

# FORO ECONOMÍA CIRCULAR Y GESTIÓN DE RESIDUOS EN LA INDUSTRIA DE CEMENTO

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# SUPPORTING DECARBONIZATION IN THE CEMENT INDUSTRY

JOSE QUIÑONES  
ERNESTO FRANCO  
LUIS SALOMÓN

CARTAGENA, NOVEMBER 2023

 Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Departamento Federal de Economía,  
Formación e Investigación DEFI  
Secretaría de Estado para Asuntos Económicos SEC



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## IFC'S INVESTMENT EXPERIENCE IN THE CEMENT BUSINESS



~US\$7.1bn

**Cumulative  
Commitments**



300+

**Projects globally**



77+

**Countries worked**



**Industry Expertise**

**In-house seasoned  
industry specialists**



**Sustainability leader**

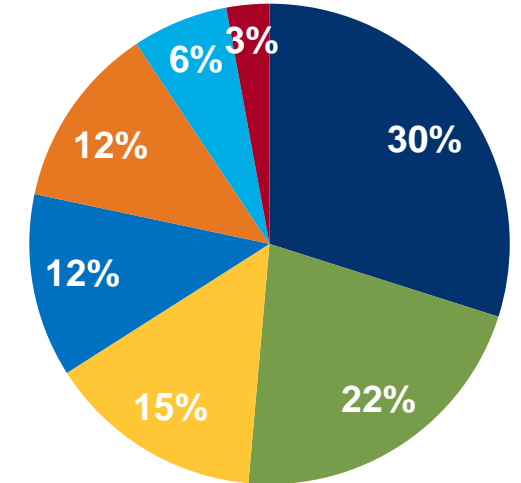
**Promoter of E&S and  
CG standards**



~US\$300m

**Current active  
portfolio**

Geographical split of IFC cumulative investments in cement<sup>1</sup>.



- Latin America and the Caribbean
- East Asia and the Pacific
- Middle East and North Africa
- Europe and Central Asia

1. ~US\$7.1bn in total – including US\$2.2bn in mobilization

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# SELECTED IFC CEMENT TRANSACTIONS

*IFC has supported cement companies in emerging markets since 1958.*

<p>Africa (7 countries) HeidelbergCement</p>  <p>USD 250m Loan, Equity</p>	<p>Brazil Votorantim Cimentos</p>  <p>USD 150m Loan</p>	<p>Vietnam Holcim</p>  <p>USD 97m A/B Loan</p>	<p>China Shanshui Cement</p>  <p>USD 58m Loan, Equity</p>	<p>Dem. Rep. Congo PPC-Barnet DRC</p>  <p>USD 52m Loan</p>	<p>Trinidad and Tobago TCL Group</p>  <p>USD 37m Loan, Risk Management</p>
<p>Global Italcementi</p>  <p>USD 200m Loan, Equity</p>	<p>Yemen AYCC</p>  <p>USD 125m A/B Loan</p>	<p>China Anhui Conch</p>  <p>USD 86m Loan</p>	<p>Vietnam Nghi Son Cement (Taiheyo)</p>  <p>USD 56m A/B Loan</p>	<p>Iraq Lafarge Bazian</p>  <p>USD 50m Loan</p>	<p>Global Cemex</p>  <p>USD 120m Loan</p>
<p>Kazakhstan Vicat/Jambyl Cement</p>  <p>USD 185m A/B Loan, Equity</p>	<p>Egypt Titan</p>  <p>USD 120m Equity</p>	<p>China Tianrui Cement</p>  <p>USD 71m Loan, Equity</p>	<p>Dominican Republic Domicem</p>  <p>USD 56m Loan</p>	<p>India OCL India Ltd.</p>  <p>USD 50m Loan</p>	<p>Albania Fushe Kruje / Seament</p>  <p>USD 30m Loan</p>
<p>Turkey Sanko Cement</p>  <p>USD 175m A/B Loan</p>	<p>Iraq Lafarge Karbala</p>  <p>USD 105m Loan</p>	<p>Bangladesh Lafarge Surma</p>  <p>USD 60m A/B Loan, Equity</p>	<p>Ethiopia Midroc</p>  <p>USD 55m Loan</p>	<p>Algeria ACC Cement</p>  <p>USD 45m Loan</p>	<p>Philippines Holcim</p>  <p>USD 27m Loan, Equity</p>

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EN LA INDUSTRIA DE CEMENTO**

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# IFC'S DECARBONIZATION OFFERING

## 1. Decarbonization strategy

## 2. Financing

### Initial Diagnostics/Light

### In-depth Decarbonization Engagement

### Scaling up investment

### Investment

2-4 months

4-8 months

4-6 months

4-6 months

- Help the client understand its carbon footprint and what it takes to develop and implement a decarbonization strategy and identify next steps.
- -OR help the client align an already existing investment program with sustainable finance principles.

- **Footprint assessment and target setting**
  - Help clients evaluate their total carbon footprint and facilitate establishing baseline emissions, scope 1, 2 and, if feasible scope 3.
  - Help clients set targets, promote Science Based Targets Initiative (SBTi) for meeting net zero goal.
- **Identify options for decarbonization**
  - Help evaluate onsite and offsite decarbonization pathways (emissions reduction, avoidance, offsetting), including prefeasibility studies via an Upstream Engagement for Early-Stage Project Development.
  - Help prioritize decarbonization options, capex requirement and financing options.
- **Design and implementation of decarbonization strategy**
  - Facilitate establishing a realistic medium and long-term decarbonization strategy aligned with clients' targets, and broader corporate business strategy, and a solid financeable implementation plan including structuring bespoke offerings, compliant with sustainable finance principles.

- IFC Upstream early-stage project development support, including business model piloting: IFC can co-invest in fleet-wide or single asset pre-investment studies and project development activities where needed and applicable to bring the decarbonization options identified to bankable investment stage
- IFC Green Loan/Bond: help to define the use of proceeds, specific eligible projects.
- IFC Sustainability-Linked Loans: help set targets/KPIs and link them to repayment structure.

- Provide Financing & Mobilize of Capital  
**IFC green, sustainability-linked and transition finance**

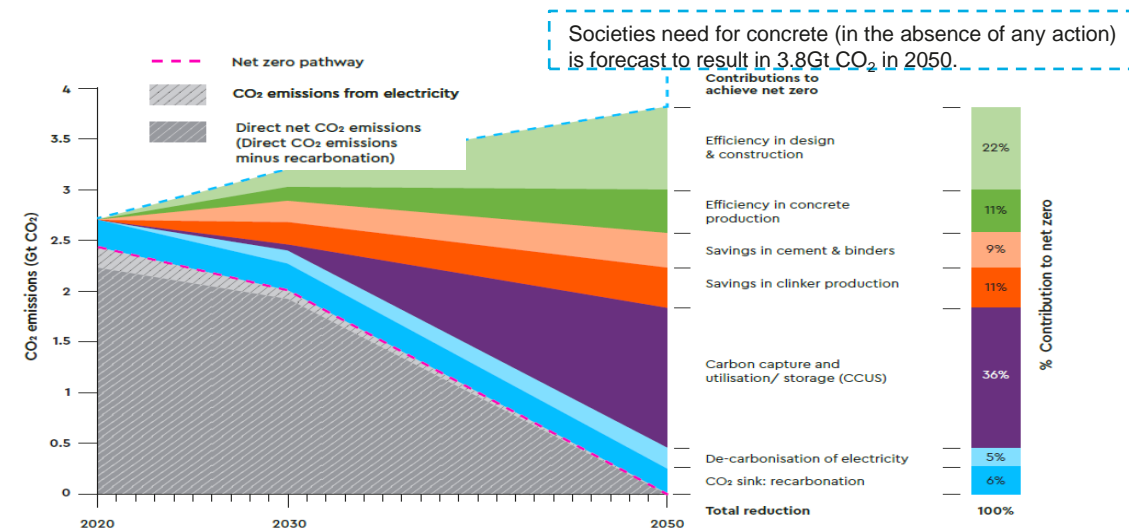
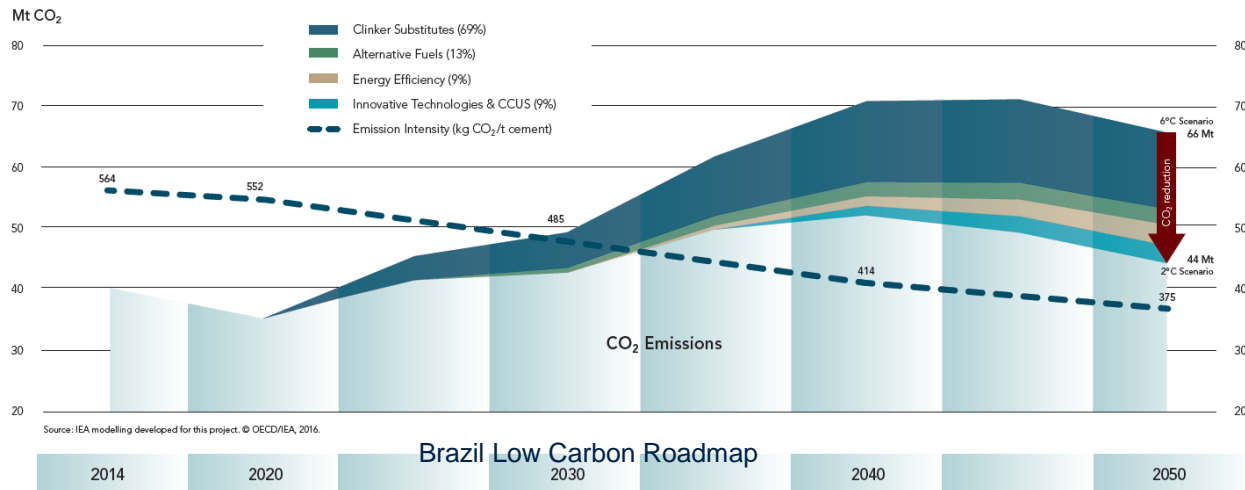
# FORO ECONOMÍA CIRCULAR Y GESTIÓN DE RESIDUOS EN LA INDUSTRIA DE CEMENTO



*IFC Climate Advisory is well positioned to help cement manufacturers achieve their GHG reduction ambitions*

- IFC can help develop **long-term decarbonization / low carbon roadmaps** for cement companies, **compliant with sustainable finance principles**
- IFC supported development of India and Brazil Low Carbon Roadmap and can help “localize” similar roadmaps for specific companies by:
  - Help assess carbon footprint
  - Help set SBTi (or equivalent) GHG reduction targets
  - Identify options for decarbonization (energy efficiency, alternative fuels, renewable energy, blended cement, etc.)
  - Design a decarbonization roadmap
- Facilitate setting internal carbon pricing
- Provide capital through Investment programs compliant with Sustainable Finance Principles
- Work with local Governments to remove barriers and adopt supportive policies

CO<sub>2</sub> emissions reduction comparing “2°C Scenario” with “6°C Scenario”



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## IFC'S CLIMATE INVESTMENT APPROACH TO CEMENT

### Best Practice Technology

- Modern kiln technology
- Vertical roller mill, or pre-grinding (roller press) for raw, coal and cement grinding
- Waste-heat recovery co-generation system
- Use of alternative sources of fuel and raw materials
- Clean power

### Sector benchmarks

- **Maximize Use of Blended Cement**
  - Target: Clinker/cement factor between 0.65 to 0.85, in line with local regulations (<0.5 for slag cement)
- **Minimize Fuel Use in Clinker Production**
  - Target: Fuel use of 2,900 -3,300 MJ/ton of clinker, matching 2011 European Integrated Pollution Prevention and Control (IPPC) Bureau's Best Available Techniques (BAT) for the cement sector
- **Minimize Use of Electricity in Cement Production**
  - Target: 80 – 105 kWh/ton of cement-based supplier guarantees
- **Encourage Use of Renewable and Alternative Fuels Wherever Locally Available**
  - Examples: WHR; Biomass (wastes and plantations); Municipal Solid Waste; Wind farm; Solar PV
- **Supplementary Cementitious Materials (SCM )**
  - Puzolan / Calcinated Clay

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## IFC TRACK RECORD IN CEMENT CLIMATE ADVISORY

### Global

- Global Waste Heat Recovery in Cement Report

### LAC

- LafargeHolcim (Brazil); Cementos Progreso (Guatemala); Holcim (Mexico), Votorantim (Brazil)
- Low Carbon Technology Roadmap (Brazil)
- Support to Asocem (Peruvian Cement Association) on cement standards (Peru)

### AFR

- LafargeHolcim (Nigeria)
- National Cement (Ethiopia)
- Alternative Fuels Study (AFR)

### SA

Ultratech, Shree Cement, Ras, ACC, Ambuja, My Home Industries,

Dalmia Cement, Sonapur Cement (India)

Low Carbon Technology Roadmap (India)

### EAP

DongLam, VCM, Song Gianh (Vietnam)

### ECA

Denizly Cimento, Oyak Group (Turkey)

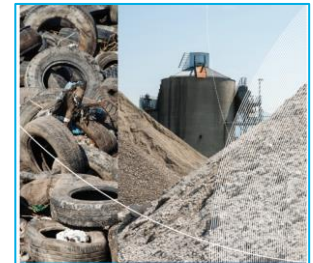
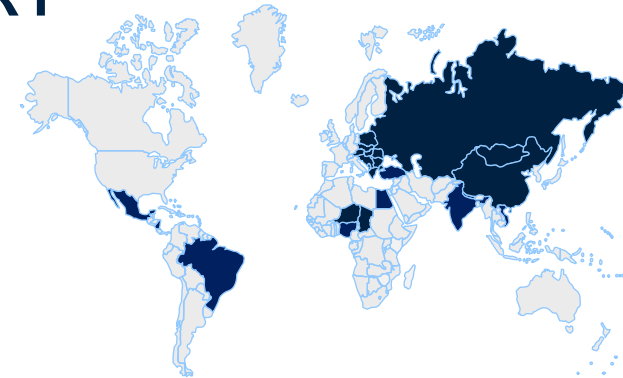
ORC WHR workshop (Turkey)

WHR review (Turkey)

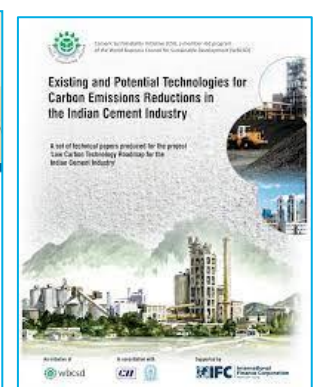
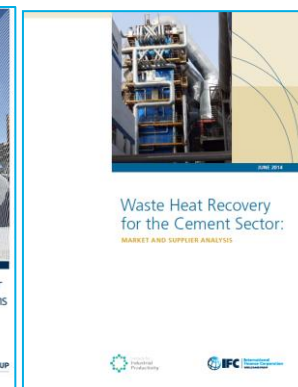
### MENA

AYCC (Yemen)

Alternative Fuels Study (Egypt)



Use of Alternative Fuels in the Cement Sector in Senegal: Opportunities, Challenges and Solutions



**16 clients, 2 Low Carbon Roadmaps,  
4 publicly available reports**

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IFC supports construction materials companies in pursuing low carbon development, improving sustainability of their operations and minimizing their environmental footprint.

Company

- Help reduce operational costs and improve environmental footprint by identifying climate-friendly investments via plant-specific energy, water, waste and material assessments
- Delivering in-depth technical advisory and feasibility studies on thermal and electric energy efficiency, process optimization, waste heat recovery, alternative fuels, on-site renewable energy solutions (solar PV, wind, biomass)
- Providing independent expert opinion on offers from equipment suppliers, solution providers, engineering firms
- Improving operational performance and sustainability standards
- Provide project development support from concept stage to bankability: IFC supports the development of projects following confirmation of their pre-feasibility by contributing resources and/or funding for the execution of development activities. IFC's value-add is in ensuring that projects are bankable

Sector

- Unlocking market opportunities through sector-level studies (e.g. country-specific alternative fuels, market mappings, etc.)
- Developing Low Carbon Technology Roadmaps for the Cement Sector (India, Brazil)



INCREASING THE USE OF ALTERNATIVE FUELS AT CEMENT PLANTS: INTERNATIONAL BEST PRACTICE



IMPROVING THERMAL AND ELECTRIC ENERGY EFFICIENCY AT CEMENT PLANTS: INTERNATIONAL BEST PRACTICE



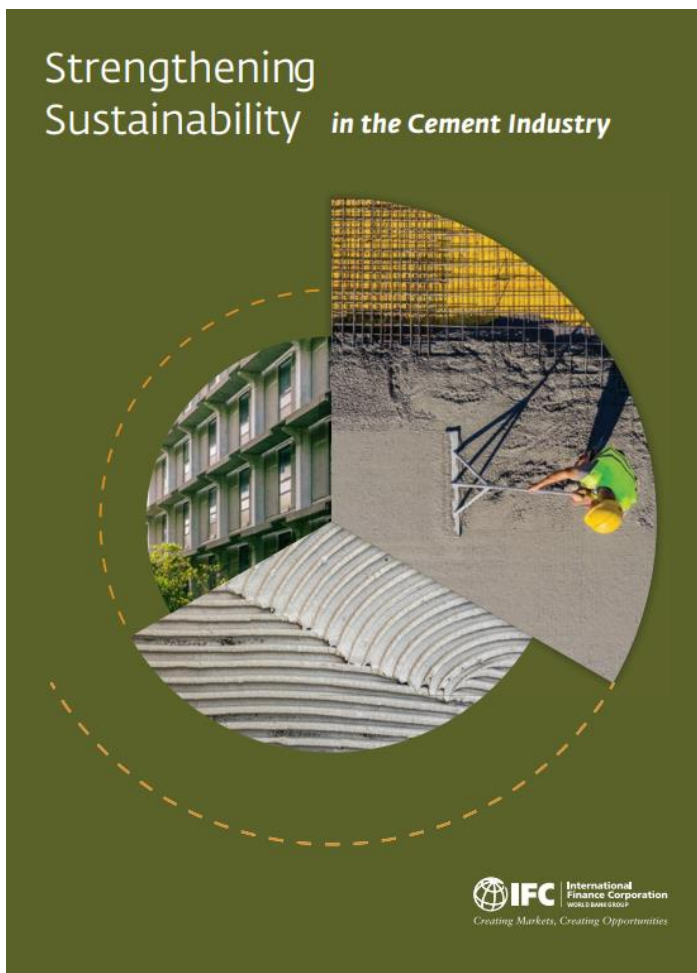
Technical and Policy Recommendation for reducing Carbon Emissions in the Peruvian Cement Industry Through 2050

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EN LA INDUSTRIA DE CEMENTO**

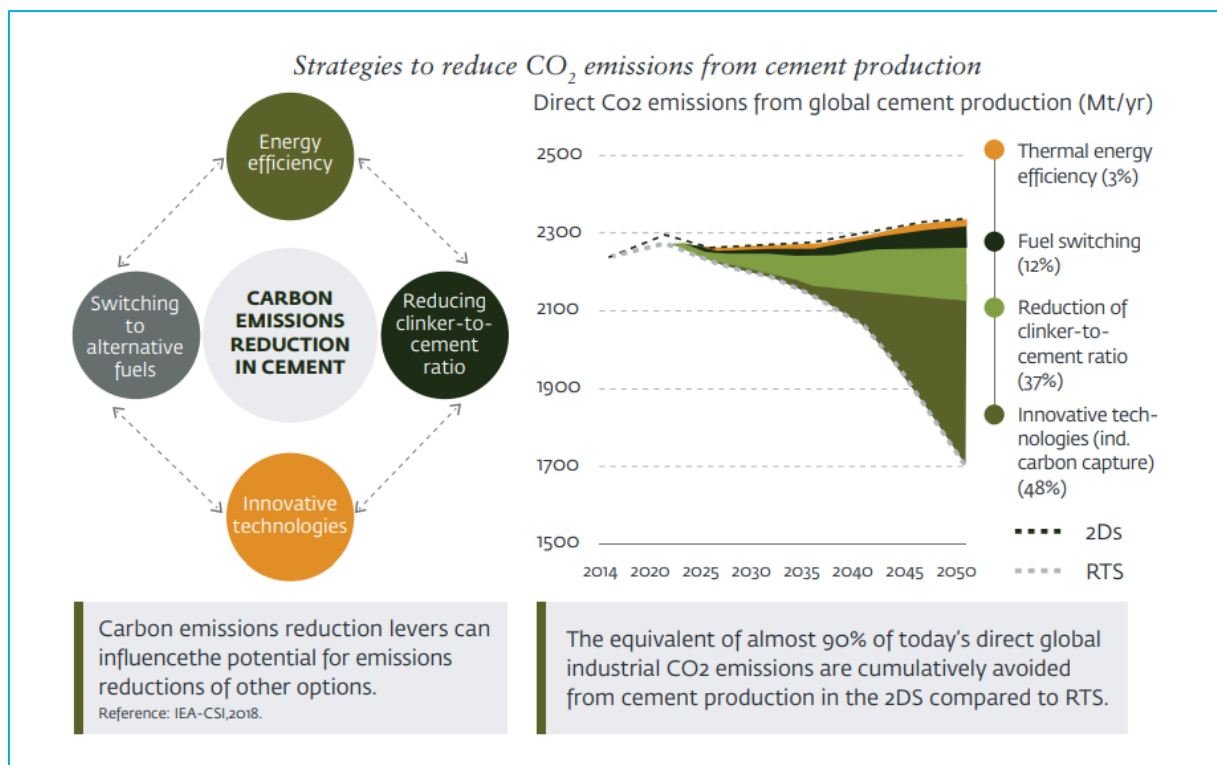
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Growing global concerns over climate change are putting an increasing focus on sustainability. This report is part of an occasional series on sustainability in industry which examines the opportunities and challenges facing various industrial sectors and the role that the International Finance Corporation can play to support their efforts and contribute to a greener planet.



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EN LA INDUSTRIA DE CEMENTO**

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# IFC DECARBONIZATION TOOL

## Decarbonizing Cement



### IFC Cement Decarbonization Tool

#### Step One in Your Decarbonization Journey

Building on its \$7.1 billion cumulative cement industry investment portfolio, IFC has developed a tool to help cement companies in emerging markets to start planning the transition. The tool helps firms make an initial high-level assessment of major decarbonization options.

Rooted in IFC's global industry knowledge of over 50 years, the tool helps firms explore five decarbonization measures at the plant level:



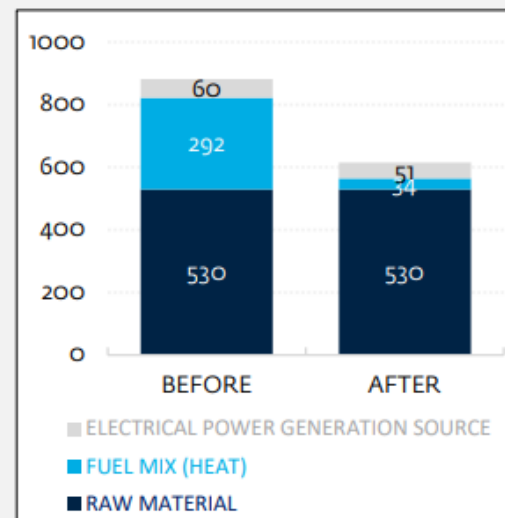
The resulting analysis drives key strategic choices. It identifies anticipated greenhouse gas (GHG) reductions, high-level CAPEX needs, and estimated payback periods. This information then helps create an approximate Marginal Abatement Cost Curve. With these results, IFC's tool can become the basis for decarbonization strategies and new climate-friendly investment projects.

#### The Industry Context Moving to Net Zero

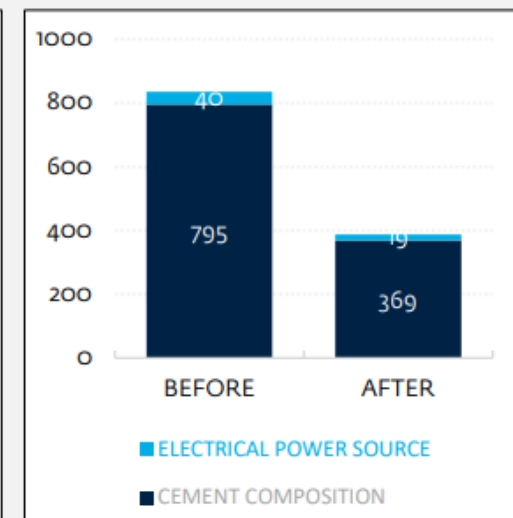
The cement industry is the source of over seven percent of GHG emissions. To reach net zero by 2050, it must decarbonize at a rate of 3 percent per year by 2030, the International Energy Agency estimates.

The first step of becoming a net zero cement producer requires taking a strategic stock of major commercially-proven decarbonization measures, drawing on advisory and investment support from a trusted global partner sharing a client's vision for sustainability, impact, and long-term success.

The charts below show the carbon footprint before and after the decarbonization measures were considered. The CAPEX is estimated at \$70m+ with the simple payback time. Ranging between less than eight years.



**Clinker Production Specific CO<sub>2</sub> Emission Rate (kg CO<sub>2</sub>/t)**



**Cement Production Specific CO<sub>2</sub> Emission Rate (kg CO<sub>2</sub>/t)**

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## IFC ADVISORY FOR IMPROVING SECTOR ENABLING ENVIRONMENT

*IFC advisory also works at the sector level with public stakeholders to identify and address regulatory bottlenecks and barriers to private investment in specific sectors.*

- **Identify regulatory and policy barriers** that may be impeding investment in specific key industries and areas of interest (e.g., decarbonization of the cement and concrete industry)
- **Provide support and technical expertise to public sector entities to implement and enforce recommended reforms**, in coordination with the World Bank (IBRD)
- **Implement advocacy and awareness activities** aimed towards dissemination of key reforms within the public and private sector
- **Develop and/or strengthen public-private dialogue (PPD) structures** to ensure continuity of reform implementation and continuous dialogue between public and private sectors

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EN LA INDUSTRIA DE CEMENTO**

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# IFC ADVISORY FOR IMPROVING SECTOR ENABLING ENVIRONMENT IN THE CEMENT AND CONCRETE SECTOR IN COLOMBIA

*Based on our recent experience in other countries in the region (including Peru and Brazil), potential areas of work in Colombia may include:*

## Key Objectives:

1. Promoting the use and enforcement of existing regulations that will strengthen the decarbonization agenda on both the supply and demand sides
2. Adjust technical standards and regulations to help facilitate production and demand for decarbonized cement and concrete
3. Facilitating dialogue and knowledge to affect consumer demand preferences towards more use of low carbon cement



## To be achieved through targeted advisory activities:

- Increasing current rates of coprocessing (TSR with biomass, RDF, SRF, industrial, municipal, etc.)
- Reducing the clinker factor with cementitious materials (pozzolans, calcined clays, slags,...)
- Affecting public procurement and investment to promote use of low carbon cement and concrete
- Adjusting or enforcing technical standards for low carbon cement

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EN LA INDUSTRIA DE CEMENTO**

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# IFC ADVISORY FOR VOTORANTIM CIMENTOS / BRAZIL

## IFC OFFERING: Advice on Resource Efficiency and GHG Reduction

### A IFC ajuda a promover a descarbonização do setor de cimento com investimento na Votorantim Cimentos

São Paulo, 20 de julho de 2023 — Com o intuito de contribuir para a transição de baixo carbono no setor de cimento no Brasil, a IFC está investindo US\$ 150 milhões na Votorantim Cimentos, uma das principais empresas brasileiras produtoras desse produto. **O investimento da IFC vai ajudar a companhia a atingir a sua meta de reduzir as emissões de gases de efeito estufa (GEE), incentivando o uso de combustíveis alternativos.**

O investimento da IFC, na forma de um **empréstimo vinculado à sustentabilidade, vai ajudar a aumentar a capacidade de coprocessamento da Votorantim Cimentos por meio da modernização da sua fábrica de Salto, localizada no estado de São Paulo, permitindo que a unidade processe diversos resíduos sólidos.** Isso vai ampliar a capacidade da empresa de alcançar níveis mais altos no uso de combustíveis alternativos em vez de combustíveis fósseis. Atualmente, **mais de 30% dos combustíveis usados pela usina de Salto de Pirapora são considerados alternativos, como biomassa, lascas de madeira, pneus usados e combustível derivado de resíduos (CDR).** A previsão é que o projeto dobre a capacidade de uso de combustíveis alternativos da fábrica.

Além do investimento, a IFC vai trabalhar com a Votorantim Cimentos **para ajudar a empresa na estratégia de abastecimento de combustíveis alternativos,** contribuindo para a sua estratégia de posicionamento no mercado para cada unidade de coprocessamento, e vai auxiliar a companhia a alinhar os seus objetivos de redução de emissões segundo o Acordo de Paris, que visa limitar o aquecimento global a bem menos que 2 graus Celsius.

<https://pressroom.ifc.org/all/pages/PressDetail.aspx?ID=27666>



<https://www.votorantimcimentos.com.br/noticia/assinamos-o-contrato-de-financiamento-de-150-milhoes-com-a-ifc/>

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## IFC AND SOCOCIM PARTNER IN LANDMARK DEAL TO BOOST LOW-CARBON CEMENT PRODUCTION IN SENEGAL

Dakar, Senegal, February 27, 2023—IFC has arranged a **€242 million financing package** for Sococim, a subsidiary of French cement maker Vicat S.A. The package comprises a **€120 million loan from IFC's own account** and €122 million equivalent in local currency parallel loans from Société Générale Sénégal, CBAO Groupe Attijariwafa Bank, Banque Internationale Pour Le Commerce et l'Industrie du Sénégal, and Ecobank Sénégal. Société Générale Sénégal has been appointed as the administrative agent to manage the local currency financing with the other lenders.

The company plans to replace part of its current clinker lines with one new fuel-efficient one, utilizing up to 70 percent of alternative fuels and boosting energy efficiency. That will help reduce greenhouse gas emissions by 312,000 tons of CO2 equivalent per year by 2030—enabling Sococim to produce cement with one of the lowest emission rates in the world.

"IFC has been a trusted long-term partner to both Sococim and Vicat. Today, it is helping us create a cleaner and more efficient African cement industry at a time of unprecedented economic and population growth in the region," said Vicat's CEO and Chairman, Guy Sidos.

"IFC's landmark investment in a hard-to-abate sector aims to not only accelerate the decarbonization process in Africa's cement sector, but also drive sustainable development, economic growth, and boost affordable housing development in Senegal and beyond," said IFC Managing Director, Makhtar Diop.

<https://pressroom.ifc.org/all/pages/PressDetail.aspx?ID=27431>



<https://www.afrik21.africa/en/senegal-the-ifc-will-mobilise-e242-million-for-sococims-low-carbon-cement/>

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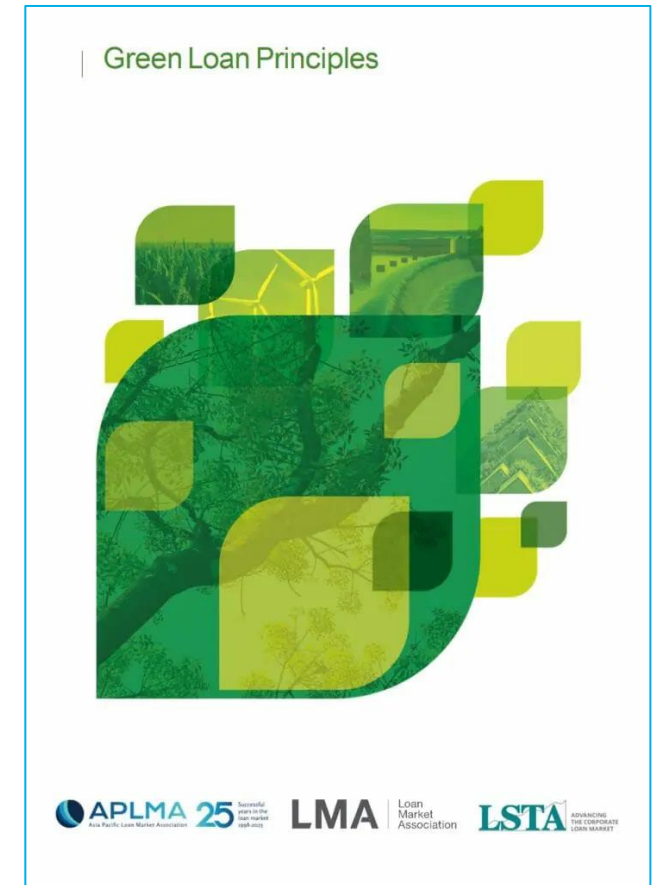
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## WHAT IS AN IFC GREEN LOAN?

*IFC Green Loans are a new product feature where IFC's Loan exclusively finances "Eligible Green Projects" structured in line with the Green Loans Principles (GLP).*

- **Eligible Green Projects:** projects that are included in the Green Loan Principles – meaning those that are Climate - related (Mitigation or Adaptation) as per IFC's Climate Definitions Plus biodiversity & pollution abatement
- **Green Loan Principles:** modelled on Green Bond Principles with four core components:
  1. Use of Proceeds destined exclusively for Eligible Green Projects
  2. Process for Project Evaluation and Selection
  3. Management of Proceeds to ensure they are allocated to Eligible Green Projects
  4. Reporting on use of proceeds and expected impact of Eligible Green Projects



<https://www.lsta.org/content/green-loan-principles/>

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## QUALIFYING ACTIVITIES IN THE CEMENT INDUSTRY FOR GREEN LOANS

### A. Renewable Energy

- Use of or support for wind, solar, RDF or other waste to fuel, biomass, geothermal, biofuels, or other alternative fuels

### B. Energy Efficiency

- **Greenfield**-IFC can recognize best in class high efficiency greenfield cement production, which we define as<sup>1</sup>:
  - Thermal energy consumption in pyro-processing—maximum of 3.0 GJ per ton clinker (and 6 stage pre-heater & pre-calciner); and / or
  - Power system—maximum of 90 kWh of electricity consumption per ton cement. Any of the following technologies are recognized: cement grinding systems using roller presses, vertical roller mills, high efficiency separators, high efficiency and low pressure drop cyclones, power management systems, variable speed drives and advanced automation systems.
- **Brownfield**—Measures that achieve demonstrated energy saving delta as validated by IFC energy efficiency specialists. Capacity upgrade -new capacity replaces existing / old capacity; waste heat recovery (in greenfield or existing capacity); cogeneration, boiler upgrades, or any of the above-mentioned technologies.

### C. Increased use of Blended Cement

### D. Recycling

### E. Water saving measures

### F. “Green” cement or construction materials

### G. Fuel Switch –to less GHG intensive fuels

### H. Carbon capture & storage or utilization

### I. R&D expenditure for climate related or ‘Green’ activity

### J. Green Buildings

Buildings that are LEED, EDGE or equivalent Green Building certification.

### K. Transport –retrofit or replacement of existing fleets or shift to less GHG intensive modes of transport

### L. Afforestation / Deforestation or REDD+ projects

### M. Pollution Abatement

-Reduction of Sulphur and other non-GHG emissions; reduction of dust

### N. Biodiversity preservation

### O. Refinancing of debt used to finance the above activities / assets

1. Per IFC climate definitions