Danantara Indonesia

PLN

TNFD 2024

Taskforce on Nature-related Financial Disclosure

DIRECTOR'S STATEMENT

Evy Haryadi

Director of Transmission and System Planning

As PLN's Director of Transmission and System Planning, I am dedicated to embedding nature-related financial disclosures into our operations. We acknowledge the significant environmental and biodiversity impacts of our activities and are committed to transparently reporting them in alignment with the TNFD framework. By deepening our understanding of nature-related risks and refining our management strategies, we strive to promote sustainable development while upholding accountability and long-term resilience.

To uphold this commitment, PLN has adopted a comprehensive approach to assessing and mitigating the environmental impacts of our projects. This includes environmental impact assessments, proactive risk management strategies, and continuous performance monitoring to ensure responsible operations. Through these efforts, we aim to integrate sustainability into every aspect of our business, reinforcing our accountability to nature and future generations.

This Taskforce on Nature-related Financial Disclosures (TNFD) report provides insights into our initiatives and progress, underscoring our dedication to reducing our ecological footprint and impact on biodiversity. Beyond compliance, we strive to set a higher standard for environmental stewardship, fostering innovation and collaboration to drive meaningful change.

Our 2024 TNFD Report reaffirms PLN's unwavering commitment to sustainability. We are determined to advance our nature-positive goals alongside all stakeholders, ensuring that our business growth aligns with ecological responsibility. As we move forward, PLN remains steadfast in its mission to create a lasting positive impact and contribute to a sustainable and thriving Indonesia.

Jakarta, 23 May 2025

Evy Haryadi

PREFACE

Kamia Handayani

Executive Vice President Energy Transition and Sustainability

I am honored to present PLN's report on the Taskforce on Nature-related Financial Disclosures (TNFD). This report details our approach to nature-related financial disclosures, covering governance, strategy, risk and impact management, metrics and targets. We view this as a significant step in strengthening transparency around nature-related risks. A deeper understanding of biodiversity, ecosystems, and their interconnections with our operations is essential to fulfilling our commitment to sustainability.

Nature plays a crucial role not only in maintaining ecological balance but also in supporting human well-being. Healthy ecosystems provide essential services such as clean air, water, and sustainable food sources, making biodiversity conservation a collective responsibility. At PLN, we integrate sustainability principles into our business operations, actively involving management, employees, and partners to ensure responsible and environmentally conscious practices. As awareness of corporate impacts on nature increases, we are aligning our initiatives with TNFD recommendations, enhancing our ability to manage nature-related risks and opportunities while contributing to both national and global sustainability goals.

This second TNFD report demonstrates PLN's ongoing dedication to incorporating nature-related considerations into our business strategy. It showcases our progress, identifies areas for further enhancement, and strengthens our collaboration with stakeholders to drive meaningful change. We extend our heartfelt thanks to WWF-Indonesia for their invaluable support in developing this report and advancing our TNFD implementation. Their expertise has been crucial in refining our sustainability approach and improving our nature-related disclosures.

On behalf of PLN, I extend my appreciation to all stakeholders for recognizing biodiversity and nature conservation as critical issues. Your support is vital as we continue this journey toward a more sustainable future. Together, we can drive greater awareness, inspire action, and commit ourselves to protecting our planet. While challenges lie ahead, we remain dedicated to achieving PLN's vision for a sustainable and resilient future.

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LIST OF ABBREVIATIONS

3P	Profit, People, and Planet
3R	Reduce, Reuse, and Recycle
ADB	Asian Development Bank
AKT	*Divisi Akuntansi* / Accounting Division
ANG	*Divisi Anggaran* / Budget Division
APR	*Divisi Penjualan dan Pelayanan Pelanggan Enterprise* / Enterprise Sales and Customer Services Division
ARED	Accelerated Renewable Energy Development
BCA	Bank Central Asia
BKI	*Divisi Pengembangan Bisnis Korporat dan Investasi* / Corporate Business Development and Investment Division
BMG	Biodiversity Management Guideline
BMP	Biodiversity Management Plan
BNI	Bank Negara Indonesia
BoD	Board of Director
BPDAS	*Balai Pengelolaan Daerah Aliran Sungai* / Watershed Management Agency
CCGT	Combined Cycle Gas Turbine
CCTV	Closed Circuit Television
CDR	Climate Disclosure Report
CEO	Chief Executive Officer
CEP	Condensate Extraction Pump
CES	*Divisi Customer Experience dan Excellence Services* / Customer Experience and Excellence Services Division
CFPP	Coal-Fired Power Plants
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSR	Corporate Social Responsibility
CV	Commanditaire Vennootschap

DIRAGA	*Direktur Pengembangan Bisnis dan Niaga* / Director of Business Development and Commerce
DIRKEU	*Direktur Keuangan* / Finance Director
DIRMHC	*Direktur Manajemen Human Capital dan Administrasi* / Director of Human Capital Management and Administration
DIROPB	*Direktur Operasi Pembangkit Batubara* / Director of Coal Power Plant Operations
DIROPG	*Direktur Operasi Pembangkit Gas* / Director of Gas Power Plant Operations
DIRUT	*Direktur Utama* / President Director
DKI	*Divisi Pengendalian Pembangkitan* / Generation Control and Independent Power Producer Division
DLH	*Dinas Lingkungan Hidup* / Environmental Agency
ENCORE	Exploring Natural Capital Opportunities, Risks, and Exposure
ESF	Environmental and Social Framework
ESG	Environmental, Social, and Governance
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management System
ESRI	Environmental Systems Research Institute
ESS	Environmental and Social Safeguards
EVP	Executive Vice President
FGD	Focus Group Discussions
FMKH	Forest Conservation Community Forum
G20	Group of Twenty
GCG	Good Corporate Governance
GIIP	Good International Industry Practice
GM	General Manager
GQL	Good Quality of Life
GROW	Green Right of Way Transmission
HKK	*Sub-Direktorat Hukum dan Kebijakan* / Legal and Policy Sub Directorate
HLB	*Divisi Korporasi dan Legal Business Partner* / Corporation and Legal Business Partner Division
HPP	Hydro Power Plant
HRSG	Heat Recovery Steam Generator
HSC	*Divisi Pelayanan Human Capital* / Human Capital Services Division
HST	*Divisi Strategi Human Capital* / Human Capital Strategy Division
HTD	*Divisi Pengembangan Talenta* / Human Talent Development Division
IBAT	Integrated Biodiversity Assessment Tool
IBSAP	Indonesian Biodiversity Strategic Action Plan
IFC	International Finance Corporation
IFI	International Finance Institutions
IFRS	International Financial Reporting Standards
IP	Indonesia Power
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPP	Indigenous Peoples Plan
IPPs	Independent Power Producers
ISO	International Organization for Standardization
ISSB	International Sustainability Standards Board
IUCN	International Union for Conservation of Nature
K3L	*Divisi Keselamatan dan Kesehatan Kerja* / Health, Safety, Security, and Environment Division
KBA	Key Biodiversity Areas
KEU	*Divisi Keuangan* / Finance Division
KLHK	*Kementerian Lingkungan Hidup dan Kehutanan* / Ministry of Environment and Forestry
KMGBF	Kunming-Montreal Global Biodiversity Framework

KOM	*Divisi Komunikasi Korporat dan TJSL* / Corporate Communication and CSR Division
KSM	*Divisi Kebijakan Strategis Manajemen Risiko* / Strategic Risk Management Policy Division
KSPI	*Kepala Satuan Pengawasan Intern* / Chief of Internal Audit
LCA	Life Cycle Assessment
LDS	*Divisi Pengembangan Listrik Desa* / Village Electricity Development Division
LEAP	Locate, Evaluate, Assess, and Prepare
LPT	*Divisi Legal Aset Properti* / Property Assets, Legal, and Integrated Permits Division
MDG	*Divisi Manajemen Digital* / Digital Management Division
MEB	*Divisi Aneka Energi Baru Terbarukan* / Various New Renewable Energy Division
MEP	*Divisi Enjiniring dan Perencanaan Pengadaan* / Engineering and Procurement Planning Division
MES	*Divisi Manajemen Aset, Enjiniring, dan Sistem Manajemen Terintegrasi* / Asset, Engineering, and Integrated Management Systems Division
MKJ	*Divisi Konstruksi Jawa, Madura, Bali, Maluku, Papua, dan Nusa Tenggara* / Construction of Java, Madura, Bali, Maluku, Papua and Nusa Tenggara Division
MKS	*Divisi Konstruksi Sumatera, Kalimantan, dan Sulawesi* / Construction of Sumatera, Kalimantan and Sulawesi Division)
MoU	Memorandum of Understanding
MPB	*Divisi Panas Bumi* / Geothermal Division
MPTS	Multi-Purpose Tree Species
MRE	*Divisi Manajemen Risiko Operasi* / Operation Risk Management Division
MRF	*Divisi Manajemen Risiko Finansial* / Financial Risk Management Division
MRP	*Divisi Manajemen Rantai Pasok* / Supply Chain Management Division
MRS	*Divisi Manajemen Risiko Strategis, Regulasi, dan Kebijakan* / Strategic Risk Management, Regulation and Policy Division
MSEs	Micro and Small Enterprises
MUM	*Divisi Umum dan Aset Properti* / General Affairs and Property Assets Division
MVA	*Divisi Manajemen Valuasi Aset* / Assets Valuation Management Division
MW	Mega Watt
NGOs	Non-Governmental Organization
NP	Nusantara Power
NPS	*Divisi Niaga dan Pemasaran* / Commercial and Marketing Division
OCGT	Open Cycle Gas Turbine
ODJ	*Divisi Operasi Distribusi Jawa, Madura, dan Bali* / Java, Madura and Bali Distribution Operation Division
ODM	*Divisi Operasi Distribusi Sulawesi, Maluku, Papua, dan Nusa Tenggara* / Sulawesi, Maluku, Papua and Nusa Tenggara Operation Distribution Division
ODS	*Divisi Operasi Distribusi Sumatera dan Kalimantan* / Sumatera and Kalimantan Operation Distribution Division
OKI	*Divisi Operasi Pembangkit dan Independent Power Producer* / Generation Operations and Independent Power Producer Division
PA	Protected Area
PBH	*Divisi Perbendaharaan* / Treasury Division
PFM	*Divisi Manajemen Porfolio* / Portfolio Management Division
PKK	*Divisi Pengendalian Kinerja Korporat* / Corporate Performance Control
PKP	*Divisi Kepatuhan* / Compliance Division
PLN	Perusahaan Listrik Negara

PMO	*Divisi Project Management Office* / Project Management Office Division
PPI	*Divisi Pengadaan Pembangkit dan IPP* / Procurement of Power Plants and IPPs Division
PPN	*Divisi Pengembangan Produk Niaga* / Commercial Product Development Division
PPR	*Divisi Penjualan dan Pelayanan Pelanggan Retail* / Retail Sales and Customer Service Division
PROPER	Public Disclosure Program for Environmental Compliance
PS	Performance Standards
PT	Perseroan Terbatas
PUSDIKLAT	*Pusat Pendidikan dan Pelatihan* / Education and Training Center
PUSHARLIS	*Pusat Pemeliharaan Ketenagalistrikan* / Electrical Maintenance Center
PUSLITBANG	*Pusat Penelitian dan Pengembangan Ketenagalistrikan* / Electrical Power Research and Development Center
REEPS	Rare, Endemic, Endangered and Protected Species
RKAP	*Rencana Kerja dan Anggaran Perusahaan* / Company Work Plan and Budget
RKJ	*Divisi Regulasi dan Kebijakan* / Regulation and Policy Division
RKO	*Divisi Perencanaan Strategis Korporat* / Corporate Strategic Planning Division
RSD	*Divisi Perencanaan Strategis Distribusi* / Distribution Strategic Planning Division
RSK	*Divisi Perencanaan Strategis Pembangkitan* / Generation Strategic Planning Division
RSL	*Divisi Perencanaan Sistem Ketenagalistrikan* / Electricity System Planning Division
SBTi	Science-Based Targets initiative
SBTN	Science-Based Targets Network
SEKPER	*Sekretaris Perusahaan* / Corporate Secretary
SEVP	Senior Executive Vice President
SHB	*Divisi Manajemen Stakeholder dan BoD Support* / Stakeholder Management and BoD Support Division
STI	*Divisi Sistem dan Teknologi Informasi* / Information Technology and System Division
SUTET	*Saluran Udara Tegangan Ekstra Tinggi* / Extra High Voltage Transmission Line
SWR	Sustainability War Room
TCFD	Taskforce on Climate-related Financial Disclosures
TCO	*Divisi Transformasi Korporat dan CEO Office* / Corporate Transformation and CEO Office Division
TEK	*Divisi Transisi Energi dan Keberlanjutan* / Energy Transition and Sustainability Division
TJSL	*Tanggung Jawab Sosial dan Lingkungan* / Corporate Social and Responsibility
TNFD	Taskforce on Nature-related Financial Disclosure
UBP	*Unit Bisnis Pembangkitan* / Power Generation Business Unit
UCPS	Upper Cisokan Pumped Storage
UID	*Unit Induk Distribusi* / Distribution Parent Unit
UIK	*Unit Induk Pembangkitan* / Generation Parent Unit
UIP	*Unit Induk Pembangunan* / Development Parent Unit
UIP3B	*Unit Induk Penyaluran dan Pusat Pengatur Beban* / Distribution and Load Dispatch Center Parent Unit
UIT	Unit Induk Transmisi / Transmission Parent Unit
UIW	*Unit Induk Wilayah* / Regional Parent Unit
WASH	Water, Sanitation and Hygiene
WRF	Water Risk Filter
WRI	World Resources Institute
WWF	World Wide Fund for Nature

EXECUTIVE SUMMARY

PLN is dedicated to biodiversity conservation and ecosystem restoration, aligning its efforts with global and national frameworks, including the Indonesian Biodiversity Strategic Action Plan (IBSAP) and the Kunming-Montreal Global Biodiversity Framework (KMGBF). Through participation in the Taskforce on Nature-related Financial Disclosure (TNFD), PLN enhances transparency and strengthens its ability to manage nature-related risks. This commitment is demonstrated through biodiversity disclosures at 10 power plants across Sumatra to Sulawesi, following the Locate, Evaluate, Assess, and Prepare (LEAP) approach, Science-Based Target Network (SBTN), and TNFD recommendations.

PLN integrates environmental sustainability into its corporate governance strategy, with the Board of Directors overseeing efforts to align operations with IBSAP. In collaboration with key stakeholders such as local communities and conservation organizations, PLN actively engages in reforestation and biodiversity monitoring efforts. Governance structures, including Internal Audit, the Risk Management Directorate, and the Sustainability Committee, ensure effective management of nature-related impacts across PLN's operations. This commitment is further reinforced by several awards in 2024, and initiatives are closely monitored through the Sustainability War Room (SWR).

PLN identifies nature-related issues, including dependencies, impacts, risks, and opportunities, using tools recommended by SBTN and TNFD, such as ENCORE, the WWF Risk Filter, Integrated Biodiversity Assessment Tool (iBAT), and Spatial Analysis. To minimize these risks, PLN has implemented various strategies at its operational locations, focusing on biodiversity protection, conservation, and water efficiency programs. These initiatives involve stakeholders, including local communities, government entities, and conservation organizations. Using advanced tools like the WWF Biodiversity Risk Filter (BRF) and Water Risk Filter (WRF), PLN measures and manages nature-related risks. PLN identifies and prioritizes risks based on medium to high scores in physical and reputational categories. These risks encompass water availability, pollution, deforestation, and social conflicts, particularly in key biodiversity areas (KBAs) and indigenous communities. To mitigate these risks, PLN combines technological, regulatory, and community engagement strategies, ensuring a balanced approach to sustainability.

Additionally, PLN measures metrics for several programs at specific locations and establishes long-term targets aligned with national objectives outlined in IBSAP and global goals in KMGBF. For aspects not yet covered in this report, PLN will include them in future while gradually refining this report in line with TNFD recommendations.

BACKGROUND

As Indonesia's primary electricity provider, Perusahaan Listrik Negara (PLN) is strategically supporting the transition to clean and sustainable energy. One approach gaining traction among global companies is nature-related reporting through the TNFD. This report provides a framework to help organizations understand, assess, and disclose their impacts and dependencies on nature in financial and operational contexts. The framework consists of a conceptual foundation for nature-related disclosures, a set of core requirements, and a series of recommended disclosures structured around four key pillars: governance, strategy, risk and impact management, and metrics and targets. This approach aligns with the Taskforce on Climate-related Financial Disclosures (TCFD) framework and the IFRS Sustainability Standards issued by the International Sustainability Standards Board (ISSB).

The interconnectedness of climate change, biodiversity, and human well-being (Good Quality of Life - GQL) is undeniable—an imbalance in one area can have profound consequences on the others. Healthy biodiversity supports climate change mitigation and adaptation, whereas uncontrolled climate change can lead to species redistribution, extinction, and ecosystem disruptions that directly impact human welfare. Failing to address climate change and biodiversity loss could lead to more frequent environmental disasters, accelerate the depletion of natural resources, and reduce global quality of life. An integrated approach to climate policy and biodiversity conservation is essential to ensuring long-term environmental sustainability and the well-being of future generations (IPBES, 2021).

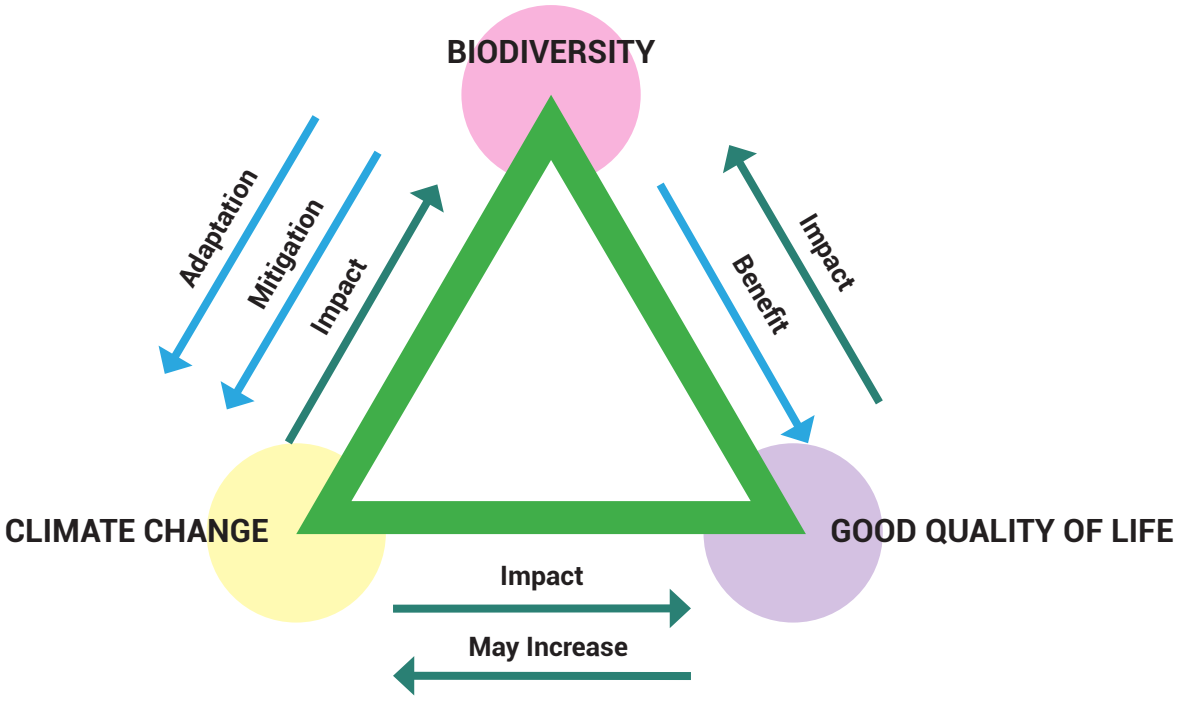

Figure 1. The interconnection between climate change, biodiversity, and human well-being, highlighting the impacts and benefits of climate change on both biodiversity and quality of life [1]

PLN has significant dependencies on ecosystem services, including water availability, carbon cycles, and protection against natural disasters such as floods and droughts. In the Hydro Power sector, the stability of water flow is crucial to ensuring a sustainable energy supply. Meanwhile, fossil fuel power plants heavily rely on water for cooling and steam generation, making water availability a key factor for efficient and reliable operations. Water resource limitations can lead to production disruptions, increased operational costs, and challenges in the supply chain. Therefore, through this TNFD reporting, PLN aims to identify, manage, and mitigate nature-related risks, including both biodiversity risks and water risks that impact its operations.

Beyond environmental considerations, sustainability in the energy sector is increasingly a priority for investors and other key stakeholders, with global investment trends shifting toward companies that adopt Environmental, Social, and Governance (ESG) framework. Aligning with this shift, PLN is committed to national and global biodiversity initiatives, as outlined in the IBSAP and the KMGBF. These frameworks focus on ecosystem restoration, biodiversity conservation, and promoting sustainable economic activities to enhance environmental resilience.

Additionally, PLN's Long-Term Plan for 2024-2028 highlights key environmental aspects, particularly nature-related issues of major concern. These include:

- Risks of climate change due to increased greenhouse gas emissions and commitments to achieving Net Zero Emissions (NZE).
- The demand for creating a safer and more inclusive work environment (zero accident policy) that is friendly to mothers and children, as well as implementing environmentally friendly business models based on the 3P principles (Profit, People, and Planet) while ensuring work-life balance.
- Environmental management to maintain ecosystems and ensure water availability, particularly for Hydro Power Plants (HPP).
- Waste management policies to mitigate the impact of electricity production and the decommissioning of unused assets, applying the principles of Reduce, Reuse, Recycle (3R).

[1] Scientific Outcome of the IPBES-IPCC co-sponsored workshop on biodiversity and climate change, Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, p. 4.

In line with its commitment to environmental sustainability, PLN is actively working towards achieving NZE by 2060, as mandated by national policy. PLN strives to increase the portion of renewable energy-based generation as a form of preserving the environment. This has been summarized in the ARED scenario which targets a portion of the use of renewable energy-based generation of 75%. By using renewable energy, PLN contributes to reducing carbon dioxide emissions and maintaining environmental resilience.

TNFD emphasizes the importance of identifying environmental impacts and understanding how natural capital and biodiversity changes affect stakeholders. We recognize that risks and opportunities arising from dependencies and effects related to investments and client financing extend to us through our financial activities. Therefore, we are committed to mapping these interconnections to proactively assess and manage potential risks.

BUSINESS PROFILE & SCOPE OF DISCLOSURE

1

BUSINESS PROFILE & SCOPE OF DISCLOSURE

Perusahaan Listrik Negara (PLN) is a state-owned company in Indonesia's electricity sector responsible for electricity supply across Indonesia. Established on October 27, 1945, as *Jawatan Listrik* dan Gas, PLN has grown into a leading energy company critical in ensuring a stable and reliable power supply for households, industries, and government institutions. Headquartered in Jakarta, PLN remains committed to continuous innovation and delivering high-quality, efficient, sustainable electricity services.

PLN operates across the entire electricity value chain, covering upstream, midstream, and downstream segments, with key roles played by its sub-holdings, Indonesia Power (IP) and Nusantara Power (NP). In the upstream stage, PLN processes primary energy sources such as coal, gas, and renewables to generate electricity through various power plants, including Coal-Fired Power Plants (CFPP), Combined Cycle Gas Turbine (CCGT), Open Cycle Gas Turbine (OCGT), Hydro Power Plants (HPP), as well as solar and geothermal power plants. In the midstream stage, the generated electricity is transmitted through high-voltage transmission networks, ensuring efficient power distribution across regions. Finally, in the downstream stage, electricity is delivered through distribution networks to industrial and residential customers, providing a reliable and high-quality power supply for communities across Indonesia.

As a key player in the energy sector, PLN recognizes the increasing importance of ESG principles in ensuring sustainable business practices. ESG has a strong correlation with biodiversity, particularly within the environmental pillar, which covers climate change, resource exploitation, ecosystems, and pollution. Biodiversity plays a crucial role in maintaining ecosystem balance, which supports various economic sectors. However, biodiversity degradation poses significant risks to business sustainability and investments. Despite this, ESG assessments have traditionally prioritized climate change mitigation and carbon emission reduction, often treating biodiversity as a peripheral issue. This is reflected in ESG rating methodologies that lack comprehensive indicators for biodiversity protection and restoration, limiting their alignment with global conservation frameworks such as the KMGBF.

While some ESG rating providers have begun integrating biodiversity aspects into their evaluations, the scope of indicators remains inconsistent, and there is no clear consensus on prioritization. Critical elements such as ecological connectivity, indigenous land integration, and the protection of invasive and endangered species are frequently overlooked. Strengthening biodiversity considerations in ESG frameworks is essential to mitigating environmental, reputational, and financial risks while ensuring more sustainable investments. Addressing these gaps requires the incorporation of more biodiversity-related indicators, including geospatial data and ecosystem-based approaches. By doing so, ESG strategies can contribute more effectively to tackling the biodiversity crisis while supporting global economic sustainability.

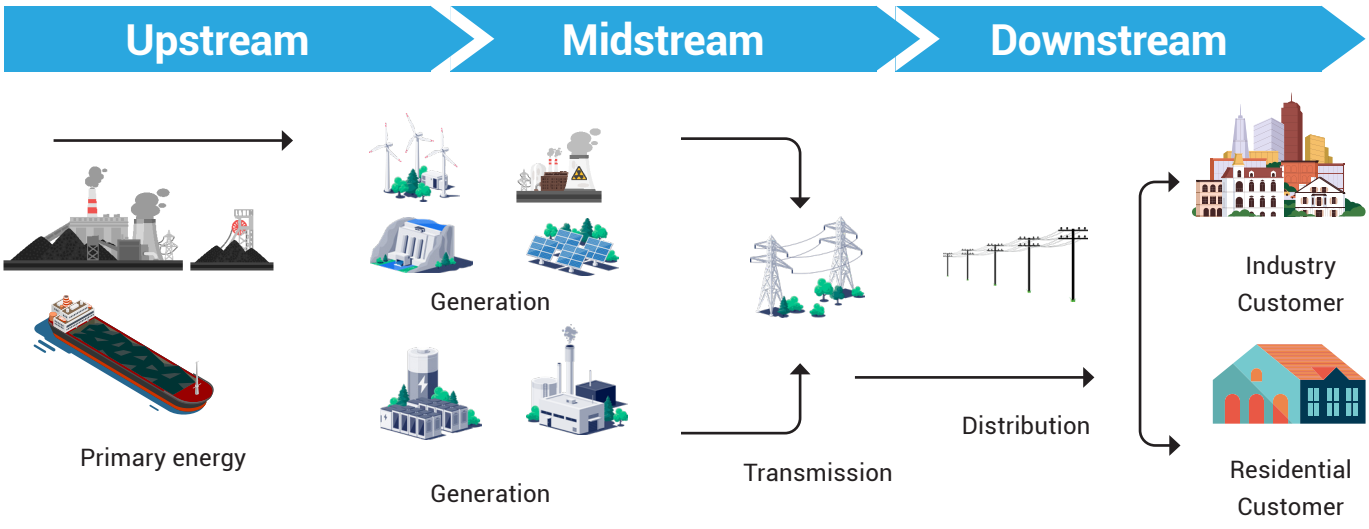

Figure 2. PLN's value chain from upstream to downstream, showing the flow of energy from generation to distribution for industrial and residential customers[2]

Given the broad and diverse scope of its operations, PLN continues to enhance efficiency in every business process by prioritizing using cleaner and more environmentally friendly energy sources. This commitment is highly relevant to PLN's operational activities in several regions with high biodiversity value. To support national targets, PLN strives to focus on ecosystem restoration and biodiversity management while implementing mitigation measures to minimize negative impacts.

On the other hand, PLN faces significant challenges, including the shift from fossil fuel to renewable energy, expanding electricity capacity to meet rising demand, and providing power access to remote areas. These challenges, however, also create opportunities for PLN to drive innovation, build strategic partnerships, and accelerate the transition to a cleaner, more sustainable energy system. Recognizing the importance of understanding its operational dependencies and environmental impact, PLN has conducted an assessment using ENCORE, providing insights into company's interactions with ecosystems and ecological footprint. The assessment conducted through ENCORE is currently general and does not yet fully capture the specific characteristics of PLN's business processes. This limitation is primarily due to the exclusion of key contextual variables such as the geographical location of business units, operational capacity, and actual on-site conditions.

Nevertheless, the ENCORE assessment provides a valuable preliminary overview that serves as a foundational reference for broader evaluations. This information enables PLN to develop more detailed, focused, and context-sensitive follow-up assessments at each business unit location, thereby supporting continuous improvement and data-driven decision-making.

Table 1. Materiality ratings of dependencies on ecosystem service[3]

Category	Ecosystem Service	Hydropower	Fossil Fuels	Transmission and Distribution
Provisioning service	Biomass provisioning	-	-	-
Regulating and maintenance service	Water Supply	VH	H	VL
	Air filtration	-	VL	-
	Flood mitigation	VH	M	M
	Global climate regulation	M	M	VL
	Local (micro and and meso) climate regulation services	L	L	-
	Noise attenuation services		VL	VL
	Rainfall pattern regulation services (at sub-continental scale)	-	-	VL
	Soil and sediment retention services	VH	M	L
	Solid waste remediation	L	M	L
	Storm mitigation services	M	L	M
	Water flow regulation services	VH	H	VL
	M. Water purification services	L	M	-

Very High High Medium Low Very Low

[2] Company Profile PLN 2021, PT PLN (Persero), pp. 14–15.
[3] Exploring Natural Capital Opportunities, Risks, and Exposure, https://encorenature.org/en, visualized by PT PLN (Persero), accessed February 2025.

Table 2. Materiality ratings of impact on ecosystem service[3]

Category	Ecosystem Service	Hydropower	Fossil Fuels	Transmission and Distribution
Land/freshwater/ocean-use change	Area of freshwater use	H	M	L
	Area of seabed use	-	-	L
	Area of land use	M	M	M
	Volume of water use	L	M	VL
Climate change	Emission of GHG	L	VH	VL
Resource exploitation	Disturbance	H	VH	L
	Other biotic resource extraction	-	-	-
Pollution/pollution removal	Emission of non-GHG air pollutants	-	VH	VL
	Generation and release of solid waste	L	H	L
	Emission of toxic pollutants to water and soil	-	VH	L

Very High High Medium Low Very Low

Based on Table 1 and 2, the relationship between ecosystem services, business profile, and the level of dependency on these services. This report's dependency and impact assessment covers the Fossil Fuel Power Plants, Hydro Power Plants, transmission, and distribution business process. These business processes were selected based on last year's rating assessment in the 2023 report, which found that the Hydro Power Plants business process has a very high dependency on ecosystem services, while the Fossil Fuel Power Plants has a significantly high environmental impact. Therefore, this report will reveal two business processes and the additional transmission business process. This TNFD report presents a selection of power plants operations and project under construction, disclosed based on the prioritization of locations. The sampled facilities include various types of power plants, such as OCGT, CCGT, CFPP, HPP, and project under construction (UIP Sulawesi Transmission Line and Upper Cisokan Pumped Storage) spanning Indonesia from Sumatra to Sulawesi.

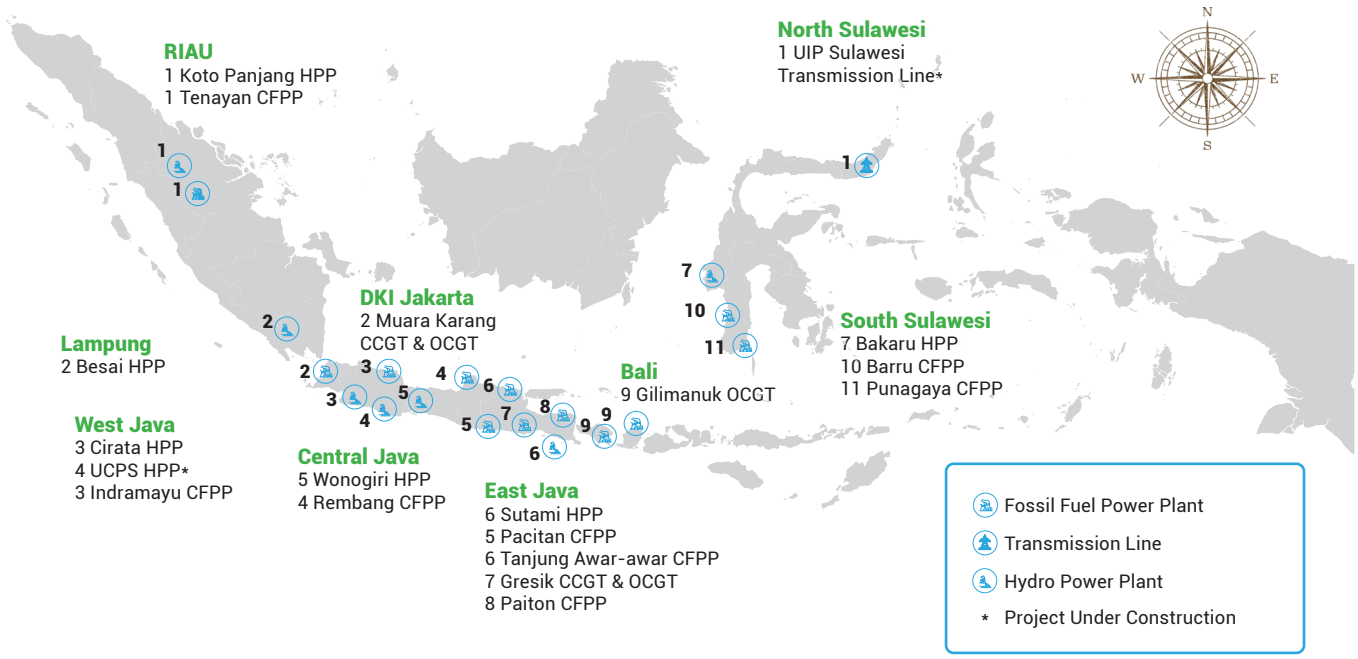

Figure 3. Business Processes of PLN for TNFD FY 2024: Fossil Fuel Power Plants, Hydropower Plants, and Transmission Line Business Processes in Indonesia Geographical Distribution Sampling of PLN's Operational activity and Projects Under-Construction across Indonesia

As this TNFD report focuses on prioritized sites, priority sites were selected from the map in Figure 3 based on their presence in areas that overlap between environmentally sensitive areas and significant material impacts to the business. In addition, some priority sites were also selected based on their energy production (capacity), as higher capacity indicates that they will have an important economic impact. This prioritization was determined using a Venn diagram of prioritized sites (Figure 4), while a detailed breakdown of sectoral locations can be found in Table 3.

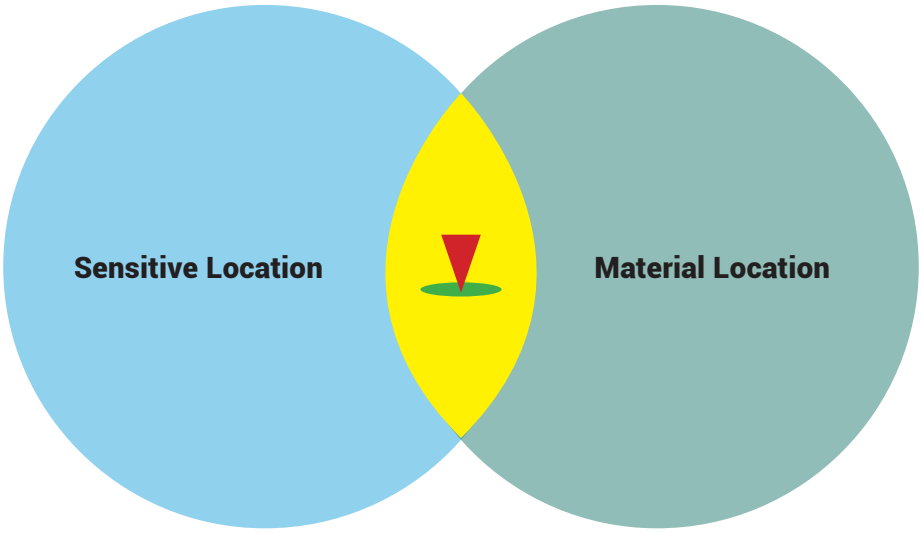

Figure 4. Assessment of priority locations based on sensitive and material locations[4]

Table 3. Sampling locations in the power plant operations business process and projects under construction

Business Process	Sub-Holding	ID	Protected Area Status	Capacity (MW)	Priority Locations
Priority locations (√) revealed in the TNFD report FY 2023					
Fossil fuel power plant operations	IP	Gilimanuk OCGT	PA of National Park	133.8	√
	IP	Keramasan CCGT	KBA	80	√
	NP	Muara Karang (OCGT, CCGT)	KBA	2,105	√
	IP	Mount Salak GPP	National Park	180	√
Priority locations (√) disclosed in the TNFD report FY 2024					
Fossil fuel power plant operations	IP	Gilimanuk OCGT	PA of National Park	133.8	√
	IP	Barru CFPP	*	233.4	√
	NP	Muara Karang (OCGT, CCGT)	KBA	2,105	√
	NP	Gresik (OCGT, CCGT)	*	2,218.98	√
	NP	Paiton CFPP	*	1,460	√
	NP	Rembang CFPP	*	630	
	NP	Tanjung awar-awar CFPP	*	700	
	NP	Punagaya CFPP	*	200	

[4] Recommendations of The TNFD Guidance (September 2023), Taskforce on Nature-related Financial Disclosures p. 54.

Business Process	Sub-Holding	ID	Protected Area Status	Capacity (MW)	Priority Locations
	NP	Indramayu CFPP	*	990	
	NP	Tenayan CFPP	*	220	
	NP	Pacitan CFPP	*	630	
Hydro Power power plant operations	IP	Wonogiri HPP	*	12.4	√
	NP	Koto Panjang HPP	Nature ReservePA of Nature Reserve	114	√
	NP	Cirata HPP	*	1,008	√
	NP	Bakaru HPP	*	126	
	NP	Sutami HPP	*	105	
	NP	Besai HPP	*	90	
Project under construction		UIP Sulawesi Transmission Line	KBA		√
		Upper Cisokan Pumped Storage HPP	*		√

Note:
*: Area is outside conservation status zones

In the 2023 TNFD report, the disclosed priority locations for Fossil Fuel Power Plant Operations specifically cover four sites situated within or adjacent to conservation areas, such as Key Biodiversity Areas (KBAs) and National Parks. These sites were identified as having medium physical risk and medium-to-high reputational risk.

To address these risks, each location implemented ongoing sustainability programs that had been consistently carried out and previously reported. These initiatives reflect each unit's long-term commitment to biodiversity conservation. For instance, Keramasan CCGT continues to monitor individual Sumatran elephants (Elephas maximus sumatrensis) in the in-situ conservation area of Padang Sugihan Elephant Training Center. Likewise, Mount Salak GPP continues to maintain its monitoring and conservation efforts for the Javan Hawk-Eagle, actively contributing to the protection of this endemic and protected species.

PLN remains committed to progressively integrating all business processes into the TNFD assessment and disclosure framework. However, recognizing that the TNFD approach is relatively new and involves multiple complex aspects and stakeholders, the implementation has been conducted gradually and in a focused manner. In 2023, the TNFD disclosure focused on pre-identified priority locations, selected based on the environmental sensitivity of the surrounding area—this initial disclosure aimed to provide a relevant and informative baseline for strengthening the company's sustainability strategy.

In 2024, the site selection approach will be enhanced to align with a more strategic framework, with a focus on two primary criteria:

1. Locations situated within or adjacent to conservation areas, such as national parks, KBAs, or nature reserves; and
2. Sites with large power generation capacity are considered to have potentially significant environmental impacts.

Furthermore, location selection also took into account representation from each sub-holding, both Indonesia Power (IP) and Nusantara Power (NP), to ensure that the TNFD disclosure reflects the operational diversity across PLN's business units. This site sampling approach aims to holistically capture not only environmental sustainability considerations but also strategic and operational dimensions of the company.

In the fossil fuel business process, PLN operates multiple OCGTs and CFPPs under its sub-holdings, IP and NP. Notable priority locations include Gilimanuk OCGT, located within a National Park, and Muara Karang OCGT & CCGT, situated in a KBA. For Hydro Power Plants operations, key priority locations include Wonogiri HPP, Koto Panjang HPP (within a Nature Reserve), and Cirata HPP, which contribute significantly to renewable energy production. Meanwhile, PLN is advancing key infrastructure projects under construction, including the UIP Sulawesi Transmission Line (located in a KBA area) and Upper Cisokan Pumped Storage HPP, both selected as sample projects representing the project under construction category. As a company operating from upstream to downstream, PLN includes these locations as part of its commitment to considering environmental aspects from the planning and construction stages, ensuring sustainable energy development.

DISCLOSURE APPROACH

2

DISCLOSURE APPROACH

The LEAP Approach (Locate, Evaluate, Assess, and Prepare) is a methodology used in TNFD to identify, evaluate, assess, and prepare for nature-related impacts and risks that may influence business decisions. This approach provides guidance for companies to integrate nature-related risks and opportunities into their strategies and decision-making processes. Below is an explanation of each stage in the LEAP Approach:

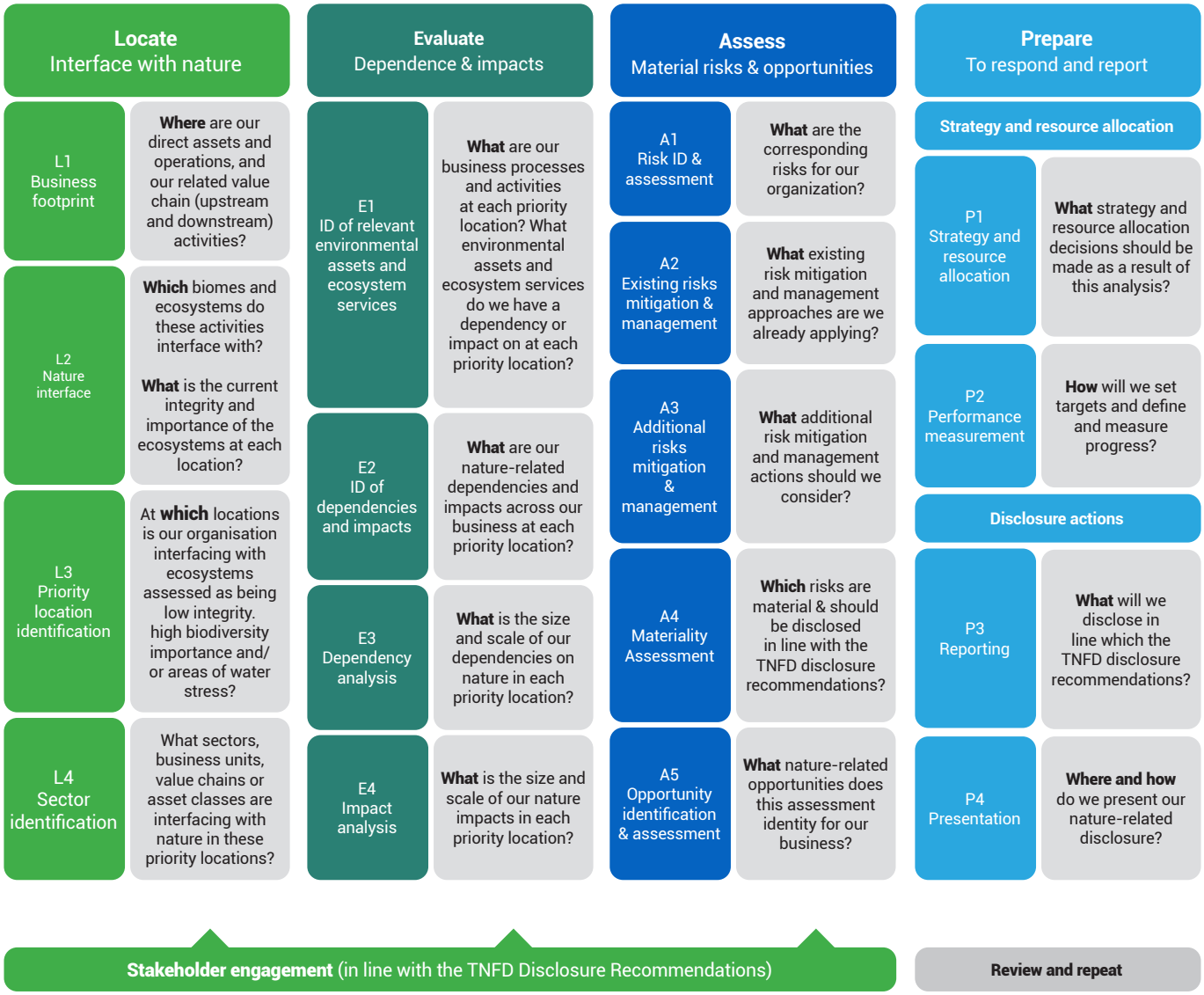

Figure 5. The LEAP Approach for assessing nature-related dependencies, risks, and opportunities in line with the TNFD Recommendations[5]

1. Locate

The first step is to identify and map nature-related factors that are relevant to company's operations. This involves identifying locations or areas most impacted or vulnerable to environmental changes, such as deforestation, ecosystem degradation, or climate change. These locations may include supply chains, operational sites, or areas related to ecosystems crucial to the business. Company assess which nature-related aspects directly or indirectly affect their business, whether from an operational or financial standpoint.

2. Evaluate

After identifying relevant locations or areas, the next step is to evaluate the potential environmental impacts that may affected. This evaluation focuses on determining the extent of the impact on biodiversity, natural resources, or climate change. At this stage, companies analyze how changes in nature or ecosystem degradation could affect their business continuity, such as disruptions in raw material supply, shifts in environmental regulations or policies, or reputational damage to the company.

3. Assess

After evaluation, companies need to assess the risks and opportunities associated with these nature-related factors. This assessment includes measuring long-term environmental risks that may impact the company and identifying opportunities for adaptation or innovation with a focus on environmental sustainability. For example, this assessment could explore how changes in environmental policies or shifts in consumer preferences towards environmentally friendly products can open new business opportunities or enhance long-term profitability.

4. Prepare

The final stage in the LEAP Approach is to prepare strategies for managing the identified risks and leveraging the opportunities. This includes developing mitigation plans to reduce negative impacts on nature and ensuring that the company can adapt to environmental changes. Preparing also involves implementing internal policies that support nature-related sustainability, such as reducing carbon footprints, protecting biodiversity, and managing natural resources more efficiently. At this stage, companies also need to design effective risk management systems to integrate nature into long-term planning and decision-making processes.

Overall, the LEAP Approach provides a clear framework for companies to address nature-related challenges and sustainability, helping them prepare for and manage risks that may arise due to environmental changes that could affect their performance.

Science Based Targets Network

SBTN (Science Based Targets Network) is used to support the LEAP approach by providing a science-based target network framework that helps organizations set measurable, accountable, and relevant sustainability targets to address environmental challenges. To achieve LEAP Approach goals, SBTN provides tools and methodologies that ensure organizations set targets driven by strong scientific data, with direct impacts on climate change mitigation and natural resource conservation.

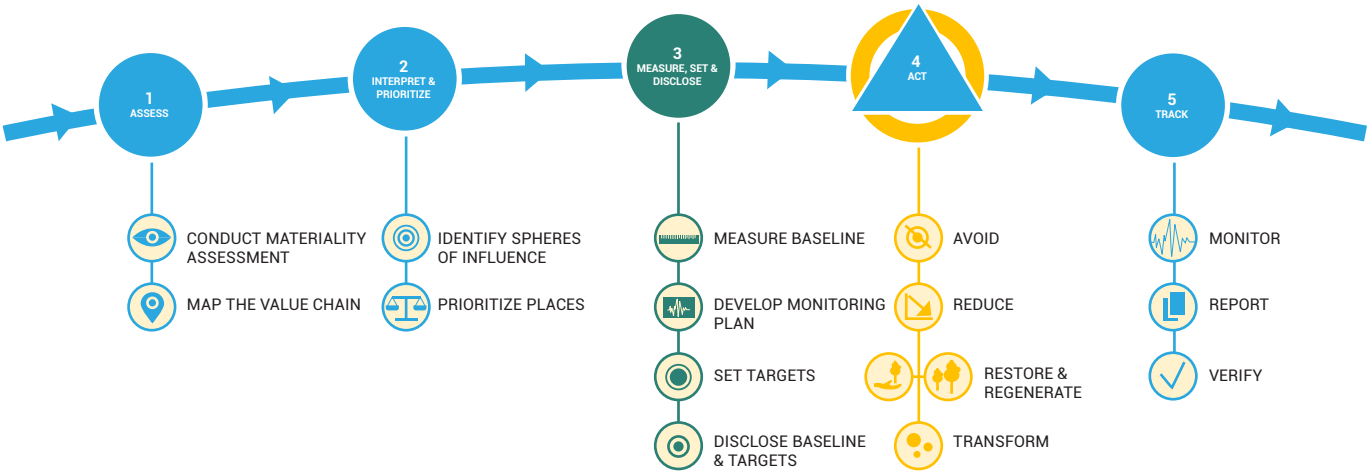

Figure 6. Scheme of the SBTN (Science-Based Targets Network) approach for integrating nature-related targets into business strategies[6]

[5] Guidance on the identification and assessment of nature-related issues: The TNFD LEAP approach (September 2023), Taskforce on Nature-related Financial Disclosures, p. 4.

[6] Take Action Now, Science Based Targets Network, https://sciencebasedtargetsnetwork.org/companies/take-action/, accessed March 2025.

This TNFD report, in addition to utilizing the LEAP Approach framework, also incorporates the SBTN framework. While PLN has not yet fully completed all steps of the SBTN framework due to data limitations, the steps that have been successfully implemented in this report include:

1 Assess: conducted a materiality assessment to understand dependencies and impact.
2 Interpret & Prioritize: identified priority locations based on materiality assessment and environmental or ecological sensitive areas.
3 Measure, Set & Disclose: based on baseline environmental impacts, PLN has developed a monitoring plan and set science-based targets. These targets are also aligned with national and global goals.
4 Act: focused on avoiding, reducing, and restoring impact on ecosystems.
5 Track: monitored progress and reported results.

This framework helps PLN implement science-based strategies to reduce negative environmental impacts and build long-term sustainability solutions. Four tools were used to identify sensitive locations and analyze our nature-related risks for PLN:

ENCORE

Encore is a web-based tool that enables users to visualize the exposure of economic sectors to natural capital risks according to their geographical location. ENCORE will enable users to better understand the risks that environmental degradation cause for businesses by allowing users to access all the information described in this report linking different industries to specific ecosystem assets and the drivers of environmental change, such as climate change, that affect them[7]. ENCORE is used to measure the materiality ratings generated by PLN's business units.

WWF Risk Filter

The WWF Risk Filter Suite is a free online platform containing two spatially explicit risk assessment tools: the Biodiversity Risk Filter (BRF) and Water Risk Filter (WRF)[8]. Designed to be used as corporate- and portfolio-level screening and prioritization tools, the WWF Risk Filter tools enable companies and financial institutions to assess nature-related risks worldwide, as well as understand their dependencies and impacts on nature. As a result, the freely available WWF Risk Filter tools provide critical nature-related information to support organizations across the different Phases of the TNFD LEAP Approach. By identifying potential risks in our operations, supply chains, and investments, we can effectively target our efforts toward managing these risks. This tool also provides a landscape risk score, representing a specific aspect of biodiversity risk derived from assessing biodiversity indicators and the industry's impact and dependence on these indicators at a specific location.

iBAT

This tool provides effective up-to-date information on biodiversity from key global databases to identify biodiversity hotspots, protected areas, and threatened species within a specific project area based on the IUCN Red List Categories and Criteria[9]. IUCN typically reassesses the Red List category for each species every five to ten years. This periodic reevaluation helps us monitor changes in species' statuses over time. Species can fluctuate-increasing, decreasing, or staying the same-due to habitat loss, climate change, and conservation efforts. Therefore, adjusting our strategies based on these observed changes is crucial. It aims to ensure that biodiversity values are considered early in decision-making to avoid or mitigate negative impacts on ecosystems and species.

Spatial Analyst

Geographic Information System software platform developed by ESRI (Environmental Systems Research Institute), used for creating, managing, analyzing, and visualizing spatial data[10]. This spatial analysis tool overlays important biodiversity areas such as KBA and protected areas.

[7] Exploring Natural Capital Opportunities, Risks, and Exposure: A practical guide for financial institutions, (ENCORE) Exploring Natural Capital Opportunities, Risks, and Exposure, p. 18.
[8] WWF Risk Filter Suite and ESRS Technical Guidance version 2.0, World Wide Fund for Nature, p. 3.
[9] Integrated Biodiversity Assessment Tool (IBAT), https://ibat-alliance.org/, accessed March 2025.
[10] Tentang ArcGIS, Esri Indonesia, https://esriindonesia.co.id/id/tentang-arcgis, accessed March 2025.

GOVERNANCE

3

GOVERNANCE

A. BoD Commitment and Responsibility

PT PLN (Persero) is committed to implementing sustainable governance as part of strengthening Good Corporate Governance (GCG) and driving continuous transformation toward a future energy company that is lean, green, innovative, and customer-focused. In this effort, the Board of Directors has established the Sustainability Committee of PT PLN (Persero) through Directors' Decree No. 0322.K/DIR/2024, with a tenure of one year. The Sustainability Committee plays a crucial role in ensuring the integration of sustainability principles into the company's strategy and operations. All members of the Board of Directors serve as the Steering Committee, responsible for setting the strategic direction of sustainability, monitoring and evaluating its progress, and reporting the implementation results to the Board of Commissioners.

As part of this commitment, the Board of Directors has also integrated environmental considerations, including natural aspects, into the planning and decision-making processes to ensure that sustainability practices become an integral part of corporate governance. To support this commitment, PLN has established several policies and roles related to nature, which are summarized as follows:

1 Statement of Corporate Intents No. 0314 of 2022 concerning the Sustainable Business Principle
2 Board of Directors No. 0045 of 2024 regarding the Sustainable Business Strategy Policy of PT PLN (Persero)
3 Director's Regulation No. 0110 of 2023 concerning Strategic Policy for Environmental Protection and Management
4 Biodiversity and Land Restoration Policy to carry out sustainable and responsible practices to manage biodiversity and conservation;
5 Sustainability Policy, which consists of seven ESG policies: Climate Change Policy, Biodiversity and Restoration Policy, Green Procurement Policy, Contractor Social Policy, Respectful Workplace Policy, Safety, Occupational Health, Security, and Environment Policy, and Community Social Aspect Policy.
6 The Environmental and Social Management System (ESMS) serves as a framework for the company to follow international best practices to identify, assess, prevent, mitigate, evaluate, and communicate environmental and social risks and impacts that may arise from PLN's management and operational activities.

The transformation that continues to be carried out has brought PLN towards a technology-based, innovative and future-oriented energy business. PLN not only provide clean energy but also manage the impacts of our operational and production activities by implementing environmental management policies and standardization, including:

1 Participation in the PROPER program by the KLHK (*Kementerian Lingkungan Hidup dan Kehutanan*/Ministry of Environment and Forestry).
2 Environmental costs through budget allocations for environmental management, both as part of business unit/operational unit activities and Corporate Social Responsibility (CSR) fulfillment.

PLN's operational units also have their own environmental policies designed to address key factors contributing to negative environmental impacts and their dependencies. These policies integrate environmental management mitigation principles with a hierarchy of prevention, reduction, restoration, and compensation of environmental impacts, as outlined in:

1 Safety, health, security and environmental policies
2 Biodiversity Policy and Land Restoration of PT PLN Indonesia Power.
3 Biodiversity Management Plan for Upper Cisokan Pumped Storage HPP.
4 Senior Manager Decree of PT PLN Nusantara Power Muara Karang Generation Unit No. 023.K/SM UP MUARA KARANG/2024 on Environmental Management Policy of PT PLN Nusantara Power Muara Karang Generation Unit.
5 Senior Manager Decree of PT PLN Nusantara Power Gresik Generation Unit No. 0007.K/GM/2024 on Environmental & Social Management System Policy at PT PLN Nusantara Power Gresik Generation Unit.

Besides policies related to nature, environmental aspects are also a major focus in policies contained in Senior Manager Decisions in PLN's operational units. One of the risks managed under these policies is the impact on the circular economy, which is addressed through the mandatory periodic implementation of Life Cycle Assessment (LCA). The application of LCA plays a crucial role in supporting environmental policies, particularly in minimizing risks to ecosystems and natural resources.

Through product life cycle evaluation, PLN can identify potential environmental impacts at every stage of production, distribution, usage, and disposal. Consequently, LCA not only helps reduce carbon footprints and waste but also creates opportunities to optimize recycling strategies and raw material reuse. The implementation of a circular economy through LCA enables PLN to be more proactive in balancing resource utilization and environmental protection, as outlined in the following policies:

1 Senior Manager Decree of PT PLN Nusantara Power Paiton Generation Unit No. 0003.K/SM UP PAITON/2024 on Environmental Management Policy, CSR, and LCA at PT PLN Nusantara Power Paiton Generation Unit.
2 Senior Manager Decree of PT PLN Nusantara Power Cirata Generation Unit No. 0007.K/SM UP CIRATA/2024 on Environmental Management Policy, Energy Efficiency, CSR and LCA at PT PLN Nusantara Power Cirata Generation Unit.

B. Nature Experience and Awards

Each board member possesses extensive experience in sustainability ESG topics, which are closely related to nature management, including biodiversity and water management. Most of them have pursued higher education in engineering, energy, and business management, which are central to PLN's business processes. This expertise also supports various nature-based initiatives implemented by PLN in its transition toward sustainable energy.

The commitment to sustainability was further strengthened by the achievement of PLN's CEO, Darmawan Prasodjo, who received the "Sustainable Leader of the Year in Energy Transition" award at the Lestari Award event in August 2024. The award was presented by the Ministry of Environment and Forestry to Darmawan Prasodjo, represented by PLN's Corporate Secretary, Alois Wisnuhardana. This recognition acknowledges his efforts in driving various sustainability initiatives and fostering strategic collaborations that have brought about positive change to PLN and the energy sector in Indonesia.

Figure 7. Alois Wisnuwardana, Corporate Secretary of PLN, representing the President Director of PLN, receives the Sustainable Leader of the Year award from the Minister of Environment and Forestry, 2024

The success of the energy transition led by Darmawan is closely linked to the significant role of various environmental sectors, including climate, biodiversity, water management, and other environmental aspects. As an expert in energy, renewables, and environmental issues, he has also completed a Post-Doctoral Program at Duke University, further enhancing his knowledge and leadership in sustainability matters.

Throughout 2024, PLN has earned several prestigious awards that highlight its commitment to environmental sustainability. These achievements serve as recognition of PLN's continuous efforts in integrating sustainable practices into its operations. The following table provides a summary of the awards received by PLN throughout the year:

Table 4. List of awards achieved by PLN during 2024

Acquisition Date	Organizer	Name of Award/Category	Award Recipient
August 2024	Katadata	ESG Awards in Energy Sector	PT PLN (Persero)
August 2024	Kompas Gramedia Group of Media	Lestari Award 2024 - Sustainable Leader of The Year in Energy Transition	President Director of PT PLN (Persero) as a sustainable leader
		Lestari Award 2024 – Waste Management Category	PT PLN (Persero) through the PLN Wastewise program
		Lestari Award 2024 – Renewable Energy Category	PT PLN Nusantara Power through Cirata Floating Solar Power Plant, West Java
August 2024	Business Update dan SustainLife Today	ESG Initiative Award 2024	PT PLN Indonesia Power PT PLN Nusantara Power PT PLN Icon Plus
August 2024	PT Sucofindo	Environmental & Social Innovation (ENSIA) 2024	PT PLN Indonesia Power PT PLN Nusantara Power
September 2024	ESG Business Awards in Singapore	Net Zero Award	PT PLN (Persero)
September 2024	Republika	Anugerah ESG Republika 2024	Emission Reduction Effort Inclusion Empowerment and Women's Empowerment Programs
December 2024	Transparency International Indonesia (TII) dan Tempo Data Science	Penghargaan Integritas Bisnis Lestari – Kategori Sapphire	PT PLN (Persero)

C. Management's Role

PLN has established a strong governance structure to ensure that environmental management and natural aspects are integrated into every business process of the company. The Sustainability Committee serves as an oversight and advisory body in the implementation of sustainability strategies, ensuring ESG aspects are embedded within the company's policies and operations.

The Sustainability Committee is responsible for setting sustainability targets, monitoring ESG performance, and coordinating cross-divisional initiatives to achieve long-term objectives. Effective governance serves as a fundamental pillar in maintaining PLN's operational sustainability, with each division actively contributing to the implementation of a comprehensive and collaborative environmental framework. Through this governance structure, PLN enhances transparency, accountability, and efficiency in environmental management.

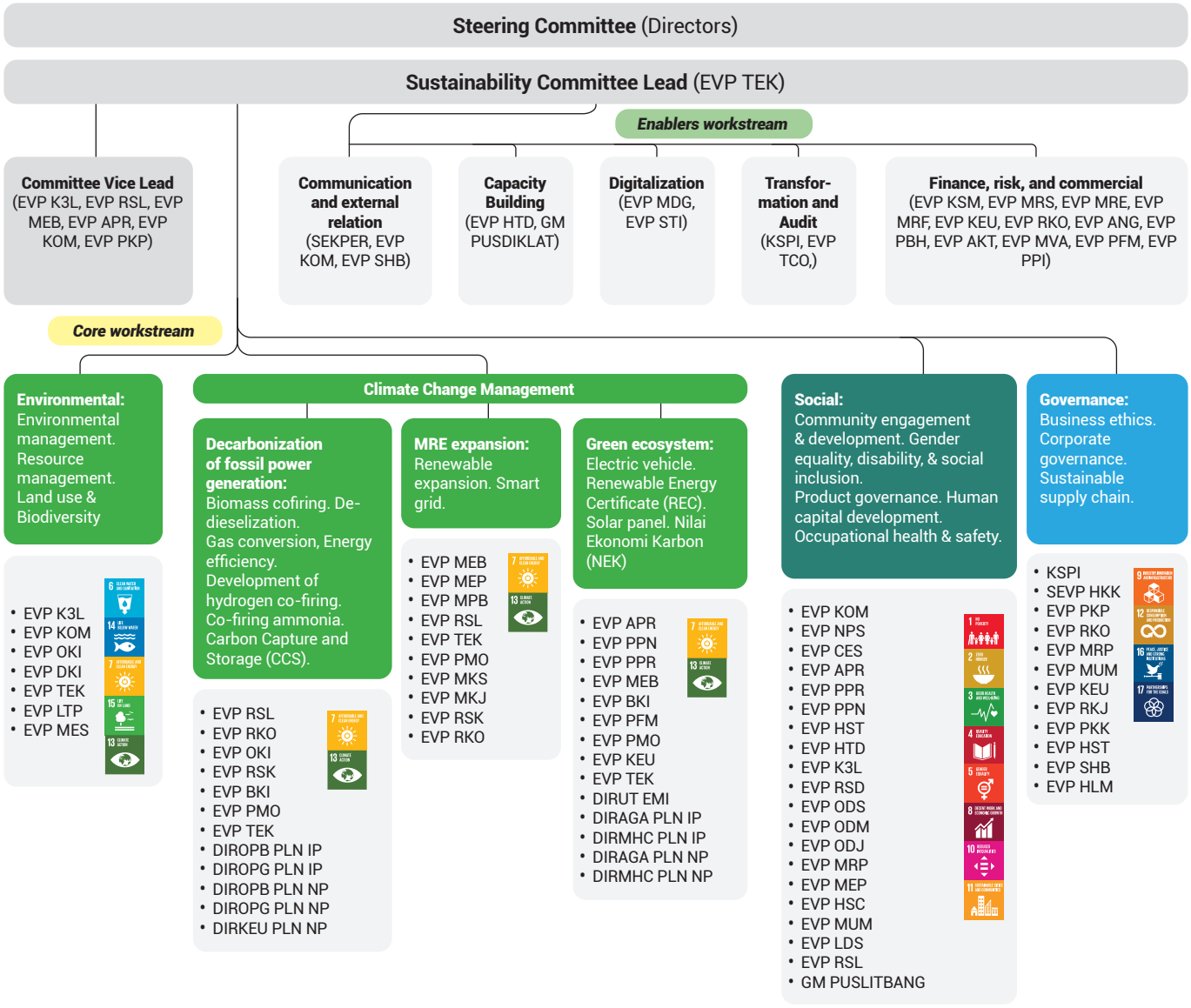

Figure 8. Structure of PLN's Sustainability Committee

As part of its commitment to sustainability, the Board of Directors has appointed the Executive Vice President (EVP) of Energy Transition and Sustainability/*Transisi Energi Keberlanjutan* (TEK) as the Chair of the Committee responsible for managing environmental aspects, including those related to nature. The TEK Division plays a strategic role in designing and developing integrated sustainability policies and strategies for environmental management.

In its implementation, the TEK Division is supported by other divisions with complementary roles, including EVP K3L (*Keselamatan dan Kesehatan Kerja*/Health, Safety, Security, and Environment), EVP KOM (*Komunikasi Korporat dan TJSL*/Corporate Communication and CSR), EVP OKI (*Operasi Pembangkitan dan Independent Power Producer*/ Generation Operations and Independent Power Producer), EVP DKI (*Pengendalian Pembangkitan dan Independent Power Producer*/Generation Control and Independent Power Producer), EVP LPT (*Legal Aset Properti*/Property Assets, Legal, and Integrated Permits), and EVP MES (*Manajemen Aset, Enjiniring, dan Sistem Manajemen Terintegrasi*/Asset, Engineering, and Integrated Management Systems).

The implementation of further environmental programs is carried out with the support of PLN's sub-holding and operational units across Indonesia, to ensure that sustainability policies are adopted comprehensively across the company's business lines. To clarify the responsibilities of each division in environmental governance, PLN has outlined these roles and authorities in PLN Directory Decisions No. 0026.P/DIR/2024, as detailed below:

- EVP TEK ensures nature programs align with PLN's NZE goals, enforces ESG and safeguard policies, and implements mitigation efforts, including CSR collaborations, to support a fair energy transition.
- EVP K3L develops policies, ensures compliance with targets, and aligns business processes with corporate ESG policies.
- EVP KOM ensures that the development of ISO-based social and environmental responsibility strategies and policies is aligned with SDGs and that the planning, implementation, monitoring, and evaluation of all business processes in the division are aligned with ESG-related corporate policies.
- EVP OKI ensures the operation, maintenance, and management of generation assets of Holding, Subsidiaries, and IPPs (Independent Power Producers) follow the asset management strategies and policies to achieve optimal generation operational performance with due regard to security, health, safety, security, and environmental aspects.
- A chairperson manages each subholding and subsidiary at the unit level, and is appointed by the authorized Leader or Director of the subholding or subsidiary. The TEK Division monitors the implementation of nature management, which is part of the sustainability performance of subholding and subsidiary.
- EVP DKI manages and oversees electricity generation from various sources, including IPPs.
- EVP LPT that all PLN-owned assets, including land, commercial buildings, residential properties, and industrial complexes, have complete legal documentation in compliance with applicable laws and regulations.
- EVP MES ensures the efficiency, reliability, and sustainability of PLN's operations through strategic asset management, engineering oversight, and the implementation of integrated management systems.

To integrate its commitment to sustainable practices into corporate governance, PLN units have also established their commitments, which are outlined in the following responsibility structure:

- The Senior Manager of Muara Karang Power Generation Unit, supported by the Maintenance Manager and Business Support Manager, serves as the Lead Coordinator for Environmental Management.
- The Senior Manager of Gresik Power Generation Unit, supported by the Maintenance Manager and Business Support Manager, serves as the Lead Coordinator for Environmental Management.
- The Manager of Gilimanuk Power Generation Business Unit.
- The Senior Manager of Cirata Power Generation Unit, with the Environmental Manager under their coordination.
- The Senior Manager of Paiton Power Generation Unit, supported by the Manager of Engineering & QA as the Head of the Proper Team.
- The Senior Environmental Manager of Wonogiri Power Generation Unit, supported by the Head of Administrative Manager.
- The Senior Power Manager of Barru Power Generation and O&M Services Unit, supported by the Environmental Manager of Barru Power Generation Unit.

PLN has established an ESMS document to provide a framework for PLN to identify, assess, prevent or mitigate, evaluate, and communicate environmental and social risks and impacts that may arise from the operational activities of PLN and its business partners.

The ESMS is designed to ensure that environmental and social risks and impacts are managed in accordance with Good International Industry Practice (GIIP), aligned with the requirements set by International Finance Institutions (IFI), and compliant with national regulations. In line with PLN's commitment to strengthening environmental sustainability, this system is implemented across various projects and internal processes to ensure that PLN's investments and operations comply with international sustainability standards.

As a living document , the ESMS will continue to be updated and refined periodically with the approval of PLN's ESMS Team to remain relevant to regulatory developments and industry best practices.

The ESMS document consists of the ESMS Manual that was launched in December 2023, and 16 Management Guidelines were launched in May 2024, covering 10 environmental aspects and 6 social aspects as follows:

1 Labor and Working Condition Management Guideline
2 Air Quality Management Guideline
3 Biodiversity Management Guideline
4 Community Health, Safety, and Security Management Guideline
5 Cultural Heritage Management Guideline
6 Indigenous People Management Guideline
7 Erosion and Sediment Control Management Guideline
8 Non-Hazardous Waste Management Guideline
9 Stakeholder Engagement Management Guideline
10 Water Efficiency Management Guideline
11 Land Acquisition and Resettlement Management Guideline
12 Noise and Vibration Control Management Guideline
13 Hazardous Materials Management Guideline
14 Hazardous Waste Management Guideline
15 Wastewater and Water Quality Management Guideline
16 Energy Efficiency Management Guideline

And also Document Independent Power Producer (IPP) E&S Guidelines for Solar PV Project and Onshore Wind Power Project.

Figure 9. In December, 2023 at the Sustainability Day Event, PLN's BoD launched the ESMS Manual (left) and the launch of 16 guidelines by the Director of Transmission and System Planning in May, 2024 (right)

D. Building a Culture of Nature-related Issues

PLN continues to foster a culture oriented towards environmental issues by integrating nature-related aspects into sustainable business practices. As part of its commitment to sustainability, PLN not only implements environmentally driven policies in internal management but also encourages awareness and active participation across all business lines.

As part of its sustainability efforts to strengthen engagement among directors, divisions, units and external parties, PLN provides several discussion and learning platforms that focus on environmental aspects including nature-related issues. With this approach, PLN not only ensures compliance with global sustainability standards, but also builds a corporate culture that is more aware of environmental impacts.

1. Sustainability Academy

The Sustainability Academy is a platform designed to accelerate PLN's sustainability journey through integrated learning. This platform focuses on environmental management, including natural and social aspects, ESG capacity building, and corporate sustainability strategies. The primary goal of this platform is to enhance sustainability knowledge essential for decision-making and the effective implementation of sustainability practices. Currently, the Sustainability Academy is in the process of developing a learning plan through PUSDIKLAT, which includes formulating governance programs to support the integration of sustainability across PLN's business processes.

PLN, in collaboration with WWF, organized biodiversity training as part of the Sustainability Academy to emphasize its dedication to sustainability. This program aimed to enhance participants' understanding of biodiversity concepts and environmental assessment techniques. Additionally, it focused on how to use the iBAT tool to assess potential project risks to the environment. The training included theoretical learning and hands-on practice, where participants actively engaged in field studies, applying survey methods and ecological analysis.

The program specifically targeted the preparation of biodiversity reports and how iBAT could be used in project planning. Through interactive sessions such as discussions, group exercises, and pre-and post-tests, participants were expected to oversee the implementation of biodiversity safeguard policies in their respective work units. This would contribute to advancing environmental sustainability in PLN projects. For the biodiversity data collection practicum, three primary methods are observation, camera traps for automatic wildlife recording, and the use of binoculars to observe species from a distance without disrupting their natural habitats.

The biodiversity training was held in two batches: the first occurred in Denpasar, Bali, from July 31 to August 2, 2024, and the second in Yogyakarta from August 13 to 16, 2024. Sixty participants from various PLN units attended the training, representing different sectors, including the UID, UIT, and UIP. The participants were 46% women and 54% men.

Figure 10. Biodiversity training in classroom session (left) and field activity in Batu Lumbang Mangrove Ecotourism, Bali (right)

2. Sustainability War Room

To achieve NZE 2060 target and ESG implementation, nature plays an important role in PLN's sustainability strategy. The Sustainability War Room (SWR) serves as a strategic platform that integrates various nature-based initiatives to support energy transition and environmental impact mitigation.

SWR meetings are held biweekly to evaluate the progress of various sustainability programs. The SWR oversees 29 strategic projects or "moonshots" focused on business growth, digitalization, and achieving the NZE target. Additionally, the SWR serves as a forum for PLN to address various ESG challenges, including dynamic nature-related issues that may impact company operations.

To ensure the achievement of sustainability targets, each indicator within the Sustainability War Room (SWR) is supported by an action plan to mitigate potential risks. This platform enables PLN to monitor the progress of action plans, evaluate sustainability indicators, and ensure that each target is met within the designated timeframe. SWR meetings are held biweekly, and biodiversity, along with TNFD, is one of the key topics discussed during these sessions.

Figure 11. Overview of the Sustainability War Room, highlighting workstreams and key focus areas for sustainability updates

E. Engagement with Stakeholders including Indigenous Peoples

PLN's commitment to environmental sustainability also extends to its responsibility toward stakeholders in supporting the successful implementation of sustainable strategies. PLN actively collaborates with regulators, environmental organizations, academics, and local communities, all of whom play a crucial role in the planning, implementation, and monitoring of nature-related management programs.

The table below outlines the key roles and contributions of stakeholders in managing environmental impacts, particularly in biodiversity conservation and water management within PLN's operational areas. Through these strategic partnerships, PLN ensures that the mitigation measures implemented not only support sustainability but also provide tangible benefits to local communities.

Table 5. Stakeholder Collaboration for Nature-related Issues

Stakeholder	Roles
Regulator (Environmental Office, Ministry of Environment and Forestry)	Establishes policies, regulations, and standards governing nature conservation efforts.
Environmental Organization	Serve as strategic partners in designing, implementing, and advocating for nature-related programs.
Agency/Institution/Community	Collaborate in conserving and managing nature-related issues through joint initiatives and shared responsibilities.
Academics	Provide expertise and research-based insights as strategic partners in designing and implementing nature-related programs.
Employee	• Develop innovative nature-related programs. • Monitor and evaluate the effectiveness of environmental initiatives.
Local Communities	Implement nature-related programs that respect local knowledge and traditions while delivering tangible socio-economic benefits.

PLN is committed to building close collaboration in its efforts to manage risks and impacts on nature, in line with the responsibilities of each stakeholder. One of the main forms of collaboration is the partnership with WWF, which has provided invaluable support in helping PLN prepare this TNFD report and build capacity for future TNFD implementation. In addition, PLN is also implementing more specific collaboration on the priority locations revealed in the FY 2024 report, with various initiatives strengthened through commitments and synergies with relevant stakeholders. The following table summarizes PLN's collaboration in various priority locations.

Table 6. Collaboration and engagement activities with stakeholders for nature-related issues

Sector	ID	Collaborations and Engagements activity
Fossil Fuel Power Plants operation	Barru CFPP	Collaboration with the NGO Komunitas Lima Putra Pesisir in the Sea Turtle Conservation Program, as well as cooperation with the Kamiri Village community in the Energy Plantation Forest Conservation Program.
	Gilimanuk OCGT	Collaboration with the Head of the West Bali National Park Office and the KLHK, as well as partnerships with the Community Empowerment Institution, SUKETEKI Assisted Group, Burung Mandiri Community Group, CV Nata Loka, and Karya Makmur Cooperative.
	Gresik OCGT & CCGT	Partnership with Local Communities, the Tegar Jati Mangrove Monitoring Group, and the Village Government.
	Muara Karang OCGT & CCGT	Collaboration with the Hutan Organik Foundation the Muara Angke Mangrove Community, and the Provincial Government of DKI Jakarta in Penjaringan Subdistrict .

Sector	ID	Collaborations and Engagements activity
	Paiton CFPP	Collaboration with the Environmental Agency (DLH) of Probolinggo City in the Critical Land Greening Program in Probolinggo Regency, the Community Monitoring Group Keranji of Bhinor Village in the Land Restoration and Coral Reef Transplantation Program, the Bhinor Underwater Community in the Hanging Garden Coral Bank Program, as well as Format for Green and the Environmental Agency of Situbondo Regency in the 10,000 Tree Planting Program in Situbondo Regency in 2021.
Hydro Power Plants operations	Koto Panjang HPP	Partnership with the Indragiri Rokan Watershed Management Agency, under the Ministry of Forestry, in the development of the Integrated Watershed Management Plan for the Koto Panjang Catchment Area, involving various stakeholders, including PT PLN Nusantara Power PLTA Koto Panjang.
	Cirata HPP	Partnership with PT Prima Kelola IPB Consulting in the preparation of the Biodiversity Monitoring Services Report.
	Wonogiri HPP	Partnership with Universitas Sebelas Maret and Perum Jasa Tirta I in the preparation of the biodiversity monitoring report at the Wonogiri Dam.
Project under construction	UIP Sulawesi Transmission Line	Collaboration with the Kinatouan Foundation.
	Upper Cisokan Pumped Storage HPP	The involvement of external experts in biodiversity and ecology from Universitas Padjadjaran, as stated in the BMP report.

Apart from its overall responsibility to stakeholders, PLN has also developed guidelines for the management of indigenous peoples, which are contained in the ESMS manual and management guideline. These guidelines are designed to ensure that the presence of indigenous peoples around project sites can be identified, assessed, and mitigated consistently in accordance with national regulatory requirements and best practice international standard . It builds on international indigenous peoples' engagement standards as well as key principles in national regulations. These approaches aim to ensure the protection of indigenous peoples' rights as well as their integration in project management in an inclusive and sustainable manner.

As part of the indigenous people protection and management process, PLN implements the following steps:

- Identify and screen indigenous peoples in the project area.
- Develop and implement a participatory indigenous consultation and engagement strategy
- Identifying risks and impacts, formulating mitigation, avoidance and benefit distribution measures, and integrating them into the indigenous people plan (IPP)
- Monitoring and evaluating the implementation of mitigation measures

This approach ensures that the engagement with Indigenous Peoples is conducted transparently, inclusively, and in alignment with PLN's sustainability principles and social responsibility in all operational activities. This guidelines alignment with the TNFD Guidance on engagement with Indigenous Peoples, Local Communities and affected stakeholder.

A strong example of this is the Kumbih 03 Hydroelectric Power Plant (HEPP) project, located across Pakpak Bharat Regency and Subulussalam City. From the early feasibility study phase in 2015 to the detailed design stage, PLN and its consultants actively engaged with the Indigenous Pakpak Simsim people through a series of consultations. Applying the Free, Prior, and Informed Consent (FPIC) framework, formal agreements were reached with key clans such as Berutu and Angkat to ensure the protection of cultural rights and recognition of traditional land claims. Additionally, the project includes a comprehensive livelihood restoration plan and cultural preservation programs in collaboration with local NGOs, reinforcing PLN's commitment to integrating Indigenous perspectives into sustainable infrastructure development.

Case Study 1. Eco-Edu Tourism: Local Community and Barru CFPP Collaboration for Sea Turtle Conservation

Figure 12. Sea turtle conservation area at Lowita Beach

The eco and educational tourism initiative based on sea turtle conservation at Lowita Beach, South Sulawesi, is a sustainable tourism innovation resulting from the collaboration between Barru CFPP and the Lima Putra Pesisir Community since 2021. This program aims to preserve the sea turtle ecosystem through education and research while also enhancing the well-being of the local community.

Prior to this innovation, local communities hunted turtle eggs for sale and consumption, leading to an imbalance in the ecosystem. After this conservation innovation, the ecosystem of Lowita Beach is better preserved, while local communities benefit economically from the adoption of turtle releases by tourists. The program also impacts various local sectors that are integrated with each other:

1 Fishermen Groups – An indirect positive impact of sea turtle conservation is the improvement of the marine ecosystem, which enhances coral reef restoration and leads to an increase in fish populations, supporting sustainable fisheries in the area.
2 Local Communities – The utilization of inorganic waste for souvenirs and the integration of organic waste, such as coconut husks, with the Karya Namira Group (a local community) create new business opportunities.
3 Research and Educational Tourism – The initiative attracts students, researchers, and tourists interested in learning about sea turtle conservation firsthand.

Through a collaborative and educational approach, this initiative not only protects sea turtles but also creates sustainable social and economic impacts for the local community.

Figure 13. Barru CFPP are seen releasing sea turtles as part of the conservation effort (left) and awareness campaign for biodiversity conservation effort at Lowita Beach, South Sulawesi (right)

Case Study 2. Koto Panjang Hydro Power Plant Watershed Ecosystem Restoration

The Koto Panjang HPP catchment area reforestation program is a collaborative program between PT PLN Nusantara Power, the Government through BPDAS Indragiri Rokan, Riau Province Watershed Forum, and the local communities of Koto Tuo Village and Pongkal Istiqomah Village. The tree planting event, which took place in the catchment area of the Koto Panjang HPP Reservoir, Kampar Regency, Riau, was motivated by the biophysical condition of the Koto Panjang Reservoir catchment area which continues to degrade.

Figure 14. Collaborative program and catchment area activities (left) and tree planting program at Koto Panjang Hydro Power reservoir (right)

During the dry season, inundation in Koto Panjang Reservoir begins to recede because the two major rivers that supply Koto Panjang Reservoir, namely the Kampar River and Batang Mahat, have begun to dry up. Conversely, during the rainy season there is a significant excess of water that can jeopardize the durability of the dam and require the water to be discharged. Both of these indicate a decline in the carrying capacity of the Koto Panjang Reservoir catchment. Analysis of the condition of the Koto Panjang Hydro Power Plant catchment area is closely related to the shrinking area of forest cover in the Kampar watershed, especially the catchment area of the Koto Panjang Hydro Power Plant Reservoir, which plays an important role in accommodating, storing and transporting water.

Through this reforestation program that has been started since 2023, PT PLN Nusantara Power Koto Panjang HPP and BPDAS Indragiri Rokan contributed seed sources with the following details.

Table 7. Details of Seedling Sources

No	Seed Source	Seedling Type	Total Seedlings
1	Koto Panjang HPP	Longan	750
		Durian Musang King & Bawor	250
2	BPDAS Indragiri Rokan	Stink Bean	500
		Matoa	500
		Soursop	650

The available seedlings were planted in two locations: along the reservoir's edge and within residential areas. The planting process was carried out collaboratively by all involved stakeholders, with support from local village residents. The village authorities are fully responsible for maintaining the planted trees, while the Riau Watershed Forum will conduct regular monitoring and evaluation of the planting and maintenance activities. While the program contributes to the preservation of the Koto Panjang Hydro Power Reservoir's water catchment area, it also provides economic benefits to the surrounding community. The seedlings planted consist of fruit-bearing trees that can be harvested and have economic value, thus improving the livelihoods of local residents.

Case Study 3. Collaboration for the Conservation of North Sulawesi's Endemic Wildlife

PLN collaborate with the NGO "Selamatkan Yaki", the Tasikoki Wildlife Rescue Center (PPS Tasikoki), and the Forest Conservation Community Forum (FMKH), has developed a series of programs aimed at supporting the conservation efforts for the protection of the Sulawesi Black Macaque (Macaca nigra), an endemic species of North Sulawesi.This wildlife conservation initiative was driven by the threats to biodiversity posed by societal pressures such as illegal wildlife trade, poaching, and the loss of natural habitats. As a result of these challenges, the Yaki population, a protected species, has declined by 80% over the past 40 years.

Recognizing the need to raise public awareness about the ecological and health risks associated with wildlife endangerment and the ineffectiveness of law enforcement, PLN and several NGOs have collaborated to implement a conservation program in Bitung, North Sulawesi. Launched in 2022, this program consists of a series of activities structured as follows:

2022

- Conducted awareness campaigns at several strategic locations in Bitung City.
- Provided medical equipment for wildlife at the Tasikoki Wildlife Rescue Center (PPS Tasikoki).

2023

- Planted tree seedlings and conducted a beach clean-up in the Batu Angus Nature Tourism Park.
- Mitigated human-wildlife interactions through awareness campaigns, Yaki deterrence patrols, and trimming tree branches near residential areas.
- Conducted tour guide training and maintained directional information boards within the Batu Angus Nature Tourism Park.

2024

- Capacity building of the Manembo-Nembo Forest Conservation Community Forum (FMKH)
- Yaki deterrence patrols conducted by members of the Forest Conservation Community Forum (FMKH)
- "Save Yaki" campaign through billboard media

Figure 15. Stakeholder engagement with a medical outreach program for the protection of the Sulawesi Black Macaque (left) and Community engagement in environmental awareness in Bitung City (right)

Through this program, positive impacts have been achieved across various aspects, including:

Nature Aspect

- Preservation of approximately 1,400 documented Yaki individuals in Bitung City.
- Support for the rehabilitation of 407 animals at the Tasikoki Wildlife Rescue Center.

Social Aspect

- Involvement of 60 members of the Forest Conservation Community Forum (FMKH) in awareness activities.
- Enhanced role of FMKH as a task force for the protection and conservation of plants and wildlife in Bitung City.

Economic Aspect

- Increased income for Micro and Small Enterprises (MSEs) through the procurement of educational materials, t-shirts, event banners, and supplies for awareness activities.

Wellbeing Aspect

- Raised awareness among approximately 2,500 residents of Bitung City, who were exposed to information through awareness activities at five locations, discouraging the consumption and captivity of wildlife.

STRATEGY

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STRATEGY

PLN identifies nature-related issues, including dependencies, impacts, risks, and opportunities, across our sampling locations based on the priority materiality risk assessment outlined in the TNFD Report FY 2023. To achieve a more specific identification, it is essential to determine priority locations based on Table 3. The location assessment follows the LEAP Approach and other science-based methodologies for greater specificity, as previously explained on Disclosure Approach.

A. Priority Location Assessment

Based on the screening results, priority locations were identified, including five Fossil Fuel Power Plants, three Hydro Power Plants, and two projects under construction (one Hydro Power Plant and one of Transmission Line). The purpose of the priority location assessment is to understand the proximity of our sites to ecological sensitive areas. To achieve this, we mapped these ecological areas within protected areas and Key Biodiversity Areas (KBA).

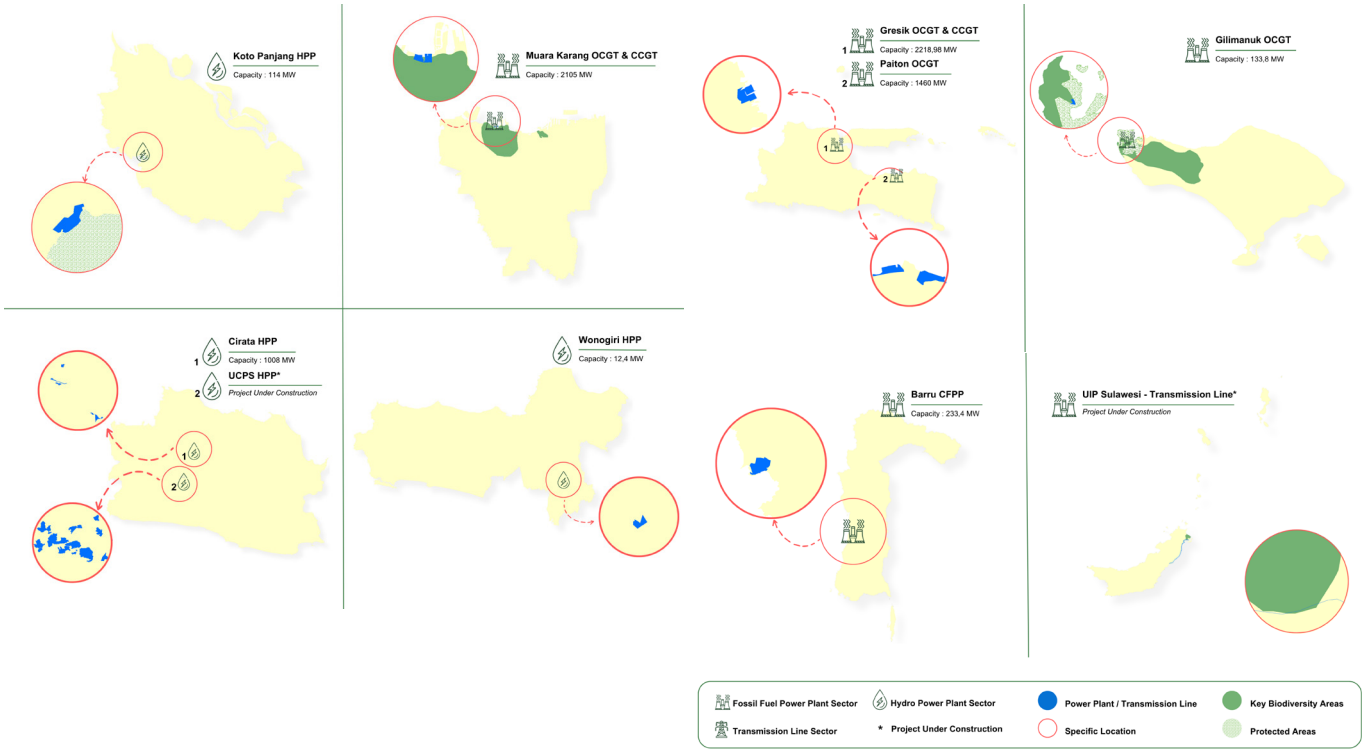


Figure 16. Map showing priority locations of energy sector sites and highlighting their proximity to ecological sensitive areas

Based on Figure 16, the locations selected for the assessment sample in the FY 2024 report include the fossil fuel sector in Muara Karang, Gresik, Paiton, Gilimanuk, and Barru. The transmission line covers UIP Sulawesi, while the Hydro Power Plant (HPP) includes Cirata, Upper Cisokan Pumped Storage, Koto Panjang, and Wonogiri. Additionally, two locations are classified as ongoing projects under construction: UIP Sulawesi and Upper Cisokan Pumped Storage HPP. These two locations serve as examples in this report, demonstrating that PLN has ensured transparency in its reporting since the pre-construction phase.

Among all these locations, several are situated within protected areas and/or Key Biodiversity Areas (KBA), including Muara Karang OCGT & CCGT, Gilimanuk OCGT, UIP Sulawesi Transmission Line, and Koto Panjang HPP. Other locations are designated as sampling locations in the FY 2024 report due to their high materiality, requiring an assessment of dependency, impact, risk, and opportunity based on Table 3.

B. Nature-related Dependency & Impact

Dependencies refer to environmental assets and ecosystem services that support an organization's continuity of operations. These include the ecosystem's role in regulating water and carbon cycles, maintaining biodiversity, and protecting against natural hazards such as floods, wildfires, and extreme weather events. Understanding and assessing the extent to which a business depends on ecosystem services is crucial for ensuring long-term sustainability and operational resilience. Meanwhile, impacts refer to changes in the state of nature, both in terms of quality and quantity, which may affect its ability to support social and economic functions. Business operations influence natural capital and ecosystem services directly, indirectly, or cumulatively, depending on the nature and scale of activities.

Biodiversity Aspect

Biodiversity-related risks arise from a company's impacts and dependencies, which are influenced by local and global biodiversity conditions. As the importance and state of biodiversity integrity can vary across site locations, the assessment of biodiversity-related risks must also be location-specific. Understanding and addressing biodiversity-related risks is crucial; however, this can be challenging without location-specific data. Through this assessment, company can gain a clearer understanding and prioritize the necessary actions to manage biodiversity-related risks effectively.

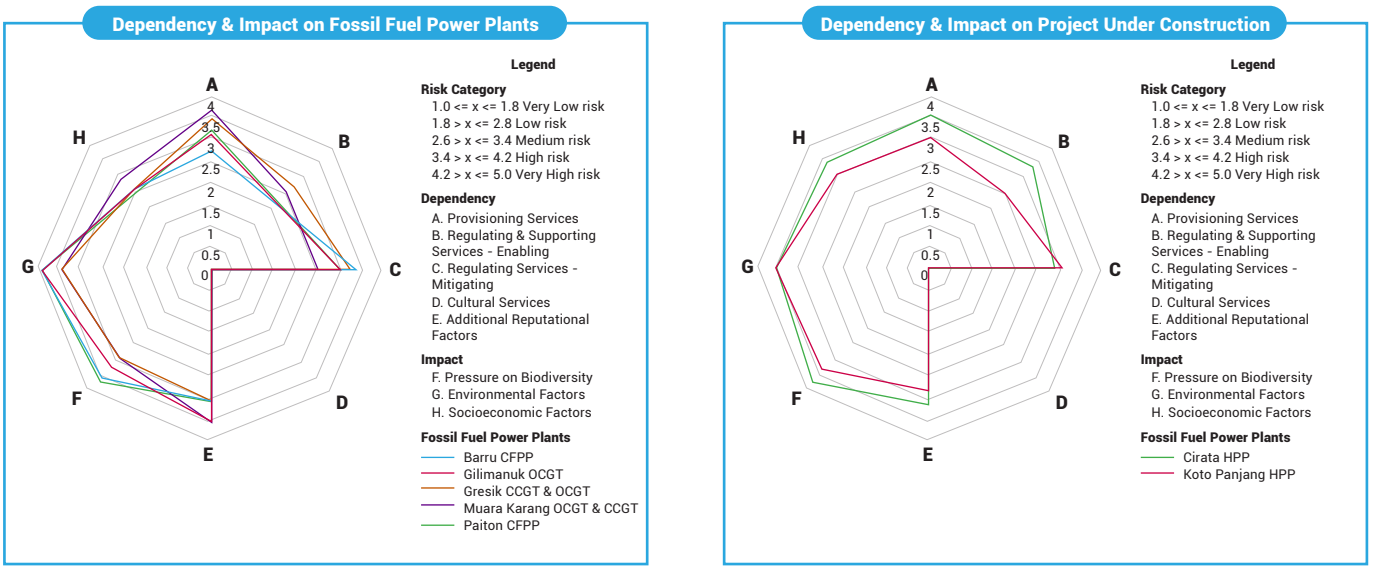
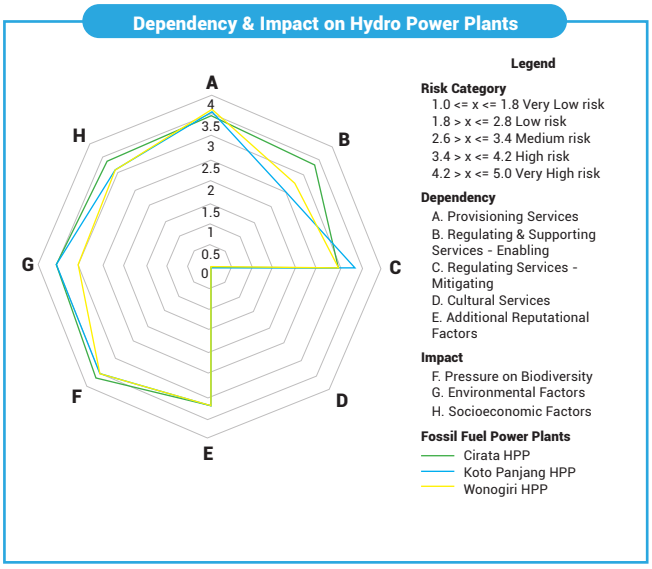


Figure 17. Dependency & impact biodiversity aspect on Fossil Fuel Power Plants, Hydro Power Plants, and project under construction

Based on Figure 17, the dependencies and impacts on Fossil Fuel Power Plants, Hydro Power Plants, and projects under construction can be summarized as follows:

Dependencies:

- Fossil Fuel Power Plants: depend on non-renewable resources like coal and natural gas, leading to rising costs due to scarcity and strict carbon regulations. They also heavily rely on water for cooling and steam generation, making water availability crucial for efficient and reliable operations.



- Hydro Power Plants: depend on provisioning services as such water availability, requiring a stable water flow to maintain a consistent energy supply. The physical abundance or scarcity of freshwater resources plays a critical role in ensuring operational efficiency. Limited water availability can lead to production and supply chain disruptions, increased operating costs, and constraints on growth.
- Project under construction: transmission units have minimal dependence on ecosystem services, whereas Hydro Power Plants under construction remain highly dependent on provisioning services, similar to their operational phase.

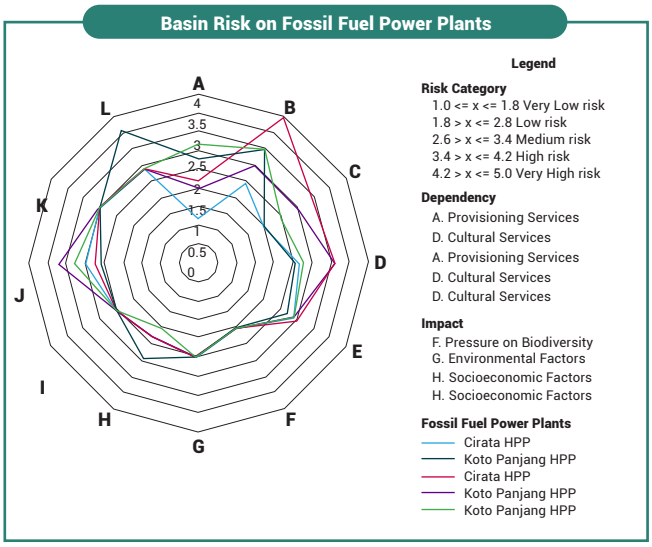
Impact:

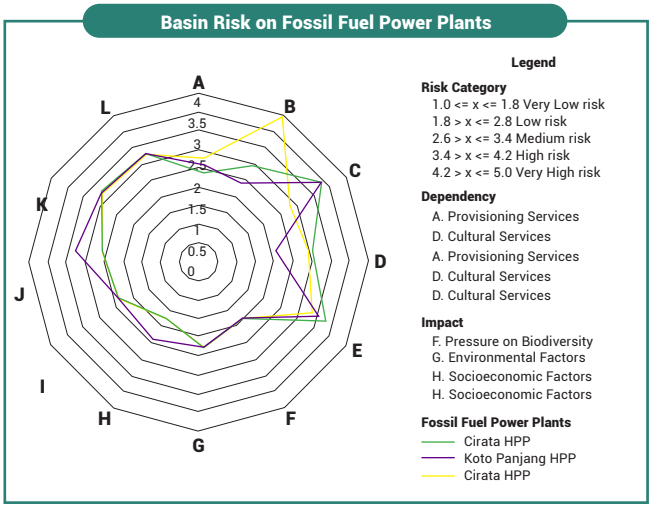
- Both operational and under-construction projects have the mostly impact on environmental factors and biodiversity pressure, compared to other potential effects.

Water Management Aspect

PLN can prioritize mitigation measures by assessing water risks and integrating water management into strategy and investment decisions to build business resilience. Basin risk refers to landscape-level risks related to water availability and quality within a specific watershed, impacting water supply across multiple sites. Operational risk pertains to risks tied to PLN's direct operations, such as water use for cooling and production. Evaluating both basin and operational risks allows PLN to address regional water challenges and internal operational risks, ensuring effective risk management and long-term sustainability.

Basin Risk





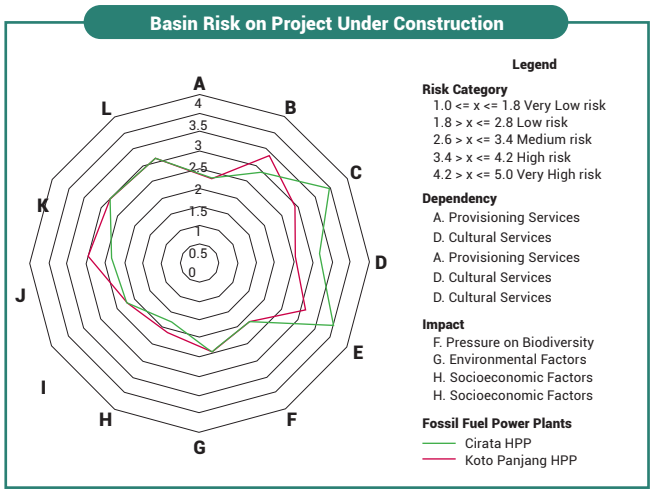
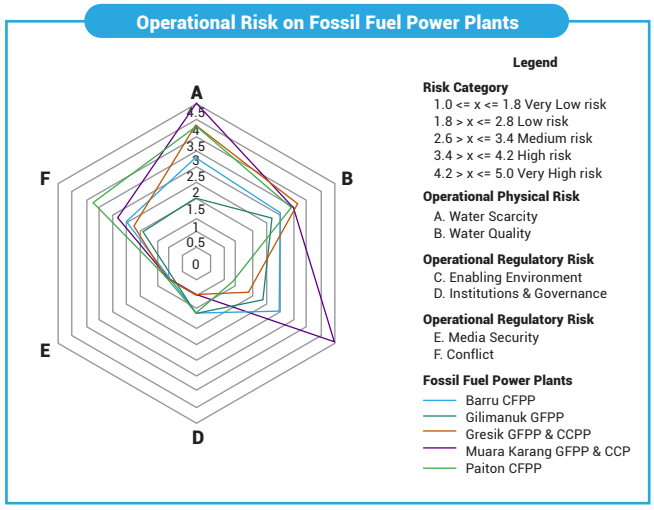


Figure 18. Dependency & impact basin risk aspect on Fossil Fuel Power Plants, Hydro Power Plants, and project under construction

Operational Water Risk



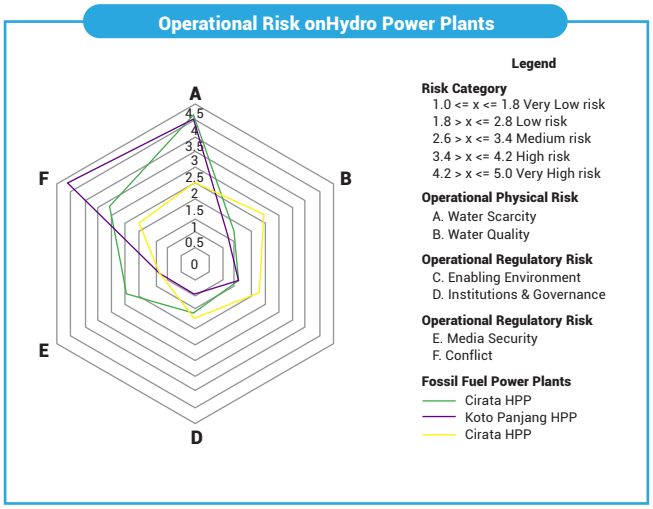


Figure 19. Dependency & impact operational water risk aspect on Fossil Fuel Power Plants and Hydro Power Plants

Based on the analysis of basin and operational risks, we identify the dependencies and impacts. The dependencies include water availability, ecosystem service status, enabling environment, institutions and governance, management instruments, WASH infrastructure, and additional reputational factors. Meanwhile, the impacts include drought, flooding, water quality, environmental factors, and socioeconomic factor (media scrutiny, conflict).

According to the basin and operational risk score, sites with risk scores above 3,4 are considered high risk and need a more conservative approach. Site with risk scores equal to or greater than three should also be considered as a reference point. Thus, these scores identify water risk hotspots across multiple sites.

The dependencies and impacts on fossil fuel power plants, Hydro Power plants, and projects under construction can be summarized as follows:

Dependencies:

- Fossil Fuel Power Plants: depend on management instruments, additional factors, and an enabling environment. They primarily rely on policy instruments and regulatory and management practices that support efficient and effective operational activities.
- Hydro Power Plants: depends heavily on the status of ecosystem services, particularly the quality of aquatic ecosystems (such as reservoirs and river systems) that supply water. Any changes in the condition of water ecosystems can reduce energy production capacity and increase operational costs.
- Project under construction: Transmission units have minimal dependence on most indicators. However, Hydro Power plants under construction remain highly dependent on ecosystem service status, similar to their operational phase.

Impact:

The impacts of these sectors include water scarcity, flooding, water quality, environmental factors, and potential conflicts. Unstable environmental conditions, such as natural disasters or climate change, can lead to water scarcity and flooding, disrupting operations and necessitating repairs. Additionally, other impacts may involve conflicts with stakeholders due to operational instability, which could potentially hinder electricity production.

C. Nature-related Risks & Opportunity

In identifying nature-related risks, PLN utilizes the WWF Biodiversity and Water Risk Filter, as outlined in the Disclosure Approach section. As a company that relies significantly on natural resources—particularly water for hydro power generation and ecosystems that support its electrical infrastructure—PLN recognizes the critical importance of assessing its environmental dependencies.

Through a dependency and impact analysis, various risks have been identified, primarily physical and reputational risks, which have the potential to disrupt operations, degrade ecosystems, and impact community well-being. To support a reliable and sustainable power supply, PLN also actively identifies strategic opportunities that can strengthen the company's long-term business resilience in the face of evolving environmental challenges.

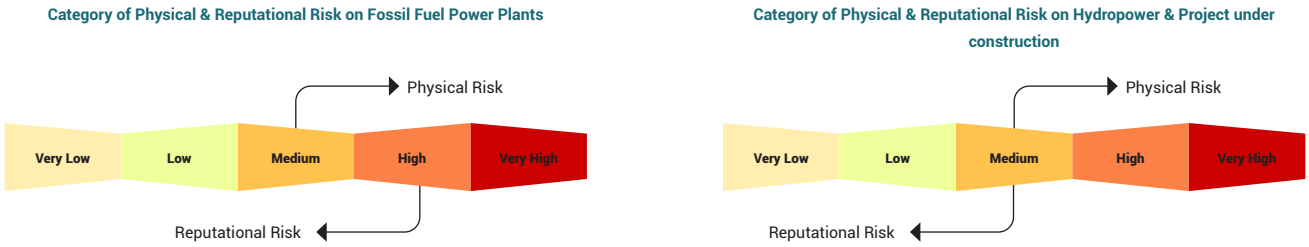


Figure 20. Categories of physical and reputational for biodiversity aspect

Based on these graphs regarding the biodiversity aspect, the overall risk type for PLN falls within the medium risk level, while high risk is only present in the reputational risk of the Fossil Fuel Power Plants business process. Meanwhile, in the graphs below, which focus on the water management aspect for physical, regulatory, and reputational risks are generally typed as low to medium risk.

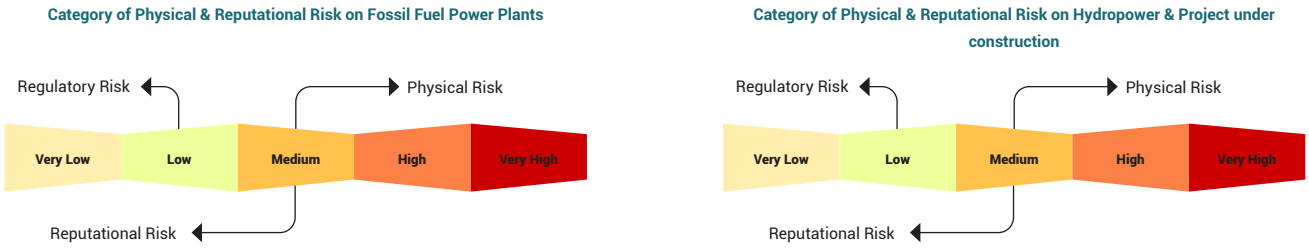


Figure 21. Categories of physical, regulatory, and reputational for water management aspect

Table 8. Key nature-related risks and opportunities identified on biodiversity aspect

Risk-type	Risk-category	Nature-related Risks	Opportunities Identified	Time Horizon
Physical risk	Provisioning services	Water availability Forest productivity and distance to market	Water recycling technology, and conservation of catchment areas.	Short to long-term
	Regulating & Supporting Services	Water condition Air condition	Emission reduction technologies and ecosystem-based water management	Short to long-term
	Regulating Services - Mitigating	Landslides Wildfire hazard Extreme heat Tropical cyclones	Restoration, reforestation, and disaster-resilient infrastructure development.	Short to long-term
	Pressure on biodiversity	Land, freshwater and sea use change Forest canopy loss Pollution	Land restoration and development of protected species.	Short to long-term
Reputational risk	Environmental Factors	Protected areas Key Biodiversity Area Ecosystem condition Range rarity	Collaboration with stakeholders for nature and ecosystem protection programs.	Short to long-term
	Socioeconomic Factors	IPs Labor/human rights Financial inequality	Partnerships with IPs and local communities, workforce empowerment, and CSR initiatives.	Short to long-term
	Additional Reputational Factors	Media scrutiny Political situation Sites of international interest Risk preparation	Transparent of nature reporting and proactive stakeholder engagement.	Short to long-term

Table 9. Key nature-related risks and opportunities identified on water management aspect

Risk-type	Risk-category	Opportunities Identified	Time Horizon
	Basin Indicator		
Physical	Water availability	Invest in water conservation and efficient use of water resource	Short to long-term
	Drought		
	Flooding		
	Water Quality		
	Ecosystem Services Status		

Risk-type	Risk-category	Opportunities Identified	Time Horizon
Regulatory	Enabling Environment	Collaborate with government on policy development for water management	Short to long-term
	Institutions & Governance		
	Management Instruments		
	WASH Infrastructure		
Reputational	Environmental Factors	Strengthen relationships with communities and improve access to clean water.	Short to long-term
	Socioeconomic Factors		
	Additional Reputational Factors		
		Operational Indicator	
Physical	Water Scarcity	Innovate in water quality monitoring and improvement systems	Short to long-term
	Water Quality		
Regulatory	Enabling Environment	Collaborating with governance, IPs, local communities, and improving water management transparency will strengthen public trust	Short to long-term
	Institutions & Governance		
Reputational	Media Scrutiny		Short to long-term
	Conflict		

D. Resilient Strategy for Nature-related Issues

Faced with the complexity of nature-related risks that can significantly impact business operations, PLN takes proactive steps to strengthen resilience in various aspects. Through careful planning and continuous investment, PLN seeks to minimize operational disruptions while reducing nature impact. This strategy is implemented through comprehensive programs covering the entire operational cycle, from construction to operational.

Green Finance Planning

The interconnection of climate change, biodiversity, and human well-being has not only allowed PLN to access green financing but also accelerated Indonesia's energy transition. This significant achievement, shifting to renewable energy, is a source of pride for all of us, as it underscores our commitment to sustainable natural resource management and the well-being of our planet.

PLN is currently developing a Sustainable Linked Financing Framework (SLFF) and a Green Financing Framework (GFF) to support the realization of its target to achieve 76% renewable energy-based power generation by 2034 through investment support estimated to exceed USD 100 billion. Over the past three years, PLN has secured financing from both domestic and international sources through loans and grants, amounting to an equivalent of IDR 67.5 trillion, which is available to fund green projects. In total, by the end of 2024, PLN has explored potential funding opportunities with development banks and financial institutions—both domestic and international—amounting to approximately USD 49.2 billion.

In 2024, PLN allocated IDR 10.07 trillion in investment spending to support climate change mitigation efforts. This budget remains focused on various strategic initiatives aligned with the national energy transition and emission reduction agenda. These include investments in:

- Biomass co-firing programs
- Development of Public Electric Vehicle Charging Stations (SPKLU)
- Expansion of gas infrastructure
- Implementation of clean coal technologies
- Hydrogen development
- Carbon capture and storage (CCS)
- New and renewable energy (NRE)
- Strengthening NRE-based transmission and distribution networks (TND RNE)
- Participation in carbon trading schemes (emission trading)

These efforts reflect PLN's strong commitment to accelerating the energy transition and building a low-carbon future through sustainable financing.

Mitigation Hierarchy

PLN implements a structured mitigation hierarchy for biodiversity management, as outlined in its ESMS Manual document. This document serves as a fundamental reference for PLN Holding and its subsidiaries, ensuring that biodiversity conservation and impact mitigation are integrated into all stages of project development. The approach follows a clear sequence: avoiding activities in areas with high biodiversity value, minimizing unavoidable impacts, restoring affected ecosystems, and, if necessary, implementing offset measures. By adhering to this hierarchy, PLN not only meets regulatory requirements but also strengthens its commitment to environmental stewardship.

These mitigation efforts are applied throughout the entire project lifecycle, from planning and construction to operational phases and post-operation phases. PLN prioritizes proactive strategies to reduce environmental harm, incorporating biodiversity considerations into decision-making processes. Restoration initiatives aim to rehabilitate ecosystems, while offset programs seek to compensate for residual impacts, ensuring a balance between development and conservation. Through these comprehensive measures, PLN strives to achieve no net loss or positive impact on biodiversity, contributing to sustainable development goals.

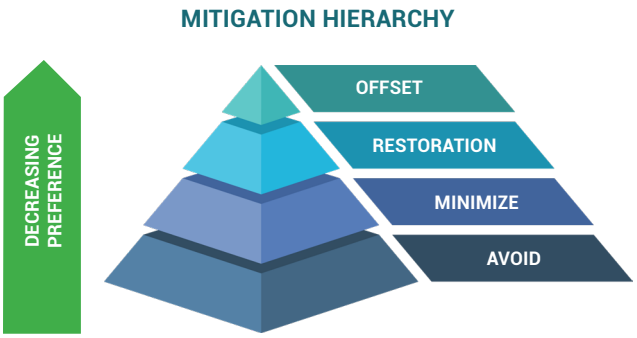


Figure 22. Mitigation Hierarchy Chart

Biodiversity Conservation & Protection

Based on the biodiversity aspect scoring, high to very high-risk impacts on environmental factors and pressures on biodiversity have been identified. Both aspects have been and continue to be minimized by PLN through various strategies implemented in multiple programs, one of which is biodiversity conservation and protection. This program is carried out not only in operational units but also in projects under construction. PLN is committed to implementing environmental protection throughout every project cycle, from planning and design to construction, operation, and post-operation. This commitment is outlined in the policies, guidelines, and management plans in the governance section above.

Project Under Construction

Biodiversity aspects are among the important provisions that must be fulfilled in under-construction projects. One practical example of the implementation of biodiversity management in Upper Cisokan Pumped Storage HPP. In addition to preparing environmental safeguard documents, the company also prepared a biodiversity management guideline, which is one part of the ESMS.

The PLN Project for the development of the Upper Cisokan Pumped Storage HPP continues to demonstrate its commitment to wildlife conservation and sustainable environmental management. This project, funded through a loan from the World Bank, adheres to the stringent international standards of Environmental and Social Standard 6 (ESS 6) for biodiversity conservation and sustainable management of living natural resources. The application of ESS 6 ensures that the project not only mitigates its environmental impact but also actively contributes to the preservation of critical habitats and ecosystems.

As part of these efforts, wildlife-friendly infrastructure such as rope bridges and dedicated tunnels has been developed and maintained. During the observation period from September 6 to 13, 2024, camera traps installed at the rope bridge recorded the presence of Long-tailed Macaques (Macaca fascicularis), although no key wildlife species (REEPS) were observed crossing. To date, no wildlife accidents have been reported in the area. Further evaluations are being conducted through CCTV monitoring over a six-month period. Additionally, design proposals for a monkey bridge made of 50 mm diameter dadung rope and a pangolin culvert have been submitted, accompanied by additional measures such as stairways and concrete barriers to ensure wildlife safety.

On another front, the PLN Project has successfully strengthened collaboration with the Food Security and Agriculture Office of West Bandung Regency to support sustainable agriculture in the UCPS buffer zone. Educational programs for local farmers, particularly on the maintenance of Multi-Purpose Tree Species (MPTS) provided through a revegetation partnership with Perhutani, have been designed as part of the local government's regular initiatives. These programs are expected to enhance planting success and improve harvest outcomes for farmers in the region.

As a strategic step, the PLN Project is also planning to draft a Memorandum of Understanding (MoU) with local governments, communities, and Perum Perhutani. This MoU aims to enhance the conservation function of forests in the UCPS watershed area and is scheduled for completion in the first quarter of 2025. These achievements reflect a strong synergy between environmental conservation, community empowerment, and social responsibility, while showcasing compliance with international best practices under the World Bank's ESS 6 framework.

In addition to conservation efforts that have been carried out through reforestation programs and species monitoring, PLN, and Perum Perhutani also implemented a natural habitat protection strategy in the UCPS Biodiversity Hydro Power project. One of the approaches implemented is the establishment of conservation zones around the project area, which aims to maintain ecosystem service and prevent further disturbance to biodiversity. These conservation zones focus on prime habitats for key species such as Surili, Javan Langur, Sunda Pangolin, and Javan Leopard. In addition, the company also rehabilitates land affected by construction by replanting native plants that support wildlife survival.

Fossil Fuel and Hydro Power Plants

Biodiversity protection and conservation activities are carried out at all plant sites, both fossil fuel and Hydro Power. Routine activities include monitoring the presence of fauna in terrestrial ecosystems and monitoring several locations, including marine ecosystems.

Table 10. Some of fauna species monitored by the unit

Location	Protected Fauna	IUCN Red List Status
Upper Cisokan Pumped Storage HPP	Grizzled Langur (*Presbytis canicrus*)	Vulnerable
	Javan Slow Loris (*Nycticebus javanicus*)	Critically Endangered
	Long-Tailed Macaque (*Macaca fascicularis*)	Endangered
	Pangolin (*Manis javanica*)	Critically Endangered
UIP Sulawesi Transmission Line	Sulawesi Black Macaque (*Macaca nigra*)	Critically Endangered
Muara Karang (OCGT, CCGT)	Long-Tailed Macaque (*Macaca fascicularis*)	Endangered
Gresik (OCGT, CCGT)	Scorpion Fish (*Scorpaenidae*)	Least Concern
	Barn Owl (*Tyto alba*)	Least Concern
Gilimanuk OCGT	Bali Myna (*Leucopsar rothschildi*)	Critically Endangered

Location	Protected Fauna	IUCN Red List Status
Paiton CFPP	Acropora aspera	Endangered
	Long-Tailed Macaque (*Macaca fascicularis*)	
	Javan Langur (*Trachypithecus auratus*)	
Barru CFPP	Green Sea Turtle (*Chelonia mydas*)	Endangered
	Hawksbill Turtle (*Eretmochelys imbricata*)	Endangered
	Olive Ridley Turtle (*Lepidochelys olivacea*)	Vulnerable
Cirata HPP	Javan Slow Loris (*Nycticebus javanicus*)	Critically Endangered
	Javan Langur (*Trachypithecus auratus*)	Vulnerable
	Long-Tailed Macaque (*Macaca fascicularis*)	Endangered

Fauna monitoring activities in terrestrial ecosystems are conducted annually by recording the presence of wildlife and ensuring that their existence is not disrupted by the impact of operational activities, thereby preserving their habitats in the natural environment. In parallel, PLN monitors the condition of coral reefs in marine ecosystems by collaborating with the Government and Bhinor Underwater Community (Local communities) to implement the Acropora aspera conservation program using the Hanging Garden Green Jetty method in Paiton CFPP. This initiative focuses on monitoring and protecting this species, which is currently classified as "Endangered" on the IUCN Red List.

Hanging Garden Coral Bank

The Hanging Garden Green Jetty method creates a sustainable Coral Bank habitat, ensuring the survival and availability of Acropora aspera corals. The program includes the creation of coral seedlings that can be periodically harvested and the transplantation of corals from these harvests. This method was chosen because the hanging placement of corals allows for optimal sunlight absorption and prevents sediment accumulation. As a result, the survival rate of coral fragments reached 96%, significantly higher than the previous reef ball method. The transplantation program has successfully planted 400 coral fragments, covering an area of 400 m^2.

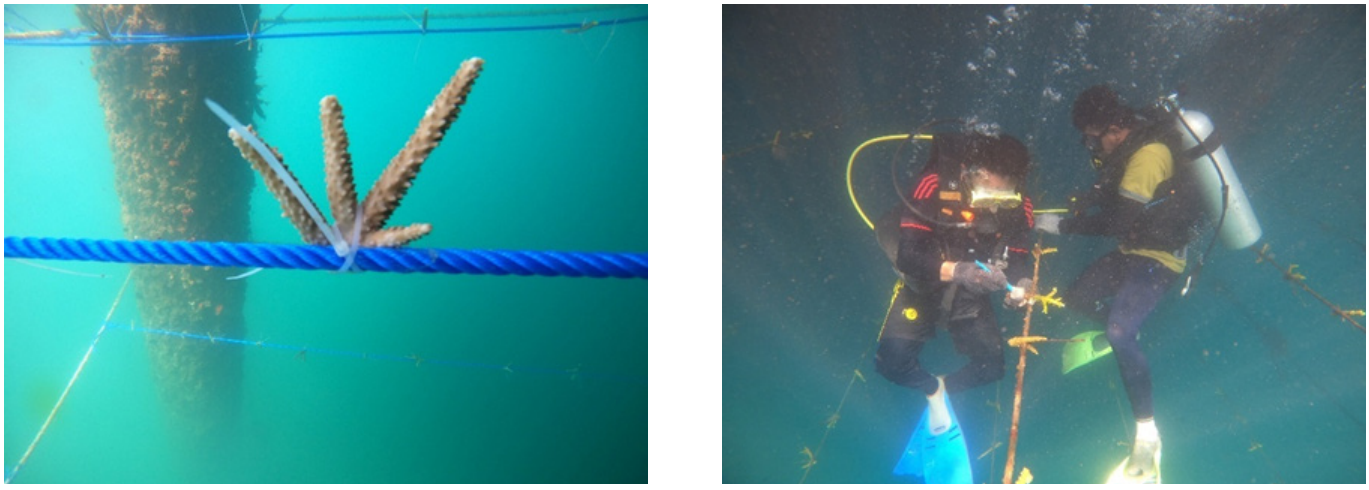


Figure 23. Hanging garden green jetty method (left) and coral transplantation activity in Paiton CFPP (right)

Conservation and Protection Activities for *Acropora aspera*:

- Measure the survival rate and growth of transplanted *Acropora aspera* fragments. This monitoring includes assessing growth rates, color changes, and signs of bleaching or disease in the corals.
- Engaging the local community in the monitoring process through training programs and environmental awareness campaigns. Field visits, along with Focus Group Discussions (FGD), are conducted to educate fishermen and stakeholders about sustainable marine conservation practices.

Water Efficiency

Water is a critical aspect of PLN's operations, for supporting power plants, such as in HPP and CFPP, and meeting domestic needs at operational facilities. Water is the primary source of power plants, sourced from surface water such as dams, reservoirs, and seawater. Additionally, these water sources are utilized by local communities for fishing, aquaculture, irrigation, transportation, and other activities.

Based on the water aspect scoring, PLN prioritizes mitigating risks related to water scarcity, water quality, environmental factors, and potential conflicts. These risks have been and continue to be minimized through water efficiency initiatives. PLN has not received complaints related to disruptions in local activities caused by water extraction. PLN ensures that water extraction from shared sources does not interfere with local community needs through various efforts undertaken.

- PLN monitors water volume adequacy. In certain conditions, when water volume is insufficient due to prolonged drought, PLN employs weather modification technology for one month to stimulate rainfall and improve water volume adequacy.
- PLN continues to promote efficient water usage through its 3R program for water management. In 2023, 39 power plants successfully implemented water recycling and reuse technologies, reducing their dependence on freshwater sources. In 2024, the number of plants adopting this technology increased to 42, with 7 of them being priority locations discussed in this TNFD report (Barru CFPP, Gilimanuk OCGT, Gresik OCGT and CCGT, Muara Karang OCGT and CCGT, Paiton CFPP, Cirata HPP, and Wonogiri HPP).

As part of PLN's commitment to water management, it has also implemented various water management programs in its generating units. These programs include conservation efforts, water use efficiency, and wastewater management to ensure more environmentally friendly and sustainable operations. The following are examples of water management programs implemented in several power plants unit of PLN.

Optimisation of Gilimanuk OCGT Wastewater Treatment with Honeycomb Filter

One of the innovations at Gilimanuk is using a honeycomb filter for wastewater treatment. This technology replaced the conventional treatment system, which was ineffective in filtering fine particles, resulting in water containing contaminants. The honeycomb filter was chosen because it can capture more contaminants, reduce maintenance requirements, and improve water quality.

With this technology, PLN can reduce the waste pollution load and produce treated water that meets quality standards for reuse. Additionally, this program reduces maintenance frequency and operational downtime. Local communities can also utilize the treated wastewater for greening purposes, saving 6 m^3 of water annually. This initiative supports environmental sustainability while providing economic benefits to the community.

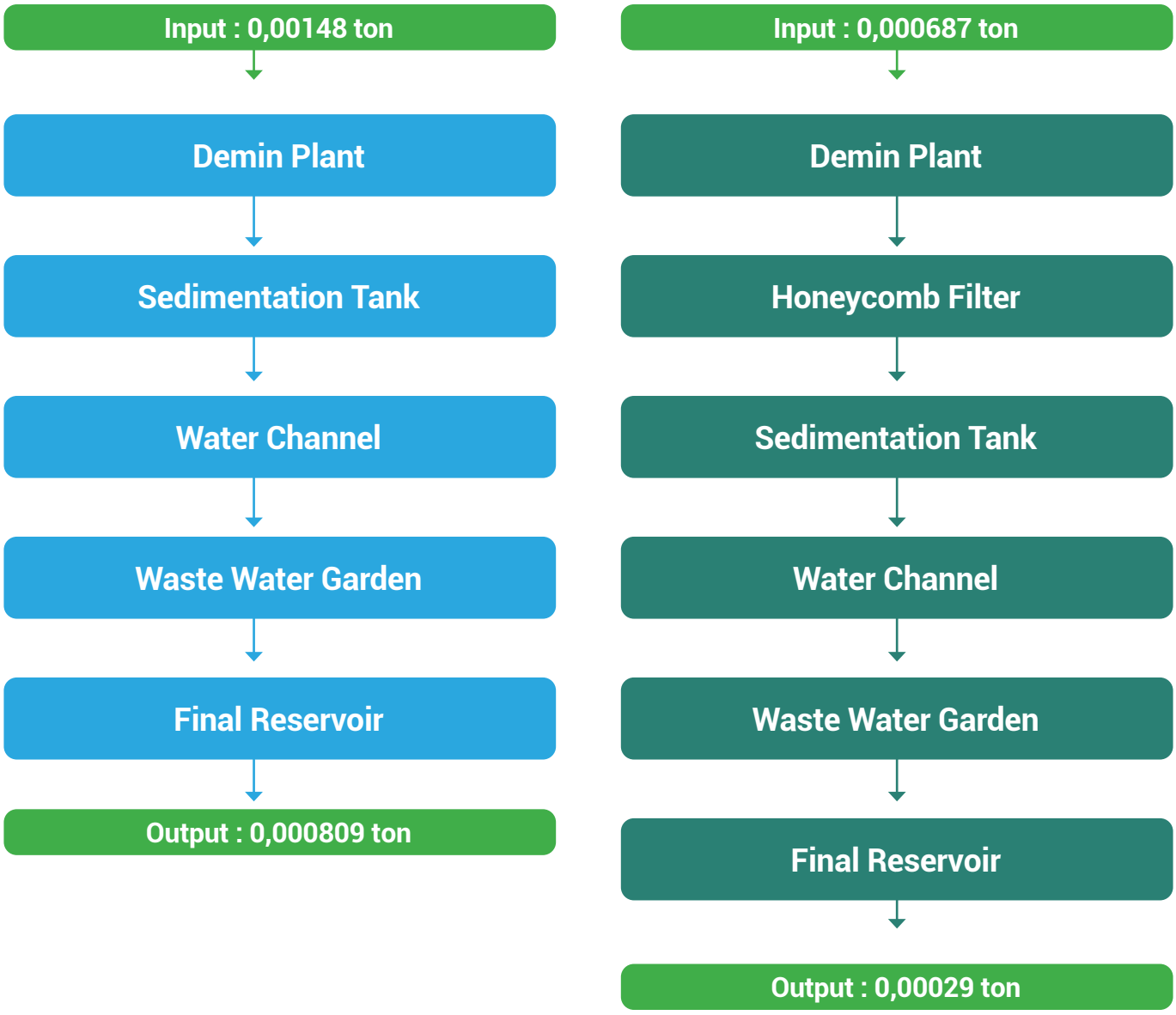


Figure 24. Schematic of the Gilimanuk OCGT Wastewater Treatment System, comparing the process before and after innovation

The N_2H_4 Injection Program to Reduce CEP Drain Potential at Gresik OCGT and CCGT

In the power generation industry, including the Gresik Power Plant, Hydrazine (N_2H_4) is a chemical that binds oxygen in the boiler feedwater or Heat Recovery Steam Generator (HRSG). If the oxygen content in the boiler feedwater remains high, there is a potential for corrosion reactions to occur on the equipment made of metal. Before the program's implementation, Hydrazine injection was performed using a hydraulic pump with manual stroke control. As the electricity production load increased, there was a higher demand for feedwater and Hydrazine, and with manual injection, there was a risk of over-injection. Excess Hydrazine did not react fully and could convert into ammonia, which could corrode metal pipes, especially those made of copper (Cu). Excess Hydrazine-containing water was typically discarded through the Condensate Extraction Pump (CEP) drain to reduce the Hydrazine concentration. Therefore, changes to the Hydrazine injection system were needed to control the over-injection potential and prevent the corrosion of Cu-based pipes in the piping system.

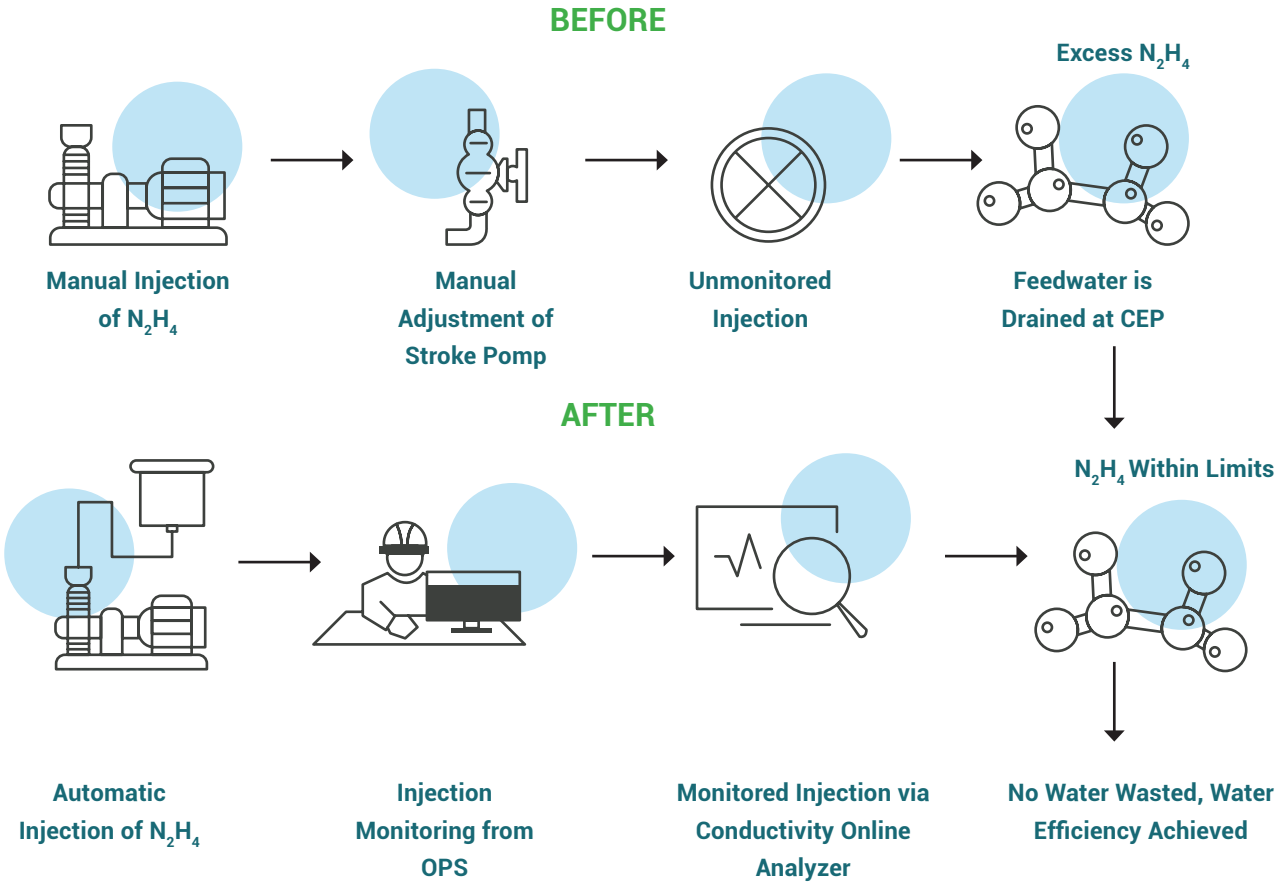


Figure 25. N_2H_4 injection program at Gresik OCGT and CCGT, showing improvements from manual to automated injection for better water efficiency

The Gresik Power Plant introduced an innovative program using an automatic pump for Hydrazine injection to reduce the potential for CEP drain, aiming to reduce the volume of boiler feedwater wasted due to over-injection of Hydrazine.

Redesign of Draft Tube Flow as a Feed Hydro Thermal Exchanger Pump in Generator at the Cirata HPP

The innovation program at PLN Cirata HPP involves redesigning the Draft Tube path as a feed for the Hydro-Thermal Exchanger Pump. Before this program, the water used in the turbine to generate electricity was discharged back into the river through the Draft Tube. With the path redesign and the addition of the Hydro-Thermal Exchanger Pump, energy efficiency will increase, and water usage will be reduced.

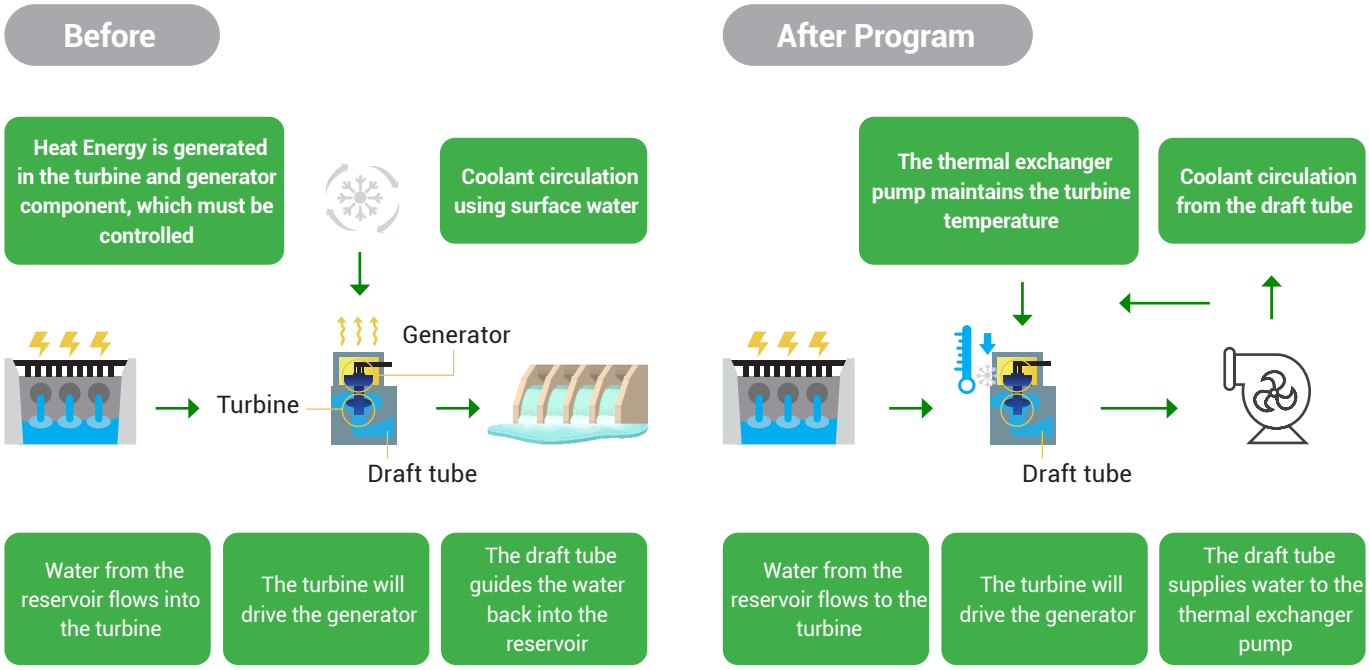


Figure 26. Redesign of draft tube flow as a feed hydro thermal exchanger pump in the generator at Cirata HPP, showing improvements in water flow and temperature control

This program has achieved significant results in conserving water by 6.307.200 m^3. Additionally, this innovation aligns with best practices and supports the circular economy by optimizing water use and minimizing environmental impacts. This program contributes to more sustainable and efficient operations and supports PLN's environmental goals.

The positive impacts consumers feel include a more stable and timely electricity supply without the risk of delays caused by turbine shutdowns due to overheating. This also improves the reliability of the electricity supply, benefiting consumers with better-quality service.

Corporate Social Responsibility Program

PLN is committed to supporting biodiversity conservation through various CSR programs focusing on environmental conservation. To reduce the risk of nature, PLN recognizes the importance of the community's role and requires CSR initiatives in other areas, even though they are not included in the category of sensitive locations. This approach is taken as a compensatory measure to support the balance of the ecosystem more broadly. By involving local communities, PLN seeks to minimize operational impacts on the environment while encouraging active participation before high risks occur.

Table 11. CSR programs related to biodiversity

No	Province	Organizer	Program
1	Jakarta	UID JAYA (*Unit Induk Distribusi Jakarta Raya*)	Green Involvement Program 2024
2	Jakarta	PUSDIKLAT (*Pusat Pendidikan Dan Pelatihan*)	Green Involvement Program at Ciliwung Riverbanks
3	Jakarta	PLN Head Office	Mangrove Planting Program
4	West Java	UID JABAR (*Unit Induk Distribusi Jawa Barat*)	Green Involvement Program 2024: Waste Bank Management
5	West Java	UIP JBT (Unit Induk Pembangunan Jawa Bagian Tengah)	Green Involvement 2024: Waste Cleanup Program
6	West Java	PUSLITBANG (*Pusat Penelitian Dan Pengembangan Ketenagalistrikan*)	Green Involvement – Ciliwung River, Depok
7	West Java	PUSHARLIS (*Pusat Pemeliharaan Ketenagalistrikan*)	Employee Green Involvement Program: Waste Management
8	West Java	UIT JBB (*Unit Induk Transmisi Jawa Bagian Barat*)	EVP "Employee Green Involvement"
9	West Java	UIT JBT (*Unit induk Transmisi Jawa Bagian Tengah*)	Green Involvement River Conservation Program 2024
10	West Java	PLN Head Office	Employee Volunteering: Waste Management
11	West Java	UID JABAR (*Unit Induk Distribusi Jawa Barat*)	Waste Incinerator Procurement Program (Low-Smoke Incinerator)
12	West Java	UID JABAR (*Unit Induk Distribusi Jawa Barat*)	Northern Coastline Conservation of Java
13	West Java	UIP JBB (*Unit Induk Pembangunan Jawa Bagian Barat*)	Reforestation and River Cleanup Program in Tarumajaya Area
14	West Java	UIP JBB (*Unit Induk Pembangunan Jawa Bagian Barat*)	Energizing Green Spaces: Tree Planting
15	West Java	UIP JBT (*Unit Induk Pembangunan Jawa Bagian Tengah*)	Critical Land Turns Fruitful: Watershed Conservation for a Sustainable Future
16	West Java	UIP JBT (*Unit Induk Pembangunan Jawa Bagian Tengah*)	Energizing Green Spaces Program 2024: Tree Planting
17	West Java	UIT JBB (*Unit Induk Transmisi Jawa Bagian Barat*)	Eco-Friendly Village 27
18	West Java	UIT JBT (*Unit Induk Transmisi Jawa Bagian Tengah*)	Mangrove Revitalization and Utilization Assistance
19	West Java	UIT JBM (*Unit Induk Transmisi Jawa Bagian Timur dan Bali*)	BUMDes "SEJAHTERA" Empowered & Synergized
20	West Java	UIT JBT (*Unit Induk Transmisi Jawa Bagian Tengah*)	Waste Management Through Eco Hi Tech Al Kasyaf

No	Province	Organizer	Program
21	West Java	UIT JBT (*Unit Induk Transmisi Jawa Bagian Tengah*)	Energizing Green Spaces 2024: Tree Planting
22	West Java	PLN Head Office	Waste Processing and Utilization Program Assistance for Agriculture
23	West Java	PLN Head Office	Waste Management and Utilization Program Assistance
24	West Java	PLN Head Office	Energizing Green Spaces Program: Tree Planting
25	Central Java	UID JATENG (*Unit Induk Distribusi Jawa Tengah dan D.I. Yogyakarta*)	Employee Green Involvement Program at Mangunharjo Beach
26	Central Java	PLN Head Office	EVP Employee Green Involvement Program at Sekuro Coastal Area, Jepara
27	Central Java	UID JATENG (*Unit Induk Distribusi Jawa Tengah dan D.I. Yogyakarta*)	Mangrove Rehabilitation Phase III, First Planting (P0) in Mojo Village, Pemalang Regency
28	Central Java	UID JATENG (*Unit Induk Distribusi Jawa Tengah dan D.I. Yogyakarta*)	Mangrove Rehabilitation Phase III, First Planting (P0) in Betahlawang Village, Demak Regency
29	Central Java	UID JATENG (*Unit Induk Distribusi Jawa Tengah dan D.I. Yogyakarta*)	Mangrove Rehabilitation Phase III, First Planting (P0) in Surodadi Village, Semarang Regency
30	Central Java	UID JATENG (*Unit Induk Distribusi Jawa Tengah dan D.I. Yogyakarta*)	Mangrove Rehabilitation First-Year Maintenance (P1) for Phase I and II in KEE Pasarbanggi, Rembang Regency
31	Central Java	UID JATENG (*Unit Induk Distribusi Jawa Tengah dan D.I. Yogyakarta*)	Mangrove Rehabilitation First-Year Maintenance (P1) in Randusanga Village, Brebes Regency
32	Central Java	UID JATENG (*Unit Induk Distribusi Jawa Tengah dan D.I. Yogyakarta*)	Mangrove Rehabilitation First-Year Maintenance (P1) in Mulyorejo Village, Pekalongan Regency
33	Central Java	UID JATENG (*Unit Induk Distribusi Jawa Tengah dan D.I. Yogyakarta*)	Mangrove Rehabilitation First-Year Maintenance (P1) in Kaliwlingi Village, Brebes Regency
34	Central Java	UIP JBT (*Unit Induk Pembangunan Jawa Bagian Tengah*)	Watershed Conservation Around Ungaran SUTET – Pedan Project in Salatiga City
35	Central Java	UIP JBT (*Unit Induk Pembangunan Jawa Bagian Tengah*)	Empowered Village: Household Waste Management for Environmental Conservation
36	Central Java	UIP JBTB (*Unit Induk Pembangunan Jawa Bagian Timur dan Bali*)	Energizing Green Spaces 2024 – Tree Planting on Village-Owned Land in Banyuanyar
37	Central Java	UIT JBTB (*Unit Induk Pembangunan Jawa Bagian Timur dan Bali*)	GROW (Green Right of Way Transmission)
38	Central Java	UIK TJB (*Unit Induk Pembangkitan Tanjung Jati B*)	Jepara Mangrove Conservation
39	Central Java	PLN Head Office	Request for Assistance in Mangrove Planting Program

No	Province	Organizer	Program
40	Central Java	UBP (*Unit Bisnis Pembangkitan*) Mrica	Reforestation of the Green Belt Area of Wonogiri Reservoir
41	East Java	UIP JBTB (*Unit Induk Pembangunan Jawa Bagian Timur dan Bali*)	Employee Green Involvement 2024 Kejawan Putih Tambak River Trekking Area
42	East Java	UIP JBTB (*Unit Induk Pembangunan Jawa Bagian Timur dan Bali*)	Employee Green Involvement 2024 Gedang Klutuk River
43	East Java	UID JATIM (*Unit Induk Distribusi Jawa Timur*)	Mangrove Beach Cleanup Action at Tanjung Sedati
44	East Java	UID JATIM (*Unit Induk Distribusi Jawa Timur*)	Three-Wheeled Motorcycle Donation for Wasiyatul Mustofa
45	East Java	UIP JBTB (*Unit Induk Pembangunan Jawa Bagian Timur dan Bali*)	Ecotourism Development for Kejawan Putih Tambak River Trekking
46	East Java	PLN Head Office	Bamboo Planting Program at Mount Lemongan
47	Bali	UID BALI (*Unit Induk Distribusi Bali*)	Employee Green Involvement Program 2024: Waste Management
48	Bali	UIP JBTB (*Unit Induk Pembangunan Jawa Bagian Timur dan Bali*)	Employee Green Involvement 2024 Tukad Mati Patasari River
49	Bali	UIP JBTB (*Unit Induk Pembangunan Jawa Bagian Timur dan Bali*)	Local Waste Management Procurement in Belalang Village
50	Bali	UIP JBTB (*Unit Induk Pembangunan Jawa Bagian Timur dan Bali*)	Construction of Waste Disposal Site in Nyitdah Village
51	Bali	PT PLN (Persero)	Mangrove Planting Program in Bali
52	Bali	UBP (*Unit Bisnis Pembangkitan*) Bali	KONTAK PAKJALI (Endemic Plant Conservation for Bali Starling Feed)
53	Riau	UID RKR (*Unit Induk Distribusi Riau dan Kepulauan Riau*)	Employee Green Involvement UID Riau and Riau Islands 2024
54	Riau	UIP3B SUM (*Unit Induk Penyaluran dan Pusat Pengatur Beban Sumatera*)	Employee Green Involvement: River Conservation
55	Riau	UID RKR (*Unit Induk Distribusi Riau dan Kepulauan Riau*)	Proklim Agrotourism Village Program
56	Riau	UID RKR (*Unit Induk Distribusi Riau dan Kepulauan Riau*)	Ecosystem Restoration in Sanglap Village, Bukit Tigapuluh National Park
57	Riau	UIP SBT (*Unit Induk Pembangunan Sumatera Bagian Tengah*)	Restoration Activities at Sultan Syarif Hasyim Grand Forest Park with Bamboo and Rare Endemic Exotic Plants of Riau

No	Province	Organizer	Program
58	Riau	UIP SBT (*Unit Induk Pembangunan Sumatera Bagian Tengah*)	International Environment Day 2024: Waste Management
59	Riau	UIP SBT (*Unit Induk Pembangunan Sumatera Bagian Tengah*)	Green Space Reforestation for Indonesia Tree Planting Day 2024
60	Central Sulawesi	UID SULUTTENGGO (*Unit Induk Pembangkitan Sulawesi Utara, Sulawesi Tengah, dan Gorontalo*)	Employee Green Involvement: Waste Management
61	Central Sulawesi	UIP SUL (*Unit Induk Pembangunan Sulawesi*)	Energizing Green Spaces: Tree Planting
62	South Sulawesi	UID SULSELRABAR *(Unit Induk Distribusi Sulawesi Selatan, Sulawesi Tenggara, dan Sulawesi Barat*)	Employee Green Involvement: Waste Management
63	South Sulawesi	UIP SUL (*Unit Induk Pembangunan Sulawesi*)	Employee Green Involvement Program Beach Cleanup Action
64	South Sulawesi	UIP3B SUL (*Unit Induk Penyaluran Dan Pusat Pengatur Beban Sulawesi*)	Employee Green Involvement Program
65	South Sulawesi	UID SULSELRABAR (*Unit Induk Distribusi Sulawesi Selatan, Sulawesi Tenggara, dan Sulawesi Barat*)	Community Empowerment Program for Biomass Processing at Barru CFPP
66	South Sulawesi	UID SULSELRABAR (*Unit Induk Distribusi Sulawesi Selatan, Sulawesi Tenggara, dan Sulawesi Barat*)	Distribution of Waste Collection Motorcycles in 14 Districts of Maros Regency
67	South Sulawesi	UIP3B SUL (*Unit Induk Penyaluran Dan Pusat Pengatur Beban Sulawesi*)	Reforestation by Planting 1000 Trees in Bantaeng Regency
68	South Sulawesi	UBP (*Unit Bisnis Pembangkitan*) Barru	Sea Turtle Conservation Program at Lowita Beach

Table 12. CSR programs related to water

No	Province	Organizer	Program
1	Jakarta	UID JAYA (*Unit Induk Distribusi Jakarta Raya*)	Community-Based Total Sanitation Program in Pademangan Barat Urban Village
2	Jakarta	PLN Head Office	PLN - TNI AD Collaboration Program for Clean Water Supply
3	Jakarta	PLN Head Office	PLN-TNI AD Collaboration Program “Manunggal Air”
4	West Java	UID JABAR (*Unit Induk Distribusi Jawa Barat*)	Irrigation Channel Construction and Improvement Program
5	West Java	UIP JBB (*Unit Induk Pembangunan Jawa Bagian Barat*)	Provision of Clean Water and Sanitation Facilities in Tarumajaya District
6	West Java	UIP JBT (*Unit Induk Pembangunan Jawa Bagian Tengah*)	Provision of Clean Water Facilities in Cisokan HPP Resettlement Area
7	West Java	UIP JBT (*Unit Induk Pembangunan Jawa Bagian Tengah*)	Provision of Clean Water Facilities in Cinunuk Village

No	Province	Organizer	Program
8	West Java	UIP JBT (*Unit Induk Pembangunan Jawa Bagian Tengah*)	Provision of Clean Water Facilities in Parigimulya Village
9	West Java	UIP JBT (*Unit Induk Pembangunan Jawa Bagian Tengah*)	Provision of Clean Water Facilities in Jatiserang Village
10	West Java	UIT JBT (*Unit Induk Pembangunan Jawa Bagian Tengah*)	Cibukamanah Berseri (Clean, Healthy, and Independent)
11	West Java	PLN Head Office	Request for Assistance in Sanitation Facilities for Al-Kamilah 2 Islamic Boarding School
12	Central Java	UID JATENG (*Unit Induk Distribusi Jawa Tengah dan D.I. Yogyakarta*)	Support for Clean Water Infrastructure and Facilities
13	Central Java	UIP JBTB (*Unit Induk Pembangunan Jawa Bagian Timur dan Bali*)	Revitalization of Irrigation Wells in Majegan Village, Tulung District, Klaten – 500 kV Ampel-Pedan SUTET
14	Central Java	UIT JBT (*Unit Induk Transmisi Jawa Bagian Tengah*)	Nglobo Village Independent Clean Water Program
15	Central Java	UIK TJB (*Unit Induk Pembangkitan Tanjung Jati B*)	Support for Clean Water and Sanitation Access in Ring 1 Village
16	East Java	UID JATIM (*Unit Induk Distribusi Jawa Timur*)	Grant Funding for Piping/Clean Water Supply
17	East Java	UID JATIM (*Unit Induk Distribusi Jawa Timur*)	Construction of a Deep Well for Eco Laku Lestari Foundation
18	Bali	UIP JBTB (*Unit Induk Pembangunan Jawa Bagian Timur dan Bali*)	Drilled Well Construction in Culik Village
19	Bali	UIP JBTB (*Unit Induk Pembangunan Jawa Bagian Timur dan Bali*)	Support for the Construction of Water Reservoirs and Irrigation Pipe Installation for the Farmer Group in Tista Village, Abang District, Karangasem Regency, Bali
20	Riau	UID RKR (*Unit Induk Distribusi Riau dan Kepulauan Riau*)	Construction of Toilets, Sanitation Facilities, and Ablution Areas at Alhusniyah Islamic High School
21	Central Sulawesi	UIP3B SUL (*Unit Induk Penyaluran dan Pusat Pengatur Beban Sulawesi*)	Water Well Drilling and Renovation of Storage and Filtration Facilities
22	South Sulawesi	UID SULSELRABAR (*Sulawesi Selatan, Sulawesi Tenggara, dan Sulawesi Barat*)	Solar Energy-Based Desalination Program
23	South Sulawesi	UIP SUL (*Unit Induk Pembangunan Sulawesi*)	Provision of Clean Water Sources
24	South Sulawesi	UIP3B SUL (*Unit Induk Penyaluran dan Pusat Pengatur Beban Sulawesi*)	Clean Water Facilities Program in Salenrang Village

RISK & IMPACT MANAGEMENT

5

RISK & IMPACT MANAGEMENT

PLN committed to ensuring that risk management is carried out systematically and in an integrated manner by the Risk Management System, as outlined in the Risk Management Policy based on the Statement of Corporate Intent for Integrated Risk Management Number 0070.P/DIR/2021. This policy includes Risk Values and the Integrated Risk Management Strategy & Mechanism, which have been established through Directors Regulation No. 0016.P/DIR/2023. To ensure the effectiveness of this policy, PLN conducts periodic reviews in reference to the Ministry of State-Owned Enterprises Regulation No. PER-2/MBU/03/2023 of 2023 regarding the Guidelines for Governance and Significant Corporate Activities of State-Owned Company.

In this TNFD report, nature-related risk measurement is conducted using online tools from the WWF Biodiversity Risk Filter (BRF) and Water Risk Filter (WRF)[11]. The BRF covers physical and reputational biodiversity-related risks, while the WRF covers physical, regulatory, and reputational water-related risks, both of which impact the locations of company or supply chain sites. These risks are interconnected and can impact the company's operational sustainability in various aspects.

- Physical risks are driven by the ways in which a business and its supply chains depend on and can be affected by both natural and human-induced conditions of land- and seascapes, and how pressures might deteriorate ecosystem services in the future.
- Regulatory water risk is heavily tied to the concept of good governance and that businesses thrive in a stable, effective, and properly implemented regulatory environment.
- Reputational risks can result from a company's actual or perceived negative impacts on biodiversity and people. Reputational risk represents stakeholders' and local communities' perceptions of whether companies conduct business sustainably or responsibly with respect to biodiversity and water, and can ultimately affect brand value and market share, among other factors.

As outlined in the strategy section, regulatory risk in water management is not a priority, as its scoring remains in the low category. Henceforth, PLN assesses physical and reputational risks in the measurement of nature-related risks, while risk score classification is applied consistently across indicators, risk categories and risk types:

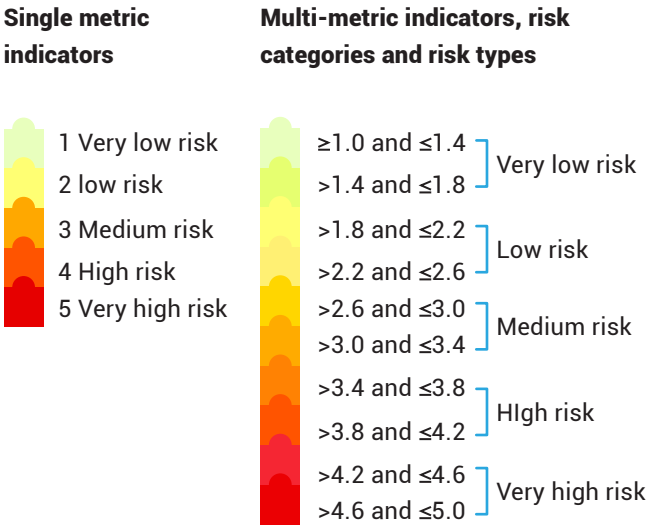


Figure 27. Risk categories based on WWF Risk Filter

[11] WWF Risk Filter Suit v2.0, https://riskfilter.org/, accessed March 2025.

A. Nature-related Physical Risk

The physical risks prioritized for discussion are selected based on an analysis showing medium to very high scores in the BRF and WRF based on Strategy section.

Many industrial sectors, particularly those dependent on the exploitation of natural resources, face significant physical risks to the environment. These risks include pollution, reduced forest productivity, water availability, and air quality, which can impact ecosystems and neighboring communities. The Fossil Fuel Power Plants, Hydro Power Plants, and transmission sectors are among the most vulnerable to these risks. Therefore, effective mitigation strategies are required to reduce negative impacts and ensure the industry's sustainability. Some of the mitigation strategies that can be implemented are presented in the table below:

Table 13. Physical risk, Impact, and Mitigation

Area of Physical Risks	Sector	Potential impact for nature	Potential impact for corporate	Scoring on Biodiversity Risk Filter	Mitigation
Biodiversity Risk					
Pollution	**Fossil Fuel Power Plants**	Degradation of air and water quality, harm to aquatic and terrestrial biodiversity, and disruption of local ecosystems.	Reputational damage, regulatory non-compliance, operational disruptions, increased costs due to emission controls.	Very High	Implementation of environmentally friendly technology and strict emission regulations
Forest productivity and distance to market	**Fossil Fuel Power Plants**	Coal extraction requires the clearing of large areas of forest, thereby reducing forest productivity, disrupting local ecosystems and can open up access to remote forests to facilitate the exploitation of timber for illegal trade.	The decrease in forest area has an impact on biomass productivity used as alternative fuel in CFPP. This can reduce the supply of biomass, thus reducing electricity production in CFPP which implements the co-firing technique.	High	Sustainable forestry practices and reforestation
Water availability	**Fossil Fuel Power Plants & Hydro Power Plants**	Large-scale exploitation of water for cooling coal-fired power plants can reduce the availability of water for communities and ecosystems, causing a decline in water quality and resulting in drought.	Fluctuations in water discharge due to climate change can hamper electricity production and dam maintenance costs will increase due to sedimentation.	High	Efficient water resource management and the use of recycling technology.

Area of Physical Risks	Sector	Potential impact for nature	Potential impact for corporate	Scoring on Biodiversity Risk Filter	Mitigation
Air condition	**Fossil Fuel Power Plants**	Air pollution can lead to acid rain, smog formation, and respiratory impacts on wildlife and ecosystem health.	Increased regulatory pressure, public concern, and potential financial penalties for exceeding emission limits.	High	Reduction of industrial emissions and the use of clean energy.
Extreme heat	**Fossil Fuel Power Plants**	Indirect environmental impact due to increased fossil fuel use from reduced energy efficiency.	Lower efficiency of gas turbines and engines.	High	Planting shade trees around industrial areas.
Land, freshwater and sea use change	**Hydro Power Plants**	Deforestation and land degradation due to Hydro Power development, changes in aquatic ecosystems	Requires expensive maintenance costs due to sedimentation, climate change disrupts fluctuations in electricity production due to changes in water patterns	High	Spatial planning that considers ecology and sustainability.
Forest canopy loss	**Hydro Power Plants & Transmission Line**	Deforestation and modification for Hydro Power development can disrupt wildlife habitats and cause changes in the forest landscape that disrupt the balance of the ecosystem.	Deforestation can trigger regulatory problems related to permits for the use of areas for HPP power plants, which will increase investment costs for reforestation with the aim of restoring forest land affected by degradation.	High	Replanting trees in affected areas with native species; Use existing Transmission Lines to reduce deforestation.
			Water Risk		
Water Quality	**Fossil Fuel Power Plants**	The process of burning fossil fuels produces waste that can pollute water sources. This pollution can reduce water quality, affect aquatic ecosystems, and endanger the health of people who depend on these water sources.	Companies must invest funds in waste management and pollution control technologies to minimize negative impacts on water quality.	Medium	Implementation of environmentally friendly technologies to reduce pollution. Use waste water treatment plant Technologies to improve water quality.
Ecosystem Services Status	**Fossil Fuel Power Plants**	Decreased ecosystem quality due to discharge of liquid waste into the sea	The high cost of implementing environmentally friendly technologies such as providing waste treatment technology to reduce threats to species	Medium	Ecosystem Restoration; Using green technology in industry to reduce negative impacts on ecosystems.
Flooding	**Hydro Power & Transmission Line**	Contamination of soil and water due to spills or leaks from damaged equipment.	Damaged equipment and plant shutdowns due to safety reasons	Medium	Implementation of sustainable practices and regular monitoring of environmental impacts.

B. Nature-related Reputational Risk

In many industry sectors, particularly those related to natural resources, there are significant reputational risks associated with impacts on biodiversity. These risks mainly include KBA, involvement of indigenous peoples and local communities, protected areas, and species rarity in a region. Some sectors such as Fossil Fuel Power Plants, Hydro Power Plants, and Transmission Line face high risks in terms of environmental impacts. This calls for effective mitigation measures to reduce negative impacts and maintain environmental sustainability. The table below presents the risks identified for each sector based on medium to high scores.

Table 14. Reputational Risk, Impact, and Mitigation

Area of Reputational Risks	Sector	Potential impact for nature	Potential impact for corporate	Scoring on Biodiversity Risk Filter	Mitigation
Biodiversity Risk					
Key Biodiversity Area (KBA)	**Fossil Fuel Power Plants & Transmission Line**	Social conflict due to the location of the CFPP intersecting with the KBA which is a habitat for endemic flora and fauna, waste disposal can pollute the ecosystem in the KBA area.	Large sanctions and fines under regulations because the operational location overlaps with the KBA and causes the company's image to become negative, thus reducing investor attractiveness.	High	Provide green corridors or buffer zones to reduce the impact of development on KBA ecosystems; Run conservation programs with local communities and ecologists.
Indigenous peoples, local communities	**Hydro Power Plants**	The loss of customary land and sources of livelihood for indigenous/local communities has increased social conflict.	Legal risks and bad reputation due to conflicts with Indigenous communities, and NGOs that hinder operational activities	High	Increased community participation in project planning, economic empowerment programs.
Protected area	**Transmission Line**	Habitat fragmentation and deforestation due to Transmission Lines cause separation of fauna habitats, the impact of which triggers local extinctions which cause social conflict.	Protests from NGOs slowed down project operations, requiring huge costs to adopt mitigation technologies needed by animals.	High	Develop feasibility studies that consider biodiversity conservation.
Range rarity	**Fossil Fuel Power Plants, Hydro Power Plants, Transmission Line**	Social conflicts due to the construction of transmission networks that can disrupt the movement of migratory species, and electromagnetic waves can affect the navigation paths of birds and bats that depend on the earth's magnetic field.	Pressure from investors who refuse to fund the project because the Transmission Line is in a navigation area of migratory species.	High	Conducting biodiversity monitoring before and after project construction; Constructing Transmission Lines that avoid areas with high densities of rare species; Protection of rare species and critical habitats; working with conservation NGOs.

Area of Reputational Risks	Sector	Potential impact for nature	Potential impact for corporate	Scoring on Biodiversity Risk Filter	Mitigation
Media scrutiny	**Fossil Fuel Power Plants, Hydro Power Plants, Transmission Line**	The media can highlight large-scale forest clearing for the construction of reservoirs and dams, which destroys the habitat of rare species and endemic water birds.	Projects are hampered by social conflicts, additional costs for mitigation, compensation, and environmental permits due to the decline in the quality of aquatic ecosystems.	High	Inviting media and stakeholders to see first-hand the mitigation efforts; Establishing active communication with communities and addressing their concerns openly; Developing a transparent communication strategy to respond quickly and accurately to environmental issues.
			Water Risk		
Conflict	**Fossil Fuel Power Plants**	Indigenous and local communities in several areas reject fossil fuel projects because they are worried about the negative impacts on the environment and their lives. For example, the geothermal power plant project in Wae Sano, East Nusa Tenggara, has faced resistance because it is considered to threaten the living space and livelihoods of local communities.	Social conflict: Rejection that is not handled properly can trigger prolonged conflict between companies and communities, disrupting social stability in the area. Disturbance to Workers: Tensions with the community can pose security risks to company workers, affecting employee productivity and well-being.	Medium	Consult and engage with local communities for equitable solutions.
Ecosystem Services Status	**Fossil Fuel Power Plants, Hydro Power Plants, Transmission Line**	The construction of electricity Transmission Lines often requires the clearing of large areas of land, which can lead to deforestation and loss of natural habitat. This can reduce the ability of forests to provide ecosystem services, one of which is as a water provider.	The high cost of implementing environmentally friendly technologies to keep the quality of the ecosystem improving	Medium	Implement conservation and rehabilitation programs for affected ecosystems.

Several mitigation measures have been implemented by PLN to reduce and address the impacts of risks at its operational sites. One of the key strategic steps taken is the monitoring of biodiversity, including both flora and fauna, at various PLN project locations. Additionally, PLN actively contributes to marine ecosystem conservation, particularly through its coral reef transplantation program. For instance, CFPP Paiton, in collaboration with the government and Bhinor Underwater Community, has used the Hanging Garden Green Jetty method to protect Acropora aspera, an Endangered species on the IUCN Red List. This initiative reinforces PLN's commitment to marine ecosystem balance and sustainability.

Beyond biodiversity conservation, PLN has also implemented a comprehensive water management program to enhance water efficiency and mitigate potential environmental impacts resulting from its operations. Some of its key initiatives include:

- Optimization of Wastewater Treatment at OCGT Gilimanuk with Honeycomb Filters – This program is designed to improve wastewater treatment efficiency, ensuring that discharged water is more environmentally friendly.
- N_2H_4 Injection Program Using Automatic Pumps to Reduce CEP Drain Potential at UP Gresik – This initiative optimizes water treatment by utilizing automated injection technology to minimize environmental risks associated with power generation.
- Redesign of Draft Tube Flow as a Feed Hydro Thermal Exchanger Pump in Generator at the Cirata HPP – This innovative approach enhances water utilization efficiency within the cooling system and power generation processes at Cirata HPP.

Through these initiatives, PLN continues to demonstrate its commitment to environmental sustainability, ensuring that its operations align with sustainable principles while contributing to ecosystem preservation for future generations.

PLN has addressed several nature-related complaints through various sustainable management efforts and has proactively managed water-related impacts. Until the end of 2024, PLN has not received any complaints or reports from residents regarding disruptions caused by the company's water intake. To manage risks, PLN has implemented various water management measures, particularly for reservoirs used by HPP and floating solar power plants, as well as seawater for CFPP. These measures include:

1. Compliance with Floating Solar Power Plant Regulations: PLN ensures that floating PLTS does not exceed 5% of the reservoir's surface area at its normal water level, as mandated by Ministerial Regulation (Permen PUPR) No. 6/2020.
2. Regular Water Quality Monitoring: PLN periodically assesses the water quality of reservoirs, dams, and coastal areas around power plants to ensure compliance with water quality standards. This process involves accredited independent laboratories.
3. Community Activity Management in Reservoirs: PLN ensures that public activities in reservoirs and dams take place in designated safe zones to maintain both safety and operational sustainability.

C. Opportunities for Green and Sustainable Growth

Based on the risk table above and the mitigation carried out, PLN has opportunities to explore by prioritizing risks related to KBA, the involvement of indigenous peoples and local communities, and protected areas. All of these are interrelated and have long-term opportunities to create sustainability-based business models, such as ecotourism development, community-based conservation services, and investment in green energy that supports ecosystem sustainability. In addition, community involvement in environmental restoration projects can open up new economic opportunities, such as ecosystem-based business sectors, carbon trading, and environmental education integrated with green tourism. By capitalizing on these opportunities, PLN can strengthen its position as a leader in sustainable energy while positively increasing its social and environmental impact.

One of the key opportunities lies in developing Educational Parks, Sanctuaries, or Other Conservation Areas. These initiatives not only serve as spaces for education and recreation but also raise public awareness about environmental conservation. Promoting ecotourism and environmental education in these areas fosters responsible interactions with nature while creating sustainable revenue streams. Additionally, enhancing CSR initiatives through community engagement can foster a sense of ownership over natural assets. Involving local communities in conservation projects encourages active participation in ecosystem protection while providing economic and social benefits. This inclusive approach strengthens community resilience, supports sustainable livelihoods, and drives long-term commitments to environmental preservation.

Sustainability initiatives also contribute to economic growth by creating new revenue opportunities and supporting circular and sustainable financial models. Adopting eco-friendly practices in business operations enables companies to create green jobs, produce sustainable products, and enhance resource efficiency. This economic cycle strengthens resilience to environmental risks while securing long-term profitability and sustainability. Beyond economic and social benefits, green growth is crucial in ecosystem preservation. Initiatives like biodiversity conservation, carbon stock management, and environmental research planning contribute to preserving ecosystem quality while safeguarding human, plant and animal life. These measures support global climate action goals while also opening new opportunities for scientific innovation and sustainability policy development.

Taking advantage of these opportunities enables businesses and communities to balance economic growth with environmental conservation, paving the way for a more sustainable and regenerative future.

METRICS & TARGET

6

METRICS & TARGET

A. Biodiversity Aspect

Endemic Species of Bali Myna

The Bali Myna (*Leucopsar Rothschild*), an endemic species from West Bali, is critically endangered due to illegal hunting and trade (CITES I). The Bali Myna is vital as a seed disperser, aiding vegetation regeneration and creating a more diverse ecosystem. This condition provides new habitats for various other species. Additionally, the Bali Myna helps control insect populations, maintaining ecosystem balance, which ensures that environmental stability allows different species to survive or adapt more effectively.

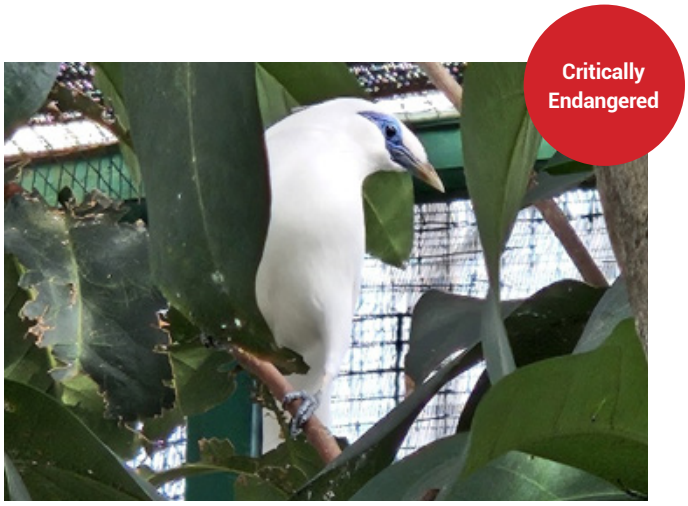


Figure 28. Bali myna at the Gilimanuk OCGT captive area

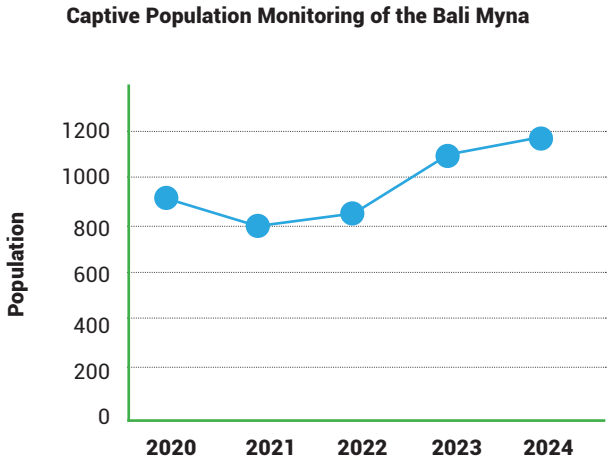


Figure 29. Monitoring of Bali Myna at the Gilimanuk OCGT captive area

As a follow-up to the TNFD 2023 report, Bali Myna monitoring continues on an ongoing basis. Figure 29 shows the Bali Myna population in captivity from 2020 to 2024. The Gilimanuk OCGT collaborates with the West Bali National Park and local NGOs to monitor the population in captivity as an alternative method to ensure the species' survival due to the significant threats it faces in the wild, including hunting and illegal trade. Bali Mynas that complete their habituation phase will be released to West Bali National Park. The graph below compares Bali Mynas's population in captivity with those released into the wild between 2023 and 2024, highlighting an increase in both categories.

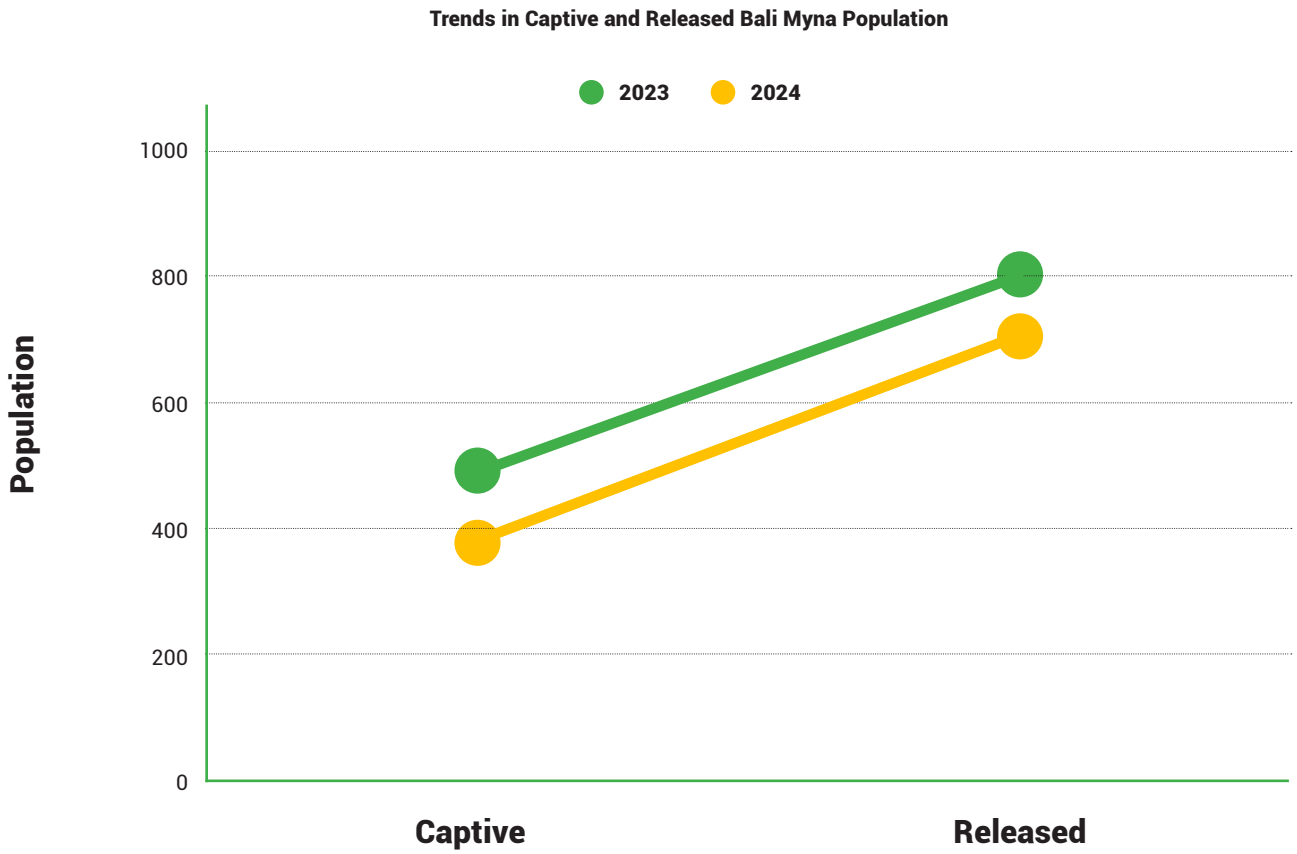


Figure 30. Total of captive and released Bali Myna populations

This trend reflects the efforts of conservation programs to stabilize and restore the species through breeding and release initiatives. However, this data still requires further monitoring to achieve optimal results. This would involve assessing survival rates in the wild and the species' ability to adapt in natural conditions, ensuring the continuation of future generations with successful reproduction in the wild. This target aligns with the IBSAP and KMGBF.

Symbiosis Between Birds and Mangrove Ecosystems

According to the 2023 TNFD PLN Report, Muara Karang CCGT has a conservation area in the Kali Adem Mangrove Area, a mangrove ecosystem protection site. Collaboration between Muara Karang CCGT and various stakeholders, including a local NGO, has successfully revitalized the degraded area into a lush secondary mangrove forest. This forest provides many benefits, one of which is as a habitat for fauna, including birds that live in mangrove habitats. The characteristics of mangrove ecosystems are unique in their habitat, consisting of a combination of land and sea components. The flora and fauna that live in it are interdependent with one another, thus forming a symbiosis. This figure demonstrates that seabirds (birds that

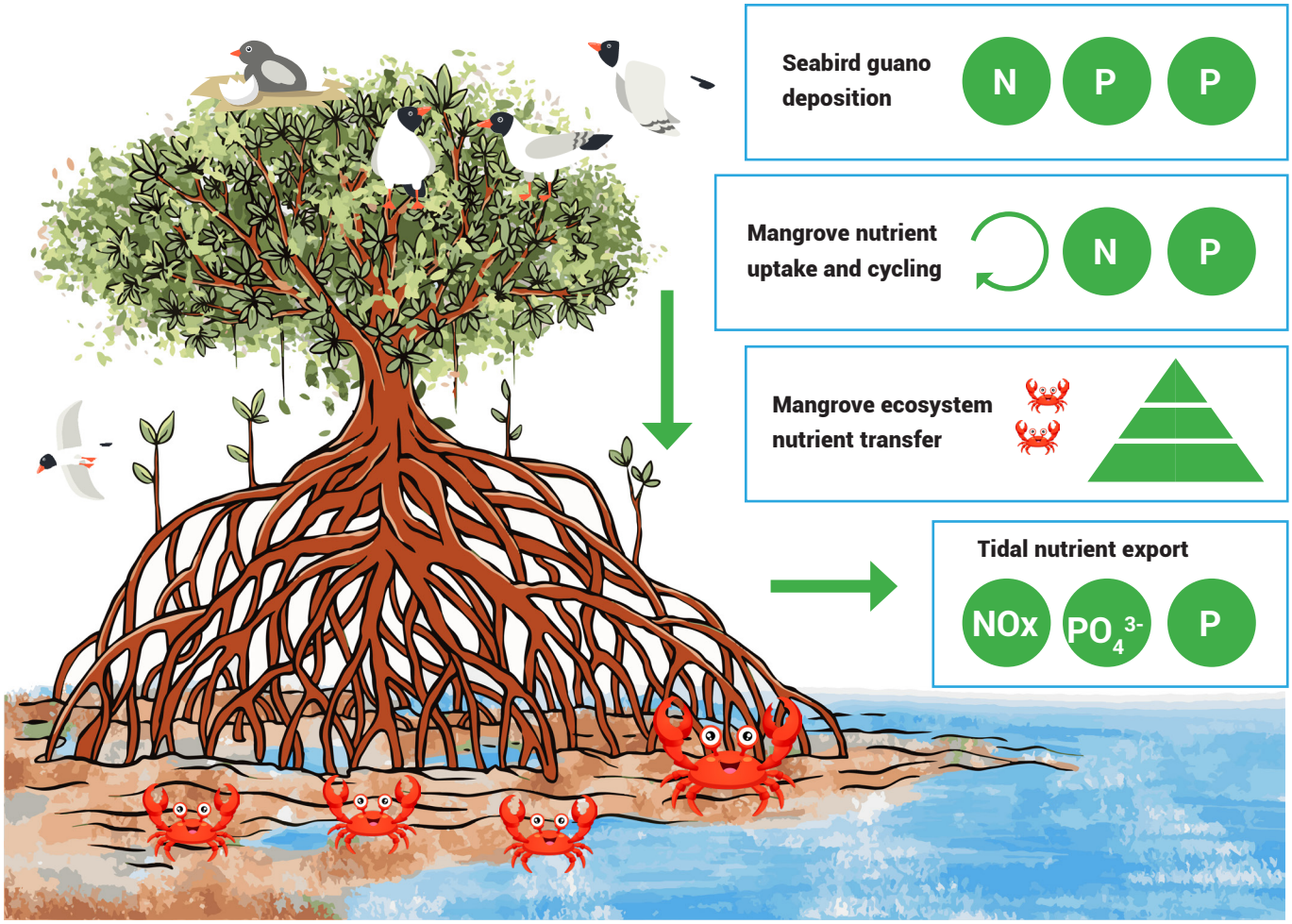


Figure 31. The transfer of seabird-derived nutrients in mangrove ecosystems[12]

live in mangrove habitats) are an essential part of the nutrient dynamics in the mangrove ecosystem, enriching both the mangrove ecosystem and adjacent habitats. This highlights the importance of seabirds in maintaining coastal biodiversity and ecosystem services[12]. Mangrove ecosystems also act as highly effective carbon sinks, to reduce atmospheric CO_2 levels and contributing to climate change mitigation.

Muara Karang CCGT routinely monitors birds in the Ecomarine Mangrove Conservation. Based on the latest monitoring results from 2024, it was found that the proportion of non-seabirds was greater than that of seabirds living in mangrove habitats. This finding indicates that mangrove ecosystems play an important role for various bird species as a place to find food, roost, and reproduce, as well as a resting place for migratory birds along their migratory routes.

Therefore, it is important to set mangrove conservation as a long-term target by considering the diversity of mangrove species planted such as *Rhizophora mucronata, Sonneratia caseolaris, Sonneratia alba, Nypa fruticans, Avicennia alba*, and *Rhizophora apiculata*. The more diverse the mangrove species, the greater the potential for increased bird species diversity. In addition, monitoring the success of mangrove planting is necessary to identify the most adaptive species, as well as to inventory aquatic biota data as an indicator for assessing water quality at this site. This provides benefits for the company, both in maintaining ecosystem sustainability and enhancing its role in biodiversity conservation.

Monitoring Fauna as an Indicator of Watershed Quality

Biodiversity serves as an important indicator in assessing ecosystem health, making continuous monitoring essential. Cirata HPP conducts regular monitoring of fauna around the Citarum Watershed, Citamiang Village, Purwakarta, West Java.

[12] Appoo, J., Bunbury, N., Jaquemet, S., & Graham, N. A. (2024). Seabird nutrient subsidies enrich mangrove ecosystems and are exported to nearby coastal habitats. Iscience, 27(4)

Bird Monitoring at Ecomarine Mangrove Conservation, Kali Adem.

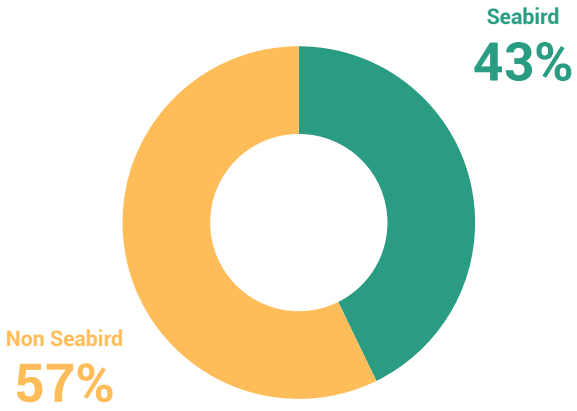


Figure 32. Percentage of Non-Seabird and Seabird in Ecomarine Mangrove Conservation

Nycticebus javanicus is an endemic species of Java, categorized as *Critically Endangered* (CR) according to the IUCN Red List. This species is predominantly found outside protected areas, making it highly vulnerable to threats such as habitat loss and poaching for illegal wildlife trade. Therefore, monitoring metrics for this species, such as population size, habitat quality, and the frequency of human-wildlife conflict, is crucial for assessing the health of the species and ensuring that conservation efforts are effectively supporting its recovery. Regular data collection on its distribution and survival rates will provide valuable insights into the species' status and guide future conservation actions.

Additionally, amphibian species live around the Cirata HPP area, making it crucial to monitor water quality. Amphibians, being highly sensitive to environmental changes, serve as key indicators of water quality. Therefore, monitoring the presence of amphibian species such as *Occidozyga lima*, *Limnonectes microdiscus*, and *Fejervarya limnocharis* around the Hydro Power plant provides valuable insights into the stability of the ecosystem and potential issues that may affect the sustainability of the plant's operations. A decline in amphibian populations could signal water quality or environmental problems that require attention. Through regular monitoring, Cirata HPP can detect potential issues and take proactive steps to minimize negative impacts on the surrounding ecosystem, ensuring the plant's continued environmentally friendly operation.

To further strengthen conservation efforts for species endemic and amfibi as bioindicator, could be a long-term target. Cirata HPP encourages collaboration through research development involving various stakeholders, including students and academics. This collaborative approach not only enhances the scientific knowledge base but also fosters a shared commitment to environmental preservation. By involving local communities and academic institutions, the company helps create a more comprehensive conservation framework, ensuring the long-term sustainability of endemic species like *Nycticebus javanicus*. This initiative demonstrates Cirata HPP dedication to promoting biodiversity, watershed quality, and reinforcing its role as a responsible corporate entity in environmental conservation.

B. Water Risk Scenario

Water risk scenario using the WRF tool focuses solely on basin risk, considering three scenario pathways: optimistic, current trend, and pessimistic[13]. Based on the risks identified in the Risk & Impact Management section, regulatory risk in water management is not prioritized, as it remains in the low-risk category. However, PLN continues to model all risk types to minimize potential future impacts. The risk categories outlined below align with those discussed in the Risk & Impact Management section.

Figure 33. Basin risk scenario (physical, regulatory, and reputational)

Based on the risk analysis, all scenarios (Optimistic, Current, and Pessimistic) show an increasing trend in physical risks, with the Pessimistic scenario experiencing a faster rise than the other two scenarios. Regulatory risks are also expected to increase significantly by 2050, especially in the Pessimistic scenario, while the Optimistic scenario remains at a lower level. Meanwhile, reputational risks are anticipated to remain high and consistent throughout the period analyzed, with only slight fluctuations between 2020 and 2030. Although the data in these scenarios provide a useful general overview, it is essential to note that this information is still general and may not be entirely accurate. Therefore, it is subject to change as further data is collected and more in-depth analysis is conducted.

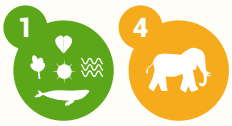
PLN aims to reduce these risks by following the optimistic scenario, with a focus on water efficiency initiatives. Water availability is crucial for PLN's operations and has implemented several measures based on strategy section. Moreover, PLN actively involves local communities and stakeholders to improve water efficiency and enhance its reputation. Long-term targets include:

1 Enhance Water Efficiency Initiatives: PLN should continue prioritizing water efficiency, particularly in areas with high water dependency. Expanding the successful N_2H_4 Injection Program across other plants can help minimize water wastage and boost operational sustainability.
2 Monitor and Evaluate Water Use: Implementing a continuous monitoring system will help identify inefficiencies and optimize water consumption. This proactive approach will enable PLN to anticipate water risks early and take corrective actions.
3 Strengthen Stakeholder Collaboration: Building stronger partnerships with local communities, government bodies, and NGOs will support sustainable water management practices and improve PLN's community relations.
4 Integrate Water Risks into Risk Management: Incorporating water-related risks into the broader risk management framework will help PLN adapt to changing conditions and ensure long-term operational sustainability.

Specific recommendations for each location will be determined by incorporating additional variables, with ongoing development within PLN's internal processes. These actions will help PLN mitigate water risks, reduce operational disruptions, and foster a more sustainable future.

[13] WWF Water Risk Filter Methodology Documentation version 2.0, October 2024. https://doi.org/10.5281/zenodo.13768279. Accessed March 2025.

Table 13. Long-term nature related target

Location or Sites	IBSAP	KMGBF
Gilimanuk OCGT Monitoring the survival rates o Bali Mynas in the wild	 **Target 4** Protection and conservation of species and genetic diversity.	 **Target 4** Halt species extinction, protect genetic diversity, and manage human-wildlife conflicts.
Muara Karang CCGT Planting a variety of mangrove species Monitoring the survival rates of mangrove species Inventory of aquatic biota as a baseline data	 **Target 1** Integrated protection of high biodiversity value areas and ecosystems within land and marine spatial planning **Target 3** Protection and effective management of protected areas and high biodiversity values areas in terrestrial and aquatic ecosystems **Target 4** Protection and conservation of species and genetic diversity	 **Target 1** Plan and manage all areas to reduce biodiversity loss **Target 3** Conserve 30% of land, waters and seas **Target 4** Halt species extinction, protect genetic diversity, and manage human-wildlife conflicts
Cirata HPP Monitoring routine for fauna in terrestrial and aquatic ecosystems, specific for endemic species	 **Target 3** Protection and effective management of protected areas and high biodiversity values areas in terrestrial and aquatic ecosystems **Target 4** Protection and conservation of species and genetic diversity.	 **Target 1** Plan and manage all areas to reduce biodiversity loss **Target 4** Halt species extinction, protect genetic diversity, and manage human-wildlife conflicts
Water efficiency Enhance Water Efficiency Initiatives Monitor and Evaluate Water Use Strengthen Stakeholder Collaboration Integrate Water Risks into Risk Management	 **Target 3** Protection and effective management of protected areas and high biodiversity values areas in terrestrial and aquatic ecosystems	 **Target 3** Conserve 30% of land, waters and seas

FUTURE PLAN

7

FUTURE PLAN

As part of our commitment to advancing nature-related risk and opportunity management, we acknowledge that our current TNFD disclosures remain at an early stage. While we have initiated baseline assessments and high-level qualitative disclosures aligned with the TNFD Recommendation and LEAP Approach, several gaps remain—particularly in the quantification of nature-related impacts, dependencies, and financial linkages. In the upcoming reporting periods, we plan to enhance the robustness of our TNFD disclosures by:

1. Development of an Integrated TNFD Database System
   Establishing a comprehensive and standardized data platform guided by TNFD Recommendations to support the screening, assessment, and prioritization of locations based on nature-related dependencies, impacts, risks, and opportunities. This system will be implemented across all operational units and business lines—from upstream to downstream—to ensure consistency and data integration enterprise-wide.
2. Scenario Analysis Tools Referencing SBTN
   Developing and adopting robust scenario analysis tools referencing the Science Based Targets for Nature (SBTN) framework. These tools will support identifying adaptive strategies, help PLN address future risks, and leverage nature-related opportunities across short-, medium-, and long-term timeframes.
3. Expansion of Site Assessments
   To obtain a more representative analysis of nature-related risks across PLN's operations, we will expand the scope of our assessments to include a broader range of asset locations. This approach will enhance the precision of our risk mapping and strengthen our overall analysis.
4. Integration into Corporate Planning
   Nature-related issues identified as material will be embedded into strategic planning documents, including the Corporate Work and Budget Plan (RKAP). This integration ensures that nature considerations are embedded into our strategic decision-making and operational planning.
5. Strengthening Linkages to Financial Reporting
   Enhancing the alignment between nature-related disclosures and our financial reporting by assessing how nature risks could influence revenue, cost structures, capital expenditures, asset valuations, and long-term financial resilience.
6. Capacity Building and Cross-functional Collaboration
   Strengthening internal capacity through the establishment of a dedicated working unit focused on monitoring nature-related dependencies, impacts, risks, and opportunities. Additionally, we will foster collaboration across departments—including Finance, ESG, Risk Management, and Strategic Planning—to ensure a fully integrated and coherent disclosure approach.

PLN TNFD Report 2024

Sustainability Report Supplement

2024