The Landscape of Water Monitoring, Reporting, and Verification (MRV)

A Guide to High-Integrity Water Markets

The Critical Need for High-Integrity Water Data

As global water scarcity intensifies, the corporate and sovereign sectors are increasingly committing to ambitious "Water Positive" and "Net New" goals. Achieving these goals requires a significant shift from traditional, low-assurance reporting to systems built on precision and transparency. A "Trust Gap" currently exists in the water market due to reliance on legacy Monitoring, Reporting, and Verification (MRV) frameworks that often depend on conservative estimates and manual reporting.

To bridge this gap, the industry is transitioning toward at-source verification and reporting, moving away from a reliance on spreadsheets and sporadic site visits which can lead to human error and "greenwashing." The emerging solution, Digital MRV (dMRV), utilizes IoT sensors and real-time data streams for:

- Continuous Monitoring: Replacing annual reports with real-time data.
- Immediate Verification: Reducing the need for lengthy manual audits through automated digital protocols.
- Standardized Units: Treating water as a liquid, investable asset (1 kM^3) backed by verifiable data.

This shift provides the precision and transparency required for financial and regulatory compliance and is necessary for an investable and high-integrity water market.

The Current MRV Standards Landscape

Monitoring, Reporting, and Verification (MRV) standards provide the essential framework for quantifying environmental benefits. The market is currently defined by a diverse set of standards, each focused on specific objectives, audiences, and types of water challenges. This list of MRVs is not exhaustive, but represents to our knowledge those with the most traction globally.

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Standard	Primary Audience & Use	Key Focus
VWBA 2.0	Major tech and industrial firms	Quantifying "Water Positive" replenishment claims.
WQBA	Hyperscalers and industrial users	Managing thermal, nutrient, and chemical liabilities.
Gold Standard (WBS)	Project developers and impact funders	Certifying social, health, and environmental outcomes (WASH).
AWS Standard V3.0	Large-scale industrial sites	Site-level water stewardship and catchment governance.
BEF WRCs	Conservation-focused corporations	Issuing volumetric water restoration certificates.

Market Dynamics and Standard Differentiation

The various MRV frameworks are not mutually exclusive and are often applied based on the nature of the water project and the specific corporate water goal (quantity vs. quality).

- **Volumetric Water Benefit Accounting (VWBA 2.0):** Published by a partnership of leading environmental organizations and technical experts, VWBA 2.0 is a leading framework for corporations to calculate and claim "Water Positive" replenishment goals. It is designed to guide a six-step process for quantifying, tracking, and communicating volumetric water benefits (VWBs).
- **Water Quality Benefit Accounting (WQBA):** Developed as a companion to VWBA 2.0, the WQBA standard focuses specifically on water quality improvements. It provides a scientifically-based framework for companies to quantify and claim improvements in water quality—specifically targeting pollutants like nutrients, sediment, bacteria, and thermal loads. Its development was supported and vetted by major corporate partners, including technology companies and consumer goods companies.
- **Gold Standard (Water Benefit Statement - WBS)**: Launched in 2014, this standard is dedicated to certifying the positive impacts of water projects, focusing on community-based purification and Water, Sanitation, and Hygiene (WASH)

outcomes. Its principles have been integrated into the Gold Standard for the Global Goals, ensuring projects deliver impacts toward at least three Sustainable Development Goals (SDGs).

- **Alliance for Water Stewardship (AWS) Standard V3.0:** Approved in December 2025, this standard is primarily focused on driving a stakeholder-inclusive process that ensures water use is socially equitable, environmentally sustainable, and economically beneficial at the site and catchment level. It was revised to enhance interoperability with corporate reporting standards such as the EU's Corporate Sustainability Reporting Directive (CSRD). AWS Standard V3.0 is a leading standard for industrial site water stewardship.

Industry Traction by MRV Standard and Water Source

The application of these standards varies significantly depending on the type of "Net New-Water" activity, demonstrating the differing focus of each framework.

MRV	Desalination (Sea & Brackish)	Atmospheric Water Generation (AWG)	Wastewater Reuse (Industrial/Urban)	Contamination Cleanup (e.g., PFAS)	Watershed/ Nature-Based Solutions
VWBA 2.0 (Volumetric)	Primary for corporate "Water Positive" replenishment claims.	Emerging: Used to quantify net-new volumes in arid regions.	Highly adopted: Focuses on volumes returned to the basin or offset from withdrawal.	Limited: Typically requires quality-adjusted volume metrics.	Highly adopted: Used for leakage reduction and aquifer recharge volumes.
WQBA (Quality)	Moderate: Tracks salinity and discharge impacts on local marine environments.	Secondary: Quality is a performance indicator.	Primary Use: Essential for hyperscalers managing thermal and nutrient loads.	Primary Use: Focuses on the "Purity Ladder" and destruction of specific contaminants.	Moderate: Monitors nutrient runoff and sediment reduction.

Gold Standard (WBS)	Limited: Rare, unless linked to community water access.	Highly adopted: Leading framework for off-grid WASH and social co-benefit projects.	Moderate: Used for community-based purification and "Water Access" projects.	Limited: Focus is on human health/WASH outcomes rather than industrial destruction.	Strong: High-integrity focus on additionality and social impacts.
Alliance for Water Stewardship (AWS)	Comprehensive: Site-level certification for large-scale industrial desal plants.	Niche: Emerging as AWG moves into large-scale commercial deployments.	Primary Use: The de facto standard for industrial site water stewardship.	Moderate: Applied to site-level remediation management.	Strong: Focuses on catchment-level water governance.
BEF WRCs	Limited: Historically focused on conservation rather than generation.	Niche: Being explored for "net-new" water recovery credits.	Moderate: Used in some industrial "water balance" portfolios.	Emerging: Advising on cleanup credit alignment.	Primary Use: Original framework for volumetric restoration certificates.

The Imperative for Digital Transformation

The transition to dMRV is driven by the shortcomings of traditional, manual systems, which suffer from a 3-6 month delay in verification and opaque offsets that are difficult for buyers to value. Integrating at-source verification is viewed as a necessary step for the future of high-integrity water markets to meet modern transparency and regulatory requirements.

Recommended Approach: Integrating At-Source Verification

To meet the high-integrity requirements outlined by regulators, the industry should adopt a framework that supercharges existing standards with automated data. This approach includes:

1. Automated Data Streams: Replacing paper trails with direct data streams from source hardware. Capturing telemetry at the point of generation—from desalination plants, Atmospheric Water Generation (AWG) units, or wastewater reuse systems—ensures data is accurate and tamper-proof.

2. Rich Metadata Attribution: Moving beyond simple volume to include at-source verification of:
    - Water Quality: Real-time measurement of chemical composition (pH, TDS).
    - Thermal Load: Critical data for managing environmental discharge compliance.
    - Geographic Provenance: Geocoded "Basin IDs" to prove local impact in high-stress watersheds.
3. Regulatory Alignment: Adopting at-source reporting automates compliance with major mandates such as the EU's Corporate Sustainability Reporting Directive (CSRD). This provides a "Defense File" of raw telemetry that serves as high-integrity evidence for sustainability claims, linking water stewardship directly to corporate reporting requirements.

By focusing on digital, at-source verification, the water market can establish the verifiable data needed to transform water stewardship into a transparent, quantifiable value driver.

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