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VCS PROJECT DESCRIPTION TEMPLATE

SHIFT FROM ROAD FREIGHT TO PIPELINE IN TRANSPORTATION OF LIQUID FUELS IN BRAZIL

Document Prepared by Logum Logística S.A

Project Title	SHIFT FROM ROAD FREIGHT TO PIPELINE IN TRANSPORTATION OF LIQUID FUELS IN BRAZIL
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Prepared By	Logum Logística S.A
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1 PROJECT DETAILS

1.1 Summary Description of the Project

Logum Logística S.A (hereafter referred to as Logum) is a company formed through the partnership of Petróleo Brasileiro S.A (PETROBRAS), COPERSUCAR S.A, Raizen Energia S.A and Uniduto Logística S.A to implement and operate a pipeline structure for the ethanol transportation from sugarcane mills to Final Delivery Stations (FDSs). The project has already 1,100 kilometres of pipelines under operation in the Southeast of Brazil, contemplating the states of Minas Gerais, São Paulo and Rio de Janeiro. The project will expand its operations in phases. Each phase will be treated as an instance which will be added in a grouped project. This document refers to the phase 1 that consists in implementing 3 terminals: Guarulhos, São Caetano do Sul and São José dos Campos. The project boundaries are set to allow future instances as the project advances to the next phases of implementation.

As per figure 1 the project consists of receiving terminals in the municipalities of Uberaba, Ribeirão Preto and Paulínia, which are in a average distance of 234, 107 and 5 km from sugarcane mills and rail terminals (Paulínia terminal collects ethanol in rail terminals), respectively. Complementary trucks collect ethanol at the mills and rail stations and delivery in the receiving terminals. The fuel is pumped trough the pipeline to the delivery terminals where they follow their way to distribution, mix and consumption centres.

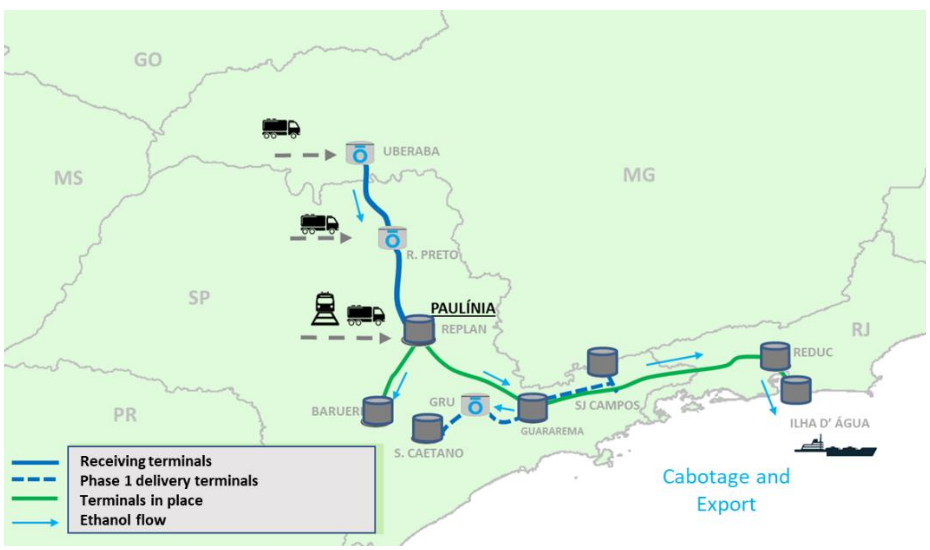

Figure 1 – Logum pipeline map and ethanol flow

Receiving terminals and phase 1 delivery terminals geographical coordinates are presented below:

Terminal type	City	Geographic Coordinates	
Receiving	Uberaba	19°45'0.57"	47°55'57.14"
Receiving	Ribeirão Preto	21°10'35.90"	47°49'14.75"
Receiving	Paulínia	22°45'41.95"	47° 9'14.67"
Delivery	Guarulhos	23°27'48.48"	46°32'0.76"
Delivery	São Caetano do Sul	23°60'23.06"	46°32'58.37"
Delivery	São José dos Campos	23°10'44.70"	45°53'14.11"

Table 1 – Terminals Geographic Coordinates

Road transport is currently responsible for 90.2% of ethanol transport in Brazil[1]. Since the pipelines run on electrical energy and road trucks uses diesel with 10% of biodiesel according to Brazilian National Council on Energy Policy (CNPE) resolution 16/2018, the replacement of this modal by the pipeline allows the reduction of greenhouse gas emissions.

The project implementation reduces the amount of truck trips, whose routes are usually within the cities. Therefore, it avoids traffic jam, pollutant emissions and road accidents in a large scale. The project activity also allow a more transparent fiscal control, since all volume transported is easily tracked, when compared to the road freight, the project allows local governments to increase their tax revenue and mitigate frauds.

In respect to phase 1, the project is expected to transport near 44,000,000 m^3 of ethanol during the 10 years of crediting period. This allows the avoidance of approximately 874,493 truck trips. The GHG emission reductions are estimated in 816,411 tCO_2e per year in average and 1,036,932 during the crediting period.

1.2 Sectoral Scope and Project Type

Sectoral scope 7, Transport is applicable to the project. The “Shift from road freight to pipeline in transportation of liquid fuels in Brazil” is a grouped project.

1.3 Project Eligibility

This project activities undertaken are supported by the approved CDM methodology –AM0110: Modal shift in transportation of liquid fuels, version 2.0. VCS standard accepted all active CDM methodology.

As per methodology AM0110 project is eligible if the conditions below are met:

[1] Milanez et al, 2015. Logística para o etanol: situação atual e desafios futuros. Sucroenergético. BNDES setorial 31, p.49-98

(a) The methodology is applicable for the transportation of liquid fuels[2] only;

(b) The pipeline network operator is the project participant. If the pipeline network operator is not the owner of the liquid fuels to be transported under the clean development mechanism (CDM) project activity, the owner(s) may also be included as project participants;

(c) If the owner(s) of the liquid fuel is/are not project participants, a contractual agreement between the liquid fuel owner(s) and the project participants shall ensure that the liquid fuel owner(s) do not claim any certified emission reductions (CERs) from the transportation of the liquid fuel by pipeline;

(d) The liquid fuel is transported using two or multiple pre-identified nodes of pipeline network. The nodes and corresponding branches of the pipeline network are defined in the CDM project design document (CDM-PDD) or equivalent at the validation of the project activity and remain fixed during the crediting period;

(e) The type of liquid fuel to be transported under the project activity is defined in the CDM-PDD or equivale net at the validation of the project activity and no change of type of liquid fuel is allowed[3] thereafter;

(f) The methodology is not applicable for operational improvements of an existing pipeline that is in operation;

All conditions presented above are met, therefor, the project is eligible.

1.4 Project Design

This project description is designed to be a Grouped Project and is structured to allow the expansion of multiple project activities after project validation.

The operation of other terminals will be added as new instances as the project advances to the next phases of implementation. New receiving and delivery terminals are expected to increase the ethanol volume transportation and, therefore, increase the GHG emissions reductions exactly the same way in which the project activity will be validated.

Eligibility Criteria

As per VCS Standard version 4.2 all project activity instances to be included must meet the conditions below:

1) Meet the applicability conditions set out in the methodology applied to the project.

2) Use the technologies or measures specified in the project description.

[2] Project participants wishing to expand this methodology to transport other materials/fuels/feedstock, wastewater may propose a revision to this methodology

[3] In case different types of liquid fuels are transported during the crediting period, a change to the project design document and the relevant procedures shall apply.

3) Apply the technologies or measures in the same manner as specified in the project description.

4) Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.

5) Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area. For example, the new project activity instances have financial, technical and/or other parameters (such as the size/scale of the instances) consistent with the initial instances, or face the same investment, technological and/or other barriers as the initial instances.

1.5 Project Proponent

Organization name	Logum Logística S.A
Contact person	Marcelo Zeferino
Title	Safety, Environment and Health Coordinator
Address	Av Engenheiro Luiz Carlos Berrini, 550 - Andar 8 Conj 82 – São Paulo, SP, Brasil
Telephone	+55 11 3181-2919
Email	marcelo.zeferino@logum.com.br

1.6 Other Entities Involved in the Project

Organization name	Green Domus Desenvolvimento Sustentável
Role in the project	Green Domus Desenvolvimento Sustentável is responsible for preparing the Project Description (PD) and the Monitoring Report to the Validation/Verification body according to VCS guidelines and procedures.
Contact person	Erich Friol Gimenes
Title	Project Consultant
Address	Av Sagitário, 138 – Alpha Offices, bl.1 – cj 401, Alphaville, Barueri, SP, Brasil
Telephone	+551194302-3443
Email	egimenes@greendomus.com.br

1.7 Ownership

As per VCS Standard version 4.2, the project owner Logum Logística S.A has the right to control and operate the project by virtue of a property right in the plant, equipment and process that generates GHG emission reductions and/or removals.

1.8 Project Start Date

Project has started its operations in August 24th of 2021 when the first commercial operation took place. The commercial operation is the start date's reference since GHG emissions are only avoided when the baseline logistics is substituted for the pipe structure. The evidence of this operations is the first invoice issued by Logum Logística S.A and can be assessed by the VVB at the validation procedure.

1.9 Project Crediting Period

Project crediting period is from August 24th of 2021 to August 23th of 2032.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	x
Large project	

Year	Estimated GHG emission reductions or removals (tCO_2e)
Year 2021	-1,041
Year 2022	36,441
Year 2023	48,236
Year 2024	80,121
Year 2025	98,442
Year 2026	116,660
Year 2027	116,213
Year 2028	115,789
Year 2029	116,053
Year 2030	115,692
Year 2031	116,340

Year 2032	77,986
Total estimated ERs	1,036,932
Total number of crediting years	10
Average annual ERs	86,411

1.11 Description of the Project Activity

Pipeline networks are composed of several pieces of equipment that operate together to move fluid from one location to another. The main elements of a pipeline system and a brief description of their operation system are shown presented below are also presented:

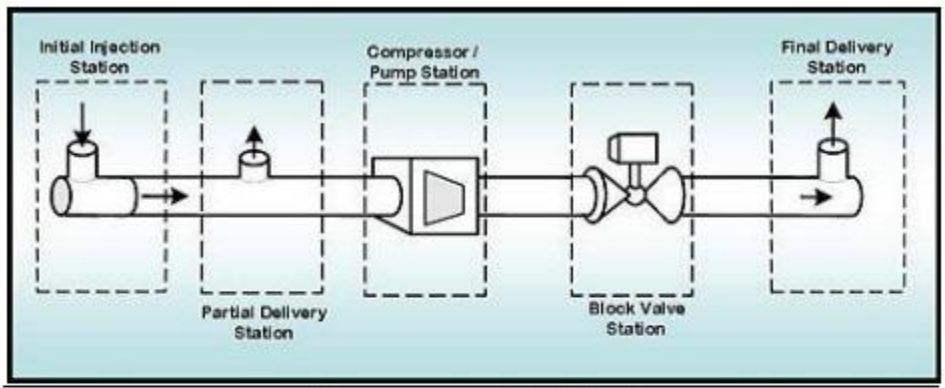

Figure 2 – Logum pipeline componentes

- *Initial Injection Station* - Known also as Supply or Pipeline Inlet Station (PIS), is the beginning of the system, where the fluid is injected into the line. Storage facilities, pumps or compressors are usually located at these locations.

- *Compressor/Pump Stations* – Pumps for impulse the liquid through the pipelines. The location of these stations is defined by the topography of the terrain, the type of fluid being transported, or operational conditions of the network.

- *Partial Delivery Station* - Known also as Intermediate Stations, these facilities allow the pipeline operator to deliver part of the product being transported.

- *Block Valve Station* - These are the first line of protection for pipelines. With these valves the operator can isolate any segment of the line for maintenance work or isolate a rupture or leak. Block valve stations are usually located every 32 to 48 km, depending on the type of pipeline. Even though it is not a design rule, it is a very usual practice in liquid pipelines. The location of these stations depends exclusively on the trajectory of the pipeline and/or the operational conditions of the line.

- *Regulator Station* - This is a special type of valve station, where the operator can release some of the pressure from the line. Regulators are usually located at the downhill side of a peak.

- *Final Delivery Stations (FDSs)* - Known also as Outlet stations or terminals, this is where the product will be distributed to the consumer. It could be a tank terminal for liquid pipelines or a connection to a distribution network for gas pipelines.

Types of pipelines

In general, pipelines can be classified, depending on its purpose, as gathering pipelines, transportation pipelines or distribution pipelines. The proposed project activity comprises the implementation of transportation pipelines, which consists of mainly long pipes with large diameters, moving products (oil, gas, refined products) between cities, countries and even continents. These transportation networks include several compressor stations in gas lines or pump stations for crude and multi-products pipelines.

Pipeline operation

When a pipeline is built, the construction project not only covers the civil work to lay the pipeline and build the pump/compressor stations, but it also has to cover all the work related to the installation of the field devices that will support remote operation.

Field devices comprise instrumentation, data gathering units and communication systems. The field instrumentation includes flow, pressure and temperature gauges/transmitters, and other devices to measure the relevant data required. These instruments are installed along the pipeline on some specific locations, such as injection or delivery stations, pump stations (liquid pipelines) or compressor stations (gas pipelines), and block valve stations.

The information measured by these field instruments is then gathered in local Remote Terminal Units (RTU) that transfer the field data to a central location in real time using communication systems, such as satellite channels, microwave links, or cellular phone connections. Pipelines are controlled and operated remotely, from what is usually known as The Main Control Room. In this center, all the data related to field measurement is consolidated in one central database. The data is received from multiple RTUs along the pipeline. It is common to find RTUs installed at every station along the pipeline.

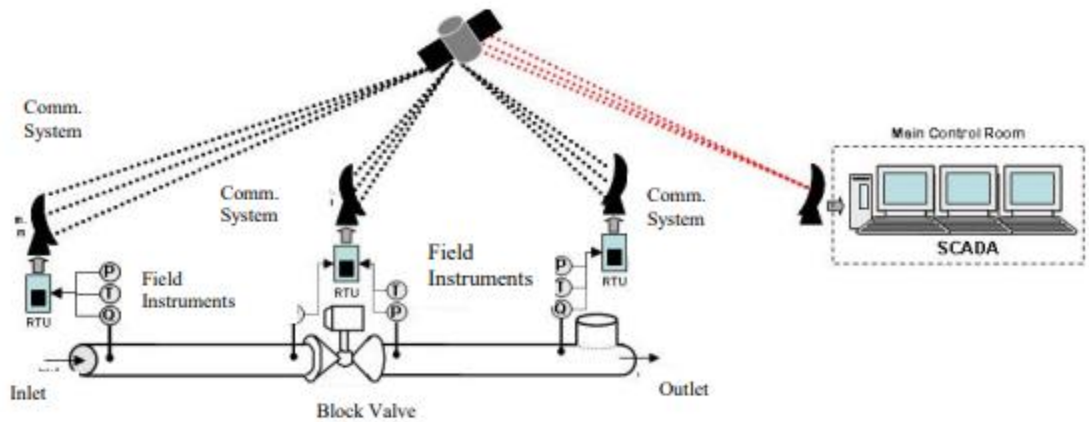

Figure 3 – Scada System for pipelines

The SCADA[4] system at PMCC Main Control Room receives all the field data and presents it to the pipeline operator through a set of screens or SCADA Human Machine Interface (HMI/SCADA), showing the operational conditions of the pipeline. The operator can monitor the hydraulic conditions of the line, as well as send operational commands (open/close valves, turn on/off compressors or pumps, change set points, etc.) through the SCADA system to the field.

Conceptually, the proposed pipeline will be employing several operating pumps at pumping stations along the pipeline. The nominal pumps pressure and capacity varies in size between each pumping station. The pressure is consistent throughout the pipeline. The following table provides a more detailed information:

Section	Ethanol Amount Capacity (m³)	Flow (m³/h)			Diamter (pol)	Lenght (km)	Δ level (m)	Pipeline Weight (tonnes)	Pipeline Speed (m/s)
		min.	op.	max.					
Uberaba - Ribeirão	27502	190	650	750	20	144	310	12723	0,95
Ribeirão - Paulínia	57025	430	750	1500	24	207	270	27113	0,76
Paulínia - Guarulhos	23000	-	850	-	18	150	-	-	1,55
	7570	400	700	880	16	62	170	4495	1,61
Paulínia - São Caetano do Sul	23000	-	850	-	18	150	-	-	1,55
	7570	400	700	880	16	62	170	4495	1,61
	2073	400	572	770	12	30	132	1600	2,40
Paulínia - São José dos Campos	23000	-	850	-	18	150	-	-	1,55
	1294	120	168	168	8	38	199	1051	1,60

Table 2 – Pipeline characteristics per section

[4] SCADA - Supervisory control and data acquisition.

With the pipeline technology described above in place the Logum project activity is expected to provide the same service level in respect to the ethanol transportation from production to consumption as previous scenario. Additionally, it allows to move ethanol from receiving terminals to delivery terminals with more efficiency, since it does not have to carry the dead weight as is the case of trucks.

Finally, the pipeline uses electricity energy to pump the fuel, which is a low GHG emissions intensity source of energy when compared to fossil fuel-based trucks. Trucks in Brazil use diesel mixed with biodiesel[5] as fuel. The difference of CO_2e emissions between the two sources of energy is the key to GHG emission reductions in this project activity.

1.12 Project Location

Project geographic coordinates are provided below:

Terminal type	City	Geodetic Corrdinates	
Receiving	Uberaba	19°45'0.57"	47°55'57.14"
Receiving	Ribeirão Preto	21°10'35.90"	47°49'14.75"
Receiving	Paulínia	22°45'41.95"	47° 9'14.67"
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Delivery	São José dos Campos	23°10'44.70"	45°53'14.11"

Table 3 – Terminals geodetic coordinates

New project instances are expected to be implemented in Brazilian territory. Some of the planned pipeline expansions are provided below:

5 According to Brazilian National Council on Energy Policy (CNPE) resolution 16/2018.

Figure 4 – Logum's operating and planned terminals

Images of the receiving terminals of Ribeirão Preto and Uberaba, as well as of Guarulhos delivery terminal are provided below as an example of Logum Logística S.A structures in place.

Figure 5 – Ribeirão Preto's Receiving Terminal

Figure 6 – Uberaba's Receiving Terminal

Figure 7 – Guarulho's Delivery Terminal

1.13 Conditions Prior to Project Initiation

Conditions prior to the project implementation are the same as the baseline scenario described in section 3.4

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

Project activity is in compliance with al law, statutes and regulatory frameworks in force in Brazil for the operation of pipelines to transport liquid fuels. The regulatory entities for this matter are the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA, Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renováveis), the São Paulo Environmental Agency (CETESB, Companhia Ambiental do Estado de São Paulo) and Petroleum, Natural Gas and Biofuels National Agency (ANP, Agência Nacional de Petróleo, Gás Natural e Biocomustíveis). A list of licenses and authorizations and the correspondent local authorities is presented below:

Local Autohority	Authotiry's description	License	License's Description
IBAMA	Environmental Protection Agency of Brazil	Operating License LO 1138/2013	License to operate the receiving terminals of Ribeirão Preto and Paulínia and related pipelines
IBAMA	Environmental Protection Agency of Brazil	Environmental License 478/2014	License to operate the receiving terminal of Uberaba and related pipelines
CETESB	São Paulo State Environmental Agency	Operating License 2684	License to operate the the pipelines sections of Guararema-São José Dos Campos
CETESB	São Paulo State Environmental Agency	Operating License 2621	License to operate the the pipelines sections of Guararema-Guarulhos
CETESB	São Paulo State Environmental Agency	Operating License 2614	License to operate the the pipelines sections of Guararema-Guarulhos
CETESB	São Paulo State Environmental Agency	Operating License 26006389	License to operate the the pipelines sections of Guararema-Guarulhos
CETESB	São Paulo State Environmental Agency	Operating License 15010294	License to operate the terminal of Guarulhos
CETESB	São Paulo State Environmental Agency	Operating License 15010295	License to operate the terminal of Guarulhos
CETESB	São Paulo State Environmental Agency	Operating License 2650	License to operate the pipeline section of Guarulhos
ANP	Oil, Natural Gas and Biofuels National Agency	Operating Authorization 587	Authorization to operate Ribeirão Preto's terminal and pipeline section to Paulinia
ANP	Oil, Natural Gas and Biofuels National Agency	Operating Authorization 212	Authorization to operate Uberaba's terminal and pipeline section to Ribeirão Preto
ANP	Oil, Natural Gas and Biofuels National Agency	Operating Authorization 913	Authorization to operate pipeline section Guararema - São José dos Campos

ANP	Oil, Natural Gas and Biofuels National Agency	Operating Authorization 541	Authorization to operate pipeline section Guararema - Guarulhos
ANP	Oil, Natural Gas and Biofuels National Agency	Operating Authorization 418	Authorization to operate pipeline section Guararema - Guarulhos
ANP	Oil, Natural Gas and Biofuels National Agency	Operating Authorization 467	Authorization to operate Guarulhos' Terminal
ANP	Oil, Natural Gas and Biofuels National Agency	Operating Authorization 102	Authorization to operate pipeline section Guararema - Guarulhos
ANP	Oil, Natural Gas and Biofuels National Agency	Operating Authorization 202	Authorization to operate pipeline section Guararema - São José dos Campos
DEFAU	Wildlife department of São Paulo State	Wildlife Management Authorization	Authorization to operate pipeline section of Guararema-Guaruçhos

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

The project activity is not registered in any other GHG programs.

1.15.2 Projects Rejected by Other GHG Programs

The project activity was never registered in any other GHG programs.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The project activity is not participating in any other Emission Trading Program or Binding Limit.

1.16.2 Other Forms of Environmental Credit

The project did not receive any form of GHG-related credit, including renewable energy certificates.

1.17 Sustainable Development Contributions

This project contributes to the Sustainable Development Contributions in the scope of the Sustainable Development Goals of the United Nations[6]. The project contributions at the host country level are listed and briefly described below:

SDG 3 – Ensure healthy lives and promote well-being for all at all ages: nearly half of the fatal road accidents involve trucks[7]. By reducing truck traffic, the project activity contributes to minimize fatal accidents.

SDG 7 – Ensure access to affordable, reliable, sustainable and modern energy for all: the project activity enables the logistics of ethanol in a more efficient way when compared to the conventional means of transportation, thus, providing the basic structure for more competitiveness and accessibility of this renewable source of energy.

SDG 9 – Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation: the pipeline structure connects the region with the highest concentration of ethanol production with the main consumption hub, in addition to linking it to the most important export channels. The logistic structure put in place by the project activity establishes the main ethanol route of Brazil and provide ways for the ethanol's supply chain to develop relying on stable and resilient infrastructure.

SDG 11 – Make cities and human settlements inclusive, safe, resilient and sustainable: ethanol's transport trucks usually have their routes passing through the cities. By reducing the flow of trucks into the cities, the project activity contributes to reduce de traffic jam and the air pollution caused by these vehicles.

SDG 13 – Take urgent action to combat climate change and its impacts: by displacing a huge amount of trucks on the ethanol's route, the project exerts a significant influence on CO_2 emission reductions.

1.18 Additional Information Relevant to the Project

Leakage Management

As per methodology AM0110 version 2.0 paragraph 49 leakage emissions are negligible and are accounted for as zero.

Commercially Sensitive Information

None of the commercially sensitive information related to the project activity are relevant to the project description document.

[6] https://sustainabledevelopment.un.org/

[7] https://www.portaldotransito.com.br/noticias/mobilidade-e-tecnologia/seguranca/rodovias-federais-quase-50-das-mortes-ocorridas-em-2021-decorreram-de-acidentes-com-caminhoes/

Further Information

Tax evasion is an iterant problem in fuel transportation in Brazil. According to the Federal Highway Police, since 2019 more than 3 million liters of ethanol transported in freight modal were not in compliance with federal tax law[8]. By transporting the ethanol in pipelines, the project activity mitigates the tax evasion problem, as the process is much more centralized and transparent.

2 SAFEGUARDS

2.1 No Net Harm

As cited in section 1.14 several environmental and operating licenses were issued to comply with the federal and state environmental agencies, respectively IBAMA and CETESB. The environmental impacts raised in procedure of obtaining these licenses, as well as the actions taken for mitigation are synthetized below for each kind of environmental impact:

Solid waste

- Solid waste class I - Hazardous, generated by the enterprise, must be properly stored according to ABNT NBR 12235 - storage of hazardous solid waste, and exclusively destined for treatment and/or disposal systems approved by CETESB.
- Solid waste class II A - non-inert and II B - inert, generated by the enterprise, must be properly stored according to ABNT NBR 11174 - storage of class II A - non-inert and II B - inert waste, and disposed in approved disposal systems by CETESB.

Air

- Tanks for ethanol storage require floating roofs or equivalent systems to control vapor emissions.
- Emission of odorous substances beyond property limits is prohibited.
- Sources of atmospheric pollution from the enterprise must be controlled to prevent discomfort to nearby residents.
- Enterprise must maintain systematic maintenance plan to minimize emissions.
- Regular presentation of fugitive emissions monitoring data (LDAR) is required.

Soil

- Containment basins must be properly sized and lined with non-flammable material (except clay) without cracks or fissures to prevent product leakage into the soil.

[8] https://agenciabrasil.ebc.com.br/geral/noticia/2020-12/prf-faz-operacao-contra-sonegacao-fiscal-na-venda-de-etanol

- Vertical fuel storage tanks must operate only with double containment bottoms and continuous leak monitoring.
- Fuel storage tanks must have uninterrupted (24/7) visual and audible overfill alarms.

Effluent management and water discharge

- Rainwater must be separated from potentially contaminated water.

The liquid effluents from the enterprise must be treated to meet the discharge standards established in Article 19-A of the Regulation of Law No. 997/76 approved by Decree No. 8468/76 and its amendments.

- The discharge of liquid effluents generated in operational areas or oily sludge into stormwater systems or public roads is prohibited, as well as their infiltration into the soil.

Noise pollution

- The noise levels emitted by the activities of the enterprise must comply with the standards established by NBR 10151.

Underground waters

- Regularly submit a Self-Monitoring Plan for groundwater. Groundwater monitoring should be conducted semi-annually.

Fire risk

- The fire prevention and firefighting system must be maintained and operated according to the approved project by the Fire Department. Keep the Fire Department Inspection Certificate (AVCB) valid and up to date.

2.2 Local Stakeholder Consultation

To comply with local requirements the Environmental State Council of São Paulo and the project proponent conducted public hearings during the period from 28th August to 7th October of 2014 in the cities of São Bernardo do Campo, São Paulo, Santos and Paulínia. The participants were invited by e-mail, local newspaper ads and radio announcements. The electronic invite and an example of a local newspaper ad are presented below:

Figure 8 – Electronic invite

INGLATERRA III ESCÂNDALO

Vítimas lutarão por indenização

Centenas de crianças e adolescentes que sofreram abuso sexual vão à Justiça

Governo do Estado de São Paulo
Secretaria de Estado do Meio Ambiente
Conselho Estadual do Meio Ambiente - CONSEMA

Edital de convocação de Audiências Públicas sobre o EIA/RIMA do empreendimento "Projeto Logum - Dutovia para Transporte de Etanol (Trecho Paulínia - Barueri - Santos)", de responsabilidade da Logum Logística S/A.

O Conselho Estadual do Meio Ambiente, usando de sua competência legal, convoca quatro audiências públicas sobre o Estudo de Impacto Ambiental e o Relatório de Impacto ao Meio Ambiente - EIA/RIMA do empreendimento "Projeto Logum - Dutovia para Transporte de Etanol (Trecho Paulínia - Barueri - Santos)", de responsabilidade da Logum Logística S/A (Processo 182/2013). **A primeira** se realizará no dia 24 de setembro de 2014, às 17 horas, na Universidade Metodista - Auditório do Campus Rudge Ramos, Rua do Sacramento, 230, São Bernardo do Campo/SP. **A segunda** se realizará no dia 30 de setembro de 2014, às 17h00, na Casa de Portugal, Avenida Liberdade, 602, São Paulo/SP. **A terceira** se realizará no dia 02 de outubro de 2014, no Auditório da Unimonte, Rua Júlio Conceição, 210, Vila Mathias, Santos/SP. **A quarta** se realizará no dia 07 de outubro de 2014, na Câmara Municipal de Paulínia, Rua Carlos Pazetti, 290, Jardim Vista Alegre, Paulínia/SP. O Conselho Estadual do Meio Ambiente informa que cópias do EIA/RIMA estarão à disposição dos interessados, para consulta, no período de 28 de agosto a 07 de outubro de 2014, nos seguintes locais:

São Bernardo do Campo
Paço Municipal de São Bernardo do Campo, Praça Samuel Sabatini, 50, São Bernardo do Campo/SP, de segunda a sexta-feira, das 8h às 12h e das 13h às 17h;

São Paulo
Subprefeitura da Capela do Socorro, Rua Cassiano dos Santos, 499, Jardim Clipper, São Paulo/SP, de segunda a sexta-feira, das 8h às 12h e das 13h às 17h;

Santos
PRODESAN - Praça dos Expedicionários, 10, Gonzaga, Santos/SP, de segunda a sexta-feira, das 8h às 12h e das 13h às 17h;

Paulínia
Câmara Municipal de Paulínia, Rua Carlos Pazetti, 290, Jardim Vista Alegre, Paulínia/SP, de segunda a sexta-feira, das 8h às 12h e das 13h às 17h;

E também no seguinte site da Logum Logística S/A:
http://logum.com.br/php/documentos-eia.php

De acordo. Publique-se
São Paulo, 25 de agosto de 2014.

Germano Seara Filho
Secretário-Executivo do Consema

II De Londres

As centenas de vítimas de abuso sexual na cidade inglesa de Rotherham decidiram ir à Justiça para pedir indenização diante da passividade das autoridades locais, anunciaram ontem seus advogados.

O relatório independente que revela a magnitude dos abusos nesta cidade de cerca de 250.000 habitantes causou indignação no Reino Unido. A ministra do Interior, Theresa May, declarou que Shaun Wright, comissário-geral da Polícia de South Yorkshire - onde Rotherham fica localizada - deveria renunciar. Wright também é ex-chefe dos serviços de cuidados à infância dessa cidade.

"Meu trabalho como ministra do Interior não é demitir ou contratar comissários-gerais de polícia. Mas ele deveria renunciar", disse May.

O relatório afirma que pelo menos 1.400 crianças foram abusadas sexualmente num período de 16 anos na cidade e aponta para a ineficiência das autoridades em investigar e impedir os casos. Segundo o informe, elas ignoraram queixas e provas devido a alguns fatores, tais como funcionários com medo de serem acusados de racismo, já que alguns dos autores dos crimes eram asiáticos.

O advogado David Greenwood, que representa 15 meninas vítimas de abusos sexuais entre 1996 e 2012 nas mãos de gangues, levou à Justiça as autoridades locais por negligência.

"Em todos os casos que estou estudando houve falhas de funcionários dos serviços sociais. Nem a prefeitura de Rotherham e nem a polícia de South Yorkshire responderam agiram como deveriam", disse.

Alexis Jay, autora do relatório (que foi encomendado pelas próprias autoridades locais), disse que "ninguém sabe a verdadeira escala da exploração sexual" em Rotherham. "Nossa estimativa conservadora é de que cerca de 1.400 crianças e adolescentes sofreram abusos em todo o período de investigação, entre 1997 e 2013", afirmou a especialista em serviços sociais.

"As autoridades envolvidas terão que responder a muitas perguntas", acrescentou, ressaltando que os primeiros relatos do que estava acontecendo foram simplesmente ignorados. De acordo com ela, algumas das vítimas foram encharcadas com gasolina e ameaçadas de serem queimadas vivas se denunciassem os crimes às autoridades. (Da France Press)

demissão do então diretor francês do Fundo em 2011. Mas este caso, relacionado a uma arbitragem da qual se beneficiou o empresário francês Bernard judicial em seu país de origem. O delito de "negligência" é passível de um ano de prisão e uma multa de 15.000 euros. (France Press)

REFERÊNCIA AOS NAZISTAS?

Zara suspende vendas de peça com estrela amarela

A marca de roupas espanhola Zara retirou ontem de seu catálogo uma camiseta infantil estilo marinheiro decorada com uma estrela amarela. O motivo foram os protestos por causa da semelhança da peça com o distintivo imposto pelos nazistas aos judeus. A camiseta, de listras horizontais em azul e branco e com uma estrela de seis pontas no lado esquerdo do peito, ficou disponível por apenas poucas horas na loja on-line da Zara. "O desenho foi inspirado nas estrelas de xerife dos típicos filmes de faroeste americanos, douradas e com seis pontas", declarou um porta-voz. "Não tem nada a ver com as conotações a que está sendo associada", acrescentou, referindo-se a estrela amarela que os judeus tinham que usar na Alemanha e outros países ocupados pelos nazistas durante a Segunda Guerra Mundial e as listras dos uniformes dos prisioneiros nos campos de concentração. "Mas entendemos que há uma sensibilidade em relação a questão e pedimos desculpas aos nossos clientes", disse o porta-voz. (France Press)

MEDO DE ACUSAÇÕES

Dois terços dos britânicos temem ajudar crianças

Cerca de dois terços dos britânicos hesitaria em ajudar uma criança perdida na rua por medo de que o gesto fosse mal-interpretado, segundo um estudo divulgado ontem. A associação de proteção à infância (NSPCC) ouviu 2.899 adultos britânicos - e 64% deles disseram que teriam medo "de ser acusados erroneamente ou que de que interpretassem mal suas intenções" caso se aproximassem de uma criança aparentemente perdida. O temor é mais alto entre os homens (73%), mas também é elevado entre as mulheres (56%). Outros 45% afirmaram que permaneceriam próximos para vigiar a criança e 47% se aproximariam dela sem hesitação. Apenas 3% dos homens e 1% das mulheres disseram que passariam pela criança sem pensar em ajudá-la. A NSPCC constatou que os britânicos são agora mais propensos a denunciar casos de abusos de crianças - algo que se deve, em parte, às revelações sobre os casos de pedofilia realizados por várias pessoas famosas. (France Press)

Figure 9 – Newspaper ad example

The list of participants of each meeting and the transcriptions of the meetings are available for VVB verification.

Engagement of Local community

For each of the pipe sections the surrounding community was invited to participate into the Logum Logística S.A environmental education program. Participants were invited door to door and by posted signs in the communities surrounding the pipe sections installations and were engaged in the activities below:

• Presentation of quarterly reports to track the progress of the Environmental Management Plan (EMP) of the environmental programs, including the Environmental Control of Works Program, Erosion and Siltation Control and Monitoring Program, Solid Waste Management Program, Liquid Effluent Management Program, Noise Control and Monitoring Program, Traffic Control and Improvement of Access Roads Program, Vegetation Suppression Control Program, Compensatory Planting Program, Fauna Conservation Program, Rehabilitation of Degraded Areas Program, Social Communication Program (including Subprogram for Population Discomfort), and Environmental Education Program.

• Receive information on the advancement of the works, demonstrating the implementation of mitigating measures through descriptive reports and dated and georeferenced photographic records.

- Presentation the effectiveness of the adopted measures and indicators.
- Presentation of Identified non-conformities and corrective actions taken.
- Presentation of the activities to be carried out in subsequent stages.

List of participants and a detailed description of these activities are registered for each pipe section and can be assessed by the VVB.

To complement these meetings and activities a new local stakeholder meeting was held in 07/06/2023 in Guarulhos. The participant invitation list is provided below:

Local Authorities

Department	Name	Contact
Municipal City Hall of Mogi das Cruzes	Honorable Mayor Caio Cesar Machado da Cunha	gabinete@pmmc.com.br
Mogi das Cruzes Department of Public Works	Mrs. Secretary Leila Alcântara Galvão	obras@pmmc.com.br
Mogi das Cruzes Municipal Department of Greenery and Environment	Mrs. Secretary Ionara Amélia Fernandes	svma@pmmc.com.br
Municipal City Hall of Guarulhos	Honorable Mayor Gustavo Henric Costa	prefeito@guarulhos.sp.gov.br
Guarulhos Department of Environment	Mr. Secretary Thiago Surfista	thiago.surfista@guarulhos.sp.leg.br
Municipal City Hall of Suzano	Honorable Mayor Rodrigo Ashiuchi	gabinete@educ.suzano.sp.gov.br
Suzano Department of Maintenance and Urban Services	Mr. Secretary Samuel de Oliveira	smmsu@suzano.sp.gov.br
Suzano Department of Environment	Mr. Secretary André Chiang	smma@suzano.sp.gov.br
Municipal City Hall of Itaquaquecetuba	Honorable Mayor Eduardo Boigues Queroz	governo@itaquaquecetuba.sp.gov.br
Itaquaquecetuba Department of Public Works	Mr. Secretary Marcelo Barbosa da Silva	semo@itaquaquecetuba.sp.gov.br
Itaquaquecetuba Department of Environment	Mrs. Secretary Yasmin Zampieri Sampaio	meioambiente@itaquaquecetuba.sp.gov.br
Municipal City Hall of São Paulo	Honorable Mayor Ricardo Nunes	prefeito@prefeitura.sp.gov.br
São Paulo Department of Urban Infrastructure and Works	Mr. Secretary Marcos Monteiro	siurb.agenda@prefeitura.sp.gov.br
São Paulo Department of Greenery and Environment	Mr. Secretary Eduardo de Castro	svmaprotocolo@prefeitura.sp.gov.br
Department of Urban Planning and Licensing	Mr. Secretary Marcos Duque Gadelho	smulgabinete@prefeitura.sp.gov.br
Department of Mobility and Transportation of São Paulo	Mr. Secretary Ricardo Teixeira	smtgabinete@prefeitura.sp.gov.br
Municipal City Hall of Santo André	Honorable Mayor Paulo Henrique Pinto Serra	accleite@santoandre.sp.gov.br
Santo André Department of Urban Mobility, Works, and Public Services	Mr. Secretary Aparecido Donizeti Pereira	adpereira@santoandre.sp.gov.br
Santo André Department of Environment	Mr. Secretary Fábio Picarelli	fpicarelli@santoandre.sp.gov.br
São Caetano do Sul Department of	Mr. Secretary Iliomar	duoh1@saocaetanodosul.sp.gov.br

Works and Housing	Darronqui	
Department of Urban Mobility	Mr. Secretary Diego Santos Vido Faria	dtv@saocaetanodosul.sp.gov.br
Municipal City Hall of Biritiba-Mirim	Honorable Mayor Carlos Alberto Taino Junior	gabineteprefeito@biritibamirim.sp.gov.br
Biritiba-Mirim Department of Public Works, Urban Planning, and Public Services	Mr. Secretary José Antonio Salgado Simão	obras@biritibamirim.sp.gov.br
Biritiba-Mirim Department of Environment	Mrs. Secretary Alaine Cristiane de Almeida Feital	meioambiente@biritibamirim.sp.gov.br
Municipal City Hall of Guararema	Honorable Mayor José Luiz Eroles Freire	gabinete@guararema.sp.gov.br
Guararema Department of Public Works, Environment, Urban Planning, and Public Services	Mr. Director Ricardo Moscatelli	ricardo.moscatelli@guararema.sp.gov.br
Municipal City Hall of Santa Branca	Honorable Mayor Adriano Marchesani Levorin	gabinete@santabranca.sp.gov.br
Santa Branca Department of Services, Works, and Transportation	Mr. Secretary Arthur Ribeiro Alvares Pimenta	meioambiente@santabranca.sp.gov.br
Santa Branca Department of Education	Mrs. Secretary Cândida de Sousa Silva	comunica@santabranca.sp.gov.br
Municipal City Hall of Jacareí	Honorable Mayor Izaias José de Santana	gabinete@jacarei.sp.gov.br
Jacareí Department of Infrastructure	Mr. Secretary Edgard Takashi Sasaki	infra.estrutura@jacarei.sp.gov.br
Jacareí Department of Environment and Urban Cleaning	Mrs. Secretary Claude Mary de Moura	meio.ambiente@jacarei.sp.gov.br
Municipal City Hall of São José dos Campos	Honorable Mayor Anderson Farias Ferreira	gabinete01@sjc.sp.gov.br
São José dos Campos Department of Housing and Public Works	Mr. Secretary Fábio Rayel Pasquini	obras@sjc.sp.gov.br
São José dos Campos Department of Urbanism and Sustainability	Mr. Secretary Marcelo Pereira Manara	seurbs@sjc.sp.gov.br
São José dos Campos Department of Education and Citizenship	Mr. Secretary Jhonis Rodrigues Almeida Santos	gabinetesme@sjc.sp.gov.br
National Agency of Oil, Natural Gas and Biofuels (ANP)	Hélio da Cunha Bisaggio	sim@anp.gov.br
National Agency of Oil, Natural Gas and Biofuels (ANP)	Leonardo Jardim da Silva Faria	lfaria@anp.gov.br

Local Communities

Entity	Municipality	Contact
Instituto Pau Brasil	Guararema	ana@institutopaubrasil.org.br
Pró Terra Environmental Organization	Guararema	proterra@guararema.net – (11) 4693-1917 / (11) 97148-7424
Ecomuseum of Campos de São José	São José dos Campos	ecomuseu@cecp.org.br
Hélio Augusto de Souza Foundation (FUNDHAS)	São José dos Campos	presidencia@fundhas.org.br
Clube da criança e do adolescente	São José dos Campos	clubeca@clubeca.org.br

(CLUBECA)		
Euryclides de Jesus Zerbini State School	Mogi das Cruzes	Phone: (11) 4645-7834
Professor David Jorge Curi State School	Suzano	Phone: (11) 4749-2977
Jardim Odete III State School	Itaquaquecetuba	Phone: (11) 4645-6554
Professor Licínio Carpinelli State School	Guarulhos	(11) 2484-8432
Jardim Vermelhão Community Association	Guarulhos	Association President: Mr. Marcelo de Jesus - Phone: (11) 96230-8877
Jardim Centenário Community Association	Guarulhos	José Carlos Vieira dos Santos - Phones: (11) 95967-9668 / (11) 2498-5605
Parque Jandaia Community Association	Guarulhos	Nelson Paulo - Phones: (11) 94929-4681 / (11) 94011-5334
São Judas Tadeu Parish	Guarulhos	Religious leader Antônio B. Martins "Toninho" - Phones: (11) 97726-1436 / (11) 2486-5730
Association for the Development of Pequeno Coração (ADPEC)	Itaquaquecetuba	Association President: Evandro Alves de Lima - Phone: (11) 96441-8220
Professor Michel Alves de Souza Municipal School	Itaquaquecetuba	Phone: (11) 4641-2106 / (11) 4641-253
Vereador Maurício Alves Braz State School	Itaquaquecetuba	Director Valdemir - Phones: (11) 4648-2052 / (11) 95218-6866
Jardim Odete II Residents' Association	Itaquaquecetuba	Phone: (11) 98723-3528
Vereador João Marques Municipal School	Itaquaquecetuba	Director Cleide Bezerra dos Santos - Phone: (11) 4644-3087 / (11) 97209-0488
Jardim Altos de Itaqua Community Association	Itaquaquecetuba	Ana Paula Cunha Santos - Phone: (11) 4642-9478
Alto da Guadalupe Residents' Association	Suzano	Juberto Souza - Phone: (11) 96941-6408; Maria do Carmo - Phone: (11) 97355-3030
Jardim Vermelhão Community Association	Guarulhos	Association President: Mr. Marcelo de Jesus - Phone: (11) 96230-8877

Participants were invited by e-mail with 30 days in advance and could participate in person or virtually. In this meeting the following topics were presented.

- Institutional Presentation of the Institution
- Mission, Vision, and Values
- Shareholder Structure
- Business Model and Current and Planned Infrastructure and Capacity

- Types of Trucks Replaced by Project Activity in Ethanol Transportation
- Contributions to Sustainable Development, including Emission Reductions, Reduction in Large Truck Traffic, Development of Local Supplier Chains, and Tax Monitoring Ease
- Detailed Emission Reductions
- Logum's Presence and Evolution in Ethanol Logistics in Each Operation
- Detailed Operation of Phase 1 and Integration with Existing Structure
- Recent Operational Volume Growth Results and Influence on Petroleum Derivatives Pipelines
- Direct Connections to Consumption Hubs from Terminals
- Q&A Session

The only questions raised in the meeting were related to technical explanations of the structure operations, the business model regarding revenue generation and the relation with price tariffs and sections, and the tax revenue model. Theses questions were clarified during the meeting and no other comment was received. The meeting was recorded and can be assessed by the VVB.

The constant communication channel is well known to the general population and can be accessed by dialing the number 168 and accessing the Transpetro's ombudsman channel[9]. All complaints from individuals or companies affected by any incident in the Logum structure are handled through this channel. The channel has been communicated in all engagement meetings and is also present on signs along the entire installed structure.

2.3 Environmental Impact

Not applicable.

2.4 Public Comments

The project is not yet available for public comments.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The following CDM approved baseline and monitoring methodologies are applied to this project:

AM0110 Modal shift in transportation of liquid fuels, version 02.0

[9] https://transpetro.com.br/transpetro-institucional/noticias/transpetro-lanca-168.htm

For more information regarding the proposed new methodology and the tools as well as their consideration by the CDM Executive Board (hereinafter referred to as the Board) please refer to <http://cdm.unfccc.int/methodologies/PAmethodologies/index.html>

3.2 Applicability of Methodology

The proposed project activity meets each of the applicability conditions of the methodology of AM0110 Modal shift in transportation of liquid fuels, version 02.0, as justified in Table below:

Applicability Conditions	Justification
(a) The methodology is applicable for the transportation of liquid fuels[10] only;	The project activity is exclusively intended to the transport of ethanol, which is a liquid fuel.
(b) The pipeline network operator is the project participant. If the pipeline network operator is not the owner of the liquid fuels to be transported under the clean development mechanism (CDM) project activity, the owner(s) may also be included as project participants;	Logum Logística S.A is the project owner and the pipeline network operator. However, the owners of the liquid fuels are not included as project participants.
(c) If the owner(s) of the liquid fuel is/are not project participants, a contractual agreement between the liquid fuel owner(s) and the project participants shall ensure that the liquid fuel owner(s) do not claim any certified emission reductions (CERs) from the transportation of the liquid fuel by pipeline;	The agreement between the pipeline network operator and the owners of the liquid fuel has been signed to ensure that the emission reduction credits from liquid fuel transportation in the pipeline go to the project owner.
(d) The liquid fuel is transported using two or multiple pre-identified nodes of pipeline network. The nodes and corresponding branches of the pipeline network are defined in the CDM project design document (CDM-	The nodes and branches are defined in the project design document and will remain fixed during credit period. Emission reduction estimative is being calculated considering the actual pipeline network in operation and phase 1, although the network expansion is

[10] Project participants wishing to expand this methodology to transport other materials/fuels/feedstock, wastewater may propose a revision to this methodology.

PDD) at the validation of the project activity and remain fixed during the crediting period;	already described in the project design document as per figure 4.
(e) The type of liquid fuel to be transported under the project activity is defined in the CDM-PDD at the validation of the project activity and no change of type of liquid fuel is allowed[11] thereafter;	The project is expected to transport only ethanol during crediting period.
(f) The methodology is not applicable for operational improvements of an existing pipeline that is in operation;	The project considers only new nodes and branches to be implemented and operated.
(g) The geographic conditions of the project site permit the use of different transportation means (e.g. pipeline, trucks, etc.);	Pipeline is not the only option to transport ethanol. The geographic of the site permits other transportation means, being road freight the most feasible.
(h) There is sufficient road transportation capacity to transport the liquid fuel from the point of origin (oj) to point of destination (dj) by trucks at the time of implementing the CDM project activity and for the duration of the crediting period;	Since, 90,2% of ethanol transport is carried out by trucks[12], there is sufficient road transportation capacity to transport ethanol from the point of origin to the point of destination.
(i) If blended biofuel is used, the conservative approach shall be applied in adopting a zero-emission factor for biofuels in the baseline scenario and in the project activity it shall be considered as the same emission factor of the fossil fuel being used.	The projects consider blend biofuel used as per Brazilian requirements and the same emission factor is being used for baseline scenario and project emissions.

[11] In case different types of liquid fuels are transported during the crediting period, a change to the project design document and the relevant procedures shall apply.

[12] Milanez et al, 2015. Logística para o etanol: situação atual e desafios futuros. Sucroenergético. BNDES setorial 31, p.49-98

Finally, as is the case for the project activity, AM0110 methodology is only applicable if the most plausible baseline scenario, as identified per the section "Selection of the baseline scenario and demonstration of additionality" below, is "M1: road transportation using trucks".

3.3 Project Boundary

The Project boundary comprises the whole area and processes where transportation of ethanol occurs, i.e.:

- Transport from Ethanol Production Centres (EPC's) until pipeline inlet stations;
- Pipeline (duct way);
- Pipeline Inlet Stations;
- Intermediary Station (inlet and/or outlet);
- Pipeline Outlet Station or Final Delivery Station; and,
- Electricity consumption by pumps along pipeline.

The figure below illustrates this scheme:

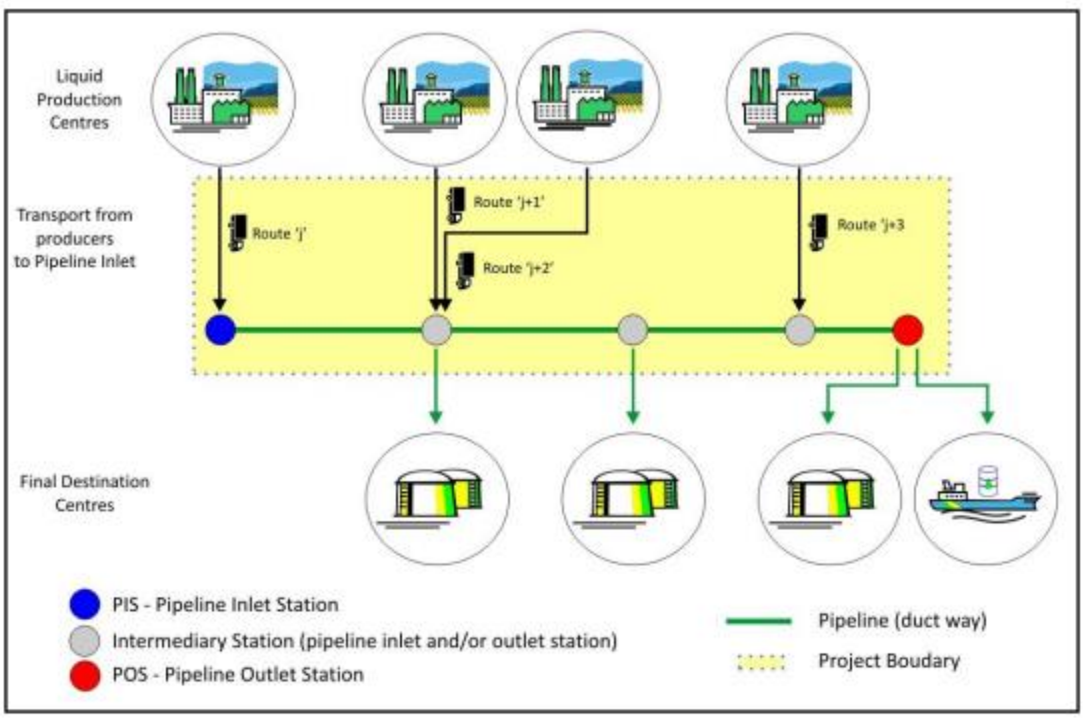

Figure 10 – Project Boundaries

Source	Gas	Included?	Justification/Explanation

Source		Gas	Included?	Justification/Explanation
Baseline	Emissions from road transportation of liquid fuels from point of origin to point of destination	CO2	Yes	Significant emission source
		CH4	No	Excluded for simplification. CH4 emissions are assumed to be very small
		N2O	No	Excluded for simplification. CH4 emissions are assumed to be very small
		Other	No	Excluded for simplification. Other GHG emissions are assumed to be very small
Project	Emissions from on-site use of electricity and/or fossil fuels to operate the pipeline system	CO2	Yes	Significant emission source
		CH4	No	Excluded for simplification. CH4 emissions are assumed to be very small
		N2O	No	Excluded for simplification. CH4 emissions are assumed to be very small
		Other	No	Excluded for simplification. Other GHG emissions are assumed to be very small
	Mobile source emissions from on-road complementary transport of ethanol to/from all pipeline inlet/outlet station.	CO2	Yes	Significant emission source
		CH4	No	Excluded for simplification. CH4 emissions are assumed to be very small
		N2O	No	Excluded for simplification. CH4 emissions are assumed to be very small
		Other	No	Excluded for simplification. Other GHG emissions are assumed to be very small
	Emissions from land use changes associated with land clearance	CO_2	Yes	May be significant emission source for change associated with land clearance.
		CH_4	Yes	May be significant emission source for change associated with land clearance.
		N_2O	Yes	May be significant emission source for change associated with land clearance.
		Other	No	May be significant emission source for change associated with land clearance.

3.4 Baseline Scenario

Baseline scenario and justification follow the steps of “Combined tool to identify the baseline scenario and demonstrate additionality” version 7.0. The steps are presented below.

Step 0: Demonstration whether the proposed project activity is the first-of-its-kind

The project is the first of its kind. As per methodological tool "Additionality of first-of-its-kind project activities" at least on of the measures below should be applied to the project activity:

(a) Fuel and feedstock switch (example: switch from naphtha to natural gas for energy generation, or switch from limestone to gypsum in cement clinker production);

(b) Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies (example: energy efficiency improvements, power generation based on renewable energy);

(c) Methane destruction (example: landfill gas flaring);

(d) Methane formation avoidance (example: use of biomass that would have been left to decay in a solid waste disposal site resulting in the formation and emission of methane, for energy generation).

The project activity promotes the switch of technology to transport liquid fuels from production to consumption centers, since the baseline scenario is the transportation through trucks using fossil-based fuels.

As per methodological tool, to identify the project activity as the first-of-its-kind, the project proponent shall comply with the requirements below:

(a) The project is the first in the applicable geographical area that applies a technology that is different from technologies[13] that are implemented by any other project, which are able to deliver the same output and have started commercial operation in the applicable geographical area before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of the proposed project activity, whichever is earlier.

(b) The project implements one or more of the measures;

(c) The project participants selected a crediting period for the project activity that is "a maximum of 10 years with no option of renewal".

As stated before, the project complies with requirements b and c. Until the date of submission of this project documentation the Brazilian agency of Oil, Natural Gas and Biofuels, namely ANP (in portugues, Agência Nacional de Petróleo, Gás Natural e Biocombustíveis) only authorizes two structures of pipelines to transport fuel[14], being the Transpetro and Logum Logística S.A structures. The actual Transpetro structure can only transport oil and gas. The project activity applies a brand-new technology that allows the structure of pipeline to transport ethanol. Since there is no other structure implemented in the host country that applies this technology, the project is considered the first-of-its-kind and is automatically additional.

[13] While identifying other technologies, project participants may also use publically available information, for example from government departments, industry associations, international associations on the market penetration of different technologies etc.

[14] https://www.gov.br/anp/pt-br/assuntos/armazenamento-e-movimentacao-de-produtos-liquidos/oleodutos-de-transporte-e-transferencia

For purposes of identification and analysis of alternative scenarios to justify baseline emissions calculation the Steps 1 and 2 of the methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality" version 7.0. are applied in the sequence.

Step 1a: Identification of alternative scenarios

According to the methodology, the baseline scenario is identified as the most plausible baseline scenario among all realistic and credible alternative(s). The methodology proposed alternatives are listed below:

S1: The proposed project activity undertaken without being registered as a CDM project activity;

S2: No investment is undertaken by the project participants, i.e., the same output as that produced by the proposed CDM project activity can also be provided by others than the project proponent (i.e., the PP is not the only output provider)

S3: The continuation of the current situation, not requiring any investment or expenses to maintain the current situation

S4: Where applicable, the continuation of the current situation, requiring an investment or expenses to maintain the current situation

S5: Other plausible and credible alternative scenarios to the project activity scenario, including the common practices in the relevant sector, which deliver the same output considering examples of scenarios identified in the underlying methodology where relevant;

S6: Where applicable, the "proposed project activity undertaken without being registered as a CDM project activity" to be implemented at a later point in time (e.g. due to existing regulations, end-of-life of existing equipment, financing aspects).

All the alternatives listed above are plausible and its barriers will be assessed in Step 2.

Step 1b: Consistency with mandatory applicable laws and regulations

All scenarios listed above are in compliance with current mandatory laws and regulations in Brazil. As per "Combined tool to identify the baseline scenario and demonstrate additionality" one must proceed to Step 2 if there are more alternatives than the S1, which is the case.

Step 2: Barrier analysis

Step 2a: Identify barriers that would prevent the implementation of alternative scenarios

This procedure consists in establishing a complete list of realistic and credible barriers that may prevent alternative scenarios to occur. Each of the alternatives listed at the Step 1 are analyzed and presented below:

S1: The proposed project activity undertaken without being registered as a CDM project activity;

This option could not have been realized without the benefits of CDM because there are important financial and economic barriers that prevent the implementation of the proposed project activity. More details regarding this issue are provided in Section B3.5 where the assessment of the project's additionality is addressed.

S2: No investment is undertaken by the project participants, i.e., the same output as that produced by the proposed CDM project activity can also be provided by others than the project proponent (i.e., the PP is not the only output provider);

If no investment is undertaken by the project participants, than the output, which is the ethanol's transportation from its producers to the regions of consumption, is held with the same infrastructure that was in place before the project activity implementation. Although is possible that a third part could implement the project activity, that is very unlikely, since it was needed the joint investment of four sector's big players (Copersucar, Raizen, Petrobras and Uniduto) to put the project in place, and since it has started its operation's start no competitors have entered the market. Thus, it leads to the same conclusion that will be addressed in situation 3.

S3: The continuation of the current situation, not requiring any investment or expenses to maintain the current situation;

The current situation which consists in transporting the ethanol mainly by road freight is the most feasible option. The supply of ethanol in Brazil is quite centralized. Almost 90% of ethanol production is located in Brazilian south-east and center-east[15]. The route to consumption market is also based in south-east where most of the fuel is used and also exported trough ports located in São Paulo and Rio de Janeiro. The short routes make the road-freight the most attractive option and most of ethanol manufactories rely only on this alternative to export their products[16]. Besides that, recent improvements in roadways have perpetuated the attractiveness of using trucks as a shipping option in this region. Finally, road transport system has the advantage of receiving and delivering the cargo directly from the manufacturing centers and distribution centers whereas many waterway and railroads systems require the cargo be shipped by truck to a terminal before and after shipment. The use of this shipping method not only reduces the logistics but also the costs that would come from transferring cargo from one shipping company to another.

S4: Where applicable, the continuation of the current situation, requiring an investment or expenses to maintain the current situation;

As stated in situation 3 above, the current situation can be maintained with or without significant investment or expenses. A significant investment or expense could improve the roadways efficiency as a logistic alternative, reducing the transport costs by shortening the travel time or by reducing

[15] https://www.bnb.gov.br/s482-dspace/bitstream/123456789/906/1/2021_CDS_159.pdf

[16] Milanez et al, 2015. Logística para o etanol: situação atual e desafios futuros. Sucroenergético. BNDES setorial 31, p.49-98

maintenance costs with better pavement conditions. Since this efficiency gains are marginal, this situation is not significantly different from S3.

S5: Other plausible and credible alternative scenarios to the project activity scenario, including the common practices in the relevant sector, which deliver the same output considering examples of scenarios identified in the underlying methodology where relevant;

The other plausible and credible alternative scenarios besides road-freight are i) Rail-based transport system, ii) waterways transport system and III) the combination of the three. The barriers preventing their use as alternative scenarios are presented below.

S5a Rail-based transport system

Rail transport has not generally been the preferred method for ethanol transport in Brazil due to few investments into maintaining, upgrading, and expanding the railroads by the government and private initiative. Besides that, due to the short distances between the producing regions and the consumer centers, ranging from 230 to 410 kilometers, the use of railway transportation mode has been deprioritized in the past years[17]. The railway network in the central-southern region, which is closer to the Logum pipeline terminals, has a reduced density, as it can be seen in figure 6. Although there are connections between, for example, Ribeirão Preto and the exportation hub located in the port region of Santos, there are no connections that allow for transportation to the same cities as the pipelines, namely São José dos Campos, Guarulhos, and São Caetano, which are the cities targeted in this project activity. According to a study conducted by the National Observatory of Transportation and Logistics, private investments in the Brazilian[18] railway network dropped from BRL 10.9 billion to around BRL 5 billion between 2015 and 2020. Therefore, although there is a new legal framework that encourages additional investment in the sector, the ongoing projects are not located in the region of interest for this project, as can be seen in Figure 7, which makes the scenario quite uncertain for the coming years. This, coupled with the fact that the current network capacity is already practically saturated by the flow of iron ore and soybeans for export, makes rail transport unviable for the short and medium-term ethanol production distribution[19].

[17] Milanez et al, 2015. Logística para o etanol: situação atual e desafios futuros. Sucroenergético. BNDES setorial 31, p.71

[18] https://ontl.epl.gov.br/wp-content/uploads/2021/06/Setor-Ferroviario-Brasileiro.pdf

[19]

Figure 11 – Railway Network (Brazilian National Transport Infrastructure Department, 2023[20])

[20] https://www.gov.br/dnit/pt-br/assuntos/ferrovias/AtlasFerrovirioVersoFinal.pdf

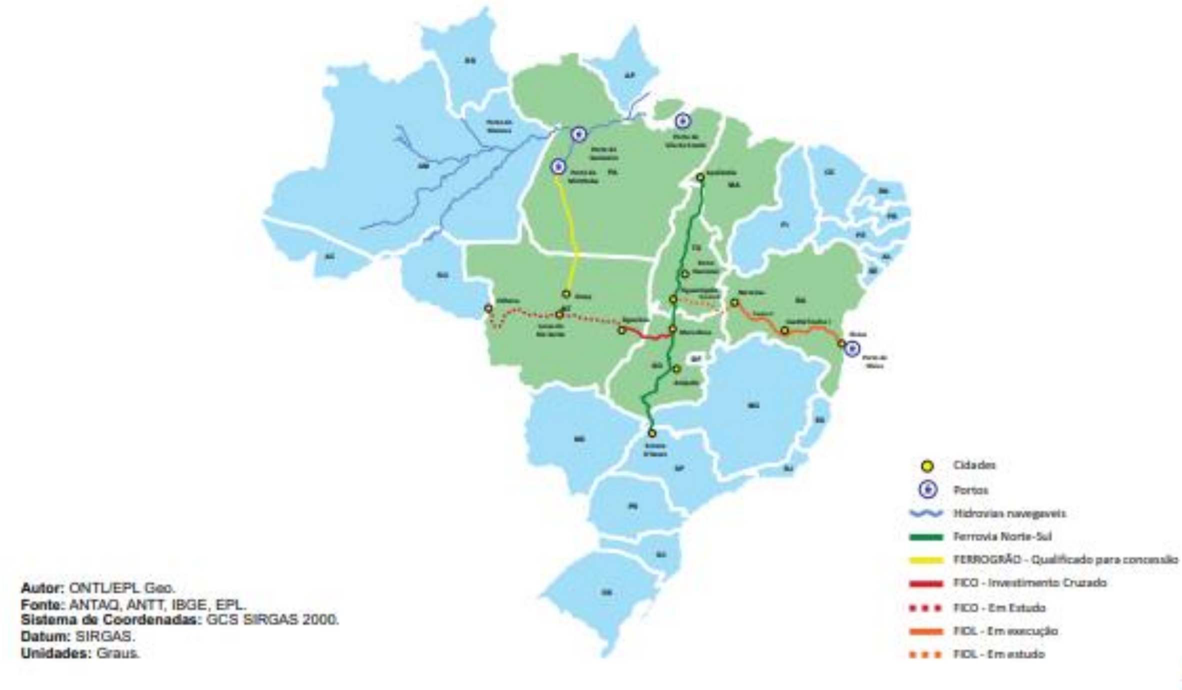

Figure 12 – Ongoing projects for railway network expansion in Brazil[21]

S5b Waterway transport system

The Brazilian water transportation of ethanol is mainly restricted to the Northern region, where a significant portion of the production from the Midwest, particularly in the state of Mato Grosso, is shipped[22]. As can be observed in Figure 8, there is limited availability of routes outside the Amazon region, and consequently, it is not a feasible alternative for ethanol transportation in the project activity's coverage areas.

[21] https://ontl.epl.gov.br/wp-content/uploads/2021/06/Setor-Ferroviario-Brasileiro.pdf

[22] Milanez et al, 2015. Logística para o etanol: situação atual e desafios futuros. Sucroenergético. BNDES setorial 31, p.77

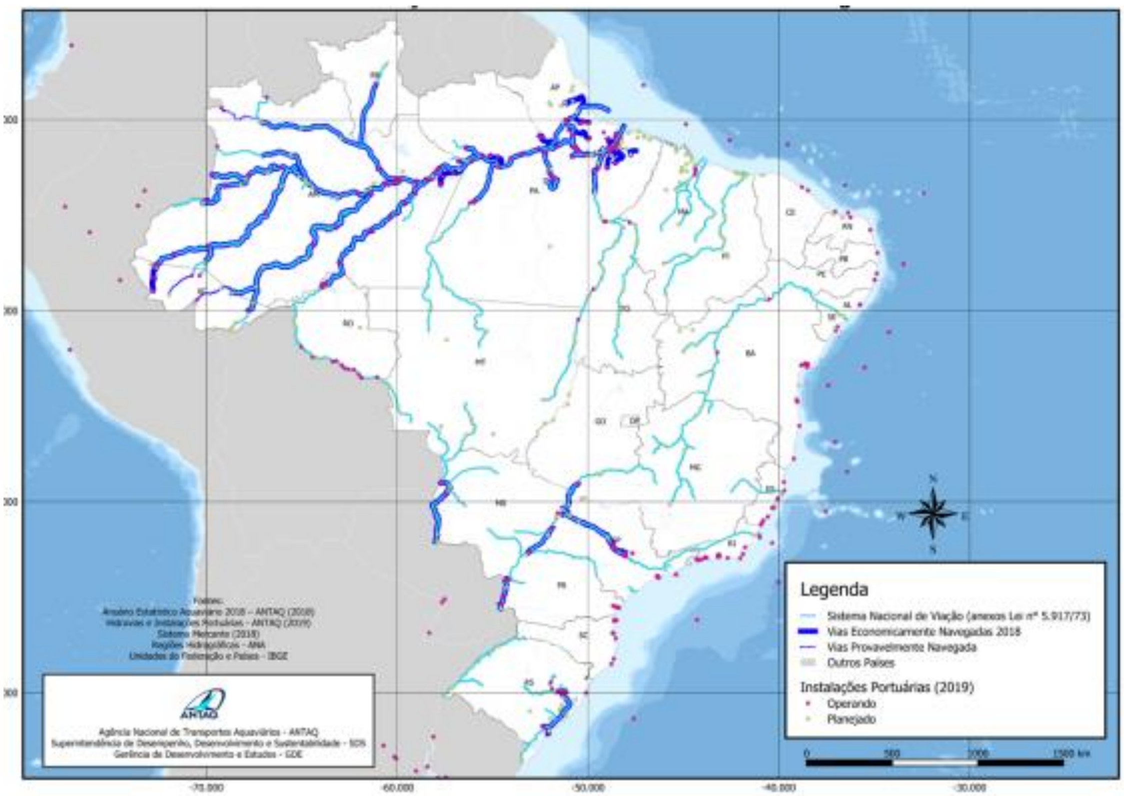

Figure 13 – Water transportation network in Brazil[23]

S5c Combination of road freight, rail-based and waterway systems

S5c1 Waterway and road-freight combination

The transportation of ethanol from sugarcane mills to coastal regions cannot be solely reliant on waterways due to their limited locations and connectivity issues. As a result, a combination of road and waterway transportation would be necessary. However, the use of waterways alone would not be a viable option due to their out-of-the-way locations and limited connectivity. For instance, transporting ethanol from Uberaba to Igarapava near the Rio Grande via waterway would require significant distances to be covered, as shown in Table 4. Therefore, direct transportation by road to Paulinia would be a more efficient alternative to shipping ethanol via a combination of waterway and road systems.

Mill Locations	Waterways	Total approximate distance travelled by waterway and road to Paulinia	Aproximate road distance to Paulinia
Uberaba	Rio Grande	1088 km	390 km

Table 4 – Water transportation network in Brazil

[23] https://www.gov.br/antaq/pt-br

The considerable distance required to transport ethanol from certain areas through waterways presents a compelling reason to opt for road transportation, saving both time and resources needed for transloading the ethanol to a barge. Moreover, waterway transportation poses a significant drawback in terms of shipping time, where the cargo may take up to double the time to reach its destination compared to road transportation.

Hence, the combination of waterway and truck transportation is not considered a viable option in the baseline scenario, given the lack of necessary intermodal infrastructure for ship/truck transloading in Brazil. It would result in longer shipping time and potentially higher costs to transport ethanol to the coast via waterway, as opposed to truck transport.

S5c2 Waterway and rail-based system combination

As previously discussed in relation to the waterway and truck option, waterway transportation is not an efficient means of transporting ethanol due to the limited availability of waterways near the project location. In this context, railway transportation does not present a viable alternative either since there are only a few rail lines connecting the sugarcane mill locations to the waterways. Moreover, the railway infrastructure is fragmented, with poorly maintained lines and locomotives, and operating at near-maximum capacity. Hence, railway transportation is not a practical option for the baseline scenario, given the inadequacy of the railway infrastructure and limited connectivity to waterways.

S5c3 Rail-based system and road-freight combination

In the event of using trucks in combination with railroads, it would be possible to transport ethanol from areas that do not have rail lines. Nevertheless, the same impediments that were identified in S5a regarding the railway infrastructure would still hinder the effectiveness of this transportation system. The fragmented state of the railway infrastructure, along with poorly maintained lines and locomotives, and the limited capacity of the system, continue to pose significant challenges. Therefore, this option cannot be considered a practical alternative for the baseline scenario.

Conclusion of Step 2

As presented above the scenarios S2, S3, and S4 are the only options that have no barriers to be implemented. The analysis of the three of them lead to the conclusion that the scenario with no implementation barriers is the continuation of the current dominant road transportation system for ethanol. As per TOOL 02 if more than one alternative scenario is not prevented by any barrier and the project is the first-of-its-kind, proceeding to step 3 “investment analysis” is an option.

Logum Logística S.A holds the distinction of being the first company to construct a dedicated, large-scale ethanol pipeline on a global scale. This pipeline stands apart from other major pipelines in Brazil, which are designed for the transportation of oil, natural gas, and iron rock minerals, and are not comparable in terms of pipeline coating and technology requirements. Interestingly, the United States, the world's leading producer of ethanol, does not operate any ethanol pipelines and instead primarily relies on trucks and railways for transportation to market.

3.5 Additionality

As stated in section 3.4 the project is the first-of-its-kind and is automatically additional.

3.6 Methodology Deviations

No methodology deviations were applied.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

As per Methodology AM0110 version 2.0, the baseline emissions from the transportation of the liquid fuel are calculated based on the amount of liquid fuel transported by the pipeline in each route j under the project activity, distance of the baseline route j (i.e. the distance between point of origin and point of destination for transportation of liquid fuel by trucks in route j) and a baseline emission factor in g CO2 per kilometer and ton of liquid fuel transported. The amount of liquid fuel transported under the project activity is monitored during the crediting period. The baseline route is determined once at the validation of the project activity and fixed throughout the crediting period.

The baseline emission factor shall be determined by applying one of two options (see Step 2):

a) The first option is applying a conservative default emission factor. This option can, for example, be used if the project participants do not have historical records of the fuel consumption in trucks;

b) The second option allows project participants to calculate the emission factor based on historical records of the fuel consumption for transportation of liquid fuel by trucks.

Baseline emissions are calculated as follows:

$$BE_y = \sum_j \left(T_{j,y} \times AD_j \times EF_{BL,j} \times 10^{-6}\right)$$

Where:

BE_y = Baseline emissions during the year y (tCO_2e).

$T_{j,y}$ = Amount of liquid fuel transported by the pipeline in route j in year y (ton)

AD_j = Distance of the baseline route j (km)

$EF_{BL,j}$ = Baseline emission factor for transportation of liquid fuel in route j (gCO_2 per ton.km, that is gCO_2 per ton of liquid fuel and km travelled)

Step 1: Determination of the distance of the baseline route j (AD_j)

At validation, project participants shall clearly identify and document the point of origin (o_j) and point of destination (d_j) from/to where the liquid fuel is transported for each route j.

The distance of the baseline route j (AD_j) is considered as the one way distance between the point of origin (o_j) and point of destination (d_j) for which the liquid fuel has to be transported in the baseline scenario.

a) If there is a documented historical record of the route used for the transportation of liquid fuel prior to the implementation of the project activity, the historical route shall be considered;

b) If such historical records are not available or if more than one route was used prior to the implementation of the project activity, then the project participants shall provide, with justification, a route between origin and destination which leads to the least fuel consumption.

The distance of the baseline route j (AD_j) shall be documented transparently in the CDM-PDD. The baseline trip route is determined once at the validation of the project activity and fixed throughout the crediting period.

Step 2: Determination of baseline emission factor for transportation of liquid fuel in route j ($EF_{BL,j}$)

he baseline emission factor ($EF_{BL,j}$) for transportation of liquid fuel in route j shall be determined using one of the following options:

Option A: Default[24] value

The project participants shall use the default emission factor[25] of 76 gCO_2/ton.km[26] if trucks consume petrodiesel or gasoline in the host country.[27]

a) If trucks consume natural gas or if petrodiesel is blended with biofuels in the host country, the default emission factor shall be adjusted as follows:

   i) If trucks consume natural gas in the host country, the default value shall be multiplied by the ratio of the emission factor of natural gas to the emission factor of petrodiesel (both expressed in gCO_2/GJ);

[24] Project participants wishing to use different default factors for road transportation may propose a revision of this methodology

[25] This default factor take into account the emissions generated by the empty trips caused by the main trips.

[26] This default emission factor is based on value for liquid fuel type “Solid mineral fuels and petroleum products” in the approved methodology “AM0090: Modal shift in transportation of cargo from road transportation to water or rail transportation”

[27] This default emission factor is determined on the basis of trucks consuming petrodiesel, however, it can also be used if trucks consume gasoline in the host country (this is conservative as gasoline trucks are less energy efficient than petrodiesel trucks).

ii) If petrodiesel is blended with biofuels in the host country, the default value shall be multiplied by the share (fraction) of petrodiesel in blended diesel determined on an energy basis.

In addition, the default value shall be used in case the demand for the transportation of liquid fuel is new.

Option B: Historical data

The baseline emission factor ($EF_{BL,j}$) for transportation of liquid fuel in route j shall be calculated based on historical data on the amount of fuels consumed for transportation of the liquid fuel, the net calorific values and CO2 emission factors of the fuel types used, the amount of liquid fuel transported, the distance of the baseline route and accounting for any non-empty return trips in route j. This option shall be applied only if:

a) The liquid fuel was transported in dedicated trucks which were not used for other purposes than transportation of liquid fuel; and
b) Data on the amount of liquid fuel transported, the amount of fuel consumed and the fuel types used is available for the trucks dedicated to the transportation of the liquid fuel.

The baseline emission factor is calculated for transportation of liquid fuel in route j as follows:

$$EF_{BL,j} = \frac{\sum_i FC_{BL,i,j,x} \times NCV_{i,x} \times EF_{CO2,i,x}}{T_{j,x} \times AD_j}$$

Where:

$EF_{BL,j}$ = Baseline emission factor for transportation of liquid fuel in route j (gCO_2 per ton.km)

$FC_{BL,I,j,x}$ = Amount of fuel i consumed by the trucks including return trip for transportation of liquid fuel in route j in year x (liter or m^3)

$EF_{CO2,I,x}$ = CO2 emission factor of fuel i consumed by the trucks in year x (g CO_2/GJ)[28]

$NCV_{i,x}$ = Average net calorific value of fuel i consumed by the trucks in year x (GJ per liter or m^3)

$T_{j,x}$ = Amount of liquid fuel transported (which includes return freight, if any) in trucks in route j in year x (ton)

AD_j = Distance of the baseline route j (km) (one-way)

x = Year (365 days) prior to the implementation of the project activity

4.2 Project Emissions

[28] If the fuel is blended with biofuel, the emission factor of the blend shall be calculated assuming an emission factor of zero for the biofuel.

As per methodology AM0110 version 2.0, the project emissions include the emissions resulting from the consumption of electricity and/or fossil fuel to operate the pipeline system, the consumption of fossil fuel in the trucks used for the transportation of liquid fuel in complementary routes[29] under the project activity and the land use change associated with land clearance for construction of the pipeline. The emission associated with the construction of the pipeline and upstream emissions related to the production of materials used in the pipeline are considered to be small and therefore are ignored. Project emissions are calculated as follows:

$$PE_y = PE_{EC,y} + PE_{FF,y} + PE_{CR,y} + PE_{CL}$$

Where:

PE_y = Project emissions in year y (tCO_2)

$PE_{EC,y}$ = Project emissions from electricity consumption to operate the pipeline system in the project activity in year y (tCO_2)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption to operate the pipeline system in the project activity in year y (tCO_2)

$PE_{CR,y}$ = Project emissions from transportation of liquid fuels in complementary routes in trucks in year y (t CO_2)

PE_{CL} = Project emissions from land use changes associated with land clearance for construction of pipeline (tCO_2)

Step 3: Determination of project emissions from electricity consumption to operate the pipeline system in the project activity in year y ($PE_{EC,y}$)

Project emissions from electricity consumption to operate the pipeline system in the project activity in year y ($PE_{EC,y}$) are calculated using the latest version of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" where the electricity consumption sources j in the tool corresponds to all electricity consumption sources under the project activity. In case the project activity consumes electricity from more than one electricity grid, the parameter $EF_{EL,j/k/l,y}$ in the tool shall refer to the emission factor of the grid with highest emission factor among the electricity grids that the project activity consumes the electricity. All emission sources shall be documented transparently in the PDD.

Step 4: Determination of project emissions from fossil fuel consumption to operate the pipeline system in the project activity in year y ($PE_{FF,y}$)

Project emissions from fossil fuel consumption to operate the pipeline system in the project activity in year y ($PE_{FF,y}$) are calculated using the latest version of the "Tool to calculate project or leakage CO_2

[29] Complementary routes, for the purpose of this methodology, are routes to transport the liquid fuel in the project situation: (i) from the point of origin (oj), to the pipeline inlet stations; and (ii) pipeline outlet stations to the point of destination (dj).

emissions from fossil fuel combustion", where the sources j in the tool correspond to fossil fuel consumption to operate pipeline system in the project activity. All emission sources shall be documented transparently in the PDD.

Step 5: Determination of project emissions from transportation of liquid fuels in complementary routes in trucks in year y ($PE_{CR,y}$)

Project emissions from transportation of liquid fuel in complementary routes in trucks in year y ($PE_{CR,y}$) shall be calculated by applying one of the following options:

a) Option A: Direct monitoring of fuel consumption;
b) Option B: Determination of specific fuel consumption by sampling;

Option A: Direct monitoring of fuel consumption

Project emissions from transportation of liquid fuel in complementary routes in trucks in year y ($PE_{CR,y}$) are calculated using the latest approved version of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion", where the sources j in the tool correspond to fossil fuel consumption in the trucks used for the transportation of liquid fuel in complementary routes in the project activity.

Option B: Determination of specific fuel consumption by sampling

Project emissions from transportation of liquid fuel in complementary routes in trucks in year y ($PE_{CR,y}$) are calculated by determining specific fuel consumption by sampling.

To determine $SC_{FF,k}$ for each complementary route k, sampling shall be conducted, in accordance with the latest version of the "Standard for sampling and surveys for CDM project activities and program of activities". The sampling approach shall be selected taking into account the variability of roads conditions and types of trucks in the region.

Specific fuel consumption shall be calculated once at the beginning of each crediting period.

The sampling plan shall provide the average specific fossil fuel consumption of trucks transporting liquid fuel from each sampled production center to a certain pipeline inlet station (PIS) as well as from a pipeline outlet station (POS) to the point of destination, and the corresponding standard deviation.

The specific fossil fuel consumption of trucks transporting liquid fuel to each PIS and each POS to the destination shall be calculated as the average of the specific fossil fuel consumption of trucks transporting liquid fuel from each sampled production center to the PIS and each POS to the destination:

$$SC_{FF} = \frac{\sum_j SC_{FF,k}}{n}$$

Where:

SC_{FF} = Specific fossil fuel consumption of trucks transporting liquid fuel (dm^3/ton.km)

$SC_{FF,k}$ = Specific fossil fuel consumption of trucks transporting liquid fuel in route k (dm^3/ton.km)

n = Total number of sampled trips delivering liquid fuel from each sampled production centers to the PIS and from POS to the destination

k = complementary routes

For each sampled complementary route k, $SC_{FF,k}$ shall be determined as follows:

$$SC_{FF,k} = \frac{FC_{PJ,k}}{T_k \times AD_k}$$

Where:

$FC_{PJ,k}$ = Amount of fuel consumed by the truck including return trip for transportation of liquid fuel in the complementary route k one time (liter or m^3)

T_k = Amount of project liquid fuel transported in the truck on complementary route k (ton)

AD_k = Distance of the complementary route k (km) (one-way)

Then, the total quantity of fossil fuel combusted in trucks transporting liquid fuel in complementary routes shall be calculated as follows:

$$FC_y = SC_{FF} \times \sum_k T_{k,y} \times AD_{k,y}$$

Where:

FC_y = Fossil fuel consumption of trucks transporting project liquid fuel in complementary routes in year y (dm^3)

SC_{FF} = Specific fossil fuel consumption of trucks transporting liquid fuel in complementary routes (dm^3 /ton.km)

$T_{k,y}$ = Amount of liquid fuel transported by trucks in complementary route k in year y (ton)

$AD_{k,y}$ = Distance of complementary route k (one way) in year y (km)

k = complementary routes

Finally, project emissions from transportation of liquid fuel in complementary routes in trucks in year y shall be calculated using the latest approved version of the “Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion”, where the sources j in the tool correspond to fossil fuel consumption in the trucks used for the transportation of liquid fuel in complementary routes in the project activity.

Step 6: Determination of project emissions from land use changes associated with land clearance for construction of pipeline (PE_{CL})

Project emissions from land use changes associated with land clearance for construction of pipeline (PE_{CL}) shall be accounted as a one-time project emission in the first year of the first crediting period and determined using the following procedure:

a) Divide the pipeline network into segments not exceeding 5km in length, and attribute each segment the type of vegetation (forest land, grassland, cropland, etc.) and location (tropical/temperate, wet/dry), according to classifications cited in IPCC 2006 guideline volume 4;

b) If the segment can be classified as forest land, then calculate the area of segment deforested on the basis of the length of segment deforested for segment s ($L_{DEF,s}$) and average width of segment deforested for segment s ($W_{DEF,s}$);

c) Assign a default value for aboveground biomass for segment s (MA,s) to be deforested for each segment, on the basis of conservative interpretation of IPCC 2006 Guidelines;[30]

d) Calculate the project emission from land use changes associated with land clearance for construction of pipeline as follows:

$$PE_{CL} = \sum_s \left(L_{DEF,s} \times W_{DEF,s} \times M_{A,s} \times 0.5 \times \frac{44}{12} \right) \times 100$$

Where:

PE_{CL} = Project emissions from land use changes associated with land clearance for construction of pipeline (tCO_2)

$L_{DEF,s}$ = Length deforested for segment s (km)

$W_{DEF,s}$ = Width deforested for segment s (km)

$M_{A,s}$ = Aboveground biomass of land to be deforested for segment s (tons d.m./ha)

0.5 = Carbon fraction of dry matter (t-C/tons d.m.)

S = Segment of pipeline network

Alternatively, if the information is required by the local regulation, it can also be used to determine the total area for each vegetation type and appropriately determine the total aboveground biomass to be deforested for the project activity, instead of performing procedures above. In this case the total aboveground biomass to be deforested has to be multiplied by (0.5x44/12) to determine the project emissions from land use changes associated with land clearance for construction of pipeline.

4.3 Leakage

According to methodology AM0110 version 2.0 leakage emissions are negligible and are accounted for as zero.

[30] Volume 4, Chapter 4, tables 4.7 and 4.8.

4.4 Net GHG Emission Reductions and Removals

The main objective of this topic is to provide an example of the emission reductions calculation procedure. The demonstration below encompasses emission reductions generated by the operations of the receiving terminals of Uberaba, Ribeirão Preto and Paulínia and the delivery terminals of Guarulhos, São José dos Campos and São Caetano.

Baseline emissions

As per methodology AM0110 version 2.0 the first step into calculating the emission reductions is to calculate baseline emissions. Following provisions of this cited methodology, the baseline emissions from the transportation of the liquid fuel are calculated based on the amount of liquid fuel transported by the pipeline in each route j under the project activity, distance of the baseline route j (i.e. the distance between point of origin and point of destination for transportation of liquid fuel by trucks in route j) and a baseline emission factor in g CO2 per kilometer and ton of liquid fuel transported.

As stated in section 3.4 the baseline scenario is the transportation of the ethanol by trucks. The baseline emission factor can be achieved using two options:

a) The first option is applying a conservative default emission factor. This option can, for example, be used if the project participants do not have historical records of the fuel consumption in trucks;

b) The second option allows project participants to calculate the emission factor based on historical records of the fuel consumption for transportation of liquid fuel by trucks.

Since the replaced truck fleet belongs to third parties, access to fuel consumption history is limited. Therefore, the first option will be chosen an applied in step 2 of the baseline emissions calculation. The steps 1 and 2 are presented below.

Step 1: Determination of the distance of the baseline route j (ADj)

The distance of the baseline route is determined by the distances of i) the mills to the receiving terminals and ii) the distance between terminals as presented in the two tables below:

Average Distance (Mills to Terminal, by trucks)	Unit	Uberaba	Ribeirão Preto
Route average distance - 2021	km	262	222
Route average distance - 2022	km	315	212
Route average distance - 2023	km	234	107
Route average distance - 2024	km	234	107
Route average distance - 2025	km	234	107
Route average distance - 2026	km	234	107
Route average distance - 2027	km	234	107
Route average distance - 2028	km	234	107
Route average distance - 2029	km	234	107

Route average distance - 2030	**km**	234	107
Route average distance - 2031	**km**	234	107
Route average distance - 2032	**km**	234	107

Table 6 – Average distance from mills to terminals for each year of the crediting period

Terminals	Unit	Average Distance (Terminal to Terminal, by trucks)
Uberaba-Paulínia	**km**	350
RibeirãoPreto-Paulínia	**km**	207
Paulínia-Paulínia	**km**	5
Paulinia - São Caetano do Sul	**km**	145
Paulínia-Guarulhos	**km**	193
Paulinia - São José dos Campos	**km**	173

Table 7 – Average distance from terminal to terminal

The source for the data from table 6 is the calculated average distance from mills to the terminals weighted by the transported volume of ethanol. This information is available in Logum Logística S.A information system and can be assessed by the VVB. The first two years are filled with real values and the ongoing years are estimated based on the planned volume for each mill and terminal. As the values calculate from terminal to terminal, the distance consider the optimal route in terms of fuel consumption following provisions of the methodology AM0110 version 2.0. The table below represents the route from mills to the delivering terminals, which is calculated by aggregating the data from the two tables above:

Average distance AD_j	UNIT	Uberaba-Paulínia	RibeirãoPreto-Paulínia	Paulínia-Paulínia	Paulinia - São Caetano do Sul	Paulínia-Guarulhos	Paulinia - São José dos Campos
Route average distance - 2021	**km**	612	429	5	145	193	173
Route average distance - 2022	**km**	665	419	5	145	193	173
Route average distance - 2023	**km**	584	314	5	145	193	173
Route average distance - 2024	**km**	584	314	5	145	193	173
Route average distance - 2025	**km**	584	314	5	145	193	173
Route average distance - 2026	**km**	584	314	5	145	193	173
Route average distance - 2027	**km**	584	314	5	145	193	173
Route average distance - 2028	**km**	584	314	5	145	193	173
Route average distance - 2029	**km**	584	314	5	145	193	173
Route average distance - 2030	**km**	584	314	5	145	193	173
Route average distance - 2031	**km**	584	314	5	145	193	173
Route average distance - 2032	**km**	584	314	5	145	193	173

Table 8 – Average distance from mills to delivering terminals for each route j

Step 2: Determination of baseline emission factor for transportation of liquid fuel in route j ($EF_{BL,j}$)

As mentioned before the default value provided by the methodology will be used as the baseline emission factor. The value is 76 g CO_2e/ton.km according to paragraph 30 of the methodology AM0110 version 2.0. Since in Brazil is mandatory that trucks use diesel blended with biodiesel, the default value shall be multiplied by the share (fraction) of petrodiesel in blended diesel determined on an energy basis. The share values for each year are presented in the table below and are provided by the National Oil, Natural Gas and Biofuels Agency of Brazil by the federal law Nº 11.097[31] :

Share (fraction) of petrodiesel in blended diesel	%
2021	89,2%
2022	90,0%
2023	89,6%
2024	88,0%
2025	88,0%
2026	88,0%
2027	88,0%
2028	88,0%
2029	88,0%
2030	88,0%
2031	88,0%
2032	88,0%

Table 9 – Share of petrodiesel in blended diesel in Brazil

After obtaining the value for the average distance and baseline emission factor of the transported ethanol, the total volume transported in each route must be calculated. It should be noted that in order to calculate the distance on each route, the volume received at each terminal and the volume destined for the delivery terminals are taken into account, so that the average distance is weighted by the proportional amount of these routes. For example, if the volume in 2021 is received with a proportion of 50% in Uberaba, 25% in Ribeirão Preto and 25% in Paulínia, and delivered 50% in Guarulhos, 25% in São José dos Campos and 25% in São Caetano do Sul, the average distance is calculated according to the equation below:

$$Average\ distance\ for\ 2021 = (50\% \times 612\ km + 25\% \ \times 429km + 25\% \times 5km) + (50\% \times 193km + 25\% \times 173km + 25\%\ x\ 145km) = 602.5km$$

The tables below present the volume planned for each receiving and delivering terminal for each year:

	Planned volume of ethanol received (thousands of m3)			
Year	**Uberaba**	**Ribeirão Preto**	**Paulínia**	**Total**
2021	571	1,563	155	2,289
2022	863	1,928	816	3,607
2023	952	2,554	1,367	4,872
2024	1,496	3,083	1,376	5,954

[31] http://www.planalto.gov.br/ccivil_03/_ato2004-2006/2005/Lei/L11097.htm

2025	1,748	3,541	1,696	6,986
2026	2,000	4,000	2,017	8,017
2027	2,000	4,000	2,179	8,179
2028	2,000	4,000	2,342	8,342
2029	2,000	4,000	2,606	8,606
2030	2,000	4,000	2,675	8,675
2031	2,000	4,000	2,740	8,740
2032	1,333	2,667	1,870	5,870

Table 10 – Volume of ethanol received in each terminal for each year in m^3

	Planned volume of ethanol delivered (thousands of m3)			
Year	**Guarulhos**	**São Caetano do Sul**	**São José dos Campos**	**Total**
2021	140	-	-	140
2022	388	827	-	1,215
2023	524	1,436	155	2,115
2024	952	1,908	336	3,195
2025	1,158	2,343	472	3,972
2026	1,364	2,778	607	4,750
2027	1,386	2,821	610	4,817
2028	1,407	2,864	612	4,883
2029	1,437	2,953	642	5,032
2030	1,450	2,950	650	5,050
2031	1,450	2,950	710	5,110
2032	967	1,967	513	3,447

Table 10 – Volume of ethanol received in each terminal for each year in m^3

By applying the logic above the average distance is calculated for each year as follows:

Year	Average Distance (km)
2021	639
2022	545
2023	439
2024	473
2025	469
2026	466
2027	460
2028	454
2029	445
2030	443
2031	441
2032	440

Table 10 – Aggregated average distance of routes j for each year

For the baseline emissions calculation the amount of ethanol in cubic meters is multiplied by the ethanol density of 0,789 according to the Brazilian National Energetic Balance of 2022[32]. The calculation with the parameters for each year is presented below:

Year	Distance (km) AD	Amount of Ethanol (m3)	Ethanol Density	Amount of ethanol (tons) T	Emissions from transport (gCO2e/ton/km) EF_{BL}	Baseline Emissions BE_y
2021	639	139,601	0.789	110,14	76	5,349
2022	545	1,215,045	0.789	958,67	76	39,675
2023	439	2,114,922	0.789	1,668,673	76	55,674
2024	473	3,194,947	0.789	2,520,813	76	90,555
2025	469	3,972,313	0.789	3,134,155	76	111,676
2026	466	4,749,679	0.789	3,747,497	76	132,718
2027	460	4,816,523	0.789	3,800,237	76	132,868
2028	454	4,883,367	0.789	3,852,977	76	133,038
2029	445	5,031,570	0.789	3,969,909	76	134,402
2030	443	5,050,000	0.789	3,984,450	76	134,254
2031	441	5,110,000	0.789	4,031,790	76	135,259
2032	440	3,446,666	0.789	2,719,419	76	90,838

Table 11 – Baseline emissions for each year

It should be noted that the calculation above follows the equation bellow, although for the purpose of simplifying the demonstration, the distance and volume values for each route were aggregated for each year by weighing the proportions of receipt and delivery at the terminals considering the distances presented before:

$$BE_y = \sum_j \left(T_{j,y} \times AD_j \times EF_{BL,j} \times 10^{-6}\right)$$

Where:

BE_y = Baseline emissions during the year y (tCO_2e).

$T_{j,y}$ = Amount of liquid fuel transported by the pipeline in route j in year y (ton)

AD_j = Distance of the baseline route j (km)

$EF_{BL,j}$ = Baseline emission factor for transportation of liquid fuel in route j (gCO_2 per ton.km, that is gCO_2 per ton of liquid fuel and km travelled)

Project emissions

Project emissions are calculated as follows:

[32] https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-675/topico-638/BEN2022.pdf

$$PE_y = PE_{EC,y} + PE_{FF,y} + PE_{CR,y} + PE_{CL}$$

Where:

PE_y = Project emissions in year y (tCO_2)

$PE_{EC,y}$ = Project emissions from electricity consumption to operate the pipeline system in the project activity in year y (tCO_2)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption to operate the pipeline system in the project activity in year y (tCO_2)

$PE_{CR,y}$ = Project emissions from transportation of liquid fuels in complementary routes in trucks in year y (t CO_2)

PE_{CL} = Project emissions from land use changes associated with land clearance for construction of pipeline (tCO_2)

To calculate the project e emissions listed above, the steps from 3 to 6 of the methodology AM0110 version 2.0 might be followed. The steps are demonstrated below:

Step 3 Determination of project emissions from electricity consumption to operate the pipeline system in the project activity in year y ($PE_{EC,y}$)

For the calculation of emissions from electricity consumption the Tool 05 "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" version 3.0 shall be used. As per the methodological tool 05 the project emissions should be calculated as follows:

$$PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EF,j,y} \times (1 + TDL_{j,y})$$

Where:

$PE_{EC,y}$ = Project emissions from electricity consumption in year y (t CO_2 / yr)

$EC_{PJ,j,y}$ = Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)

$EF_{EF,j,y}$ = Emission factor for electricity generation for source j in year y (t CO_2/MWh)

$TDLj,y$ = Average technical transmission and distribution losses for providing electricity to source j in year y

Since the project has its energy consumed from the Brazilian interconnected national grid, the emission factor is calculated using option A1 of tool 05 (paragraph 19). The option is described below:

Option A1: Calculate the combined margin emission factor of the applicable electricity system, using the procedures in the latest approved version of the "Tool to calculate the emission factor for an electricity system" ($EF_{EL,j/k/l,y} = EF_{grid,CM,y}$).

Here, source j is the interconnected national grid. The Tool defines that the combined emission factor is:

$$EF_{grid,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Where:

$EF_{grid,y}$ = Grid emission factor in year y (tCO2/MWh)

$EF_{grid,OM,y}$ = Operating margin CO2 emission factor in year y (t CO2/MWh)

$EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (t CO2/MWh)

w_{OM} = Weighting of operating margin emissions factor (per cent)

w_{BM} = Weighting of build margin emissions factor (per cent)

Brazilian operating and building margins of the interconnected grid are calculated annually and provided by the Ministry of Science, Technology and Innovation. The values for the years of 2021 and 2022 are presented below and can be found at the ministry website[33]. For the purpose of this example the values for the years from 2023 to 2032 will be the same as 2022 since they are not published yet.

Year	Operating Margin	Building Margin
2021	0.5985	0.054
2022	0.3621	0.027
2023	0.3621	0.027
2024	0.3621	0.027
2025	0.3621	0.027
2026	0.3621	0.027
2027	0.3621	0.027
2028	0.3621	0.027
2029	0.3621	0.027
2030	0.3621	0.027
2031	0.3621	0.027
2032	0.3621	0.027

Table 12 – Operating and Building Margins of the Brazilian National Grid

As per methodological tool 07 version 7.0 all projects which are not solar and wind power plants should use the values of w_{OM} = 0.5 and w_{BM} = 0.5 for the first crediting period, and w_{OM} = 0.25 and w_{BM} = 0.75 for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool. The grid emission factor calculated for each year is presented below:

[33] https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao

Year	Operating Margin	Building Margin	w_{OM}	w_{BM}	Grid Emission Factor
2021	0.5985	0.054	0.5	0.5	0.3263
2022	0.3621	0.027	0.25	0.75	0.1108
2023	0.3621	0.027	0.25	0.75	0.1108
2024	0.3621	0.027	0.25	0.75	0.1108
2025	0.3621	0.027	0.25	0.75	0.1108
2026	0.3621	0.027	0.25	0.75	0.1108
2027	0.3621	0.027	0.25	0.75	0.1108
2028	0.3621	0.027	0.25	0.75	0.1108
2029	0.3621	0.027	0.25	0.75	0.1108
2030	0.3621	0.027	0.25	0.75	0.1108
2031	0.3621	0.027	0.25	0.75	0.1108
2032	0.3621	0.027	0.25	0.75	0.1108

Table 13 – Grid Emission Factor for each year

For the calculation of the quantity of electricity consumed by the project it will be used an electricity meter installed at the sources of consumption. The values will be measured in absolute terms and monitored. For the purpose of this example of calculation an average of the pipeline efficiency was calculated using the measure of the year of 2019:

Pipeline Efficiency	UNIT	Value
Mayors pumps average Power used	KW	961
Mayors pumps average - Ethanol Flow	m^3/h	769
Total volum of liquid transported	m^3	4,000,000
Hours of mayors pump Operation	hours	5,202
Consumption mayor pumps	KW.h	4,998,700
Pipe efficiency rate	$KW.h/m^3$	1,250
Share of energy consume due to internal terminal flows	#	0.3
Pipe efficiency rate (short distance)	$KW.h/m^3$	0.536

Table 14 – Efficiency of Electricity Consumption

The average technical transmission and distribution losses $TDLj,y$ value of 7.3% was obtained using the latest value published by the Brazilian DNA ANEEL in 2021[34].

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https://antigo.aneel.gov.br/documents/654800/18766993/Relat%C3%B3rio+Perdas+de+Energia_+Edi%C3%A7%C3%A3o+1-2022.pdf/143904c4-3e1d-a4d6-c6f0-94af77bac02a#:~:text=As%20perdas%20t%C3%A9cnicas%20e%20n%C3%A3o,Homologat%C3%B3rias%20(REHs)%20da%20ANEEL.

The table below presents the calculation parameters and results for the project emissions from electricity consumption:

Year	Amount of ethanol (m3)	Pipe electricity consumption efficiency (Kwh/m3)	Electricity Consumption (Mwh) $EC_{PJ,j,y}$	Grid Emission Factor (tCO2/Kwh) $EF_{EF,j,y}$	Technical Distribution Losses $TDLj,y$	Project Emissions from electricity Consumption $PE_{EC,y}$
2021	139,601	0.536	75	0.3263	7.3%	26
2022	1,215,046	0.536	651	0.1108	7.3%	77
2023	2,114,922	0.536	1,134	0.1108	7.3%	135
2024	3,194,947	0.536	1,712	0.1108	7.3%	204
2025	3,972,314	0.536	2,129	0.1108	7.3%	253
2026	4,749,680	0.536	2,546	0.1108	7.3%	303
2027	4,816,524	0.536	2,582	0.1108	7.3%	307
2028	4,883,368	0.536	2,617	0.1108	7.3%	311
2029	5,031,571	0.536	2,697	0.1108	7.3%	321
2030	5,050,000	0.536	2,707	0.1108	7.3%	322
2031	5,110,000	0.536	2,739	0.1108	7.3%	326
2032	3,446,666	0.536	1,847	0.1108	7.3%	220

Table 15 – Project emissions from electricity consumption for each year

Step 4: Determination of project emissions from fossil fuel consumption to operate the pipeline system in the project activity in year y ($PE_{FF,y}$)

The project activity does not use any kind of fossil fuel to operate the pipeline. Therefore, the value for $PE_{FF,y}$ is null.

Step 5: Determination of project emissions from transportation of liquid fuels in complementary routes in trucks in year y ($PE_{CR,y}$)

The project emissions from transportation of liquid fuels in complementary routes will be calculated using the option B "Determination of specific fuel consumption by sampling" since direct monitoring is unfeasible due to the fact that carriers are third parties. After determining the specific fossil fuel consumption of the trucks by sampling achieving the parameter SC_{FF} the amount of fossil fuel consumption is calculated by route following the equation below:

$$FC_y = SC_{FF} \times \sum_k T_{k,y} \times AD_{k,y}$$

Where:

FC_y = Fossil fuel consumption of trucks transporting project liquid fuel in complementary routes in year y (dm^3)

SC_{FF} = Specific fossil fuel consumption of trucks transporting liquid fuel in complementary routes (dm^3 /ton.km)

$T_{k,y}$ = Amount of liquid fuel transported by trucks in complementary route k in year y (ton)

$AD_{k,y}$ = Distance of complementary route k (one way) in year y (km) k = complementary routes

As sampling will be held from the moment the project initiates monitoring, the calculations presented below will be conducted using an estimated fuel consumption based on the efficiency parameters provided below:

Parameters	Unit	Value	Source
$EFCO_{2,diesel}$	tCO_2/TJ	74.1	IPCC (2006)
NCV_{diesel}	TJ/ton	0.043	IPCC (2006)
Density of diesel	ton/m^3	0.789	ANP (National Petroleum Agency)
(COEF) - CO_2 emission coefficient of fuel type i in year y (petroDiesel)	tCO_2/ m^3	2.514	IPCC (2006)
Truck Fuel economy - loaded - SEC_{load}	km/liters	3.40	GHG Protocol Tool 2023
Truck Fuel economy - empty - SEC_{empty}	km/liters	3.40	GHG Protocol Tool 2023
Truck Fuel economy - loaded - SEC_{load}	liters/km	0.3	Calculated
Truck Fuel economy - empty - SEC_{empty}	lietr/km	0.3	Calculated
Specific fossil fuel consumption SC_{FF}	$dm^3/ton.km$	0.00745	Calculated

Table 16 – Parameters and calculation of estimated specific fuel consumption

The complementary distances were calculated for each route considering the average distances from mills to terminals and the proportion of the amount of ethanol received in each terminal for each year. In other words, for each year is calculated the aggregated average distance weighted by the amount of ethanol transported in each route. Calculated distances are presented below:

Year	Average Distance AD_y (km)
2021	292
2022	189
2023	252
2024	238
2025	243
2026	246
2027	252
2028	258
2029	266
2030	268
2031	270
2032	272

Table 17 – Aggregate average distance by route for each year

The amount of ethanol travelled for each year was aggregated for each route to achieve the parameter, $\sum_k T_{k,y}$. After that, as per methodological tool 03 “Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion” the fraction of petrodiesel in blended diesel is considered, as well as the coefficient of CO_2 emission of fuel type $COEF_{i,y}$, which in this case is only diesel, thus, as per IPCC 2006[35] , the emission factor for liter or dm³ is 0.002603 tCO_2e. The values for each parameter for each year, as well the calculated emissions form complementary transport, are presented below:

Year	Distance (km) $AD_{k,y}$	Diesel Consumption per dm³/ ton.km SC_{FF}	Amount of ethanol (ton) $\sum_k T_{k,y}$	Amount of diesel Consumption (dm³) FC_y	Petrodiesel fraction in blended diesel (%)	Emission Factor (tCO_2e/dm^3) $COEF_{i,y}$	Emission from complementary routes $PE_{cr,y}$
2021	292	0.00745	110,145	239,620	0.892	0.002603	556
2022	189	0.00745	958,671	1,347,655	0.900	0.002603	3,157
2023	252	0.00745	1,668,674	3,131,321	0.896	0.002603	7,303
2024	238	0.00745	2,520,813	4,465,951	0.880	0.002603	10,230
2025	243	0.00745	3,134,155	5,667,104	0.880	0.002603	12,981
2026	246	0.00745	3,747,497	6,877,855	0.880	0.002603	15,55
2027	252	0.00745	3,800,237	7,137,070	0.880	0.002603	16,48
2028	258	0.00745	3,852,977	7,394,375	0.880	0.002603	16,938
2029	266	0.00745	3,969,909	7,870,199	0.880	0.002603	18,028
2030	268	0.00745	3,984,450	7,962,841	0.880	0.002603	18,240
2031	270	0.00745	4,031,790	8,117,035	0.880	0.002603	18,593
2032	272	0.00745	2,719,420	5,514,492	0.880	0.002603	12,632

Table 18 – Parameters and project emissions from complementary routes calculation

Step 6: Determination of project emissions from land use changes associated with land clearance for construction of pipeline (PE_{CL})

As stated by the methodology AM0110 version 2.0 if the information of deforested area is required by local regulations, the total amount of aboveground biomass shall be appropriately determined and multiplied by 0.5x44/12. The total hectare of deforested area is presented below together with the

[35] https://www.ipcc-nggip.iges.or.jp/public/2006gl/

correspondent authorizations of vegetation suppression given by the Environmental Agency of the state of São Paulo[36].

Pipe Section	Authorization of Vegetation Suppression Number	Total hectare of deforestation
EVL Suzano - Guarulhos	98858/2018	4.65
Guarulhos - São Caetano do Sul	57430/2018	12.82
Guararema - São José dos Campos	60918/2020; 70835/2021	12.16
Guarulhos	28/2020	2.05
Total		31.68

Table 19 – Total deforested area as declared for local regulations.

The amount of aboveground biomass was determined using the default values of IPCC guideline volume 4[37], which is 100 tons.d.m. ha^{-1} for tropical moist deciduous forest considering the Americas other broadleaf as the parameter for the continent. The emissions from land use changes associated with land clearance for construction of pipeline is calculated as per the equation below:

PE_{CL} = 31.68 x 100 x 0.5x44/12 = 5,808 tCO_2e

According to the methodology this value is incorporated in the project emissions of the first year of project activity.

As the result of the calculations of the project emissions demonstrated above the total project emissions are presented below:

Year	Project emissions from electricity consumption $PE_{EC,y}$	Project emissions from fossil fuel consumption $PE_{FF,y}$	Project emissions from transportation of liquid fuels in complementary routes $PE_{CR,y}$	Project emissions from land use PE_{CL}	Project Emissions PE_y
2021	26	0	556	5,808	6,390
2022	77	0	3,157	0	3,234
2023	135	0	7,303	0	7,438
2024	204	0	10,230	0	10,434
2025	253	0	12,981	0	13,234

[36] All authorizations of vegetation suppression are available for VVB verification

[37] https://www.ipcc-nggip.iges.or.jp/public/2006gl/ Volume 4, Chapter 4, tables 4.7 and 4.8.

2026	303	0	15,755	0	16,058
2027	307	0	16,348	0	16,655
2028	311	0	16,938	0	17,249
2029	321	0	18,028	0	18,349
2030	322	0	18,240	0	18,562
2031	326	0	18,593	0	18,919
2032	220	0	12,632	0	12,852

Table 20 – Project Emissions for each year

Leakage

According to methodology AM0110 version 2.0 leakage emissions are negligible and are accounted for as zero.

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
2021	5,349	6,390	0	-1,041
2022	39,675	3,234	0	36,441
2023	55,674	7,438	0	48,236
2024	90,555	10,434	0	80,121
2025	111,676	13,234	0	98,442
2026	132,718	16,058	0	116,660
2027	132,868	16,655	0	116,213
2028	133,038	17,249	0	115,789
2029	134,402	18,349	0	116,053
2030	134,254	18,562	0	115,692
2031	135,259	18,919	0	116,340
2032	90,838	12,852	0	77,986

Total	1,196,306	154,566	0	1,036,932

5 MONITORING

5.1 Data and Parameters Available at Validation

The tables below are in reference to all data and parameter that are determined or available at validation and remain fixed throughout the project crediting period.

Table 5.1.1

Data / Parameter	$EF_{BL,j}$
Data unit	*gCO_2 per ton.km*
Description	*Baseline emission factor for transportation of liquid fuel in route j*
Source of data	*Default value of methodology AM0110 version 2.0*
Value applied	*76*
Justification of choice of data or description of measurement methods and procedures applied	*The value is provided by the methodology*
Purpose of Data	*Calculation of baseline emissions*
Comments	-

Table 5.1.2

Data / Parameter	$M_{A,s}$
Data unit	tons d.m./ha
Description	Aboveground biomass of land to be deforested for segment s
Source of data	Default value for aboveground biomass for segment s, to be deforested for each segment on the basis of conservative interpretation of IPCC 2006 Guidelines11
Value applied	100
Justification of choice of data or description of measurement methods	Since the project participant is required to report the total deforested area by the implementation of the project activity, it

and procedures applied	was chosen to multiply the total area by the default value for aboveground biomass of the identified type of vegetation to obtain the value of emissions associated with land clearance.
Purpose of Data	*Calculation of project emissions*
Comments	The calculation is held once and it is considered only in the first year of the crediting period.

Table 5.1.3

Data / Parameter	W_{OM}
Data unit	%
Description	Weighting of operating margin emissions factor
Source of data	Value provided by the methodological tool 07 version 7.0
Value applied	0.5 for the first period and 0.25 for the subsequent years
Justification of choice of data or description of measurement methods and procedures applied	Value provided by the methodological tool 07 version 7.0
Purpose of Data	*Calculation of project emissions*
Comments	

Table 5.1.4

Data / Parameter	W_{BM}
Data unit	%
Description	Weighting of building margin emissions factor
Source of data	Value provided by the methodological tool 07 version 7.0
Value applied	0.5 for the first period and 0.75 for the subsequent years
Justification of choice of data or description of measurement methods and procedures applied	Value provided by the methodological tool 07 version 7.0
Purpose of Data	*Calculation of project emissions*
Comments	

5.2 Data and Parameters Monitored

The tables below are in reference to all data and parameter that are for each year of the project crediting period.

Table 5.2.1

Data / Parameter	ADj
Data unit	kilometers
Description	Distance of the baseline route j (km)
Source of data	Historical data or measurement from the project participants
Description of measurement methods and procedures to be applied	The localization of each mill, receiving and delivery terminals are available in Logum Logística S.A information system. Average distances can be calculated considering the historical data of the amount of ethanol travelled in each route for each year.
Frequency of monitoring/recording	*Annually*
Value applied	*Estimated values are provided in tables 8 and 9*
Monitoring equipment	*The data of location of mills, receiving and delivery terminals are stored in Logum Logística S.A information systems*
QA/QC procedures to be applied	*Data is extracted from the information system by the project team following an established and documented procedure and can be assessed or replicated by the VVB.*
Purpose of data	*Calculation of baseline emissions*
Calculation method	Each point of origin (mills) is registered at the Logum Logistic System and the average of the distance to each receiving terminal is calculated. The distance between terminals are also registered. The average distance of the route is weighted considering the amount of ethanol travelled in each route for each year.
Comments	-

Table 5.2.2

Data / Parameter	$SC_{FF,k}$
Data unit	dm^3/ton.km
Description	Specific fossil fuel consumption of trucks transporting liquid fuel in complementary route k
Source of data	Sampling by project participant
Description of measurement methods and procedures to be applied	The latest version of the "Standard for sampling and surveys for CDM project activities and programme of activities" shall be used to determine the specific fuel consumption of the trucks transporting liquid fuel in complementary routes. The sampling shall provide the specific consumption of fossil fuel of trucks transporting liquid fuel in complementary route k
Frequency of monitoring/recording	*Annually*
Value applied	*0.00745 (estimated)*
Monitoring equipment	*Data will be collected following provisions of the* "Standard for sampling and surveys for CDM project activities and programme of activities"
QA/QC procedures to be applied	*Data will be collected following provisions of the* "Standard for sampling and surveys for CDM project activities and programme of activities"
Purpose of data	*Calculation of project emissions*
Calculation method	*Calculation will be held following provisions of the* "Standard for sampling and surveys for CDM project activities and programme of activities"
Comments	-

Table 5.2.3

Data / Parameter	$T_{j,y}$
Data unit	*Ton*

Description	Amount of liquid fuel transported by the pipeline in route j in year y (ton)
Source of data	Historical data from the project participants
Description of measurement methods and procedures to be applied	*Amount of liquid fuel transported by the pipeline for each route is registered in Logum Logidstia S.A information system and can be assessed any time.*
Frequency of monitoring/recording	*annually*
Value applied	*The estimated values are provided in table 10.*
Monitoring equipment	*The values are stored in Logum Logistica S.A information system.*
QA/QC procedures to be applied	*Data is extracted from the information system by the project team following an established and documented procedure and can be assessed or replicated by the VVB.*
Purpose of data	*Calculation of baseline emissions*
Calculation method	Not applicable
Comments	-

Table 5.2.4

Data / Parameter	$EC_{PJ,j,y}$
Data unit	*Mwh/year*
Description	Quantity of electricity consumed by the project electricity consumption source j in year y
Source of data	Measure by installed electricity meters
Description of measurement methods and procedures to be applied	*The total amount of electricity consumed by the project is measure in each terminal by local teams and stored in Logum Logística project data base.*
Frequency of monitoring/recording	*annually*
Value applied	*The estimated value per m^3 is provided in table 16.*

Monitoring equipment	*The values collected with electricity meter installed in each terminal.*
QA/QC procedures to be applied	*Data is extracted from the local team following an established and documented procedure that can be assessed by the VVB.*
Purpose of data	*Calculation of project emissions*
Calculation method	Not applicable
Comments	-

Table 5.2.4

Data / Parameter	$EF_{EF,j,y}$
Data unit	tCO_2/MWh
Description	Emission factor for electricity generation for source j in year y
Source of data	Application of the methodological tool 07 version 7.0
Description of measurement methods and procedures to be applied	*The measurement follow the provisions of the methodological tool 07version 7.0*
Frequency of monitoring/recording	*annually*
Value applied	*The estimated value for each year is provided in table 13.*
Monitoring equipment	*Not Applicable*
QA/QC procedures to be applied	*The measurement follow the provisions of the methodological tool 07version 7.0*
Purpose of data	*Calculation of project emissions*
Calculation method	Not applicable
Comments	-

Table 5.2.5

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO_2/MWh
Description	Operating margin CO2 emission factor in year y
Source of data	Brazilian Ministry of Science, Technology, and Innovation
Description of measurement methods and procedures to be applied	*The data is provided by the Brazilian of Science, Technology, and Innovation at the url https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao*
Frequency of monitoring/recording	*annually*
Value applied	*The estimated value for each year is provided in table 12.*
Monitoring equipment	*Not Applicable*
QA/QC procedures to be applied	*Not pplicable.*
Purpose of data	*Calculation of project emissions*
Calculation method	Not applicable
Comments	-

Table 5.2.6

Data / Parameter	$EF_{grid,\mathrm{BM},y}$
Data unit	tCO_2/MWh
Description	Building margin CO2 emission factor in year y
Source of data	Brazilian Ministry of Science, Technology, and Innovation
Description of measurement methods and procedures to be applied	*The data is provided by the Brazilian of Science, Technology, and Innovation at the url https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao*
Frequency of monitoring/recording	*annually*
Value applied	*The estimated value for each year is provided in table 12.*

Monitoring equipment	*Not applicable*
QA/QC procedures to be applied	*Not applicable.*
Purpose of data	*Calculation of project emissions*
Calculation method	Not applicable
Comments	-

Table 5.2.7

Data / Parameter	$TDLj,y$
Data unit	%
Description	Average technical transmission and distribution losses for providing electricity to source j in year y
Source of data	Brazilian DNA (ANEEL)
Description of measurement methods and procedures to be applied	*The data is provided by the Brazilian DNA (ANEEL)*
Frequency of monitoring/recording	*annually*
Value applied	*7.3% for the year of 2021*
Monitoring equipment	*Not Applicable*
QA/QC procedures to be applied	*Not applicable.*
Purpose of data	*Calculation of project emissions*
Calculation method	Not applicable
Comments	-

Table 5.2.8

Data / Parameter	$T_{k,y}$
Data unit	*Dm³*
Description	Amount of liquid fuel transported by trucks in complementary route k in year y
Source of data	Historical data from the project participants
Description of measurement methods and procedures to be applied	*Amount of liquid fuel transported by the pipeline for each route is registered in Logum Logidstia S.A information system and can be assessed any time.*
Frequency of monitoring/recording	*annually*
Value applied	*The estimated values are provided in table 10.*
Monitoring equipment	*The values are stored in Logum Logistica S.A information system.*
QA/QC procedures to be applied	*Data is extracted from the information system by the project team following an established and documented procedure and can be assessed or replicated by the VVB.*
Purpose of data	*Calculation of project emissions*
Calculation method	Not applicable
Comments	-

Table 5.2.8

Data / Parameter	$AD_{k,y}$
Data unit	*Kilometers*
Description	Distance of complementary route k (one way) in year y
Source of data	Historical data or measurement from the project participants
Description of measurement methods and procedures to be applied	The localization of each mill and receiving terminals are available in Logum Logística S.A information system. Average distances can be calculated considering the historical data of the amount of ethanol travelled in each route for each year.
Frequency of	*Annually*

monitoring/recording	
Value applied	*Estimated values are provided in table 17.*
Monitoring equipment	*The data of location of mills and receiving terminals are stored in Logum Logística S.A information systems*
QA/QC procedures to be applied	*Data is extracted from the information system by the project team following an established and documented procedure and can be assessed or replicated by the VVB.*
Purpose of data	*Calculation of project emissions*
Calculation method	Each point of origin (mills) is registered at the Logum Logistic System and the average of the distance to each receiving terminal is calculated. The average distance of the route is weighted considering the amount of ethanol travelled in each route for each year.
Comments	-

5.3 Monitoring Plan

The monitored parameters of the project activity encompass collection of primary, sampling and published data. Information regarding the baseline and complementary routes, as well as the total amount of ethanol transported in each route and electricity consumption of pipe operations is collected through primary data, since it is stored in Logum Logística S.A information system or can be measured with instruments installed in its infrastructure. The consumption of fossil fuel from trucks travelling from mills to terminals (complementary route) is collect by sampling following provisions of the "Standard for sampling and surveys for CDM project activities and program of activities". Finally, the information related to the emission factor of the national electricity grid is provided by published data from Brazilian authorities. The scheme below presents the parameters and their sources of data collection:

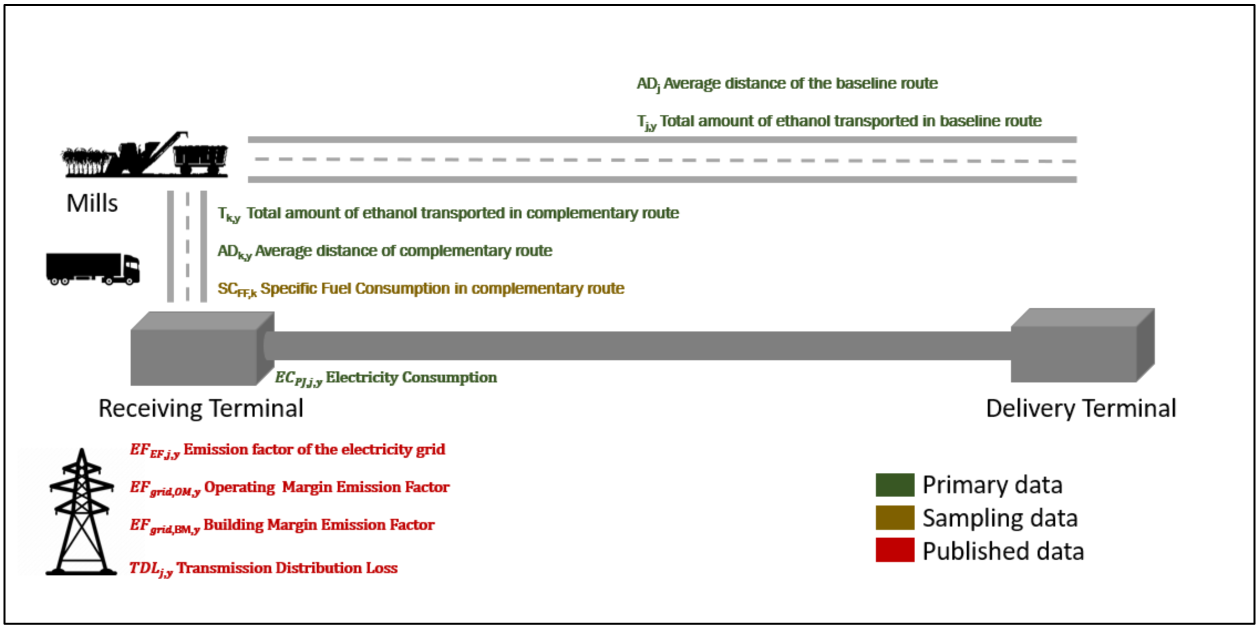

Figure 14 – Monitoring data source scheme

Primary data:

AD_j Average distance of the baseline route and $AD_{k,y}$ Average distance of complementary route

Information of localization of mills', receiving and delivery terminals are stored in Logum Logística S.A information system. To calculate the baseline route the information between mills and receiving terminals are calculated considering the average optimal road route weighted by the amount of ethanol transported from each mill. From receiving to delivery terminals, the distance calculation considers the optimal road between them. Since the project activity rely on three different points of receiving the distance to the delivery terminal is the average distance of Uberaba, Ribeirão Preto and Paulínia terminals weighted by the total amount received in each terminal for each year.

$T_{j,y}$ Total amount of ethanol transported in baseline route and $T_{k,y}$ Total amount of ethanol transported in complementary route

The amount of ethanol transported in baseline route is the registered quantity of fuel delivered in each terminal each year. This information is easily collected in Logum Logística S.A's information system, since this is a critical information for the business performance. For the calculation of the amount transported in complementary route, the quantity of ethanol delivery in terminals are considered to be received following the proportion of the total amount flowing from mills to the three receiving terminals, so the amount transported for each complementary route can be estimated.

$EC_{PJ,j,y}$ Electricity consumption

The electricity consumption to operate the pipelines is measured by an electricity meter installed in each terminal. This information is collected and stored for other purposes than the monitoring of the project activity, it is also important to track the efficiency of the pipeline operation in order to manage costs and identify maintenance issues.

Sampling Data

$SC_{FF,k}$ Specific Fuel Consumption in complementary routes

The specific fuel consumption is calculated in quantity per ton.km. The estimation of this parameter is collected by sampling. The fleet the transports the ethanol form mills to receiving terminals are third part, so it is necessary to collect information from a sample of travels. The data consists of four parameters for each travel being i) distance travelled, ii) quantity of ethanol transported, iii) time running empty and iv) diesel consumption. The sample must satisfy the conditions stated in the guideline “Standard for sampling and surveys for CDM project activities and program of activities”.

Published Data

$EF_{EF,j,y}$ Emission factor of the electricity grid, $EF_{grid,OM,y}$ Operating Margin Emission Factor, $EF_{grid,BM,y}$ Building Margin Emission Factor and $TDL_{j,y}$ Transmission Distribution Loss

The information composing the emission factor of the national electricity grid is published by the Brazilian Ministry of Science, Technology and Innovation and Brazilian’s DNA (ANEEL). The data is collected and sources are displayed in the monitoring report under the standard of Verra VCS.

Monitoring Plan Organizational Structure

The information to be collected for project monitoring purposes is collected in internal systems and by sampling third part transport suppliers. The project leader designed by Logum Logistica S.A is accountable for collecting the data and implementing procedures of quality and integrity. All information gathering is formally registered, and their evidence is presented to the VVB in the monitoring report verification. To enforce the quality and integrity of project monitoring a committee consisted of Logum Logística S.A leadership members is responsible for approving all parameters the compose the monitoring report for each verification cycle. The structure and information flow are synthetized in the scheme below:

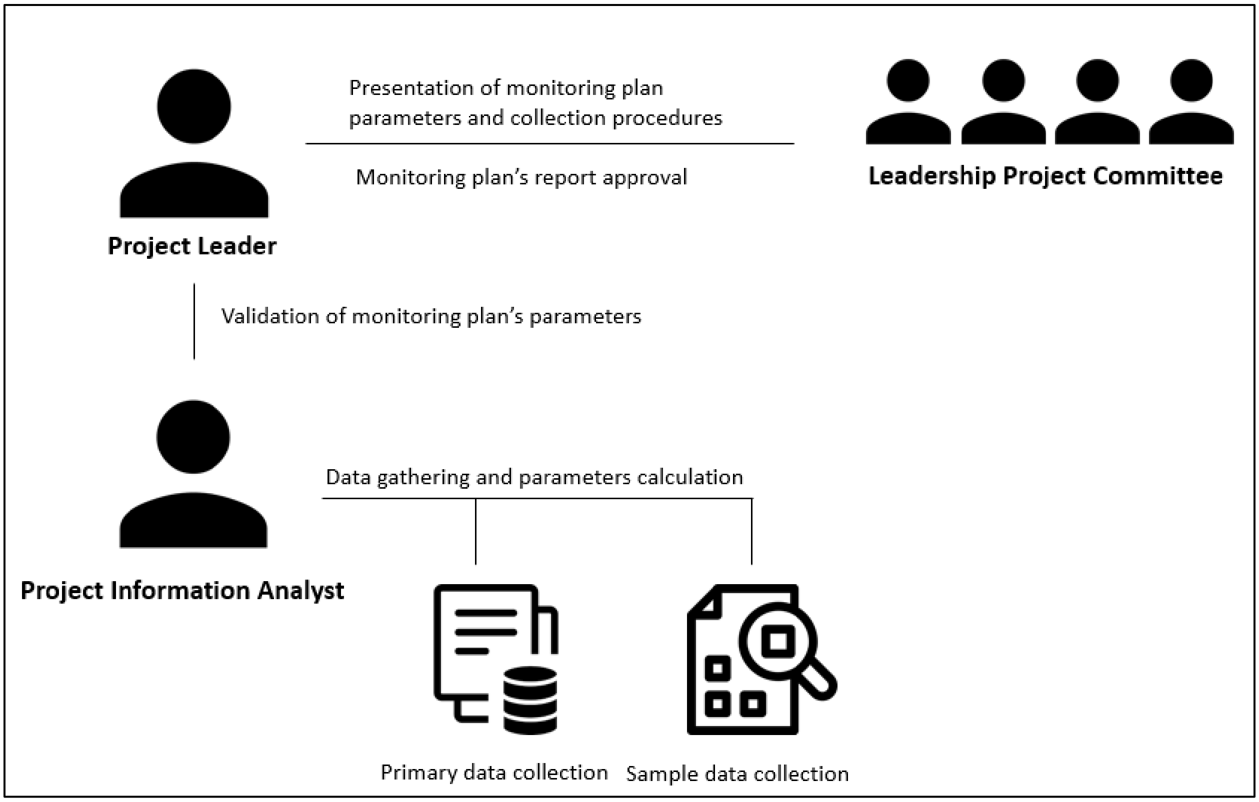

Figure 15 – Monitoring plan organization structure scheme