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LYON TURIN ENGAGEMENT FORUM

LYON–TURIN ENGAGEMENT FORUM

Commitment to the construction sites *of the Lyon–Turin railway line*

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Workers at work on a communications section of the CO08 construction site, Saint-Julien-Montdenis, France

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Foreword

The Letter of the President & the CEO of TELT

> "Connectivity is synonymous with resilience"

Europe is entering a decisive phase of its transformation. Instability in the Mediterranean and the Middle East, intensifying competition for energy, raw materials and critical technologies, and the growing exposure of essential infrastructure to physical, climate-related and cyber threats have revealed the extent to which the continent's security depends on the strength of its connections. Climate objectives, economic competitiveness, territorial cohesion and strategic autonomy can no longer be pursued in isolation. In this context, investing in modern, efficient and sustainable infrastructure is far more than a matter of transport policy. It strengthens Europe's capacity to protect its citizens, safeguard the continuity of trade and respond to crises without compromising its environmental and social ambitions. The TELT project embodies this vision, consolidating connections across the Alps and contributing to a more integrated, reliable and resilient European network.



TELT's President, Daniel Bursaux

Today, connectivity is synonymous with resilience. Recent crises have exposed the fragility of global supply chains and Europe's dependence on imported fossil fuels. They have also shown the need for corridors that can guarantee, even in exceptional circumstances, the movement of people, essential goods, industrial components and strategic resources. Robust, interoperable cross-border connections reduce the risk of isolation, diversify supply routes and reinforce both economies and communities. Seen from this perspective, the shift from road to rail matters for climate, energy and geopolitics

alike. An efficient, electrified rail network reduces reliance on imported fuels, limits exposure to price volatility and provides stable, safe, high-capacity transport. The TELT project is an integral part of this transformation, reinforcing a corridor that is vital to Europe's economic and logistical continuity.



TELT's CEO, Maurizio Bufalini

Building this infrastructure therefore means looking beyond the tunnel itself. It means contributing to a European network in which major corridors, regional links, energy hubs and multimodal transport systems operate in concert, enhancing our collective capacity to prevent and withstand crises. Within this framework, sustainability becomes a tangible dimension of people's security. Energy efficiency, electrification, the use of renewable sources, the circular economy and lower consumption of virgin raw materials all help reduce external dependencies and secure the long-term availability of resources. For TELT, building sustainably thus means protecting the environment while contributing to energy security, continuity of supply and European industrial resilience. Environmental performance, the circular use of materials, innovation, safety and responsible construction form a single strategy, one that unites engineering excellence, strategic autonomy and responsibility towards future generations.

This ambition can only be achieved collectively. The companies, institutions and partners involved in the TELT project bring together expertise from across Europe. They operate within a value chain that must be transparent, diversified and reliable. Their cooperation shows how sharing knowledge, tracing supply chains, developing innovative solutions and adopting common standards can reduce vulnerabilities, support Europe's productive capacity and pave the way for the next generation of critical infrastructure. In an increasingly fragmented geopolitical landscape, cross-border cooperation is more than a European principle: it is a precondition for shared development and prosperity.

Ultimately, the TELT project is a link in the fullest sense of the word. It connects France and Italy, and regional and European networks. It brings together civil mobility, logistical continuity and the protection of essential functions, and joins the ecological transition with economic security. Our shared commitment is to turn this vision into sustainable infrastructure, capable of serving citizens and businesses and of supporting Europe even in times of greatest strain.

By strengthening sustainable cross-border rail links, we are helping to shape the future of mobility. In this future, people, goods and ideas move more freely, distances grow shorter, and the traditional constraints of space and time give way to new opportunities for connection, exchange and growth. This is how sustainability becomes a policy for safety and peace: not an additional burden, but the foundation of a more autonomous, connected, competitive and resilient Europe.

Daniel Bursaux
President of TELT

Maurizio Bufalini
CEO of TELT

The Letter of the President of UN Global Compact Network Italy

> “Moving from commitment to action”



Today, sustainability is increasingly measured by our ability to move from principles to concrete implementation.

Throughout my experience in the business world, I have seen how this transition becomes possible when sustainability is no longer regarded as a separate function or an additional requirement, but becomes an integral part of the way companies make decisions, manage risks, innovate and build relationships.

This is precisely at the heart of the mission of the UN Global Compact Network Italy: encouraging businesses to align their strategies and operations with universal principles relating to human rights, labour, the environment and anti-corruption, while contributing to the achievement of the Sustainable Development Goals.

UNGCNI brings together hundreds of business and non-business stakeholders committed to promoting responsible business practices, making collaboration among companies a key driver for accelerating sustainable development.

Working together in this way also enables companies to learn from one another. Large organisations can help mobilise their supply chains, while suppliers and specialised companies can contribute innovation, expertise and solutions developed directly through their operational activities.

From this perspective, major infrastructure projects play a significant role. Given their scale, the duration and complexity of their activities and, above all, the business ecosystems they engage, they have the potential to translate sustainability principles into shared practices across entire value chains.

Sustainability thus becomes a process of mutual learning and continuous improvement, rather than a set of requirements passed down along the supply chain.

For major infrastructure projects, this represents both an opportunity and a responsibility. Their legacy should not be measured solely in terms of the kilometres built or the services they will provide, but also in terms of the capabilities they leave behind, the innovation they foster, the standards they help raise and the culture of responsibility they contribute to building among the companies involved.

We trust that the Lyon–Turin Engagement Forum will be able to pursue this approach: moving from commitment to action, and from the sustainability of a project to the sustainability of the ecosystem that makes it possible.

Filippo Bettini
President
UN Global Compact Network Italy

How AI can help to close the Capital projects execution gaps

> "The charters come to life, or not, at six in the morning, at the face."

What the Lyon–Turin Engagement Forum does is astonishing and rare: companies that compete elsewhere publish their results side by side every year and accept to be questioned on them.

Commitments are signed in a meeting room, but they are tested underground, at the six o'clock shift change, when a foreman with three priorities and two radios faces a schedule that does not care how tired anyone is.

The 2026 Accenture Research study "The capital projects execution gap", based on 700 senior leaders and 350 site workers, shows how wide the distance between the boardroom and the worksite can be. Around three quarters of leaders believe they positively influence cost, planning and schedule, yet only 13% of site workers say project goals consistently shape their daily work. The issue is not people, but distance: field signals arrive late or filtered, safety quietly competes with the day's planned progress, and tools are designed for the head office rather than for a wet, dark and noisy gallery. For the women and men underground, safety is not a department next to the work; it is the work.

Artificial intelligence can help close this distance. It allows us to move from lagging indicators, which arrive after the harm, to leading signals, such as exposure, ground conditions, fatigue or machine–pedestrian interaction, captured while there is still time to act. Instead of managing the unexpected, teams can compare scenarios and choose the safest and most efficient one. Project risk could be quantified before each shift, briefings delivered in each team's own language, and a near miss on one lot turned into a lesson for every lot.

Yet AI on a worksite usually fails quietly: tools are installed, presented, then gradually ignored. The appetite is there: 83% of site workers with access to AI planning tools report a positive impact. Adoption is the real challenge, and I see four conditions for it. Design with field teams: every tool should remove friction from work

underground rather than add a screen, a form and a password, and its success should be measured by use and outcomes rather than by systems deployed. Invest in people before software: genuine AI literacy means foremen who understand what a tool sees and what it does not, and who know when to overrule it. Earn trust: the same camera can protect or police depending on who sees the data and who can switch it off. And make AI work for everyone, subcontractors and newcomers included, because inclusion is a condition of adoption.

The new charters on Responsible AI and on Diversity & Inclusion give the Lyon–Turin a common framework; their value will be measured on site, shift after shift. This tunnel will carry people and goods for more than a century, and it will be remembered for its engineering. I hope it will also be remembered as the place where Europe learned to build with AI in a way that better protected people, and where every worker went home at the end of every shift.

Technology will not build it alone. It takes technology, combined with human ingenuity and with all the people who work on the construction sites of the Lyon–Turin railway line.

Vincent Boyet
Managing Director
Accenture Construct



Workers at work near the TBM Viviana, at CO07 construction site, Saint Martin La Porte, France

FOREWORD

The Lyon-Turin Engagement Forum: Sustainability Benchmark

Regulatory Context / Benchmarking Sustainability across Major Rail-Infrastructure Projects

Over recent years, a succession of social and geopolitical developments has given rise to a new environment characterised by intensified economic competition, heightened public scrutiny and growing political fragmentation.

> Within this complex scenario, how is the Lyon–Turin base tunnel project positioned, and what role and significance can it claim?

By its very nature, this project traverses borders, legal systems, technical cultures, territories and diverse sensibilities. No national administration acting in isolation could ensure the continuity required to manage an undertaking of such complexity. It was precisely for this reason that TELT was established as a shared space of responsibility between Italy and France—an entity capable of reconciling public decision-making, institutional oversight, technical expertise, dialogue with local communities and a broader European vision.

The Lyon–Turin project may be understood, on one level, as the account of a European connection designed to transfer a substantial share of freight traffic from road to rail, to reduce emissions and congestion, and to render trans-Alpine mobility more sustainable. Yet it is equally a local narrative. In the valleys through which the project passes, it raises fundamental questions concerning quality of life, employment, safety, trust in public institutions and the capacity of local communities to prepare for the future.

To address these challenges effectively, a two-tiered governance model has been developed. On the one hand, a bottom-up commitment is embodied by the working groups operating directly on the construction sites, which sustain operational collaboration grounded in day-to-day responsibilities, cooperation and dialogue, with the aim of sharing best practices, resolving problems and advancing sustainability objectives and targets. On the other hand, top management remains continuously engaged in high-level strategic forums—comprising the leadership of partner companies, the client, and the relevant institutional and civil-society stakeholders—convened to review progress, confront shared challenges and reinforce common commitments. These forums serve as platforms for accountability and alignment, informing strategic decisions, resource prioritisation and collective action in pursuit of sustainability objectives.



BOTTOM-UP COMMITMENT

Working groups operating directly on the construction sites

Operational collaboration grounded in day-to-day responsibilities, cooperation and dialogue



TOP MANAGEMENT

High-level strategic forums

The leadership of partner companies, the client, and the relevant institutional and civil-society stakeholders

The two-tiered governance model of the Lyon–Turin Engagement Forum.

This model is not without precedent: it has already proven effective in the United Kingdom's Crossrail (Elizabeth Line) project and in France's Grand Paris Express. The former adopted a pioneering approach to collaborative sustainability, establishing a comprehensive framework that achieved significant progress in areas such as carbon reduction, waste management and social inclusion. The French example, by contrast, instituted committees of good practice that engaged contractors, planners and public actors in a process of continuous co-development. The governance structure of the Brenner Base Tunnel closely resembles that of TELT, since it manages cross-border complexity through a binational organisation. A further relevant reference is the Gotthard Base Tunnel, notable for its maturity and its operational status; like TELT, it has adopted an integrated management system encompassing quality, environment and safety, as well as operational and strategic risk management.

> TELT has the potential to emerge as a European benchmark for the integration of ESG governance into the development of large-scale cross-border infrastructure.

Most significantly, this model has proven effective for our own organisation, as evidenced by the progress and results that we have collectively achieved across the domains that underpin this infrastructure: health and safety, legality and anti-corruption, environmental stewardship, respect for local communities, and attention to people. In connection with these pillars, over the past two years we

have developed a series of commitments that have engaged us on specific and consequential issues:

FIRST-LEVEL PACT

The Integrity and Sustainability Pact

SECOND-LEVEL COMMITMENT

The Drug- and Alcohol-Free Commitment

SECOND-LEVEL COMMITMENT

The Whistleblowing Commitment

Today we advance further still, by extending our attention to two matters of growing relevance: Artificial Intelligence and Diversity & Inclusion. Both must be managed responsibly if they are to deliver optimal outcomes for all, and this in turn requires that a common framework and a shared commitment be agreed upon. While these themes are addressed in greater detail later in the paper, we wish to underline here the particular importance that the integration of sustainability assumes within TELT, relative to comparable infrastructures. Within the Euro-Alpine corridor, sustainability extends beyond the environmental dimension to encompass supply-chain oversight, with particular regard to anti-corruption and anti-mafia measures., the double materiality assessment informs the due diligence and engagement of our supply chain, thereby fostering virtuous social and governance practices.

This distinctive binational management of contracts, operational sites, policies and materials places the Mont-Cenis base tunnel at the forefront of innovation and of the responsible management of civil infrastructure and cooperation.

The international difficulties in various fields of recent years have demonstrated that division and fragmentation do not serve as levers of development, growth and well-being; indeed, quite the contrary. It is for this reason that our project is now more vital than ever, because it demonstrates that dialogue, trust and shared responsibility constitute the preconditions for social, economic and environmental sustainability and advancement.

The Lyon–Turin base tunnel project is therefore of heightened significance in the present context, since its approach advances the attainment of sustainability targets, mitigates risk through early and collective problem-solving, promotes the transfer of best practices, and strengthens the project's legitimacy among institutions, communities and stakeholders. In doing so, it contributes to the construction of both infrastructure and public trust.

In our view, its relevance resides in its model of collaborative sustainability governance, which we believe should define the future of major infrastructure delivery. As environmental and social challenges grow ever more complex, success can no longer be measured solely by the infrastructure delivered, but equally by the governance, partnerships and shared value generated throughout the process.

Regulatory Context

The new Lyon–Turin base tunnel forms part of the Mediterranean Corridor, one of the Core Network Corridors of the European Union's Trans-European Transport Network (TEN-T)[1] — the principal instrument for planning and developing a coherent, efficient, multimodal and high-quality transport infrastructure across the Union. TEN-T policy is currently governed by Regulation (EU) 2024/1679, an updated regulation of the first version Regulation (EU) No 1315/2013, which establishes the requirements for:

- ensuring consistent quality throughout the EU;
- promoting digitalisation and enhancing multimodality;
- ensuring the development of more sustainable forms of transport, by reducing transport emissions and strengthening resilience against the impacts of climate change

The Smart TEN-T Regulation (Regulation (EU) 2021/1187) further establishes streamlining measures intended to reduce the delays encountered in the implementation of TEN-T projects, by removing the bureaucratic obstacles that might otherwise compromise the effectiveness of such investments.

The forthcoming CEF III (2028–2034) is currently under negotiation and may entail an increased budget for the transport sector, while the 6th Work Plan of the Mediterranean Corridor is likewise under development. **The 5th Work Plan (2022) identified the base tunnel between France and Italy as the principal missing cross-border link** in order to make the entire corridor fully operational; the tunnel is, indeed, regarded as the "central hub" of the Mediterranean Corridor (commissioning of the tunnel is currently forecast for 2033[2]). The project is firmly anchored to the European Green Deal, constituting **a decisive modal shift for the decarbonisation of transport**. It is worth recalling that greenhouse gas (GHG) emissions from the transport sector account for 25% of total EU emissions, and that

[1] Trans-European Transport Network (TEN-T) - Mobility and Transport

[2] Linea Torino-Lione: l'assessore Mazzoleni illustra stato lavori e cronoprogramma in Consiglio Comunale | Città di Torino

the European Commission has set a target of a 90% reduction in transport emissions by 2050 (relative to 1990 levels)[3]. By alleviating road bottlenecks and reinforcing European connectivity, the base tunnel is thus instrumental in rendering Europe more interoperable, connected, resilient and sustainable. Moreover, of the 169 targets underpinning the Sustainable Development Goals, two are directly related to transport[4] and a further fifteen are indirectly related to the sector[5]—notwithstanding the absence of a dedicated transport-specific SDG.

25%

share of total EU greenhouse gas emissions generated by the transport sector

90%

reduction in transport emissions targeted by the European Commission by 2050 (relative to 1990 levels)

2 + 15

of the 169 SDG targets directly and indirectly related to transport

Having established the importance of the project and its relevance within the context of the European Green Deal, we may now consider how it compares with other analogous undertakings.

The following analysis is structured around the policy goals of the Global Tracking Framework for Transport (GTF): universal access (urban, rural, gender), efficiency, safety, green mobility (GHG emissions, air pollution, noise pollution). The ENVISION and BREEAM Infrastructure rating systems will also be considered for this analysis, given their relevance to the sector.

[3] Transport and the Green Deal - European Commission

[4] Target 3.6 by 2030, halve the number of global deaths and injuries from road traffic accidents (deadline reset by UN General Assembly resolution A/RES/74/299). Target 11.2 aims to, by 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations - women, children, persons with disabilities and older persons.

[5] Implementing the SDGs | SUSTAINABLE MOBILITY FOR ALL

Benchmarking Sustainability across Major Rail-Infrastructure Projects

How to read this chapter. The comparison that follows is a structured, qualitative one, not a ranking, and it is presented in aggregate: the reference projects are not named, and the focus is on how the Lyon–Turin is positioned relative to the sample as a whole. The performance levels it expresses are an internal assessment by TELT, based on publicly documented practices: they are not scores or ratings issued by third parties, and they have not been independently verified. Two further caveats apply. First, the evidence is not of the same kind: for projects already in operation, it consists largely of measured and reported results, whereas for TELT and the other projects under construction it consists mainly of design data, targets and projections. Second, the data on the other projects come from public documents published by their promoters and operators, and are reported as declared by them, without independent verification by TELT.

To keep the language consistent, three levels are used throughout the chapter:

- **strong**: a documented practice backed by quantified evidence that is directly relevant to the topic (measured results, or figures published by the promoter);
- **comparable**: a documented practice in line with that of the other projects in the sample, with evidence that is partial or still based on the design stage;
- **moderate**: limited publicly documented practice on the topic, or a design that leaves room for improvement.

1. Analytical framework, rationale and method

The assessment of the sustainability performance of a trans-alpine railway such as the Lyon–Turin against comparable undertakings demands a reference grid that is independent of the specificities of any single project. The primary lens adopted here is the **Global Tracking Framework for Transport** (GTF), which, developed under the Sustainable Mobility for All (SuM4All) partnership and hosted on the World Bank data portal, constitutes the first global repository of transport data and codifies the very definition of sustainable mobility.[6]

[6]Sustainable Mobility for All (SuM4All), Global Tracking Framework for Transport, https://www.sum4all.org/global-tracking-framework; and https://www.sum4all.org/news/launched-global-tracking-framework-transport-30-0.

The framework organises the notion of sustainable mobility around four policy goals, each associated with a principal indicator and a set of supporting indicators:



Universal Access

Measures the extent to which people—across the urban, rural and gender dimensions—can reach economic and social opportunities.



Efficiency

Captures the productivity and reliability of the transport system.



Safety

Concerns the protection of users and workers across all modes.



Green Mobility

Addresses the shift towards a low-emission and climate-resilient path, and is articulated through greenhouse-gas emissions, air pollution and noise pollution.[7]

The GTF, however, was conceived to benchmark *national transport systems*, not individual assets. To anchor the comparison at the level of the projects themselves, it is complemented by the two leading **asset-level infrastructure rating systems**. The first is **ENVISION**, developed by the Institute for Sustainable Infrastructure (ISI) and Harvard University: a comprehensive rating system which evaluates the environmental, social, and economic sustainability of large projects through 64 credits across five categories (Quality of Life, Leadership, Resource Allocation, Natural World, and Climate & Resilience) scored on a Verified-to-Platinum scale.[8] The second is **BREEAM Infrastructure** (formerly CEEQUAL), the first global evidence-based rating for civil works, aligned with the UN Sustainable Development Goals.[9]

The use of GTF and ENVISION/BREEAM allows a coherent analysis, because the GTF policy goals are outcome-oriented while ENVISION and BREEAM are design-and-delivery instruments: the two logics are therefore complementary. ENVISION asks not only whether an asset is efficient but whether it should exist in this form and how it will serve the public over a 50–100-year horizon: precisely the time-frame of a base tunnel. BREEAM Infrastructure, instead, translates sustainability into auditable, evidence-based credits over the full life-cycle. The table below makes explicit the correspondence, comparing each GTF goal against the rating category that operationalises it and against the parts of TELT's own reporting that already populate those categories.

The use of both GTF framework and ENVISION/BREEAM rating system is useful because both are explicitly aligned with the Sustainable Development Goals and

[7] SuM4All / World Bank, GTF data portal and Global Sustainable Mobility Index, https://datatopics.worldbank.org/sum4all/home.

[8] Institute for Sustainable Infrastructure (ISI), "Use Envision," https://sustainableinfrastructure.org/envision/use-envision/ .

[9] BRE, Introduction to BREEAM Infrastructure (formerly CEEQUAL), https://breeam.com/breeam-infrastructure.

the Paris Agreement, and therefore dialogue with the ESRS/CSRD and GRI reporting architecture already adopted by TELT. Moreover, TELT has adhered to the UN Global Compact since 2015, and has completed a preliminary ENVISION self-assessment, not verified by ISI, reaching the GOLD level with PLATINUM potential. So, the mapping proposed below reflects the frameworks the company already uses.[10]

GTF policy goal	ENVISION category	BREEAM Infrastructure topic (indicative)	Typical asset-level indicators	TELT public source / evidence
Universal Access	Quality of Life (wellbeing, mobility, equitable access)	Communities & stakeholders; social value	Station accessibility; served population; gender & inclusion policy	Binational Diversity & Inclusion policy; gender-equality index *(Sustainability Report 2025)*
Efficiency	Resource Allocation (energy, materials, water)	Energy & carbon; resources	Trains/day; energy per tonne-km; modal-share target	Rail modal share >40% by 2035; ~40 Mt of freight/year between France and Italy *(TELT/FS project data)*
Safety	Leadership + Quality of Life (health & safety, management)	Management; people (H&S)	Cross-passage spacing; accident rate; parameters monitored	"Mission S"; Health Impact Assessment 2025 *(Sustainability Report / LTEF Paper)*
Green Mobility	Natural World + Climate & Resilience (emissions, ecology)	Land use & ecology; pollution; resilience	CO_2 avoided/yr; spoil-reuse %; biodiversity offset ha	~1 Mt CO_2/year avoided; >50% spoil reuse; CETU Life Cycle Assessment; 148.5 ha of habitat *(LTEF Papers 2024–25)*
(cross-cutting) Governance	Leadership (collaboration, ethics, long-term stewardship)	Project management & governance	Anti-corruption pact; whistleblowing; NIS 2 third-party governance	Integrity & Sustainability Pact; whistleblowing; NIS 2 governance *(Sustainability Report / Aprovall)*

Correspondence between the GTF policy goals, the ENVISION categories, indicative BREEAM Infrastructure topics (descriptive labels, not the official section names) and TELT's public evidence.

The sample on which this benchmark is built includes seven major rail-infrastructure projects in Europe, described here by type:

- **mountain base tunnels**, Alpine and on a national line, some in service and some under construction: the closest structural and functional analogues to the Lyon–Turin;
- **new-build links under construction**: a greenfield high-speed corridor across the three Baltic States and an 18-kilometre immersed tunnel beneath a sea strait in Northern Europe;
- **a binational rail tunnel in long-term operation**: the only one in the sample, and the main reference for the operational phase;

[10]TELT, Rapporto di Sostenibilità 2025 (eighth voluntary edition, GRI-referenced and ESRS-inspired). In 2023–2025 TELT completed the preliminary ENVISION self-assessment, reaching GOLD – potential PLATINUM, and has adhered to the UN Global Compact since 2015.

- a **large metropolitan rail network** under construction: a reference for accessibility and carbon accounting.

It is important to specify that, to TELT's knowledge, **these reference projects have not formally pursued ENVISION or BREEAM certification**, and that TELT has carried out only a preliminary self-assessment against ENVISION, not verified by ISI (indicative level: GOLD, with PLATINUM potential). **These rating systems are therefore employed as an analytical grid** to structure the comparison of the projects' documented sustainability practices, rather than as evidence of achieved third-party certification. Where continental-European projects pursue formal certification, they typically rely on national schemes or statutory Environmental Impact Assessments.

2. Universal Access

For linear cross-border works, the contribution to universal access is primarily the **capacity to link regions and national networks.** The GTF suggests distinguishing the reach of the infrastructure (who is connected), its territorial equity (urban versus rural and peripheral areas) and its gender sensitivity (whether the works and the organisation behind them actively address the differentiated needs and opportunities of women). In ENVISION terms these concerns can be found in the Quality of Life category. How do the projects mentioned compare on this goal?

2.1 Corridor integration

Across the sample, universal access is first of all a matter of corridor integration. The Alpine base tunnels convert a mountain crossing into a low-gradient “flatland” railway beneath up to 2,300 metres of rock, embedding trans-Alpine mobility within a continental corridor and connecting two macro-regions; one of those under construction is designed to compress a journey of roughly eighty minutes to around twenty-five and, once linked to a bypass, to form a 64 km underground connection: the longest in the world. On a national line in a neighbouring country, a pair of base tunnels together opens a fast axis between three major cities on a European corridor. In ENVISION terms these corridor tunnels relate to the Quality of Life category (community mobility and access), and in BREEAM Infrastructure to the topics concerning communities and transport. On the basis of the public documentation, the level of the sample is strong on regional connectivity but moderate on the inclusive and local-community aspects, where an essentially infrastructural design leaves room for improvement.

In each case the access gain is systemic: it serves an entire macro-region rather than a single city, and it is inseparable from the modal-shift ambition later examined. When it enters into service, the Lyon–Turin base tunnel will have the same effect: it will connect two countries, reduce travel time and foster economic cooperation between two different regions, as well as connection between two cities.

2.2 Inclusion, territory and social equity

The *inclusive*, *territorial* and *social* dimensions of access are best documented in three projects of the sample. A new-build corridor across three countries plans stations conceived with a "strong focus on functionality, inclusivity and passenger comfort" (ramps, lifts, tactile guidance), reunifies urban fabrics previously severed by railway embankments and, by building a European-standard line alongside a network of a different gauge, ends a historical condition of network isolation. A metropolitan network under construction is conceived to reduce the socio-spatial inequalities between a capital and its suburbs, and couples this ambition with a recruitment policy that actively promotes diversity and equal opportunity, tracked through annual indicators. The binational tunnel already in operation adds an already-realised benefit: according to its operator, around 26% of trade in goods between the two countries it links passes through it. These practices relate to the equity topics of ENVISION's Quality of Life category and to the community topics of BREEAM Infrastructure, and on this goal the sample is strong where an explicit inclusion focus is documented.

2.3 Positioning of the Lyon–Turin

How does Lyon–Turin compare to the sample? Concerning corridor access, the Lyon–Turin is aligned with the Alpine and national-line base tunnels, since it is designed to take over 1 million lorries off the roads every year (reducing annual CO_2 emissions by 1 million tonnes) and it envisages up to 22 long-distance passenger trains a day (design figures). On the gender and inclusion dimension, TELT shows a distinctive attention to the issue, documented in its voluntary application of the French gender-equality index methodology in Italy, its binational Diversity and Inclusion policy and its dedicated recruitment events for people with disabilities. These are policies and processes of the promoter: the public documentation does not provide comparable quantitative data (such as the share of women in the workforce, in management or on site) for TELT or for the other projects, and no ranking is therefore implied. These aspects bring TELT closer to the inclusive posture of the greenfield corridor and the metropolitan network than to the more strictly infrastructural framing of the mountain base tunnels. Overall, the Lyon–Turin shows a solid profile: comparable to the sample on mobility and access, and with a

more developed policy framework on the inclusion topics of ENVISION's Quality of Life category and the community topics of BREEAM Infrastructure. Its corridor figures are design values for a project under construction, not measured results.

3. Efficiency of the transport system

Efficiency is the dimension on which the reference projects converge the most, since all are premised on the same structural logic: replacing a steep, capacity-constrained mountain alignment with a flat, high-capacity route that lowers energy consumption per unit transported and enables longer, heavier and faster convoys. The GTF reads efficiency as a systemic property—throughput, reliability and resource productivity, not only as mere speed, mapping directly onto ENVISION's Resource Allocation category.

3.1 Capacity, speed and energy per tonne

The efficiency dividend is best documented where a mountain crossing is already in service: at opening, freight-path capacity along the corridor rose from 180 to 260 trains per day, and passenger journey times fell by roughly half an hour. A second Alpine tunnel under construction is designed for a comparable step-change, with twin tubes and a continuous exploratory tunnel enabling up to some four hundred trains per day under ERTMS Level 2 control. Both are strong on the energy and resource-use topics of ENVISION's Resource Allocation category and of BREEAM Infrastructure, the measured capacity gains of the tunnel in service providing the most robust evidence in the sample, while the figures of the tunnel under construction are design values.

A study by an applied-research institute shows that rail consumes markedly less energy per tonne carried than road, an advantage that persists even in a hypothetical scenario of full road electrification, showing that the efficiency of the modal shift depends not only on the carbon intensity of trucks but also on the steel-wheel-on-steel-rail system. By cutting gradients, the national-line project in the sample allows heavy freight to run with a single locomotive instead of two, the very mechanism at the heart of the Lyon–Turin's case and is likewise strong on the same energy and resource-use topics, its single-locomotive operation delivering a clear efficiency gain.

3.2 Efficiency by design on greenfield lines

New-build lines embody the same principle in a different setting: a design speed of 249 km/h for passengers and 120 km/h for freight, double-track 25 kV electrification,

a 25 t axle load and ERTMS Level 2 traffic management, all built to a single interoperable standard rather than retrofitted onto legacy assets. As fully electrified, interoperable lines they are strong on the documented practices relating to ENVISION's Resource Allocation and Climate and Resilience categories and to the energy, carbon and transport topics of BREEAM Infrastructure, although their figures are design values for lines under construction.

3.3 Positioning of the Lyon–Turin

The Lyon–Turin is designed to achieve efficiency gains comparable to those of the reference base tunnels. The transformation of a mountain line (where gradients of up to 3% require as many as three locomotives and raise energy costs by roughly 40%) into a base-level railway generates efficiency gains directly comparable to those achieved by the Alpine base tunnel already in service. In fact, in terms of travelling time it will allow important time savings, for example the journey Milan–Paris will be reduced from about 7 hours to around 4 hours; in terms of freight, the infrastructure will allow the passage of trains up to 750 metres long and with a capacity of up to 1,500 tonnes: considering that one train replaces 60 heavy goods vehicles on the road, the project could reduce CO_2 emissions by 1 million tonnes a year. It is therefore designed for the sustained, high-density throughput that the GTF associates with systemic efficiency. Its level is comparable to that of the reference projects on the energy and resource-use topics of ENVISION's Resource Allocation category and of BREEAM Infrastructure, given its expected shift of more than one million lorries a year to rail; these are design values, not measured results. This would be in line with the policy goal set by the European Commission's 2011 Transport White Paper of shifting 30% of road freight over 300 km to other modes, such as rail or waterborne transport, by 2030, and more than 50% by 2050. That goal is indicative, not binding, and the 2020 Sustainable and Smart Mobility Strategy has since aimed to increase rail freight traffic by 50% by 2030 and to double it by 2050.



30%

EU goal of shifting road freight to rail or waterborne transport



4 hours

Milan–Paris journey, instead of nearly 7 today



1,500 T

Trains 750 m long and with a capacity of up to 1,500 tonnes

4. Safety across transport modes

Under the GTF, safety spans the whole life cycle of the asset, comparable to ENVISION's Leadership and Quality of Life categories. It is useful to distinguish two levels: the *operational safety* of the infrastructure once in service, and the *occupational safety* of the construction phase, which for decade-long mega-projects involving thousands of workers is a material sustainability issue.

4.1 Operational safety

Modern base tunnels embed safety in their structure. The twin-tube, single-track configuration adopted by the Alpine base tunnels in the sample, and by the Lyon–Turin, physically separates the two directions of travel and provides frequent cross-passages that serve as protected escape routes: every c. 325 m in one case and every c. 333 m in another, the latter complemented by a continuous exploratory tunnel and dedicated emergency stations. The tunnels on the national line apply the same principle, with 56 cross-passages in one and connections every 500 m in the other. According to TELT's current project design, the Lyon–Turin follows the paradigm with 204 safety by-passes connecting its two tubes, together with four access declines ("descenderies") that double as maintenance routes. The greenfield corridor addresses operational safety by systematically eliminating hazardous level crossings through overpasses, viaducts and tunnels and favouring accessible pedestrian structures in urban areas. These are documented design features, and on that basis the tunnels are at a comparable level; the relevant rating areas are the health-and-safety topics of ENVISION's Quality of Life and Leadership categories and the management topics of BREEAM Infrastructure. A comparison of operating safety records is not possible, because most of these projects are still under construction.

4.2 Occupational safety

On the construction phase, the projects in the sample share a common approach: binding social clauses on pay, working conditions and accommodation for workforces that reach several thousand people, worksite-risk prevention as an explicit pillar of the CSR roadmaps of some promoters, and promoters who describe their accident rates as favourable compared with industry averages. The values, perimeters and sources of those comparisons are not stated, so these are figures declared by the promoters that cannot be benchmarked across the sample. The Lyon–Turin has set a "zero fatalities, zero accidents" objective ("Mission S") and operates constant monitoring of 135 environmental and health parameters (water, dust, asbestos, radon and others) under national supervisory control; a 2025 Health

Impact Assessment concluded that the worksites had not altered health parameters in the Susa valley. This shows a structured approach to public-health safety, but an objective is not a result, and environmental monitoring does not measure workplace accidents. As regards occupational safety, TELT reports (see the chapter “One Year On”) that between 2024 and 2025 its frequency rate fell by 18% and its severity rate by 19%, with no fatal accidents recorded in 2025–2026. Definitions, perimeters and absolute values are not published on a common basis across the sample, so no ranking can be drawn: promoters report favourable accident trends, and the corresponding rating areas are ENVISION’s Leadership category and the management topics of BREEAM Infrastructure.

5. Green Mobility — GHG emissions, air pollution and noise pollution

Green mobility is the most quantitative of the four GTF goals, and the one that most sharply differentiates projects from one another. It corresponds to ENVISION's Natural World and Climate & Resilience categories. Three sub-themes structure the comparison: the greenhouse-gas balance between construction emissions and modal-shift savings; the circular-economy management of excavated material (“spoil”); and the mitigation of air pollution, noise and impacts on water and biodiversity.

5.1 The greenhouse-gas balance and the notion of an offset period

On the carbon balance, the Lyon–Turin is expected to remove more than one million heavy goods vehicles from Alpine roads each year and to avoid in the order of one million tonnes of CO_2 annually, rail being roughly nine times less carbon-intensive and six times less energy-intensive than road. The multiples quoted for the different projects rest on different methods and perimeters and should not be compared directly. Across the sample, carbon balances are for the most part projections for projects under construction, not measured results: the most ambitious promoter projects a net-negative balance over the lifetime of its network, with cumulative savings of around 10.9 Mt CO_2e by 2050 and 24 Mt CO_2e by 2070, while one Alpine project contributes a methodologically important concept: the emissions “offset period” of roughly five to eighteen years required for operational savings to compensate construction emissions, explicitly modelled against the future electrification of road transport and the decarbonisation of the energy mix. The only measured figures in the sample come from the tunnel already in operation (see section 5.4). TELT has not calculated an offset period of its own: the 8.2 Mt CO_2e expected from construction at project scale (see section 5.5) and the ~1 Mt CO_2 avoided each year in operation refer to different perimeters and time horizons, and

a robust estimate would require an explicit model with stated assumptions. On ENVISION's Climate and Resilience category (greenhouse-gas reduction) and the energy and carbon topics of BREEAM Infrastructure, the Lyon–Turin is therefore comparable to the sample, with a significant expected contribution (~1 Mt CO_2/year avoided), while the sample's strongest points are the cumulative lifetime projections and the rigour of the offset-period method; all of these are projections for projects under construction.

5.2 Circular economy and spoil management

The management of excavated material is a defining environmental test for base tunnels, and the sample converges on a reuse-first approach. The first Alpine base tunnel in service remains the reference model, having handled over 28.2 Mt of spoil and turned it into concrete aggregates and new landscape features such as artificial lakes. Another Alpine project conveys the bulk of its spoil by belt conveyor to nearby deposits with low noise impact, a metropolitan network has managed nearly 47 million tonnes of excavated material, part of it transported by river and rail, and a newly opened national-line tunnel has reused around two-thirds of its c. 6 million m^3 of spoil. The Lyon–Turin has adopted the same paradigm at cross-border level, committing to reuse more than half of its excavation materials—for instance in the tunnel's inner concrete segments—and has demonstrated design-stage decarbonisation through an optimised jetting variant on the CO8 site that eliminated full-section jetting, cutting cement use by 18,000 tonnes and around 12,000 tonnes of CO_2-equivalent emissions. On ENVISION's Resource Allocation and Natural World categories and the material-resources topics of BREEAM Infrastructure, the tunnel in service offers the most documented practice, with the Lyon–Turin (a commitment to reuse more than 50%) comparable to the rest of the sample.

5.3 Air, noise, water and biodiversity

On air quality, noise and ecosystems, the first Alpine base tunnel in service combined particulate filters, wastewater treatment, humus noise barriers and extensive renaturation of streams and portals. The greenfield corridor frames fifteen key sustainability commitments spanning climate mitigation, biodiversity (more than ninety wildlife crossings), sustainable materials, noise-and-vibration reduction, water quality and climate resilience, while the immersed-tunnel project operates under strict sediment-spill and underwater-noise limits and reuses some fifteen million cubic metres of seabed material to create new wetlands.

Measured against these peers, the Lyon–Turin's environmental programme is comprehensive. TELT is implementing 26 areas of measures for protected or threatened species (targeting 148.5 hectares of managed habitat) within a research programme addressing more than one thousand protected species and habitats, reinforced by a fifty-year forestry agreement at Aussois and a scientific collaboration with the University of Turin. Its environmental performance is tracked through indicators certified by the CETU (Centre d'études des tunnels) feeding a full Life Cycle Assessment, with geothermal energy already in use at the Chiomonte visitor centre and progressively electrified machinery across sites. All this places the project at least in line with the monitoring standard of its comparators. On ENVISION's Natural World and Climate and Resilience categories and on the ecology, pollution and water topics of BREEAM Infrastructure, the greenfield corridor and the immersed-tunnel project are strong on the documented practices, while the Lyon–Turin stands out for its 148.5-hectare habitat programme and its CETU-certified indicators.

5.4 Reporting evidence from a tunnel in operation

The only binational tunnel in the sample already in long-term operation supplies reported operating data rather than projections alone. Its operator states that, through modal shift, the group avoids about 1.4 Mt of CO_2e per year, and that a car crossing on its shuttle service emits about seventy-three times less CO_2 than the equivalent ferry crossing (a 2020 study by Carbone 4 based on 2019 data). On the reporting side, which is the area covered by ENVISION's Leadership category and by the carbon topics of BREEAM Infrastructure, the operator reports that more than half of the electricity used by the group comes from renewable sources, is rated at the Leadership level (A–) by CDP, and has climate targets validated by the Science Based Targets initiative (SBTi). The CDP rating and the SBTi validation assess the transparency of the reporting and the validity of the targets; they do not certify measured carbon performance. This tunnel therefore offers the Lyon–Turin a mature, externally reviewed reporting template for the operational phase, which none of the tunnels still under construction can yet provide.

5.5 Lyon–Turin

Within TELT's perimeter (about 35% of the 8.2 Mt of CO_2 equivalent expected from the construction of the whole line, that is, roughly 2.9 Mt), the production of construction materials, and concrete in particular, is the main source of emissions, accounting for approximately 93.4% of the total. Emissions associated with construction equipment and on-site activities represent around 3.2%, while the production and installation of railway systems contribute approximately 2.7%. The

transport of excavated materials accounts for the remaining 0.7% (about 19 kilotonnes), a marginal share, primarily due to the local reuse strategy adopted within the project. This breakdown highlights the predominant role of materials in the project's carbon footprint and underscores the importance of strategies aimed at using low-carbon materials, optimising material formulations, and reusing aggregates derived from excavation materials.

LYON–TURIN CONSTRUCTION EMISSIONS BY SOURCE



Approximate share of construction-phase emissions within TELT's perimeter (about 2.9 Mt CO_2e).

This approach ensures proximity between excavation, treatment, and intermediate storage areas. As a result, transport-related emissions are estimated at approximately 19 kilotonnes of CO_2 equivalent, corresponding to about one quarter of the emissions that would have been generated in the absence of local reuse and if materials had been transported to distant recovery sites, particularly near Lyon or Milan.

At the overall project scale, the construction phase of the Lyon–Turin railway line is expected to generate approximately 8.2 million tonnes of CO_2 equivalent, of which 35% falls within TELT's operational scope. This proportion reflects the significant yet controlled contribution of the cross-border section within this binational project and highlights the need to coordinate emission reduction strategies across the entire corridor.

8.2

Mt CO_2e

expected from the construction phase at overall project scale

35%

falls within TELT's operational scope

~19

kt CO_2e

transport-related emissions, about one quarter of the no-local-reuse scenario

6. Synthesis matrix

The matrix consolidates the comparison across the four GTF goals, setting the aggregate picture of the sample against the position of the Lyon–Turin. Figures for projects in operation are reported results, while those for projects under construction, TELT included, are design values, targets or projections; all data are reported as declared by promoters and operators.

GTF policy goal	Reference sample (aggregate)	Lyon–Turin (TELT)	Positioning
Universal Access	Corridor integration (one tunnel shortens a journey from ~80 to ~25 min; a 64 km underground link); inclusive stations (7 international + 40+ local); a metropolitan network of 200 km and 68 stations; ~26% of trade in goods between the two countries linked carried by the operating tunnel (operator-reported)	Med. corridor; ~1M lorries/yr shifted to rail; up to 22 long-distance passenger trains/day; binational D&I (design figures)	Comparable on corridor access; more developed policy framework on inclusion
Efficiency	Freight paths 180→260/day (measured, tunnel in service); up to ~400 trains/day and ERTMS L2 (design); 249 km/h on a greenfield line; single-locomotive freight on gradient-free lines	Flatland railway; ~3 h time saving Milan–Paris; trains up to 750 m and 1,500 t (design figures)	Comparable; strong evidence in the sample comes from the tunnel already in service
Safety	Twin tubes with cross-passages every ~325–500 m; exploratory tunnel; level-crossing elimination; accident rates below industry average (promoter-reported, one project); decades of operating record (one tunnel)	Design: 204 by-passes; Mission S objective; 135 environmental parameters monitored; frequency rate −18% and severity rate −19% (2025 vs 2024)	Comparable on design; operating records and accident rates are not comparable
Green Mobility	Spoil: 28.2 Mt handled reuse-first (tunnel in service); ~2/3 of 6 Mm^3 reused; ~47 Mt moved by river/rail. Carbon: projected ≈ −24 Mt CO_2e by 2070 (promoter); offset period 5–18 yrs (modelled); ~1.4 Mt CO_2e/yr avoided, >50% renewable electricity, CDP A−, SBTi-validated targets (operator)	~1 Mt CO_2/yr avoided; >50% spoil reuse; CETU LCA; 148.5 ha of habitat (design figures)	Comparable; distinctive on the habitat programme and CETU-certified indicators

Aggregate comparison across the four GTF goals: reference sample versus Lyon–Turin. Figures for projects under construction are design values or projections.

7. How the reference projects use AI

7.1 Operational AI: predictive maintenance and monitoring

The binational tunnel in long-term operation offers the most publicly documented use of AI in the sample, with figures supplied by its operator. The operator has built a unified data platform underpinning a roadmap of twelve generative-AI use cases,

supported by a dedicated budget of some €2.5 million to 2025 and yielding an estimated €1.5 million in annual savings from predictive maintenance of ageing rolling stock and complex infrastructure operating around the clock. Examples of field applications include:

12	€2.5 million	€1.5 million
generative-AI use cases on the operator's unified data platform	dedicated budget to 2025	estimated annual savings from predictive maintenance

- **Catenary inspection:** a truck equipped with cameras on board a freight shuttle travelling at 120 km/h in the tunnel, which captures images of the catenary analysed by AI and then generates alerts to anticipate field interventions.
- **Wheel-profile monitoring:** a tool for the prediction of reprofiling by systematic inspection and measurement, which continuously analyses the wheel profiles of shuttles using a non-contact laser system, enabling accurate measurements at 90 km/h every 117 km.

7.2 Digital twins and augmented reality

On an Alpine base tunnel in operation, the national railway operator deploys a digital twin with indoor positioning to locate maintenance personnel within the twin tubes in real time (enhancing both worker safety and line availability) alongside augmented reality for the maintenance of electrical cabinets. At group level, the same operator runs one of Europe's most comprehensive railway-AI programmes, applying camera- and sensor-based predictive maintenance to wheelsets and track, albeit with AI still representing a modest share of a broader billion-euro optimisation effort.

7.3 Digital by design on greenfield lines

Being greenfield, the corridor is digital by design. It integrates BIM, asset-information management and GIS within a Common Data Environment, and operates a geospatial digital twin that unifies the data generated daily by hundreds of contractors across three countries, applying analytics and AI to "predict potential issues before they arise." The value of this approach was demonstrated when weekly construction video revealed incorrectly installed barriers months before the defect would have been identified through LiDAR scanning.

7.4 Machine learning, spoil tracking and environmental data

The metropolitan network has applied machine learning to predict tunnelling-induced ground settlements on two of its lines, and has deployed a digital spoil-tracking tool that eliminated more than 1.5 million paper consignment slips. The immersed-tunnel project, for its part, has designed a lifecycle digital twin interlinking BIM, GIS, its maintenance system, SCADA and Structural Health Monitoring, complemented by a portal that streams real-time environmental sensor data on sediment, noise and water quality. In the other Alpine and national-line tunnels, by contrast, publicly documented digital activity centres principally on BIM modelling rather than on operational AI.

7.5 The Lyon–Turin

The Lyon–Turin is running AI pilot projects in human resources, legal affairs and the secretariat, in order to digitalise and optimise company processes. Moreover, to support compliance with the European Directives on Cybersecurity (EU Directive 2022/2555 – NIS 2) and on the resilience of critical entities (EU Directive 2022/2557 – CER), and to assess the impacts of the application of Artificial Intelligence on TELT's processes and activities (EU Regulation 2024/1689 – AI Act), a dedicated cross-functional Commission was established to provide opinions on the impact generated by the initiatives launched within TELT, in order to support compliance with both European and national regulations. Another use of artificial intelligence relates to monitoring activities in an operational site in order to detect and prevent risks for workers' safety. This pilot project has been rolled out in one operational site for now, with the aim of progressively extending it to the other sites; it is subject to the applicable data-protection, labour-law and AI Act requirements.

At the heart of this approach is the Charter for the Development of Responsible Artificial Intelligence (the "AI Commitment"), a voluntary charter through which TELT and the companies that adhere to it (contractors, subcontractors, technical partners and suppliers) undertake a shared set of commitments: the mapping of AI systems and use cases, a clear allocation of responsibility, preventive risk assessment, human supervision, AI literacy, transparency and data protection—explicitly conceiving of AI as a support to human judgement rather than a substitute for it.

7.6 Mapping AI uses onto ENVISION and BREEAM

The table below maps each functional use of AI onto the corresponding ENVISION and BREEAM categories, and indicates how widespread each use is across the sample.

AI functional use	ENVISION category	BREEAM area	Prevalence in the sample
Operational AI (predictive maintenance, monitoring)	Resource Allocation	Energy & carbon; asset management	Most documented among the projects in operation and the immersed-tunnel project
Construction / excavation AI (settlement, TBM)	Climate & Resilience; Natural World Land use; resources Metropolitan network; Lyon–Turin		
Digital twin / data platform (BIM–GIS–AIM)	Resource Allocation; Leadership	Management; monitoring	Greenfield corridor; immersed-tunnel project; binational tunnel in operation
Responsible-AI governance (policy, ethics, AI Act, supply chain)	Leadership (collaboration, ethics, stewardship)	Project management & governance	Lyon–Turin (distinctive)

8. Listening to stakeholders: the survey on the infrastructure of the future

The benchmark above compares the Lyon–Turin with what similar projects do. A second question is **what the people who plan, finance, regulate and build infrastructure expect from it**. To answer it, TELT carried out an international survey on the infrastructure of the future in 2025–2026, in an English-language version and a bilingual Italian–French version. The survey collected 89 responses: 42 from Italy, 18 from France and 29 from other countries. The sample is deliberately varied: independent professionals expressing their own opinions (24), the political and institutional context (22), the scientific and academic community (21), TELT suppliers (11), TELT financiers or directly linked agencies (4), TELT shareholders (3) and other organisations, including infrastructure managers, public promoters and trade associations (4). It is not statistically representative: 18 of the 89 respondents (about 20%) are linked to TELT as suppliers, financiers or shareholders, so the results should be read as indications of stakeholder expectations rather than as a representative opinion poll. The results were presented at the CEO Meeting held in Turin on 16 October 2026 (which brought together leaders of European infrastructure managers and promoters, including several of the projects examined above).

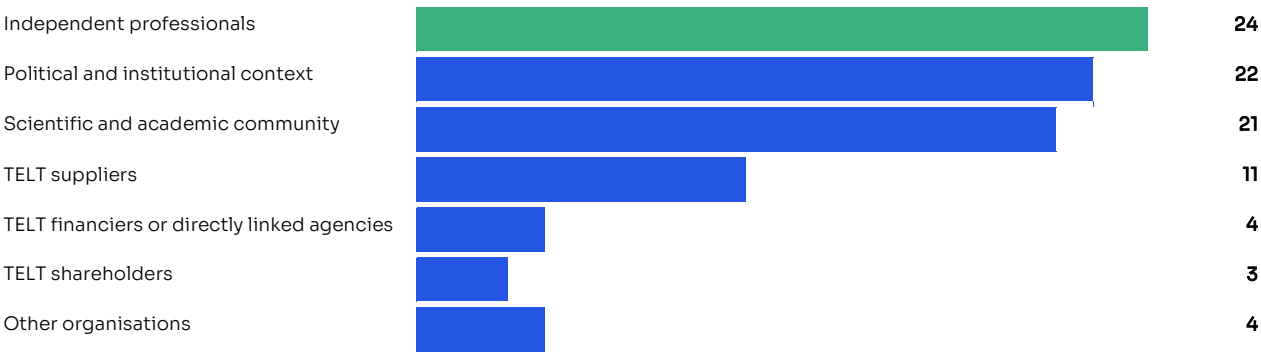
89
responses to the international survey on the infrastructure of the future

42
from Italy

18
from France

29
from other countries

SURVEY SAMPLE BY RESPONDENT PROFILE



Number of respondents.

The first finding is consistent with the premise of the whole benchmark. In the ranking of infrastructure priorities (88 responses), transport receives 42 first choices and energy 39. Together they account for 81 first choices and 154 placements in the top two positions, well ahead of communication and digital infrastructure and of defence, which most respondents rank last (63). Defence is nonetheless part of the strategic framing of some of the projects examined: one greenfield corridor, for example, also cites military mobility among its benefits. The two versions of the survey order these priorities differently. Respondents to the English version put **energy** first (17 first choices against 5 for transport). Respondents to the Italian–French version put **transport** clearly first (37 against 22). Read together, the results suggest that energy and mobility are seen as parts of a single strategic architecture. The same logic shapes the base tunnels in the sample: the Alpine and national-line base tunnels and the Lyon–Turin are all designed to shift freight from road to rail, cut energy use per tonne carried and decarbonise transport along the TEN-T corridors.

INFRASTRUCTURE PRIORITIES: FIRST CHOICES (88 RESPONSES)



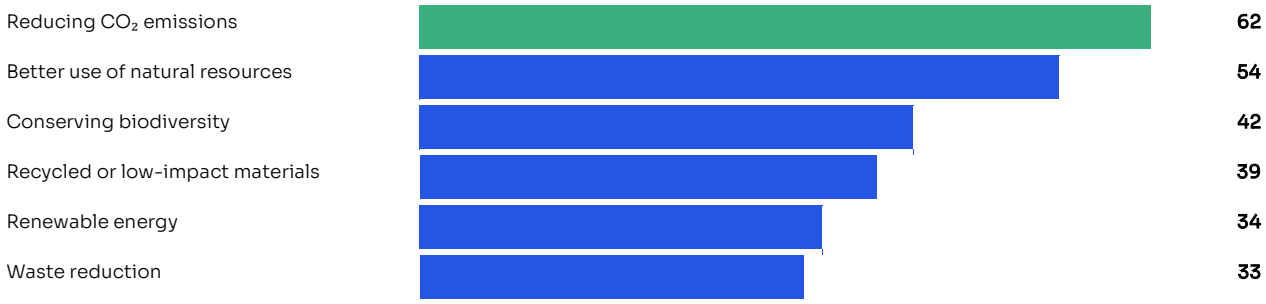
Number of first choices.

Survey version	Energy (first choices)	Transport (first choices)
English version	17	5
Italian–French version	22	37

Environmental expectations follow the Green Mobility analysis just as closely. The most cited priorities are reducing CO_2 emissions (62), making better use of natural resources (54) and conserving biodiversity (42). Recycled or low-impact materials (39), renewable energy (34) and waste reduction (33) come next. These match the three topics used to compare the projects: the greenhouse-gas balance, circular management of excavated material, and protection of air, water and ecosystems. The Lyon–Turin is expected to avoid around one million tonnes of CO_2 a year. It plans to reuse more than half of its excavated material and to manage 148.5 hectares of habitat for protected species. Materials account for about 93.4% of its construction emissions, which explains why respondents' focus on low-impact materials matters so much for the project. Respondents also call for a life-cycle approach covering design, construction, operation and end-of-life. This is the same long-term view

taken by ENVISION, by the Brenner's "offset period" method and by TELT's CETU-certified Life Cycle Assessment.

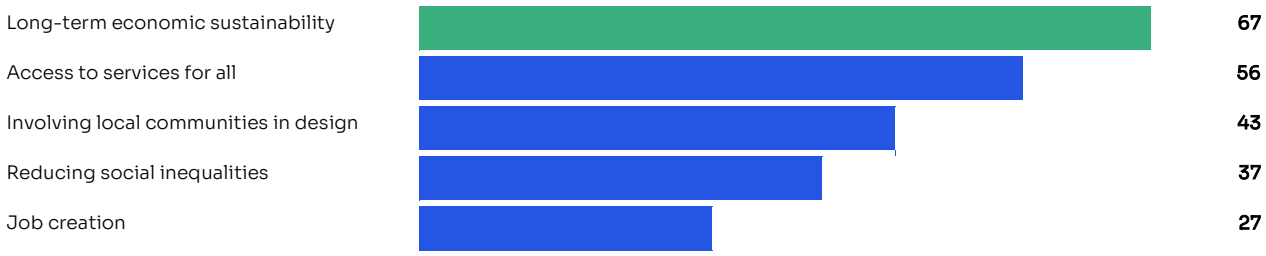
ENVIRONMENTAL EXPECTATIONS



Number of mentions.

The survey also shows that respondents judge infrastructure by the **lasting public value** it creates, not only by what it builds. Long-term economic sustainability (67) and access to services for all (56) are the most cited needs, followed by involving local communities in design (43), reducing social inequalities (37) and job creation (27). Involving local communities is a particular concern of respondents to the Italian–French version, 32 of whom select it, compared with 11 in the English version. This probably reflects how much the territorial dimension matters in the countries crossed by the project. In the benchmark, these expectations fall under Universal Access, under ENVISION's Quality of Life category and under the community topics of BREEAM Infrastructure. In that area, the most inclusive comparators are Rail Baltica and the Grand Paris Express. The Lyon–Turin comes closer to them than the earlier Alpine tunnels did, thanks to its binational Diversity and Inclusion policy, its gender-equality index and its links with the territories it crosses.

LASTING PUBLIC VALUE: MOST CITED NEEDS



Number of mentions.

The **obstacles** respondents identify point to governance more than to technology. The most cited barriers are high upfront costs (48), resistance to change among stakeholders (45) and inadequate policies (43). Difficulties in managing the life cycle (24) and insufficient technological innovation (17) are cited much less often. The two versions differ here as well. Respondents to the English version are most concerned about upfront costs (18). Respondents to the Italian–French version point equally to

resistance to change and to inadequate policies (33 each). In both cases, the main obstacle is not technological: according to respondents, innovation makes a difference only when it is backed by consensus, consistent rules and the capacity to manage projects over time.

OBSTACLES: MOST CITED BARRIERS



Number of mentions.

Views on **funding** point the same way. The most cited source is the State combined with the European Union (59), with public-private partnership as a complementary option (37) and public funding alone cited less often (20). For long-term strategic works, financing depends on governance. The Lyon–Turin's 50/50 Franco-Italian public structure, its co-financing under the Connecting Europe Facility, its Integrity and Sustainability Pact and its oversight of around 4,500 third parties are designed to respond to that need.

FUNDING: MOST CITED SOURCES



Number of mentions. Source: TELT international survey on the infrastructure of the future, 2025–2026.

The benchmark and the survey use different methods: one compares peer projects, the other collects the expectations of a sample of stakeholders, about one fifth of which is linked to TELT and which is not representative. Their findings are nonetheless consistent with one another: both describe infrastructure that links energy and mobility, is managed over its whole life cycle, puts people and territories at the centre, is governed through consistent policies and shared rules, and treats CO_2, resources and biodiversity together. These results offer a useful reference for the next stages of the project, with the caution that comes from the limits of the sample. As the survey concludes, the future does not only require new works: it requires a new pact between infrastructure, institutions, territories and generations. Building that pact is the purpose of the engagement activities described in the following section.

9. Overall positioning of the Lyon–Turin

Read through the GTF grid and cross-checked against ENVISION and BREEAM, on the basis of an internal, qualitative assessment of public information, the Lyon–Turin emerges as broadly aligned with its peers across the four goals, with a distinctive integrated profile that none of the comparators fully replicates.

On **Efficiency** and **Green Mobility** it shares the modal-shift paradigm of the Alpine and national-line tunnels and matches their quantitative ambition, with an expected avoidance of roughly one million tonnes of CO_2 per year and the reuse of more than half of its spoil. On **Safety** it combines the designed-in protection of the twin-tube tunnels with a granular health-and-environment monitoring regime, supported by a 2025 Health Impact Assessment. On the inclusion dimension of **Universal Access** it shows a distinctive attention to the issue, closer to the inclusive models of the greenfield corridor and the metropolitan network than to the earlier, more strictly infrastructural framing of the mountain tunnels. The binational tunnel in operation offers a proven operational template, while the national-line and Alpine tunnels in service confirm that the circular-economy and single-locomotive efficiency logics are achievable at scale.

What distinguishes the Lyon–Turin is therefore not superiority on any single indicator but the *integration* of attributes rarely found together: a fixed, cross-border, base-level infrastructure; a fully public, 50/50 binational governance; central positioning on the TEN-T Mediterranean corridor; a sustainability profile assessed on a preliminary basis against the ENVISION framework (a self-assessment not verified by ISI, indicatively GOLD with PLATINUM potential) and reported to ESRS-aligned standards, underpinned by CETU-certified environmental indicators. **On this evidence, and bearing in mind that the assessment is internal and qualitative and that most TELT data are design values, the Lyon–Turin can be presented as a project with a distinctive integrated profile within the European family of great transalpine and cross-border railways.**

Artificial intelligence (AI) is one of the two emerging themes—alongside diversity and inclusion—that this paper introduces as new frontiers of responsible infrastructure development and that, although not directly analysed by the previous frameworks, is nevertheless worth considering. The uses of AI are grouped into four functional categories: **operational AI** (predictive maintenance and in-service monitoring); **construction and excavation AI** (settlement prediction and tunnel-boring-machine control); **digital twins and data platforms** (BIM–GIS–AIM

environments); and **responsible-AI governance** (policy, ethics, EU AI Act compliance and supply-chain oversight).



Operational AI

Predictive maintenance and in-service monitoring



Construction and excavation AI

Settlement prediction and tunnel-boring-machine control



Digital twins and data platforms

BIM–GIS–AIM environments



Responsible-AI governance

Policy, ethics, EU AI Act compliance and supply-chain oversight

Within the asset-level rating systems adopted elsewhere in this paper, these dimensions do not fall under a single credit but are distributed across two categories in particular. Operational efficiency and monitoring correspond to ENVISION's Resource Allocation category and to the energy and asset-management topics of BREEAM Infrastructure; the governance of AI, by contrast, maps onto ENVISION's Leadership category (which rewards collaboration, ethical management and long-term stewardship) and onto the management and project-governance topics of BREEAM Infrastructure. This distinction is useful because the first three categories concern the technologies employed, while the fourth concerns the framework of rules and responsibilities that governs their use.

> In conclusion, the Lyon–Turin project shows a distinctive profile, also on the most innovative topic, AI. What distinguishes it from the other tunnels in the analysis is its sustained effort to engage partner companies on a wide range of sustainability topics, in order to encourage the development and spread of best practices, as well as continuous improvement.

The next section of this paper analyses these engagement activities, presenting the progress made by the companies involved in the project.



2024 Lyon Turin Engagement Forum, held in Paris.

POSITION PAPER 2026

One Year On: From Commitment to Results

At last year's Lyon–Turin Engagement Forum, held in Rome, companies signed a new pact and committed to engage on two essential themes: drug- & alcohol-free promise, ensuring safety and responsibility in every workplace; and whistleblowing protection, guaranteeing that anyone can report misconduct without fear of retaliation.

Together, these commitments shape a framework of trust, accountability, and sustainability for the future of the project.



COMMITMENT

Drug & Alcohol-Free Commitment

The Drug & Alcohol-Free Commitment is not only a commitment to safety, but also a cultural foundation that strengthens mutual trust and ensures the highest standards of quality in the construction sites.



COMMITMENT

Whistleblowing protection

The protection of **whistleblowing mechanisms** guarantees transparency and integrity, creating an environment where concerns can be raised without fear of retaliation, thereby reinforcing the shared ethical standards of the project.

Fast-forward to today, one year after that pact, we are proud to see the efforts put in place by companies operating in the construction of the base tunnel on these important topics. During the year we have organised moments for sharing and collecting experiences and best practices on the aforementioned topics and the results were truly inspiring.

Safety

Safety is progressively a structural element of our collective industrial performance, also thanks to the cooperation between TELT and OPPBTP (Organisme Professionnel de Prévention du Bâtiment et des Travaux Publics): activities began at the end of 2025, initiating a structured process jointly agreed upon by the partners, which includes training activities, joint site visits and interviews, as well as the assessment of objectives. In parallel, between 2024 and 2025 the frequency rate fell by 18% and the severity rate by 19%. As a result, the number of incidents has greatly decreased, both in frequency and gravity and no fatal accidents were recorded in 2025–2026, putting us on track towards the "zero accidents" goal. Moreover, at operational construction site 08, TELT and its contractors launched a pilot project based on the use of artificial intelligence to support operational activities and strengthen safety oversight, representing one of the first examples of AI experimentation applied to a major cross-border infrastructure construction site.

Environment

On the **environment** topic, sustainability issues are progressively integrated in the operational management of the project, in line with a multilevel governance model promoted by the Lyon–Turin Engagement Forum. More specifically, we learned that effective **water** management requires anticipating water-related impacts through a predictive understanding of site conditions and an integrated assessment of surface and groundwater effects, combining monitoring data with the operational knowledge of on-site teams and continuously adapting treatment and management solutions to evolving excavation conditions and emerging challenges. 2025 has also seen the strengthening of initiatives dedicated to **ecological transition** and innovation. Both in France and in Italy, Biodiversity has gained increasing attention: in France the collaboration between TELT and companies for some actions of ecological compensation has continued, while in Italy innovative biodiversity research protocols were developed. Alongside the protection of ecosystems, TELT places strong emphasis on the **responsible management of resources**: the adopted approach follows the **"**Avoid–Reduce–Compensate" hierarchy and aims to transform construction activities into an opportunity for advancing the circular economy.

Territory

In addition to this, construction activities are also seen as means for creating value for the **territory** and fostering long-term relationships with local communities. Companies operating in construction sites have deployed various initiatives, such as territorial communication tools, structured engagement practices, training programmes, dialogue with schools and universities, among others.

Integrity and legality

Finally, a culture of **integrity and legality** is getting progressively developed and deeply integrated throughout the value chain. In addition to the Ethical Code, a new Anti-corruption Code has been designed to solidify the company's commitment against corruption. This builds on previous initiatives, including adherence to the UN Global Compact (2015) and adopting the "Policy for Combating Corruption and Fraud" (2019). This comprehensive framework applies to all TELT's employees, partners and contractors. In addition, whistleblowing tools are being adopted by many of the companies operating in the project, therefore guaranteeing to all workers the possibility to report any kind of concerns or issues (fraud, corruption, environmental violations, misconduct...) without fear of retaliation. Moreover, TELT's whistleblowing tool is available to its suppliers too.

In conclusion, the sustainability of the Lyon–Turin project is not understood solely in terms of environmental performance, but as the integration of safety, ethics, transparency, engagement with the local community and continuous improvement through collaboration between TELT and the contractors on the construction sites. The progress made this year is consistent with TELT's mission to be a shared framework of responsibility between Italy and France, bringing together public decision-making, oversight, technical expertise, stakeholder engagement at the local level, and a broader European vision, and sets the foundation for further improvements and achievements.

For more detailed information and facts and figures see the Sustainability Report 2025[11].

[11] Pubblicazioni & relazioni scaricabili



TELT's CEO, Maurizio Bufalini, signing the Pact for Integrity and Sustainability and the Mission-S Commitment with the UXT group of Companies, on 18 December 2023 in Susa Valley, Italy

CHAPTER 01

Focus on the companies of the Lyon-Turin Railway Line

01

Companies directly involved in the construction sites / Companies involved in construction sites with delegated contractor

Companies directly involved in the construction sites

Dodin Campenon Bernard

- **Profile**: a subsidiary of VINCI Construction, designs and carries out major civil engineering projects in France and around the world.
- **Sustainability approach**: an environmental action plan built on six levers (skills, prospecting, business acquisition, project execution, support functions, business management), the last consolidating environmental indicators to monitor the 2030 targets.
- **Targets and evidence**: by 2030, −40% CO_2 emissions for scopes 1&2 and −30% for upstream scope 3; 90% material recovery from inert and non-hazardous waste; 100% of washing water recycled.

Eiffage

- **Profile**: key player in urban construction and sustainable infrastructure, active in construction and concession operations.
- **Sustainability approach**: for over ten years it has worked with clients, suppliers and partners on the environmental transition, with the aim of reducing its carbon footprint and protecting the living world.
- **Targets and evidence**: no quantified targets in the source material.

Ghella

- **Profile**: global player in major public works, founded in 1894 after generations of mining activity, with a focus on tunnels for urban centres and rail links.

- **Sustainability approach**: eco-design, minimisation of greenhouse gas emissions, low-impact materials and circular economy, together with stakeholder engagement, health and safety, ethics and inclusion.
- **Targets and evidence**: an ESG Strategy with a multi-year plan including quantitative targets to 2030 and 2050 (values not stated in the source).



Implenia

- **Profile**: contractor for building and civil engineering, acting either as total contractor or as specialist.
- **Sustainability approach**: sustainability has been one of five corporate values since 2009. The environmental policy rests on five points, and a Group environmental standard sets minimum requirements for site management (waste, noise, air, water, soil, site energy), with priority to local legislation.
- **Targets and evidence**: targets for reducing greenhouse gases and energy consumption and increasing renewable energy production are mentioned, without values.



Itinera

- **Profile**: company of the ASTM Group, founded in 1938, delivering major infrastructure and civil construction projects in Italy and abroad.
- **Sustainability approach**: it contributes to the ASTM Group Sustainability Plan 2023–2030 through four priorities: climate transition and resource use, people and safety, responsible supply chain, and territories and communities. The strategy is aligned with the SDGs.
- **Targets and evidence**: decarbonisation measures include HVO for vehicles and equipment and certified renewable electricity; no quantified targets in the source.

NGE

- **Profile**: fourth largest French construction group, with €5 bn revenue in 2025, nearly 25,000 employees and eight areas of expertise. It designs, finances, builds, maintains and operates infrastructure (for example, the 264 km Ferrocarril Central line in Uruguay under a public-private partnership).
- **Sustainability approach**: its model supports economic development, ecological transition and the transformation of territories. [da integrare: la fonte non descrive politiche di sostenibilità]
- **Targets and evidence**: no quantified targets in the source.

Spie Batignolles

- **Profile**: independent French group in building and civil engineering.
- **Sustainability approach**: the Accel'R plan (launched in 2023) coordinates its decarbonisation efforts. It also runs the BTP 4.0 transformation project (BIM, artificial intelligence, prefabrication) and preserves natural areas through Spie batignolles paysage.
- **Targets and evidence**: –24% greenhouse gas emissions by 2030.

VINCI Construction Grands Projets

- **Profile**: the VINCI unit that designs and builds major infrastructure worldwide.
- **Sustainability approach**: five values guide its action: safety, excellence, valuing employees, innovation, and social and environmental commitment.
- **Targets and evidence**: a "zero accidents" objective; no environmental targets in the source.

Webuild

- **Profile**: global player in large, complex infrastructure, with over 120 years of experience, about 50 countries, more than 92,000 people and around 17,500 partners.
- **Sustainability approach**: it is guided by its ESG Plan, launched in 2021. The 2024–2025 plan has three pillars: Green, Safety & Inclusion, Innovation.
- **Targets and evidence**:

Indicator	2025 target	2024 result
GHG intensity (scope 1&2)	–10% vs 2022	–25% vs 2022
Lost Time Injuries Frequency Rate	–6% vs 2022	–33% vs 2022
Women managers	+20% vs 2023	+6% vs 2023
Investment in clean tech and innovation	€430 m additional vs 2023	more than €250 m

Also: 93% of the construction backlog contributes to the SDGs; 40.1% of 2024 revenue, 66.8% of CapEx and 51.1% of OpEx are aligned with the EU Taxonomy.

Engineering companies

FS Engineering

- **Profile**: engineering company;
- **Sustainability approach**: it sees sustainability as the driver of infrastructure conceived as a system, based on circular economy and on identifying the "right" project. It describes itself as a pioneer of sustainable design and construction of large transport works.
- **Targets and evidence**: no quantified targets in the source.

Setec

- **Profile**: independent engineering group, owned by its employees and company representatives.
- **Sustainability approach**: the "Engineers & Citizens" approach rests on four pillars: reducing the environmental impact of projects and activities, ensuring practices respect the group's values, promoting the development of all teams, and involving its ecosystem. A roadmap is deployed across all subsidiaries.
- **Targets and evidence**: no quantified targets in the source.

Systra

- **Profile**: engineering company for transport systems, offering mobility solutions that facilitate access to regions and services.
- **Sustainability approach**: eco-design and circular economy applied across the whole life cycle. Its sustainable development has three dimensions: environmental, societal and social responsibility.
- **Targets and evidence**: no quantified targets in the source.

Ingérop

- **Profile**: independent engineering and consulting group active in buildings, water, energy, industry, infrastructure & mobility, transport and urban development. On the

Lyon–Turin project, Ingérop Conseil et Ingénierie provides works supervision (maîtrise d'œuvre) for the CO8 site.

- **Sustainability approach**: a Group charter on responsible AI covers data protection, environmental impact, the quality of generated content and intellectual property. It is supported by training for all employees, two-level checks on deliverables and a "frugal AI" approach. Diversity, inclusion and equal opportunities are built into the whole career path, from recruitment to job retention, with specific action on women's careers in engineering and on disability.
- **Targets and evidence**: no quantified targets in the source. Evidence includes a gender-diversity charter, a "Leadership au féminin" training programme, the "nos carrières n'ont pas de genre" campaign, a generative-AI tool hosted in France with a capped monthly use, and the signature of TELT's AI and D&I commitments.

Other companies involved on the valorisation of materials sites

Cavit

- **Profile**: producer of recycled aggregates from demolition and construction waste.
- **Sustainability approach**: the production process reduces the need to extract natural resources and complies with environmental regulations.
- **Targets and evidence**: EPD (Environmental Product Declaration) certification, based on a life cycle assessment of its products.

Cogeis

- **Profile**: general contractor and construction company founded in 1963. With over 60 years of experience and more than 300 professionals, the company operates across Italy and internationally on large-scale infrastructure and civil engineering works
- **Sustainability approach**: sustainability is a guiding principle of industrial and organisational choices, integrated into daily processes and long-term decisions.
- **Targets and evidence**: first Sustainability Report in 2023.

Eurovia

- **Profile**: subsidiary of VINCI Construction, one of the world's leading players in transport infrastructure and urban development.
- **Sustainability approach**: it follows the VINCI Group Manifesto, with attention to risk prevention, social responsibility and high environmental and ethical standards.

- **Targets and evidence**: VINCI's 2030 environmental ambition covers climate change, circular economy and natural environments, including –40% direct greenhouse gas emissions by 2030. Its role in Lyon–Turin (CO11, GEME) is described in the dedicated section.

Companies involved in construction sites with delegated contractor

The construction and management of the cross-border section of the Turin–Lyon line is entrusted to TELT, the binational public promoter established to coordinate the project on behalf of the two States (France and Italy) and created as an evolution of the previous body responsible for the preliminary studies. TELT therefore acts as a supranational contracting authority for the works on the international section and assumes technical, financial, and contractual coordination functions among partners and national networks.

For operational reasons and to ensure integration with local infrastructures, TELT also makes use of instruments of transfer/delegation of contracting authority.

In Italy, pursuant to the Italy–France Binational Agreement of 24 February 2015, and specifically Article 4, TELT may “entrust the competent infrastructure managers with the role of contracting authority for the design and execution of works made necessary by the impacts of the cross-border section on the infrastructures and facilities of said managers.” These managing entities are often also considered as “interfered parties” under Italian legislation, applying Articles 170 and 171 of Legislative Decree No. 163/2006.

Among the managers involved with TELT as delegated contracting authorities are SITAF, the motorway concessionaire responsible for the construction and management of the A32 Turin–Bardonecchia Motorway and RFI – Rete Ferroviaria Italiana, the concessionaire of the Italian railway network.

In France, the technical interfaces and implementation of the national section fall within the competencies of SNCF Réseau (or the competent national authorities/entities). This distinction reflects the multi-level nature of the project: TELT acts as the international contracting/promoting authority for the cross-border section, while RFI and SNCF maintain technical and managerial responsibility for their respective national portions of the network.

The practice adopted therefore combines (i) a binational promoter — TELT — which holds the political and financial mandate for the international section; (ii) the transfer or delegation of contracting authority to local actors (e.g. SITAF) for specific related works, in order to leverage local expertise and instruments; and (iii) the retention by national infrastructure managers (RFI, SNCF Réseau) of technical responsibilities and management of the interfaces with the national network. This framework organizes responsibilities, technical risks, and administrative procedures in such a way as to reconcile international governance with territorial operational capacity.

RFI

- **Profile:** concessionaire of the Italian railway network. It acts as a delegated contracting authority on behalf of TELT and retains technical and managerial responsibility for the Italian national portion of the network.
- **Sustainability approach:** in line with the UN 2030 Agenda, the European Green Deal and the Holding's directives, it pursues an integrated, multimodal and inclusive infrastructure system through Strategic Sustainability Plans and Sustainability Protocols, in accordance with Just Transition principles. Its construction sites follow the Do No Significant Harm (DNSH) principle.
- **Targets and evidence:** no quantified targets in the source.

SITAF

- **Profile**: motorway concessionaire of the ASTM Group, responsible for building and managing the A32 Turin–Bardonecchia motorway. It acts as a delegated contracting authority on behalf of TELT for specific related works.
- **Sustainability approach:** working closely with the ASTM Group, it aims to progressively minimise the environmental impact of its operations and to address climate risks from the design stage onwards. It also commits to protecting human rights, providing an inclusive work environment, combating corruption and maintaining a transparent supply cycle.
- **Targets and evidence:** no quantified targets in the source. Its suppliers are selected on the basis of transparency and impartiality and with checks for conflicts of interest, in line with its internal procedures.

SNCF Réseau

- **Profile:** infrastructure manager of the French national rail network. Since 2020 it has been a public limited company within the SNCF Group, wholly owned by the French State. It manages 28,000 km of operational lines, including 2,700 km of high-speed lines, and retains technical responsibility for the French national section.
- **Sustainability approach:** committed to sustainable mobility for all, it works with customers and regional partners, improves its industrial and economic performance and seeks to speed up the rail sector's ecological transition.
- **Targets and evidence:** it aims to double rail traffic within the next 10–15 years, making rail the preferred mode for both passengers and freight. The source gives no quantified environmental targets.



Aerial view of CO3-4 site, Chiomonte, Italy

CHAPTER 02

A journey through the construction sites

Presentation of the construction sites / October 2026 construction update

02

Presentation of the construction sites

57.5 km

Mont Cenis base tunnel: two parallel tubes carrying freight and passenger trains

164 km

of galleries

4

access adits, totalling about 18 km of tunnels

2

new international stations at Susa and Saint-Jean-de-Maurienne

The 57.5 km Mont Cenis base tunnel is being excavated beneath the Alps between France and Italy from several fronts, reached through access adits built in an earlier phase of the works. Excavation relies mainly on the mechanised method, using large tunnel boring machines (TBMs) and, depending on the geological characteristics, the conventional method, with explosives or hydraulic breakers.

Beyond the base tunnel itself, TELT is responsible for building the two new international stations at Susa and Saint-Jean-de-Maurienne and the connections with the existing line. These works are developed in 12 construction sites in the Susa and Maurienne valleys.

More than half of the excavated material is sent to processing sites, where it is turned into resources for the base tunnel itself: tunnel-lining segments, concrete aggregates and railway embankments. Rock whose mechanical properties make it unsuitable for reuse is used to restore and regenerate selected natural sites in the surrounding area.



Construction site platform at site CO06, La Praz, France, about 14–16 months ago

The currently operational construction sites are the following:

Site	Works	Awarded to
CO 03-04	Base tunnel Maddalena-Chiomonte	UXT (Itinera, Ghella, Spie Batignolles)
CO 05-a	Avrieux Shaft	LYTO (VINCI Construction Grands Projets, DODIN CAMPENON BERNARD, CAMPENON BERNARD Centre Est, WeBuild, MASTER DRILLING Europe).
CO5	Base Tunnel Modane – Maddalena	Elyot (Eiffage, Spie Batignolles Génie Civil, GHELLA, COGEIS) for the construction site;
CO 06-07	Base Tunnel La Praz-Modane-S. Martin La Porte	VINCI Construction Grands Projets (group head) / Dodin Campenon Bernard / Campenon Bernard Centre Est WeBuild.
CO 08	Base Tunnel S. Julien Mont Denis-S. Martin La Porte	IMPLENIA Suisse (group head) / IMPLENIA France / NGE / ITINERA
CO 09	S. Jean de Maurienne Works	Delegated to SNCF
CO 10	Valorization of Materials (Italian Side)	COGEIS, CAVIT, COGEFA, HUPAC
CO 11	Valorization of Materials (French Side)	GEME (EUROVIA Alpes, Carrières du Bassin Rhônalpin / SATM / Granulats VICAT / SPIE BATIGNOLLES VALERIAN / SPIE BATIGNOLLES MALET / VINCI Construction Terrassements (now Térélian) / GIE GMM 73

Construction of the Lyon–Turin base tunnel is now under way in both countries. As the principal component of the cross-border section, the base tunnel is a complex infrastructure: two parallel 57.5 km tubes carrying freight and passenger trains, linked by 204 safety by-passes and served by four access adits. Alongside the underground works, surface construction sites on both the Italian and French sides

will connect the line to the respective national networks through the new international stations.

Three of the four adits are on the French side, at Villarodin-Bourget/Modane, La Praz and Saint-Martin-La-Porte, and one is on the Italian side, at Chiomonte. Together they total about 18 km of tunnels.

Today the adits provide access to the base-tunnel worksites. Once the line enters service, they will become maintenance accesses and emergency exits.

October 2026 construction update

Tunnel excavation progress totalled 50.2 km (30.7 per cent), comprising 27.8 km of ancillary tunnels (access tunnels, logistics and safety tunnels, shafts and other underground structures) and 22.4 km of the Montcenis Base Tunnel.

Production for the month totalled 407 metres, across 14 excavation fronts with 1 tbm active and 2 on set-up phase. 4.5 km of permanent lining has been completed (2.8 per cent).

There are over 3.200 people working on the construction sites, for the construction management and the public promoter, 2,129 companies registered on the whitelist (547 Italian, 1,459 French and 123 from other countries).



TELT's Deputy Managing Director – France, Lionel Gros, during an event held in Riga, Latvia, to boost knowledge sharing between Rail Baltica and Tunnel Euralpin Lyon Turin

CHAPTER 03

From Workshop to Best Practices

Three Practical Workshops / One year of work

03

Three Practical Workshops

1 April 2026	20 May 2026	6 July 2026	25 November 2026
Health & Safety	**Environment**	**Ethics & Anticorruption**	**Paris Forum**
First edition of “Mission S – Impulsion Lyon-Turin Engagement Forum”, Modane	Second Environmental Workshop of the Lyon Turin Engagement Forum	Third and final Workshop, dedicated to anti-corruption	Concluding event

Health & Safety

The strategic framework: Mission-S and the TELT–OPPBTP agreement

TELT has committed to a rigorous **prevention approach** and, to strengthen that commitment and make it tangible for all project stakeholders, signed a multi-year agreement with OPPBTP extending to 2033. The agreement aims to challenge existing practices and implement concrete actions that not only meet safety requirements but also create a collective prevention dynamic. Mission-S is grounded in a historical observation: over the last hundred years, falling accident rates have been driven by detailed legislation and precise rules, technological progress and new organisational approaches, but the remaining scope for improvement now lies in collective participation.

On this basis, Mission-S is a shared commitment supported by an articulated set of tools. Management and contractual instruments include the ISO 45001 management system, tender specifications and partner selection, a single health and safety coordinator, one CSPS for France and one for Italy, and the Common Operating Rules. Values and accountability instruments include the Code of Ethics, Safety Policy, Integrity and Sustainability Pact, and adherence to the Global Compact and Sustainable Development Goals. Within this framework, the parties commit to improving health, safety and comfort at work; collaborating on shared performance assessment; promptly reporting and analysing events; implementing new solutions; and cooperating on an emergency management plan.

In summary, the strategy is based on vigilance, lessons learned, and individual and collective commitment. It seeks to place safety at the heart of the project, bringing every stakeholder together around the same objective. The unifying message chosen for the day, “we are all here to look after one another”, clearly expresses the relational and shared nature of the prevention approach promoted by TELT.

> “We are all here to look after one another.”
>
> The unifying message chosen for Mission-S Impulsion

TELT’s prevention ambition

The 2025 review is structured around the two main accident indicators. The frequency rate is the number of accidents resulting in more than one day of absence divided by hours worked and multiplied by one million. The severity rate is the number of days lost through temporary incapacity divided by hours worked and multiplied by one thousand. Comparing the overall 2024 and 2025 figures shows significant improvement, with an 18% fall in the frequency rate and a 19% fall in the severity rate. Despite this progress, the message was clear: collective results are not yet satisfactory and further consolidation requires everyone to work together, as explored in the following round tables.

−18%

Accidents frequency rate, overall, 2025 figures compared with 2024

−19%

Accidents severity rate, overall, 2025 figures compared with 2024

Essential values for a shared culture

MISSION-S’S SEVEN VALUES

Unity	**Innovation**	**Rigour**	**Training**
Involvement	**Determination**	**Care**	

This framework encompasses TELT’s awareness-raising and training actions, from awareness visits organised at every site with all stakeholders present to “Sharing Safety” meetings, where internal and external representatives of the operational sites share analyses of accidents and specific issues.

Conveying the message and conditions for success

The guiding principle is that safety must be anticipated from the design stage, contractually embedded in the project and collectively governed by all stakeholders, since it is inseparable from production and overall performance. Relevant operational practices include systematically reporting accidents and near misses and adopting transparency as a guiding principle, even where this can produce apparently unfavourable indicators. Participants also identified the need to simplify procedures in order to reinforce essential rules and acknowledged differing levels of prevention maturity among project stakeholders.

A key contribution was the definition of each stakeholder's role in the prevention chain, following the model "each in their own role".

Stakeholder	Role in the prevention chain — "each in their own role"
Client	The client initiates the project, defines its financial and technical instruments and selects the appropriate parties for the nature of the operation, including works supervision, the safety coordinator and contractors, providing them with the means to act.
Works supervision	Works supervision monitors the operation so that contractors can carry it out safely, anticipates subsequent work on the asset, contributes to the special technical clauses and tender documentation, and helps establish practical cooperation arrangements.
Safety coordinator	The safety coordinator oversees implementation of and compliance with the general principles of prevention, helps prevent risks arising from simultaneous activities, prepares and monitors the General Coordination Plan and, from the design stage, compiles the file for subsequent work on the asset.
Contractors	Contractors participate in implementing the client's prevention policy, define operating methods and the measures required for safe work, provide induction, training and information, make the best use of available resources and help practices evolve through lessons learned.

Senior management placed particular emphasis on making safety the first item in coordination meetings and avoiding decisions based solely on schedule compliance. Every technical change should instead be systematically assessed for its safety impact. This is the logic conveyed by the image of a marathon rather than a sprint: sustained commitment over time, supported by a prevention culture founded on exemplary behaviour, trust and transparency, by hands-on management serving collective safety, and by the ability to recognise and disseminate good practices.

The Mission-S Impulsion 2026–2028 action plan

Mission-S Impulsion is underpinned by an action plan combining short-term measures and medium- to long-term development priorities, the latter to be implemented with OPPBTP support. In the short term, the plan provides for recognising and disseminating good practices by improving the "Sharing Safety" tool; diversifying the client's frontline presence when joint action by all stakeholders needs

to be intensified, including site information and communication; refining the procedure for sharing accident information, not as a one-way flow but as an essential contribution to continuous improvement for everyone; continuing Mission-S and Lyon Turin Engagement Forum tools; and involving works supervision teams and joint ventures in lessons learned from applying the Common Operating Rules.

In the medium and long term, the 2026–2028 plan strengthens several areas organised around key concepts.

Key concept	Medium- and long-term priorities, 2026–2028
Rules	Under "rules", the aim is to simplify, optimise and clarify non-negotiable points, improve the shared event-reporting procedure and involve works supervision and joint ventures in feedback on the Common Operating Rules.
Involvement and determination	Under involvement and determination, the aim is to enhance practices shared by all operators on major topics by implementing the Charter against drug and alcohol use, holding "Sharing Safety" meetings and organising cross-site visits led by the client.
Training and communication	For training and communication, the objective is to share initiatives and "speak the same language" through participation in safety days, the site induction kit, training and awareness visits.
Innovation	Under innovation, the plan seeks to capitalise on internal and external innovative experience through the use of artificial intelligence on site, trials of solutions originating from or developed by OPPBTP, and the sharing of good practices.

SITE

CO05

Safety training at CO 05 Site

Under the People pillar, the ELYOT consortium (CO5) has delivered additional non-compulsory skills training through a ventilation course developed with POCESS. The course was designed to strengthen operational skills in managing ventilation conditions and in understanding why they matter. It was aimed at everyone directly or indirectly involved in ventilation, from design to operations.

The first session took place in early 2026 and trained 10 people over three days, which the consortium reports as more than 400 hours. A second session for another 10 people over three days is scheduled for early 2027. The results are documented by the training contract with POCESS, the attendance sheets and the training programme. The main benefits reported are better safety performance, closer control of works and performance, and fewer risk situations. The consortium notes one constraint: the course is demanding and needs a minimum number of participants. A dedicated training platform is planned for 2027. A site is currently being selected, and the

platform will include simulators specific to underground works, focused on operating machinery in the tunnel and on the surface.

On accident prevention, an AI-based system for controlling and operating the conveyors is being introduced. Its aims are to improve conveyor operation and maintenance, reduce breakdown interventions in favour of preventive maintenance, make maintenance more systematic, and improve overall safety. The indicator used is the conveyor utilisation rate. Worker information and training on the system, and the next steps for scaling it up, have not yet been started.

On diversity and inclusion, in partnership with MELT a day dedicated to women job-seekers was organised, enriched by the testimonies of CO5's female staff. On the training front, tailored programmes lasting between one and four weeks were activated, with financial support from France Travail: five minibus drivers, eighteen assistant mechanics, ten tunnel-boring machine operators and ten Wurms operators by the end of 2027.

Completing the picture are sponsorship and patronage initiatives, from support for ski-mountaineering athlete Eliott, of the French national team, to events and sports clubs in the Haute Maurienne; together, these initiatives pursue well-defined territorial communication objectives, namely giving visibility to the site, showcasing people, strengthening the bond with the territory and supporting recruitment.

SITE

CO6-7

Implementation of safety and wellbeing measures on CO 6-7 SITES

A set of traffic management procedures has been introduced, including the implementation of one-way circulation routes and the installation of traffic lights. These actions have been supported by the enforcement of speed limits monitored by radar control, as well as the installation of anti-collision systems. Particular attention has been given to staff training and the assessment of competencies, with the goal of ensuring responsible risk management. The anti-collision systems have been adapted to the specific types of equipment used and to the particular risk levels associated with each activity. Within the CO6-7 framework, a BIM-based training model has also been developed for mechanized excavation, contributing to a more structured and risk-aware operational approach.

To strengthen fire safety on the CO6/7 project, additional fire prevention and detection measures have been implemented, including a fibre-optic thermal

monitoring system and thermal imaging cameras for the early detection and rapid management of fire risks.

Safety is at the heart of the concerns of the CO6/7 project teams. A flagship initiative, the ***Socle Prévention program***, was developed to strengthen a proactive safety culture across all project teams. This 2–3-day training course combines technical, managerial, and leadership skills and aims to:

- Reinforce the safety culture and understanding of the specific risks associated with underground works: tasks performed, air quality, lifting operations, and emergency procedures.
- Promote managerial aspects and collaborative participation: encourage active worker involvement, strengthen the shared sense of responsibility and belonging, and harmonize behaviours.

The program has involved around 1,500 participants – workers and supervisors alike – for a total of 23,000 hours and will serve, through the strengthening of basic knowledge, to achieve a lasting cultural change based on prevention and shared responsibility.

Innovation also plays a key role in training: the introduction of a **virtual reality simulator** for the installation of tunnel lining segments during tunnelling operations allows operators to safely practice complex procedures in a controlled environment. This digital tool significantly reduces on-site risks while improving technical competence and safety awareness. Workers are trained in general health and safety rules, the specific risks associated with underground work, traffic management and interactions between machinery and pedestrians, the operation of machinery, emergency procedures and production activities such as mechanised excavation and the laying of segments. The area is used on a daily basis. The reported figure is approximately 1,000 users per year, including new arrivals, visitors, operators, temporary staff and subcontractor personnel.

Worker preparation is supported by dedicated facilities: separate rooms for newcomers and visitors and a virtual training area equipped with a jumbo-driving simulator that reproduces on-site controls. Operators train progressively, without exposure to tunnel risks, under the guidance of the manufacturer's trainer, and their aptitude is assessed before they drive in real conditions. The area is used daily by around 1,000 people a year, including newcomers, operators, temporary staff and subcontractors. In addition, three **Safety Days** are organized after major holiday periods to ensure a safe return to work and to reinforce awareness of critical risks.

Health and safety are inseparable. A specific workshop on **psychosocial risks** has been set up to raise awareness about stress, emotional overload, and other psychological factors that can affect well-being and workplace safety. Led by a clinical psychologist, these sessions offer practical strategies to recognize and manage early warning signs. Nearly 800 workers have participated in awareness programs on psychosocial well-being and addiction prevention, supported by specialized organizations.

~1,500
participants in the Socle Prévention program, workers and supervisors alike

23,000
hours of Socle Prévention training

~1,000
users per year of the virtual training area

~800
workers in psychosocial well-being and addiction-prevention awareness programs

Inclusive employment and skills development also remain key priorities:

25,000+
hours of training delivered in partnership with France Travail and Mon Emploi Lyon Turin

315,771
hours of employment integration achieved, significantly exceeding the target of 200,000 hours

6,000+
hours dedicated since January 2026 to the deployment of the prevention program (Socle Prévention)

65
adapted positions created to promote accessibility and inclusion on site

- In December 2026, a smoking prevention and screening initiative will be carried out in partnership with specialized professionals

These initiatives embody a holistic approach to human sustainability, fostering motivation, safety, and team cohesion.

SITE
CO08

Artificial Intelligence for workers' safety at CO08

The People pillar includes taking care of workers' Health and safety as well. One good practice developed by CO08 was creating a practical path dedicated to new employees to show them the correct behaviour to have on site in order to safeguard

everyone's safety. This new knowledge acquired will be useful for their future employment, creating a shared cultural baggage.

The most important step regarding safety, however, is a project carried out in conjunction with TELT for implementing **the use of Artificial Intelligence** on Site for monitoring the correct and continuous deployment of safe behaviour. The aim is to strengthen risk prevention and the protection of employees, whilst ensuring compliance with data protection, confidentiality and regulatory requirements.

This project consisted of placing 7 cameras on site from June to October, in the entrance area of the tunnel's two tubes, a particularly critical location due to heavy vehicle and pedestrian traffic, the co-existence of several activities, and the storage of materials. The cameras can detect 8 potentially dangerous behaviours in real time, whilst the system is fully compliant with privacy requirements by ensuring complete data protection through automatic face blurring and the absence of any worker identification. This project represents a unicum at European level and in the next months this system will be consolidated, evaluating its employment in the other operational sites as well.

Concerning the **People** pillar, the group of companies has made significant efforts for training and improving the skills and competences of its employees. More specifically, from January to August 2026 a total of 222 technical trainings have been organised. In addition, starting from October 2026, 720h of French training for foreign workers will be deployed: a virtuous initiative that will help them integrate better in the working and living community, but also to better understand instructions. This is key to improving people's skills and increasing their competences, which will be crucial once the Lyon Turin project is over and they will have to work for other projects.



222

technical trainings organised from January to August 2026



720h

of French training for foreign workers from October 2026



7

AI cameras placed in the entrance area of the tunnel's two tubes



8

potentially dangerous behaviours detected in real time

During the year efforts focused on reinforcing the principle of "speak up early" in case of risk or potential risk of unsafe behaviour and conflict of interest through the whistleblowing system. Further details on how the three companies operating at CO08 – Implenia, NGE and Itinera – work on building a shared culture based on safety,

exemplarity, responsibility and transmission of values are provided in the next section of this paper.

SITE
CO11

Non-compulsory training and daily safety briefings at CO11

Since the start of the year, the consortium has run an additional programme of non-compulsory training. It covers health and safety as well as technical and quality skills. The programme is aimed at both site and office staff, according to the needs of each role. This includes workers, operators, team leaders, site supervisors, and technical, administrative and support staff. The courses cover:

- first aid at work (SST)
- load slinging for lifting operations
- working at height
- safe use of cutting tools and portable power tools
- fire extinguisher handling
- aggregate marking under the NF standard

Teaching combines theory, practical demonstrations, role-play, supervised exercises and discussion of real situations from the field, so skills can be applied straight away on site. In total, the programme recorded 190 participations and 43 hours of teaching, which adds up to 1,537 trainee-hours:

- first aid (SST): 63 people over 14 hours, 882 trainee-hours
- slinging: 16 people over 7 hours, 112 trainee-hours
- working at height: 35 people over 7 hours, 245 trainee-hours
- cutting and power tools: 28 people over 7 hours, 196 trainee-hours
- fire extinguishers: 39 people over 1 hour, 39 trainee-hours
- NF aggregate marking: 9 people over 7 hours, 63 trainee-hours

The results are documented by training registers, signed attendance sheets, course programmes, certificates and consolidated tracking tables. The main benefits reported are stronger safety knowledge and prevention habits for workers. For the site, the consortium reports more consistent practices across teams, better coordination and fewer incidents. Enabling factors were a shared commitment to developing skills and the very practical nature of the courses. The main obstacle is fitting training around production, scheduling constraints and team availability.

The consortium has also set up a dedicated preparation area on site. It is located near the site offices, the welfare facilities and the safety notice boards. It is equipped with:

- traffic plans and safety instructions
- operating procedures and prevention sheets
- a daily briefing board

Every morning, the site manager or team leader holds a briefing for all staff, known as the "first five minutes", before work starts. The briefing covers the day's tasks, objectives, risks and prevention measures. Topics include co-activity, vehicle and pedestrian traffic, lifting, handling, earthworks, working near utility networks and working at height. Briefings also go over PPE, site access, restricted areas and emergency procedures. Subcontractors and other external contractors join when they work in the same areas, and extra reminders are given during the day if conditions change. The consortium reports several improvements: teams are better prepared, safety culture is stronger, co-activity is easier to manage and work quality has improved. It notes that the model can easily be reproduced on other Lyon-Turin sites.

Environment

Introduction

This section brings together the progress made in environmental management across the operational sites (CO) of the cross-border section of the Turin–Lyon line, integrating the lessons learned presented by the individual joint ventures in their respective presentations during the Second Environmental Workshop of the Lyon Turin Engagement Forum, held on 20 May 2026.

The themes addressed recur across all the sites and concern water management, the control of atmospheric emissions, energy consumption, protection of the territory through the control of invasive species and the renaturalisation of spoil deposits, noise management and, finally, the relationship with local communities.



Water management



Control of atmospheric emissions



Energy consumption

Invasive species and renaturalisation of spoil deposits

Noise management

Relationship with local communities

Taken as a whole, the Workshop confirmed the validity of an integrated approach to sustainability, able to hold together environmental protection, operational performance and the relationship with the territory, and identified the sharing of lessons learned between lots as the main lever of continuous improvement.

SITE

CO3-4

Emissions reduction and energy strategy at Site CO3-4

Site CO3-4 bases its environmental action on a principle of integrated prevention, applying innovative measures designed to avert every form of pollution – of soil, water, air, light and noise – and adopting construction methods intended to minimise the impact on the surrounding environment. On the biodiversity front, the joint venture combines monitoring of neighbouring areas, aimed at countering the spread of non-native invasive species, with specific attention to the conservation of the natural habitat, a necessary condition for ensuring the reproduction and life of local fauna.

The most substantial part of the commitment, however, concerns emissions reduction and energy strategy. Electricity is purchased from renewable sources with Guarantees of Origin, while a “green” TBM operating in the tunnel is equipped with heat recovery from its own cooling circuit: this is a closed system in which cold water, introduced at around 23°C, returns at around 35°C and is reused for sanitary purposes and for space heating via radiant floors, with estimated energy savings of 1,257 kWh per day. The use of eco-sustainable materials with EPD certification is combined with LED lighting and the optimisation of electrical systems, while the fleet combines electric vehicles for staff transfers with diesel vehicles compatible with HVO biofuels, which reduce greenhouse gases and nitrogen oxides.

Particularly significant are the photovoltaic plant and the ventilation system. The former, installed on the roofs of the Salbertrand sites with 624 modules spread over 1,218 m² in a three-phase grid-connected medium-voltage configuration, generates around 288,000 kWh per year. The latter, governed by inverters and sensors that

modulate the flow rate according to temperature, humidity and gas concentration, achieves a 40% reduction in consumption, equivalent to more than 35 million kWh saved. Overall, the Scope 1 CO2eq emissions forecast for the entire life of the project are estimated at 23,637 tonnes.

1,257
kWh/day
estimated energy savings from the "green" TBM's heat recovery

288,000
kWh/yr
from 624 photovoltaic modules over 1,218 m²

–40%
ventilation consumption, more than 35 million kWh saved

23,637 t
Scope 1 CO2eq emissions forecast for the entire life of the project

Completing this approach, the site was designed as "climate proof" infrastructure: since the outdoor areas are exposed to climatic events, mitigation design features were included.

Climate exposure	Mitigation design features
Rising temperatures – with the associated risks of damage to road surfaces, structures and machinery, of fires and of discomfort for workers	Structures resistant to thermal stress, fire-fighting systems, firebreak roads and a stable temperature guaranteed by the tunnel
Increased rainfall, which can result in flooding, overflows and landslides	A drainage network sized for a hundred-year return period, retention basins and anti-landslide solutions
Wind gusts	Adequate anchoring of structures

The territorial dimension finds expression in the Territorial Pact and in the management of workforce accommodation, which at peak requires around 630 beds. The strategy pursues a balanced distribution of workers, so as to avoid excessive concentration in a single municipality, minimises induced traffic through route optimisation and the use of shared transport, with the aim of reducing or eliminating commuting emissions, and seeks accommodation solutions that do not saturate tourist capacity, instead making use of existing public and private assets. The buildings identified – disused public or private properties of public interest – are located in the municipalities of Chiomonte, Salbertrand, Susa and Oulx, and include a barracks and municipal buildings in Susa, RFI buildings in Salbertrand and private properties in Salbertrand and Chiomonte, together with further staff accommodation facilities in Bussoleno, Chiomonte, Gaglione, Novalesa, Susa and Venaus.

SITE

CO04C

Alien species oversight at Site CO04C

Operational Site 04c, relating to the Chiomonte Interchange on the Italian side of Construction Lot 1, focuses its lessons learned on soil management and, in particular, on the control of invasive alien plant species. The action is grounded in the regional regulatory framework defined by Regional Council Resolution (DGR) 46-5100 of 18 December 2012, updated by D.G.R. no. 14-85 of 2 August 2024, and translates into an Environmental Management Plan accompanying the ongoing work phases of the "La Maddalena" site in Susa, with control and environmental integration activities.

Oversight concerns the species listed in the Black List and the Management List of Annex B, including *Ambrosia artemisiifolia, Artemisia annua, Artemisia verlotiorum, Buddleja davidii* and *Robinia pseudoacacia*. The management of these species is aimed at containing their spread along the intervention area and ensuring proper environmental restoration once works are completed.

SITE

CO5

Water management at Site CO5

From an environmental perspective, CO5 is working to update the stormwater management arrangements for its construction sites by drafting a '*Porter à Connaissance*' dossier for the environmental permit in relation to the Water Act. To this end, it is taking into account the regulation of stormwater prior to discharge into the Arc. The design assumptions take into account a ten-year return period rainfall for the sizing of the drainage system. The configuration of the platform's various catchment areas is set to change: from twelve catchment areas and eight discharge points into the Arc to four catchment areas and five discharge points. In the two most affected catchment areas, five oil separators and two retention basins are planned – one for platform water and the other for roof runoff. The treatment plant's capacity is increased from 150 to 200 litres per second. The method for calculating point discharges from catchment areas uses the curve number method in accordance with the SCS Lag approach. The concentration time is estimated using the Rocha (2014) and Mockus (2001) formulas. Precipitation intensity is calculated using the Montana formula, and the ten-year peak discharge is calculated using the rational method.

Stormwater and drainage	From	To
Catchment basins (2019 → 2026-2027 horizon)	12	4
Discharges into the Arc (2019 → 2026-2027 horizon)	8	5
Treatment station capacity	150 l/s	200 l/s

SITE

CO6-7

Water management and decarbonization at Site CO6-7

The CO6 and CO7 construction sites continue to implement environmental initiatives aimed at reducing environmental impacts and promoting sustainable resource management.

Water management is at the heart of the lessons learned from CO6-7. The treatment stations incorporate a system dedicated to nitrite treatment. In 2025, 17.5% of the treated water reused on site, a figure that rose to 25.2% in the first quarter of 2026. The breakdown of consumption highlights the clearly predominant weight of treated drainage water, equal to 97.9% of the total, compared with 1.2% for drilling water and 0.9% for drinking water. Monitoring of water inflows relies on flow meters installed on the drainage pipes and on a quarterly campaign carried out at around one hundred points, measuring flow rate, pH, conductivity and temperature and performing chemical analyses of ions, metals, chemical aggressiveness and stable isotopes. The analysis aims to identify the origin of the water – from surface rainfall to deep hydrothermal circulation – and to define its aggressive character and its impact on the lining concrete and reinforcement, comparing surface data with underground data.

BREAKDOWN OF WATER CONSUMPTION AT CO6-7



25.2%

of treated water reused on site in Q1 2026 (17.5% in 2025)

Water reuse remains a key component of site operations. Recycled tunnel dewatering water (exhaure water) constitutes the main water resource used during construction activities. During the first six months of 2026, more than 421,000 m^3 of recycled exhaure water were used on the project, primarily for tunnelling operations and site activities. This approach contributes to reducing reliance on conventional water resources and supports more sustainable water management practices on site.

The second line of work concerns the **calculation of emissions and decarbonisation strategies.** In 2026, the consortium maintained its carbon management approach through the completion of a carbon footprint assessment and the implementation of a dedicated emissions reduction strategy. Particular attention was given to major sources of environmental impact, including construction materials and transport activities. The balance is built according to the GHG Protocol, covering Scopes 1, 2 and 3 and drawing mainly on ADEME emission factors and suppliers' environmental declarations, with an analysis of the emissions breakdown extended from 2022 to 2024. The action levers identified range from the purchase of recycled steel to the use of local suppliers, from the adoption of lower-impact concrete formulas to the reuse of material and the purchase of second-hand installations. On the operational level, the recovery of waste, the reuse of timber, iron and MATEX structures collected at the segment plant and the recovery of steel from the old SMP4 conveyors made it possible to avoid a total of 3,181 tonnes of CO2 between 2023 and 2024, while in 2026 a trial is under way with TransAlpes for an electric bus serving the SMP and SMM sites.

The project team also carried out an analysis of steel supply chains among its main suppliers. This work focused on material representing approximately 80% of the impact associated with steel procurement and supports the identification of future improvement opportunities. Transport-related emissions are being addressed through the use of local service providers and the deployment of vehicles operating on biofuels. Hybrid or electric vehicles already account for 30% of the company-car fleet, with a target of 100%; wider adoption is constrained by charging infrastructure and by safety restrictions in the tunnel.

> A major milestone was achieved in 2026 with both CO6 and CO7 sites supplied exclusively with electricity from renewable sources. This measure contributes directly to the project's decarbonization efforts and supports the environmental commitments established by the consortium.

Environmental performance is supported by a structured **awareness and training programme** covering topics such as waste management, accidental pollution prevention and environmental responsibilities. In 2026, the consortium also organised an Environmental Challenge involving both office and operational personnel. Teams were assessed using a standardized evaluation framework designed to identify good practices and opportunities for improvement. The initiative led to the implementation of several improvement actions across the project.

Environmental training and awareness activities continue throughout the project. Records indicate that more than 2,300 cumulative hours of environmental awareness and training have been delivered since the start of the works.

3,181 t
of CO2 avoided between 2023 and 2024

30%
hybrid or electric company cars, with a target of 100%

2,300+ h
cumulative environmental awareness and training

Through continuous monitoring of environmental indicators, renewable energy use, water reuse and employee engagement, the CO6 and CO7 sites pursue their objective of delivering major infrastructure while integrating environmental considerations into day-to-day operations.

Biodiversity protection is embedded in site methods. An ecologist attends sensitive operations; specific techniques were adopted for earthworks and conveyor foundations near protected flora; clearing is scheduled outside nesting periods; and reptile shelters have been installed at the segment plant.

SITE
CO8

Photovoltaic plant study at Site CO8

The site continued its efforts for reducing its impacts, notably emissions. In fact, the sites employ a growing number of electric vehicles: more precisely, 10% of vehicles are electric, for a total of 35 vehicles; in addition, 26% of the fleet are clean vehicles, totalling 42 vehicles.

Moreover, it uses 100% certified green energy, mainly through solar power, and carried out a feasibility study for a photovoltaic plant, starting from the consumption of the

site facilities recorded in 2024, equal to 206,718 kWh per year, and analysing four scenarios, among which the one with around 300 m² of panels was examined in depth. The first solution envisages a solar canopy, namely a modular timber structure of 300 m² with bifacial panels and twelve charging points for electric vehicles, reusable at other TELT sites and capable of operating in bidirectional charging without additional batteries; the second envisages covering the aggregate cells of the batching plant with 450 m² on a metal structure, with the dual advantage of producing energy and shading the aggregates, limiting their heating and reducing the need to cool the mixing water in the event of a heatwave. Some points nevertheless remain open: the possibility of using "Made in Europe" panels conflicts with the limited duration of the site, insufficient to amortise the investment in both economic and CO2 terms, which is why a model for making the plant available to TELT is needed to make the solution truly durable.

The site also continued its efforts to reduce its impacts on biodiversity by activities of Flora conservation and management of invasive species, such as: respect for the breeding seasons and life cycles of protected species; centimetre-level flora survey for the monitoring and protection of flora and fauna, transplanting Maurienne tulips, management of invasive plants, use of overhead conveyor belts, minimising the footprint of the construction site to take account of the current nesting period, protection of nesting flora and fauna, felling of black locust (invasive), stripping and storage of topsoil, restoration through sowing.

SITE
CO11

Water management and renaturalisation at Site CO11

CO11 manages an extensive logistics system along the Arc, between Modane and Saint-Jean-de-Maurienne, comprising five logistics platform (transit) bays, two material processing plants for the production of aggregates, an ITE plant (Installation Terminale embranchée, branch terminal), three permanent storage sites, a bypass road around Modane and sixteen kilometres of conveyor belts. In this context, water management has distinctive characteristics: unlike excavation sites, which have drainage water in quantities far exceeding their needs – practically unlimited – the CO11 sites have no clean water resources, yet must meet multiple industrial requirements: fire protection, process water for the Illaz and Moulin plants, dust suppression via misting and water tankers, and the washing of wheels, sweepers, transfer towers and workshops. To remedy this, boreholes were drilled on five

platforms, with the associated application dossiers and IOTA procedures, whilst facing distribution constraints linked to pressure losses across networks extending up to one and a half kilometres per borehole and with height differences of up to one hundred metres, to the guaranteed residual pressure for fire protection and misting systems, as well as the risk of freezing.



Platform water management must also reconcile competing needs – maximising storage surface while at the same time waterproofing circulation areas – in compliance with the doctrine of the State services, which requires that runoff not be aggravated and favours infiltration into the soil, with discharge quality control carried out according to IOTA requirements through annual and biannual sampling. Emblematic is the water recycling at the Illaz plant, where the process requirement of 1,200 m³ per day is met by the full recycling of collected water – process, cycloning and rainwater – supplemented by an additional supply of 350-600 m³ per day from two wells and a 600 m³ buffer tank, with two treatment lines.

The site's second major theme is the renaturalisation of the permanent deposits at Les Resses and Les Tierces, carried out with the aim of achieving durable results compliant with the requirements of the State services, respecting existing landscapes, reconstituting the environmental mosaic and restoring pre-works ecological functionality, so as to provide useful lessons learned for other sites. The case of Les Resses is particularly delicate because of the strong landscape perception from the main valley routes and the concurrent lack of topsoil and water, compounded by the presence of invasive alien species; the objective is to reproduce the original environments and progressively renaturalise. To this end, soil formulation tests were launched using the Microhumus technique, which employs mixtures of MATEX, silt and compost to compensate for the shortage of topsoil, along with a strategy aiming at fostering natural colonisation and soil improvement.

On biodiversity, the consortium protects plant species (wild garlic, Didier's tulip) and animal species (natterjack toad and other amphibians, small fauna and bats). Its main measures are:

- **Ponds at Les Resses:** two shallow ponds of about 100 m² for the natterjack toad and one 150 m² pond for other amphibians, with nearby shelters.

- **Conveyor redesign:** the conveyor between Illaz and Saint-Julien was redesigned with a gantry and a temporary embankment to avoid the wild garlic stations.
- **Didier's tulip:** smaller work footprints and fenced-off protection zones.
- **Small fauna:** fences that small animals cannot cross.
- **Bats:** surveys before tree clearing.

At the final checkpoint, a strong regrowth of wild garlic was observed. The ecological lighting at the Saint-Julien platform was approved during a night inspection on 21 June. Wildlife experts carry out monthly checks, and staff have been made aware of the ecological calendar and of what to do if they find a protected species. The consortium believes the sector can contribute more by using ecologists, regular monitoring, adapted lighting, refuge areas and replacement ponds.

The 30% green-vehicle target has not yet been reached across the whole fleet studied. A survey carried out within the consortium in early 2026 found an overall rate of 18.6%: 29 green vehicles out of 156 responses (19 hybrid, 9 electric and 1 biofuel). The target has been met for the ETAM and executive staff, where the rate is 32.5%. Green vehicles are defined as electric, hybrid and biofuel vehicles. The expected benefits are lower CO_2 emissions, less fossil fuel use and less local air pollution. The main constraints concern site use, especially for workers and heavy vehicles: range, payload, equipment transport, model availability and access to charging.

The transition is speeding up through transport providers that use B100 fuel. The provider SATM also has a decarbonisation plan that aims to:

- cut its footprint by 50% by 2035
- remove combustion engines from its own fleet by 2035
- replace 50% of combustion engines with electric in the fleet it operates by 2035

Field tests carried out in early 2026 for CO5, CO6/7, CO8 and CO11 were successful. The first electric 8x4 tipper truck is due in December 2026.

The consortium has also introduced a plastic-free rule, based on the principle that "the best waste is the waste that does not exist". The rule applies to the welfare facilities, canteens, offices, meeting rooms and break areas. Plastic bottles, cups and disposable cutlery and tableware have been replaced by:

- water fountains
- reusable water bottles distributed to staff
- kits with reusable cutlery and eco-cups
- reusable tableware

As a result, plastic waste has fallen, purchasing has shifted towards reusable products and staff habits have changed. Compliance is checked during site visits and inspections, and reminders are given at inductions and meetings. The consortium reports that the approach works when alternatives are simple, available and well explained, and that it should be built in from the start of a site.

Ethics & Anticorruption



The Prefect of the Auvergne-Rhône-Alpes region, Stéphan Bouillon, and the Prefect of Turin, Renato Saccone during the Signature of the Binational Antimafia Pact, on 22 February 2022 in Modane, France

Introduction

Anti-corruption is one of the pillars of the Integrity Pact signed by TELT and all partner companies, which thereby commit to identifying good practices and engaging with the entire supply chain to promote and align rules, processes, procedures and practices towards an increasingly high common standard. Within this framework, the sharing of experiences between joint ventures is confirmed as one of the main tools of collective learning, capable of transforming operational challenges into levers for improvement and innovation.

TELT's institutional and regulatory framework

Although not subject to the French Sapin II law – not meeting the size requirement of five hundred employees – TELT has voluntarily chosen to strengthen its commitment to preventing and combating corruption, already begun with the 2019 Policy against Corruption and Fraud and culminating in the adoption of an Anti-Corruption Code. Oversight of the matter is entrusted to an Ethics Committee, composed of an external chair and four directors, and to a reference structure, in collaboration with the Risk Management and Internal Control, Human Resources and Staff Representatives functions.

The **Code of Ethics** is the reference document and is conceived as an evolving instrument, last updated in December 2025 with the introduction of a paragraph on the use of social networks, guiding principles on the use of artificial intelligence, the

broadening of the protected categories and the updating of the regulatory references on whistleblowing. It is accompanied by the Anti-Corruption Code, approved by the Board of Directors on 10 December 2025, which applies to employees, temporary staff, members of the statutory bodies and third parties dealing with TELT: the document identifies the main risk situations – from relations with the Public Administration to facilitation or extorted payments, from gifts and hospitality to personnel management – and provides for sanctions in the event of a breach, drawing on French and Italian criminal law and international standards, in particular the ISO 37001:2016 standard.

At the operational level, the reporting of wrongdoing is managed through the dedicated **IntegrityLine platform**, which is secure, independent and confidential, and can be used not only by employees and addressees of the Code but also by third parties in a contractual relationship with TELT and by people working on the sites, so as to ensure broader protection and with the guarantee of anonymity to protect the whistleblower and as an incentive to report. Ongoing and planned initiatives finally include the continuation of training and awareness-raising activities – also in collaboration with Transparency International Italia – the roll-out of an intranet section dedicated to ethics, transparency and governance, including the updated Corruption Perceptions Index, and, by the end of 2026, an awareness-raising action on whistleblowing conducted directly on site, to bring the values of ethics and transparency "into the field".

REFERENCE DOCUMENT

Code of Ethics

An evolving instrument, last updated in December 2025

APPROVED 10 DECEMBER 2025

Anti-Corruption Code

Drawing on French and Italian criminal law and ISO 37001:2016

REPORTING

TELT's Whistleblowing platform

Secure, independent and confidential, open to third parties and site workers

SITE

CO5

Anti-corruption practices at Site CO5

The lessons learned from CO5, presented by the Elyot Joint Venture, stand out for the strong emphasis placed on combating mafia infiltration along the supply chain. In carrying out its contract, the joint venture subjects all of its partners to the requirements of the anti-mafia regulation, formalising and making mandatory in

those contracts' adherence to this discipline. Each month a monitoring report on the partners covered by the anti-mafia provisions is submitted to the client, covering both main contracts and minor orders: in total, 462 anti-mafia procedures have been initiated at TELT. On 27 October 2025 the Elyot Joint Venture also signed the common Ethics Charter on ethical reporting and monitoring, on the occasion of the TELT forum held in Rome, and identified four ethics officers on site, namely the project director, their deputy, the administrative and financial director and the procurement manager.

462

anti-mafia procedures initiated at TELT

4

ethics officers identified on site

78%

of managers and ETAM staff trained on site, with the objective of 100%

The second line of action concerns compliance with the Sapin II law, overseen primarily through the VIACO platform – Vitrine des Acteurs de la Construction – geared towards transparency, the fight against corruption and the modernisation of economic life. By means of a questionnaire addressed to subcontractors, service providers and suppliers, the joint venture can vet its partners under the Sapin II law, verify their ethical and corporate social responsibility compliance, give visibility to all parties involved on the site in accordance with the labour code and keep this information constantly updated. The partner selection process is structured and overseen by the Procurement department, with selection criteria defined upstream to ensure a clear, transparent and objective choice, while above a given financial threshold the selected supplier undergoes a supplementary assessment through the ViaCO analysis.

On these safeguards is grafted the construction of a genuine culture of ethics, rooted in the policies of the joint venture's companies. Dedicated training courses have been activated to raise team awareness – Eiffage GC's "Commerce et Éthique" course and Spie Batignolles GC's training on the Sapin II law – which on site have already reached 78% of managers and ETAM staff, with the declared objective of training 100% of personnel; to this are added the systematic inclusion of ethical commitment clauses in contracts and the entry of partners onto sourcing platforms with analysis of ViaCO questionnaires. The joint venture has also launched inter-site sharing initiatives, organising meetings and committees dedicated to examining all suppliers, with an analysis covering technical aspects, commercial relations and

administrative lessons learned in order to identify and report any malfunctions at every level.

SITE

CO6/7

Ethical approach and internal Alert Mechanism at Sites CO6/7

The CO6/7 Joint Venture promotes a culture of integrity and transparency through a dedicated whistleblowing system, robust compliance procedures, and targeted ethics initiatives. The framework covers all employees, subcontractors and stakeholders and includes two designated reporting officers, confidential reporting channels, training programmes on anti-corruption, competition law and conflicts of interest, as well as project-wide communication campaigns. To date, eight alerts have been reported and processed through the system, demonstrating the effective implementation of the Project's ethics and compliance framework.

8

alerts reported and processed through the system to date

2

designated reporting officers

To oversee the anti-corruption theme, sites 6 and 7 adopted a structured ethical approach, presented by Edward Clayton of Setec, centred on an Ethics Committee chaired by the Managing Director. The commitment of the Maîtrise d'Œuvre goes beyond mere regulatory compliance to become a genuine culture of integrity, cultivated at all levels of the organisation and supported by clear policies, regular training, rigorous controls and a constant drive for continuous improvement. To ensure transparency, the reference documentation was made accessible to all – the anti-corruption code of conduct applicable to the entire group, the policy on gifts and invitations with the related register of declarations, the professional alert mechanism, the Ethics Committee's rules and its annual reports – while on the training front mandatory training is provided for all staff, to be renewed every three years, with enhanced training for the most exposed roles, alongside control, awareness and support mechanisms aimed at promoting a culture of integrity and compliance.

The operational core of this approach is the Internal Alert Mechanism, presented by Yamina Haouas, project HR Director for the construction company represented by

the VINCI/WEBUILD consortium. It is a system dedicated to the collection and handling, in full confidentiality, of internal reports relating both to the site's own activities and to those of subcontractors and suppliers, complementary to the mechanisms already existing at each partner entity and to the provisions of TELT's Code of Ethics. Its scope embraces all stakeholders – employees of the joint venture's companies, subcontractors, temporary workers and third parties present on site – and covers a wide range of reports, from business ethics (fraud, corruption, conflicts of interest) to health, safety and the environment, from human rights and fundamental freedoms to labour relations, including situations of harassment, discrimination and sexist behaviour.

Operationally, the formalised procedure designates two dedicated officers – the Administrative and Financial Director and the project's Human Resources Director – and provides for alert channels articulated both at site level (with the Reporting Officer and the site HR Director) and at the level of the individual companies through the existing internal mechanisms, following a principle of centralisation and coordination. Its operation is based on a number of key principles: strict confidentiality of information, independence and impartiality of investigations, respect for the presumption of innocence, traceability of decisions and actions, protection of the parties involved and regulatory compliance, in particular with the GDPR and TELT's Code of Ethics. To support the effectiveness of the mechanism, and to foster a culture of ethics, respect and risk prevention, communication and awareness actions were deployed in the form of signage at all CO6/7 sites, publications on the intranets of the joint venture's companies and training focused on anti-corruption rules, competition law, conflicts of interest, human rights and the GDPR.

SITE

CO8

Whistleblowing mechanism at Site CO8

Site CO8, which forms the entrance to the base tunnel on the Villard-Clément side, brings together a joint venture of companies – Implenia, NGE and Itinera – on a highly technically complex site: two main tubes for a total of 5.678 kilometres of tunnel, eleven safety cross-passages, over three hundred workers, four work zones and two batching plants. The lessons learned presented by Gregor Cernic offer a combined reading of site, governance and alert culture, moving from the good practices already visible on the ground – from the sustainable base camp to the

protection of residents, from environmental management to safety culture – to translate them into concrete levers for promoting the whistleblowing mechanism.

5.678 km	11	300+	4	2
of tunnel in two main tubes	safety cross-passages	workers	work zones	batching plants

Operationally, the site structured the reporting mechanism around a few simple and credible sharing principles:

Sharing principle	How it is applied at CO8
Visibility	Visibility, with clear notices in the base camp, workshops and areas dedicated to suppliers
Multilingual messages	The multilingual nature of the messages, presented in French, English and Italian with simple wording adapted to the context
Onboarding	Integration into onboarding, with presentation of the mechanism during start-up briefings
Role of managers	The active role of managers in reminding people of the right to report and reassuring them about confidentiality
Value chain	The dissemination of information throughout the value chain, including temporary workers, subcontractors, consultants and suppliers
Monitoring and lessons learned	The monitoring and sharing of lessons learned

On this basis, the principle of "speak up early" and a culture of responsibility, exemplarity and safety are promoted.

The presentation also explores the specific contributions of the three partners, whose combination defines the CO8 approach.

Implenia

Implenia recalls the values of excellence, collaboration, performance and integrity and a central "speak up early" message, with precise expectations of staff – to know the Code and internal rules, follow the training, speak up in case of doubt or potential breach, declare conflicts of interest and cooperate fully in the event of an investigation – and visible leadership directly linking integrity, reputation and the company's success.

NGE

NGE brings the contribution of a social responsibility culture based on safety, exemplarity, responsible procurement, local impact, inclusion and transmission of values: although NGE's group reporting channel is not yet specifically deployed on site, the report describes an ecosystem conducive to developing a reporting system.

Itinera

Itinera, finally, provides the formal mechanism, namely procedure PRO_IT_15_r3 revised on 14 July 2023 and aligned with Legislative Decree 24/2023, open to a very broad range of addressees, which allows written or oral reports, including anonymous ones, through a digital platform, confidential mail or an interview, with acknowledgement of receipt within seven days and feedback to the whistleblower within three months, under the responsibility of Internal Audit and with strong guarantees of confidentiality, prohibition of retaliation and possible corrective and disciplinary measures.

SITE

CO9

SNCF's anti-corruption training plan at Site CO9

Site CO9, shares an experience described as particularly instructive, which highlighted the importance of carrying out frequent and thorough checks. The contribution is articulated on two complementary registers: on the one hand an awareness campaign with direct language – built around the slogan "Non à la corruption: apprenons à ne pas dépasser la ligne" (No to corruption: lets learn to not cross the line)– which, through short fact sheets and QR codes, invites staff to question themselves about risky behaviour in case of doubt, about conflicts of interest that may emerge following a change of role or personal situation, and about the conditions under which it is lawful to offer or accept invitations and gifts, referring back to the group's compliance mechanisms and the related training; on the other hand a structured training plan, which gives concrete form to these principles.

SNCF Réseau's 2025 training plan on combating corruption and influence peddling is set within the framework of the Sapin II law, which imposes eight prevention obligations on companies, including the training of exposed persons in line with the recommendations of the French Anti-Corruption Agency. The plan is addressed to all SNCF Réseau staff on permanent and fixed-term contracts, while temporary workers, apprentices and trainees – given the short duration of the assignment and

the absence of decision-making power – are exempt from the obligation, though they may be invited to follow its modules. The content and format are calibrated according to the degree of exposure: all staff receive general awareness training, while particularly exposed personnel are the recipients of in-depth training. The identification of exposed persons starts from the risk mapping and the "reference roles": all managers are considered exposed, while for non-managerial staff the list of at-risk roles – from the civil engineering works supervisor to the buyer, from the lawyer to the procurement manager – was updated in January 2025.

The training mechanism is articulated on three levels. An awareness module lasting around forty minutes, not compulsory, enables each employee to identify corruption and influence peddling, to know how to behave in the face of gifts and invitations, to recognise at-risk cases and to be aware of the ethical alert procedure. To this are added two genuine training modules in e-learning mode: the first, dedicated to SNCF Réseau employees in direct or indirect contact with suppliers, is compulsory and to be renewed every two years and aims to recognise at-risk situations, to master the rules on gifts and invitations, to identify the sanctions and to adopt the correct posture in relations with suppliers; the second, extended to the entire SNCF group, is compulsory for all managers and exposed employees and explores the essential concepts – corruption, influence peddling, favouritism, conflicts of interest – the risks and the criminal and disciplinary sanctions and the correct behaviours, from the anti-corruption code of conduct to the ethical alert.

SITE

CO11

Anti-corruption practices at Site CO11

At site CO11, dedicated to the management and use of excavated material, the GEME joint venture brings together different companies, including from the VICAT and VINCI groups, each with its own reference policies and codes of ethics and its own whistleblowing systems. The first anti-corruption tool consists of the requirement, for all the joint venture's suppliers, to be registered on a white list: to date 449 CO11 service providers are registered. The joint venture's external communication also always passes through the Maîtrise d'Ouvrage and, more specifically, through TELT Territoires, ensuring a single, overseen institutional channel.

449

CO11 service providers registered on the white list

0

ethics-related reports on CO11 to date

On the training front, staff are required to follow mandatory courses on ethics and combating corruption through the e-learning of their originating companies – Vicat, Eurovia and Térélian, the latter two of the VINCI group – with monitoring entrusted to the respective Human Resources functions to verify completion of the training. As regards the reporting of wrongdoing, the VICAT and VINCI groups have distinct systems: VICAT provides a form accessible from its institutional website in the section dedicated to whistleblowers, while VINCI allows access to "VINCI Integrity" via its intranet or a dedicated email address. The GEME LT joint venture undertakes to report every alert to TELT and has designated its ethics officers in the Administrative and Financial Director, as holder, and the Deputy to the QPE Director, as alternate; to date there are no ethics-related reports on CO11.

Local communities

SITE

CO5

Local integration

Alongside the technical dimension, the site has invested continuously in local integration and the territory. The podcast "Le Quart d'heure des Mauriennaises", produced with the #Mauriennisez-vous association, showcases local stakeholders and site staff; in terms of guidance, second-year students of the BUT in Civil Engineering at the IUT of Chambéry were involved through a site visit and a classroom meeting. On diversity and inclusion, in partnership with MELT a day



Students of the BUT in Civil Engineering at the IUT of Chambéry listening to a representative of CO05 during a classroom meeting

dedicated to women job-seekers was organised, enriched by the testimonies of CO5's female staff. On the training front, tailored programmes lasting between one and four weeks were activated, with financial support from France Travail: five minibus drivers, eighteen assistant mechanics, ten tunnel-boring machine operators and ten Wurms operators by the end of 2027, for an overall target of thirty people to be trained. Completing the picture are sponsorship and patronage initiatives, from support for ski-mountaineering athlete Eliott, of the French national team, to events and sports clubs in the Haute Maurienne; together, these initiatives pursue well-defined territorial communication objectives, namely giving visibility to the site, showcasing people, strengthening the bond with the territory and supporting recruitment.

SITE
CO6-7

Continuous dialogue with local communities

The **relationship with the territory** is also particularly structured: it is articulated through the "Mon Emploi Lyon Turin" recruiting initiative, the AperEco meetings with Auvergne-Rhône-Alpes-Entreprises, site visits and open days for local representatives, businesses, associations, schools and universities, as well as the Pléiade and "Mon Logement Lyon Turin" programmes, all supported by daily interaction with stakeholders.

Regular interactions take place with local stakeholders. The exchanges carried out with local partners have led to numerous initiatives, such as:

- The development of an **educational tool for students (Project Pléiade)** in partnership with the University of Lorraine,
- The organization of **economic events** with Auvergne–Rhône–Alpes Entreprises,
- More than 2,700 visitors welcomed to the project since its inception, excluding public open-day events.
- **Open days** to welcome the general public to our construction sites, and,
- Participation in **local sports events.**

The measures implemented have improved the performance in environmental protection, safety compliance, employee engagement and retention, as well as territorial integration.

The **2026 Action Plan**, in continuity with previous years, will further strengthen the development of a virtuous and exemplary construction model.

SITE
CO08

Local heritage promotion

The site has continued to support local initiatives contributing to preserving and promoting Maurienne's mining heritage. Examples include a slate festival, a slate workers' picnic, sponsorship of the Iron Mining Museum, promotion of the history

of Saint Julien Montdenis, team-building activities based on the valley's history. Great importance is given to these activities to ensure the construction site is viewed positively within the valley for the smooth running of operations and the integration of employees in the local community. For the next year the group of companies aims to open the construction site to schools, in order to turn the site into a learning environment to introduce pupils to different jobs and share the Lyon Turin experience through forums, classroom talks and technical tours of the tunnel.



Kids on a supervised working machine during the "Open doors" day, at operational Site CO08, Saint Julien Mont Denis, France

SITE

CO11

Managing local relations with integrity

A distinctive feature of CO11 finally concerns the relationship with residents, managed with particular attention to integrity and acceptance of the project. The joint venture chose to refuse any financial compensation to the residents at whose premises sound meters or noise-pollution monitoring devices were installed, favouring dialogue and obtaining their agreement and limiting itself to a symbolic thank-you at year-end. Instead of individual compensation, the site carries out investments for the benefit of the community, such as the renovation of the former Les Resses school, in the municipality of Villargondran, initially intended as a communication pavilion and subsequently reusable by the municipality. This school is a municipal building with strong local memory. It has become an information and

exhibition centre for GEME CO11 (status: in progress). The centre explains the site, the management of excavated materials, environmental checks and reuse. The consortium chose to invest about €400,000 in the existing building rather than install temporary portable cabins. It financed the renovation, brought the building up to standard and opened it to residents, elected officials, schools and local stakeholders. Once the works are finished, the building will be returned to the municipality for use by local associations. The project was carried out with the municipality of Villargondran, which owns the building and will benefit from it in the end. The consortium sees several kinds of value:

- **Cultural:** it brings a building back to life in a village marked by the destruction of 1944 and the reconstruction that followed.
- **Social:** it creates a place for welcome, exchange and education.
- **Territorial:** it leaves the municipality a lasting, renovated facility.
- **Environmental and reputational:** it renovates instead of building temporary structures and leaves a positive legacy.

The consortium believes the project shows how an operational need can become value for the local area. It also sees it as a model that other major sites can reproduce.

The joint venture also maintains measured involvement of local elected officials in the site's social events, from Santa Barbara to Safety Day and support for the local basketball team, so as to improve the perception of the project without creating conflict-of-interest situations.

One year of work: the results achieved by the partner companies

Three practical workshops brought TELT and its partner companies together in 2026, each conceived as a **structured moment of discussion and strategic alignment**.

Safety was discussed in a collective plenary session organised around three round tables and a shared action plan, while the environmental and anti-corruption themes were addressed **site by site**, through the lessons learned presented by each joint venture.

Across all three events, the sharing of experiences between lots is confirmed as **the main lever of collective learning** and continuous improvement.

TIMELINE OF THE YEAR

1 April 2026
Health & Safety
"Mission S – Impulsion Lyon-Turin Engagement Forum", Modane

20 May 2026
Environment
Second Environmental Workshop

6 July 2026
Ethics & Anticorruption
Third and final Workshop

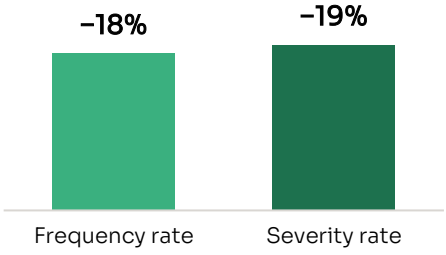
25 Nov 2026
Paris Forum
Concluding event

Health & Safety

THEME 01

Health & *Safety*

~94	3	2026–2028	2033
Participants Mission S – Impulsion, facilitated by OPPBTP	**Round tables** And a shared action plan	**Action plan** Short-, medium- and long-term priorities	**TELT–OPPBTP** Multi-year agreement extending to 2033



Accident indicators: *2025 vs 2024*

FREQUENCY RATE
Accidents with more than one day of absence ÷ hours worked × 1,000,000

SEVERITY RATE
Days lost through temporary incapacity ÷ hours worked × 1,000

> "Not a sprint but a marathon."

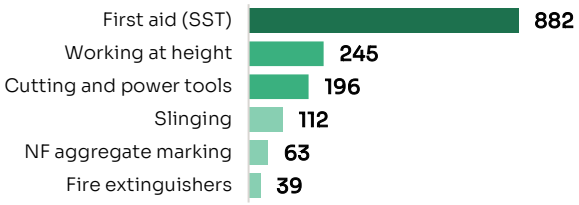
Site results

CO6-7 · HOURS OF EMPLOYMENT INTEGRATION



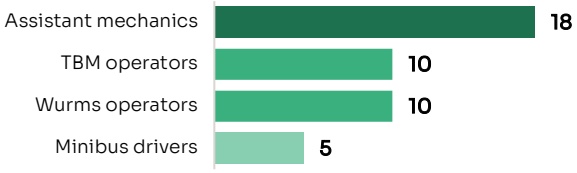
~1,500 Socle Prévention participants (**23,000** hours) · **~800** workers in psychosocial awareness · **65** adapted positions · **three** Safety Days

CO11 · TRAINEE-HOURS BY COURSE



1,537 trainee-hours · **190** participations · **43** hours of teaching (non-compulsory programme)

CO5 · FRANCE TRAVAIL PROGRAMMES, BY END 2027



CO8 · AI FOR WORKERS' SAFETY AND TRAINING

7
AI cameras
June–October, entrance of the two tubes

8
Behaviours
Dangerous, detected in real time

222
Technical trainings
January to August 2026

720 h
French training
Foreign workers, from Oct 2026

Enviroment

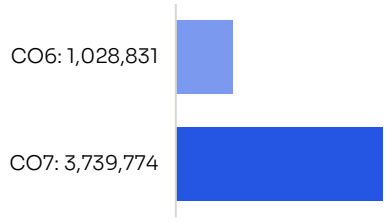
THEME 02

Environment

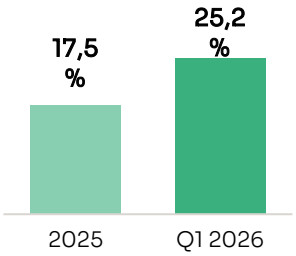
At the Second Environmental Workshop (20 May 2026), the themes addressed **recur across all the sites**: water, atmospheric emissions, energy, invasive species and renaturalisation of spoil deposits, noise, and relations with local communities.

CO6-7 · WATER AT THE HEART OF THE LESSONS LEARNED

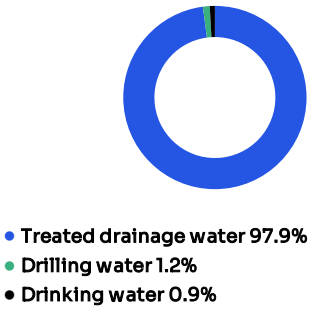
WATER TREATED IN 2025, M³



TREATED WATER REUSED ON SITE



BREAKDOWN OF WATER CONSUMPTION



421,000+ m³ of recycled exhaure water used in the first six months of 2026

3,181 t
CO_2 avoided
2023–2024, through waste recovery and reuse of materials and structures

100%
Renewable electricity
CO6 and CO7 supplied exclusively from renewable sources in

30%
Hybrid or electric
Of the company-car fleet, with a target of 100%

2,300+ h
Environmental training
Cumulative since the start of the works

CO3-4 · EMISSIONS REDUCTION AND ENERGY STRATEGY

Renewable electricity with Guarantees of Origin and a **"green" TBM** that recovers heat from its closed cooling circuit: cold water introduced at **around 23°C** returns at **around 35°C** and is reused for sanitary purposes and radiant-floor heating.

1,257
kWh per day
Estimated energy savings from the green TBM's heat recovery

~288,000
kWh per year
Around 288,000, from 624 PV modules over 1,218 m²

−40%
Ventilation Consumption; more than 35 million kWh saved

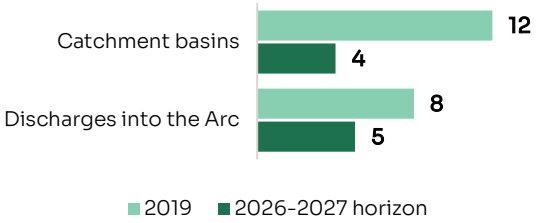
23,637 t
Scope 1 CO_2 eq
Forecast for the entire life of the project

CO5

GROUPEMENT ELYOT

Stormwater and *drainage*

Stormwater and drainage were updated through a *Loi sur l'eau* dossier, with a regulation of **15 l/s per hectare**, five hydrocarbon separators and two retention basins planned.



150 → 200

Litres per second

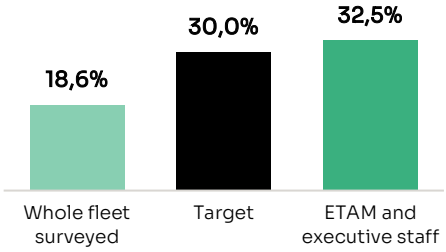
Treatment station capacity, supplemented by a station for platform water

CO11

GEME LYON TURIN

Green vehicles, water and a *plastic-free rule*

SHARE OF GREEN VEHICLES, EARLY 2026



29 OF 156 RESPONSES



- **19 hybrid**
- **9 electric**
- **1 biofuel**

Water: at the Lllaz plant, the **1,200 m³/day** requirement is met by full recycling, plus **350–600 m³/day** from two wells and a **600 m³** buffer tank.

Plastic-free rule in welfare facilities, canteens, offices and break areas: water fountains, reusable bottles, cutlery, eco-cups and tableware. Plastic waste has fallen.

Ethics & Anticorruption

THEME 03

Ethics & *Anticorruption*

At the Third and final Workshop (6 July 2026), the sites presented how they apply the **Integrity Pact** signed by TELT and all partner companies.

TELT'S INSTITUTIONAL AND REGULATORY FRAMEWORK

2019
Policy
against Corruption and Fraud

Dec 2025
Code of Ethics
Updated, incl. AI principles and whistleblowing

10 Dec 2025
Anti-Corruption Code
Approved by the Board; draws on ISO 37001:2016

End 2026
On-site awareness
Whistleblowing awareness action on site

> The sites' practices are giving concrete form to TELT's Anti-Corruption Code and Code of Ethics.

Site results

CO5 Groupement Elyot	462 Anti-mafia procedures initiated at TELT	4 Ethics officers identified on site	78% Managers and ETAM trained; objective 100%
CO6/7 Setec · Vinci · Webuild	8 Alerts processed through the internal alert system	2 Reporting officers	3 years Setec (works supervision): mandatory training renewal
CO8 Itinera procedure	7 days Acknowledgement of receipt to the whistleblower	3 months Feedback to the whistleblower	"Speak up early" Six sharing principles for the reporting mechanism
CO9 SNCF Réseau	~40 min Awareness module, not compulsory	2 years Supplier-contact module, compulsory, renewed	All Managers and exposed employees: compulsory module
CO11 GEME Lyon Turin	449 Service providers on the whitelist	0 Ethics-related reports to date	~€400,000 Invested in renovating the former Les Resses school: local investments are preferred to financial compensations

LTEF 2026 QUESTIONNAIRE

Where the sites stand on the 2026 challenges

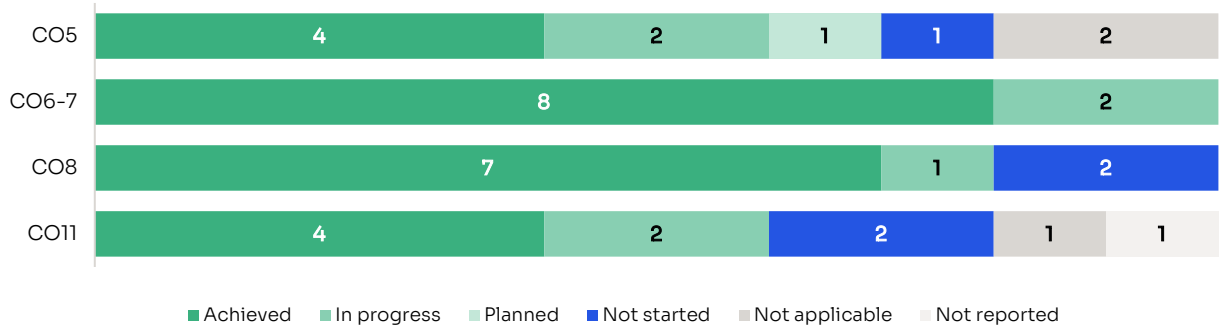
Each joint venture reported the status of its actions against the ten challenges of the Lyon-Turin Engagement Forum, across the four pillars: People, Environment, Value creation and Anti-corruption and Legality. **31 of the 40 site–challenge combinations have been taken up**, and 23 of them are declared as achieved. Every challenge has been achieved by at least one site.

31 / 40	23 / 40	5 / 40	3 / 40	1 / 40
Taken up Achieved, in progress or planned	**Achieved** Declared as completed	**Not started** No action launched yet	**Not applicable** Challenge not relevant to the site	**Not reported** No answer given

PILLAR · CHALLENGE	CO5	CO6-7	CO8	CO11
PEOPLE 40 additional hours of non-compulsory training	**Achieved** Ventilation course, 400+ h	**Achieved** 23,000 h of training	**Not started** French courses: 720 h	**Achieved** 1,537 trainee-hours
PEOPLE Training area to prepare workers for site activities	**Planned** Platform planned for 2027	**Achieved** ~1,000 users a year	**Achieved** Outdoor safety course	**Achieved** Daily briefing area
PEOPLE At least one AI system for accident prevention	**In progress** Conveyor operation system	**Achieved** Pedestrian detection	**In progress** 7 cameras, since June 2026	**Not started**
ENVIRONMENT At least 30% green vehicles	**Achieved** 38.7% of company cars	**Achieved** 30% of company cars	**Achieved** 26% of own machinery	**In progress** 18.6% of fleet surveyed
ENVIRONMENT At least +10% energy from renewable sources	**Achieved** 100% hydroelectric	**Achieved** 100% renewable electricity	**Achieved** 100% certified green	**Not started***
ENVIRONMENT Plastic-free rule on construction sites	**Not started**	**In progress** Cigarette-butt recovery	**Not started**	**Achieved** Fountains, flasks, eco-cups
ENVIRONMENT At least 5% circular materials, excluding concrete	**In progress** 3.2% (MATEX)	**Achieved** Recycled steel, reused timber	**Achieved** Reconditioned crusher	**Not applicable***
ENVIRONMENT Species-protection project proposed by TELT	**Not applicable** No project proposed	**Achieved** Ecologist on sensitive works	**Achieved*** Maurienne tulip transplant	**Achieved** Three amphibian ponds
VALUE CREATION Project to enhance historic heritage	**Not applicable** Territorial initiatives	**In progress** Territorial outreach	**Achieved** Slate-mining heritage	**In progress** Former Les Resses school
ANTI-CORRUPTION Ethics committee and common reporting mechanism	**Achieved*** TELT anti-mafia rules applied	**Achieved** 8 events handled	**Achieved** Benchmark, 6 July workshop	**Not reported**

Status as declared by each joint venture for the first question of each challenge. * Status field left blank: classification taken from the answer given.

CHALLENGES BY STATUS, PER SITE (OUT OF 10)

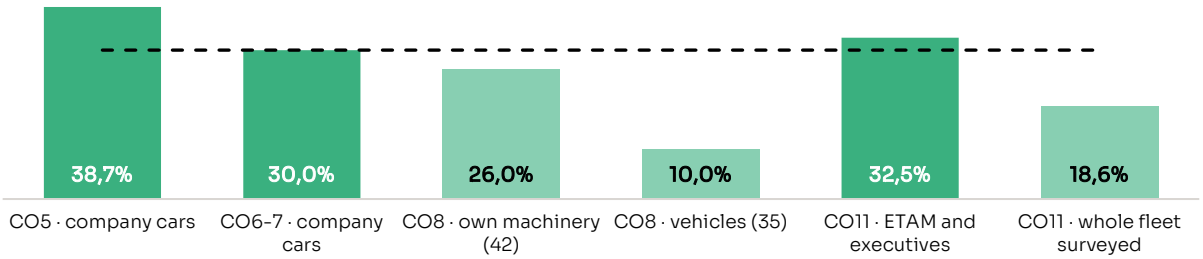


Source: LTEF 2026 questionnaires completed by the CO5, CO6-7, CO8 and CO11 joint ventures.

What the sites have measured

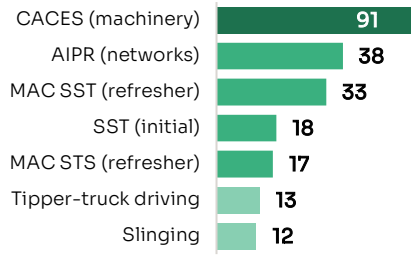
LTEF 2026 QUESTIONNAIRE

SHARE OF GREEN VEHICLES BY SITE, AGAINST THE 30% CHALLENGE



Dashed line: 30% target. Each site applies its own reference perimeter, as reported in its questionnaire; shares are therefore not strictly comparable.

CO8 · TECHNICAL TRAININGS, JAN–AUG 2026



222 trainings, plus refresher courses for electrical authorisation.

FURTHER RESULTS REPORTED BY THE SITES

100%
Renewable electricity
CO5 (local hydropower), CO6-7, and CO8 (certified Guarantees of Origin)

517
Valais fescue plants
Collected and nursery-grown at CO5; 28 frogs, 24 egg strings and 2 green lizards relocated

3
Amphibian ponds
Created by CO11 at Les Resses: two of ~100 m² for the natterjack toad, one of 150 m²

Dec 2026
First electric 8×4 tipper
Due on CO11 after conclusive field tests by SATM in Q1 2026

Source: LTEF 2026 questionnaires completed by the CO5, CO6-7, CO8 and CO11 joint ventures.



Entrance of the CO3-4, Chiomonte, Italy

CHAPTER 04

Next steps and commitments

Drug and alcohol-free commitment / Whistleblowing commitment / The artificial intelligence commitment / The Diversity and Inclusion commitment

04

As mentioned at the beginning of this paper, in the last two years TELT has engaged its partners on the topics of sustainability, ethics, safety and responsibility in the construction of the Lyon–Turin base tunnel. Companies have adhered to three commitments, engaging themselves to foster safer, drug-free worksites; to protect biodiversity and combat PFAS pollution; to strengthen transparency through whistleblowing mechanisms. These pacts/commitments are the following.

Drug and alcohol-free commitment

The commitment against drug and alcohol use has become a structured prevention system across TELT's construction sites. It rests on three mutually reinforcing pillars: shared rules, awareness-raising and testing. Every company in the contractor group of companies has incorporated the issue into its internal regulations, and dedicated site procedures complement them, such as the addiction-management procedure adopted for Lot 5A.

PILLAR 1
Shared rules

PILLAR 2
Awareness-raising

PILLAR 3
Testing

Awareness-raising starts at the safety induction of every worker on site, whether direct staff, subcontractor or service provider, and continues through dedicated "safety quarter-hours". Thematic events reinforce it, including the 2024 Safety Week, where an external trainer used interactive workshops to simulate the effects of psychoactive substances and explain their criminal-law implications, and the itinerant FASTT health truck dedicated to temporary workers.

Testing is carried out with equipment equivalent to that used by law-enforcement agencies (Dräger DrugTest 5000 and Dräger 6000 breathalysers). Tests are run on arrival, at random on entire teams, in cases of suspicious behaviour and, since 2025, systematically after any accident, and they apply without distinction of rank, from project management to operatives and temporary staff.

The results are measurable. On the CO5 lot, more than 1,100 alcohol tests and 1,160 drug tests have been carried out since the start of works, with 13 and 27 positive results respectively. On the CO6-7 lot, 1,050 people have been tested, with a positive rate of 8%.

Lot	Tests carried out	Results
CO5	More than 1,100 alcohol tests and 1,160 drug tests since the start of works	13 and 27 positive results respectively
CO6-7	1,050 people tested	Positive rate of 8%
CO11	207 tests in 2026; 16 awareness sessions run by the site nurse	99% negative results; six service providers volunteered to be tested

Drug and alcohol testing on the construction sites, as reported by each contractor group of companies.

The system has also spread to newly opened sites: within a few months of starting, the CO11 group of companies put in place a complete framework, comprising legal support, revised site regulations, testing procedures, 16 awareness sessions run by the site nurse and a psychological support service. It carried out 207 tests in 2026 with 99% negative results, and six service providers volunteered to be tested in order to set an example.

These figures also delimit the system's scope: under French labour law, the groups of companies may test only their own employees and temporary staff, not subcontractors, service providers or suppliers[12]. This legal boundary is precisely where a shared, supply-chain-wide commitment can add further value.

[12] Testing data are reported by each contractor grouping according to its own methodology (number of tests or number of persons tested, cumulative or annual) and are therefore not strictly comparable across lots. Under French labour law, screening may be applied only to the groupings' own employees and temporary staff, not to subcontractors, service providers or suppliers.

Whistleblowing commitment

As part of our discussions on initiatives to raise awareness of ethics, anti-corruption and the prevention of criminal infiltration on construction sites within the cross-border section, TELT would like to develop two complementary resources: a short video clip aimed at construction site workers and an information leaflet tailored to each consortium. The aim is to make these issues more tangible and accessible to staff on the ground, whilst emphasising that preventing corruption, adhering to ethical standards and reporting suspicious situations are everyone's responsibility. The video clip can be used for induction and awareness-raising activities carried out within each consortium. The joint leaflet, on the other hand, is distributed to workers to highlight TELT's commitments regarding ethics, anti-corruption, whistleblowing and the fight against criminal infiltration, whilst also setting out, for each group, the local points of contact and support mechanisms available.

RESOURCE 1

A short video clip

Aimed at construction site workers, for induction and awareness-raising activities within each consortium

RESOURCE 2

An information leaflet

Tailored to each consortium, setting out local points of contact and support mechanisms

> These actions reflect a holistic approach to building infrastructure with integrity and together, they illustrate how TELT and its partners are transforming a complex engineering project into a model of environmental stewardship, social accountability, and shared progress for the Alpine region and beyond.

TELT aims at continuous improvement and progress, in order to adapt to a challenging and ever-changing environment, as well as to the issues and opportunities it brings. Therefore, TELT wants to take a further step forward and launch two new pacts, to deepen commitments and the attention on emerging topics concerning safety and social sustainability.

The artificial intelligence commitment

As part of its broader mission to ensure the highest standards of safety and responsibility on the Lyon–Turin base tunnel worksites, TELT introduces a shared commitment of developing and deploying a responsible use of Artificial Intelligence (AI). In line with the provisions introduced in the latest revision of TELT's Code of Ethics, AI should be designed to support safety, risk prevention, operational excellence, transparency, and the sharing of knowledge.

This joint initiative is designed to help track, prevent and monitor safety risks on operational sites. The data and information collected can be used to analyse the root causes of incidents and therefore allow more efficient prevention. Technology will be at the service of people in order to reduce work-related risks and accidents and to foster knowledge sharing.

Just like the Drug and Alcohol-free commitment, this initiative is part of a broader strategy aimed at protecting health and safety, placing people's well-being and the integrity of operations at the centre.

Moreover, this commitment and the related operational projects represent a unicum at European level, demonstrating how the Lyon-Turin base tunnel is both an ambitious and innovative project, representing a new generation of infrastructure and value creation.

Applicable European regulatory framework

With the adoption of Regulation (EU) 2024/1689 (AI Act), the European Union has established the first harmonised regulatory framework for the development and use of Artificial Intelligence. The Regulation was subsequently updated by Regulation (EU) 2026/1744 (Digital Omnibus on AI), which amended the application timeline of certain provisions. Regulation (EU) 2016/679 (GDPR) continues to ensure the protection of personal data processed through Artificial Intelligence systems.

Reference	Content relevant to the Charter
Regulation (EU) 2024/1689 – AI Act	Establishes harmonised rules for the development, placing on the market, putting into service and use of AI systems in the European Union. It promotes human-centric and trustworthy AI, protecting health, safety, fundamental rights, democracy, the rule of law and the environment. The subsequent Regulation (EU) 2026/1744 – Digital Omnibus on AI updates certain provisions and deadlines.
Article 4 AI Act – AI literacy	As amended by Regulation (EU) 2026/1744, requires providers and deployers to take measures to support the AI literacy of their staff and other persons operating or using AI systems on their behalf (applicable since 02/02/2025).
Article 5 AI Act – prohibited practices	Identifies AI practices that are not permitted in the European Union. Every use case must be verified prior to purchase, development, putting into service or use.
Article 50 AI Act – transparency	Introduces information and transparency obligations (applicable from 02/08/2026) for certain AI systems, including systems that interact directly with people and systems that generate or manipulate synthetic content.

The Diversity and Inclusion commitment

In the past two years TELT and the companies involved in the project have put in place growing efforts to promote diversity and inclusion at company level and on the operational sites. Through a structured program of tools, initiatives, and events, TELT fostered active employee engagement, encouraged cross-functional dialogue among its departments, and promoted values such as inclusion, accountability, and collaboration, thereby contributing to the creation of an increasingly informed, participatory, and responsible working environment. In 2023, TELT issued its "Diversity and Inclusion" Policy, designed to foster an inclusive workplace and promote the value of all employees' skills and talents through dedicated actions. Through these efforts we have achieved an improvement in the gender equality index and a new model of competence.

But attention was also given to the communities living in the territories affected by the project. During the year meetings with local authorities and affected stakeholders were organized, with the aim of increasing awareness and understanding of the project. On both the Italian and French sides, support measures for construction sites and local communities continued in the areas of employment and training, development of local and regional economic fabric, housing, research and innovation, energy transition, revitalisation of urban centres located near railway stations, quality of life, and sustainable mobility.

TELT is also a member of the **Diversity & Inclusion Observatory of the UN Global Compact Network Italia**, a working group that brings together Italian companies and organisations adhering to the UN Global Compact to explore Diversity, Equity & Inclusion topics in depth, compare approaches and exchange good practices, with contributions from the International Labour Organization (ILO) and the Italian Association for Personnel Management (AIDP). Through its participation, TELT contributes to and benefits from a shared reflection that, over the years, has led to five publications, including operational guidelines to measure D&I actions within companies and a handbook on foreign workers and the value of diversity. More specifically, TELT has shared its best practices in the following Practical Guidelines:

- "How to monitor and measure DE&I"
- "How to develop a DE&I policy"
- "How to monitor DE&I"

In 2026, the Observatory's activities focused on the topics of internal and external backlash against DEI, neurodiversity and talent enhancement, topics that TELT intends to further integrate into its own initiatives and into the commitments shared with its partners.

> The new pact on the promotion of Diversity and Inclusion goes in this direction, aiming to further enhance the attractiveness of our professions, promoting collective innovation, and supporting the long-term sustainable performance of our organizations. With this pact we want all companies to engage even further on these commitments, by strengthening and developing even more the actions they have already put in place.

Conclusion

The Lyon-Turin project represents more than a major European infrastructure investment: it is a long-term commitment to a more connected, sustainable and resilient European transport system.

The companies involved in the project share a responsibility that goes beyond the delivery of infrastructure. Through their activities, choices and partnerships, they contribute to shaping the project's wider economic, social and environmental impact. This commitment requires a continuous effort to promote sustainability, innovation, safety, integrity, inclusion and dialogue with local communities.

The signatories of this position paper therefore reaffirm their willingness to act collectively and responsibly throughout the project's development and operation. They recognise that the success of the Lyon-Turin project will also depend on the ability of the business community to work together, share good practices, anticipate challenges and turn common commitments into measurable actions.

By joining forces, companies can help ensure that the Lyon-Turin becomes not only a strategic European transport link, but also a concrete example of how major infrastructure projects can create lasting value for people, territories and future generations. Our commitment is therefore clear: to build together, responsibly and sustainably, the conditions for the Lyon-Turin project to deliver its full potential for Europe and the territories it connects.

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