



6-8 JULY 2026

AFRICA DIALOGUE ON CEMENT FOR GREEN INDUSTRIALIZATION

Addis Ababa, Ethiopia

Building Africa's low-carbon future

OUTCOME REPORT



Jointly organized by



ORGANIZACIÓN DE LAS NACIONES UNIDAS
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Based on a decision of
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At a glance

The Africa Dialogue on Cement for Green Industrialization brought the people who shape the sector into one room. Governments, cement producers, financial institutions, researchers, construction stakeholders, young professionals and development partners worked through a shared question: How can Africa build the infrastructure it needs while strengthening local industry and reducing emissions?

110+
participants



38
speakers



23
African countries



The Dialogue was the first Africa-wide event dedicated to mapping the cement decarbonization landscape and identifying practical pathways for implementation. It linked cement production with infrastructure, construction, jobs, trade, industrial policy, and climate action.

The three days followed the journey from understanding how cement is made to identifying how change can happen at scale.





The Dialogue began where cement is made

On 6 July, participants travelled 35 km from Addis Ababa to the Habesha Cement Plant. Government representatives, industry leaders and technical experts toured the facility, saw the production process and industrial infrastructure at close range, and discussed the practical opportunities and constraints facing cement producers. The visit grounded the conversations that followed in the realities of plant operations, investment and modernization.

Back at the conference centre, an introductory session led by the École Polytechnique Fédérale de Lausanne (EPFL) and the University of Cape Town built a common technical foundation. Participants delved into how cement and concrete are produced, where emissions arise, and, at the heart of the session, what levers exist to bring those emissions down. The day ended with a welcome dinner that gave participants an early opportunity to connect across government, industry, research and international organizations.

Africa can build the infrastructure it needs while choosing a more competitive and lower emission industrial pathway from the outset.

The next step was to understand what can change now

Session 1 set the scene. On 7 July, the formal Dialogue opened by placing cement within Africa's wider development and green industrialization ambitions. Speakers from the government of Ethiopia, United Nations Industrial Development Organization (UNIDO), the Global Cement and Concrete Association (GCCA), the Cement Breakthrough and EPFL examined why decisions made during Africa's current infrastructure expansion will shape industrial competitiveness and emissions for decades. The discussion also connected national action with growing international cooperation on industrial decarbonization.

Session 2 moved from the scale of the challenge to solutions already available.

Experts and companies examined clinker substitution and LC³, material efficiency, alternative fuels and co-processing, future plant design and the longer-term role of carbon capture. Industry cases from Ghana, Uganda, Ethiopia and elsewhere showed that several of these approaches have already moved beyond research and pilot projects into commercial use.

Participants then moved into working groups. Government, industry, finance and research representatives challenged the proposed pathways against African conditions and discussed the resources, infrastructure, standards, policies and business models needed to scale them. The conversations showed that technical feasibility alone is insufficient. Local materials, supply chains, market demand, and institutional capacity determine what can work in each country.

Session 3 turned to national cement decarbonization roadmaps. Country representatives, industry and construction stakeholders examined how roadmaps can align climate policy, industrial strategy and infrastructure investment. Breakout groups considered who should lead them, which institutions need to participate and how roadmaps can become tools for implementation and investment rather than stand-alone studies. The discussions stressed early involvement from industry, municipalities, construction stakeholders and financiers.



African nations have a unique opportunity to integrate near-term, scalable, low-carbon measures immediately. Let us use this regional dialogue to foster lasting networks, align our industrialization ambitions with climate responsibility, and build a green foundation for generations to come. "

**H.E. Ato Melaku Alebel,
Minister of Industry, Federal
Democratic Republic of Ethiopia**

The final day focused on making implementation possible

On 8 July, the conversation shifted from pathways and roadmaps to the systems needed to deliver them. The day was opened with the perspective of young Africans, drawing on a consultation with more than 200 young people from over 20 countries. The intervention called for young people to participate as contributors to industrial transformation through education, entrepreneurship, innovation and policymaking.

Session 4 examined the policy tools that can turn low-carbon technologies into normal market practice. Sessions covered measurement, reporting and verification, material standards, green public procurement, building codes, and waste and co-processing regulation. Country experiences from Ethiopia, Kenya and the Republic of the Congo brought the discussion from policy design to implementation. Working groups then tested what these instruments would require in different national contexts.

A clear message emerged. Many of the required technologies and policy tools are already understood. Implementation is now the harder task. Countries need institutions that can develop and adopt standards where they are lacking, enforce them where they exist, collect reliable data, create demand, coordinate across ministries and give industry enough confidence to invest. Access to relevant case studies and success stories is also critical, as proven examples can show what works in practice, help countries adapt solutions to their own context and build confidence in implementation.



Francis Ndonga, National Energy Expert, UNIDO



Participants discussing national decarbonization roadmaps.

Session 5 followed the same logic into finance. Development finance institutions, institutional investors, industry, government and philanthropy examined how a promising idea becomes a bankable project. Participants discussed project preparation, the capital stack, concessional and commercial finance, carbon markets and risk. When the room was asked what would most help move from concepts to implementation, developing bankable project pipelines received the strongest support.

The Dialogue then moved deliberately from discussion to direct engagement. In the Project and Partnership Marketplace, participants held bilateral conversations with the Global Matchmaking Platform, UNIDO's Net Zero Partnership for Industrial Decarbonization, the Industrial Deep Decarbonisation Initiative (IDDI), the Climate Technology Centre and Network (CTCN), GCCA and the Cement Breakthrough, EPFL, the Climate Club, the Konrad-Adenauer-Stiftung (KAS) and other partners. Countries and project developers could discuss their needs directly and explore technical assistance, partnerships and support for concrete initiatives.

From dialogue to delivery

By the closing session, the different parts of the transition had come together. Technologies need national direction. Roadmaps need policy and institutions. Reliable data informs policy, while well-designed policy can create market demand. Projects need preparation to become finance-ready, and finance to move into implementation. All of them depend on coordination between governments, industry, finance, research, construction stakeholders, youth and international partners.

The Dialogue began on a cement plant floor and ended with countries, industry and partners sitting together to discuss how to move low carbon cement projects forward. That progression captured its central message:

Africa already has many of the technologies, resources and examples it needs. The next challenge is to connect them and deliver at scale.

SESSION 1

Scene setting



WHY THE DIALOGUE MATTERS

Cement at the heart of Africa's development

Cement plants commonly operate for 30 to 50 years. The plants, standards and infrastructure choices adopted now will therefore shape emissions and industrial competitiveness for decades. Africa can integrate cleaner production before emissions intensive assets become established.

Clinker produces around 85 to 90 per cent of emissions from cement-based materials. About 60 per cent of typical cement emissions arise from the chemical breakdown of limestone. Fuels and energy account for about 40 per cent, most of it from combustion fuel to heat the kiln; electricity, used mainly for grinding, is a much smaller share. Switching to cleaner kiln fuels alongside more efficient plants addresses part of the challenge. Lower clinker use addresses the largest process emissions.

Progress requires a portfolio of proven technologies, clear national direction, enabling policy, strong project preparation, suitable finance and long-term partnerships.



Cement and concrete will support Africa's future housing, transport, energy, water, health and education infrastructure. This makes the sector central to both development and climate policy.

Every bag of cement we choose today is a vote for the kind of Africa we will live in tomorrow. The decisions we make today will lock in emissions for the next half century. If we embed low-carbon norms now, Africa can industrialize sustainably, attract green investment, and equip its youth with the skills to lead tomorrow's construction sector."

Stephen Kargbo,

Director of the UNIDO Sub-Regional Office and Representative to Ethiopia, the African Union and UNECA

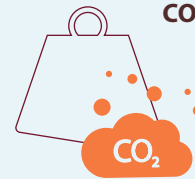
18 billion

tonnes of cement required during the **next 30 years**



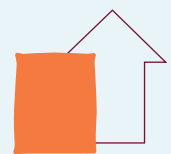
13 billion

tonnes of additional CO₂ equivalent under a business-as-usual pathway



200 to 900 million

tonnes of annual cement demand today to 2050



752 million

additional urban residents expected by 2050, an increase of 104%, compared with 9.9 million additional urban residents

in Europe, or 1.8% (UN DESA, World Urbanization Prospects 2025)





Thomas Guillot, Chief Executive, Global Cement and Concrete Association, speaks about global action and progress on cement decarbonization

KEY MESSAGES

Stronger local value chains

Clay, biomass, waste management, testing, engineering and construction services can create domestic jobs and new technical capabilities. Local substitution can also retain foreign exchange. For example, Côte d'Ivoire currently imports around 6 million tonnes of clinker annually, associated with an estimated €300 million in foreign-currency outflows.

Greater industrial resilience

Reducing clinker and fossil fuel imports can reduce foreign exchange exposure and strengthen supply security. Regional trade can grow around calcined clay, blended cement and related technology.

Low carbon cement is a green industrialization opportunity

The Dialogue framed cement decarbonization as economic transformation. Local materials and efficient construction can reduce import dependence, retain value in African economies and create skilled work.

Early investment can also position African producers in emerging markets for lower emission construction materials. Better design and material efficiency can reduce embodied carbon and infrastructure cost at the same time.

Green industrialization can align infrastructure development, industrial competitiveness, jobs and skills, and climate ambition.



Africa is experiencing rapid urbanisation. With around 80% of its 2050 building stock yet to be constructed, cement demand across the continent is projected to increase dramatically in the coming decades, which is why it is vital to have regional dialogues across government, industry and other key stakeholders to discuss decarbonisation in the local context.

During this dialogue, we have seen true collaboration in the desire to drive real and meaningful change in the region, but the decisions we make now will lock in industrial pathways for decades and determine the carbon intensity of Africa's future, and so action is needed now to implement early investment in low-carbon solutions, to strengthen Africa's competitive position and open up new economic opportunities."

Thomas Guillot,
Chief Executive of the GCCA



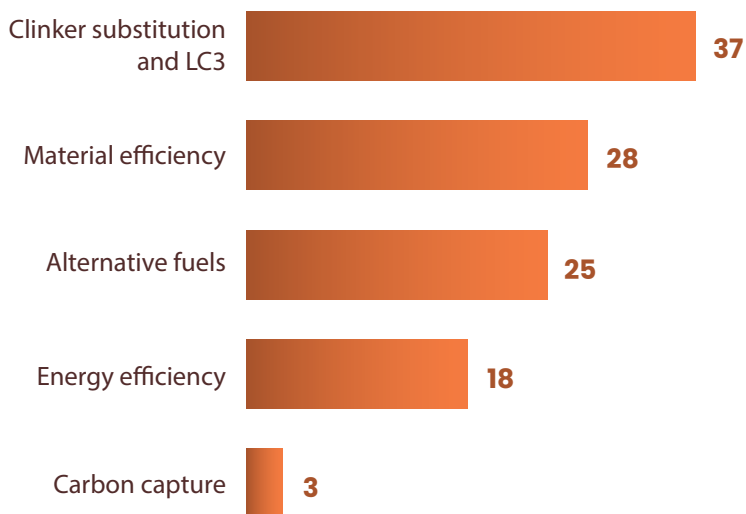
SESSION 2

Key levers for low-carbon cement production

WHAT CAN SCALE DURING THE NEXT 10 TO 15 YEARS

The pathways participants prioritized

Participants placed the highest priority on solutions that are commercially available and compatible with current investment cycles. They also showed strong interest in measures that lower costs or strengthen local industry alongside emissions reductions. [Mentimeter poll]



Clinker substitution received the strongest support, followed by material efficiency and alternative fuels. Energy efficiency also received support, though its potential is more limited in Africa as many cement plants are relatively new and already efficient. It remains useful for process optimization and plant performance. Carbon capture received fewer votes as an immediate regional priority, while participants recognized its longer-term role in addressing residual process emissions.

Countries can move quickly by scaling proven solutions today and preparing infrastructure and policy for longer term carbon management.

KEY MESSAGES

Act now

Maximize clinker substitution, material efficiency, alternative fuels and plant efficiency. These levers can deliver substantial reductions with technologies already in use.

Prepare for the future

Begin carbon management planning, including storage assessment, regulations, transport needs and retrofit ready plant design.

Peter Dickson, Quality and Process Manager, CBI Ghana, presents the company's LC3 project



THE LARGEST IMMEDIATE OPPORTUNITY

Use less clinker and more local materials

Clinker substitution offers one of the largest near-term opportunities to reduce cement emissions. Calcined clay is widely available across Africa and can replace a substantial share of clinker. Other options include volcanic pozzolans, rice husk ash, limestone filler and suitable industrial materials.

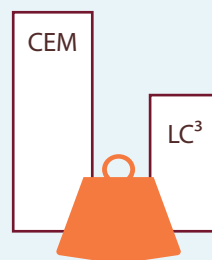


Scaling LC³ production using local clay, CBI Ghana

CBI Ghana has demonstrated the commercial potential of limestone calcined clay cement (LC³), as a response to Ghana's dependence on imported clinker and availability of local clay resources. The company has developed 400,000 tonnes of calcined clay capacity with a carbon intensity of around 390 kg CO₂ per tonne of cement, saving around 360,000 tonnes of CO₂ emissions annually. Alongside technical performance, CBI also worked to optimize the colour of the calcined clay to support customer acceptance, illustrating the importance of addressing market requirements when introducing new low-carbon cement products. The approach also increases local sourcing, reduces reliance on imported clinker and associated foreign-exchange exposure, and supports local employment. Ghana's dedicated LC³ standard, which allows clinker content as low as 35%, provided an important enabling framework for bringing the product to market.

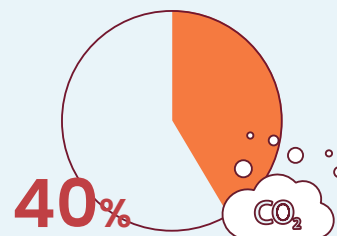
818

kg per tonne for a conventional CEM I example



493

kg CO₂ per tonne for an LC³ example with 50 per cent clinker



40%

estimated emissions reduction in the comparison

Anne Dekeukelaere, Cement Breakthrough Facilitator, moderates a session on waste management and co-processing regulations.





Professor Karen Scrivener, EPFL, presents the case for LC³, concrete blocks, and better design in Africa



While supplementary cementitious materials (SCMs) such as fly ash and blast furnace slag have historically delivered emissions reductions, their global availability is limited and unlikely to meet future demand. Calcined clay therefore represents the most scalable alternative, particularly for developing regions.”

Karen Scrivener,
Professor and Head of the
Laboratory of Construction
Materials, EPFL

Scaling local materials requires geological mapping, laboratory testing, material characterization, standards, calcination and grinding capacity, quality control, and market confidence among engineers, contractors and public buyers.

Local resources, standards, investment and market confidence must develop together. Each element reinforces the others.



Building the Business Case for LC³ in Côte d'Ivoire, Cimpor

CIMPOR and the Côte d'Ivoire case. CIMPOR has made calcined clay a key part of its strategy to reduce clinker use, with investments across Africa and Europe. Its experience began in Côte d'Ivoire, where it produced its first calcined clay in 2020 and subsequently introduced certified calcined-clay blended cements. The business case is particularly compelling: Côte d'Ivoire imports around 6 million tonnes of clinker annually, representing approximately €300 million in foreign-currency outflows, while abundant local clay offers a lower-cost domestic alternative. CIMPOR estimates that 1 million tonnes of calcined clay could replace around 1 million tonnes of imported clinker, avoiding approximately USD 60 million in imports while increasing local value creation. To accelerate uptake, CIMPOR proposes a targeted VAT exemption for LC³ cement, arguing that the forgone tax revenue could be offset by reduced clinker imports and foreign-currency outflows.

The Intergovernmental Council for Buildings and Climate (ICBC) Call to Action on Blended Cement, launched at COP30, calls on countries to update standards and codes, use public procurement to create demand for low-carbon cement and concrete, and work with industry to remove barriers to the use of SCMs. Kenya has already acknowledged the Call to Action, and other African countries are invited to join.

Countries interested in joining can contact Divya Nawale at divya.nawale@un.org for more information.

REDUCE DEMAND BEFORE CHANGING TECHNOLOGY

Build better and use materials efficiently

Large reductions can occur through better design and construction practice. Engineers can reduce unnecessary material use while preserving safety, durability and service quality.

Public infrastructure and housing programmes can demonstrate efficient design and build confidence across the market.

Material efficiency cuts emissions, construction cost and resource pressure. It also reduces the scale of new production capacity required.



Material efficiency through precast construction, Kijani Impact, Tanzania

Kijani Impact is developing a business model that links local calcined clay production, LC³ cement and precast concrete manufacturing. The model places clay calcination close to local deposits, works with existing cement producers to manufacture LC³, and establishes precast production closer to construction markets. Starting with 10,800 tonnes/year of calcined clay, equivalent to around 36,000 tonnes/year of LC³ cement, the approach is designed to scale through a franchise model for precast production.

The experience highlights the importance of partnerships with government, cement producers, technical institutions and investors, with reaching commercial and investment agreements proving more challenging than the technical development itself.

KEY MESSAGES

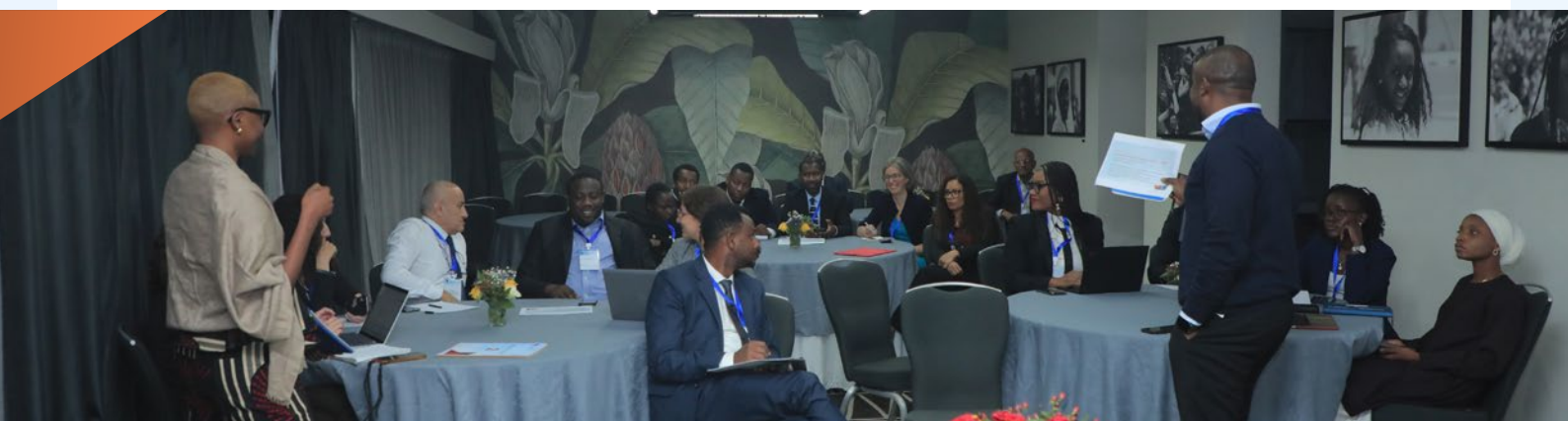
Design and specification

Avoid overdesign and overspecification. Optimize structural systems, concrete mixes, aggregates and components. Use whole life and embodied carbon considerations from the start.

Production and quality control

Better mix design and more controlled production can achieve the required concrete performance with less cement. Concrete block production represents a significant opportunity in Africa, as blockmaking can account for up to 80% of cement use in some countries but is often informal and inefficient. Improved batching, curing and quality control in block production can reduce cement use while maintaining required performance. Ready-mixed and precast concrete can similarly enable more controlled and material-efficient production.

Alice Titus Bakera, Lecturer, University Dar es Salaam & Founder, Kijani Impact, Tanzania, moderates a session on material efficiency in construction.

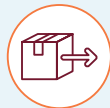


Turn waste into an industrial resource

Cement kilns can recover the energy and mineral content of suitable waste through co-processing. This can reduce fossil fuel use, divert waste from landfills and create economic activity in collection, sorting and pre-processing.

Increasing substitution rates depends on much more than the technical capacity of the kiln.

Co processing is a supply chain strategy as well as kiln technology. Reliable systems outside the plant determine performance inside the plant.



1. Building reliable supply

Develop sufficient and diversified local waste and biomass streams. Seasonality, stock-outs and inconsistent availability can limit substitution rates.



4. Make the economics work

Transport, sorting and pre-processing can make alternative fuels expensive. Polluter-pays mechanisms can help finance collection and treatment costs, while reliable volumes, efficient logistics and longer-term supply arrangements are important for investment and competitiveness.



2. Strengthen collection and pre-processing

Source separation, collection, sorting and pre-processing infrastructure are needed to turn waste into a consistent fuel. Local RDF production can help diversify supply where biomass is volatile.



5. Prepare the plant

Higher substitution rates can require receiving, storage, handling and feeding equipment, laboratories, fire and environmental controls, skilled staff and adjustments to kiln operation and fuel mixes.



3. Ensure fuel quality

Moisture, calorific value, composition and contaminants need to be controlled. Variable fuels can affect kiln stability, output and product quality.



6. Create an enabling framework

Clear permitting, traceability and appropriate waste-management policies are needed, including landfill policies that encourage waste diversion and recognition of co-processing within the waste hierarchy. Coordination between municipalities, waste companies, cement producers and government is critical.

Turning waste into alternative fuel

Heidelberg Materials is working to expand the use of RDF in its local operations in Africa, including Tanzania, in a context where more than 90% of municipal waste is landfilled, openly dumped or burned and only 4% is recycled. Across Heidelberg Materials' Africa-Mediterranean-West Asia (AMWA) region, alternative fuels account for around 18% of fuel use, compared with 35% globally, highlighting the potential for further substitution of fossil fuels.

Through partnerships with local stakeholders, the company is developing waste collection, sorting and treatment systems to convert non-recyclable waste into alternative fuel, reducing waste disposal and dependence on fossil fuels.

From imported fossil fuels to local biomass

Hima Cement in Uganda has progressively increased the use of locally sourced biomass to replace imported fossil fuels, reducing both its carbon emissions and exposure to high fuel and transportation costs. At its integrated Hima plant of 1MT pa, the company uses around 100,000 tonnes of biomass annually, including coffee husks, rice husks, maize cobs and sugar bagasse. Hima increased its thermal substitution rate from 0% in 2001 to 65% in 2022 and aims to reach 70% by 2030. To achieve this, the company has diversified biomass sources, established collection centres, expanded storage, introduced fuel pre-treatment and continuously optimized kiln operations.

These measures have helped address seasonal availability, variable fuel quality, high costs and transport constraints. By substituting imported fossil fuels with locally available resources, Hima has reduced fuel costs and dependence on imported energy while lowering Scope 1 emissions, strengthening energy security and creating income opportunities for local farmers and biomass suppliers.

Katharina Fischer, Area Manager Decarbonization
Africa-Mediterranean-Western Asia, Heidelberg
Materials, presents the company's initiatives in Africa
turning waste into value



EFFICIENCY, FLEXIBILITY AND RESIDUAL EMISSIONS

Improve plant performance and prepare for the future

KEY MESSAGES

Design new capacity for flexibility

New plants can accommodate alternative fuels and calcined clay from the start. Shared utilities and waste heat can reduce the cost of clay calcination. Plant design can also allow easier carbon capture retrofits.

Plan for carbon capture

Clinker substitution and efficiency leave residual process emissions. Countries can begin storage assessment, regulatory design, transport planning and industrial cluster analysis before large projects reach construction.

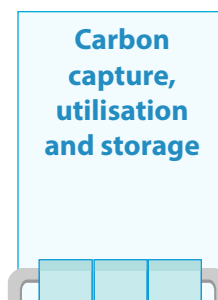
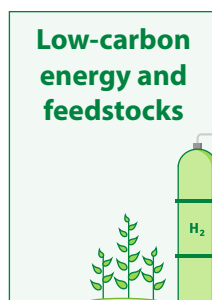
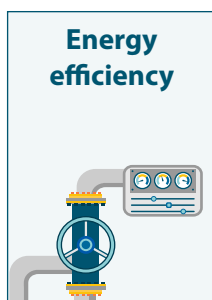
Corporate decarbonization approach in Africa, Dangote Cement

Dangote Cement has developed a group-wide roadmap targeting a 20% reduction in Scope 1 and 2 CO₂ emissions intensity by 2030 across its operations in 11 African markets.

The roadmap combines clinker substitution, energy efficiency and alternative fuels with investments in renewable energy, waste heat recovery and LC³. In Ethiopia, emissions intensity had already fallen 21% from its 2021 baseline by 2025. As a GCCA member, Dangote also aims to contribute to the Africa Net Zero Roadmap Accelerator in its operating countries, connecting its corporate strategy with wider cement sector decarbonization efforts across Africa.

Global industry roadmaps treat carbon capture as one element within a wider portfolio. Design efficiency, concrete optimization, clinker reduction, cleaner energy and recarbonation remain essential.

Improve current plants, build new plants for multiple pathways and prepare early for the infrastructure needed to manage residual emissions.





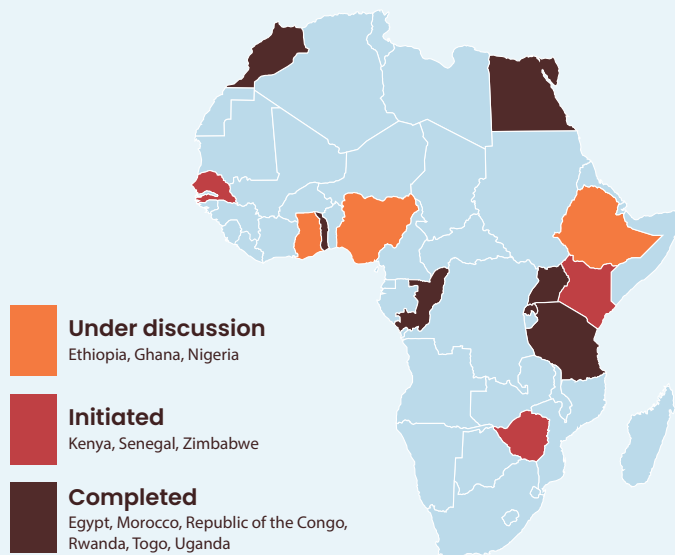
SESSION 3

Translating key levers into national strategies and roadmaps

TURN SHARED AMBITION INTO DELIVERY

Roadmaps give countries direction

Low-carbon cement roadmap status in Africa



Cement decarbonization roadmaps are planned, ongoing or completed in **12 African countries**.

This covers **41% of the continent's cement production capacity**.

In addition, around 20 African countries identify cement as a mitigation sector in their nationally determined contributions.

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

source: Climate Technology Centre and Network (CTCN)

A roadmap is a coordination and investment instrument. Its value comes from implementation, project pipelines and regular review.

A toolkit for the preparation of national cement and concrete industry decarbonization roadmaps is currently under development by UNIDO's NZP-ID, GCCA and UNEP CTCN. This toolkit aims to guide stakeholders at a national level to design, co-develop, and implement a national cement decarbonization roadmap, grounded in the GCCA Framework.



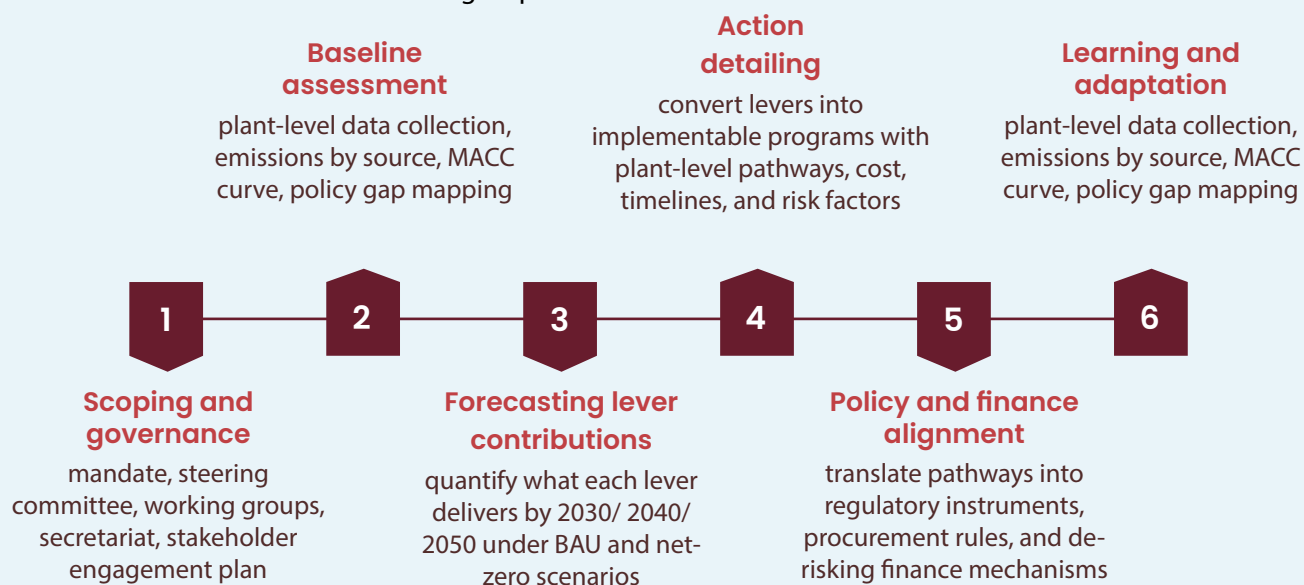
A national roadmap aligns government, industry, researchers, financiers and construction stakeholders around a common vision. It clarifies responsibilities, links policy with investment and creates confidence through transparent milestones. The technology is there. The vision is there. And across governments, industry and international partners, there is broad agreement on the direction of travel. But we also agree that there is much more to do. The next step is to connect technologies with the right policies, local capabilities, finance and partnerships so that countries can move from ambition to implementation at scale."

Robinson Mugo,
Regional Manager for Africa, UNEP CTCN



Robinson Mugo, CTCN Africa Regional Manager, UNEP CTCN, making the case for national low carbon cement roadmaps

The toolkit follows a parallel tracks framework between public and private sector and includes the following steps:



Contributions to the finalization of the toolkit are welcome.
Please contact: I.OORTALONSO@unido.org

The panel brought together perspectives from government (Senegal), a cement industry association (Morocco's APC), a cement producer (Heidelberg Materials), the demand side (World Green Building Council) and finance (AfDB). Several outcomes stood out:

- ▶ **Process and stakeholder roles:** The importance of an iterative and inclusive roadmap development process was stressed. A bottom-up approach from cement producer plans to a consolidated national ambition has proven successful. Consultations should not be limited to the supply side but include demand-side stakeholders, including municipalities and civil society. Furthermore, it was underlined that a roadmap needs to be pragmatic and realistic – it should be built on a solid evidence base (plant-level data and MRV), and prioritize accessible solutions (reality check on CCUS).
- ▶ **From ambition to action:** What makes a roadmap implementable depends first and foremost on the clarity of the ambition, pathways and responsibilities of each stakeholder. Governance and sound ownership are crucial and provide market confidence. Depending on the decarbonization lever, different stakeholders need to be engaged and different financial products are relevant.
- ▶ **Alignment of agendas:** Aligning agendas between the cement and concrete industry, the buildings and construction sector, as well as the economic development and climate agendas is crucial. Common metrics should be identified to create a market momentum.

Breakout groups found that countries are at very different stages of cement decarbonisation roadmap development (some have adopted roadmaps, others are mid-process, several have not started) with progress shaped largely by whether government or industry initiates it.

The recurring message was that the real constraint is not drafting the roadmap but implementing it. Roadmaps are often built in silos, poorly disseminated, disconnected from the ministries controlling standards and procurement, and non-binding until anchored in national NDCs, while fragmented climate-finance modalities rarely match implementation timelines. Participants called for stronger government ownership, dedicated champions, cross-ministry coordination, and inclusion of the full value chain.

The six-step toolkit was seen as a broadly relevant and useful framework, but should be improved by building cross-ministry inclusion and NDC alignment into the governance step from the start, reconsidering whether plant-level data and MACC curves are realistic at national scale, and adding practical tools to test the feasibility of specific mitigation levers.

SESSION 4

Policy enablers for roadmaps implementation



FOUR COMPLEMENTARY POLICY PILLARS

Policy must turn technology into markets

KEY MESSAGES

Supply policies

Industrial regulation and carbon pricing where suitable, permitting reform, technology guidance, and waste and co processing rules.

Demand policies

Green public procurement, product certification, performance-based standards, green building standards, building codes and embodied carbon requirements.

Direct public funding

Grants, research support, demonstration funding and investment in laboratories, data systems and other enabling infrastructure.

Financial incentives

Tax credits, tax exemptions, concessional loans, guarantees, green bonds and finance for equipment upgrades or new production capacity.

Technology deployment depends on an enabling policy environment. Governments can combine supply measures, demand creation, direct funding and financial incentives according to national conditions.

Connecting industry and the built environment

Building codes, construction standards and procurement determine whether lower-carbon cement finds a market. Participants stressed that industrial and built-environment policies need to develop together.

Enabling co-processing

Waste regulation also shapes industrial decarbonization. Clear rules for collection, sorting, permits, traceability and co-processing can turn suitable waste into a reliable industrial resource.

Policy creates confidence when instruments are clear, coordinated, realistic and supported by institutions that can implement them.



These pillars depend on common foundations. Countries need reliable data, institutional coordination, standards, infrastructure, skills, market awareness and continuous collaboration with industry and the construction sector. “

Ankita Gangotra,
IDDI, UNIDO



Ankita Gangotra,
Coordinator, Industrial
Deep Decarbonisation
Initiative, UNIDO

MOVE FROM RECIPES TO PERFORMANCE

Standards are the gatekeepers of innovation

New cement products reach the market only when engineers can approve use and authorities can verify their quality. Standards therefore shape the pace of innovation.

Standards can enable innovation and market uptake

Performance based standards need capable laboratories, accreditation, technical guidance and professional training. Standards bodies, research institutes, cement producers, engineers, universities and public buyers should develop and test these rules together to build credibility and market confidence.

Wider uptake of LC³ standards will also require recognition across construction standards, specifications and procurement practices.

Greater regional harmonization can create wider market uptake by creating consistent requirements, reduce repeated testing and support regional trade in low-carbon cement.

KEY MESSAGES

Prescriptive approach

Rules define materials and fixed compositions. This can protect quality, yet rigid recipes can limit new blends and local supplementary materials.

Performance approach

Rules assess strength, durability and safety. Producers can use local materials and different formulations when products meet the required performance.



Developing a national standard for LC³ in Ghana

Ghana developed a national standard for limestone calcined clay cement (LC³) in 2024, establishing specifications for its composition, strength and other mechanical, physical and chemical properties. Developed over three years and supported by testing across 11 national and international laboratories, the standard allows LC³ with clinker content as low as 35%, with estimated potential savings of around 200 kg CO₂ per tonne of cement. By formally standardizing LC³ as a cement product, Ghana has removed an important barrier to its production and commercialization.

Ghana's LC³ standard demonstrates how cement standards can evolve to accommodate lower-clinker formulations while maintaining clear performance and quality requirements.

REGIONAL EXPANSION AND HARMONIZATION:

Togo and Kenya have started the development of similar national LC³ standards, while the East African Community (EAC) has begun discussions on an LC³ standard for its member countries.



Linking low-carbon materials to building policies in Ghana and Senegal

Ghana and Senegal are beginning to connect cement decarbonization with policies for the wider built environment. Ghana's Climate Action Roadmap recommends integrating low-carbon materials into building regulations and is developing a priority action plan on material efficiency with the Ministry of Housing. This complements the development of its LC³ standard by addressing the downstream conditions for lower-carbon materials to be used in construction. In Senegal, the 2024 Climate Action Roadmap for Buildings and Construction targets reductions in embodied carbon, while National Green Building Guidelines are under development, alongside a cement decarbonization roadmap.

Green building certification schemes can complement mandatory standards and building codes by rewarding the use of low-carbon materials, helping build market recognition and demand before such requirements are incorporated into regulation.

Standards can protect quality and enable innovation at the same time. The shift depends on testing capacity, professional competence and market trust.

Ruvimbo Munemo, Post-Doctoral Researcher, EPFL, talks about material standards.



USE PUBLIC BUYING POWER AS A MARKET SIGNAL

Governments can create demand through procurement

Public authorities purchase a large share of infrastructure materials. Green public procurement can create an early market for lower emission cement and concrete before wider commercial demand develops.

The Industrial Deep Decarbonisation Initiative supports governments with harmonized definitions, procurement guidance, peer learning and a voluntary pledge. Membership gives countries a flexible entry point before they adopt time bound purchasing commitments. Ethiopia and Uganda joined the initiative during the Dialogue, expanding African participation.

Predictable public demand gives producers and investors greater confidence to invest in new products, equipment and supply chains.

The Industrial Deep Decarbonisation Initiative (IDDI), coordinated by UNIDO, brings together governments to accelerate the decarbonisation of steel, cement and concrete through harmonised standards, emissions reporting and green public procurement.

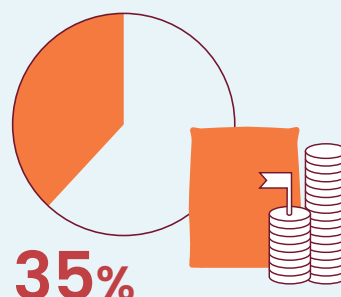
Countries are invited to join IDDI and participate in its Green Public Procurement (GPP) Pledge, which provides a flexible framework for using public purchasing power to create demand for low- and near-zero-emission industrial materials.

Should countries be interested in joining IDDI or committing to the GPP Pledge, please contact the IDDI Secretariat at iddi@unido.org for more information.



20 to 30%

of construction industry revenue flows **through governments**



35%

of cement may be purchased by **public authorities** in major economies

1. Review rules

Examine procurement laws, strategies and technical specifications.

2. Set criteria

Add credible emissions and performance requirements linked to national standards.

3. Consult the market

Engage procurement agencies, ministries, standards bodies, producers and contractors.

4. Phase delivery

Assess market readiness and increase ambition through realistic stages.

5. Demonstrate

Use public infrastructure and housing projects to test criteria and build supplier capacity.

6. Report progress

Track purchases, product performance and market response.

BUILD PRACTICAL MRV SYSTEMS

Reliable data underpins policy and finance

Measurement, reporting and verification provides the evidence base for industrial policy, decarbonization roadmaps, international climate reporting, investment and market access.

MRV systems should therefore be designed around their intended purpose and data needs, while mapping requirements across different frameworks to maximize the use of existing industry data and reduce duplication and reporting burden. Verification and clear responsibilities build trust among government, industry, financiers and buyers.

Start with a manageable system, use common definitions and build sophistication over time. Reliable data turns ambition into measurable progress.



Reliable data is the foundation of effective decarbonization. It allows us to track progress, improve policy and build confidence with investors and markets. MRV does not need to start with a complex system. Countries can build on the data companies already collect and strengthen the system as capacity grows."

Evita Moawad, NZP-ID, UNIDO

KEY MESSAGES

Data tracked

Production and materials: clinker and cement output, raw material use, clinker content and supplementary material content.

Energy and fuels: fossil and alternative fuels, biomass, refuse derived fuel, waste tyres, grid electricity, self-generation and renewable electricity.

Mitigation actions: efficiency investments, clinker substitution, alternative fuel projects, renewable energy and carbon capture where relevant.

Data flow and use

Data originate at facility level, where emissions and mitigation performance are measured and reported; are aggregated at company level to track corporate performance; analysed at sector level to assess emissions trends and progress against sector decarbonization roadmaps; and can feed into national systems for GHG inventories, BTR/ETF reporting and policy decisions.

Effective MRV also requires clear roles and responsibilities, legal frameworks, data requirements, information-sharing arrangements and compatible data systems, building on existing reporting systems wherever possible.



Evita Moawad, Industrial Decarbonization Expert, NZP-ID, UNIDO



Strengthening industrial sector reporting in national MRV systems: Kenya, Morocco, and Egypt

Kenya, Morocco and Egypt are working to better capture industrial emissions and mitigation actions to support international climate reporting under the Enhanced Transparency Framework (ETF), as well as national policy needs. With support from NZP-ID, they are translating national reporting requirements into practical methodologies and data requirements for industry, and establishing information flows between industry and national MRV systems.



Building on existing industry reporting: GCCA GNR

The cement industry already collects significant amounts of emissions and performance data through the GCCA GNR database, using GCCA's Cement CO₂ and Energy Management Protocol, which is based on GHG Protocol and IPCC methodologies. Around 41% of cement production in Africa is already covered by GNR reporting.

This provides an existing data and reporting infrastructure that countries can consider when developing or strengthening national MRV systems. With support from CTCN, Ethiopia plans to be the first country to pilot a national MRV system based on the GNR platform.

A breakout session on built environment policies



A full-page background image featuring a worker in the foreground on the left, wearing a white hard hat and a blue uniform with a bright yellow high-visibility vest that has a large green 'K' logo. The worker is looking towards the right. In the background, there is industrial machinery, including a large horizontal pipe and a complex structure of pipes and metal frames. The ground is reddish-brown dirt with some small green plants. The top and bottom right corners of the image are overlaid with a light blue geometric pattern of thin lines forming a network. A dark red rectangular box is positioned in the upper right, containing the text for this section.

SESSION 5

From concepts to financed projects

MATCH FINANCE WITH PROJECT MATURITY

Move from concepts to bankable projects

Finance follows project readiness. Investors need credible technology, capable teams, clear markets, sound studies, realistic permits and manageable risks. Project preparation should thus begin early.



Grants

Resource mapping, feasibility studies, and early project preparation, as well as, technical assistance for the enabling environment.



Debt and green loans

Established technologies, plant upgrades and larger-scale deployment with more predictable cash flows.



Concessional finance

Demonstrations and scale-up where technology, commercial or first-mover risks prevent conventional financing.



Guarantees

De-risking private and local lending by addressing credit risk, political and other investment risks.



Equity

First-of-a-kind and early commercial projects that require patient risk capital.



Advisory services

Technical, environmental, commercial and financial preparation to strengthen project bankability.

Guarantees and advisory services can support projects across different stages of maturity.

Carbon markets and philanthropy can complement traditional financing. They can help address risks and financing gaps that conventional capital may not cover. Philanthropic funding, including through initiatives such as ClimateWorks Foundation's Global Industry Hub (GIH), can support early-stage innovation and demonstration, while carbon finance can provide additional revenues that improve project economics.

Mobilizing local capital for proven technologies, SOCOCIM Industries

IFC described a €242 million package for SOCOCIM Industries. It included a €120 million IFC green loan and €122 million in local currency loans mobilized from Senegalese banks. A further €75 million loan followed in 2024. Measures include replacement of older clinker lines with a new fuel-efficient kiln capable of up to 70% alternative fuel substitution, alongside waste heat recovery and energy-efficiency upgrades. Expected annual reductions reach about 312,000 tonnes of CO₂ equivalent by 2030.

Article 6.2 to unlock low-carbon cement investment in Africa

Article 6.2 can provide additional revenue to improve the viability of cement decarbonization projects through the sale of verified emission reductions (ITMOs). Indicative ITMO purchase prices range from USD 10–40/tCO₂. However, access remains complex, with different bilateral requirements, high transaction costs, and the need to demonstrate additionality, quantify emission reductions and secure host-country authorization.

The GCCA A.6.2– LC³ Accelerator is working to make Article 6.2 more accessible for cement projects, from helping countries and companies navigate requirements and develop eligible projects to de-risking transactions and demonstrating the approach through an LC³ A.6.2 carbon crediting project in Africa.

The financing challenge begins before the financing request. Strong preparation creates a pipeline that public and private capital can support.

Danilo Trugillo, CEO, Dangote Cement Ethiopia presents the company's corporate decarbonization strategy



YOUTH INTERVENTION

People make technology and policy work



Invest in institutions, skills and future leadership

Technology deployment depends on capable institutions and skilled professionals. Governments need expertise in roadmaps, standards, procurement, data and industrial policy. Laboratories and standards bodies need equipment, accreditation and trained staff.

Ahead of the Africa Dialogue, the Green Africa Youth Organization (GAYO), through GAYO Eco-Clubs Africa and the Youth Climate Council Global Alliance, and with technical support from UNIDO, convened a virtual youth consultation on cement decarbonization and green industrialization.

The consultation brought together 207 young people from 22 African countries, including engineers, architects, entrepreneurs, researchers, policymakers, students and climate advocates. Participants explored the technical and policy challenges of cement decarbonization and developed 12 recommendations for the Dialogue.

What young people called for

The consultation highlighted the need for stronger technical capacity in government, better implementation of existing policies, formal youth participation in decision-making, dedicated finance for young entrepreneurs, industry mentorship and greater integration of sustainability into higher education.



Africa does not have a youth interest gap, it has an inclusion gap. Young people are already engaged, already skilled, and already contributing to climate and industrial solutions across the continent. The real challenge is not motivation, but meaningful access to decision-making spaces, implementation processes, and investment pathways."

Baliqees Salaudeen-Ibrahim,
Climate Director, Green Africa Youth Organization



207

young people
joined the consultation



22

African countries
represented



60%

approximate share of Africa's
population **below age 25**

KEY MESSAGES

Education and professional practice

Universities can integrate low carbon cement, material efficiency and sustainable construction into engineering and architecture programmes. Industry partnerships can support testing, demonstrations and continuing professional training.

Enterprise and innovation

Young entrepreneurs need mentorship, patient capital, investment readiness support and access to industrial partners. National roadmap processes can include young professionals as active contributors.

Young people should be treated as partners in designing and delivering the transition, with opportunities to contribute to roadmap development, policy implementation and investment decisions. At the same time, effective technology deployment requires capable institutions and skilled professionals, including government expertise in standards, procurement, data and industrial policy, and well-equipped, accredited laboratories and standards bodies.

Africa's demographic strength can become an industrial advantage when education, policy and investment create real routes for young people to lead and deliver the transition.

Nasra Nanda, CEO, Kenya Green Building Society and Chairperson of the Africa Regional Network, World Green Building Council, talks about aligning Africa's industrialization and climate ambitions through national strategies and sectoral roadmaps.



MARKETPLACE

Projects and partnership



Connect country priorities with existing support



Countries already have access to a growing network of technical, policy and financing initiatives. The central task is to connect this support around national priorities and reduce fragmentation.”

Sarbojit Pal,
Global Matchmaking Platform, UNIDO

The Dialogue concluded its working sessions with a Project and Partnership Marketplace, where participants met directly with international initiatives and technical partners to discuss country needs, projects and opportunities for collaboration.

A country-led model starts with clear national requests. Partners can then combine technical assistance, project preparation, policy support and finance around the same implementation pathway.

Countries can move faster when existing initiatives work as one support system around country defined priorities.

KEY MESSAGES

Set priorities and find partners

The Climate Club Global Matchmaking Platform helps countries define industrial needs, translate them into project concepts and connect with technical and financial partners.

Develop roadmaps and projects

CTCN, UNIDO, GCCA and the Net Zero Partnership support roadmaps, technology assessment, project pipelines, nationally determined contribution delivery and investment preparation.

Create markets and common rules

IDDI supports procurement, harmonized emissions definitions, product data and peer learning.

Coordinate international action

The Belém Declaration and Global Green Industrialization Agenda provide a wider mandate for technical assistance, finance, technology cooperation and stronger coordination. The Cement and Concrete Breakthrough supports country exchange and practical policy discussion.



Sarbojit Pal,
Program Manager, Global
Matchmaking Platform, UNIDO

Country's need

Existing source of support

Define national priorities and find partners	Global Matchmaking Platform of the Climate Club
Develop a cement roadmap	CTCN, UNIDO, GCCA and UNIDO's Net Zero Partnership support
Connect cement priorities with NDC implementation	Net Zero Partnership NDC 3.0 Delivery Package
Develop investment-ready projects	Net Zero Partnership pipeline support, development finance and advisory partners
Introduce green public procurement	Industrial Deep Decarbonisation Initiative
Harmonize emissions standards and definitions	IDDI and related standards initiatives
Exchange experience with other governments	Cement and Concrete Breakthrough
Coordinate green industrialization internationally	Belém Declaration and Global Green Industrialization Agenda
Prepare LC ³ projects for carbon markets	GCCA Article 6.2– LC ³ Accelerator
Access technical assistance on policy development, feasibility studies, capacity building, etc.	CTCN and international implementation partners

Countries share their experiences with the development of national cement decarbonization roadmaps



CLOSING SESSION

From dialogue to delivery



CLEAR ROLES ACROSS THE DELIVERY ECOSYSTEM

Who makes scale happen

Scale depends on coordinated roles. Each actor contributes a distinct capability, and each depends on the others for implementation.

Coordination should continue. Regular country processes, regional exchange and transparent monitoring can keep partners focused on the same priorities.

The transition becomes deliverable when roles are explicit, decisions are coordinated and support continues from planning through investment and implementation.



This was the first regional Dialogue on cement in Africa. It should not be the last.

We hope everyone here will return to their capitals and organisations and ask 'What do these discussions mean for our own national context?'. We hope this is the start of continued cooperation focused on action, implementation and results.

H.E. Ato Hassan Mohamed,
State Minister of Ministry of Industry,
Federal Democratic Republic of Ethiopia



GOVERNMENTS

Lead the transition

Set national direction, coordinate roadmaps, align industrial and climate policy, update standards and procurement, and provide stable signals.



ACADEMIA AND THINK TANKS

Generate knowledge and capacity

Characterize local materials, support testing and standards, assess policy and technology, train professionals and communicate evidence.



FINANCIAL INSTITUTIONS

Make projects bankable

Engage early, structure proposals, provide equity, debt and guarantees, reduce first mover risk and mobilize local and international capital.



INDUSTRY

Demonstrate and scale

Provide operational data, test proven technologies, prepare projects, build confidence in new products and report progress.



YOUTH AND ENTREPRENEURS

Innovate and shape the transition

Develop companies, technologies and business models, contribute to roadmaps, strengthen public understanding and form the future workforce.



INTERNATIONAL PARTNERS

Connect and catalyze

Match priorities with initiatives, provide technical assistance, support project preparation, facilitate regional learning and help mobilize finance.

SEVEN PRIORITIES FROM THE DIALOGUE

An agreed direction for action

Africa can build the future differently

1. Prioritize proven pathways now

Scale clinker substitution, material efficiency, alternative fuels and energy efficiency while preparing for future carbon management.

2. Develop country led roadmaps

Align industry, climate, infrastructure, construction and waste priorities through clear responsibilities and timelines.

3. Create markets

Use standards, building codes, public procurement and demonstration projects to give industry confidence to invest.

4. Build reliable data systems

Develop practical MRV that supports roadmaps, nationally determined contributions, procurement, investment and carbon markets.

5. Prepare bankable pipelines

Convert broad concepts into sound projects with credible business models, capable partners and suitable financing structures.

6. Invest in institutions and people

Strengthening governments, standards bodies, laboratories, universities, industry professionals and youth led innovation.

7. Coordinate support around country needs

Connect countries with technical assistance, finance and implementation partners, reduce duplication and elevate proven country case studies for peer learning.



How progress should be measured

Track policies implemented, standards updated, projects prepared, partnerships established, finance mobilized, jobs and skills created, and emissions avoided.

The Dialogue produced a shared direction that links technology, policy, data, finance, institutions and partnerships.

Participants recommended that the next phase move from dialogue to delivery through country processes, practical projects and sustained regional cooperation.

H.E. Ato Melaku Alebel, Minister of Ministry of Industry, Federal Democratic Republic of Ethiopia





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