

TRA2026 Carbon Footprint Report

Content

1. Executive Summary	4
1.1 The Big Picture.....	4
1.2 Key Results	4
1.3 Major Carbon Drivers	5
1.4 Achievements	6
2. Introduction & Context	7
2.1 About TRA2026.....	7
2.2 Context and Relevance of Event Foot Printing	7
2.3 Report Objectives	7
3. Methodology	9
3.1 Accounting Framework and Tool	9
3.2 System Boundaries	9
3.3 Data Collection and Emission Calculation by Category	9
3.4 Data Quality and Assumptions	13
4. Inventory Results & Data Analysis.....	14
5. Sustainability Initiatives & Avoided Emissions	17
6. Recommendations for Future TRA Events.....	19
6.1 Resolving Data Collection Gaps and Accounting Boundaries	19
6.2 High-Impact Decarbonization Action Plan	19
6.3 High-Integrity Carbon Neutralization Strategy	21
6.4 Recommendations for Future EU-Funded Conference Projects	21
7. References	23
ANNEX 1. Recommended TRA Exhibitor Green Charter	24

1. Executive Summary

1.1 The Big Picture

The Transport Research Arena (TRA) 2026 took place from May 18 to May 21, 2026, in Budapest, Hungary, hosted at the prominent Hungexpo Budapest Congress and Exhibition Centre. As Europe's flagship event for transport and smart mobility research and innovation, this iteration convened an international assembly of over 3,000 attendees representing academia, private industry, public authorities, and policymakers from 69 countries.

Centering on the core theme "Re-Generation in Transport," TRA2026 served as a collective call to action. The conference focused on integrating next-generation thinkers and cutting-edge solutions to accelerate a just, smart, and sustainable transition. The extensive professional program was anchored across four fundamental pillars: user-centred mobility, green mobility and decarbonisation, planning and operation, and transport digitalisation.

Because the event's intellectual focus directly targeted the decarbonization of global transport systems, this report documents the comprehensive post-event evaluation of the conference's own greenhouse gas emission—ensuring the event's operational reality matched its progressive scientific mandate.

1.2 Key Results

The total carbon footprint for the event reached 1,086.47 tCO₂e. To visualize 1,086.47 tCO₂e in concrete terms, it equals to drive about 240 gasoline-powered cars for one full year (~4.32 million km driven). It is important to note, that 51.45% of total emissions are from flights from European point of departure. If all attendees flying from Europe have chosen train over flights, 517.44 tCO₂e could have been avoided, that is 47.63% of total event emission. For the next conference in Milan, it is essential to address this emission and incentivize train travel within Europe.

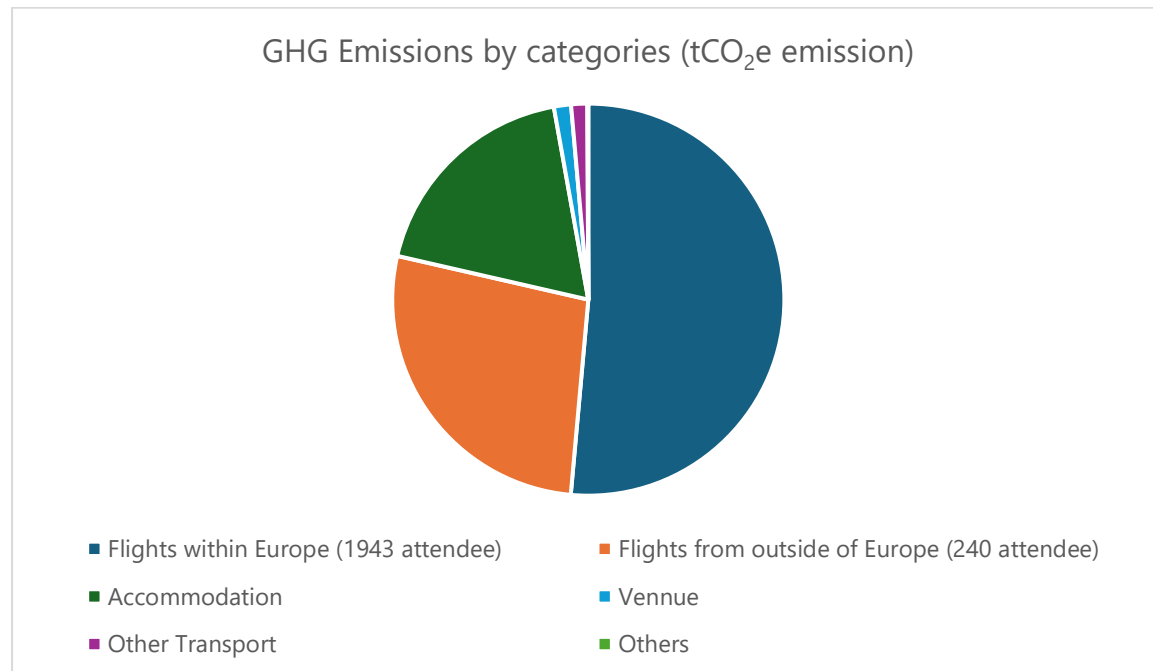
Emissions per attendee count 0.35 tCO₂e per person, 352 kg CO₂e per person (calculated as 1,086.47 tCO₂e divided by 3086). An amount of 352 kg CO₂e represents roughly 1 months' worth of an average individual's carbon footprint in Europe or taking an electric train or subway for over 16,000 km.

The mission of this report is to inform future benchmarking and create a reliable data baseline to help the European Commission, the TRA Management Committee, and future host countries (e.g., for TRA2028) design and execute progressively lower-

impact iterations of the conference, targeting the most polluting area of the conference, Flight emissions.

1.3 Major Carbon Drivers

Emissions were overwhelmingly driven by participant travel and lodging, while on-site operations accounted for a minor fraction of the total impact.



Flights are the single largest contributor (78.58%, 853.80 tCO₂e), representing nearly four-fifths of the total carbon footprint due to long-distance participant travel.

If all attendees flying from Europe have chosen train over flights, 517.44 tCO₂e could have been avoided, that is 47.63% of total event emission.

Accommodation (18.59%, 202.03 tCO₂e), hotel guest-nights formed the second-largest emission source. Venue energy/waste (15.3 tCO₂e) and local transit (4.47 tCO₂e) contributed minor portions to the total.

To guide future decarbonization strategies, emissions are split into operational control categories:

- **Influenceable Emissions** (1,055.82 tCO₂e, 97.0%): Flights and hotel stay form most emissions. These cannot be directly reduced by event operations alone but can be influenced via remote/hybrid participation options, regional hubs, or travel policies and incentives.

- **Controllable Emissions** (30.65 tCO₂e, 3.0%): Venue operations, signage, production, and catering are under direct organizer control and represent the baseline footprint of physical event execution.

1.4 Achievements

Operational success was achieved by driving key controllable impact areas down to zero or near-zero levels. A central contributor to this baseline was the selection of HUNGEXPO as the host venue. The facility's modern infrastructure allowed the event to minimize its operational footprint through energy-efficient heating and cooling systems, optimized on-site resource management, digital-first communication strategies, and rigorous selective waste separation.

To minimize local transit emissions, organizers provided all registered attendees with a complimentary Budapest public transportation pass. This incentive encouraged a shift toward low-carbon mobility—including metro, tram, and bus connections—limiting local transportation emissions to 14.47 tCO₂e (1.33% of the total footprint) despite citywide delegate movements.

2. Introduction & Context

2.1 About TRA2026

The Transport Research Arena (TRA) is Europe's largest transport research and technology conference, serving as a pivotal biennial gathering for researchers, policymakers, industry experts, and operators. TRA2026 brought together key stakeholders to discuss, debate, and advance the latest innovations in smart, safe, and sustainable mobility across all transport modes—road, rail, air, and waterborne.

As a premier forum dedicated to reshaping the future of mobility, the core theme of TRA2026 focused heavily on decarbonization, digital transformation, and resilient transport infrastructures. Navigating the transition to net-zero transport systems requires **not only intellectual dialogue but also operational leadership**. Therefore, ensuring that the physical hosting of TRA2026 reflected its institutional ethos of environmental stewardship was priority for the organizing committee.

2.2 Context and Relevance of Event Foot Printing

Large-scale international conferences are inherently resource intensive. They require significant energy to power venues, generate demand for temporary physical infrastructure, rely heavily on hospitality services, and—most notably—induce large volumes of international and regional travel.

In an era defined by the urgent need to address climate change, understanding the environmental toll of hosting such events is critical. Measuring greenhouse gas (GHG) emissions is no longer an administrative afterthought; it is a vital metric of an event's operational efficiency. By quantifying the carbon footprint of TRA2026, the organizers aim to move beyond high-level sustainability rhetoric and establish a clear, data-driven accounting of the event's actual climate impact.

2.3 Report Objectives

This report has been commissioned to provide a comprehensive, transparent, and post-event evaluation of the carbon footprint of TRA2026. The specific objectives of this assessment are to:

- **Establish accountability:** Provide a transparent, verifiable disclosure of the total greenhouse gas emissions generated by the execution and dismantling of the event.
- **Identify carbon hotspots:** Pinpoint which operational categories (ranging from international flights to catering choices) contributed most significantly to the total footprint, enabling data-driven insights.

- **Evaluate mitigation measures:** Create baseline for the measurement of the effectiveness of the green initiatives implemented during future events (e.g., waste reduction policies, digital ticketing, sustainable catering choices) in avoiding emissions.
- **Inform future benchmarking:** Create a reliable data baseline to help the European Commission, the TRA Management Committee, and future host countries (e.g., for TRA2028) design and execute progressively lower-impact iterations of the conference.

3. Methodology

This section outlines the methodological framework, boundaries, and data collection procedures used to calculate the greenhouse gas (GHG) footprint of the TRA2026 event. The primary objective is to ensure transparency, accuracy, and reproducibility in accounting for the event's environmental impact.

3.1 Accounting Framework and Tool

The carbon footprint calculation was conducted using the Green Events Tool (GET) as a guide, a specialized web-based platform developed jointly by the United Nations Environment Programme (UNEP), the UNFCCC secretariat, and the Gulf Organisation for Research & Development (GORD). The tool aligns with international GHG accounting standards, including the GHG Protocol Corporate Value Chain (Scope 3) Standard and ISO 14064-1^{1,2,3}.

All emissions are calculated and reported in kilograms or metric tonnes of carbon dioxide equivalent (kgCO₂e or tCO₂e), factoring in the global warming potential (GWP) of CO₂, CH₄, and N₂O.

3.2 System Boundaries

The assessment covers the post-event calculation phase, capturing the actual, recorded resource consumption and participant activities directly tied to TRA2026. The operational boundary includes the following eight distinct categories:

- Venue: Energy & Waste
- Transport: Flights & Other Transportation
- Event Operations: Audio Visual, Communication, Production & Exhibition
- Hospitality: Accommodation & Catering

3.3 Data Collection and Emission Calculation by Category

To compute the total impact, primary data collected from venue operators, vendors, and participant surveys were multiplied by appropriate emission factors (EF) embedded within the Green Events Tool database:

$$\text{Total Emissions} = \sum (\text{Activity Data} * \text{Emission Factor})$$

¹ UNEP/UNFCCC/GORD (2021) Green Events Tool, [Main Home - Green Events Tool](#)

² WRI/WBCSD (2011) GHG Protocol Scope 3 Standard, [Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf](#)

³ ISO 14064-1:2018 Greenhouse Gas Accounting, [ISO 14064-1:2018 - Greenhouse gases](#)

1. Venue

- **Methodology:** The potential GHG emission sources included in the venue category are: stationary fuel combustion (like boilers, gas heaters, cookstoves, electricity generators or any other devices that burn fuels onsite), grid electricity consumption, refrigerant emissions (from leaks in air conditioning units), grid heat/cold/steam consumption, embedded carbon of the building materials used in preparation of the venue (i.e., GHG emission attributable to manufacturing of the building materials), grid water consumption, and related waste disposal.

Not all the event is required to consider embedded carbon in building materials. In general, such embedded carbon in building material is considered when new permanent building(s) or new temporary building(s) have been constructed. For temporary building(s), generally the 100% of the embedded carbon emissions are assigned to this event and for permanent buildings, an allocation ratio can be used.

- **Data Inputs:** Stationary fuel combustion (0), total electricity consumption (kWh), purchased heat/cold/steam consumption (0), embedded carbon of building materials (0), water consumption (m3), waste disposal (m3).
- **Missing Inputs:** refrigerant emission. Number of devices and brand name of the devices were available, but the possibilities for the calculation were limited, thus refrigerant emission is excluded from the inventory.
- **Application:** Waste emissions are calculated based on an estimated weight of the different waste categories (as volume was provided in cubic meter) and for mixed waste treatment. For TRA2026 there was no temporary or permanent building constructed, therefore the embedded carbon of building materials is 0.

2. Flights

Air travel typically represents the largest share of an international conference's carbon footprint.

- **Methodology:** Flight distances are calculated using great-circle distances between origin and destination (BUD) airports. For all travel, direct flights on economy class and return trips were calculated, using emission factors of DEFRA 2025 short-haul economy-class factor with RF: 0.12576 kg CO₂e/passenger-km, in kg CO₂e⁴.

⁴ UK DESNZ / DEFRA Greenhouse Gas Reporting Conversion Factors (2025 Edition)

- **Data Inputs:** Pre-event attendee registration data detailing the city of origin.
- **Application:** Pre-event attendee registration data lacks information on class of travel (Economy, Premium Economy, Business), and whether it was a direct flight or if there was a layover where it happened. Therefore, in this category the Green Events Tool was not used, but independent calculation was performed based on the assumption that all flights were direct flights to Budapest.

3. Other Transportation

- **Methodology:** Covers non-flight transit associated with the event: bicycle (zero emission), coach, car, train.
- **Data Inputs:** Pre-event attendee registration data, sense checked. Entries with peculiar information were checked and excluded if the data seemed faulty (e.g., traveling by bus from Nashville, USA to Budapest).
- **Application:** Public transportation used within the city of Budapest and bicycling are calculated as zero emissions. Total passenger-kilometers (pkm) are aggregated per transport mode and multiplied by vehicle-specific emission factors.
 - Travel by car: For the calculation, the DEFRA/DESNZ 2026 passenger car emission factors (Scope 1, kg CO₂e per km), the "Cars (by size), medium car" has been used. In cases where the type of the car (petrol/diesel/hybrid/electric) was missing emission factor for petrol car was used. Where participants of the conferenced indicated that multiple passengers travelled together in the car, the emission has been divided by the number of the passengers and driver driving together.
 - Travel by coach: The DEFRA Coach emission factor has been applied.
 - Travel by train: The EEA/UIC European high-speed electric rail emission factor has been applied⁵.

4. Audio/Visual (AV)

- **Methodology:** The used Green Events Tool recommends, that Audio/Visual GHG emissions are associated to the production of video clips, music tracks and similar elements of event delivery. To avoid double counting, the emissions from the electricity consumption of Audio/Visual device on site is considered

⁵ EEA / UIC Ecotransit Europe Railway Carbon Footprint Methodology.

under Venue section. As the event delivery did not include the production of video clips, music tracks and similar elements, this category is zero.

5. Communication

For in-person events, GHG sources covered by this category include material manufacturing and use (such as paper, cardboard), printing services and related waste disposal.

- **Data Inputs:** Data of weight and material of all marketing material (e.g., printed program booklets and advertising space) sourced from the contracted marketing company.
- **Methodology:** Physical print items are assessed using material weight factors (e.g., kg of recycled paper).
- **Application:** Digital footprints are excluded from this calculation.

6. Production/Exhibition

GHG emissions attributable to manufacturing of all materials used to build the booths or other structures, and related waste disposal are considered under this category. GHG emissions related to energy consumption, water consumption and other sources are already considered under the "Venue" category.

- **Data Inputs:** The data input from the Hungexpo details the material balance of a modular exhibition build.
- **Methodology:** The methodology quantifies GHG emissions exclusively from the raw material manufacturing and end-of-life disposal of newly produced or damaged installation elements. By utilizing a cradle-to-gate approach coupled with waste-treatment emission factors, it isolates material life cycles from transport and venue energy use. Consequently, circular, reused, and rented assets (such as Octanorm frames and modular furniture) are credited with a zero-carbon impact for the event.
- **Application:** For the calculation the cradle-to-gate emission factors of DEFRA were used.

7. Accommodation

- **Data Inputs:** The attendee list and data source collected at the registration of the conference: total number of overnight stays (guest-nights) booked by international and non-local attendees.

- **Methodology:** In Green Event Tool, the emission of accommodation is generated from stationary fuel consumption, electricity consumption, water consumption and waste disposal. The emission factors are sourced from Cornell Hotel Sustainability Benchmarking Index (CHSB)⁶. The data source only provides the emission factors/energy index for a mixed emission source. Emission factors are directly multiplied with the rooms and duration.
- **Application:** as the question of number of nights spent in the destination was not mandatory to fill some participants left the question empty. Those who owned 4 days pass, the stay of 3 nights was assumed.

8. Catering

- **Methodology:** The Green Events Tool in this category covers GHG emissions associated with catering services provided by catering facilities that are not located at the event venue. As catering services in the case of TRA2026 at Hungexpo are in the event venue, GHG emissions attributable to them are considered under the "Venue" category and shall not be considered here.
- **Application:** Please note, that the methodology provided by the Green Events Tool excludes the emissions of the production and transportation of the ingredients of meals and drinks to the catering services located on site.

3.4 Data Quality and Assumptions

The data collection included primary and secondary data. Accurate primary data (e.g.: data provided by marketing agency and venue host based on utility bills, procurement list, vendor material sheets) was prioritized.

Secondary Data / Proxies: Where exact participant travel data was missing, statistical averages from the survey sample were extrapolated to represent the total attendee base.

Exclusions: Sense check was applied to primary data, especially where attendees had the option to not provide answer in the registration form. Minor emissions contributing to less than 1% of the total footprint (e.g., individual presenter laptop use) were excluded from the system boundary to maintain administrative feasibility.

⁶ Cornell University CHSB Index (Tool v11 or latest year)

4. Inventory Results & Data Analysis

This chapter includes the total emissions summary, a master breakdown table of the 8 categories:

Emission Category	Activity Data Summary	Total Emissions (t CO ₂ e)	% of Total Footprint
1. Venue	Total kWh, heating/cooling energy, & waste volumes	15.3311	1.41%
2. Flights	Total passenger-km flown	853.7981 (558.8 from European point of departure)	78.5847% (51.45% from European point of departure)
3. Other Transportation	Local transit, trains, taxis, and event shuttles	Bus: 0.140 Car: 12.1110 Train: 2.214 TOTAL: 14.465	1.33%
4. Audio/Visual	Emissions associated to the production of video clips, music tracks	0	0%
5. Communication	Physical print items	0.196	0.018%

Emission Category	Activity Data Summary	Total Emissions (t CO ₂ e)	% of Total Footprint
6. Production/Exhibition	Booth materials, logistics, and square footage	0.653	0.0601%
7. Accommodation	Total hotel guest-nights	202.026	18.59%
8. Catering	Total meals prepared not inhouse	0	0% <i>(emissions of meals prepared inhouse have been embedded within the venue category)</i>
TOTAL	—	1,086.4692	100%

Flights category dominated the footprint over 78,5% of total emissions, flights from European point of departure accounts for 51,45% of total emissions. If all attendees flying from Europe have chosen train over flights, 517.44 tCO₂e could have been avoided, that is 47.63% of total event emission.

Compared to flying, taking a train from Brussels to Budapest reduces total climate impact by 85% to 90%.

Emissions comparison (Brussels-Budapest, one-way, single passenger)

Transport mode	Total estimated CO ₂ equivalent (CO ₂ e)	Relative footprint
Flight (Direct economy)	~180–230 kg CO ₂ e	100%

Transport mode	Total estimated CO ₂ equivalent (CO ₂ e)	Relative footprint
Train (High-speed / Night train connection)	~20–35 kg CO ₂ e	~10–15%

The key drivers behind the difference are radiative forcing (non-CO₂ impacts), short-distance inefficiency and the decarbonized rail power. Planes emit water vapor, nitrogen oxides (NO_x), and soot directly into the upper troposphere, creating contrails that trap extra heat⁷. Including these non-CO₂ high-altitude effects effectively double or triples the warming footprint of a flight compared to ground emissions. Over roughly 970–1,000 km (direct air line), the fuel-intensive take-off and climb phases account for a significant portion of a flight's total fuel burn. Moreover, the train route from Brussels to Budapest passes through Western and Central European rail grids (such as Belgium, Germany, and Austria) that rely heavily on nuclear and renewable energy sources, resulting in very low emissions per passenger-kilometre.

Splitting the data into Controllable vs. Influenceable emissions is important to understand the scope of decarbonization efforts, as organizers can directly control the *Venue*, *AV*, *Catering*, and *Production*, but can only influence *Flights* and *Accommodation* through hybrid options and marketing. This distinction makes the data much more useful for future event planners:

Controllable emissions: 30.6451 t CO₂e, **3%** of total emissions.

Influenceable emissions: 1,055.8241 t CO₂e, **97%** of total emissions.

⁷ IPCC Sixth Assessment Report (AR6), Working Group III, Chapter 10 (Transport)

5. Sustainability Initiatives & Avoided Emissions

Operational and venue sustainability initiatives (HUNGEXPO)

A core driver of operational efficiency was hosting the event at the modern HUNGEXPO Budapest Congress and Exhibition Center, which operates under the global Think Green framework of GL events and aligns with ISO 20121 sustainable event management principles⁸. On-site environmental initiatives directly suppressed controllable footprint drivers across four primary pillars:

1. Clean energy transition and efficiency: HUNGEXPO's commitment to transition to 100% green energy sources and conduct regular energy-efficiency audits significantly lowered venue grid emissions. High-efficiency HVAC controls and LED venue infrastructure kept overall venue energy and waste emissions down to 15.33 tCO₂e (1.41% of total).

2. Sustainable catering and food waste diversion: Operating via an energy-efficient, state-of-the-art on-site production kitchen eliminated meal transportation logistics. The venue prioritizes seasonal, locally sourced ingredients, reusable glass/porcelain tableware, and drinking water refill stations to eradicate single-use plastics. Furthermore, a permanent partnership with a local charity organization redistributes leftover food, diverting organic waste from landfills and achieving 0 tCO₂e in net catering emissions, as the suggested methodology by Green Events Tool accounts all inhouse emissions (incl. emissions related to catering services located on site) in the Venue category.

3. Paperless digital solutions: Through HUNGEXPO's digital-first infrastructure—including online registration, mobile event apps, and digital signage—physical print materials were kept to a minimum, resulting in a negligible communications footprint of 0.20 tCO₂e.

4. Selective waste recovery: Comprehensive "waste islands" set up throughout the halls ensured strict source-separation (reduce-reuse-recycle) from event setup to dismantling, including a post-event sorting to ensure high-quality.

5. Sustainable Mobility & Avoided Ground Emissions:

To tackle local travel impact, city transit authorities provided all registered participants with a complimentary Budapest public transportation pass.

⁸ ISO 20121:2024 Event Sustainability Management Systems.

By removing financial and logistical barriers to using the metro, tram, and bus networks, the pass assumably incentivized a major modal shift away from fossil-fuel-powered taxis and private ride-shares. Unfortunately, this report lacks data on the usage of public transport pass. (Just for the record, it was noticed, that the parking site at the venue (of approx. 200 vehicles) was approx. 50% utilized during the event, with an automotiv konference taking place at the venue as well.)

Ground transportation generated just 14.47 tCO₂e (1.33% of the total footprint). Comparative baseline scenarios project that relying on individual taxi rides for delegate transfers across Budapest would have yielded approximately 35 tCO₂e. The public transport initiative effectively avoided an estimated 20–30 tCO₂e in citywide transit emissions.

Offsetting & Footprint Neutralization

While operational choices successfully minimized local emissions, participant air travel (853.80 tCO₂e) and hotel stays (202.03 tCO₂e) comprised an unavoidable remaining baseline.

Carbon Offsetting and Sequestration

In alignment with its sustainability goals, the organizers take active measures to counterbalance the greenhouse gas (GHG) emissions originating from its operations. A key pillar of this decarbonization and offset strategy is a large-scale tree planting initiative carried out along the national road network.

Program Overview

Planting activities took place across approximately 75–80 locations along both major highways and secondary road networks. Contractual deadlines slated project completion for December 15, 2025 (with minor delay in certain instances). Necessary replacement plantings were conducted in Spring 2026. Approximately 4,795 trees were planted. Converting individual and avenue trees into a standardized 5×5-meter planting grid yields an estimated total coverage area of 120,000 m² (~11.98 hectares). Post-planting care and maintenance (irrigation, weeding, and ongoing plant protection) are directly managed by Magyar Közút Nonprofit Zrt.

Species Selection Strategy and Ecological Criteria

Plant selection was tailored region by region (4–6 species per location) based on specific habitat conditions. Given the unique environmental stressors along public roads, species were selected according to strict functional criteria:

- **Resilience and climate adaptation:** Fast-growing, drought-tolerant species with low susceptibility to pests and pathogens, making them highly suited to Hungary's evolving climate conditions.
- **Pollution tolerance:** High resistance to dust, smoke, and traffic-related airborne pollutants.
- **Tree species:** European White Elm, Siberian Elm, Field Maple, Norway Maple, Flowering Ash, European Ash, Hungarian Ash, Goldenrain Tree, Small-leaved Lime, Large-leaved Lime.
- **Shrub species:** Common Hawthorn, Blackthorn.

Carbon Sequestration Methodology and Projected Impact

To estimate the carbon capture potential over time, the project utilized the **CASMOFOR** (*C*arbon *S*equstration *M*odel for *F*ORestations) model, a carbon-cycle estimation framework calibrated for Hungarian forest and habitat conditions.

Model Parameters and Input Data:

- **Forest equivalent:** The 4,795 planted trees are modeled as equivalent to **~12 hectares (11.98 ha)** of forest stand at a density of 400 trees/ha.
- **Project horizon:** 35 years (defined as the rotation/final harvest age within the model).
- **Yield class:** Class III (representing average national growth intensity on an I–VI scale).
- **Proxy species composition:** To match the growth characteristics and habits of the selected species within the model's framework, the stand was configured as *33% Hornbeam, 33% Pedunculate Oak, and 34% Black Locust*.

Risk Assumptions and Model Adjustments:

1. The model relies on long-term average variables; localized microclimatic conditions may cause actual carbon sequestration rates to fluctuate.
2. Standard forest management/harvesting interventions in the model are used as a proxy to account for natural die-off and loss rates among the planted trees.
3. Because isolated roadside trees behave differently than dense forest stands, a conservative approach was applied by selecting a lower yield class and factoring in planted shrubs as forest understory vegetation.

Projected sequestration outcomes in 35-year horizon:

Metric	Value
Accumulated Carbon Stock (<i>C</i>)	1,056 tonnes
Net <i>CO</i>₂ Sequestered Equivalent	3,876 tonnes

(Conversion factor: 1 kg of carbon = 3.67 kg of CO₂. Calculations incorporate total carbon storage capacity, including above-ground biomass, root systems, foliage, and litter).

6. Recommendations for Future TRA Events

The empirical baseline established at TRA2026 in Budapest (1,086.47 tCO₂e total; 0.35 tCO₂e per attendee) demonstrates a critical structural reality: 97% of total emissions are influenceable Scope 3 impacts driven by long-distance participant travel (78.58%) and hotel accommodations (18.59%). Conversely, directly controllable operational categories (venue energy, catering, printed communications, and exhibition builds) accounted for just 3% (30.6 tCO₂e) due to host venue efficiencies and targeted waste-minimization policies. To achieve a meaningful net reduction for TRA2028, future organizers must address data accounting gaps and deploy targeted policies focused primarily on attendee travel, lodging, and supply chain procurement.

6.1 Resolving Data Collection Gaps and Accounting Boundaries

Data collection for TRA2026 encountered specific bottlenecks, including missing participant travel layover data, unrecorded flight cabin classes, partially unmonitored accommodation durations, and unquantified digital streaming data volumes. To eliminate secondary extrapolations for TRA2028:

- **Mandatory registration fields:** The TRA2028 registration portal must mandate exact origin cities, layovers, preferred long-distance transit modes, cabin classes, and specific hotel bookings to replace post-event survey proxies with high-fidelity primary data.
- **Contractual vendor disclosures:** Venue management, catering, and exhibition logistics contracts must enforce post-event environmental disclosures, including sub-metered electricity/heating consumption during setup and teardown, precise meal dietary split breakdowns, and total food waste diversion weights.

6.2 High-Impact Decarbonization Action Plan

Decarbonizing mobility and lodging (Scope 3 — highest impact)

- **Rail-First incentive program:** Partner with European rail networks (such as ÖBB, DB, SNCF, and regional operators) to offer discounted "TRA Green Rail Passes" for delegates traveling within a 1,000 km radius, establishing direct rail as the default preference over short-haul flights. In 2026 if all conference attendees flying from Europe have chosen train over flights, 517.44 tCO₂e could have been avoided, that was 47.63% of total event emission.
- **Integrated zero-emission local transit:** Replicate the successful TRA2026 Budapest transit pass initiative by fully embedding an unlimited local public

transport pass directly within digital attendee badges, complemented by zero-emission electric shuttles connecting major rail hubs directly to the venue.

- **Public bike-sharing incentive program:** Encourage attendees to use active micromobility modes by providing complimentary public bike-sharing passes and promoting safe cycling routes between venues, hotels, and key city destinations.
- **Cyclist-friendly infrastructure:** Ensure the availability of secure bicycle parking, bicycle repair stations, and access to changing rooms and shower facilities at the venue and selected accommodation partners to support cycling as a convenient transport option.
- **Sustainable accommodation partner network:** Establish a preferred hotel booking network that prioritizes certified eco-labeled properties (e.g., EU Ecolabel, Green Key) operating on renewable energy and water-conservation protocols.

Optimizing venue operations and supply chain

- **100% Renewable energy guarantees:** Mandate that all electricity drawn for build-up, show days, and teardown is covered by 100% renewable energy Guarantees of Origin (GOs), alongside strict overnight power-down rules for stand lighting, LED screens, and heavy AV equipment.
- **Plant-forward and zero-waste catering:** Shift menu defaults to an 80% plant-based or vegetarian ratio using local, seasonal produce. Require 100% reusable tableware and establish daily partnerships with local food-rescue charities to eliminate organic landfill waste.
- **Mandatory exhibitor Green Charter:** Enforce reusable modular shell schemes and prohibit single-use wall-to-wall carpeting and PVC banners across all exhibition halls. Enforce a paperless default by banning physical brochure handouts in favor of digital QR-code collateral exchanges via the official event application.
- **Expanded hybrid participation and virtual access:** Offer dedicated interactive virtual pass tiers for international observers and secondary panel speakers, allowing global participation while bypassing unnecessary long-haul aviation emissions.

- **Waste segregation and resource recovery system:** Introduce clearly labeled multi-stream waste collection points throughout the venue and establish partnerships with recycling and composting providers to maximize material recovery rates.
- **Venue sustainability performance requirements:** Require event venues to demonstrate certified environmental management practices (e.g., ISO 14001) and disclose energy, water, and waste performance data to support continuous improvement and transparent reporting.

6.3 High-Integrity Carbon Neutralization Strategy

Because international transport impacts cannot be entirely eradicated for a continental research assembly, TRA2028 should incorporate a transparent carbon contribution mechanism into the registration fee structure. Collected funds should be dedicated strictly to high-integrity, third-party certified carbon removal projects (e.g., Gold Standard or Verified Carbon Standard credits) to neutralize residual, unavoidable participant travel emissions⁹.

6.4 Recommendations for Future EU-Funded Conference Projects

- **Mandatory Sustainability Coordinator:** Require the appointment of a dedicated Sustainability Coordinator for each conference project, responsible for integrating sustainability considerations throughout the planning and delivery phases, identifying emission reduction opportunities, monitoring environmental performance, and calculating the event's carbon footprint.
- **Sustainability strategy and performance reporting:** Require projects to develop a sustainability strategy and action plan at the outset of the project, including measurable objectives and key performance indicators. A final sustainability report should be submitted at project closure, with a portion of project funding linked to the achievement of predefined sustainability targets.
- **Standardized carbon accounting methodology:** Establish a harmonized carbon calculation methodology for all conferences funded under the programme. Applying a consistent accounting framework across events would improve transparency, enable benchmarking, and support the tracking of emissions reduction trends over time.

⁹ Gold Standard for the Global Goals (GS4GG), Verra – Verified Carbon Standard (VCS) Program Rules

- **Mandatory sustainability deliverables:** Integrate sustainability-related deliverables and reporting requirements into grant agreements, ensuring that environmental performance is treated as a core project outcome alongside technical and dissemination objectives.
- **Knowledge sharing and best practice transfer:** Create a mechanism for capturing and sharing sustainability lessons learned, successful initiatives, and emissions reduction measures between conference organizers to support continuous improvement across future projects.

This report has been created by Centre for Budapest Transport, 31/07/2026.

7. References

1. WRI & WBCSD (2011). Corporate Value Chain (Scope 3) Accounting and Reporting Standard. World Resources Institute and World Business Council for Sustainable Development.
2. ISO (2018). ISO 14064-1: Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals. International Organization for Standardization.
3. UNEP, UNFCCC, & GORD (2021). Green Events Tool (GET). United Nations Environment Programme, UNFCCC Secretariat, and Gulf Organisation for Research & Development.
4. UK DESNZ (2025). Government emission conversion factors for greenhouse gas company reporting. UK Department for Energy Security and Net Zero.
5. EEA & UIC (2024). Rail energy and CO2 database. European Environment Agency & International Union of Railways.
6. Cornell University (2024). Cornell Hotel Sustainability Benchmarking Index (CHSB). Center for Hospitality Research.
7. IPCC (2022). Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the IPCC. Cambridge University Press.

ANNEX: Recommended TRA Exhibitor Green Charter

As Europe's flagship transport research conference, TRA is committed to practicing the sustainable mobility principles we discuss. All exhibitors are required to minimize raw material usage, waste production, and energy consumption during booth construction, operation, and teardown.

1. Booth Construction & Materials

Mandatory Rules:

1. **No Single-Use Carpeting:** Wall-to-wall single-use flooring is strictly prohibited. Polished venue flooring or reusable modular floor tiles must be used instead.
2. **Reusable Systems:** Structures must utilize modular shell schemes, rented framing systems, or reusable timber/aluminium components.
3. **PVC & Vinyl Elimination:** Banners, backdrops, and signs must be printed on recyclable cardboard, FSC-certified paper, or 100% recycled PET textiles (RPET). No unrecyclable PVC flex banners are permitted.

Recommended Best Practices:

4. Prioritize local booth builders to reduce long-haul freight transport.
5. Avoid heavy custom paint jobs on-site; use pre-finished or modular paneling.

2. Energy Efficiency & Operations

Mandatory Rules:

1. **LED Lighting Only:** All booth lighting fixtures must use 100% LED or low-energy equivalent tech.
2. **Overnight Power Downs:** AV screens, illuminated signage, computers, and display rigs must be powered off outside of official exhibition hours.

Recommended Best Practices:

3. Utilize smart power strips to auto-cut phantom load when the booth is unattended.
4. Opt for passive lighting designs that utilize hall ambient light rather than over-lit overhead rigs.

3. Marketing Materials & Giveaways

Mandatory Rules:

1. **Paperless Default:** Bulk distribution of printed paper brochures or catalogs is not allowed. All collateral must be shared digitally via QR codes, NFC tags, or the official TRA Event App.
2. **No Single-Use Plastics:** Plastic promotional giveaways (pens, keychains, stress balls) are prohibited.

Recommended Best Practices:

3. Limit physical takeaways to useful, high-quality, bio-based, or recycled items (e.g., local produce, FSC notebooks).
4. Print badges and essential signage on unbleached, fully compostable cardstock.

4. Waste & Freight Logistics

Mandatory Rules:

1. **Zero Left Behind:** Exhibitors are responsible for removing 100% of custom build materials upon breakdown. Abandoned materials will incur waste management surcharges.
2. **On-Site Sorting:** All packing materials (cardboard, wooden pallets, shrink-wrap) must be sorted into HUNGEXPO's designated recycling streams during build-up and breakdown.

Recommended Best Practices:

3. Consolidate freight shipments using shared transport logistics providers.

Exhibitor Compliance Acknowledgment: By signing the TRA Exhibition Agreement, your organization agrees to comply with the mandatory rules outlined in this Green Charter. Compliance audits will be conducted on-site during setup days.