



Hydropower
Sustainability
Standard

Assessment Report

Project Name: Mascarenhas Hydropower Plant

Installed Capacity: 198 MW

Country: Brazil



Project Sponsor: Energest S.A.

Report Author: Joerg Hartmann, Antonio Fonseca dos Santos, Vito Mandilovich

Report Date: final draft September 4, 2024

Cover page photo: Upstream view of reservoir and powerhouse of the Mascarenhas HPP

Add certification label
(if the project is
certified)



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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.



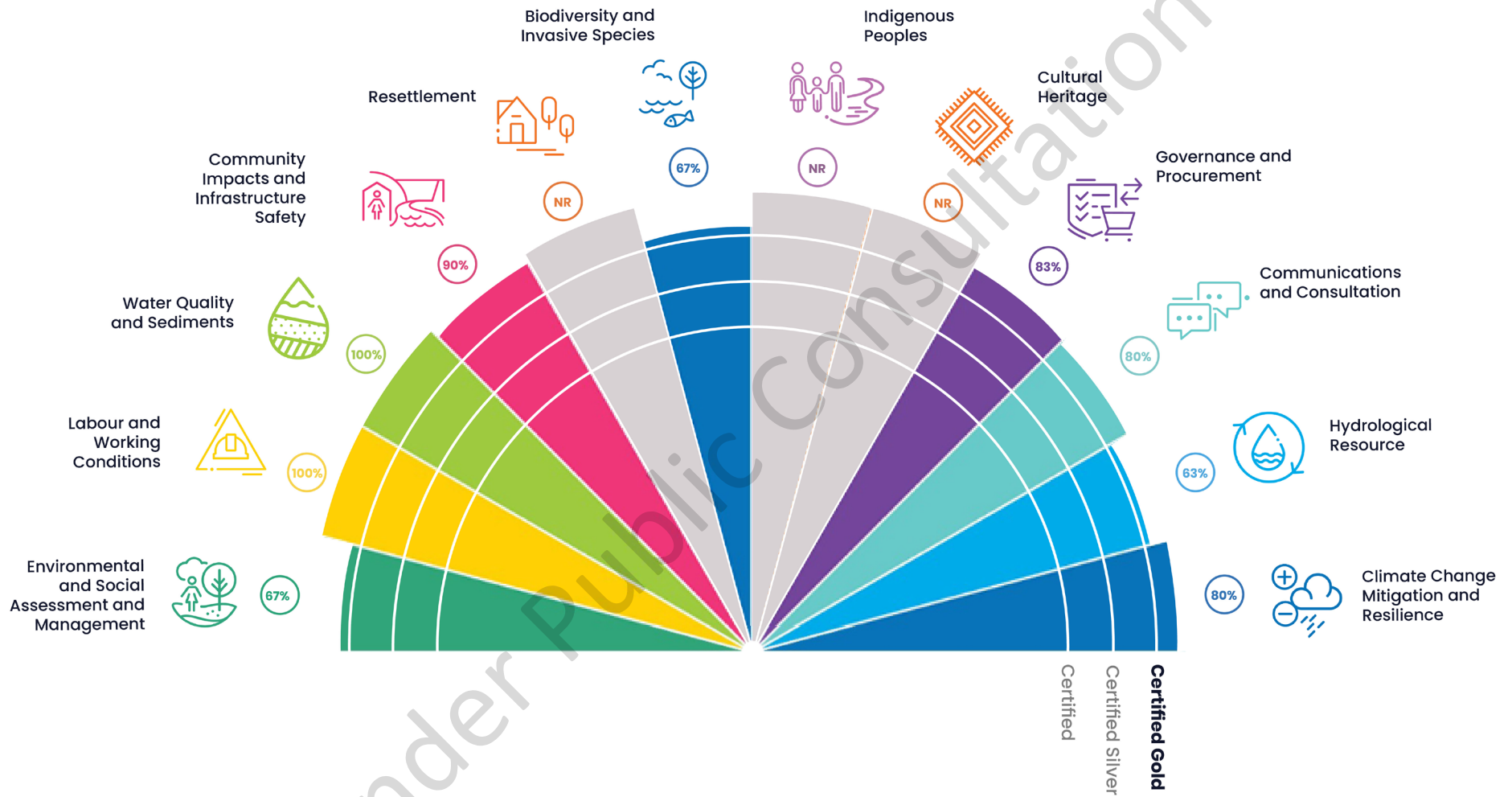
Hydropower Sustainability Standard

<p>About the HSS</p>	<p>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.</p> <p>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.</p> <p>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.</p>
<p>Intended users and uses</p>	<p>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).</p> <p>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.</p> <p>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.</p>
<p>Structure of the reporting template</p>	<p>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.</p>
<p>Supporting resources</p>	<p>Additional guidance on the structure, content and history of the HS Standard can be found online at: www.hs-alliance.org</p>
<p>Version date</p>	<p>October 2023</p>

A. Assessment Overview

Assessor(s)	Joerg Hartmann (Sustainable Water & Energy LLC), Antonio Fonseca dos Santos (Kelowna Consultoria Ambiental e Sustentabilidade LTDA), Vito Mandilovich (EXP Consulting Consultoria)
Assessment objective	Assess the environmental, social, and governance performance of the Mascarenhas hydroelectric plant using the Hydropower Sustainability Standard
Assessment dates	May 6-10, 2024
Assessment report date	final draft September 4, 2024
Summary of key findings	<p>The Mascarenhas HPP has been operating for 50 years, and ecosystems and communities around the project have had 50 years to adapt to its presence. The environmental license prescribes some standard E&S monitoring and management measures. These have been significantly expanded since Paraty Energia and Victory Hill assumed operations, with a number of different assessments and audits to identify additional needs and opportunities for improved E&S performance. The project is certified against the ISO 9001 and ISO 14001 standards.</p> <p>Mascarenhas HPP has good labour relations, labour management practices, and a high level of work satisfaction. Paraty Energia has retained all EDP's existing employees and offers opportunities for professional growth. There have been no labour disputes, strikes or any similar incidents. The project is certified against the ISO 45001 standard.</p> <p>The project continuously monitors and evaluates sediment and water quality in its area of influence, and reports to the environmental authority. There are no indications of any significant ongoing issues or impacts of the project.</p> <p>Negative or positive social impacts from the project are limited. There are no records of social commitments, and the project has been operating for 50 years so comparisons with the pre-project situation are not meaningful. Annual payments to government include significant amounts for local municipalities. Since assuming operations, Paraty Energia has engaged with the local community and started a process of clarifying land titles in the project's properties around the reservoir. No public health issues related to the project have been identified. Public safety is assured through compliance with Brazilian regulations including regular dam safety maintenance, inspections, trainings, and upgrades, including a plan to raise the dam height to adapt to increasing floods.</p> <p>The project area is part of the Brazilian Atlantic Rainforest zone, but only small remnants of the forest remain. No critical habitats or native endangered species are known to occur in the project area. There is a long-standing fish management and monitoring program, compliant with regulatory requirements, and generally healthy aquatic ecosystems. Other than these fish-related activities there is limited assessment and management of biodiversity, but the updated PACUERA is expected to identify some opportunities for improvement. Paraty Energia has committed to implement the actions that will be defined by the PACUERA, and to improve</p>

	<p>biodiversity conservation on the properties it manages around the reservoir. It has also committed to continue evaluating and studying fish ecology and fishing in its area of influence, and use the results of these studies to guide future improvements.</p> <p>The project operates in a mature, highly regulated electricity market, and has robust corporate government processes established between its Brazilian and international partners.</p> <p>The project is in the process of developing closer stakeholder relations, in particular with local communities, based on systematic stakeholder mapping and a communications plan as part of the integrated management system. There are periodic meetings with the community and different groups of stakeholders, mechanisms to respond to grievances and emergency issues, and transparent disclosure of information, including through public annual reporting.</p> <p>Hydrological resources in the Rio Doce basin are well understood from decades of records, and inflows to the Mascarenhas reservoir are predictable from upstream cascade operations. Water quantities are closely monitored and data shared. The small reservoir is managed for hydropower generation, with limited ability to support drought and flood management. Plant operations are planned by Paraty Energia while dispatch is by the national system operator ONS. Downstream releases are adjusted frequently to match system requirements, and constrained by a minimum flow requirement. The plant has been operating in a similar manner for a long time, and there have been only limited analyses to reconsider reservoir management and downstream flow release impacts and options. Paraty Energia has committed to review the implications of different operational options on economic, social and environmental objectives, both in the reservoir and downstream, and use the results of this review to guide future operations.</p> <p>Mascarenhas HPP has been providing low-carbon electricity for 50 years and has displaced significant amounts of fossil fuels. The reservoir likely has small emissions, there has been some reforestation which absorbs GHGs, and emissions are tracked, published and starting to be reduced. A comprehensive Climate Change Resilience Assessment was developed, indicating that the project is resilient under a number of scenarios. The contribution of Mascarenhas HPP to climate change adaptation is limited by its small run-of-river reservoir.</p>
<p>Limitations of the assessment</p>	<p>There were no significant limitations to this assessment.</p>



Operation

Figure 1 – Hydropower Sustainability Standard (HSS) Results Diagram

B. Project Details

Project name	Mascarenhas Hydropower Plant (Usina Hidrelétrica Mascarenhas)
Country	Brazil
Location	Rio Doce, Municipality of Baixo Guandu, Espírito Santo State
Purpose	Power Generation
Developer / Owner	Energest S.A., operated and co-owned by Paraty Energia
Financer(s)	VH Global Sustainable Energy Opportunities Plc's ("GSEO"), majority owner
Installed capacity (MW)	198 MW
Construction start date (planned or actual)	1968
Commercial operations date (planned or actual)	1973 (first generation unit) - 1974 (full COD)
Annual average generation (GWh / year)	1,124 GWh/year (128.4 MW average)
Associated infrastructure: road(s) (length)	none
Transmission lines and sub-stations (names, lengths and capacities)	0.25 km 138 kV line connecting to Mascarenhas sub-station
Total cost (USD m)	n.a.
Annual operating costs (USD m)	USD 12.8 m/a
Specific investment cost (USD m / MW)	n.a.
Levelised energy cost (USD / kWh)	n.a.
Dam type	Concrete Gravity Dam
Dam height (m)	28 m
Dam length at crest (m)	540 m
Units (number, type, MW)	4 Kaplan units @ 49.5 MW each
Reservoir area at Full Supply Level (FSL) (km ²)	3.9 km ²
Average net head at FSL (m)	17 m
Average flow (m ³ / s)	896.4 m ³ /s
Design flow (m ³ / s)	14,500 m ³ /s
Load factor	64.8%
Number of physically displaced households	n.a.
Power density (W / m ²)	50.8
Emissions intensity (gCO _{2e} / kWh)	n.a.
Contacts / website	contato@paratyenergia.com.br ; www.paratyenergia.com.br

Mascarenhas Hydropower Plant, 198 MW, Brazil



Operation

Figure 1 – Overview of Mascarenhas HPP, showing the Rio Doce flowing from left to right, the reservoir with its well-vegetated buffer zone, 2 saddle dams on the left bank, the main dam with a spillway on left, central dam, and powerhouse on right, the substation directly south of the powerhouse, the railway tracks (operated by mining company Vale S.A.), and the original village of Mascarenhas, which was expanded during construction of the HPP.

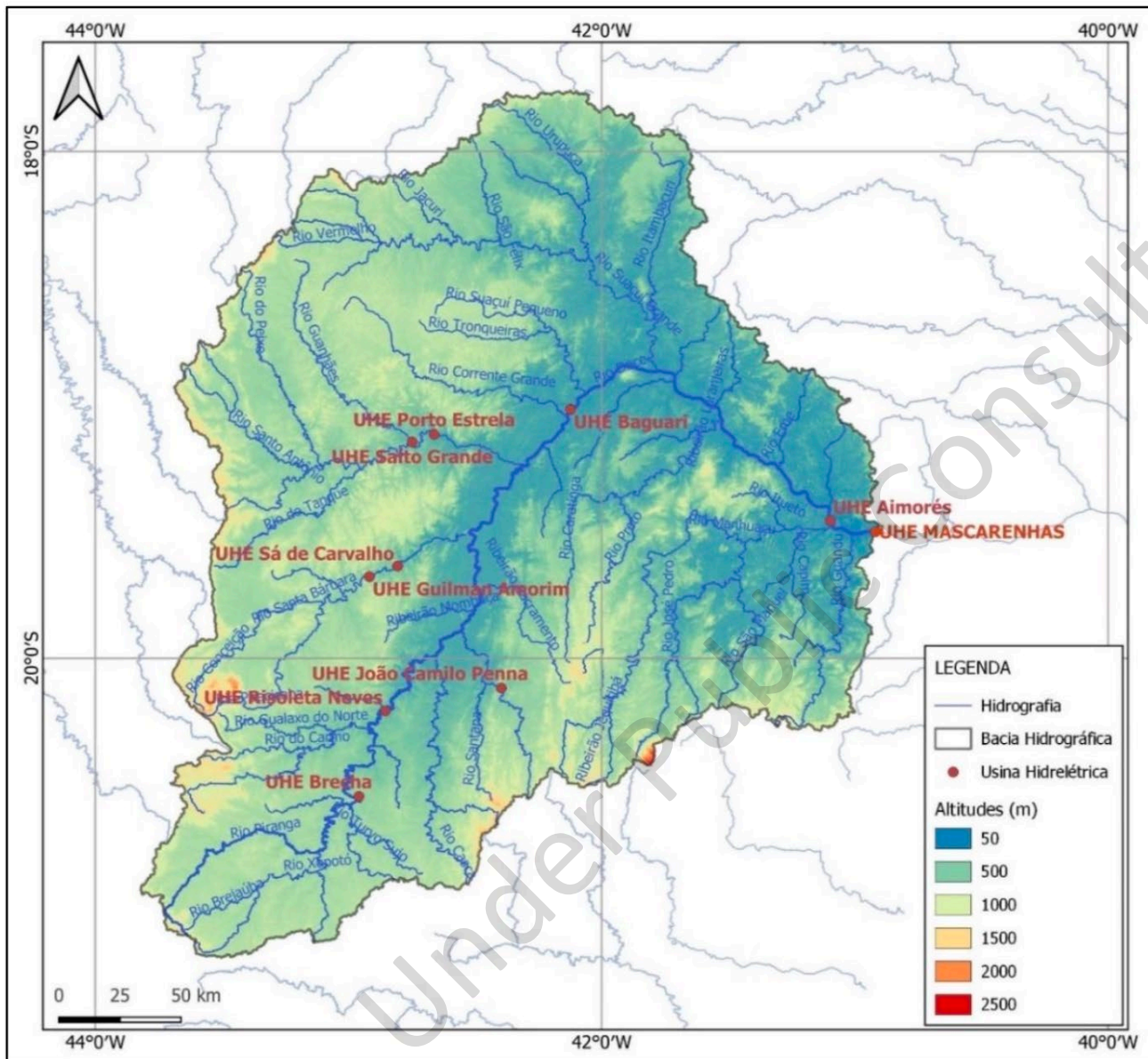


Figure 2 – Map of Mascarenhas HPP catchment (73,700 km²), showing the cascade of upstream hydropower plants.

Mascarenhas Hydropower Plant, 198 MW, Brazil

C. Performance against Minimum Requirements

There are no gaps against Minimum Requirements.

Under Public Consultation

D. Performance against Advanced 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	5	11	19	NR	4	NR	NR	5	12	10	12
PERCENTAGE OF REQUIREMENTS MET	67%	100%	100%	90%	NR	67%	NR	NR	83%	80%	63%	80%

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.

Mascarenhas Hydropower Plant, 198 MW, Brazil

E. Environmental and Social Action Plan (ESAP)

This section is not used as Paraty Energia is planning to address remaining gaps internally, through updates of the Sustainability Action Plan.

Under Public Consultation

F. Abbreviations and Acronyms

ANA	Agência Nacional de Águas e Saneamento Básico
ANEEL	Agência Nacional de Energia Elétrica
CFURH	Compensação Financeira pela Utilização de Recursos Hídricos para Fins de Geração de Energia Elétrica
CLT	Consolidação das Leis Trabalhistas
GSEO	Global Sustainable Energy Opportunities
IBAMA	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis
IEMA	Instituto Estadual de Meio Ambiente e Recursos hídricos do Espírito Santo
NR	Normas Regulamentadoras de Segurança e Saúde no Trabalho
PACUERA	Plano Ambiental de Conservação e Uso do Entorno de Reservatórios Artificiais
PAE	Plano de Ação de Emergência
ONS	Operador Nacional do Sistema
SIG	Sistema de Gestão Integrado



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	Management of reservoir levels and downstream releases; water quality and sedimentation; management of reservoir buffer zone and other parts of the Mascarenhas HPP property; relations with neighbouring communities such as Vila Mascarenhas and the wider Baixo Guandu municipality.
Identify the environmental regulator	Instituto Estadual de Meio Ambiente e Recursos hídricos do Espírito Santo - IEMA (Environmental and Water Resource Institute of Espírito Santo State) Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis – IBAMA
Identify other regulators (e.g. on land, water use, Indigenous Peoples)	ANEEL – Agência Nacional de Energia Elétrica – Electric Energy Federal Regulator ANA – Agência Nacional de Águas e Saneamento Básico – Water Resources Federal Regulator
Summarise the ESIA regulatory requirements	There was no ESIA at the initial stage of the project, but a limited one in 1999 when the installation of a 4 th turbine was being prepared. The current operational license from IEMA (2024-2030) has 28 conditions, and there are general E&S regulations that apply to all hydropower projects in Brazil. Other permits include a water resource permit from ANA and a fish rescue permit from IEMA.
Describe the non-physical cultural heritage in the project area	The project area is in Espírito Santo State near the border with Minas Gerais State, a typical part of rural Brazil, with indigenous populations long displaced.

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	✓ There are very systematic processes, with a work procedure as part of the Integrated Management System (SIG) and with a series of spreadsheets, to identify and manage impacts related to a number of components of the	✗ Processes to identify ongoing and emerging environmental and social issues take into account broad considerations, and both risks and opportunities	There are some examples of broader considerations, often pursued through specialized consultants. For example, there has been a life-cycle analysis of GHG emissions that will serve as an input for a GHG net zero

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	Mascarenhas HPP. These are updated at least once a year, or when required, by an incident or a regulatory change.		strategy. When concerns arose about erosion of a downstream island, a consulting company was contracted to analyse the situation and demonstrate that it was not caused by Mascarenhas HPP.
The processes utilise appropriate expertise	✓ Paraty Energia has qualified and certified environmental professionals at the site, in the corporate office, at the VH Global GSEO team, and at the operational service provider CSC Energia, with broad experience across the hydropower sector. Specialized service providers are brought in for many tasks, for example for fish transposition and fish monitoring, ISO auditing, waste management and preparation of plans such as the PACUERA (<i>Plano Ambiental de Conservação e Uso do Entorno de Reservatórios Artificiais</i> , Environmental Plan for Conservation and Use of the Surroundings of Artificial Reservoirs, a mandatory plan for all reservoirs in Brazil).		An incentive scheme with awards for employees is yielding some environmental and social improvements, for example regarding oil-water separation, a camera on the crane that cleans the trashrack, donation of furniture acquired during the Covid-19 pandemic to an NGO, and using untreated rainwater for bathrooms. However, a number of ongoing and emerging issues have not been properly analysed, as detailed in the respective sections of this report, which is a significant gap . This refers for example, to biodiversity and impacts of peaking operations downstream.
Monitoring programmes are in place for identified issues	✓ There are multiple monitoring programs at different levels. Under Paraty Energia’s management contract with VH, any ESG non-conformances are tracked among the other KPIs. For VH’s sustainability reporting, a number of environmental and social indicators are tracked. At the level of the plant, there is regular monitoring and reporting to IEMA. An		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
		annual E&S responsibility report to ANEEL is also publicly disclosed.			
MANAGEMENT					
Environmental and social management system is in place to manage measures to address identified environmental and social issues	✓	VH and Paraty Energia both have approved sustainability policies. Two complementary E&S management frameworks are in place for Mascarenhas HPP. Under the environmental license, last renewed in 2024, there are a number of required management programs, most of which are outsourced through CSC Energia and other specialized providers. The Sustainability Action Plan agreed with VH, and reviewed every year, includes these programs as well as additional voluntary ones.	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	The existing Sustainability Action Plan is evidence of the operators' commitment to best practices in E&S management and quick action to improve E&S management at the plant, after taking over operations. It is based on a number of sustainability commitments from VH, a materiality analysis of ESG issues, an assessment of contributions of the plant to the SDGs, climate considerations, this sustainability assessment, and other processes. ESG issues are discussed at every quarterly board meeting and other regular meetings of Paraty Energia, Energest and VH.
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	✓	The ESMS is well structured with manuals and work procedures, internal audits by CSC Energia who have certified ISO auditors, and the Mascarenhas HPP is externally certified against ISO 9001, ISO 14001 and ISO 45001.
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 non-compliances.
• no major non-compliances	✓	There are no indications for major non-compliances. Both IBAMA and IEMA have confirmed the absence of			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		any outstanding sanctions and non-compliances. There have been no recent inspections by E&S regulators.			
• no major non-conformances	✓	There are no indications for major non-conformances. Paraty Energia has met the agreed KPIs in its operating contract with VH, including for ESG, resulting in full payment of management fees.			
Environmental and social commitments have been or are on track to be met	✓	There are no indications otherwise. While there were no records of commitments from before Paraty Energia assumed operations, there have been a number of voluntary commitments since. For example, some of these are related to education (school visits, environmental poetry competition, coordination with municipal secretary of education). Some are related to dealing with complaints (e.g. the malfunction of alarms, after which psychological support was offered in Vila Mascarenhas).	There are no non-conformances	✓	There are no indications for non-conformances. A list of non-conformances identified through a 2023 internal audit was processed before ISO certification or are now being processed with action plans. The external Bureau Veritas ISO audit did not identify pending issues.
Environmental and social funding commitments have been or are on track to be met	✓	E&S commitments are included in the plant's budget, and Sustainability Policies.			
OUTCOMES					
Negative environmental and social impacts associated with hydropower facility	✓	Ecosystems and communities around the project have had 50 years to adapt to its presence. There are few	Negative environmental and social impacts associated with hydropower facility	✗	While there are environmental management measures for all impacts, the effectiveness of some of

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
operations are avoided, minimised and mitigated		ongoing negative impacts, and these are generally well mitigated.	operations are avoided, minimised, mitigated and compensated		these in compensating for impacts is difficult to confirm in the absence of more dedicated monitoring and evaluation, which is a significant gap . This refers principally to 1) biodiversity management and 2) the downstream effects of fluctuating releases for power generation (see sections 6 and 11). There are also some opportunities for stronger stakeholder engagement and positive E&S impacts that are not yet realized.
Land disturbance associated with development of the hydropower project is rehabilitated or mitigated	✓	The properties belonging to the Mascarenhas HPP are in good ecological condition.			
The operating hydropower facility or the corporate entity to which it belongs can pay for social and environmental commitments	✓	There are no concerns regarding the willingness and ability of the shareholders of the company that owns Mascarenhas HPP (Energest) to pay for E&S commitments.			

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

Summary of findings and other notable issues
The Mascarenhas HPP has been operating for 50 years, and ecosystems and communities around the project have had 50 years to adapt to its presence. The environmental license prescribes some standard E&S monitoring and management measures. These have been significantly expanded since Paraty Energia and Victory Hill assumed operations, with a number of different assessments and audits to identify additional needs and opportunities for improved E&S performance. The project is certified against the ISO 9001 and ISO 14001 standards.

Relevant evidence	
Interview	1-13, 20, 24-28, 32, 39, 40
Document	1-40, 57, 109, 110, 153-156, 197-220, 226-228, 242, 290-301, 304-310, 384, 385
Photo	--



2 Labour and Working Conditions

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

Background	
Labour requirements during operation (full-time equivalent)	The total number of employees at the power plant is 24. Additionally, staff time in Paraty Energia's Sao Paulo head office is dedicated to Mascarenhas HPP.
Applicable key human resources regulations	Brazil has a comprehensive set of labour legislation consolidated in one set of regulation called 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	OHS 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 OHS 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	Workers located at Mascarenhas HPP are represented by the union SINERGIA (Sindicato dos Energéticos do Espírito Santo).

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	✓ During the asset due diligence phase, external operations management and labour law experts confirmed compliance with existing labour management regulations. All practices were maintained by Paraty Energia. At the time of taking over operations from EDP, Paraty Energia carried out a	✓ Identification of ongoing or emerging labour management issues takes broad considerations into account, and both risks and opportunities	✓ Upon assuming operations, Paraty Energia also had an internal survey carried out by CSC Energia (the advisory company providing many of the operational processes used by the project, see sections 1 and 9) as well as an employee family's mapping and employee profile, carried out by

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		round of interviews and assessments with all power plant employees. At the time, the need for hiring was identified and 4 new positions were filled; another assessment at the end of 2023 identified one more position which has since been filled.			Energizar Consultoria. Paraty Energia intends to maintain these surveys as a periodic routine.
The assessment included project occupational health and safety issues, risks, and management measures	✓	Energest’s integrated management system (see below) includes a series of work Instructions (IT) to address hazard analysis and risk classification, safe work process, change management, identification of legal requirements, investigation and analysis of accidents and incidents, monitoring, measurement and analysis of the management system, and risks and opportunities.			
Monitoring is being undertaken to assess if management measures are effective	✓	Paraty Energia contracted CSC Energia to review the facility’s management system and adapt it to the new ownership, and also to permanently monitor and supervise the efficiency of these procedures.			
Ongoing or emerging labour management issues have been identified	✓	An internal work environment survey which monitors the situation and opinion of employees and seek to identify improvements was carried out and used to verify if labour management issues have been identified.			
MANAGEMENT					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Human resource and labour management policies, plans and processes are in place to address all labour management planning components	✓	Energest S.A. has an integrated Environmental, Health & Safety and Quality Management system in place with processes and procedures to manage issues associated with the power plant, including human resources. A Procurement Standard and Procedures document applies to all labour issues of permanent, temporary or contract staff. The power plant is certified under ISO 9001, ISO 14001, and ISO 45001 standards.	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	Power plant employees are engaged through the Daily Safety Dialogues, among other processes. These take place every working day and while focused on work safety and the environment, also provide information and allow dialogue on any other relevant areas. During the on-site assessment, for example, one talk was provided on the catastrophic floods in southern Brazil, and the operational problems for the power plants in that region.
Human resource and labour management policies, plans and processes of contractors, subcontractors and intermediaries are in place	✓	Paraty Energia has a Technical Specification specifically for contractors. It establishes requirements and responsibilities for the process of approval and monitoring of contractors, related to OHS, the Environment, and Quality			The company has a program to encourage employees to present innovative ideas for operational improvements. Many of the ideas presented have already been implemented, eliminating risks and taking advantage of opportunities that are often only identified by those involved in day-to-day operations.
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 non-compliances.
• no major non-compliances	✓	The processes in place have been defined based on regulatory standards (known as NRs), applicable to the business, and other requirements of regulatory and/or supervisory bodies. The fact that no official labour inspections have taken			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		place indicates that there are no reports of unfair labour relations or other non-compliances.			
• no major non-conformances	✓	There are no indications for major non-conformances.			
Any labour related commitments have been or are on track to be met	✓	There is no evidence of any commitments that have not been met. There have been no labour disputes, strikes or any similar incidents. In the last negotiation of the collective labour agreement, Paraty Energia offered improvements and incentives to all employees. An example is daycare assistance, which under the former operator was only provided to women (as is mandatory by law), while Paraty Energia now offers this assistance to all male and female employees.	There are no non-conformances	✓	There are no indications for non-conformances.
OUTCOMES					
There are no identified inconsistencies of labour management policies, plans and practices with internationally recognised labour rights	✓	There are no identified inconsistencies of labour management policies, plans and practices at Mascarenhas HPP with internationally recognized labour rights.	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. Staff reported a high level of work satisfaction. There were no health and safety incidents in 2023, and staff turnover was below the benchmark 10%.

Mascarenhas Hydropower Plant, 198 MW, Brazil

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

Summary of findings and other notable issues
Mascarenhas HPP has good labour relations, labour management practices, and a high level of work satisfaction. Paraty Energia has retained all EDP’s existing employees and offers opportunities for professional growth. There have been no labour disputes, strikes or any similar incidents. The project is certified against the ISO 45001 standard.

Relevant evidence	
Interview	1, 2, 4, 5, 14 to 19, 35, 38
Document	1, 4-16, 19, 27-30, 36, 37, 41-49, 57-60, 62-106, 121-123, 138, 158, 160, 163, 169, 180, 214, 261, 267, 268, 269, 272, 317, 348
Photo	5, 14, 18, 19-23, 39, 42, 49, 50, 54-57, 61, 65, 76

Under Public Consultation



3 Water Quality and Sediments

Scope and Principle	
<p>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.</p>	
Background	
Water Quality	
Description of water quality	<ul style="list-style-type: none"> The Rio Doce is a watercourse in southeastern Brazil with a watershed area of approximately 86,000 km² and 853 km in length. The basin covers almost 230 municipalities with a total population of 3.6 million inhabitants. The water quality in the reservoir of Mascarenhas HPP is compliant with the requirements of the operational license and in general can be considered good, according to the results of the Water Quality Monitoring Program at 4 monitoring sites, as reported periodically to the environmental authority. In 2023 the IQA values (Water Quality Index) were “good” at most monitoring sites and “regular” at one upstream site, indicating that the quality of outflowing water is better than the quality of inflowing water. Water from the reservoir is abstracted by the local municipality for treatment and distribution as drinking water.
Key water quality issues	<ul style="list-style-type: none"> In 2015 there was a major dam failure and environmental catastrophe in the upstream catchment, when mud from a tailings dam at Mariana belonging to Samarco Mining reached the Rio Doce via the Rio Carmo. However, the monitoring program indicates that as of today, no remaining contaminants can be identified in the Mascarenhas reservoir. The Rio Doce suffers from sedimentation due to deforestation and low coverage by riparian forests, and from receiving untreated sewage. Some water quality samples taken in 2023 were non-conformant, likely due to untreated wastewater.
Main influences on water quality	<ul style="list-style-type: none"> Mining and related activities Agricultural activities such as plantations and livestock Towns of Aimorés (around 25,000 inhabitants) and Baixo Guandu (around 30,000 inhabitants) directly upstream of the reservoir, located on the banks of Rio Doce Pollution levels tend to be higher in the dry season
Sedimentology	
Key sediment issues	<ul style="list-style-type: none"> There are three hydropower reservoirs upstream up Mascarenhas HPP (Risoleta Neves/Candongu HPP, Baguari HPP and Aimorés HPP), and most of the sediment load of the Rio Doce is deposited in these reservoirs.

	<ul style="list-style-type: none"> This includes the additional load from the 2015 Mariana dam failure, when most of tailings that reached the Rio Doce were retained in the Risoleta Neves/Candongu HPP.
Sediment load (tonnes/year)	2.9 million /year (2023)
Catchment area at the dam	73,487 km ²
Other information	<p>The current Operating License requires:</p> <ul style="list-style-type: none"> Semiannual monitoring of water quality, in the dry season and in the rainy season, with presentation of a consolidated annual report Monitoring sediment quality every 5 years, evaluating the possible influence of the reservoir on water quality Sedimentological monitoring every 4 years Bathymetry surveys of the reservoir every 10 years

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:			
<ul style="list-style-type: none"> water quality 	✓	As required by the Operating License, Mascarenhas HPP has a dry and wet season water quality monitoring program to identify potential sources of pollution from both anthropic activities and natural processes, and the monitoring of physical, chemical and biological parameters (phytoplankton, zooplankton and benthic species). Quality is tracked through the calculation of various indices.	Identification of ongoing or emerging water quality issues takes into account both risks and opportunities
<ul style="list-style-type: none"> erosion and sedimentation 	✓	As required by the Operating License, Mascarenhas HPP has a sediment monitoring program to assess the load that reaches the reservoir, and also 10 km downstream of the dam.	
		✓	Although not required under the operating license, Mascarenhas also monitors the plant's drinking water and treated industrial and sanitary effluents twice a year, through a third-party company. The results have been satisfactory.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (X)		Findings and Observations	Requirement is met: yes (✓) or no (X)		Findings and Observations
		The reservoir was impounded 50 years ago, and the banks are well stabilized. The Permanent Preservation Areas around the reservoir are covered with vegetation, and no problems with erosion have been identified.			
If management measures are required then monitoring is being undertaken to assess if management measures are effective for:					
• water quality	✓	No management measures other than preventing pollution from the powerhouse are required. Extensive sampling is carried out in the reservoir, its tributaries and downstream from the dam as part of the water quality monitoring program.	Identification of ongoing or emerging erosion and sedimentation issues takes into account both risks and opportunities	✓	Sediment monitoring detected a significant increase between the 2022 and 2023 rainy seasons. Similar sudden changes have been detected in the past. No studies were carried out to determine the causes, but Paraty Energia is monitoring the situation. The last bathymetry survey was carried out in 2013 and revised in 2016 and 2020, showing that the reservoir has not lost volume along the recent years. Regulations requires surveys every 10 years, and new bathymetry and sedimentology surveys are scheduled for 2024. Depending on the results, an Action Plan will be drawn for approval by ANA.
• erosion and sedimentation	✓	No management measures other than implementing the PACUERA and maintaining reservoir buffer zones are required.			
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	✓	Potential water quality issues associated with the operations of the plant are well managed. Areas where chemicals and oils are stored are appropriately contained.	• water quality	✓	Water quality is monitored on a regular basis.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (X)		Findings and Observations	Requirement is met: yes (✓) or no (X)		Findings and Observations
		Wastewater is treated to meet effluent quality requirements before it is discharged to the river. Drainage channels throughout the powerhouse convey seepage and any water contaminated with oil to an oil/water separator.			
• erosion and sedimentation	✓	As above, regarding the monitoring program.	• erosion and sedimentation	✓	Semi-annual monitoring campaigns are conducted and analysed for trends.
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 related to water quality.	• water quality	✓	There are no indications for non-compliances related to water quality.
• water quality, with no major non-conformances	✓	There are no indications for major non-conformances related to water quality.			
• erosion and sedimentation, with no major non-compliances	✓	There are no indications for major non-compliances related to erosion and sedimentation.	• erosion and sedimentation	✓	There are no indications for non-compliances related to erosion and sedimentation.
• erosion and sedimentation, with no major non-conformances	✓	There are no indications for major non-conformances related to erosion and sedimentation.			
Commitments related to the following have been or are on track to be met:			There are no non-conformances relating to:		
• water quality	✓	All commitments related to water quality issues are being met as presented in the Water Quality Monitoring Program.	• water quality	✓	There are no indications for non-conformances related to water quality.
• erosion and sedimentation	✓	All commitments related to erosion and sedimentation issues are being	• erosion and sedimentation	✓	There are no indications for non-conformances related to erosion and sedimentation.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (X)	Findings and Observations	Requirement is met: yes (✓) or no (X)	Findings and Observations
	met as presented in the Sediment Monitoring Program.		
OUTCOMES			
Negative water quality impacts arising from activities of the operating hydropower facility are avoided, minimised and mitigated	✓	Potential negative water quality impacts from the operating hydropower facility are avoided, minimized and mitigated with no significant gaps.	<p>Water quality in the area affected by the operating hydropower facility is of a high quality</p> <p>✓</p> <p>The analysis show that the water quality is good. The project’s own results are generally consistent with the publicly available monitoring results of Renova, the foundation established to deal with the aftermath of the Mariana dam failure. It is also confirmed by fish monitoring results which show that water quality is adequate for the fish fauna. Water from the Mascarenhas reservoir is collected by the local municipality for treatment and distribution as drinking water.</p>
			<p>The facility has contributed or is on track to contribute to addressing water quality issues beyond those impacts caused by the operating hydropower facility</p> <p>✓</p> <p>Some water quality samples show that the quality of the outflowing water is better than the quality of the inflowing water. Minor amounts of solid waste are retained in the log boom and trashracks and extracted from the reservoir. The waste is removed, separated, and stored until adequate disposal. Organic material is destined for the plant's composting project and other waste is destined for recycling or landfill.</p>

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (X)	Findings and Observations	Requirement is met: yes (✓) or no (X)	Findings and Observations
Erosion and sedimentation issues are avoided, minimised and mitigated	✓	Potential erosion and sedimentation issues are avoided, minimized and mitigated with no significant gaps.	Erosion and sedimentation associated with the operating facility do not present ongoing problems for environmental, social and economic objectives of the facility or the project-affected areas

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

Summary of findings and other notable issues
The project continuously monitors and evaluates sediment and water quality in its area of influence, and reports to the environmental authority. There are no indications of any significant ongoing issues or impacts of the project.

Relevant evidence	
Interview	20, 27, 28
Document	107-114, 153, 154, 184, 198, 203, 271, 299-301, 319-322, 329-347, 351-356, 380, 389
Photo	9, 48, 51, 52, 53, 66



4 Community Impacts and Infrastructure Safety

Scope and Principle

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

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

Background

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

Community Impacts and Benefits

Description of project-affected communities and how they are affected (distinguish between physically displaced (addressed in Section 5), economically displaced and other project-affected communities and include estimated number of people and households)

The project was constructed from 1969 to 1974. At the time there was no environmental legislation, no environmental or social assessment was undertaken, it is not known whether commitments to project-affected communities or regarding project benefits were made, and there are no data on the pre-project baseline situation against which to compare post-project conditions.

Approximately 300 meters downstream of the Mascarenhas HPP dam is District Quilometro 14 do Mutum, known as Vila Mascarenhas, part of the municipality of Baixo Guandu. This residential area with a population of 1,200 inhabitants has existed since 1911, was expanded to accommodate workers during construction of the project, and today is still the home to a number of project staff. Under the previous operator of the power plant, there was reportedly little relationship with the community and even animosity among some residents, since the previous operator was also the local energy distribution company, associated with cutting electricity supply in case of non-payment and quality of power supply. Paraty Energia as the new operator restarted engagement with the population of Vila Mascarenhas. As the community is directly downstream of the dam, its safety is a key objective in the Emergency Action Plan (*Plano de Ação de Emergência, PAE*).

	The real estate documentation of the project property and surrounding areas is incomplete. 76 neighbouring properties were identified in the 2021 version of the Reservoir's Zoning Plan, known as PACUERA. Paraty Energia is currently georeferencing the power plant installations (including the reservoir), to update the PACUERA following which a specialized consultancy will be contracted for land ownership regularization services. This may be complex since some of the properties belonging to the project may have been invaded and there may be legal uncertainties.
Agencies relevant to land acquisition	Instituto Nacional de Colonização e Reforma Agrária - INCRA
Agencies relevant to livelihood restoration and project benefits	Municipality of Baixo Guandu Instituto Capixaba de Pesquisa, Assistência Técnica e Extensão Rural - INCAPER
Infrastructure Safety and Public Health	
Type of dam	Main concrete dam including powerhouse and spillway sections, plus 2 earth fill dams
Dam height (m)	28 m
Probable maximum flood (m ³ / s)	Not assessed
Design flood (expressed as estimated flood with return period)	14,500 m ³ /s, 1-in-10,000 years flood as estimated before recent update and used for spillway design.
Spillway capacity (m ³ / s)	7 x 2,071 = 14,500 m ³ /s
Spillway height (masl)	63.5 masl
Headrace length (m)	NA
Headrace width (m)	NA
Headrace capacity (m ³ / s)	NA
Seismicity	Very low seismicity
Geology	Metamorphic and igneous rocks with significant presence of fracturing and shear zones. They are low-porous rocks (between 0 and 15%), hard, with a clay-silica-sandy texture.
Dam safety regulatory authorities	ANEEL
Local presence/capacity of emergency services	Fire Departments, Civil Defence and hospitals in the municipalities of Baixo Guandu (upstream) and Colatina (downstream)
Potential safety risks in this context	Low risk with high potential associated damage, according to ANEEL Resolution 1064/2023 – Class B
Degree of risk of dam failure and in what way	Low risk. There are concrete main structures and two earth fill saddle dams. The studies identified 5 probable failure modes: instantaneous overtopping or collapse of the spillway, instantaneous collapse of a concrete dam block, instantaneous overtopping or collapse of the spillway due to break of the upstream dam of Aimorés HPP (cascade failure), overtopping of saddle dam 1 with 2 inoperative flood gates, and overtopping of saddle dam 2 with 2 inoperative flood gates. Dam break studies are comprehensive. Cascade failure (Aimorés + Mascarenhas dam break scenario) during a 1-in-10,000-year flood was also studied. This is estimated to produce a 26,497 m ³ /s peak flood wave downstream of Mascarenhas. I.e., a joint failure of the Aimores and Mascarenhas dams would add 8,751 m ³ /s to the 1-in-10,000-year flood of 17,746 m ³ /s.

Population at risk of dam break (locations, numbers)	As of July 2023, 792 persons live within the self-rescue zone defined by the Emergency Action Plan.
Dam safety standards followed	ANEEL Resolution 1064/2023
Agencies relevant to dam safety	ANEEL
Other infrastructure safety issues	Electricity for the spillway gates comes from 3 independent sources. Gates can be manually operated if necessary.
Description of key public health issues	In the middle of the last century Baixo Guandu was the first municipality in Espírito Santo State to achieve water treatment with fluoridation for distribution to the entire population. In December 2022 the municipality achieved a Primary Health Care index of 9.26 (maximum score is 10). Remaining challenges include delays in medical care, and a need to improve health care infrastructure and expand access to exams and medical specialties. There have been recent interruptions to domestic water supply, and the 2015 mining tailings dam accident upstream had consequences in the physical and mental health of the population.
Agencies relevant to public health	National Health Surveillance Agency – ANVISA Espírito Santo State Health Department Municipal Health Department of Baixo Guandu

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Community Impacts and Benefits			
Monitoring is being undertaken to assess if the following commitments have been delivered and if management measures are effective:			
• commitments to project-affected communities	✓ There is no record of any commitments to project-affected communities.	Identification of ongoing or emerging issues for project-affected communities takes into consideration both risks and opportunities, and interrelationships among issues	✓ Since assuming the operation of the powerplant, Paraty Energia has begun engagement activities to strengthen relations with the local population. These include discussions with communities about risks (such as dam safety risks and biodiversity) and opportunities for development, and voluntary social responsibility projects for the Baixo Guandu municipality and in particular, Vila Mascarenhas.
• commitments to project benefits	✓ There is no record of any commitments to project benefits. However there is a regulatory requirement to pay a percentage of revenues to ANEEL for distribution to different government entities, under the <i>Compensação Financeira pela Utilização de Recursos Hídricos para Fins de Geração de Energia Elétrica</i>		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
		(CFURH) mechanism. In 2023, approximately USD 1 million was paid.			
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	✓	See above.
• issues that affect project-affected communities	✓	The need to create a stronger relationship with the local community and change their perceptions regarding the power plant was identified. Surveys were carried out to map the key stakeholders and discussions were held to identify risks and opportunities.			
• delivery of project benefits	✓	See above.			
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	✓	Based on the results of hydrological studies carried out in 2023, which indicated an increase in the 1-in-10,000-year flood flows to 17,746 m ³ /s, a review of the flood resilience of the dams was carried out. This led to a study and decision to ensure the freeboard recommended by international engineering standards, by raising the main dam (to protect the powerhouse from flooding) and the saddle dams (for public safety, particularly downstream in Vila Mascarenhas).
• dam and other infrastructure safety	✓	The regular inspections have identified a number of issues over the years. The Nov 2022 Structures Behavior Study Report and Regular Safety Inspection Report contained a number of recommendations, with a suggested completion period of 1 year, which have not yet been carried out but are scheduled to be completed in 2024.			
• public health issues associated with the operating hydropower facility	✓	No public health issue has been identified associated with the operations of Mascarenhas HPP.			
Routine monitoring of dam and infrastructure safety is being undertaken to identify	✓	Routine monitoring of dam and infrastructure safety is undertaken			

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		following applicable Brazilian regulations.			
If public health issues require management measures then monitoring is being undertaken to assess if management measures are effective		✓ Not applicable	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		✓ While no public health issues associated with Mascarenhas HPP have been identified, Paraty Energia is extending its internal campaign for vaccination against influenza, to the families of workers and residents of Vila Mascarenhas, in partnership with the Municipal Health Department of Baixo Guandu. Other support for Vila Mascarenhas residents, some of which are struggling with drug and mental health issues, is being considered (such as support for community sports and sponsorship for sports teams).
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 no commitments or agreements with project-affected communities and project benefits.
• to project-affected communities	✓	There are no commitments with project-affected communities.			
• to project benefits	✓	There are no commitments to project benefits.			
Measures are in place to manage any identified issues relating to these commitments:					
• to project-affected communities	✓	See above.			
• to project benefits	✓	See above.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
If there are any formal agreements with project-affected communities, these are publicly disclosed	✓	There are no formal agreements with project-affected communities. Recent initiatives such as with the health, cultural and environmental departments of the municipality are openly discussed.			
Commitments to project benefits are publicly disclosed	✓	See 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	✓	Safety management plans and processes were developed in conjunction with relevant regulatory and local authorities, ANEEL and Civil Defence. An ongoing Dam Safety Program and an Emergency Action Plan (PAE) are in place, which included the registration of the population and properties located in the self-rescue zone (ZAS - Zona de Auto Salvamento) and regular drills.	Processes are in place to anticipate and respond to emerging infrastructure safety risks and opportunities	✗	<p>Paraty Energia has a procedure for purchasing and inventory of critical spare parts, which includes supply chain risks and was validated in the ISO audit. There is a recognized need for improvement of this procedure, regarding the maintenance on-site of a stock of critical parts to safely operate the floodgates and associated equipment, as well as for data communication systems. A R&D project is underway with a specialist company that aims to incorporate AI into the process of failure prediction and inventory management.</p> <p>As provided for in the PAE, the safety team contacts are reviewed annually together with the Civil Defence team and updated whenever there is any significant change. The last update was in October 2023. However, the term 'significant' is not specified and it is not clear that the contacts would</p>

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
					be updated even if only one contact changes, which is a significant gap .
These plans and processes provide for communication of public safety measures	✓	Communications with stakeholders on safety measures are well established.	Public safety measures are widely communicated in a timely and accessible manner	✓	The project has effective communications with the downstream population and with the local Civil Defence team. One short-range siren is installed on the dam to warn people immediately downstream about releases. Seven other long-range sirens have been installed to warn the population in flooding situations. In case of any safety situation, text message warnings are also sent to a group of key people.
Emergency response plans and processes include awareness and training programmes and emergency response simulations	✓	Training and drills are included in the comprehensive PAE. The downstream community Vila Mascarenhas is included in the plan’s “Manage Closely” category. Evacuation drills are carried out every 3 years, in compliance with regulations. The next evacuation drill is scheduled for 2026, to be carried out jointly with Aimorés HPP, the next upstream hydropower plant, which is a major improvement on the regular practice in the country.			
Measures are in place to manage identified public health issues	✓	No public health issues have been identified.			
CONFORMANCE AND COMPLIANCE					
Community Impacts and Benefits					
Processes and objectives in place to manage the following have been and are on track to be met:			There are no non-compliances relating to:		
• delivery of commitments to project-affected communities, with no major non-compliances	✓	There is no record of any commitments to project-affected communities or regarding project benefits.	• project-affected communities	✓	There are no indications for non-compliances related to project-affected communities.
• delivery of commitments to project-affected	✓	See above			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
communities, with no major non-conformances					
• project benefits, with no major non-compliances	✓	See above	• project benefits	✓	There are no indications for non-compliances related to project benefits.
• project benefits, with no major non-conformances	✓	See above			
Commitments have been or are on track to be met relating to:			There are no non-conformances relating to:		
• project-affected communities	✓	See above	• project-affected communities	✓	There are no indications for non-conformances related to project-affected communities.
• project benefits	✓	See above	• project benefits	✓	There are no indications for non-conformances related to project benefits.
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 related to dam and other infrastructure safety.	• dam and other infrastructure safety	✓	There are no indications for non-compliances related to dam and other infrastructure safety.
• dam and other infrastructure safety, with no major non-conformances	✓	There are no indications for major non-conformances related to dam and other infrastructure safety.			
• public health issues, with no major non-compliances	✓	There are no indications for major non-compliances related to public health.	• public health	✓	There are no indications for non-compliances related to public health.
• public health issues, with no major non-conformances	✓	There are no indications for major non-conformances related to public health.			
Commitments have been or are on track to be met relating to:			There are no non-conformances relating to:		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations		
• dam and other infrastructure safety	✓ There is no record of any commitments related to dam and other infrastructure safety.	• dam and other infrastructure safety	✓ There are no indications for non-conformances related to dam and other infrastructure safety.		
• public health	✓ There is no record of any commitments related to public health.	• public health	✓ There are no indications for non-conformances related to public health.		
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 baseline data to compare livelihoods and living standards with pre-project conditions. However, in the 50 years since the project was commissioned, Brazil's economy and per capita income has grown significantly.	✗ The measures put in place to improve livelihoods and living standards are on track to become self-sustaining in the long-term	✗ There are no indications for targeted measures to improve livelihoods and living standards by the current or previous operators, which is a significant gap . While the plant has been providing some ongoing support to the local economy through employment, procurement, taxes etc, these do not have the objective and are not specifically designed to enhance the livelihoods and living standards of people impacted by the project.		
Economic displacement has been fairly compensated, preferably through provision of comparable goods, property or services	✓ There is no record of any commitments to project-affected communities. Compensation has not been documented.				
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	✓ There is no record of any commitments to project-affected communities.	✓ Benefits are significant and sustained for communities affected by the project	✓ The project has created a number of benefits, although these have not been systematically documented. Most of the annual CFURH payments are received by the municipalities of Baixo Guandu and Aimorés and constitute a significant portion of their budgets. Additionally, recently Paraty Energia has started a number of promising voluntary initiatives for neighbouring communities, including		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations		
			sports, environmental education, and cultural projects, such as support for the recently opened city museum.		
Infrastructure Safety and Public Health					
Safety risks have been avoided, minimised and mitigated with no significant gaps	✓	No significant gaps have been identified.	Safety risks have been avoided, minimised and mitigated with no identified gaps	✓	There are no identified gaps. A response to the recently identified increase in peak floods is on track.
			Safety issues have been addressed beyond those risks caused by the operating facility itself	✓	On a number of occasions (for example, in January 2022) the reservoir was managed to dampen an incoming peak flood, in coordination with authorities in the downstream town of Colatina. The flood management effect is relatively small, however, as the reservoir volume is limited and lowering it significantly could affect Baixo Guandu municipality's raw water intake and damage equipment.
Negative public health impacts arising from activities of the operating hydropower facility are avoided, minimised and mitigated	✓	No negative public health impacts from the operating hydropower facility have been identified.	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	✓	As described above, the project is offering vaccinations to local residents.
List of significant gaps against Minimum Requirements			Number of Advanced Requirements met		
None			19		

Summary of findings and other notable issues	
<p>Negative or positive social impacts from the project are limited. There are no records of social commitments, and the project has been operating for 50 years so comparisons with the pre-project situation are not meaningful. Annual payments to government include significant amounts for local municipalities. Since assuming operations, Paraty Energia has engaged with the local community and started a process of clarifying land titles in the project’s properties around the reservoir. No public health issues related to the project have been identified. Public safety is assured through compliance with Brazilian regulations including regular dam safety maintenance, inspections, trainings, and upgrades, including a plan to raise the dam height to adapt to increasing floods.</p>	

Relevant evidence	
Interview	1-13, 16-19, 21-26, 30, 31
Document	10, 13-16, 51-54, 61, 108-112, 115-139, 163, 185, 186, 198, 203, 204, 208, 211, 226, 228-232, 243-262, 266, 271, 272, 275-291, 302-306, 308, 311, 315, 316, 329, 349-351, 357, 358, 359, 367, 369, 370, 373-375, 380, 383, 384, 395, 398
Photo	2-4, 11-13, 15-19, 24, 27, 29-31, 32, 34-41, 43-45, 55, 62, 63, 66-75

Under Public Consultation

5 Resettlement



Scope and Principle

This section addresses how the physical displacement arising from development of the hydropower facility has been addressed, in cases where resettlement occurred and commitments are well-documented against a pre-project baseline. The principle is that the dignity and human rights of those physically displaced have been respected; that these matters have been dealt with in a fair and equitable manner; that livelihoods and standards of living for resettles and host communities have been improved; and that commitments made to resettles and host communities have been fully fulfilled. This section does not address those that are only economically displaced, who are addressed in Section 4.

Background

Did the project require or result in any physical displacement of people? Please state the evidence on which this determination is made.

Yes, this section is relevant (for older projects, see note below)

[Click here to enter text.](#)

No, this section is not relevant

The reservoir flooded an area of around 4 km² and 0.6 km² were acquired additionally for construction and operational purposes and are now part of the concession area. The history of economic and physical displacement and any commitments made at the time are not documented.

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



6 Biodiversity and Invasive Species

Scope and Principle	
<p>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.</p>	
Background	
Short description of the ecological region in the project area	The Rio Doce basin was once largely covered by the large Brazilian Atlantic Rainforest, an area of high biodiversity, only ~10% of which are remaining. The project area belongs to the Sub-Montane Semideciduous Seasonal Forest, in the altitudinal range of 50 to 500 meters. Currently, the area is predominantly covered by farms and ranches, interspersed with small forest fragments.
Protected areas (national parks and reserves etc) and their distance from the project	All identified protected areas of different status (State Park, Biological Reserve, Biological Station, National Forest) are located at a distance of more than 100 km from the project.
Critical habitats in the project area, including important bird areas, hotspots of endemism etc.	No critical habitats have been identified in the project area.
# threatened species in the directly affected area: terrestrial	The 2021 version of the PACUERA identified 10 endangered flora species, out of 131 species surveyed, in the narrow buffer zone around the reservoir. This is being reviewed in the ongoing update of the PACUERA.
# threatened species: aquatic	<i>Prochilodus vimboides</i> (Curimba) is included in the national list of endangered species and the IUCN Red List, classified as “vulnerable”. It was introduced in the Rio Doce watershed.
Any other species of conservation importance	No other species of conservation importance are known.
Migratory pathways	No migratory pathways are known.
Invasive species: terrestrial	The gecko <i>Hemidactylus mabouia</i> is originally from the African continent, therefore exotic to the territory of Espírito Santo.
Invasive species: aquatic	At least 18 fish species were introduced in the Doce River watershed, mostly with government incentives to enhance the fishing activity in the region. Around 30% of all fish caught during the last monitoring in 2023 were introduced, with a higher percentage in the reservoir.

Key threats to biodiversity	<ul style="list-style-type: none"> • Aquatic: release of sewage, industrial and mining effluents and diffuse sources of nutrients, pollutants and sediments from agricultural areas, side roads and urban solid waste; fragmentation due to hydropower plants; introduction of species • Terrestrial: development of agricultural activities including deforestation and use of pesticides
Agencies involved in biodiversity conservation	<ul style="list-style-type: none"> • Brazilian Institute for the Environment and Renewable Natural Resources – IBAMA • Instituto Estadual de Meio Ambiente e Recursos hídricos do Espírito Santo – IEMA • IBAMA’s Instituto Chico Mendes – ICMBio
Other relevant information	There are two ichthyofauna programs in force: manual fish transposition and fish rescue during maintenance stops.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
ASSESSMENT			
Ongoing or emerging biodiversity issues have been identified	✓	The condition of the fish fauna in the reservoir and in the Rio Doce has been identified as an ongoing biodiversity issue.	
If management measures are required, then monitoring is being undertaken to assess if management measures are effective	✓	As a license condition, an Ichthyofauna Monitoring Program is being implemented and a technical report is submitted annually to IEMA, as part of the Annual Environmental Monitoring Report. Detailed information on species, sex, weight, reproductive status etc. of fish caught during monitoring, fish rescue, and fish transposition is reported.	Identification of ongoing or emerging biodiversity issues takes into account both risks and opportunities
			✓
			Until recently, the identification of biodiversity issues was limited to the continued implementation of long-established fish-related management and monitoring programs. While there were various descriptions of flora and fauna around the reservoir, for example in the 1999 environmental studies for installation of the 4 th generating unit and in the 2021 version of the PACUERA, there were no clear conclusions regarding conservation value and strategies, and no clear information about the status and enforcement of various zoning proposals. In 2024, Paraty Energia contracted a specialised company to update the PACUERA, including new biodiversity surveys (expanding the list of identified birds). A preliminary list of risks and opportunities has been prepared, and by October 2024 a final version of the

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
			PACUERA with detailed mappings and the definition of new environmental management programs will be available.
MANAGEMENT			
Measures are in place to manage identified biodiversity issues	✓ Until now, no terrestrial biodiversity issues have been identified and therefore, no related measures are in place. This may change with the ongoing update of the PACUERA. The reforestation of 50 ha since 2010 does not appear to be based on biodiversity criteria, and no biodiversity results have been reported. The project carries out fish rescue campaigns during plant maintenance periods, when a generating unit is shut down and fish are trapped. A catch-and-release program (Program for Manual Transposition of the Native Ichthyofauna of the Doce River Basin) is also implemented periodically, to transfer some specimen of native fish species captured downstream of the dam into the Mascarenhas reservoir. The project has installed warning signs around its properties, including "Environmental Preservation Area", "No Hunting" and "No Fishing". Also, the project produced pamphlets on	✗ Processes are in place to anticipate and respond to emerging risks and opportunities	Other than the updates of the PACUERA, which occur at long intervals, there are no specific processes to identify, anticipate and respond to emerging risks and opportunities. The reports on fish monitoring and fish transposition do not discuss effectiveness of the fish transposition (although that is one of the stated objectives of the fish monitoring). To track effectiveness would involve comparing populations of target species downstream and upstream. There are also no ongoing processes for terrestrial biodiversity. The lack of adaptive management of biodiversity 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
		the risks and consequences of illegal fishing, which were distributed to the local population. An awareness program is also planned in nearby schools.			
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	✓	No non-compliances have been identified.
• no major non-compliances	✓	No major non-compliances have been identified.			
• no major non-conformances	✓	No major non-conformances have been identified.	There are no non-conformances	✓	No non-conformances have been identified.
Biodiversity related commitments have been or are on track to be met	✓	No commitments have been identified.			
OUTCOMES					
Negative biodiversity impacts arising from activities of the operating facility are avoided, minimised, mitigated, and compensated	✓	Fish management and monitoring activities appear generally successful, given the existing constraints in the project area (water quality issues, fragmentation by other dams directly upstream, introduced species). The turbines are slow-moving Kaplan turbines, and together with the frequent operation of the spillway gates, should allow relatively successful downstream passage of fish. No negative impacts on terrestrial biodiversity have been identified.	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	✓	Fish populations appear generally healthy, and in 2023 26 different species were identified. Habitat conditions and in particular, water quality appear adequate. Habitat conditions in the fenced-in forest around the powerplant installations appear good, while the riparian forest in other sections around the reservoir shows some signs of fragmentation. In general, the forest around the reservoir represents one of the larger and better-preserved forest fragments in the area.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
		<p>The facility has contributed or is on track to contribute to addressing biodiversity issues beyond those impacts caused by the operating hydropower facility</p>	<p>✗</p> <p>There are no documented positive impacts of the project on biodiversity, which is a significant gap. It is possible that the forest on the property provides good terrestrial habitats, but until recently it had not been adequately surveyed and is not managed or protected for biodiversity. The new PACUERA, which is under preparation, could be an opportunity to change this. The standard ToR for PACUERAs require that opportunities for environmental improvements be identified. Beyond the PACUERA, Paraty Energia is also considering a series of voluntary measures such as donation of seedlings to neighbouring landowners in the areas surrounding the reservoir, establishing a private protected area (<i>Reserva Particular do Patrimônio Natural</i>, RPPN), and partnerships with environmental organizations in surrounding areas. These may lead to biodiversity gains in the future.</p>

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

Summary of findings and other notable issues

The project area is part of the Brazilian Atlantic Rainforest zone, but only small remnants of the forest remain. No critical habitats or native endangered species are known to occur in the project area. There is a long-standing fish management and monitoring program, compliant with regulatory requirements, and generally healthy aquatic ecosystems. Other than these fish-related activities there is limited assessment and management of biodiversity, but the updated PACUERA is expected to identify some opportunities for improvement. Paraty Energia has committed to implement the actions that will be defined by the PACUERA, and to improve biodiversity conservation on the properties it manages around the reservoir. It has also committed to continue evaluating and studying fish ecology and fishing in its area of influence, and use the results of these studies to guide future improvements.

Relevant evidence	
Interview	1, 5, 11-13, 41
Document	140-151, 226, 292, 293, 296-301, 307-316, 324-328, 361-372, 376-379, 391-393
Photo	58-60, 63, 72

Under Public Consultation



7 Indigenous Peoples

Scope and Principle

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

Background

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

Yes, this section is relevant

[Click here to enter text.](#)

No, this section is not relevant

The closest indigenous community are the Tupininquim, located in the Municipality of Aracruz in northern Espirito Santo state, at a distance of 75 km from Mascarenhas.

Under Public Consultation



8 Cultural Heritage

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

Background	
Does the project affect any physical cultural resources? Please state the evidence on which this determination is made.	
Yes, this section is relevant	Click here to enter text.
No, this section is not relevant	There are no indications of any significant physical cultural assets affected by the Mascarenhas HPP. Paraty Energia has agreed with the Municipality of Baixo Guandu’s Secretariat of Culture to contributions to a new local museum, to showcase documents, equipment and the film on 50 years of history of the project (see at https://www.instagram.com/reel/C9Dd9ddJs8s/?utm_source=ig_web_copy_link&igsh=MzRIODBiNWFIZA==).



9 Governance and Procurement

Scope and Principle	
<p>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.</p>	
Background	
Key information on political context and public sector risks	<p>According to the World Bank’s Worldwide Governance Indicators for 2022, on a scale from 0 to 100 Brazil ranked 56 on Voice and Accountability, 34 on Political Stability and Absence of Violence/Terrorism, 31 on Government Effectiveness, 44 on Regulatory Quality, 43 on Rule of Law and 32 on Control of Corruption. Those figures place the country on a lower level when compared with the region Latin America & Caribbean (57, 58, 49, 52, 48 and 49 respectively). In general terms, there has been a downward trend over the last 10 years.</p> <p>Paraty Energia operates in a highly regulated environment, interacting with many state and federal agencies.</p>
Key information on corporate ownership and governance	<p>The Mascarenhas HPP was originally built and operated by the public power company of Espírito Santo State (ESCELSA) and commissioned between 1973 and 1974. The project was later privatized and incorporated into the company Energest, whose control was held by EDP Brasil, the local branch of the Portuguese group. In 2022, EDP sold the control of Energest to VH Brasil, a company co-owned by Paraty Energia and Victory Hill (VH Global Sustainable Energy Opportunities plc - GSEO). Energest also has an operating and management contract with Paraty Energia.</p> <p>GSEO is a fund listed on the London Stock Exchange, focused on accelerating the energy transition and with an investment framework aligned with the UN Sustainable Development Goals. Paraty Energia and VH considered, compared and conducted due diligence (including on ESG issues) on a number of hydropower assets in Brazil before acquiring Mascarenhas HPP, and its low ESG risks were one reason why the project was chosen.</p>
Details of the concession, if applicable	The concession expires in March 2027, with the right to renew for an additional 20 years.
Key licenses or permits	Environmental operating license from the state agency IEMA.

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	
Ongoing or emerging political and public sector governance issues have been identified	✓	The partners and analysts at Paraty Energia are well aware of political and regulatory issues that could affect the project, in particular issues around market design and concessions. Issues were also identified during the recent due diligence for the acquisition of Mascarenhas HPP.	There are no significant opportunities for improvement in the assessment of political and public sector governance issues and corporate governance requirements and issues	✓	Paraty Energia is a member of various business associations including APINE, which is leading the discussion on concession renewals on behalf of its members. Input on governance issues is also obtained from board members with good connections into government, from VH, and the service provider CSC and legal advisers.
Corporate governance requirements and issues have been identified	✓	Various corporate governance requirements and options were analysed during the acquisition of the Mascarenhas HPP.			
Monitoring is being undertaken to assess if corporate governance measures are effective	✓	The operator Paraty Energia reports monthly, quarterly and annually to VH as the majority shareholder. Energest board meetings frequently discuss governance issues. VH has appointed an Owner’s Engineer to monitor the project and its operator, and sign off on the KPI monitoring results.			
MANAGEMENT					
Processes are in place to manage the following:			Processes are in place to anticipate and respond to emerging risks and opportunities	✓	The corporate governance structure is well established, with shareholders requiring, supporting and monitoring good corporate governance, the SIG covering internal quality and HSE issues, communications channels including a grievance mechanism to gather stakeholder input, and external service providers with broad experience. These processes should be able to identify and manage any
• corporate, political and public sector risks	✓	Risks were reviewed during the recent due diligence for the acquisition of Mascarenhas HPP, and taken into account in the structuring of the transaction. The Integrated Management System (SIG) includes a risk management process with a risk identification work procedure and a risk register. Risks are discussed in every board meeting.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• compliance	✓	Paraty Energia has a well-developed compliance system, with contributions from the in-house legal team and external service providers like CSC and legal advisers. There is a compliance manual, 1,305 requirements are listed in a compliance register, and the Integrated Management System (SIG) provides reminders. To provide oversight, Paraty Energia’s board has a compliance and governance committee.			governance-related risks and opportunities.
• social and environmental responsibility	✓	Paraty Energia, VH and Energest have various sustainability policies and commitments, and the project has management processes to implement these.			
• procurement of goods and services	✓	The Mascarenhas project conducts most procurement of goods and services through the service provider CSC and applies their standardized procurement and contract management processes with only minor customization.			
• grievance mechanisms	✓	See also sections 4 and 10. A grievance mechanism with a focus on ethical behaviour has been established.	Contractors are required to meet or have consistent policies as the developer	✓	The technical specifications for contracts include detailed OHS and environmental requirements, in terms of compliance both with applicable laws and with the developer’s processes and objectives. Contractor performance is evaluated including on matters of OHS, environment, and labour and human rights.
• ethical business practices	✓	Paraty Energia’s business practices are guided by a ‘Principles and Values’ document. The compliance manual includes an ethics code.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
• transparency	✓	A substantial amount of commercial and sustainability-related information is publicly available through the Paraty Energia website, for example the 2023 external financial audits for Energest and Paraty Energia, the annual sustainability report of the plant, the emergency action plan, and the climate resilience assessment.	Procurement processes include anti-corruption measures as well as sustainability and anti-corruption criteria specified in pre-qualification screening	✗	There is no evidence showing how HSE and anti-corruption criteria are used in the selection of suppliers, which is a significant gap . In the current contracting process, bidders make a self-declaration of compliance and once suppliers are selected, some HSE and anti-corruption requirements are included in contractual documents.
Policies and processes are communicated internally and externally as appropriate	✓	Internal communication within the small Paraty Energia team and with VH appears seamless. External communications are primarily through the websites of Paraty Energia and VH, and are appropriately detailed, clear and accessible.			
In case of capacity shortfalls, appropriate external expertise is contracted for additional support	✓	Paraty Energia relies strongly on external expertise.			
CONFORMANCE AND COMPLIANCE					
The project has no major non-compliances	✓	There are no indications for major non-compliances.	The project has no non-compliances	✓	There are no indications for non-compliances.
OUTCOMES					
There are no significant unresolved corporate and external governance issues identified	✓	There are no indications for significant governance issues, i.e. issues that would affect the project materially at this time.	There are no unresolved corporate and external governance issues identified	✓	The regulatory framework of the Brazilian electricity sector is considered relatively robust and has attracted a number of international investors over the past decades. An issue of high importance for Paraty Energia is the extension of the concession, which could affect the

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
			project in coming years. There are rules for protecting investors if concession renewals are delayed (in which case the operator remains in place) or the concession is not renewed (in which case investments made by the operator are reimbursed). There are currently no indications for regulatory risks regarding concession renewal.

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

Summary of findings and other notable issues
The project operates in a mature, highly regulated electricity market, and has robust corporate government processes established between its Brazilian and international partners.

Relevant evidence	
Interview	2, 4-9, 11-12, 32-40
Document	1-3, 17-40, 56, 57, 153-184, 217-222, 227, 228, 233-246, 384, 385
Photo	--



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	Neighbours, other residents and officials of the Municipality of Baixo Guandu. The urban area of the municipality is located upstream, at the tail end of the Mascarenhas HPP reservoir, and one of its districts (Vila Mascarenhas) is located just downstream of Mascarenhas HPP dam. A number of farmers and other residents are located around the reservoir.
Directly affected institutional-level stakeholders	ANEEL, IBAMA, NOS, ANA, ICMBio, IEMA, Fire Brigade of Espírito Santo State, Municipality of Baixo Guandu, Municipality of Colatina, COEPDEC – Coordenadoria Estadual de Proteção e Defesa Civil do Espírito Santo, Polícia Militar – Secretaria de Segurança e Defesa da Cidadania
Other relevant information	At the time of construction, due to the political situation in the country there were no public hearings or public disclosure of information.

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	✓	Paraty Energia as the new operator identified a lack of engagement with local stakeholders, and the need for improving consultation processes and developing a communication plan.	✓
Requirements and approaches are determined through a periodically updated assessment process involving stakeholder mapping	✓	The stakeholder identification and mapping activity was carried out by Paraty Energia in 2023-2024 for the first time, and the integrated management system (SGI) provides for periodic updating.	
		The stakeholder mapping takes broad considerations into account	The stakeholder mapping takes a broad view of stakeholders, identifying the ones to be monitored and informed, classifying them according to their interest in the project and influence on the project, and their needs and expectations.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations		
Effectiveness is monitored	✓ The effectiveness of engagement is monitored through a process laid out in one of the work instructions (IT, through the spreadsheet ENGT.MP.SIG-002, part of the SGI).				
MANAGEMENT					
Communications and consultation plans and processes are in place to manage communications and engagement with stakeholders	✓ Some elements of communication plans and processes are in place, such as the SGI manual, stakeholder map, spreadsheet with stakeholder needs and expectations, and the work instruction for external events (“Gerenciamento de Ocorrências Externas”). They establish communication channels between stakeholders and the project.	✗ 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	✗ While the stakeholder map shows some awareness of different needs and approaches for different groups, plans remain at a general level such as ‘maintain open communication channels’ and are not further specified, for example for the ongoing update of the PACUERA, which is a significant gap .		
They include an appropriate grievance mechanism	✓ All stakeholders including employees, suppliers, and the local community can express concerns and report any behaviour that violates the standards of conduct set forth in the project’s code and/or current legislation. Reports should be filed through the “Ethics Channel” by phone or via the website.	✗ Processes are in place to anticipate and respond to emerging risks and opportunities	✗ Although there are some processes to anticipate and respond to issues related to communications and consultation, they are focused on emerging risks and not on opportunities, which is a significant gap .		
They outline communication and consultation needs and approaches for various stakeholder groups and topics	✓ The plans and processes provide a basic differentiation of needs and approaches by different stakeholder groups and topics.				
STAKEHOLDER ENGAGEMENT					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
The project operation stage involves engagement with directly affected stakeholders	✓	Engagement of directly affected stakeholders is detailed in the Social Communication Program.	Engagement is inclusive and participatory	✓	The Social Communication Program addresses all groups of local stakeholders, and the meetings are mostly held in community sites (churches, sports facilities, public schools, etc.). Paraty Energia provides transportation for the meetings when necessary.
Engagement is:					
• appropriately timed and scoped	✓	The Social Communication Program includes periodic activities and has a mechanism to respond in case of any emerging or urgent situation, and to respond to contacts initiated by the community.	Negotiations are undertaken in good faith	✓	There are no indications otherwise. All complaints or suggestions appear to be taken into account and discussed with the community in good faith.
• often two-way	✓	See above			
• undertaken in good faith	✓	See above			
The business interacts with a range of directly affected stakeholders to understand issues of interest to them	✓	The stakeholder mapping presents a range of directly affected stakeholders and their interests.	The assessment and management process for downstream flow regimes has involved appropriately timed and two-way engagement with directly affected stakeholders	✓	The downstream release framework has been established for a long time, and there are no indications that it is not accepted by downstream stakeholders (see section 11). Stakeholders can access up-to-date information about downstream releases directly on Paraty Energia’s website, and there is a database of all interested parties to receive information real time information, via text messages, about any significant change in downstream releases.
Ongoing processes are in place for stakeholders to raise issues and get feedback	✓	See above	Ongoing processes are in place for stakeholders to raise	✓	There are processes to raise issues with downstream flow and the public

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations		
		issues with downstream flow regimes and get feedback	is advised by SMS of any new activity or needed information.		
Ongoing processes are in place for:					
• environmental and social issues	✓ See above. Paraty Energia’s website also presents the status of implementation of the E&S programs.	Feedback on how issues raised have been taken into consideration has been thorough and timely	✓ When issues are raised, Paraty Energia takes immediate action to hold meetings with stakeholders and discuss the situation. A recent example is a false alarm of the emergency sirens which triggered uncertainty and complaints from the population of Vila Mascarenhas. Within a few days, project representatives held several meetings in the village to resolve the situation.		
• project-affected communities	✓ See above, in particular with the directly affected community Vila Mascarenhas, downstream of the dam.	Project-affected communities have been involved in decision-making around relevant issues and options	✗ There are no indications of involvement of communities in decision-making, which is a significant gap .		
• resettles and host communities	✓ Not relevant	Resettles and host communities have been involved in decision-making around relevant issues and options	Not relevant		
• Indigenous Peoples	✓ Not relevant				
• employees and contractors on human resources and labour management issues	✓ There are processes for engagement of employees and contractors on human resources and labour management issues (see also section 2).				
• management of climate risks	✓ Paraty Energia has contributed to a discussion about climate risks by disclosing the climate risk vulnerability assessment.				
Channels of communication with Indigenous Peoples are maintained	✓ Not relevant	Directly affected Indigenous Peoples have been involved in	✓ Not relevant		

Minimum Requirements			Advanced Requirements			
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations	
These channels are:			decision-making around relevant issues and options			
• appropriately timed	✓	See above				
• culturally appropriate	✓	See above				
• two-way	✓	See above				
A mutually agreed disputes procedure is in place with Indigenous Peoples	✓	Not relevant				
Public disclosure:			The business publicly reports on project performance in sustainability areas of high interest to its stakeholders		✓	
• the business makes significant project reports publicly available	✓	The VH GSEO fund which is the majority owner of Energest and the Mascarenhas HPP, produces an annual, publicly available report on its assets which includes a sustainability section. Also, Paraty Energia discloses an annual report on Socio-Environmental Responsibility and Economic-Financial aspects of the project.				
• the business publicly reports on project performance, in some sustainability areas	✓	See above				
• power density calculations, estimated GHG emissions, and / or the results of a site-specific assessment are publicly disclosed	✓	Paraty Energia has committed to publicly disclose the power density calculations for Mascarenhas HPP.				
			The assessment of project resilience is publicly disclosed	✓	The initial 2023 assessment (see section 12) has been disclosed through Paraty Energia’s website.	
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	✓	No non-compliances have been identified.
• no major non-compliances	✓	No major non-compliances have been identified.			
• no major non-conformances	✓	No major non-conformances have been identified.	There are no non-conformances	✓	No non-conformances have been identified.
Communications related commitments have been or are on track to be met	✓	Paraty Energia is implementing the communication plan according to its internal work instructions.			

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	12

Summary of findings and other notable issues
The project is in the process of developing closer stakeholder relations, in particular with local communities, based on systematic stakeholder mapping and a communications plan as part of the integrated management system. There are periodic meetings with the community and different groups of stakeholders, mechanisms to respond to grievances and emergency issues, and transparent disclosure of information, including through public annual reporting.

Relevant evidence	
Interview	1-3, 5-13, 18, 19, 21-26, 29-32
Document	13, 14, 18, 29, 40, 47-49, 51-53, 57, 58, 61, 113, 115, 117, 121, 133, 134, 139, 144, 146, 163, 171, 185, 186, 191, 198, 211, 226-237, 240, 247-249, 257-262, 272, 275, 280-291, 304-311, 315, 323, 330-347, 349, 361-366, 368-375, 383
Photo	1, 3, 4, 13, 15, 18, 19, 22-24, 56, 63, 65, 69-71, 75, 76



11 Hydrological Resource

Scope and Principle	
<p>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.</p>	

Background	
Hydrology and flows	
Average flow at dam (m ³ / s)	896.4
Minimum monthly average flow (m ³ / s)	422
Maximum monthly average flow (m ³ / s)	1,661
Lowest observed flow (m ³ / s)	N.A.
Highest observed flow (m ³ / s)	11,200
Design flow (m ³ / s)	14,500
Affected river reaches (start/end and how affected)	7 km upstream of the dam (reservoir length); the extent of downstream impacts has not been fully documented
Proposed downstream flow regimes for environmental or social objectives	Minimum downstream release 210 m ³ /s
Reservoir	
Reservoir length (km)	7
Minimum operating level MOL (masl)	59.80
Normal operating level (masl)	60.75
Full supply level FSL (masl)	61.05
Reservoir area at FSL (km ²)	3.91
Reservoir area at MOL (km ²)	3.62
Volume at FSL (million m ³)	25.88
Volume at MOL (million m ³)	21.16
Average retention time in days	A rough estimate shows that at average inflows, all water in the reservoir would be replaced in approximately 8 hours.
Number of days for filling	See above

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	✓	Daily production plans are prepared by the national system operator ONS for the hydropower plants in a river system based on hydrometric data provided to the ONS by the various plant owners. Inflows and outflows of the Mascarenhas reservoir is monitored by a hydrometric network with 5 telemetry stations.	Issues that may impact on water availability or reliability have been comprehensively identified		Monitoring results indicate a decreasing trend in annual average flows since 1931. The project conducts quantitative monitoring of water resources, presenting annual reports with measurements in dry and rainy periods, and reporting trends. The operations of the upstream cascade are well understood. Inflows are directly affected by the releases from the upper reservoir, Aimorés, owned and operated by Aliança Energia.
• reservoir management	✓	The Mascarenhas HPP has a very detailed reservoir operation manual, with operational rules for different levels and flow situations. Dispatch of the Mascarenhas HPP and other hydropower facilities in the river system is managed by ONS on a daily basis within the constraints of the HPP's Operating License, and the respective water rights. Reservoir levels fluctuate within a small range and the riparian vegetation has stabilized over 50 years of operation with no notable shoreline erosion or sediment accumulation.			✓

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
					likely reduction in average precipitation in the basin by 1.5% to 7.6% by 2080), as well as a recent project-specific resilience study (see section 12) provide some indications on long-term water reliability. Thus, relevant issues have been comprehensively identified, although uncertainties about long-term change remain.
<ul style="list-style-type: none"> • downstream flow regimes 	✓	Mascarenhas HPP is a run-of-river plant with daily regulation and a minimum release of 210 m ³ /s according to its water rights resolution (ANA Nº 770/2011), which has to be taken into account in operational decisions.			See above. Short-term availability is very well predictable since it largely depends on upstream releases, and some trend assessments have been carried out. There are good processes for forecasting and coordination, with data available in the public domain. In 2023-2024, Mascarenhas worked with other members of the Rio Doce Basin Committee on the project “Flow and Level Forecast System for the Rio Doce Basin”. Mascarenhas provided (i) real-time data for the integrated system that communicates with Civil Defence and other civil society bodies to prevent and manage crises related to the rainy season, (ii) updated urban flood maps with return periods of 2 to 500 years, and (iii) a flow forecast system based on precipitation forecasts for up to 15 days.
If management measures are required then monitoring is being undertaken to assess if management measures are effective:					
<ul style="list-style-type: none"> • reservoir management 	✓	A number of limnological monitoring programs are undertaken as required by licence and reported to the environmental regulator (see sections 3, 6).	Scenarios, uncertainties and risks for water availability and reliability are routinely and extensively evaluated over the short- and long-term	✓	
<ul style="list-style-type: none"> • downstream flow regimes 	✓	The hydrometric network with 5 telemetry stations monitors inflows and outflows of the reservoir.			

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
			<p>The reservoir is operated with small variations of the water level by up to 1.2m. Thus, uncertainties regarding water availability have limited impact on reservoir management.</p> <p>As for commercial aspects, the project was the subject of a hydrological study by the Ministry of Mines and Energy in 2022, which resulted in an adjustment of the plant's Physical Guarantee to 128.1 MW, reflecting long-term water availability and dispatch estimates. The Physical Guarantee in conjunction with Paraty Energia's management strategy limits the project's financial exposure.</p>
Monitoring is being undertaken of hydrological resource availability and reliability	✓ There is a large network of hydrological stations along the hydropower cascade in the Rio Doce basin, with shared information.	✗ Identification of ongoing or emerging reservoir management issues takes into account both risks and opportunities	<p>While there is a good general understanding of water resource management issues, hydrology and reservoir conditions, and good day-to-day communication with the upstream HPP Aimorés, ONS, Civil Defence and municipalities, there is limited analysis of emerging risks and opportunities (e.g. increasing urbanization at the upstream end of reservoir, agricultural use of reservoir buffer zone, existing or potential other uses of the reservoir such as recreation, capture fisheries, conservation, drought and flood</p>

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
			management, floating PV, or aquaculture and their compatibility with each other). An updated PACUERA is now being prepared, but will focus on the reservoir’s banks and buffer zone, not on the reservoir itself. These limitations are a significant gap .
Inputs to this monitoring include:		✗ Issues identification relating to downstream flow regimes takes into account both risks and opportunities	Other than a register of downstream installations, an analysis of erosion of an island 30 km downstream (shown to be not attributable to Mascarenhas HPP operations), and a dam break analysis, there is no documented identification of downstream risks and opportunities. The minimum release rule was last updated through a 2011 ANA resolution valid until 2025, following the integrated basin plan. It was equivalent to the 7 days low flow, 10-year return period. The plan had established downstream water needs, particularly for urban water supply in Colatina, the largest downstream settlement. A revision of the rule is now under discussion, since releases have been much lower during droughts and the water intake for Colatina includes a floating pump that can adjust to different water levels. No analysis of ecological flow effects and no analysis of the effects

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
					of peaking operations under normal and exceptional (e.g. full power after shutdown) operating conditions has been conducted. Water level fluctuations after changes in releases are only measured directly downstream of the plant (in case of sudden full power, water levels change by almost 5 m), not further downstream. These limitations are a significant gap .
• field measurements	✓	See above on the Mascarenhas HPPs hydrometric network and monitoring and reporting protocols.	✗	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	See above. Only partial assessments have been undertaken, which is a significant gap .
• appropriate statistical indicators	✓	The PI system software monitors the flow data from the stations, reports the data in real time and produces up to 48-hour inflow predictions. Using these data, generation is forecast through the "Daily Production Program".			
• issues which may impact on water availability or reliability	✓	See above. Mascarenhas HPP is required by the operating license to perform a quantitative monitoring of water resources, presenting annual reports with measurements in dry and rainy periods, including trends.			
• a hydrological model	✓	ONS is responsible for the overall management of the hydrology of the cascade, based on detailed long-term records. ONS uses several models to operate the national			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		system, which are widely known by the operators. The month-ahead operation plan is decided in an on-line meeting with the participation of all operators.			
MANAGEMENT					
Measures are in place to guide generation operations that are based on:					
• analysis of the hydrological resource availability	✓	Mascarenhas HPP and other power plants in the cascade share hydrometric data with each other and with ONS. Analysis of the hydrological resources and trends allows Mascarenhas HPP to guide operations and forecast performance.	Planning of generation operations has a long-term perspective	✓	Short-term (day ahead) operations of the Mascarenhas plant are proposed by the plant, but ultimately determined by the ONS, the body responsible for the operation of the Brazilian electrical system within a centralized operating mode. ONS takes long-term weather forecasts and the water value/storage situation of the Brazilian reservoir system into account, some of which are large interseasonal and -annual reservoirs.
• a range of technical considerations	✓	Operations are based on a range of technical considerations, including the operations of the other power plants in the Doce River watershed.	Planning of generation operations fully optimises and maximises efficiency of water use	✓	The operating regime for the following day is determined by Mascarenhas based on generation optimization software, and submitted for approval by ONS.
• an understanding of power system opportunities and constraints	✓	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 maintaining a high level of supply reliability. Mascarenhas HPP is well	Planning of generation operations has the flexibility to anticipate and adapt to future changes	✓	Planning and real-time operation are carried out by Mascarenhas' own team on site. Paraty Energia monitors changes to sector regulations and market conditions, and can adapt within the technical and environmental constraints of the plant.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	aware of the constraints of operating a hydropower facility in a highly regulated river basin with dispatch by the national electricity system operator.		
Measures are in place to manage identified reservoir management issues	✓ The reservoir is managed within a small range to maximize Mascarenhas HPP's contribution to the national power system. No other significant reservoir-related issues have been identified and are actively managed.	Processes are in place to anticipate and respond to emerging risks and opportunities for reservoir management	✓ As stated above, there has been limited identification and analysis of emerging risks and opportunities. However, some elements are already in place (such as the Reservoir Operation Manual that focusses on floods and emergency situations) and there are a number of processes for additional discussion and possible changes towards a more comprehensive reservoir management, among them: 1) the good communications channels with other stakeholders, including formal forums such as Basin Committees and informal channels such as WhatsApp groups, e.g. for coordination during droughts and floods, 2) the ongoing update of the PACUERA, 3) initial internal discussions on changing reservoir operations to a constant level, which would maximize the head and simplify operations, 4) an initiative to work with the Civil Defence and Aliança Energia (upstream operator) to prepare an Operational Agreement for the Dams of the Rio

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
			Doce Basin, with the objectives of 1) reducing local impacts for normal operation and flood control, 2) making generation compatible with other uses of water resources and 3) operating the plants in accordance with environmental requirements.
Measures are in place to address identified downstream flow issues	✓ The operating rules address some identified downstream issues, and there is monitoring of some downstream issues (water levels, water quality, sediments and fish) in several locations downstream of the Mascarenhas HPP.	✗ Processes are in place to anticipate and respond to emerging risks and opportunities for downstream flow regimes	✗ The local operations team visually checks the area immediately downstream region before increasing releases. There is also coordination with the downstream city of Colatina, primarily to manage releases during floods and droughts. Other than that, there is very limited analysis of emerging risks and opportunities, which is a significant gap .
Where formal commitments have been made to downstream flow regimes, these are publicly disclosed	✓ The downstream flow commitment of 210 m ³ /s is publicly disclosed and shown on the project website.	✗ 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	✗ The minimum downstream flow commitment of 210 m ³ /s was defined by the Doce River Basin Committee, through the integrated water resources plan, and ANA with reference to historical drought flows. However, there is 1) no clear description of flow objectives (reportedly fishing and municipal water supply), 2) only a minimum flow and not a comprehensive description of a flow regime, 3) only monitoring of flow deliveries but no monitoring of flow outcomes. These limitations are 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	
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 of non-compliances related to reservoir management.	• reservoir management	✓	No non-compliances have been identified.
• reservoir management, with no major non-conformances	✓	There are no indications of non-conformances related to reservoir management.			
• downstream flow regimes, with no major non-compliances	✓	There are no indications of non-compliances related to downstream flows.	• downstream flow regimes	✓	No non-compliances have been identified.
• downstream flow regimes, with no major non-conformances	✓	There are no indications of non-conformances related to downstream flows.			
Commitments relating to the following have been or are on track to be met:			There are no non-conformances relating to:		
• reservoir management	✓	All commitments related to reservoir management are being met.	• reservoir management	✓	No non-conformances have been identified.
• downstream flow regimes	✓	All commitments related to downstream flow regimes management are being met.	• downstream flow regimes	✓	No non-conformances have been identified.
OUTCOMES					
Downstream flow regimes take into account environmental, social and economic objectives	✓	A basic downstream flows regime has been defined that takes some objectives other than generation into account.	Downstream flow regimes and commitments are an optimal fit amongst environmental, social and economic objectives within practical constraints of the present circumstances	✗	There is no analysis whether the flow regime represents an optimal fit, which is a significant gap . The current regime represents optimization of one objective (generation) under constraints, which is different from a multi-objective optimization, where trade-
Where relevant, they also take agreed transboundary objectives into account	✓	There are no transboundary objectives for the Rio Doce watershed.			

Mascarenhas Hydropower Plant, 198 MW, Brazil

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
			offs between different objectives are taken into account.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	10

Summary of findings and other notable issues
<p>Hydrological resources in the Rio Doce basin are well understood from decades of records, and inflows to the Mascarenhas reservoir are predictable from upstream cascade operations. Water quantities are closely monitored and data shared. The small reservoir is managed for hydropower generation, with limited ability to support drought and flood management. Plant operations are planned by Paraty Energia while dispatch is by the national system operator ONS. Downstream releases are adjusted frequently to match system requirements, and constrained by a minimum flow requirement. The plant has been operating in a similar manner for a long time, and there have been only limited analyses to reconsider reservoir management and downstream flow release impacts and options. Paraty Energia has committed to review the implications of different operational options on economic, social and environmental objectives, both in the reservoir and downstream, and use the results of this review to guide future operations.</p>

Relevant evidence	
Interview	2, 4, 16, 17
Document	187-193, 273, 274, 353, 381, 382, 392, 400
Photo	1, 2, 6, 7-12, 14, 16, 29-40, 62, 63, 66-68, 71-74



12 Climate Change Mitigation and Resilience

Scope and Principle	
<p>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.</p>	
Background	
Climate Change Mitigation	
Capacity (MW)	198
Average reservoir area (representing area of flooded land, net of pre-impoundment water body) (km ²) (3.9 km ² at FSL (including original waterbody)
Power density (W / m ²)	50.8
Emissions intensity (gCO ₂ e / kWh)	N/A (as the power density is above the 5 W/m ² threshold, even without considering the pre-impoundment water body, no emissions intensity assessment including the reservoir was required).
National and regional policies, plans and commitments relevant to mitigation	<ul style="list-style-type: none"> • Law Nº 12.187 (2009) establishes the National Policy of Climate Change as a framework for sectoral and regional mitigation and adaptation plans. • Relevant plans include the annually updated 10-Year Energy Expansion Plan. Brazil produces low carbon electricity, including approximately 65% hydropower and 15% other renewables such as wind, solar and biomass. • Mitigation commitments include reducing deforestation and reducing transportation sector emissions by increasing the share of biofuels.
Climate Change Resilience	
Hydrological data available for the project site and the basin, and observed climate trends	<ul style="list-style-type: none"> • A hydrological series of monthly average flows for the period of record 1931-2017 is included in the facility’s Water Rights grant from ANA. Hydrometric data including hydrology data have been measured by Mascarenhas HPP since 2003. • The hydrological monitoring network supporting Mascarenhas HPP consists of 5 hydrometric stations (4 rainfall stations, 4 fluviometric stations and 1 limnometric station) • A weather station has been operating uninterruptedly since commissioning in 1974.
Regional and basin-level climate models relevant to the project location, if any	Historical and projected climate data for the watershed and for Brazil are available, for example, through https://climateknowledgeportal.worldbank.org (watershed #LAC001342).

Any climate change predictions for the project location, and degree of consistency	Observed trends coincide with climate change projections, indicating that the Rio Doce basin may experience a decrease in precipitation and runoff.
National policies, plans and commitments relevant to adaptation and resilience	See above under Mitigation, as well as National Adaptation Plan to Climate Change (2016).

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/m ² , net GHG emissions (gCO ₂ e) of electricity generation are calculated, independently verified and periodically updated	✓	Not required (power density above 5 W/m ²)	If a site-specific assessment is required, it incorporates a broad range of scenarios, uncertainties and risks
If power density is below 5 W/m ² and estimated emissions are above 100 gCO ₂ e/kWh, a site-specific assessment of GHG emissions is undertaken and periodically updated	✓	Not required (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	✓	An initial Climate Risk and Vulnerability Assessment was undertaken in 2023, following a methodology described in the EU Commission Delegated Regulation 2021/2139 (Technical Screening Criteria of the EU Taxonomy). A comprehensive climate resilience assessment study following the IHA 2019 Resilience Guide methodology was developed in	Assessment of resilience incorporates sensitivity analysis, project specific hydrological modelling using recognised climate models
			✓
			The resilience assessment used climate projection data derived from global climate model compilations from the Coupled Model Intercomparison Projects (CMIPs), overseen by the World Climate Research Program. Three scenarios were adopted based on Shared Socioeconomic Pathways (SSPs) and their respective greenhouse gas emissions

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		2024, and is intended to be updated periodically.			trajectories: SSP1-2.6, SSP2-4.5, and SSP5-8.5.
The assessment:					
<ul style="list-style-type: none"> incorporates an assessment of plausible climate change at the project site 	✓	The study incorporates an assessment of plausible climate change at the project site. It used a variety of sources including official Brazilian processes and models such as the <i>Sistema de Informações e Análises sobre Impactos das Mudanças do Clima</i> (AdaptaBrasil) of the MCTI (Ministry of Science, Technology and Innovation).			
<ul style="list-style-type: none"> identifies a range of climatological and hydrological conditions at the project site 	✓	A range of climatological and hydrological conditions was identified, with a likelihood of temperature increases, overall precipitation decreases and more frequent extreme events.			
<ul style="list-style-type: none"> applies these conditions in a documented risk assessment or stress test 	✓	A risk assessment was undertaken after determining that changes in the hydrological regime are likely and will affect the economic, safety and environmental performance of the project.			
The risk assessment or stress test encompasses:					
<ul style="list-style-type: none"> dam safety 	✓	Dam safety is part of the risk assessment.	The project's opportunities to provide adaptation services are considered on an ongoing basis	✓	Adaptation services have not been evaluated. While this is a gap, it is considered non-significant because the project (with a single purpose, run-of-river reservoir) has very
<ul style="list-style-type: none"> other infrastructural resilience 	✓	Other infrastructure components were included in the risk			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		assessment: spillway, dissipation basin.			limited ability to provide any adaptation services (e.g. flow regulation during high-flow (flood) or low-flow (drought) conditions).
• environmental and social risks	✓	The risk assessment included fauna protection due to lower river flows, erosion control and fire protection, with proposed mitigation actions including environmental education.			
• power generation availability	✓	Power availability was considered, as well as possible effects of supply and demand changes on energy prices.			
MANAGEMENT					
Climate Change Mitigation					
If GHG emissions estimates assume design and management measures, these measures are in place	✓	Full GHG emission estimates (in particular, including reservoir emissions) have not yet been undertaken for Mascarenhas, but partial estimates (Scope 1, 2, 3, biogenic emissions) are tracked to be included in VH’s global reporting. Some management measures e.g. to reduce the use of fossil fuels in transport are in place, and more are planned to be introduced.	Management measures are in place to respond to risks and opportunities including offsetting emissions	✗	Only partial measures to manage emissions are in place at this time. There are efforts to reduce the use of fossil fuels in transport. Some of the vegetation lost by the impoundment of the reservoir has been replaced, and this has offset some emissions although that was not the primary motivation. 52 ha around the reservoir have been replanted and seedlings are still donated to landowners to increase vegetation coverage. However, these partial measures do not systematically respond to risks and opportunities, and the 2023 Sustainability Action Plan does not

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
					address emissions, which is a significant gap .
			Plans are in place to monitor parameters used in GHG emissions estimates or to monitor GHG stocks	✓	There are monitoring templates and processes to track partial emissions estimates.
Climate Change Resilience					
Measures are in place to avoid or reduce identified climate risks	✓	Some ongoing measures will help to reduce climate risks, even if they are not the result of resilience analyses, e.g. the raising of the dams. Additionally, several measures were identified during the recent climate resilience assessment to avoid or reduce identified climate risks, to be effective at once.	Measures take account of a broad range of risks and interrelationships	✓	Proposed resilience measures consider risks and opportunities.
			Processes are in place to respond to unanticipated climate change	✗	No processes are in place at this point in time to respond to unanticipated climate change, which is a significant gap .
			Plans are in place to provide adaptation services if necessary	✓	With a single purpose, run-of-river reservoir, the project has very limited ability and no specific plans to provide any adaptation services, and there are no indications that such services are necessary.
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	✓	There are no indications of non-compliances.
• no major non-compliances	✓	There are no indications of major non-compliances.			
• no major non-conformances	✓	There are no indications of major non-conformances.	There are no non-conformances	✓	There are no indications of major non-conformances.
Mitigation-related commitments have been or are on track to be met	✓	Commitments regarding offsetting of lost vegetation have been and are on track to be met.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
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 of non-compliances.
• no major non-compliances	✓	There are no indications of major non-compliances.			
• no major non-conformances	✓	There are no major non-conformances.	There are no non-conformances	✓	There are no indications of non-conformances.
Resilience-related commitments have been or are on track to be met	✓	There are no commitments at this time.			
OUTCOMES					
Climate Change Mitigation					
The project's GHG emissions are demonstrated to be consistent with low carbon power generation	✓	The power density of the Mascarenhas project is high, and while emissions from the reservoir GHG have not been estimated, given the characteristics of the reservoir (older and with a short water retention time) the emissions intensity is likely to be low.	Project net emissions are minimised or project operations facilitate system emissions reductions	✓	Emissions are considered low, given the characteristics of the project. Also, Paraty Energia is tracking a number of emissions indicators, has conducted a life-cycle analysis to estimate the emissions associated with construction and operation, and has estimated avoided emissions (displacement of fossil-based generation).
Climate Change Resilience					
Findings of the climate change assessment indicate that the project is resilient to climate change	✓	The resilience assessment indicates that the project is resilient under a range of scenarios. In particular, safety measures are already underway or committed to. The mitigation of	The project is resilient under a broad range of scenarios	✗	While a broad range of scenarios were considered in the 2024 resilience assessment, this was the first comprehensive assessment and there is still a considerable range of uncertainty regarding future changes, their impacts on

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	commercial exposure to reduced flows is discussed in section 11.		water resource uses in the basin, and possible resilience measures to be adopted by Mascarenhas HPP and by other stakeholders. Therefore, it is too early 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 local, regional or national levels	✓ While the project has very limited ability to provide any specific adaptation services, in a general sense it contributes to an increased adaptive capacity.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	12

Summary of findings and other notable issues
Mascarenhas HPP has been providing low-carbon electricity for 50 years and has displaced significant amounts of fossil fuels. The reservoir likely has small emissions, there has been some reforestation which absorbs GHGs, and emissions are tracked, published and starting to be reduced. A comprehensive Climate Change Resilience Assessment was developed, indicating that the project is resilient under a number of scenarios. The contribution of Mascarenhas HPP to climate change adaptation is limited by its small run-of-river reservoir.

Relevant evidence	
Interview	1-5, 34-37, 39, 40
Document	194-197, 213, 216, 217, 220, 223, 239, 277, 279, 351, 353, 390, 392, 398-400
Photo	--

Appendix 1 – Interviews

Mascarenhas Hydropower Plant, 198 MW, Brazil

Ref	Interviewee/s, Position	Organisation	Date	Location
1	Frankcione Falcão / Environmental Engineer	Paraty Energia	May 7th	Mascarenhas HPP
2	Diego Moulin / Hydropower plant manager	Paraty Energia	May 7th	Mascarenhas HPP
3	Christian Lenk / Civil engineering technician	Paraty Energia	May 7th	Mascarenhas HPP
4	Alvaro Queiroz / COO of Paraty and Director of Energest	Paraty Energia	May 7th	Mascarenhas HPP
5	Bárbara Triginelli / ESG Specialist	Paraty Energia	May 7th	Mascarenhas HPP
6	Lastenio Cardoso / Mayor	Baixo Guandu Municipality	May 7th	Baixo Guandu City Hall
7	Wesley Damasceno / Mayor's advisor	Baixo Guandu Municipality	May 7th	Baixo Guandu City Hall
8	Eliseu Siquera / Councilman	Baixo Guandu Municipality	May 7th	Baixo Guandu City Hall
9	Rodrigo Rodrigues / Municipal attorney	Baixo Guandu Municipality	May 7th	Baixo Guandu City Hall
10	Estefania Braga / Communication advisor	Baixo Guandu Municipality	May 7th	Baixo Guandu City Hall
11	Cleres de Martins Schwambach / Secretary of Environment and Rural Development	Baixo Guandu Municipality	May 7th	Environmental Department
12	Betania Trindade / Head of the environmental department	Baixo Guandu Municipality	May 7th	Environmental Department
13	Nileny Peixoto / Technical assistant	Baixo Guandu Municipality	May 7th	Environmental Department
14	Carlito Mário Rodrigues Bosi / Occupational health and safety technician	Paraty Energia	May 8th	Mascarenhas HPP
15	Lelis Paulino da Silva / Administrative assistant	Paraty Energia	May 8th	Mascarenhas HPP
16	Rondinele Gatte / Operator	Paraty Energia	May 8th	Mascarenhas HPP
17	Paulo Celso de Carvalho / Operator	Paraty Energia	May 8th	Mascarenhas HPP
18	Leandro Plácido / Electrical engineer	Paraty Energia	May 8th	Mascarenhas HPP
19	Julyeverson dos Reis / Mechanical engineer	Paraty Energia	May 8th	Mascarenhas HPP
20	Vinicius Pompeu / Director	Visão Ambiental	May 8th	Online
21	Sandro Farias Brandão / Coordinator	Baixo Guandu Civil Defence	May 8th	Mascarenhas HPP
22	Carlos Roberto Souza da Silva	Baixo Guandu Civil Defence	May 8th	Mascarenhas HPP
23	Joao Augusto Ferreira Pedrinha	Baixo Guandu Civil Defence	May 8th	Mascarenhas HPP
24	Rubens de Souza / Community Relationship Analyst	Aliança Energia	May 8th	Aimorés HPP - MG
25	Thiago Pereira Santos / Planning Technician	Aliança Energia	May 8th	Aimorés HPP - MG
26	Nelson Seletes / President	Bairro Mascarenhas Residents' Association	May 8th	Nelson's House in Vila Mascarenhas

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27	Flávio Soares / Environmental Engineer	Phyis Engenharia Ambiental	May 8th	Mascarenhas HPP
28	Geraldo André Barreto / Environmental Engineer	Phyis Engenharia Ambiental	May 8th	Mascarenhas HPP
29	Fernando Ambrosio Gabriel / Security Guard	Visel	May 8th	Mascarenhas HPP
30	Miria Souza Cruz / Secretary of culture	Baixo Guandu Municipality	May 9th	Mascarenhas HPP
31	Dionimar Martinelli / Secretary of communications	Baixo Guandu Municipality	May 9th	Mascarenhas HPP
32	Wesley Uhlig / Coordination of Petroleum, Gas, Energy, and Coastal Works - CPEO	IEMA	May 9th	IEMA Cariacica
33	Fernando Pereira / Head of Research and Prices	Paraty Energia	May 10th	Paraty Energia's Office SP
34	Rafael Molina / Regulatory Expert	Paraty Energia	May 10th	Paraty Energia's Office SP
35	Pedro Pileggi / CEO of Paraty	Paraty Energia	May 10th	Paraty Energia's Office SP
36	Phillip Osborn / CFO of Paraty and Director of Energest	Paraty Energia	May 10th	Paraty Energia's Office SP
37	Andre Maiani / VP and BusDev	Paraty Energia	May 10th	Paraty Energia's Office SP
38	Sandra Lima / HR	Paraty Energia	May 10th	Paraty Energia's Office SP
39	Sergio Parada / Hydropower plant president	Paraty Energia	May 14th	Online
40	Eleanor Fraser-Smith / Head of Sustainability	Victory Hill	May 15th	Online
41	Edgar Posser Junior / Agricultural Engineer - Ichthyofauna team	Overtech	May 17th	Online

Appendix 2 – Documents

Ref	Author	Year	Title	Notes
1	Paraty Energia	2023	ENGT.MA.SIG-0001 - Manual do Sistema de Gestão Integrado da UHE Mascarenhas	Document that references ISOs 9001, 14.0001, 45.0001, and 19.011.
2	CSC Energia e Paraty Energia	2024	Relatório de Atividades	Report with the schedule of all activities related to environmental licensing.
3	IEMA	2024	Licença de Operação (LO) - Renovação - GGE / COEI / Nº 30/2024 / Classe IV	
4	Paraty Energia	2023	ENGT.AI.SIG-0002/2023 - Avaliação de Aspectos e Impactos - UHE Mascarenhas - Operação e Manutenção de Barragem	
5	Paraty Energia	2023	ENGT.AI.SIG-0003/2023 - Avaliação de Aspectos e Impactos - UHE Mascarenhas - Uso e Conservação do Reservatório	
6	Paraty Energia	2023	ENGT.AI.SIG-0004/2023 - Avaliação de Aspectos e Impactos - UHE Mascarenhas - Operação e Manutenção de Turbinas e Geradores	
7	Paraty Energia	2023	ENGT.AI.SIG-0005/2023 - Avaliação de Aspectos e Impactos - UHE Mascarenhas - Trafos elevadores	
8	Paraty Energia	2023	ENGT.AI.SIG-0006/2023 - Avaliação de Aspectos e Impactos - UHE Mascarenhas - Automação e Telecomunicação	
9	Paraty Energia	2023	ENGT.AI.SIG-0007/2023 - Avaliação de Aspectos e Impactos - UHE Mascarenhas - Galpão de Resíduos e Almoxarifados	
10	Paraty Energia	2023	ENGT.AI.SIG-0008/2023 - Avaliação de Aspectos e Impactos - UHE Mascarenhas -Infraestrutura e Serviços Gerais	
11	Paraty Energia	2023	ENGT.AI.SIG-0009/2023 - Avaliação de Aspectos e Impactos - UHE Mascarenhas - Serviços Administrativos	
12	Paraty Energia	2023	ENGT.AI.SIG-0010/2023 - Avaliação de Aspectos e Impactos - UHE Mascarenhas - Uso de Veículos Automotores	
13	Paraty Energia	2023	Identificação de Perigos, Danos e Avaliação dos Riscos	Topics covered: Vehicle driving, Maintenance and Operation of step-up transformers, Maintenance and Operation of the dam, Maintenance and operation of generating units, Administrative tasks, Environment (SMS), Civil activities, Conservation and Cleaning, Surveillance, Warehouse, and External Activities.
14	Paraty Energia	2023	ENGT.FO.SIG-0002 Formulário de Ocorrências Externas	Form used to record any external occurrence reported to the power plant. After registration, the case is analyzed as valid or invalid, and the necessary measures are taken.
15	Paraty Energia	2023	ENGT.PR.SIG-0009 Gerenciamento de Ocorrências Externas	Manual with instructions to be followed in cases of external occurrences.
16	Paraty Energia	2024	External Occurrences	Screenshot showing the actions taken in the case of external occurrence OE-001-2023 (requested during interview with Frankione Falcão).
17	Paraty Energia	2023	ENGT.MP.SIG-0001 - Contexto do Negócio a Análise de Risco	
18	Paraty Energia	2023	ENGT.MP.SIG-0002 - Necessidades e Expectativas das Partes Interessadas	

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19	Paraty Energia	2023	ENGT.MP.SIG-0003 - Gestão Organizacional	
20	Paraty Energia	2023	ENGT.MP.SIG-0018 - Processo Administrativo Financeiro	
21	Paraty Energia	2024	Mapa de Planejamento - Programação	
22	Paraty Energia	2024	Plano de Manutenção 2024	
23	Paraty Energia	2024	RMO - Relatório Mensal de Operação - Março/2024	
24	Paraty Energia	2024	RMO - Relatório Mensal de Operação - Abril/2024	
25	Paraty Energia	2024	RMO - Relatório Mensal de Operação - Fevereiro/2024	
26	Paraty Energia	2024	RMO - Relatório Mensal de Operação - Janeiro/2024	
27	Paraty Energia	2023	ENGT.FO.SIG-0020 - Gestão de Mudança	
28	Bureau Veritas Certification Brasil	2023	Relatório de Auditoria - Auditoria de Recertificação - Híbrido / ISO 9001:2015 - ISO 14001:2015 - ISO 45001:2018	
29	CSC Energia	2023	Termo de Confidencialidade e Propriedade Intelectual	
30	CSC Energia	2023	Relatório de auditoria interna - ISO 14001:2015, ISO 9001:2015 e ISO 45001:2018	
31	Paraty Energia	2023	ENGT.AT.SGI-001 - Ata de Análise Crítica	
32	Bureau Veritas Certification Brasil	2023	Certificado ISO 9001:2015 - Escopo de Certificação - Operação e Manutenção da Usina Hidrelétrica de Mascarenhas	Validade: 18.11.2026
33	Bureau Veritas Certification Brasil	2023	Certificate ISO 9001:2015 - Scope of certification - Operation and maintenance of Mascarenhas Hydroelectric power plant	Expiration date: 18.11.2026
34	Bureau Veritas Certification Brasil	2023	Certificado ISO 14001:2015 - Escopo de Certificação - Operação e Manutenção da Usina Hidrelétrica de Mascarenhas	Validade: 18.11.2026
35	Bureau Veritas Certification Brasil	2023	Certificate ISO 14001:2015 - Scope of certification - Operation and maintenance of Mascarenhas Hydroelectric power plant	Expiration date: 18.11.2026
36	Bureau Veritas Certification Brasil	2023	Certificado ISO 45001:2018 - Escopo de Certificação - Operação e Manutenção da Usina Hidrelétrica de Mascarenhas	Validade: 26.12.2026
37	Bureau Veritas Certification Brasil	2023	Certificate ISO 45001:2018 - Scope of certification - Operation and maintenance of Mascarenhas Hydroelectric power plant	Expiration date: 26.12.2026
38	Bureau Veritas Certification Brasil	2023	Contatos Bureau Veritas Certification Brasil	

39	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis - IBAMA	2024	Certidão Negativa de Débito	Indication that there are no pending matters related to ENERGEST and the federal environmental agency
40	IEMA	2024	Certidão Positiva de Débitos Ambientais com efeitos de negativa	
41	Paraty Energia	2023	ENGT.MP.SIG-0014 - Processo Gestão de Pessoas	
42	Instituto Santa Catarina	2024	Certificado de Curso de Direção Defensiva - Carlito Mario Rodrigues Bosi	
43	Instituto Santa Catarina	2024	Certificado de Curso de Direção Defensiva - Diego Moulin Sanson	
44	Governo do Estado do Espírito Santo - Secretaria de Estado de Segurança Pública e Defesa Social - Corpo de Bombeiros Militar	2023	Registro de Certificação - Curso de Formação de Brigadistas Eventuais - NT 07/CBMES - Frankcione Falcão	
45	Paraty Energia	2023	Controle Treinamentos Obrigatórios Geração ES	
46	Previx - Segurança do Trabalho e Higiene Ocupacional	2023	PGR - Programa de Gerenciamento de Riscos	
47	TREICAP - Treinamento e Capacitação	2024	Lista de Presença - Curso NR 33 - Espaço Confinado para Supervisores de Entrada - Reciclagem	
48	TREICAP - Treinamento e Capacitação	2024	Lista de Presença - Curso NR 35 - Trabalho em Altura	
49	Previx - Segurança do Trabalho e Higiene Ocupacional	2023	Laudo Técnico das Condições Ambientais de Trabalho (LTCAT)	
50	ENEMAX - Engenharia e Consultoria	2023	Cadastro UHE Mascarenhas - Análise Prévia	
51	Paraty Energia	2023	Comunicado oficial	Announcement disseminated on social media, news portal, and through mobile loudspeakers in the Mascarenhas Village informing about the dates for the registration and mapping of the population within the Self-Rescue Zone would be conducted
52	Paraty Energia	2024	Comunicado oficial	Notice disseminated on social media, official announcement via WhatsApp, and community meeting, informing the population about the failure of the siren located near the substation, reason for the

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				event, and measures taken. (event on 01/31/2024) - File in JPEG and PPT format
53	Paraty Energia	2023	Vídeo - Divulgação Sonora	Notice made through a sound alert on June 3, 2023, after the unintentional activation of the siren located near the church in the Village of Mascarenhas
54	Paraty Energia	2023	Formulário de Ocorrências Externas- OE - 001 - 2023	The external occurrence record assessed as valid followed the actions described in the schedule presented in screenshot Ref.16 of this document list
55	CSC Energia e Paraty Energia	2024	Relatório de Atividades	The report with the schedule of all activities related to the Integrated Management System - IMS
56	CAL -Ius Natura	2024	Requisitos de CAL	The report with all applicable regulations to UHE Mascarenhas and the status of compliance with legal requirements
57	Paraty Energia	2023	Governança Corporativa - Manual de Compliance e Código de Ética	
58	Governo do Estado do Espírito Santo - Secretaria de Estado de Segurança Pública e Defesa Social - Corpo de Bombeiros Militar	2023	Registro de Certificação - Curso de Formação de Brigadistas Eventuais - NT 07/CBMES - Diego Moulin Sanson	
59	Paraty Energia	2023	Governança Corporativa - Política de Meio Ambiente, Segurança e Qualidade	
60	Paraty Energia	2024	Escala de Revezamento	
61	Paraty Energia	2024	Imagem de Placa localizada na entrada da UHE Mascarenhas com indicação dos canais de comunicação	The phone numbers indicated on the sign are also published on the website - https://www.paratyenergia.com.br/mascarenhas/
62	Paraty Energia	2024	Relação de colaboradores	
63	Paraty Energia	2023	Acordo Coletivo de Trabalho	
64	Paraty Energia	2023	Inspeção de Segurança - 16.02.2023	
65	Paraty Energia	2023	Inspeção de Segurança - 27.03.2023	
66	Paraty Energia	2023	Inspeção de Segurança - 13.04.2023	
67	Paraty Energia	2023	Inspeção de Segurança - 18.04.2023	
68	Paraty Energia	2023	Inspeção de Segurança - 18.05.2023	
69	Paraty Energia	2023	Inspeção de Segurança -21.06.2023	
70	Paraty Energia	2023	Inspeção de Segurança -19.06.2023-TRAFO	Cleaning
71	Paraty Energia	2023	Inspeção de Segurança -19.06.2023 - UG2	
72	Paraty Energia	2023	Inspeção de Segurança -19.06.2023 - UG2	Cleaning of Generator 02

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73	Paraty Energia	2023	Inspeção de Segurança -19.06.2023 - UG2	Preventive Maintenance
74	Paraty Energia	2023	Inspeção de Segurança - 04.07.2023	
75	Paraty Energia	2023	Inspeção de Segurança - 26.07.2023	
76	Paraty Energia	2023	Inspeção de Segurança - 27.07.2023	
77	Paraty Energia	2023	Inspeção de Segurança - 31.07.2023	
78	Paraty Energia	2023	Inspeção de Segurança - 08.08.2023	
79	Paraty Energia	2023	Inspeção de Segurança - 15.08.2023	
80	Paraty Energia	2023	Inspeção de Segurança - 21.08.2023	
81	Paraty Energia	2023	Inspeção de Segurança - 22.08.2023	
82	Paraty Energia	2023	Inspeção de Segurança - 24.08.2023	
83	Paraty Energia	2023	Inspeção de Segurança - 25.08.2023	
84	Paraty Energia	2023	Inspeção de Segurança - 29.08.2023	
85	Paraty Energia	2023	Inspeção de Segurança - 08.09.2023	
86	Paraty Energia	2023	Inspeção de Segurança - 11.09.2023	Movement of the Stop Log
87	Paraty Energia	2023	Inspeção de Segurança - 15.09.2023	
88	Paraty Energia	2023	Inspeção de Segurança - 11.09.2023	Manual Tool Transportation
89	Paraty Energia	2023	Inspeção de Segurança - 16.09.2023	
90	Paraty Energia	2023	Inspeção de Segurança - 21.09.2023	
91	Paraty Energia	2023	Inspeção de Segurança - 23.10.2023	Painting of transformer protective grilles
92	Paraty Energia	2023	Inspeção de Segurança - 24.10.2023	
93	Paraty Energia	2023	Inspeção de Segurança - 23.10.2023	Maintenance on the gate
94	Paraty Energia	2023	Inspeção de Segurança - 09.10.2023	
95	Paraty Energia	2023	Inspeção de Segurança - 06.10.2023	
96	Paraty Energia	2023	Inspeção de Segurança -11.12.2023	Cleaning
97	Paraty Energia	2023	Inspeção de Segurança -11.12.2023	Garden
98	Paraty Energia	2023	Inspeção de Segurança -12.12.2023	Maintenance Valve
99	Paraty Energia	2023	Inspeção de Segurança -12.12.2023	Valve identification
100	Paraty Energia	2023	Inspeção de Segurança -12.12.2023	Valve identification; Piezometer Maintenance
101	Paraty Energia	2024	Inspeção de Segurança - 16.02.2024	
102	Paraty Energia	2024	Inspeção de Segurança - 23.02.2024	
103	Paraty Energia	2024	Inspeção de Segurança - 01.03.2024	
104	Paraty Energia	2024	Inspeção de Segurança - 11.03.2024	
105	Paraty Energia	2024	Inspeção de Segurança - 15.04.2024	
106	Paraty Energia	2024	Inspeção de Segurança - 19.04.2024	

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107	Conselho Regional de Engenharia e Agronomia do ES (CREA - ES)	2023	Anotação de Responsabilidade Técnica (ART)	Regarding sediment monitoring in the reservoir area of the Mascarenhas HPP
108	Fundação Espírito-santense de Tecnologia - FEST	2013	Mapa Batimétrico e Detalhamento da Região próxima ao Barramento	Map coordinates shared in the same folder
109	Paraty Energia	2023	CT-GMA-012-2323 Usina Hidrelétrica (UHE) Mascarenhas Licença de Operação (Renovação) LO – GGE/COEI/Nº 11/2022/CLASSE IV Atendimento à Condicionante 08-MONITORAMENTO SEDIMENTOMÉTRICO	Official document for protocol of the documents required to meet Condition 08 of the Operating License
110	Paraty Energia	2023	ENGT.CT.GMA-013 Usina Hidrelétrica (UHE) Mascarenhas Licença de Operação (Renovação) LO – GGE/COEI/Nº 11/2022/CLASSE IV Atendimento à Condicionante 06-QUALIDADE DA AGUA	Official document for protocol of the documents required to meet Condition 06 of the Operating License
111	Fundação Espírito-santense de Tecnologia - FEST	2023	Relatório Final - Monitoramento Sedimentométrico na área do Reservatório da UHE Mascarenhas	
112	Fundação Espírito-santense de Tecnologia - FEST	2023	Relatório Final - Monitoramento Sedimentométrico na área do Reservatório da UHE Mascarenhas - Revisão 1	
113	IEMA	2023	E-mail confirmando o recebimento dos documentos enviados pelo ofício CT-GMA-012-23	
114	Visão Ambiental	2023	RC-CONS-REF23-N-001 - Relatório do Programa de Monitoramento Limnológico - Consolidado:2023	Report for compliance with Condition 06 of the Operating License
115	ENEMAX - Engenharia e Consultoria	2023	Implantação do PAE - Cadastro da população a jusante	
116	Intertechne	2022	UHE Mascarenhas - Revisão Periódica de Segurança de Barragem - I.12 Manual de Manutenção das estruturas Civis	
117	Paraty Energia	2023	Ata de Reunião nº 13/2023 - Plano de Segurança de Barragem / Plano de Ação de Emergência	
118	Fractal Engenharia	2023	Lista de Apêndices Plano de Ação de Emergência	
119	Fractal Engenharia	2023	983-MAS-RT-PAE-0001 - Plano de Segurança de Barragem - Volume VI - Plano de Ação de Emergência	Word and PDF versions provided. - Page 55 of the PAE has the evaluated scenarios versus the number of affected individuals
120	Fractal Engenharia	2023	APÊNCIDES do plano de segurança de barragem	
121	Fractal Engenharia	2023	983-MAS-AP-PAE-0001-0 - Apêndice 1 - Lista de Contatos Internos e Externos	

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122	Fractal Engenharia	2023	983-MAS-AP-PAE-0002-0 -Apêndice 2 - Plano de Comunicação	
123	Fractal Engenharia	2023	983-MAS-AP-PAE-0003-0 -Apêndice 3 - Plano e Registro de Treinamento do PAE	
124	Fractal Engenharia	2023	983-MAS-AP-PAE-0004-0 -Apêndice 4 - Monitoramento e Controle de Estabilidade	
125	Fractal Engenharia	2023	983-MAS-AP-PAE-0005-0 -Apêndice 5 - Fichas de Ação	
126	Fractal Engenharia	2023	983-MAS-AP-PAE-0006-0 -Apêndice 6 - Formulário Tipo	
127	Fractal Engenharia	2023	983-MAS-AP-PAE-0007-0 -Apêndice 7 - Memória de Cálculo do Estudo de Ruptura Hipotética e Trânsito de Cheias	Dam break study
128	Fractal Engenharia	2023	983-MAS-AP-PAE-0008 - Apêndice 8 - Cartas de Inundação	
129	Fractal Engenharia	2023	983-MAS-AP-PAE-0009 -Apêndice 9 - Pontos de Encontro e Rotas de Fuga	
130	Fractal Engenharia	2023	983-MAS-AP-PAE-00010-0 -Apêndice 10 - Caderno de Coordenadas das Estruturas Vulneráveis	Mapping of downstream assets
131	Fractal Engenharia	2023	983-MAS-AP-PAE-00011-0 -Apêndice 11 - Análise de Risco (FMEA e Árvore de Eventos)	
132	Fractal Engenharia	2023	983-MAS-AP-PAE-00012-0 -Apêndice 12 - Guia do PAE	
133	Fractal Engenharia	2023	983-MAS-AP-PAE-00013-0 -Apêndice 13 - Entidades com Cópia do PAE	
134	Paraty Energia	2023	Apresentação sobre a Barragem da UHE Mascarenhas	
135	Geocoba	2023	Relatório de Inspeção de Segurança Regular (ISR) - 0311-OS-SBAR-EOR-ISR-0002-0	
136	Geocoba	2023	Relatório de Estudo de Comportamento das Estruturas - 0311-PS-SBAR-EOR-RU-0002_0	
137	Geometrisa	2024	Análise Técnica: Relatório de Inspeção de Segurança Regular - ISR - GE-AT-UHE-MAS-01-24-R0	
138	Paraty Energia	2023	Ata de Reunião nº 21/2023 - Plano de Segurança de Barragem / Plano de Ação de Emergência / Pós Simulado de 23/09/2023	
139	ENEMAX - Engenharia e Consultoria	2023	Implantação do PAE - Simulado Externo	
140	Ello Ambiental - Estudos, projetos e treinamentos	2023	Dados Brutos_Consolidados_2023 Campanha	Data used for the elaboration of the report
141	Paraty Energia	2024	ENGT.CT-GMA.014 Usina Hidrelétrica (UHE) Mascarenhas, Licença de Operação (Renovação) lo - GGE/COEI/ Nº 11/2022/CLASSE IV, Atendimento à Condicionante 09-MONITORAMENTO DA ICTIOFAUNA	Official document for protocol of the consolidated report of 2023
142	Paraty Energia	2024	ENGT.CT-GMA.015 Usina Hidrelétrica (UHE) Mascarenhas, Licença de Operação (Renovação) lo - GGE/COEI/ Nº 11/2022/CLASSE IV, Atendimento à Condicionante 09-MONITORAMENTO DA ICTIOFAUNA	Official document for protocol of the partial report of 2023 and raw data
143	Ello Ambiental - Estudos, projetos e treinamentos	2023	Fotos dos peixes da campanha	
144	IEMA	2024	E-mail confirmando o recebimento dos documentos enviados pelo ofício ENGT.CT-GMA.014	

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145	Ello Ambiental - Estudos, projetos e treinamentos	2024	5º Relatório Consolidado Anual do Monitoramento de Ictiofauna na UHE Mascarenhas, Baixo Guandu - ES	
146	Paraty Energia	2023	ENGT.CT.SIG-0003 Usina Hidrelétrica (UHE) Mascarenhas, Licença de Operação (Renovação) lo - GGE/COEI/ Nº 11/2022/CLASSE IV, Autorização de Manejo de Fauna 210-2023	Official letter presenting the Fish Rescue report during a machinery stop at the Mascarenhas Hydroelectric Power Plant
147	Visão Ambiental	2023	Planilha de resgate - UHE Mascarenhas - Dados Brutos Agosto de 2023	
148	Visão Ambiental	2023	Relatório de Resgate da Ictiofauna - Referência Agosto 2023	
149	Econservação - Estudos e Projetos Ambientas	2023	Folder RENOVAÇÃO AMF	Documents necessary for requesting authorization for wildlife management
150	IEMA	2023	Autorização para manejo de fauna silvestre para licenciamento ambiental estadual	Documents required for the execution of fish passage
151	ICA - Soluções e Serviços	2023	UHE Mascarenhas - Programa de Transposição Manual de Peixes - Relatório 05 (Fevereiro/2023)	
152	Paraty Energia	2024	Justificativa para o tópico não ser aplicável	
153	IEMA	2011	Licença de Operação (Renovação) LO - GCA/SAIA/Nº 130/2011/CLASSE III	
154	Secretaria de Estado para Assuntos do Meio Ambiente - SEAMA	1999	Licença de Operação Nº 080/99	
155	IEMA	2006	Licença de Operação (Ampliação) LO - GCA/SAIA/ Nº 195/2006/ CLASSE I	License related to the activity: 4th generating unit of the Mascarenhas Hydroelectric Power Plant
156	IEMA	2006	Licença de Operação (Renovação) LO - GCA/SAIA/Nº 091/2006/CLASSE IV	
157	Paraty Energia	2024	Site interno de Negócios	https://www.paratyenergia.com.br/mascarenhas/
158	Paraty Energia	2024	Organograma Paraty Energia e Paraty O&M	
159	Paraty Energia	2023	Governança Corporativa - Estrutura Societária	
160	Paraty Energia	2023	Governança Corporativa - Princípios e Valores	
161	APINE	2024	Empresas associadas	
162	Paraty Energia	2023	Ata de Reunião Comitê Governança	
163	Paraty Energia	2023	E-mail do canal de denúncia	
164	Canal Energia	2024	Site Canal Energia	https://www.canalintegro.com.br/energiaetica
165	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-4.0 - Grupo de Produtos Aquisições e Contratos - Produto Gestão de Aquisições	Service level agreement between the parties
166	Paraty Energia	2023	Anexo 02 - Gestão Documental de SSMA	Example of a form used to list the necessary documents that the supplier must provide, according to the activity(ies) performed
167	Paraty Energia	2023	ENGT.FO.SIG-00158 - Especificação Técnica	Technical specification template

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168	Paraty Energia	2023	ENGT.FO.SIG-0021 - Quadro de Quantidade e Preço e Detalhamento de Custo	Model table for detailing quantity and price of each service to be provided
169	Paraty Energia	2023	ENGT.PR.SIG-0016 - DIRETRIZES BÁSICAS DE SSMA PARA EMPRESAS CONTRATADAS	Template form used to list the necessary documents that the supplier must provide, according to the service(s) rendered.
170	CSC Energia	2024	Lista de todas as compras realizada em 2024	
171	Paraty Energia	2024	Publicação das políticas apresentadas no site - compromissos públicos	https://www.paratyenergia.com.br/politicas
172	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-1.0 - Grupo de Produtos Contabilidade - Produto Contabilidade e Tributário	
173	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-2.0 - Grupo de Produtos Aquisições e Contratos - Produto Suporte à Gestão de Contratos com Fornecedores	
174	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-3.0 - Grupo de Produtos Infraestrutura Administrativa - Produto Gestão Documental	
175	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-5.0 - Grupo de Produtos MA - Produto Gestão de Meio Ambiente	
176	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-5.0 - Grupo de Produtos MA - Produto Gestão de Meio Ambiente	
177	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-6.0 - Grupo de Produtos MA - Produto Gestão de Meio Ambiente	
178	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-7.0 - Grupo de Produtos Pesquisa e Desenvolvimento - Produto Gestão de Programas e Projetos de P&D	
179	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-8.0 - Grupo de Produtos Financeiros - Produto Tesouraria	
180	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-9.0 - Grupo de Produtos Recursos Humanos - Produto Folha de Pagamento	
181	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-10.0 - Grupo de Produtos Contabilidade - Produto Gestão orçamentária	
182	CSC Energia	2022	Acordo de Serviço e Produto CC-22-015-ASP-10.0 - Grupo de Produtos Tecnologia da Informação - Produto Suporte ao Cliente	
183	ENERGEST	2023	Estatuto Social	
184	Agência Nacional de Energia Elétrica - ANEEL	2007	Contrato de Concessão nº 003/2007 - ANEEL - ENERGEST	
185	Paraty Energia	2024	Plano de Comunicação com os Stakeholders	
186	Paraty Energia	2024	Stakeholder Communication Plan	
187	Agência Nacional de Águas - ANA	2023	Outorga nº 2331, de 12 de setembro de 2023	Granting of the right to use water resources for irrigation
188	Overtech Soluções Tecnológicas	2023	Banco de Dados e planilhas com o tratamento destes	
189	Paraty Energia	2024	ENGT.CT.GMA-012 Usina Hidrelétrica (UHE) Mascarenhas Licença de Operação (Renovação) LO – GGE/COEI/Nº 11/2022/CLASSE IV	Official letter of submission of the annual report

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			Atendimento à Condicionante 05 quantitativo recursos hídricos	
190	Overtech Soluções Tecnológicas	2023	Fichas de campo	
191	IEMA	2024	Protocolo dos documentos encaminhados	
192	Overtech Soluções Tecnológicas	2023	Relatório Anual 2023 a UHE Mascarenhas em Atendimento à Resolução Conjunta ANA/ANEEL nº 127/2022	
193	Overtech Soluções Tecnológicas	2023	Retrieves	
194	Paraty Energia	2024	Memorando sobre a resiliência da UHE Mascarenhas às variações climáticas	
195	EDP	2022	Inventário de emissões de gases de efeito estufa	
196	Paraty Energia	2024	Arquivo de nº 155	Power density and estimated emissions
197	AARDVARK Certification LTD	2023	EU Taxonomy Alignment	
198	Vera Cruz - Soluções Geofísicas e Geológicas	2023	Laudo Técnico - Análise dos processos erosivos em ilha no município de Colatina - ES	Recent morphological assessment of an island located in the municipality of Colatina, ES, to analyze the influence of the Mascarenhas HPP operation on its morphology
199	BMG - Engenheiros Associados - ENERGEST - GAHP / GAHO / GAHE	2013	ENGT.MA.SIG-0003 - Manual de Operação da UHE Mascarenhas - Introdução Geral	
200	BMG - Engenheiros Associados - ENERGEST - GAHP / GAHO / GAHE	2013	ENGT.MA.SIG-0004 - Manual de Operação da UHE Mascarenhas - Unidades Geradoras	
201	BMG - Engenheiros Associados - ENERGEST - GAHP / GAHO / GAHE	2013	ENGT.MA.SIG-0005 - Manual de Operação da UHE Mascarenhas - Auxiliares da Unidade Geradora	
202	BMG - Engenheiros Associados - ENERGEST - GAHP / GAHO / GAHE	2013	ENGT.MA.SIG-0006 - Manual de Operação da UHE Mascarenhas - Sistemas Auxiliares Mecânicos da Casa de Força	
203	BMG - Engenheiros Associados - ENERGEST - GAHP / GAHO / GAHE	2013	ENGT.MA.SIG-0007 - Manual de Operação da UHE Mascarenhas - Vertedouro e Reservatório	
204	BMG - Engenheiros Associados - ENERGEST - GAHP / GAHO / GAHE	2013	ENGT.MA.SIG-0008 - Manual de Operação da UHE Mascarenhas - Pórticos	

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205	BMG - Engenheiros Associados - ENERGEST - GAHP / GAHO / GAHE	2013	ENGT.MA.SIG-0009 - Manual de Operação da UHE Mascarenhas - Transformador Elevador e SMF	
206	BMG - Engenheiros Associados - ENERGEST - GAHP / GAHO / GAHE	2013	ENGT.MA.SIG-0010 - Manual de Operação da UHE Mascarenhas - Serviço Auxiliar em Corrente Alternada	
207	BMG - Engenheiros Associados - ENERGEST - GAHP / GAHO / GAHE	2013	ENGT.MA.SIG-0011 - Manual de Operação da UHE Mascarenhas - Serviço Auxiliar em Corrente Contínua	
208	BMG - Engenheiros Associados - ENERGEST - GAHP / GAHO / GAHE	2013	ENGT.MA.SIG-0012 - Manual de Operação da UHE Mascarenhas - Grupo gerador Diesel	
209	BMG - Engenheiros Associados - ENERGEST - GAHP / GAHO / GAHE	2021	Capa relatório técnico de faixa de operação	
210	CTA Meio Ambiente	2011	Mapa de localização das parcelas de monitoramento	Map indicating the areas where reforestation has occurred under the Degraded Areas Recovery Plan
211	Paraty Energia	2023	Apresentação institucional da UHE Mascarenhas	
212	Paraty Energia	2023	ENGT.PR.SIG-0003 - 01 - Identificação e Qualificação de aspectos e impactos ambientais	Procedure
213	Paraty Energia	2024	Project Macarena - Risk Register	
214	Paraty Energia	2022	Exhibit 3.2.3 - Operator Performance Measurement Matrix	
215	Paraty Energia	2024	4 - ESG Upload Template UHE Mascarenhas - April 2024	Data spreadsheet requested for KPIs
216	Paraty Energia	2024	4 - GHG data template - April 2024	Data spreadsheet requested for KPIs
217	Victory Hill - VH Global Sustainable Energy Opportunities plc	2024	Performance Assessment Report Project Macarena - Operating Partner: Paraty Energia - Hydro power asset in Brazil	
218	Paraty Energia	2024	Monthly Report - Mar/2024 - HPP Mascarenhas	Monthly Report example
219	Paraty Energia	2024	Operator Report - Board Meeting - March/2024	
220	Victory Hill - VH Global Sustainable Energy Opportunities plc	2023	GHG Performance Report by Month - 01.01.2022 - 31.12.2023	
221	Kelowna Consult	2023	ESG Consultancy - Technical Report - 01 - Quantitative table for study of Life Cycle Analyses	
222	Paraty Energia	2024	Budget Presentation- Board Meeting - March/2024	

223	AARDVARK Certification LTD	2023	Climate Risk & Vulnerability Assessment	Published on https://www.paratyenergia.com.br/mascarenhas/
224	Kelowna Consult	2023	Mascarenhas Hydro Electric Power Plant - LCA Model	
225	Paraty Energia	2022	Project Macarena - Transaction and Operational Structure	
226	Paraty Energia	2024	Relatório Anual de Responsabilidade Socioambiental e Econômico-financeiro	Published on https://www.paratyenergia.com.br/mascarenhas/
227	Victory Hill - VH Global Sustainable Energy Opportunities plc	2024	Annual Report and Accounts for the year ended 31 December 2023	
228	Victory Hill - VH Global Sustainable Energy Opportunities plc e Paraty Energia	2024	GSEO - Macarena Sustainability Action Plan	
229	Subsecretaria Municipal de Desenvolvimento Rural e Meio Ambiente, Secretaria Municipal de Educação e Paraty Energia	2023	Anexo I - Regulamento - Raízes do Futuro: Concurso Estudantil de Poesia	Poetry contest sponsored by Paraty in celebration of Tree Day. An example of proactive action with the community, aiming to promote environmental education and also enhance the power plant's relationship and image with the community
230	Subsecretaria Municipal de Desenvolvimento Rural e Meio Ambiente, Secretaria Municipal de Educação, ASCAMARE e Paraty Energia	2023	Anexo II - Regulamento - Gincana Amigos do Meio Ambiente	Scavenger hunt to promote environmental awareness and encourage sustainable actions among students from public schools. Another example of proactive action with the community
231	Subsecretaria Municipal de Desenvolvimento Rural e Meio Ambiente, Secretaria Municipal de Educação, ASCAMARE e Paraty Energia	2023	Projeto Dia Mundial da Árvore 2023	Description of all projects developed in celebration of Municipal Tree Day, including the Poetry Contest and Scavenger Hunt
232	Paraty Energia	2023	FOTOS: Exemplos de placas educativas distribuídas pelo município e do dia do evento	
233	APINE	2024	Apresentação dos temas prioritários para 2024	
234	APINE	2024	Conselho de Administração da APINE - Eleito na AGO de 30/04/2024 (mandato de abril/24 a abril/26)	
235	APINE	2024	E-mail INFO APINE: Legislação	In order to monitor regulatory changes and take proactive action in regulatory and legislative discussions on topics that may impact the

				power plant, Paraty is part of APINE. In the folder, we provide examples of the association's work, reports, and technical groups
236	Fórum do Meio Ambiente e Sustentabilidade do Setor Elétrico	2024	Nota Técnica FMASE 029/2024	Technical note on normative legal guidance affecting APINE members
237	APINE	2024	Plano de Ação da APINE 2024	
238	Advocacia-Geral da União, Procuradoria-Geral Federal, Procuradoria Federal Junto à AGÊNCIA Nacional de Energia Elétrica, Coordenação de Energia	2021	Parecer nº00271/2021/PFANEEL/PGF/AGU - Assunto: Prorrogação da Concessão	
239	Ministério de Minas e Energia, Empresa de Pesquisa Energética e Eletrobrás	2017	Revisão Ordinária de Garantia Física de Energia das Usinas Hidrelétricas - UHEs Despachadas Centralizadamente no Sistema Interligado Nacional - SIN	
240	Paraty Energia	2023	UHE Mascarenhas - Concessão	In addition to working with APINE, Paraty also works directly with its regulatory team to monitor the process at ANEEL and MME. Furthermore, there is a law firm mandated by Paraty and EDP (Madrona Advogados) directly involved in the case with ANEEL.
241	Agência Nacional de Energia Elétrica - ANEEL	2020	Nota Técnica nº 143/2020-SFG/ANEEL - Campanha 2020 de Fiscalização de Desempenho Operacional DARDO - etapa de Monitoramento - das Usinas Hidroelétricas com Despacho Centralizado pelo Operador Nacional do Sistema Elétrico.	
242	Agência Nacional de Energia Elétrica - ANEEL	2022	Resultados do monitoramento referentes ao DARDO 2022 - Ranqueamento das Centrais	Every two years, ANEEL conducts an evaluation process for hydroelectric power plants. Regulatory Self-Assessment and Operational Performance Statement (Dardo). The Mascarenhas Hydroelectric Power Plant reached the 8th position in 2020. In the last two cycles, the plant has received maximum scores in the categories of Environment, Operation Management, Maintenance Management, O&M, and Safety.
243	Paraty Energia, Agência Nacional de Energia Elétrica - ANEEL, IN FORMA Software S/A	2023	Metodologia para definição de estoque ótimo de Usinas utilizando Critérios Operacionais e Econômicos	Proactively, Energest decided to develop an objective R&D project focusing on efficient inventory management and supply process optimization. This project promotes plant employees and management team best practices while seeking continuous improvement of practices

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244	IN FORMA Software S/A	2023	Apresentação para abertura de projeto	
245	IN FORMA Software S/A	2023	P&D 02331-0123/2023 - Contrato de Prestação de Serviços para Desenvolvimento de Projeto de Pesquisa & Desenvolvimento "Metodologia para definição de estoque ótimo de Usinas utilizando critérios Operacionais e Econômicos"	
246	IN FORMA Software S/A	2023	Anexos do contrato de Prestação de Serviços	
247	Valbert Vago e Proveido Produções	2023	Projeto Memória Viva Baixo Gaundu - Vídeo documentário sobre a história do município de Baixo Guandu - ES, dos pioneiros aos dias atuais	With the aim of getting closer to the community and the region's history, Paraty's management has been developing projects for cultural rescue. The document presents an initiative assessed for sponsorship.
248	ROOSTER Produtora	2024	Roteiro Paraty Energia "UHE Mascarenhas - 50 anos de Operação"	Script of the documentary being produced to celebrate the 50th anniversary of the Mascarenhas Hydroelectric Power Plant operation
249	O Empreiteiro	1972	Mascarenhas, Primeira Usina do Rio Doce	Report about the construction of the Mascarenhas Hydroelectric Power Plant
250	Visão Geo	2023	Proposta Comercial - Regularização Fundiária - UHE Mascarenhas	Commercial proposal for the land regularization of properties surrounding the reservoir
251	ConsultGEL - Consultoria em Geomática	2018	Relatório de Atividades - Diagnóstico Fundiário - UHE Mascarenhas - Baixo Guandu/ES e Aimorés/MG	
252	ConsultGEL - Consultoria em Geomática	2023	Proposta Comercial Simplificada - 1157 - Regularização Fundiária	
253	WML - Engenharia e Meio Ambiente	2023	Proposta de Consultoria e Serviços Técnico Ambientais para Atualização do Plano Ambiental de Conservação e Uso do Entorno de Reservatório Artificial (PACUERA) para a UHE Mascarenhas, em Baixo Guandu - ES	Since 2018, the plant management has been pursuing actions for land regularization. After the pandemic, the process resumed with the hiring of diagnostics and mapping of properties and occupations. In 2024, work is being developed by WML for georeferencing and updating of Pacuera. The tax part was equalized in 2023, with the payment of all due taxes.
254	Paraty Energia	2023	ENGT.FO.SIG-0018 - Especificação Técnica Atualização PACUERA	
255	Paraty Energia	2023	ENGT.FO.SIG-0021 - Quadro de Quantidade e Preço e Detalhamento de Custo	
256	Paraty Energia	2023	Gestão Documental SSMA	Form filled out for the PACUERA update service
257	WML - Engenharia e Meio Ambiente	2024	E-mail com o envio do relatório parcial do PACUERA e atualizações sobre os itens em andamento	
258	Paraty Energia	2023	ENGT.CT.SIG.002 - Usina Hidrelétrica (UHE) Mascarenhas - Apoio Posto de Saúde - Vila de Mascarenhas	Official letter requesting support from the City Hall of Baixo Guandu to provide a room at the local health center located in the Mascarenhas Village for psychological support offered by Paraty Energia to those who felt the need after the sounding of the Siren on 02/06/2023

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259	Coordenadora unidade Vila de Mascarenhas	2023	Áudio Kenia	Audio indicating that, at the request of the Health Secretary, appointments with the psychologist could no longer take place at the health center
260	ENERGEST	2024	Carta a Associação de Moradores de Mascarenhas	Letter to inform the Association about the fulfillment of all commitments made with the community in a meeting held on 25.07.2023. (Signed and scanned PDF)
261	Maryana Alves - Consultoria e Treinamentos	2023	Contrato de Prestação de Serviços de Consultoria Psicológica	
262	Paraty Energia	2023	E-mail: Ata de Reunião - Comunidade de Mascarenhas e Paraty	Email sending the minutes of the meeting held with the community of Mascarenhas Village and Paraty Energia on 25.07.2023
263	Maryana Alves	2023	Relatório Semanal - 24.10.2023	
264	Maryana Alves	2023	Relatório Semanal - 27.10.2023	
265	Maryana Alves	2023	Relatório Semanal - 06.11.2023	
266	Maryana Alves	2023	Relatório Final - 15.02.2024	Example of prompt action by the administration in the event of an accidental siren activation. Including communication with community leaders and psychological support
267	Paraty Energia	2024	Inspeção de Segurança 06.02.2024	
268	Paraty Energia	2024	Inspeção de Segurança 29.04.2024	
269	Paraty Energia	2024	Inspeção de Segurança 30.04.2024	
270	Paraty Energia	2024	E-mail: Calendário de Eventos (Abraman, snptee, cenocom...)	
271	Rural Tech - Tecnologia em campo	2016	Relatório Técnico - Atualização das Curvas Cota X Área X Volume	Proactively, the power plant commissioned studies to assess the impacts of the plant's operation on sedimentation and erosion downstream of the project. No relationship was identified between the operation of the plant and such events
272	Paraty Energia	2023	Outodor Simulado de Evacuação	
273	Operador Nacional do Sistema Elétrico - NOS	2018	Formulário de Solicitação de Atualização de Restrição Hidráulica - FSAR - H	The document indicating the minimum discharge flow rate
274	Agência Nacional de Águas - ANA	2011	Resolução nº 770, de 24 de outubro de 2011	Grant of water resources usage rights for electricity generation
275	Paraty Energia	2024	E-mail: Variação de Nível de Jusante	
276	Intertechne	2024	Alteamento dos Diques 01 e 02	Basic project for the execution of dam raising
277	Paraty Energia	2024	Contrato de Prestação de Serviços	Contract for the provision of services for the Preparation of Executive Project for the Raising of Dams 1 and 2

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278	Paraty Energia	2024	Projeto Básico - Barramento UHE Mascarenhas	Document for defining the cost for the closure work of the spillway. Note: Under review according to technical visits with contractors on-site, as well as ongoing searches regarding reinforcement detailing at the powerhouse crest to determine the locking method
279	Paraty Energia	2024	Relatório Técnico - UHE Mascarenhas - Análise das Alternativas para mitigação de inundação para vazão decamilenar	Document on the feasibility of the spillway to discharge the 1-in-10,000-years flow with the reservoir level rise
280	Ministério do Esporte	2023	Recibo de pagamento	Receipt of payment for the project incentive named 'Football and Citizenship,' promoted by the NGO Sociedade Jardim Lapenna and sponsored through the Sports Law
281	Ministério do Esporte	2023	Futebol e Cidadania - Jardim Lapenna nº 2202355	Project Description
282	Sociedade Nova Jardim Lapenna	2023	Apresentação Institucional da Sociedade Nova Jardim Lapenna	
283	Liga nacional de basquete	2023	Recibo de pagamento	Receipt of payment for the incentive of the project 'Star Game,' sponsored through the Sports Law
284	Liga nacional de basquete	2023	Apresentação Institucional da Liga Nacional de Basquete	
285	Ciência Divertida	2023	Apresentação Oceavo Diverteatro e Cine Viajante	Presentation of the project that was incentivized by the Cultural Incentive Law
286	Ciência Divertida	2023	Cartaz do projeto	Poster to be used in schools
287	Ministério da Cultura	2023	Recibo de pagamento	
288	Ministério da Cultura	2023	Recibo de pagamento	
289	República Federativa do Brasil	2023	Diário Oficial da União de 19.01.2023	Project description on page 75
290	Paraty Energia	2023	ESG Monthly Report - March.2024	Presentation of the progress of the actions described in the GSEO - Macarena Sustainability Action Plan (Ref. 221 of this document) agreed upon with Victory Hill for the months of January, February, and March.
291	Paraty Energia	2023	ESG Monthly Report - April.2024	Presentation of the progress of the actions described in the GSEO - Macarena Sustainability Action Plan (Ref. 221 of this document) agreed upon with Victory Hill for the month of April.
292	Secretaria de Estado para Assuntos do Meio Ambiente - SEAMA	1999	Licença de operação nº 080/99 para Geração de Energia Elétrica – Usina Hidrelétrica Mascarenhas	
293	Engevix	1999	Estudo de Impacto Ambiental - Implantação da 4ª Máquina	
294	IEMA	2006	Licença Prévia (Ampliação) LP-GCA/SAIA/Nº212/2006 / CLASSE I para 4ª Unidade Geradora da UHE Mascarenhas	

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295	IEMA	2006	Licença de Instalação (Ampliação) LI-GCA/SAIA/Nº234/2006 / CLASSE I para 4º Unidade Geradora da UHE Mascarenhas	
296	IEMA	2006	Licença de Operação (Renovação) LO-GCA/SAIA/Nº091/2006/CLASSE IV para Geração de Energia Elétrica – Usina Hidrelétrica de Mascarenhas	
297	IEMA	2006	Licença de Operação (Ampliação) LO-GCA/SAIA/Nº195/2006 / CLASSE I para 4º Unidade Geradora da UHE Mascarenhas	
298	IEMA	2007	Licença de Instalação (Ampliação) LI – GCA/SAIA/Nº 146/2007 / CLASSE II para Ampliação da capacidade de Geração de Energia da UHE Mascarenhas	
299	IEMA	2011	Licença de Operação (Renovação) LO-GCA/SAIA/Nº 130/2011 / CLASSE III para Geração de Energia Hidrelétrica – UHE Mascarenhas, com potência instalada de 184,5 MW	
300	IEMA	2022	Licença de Operação (Renovação) LO-GGE/COEI/Nº11/2022 / CLASSE IV para Geração de Energia Hidrelétrica – UHE Mascarenhas, com potência instalada de 184,5 MW	
301	IEMA	2024	Licença de Operação (Renovação) LO-GGE/COEI/Nº30/2024/CLASSE IV para Geração de Energia Hidrelétrica – UHE Mascarenhas, com potência instalada de 198 MW	
302	Fractal Engenharia	2023	983-MAS-DES-APMR-0002-0	Scenario equivalent to the rupture of 1.5 gates
303	Paraty Energia	2024	Cenários hipotéticos de ruptura UHE Mascarenhas	able containing the description of each of the scenarios evaluated for the PAE (Presented in Folder 94, PAE - Topic 4 - Community Impacts and Infrastructure Safety)
304	Paraty Energia	2023	Projeto Semana do Meio Ambiente	
305	Paraty Energia	2023	Apresentação realizada na semana do meio ambiente	
306	Paraty Energia	2023	Fotos dos brindes entregues na semana do meio ambiente	
307	EDP	2022	Ata de Reunião	Minutes referring to the meeting held on April 19, 2022, to define the necessary actions to comply with condition 11 of operating license No. 11.2022
308	EDP	2022	CT-GMA-653049/22 Usina Hidrelétrica (UHE) Mascarenhas - Reunião para parceria/convênio com a Polícia Militar Ambiental - Atendimento à Condicionante nº 11	Official letter requesting a meeting with the Environmental Military Police
309	EDP	2022	CT-GMA-663871/22 Usina Hidrelétrica (UHE) Mascarenhas -Licença de Operação (Renovação) LO - GGE/COEI/Nº 11/2022/CLASSE IV - Atendimento à Condicionante nº 11	Letter for presentation to IEMA of the meeting minutes.
310	IEMA	2022	E-mail de protocolo do Ofício CT-GMA-663871/22	
311	Paraty Energia	2023	Folder (frente e verso) apresentado na semana do meio ambiente em 2023	
312	ICA - Soluções e Serviços	2024	Programa de Transposição Manual de Peixes - Relatório 06 (Fevereiro/2024)	
313	ICA - Soluções e Serviços	2024	Programa de Transposição Manual de Peixes - Relatório 07 (Março/2024)	

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314	Paraty Energia	2023	Apresentação Transposição Manual de Peixes - 2021 e 2023	Presentation held at the Mascarenhas Hydroelectric Plant for the community of Mascarenhas Village and at the City Hall of Baixo Guandu Municipality regarding the fish passage campaigns carried out between 2021 and 2023
315	Paraty Energia	2023	Fotos dos eventos realizados	
316	Paraty Energia	2023	Convites dos eventos realizados	
317	Paraty Energia	2024	Sistema de combate a incêndio móvel	
318	Paraty Energia	2024	Fotos de treinamento dos colaboradores para combate a incêndio	
319	Physis Engenharia Ambiental	2023	RT PHY23-27 - Monitoramento de Efluentes Industriais e Sanitários da UHE Mascarenhas - Campanha de referência: Maio/2023	
320	Physis Engenharia Ambiental	2023	RT-PHY23-44 - Monitoramento de Água Potável da UHE Mascarenhas - Campanha de referência: Setembro/2023	
321	Physis Engenharia Ambiental	2023	RT PHY23-45 - Monitoramento de Efluentes Industriais e Sanitários da UHE Mascarenhas - Campanha de referência: Setembro/2023	
322	Physis Engenharia Ambiental	2024	E-mail Resultados Potabilidade Maio24	
323	Paraty Energia	2024	Email Reunião com stakeholder sobre Manutenção (benchmarking com o Grupo Aliança)	Evidence of the relationship with the upstream plant of the Mascarenhas Hydroelectric Plant
324	EDP	2014	Plano de Manejo da Ictiofauna na área de Influência da UHE Mascarenhas - Número: EM-ES-MA-RT-0009/14	Plan presented to IEMA to initiate fish passage campaigns
325	EDP	2014	CT-GMA-52/14 - Usina Hidrelétrica de Mascarenhas - LO GCA/SAIA/Nº130/2011 CLASSE III - Condicionante 12	Letter for presentation to IEMA of the Fish Management Plan for the Mascarenhas HPP
326	IEMA	2014	OF/Nº 2523/14/IEMA/GCA/CAIA/(ACGE)	IEMA's feedback approving the Management Plan
327	ICA - Soluções e Serviços	2023	Plano de Trabalho para renovação de autorização de manejo de fauna (captura, marcação, manejo e transporte de fauna) - Autorização nº 163/2021 - Processo IEMA n 68896158	Work plan presented for the current campaigns
328	IEMA	2024	Email Duvidas LO 11/2022 - Processo 22111140 - Transposição Manual de Peixes na UHE Mascarenhas.	Confirmation from IEMA regarding the activities covered in item 09 of LO Nº. 11/2022 (fish monitoring, manual fish transposition, and fish stocking suspension)
329	Paraty Energia	2024	Especificação Técnica - Profissionais especializados para atualização das curvas Cota X Área X Volume	Technical specification for the hiring of bathymetry service, which requests the preparation of a comparative report of previous events (2009, 2013, and 2016) for temporal analysis.
330	Energest	2007	IEMA_08134.07_29.05.07_CT-CCSM-6.07 - uhe Mascarenhas - Condicionante nº 04 da LO 091/06	Letter presenting the Sediment Monitoring Program in the Reservoir Area of the Mascarenhas Hydroelectric Plant.

331	Fundação Espírito-santense de Tecnologia - FEST	2007	ANEXO_IEMA_08134.07_29.05.07_CT-CCSM-6.07 - Programa de Monitoramento Sedimentométrico na área do reservatório da UHE Mascarenhas	
332	IEMA	2007	OF Nº 5148_IEMA.GCA (ACGE)	Approval of the Program by IEMA
333	Energest	2008	IEMA_01034.08_17.01.08_CT-GRF-5.08 - Usina Hidrelétrica Mascarenhas - LO-GCA/SAIA/Nº091/2006/Classe IV - Condicionante nº 04 - Programa de Monitoramento Sedimentométrico na Área do Reservatório da UHE Mascarenhas	Request from ENERGEST to change the date of the first campaign
334	Energest	2008	IEMA_08759.08_09.05.08_CT-GRHME-7.08 - Usina Hidrelétrica Mascarenhas - LO-GCA/SAIA/Nº091/2006/Classe IV - Condicionante nº 04	Indication of the date for presenting the first report.
335	IEMA	2008	OF Nº 3221_IEMA.GCA (ACGE) - Condicionante 04 da LO 091/06	Agreement from IEMA and establishment of deadline for presenting the first report
336	Energest	2008	IEMA_17531.08_17.07.08_CT-GRHME-18.08 - Usina Hidrelétrica Mascarenhas - LO-GCA/SAIA/Nº091/2006/Classe IV - Condicionante nº 04	Letter of delivery of the report from the first campaign
337	Fundação Espírito-santense de Tecnologia - FEST	2008	ANEXO_IEMA_17531.08_17.07.08_CT-GRHME-18.08 - Monitoramento Sedimentométrico na área do Reservatório da UHE Mascarenhas - ES - Relatório Primeira Campanha	Report of the first campaign (June/2008)
338	Energest	2009	IEMA_02979.09_17.02.09_CT-GRAOE-16.09 - Usina Hidrelétrica Mascarenhas - LO-GCA/SAIA/Nº091/2006/Classe IV - Condicionante nº 04	Letter of delivery of the final report
339	Fundação Espírito-santense de Tecnologia - FEST	2008	ANEXO_IEMA_02979.09_17.02.09_CT-GRAOE-16.09 - Monitoramento Sedimentométrico na área do Reservatório da UHE Mascarenhas - ES - Relatório Final	Final Report
340	IEMA	2009	OF Nº 5484_IEMA.GCA(ACGE) - Condicionante 04 da LO 091/06	Letter from IEMA indicating that the next campaign should be conducted in 2012.
341	IEMA	2011	OF Nº 605.11_IEMA.GCA.SAIA(ACGE) - Condicionante 04 da LO 091/06	Letter from IEMA indicating that the next campaign should be carried out under the next operating license, due to the renewal request for this one
342	EDP	2014	IEMA_023097.2014_06.10.14_CT-GMA- 239.14 - Usina Hidrelétrica (UHE) Mascarenhas - LO-GCA/SAIA/Nº130/2011/Classe III - Condicionante nº 08	Letter of delivery of the final report of the 2nd analysis cycle

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343	Fundação Espírito-santense de Tecnologia - FEST	2014	FEST_Relatorio_Final_UHEMascarenhas_EDPN_4600015088 - Serviço de Levantamento Topo-Batimétrico e Monitoramento Sedimentométrico e Sedimentológico - 2º Ciclo - UHE Mascarenhas - Relatório Final	Final report of the campaign requested in the LO with the comparison of the 2008 data
344	IEMA	2015	OF_Nº3688.15_IEMA_GCA_CAIA(ACGE) - Condicionante 08 - LO 130/11	Letter from IEMA indicating agreement with the presented data
345	EDP	2015	IEMA_016132.16_15.09.16_CT-GMA-177.16 - - Usina Hidrelétrica (UHE) Mascarenhas - LO-GCA/SAIA/Nº130/2011/Classe III - Condicionante nº 08	Indication from EDP regarding the analysis of the impact of the Fundão dam breach on the Doce River conducted. Due to the impossibility of comparing the results using different methodologies, it was suggested to use post-event data as the baseline.
346	Fundação Espírito-santense de Tecnologia - FEST	2023	2023_FEST_EDP__Relatório_Final_rev 01 - Monitoramento Sedimentométrico na área do reservatório da UHE Mascarenhas - Relatório Final	Report presented with comparisons between the 2013/2014 and 2023 campaigns
347	Paraty Energia	2024	Resumo dos documentos apresentados sobre o monitoramento sedimentológico	
348	Paraty Energia	2024	Contrato de Prestação de Serviços	Contract for the Expansion of the Internal Radio Communication System for operators, covering the lower floors, increasing the level of work safety for employees and service providers
349	ROOSTER Produtora	2024	História da vila de mascarenhas e nome da usina	
350	Paraty Energia	2024	[UMAS] Alerta de Elevação de Vazão (EMAIL Automático)	Example of email sent to operators when it is necessary to perform some type of maneuver due to an increase in upstream flow
351	EDP	2020	CT-GMA-10/20 - UHE Mascarenhas - Atendimento ao Ofício n/] 140/2020/SGH/ANA - Avaliação Preliminar do Relatório Final para a Atualização das curvas Cota x Área x Volume da UHE Mascarenhas - Resolução Conjunta ANA/ANEEL nº 3, de 10 de agosto de 2010.	
352	EDP	2016	CT-PR - 14/16 - Relatório UHE Mascarenhas - RES ANA/ANEEL nº 3/2010	
353	Rural Tech - Tecnologia em campo	2020	MSC - CAV - 03 - RT - AC - R03 - Relatório Técnico - Atualização das Curvas Cota X Área X Volume (REVISADO)	
354	Agência Nacional de Águas - ANA	2020	Ofício nº 226/2020/SGH/ANA - Documento nº 02500.037915/2020-17	
355	Agência Nacional de Águas - ANA	2020	Ofício Nº 140/2020/SGH/ANA - Documento nº 02500.027704/2020-76	
356	Paraty Energia	2024	Resumo dos documentos apresentados sobre o monitoramento batimétrico	
357	Paraty	2024	Evidências do sistema SE SUITE - Acompanhamento das recomendações para Segurança de Barragens	
358	Sultec Engenharia e Geotecnia	2023	Reparo Civil na Caixa Espiral da UHE Mascarenhas - UHE Mascarenhas_ET - Reparo Civil Caixa Espiral da UG03 R2 - Contrato MASC-014-23	

359	Sultec Engenharia e Geotecnia	2023	Serviços de impermeabilização de estruturas de concreto da UHE Mascarenhas - ET - Impermeabilização Poliuretano - UMAS_REV_FF - Contrato MASC -010-23	
360	Paraty Energia	2023	ENGT.IT.SST-001 - Aplicação de Herbicida e Inseticida em Área Externa	
361	IEMA	2007	Ata de Reunião - Condicionantes relativas à ictiofauna - PCH's Suíça, Rio Bonito e UHE Mascarenhas	
362	ENERGEST	2007	Ofício 1. IEMA_07592.07_17.05.07 - UHE Mascarenhas - Condicionante 12 - LO 091/06	
363	Centro de Tecnologia em Aquicultura e Meio Ambiente - CTA	2007	Relatório para atendimento da condicionante 12 - Licença de Operação 091/2006 (2. ANEXO_IEMA_07592.07_17.05.07)	
364	ENERGEST	2008	Ofício - CT-GRF-16/08 - UHE Mascarenhas - LO GCA/SAIA/nº 091/2006/Classe IV - Condicionante nº 12	
365	Centro de Tecnologia em Aquicultura e Meio Ambiente - CTA	2008	4. ANEXO_IEMA_04538.08_07.03.08_CT-GRF-16.08 - Monitoramento semestral da ictiofauna na área de influência da UHE Mascarenhas, em pontos amostrais a montante, a jusante e na área do reservatório	
366	IEMA	2008	OF Nº 3838_IEMA.GCA (ACGE)	
367	LIMNOBIOS - Consultoria em Ambientes Aquáticos	2008	Termo de Referência - Estudos visando avaliação de alternativas de manejo dos recursos pesqueiros na área de influência da Usina de Mascarenhas e Aimorés	
368	IEMA	2009	OF/Nº 1122/IEMA/GCA (ACGE)	
369	Centro de Tecnologia em Aquicultura e Meio Ambiente - CTA	2010	CTA-DT-234/10 - Estudos Visando Avaliação de Alternativas de Manejo dos Recursos Pesqueiros na Área de Influência das Usinas Hidrelétricas de Mascarenhas e Aimorés - Relatório Final	
370	IEMA	2010	Ata de Reunião entre IEMA/EDP/CTA/Pescadores de Baixo Guandu	
371	IEMA	2011	OF/Nº1140/11/IEMA/GCA/SAIA (ACGE)	
372	Paraty Energia	2024	Resumo sobre os documentos apresentados	
373	Paraty Energia	2023	Programa de Educação Ambiental e Comunicação Social	
374	Paraty Energia	2023	Comunicado oficial	Notice sent to the Mascarenhas Village community informing about the Lecture on the themes of the Social Communication Plan and the Environmental Education Program
375	Paraty Energia	2023	Fotos da palestra realizada em agosto de 2023 com os temas do Plano de Comunicação Social e do Programa de Educação Ambiental.	
376	Paraty Energia	2023	E-mail: ENGT.CT.SIG-0003 - Relatório resgate de peixes	Email forwarded to the protocol email for the documentation related to fish rescue conducted at the machine stop
377	Paraty Energia	2023	ENGT.CT.SIG-0003 - Usina Hidrelétrica (UHE) Mascarenhas - Licença de Operação (Renovação) LO-GGE/COEI/Nº11/2020/CLASSE IVA - Autorização de Manejo de Fauna 210-2023	
378	Visão Ambiental	2023	RL-RRI-N-012023 - Relatório de Resgate da Ictiofauna - Relatório - Referência Agosto de 2023	
379	Visão Ambiental	2023	Planilha de Resgate - UHE Mascarenhas - Dados Brutos Agosto de 2023	

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380	Paraty Energia	2024	ENGT.MA.SIG-0007 - Manual de Operação da UHE Mascarenhas - Vertedouro e Reservatório -Ver.4	Revised manual with the inclusion of a note on page 39 regarding the assessment of reservoir siltation and the measures to be taken
381	Paraty Energia	2024	CSC-RNC-0184 - Oportunidade de Melhoria	Improvement opportunity - Supplementary trend analysis of water resources quantity to obtain more representative data
382	Paraty Energia	2024	E-mail: Re: RES: Dados tendência UHE Mascarenhas	Email forwarded to the supplier responsible for quantitative water monitoring after a meeting where it was indicated that the trend analysis of the data is conducted annually, but it is possible to enhance the data by considering monthly analysis. Therefore, the email requested the submission of the proposal, which will form the basis of the action plan for improvement opportunity CSC-RNC-0184
383	Speed market	2024	Relatório de envio de SMS enviado a população cadastrada no período de 01.01.2024 a 27.02.2024	The report indicates all the numbers that received the message, the text sent, whether it was received by the recipient or not, among other data
384	Paraty Energia	2023	ESG SDG compliance and risk assessment and management tool	
385	Grupo Energia Consult	2022	Due Diligence - Mascarenhas HPP (GER1845-RE-0002-R1)	
386	Paraty Energia	2024	HSA Questions	
387	Paraty Energia	2024	Documentation photos regarding the initial construction project of the Mascarenhas Hydroelectric Power Plant indicating the need for resettlement and the payment for these lands	
388	Mattos Filho	2022	Projeto Interlagos - Legal Final Due Diligence Report	
389	Paraty Energia	2024	RT-MA-0002/24 RELATÓRIO DESCRITIVO- FOTOGRÁFICO DESTINAÇÃO MATERIAL FLUTUANTE LOGBOOM E GRADEAMENTO	
390	Paraty Energia	2024	Mapeamento de riscos e oportunidades e potenciais medidas de adaptação - Spreadsheet	
391	Paraty Energia	2024	Biodiversidade e Espécies Invasoras - UHE Mascarenhas	
392	Paraty Energia	2024	Recursos Hidrológicos – UHE Mascarenhas	
393	Ello Ambiental	2024	Análise da Viabilidade da Avaliação da Transposição de Peixes e Monitoramento de Ictiofauna na UHE Mascarenhas, Baixo Guandu-ES – Relatório Técnico	
394	Paraty Energia	2024	PACUERA – Riscos e Oportunidades - Spreadsheet	
395	Paraty Energia	2024	Mapa de Zoneamento Socioambiental – Atualização - PACUERA	
396	Paraty Energia	2024	Mapa de Unidades Ambientais Homogêneas – Atualização - PACUERA	
397	Paraty Energia	2024	Mapa de Uso do Solo – Atualização - PACUERA	
398	PMBC – Painel Brasileiro de Mudanças Climáticas	2014	Base Científica das Mudanças Climáticas – Volume 1	
399	IUCN - The International Union for Conservation of Nature	2020	Integração da perspectiva da mudança climática na restauração da Bacia do Rio Doce	
400	Paraty Energia	2024	Avaliação de Resiliência Climática UHE Mascarenhas	

Appendix 3 - Photographs



Photo 1: Aimorés HPP reservoir, upstream of Mascarenhas. Owned by mining company Vale S.A.



Photo 2: View from Aimorés HPP powerhouse (330 MW) to Rio Doce and Baixo Guandu town



Photo 3: Baixo Guandu City Hall



Photo 4: Signs used for planting trees in public spaces in Baixo Guandu



Photo 5: After work Mascarenhas HPP staff and families exercise meet in Baixo Guandu park

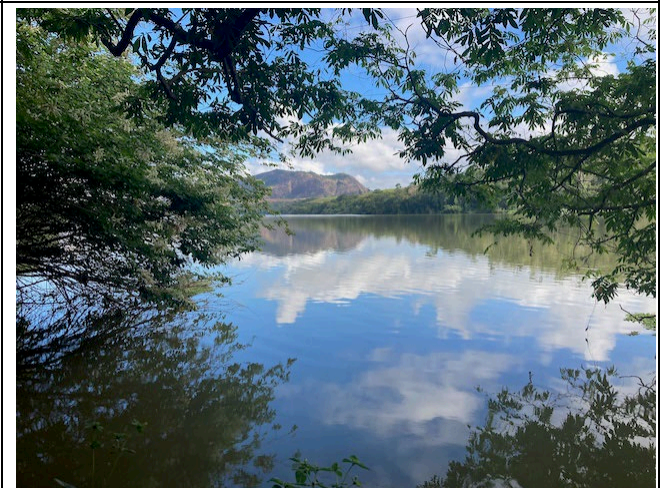


Photo 6: Reservoir banks with well-developed riparian vegetation

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Photo 7: Right bank of the reservoir



Photo 8: Wetland on reservoir bank



Photo 9: Log boom above intakes with minor accumulation of macrophytes



Photo 10: Storage of woody debris extracted from reservoir for composting



Photo 11: Saddle dam 1



Photo 12: Saddle dam 2

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Photo 13: Joint environmental education poster between municipality and Paraty Energia



Photo 14: Boat for use on reservoir



Photo 15: Re-vegetated work camps, now a protection zone on HPP property



Photo 16: Water treatment facility originally built for project and now operated by municipality



Photo 17: Highway 259 at the turnoff to Mascarenhas village and HPP



Photo 18: Railroad crossing signal and sign for tax benefits next to entrance to power plant



Photo 19: Power plant main gate



Photo 20: Powerhouse entrance



Photo 21: Landscaping and signage between powerhouse and substation

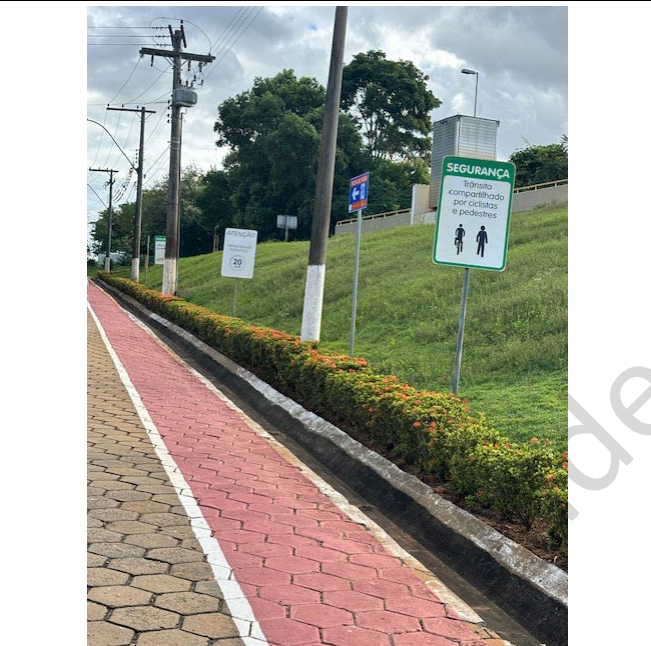


Photo 22: Walkways on HPP property 1



Photo 23: Walkways on HPP property 2



Photo 24: Emergency siren

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Photo 25: Short transmission line to substation



Photo 26: ISA CTEEP substation at Mascarenhas HPP



Photo 27: Road across top of concrete dam



Photo 28: Upstream trash rack cleaning equipment



Photo 29: Powerhouse from downstream



Photo 30: Spillway from downstream

Operation

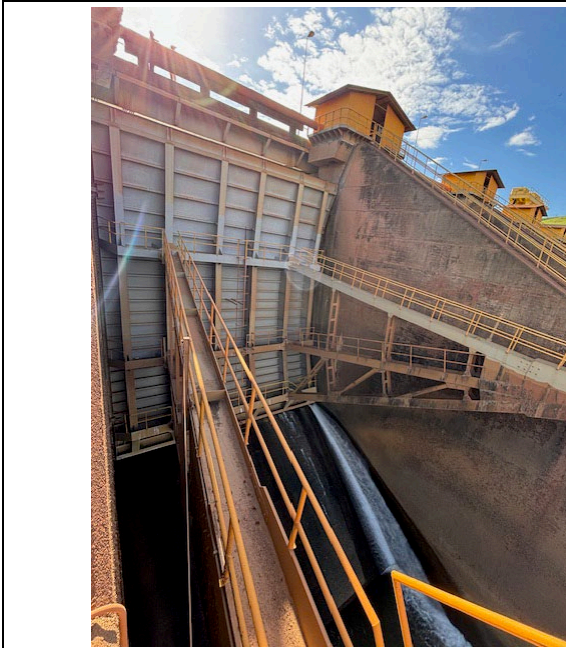


Photo 31: Leaking spillway gate to be repaired 1

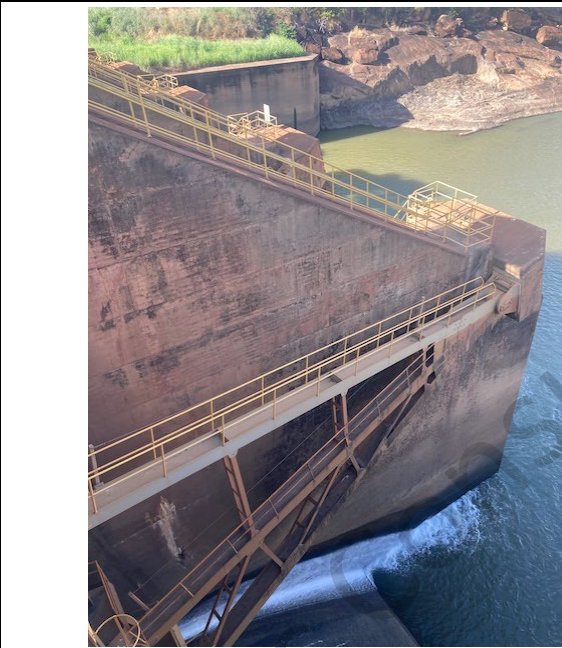


Photo 32: Leaking spillway gate to be repaired 2

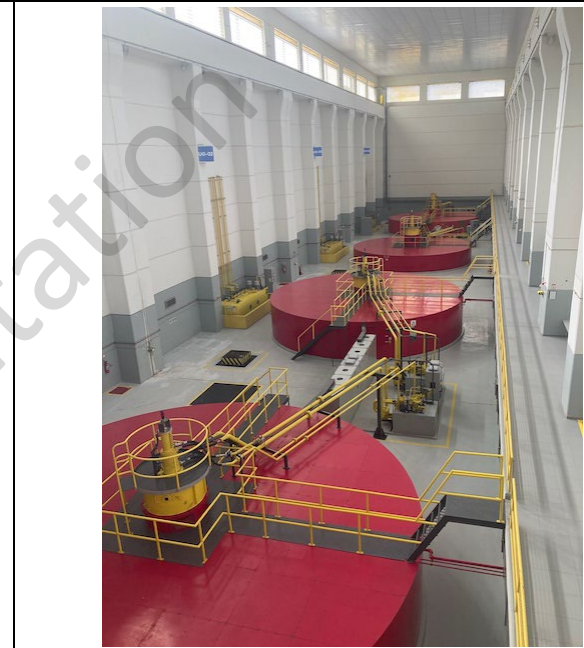


Photo 33: 4 generating units in powerhouse



Photo 34: Powerhouse control room

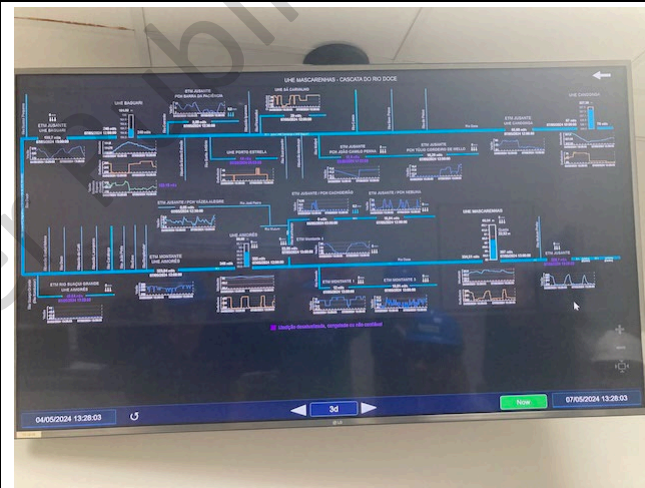


Photo 35: Real-time hydrological and operational information on the Rio Doce cascade



Photo 36: Hydrological data

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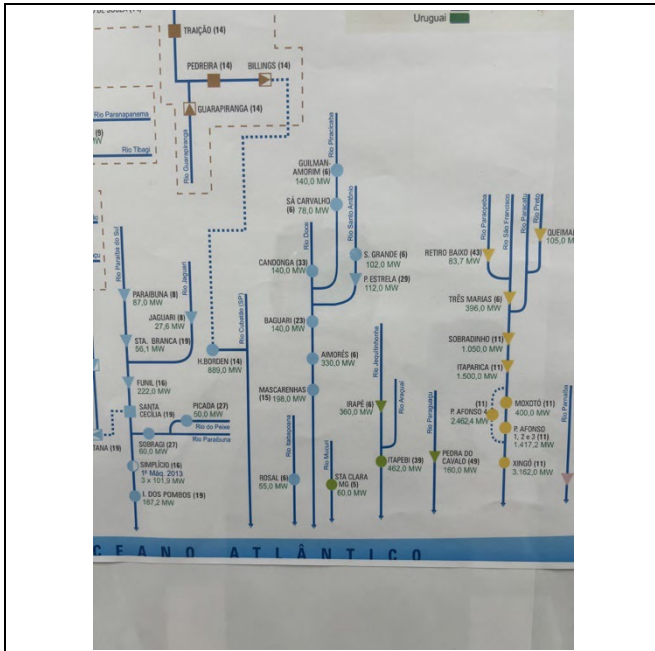


Photo 37: Rio Doce Cascade, with Mascarenhas HPP as the plant furthest downstream

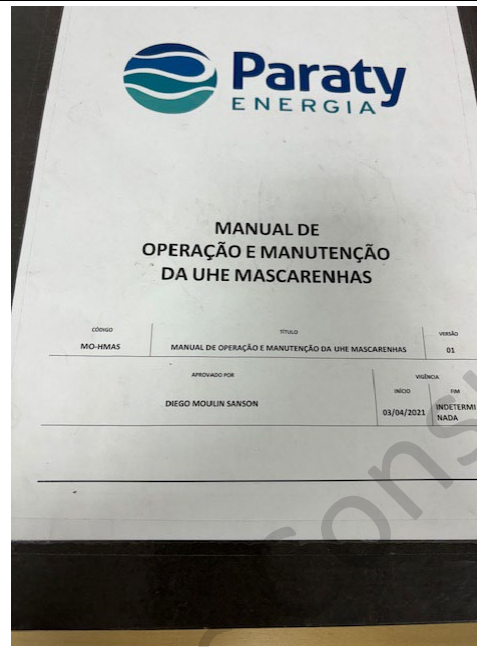


Photo 38: O&M manual in control room



Photo 39: Emergency Response Manual in control room



Photo 40: Forecasted and actual generation



Photo 41: Operational status of the warning sirens



Photo 42: Awards, permits and ISO certificates

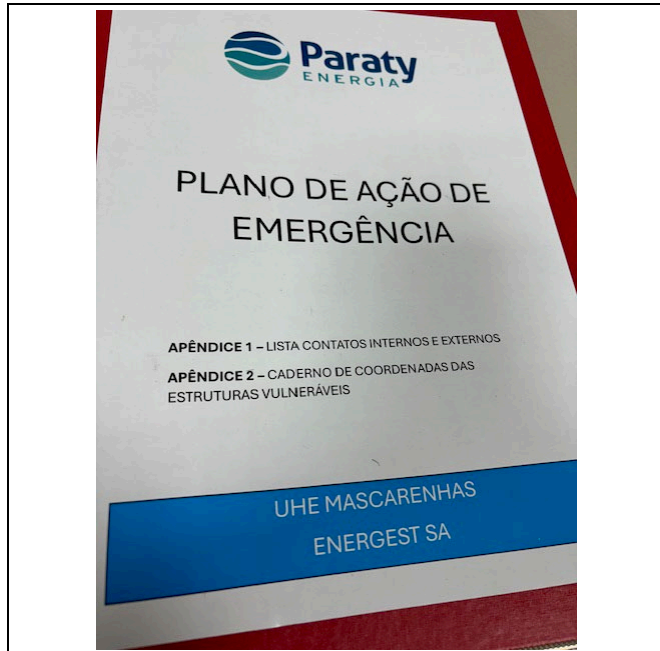


Photo 43: Emergency Action Plan in control room

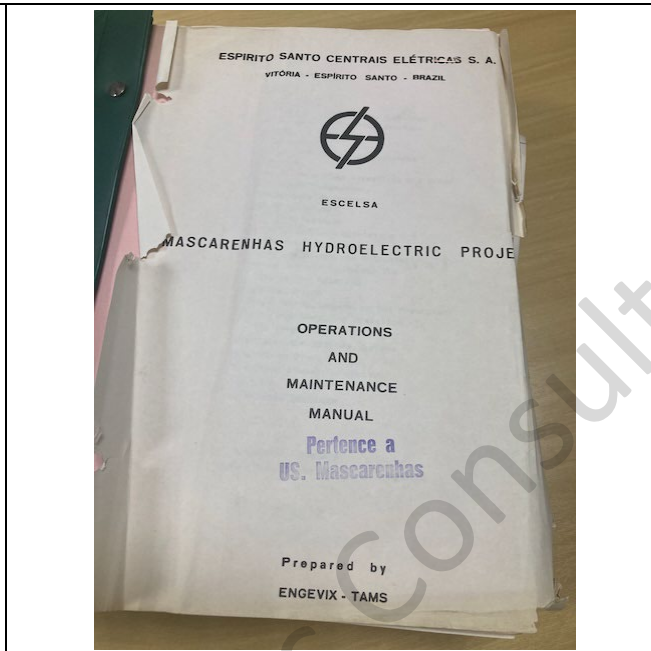


Photo 44: Original documents in plant archive

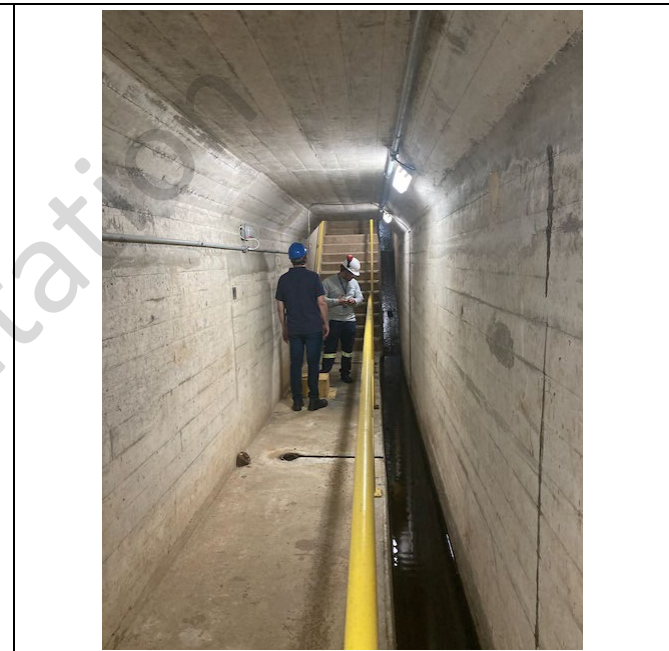


Photo 45: Drainage monitoring below powerhouse; note good conditions after 50 years



Photo 46: Shaft pit



Photo 47: Battery room



Photo 48: Oil containment barrier for unit 2

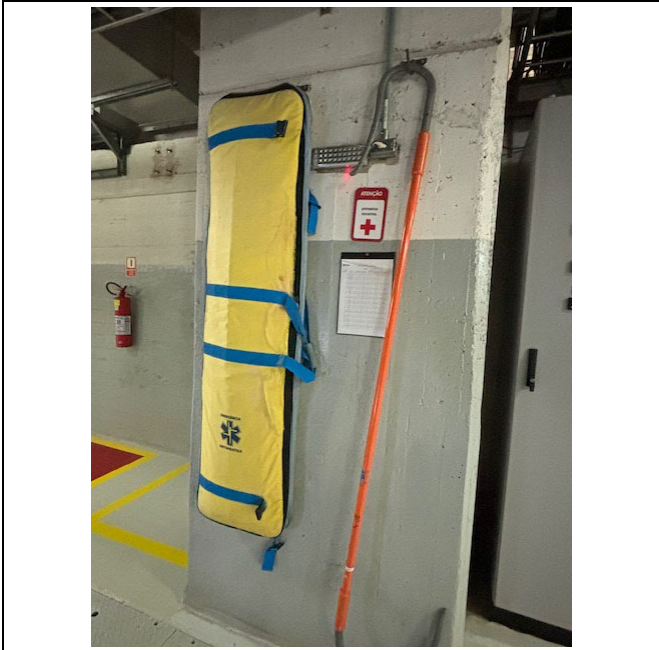


Photo 49: Health and safety equipment



Photo 50: Health and safety instructions - lifting



Photo 51: Spill emergency kit



Photo 52: Oli-water separators on lowest floor of powerhouse



Photo 53: Sewage treatment on lowest floor of powerhouse



Photo 54: Example for modern safety signage

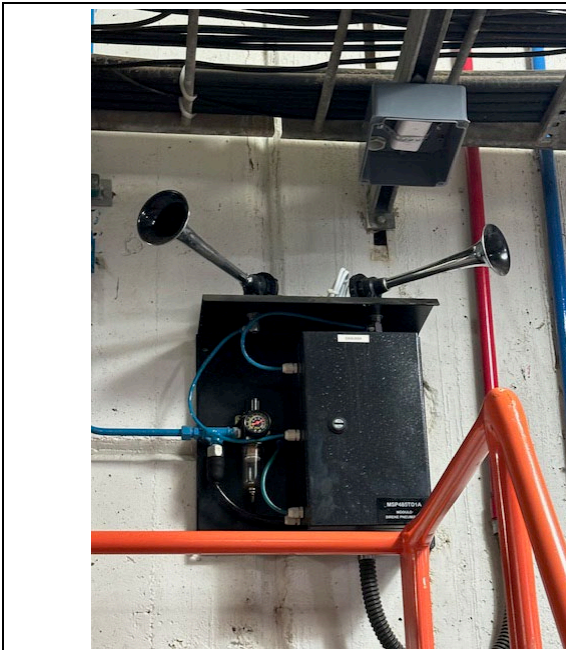


Photo 55: Internal warning sirens



Photo 56: Health and safety signage

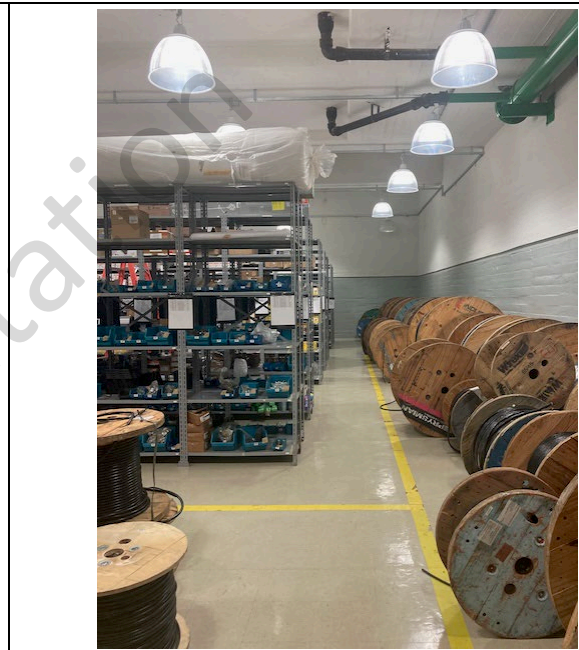


Photo 57: Housekeeping in powerhouse storage



Photo 58: Fish collection and transposition equipment 1



Photo 59: Fish collection and transposition equipment 2



Photo 60: Fish rescue equipment (during turbine maintenance)



Photo 61: Waste separation in powerhouse



Photo 62: View from central dam downstream, with powerhouse release from right and spillway on left



Photo 63: Fishery exclusion zone close to power plant

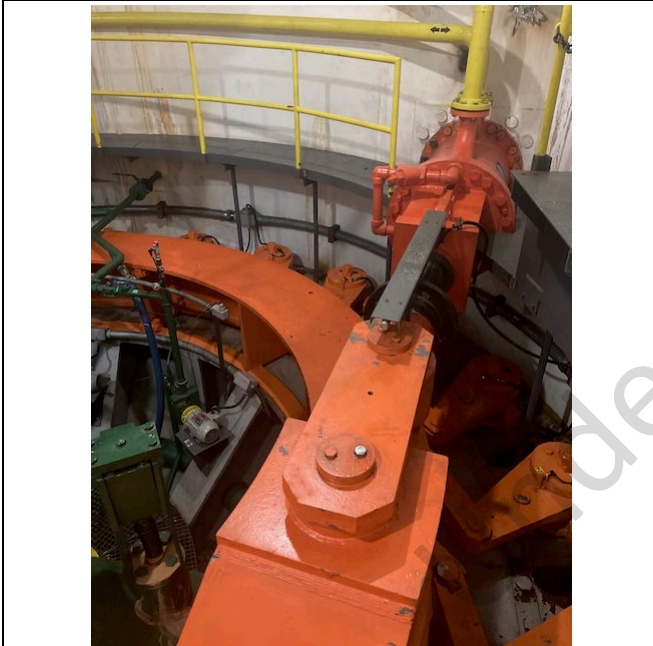


Photo 64: Servomotor that caused outage on unit 2

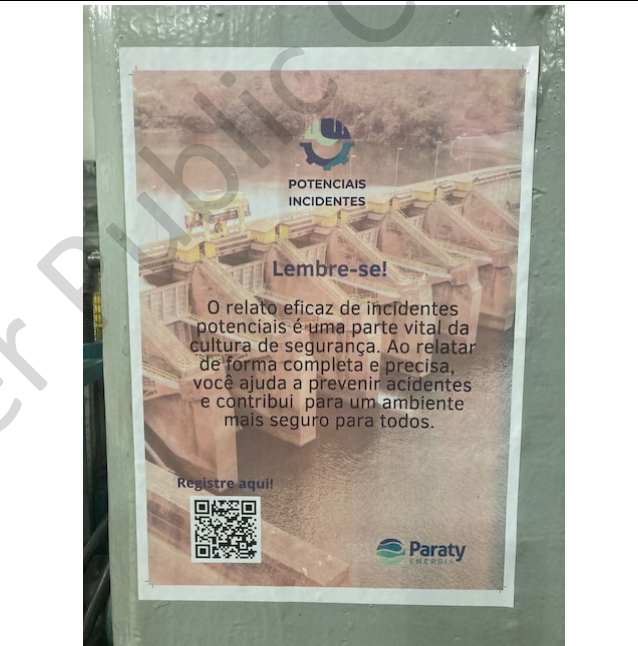


Photo 65: Near-miss notification with QR code



Photo 66: Flood debris downstream of power plant

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Photo 67: Substation with Vila Mascarenhas behind



Photo 68: First homes and boats downstream, near the yellow marker stripe indicating the safety zone



Photo 69: Church and siren in Mascarenhas village square



Photo 70: Signage of the Social Communication Program at the entrance of Vila Mascarenhas



Photo 71: Evacuation route sign in Mascarenhas village, at the site of the upcoming 50-year anniversary festivities



Photo 72: Rio Doce downstream with fishing boat

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Mascarenhas Hydropower Plant, 198 MW, Brazil



Photo 73: Downstream view from BR 259 bridge



Photo 74: Rio Doce downstream near Colatina



Photo 75: Recognition from school officials for hosting visits to power plant



Photo 76: History of the Mascarenhas HPP, in powerplant entrance room

Operation