



# DECARBONIZATION ROADMAP

## MOTIVATION AND CONTEXT

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Aluminum is currently the second most widely used metal worldwide, playing a central role in numerous industrial sectors. Its strength and durability make it indispensable for a wide range of applications, from civil construction to electric mobility.

Its presence is particularly significant in clean and low-carbon technologies, such as power transmission systems, solar panels, electric vehicles, and, in the case of Triangle's, the production of bicycle frames.

However, despite its strategic relevance to the energy transition and sustainable development, the aluminum sector is also one of the major emitters of greenhouse gases (GHG). It is estimated to be responsible for around 2% of global anthropogenic emissions. This environmental impact is mainly associated with the dependence on fossil fuels in production processes.

The transition to a carbon-neutral economy is one of the central pillars of European sustainability policies. The European Green Deal and the Carbon Border Adjustment Mechanism (CBAM) set ambitious targets for reducing greenhouse gas (GHG) emissions, requiring industry to adopt decarbonization and energy-efficiency strategies.

In the light mobility sector, and particularly in the production of aluminum bicycle frames, these requirements are especially relevant, as aluminum is a key material for the energy transition due to its lightness, durability, and recyclability, while its primary production has a significant carbon intensity. Decarbonizing the aluminum value chain is therefore essential to ensure the competitiveness and sustainability of companies in this sector.

Triangle's recognizes the need to align its activities with global carbon-neutrality commitments and to position itself as a benchmark in the sustainable production of aluminum bicycle frames. The decision to develop and implement a decarbonization roadmap stems from two main motivations: Aluminium Stewardship Initiative (ASI) certification and strategic market positioning.

Decarbonization is embedded in Triangle's strategic vision: to produce high-quality bicycle frames with the lowest possible environmental impact.

This decarbonization roadmap serves as a decision-support and planning tool, guiding the company's actions along the following pillars:

- Reduction of direct, indirect, and value-chain emissions (Scopes 1, 2, and 3);
- Procurement of renewable energy and on-site self-consumption solutions;
- Process efficiency and optimized management of energy resources;
- Material circularity, with valorization of waste;
- Engagement of internal and external stakeholders;
- Transparency and communication of environmental performance, aligned with international best practices.

Through this approach, Triangle's strengthens its commitment to sustainability, innovation, and responsible leadership in the European sustainable mobility sector, contributing to a more efficient, transparent, and low-carbon industry.

# TRIANGLE'S 2024 CARBON FOOTPRINT RESULTS

In 2024, Triangle's carried out its first carbon footprint calculation, based on the GHG Protocol methodology, covering Scopes 1, 2, and 3.

Scope 3 proved to be the most significant, accounting for 95.7% of the company's total greenhouse gas (GHG) emissions in 2024. The main contributing categories were:

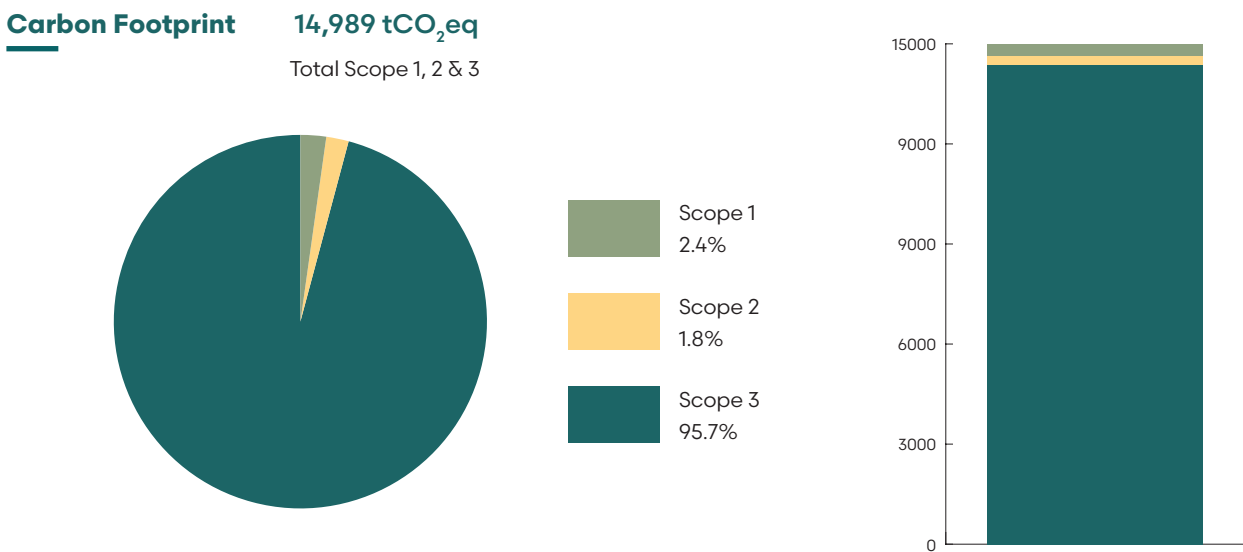
- Purchased Goods and Services - 75.4%
- Capital Goods - 17.8%
- Upstream Transportation and Distribution - 2.2%
- Employee Commuting - 2.1%

Scope 1 accounts for 2.4% of emissions and is associated with natural gas consumption (stationary combustion) and fuel used by the company fleet (mobile combustion).

Scope 2 represents 1.8% of total emissions, corresponding to Triangle's electricity consumption.

## E1-6: Gross Scopes 1, 2, 3 and Total GHG Emissions

To calculate Triangle's corporate carbon footprint, the GHG Protocol methodology was used to calculate direct (scope 1) and indirect (scope 2 and 3) emissions.



<b>Scope 1</b>	<b>Scope 2</b>	<b>Scope 3</b>
<b>366.69</b> tCO <sub>2</sub> e	<b>271.37</b> tCO <sub>2</sub> e	<b>14,351</b> tCO <sub>2</sub> e

## Scope 1

For scope 1, emissions from stationary and mobile combustion were considered.

Scope 1 shows a total of 367 tonnes of CO<sub>2</sub>eq, with natural gas consumption accounting for approximately 80% of emissions, followed by the car fleet with the remaining 20%.

- Stationary combustion (natural gas) - 291.34 tCO<sub>2</sub>eq (79.5%)
- Mobile combustion (fleet) - 75.35 tCO<sub>2</sub>eq (20.5%)
- Total - 366.69 tCO<sub>2</sub>eq

Category	tCO <sub>2</sub> e	%
Stationary Combustion (Natural)	291.34	79.5
Mobile Combustion (Fleet)	75.35	20.5

## Scope 2

For scope 2, emissions from electricity consumption were taken into account.

Scope 2 has a total of 271 tonnes of CO<sub>2</sub>eq.

- Electricity - 271.37 (100%)

Category	tCO <sub>2</sub> e	%
Electricity	271.37	100

## Scope 3

Scope 3 considered emissions from the value chain upstream and downstream of the company's activities.

Scope 3 has a total of 14,351 tonnes of CO<sub>2</sub>eq, with the main emissions associated with the Acquisition of products and services (75%) and Capital goods (18%) categories.

- Acquisition of products and services - 10,825 tCO<sub>2</sub>eq (75.4%)
- Capital goods - 2,560 tCO<sub>2</sub>eq (17.8%)
- Activities related to energy - 66.67 tCO<sub>2</sub>eq (0.46%)
- Transportation and distribution (T&D) upstream - 310.19 tCO<sub>2</sub>eq (2.2%)
- Waste generated in operations - 89.18 tCO<sub>2</sub>eq (0.60%)
- Business trips - 127.84 tCO<sub>2</sub>eq (0.9%)
- Employees commuting - 294.23 tCO<sub>2</sub>eq (2.1%)
- T&D downstream - 77.21 tCO<sub>2</sub>eq (0.54%)
- Total - 14,351 tCO<sub>2</sub>eq (100%)

In the overall carbon footprint, scope 3 proved to be the most representative with 95.7% of total emissions, followed by scope 1 with 2.4 per cent and scope 2 with 1.8%.

Category	tCO <sub>2</sub> e	%
Acquisition of products and services	10,825	75.4
Capital Assets	2,560	17.8
Energy-related activities	66.67	20.46
Upstream transport of materials	310.19	2.2
Waste	89.19	0.6
Business Trips	127.84	0.9
Employee Commute	294.23	2.1
Downstream transport of material	77.21	0.54

## GHG Emissions Intensity per Turnover

0.00080 tCO<sub>2</sub>eq/€

Based on the analysis of the results of the carbon footprint, a set of actions emerges that will allow for greater capacity to mitigate emissions.

### Scope 1

- Continue the transition to low-carbon vehicles (electric, hybrid)\*
- Increase efficiency in natural gas consumption

\* A large part of the fleet is already made up of hybrid cars. At the moment, only three vans run on diesel.

### Scope 2

- Sign green energy contracts
- When purchasing or replacing, prioritise the choice of efficient equipment

### Scope 3

- Prioritise the choice of suppliers that adopt low-carbon practices and provide detailed information on the carbon footprint of their products
- Whenever possible, buy second-hand products
- Encourage the use of more sustainable modes of transport
- For car hire, opt for electric, hybrid or fuel-efficient vehicles
- Explore partnerships with distribution companies that have more sustainable practices

Additionally, a tool based on the ASI-endorsed methodology was used to establish a GHG Emissions Reduction Plan and to ensure a GHG Emissions Reduction Pathway consistent with a 1.5°C warming scenario.

## GHG EMISSIONS REDUCTION PLAN

Triangle's Decarbonization Action Plan was developed collaboratively through a participatory workshop involving 17 employees with decision power, with all company departments represented.

The objective of this exercise was to identify, prioritize, and schedule concrete actions to reduce greenhouse gas (GHG) emissions associated with the company's operations and its supply chain.

During the workshop, participants were divided into working groups by thematic area (energy, materials, processes, logistics, and engagement), using guided brainstorming techniques, multicriteria assessment, and impact vs. effort analysis.

Each group assessed improvement opportunities based on:

- Potential for emissions reduction;
- Technical and financial feasibility;
- Implementation timeframe;

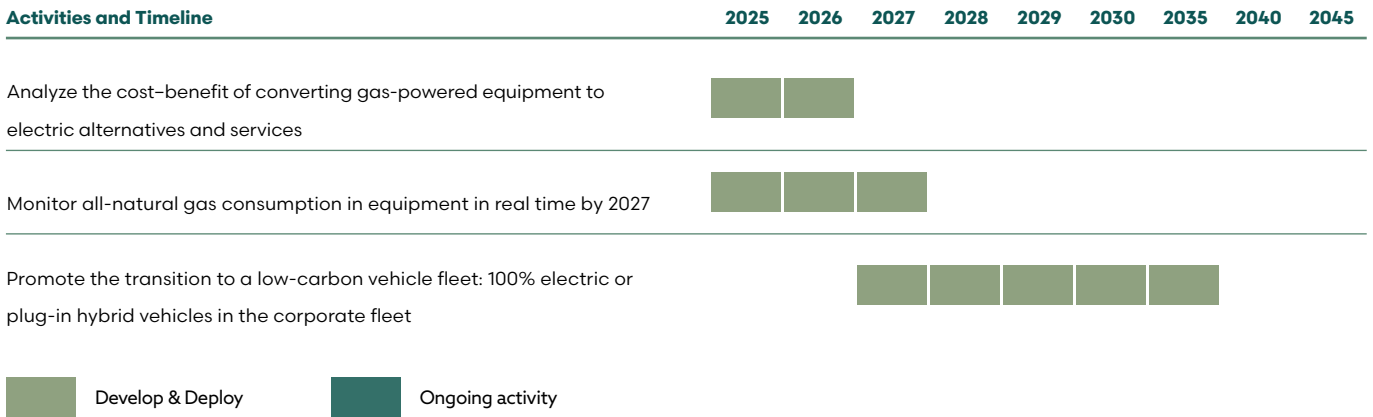
Contribution to ASI certification requirements.

The resulting ideas were consolidated into the Action Plan with short- (2030), medium- (2035), and long-term (2045) horizons – as Portugal has not set a net-zero emissions goal for 2050, considering that the country could achieve it in 2045 –, grouped according to the main strategic decarbonization drivers.

## Scope 1

**Commitment:** Reduction of Fossil Fuel Consumption

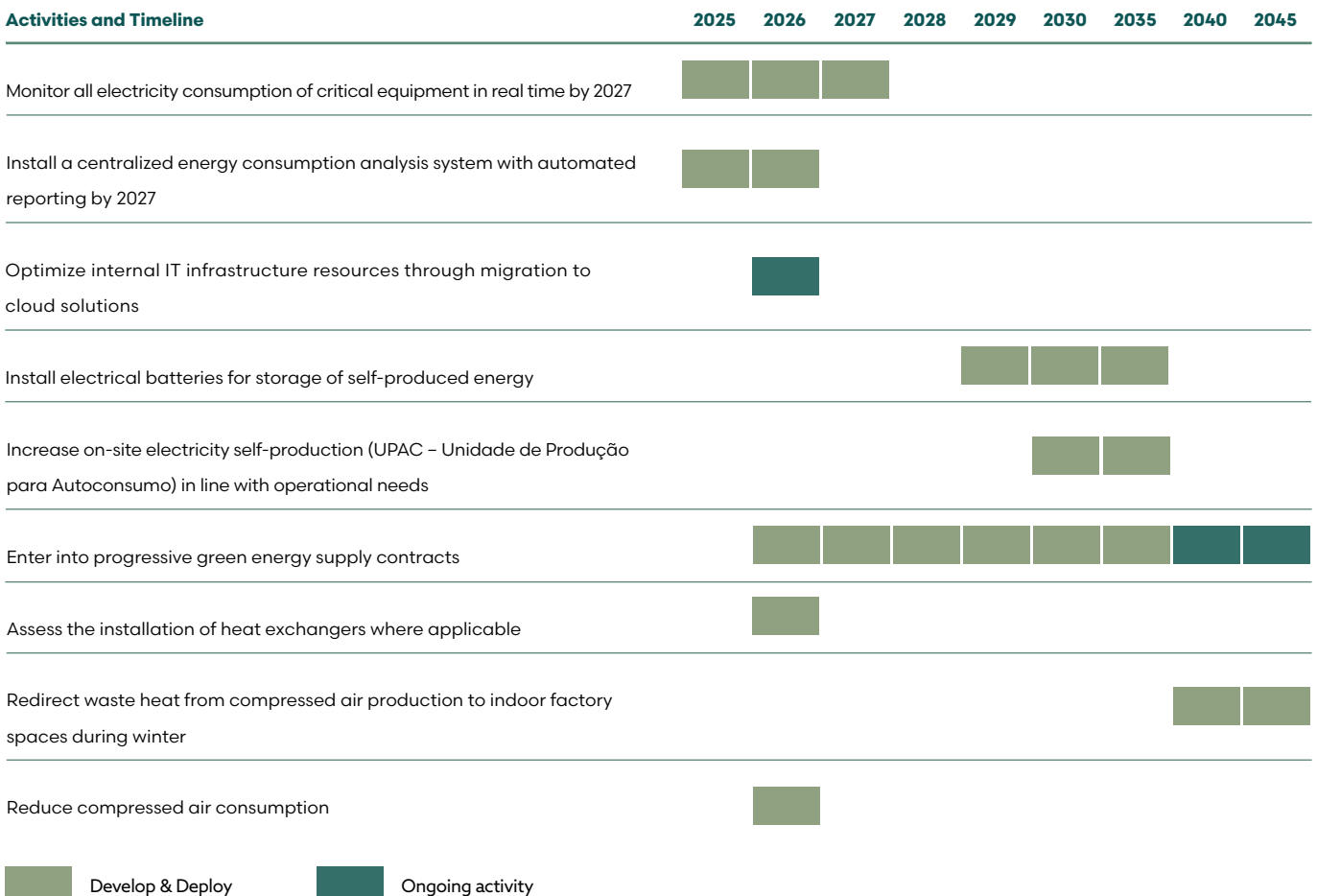
**2030 Target:** Reduction of fuel consumption per piece of equipment in production units compared to 2024 (42% reduction in Scope 1 and Scope 2 emissions)



## Scope 2

**Commitment:** Reduce energy consumption per bicycle frame produced

**2030 Target:** Increase on-site electricity self-production capacity by 2030 compared to 2024; Improve energy efficiency compared to 2024; (42% reduction in Scope 1 and Scope 2 emissions)

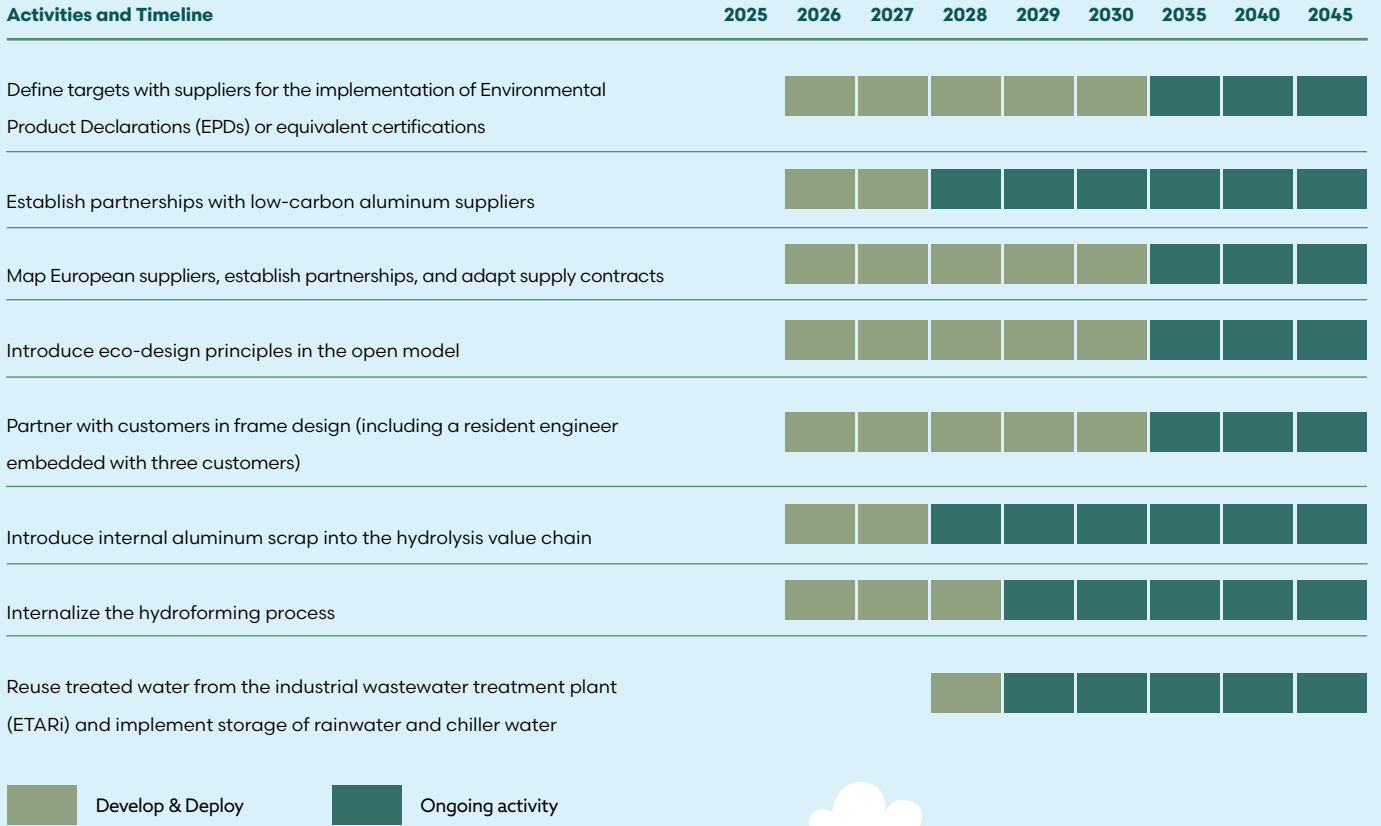


# Scope 3

## Category 1

**Commitment:** Reduction of CO<sub>2</sub>e emissions in aluminum products compared to 2024

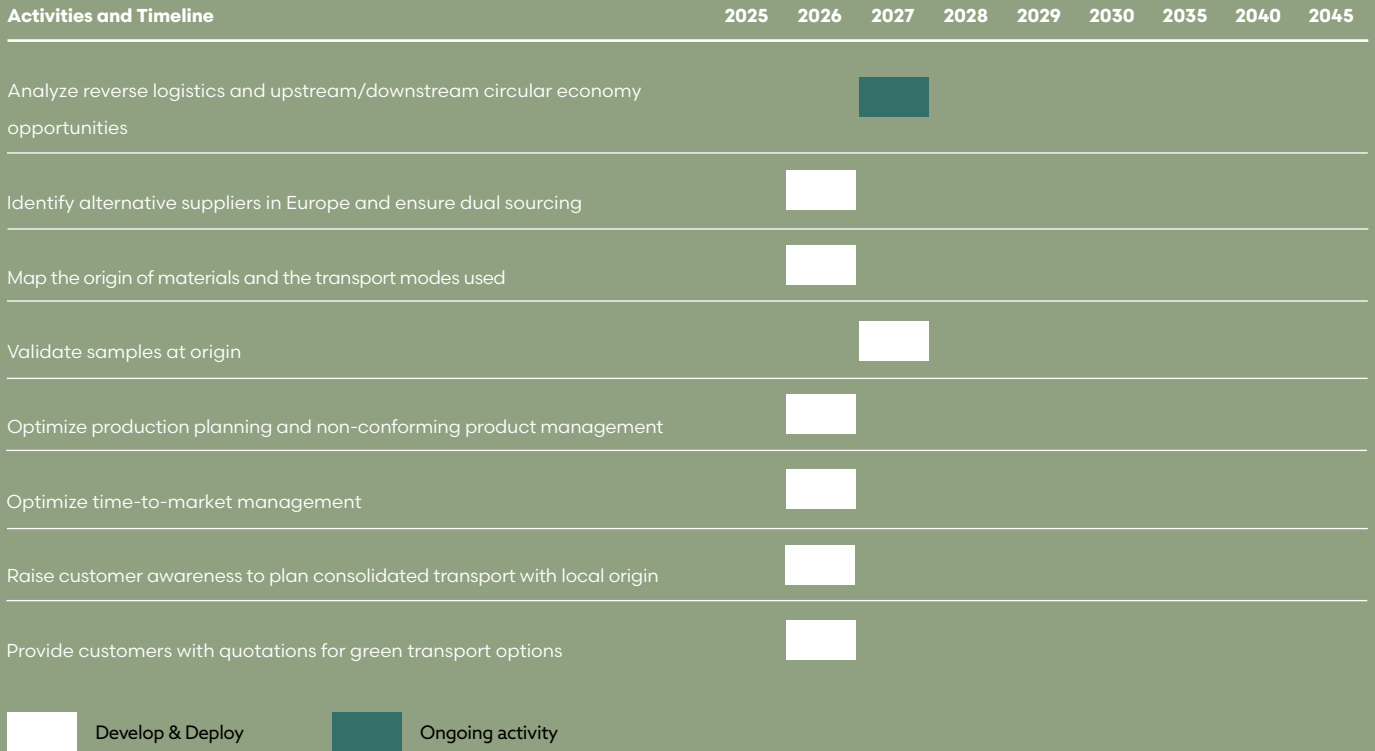
**2030 Target:** Source at least 80% of aluminum profiles with carbon information (EPD or other certified documentation); 30% reduction in dependency on Asian suppliers (percentage of components purchased)



### Category 4 & 9

**Commitment:** Reduction of CO<sub>2</sub>e emissions from transportation

**2030 Target:** Map 100% of logistics routes (maritime, road, and air) and prioritize lower-impact routes; Consolidate outbound transportation with national suppliers



### Category 5

**Commitment:** Reduction of aluminum waste in the production process

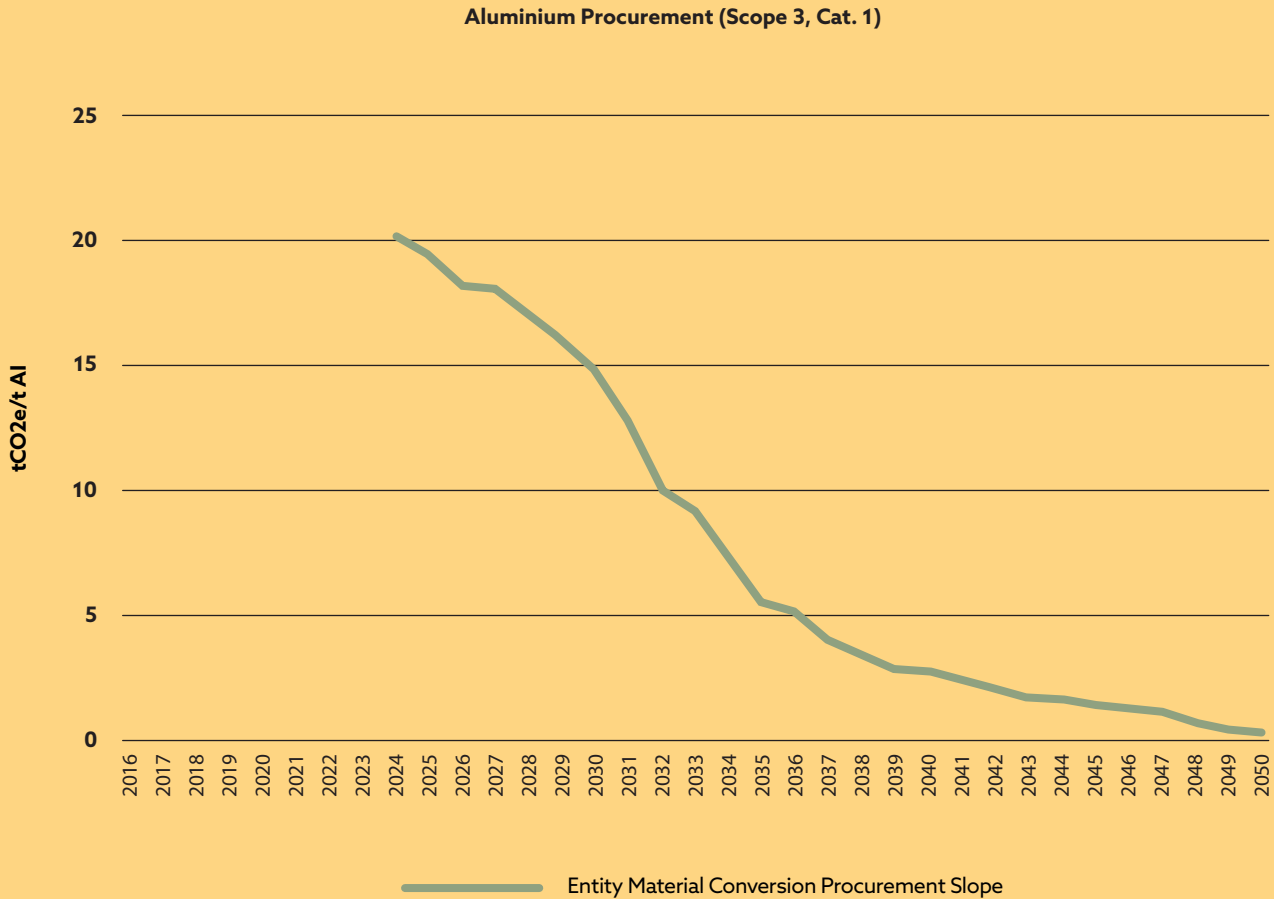
**2030 Target:** Maintain the waste rate below 30% per product produced



# GHG EMISSIONS REDUCTION PATHWAY

Triangle's has defined a GHG emissions intensity reduction pathway for Scope 3, Category 1 (Purchased Goods and Services), aligned with a 1.5°C warming scenario and expressed in tonnes of CO<sub>2</sub> equivalent per tonne of aluminum processed (tCO<sub>2</sub>e/t Al). The pathway uses

2024 as the baseline year, corresponding to the company's first comprehensive carbon footprint assessment, developed **in accordance with the GHG Protocol and supported by the ASI-endorsed methodology.**



In 2024, the emissions intensity associated with Scope 3, Category 1 was 20.2 tCO<sub>2</sub>e/t Al, serving as the reference point for the reduction trajectory. A first phase of progressive reduction between 2024 and 2030 is defined, reaching 14.8 tCO<sub>2</sub>e/t Al by 2030, which represents an approximate 27% reduction compared to the baseline. This phase reflects early actions focused on supplier engagement, increased transparency of carbon data (EPDs or equivalent), gradual substitution of high-carbon aluminum, and initial eco-design and process-optimization measures.

Between 2030 and 2035, Triangle's plans an accelerated decrease in emissions intensity, from 14.8 to 5.5 tCO<sub>2</sub>e/t Al, corresponding to a 73% reduction relative to 2024. This step change is driven by structural interventions in the value chain, including a significant shift toward low-carbon aluminum sourcing, reduced dependency on Asian suppliers, increased use of recycled aluminum, internalization of key processes, and closer collaboration with European suppliers aligned with climate targets.

From 2035 to 2040, the emissions intensity of Scope 3, Category 1 is expected to decline further, from 5.5 to 2.8 tCO<sub>2</sub>e/t Al, supported by advanced circularity strategies, higher recycled content, supplier decarbonization requirements, and continuous improvement in product design and material efficiency.

In the final phase, from 2040 to 2050, Triangle's targets near-zero emissions intensity for Scope 3, Category 1, reducing residual emissions from 2.8 tCO<sub>2</sub>e/t Al in 2040 to 0.4 tCO<sub>2</sub>e/t Al by 2050. This represents an overall reduction of approximately 98% compared to the 2024 baseline. Remaining emissions are expected to be limited to hard-to-abate sources within the upstream aluminum value chain and will be addressed through sus-

tained supplier engagement, technological innovation, and – where unavoidable – the application of high-integrity mitigation measures consistent with international best practices.

This Scope 3 Category 1 GHG emissions intensity pathway provides a robust and transparent framework for tracking progress, supporting strategic procurement and investment decisions, and ensuring alignment with the GHG Protocol, ASI Performance Standards, and European climate neutrality objectives.

## Document Control

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