

Graphyte Comments on CARB SB 905 Information Solicitation

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Chair Liane Randolph
California Air Resources Board
1001 I Street
Sacramento, CA 95814

California Air Resources Board:

Graphyte appreciates the opportunity to comment on the California Air Resources Board's (CARB's) Information Solicitation to Inform Implementation of the Carbon Capture, Removal, Utilization, and Storage (CCRUS) Program under Senate Bill 905 (SB 905).

Graphyte is a U.S. based carbon-removal company with a novel solution called Carbon Casting, an engineered biomass carbon storage process that delivers durable, low-cost, and scalable carbon removal. The process stabilizes waste biomass—such as rice straw, almond shells, and forest thinnings—by drying, compressing, and encapsulating it within an impermeable barrier. The resulting carbon blocks are stored in engineered, monitored facilities designed for 1,000+ years. Carbon Casting offers one of the most efficient, cost-effective, and high-quality approaches to generate carbon removal credits.

Graphyte has proven our ability to deliver credits at commercial scale through the Loblolly Project in Pine Bluff, Arkansas. This project has completed independent verification under the Isometric Subsurface Biomass Carbon Removal and Storage Protocol. We have issued over 6,000 carbon removal credits to date and are delivering to our early corporate buyers.

As CARB develops its SB 905 framework, Graphyte urges explicit recognition of subsurface biomass carbon removal and storage (known as biomass direct storage) as a qualifying pathway for durable carbon removal. The potential for such projects in California is significant. Each year the state produces tens of millions of tons of agricultural and forestry residues that are often burned or left to decompose, releasing CO₂ and methane. Carbon Casting can safely and permanently store this carbon while reducing wildfire risk, minimizing open burning, and creating new value streams for farmers and forest managers.

By transforming waste biomass into a permanent carbon asset, Graphyte can help California meet its carbon-neutrality and methane-reduction goals, while driving economic development in rural communities.

Responses to Selected Questions

Question 1 – Additional Key Terms for Definition

CARB should adopt a new term — “Durable CDR Storage Solution” — to encompass all carbon dioxide removal (CDR) approaches that achieve verifiable, long-term carbon storage on climate-relevant timescales.

A Durable CDR Storage Solution can be defined as: “A carbon removal approach that physically isolates or chemically stabilizes carbon dioxide in a form that can be directly measured, independently verified, and demonstrated to prevent re-emission of carbon for 1,000 years or longer.”

This definition is intentionally pathway-neutral and based on performance rather than storage medium. It includes both geologic storage (e.g., injection into saline reservoirs) and non-geologic engineered storage, such as direct biomass storage through Graphyte’s Carbon Casting technology. Defining durability this way allows CARB to consistently evaluate all durable removal pathways using common criteria of measurability, permanence, and verifiability. This clarity will distinguish short-term sequestration from durable solutions that materially advance California’s 2045 carbon neutrality goal.

Question 3 – Additional Project Categories

CARB should explicitly recognize direct biomass storage as a distinct category of carbon dioxide removal or breakout subcategory within ‘Biomass-based carbon removal and storage.’ Direct biomass storage involves storing processed or stabilized biomass in durable terrestrial environments designed to prevent decomposition and re-emission of carbon. This differs from BECCS, biochar, and bio-oil because it does not require combustion or geologic injection. Instead, the biogenic carbon is preserved in solid form through engineered encapsulation and storage—a process that has very high biomass utilization efficient, low energy inputs, and precise monitoring, verification, and reporting.

Graphyte’s Carbon Casting technology exemplifies this approach, which has been formally codified in the Isometric Subsurface Biomass Carbon Removal and Storage Protocol (Version 1.0, 2024). That standard establishes rigorous criteria for site design, monitoring, durability justification, and post-closure stewardship consistent with CARB’s SB 905 objectives.

Recognizing direct biomass storage as its own durable CDR pathway or as a subcategory will generate visibility and improve awareness for this approach, ultimately allowing CARB to utilize California’s extensive agricultural and forestry residues, reduce wildfire and burning emissions, and expand the state’s portfolio of permanent carbon removal options.

Question 5 – Financial Responsibility Instruments

CARB should adopt an approach that accommodates the distinct characteristics of both geologic and non-geologic storage. For biomass carbon storage projects such as Carbon Casting, long-term stewardship is achieved through a combination of engineering design, continuous monitoring, and legally binding land protections.

Appropriate instruments could include:

- Surety bonds or performance bonds linked to monitoring milestones;
- Dedicated escrow or trust accounts for long-term care and remediation; and
- Environmental deed restrictions enforceable by independent third parties.

Graphyte employs this layered structure at its Arkansas site, where deed restrictions prevent land disturbance and a community nonprofit holds enforcement rights. This model ensures durability while maintaining proportional costs for smaller or early-stage projects.

Question 6 – Costs Covered by Financial Instruments

CARB's framework should require coverage for: post-closure monitoring, verification, and reporting; remediation or reversal response actions; community health protections in the unlikely event of a breach; and administrative or legal expenses associated with stewardship. Graphyte supports allowing staged or decreasing financial coverage as long-term performance is demonstrated, reducing unnecessary capital burdens while maintaining accountability.

Question 9 – Monitoring for Criteria Pollutants and Toxics

Graphyte employs a robust MRV system including continuous CO₂ and CH₄ monitoring, leak detection, regular groundwater and surface-water sampling, and regular third-party audits. These measures provide early detection of any deviations from baseline conditions and ensure public transparency. CARB should adopt performance-based MRV requirements that allow methodological flexibility based on technology risk.

Question 10 – Priority Pollutants and Monitoring Locations

For non-combustion storage pathways like Carbon Casting, monitoring should focus on methane and carbon dioxide within storage zones to confirm stability. Targeting parameters specific to each storage type will maximize environmental protection while maintaining efficiency.

Question 18 – Unified Permit Application Design

CARB's permitting framework should be modular and pathway-neutral, accommodating geologic and non-geologic storage projects under a common structure. For biomass

storage, existing solid-waste and industrial permitting pathways provide a strong model. Graphyte recommends a centralized portal with standardized templates, integration with CEQA documents, and role-based access for developers, agencies, and the public. This system would reduce redundancy and enable transparent project tracking.

Question 22 – Integration with State Climate Programs

Graphyte supports integration of verified biomass carbon removal storage credits into California's Cap-and-Trade and Low Carbon Fuel Standard. Recognizing durable biomass removals within these programs would expand the state's toolkit for meeting climate targets while maintaining rigorous accounting and verification.

Question 23 – State Actions to Scale Deployment

To achieve large-scale deployment of durable carbon removal, the State of California should take a proactive role in bringing supply online for high-integrity, high-durability projects. CARB, in coordination with other state agencies, can accelerate progress by:

- Establishing grant and incentive programs that support the construction and early operation of durable CDR facilities;
- Streamlining permitting processes for projects that meet stringent durability and environmental-safety criteria; and
- Creating long-term procurement or credit-purchase mechanisms that provide market certainty for developers investing in durable storage infrastructure.

These actions would bridge the gap between research and commercial deployment, positioning California as a leader in permanent carbon-removal technologies.

Question 25 – Protocol Development and Standardization

CARB should prioritize protocols based on durability, measurability, and independent verification rather than storage medium. The Board can accelerate progress by recognizing existing high-integrity methodologies that already meet these criteria.

Graphyte recommends that CARB:

1. Align state-level standards with global initiatives such as the IC-VCM Core Carbon Principles; and
2. Maintain technology neutrality by establishing a core performance standard for all durable CDR storage solutions, supplemented by technology-specific protocols.

This approach will accelerate regulatory readiness while maintaining the highest standards of environmental integrity and public trust.

Question 25 – Protocol Development and Standardization

CARB should prioritize protocols based on durability and verifiability rather than storage medium. Graphyte recommends a core performance standard for all durable carbon removal projects, supplemented by technology-specific modules. For biomass storage, CARB could reference the Isometric Subsurface Biomass Carbon Removal and Storage Protocol, which details requirements for 1,000-year permanence and robust MRV. Adopting third-party standards will accelerate deployment while maintaining environmental integrity.

Question 26 – Broad vs. Technology-Specific Protocols

Graphyte supports a hybrid approach including (1) a base standard for all CCRUS projects covering core requirements like durability justification, MRV, and financial assurance and (2) technology-specific protocols for unique mechanisms such as biomass storage or mineralization. This structure encourages innovation while ensuring consistent quality and comparability across projects.

Conclusion

CARB's implementation of SB 905 is a pivotal opportunity to define a scientifically rigorous, internationally aligned carbon-management framework. Recognizing engineered biomass carbon storage as a Durable CDR Storage Solution—supported by certified protocols such as Isometric's Subsurface Biomass Carbon Removal—will enable California to deploy high-integrity, low-risk carbon-removal projects that reduce wildfire risk, create agricultural value, and advance the state's carbon-neutrality goals.

Graphyte appreciates CARB's leadership and looks forward to collaborating as the agency develops standards, permitting pathways, and recognition programs for durable carbon removal.

Sincerely,

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