

Argentina Landfill Protocol Workgroup Meeting #2 Notes and Takeaways

Workgroup Meeting #2 Notes – 2/12/2025 | 11:30am – 1:30pm (ARG time) **Reserve Attendees:** Amy Kessler, Rachel Mooney, Alex French, Miguel López Delgado <u>Link to review recording</u>

Workgroup Members in attendance:

Organization (alphabetically)	Name	Present (P) or Absent (A)
ATOA Carbon	Sami Osman	A
Ecobait360 /Delta Regional National Technological University	Ariel Clebañer	А
EMPAR Environmental Solutions	Brunel Alejandro	A
Environmental Management and Sustainable Development	Fernando Pegoraro	А
HINS	Sofia Neyra	Р
Independent Consultant	Ana Marcela Villarroya	A
Independent Consultant	Gisela Daniele	Р
Independent Consultant	Jose Davila	Р
Independent Consultant	Nicolas Zeballos	Р
IRAM - Argentine Institute for Standardization and Accreditation	Jessica Wasilevich	Р
LSQA Argentina	Alejandra N. Arribillaga	Р
MexiCO2	David Colin	A
Ministry of Environment and Circular Economy Cordoba Province	Germán Juri	А
Ministry of Environment and Circular Economy Cordoba Province	Iriart Marine	Р
Secretariat of Climate Change, Ministry of Environment and Circular Economy of the Province of Córdoba	Julia Coito	Р
SEGAM CONSULTANT/Secretariat of Energy Transition, Ministry of Infrastructure and Public Services of the Province of Cordoba	Marcos Cena	Р



Agenda:

- 1. Introduction
- 2. Process overview
- 3. Protocol Considerations
 - Previous meeting pending questions
 - Social Safeguards MRV
 - The GHG Assessment Boundary
 - Quantifying GHG Emission Reductions
 - Project Monitoring & Monitoring Requirements
 - QA/QC requirements
- 4. Next steps

Main Points of Discussion and Decisions Made:

1. Previous meeting pending questions

- The Reserve presented the topics that were discussed during the previous Working Group (WG) meeting and the comments that were received via email. The Reserve provided space for anyone that had other comments/documents to share.
- Concept of methanization was understood to be the process in which organic solid wastes are anaerobically degraded and produce biogas. It was confirmed that within the context of landfills methanization is determined as eligible. The concept of the organic waste digestion protocol, which registers projects that divert and anaerobically digest eligible organic waste and/or wastewater streams that otherwise would have gone to uncontrolled anaerobic storage, treatment and disposal systems, was also presented.
 - WG member clarified that this comment was made at the previous meeting in reference to biogas methanization, not waste methanization. Process in which landfill gas is treated to extract/purify methane from landfill gas.
 - The Reserve clarified that the Protocol focuses on landfills and specifically the GHG limits of the project are defined from the moment the waste is deposited in the landfill and the landfill gas is captured to the gas destruction inside or outside the facility. The ultimate purpose of the gas must be destruction. Therefore, methanization could be carried out if the whole process, plus the destruction of the biogas, is well controlled and monitored and there is access to the parameters of the destruction device. In addition, GHG emissions from the landfill gas treatment process should be quantified and deducted from the GHG emission reductions of the project.
- The Reserve reminded the GW and observers to submit any comments or documents considered relevant for the Protocol development. Outstanding items include:
 - Evapotranspiration Pools and their role in landfills.
 - Examples of active Landfill Gas Collection and Control Systems and applicable destruction devices in use in the jurisdiction.
 - Further information on the national, provincial, and/or local environmental permits and documents required to operate a landfill.
 - Further information on the special ownership conditions for Landfills in Argentina that should be considered in the protocol. What documents should verifiers review to confirm ownership of landfill facilities in Argentina.



- The Reserve mentioned that there were no comments received regarding this topic, so then it would be possible to proceed with the scenarios proposed during the previous meeting (for example: Landowner (private) + Landfill Operator + Municipality Waste Provider, or Public Land (military), Landfill Operator, External Operators City/Municipality waste provider among others)
- Review of the Free Prior Informed Consent and Notification and Participation (Social Safeguards 1 & 2). Specifically, please clarify the overview of stakeholders involved and to be considered to comply with the requirements of these safeguards.
- Inventories or databases that track the operation of each landfill and data on landfill gas collection and control systems in the jurisdiction.
- Additional information on the impact of CDM or other international standards on common practice in the industry (projects mapped)
- Studies and/or data to confirm that the installation of landfill gas collection and control systems not common practice at landfills in Argentina
 - The Reserve mentioned that no studies were received, but comments confirming that it is not a common practice. Reminder of sending comments/studies documents to the Reserve's team
- Further information on the laws/regulations applicable to landfills in Argentina (by Province, Municipalities) and the applicable regulatory agencies.
- Information on Occupational Health and Safety laws for landfill sites and the applicable regulatory body/agency.
- Information on the regulatory body that oversees environmental regulations for landfills.
- Emission Factors for Stationary and Mobile Combustion Fuels in Argentina, Net Calorific Values of Fossil Fuels in Argentina, Predetermined Destruction Efficiencies for Combustion Devices. Alternatively, confirm that the use of existing values is appropriate

2. Safeguards MRV

- The Reserve Presented the SS 1 FPIC and asked if it would be feasible for the scenario proposed between the potential actors involved in a landfill project in Argentina to comply with the protocol and SS1. Considering the relationship between the parties involved, their contract (to clarify the ownership of GHG emissions reductions), the meetings and transfer of project information in the initial moments, as well as the project approval process through voting and acceptance. It was also reminded that these meetings must be documented. The topics discussed, the agreed points, information from the participants, etc. must be noted. These meeting notes must be signed by the present participants.
 - WG member: There is an experience with a landfill in Santa Fe that in the initial stages of the installation of the landfill the project proponent tried to meet with all potential involved actors. There were meetings with the municipality and provincial authorities. So, this type of practices are being done in the current landfill scene in Argentina.
- The Reserve presented SS2 Ongoing Notification, Participation, and Documentation and mentioned that it would be needed signed documentation to demonstrate compliance.



Then understanding that meetings are usually held, and meeting notes can be provided it is understood as feasible.

- No comments from the WG
- The Reserve presented SS3 Labor and Safety and asked what the verification of this safeguard should look like.
 - WG Member questioned if the verifiers should contact the applicable government agency because this could be problematic since communications with the government agencies can take a long time. Also mentioned that some landfills may be accredited under ISO 45001 Occupational Health and Safety Standard.
 - The Reserve commented that verifiers shall have a way to verify that all rules and regulations related to Labor and Safety for Landfills in Argentina must be complied aside from checking the Signed Attestation of Regulatory Compliance. It was also mentioned that it is needed to check but it may be possible that entities accredited under ISO 45001 may comply directly with this safeguard
- The Reserve presented SS4 Respect Local Land Tenure Rights & No Conflicts. It was stated that it will be mandatory to sign the Attestation of No Conflict attesting that there are no land tenure disputes that affect the project boundary, including all landfill installations directly associated with the carbon project. Additionally, the Reserve conducts a 30-day public comment period for all listed projects prior to registration and has an ongoing dispute resolution process. Projects receiving material complaints will not be registered until a satisfactory dispute resolution plan has been approved.
 - No comments from the WG
- The Reserve presented ES1 Air and Water Quality and ES2 Mitigation of Pollutants. It was mentioned that, apart from the signed Attestation of Regulatory Compliance form, the project developer must certify that the project is in material compliance with all applicable laws, including environmental regulations (e.g., air and water quality). Projects must be designed and implemented to mitigate potential emissions of pollutants that may cause degradation of soil, air, surface water, and groundwater quality, and project developers must obtain appropriate local permits prior to installation to avoid violation of all applicable laws. Then, projects must keep the historical records, ongoing monitoring and reporting through data logging of physical measurements, online sources, and government data to demonstrate the project was designed as exposed above.
 - No comments from the WG

3. The GHG Assessment Boundary

- The Reserve presented the GHG Assessment Boundary for the project which includes all emissions sources from the operation of the landfill gas collection system to the ultimate destruction of the gas. The primary gases included are CO₂ and CH₄.
 - CO2 emissions associated with the generation and destruction of landfill gas are considered biogenic emissions (as opposed to anthropogenic) and will not be included in the GHG reduction calculation.
 - To clarify this point: The rationale is that carbon dioxide emitted during combustion represents the carbon dioxide that would have been emitted during natural decomposition of the solid waste. Emissions from the landfill gas control system do not yield a net increase in atmospheric carbon dioxide because they are theoretically equivalent to the carbon dioxide absorbed during plant growth.



- This protocol does not account for CO2 reductions associated with the displacement of fossil-based grid-delivered electricity or natural gas.
- N2O emissions are excluded, baseline and project emissions are assumed to be equal or very small
- The Reserve presented the GHG Assessment Boundary also in an example illustration showing all the emission sources of a landfill project. It was noted that not all of the sources presented would always be in a project. In addition, it was mentioned that leakage is not expected with these protocols.
 - WG member asked if leaks in the landfill gas destruction system are expected and if calibration checks are included.
 - The Reserve clarified that the protocol does have monitoring criteria and will consider the calibrations and revisions of the landfill gas capture and collection systems. No further details were provided as the monitoring requirements proposed by the Protocol will be discussed later during the meeting.

4. Quantifying GHG Emission Reductions

- The Reserve presented the quantification of GHG Emissions Reductions of a Landfill Project that are quantified by comparing actual project emissions to baseline emissions at the landfill
 - Baseline emissions are an estimate of the GHG emissions from sources within the GHG Assessment Boundary that would have occurred in the absence of the landfill project.
 - Project emissions are actual GHG emissions that occur at sources within the GHG Assessment Boundary. Project emissions must be subtracted from the baseline emissions to quantify the project's total net GHG emission reductions.
 - GHG emission reductions must be quantified and verified on at least an annual basis.
 - Project developers may choose to quantify and verify GHG emission reductions on a more frequent basis if they desire.
 - The length of time over which GHG emission reductions are quantified and verified is called the "reporting period."
 - Project developers shall use the calculation methods provided in this protocol to determine baseline and project GHG emissions to quantify GHG emission reductions.
- The Reserve presented the organizational chart for equations and invited WG members and observers to review this section of the Protocol to provide any comments that may arise.
- The Reserve presented the quantification of Baseline Emissions. The baseline scenario assumes that all uncontrolled methane emissions are released to the atmosphere except for the portion of methane that would be oxidized by bacteria in the soil of uncovered landfills, absent the project.
 - Projects can be grouped into different categories depending upon the baseline scenario and take the appropriate deduction.
 - Landfills where no previous destruction took place prior to project implementation
 - Landfills where previous collection and/or destruction took place with a non-qualifying destruction device



- Landfills where previous collection and destruction took place with a qualifying destruction device
- Closed landfills where previous collection and destruction took place in a qualifying flare
- Any project at a landfill where methane was collected and destroyed at any time prior to the project start date – even if the prior collection and/or destruction system was removed or has been dormant for an extended period of time – must apply the pre-project deduction
- No comments from the WG
- The Reserve presented the quantification of Project Emissions. Certain GHG emissions may occur or increase as a result of the project activity and therefore must be deducted from the overall project reductions.
 - The following categories of emissions must be accounted for under this protocol:
 - Total annual indirect carbon dioxide emissions resulting from consumption of electricity from the grid
 - Total annual carbon dioxide emissions from the on-site destruction of fossil fuel
 - Total annual carbon dioxide emissions from the combustion of supplemental natural gas
 - Total annual methane emissions from the incomplete combustion of supplemental natural gas
 - Emissions resulting from incomplete destruction of landfill gas or the fugitive release of landfill gas do not need to be accounted for. It is assumed that these would have been released to the atmosphere in the baseline scenario as well
 - No comments from the WG

5. Project Monitoring & Monitoring Requirements

- The Reserve presented the monitoring requirements. Project developers are responsible for monitoring project performance and operating the landfill gas collection and destruction system in accordance with the manufacturer's recommendations for each system component.
 - The Protocol requires a monitoring plan to be established for all project-related monitoring and reporting activities.
 - It will serve as a basis for verifiers to confirm that the monitoring requirements of the Protocol have been and continue to be met, and that strict ongoing monitoring and recording is being carried out.
 - It should cover all aspects of monitoring and reporting contained in this
 protocol and should specify how data for the parameters will be collected
 and recorded.
 - It should include details of the frequency with which data is obtained, the recording plan; the frequency with which instruments are cleaned, inspected, field verified and calibrated. In addition, the role of the person performing each specific monitoring activity, as well as the QA/QC arrangements. This is to ensure that data collection and metric calibration is ongoing and accurate.
 - Must include a detailed diagram of the landfill gas collection and destruction system, including the placement of all meters and equipment that affect FSRs within the GHG Assessment Limits.



- Must include the procedures that the project developer will follow to determine and demonstrate that the project passes the Legal Requirement Test at all times.
- Methane emission reductions from landfill gas capture and control systems must be monitored with measurement equipment that directly meters:
- The flow of landfill gas delivered to each destruction device, measured continuously and recorded every 15 minutes or totalized and recorded at least daily, adjusted for temperature and pressure
- The fraction of methane in the landfill gas delivered to the destruction device, measured continuously and recorded every 15 minutes and averaged at least daily (measurements taken at a frequency that is between daily and weekly may be used with the application of a 10% discount). Projects may not be eligible for crediting if methane concentration is not measured and recorded at least weekly.
 - WG member asked why the 10% deduction is applied to projects that conduct measurements between daily and weekly, stating that the methane fluctuation is not that significant.
 - The Reserve stated that we will follow up with more details and invite to the GW members and observes to please send comments, documentation, or related studies that could support that the methane fraction does not vary daily, or in few days, or even weekly.
- The operational activity of the destruction device(s) monitored and documented at least hourly to ensure landfill gas destruction. Alternatively, the presence of a safety shut off valve.
- The Reserve asked the GW if there is access in Argentina to the following equipment:
 - Continuous flow meters
 - Continuous methane concentration analyzers
 - Portable instruments to acquire methane data (i.e., handheld methane analyzer)
 - Portable instruments to conduct field checks for calibration accuracy of monitoring equipment
 - Devices that can automatically self-calibrate
 - Pressure transmitters for alternative flow monitoring
 - Meters installed on the wellhead to improve biogas collection efficiency
 - Thermocouples to confirm operational status of flares
- WG member: in general, all devices are available but are expensive and can be found in very few places.
- WG member advised that there is access to all the device types presented, however they are imported and expensive. There is no local manufacturer. Moreover, there is limited experience in monitoring equipment for destruction. The more common destruction systems are passive; flow meters are not common. Other common monitoring is related to safety reasons, generation of electricity, or other atmospheric pollutants (i.e. odors).
 - Clarification: As an alternative to the direct measurement of LFG, projects may instead choose to demonstrate volumes of CH4 destroyed using output data for their destruction device. Please check section 6.1.1. Indirect Monitoring Alternative.



- The Reserve continued presenting monitoring requirements:
 - If discontinuous CH4 concentration monitoring is to be employed, then the project developer shall develop a prescriptive methodology for how such monitoring is carried out.
 - Methane fraction of the landfill gas is to be measured on a wet/dry basis, depending on the basis (i.e., measured on the same basis) of measurement for flow, temperature, and pressure.
 - Methane and flow meters must be installed in the same location relative to any moisture-removing components and operate on the same basis
 - Allowed variation: flow meter on dry basis and methane on wet basis.
 - No comments from the WG.
 - If there are any periods when not all destruction devices measured under a single flow meter are operational, methane destruction during these periods will be eligible provided that the verifier can confirm all the following conditions were met:
 - The destruction device efficiency of the least efficient destruction device in operation shall be used as the destruction efficiency for all destruction devices monitored by this meter.
 - All devices are either equipped with valves on the input gas line that close automatically if the device becomes non-operational (requiring no manual intervention), or designed in such a manner that it is physically impossible for gas to pass through while the device is non-operational.
 - For any period where one or more destruction devices within this arrangement is not operational, it must be documented that the remaining operational devices have the capacity to destroy the maximum gas flow recorded during the period. For devices other than flares, it must be shown that the output corresponds to the flow of gas.
 - No comments from the WG.
 - All destruction devices must have their operational status monitored and recorded at least hourly. If these data are missing or never recorded for a particular device, that device will be assumed to be not operating and no emission reductions may be claimed for landfill gas destroyed by that device during the period when data are missing.
 - All flow data collected must be corrected for temperature and pressure at 0 °C and 1 atm, either internally or via Equation 5.2. The temperature and pressure of the landfill gas must be measured continuously.
- The Reserve presented direct use scenarios: where gas is delivered offsite to a thirdparty end user (not commercial natural gas transmission/distribution system) must make reasonable effort to obtain operational status of the destruction device(s).
 - Alternatively, the verifier must confirm to a reasonable level of assurance that there is no release of gas, including:
 - Signed attestation of no catastrophic failure.
 - In person interview with the owner of the destruction device(s).
 - Exam safety features and equipment design.
 - Records that corroborate type and level of operation of the destruction device (e.g. engine output data).



- The Reserve presented the suggested arrangement of the landfill gas flow meters and methane concentration metering equipment.
 - The number of flow meters must be sufficient to track the total flow as well as the flow to each destruction device. The presented scenario includes one more flow meter than would be necessary to achieve this objective.
 - No comments from the WG.

6. QA/QC requirements

- The Reserve presented the QA/QC requirements
 - The Monitoring Plan should include quality assurance/quality control (QA/QC) provisions to ensure that data acquisition and meter calibration are performed consistently and accurately. Metering equipment is sensitive to gas quality (moisture, particulates, etc.), so a strict QA/QC procedure for calibration of such equipment should be established in the monitoring plan. Measuring instruments should be inspected and calibrated according to the following schedule.
 - All gas flow meters and continuous methane analyzers must be:
 - Cleaned and inspected on a regular basis, as specified in the project's monitoring plan, with activities and results documented by site personnel. Cleaning and inspection frequency must, at a minimum, follow the manufacturers' recommendations.
 - Field checked for calibration accuracy by a third-party technician with the percent drift documented, using either a portable instrument (such as a pitot tube) or manufacturer specified guidance, at the end of – but no more than two months prior to or after – the end date of the reporting period
 - The Reserve requested information about the potential third-party technician for the field check for calibration accuracy.
 - WG Members: stated that there are labs in Buenos Aires and in the interior of the country available to perform calibration and field checks. A WG member asked if self-calibrated devices are eligible.
 - The Reserve responded that in those cases it may be needed to contact the Reserve's team. It depends on the devices and their specifications.

<u>Clarification:</u> Devices that self-calibrate automatically would not be considered a third-party calibration under the protocol and would need additional consideration if it is a common device. Selfcalibrate devices may be used but will need review from the Reserve's team.

- Calibrated by the manufacturer or a certified third-party calibration service per manufacturer's guidance or every 5 years when calibration frequency is not specified by the manufacturer.
- All flow meters and methane analyzers should be within a +/-5% threshold for accuracy.
- No comments from the WG.



- The Reserve presented the missing data scenario and invited the WG members to review appendix C of the Protocol
 - In situations where the flow rate or methane concentration monitoring equipment is missing data, the project developer shall apply the data substitution methodology provided in Appendix C. If for any reason the destruction device monitoring equipment is inoperable (for example, the thermocouple on the flare), then no emission reductions can be registered for the period of inoperability.
 - No comments from the WG.

Next steps

- The Reserve reviewed the next steps
 - WG should send their comments on the items discussed at the second meeting in writing by February 21, 2025.
 - The next WG meeting was planned for March 5, 2025, at 11:30-13:30 ARG time,
 - WG member mentioned that will not be present that date.
 - No other comments received from the WG.
- The next WG meeting (#3) was finally set for Monday, March 10, 2025, at 11:30-13:30 ARG time

Pending Questions for the Workgroup:

- Please provide inventories or databases that track the operation of each landfill and data on landfill gas collection and control systems at any scale.
- Please provide studies and/or data to confirm that the installation of landfill gas collection and control systems not common practice at landfills in Argentina
- Please send comments, documentation, or related studies that could support the fact that the methane fraction does not vary daily, or in few days, or even weekly
- Please provide further information on the passive destruction systems usually installed and the monitoring equipment used, if any.
- Please provide examples of commonly used equipment for:
 - Continuous flow meters
 - Continuous methane concentration analyzers
 - Portable instruments to acquire methane data (i.e., handheld methane analyzer)
 - Portable instruments to conduct field checks for calibration accuracy of monitoring equipment
 - Devices that can automatically self-calibrate
 - Pressure transmitters for alternative flow monitoring
 - Meters installed on the wellhead to improve biogas collection efficiency
 - Thermocouples to confirm operational status of flares
- Please confirm feasibility of the suggested arrangement for the landfill gas flow meters and methane concentration metering equipment
- Please provide further information about the potential third-party technician for the field check for calibration accuracy. Location of the instrumental labs, ownership (private/public), services and/or expertise, accreditation and/or approval form the manufacturer, other.