



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Progress by innovation



ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK FOR THE ACCELERATE-TO-DEMONSTRATE FACILITY

A2D FACILITY

Partners



ACKNOWLEDGEMENT

This Action Plan was conducted by UNIDO under the overall guidance of **Mr. Peter Warren**, A2D Facility Manager, and **Ms. Lorena Alberte**, A2D Facility GESI & ESS Project Coordinator.

This effort was made possible through the support of the United Kingdom’s Department for Energy Security and Net Zero (DESNZ).



About UNIDO

The United Nations Industrial Development Organization (UNIDO) is a specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability. UNIDO’s mandate is fully recognized in SDG-9, which calls to “build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation” but UNIDO’s activities contribute to all SDGs.

UNIDO’s vision is a world without poverty and hunger, where industry drives low emission economies, improves living standards, and preserves the livable environment for present and future generations, leaving no one behind.



TABLE OF CONTENTS



Acknowledgement	3
Abbreviations and acronyms	7
1. Introduction	8
1.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF) BACKGROUND	11
1.2 PURPOSE OF THE ESMF	12
1.3 ENVIRONMENTAL AND SOCIAL (E&S) RISK SCREENING OUTCOMES	16
1.3.1 Potential Environmental and Social (E&S) Risks and Impacts	17
1.3.2 Thematic Areas: In-Scope and Out-of-Scope Considerations	20
1.3.3 Mitigation Measures and Compliance Framework	24
2. Programme Background	26
2.1 DESCRIPTION OF THE A2D FACILITY	28
2.2 POTENTIAL ADVERSE EFFECTS OF SUPPORTED PROJECTS	28
2.2.1 Critical Minerals	29
2.2.2 Clean Hydrogen	30
2.2.3 Smart Energy	30
2.2.4 Industrial Decarbonization	31
2.2.5 Monitoring Framework	32
2.3 CLIMATE RISKS	33
3. Policy, Legal and Administrative Framework	34
3.1 SUMMARY OF THE NATIONAL LEGAL FRAMEWORK FOR THE PROJECTS	36
3.2 SUMMARY OF APPLICABLE INTERNATIONAL LEGAL FRAMEWORK AND ILO STANDARDS	36
3.3 INTERNATIONAL INDUSTRY BEST PRACTICES FOR ESS	39

4. ESMF Tools and Procedures	42
4.1 PROCEDURE FOR SELECTING SUPPORTED DEMONSTRATION PROJECTS	45
4.2 PROCEDURES DETERMINING TYPES OF ESS ASSESSMENTS REQUIRED	46
4.2.1 Environmental and Social Screening Tools: ESS Assessments needed for Demonstration Projects (ESIA, ESMP, ESMF, FPIC, Gender Study)	46
4.2.2 Stakeholder Mapping and Engagement	48
4.2.3 Scoping Study	48
4.2.4 Risk/Impact Identification Matrix	49
5. Institutional Arrangements and Capacity Development	52
5.1 ESMF ROLES AND RESPONSIBILITIES	54
5.2 CAPACITY DEVELOPMENT PLANNING	56
6. Communication and Stakeholder Engagement Plan	58
6.1 PURPOSE AND OBJECTIVES	61
6.2 GRIEVANCE MECHANISM	62
6.2.1 Access to Grievance Mechanisms	62
6.2.2 Access to the UNIDO Institutional Grievance Mechanism	63
7. ESMF Implementation Plan	64
7.1 ESS MONITORING AND EVALUATION (M&E) PLAN	67
7.2 SUMMARY	74
8. Environmental and Social Safeguards (ESS) Draft Action Plan	76
Annexes	79
A1 SCREENING FOR E&S IMPACT POTENTIAL RISKS	80
A1.1 Environmental and Social Screening Template following UNIDO’S ESSPP	80
A1.2 UNIDO ESSPP – Key guidance	88
A1.3 ESS Categorization Guidance	92
A2 ENVIRONMENTAL AND SOCIAL SAFEGUARDS DRAFT ACTION PLAN	95
A2.1 Overview	95
List of tables	132

ABBREVIATIONS AND ACRONYMS

A2D Facility	Accelerate-to-Demonstrate Facility
AI	Artificial Intelligence
CCUS	Carbon Capture, Utilization, and Storage
DAC	Development Assistance Committee
ESS	Environmental and Social Safeguards
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESSPP	UNIDO's Environmental and Social Safeguards Policies and Procedures
GHG	Global Greenhouse Gas
GNI	Gross National Income
GRI	Global Reporting Initiative
IoT	Internet of Things
ISID	Inclusive and Sustainable Industrial Development
KPI	Key Performance Indicators
ODA	Official Development Assistance
OS	Operational Safeguards
UNIDO	United Nations Industrial Development Organization

1

Introduction

The Environmental and Social Management Framework (ESMF) will cover specific actions, responsibilities, and timelines for A2D Facility and project management teams of the demonstration projects to comply with UNIDO's ESSPP and internationally required and accepted environmental and social operational standards.

The A2D Facility has been classified as “**Category C**” according to the UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP) through the Environmental and Social (E&S) risk Screening process, indicating that it is expected to have minimal or no adverse environmental or social impacts. While no further specific environmental and/or social assessment is required for Category C projects, the Facility is required to develop an Environmental and Social Management Framework (ESMF) - a project-level tool to apply when selecting individual supported demonstration projects. This will ensure that the project avoids, minimizes, and/or mitigates potential adverse E&S impacts that may emerge from the selected startup sub-project activities and interventions across all stages of the selected sub-project cycle (planning, implementation, post-implementation).

UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP) require that all UNIDO projects and any subsequent “subprojects” that result from UNIDO projects—such as those established through financial mechanisms, accelerator/incubator schemes, business models, and similar initiatives—undergo environmental and social risk (E&S) assessments. A “subproject” as stated in the UNIDO ESSPPs is hereby referred to throughout this document as a “supported project” or “demonstration project” and as “Supplier Project Management Team (Supplier PMTs)”, define as the ultimate project or activity that is supported through any intervention, investment, or mechanism implemented by UNIDO, regardless of whether the project is directly executed by UNIDO or any sub-entity.

The Environmental and Social Management Framework (ESMF) describes procedures and tools to manage the potential impacts of forthcoming yet-to-be-defined supported demonstration projects. This ensures that proposals, investments, and project submissions resulting from the said mechanisms, schemes, or models do not pose any negative impacts or risks on their social and natural environments.

The ESMF for the A2D Facility ensures that all demonstration projects that will be supported by the A2D Facility and that remain unidentified at this stage will be screened at the proposal stage for their potential environmental and social impacts. ESS-specific criteria are included as part of the wider criteria for proposal evaluation, including the mandatory requirement that previously conducted environmental and social (E&S) assessments on the proposed demonstration project be submitted as annexes to the proposal. Additionally, site-specific ESS studies (ESIA and/or ESMP) will be developed as needed by each demonstration project, in line with the mitigation hierarchy for the management of the impacts identified during the impact assessment process. This document determines a guideline to implementation schedule and action plan, roles and responsibilities, and reporting and monitoring requirements for doing so.

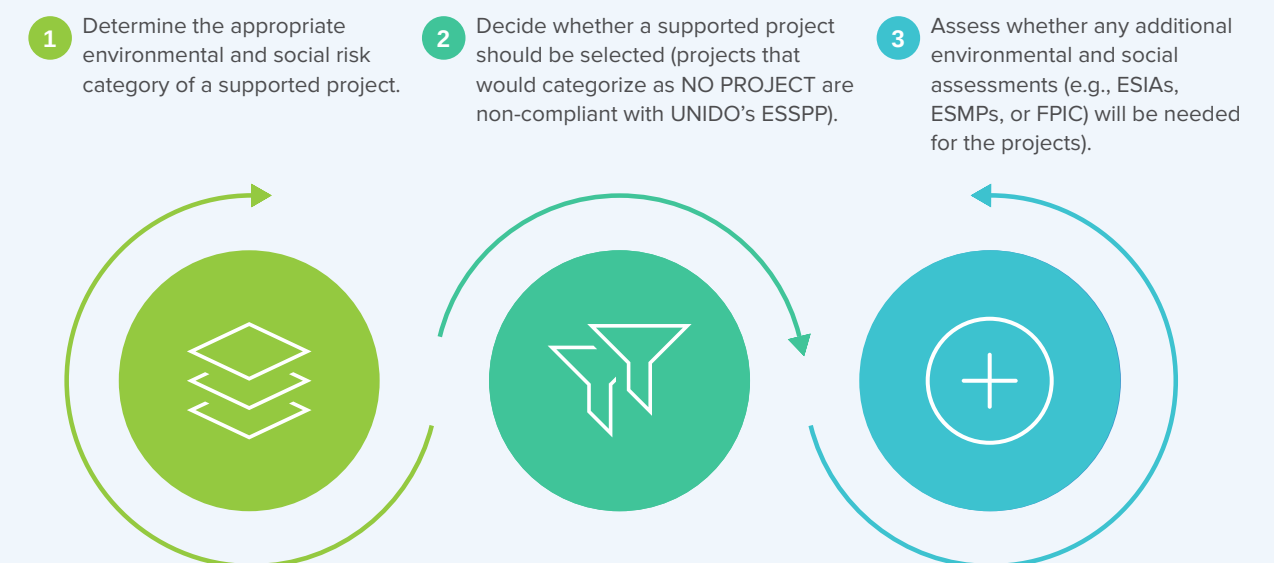


1.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF) BACKGROUND

UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP) require that all UNIDO projects and any subsequent supported projects that result from UNIDO projects, e.g. from those that set up financial mechanisms, accelerator/incubator schemes, business models and the like, undergo environmental and social

risk (E&S) assessments. This is to ensure that proposals, investments, and project submissions resulting from the said mechanisms/schemes/models do not pose any negative impacts or risks on their social and natural environments.

The Environmental and Social Management Framework (ESMF) describes procedures and tools to manage the potential impacts of forthcoming but yet undefined projects. The ESMF is a plan for steps to:



The ESMF for this programme ensures that all demonstration projects that will be supported under the A2D Facility, and that remain unidentified at this stage, will be screened for their potential environmental and social impacts and develop site-specific ESS studies (ESIA and/or ESMP) as needed, in line with the mitigation hierarchy for the management of the impacts identified during the impact assessment process.

This document determines the implementation schedule and action plan, roles and responsibilities, reporting and monitoring requirements for doing so. The Environmental and Social Management framework (ESMF) is in accordance with the UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP) and national rules and regulations of ODA-eligible countries to deploy climate innovation solutions in developing countries.

1.2 PURPOSE OF THE ESMF

The Environmental and Social Management Framework (ESMF) will cover specific actions, responsibilities, and timelines for A2D Facility and project management teams of the demonstration projects to comply with UNIDO’s ESSPP and internationally required and accepted environmental and social operational

standards (i.e.: Global Environment Facility, Green Climate Fund, World Bank, FAO and/or UNEP standards). It outlines specific measures to address potential environmental and social risks associated with the A2D Facility scope of work.

- ▶ **Promote Environmental and Social Responsibility**, through fostering responsible business practices and ensure that the programme contributes to sustainable development while ensuring the benefits of interventions are shared equitably, leaving no one behind.
- ▶ **Mitigate Negative Impacts**, by preventing and or minimizing adverse impacts on the ecosystem, biodiversity, air and water quality, land use, cultural heritage and social well-being of ecosystems and local communities.
- ▶ **Enhance Programme Reputation**, by strengthening the reputation of the A2D Facility by demonstrating commitment to responsible practices and community alignments.



OBJECTIVES OF THE ESMF

An ESMF is a management tool that details the plan for developing mitigation, monitoring, and institutional measures to be taken during implementation, operation

and decommissioning of demonstration projects to eliminate adverse environmental and social risks and impacts, offset them, or reduce them.

The project-level, site-specific ESIA/ESMPs will:

- I Assess the project’s potential environmental and social impacts, both positive and negative, and evaluate their short- and long-term effects.
- II Establish mitigation measures to address adverse impacts and enhancement measures to maximize benefits, while clearly defining the roles and responsibilities of the implementation teams.
- III Outline the necessary steps to ensure that mitigation and enhancement measures are effectively implemented, timely executed, and properly reported.
- IV Specify the mechanisms for compliance with relevant legal and regulatory requirements, where applicable.
- V Include mandatory monitoring requirements aligned with the A2D Facility project-level monitoring framework, ensuring that ESS-related indicators are tracked and reported consistently to assess compliance and effectiveness.

The ESMF designed for the A2D Facility serves as a structured framework that will play a leading role in the identification, assessment and management of potential or anticipated environmental and social risks associated with demonstration projects set to benefit from it. Its purpose is to ensure compliance with UNIDO’s ESSPP and its Environmental and Social Operational Standards as well as leveraging International best practices, relevant local regulatory standards and other DFIs/ MDBs ESS standards and benchmarks. The ESMF is crucial for guiding the A2D Facility’s demonstration projects towards sustainable and responsible development outcomes.

The main objective of the ESMF is to identify potential negative side effects of A2D Facility’s supported demonstration projects with the aim to avoid, reduce or offset them as well as to identify and seize opportunities to maximize positive impacts, co-benefits,

and synergies. Environmental and Social Safeguards (ESS) play a crucial role in the A2D Facility by ensuring that its interventions avoid harmful or irreversible impacts on the environment and the communities they affect. These safeguards also enhance the Facility’s accountability to the countries and communities it supports, stakeholders involved in development processes, and the broader donor and development cooperation community.

The ESMF provides a structured programme and project planning tool to achieve better environmental and social results and creates space for informed discussions that consider best practices and specific project needs. Impact assessments and safeguarding measures in programmes and projects play a crucial role in facilitating meaningful stakeholder consultations, enhancing stakeholder buy-in, and ensuring long-term sustainability beyond project

completion. Additionally, they help identify various risks, including those related to Gender Equality and Social Inclusion (GESI), while enabling adaptive risk management measures to effectively address emerging challenges. The Environmental and Social Safeguards Management Framework (ESMF) of the A2D Facility will be guided by UNIDO’s Environmental and Social Safeguards Policies and Procedures (ESSPP). This framework ensures that all program activities align with international best practices for sustainability and inclusion while upholding UNIDO’s core principles

of environmental stewardship, social inclusion, and equitable economic development.

By providing a structured approach to identifying, mitigating, and managing potential environmental and social risks, the ESMF will help maximize the programme’s positive contributions to inclusive and sustainable industrial development (ISID).

To achieve the aforementioned objectives, the ESMF will focus on de-risking through key areas such as:



RISK MANAGEMENT AND POLLUTION PREVENTION

This will be through the identification and mitigation of environmental and social risks/impacts, ensuring project activities “Do No Harm” to the local ecosystems, biodiversity and or communities. The International Energy Agency (IEA, 2020) reports that industrial decarbonization could reduce global CO2 emissions by up to 20% by 2050, however this brings the need for careful management of pollutants in transitioning technologies to low-carbon. The ESMF and the required Environmental and Social (E&S) studies for each demonstration project propose and outline specific measures to prevent pollution and manage risks, ensuring that the A2D Facility either avoids adverse impacts entirely or minimizes them to the greatest extent possible.



BIODIVERSITY CONSERVATION AND SUSTAINABLE MANAGEMENT OF RESOURCES

The document outlines potential measures to be put in place to protect local biodiversity and promote sustainable resource management by conducting baseline environmental assessments, and/or establishing biodiversity offset programmes, and ensuring that natural resources are responsibly managed, aligned with conservation goals.



COMPLIANCE WITH STANDARDS

The ESMF aligns with applicable national, local and international environmental and social standards and frameworks, following UNIDO’s ESSPP, which covers 12 operational standards. For instance, the World Bank emphasizes the importance of robust E&S standards in fostering sustainable development and mitigating conflicts. The plan will help in improving relations and avoid compliance-related penalties, which will improve the programme’s sustainability.



STAKEHOLDER ENGAGEMENT AND COMMUNICATION

The development of a Stakeholder Engagement Plan is key as it will ensure transparent and meaningful engagement with all identified stakeholders including innovators, research institutions, local community groups and NGO’s/Lobby groups. This helps in addressing community concerns, enhances public and reduces the risk of conflicts. The ESMF proposes a draft plan to help supported demonstration projects develop their own stakeholder engagement plans and communication strategies.



COMMUNITY HEALTH, SAFETY, AND SECURITY

The ESMF prioritizes the safeguarding of both ecosystems and communities near the project’s implementation sites by encouraging demonstration projects to establish comprehensive plans for managing emissions, noise, and waste. It also encourages the development of emergency response protocols and ensures continuous, transparent communication to keep communities informed about project activities and potential risks.



MONITORING, REPORTING AND ACCOUNTABILITY

The ESMF establishes a draft plan to guide demonstration projects in their own monitoring and reporting plans to ensure robust oversight of their project’s implementation and accountability in meeting environmental and social commitments. This includes that demonstration projects ought to set up monitoring frameworks and compliance indicators to track environmental impacts, social outcomes, and adherence to ESS requirements. A structured reporting schedule will keep stakeholders—including the A2D Facility, its donors, local communities, and project developers (referred to as Suppliers Project Management Teams), as well as governments—informed about progress, challenges, and impacts. Additionally, when necessary, independent audits and evaluations will be conducted by demonstration projects, to assess compliance with ESS requirements, measure effectiveness, and provide actionable recommendations for continuous improvement.



1.3 ENVIRONMENTAL AND SOCIAL (E&S) RISK SCREENING OUTCOMES

OVERVIEW

Environmental and social sustainability is fundamental to achieving development objectives and is systematically integrated into UNIDO's project cycle through the consistent application of an environmental and social screening and assessment procedure.

The A2D Facility is designed to accelerate the commercialization of climate innovation solutions in developing countries, bridging the critical gap between early-stage innovation and large-scale commercial deployment in four key initial areas: clean hydrogen, critical minerals, smart energy and industrial decarbonization. As the specific demonstration projects to be supported under the Facility have not yet been determined as those will be selected through various competitive call-for-proposals, each intervention will require a dedicated Environmental and Social (E&S) risk screening and impact assessment to identify and address potential risks and opportunities and determine which categorization hence which ESS assessment will be needed.

This section provides an overview of the general environmental and social (E&S) risks and impacts associated with the four thematic areas of focus under the A2D Facility. It defines the overall scope while emphasizing that each demonstration project will undergo a detailed E&S evaluation before implementation. The section also identifies key environmental and social risks, potential impacts, and mitigation measures specific to potential supported activities within these thematic areas. The findings presented below are based on a general and initial screening of potential E&S risks and impacts.



1.3.1 Potential Environmental and Social (E&S) Risks and Impacts

The E&S risk screening of potential supported projects will define and identify risks and corresponding mitigation measures. Since the specific projects to be funded have not yet been determined, we present below some potential environmental and social risks related

to the programme's areas of focus. This proactive approach ensures that key risks are anticipated and addressed, supporting the sustainability and overall effectiveness of the project.

OVERVIEW OF E&S RISKS AND IMPACTS

The A2D Facility supports ODA-eligible countries by funding the commercialization of clean energy solutions. Given the breadth of potential supported projects, inherent environmental and social risks must be carefully managed to ensure sustainable outcomes. However, as no specific interventions have been confirmed, these risks and mitigation strategies serve as a general framework for future assessments. It is important to firstly state that any proposed supported project will be excluded if it:

- 1 Infringes on the protection of critical habitats.
- 2 Introduces or uses potentially invasive, non-indigenous alien species.
- 3 Uses banned pesticides and/or chemicals.
- 4 Causes involuntary resettlement or results in physical or economic displacement.
- 5 Alters, damages, or removes cultural heritage or protected sites.
- 6 Involves forced, trafficked, or child labor.

The **E&S risk screening process** will ensure that all supported projects align with environmental and social safeguards before any funding decisions are made. It is important to note that projects can be halted or reassessed at any stage, even after passing the initial E&S screening process, should new risks or concerns arise.





ENVIRONMENTAL RISKS AND IMPACTS

- **Greenhouse Gas (GHG) Emissions:** Some interventions, particularly in resource processing and energy-intensive industries, could contribute to increased GHG emissions if clean technologies are not effectively implemented. The transition to low-carbon solutions is critical in mitigating this risk.
- **Water Usage and Pollution:** Activities related to thematic areas such as mineral refining, processing and recycling and clean hydrogen production often require significant water resources. If not properly managed, this can lead to water contamination, water stress, and ecological degradation, particularly in water-scarce regions. Identifying and managing the environmental and social (E&S) impacts of these projects—such as emissions or wastewater—can present challenges. To address this, training on circular economy principles and environmental standards will be provided to enhance awareness and ensure compliance with international, national, and local regulations.
- **Habitat Destruction and Biodiversity Loss:** Infrastructure expansion for renewable energy, critical minerals processing, and clean hydrogen projects may impact ecosystems through land-use changes, potential contribution to deforestation or habitat fragmentation. Sustainable site selection and biodiversity protection strategies are essential.



SOCIAL RISKS AND IMPACTS

- **Labor Rights and Occupational Safety:** Projects involving resource refining, processing and recycling, and industrial retrofitting pose occupational health and safety risks. Ensuring compliance with International Labour Organization (ILO) standards is crucial for safeguarding workers. Potential lack adequate management systems for labour and human rights, leading to potential violations. Mitigation includes screening and training to ensure beneficiaries have robust human rights management practices. Potential occupational incidents due to exposure to physical or chemical hazards, especially for those climate innovation technologies. Mitigation includes training on occupational health and safety, provision of protective equipment, and adherence to national safety laws. Strengthening occupational safety also has a broader security dimension, as weak labour protections can contribute to social unrest, forced migration, and economic instability.
- **Community Displacement and Land Conflicts:** Large-scale projects, including hydrogen and industrial decarbonization initiatives, may require land acquisition, potentially displacing communities. Effective consultation and fair compensation mechanisms must be embedded in project planning. Potential poor community engagement, leading to dissatisfaction or resistance from residents. To mitigate this potential risk, project developers should take into consideration community engagement and local regulations to be enforced ensuring proper consultation with potentially affected communities. Demonstration projects can serve as models for responsible land-use planning and conflict-sensitive project design, reducing tensions and fostering long-term stability.
- **Health and Safety Risks for Local Communities:** Pollutants, dust, and chemical waste from industrial activities can negatively impact public health. Robust air and water quality monitoring, emissions reduction strategies, and community health protection measures must be integrated. In fragile contexts, such environmental health risks can contribute to broader instability, making it crucial for demonstration projects to incorporate stringent environmental safeguards that support long-term community well-being.

- **Children and Persons with Disabilities:** Projects should strengthen attention to the rights of children and persons with disabilities, ensuring that their specific needs are considered and addressed. Exploring options to better communicate, visualize, and reflect GEF Policy requirements related to these groups will help ensure inclusivity and protection for vulnerable populations. Ensuring social inclusion also plays a role in national security by promoting equitable access to opportunities and reducing grievances that could fuel social tensions.
- **Youth Groups and Constituencies of MEAs / Conventions:** Ongoing efforts should be made to expand engagement with youth groups and constituencies of Multilateral Environmental Agreements (MEAs) and Conventions that the GEF serves. Enhancing youth involvement and support within these groups will help empower the next generation in environmental and social governance. Enhancing youth involvement and support within these groups will help empower the next generation in environmental and social governance. Proactively engaging youth in climate and sustainability initiatives can also contribute to long-term security by reducing the risk of disenfranchisement and instability among younger populations.
- **Fragile and Conflict-Affected Situations:** In Fragile and Conflict-Affected Situations (FCS), a conflict-sensitive approach is essential to addressing the needs of vulnerable communities, Indigenous Peoples, and local livelihoods. Ensuring that projects do not exacerbate existing conflicts but rather support access to natural resources and sustainable development, is critical for promoting peace and resilience in these contexts. Given the potential for competition over resources such as water, land, and energy to escalate into geopolitical tensions or localized conflicts, demonstration projects can play a crucial role in promoting stability by showcasing sustainable, inclusive, and conflict-sensitive development models.

By proactively addressing these environmental and social risks, demonstration projects not only mitigate negative impacts but also contribute to broader national and international security goals by fostering resilience, reducing resource-driven conflicts, and promoting equitable access to sustainable development opportunities.



1.3.2 Thematic Areas: In-Scope and Out-of-Scope Considerations

UPSTREAM ACTIVITIES

Key Potential Risks and Impacts	Mitigation Measures
 GHG Emissions from Feedstock Preparation The production of hydrogen feedstocks (e.g., bio-based or synthetic feedstocks) and the energy-intensive preprocessing of materials for industrial decarbonization can generate emissions if fossil fuels are used. Potential emissions from transport and logistics for critical components, especially when supply chains rely on high-emission transportation modes.	 Decarbonization of Upstream Processes Promoting the use of renewable energy sources in material preprocessing and feedstock preparation to reduce GHG emissions. Implementing energy efficiency measures in upstream facilities.
 High Energy and Water Consumption Upstream activities, such as material preprocessing for electrolyzes, batteries, and energy storage systems, require substantial energy and water inputs. Water-intensive processing for clean hydrogen production (e.g., desalination for electrolysis in water-scarce regions) can contribute to local water stress.	 Sustainable Water and Resource Management Prioritizing water-efficient technologies and closed-loop processing systems in component manufacturing and material treatment. Establishing safeguards to prevent water depletion in vulnerable regions by ensuring sustainable withdrawal rates and impact assessments.
 Chemical and Industrial Waste Generation Preprocessing and material treatment may involve hazardous chemicals that, if not managed properly, could contaminate water and soil. Poor disposal of industrial by-products can increase long-term environmental risks.	 Hazardous Waste and Chemical Management Enforcing best practices for the handling, storage, and disposal of chemicals used in industrial processes. Implementing pollution control technologies and ensuring compliance with international environmental safety standards.
 Social and Labor Risks Occupational health and safety (OHS) concerns in upstream supply chains, particularly in handling high-temperature processes, hazardous substances, or automated systems. Potential supply chain disruptions leading to economic instability for local businesses and workers dependent on upstream industries.	 Enhancing Occupational Health and Safety (OHS) Strengthening safety regulations and training programs for workers handling hazardous substances or operating in high-risk environments. Ensuring that supply chain partners adhere to international labor standards, including the International Labour Organization (ILO) conventions on safe working conditions.
 Supply Chain Vulnerabilities and Security Risks Dependence on complex global supply chains for key components (e.g., electrolyzes, industrial catalysts, and energy storage materials) can pose national and international security risks, particularly in times of geopolitical instability. Potential risk of illicit supply chains if transparency and traceability are not enforced in procurement.	 Supply Chain Transparency and Security Measures Establishing traceability systems and certification mechanisms for key materials and components to ensure ethical sourcing and prevent illicit supply chains. Strengthening regional supply chains to reduce reliance on vulnerable international trade routes and improve resilience to geopolitical risks.

MIDSTREAM ACTIVITIES

Midstream activities, including the refining, processing, and recycling of critical minerals, as well as retrofitting and upgrading existing industrial infrastructure with energy-efficient and lower-emission technologies, present both opportunities and risks. The following examples highlight some of the key risks and impacts

associated with these types of interventions, though specific projects are yet to be defined. These examples aim to illustrate the potential environmental and social implications of midstream activities.

Key Risks
 Industrial Emissions Temporary increases in emissions during retrofitting processes, including in the refining and processing of critical minerals.  Resource Consumption High energy and water usage, particularly in regions with resource constraints, is a potential risk. The refining and processing of critical minerals can require substantial amounts of water and energy.  Occupational Health and Safety (OHS) Increased risks of accidents and exposure to harmful substances, especially in refining and processing operations involving critical minerals, where workers may be exposed to hazardous materials.  Social Risks for Vulnerable Groups Projects in midstream processes, especially in regions with marginalized populations, could lead to adverse effects on vulnerable groups, such as children, persons with disabilities, and local communities, if not properly managed.  Failure to Recycle Waste from Processed Critical Minerals Not adequately recycling waste from processed critical minerals, such as lithium batteries, could lead to significant environmental contamination and resource depletion. Improper disposal of materials like lithium can harm ecosystems and contribute to pollution, posing risks to both human health and the environment.

Key Impacts
 GHG Emission Reductions Improved industrial processes can significantly lower emissions in the long term, including during retrofitting projects focused on critical mineral processing and recycling.  Energy Efficiency Gains Adoption of advanced technologies results in operational cost savings and improved energy efficiency in midstream activities, such as energy recovery and optimization of critical mineral production.  Temporary Disruptions Construction and retrofitting activities may cause short-term noise, pollution, and habitat disturbances. Additionally, these activities could impact local communities, particularly in areas of critical mineral extraction and refining, where land-use changes may affect livelihoods or access to resources.  Improved Resource Management With the right mitigation measures in place, midstream projects, especially those focusing on critical minerals, have the potential to adopt circular economy practices, improving resource efficiency and reducing waste and contamination.

Mitigation Measures
➤ Training and Compliance Ensuring that workers and communities are trained in occupational health and safety and ensuring compliance with national and international environmental and social standards, especially in critical mineral refining processes. ➤ Community Engagement Meaningful consultation with affected communities, ensuring fair compensation, and addressing any potential displacement or land-use issues related to midstream activities. ➤ Environmental Management Plans Implementation of measures such as water and energy use monitoring, emissions reduction strategies, and waste management plans to mitigate the potential environmental impacts of these midstream activities, with specific focus on recycling waste from critical mineral processing. ➤ Recycling and Circular Economy Implementing robust recycling systems for critical mineral waste, including materials like lithium batteries, to reduce contamination and improve resource recovery, helping to minimize environmental impacts.

DOWNSTREAM ACTIVITIES

Downstream activities focus on the distribution and societal impact of low-carbon products, including supply chain management and workforce transitions. While specific projects are yet to be defined, the following examples illustrate some of the key risks and impacts associated with these types of interventions.

These examples also highlight how the entire value chain of clean hydrogen projects is considered, including potential risks related to water usage for electrolysis and its impacts on ecosystems and local communities in water-scarce regions.



Key Risks
➤ Social Displacement Workforce transitions in carbon-intensive industries may result in unemployment or economic instability if not properly managed. ➤ Water Usage for Electrolysis Desalination for hydrogen electrolysis may lead to significant environmental impacts, especially in water-scarce regions, where it could threaten local ecosystems and communities. ➤ Waste Management If large-scale workforce deployment occurs in remote locations for these projects, proper waste management and disposal systems must be in place to ensure environmental and social protection.

Key Impacts
➤ Sustainable Product Development The reduction of the carbon footprint of industrial outputs through the adoption of low-carbon products and clean hydrogen technologies. ➤ Green Job Creation The creation of new workforce opportunities in renewable energy, low-carbon industries, and clean hydrogen production. ➤ Social Inequality Risks Without proper retraining programs, vulnerable groups may face economic instability due to workforce shifts in traditional carbon-intensive sectors.

Mitigation Measures
➤ Workforce Retraining and Transition Programs Implementing programs to upskill workers in carbon-intensive sectors, ensuring they are equipped for new roles in low-carbon industries, especially in the clean hydrogen sector. ➤ Water Management Strategies Employing sustainable water management practices, such as using renewable energy for desalination, to minimize the impact on local water resources and ecosystems in water-scarce regions. ➤ Circular Economy and Waste Management Promoting a circular economy approach by establishing robust waste management and recycling systems, especially for critical minerals refining and processing by-products and related technologies. This can reduce the environmental impact and encourage resource recovery. ➤ Community Engagement and grievance mechanisms Ensuring proper consultation and transparent communication with affected communities to address any concerns related to water usage, environmental impacts, and workforce transitions, and implementing fair compensation mechanisms where necessary. ➤ Sustainable Product Design Fostering the development of low-carbon products that integrate sustainability into their entire lifecycle, from production to disposal, to reduce negative impacts on both local communities and the environment.

1.3.3 Mitigation Measures and Compliance Framework

COMPLIANCE WITH NATIONAL AND INTERNATIONAL LAWS

- ▶ Supported projects must comply with national environmental, social and labour laws.
- ▶ If local regulations are insufficient, the Environmental and Social Management Framework (ESMF) will align with international best practices and ILO standards.
- ▶ Adherence and compliance to UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP).

SUSTAINABLE RESOURCE MANAGEMENT

- ▶ Adoption of energy- and water-efficient technologies.
- ▶ Implementation of circular economy principles to reduce waste and environmental footprints.

COMMUNITY ENGAGEMENT AND BENEFIT SHARING

- ▶ Establish participatory decision-making processes.
- ▶ Provide reskilling programs for workers affected by industrial transitions.

MONITORING AND EVALUATION

- ▶ Regular E&S impact assessments tailored to each project.
- ▶ Third-party audits and stakeholder consultations.

MIDSTREAM ACTIVITIES

- ▶ **Air Pollution Control:** Advanced filtration and emission reduction technologies.
- ▶ **Resource Efficiency:** Water recycling systems and energy efficiency measures.
- ▶ **OHS Management:** Safety training, regular audits, and provision of personal protective equipment (PPE).

DOWNSTREAM ACTIVITIES

- ▶ **Social Safeguards:** Reskilling programs and participatory decision-making.
- ▶ **Waste Management:** Circular economy strategies and waste-to-energy initiatives.

By integrating these measures, the A2D Facility aims to maximize development co-benefits while mitigating associated environmental and social risks. Each project will undergo an individual E&S assessment to ensure compliance with these guidelines, fostering sustainable industrial transitions for people and the planet.

In addition, ongoing environmental and social (E&S) assessments will be conducted throughout the project lifecycle to monitor compliance with the established safeguards and standards. This continuous due

diligence process ensures that any emerging risks or non-compliance issues are identified and addressed in a timely manner. Adherence to these standards is not only fundamental to the Facility’s commitment to responsible and inclusive development but also constitutes a condition for the continuation of technical and financial support.

2

Programme Background

The A2D Facility fills an important gap in the landscape of climate innovation funds that support developing countries through international climate finance and Official Development Assistance.



2.1 DESCRIPTION OF THE A2D FACILITY

As clean energy transitions accelerate, integrating innovative climate solutions into demonstration projects requires a robust risk management approach. Ensuring that these projects are both sustainable and inclusive is critical to achieving long-term socio-economic and environmental benefits.

Approximately 35% of the emissions reductions needed to achieve a global net-zero scenario by 2050 must come from technologies still in the demonstration or prototype stages (IEA, 2023). This highlights the urgency of accelerating the commercialization of innovative clean energy solutions through scalable “lighthouse” demonstration projects with catalytic impacts. To ensure their success and long-term sustainability, these projects must be investment-ready—designed to integrate inclusive approaches that consider the needs of both ecosystems and communities, fostering equitable and widespread adoption.

The Accelerate-to-Demonstrate (A2D) Facility of the United Nations Industrial Development Organization (UNIDO) is a large-scale Facility focused on accelerating

the commercialization of innovative climate solutions in developing countries (countries that are eligible to receive Official Development Assistance (ODA)). It focuses on providing grant funding to support the implementation and operation of catalytic demonstration projects in the following initial thematic areas-of-focus: critical minerals, clean hydrogen, smart energy, and industrial decarbonization.

The A2D Facility fills an important gap in the landscape of climate innovation funds that support developing countries through international climate finance and Official Development Assistance (ODA), as it targets the demonstration phase of the climate innovation chain. The Facility targets those demonstration projects that have a “lighthouse” effect and have the potential to have transformational impacts in supported countries. This complements the existing landscape by filling the gap between programs supporting earlier-stage smaller projects and larger commercial-scale projects and ensuring that demonstration projects are integrated within a broader enabling environment within supported countries.

2.2 POTENTIAL ADVERSE EFFECTS OF SUPPORTED PROJECTS

ENVIRONMENTAL AND SOCIAL POTENTIAL RISKS AND MITIGATION STRATEGIES BY THEMATIC AREA

This analysis provides a generalist overview of the potential environmental and social (E&S) risks associated with the potential supported demonstration projects under the Facility, which will be selected through individual calls for proposals. Since no specific projects have been confirmed at this stage, this is a general analysis that highlights potential risks by

thematic area. It is important for project developers to tailor their own risk assessments based on the specific nature of their interventions. The following sections outline the potential adverse effects for each thematic area and propose mitigation strategies to minimize the environmental and social impact of the projects.

2.2.1 Critical Minerals

- 1
- Key General E&S Risks: air pollution and GHG’s, water pollution, soil contamination, occupational health and safety, biodiversity disruptions.
- 2
- Mitigation Measures: compliance with UNIDO’s Environmental and Social safeguards, adherence to IRMA (Initiative for Responsible Mining Assurance) standards, Implementation of water treatment plants and adequate and proper occupational health and safety policies.

TABLE 1: Critical Minerals Screening (examples)		
Risk	Description	Mitigation Measures
Biodiversity Loss-land Degradation	Loss of vegetation and land degradation due to the establishment and operation of midstream and downstream processing facilities (e.g., refining, smelting, transportation infrastructure). N.B.: The A2D Facility will not support any project that infringes on the protection of critical habitats.	- Reforestation and land restoration. - Vegetative buffer zones around processing sites. - Soil conservation measures to reduce erosion.
Soil Contamination	Loss of soil fertility from industrial discharge seeping into nearby lands reducing agricultural productivity.	- Soil Remediation. - Controlled waste disposal. - Sustainable land management practices.
Climate Change	High greenhouse gas (GHG) emissions from transportation, processing and refining activities.	- Adoption of renewable energy technologies. - Clean energy innovative technologies.
Waste Management	Improper disposal and treatment of industrial waste leading to contamination of ecosystems (air, water, soil).	- Establishing and implementing proper waste storage. - Waste recycling. - Proper enhanced monitoring protocols.
Labor Conditions	Poor working conditions, including unsafe practices in processing facilities.	- Enforcement of labor laws. - Traceability in supply chains. - Establishment of fair and safe working conditions.
Community displacement	Disruptions to local communities and livelihoods due to infrastructure development or facility construction. N.B: The A2D Facility will not support any project that causes involuntary resettlement or results in physical or economic displacement.	- Inclusive stakeholder consultations. - Fair compensation. - Grievances Mechanisms in place.
Health and Safety risks	Exposure to hazardous substances and chemicals during the processing and refining of critical minerals, endangering workers and local communities.	- Implementation of occupational safety standards. - Provision and proper use of personal protective equipment (PPE). - Awareness and training programs.

2.2.2 Clean Hydrogen

- 1

Key General E&S Risks: hydrogen leakage, water usage for electrolysis, land acquisition.
- 2

Mitigation measures: leak detection systems, alternative water sources and minimal to no land acquisition.

TABLE 2: Clean Hydrogen Screening (examples)		
Risk	Description	Mitigation Measures
Water Scarcity	High water demand for electrolysis processes in hydrogen production.	▪ Use of desalinated technology or recycled water to reduce pressure on local water resources. ▪ Implement water-efficient practices.
Land Acquisition	Development of facilities in rural or sensitive areas, potentially leading to conflicts over land use. N.B.: The A2D Facility does not support projects that will cause involuntary resettlement of communities.	▪ Avoid sensitives areas. ▪ Implement a due compensation process to ensure fair treatment of affected communities.

2.2.3 Smart Energy

- 1

Key E&S Risks: Cybersecurity vulnerabilities, energy inequity, land use for smart grids.
- 2

Mitigation Measures: Robust cybersecurity frameworks and equitable energy access policies.

TABLE 3: Smart Energy screening (examples)		
Risk	Description	Mitigation Measures
Privacy and Cybersecurity	Cybersecurity vulnerabilities in smart energy systems that may expose communities and utilities to data breaches or cyberattacks.	▪ Implement robust cybersecurity frameworks. ▪ Establish data protection protocols to safeguard sensitive information.
Land Use Conflict	Potential conflicts with local communities over land use due to the development of infrastructure for smart grids and energy facilities. N.B.: The A2D Facility will not support any project that alters, damages, or removes cultural heritage or protected sites, causes involuntary resettlement, or results in physical or economic displacement.	▪ Engage stakeholders in land-use planning. ▪ Inclusive consultation processes to address local community concerns. ▪ Conflict resolution mechanisms to ensure rights are respected.

2.2.4 Industrial Decarbonization

- 1

Key General E&S Risks: Increased Industrial automation affecting jobs, potential leakage from CCUS sites.
- 2

Mitigation Measures: Workforce reskilling programs and compliance with ISO 27919-1 standards for CO₂ storage.

TABLE 4: Industrial Decarbonization Screening (examples)		
Risk	Description	Mitigation Measures
Job Displacement and shifts	Reduced demand for manual labor and traditional processes due to increased industrial automation.	▪ Capacity-building initiatives and workforce reskilling programs to equip workers with the necessary skills for new technologies and decarbonization processes.
Carbon Management Risks	Potential risks associated with carbon capture, utilization, and storage (CCUS) or alternative emissions reduction approaches, including impacts on environmental safety and resource management.	▪ Compliance with ISO 27919-1 standards for CO₂ storage. ▪ Advanced monitoring technologies and leak detection systems to prevent and address leakage risks.



2.2.5 Monitoring Framework

TABLE 5: E&S Risks Monitoring (examples)			
Risk	Unit of Measurement	Frequency (to be agreed between UNIDO and each supported project)	Responsibility
GHG Emissions Reduction	▪ Tons of CO ₂ -equivalent.	▪ Annually.	▪ Project Management Team.
Biodiversity Restoration	▪ % of land reclaimed.	▪ Quarterly.	▪ Environmental consultants.
Health and Safety Risks	▪ Incidents Rate.	▪ Daily: on-site safety checks.	▪ Project Management Team.
	▪ Compliance Rate.	▪ Weekly: Inspection of PPE.	▪ Health and Safety Officers.
	▪ Exposure Levels.	▪ Monthly: Comprehensive H&S audits.	▪ Independent H&S Auditors.
	▪ Training Completion Rate.	▪ Quarterly: Health and Safety compliance records review.	
Energy Access and Demand	▪ Kwh (kilowatt-hours) for electricity demand per day/month/year. ▪ No. of newly connected users.	▪ Monthly. ▪ Quarterly. ▪ Annually.	▪ Project Management Team.
Water Resources Usage	▪ In m ³ (cubic meters) of water withdrawn/consumed.	▪ Quarterly.	▪ Project Management Team.
Privacy and Cybersecurity Risks	▪ No. of security breaches or privacy incidents reported per month/quarter.	▪ Monthly. ▪ Quarterly.	▪ Cybersecurity Team. ▪ Data Privacy Officers.
Carbon Management Risks	▪ Ppm (parts per million) or tCO ₂ of CO ₂ concentration.	▪ Quarterly. ▪ Annually.	▪ Project Management Team.
Job Creation	▪ Number of jobs created.	▪ Semi-annually.	▪ Project Management Team.
Soil Contamination	▪ Mg/kg (milligrams per kilogram) for chemicals (e.g sulphuric acid).	▪ Quarterly.	▪ Environmental and Social Consultants.
E-Waste Management	▪ Kg (kilograms) of E-waste generated annually or monthly. ▪ Percentage (%) of E-waste recycled/reused. ▪ Percentage of E-waste disposed through certified disposal channels.	▪ Monthly. ▪ Quarterly. ▪ Annually.	▪ Environmental and Social Consultants.
Community Displacement	▪ No. of Project affected Persons.	▪ Monthly. ▪ Quarterly.	▪ Project Management Team.
Labor and Working Conditions	▪ Compliance with national labor laws and regulations.	▪ Monthly. ▪ Quarterly. ▪ Annually.	▪ Project Management Team.

2.3 CLIMATE RISKS



PHYSICAL RISKS

- ▶ **Extreme Weather Events:** The implementation of climate innovation solutions could be impacted by increasing frequency and intensity of extreme weather events, such as floods, storms, or droughts. These events can disrupt industrial activities, supply chains, and infrastructure.
- ▶ **Changes in Temperature:** Rising temperatures may affect energy demand and supply, impacting the operational efficiency of energy-intensive industries involved in the A2D Facility.



TRANSITION RISKS

- ▶ **Regulatory Risks:** As climate regulations become stricter, the transition to low-carbon technologies might face challenges in meeting compliance standards in different regions, especially where regulations around emissions, energy efficiency, or carbon pricing are evolving quickly.
- ▶ **Market Risks:** The push for decarbonization may shift market preferences toward more sustainable products and services. Industries that are slow to adopt new technologies could face financial and reputational risks as consumers demand greener alternatives.



REPUTATIONAL RISKS

If the A2D Facility does not effectively address the environmental and social implications of its actions, or if it fails to deliver expected emissions reductions, it could face reputational damage. This would affect stakeholders' trust, including local communities, investors, and governments.



SOCIAL RISKS

- ▶ **Displacement of Jobs:** Industrial shifts, such as decarbonization, may lead to job losses or labor market disruption in sectors reliant on fossil fuels or traditional energy sources. Ensuring a just transition for workers affected by these changes is crucial.
- ▶ **Inequities in Transition:** Vulnerable groups, especially in developing countries, may experience disproportionate impacts from the transition to a low-carbon economy, such as increased energy costs or loss of livelihoods in carbon-intensive sectors.



TECHNOLOGY AND INNOVATION RISKS

The success of the A2D Facility depends heavily on the adoption of new technologies for decarbonization. However, there is a risk that some of these technologies may not perform as expected or may not be scalable, potentially leading to delays and increased costs.



ENVIRONMENTAL RISKS

Unintended Environmental Consequences: While the primary goal of the A2D Facility is to reduce carbon emissions, some interventions might lead to unintended negative environmental impacts, such as the use of materials for renewable energy technologies, high water usage for carbon capture technologies, or challenges in waste management from new materials.

To mitigate these risks, the A2D Facility will develop a comprehensive risk management strategy, incorporating climate resilience measures, adaptive technologies, and socially inclusive strategies, in line with UNIDO's Priorities and Climate Change Strategy.¹ These efforts will be outlined in the Environmental and Social Safeguards Requirements and assessment of supported projects, ensuring that climate risks are continuously monitored and managed over the course of the implementation.

1) UNIDO. (n.d.). *Clean energy and climate action*. United Nations Industrial Development Organization. Available at: <https://www.unido.org/our-priorities/clean-energy-and-climate-action>

3

Policy, Legal and Administrative Framework

Where national regulations are insufficient or do not align with best practices, the ESMF will ensure that projects adhere to applicable international legal frameworks and International Labor Organization (ILO) Standards, selecting the most protective standard where feasible.



3.1 SUMMARY OF THE NATIONAL LEGAL FRAMEWORK FOR THE PROJECTS

The specific developing countries to be supported in calls-for-proposals are in the process of being determined. Once the selection process is completed for each call-for-proposals, the countries and demonstration projects will develop their own Environmental and Social Management Frameworks (ESMF), Environmental and Social Impact Assessments (ESIA), or Environmental and Social Management Plans (ESMPs), ensuring alignment with the respective national legal frameworks.

The Programme and the demonstration projects will be implemented in full compliance with national laws and relevant international standards. The selection criteria for demonstration projects will incorporate an assessment of compliance with local and national environmental and social laws. Where national regulations are insufficient or do not align with best practices, the ESMF will ensure that projects adhere to applicable international legal frameworks and International Labor Organization (ILO) Standards, selecting the most protective standard where feasible.

COMPLIANCE WITH UNIDO ENVIRONMENTAL AND SOCIAL SAFEGUARDS POLICIES AND PROCEDURES

The ESMF for this project is fully aligned with AI/2021/03 - UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP). In cases where there is a conflict between the ESSPP regulations and national legislation, preference will be given to national environmental and social regulations, provided they meet or exceed the level and requirements of the UNIDO ESSPP and align with best practices established by other international organizations.

3.2 SUMMARY OF APPLICABLE INTERNATIONAL LEGAL FRAMEWORK AND ILO STANDARDS

The project will comply with relevant international environmental and social frameworks, ensuring adherence to internationally recognized best practices. Key applicable ILO Standards and international legal frameworks include:

- 1 ILO Standard on Occupational Health and Safety (Convention No. 155) to ensure safe and healthy working conditions.
- 2 ILO Convention No. 181 on Private Employment Agencies, which provides guidelines on fair labor practices and worker protections.
- 3 International Environmental Agreements, such as the Paris Agreement and the Convention on Biological Diversity, as relevant to project activities.

TABLE 6: International Policies and Legislation



PARIS AGREEMENT

The A2D Facility aligns closely with the Paris Agreement goals by reducing industrial greenhouse gas emissions which is central to the decarbonization strategy. Countries committed to the Paris Agreement have specific Nationally Determined Contributions (NDCs), which represents country-specific climate action targets. The A2D Facility must design operations that lower emissions through advanced technologies and cleaner energy sources. This requires monitoring and reporting mechanisms for tracking emissions and ensuring transparency in meeting international climate goals.

Additionally, there is need to conduct a climate risk assessment of the A2D Facility to understand its vulnerability to climate change, ensuring it complies with the adaptation goals under the Paris Agreement, and implements mitigation strategies to limit carbon emissions.



UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS (SDGs)

Particularly relevant to the A2D Facility are **SDG 13** (Climate Action), **SDG 9** (Industry, Innovation and Infrastructure), **SDG 7** (Affordable and Clean Energy). These goals can provide benchmarks and targets for tracking the A2D Facility's progress.

There is need to establish clear performance indicators of the A2D Facility operations that align with these SDGs, and track progress towards achieving these goals. This would involve continuous monitoring of energy use and emissions and ensuring that local communities benefit from the A2D Facility especially in off-grid or underserved areas. Stakeholder engagement strategies should be implemented to educate and involve all key stakeholders in SDG-aligned initiatives.



MONTREAL PROTOCOL (KIGALI AMENDMENT)

Specifically, the Kigali Amendment focuses on phasing down hydrofluorocarbons (HFCs), a potent greenhouse gas commonly used in refrigeration and air conditioning systems. This is pertinent to industrial decarbonization efforts. The A2D Facility will need to assess its potential HFC emissions and develop strategies to phase out the use of these substances by ensuring that alternative technologies are incorporated into the Facility's design and operations. Compliance with this aspect of the Montreal Protocol will require periodic audits to ensure that refrigeration and air conditioning systems meet international standards for reduced emissions.



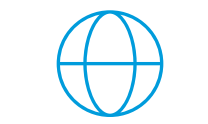
IFC PERFORMANCE STANDARDS ON ENVIRONMENTAL AND SOCIAL SUSTAINABILITY

IFC's performance standards provide benchmarks for environmental and social risk management.



EQUATOR PRINCIPLES

This risk management framework applies to environmental and social risks in projects, particularly in industrial investments, and provides standards for due diligence and project monitoring.

	GREEN BOND PRINCIPLES AND SUSTAINABLE FINANCE TAXONOMIES Many countries and regions have developed frameworks for sustainable finance. These include the UN Green Bond Principles (GBP) which guide the issuance of bonds that finance environmentally sustainable projects, ensuring transparency in the use of proceeds for climate-friendly initiatives. The UN Sustainable Finance Taxonomy classifies economic activities based on their alignment with environmental sustainability, promoting investments that contribute to achieving the Sustainable Development Goals (SDGs), such as renewable energy, energy efficiency, and sustainable infrastructure.
	UNFCCC GUIDELINES These include alignment with Nationally Determined Contributions (NDCs) under the Paris Agreement as well as Adopting Clean Development Mechanisms (CDM) for emission reduction projects.
	OECD GUIDELINES FOR MULTINATIONAL ENTERPRISES For projects involving international corporations, these guidelines ensure environmental protection, promotion of labor rights and community consultation and benefits.
	ENVIRONMENTAL AND SOCIAL SAFEGUARDS INTERNATIONAL STANDARDS integrate international standards and frameworks on ESS: ▶ IFC’s performance standards: Includes standards on assessment of environmental and social risks, pollution control, resource use, and community welfare (IFC, 2012). ▶ World Bank Environmental and Social Framework (ESF): Covers energy, climate change, and environmental sustainability (World Bank, 2017). ▶ Other MDBs ESS safeguards: i.e. AfDB Integrated Safeguards System (ISS): Includes standards on pollution control, resource use, and community welfare (AfDB, 2014). EIB’s Environmental and Social Standards (EIB, 2022). ▶ GEF’s Policy on ESS: GEF’s approach to anticipating, and then avoiding, preventing, minimizing, mitigating, managing, offsetting or compensating any adverse impacts that GEF-financed projects and programs may have on people or the environment throughout the project or program cycle; thereby enhancing the environmental and social outcomes of such projects and programs. GEF’s policy on Environmental and Social Safeguards sets out 9 Minimum Standards to identify and address E&S risks in programmes and projects. In addition to this Policy, GEF’s approach to identifying and addressing relevant E&S risks and impacts is supported by the Policy on Stakeholder Engagement, the Policy on Gender Equality and the Minimum Fiduciary Standards for GEF Partner Agencies. ▶ GCF’s Environmental and Social Management System (ESMS) is made up of processes and procedures which help GCF identify, analyze, avoid, minimize, and mitigate any potential adverse environmental and social impact of climate finance activities. The ESMS is designed not only to avoid harm, but to improve the environmental and social performance of GCF and the activities it finances consistently over time. GCF has established as well the Independent Redress Mechanism (IRM) which response to complaints by people who feel they have been adversely affected, or may be affected by programmes or projects. ▶ FAO’s Framework for Environmental and Social Management (FESM) as the revision of the Environmental and Social Management Guidelines (ESMG).

3.3 INTERNATIONAL INDUSTRY BEST PRACTICES FOR ESS

TABLE 7: International Industry Best Practices for ESS	
When feasible, the ESMF will encourage supported demonstration projects to further integrate international best practices from leading organizations in their implementation. These may include:	
1	ISO 14000 Standards: These standards provide guidelines for environmental management systems (EMS), which can be applied to industrial decarbonization efforts in A2D. ISO 50001 for energy management is also directly relevant. It supports the establishment of effective Environmental Management Systems (EMS), ensuring that A2D projects incorporate sustainable practices, minimize environmental harm, and promote continual improvement in industrial operations.
2	ISO 50001 (Energy Management Systems): Provides a framework for improving energy efficiency in industries, helping them reduce carbon emissions. By adopting these frameworks, those projects participating in A2D Facility will enhance energy efficiency and reduce carbon emissions, ensuring alignment with global best practices. ESS management must integrate energy management principles to optimize energy use and reduce operational costs while minimizing environmental impact.
3	ASHRAE Standards: Specific standards, such as ASHRAE 90.1, outline energy efficiency measures for industrial facilities. Industrial facilities under the A2D Facility must adhere to ASHRAE standards to achieve energy efficiency in design and operation, reducing emissions.
4	EN 16247: Focused on energy audits for industrial systems, aiding in identifying areas for decarbonization. It facilitates the identification of inefficiencies and decarbonization opportunities in industrial systems, aligning with A2D Facility’s objectives.
5	ISO 14064 (GHG Accounting): Helps industries quantify, monitor, and manage GHG emissions. It will help the projects under the A2D Facility monitor and manage emissions across scopes 1, 2, and 3, ensuring accountability and alignment with national and international climate goals.
6	IEC Standards for Industry 4.0 Technologies: Promote automation, AI, and digital twins to optimize resource use and minimize emissions. This will encourage automation and resource optimization to minimize emissions, making these technologies essential for achieving A2D Facility’s decarbonization targets. It provides a widely accepted framework for measuring and managing emissions, critical for achieving A2D Facility’s industrial decarbonization outcomes.
7	GHG Protocol: Widely used for measuring and managing emissions across scopes 1, 2, and 3 in industrial processes. It will help the A2D Facility project beneficiaries identify inefficiencies and reduce resource waste, promoting sustainable resource use.
8	Science-Based Targets Initiative (SBTi): Provides frameworks for setting science-aligned decarbonization targets. It aligns A2D’s decarbonization efforts with global climate science, ensuring emissions reductions contribute meaningfully to climate goals.

TABLE 7: International Industry Best Practices for ESS	
9	ISO 14001 (Environmental Management): Encourages industries under A2D to adopt circular economy practices, such as recycling and reusing materials, to reduce their carbon footprint. This encourages the adoption of sustainable practices and reduction of carbon-intensive processes.
10	ISO 14051 (Material Flow Cost Accounting): Supports industries in identifying resource inefficiencies. Through the identification of inefficiencies and reduce resource waste, promoting sustainable resource use.
11	ISO 14093 (Circular Economy Performance): Encourages practices like recycling and reuse in manufacturing systems. Encourages industries to adopt circular economy practices, such as recycling and reusing materials, to reduce their carbon footprint.
12	EN 15804 (Sustainability of Construction Products): Focuses on life cycle assessments for materials used in industrial processes.
13	ISO 14067 (Carbon Footprint of Products): Supports industries in aligning their products with carbon trading standards.
14	ILO Guidelines on Occupational Safety and Health: Ensures safe transitions to low-carbon technologies. It ensures that the transition to low-carbon technologies prioritizes worker safety and health
15	Global Reporting Initiative (GRI): Standards by GRI help companies report on environmental impacts, potentially providing a framework for A2D's industrial partners to measure and disclose decarbonization efforts. This will provide a framework for measuring and disclosing environmental and social impacts, ensuring transparency in A2D projects.
By integrating these frameworks and legislative measures, the A2D Facility and each supported project can align itself with international, regional, and national decarbonization and sustainability goals, improving its efficacy and compliance across participating countries.	



4

ESMF Tools and Procedures

UNIDO's Environmental and Social Safeguards Policy and Procedures (ESSPP) outlines procedures for screening and assessing environmental and social (E&S) impacts.

NET
ZERO

CO₂

UNIDO’s Environmental and Social Safeguards Policy and Procedures (ESSPP) outlines procedures for screening and assessing environmental and social (E&S) impacts.

Below is an overview of these procedures, including the tools for selecting and screening demonstration projects (See Annex 1).

These policies and procedures aim to:

- ▶ Minimize negative E&S impacts while enhancing positive outcomes,
- ▶ Promote sustainable development by integrating E&S considerations into all UNIDO activities,
- ▶ Ensure compliance with international E&S standards,
- ▶ Protect and promote human rights and environmental health.

The ESSPP are based on the following Principles:

- ▶ **Do No Harm:** Avoid causing harm to people and the environment.
- ▶ **Sustainability:** Promote environmental sustainability and resilience.
- ▶ **Inclusivity:** Ensure participation and inclusion of all stakeholders, particularly vulnerable groups.
- ▶ **Accountability:** Implement transparent and accountable processes.

In addition, UNIDO has adopted 12 Operational Safeguards (OS), limiting their number to what is required to achieve the goals and optimal functioning

of the UNIDO’s Integrated Safeguard Policy Statement (ISPS). The Operational Safeguards are:

**OS 1: ENVIRONMENTAL AND SOCIAL ASSESSMENT**

**OS 2: PROTECTION OF NATURAL HABITATS AND BIODIVERSITY**

**OS 3: INVOLUNTARY RESETTLEMENT AND LAND ACQUISITION**

**OS 4: INDIGENOUS PEOPLES**

**OS 5: PEST MANAGEMENT**

**OS 6: CULTURAL HERITAGE**

**OS 7: SAFETY OF DAMS**

**OS 8: LABOR AND WORKING CONDITIONS**

**OS 9: RESOURCE EFFICIENCY AND POLLUTION PREVENTION**

**OS 10: COMMUNITY HEALTH, SAFETY AND SECURITY**

**OS 11: INFORMATION DISCLOSURE AND STAKEHOLDER CONSULTATION**

**OS 12: ACCOUNTABILITY AND GRIEVANCE SYSTEMS**

4.1 PROCEDURE FOR SELECTING SUPPORTED DEMONSTRATION PROJECTS

The Facility provides grants through competitive calls-for-proposals and all requirements are published in Call-for-Proposals documents, including requirements for environmental and social safeguards.

To be eligible for support from the Facility, and as part of the technical evaluation assessment, all proposals must detail how they meet requirements on Gender Equality and Social Inclusion (GESI) and Environmental and Social Safeguards (ESS). This includes providing detailed and previously conducted Environmental and Social Impacts Assessments or equivalent for the project accompanied by a summary of the key findings and evidence-based action plans as part of proposal submissions into published calls-for-proposals. Proposals need to ensure that all data are gender-disaggregated to ensure transparency and to confirm alignment with UNIDO’s ESS Policy and Procedures (ESSPP) requirements. Proposals need to ensure that they have sufficiently budgeted for all UNIDO monitoring and reporting requirements, including ESS.

Where existing Environmental and Social Impact Assessments or equivalent are not available, applicants must submit a detailed and evidence-based ESS Action Plan as part of the proposal submission. The Action Plan should outline in detail how the project will incorporate ESS assessments, manage potential risks, roles and responsibilities, and ensure compliance with all environmental and social safeguards throughout the project’s lifecycle. All requirements are published in Call-for-Proposals documents when calls-for-proposals are published.



4.2 PROCEDURES DETERMINING TYPES OF ESS ASSESSMENTS REQUIRED

4.2.1 Environmental and Social Screening Tools: ESS Assessments needed for Demonstration Projects (ESIA, ESMP, ESMF, FPIC, Gender Study)



Once the demonstration projects are selected, approved, and under contractual agreement with UNIDO, they will undergo an Environmental and Social (E&S) screening and categorization process (since no project would have been supported at the earlier stage if overviewed like Category NO PROJECT). This categorization will determine if and which type of assessments (ESIA, ESMP, or ESMF) are required in order to address identified potential risks and impacts. According to ESSPP (AI/2021/03), ESIA, ESMPs, and ESMFs are generally expected to be submitted within six months from project implementation start date. A2D Facility will follow UNIDO’s ESSPP to screen sub-projects for potential risks and it’s already developed E&S

Screening categorization. The screening process under UNIDO’s ESSPP is designed to identify potential E&S risks and impacts early in the project lifecycle, ensuring that these are properly mitigated or managed.

Initial Screening is undertaken to determine if the supported demonstration project or activity falls under the ESSPP’s Operational Safeguards and its scope. The screening involves an initial review of the project’s location, nature, and scale to identify any major potential impacts, especially those relating to biodiversity, community health and safety, land acquisition, etc.

Gender Equality and Social Inclusion: The A2D Facility has established a [Gender Equality and Social Inclusion Framework](#) to support projects in integrating gender considerations effectively. This framework provides structured guidance for developing Gender Analyses, Gender Assessments, and Gender Action Plans, ensuring alignment with specific timelines, requirements, and monitoring and reporting frameworks. These measures

are designed to complement the Environmental and Social Safeguards (ESS) requirements, enhancing gender-responsive and socially inclusive project implementation.

Categorization: Based on the results of the initial screening, projects are categorized into one of the three risk levels listed in Table 8.

TABLE 8: Risk Categorization of the A2D Facility supported projects	
Risk Categorization	Description
HIGH RISK Category A	These are projects, which are likely to have significant adverse E&S impacts that are sensitive, diverse, or unprecedented. A comprehensive Environmental and Social Impact Assessment (ESIA) study along with an Environmental and Social Management Plan (ESMP) has to be undertaken. This includes: - A The Environmental Assessment, focuses on potential impacts on natural resources, air quality, water systems, ecosystems, etc. - B The Social Assessment, evaluates impacts on local communities, including health, safety, labor, land acquisition, and livelihood. - C Public consultation and disclosure for Category “high” and sometimes Category “medium” projects, public consultations are held to gather input from affected communities. The findings of the ESIA report as well as the ESMP are disclosed to ensure transparency. Further guidance on ESMP is provided in Annex G of UNIDO ESSPP. ToR for ESS experts: ▶ ESIA TOR
MODERATE RISK Category B	These are projects, which may have negative E&S impacts but can be mitigated to acceptable levels. These projects require limited ESIA or focused mitigation plans. Environmental and Social Management Plans (ESMP) have to be undertaken. Further guidance on ESMP in Annex G of UNIDO ESSPP. ToR for ESS experts: ▶ ESMP Template June 2021_English ▶ ESMP Quality Checklist ▶ ESMP TOR Structure ▶ ESMP TOR
LOW RISK Category C	Where potential impacts are negligible. These projects require minimal or no further assessments. In the case of the presence of unidentified sub components, an Environmental and Social Management Framework (ESMF) is required.

4.2.2 Stakeholder Mapping and Engagement

This section outlines the proposed actions for the demonstration projects under the A2D Facility to ensure effective stakeholder engagement, identify site-specific challenges, and achieve project objectives. It is important to note that these actions are intended for the demonstration projects themselves, which are responsible for implementing stakeholder consultations, environmental and social assessments, baseline data collection, and risk mitigation strategies. The A2D Facility provides a framework for these projects, and the Environmental and Social Management Framework (ESMF) serves as a roadmap guideline for the demonstration projects to follow in order to address environmental and social safeguards effectively.



IDENTIFY KEY STAKEHOLDERS

Identifying and engaging with relevant stakeholders ensuring demonstration projects are inclusive, addresses site-specific challenges, and achieves its objectives effectively. The following outlines the primary stakeholder's integral to the A2D Facility's implementation and impact, with examples particularly relevant to developing countries. These include:

- PRIMARY: Local communities, directly affected populations, project proponents.
- SECONDARY: Civil society organizations (CSOs), NGOs, and media.
- TERTIARY: Government bodies, regulatory agencies, and international financing institutions. (See Table 6 in Chapter 7).



CONDUCT INITIAL CONSULTATIONS

Initial consultations are essential for engaging stakeholders, gathering insights on local challenges, and identifying risks that need to be addressed throughout the implementation of the A2D Facility. It invokes:

- Organizing stakeholder meetings and focus group discussions to gather insights into site-specific challenges such as air quality, resource availability, and community well-being.
- Use of participatory rural appraisal (PRA) techniques to involve local communities in identifying sector-specific environmental and social risks.
- Documentation of sector-specific concerns, such as technology adoption barriers for industrial players and social equity concerns for affected workers.

As part of these responsibilities, demonstration projects must provide detailed and reliable Environmental and Social Impact Assessments (ESIAs) that have already been conducted and completed for the proposed project. A summary of key findings should also be included in an Annex. If ESIAs and Environmental and Social Safeguards (ESS) evidence are not available, projects must submit an ESS Action Plan in the application form, outlining how ESS assessments will be integrated and potential risks mitigated. It is important to note that completed assessments are mandatory—projects still in the planning phase, with only planned assessments, will be considered out-of-scope for support.

Acceptable forms of evidence include ESIAs, independent third-party audits, Environmental and Social Management Plans (ESMPs), and reports incorporating sustainability standards. These must align with safeguarding evidence and international safeguarding frameworks such as GEF, GCF, WB, UN Global Compact, ILO Standards, ISO certifications, and other relevant environmental and social sustainability benchmarks.

This a crucial first step in evaluating the environmental and social parameters impacted by the A2D Facility, ensuring alignment with its clean innovation technologies goals. It will assist in the identification of critical environmental and social parameters, such as air quality, water resources, biodiversity, and noise levels, particularly in regions with high-emission industries

like cement, steel, or energy. Social aspects like labor conditions, community health, and access to resources will also be assessed where industrial operations heavily affect local populations.

Supported demonstration projects may use various tools and methodologies to support their assessments, depending on available resources. For example, **Geographic Information Systems (GIS)** can be used to map out environmental and socio-economic features around demonstration projects, helping visualize areas of high environmental sensitivity and proximity to vulnerable communities. GIS analysis can assist decision-makers in prioritizing mitigation measures in areas with high industrial emissions or pollution risks; however, its use is not mandatory unless explicitly required in project contracts.

Similarly, **baseline studies** can be conducted to assess current environmental and social conditions in regions where the A2D Facility operates. These studies may include assessments of air and water quality, biodiversity, and socio-economic factors. While useful for capturing data on existing environmental degradation (e.g., water contamination), establishing benchmarks for future impact measurement, and informing mitigation efforts, the extent and methodology of these studies should align with project-specific budgets and resource allocations.

4.2.4 Risk/Impact Identification Matrix

Risk Identification Matrix is a key tool for systematically evaluating and prioritizing environmental and social (E&S) risks associated with the A2D Facility's operations. By linking project activities to potential E&S risks, the matrix allows for a structured approach to risk

management. Prioritizing risks based on severity, likelihood, and reversibility ensures that the most critical issues are addressed first, minimizing the impact on both the environment and local communities.

4.2.3 Scoping Study

The demonstration projects under the A2D Facility are responsible for assessing stakeholders, mitigating risks and addressing potential impacts. This includes conducting scoping studies, identifying environmental and social risks, and implementing baseline data collection to ensure that project activities align with clean innovation technology goals. The A2D Facility provides the overarching framework, while the demonstration projects must take the necessary steps to engage stakeholders, mitigate risks, and address potential environmental and social impacts.



BASELINE DATA COLLECTION

The first step in ensuring that the supported demonstration projects operate sustainably is to collect baseline data on critical environmental and social parameters. Some examples of this baseline data are:

- 1 Assessing of air quality, water resources, biodiversity, socioeconomic conditions, and cultural heritage in the regions surrounding the project.
- 2 Measurement of current pollution levels, especially in industrial zones that may already be impacted by emissions from sectors like cement and steel production.
- 3 Water resource assessments will highlight any existing pressures on local water supplies, as water scarcity is often a significant concern in industrial areas.
- 4 Conducting biodiversity assessments to understand the local ecosystem, particularly in sensitive areas where the supported demonstration projects may be located, ensuring that operations do not disrupt valuable habitats.
- 5 Obtain socioeconomic data, such as employment rates, income levels, and health outcomes which will help to understand the community’s reliance on local industries and potential vulnerabilities to disruptions caused by the Facility.
- 6 Cultural heritage evaluations to ensure that the demonstration projects avoid damaging culturally significant areas.

Undertaking Environmental and Social Impact Assessments (ESIA) as the primary tool to gather and analyze that baseline data thereby providing a comprehensive understanding of the local context and enabling more informed decision-making.



IMPACT PREDICTION

Once baseline data is collected, the next step is to forecast potential environmental and social impacts through impact prediction models. These tools will simulate the effects of the demonstration projects activities on the environment and local communities, predicting changes to air quality, water resources, biodiversity, and social conditions. For example, the prediction models can assess the likelihood of increased emissions from demonstration projects operations or potential water contamination due to industrial processes. The modeling will include various scenarios to account for both best- and worst-case outcomes. In the best-case scenario, the demonstration projects could significantly reduce emissions and provide positive social outcomes, such as job creation and community development. However, in a worst-case scenario, there could be adverse environmental impacts, such as air and water pollution, or social challenges, such as community displacement or inadequate labor conditions. This dual scenario approach will help project planners and stakeholders prepare for different eventualities and design robust mitigation strategies accordingly.



GAP ANALYSIS

A gap analysis is essential to ensure that the A2D Facility aligns with international environmental and social standards. This involves comparing the Facility’s planned practices with internationally recognized frameworks, such as the IFC Performance Standards and UNIDO’s guidelines.



MITIGATION PLANNING

Following the identification and assessment of potential environmental and social risks associated with each demonstration project intervention, a dedicated management plan must be developed and put in place for each project. This management plan shall address all identified risks and define the measures required to effectively manage them throughout the project lifecycle.

The Management Plans of each demonstration project will outline targeted, actionable measures designed to avoid, minimize, manage, or offset the environmental and social risks identified during the assessment process. Each measure will be clearly linked to its corresponding risk, with defined roles and responsibilities, timelines, and monitoring arrangements to ensure effective implementation and accountability.

The management plans will incorporate social measures aimed at promoting positive outcomes, such as improving working conditions, strengthening occupational health and safety standards, and providing training and skills development opportunities to ensure that local communities benefit meaningfully from the demonstration projects outcomes.

The plan will further include provisions for continuous monitoring of environmental and social performance, using key performance indicators (KPIs) to systematically track progress, assess effectiveness, and enable adaptive management where necessary.

Institutional Arrangements and Capacity Development

The Environmental and Social Safeguards Management Framework (ESMF) for the A2D Facility outlines key players involved in its implementation.



5.1 ESMF ROLES AND RESPONSIBILITIES

The Environmental and Social Safeguards Management Framework (ESMF) for the A2D Facility outlines key players involved in its implementation. The outlining and defining of roles and responsibilities of various stakeholders ensure that the supported projects comply with UNIDO's ESSPP and mitigate potential negative impacts. These roles ensure compliance and the smooth execution of risk mitigation strategies throughout the project lifecycle.

ESS GOVERNANCE STRUCTURE

The A2D Facility operates within a structured management framework to ensure the effective implementation of the Environmental and Social Safeguards Management Framework (ESMF). The following table outlines the key personnel and their designated roles and responsibilities in the application of the ESMF.

TABLE 9: Key Personnel and Their Designated Roles and Responsibilities in the Application of the ESMF

Personnel / Entity	Roles and Responsibilities
UNIDO Senior Management	- Ensure alignment with UNIDO's ESSPP. - Allocate necessary resources for ESS requirements towards effective implementation for each supported project integrated in overall costs of call-for-proposals. - Make strategic decisions on significant Environmental and Social issues during programme execution, such as escalated risks and issues. - Align with Donor's Requirements on ESS.
Donor	Ensure alignment with donor safeguards and compliance with ESS requirements, GESI frameworks and KPIs (such as KPI 15 on Transformational Change).
UNIDO A2D Facility Gender Equality and Social Inclusion (GESI) and Environmental and Social Safeguards (ESS) Lead	- Prepare, update and oversee the ESMF. - Ensure compliance with UNIDO's ESSPP and Operational Standards and international frameworks. - Engage and liaise with relevant UNIDO teams regarding ESS and GESI. - Provide technical guidance on environmental and social risk management at the programme-level and the project-level. - Oversee project-level risk assessments, implementation of ESIA/ESMP/ESMF and mitigation strategies, as well as supporting programme-level risk management. - Evaluate project proposals on ESS and GESI criteria and requirements. - Screening and categorization of supported projects. - Review project-level monitoring, reporting and evaluation plans. - Support A2D Facility project leads on monitoring and results collection against the project-level monitoring and reporting tool's ESS and GESI indicators.

Personnel / Entity	Roles and Responsibilities
Supplier delivering demonstration project (Supplier - PMTs)	- Integrate ESMF into project design and implementation. - Adherence to key frameworks: UNIDO's ESSPP, National laws and international policies and legislation and UNIDO's Policy on Gender Equality (2019) and Donor's International Gender Strategy and GESI frameworks. - Develop ESIA, ESMP or ESM depending on categorization obtained designed to: identify and manage E&S risks, ensuring positive outcomes for ecosystems and communities and follow a 'do no harm' approach that prioritizes the protection of both the environment and the well-being of communities. - Allocation of relevant expertise and budget towards ESS implementation. - Submission of ESS requirements no later than 6 months after contract signature. First Deliverable (Inception Report) must contain a plan on how the ESS requirement will be developed. All ESS types of assessments required will need to be submitted no later than 6 months after project implementation started. - Monitor daily operations to ensure ESS adherence. - All supported projects must report against a gender output indicator in the A2D Facility's Logframe, which complies with UNIDO Gender Marker 2 requirements and follows the OECD-DAC gender equality policy marker score 1 throughout the project cycle. - All supported projects must report against a disability inclusion output indicator in the A2D Facility's Logframe, and include documented measures to ensure accessibility, inclusive consultation, and non-discrimination for persons with disabilities and marginalized groups. This ensures that all project beneficiaries, particularly those at risk of exclusion, are meaningfully included throughout the project lifecycle. - All supported projects must report against an ESS output indicator in the A2D Facility's Logframe, which complies with UNIDO'S Environmental and Social Safeguards Policies and Procedures throughout the project cycle as well as with Donor's reporting requirements. - Report on ESS implementation quarterly, annually and when requested from UNIDO.
Environmental and Social National Consultants/ Specialists/Experts (as part of Supplier PMTs)	- Conduct risk assessments for environmental and social impacts. - Develop required ESS assessments after receiving categorization. - Develop and implement mitigation measures. - Provide technical advice on sustainability and regulatory compliance. - Support the Supplier PMTs in achieving ESS standards.
Stakeholder Engagement/ Community Liaison (as part of Supplier PMTs)	- Ensure effective communication with affected communities. - Address stakeholder concerns and integrate feedback. - Maintain transparency and open feedback channels. - Report on stakeholder engagement activities.
Monitoring and Evaluation (M&E) Team (as part of Supplier PMTs)	- Develop monitoring indicators and tools for ESS effectiveness. - Assess environmental and social performance. - Report outcomes and propose corrective actions. - Ensure compliance with ESS performance standards.
Grievance Redress Mechanism (GRM) Committee (as part of Supplier PMTs)	- Ensure effective operation of the GRM. - Document and track grievances, ensuring resolution. - Align GRM with UNIDO's guidelines. - Report and recommend improvements for grievance resolution.

Personnel / Entity	Roles and Responsibilities
Third-Party Auditors (as part of Supplier PMTs)	- Conduct independent audits on ESS compliance when necessary. - Provide recommendations for improving ESS performance. - Ensure transparency and accountability in mitigation measures.
Engaged Communities (as part of Supplier PMT's work)	- Participate in consultations and provide feedback. - Report grievances or concerns to the GRM. - Engage in sustainability and community development activities as per criteria established in each call-for-proposals (i.e: Development of an internationally recognised community of industry stakeholders, investors, and innovators and adopters in its sector, with links to wider existing platforms.

5.2 CAPACITY DEVELOPMENT PLANNING

A robust capacity development strategy that includes thorough assessments, targeted training, and continuous improvement mechanisms is vital for the effective and sustainable implementation of the

ESMF. This approach will empower stakeholders and support long-term project success while promoting E&S sustainability.

To ensure the effective application of the ESMF, the Supplier's Project Management Teams will implement capacity-building initiatives, including:

- 1 Training Programs for project staff on ESS principles, risk assessment, and mitigation strategies.
- 2 Technical Assistance to enhance the expertise of environmental and social specialists.
- 3 Workshops and Stakeholder Engagement Sessions to strengthen collaboration with communities.
- 3 Third-Party Evaluations to provide external recommendations for improved sustainability practices.



By clearly defining roles and responsibilities and reinforcing capacity development, the A2D Facility aims to uphold UNIDO's environmental and social sustainability objectives, ensuring compliance and accountability at all levels.

The successful implementation of the ESMF relies on the capacity of the organizations involved. To ensure effective ESMF execution, it is essential to have a structured plan that continuously assesses and improves the capacity of stakeholders. This plan focuses on:

CAPACITY NEEDS ASSESSMENT

- 1 **Objective:** Identify existing capabilities and knowledge gaps among teams tasked with implementing the ESMF.
- 2 **Methodology:** Conduct in-depth assessments using surveys, interviews, and skills audits to understand current proficiency levels.
- 3 **Outcome:** Pinpoint areas requiring further development and create a roadmap for targeted capacity-building interventions.

TRAINING AND CAPACITY BUILDING

- 1 **Initial Programs:** Provide workshops on core topics such as environmental management, safe waste handling, and specific topics related to the four thematic areas of focus.
- 2 **Specialized Modules:** Provide trainings according to the topics defined in the roadmap for each project.
- 3 **Practical Workshops:** Conduct hands-on sessions to enhance the application of knowledge in real project settings.
- 4 **Target persons, timeline, and frequency:** according to the roadmap defined in the previous step (capacity needs assessment).

CONTINUOUS MONITORING AND ADJUSTMENT

- 1 **Performance Indicators:** Track the number of training sessions held, participant engagement levels, and improvements in E&S practices.
- 2 **Evaluations:** Carry out semi-annual evaluations of training effectiveness and adjust programs as necessary to meet evolving project demands.

6

Communication and Stakeholder Engagement Plan

Effective communication and stakeholder engagement are very critical to demonstration project's success. Inclusivity, transparency and trust-building are key essentials for achieving environmental and social goals.



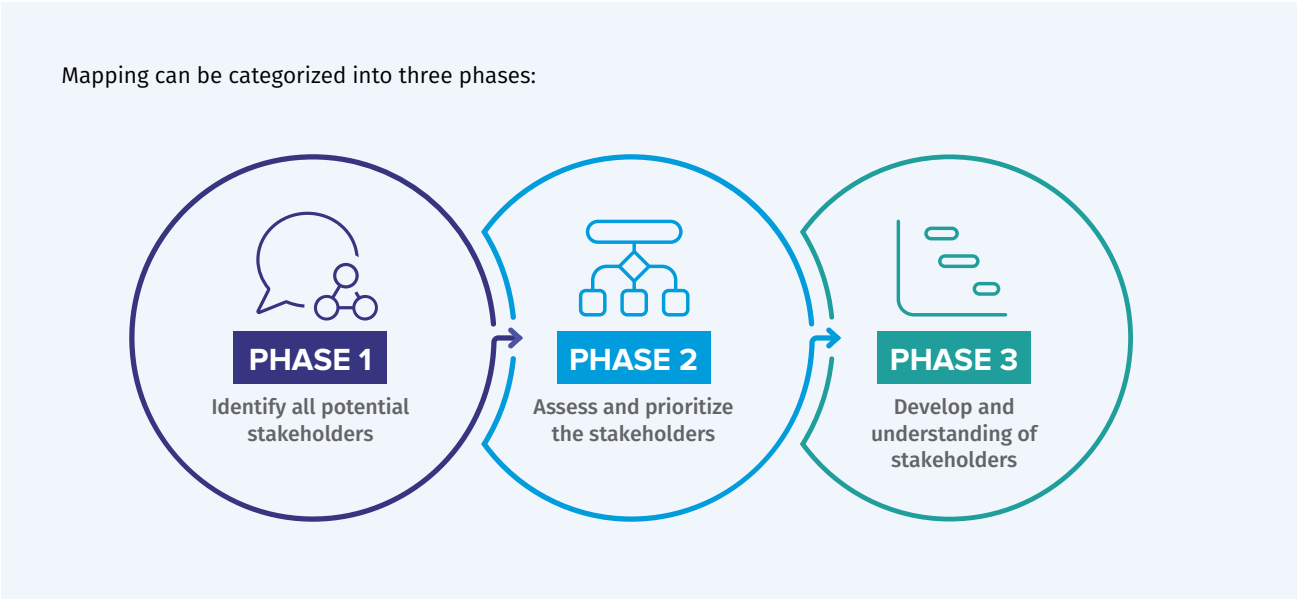
This section outlines proposed guidelines for demonstration projects on managing their communication and stakeholder engagement plans related to Environmental and Social Safeguards. Effective communication and stakeholder engagement are very critical to demonstration project’s success. Inclusivity, transparency and trust-building are key essentials for achieving environmental and social goals.

Stakeholder engagement is a continuous process that encompasses several key components, including: (a) identifying and analyzing stakeholders, ensuring data is disaggregated by factors such as sex, age, and other relevant socio-demographic variables; (b) integrating stakeholder engagement throughout the entire project cycle, from planning to monitoring; (c) providing timely access to relevant and easily understandable information about project activities; (d) facilitating meaningful participation and consultation with diverse stakeholders, including both women and men and traditionally marginalized communities; (e) establishing mechanisms to address disputes and grievances effectively; (f) ensuring transparent reporting to stakeholders; and (g) involving vulnerable and marginalized communities in monitoring and evaluation efforts and ensuring all information is gender-disaggregated.

To manage communication and stakeholder engagement effectively, each demonstration project must first map the stakeholders involved, their roles, and responsibilities within the project, and this needs to be included as part of proposals submissions. This mapping process helps identify key stakeholders that need to be engaged to achieve the project’s objectives. Stakeholder selection should be based on project goals, expected results, the project’s environmental and social impacts, available resources, and the willingness of stakeholders to engage. This will be further enhanced after project selection.

The objectives of their respective strategies should:

- Ensure that all stakeholders understand the purpose, benefits and impacts of the A2D Facility.
- Manage environmental and social risks through communication to relevant stakeholders in an inclusive, transparent and responsive manner.



6.1 PURPOSE AND OBJECTIVES

To facilitate effective collaboration and communication between project stakeholders, including local communities, government agencies, private sector participants, and civil society organizations. The purpose is to ensure that supported demonstration projects achieve their objectives while upholding social inclusion, environmental integrity, and long-term community benefits. Key aspects will include those listed below.

- **INCLUSIVE PARTICIPATION**

Promotion of meaningful participation of all stakeholders, particularly vulnerable and marginalized groups, in decision-making processes, ensuring their voices are heard and their needs are addressed.
- **CONFLICT PREVENTION AND RESOLUTION**

Minimizing and resolving potential conflicts that may arise from land use changes, resource competition, or differing stakeholder priorities by providing a transparent and equitable platform for dialogue.
- **ENHANCED AWARENESS AND CAPACITY BUILDING**

Raising awareness about the A2D Facility's goals, benefits, and implementation strategies while strengthening local capacity to support and engage with decarbonization initiatives.
- **TRANSPARENCY AND ACCOUNTABILITY**

Establishing trust among stakeholders by fostering transparent communication and ensuring the accountability of project implementers to the affected communities and partners.
- **ALIGNMENT WITH INTERNATIONAL BEST ENVIRONMENTAL AND SOCIAL PRACTICES**

Aligning the A2D Facility with UNIDO's Operational Standards as the key guide in implementation as well as other best international practices, GEF and GCF standards as well as the IFC's Performance Standards, including the IFC's Performance Standards and UN Sustainable Development Goals, to ensure robust environmental and social outcomes.
- **MONITORING AND FEEDBACK**

Provision of mechanisms for continuous monitoring and evaluation of stakeholder engagement activities, allowing for adaptive management and incorporation of stakeholder feedback into project implementation.
- **EQUITABLE BENEFIT SHARING**

Ensuring that the benefits of industrial decarbonization, such as improved air quality, job creation, and economic opportunities, are equitably shared among all stakeholders.

6.2 GRIEVANCE MECHANISM

UNIDO is committed to maintaining an open and transparent dialogue with project stakeholders by providing accessible channels for feedback, concerns, and grievances. As part of this commitment, the A2D Facility will communicate implementation progress annually, with particular attention to issues that pose ongoing risks or impacts to stakeholders. Additionally, concerns raised through the consultation process or grievance mechanism will be systematically addressed to ensure stakeholder engagement remains meaningful, inclusive, and responsive.

To enhance transparency and accountability, the Environmental and Social Management Framework (ESMF) will be made publicly available on the UNIDO website via the UNIDO Open Data platform. This will enable stakeholders to access key programme-related information and monitor progress on environmental and social safeguards.

6.2.1 Access to Grievance Mechanisms

At the project level, **Project Management Teams (Supplier PMTs), who are responsible for implementing demonstration projects, will be required to develop and operationalize institutional grievance and complaint management plans.** These plans are designed to provide all stakeholders, especially vulnerable or marginalized groups, with a clear, accessible, and transparent process through which they can safely raise concerns or complaints related to project activities.

Recognizing the barriers that vulnerable populations may face in navigating formal mechanisms, the grievance process will include intermediate and independent sources of support, such as local civil society partners or community liaison officers, to help individuals understand their rights, articulate their concerns, and access the grievance system. These intermediaries can serve as trusted entry points for people who may lack access, confidence, or capacity to engage directly with formal mechanisms.

The plans will include detailed procedures for receiving, recording, addressing, and resolving grievances, as well as clear timelines and designated contact points.

Responsibilities for managing grievances will be clearly assigned within the Supplier PMTs, ensuring prompt review and early communication of cases to the A2D Facility Team Project Leads.

To reinforce accessibility and build trust, the grievance process will be designed to protect the rights of complainants, ensure confidentiality, and prevent retaliation. Regular training and awareness-raising sessions will be carried out to ensure that all project stakeholders, including implementing teams and local communities, understand how to access and use the grievance mechanism effectively. A visual flow diagram illustrating the steps in the grievance process and available support pathways will be included in project communication materials to facilitate understanding and accessibility.

The mechanism will be flexible and adaptable, capable of addressing environmental, social, and operational issues throughout the project lifecycle. In addition, monitoring and reporting systems will track grievance resolution, helping to improve responsiveness and accountability over time.

6.2.2 Access to the UNIDO Institutional Grievance Mechanism

If no project-specific grievance mechanism is available—or if a complainant prefers an alternative route—they may submit a grievance through the **UNIDO Institutional Grievance Mechanism, managed by the Independent Office of Evaluation and Internal Oversight (IOD).** This mechanism offers a confidential and independent channel for reporting concerns related to UNIDO’s operations, including environmental and social risks, ethical violations, or implementation challenges.

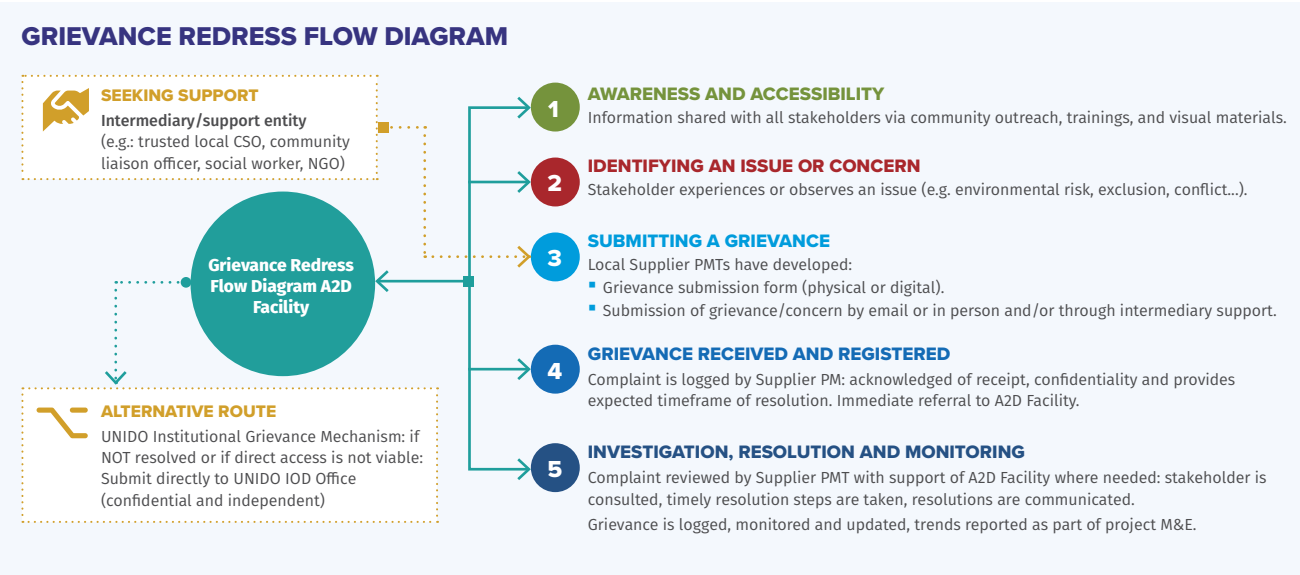
Stakeholders can submit grievances in accordance with UNIDO’s transparency and accountability policies. More information, including submission guidelines and procedures, is available at: [IOD Report | UNIDO](#).

By maintaining responsive grievance mechanisms at both the project and institutional levels—and by addressing the specific needs of vulnerable and marginalized stakeholders—the A2D Facility promotes equitable access to redress, reinforces transparency, and contributes to continuous learning and improvement in project implementation. UNIDO remains committed to ensuring that all grievances are handled in a timely, impartial, and effective manner, strengthening stakeholder trust and upholding its environmental and social commitments. UNIDO is committed to maintaining an open and transparent dialogue with project stakeholders by providing accessible channels for feedback, concerns, and grievances. As part of this commitment, A2D Facility

will communicate implementation progress annually, particularly on issues that present ongoing risks or impacts to stakeholders. Additionally, any concerns raised through the consultation process or grievance mechanism will be systematically addressed to ensure stakeholder engagement remains meaningful and responsive.

To enhance transparency and accountability, the Environmental and Social Management Framework (ESMF) will be made publicly available on the UNIDO website at the following link: [UNIDO Open Data](#). This will enable stakeholders to access key programme-related information and track progress on environmental and social safeguards.

If the UNIDO grievance mechanism is not fully appropriate or sufficiently tailored to address grievances arising from A2D Facility-supported demonstration projects, an intermediate (and independent) source of support may be required to assist stakeholders in submitting their complaints. Local avenues for grievance submission should therefore be established, ensuring accessible and trusted channels are available. The flow diagram below provides a clear example of a possible grievance process, with particular attention to facilitating access for vulnerable or marginalized groups and incorporating the option of intermediate support.



7

ESMF Implementation Plan

This section outlines the procedures, roles, responsibilities, and timelines for mainstreaming the ESS Management Framework (ESMF) within project planning, implementation, and monitoring phases.



This section describes how Environmental and Social Safeguards (ESS) considerations are integrated into the Environmental and Social Management Framework (ESMF) of the A2D Facility across the lifecycle of supported demonstration projects. It outlines the procedures, roles, responsibilities, and timelines for mainstreaming the ESS Management Framework (ESMF) within project planning, implementation, and monitoring phases. These measures are designed to ensure that environmental and social safeguards and non-discrimination principles are systematically embedded in the environmental and social safeguards process.

The following table presents a structured summary of how ESS is operationalized through the ESMF, highlighting key procedural steps, responsible parties, and corresponding budgetary considerations throughout the selection, appraisal, and implementation of demonstration projects:

Summarizing the above information in a table to demonstrate application of ESMF and how it is mainstreamed/integrated into the project design and potential existing mechanisms for selection of A2D Facility supported projects:

TABLE 10: ESMF Procedures, Roles and Responsibilities			
ESMF Procedures	Schedule / Timing in project cycle	Responsible	Budget
Selection of supported projects	Established period for each call-for-proposals.	UNIDO A2D Facility Team Donor.	N/A
Screening & Categorization of supported projects	During UNIDO decision on supported projects.	UNIDO A2D Facility team.	N/A
Determination of Assessment needed (ESIA, ESMP, ESMF, FPIC)	Kick-off/Project implementation starts.	UNIDO A2D Facility team.	N/A
Submission of ESS Assessment required (ESIA, ESMP, ESMF, FPIC)	No later than six months after receiving determination of ESS Assessment needed with a first draft to be submitted with the Deliverable 1: Inception Report.	Supplier Project Management Teams (Supplier PMT) with support from UNIDO.	Integrated into project-level budgets agreed in each call-for-proposals.
Stakeholder engagement	Overall Project implementation cycle.	Supplier Project Management Teams (Supplier PMT).	Integrated into project-level budgets agreed in each call-for-proposals.
Capacity development	Project implementation phase.	Supplier Project Management Teams (Supplier PMT).	Integrated into project-level budgets agreed in each call-for-proposals.

7.1 ESS MONITORING AND EVALUATION (M&E) PLAN

The Environmental and Social Monitoring Plan for the A2D Facility's operations align with UNIDO's Environmental and Social Safeguards Policies and Procedures (ESSPP) and address potential risks identified during the planning phase. This plan outlines monitoring objectives, methodologies, responsibilities,

and reporting processes to track the effectiveness of mitigation measures, ensure compliance with national and international standards, and promote transparency and accountability throughout the Facility's lifecycle.



MONITORING OBJECTIVES

The key objectives of this Environmental and Social Monitoring Plan are to:

- Ensure the A2D Facility’s operations are consistent with UNIDO’s ESSPP and other relevant environmental and social standards and international frameworks.
- Monitor the implementation of the ESMF, identifying areas for improvement and updating it with new developments.
- Detect and mitigate (and escalate where appropriate) any environmental or social risks during the A2D Facility’s implementation.
- Provide regular updates to stakeholders, ensuring that their concerns are addressed and incorporated into decision-making processes.
- Evaluate the effectiveness of the environmental and social strategies and propose corrective actions where necessary.

KEY MONITORING AREAS FOR THE A2D FACILITY

The monitoring plan for the A2D Facility will focus on the following areas as a proposal that then will need to be tailored for each project/intervention:

Environmental indicators

- 1 **Carbon emission reduction** by regular tracking of greenhouse gas emissions to measure progress toward decarbonization and climate goals.
- 2 **Water usage efficiency** by monitoring water extraction, consumption, and recycling to ensure sustainable use and minimize resource depletion.
- 3 **Energy demand and consumption** through assessing energy use patterns and promoting energy efficiency while integrating renewable energy sources.
- 4 **Waste generation and disposal** by tracking waste production, segregation, recycling, and disposal to minimize environmental pollution and support circular economy practices.
- 5 **Air quality (particulate matter and VOCs)** by monitoring air pollutants, including particulate matter (PM) and volatile organic compounds (VOCs), to protect public health and comply with regulatory standards.

Social/Security Indicators

- 1 **Local employment creation** by monitoring the number of jobs created within host communities and the provision of skill-building opportunities.
- 2 **Community health and safety** by assessing risks to community health and implementing safety measures to minimize accidents and health impacts.
- 3 **Gender equality in the workforce** by tracking the participation of women and marginalized groups, with goals to increase representation and inclusion.
- 4 **Community engagement and stakeholder feedback** by valuating the effectiveness of consultation processes and grievance mechanisms to ensure meaningful community involvement.
- 5 **Access to social services** by monitoring the delivery of benefits such as improved infrastructure, healthcare, and education to local communities.

MONITORING METHODOLOGY

To achieve effective monitoring, the Project Management Teams (PMTs) of the Suppliers implementing the demonstration projects should consider using the following actions to support their Monitoring and Evaluation Plans underlaid with robust evidence when feasible taken into account that minimum expectation would consider complying with A2D Facility’s Monitoring, Reporting and Evaluation rules and procedures as well as following the Facility’s Logframe:

- **Routine inspections** by environmental and social specialists that will conduct site visits to monitor compliance with the ESS Action Plan and regulatory requirements.
- **Continuous data collection** on key environmental parameters tailored to each supported project (i.e.: air, water, noise, waste) and social impacts (i.e.: community feedback, labor conditions) through surveys and verification systems.
- **Surveys and stakeholder consultations** though regular engagement with local communities, stakeholders, and workers to understand the social impacts of facility operations and collect feedback.
- **Third-party audits** to validate the Facility’s compliance with environmental and social standards, ensuring transparency and accountability.
- **Feedback mechanisms** by utilizing grievance redress mechanisms (GRM) for affected communities to raise concerns, which will be tracked and addressed by the project team.

ROLES AND RESPONSIBILITIES

The successful implementation of the ESMF for the A2D Facility will involve key stakeholders:

- 1 **UNIDO Senior Management** ensures alignment with UNIDO’s ESSPP, allocates resources for monitoring activities, and makes strategic decisions when environmental or social risks arise, keeping the Donor informed on any safeguarding issues.
- 2 **UNIDO A2D Facility team** (such as through the A2D Facility GESI-ESS lead) leads the implementation and management of the ESMF, ensuring compliance with relevant environmental and social standards and keeps A2D Facility Senior Management Level informed and updated about any safeguarding issues arising at any moment.
- 3 **Supplier Project Management Team (Supplier PMT)**, which are the demonstration project implementers, coordinates and integrates the monitoring plan into daily operations, ensuring the alignment of environmental and social objectives with project goals.
- 4 **Environmental and Social specialists/experts** from Supplier PMTs conduct technical assessments, guide mitigation actions, and support the project team in addressing identified risks.
- 5 **Monitoring and evaluation (M&E) team from Supplier PMTs** develops monitoring indicators and tools to track performance, assesses the effectiveness of mitigation measures, and reports on progress to UNIDO’s A2D Facility Team.
- 6 **Stakeholders, local authorities, and regulators** ensure compliance with national regulations and assist in addressing local concerns and challenges.
- 7 **Independent auditors/consultants** provide external validation of the A2D Facility’s environmental and social performance, ensuring objectivity and transparency.

REPORTING AND DOCUMENTATION

Monitoring activities will be documented through detailed reports, which will include:

- **Data on environmental and social indicators** tailored to each project/intervention.
- **Assessment of the implementation** of mitigation measures and recommendations for corrective actions.
- **Reports on stakeholder engagement activities**, including consultations, feedback, and grievance resolution.
- **Compliance reports** for regulatory authorities and international standards.

CORRECTIVE ACTIONS AND CONTINUOUS IMPROVEMENT

The identification or realization of discrepancies or non-compliance by the Supplier PMTs will initiate corrective actions to be taken by the Supplier PMTs to be reviewed and monitored by UNIDO. These may include:

- **Adjusting operational procedures** to minimize environmental or social risks.
- **Providing additional training** for staff or contractors on environmental and social best practices.
- **Enhancing the Stakeholder Engagement Plan** based on community feedback and concerns.
- **Regularly reviewing and updating** the ESMF to integrate lessons learned and improve future operations (UNIDO as responsible).

ENSURING INDEPENDENCE

To ensure an independent and impartial process, the following measures will be incorporated:

- **External Auditing:** An independent third-party auditor will be appointed to assess the corrective actions and review compliance with environmental and social standards. This will ensure objectivity in evaluating performance and addressing any discrepancies.
- **Clear Separation of Roles:** UNIDO staff responsible for oversight will be separate from those directly involved in the operational aspects of the Supplier PMTs, ensuring that monitoring and decision-making are free from internal biases.
- **Transparency and Reporting:** Regular progress reports, including those from independent auditors, will be made publicly available to ensure transparency and allow for external scrutiny.
- **Stakeholder Participation:** A formal mechanism will be established to include independent stakeholders, including community representatives or civil society groups, in the monitoring process. This ensures that the corrective actions align with community concerns and expectations, maintaining accountability and impartiality.

By incorporating these safeguards, we ensure that the process remains objective, transparent, and free from conflicts of interest, fostering continuous improvement while upholding the highest standards of integrity.

A2D FACILITY LOGFRAME’S OUTPUT INDICATORS

All supported projects must report against an ESS output indicator in the A2D Facility’s Logframe, which complies with UNIDO’S Environmental and Social Safeguards Policies and Procedures throughout the project cycle as well as with Donor’s reporting requirements.

ESS REPORTING

All supported projects must report against an ESS output indicator in the project’s Logframe. This indicator must comply with and meet the criteria set forth in UNIDO’s Environmental and Social Safeguards Policies and Procedures, ensuring alignment with UNIDO’s ESSPP Operational Safeguards (OS 1 to 12) as well as GEF-GCF Environmental and Social Safeguards Indicators. The project must also ensure that it provides equitable benefits, particularly for marginalized groups such as women, indigenous peoples and local communities (IPLCs), vulnerable groups, persons with disabilities and adheres to the criteria outlined in both UNIDO’s Operational Safeguards and GEF’s Environmental and Social Indicators (particularly those related to social inclusion, as highlighted in the 68th GEF Council Meeting).

A positive impact on environmental sustainability and social inclusion, including the protection of biodiversity, sustainable land and water management, climate change mitigation and pollution reduction:

Programmatic OS



OS 1: ENVIRONMENTAL AND SOCIAL ASSESSMENT



OS 2: PROTECTION OF NATURAL HABITATS



OS 3: INVOLUNTARY RESETTLEMENT



OS 4: INDIGENOUS PEOPLES



OS 5: PEST MANAGEMENT



OS 6: PHYSICAL CULTURAL HERITAGE



OS 7: SAFETY OF DAMS



OS 8: LABOR AND WORKING CONDITIONS



OS 9: RESOURCE EFFICIENCY AND POLLUTION PREVENTION



OS 10: COMMUNITY HEALTH, SAFETY AND SECURITY

Framework Operational Safeguards



OS 11: INFORMATION DISCLOSURE



OS 12: ACCOUNTABILITY AND GRIEVANCE SYSTEMS

The project ensures equitable benefits, particularly for marginalized groups such as women and indigenous peoples and local communities (IPLs), and adheres to the criteria outlined in both *UNIDO’s Operational Safeguards* in addition to *GCF and GEF’s Environmental and Social Indicators* (particularly on social inclusion 68th GEF Council Meeting).

Please Refer to *Annex 0: Output Indicator 3.4 Compliance with UNIDO’s ESSPP* and its *Operational Safeguards*.

TABLE 11: ESMF Monitoring Plan					
Monitoring activity	Description	Frequency / Timeframe	Expected Action	Roles and Responsibilities	Cost
Track progress of ESMF implementation	Implementation of ESMF reported back to UNIDO ESS team.	Quarterly until ESIAs, ESMPs, ESMFs, IPs, FPICs are in place.	Required ESMF steps are completed in timely manner.	UNIDO A2D Facility Team (such as the GESI-ESS lead).	N/A
Monitoring of potential impacts identified in subsequent supported project level ESIAs and ESMPs	Fill out ESMP monitoring template for each demonstration project as required and update quarterly.	Continuous monitoring with updating of monitoring template every quarter.	Implementation of ESMP; monitoring of environmental and social risks, monitoring of mitigation measures.	Supplier PMTs in collaboration with UNIDO A2D Facility team (such as the GESI-ESS lead).	N/A
Report ESMF monitoring progress to UNIDO ESS team	Share ESMP monitoring template with UNIDO ESS team.	Annually.	ESMF implementation progress is adequately communicated to UNIDO ESS team.	UNIDO A2D Facility Team (such as the GESI-ESS lead).	N/A
Independent ESS monitoring field visits	Selected sites will be determined based on E&S risk categorization.	Once.	Monitoring mission to determine efficacy of ongoing ESIAs and ESMPs.	Supplier PMTs in collaboration with UNIDO A2D Facility team (such as the GESI-ESS lead).	Integrated into project level budgets agreed in each call-for-proposals.
Learning	Knowledge, good practices and lessons learned regarding ESS management will be captured regularly, communicated to UNIDO ESS team and integrated back into the project	At least annually.	Relevant lessons are captured by the project teams and used to inform management decisions.	Supplier PMTs.	Integrated into project-level budgets agreed in each call-for-proposals.
Review and make course corrections	The Project Steering Committee shall review data from ESS monitoring actions to inform decision making.	Annually or more.	ESS performance data, risks, lessons and quality will be used to make course corrections by project steering committee.	Supplier PMTs.	Integrated into project level budgets agreed in each call-for-proposals.

Aside from the progress of the ESMF implementation, the effectiveness of the mitigation measures under the ESMPs developed will also need to be monitored. The following template provides a simple format and may be adopted by the programme team as necessary. For each measure it should be signalled whether implementation is on schedule (or ahead of schedule or completed), slightly delayed or delayed - using the suggested colour coding. Where delays are encountered the reasons need to be explained and solutions suggested. The measures included should reflect the ESS risks outlined in the respective ESMP mitigation and monitoring tables.

Annual monitoring should also identify any additional environmental or social risks that may have emerged since the project started and establish appropriate mitigation measures for any significant new risk. These additional risks and their mitigating measures should be added to the ESMP and reported on as part of annual monitoring.

Note: The progress of implementing mitigation measures should be color-coded:

Green: On Schedule / Ahead of Schedule / Completed

Orange: Slightly Delayed

Red: Delayed

On Schedule / Ahead of Schedule / Completed

Slightly Delayed

Major delays / Issues

TABLE 12: ESMP Monitoring Template				
Period covered by the report:				
Describe the progress of implementing the ESMP:				
E&S Risks	Mitigation measures	Color coding	Describe status of completion, suggest solutions where problems are encountered	Early judgement: Does this measure seem effective? How could this measure be adapted?
New E&S risks that have emerged				
ESMP monitoring - main findings:				Date/Name of reviewer:
				Status ESMP On Schedule Slightly Delayed Major delays / Issues

7.2 SUMMARY

An Environmental and Social Management Framework (ESMF) has been developed to guide the implementation of projects under the Accelerate-to-Demonstrate (A2D) Facility. The Accelerate-to-Demonstrate (A2D) Facility of the United Nations Industrial Development Organization (UNIDO) is a large-scale Facility focused on accelerating the commercialization of innovative climate solutions in developing countries (countries that are eligible to receive Official Development Assistance (ODA)). It focuses on providing grant funding to support the implementation and operation of catalytic demonstration projects in the following initial thematic areas-of-focus: critical minerals, clean hydrogen, smart energy, and industrial decarbonization.

Given that specific projects have not yet been identified as those will be selected through each call-for-proposals, the framework provides a structured, generic approach aligned with UNIDO’s Environmental and Social Safeguards Policy and Procedures (ESSPP)

and international best practices. It ensures that pilot demonstration activities adhere to sustainability principles while contributing to climate innovation. The ESMF establishes systematic data collection and decision-making processes, allowing for transparent evaluation of environmental and social risks.

The framework also incorporates structured templates and methodologies to assess the feasibility of demonstration projects, ensuring compliance with the A2D Facility’s mandate to support transformative, low-carbon industrial solutions. By focusing on real-world implementation and knowledge dissemination, the A2D Facility enhances the commercialization of breakthrough clean energy solutions while safeguarding environmental and social integrity.

TABLE 13 / ANNEX 0: Output Indicator 3.5 Compliance with UNIDO’s ESSPP and its Operational Safeguards				
UNIDO ESSPP	Operational Safeguards 1 - 12 (Mandatory /Crosscutting OS 1-11-12)	Not Relevant for the Project	YES (potentially)	Mitigation Strategy (as per ESIA/ESMP) (if responded YES/ Potentially)
1	Environmental and Social Assessment: The objective of this overarching framework is to: - Identify, evaluate and manage E&S Risks and impacts. - Follow the mitigation hierarchy approach. - Systematically identify vulnerable groups, and to adopt differentiated measures to expand project benefits.	*Required for all projects.	☐	
2	Protection of Natural Habitats and Biodiversity: Projects need to ensure that biological diversity is conserved, and that a sustainable use of natural resources is promoted.	☐	☐	

UNIDO ESSPP	Operational Safeguards 1 - 12 (Mandatory /Crosscutting OS 1-11-12)	Not Relevant for the Project	YES (potentially)	Mitigation Strategy (as per ESIA/ESMP) (if responded YES/ Potentially)
3	Involuntary Resettlement and Land Acquisition: Projects need to avoid involuntary resettlement or physical and/or economic displacement through project-related land use.	☐	☐	
4	Indigenous People: Projects are required to foster full respect for indigenous peoples and their dignity, human rights, and cultural uniqueness. This may require obtaining their Free, Prior and Informed Consent (FPIC).	☐	☐	
5	Pest Management: Projects need to minimize and manage environmental, and health risks associated with the use of pesticide and promote safe, effective, and environmentally sound pest management.	☐	☐	
6	Physical Cultural Heritage: Projects need to ensure the protection of tangible and intangible cultural heritage from damage or alteration.	☐	☐	
7	Safety of Dams: Projects need to ensure compliance with international quality and safety standards in the design, construction, operation, and maintenance of new and existing dams.	☐	☐	
8	Labour and Working Conditions: Projects need to ensure the protection of the fundamental rights of workers and their health and safety at the workplace, consistent with good international industry practice.	☐	☐	
9	Resource Efficiency and Pollution Prevention: Projects need to promote the efficient use of energy, water, material and other resources, reduce GHG emissions and the use of water, and avoid or minimize hazardous material or substances released by the project.	☐	☐	
10	Community Health, Safety and Security: Projects need to avoid or minimize any health, safety, and security risks and impacts on project-affected communities.	☐	☐	
11	Information Disclosure and Stakeholder Consultation: All projects are required to apply UNIDO’s approach to information disclosure guided by openness and transparent consultation with project-affected stakeholders.	*Required for all projects.	☐	
12	Accountability and Grievance Systems: A mechanism for dispute resolution and for ensuring accountability and compliance with UNIDO’s environmental and social safeguards exists at UNIDO institutional level and, if required, also at project/programme level.	*Required for all projects.	☐	

A conceptual illustration featuring a pair of hands holding a glowing, translucent globe. The globe is surrounded by a network of white lines and various icons, including a wind turbine, a group of people, a recycling symbol, a water drop, a factory, a globe, a sun, a leaf, a gear, a document, a truck, a cloud with rain, a building, a plug, and a recycling symbol. The background is a vibrant green with a subtle pattern of white lines and dots, suggesting a global or digital network. The overall theme is sustainability and technology.

Annexes

Annex 1	Screening for E&S Potential Risks	80
Annex 2	Environmental and Social Safeguards Draft Action Plan	95

ANNEX 1

Screening for E&S Potential Risks

UNIDO Environmental and Social Safeguards Policy and Procedures (ESSPP) require that all UNIDO projects and any demonstration projects (proposal, investment, and project submissions) that result from UNIDO projects, e.g. from those that set up financial mechanisms, accelerator/incubator schemes or business models, undergo environmental and social risk (E&S) assessments.

The objective of the E&S Scorecard for demonstration projects is to help A2D Facility project to (i) decide whether a demonstration project should be supported/

selected (projects that would categorize as NO PROJECT are non-compliant with UNIDO ESSPP), and (ii) assess whether any additional environmental and social assessments (e.g. ESIAs, ESMPs, or FPIC) should be undertaken at later stages, e.g. by determining the environmental and social risk category of demonstration projects. The completed and signed E&S Scorecard for supported projects should form an integral part of the selection criteria for any mechanisms/schemes/models. To complete the E&S Scorecard for supported projects, basic understanding of UNIDO ESSPP is expected.

A1.1 Environmental and Social Screening Template following UNIDO’S ESSPP

The aim of the A2D Facility Environmental and Social Screening (ESS) Template is to evaluate and manage potential environmental and social (E&S) risks and impacts associated with the A2D Facility’s projects and activities, ensuring that they align with sustainable development goals and international best practices, including UNIDO’s Operational Standards. This template facilitates responsible decision-making and promotes the integration of sustainability principles into the decarbonization efforts of industries.

SPECIFIC OBJECTIVES

1

Identify E&S Risks and Opportunities: assess potential risks such as greenhouse gas emissions, resource overuse, displacement, or labor rights issues, and identify opportunities for environmental and social benefits (e.g., job creation, reduced carbon footprint).

2

Categorize Risk Levels: assign a risk category (low, medium, or high) to proposed projects or interventions under the A2D Facility based on the severity of identified impacts.

3

Guide Action Plans: inform the preparation of Environmental and Social Impact Assesment (ESIA) or Management Plans (ESMP).

E&S SCREENING / CATEGORIZATION

Preliminary E&S Risk Categorization

Projects under the A2D Facility will be categorized into risk levels (High (A), Medium (B), Low (C)) based on UNIDO’s ESSPP. Risk Categorization outlines the basis for classifying risks.

TABLE A1-0: Preliminary E&S Risk Categorization	
Risk Level	Description
NO PROJECT Category	A proposed project is classified as Category NO PROJECT if it: - i is likely to infringe on the protection of critical habitats or physical cultural resources; - ii introduces or uses potentially invasive, non-indigenous alien species; - iii uses banned pesticides and/or chemicals; - iv causes involuntary resettlement or physical and economic displacement, or - v involves, supports, or is associated with any form of child labour, forced or trafficked labour, or practices inconsistent with international labour standards. Projects categorized in this category cannot be supported by UNIDO and the A2D Facility, since they are not in compliance with UNIDO’s OSs on: - OS2: Protection of critical habitats; - OS3: Involuntary resettlement; - OS5: Pest Management; and - OS6: Protection of physical cultural resources.
HIGH RISK Category A	The project is likely to induce significant adverse impacts (that are sensitive, diverse, unprecedented or that affect an area broader than the sites or facilities subject to physical works) that are irreversible or complex and require and Environmental and Social Impact Assessment (ESIA) and an Environmental and Social Management Plan (ESMP). - Example 1: A project establishing industrial parks or new large-scale infrastructure (e.g, for processing, recycling, waste treatment). - Example 2: A project establishing agroforestry systems in proximity to natural habitats and on land owned by Indigenous People and Local Communities.
MODERATE RISK Category B	The project is likely to have moderate, site-specific impacts that are reversible with mitigation. In most cases impacts can be readily minimized by applying appropriate management measures. An Environmental and Social Management Plan (ESMP) will need to be completed during Project inception. - Example 1: POPs waste treatment and disposal at an existing facility through installation of equipment. - Example 2: Deployment of renewable energy smart mini grids in rural areas.
LOW RISK Category C	The project is likely to have minimal or negligible adverse impacts. No further specific E&S assessment is required. Additional E&S requirements may, however, still apply. Example: Small scale energy audits or technical capacity building.

TABLE A1-1: Screening for E&S Impact Potential			
The aim of the environmental and social screening process is to determine if and what environmental and social review and management is required, quickly identifying those projects where potential environmental and social issues exist, so that only those with potential environmental and social implications will be required to undergo more detailed assessments.			
Please respond to the below questions with “No” or “Yes”, taking note of the guidance provided.			
GUIDING PRINCIPLES	NO	YES	GUIDANCE
1 Has a combined environmental and social impact assessment/review that covers the proposed project already been completed by the National Partner, Project Execution Partner, or other donor(s) within the last year?			If you answered “yes” , please refer to the table in Annex E of the ESSPP to identify whether the existing documentation meets UNIDO’s ESSPP requirements. Please attach existing documentation and send to l.gonzalalberte@unido.org / ess@unido.org for further guidance.
2 Would the proposed project potentially involve or lead to adverse impacts on the situation of women, men, girls and boys? This includes adverse impacts on gender equality, gender-based violence (GBV) and/or sexual exploitation and abuse (SEA).			For definitions of GBV and SEA, please refer to Annex I of the ESSPP. If you answered “yes” , kindly contact the UNIDO Gender Coordinator at l.gonzalalberte@unido.org / gender-coordinator@unido.org as well as ess@unido.org for further guidance.
3 Has a climate risk assessment for the proposed project been carried out?			If you answered “yes” , please provide this assessment to l.gonzalalberte@unido.org / ess@unido.org . If you answered “no” , please refer to Table 3 and complete in line with guidance provided.
ESS CATEGORIZATION	NO	YES	GUIDANCE
4 Is the proposed project: ▪ Likely to infringe on the protection of a critical habitat²? ▪ Introducing or using potentially invasive, non-indigenous alien species? ▪ Manufacturing, trading, and/or using pesticides and/or chemicals subject to international action bans or phase-outs³ (OS5)? ▪ Causing involuntarily resettlement or physical and economic displacement of populations, including Indigenous People? ▪ Altering, damaging or removing any cultural heritage and/or sites? ▪ Using forced, trafficked or child labour? ▪ Employing children under the age of 18 in hazardous work?			If you answered “yes” , the proposed project will be categorized as “Category NO PROJECT”. It is non-compliant with UNIDO’s ESSPP . National stakeholders and project proponents will be informed accordingly that UNIDO and A2D Facility cannot support the development of this project. Alternatively, further discussions and redesign of the project is required for the project to be reassessed for UNIDO support.

2) Please refer to Annex I for a definition of ‘critical habitat’ and other terms used in Table 1.

3) For example, DDT, PCBs and other chemicals listed in international instruments such as the WHO Recommended Classification of Pesticides by Hazard (Classes IA, IB, or II); the Stockholm Convention on Persistent Organic Pollutants; or the Montreal Protocol.

The aim of the environmental and social screening process is to determine if and what environmental and social review and management is required, quickly identifying those projects where potential environmental and social issues exist, so that only those with potential environmental and social implications will be required to undergo more detailed assessments.			
Please respond to the below questions with “No” or “Yes”, taking note of the guidance provided.			
GUIDING PRINCIPLES	NO	YES	GUIDANCE
5 Is the proposed project scope including: ▪ Actual establishment and/or relocation of a new large-scale facility such as a large-scale manufacturing and/or processing plant, landfill site, dam above 15m in height, etc.? ▪ Actual establishment and/or relocation of industrial zones or industrial parks? ▪ Deploying new large-scale technology installations such as large-scale waste(water) treatment plants, large-scale power generation and distribution systems, etc.? ▪ Activities that would adversely or seriously affect indigenous peoples (IP) – including those living in voluntary isolation – rights, lands, natural resources, territories, livelihoods, knowledge, social fabric, traditions, governance systems, and culture or heritage inside and/or outside the project area? ▪ Activities that require an ESIA by national law/regulations?			Please refer to Annex 1 for further details and examples. If you answered “yes” , the proposed project will be categorized as “ Category A ”. Complete Tables 2&4 and attach to the UNIDO project documentation.
6 Is the proposed project scope including: ▪ Upgrading/optimization of processes/introduction of alternative technologies at an existing facility such as treatment and disposal of POPs at existing facilities, pilot resource efficient technology transfer and installation at existing facilities, etc.? ▪ Deploying new small-scale technology installations such as limited bioenergy or other small- and medium-scale renewable energy installations, small-and medium scale agro- and food-processing installations, etc.?			Please refer to Annex 1 for further details and examples. If you answered “yes” , the proposed project will be categorized as “ Category B ”. Complete Tables 2&4 and attach to the UNIDO project documentation.
7 Is the proposed project scope including: ▪ Development of feasibility studies,⁴ roadmaps, inventories, strategies, business plans, studies, etc.? ▪ Provision of policy advice, capacity building / awareness raising, etc.? ▪ Organisation of forums, etc.? ▪ Setting-up of financial mechanisms, accelerators/ incubators, business models, etc.?			Please refer to Annex 1 for further details and examples; particularly regarding the requirements pertaining to mechanisms/schemes/models to be set-up. If you answered “yes” , the proposed project will be categorized as “ Category C ”. Complete Tables 2&4 and attach to the UNIDO project documentation.

4) If a full feasibility study is to be developed for a planned Category A project, an ESIA needs to be included (if not already undertaken or to be undertaken by another project stakeholder).

TABLE A1-2: Screening for E&S Impact Potential	
Based on the answers provided in Table 1, please select from the following:	
☐ Category NO PROJECT	The proposed project is non-compliant with UNIDO’s ESSPP OS2/OS3/OS5/OS6/OS8. Further discussions, alternative design, and reassessment of the project is required or further project development will be stopped.
☐ Category A	The proposed project is likely to induce significant and/or irreversible adverse environmental and/ or social impacts that are sensitive, diverse, or unprecedented. A full ESIA and ESMP will need to be completed during Project Formulation/Inception.
☐ Category B	The proposed project is likely to have less adverse impacts on human populations or environmentally important areas than those of Category A projects. Likely impacts will be few in number, site-specific, and few if any will be irreversible. An ESMP will need to be completed during Project Inception.
☐ Category C	The proposed project is likely to have minimal or no adverse social and/or environmental impacts. No further specific environmental and/or social assessment is required during Project Formulation or Inception. Additional requirements may, however, still apply.

TABLE A1-3: Climate Risk	
Consideration of climate risk is an important aspect of project desing and implementation. As a minimum, the below questions would need to be answered at the project concept stage. Additional analysis can be provided during the preparatory phase. You may want to consult the following publications and tools. → STAP guidance on climate risk screening. ⁵ → Climate Expert – specifically for SMEs and Industrial Zones. ⁶ → World Bank Climate and Disaster Risk Screening Tools. ⁷	
Please respond to the below questions, taking note of the guidance provided.	
Has the sensitivity to climate change , and its impacts, been assessed? Consider to include: ▪ Details of the historical (past to current) and the range of projected future climatic conditions in the project location.⁸ ▪ Information on the overall vulnerability (the product of exposure, sensitivity and adaptive capacity) of targeted natural resources in the project area to climate change. ▪ Information on the vulnerability and exposure of the local communities in the project area to a changing climate. ▪ Information on the role of climate change as a driver to the problem being addressed, if applicable. ▪ Details on how climate and non-climate stressors might interact to exacerbate climate risks.	Please provide details:

5) Available at: <https://stagef.org/sites/default/files/publications/Climate%20Risk%20Screening%20web%20posting.pdf>

6) Available at: <https://www.climate-expert.org/en/home/>

7) Available at: <https://climatescreeningtools.worldbank.org/>

8) Projected future climatic conditions and possible impacts include temperature, precipitation, drought, flood, sea-level rise, ocean warming, ocean acidification, shifting seasonal patterns, heatwaves, storm surges, winds, frequency and intensity of extreme events, etc.

Consideration of climate risk is an important aspect of project desing and implementation. As a minimum, the below questions would need to be answered at the project concept stage. Additional analysis can be provided during the preparatory phase. You may want to consult the following publications and tools. → STAP guidance on climate risk screening. ⁵ → Climate Expert – specifically for SMEs and Industrial Zones. ⁶ → World Bank Climate and Disaster Risk Screening Tools. ⁷	
Please respond to the below questions, taking note of the guidance provided.	
How will the project’s objectives or outputs be affected by climate risks over the period 2020 to 2050 , and have the impact of these risks been addressed adequately? Consider to include: ▪ Information on how the targeted project components (e.g., forests, wetlands, rivers, semi-arid croplands, parks, mangroves, chemicals, fishery, etc.) will be impacted by climate change and the level of severity. ▪ Specific information on how different levels of projected climate change impacts, including climate variability, in the project location can affect the efficacy of proposed interventions? ▪ Information on how the proposed interventions may contribute to reducing the vulnerability to climate risks. ▪ Evaluation of the possibility that the proposed interventions increase vulnerability to climate risks or lead to maladaptation, and measures for preventing this.	Please provide details:
Have resilience practices and measures to address projected climate risks and impacts been considered ? How will these be dealt with? Consider to include: ▪ How proposed climate risk management options address the identified current and projected climate risks. ▪ Details of the resilience enhancement practices, measures, and technologies proposed to manage identified current and projected climate risks. ▪ Evaluation of how to manage adaptively and project implementation proceeds. ▪ Information on the feasibility, effectiveness, tradeoffs, and co-benefits of the proposed climate risk management option, and its alignment with project objectives and expected outcomes.	Please provide details:
What technical and institutional capacity , and information , will be needed to address climate risks and resilience enhancement measures ? Consider to include: ▪ Details of the technical and institutional capacities needed to address identified climate vulnerabilities and design resilience enhancement measures. ▪ Information on the financial implications of the proposed climate vulnerability management option. ▪ Mechanisms for evaluation of the success of mechanisms to reduce vulnerability and improve resilience.	Please provide details:

TABLE A1-4: Identification of E&S Risks (OS-specific questions)				
PROJECT SPECIFIC QUESTIONS	YES	NO	RELEVANT SAFEGUARDS TO BE TRIGGERED & ADDITIONAL GUIDANCE	IF ANSWERED “YES”, DETAIL THE SPECIFIC PROJECT ACTIVITIES AND POTENTIAL E&S IMPACTS THAT PERTAIN TO THIS OS ⁹
1 Could the project directly or indirectly undertake any activities located in natural habitats?			OS 2: Protection of Natural Habitats and Biodiversity. For further details please refer to: - The relevant section in Annex 1. - ESSPP OS 2. - ESSPP Annex I. (for definition of natural habitats).	
2 Could the project directly or indirectly use natural resources, e.g., plantation forestry, commercial harvesting, agriculture, livestock, fisheries and aquaculture?				
3 Could the project potentially involve land acquisition?			OS 3: Involuntary Resettlement and Land Acquisition.	
4 If the project involves land acquisition, would this potentially require a conversion of the land use category?			OS 10: Community Health, Safety and Security. For further details please refer to: - The relevant section in Annex 1. - ESSPP OS 3 and OS 10. - ESSPP Annex I (for definition of land use categories).	
5 Could indigenous peoples (IP), including those living in voluntary isolation, be present in the project/programme's area of influence and would the project/programme have any impact on their livelihoods, lands, etc.? Will the IP be direct beneficiaries/ stakeholders in the project/programme?			OS 4: Indigenous People. OS 6: Cultural Heritage. OS 10: Community Health, Safety and Security. For further details please refer to: - The relevant section in Annex 1. - ESSPP OS 4, OS 6, and OS 10. - ESSPP Annex A: Practical Guide for OS 4 – Indigenous People, which details assessment and consultation requirements that are to be considered. - ESSPP Annex I (for related definitions).	

9) This might include both environmental and social opportunities that could be seized to strengthen the project, as well as risks that need to be managed. Information provided will inform the development of the TOR for the ESIA and/or ESMP.

PROJECT SPECIFIC QUESTIONS	YES	NO	RELEVANT SAFEGUARDS TO BE TRIGGERED & ADDITIONAL GUIDANCE	IF ANSWERED “YES”, DETAIL THE SPECIFIC PROJECT ACTIVITIES AND POTENTIAL E&S IMPACTS THAT PERTAIN TO THIS OS ⁹
6 Could the project potentially apply or promote the use of pesticides?			OS 5: Pest Management. For further details please refer to: - The relevant section in Annex 1. - ESSPP OS 5. - ESSPP Annex I (for related definitions). Note: If a project manufactures, trades, and/ or uses pesticides and/ or chemicals subject to international action bans or phase-outs , it will be categorized as NO PROJECT.	
7 Could any cultural heritage and/or sites be present in the project area or area of influence? Would the project directly deal with such resources?			OS 6: Cultural Heritage For further details please refer to: - The relevant section in Annex 1. - ESSPP OS 6. - ESSPP Annex I (for definitions of cultural heritage).	
8 Will the project involve building of new or rehabilitating of existing dams?			OS 7: Safety of Dams. OS 8: Labour and Working Conditions. OS 9: Resource Efficiency and Pollution Prevention OS 10: Community Health, Safety and Security For further details please refer to: - The relevant section in Annex 1. - ESSPP OS 7, OS 8, OS 9, OS 10. - ESSPP Annex B: Practical Guide for OS 7 – Safety of Dams. - ESSPP Annex I (for related definitions). - In the case of SHP projects, please explicitly state that run-of-the-systems will be used, if applicable.	

PROJECT SPECIFIC QUESTIONS	YES	NO	RELEVANT SAFEGUARDS TO BE TRIGGERED & ADDITIONAL GUIDANCE	IF ANSWERED “YES”, DETAIL THE SPECIFIC PROJECT ACTIVITIES AND POTENTIAL E&S IMPACTS THAT PERTAIN TO THIS OS ⁹
9 Could the working environment pose a potential threat to technical staff (e.g. gas leakage, PCB oil spillage, exposure to chemicals and/or other hazardous materials, electric shocks, use of potentially hazardous tools, machinery and equipment, exposure to heights, etc.)?			OS 8: Labour and Working Conditions. For further details please refer to: ▪ The relevant section in Annex 1. ▪ ESSPP OS 8.	
10 Could the project directly and/or through a third party: (i) generate or cause generation of solid, liquid or gaseous waste/emissions; (ii) use, cause use of, or manage the use, storage or disposal of hazardous materials and chemicals, including pesticides; (iii) significantly consume or cause consumption of water (> 5,000 m3/day), energy, or other resources?			OS 8: Labour and Working Conditions. OS 9: Resource Efficiency and Pollution Prevention. For further details please refer to: ▪ The relevant section in Annex 1. ▪ ESSPP OS 8 and OS 9.	
11 Could the project pose risks and have potential negative impacts to the health, safety and security (e.g., potential risks associated with project-related civil works, potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases, and communicable diseases) of the project-affected communities during its lifetime?			OS 10: Community Health, Safety and Security. For further details please refer to: ▪ The relevant section in Annex 1. ▪ ESSPP OS 10.	

A1.2 UNIDO ESSPP – Key guidance

Environmental and social sustainability is fundamental to the achievement of development outcomes and is systematically mainstreamed into UNIDO’s project cycle through consistent application of an environmental and social screening and assessment procedure. Opportunities to strengthen the environmental and social sustainability of projects need to be identified and realized. A precautionary approach shall be applied, and potential adverse impacts and risks need to be avoided or minimized if possible and mitigated if not.

UNIDO’s Integrated Safeguards Policy Statement (ISPS) sets out the Organization’s commitments to and responsibilities for ensuring environmental and social sustainability, and its pledge to reducing the risk of non-compliance with UNIDO’s environmental and social safeguards. UNIDO is committed to ensuring that its projects comply with the Organization’s safeguards by assessing environmental, climate change and social risks and impacts as early as possible in the project cycle, disclosing relevant information and providing effective monitoring and supervision of

agreed environmental and social management and mitigation measures during project implementation. If the Organization finds that the environmental or social impacts of any of its proposed projects are not likely to be adequately addressed, it may choose not to proceed with the project.

UNIDO assists its Member States with technical assistance type projects, which largely provide capacity building, training and awareness raising, strategic

planning, policy reform, institution strengthening, technology conversion and rehabilitation services. Investment projects supported by UNIDO are predominantly demonstration-scale interventions, such as pilot demonstrations of specific technologies. On occasion, UNIDO also engages in the (co-) development of inclusive and sustainable industrial parks. Within the context of its technical assistance projects and operations, UNIDO is committed to full compliance with the safeguard standards listed below.





OS 1: ENVIRONMENTAL AND SOCIAL ASSESSMENT

OS 1 is an overarching safeguard providing the framework for the required environmental and social screening and assessment that all UNIDO projects should undergo. This OS also determines whether proposed projects could potentially involve activities or components that pose any specific risks covered by OS 2 to OS 10 and whether any of these Operational Safeguards need to be triggered.



OS 2: PROTECTION OF NATURAL HABITATS AND BIODIVERSITY

This OS recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. Depending on the nature and scope of proposed activities, UNIDO may engage in projects targeting or located in **critical habitats**¹⁰, so long as these projects do not infringe on the protection of the critical habitats. Moreover, UNIDO does not engage in any projects that introduce or use potentially invasive, non-indigenous alien species. UNIDO uses a precautionary and ecosystem-centred approach to natural resource conservation and management to ensure opportunities for environmentally sustainable development. The safeguard reflects the importance of biodiversity and the value of key ecosystems to the population, emphasizing the need to respect, conserve and maintain the knowledge, innovations and practices of indigenous and local communities, and to protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements.



OS 3: INVOLUNTARY RESETTLEMENT AND LAND ACQUISITION

The objective of this OS is to avoid physical and economic displacement as a result of project-related land use. This safeguard ensures that projects potentially involving land acquisition resulting in involuntary physical and/or economic displacement are either re-designed to include viable alternatives or are not approved for further development by UNIDO.



OS 4: INDIGENOUS PEOPLE

UNIDO ensures that, consistent with the rights and responsibilities set forth in the United Nations Declaration on the Rights of Indigenous Peoples and other international instruments relating to indigenous peoples,¹¹ projects are designed and implemented in a way that fosters full respect for indigenous peoples, including those living in voluntary isolation, and for their dignity, human rights, and cultural uniqueness so that they (a) receive culturally appropriate social and economic benefits; and (b) do not suffer adverse effects during the development process.¹²



OS 5: PEST MANAGEMENT

UNIDO ensures that, in any project applying or promoting the use of pesticides, the environmental and health risks associated with pesticide use are minimized and managed, and that safe, effective, and environmentally sound pest management is promoted and supported. The principles of integrated pest management¹³ and integrated management of vectors and intermediate hosts¹⁴ are applied, to the extent feasible. UNIDO does not support the use of any pesticides, products or chemicals specified under the Stockholm Convention on Persistent Organic Pollutants or classified by the World Health Organization (WHO) as Classes IA, IB, or II. Additionally, UNIDO ensures that its projects follow the minimum standards described in the Code of Conduct on the Distribution and Use of Pesticides of the Food and Agriculture Organization of the United Nations (FAO).

10) For a definition of the term ‘critical habitat’ and the other terms used in Annex 1, please refer to ESSPP Annex I.

11) Including the *International Labour Organization Convention 169 on Indigenous and Tribal Peoples (1989)*; *United Nations Declaration on the Rights of Indigenous Peoples (2007)*; *UNDG Guidelines on Indigenous Peoples’ Issues (2008)*; *United Nations Permanent Forum on Indigenous Issues (under the Economic and Social Affairs Department)*, *Inter-Agency Support Group on Indigenous Issues*, and *United Nations International Decade of the World’s Indigenous Peoples Plan of Action*.

12) For definitions of ‘indigenous peoples’ and ‘indigenous peoples living in voluntary isolation’, please refer to Annex I. For further details, please see: <http://www.oas.org/en/iachr/indigenous/docs/pdf/Report-Indigenous-Peoples-Voluntary-Isolation.pdf>

13) For a definition of ‘integrated pest management’, please refer to ESSPP Annex I.

14) For a definition of ‘integrated management of vectors and intermediate hosts’, please refer to ESSPP Annex I.



OS 6: CULTURAL HERITAGE

UNIDO recognizes the vital importance of cultural heritage¹⁵ for current and future generations. This OS is designed to ensure that effective and active measures are taken to avoid support for projects involving the alteration of, damage to or removal of any type of tangible or intangible cultural heritage. Should such potential adverse impacts on a type of cultural heritage be identified during the development period, UNIDO management will decide, in consultation with national counterparts, either to relocate the project to a different site or to stop any further project development.



OS 7: SAFETY OF DAMS

The objective of this OS is to ensure quality and safety in the design, construction, operation, and maintenance of new dams and in the rehabilitation of existing dams. UNIDO does not usually engage in large-scale water management infrastructure investment projects that involve the construction or rehabilitation of large and complex dams, i.e. dams of height above 15 meters.



OS 8: LABOUR AND WORKING CONDITIONS

The objective of this OS is to ensure that UNIDO supported projects comply with national labour laws, and with the objectives of the International Labour Standards of the International Labour Organization (ILO), which include: **(i)** to promote fair treatment, non-discrimination, and equal opportunity for workers; **(ii)** to promote compliance with national employment and labour laws, which comply with the mentioned standards; **(iii)** to protect workers, including vulnerable categories of workers such as children, women, and migrant workers; **(iv)** to promote safe and healthy working conditions and the health of workers; and to avoid the use of forced labour, trafficked labour or child labour.



OS 9: RESOURCE EFFICIENCY AND POLLUTION PREVENTION

While UNIDO’s ESSPP is governed by a precautionary approach and most UNIDO projects aim to foster resource efficiency and/or pollution prevention, this OS ensures the adoption of a project-level approach to resource efficiency, cleaner production processes and pollution management, in line with internationally disseminated technologies and practices.¹⁶ The objective of this OS is, therefore, to avoid or minimize the adverse impacts of pollution on human health and the environment by avoiding or minimizing project-level wastes, emissions, and pollution. Additionally, the OS strives to promote a more sustainable use of resources, including materials, energy, land and water.



OS 10: COMMUNITY HEALTH, SAFETY AND SECURITY

This OS recognizes that project activities, equipment, and infrastructure can increase the exposure of project-affected communities and beneficiaries to health, safety and security risks and impacts, and ensures that these health, safety, and security risks and impacts are avoided or minimized and that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles. The objective of this OS, therefore, is to anticipate and avoid adverse impacts on the health, safety and security of project-affected communities and beneficiaries during the project lifetimefrom both routine and non-routine circumstances.



OS 11: INFORMATION DISCLOSURE AND OS 12: ACCOUNTABILITY AND GRIEVANCE SYSTEM

Framework Operational Safeguards, OS 11 and OS 12, provide overarching frameworks on UNIDO’s information disclosure requirements and the accountability and grievance system. As such, they are not directly relevant for completing E&S Screening. However, OS 11 and OS 10 are applicable to all UNIDO projects, even those with minimal or no adverse environmental or social impacts. The requirements of these operational safeguards also apply to UNIDO project executing entities.

15) For a definition of ‘cultural heritage’, please refer to ESSPP Annex I.

16) As reflected in internationally recognized standards such as the World Bank Group’s Environmental, Health, and Safety Guidelines, available at <http://www.ifc.org/ehsguidelines>. These standards contain performance levels and measures that will normally be acceptable and applicable to projects. When national regulations differ from these levels and measures, the project will achieve whichever are more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the project will provide full and detailed justification for any proposed alternatives, provided that such alternatives are consistent with the ESSPP.

A1.3 ESS Categorization Guidance

Project¹⁷ categorization is based on a combination of project type, characteristics of potential impacts, and sensitivity of the receiving environment, i.e. planned project site. In the meantime, the following provides an indication of how UNIDO projects might be categorized and a framework for the screening decision. However,

many factors come into play during screening, and the below should not be used as the sole basis for decision-making. Project concept screening results in the determination of one or more of the categories listed below.

CATEGORY A

A proposed project is classified as Category A if it is likely to induce significant and/or irreversible adverse environmental and/or social impacts that are sensitive, diverse, or unprecedented, or that affect an area broader than the sites or facilities subject to physical works.

Projects that would usually be identified as Category A are large-scale infrastructure development investment projects supported by multilateral and regional development banks. The projects or components included in this list could potentially have adverse impacts and normally warrant the subsequent conducting of an Environmental and Social Impact Assessment (ESIA) and an agreement on a proper Environmental and Social Management Plan (ESMP):

- Projects involving resettlement of populations.
- Projects with construction of new dams of height above 15 meters.
- Projects on large-scale aquaculture and mariculture.
- Projects on large-scale energy production and distribution facilities.
- Resource recovery facilities projects (e.g. large-scale mining operations, large-scale recycling plants).
- Large-scale agro-industry projects.
- Large-scale afforestation/reforestation, including logging operations, use of Mangroves and wetlands projects.
- Large-scale forest industry operations projects, such as sawmills and pulp and paper mills.
- Projects that establish new and/or relocate industrial zones and/or industrial park.
- Projects that establish new and/or relocate large-scale manufacturing, processing and/or treatment plants (e.g. wastewater, POPs, etc.).
- Projects that may have potentially significant adverse impacts on physical cultural resources.
- Large-scale natural resource extraction activities such as farming, irrigation, mining or fishing; and
- Activities that require an ESIA by national law are also classified as A.

17) When reference is made to 'project', this also encompasses 'programme'.

CATEGORY B

Category B projects often differ from Category A projects only in scale. They are likely to have less adverse impacts on human populations or environmentally important areas than those of Category A projects. Likely impacts will be few in number, site-specific, and few if any will be irreversible. In most cases impacts can be readily minimized by applying appropriate management and mitigation measures or incorporating internationally recognized design criteria and standards.

The following projects and components may have environmental and/or social impacts that would result in less serious risks, and warrant the development of ESMPs instead of ESIAs:

- Energy efficiency and energy conservation projects.
- Projects with rehabilitation of dams of height above 15 meters.
- Small- and medium-scale agro-industries projects.
- Small- and medium-scale irrigation and drainage projects.
- Projects on small and medium-scale aquaculture, including small and medium-scale industrial and artisanal fisheries.
- Renewable energy projects (incl. new hydroelectric dams 15 metres or below in height).
- Rural electrification projects, including mini-grids.
- Limited bioenergy projects.
- Climate adaptation projects.
- Chemicals and waste recovery, recycling and destruction projects (e.g. projects dealing with phase-out and handling of persistent organic pollutants, ozone depleting substances, e-waste, mercury and other heavy metals, etc.) at existing facilities.
- Small- and medium-scale reforestation/afforestation projects.
- Small- and medium-scale rural water supply and sanitation projects; and
- Projects that may have potentially minor adverse impacts on physical and cultural resources.

CATEGORY C

A proposed project is classified as Category C either if it is likely to have minimal or no adverse social and/or environmental impacts (e.g. studies, mapping, strategy development, business plan development, feasibility study development, policy advice, inventory work, and awareness raising / capacity building activities) and/or has only a minor budget allocation.¹⁸ Moreover, projects that centre on the setting-up of financial mechanisms, accelerators/ incubators, business models and the like are classified as Category C.¹⁹ All Category C projects that develop full feasibility studies for Category A projects will need to include an ESIA within the feasibility study, unless an ESIA, meeting the standards of ESSPP, has been or will be undertaken by another project stakeholder.

No further specific environmental and/or social assessment is required for a Category C project beyond the ESS screening. It is, however, important to note that Category C projects, particularly those with procurement components, may still have potential environmental and social sustainability considerations. These should be addressed as part of the regular project design activities and through UNIDO's procurement processes, as applicable.

18) Please note that projects shall neither be divided into two or more separate projects nor deliberately under-budgeted for the purpose of meeting this criterion.

19) However, the design of selection criteria for such mechanisms/schemes/models should include ESS considerations, in line with the requirements set out in the ESSPP, while the selected financial intermediaries are expected to have their own environmental and social management systems in place in order to address any identified ESS risks. This ensures that resulting proposal, investment, and project submissions towards the said mechanisms/schemes/models undergo separate environmental and social screenings and assessments.

No further specific environmental and/or social assessment is required for a Category C project beyond the ESS screening. It is, however, important to note that Category C projects, particularly those with procurement components, may still have potential environmental and social sustainability considerations. These should be addressed as part of the regular project design activities and through UNIDO's procurement processes, as applicable.

CATEGORY "NO PROJECT"

(i) is likely to infringe on the protection of a critical habitat.²⁰

(ii) introduces or uses potentially invasive, non-indigenous alien species.

(iii) uses banned pesticides and/or chemicals.

(iv) causes involuntary resettlement or physical and economic displacement;.

(v) is likely to alter, damage, or remove any cultural heritage and/or sites; or

(vi) uses forced, trafficked, or child labor.

Projects categorized as NO PROJECT cannot be supported by UNIDO, since they are not in compliance with UNIDO's Standards. Further discussions with stakeholders are required to re-design and/or relocate the project in order to re-categorize the project. Failing this, the proposal will not be considered for further development.

20) For exact definition please refer to ESSPP Annex I.

ANNEX 2

Environmental and Social Safeguards Draft Action Plan

A2.1 Overview

This chapter outlines a proposed draft **Environmental and Social (ESS) Action Plan** for potential demonstration projects supported by the A2D Facility. The ESS Action Plan is intended to serve as a guiding framework for demonstration projects to identifying and mitigating potential environmental and social risks associated with the project's activities, while ensuring that these activities contribute positively to sustainable development.

Key components of the proposed action plan include strategies aimed at minimizing environmental impacts, such as carbon emissions, waste generation, and resource depletion, alongside measures to safeguard the health, safety, and well-being of local communities.

A **detailed list of proposed measures**, accompanied by example indicators, is provided below in a table format. These indicators are **intended as guidelines** for the Supplier Project Management Teams (Supplier PMTs) to review and consider (if appropriate) when selecting and applying the most relevant indicators for their interventions. The indicators serve as illustrative examples to help projects in tracking and measuring environmental and social impacts.

Each project supported under the A2D Facility is expected to develop its own Environmental and Social Management Framework (ESMF), Environmental and Social Management Plans (ESMPs), or Environmental and Social Impact Assessments (ESIAs), based on the results of their **Environmental and Social (E&S) Screening** and the **Categorization** obtained (see Annex 1: Screening for E&S potential risks).

The action plan, along with the relevant indicators, should be tailored to each project's specific context. The projects will select, adapt, and develop the indicators most pertinent to their activities, ensuring that they monitor, report, and assess progress. Then each demonstration project will have to tailor their indicators and establish baseline data, setting targets, milestones, and benchmarks, in collaboration with the A2D Facility team. Projects will report on progress annually and quarterly, to be agreed with UNIDO.

In general, projects supported under the A2D Facility will have a six-month period from the start of implementation to submit their Environmental and Social Safeguards (ESS) respective improved assessments. These will be reported annually and/or as agreed with the UNIDO A2D Facility Team.

All supported projects must report against an ESS output indicator in the project's Logframe. This indicator must comply with and meet the criteria set forth in **UNIDO's Environmental and Social Safeguards Policies and Procedures**, ensuring alignment with UNIDO's ESSPP Operational Safeguards (OS 1 to 9) as well as **GEF-GCF Environmental and Social Safeguards Indicators**. The project must also ensure that it provides equitable benefits, particularly for marginalized groups such as women, indigenous peoples and local communities (IPLCs), vulnerable groups, persons with disabilities and adheres to the criteria outlined in both **UNIDO's Operational Safeguards and GEF's Environmental and Social Indicators** (particularly those related to social inclusion, as highlighted in the [68th GEF Council Meeting](#)).

CROSS CUTTING						CRITICAL MINERALS		CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-1: ESMF Monitoring Plan										
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators				Compliance Indicators		
 CROSS CUTTING THE FOUR THEMATIC AREAS	OS 1 - OS 12	General Environmental and Social Risks	Environmental Management and Pollution Prevention Implementation of measures to minimize emissions, waste, and pollution. This includes energy efficiency measures, carbon capture technologies, and adopting a circular economy model for waste management.	 AIR QUALITY: Levels of particulate matter (PM10, PM2.5), CO₂, NO_x and SO₂. EXAMPLE: PM10 and PM2.5 levels: (X% below regulatory thresholds). ▪ Year 1: 10% below regulatory thresholds. ▪ Year 3: 25% below regulatory thresholds. ▪ Year 5: Sustain levels at 30% below thresholds. CO₂: (Y% reduction compared to baseline emissions set out by a facility). ▪ Year 1: 15% reduction from baseline. ▪ Year 3: 35% reduction. ▪ Year 5: Achieve 50% reduction. NOx and SO₂: (Z% decrease from initial levels). ▪ Year 1: 10% decrease from baseline. ▪ Year 3: 30% decrease. ▪ Year 5: Sustain levels at 40% below baseline.  WATER QUALITY: pH levels, chemical oxygen demand (COD), biological oxygen demand (BOD), and heavy metal concentrations. EXAMPLE: pH: within optimal range (e.g. 90% samples between 6.5–8.5 which is the ideal pH range). ▪ By Year 2: 95% of samples within the optimal range (6.5–8.5). COD/BOD: (X% below discharge limits). ▪ Year 1: 20% reduction below discharge limits. ▪ Year 3: 50% reduction. ▪ Year 5: Maintain 70% below limits Heavy Metals: (Y% of samples within permissible limits). ▪ Year 1: 80% compliance with permissible limits. ▪ Year 3: 95% compliance.  ENERGY USAGE: Total energy consumption, breakdown by source (renewable vs. non-renewable). EXAMPLE: Renewable Energy: (X% of total consumption). ▪ Year 1: 30% of total energy consumption. ▪ Year 3: 50%. ▪ Year 5: 70%. Non-Renewable Energy: (Y% of total consumption). ▪ Year 1: 70% of total consumption. ▪ Year 3: 50%. ▪ Year 5: 30%.  WASTE GENERATION: Volume of waste produced, percentage of waste recycled, and hazardous waste disposal. EXAMPLE: Waste Recycled: X% of total waste. ▪ Year 1: 40% of total waste recycled. ▪ Year 3: 60%. ▪ Year 5: 80%. Hazardous Waste Safely Disposed: (Y% of hazardous waste). ▪ Year 1: 85% safely disposed of per regulatory standards. ▪ Year 3: 95%. ▪ Year 5: Achieve 100% compliance.				▪ Compliance with environmental permits and emissions standards set by national regulations or international frameworks. ▪ Adherence to carbon emission reduction targets or reporting requirements (e.g., carbon footprint reductions). ▪ Compliance with water quality standards and waste disposal regulations. ▪ Certification to ISO 14001 (Environmental Management). ▪ Adherence to UNIDO's OS 1- Environmental and Social Assessment. ▪ OS 9- Resource Efficiency and Pollution Prevention and Control.		

						CROSS CUTTING	CRITICAL MINERALS	CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-1: ESMF Monitoring Plan										
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators				Compliance Indicators		
 CROSS CUTTING THE FOUR THEMATIC AREAS	OS 1 - OS 12	General Environmental and Social Risks	Stakeholder Engagement and Community Outreach Establish an ongoing consultation process with stakeholders, including local communities, to address their concerns and ensure active participation in decision-making	NUMBER OF COMMUNITY CONSULTATIONS HELD EXAMPLE: X% of targeted communities consulted (70% in Year 1, 100% by Year 3). NUMBER OF GRIEVANCES SUBMITTED AND RESOLVED THROUGH THE GRIEVANCE MECHANISM EXAMPLE: ▪ Year 1: Establish grievance mechanism and resolve at least 80% of grievances within 30 days. ▪ Year 2: Improve resolution rate to 90%. ▪ Year 3: Maintain 95% resolution rate with enhanced follow-up. FEEDBACK FROM STAKEHOLDERS REGARDING PROJECT IMPACTS AND BENEFITS EXAMPLE: (X% positive feedback from stakeholders). ▪ Year 1: Conduct baseline surveys; achieve at least 70% stakeholder satisfaction. ▪ Year 2: Incorporate feedback and improve satisfaction to 85%. ▪ Year 3: Ensure 90% of stakeholders report benefits or improved impacts from the project.				▪ Adherence to UNIDO's Operational Standard 1 (Environmental and Social Risks and Impacts Assessment and Management). ▪ Timely resolution of grievances within stipulated timeframes (e.g., within 30 days). ▪ Evidence of effective communication and consultation with local communities, particularly vulnerable groups. ▪ Adherence to UNIDO's OS 11: Information Disclosure and Stakeholder Engagement.		
			Labor and Working Conditions Ensure fair and safe working conditions, compliance with labor laws, and the promotion of worker health and safety. This includes OSH training programmes and regular safety drills.	THE NUMBER OF WORKERS TRAINED IN HEALTH AND SAFETY PRACTICES EXAMPLE: X% of total workforce trained (e.g., 50% in Year 1, 100% by Year 3). ▪ Year 1: Train at least 50% of workers in basic health and safety protocols. ▪ Year 2: Increase training coverage to 80% of workers, including advanced safety practices for high-risk roles. ▪ Year 3: Achieve 100% workforce training with annual refreshers for all employees. NUMBER OF WORKPLACE ACCIDENTS, INJURIES, AND FATALITIES EXAMPLE: X% reduction in incidents (e.g., 25% reduction in Year 1, 70% by Year 3). ▪ Year 1: Reduce accidents and injuries by 25% through training and safety upgrades. ▪ Year 2: Achieve 50% reduction with improved monitoring and incident response. ▪ Year 3: Sustain a 70% reduction, with zero fatalities as a target. EMPLOYEE SATISFACTION SURVEYS AND FEEDBACK MECHANISMS EXAMPLES: X% of employees reporting satisfaction (e.g., 70% in Year 1, 90% by Year 3). X% utilization of feedback mechanisms (e.g., 50% in Year 1, 85% by Year 3). X% of employees reporting satisfaction (e.g., 70% in Year 1, 90% by Year 3). X% utilization of feedback mechanisms (e.g., 50% in Year 1, 85% by Year 3).				▪ Compliance with national labor laws and international labor standards (e.g., ILO conventions). ▪ Adherence to occupational health and safety regulations (e.g., OSHA standards). ▪ Certification to ISO 45001 (Occupational Health and Safety Management). ▪ Adherence to OS 8- Labor and Working Conditions.		
			Land Acquisition and Resettlement Develop and Implement a Resettlement Action Plan (RAP) if required, ensuring that affected individuals or communities are compensated, resettled, or provided with alternative livelihoods.	NUMBER OF HOUSEHOLDS OR INDIVIDUALS IMPACTED BY LAND ACQUISITION EXAMPLE: X% of affected households identified and engaged. ▪ Year 1: Identify all (100%) of impacted households and conduct consultations with at least 80% of them. ▪ Year 2: Ensure that all (100%) affected individuals are consulted and documented. STATUS OF LAND COMPENSATION OR RESETTLEMENT EXAMPLE: X% of compensation funds disbursed (e.g., 60% by Year 1, 100% by Year 2). X% of resettlements completed (e.g., 50% by Year 1, 100% by Year 3). ▪ Year 1: Complete 60% of compensation payments and resettle 50% of households. ▪ Year 2: Achieve 100% compensation disbursement and resettle 75% of households. ▪ Year 3: Finalize resettlement for 100% of displaced households, including access to basic services.				▪ Compliance with UNIDO's Operational Standard 3 on (Involuntary Resettlement) and Land Acquisition) ▪ Adherence to the RAP timelines and compensation mechanisms. ▪ No instances of community displacement without adequate compensation or resettlement. ▪ Adherence to OS 12- Accountability and Grievance System.		

TABLE A2-1: ESMF Monitoring Plan					
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators	Compliance Indicators
 CROSS CUTTING THE FOUR THEMATIC AREAS	OS 1 - OS 12	General Environmental and Social Risks	Land Acquisition and Resettlement Develop and Implement a Resettlement Action Plan (RAP) if required, ensuring that affected individuals or communities are compensated, resettled, or provided with alternative livelihoods.	MONITORING OF LIVELIHOOD RESTORATION EFFORTS FOR DISPLACED PERSONS EXAMPLE: X% of displaced persons who have been engaged in restoration programs (e.g., 70% in Year 1, 100% by Year 3). X% reporting of restored or improved livelihoods (e.g., 50% in Year 2, 80% by Year 3).	
			Health and Safety Implement a comprehensive Health and Safety management schedule/system to protect workers and surrounding communities. This includes risk assessments, safety protocols, and emergency preparedness plans.	FREQUENCY OF SAFETY INSPECTIONS AND AUDITS EXAMPLE: The number of planned inspections conducted on schedule. - Year 1: Conduct safety inspections quarterly for 80% of project sites. - Year 2: Increase frequency to monthly audits at critical sites and ensure 90% compliance. - Year 3: Achieve 100% adherence to inspection schedules across all project sites, with follow-ups within say 15 days of audits. NUMBER OF SAFETY INCIDENTS (INCLUDING NEAR-MISSES) AND CORRECTIVE ACTIONS TAKEN EXAMPLE: X% reduction in safety incidents and near-misses. - Year 1: Reduce incidents by 30% and implement corrective actions for at least 75% of reported cases within 30 days. - Year 2: Improve incident reduction to 50% and 90% corrective action implementation. - Year 3: Achieve a 70% reduction in incidents and 100% implementation of corrective actions within 15 days. HEALTH STATISTICS AND INCIDENTS RELATED TO THE PROJECT'S OPERATIONS (E.G., RESPIRATORY DISEASES, WATERBORNE DISEASES) EXAMPLE: X% reduction in health-related incidents (e.g., respiratory diseases, waterborne diseases). X% of affected individuals receiving medical support. - Year 1: Reduce health-related incidents by 20% through preventive measures (e.g., clean water access, protective equipment). - Year 2: Ensure 90% of affected individuals receive timely medical support and reduce incidents by 35%. - Year 3: Achieve a 50% reduction in health incidents and 100% access to medical care for affected individuals.	- Adherence to health and safety standards set by national regulations and international guidelines. - Compliance with emergency preparedness and response protocols, including the completion of safety drills. - No significant violations of health and safety regulations (e.g., worker exposure to hazardous conditions).
			Biodiversity and Ecosystem Protection Develop BAPs to implement biodiversity protection measures, especially if the Facility is located near sensitive ecosystems. This could involve conducting biodiversity assessments and establishing conservation practices.	MONITORING BIODIVERSITY HEALTH (E.G., SPECIES COUNTS, HABITAT QUALITY) EXAMPLE: X% of key species monitored. - Year 1: Establish baseline and monitor 70% of key species. - Year 3: Achieve 100% species monitoring and report on habitat quality annually. ASSESSMENT OF ANY HABITAT DISTURBANCE OR DEGRADATION DUE TO THE PROJECT'S OPERATIONS EXAMPLE: X% Extent of project site assessed. IMPLEMENTATION OF ANY COMPENSATORY BIODIVERSITY MEASURES (E.G., HABITAT RESTORATION, CONSERVATION PROGRAMMES) EXAMPLE: X% of restoration/conservation targets achieved - Year 2: Implement 50% of habitat restoration or conservation measures. - Year 4: Achieve 100% of compensatory biodiversity commitments.	- Compliance with national and international biodiversity conservation regulations. - Adherence to the Environmental and Social Management Plan (ESMP) for biodiversity. - No significant adverse impacts on critical or protected ecosystems.

TABLE A2-1: ESMF Monitoring Plan					
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators	Compliance Indicators
 CROSS CUTTING THE FOUR THEMATIC AREAS	OS 1 - OS 12	General Environmental and Social Risks	Climate Change Mitigation and Adaptation Integrate climate change adaptation strategies and focus on reducing the Facility's carbon footprint through energy efficiency, renewable energy adoption, and decarbonization technologies.	GHG EMISSIONS REDUCTION PER UNIT OF PRODUCT OUTPUT EXAMPLE: X% reduction in GHG emissions per unit. - Year 1: Achieve a 20% reduction in GHG emissions per unit, E.g aligning with the Science-Based Targets initiative (SBTi) for 1.5°C pathways. - Year 3: Improve to 40%. - Year 5: Attain 50% reduction. PERCENTAGE OF ENERGY SOURCED FROM RENEWABLE ENERGY EXAMPLE: X% of energy from renewables. - Year 1: Source 30% of energy from renewables. - Year 3: Increase to 50%. - Year 5: Achieve 70% renewable energy sourcing. CARBON INTENSITY (TONS OF CO₂ PER UNIT OF PRODUCTION) EXAMPLE: X% reduction in carbon intensity. - Year 2: Reduce carbon intensity by 25%, adhering to benchmarks like the ISO 14064-1 GHG Standards. - Year 3: Improve to 40%. - Year 5: Achieve 60% reduction.	- Compliance with national and international climate change mitigation targets. - Adherence to climate change disclosure requirements (e.g., Carbon Disclosure Project, national GHG reporting). - Alignment with regional or international decarbonization goals (e.g., Paris Agreement targets).
			Emergency Preparedness and Response Establish an effective emergency response system, including disaster preparedness plans, spill response measures, and hazard management systems.	NUMBER OF EMERGENCY RESPONSE DRILLS CONDUCTED EXAMPLE: - Year 1: Establish a baseline response time and achieve 80% effectiveness in response measures. - Year 2: Reduce response time by 30% and improve effectiveness to 85%. - Year 3: Achieve 90% effectiveness and maintain rapid response times. RESPONSE TIME TO EMERGENCIES AND EFFECTIVENESS OF RESPONSE MEASURES EXAMPLE: Number of assessments annually. - Year 1: Conduct 1 comprehensive emergency preparedness assessment. - Year 2: Update and reassess plans semi-annually. - Year 3: Conduct quarterly assessments and updates based on evolving risks. Frequency of emergency preparedness assessments and updates.	- Compliance with international standards for emergency response (e.g., UN Environment Programme guidelines). - Full adherence to national disaster management regulations. - No significant delays or failures in emergency response actions.

TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area					
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators	Compliance Indicators
 CRITICAL MINERALS	OS 9 OS 10	Air Pollution and GHGs Emissions	Process Optimization and Energy Efficiency ▪ Implement cleaner production technologies to reduce emissions during mineral processing. ▪ Use energy-efficient equipment and processes, such as high-efficiency furnaces and advanced separation techniques. ▪ Introduce heat recovery systems to minimize energy loss. ▪ Optimize supply chains to minimize transportation-related emissions. ▪ Enhance energy efficiency in refining and manufacturing facilities. Transition to Low-Carbon Energy Sources Shift to renewable energy sources (solar, wind, or hydropower) for energy-intensive activities like smelting and refining by: ▪ Use green hydrogen in metallurgical processes to replace coal or natural gas. ▪ Incorporate grid decarbonization initiatives to power processing and manufacturing units sustainably. Emissions Capture and Management ▪ Carbon Capture, Utilization, and Storage (CCUS): Deploy CCUS technologies at smelters and refineries to capture CO₂ emissions. ▪ Install air pollution control systems (e.g., scrubbers, electrostatic precipitators) to reduce particulate matter, sulfur dioxide (SO₂), and nitrogen oxides (NO_x). Sustainable Transportation ▪ Electrify transportation is used in midstream and downstream logistics. ▪ Adopt low-carbon fuels such as biofuels for vehicles transporting critical minerals. ▪ Optimize transportation routes and improve load efficiency to reduce emissions. Circular Economy Practices ▪ Increase recycling and reuse of critical minerals to reduce demand for primary extraction and associated emissions. ▪ Promote urban mining to recover minerals from end-of-life products, reducing the need for energy-intensive processing. Research and Development (R&D) ▪ Invest in R&D for low-emission processing technologies (e.g., solvent extraction, bioleaching). ▪ Develop and scale up innovations such as electric or hydrogen-based smelting.	REDUCTION IN MINING-RELATED GREENHOUSE GAS (GHG) EMISSIONS (IN TONS CO₂ EQUIVALENT) EXAMPLE: X% reduction in GHG emissions (e.g., 25% by Year 2, 50% by Year 5), measured in tons of CO₂ equivalent). ▪ Year 1: Establish a baseline for mining-related GHG emissions following the Greenhouse Gas Protocol standards. ▪ Year 2: Achieve a 25% reduction through energy efficiency measures and cleaner technologies. ▪ Year 3: Reduce emissions by 40%, aligned with targets like the Paris Agreement's 1.5°C pathway. ▪ Year 5: Attain a 50% reduction by integrating renewable energy and adopting low-carbon mining practices.	AIR POLLUTION ▪ Reduction in particulate matter emissions by 10% annually. ▪ SO_x and NO_x emissions capped at regulated thresholds (e.g., 50 mg/Nm³ for SO_x). ▪ 95% efficiency in dust capture systems during processing. GREENHOUSE GASES (GHGS) ▪ Annual reduction targets for GHG emissions by 20% annually. ▪ Carbon intensity of operations below 0.5 tCO₂e per metric ton of processed material. ▪ Implementation of energy-efficient technologies (e.g. >90% renewable energy use). ▪ Adherence to UNIDO's OS 9- Resource Efficiency and Pollution Prevention and Control. ▪ Adherence to UNIDO's OS 10.
	OS 9 OS 2 OS 10	Water Resources Usage in mining operations	Mitigating water resource usage in critical mineral activities requires implementing water-efficient practices, recycling technologies, and sustainable water management strategies. ▪ Optimize water use in processing activities by adopting water-efficient mineral processing technologies (e.g., dry processing, paste tailings). ▪ Implement water Recycling and Reuse by installing closed-loop water systems to recycle process water. ▪ Alternative water sources: Use of non-conventional water sources like seawater desalination or treated wastewater for operations. ▪ Improve tailings management by transitioning to dry-stack or filtered tailings to minimize water loss. ▪ Reduce evaporation losses by installing covers or shading systems on water reservoirs and tailings ponds.	REDUCTION IN WATER CONSUMPTION PER TON OF PROCESSED MINERAL (%) EXAMPLE: X% reduction in water consumption (e.g., 15% by Year 2, 30% by Year 5). ▪ Year 1: Establish a baseline water consumption per ton of processed mineral. ▪ Year 2: Achieve a 15% reduction by implementing water-efficient technologies. ▪ Year 5: Achieve a 30% reduction through continuous improvements and optimization. PERCENTAGE OF WATER RECYCLED AND REUSED IN OPERATIONS (%) EXAMPLE: X% of water recycled and reused (e.g., 40% by Year 2, 70% by Year 5). ▪ Year 1: Recycle and reuse 30% of water used in operations. ▪ Year 2: Increase recycling to 40% with improved systems. ▪ Year 5: Achieve 70% water recycling and reuse.	▪ ≥90% of water is reused or recycled in operations. ▪ ≤10% annual reduction in freshwater withdrawal intensity. ▪ Zero discharge of untreated wastewater into the environment. ▪ 100% compliance with local and international water quality standards. ▪ Real-time monitoring of water usage and discharge. ▪ No significant impact on local water availability for communities. ▪ Implementation of water stewardship programme in 100% of project sites.

TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area					
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators	Compliance Indicators
 CRITICAL MINERALS	OS 9 OS 2 OS 10	Water Resources Usage in mining operations	- Conduct water footprint assessments through regularly assessing water use and identifying hotspots for reduction. - Integrate advanced monitoring systems. - Use IoT and AI tools to monitor water usage in real-time. - Engage in watershed management by partnering with local communities to restore and manage shared water resources. - Implement water efficiency standards: Align operations with global standards like the Alliance for Water Stewardship (AWS) or UNIDO's Operational Standards. - Encourage R&D in Low-Water Technologies by developing and deploying innovative techniques such as bio mining or electro-extraction. - Set and monitor water reduction targets to establish science-based targets for water use reduction. - Offset and Compensatory Measures: Fund local water conservation and replenishment projects.	➤ PROPORTION OF OPERATIONAL WATER SOURCED FROM NON-FRESHWATER RESOURCES (%) EXAMPLE: X% of water sourced from non-freshwater. - Year 1: Begin sourcing 10% of operational water from non-freshwater (e.g., recycled water, desalination). - Year 2: Increase to 20%. - Year 5: Achieve 50% of operational water sourced from non-freshwater resources.	≥80% stakeholder consultation on water management plans. - Annual third-party audits of water usage and impacts. - Transparent reporting of water usage and conservation metrics. - Adherence to UNIDO's OS- 9.
				➤ VOLUME OF WATER RECOVERED FROM TAILINGS FOR REUSE (M³) EXAMPLE: X cubic meters of water recovered (e.g., 50,000 m³ by Year 2, 150,000 m³ by Year 5).	
				➤ DECREASE IN EVAPORATION RATES FROM STORAGE FACILITIES (%) EXAMPLE: X% reduction in evaporation rates. - Year 1: Implement measures to reduce evaporation (e.g., covers, additives) and assess baseline rates. - Year 2: Achieve a 10% reduction in evaporation. - Year 5: Achieve a 25% reduction with continuous innovation.	
				➤ AVAILABILITY OF REAL-TIME WATER USAGE DATA (% OF FACILITIES MONITORED) EXAMPLE: X% of facilities monitored (e.g., 50% by Year 1, 90% by Year 3).	
				➤ ANNUAL PERCENTAGE REDUCTION IN WATER CONSUMPTION AGAINST THE BASELINE EXAMPLE: X% annual reduction. - Year 1: Achieve a 5% reduction in water consumption from baseline. - Year 3: Achieve a cumulative 10% reduction. - Year 5: Achieve a 20% reduction in water consumption.	
				➤ IMPROVEMENT IN LOCAL WATER QUALITY AND AVAILABILITY INDICES EXAMPLE: - Year 1: Establish baseline water quality and availability indices. - Year 2: Improve local water quality and availability by 10%. - Year 5: Achieve a 30% improvement.	
				➤ CERTIFICATION OR COMPLIANCE WITH RECOGNIZED WATER EFFICIENCY FRAMEWORKS EXAMPLE: X% of facilities certified or compliant. - Year 2: Achieve certification/compliance in 50% of facilities (e.g., ISO 14046 or Water Stewardship Certification). - Year 5: Achieve 100% compliance/certification across all facilities.	
				➤ ADOPTION RATE OF LOW-WATER MINING TECHNOLOGIES ACROSS SITES EXAMPLE: X% of sites adopting low-water technologies (e.g., 30% by Year 2, 70% by Year 5).	

						CROSS CUTTING	CRITICAL MINERALS	CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area										
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators				Compliance Indicators		
 CRITICAL MINERALS	OS 9 OS 2 OS 10	Water Resources Usage in mining operations		➤ PERCENTAGE OF STAKEHOLDERS INVOLVED IN WATER STEWARDSHIP PROGRAMMES AND PUBLIC DISCLOSURE RATES EXAMPLE: X% of stakeholders involved, X% public disclosure rate. ▪ Year 1: Involve 40% of stakeholders in water stewardship programs and publicly disclose water usage data. ▪ Year 2: Increase stakeholder involvement to 60% and disclosure rate to 75%. ▪ Year 3: Ensure 80% of stakeholders are engaged, with 100% data disclosure.						
	OS 2	Habitat Destruction and Biodiversity Loss	▪ Habitat Restoration and Rehabilitation: rehabilitation of degraded ecosystems and restore natural habitats near processing and manufacturing sites. ▪ Implementation of Biodiversity Management Plans (BMPs): Develop and enforce site-specific BMPs to mitigate impacts on local flora and fauna. ▪ Avoidance and minimization of habitat disturbance by prioritizing infrastructure development on already disturbed lands or brownfield sites. ▪ Promote sustainable supply chains by sourcing minerals from suppliers adhering to sustainable mining and biodiversity-friendly practices. ▪ Enhance Good Waste Management Practices: development and adoption of comprehensive Waste Management Plans that include all inputs and outputs. Also, properly manage tailings, slag, and effluents to prevent contamination of nearby ecosystems. ▪ Conduct regular biodiversity monitoring by monitoring and assess biodiversity in and around facilities to identify and address emerging threats. ▪ Minimize water and energy use through implementing water and energy-efficient technologies to reduce environmental pressure. ▪ Adhere to International Standards such as UNIDO's Operational Safeguards, IFC Performance Standards, Equator Principles, and the Convention on Biological Diversity (CBD). ▪ Offset unavoidable impacts: invest in biodiversity offset projects to compensate for any unavoidable habitat loss. ▪ Engage local communities: Partnering with local communities to promote conservation and sustainable land use. ▪ Reduce Air and Water pollution by the Implementation of technologies that help reduce emissions and effluent discharges that affect nearby habitats. ▪ R&D in Biodiversity-Friendly Technologies: Invest in technologies that minimize ecological footprints, such as green processing.	➤ AREA OF HABITAT RESTORED OR REHABILITATED (IN HECTARES) EXAMPLE: X hectares of habitat restored (e.g., 50 hectares by Year 2, 200 hectares by Year 5). ➤ NUMBER OF OPERATIONAL FACILITIES WITH BMPs IN PLACE EXAMPLE: X% of facilities with BMPs (e.g., 80% by Year 2, 100% by Year 5). ➤ PERCENTAGE OF NEW DEVELOPMENTS SITED OUTSIDE CRITICAL HABITATS (%) EXAMPLE: X% of new developments outside critical habitats (e.g., 90% by Year 2, 100% by Year 3). ➤ PROPORTION OF RAW MATERIALS SOURCED FROM CERTIFIED SUSTAINABLE SUPPLIERS (%) EXAMPLE: X% of materials sourced sustainably (e.g., 40% by Year 2, 80% by Year 5). ➤ REDUCTION IN HARMFUL WASTE DISCHARGE LEVELS (TONS/YEAR) EXAMPLE: X% reduction in harmful waste discharge (e.g., 20% by Year 2, 50% by Year 5). ➤ FREQUENCY AND COMPREHENSIVENESS OF BIODIVERSITY ASSESSMENTS EXAMPLE: ▪ Year 1: Conduct biodiversity assessments at 80% of operational sites. ▪ Year 2: Increase frequency to annual assessments for all sites. ▪ Year 3: Ensure comprehensive assessments are done at 100% of sites. ➤ DECREASE IN WATER WITHDRAWAL AND ENERGY CONSUMPTION RATES PER OPERATIONAL UNIT (%) EXAMPLE: X% decrease in water and energy usage (e.g., 5% annually, 20% by Year 5). ➤ COMPLIANCE WITH INTERNATIONAL BIODIVERSITY CONSERVATION STANDARDS (%) EXAMPLE: ▪ Year 1: Achieve 70% compliance with IUCN or UNESCO Biosphere Reserve standards. ▪ Year 3: Achieve 100% compliance. ➤ AREA OR QUALITY OF BIODIVERSITY OFFSETS ACHIEVED (HECTARES OR BIODIVERSITY UNITS) EXAMPLE: X hectares or biodiversity units achieved (e.g., 30 hectares by Year 2, 100 hectares by Year 5). ➤ NUMBER OF COMMUNITY-LED BIODIVERSITY CONSERVATION PROJECTS SUPPORTED EXAMPLE: ▪ Year 1: Support 3 community-led projects. ▪ Year 2: Increase support to 6 projects. ▪ Year 3: Achieve 10 community-led biodiversity projects.				▪ Achieve biodiversity ratios of 1:3 (habitat restoration to destruction). ▪ 80% maintenance of species populations at baseline levels. ▪ Zero tolerance for encroachment into protected/sensitive areas or High Conservation Value (HCV) areas. ▪ No net loss of critical habitats during site expansion. ▪ Restoration of 100% of disturbed land post-operations. ▪ Adherence to UNIDO's OS 2.		

TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area					
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators	Compliance Indicators
 CRITICAL MINERALS	OS 2	Habitat Destruction and Biodiversity Loss		➤ LEVELS OF POLLUTANTS IN AIR AND WATER NEAR OPERATIONAL SITES (PPM) EXAMPLE: ▪ Year 1: Establish baseline pollutant levels and reduce by 10%. ▪ Year 2: Achieve a 20% reduction. ▪ Year 5: Achieve a 50% reduction in pollutant levels.	
	OS 8 OS 12	Labor Conditions and Occupational Health and Safety Risks	▪ Establishment and Enforcement of Health and Safety Management Systems: development of comprehensive workplace health and safety policies/plans aligned with OSHA and International Labor Organization (ILO) standards. Such as Health and Safety schedule plan, Emergency Response and Preparedness Plan, Oil Spill Response Plan, Hazardous (Chemical) Management Plan. ▪ Conduct regular and periodic safety audits and inspections: undertake periodic safety audits and risk assessments to identify and mitigate hazards. ▪ Provide adequate training and capacity building to workers and contractors on safety protocols, proper equipment usage, and emergency response procedures. Additionally, we undertake First Aid Training and Fire Fighting Techniques for workers. ▪ Provision of adequate and appropriate Personal Protective Equipment (PPE). Ensure that all workers and visitors on site have access to and use suitable PPE. ▪ Implement Incident Reporting and Response Systems: establish systems for reporting, investigating, and addressing workplace incidents. ▪ Promote fair wages and decent working hours for the workers by aligning wage structures and working hours with National Labor Laws and Industry best practices. ▪ Address Gender Equality and Non-Discrimination by developing policies ensuring equal opportunities and a harassment-free workplace. ▪ Monitor and reduce workplace hazards by Installing engineering controls (e.g., ventilation, noise reduction) to minimize exposure to harmful conditions. ▪ Promote Employee Welfare Programmes such as healthcare, mental health support, and wellness programmes. ▪ Compliance with International Labor Standards: Adhere to ILO conventions on forced labor, child labor, and freedom of association. ▪ Improve Workplace Ergonomics by designing workstations and workflows to reduce physical strain and repetitive stress injuries. ▪ Foster Worker Participation in Health and Safety Committees: establish worker-led safety committees to actively address labor and safety concerns. ▪ Transparent reporting and accountability: publicly disclose labor conditions and workplace safety metrics in annual sustainability reports. ▪ Emergency Preparedness and Response: develop and regularly test emergency evacuation and disaster response plans. ▪ Address supply chain Labor Practices by ensuring all contractors and suppliers also meet labor and safety standards. ▪ Monitor Grievance Mechanisms by creating accessible and anonymous channels for workers to report grievances confidentially such as suggestion boxes mounted at discrete locations.	➤ NUMBER OF PROJECTS CERTIFIED UNDER RECOGNIZED HEALTH AND SAFETY STANDARDS (e.g. ISO 45001) EXAMPLE: X projects certified (e.g., 3 in Year 1, 10 by Year 3). ➤ NUMBER AND FREQUENCY OF SAFETY AUDITS CONDUCTED PER YEAR EXAMPLE: X audits per year (e.g., 2 in Year 1, 5 by Year 3). ➤ PERCENTAGE OF EMPLOYEES COMPLETING SAFETY TRAINING ANNUALLY (%) EXAMPLE: X% of employees trained (e.g., 80% in Year 1, 100% by Year 3). ➤ PPE ISSUANCE LIST AND PERCENTAGE OF WORKERS EQUIPPED WITH PPE FOR SPECIFIC JOB ROLES (%) EXAMPLE: X% of workers equipped (e.g., 90% by Year 1, 100% by Year 2). ➤ REDUCTION IN THE NUMBER OF WORKPLACE ACCIDENTS AND INJURIES (PER 1,000 WORKERS) EXAMPLE: X% reduction (e.g., 10% by Year 2, 30% by Year 5). ➤ PERCENTAGE OF WORKERS RECEIVING FAIR WAGES ABOVE THE MINIMUM WAGE THRESHOLD ➤ GENDER PARITY IN WORKFORCE COMPOSITION (% OF WOMEN EMPLOYEES) ➤ DECREASE IN EXPOSURE LEVELS TO HAZARDOUS SUBSTANCES (E.G., SILICA, HEAVY METALS) ➤ PERCENTAGE OF EMPLOYEES ENROLLED IN WELFARE PROGRAMMES ➤ THE NUMBER OF THIRD-PARTY VERIFICATIONS OF LABOR COMPLIANCE COMPLETED ANNUALLY ➤ REDUCTION IN ERGONOMIC-RELATED INJURY REPORTS (%) ➤ NUMBER OF ACTIVE WORKER SAFETY COMMITTEES PER FACILITY ➤ PERCENTAGE OF OPERATIONAL SITES WITH PUBLICLY AVAILABLE SAFETY PERFORMANCE DATA ➤ FREQUENCY OF EMERGENCY DRILLS CONDUCTED PER YEAR ➤ PERCENTAGE OF SUPPLIERS AUDITED FOR COMPLIANCE WITH LABOR AND SAFETY POLICIES ➤ NUMBER OF GRIEVANCES RECEIVED AND RESOLVED EFFECTIVELY WITHIN A STIPULATED TIMEFRAME	LABOR CONDITIONS ▪ 100% compliance with national and international labor laws (e.g., ILO standards). ▪ Zero tolerance for child labor or forced labor. ▪ Gender equity in workforce participation (e.g., minimum 30% female representation). ▪ Minimum wage compliance for 100% of workers. ▪ > 95% of employees on permanent contracts rather than casual or informal arrangements. ▪ Provision of skills training for at least 20% of employees annually. ▪ Worker grievance measures are resolved within 30 days, with at least 95% satisfaction rates. OCCUPATIONAL HEALTH AND SAFETY (OHS) RISKS ▪ Lost Time Injury Frequency Rate (LTIFR) < 1.0 annually. ▪ Zero fatalities or severe injuries during operations. ▪ Compliance with permissible exposure limits for hazardous substances (e.g., silica dust, heavy metals). ▪ Provision of personal protective equipment (PPE) to 100% of the workers. ▪ 90% participated in annual safety training and emergency drills. ▪ Independent OHS audits conducted annually with >95% compliance scores. ▪ Emergency response time for incidents ≤ 15 minutes. ▪ Adherence to UNIDO's OS-8.
	OS 3 OS 4 OS 6 OS 10 OS 11	Community Displacement	▪ Avoid and minimize displacement by implementing design project layouts that avoid inhabited areas, Indigenous Peoples lands, and cultural heritage sites. ▪ Conduct Cultural Heritage and Social Impact Assessments (SIAs) to assess potential impacts on communities and cultural heritage through comprehensive studies. ▪ Develop and Implement Resettlement Action Plans (RAPs): Where displacement is unavoidable, prepare RAPs with provisions for indigenous groups and cultural preservation.	➤ PERCENTAGE OF PROJECTS SITED OUTSIDE INDIGENOUS LANDS OR CULTURALLY ➤ NUMBER OF ASSESSMENTS COMPLETED, INCLUDING COMMUNITY PARTICIPATION SENSITIVE AREAS (%) ➤ NUMBER OF RAPs ADDRESSING INDIGENOUS AND CULTURAL HERITAGE CONCERNS ➤ PERCENTAGE OF PROJECTS OBTAINING DOCUMENTED FPIC FROM AFFECTED COMMUNITIES (%)	▪ 100% RAP implementation pre-displacement. ▪ Full compensation before relocation. ▪ Livelihood restoration within 2 years. ▪ Grievance resolution within 60 days (>90% satisfaction).

						CROSS CUTTING	CRITICAL MINERALS	CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area										
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators		Compliance Indicators				
 CRITICAL MINERALS	OS 3 OS 4 OS 6 OS 10 OS 11	Community Displacement	- Obtain Free, Prior, and Informed Consent (FPIC). Engage indigenous communities near mining facilities to seek FPIC for activities impacting their lands and resources. - Preserve and Protect Cultural Heritage Sites by developing management plans to protect tangible and intangible cultural heritage. - Ensure fair compensation and Livelihood Restoration: provide culturally appropriate compensation and support for livelihood restoration because of the mining activities. - Promote Inclusive Community Engagement: Involve indigenous peoples and local community leaders in planning and decision-making processes. - Establish accessible Grievance Redress Mechanisms Procedures. Creation of channels for affected communities to report grievances about displacement or heritage impacts. - Partner with Cultural and Indigenous Experts: collaborate with anthropologists, archaeologists, and indigenous rights experts. - Adhere to International Standards and best standards practices. Align with UNIDO's Operational Standards OS 3, OS 6, OS10, OS 11 and UNESCO's Cultural Heritage Conventions. - Establish Indigenous Community Development Programmes through CSR initiatives such as in investing in education, healthcare, and infrastructure for indigenous and displaced local communities. - Implement land access and usage agreements: develop land lease agreements with indigenous communities to ensure land rights and benefit-sharing. - Conduct Capacity-Building Programmes to train displaced individuals in skills to adapt to new livelihoods or environments. - Transparent reporting and accountability: publicly disclose plans and outcomes related to displacement and cultural heritage protection. - Support Cultural Heritage Conservation by offering funds to document restore and promote endangered cultural practices.	- NUMBER OF CULTURAL HERITAGE SITES PRESERVED OR MANAGED UNDER APPROVED PLANS - PERCENTAGE OF DISPLACED INDIGENOUS FAMILIES ACHIEVING PRE-DISPLACEMENT LIVING STANDARDS - NUMBER OF INDIGENOUS AND COMMUNITY REPRESENTATIVES ACTIVELY PARTICIPATING IN CONSULTATIONS - PERCENTAGE OF GRIEVANCES RESOLVED WITHIN AGREED TIMEFRAMES - THE NUMBER OF PARTNERSHIPS FORMED FOR CULTURAL AND COMMUNITY IMPACT MITIGATION - PERCENTAGE OF PROJECTS COMPLIANT WITH INTERNATIONAL STANDARDS ON INDIGENOUS PEOPLES AND CULTURAL HERITAGE - AMOUNT OF FUNDING ALLOCATED TO INDIGENOUS COMMUNITY DEVELOPMENT ANNUALLY AND CSR ACTIVITIES - NUMBER OF AGREEMENTS SIGNED WITH INDIGENOUS GROUPS - PERCENTAGE OF DISPLACED INDIVIDUALS PARTICIPATING IN CAPACITY-BUILDING INITIATIVES - NUMBER OF PUBLIC REPORTS ON DISPLACEMENT AND CULTURAL HERITAGE MEASURES PUBLISHED ANNUALLY - THE NUMBER OF CULTURAL HERITAGE PROJECTS SUPPORTED FINANCIALLY		80% community participation in planning. 100% support of vulnerable groups. - No loss of access to critical services. - Annual independent compliance audits. - Quarterly post-resettlement monitoring for 2 years. - Adherence to UNIDO's OS- 3.				
	OS 10	Community Health and Safety	- Conduct Community Health Impact Assessments (HIAs) to Identify and evaluate potential health risks to communities from operations. - Monitor and reduce Air and Water Pollution by installing advanced emission controls and water treatment systems to prevent contamination. - Establish Hazard Management Plans: develop and implement emergency response plans to address industrial accidents and chemical spills. - Improve Infrastructure and Traffic Safety by upgrading roads and managing vehicle movement to reduce risks of accidents near facilities. - Control Noise and Vibration Levels: Install noise barriers and schedule high-impact activities during non-sensitive hours. - Strengthen Disease Prevention and Health Programmes: Implement programmes to combat communicable diseases (e.g., malaria, respiratory illnesses) exacerbated by operations. - Provide clear communication on Hazards by informing communities about potential risks and safety precautions through workshops and signage. - Adhere to International Safety Standards: Align operations with UNIDO Operational Safeguards, World Bank EHS Guidelines, IFC Performance Standards. - Promote Community Engagement by establishing formal channels for community members to report health and safety concerns. - Minimize Hazardous Material Transport Risks by using safe routes and specialized transport systems for hazardous materials.	- NUMBER OF HIAS CONDUCTED BEFORE PROJECT INITIATION EXAMPLE: X HIAs conducted (e.g., 2 in Year 1, 5 by Year 3). - REDUCTION IN POLLUTANT LEVELS (e.g. PM2.5, SO₂, NO_x, HEAVY METALS) IN SURROUNDING AREAS (%) EXAMPLE: - Year 1: Establish baseline pollutant levels and reduce by 5%. - Year 2: Achieve a 10% reduction in pollutant levels. - Year 5: Achieve a 25% reduction in surrounding area pollutant levels. - NUMBER OF EMERGENCY DRILLS CONDUCTED WITH COMMUNITY PARTICIPATION ANNUALLY - REDUCTION IN ROAD ACCIDENTS RELATED TO PROJECT ACTIVITIES (%) - PERCENTAGE OF OPERATIONS MEETING LOCAL NOISE AND VIBRATION STANDARDS - NUMBER OF HEALTH CAMPAIGNS OR MEDICAL OUTREACHES CONDUCTED ANNUALLY - NUMBER OF COMMUNITY SAFETY AWARENESS SESSIONS HELD ANNUALLY - PERCENTAGE OF FACILITIES COMPLIANT WITH INTERNATIONAL SAFETY STANDARDS (%) - NUMBER OF GRIEVANCES RELATED TO HEALTH AND SAFETY RESOLVED WITHIN A SPECIFIED TIMEFRAME		- Zero fatalities from project-related activities. 100% compliance with national and international health standards. - Emergency response time ≤ 15 minutes. 90% community participation in health awareness programmes. - Access to potable water for 100% of affected communities. - Zero increase in disease incidence (e.g., respiratory, waterborne). 100% of traffic-related risks mitigated with safety measures. - Hazard-free zones were established around project sites. - Regular monitoring of air, water, and soil quality. - Annual independent audits of health and safety measures. - Adherence to UNIDO's OS- 10.				

						CROSS CUTTING	CRITICAL MINERALS	CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area										
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators				Compliance Indicators		
 CRITICAL MINERALS	OS 10	Community Health and Safety	▪ Protect domestic water sources: prevent contamination of local water sources through strict waste and effluent management. ▪ Encourage Local Employment: employ residents to reduce socio-economic stressors that indirectly affect health and safety as well as avoid conflicts and effects from labor influx. ▪ Implement Robust Waste Management Systems to ensure safe disposal or recycling of waste products to prevent environmental contamination. ▪ Collaborate with Local Authorities and NGOs and other relevant stakeholders to address systemic health and safety risks in the area. ▪ Monitor Health Outcomes: Track community health metrics to identify trends and improve interventions.	➤ REDUCTION IN INCIDENTS INVOLVING HAZARDOUS MATERIAL SPILLS OR LEAKS (%) ➤ WATER QUALITY IN LOCAL COMMUNITIES MEET DRINKING WATER STANDARDS (% COMPLIANCE) ➤ PERCENTAGE OF LOCAL HIRES IN PROJECT OPERATIONS ➤ VOLUME OF WASTE PROPERLY MANAGED OR RECYCLED ANNUALLY (TONS) ➤ NUMBER OF JOINT INITIATIVES OR PROGRAMMES WITH LOCAL STAKEHOLDERS						

CROSS CUTTING						CROSS CUTTING	CRITICAL MINERALS	CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area										
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators				Compliance Indicators		
 CLEAN HYDROGEN	OS 2 OS 9	Increased Water Resources Demand	- Optimize Water Usage in Hydrogen Compression and Cooling by usage of advanced cooling technologies (e.g., dry cooling or hybrid systems) to reduce water consumption in hydrogen liquefaction and compression. - Recycle and Reuse process water: Implement closed-loop systems to treat and recycle water used in midstream and downstream operations. - Use of alternative Water Sources: Source water from non-traditional sources, such as treated wastewater or desalinated water, instead of freshwater. - Employ water-efficient technologies such as installing water-efficient systems for operations such as cleaning and maintenance of storage tanks. - Conduct Water Quality Audits-Perform regular water audits to identify and mitigate inefficiencies in water usage. - Minimize water losses in storage and transport by ensuring that there is leak-proof storage and transport systems to prevent water loss during hydrogen operations. - Use low-water-intensity storage solutions: Shift to storage systems requiring minimal water for cooling or maintenance, such as advanced composite materials. - Implement water-usage monitoring systems where sensors and smart meters are installed to monitor real-time water consumption and identify inefficiencies. - Develop Regional Water Management Strategies- tailor water management plans based on local water availability and stress levels. - Promote Employee Training on Water Conservation by training employees on best practices for reducing water consumption during hydrogen operations. - Engage in Watershed Restoration Projects: partner with local organizations to restore and enhance watershed health near hydrogen facilities. - Design efficient hydrogen transport networks through the optimization of hydrogen pipelines to reduce the need for water-intensive cooling systems. - Adhere to Water Quality Standards: Align with global standards, such as the Alliance for Water Stewardship (AWS), to promote sustainable water use. - Report water use transparently through publish of water usage data and reduction measures in sustainability reports. - Incorporate Green Infrastructure such as rainwater harvesting and permeable surfaces to capture and use surface run-off and storm water for non-process activities. - Perform Life Cycle Water Assessments (LCWA) - analyze the water footprint of midstream and downstream activities to identify hotspots and reduce impact. - Collaborate with Local Communities on Water Management to ensure sustainable water use and equitable access. - Utilize Advanced Membrane Technologies: Deploy membrane-based technologies for efficient water separation and reuse in hydrogen processes. - Offset Water Use Trough Conservation Initiatives by investing in water conservation projects to offset water consumption in hydrogen operations.	➤ REDUCTION IN WATER CONSUMPTION PER TON OF HYDROGEN LIQUEFIED (M³/TON H₂) EXAMPLE: ▪ Year 1: Establish baseline water consumption per ton of hydrogen liquefied. ▪ Year 2: Achieve a 10% reduction in water usage per ton of hydrogen. ▪ Year 5: Achieve a 30% reduction in water usage per ton of hydrogen. ➤ PERCENTAGE OF PROCESSED WATER RECYCLED AND REUSED (%) EXAMPLE: X% of water recycled and reused (e.g., 40% by Year 2, 70% by Year 5). ➤ VOLUME OF ALTERNATIVE WATER SOURCES UTILIZED ANNUALLY (M³) EXAMPLE: X m³ of alternative water used (e.g., 500 m³ by Year 2, 2,000 m³ by Year 5). ➤ REDUCTION IN WATER INTENSITY OF EQUIPMENT CLEANING OPERATIONS (M³/UNIT CLEANED) EXAMPLE: ▪ Year 1: Establish baseline water usage per unit cleaned. ▪ Year 2: Reduce water intensity of equipment cleaning by 15%. ▪ Year 5: Achieve a 30% reduction in water intensity for cleaning operations. ➤ NUMBER OF WATER AUDITS CONDUCTED ANNUALLY ➤ REDUCTION IN WATER LOSSES DURING TRANSPORT AND STORAGE (%) ➤ WATER USAGE PER STORAGE UNIT MAINTAINED (M³/UNIT) ➤ PERCENTAGE OF OPERATIONS EQUIPPED WITH REAL-TIME WATER MONITORING SYSTEMS (%) ➤ NUMBER OF SITE-SPECIFIC WATER MANAGEMENT STRATEGIES IMPLEMENTED ➤ NUMBER OF EMPLOYEES TRAINED IN WATER CONSERVATION PRACTICES ANNUALLY ➤ AREA OF WATERSHEDS RESTORED OR PROTECTED (HECTARES) ➤ REDUCTION IN WATER DEMAND FOR HYDROGEN PIPELINE OPERATIONS (M³/KM) ➤ PERCENTAGE OF FACILITIES CERTIFIED UNDER WATER STEWARDSHIP STANDARDS (%) ➤ NUMBER OF PUBLIC REPORTS DETAILING WATER USE AND EFFICIENCY MEASURES ANNUALLY ➤ VOLUME OF RAINWATER HARVESTED AND UTILIZED (M³/YEAR) ➤ NUMBER OF LCWAS COMPLETED FOR HYDROGEN PRODUCTION AND DISTRIBUTION OPERATIONS ➤ NUMBER OF COMMUNITY WATER MANAGEMENT PROGRAMMES INITIATED OR SUPPORTED ➤ WATER SAVINGS ACHIEVED USING ADVANCED TECHNOLOGIES (M³/YEAR) ➤ REDUCTION IN WATER DEMAND DUE TO ALTERNATIVE HYDROGEN DELIVERY METHODS (%) ➤ VOLUME OF WATER OFFSET THROUGH CONSERVATION INITIATIVES (M³/YEAR)				▪ Water recycling rate >90%. ▪ ≤10% reduction in water withdrawal intensity annually. ▪ Adherence to UNIDO's OS- 9.		
	OS 9	Increased Energy Demand	- Use Renewable Energy Sources by powering midstream and downstream activities with renewable energy, such as solar or wind. - Implement Waste Heat Recovery Systems to recover and reuse waste heat generated during compression, liquefaction, and transport. - Enhance Pipeline Efficiency by optimization of hydrogen pipeline design and materials to reduce energy losses during transport.Adopt Advanced Insulation for Storage using high-performance insulation materials to reduce boil-off losses and energy demands in hydrogen storage.	➤ ENERGY CONSUMED PER TON OF HYDROGEN COMPRESSED OR LIQUEFIED (KWH/TON H₂) EXAMPLE: ▪ Year 1: Establish baseline energy consumption per ton of hydrogen compressed or liquefied. ▪ Year 2: Achieve a 10% reduction in energy consumption per ton of hydrogen. ▪ Year 5: Achieve a 30% reduction in energy consumption per ton of hydrogen.				▪ Energy efficiency improvement >5% annually. ▪ 100% integration of green energy sources. ▪ Adherence to UNIDO's OS- 09.		

CROSS CUTTING						CROSS CUTTING	CRITICAL MINERALS	CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area										
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators				Compliance Indicators		
 CLEAN HYDROGEN	OS 9	Increased Energy Demand	- Adopt Advanced Insulation for Storage using high-performance insulation materials to reduce boil-off losses and energy demands in hydrogen storage. - Automate Energy Management Systems (EMS): Deploy smart EMS to monitor, control, and optimize energy usage in real-time. - Shift to Gaseous Hydrogen Transport through use of hydrogen in gaseous form when feasible, avoiding energy-intensive liquefaction processes. - Conduct Periodic Energy Audits to assess energy usage to identify inefficiencies and implement corrective measures. - Integrate Battery Energy Storage Systems (BESS): Store renewable energy in batteries for use during peak demand in hydrogen operations. - Minimize Transport Distances by strategically locating midstream and downstream facilities near production or consumption hubs to reduce transport energy. - Adopt Lightweight Materials in Transport Systems-Use lightweight materials for hydrogen transport vehicles and containers to reduce energy consumption. - Improve Cooling and Refrigeration Efficiency: Upgrade cooling and refrigeration systems to energy-efficient models in hydrogen liquefaction plants. - Transition to Low-Carbon Fleet for Transport- use hydrogen or electric-powered vehicles for hydrogen distribution to reduce fossil fuel dependency. - Monitor and Report Energy Performance by establishing transparent energy performance monitoring and public reporting frameworks. - Collaborate with Energy Efficiency Programmes such as industry and government to adopt best practices for energy efficiency - Adhere to International Energy Standards: Align operations with energy efficiency standards such as ISO 50001. - Retrofit Existing Infrastructure: Upgrade legacy infrastructure to modern, energy-efficient technologies. - Use Modular and Scalable Systems that deploy modular hydrogen processing and storage systems that can scale energy use based on demand.	- PERCENTAGE OF ENERGY FROM RENEWABLE SOURCES USED IN OPERATIONS (%) EXAMPLE: X% renewable energy used (e.g., 40% by Year 2, 70% by Year 5). - THE AMOUNT OF ENERGY RECOVERED FROM WASTE HEAT (MWH/YEAR). ENERGY LOSS PER KILOMETER OF HYDROGEN TRANSPORT PIPELINE (KWH/KM) EXAMPLE: - Year 1: Recover 300 MWh from waste heat. - Year 2: Increase to 500 MWh recovered from waste heat. - Year 5: Achieve 1,500 MWh of energy recovery annually. - REDUCTION IN BOIL-OFF RATE FOR STORED HYDROGEN (%) - PERCENTAGE REDUCTION IN OVERALL ENERGY CONSUMPTION DUE TO EMS IMPLEMENTATION (%) - REDUCTION IN ENERGY DEMAND FROM ALTERNATIVE TRANSPORT METHODS (KWH/TON H₂) - NUMBER OF ENERGY AUDITS CONDUCTED ANNUALLY - INSTALLED CAPACITY OF BATTERY ENERGY STORAGE SYSTEMS (MW) - AVERAGE DISTANCE TRAVELED FOR HYDROGEN TRANSPORT (KM) - REDUCTION IN ENERGY DEMAND PER TON OF HYDROGEN TRANSPORTED (%) - PERCENTAGE OF TRANSPORT FLEET OPERATING ON LOW-CARBON ENERGY (%) - FREQUENCY OF ENERGY PERFORMANCE REPORTS PUBLISHED ANNUALLY - NUMBER OF PARTNERSHIPS FORMED FOR ENERGY EFFICIENCY INITIATIVES - PERCENTAGE OF PROJECTS CERTIFIED UNDER ISO 50001 ENERGY MANAGEMENT SYSTEMS (%) - REDUCTION IN ENERGY CONSUMPTION DUE TO RETROFITS (MWH/YEAR) - REDUCTION IN THE ENERGY CONSUMPTION IN LOW-DEMAND SCENARIOS (%)						
	OS 9	Energy Access and Equity	- Prioritize Local Energy Access: Design of hydrogen infrastructure to supply energy to local communities, especially underserved areas, before exporting to larger markets. - Promote Affordable Pricing Mechanisms by implementing subsidies, sliding-scale pricing, or partnerships to make clean hydrogen-derived energy accessible to low-income communities. - Engage in Inclusive Infrastructure Planning through involving local stakeholders, including marginalized groups, in the planning and decision-making processes to ensure equitable distribution of benefits. - Develop Local Supply Chains and Jobs-build midstream and downstream facilities that create employment and economic opportunities for local populations, emphasizing equity in hiring practices. - Invest in Capacity-Building and Training-provide training programmes for local workers to participate in hydrogen-related industries and improve their socio-economic standing.	- PERCENTAGE OF HYDROGEN ALLOCATED TO LOCAL ENERGY NEEDS - AVERAGE COST OF HYDROGEN-BASED ENERGY FOR UNDERSERVED COMMUNITIES - NUMBER OF COMMUNITY CONSULTATIONS HELD, AND STAKEHOLDERS INVOLVED - PERCENTAGE OF JOBS CREATED FOR LOCAL AND MARGINALIZED GROUPS - NUMBER OF LOCAL PARTICIPANTS TRAINED IN HYDROGEN-RELATED INDUSTRIES				30% of hydrogen is used in underserved regions. - Equitable pricing models for marginalized communities.		
	OS 2	Land Use and Biodiversity	- Conduct Environmental and Biodiversity Assessments: undertake detailed Environmental and Social Impact Assessments (ESIAs) and Biodiversity Action Plans (BAPs) for all projects. - Avoid Critical Habitats and Sensitive Ecosystems by planning and designing to ensure site infrastructure (pipelines, storage facilities) away from critical habitats, wetlands, and protected areas.	- COMPREHENSIVE ESIA'S AND BAPS ASSESSMENTS COMPLETED - NUMBER OF PROJECTS OUTSIDE ECOLOGICALLY SENSITIVE ZONES - AREA RESTORED OR CONSERVED VIA OFFSET PROGRAMMES (HECTARES) - LAND AREA USED PER TON OF HYDROGEN PROCESSED (HECTARES/TON H₂)				- Net gain in biodiversity through offsets (ratio 1:3). - Zero encroachment into High Conservation Value (HCV) areas. - Adherence to UNIDO's OS- 2.		

						CROSS CUTTING	CRITICAL MINERALS	CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area										
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators				Compliance Indicators		
 CLEAN HYDROGEN	OS 2	Land Use and Biodiversity	▪ Implement Biodiversity Offsetting Programmes to compensate for unavoidable habitat loss by restoring or protecting habitats of equal or greater ecological value. ▪ Minimize Land Footprint: Optimize Facility layouts and use multi-functional infrastructure to reduce land conversion. ▪ Promote Reforestation and Afforestation by planting native species in degraded or impacted areas to support ecosystem recovery. ▪ Implement Sustainable Land Management Practices: Adopt practices that reduce soil erosion, degradation, and contamination around facilities and pipelines. ▪ Utilize Vertical or Compact Storage Solutions such as vertical storage tanks and compact infrastructure designs to reduce land disturbance. ▪ Monitor and Control Invasive Species: develop management plans to prevent the introduction or spread of invasive species during construction and operations. ▪ Engage in Community and Stakeholder Collaboration: Work with local communities, NGOs, and environmental agencies to identify and mitigate biodiversity impacts.	➤ NUMBER OF TREES PLANTED OR REFORESTED AREAS (HECTARES/YEAR) ➤ SOIL QUALITY IMPROVEMENT METRICS (E.G., EROSION RATES) ➤ LENGTH AND CONNECTIVITY OF WILDLIFE CORRIDORS (KM) ➤ LAND AREA SAVED THROUGH COMPACT INFRASTRUCTURE DESIGN (HECTARES) ➤ INCIDENCE OF INVASIVE SPECIES NEAR PROJECT SITES ➤ NUMBER OF BIODIVERSITY PARTNERSHIPS OR PROJECTS						
	OS 3	Community Displacement	▪ Conduct Comprehensive Resettlement Action Plans (RAPs). Develop and implement RAPs that ensure displaced communities are relocated with fair compensation, access to improved housing, and restoration of livelihoods. ▪ Ensure Free, Prior, and Informed Consent (FPIC) through engaging affected communities, including indigenous populations, in decision-making processes to secure their consent before initiating projects. ▪ Promote Equitable Benefit Sharing: establish mechanisms to ensure displaced or impacted communities receive a fair share of benefits from hydrogen projects, such as revenue-sharing programmes or community development funds. ▪ Minimize displacement through Strategic Land Use Planning: Design hydrogen infrastructure to avoid densely populated areas or culturally significant sites, reducing the need for relocation. ▪ Provide Livelihood Restoration and Training Programmes by offering skill development, employment opportunities, and financial support to displaced individuals to restore or improve their livelihoods.	➤ THE PERCENTAGE OF DISPLACED HOUSEHOLDS RESETTLED WITH IMPROVED LIVING CONDITIONS ➤ NUMBER OF FPIC AGREEMENTS SIGNED WITH AFFECTED COMMUNITIES ➤ PERCENTAGE OF PROJECT REVENUE ALLOCATED TO COMMUNITY BENEFIT PROGRAMMES ➤ REDUCTION IN THE NUMBER OF HOUSEHOLDS DISPLACED PER PROJECT ➤ PERCENTAGE OF DISPLACED INDIVIDUALS WHO REGAIN OR IMPROVE THEIR INCOME LEVELS WITHIN TWO YEARS				▪ 100% RAP implementation and pre-displacement compensation. ▪ Livelihood restoration within 2 years. ▪ Adherence to UNIDO's OS-3.		

TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area					
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators	Compliance Indicators
 SMART ENERGY	OS 9	Electronic Waste (E-Waste)	- Implement Circular Economy Practices by designing and developing components with recyclability and reusability in mind, ensuring parts are easy to disassemble and recycle. - Establish E-Waste Collection and Recycling Programmes: Set up take-back schemes and partner with certified e-waste recyclers to handle discarded smart energy equipment. - Use Sustainable and Non-Toxic Material and replace hazardous substances in electronic components with sustainable alternatives to minimize environmental harm. - Extend Product Lifespan -Develop durable and upgradable smart energy devices to reduce the frequency of replacements and e-waste generation. - Promote Consumer Awareness and Training to educate end-users and service providers on proper disposal and recycling methods for smart energy equipment. - Adopt Modular System Designs: Use modular designs for smart energy systems to enable easy repair and replacement of individual parts rather than discarding entire systems. - Establish E-Waste Regulations Compliance to ensure compliance with national and international e-waste management regulations such as WEEE (Waste Electrical and Electronic Equipment) directives. - Optimize Supply Chains for Resource Efficiency by using supply chain optimization to minimize excess inventory and reduce e-waste from unused components. - Leverage block chain for E-Waste Tracking by implementing block chain systems to monitor and track the lifecycle of electronic components from production to recycling. - Promote Research and Innovation in E-Waste Solutions: Invest in research for innovative recycling technologies and sustainable materials in smart energy systems.	- REDUCTION IN WATER CONSUMPTION PER TON OF HYDROGEN LIQUEFIED (M³/TON H₂) - PERCENTAGE OF COMPONENTS REUSED OR RECYCLED AT THE END OF THEIR LIFECYCLE - VOLUME OF E-WASTE COLLECTED AND PROPERLY RECYCLED ANNUALLY (TONES) - PERCENTAGE REDUCTION IN HAZARDOUS MATERIALS USED IN MANUFACTURING - AVERAGE OPERATIONAL LIFESPAN OF SMART ENERGY DEVICES (YEARS) - NUMBER OF AWARENESS CAMPAIGNS WERE CONDUCTED, AND PARTICIPANTS TRAINED ANNUALLY - PERCENTAGE OF MODULAR COMPONENTS IN NEW SMART ENERGY SYSTEMS - PERCENTAGE OF E-WASTE PROCESSED ACCORDING TO REGULATORY STANDARDS - PERCENTAGE REDUCTION IN SURPLUS ELECTRONIC INVENTORY - NUMBER OF SMART ENERGY DEVICES TRACKED VIA BLOCK CHAIN SYSTEMS - R&D EXPENDITURE ON E-WASTE MANAGEMENT AS A PERCENTAGE OF REVENUE	20% annual reduction in e-waste generation. ≥90% of e-waste collected and recycled. ≥50% of recovered materials reused in new products. 100% retired equipment processed by certified recyclers. - Zero use of hazardous substances (e.g., lead, cadmium). 100% safe disposal of hazardous components. - Take-back programmes covering 100% of distributed products. ≥80% consumer awareness on proper e-waste disposal. - Annual independent audits of e-waste practices. - Transparent reporting of e-waste metrics. ≥10% R&D budget allocated to circular economy solutions. - Real-time tracking of e-waste collection and recycling. - Adherence to UNIDO's OS- 09.
	OS 9	Resource Demand	- Optimize Material Use Through Design Innovations: Develop lightweight, durable, and compact components to reduce the raw material needed for production and transport. - Integrate Circular Economy Principles: use recycled materials and design products for recyclability to decrease reliance on virgin resources. - Improve Energy Efficiency in Operations by upgrading equipment and systems to reduce energy demand in transport, storage, and processing. - Implement Digital Twins for Resource Optimization by using digital twin technologies to simulate and optimize resource use across the supply chain. - Transition to Renewable Energy for Operations to power midstream and downstream facilities with renewable energy sources like solar or wind. - Localize Supply Chains to establish manufacturing and processing facilities close to resource extraction sites to reduce transport resource demands. - Develop Modular and Scalable Systems: Design systems that can scale resource use according to demand, reducing unnecessary resource consumption during low-demand periods. - Conduct Lifecycle Assessments (LCAs): Perform LCAs to identify and address resource-intensive processes in the supply chain. - Promote Resource Conservation Awareness: Train employees and stakeholders on best practices for conserving resources in midstream and downstream activities.	- REDUCTION IN MATERIAL USE PER UNIT OF SMART ENERGY DEVICE (%) - PERCENTAGE OF RECYCLED MATERIALS USED IN MANUFACTURING (%) - ENERGY CONSUMPTION PER UNIT OF ENERGY DELIVERED (KWH/UNIT) - REDUCTION IN RESOURCE WASTE DUE TO OPERATIONAL INEFFICIENCIES (%) - PERCENTAGE OF OPERATIONS POWERED BY RENEWABLE ENERGY (%) - AVERAGE TRANSPORT DISTANCE FOR RAW MATERIALS AND COMPONENTS (KM) - MATERIAL WASTAGE REDUCTION IN MANUFACTURING (%) - RESOURCE UTILIZATION EFFICIENCY DURING OFF-PEAK PERIODS (%) - NUMBER OF LIFECYCLE ASSESSMENTS CONDUCTED ANNUALLY - NUMBER OF CONSERVATION TRAINING SESSIONS CONDUCTED, AND PARTICIPANTS TRAINED ANNUALLY	5% annual reduction in raw material usage. ≥90% of materials are sourced from recycled or renewable inputs. ≥80% material recovery rate in production processes. - Zero procurement from conflict or unsustainable sources. 100% compliance with responsible sourcing standards (e.g., OECD Guidelines). - Transparent reporting of resource consumption metrics annually. ≥10% annual improvement in resource efficiency through innovation. 100% of suppliers audited for sustainable practices. - Implementation of closed-loop systems for key resources. 100% substitution of critical raw materials with sustainable alternatives where feasible. - Adherence to UNIDO's OS- 9.

CROSS CUTTING						CROSS CUTTING	CRITICAL MINERALS	CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area										
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators				Compliance Indicators		
 SMART ENERGY	OS 9	Energy Access and Equity	▪ Prioritize Local Energy Access to ensure that energy produced and distributed by smart energy systems benefits local and underserved communities before being exported to larger markets. ▪ Implement Affordable Energy Pricing Models: Develop pricing mechanisms such as subsidies or tiered pricing to make smart energy affordable for low-income households. ▪ Build Inclusive Infrastructure by extending distribution networks to remote and underserved areas, ensuring equitable energy availability. ▪ Partner with Local Stakeholders: Collaborate with local governments, community groups, and NGOs to identify energy needs and ensure equitable benefits distribution. ▪ Develop Community-Based Energy Programme to establish small-scale, community-managed energy projects (e.g., micro grids or distributed energy systems) to empower local populations. ▪ Promote Energy Literacy and Training: Educate communities about smart energy technologies and their benefits to encourage adoption and equitable use. ▪ Monitor and Reduce Energy Inequities by using data analytics to track disparities in energy distribution and consumption and take corrective actions to balance supply. ▪ Establish Policies for Energy Equity: Advocate for and implement policies that mandate equitable energy distribution and access in smart energy systems. ▪ Leverage Technology for Accessibility: Utilize IoT and AI technologies to improve energy access in remote areas by optimizing resource allocation and minimizing outages. ▪ Provide Direct Economic Benefits to Communities: Share economic benefits through local employment, revenue-sharing, or investment in community development projects.	● PERCENTAGE OF ENERGY SUPPLIED TO LOCAL COMMUNITIES (%) ● REDUCTION IN ENERGY COSTS FOR UNDERSERVED POPULATIONS (%) ● NUMBER OF UNDERSERVED HOUSEHOLDS CONNECTED TO SMART ENERGY GRIDS ● NUMBER OF PARTNERSHIPS AND COMMUNITY CONSULTATION MEETINGS CONDUCTED ● NUMBER OF COMMUNITY-BASED ENERGY SYSTEMS INSTALLED ● NUMBER OF TRAINING SESSIONS HELD, AND PARTICIPANTS TRAINED ● REDUCTION IN ENERGY DISTRIBUTION INEQUITY METRICS ● NUMBER OF POLICIES OR REGULATIONS ENACTED TO PROMOTE ENERGY EQUITY ● PERCENTAGE REDUCTION IN OUTAGES OR ENERGY DELIVERY DELAYS IN UNDERSERVED AREAS (%) ● PERCENTAGE OF PROJECT REVENUE ALLOCATED TO COMMUNITY BENEFIT PROGRAMMES (%)				▪ 100% inclusion of underserved communities in energy distribution plans. ▪ ≥30% of energy supplied to low-income or rural areas. ▪ Energy affordability programmes benefit 80% of vulnerable households. ▪ ≥50% of new energy projects address energy poverty directly. ▪ Transparent pricing models with no discriminatory practices. ▪ ≥90% of local stakeholders consulted in energy access planning. ▪ 100% compliance with SDG 7 (affordable, reliable, sustainable energy). ▪ Annual monitoring of energy access and equity impacts. ▪ ≥10% annual increase in energy access for marginalized groups. ▪ Partnerships with local organizations to improve equitable energy distribution ▪ Adherence to UNIDO's OS-9.		
	OS 9	Privacy and Cybersecurity Risks	▪ Implement Robust Cybersecurity Frameworks: Develop and enforce comprehensive cybersecurity policies, standards, and frameworks aligned with international standards (e.g., ISO 27001, NIST). ▪ Use Advanced Encryption and Authentication Mechanisms: Secure data transmission and access through end-to-end encryption and multi-factor authentication (MFA). ▪ Conduct Regular Cybersecurity Audits and Penetration Testing by performing periodic system assessments to identify and mitigate vulnerabilities. ▪ Protect Consumer Privacy with Data Minimization: Collect only essential user data and anonymize sensitive information to reduce privacy risks. ▪ Establish Incident Response and Recovery Plans: Develop rapid-response protocols for managing cyberattacks and data breaches to minimize downtime and damage. ▪ Build Resilient Network Architectures: Use decentralized and distributed system designs (e.g., block chain) to enhance security and reduce single points of failure. ▪ Provide Cybersecurity Training and Awareness Programmes: Educate employees and stakeholders on best practices for cybersecurity and data privacy. ▪ Monitor Systems with Real-Time Threat Detection: AI-driven monitoring tools to identify and respond to threats in real-time. ▪ Ensure Compliance with Privacy Regulations: Align operations with data protection laws such as GDPR, CCPA, or equivalent local regulations. ▪ Promote Consumer Trust Through Transparent Policies: Publish clear policies on data usage, storage, and security to maintain transparency with consumers.	● PERCENTAGE OF SYSTEMS COMPLIANT WITH CYBERSECURITY STANDARDS (%). ● PERCENTAGE OF SYSTEMS UTILIZING ENCRYPTION AND MFA TECHNOLOGIES (%). ● NUMBER OF AUDITS AND PENETRATION TESTS CONDUCTED ANNUALLY. ● PERCENTAGE REDUCTION IN UNNECESSARY DATA COLLECTION PRACTICES. ● AVERAGE RESPONSE TIME TO CYBERSECURITY INCIDENTS (HOURS). ● PERCENTAGE OF SYSTEMS ADOPTING DECENTRALIZED NETWORK ARCHITECTURES. ● THE NUMBER OF TRAINING SESSIONS HELD, AND PARTICIPANTS TRAINED ANNUALLY. ● PERCENTAGE OF THREATS DETECTED AND MITIGATED IN REAL-TIME. ● PERCENTAGE OF COMPLIANCE WITH APPLICABLE DATA PRIVACY LAWS. ● CONSUMER SATISFACTION RATE REGARDING DATA PRIVACY POLICIES.				▪ Zero data breaches or unauthorized access incidents annually. ▪ ≥95% of employees trained in cybersecurity and privacy best practices. ▪ Real-time monitoring of 100% digital systems for vulnerabilities. ▪ Incident response time ≤24 hours for cybersecurity breaches. ▪ Implementation of end-to-end encryption for 100% of sensitive data. ▪ Multi-factor authentication (MFA) is adopted across all systems. ▪ ≥99% uptime for critical cybersecurity infrastructure. ▪ Annual third-party audits of privacy and cybersecurity protocols. ▪ Transparent reporting of cybersecurity risks and mitigation measures.		

					CROSS CUTTING	CRITICAL MINERALS	CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area									
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators			Compliance Indicators		
 INDUSTRIAL DECARBONIZATION	OS 3	Land Use Conflicts	- Optimize Land Use Through Spatial Planning: Utilize advanced land-use planning tools to select sites with minimal environmental and community impact, such as previously degraded or industrial areas. - Prioritize Compact and Modular Infrastructure: Design infrastructure with minimal land footprint, incorporating vertical or modular designs where feasible. - Implement Green Buffer Zones: Create green belts or buffer zones around industrial sites to mitigate impacts on surrounding land and ecosystems. - Incorporate Multi-Use Land Strategies: Enable co-location of industrial facilities with other land uses, such as agriculture, renewable energy installations, or community spaces. - Conduct Environmental and Social Impact Assessments (EIAs): undertake comprehensive ESIA's to identify and mitigate potential land-use conflicts before project development. - Restore and Rehabilitate Disturbed Land by committing land restoration projects post-decommissioning or during infrastructure upgrades, improving soil and ecosystem health. - Utilize Digital and Remote Sensing Technologies to leverage satellite imaging and GIS tools to monitor land use and ensure compliance with sustainable practices. - Engage Communities in Land Use Changes and Decisions by collaborating with local stakeholders to incorporate community needs and cultural heritage considerations in land-use planning. - Implement Land Use Offsets by: Offset land-use impacts by investing in conservation or afforestation projects in other areas. - Promote Circular Land Use Practices through Reusing existing infrastructure or materials to reduce the need for additional land development.	- PERCENTAGE OF PROJECTS DEVELOPED ON BROWNFIELD OR PREVIOUSLY DEGRADED LAND (%) - REDUCTION IN LAND AREA REQUIRED PER UNIT OF PRODUCTION OR OPERATION (%) - AREA OF GREEN BUFFER ZONES CREATED (HECTARES) - PERCENTAGE OF LAND SHARED FOR MULTIPLE PURPOSES (%) - NUMBER OF EIAs CONDUCTED ANNUALLY AND PERCENTAGE OF IDENTIFIED IMPACTS MITIGATED (%) - AREA OF LAND RESTORED OR REHABILITATED ANNUALLY (HECTARES) - PERCENTAGE OF LAND MONITORED THROUGH REMOTE SENSING TOOLS (%) - NUMBER OF COMMUNITY CONSULTATIONS WERE HELD, AND STAKEHOLDER AGREEMENTS REACHED - AREA OF LAND OFFSET THROUGH CONSERVATION OR AFFORESTATION PROJECTS (HECTARES) - PERCENTAGE OF PROJECTS USING EXISTING INFRASTRUCTURE OR RECYCLED MATERIALS (%)			100% compliance with zoning and land use regulations. - No affected conversion of protected or ecologically sensitive areas. - Land disturbance <10% of the total project footprint. - Implementation of land rehabilitation/restoration plans (e.g., 100% of disturbed land restored within 3 years). 90% of project land is used planned in consultation with local communities. 100% resolution of land disputes through fair and transparent processes. - Grievance mechanisms established with >90% community satisfaction. - Zero incidents of violent conflict related to land use or project activities. - Regular stakeholder engagement to mitigate land use conflicts (at least quarterly). - Independent third-party assessments of conflict risk every 2 years. - Adherence to UNIDO's OS- 11.		
	OS 10	Community Health and Safety Risk	- Conduct Comprehensive Health and Safety Impact Assessments (HSIAs) to evaluate potential health and safety risks to communities from industrial decarbonization activities, such as emissions, accidents, or hazardous material handling. - Monitor Air Quality and Pollutants: Install air quality monitoring stations around facilities and transportation routes to track emissions and pollutants impacting communities. - Strengthen Emergency Preparedness, Procedures and Response: Develop and regularly test community-specific emergency response plans for incidents like CO₂ leaks, fires, or spills. - Ensure Safe Transport and Storage of Materials: Use advanced safety measures, such as reinforced pipelines and leak detection systems, to reduce risks from transporting and storing CO₂ or other hazardous materials. - Engage Communities in Risk Awareness Programmes by conducting regular community awareness and training sessions to educate residents about potential risks and safety measures. - Limit Noise and Light Pollution: Implement noise reduction technologies and shielded lighting at industrial sites to minimize disruptions to local communities. - Promote Worker and Community Safety Protocols: Adopt and Enforce stringent Occupational Health and Safety (OHS) standards that also protect nearby communities from potential industrial hazards. - Conduct Water Quality and Resource Monitoring: Monitor and prevent contamination of local water sources due to industrial activities. - Establish Grievance Mechanisms for Communities to create accessible platforms for communities to report health and safety concerns related to industrial decarbonization activities.	- NUMBER OF HSIAs CONDUCTED ANNUALLY - PERCENTAGE REDUCTION IN HARMFUL AIR POLLUTANTS (E.G., PM2.5, NOX, SOX) AROUND INDUSTRIAL SITES EXAMPLE: - Year 1: Establish baseline air pollutant levels around industrial sites. - Year 2: Achieve a 10% reduction in harmful air pollutants (PM2.5, NOx, SOx). - Year 5: Achieve a 30% reduction in harmful air pollutants. - PERCENTAGE OF COMMUNITIES WITH TESTED AND FUNCTIONAL EMERGENCY RESPONSE PLANS (%) - NUMBER OF TRANSPORT OR STORAGE-RELATED INCIDENTS REPORTED ANNUALLY - NUMBER OF TRAINING SESSIONS HELD, AND PARTICIPANTS TRAINED ANNUALLY - REDUCTION IN NOISE LEVELS (DECIBELS) AND LIGHT POLLUTION INTENSITY IN AFFECTED AREAS (%) - NUMBER OF OHS VIOLATIONS REPORTED ANNUALLY - NUMBER OF WATER CONTAMINATION INCIDENTS PREVENTED OR MITIGATED ANNUALLY - NUMBER OF GRIEVANCES REPORTED AND RESOLVED ANNUALLY			- Regular monitoring of air, water, and soil quality with no exceedances of safety thresholds. 100% of affected communities were informed about health risks and safety measures. - Provision of health services to 100% of local communities near project sites. 100% of project areas secured with no unauthorized access. - Zero fatalities or injuries from project-related activities in surrounding communities. 90% community participation in safety and emergency preparedness programmes. 100% of local communities included in health and safety consultations. - Regular safety drills with community involvement (at least once a year). - Community grievance mechanisms with 100% response rate within 30 days. - Adherence to UNIDO's OS- 10.		

						CROSS CUTTING	CRITICAL MINERALS	CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area										
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators				Compliance Indicators		
 INDUSTRIAL DECARBONIZATION	OS 8	Job Reskilling Needs	- Develop Low-Cost, Context-Specific Training Programmes: Design affordable, localized training programmes that reflect the specific needs of decarbonization industries in developing countries. - Promote Public-Private Partnerships (PPPs): Foster partnerships between governments, local industries, NGOs, and international organizations to fund and implement large-scale reskilling initiatives. - Integrate Reskilling into Existing Community Development Programmes to leverage ongoing development programmes to include workforce reskilling for decarbonization activities. - Provide Financial Support for Reskilling by offering subsidies, microloans, or scholarships to workers for reskilling programmes. - Build Local Training Centers to establish decentralized training hubs in key industrial regions to provide hands-on training. - Focus on Gender Equity and Youth Inclusion: Ensure reskilling programmes prioritize gender equity and youth participation, addressing barriers faced by marginalized groups. - Align Training with Regional Decarbonization Goals: Customize training to align with the country's industrial decarbonization strategies, such as CCUS, renewable energy, or energy efficiency technologies. - Monitor Outcomes and Scale Successful Models to evaluate the effectiveness of reskilling programmes and replicate successful models across regions.	- NUMBER OF TRAINEES ENROLLED IN LOW-COST RESKILLING PROGRAMMES ANNUALLY - NUMBER OF PPP PROJECTS IMPLEMENTED FOR WORKFORCE RESKILLING - PERCENTAGE OF DEVELOPMENT PROGRAMMES INCORPORATING RESKILLING COMPONENTS (%) - AMOUNT OF FINANCIAL ASSISTANCE DISBURSED FOR WORKFORCE TRAINING (USD) - NUMBER OF TRAINING CENTERS ESTABLISHED AND OPERATIONAL - PERCENTAGE OF FEMALE AND YOUTH PARTICIPANTS IN TRAINING PROGRAMMES (%) - NUMBER OF PROGRAMMES ALIGNED WITH NATIONAL DECARBONIZATION GOALS - JOB PLACEMENT RATE OF RESKILLED WORKERS IN DECARBONIZATION-RELATED INDUSTRIES (%)				100% of workers affected by automation or technology changes receive reskilling opportunities. - Minimum 20% of workforce retrained annually for decarbonization-related skills (e.g., renewable energy, carbon capture). 90% of reskilled employees maintain or achieve equal to or higher pre-transition job levels. - Reskilling programmes cover both technical and soft skills (e.g., digital literacy, safety). - Partnerships with educational institutions to offer recognized certifications or diplomas in clean technologies. - At least 80% participation rate in reskilling and upskilling programmes. 100% of training programmes are inclusive, with particular focus on underrepresented groups (e.g., women, local communities). - Creation of pathways for career progression post-reskilling for 100% of trainees. - Creation of green jobs (e.g., renewable energy technicians, environmental compliance officers) to offset job losses. 90% job retention rate post-reskilling within 12 months. - Clear career progression frameworks for reskilled employees. - Annual assessments of reskilling effectiveness with a minimum 75% satisfaction rate from participants. - Independent audits of reskilling programmes to ensure alignment with industry decarbonization goals. - Adherence to UNIDO's OS- 10.		
	OS 9	Energy Demand and Renewable Energy Integration	- Implement Energy Efficiency Measures by upgrading equipment, processes, and infrastructure in midstream and downstream activities to reduce energy consumption. - Adopt Renewable Energy Systems by transitioning to renewable energy sources such as solar, wind, and hydropower for powering industrial activities. - Develop Micro grid and Off-Grid Solutions: Establish renewable energy-based micro grids and off-grid solutions to supply consistent power to industrial facilities, especially in remote areas. - Incorporate Waste-to-Energy Technologies: Use industrial and agricultural waste to generate energy, reducing demand on conventional energy systems. - Promote Energy Demand Management Programmes: Implement demand-side management (DSM) programmes, such as load shifting, peak shaving, and energy audits, to optimize energy usage. - Facilitate Public-Private Partnerships for Renewable Energy Projects to engage private sector stakeholders and governments to co-develop renewable energy projects tailored to industrial needs. - Train Workforce on Renewable Energy Technologies: Reskill workers to operate and maintain renewable energy systems in industrial settings.	- PERCENTAGE REDUCTION IN ENERGY INTENSITY PER UNIT OF PRODUCTION (%) - PERCENTAGE OF ENERGY CONSUMPTION SOURCED FROM RENEWABLES (%) - NUMBER OF INDUSTRIAL FACILITIES POWERED BY MICRO GRID SOLUTIONS - AMOUNT OF ENERGY GENERATED FROM WASTE-TO-ENERGY PROCESSES (MWH) - REDUCTION IN PEAK ENERGY DEMAND IN INDUSTRIAL OPERATIONS (MW) - NUMBER OF PPPS ESTABLISHED FOR RENEWABLE ENERGY INTEGRATION - NUMBER OF WORKERS TRAINED IN RENEWABLE ENERGY SYSTEMS ANNUALLY - PERCENTAGE REDUCTION IN GREENHOUSE GAS (GHG) EMISSIONS DUE TO RENEWABLE ENERGY INTEGRATION (%)				- Energy intensity reduction of at least 10% per year. - Maximum allowable energy consumption per unit of production (e.g., 10% reduction annually in energy use per ton of products). 100% energy use data collection and reporting, with transparent tracking of energy efficiency progress. 50% of total energy demand is met by renewable sources within 5 years. 100% of new energy infrastructure powered by renewable sources (e.g., solar, wind, green hydrogen).		

						CROSS CUTTING	CRITICAL MINERALS	CLEAN HYDROGEN	SMART ENERGY	INDUSTRIAL DECARBONIZATION
TABLE A2-2: Potential Environmental and Social Risks specific to each Thematic Area										
Thematic Area	UNIDO's ESSPP OS	E&S Risk/Impact	Action/Measures	Monitoring Indicators				Compliance Indicators		
 INDUSTRIAL DECARBONIZATION	OS 9	Energy Demand and Renewable Energy Integration	Monitor and Evaluate Renewable Energy Integration by use of performance monitoring tools to assess the impact of renewable energy adoption on energy demand and sustainability goals.					- At least 80% of energy used in production processes is sourced from on-site renewable energy generation or long-term contracts. 90% of energy waste reduced through process optimization (e.g., heat recovery, energy-efficient equipment). - Implementation of real-time energy management systems across all operations. - Energy savings from efficiency projects contributing to at least 30% of overall energy demand reduction. 100% of surrounding communities have access to affordable, reliable, and sustainable energy (as per SDG 7). - Local community involvement in energy decision-making, with at least 75% of energy solutions tailored to their needs. - Annual independent audits of energy usage and renewable energy integration. - Transparent public reporting on energy demand and renewable energy share in annual sustainability reports. - Achievement of a 90%+ compliance rate with energy and renewable energy integration targets. - Adherence to UNIDO's OS- 9.		
	OS 9	Carbon Capture Utilization and Storage Risks	- Ensure Safe CO₂ Transport Infrastructure by designing and maintaining pipelines and transport systems to minimize leaks and ruptures. - Implement Continuous Monitoring Systems: Use of advanced sensors and AI-based monitoring systems to track CO₂ transport, storage, and utilization in real time. - Conduct Thorough Site Selection for CO₂ Storage and select storage sites with stable geological formations, ensuring minimal risk of CO₂ leakage or groundwater contamination. - Develop Emergency Response Plans: Establish and regularly update response protocols for CO₂ leaks, spills, or accidental releases in transport and storage systems. - Enhance Public Awareness and Stakeholder Engagement by conducting community outreach and stakeholder consultation to address concerns about CCUS risks and build public trust. - Promote Research and Development in Risk Mitigation by investing in research to improve CCUS technologies, focusing on risk reduction in transport, storage, and utilization phases. - Conduct Lifecycle Risk Assessments: conduct regular assessments of risks across the CCUS lifecycle to identify and address vulnerabilities proactively - Utilize CO₂ for Sustainable Applications by focusing on safe and sustainable utilization pathways (e.g., concrete production, fuels, or chemicals) to minimize the risks of CO₂ re-release. - Establish Long-Term Monitoring for Stored CO₂: Monitor CO₂ storage sites for decades to ensure long-term containment and address any post-storage risks.	- NUMBER OF CO₂ TRANSPORT INCIDENTS PER YEAR EXAMPLE: - Year 1: Establish baseline number of CO₂ transport incidents. - Year 2: Limit to 1 incident per year. - Year 5: Achieve 0 transport incidents annually. - PERCENTAGE OF CCUS FACILITIES EQUIPPED WITH REAL-TIME MONITORING SYSTEMS (%) EXAMPLE: - Year 1: Equip 30% of CCUS facilities with real-time monitoring systems. - Year 2: Increase to 50% of CCUS facilities. - Year 5: Ensure 100% of CCUS facilities are equipped with real-time monitoring systems. - NUMBER OF STORAGE SITES ASSESSED AND CERTIFIED FOR GEOLOGICAL STABILITY - AVERAGE RESPONSE TIME TO CCUS INCIDENTS (HOURS) - NUMBER OF COMMUNITY CONSULTATIONS ARE HELD, AND STAKEHOLDERS ARE ENGAGED ANNUALLY - PERCENTAGE OF CCUS FACILITIES COMPLIANT WITH REGULATIONS (%) - ANNUAL INVESTMENT IN CCUS RISK MITIGATION R&D (USD) - NUMBER OF LIFECYCLE RISK ASSESSMENTS CONDUCTED ANNUALLY - PERCENTAGE OF CAPTURED CO₂ UTILIZED IN SUSTAINABLE APPLICATIONS (%) - DURATION OF POST-STORAGE MONITORING (YEARS)				- Capture rate of ≥90% of CO₂ emissions from relevant processes. - Annual increase in capture efficiency by 5% for new installations. ≥80% of captured CO₂ utilized in industrial applications or stored in secure geological formations. - Verification of storage integrity with ≤1% annual leakage rate. - Compliance with international standards for CO₂ storage (e.g., ISO 27914:2017). ≤20% increase in energy demand for CCUS operations, offset by renewable energy integration. - Water usage for CCUS operations is limited to <10% of total site water consumption. - Real-time monitoring of CO₂ capture, transportation, and storage performance. - Annual independent verification of captured and stored CO₂ volumes. - Transparent reporting of CCUS metrics in sustainability disclosures. - Zero incidents of CO₂ leaks or associated health and safety risks. - Risk assessments completed for all storage sites, with mitigation measures in place. - Consultation with 100% of affected communities regarding CCUS activities and associated risks. - Annual investment in R&D to enhance CCUS efficiency and reduce costs (e.g., at least 5% of project budgets). - Adherence to UNIDO's OS-9.		

LIST OF TABLES



Table 1	Critical Minerals Screening (examples)	29
Table 2	Clean Hydrogen Screening (examples)	30
Table 3	Smart Energy screening (examples)	30
Table 4	Industrial Decarbonization Screening (examples)	31
Table 5	E&S Risks Monitoring (examples)	32
Table 6	International Policies and Legislation	37
Table 7	International Industry Best Practices for ESS	39
Table 8	Risk Categorization of the A2D Facility supported projects	47
Table 9	Key Personnel and Their Designated Roles and Responsibilities in the Application of the ESMF	54
Table 10	ESMF Procedures, Roles and Responsibilities	66
Table 11	ESMF Monitoring Plan	72
Table 12	ESMP Monitoring Template	73
Table 13	Output Indicator 3.5 Compliance with UNIDO’s ESSPP and its Operational Safeguards	74
Table A1-0	Preliminary E&S Risk Categorization	81
Table A1-1	Screening for E&S Impact Potential	82
Table A1-2	Screening for E&S Impact Potential	84
Table A1-3	Climate Risk	84
Table A1-4	Identification of E&S Risks (OS-specific Questions)	86
Table A2-1	ESMF Monitoring Plan	96
Table A2-2	Potential Environmental and Social Risks specific to each Thematic Area	104





Vienna International Centre
Wagramerstr. 5, P.O. Box 300
A-1400 Vienna, Austria



+43 1 26026-0



www.unido.org



A2DFacility@unido.org



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION