PILOT – DECISION SUMMARY

Decision Summary – Q1 2025

PUBLICATION DATE: **12.05.2025**
VERSION: Pilot 2.0

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SUMMARY

This document outlines the assessment and approval decisions for innovative dMRV (digital Monitoring, Reporting, and Verification) pilot projects submitted under dMRV Pilot Programme. The pilots represent diverse applications of digital technology in for activities spanning electric cooking solutions, biomass cooking systems, safewater supply, sustainable rice cultivation practices and others. Each project has been evaluated for its likely conformance with Gold Standard requirements. The decision includes specific conditions and forward actions required for each pilot before their first verification, ensuring robust implementation of dMRV solutions while maintaining data integrity and verification standards.

CONTENTS

1| Pilot – Approved in Previous Round(s)

Pilot	Project ID	Title	Decision
01	PoA - GS11815, VPAs - GS 11817, 11816	Electric Cooking Program by ATEC	Approved
02	PoA - GS11506, VPAs - GS11507	Fair Climate Programme for Advanced Biomass Cooking Solutions (PoA)	Approved
03	PoA: GS 13121, VPA: GS 13122	Pro-climate paddy cultivation for reducin methane emission and saving water (PoA)	Approved

2| Pilot 04- Project Oasis: India Smallholder Dairy Biogas Project

2.1 | Project Information

Project Title: Project Oasis: India Smallholder Dairy Biogas Project

GS ID: PoA – GS23154*, VPAs – GS23177

**New VPAs (real case or regular case) may be included provided that VPAs demonstrate conformance with GS4GG requirements and meet any conditions outlined below.*

Project Developer: Arukah Capital Pte. Ltd.

Submission Date: 15/02/2025

Approval date: 28/04/2025

2.2 | Methodology:

Title: Methodology for Animal Manure Management and Biogas Use for Thermal Energy Generation.

Version: 1.1

Deviations from methodology requirements: None

2.3 | dMRV solution overview

Arukah and Sembcorp present a next generation dMRV solution applying the Gold Standard Methodology for Animal Manure Management and Biogas Use for Thermal Energy Generation, Version 1.1. The solution targets household-scale biogas units for smallholder dairy farmers in India. Building on in-field trials by Arukah from Feb 2024, spanning at-source digital metering and digital payments to farmers for verified work, dMRV solution covers monitoring, reporting, and verification addresses traditional challenges in monitoring and verifying decentralized small biogas units.

The technical solution integrates IoT-enabled metering devices that monitor 100% of installed units, replacing traditional sampling methods. The system features automated data collection through internet infrastructure, real-time emissions reduction calculations, and blockchain-based data verification. This digital infrastructure enables remote tracking and control while significantly reducing operational costs associated with last-mile monitoring.

This dMRV solution offers three key advantages. First, it ensures accuracy through IoT metering, automated data cleaning, and AI-driven verification. Second, it improves efficiency by eliminating the need for costly on-site visits and enabling real-time performance tracking. Third, it enhances transparency through farmer-level data visualization, blockchain-based data integrity, and secure access for all stakeholders including developers, auditors, and buyers.

The solution has significant scaling potential - with an estimated addressable market of 150 million smallholder farming households globally, up from the current 1 million installed units. At full scale, this could generate approximately 1 Gigaton of annual emissions reduction and $10 billion in climate-related

income, while promoting clean energy transition and sustainable agriculture practices.

2.4 | Decision

Final Assessment: Approved

2.5 | Conditions (if any):

The following Forward Actions to be completed before the first verification:

1. FAR 1: The developer shall estimate the energy usage attributable to the use of digital monitoring and reporting infrastructure attributable to the project activity in a conservative manner and account these emissions as project emissions to estimate the net emission reductions from the project.
2. FAR 2: The developer shall document data security protocols:
    - Detail user authentication and authorization frameworks
    - Compliance with GDPR and local data protection regulations
3. FAR 3: The project developer shall implement monitoring for a minimum sample size of 40 representative biogas units during the piloting phase (i.e., first six months) or a sample size determined to achieve 90/10 confidence interval, whichever is higher. The project design document shall detail the scaling strategy from pilot phase (30 units) to full deployment (2,000 units) with a clear timeline. To ensure continuous monitoring during both piloting and full deployment, protocols for maintaining data integrity shall be in place.
4. FAR 4: For biogas use for energy generation purposes, the developer shall comply with the requirements as outlined in the applied version of methodology for parameter Qbiogas,d,y.
5. FAR 5: The Project Design Document (PDD) shall be supplemented with thoroughly documented AI/ML implementation strategy, including detailed model architectures, training methodologies, and data pre-processing techniques. The documentation should specify the complete training dataset sources, data quality assurance measures, and model validation procedures. Additionally, the document should outline how the AI systems maintain transparency and auditability through clear version control and logging mechanisms.

    The Validation and Verification Body (VVB) shall assess the following aspects during validation/verification — as applicable:

    - Completeness and accuracy of AI model documentation
    - Appropriateness of training data selection and pre-processing methods
    - Implementation of model performance monitoring and quality control measures

- Compliance with relevant data protection and privacy regulations
- Presence of adequate audit trails for model decisions and outputs

Both the project developer and VVB shall ensure that all AI/ML systems maintain clear accountability channels and include appropriate safeguards against potential system failures or biases.

6. For the dMRV application, the proposed approach to annual survey among all participating farmers instead of using sampling-based baseline and monitoring surveys is accepted, subject to the following conditions:
   - Any data gaps in methodology compliance shall be addressed using conservative estimates
   - The quantification approach shall be adjusted as needed where VVB shall validate the accuracy ensuring conservativeness as needed.
   - The developer shall share the outcome at the time of the next updates i.e., after six months of decision communication.
7. The VVB shall follow the requirements outlined in **dMRV - Validation and verification requirements** for further assessment.
8. **Recommendation:** The project developer should stay updated regarding the digitization of this methodology. A digitized version of the methodology is under development and may become available for application. When available, the developer may explore opportunities to integrate the proposed project activity to take advantage of the full digital ecosystem.

2.6 | Next Steps:

- The project developer shall update status of dMRV implementation at six months time from approval date.
- The project developer may submit the request for validation/verification following the requirements outlined in **Application of GS4GG requirements with dMRV solution**.

3| PILOT 05- Aquacarbon Safewater

3.1 | Project Information

Project Title: Aquacarbon Safewater
GS ID: PoA - GS23182*, VPAs - GS23183
**New VPAs (real case or regular case) may be included provided that VPAs demonstrate conformance with GS4GG requirements and meet any conditions outlined below.*
Project Developer: Element15 B.V.
Submission Date: 06/02/2025
Approval date: 28/04/2025

3.2 | Methodology:

Title: Emission Reductions from Safe Drinking Water Supply,

Version: 1.0

Deviations from methodology requirements: None

3.3 | dMRV solution overview

The project implements digital Measurement, Reporting, and Verification (dMRV) for safe drinking water supply initiatives, following the "Emission Reductions from Safe Drinking Water Supply" methodology version 1.0. The pilot project, currently operational in Ghana, focuses on quantifying carbon reductions from avoided water boiling through improved water access.

The Element15 dMRV platform represents an advancement in carbon credit verification by integrating IoT sensors, AI-driven analytics, and geospatial data into a comprehensive digital ecosystem. The solution operates on VIKTOR, an ISO-certified development platform that ensures data security and compliance standards. The system employs three key technological components:

1. Smart Data Collection Infrastructure:
    - IoT-enabled water meters installed at community treatment sites provide real-time usage monitoring
    - Geospatial analysis tools utilizing satellite imagery and digital mapping for population coverage assessment
    - Mobile-enabled field surveys through KoBoToolbox for offline data collection in rural areas
2. Advanced Analytics and Processing:
    - Machine learning algorithms detect usage anomalies and predict maintenance requirements
    - Integrated big data system combines IoT sensor data, geospatial insights, and survey information
    - Automated validation and standardization processes reduce human error
3. Secure Cloud-Based Platform:

- Centralized data storage with robust access control and encryption
- Automated compliance reporting aligned with Gold Standard methodologies
- Dedicated verifier portal for independent audits and certification

The solution addresses traditional MRV challenges by eliminating manual inefficiencies and fragmented record-keeping. Key advantages include:

- Enhanced accuracy through automated data collection and validation
- Reduced operational costs and accelerated credit issuance
- Improved transparency with real-time dashboard access for stakeholders
- Strengthened carbon offset integrity through reliable data management

Through these improvements in accuracy and efficiency, the platform strengthens confidence in carbon credit generation and trading. The system's reliable, continuously updated data minimizes reporting inconsistencies and disputes. With automated validation and compliance tracking aligned with established MRV methodologies, the platform creates a standardized, auditable process that will continue to evolve and improve based on performance metrics.

3.4 | Decision

- **Final Assessment**: Approved

3.5 | Conditions (if any):

The following Forward Actions to be completed before the first verification:

1. FAR 1: The developer shall estimate the energy usage attributable to the use of digital monitoring and reporting infrastructure attributable to the project activity in a conservative manner and account these emissions as project emissions to estimate the net emission reductions from the project.
2. FAR 2: The developer shall document data security protocols:
    - Detail user authentication and authorization frameworks
    - Compliance with GDPR and local data protection regulations
3. FAR 3: The developer shall implement a robust data recovery system:
    - Create automated backup schedule with specified retention periods
    - Document failover procedures and emergency response protocols
4. FAR 4: The developer shall implement a digital verification approach for all eligible end users (i.e., those residing within one kilometer of the water system) as per methodology requirements. This should use GPS-

based mobile service technology to verify user distances and establish automated verification protocols to replace manual surveys. The developer may implement an alternative solution that offers similar robustness.

5. The Project Design Document (PDD) shall be supplemented with thoroughly documented AI/ML implementation strategy, including detailed model architectures, training methodologies, and data pre-processing techniques. The documentation should specify the complete training dataset sources, data quality assurance measures, and model validation procedures. Additionally, the document should outline how the AI systems maintain transparency and auditability through clear version control and logging mechanisms.

   The Validation and Verification Body (VVB) shall assess the following aspects during validation/verification — as applicable:

   - Completeness and accuracy of AI model documentation
   - Appropriateness of training data selection and pre-processing methods
   - Implementation of model performance monitoring and quality control measures
   - Compliance with relevant data protection and privacy regulations
   - Presence of adequate audit trails for model decisions and outputs

   Both the project developer and VVB shall ensure that all AI/ML systems maintain clear accountability channels and include appropriate safeguards against potential system failures or biases.

6. The VVB shall follow the requirements outlined in **dMRV - Validation and verification requirements** for further assessment.

3.6 | Next Steps:

- The project developer shall update status of dMRV implementation at six months time from approval date.
- The project developer may submit the request for validation/verification following the requirements outlined in **Application of GS4GG requirements with dMRV solution**.