EPD OPTIMIZATION REPORT

LEED Credit: LEED v4.1 MRc2 — Environmental Product Declarations, Option 2 (Optimization Assessment)

Product:	Manufacturer:
SRC (CEM I 42.5 N - SR 5, LA)	Union Cement Company
Issue Date:	**Expiry Date:**
26-Mar-2026	25-Mar-2031

EPD Reference and Optimization Basis

شركة أسمنت الاتحاد(ش.م.خ.)
UNION CEMENT COMPANY (Pr.J.S.C)

Product: Sulphate Resisting Cement (CEM I 42.5 N - SR 5, LA)
Declared Unit: 1 metric ton
System Boundary: Cradle-to-gate with options (A1-A4, C1-D)
Manufacturer: Union Cement Company (Pr.J.S.C), UAE
Program Operator: International Climate Intelligence System (ICIS)
EPD Number: ICIS-202603-127
Issue Date: 26-Mar-2026
Expiry Date: 25-Mar-2031

Basis of Assessment

- Baseline EPD: Sulphate Resisting Cement (CEM I 42.5 N - SR 5, LA) EPD (ICIS-202603-127).
- Same product optimization; no third-party manufacturer EPDs used.
- System boundary: cradle-to-gate (A1–A3); declared unit: 1 metric ton.
- Modeled optimization scenario corresponding to an indicative 10-12% reduction in A1–A3 GWP.
- Improvements limited to manufacturer-controlled parameters in A1 and A3 with unchanged production technology.

Purpose

The purpose of this report is to assess potential cradle-to-gate (A1–A3) environmental impact reduction opportunities for Union Cement Company's Sulphate Resisting Cement (CEM I 42.5 N - SR 5, LA) through a modeled optimization scenario, in accordance with the requirements of LEED v4.1 MRc2 – Environmental Product Declarations (Option 2).

Methodology

The optimization assessment was conducted using a life cycle assessment-based approach consistent with EN 15804+A2 and ISO 14025 principles, aligned with the requirements of LEED v4.1 MRc2 Option 2.

The current Sulphate Resisting Cement (CEM I 42.5 N – SR 5, LA) EPD (ICIS-202603-127) was used as the baseline. A modeled optimization scenario was developed for the same product by adjusting selected, manufacturer-controlled parameters within the cradle-to-gate (A1–A3) system boundary, while keeping the declared unit, production route, and system boundaries unchanged.

The methodology focuses on identifying realistic improvement levers within the A1 (raw material supply) and A3 (manufacturing) stages, including raw material system optimization and kiln energy efficiency improvements. No changes were made to product classification, functional performance, or downstream life cycle stages.

Environmental impacts were evaluated using the same impact assessment method applied in the baseline EPD to ensure consistency and comparability between the baseline and modeled optimization scenario.

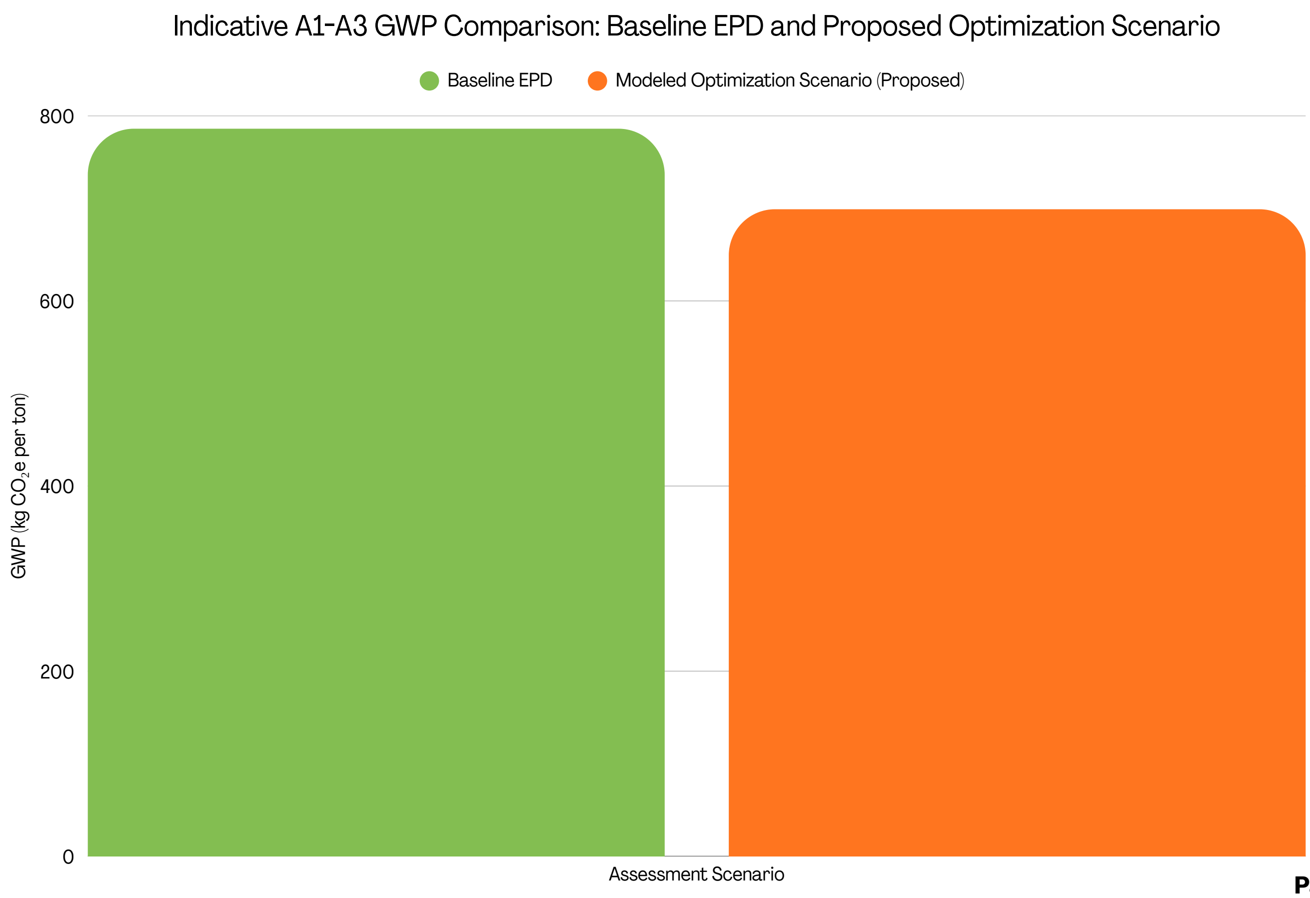
As the optimization scenario is modeled for the same product and manufacturer using identical declared unit, system boundaries, and impact assessment method, the baseline and optimization results are directly comparable.

Results

The cradle-to-gate (A1–A3) Global Warming Potential (GWP) results for the baseline EPD and the modeled optimization scenario are summarized below.

Scenario	A1-A3 GWP (kg CO_2e / ton)
Baseline EPD	786
Modeled Optimization Scenario (proposed)	~692-707

The modeled optimization scenario represents a proposed potential reduction of approximately 10-12% in A1–A3 GWP relative to the baseline EPD, subject to implementation of the identified optimization measures.



Key Optimization Opportunities (A1 & A3)

A1 – Raw Material Supply (Clinker System & Inputs)

- Optimize raw material system to maintain low C_3A clinker chemistry while improving input efficiency and reducing associated upstream emissions.
- Prioritize lower-carbon raw materials using supplier-specific emissions data for clinker, gypsum, and corrective inputs.
- Improve raw mix control to minimize variability and reduce excess limestone use and associated calcination emissions.
- Enhance material efficiency to achieve required sulphate-resistant performance with optimized clinker phase composition.
- Optimize packaging and upstream inputs to reduce embodied impacts within the A1 boundary.

A3 – Manufacturing (Kiln & Grinding Operations)

- Improve kiln thermal efficiency through optimized preheater–precalciner operation and reduced specific heat consumption (GJ/ton clinker).
- Increase alternative fuel substitution (AFR) to reduce fossil CO_2 emissions while maintaining stable low C_3A clinker formation.
- Optimize clinker cooling and heat recovery to improve thermal integration and reduce energy losses.
- Enhance grinding efficiency by reducing specific electricity consumption (kWh/ton cement) through process control.
- Improve process stability and minimize losses across pyroprocessing and grinding operations.

Key Findings

- The optimization assessment indicates that measurable reductions in A1–A3 GWP are achievable for SRC through targeted improvements in raw material system control and kiln energy performance within manufacturer-controlled processes.
- A3 remains the dominant contributor to total GWP, with reductions primarily driven by enhanced pyroprocessing efficiency, thermal energy optimization, and fuel-related emission reduction.
- A1 reductions are influenced by raw material efficiency and clinker system control, where optimization focuses on maintaining low C_3A chemistry while reducing upstream impacts.
- The identified measures focus on process and material efficiency improvements without altering product classification, sulphate-resisting performance, or underlying production technology.
- The reduction potential reflects realistic operational improvements aligned with current SRC manufacturing practices rather than fundamental process or composition changes.
- The optimization approach maintains full comparability with the baseline EPD through consistent system boundaries, declared unit, and impact assessment methodology.
- Overall, the results potentially demonstrate a credible and technically achievable pathway for 10–12% reduction in cradle-to-gate GWP through incremental, performance-aligned optimization measures.

Limitations & Assumptions

This optimization assessment is based on a modeled scenario and represents indicative reduction potential rather than verified or achieved performance. The assessment is limited to cradle-to-gate (A1–A3) life cycle stages and Global Warming Potential (GWP) only; other impact categories and downstream life cycle stages are not evaluated. The modeled optimization assumes implementation of the identified improvement measures, primarily related to raw material system control and kiln energy performance, without changes to product classification, sulphate-resisting performance, or declared unit. Results are intended solely for LEED v4.1 MRc2 Option 2 documentation purposes.

Alan Beski Christopher
Sustainability Manager
GCAS Quality Certifications

Office no. 110, National Insurance Building
Sheikh Zayed Road
P.O. Box 65561
Dubai, UAE
www.gcasquality.com | info.dubai@gcasquality.com

GCAS Quality Certifications - ECO Platform member