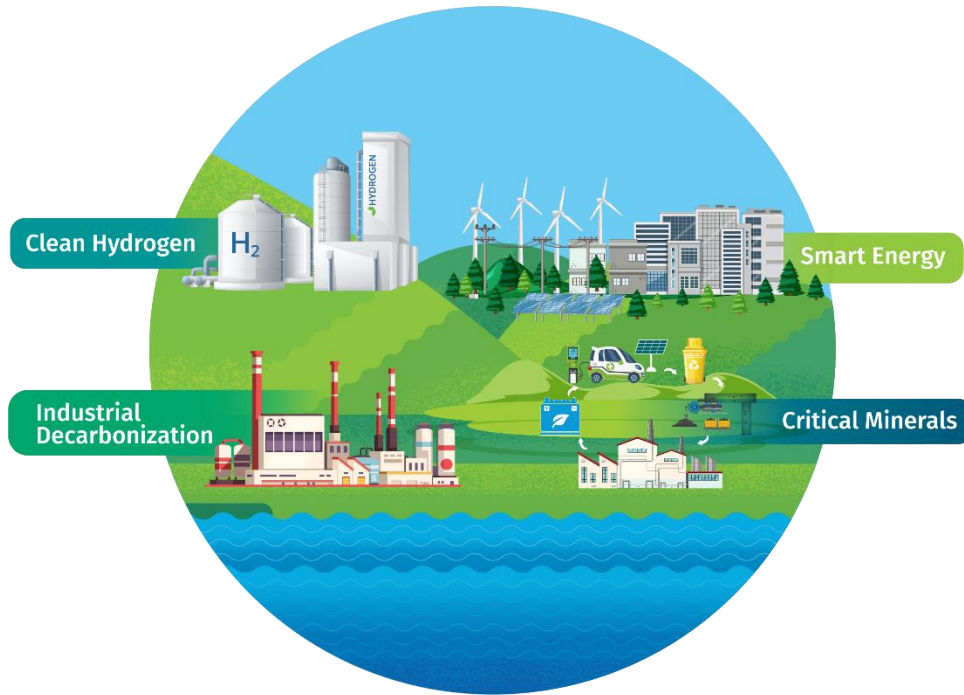




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Accelerating Innovation in Critical Minerals

Market Assessment Launch Event

Accelerate-to-Demonstrate (A2D) Facility

Saturday, 16 November 2024, 18:15 – 19:15 AZT

Our partners:





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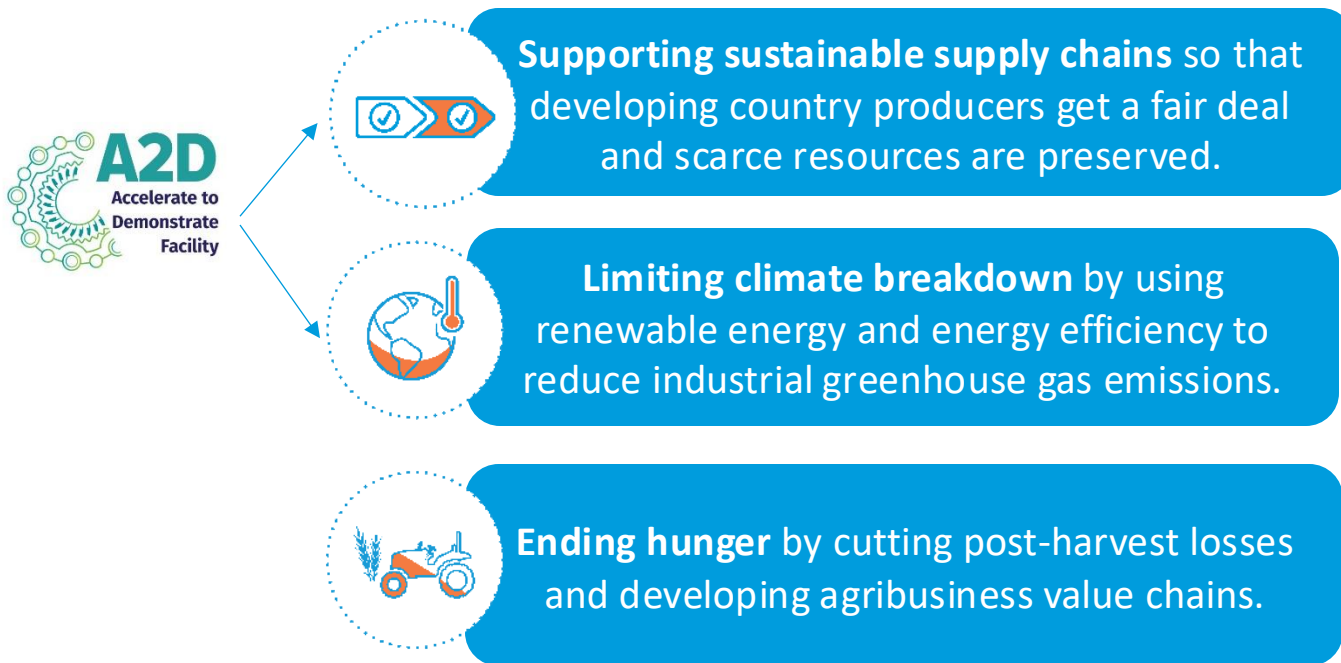
Agenda

Time	Agenda item	Speaker
18:15 – 18:25	Opening remarks	Mr. Peter Warren, A2D Facility Manager, UNIDO
18:25 – 18:45	Market assessment presentation	Ms. Lisa Sachs, Director of the Columbia Center on Sustainable Investment (CCSI)
18:45 – 18:55	Questions and answers	Moderated by: Mr. Peter Warren, A2D Facility Manager, UNIDO
18:55 – 19:00	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:



UNIDO's expertise:

- ❖ Technical assistance and capacity building
- ❖ Investment and innovation funding
- ❖ Partnerships and collaboration
- ❖ Policy dialogues



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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:





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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 2023)
- **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 and A2D logos at the top. Below the title, there are three main sections: "Introduction", "Policy readiness insights across 30 developing countries", and "Noteworthy global financial mechanisms".

Introduction
Critical minerals are essential for solar panels, wind turbines, batteries, electric vehicles (EVs), and other technologies needed for just energy transitions and the Sustainable Development Goals (SDGs). This assessment examines technological innovation in critical minerals value chains in developing countries, focusing on the midstream (processing and refining) and downstream segments (manufacturing, extraction from secondary sources, and end-of-life treatment). It navigates the nexus of stakeholders, policies, initiatives, financial mechanisms, technologies, and SDG impacts. Starting from an analysis of 30 countries, deep-dives were conducted in three from each developing region: Africa, Asia and South Pacific (ASP), and Latin America and the Caribbean (LAC). The findings will be useful for activities and organizations focused on accelerating innovation in critical minerals in developing countries. Initiatives, such as the Accelerate-to-Demonstrate (A2D) Facility, are instrumental in facilitating the development, deployment, and scale-up of technological innovation in developing countries.

Policy readiness insights across 30 developing countries
The 30 developing countries initially selected were rated according to their policy readiness level, providing an overview of relative strengths and areas for improvement.

- 50% rated high in renewable energy targets and policies for technological innovation, research and development (R&D), and critical minerals processing and refining
- 30% rated high in policies for assembly and manufacturing
- 6.7% rated high in policies for circular economy, recycling, and waste management

Noteworthy global financial mechanisms

UNIDO 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

Use of Critical minerals analysed

- Lithium
- Nickel
- Manganese
- Cobalt
- Graphite
- Rare Earth Elements (REEs)
- Copper
- Platinum Group Metals (PGMs)

Stakeholders, initiatives, and financing 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.



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



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Market Assessment Presentation

Ms. Lisa Sachs

Director

Columbia Center on Sustainable Investment
Columbia University



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Market Assessment on Critical Minerals Innovation in Developing Countries

Saturday, 16 November 2024, 18:15–19:15 (AZT)

Policy, Legal, and Regulatory Frameworks

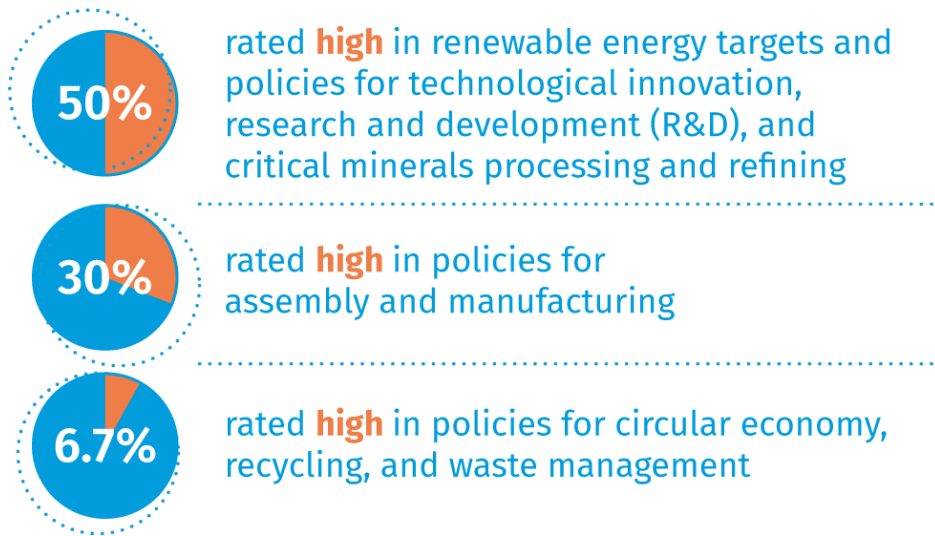


Table. High-level analysis of policy, legal, and regulatory environments in the 30 Phase 1 developing countries

	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





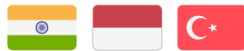

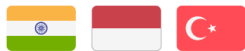



Initiatives by international organizations, governments, industry, and other stakeholders support technological innovation in critical minerals in developing countries. A total of **100** global, regional, and national initiatives were analysed, including financing mechanisms **(53%)** and other initiatives **(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

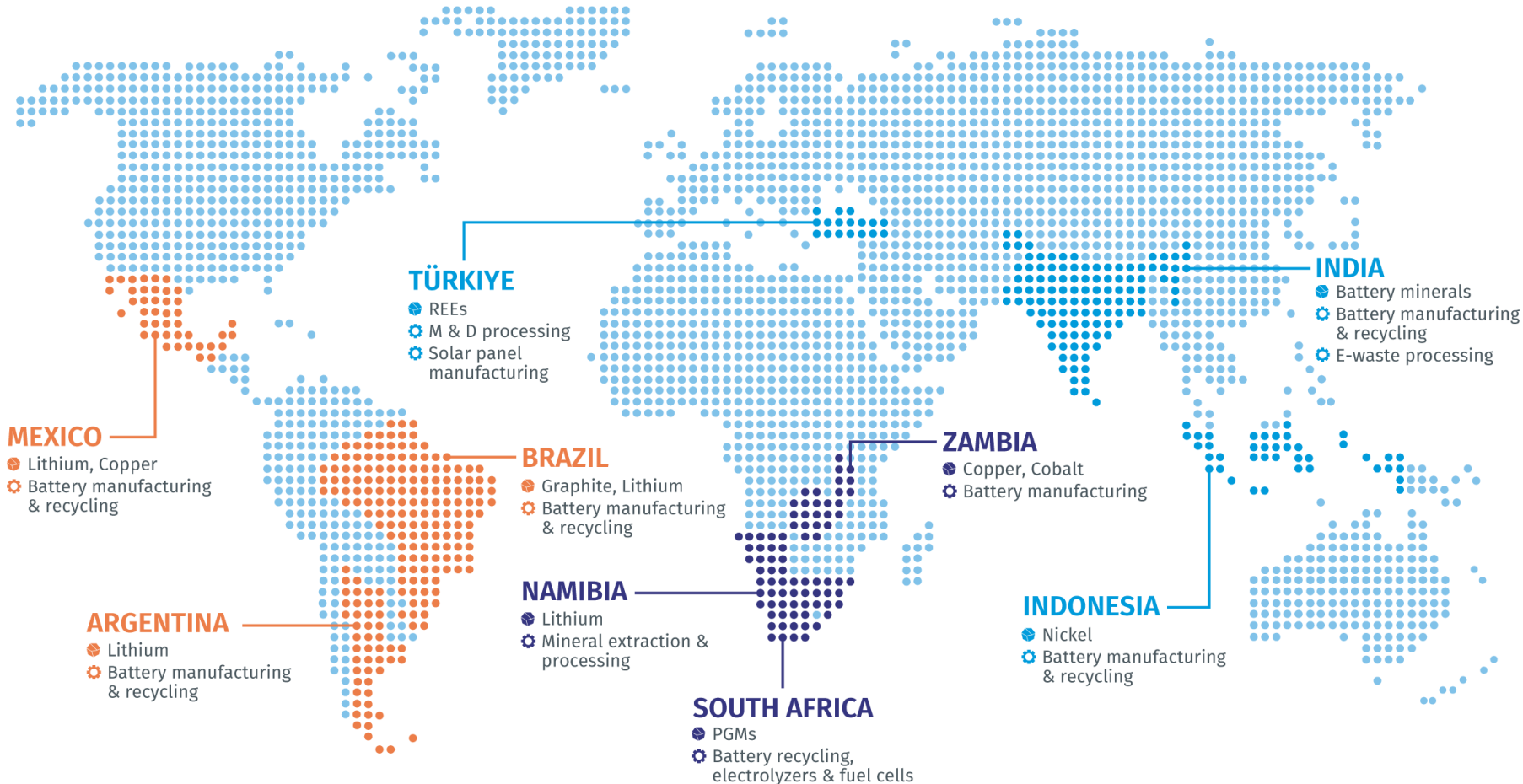
UNIDO's A2D Facility	GBP 65 million
World Bank	
• Resilient and Inclusive Supply-Chain Enhancement (RISE) Partnership	USD 75 million
• Climate-Smart Mining Initiative	USD 50 million
• Energy Sector Management Assistance Program (ESMAP)'s Energy Storage Partnership (ESP)	Broader USD 1 billion battery 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 data-bbox="254 406 394 549" style="text-align: center;">  </div> <div data-bbox="280 585 369 735" style="text-align: center; font-size: 2em; font-weight: bold;">ASP</div> <div data-bbox="140 1092 509 1235" style="display: flex; flex-direction: column; align-items: flex-end;"> <div style="display: flex; align-items: center; margin-bottom: 5px;">  India </div> <div style="display: flex; align-items: center; margin-bottom: 5px;">  Indonesia </div> <div style="display: flex; align-items: center;">  Türkiye </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 1235">  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>Investment in R&D and mid- and downstream facilities promotes industrial development, technological innovation, and expansion of resilient infrastructure.</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.



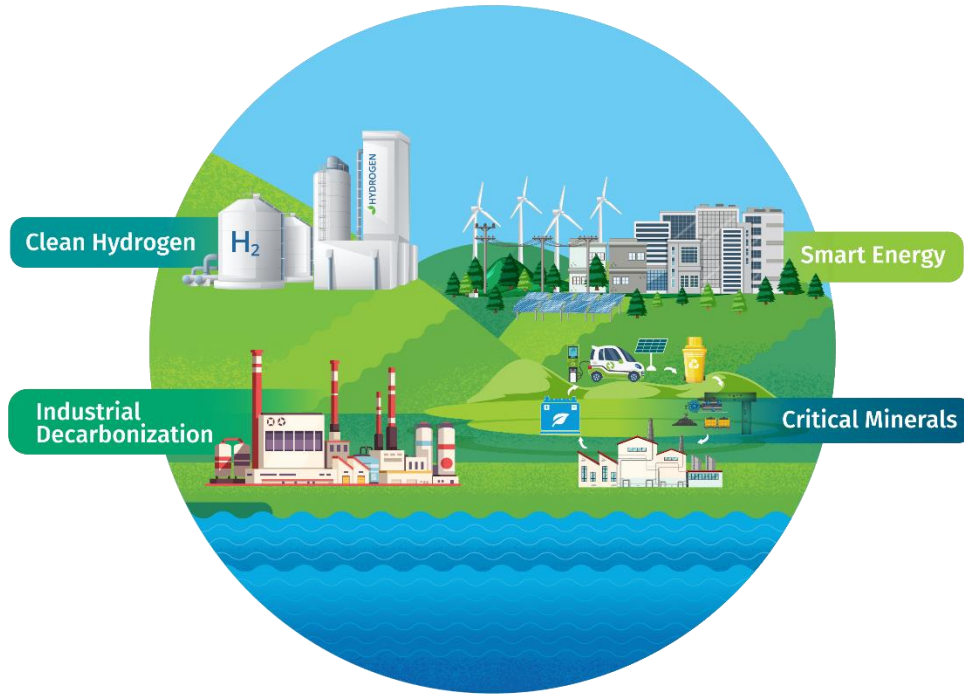
Besides fostering technological innovation in developing countries, international organizations and governments should put in **place regulatory and financial conditions to facilitate technology transfer** from companies based in developed countries.



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Join our Market Assessment Webinars

Critical Minerals

Tuesday, 26 Nov
2.00 – 3.00 p.m. (CET)



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](#)