Jeddah Steel Factory Company for Metal Products

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 & EN 15804:2012+A2:2019/AC:2021

Reinforcing Steel Bar

EPD Program	Title	Details
International Climate Intelligence System 71-75 Shelton Street Covent Garden, London, WC2H 9JQ United Kingdom office@climateintell.com	Registration Number	ICIS-202607-145
	Publication Date	09-07-2026
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Jeddah Steel Factory
Company for Metal Products
Jeddah, P.O. Box 22429
Kingdom of Saudi Arabia
+966 55 307 7056

For the latest version and validity of this EPD within International Climate Intelligence System (ICIS), refer to www.climateintell.com.

JSF

As Saudi Arabia rises, **Jeddah Steel** holds the promise inside.

REINFORCING THE KINGDOM'S FUTURE

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OVERVIEW

This Environmental Product Declaration (EPD) presents verified, transparent environmental performance data for Reinforcing Steel Bars manufactured by Jeddah Steel Factory at its facility in Jeddah, Kingdom of Saudi Arabia, for the reporting period January 2025 to December 2025. The declared unit for this assessment is 1 metric ton of Reinforcing Steel Bars.

The LCA follows the requirements of ISO 14025 and EN 15804:2012+A2:2019/AC:2021, covering all relevant life cycle stages within the defined system boundary. This EPD enables architects, engineers, contractors, consultants, developers, and sustainability professionals to make informed material choices by providing consistent, third-party-verified environmental information suitable for green building certification schemes, embodied carbon reporting, structural material selection, and procurement transparency.

PRODUCT INFORMATION

Product Name

Reinforcing Steel Bar

Product Type

Hot rolled deformed reinforcing steel bars

Declared Unit

1 metric ton

PCR & Version

ICIS PCR 2026:18 v1.2.6
(EN 15804 + A2 aligned)

Scope

Cradle-to-Gate with options (A1-A4, C1-D)

Production Route

TMT Rolling

Recycled Content

100% pre-consumer scrap steel used as billet feedstock

Electricity Mix

Saudi Arabia grid mix from Ecoinvent 3.12 (cut-off). Natural Gas (53.67%), Oil (46.10%), Wind (0.17%) and others.

LCA Tool and Database

Air.e.LCA v3.21.1.2 and Ecoinvent v3.12 (Cut-Off)

Geographical Scope

Kingdom of Saudi Arabia

PRODUCT INFORMATION

Verification

International Climate Intelligence System
71-75 Shelton Street, Covent Garden
London, WC2H 9JQ
United Kingdom
office@climateintell.com
www.climateintell.com

Product Group Classification

UN CPC Code: 41242 – Hot-rolled bars and rods of iron or non-alloy steel

Environmental Performance Summary (A1-A3)

Indicator	Result	Unit
Climate change (GWP) - total	8.57E+02	Kg CO_2e
Climate change (GWP) - fossil	8.55E+02	Kg CO_2e
Ozone Depletion (ODP)	1.37E-05	Kg CFC-11e
Abiotic depletion of fossil resources	6.33E+03	MJ

Hotspot Summary

Process	Share of Total GWP (%)
Raw Material Supply (A1)	60.40
Raw Material Transportation (A2)	0.0002
Manufacturing (A3)	32.53
Remaining Modules (A4, C1-C4)	7.0698

PRODUCT INFORMATION

Where This Adds Value

Scheme / Area	Relevance to Reinforcing Steel Bars
LEED v4.1 / v5 (USGBC) – MR Credit: EPDs	The Type III EPD supports MR credits for Environmental Product Declarations and contributes to whole-building life cycle assessment (LCA), enabling embodied carbon evaluation of reinforcing steel bars used in Saudi Arabia-based projects.
BREEAM International – Mat 01 / Mat 02	Provides third-party verified environmental data aligned with EN 15804, supporting Mat 01 life cycle impacts and Mat 02 responsible sourcing documentation for projects delivered in Saudi Arabia under BREEAM International schemes.
Mostadam / Saudi Green Building Code – Material Transparency	Supports material transparency and LCA-based evaluation requirements, enabling informed selection of reinforcing steel bars for green building, infrastructure, and sustainability-focused developments within the Kingdom of Saudi Arabia.
Saudi Green Building Code / SBC 1001 – Materials & Resources	Supports material documentation and environmental performance reporting for reinforcing steel bars used in structural concrete applications, facilitating sustainable material selection within Saudi Arabia construction and infrastructure projects.
Infrastructure & Building Projects (Saudi Arabia – Municipalities, PIF, Giga Projects)	Provides project-specific environmental data for reinforcing steel bars used in foundations, columns, beams, slabs, bridges, retaining walls, and other reinforced concrete works, supporting sustainable design and approval processes across Saudi Arabia.
Procurement Transparency (Saudi Contractors & Consultants)	Supports contractor and consultant requirements for verified environmental documentation in material submittals, technical approvals, embodied carbon assessments, and sustainability reporting across commercial and infrastructure projects in Saudi Arabia.

PRODUCT INFORMATION

Saudi Vision 2030 & National Climate Reporting	Provides product-specific environmental data to support embodied carbon calculations and reduction strategies, enabling alignment with Saudi Vision 2030, Saudi Green Initiative objectives, and national greenhouse gas reporting frameworks.

ABOUT JEDDAH STEEL

Jeddah Steel Factory Company for Metal Products is a Saudi Arabia-based manufacturer specialising in deformed reinforcing steel bars and steel billets for building, infrastructure, commercial, and industrial applications. Located in Jeddah, the company operates induction melting, continuous casting, and automated rolling facilities, supporting dependable supply, controlled production quality, and consistent product performance for demanding construction projects across the Kingdom.

Jeddah Steel operates an integrated production infrastructure comprising high-capacity induction furnaces, continuous casting machines, and automated rolling mills for the manufacture of steel billets and deformed reinforcing bars. The facility is engineered for scalable output of up to 150,000 metric tons annually, supporting supply continuity for large building, infrastructure, and industrial developments across Saudi Arabia.

Key production infrastructure includes:

- High-capacity induction furnaces for controlled steel melting.
- Continuous casting machines for consistent billet production.
- Automated rolling mills for dimensional control and rib formation.
- Quality control laboratories supporting production verification.
- Smart monitoring systems for operational and inventory control.

Jeddah Steel maintains quality-focused manufacturing and testing practices supported by dedicated quality control laboratories operating alongside production lines. Chemical composition is verified through spectrometer analysis, while mechanical testing confirms yield strength, tensile strength, and elongation of finished reinforcing bars. The company profile identifies SASO certification together with ISO 9001, ISO 14001, and ISO 45001 management systems, supporting quality, environmental, and occupational health and safety performance.

Key assurance aspects include:

- SASO and ASTM A615 compliance verification.
- ISO 9001 quality management practices.
- ISO 14001 environmental management practices.
- ISO 45001 occupational health and safety practices.

PRODUCT DESCRIPTION

Reinforcing Steel Bars by Jeddah Steel are hot rolled, deformed steel bars designed for use as tensile reinforcement in reinforced concrete construction. The product is manufactured from steel billets produced using 100% pre-consumer scrap steel feedstock, supporting circular material use while delivering the strength and performance required for structural applications. Supplied as straight steel bars with a ribbed surface profile, the product improves mechanical bonding with concrete and supports effective load transfer within reinforced concrete elements. It is intended for use in foundations, columns, beams, slabs, bridges, retaining walls, and other civil and infrastructure works.

Reinforcing Steel Bars by Jeddah Steel are engineered for construction environments where structural reliability, bond performance, ductility, and durability are essential. The bars are manufactured as Grade 60 / Grade 420 reinforcement in 12 mm, 14 mm, 16 mm, 18 mm, and 20 mm diameters, with controlled yield strength, tensile strength, elongation, bendability, rib geometry, mass, and straightness. In Saudi Arabia, the product provides dependable reinforcement for concrete construction systems and supports transparent selection through verified performance information.

Sectors & Corresponding Uses

Sector	Application / Use Case
Residential Buildings	Use in reinforced concrete foundations, columns, beams, slabs, staircases, and structural elements
Commercial Developments	Application in concrete frames, basements, podiums, floor systems, and load-bearing structures
High-Rise Towers	Use in core walls, columns, transfer beams, elevated slabs, and vertical structural systems
Infrastructure Projects	Application in bridges, tunnels, culverts, retaining walls, roads, and transport-related concrete works
Industrial & Civil Facilities	Use in warehouses, factories, utility buildings, tanks, drainage structures, and heavy-duty concrete works

PRODUCT DESCRIPTION

Technical Specifications

Parameter	Details / Specification
Form	Hot rolled deformed reinforcing steel bars
Standard	SASO-ASTM A615/A615M
Steel Grade	Grade 60 / Grade 420
Diameters	12 mm, 14 mm, 16 mm, 18 mm, and 20 mm
Delivery Form	Straight bars supplied in bundles
Standard Length	Commercial length of 12 metres
Surface Profile	Deformed ribbed surface for concrete bond performance
Yield Strength	Minimum 420 MPa; tested values reported from approximately 569 MPa to 603 MPa
Tensile Strength	Minimum 550 MPa; tested values reported from approximately 675 MPa to 735 MPa
Elongation	Minimum 9%; tested values reported from 11.5% to 13.5%
Stress Ratio	Minimum Rm/Re ratio of 1.10; tested values reported from 1.14 to 1.26
Packing	Bars are bundled, tagged, and prepared for storage, handling, and delivery

MANUFACTURING DETAILS

The production of Reinforcing Steel Bars by Jeddah Steel is based on a controlled hot rolling and TMT processing route using ready-to-roll steel billets. The process begins with billet receipt, where billets are transferred to the rolling mill area and verified for suitability prior to production. The billets are then charged into the reheating furnace and heated to the required rolling temperature to ensure adequate plasticity for deformation. This reheating stage prepares the steel for progressive size reduction and shaping through the rolling line.

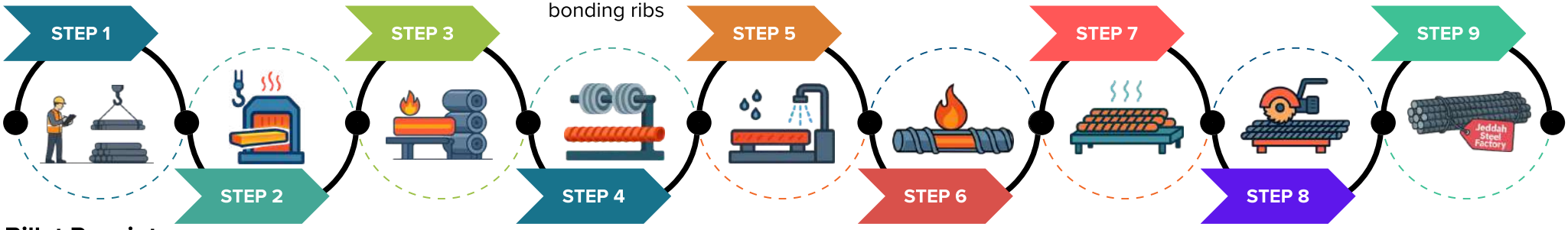
The heated billets are passed through roughing, intermediate, and finishing rolling stands, where the cross-section is gradually reduced and the bars are elongated to the required nominal diameter. During the finishing stage, rib formation takes place through grooved rolls that form the deformed surface profile required for mechanical bonding with concrete. The hot rolled bars then pass through the TMT quenching system, where controlled water cooling rapidly cools the surface while the core remains hot. This is followed by self-tempering, where retained core heat tempers the hardened outer layer and supports the required combination of strength and ductility.

After self-tempering, the bars are transferred to the cooling bed for atmospheric cooling and dimensional stabilization. The cooled bars are then cut to the required commercial length, typically 12 metres, and subjected to quality checks to confirm dimensional and mechanical conformity. Following successful verification, the reinforcing steel bars are bundled, secured with steel wire, tagged, and prepared for storage, handling, and delivery to customers.

For a visual representation of the full manufacturing workflow, refer to the illustrated flow chart on the next page. A screenshot of the process flow as modeled in the LCA software is provided on the page that follows.

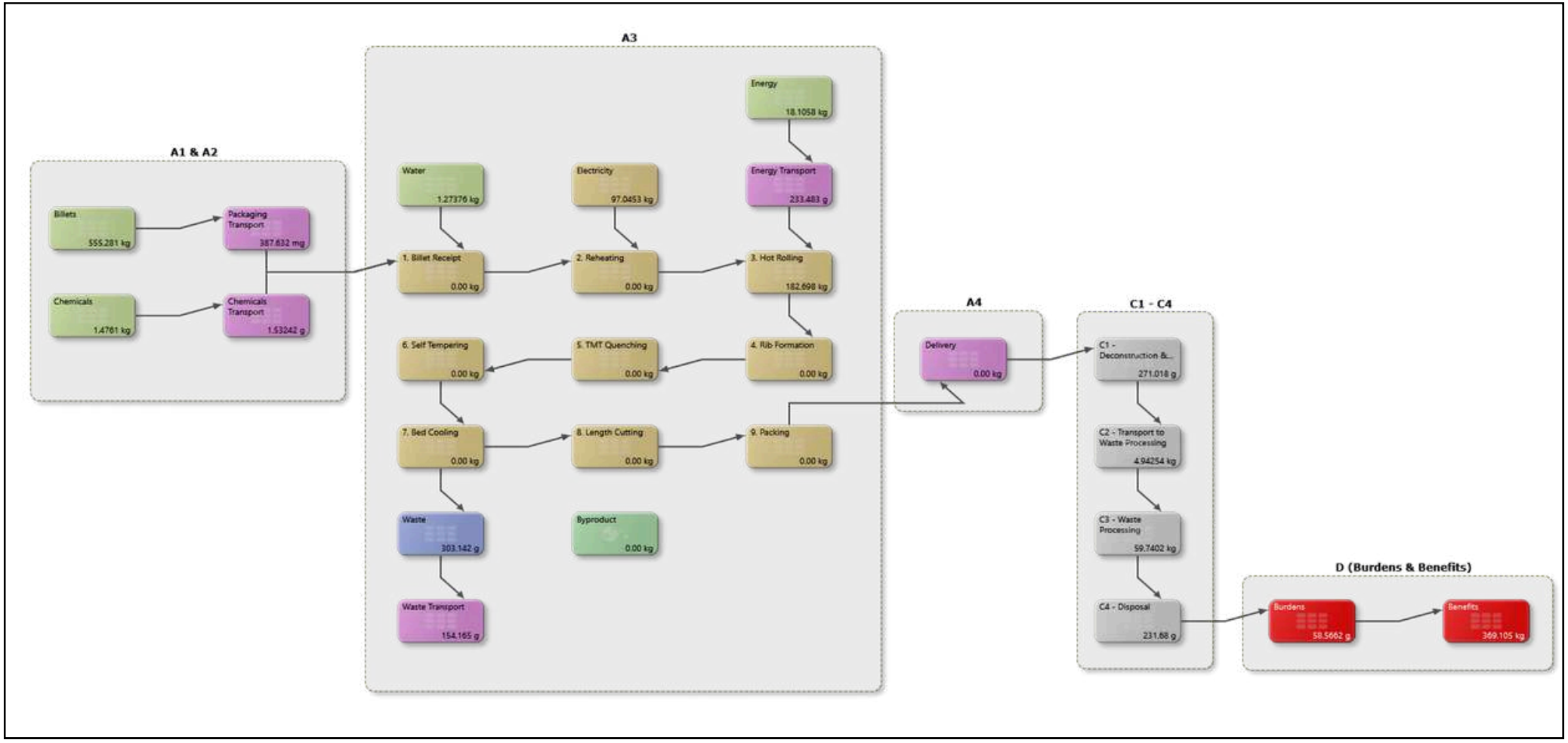
MANUFACTURING DETAILS

Schematic overview of Reinforcing Steel Bars manufacturing process



MANUFACTURING DETAILS

Screenshot of Reinforcing Steel Bar LCA model from LCA software



CONTENT DECLARATION

The content declaration provides a transparent breakdown of all material inputs used in the production of Reinforcing Steel Bars by Jeddah Steel, expressed per 1 metric ton of product. The product is primarily composed of steel billets produced using 100% pre-consumer scrap steel feedstock, supported by steel wire used for bundling and packing. Minor process inputs are included where relevant to ensure complete production accounting. The total of all listed inputs equals 1 metric ton, matching the declared unit and aligning with EN 15804 and ISO 14025 requirements.

Component	Weight (kg/Declared unit)	Post-consumer recycled (%)	Pre-consumer recycled (%)	Biogenic Content (%)	Biogenic Carbon (kg C/DU)
Steel Billets	1000	0	100	0	0
Total	**1000**	**0**	**100**	**0**	**0**

Substances of Very High Concern (SVHC)

According to the requirements of the ECHA Candidate List, Reinforcing Steel Bars by Jeddah Steel contain no substances of very high concern (SVHCs) above the 0.1% (w/w) threshold in the final product.

The steel materials used in the production of Reinforcing Steel Bars by Jeddah Steel, primarily billets produced from 100% pre-consumer scrap steel feedstock, were reviewed against the latest published SVHC list at the time of reporting. Based on manufacturer declarations and available safety data, no SVHCs are present above the applicable threshold.

Packaging Material Declaration

Packaging material used for Reinforcing Steel Bars by Jeddah Steel consists of steel bundling wire. This material serves a specific function within the product supply chain by securing the bars during bundling, handling, storage, and transport. Steel bundling wire is included in the life cycle assessment because it contributes to upstream manufacturing impacts and generates a recoverable material stream after use.

CONTENT DECLARATION

Packaging Material	Biogenic Content (%)	Biogenic Carbon Fraction (kg C/kg material)	Notes & References
Steel Bundling Wire	0% biogenic	0 kg C per kg material	Steel bundling wire is non-biogenic and stores no biogenic carbon, as biogenic carbon reporting applies only to biomass-derived materials (CEN, 2019; IPCC, 2006).

Steel bundling wire does not contain biogenic carbon because it is a metallic, non-biogenic packaging material. No renewable carbon storage is assigned to the packaging material, and no biogenic carbon flows are reported for the steel bundling wire. Its treatment in the LCA model follows EN 15804+A2 guidance, with packaging material flows presented in the Packaging Composition and Biogenic Carbon table below.

Packaging Material	Weight (kg/Declared Unit)	Share of Packaging (%)	Biogenic Carbon (kg C/DU)	End-of-Life Handling
Steel Bundling Wire	9.80E-04	100	0.00E+00	Reuse / Landfill
Total	**9.80E-04**	**100**	**0.00E+00**	-
Note - Biogenic content in packaging materials does not exceed the 5% threshold of the total packaging weight as stated in ICIS PCR 2026:18. Hence, no biogenic emissions are added in Module A3 and balanced out in Module A5.				

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Declared Unit

The declared unit for this EPD is 1 metric ton of Reinforcing Steel Bars at the factory gate. All material inputs, energy use, emissions, transportation, packaging, and end-of-life modelling are quantified relative to this unit. This ensures consistent comparison across life cycle stages and aligns with EN 15804+A2 requirements for construction products. No functional performance is assigned to the product in this declaration, as the EPD is based on a declared unit rather than a functional unit.

Temporal, Geographical & Technological Representativeness

Temporal Representativeness: Primary data for Reinforcing Steel Bars reflects the reporting period January 2025 to December 2025, in line with EN 15804+A2 requirements that primary manufacturing data must be no older than five years. All on-site information, including raw material consumption, energy use, water use, and waste generation, represents current operational conditions at the Jeddah facility during the defined reporting year. Background data used in the study are consistent with the temporal validity provided in their respective datasets to ensure alignment with the modelling year.

Geographical Representativeness: The LCA model for Reinforcing Steel Bars reflects the actual manufacturing and supply conditions of Jeddah Steel's Jeddah facility, where all primary data was collected. The study represents production and operations within Saudi Arabia, with Saudi-specific conditions applied wherever available — particularly for raw material sourcing patterns, electricity grid characteristics, water production, and end-of-life treatment routes.

Where Saudi-specific datasets or regional factors were not available, GCC-appropriate or globally representative datasets were used. All transport distances, energy consumption figures, and end-of-life scenarios are based on realistic practices in Saudi Arabia, ensuring geographical relevance of the final results.

Technological Representativeness: The manufacturing process modelled for Reinforcing Steel Bars reflects the site-specific production technology used at the Jeddah facility. The product is manufactured through billet reheating, hot rolling, rib formation, TMT water quenching, self-tempering, cooling bed treatment, length cutting, quality control, bundling, and dispatch. These operations are carried out using reheating furnaces, rolling mill stands, quenching systems, cooling beds, cutting machines, and material handling systems. Thermal processing and metallurgical transformation occur as intended parts of rebar manufacture. The technological assumptions used

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in the LCA are representative of actual plant operations.

LCA Software & Database

The life cycle model for Reinforcing Steel Bars was developed using Air.e.LCA v3.21.1.2, with all background inventory data sourced from Ecoinvent v3.12 (Allocation, cut-off by classification). The software was used to structure process flows, assign datasets, calculate environmental indicators, and perform all module-by-module inventory tracking. The database provides consistent, peer-reviewed life cycle inventories for raw materials, energy supply, transportation, and waste management processes. All datasets selected reflect technologies and supply chains relevant to the product and regional context, ensuring reliable integration of foreground data with established international life cycle inventories.

System Boundary

This EPD covers the product life cycle from “cradle to gate with options”. The LCA includes the production stage modules A1–A3, delivery module A4, end-of-life modules C1–C4, and resource recovery module D, in accordance with EN 15804:2012+A2:2019/AC:2021. Modules A5 and B1–B7 are not declared.

Processes not directly controlled by the company but included in this environmental study comprise upstream raw material production, fuel extraction and processing, electricity generation and supply, external transport, end-of-life treatment, and resource recovery scenarios. All relevant direct and indirect environmental impacts associated with these processes have been calculated and included in the LCA and this EPD.

Personnel-related processes, such as employee transportation to and from work, are excluded. The production, maintenance, and end-of-life treatment of infrastructure and capital goods used in the product system are also excluded.

Module A1 - Raw Material Supply

Module A1 encompasses all upstream processes related to sourcing and preparation of material inputs used in the manufacture of Reinforcing Steel Bars. The primary steel input is produced from 100% pre-consumer scrap steel feedstock, with no inbound transport considered for this input in the model. This reflects the site-specific production route and supports circular material use while maintaining quality and performance for hot rolled deformed rebar. Steel bundling wire used for

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packaging is sourced locally from Jeddah. Process consumables such as hydraulic oil, gear and transmission oil, multipurpose grease, antiscalant, and industrial degreaser are also sourced locally from Jeddah. All upstream production and preparation activities are included within this module.

Module A2 - Raw Material Transportation

Module A2 covers the transportation of packaging materials and process consumables to Jeddah Steel's facility in Jeddah, Kingdom of Saudi Arabia. The primary steel input is produced from 100% pre-consumer scrap steel feedstock and no inbound transport is considered for this input in the model. Steel bundling wire used for packaging is sourced locally within Jeddah and transported to the facility by road using >32-ton Euro 6 lorries. Process consumables such as hydraulic oil, gear and transmission oil, multipurpose grease, antiscalant, and industrial degreaser are also sourced locally from Jeddah and delivered by road using >32-ton Euro 6 lorries.

Environmental impacts in this module arise from fuel consumption associated with local road transport. No sea freight or international transport is modelled for these inputs. Transport distances, load factors, and logistics assumptions reflect realistic local supply chain conditions, ensuring representative accounting of inbound transport to the Jeddah facility during the annual reporting period.

Module A3 - Manufacturing

Manufacturing impacts cover all processes required to convert steel input into finished Reinforcing Steel Bars at the Jeddah production facility. Production follows a controlled hot-rolling and TMT process comprising nine stages: Billet Receipt, Reheating, Hot Rolling, Rib Formation, TMT Quenching, Self Tempering, Bed Cooling, Length Cutting, and Packing. These stages ensure controlled deformation, ribbed surface geometry, mechanical strength, ductility, dimensional accuracy, and bond performance required for reinforced concrete applications.

Environmental loads in this module include electricity consumption for rolling, quenching, cutting, cooling, and auxiliary operations; fuel use for billet reheating and internal handling; water use for TMT quenching; and minor emissions from combustion and material handling. Additional impacts include steel scrap, mill scale, and operational waste streams, managed through recovery or recycling practices. All direct emissions from electricity use, fuel combustion, on-site equipment operation, water use, and material handling are included within A3.

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Module A4 - Delivery

Module A4 accounts for outbound transportation of finished Reinforcing Steel Bars from the Jeddah manufacturing facility to customer locations. For this EPD, no company-controlled outbound transport is modelled because finished rebars are collected directly from the factory gate by customers using their own trucks. Therefore, Jeddah Steel does not arrange or operate product delivery after dispatch from the manufacturing facility.

As a result, transport-related emissions for Module A4 are reported as zero within the declared system boundary. Customer-arranged transportation beyond the factory gate is outside the operational control of Jeddah Steel and is not included in the LCA model. This approach reflects the actual sales and dispatch practice followed during the reporting period.

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Module C1 - Deconstruction and Demolition

Module C1 covers the demolition/deconstruction stage of Reinforcing Steel Bars at the end of their service life in Saudi Arabia. Since reinforcing bars remain embedded within reinforced concrete elements, they are assumed to be demolished as part of the overall reinforced concrete structure rather than removed as standalone products. Module C1 is therefore limited to the energy use and related emissions associated with demolition or deconstruction activities before waste transport and downstream treatment (CEN, 2019; ISO, 2017).

In the absence of project-specific demolition measurements, a representative demolition energy of 24 MJ per ton of rebar is assumed for this EPD. This value represents the allocated share of diesel-powered demolition energy attributable to the reinforcing steel embedded within reinforced concrete structures. The energy demand is modelled as diesel use by construction and demolition equipment, using the lower heating value of diesel for energy-to-fuel conversion where required (IPCC, 2006). The scenario is considered representative for the product application in Saudi Arabia, where reinforcing steel is mainly used in reinforced concrete building, infrastructure, and civil engineering works.

Module C1 therefore includes only the environmental impacts associated with demolition energy, fuel combustion, and related equipment operation at the end-of-life stage.

Module C2 - Transport to Waste Processing

Module C2 covers the transport of end-of-life Reinforcing Steel Bars from the demolition site to downstream waste management routes within Saudi Arabia. Since the product is used only in Saudi Arabia, the transport scenario is based on domestic road movement from building, infrastructure, and civil engineering sites to authorised recycling and disposal facilities. The reinforcing steel is assumed to be recovered from reinforced concrete demolition waste after structural demolition and transported as ferrous scrap or residual metal-containing waste for further handling.

Reinforcing steel has a high end-of-life recovery potential because it is metallic, magnetically separable, and economically valuable as ferrous scrap. Published steel-sector references report high recycling and recovery levels for reinforcing steel and construction steel, including a 90% end-of-life recycling rate used in global rebar LCA modelling and up to 96–98% recovery or recycling levels reported in mature construction steel waste systems (worldsteel, 2021;

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SteelConstruction.info, 2012). The 92% recycling and 8% landfill scenario adopted in this EPD is therefore conservative when compared with the highest reported recovery systems, while remaining above the global rebar modelling benchmark.

Saudi Arabia is actively developing its waste management and recycling infrastructure as part of its circular economy transition. Construction and demolition waste recycling is particularly relevant for major urban development, infrastructure expansion, and giga-project activity in the Kingdom. Based on the end-of-life scenario adopted for this EPD, 92% of the rebar mass is assumed to be transported to recycling facilities, while the remaining 8% is transported to landfill due to contamination, recovery limitations, or practical sorting losses.

A one-way transport distance of 50 km is applied for both routes, representing a conservative and practical distance between demolition sites and authorised waste management facilities within Saudi Arabia. Transport is modelled using Euro 6, >32-ton trucks, consistent with the road freight transport dataset used in the LCA model. Load utilisation and transport modelling reflect bulk movement of heavy steel or metal-containing demolition waste.

Module C2 accounts only for the environmental impacts associated with transportation, including diesel consumption, tailpipe emissions, and load-dependent road freight impacts, in accordance with modular life cycle reporting requirements (CEN, 2019/2021; ISO, 2017; Haider et al., 2022; ecoinvent Association, 2025).

Type	Capacity utilization	Type of vehicle	Average distance
Truck	92%	Euro 6, >32 ton truck	50 kms

Module C3 - Waste Processing

Module C3 covers the waste processing of end-of-life Reinforcing Steel Bars recovered from reinforced concrete demolition waste in Saudi Arabia. Following demolition and transport, the recyclable fraction of rebar is processed to separate ferrous metal from concrete rubble and mixed construction and demolition waste. Processing activities include sorting, mechanical separation, magnetic recovery, removal of adhering concrete where required, cutting or shearing, and preparation of the recovered steel as recyclable ferrous scrap.

Based on the adopted end-of-life scenario, 92% of the rebar mass is assumed to undergo waste

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processing for recycling. These activities are modelled as scrap preparation operations carried out at authorised recycling or metal recovery facilities. The output from Module C3 is prepared ferrous scrap suitable for downstream recycling routes. Module C3 therefore includes only the environmental burdens associated with waste processing, separation, and scrap preparation. (CEN, 2019/2021; ISO, 2017; ecoinvent Association, 2025).

Module C4 - Disposal

Module C4 covers the final disposal of the non-recovered fraction of end-of-life Reinforcing Steel Bars in Saudi Arabia. Based on the adopted end-of-life scenario, 8% of the rebar mass is assumed to remain unrecovered after demolition, transport, and waste processing due to contamination, practical recovery limitations, or residual material losses. This fraction is modelled as metal-containing construction and demolition waste directed to landfill.

The landfilled fraction is assumed to be managed at authorised landfill facilities within Saudi Arabia. Since reinforcing steel is a metallic and non-biogenic material, no biogenic carbon release or methane generation is assigned to the steel fraction during disposal. Environmental impacts in Module C4 are therefore limited to landfill operation, waste handling, compaction, site management, and associated background processes represented in the LCA model.

Module C4 includes only the environmental burdens associated with final disposal of the non-recovered 8% fraction (CEN, 2019/2021; ISO, 2017; ecoinvent Association, 2025).

Module D - Reuse, Recovery & Recycling Potential

Module D reports the net environmental burdens and benefits associated with recovered materials leaving the product system boundary at end-of-life. For Reinforcing Steel Bars, the main recovery route is recycling of ferrous scrap generated from reinforced concrete demolition. Steel bundling wire used for packaging is also considered, as it is a metallic packaging material capable of entering ferrous scrap recovery routes after use. Steel can be repeatedly recycled without loss of its fundamental material properties, supporting circular use in future steel production routes (worldsteel, 2021).

Based on the adopted end-of-life scenario, 92% of the rebar mass is assumed to leave the product system as prepared ferrous scrap after waste processing. The same ferrous metal recovery logic is applied to steel bundling wire, where recovered wire is directed to scrap recycling. The recovered

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scrap is assumed to substitute equivalent steel scrap or secondary steelmaking input in the market. Any additional burdens required after the end-of-waste point, such as further scrap handling, preparation, or recycling process inputs, are accounted for before calculating the net benefit.

For the Saudi Arabia scenario, Module D reflects the contribution of recovered reinforcing steel and steel bundling wire to the local and regional circular economy. Saudi Arabia's expanding recycling infrastructure and material recovery initiatives support diversion of construction, demolition, and metallic waste from landfill and improve the availability of secondary raw materials for industrial use. The reported Module D result therefore represents the balance between recycling-related burdens and avoided impacts from substituting primary or equivalent secondary material production.

Module D is reported outside the product life cycle and is not added to Modules A1–C4. The benefits are attributed to the wider waste management and material recovery system, while the product system reports them separately to maintain transparent modular accounting in accordance with EN 15804:2012+A2:2019/AC:2021 and ISO 21930:2017.

Process	Unit (metric ton)
Collection process specified by type	
Reinforcing Steel Bars recovered from reinforced concrete demolition waste	1
Recovery system specified by type	
Recovered reinforcing steel sent for ferrous scrap recycling	0.92 (92%)
Material sent for energy recovery	Not applicable
Disposal specified by type	
Non-recovered reinforcing steel / residual metal-containing C&D waste sent to landfill	0.08 (8%)
Transportation assumptions	
Transport to recycling and landfill sites	50 km transport by Euro 6, >32 ton truck

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System Boundaries Illustration

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction / installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction & Demolition	Transport	Waste Processing	Disposal	Reuse, Recovery & Recycling potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules Declared	**X**	**X**	**X**	**X**	**X**	ND	ND	ND	ND	ND	ND	ND	**X**	**X**	**X**	**X**	**X**
Geography	KSA	KSA	KSA	KSA	-	-	-	-	-	-	-	-	KSA	KSA	KSA	KSA	KSA
Share of specific data	GWP > 90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	0%			-		-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%			-		-	-	-	-	-	-	-	-	-	-	-	-

X - Included, ND - Modules not declared.

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Cut-Off Rules

All relevant material and energy flows contributing to the manufacture of Reinforcing Steel Bars have been included in the LCA model. More than 99% of the total mass, energy use, and environmental relevance is captured. Negligible flows—those that do not influence the overall results—are excluded.

The Polluter Pays Principle and the Modularity Principle are applied to ensure that impacts are assigned to the processes where they occur and that each life cycle stage is reported independently. No known data gaps or exclusions are expected to influence the robustness of the results.

Allocation

No allocation was applied to electricity consumption, fuel use, water use, process consumables, or other operational inputs for the Reinforcing Steel Bars modelled in this EPD, as these inputs were recorded and modelled directly for the rebar production system at Jeddah Steel's manufacturing facility. The LCA therefore uses site-specific primary data without applying mass-based or energy-based allocation to shared utilities.

Steel inputs, steel bundling wire, process consumables, and associated transport flows were modelled using product-specific data, as these inputs are directly linked to the manufacture of Reinforcing Steel Bars. Co-products and recoverable outputs, such as process scrap, mill scale, and other metallic residues, were quantified based on site records and modelled in accordance with the selected LCA modelling approach. No economic allocation was applied to operational inputs.

Electricity

Electricity consumption in the LCA model is based on the Saudi Arabia grid mix as represented in Ecoinvent v3.12 (Allocation, cut-off by classification). The Saudi Arabia electricity supply is predominantly generated from natural gas, oil, supplemented by solar and wind energy. The modelled grid composition is as follows:

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Energy Source	Share (%)
Natural Gas - Conventional Power Plant	51.20
Oil	46.10
Natural Gas - Combined Cycle Power Plant	2.48
Wind (turbine, onshore)	0.17
Solar (thermal parabolic trough, 50 MW)	0.06

The climate impact associated with this electricity mix is 9.74E-01 kg CO_2e per kWh, and this factor is applied consistently to all electricity use across modules A1–A3 and relevant downstream stages.

Calculation Rules

The LCA model for Reinforcing Steel Bars uses foreground data collected directly from Jeddah Steel's manufacturing facility, combined with background datasets from Ecoinvent v3.12 using the Allocation, Cut-Off by classification system model. These datasets provide emission factors for steel inputs, electricity, fuel use, water, process consumables, steel bundling wire, transport, waste processing, landfill, and recovery routes. Saudi Arabia-specific conditions, including local electricity supply, local sourcing of consumables, and Saudi end-of-life assumptions, were incorporated where relevant.

Transport activities include local inbound transport of steel bundling wire and process consumables to the Jeddah facility. No inbound transport is modelled for the primary steel input, and no outbound A4 transport is modelled because finished rebars are collected by customers from the factory gate. Exclusions are limited to negligible activities such as administration, office utilities, employee commuting, infrastructure, and capital equipment.

Byproducts Assignment

By-products and recoverable outputs, mainly process scrap, mill scale and metallic residues, are generated during manufacturing and collected for recovery or recycling. Economic allocation assigns burdens between Reinforcing Steel Bars and by-products based on relative economic value.

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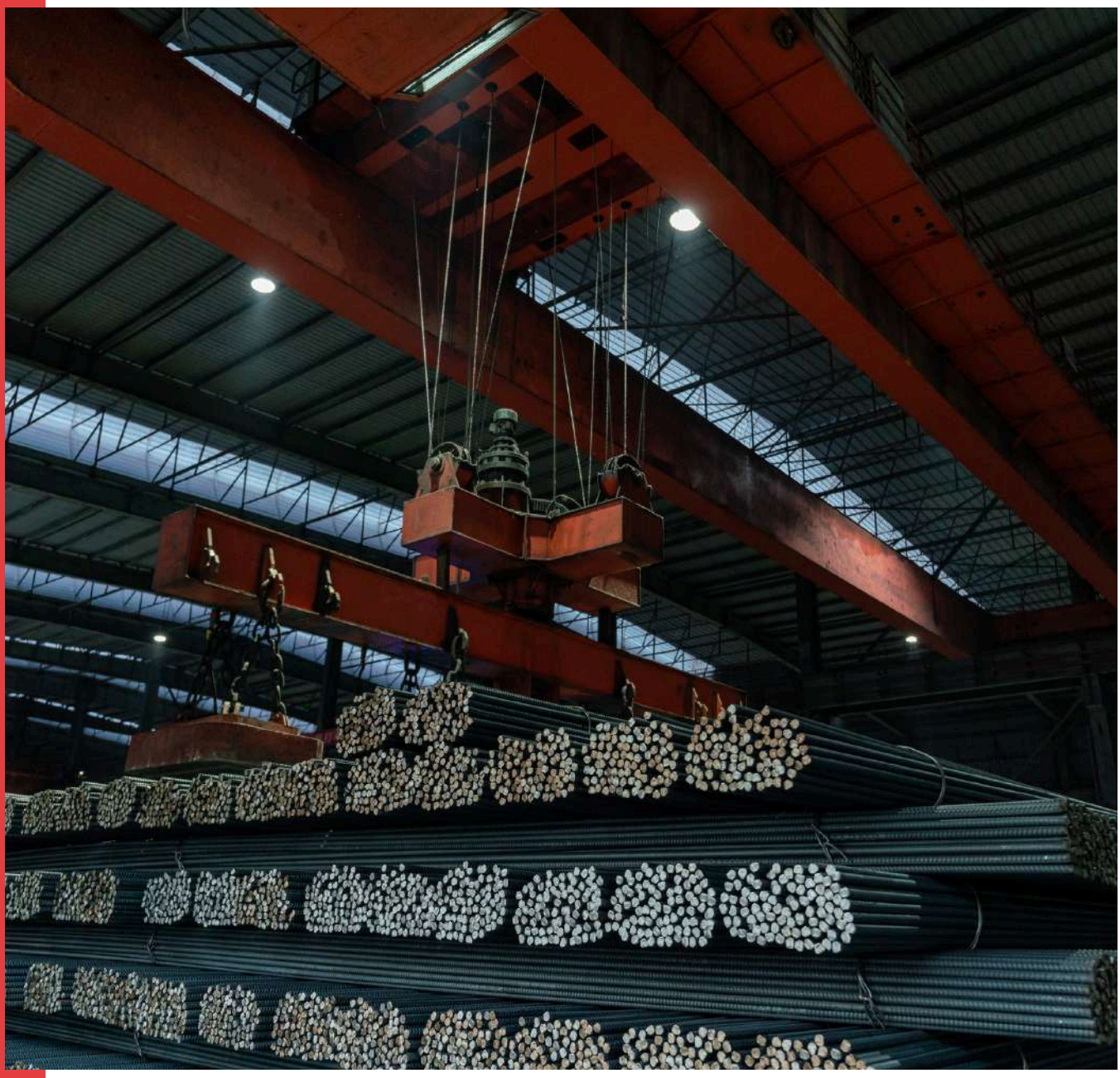
In the following tables, the environmental performance of the declared unit “1 metric ton of Reinforcing Steel Bars” is presented for Jeddah Steel Factory Company for Metal Products. Environmental impacts are calculated using EF 3.1 (ILCD), ensuring consistency with the applied life cycle impact assessment methodology.



ENVIRONMENTAL PERFORMANCE

Core Environmental impact indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding thresholds values, safety margins or risks.

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Climate change (GWP) - fossil	Kg CO_2e	5.55E+02	1.92E-03	3.00E+02	8.55E+02	0.00E+00	2.71E-01	4.94E+00	5.97E+01	2.32E-01	-3.67E+02
Climate change (GWP) - biogenic	Kg CO_2e	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Climate change (GWP) - LULUC	Kg CO_2e	4.27E-01	9.03E-07	2.79E-02	4.55E-01	0.00E+00	3.61E-05	2.32E-03	7.25E-03	2.49E-05	-3.10E-01
Climate change (GWP) - total	Kg CO_2e	5.57E+02	1.92E-03	3.00E+02	8.57E+02	0.00E+00	2.71E-01	4.94E+00	5.97E+01	2.32E-01	-3.69E+02
Ozone depletion	Kg CFC-11e	5.88E-06	3.00E-11	7.83E-06	1.37E-05	0.00E+00	1.25E-08	7.16E-08	9.02E-07	3.37E-09	-3.78E-06
Acidification	mol H+e	2.89E+00	4.55E-06	2.59E+00	5.47E+00	0.00E+00	1.36E-03	1.17E-02	5.28E-01	2.02E-03	-2.13E+00
Eutrophication, aquatic freshwater	kg PO_4^{3-} eq	7.88E-01	4.47E-07	2.55E-02	8.13E-01	0.00E+00	2.57E-05	1.15E-03	7.85E-03	3.53E-05	-6.06E-01
Eutrophication, aquatic freshwater	Kg P eq	2.57E-01	1.46E-07	8.31E-03	2.65E-01	0.00E+00	8.38E-06	3.75E-04	2.56E-03	1.15E-05	-1.97E-01
Eutrophication, aquatic marine	Kg N eq	1.32E+00	1.28E-06	7.56E-01	2.07E+00	0.00E+00	1.51E-04	3.29E-03	2.45E-01	9.19E-04	-1.09E+00
Eutrophication, terrestrial	mol N eq	6.32E+00	1.00E-05	8.17E+00	1.45E+01	0.00E+00	1.52E-03	3.48E-02	2.68E+00	1.00E-02	-4.54E+00
Photochemical ozone formation	Kg NMVOC eq	3.02E+00	7.41E-06	2.37E+00	5.39E+00	0.00E+00	2.21E-03	1.91E-02	8.02E-01	3.05E-03	-1.97E+00
Abiotic depletion, minerals & metals	Kg Sb eq	4.19E-03	5.79E-09	4.96E-04	4.69E-03	0.00E+00	1.27E-07	1.49E-05	2.92E-05	8.60E-08	-3.69E-03
Abiotic depletion of fossil resources	MJ	4.76E+03	2.38E-02	1.57E+03	6.33E+03	0.00E+00	1.12E+01	6.12E+01	7.13E+02	2.73E+00	-3.34E+03
Water use	m^3 depr.	8.11E+02	1.55E-04	8.20E+00	8.19E+02	0.00E+00	1.16E-02	3.99E-01	2.26E+00	8.31E-03	-4.56E+02

The results of the environmental impact indicators — Abiotic depletion, Water use, and all optional indicators except Particulate matter and Ionizing radiation, human health — shall be used with care, as the uncertainties on these results are high or there is limited experience with the indicator. Reading example: 1.57E-03 = $1.57 \times 10^{-3} = 0.00157$.

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Additional environmental impact indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Particulate matter	Incidence	1.00E-04	1.96E-10	1.00E-05	1.10E-04	0.00E+00	1.39E-08	5.05E-07	1.00E-05	5.68E-08	-8.01E-05
Ionizing radiation, human health	Kbq U-235 eq	1.75E+01	2.43E-05	8.51E-01	1.83E+01	0.00E+00	1.62E-03	6.26E-02	4.06E-01	1.32E-03	-1.14E+01
Ecotoxicity (freshwater)	CTUe	8.96E+03	4.79E-03	2.50E+02	9.21E+03	0.00E+00	6.30E-01	1.23E+01	8.16E+01	3.20E-01	-7.75E+03
Human toxicity, cancer effects	CTUh	1.08E-06	3.07E-13	6.15E-08	1.14E-06	0.00E+00	4.45E-11	7.91E-10	5.83E-09	2.53E-11	-9.40E-07
Human toxicity, non-cancer effects	CTUh	9.00E-05	1.84E-11	9.93E-07	9.10E-05	0.00E+00	1.28E-09	4.73E-08	1.14E-07	4.70E-10	-8.00E-05
Land use related impacts/soil quality	Dimensionless	2.33E+03	3.02E-02	1.62E+02	2.49E+03	0.00E+00	7.91E-01	7.77E+01	5.61E+01	3.50E+00	-1.91E+03

This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or radioactive waste disposal in underground facilities. Potential ionizing radiation from soil, radon, and some construction materials is also not measured by this indicator.

GWP-GHG Indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG	Kg CO_2e	5.57E+02	1.92E-03	3.00E+02	8.57E+02	0.00E+00	2.71E-01	4.94E+00	5.97E+01	2.32E-01	-3.69E+02

This indicator includes all greenhouse gases, excluding biogenic carbon dioxide uptake and emissions, as well as biogenic carbon stored in the product, as defined by IPCC AR6 (2021). The indicator aligns closely with the Global Warming Potential (GWP) outlined in EN 15804:2012+A2:2019, incorporating updated characterization factors and environmental impact indicators.

Resource Use Indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Renewable PER used as energy	MJ	4.93E+02	4.04E-04	2.12E+01	5.14E+02	0.00E+00	2.16E-02	1.04E+00	7.06E+00	2.61E-02	-3.61E+02
Renewable PER used as materials	MJ	2.19E+00	0.00E+00	9.50E-02	2.29E+00	0.00E+00	1.02E-04	0.00E+00	0.00E+00	0.00E+00	-1.46E+00

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Total use of renewable PER	MJ	4.95E+02	4.04E-04	2.13E+01	5.16E+02	0.00E+00	2.17E-02	1.04E+00	7.06E+00	2.61E-02	-3.62E+02
Non-renewable PER used as energy	MJ	4.76E+03	2.38E-02	1.57E+03	6.33E+03	0.00E+00	1.12E+01	6.12E+01	7.13E+02	2.73E+00	-3.34E+03
Non-renewable PER used as materials	MJ	6.16E-04	0.00E+00	2.83E-05	6.44E-04	0.00E+00	2.31E-08	0.00E+00	0.00E+00	0.00E+00	-5.36E-04
Total use of non-renewable PER	MJ	4.76E+03	2.38E-02	1.57E+03	6.33E+03	0.00E+00	1.12E+01	6.12E+01	7.13E+02	2.73E+00	-3.34E+03
Use of secondary materials	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m^3	0.00E+00	0.00E+00	2.81E-01	2.81E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste Indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	Kg	0.00E+00	0.00E+00	5.60E+01	5.60E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste	Kg	0.00E+00	0.00E+00	9.34E-01	9.34E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E+01	0.00E+00
Radioactive waste	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Output Flow Indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Components for reuse	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.21E+02
Materials for recycling	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.20E+02	0.00E+00	9.21E+02

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Materials for energy recovery	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Biogenic carbon content

Details	Unit	A1-A3
Biogenic carbon content in product	Kg C	0.00E+00
Biogenic carbon content in accompanying packaging	Kg C	0.00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2. "Reading example: 1.57E-03 = $1.57*10^{-3}$ = 0.00157"

Disclaimer: “According to the **EN 15804:2012+A2:2019** standard, the LCIA results are relative expressions translating impacts into environmental themes such as climate change, ozone depletion, etc. (midpoint impact categories). Thus, the LCIA results do not predict impacts on category endpoints such as impact on the extinction of species or human health. In addition, the results do not provide information about exceeding thresholds, safety margins or risks”.

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Interpretation

The life cycle results for Reinforcing Steel Bars by Jeddah Steel demonstrate a strongly upstream and manufacturing-driven environmental profile, with Module A1 accounting for 60.40% of total GWP. This contribution is primarily linked to the steel billets used as the main input for rebar production, even though the billet feedstock is based on 100% pre-consumer scrap steel. The upstream burden reflects the energy, processing, and material transformation required to produce billets suitable for hot rolling into reinforcing bars. Given the metallic nature of rebar and the need to achieve specified strength, ductility, dimensional accuracy, and bond performance, the environmental profile is fundamentally governed by billet production and preparation before the material enters the rolling process.

Module A3 contributes 32.53% of total GWP and represents the second major impact source. This is expected for rebar manufacturing because the process involves billet reheating, hot rolling, rib formation, TMT quenching, self-tempering, bed cooling, length cutting, and packing. Within A3, furnace oil combustion in the reheating furnace is a major contributor, as billets must be heated to the required rolling temperature before deformation. The burning of furnace oil generates direct CO_2 emissions and other combustion-related impacts. Electricity consumption also contributes significantly through rolling mill operation, quenching systems, cutting equipment, cooling beds, pumps, compressors, and auxiliary plant systems. Diesel use for internal material handling and mobile equipment further adds to the manufacturing-stage impacts. The A3 contribution therefore reflects the combined effect of thermal energy, electrical energy, and internal fuel use required for hot rolling and controlled metallurgical processing at the Jeddah facility.

Module A2 is negligible at 0.0002%, as no inbound transport is considered for the primary steel billet input in the model. Only locally sourced steel bundling wire and minor process consumables are transported to the facility, which explains the extremely low contribution of this module. Module A4 is reported as 0%, since finished rebars are collected directly by customers from the factory gate using their own trucks. As Jeddah Steel does not arrange or control outbound delivery, no manufacturer-controlled transport emissions are included in the declared A4 boundary.

End-of-life modules contribute comparatively lower impacts, reflecting the high recovery potential of reinforcing steel. Module C1 contributes only 0.03%, as demolition energy is limited to the allocated share associated with rebar embedded within reinforced concrete structures. Module C2 contributes 0.536%, representing transport of recovered and residual rebar fractions to recycling

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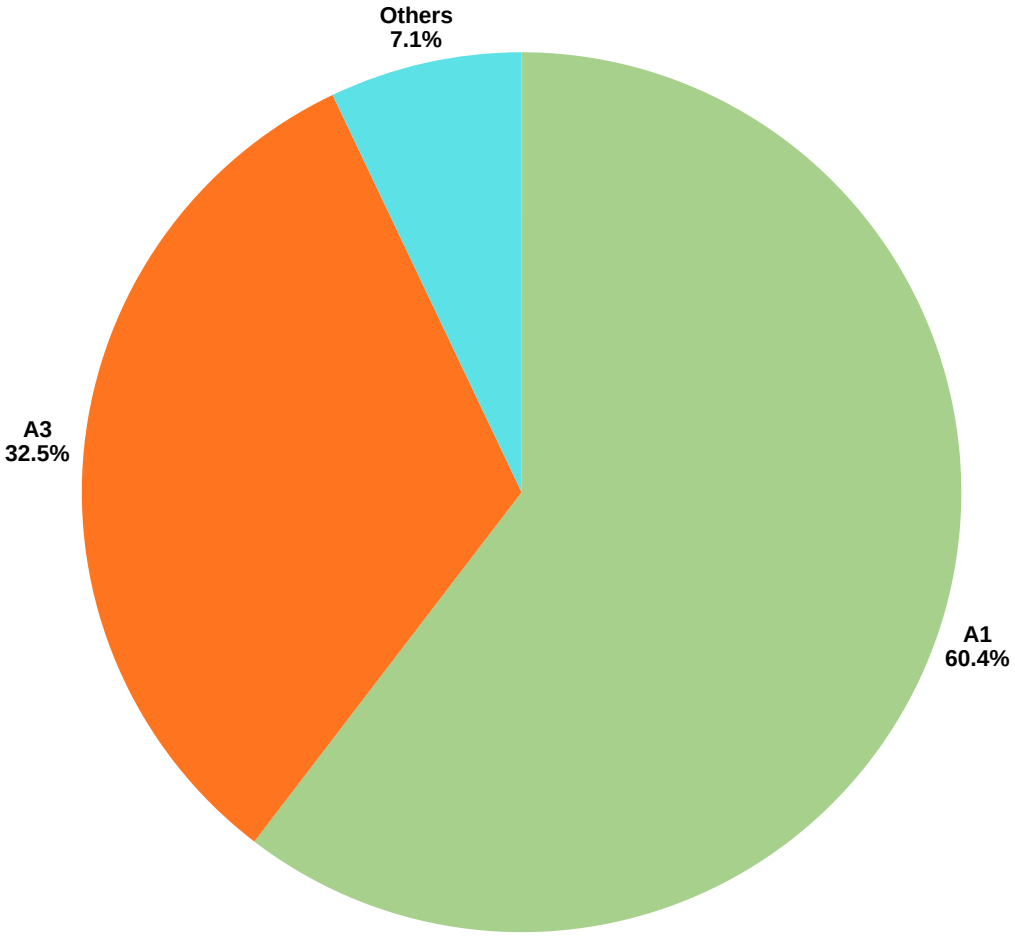
and landfill routes within Saudi Arabia. Module C3 contributes 6.48%, mainly due to waste processing activities such as separation, magnetic recovery, cutting, shearing, and preparation of recovered steel as ferrous scrap. Module C4 remains very low at 0.03%, as only 8% of the rebar mass is assumed to be landfilled and steel does not generate biogenic carbon or methane emissions during disposal.

Overall, the results confirm that the GWP profile is dominated by upstream steel billet production and energy-intensive manufacturing at the Jeddah facility. Within manufacturing, furnace oil combustion during billet reheating, electricity consumption for rolling and auxiliary systems, and diesel use for internal material handling are the main contributors. Transport and disposal impacts remain limited due to local sourcing, factory-gate collection, and high steel recovery at end-of-life.

Life Cycle Stage Contribution to GWP (kg CO_2e per 1 metric ton of Reinforcing Steel Bars)



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Mandatory Statements

Explanatory materials are available from the EPD Owner and/or LCA Author. The verifier and Program Operator make no claims and bear no responsibility regarding the legality of the study. Sole ownership, liability, and responsibility for the EPD lie with the EPD Owner. The LCA Author is not liable for manufacturer-provided information, life cycle data, or supporting evidence.

EPDs within the same product category, but issued by different EPD programs, may not be comparable. For valid comparison, both EPDs must be based on the same PCR (including version number), or on fully-aligned PCRs. Products must have identical function, technical performance, and use cases (e.g. the same declared or functional unit); share equivalent system boundaries, data descriptions, and data quality standards; use comparable collection methods and allocation rules; include matching content declarations; and be valid at the time of comparison.

Information related to EPD of multiple products

This is not an EPD of multiple products.

Information related to Sector EPD

This is not a sector EPD.

Differences vs previous versions

This is the first version of the EPD.

REVIEW AND VERIFICATION

EPD Programme and Registration Details

Item	Details
Programme Operator	International Climate Intelligence System 71-75 Shelton Street Covent Garden, London, WC2H 9JQ, United Kingdom
Registration Number	ICIS-202607-145
Publication Date	09-07-2026
Valid Until	08-07-2031
Geographical Scope	Kingdom of Saudi Arabia
Product Category Rules	PCR 2026:18 Construction Products, EN 15804:2012+A2:2019/AC:2021, Version 1.2.6, dated 21-Jan-2026
PCR Review Conducted by	International Climate Intelligence System

Verification Information

Item	Details
Verification Route	Independent external third-party verification of the EPD and underlying LCA data.
Verification Basis	ISO 14025:2006, ISO 14040:2006, ISO 14044:2006, EN 15804:2012+A2:2019/AC:2021, and PCR 2026:18
Third-party Verifier	Luis Manuel

CONTACT DETAILS

EPD Owner

Jeddah Steel Factory Company for Metal Products
Factory

Jeddah Steel Factory Company for Metal Products
Jeddah, P.O. Box 22429
Kingdom of Saudi Arabia
Email: tamer@jeddahsteel.com.sa
Ph: +966 55 307 7056

EPD Author

Alan Beski Christopher
Sustainability Manager

GCAS Quality Certifications
P.O Box 65561
Dubai, United Arab Emirates

Email: info.dubai@gcasquality.com
Website: www.gcasquality.com

EPD Verifier

Luis Manuel
San Adrián, Spain

Accredited by
International Climate Intelligence System
71-75 Shelton St, London WC2H 9JQ, United Kingdom

Program Operator

Email - office@climateintell.com
Website - www.climateintell.com

ACRONMYS

Acronym / Unit	Meaning
EPD	Environmental Product Declaration
LCA	Life Cycle Assessment
LCIA	Life Cycle Impact Assessment
ICIS	International Climate Intelligence System
PCR	Product Category Rules
GPI	General Programme Instructions
EN	European Standard
CEN	European Committee for Standardization
SASO	Saudi Standards, Metrology and Quality Organization
ISO	International Organization for Standardization
ASTM	American Society for Testing and Materials
EF 3.1	Environmental Footprint 3.1 method
ILCD	International Reference Life Cycle Data System
IPCC	Intergovernmental Panel on Climate Change
AR6	Sixth Assessment Report
GWP	Global Warming Potential
GHG	Greenhouse Gas
GWP-GHG	Global Warming Potential including greenhouse gases, excluding biogenic carbon uptake and emissions
SVHC	Substance of Very High Concern
ECHA	European Chemicals Agency
UN CPC	United Nations Central Product Classification
TMT	Thermo-Mechanically Treated
C&D	Construction and Demolition
KSA	Kingdom of Saudi Arabia
GCC	Gulf Cooperation Council
LEED	Leadership in Energy and Environmental Design
USGBC	U.S. Green Building Council

ACRONMYS

MR	Materials and Resources
BREEAM	Building Research Establishment Environmental Assessment Method
SBC	Saudi Building Code
MPa	Megapascal
Rm/Re	Tensile strength to yield strength ratio
kg CO_2e	Kilograms of carbon-dioxide equivalent
kg CFC-11e	Kilograms of Chlorofluorocarbon-11 equivalent
mol H+e	Moles of hydrogen ion equivalent
kg PO_4^{3-} eq	Kilograms of phosphate equivalent
kg P eq	Kilograms of phosphorus equivalent
kg N eq	Kilograms of nitrogen equivalent
mol N eq	Moles of nitrogen equivalent
kg NMVOC eq	Kilograms of non-methane volatile organic compound equivalent
kg Sb eq	Kilograms of antimony equivalent
MJ	Megajoules
m^3 depr.	Cubic meters of water deprived
incidence	Unit representing human health impact related to particulate matter exposure
Kbq U-235 eq	Kilo-becquerels of Uranium-235 equivalent
CTUe	Comparative Toxic Unit for ecosystems
CTUh	Comparative Toxic Unit for humans
dimensionless	Unitless characterization factor — used for land-use/soil quality impacts
kg C	Kilograms of biogenic carbon contained in product or packaging

STANDARDS AND REFERENCES

Standards & Methodological Frameworks

- EN 15804:2012 + A2:2019 / AC:2021 – Sustainability of construction works – Core rules for environmental product declarations of construction products.
- ISO 14025:2006 – Environmental labels and declarations – Type III environmental declarations – Principles and procedures.
- ISO 14040:2006 – Life cycle assessment – Principles and framework.
- ISO 14044:2006 – Life cycle assessment – Requirements and guidelines.

PCR & Program Documents

- PCR 2026:18 Construction Products, Version 1.2.6 – International Climate Intelligence System (EN 15804+A2 aligned).
- EPD General Program Instructions (GPI) of International Climate Intelligence System, v2.0, 2023.
- ICIS Environmental Product Declaration Template – International Climate Intelligence System, 2026.

Databases, Tools & Modelling Sources

- Ecoinvent v3.12, system model: Allocation, cut-off by classification.
- Air.e.LCA Software v3.21.1.2 by Solid Forest – Used for LCA modelling and impact calculations.
- IPCC AR6 (2021) Characterization Factors – Applied for GWP indicators (where relevant).
- EF 3.1 (Environmental Footprint 3.1 method) – Used for all midpoint impact indicators.

Transport Calculation Tools

- Google Maps – Road transport distance calculations.

Biogenic Carbon and End-of-Life

- CEN (2019/2021). EN 15804:2012+A2:2019/AC:2021 — Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products.
- International Organization for Standardization (2017). ISO 21930:2017 — Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services.

STANDARDS AND REFERENCES

- Intergovernmental Panel on Climate Change (2006). 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
- Haider, H., et al. (2022). Life Cycle Assessment of Construction and Demolition Waste Management in Riyadh, Saudi Arabia. International Journal of Environmental Research and Public Health, 19(12), 7382.
- worldsteel (2021). Rebar — Global — Construction.
- SteelConstruction.info (2012). Reinforcing Steel — End of Life Dataset.
- SteelConstruction.info (2012). The Recycling and Reuse Survey.
- Saudi Investment Recycling Company (SIRC) / Public Investment Fund (PIF). Saudi Investment Recycling Company profile and circular economy initiatives.

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From Steel to Structure, Responsibility Runs Through

JEDDAH STEEL FACTORY | REINFORCING STEEL BAR