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A2D Facility Annual Event 2026

Scaling Innovative
Solutions for Sustainable
Industrial Development

**13-16 April 2026,
Bogotá, Colombia**





Agenda

Time	Activity
09:00 – 09:05	Arrival & Seating
09:05 – 09:07	Opening
09:07 – 09:12	Security Briefing
09:12 – 09:22	Introduction and Video on A2D Facility 3 Years On
09:22 – 09:30	Video Announcement by UNIDO Director General
09:30 – 09:53	Opening Statements: • Mr. Alois Mhlanga, Director, Climate Innovation and Montreal Protocol, UNIDO • TBC, Colombian Minister / Senior Government Official • Ms. Lara Hirschhausen, Head of International Climate Finance Innovation Programmes, Department for Energy and Net Zero, UK Government • Caz Shaps, Counsellor, Economic, Climate and Science, British Embassy Colombia
09:53 – 10:00	Accelerate-to-Demonstrate (A2D) Facility Overview
10:00 – 10:30	Panel Discussion with first cohort of A2D Facility-supported demonstration projects



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Video on A2D Facility 3 Years On





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Announcement

Mr. Gerd Müller,
Director General,
UNIDO



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Video Announcement by UNIDO DG





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Opening Statements

**Mr. Alois Mhlanga,
Director of Climate Innovation and Montreal
Protocol,
Technical Cooperation and Sustainable Industrial
Development,
UNIDO**



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Opening Statements

Ms. Lara Hirschhausen
Head of International Climate Finance Innovation
Programmes,
UK Department for Energy and Net Zero,
UK Government



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Opening Statements

Caz Shaps
Counsellor,
Economic, Climate and Science,
British Embassy Colombia



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Mentimeter!





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Accelerate-to-Demonstrate (A2D) Facility

*Accelerating the Commercialization of
Innovative Climate Solutions through
Transformational Demonstration Projects*



Overview of A2D Facility

The Solution

The A2D Facility aims to accelerate the commercialization of innovative climate solutions in developing countries by supporting catalytic and scalable demonstration projects in:

- Clean hydrogen
- Critical minerals
- Smart energy
- Industrial decarbonization



Initial Funding and Timescales

- Initial contribution of ~USD 85 million from the UK Government
- Initially operates from April 2023 to March 2029
- Global (developing country-focused) Facility
- Grants of USD 1-5 million per demonstration project
- 5 demonstration projects supported through first call-for-proposals in 2024 (in Kenya, Namibia, Nigeria, Nepal and Tanzania)
- Second call-for-proposals closed in June 2025 – four new projects have been announced in early 2026 (in Kenya, Namibia, Nigeria, South Africa)
- Main Sustainable Development Goals (SDGs)-of-focus:



Activities bringing **transformational solutions** to the market at scale.

Providing grant support for implementing transformational 'lighthouse' demonstration projects with strong scalability potential, and which create and **disseminate knowledge and experiences** to foster collaboration, learning and scalability. Planning-related activities for demonstration projects are out-of-scope.



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Panel Discussion



Moderator:

Peter Warren

A2D Facility Manager,
UNIDO



Paul Willacy

CEO,
Compact Syngas
Solutions Ltd



Noela Thomas Kimei

Business Development
Manager,
Payless Energy Company
Limited



Jerome Namaseb

Chief Executive
Officer,
Daures Green
Hydrogen Village



**Mercy Edward
Masanga**

Founders Associate,
Greenage
Technologies



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Further Information

- **A2D Facility Website:** A2DFacility.unido.org
- **A2D Facility LinkedIn Account:** [Follow the LinkedIn page here](#)
- **A2D Facility Mailing List:** [Join the mailing list here](#)
- **A2D Facility Year 1 Annual Report:** [Access the Annual Report here](#)
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Accelerate-to-Demonstrate (A2D) Facility Annual Event

Data for Scalability

14 April 2026

11:15 – 12:30



Agenda

Introduction

- Mr. **Yaman Al Eryani**, UNIDO

Opening Presentation

- Ms. **Megan Laws** , MEL Adviser, DESNZ

Panel Discussion

- Ms. **Megan Laws** , MEL Adviser, DESNZ
- Mr. **Ruben Goldsztany**, Director, ANDI
- Ms. **Andrea Ortega**, M&E Adviser, MAF
- Ms. **Mercy Masanga**, Energy System Associate, Ubuntu

Q&A

Objective:

Show MEL as a de-risking tool that strengthens commercial and technical feasibility case for financiers and MDBs.

What makes a transformational change project.

Enable evidence-based matchmaking by using transparent reporting to connect developers with international partners and technology providers.



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Speaker

Megan Laws, MEL Advisor, DESNZ



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Panel Discussion



Moderator:

Yaman Al Eryani

Monitoring and
Reporting, UNIDO



Megan Laws
MEL Advisor,
DESNZ



Ruben Goldsztayn
Director,
ANDI



Andrea Ortega
M&E Advisor,
MAF



Mercy Masanga
Energy System
Associate,
Ubuntu Energy



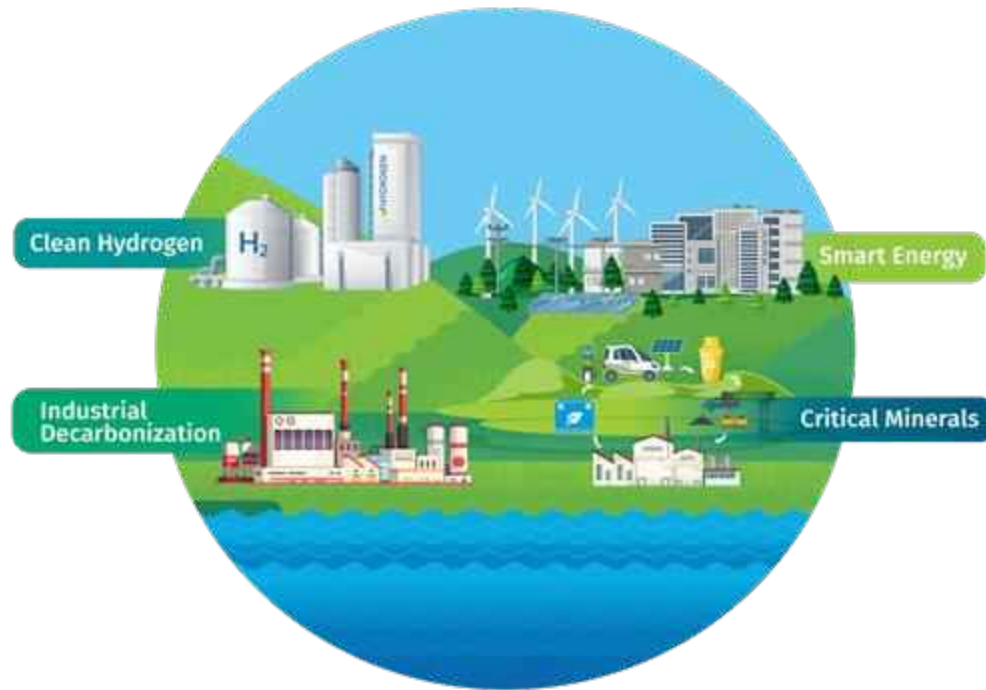
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Thank you

A2D Facility Annual Event:
Feedback Form (Monitoring and
Reporting) 14 April 2026



Please share your feedback on the session
Scan the QR code to fill the form



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Scaling Innovative
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Accelerate-to-Demonstrate (A2D) Facility Annual Event

Aligning Finance for Demonstration and Scalability of Innovative Climate Solutions in Developing Countries

14 April 2026 | 11:15



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Welcome

Peter Warren
A2D Facility Manager, UNIDO



Objectives

- **Share practical financing experiences and risk approaches** that support the transition of innovative solutions from demonstration to scalable investment.
- **Identify key enablers of scalability**, including market conditions and enabling environments, while providing accessible insights into how finance drives industrial transformation.
- **Foster collaboration and alignment of capital** among financiers and stakeholders to support high-impact, scalable solutions in developing countries.



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Agenda

Introduction: 11:15 – 11:20

- Mr. Peter Warren, A2D Facility Manager, UNIDO

Opening Remarks: 11:20 – 11:25

- Mr. Alois Mhlanga, Director, Division of Climate Innovation and Montreal Protocol, UNIDO

Panel Discussion: 11:25 – 11:50

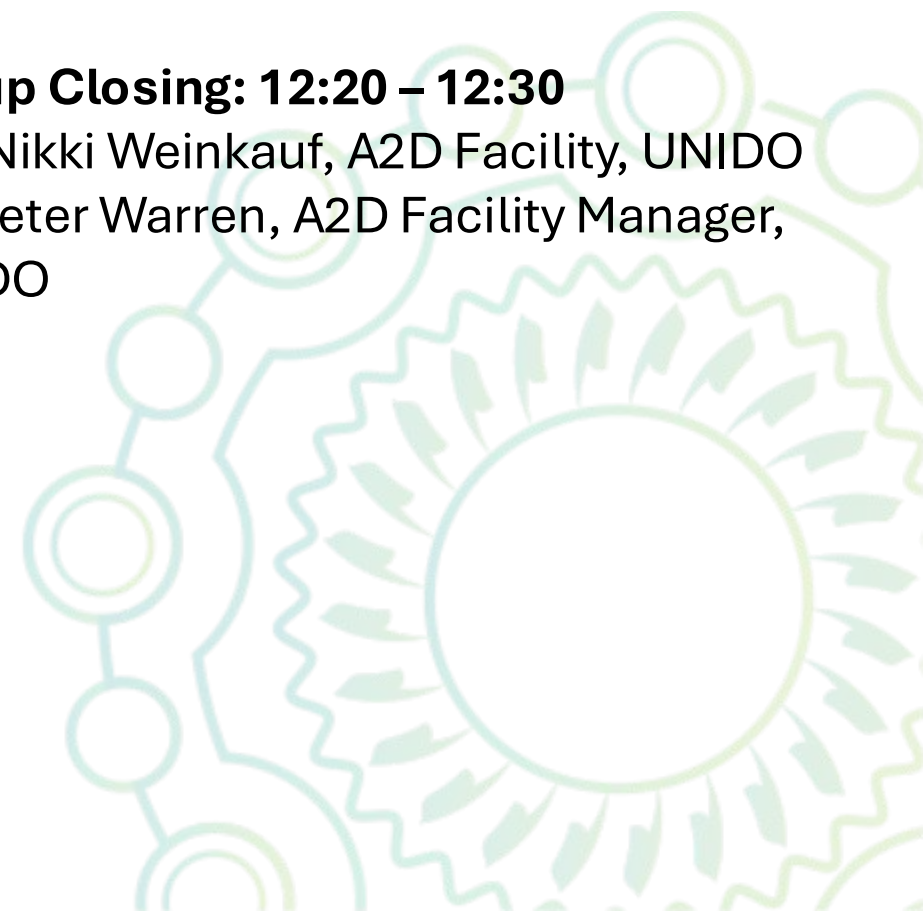
- Camila Silva Arango, Technical Assistance Manager, Finance in Motion
- Monica Silva Gonzalez, Technical Advisor, Mitigation Action Facility
- Carolina Cárdenas, Country Representative, IFC Colombia
- Tamara Babayan, Senior Energy Specialist, The World Bank

Interactive Fishbowl Activity: 11:50 – 12:20

- Audience participation

Wrap-up Closing: 12:20 – 12:30

- Ms. Nikki Weinkauff, A2D Facility, UNIDO
- Mr. Peter Warren, A2D Facility Manager, UNIDO





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Opening Remarks

Mr. Alois Mhlanga
Director, Division of Climate Innovation and Montreal
Protocol, UNIDO



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Panel Discussion



Moderator:
Peter Warren
A2D Facility Manager
UNIDO



Tamara Babayan,
Senior Energy
Specialist, Global
Energy Department,
ESMAP, World Bank



Camila Silva Arango,
Technical Assistance
Manager, Finance in
Motion



**Monica Silva
Gonzalez,**
Technical Advisor,
Mitigation Action
Facility



**Carolina
Cárdenas,**
Country
Representative,
IFC Colombia



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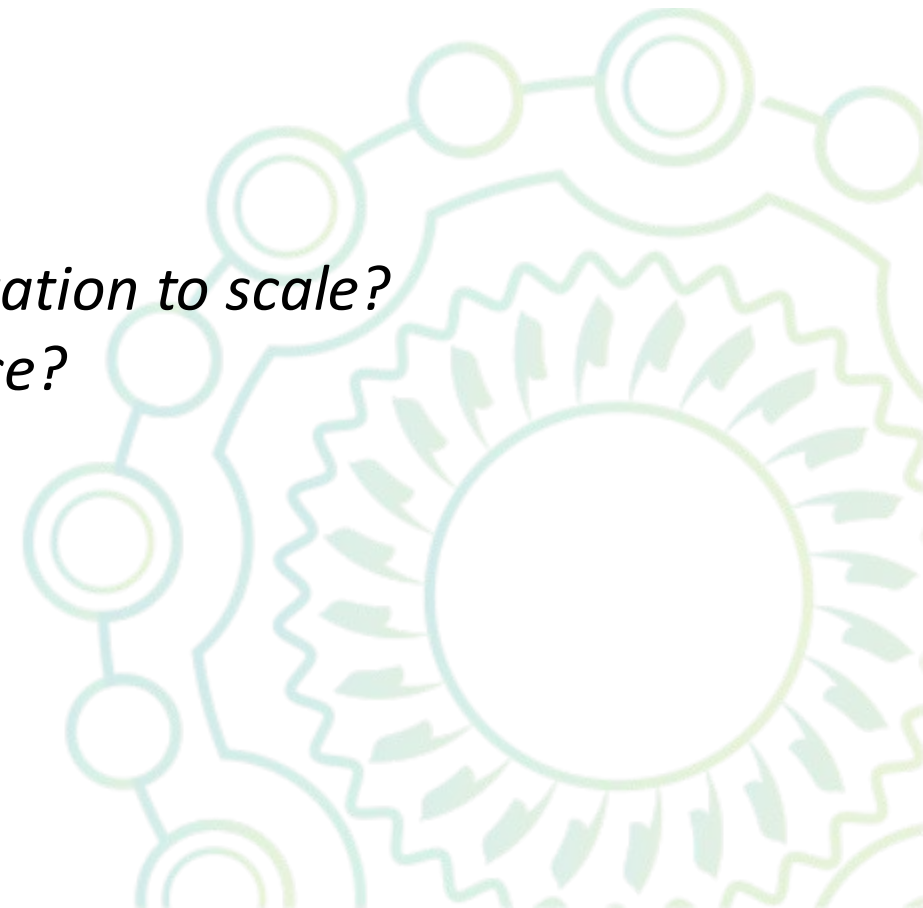
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Interactive Fishbowl Activity

What needs to happen next to unlock greater investment into scalable climate solutions in developing markets?

Additional prompts:

- *What actually enables projects to move from demonstration to scale?*
- *What specific financing approach has worked in practice?*
- *How do we scale beyond a single project?*





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Wrap-up & Closing

Feedback Form: Finance Session 1



Thank you





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Accelerate-to-Demonstrate (A2D) Facility Annual Event

Scaling Smart Energy Ecosystems: Innovation, Value Chains and Investment Pathways

Part A Main Session

14 April and 2pm-3:30pm UTC-5

Bosque 1, 2nd Floor, Hilton Bogota Corferias, Colombia



Smart Energy Session Objective (Part A Main Session & Part B Workshop):

- Explore **scaling strategies and replication pathways** for smart energy solutions following early-stage pilot implementation.
- Identify key linkages across **smart energy value chains** and discuss opportunities for stronger sector integration.
- Highlight growth opportunities for **SMEs operating in the smart energy ecosystem** in developing countries.
- Present **investment tools, financing approaches, and analytical frameworks** that support smart energy project development and scale-up.
- Facilitate **networking and partnership opportunities** among stakeholders to support future project development and collaborative initiatives.



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Smart Energy Part A Main Session Agenda

Introduction (5 min)

- Yi Zhang, Project Coordinator on smart energy and industrial decarbonization, A2D Facility, TCS/CMP, UNIDO

Project/Programme Presentation (15min * 4)

- Rojen Kumar Shrestha, Project Coordinator, Practical Action
- Chukwuemeka Godwin Nwangele, Co-founder, Greenage Technologies
- Mercy Masanga, Energy Systems Associate, Greenage Technologies
- Jaime Alberto Mongui, Senior Quality Expert, TCS/SME/CQC, UNIDO
- Alejandro Restrepo Martinez, Industrial Energy Efficiency Manager, ATERA

Moderated Q&A (20min)

Closing and Wrap-ups (5min)





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*From Catalytic Demonstration to Scalable
Market Transformation (First cohort of
A2D Facility beneficiaries' presentation)*

**Rojen Kumar Shrestha, Project Coordinator,
Practical Action**



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Transforming Wasted Energy to Community Power (First cohort of A2D Facility beneficiaries presentation)

Chukwuemeka Godwin Nwangele, Co-founder, Greenage Technologies &

Mercy Masanga, Energy Systems Associate, Greenage Technologies



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How UNIDO incorporates SMEs into Smart Energy Value Chains

**Jaime Alberto Mongui, Senior Quality Expert,
TCS/SME/CQC, UNIDO**



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Energy Districts: A collaborative journey with UNIDO in Colombia

**Alejandro Restrepo Martinez,
Industrial Energy Efficiency Manager, ATERA**



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Moderated Q&A



Moderator:

Yi Zhang,

Smart Energy and
Industrial
Decarbonization Lead,
A2D Facility, UNIDO



**Chukwuemeka Godwin
Nwangele,**

Co-founder,
Greenage Technologies



Jaime

Alberto Mongui,

Senior Quality Expert,
TCS/SME/CQC,
UNIDO



Mercy Masanga,

Energy Systems Associate,
Greenage Technologies



**Alejandro Restrepo
Martinez,**

Industrial Energy Efficiency
Manager, ATERA



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Participant Feedback Form

- Please take a few minutes to fill out the A2D Facility Workshop Session Feedback Form.
- Time to complete: ~3-4 minutes
- Link to the form: [A2D Facility Annual Event Feedback Form-Thematic Session Smart Energy Part A main session – Fill out form](#)
- Your responses will remain confidential and will be used to enhance future sessions and activities.

A2D Facility Annual Event Feed
back Form-Thematic Session
Smart Energy Part A main session





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Thank you





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the hardest-to-abate
sectors. **Now!**



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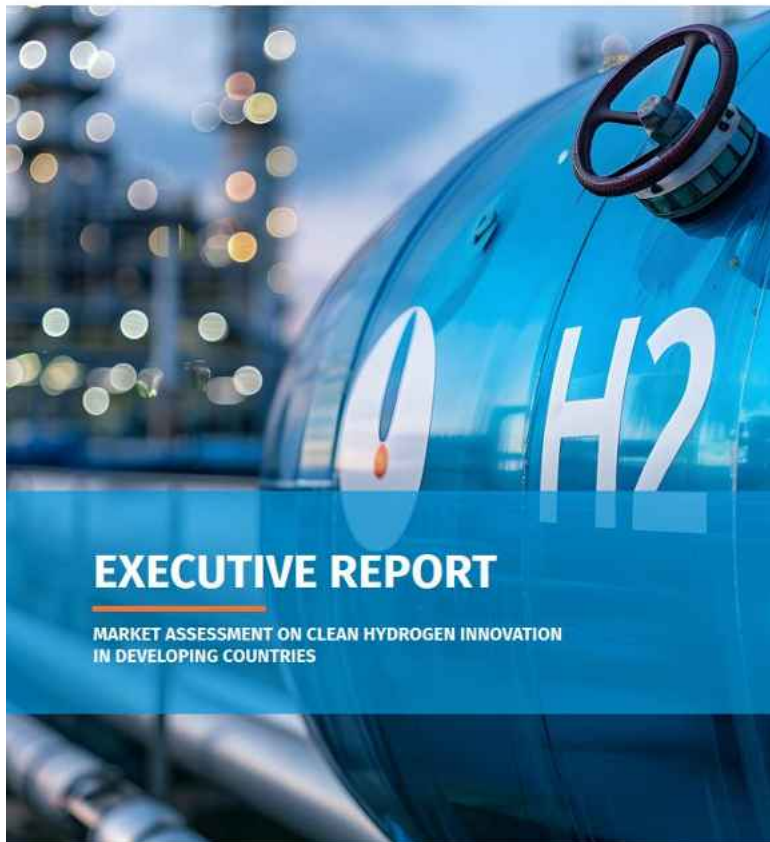
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Global Hydrogen Market Reality Two Years After COP29

A2D Facility Annual Event 2026

BRUSSELS • PARIS • ROTTERDAM • MADRID • SANTIAGO • BOGOTA

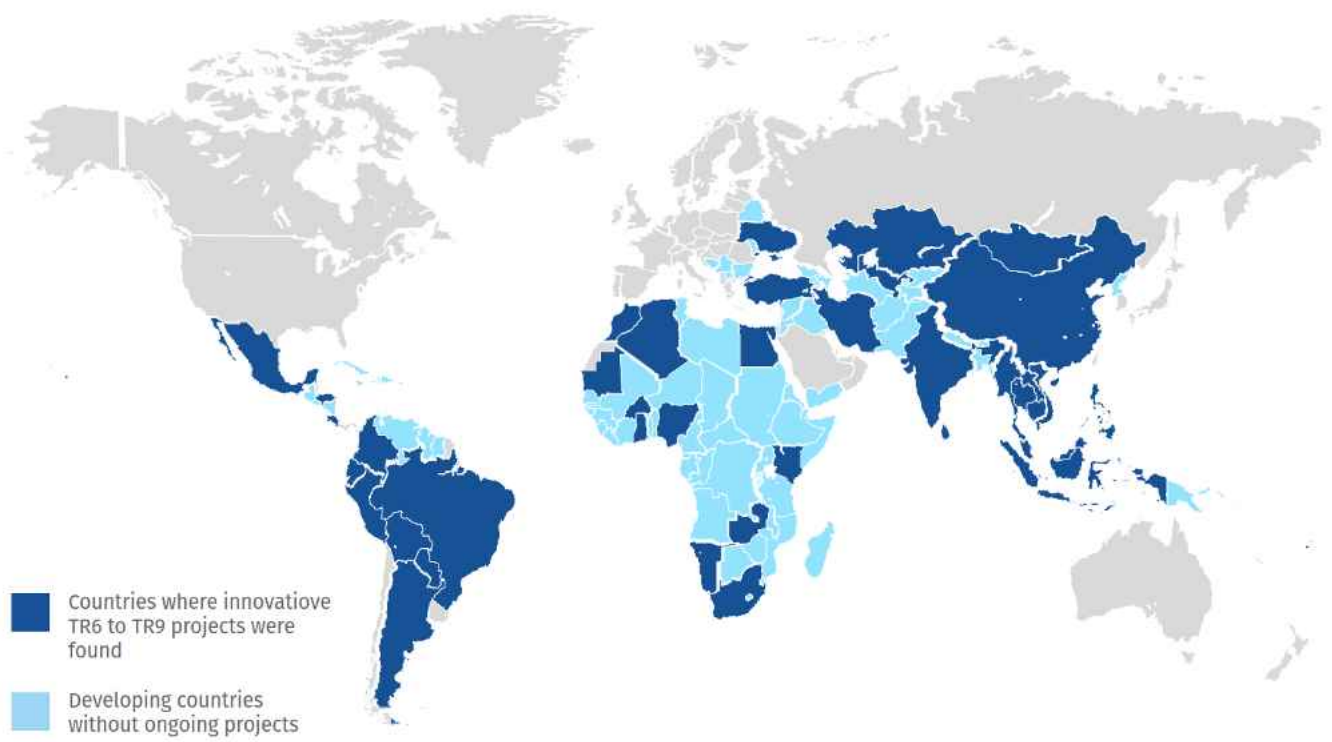
At COP 29, UNIDO presented its report “Market Assessment on Clean Hydrogen Innovation in Developing Countries”



Objectives

- **Present an overview of clean hydrogen technologies and projects in developing countries**, including their maturity (TRLs), scales of deployment, and distribution across regions, with a particular focus on technologies already close to commercialization.
- **Analyze the enabling ecosystem for clean hydrogen innovation** by assessing stakeholder involvement (public and private), existing policies and strategies, financing mechanisms, R&D activities, and ongoing initiatives that support or barriers that hinder H₂ deployment in developing countries.
- **Identify leading and high-potential developing countries for clean hydrogen innovation** and assess how clean hydrogen deployment can contribute to decarbonization objectives and the achievement of the Sustainable Development Goals (SDGs).

A total of 114 hydrogen projects under development using technologies with TRLs 6–9 were identified across 35 developing countries (excl. China)



- All 141 developing countries were characterized considering three criteria:
 - Evidence of a national strategy, roadmap or plan for the deployment of clean H₂
 - Presence of clean H₂ association
 - Evidence of innovative H₂ projects under development
- 47 countries met at least one of this criteria. Specifically, 114 projects under development were identified in 35 of them.
- 16 countries were identified as pioneers in Clean H₂ Innovation¹

Asia	America	Africa	Europe
India	Argentina	Egypt	Türkiye
Indonesia	Brazil	Kenya	Ukraine
Malaysia	Colombia	Morocco	
Vietnam	Costa Rica	Namibia	
	Mexico	South Africa	

¹Based on the existence of a clean hydrogen ecosystem, the presence of stakeholders, initiatives, financing mechanisms, R&D activities and projects.

An uneven trend evolution in upstream and midstream value chain stages has been observed in the last couple of years.

Stage of value chain

Key trends observed in developing countries (2024)

Trend Evolution by 2026 ¹



Hydrogen Production

Most projects (41%) focused on clean H₂ production using **mature electrolysis technologies** (TRL >6). Projects are mainly funded by **companies from high-income countries, seeking to capitalize on favorable geographic conditions.**

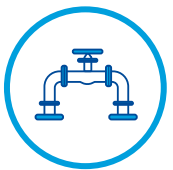
Overall trend remain unchanged, but **several projects** identified for the 2024 report appear to have been **cancelled or put on hold**, with no public updates in recent years.



Hydrogen Storage

While some countries are exploring **geological hydrogen storage**, these projects remain at an **early stage**. Alternative storage options, such as liquid hydrogen, carriers, or metal hydrides, are even less mature.

As lithium battery costs continue to fall and hydrogen industrial uses are prioritized over energy uses, **innovative hydrogen storage projects remain limited and relatively underdeveloped.**



Hydrogen Transport

Transport solutions remain limited, with most projects clustered around ports and dependent on existing infrastructure. Selected **EU and African developing countries** remain exceptions, with **active H₂ pipeline development.**

Project developers continue to **minimize H₂ costs by limiting molecule transport**, with only a small number of countries or hydrogen hubs developing long-distance transport projects.

© Hincio S.A. ¹Analysis based on Hincio knowledge of the global hydrogen ecosystem. An exhaustive update has not been carried out for this presentation

Interest in downstream hydrogen deployment is increasingly refocusing from energy uses to industrial applications.

Stage of value chain



Hydrogen Transformation

Key trends observed in developing countries (2024)

Ammonia and Power-to-Chemical projects are **central to decarbonization of fertilizer supply and clean fuel markets** in developing regions, particularly in LAC and Africa, **while enabling H₂ long-distance transport and export** through existing port infrastructure and shipping capacity.

Trend Evolution by 2026 ¹

Focus on Power-to-Chemical projects has increased, driven by **potential regulatory developments** (e.g. IMO, RED III, CBAM), **higher techno-economic viability**, and **uncertainty over the reliability of global supply chains**. Interest on **H₂ derivatives as pure-play carriers** is consolidating around only a **limited number of projects** leveraging on financial support schemes (e.g. CfDs).



End-use Applications

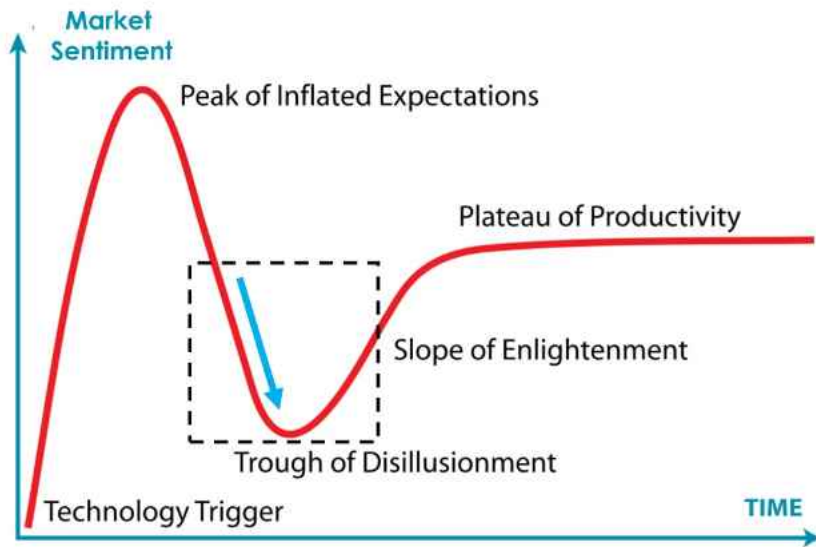
End-use H₂ deployment is **progressing mainly in transport**, with fuel-cell vehicles, buses, and trains representing 23% of mapped projects. H₂ as fossil fuel substitute in **power and energy applications is also being explored**, but few projects have reached adequate levels of technological maturity.

As lithium battery costs continue to decline, **interest in fuel-cell transport and energy end-uses has fallen sharply**, leaving only highly robust **projects targeting narrow, niche applications to remain competitive** against more cost-efficient decarbonization options.

© Hincio S.A. ¹Analysis based on Hincio knowledge of the global hydrogen ecosystem. An exhaustive update has not been carried out for this presentation

Under the current slowdown of the global hydrogen ecosystem, marked by demand and financing uncertainty and shifting geopolitical priorities, the recommendations of the 2024 report are more relevant than ever.

Key Recommendations



Gartner Hype Cycle

- **Early-stage risk mitigation is critical to bankability.** Addressing permitting, off-take, technology, and financing risks upfront significantly improves bankability and reduces the cost of capital.
- **Focus investment in dev. countries on mature, commercially proven technologies** to create early momentum and catalyze local ecosystem, particularly in risk-averse and highly uncertain market environments.
- **Secure off-take engagement early.** Early off-takers are often the single most decisive factor for a project to be bankable.
- Where possible, **prioritize local demand** and **diversified off-take pool**, emphasizing business cases where **regulatory support is not a necessity**, **cost gaps are manageable**, and **additional value drivers** can be captured (e.g industrial development, job creation, and energy security).
- Leverage targeted **government and public-sector financial support** (grants, concessional financing, demand-side mechanisms, etc.) to reduce early-stage risk, crowd in private capital, and accelerate market formation.



Experts decarbonizing the
hardest-to-abate sectors. **Now!**



Luis Miguel Diazgranados
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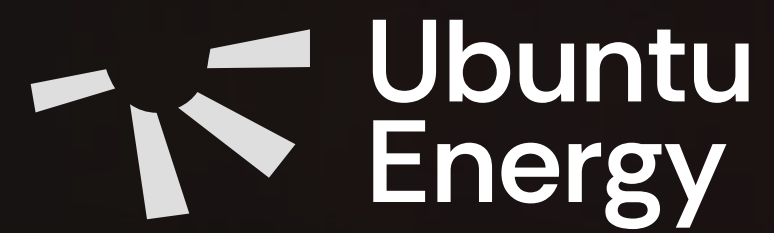


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Transforming Wasted Energy to Community Power



Africa's Energy Paradox

- There is no grid for power flow
- No existing trading framework and software
- Lack of automation for distribution of power

150GW

Underutilized solar power

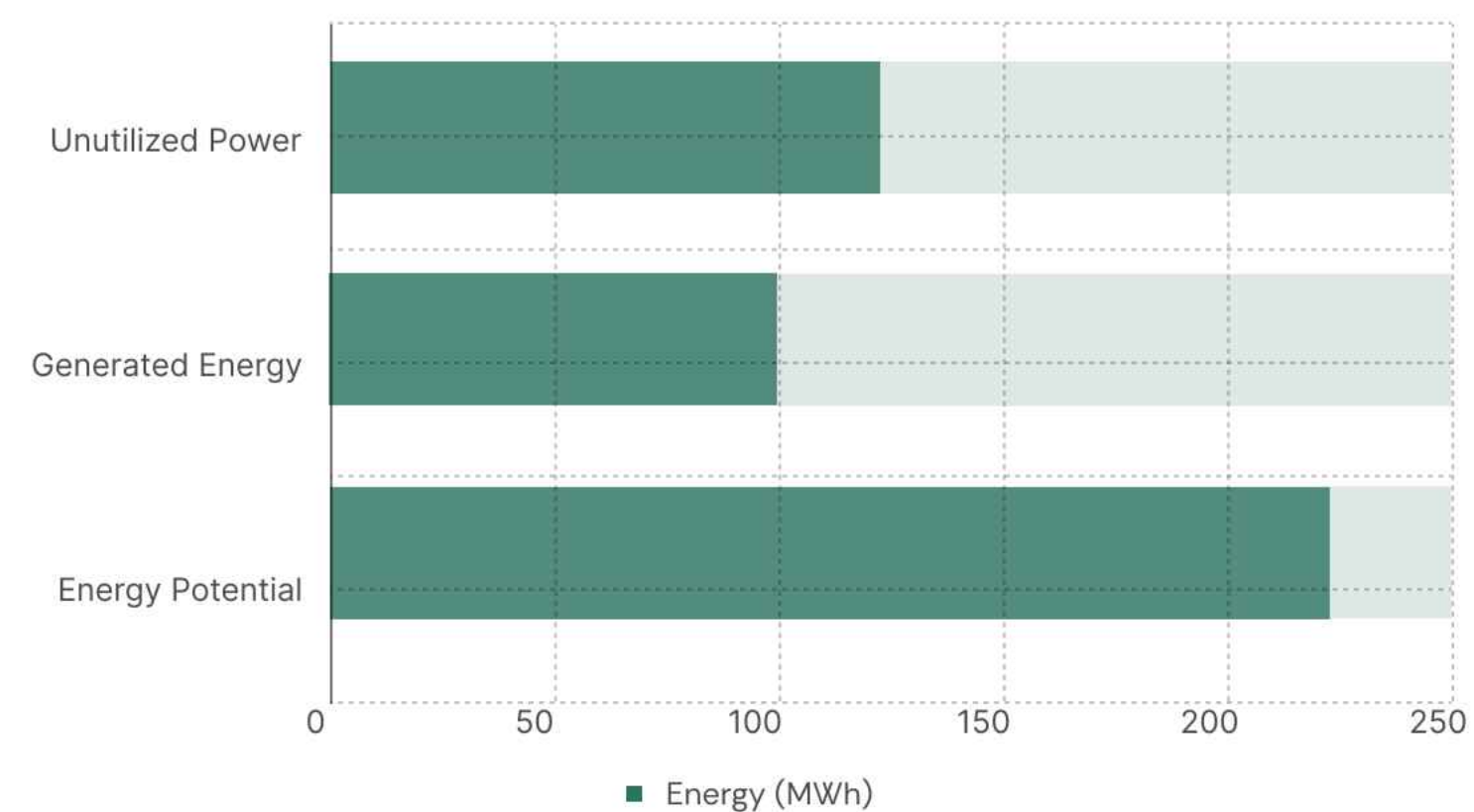
\$15B

Spent on diesel annually

MTCO₂

In avoidable annual emissions

6 Months Energy Underutilization Plot



Excess Generation



Unmet Demand

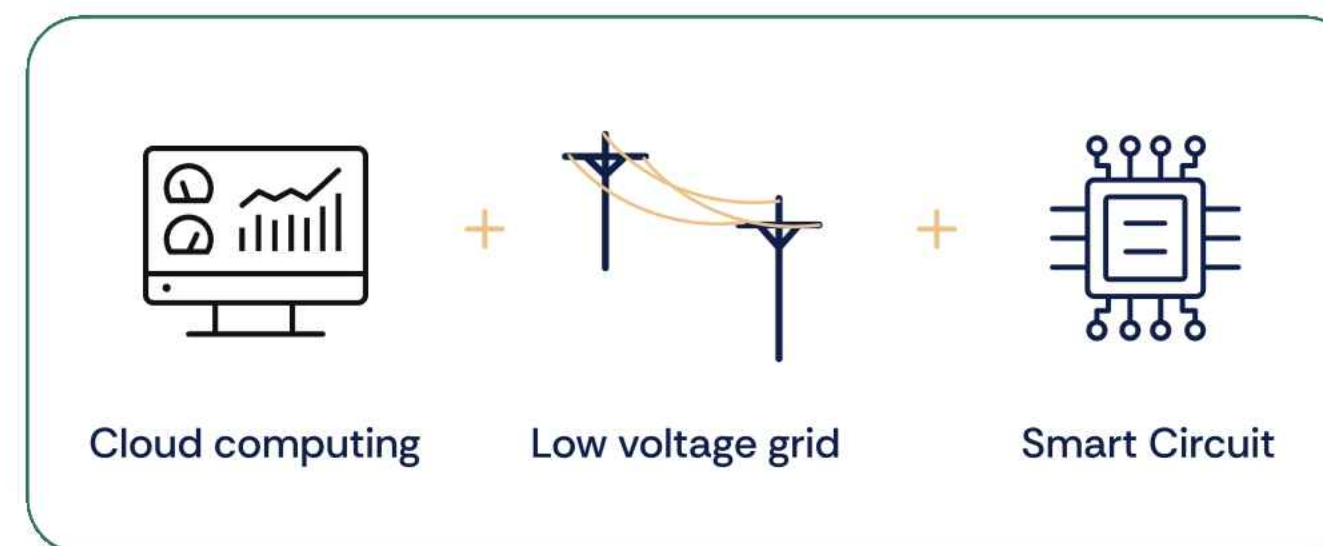


Automated power distribution/sharing with P2P trading

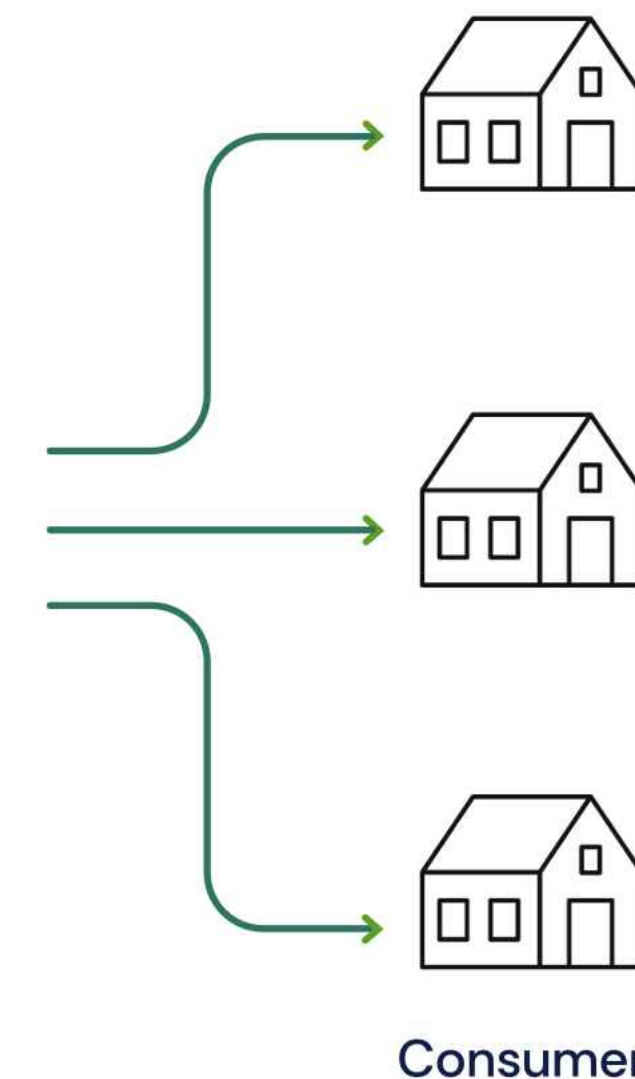
- Share/trade excess energy from one anchor site to 5–20 community consumers.
- ML and optimization/DSR.
- Remote observability and control of hardware from software.

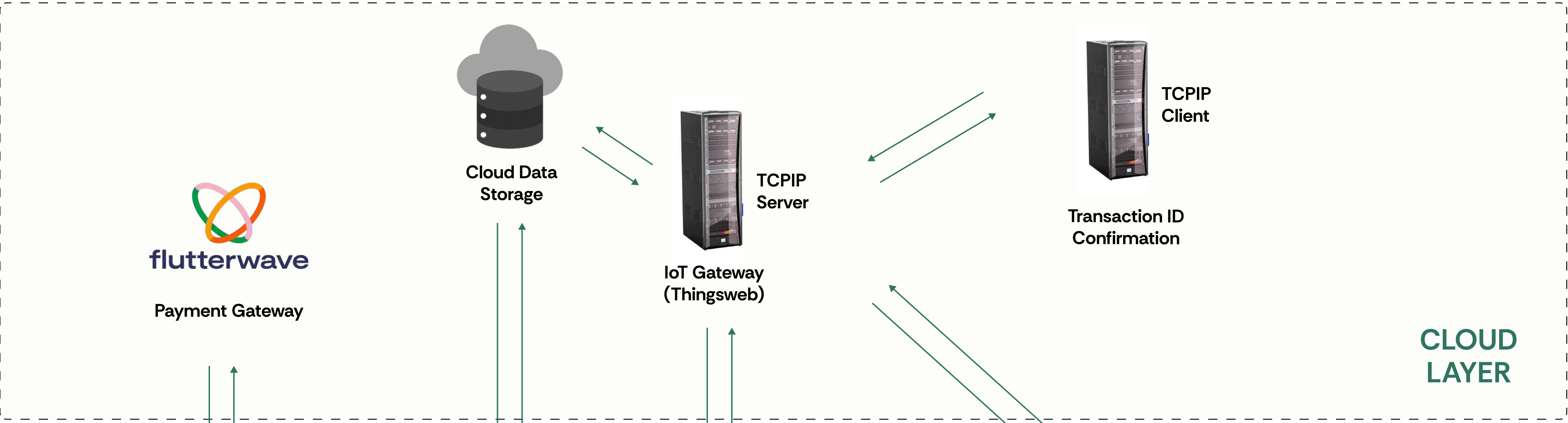


Unutilized
energy

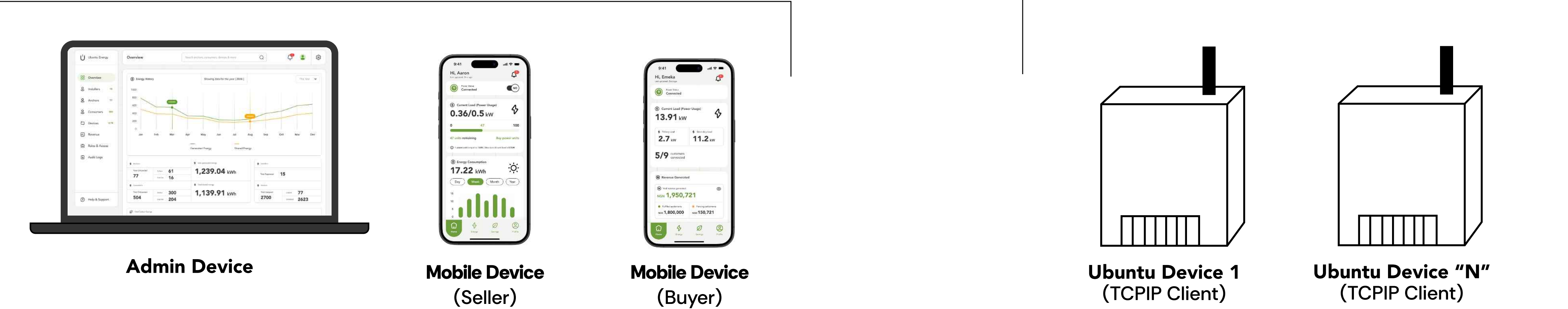


■ Patent-pending power distribution technology





CLOUD LAYER



POWER SHARING SYSTEM ARCHITECTURE

Pilot Results



100

Smart schools
200,000
students
impacted

3000

Homes/small
businesses
powered per
school

\$ 20

Monthly Saving/ Home

200

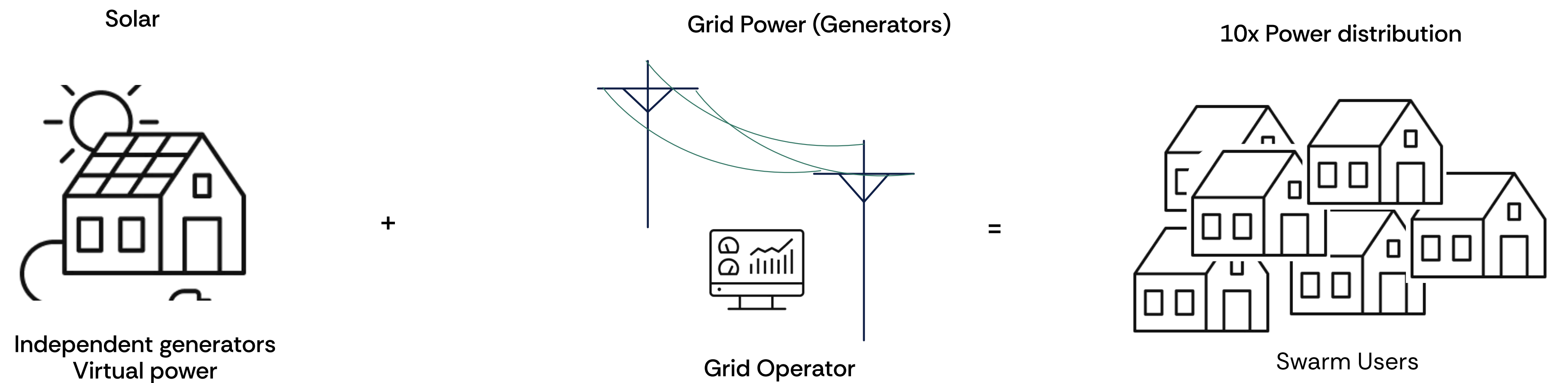
Sites by May

40,000

People will be
impacted

10x Growth in Power Distribution with VPP

- Up to 45 GW of under-utilized power assets. Assets can provide electricity with complementary generation sources, scale grid capacity and drive development
- Redistribute >> GW of power as Virtual Power Plant (VPP)
- Fix the failing grid and improve the entire electricity architecture



Rooftop solar, mini-grids and backup generators fed into the VPP pool

Low-voltage grid managed by Ubuntu Smart Circuit and cloud platform

Millions of households powered via peer-to-peer energy trading. 45+ GW of power redistributed for universal access

VPP model enables 10x the energy capacity of individual generation — transforming wasted power into tech and economic growth

Scaling Through Capacity Building



Technical Workshops for Installers in Nigeria

👤 2026 Workshops

2

Workshops

50

Installers trained

🎯 2026

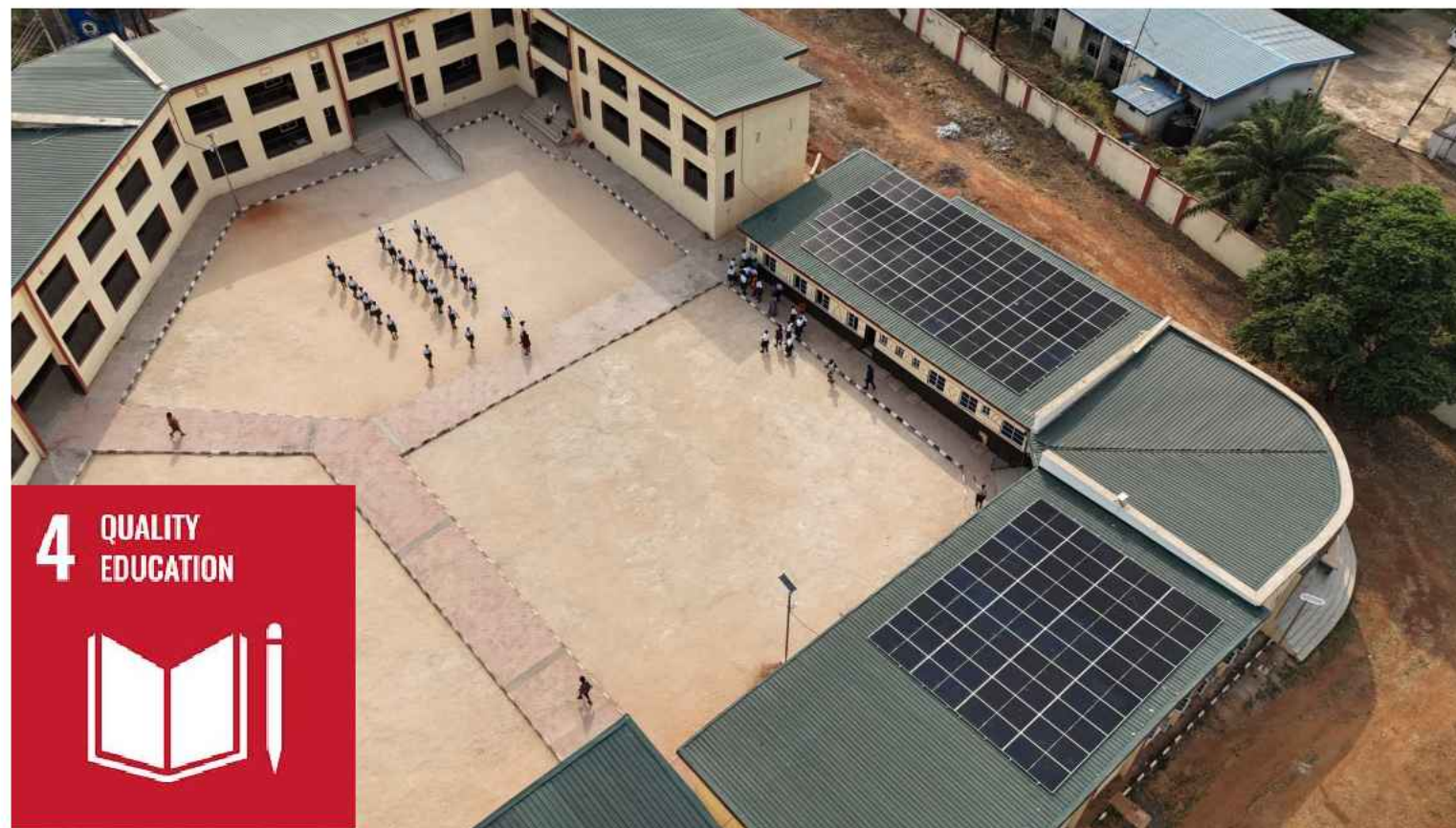
2,000

consumers from 50 installers by 2026

Ubuntu's founding team deployed hundreds of sites as installers, this playbook is proven and replicable.

Every new certified engineer adds more expanded deployment capacity, in-field maintenance support and more consumers reached

Our Impact Across the SDGs



Solar-powered anchors enable consistent electricity for lighting, devices and learning



VPP model provides clean, affordable electricity to off-grid and under-served households



Each site displaces diesel generation — directly reducing CO₂ emissions at community scale



Our Partners



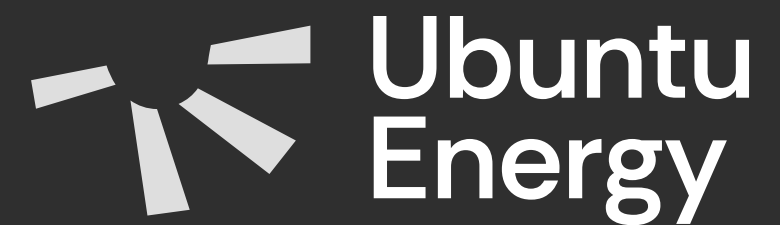
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Thank You!

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E: godwin.nwangele@gmail.com



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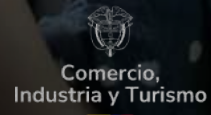
EnCadena: Better Suppliers Project - Colombia

How UNIDO incorporates SMEs into Smart Energy Value Chains

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PROGRAM

En-Cadena
Mejores proveedores

Smart Energy defines new business frameworks for SMEs...

Colombia is moving forward to a more sustainable and resilient energy and electricity matrix through a **Just Energy Transition that promotes the integration of local actors.**

Public policies and instruments recognize the **opportunities given by this technological transformation** to re-industrialize the Country and regions by adopting the value chain concept.

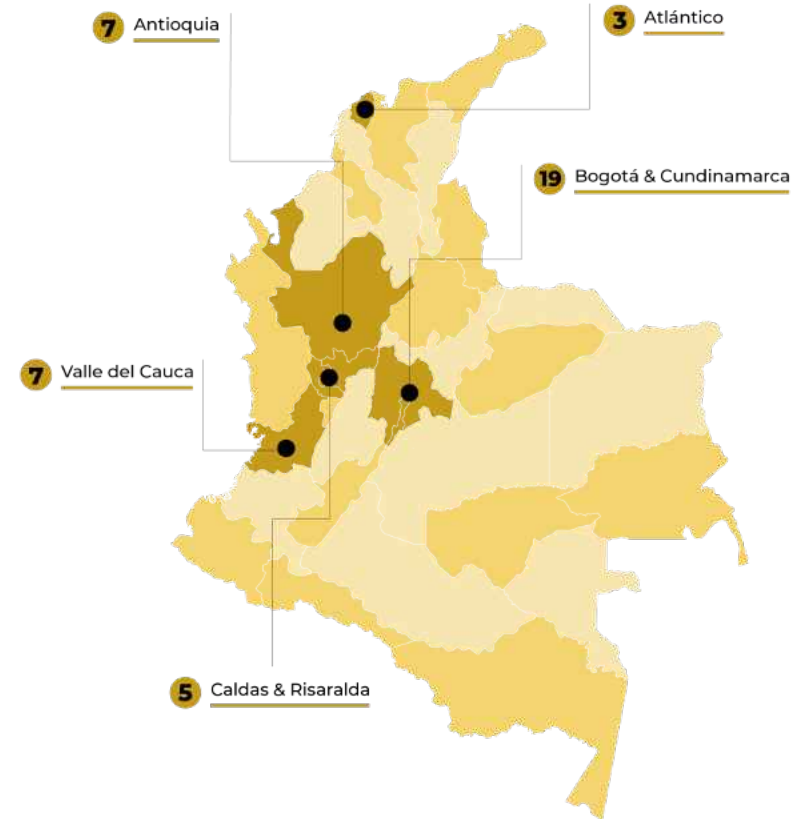
The policy vision rely on collaborative actions or value shared creation* within the productive ecosystem, requiring the analysis and improvement of i.e. business models of SMEs and Anchor companies, strategic alliances, and production systems.

Ministry of Commerce, Industry and Tourism, through iNNpulsa and UNIDO, started, in 2024, an intervention aimed to **improve the SMEs capacity to participate in value chains of Innovators and Adopters**, stakeholders recognized in Market Assessment on Smart Energy produced by A2D (2025).

Anchor enterprises



41 beneficiary MSMEs



*Creating Shared Value concept is an scheme of creation of economic value that also creates value for society (Porter & Kramer, 2011)

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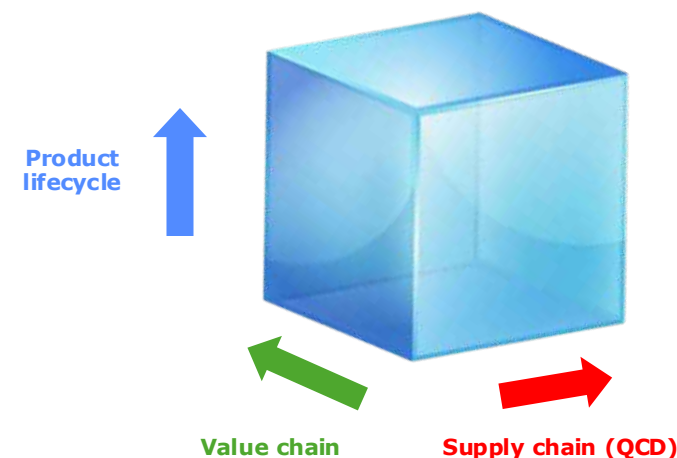


The intervention **prioritized** Non-Conventional Renewable Energy Sources and Energy Storage value chains together with the concept of “Product Lifecycle”

Prioritized sources (IRENA)

	Hydroelectric
	On-grid/Off-grid photovoltaic
	Passive solar thermal
	Wind energy
	Geothermal
	Biomass
	Hydrogen/Electrolysis
	Energy storage

Lifecycle stages used to promote the opportunities of local SMEs:



- System or equipment design
- Installation and setup
- Operation & Maintenance
- Disposal (Circular Economy)

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How to include local SMEs into the value chains

The incidence model based on demand

The sandbox playground: Safe spaces with the productive ecosystem (anchor enterprises, local SMEs, support institutions, and Government) to identify Smart Energy challenges upon sustainability premises.

Technical Assistance to SMEs and Anchor Enterprises to harmonize Business Models, Productive & Quality Capacity and Strategic Alliances with the challenges identified.

R&D Strategic Alliances to materialize the solutions (at least early development stages).



*Sandbox playground with CAVASA and beneficiary MSMEs in Valle del Cauca.
February 20th, 2026*

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The project in action: Sample of Smart Energy challenges and local industrial capacities to address them

Challenges

- Energy requirement vs system performance (Optimization + Digitalization).
- Scheduling of equipment operation depending on the energy billing/price.
- Energy optimization of agro-industrial processes based on the availability of renewable energy sources (on-grid co-generation).
- Co-generation decisions based on quality and availability of biomass (beyond technical feasibility).
- Energy efficiency as a service.

Local SMEs Capacities

- Design of Energy Management systems.
- Electric installation services.
- Metalworking.
- Agrovoltaic systems manufacturing.
- Design of energy distribution and control systems.
- Maintenance and retrofit of electric equipment.
- Solid biofuel production.
- Wiring manufacturing.
- Unmanned aerial vehicle services.

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The project in numbers



Sandbox playground with JOTAGALLO and beneficiary MSMEs in Caldas and Risaralda. April 6th, 2026

Highlights

- 41** MSMEs benefiting from technical assistance
- 11** anchor enterprises strengthening their value chains
- 40** hours of technical assistance per beneficiary MSME
- 1,483** hours delivered to date
- 1,331** people employed of which **329** are women



Sales (2024)

COP 533 mil millones / USD 147M

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Thank you

MR. Jaime Alberto MONGUÍ

j.mongui@unido.org

National Technical Coordinator

EnCadena. Mejores Proveedores (EnCadena: Better Suppliers) Project - Colombia
Directorate of Technical Cooperation and Sustainable Industrial Development (TCS)
Division of MSME Competitiveness, Quality and Job Creation (TCS/SME)

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Energy Districts:

A collaborative journey with UNIDO, Colombia

Value Proposition



Tailor-made energy efficiency

We design personalized energy solutions based on the industrial process.

Guaranteed savings and productivity

We reduce costs, increase competitiveness, and ensure the reliability of industrial processes

Electrification and decarbonization

We electrify processes and reduce your carbon footprint

Investment-free business model

We have an Energy as a Service (EaaS) business model, where Atera makes the investment and the client pays a fee associated with the service

Behind the meter solutions



Distributed generation



Thermal processes



Compressed air systems

Geographic footprint

Distributed generation

174 MW

99.2 MW Colombia

61 MW Honduras

13.8 MW Panamá

4030 RT
3 Energy District

13.2 MW
Compressed air

40.6 MW
Backup plants

Energy driven by results



+550



Industrial clients have implemented energy efficiency projects with us



+47
MUSD

Savings generated, making energy efficiency a strategic investment

*14.8MM USD annual savings



224.000

Metric tons of cumulative avoided CO₂ emissions

 **97** Employees

Energy Districts:

A collaborative journey with UNIDO, Colombia

Journey

With UNIDO

40Triada Studies:

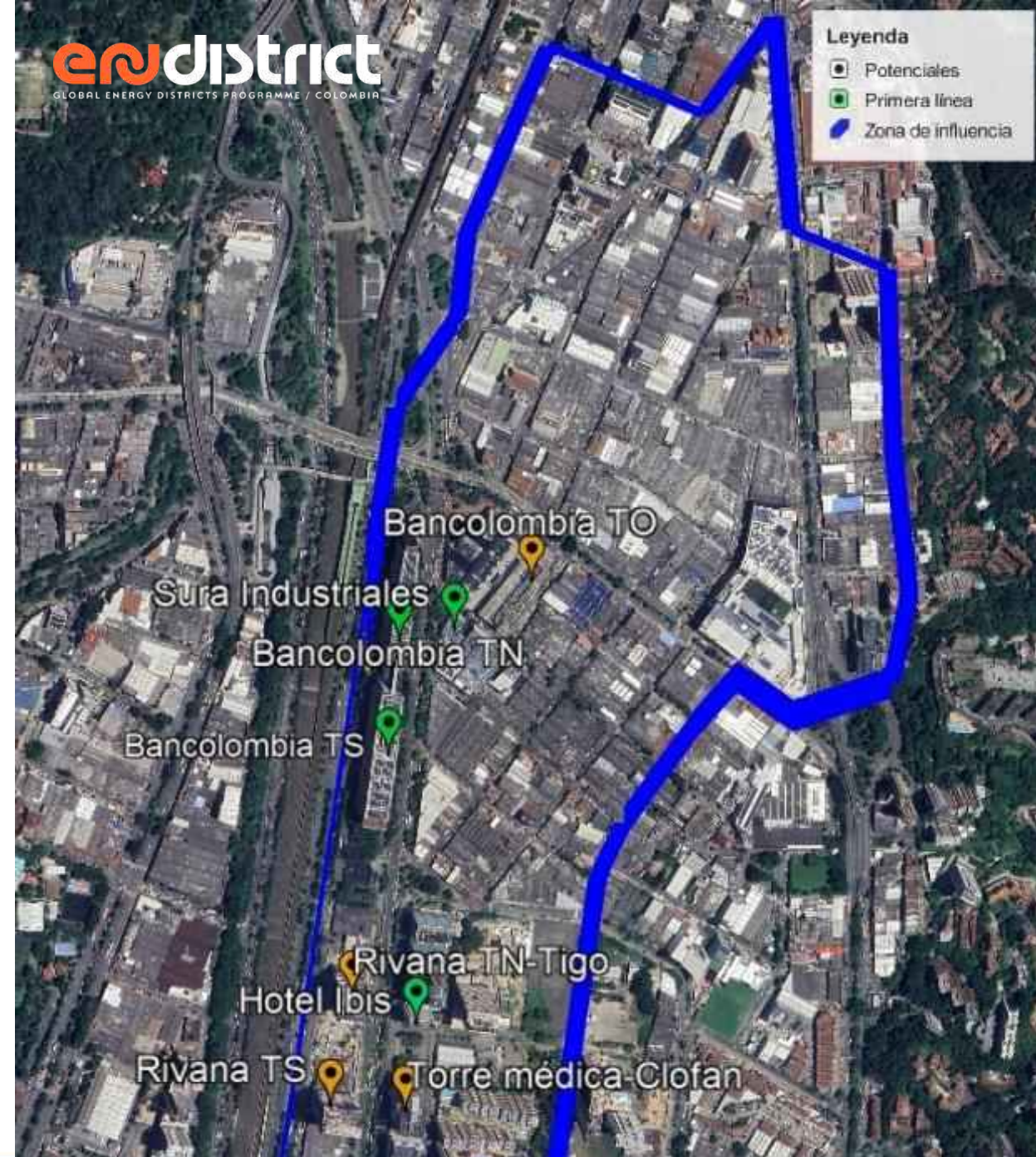
Energy assessment, development of basic engineering designs and feasibility study for the—Energy Districts in Colombia— phase II

23 potential clients identified → Prospects selected based on location, building characteristics, and cooling systems.

ISO 50002 Level 2 energy audits for priority clients, including on-site evaluation of cooling efficiency, climate conditions, and operating costs.

ISO 50002 Level 1 energy audits for potential clients, focusing on thermal load profiling and equipment inventory.

Final report, including conceptual Thermal District design, alignment with the Sustainable Development Goals (SDGs), and a multidimensional impact and benefits evaluation.



Journey

With UNIDO

Altana Transfer Station:

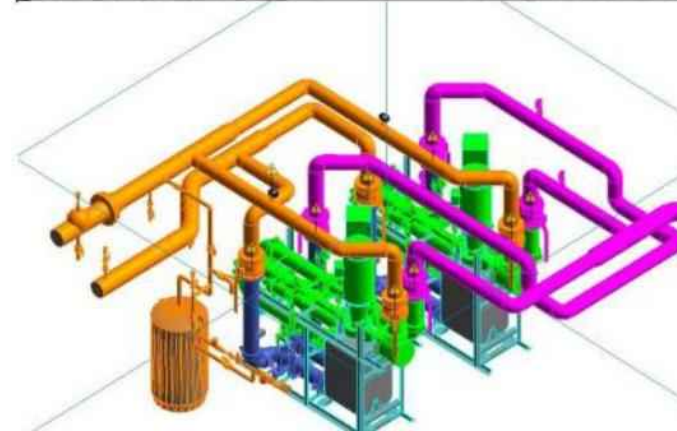
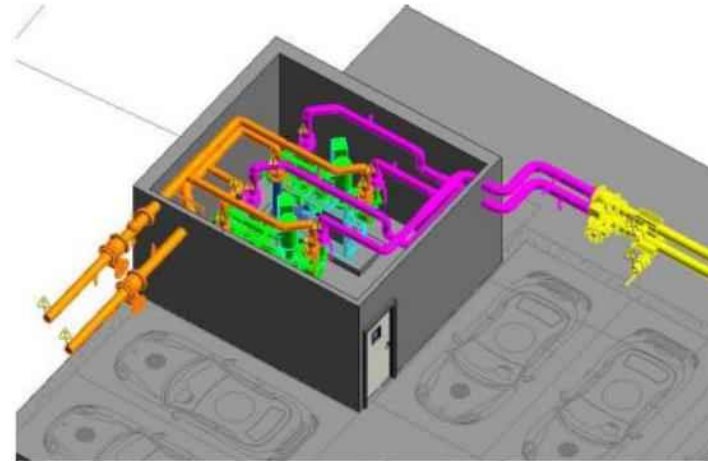
Equipment Supply and mechanical detailed engineering- Energy Districts in Colombia- phase II

Detailed engineering → Mechanical, electrical, civil and Control

Main equipment selection → Pumps, Plate heat exchanger.

EPC signed contract, including commissioning.

Final report, including an operational transfer station in Altana.



Our projects

locations and capacities



1. **Nuestro Montería (2017) – Montería, Córdoba – 24.600 m² GLA**
 - 1.400 RT (1000 Water-cooled electric chillers + 400 absorption chiller)
 - 1,25 MWe (1 MW Natural gas Microturbine + 250 kW Photovoltaic)
 - 158 Clients



2. **Serena del Mar (2018) – Cartagena, Bolívar.**
 - 1,300 RT (700 W. cooled chillers + 200 Air-cooled chillers + 400 abs. chiller)
 - 816 RT Satelital plants (816 Air-cooled electric chillers)
 - 500 kW Hot water
 - 1 MWe (Natural gas Microturbine)
 - Diesel Backup
 - +500 Clients (Hospital, Commercial and residential)



3. **Gran Manzana (2025) – Cartagena, Bolívar. – 26,900 m² GLA**
 - 700TR (500 Water -cooled electric chillers + 200 absorption chiller)
 - 1,568 RT-h Thermal energy storage
 - 800 kW (Natural gas Microturbine 3 x 200 kW operation + 1x200 kW Backup)
 - Diesel Backup
 - + 150 Clients

3. In process...

Project for the Integration of Renewable Energy in Energy Districts in Colombia

endistrict
GLOBAL ENERGY DISTRICTS PROGRAMME / COLOMBIA

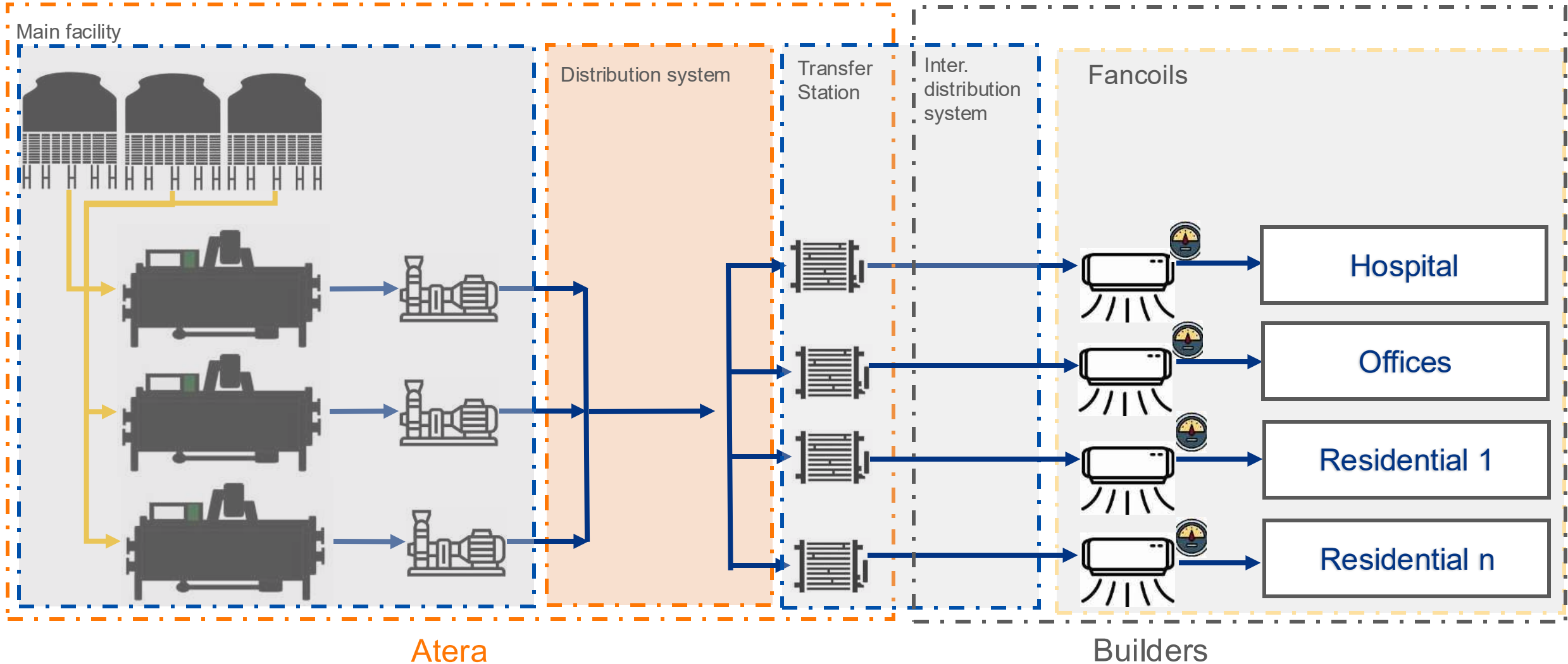
Serena del Mar

Plants, distributions and demands



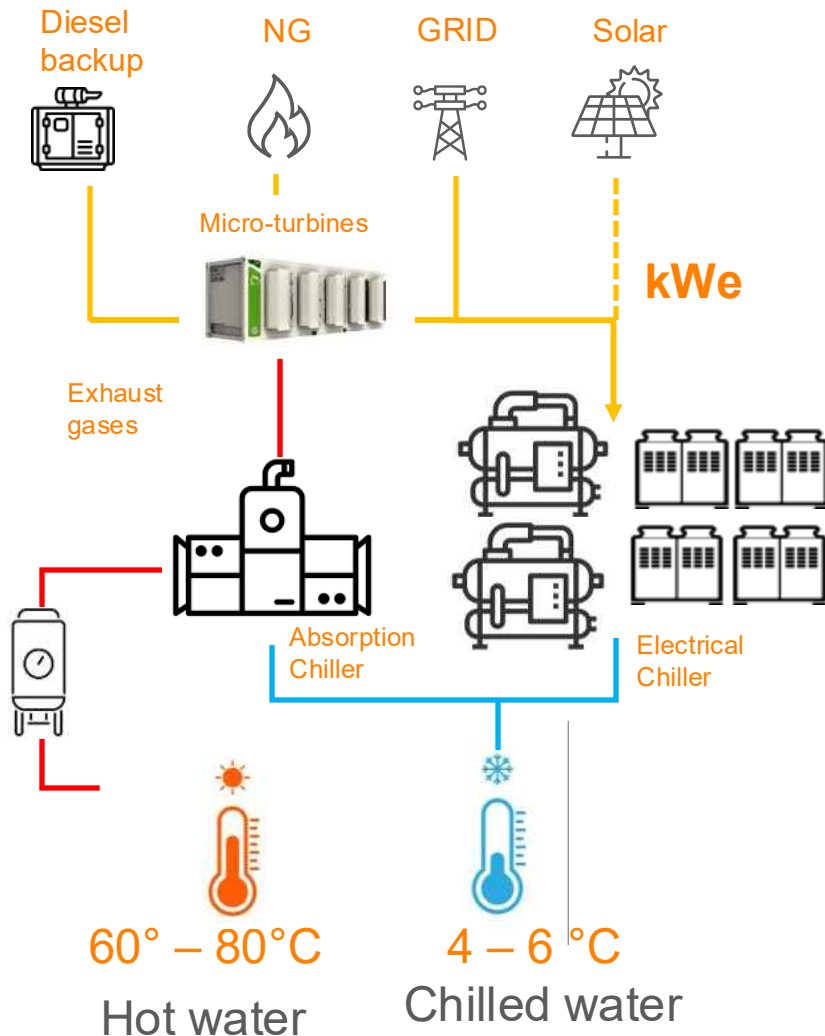
Scopes

Serena del Mar



Project design and standards

Energy efficiency, system configurations, and innovations.



System configuration:

- Multiple energy sources.
- Modularity, allowing the gradual demand growth.
- Tri and cogeneration, optimizing the use of natural gas.
- High reliability.

Innovations:

- Parallel pumping, to increase the efficiency.
- Thermal storage tanks.
- Automated water treatment system.



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Partners:



UNIDO A2D FACILITY · ANNUAL EVENT 2026

GREEN HYDROGEN INNOVATION CENTER (GHIC) - KENYA

Scaling Innovative Solutions for Sustainable Industrial Development

Bogotá – Colombia | 14th April, 2026



GREEN HYDROGEN
INNOVATIONS CENTRE



3,000+ acres
Farm Scale – Nyeri, Kenya

56,800 kg/yr
Green Ammonia
Production

56.4M L/yr
Medical Oxygen Production

55% IRR
Post-Tax Return (w/ A2D
Grant)



KENYA'S FERTILIZER & MEDICAL OXYGEN ANNUAL PRODUCTION OUTLOOK

FERTILIZER (CAN)



Annual Fertilizer Used

180,000 kg

CAN (27% Nitrogen) – Calcium Ammonium Nitrate

Kenya National Fertilizer Production



Source: Kenya National Bureau of Statistics, 2024/2025



MEDICAL OXYGEN

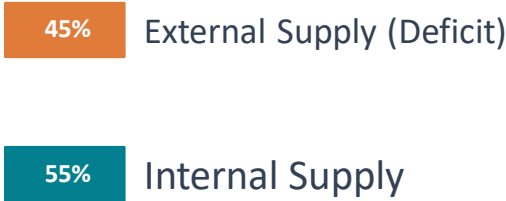


Annual National Demand (Kenya)

12 Billion

Litres of Medical Oxygen per year

Consolata Hospital Mathari – Supply Coverage



GHIC will produce 56.41M litres/yr — fully covering the hospital deficit



GHIC PROJECT BACKGROUND – NYERI HILL FARM, KENYA



LOCATION

Nyeri, Kenya's central highlands rich volcanic soil, optimal altitude & ideal coffee growing conditions.



FARM SCALE

3,000+ acres of prime highland, 825 acres dedicated exclusively to high-quality single estate Arabica coffee.



INNOVATION

Ultramodern fertigation: precise fertilizer dosages via drip-line irrigation for optimal nutrition & water efficiency.



MEDICAL OXYGEN

Hospital consumes 56.2M litres/yr of medical O₂. 45% currently procured from costly external suppliers.



PRODUCTION TARGET

Annual target: 500+ tonnes of clean premium Arabica — positioning Nyeri Hill as Kenya's leading single estate.



FERTILIZER USAGE

Current usage: 180,000 kg CAN/yr via import. GHIC replaces this with locally produced green ammonia.



EXECUTIVE SUMMARY – GHIC PROJECT



56,800 kg/yr

Expected Green Ammonia Production
Replaces fossil-based CAN fertilizer via existing fertigation system



56,410,000 L/yr

Expected Medical Oxygen Production
Fully covers Consolata Hospital Mathari deficit — surplus sold

~226 t/yr CO₂

Avoided Emissions – Annual Carbon Savings

PROPOSED TECHNICAL SETUP



Solar PV Plant

0.55 MWp



Battery Energy Storage

0.25 MWh BESS



AEM Electrolyzer

0.22 MW



ASU Plant

0.05 kTPA



NH₃ Ammonia Plant

0.06 kTPA

EPC Consortium: PT MBR Global Indonesia • Enapter GmbH • Soventix GmbH • Nium Ltd • CapsHydrogen Energy Ltd



EXECUTIVE SUMMARY – FINANCIAL DETAILS

TOTAL PROJECT INVESTMENT

~ USD 3.2 Million

Implementation Period: 2026 – 2028 (Phase 1)

UNIDO A2D Facility

83%

~USD 2.65M

Grant financing

83% UNIDO Grant

Starkmacher Impact GmbH

17%

~USD 0.53M

Co-financing

17% Co-fin



KEY MOTIVATIONS FOR THE GHIC PROJECT



BRANDING

Branding & marketing for clean, sustainably-produced Kenyan coffee in local and international markets.



STABILITY

On-site nitrogen fertilizer production cushions the farm against supply chain disruption and import price volatility.



REFERENCE SITE

Establish Nyeri Hill Farm as a regional centre of excellence for modern, sustainable agricultural practices.



VALUE ADDITION

O₂ as a high-value by-product meets medical demand at Consolata Hospital, creating a second revenue stream.



SCALABILITY

Abundant land, water & solar resources enable expansion of O₂ and green ammonia for wider markets + job creation.



SUSTAINABILITY

~226 t/yr CO₂ avoided. Demonstrates green hydrogen viability for African agri-food and healthcare sectors.



GHIC PROJECT SUMMARY

INPUTS & INFRASTRUCTURE



0.55 MWp

Solar PV Plant (grid-connected, no feed-in tariff)



0.22 MW

AEM Electrolyzer



0.25 MWh

BESS Battery Storage



110 m³/yr

Treated water input



~3.2M USD

CAPEX Investment

KEY OUTPUTS & RESULTS

56,800 kg/yr

Green Ammonia → replaces CAN fertilizer

56.41M L/yr

Medical Oxygen → covers hospital deficit

~226 t/yr

CO₂ Emissions Avoided

55% IRR

Post-Tax Internal Rate of Return

1.2 years

Simple Pay-Back Period (post-tax)



SITE CHARACTERISTICS – NYERI HILL FARM, KENYA (0.39°S, 36.92°E)



Nyeri Hill Farm – Arabica Coffee Estate, Nyeri County, Central Kenya



Land Available

Plant needs ~1.5 of >20 available acres. Solar PV & ammonia plant sited next to fertigation plant.



Water Source

Sourced from on-site water pan via existing infrastructure supplying the fertigation plant.



Ammonia Delivery

Aqueous ammonia applied to coffee farm through existing fertigation drip-irrigation system.



O₂ Distribution

Oxygen by-product transported to Consolata Hospital Mathari by road vehicle (~2.6 km away).



Site Characteristics

Existing Infrastructure: Fertigation Plant



Fertilizer + Irrigation pumping system



FERTILIZER SUBSTITUTION – FROM FOSSIL TO GREEN

⚠ CURRENT SCENARIO

CAN Fertilizer

(Calcium Ammonium Nitrate – fossil-based)

- ✓ Nitrogen content required: 46,576 kg
- ✓ 180,000 kg CAN (27%N) per year
- ✓ Procured via imports – March/April (Long Rains)
- ✓ Subject to global price volatility & supply disruption
- ✓ Fossil-based: significant carbon footprint

✓ PROPOSED SCENARIO

Green Ammonia (NH₃)

(Produced on-site via solar-powered electrolysis)

- ✓ Same nitrogen content: 46,576 kg
- ✓ 56,800 kg NH₃ (82%N) – 100% coverage of need
- ✓ Produced daily, stored 365 days – applied March/April
- ✓ On-site production: zero import dependency
- ✓ 100% green: solar-powered, zero carbon footprint



Current Oxygen Consumption at Consolata Hospital Mathari



Description	Current Situation	Project Phase 1	Project Phase 2/3
Oxygen demand met from existing generator	31,104,000 L	31,104,000 L	31,104,000 L
Oxygen demand met from external suppliers	25,092,000 L	25,092,000 L	25,092,000 L
Oxygen from GHIC Green Hydrogen Project	–	56,410,000 L	114,500,000 L
Total Annual Oxygen Demand	56,196,000 L	56,196,000 L	56,196,000 L



CURRENT OXYGEN CONSUMPTION AT CONSOLATA HOSPITAL MATHARI

GREEN HYDROGEN INNOVATIONS CENTRE

S/No.	Description	Phase 1: Local Consumption, pilot phase (supported by UNIDO A2D Grant)	Phase 2: Regional consumption, scaled up pilot	Phase 3: National consumption, industrial scale
		Value	Value	Value
	Oxygen Production:			
1	Oxygen Production by Existing Oxygen Plant (Litres/Annum)	31,104,000	31,104,000	31,104,000
2	Oxygen Production by Proposed Green Hydrogen Innovations Centre (Litres/Annum)	56,700,000	113,400,000	226,800,000
	Total Oxygen Production p.a.	87,804,000	144,504,000	257,904,000
	Oxygen Consumption:			
A	Consolata Hospital Mathari (Own Consumption):			
1	Oxygen Demand met by Existing Oxygen Plant (Litres/Annum)	31,104,000	31,104,000	31,104,000
2	Oxygen Demand to be met by Proposed Green Hydrogen Innovations Centre (Litres/Annum)	25,092,000	25,092,000	25,092,002
	Sub-Total	56,196,000	56,196,000	56,196,002
B	Other Offtakers:			
3	Mary Immaculate Hospital Kerugoya (Litres/Annum)	960,000	960,000	960,000
4	Mary Immaculate Mweiga (Litres/Annum)	720,000	720,000	720,000
5	Mother Angela Huruma Hospital, Nanyuki (Litres/Annum)	9,000	9,000	9,000
6	PCEA Tumutumu Hospital (Litres/Annum)	–	–	–
7	Consolata Hospital Nanyuki (Litres/Annum)	480,000	480,000	480,000
8	Other Regional/National Hospitals (Litres/Annum)	29,439,000	86,139,000	199,539,000
	Sub-Total	31,608,000	88,308,000	201,708,000
	Total Oxygen Consumption p.a.	87,804,000	144,504,000	257,904,002
	Land requirement:			
1	Land requirement (Acres)	2	4	8



DESIGN CONSIDERATION FOR PRE-FEASIBILITY CALCULATIONS

Calculation boundary

Replacement of grey imported Nitrogen fertilizer (CAN)

Space available for Solar PV only

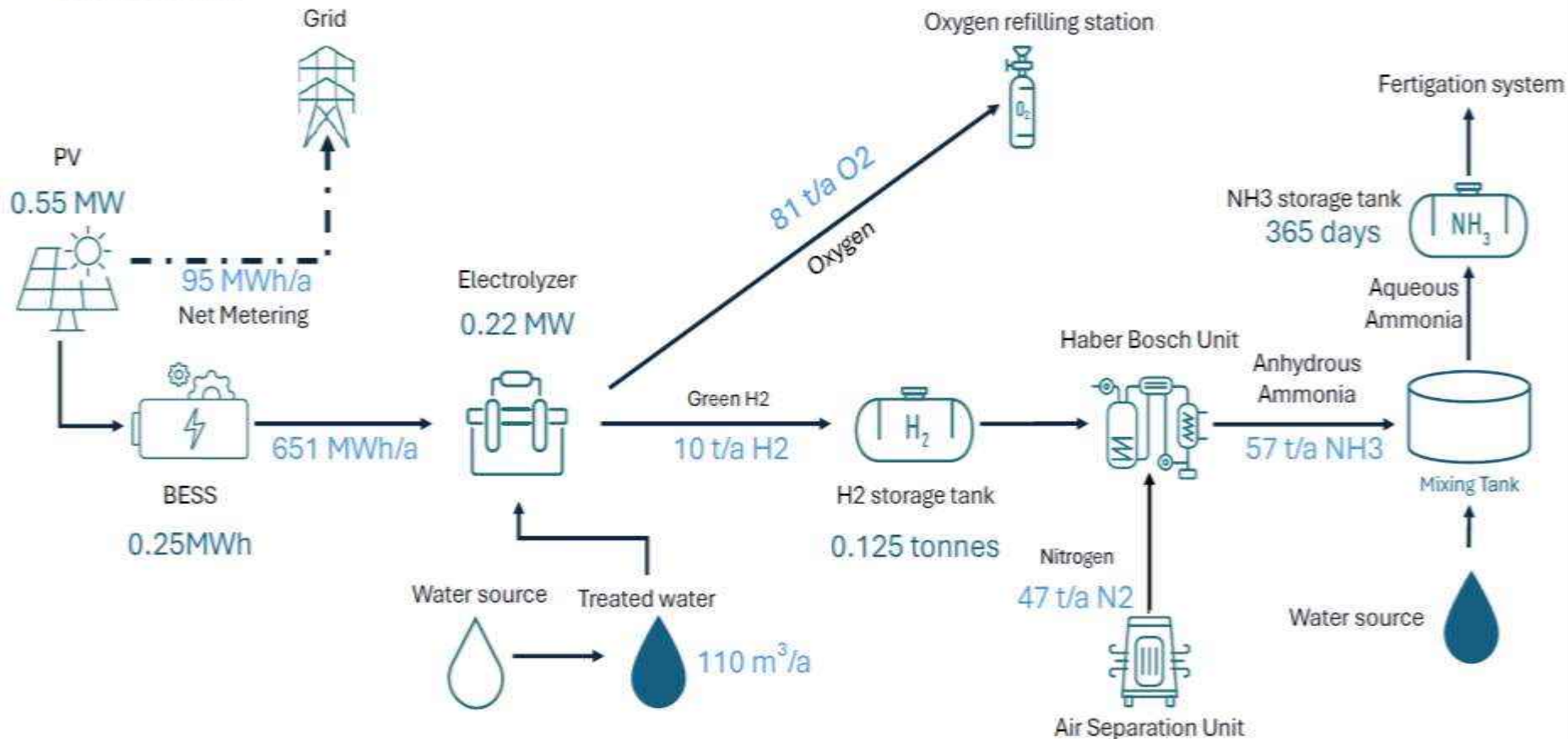
Preferred optimization criteria: Lowest LCOA

Large scale storage to bridge constant production vs. seasonal use



GHIC Project Technical Sizing

25 year average values





KEY FINANCIAL ASSUMPTIONS & TARGET

Parameter	Value KES	Value USD
Current CAN price	60 KES/kg	0.47 USD/kg
NH ₃ price equivalent (based on fertilizer purchase price)	218 KES/kg	1.70 USD/kg
O ₂ sales price	196 KES/kg	1.22 USD/kg
Excess electricity	Cannot be used	
Inflation rate (USD)	–	2.22%
Loan tenure	–	5 years
Overall equipment cost	–	3.03 Mio. USD
Additional costs (installation, taxes, knowledge dissemination, administration)	–	0.15 Mio. USD
Share of costs covered by grant (UNIDO A2D)	–	83% (cofinancing amounts to 20% of covered value)
Interest rate on cofinancing loan	–	11%



KEY FINANCIAL RESULTS (Including A2D Grant)



55%

Project IRR
(Post-Tax)



1.2 yrs

Simple Pay-Back
Period (Post-Tax)



1.18

Avg Debt Service
Coverage (Pre-Tax)



767 kUSD

Net Present
Value (NPV)

Without A2D Grant — IRR: 2% | Pay-Back: 24 years | NPV: -2,404 kUSD

→ *The A2D Grant is critical to project viability and delivering positive social & environmental impact.*



CAPEX / OPEX STRUCTURE

CAPEX

3.2 Mio. USD

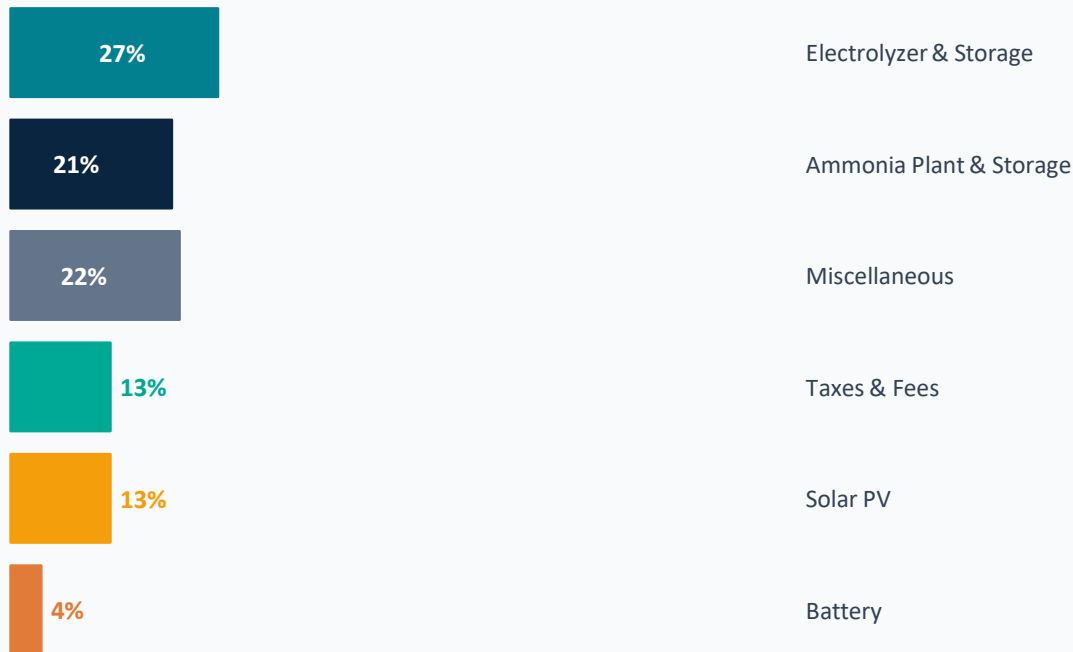
Total capital expenditure

OPEX (Year 1)

78 kUSD/yr

Operating expenditure (Year 1)

CAPEX Breakdown by Component



Consumables, spare parts, A2D knowledge dissemination, financial auditing, data collection, monitoring, reporting & admin costs.



PROJECTED INCOME – YEAR 1

Year 1 Revenue:

USD 212,000

OPEX: USD 78,000 | Net: USD 134,000

Avoided Oxygen Purchase

51%

of total income

~108 kUSD

Consolata Hospital Mathari — O₂ at 1.22 USD/L

Avoided Fertilizer Purchase¹

49%

of total income

~104 kUSD

Green NH₃ replacing CAN fertilizer — at 1.70 USD/kg equivalent

¹ Includes ~6% excess production vs. calculated demand, valued at same price (assumption: can be used or sold at a later time).



THANK YOU

GREEN HYDROGEN INNOVATIONS CENTRE (GHIC) PROJECT – KENYA

UNIDO A2D Facility Annual Event 2026 | Bogotá, Colombia | 14 April 2026

Presented by Nyeri Hill Farm & GHIC Project Team



~USD 3.2M

Total Investment

55% IRR

Post-Tax Return

1.2 yrs

Pay-Back Period

226 t CO₂

Annual Savings



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Partners:



Accelerate-to-Demonstrate (A2D) Facility Annual Event

From Risk to Resilience Part A:

Safeguards in Action: Driving Impact and Funding for Scalable Demonstration Projects

14 April 2026 | 2:00–3:30



Agenda

Introduction (2.00 -2.05)

- Ms. Lorena Alberte, GESI – ESS Project Coordinator, UNIDO

Spotlight Presentations (2.05 – 2.50)

- Mr. Mariano Cirone, Senior Specialist in Safeguards, Forest & Climate, UNEP'S Nature and Market-based Solutions Team
- Ms. Natascha Weiler, UNIDO Representative in Colombia
- Mr. Kevin McCall, Environmental and Social Safeguards Specialist, World Bank
- Mr. Panashe Daringo, Founder and Managing Director of Mondjila Project Advisory

Fireside Chat (2.50 – 3.20)

Q&A Audience (3.20 – 3.30)

- Audience participation

Objective:

This session positions Environmental and Social Standards (ESS) not merely as compliance requirements, but as strategic enablers of scale.





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Partners:



UK Government



Speaker

**Mariano Cirone, Senior Specialist in Safeguards,
Forests & Climate from the UNEP's Nature and
Market-based Solutions Team**

UNIDO - A2D Facility Annual Event 2026



From risk to resilience: Reflections and lessons from UNEP's LAC Nature and Market-based Solutions Team on environmental and social safeguards

Mariano Cirone
Climate, Forest and Safeguards Specialist

www.unep.org

Understanding E&S risks

The question is not if risk exists — but when and how we manage it

- **Risks are inherent to projects**
- **Multidimensional risks:** in the LAC context projects often intersects with biodiversity hotspots, water stress and social vulnerability,
- The **strategic questions around risks** are:
 - when is it identified?
 - how well it is understood?
 - Were they managed early enough?



What do we mean by E&S risk?

Understanding environmental and social risk

$$\text{Risk} = \text{Likelihood} \times \text{Severity} \times \text{Exposure}$$

Management capacity

- **Likelihood** → probability of impact
- **Severity** → magnitude of impact
- **Exposure** → ecosystems affected / People (UNEP “Leaving No One Behind” principle)
- **Management capacity** → ability to respond



Understanding our risks at early stages helps avoid delays, costs and negative impacts.

Examples



Environmental

Water, biodiversity, pollution
Climate & disaster exposure



Social

Labor conditions
Land conflicts & IP and LC's rights,
gender gap

What are E&S safeguards?

From “do no harm” to “do good”

- Safeguards are a structured process to help projects identify and manage E&S risks

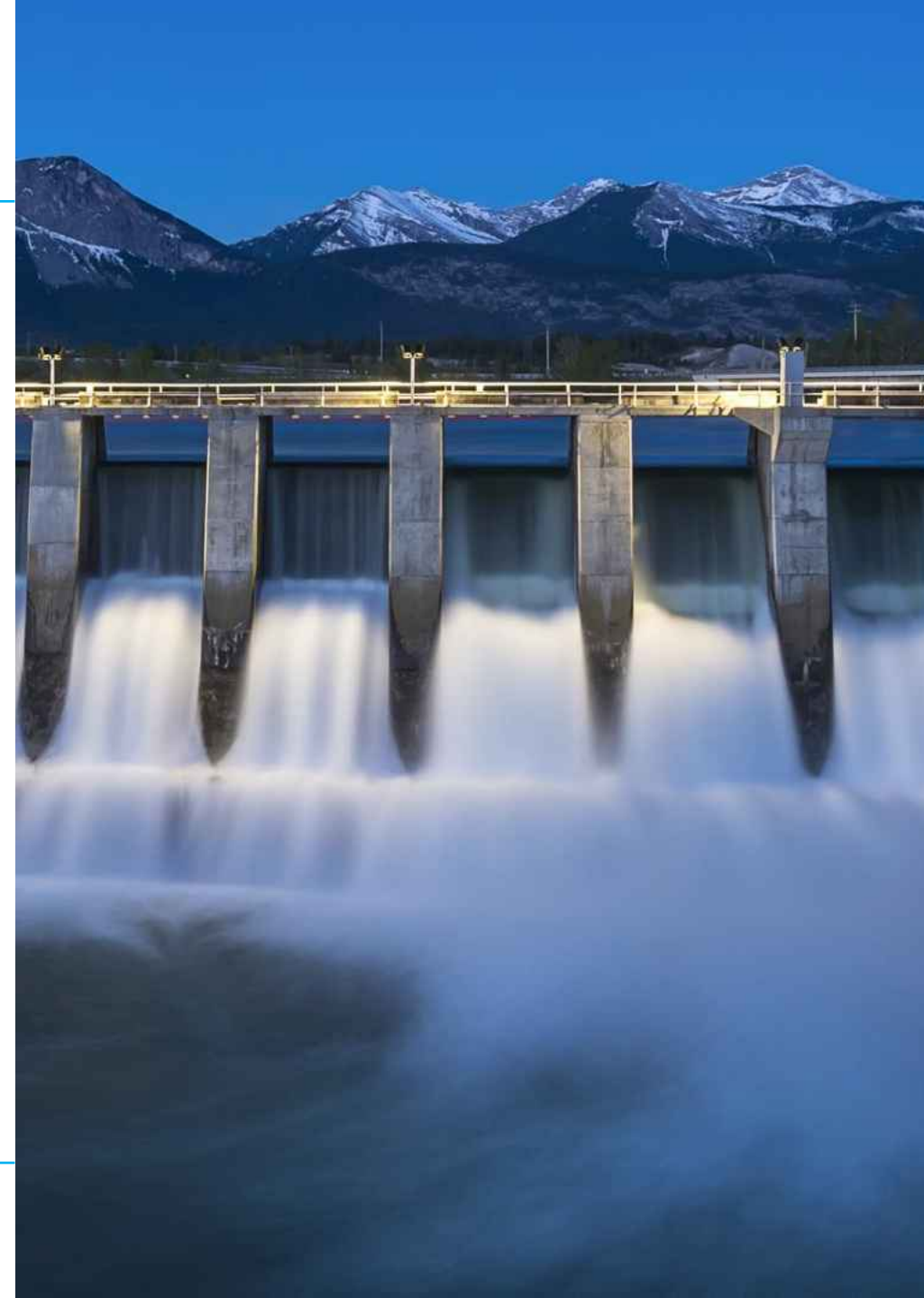
• Focused on the
“mitigation hierarchy”

• Positive impacts on human rights and A&S **non-carbon benefits.**

**“Do no harm”
approach**



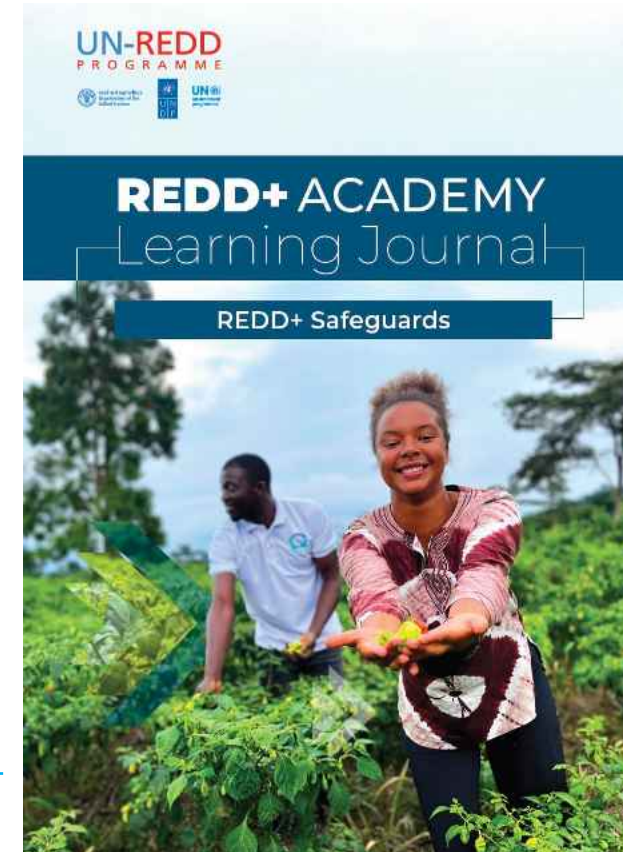
**“Do good”
approach**



International safeguards frameworks

Different standards, shared principles

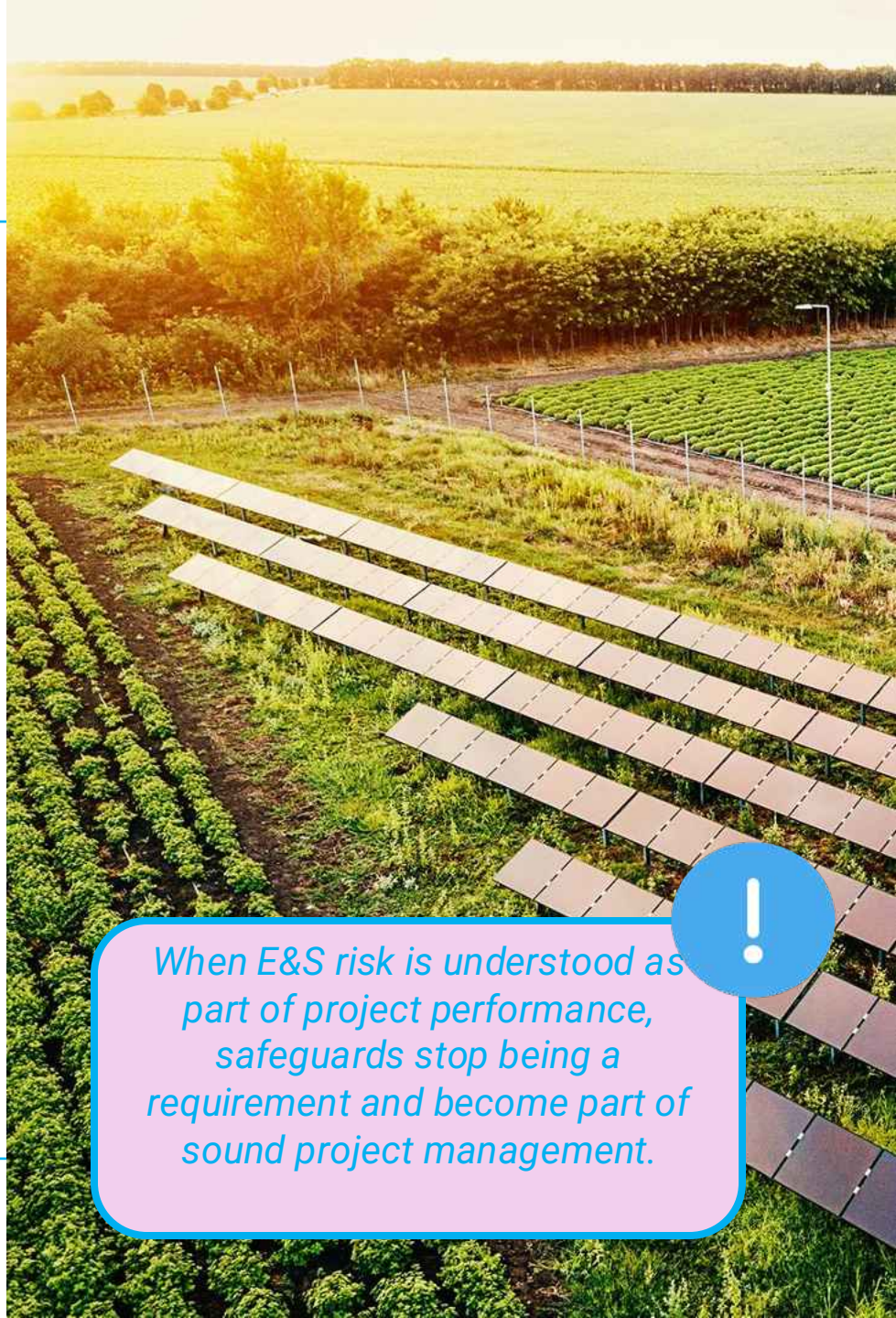
- Safeguards emerged through multilateral development banks and international financiers, to establish a “floor” of E&S risks protection
- Safeguards frameworks approach **similar topics**:
 - Risk management (mitigation hierarchy)
 - Biodiversity & natural resources
 - Labour & working conditions
 - Gender & inclusion
 - Indigenous Peoples and LC’s rights
 - Stakeholder engagement & GRM
 - Transparency
- An approach developed by UNEP: **Cross-cutting Safeguards Frameworks**
 - Establishing an own safeguards framework addressing the typical safeguards topics, to guide project design, capacity-building and implementation.
 - Example of Safeguards+ Honduras (<https://salvaguardashonduras.gob.hn/>)



Why safeguards matter for technology-driven projects

E&S risks are often treated as external or procedural, but they can directly affect project delivery.

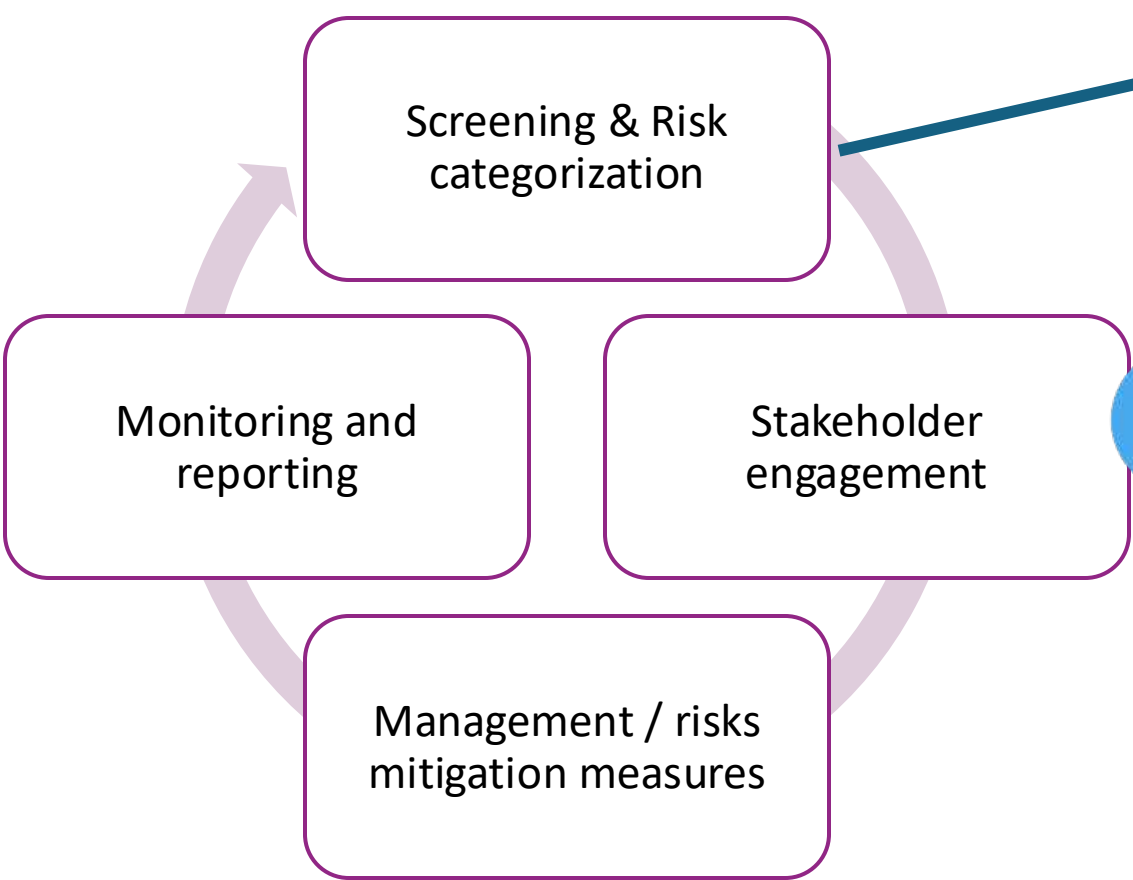
- **Project timelines:** Stakeholder consultations and other safeguards processes require time, planning, and resources.
- **Access to finance:** Some activities or technologies may not align with donor safeguards requirements.
- **Stakeholder acceptance:** Projects may need community FPIC, benefit-sharing arrangements, or even redesign to address local rights and concerns.
- **Long-term operability:** Maintenance costs, technical capacity, and post-project sustainability can determine whether results last
- **Scalability:** A project that works in pilot phase may fail at scale if E&S risks were not considered from the start.



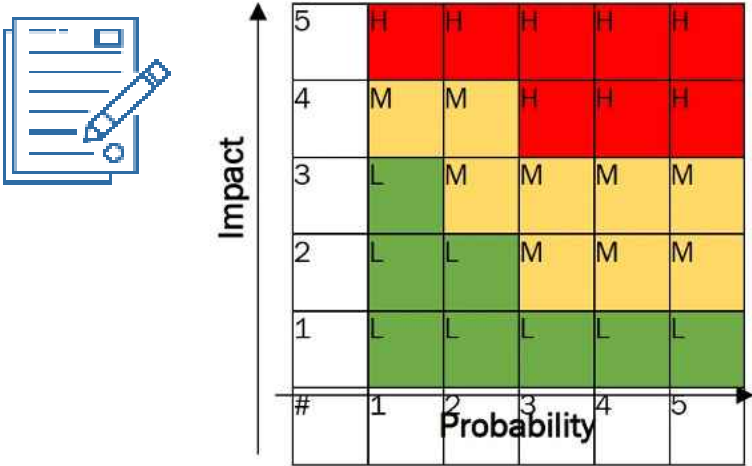
When E&S risk is understood as part of project performance, safeguards stop being a requirement and become part of sound project management.

Safeguards across the project cycle

A strong safeguards approach runs throughout the full project cycle, and not only when applying or reporting for funding or donor/investor



Safeguard Risk Identification Form (SRIF)



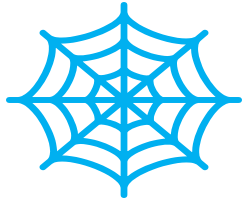
UNEP ESSF, 2020



When safeguards are built into how a company designs and delivers projects—not treated as a box-ticking exercise—they become part of the business culture, strengthening execution, reducing long-term risk, and supporting scalable, credible outcomes.

From paper to practice...

More than what is written at design stage or later reflected in an ESMF or similar document, safeguards need to be understood as something practical, dynamic and operational during implementation.



- **Grievance mechanisms**

- They must be accessible and trusted.
- Culturally appropriated (channels, language, with special provision for certain types of complaints or stakeholders)
- Dissemination matters: no complaints does not always mean no problems.



- **Stakeholders' engagement**

- FPIC is not a one-time event.
- Social legitimacy must be maintained through dialogue.
- Changes in project conditions may require renewed engagement.



- **Information disclosure**

- Transparency must continue throughout implementation.
- Information should be timely, clear and accessible: supports trust and accountability.



Some final remarks



When we think a project, safeguards are not separate from innovation; they are part of what makes it credible, financeable, and viable.

A strong project is not only one where the technology works, but one that can also anticipate risk, engage stakeholders, adapt during implementation, and sustain positive results over time.

Thank you

Mariano Cirone

Senior Specialist in Safeguards, Forests & Climate

Nature and Market-based Solutions Team | Climate
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United Nations Environment Programme

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Speaker

**Natascha Weiler, UNIDO Representative in
Colombia**

A woman with dark skin and short dark hair is wearing a white hard hat and a high-visibility yellow safety vest over a light-colored shirt. She is looking directly at the camera with a neutral expression. The background is a blurred industrial setting with several large, stacked shipping containers in shades of orange, blue, and green. A semi-transparent blue banner is overlaid on the bottom half of the image, containing white text.

UNIDO's approach to Environmental & Social Safeguards

The case of the A2D Facility

UNIDO ESSPP (2021)

UNIDO ESSPP are a set of:

1. **Policies and principles:** UNIDO's commitment to and responsibility for Environmental and social Safeguards.
2. **Procedures and tools:** Safeguard requirements and tools that project teams are expected to apply.



UNIDO ESSPP - Drivers



Ensure that UNIDO interventions **do not have adverse and irreversible impacts** on environment & affected people – **foundation** of inclusive and sustainable industrial development



Required/encouraged by **Member States** and key **funding partners** of UNIDO



ESS = **standard practice** in development cooperation – key principles: risk identification engagement, categorization, and management; stakeholder engagement

Project ESS Risk Screening

❖ Risk screening and verification process:

- The UNIDO project manager (PM) responsible for conducting initial field stakeholder consultations is tasked with **considering the ESS implications of the proposed project – complete Environmental and Social (E&S) Screening Template.**
- This may be completed in conjunction with a national partner, and/or a project executing entity (PEE), if identified at this early stage.
- Project Managers **submits the UNIDO's ESS screening sheet to ESS Coordination for review to ensure correct ESS Risk Categorization and ESS risk mitigation strategy.**



ESS Screening Template

UNIDO Environmental and Social (E&S) Screening Template

The UNIDO Environmental and Social Safeguards Policy and Procedures (ESSPPs) are applicable to all UNIDO projects and programmes submitted to the AF, OCF and OCF and all other UNIDO projects and programmes as required. It requires that UNIDO projects and programmes undergo environmental and social risk (E&S) assessment. The table UNIDO study whether a project or programme should be registered and, if so, the way in which environmental and social issues should be addressed in its development and implementation. To complete the E&S screening, fully understanding of the ESSPP is required. As such, project development teams are recommended to thoroughly review the ESSPP. ESS categorization guidance is provided in Annex 1.

The objective of the E&S Screening Template is to fully UNIDO project development teams in a timely approach to determine the appropriate environmental and social risk category of a proposed UNIDO project or programme, and to assess whether the project's or programme's activities pose any specific risks covered by ESSPP OS 1 to OS 10.

Once the E&S screening template is completed, the project development team will be in the position to plan the resulting required environmental and social assessments in a, OS 6 and ESSPPs, or OS 10. The completed and signed E&S Screening Template should be attached to the concept sheet and project document submitted to accordance with UNIDO project cycle procedures.

Title of the proposed project/programme:	
UNIDO Project Number:	
Proposed duration for the project/programme:	
Name and location of the subsector:	
Department/Division of the subsector:	
Proposed ESM category:	
Signature & Date of subsector:	
Comments by Compliance Officer:	

Title page

TABLE 1 - E&S Screening & Categorization Outcome	
Based on the answers provided in Table 1, please select from the following:	
☐ Category NO PROJECT	The proposed project/programme is non-compliant with UNIDO's ESSPP OS 1-OS 3/OS 6/OS 8/OS 10. Further discussions, alternative design, and reassessment of the project is required or further project development will be stopped.
☐ Category A	The proposed project/programme 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 or Inception.
☐ Category B	The proposed project/programme is likely to have less adverse impacts on human populations or environmentally important areas than those of Category A projects. Likely impacts will be low in number, site-specific, and few if any will be irreversible. An ESMP will need to be completed during Project Formulation or Inception.
☐ Category C	The proposed project/programme 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. ¹

Risk Categorization

TABLE 3 - Climate Risk	
Consideration of climate risk is an important aspect of project/programme design for the AF, OCF and OCF and may also be requested by other funding partners. 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 screening¹ Climate Expert – specifically for SMEs and Industrial Zones² World Bank Climate and Disaster Risk Screening Tools³	
Please respond to the below questions, taking note of the guidance provided.	
(i) Has the sensitivity to climate change, and its impacts, been assessed?	Please provide details:
Consider to include: - Details of the historical (past to current) and the range of projected future climatic conditions in the project location.⁴ - Information on the overall vulnerability (the product of exposure, sensitivity and adaptive capacity) of 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 in addition to the problems being addressed, if applicable. - Details on how climate and non-climate stressors might interact to magnify climate risks.	Please provide details:
(ii) 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?	Please provide details:
Consider to include:	

Climate Risks

TABLE 4 - Identification of E&S Risks (OS-specific questions)				
Project/Programme-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 ¹⁶
1. Could the project/programme directly or indirectly undertake any activities located in sensitive habitats?			OS 7: Protection of Natural Habitats and Biodiversity. <i>For further details please refer to: - The relevant section in Annex 1 - ESSPP OS 7 - ESSPP Annex 1 (the definition of natural habitats)</i>	
2. Could the project/programme directly or indirectly use natural resources, e.g., plantation, forestry, commercial harvesting, agriculture, livestock, fisheries and aquaculture?			OS 3: Bio-diversity Conservation and Land Acquisition OS 10: Community Health, Safety and Security <i>For further details please refer to: - The relevant section in Annex 1 - ESSPP OS 3 and OS 10 - ESSPP Annex 1 (the definition of land use categories)</i>	
3. Could the project/programme potentially involve land acquisition?				
4. If the project/programme involves land acquisition, would this potentially require a conversion of the land use category?				

Identification of OS

Risk Categorization



A semi-circular gauge with three segments: red (left), yellow (middle), and green (right). The needle points into the red segment.

HIGH RISK



Two document icons: one with checkmarks and another with a pie chart.

ESIA & ESMP

Category A (4%)



A semi-circular gauge with three segments: red (left), yellow (middle), and green (right). The needle points into the yellow segment.

MODERATE RISK



A document icon with a pie chart.

ESMP & ESMF

Category B (30%)



A semi-circular gauge with three segments: red (left), yellow (middle), and green (right). The needle points into the green segment.

LOW RISK



An icon showing a document and a clock.

No further assessments

Category C (66%)



A green circle with a diagonal slash through it.

Alternative design & reassessment

No Project



Category A:

- **Example 1:** A project establishing **industrial parks** or **new large-scale infrastructure** (e.g., for processing, recycling, waste treatment, etc.)
- **Example 2:** A project establishing agroforestry systems **in proximity to natural habitats** and on land owned by **Indigenous People**.

Note: Example 1 is rated **Category A** because of the **type of intervention** (*development of a large-scale facility*), and Example 2 because of its **natural and**



Category B:

- **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.

Note: Example 1 and Example 2 are *introducing or upgrading small- or medium-scale technologies* at existing facilities and are therefore **Category B**.



Category C:

- **Example 1:** *Conference* for global awareness raising, knowledge exchange, and advocacy in the area of sustainable energy.

Note: Projects providing *feasibility studies, road maps, inventories, strategies, business plans, policy advice, capacity building and awareness raising* are low risk interventions and therefore Category C.



alternative design &
reassessment

NO PROJECT criteria, if a project ...

- (i) is likely to **infringe on the protection of a critical habitat**;
- (ii) introduces or uses potentially invasive, non-indigenous **alien species**;
- (iii) uses **banned pesticides and/or chemicals**;
- (iv) causes **involuntary resettlement or economic displacement**;
- (v) is likely to alter, damage, or remove any **cultural heritage**; or
- (vi) uses **forced, trafficked, or child labor**.

These projects cannot be supported by UNIDO. Further discussion with stakeholders are required to **re-design and/or relocate the project** in order to re-categorize the project.

UNIDO GRM Access

Stakeholders can access UNIDO's Institutional Grievance Mechanism through the following channels:

VIA MAIL



UNIDO - OFFICE OF
EVALUATION AND INTERNAL
OVERSIGHT (D2161)

WAGRAMESTR.5, 1400
VIENNA, AUSTRIA

BY TELEPHONE



+43 1 26026 3666

BY E-MAIL



OVERSIGHT-
HOTLINE@UNIDO.ORG

WEB-REPORTING TOOL



QR-CODE

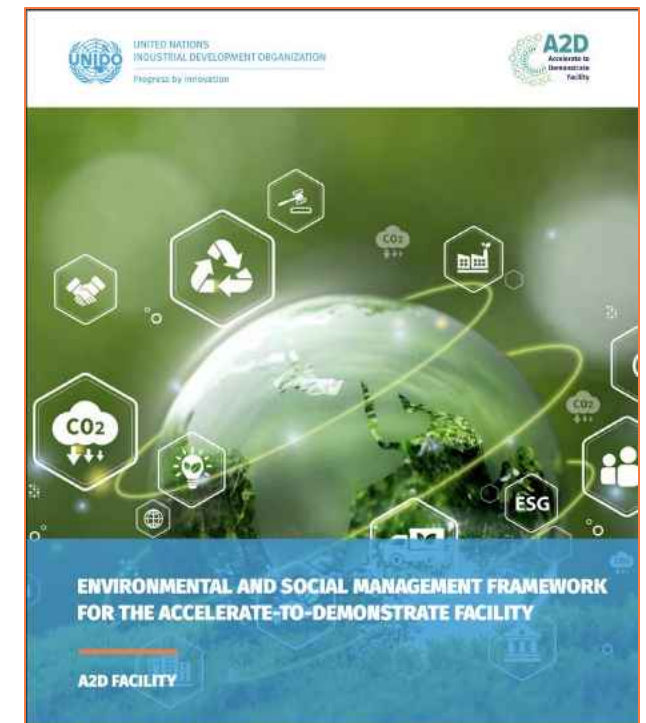
ESSPP relevance for A2D Facility

- A2D was assessed as **one project** under UNIDO ESSPP
- **Medium risk categorization** required comprehensive **ESMF** – **technology demonstration in high-risk sectors**
- Given size and key components being unknown, **facility-level ESS team** was recommended to be set up
- Each demonstration project prepares specific **ESMP (+ ESIA)**
- In line with UK requirements, **ESS** team covers **GEDSI** aspects
- **Facility-level grievance mechanism** established
- UNIDO ESS team **backstops** A2D ESS/GEDSI teams
- **Corporate-level escalation** possible across the board (e.g., grievances)



A2D Facility - ESMF

- Translates UNIDO ESSPP into **practical guide** throughout **entire project cycle** from A2D governance perspective
- **Reflects** UK Govt **GEDSI requirements** (stakeholder engagement, grievances, monitoring tools)
- **Tailors ESS risk/GEDSI assessment to A2D technical areas** (clean hydrogen, critical minerals, smart energy, decarbonization)
- Introduces monitoring indicators & templates for **enhanced and consistent risk management** across funded projects
- Goes beyond compliance to promote benefit-sharing with communities – **from doing no harm to positive local impact**
- Establishes **mandatory reporting requirements** in line with A2D Logframe and donor obligations



Key Takeaways

- ❖ **ESS ensures** projects do **less harm and deliver better outcomes** for communities and the planet.
- ❖ Risk management hierarchy: **Avoid → Reduce → Mitigate/Restore → Compensate.**
- ❖ Projects are **screened and classified** to determine **ESS requirements – full disclosure via Compass.**
- ❖ **Category A** projects require **ESIA & ESMP**; **B** requires **ESMP or ESMF**; **C** typically needs no assessment.
- ❖ **Specific Operational Safeguards (OS)** apply to **different risk areas** (e.g., biodiversity, labour, pollution).
- ❖ A2D Facility fully compliant with ESSPP; also aligns with donor **GEDSI**



With thanks from Colombia!

n.weisert@unido.org



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Speaker

**Kevin McCall, Environmental and Social Safeguards
Specialist, World Bank**



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Speaker

**Panashe Daringo, Founder and Managing Director
of Mondjila Project Advisory and Management,
Daures Green Hydrogen Project**



Daures Green Hydrogen Village

Safeguards in Action: Driving Impact and Funding for Scalable Demonstration Projects | 14 April 2026 DRAFT

Ammonium Sulfate Fertilizers from Renewable Hydrogen in Namibia Renewable Hydrogen in Namibia (UNIDO)



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Problem Statement.

- Region has the lowest fertilizer **application rates** – Poor crop yields, food insecurity
- Over 20 countries in Sub-Sahara are net fertilizer importers. Namibia **imports 100%**
- Population will more than double from its current 1.4 billion to around **3.2 billion by 2070**



Agenda 14 April 26

- Introduction into Daures Green Hydrogen Village
- Scaling Daures : Project Phases
- Project Photos
- A2D Progress Photos
- Project Structures
- The Why ?
- Fire Side Chat



AGENDA 1

Introducing Daures Green Village



Project Location Daures Green Village

Village in the middle of the Desert

BASELINE

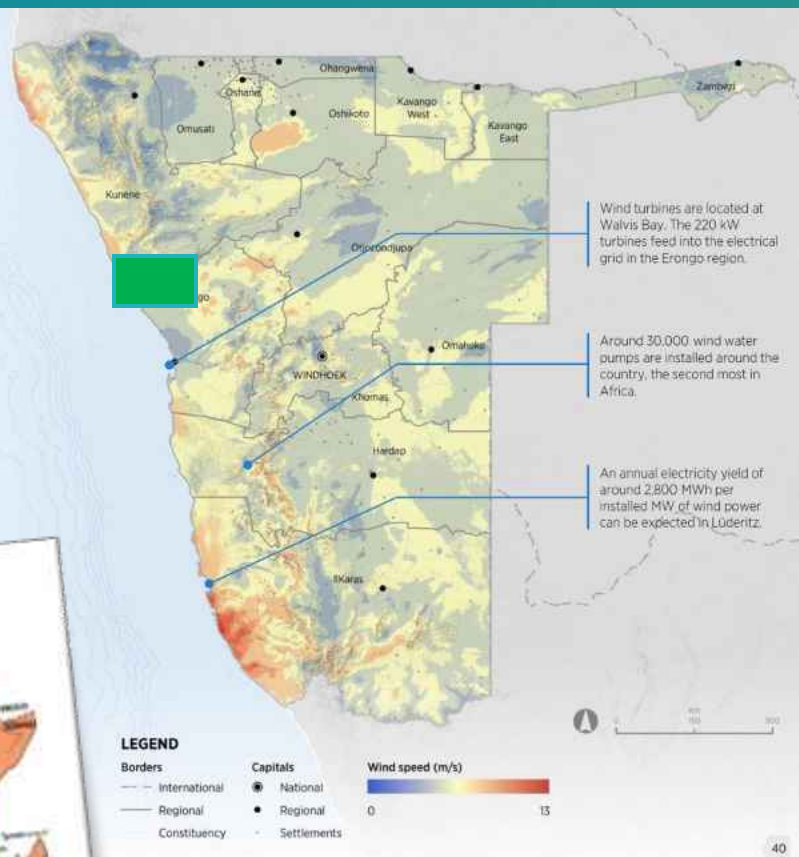
Wind speed

Significant wind speeds presents opportunities for renewable wind energy development.

A combination of solar and wind potential makes Namibia well positioned for renewable energy generation.

Significant areas of Namibia have wind speeds above 5m/s, the threshold for wind turbines to be economically viable. Several areas, particularly the southwest of the country, having an annual average of 7m/s, considered excellent for wind power generation.

The highest wind speed occurs around the town of Lüderitz and southwards, reaching speeds of 13m/s. The majority of the 1500km coastline is positioned



BASELINE

Solar
radiation

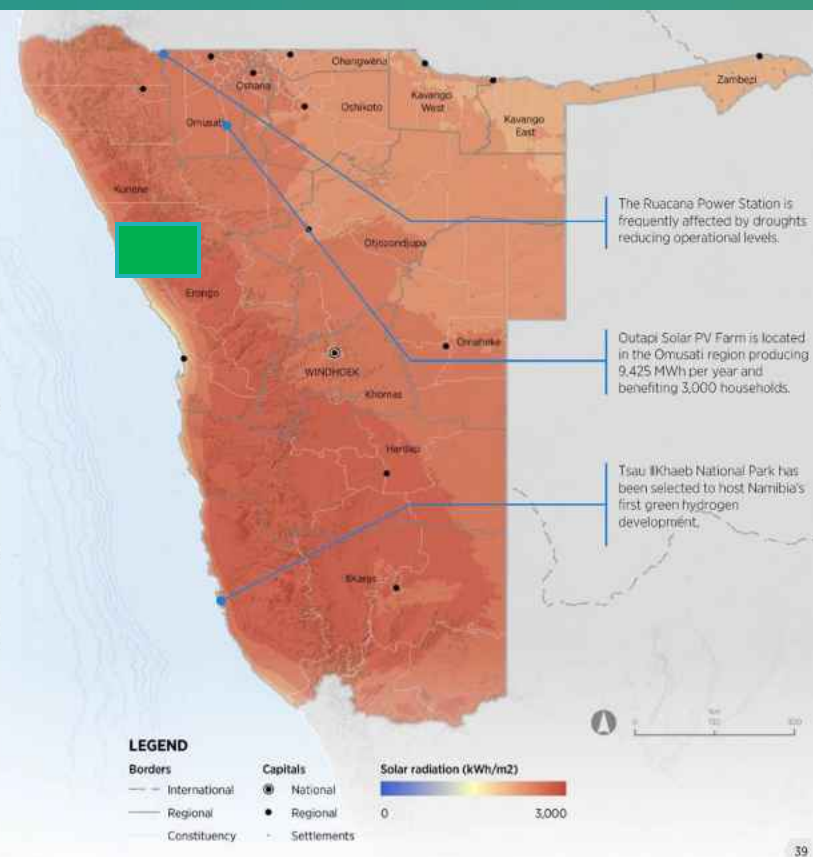
Namibia has vast untapped solar energy that has transformative potential for the energy system.

Solar radiation is a pivotal source for renewable energy development, moving away from traditional energy sources and promoting a sustainable future.

Solar radiation levels across Namibia reach nearly 3,000-Kilowatt hour per m² over large areas. The solar potential in Namibia is one of the highest in the world, with the highest levels stretching down the west of the country.

Namibia's solar potential offers long-term energy security that can reverse the present reliance on energy imports and increase energy exports, positioning Namibia as a key energy player in Africa.

The solar power potential further creates green hydrogen generation possibilities. This has received considerable backing by the Namibian government, adopting several committees to support development of hydrogen sites across the country.



Daures Green Phase 1



Above : Daures Green Village : April 2023

Introducing Daures



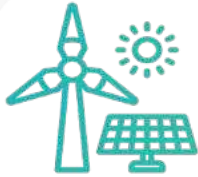
- **Pioneering Net-Zero (E)**
SADC's first commissioned green ammonia plant, demonstrating commercial-scale, net-zero energy viability in Namibia.
- **Decarbonization Blueprint (E)**
Operates on 100% off-grid renewables to produce green fuels, targeting emissions in heavy industry and transport.
- **Circular Agriculture (E)**
Utilizes green ammonia to produce low-carbon fertilizers and cultivates high-value crops in community greenhouses.
- **Community Upliftment (S)**
Drives regional empowerment through direct job creation, local enterprise support, and improved living standards.
- **Skills & Knowledge Transfer (S)**
Acts as a live R&D hub, partnering with global and local universities for technical training and capacity building.
- **Rigorous Governance (G)**
Adheres to international standards and aligns with national frameworks (HPPII, NDP6) to manage a de-risked \$1.3B+ expansion.

AGENDA 2

Scaling Daures : Project Phases



Phase 1 and 1.5 : Pilot (local Use case)
250 KW Electrolizer, 820 Kw PV, Met Mast, 100 tons per ann



Phase 2 : Commercial Facility (SADC Use Case)
20 000 tpa Ammonia, 60 MW PV and 10 MW Wind



Phase 3 : Large Scale Commercial (Europe/Japan Export)
200 000 tpa Ammonia, 600 MW PV, 100 MW Wind

Agenda 3

Project Pictures



Daures Green Phase 1



Above : Daures Green Village : April 2023

Daures Green Phase 1



Above : Daures Green Village : April 2026

Daures Green Phase 1



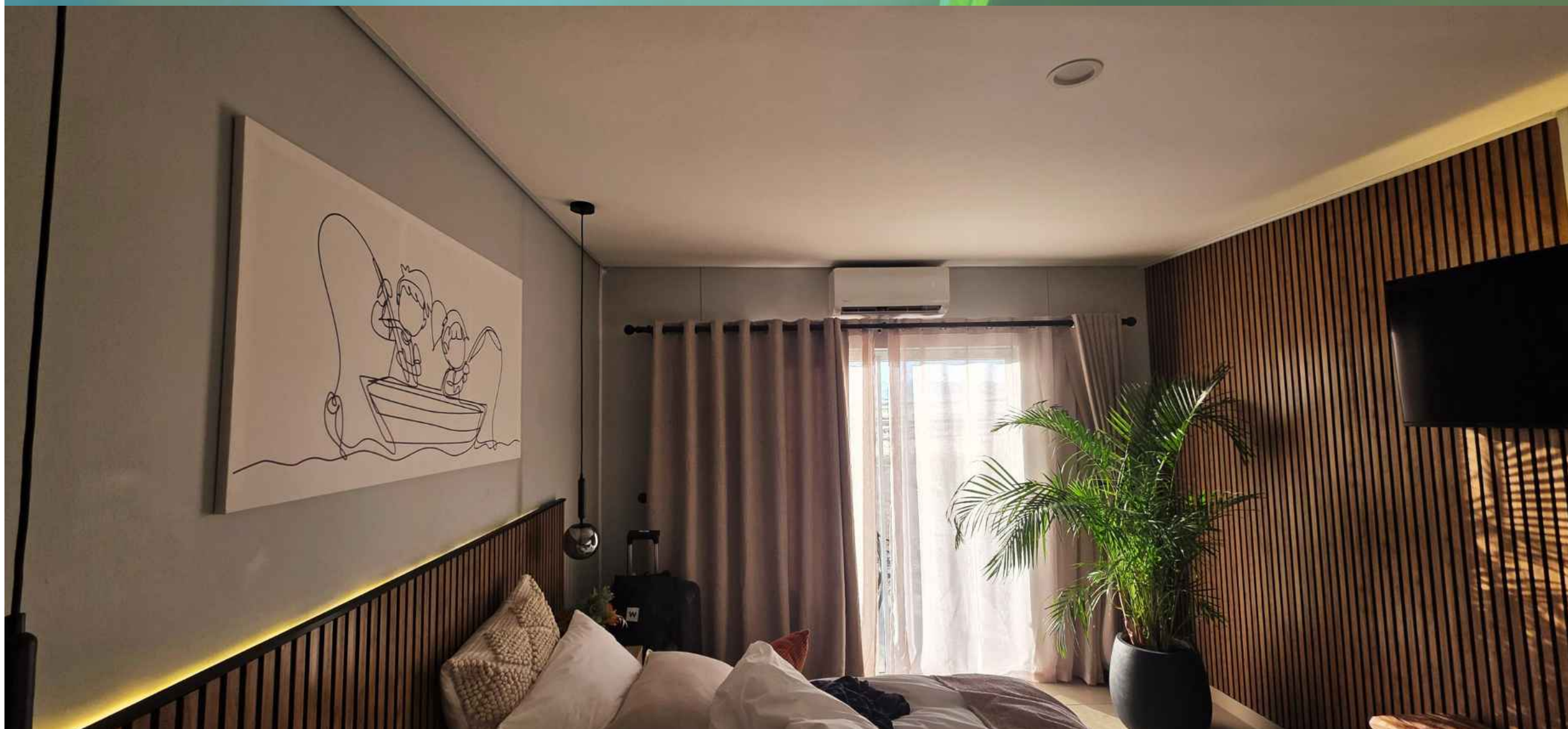
Above : Daures Green Village : April 2023

Daures Green Phase 1



Above : Daures Green Village : April 2026

Daures Green Phase 1



Above : Daures Green Village : April 2026

Agenda 3

A2D Project Progress Pictures





Photos for the Construction of the Ammonium Sulphate Building

October 2025



Above : Bulk earth works for the ammonia sulphate package plant now complete



January 2025



Above : Concrete works Completed



Progress Photos

February 2026



Above : Brick work underway

Photos for the Construction of the Ammonium Sulphate Building

April 2026



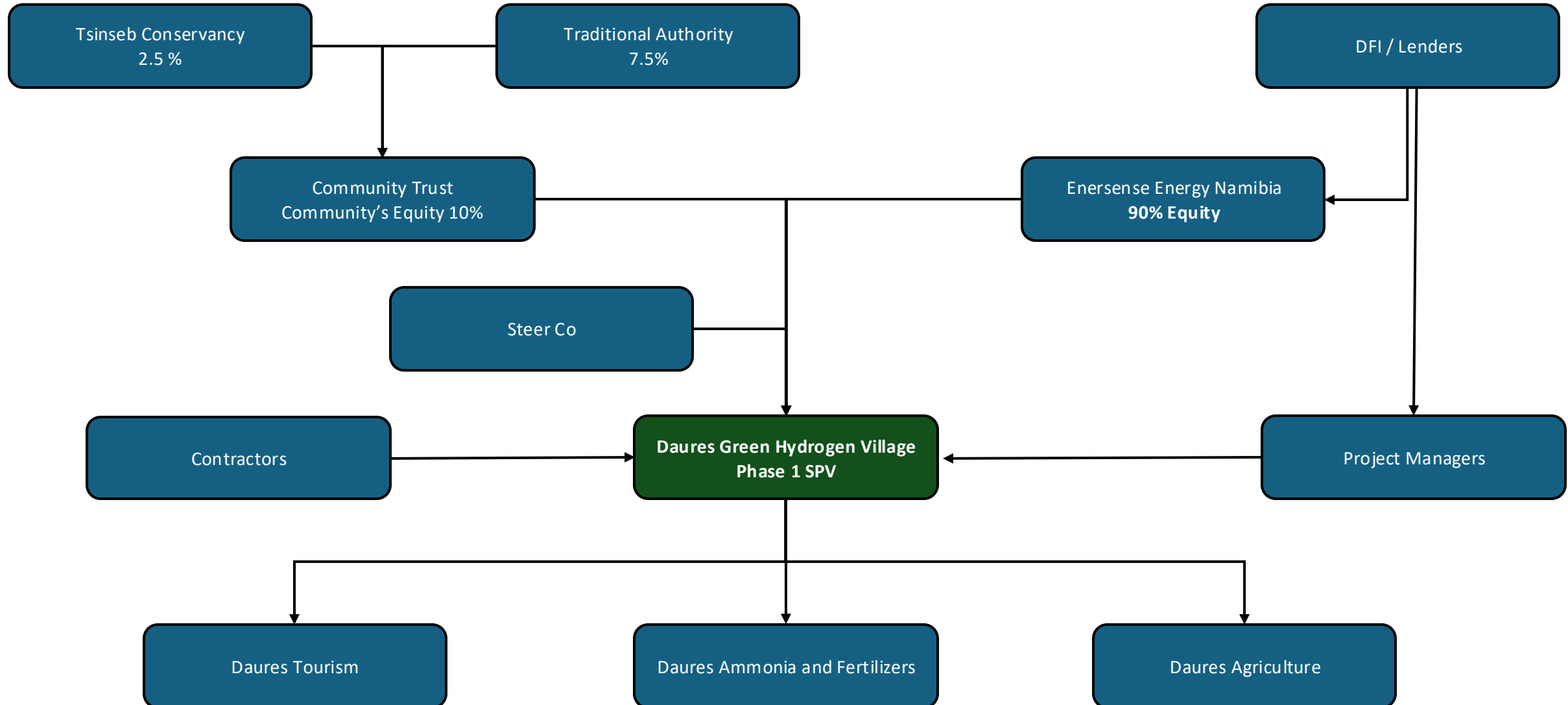
Above : Bulk earth works for the ammonia sulphate package plant now complete



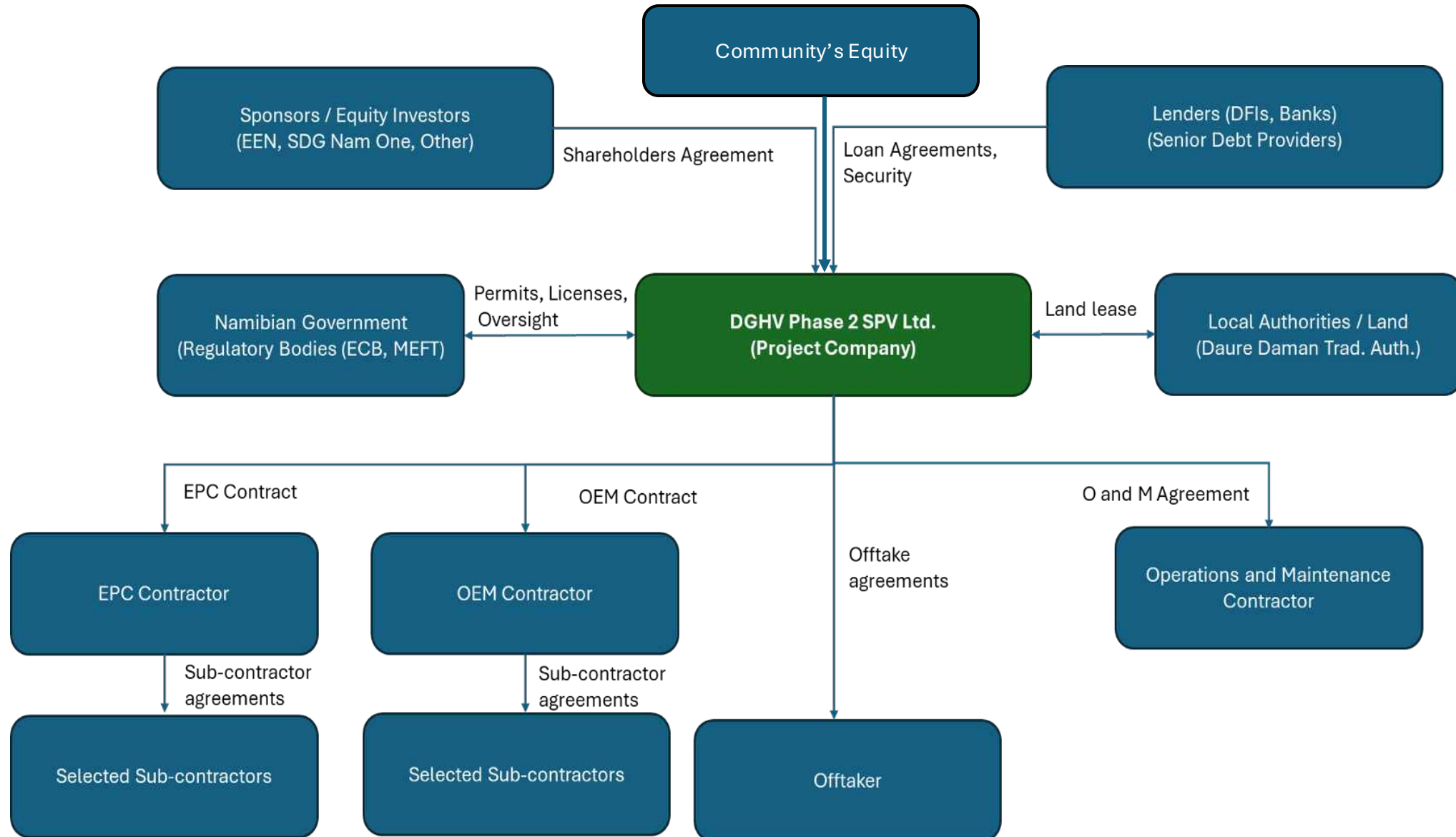
AGENDA 4

Project Structures : Phase 1 and Phase 2

Phase 1 : Project Structure



Phase 2 : Project Structure



AGENDA 5

The Why ?



The Why ?



Bulletproof "Social License to Operate" (Social):

- When communities hold actual equity rather than just receiving philanthropic handouts, they transition from passive bystanders to active project champions. This deep, structural integration is the most robust form of the 'S' in ESG, ensuring local populations actively protect, support, and advocate for the asset because its success is quite literally their success.

De-risks Operations for Institutional Investors (Governance):

- Local shareholding aligns community financial interests directly with project milestones. This effectively neutralizes long-term operational risks such as land disputes, labor unrest, and political friction. For institutional investors evaluating large-scale deployments, this embedded alignment is a massive risk mitigator.

Drives Circular Wealth Creation and Avoids the "Resource Curse" (Social/Environmental):

- Dividends generated from community shares provide a sustainable, independent funding stream for localized economic ecosystems. Instead of capital flight, financial returns remain in the region to fund secondary economies—such as climate-smart agriculture, local enterprise development, and infrastructure—creating a resilient, self-sustaining micro-economy.

Elevates ESG Scoring for Premium Capital Mobilization (Governance/Social):

- Meaningful community ownership goes far beyond basic compliance or traditional corporate social responsibility (CSR); it represents a gold standard in ESG transaction structuring. Projects that structurally embed community equity are prioritized by global impact funds, making it significantly easier to attract premium, lower-cost green financing and unlock massive subsequent funding phases.

Catalyzes Generational Capacity Building (Social):

- Equity ownership fundamentally guarantees communities a permanent seat at the table. This necessitates their involvement in governance, board representation, and strategic planning, which forces the transfer of high-level financial literacy, technical understanding, and executive management skills to local leadership over the project's lifecycle.



Discussion



Safeguards in Action: Driving Impact and Funding for Scalable Demonstration Projects | 14 April 2026

Contact : Panashe Daringo : panashe@mondjila-projects.com



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Fireside Chat



Moderator:

Lorena Albarte

GESI – ESS Project
Coordinator,
UNIDO



Natascha Weiler
UNIDO
Representative in
Colombia,
UNIDO



Mariano Cirone
Senior
Safeguards
Specialist,
UNEP



Kevin McCall
Senior ESS
Specialist,
World Bank



Panashe Daringo
Founder and
Managing Director
of Mondjila Project
Advisory



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Environmental and Social Safeguards Management Framework

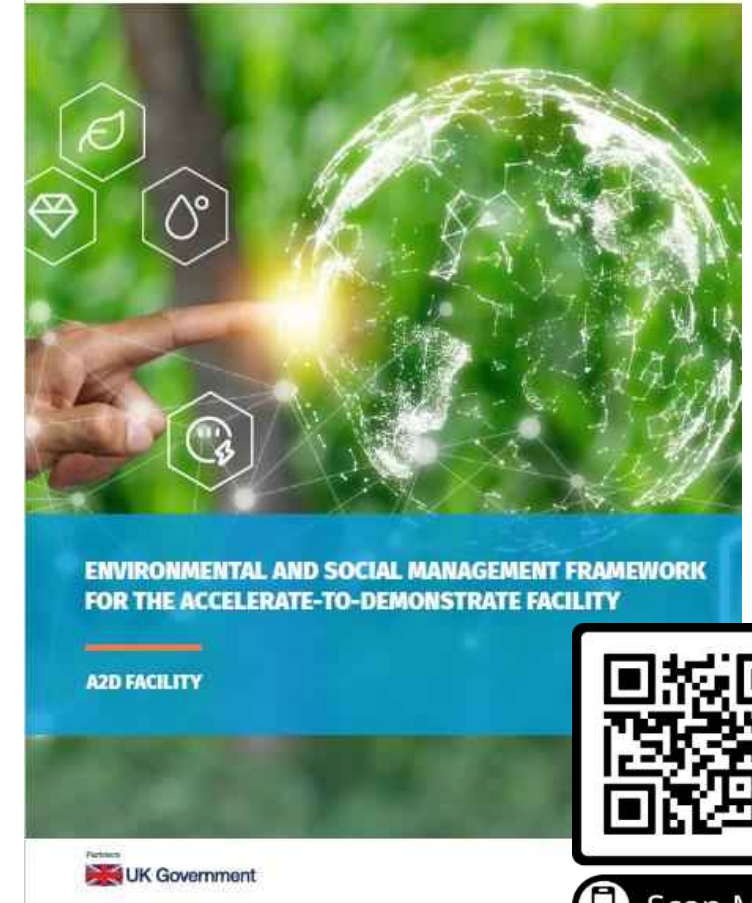
- Establishes the **environmental and social safeguards standards** required for all projects, aligned with **UNIDO ESSPP** and international good practice
- Provides **clear actions, responsibilities, and timelines** to manage environmental and social risks throughout the **project lifecycle for Supplier Project Management Teams (SPMT)**.
- Translates UNIDO's **Inclusive and Sustainable Industrial Development (ISID)** principles into **operational project-level safeguards**
- Supports developers to **identify, assess, and mitigate risks** linked to clean energy and industrial decarbonization technologies
- Includes **screening procedures, risk categorization, mitigation measures, stakeholder engagement requirements, and monitoring tools**
- Ensures projects are **environmentally sound, socially responsible, and innovation-friendly**
- Promotes stakeholder and **community engagement as well as protection of ecosystems** while promoting sustainable industrial transformation and shared prosperity.
- Reinforces **programme accountability** and the principle that no one is left behind in industrial growth
- Requires **mandatory reporting** against an ESS output indicator in the A2D Facility Logframe, in line with UNIDO safeguards.



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Scan Me

ESMF for the A2D Facility Website: [Here](#)



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Q&A

Your Feedback Matters!

 Please take a few minutes to fill out the Session Feedback Form.

Your input will help us improve future events and training sessions.

Time to complete: ~5 minutes

 Your responses will remain confidential and will be used to enhance future engagements

Thank you for your valuable feedback!

**Safeguards in Action: Driving
Impact and Funding for Scalable
Demonstration Projects**

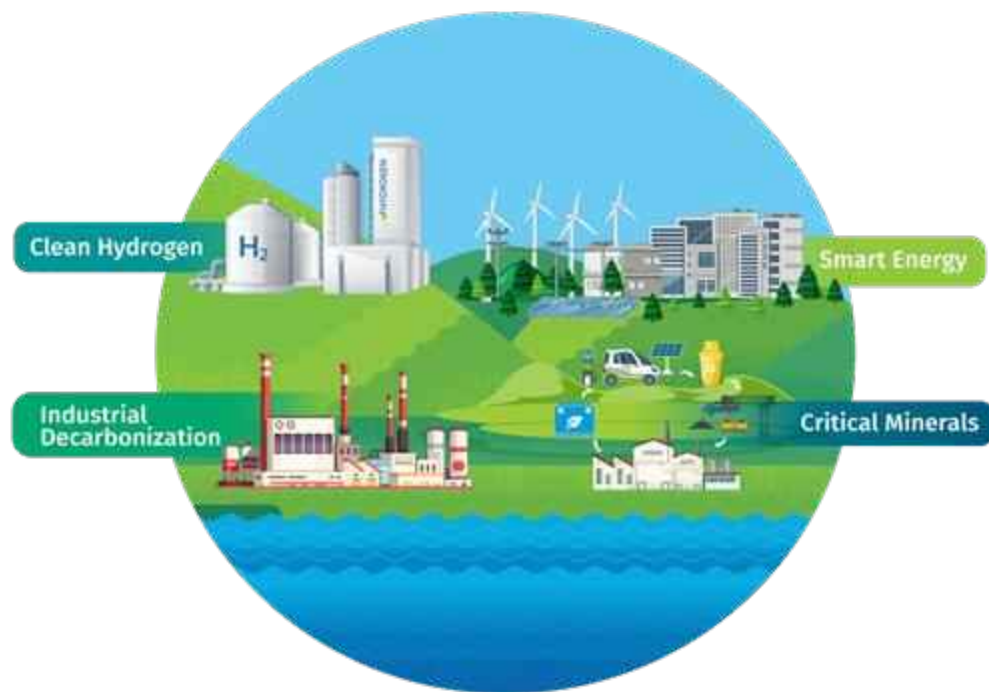




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Further Information

- **A2D Facility Website:** A2DFacility.unido.org
- **A2D Facility LinkedIn Account:** [Follow the LinkedIn page here](#)
- **A2D Facility Mailing List:** [Join the mailing list here](#)
- **A2D Facility Year 1 Annual Report:** [Access the Annual Report here](#)
- **A2D Facility Year 2 Annual Report:** [Access the Annual Report here](#)
- **A2D Facility Market Assessments:** [Access the reports here](#)
- **A2D Facility GESI Framework:** [Access the GESI Framework here](#)
- **A2D Facility ESMF:** [Access the ESMF here](#)

Thank you





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Accelerate-to-Demonstrate (A2D) Facility Annual Event

Part B: GIS Workshop

From Risk to Resilience: Leveraging Data & GIS to Mitigate Environmental & Social Risks in Demonstration Projects

14 April 2026 | 4:15–5:45



Agenda

Welcome & Session Framing + UNIDO's ESSPP and A2D Facility ESMF (16.15 - 16.35)

- Ms. Lorena Albarte, GESI – ESS Project Coordinator, UNIDO

Presentations on GIS and Youth Mappers (16.35 – 17.00)

- Erick Tamba Mnyali, Geospatial Specialist, Director, GeoTE Tanzania & Member of the YouthMappers Alumni Council
- Ebenezer Nana Kwaku Boateng (PhD, Geospatial Researcher, Postdoctoral Researcher Scholar, ASU & YouthMappers Alumni Council Member and ArcGIS Manager

Interactive GIS Exercise: From Data to Decision (17.00 – 17.45)

- Overview of Greener Tea Project: Paul Willacy, Chief Executive Officer, Compact Syngas Solutions Ltd (17.00 – 17.05)
- Exercise UNIDO and Youth Mappers (17.05 – 17.45):

Step 1: Setting the Scenario / Step 2: Understanding GIS Layers / Step 3: Geospatial Risk Identification / Step 4: Risk Mitigation & Early Warning Design for Resilience / Step 6: Results & Reflection

Objective:

This session positions Environmental and Social Standards (ESS) not merely as compliance requirements, but as strategic enablers of scale.





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Workshop Trainers



Facilitator:

Lorena Alberte

GESI – ESS Project
Coordinator,
UNIDO



Erick Tamba Mnyali

Geospatial
Specialist, Director
GeoTE Tanzania &
Youth Mappers
Alumni Council



**Ebenezer Nana
Kwaku Boateng**

Geospatial
Researcher
(PhD), ArcGIS
Manager
YouthMappers
Alumni Council a



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Safeguards Trainer

Lorena Albarte, GESI – ESS Project Coordinator, A2D
Facility, UNIDO



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Partners:



Expected Outcomes

Participants will:

- Understand UNIDO's safeguards frameworks and application in real A2D Facility Demonstration Projects
- Recognize Geospatial Information Systems (GIS) as a practical tool for E&S risk management and gain practical experience in GIS-based risk identification
- Be able to connect environmental, social and climate risks to project design, formulation and site selection
- Gain hands-on experience with spatial decision-making
- Be better equipped to integrate safeguards into project planning and explore how to integrate: early warning systems, monitoring frameworks, stakeholder engagement into project design



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Environmental and Social Safeguards are...



policies, standards, and operational procedures to identify and mitigate negative environmental and social impacts in development projects to:

- Provide guidance to project teams on managing unintended impacts.
- Help ensure sustainability and accountability in all project phases.
- Identify and manage E&S risks, maximizing positive outcomes and co-benefits for ecosystems and local communities.



Environmental and Social Safeguards Policies and Procedures (ESSPP)



UNIDO ESSPP are a set of:

1. Policies and principles: UNIDO's commitment to and responsibility for Environmental and social Safeguards.

2. Procedures and tools: Safeguard requirements and tools that project teams are expected to apply.



Why are ESS Necessary?



All projects can have unintended environmental & social impacts, regardless of their primary objectives

Role of Safeguards:

- Assess environmental & social risks early in project planning.
- Define strategies to prevent & mitigate harm.
- Engage stakeholders and enhance local ownership of projects.
- Comply with donor requirements.



ESSPP: Operational Safeguards (OS)

UNIDO's OS comprise nine programmatic and three framework safeguard requirements that project development teams must follow to address E&S risks.



OS 1:
Environmental &
Social Assessment



OS 11:
Information Disclosure &
Stakeholder Consultation



OS 2 - OS 10:
Programmatic OS



OS 12:
Accountability &
Grievance System



ESSPP: Operational Safeguards (OS)

OS 1: Environmental & Social Assessment

The objectives of this overarching framework are to:

1. Identify, evaluate and manage ES risks and impacts.
2. Follow the mitigation hierarchy approach.
3. Systematically identify vulnerable groups, and to adopt differentiated measures so that adverse impacts do not fall disproportionately on disadvantaged or vulnerable groups, and to make sure that they are not excluded from project benefits.

Vulnerability is a group's likelihood of facing harder conditions, e.g., due to gender, economic status, migration status, ethnicity, religion, sexual orientation, language or health condition.



ESSPP: Operational Safeguards (OS)

Framework Operational Safeguards

*required for all projects (A, B, C)

OS 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.

OS 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.



Programmatic Operational Safeguards (OS 2 -10)

- **OS 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.
- **OS 3 - Involuntary Resettlement and Land Acquisition:** Projects need to avoid involuntary resettlement or physical and/or economic displacement through project-related land use.
- **OS 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).
- **OS 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.
- **OS 6 - Cultural Heritage:** Projects need to ensure the protection of tangible and intangible cultural heritage from damage or alteration.





Programmatic Operational Safeguards (OS 2 -10)

- **OS 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.
- **OS 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.
- **OS 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.
- **OS 10 - Community Health, Safety and Security:** Projects need to avoid or minimize any health, safety, and security risks and impacts on project-affected communities.



Why Project Categorization is important?

- Determines the level of **environmental and social risk** in a project
- Ensures **appropriate safeguards** are applied.
- Helps project teams plan for potential challenges **early**
- Guides the **required documentation** and approval process



Category A



Category B



Category C



No Project



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Environmental and Social Safeguards Management Framework

- Establishes the **environmental and social safeguards standards** required for all projects, aligned with **UNIDO ESSPP** and international good practice
- Provides **clear actions, responsibilities, and timelines** to manage environmental and social risks throughout the **project lifecycle for Supplier Project Management Teams (SPMT)**.
- Translates UNIDO's **Inclusive and Sustainable Industrial Development (ISID)** principles into **operational project-level safeguards**
- Supports developers to **identify, assess, and mitigate risks** linked to clean energy and industrial decarbonization technologies
- Includes **screening procedures, risk categorization, mitigation measures, stakeholder engagement requirements, and monitoring tools**
- Ensures projects are **environmentally sound, socially responsible, and innovation-friendly**
- Promotes stakeholder and **community engagement as well as protection of ecosystems** while promoting sustainable industrial transformation and shared prosperity.
- Reinforces **programme accountability** and the principle that no one is left behind in industrial growth
- Requires **mandatory reporting** against an ESS output indicator in the A2D Facility Logframe, in line with UNIDO safeguards.



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Programme by Innovation



Scan Me

ESMF for the A2D Facility Website: [Here](#)



UNIDO Youth Policy & ISID

Empowering Youth through Geospatial Innovation and Data

Why Youth Matter for ISID? Youth are key drivers of innovation, digital transformation, and sustainable industrial development

UNIDO Youth Policy: Key Pillars

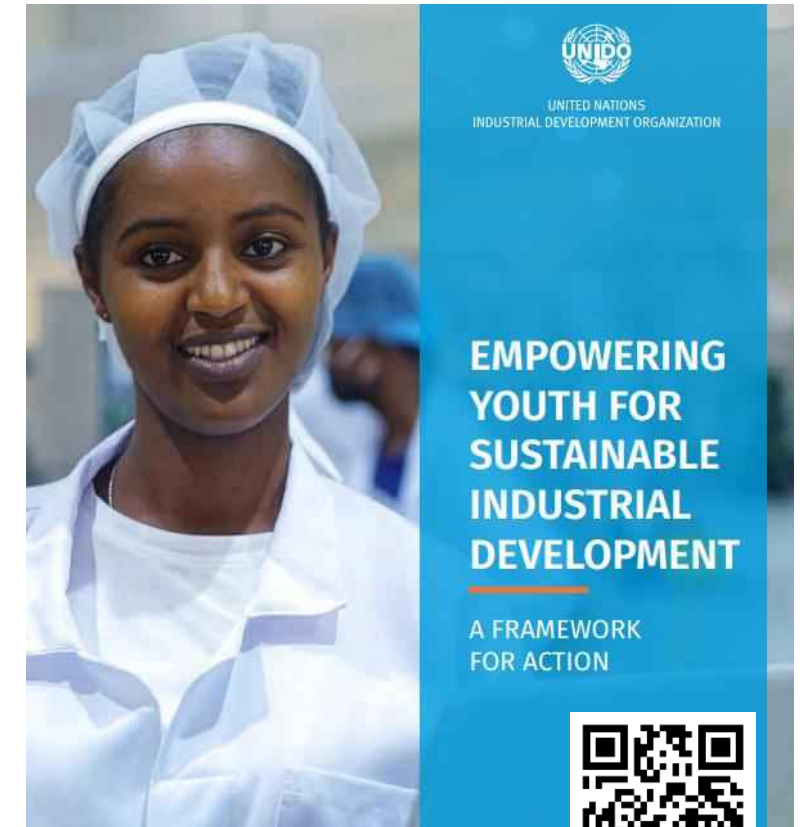
- **Engagement:** Meaningful participation of youth in industrial policy and project design
- **Capacity Development:** Skills-building in digital, technical, and entrepreneurial domains
- **Employment & Entrepreneurship:** Supporting green jobs and youth-led enterprises
- **Inclusion:** Ensuring opportunities for women and underrepresented groups

Link to ISID (Inclusive and Sustainable Industrial Development)

- Promotes economic competitiveness, social inclusion, and environmental sustainability. Aligns youth action with SDGs (especially SDG 9 & 8)

Role of YouthMappers in Advancing ISID

- GIS skills enable data-driven decision-making for local and global challenges
- Harnessing GIS and open data for industrial planning and climate resilience
- Supporting evidence-based solutions for energy, infrastructure, and urban development
- Building a global network of youth geospatial leaders





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GIS Specialist and Trainer

**Erick Tamba Mnyali, Geospatial Specialist - Director,
GeoTE Tanzania & Member of the YouthMappers
Alumni Council**



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GIS Specialist and Trainer

Ebenezer Nana Kwaku Boateng, PhD, Geospatial Researcher, Postdoctoral Researcher Scholar, ASU & YouthMappers Alumni Council Member and ArcGIS Manager



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YouthMappers



442 Chapters Across 82 Countries

OUR IMPACT



27.2 Million
BUILDINGS



1.1 Million
ROADS (KM)



154,500
AMENITIES



67.8 Million
PEOPLE IMPACTED



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YouthMappers – Our Mission

- Cultivating the next generation of leaders through geospatial technologies
- Open data to address real-world challenges
- Ethical, inclusive, and impactful mapping



We Don't Just Build Maps. **We Build Mappers.**



YouthMappers – Our Mission



MAPPING PROJECTS



- Student-Led
- Community Mapping
- Research Projects
- Remote Mapping
- Partner Collaboration

TRAINING & DEVELOPMENT



- YouthMappers Academy
- Webinars
- Student-organized conferences
- Experiential Learning

LEADERSHIP & FELLOWSHIPS



- Leadership Fellowship
- Regional Ambassadors
- Fieldwork Grants

We Don't Just Build Maps. **We Build Mappers.**



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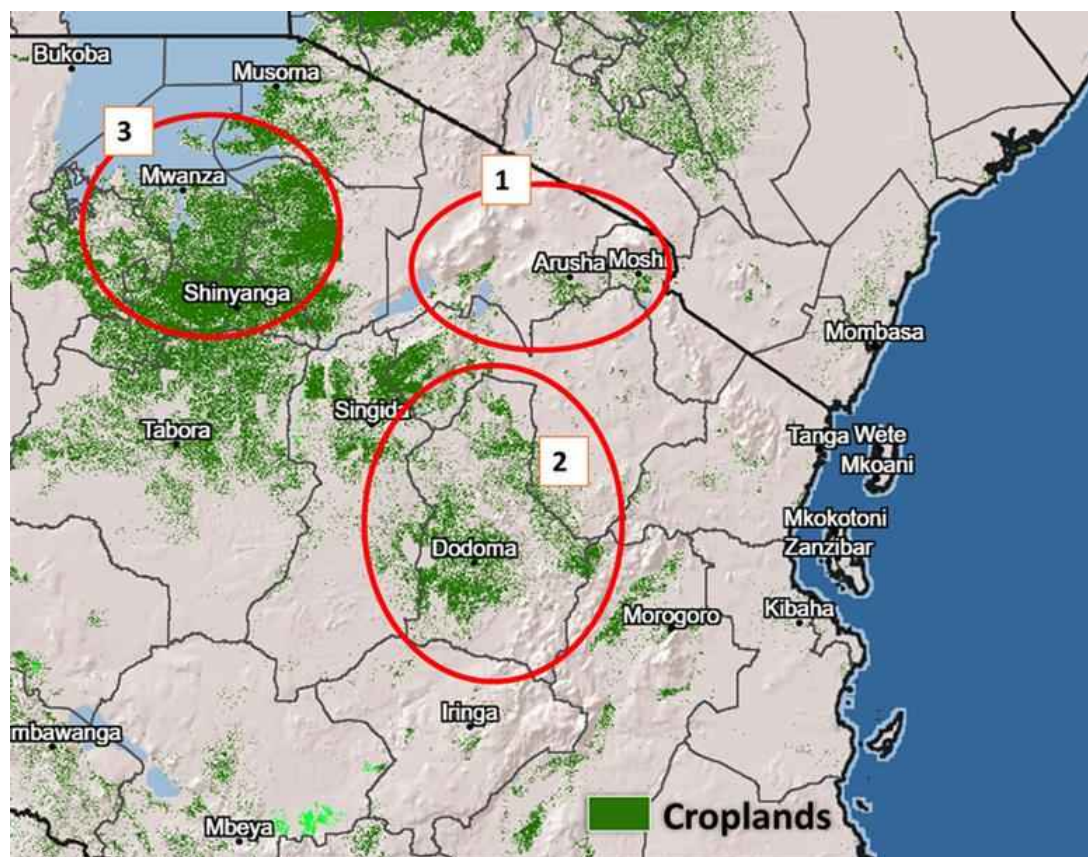


YouthMappers Crop Identification Pilot Project- Tanzania



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YouthMappers Crop Identification Pilot Project- Tanzania



Mahindi

Pamba

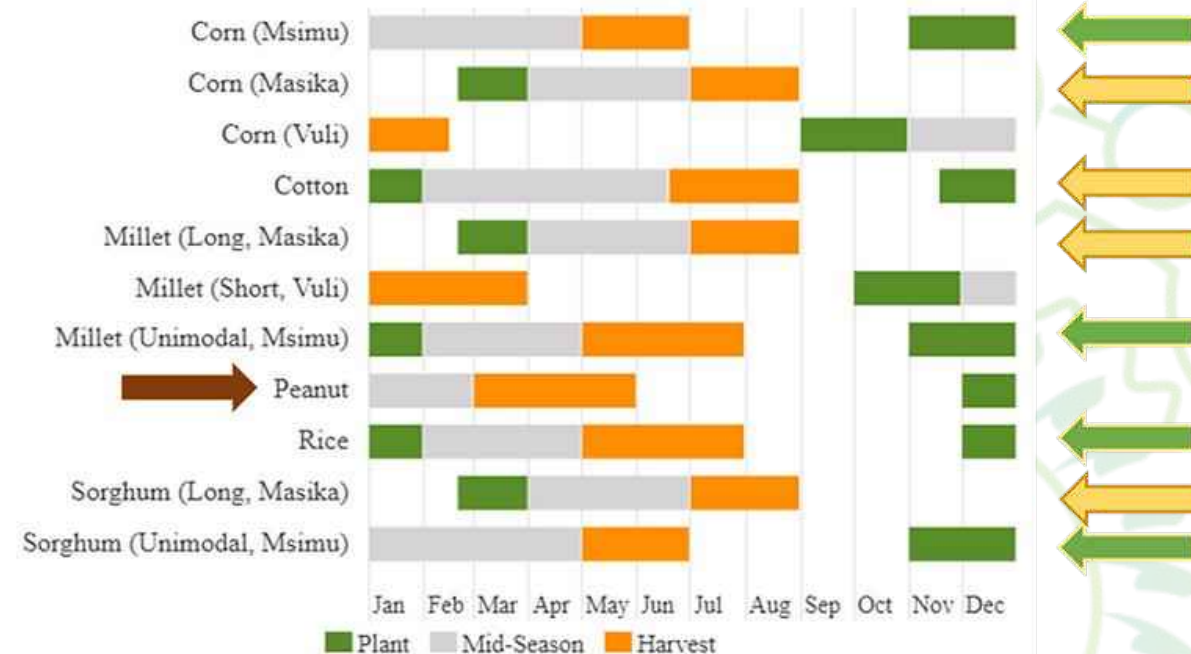
Ulezi

Karanga

Mpunga

Mtama

Tanzania – Crop Calendar



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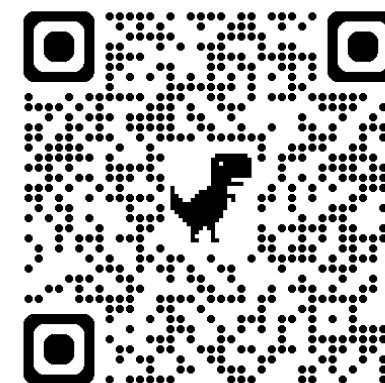
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YouthMappers- Farmers Profiling and Mapping (USAID+IITA)



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Speaker

**Paul Willacy, Chief Executive Officer, Compact
Syngas Solutions Ltd, Greener Tea Project**



Case Study: A2D Facility Supported Demonstration Project

Industrial Decarbonization: "Greener" Tea: Clean Heat and Power with Biomass Residues in Kenya

Objective

To operate a 500kW gasifier using waste biomass to reduce emissions from tea production by 30%, linking energy use to climate and community results to create a **pipeline for scaling** to other factories and industries.

Transformational Project

The MicroHub gasifier converts local biomass into power and heat, reducing fuel use and enabling use of 20% energy from prunings, crop residues, and bamboo. Production of biochar improves soil fertility, increases tea yields, and sequesters carbon.

Expected Impacts

- Environmental: Improves soil health and clean energy expanding biodiversity and aiding carbon sequestration
- Social: Supports green jobs and empowers local communities, particularly women
- Economic: Reduces reliance on fossil fuels, lowers energy and fertilizer costs, improves factory margins & reduces vulnerability to price fluctuations

PROJECT KEY INFORMATION

LEAD ORGANIZATION

Compact Syngas Solutions

CONSORTIUM PARTNERS

- Supivaa
- IITA

DURATION

01 Feb 2025 - 01 Mar 2028

LOCATION

Kenya





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Interactive GIS Exercise: From Data to Decision

Youth Mappers: Hands-on, guided participatory exercise

➤ How GIS/data supports decision-making

Use of geospatial tools (e.g., satellite imagery, Copernicus data)

Objective: Identify a suitable site for potential demonstration project, Identify and Mitigate or Minimize environmental and social risks, Integrate early warning and resilience considerations

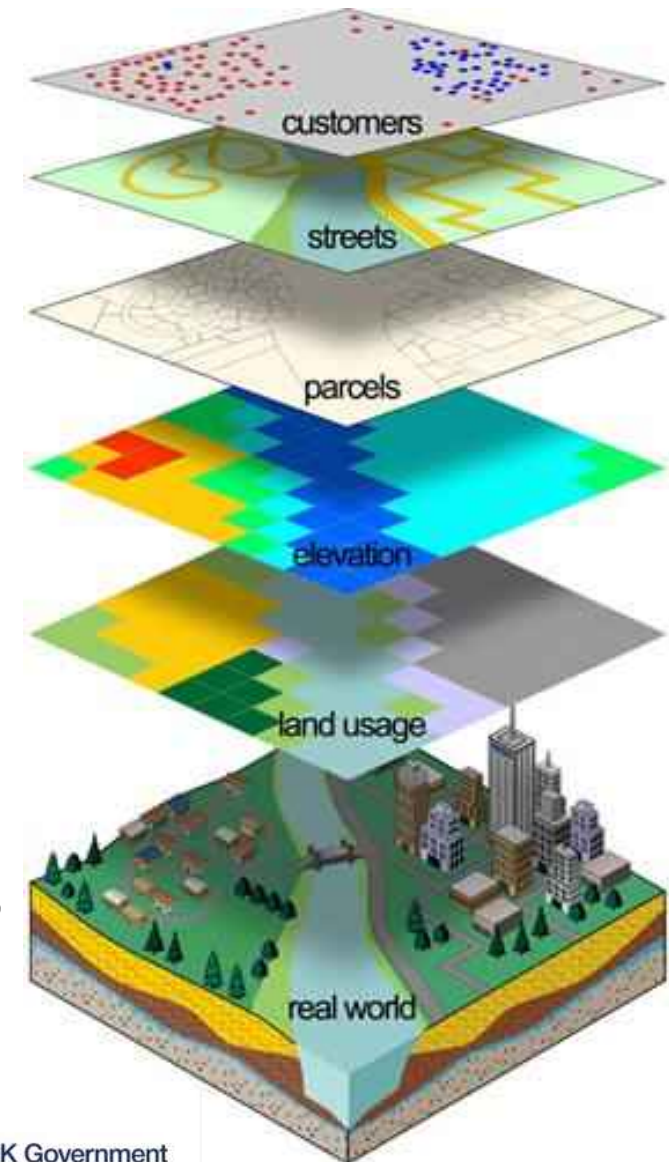


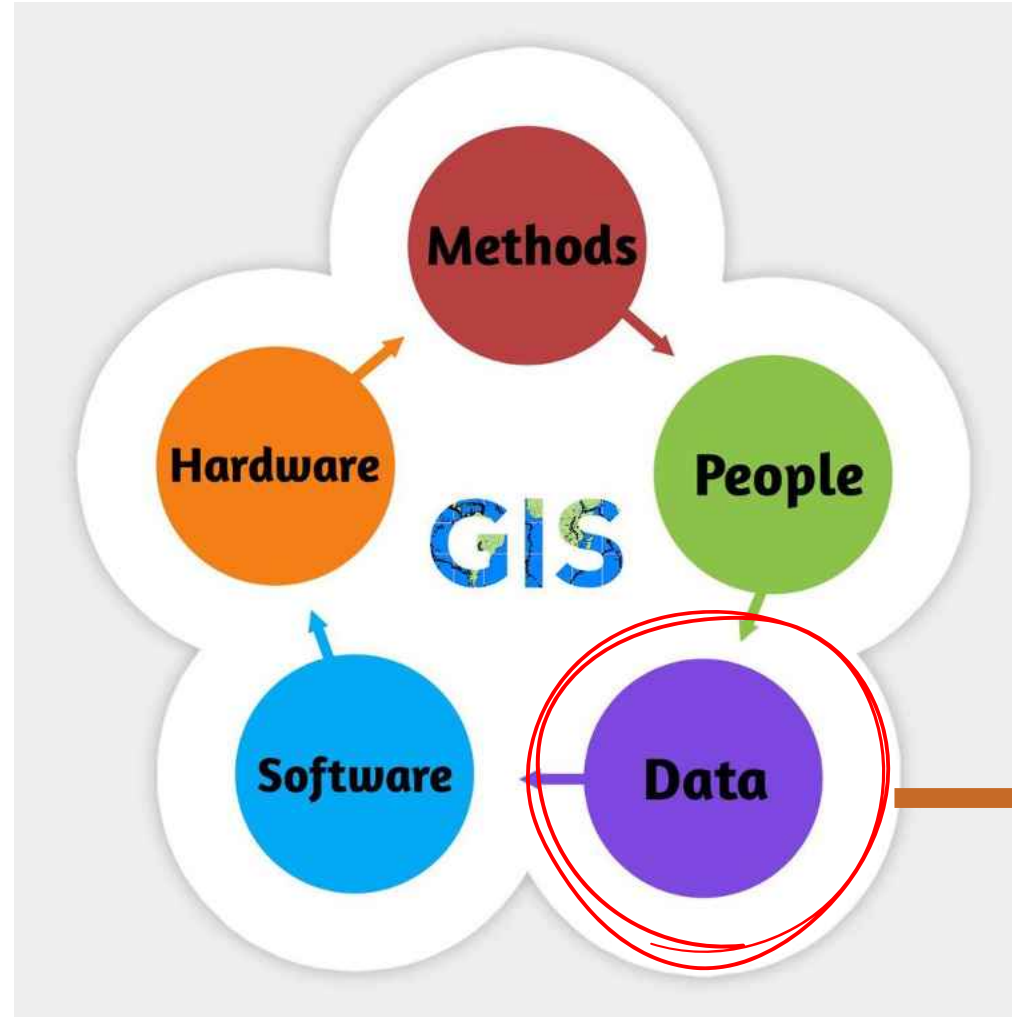
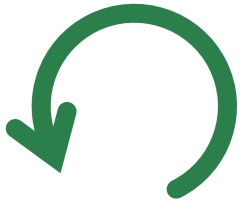
*Lets break the
ice*

MULTI- More than one

CRITERIA- factors used to evaluate a
decision.

*“Multi-Criteria means making a decision by considering more
than one factor.”*





***SPATIAL
VS
ATTRIBUTE/CHARACTERI
STIC***

***Elements of
GIS***



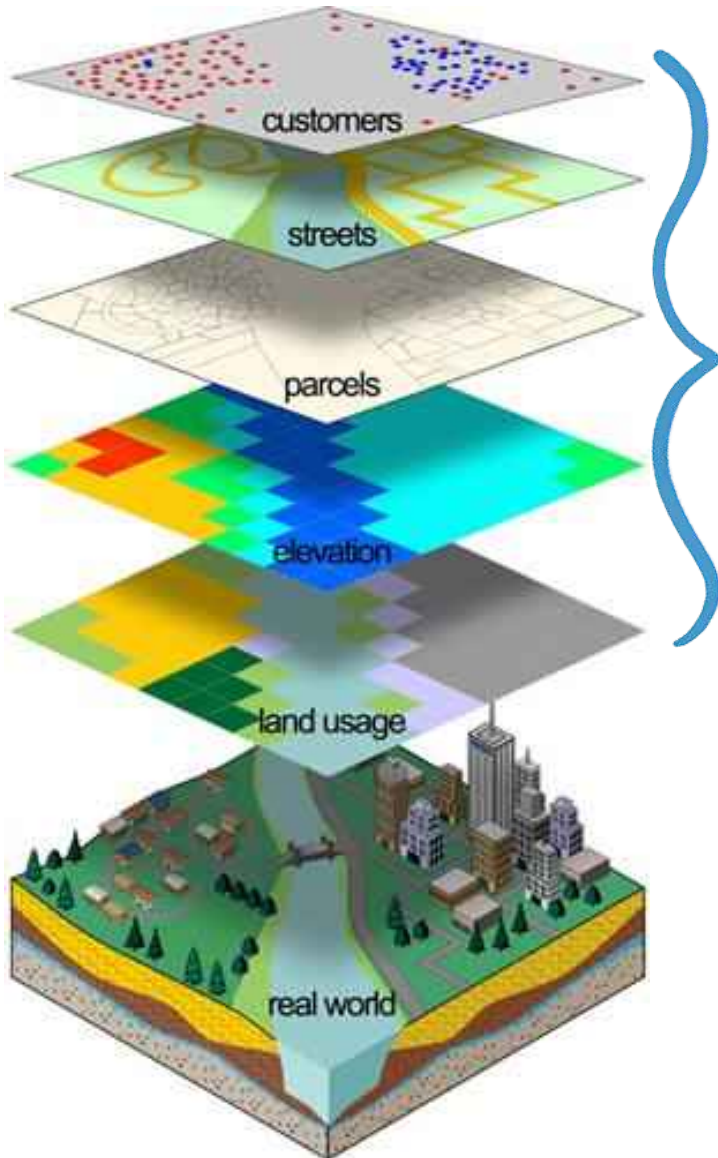
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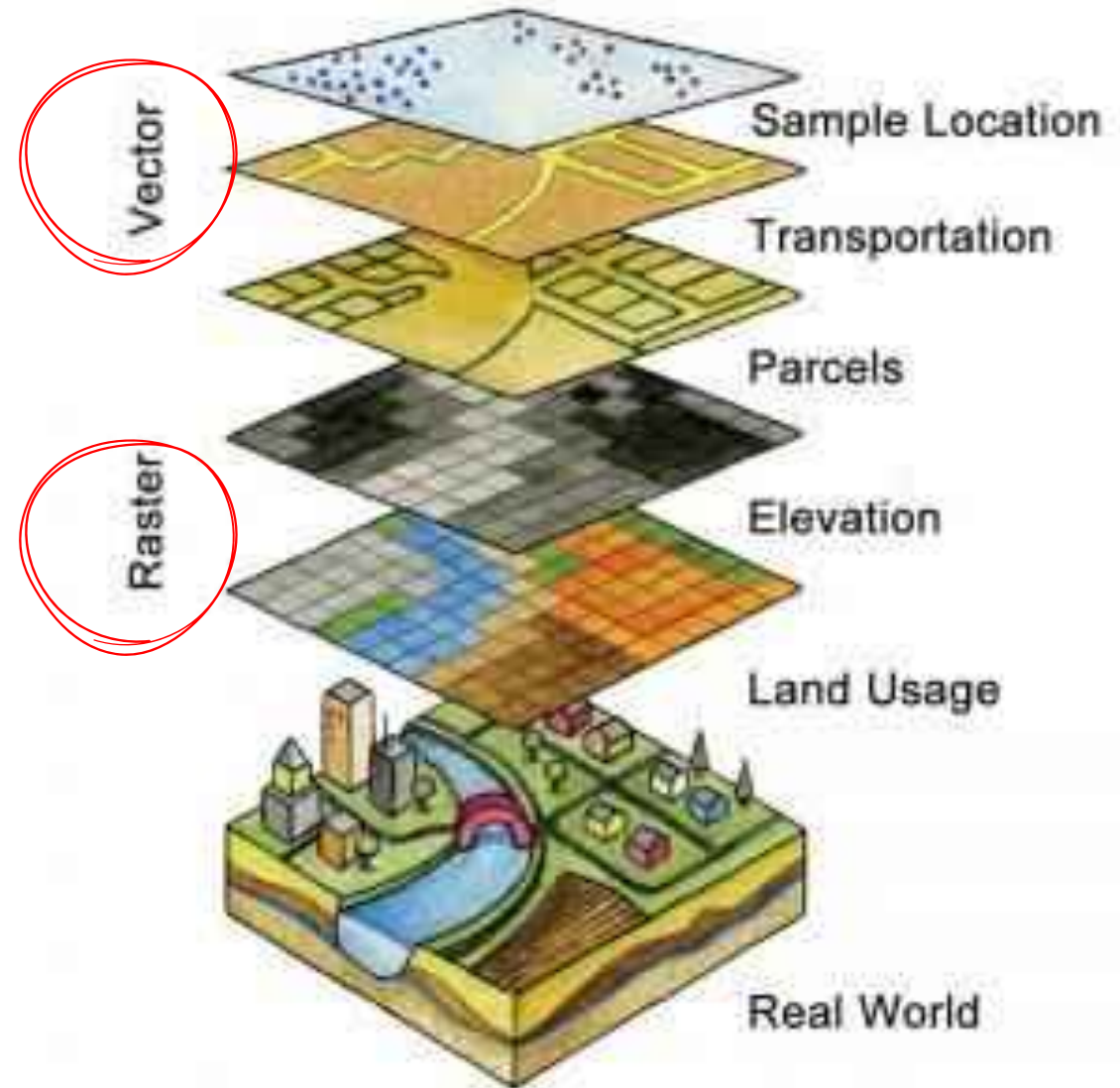
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Factors/layers



.....Dat



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TERMS

Criteria Factors used in decision

Constraint Areas excluded from analysis

Weight Importance of each criterion

Overlay Combine multiple map layers

Suitability How appropriate a location is

WORKSHOP SCENARIO

A development consortium plans to establish a climate-resilient demonstration project site aimed at promoting environmental sustainability, social risk reduction, and early warning for climate-related hazards. The selection must avoid areas prone to flooding, steep slopes, and ecologically sensitive zones while ensuring accessibility through nearby roads and consideration of settlement proximity. Temperature conditions are also considered for operational suitability. Using GIS, identify the most suitable locations for the project.

- Identify the GIS data layers you need
- Factors and constraints considerations



What did the stakeholders say?

- literature?? Expert Knowledge??



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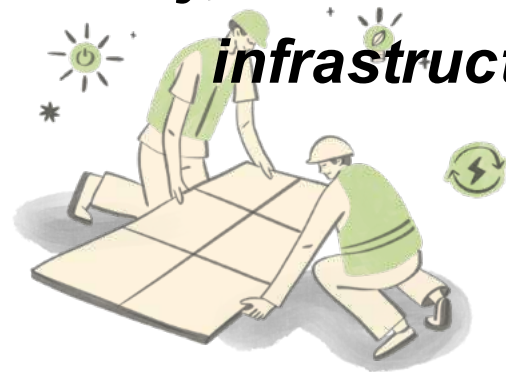
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*Conservation (**Biodiversity, habitat connectivity, threats**)*

Urban planning

*(**Accessibility, environmental constraints, infrastructure**)*



Renewable energy

*(**Wind speed, solar radiation, landuse e.t.c**)*



Agriculture (Soil quality, climate, slope e.t.c)



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In Groups, Lets discuss the variables using the maps

What does this variable tell us about environmental or social risk in the study area?

interpret meaning using numbers and logic — e.g., is it hazard, exposure, or accessibility etc.?



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SLOPE

- Erosion
- Runoff
- Landslide
- infrastructure stability



- 0 - 2% Very flat (Floods accumulate)
- 2 -8% Gentle (stable)
- 8 - 15 (moderate)
- 15-30 (High erosion risk)
- > 20 very High risk



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Waterway proximity



- Flood risk
- Resource access

- 0 - 100 Flood prone high risk
- 100 - 300 risk
- 300 - 700 (safe and accessible)
- 700-900 (Moderate)
- > 900 Too far

Settlement proximity



- social risks

- 0 - 200 High exposure/conflict
- 200 - 500 Moderate risk
- 500 - 900 (optimal balance)
- 700-900 (Reduced accessibility)
- > 900- 1200 (Reduced accessibility)
- >1200 isolated

NDVI



- Ecosystem stability

- 0.08 - 0.2 Bare land, high degraded
- 0.2 - 0.4 low vegetation
- 0.4 - 0.7 (stable)
- 0.7-0.85(Dense vegetation)
- > 0.85 (ecological sensitive)



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Temperature



- Climate stability

- 16.2 - 16.6 slightly cool
- 16.6 - 17.1 stable/optimal
- 17.1 - 17.4 slight stress
- 17.4 - 17.6 warmer stress



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Road proximity

- Emergency access
 - Too close = noise/disturbances
 - Too far = poor accessibility
- 0 - 50 Too close
 - 50 - 150 very good access
 - 150 - 300 Good
 - 300 - 450 Moderate
 - > 450 poor accessibility



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Rank the 6 variable's based on their importance considering E&S
safeguards of our project

There is no correct answer



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Accelerate to
Demonstrate
Facility

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AHP = intelligent, decision-based weighting

- Logical & scientific
- Reduces bias
- Has CR (quality check)
- Accepted in academic research



Analytic
Hierarchy Process

- Takes time
- Requires thinking (not guessing)

Value

Meaning

1

Equal importance

3

Slightly more important

5

Strongly more important

Odd numbers

Clear, strong judgments

Even numbers

Fine-tuning / uncertainty

7

Very strongly more important

9

Extremely more important

2,4,6,8

Intermediate values



Analytic
Hierarchy Process



Group, based on the ranking, fill in the AHP Matrix Table

There is no correct answer



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Criteria	Slope	Water Proximity	Road Proximity	Settlement Proximity	NDVI	Temperature
Slope	1	1	3	5	5	7
Water Proximity	1	1	2	3	5	7
Road Proximity	0.333	0.5	1	3	5	7
Settlement Proximity	0.2	0.333	0.333	1	3	5
NDVI	0.2	0.2	0.2	0.333	1	3
Temperature	0.143	0.143	0.143	0.2	0.333	1



Slope > Waterway > Road > Settlement > NDVI > Temperature

Range	Meaning	Interpretation
15 – 30	Very Low Suitability	Avoid completely
30 – 50	Low Suitability	Not recommended
50 – 70	Moderate Suitability	Possible with caution
70 – 85	High Suitability	Good for construction
85 – 98	Very High Suitability	Best locations



Recap and Best practices

- What is your goal?
- How will the model be used?
- Who will use the model?
- Does the model meet the need?

DATA

- Are the datasets available?,
- of adequate quality??,
- spatial/can it be made spatial,
- spatial resolution?,
- up to date?,



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Key Messages

Environmental and Social Safeguards are a prerequisite for scaling climate and industrial innovation

- Safeguards go beyond risk mitigation to creating positive, inclusive development impacts

GIS and Earth Observation technologies enable:

- Evidence-based planning
- Early warning systems
- Transparent and accountable decision-making

ESS risks are financially material and critical for project bankability and sustainability

- Technology (GIS, AI, remote sensing) is a key accelerator of safeguards implementation
- Ground truthing /data validation and accuracy checks is the key aspect sustainable and sound decisions

Successful projects depend on:

- Community engagement and social license to operate
- Respect for local and Indigenous rights
- Integrating climate risk, disaster risk reduction, and human security strengthens project resilience
- Youth engagement is essential to scaling innovative, data-driven safeguards solutions



Key Takeaways

- 1** ESS ensures projects do no harm and deliver better outcomes for communities and the planet.
- 2** GIS and Earth Observation technologies enable; evidence-based planning, early warning systems, transparent and accountable decision-making.
- 3** ESS risks are financially material and critical for project bankability and sustainability.
- 4** Ground truthing/data validation and accuracy checks is they key aspect for sustainable and sound decisions
- 5** Successful projects depend on: Community engagement and social license to operate
Respect for local and Indigenous rights.
- 6** Integrating climate risk, disaster risk reduction, and human security strengthens project resilience Youth engagement is essential to scaling innovative, data-driven safeguards solutions



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Q&A

Your Feedback Matters!

🔗 Please take a few minutes to fill out the GIS Workshop Feedback Form.

Your input will help us improve future events and training sessions.

Time to complete: ~5 minutes

💡 Your responses will remain confidential and will be used to enhance future engagements

Thank you for your valuable feedback!

From Risk to Resilience: Leveraging
Data & GIS to Mitigate
Environmental & Social Risks





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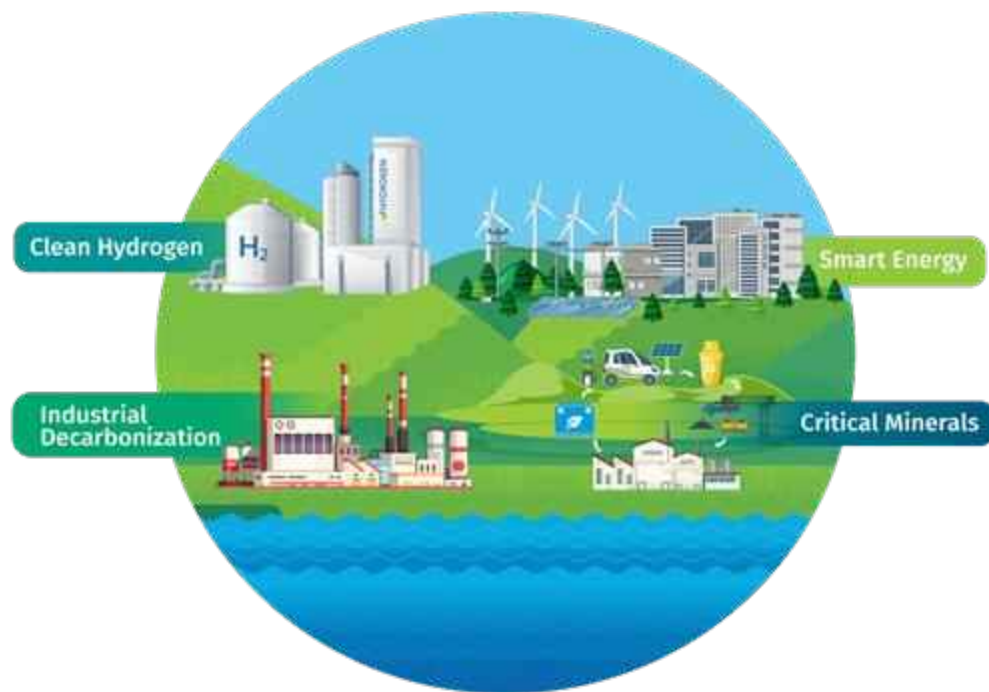
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Further Information

- **A2D Facility Website:** A2DFacility.unido.org
- **A2D Facility LinkedIn Account:** [Follow the LinkedIn page here](#)
- **A2D Facility Mailing List:** [Join the mailing list here](#)
- **A2D Facility Year 1 Annual Report:** [Access the Annual Report here](#)
- **A2D Facility Year 2 Annual Report:** [Access the Annual Report here](#)
- **A2D Facility Market Assessments:** [Access the reports here](#)
- **A2D Facility GESI Framework:** [Access the GESI Framework here](#)
- **A2D Facility ESMF:** [Access the ESMF here](#)

Thank you

