Nick Clark · Published April 25, 2026 · PDF

EC3 (Embodied Carbon in Construction Calculator) by Building Transparency vs a credentialed carbon-sequestration surface bound to the material

EC3 (Embodied Carbon in Construction Calculator) by Building Transparency is a free, widely adopted tool that reads Environmental Product Declarations to benchmark and reduce the embodied carbon of building materials during design and procurement. It answers a real and pressing question: given the products available for a project, which choices lower embodied carbon. This article contrasts EC3's EPD-benchmarking model with a different structural axis, built on the Credentialed Surfaces, disclosed in U.S. Provisional Application No. 64/050,895, in which carbon sequestration is a credentialed, policy-evaluable property surface bound to the specific material and migrating with its mass across the building lifecycle.

What EC3 (Embodied Carbon in Construction Calculator) by Building Transparency Does

EC3, the Embodied Carbon in Construction Calculator, is a free tool developed and stewarded by Building Transparency. Its purpose is to help project teams see and reduce the embodied carbon of the materials they specify. It does this by drawing on a large, openly accessible library of Environmental Product Declarations, the standardized, third-party-verified documents in which manufacturers report the life-

cycle environmental impacts of a given product. A user can assemble a material list for a project, pull in the relevant EPDs, and compare products within a category against benchmark distributions so that lower-carbon options become visible at design time and at procurement.

This is genuinely useful, and EC3 has become an important reference point in the embodied-carbon conversation. Its strengths are real. It aggregates a large volume of EPD data into one place. It normalizes that data into comparable functional units so that teams are not comparing incommensurate reports by hand. It surfaces benchmark ranges so a specifier can tell whether a given product is typical, better than typical, or worse. And by being free and openly available, it lowers the cost of considering embodied carbon at all, which is the behavior the tool is designed to encourage. EC3 operates over the reporting layer: it reads declarations that manufacturers produce, and helps humans make better procurement decisions from them.

The Architectural Axis

The axis worth drawing out is not whether EC3 reports carbon well. It reports carbon well within its model. The axis is where the carbon claim lives and what can be done with it downstream.

In the EPD-benchmarking model, the carbon claim lives in a document that describes a product line or a manufacturing process. It is a report about a category of material, consulted by a person during a design or purchasing decision. Once the material is poured, installed, repaired, or eventually demolished, the report and the physical mass diverge. The EPD does not travel with the specific cubic meter that ended up in a specific wall, and it is not something an automated building system or a market participant evaluates in real time against the material actually in place.

The disclosed architecture addresses a different structural question: what if the carbon claim were not a report consulted at procurement, but a signed, machine-evaluable property of the specific material, one surface among several, that persists and travels with the mass for as long as the mass exists. This is a difference in where the claim is bound and what can programmatically act on it, not a criticism of how EC3 aggregates or benchmarks EPD data.

How the Disclosed Approach Differs

U.S. Provisional Application No. 64/050,895 discloses building materials that carry a credentialed admissibility profile bound to the specific element by cryptographic signature. That profile is composed of multiple independently credentialed property surfaces, structural, thermal, energy storage, fire performance, and among them a carbon-sequestration admissibility surface, each signed by an authority with declared scope. In the disclosure, an environmental-credit authority signs the carbon-sequestration surface, distinct from the structural engineering authority that signs the structural surface. The carbon claim is thus not a free-floating document but a signed surface attached to the identity of the actual material.

Several structural properties follow from that binding, all traceable to the disclosure. First, the carbon claim is machine-evaluable rather than only human-readable: the surface declares parameters and admission conditions that a building system or a market participant can query and evaluate, not merely a PDF a specifier reads. Second, the disclosure describes attestations issued as credentialed events signed by the producing apparatus and recorded in a lineage chain, so that the origin of a sequestration claim is auditable back to the event that created it rather than asserted at the category level.

Third, and central to the axis, the disclosure describes a migrating carbon-attestation primitive. Carbon-sequestration attestations bound to a material migrate with that material across material flows and across structural lifetimes, each migration a

credentialed transaction signed by an environmental-credit authority and recorded in lineage. Under the disclosed continuous re-credentialing and metabolic-lifetime model, events such as tuck-pointing, surface-coating refresh, topping-slab augmentation, or eventual recovery each issue, transfer, or extinguish attestations against specific structural mass. The claim is evaluated against the cumulative material actually in place over time, not only against a category report captured once at design.

It is important to be precise about scope. The novelty disclosed here is the credentialing and governance architecture, the binding of a signed, policy-evaluable carbon surface to a specific material and its migration through a lineage chain. The underlying materials science that a sequestration claim would rest on is pre-existing and is not asserted here as newly discovered. And because this is a provisional disclosure of an architecture, nothing in it should be read as a claim that such credentialed materials have been built, deployed, benchmarked, or independently validated at scale. What is disclosed is the architecture; what EC3 offers is a shipping, widely used tool.

Where They Fit Together

These are complementary rather than substitutable, and it is worth being honest that they largely answer different questions. EC3 answers a question that exists today for essentially every project: among the products a team can actually buy, which lower embodied carbon, and how does a candidate compare to its peers. That question does not depend on any material carrying a signed surface, and EC3's EPD-driven benchmarking is a mature, freely available way to answer it.

The credentialed-surface architecture addresses a downstream question: once a carbon claim exists, how does it stay bound to the specific mass, remain evaluable by automated systems and markets, and survive repair, augmentation, and recycling with an auditable lineage. One can imagine EPDs and benchmarking tools like EC3 continuing to inform which materials a team selects, while a credentialed carbon-

sequestration surface, if such materials existed, governs how a specific installed element's claim is tracked and transacted over its life. Selection and lifetime governance are different layers, and neither obviates the other.

Boundary Conditions

Several limits should be stated plainly. On the disclosed side, the carbon-sequestration surface is a credentialing and governance construct; it is only as trustworthy as the authorities that sign it and the underlying measurement science that any such authority would rely on, none of which is claimed here as novel. The disclosure is a provisional filing of an architecture. It carries no assertion that credentialed materials have been manufactured, that sequestration figures have been achieved, or that any performance number has been benchmarked. Where the disclosure recites ranges, they are illustrative of the architecture, not validated results, and this article invents no figures for the disclosed side.

On the EC3 side, the observations here are limited to genuine, architecture-level facts about a tool that reads EPDs to benchmark and reduce embodied carbon. Nothing above should be read as attributing a defect, error, or incident to EC3 or to Building Transparency. EC3 is designed as a decision-support and benchmarking tool over EPD data, and the fact that it operates at the reporting and procurement layer rather than binding signed surfaces to specific installed mass is a design scope, not a flaw. The comparison is about two layers of the problem, not about one tool falling short of the other's purpose.

Disclosure Scope

The disclosed architecture described in this article, the credentialed carbon-sequestration surface, the multi-authority admissibility profile, the lineage chain, and the migrating carbon-attestation primitive, is disclosed in U.S. Provisional Application No. 64/050,895. All statements about what the disclosed approach does trace to that

filing, which is a provisional disclosure of an architecture and not a representation that any product has been built, validated, or benchmarked. References to EC3 (Embodied Carbon in Construction Calculator) and to Building Transparency are provided as external market and technical context to locate the disclosure against a well-known point of comparison; they are not claims of the filing, do not form part of its disclosure, and are not asserted to be endorsed by or affiliated with Building Transparency. This article does not assert or imply any defect, deficiency, or wrongdoing on the part of EC3 or Building Transparency; EC3 is accurately characterized as a capable, freely available EPD-based embodied-carbon benchmarking tool, and the comparison is confined to a difference in architectural axis.

Credentialed Surfaces (/credentialed-materials)

All 40 steps → (/inventive-steps)

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)