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One Click LCA, a life-cycle-assessment and EPD software platform for construction vs a credentialed carbon-sequestration property surface bound to the material

One Click LCA is a widely used life-cycle-assessment and Environmental Product Declaration software platform that helps construction teams quantify embodied carbon and publish verified environmental data for building products and projects. It answers a real question well: what is the environmental footprint of a design or a product. This article positions that platform against a different structural axis, an attestation that is cryptographically bound to a specific mass of installed material and that migrates with that material across its lifetime, built on the Credentialed Surfaces, disclosed in U.S. Provisional Application No. 64/050,895.

What One Click LCA, a life-cycle-assessment and EPD software platform for construction Does

One Click LCA is an established software platform for life-cycle assessment (LCA) and Environmental Product Declarations (EPDs) in the construction and manufacturing sectors. It lets designers, contractors, and manufacturers model the environmental impact of buildings, infrastructure, and products across their life cycle, drawing on large curated databases of material and process impact data. It supports many

recognized standards and reporting frameworks used in green-building certification and procurement, and it offers tooling to generate EPDs that third-party program operators can verify and publish.

The platform is genuinely strong at what it is built for. It reduces the manual burden of assembling life-cycle inventories, keeps pace with evolving methodology and regional datasets, and produces documents and dashboards that fit into how design teams and procurement organizations actually make decisions. For an architect comparing two structural systems, or a manufacturer preparing a declaration for a product line, that calculation and reporting capability is the right tool, and it is mature.

Understood at the architecture level, One Click LCA is a calculation-and-reporting layer. It ingests descriptions of designs and products, applies methodology and datasets, and emits an assessment or a declaration. That output is a document about a category of product or a specific design as modeled. It is authoritative in the sense that a verified EPD carries a program operator's assurance about the underlying study.

The Architectural Axis

The axis this disclosure addresses is not calculation quality and not dataset coverage. It is where the environmental claim lives and what it is attached to.

An EPD or LCA result is, structurally, a statement about a product type or a modeled design. It is produced at a point in time, describes a representative or specified configuration, and is published as a document that downstream parties read and trust. When a specific batch of material is poured into a specific wall, the connection between that installed mass and the published declaration is maintained by process, documentation, and organizational trust, rather than by a cryptographic binding carried by the material itself. When the building is renovated, when mortar is repointed, when a surface coating is refreshed, or when the material is eventually

recovered and reused, the environmental claim does not automatically travel with the physical mass. Re-establishing a claim against the same material at a later lifecycle stage is a fresh exercise.

This is not a defect in One Click LCA. Assessing product types and modeled designs is precisely the job an LCA and EPD platform is meant to do, and doing it against representative configurations is the correct methodology. The axis is simply orthogonal: a per-instance, material-bound, lifetime-persistent attestation is a different structural object than a product-level or project-level declaration document.

How the Disclosed Approach Differs

The disclosed architecture treats carbon sequestration as a credentialed property surface of a specific structural element, on equal footing with the element's structural, thermal, and other property surfaces. Under U.S. Provisional Application No. 64/050,895, a credentialed structural element carries a credentialed admissibility profile in which a carbon-sequestration admissibility surface is one surface among a plurality, each independently credentialed by an authority with a declared scope and composing with the others through signed composition rules. In the disclosed embodiments an environmental-credit authority signs the carbon-sequestration surface, while a structural engineering authority signs the structural surface and other authorities sign their respective surfaces.

Three structural properties distinguish this from a declaration document.

First, binding to a specific mass. The attestation is bound to the identity of a particular credentialed structural element by cryptographic signature, not asserted about a product category. In the disclosed processing pathways, an attestation is issued as a credentialed event signed by the producing apparatus's credentialed identity and recorded in the lineage chain of the produced material. The methane-avoidance attestation described in the disclosure, for example, declares the diverted feedstock

mass, a feedstock-class methane-emission factor, and the resulting carbon-dioxide-equivalent avoidance, and it is described as independently queryable by environmental-credit authorities and admissibility-evaluable by carbon-market participants.

Second, migration with the material. The disclosure describes a migrating carbon-attestation primitive in which biogenic carbon-credit attestations bound to a credentialed substrate migrate with that substrate across material flows and across structural lifetimes, each migration being a credentialed transaction signed by an environmental-credit authority and recorded in the lineage chain. This is framed to support continuous credentialed carbon-sequestration markets in which each cement pour, mortar repointing, surface-coating refresh, and re-credentialing event can issue, transfer, or extinguish carbon-credit attestations against specific structural mass, rather than against a modeled product type at a single moment.

Third, lifetime lineage and composition. The disclosure records a credentialed element's lifecycle in a lineage chain spanning pre-installation credentialing, in-service operation, end-of-storage-life, end-of-structural-life decommissioning, recycling-grade re-credentialing, and re-installation, each transition signed by an appropriate authority. A continuous re-credentialing primitive lets the composite profile be re-evaluated against cumulative material flows such as tuck-pointing, cavity-fill replacement, or topping-slab augmentation, rather than only at original installation. Because the carbon-sequestration surface composes with the structural and other surfaces under signed composition rules, the environmental claim is not a standalone document but a governed surface of the same object a building-code authority and a building energy management system evaluate.

The novelty here is architectural, not a discovery in materials science. Biomass-derived carbonaceous materials, embodied-carbon accounting, and biogenic carbon crediting are pre-existing. What is disclosed is the combination that makes an environmental claim a cryptographically bound, authority-signed, migrating property surface of a specific structural mass.

Where They Fit Together

These are complementary rather than competing. An LCA and EPD platform answers what is the environmental footprint of this design or this product, using rigorous methodology and curated datasets. That question remains essential, and nothing in the disclosed architecture computes life-cycle impacts or replaces methodology and datasets.

A natural composition is for the assessment and declaration work to inform the value declared on a credentialed material's carbon-sequestration surface, and for a program operator's or environmental-credit authority's verification to be the authority signature the disclosed architecture requires on that surface. In such a composition, the platform supplies the substantive environmental characterization, and the credentialed property surface supplies the per-instance binding, the migration across lifecycle events, and the composition with the material's other credentialed surfaces. One answers the modeling question; the other answers the this-specific-mass, over-its-whole-life binding question.

Boundary Conditions

Honesty about asymmetry matters here. One Click LCA is a shipping, mass-adopted product used on real projects today, with mature datasets and standard support. The subject of this comparison is a provisional disclosure of an architecture. It is not a built, validated, or benchmarked system, and no performance, adoption, or economic figures are claimed for it. The comparison is between something that ships and an architecture that has been disclosed.

The underlying materials science is pre-existing and is not claimed as newly discovered. Carbonaceous building-material constituents, embodied-carbon methodology, and biogenic carbon crediting all predate this disclosure. The claimed contribution is the

credentialing architecture: binding an environmental attestation to a specific material mass, migrating it across the material's lifetime, and composing it as a governed property surface with the material's other surfaces.

The disclosed architecture also depends on institutional conditions that do not yet broadly exist: environmental-credit authorities willing to sign per-instance carbon-sequestration surfaces, registries able to track migrating attestations across renovations and recyclings, and building and carbon-market participants able to consume material-bound attestations. Where those conditions are absent, product-level and project-level declarations of the kind One Click LCA produces remain the practical and appropriate instrument.

Disclosure Scope

The technical claims about the disclosed approach in this article trace to U.S. Provisional Application No. 64/050,895, which discloses a multi-function credentialed structural substrate whose carbon-sequestration admissibility surface, migrating carbon-attestation primitive, and cradle-to-cradle lineage chain are the features positioned here. The description of One Click LCA and of the broader LCA and EPD software market is external context offered to locate the disclosure on a real architectural axis; it is not part of the filing and is not a claim of the filing. Nothing here asserts any defect, deficiency, or wrongdoing on the part of One Click LCA or its operator; the platform is accurately a capable, widely used tool for its intended purpose. The comparison is limited to a structural difference in what an environmental claim is bound to and how it persists, and it should be read as describing that difference rather than ranking the two.

Building surfaces as credentialed agents that participate in the structure's networking and electrical systems.

Provisional application

PRIMARY TECHNICAL DISCLOSURE

- Credentialed Building Materials: Cryptographic Admissibility for Structural Surfaces (/articles/credentialed-building-materials-cryptographic-admissibility-for-structural-surfaces)

SECONDARY TECHNICAL

- Carbon-Sequestration Admissibility Surface (/articles/credentialed-materials/carbon-sequestration-property-surface)
- Composition Rules Governing Surface Interactions (/articles/credentialed-materials/composition-rules)
- Decommissioning And Re-Credentialing Attestation (/articles/credentialed-materials/decommissioning-and-recredentialing)
- Electrical-Distribution Admissibility Surface (/articles/credentialed-materials/distribution-property-surface)
- End-Of-Storage-Life Attestation (/articles/credentialed-materials/end-of-storage-life-attestation)
- Energy-Storage Admissibility Surface (/articles/credentialed-materials/energy-storage-property-surface)
- Lineage Chain Across Material Lifecycle (/articles/credentialed-materials/lineage-chain-across-lifecycle)
- Authority Signatures Block Binding Property Surfaces To Material Identity (/articles/credentialed-materials/master-credential-binding)
- Multi-Authority Signature Block (/articles/credentialed-materials/multi-authority-signature-block)
- Data Network Admissibility Surface (/articles/credentialed-materials/network-property-surface)
- Profile Versioning Continuity (/articles/credentialed-materials/profile-versioning-continuity)
- Structural Admissibility Surface (/articles/credentialed-materials/structural-property-surface)
- Thermal-Property Admissibility Surface (/articles/credentialed-materials/thermal-property-surface)
- Versioned Admissibility Profiles With Lineage Chain (/articles/credentialed-materials/versioned-profiles-with-lineage)
- Water-Coupled Admissibility Surface (/articles/credentialed-materials/water-coupled-property-surface)

APPLICATIONS · GENERAL

- Credentialed Structural Materials for Construction and Civil Infrastructure: Carrying Strength, Mix, and Provenance as Multi-Authority Attestations (/articles/credentialed-materials/construction-and-infrastructure)
- Carbon-Credit-Bearing Building Materials: Sequestration Attestations That Survive Incorporation, Transfer, and Decommissioning (/articles/credentialed-materials/carbon-credit-materials)
- Building-Product Compliance and Code Approval: Property-Surface Profiles as Machine-Evaluable Admissibility Evidence (/articles/credentialed-materials/building-product-compliance)
- Credentialed Building Materials for Real Estate Valuation, Insurance, and Disclosure: A Property History That Binds to the Asset (/articles/credentialed-materials/real-estate-and-asset-lifecycle)
- Recredentialing Recovered Materials: Verifiable Lineage for Reuse and Decommissioning in the Circular Economy (/articles/credentialed-materials/circular-economy-and-decommissioning)
- Energy and Grid-Coupled Surfaces: Crediting Stationary Storage in Structural Mass Without Trusting the Cell (/articles/credentialed-materials/energy-and-grid-surfaces)
- Credentialed Surfaces for Water and Environmental Infrastructure: Signed Performance and Compliance Attestations on Water-Coupled Concrete (/articles/credentialed-materials/water-and-environmental-infrastructure)

APPLICATIONS · SPECIFIC

- Circularise, a blockchain-based supply-chain traceability and digital-product-passport platform for materials vs credentialed material surfaces: attestations bound to the physical material (/articles/credentialed-materials/circularise)
- EC3 (Embodied Carbon in Construction Calculator) by Building Transparency vs a credentialed carbon-sequestration surface bound to the material (/articles/credentialed-materials/ec3-building-transparency)
- CarbonCure Technologies, which injects and mineralizes CO2 into concrete during mixing vs a credentialed carbon-sequestration attestation architecture (/articles/credentialed-materials/carboncure)
- Sublime Systems, maker of low-carbon cement via an electrochemical (ambient) process vs a credentialed carbon-sequestration surface bound to the material (/articles/credentialed-materials/sublime-systems)
- Brimstone carbon-negative portland cement vs credentialed material attestations: process decarbonization or per-element carbon accounting? (/articles/credentialed-materials/brimstone)
- The EU Digital Product Passport (DPP) under the Ecodesign for Sustainable Products Regulation (ESPR) vs credentialed surfaces: a data-carrier standard next to a material-bound attestation architecture (/articles/credentialed-materials/eu-digital-product-passport)

- **One Click LCA, a life-cycle-assessment and EPD software platform for construction vs a credentialed carbon-sequestration property surface bound to the material (/articles/credentialed-materials/one-click-lca)**
- Concrete.ai vs credentialed carbon-sequestration surfaces on structural materials (/articles/credentialed-materials/concrete-ai)

Credentialed Surfaces overview → (/credentialed-materials)