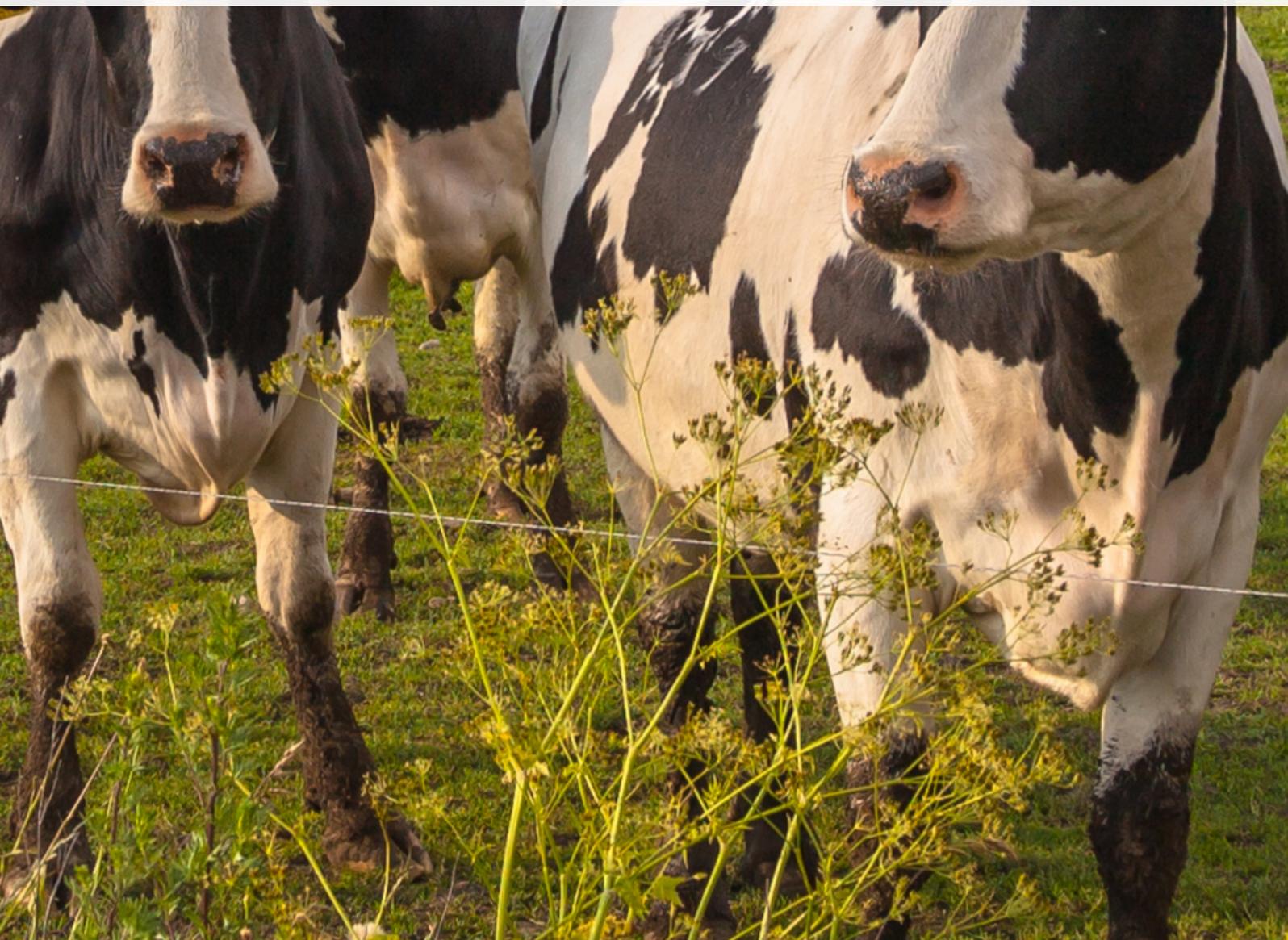




GUARANTEE FUND FOR BIOGAS

INSTRUMENT ANALYSIS
SEPTEMBER 2021



Guarantee Fund for Biogas

LAB INSTRUMENT ANALYSIS

September 2021

DESCRIPTION & GOAL —

The Guarantee Fund for Biogas will provide construction-phase loan guarantees to biogas project developers in Brazil, enabling existing credit lines for the sector

SECTOR —

Renewable energy

FINANCE TARGET —

Independent biogas project developers and their respective value chains

GEOGRAPHY —

For pilot phase: States of Mato Grosso, Minas Gerais, Paraná, Santa Catarina, and São Paulo in Brazil

At scale: Rio de Janeiro, Goiás and Pernambuco

The Lab identifies, develops, and launches sustainable finance instruments that can drive billions to a low-carbon economy. The 2021 Lab cycle targets three specific sectors: sustainable food systems, sustainable energy access, and sustainable cities, in addition to two regions: Brazil and Southern Africa.

AUTHORS AND ACKNOWLEDGEMENTS

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SUMMARY

Biogas is a renewable non-intermittent energy source that has the natural potential to produce up to 40% of the Brazil's electric energy demand and replace 70% of its diesel consumption. Although credit lines for biogas projects are plenty in the country, Brazil's independent biogas developers (not linked to large groups) lack the required collateral to enable project loans.

The Guarantee Fund for Biogas (GFB) will be the first guarantee fund in Brazil with an environmental focus. By providing short-term collateral for biogas project loans, it aims to unlock public and private finance for one of the most promising renewable energy sources in the country.

The instrument adheres to all Lab criteria:

- **Innovative:** First environmental guarantee fund in Brazil, targeting private investors that seek to leverage existing credit lines for biogas projects. It is an opportunity for investors to not only foster biogas adoption in Brazil, but also kick-start the country's market for environmental guarantee funds.
- **Financially sustainable:** Provides appropriate returns for investors and charges below market-level fees from clients. Initial guarantee exposure will be equal or lower to fund's equity, but as a track-record is established, fund will be able to leverage up to 3 times its resources as collateral.
- **Catalytic:** Initial pilot will leverage USD 26.5 million in private investments and USD 26.5 million in concessional capital, enabling USD 67 million in loans in its first year (guarantees averaging 80% of loan value) and USD 271 million along its 10-year lifespan
- **Actionable:** The instrument will be constituted as a CVM compliant fixed-income fund (investment in treasury bills only) and will post its shares as collateral for biogas loans. This is an innovative structure that does not require any changes in regulation.

Next steps: Looking forward, the proponents will further develop the Fund's underwriting criteria, further validate its model with project lenders and lawyers, as well as seek a fund manager for the instrument.

TABLE OF CONTENTS

SUMMARY	3
CONTEXT.....	5
CONCEPT	6
1. Instrument Mechanics.....	6
2. Innovation	7
2.1 Barriers Addressed: GFB will help unlock loans for biogas projects that currently lack collateral	7
2.2 Innovation: The first environmental guarantee fund in Brazil	8
2.3 Challenges to Instrument Success.....	8
MARKET TEST AND BEYOND	10
3. Implementation Pathway and Replication.....	10
3.1 Pilot Scope and Initial Pipeline.....	10
3.2 Pilot Implementation and Pathway	11
3.3 Scale-up Strategy	11
4. Financial Impact and Sustainability	12
4.1 Quantitative Modeling	12
4.2 Private Finance Mobilization and Replication Potential.....	13
5. Environmental and Socio-economic Impact	13
5.1 Environmental Impact.....	14
5.2 Social and Economic impact	15
NEXT STEPS	16
REFERENCES	17

CONTEXT

Biogas is a renewable energy and fuel source that is currently limited by guarantee requirements from project lenders

Brazil has the highest natural potential in the world for biogas: 17 GW of electric energy and 43.2 billion Nm³/year of bio methane, leveraging an abundance of waste products from sugar (48.9%), animal protein (29.8%), other agricultural sub products (15.3%), and urban solid waste (6%), that would otherwise be disposed in landfills or eventually be burned (making up ~37% of the agricultural sector current CO₂e emissions). This means that biogas has the potential to fulfill almost 40% of the country's electric energy demand and replace up to 70% of its diesel consumption, while delivering solid environmental results¹.

The Brazilian federal government recognized the potential of biogas with regards to its contribution to energy security, market predictability, and mitigation of GHG emissions with the creation of Renovabio, a state program that works within 3 main axes: 1) carbon mitigation goals; 2) certification of biofuel production; and 3) issuance of carbon credits (CBIO). In 2020 the Renovabio market was able to mobilize over USD 120 million through the commercialization of around 15 million CBIOs².

Brazil's current biogas capacity of 300 MW is highly concentrated in projects developed by large groups using a vertically integrated business model (usually large fuel distributors handle procurement, operation and distribution). This limits the expansion of biogas in Brazil, as seen by its low adoption in the country (under 0.1% of the energy matrix). On the other hand, there is an ecosystem of independent developers who operate in more flexible business models (dividing ownership, procurement and operation between different players), with the potential to unlock substantial volumes for the sector. An initial assessment of only a portion of these developers points to double the country's current installed capacity within 2 years.

Although there are different public and private credit lines that could offer loans for biogas projects, independent biogas project developers are limited by guarantee requirements from lenders, who often demand real-estate or cash guarantees of up to 120% of the loan value. Projects that are already operational often have energy and fuel off-take agreements that can be utilized as collateral. However, these agreements are seldom present during the construction phase of the projects (up to 2 years), and independent developers lack the assets to cover such pre-operational collateral requests.

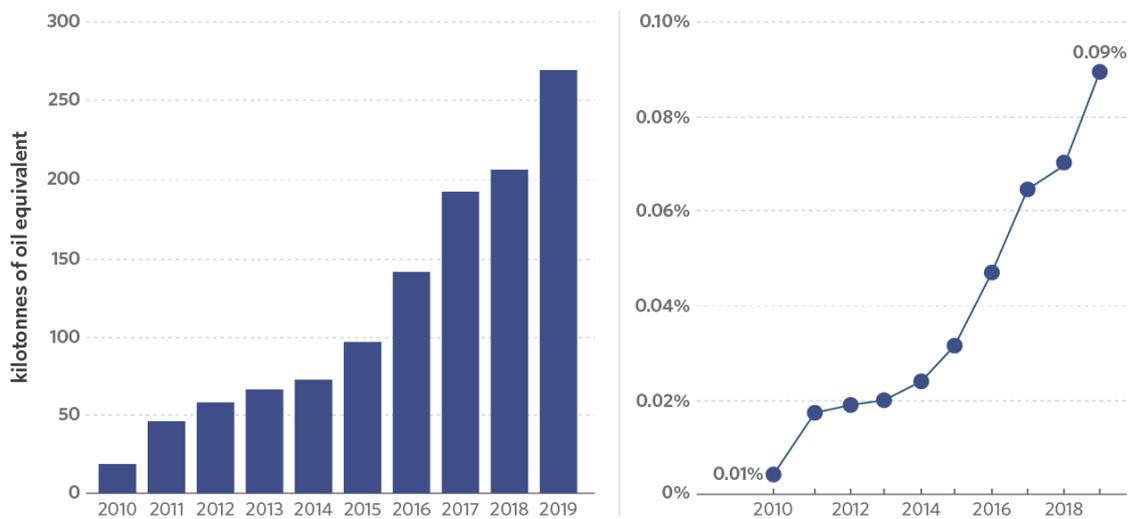
The Guarantee Fund for Biogas (GFB) will set-up a guarantee structure that will enable independent project developers to utilize existing credit lines and unlock more private and public capital for the sector.

Proponent Abiogás is the largest association of developers, suppliers, and clients of the biogas industry in Brazil. It was founded in 2013 with the goal of acting as a liaison between industry, government, and society. The proponent's ability to mobilize different industry actors is instrumental in building and maintaining a sustainable project pipeline for the fund.

¹ https://abiogas.org.br/wp-content/uploads/2021/01/Infograficos-Abiogás_D_2021-1.pdf

² <https://www.gov.br/mme/pt-br/assuntos/noticias/renovabio-e-sucesso-em-2020-e-traz-novas-perspectivas-para-o-mercado-de-biocombustiveis-em-2021>

Figure 1: Biogas volumes in Brazil and its share of internal energy supply



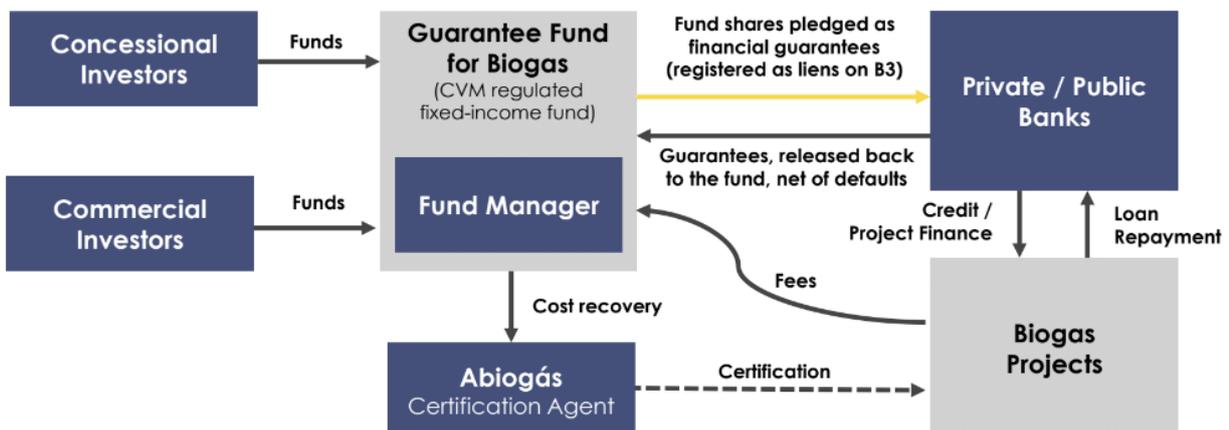
1. INSTRUMENT MECHANICS

GFB will scale up the implementation of biogas projects in Brazil by delivering direct guarantees to unlock existing credit lines

The GFB seeks to unlock existing public and private credit lines for independent biogas project developers. It will do so by providing financial guarantees for project loans. The instrument will be set-up as a closed fixed-income fund (art. 113 of CVM Instruction nº 555) that will invest solely in Brazilian treasury bills, pledging its shares as collateral.

The fund will invest up to 100% of its resources on Brazilian treasury bills, ensuring a sovereign-level risk to underlying assets. For each operation the Fund will charge a yearly fee from biogas developers, which will be its main source of revenues. In return, the Fund will pledge its shares as financial guarantees for project loans.

Figure 2: Guarantee Fund for Biogas instrument mechanics.



These guarantees will be registered as liens in B3, Brazil's main financial infrastructure company, acting as a public registry (formerly CETIP). This means that mobilized resources cannot be utilized for any other purpose, ensuring a solid lien and mitigating guarantee recovery risk for project lenders.

Once the guarantees are in place, lenders will then provide credit or project finance for biogas developers. Guarantees will be released once loans are repaid and/or developers are able to secure off-take agreements or other assets which can be pledged as collateral.

The Fund will provide annual yields for senior tranche investors, while concessional investors are expected to be repaid at the end of the fund's 10-year lifespan. Due to the revolving nature of the guarantees, during these 10 years the fund will be able to pledge its resources many times over. That, combined with the fund's ability to leverage up to 3 times its resources once a track-record is established, means the fund has the potential to generate increasingly higher impact on the sector.

The fund's registration, day-to-day operations, and capital raising will be led by an asset management company with experience in credit operations and broad market reach. Proponent Abiogás will work alongside this manager to attest for the financial, environmental, and market suitability of selected projects. As a non-for-profit association, Abiogás will charge the Fund only the costs associated with this service.

2. INNOVATION

GFB will be the first environmental guarantee fund in Brazil and the first to focus on the biogas industry

2.1 BARRIERS ADDRESSED: GFB WILL HELP UNLOCK LOANS FOR BIOGAS PROJECTS THAT CURRENTLY LACK COLLATERAL

The GFB addresses three main barriers to the adoption of biogas projects in Brazil:

- 1. Lack of collateral of biogas project developers.** Independent developers lack the collateral required to access existing public and private credit lines. The fund will set-up a simple guarantee structure, enabling access to these credit lines and unlocking substantial capital for the sector.
- 2. Biogas is sometimes perceived as an unreliable energy source, with potential food security issues.** However, the Fund will work solely with projects that take their inputs from agricultural and urban solid waste. This means a stable and risk-free supply of organic inputs that would otherwise be disposed in landfills or burned. Proponent Abiogás will oversee all operations using international standards for biogas efficiency and carbon emissions.
- 3. Guarantee funds can be costly and often uneconomical, charging fees that may derail credit operations.** A blended finance structure will help keep fees low for developers, while still providing market returns for senior tranche investors. The substitution of real-estate collateral for quasi-cash guarantees will enable lower interest rates on debt operations.

2.2 INNOVATION: THE FIRST ENVIRONMENTAL GUARANTEE FUND IN BRAZIL

The GFB will be the first environmental guarantee fund in Brazil. Currently the Brazilian market presents several commercial and subsidized credit lines that cater to biogas projects. As seen below, BNDES (the Brazilian national development bank), alongside local development banks, offers some of these lines. However, all credit lines require some form of collateral, which often prevents smaller independent developers from accessing them. The most relevant guarantee fund in Brazil, the FGI, is a BNDES-managed fund with broad market focus but that still presents limitations for biogas developers.

Instrument	Limitation	GFB Differential
FGI (BNDES)	General guarantee fund charging 5% for 80% guarantees. Limited to projects up to R\$ 10 M (~1MW) and requires fixed assets as 'sub-collateral'	Focus on biogas, higher upper limit and has no sub-collateral requirements
Linha Economia Verde (Desenvolve SP)	Perceived as costly at ~SELIC +6.36% and limited to Sao Paulo state	Leverages concessional capital and quasi-cash guarantees to lower fund costs and credit rates
Energia Renovavel (BRDE)	Restricted to the South region of Brazil and demands up to 120% in guarantees	Satisfies guarantee requirements demanded by existing credit lines
FINEM, FINAME, FUNDO CLIMA, FUNDO ABC (BNDES)	Require up to 80% in guarantees, which are usually unavailable	

2.3 CHALLENGES TO INSTRUMENT SUCCESS

- 1. Credit risk:** the Fund may experience higher than expected defaults, substantially affecting returns. Biogas projects may face disruptions of cash flow from (i) lack of inputs due to crop failure, (ii) interruption of operations due to low infrastructure maintenance or mismanagement, and (iii) lack of off-takers, which provide the revenues for the projects.
 - In order to mitigate this risk, the GFB will do a strict selection of its projects applying the criteria of ratability, stability, and efficiency. This will be done by the fund manager, in partnership with Abiogás.
 - Concessional capital will be deployed on a first-loss tranche of the Fund (50% of capital), that will absorb initial defaults.
 - Finally, the project portfolio will be highly diversified in its types of investments (bio digestion, purification), regions, and inputs.
- 2. Feasibility risk:** fees charged by the Fund may be too costly for developers. Once added to the cost of loans, guarantee fees may render some projects unfeasible, especially those who seek commercial (non-subsidized) credit lines.

- To mitigate this risk, the blended finance structure will accommodate below-market rates of return, which will impact fees favorably.
- Also, the instrument will be set-up as a fixed-income fund with a low underlying risk in its investments.

3. Pipeline risk: the Fund may not be able to build a pipeline large enough to allocate its resources. While there is no shortage of biogas projects in Brazil, many of those may fall short of the Fund's criteria for investment.

- To ensure a sustainable pipeline, Abiogás, who is comprised of over 70 companies in the biogas sector, will work actively in marketing the GFB as a solution for project developers. By tapping into this network, Abiogás was already able to produce a USD 193 million pipeline over a short 2-month period.
- Moreover, the Fund will enter into partnerships with public and private lenders, who will also act as a source of pipeline.

4. Guarantee replacement risk: developers might be unable to secure proper off-take agreements to replace the guarantees provided by the Fund

- The GFB will require developers to present a list of potential off-takers (possibly with signed Letters of Intention) before guarantees are pledged.
- Developers will be required to apply a standard off-take agreement, which will be developed by the fund in conjunction with potential lenders.
- The guarantee contract will include a substantial fee increase in the event of a failure to replace the fund's guarantees after 2 years.

The risk assessment analysis is summarized in the table below:

Credit Risk	Feasibility Risk	Pipeline Risk	Guarantee Replacement Risk
Defaults may substantially affect returns for investors	Charges become uneconomical for developers	Pipeline isn't large enough to allocate Fund's resources	Developers are unable to replace guarantees
Technical Advisory Board oversees all projects	Blended finance structure lowers overall cost of capital	Abiogás will work in marketing the GFB as a solution for project developers	List of potential off-takers is required before guarantees are pledged
Concessional capital will be used as a First-Loss tranche	GFB will be set-up as a fixed-income fund with a low underlying risk	Fund will seek partnerships with public and private lenders	Standard off-take agreement developed with potential lenders
Diversification of projects			Fee increases if guarantees are not replaced after 2 years

MARKET TEST AND BEYOND

3. IMPLEMENTATION PATHWAY AND REPLICATION

Pilot fund will target agriculture waste inputs to enable an initial loan portfolio of USD 67 million, that will reach up to USD 271 million in 10 years

3.1 PILOT SCOPE AND INITIAL PIPELINE

An initial pipeline assessment was made by analyzing a portfolio of USD 193 million in credit operations, consisting of 33 existing projects, and adding up to 83 MW of electricity generation capacity and 419 thousand m³/day of bio methane, sourced mainly from Abiogás' base of developers.

Projects were then screened by ratability, stability and efficiency resulting in a total of 16 selected projects, or USD 67 million in credit operations and 29 MW of electricity generation capacity and 194 thousand m³/day of bio methane in the Fund's first year. Individual project guarantees, capped at 10% of each project, will range from USD 530 thousand to USD 6 million with a regional focus on Santa Catarina, Paraná, São Paulo, Mato Grosso, and Minas Gerais states. The portfolio will present a combination of bio digestion projects (avg. capex/MW of USD 500 thousand) and 'complete' projects, with both bio digestion and purification (avg. capex/MW of USD 1.8 million).

Also, considering that the Fund will initially pledge up to 100% of its capital in guarantees and will cover 80% of the loans addressed (as per current lenders' guarantee requirements), an initial fundraising of USD 53 million will cover the guarantees required for USD 67 million of credit in its first year and, through its revolving structure, USD 271 million over 10 years (amounting to 75 MW of electricity generation capacity and 554 thousand m³/day of bio methane throughout its lifespan). Additional leverage will be achieved once a track-record is proven and portfolio diversification allows for measurable risk mitigation

Projects that utilize solid waste from urban landfills as inputs were screened out of the instrument's pilot. These projects do not require bio digesters and, therefore, demand lower investments (per MW), which makes them more bankable and less demanding of external guarantees. Also, since urban landfills are considered to have a negative environmental impact, these projects are perceived as less climate-friendly and less appealing to climate-related investors.

Figure 3: Target areas for the GFB pilot



3.2 PILOT IMPLEMENTATION AND PATHWAY

The instrument is expected to achieve the following milestones in its pathway to implementation:

1. **Alignment of key stakeholders:** lenders, fund manager, developers
2. **Rating:** align rating practices with agencies and adjust pipeline accordingly
3. **Fundraising:** roadshow with potential investors to fundraise for initial pilot of USD 53 million
4. **First closure:** establish fund within art. 113 of CVM Instruction n° 555 and initiate deployment of resources
5. **Increase leverage:** track record and portfolio risk mitigation allow for guarantee exposure to rise above equity
6. **Phase-out of concessional capital:** as the fund proves to be self-sustainable, public capital will be phased-out and replaced by private investors

3.3 SCALE-UP STRATEGY

Once the GFB achieves a sustainable track record and is able to obtain favorable ratings due to portfolio diversification, the fund manager will be able to raise the guarantee exposure, pledging up to three times the Fund's capital in guarantees. As a benchmark, the FGI, managed by BNDES, is able to leverage up to 7 times its equity in guarantees. However, the FGI is backed by the Brazilian government and, thus, achieves a much higher rating than a private guarantee fund. The projection of leveraging the GFB at 3 times its equity considers the limitation of private funds and its innovative aspect.

Once achieved, this leveraged structure will enable the fund to guarantee a total of USD 813 million in credit demand throughout a 10-year lifespan, utilizing the same starting capital of USD 53 million. The current pipeline points to additional projects in Rio de Janeiro, Paraíba, and Pernambuco.

4. FINANCIAL IMPACT AND SUSTAINABILITY

4.1 QUANTITATIVE MODELING

The GFB was modelled as a revolving guarantee fund whereby a filtered pipeline of projects informs the initial demand for guarantees and, consequently, the initial size of the fund (see section 3.1). The fund's liabilities are constituted by a first-loss tranche of 50% of the fund's capital – funded by concessional investors – and a senior tranche of 50% of the fund's capital – funded by commercial agents. Initially, guarantees are deployed on a schedule of R\$ 10 million per month, reaching the fund's total capital within two years. Guarantees are then released back into the fund net of their related defaults, two years after they are pledged (considering an average two-year construction period of biogas projects).

The fund's main revenues stem from (i) interests on its cash position, as lenders do not require carry value on their collateral, and (ii) a guarantee fee, which is paid yearly for each newly pledged guarantee. Its main costs consist of (i) the return to senior tranche investors, (ii) the manager's administration fee, (iii) the cost of registering and maintaining guarantees with B3 (see section 1), (iv) defaults on loans, and (v) other set-up and fund maintenance costs. Below are the main financial assumption and results for the pilot instrument:

- Main financial assumptions for the pilot – baseline scenario:

Input	Value
First-Loss Tranche	50% of fund capital
Avg. Guarantee Term	24 months
Annual Guarantee Fees	2.5% of outstanding guarantees
Estimated Default	2% per year
Minimum Cash on Fund	R\$ 1 million
Administration Fee	1% per year
Abiogás Cost Recovery	1% per year

- Main financial results for the pilot – baseline scenario:

Result	Value
IRR – First-Loss Tranche	4%
IRR – Senior Tranche	CDI + 6%
Avg. Exposure per Project	6.3%
Loans Enabled – year 1	USD 67 million
Loans Enabled – lifetime	USD 271 million

As seen above, the baseline scenario for the fund considers 2.5% yearly in guarantee fees, which were set using the FGI as a benchmark. Moreover, defaults were set at 2% per year, considering the historic track record of non-payments for biogas projects.

The GFB can provide senior investors with an annual return of CDI + 6%. While the subordinate tranche is expected to realize a yearly return of 4%.

The pilot phase is expected to leverage USD 67 million in credit operations in its year 1, and approximately USD 271 million throughout its 10-year lifetime, considering the proposed revolving structure.

4.2 PRIVATE FINANCE MOBILIZATION AND REPLICATION POTENTIAL

In its initial pilot the GFB is expected to raise USD 53 million from commercial and concessional sources, as explained below:

Pilot	Investment Opportunity	Type of Capital
First-Loss Tranche	USD 26.5 million	Concessional Investors
Senior Tranche	USD 26.5 million	Commercial Investors
Total Pilot	USD 53 million	-

Although the instrument can be replicated in any country that has a substantial potential for biogas production from agricultural waste and a solid credit market for biogas projects, due to the immense opportunity presented in the Brazilian market alone, the replication analysis kept the instrument's focus in its home country.

Considering that 10% of the country's biogas potential for electric energy can be addressed by the instrument (1.7 GW), replication would enable USD 6.1 billion in loans, which would require USD 401 million in investments to be deployed along 10 years. Replication is expected to happen after the instrument is able to increase its guarantees-to-equity leverage.

5. ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACT

Biogas projects generate relevant social and environmental impact – emitting 96% less CO₂e than the current Brazilian energy matrix, which amounts to 348,000 ton CO₂e mitigated per year already on the pilot phase

The pilot instrument will enable approximately 45 projects and mitigate up to 348,000 ton CO₂e per year over its first 10 years. At scale, the instrument is expected to mitigate three times as much, while the replicated portfolio (addressing 10% of the Brazilian biogas potential) would reduce emissions by 7.8 million ton CO₂e per year.

	Pilot	At Scale	Replication
Fund Capital	USD 53 million	USD 53 million	USD 401 million
Loans Enabled – year 1	USD 67 million	USD 200 million	USD 1.5 billion
Loans Enabled – lifetime	USD 271 million	USD 813 million	USD 6.1 billion
Guarantee Exposure	Up to 100% of capital	Up to 300% of capital	Up to 300% of capital
Total Amount of Projects – 10 years	45	134	1008
Total Energy Generation Capacity	75 MW	226 MW	1.7 GW
Tons of CO ₂ e Mitigated Per Year	348 thousand	1 million	7.8 million
Temporary Jobs Created	1,053	3,160	23,800
Permanent Jobs Created	211	632	4,760

5.1 ENVIRONMENTAL IMPACT

Embrapa's Renovacalc³ informs the total emissions for biogas projects, which stands at 0.0045 ton CO₂e per MWh related to energy generation and 0.0054 ton CO₂e per MWh of biomethane produced. These numbers were vetted with the World Biogas Association.

Considering that the pilot will enable 75 MW of energy capacity over its 10-year lifetime or an average of 1,580 GWh per year, carbon mitigation is expected to be approximately 348 thousand tons of CO₂e every year. At scale, the instrument will be able to increase its guarantee exposure, leading to a total of 1 million tons of CO₂e mitigated per year. Once the replication stage is achieved, carbon mitigation will stand at 7.8 million ton CO₂e per year.

These figures compare biogas emissions against the Brazilian energy mix. However, due to its low intermittence, biogas is often perceived as a substitute for the higher emitting energy sources, such as thermal. A comparison against these sources would lead to much higher carbon mitigation. Moreover, the Brazilian Company for Energy Research (EPE) estimates that the country will shift towards higher emitting sources which, by 2030, will make up 52% of the country's energy mix. This will improve the comparative impact and mitigation metrics of biogas projects⁴.

Biogas projects also have a positive impact on the management of animal waste and burning of agricultural residues, which correspond to approximately 37% of the CO₂e

³ Empresa Brasileira de Pesquisa Agropecuária (Embrapa) is a reputed governmental research institution that supported the development of the RenovaBio programme – Renovacalc is a carbon calculator developed for this programme

⁴ <https://www.epe.gov.br/pt/publicacoes-dados-abertos/publicacoes/plano-decenal-de-expansao-de-energia-2030>

emissions of the agricultural sector mapped by SEEG Brazil⁵. Unlike other parts of the world, nearly all biogas produced in Brazil takes its inputs from waste – urban or agricultural. Therefore, biogas projects in the country carry low risk to food security.

5.2 SOCIAL AND ECONOMIC IMPACT

Biogas also brings the possibility of generating new jobs in a decentralized way and become an alternative income for producers in rural areas, whether by selling energy, by compensating their energy consumption, or by the commercialization of bio fertilizer that is generated in the bio digestion process.

According to the International Renewable Energy Agency (IRENA), each MW of biogas generation installed creates 2.28 direct jobs in the operation and maintenance of the plant. Moreover, the World Biogas Association⁶ estimates 14 temporary jobs are directly created to design, develop, and build a plant. These numbers increase when considering the indirect jobs linked to the design, construction, and operation of solutions for the management of waste that will be used in bio digestion.

The GFB is aligned and contributes to achieving several of the Sustainable Development Goals (SDGs), including:

SDG 7 – Affordable Clean Energy: the instrument contributes to the production of clean and affordable energy, emitting 96% CO₂e than the current Brazilian energy matrix and potentially addressing 40% of Brazil's electric energy demand and 70% of its diesel consumption.

SDG 8 – Decent Work and Economic Growth: by supporting an ecosystem of independent developers who operate in more flexible business models, the GFB will engage with a diversified group of stakeholders and suppliers, expanding the biogas market outreach and decentralizing its capacity to create direct and indirect jobs in other regions of the country.

SDG 12 – Responsible Consumption and Production: unlike other parts of the world, the biogas industry in Brazil poses no threat to the national food security since it takes its inputs solely from waste – urban or agricultural – that would otherwise be disposed in landfills or burned.

SDG 13 – Climate Action: the instrument has the potential to significantly decrease the CO₂e emissions of the Brazilian energy matrix. Not only it emits 96% less carbon than the current matrix (e.g., 348-thousand-ton CO₂e mitigated per year already on the pilot phase), but it also takes its inputs solely from urban and agricultural waste (as an example, waste burning represents 37% of the agricultural sector's emissions). Finally, biomethane is also a sustainable alternative to Brazil's diesel consumption.

⁵ The Greenhouse Gas Emission and Removal Estimation System (SEEG) is an initiative of the Climate Observatory that comprises the production of annual estimates of greenhouse gas (GHG) emissions in Brazil. The SEEG methodology was published in the scientific journal NATURE in 2018.
<http://seeg.eco.br/>

⁶ <https://www.worldbiogasassociation.org/pathwaysto2030/>

NEXT STEPS

Recommended next steps for the GFB proponents include:

- Discuss guarantee terms with lenders
- Validate structure with Da Fonte – law firm providing pro bono work for the Fund
- Develop relationship with fund managers and select partner
- Roadshow with potential concessional investors
- Set-up underwriting criteria and develop Abiogás project evaluation methodology

REFERENCES

Nota técnica Renovacalc: Método e ferramenta para a contabilidade da Intensidade de Carbono de Biocombustíveis no Programa RenovaBio. Embrapa Meio Ambiente et al, 2018.

O potencial brasileiro de biogás. Abiogás, 2020.

Proposta de programa nacional do biogás e biometano. Abiogás, 2020

Outlook for biogas and biomethane. World Energy Outlook Special Report. IEA, 2020.

Avaliação econômico-financeira da microgeração de energia elétrica proveniente de biogás da suinocultura. Avaci, Angelica et al, 2012.

Plano Decenal de Expansão de Energia 2030. EPE, 2021.