



Climate- Smart Mining

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Leveraging the growing demand for critical minerals for the clean energy transition to support positive development impacts and trajectories in resource-rich developing countries through responsible mining practices.

The urgency to combat climate change has led to a significant increase in the demand for critical minerals, essential for producing clean energy technologies such as wind turbines, solar panels, electric vehicles, and energy storage systems. Reports from the World Bank and other international agencies highlight the need for a massive scale-up in the production of minerals like lithium, graphite, cobalt, nickel, copper, and neodymium to meet climate targets. This surge in demand presents both opportunities and challenges for resource-rich developing countries, which must navigate the environmental, social, governance, and market complexities associated with mineral development.

The transition to a low-carbon economy requires a collective effort and a new way of thinking. Mining is a key enabler of this transition, particularly for extracting critical minerals essential for manufacturing clean energy products and digital technologies. Developing countries with high mineral potential can play a crucial role in mitigating supply disruptions while addressing broader sustainable development challenges. However, projected demand for critical minerals far exceeds current and projected production, necessitating investments in alternative technologies, policy changes, and the establishment of circular strategies.



What is Climate-Smart Mining?

The Climate-Smart Mining (CSM) initiative, launched in 2019 as a public-private partnership led by the World Bank (WB) and the International Finance Corporation (IFC), provides:



ADVICE



ANALYTICS & KNOWLEDGE



CAPACITY BUILDING

.....TO RESOURCES-RICH DEVELOPING COUNTRIES AND.....
RESPONSIBLE MINING COMPANIES



ITS GOAL is to help these countries and companies decarbonize, enhance climate resilience, and reduce the material footprint of critical mineral supply chains essential for the clean energy transition, while enabling host communities and societies to benefit equitably from the increasing demand for such minerals through sustainable development.

CSM initiative aims to create shared value and deliver social, economic, and environmental benefits for resource-rich countries and to position these countries and responsible mining companies to be competitive and responsible suppliers in the global market, ultimately contributing to their long-term sustainability.

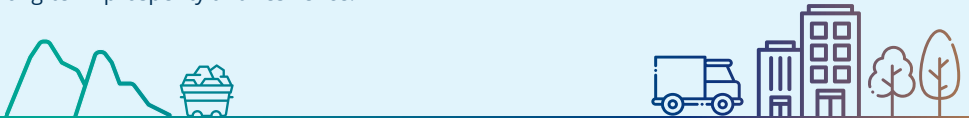
Since 2019, the CSM initiative has made significant contributions through a range of landmark thought leadership and knowledge products, organizing impactful events, and fostering key partnerships. Additionally, CSM has developed country and sub-regional roadmaps with high impact potential that can be scaled up efficiently, providing structured frameworks for national and regional policy analysis, capacity assessments, and planning activities. These roadmaps guide countries in developing tailored decarbonization pathways and climate resilience strategies, ensuring sustainable development and responsible growth in the mining sector.

Why CSM?

There is broad consensus that a future with clean and renewable energy supply is more mineral intensive than today's baseline and resource-rich developing countries and responsible mining companies stand at the forefront of supplying these critical minerals necessary for renewable energy technologies. The shift to renewables is estimated to require almost five times the volume of critical minerals compared to our current fossil fuel-powered systems, which could multiply adverse environmental, social, and climate impacts in mining regions. Many prospective mining areas are affected by fragility and poor governance, coincide with indigenous lands, or high biodiversity value. As demand grows, it thus becomes ever more important that mining contributes positively to sustainable development and is climate-smart.

A climate-smart approach is an integrated strategy to transform and reorient mining. It focuses on reducing GHG emissions of mining operations, improving climate resilience of mines and adjacent communities, capturing circular economy opportunities, and ensuring the competitiveness of responsible mining companies operating under supportive legislation. This approach not only aligns with international climate goals but also positions developing countries to attract responsible investments and become competitive players in the global market for green technologies.

The CSM initiative supports developing countries in leveraging their critical mineral wealth to drive economic growth, create jobs, and fund essential development programs. By adopting climate-smart mining practices, these countries can ensure that their natural resources are developed in an environmentally responsible and economically beneficial manner, laying the foundation for long-term prosperity and resilience.



Key benefit: Convening Public and Private Sectors

As a joint initiative between the World Bank and IFC, the CSM initiative provides innovative thought leadership to advance private sector adoption of CSM principles and convenes stakeholders across the mineral value chain to promote climate action. The World Bank Group is committed to helping resource-rich developing countries realize their potential as key contributors to the global clean energy transition, while ensuring that mining activities align with sustainable development goals.

Knowledge creation is crucial for supporting the mining sector in its efforts to decarbonize and become resilient, as funding alone is insufficient. Sustainable finance, collaboration across the mineral value chain, policy advice, technology innovation, shared infrastructure, and data all play important roles.

The CSM Framework

The CSM framework focuses on two pillars:



PILLAR 1

Decarbonization



This pillar aims to minimize the carbon footprint of mining operations while enhancing the resilience and adaptation of host communities, ecosystems, and landscapes.

It promotes the adoption of renewable energy, improved energy efficiency, and innovative solutions such as afforestation and carbon capture technologies. Additionally, it focuses on ecological and community resilience, advocating for nature-based solutions and resilient infrastructure to create a climate-adaptive mining sector that benefits both the environment and local communities. This pillar is about crafting holistic roadmaps that guide national and regional policies, strategies for emission reduction, and voluntary decarbonization initiatives. It emphasizes the importance of regulatory compliance and transparent progress reporting in reducing greenhouse gas emissions.

This pillar is dedicated to enhancing the responsible production capabilities of mineral-rich developing countries.

It aims to empower governments and mining companies to manage natural resources effectively, attract investments, and ensure that the rising demand for critical minerals achieves equitable economic benefits and sustainable development. Efforts under this pillar include de-risking investments by improving regulatory frameworks, strengthening institutional governance, and ensuring adherence to high environmental and social performance standards with an emphasis on continuous improvement. It also supports better access to comprehensive geological data and advocates for streamlined licensing and efficient permitting processes. To diversify mineral sourcing, this pillar explores opportunities for circularity, such as recycling, tailings re-treatment, and urban mining.



PILLAR 2

Critical Mineral Supply

Under the two pillars, four thematic areas and eight building blocks address some key challenges of responsible critical mineral supply:



Cross-cutting themes

Good Governance ensures accountability and transparency in the mining sector by robust regulations to manage mining operations and their environmental and social impacts responsibly.

Inclusive Engagement ensuring participation, gender sensitivity, and collaboration ensuring that mineral resources benefit all stakeholders, including local communities and vulnerable groups.

Skills Development and Innovation focuses on enhancing capacity of individuals and institutions within the mining sector through training, new technologies, and innovative practices that minimize environmental and climate footprints and improve efficiency.

How is CSM implemented?

The CSM initiative is implemented through a series of strategic activities carried out by different units across the World Bank Group. These activities are customized to the development stage and specific needs of the regions or countries involved, and key private sector challenges and opportunities.

Key components of the implementation strategy:



Global, Regional, and Country Analytics

The initiative will generate comprehensive reports, gap analyses, regulatory reviews, and CSM country/subregional roadmaps to provide a solid foundation for informed decision-making and policy development.



Institutional Strengthening and Capacity Building

Targeted interventions such as trainings, workshops, and organizational reviews will be implemented to enhance the capabilities of institutions involved in the mineral supply chain.



Country Advisory Services

Tailored technical assistance and advisory services will be provided to meet the specific needs of individual countries, ensuring that interventions are relevant and effective.



Strategic Partnerships and Investment Facilitation

The initiative will engage a wide range of stakeholders across the mineral value chain, fostering collaborations for sustainable outcomes.



Spearhead Knowledge Generation and Exchange

Platforms will share best practices, research, and lessons learned, supporting capacity building, data collection, policy dialogue, and advocacy to enhance transparency and accountability.

What impact?

CSM ensures that resource-rich developing countries and responsible mining companies can leverage mineral wealth for long-term economic growth and sustainability by promoting environmentally responsible and socially inclusive practices in the mineral supply chain. The impact of the CSM initiative is expected to be significant for resource-rich developing countries:



Economic Competitiveness

By leveraging joint collaboration with IFC to focus on market opportunities and attract responsible investments, the CSM initiative aims to position developing countries as competitive suppliers of critical minerals essential for the clean energy transition. This approach fosters sustainable economic development for these nations.



Environmental and Social Responsibility

Reducing the environmental and climate footprint and mitigating the social impacts of mining are essential for the global clean energy transition and the prosperity of local communities. The CSM initiative emphasizes decarbonization, building resilience to climate change, minimizing waste through circular economy principles, and aligning with global sustainability standards.



Equitable Sharing and Good Governance

The initiative goes beyond just environmental concerns. Citizen engagement, gender inclusion, strong governance practices, and fostering innovation are cross-cutting themes designed to ensure that benefits from mining are shared equitably, decision-making is transparent, and technological advancements drive responsible practices.



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 WB: <https://www.worldbank.org/en/programs/climate-smart-mining>

 IFC: <https://commdev.org/>