. • The Environmental Education Program aims to raise awareness of wildlife such as turtles, cetaceans, otters, spiders, and crocodiles. • Nests of the Amazon turtle and river turtle species are protected. • The seasonal overlap of the reservoir and the Mapinguari National Park has been compensated by the construction of new infrastructure for the park with accommodation for park rangers, workshops, offices, a visitor center, laboratories, and improvements to access and internal park roads. • The project's environmental compensation plan consists of providing financial resources to federal, state and municipal protected areas, as determined by the respective governmental entities. Compensation activities			Due to the rapid water flows in the reservoir, the risk of invasive macrophyte blooms (such as water hyacinth) is considered minimal. Nevertheless, an extensive macrophyte monitoring programme is in place to evaluate shifts in biomass and species composition, primarily in newly formed shallow shoreline wetlands and tributary backwaters. These additional habitats have resulted in increased opportunities for aquatic birds and other species. Macrophytes are controlled in areas close to the dam. While SAE continues its dolphin monitoring programmes, given the decline in populations the absence of conservation actions for dolphins constitutes a **significant gap**.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		and funds towards the State of Rondônia's protected areas totaled over BRL 10 million (approx. USD 1.9 million), and for federal protected areas over BRL 65 million (approx. USD 12 million).			
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	✓	There are no indications for non-compliances.
• no major non-compliances	✓	There are no indications for major non-compliances.			
• no major non-conformances	✓	There are no indications for major non-conformances.	There are no non-conformances	✓	There are no indications for non-conformances.
Biodiversity related commitments have been or are on track to be met	✓	Biodiversity commitments are being met on an ongoing basis through implementation of the operations phase PBA as well as additional, voluntary initiatives.			
OUTCOMES					
Negative biodiversity impacts arising from activities of the operating facility are avoided, minimised, mitigated, and compensated	✓	The project's PBA is designed to avoid, minimise, and mitigate adverse effects on biodiversity. Furthermore, it provides financial contributions and technical assistance to protected areas (although some funding disbursements have experienced delays due to government-related bureaucratic processes). The fish transposition system is being used by target species for upstream passage at the dam. Between May	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	✓	Unrelated to the project, the expansion of agriculture (primarily soybean and cattle) and of the city of Porto Velho pose major threats to regional biodiversity. The remaining terrestrial ecosystems in the Mapinguari National Park and the APP around the reservoir are of major conservation importance for the southwestern Amazon. Aquatic ecosystems in the affected reach of the Madeira River appear to

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		and December 2023, 223 individuals were captured and tagged, comprising 141 *B. platynemum* and 82 *B. rousseauxii*. Additionally, tracking continued for fish tagged earlier, between April and July 2022. In 2023, cast net operations in the fishway yielded a total catch of 698,005 kg, representing 16 species—mainly from the *Pimelodidae* family, which consists predominantly of large Amazonian catfish. According to IBAMA's Technical Opinion nº 19083850/2024-Cohid/CGTef/Dilic, monitoring of terrestrial fauna indicates that most impacts on land-based wildlife are attributable to external human activities rather than the project itself. There is no evidence to suggest that reservoir filling has exerted selective pressure on terrestrial taxa.			be healthy, functional and viable, based on fish monitoring results. While target species are using the fishway, work is ongoing to enhance its effectiveness.
			The facility has contributed or is on track to contribute to addressing biodiversity issues beyond those impacts caused by the operating hydropower facility	✓	Many protected areas in the Brazilian Amazon face significant human pressures and have limited resources to enforce regulations, specially near big cities such as Porto Velho. The areas on both banks of the Santo Antônio reservoir are better protected than most, partly because of funding provided by the project, the barrier effect of the reservoir, the remote sensing and other monitoring activities supported by the project, and some logistical support to law enforcement against invasions. The creation of the first Amazon Bioeconomy and Conservation Center (CBCA) is an initiative to promote research and sustainable development in the upper Madeira River region. Work carried out with downstream fishing groups also contributes to positive outcomes on aquatic biodiversity (e.g. new fishing and fish conservation methods for abundant species, better marketing of fishermen's catches to conserve fish

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
					and reduce waste, awareness campaigns with communities).

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	5 out of 6

Summary of findings and other notable issues
Comprehensive biodiversity assessments and continuous monitoring by the project indicate that aquatic and terrestrial ecosystems within the affected area remain largely healthy. SAE employs several strategies to minimise fish mortality and provide fish passage at the plant. However, certain endangered aquatic species, such as the Amazon River dolphin (*Inia geoffrensis*) and tucuxi (*Sotalia fluviatilis*), warrant identification of targeted conservation measures. SAE has allocated compensation to ICMBio and SEDAM to enhance infrastructure in Mapinguari National Park and support adjacent protected areas, alongside efforts to safeguard the reservoir's buffer zone. Additionally, voluntary biodiversity initiatives, such as the establishment of the Amazon Bioeconomy and Conservation Center (CBCA), are underway to promote restoration of vegetative cover in the upper Madeira region.

Relevant evidence	
Interview	4, 5, 10, 18, 19, 20, 82, 83, 90
Document	1, 8, 10, 12–14, 17, 18, 34, 35, 37–45, 48–56, 69, 72–76, 79–86, 88, 89, 116–119, 135–138, 143, 161, 165, 167, 168, 183, 191-194, 202-205, 215-220, 222, 230
Photo	4-8, 16, 17, 67-69, 72-87

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	Although no Indigenous Peoples have been or are directly affected by the construction and operation of the project, there are indigenous territories located in its area of indirect influence. As a result, a support program for indigenous communities was agreed.
No, this section is not relevant	Click here to enter text.

	Add columns for each Indigenous People
Brief description of the peoples and their culture, lands, and representation	Three indigenous territories are located within the area of indirect influence of the project, in the state of Rondônia, with the Karitian and Karipuna ethnic groups upstream of the dam and the Cassupá and Salaãi indigenous area downstream, in the periurban area of Porto Velho. The Karitian people belong to the Tupi-Arikém linguistic family and are currently the only speakers of this language. They live in 7 communities, all with terrestrial access, with a total of 290 people. In addition to these, FUNAI estimates that there are approximately 100 Karitian living outside the territory, largely looking for qualifications and job opportunities in Porto Velho. 23 people are from the Tupi Kawahib family of the Karipuna people, of which 13 are residents of the Panorama village, which has land access from Porto Velho and where they live together with non-indigenous and indigenous people from other ethnic groups, which maintain marriage or kinship relationships with the Karipuna. The Cassupá and Salamã people belong to the Aikanã linguistic family, and originate from southern Rondônia from the confluence of the Tanaru and the Pimenta Bueno rivers. Currently the community is made up of families formed by indigenous and non-indigenous marriages with up to 49 people living in the Cassupá and Salamãi area, but there are also members of this group living in other neighbourhoods of Porto Velho and in the cities of Ouro Preto do Oeste and Costa Marques, all in Rondônia.

Directly affected communities and how they are affected	There are no directly affected communities. The indigenous territories were originally considered potentially at risk of indirect impacts due to their vulnerability to possible encroachment driven by the migration of workers attracted to construction, and pressure on land. There has been no evidence of such encroachment or other indirect impacts on indigenous peoples. However, the planned IP Support Program includes actions to inspect and protect the territorial borders, as proposed in the PATI - Action Plan for the Protection of the Madeira River Indigenous Lands.
Other affected indigenous communities	Potentially isolated communities (to be addressed through a subprogram funded by SAE)
# households physically displaced	None
# households economically displaced	None

Agencies relevant to Indigenous Peoples	The 1988 Brazilian Constitution (Article 231) recognises IP's right to pursue their traditional ways of life and to the permanent and exclusive possession of Indigenous Territories (ITs). Fundação Nacional do Índio (FUNAI) is the government agency responsible for Brazilian IPs. FUNAI places restrictions on the interaction of third parties with IPs, and particularly isolated IPs, and has to approve all support measures by the project.
Other relevant information	Click here to enter text.

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 the operating hydropower facility that may affect Indigenous Peoples' rights have been identified	✓	The project had a good initial understanding of the socioeconomic and sociocultural conditions of the IPs located in its area of indirect influence. As part of the PBA, some programs aimed at indigenous populations had been developed: a production and sustainability program, a cultural valorisation and ethnic strengthening program, a territorial management and protection Program, and an indigenous articulation and management of the PBA program. Some initial activities were implemented, but the majority of the activities had not been started due to	Identification of issues that may affect Indigenous Peoples' rights is undertaken with the free, prior and informed participation of Indigenous Peoples	✓	Legally, all contact and consultation with indigenous peoples is carried out through FUNAI, and IPs are consulted at all stages of the development of the support program, in accordance with this requirement.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		bureaucratic delays in communications with and approvals by FUNAI. In 2024 FUNAI instructed SAE to contract a company to update the analysis of priorities and design the second phase. A draft has reportedly been delivered to FUNAI. The ongoing process will take about two years and includes consultations and validation by indigenous peoples.			
If management measures are required, then monitoring is being undertaken to assess if management measures are effective	✓	No direct impacts of the project or IP rights at risk due to the project have been identified, that would require management measures. Once the support program is agreed and initiated, there will be monitoring.	Identification of issues that may affect Indigenous Peoples' rights takes into account both risks and opportunities	✘.	There has been no up-to-date identification of risks and opportunities, since the second phase of the support program is significantly delayed. This means that opportunities to improve the IP's situation may have been missed, which is a **significant gap**.
MANAGEMENT					
Measures are in place to address the Indigenous Peoples' rights at risk	✓	The planned support program included epidemiological control, land regularization, evaluation of production potentials and sources of livelihoods, and IP representation in program discussions. The program cost was estimated at USD 5 million and would have benefited around 360 individuals, resulting in an average investment of around USD 14,000/person. Only the first phase of the support program was implemented, focused	Measures to address ongoing or emerging issues that may affect Indigenous Peoples' rights at risk have been developed with the free, prior and informed participation of Indigenous Peoples	✓	See above

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		on health and education infrastructure. There was also some emergency support for Indigenous communities during the Covid-19 pandemic. The delays of the second phase of the support program are a gap, but it is not considered significant because there is no evidence of rights at risk, SAE has maintained contact with FUNAI, and the program now appears on track to be delivered.			
Formal agreements are publicly disclosed	✓	All plans are available to the IPs, an IPs are provided with appropriate information materials, including in their languages.	Processes are in place to anticipate and respond to emerging risks and opportunities	✘	The long delays in approving the second phase of the IP support program are evidence of a process that is too slow to anticipate and respond to emerging risks and opportunities. The Santo Antônio project is already 13 years into operations, and benefits will take at least some more years to be delivered. This is a **significant gap** because Indigenous territories and communities in the Brazilian Amazon are facing significant pressures and are in urgent need of support.
CONFORMANCE AND COMPLIANCE					
Processes and objectives relating to Indigenous Peoples' rights at risk have been and are on track to be met with:			There are no non-compliances	✓	There are no indications for non-compliances.
• no major non-compliances	✓	There are no indications for major non-compliances.			
• no major non-conformances	✓	There are no indications for major non-conformances.	There are no non-conformances	✓	There are no indications for non-conformances, simply because the

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
Commitments made to Indigenous Peoples have been or are on track to be met	✓	Formal commitments are still under development and will be included in the updated plan.			preliminary support program had no firm timeline.
OUTCOMES					
Processes provide for negative impacts of the project to Indigenous Peoples' rights to be avoided, minimised, mitigated or compensated	✓	Negative impacts of the project on IPs have not been identified.	Opportunities for positive impacts have been identified and maximised as far as practicable	✘	The preliminary budget and design of the program could have delivered substantial and sustained benefit, and some support was indeed delivered during the first phase. Due to uncertainties regarding program content and resources, the maximization of positive impacts cannot be confirmed at this time, which is a **significant gap**.
Processes provide some practicable opportunities for positive impacts to be achieved	✓	In principle, the Brazilian approach of facilitating support for IPs from infrastructure projects such as the Santo Antônio HPP could work, and may still work when the support program is finally designed and approved. However, it requires more resources and a greater sense of urgency for FUNAI to actually organize the process.	Opportunities for positive impacts have been or are on track to be achieved	✓	Some opportunities for substantial positive impacts have been achieved to date, and other opportunities may now be on track as the design of the second phase of the support program is progressing.

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	5 out of 8

Summary of findings and other notable issues
No negative impacts of the project on Indigenous Peoples have been identified. While some activities with positive impacts have been delivered, the bulk of the support program has suffered bureaucratic delays, resulting in missed opportunities to improve the situation for IPs in the region.

Santo Antônio HPP, 3,568 MW, Brazil

Relevant evidence	
Interview	11, 58, 83
Document	17, 32, 42, 112, 127-133, 174-176, 208, 215, 218-220
Photo	–

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	The project affects physical cultural resources including archaeological and historical resources.
No, this section is not relevant	Click here to enter text.

Sites of physical cultural heritage affected by or in proximity to the project-affected areas	How they are affected
Madeira-Mamoré Railroad (EFMM), Candelaria Cemetery, Santo Antônio Cemetery, Santo Antônio Church (Memorial Rondon) and Archaeological Sites. The survey of prehistoric archaeological potential identified 15 archaeological sites corresponding to human occupation prior to European colonization.	Archaeological sites were defined according to their importance and the risk of impact, including some that were inundated. The other historical heritage sites mentioned are in the proximity of the project area.

Agencies responsible for cultural heritage	IPHAN – National Institute for Historic and Artistic Heritage, SPU, Municipality of Porto Velho, and UNIR (Rondônia State University)

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 cultural heritage issues with respect to physical cultural resources have been identified	✓	Ongoing and emerging issues were identified to be addressed by the cultural heritage program, including 1) rehabilitation of parts of the former Madeira-Mamoré Railroad (EFMM), 2) heightening of the EFMM Bridge in	Identification of ongoing or emerging cultural heritage issues takes broad considerations into account, and both risks and opportunities	✓	There are a number of examples for adaptive management during the implementation of the cultural heritage program, including adding the heightening of the EFMM bridge when the reservoir level was

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		Jaci-Paraná, 3) construction of the EFMM Museum, 4) rehabilitation of the Rondon Memorial, 5) revitalization of the Candelaria cemetery, 6) rescue and cataloguing of archaeological findings, and 7) 3D mapping of cave inscriptions.			increased, and adding support to the construction of the EFMM Museum after the damages caused by the 2014 flood. SAE also implemented a project for Heritage Education with the communities, promoting awareness of the importance of preserving the historical and archaeological heritage. The project was applied to workers during construction, teachers, students and the general public, reaching over 17,000 people. This will contribute to future findings to be preserved and reported to SAE or the authorities for their proper treatment.
If management measures are required, then monitoring is being undertaken to assess if management measures are effective.	✓	Monitoring and reporting were done during implementation. The program is considered as finished by SAE and awaits its formal acceptance.			
MANAGEMENT					
Measures are in place to manage identified cultural heritage issues	✓	SAE is currently awaiting the acceptance of the cultural heritage program and any recommendations coming from the authorities. Sites and assets have been handed over and are now managed by public authorities, museums and universities.	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	The public authorities, museums and universities now responsible for the cultural heritage assets have their own processed to anticipate and respond to emerging risks and authorities. Should SAE encounter any chance finds, they are responsible for altering the authorities as any other landowner in Brazil.
CONFORMANCE AND COMPLIANCE					
Processes and objectives in place to manage cultural heritage issues have been and are on track to be met with:			There are no non-compliances	✓	There are no indications for non-compliances.
• no major non-compliances	✓	There are currently no major non-compliances.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
• no major non-conformances	✓	There are currently no major non-conformances.	There are no non-conformances	✓	There are no indications for non-conformances.
Cultural heritage related commitments have been or are on track to be met	✓	There are no indications otherwise. SAE implemented a number of voluntary measures, primarily the support for the EFMM Museum, one of the most significant historical attractions of Porto Velho.			
OUTCOMES					
Negative cultural heritage impacts arising from activities of the operating hydropower facility are avoided, minimised, mitigated and compensated	✓	The project implemented a comprehensive cultural heritage program to preserve historical and archaeological resources.	Where opportunities have been identified, measures to address cultural heritage issues beyond those impacts caused by the facility have been or are on track to be achieved	✓	A number of the activities under the program go beyond any impacts caused by the facility, and their outcomes will be a valuable contribution to preserving cultural heritage.

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	5 out of 5

Summary of findings and other notable issues
The project implemented a cultural heritage management program that salvaged and rehabilitated physical cultural heritage features, including historical industrial features that have shaped the region. It contributed to the dissemination of historical knowledge through various activities, exhibits and publications, and contributed to the archaeology department at the university and the railroad museum in Porto Velho.

Relevant evidence	
Interview	11, 58, 82
Document	17, 42, 127-133
Photo	89, 111-116, 124-126, 133

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	According to the World Bank's Worldwide Governance Indicators for 2023, on a scale from 0 to 100 Brazil ranked 60 on Voice and Accountability, 28 on Political Stability and Absence of Violence/Terrorism, 32 on Government Effectiveness, 40 on Regulatory Quality, 42 on Rule of Law and 34 on Control of Corruption. Those figures place the country on a lower level when compared with the region Latin America & Caribbean (58, 58, 49, 52, 48, and 49 respectively). In general terms there has been a downward trend over the last 10 years. There have been major corruption issues related to Brazilian infrastructure projects, including hydropower, in the recent past. SAE/Eletrobras operate in a highly regulated environment. Key federal government institutions with respect to the overall project are ANEEL, IBAMA, ONS and ANA. Other agencies with responsibilities for particular aspects of the project include FUNAI (for indigenous peoples) and IPHAN (for cultural heritage). The Ministério Público (public prosecutor) is authorised to bring action against individuals, businesses, and the federal, state and municipal governments, in the defence of minorities, the environment, consumers and the civil society in general. The project is within the governing jurisdictions of the Federal Government, the State of Rondônia, and the Municipality of Porto Velho.
Key information on corporate ownership and governance	Eletrobras, the former state-owned power sector holding company, was privatized in 2022, with the government retaining about 45% of the shares. The maximum share of voting power for any shareholder is 10%. Eletrobras is the largest power company in South America, with an installed capacity of 44.2 GW, mostly in hydropower plants, and 74,000 km of transmission lines. Santo Antônio Energia SA (SAE) was founded in 2008 as a Special Purpose Company responsible for the construction and operation of Santo Antônio HPP. In 2023, Eletrobras increased its shares in SAE by 22.9% to 99.7% (through the subsidiary Eletrobras Furnas and the holding company Madeira Energia) and restructured the BRL 19.7 billion debt of SAE, which is now being integrated into Eletrobras' corporate governance structures. The integration into Eletrobras is proceeding step-by-step, following an analysis of the compatibility between policies, processes and software systems, and aiming to ensure clarity of rules and responsibilities and no interruption of operations.

Details of the concession, if applicable	The concession agreement between SAE and the Ministry of Mines and Energy (MME) / ANEEL was signed in 2008 for a term of 35 years, later extended to 2047. The installed capacity of the plant was increased from 3,150 MW under the initial concession contract to 3,568 MW during construction, by including 6 additional generating units and raising the reservoir level. Santo Antônio's concession follows the typical Brazilian hydropower BOOT model: the company Built, Owns and Operates the asset and will, by the end of the present concession, Transfer it back to the government, to be auctioned again to the bidder that offers the lowest energy tariff among all competitors.
Key licenses or permits	Concession Contract 001/2008-MME-UHE Santo Antônio Operating License No 1044/2011 from IBAMA for the hydropower plant (extension for 10 years from 2016) Operating License No 15284 from SEDAM for the TL to the Porto Velho substation (extension for 4 years from 2024) There is also a significant number of secondary permits from the various regulators, for example for vegetation management in the transmission line corridors and around survey points, capture of animals for biological monitoring, operation of the cafeteria and landfill at the power plant, water supply for human consumption and for the powerhouse, and wastewater treatment in the operations area.

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	✓	SAE and Eletrobras are well aware of, and indeed part of, discussions related to the Brazilian power sector. Eletrobras monitors political and regulatory changes and analyses and comments on draft laws, and shares relevant information with subsidiary companies. There are also external advisers, and Eletrobras is a member of about 75 different associations. Risks related to legal proceedings (and potential associated costs) are tracked.	There are no significant opportunities for improvement in the assessment of political and public sector governance issues and corporate governance requirements and issues	✓	Governance issues are well understood, and there are no indications of any opportunities for improvement in their analysis. Among the most important governance issues for SAE/Eletrobras are government policies regarding 1) concessions for hydropower plants and 2) payment rules and incentives for different sources of power in the Brazilian grid (primarily hydropower, gas, and solar and wind).
Corporate governance requirements and issues have been identified	✓	Both Eletrobras (after privatization) and SAE (after acquisition) have been going through a corporate restructuring process. Issues			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		identified for Eletrobras were primarily related to the listing in the Brazilian stock market (B3), while issues identified for SAE were primarily related to the integration with Eletrobras, with a gradual replacement or updating of SAE policies and processes. There is also significant awareness in Brazil of the need to control corruption risks, following the recent history of the construction and energy sector.			
Monitoring is being undertaken to assess if corporate governance measures are effective	✓	There are well-established internal controls and an internal audit program (recently assumed by Eletrobras, with legal and real estate services in the 2025 audit plan). External monitoring includes financial audits (PWC), evaluations against the Equator Principles (JPG), and an Eletrobras stakeholder perceptions survey in 2024.			
MANAGEMENT					
Processes are in place to manage the following:			Processes are in place to anticipate and respond to emerging risks and opportunities	✓	The recent changes in Eletrobras and SAE have brought significant transition challenges to corporate governance. However, there are no indications that this is leading to any significant uncertainties or weaknesses. Both SAE and Eletrobras are well organised and prepared to
• corporate, political and public sector risks	✓	There are well-established processes for managing risks, including a risk management committee of the Eletrobras Board, risk management policies and processes, including a Policy for Institutional and Government Relations and a Policy for Operational Insurance, and risk			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		analyses and registers. SAE has a risk panel reporting to the board, which has identified 18 major risks. There is an ongoing contract with a consulting firm to estimate costs of different risks (e.g. droughts) and formulate adaptation strategies. Insurance is in place for all equipment, and contractors are required to be insured or to provide financial guarantees.			anticipate and respond to emerging risks and opportunities. Eletrobras is listed in the Level 1 segment of the Brazilian stock market, which is the least demanding in terms of corporate governance.
• compliance	✓	Risk, compliance and audits are managed by one department in SAE, which covers compliance regarding procurement and financial management, while the Sustainability Department covers compliance with environmental, social and OH&S regulations and license conditions. Eletrobras' Compliance Policy (PO-GN.01-001) is applied.			
• social and environmental responsibility	✓	SAE generally follows the Sustainability Policy of Eletrobras Companies, and specifically for CSR programmes, Eletrobras' policy on Private Social Investment (PO-GN.05-004).			
• procurement of goods and services	✓	SAE is outsourcing many activities and thus has an active procurement process; the largest contract currently in force is for approximately BRL 40 million. SAE is in the process of adopting Eletrobras procurement guidelines.	Contractors are required to meet or have consistent policies as the developer	✓	Contractors are required to meet both regulatory and SAE/Eletrobras expectations regarding sustainability. There are multiple mechanisms to enforce these expectations, including sustainability evaluations for joining the supplier register and before

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		At the end of 2024, Eletrobras had 3,421 suppliers registered through its electronic portal. The 2022 version of the Policy of Supply Logistics of Eletrobras Companies introduced issues such as integrity and sustainability into procurement. The 2024 version of the Guidelines for Conduct of Suppliers specified the evaluation criteria. Suppliers are also categorized as critical and as low, medium and high risk, based on financial, sustainability, and integrity criteria. All critical suppliers have contract clauses and are monitored for sustainability risks.			contract award, contract provisions, supervision during contract performance, training by SAE/Eletrobras, and performance awards.
• grievance mechanisms	✓	There are a number of channels for grievances, inquiries and suggestions (e.g. for workers, contractors, affected communities, and the general public), with appropriate procedures (see also section 10).			
• ethical business practices	✓	SAE applies the same ethics rules and Code of Conduct as Eletrobras. There is a widely published 'Ética' channel, i.e. an ethics complaints mechanism (operated by an external company for Eletrobras), and internal whistleblower protections, and Eletrobras has an 'ouvidoria', i.e. an Ombudsman. Complaints are investigated and regular audits and trainings are conducted, with a high			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		level of management attention and appropriate sanctions. For example, if a contractor is found to not pay social security contributions, they can be blacklisted.			
• transparency	✓	SAE issued a Sustainability and Annual Report in 2022, and Eletrobras has been issuing Sustainability and Annual Reports since 2022, which now include SAE. Reports, licenses and news related to the Santo Antônio project are widely available, through websites of SAE, IBAMA and other sources.	Procurement processes include anti-corruption measures as well as sustainability and anti-corruption criteria specified in pre-qualification screening	✓	Since 2021 Eletrobras conducts due diligence of suppliers which covers issues such as climate change, water, biodiversity, waste and legal requirements. Suppliers receive feedback to move them towards improved performance. Decarbonization is also a focus of the annual supplier conference. Since 2024, ESG criteria have been included in the analyses to qualify for inclusion in the supplier register. Negative results for compliance, human rights, environment and OH&S can lead to exclusion.
Policies and processes are communicated internally and externally as appropriate	✓	There is broad access of internal and external stakeholders to policies and processes, internally primarily through the SAE and Eletrobras intranets and externally in particular through the Eletrobras website. Contracts include all legal and corporate requirements, and kick-off meetings with contractors emphasize compliance with these.			
In case of capacity shortfalls, appropriate external expertise is contracted for additional support	✓	The majority of workers at the Santo Antônio plant are outsourced, including both for standard maintenance, landscaping, security etc. and specialists e.g. for environmental monitoring or for medical services. There are multiple examples for external expertise, although the integration into			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		Eletrobras may provide access to a larger pool of internal expertise.			
CONFORMANCE AND COMPLIANCE					
The project has no major non-compliances	✓	There are no indications for any major non-compliances.	The project has no non-compliances	✓	There are no indications for any non-compliances.
OUTCOMES					
There are no significant unresolved corporate and external governance issues identified	✓.	There are no indications for any significant unresolved issues that are currently affecting the project.	There are no unresolved corporate and external governance issues identified	✓	There are no indications for any unresolved issues that are currently affecting the project.

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	6 out of 6

Summary of findings and other notable issues
SAE and its parent company Eletrobras have good corporate governance structures and processes, adequate for operating in a public sector context with some challenges. Transition challenges related to the privatization of Eletrobras and the integration of SAE are also well managed.

Relevant evidence	
Interview	1, 8-10, 29, 34, 38, 39, 48, 49, 50, 57, 64
Document	3-9, 11, 17-19, 42-47, 57-82, 112-134, 140-145, 176, 195, 196, 199, 201, 221-223, 229-231
Photo	70, 127, 132

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	Directly affected community stakeholders include resettlees, fishermen and garimpeiros (miners that dredge the river for gold), farmers, and other residents affected by land acquisition or in other ways by the construction and operation of SAE, including through benefit sharing.
Directly affected institutional-level stakeholders	IBAMA, SEMA, ANEEL, ANA, IPHAN, Ministry of Transport, ICMBio, FUNAI, SEDAM (Municipal Environment Agency), INCRA (National Colonization and Land Institute)
Other relevant information	Other entities with whom the project needs to engage and communicate include the financing entities and the upstream Jirau HPP.

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	✓	As part of the PBA, a communication program has been implemented to ensure bidirectional communication between SAE and stakeholders. This program has Action Plans that are periodically updated as needed. For example, the Action Plan for the first half of 2025 focuses on resettlees and residents in reservoir areas, aiming at land regularization and general information on the use of the reservoir surroundings area.	The stakeholder mapping takes broad considerations into account	✓	The stakeholder mapping includes a wide range of stakeholders in affected and neighbouring communities, including directly affected individuals, leaders and officials, school principals and teachers, doctors and nurses, small business owners, community associations, religious leaders, NGOs, and local and state government representatives. As a result of the ongoing integration with Eletrobras, the stakeholder network has been

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
Requirements and approaches are determined through a periodically updated assessment process involving stakeholder mapping	✓	The list of relevant stakeholders and their contact information is updated as necessary in response to the findings of social experts working with the communities. Media are also monitored by SAE, eventually expanding the reach of the stakeholder mapping as a response to specific issues that may affect the project's public image. Eletrobras complements the stakeholder mapping at the national level.			extended, including additional national government agencies. Engagement actions defined in the communications action plan enable additional contacts with stakeholders with specific concerns.
Effectiveness is monitored	✓	SAE has around 14,000 followers on Instagram, 50,000 followers on LinkedIn and 190,000 followers on Facebook. SAE continuously monitors social media and conventional press vehicles, and analyse the overall public perception. Likewise, at the corporate level Eletrobras is monitoring the effectiveness of their communications.			
MANAGEMENT					
Communications and consultation plans and processes are in place to manage communications and engagement with stakeholders	✓	SAE has 17 ongoing Socio-Environmental Programs as part of the PBA, which require the distribution of information and consultations with stakeholders on a regular basis. In addition to these requirements, SAE maintains constant communication with stakeholders in accordance with a periodically updated Action Plan.	Communication and consultation plans and processes show a high level of sensitivity to communication and consultation needs and approaches for various stakeholder groups and topics	✓	Communication plans and processes have been adapted to the project's development phases and circumstances. That included a printed bulletin in lay language and a local radio program in the past, and it presently follows the recommendations included in the action plan, targeted at specific recipients, and both SAE's and

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
					Eletrobras' websites. SAE's employees have access to a weekly newsletter, intranet portal and social network. SAE and Eletrobras also maintain a communications program for the local community and media. Topics developed and disseminated in the last 12 months include a blood donation campaign, a training course with the Riacho Azul resettlement, dissemination of monitoring of turtles, information about operational themes, and sponsorship for festivals and cultural events. The institutional visits program is an important means of building relationship with the company's stakeholders. It consists of visits to the project on weekends and was developed in partnership with the City Hall of Porto Velho, through the Municipal Secretariat of Tourism. It is part of the Municipal Official Tourism Circuit, with the support of a local tourism agency and specialized monitors, and has received 4,947 people from June 2024 to July 2025. Overall, communication has been and presently is culturally appropriate and inclusive.
They include an appropriate grievance mechanism	✓	SAE provides a toll-free phone number for a general hotline for	Processes are in place to anticipate and respond to	✓	There are a number of processes to anticipate and respond to

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		information and grievances ("Canal 0800") and a compliance or ethics channel ("Ética"), linked to the centralized Eletrobras' compliance channel. The project also offers specific communication channels for suppliers and for media inquiries. SAE's website has a compliance FAQ page whose links to grievance channels do not work. This flaw can be easily fixed and is therefore presently a non-significant gap.	emerging risks and opportunities		communication and consultation risks and opportunities, at the level of SAE and of Eletrobras. Regular grievance reports are prepared and sent to a committee for analysis and deliberation.
They outline communication and consultation needs and approaches for various stakeholder groups and topics	✓	The communications plan is updated regularly and is directed to diverse stakeholder groups and topics, as needed.			
STAKEHOLDER ENGAGEMENT					
The project operation stage involves engagement with directly affected stakeholders	✓	The communications plan includes a schedule of engagement activities with stakeholders. Engagement with institutional-level stakeholders is organized according to regulatory schedules and other considerations.	Engagement is inclusive and participatory	✓	There are many examples for inclusive and participatory engagement processes. This includes engagement with strongly opposed groups, for example during the public hearing in December 2013 about the expansion of the project.
Engagement is:					
• appropriately timed and scoped	✓	The communication plan is updated regularly. Timing and scope of communication activities are adjusted according to needs.	Negotiations are undertaken in good faith	✓	Negotiations with stakeholders are open and transparent, and SAE readily shares information and monitoring results with government agencies and other stakeholders. No evidence was found that they are not undertaken in good faith.
• often two-way	✓	Engagement activities allow for two-way communication. An example is the Social Monitoring Group (GAS),			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		which ensures that all parties are heard in solving issues involving commitments to communities.			
• undertaken in good faith	✓	There are no indications to the contrary.			
The business interacts with a range of directly affected stakeholders to understand issues of interest to them	✓	Project staff interact with a range of directly affected stakeholders on a regular basis and implement activities related to their needs.	The assessment and management process for downstream flow regimes has involved appropriately timed and two-way engagement with directly affected stakeholders	✓	The project operates as a run-of-river facility and has only a minor effect on the natural flow regime (see section 11). SAE interacts with downstream communities and stakeholders regarding operations and activities related to downstream issues. Its operations are dispatched by the national system operator ONS, within the constraints of its operating license. There is a good relationship between the operators of Santo Antônio and the upstream Jirau HPP, and SAE has been proactive in sharing information with them.
Ongoing processes are in place for stakeholders to raise issues and get feedback	✓	SAE offers several communication channels for stakeholders to raise issues and get feedback, if required: this includes the grievance mechanisms and regular meetings, for example of the GAS.	Ongoing processes are in place for stakeholders to raise issues with downstream flow regimes and get feedback	✓	As described above; the available processes can address downstream flow regime issues (see section 11).
Ongoing processes are in place for:			Feedback on how issues raised have been taken into consideration has been thorough and timely	✓	Issues raised by the public are typically addressed by SAE openly, transparently and in a timely manner through the project's grievance mechanism or during engagement and consultation activities in the communities described in the various
• environmental and social issues	✓	As described above; the available processes can address environmental and social issues. Grievances and information requests will be directed to the appropriate staff in SAE.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
					programs of the PBA and in the Communication Plan. There are, however, sometimes delays in feedback when government agencies are involved (e.g. regarding support programs for IPs, see section 7; offset programs for protected areas, see section 6; and the PACUERA, see section 11.
• project-affected communities	✓	As described above; the available processes can address issues related to project-affected communities.	Project-affected communities have been involved in decision-making around relevant issues and options	✓	Project-affected communities have been heard and involved in relevant issues and options throughout the construction and operation of the plant.
• resettlees and host communities	✓	As described above; the available processes can address issues related to resettlees and host communities.	Resettlees and host communities have been involved in decision-making around relevant issues and options	✓	Resettlees have been heard and involved in relevant decisions options throughout the construction and operation of the plant. As a result, the resettlement program has evolved to meet requests from the affected communities.
• Indigenous Peoples	✓	As described above; the available processes can address issues related to IPs. Grievances and information requests will be directed to the appropriate staff in SAE. All communication with IPs will be coordinated by FUNAI.			
• employees and contractors on human resources and labour management issues	✓	Employees and contractors may use SAE's and Eletrobras' communication channels to raise issues and get feedback.			
• management of climate risks	✓	As described above; the available processes can address issues related to climate risks.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
Channels of communication with Indigenous Peoples are maintained	✓	Communication with IPs is coordinated by FUNAI, and SAE has dedicated staff for liaison with IPs and FUNAI. Engagement and consultation activities with IPs continue and will be maintained in the long term.	Directly affected Indigenous Peoples have been involved in decision-making around relevant issues and options	✓	See section 7. Consultations with IPs about the support program are ongoing.
These channels are:					
• appropriately timed	✓	There are no indications otherwise.			
• culturally appropriate	✓	There are no indications otherwise.			
• two-way	✓	There are no indications otherwise.			
A mutually-agreed disputes procedure is in place with Indigenous Peoples	✓	The ongoing communication channels between FUNAI and its regional offices, IPs, NGOs working in the ITs, and the SAE project team provide procedures to resolve disputes. FUNAI with its formal role acts as a de-facto mediator between IPs and third parties such as HPP companies.			
Public disclosure:			The business publicly reports on project performance in sustainability areas of high interest to its stakeholders	✗	SAE shows a high level of transparency in some areas, e.g. by making key corporate bylaws and policies available on their website. However, SAE's sustainability actions and outcomes after 2022 have been consolidated in Eletrobras' reports, are not as easily accessible, and do not necessarily respond to local stakeholder's interest, since the
• the business makes significant project reports publicly available	✓	On its website, SAE makes a variety of information available such as financial statements, rating agencies reports, meetings of the Board of Directors, and other administrative documents.			
• the business publicly reports on project performance, in some sustainability areas	✓	A number of sustainability-related brochures on different topics are available through SAE's website. The most up-to-date and comprehensive information is made available through			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		the 2022 project-level sustainability report. SAE's later sustainability actions are consolidated in Eletrobras' reports. There are no recent reports on SAE's performance in sustainability areas, but all environment-related information, such as the EIA, public hearings, PBA, action plans and monitoring reports, are available through IBAMA's website. Access to such documents could be much simplified by making them available online on SAE's website, but since the documents are public, this constitutes a non-significant gap.			materiality analysis is done at a national level. This is a **significant gap**.
• power density calculations, estimated GHG emissions, and / or the results of a site-specific assessment are publicly disclosed	✓	The Eletrobras' website provides GHG emissions estimates in an aggregate manner for the entire company. SAE conducted a study on its GHG emissions in 2022, but individualized data for SAE is not publicly available. Also, the estimates do not include reservoir emissions, possible the largest source in a hydropower company. However, although not specifically disclosed, the project's power density is relatively high and can be easily calculated from information available on SAE's website. Therefore, this gap is not significant.	The assessment of project resilience is publicly disclosed	✘.	SAE developed a climate change adaptation plan in 2016 and updated it in 2023. However, such studies are not publicly disclosed, which is a **significant gap**.
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 communications and consultation have been and are on track to be met with:			There are no non-compliances	✓	There are no indications for non-compliances.
• no major non-compliances	✓	There are no indications for major non-compliances.			
• no major non-conformances	✓	There are no indications for major non-conformances.	There are no non-conformances	✓	There are no indications for non-conformances.
Communications related commitments have been or are on track to be met	✓	Communication commitments have been met and are ongoing as per the ongoing programs in the project's PBA.			

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	13 out of 15

Summary of findings and other notable issues
SAE and Eletrobras maintain a number of communication channels and engagement mechanisms, including functional grievance mechanisms, some of which are provided under the PBA. The project and Eletrobras as a company are generally transparent, but project-level sustainability information could be made more easily accessible.

Relevant evidence	
Interview	84
Document	6, 17-18, 146, 148, 172, 176, 201, 222, 231
Photo	70

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)	18,495 m^3/s
Minimum monthly average flow (m^3 / s)	4,910 m^3/s
Maximum monthly average flow (m^3 / s)	35,758 m^3/s
Lowest observed flow (m^3 / s)	2,007 m^3/s
Highest observed flow (m^3 / s)	59,636 m^3/s
Design flow (m^3 / s)	29,000 m^3/s
Affected river reaches (start/end and how affected)	115 km of the Madeira River from Santo Antônio dam to Jirau dam (inundated by reservoir) Sections of tributaries flowing into reservoir, e.g. 20 km of the Jaci-Paraná River, a right bank tributary (inundated by reservoir) Reach of Madeira River downstream of Santo Antônio dam (affected by very minor flow variations when individual generating units are turned on or off)
Proposed downstream flow regimes for environmental or social objectives	Minimum release of 3,293 m^3/s
Reservoir	
Reservoir length (km)	115 km
Minimum operating level MOL (masl)	70.5 masl
Normal operating level (masl)	71.3 masl
Full supply level FSL (masl)	71.3 masl
Reservoir area at FSL (km^2)	428.62 km^2
Reservoir area at MOL (km^2)	357.32 km^2

Volume at FSL (million m^3)	3,425.30 million m^3
Volume at MOL (million m^3)	3,114,21 million m^3
Average retention time in days	Average residence time estimated at 1 day
Number of days for filling	The reservoir was first filled to 70.5 m in 4 stages between September 2011 and January 2012, and the level was raised to 71.3 m in June 2017.
Other relevant information	Santo Antônio HPP (as well as the upstream Jirau HPP) is operated as a run-of-river project, with inflow equalling outflow and a constant reservoir elevation, maintaining the natural flow regime with very minor alterations. ANA Resolution Nº 556/2006 granted a water use permit to the project and defined at that time operating constraints (outflows and water level in the reservoir). After the 2014 flood ANA issued Resolution Nº 1607/2016, with constraints to ensure infrastructure and water supply safety: • The water supply to the city of Porto Velho and other communities affected by the reservoir, notably Jaci-Paraná, cannot be interrupted as a result of the operation of the project. • Settlements on the reservoir banks, notably Teotônio and Jaci-Paraná, must be protected against floods with a recurrence time of less than 50 years, taking into account the flood line at the time of implementation of the project and the effects of siltation on the flood line after the fourth year of operation. Jaci-Paraná should be protected up to 77.1 m. • Transport infrastructure, consisting of highways, railways and bridges, notably BR 364 (a Federal Highway and the only land connection between the state of Acre and the rest of the country), must be protected against floods with a recurrence time of 100 years, considering the flood line at the time of implementation of the project and the effects of sedimentation on the flood line after the fourth year of operation. BR 364, in the sections affected by the Santo Antônio HPP reservoir, was raised to a level of 77.4 m, while also observing the freeboard recommended by DNIT for the span under the Jaci-Paraná River bridge.

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	✓	Santo Antonio Energia operates a hydrometric network with 10 telemetry stations (Jusante Rio Beni, Jusante Caldeirão do Inferno, Montante Jaci Paraná, Jaci Paraná Vila, UHE Santo Antônio Montante,	Issues that may impact on water availability or reliability have been comprehensively identified	✓	The hydrometric network was established following an analysis of various runoff scenarios within the Madeira River watershed, including contributions from both low-gradient regions (Guaporé and Mamoré) and the Andean slopes (Beni and Madre

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		UHE Santo Antônio Jusante-R7, Porto Velho, São Carlos, Papagaio and Humaitá). An automatic station is located in the reservoir and is also used to monitor water quality for Porto Velho's water supply. The inter-annual variability of inflows is larger than anticipated, with the most extreme floods and droughts in the Madeira River occurring since the start of operations.			de Dios). This network supports water availability forecasting and informs reservoir management through flow models that are systematically updated each day. Hydrological models have been updated with data from the flood of 2014 and the drought of 2023/2024.
• reservoir management	✓	Requirements determined by ANA for the operational phase are based on a thorough analysis of sustainability criteria. The dam is close to the urban area of Porto Velho on the right bank (7 km upstream), with some occupation pressure. Although a part of the left bank is covered by the national park, some of the rural resettlement projects were also implemented on this bank. The project has an asset protection team that patrols their properties surrounding the reservoir, primarily the APP to prevent land invasions. At the tail end of the reservoir, the urban district of Jaci-Paraná had part of its area inundated and families resettled (see section 5). There is a significant tourism activity in the			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		reservoir, including artificial beaches built by the project and several floating restaurants and hotels. The recreational areas are easily accessible, located next to the BR-364 federal highway, and are very busy on weekends and holidays. There are also barge mining and fishing activities in the reservoir.			
• downstream flow regimes	✓	The regulator performed a detailed hydrological study (published as ANA Technical Note Nº 100/2006) as a basis for rulings on downstream releases. The Resolution ANA Nº 1607/2016, establishes the water use rights of the project and also details other water users and their prospective needs, as far as the year 2043. This provides a comprehensive identification of issues – including water supply and flood protection for the downstream city of Porto Velho, and navigation downstream to the confluence with the Amazon – and defines a minimum downstream flow of 3,293 m^3/s. Integrated operation with Jirau HPP is very important due to their central role for national energy security. Technical discussions are carried out between the two	Scenarios, uncertainties and risks for water availability and reliability are routinely and extensively evaluated over the short- and long-term	✘	Technical Opinion Nº 60/2023-COHID/CGTEF/DILIC, in their analysis of the project's PBA, concluded that the hydro-sedimentological monitoring program has to be continued throughout the life of the project, not only for reservoir management but also because of the waterway from Porto Velho to the Amazon River. Likewise, the monitoring of water availability and reliability has to continue because it is the main water source for the city of Porto Velho. While such monitoring, integration with Jirau HPP operations, and assessment of risks around water availability and reliability are routinely conducted on a short-term basis, there is a lack of long-term evaluation of the probability and implications of extreme events such as the 2014

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		operators, ANA and the National System Operator (*Operador Nacional do Sistema Elétrico*, ONS), to maximize energy generation while respecting flood protection limits defined by ANA.			flood and the 2023/2024 drought, which is a **significant gap**.
If management measures are required, then monitoring is being undertaken to assess if management measures are effective:					
• reservoir management	✓	A number of monitoring programs in and around the reservoir are ongoing, as described in sections 3, 4, and 6. Some monitoring programs have been concluded with approval of the regulators, after demonstrating effectiveness, such as the real time water quality monitoring at the water supply intake for the city of Porto Velho.			
• downstream flow regimes	✓	There is ongoing monitoring and reporting of the issues identified in Resolution ANA Nº 1607/2016 to feed into regular technical discussions to optimize operations, as discussed above.			
Monitoring is being undertaken of hydrological resource availability and reliability	✓	ANA Technical Opinion Nº 87/2021/COREG/SRE defines hydrometric monitoring conditions established in Resolution Nº 269/2009. SAE provides daily information to ONS on reservoir operations including average flows for the previous day at gauge stations upstream and downstream	Identification of ongoing or emerging reservoir management issues takes into account both risks and opportunities	✓	SAE's monitoring program consistently delivers data to ANA and ONS, supporting the identification of risks and opportunities. Among other parameters this program monitors the positions of mining barges, water quality for Porto Velho and Jaci-Paraná, and the reservoir's

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		of the reservoir; precipitation over the previous day; water levels at locations of interest for flood control; inflow forecasts from the Jirau reservoir over a 5-day horizon; and incremental flow forecasts for the Santo Antônio plant over a 5-day horizon.			preservation area to detect potential encroachment.
Inputs to this monitoring include:			Issues identification relating to downstream flow regimes takes into account both risks and opportunities	✓	The operators of the Santo Antônio and Jirau HPPs have implemented a formal Communication Plan and an Integrated Operation System between their respective control centres to facilitate information exchange, monitor water flows, and identify potential risks or opportunities. A key concern is the prevention of flooding along BR 364 near the reservoir's tail.
• field measurements	✓	Continuous measurements of water levels are carried out at 10 telemetric stations (see above). Additionally, quarterly measurements of flows and sediment yield are carried out at 6 stations (Jusante Rio Beni, Jusante Caldeirão do Inferno, Montante Jaci-Paraná, Porto Velho, São Carlos, Papagaio and Humaitá). Date collected daily includes • levels and flows in the main tributaries	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	✓	ANA and ONS establish reservoir management protocols based on flow range assessments and diverse operational scenarios, which underpin integrated operations at the Santo Antônio and Jirau HPPs. Given the reservoir's limited storage capacity, active flow regulation is not feasible; therefore, operational guidelines are designed to preserve the natural variability of the river to the greatest extent possible.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		• precipitation observed by satellite • short-, medium- and long-term weather forecasts			
• appropriate statistical indicators	✓	Appropriate statistical indicators are applied through the statistical models used for inflow and flood forecasting.			
• issues which may impact on water availability or reliability	✓	To constantly assess issues that may impact on water availability or reliability, the project has a hydrological team with high expertise using data and hydrological models to identify any emerging issues.			
• a hydrological model	✓	Three models are utilized to forecast flows over the short, medium, and long term: • Predictor Model 01 – Integrated Hydrological System with Multiple Regression and SMAP. This model was developed to provide forecasts up to 15 days in advance, combining statistical models and conceptual hydrological rainfall–runoff models. • Predictor Model 02 – Simplified Flow × Flow Model. This is a hydrological forecasting tool designed at UHE Santo Antônio to offer highly reliable forecasts up to five days. Its operation is			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		based on the direct propagation of flows measured at strategic stations in the Madeira River basin, without the need for rain-flow conversion. • Predictor Model 03 – SIG²A Platform – SPEHC. This is the most recent and technologically advanced tool to forecast inflows. It is based on the SIG²A platform – SPEHC Module, combining physically based hydrological modeling with the assimilation of multiple sources of interference. It provides short/medium term (up to 15 days) and long term (up to 6 months) predictions, which enables seasonal planning.			
MANAGEMENT					
Measures are in place to guide generation operations that are based on:			Planning of generation operations has a long-term perspective	×	As stated in the internal document *Diretrizes para Operação do Reservatório em Condições Normais*, operational planning for the reservoir is conducted on a monthly basis. This interval is determined by factors such as reservoir capacity, data provided by the monitoring network, and flow forecast models. For extended planning horizons, responsibility shifts to ONS at the system level.
• analysis of the hydrological resource availability	✓	The power plant is dispatched by the national system operator (ONS), within the constraints of the HPP's Operating License, ANA Resolution, and the operations of the upstream Jirau HPP. Daily production plans are prepared by ONS for the hydropower plants in a river system based on hydrometric data provided by the various plant owners.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		The project maintains a hydrometric network following ANA/ANEEL Joint Resolution Nº 03/2010 to monitor hydro-sedimentological variables at various points in the Brazilian portion of the Madeira River basin. In addition to regular data series, several additional measurement campaigns were carried out, allowing the characterization of discharges and sediments (in suspension and bedload). The discharge curves of all the stations are revised annually. The precipitation series of the rainfall network is also revised annually to identify changes to the historical series. The measurements and analyses are provided by external consultants and made available for SAE's hydrological team to feed into the models.			During the 2023 drought, SAE implemented an emergency procedure known as "artificial downstream" to ensure the continuous generation of energy. This involved artificially elevating the downstream level of the G1 generator group by opening the spillway, increasing outflow, and suspending generation in other generator groups to maintain the gross head within acceptable operational parameters. This is an example of short-term adaptation. However, long-term generation planning - particularly for drought scenarios - has not been conducted, which is a **significant gap**.
• a range of technical considerations	✓	The project hydrological team applies a high level of expertise using data and hydrological models to analyze a range of technical considerations in order to guide generation operations.	Planning of generation operations fully optimises and maximises efficiency of water use	✘	The project's operation and hydrology teams employ advanced modelling tools to plan generation within specified technical parameters, striving to optimise water usage efficiency. These parameters encompass inflow rates, reservoir levels, and considerations for equipment maintenance and service schedules. Daily generation offers are submitted to ONS,

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
					enabling comprehensive management of the national power system through coordinated dispatch of power plants. Dispatch scheduling is determined by ONS based on offers from all generating units and overall system requirements. During real-time operations, should it be necessary to modify the scheduled dispatch to adhere to water level targets, SAE operators will formally request adjustments from ONS. Dispatch scheduling by ONS does not always optimise and maximise efficiency of water use, likely due to other system-level considerations. During the on-site assessment, the project was spilling water that could have generated approximately 1 GW, while at the same time 9.5 GW of thermal power were being generated in the national grid. This is a **significant gap**.
• an understanding of power system opportunities and constraints	✓	The national system operator ONS dispatches the power plant, taking into account national-level information on parameters such as demand, supply from variable renewables, reservoir levels, and transmission constraints, to minimize system costs while	Planning of generation operations has the flexibility to adapt to anticipate and adapt to future changes	×	As outlined above, as a run-of-river project regulated by the Operating License and ANA Resolution, Santo Antônio has limited flexibility in daily generation operations. This flexibility does not adequately address adaptation to future changes, particularly in response to severe flood and drought events such as

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		maintaining a high level of supply reliability.			those experienced in 2014 and 2023/2024, and potential long-term climate-induced hydrological trends. This represents a **significant gap**.
Measures are in place to manage identified reservoir management issues	✓	There are measures in place for all identified reservoir management issues. Reservoir buffer zones are protected through various measures. Reservoir water levels are limited to avoid flooding. SAE provides support for recreational activities; clears logs, macrophytes and debris; and monitors reservoir uses such as mining and fishing. In 2022 IBAMA provided technical opinion no. 119/2022 on the draft PACUERA, recommending the review and completion of 55 action items. Approval of the revised PACUERA report (produced by the consultancy ARCADIS) is pending.	Processes are in place to anticipate and respond to emerging risks and opportunities for reservoir management	✘	The project hydrological team has a high level of expertise and uses data and hydrological models to anticipate and respond to emerging risks and opportunities for reservoir management. The PACUERA requires IBAMA approval prior to sharing with communities on the reservoir banks. Although SAE - in anticipation of agency approval - has implemented many measures, some risks and opportunities cannot yet be addressed (see also section 1), which is a **significant gap**.
Measures are in place to address identified downstream flow issues	✓	The operating rules address identified downstream issues. There are automatic hydro-sedimentological and water quality stations in the reservoir and downstream of the Santo Antônio dam to identify issues related to downstream flows. This data is analyzed by an external consulting firm to identify patterns and deviations. There are also some social mitigation measures for	Processes are in place to anticipate and respond to emerging risks and opportunities for downstream flow regimes	✓	As described above, there is a formal communication mechanism between the two operations centres of the Santo Antônio and Jirau HPPs.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		downstream communities, largely to compensate for impacts on fishing.			
Where formal commitments have been made to downstream flow regimes, these are publicly disclosed	✓	The Hydro-sedimentological Monitoring Program is integrated with the Social Communication and Environmental Education programs, disclosing downstream flow information. Technical hydrological information is publicly accessible through ANA's website. There are formal commitments with the Civil Defense of the State of Rondônia due to the implications of floods in the Madeira River for the urban area of Porto Velho.	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	✓	ANA has defined flow objectives and a minimum downstream flow of 3,293 m^3/s. Also, technical discussions are carried out between the two HPP operators, ANA and ONS for the integrated operation of the two power plants. The magnitude, range and variability of the flow regimes is almost completely determined by natural flow conditions. The Hydro-sedimentological Monitoring Program is verifying how the parameters defined by ANA are being met.
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 related to reservoir management.	• reservoir management	✓	There are no indications for non-compliances related to reservoir management.
• reservoir management, with no major non-conformances	✓	There are no indications for major non-conformances related to reservoir management.			
• downstream flow regimes, with no major non-compliances	✓	There are no indications for major non-compliances related to downstream flow regimes.	• downstream flow regimes	✓	There are no indications for non-compliances related to downstream flow regimes.
• downstream flow regimes, with no major non-conformances	✓	There are no indications for major non-conformances related to downstream flow regimes.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		**Findings and Observations**	**Requirement is met: yes (✓) or no (✗)**		**Findings and Observations**
Commitments relating to the following have been or are on track to be met:			There are no non-conformances relating to:		
• reservoir management	✓	There are no commitments beyond the regulatory conditions. SAE is implementing some reservoir management measures in anticipation of the PACUERA approval.	• reservoir management	✓	There are no indications for non-conformances related to reservoir management.
• downstream flow regimes	✓	There are no commitments beyond the regulatory conditions.	• downstream flow regimes	✓	There are no indications for non-conformances related to downstream flow regimes.
OUTCOMES					
Downstream flow regimes take into account environmental, social and economic objectives	✓	Downstream flow regimes as defined by the water rights conditions, are very close to natural flows and take into account the integrated operation with the upstream Jirau project, energy generation and public safety issues.	Downstream flow regimes and commitments are an optimal fit amongst environmental, social and economic objectives within practical constraints of the present circumstances	✓	The design of the plant, with a small regulating capacity, provides for maintaining very close to a natural flow regime. The operations aim to obtain the maximum possible generation of energy while respecting flood protection limits defined by ANA. An optimal fit is achieved through frequent technical discussions between stakeholders. If the plant is not fully dispatched due to system conditions, as determined by ONS, the same amount of water is spilled instead of turbined, and downstream flows are not affected.
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	11 out of 16

Summary of findings and other notable issues

Santo Antônio HPP, 3,568 MW, Brazil

The project has an extensive hydrometric network as well as modelling and forecasting expertise. The reservoir is operated as a run-of-river facility and fluctuates between 428 km^2 during the wet season and 357 km^2 during the dry season, largely depending on the rainfall in the watersheds of the 4 main upstream tributaries (Beni, Madre de Dios, Mamoré and Guaporé). Operations are dispatched by the national system operator (ONS) on a daily basis, within the constraints of the Operating Licenses, and are coordinated with the upstream Jirau HPP, as well as with the National Water Agency – ANA, in order to obtain the maximum possible generation of energy while respecting flood protection limits. There are instances when this is not achieved, and water that could have been used for generation is spilled. There is limited flexibility to adapt operations to short-term and long-term changes in flows. The approval of the PACUERA is pending.

Relevant evidence	
Interview	11, 24, 25, 27, 32
Document	2, 10, 11, 17, 18, 20, 22–24, 27–31, 75, 77, 124, 126, 133–138, 143, 149, 160, 166, 170, 177, 179, 181-185, 190, 215-220
Photo	1, 2, 3, 21, 23, 30, 31, 32, 33, 39, 110, 111

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)	3,568 MW
Average reservoir area (representing area of flooded land, net of pre-impoundment water body) (km^2)	428 km^2 wet season 357 km^2 dry season Average 393 km^2 (including original water body) Area of flooded land 350 km^2
Power density (W / m^2)	9.1 W/m^2 considering total area or 10.2 W/m^2 considering only the flooded area
Emissions intensity (gCO_2e / kWh)	N/A (above 5 W/m^2 threshold) SAE did produce emissions intensity estimates, without reservoir emissions. The estimates for 2022 are 0.155 gCO_2e / kWh excluding illegal land use change in the reservoir buffer zone.
National and regional policies, plans and commitments relevant to mitigation	The main national policy relevant to climate change mitigation and adaptation is the *Política Nacional sobre Mudanças Climáticas – PNMC*, which encompasses relevant sectoral and regional plans including the *Plano Decenal de Energia – PDE* (10-Year Energy Plan) and the *Plano de Ação para a Prevenção e Controle do Desmatamento na Amazônia Legal – PPCDAM* (Action Plan for the Prevention and Control of Deforestation in the Legal Amazon).
Climate Change Resilience	
Hydrological data available for the project site and the basin, and observed climate trends	The hydrological monitoring network supporting the project consists of 10 stations, eight on the Madeira River and two on the Jaci-Paraná River, with observations dating back at least since 2008, all operated and maintained by SAE. Additionally, data from the hydrological monitoring network supporting Jirau HPP (14 stations, nine on the Madeira River, three on the Abunã River, one on the Mamoré River and one on the Guaporé River) are also available.
Regional and basin-level climate models relevant to the project location, if any	SAE contracted EQAO to elaborate an updated Adaptation Plan. The plan utilized mainly 3 general circulation models (GCMs), HadGEM2-ES, MIROC5 and HadGEM3-A. No specific regional or basin-level models were available.

Any climate change predictions for the project location, and degree of consistency	Observed trends coincide with uncertain climate change projections, indicating that the western portion of the Amazon basin, fed by the Andes mountains, may experience an increase in precipitation and runoff while the eastern portion will experience a decrease, with the Madeira River basin falling in between.
National policies, plans and commitments relevant to adaptation and resilience	See above under mitigation.
Other relevant information	The droughts in 2023 and 2024 in Amazon were so intense that they resulted in declarations by the National Water and Basic Sanitation Agency (ANA) of quantitative scarcity of water resources in the Madeira River.

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	✓	n/a (power density above 5 W/m^2)	If a site-specific assessment is required, it incorporates a broad range of scenarios, uncertainties and risks	✓	n/a (power density above 5 W/m^2)
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	✓	n/a (power density above 5 W/m^2)			
Climate Change Resilience					
An assessment of the project's resilience to climate change is undertaken and periodically updated	✓	The first version of SAE's Climate Change Adaptation Plan was prepared in 2016. In 2023, the independent E&S monitoring consultancy JPG recommended an update of this Adaptation Plan. In the second half of 2023, EQAO was	Assessment of resilience incorporates sensitivity analysis, project specific hydrological modelling using recognised climate models	✓	A basic sensitivity analysis was performed based on a number of studies that examine the effects of climate change in the Madeira basin. The sensitivity analysis was the basis of the Adaptation Plan elaborated by EQAO.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		contracted to update the plan to assess the potential impacts of climate change on the operations of the project, to assess its resilience to climate change, and to identify any needs for functional or structural adaptation measures. Further studies are under preparation.			
The assessment:					
• incorporates an assessment of plausible climate change at the project site	✓	The studies used results from several existing climate change studies and models for the Madeira basin, and identified risks of Severe Droughts; Flow Reduction Near or Below Minimum; Increase in Average Temperature; Extreme Floods; and Heavy Rains and Atmospheric Discharges.			
• identifies a range of climatological and hydrological conditions at the project site	✓	See above.			
• applies these conditions in a documented risk assessment or stress test	✓	The studies followed the IHA Resilience Guide (2019), completing steps 1 (screening) and 2 (initial analysis), but did not proceed to the full stress test (step 3).			
The risk assessment or stress test encompasses:			The project's opportunities to provide adaptation services are considered on an ongoing basis	✓	The Santo Antônio project (with a single purpose, run-of-river reservoir) has very limited ability to provide any adaptation services (e.g. flow regulation during floods and
• dam safety	✓	Different GCMs and emissions scenarios all projected peak floods within the capacity of the spillway and the powerhouse and took into			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		account the broad variability shown by the flood of 2014 and the droughts of 2023 and 2024.			droughts). The lack of ongoing consideration of opportunities is therefore considered a non-significant gap.
• other infrastructural resilience	✓	The resilience analysis did not directly address the resilience of other infrastructure components; however the BR 364 highway and Jaci-Paraná districts bordering the reservoir, as well as downstream Porto Velho neighborhoods have already been adapted to cope with historic flood levels.			
• environmental and social risks	✓	The analysis of E&S risks as part of the resilience analysis identified an increased sediment load from the upstream river basin.			
• power generation availability	✓	Several studies of discharge estimates for Porto Velho have been prepared by the National Institute for Space Research. Analyses of hydrological data from the project between 2011 and 2023 demonstrates the linkages between variations in river flows and water resource management, and energy generation efficiency. Considering only climate change (i.e. without significant land use changes), firm energy reductions are seen in most models. In some cases, reductions could reach 15% in the 2011-2041 period, 25% in the 2041-2070			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		period, and 40% in the 2071-2099 period.			
MANAGEMENT					
Climate Change Mitigation					
If GHG emissions estimates assume design and management measures, these measures are in place	✓	No reservoir GHG emission estimates have been undertaken, and hence no design and management measures are assumed.	Management measures are in place to respond to risks and opportunities including offsetting emissions	✓	The project is implementing measures to offset the vegetation lost by the impoundment of the reservoir, including maintenance activities in protected areas totaling approximately 40,299 ha of vegetation, of which 29,728.5 ha are in the Permanent Preservation Area (APP). Also, 880 ha of construction areas are in the process of revegetation. The carbon stock of these areas was calculated, assuming data from the 4th National Inventory (2021) as 20.9 million tCO_2. A number of other initiatives e.g., to reduce the use of fossil fuels in transport, including the use of electric vehicles in the work fleet, are under implementation. In 2022, SAE entered into a partnership with the Amazon+21 Institute to create the Amazon Bioeconomy and Conservation Center, which aims, among other objectives, to restore 893 ha near the reservoir.
			Plans are in place to monitor parameters used in GHG	✓	In 2013 SAE produced its first Internal GHG Emissions Inventory Report, still during the construction

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
			emissions estimates or to monitor GHG stocks		phase. In 2020, external audit reports on the Equator Principles and IFC's Performance Standards recommended resuming the preparation of these inventories. In 2023, SAE issued its GHG Emissions Inventory Report, covering carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), nitrogen trifluoride (NF_3), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). Since the project maintains a landfill for non-recyclable waste, the emissions estimates considered waste disposal since its opening in 2017. Therefore, this inventory includes the degradation of organic matter and, consequently, its emissions from all accumulated waste up to 2022. During 2022, SAE emitted a total of 3,288 tCO_2e distributed across Scopes 1 (83%), 2 (3%) and 3 (14%), with a result of 0.155 $kgCO_2e/KWh$. This did not yet include reservoir GHG emissions.
Climate Change Resilience					
Measures are in place to avoid or reduce identified climate risks	✓	EQAO identified opportunities for increasing resilience based on probability of changes (ranging from "verifiable" to "impossible") and vulnerability of revenues	Measures take account of a broad range of risks and interrelationships	×	EQAQ's climate change impact matrix allowed the prioritization of measures, to ensure operational continuity and minimize abroad range of financial, operational, and

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
		(ranging from "very high" to "low"). The combination of these two criteria results in risk exposure and recommendations for action, such as periodic reviews of spillway capacity, continuous monitoring of hydro-climatic and sedimentation parameters, implementing water crisis management systems, strengthening operational infrastructure, and creating a contingency fund to cover additional costs arising from extreme droughts. Implementation of recommendations has been suspended, as Eletrobras has contracted a new consultant (Way Carbon) to elaborate a Climate Mitigation and Resilience Plan for all its hydropower plants (with Santo Antonio the number one priority). While the current absence of resilience measures is a gap, it is not significant at the level of Minimum Requirements, as related work is ongoing.			reputational risks. However implementation has been suspended, pending the elaboration of the new Climate Mitigation and Resilience Plan by consultants Way Carbon. This is a **significant gap** at the level of Advanced Requirements.
			Processes are in place to respond to unanticipated climate change	✘	No such processes are apparent, which is a **significant gap**.
			Plans are in place to provide adaptation services if necessary	✓	See above. The project has very limited ability to provide any adaptation services, and therefore the absence of relevant plans is not a gap.
CONFORMANCE AND COMPLIANCE					
Climate Change Mitigation					
Processes and objectives relating to mitigation have been and are on track to be met with:			There are no non-compliances	✓	

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		**Findings and Observations**	**Requirement is met: yes (✔) or no (✘)**		**Findings and Observations**
• no major non-compliances	✓	There are no indications for major non-compliances related to climate change mitigation.			There are no indications for non-compliances related to climate change mitigation.
• no major non-conformances	✓	There are no indications for major non-conformances related to climate change mitigation.	There are no non-conformances	✓	There are no indications for non-conformances related to climate change mitigation.
Mitigation-related commitments have been or are on track to be met	✓	The mitigation-related commitments regarding offsetting of lost vegetation are on track to be met.			
Climate Change Resilience					
Processes and objectives relating to resilience have been and are on track to be met with:			There are no non-compliances	✓	There are no indications for non-compliances related to climate change resilience.
• no major non-compliances	✓	There are no indications for major non-compliances related to climate change resilience.			
• no major non-conformances	✓	There are no indications for major non-conformances related to climate change resilience.	There are no non-conformances	✓	There are no indications for non-conformances related to climate change resilience.
Resilience-related commitments have been or are on track to be met	✓	The resilience-related commitments regarding the raising of the BR 364 highway have been met.			
OUTCOMES					
Climate Change Mitigation					
The project's GHG emissions are demonstrated to be consistent with low carbon power generation	✓	The power density of the Santo Antônio project is relatively high, and while GHG emissions from the reservoir have not been estimated, given its characteristics (with a	Project net emissions are minimised, or project operations facilitate system emissions reductions	✓	Santo Antônio's GHG Emissions Inventory for the 2023 period estimates avoided emissions at 4 million tCO_2e, or 140 times more than the company's own emissions (including land use change in the

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✔) or no (✘)		Findings and Observations	Requirement is met: yes (✔) or no (✘)		Findings and Observations
		short water retention time) the emissions are likely to be low.			reservoir buffer zone, but not reservoir emissions). This does not yet include the positive mitigation effects from facilitating the integration of additional low-carbon, variable renewables into the Brazilian power system. The inventory includes a recommendation to define an action plan for emissions reductions; establish reduction and compensation targets; and adhere to national and international initiatives.
Climate Change Resilience					
Findings of the climate change assessment indicate that the project is resilient to climate change	✓	Most projections in the initial resilience analysis suggested that flood risks could be managed within the existing spillway capacity, and there is a significant safety margin with additional releases through the powerhouses. Risks for generation are possible but more likely to occur towards the end of the century. Increased sedimentation is also possible but there is no suggestion that it could not be handled. In summary, at the level of minimum requirements there are no indications that the project is not resilient.	The project is resilient under a broad range of scenarios	✘	Although a number of measures have been suggested to increase the resilience of the project, no plan or processes are in place at this point in time, and thus it is currently not possible to confirm that the project is resilient under a broad range of scenarios, which is a **significant gap.**
			The project will contribute to climate change adaptation at a local, regional or national levels	✘	See above. There is no indication that the project will be able to contribute to climate change adaptation, which is a **significant gap**.

Santo Antônio HPP, 3,568 MW, Brazil

List of significant gaps against **Minimum Requirements**	Number of **Advanced Requirements** met
None	11 out of 15

Summary of findings and other notable issues
The power density of the project is relatively high and the characteristics of the reservoir indicate low emissions risks, so that no detailed emissions estimates are required. The reforestation of the reservoir buffer zone absorbs significant amounts of GHG. The run-of-river type reservoir limits the ability to provide adaptation services to society, for example through water storage. Some initial climate resilience studies and plans have been undertaken by SAE, and will now be updated with a consistent methodology, across the Eletrobras hydropower fleet.

Relevant evidence	
Interview	13, 22, 41, 51, 52
Document	1, 2, 5, 8, 150, 151, 152, 177, 179, 182, 184, 190, 200, 207
Photo	–

Appendix 1 – Interviews

Ref	Interviewee/s, Position	Organisation	Date	Location
1	ALINE DE SOUZA COUTO / GERENTE FINANCEIRA	SAE	01/07/2025	ONLINE
2	ALISSON DINIZ TEIXEIRA / ANALISTA DE MANUTENÇÃO	SAE	01/07/2025	CASA DE FORÇA – UHE SANTO ANTONIO
3	ALYNE MAYRA RUFINO DOS SANTOS / ANALISTA TÉCNICA	IPHAN	02/07/2025	IPHAN / PORTO VELHO
4	ANA CAROLINA SOUTO / ANALISTA AMBIENTAL ESPECIALISTA	SAE	01/07/2025	STP / UHE SANTO ANTÔNIO
5	ANA CAROLINA SOUTO / ANALISTA AMBIENTAL ESPECIALISTA	SAE	02/07/2025	PARNA MAPINGUARI
6	ANDRÉ FLÁVIO SCHIANTE DOS SANTOS / GERENTE DE ENGENHARIA PLANEJAMENTO E CONTROLE	SAE	01/07/2025	EDIFÍCIO DE COMANDO – UHE SANTO ANTONIO
7	ANDRÉ FLÁVIO SCHIANTE DOS SANTOS / GERENTE DE ENGENHARIA PLANEJAMENTO E CONTROLE	SAE	02/07/2025	EDIFÍCIO DE COMANDO – UHE SANTO ANTONIO
8	ANDRÉ GERMANO VASQUES / GERENTE DE MEIO AMBIENTE SAÚDE E SEGURANÇA	SAE	30/06/2025	IBAMA
9	ANDRÉ GERMANO VASQUES / GERENTE DE MEIO AMBIENTE SAÚDE E SEGURANÇA	SAE	01/07/2025	SEDAM
10	ANDRÉ GERMANO VASQUES / GERENTE DE MEIO AMBIENTE SAÚDE E SEGURANÇA	SAE	01/07/2025	UHE SANTO ANTONIO
11	ANDRÉ GERMANO VASQUES / GERENTE DE MEIO AMBIENTE SAÚDE E SEGURANÇA	SAE	02/07/2025	IPHAN E FUNAI
12	ANDRÉ GERMANO VASQUE / GERENTE DE MEIO AMBIENTE SAÚDE E SEGURANÇA S	SAE	03/07/2025	JACY- PARANÁ
13	ANDRÉ GERMANO VASQUES / GERENTE DE MEIO AMBIENTE SAÚDE E SEGURANÇA	SAE	03/07/2025	UHE SANTO ANTONIO
14	ANDRÉ GERMANO VASQUES / GERENTE DE MEIO AMBIENTE SAÚDE E SEGURANÇA	SAE	04/07/2025	CENTRAL DE RESÍDUOS – UHE SANTO ANTONIO
15	CARLISSON JUNIOR RAMOS DOS SANTOS / COORDENAÇÃO DE MANUTENÇÃO MARGEM ESQUERDA	SAE	01/07/2025	CASA DE FORÇA – UHE SANTO ANTONIO
16	CAROLINE LIMA FERNANDES LOURENCO / ANALISTA DE SEGURANÇA DO TRABALHO	SAE	30/06/2025	UHE SANTO ANTONIO
17	DANIEL MACIEL / DIRETOR	SUPERINTENDÊNCIA MUNICIPAL DE PROTEÇÃO E DEFESA CIVIL DE PORTO VELHO	04/07/2025	DEFESA CIVIL/PORTO VELHO

18	DARIO PIRES DE CARVALHO / COORDENADOR DE MEIO AMBIENTE	SAE	01/07/2025	UHE SANTO ANTONIO
19	DARIO PIRES DE CARVALHO / COORDENADOR DE MEIO AMBIENTE	SAE	01/07/2025	STP / UHE SANTO ANTÔNIO
20	DARIO PIRES DE CARVALHO / COORDENADOR DE MEIO AMBIENTE	SAE	02/07/2025	PARNA MAPINGUARI
21	DARIO PIRES DE CARVALHO / COORDENADOR DE MEIO AMBIENTE	SAE	03/07/2025	JACY- PARANA
22	DARIO PIRES DE CARVALHO / COORDENADOR DE MEIO AMBIENTE	SAE	03/07/2025	UHE SANTO ANTONIO
23	DARIO PIRES DE CARVALHO / COORDENADOR DE MEIO AMBIENTE	SAE	04/07/2025	CENTRAL DE RESÍDUOS – UHE SANTO ANTONIO
24	DOUGLAS TEIXEIRA SILVA DE ASSIS MORAIS / GERENTE DE OPERAÇÕS	SAE	01/07/2025	COG – UHE SANTO ANTONIO
25	DOUGLAS TEIXEIRA SILVA DE ASSIS MORAIS / GERENTE DE OPERAÇÕS	SAE	01/07/2025	UHE SANTO ANTONIO
26	DOUGLAS TEIXEIRA SILVA DE ASSIS MORAIS / GERENTE DE OPERAÇÕS	SAE	01/07/2025	UHE SANTO ANTONIO
27	EDVALDO SOARES DE ARAÚJO NETO / COORDENADOR DE OPERAÇÃO – PÓS OPERAÇÃO	SAE	02/07/2025	UHE SANTO ANTONIO
28	ELOI TELLES / OPERADOR DE ETA/ETE	NEOMAX	04/07/2025	ETA - UHE SANTO ANTÔNIO
29	EMERSON AGUIAR / ANALISTA AMBIENTAL	IBAMA	30/06/2025	IBAMA / PORTO VELHO
30	FABIO LUIS NOGUEIRA DE ALMEIDA / ANALISTA SOCIOAMBIENTAL SÊNIOR	SAE	30/06/2025	UHE SANTO ANTONIO
31	FELIPE FREIRE / TÉCNICO SEGURANÇA E PROTEÇÃO	SUPERINTENDÊNCIA MUNICIPAL DE PROTEÇÃO E DEFESA CIVIL DE PORTO VELHO	04/07/2025	DEFESA CIVIL/PORTO VELHO
32	FELIPPE FERNANDES / ENGENHEIRO HIDRÓLOGO	SAE	02/07/2025	UHE SANTO ANTONIO
33	GEAN MORAES DE ALMEIDA / TÉCNICO DE SEGURANÇA DO TRABALHO JUNIOR	SAE	30/06/2025	UHE SANTO ANTONIO
34	GIGLIANE ALVES NASCIMENTO GARCIA / ANALISTA DE AUDITORIA JÚNIOR	SAE	01/07/2025	UHE SANTO ANTONIO
35	HELIO DA SILVA ALBUQUERQUE / BOMBEIRO CIVIL	SAE	01/07/2025	CASA DE FORÇA - UHE SANTO ANTONIO

36	JOAO PAULO CABRAL COSTA / COORDENADOR DE SAÚDE E SEGURANÇA DO TRABALHO	SAE	30/06/2025	UHE SANTO ANTONIO
37	JOSE LEANDRO DA SILVA VALENTIM / TÉCNICO DE SEGURANÇA DO TRABALHO SÊNIOR	SAE	30/06/2025	UHE SANTO ANTONIO
38	JÚNIOR PEREIRA DE SOUSA / COORDENADOR DE SUPRIMENTOS	SAE	01/07/2025	UHE SANTO ANTONIO
39	JULIANA FERREIRA MALAMAN / COORDENADORA DE COMPLIANCE	SAE	01/07/2025	ONLINE
40	KARINE VITORIA SANTOS / ASSISTENTE SOCIOAMBIENTAL	SAE	30/06/2025	UHE SANTO ANTONIO
41	KARINE VITORIA SANTOS / ASSISTENTE SOCIOAMBIENTAL	SAE	03/07/2025	UHE SANTO ANTONIO
42	KATIA DE OLIVEIRA VIEIRA / COORDENADORA DE SEGURANÇA DE BARRAGEM E MANUTENÇÃO CIVIL	SAE	01/07/2025	EDIFÍCIO DE COMANDO – UHE SANTO ANTONIO
43	KATIA DE OLIVEIRA VIEIRA / COORDENADORA DE SEGURANÇA DE BARRAGEM E MANUTENÇÃO CIVIL	SAE	04/07/2025	JUSANTE- UHE SANTO ANTÔNIO
44	KATIA DE OLIVEIRA VIEIRA / COORDENADORA DE SEGURANÇA DE BARRAGEM E MANUTENÇÃO CIVIL	SAE	04/07/2025	DEFESA CIVIL/PORTO VELHO
45	KENNER GRANADO JUNQUEIRA / MÉDICO DO TRABALHO	SAE	30/06/2025	UHE SANTO ANTONIO
46	LAURO UILIAN MAIA QUEIROZ / TÉCNICO DE SEGURANÇA DO TRABALHO SÊNIOR	SAE	30/06/2025	UHE SANTO ANTONIO
47	LEILA MARA DE CASTRO ALMEIDA	SAE	30/06/2025	UHE SANTO ANTONIO
48	LUCIANA MASCARENHAS VASCONCELLOS / GERENTE JURÍDICA	SAE	01/07/2025	ONLINE
49	MÁRCIA DOS SANTOS AMARAL / ANALISTA DE COMPLIANCE JÚNIOR	SAE	01/07/2025	UHE SANTO ANTONIO
50	MARIA BONAZZI SANCHES / ANALISTA DE COMPLIANCE ESPECIALISTA	SAE	01/07/2025	ONLINE
51	MAURO DA CUNHA MOREIRA / ANALISTA SOCIOAMBIENTAL ESPECIALISTA	SAE	03/07/2025	UHE SANTO ANTONIO
52	MAURO DA CUNHA MOREIRA / ANALISTA AMBIENTAL ESPECIALISTA	SAE	04/07/2025	CENTRAL DE RESÍDUOS
53	MAXENDELL FERNANDES DE MIRANDA / SOCIODIRETOR	MF MIRANDA	30/06/2025	UHE SANTO ANTONIO
54	MELLISSA GONCALVES DA SILVA CARDOSO / ASSISTENTE DE RECURSOS HUMANOS	SAE	30/06/2025	UHE SANTO ANTONIO
55	NORMANDO LIRA / COORDENADOR	COMPLEXO EFMM	04/07/2025	MUSEU ESTRADA DE FERRO MADEIRA MAMMORE
56	NAIARA VALÉRIA REIS RAMALHO SILVA / COORDENADORA DE RECURSOS HUMANOS	SAE	30/06/2025	UHE SANTO ANTONIO

57	ODAIR APARECIDO VAROLLO JÚNIOR / GERENTE EXECUTIVO FINANCEIRO	SAE	01/07/2025	ONLINE
58	PAULO CESAR SADO / COORDENADOR DO MEIO FÍSICO E FUNDIÁRIO	SAE	02/07/2025	IPHAN E FUNAI
59	PAULO CESAR SADO / COORDENADOR DO MEIO FÍSICO E FUNDIÁRIO	SAE	03/07/2025	JACY- PARANÁ
60	PAULO CESAR SADO / COORDENADOR DO MEIO FÍSICO E FUNDIÁRIO	SAE	04/07/2025	MUSEU ESTRADA DE FERRO MADEIRA MAMORE
61	PRISCILA GUERRERO ORTIZ ZOCCAL / ANALISTA SOCIOAMBIENTAL SENIOR	SAE	30/06/2025	VILA NOVA DE TEOTÔNIO E RIACHO AZUL
62	RAMSES PACÍFICO BANTO ALMEIDA DE LIMA / TÉCNICO DE SEGURANÇA DO TRABALHO ESPECIALISTA	SAE	30/06/2025	UHE SANTO ANTONIO
63	RODRIGO ANDRADE / TÉCNICO	SUPERINTENDÊNCIA MUNICIPAL DE PROTEÇÃO E DEFESA CIVIL DE PORTO VELHO	04/07/2025	DEFESA CIVIL/PORTO VELHO
64	ROGER NEPITALI ALENCAR PARDO / ANALISTA DE SUPRIMENTOS	ELETROBRAS	01/07/2025	UHE SANTO ANTONIO
65	ROZELY CHILLENE DA SILVA MORAIS / ANALISTA DE ADMINISTRAÇÃO DE PESSOAL SÊNIOR	SAE	30/06/2025	UHE SANTO ANTONIO
66	SELMA SANTOS DA SILVA / ASSISTENTE ADMINISTRATIVO RH	SAE	30/06/2025	UHE SANTO ANTONIO
67	TALITA PERES / TÉCNICA LABORATÓRIO	NOVA AQUA	01/07/2025	LABORATORIO DE PEIXES - UHE SANTO ANTONIO
68	TÂNIA MACHADO DA SILVA	VENTURO	01/07/2025	ONLINE
69	TIAGO OLIVEIRA BORGES / ANALISTA DE DOCUMENTAÇÃO SÊNIOR	SAE	01/07/2025	UHE SANTO ANTONIO
70	WILTON CESAR PIRES DE SANTANA / COORDENADOR DE MANUTENÇÃO AUXILIARES	SAE	01/07/2025	EDIFÍCIO DE COMANDO – UHE SANTO ANTONIO
71	WILTON CESAR PIRES DE SANTANA / COORDENADOR DE MANUTENÇÃO AUXILIARES	SAE	01/07/2025	CASA DE FORÇA - UHE SANTO ANTONIO
72	FRANCISCA BRITO SALES (DIRETORA)	PREFEITURA DE PORTO VELHO	30/06/2025	ESCOLA MUNICIPAL RIACHO AZUL
73	DANIELE DO PRADO FERRAZ / MERENDEIRA E ZELADORA	PREFEITURA DE PORTO VELHO	30/06/2025	ESCOLA MUNICIPAL RIACHO AZUL
74	WILSA / ENFERMEIRA CHEFE	PREFEITURA DE PORTO VELHO	30/06/2025	UNIDADE DE SAÚDE VILA NOVA DE TEOTÔNIO
75	DANIELA PEREIRA DA HORA / DIRETORA	PREFEITURA DE PORTO VELHO	30/06/2025	ESCOLA MUNICIPAL ANTONIO AUGUSTO VASCONCELOS (VILA NOVA DE TEOTÔNIO)

76	ANTONIO APARECIDO DE OLIVEIRA / PRESIDENTE DA ASSOCIAÇÃO	ASPARSD (Associação dos agricultores dos reassentamentos São Domingos, Riacho Azul e Comunidade Cachoeira dos Macacos)	30/06/2025	CENTRO COMUNITÁRIO SÃO DOMINGOS
77	VALCINEY MARQUES DA SILVA / DIRETOR	PREFEITURA DE PORTO VELHO	03/07/2025	ESCOLA MUNICIPAL JOAQUIM VICENTE RONDON – JACI PARANÁ
78	ROSIMAR LOPES DA SILVA / BARQUEIRO	PUBLIC	30/06/2025	ÁREA DE LAZER VILA NOVA DE TEOTÔNIO
79	WEDER BRIZON / SINDICALISTA	SINDICATO DOS URBANITÁRIOS	03/07/2025	SINDICATO DOS URBANITÁRIOS
80	LUZANIRA MORAES / SINDICALISTA	SINDICATO DOS URBANITÁRIOS	03/07/2025	SINDICATO DOS URBANITÁRIOS
81	ROBSON ALMEIDA / SINDICALISTA	SINDICATO DOS URBANITÁRIOS	03/07/2025	SINDICATO DOS URBANITÁRIOS
82	ATENDENTE / RECEPÇÃO	PREFEITURA PORTO VELHO	03/07/2025	HOSPITAL MATERNIDADE MUNICIPAL MÃE ESPERANÇA
83	ATENDENTE / ENFERMAGEM	PREFEITURA PORTO VELHO	03/07/2025	PRONTO ATENDIMENTO DRA. ANA ADELAIDE
84	ÉDIPO BARBOSA / ENGENHEIRO CIVIL	SAE	02/07/2025	PARNA MAPINGUARI
85	RAIMUNDO DOS SANTOS RODRIGUES / GUARDA PARQUE EST. BIOLOGIA	ICMBio	02/07/2025	PARNA MAPINGUARI
86	MARCOS BERTI / SUPERINTENDENTE	SUPERINTENDÊNCIA MUNICIPAL DE PROTEÇÃO E DEFESA CIVIL DE PORTO VELHO	04/07/2025	DEFESA CIVIL/PORTO VELHO
87	FABRÍCIO FREITAS DE ARAÚJO / TÉCNICO	IPHAN	02/07/2025	IPHAN/PORTO VELHO
88	JAILANE LEAL DE QUEIROZ ARRUDA / ANALISTA ANTROPOLOGIA	FUNAI	02/07/2025	FUNAI/PORTO VELHO
89	MAURÍCIO VANCONCELOS / ASSESSOR DE COMUNICAÇÃO	SAE / ELETROBRÁS	03/07/2025	UHE SANTO ANTONIO
90	MARCO ANTONIO RIBEIRO DE MENEZES LAGOS / SECRETARIO	SEDAM	01/07/2025	PALACIO RIO MADEIRA, SEDE DO GOVERNO DE RONDONIA

Appendix 2 – Documents

Ref	Author	Year	Title
1	SAE	2024	POLÍTICA DO SISTEMA DE GESTÃO INTEGRADA - PLT-0008
2	ELETROBRAS	2025	POLÍTICA DE SEGURANÇA DE BARRAGENS
3	ELETROBRAS	2025	ESTATUTO SOCIAL DA CENTRAIS ELÉTRICAS BRASILEIRAS S.A. - ELETROBRAS
4	ELETROBRAS	2024	POLÍTICA DE COMPLIANCE ELETROBRAS
5	ELETROBRAS	2014	POLÍTICA DE SEGUROS OPERACIONAIS DAS EMPRESAS ELETROBRAS
6	ELETROBRAS	2024	CÓDIGO DE CONDUTA ELETROBRAS
7	ELETROBRAS	2022	POLÍTICA DE LOGÍSTICA DE SUPRIMENTOS DAS EMPRESAS ELETROBRAS
8	ELETROBRAS	2019	POLÍTICA DE SUSTENTABILIDADE
9	ELETROBRAS	2025	POLÍTICA DE INVESTIMENTO SOCIAL PRIVADO
10	SAE	2024	17º RELATÓRIO DE ACOMPANHAMENTO DOS PROGRAMAS AMBIENTAIS - 8º RELATÓRIO ANUAL APÓS A RENOVAÇÃO DA LICENÇA DE OPERAÇÃO Nº1044/2011
11	ANA	2016	OUTORGA ANA Nº 1607
12	IBAMA	2025	RELATÓRIO ANUAL DE ATIVIDADES POTENCIALMENTE POLUIDORAS E UTILIZADORAS DE RECURSOS AMBIENTAIS - RAPP
13	IBAMA	2025	CADASTRO TÉCNICO FEDERAL - PORTO VELHO
14	IBAMA	2025	CADASTRO TÉCNICO FEDERAL - SÃO PAULO
15	SAE	2024	REGISTRO DE QUASE ACIDENTE AMBIENTAL - ADERNAMENTO DE FLUTUANTE
16	GRANT THORNTON	2024	RELATÓRIO DE AUDITORIA INTERNA SAÚDE E SEGURANÇA DO TRABALHO
17	JGP	2024	30º RELATÓRIO DE MONITORAMENTO AMBIENTAL E SOCIAL INDEPENDENTE DO PROJETO HIDRELÉTRICO SANTO ANTÔNIO
18	ELETROBRAS	2025	RELATÓRIO DE SUSTENTABILIDADE ANUAL 2024
19	SAE	2024	METAS ESTRATÉGICAS 2024
20	PCE	2024	PLANO DE SEGURANÇA DE BARRAGEM
21	GEOMETRISA	2024	RELATÓRIO DO SIMULADO EXTERNO DE EVACUAÇÃO NA ZONA DE AUTO SALVAMENTO - REVISÃO 1
22	GEOMETRISA	2023	REVISÃO PERIÓDICA DE SEGURANÇA DE BARRAGENS - MARGEM DIREITA
23	GEOMETRISA	2023	REVISÃO PERIÓDICA DE SEGURANÇA DE BARRAGENS- LEITO DO RIO
24	GEOMETRISA	2023	REVISÃO PERIÓDICA DE SEGURANÇA DE BARRAGENS - MARGEM ESQUERDA
25	GEOMETRISA	2023	REVISÃO PERIÓDICA DE SEGURANÇA DE BARRAGENS - OBRAS DE TERRA E CANAIS
26	GEOMETRISA	2023	DIVULGAÇÃO EXTERNA DE MÍDIAS SOBE O SIMULADO DE EMERGÊNCIA
27	INTERTECHNE	2024	RELATÓRIO DE INSPEÇÃO DE SEGURANÇA REGULAR - MARGEM DIREITA
28	INTERTECHNE	2024	RELATÓRIO DE INSPEÇÃO DE SEGURANÇA REGULAR - LEITO DO RIO
29	INTERTECHNE	2024	RELATÓRIO DE INSPEÇÃO DE SEGURANÇA REGULAR - MARGEM ESQUERDA

30	INTERTECHNE	2024	RELATÓRIO DE INSPEÇÃO DE SEGURANÇA DE BARRAGENS - OBRAS DE TERRA E CANAIS
31	INTERTECHNE	2025	PLANO DE AÇÃO DE EMERGÊNCIA UHE SANTO ANTÔNIO
32	IBAMA	2023	PARECER TÉCNICO 167/2022- PROGRAMA DE APOIO Á COMUNIDADE INDÍGENA
33	IBAMA	2023	PARECER TÉCNICO 49/2023 - REMANEJAMENTO
34	IBAMA	2024	PARECER TÉCNICO 12/2024 - FLORA
35	IBAMA	2024	RELATO DE VISTORIA 6/2024
36	IBAMA	2024	PARECER TÉCNICO 40/2024 SAÚDE PÚBLICA
37	IBAMA	2024	RELATÓRIO DE VISTORIA 7/2024
38	IBAMA	2024	PARECER TÉCNICO REFERENTE ACOMPANHAMENTO DE LO nº 19083850/2024-Cohid/CGTef/Dilic
39	IBAMA	2024	PARECER TÉCNICO 105/2024 MONITORAMENTO E APOIO ATIVIDADE PESQUEIRA
40	IBAMA	2024	RELATÓRIO DE VISTORIA 2/2024
41	IBAMA	2024	RELATÓRIO DE VISTORIA 19/2024
42	IBAMA	2022	LICENÇA DE OPERAÇÃO (LO) Nº 1044/2011 - 1044/2011 1ª RENOVAÇÃO - 3ª RETIFICAÇÃO
43	IBAMA	2015	PARECER TÉCNICO PAR. 02001.004876/2015-35 COHID/IBAMA
44	SEDAM	2022	LICENÇA DE OPERAÇÃO Nº 154881 - LINHA DE TRANSMISSÃO 500 KV
45	SEDAM	2024	LICENÇA DE OPERAÇÃO Nº 158284 - LINHA DE TRANSMISSÃO 230 KV
46	SEMA	2021	LICENÇA AMBIENTAL DE OPERAÇÃO Nº 234 SOL/DLA - CENTRAL DE RESÍDUOS
47	SEMA	2023	LICENÇA AMBIENTAL DE OPERAÇÃO Nº 173 SOL/DLA - RESTAURANTE 2
48	SEDAM	2025	AUTORIZAÇÃO Nº 28/2025 - LEVANTAMENTO, AFUGENTAMENTO, RESGATE E DESTINAÇÃO DE FAUNA SILVESTRE - LINHA DE TRANSMISSÃO 230 KV
49	SEDAM	2025	AUTORIZAÇÃO Nº 27/2025 - LEVANTAMENTO, AFUGENTAMENTO, RESGATE E DESTINAÇÃO DE FAUNA SILVESTRE - MARCOS GEODÉSICOS
50	SEDAM	2025	AUTORIZAÇÃO Nº 29/2025 - LEVANTAMENTO, AFUGENTAMENTO, RESGATE E DESTINAÇÃO DE FAUNA SILVESTRE - ACESSO DA LINHA DE TRANSMISSÃO 525 KV
51	IBAMA	2024	ABIO Nº 138/2011 - 3ª RENOVAÇÃO - 2ª RETIFICAÇÃO - FAUNA
52	IBAMA	2024	ABIO Nº 257/2013 - 2ª RENOVAÇÃO - 1ª RETIFICAÇÃO - RESGATE DA ICTIOFAUNA - UG E STP
53	IBAMA	2024	ABIO Nº 1255/2020 - 1ª RENOVAÇÃO - 1ª RETIFICAÇÃO - PROGRAMA DE CONSERVAÇÃO DA ICTIOFAUNA
54	IBAMA	2023	ABIO Nº 1493/2023 - MONITORAMENTO TELEMÉTRICO
55	IBAMA	2023	ABIO Nº 1578/2023 - TRANSPOSIÇÃO DA DOURADA
56	IBAMA	2024	ABIO Nº 1618/2024 - FISHWHEEL
57	SAE	2023	CT.001.2023 CONSULTGEL
58	SAE	2024	CT.GMAST.012.2024 JOÃO BOSCO NOGUEIRA JUNIOR
59	SAE	2024	CT.GMAST.018.2024-SOCIOAMBIENTAL- PGSP SAE
60	SAE	2024	CT.GMAST.021.2024 SOLARIS
61	SAE	2022	CT.GMAST.023.2022 BSA MAPINGUARI

62	SAE	2023	CT.GMAST.024.2023 ARCADIS
63	SAE	2024	CT.GMAST.024.2024 SYNERGIA
64	SAE	2023	CT.GMAST.036.2023 KRUK CONSULTORIA, AVALIAÇÕES E PERÍCIAS DO PATRIMÔNIO
65	SAE	2021	CT.GS.016.2021 CPPT CUNIA
66	SAE	2021	CT.GS.020.2021 CONTRUCCI
67	SAE	2023	CT.JUR.011.2023 - BORGES E ALMEIDA ADVOCACIA
68	SAE	2021	TA01.CT.GS.016.2021 CPPT CUNIA
69	SAE	2022	TA02.CT.GMAST.023.2022 BSA MAPINGUARI
70	SAE	2023	TA03.CT.GMAST.024.2023 ARCADIS
71	SAE	2021	TA03.CT.GS.020.2021 CONTRUCCI
72	SAE	2024	CT.GMAST.002.2024 - PLANET_(PROGRAMA LIMNO E MACRÓFITAS)
73	SAE	2022	CT.GMAST.007.2022 - J PINTO (PROGRAMA LIMNO E MACRÓFITAS)
74	SAE	2022	CT.GMAST.010.2022_PISCES (PROGRAMA ICTIOFAUNA)
75	SAE	2023	CT.GMAST.018.2023 RHA (PROGRAMA HIDROSSEDIMENTOLOGICO)
76	SAE	2023	CT.GMAST.035.2023_TRANSPOSIÇÃO DOURADA (PROGRAMA ICTIOFAUNA)
77	SAE	2024	CT.GO.012.2024-RURALTECH (PROGRAMA HIDROSSEDIMENTOLÓGICO)
78	SAE	2022	CT.GS.006.2022 - 00 - CT.GS.006.2022 FECD (PROGRAMA HIDROBIOGEOQUÍMICO)
79	SAE	2021	CT.GS.021.2021 (PROGRAMA DE ICTIOFAUNA)
80	SAE	2020	CT.GS.028.2020_SETE (PROGRAMA DE FAUNA)
81	SAE	2023	CT.GS.028.2023_BICHO DO MATO (PROGRAMA DE FAUNA)
82	SAE	2020	CT_GS.003.2020 (PROGRAMA DE ICTIOFAUNA)
83	SAE	2022	TA01.CT.GMAST.007.2022 - J PINTO
84	SAE	2021	TA01.CT.GS.021.2021 - NOVA AQUA ADT (PROGRAMA DE ICTIOFAUNA)
85	SAE	2021	TA01.CT.GS.024.2021 - VENTURO (PROGRAMA LIMNO E MACRÓFITAS)
86	SAE	2020	TA1_CT.GS.0028.2020_SETE (PROGRAMA DE FAUNA)
87	SAE	2022	TA02.CT.GMAST.007.2022 - J PINTO
88	SAE	2021	TA02.CT.GS.018.2021 - RUMO AMBIENTAL (APOIO BRIGADA AMBIENTAL)
89	SAE	2020	TA2_CT.GS.0028.2020_SETE (PROGRAMA DE FAUNA)
90	SAE	2023	CT.GMAST.002.2023 ACQUA
91	SAE	2023	CT.GMAST.003.2023 WW CONSULTORIA
92	SAE	2020	CT.GS.002.2020 TETRATECH
93	SAE	2018	CT.GS.047.2018 GEOCAT
94	SAE	2020	TA02.CT.GS.002.2020 TETRA TECH ENGENHARIA E CONSULTORIA
95	SAE	2018	TA06.CT.GS.047.2018 GEOCAT
96	SAE	2022	2022.07.13 - 01 - PROCURAÇÃO_ACORDO_JOANA_D'ARC_FASE_2.DOCX

97	SAE	2022	2022.07.13 - 02 - SUMMARY - PROCURAÇÃO TC JOANA
98	SAE	2022	2022.08.10 - 01_-_TC_-_TERMO_DE_COMPROMISSO_-_ACP_JOANA_D_ARC_AGOSTO_2022.DOCX
99	SAE	2022	2022.08.10 - 02_-_ANEXO_01_-_SEGUNDA_PROPOSTA_SAE
100	SAE	2022	2022.08.10 - 03_-_ANEXO_02_-_LINHA_DO_TEMPO_ASSINAR
101	SAE	2022	2022.08.10 - 04_-_ANEXO_03_-_MINUTA_DE_TERMO_INDIVIDUAL_DE_ADESÃO_DEFINITIVO.DOCX
102	SAE	2022	2022.08.10 - 05 -SUMMARY - TC JOANA
103	SAE	2022	TERMO DE QUITAÇÃO - HONORÁRIOS DRS. FREITAS E RONALDO - ACP JOANA D' ARC - ACORDO CELEBRADO EM AGO-22
104	SAE	2022	TERMO DE QUITAÇÃO - HONORÁRIOS MARCELO MININI - ACP JOANA D' ARC - ACORDO CELEBRADO EM AGO-22
105	SAE	2022	TERMO DE QUITAÇÃO - HONORÁRIOS PAULO LÉRIAS - ACP JOANA D' ARC - ACORDO CELEBRADO EM AGO-22
106	SAE	2018	DÉCIMA PRIMEIRA SESSÃO CONJUNTA DE MEDIAÇÃO
107	SAE	2018	TAC EFMM - REPACTUAÇÃO 2018.09.17
108	SAE	2017	TAC EFMM 2017.12.15
109	MPF	2006	MANIFESTAÇÃO MPF EXTENSÃO DE PRAZO PARA O ITEM I DO ACORDO
110	MPF	2018	TAC RESERVA TÉCNICA - ATA DE AUDIÊNCIA - REPACTUAÇÃO DE ACORDO
111	MPF	2017	TAC RESERVA TÉCNICA - ATA DE AUDIÊNCIA - SENTENÇA DE HOMOLOGAÇÃO
112	MPF	2011	TC - INDÍGENA
113	MPF	2018	TC - MORRINHOS
114	ICMBIO	2022	TC - PARNA MAPINGUARI
115	MPE RO	2016	TC - PARQUE DOS BURITIS
116	MPF	2023	TC - PEIXES I
117	MPF	2019	TC - PEIXES II
118	MPF	2020	TC - PEIXES III
119	MPF	2020	TC - PEIXES IV
120	MPF	2023	TC - RIACHO AZUL
121	MPF		TC - SANTA RITA
122	MPF	2012	TC - TRIÂNGULO
123	ANEEL	2014	ADJUDICACAO_LEILAO_A-3-2014_PUBLICACAO (1)
124	ANA	2019	ATO DE OUTORGA_N 2848_2019_ANA_DOU
125	ANEEL	2007	AVISO DE HOMOLOGAÇÃO E ADJUDICAÇÃO N. LEILÃO 05-2007
126	ANA	2016	RESOLUÇÃO ANA 1607 DE 19-12-2016
127	ANEEL	2008	1° TERMO ADITIVO - CONTRATO DE CONCESSÃO SAE
128	ANEEL	2008	2° TERMO ADITIVO - CONTRATO DE CONCESSÃO SAE
129	ANEEL	2008	3° TERMO ADITIVO - CONTRATO DE CONCESSÃO SAE
130	ANEEL	2008	4° TERMO ADITIVO - CONTRATO DE CONCESSÃO SAE
131	ANEEL	2008	5° TERMO ADITIVO - CONTRATO DE CONCESSÃO SAE

132	SAE	2022	REPRESENTAÇÃO ASSINATURA 5 ADITIVO
133	MME	2008	CONTRATO DE CONCESSÃO SAE
134	ANA	2016	OUTORGA ANA_SAESA
135	SAE	2022	UHE SANTO ANTÔNIO (RIO MADEIRA) - RA2021
136	SAE	2023	UHE SANTO ANTÔNIO (RIO MADEIRA) - RA2022
137	SAE	2024	RELATÓRIO ANUAL 2024_BASE 2023
138	SAE	2024	SAE 2024-00306 - ANA ENVIO RELATÓRIO ANUAL 2023 - RESOLUÇÃO CONJUNTA ANA_ANEEL
139	SAE	2024	E-PROTOCOLO-040110_2024
140	BNDES	2012	ADITIVO Nº4 AO CONTRATO DE FINANCIAMENTO MEDIANTE ABERTURA DE CRÉDITO
141	SAE	2018	6ª REVISÃO DO TERMO DE REFERÊNCIA PARA ELABORAÇÃO DE PROJETOS A SEREM CONTEMPLADOS COM RECURSOS DO SUBCRÉDITO F DA LINHA DE "INVESTIMENTOS SOCIAIS DE EMPRESAS (ISE)" DO BNDES
142	BNDES	2019	ADITIVO Nº7 AO CONTRATO DE FINANCIAMENTO MEDIANTE ABERTURA DE CRÉDITO
143	SAE	2024	ORÇAMENTO SOCIOAMBIENTAL
144	EY BRASIL	2022	DIAGNÓSTICO DE MATURIDADE ESG
145	TETRA TECH	2022	DIAGNÓSTICO ORGANIZACIONAL EM SISTEMA DE OC INTEGRADA
146	CPPT CUNIÃ	2025	PLANO DE AÇÃO PROGRAMA DE COMUNICAÇÃO SOCIAL
147	IBAMA	2024	PROGRAMA DE SAÚDE PÚBLICA - RELATÓRIO FINAL
148	CONRERP	2012	CERTIFICADO PRÊMIO RELAÇÕES PUBLICAS E SUSTENTABILIDADE: RESPONSABILIDADE SOCIAL E AMBIENTAL
149	SAE	2025	APRESENTAÇÃO HIDROLOGIA DE MANEJO DE TRONCOS
150	SAE	2025	APRESENTAÇÃO PLANO DE ADAPTAÇÃO DE MUDANÇAS CLIMÁTICAS
151	BLOCKC	2023	INVENTARIO DE EMISSÃO DE GASES DE EFEITO ESTUFA
152	EQAO	2024	PLANO DE ADAPTAÇÃO Á MUDANÇA DO CLIMA
153	ELETROBRAS	2025	POLÍTICA DE GESTÃO DE PESSOAS
154	SAE	2019	PGC ADMINISTRAÇÃO PESSOAL
155	SAE - SINDUR - Eletricitários de São Paulo	2025	ACORDO COLETIVO DE TRABALHO
156	ELETROBRAS	2025	RELATÓRIOS GERENCIAIS INDICADORES P&O
157	SAE	2025	ORGANOGRAMA SANTO ANTONIO ENERGIA
158	RUMO AMBIENTAL	2021	RELATÓRIO DE INVESTIGAÇÃO DE UG 04
159	SAE	2025	APRESENTAÇÃO KPIs SEGURANÇA DO TRABALHO E SAÚDE OCUPACIONAL
160	SAE	2025	APRESENTAÇÃO PROGRAMA DE MONITORAMENTO HIDROSSEDIMENTOLÓGICO
161	SAE	2025	APRESENTAÇÃO PROGRAMA DE MONITORAMENTO LIMNOLÓGICO E DE MACRÓFITAS AQUÁTICAS - COLUNA DÁGUA
162	SAE	2025	APRESENTAÇÃO PROGRAMA DE MONITORAMENTO LIMNOLÓGICO E DE MACRÓFITAS AQUÁTICAS - COMUNIDADE FITOPLANCTÔNICA

163	SAE	2025	APRESENTAÇÃO PROGRAMA DE MONITORAMENTO LIMNOLÓGICO E DE MACRÓFITAS AQUÁTICAS - COMUNIDADE ZOOPLANCTÔNICA
164	SAE	2025	APRESENTAÇÃO PROGRAMA DE MONITORAMENTO LIMNOLÓGICO E DE MACRÓFITAS AQUÁTICAS - COMUNIDADE BETÔNICA
165	SAE	2025	APRESENTAÇÃO PROGRAMA DE MONITORAMENTO LIMNOLÓGICO E DE MACRÓFITAS AQUÁTICAS - MACRÓFITAS
166	SAE	2025	APRESENTAÇÃO PROGRAMA DE MONITORAMENTO LIMNOLÓGICO E DE MACRÓFITAS AQUÁTICAS - SEDIMENTOS
167	SAE	2025	APRESENTAÇÃO PROGRAMA DE MONITORAMENTO LIMNOLÓGICO E DE MACRÓFITAS AQUÁTICAS - MONITORAMENTO EM TEMPO REAL
168	Rafael M. Almeida et al	2019	LIMNOLOGICAL EFECTS OF A LARGE AMAZONIAN RUN-OF-RIVER DAM ON THE MAIN RIVER AND DROWNED TRIBUTARY VALLEYS (SCIENTIFIC REPORTS)
169	TERRAFÍSICA	2025	RELATÓRIO MENSAL DE ANÁLISE DE DADOS REGISTRADOS PELA ESTAÇÃO ACELEROGRÁFICA
170	SAE	2024	ESTRUTURAÇÃO DO COMITÊ GESTOR DE CHEIAS
171	WW CONSULTORIA E TECNOLOGIA LTDA	2025	RELATÓRIO DE ATIVIDADES PROGRAMA DE MONITORAMENTO SISMOLÓGICO
172	SAE	2018	BOOK REMANEJAR - PROGRAMA DE REMANEJAMENTO DA POPULAÇÃO
173	SYNERGIA	2021	DIAGNÓSTICO FINAL DE REASSENTAMENTOS
174	GAMELEIRA CONSULTORIA	2012	PROGRAMA DE PROTEÇÃO AOS POVOS INDÍGENAS CASSUPÁ E SALAMÃI NA ÁREA DE INFLUÊNCIA DA UHE SANTO ANTÔNIO
175	GAMELEIRA CONSULTORIA	2013	PROGRAMA DE PROTEÇÃO DAS TERRAS INDÍGENAS KARITIANA E KARIPUNA NA ÁREA DE INFLUÊNCIA DA UHE SANTO ANTÔNIO
176	SAE	2025	VISÃO GERAL E INFORMAÇÕES DOS DIFERENTES CANAIS PARA RECLAMAÇÕES, CONSULTAS E SUGESTÕES
177	RHA RECURSOS HÍDRICOS E AMBIENTAIS	2023	RELATÓRIO DE ATUALIZAÇÃO DOS ESTUDOS HIDROLÓGICOS
178	SAE	2024	ESTRUTURAÇÃO DO COMITÊ GESTOR DE CHEIAS
179	PCE	2017	ESTUDOS HIDROLÓGICOS E RUPTURA DA BARRAGEM
180	PCE	2017	ESTUDOS DE MODELAGEM HIDRÁULICA PARA DETERMINAÇÃO DOS MAPAS DE INUNDAÇÃO APÓS A RUPTURA DA BARRAGEM
181	Rafael M. Almeida et al	2020	HYDROPEAKING OPERATIONS OF TWO RUN-OF-RIVER MEGA-DAMS ALTER DOWNSTREAM HYDROLOGY OF THE LARGEST AMAZON TRIBUTARY
182	KEVIN DAMASIO	2025	AMAZON PEOPLE BRACE FOR A DRIER FUTURE ALONG THE ENDANGERED MADEIRA RIVER (MONGABAY)
183	Elizabeth P. Anderson et al	2018	FRAGMENTATION OF ANDES-TO-AMAZON CONNECTIVITY BY HYDROPOWER DAMS (SCIENCE ADVANCES)
184	Nicole Cristine Laureanti et al	2024	EXTREME SEASONAL DROUGHTS AND FLOODS IN THE MADEIRA RIVER BASIN, BRAZIL: DIAGNOSIS, CAUSES, AND TRENDS (CLIMATE)

185	SGB	2025	BOLETIM DE MONITORAMENTO HIDROLÓGICO DA BACIA DO RIO MADEIRA - 17 de junho de 2025
186	Carolina R. C. Doria et al	2021	UNDERSTANDING IMPACTS OF DAMS ON THE SMALL-SCALE FISHERIES OF THE MADEIRA RIVER THROUGH THE LENS OF THE FISHERIES PERFORMANCE INDICATORS (MARINE POLICY)
187	Carolina R. C. Doria et al	2021	STAKEHOLDER PERCEPTIONS ON THE GOVERNANCE OF FISHERIES SYSTEMS TRANSFORMED BY HYDROELECTRIC DAM DEVELOPMENT IN THE MADEIRA RIVER, BRAZIL (FRONTIERS IN ENVIRONMENTAL SCIENCE)
188	Daniel Rondinelli Roquetti et al	2024	AMAZON COMMUNITIES DISPLACED BY HYDROELECTRIC DAMS: IMPLICATIONS FOR ENVIRONMENTAL CHANGES AND HOUSEHOLD LIVELIHOOD (GLOBAL ENVIRONMENTAL CHANGE)
189	Caroline C. Arantes et al	2023	LARGE-SCALE HYDROPOWER IMPACTS AND ADAPTATION STRATEGIES ON RURAL COMMUNITIES IN THE AMAZONIAN FLOODPLAIN OF THE MADEIRA RIVER (JOURNAL OF ENVIRONMENTAL MANAGEMENT)
190	Carlos André B. Mendes et al	2017	SOME IMPORTANT UNCERTAINTIES RELATED TO CLIMATE CHANGE IN PROJECTIONS FOR THE BRAZILIAN HYDROPOWER EXPANSION IN THE AMAZON
191	KEVIN DAMASIO	2024	HYDROPOWER PLANTS DISRUPT FISHERS' LIVES IN AMAZON'S MOST BIODIVERSE RIVER BASIN (MONGABAY)
192	SAE	2013	PEIXES DO RIO MADEIRA – VOL 1-3
193	Waleska Gravena et al	2012	LOOKING TO THE PAST AND THE FUTURE: WERE THE MADEIRA RIVER RAPIDS A GEOGRAPHICAL BARRIER TO THE BOTO (CETACEA: INIIDAE)? (CONSERVATION GENETICS)
194	Enzo Aliaga-Rossel and Luis A. Guizada Duran	2020	FOUR DECADES OF RESEARCH ON DISTRIBUTION AND ABUNDANCE OF THE BOLIVIAN RIVER DOLPHIN *INIA GEOFFRENSIS BOLIVIENSIS* (ENDANG SPECIES RES)
195	SAE	2025	LISTAGEM DE NÃO CONFORMIDADES
196	EY	2022	EXECUTIVE PRESENTATION - ESG MATURITY DIAGNOSIS - SAE
197	SAE	2019	ADMINISTRAÇÃO DE PESSOAL PGC-GP-0004
198	Santo Caos - Eletrobras	2024	DIAGNÓSTICO DE ENGAJAMENTO 2024
199	Eletrobras	2025	POLÍTICA DO SGI DA SPE SANTO ANTÔNIO ENERGIA S.A. GRSGR-001/2025
200	SAE	2022	Pesquisa e Desenvolvimento - Conheça os projetos de P&D que estão sendo desenvolvidos pela Santo Antônio Energia
201	SAE	2025	PLANILHA CANAL 0800 (2024 - 2025)
202	SAE	2024	MONITORAMENTO DE MAMÍFEROS AQUÁTICOS E SEMIAQUÁTICOS UHE SANTO ANTÔNIO
203	SAE	2024	PROCEDIMENTO OPERACIONAL PO-GMASST-0029 – MONITORAMENTO DE ESPÉCIES DE BIVALVES INVASORAS NO RESERVATÓRIO E ESTRUTURAS DA HIDRELÉTRICA SANTI ANTÔNIO
204	IUCN	2024	RED LIST IUCN – LISTA DE ESPÉCIES AMEAÇADAS (REGIÃO UHE SANTO ANTÔNIO – PROVIDENCIADA POR SAE)
205	SAE	2024	SUBPROGRAMA DE MONITORAMENTO DA ATIVIDADE PESQUEIRA
207	SAE ELETROBRAS	2025	ELETROBRAS – HIDRELÉTRICA SANTO ANTÔNIO – PLANO DE ADAPTAÇÃO ÀS MUDANÇAS CLIMÁTICAS
208	FUNAI/Brasília	2025	OFÍCIO Nº 42/2025 – DIRETORIA DE PROMOÇÃO AO DESENVOLVIMENTO SUSTENTÁVEL – AUTORIZAÇÃO DE INGRESSO E ANÁLISE DE PLANO DE TRABALHO – UHE SANTO ANTÔNIO
209	IBAMA	2021	NOTA TÉCNICA Nº 15/2021/COHID/CGTEF/DILIC – PROGRAMA DE REMANEJAMENTO DA POPULAÇÃO ATINGIDA

210	IBAMA	2020	PARECER TÉCNICO Nº 125/2020-COHID/CGTEF/DILIC – ANÁLISE DO PROGRAMA DE REMANEJAMENTO DA POPULAÇÃO ATINGIDA PELA CONSTRUÇÃO DA UHE SANTO ANTÔNIO – PERÍODO MARÇO DE 2016 A MARÇO 2020
211	MESA – Madeira Energia S.A.	2008	PROJETO BÁSICO AMBIENTAL AHE SANTO ANTÔNIO – SEÇÃO 22 – PROGRAMA DE REMANEJAMENTO DA POPULAÇÃO ATINGIDA
212	SAE	2021	RESPOSTA AOS OFÍCIOS E PARECER TÉCNICO – OFÍCIO Nº 99/2021/COHID/CGTEF/DILIC (SEI 9500025); OFÍCIO Nº 688/2020 /COHID/CGTEF/DILIC (SEI 8597997); E PARECER TÉCNICO Nº 125/2020-COHID/CGTEF/DILIC - PROGRAMA DE REMANEJAMENTO DA POPULAÇÃO ATINGIDA
213	Eletrobras	2025	APRESENTAÇÃO PROGRAMA DER MONITORAMENTO SISMOLÓGICO
214	Terrafísica Inovações Sismológicas	2025	RELATÓRIO MENSAL DE ANÁLISE DE DADOS REGISTRADOS PELA ESTAÇÃO ACELEROGRÁFICA (ACSAE) UHE SANTO ANTÔNIO
215	SAE	2025	MAPAS TEMATICOS - USO E OCUPAÇÃO DO SOLO NA APP CONSOLIDADA DA UHE SANTO ANTÔNIO, LOCALIZAÇÃO DAS ALDEIAS INDÍGENAS NO ENTORNO DO RESERVATÓRIO DA HIDRELÉTRICA SANTO ANTÔNIO, ÁREA DE ABRANGÊNCIA DO RESERVATÓRIO e LOCALIZAÇÃO DOS REASSENTAMENTOS
216	IBAMA	2022	Parecer Técnico nº 119/2022-Cohid/CGTef/Dilic - Análise do Pacuera da UHE Santo Antônio
217	ARCADIS	2023	PLANO AMBIENTAL DE CONSERVAÇÃO E USO DO ENTORNO DE RESERVATÓRIO ARTIFICIAL – PACUERA – ATUALIZAÇÃO 2023 Usina Hidrelétrica Santo Antônio
218	LEME – FURNAS - ODEBRECHT	2005	Relatório de Impacto Ambiental (RIMA) das Usinas Hidrelétricas de Santo Antônio e Jirau
219	LEME – FURNAS - ODEBRECHT	2006	ESTUDIO DE IMPACTO AMBIENTAL (EIA) - COMPLEMENTAÇÃO E ADEQUAÇÃO ÀS SOLICITAÇÕES DO IBAMA
220	MADEIRA ENERGIA	2009	PROJETO BÁSICO AMBIENTAL – PBA CONSOLIDADO - AHE – SANTO ANTÔNIO – RIO MADEIRA
221	ANEEL	2016	Declaração de Utilidade Pública
222	SAE	2022	SUSTAINABILITY REPORT
223	Eletrobras	2024	PO-GN.05-003 POLITICA DIREITOS HUMANOS
224	Eletrobras	2020	POLÍTICA DE EDUCAÇÃO CORPORATIVA DAS EMPRESAS ELETROBRAS
225	Eletrobras	2022	POLÍTICA DE SEGURANÇA E SAÚDE OCUPACIONAL DAS EMPRESAS ELETROBRAS
226	Eletrobras	n/d	CARTILHA DE COMBATE AO ASSÉDIO SEXUAL E MORAL
227	Eletrobras	2010	Cartilha Saúde Emocional da Mulher
228	Promundo - Eletrobras	2016	PROMOÇÃO DO RESPEITO À DIVERSIDADE NAS EMPRESAS: CADERNO DE FERRAMENTAS
229	Eletrobras	2024	GUIA DE CONDUTA PARA FORNECEDORES DA ELETROBRAS
230	Eletrobras	2019	POLÍTICA AMBIENTAL DAS EMPRESAS ELETROBRAS
231	SAE	2022	RELATÓRIO DA ADMINISTRAÇÃO

Appendix 3 - Photographs

		
Photo 1: Reservoir at the former location of the Teotônio rapids	Photo 2: Reservoir level controlled at 71.3 masl	Photo 3: BR-364 highway raised by SAE after the 2014 flood and the increase in the reservoir operating level to 71.3 masl
		
Photo 4: Continuous protective forest along reservoir bank	Photo 5: Alligator on reservoir bank	Photo 6: Macrophytes along reservoir bank

Photo 7: Macrophyte bank on the banks near the Vila Nova de Teotônio recreation area

Photo 8: Experimental 'fish wheel' for fish monitoring at SAE port on reservoir

Photo 9: Logboom components and barges at SAE port on reservoir

Photo 10: Published research on macrophytes and *mansonia* mosquitos

Photo 11: SAE meteorological monitoring station

Photo 12: SAE Mobile Warning and Dam Safety app

		
Photo 13: Reservoir shore beach at the town of Jaci-Parana	Photo 14: Restaurant and gold mining barge on reservoir near the mouth of the Jaci Parana tributary	Photo 15: Private quarry on reservoir bank, one of the few interruptions of shoreline protective forest
		
Photo 16: APP (permanent buffer zone protection area) signage close to Riacho Azul resettlement site	Photo 17: Reforestation area at the Bioeconomy Centre's research and development site	Photo 18: Soybean silo and Jirau HPP transmission lines along BR-364 highway south of the reservoir

		
Photo 19: Logboom and macrophyte cleaning operation near the dam	Photo 20: Log spillway	Photo 21: View downstream from main spillway
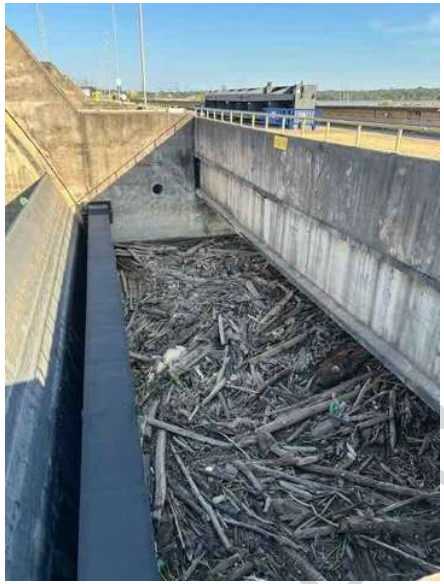		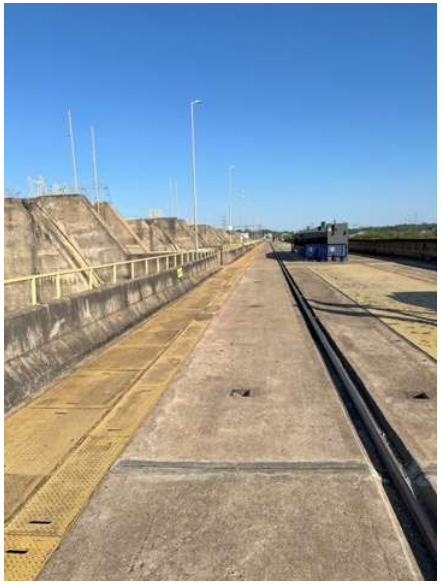
Photo 22: Debris including logs, trash and dead animals collecting at main spillway	Photo 23: Radial gate in main spillway	Photo 24: Main spillway crest

Santo Antônio HPP, 3,568 MW, Brazil

		
Photo 25: Entrance gate to power plant	Photo 26: SAE lost time injury record	Photo 27: Solar PV research and development project
		
Photo 28: Work risk analysis sheet filled out before entry to powerhouse	Photo 29: Worker transport between power plant and Porto Velho	Photo 30: Central control room

		
Photo 31: Monitoring of upstream water levels and flows (example station on Rio Beni, Bolivia)	Photo 32: Power plant generating 2,469 MW (i.e. below capacity) while spilling 7,166 m^3/s	Photo 33: National power grid status , including 9,542 MW of thermal generation
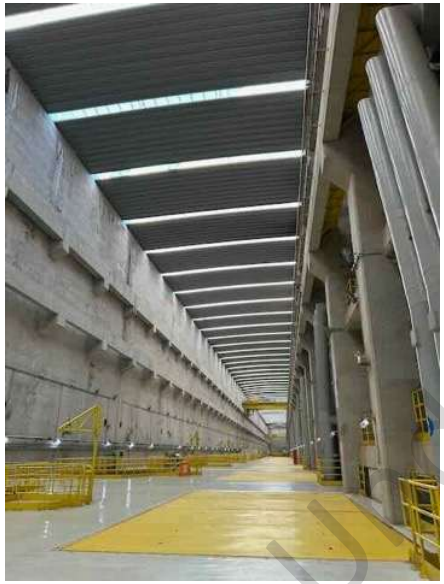		
Photo 34: View along powerhouse 2	Photo 35: Transport and PPE use by operators	Photo 36: Housekeeping

Photo 37: Access to horizontal bulb turbines

Photo 38: Bulb turbine distributor

Photo 39: Backup control room

Photo 40: Redundant operations example (local controls for generating unit 10)

Photo 41: Eletrobras work safety guidelines

Photo 42: SF6 used in electrical equipment

Photo 43: Contractor OH&S posters

Photo 44: Eye rinse station

Photo 45: OH&S inspections plan color coded by months

Photo 46: Emergency plan displays in control room

Photo 47: Safety equipment at entrance to powerhouse

Photo 48: Work safety tagout markers 1

Photo 49: Work safety tagout markers 2

Photo 50: Oil spillage containment basin

Photo 51: Hazardous waste bin and spill kit

Photo 52: Safety glove insulation tester

Photo 53: Safety barriers, PPE, oil containment

Photo 54: Assessment team at entrance to SAE administration offices

		
Photo 55: Entrance area to main restaurant at powerplant	Photo 56: Administration area cafeteria, decorated for Festas Juninas	Photo 57: Milestones in SAEs sustainability history, displayed in cafeteria
		
Photo 58: First responder brigade	Photo 59: Security surveillance	Photo 60: SAE ambulance

Photo 61: Drinking water treatment plant

Photo 62: Contractor staff demonstrating turbidity of Madeira River water before treatment

Photo 63: Wastewater treatment plant

Photo 64: Clinic in administration area of the plant

Photo 65: Hazardous waste separation

Photo 66: Landfill on SAE property

Photo 67: Monkeys around administrative building

Photo 68: Ringed Kingfisher (*Megaceryle torquata*)

Photo 69: Fish laboratory

Photo 70: Canal de Denuncias poster

Photo 71: Equipment for emergency operation of spillway gates

Photo 72: Fishway signage

		
Photo 73: Fish hatchery	Photo 74: Dourada (Gilded Catfish, *Brachyplatystoma rousseauxii*) in fish laboratory	Photo 75: Pirarara (*Phractocephalus hemioliopterus*) in fish laboratory
		
Photo 76: Entrance to fishway	Photo 77: Fishway with telemetry equipment on left	Photo 78: Fishway with rest areas

Photo 79: Fishway with telemetry equipment on right

Photo 80: Tambaqui (*Colossoma macropomum*) in fish laboratory

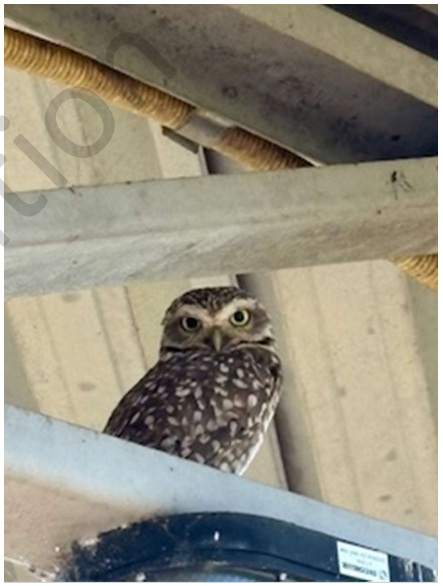

Photo 81: Burrowing Owl (*Athene cunicularia*) at fish hatchery

Photo 82: Cattle ranching in buffer zone of Mapinguari National Park

Photo 83: 17,800 km^2 Mapinguari National Park on left bank of Madeira River

Photo 84: New park operations base funded by SAE

		
Photo 85: Assessment team in Mapinguari NP	Photo 86: Natural savannas in Mapinguari NP	Photo 87: Park and public market in Jaci Paraná built by SAE
		
Photo 88: Health centre in Jaci Paraná renovated by SAE	Photo 89: Jaci Paraná church rebuilt by SAE	Photo 90: Jaci Paraná school, funded by SAE and completed in 2023

Photo 91: Sports stadium in Jaci Paraná funded by SAE

Photo 92: Parque dos Buritis resettlement district in Jaci Paraná

Photo 93: Parque dos Buritis standard house, one of few empty resettlement homes

Photo 94: São Domingos resettlement area Community Centre built by SAE

Photo 95: Catholic Church built by SAE

Photo 96: Remaining lot in the São Domingos resettlement area

		
Photo 97: Entrance to Riacho Azul and São Domingos resettlement areas	Photo 98: School in Riacho Azul built by SAE	Photo 99: Water treatment and distribution plant for Riacho Azul built by SAE
		
Photo 100: Vila Nova de Teotônio resettlement area	Photo 101: Vila Nova de Teotônio school plaque	Photo 102: Tourist signage on reservoir beach

		
Photo 103: Beach	Photo 104: Recreational area built by SAE	Photo 105: Beach restaurant built by SAE
		
Photo 106: Church built by SAE	Photo 107: Health centre built by SAE and renovated by the municipality of Porto Velho	Photo 108: Community Centre of the Association of Producers and Residents built by SAE

		
Photo 109: Fish farm built by SAE	Photo 110: New access road to the Vila Nova de Teotônio resettlement area built by SAE	Photo 111: Madeira-Mamoré railroad bridge, on raised foundations
		
Photo 112: Entrance to Madeira-Mamoré railroad yard and museum, restored with funding from SAE	Photo 113: Madeira-Mamoré railroad museum 1	Photo 114: Madeira-Mamoré railroad museum 2

		
Photo 115: Madeira-Mamoré railroad museum 3	Photo 116: Madeira-Mamoré railroad museum 4	Photo 117: Bank protection downstream of powerhouse 1 and complementary spillway, with drinking water pipeline to Porto Velho
		
Photo 118: Fishermen in safety exclusion zone downstream of spillway	Photo 119: Treatment plant for water from reservoir and river intakes, for Porto Velho city	Photo 120: Long distance boat between Porto Velho and Manaus, with Santo Antônio dam in background

Photo 121: View upstream from BR-319 bridge towards Porto Velho, with soybean port

Photo 122: Traffic on Madeira River downstream of Porto Velho, from BR-319 bridge

Photo 123: Aerial view of Madeira River downstream of Porto Velho

Photo 124: Santo Antonio chapel at the memorial for Marshal Rondon, just downstream of power plant

Photo 125: Historical marker of the border between Mato Grosso and Amazonas states before 1943, at Marshal Rondon memorial

Photo 126: Marshal Rondon memorial

Photo 127: IBAMA office in Porto Velho, Rondônia

Photo 128: Collective labour agreement at SINDUR office Porto Velho

Photo 129: Flood warning siren in Porto Velho, provided by SAE

Photo 130: Emergency meeting point sign in Porto Velho, close to the port

Photo 131: Meeting with Defesa Civil team, Porto Velho

Photo 132: State government of Rondônia

Photo 133: Cemetery in Porto Velho, where remains of cemeteries flooded by reservoir were relocated

Photo 134: Health Centre renovated by SAE in downtown Porto Velho

Photo 135: Rondônia State Building Tudo Aqui 1, funded by SAE

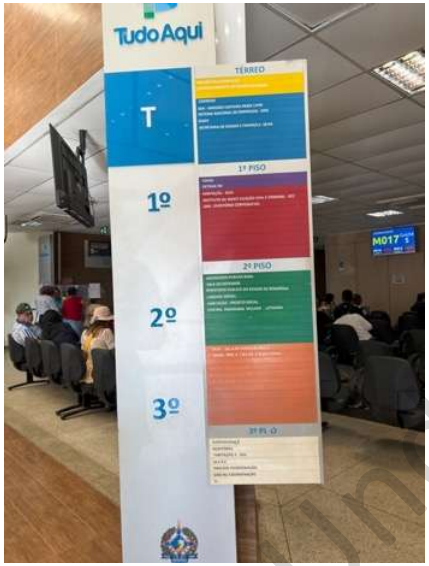

Photo 136: Rondônia State Building Tudo Aqui 2

Photo 137: Women's Hospital in Porto Velho plaque, funded by SAE

Photo 138: Porto Velho substation with transmission lines from Santo Antônio and Jirau HPPs

Santo Antônio HPP, 3,568 MW, Brazil