

Accelerating Innovation in Critical Minerals

Market Assessment Webinar

26th November 2024, 2:00-3:00pm CET

Accelerate-to-Demonstrate (A2D) Facility

Our partners:





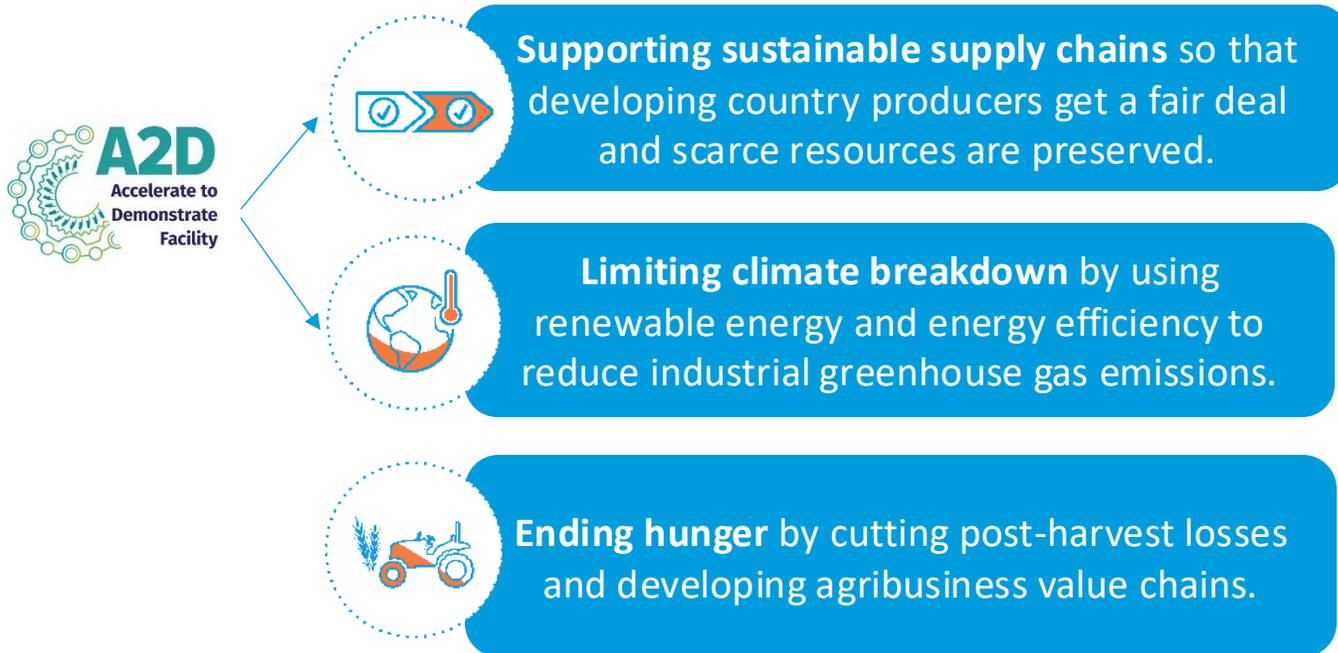
Agenda

Time	Agenda item	Speaker
2:00 – 2:05 p.m	Opening remarks	Mr. Peter Warren, A2D Facility Manager, UNIDO
2:05-2:10 p.m	Overview of the A2D facility	Ms. Valeria Arroyave Cardozo, Critical Minerals Project Coordinator, UNIDO
2:10 – 2:40 p.m	Market assessment presentation	Mr. Martin Dietrich Brauch, Lead Researcher of the Columbia Center on Sustainable Investment (CCSI)
2:40-2:55 p.m	Questions and answers	Moderated by: Ms. Valeria Arroyave Cardozo, Critical Minerals Project Coordinator, UNIDO
2:55 – 3:00 p.m	Closing Remarks	Mr. Peter Warren, A2D Facility Manager, UNIDO



UNIDO's role in advancing clean energy innovation

- ❖ UNIDO is the UN Agency for the promotion of inclusive and sustainable industrial development in developing countries.
- ❖ UNIDO focuses on three main priorities:





Examples of key UNIDO initiatives in critical minerals

Global Alliance and Partnership for Responsible and Green Minerals

Aim: Setting up international guidelines and benchmarks for sustainable critical minerals supply chains (UNIDO is a member).

Launched on 10 January 2024

UN Framework on Just Transitions for Critical Energy Transition Minerals

Aim: Establishing voluntary global principles to guide responsible management of clean energy minerals (UNIDO is a member).

Introduced on 26 April 2024

Accelerate-to-Demonstrate (A2D) Facility

Aim: Accelerating the commercialization of innovative critical minerals solutions in developing countries (UNIDO is implementing agency).

Launched on 15 May 2023

Global Electronics Management (GEM) Programme

Aim: Creating an enabling environment for responsible electronics management by supporting access to finance, technology, policy, legislation (UNIDO is implementing agency).

Approved on 20 June 2024 (USD 9.5m from GEF)

UNIDO in multilateral agreements:





Overview of the Accelerate-to-Demonstrate (A2D) Facility

The Challenge

35% of the emissions reductions needed by 2050 come from technologies that are still in development and have not reached markets at commercial scale (IEA, 2023).

The Solution

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

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



Initial Funding and Timescales

- **Initial contribution of ~USD 80 million** from the UK Government (DESNZ)
- Initially operates from **April 2023 to March 2029**
- Projects supported through calls-for-proposals (first call in July 2024)
- **Grants of USD 1-5 million** per project.
- Main SDGs-of-focus:





Market assessment on accelerating innovation in critical minerals

What: the large-scale, new market assessment presents new evidence and analysis covering the landscape of critical minerals innovations, stakeholders, barriers, initiatives, Sustainable Development Goal (SDG) impacts, financial delivery mechanisms and existing projects.

Purpose: it fills an important gap in focusing on the midstream (e.g. processing) and downstream (e.g. recycling) of critical minerals value chains in developing country contexts.

The image shows the cover of a report titled "MARKET ASSESSMENT ON CRITICAL MINERALS INNOVATION IN DEVELOPING COUNTRIES". The cover features the UNIDO logo and the A2D Accelerate to Demonstrate Facility logo. The main title is in a blue box. Below the title, there are three main sections: Introduction, Policy readiness insights across 30 developing countries, and a List of Critical Minerals Analysed. The Introduction section provides a detailed overview of the assessment's scope and findings. The Policy readiness insights section includes three circular charts showing the percentage of countries rated high in various areas: 50% for renewable energy targets and policies, 30% for assembly and manufacturing, and 6.7% for circular economy, recycling, and waste management. The List of Critical Minerals Analysed includes Lithium, Nickel, Manganese, Cobalt, Graphite, Rare Earth Elements (REEs), Copper, and Platinum Group Metals (PGMs). The Stakeholders, initiatives, and financing mechanisms section discusses the support from international organizations, governments, and industry. The Noteworthy global financial mechanisms section lists several programs, including UNIDO's A2D Facility, World Bank Resilient and Inclusive Supply-Chain Enhancement (RISCE) Partnership, Climate-Smart Mining Initiative, Energy Sector Management Assistance Program (ESMAP)'s battery storage programme, and European Union (EU)'s Horizon Europe.



Access the report at
<https://a2dfacility.unido.org>
/ or scanning the QR code.



UNITED NATIONS
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Progress by innovation



Market Assessment Presentation

Mr. Martin Dietrich Brauch
Lead Researcher
Columbia Center on Sustainable Investment
(CCSI)



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



Market Assessment on Critical Minerals Innovation in Developing Countries

Tuesday, 26 November 2024, 2:10–2:40 p.m. (CET)

Objectives

- **Understand the nexus** of key stakeholders, policies, initiatives, financial mechanisms, technologies, and SDG impacts in critical minerals value chains in developing countries.
- **Identify potential lighthouse pilot projects** for technological innovation in developing countries.
- **Support UNIDO's A2D Facility and other key activities and organizations** focused on accelerating innovation in critical minerals in developing countries.



Scope



Critical Minerals

- Minerals that play a key role in the global clean **energy transition**:
 - Lithium
 - Nickel
 - Manganese
 - Cobalt
 - Graphite
 - Rare Earth Elements (REEs)
 - Copper
 - Platinum Group Metals (PGMs)



Geography

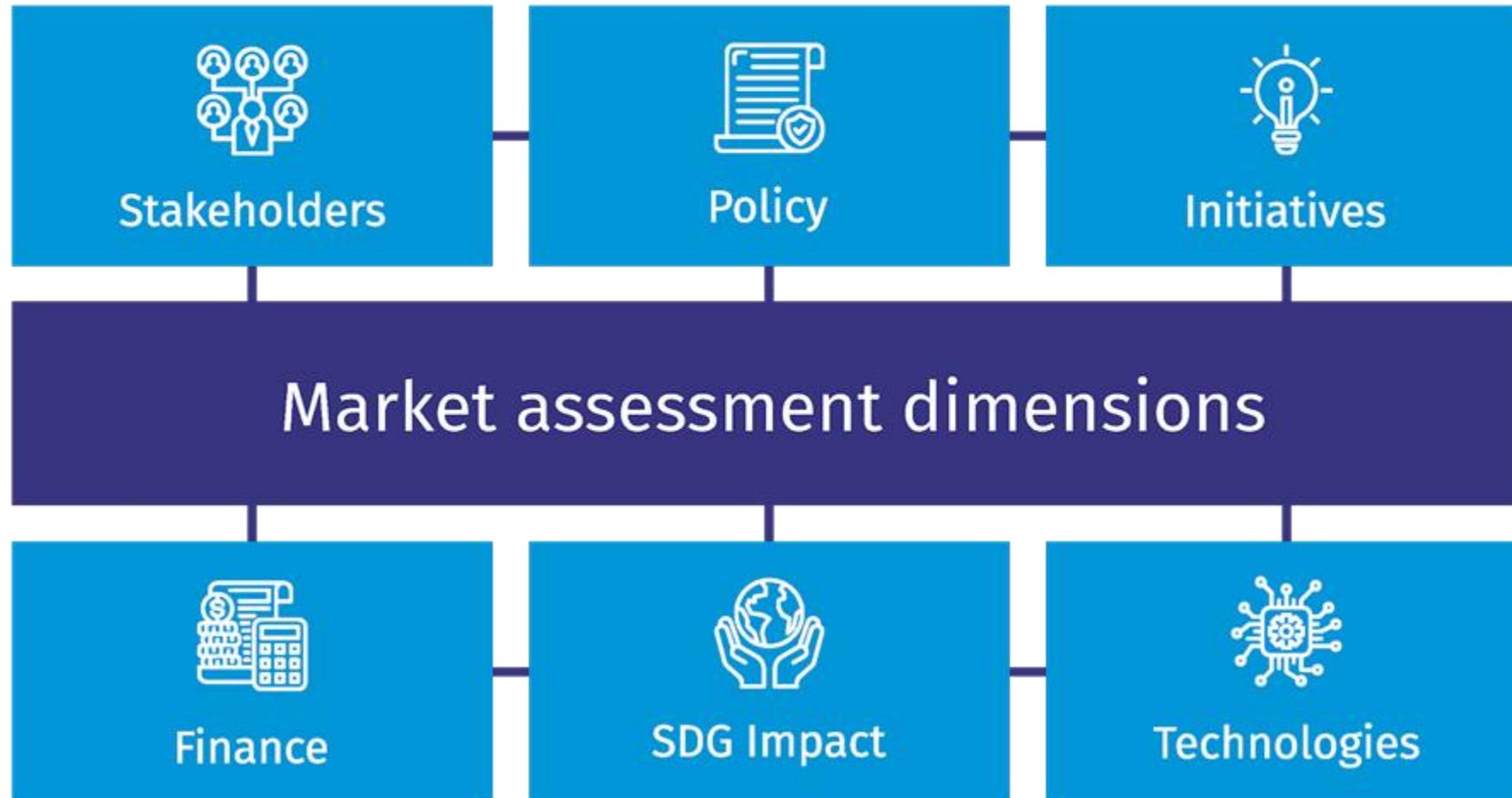
- **Phase 1: 30 countries** selected out of 131 OECD official development assistance (ODA) recipients in Africa, Asia and South Pacific (ASP), and Latin America and the Caribbean (LAC)
- **Phase 2: 9 countries** selected from 30 Phase 1 countries, divided evenly between the 3 regions



Technology

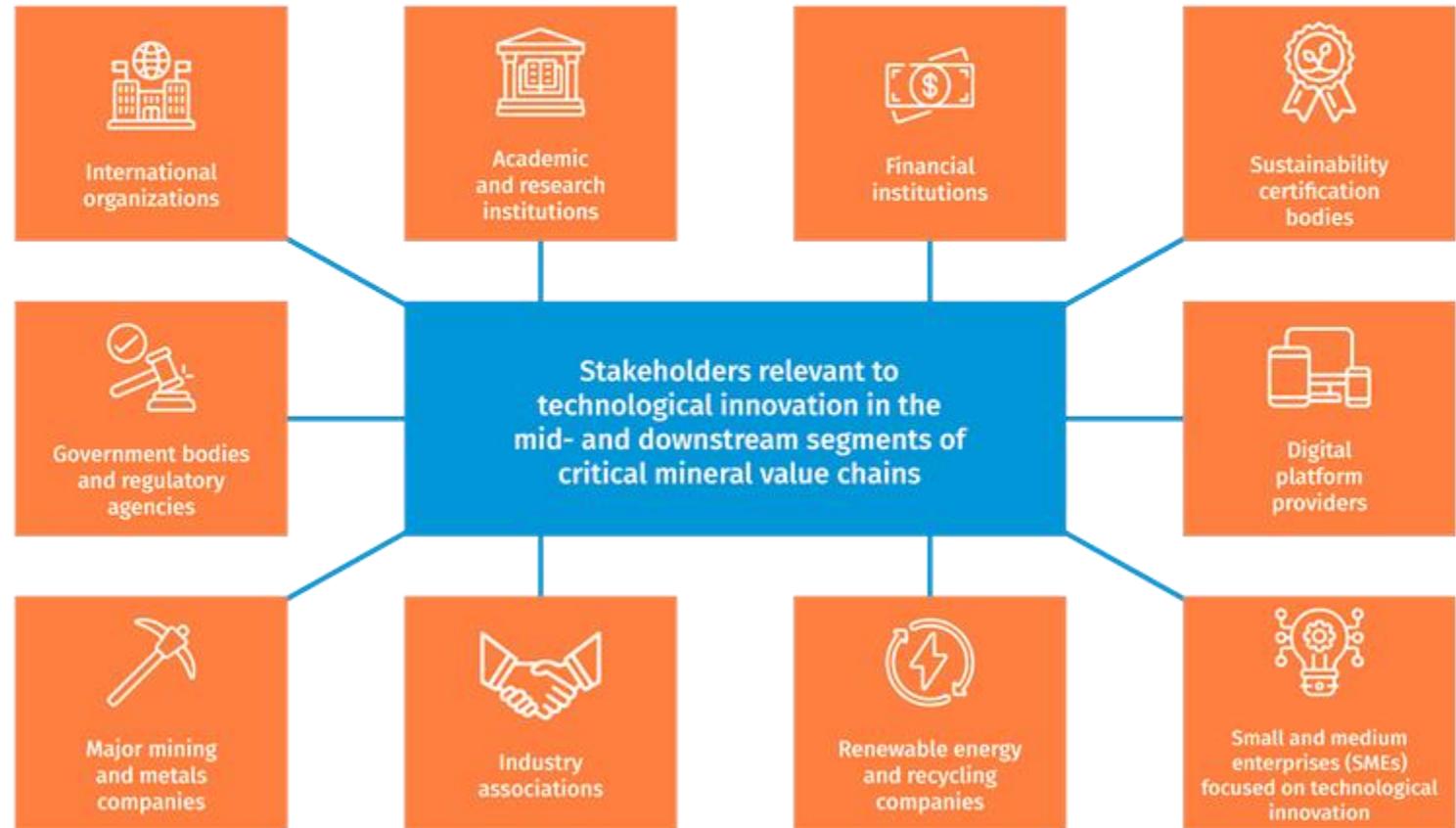
- **Midstream**: processing, refining, and recovery
- **Downstream**: manufacturing of end-use goods, recycling
- **Technology Readiness Levels (TRLs)**: target of 6–7 for developing countries, 8–9 for transfer from developed countries





Stakeholder Mapping

The assessment achieved a macro-level understanding of the **relevant stakeholder groups** and their **actual and potential roles in technological innovation** in the mid- and downstream segments of critical minerals value chains.



Policy, Legal, and Regulatory Frameworks

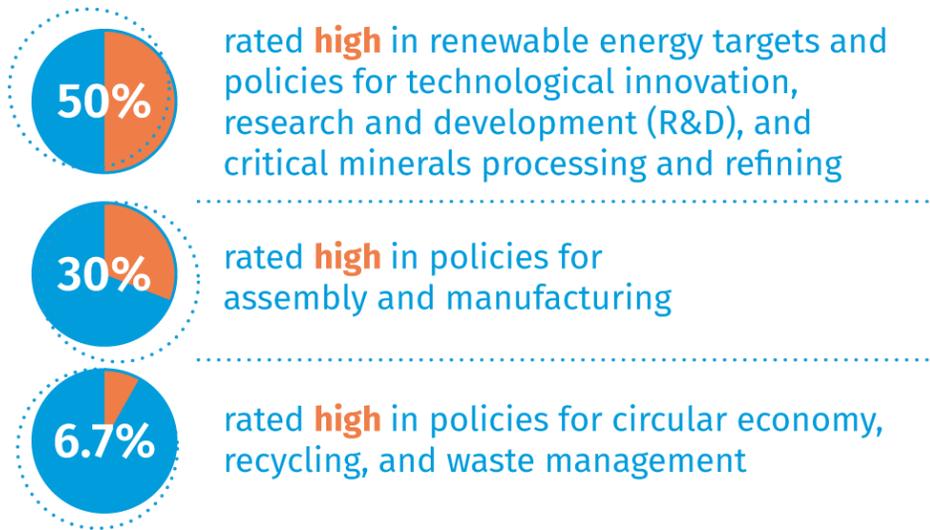


Table. High-level analysis of policy, legal, and regulatory environments in the 30 Phase 1 developing countries

	Africa	ASP	LAC
High	Morocco Namibia South Africa Zambia	India Indonesia Türkiye	Argentina Brazil Mexico
Medium	Egypt Tanzania Tunisia	Georgia Malaysia Kazakhstan Philippines Thailand	Bolivia Colombia Peru
Low	Kenya Mauritius Nigeria Senegal	Cambodia Jordan Viet Nam	Dominican Republic Ecuador

Initiatives and Financial Mechanisms

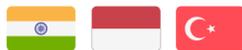
Initiatives by international organizations, governments, industry, and other stakeholders support technological innovation in critical minerals in developing countries. A total of **100** global, regional, and national initiatives were analysed, including financing mechanisms **(53%)** and other initiatives **(47%)**; they seek to either finance innovation projects or build up the enabling environment for mid- and downstream activities.

Gaps in these initiatives include the need for greater scale; finer coordination among them as to policy interventions, minerals, and segments to be prioritised in different markets; and increased sharing of knowledge and data on technologies and their drivers and barriers.

Noteworthy global financial mechanisms

UNIDO's A2D Facility	GBP 65 million
World Bank	
• Resilient and Inclusive Supply-Chain Enhancement (RISE) Partnership	USD 75 million
• Climate-Smart Mining Initiative	USD 50 million
• Energy Sector Management Assistance Program (ESMAP)'s Energy Storage Partnership (ESP)	Broader USD 1 billion battery storage programme
European Union (EU)'s Horizon Europe	Broader EUR 95.5 billion innovation programme

	STRENGTHS	AREAS FOR IMPROVEMENT
<div style="text-align: center;">  AFRICA </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="text-align: center;">  Namibia </div> <div style="text-align: center;">  South Africa </div> <div style="text-align: center;">  Zambia </div> </div>	<ul style="list-style-type: none"> Mineral beneficiation strategies  Bilateral cooperation with developed countries (e.g. EU-Namibia Strategic Partnership on Raw Materials Value Chains and Renewable Hydrogen [USD 1.1 billion]; South Africa-UK Minerals for Future Clean Energy Technologies Partnership; partnership between Zambia and the Japan Organization for Metals and Energy Security) Regional initiatives (e.g. African Green Minerals Strategy and DRC-Zambia Battery Council)  Industrial development agencies  Policies advancing SDGs <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> 	<ul style="list-style-type: none"> Circular economy, recycling, and waste management policies  Power and logistics infrastructure constraints to industrial development  Government institutional capacity to build up and enforce regulatory frameworks  Policies advancing SDGs <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>

	STRENGTHS	AREAS FOR IMPROVEMENT
<div style="text-align: center;">  <h1>ASP</h1> </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="display: flex; flex-direction: column; align-items: center;">    </div> <div style="text-align: right;"> <p>India</p> <p>Indonesia</p> <p>Türkiye</p> </div> </div>	<ul style="list-style-type: none"> • Circular economy, recycling, and waste management policies  • Tax incentives for technology development  • Special Economic Zones (SEZs) for industrialisation and downstream activities  • Cooperation with developed countries: Minerals Security Partnership  • National financial mechanisms (e.g. Make in India; Indonesia Battery Corporation; Turkish Growth and Innovation Fund [USD 218 million]) • Policies advancing SDGs  	<ul style="list-style-type: none"> • Regional cooperation and initiatives • Reliance on imported fossil fuel-based energy • Policies advancing SDGs 

	STRENGTHS	AREAS FOR IMPROVEMENT
<div data-bbox="249 401 397 548"></div> <div data-bbox="285 582 359 725">LAC</div> <div data-bbox="142 1093 496 1233">  Argentina  Brazil  Mexico </div>	<ul style="list-style-type: none"> Financial incentives for companies in mid- and downstream segments (e.g. tax rebates and exemptions)  State-owned company for lithium value chain  R&D frameworks and initiatives  Industry-led initiatives to coordinate stakeholders: Mining Hub  Multilateral development bank (MDB) support (e.g. International Finance Corporation [IFC] loans and Inter-American Development Bank [IDB] programmes) Policies advancing SDGs    	<ul style="list-style-type: none"> Stringent circular economy policies on critical minerals  Policies governing mid- and downstream activities are fragmented across different ministries and minerals, lacking cohesive national frameworks  Regional cooperation and initiatives Policies advancing SDGs 

Innovators, Technologies, and Projects



LAC

- Tech for extracting and refining lithium from salar brines and producing battery-grade lithium carbonate (M)
- Tech for extracting and refining lithium from clay deposits and producing battery-grade lithium carbonate (M)
- Tech for producing lithium-ion batteries using lithium carbonate (D)

AFRICA

- Modular tech for recycling lithium-ion batteries using safer chemicals and environmentally sound processes (D)

ASP

- Tech for processing nickel laterites (U/M)
- Tech for producing battery raw materials and battery-grade products (M)
- Tech for producing high-purity silicon ingot for silicon wafers, and solar cells, for solar panel manufacturing (D)
- Tech for recovering energy-critical metals (e.g. nickel hydroxide) from recycled lithium-ion batteries (D)

U = upstream M = midstream D = downstream

Challenges for Innovation in Critical Minerals in Developing Countries

- Insufficient **existing R&D and ecosystems** for innovation
- **Power and logistics infrastructure constraints** to industrial development
- **High cost and long lead time** of technological innovation and infrastructure development
- **Gaps in local skills** and access to skills development opportunities
- **Government institutional capacity** to build up and enforce regulatory frameworks
- Insufficient **economic incentives and government support** for startups and innovators
- **Country-specific challenges and investment risks** depending on geology, mineral resource availability, material complexity, and technology requirements

Opportunities for Innovation in Critical Minerals in Developing Countries

- Implementing already available and proven technologies at higher TRLs in developed countries
- Adapting technologies to local conditions and constraints and improving operational efficiency
- **In countries with primary mineral resources:** leveraging existing upstream industry, technology, infrastructure, workforce, and skills for vertical integration across the value chain (e.g. PGMs in South Africa, nickel in Indonesia, and lithium in Argentina)
- **In countries with limited primary mineral resources:** investing in downstream processing and assembly (e.g. battery manufacturing and recycling in India, solar panel production in Türkiye)
- Making a positive impact on SDGs

SDG Assessment – Theory of Change

Direct Linkages

	<p>Mid- and downstream activities can drive poverty alleviation and economic growth by creating jobs, fostering skill diversification, and increasing government revenues.</p>
	<p>Investment in R&D and mid- and downstream facilities promotes industrial development, technological innovation, and expansion of resilient infrastructure.</p>
	<p>Mid- and downstream activities produce components essential for renewable energy systems and decarbonisation technologies, reducing local and global emissions.</p>

Indirect Linkages

	<p>Targeted interventions can promote gender equality by encouraging women's participation in technical and leadership roles and reducing time poverty for women.</p>
	<p>Mid- and downstream activities produce components essential for clean energy technologies. Local operations support just transitions and renewable energy deployment.</p>
	<p>Mid- and downstream activities can promote responsible consumption and production by enabling efficient refining, manufacturing, and recycling practices that minimise impacts.</p>
	<p>Innovation in the mid- and downstream segments can reduce the impact on terrestrial ecosystems by minimising emissions, waste, and stress on water, land, and biodiversity.</p>

Ten Recommendations to Ramp Up Technological Innovation in the Mid- and Downstream Segments



International support to developing country governments and stakeholders in the innovation ecosystem should be increased, including through technical assistance, capacity building, policy advice, and access to finance.



International and regional organizations and development finance institutions should build on initiatives for the **enabling environment** (e.g. World Bank's RISE Partnership) and **specific innovation projects** (e.g. UNIDO's A2D Facility).



A global multi stakeholder platform should be created to coordinate initiatives, foster collaboration, and share knowledge and data on technological innovation. UNIDO is well-positioned to house such a platform.



UNIDO should lead in ensuring the **continuous gathering, transparency, and analysis of data on innovation**—for example, through rolling surveys and public databases—going beyond the discrete exercise of this assessment.



Developing country policy should provide regulatory guidelines, support domestic collaborations, and offer innovation incentives; **developed country policy** should promote international cooperation, facilitate knowledge transfer, and provide access to finance.

Ten Recommendations to Ramp Up Technological Innovation in the Mid- and Downstream Segments



Developing countries should prioritise **the development of energy, communications, and logistics infrastructure** to address broader industrial development constraints, in line with the SDGs and national priorities and strategies.



Special programmes should be created to **support small and medium enterprises (SMEs)** involved in technological innovation in developing countries to partner with other stakeholders and access funding opportunities, including UNIDO's A2D Facility.



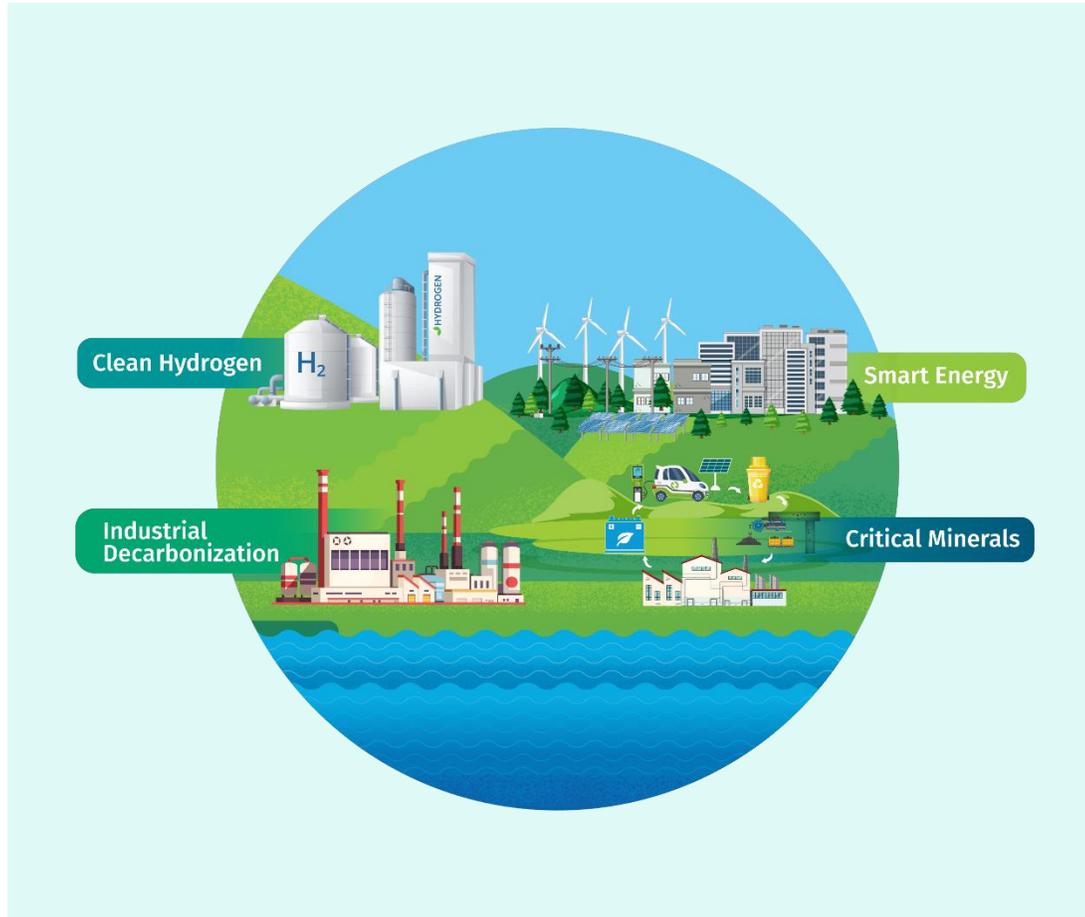
Policymakers should **incentivise circular policies and practices** through regulations, incentives, and innovation funding; the private sector should **strengthen the business case for circularity** by showcasing cost savings, new revenue streams, and improved resource efficiency.



Industry-led initiatives to coordinate mining value chain stakeholders around common challenges and priorities for innovation—such as Brazil's Mining Hub and other initiatives led by mining associations—should be encouraged.



Besides fostering technological innovation in developing countries, international organizations and governments should put in **place regulatory and financial conditions to facilitate technology transfer** from companies based in developed countries.



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Accelerate-to-Demonstrate (A2D) Facility

Our partners:





Join our other Market Assessment Webinars

Clean Hydrogen

Wednesday, 27 Nov
2.00 – 3.00 p.m. (CET)



Smart Energy and Industrial Decarbonization

Thursday, 28 Nov
2.00 – 3.00 p.m. (CET)



Further information on the A2D Facility:

- A2D Facility Website: a2dfacility.unido.org
- A2D Facility LinkedIn Account: [Accelerate-to-Demonstrate \(A2D\) Facility](#)
- A2D Facility Mailing List: [Join the mailing list here](#)
- A2D Facility Year 1 Annual Report: [Access the Annual Report here](#)