IDB Inter-American Development Bank

Selection process #::::::::

TERMS OF REFERENCE

DESIGN OF A TECHNOLOGY DECARBONIZATION PATHWAY FOR HEAVY INDUSTRY IN MEXICO, BRAZIL, and TRINIDAD AND TOBAGO

Regional: Mexico, Brazil, and Trinidad & Tobago
RG-T3918

[Web link to approved document]

Decarbonization Pathways for the Heavy Industry in LAC

1. Background and Justification

1.1. Industry activities are related to approximately a third of total global emissions. To avoid average global warming of 1.5C compared with pre-industrial levels, it will be necessary to reach net-zero CO2 emissions by 2050. Out of the almost 50 GtCO2e global annual emissions in 2018, industry contributed to 33% of them. Out of this amount, approximately half of it are produced by three key heavy industries only: Iron & Steel, Chemical and Cement. This situation is expected to worsen in the future, since these industries are expected to grow driven by increased urbanization rates and demand for manufactured goods. Besides, these industries are key in the deployment of renewable energy facilities. By 2050, global cement production is expected to increase by 12%, steel production by 30%, and plastics by 150%.

1.2. In the Latin America and the Caribbean (LAC) region, 17.5% of annual total emissions were produced by industrial activities. This is a growth of 66% since 1990. They are mostly originated from manufacturing and construction activities (47%, mostly iron and steel making), and industrial processes (28%, mostly cement and other non-industrial sources). The five countries with the largest emissions from these sectors are Mexico, Brazil, Venezuela, Argentina, Colombia and Chile (Adding together 85% of all the region's industrial emissions), while Trinidad & Tobago holds the largest industrial emissions per capita in the region (4.3 tCO2/capita). The main industrial areas of LAC are the Northeast Atlantic coast of Mexico and the Southeastern coast of Brazil, and Trinidad and Tobago in the Caribbean region. Brazil is the produces roughly half of the steel in the region (9th in the global ranking) producing 32.2 million tons annually, followed by Mexico (18.5 million tons). Brazil also leads the regional production of cement (53.8 million tons), followed again by Mexico (41.8 million).

1.3. Most of these heavy industrial activities are difficult to decarbonize, requiring a

comprehensive plan combining renewable power supply, efficient technologies, cleaner fuels, and carbon capture and storage technologies. While the efficiency in energy consumption is driven by economic incentives and much of the processes have achieved high levels of efficiency, the use of alternative clean fuels and technologies will require further support. This will require close collaboration between the public and the private sector to create an enabling regulatory environment, financial incentives, and research and exchange of information.

1.4. Heavy industry decarbonization is aligned with the Nationally Determined Contributions (NDC) and clean fuel strategies being developed by most countries in LAC. Trinidad and Tobago's NDC aims at achieving a reduction in overall emissions from the industrial, power generation, and transportation sectors by 15% by 2030 from BAU. Brazil commits to reduce greenhouse gas emissions by 37% below 2005 levels in 2025, and by 43% below 2005 levels in 2030. Mexico established an unconditional commitment to reduce its GHG emissions by 22% and 51% of its black carbon emissions by 2030, compared to BAU scenario. Countries in the region are also taking steps towards the development of clean fuel strategies, particularly for green hydrogen.

1.5. In this context, the IDB is seeking to contract firm that could help countries in LAC countries in the design of a technology decarbonization pathway for heavy industry

2. Objectives

2.1. The objective of this consultancy is to assess technologies that can contribute in the decarbonization pathway for heavy industry in LAC.

3. Key Activities

Activity 1: Characterization of the heavy industry sector in beneficiary countries.

- Identification of type of technologies being used in the steel, cement and chemistry industries in LAC, types of furnaces, kilns, crackers, etc.
- Geographical localization of main industrial clusters by economic activity
- Identification of energy consumption patterns, particularly amount an typology of fossil fuels.

Activity 2: Greenhouse gas emissions baselines in heavy industry

- revise existing methodologies to estimate GHG emissions from the industrial sector
- create baselines of emissions for the cement production, iron & steel industry, chemical and petrochemical activities

Activity 3: Identification of most cost-efficient technologies options for the decarbonization of heavy industry in LAC.

- Identify technology options for the decarbonization of LAC's heavy industry, including energy efficiency measures, carbon capture, electrification of facilities, use of cleaner fuels, as well as demand-side actions such as the substitution of steel and cement by alternative construction materials, and carbon capture technologies.
- Analyze benefits and challenges associated with the implementation of such the technologies.
- Estimation of the investment needs that these measures would require
- Estimation of the clean fuel demand (particularly green hydrogen and green ammonia) caused by a wide industrial decarbonization strategy.

The products of this consultancy will be coordinated with the governments of beneficiaries' countries, with national public stakeholders, and with the regional sectoral heavy industry associations such as ALACERO for the iron & steel industry, APLA for the chemistry sector, and FICEM for the cement industry[1].

4. Expected Outcome and Deliverables

- Deliverable 1: Work Plan
- Deliverable 2: Report on the characterization of the heavy industry sector in beneficiary countries.
- Deliverable 3: Report on heavy industry GHG emissions in LAC
- Deliverable 4: Report on cost-efficient technologies options for the decarbonization of heavy industry in LAC.

5. Reporting Requirements

5.1. Every report must be submitted to the corresponding supervisor in an electronic file. The report should include cover, main document, and all annexes. Zip files will not be accepted as final reports, due to Records Management Section regulations; they must be submitted in PDF, Word, Excel or Jpeg formats.

6. Supervision and Reporting

6.1. This consultancy will be supervised by the Mining, Geothermal and Hydrocarbon Special Group at the Infrastructure and Energy Department. All communications will be directed to the Team Leader, Christiaan Gischler (CHRISTIAANG@iadb.org), copying Javier García Fernández (jgarciaf@iadb.org).

[1] ALACERO: Asociación Latinoamericana del Acero, FICEM: Federación Inter-Americana del Cemento, APLA: Latin-American Petrochemical and Chemical Association

7. Schedule of Payments

7.1. Payment terms will be based on project milestones or deliverables. The Bank does not expect to make advance payments under consulting contracts unless a significant amount of travel is required. The Bank wishes to receive the most competitive cost proposal for the services described herein.

7.2. The IDB Official Exchange Rate indicated in the RFP will be applied for necessary conversions of local currency payments.

Payment Schedule	
Deliverable	**%**
Deliverable 1	10%
Deliverable 2	40%
Deliverable 3	25%
Deliverable 4	25%
TOTAL	100%

Selection process #::::::::

TERMS OF REFERENCE

IDENTIFICATION OF OPPORTUNITIES FOR THE DEVELOPMENT OF DEMONSTRATIVE PROJECTS FOR HEAVY INDUSTRY DECARBONIZATION IN IN MEXICO, BRAZIL, and TRINIDAD AND TOBAGO

Regional: Mexico, Brazil, and Trinidad & Tobago
RG-T3918

[Web link to approved document]

Decarbonization Pathways for the Heavy Industry in LAC

8. Background and Justification

8.1. Industry activities are related to approximately a third of total global emissions. To avoid average global warming of 1.5C compared with pre-industrial levels, it will be necessary to reach net-zero CO2 emissions by 2050. Out of the almost 50 GtCO2e global annual emissions in 2018, industry contributed to 33% of them. Out of this amount, approximately half of it is produced by three key heavy industries only: Iron & Steel, Chemical and Cement. This situation is expected to worsen in the future, since these industries are expected to grow driven by increased urbanization rates and demand for manufactured goods. Besides, these industries are key in the deployment of renewable energy facilities. By 2050, global cement production is expected to increase by 12%, steel production by 30%, and plastics by 150%.

8.2. In the Latin America and the Caribbean (LAC) region, 17.5% of annual total emissions were produced by industrial activities. This is a growth of 66% since 1990. They are mostly originated from manufacturing and construction activities (47%, mostly iron and steel making), and industrial processes (28%, mostly cement and other non-industrial sources). The five countries with the largest emissions from these sectors are Mexico, Brazil, Venezuela, Argentina, Colombia and Chile (Adding together 85% of all the region's industrial emissions), while Trinidad & Tobago holds the largest industrial emissions per capita in the region (4.3 tCO2/capita). The main industrial areas of LAC are the Northeast Atlantic coast of Mexico and the Southeastern coast of Brazil, and Trinidad and Tobago in the Caribbean region. Brazil is the produces roughly half of the steel in the region (9th in the global ranking) producing 32.2 million tons annually, followed by Mexico (18.5 million tons). Brazil also leads the regional production of cement (53.8 million tons), followed again by Mexico (41.8 million).

8.3. Most of these heavy industrial activities are difficult to decarbonize, requiring a

comprehensive plan combining renewable power supply, efficient technologies, cleaner fuels, and carbon capture and storage technologies. While the efficiency in energy consumption is driven by economic incentives and much of the processes have achieved high levels of efficiency, the use of alternative clean fuels and technologies will require further support. This will require close collaboration between the public and the private sector to create an enabling regulatory environment, financial incentives, and research and exchange of information.

8.4. Heavy industry decarbonization is aligned with the Nationally Determined Contributions (NDC) and clean fuel strategies being developed by most countries in LAC. Trinidad and Tobago's NDC aims at achieving a reduction in overall emissions from the industrial, power generation, and transportation sectors by 15% by 2030 from BAU. Brazil commits to reduce greenhouse gas emissions by 37% below 2005 levels in 2025, and by 43% below 2005 levels in 2030. Mexico established an unconditional commitment to reduce its GHG emissions by 22% and 51% of its black carbon emissions by 2030, compared to BAU scenario. Countries in the region are also taking steps towards the development of clean fuel strategies, particularly for green hydrogen.

8.5. In this context, the IDB is seeking to contract firm that could help the IDB and beneficiary countries in identifying potential demonstrative projects for heavy industry decarbonization in LAC.

9. Objectives

9.1. The objective of this consultancy is to identify possible demonstrative projects for heavy industry decarbonization in LAC

10. Key Activities

Activity 1: Identification of opportunities for the development of demonstrative projects for heavy industry decarbonization in LAC

- identify the most suitable industry clusters among selected countries
- analyze technical and regulatory environment in beneficiary countries, assessing those more conducive for testing decarbonization measures in heavy industry
- Among identified clusters and countries, propose at least three demonstrative projects that could be developed in subjects such as clean fuel adaptation, carbon capture or energy efficiency
- estimate expected investment requirements for those demonstrative projects previously identified

- carry out a high-level cost-benefit analysis and the possibilities of integrating a circular economy approaching those projects,
- propose most suitable financial mechanisms to scale up these demonstrative projects and incentivize the adoption of this new technologies among industrial stakeholders.
- identify international multilateral and bilateral financing sources allocating funds to promote industry decarbonization measures.

The products of this consultancy will be coordinated with the governments of beneficiaries' countries, with national public stakeholders, and with the regional sectoral heavy industry associations such as ALACERO for the iron & steel industry, APLA for the chemistry sector, and FICEM for the cement industry[2].

11. Expected Outcome and Deliverables

- Deliverable 1: Work Plan
- Deliverable 2: Draft report for the identification of opportunities for the development of demonstrative projects for heavy industry decarbonization in LAC
- Deliverable 3: Final report for the identification of opportunities for the development of demonstrative projects for heavy industry decarbonization in LAC

12. Reporting Requirements

12.1. Every report must be submitted to the corresponding supervisor in an electronic file. The report should include cover, main document, and all annexes. Zip files will not be accepted as final reports, due to Records Management Section regulations; they must be submitted in PDF, Word, Excel or Jpeg formats.

13. Supervision and Reporting

13.1. This consultancy will be supervised by the Mining, Geothermal and Hydrocarbon Special Group at the Infrastructure and Energy Department. All communications will be directed to the Team Leader, Christiaan Gischler (CHRISTIAANG@iadb.org), copying Javier García Fernández (jgarciaf@iadb.org).

14. Schedule of Payments

14.1. Payment terms will be based on project milestones or deliverables. The Bank does not expect to make advance payments under consulting contracts unless a significant amount of travel is required. The Bank wishes to receive the most competitive cost

[2] ALACERO: Asociación Latinoamericana del Acero, FICEM: Federación Inter-Americana del Cemento, APLA: Latin-American Petrochemical and Chemical Association

proposal for the services described herein.

14.2. The IDB Official Exchange Rate indicated in the RFP will be applied for necessary conversions of local currency payments.

Payment Schedule	
Deliverable	**%**
Deliverable 1: Work Plan & Methodology	10%
Deliverable 2	40%
Deliverable 3	50%
TOTAL	100%

Selection process #::::::::

TERMS OF REFERENCE

GUIDELINES FOR POLICY AND REGULATION-MAKING TO INCENTIVIZE THE DECARBONIZATION OF HEAVY INDUSTRY IN MEXICO, BRAZIL, and TRINIDAD AND TOBAGO

Regional: Mexico, Brazil, and Trinidad & Tobago
RG-T3918

[Web link to approved document]

Decarbonization Pathways for the Heavy Industry in LAC

15. Background and Justification

15.1. Industry activities are related to approximately a third of total global emissions. To avoid average global warming of 1.5C compared with pre-industrial levels, it will be necessary to reach net-zero CO2 emissions by 2050. Out of the almost 50 GtCO2e global annual emissions in 2018, industry contributed to 33% of them. Out of this amount, approximately half of it is produced by three key heavy industries only: Iron & Steel, Chemical and Cement. This situation is expected to worsen in the future, since these industries are expected to grow driven by increased urbanization rates and demand for manufactured goods. Besides, these industries are key in the deployment of renewable energy facilities. By 2050, global cement production is expected to increase by 12%, steel production by 30%, and plastics by 150%.

15.2. In the Latin America and the Caribbean (LAC) region, 17.5% of annual total emissions were produced by industrial activities. This is a growth of 66% since 1990. They are mostly originated from manufacturing and construction activities (47%, mostly iron and steel making), and industrial processes (28%, mostly cement and other non-industrial sources). The five countries with the largest emissions from these sectors are Mexico, Brazil, Venezuela, Argentina, Colombia and Chile (Adding together 85% of all the region's industrial emissions), while Trinidad & Tobago holds the largest industrial emissions per capita in the region (4.3 tCO2/capita). The main industrial areas of LAC are the Northeast Atlantic coast of Mexico and the Southeastern coast of Brazil, and Trinidad and Tobago in the Caribbean region. Brazil is the produces roughly half of the steel in the region (9th in the global ranking) producing 32.2 million tons annually, followed by Mexico (18.5 million tons). Brazil also leads the regional production of cement (53.8 million tons), followed again by Mexico (41.8 million).

15.3. Most of these heavy industrial activities are difficult to decarbonize, requiring a

comprehensive plan combining renewable power supply, efficient technologies, cleaner fuels, and carbon capture and storage technologies. While the efficiency in energy consumption is driven by economic incentives and much of the processes have achieved high levels of efficiency, the use of alternative clean fuels and technologies will require further support. This will require close collaboration between the public and the private sector to create an enabling regulatory environment, financial incentives, and research and exchange of information.

15.4. Heavy industry decarbonization is aligned with the Nationally Determined Contributions (NDC) and clean fuel strategies being developed by most countries in LAC. Trinidad and Tobago's NDC aims at achieving a reduction in overall emissions from the industrial, power generation, and transportation sectors by 15% by 2030 from BAU. Brazil commits to reduce greenhouse gas emissions by 37% below 2005 levels in 2025, and by 43% below 2005 levels in 2030. Mexico established an unconditional commitment to reduce its GHG emissions by 22% and 51% of its black carbon emissions by 2030, compared to BAU scenario. Countries in the region are also taking steps towards the development of clean fuel strategies, particularly for green hydrogen.

15.5. In this context, the IDB is seeking to contract firm that could help countries in LAC countries analyzing key regulatory barriers for the development of an industrial decarbonization program in beneficiary countries and propose a strategy to overcome them.

16. Objectives

16.1. The objective of this consultancy is to develop guidelines for policy and regulation-making to incentivize the decarbonization of heavy industry in Mexico, Brazil and Trinidad & Tobago.

17. Key Activities

Activity 1: Development of guidelines for policy and regulation-making to incentivize the decarbonization of heavy industry.

- Analysis of key regulatory barriers for the development of an industrial decarbonization program in beneficiary countries The key barriers to be analyzed will be those limiting the incentives for the adoption of new technologies by industrial stakeholders, limiting the adoption of new energy sources such as clean fuel, and limiting the availability of financial resources to implement these decarbonization measures.
- Propose recommendations for
    - The design of national strategies for the decarbonization of heavy industry,
    - the development of technology and safety standards regarding the use of clean fuels and electrification measures in heavy industry processes,
    - the development of clean labelling systems for industrial products.

The products of this consultancy will be coordinated with the governments of beneficiaries' countries, with national public stakeholders, and with the regional sectoral heavy industry associations such as ALACERO for the iron & steel industry, APLA for the chemistry sector, and FICEM for the cement industry[3].

18. Expected Outcome and Deliverables

- Deliverable 1: Work Plan
- Deliverable 2: Draft report for guidelines for policy and regulation-making to incentivize the decarbonization of heavy industry.
- Deliverable 3: Final report for guidelines for policy and regulation-making to incentivize the decarbonization of heavy industry.

19. Reporting Requirements

19.1. Every report must be submitted to the corresponding supervisor in an electronic file. The report should include cover, main document, and all annexes. Zip files will not be accepted as final reports, due to Records Management Section regulations; they must be submitted in PDF, Word, Excel or Jpeg formats.

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21. Schedule of Payments

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21.2. The IDB Official Exchange Rate indicated in the RFP will be applied for necessary conversions of local currency payments.

Payment Schedule	
Deliverable	**%**
Deliverable 1: Work Plan & Methodology	10%

[3] ALACERO: Asociación Latinoamericana del Acero, FICEM: Federación Inter-Americana del Cemento, APLA: Latin-American Petrochemical and Chemical Association

Deliverable 2	40%
Deliverable 3	50%
TOTAL	100%