2024

ENVIRONMENTAL REPORT

adif
ALTA VELOCIDAD

2024 ENVIRONMENTAL REPORT INDEX

APPENDICES

1. BRIEF INTRODUCTION OF THE COMPANY

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Adif-Alta Velocidad was established on 31 December 2013, by Royal Decree-Law 15/2013[1], which provided for the division of Adif into two public business entities based on principles of rationalisation, efficiency, and budgetary stability.

Pursuant to Art. 23 of the Railway Act (Law 38/2015[2]) and as laid down in the Royal Decree 1044/2013[3] of 27 December2004, approving the Statute of Adif-Alta Velocidad thereunder, the following functions - among others - correspond to Adif-Alta Velocidad:

- Approval of basic and construction projects for railway infrastructures.
- The administration of the railway infrastructures it owns and those entrusted to it.
- The provision of the minimum access package to the railway infrastructure and to put in place the coordination mechanisms.
- Control, monitoring and inspection of the railway infrastructure it manages, as well as of its protection areas and of its railway traffic.
- The allocation of infrastructure capacity to railway undertakings and other applicants who so request.
- The provision of basic, complementary and ancillary services to rail transport services.
- The determination, revision and collection of charges for the use of railway infrastructures.

This network is primarily built according to European technical specifications for interoperability, enabling seamless rail services to and from Spain, connecting with the broader European rail network. Its main function is to provide a safe, reliable, and efficient railway system, adding value and emphasizing sustainability as one of its core principles.

Spain's current economic and social situation is marked by the European funds for the reconstruction and recovery of countries, which was approved after the pandemic. Spain has the opportunity to carry out a strong economic, digital, social and ecological transformation, which should also serve as a basis for the definition of Adif and Adif-Alta Velocidad's strategic lines of action that will benefit from this transformative momentum. Its lines of action include moving towards the decarbonisation of the economy, clearly contributing to the emission reduction targets set by Agenda 2030 and Spain's National Energy and Climate Plan 2030.

Moving towards the decarbonisation of the economy is one of Adif-Alta Velocidad's main lines of action

In recent years, Adif-Alta Velocidad has evolved from a business model based on the key but rather complementary role played by Corporate Social Responsibility, which was sometimes separated from the strategy of the company, to a model in which the Corporate Responsibility and Sustainability strategy equals the Business Strategy.

! Adif Alta Velocidad aims to contribute to specific sustainable development goals in accordance with the United

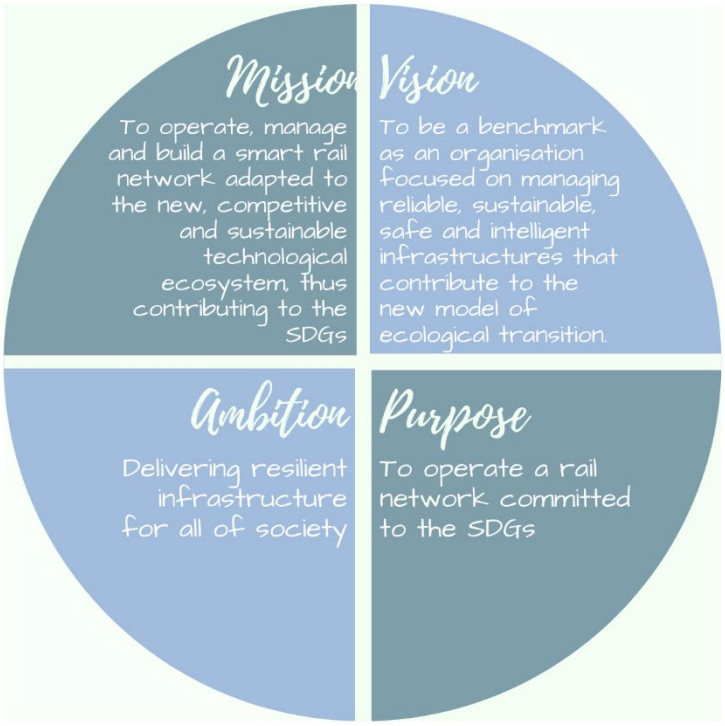
[1] Royal Decree Law 15/2013 of 13 December 2013 on the restructuring of the State-owned company 'Administrador de Infraestructuras Ferroviarias' (Adif) and other urgent economic measures (BOE No. 299 of 14 December 2013).

[2] Law 38/2015 of 29 September 2015 on the Rail Sector (BOE No. 234 of 30 September 2015) and its amendments.

[3] Royal Decree 1044/2013 of 27 December, approving the Statute of the Public Business Entity ADIF-Alta Velocidad (Official State Gazette (BOE) No. 311, 28 December 2013).

Nations 2030 Agenda and public policies promoted by the Ministry of Transport and Sustainable Mobility and the Spanish Government.

With this approach and a defined corporate purpose, Adif-Alta Velocidad defines the Entity's Vision and Mission.



2. COMPANY'S ENVIRONMENTAL STRATEGY

2. COMPANY'S ENVIRONMENTAL STRATEGY

3-3

In 2019, a process of reviewing and updating the business strategy was carried out through the formulation of the 2023 Strategic Plan (SP 2030), which aims to optimise the competitiveness and sustainability of Adif and Adif-Alta Velocidad in the railway infrastructure management and operation sector, responding to the challenges of the future. This Plan is aligned with the European Funds, Spain's Recovery and Resilience Plan, Spain 2050 national long-term strategy, the Safe, Sustainable and Connected Mobility Strategy of the Ministry of Transport, Mobility and Urban Agenda (MITMA), and the United Nations Sustainable Development Goals (SDGs).

SP 2030 is based on four pillars: safety, service, sustainability, and results orientation, which are fully aligned with the mission, vision and values of the institution. These pillars are driven by three levers that will stimulate their achievement: communication, innovation, and digital transformation. People, considered as the drivers of the Plan, are the pillars and the levers.

SP 2030 places the environment and climate as one of the priorities of the business strategy through the pillars of safety and sustainability - understood as a commitment to present and future generations -, which promote actions that guarantee the well-being of people in a healthy environment. These pillars are specified in a series of strategic and tactical objectives that develop Adif and Adif-Alta Velocidad's commitment to the environment.

As part of this process, the tools with which the sustainability objectives are achieved have been defined:

- Plan to combat climate change
- Circular economy plan

These plans are specified in the strategic initiatives. In addition, there is a separate strategic initiative: the responsible public procurement project.

Sustainability pillar	
Strategic objective 1: Becoming a benchmark in contributing to the energy transition - To develop an energy community	
Lead the way in reducing environmental impact through transport electrification, more efficient energy management, renewable energy sourcing and the use of other sustainable and recycled materials.	Tactical objective 30: Enhance the responsible and sustainable energy positioning of rail transport.
	Tactical objective 31: Contribute to environmentally friendly transport and to the responsible use of resources.
Strategic objective 2: Fight the effects of climate change (achieving net zero emissions by 2050)	
Strengthen the commitment of Adif and Adif-Alta Velocidad in the fight against climate change by allocating actions aimed at climate neutrality by 2050 in line with the European Strategy.	Tactical objective 32: Contribute to environmentally friendly transport and to the responsible use of resources.
	Tactical objective 33: Adapt entity's assets to environmental requirements.
	Tactical objective 34: Increasing the use of smart and sustainable materials to improve the resilience of the infrastructures.
Strategic objective 3: Restoring nature and biodiversity	
Ensure the protection of nature and develop measures that contribute to reversing the degradation of ecosystems, reducing pressure on biodiversity.	Tactical objective 35: Increasing the use of smart and sustainable materials to improve the resilience of the infrastructures.
Strategic objective 4: Promoting a culture of climate change awareness	
Raise awareness among our internal and external stakeholders of the fight against climate change by shaping a culture that promotes rail as a more sustainable mode of transport, favours energy efficiency, and works to reduce their carbon footprint. Encourage the use of an economic and social system that is committed to optimising resources through alternatives that promote circular economy models.	Tactical objective 36: Raise stakeholder awareness of climate change issues.
Strategic objective 6: Reach new revenue lines through energy transition opportunities - contribute to the development of sustainable finance	
Achieve the development of new lines of business derived from investment opportunities in self-consumption systems that will enable Adif and Adif-Alta Velocidad to obtain greater energy independence.	Tactical objective 38: Develop services that promote the use of sustainable modes of transport.
Safety pillar	
Strategic objective 6: Strengthening environmental protection	
Keep promoting an activity that ensures comprehensive environmental safety, taking preventive measures to mitigate threats and reduce the environmental risks and impacts, which derive from the effects derived from our presence in the environment.	Tactical objective 11: Undertake actions that reduce the environmental impact of Adif and Adif-Alta Velocidad, minimise risks, and ensure comprehensive environmental protection.

Environmental objectives of the sustainability pillar and the security pillar (excerpt from SP 2030)

For the monitoring of the SP 2030, a set of strategic indicators has been defined for each pillar. The strategic indicators of the environmental dimension of the sustainability pillar are reduction of greenhouse gases (GHGs) emissions and improvement of energy efficiency.

Table 1. Indicators of the environmental dimension of the sustainability pillar *

	2022	2023	2024
GHGs emissions reduction (t CO_2eq)	15,426	15,620	15,652
Energy efficiency improvement (GWh equivalent)	123.60	125.17	125.43

* Base year 2009.

Source: Management Report, financial year 2022 Adif-Alta Velocidad.

Adif-Alta Velocidad's Code of Ethics and Conduct is the guide for ethical and responsible behaviour for people working at Adif-Alta Velocidad, regardless of the area or corporate department in which they work.

The Code translates Adif-Alta Velocidad's values, principles and commitments to conduct into guidelines for behaviour. It takes into account its nature as a public business entity and the applicable regulatory framework. At the same time, the Code expresses Adif-Velocidad's commitment to its stakeholders (groups or persons with whom it relates, including employees, customers, providers, contractors, operators or third parties) regarding the ethical model towards its management and efforts.

The commitments to conduct set out in the Code also include respecting and preserving the natural environment and cultural heritage, as part of its responsibility as a company and in order to respond to the requests of its stakeholders.

Respect for the natural environment has become one of the priorities of advanced entities such as Adif-Alta Velocidad, and it plays a key role regarding the technical and economic effort to modernise railway services from an environmental and service quality perspective.

Adif-Alta Velocidad identifies the existence of environmental effects associated with the maintenance of the railway infrastructures it owns, as well as the ones whose administration has been entrusted to it by the State. These effects are also produced by transport operations carried out on them and by the creation of new lines.

The Environmental Policy, revised in 2024, is the highest-level document regarding Adif-Alta Velocidad's environmental commitment, in line with the General Procedure for the Management and Coordination of Environmental Activities (ADIF-PG-109-001-001).

Environmental Policy of Adif - Alta Velocidad

1. Promote commitments to the continual improvement of environmental performance based on the implementation, audit and periodic certification of its environmental criteria, based on the ISO 14001 standard, specifying the responsibilities, as well as the internal tools for its control and monitoring.
2. Ensure that the works act in accordance with legal compliance obligations, as well as other applicable requirements, and in collaboration with the official organizations in charge of its supervision.
3. Define internal procedures that, based on the precautionary principle, guarantee environmental protection and pollution prevention, during all phases of the life cycle of railway infrastructure and facilities, while promoting the transition to a circular economy that optimises the use of resources.
4. Achieve the environmental integration of the railway while maintaining the utmost respect for natural spaces and cultural and archaeological heritage, protecting biodiversity and ecosystems, preserving the landscape and all its values, and restoring any environments that may have been affected.
5. Develop energy efficiency improvement plans that reduce energy consumption and GHG emissions in the construction, maintenance and operation of railway infrastructure and facilities.
6. Rationalise the consumption of natural resources and raw materials, minimise the generation of waste, wastewater and soil contamination, recover any contaminated soil, and adopt all technically and economically feasible measures to reduce noise and vibration impact.
7. Require identical degree of environmental commitment from subsidiary companies, contractors and suppliers, by signing the corresponding contractual agreements and defining the necessary criteria to carry out sustainable public procurement.
8. Determine the environmental risk and opportunities associated with all its activities, focusing especially into issues related to Resilience to Climate Change in all railway infrastructures and facilities.
9. The conservation, protection and improvement of the environment requires the active collaboration of all employees, for which specific environmental training and awareness programmes will be implemented for Adif and Adif Alta Velocidad staff.
10. Promote commitment to the environment from upper management. Provide the human, financial and material resources necessary to ensure compliance with these commitments and communicate the results of its environmental management publicly and periodically, in the interests of transparency.

* Revised in 2024

What is Expected from Adif-Alta Velocidad?

1. We must follow internal procedures and recommendations to improve the environmental performance of Adif-Alta Velocidad, comply with all environmental laws relating to our activities, and collaborate with the relevant Official Bodies for supervision.
2. We must assess the environmental risks of our activities and processes, considering potential damage to the entity's reputation or serious breaches of environmental legislation, internal rules, and procedures.
3. We should continuously seek ways to improve our work to minimise our environmental impact. Suggestions for improvement in this area are always welcome.
4. We will strive to reduce the use of toxic, polluting, or hazardous materials, replacing them with more environmentally friendly alternatives whenever possible.
5. We must take necessary measures to preserve energy and natural resources, avoiding unnecessary waste and using only what is needed for our work.
6. We will minimise pollution by reducing, reusing, and recycling waste and wastewater, and we will act with the utmost respect for protected natural areas, fostering awareness of these issues among colleagues.
7. Finally, we will actively participate in environmental initiatives and activities that raise awareness of the natural environment, supporting Adif-Alta Velocidad's relationship with organisations dedicated to nature conservation.

3. MAIN ACHIEVEMENTS

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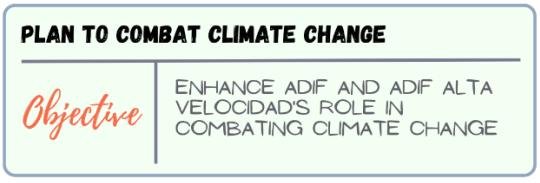
PLAN TO COMBAT CLIMATE CHANGE (PCCC)

3-3

Adif and Adif-Alta Velocidad's PCCC 2018-2030 is part of the Strategic Plan 2030 (SP 2030). It is embedded in the sustainability pillar, which has several strategic objectives related to the fight against climate change. It also advocates for a mode of transport which is environmentally friendly and which makes responsible use of resources.



The PCCC takes advantage of the knowledge and experience acquired with the Energy Saving and Efficiency Master Plans that have been developed in Adif and Adif-Alta Velocidad since 2009. PCCC replaces those.

The PCCC aims to go beyond energy efficiency, including measures to decarbonise the railway system and to increase the use of renewable energies. It also aims at improving the resilience of railway infrastructures. Its time scope is 2018-2030, setting specific targets for energy savings and GHGs emissions reduction for 2020, 2025 and 2030 milestones.

It is structured in 5 lines of action that are deployed through 17 programmes and 56 projects to achieve the mitigation, adaptation and culture, and awareness objectives. The lines of action are the following:

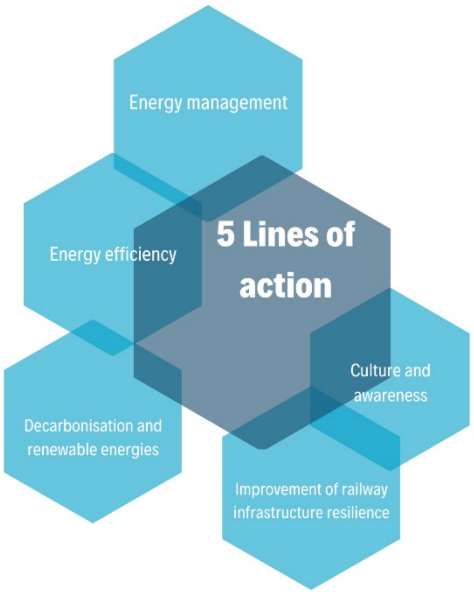


Figure 1. Lines of action of the PCCC

In addition, specific targets encompassing the aforementioned objectives.

Adif-Alta Velocidad, in line with the management entrustment agreement signed by the two entities, advises Adif on energy saving and efficiency and coordinates the implementation and monitoring of the PCCC.

Several tools have been defined to monitor the implementation of this Plan:

- Joint bi-annual meetings to assess the progress of the various initiatives.
- Completion of the format established by the Corporate Strategic Plan Sub-Department for the strategic initiatives that shape the SP 2030.
- Establishment of a global report, as well as specific reports by area specifying the degree of implementation of the actions included in the PCCC.

With this Plan, Adif and Adif-Alta Velocidad are aligned with the main existing international

commitments in the fight against climate change, contributing both to the achievement of United Nations 2030 Agenda SDGs (specifically goal 13 "Climate Action") and the agreement reached by the signatory countries under the Paris Agreement. Likewise, the ultimate goal is to achieve carbon neutrality by 2050. Adif and Adif-Alta Velocidad have pursued this objective since they joined the International Union of Railways (UIC) 2019 Climate Responsibility Pledge.

The PCCC is a living document. The main projects under development are: the Energy Self-consumption Plan (installation of photovoltaic solar panels for self-consumption with and without surplus), the installation of charge points for electric vehicles, the implementation of railway lines, the replacement of diesel C boilers with less polluting technology and energy guidelines, among others.

In addition, in 2022, ***a climate risk related to the adaptation of railway infrastructure to combat the adverse effects of climate change*** was identified and included in the Risk Map, both at Adif and Adif-Alta Velocidad level.

Adif and Adif-Alta Velocidad are conducting studies on the adaptation of the entire railway network to the adverse effects of climate change, applying an internal methodology developed to analyse vulnerability, risk and adaptation to the effects of climate change (Internal Standard NAG 4-0-0.0). This methodology involves an analysis of resilience, both for railway infrastructure components and railway services, identifying the potential impacts associated with projections of different climate variables. Based on the risks identified, adaptation measures are proposed to improve resilience. These analyses are carried out with a triple time horizon: near future (2011-2040), medium-term (2041-2070) and distant future (2071-2100). The latter horizon covers the useful life of the infrastructure components.

1 Reduction of energy consumption

The consumption savings targets are estimated based on the following categories:

- Uses Traction (UT): Projects that focus on energy used for train traction.
- Uses other than Traction (UOT): Projects that address energy used for other requirements (such as lighting, air conditioning, etc.)

The cumulative reduction in energy consumption for the period 2018-2030 is estimated to total

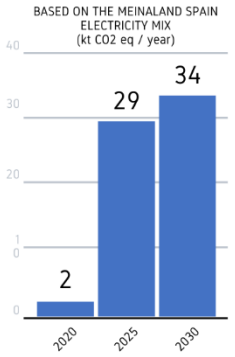
2,900 GWH

ANNUAL ENERGY CONSUMPTION REDUCTION TARGET (GWH/YEAR)

	2020	2025	2030
UT Uses Traction	5.4	119.8	135.9
UOT Uses other than Traction	4.0	12.0	20.0
TOTAL	9.4	131.8	155.9

2 Reduction of GHG emissions

To define the GHG reduction target for the railway system, a dual calculation was made: one based on the meinaland Spain electricity mix and the other based on the electricity market with the purchase of green energy. In 2019, both Adif and Adif Alta Velocidad chose to purchase green energy with Guarantee of Origin Certificates (GoO).



The cumulative emissions reduction by 2030 is projected to be

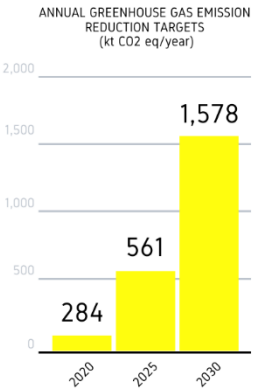
777 kt CO2 eq

BASED ON THE MEINALAND SPAIN ELECTRICITY MIX

3,700 kt CO2 eq

BASED ON THE ELECTRICITY MARKET WITH THE PURCHASE OF GREEN ENERGY

To calculate the GHG emissions avoided through modal shift, increases in the modal shares of both freight and passenger rail transport have been estimated. This estimation is based on a scenario aligned with the objectives of the White Paper on Transport, as well as those established by the European Union and the International Energy Agency. It also takes into account all planned actions included in the Plan that are expected to support these increases.



Cumulative emission reductions from modal shift by 2030 are estimated to exceed

8,400 kt CO2 eq

TOTAL CUMULATIVE GREENHOUSE GAS EMISSION REDUCTION (2030)

9,100 kt CO2 eq
BASED ON THE MEINALAND SPAIN ELECTRICITY MIX

12,000 kt CO2 eq
BASED ON THE ELECTRICITY MARKET

PURCHASE OF GREEN ENERGY (GoO)

3 Improvement of railway infrastructure resilience

In relation to adapting to the adverse effects of climate change, the targets set refer to the number of railway infrastructure projects that include a specific section for assessing vulnerability to these impacts.

		2020	2025	2030
% of major projects with climate change adaptation assessment		100%	100%	100%
% of projects subject to monitoring with climate change adaptation assessment	New construction	75%	90%	100%
	Renovation, stations, and terminals	50%	75%	100%
	Maintenance	25%	50%	100%
% of maintenance works not subject to supervision, where maintenance specifications include climate change adaptation assessment		25%	50%	100%

4 Culture to combat climate change

The targets for raising awareness and engaging our stakeholders, both internal and external, are based on the progress of various planned actions in this area.

	2020	2025	2030
% of parking spaces equipped with electric vehicle charging points available to employees	3%	5%	10%
% of contracting specifications that include clauses related to climate change, where applicable	50%	100%	100%
% of investment allocated to cultural projects compared to the total planned investment	20%	60%	100%

Figure 2. Objectives and targets of the PCCC 2018-2030 (base year used for the quantification of targets: 2016)

Monitoring the implementation of actions to combat climate change

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Adif and Adif-Alta Velocidad work together in the implementation of energy efficiency and climate change actions derived from successive plans. Therefore, the results shown in this section might occasionally be the same for both entities.

From 2009 to 2024, a total of seven hundred and thirty-two measures have been implemented in Adif and Adif-Alta Velocidad for energy saving and efficiency, renewable energy generation systems, and the fight against climate change.

The set of actions carried out by Adif and Adif-Alta Velocidad between 2009 and 2024, within the framework of the successive energy saving and climate change plans, prevented the release of 213.883 kt of CO_2.

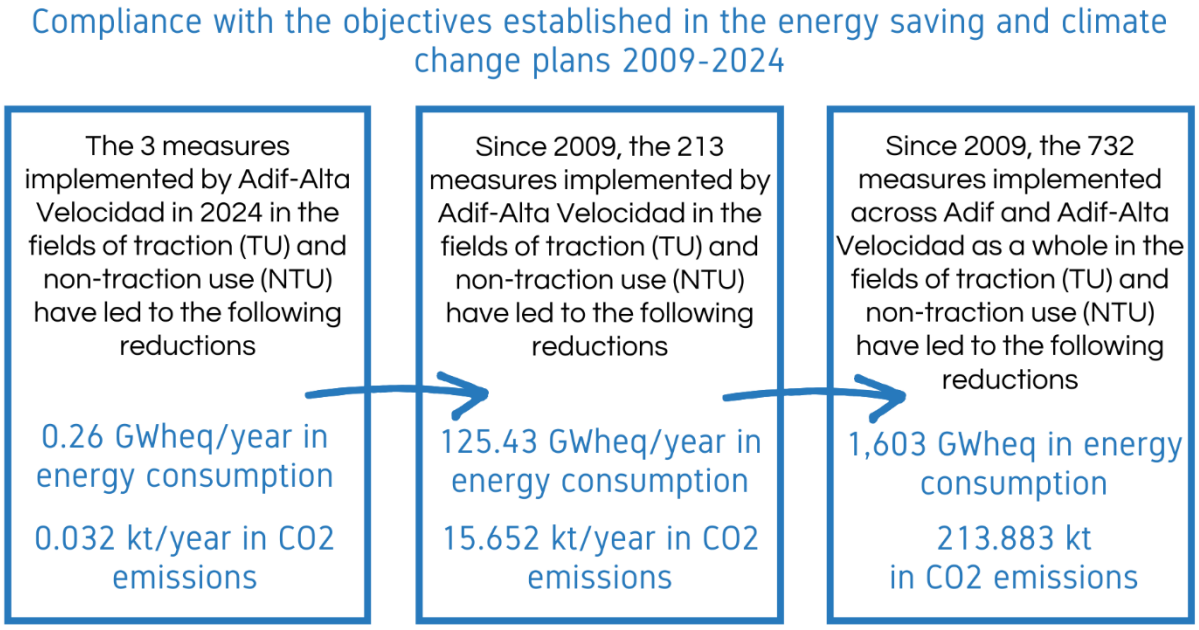


Figure 3. Reductions achieved with the implementation of actions to improve energy efficiency and to combat climate change in Adif and Adif-Alta Velocidad since 2009

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department

The actions carried out within the framework of the successive energy saving and climate change plans focus on energy efficiency and renewable energy actions in specific areas: stations, offices, logistics facilities and other facilities.

In addition, six hundred and sixty-one vehicles for railway infrastructure maintenance operations have been renewed.

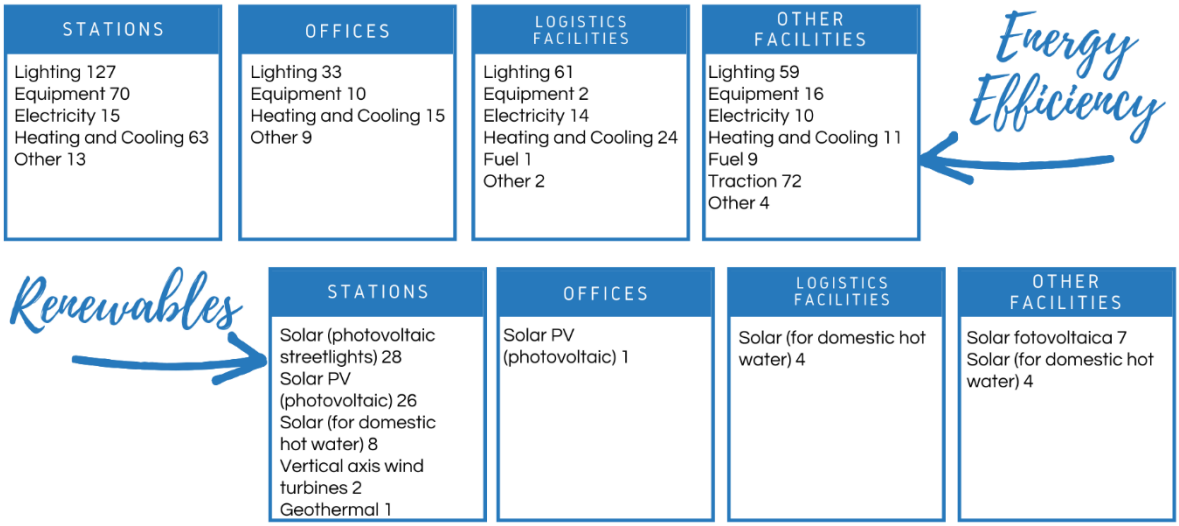
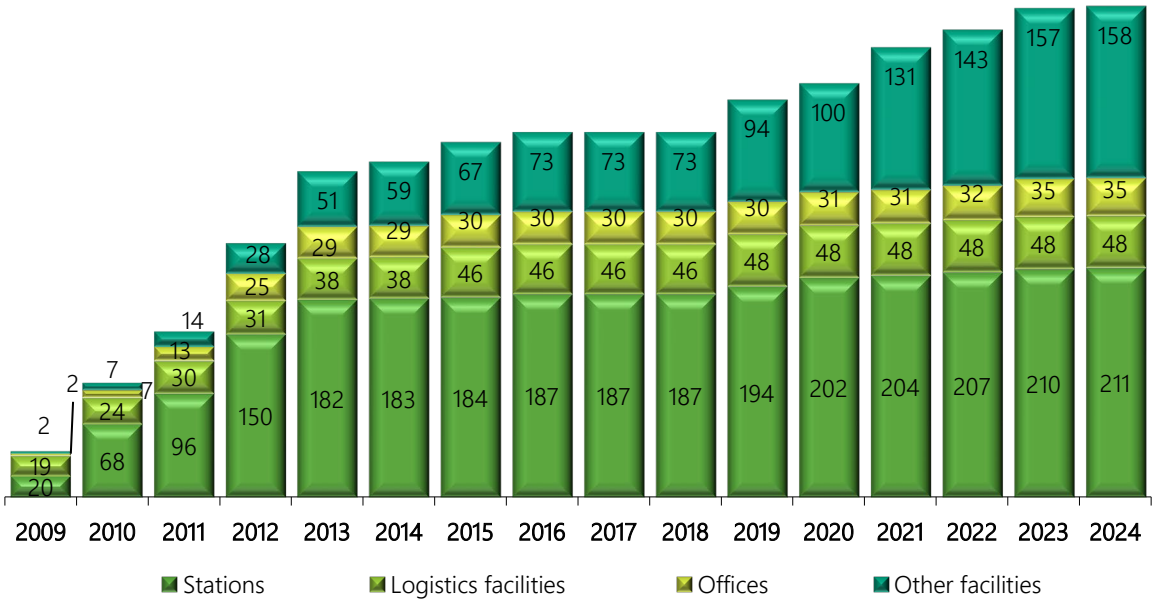


Figure 4. Actions carried out by 31 December 2024 within the framework of Adif and Adif-Alta Velocidad's Action Plan for Energy Saving-Efficiency and Renewable Energy Generation Systems

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department

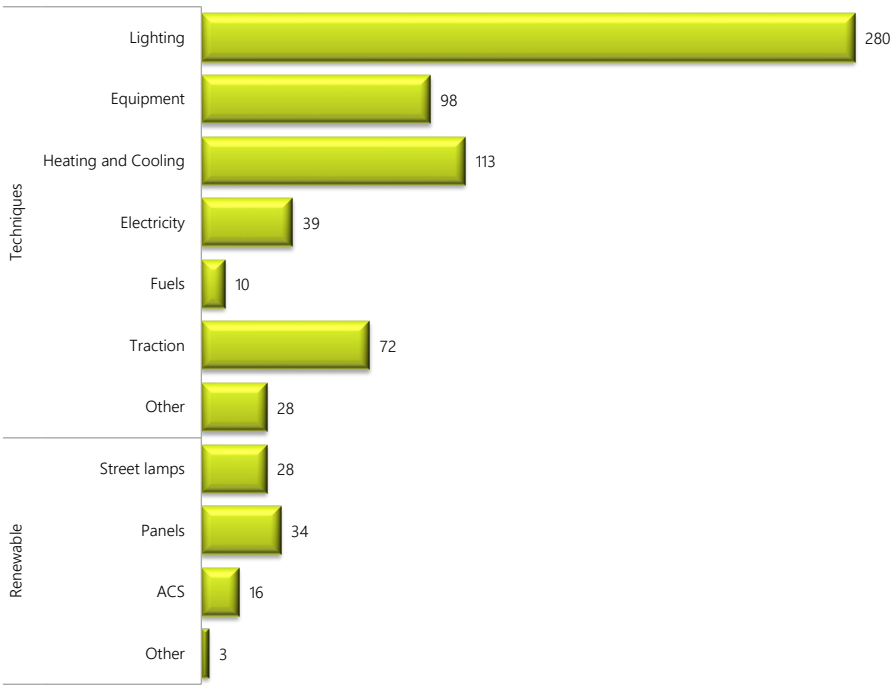
Chart 1. Facilities where technical or renewable measures have been implemented in Adif and Adif-Alta Velocidad (No. of facilities) *



** Data modified in relation to the 2023 Environmental Report.*

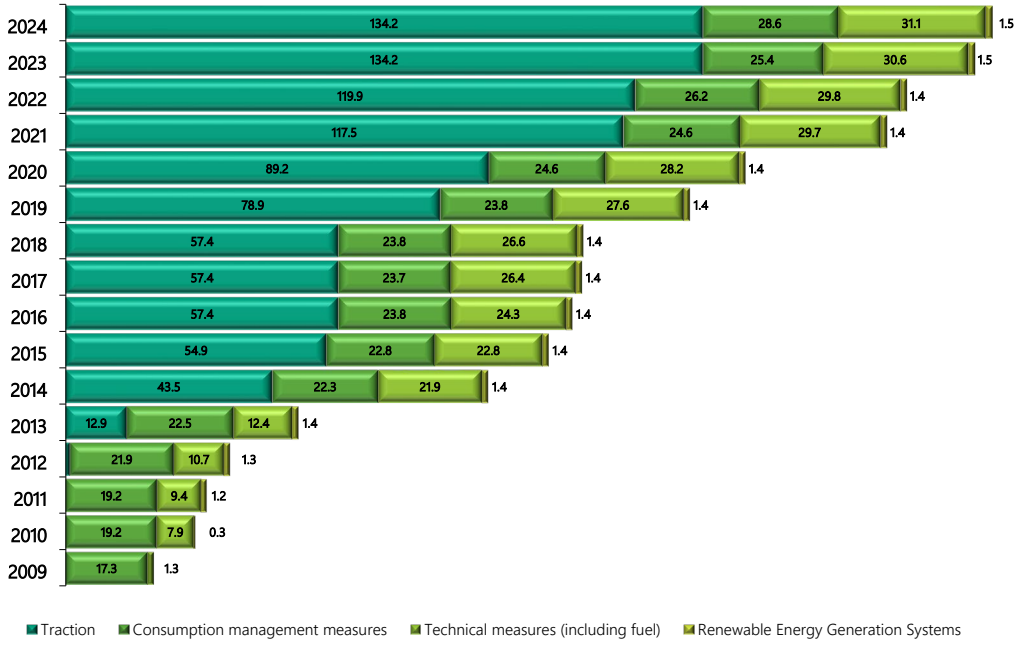
Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department

Chart 2. Energy saving and efficiency measures and renewable energy generation systems implemented between 2009-2024 in Adif and Adif-Alta Velocidad



Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department

Chart 3. Achievements by 31 December of each year with the measures implemented in Adif and Adif-Alta Velocidad (Savings achieved in GWh/year) *



** Management measures represent: fuel savings (fleet and generators renewal) and traction energy savings, as well as fleet management and electricity consumption management measures.*

*** Data for 2023 was modified in relation to the 2023 Environmental Report.*

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department

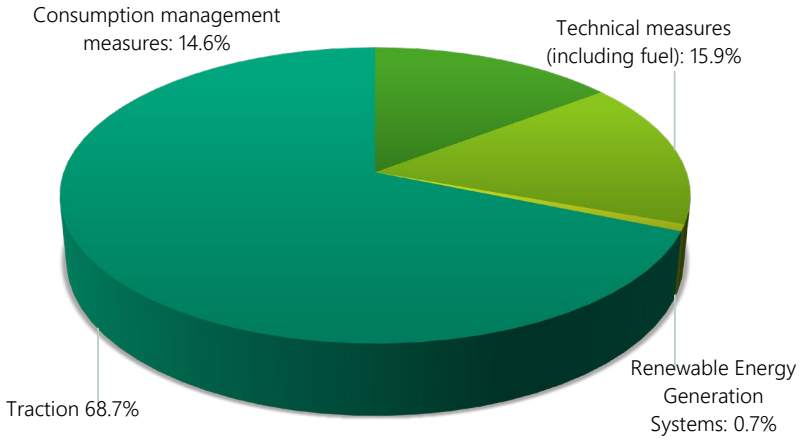
Chart 4. Achievements by 31 December of each year with the measures implemented, in Adif and Adif-Alta Velocidad (Total savings achieved in GWh/year)

** Data for 2023 was modified in relation to the 2023 Environmental Report.*

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department

As of 31 December 2024, the main contribution of the different types of measures implemented to the annual savings in energy consumption achieved was due to traction measures (68.7%), followed by technical measures (15.9%), and consumption management measures (14.6%).

Chart 5. Percentages of annual savings in energy consumption achieved by the different types of measures implemented by 31 December 2024 in Adif and Adif-Alta Velocidad



Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department

PRIME BENCHMARKING ANALYSIS

In 2013 PRIME (Platform of Rail Infrastructure Managers in Europe) was created as a platform for cooperation between the European Commission and European Rail Infrastructure Managers (EIM) with the aim of providing an effective and efficient rail service. Twenty-two organisations participate in PRIME, including Adif-Alta Velocidad.

Periodic benchmarking analyses are among the tasks carried out within the framework of this platform. These aim at providing a comprehensive view of actions on the railway network, so that infrastructure managers can exchange practices and actions and identify areas in which there is room for improvement.

These analyses cover various dimensions of railway infrastructure management, such as costs, safety, sustainable development, punctuality, resilience and digitalisation.

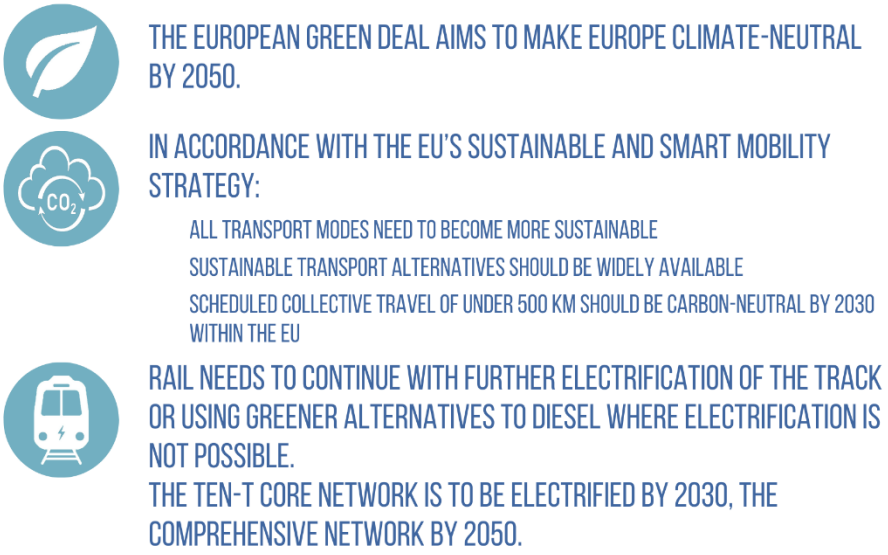


Figure 5. Objectives of PRIME

The latest available data corresponds to 2023, when the eighth report on PRIME's KPIs and benchmarking was presented. For the purposes of this report, 40 strategic indicators (KPIs) corresponding to different areas were selected and their evolution between 2019 and 2023 was analysed.

In the environmental context, indicators cover waste, noise management, and railway-related incidents, among others.

PRIME's next challenges in relation to these analyses are to increase participation, to improve data quality and conduct exhaustive data studies, and to prepare and share the results among railway infrastructure managers.

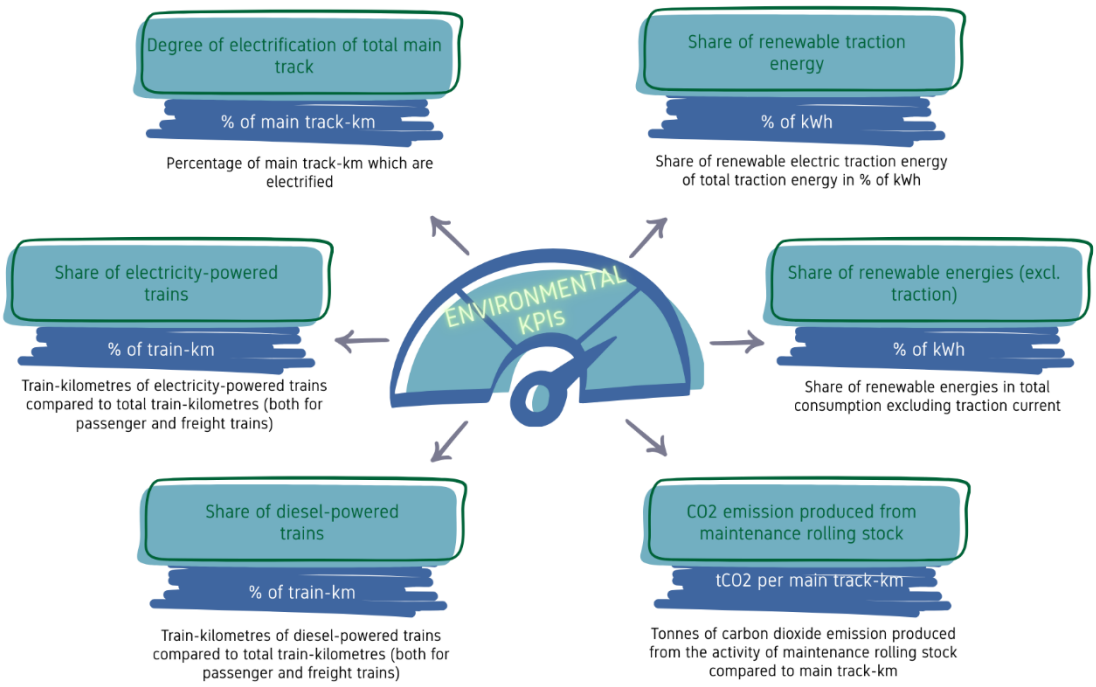


Figure 6. Selected environmental KPIs in PRIME

GREEN BOND

3-3 | 302-4 | 305-5

In the financial sphere, Adif-Alta Velocidad carried out its eighth issue of fixed-income securities under 'green bonds' in April 2024, reaffirming its commitment to sustainable development, environmental protection and the fight against climate change.

8th green bond issuance

With this eighth issue, Adif-Alta Velocidad continues contributing to the development of the green bond market as a sustainable financing alternative, actively participating in various forums such as the Spanish Observatory for Sustainable Financing and the Corporate Forum for Sustainable Finance. The latter comprises entities from various sectors, which together account for more than two-thirds of the total issuance of green and sustainable bonds in Europe. Adif-Alta Velocidad launches its issues under the umbrella of the new Green Financing Framework, renewed in August 2022, which is aligned with the Green Bond Principles (GBP) of the International Capital Market Association (ICMA) and has received the highest rating from the external evaluator, Sustainable Fitch. Additionally, this Framework reflects the commitment of Adif-Alta Velocidad and its firm and decisive alignment with the principles contained in the European Taxonomy regarding the objective of climate change mitigation.

Consolidating its position as leading socially responsible public issuer in the European market, in 2024. Adif-Alta Velocidad was ranked by the Sustainability ESG Risk Rating – an indicator that rates ESG (environmental, social and governance) factors – as the best performer in the transport infrastructure sector (out of 175 entities) and third worldwide among more than 15,000 companies assessed. Similarly, in May 2024, MSCI updated its rating, with Adif-Alta Velocidad receiving an ESG Risk Rating of BB, an improvement over the previous year's rating (B).

> ***! Adif-Alta Velocidad, the first Spanish company to issue green bonds (since 2017), remains, with its new issue, in fourth position as a green bond issuer in the Spanish public sector and is at the forefront at European level.***

Continuing its commitment to transparency, in 2024 Adif-Alta Velocidad presented its annual report on the use of proceeds from its 2023 bond issue. The funds were allocated to Eligible Green Projects (EGPs), including the construction of new high-speed lines, the extension of existing ones, and measures to maintain and improve energy efficiency on these lines. These EGPs encompass both new and ongoing projects, covering disbursements from two years before the bond issue to three years after. Adif-Alta Velocidad carries out its work while minimising the potential environmental impact of its activity. To this end, it has a certified Environmental Management System (ISO 14001), becoming the first European infrastructure manager to achieve this certification.

The organisation aims to play a key role in sustainable development and to strengthen its contribution to Spain's transition to a low-carbon, climate-resilient economy.

> ***! In the eighth green bond issue, 71% of investors who purchased these bonds were socially responsible investors***

SUSTAINABLE DEVELOPMENT GOALS (SDGS) IN ADIF-ALTA VELOCIDAD'S STRATEGY

Adif-Alta Velocidad focuses on providing a safe, reliable and efficient railway network for all, with sustainability as one of its fundamental pillars. Some of the challenges Adif and Adif-Alta Velocidad proposed to be addressed are: the need for a low-emission and more efficient mobility model, the preservation of natural resources, the promotion of socially inclusive economic development, and the improvement of citizens safety and health.

By analysing the contribution of strategic initiatives to the achievement of the United Nations Sustainable Development Goals (SDGs), it is possible to determine which Goals are prioritized in the development of SP 2030. Furthermore, the progress on specific targets can be assessed through indicators from Adif and Adif-Alta Velocidad.

The SDGs which are most impacted by the implementation of the strategic initiatives are the following:

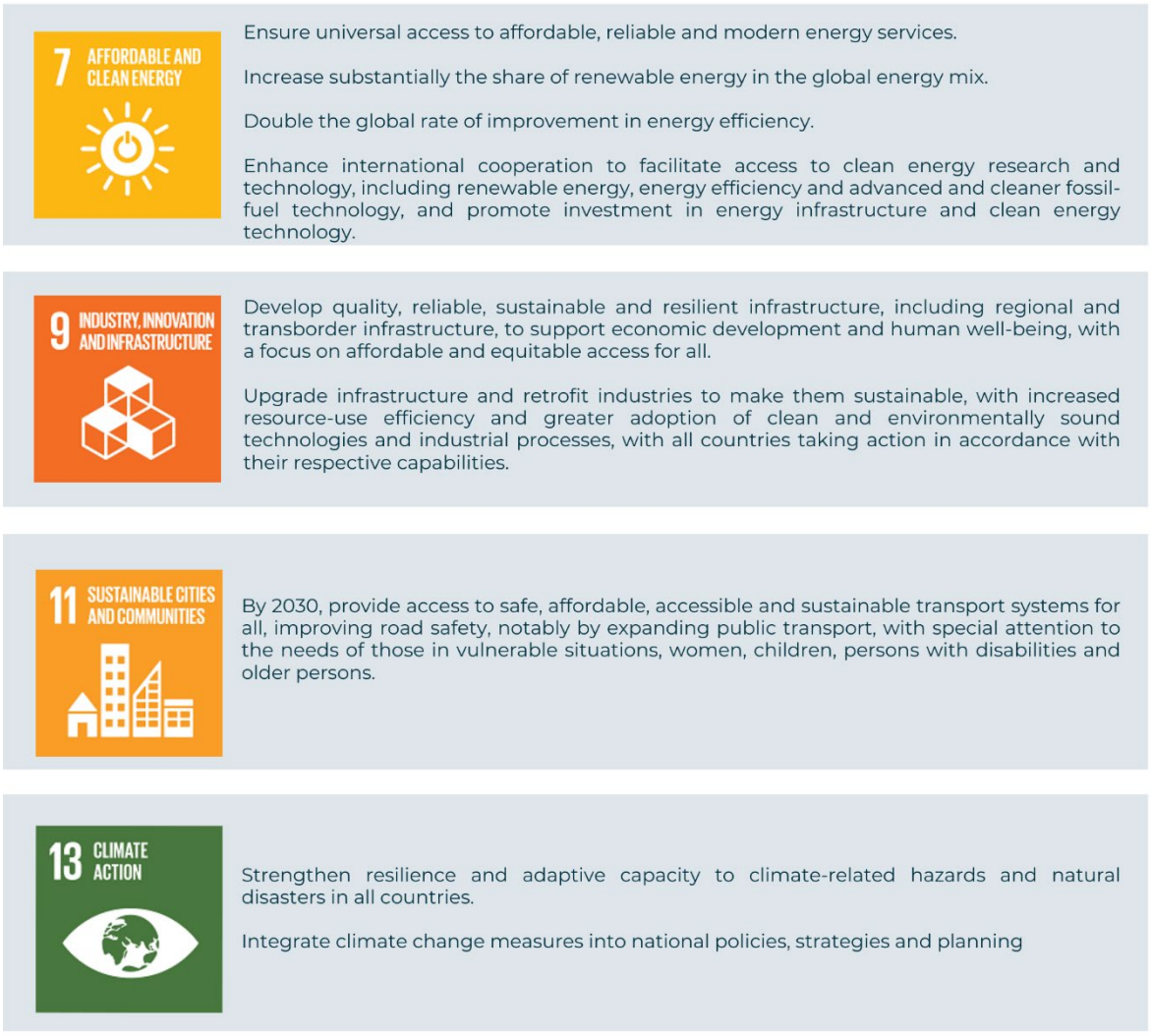


Figure 7. SDGs which are most impacted by the implementation of Adif-Alta Velocidad's strategic initiatives

Aligning the strategy with the SDGs offers a competitive advantage for Adif-Alta Velocidad, enabling the identification of future business opportunities, the strengthening of stakeholder

relationships, efficient management, and a positive impact on society across three crucial pillars: social, environmental, and economic.

The Plan is designed to align with the United Nations 2030 Agenda, which encompasses 169 integrated and indivisible goals across the economic, social, and environmental spheres.

In addition, three priority sustainability challenges are addressed: climate emergency, corporate governance, and social inequality. In this line, Adif and Adif-Alta Velocidad set the following objectives:

- Achieve net zero greenhouse gas emissions by 2050.
- Shape strategic initiatives that integrate support for inclusion, equality, diversity, and the elimination of all forms of discrimination.

In updating the activities of Adif and Adif-Alta Velocidad, a framework agreement has been signed with the Secretary of State for the 2030 Agenda, along with 16 other public entities and companies, to strengthen its implementation and advance towards the fulfilment of the SDGs of the 2030 Agenda.

This scope of collaboration includes the exchange of good practices in the implementation of the SDGs and their targets, and the development of joint projects in this area, including certification of goods and services. Additionally, it involves sharing dissemination activities and implementing training on the SDGs, among other measures.

In addition, Adif and Adif-Alta Velocidad, together with other UIC (International Union of Railways) organisations have set up the SDG Rail Index Working Group. This group aims to create an international scoring system to rate railway companies, ensuring each one's alignment with the SDGs and the 2030 Agenda.

In the group, the determined indicators and methodology, based on the applicable regulations, enable the establishment of homogeneous comparisons to obtain a compliance rating for each organisation. This process is automated using a tool that incorporates various KPIs provided by organizations, ultimately determining the level of SDGs alignment for the international railway sector and each individual company or sector.

In 2022, for the first time, the UIC accredited the Rail Sustainability Index rating, which evaluates the progress of railway companies towards sustainable development using a comparability index based on the most relevant SDGs for the railway sector.

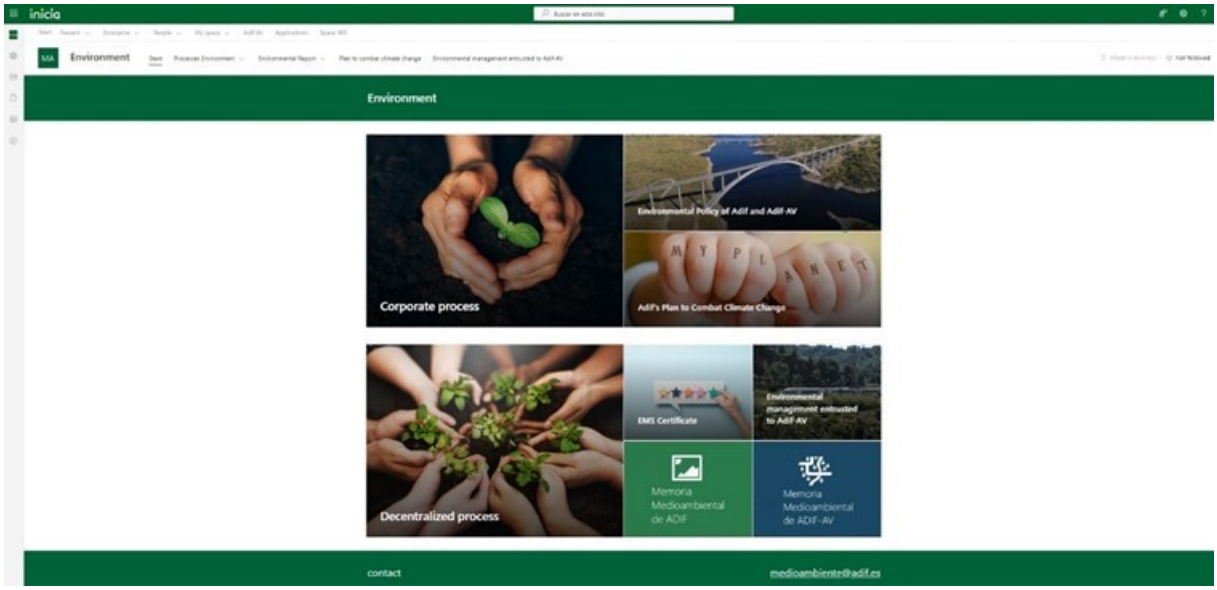
Adif and Adif-Alta Velocidad Velocidad jointly obtained the highest score in three out of the seven SDGs analysed: affordable and clean energy (SDG 7), sustainable cities and communities (SDG 11), and climate action (SDG 13).

Adif and Adif-Alta Velocidad's performance reaches 84.10%, compared to an average sector performance of 44.03%

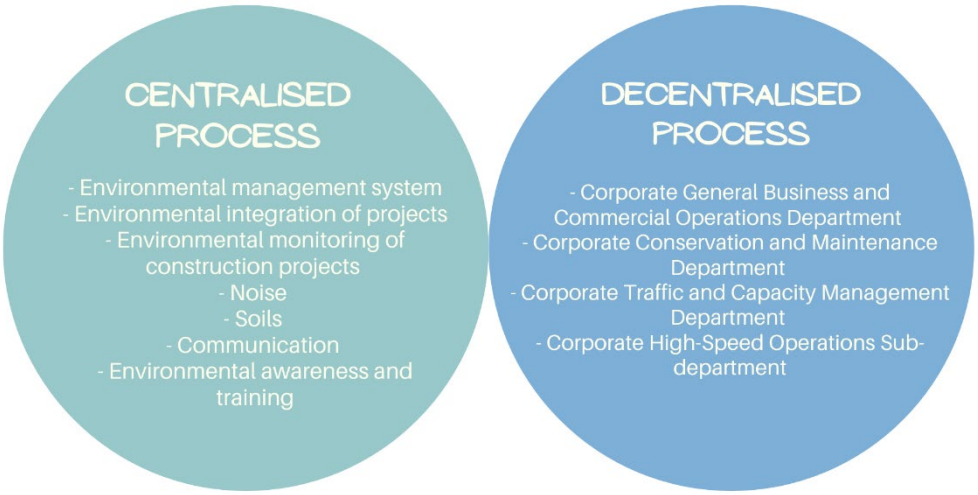
ADIF AND ADIF-ALTA VELOCIDAD INTERNAL COMMUNICATION PORTAL

In 2019, the Environment section was created in the *Inicia* corporate portal with the aim of improving internal communication and sharing corporate information on aspects related to the environment. In this way, the management and coordination of environmental activities could be improved by taking advantage of existing synergies. All areas of activity involved can contribute content and a mailbox is available for environmental communications.

The homepage provides access to Adif and Adif-Alta Velocidad's Environmental Policy, Adif-Alta Velocidad 's environmental management information, and the Environmental Reports for both entities. The rest of the content is structured based on whether the aspects belong to centralised or decentralised management processes. Within each of these sections, all environmental aspects are detailed with links to the relevant documents and current procedures.



ENVIRONMENTAL INFORMATION AVAILABLE IN INICIA



FRAMEWORK COLLABORATION AGREEMENT BETWEEN RENFE OPERADORA AND ADIF-ALTA VELOCIDAD ON ENVIRONMENTAL MANAGEMENT AND THE PROMOTION OF SUSTAINABLE MOBILITY

In February 2007, Adif and Renfe Operadora signed a framework collaboration agreement on Environmental Management and Sustainable Mobility, which is still in effect. This agreement acknowledges the need to properly manage various environmental aspects related to the interaction between infrastructure and railway operations. The new agreement, which is currently being reviewed by the legal advisors of both companies, will take the form of a General Protocol for Action, in accordance with the regulations governing the legal regime of the public sector.

Since its separation from Adif, Adif-Alta Velocidad has upheld the commitments made under this agreement.

The purpose of the Agreement is to define the basis for collaboration between Renfe Operadora and Adif and Adif-Alta Velocidad in environmental management and the promotion of sustainable mobility:

- Establishing a framework for cooperation between companies.
- Developing environmental management actions related to the interrelationship between railway infrastructure and operation.
- Facilitating the exchange of information and experiences to achieve the proposed objectives.
- A Joint Monitoring Committee has been established to set the objectives, define the terms and conditions of the Agreement, and coordinate and implement the resulting actions.

The Collaboration Agreement on soil decontamination, formalized in October 2008 and still in effect, is notable for its economic significance and the importance of its content. Likewise, positive and relevant contributions have been made in the rest of the actions which, given their specific nature, require additional information to be approved and implemented. This agreement remains in full force and effect and collaboration in this area continues as usual.

4. ENERGY AND EMISSIONS

4. ENERGY AND EMISSIONS

ENERGY CONSUMPTION

Energy consumption in Adif-Alta Velocidad's own activities

302-1

The main source of energy consumption in Adif-Alta Velocidad's operations is electricity from the mainland Spain Electricity System, which accounted for 87.7% of the total energy consumed in 2024.

According to the Inventory of Fixed Assets available as of 31 December 2024, Adif-Alta Velocidad has assigned a Talgo High-Speed electric traction set for testing and measurement work on high-speed infrastructure, as well as two diesel self-propelled trains, all of which are owned by Adif. In addition, Adif-Alta Velocidad has twenty-two (22) diesel-electric locomotives of UIC gauge, assigned to high-speed maintenance.

Other, less significant energy consumptions were also recorded: natural gas (2.8%) used for hot water production and heating; diesel B (9.3%) used in track maintenance equipment and workshop operations; and diesel A and gasoline (0.2%).

Additionally, Adif-Alta Velocidad continues to develop solar energy initiatives.

Table 2. Energy and fuel consumption recorded in Adif-Alta Velocidad's activities

Type of energy	2017	2018	2019	2020	2021	2022	2023	2024
Electrical power (kWh/year)	**147,655,608**	**158,552,298**	**162,045,501**	**154,047,271**	**153,298,309**	**181,283,190**	**200,474,421**	**199,067,570**
Uses Traction (UT)	60,648,958	70,663,199	74,193,925	72,652,432	73,597,366	64,030,746	68,736,254	58,619,234
Uses Other than Traction (UOT)	87,006,650	87,889,099	87,851,576	81,394,839	79,700,943	117,252,444	131,738,167	140,448,336
Diesel (l/year)	**804,349**	**751,983**	**804,176**	**701,366**	**735,052**	**785,318**	**733,611***	**2,093,814**
Diesel A Automotive	36,247	34,030	39,346	19,652	22,028	13,013	9,922	2,238
Diesel B Rail Maintenance	739,688	238,095	281,829	199,022	232,008	289,477	224,518*	1,535,787
Diesel B Railway yards shunting	0	471,853	483,001	482,692	481,016	482,828	499,171	555,789
Diesel C Heating	28,414	8,005	0	0	0	0	0	0
Petrol (l/year)	**25**	**5,626**	**11,421**	**17,511**	**21,199**	**27,083**	**30,698**	**39,292**
Natural Gas (m^3/year)	**1,063,722**	**937,835**	**1,004,749***	**900,462**	**940,798**	**841,855**	**526,105**	**596,175**

** Data revised in relation to the 2023 Environmental Report*

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department.

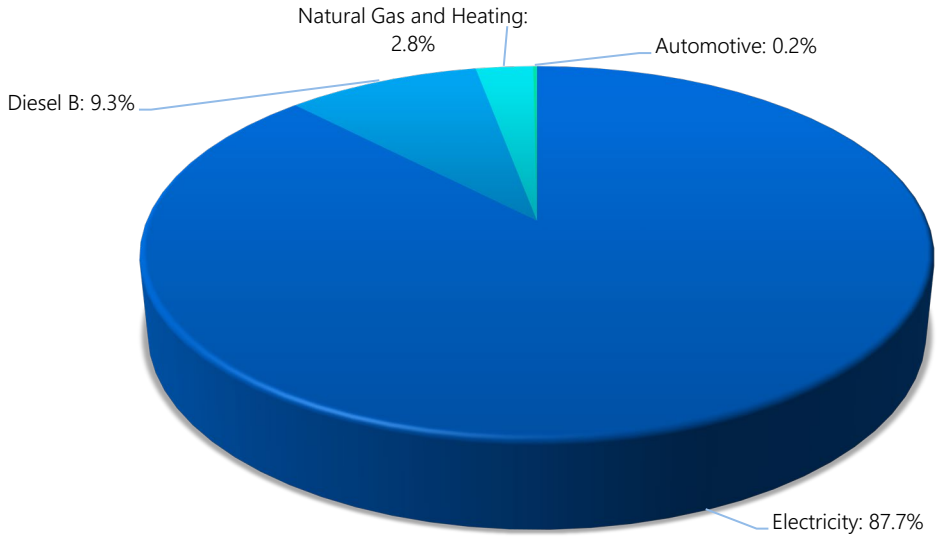
Table 3. Energy and fuel consumption recorded in our own activities (TJ/year)

Type of energy	2017	2018	2019	2020	2021	2022	2023	2024
Electrical Power (TJ/year)	**531.56**	**570.79**	**583.36**	**554.57**	**551.87**	**652.62**	**721.71**	**716.64**
Uses Traction (UT)	218.34	254.39	267.10	261.55	264.95	230.51	247.45	211.03
Uses Other than Traction (UOT)	313.22	316.40	316.27	293.02	286.92	422.11	474.26	505.61
Diesel fuel (TJ/year)	**28.59***	**26.73**	**28.59**	**24.93**	**26.13**	**27.92**	**26.08***	**76.21**
Diesel A Automotive	1.29	1.21	1.40	0.70	0.78	0.46	0.35	0.08
Diesel B Rail Maintenance	26.30	8.46	10.02	7.08	8.25	10.29	7.98*	55.90
Diesel B Railway yards shunting	0.00	16.77	17.17	17.16	17.10	17.16	17.75	20.23
Diesel C Heating	1.01	0.28	0.00	0.00	0.00	0	0.00	0.00
Petrol (TJ/year)	**0.001**	**0.183**	**0.371**	**0.568**	**0.688**	**0.879**	**0.996**	**1.40**
Natural Gas (TJ/year)	**40.67**	**35.85**	**38.40**	**34.12**	**35.54**	**31.81**	**19.80**	**22.54**
Total	**600.82**	**633.56**	**650.72**	**614.19**	**614.24**	**713.22**	**768.58***	**816.79**

** Data revised in relation to the 2023 Environmental Report*

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department.

Chart 6. Distribution of energy consumption recorded in Adif-Alta Velocidad in the year 2023 (% of total amount of energy consumed)



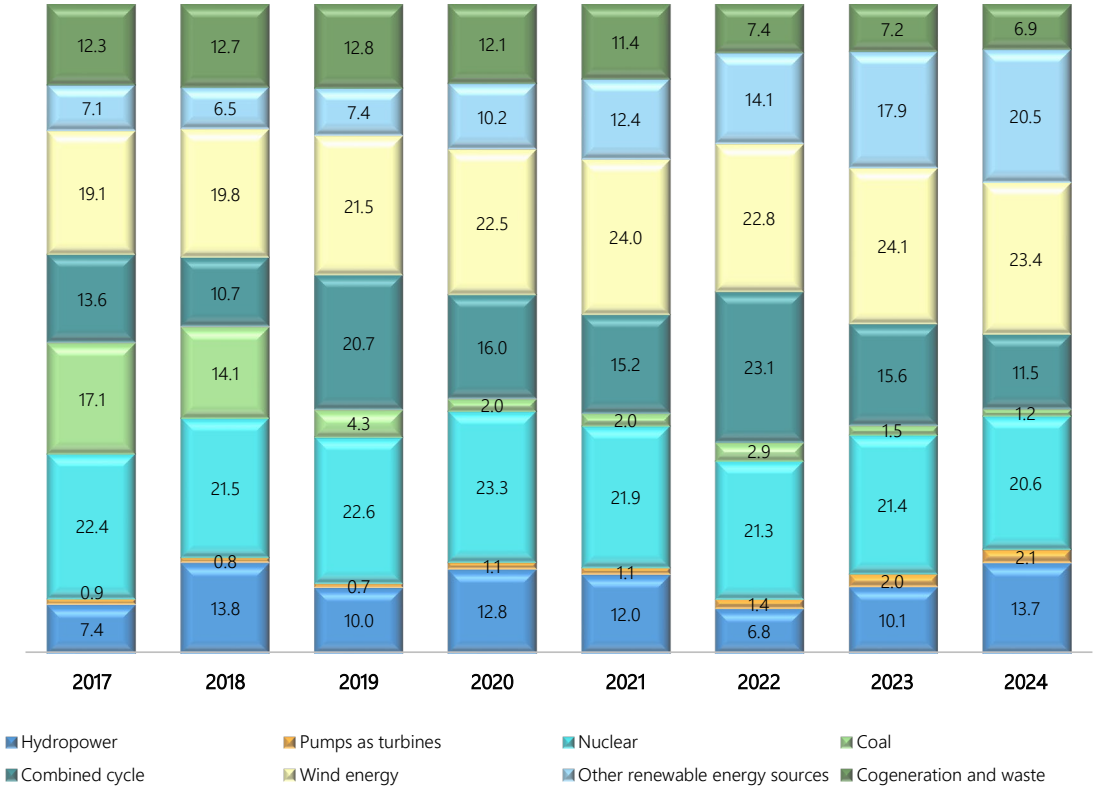
Origin of the energy in the Spanish Peninsular Electricity System

The electricity used is sourced from the Spanish Peninsular Electricity System, which in 2024 primarily derived from wind generation (23.4%), nuclear power (20.6%), other renewable sources (20.5%), hydroelectric sources (13.7%), combined cycle plants (11.5%), cogeneration and waste (6.9%).

! In 2024, hydro, wind and other renewable energy sources accounted for 57.7%, which is more than 37 percentage points higher than that of nuclear power.

The contribution of the different sources varies, primarily influenced by weather conditions and the output of existing hydropower facilities.

Chart 7. Power generation scheme in the Spanish Peninsular Electricity System (%) *



** Data for 2023 was modified in relation to the 2023 Environmental Report*

Source: Red Eléctrica, Electricity System Data, 2025.

Primary energy consumption

302-2

The primary indirect energy consumption at Adif-Alta Velocidad mainly comes from recorded electricity usage.

In 2024, indirect primary energy consumed from non-renewable sources accounted for 1,400.32 TJ, compared to 296.69 TJ from renewable sources. These values are like those of the previous year.

It should be noted that, since 2019, Adif-Alta Velocidad has been purchasing green electricity, which, in other words, comes with a Renewable Guarantee of Origin Certificate (GoO). When applying international standards for calculating the carbon footprint, it is convenient to perform a double calculation. On the one hand, considering the electricity market where the energy is purchased, i.e. the purchase of energy with GoO. On the other hand, considering the primary energy associated with the electricity consumed according to the generation mix (in this case, the Spanish peninsular electricity mix).

Therefore, under this assumption, the following table presents the indirect consumption from final electricity use by each type of primary energy source for the period 2017-2024:

Table 4. Indirect primary energy consumption which could be attributed to recorded electricity consumption (TJ/year)

	2017	2018	2019	2020	2021	2022	2023	2024
Coal	267.49	263.86	80.22	39.89	41.84	66.45	44.54	38.33
Natural gas and fuel oil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combined cycle	212.74	200.23	386.18	318.22	318.18	523.59	457.78	375.46
Nuclear	350.39	402.34	421.63	462.56	457.52	484.01	632.40	685.31
Cogeneration and non-renewable waste	193.97	233.92	238.80	240.45	238.39	168.52	215.03	230.71
Pumps as turbines	14.08	14.97	13.06	22.51	22.43	32.64	60.47	70.50
Fossil resources	**1,038.67**	**1,115.32**	**1,139.89**	**1,083.63**	**1,078.36**	**1,275.22**	**1,410.22**	**1,400.32**
Hydropower	48.32	81.32	61.93	64.55	56.61	42.16	57.14	70.11
Wind energy	124.73	116.68	133.14	113.27	113.25	141.18	138.55	120.81
Solar energy (photovoltaic and thermal)	35.26	28.29	35.30	41.01	48.17	74.14	93.37	96.96
Other renewable energy sources	11.75	10.02	11.15	10.75	10.45	12.71	9.72*	8.82
Renewable energy sources	**220.07**	**236.31**	**241.51**	**229.59***	**228.48**	**270.18**	**298.78***	**296.69**
Total	**1,258.73**	**1,351.63**	**1,381.41**	**1,313.22**	**1,306.84**	**1,545.40**	**1,709.00***	**1,697.01**

** Data revised in relation to the 2023 Environmental Report*

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department.

If the primary energy derived from electricity is added to the consumption of the other fuels, the total primary energy would be as follows:

Table 5. Total primary energy consumption (electricity + other fuels) (TJ/year)

	2017	2018	2019*	2020	2021	2022	2023*	2024
Total primary energy	1,328.00	1,414.40	1,448.77	1,372.84	1,369.20	1,606.01	1,755.87	1,797.16

** Data revised in relation to the 2023 Environmental Report*

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department.

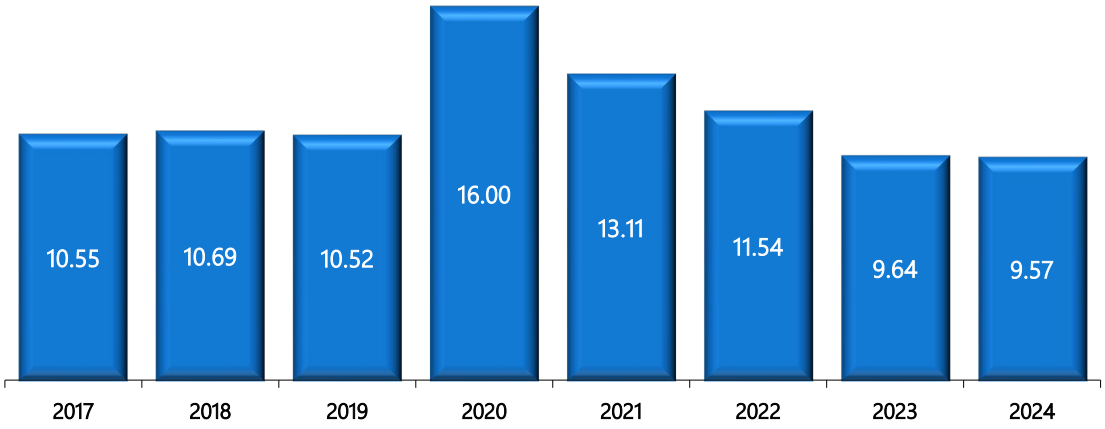
Final and primary energy intensity

302-3

The final and primary energy intensity – energy consumption (in MJ) per unit of production representing Adif-Alta Velocidad´s activity (managed traffic in train-km) – are two indicators that measure the entity's energy management efficiency and the dependency of energy consumption on activity growth.

In 2024, Adif-Alta Velocidad´s final energy intensity was 9.57 MJ/train-km, which, despite a decrease (9.3%) con compared to 2017, still reflects a very high energy dependency.

Chart 8. Final energy intensity (managed MJ/train-km)

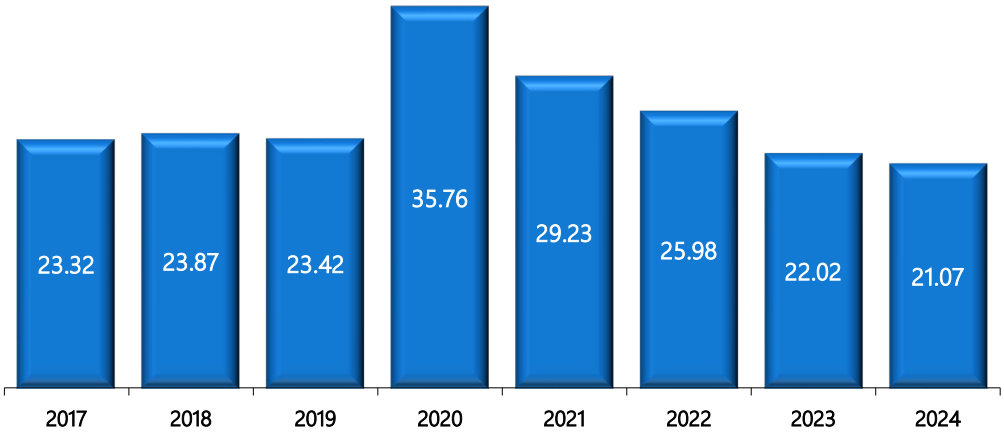


* Ratio between final energy consumption in Adif-Alta Velocidad's own activities and managed traffic in train-km.

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department.

! In 2024, Adif-Alta Velocidad's primary energy intensity was 21.07 MJ/train-kilometre managed, which is 4.3% lower than the previous year.

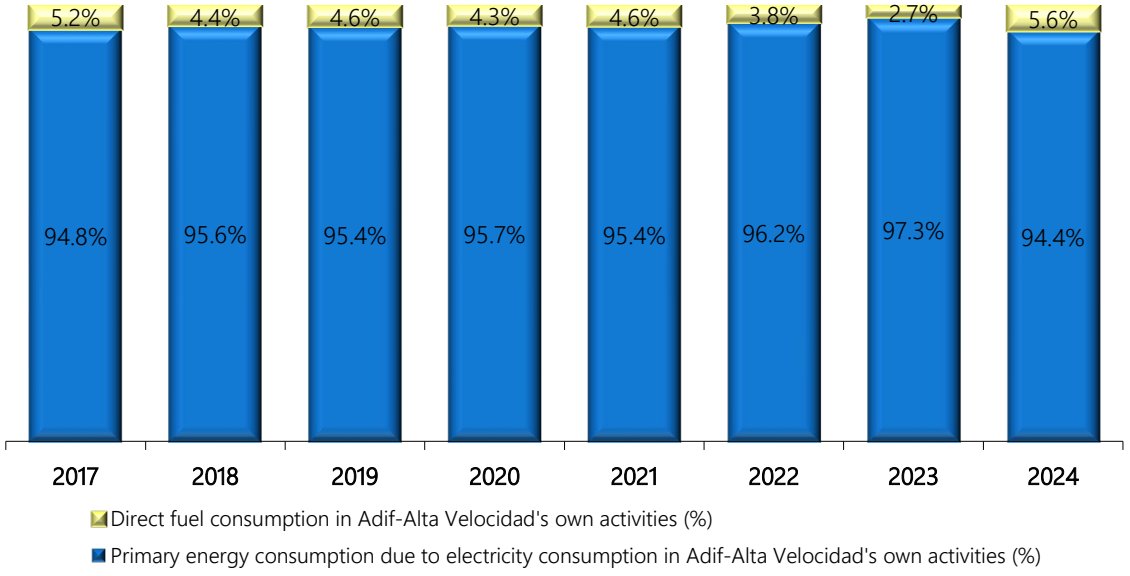
Chart 9. Primary energy intensity (managed MJ/train-km)



Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department.

Primary energy intensity at Adif-Alta Velocidad is significantly influenced by the contribution of renewable energies to the production of electricity in Spanish mainland electric system. In Adif-Alta Velocidad, 94.4% of primary energy consumption is due to electricity consumption, which is very similar to previous years. Dependence on electricity has remained relatively constant from 2017 to 2024.

Chart 10. Distribution of primary energy consumption in Adif-Alta Velocidad's own activities (% of total primary energy consumed)



Source: Own preparation based on REE and data from Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department.

CARBON FOOTPRINT

305-1 | 305-2 | 305-4

GHGs emissions to the atmosphere due to Adif-Alta Velocidad´s own activities are related to:

- Indirect emissions originating in the generation of electrical energy, emissions which, in addition to consumption, depend on the generation scheme of the peninsular electricity system.
- Direct emissions from oil and natural gas boilers.
- Direct emissions from traction motor equipment and machinery used in rail maintenance, shunting, and auxiliary operations.
- Direct emissions from the road vehicle fleet used.

These emissions are tracked by calculating the carbon footprint, which provides information on GHG emissions associated with an organisation's activities. These emissions are categorized into two scopes:

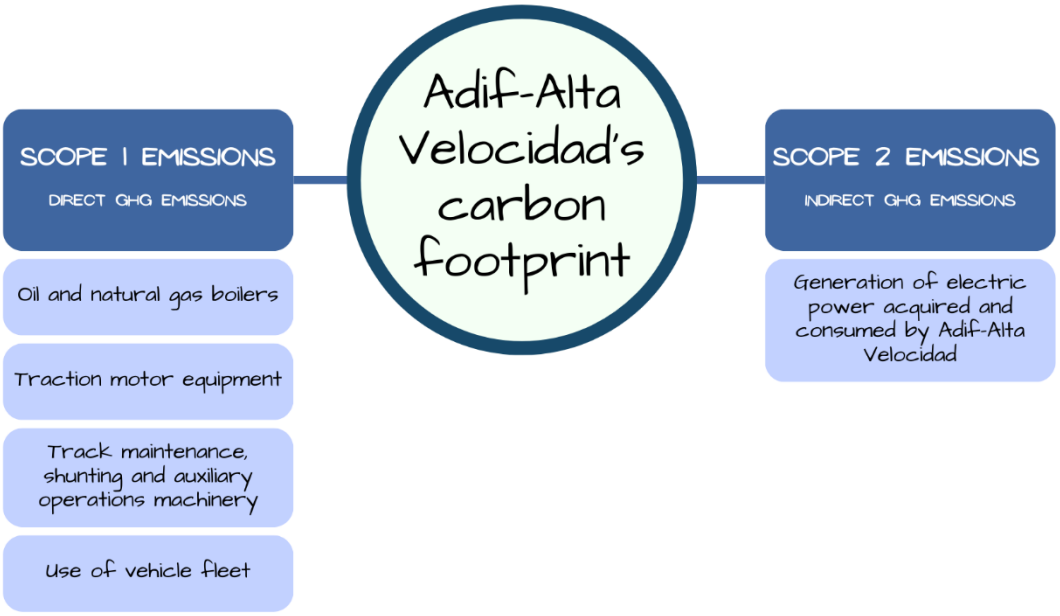


Figure 8. List of activities generating Scope 1 and 2 emissions

Table 6. HG emissions to the atmosphere derived from Adif-Alta Velocidad's own activities (t/year) *

Compound	2017	2018	2019	2020	2021	2022*	2023	2024
Indirect emissions due to registered electricity consumption (Scope 2) (a)								
Carbon dioxide (CO_2)	38,095.15	34,648.43	-	-	-	-	-	-
Methane (CH_4)	1.42	1.29	-	-	-	-	-	-
Nitrous oxide (N_2O)	0.00	0.00	-	-	-	-	-	-
CO_2 equivalent (CO_2eq)	38,135.11	34,684.49	27,061.60	19,040.24	18,089.20	25,923.50	20,047.44	15,887.24
Direct emissions from combustion plants (oil and natural gas boilers) (Scope 1) (b)								
Carbon dioxide (CO_2)	2,374.61	2,044.69	-	-	-	-	-	-
Methane (CH_4)	0.04	0.04	-	-	-	-	-	-
Nitrous oxide (N_2O)	0.005	0.004	-	-	-	-	-	-
CO_2 equivalent (CO_2eq)	2,377.07	2,046.72	1,941.41	1,724.88	1,796.91	1,607.93	1,000.98	1,139.58
Direct emissions from rail maintenance, shunting and ancillary operations (Scope 1) (c)								
Carbon dioxide (CO_2)	1,864.01	1,789.07	-	-	-	-	-	-
Methane (CH_4)	0.11	0.10	-	-	-	-	-	-
Nitrous oxide (N_2O)	0.01	0.01	-	-	-	-	-	-
CO_2 equivalent (CO_2eq)	1,870.99	1,795.76	2,071.92	1,846.76	1,931.58	2,092.17	1,960.48	5,666.12
Direct emissions from vehicles used (Scope 1) (d)								
Carbon dioxide (CO_2)	91.40	98.02	-	-	-	-	-	-
Methane (CH_4)	0.00	0.00	-	-	-	-	-	-
Nitrous oxide (N_2O)	0.00	0.00	-	-	-	-	-	-
CO_2 equivalent (CO_2eq)	92.09	99.01	123.36	86.82	100.62	90.41	90.17	89.35
Total emissions from Adif-Alta Velocidad´s own activities								
Carbon dioxide (CO_2)	42,425.16	38,580.22	-	-	-	-	-	-
Methane (CH_4)	1.58	1.43	-	-	-	-	-	-
Nitrous oxide (N_2O)	0.02	0.02	-	-	-	-	-	-
CO_2 equivalent (CO_2eq)	42,475.25	38,625.98	31,198.29	22,698.70	21,918.31	29,714.01	23,099.07	22,782.30
Scope 1 emissions								
CO_2 equivalent (CO_2eq)	4,340.15	3,941.48	4,136.70	3,658.46	3,829.11	3,790.52	3,051.63	6,895.05
Scope 2 emissions								
CO_2 equivalent (CO_2eq)	38,135.11	34,684.49	27,061.60	19,040.24	18,089.20	25,923.50	20,047.44	15,887.24

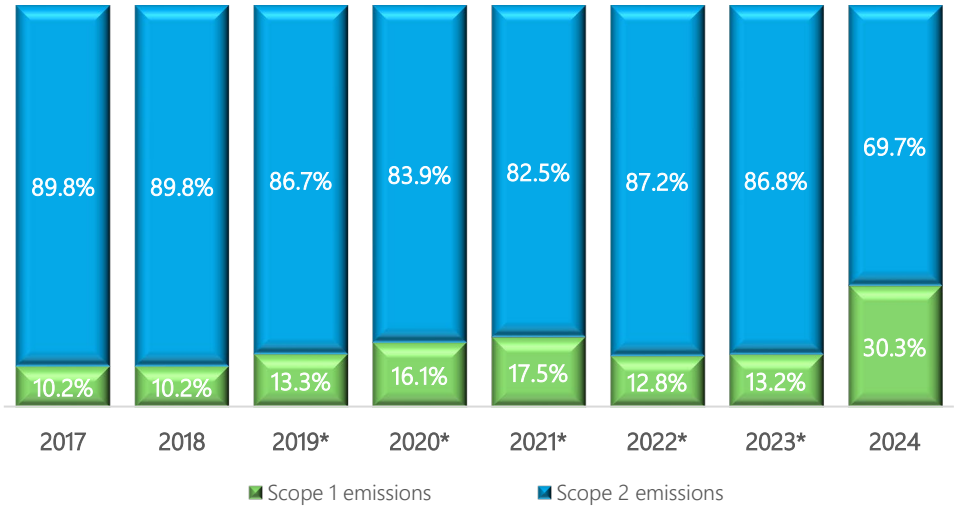
** Data revised in relation to the 2023 Environmental Report*

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department

In calculating GHG emissions CO2, CH4 and N2O, emissions have been considered, using the following equivalences: 1 for CO2, 28 for CH4 and 265 for N2O. Equivalences used in the IPCC Fifth Assessment Report.

! Adif-Alta Velocidad´s Carbon Footprint decreased by over 1.3% in 2024 compared to the previous year

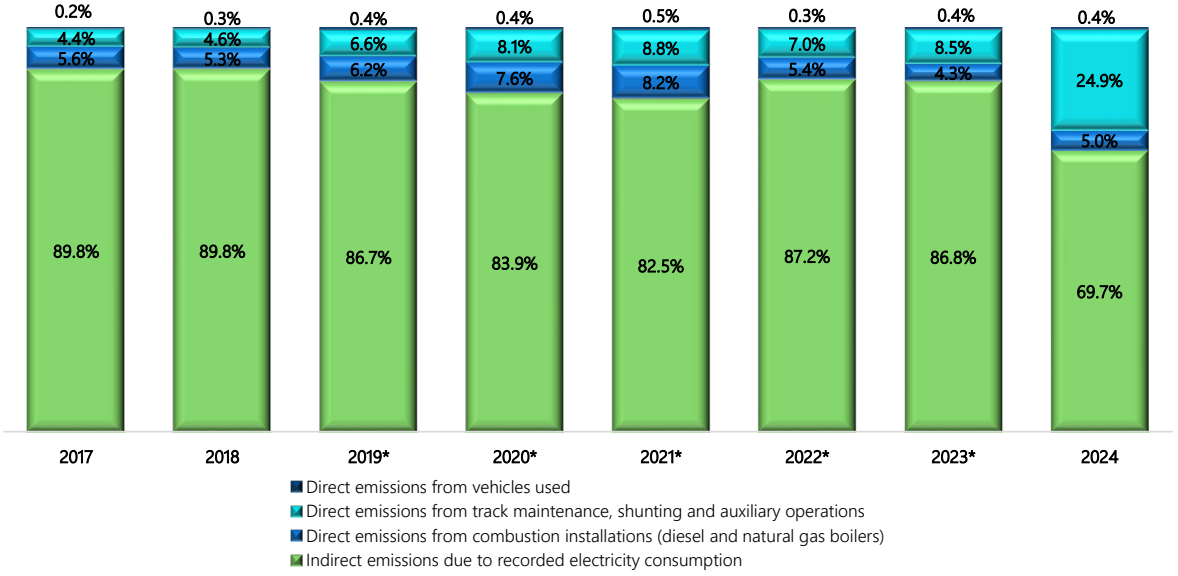
Chart 11. Scope 1 and 2 emissions of total GHG emissions (%)



** Data revised in relation to the 2023 Environmental Report*

Within Scope 1, the largest direct GHG emitters in 2024 were track maintenance, shunting, and auxiliary operations, followed by combustion installations.

Chart 12. Contribution of different sources to GHG emissions (%)



** Data revised in relation to the 2023 Environmental Report*

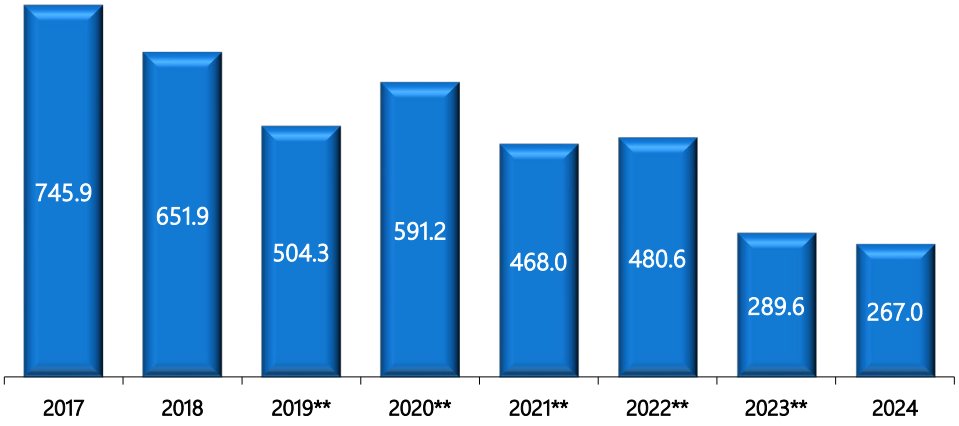
The intensity of GHG emissions (in t CO2eq/million managed train-km) from our activities is an indicator that measures how dependent the company's growth is on GHG emissions. It also reflects the energy and environmental efficiency of the operations performed.

In Adif-Alta Velocidad´s case, with GHG emissions from electricity consumption contributing 69.7%, this is also related to the reliance on fossil fuels in the generation structure of the mainland electricity sector.

! Between 2017 and 2024, Adif-Alta Velocidad´s GHG emissions intensity has been reduced by 64.2%.

The reduction in GHG emissions intensity is due to both a decrease in emissions and an increase in traffic handled by the entity.

Chart 13. GHG emissions intensity * (t CO_2eq/million train-km managed)



** Ratio between total GHG emissions due to Adif-Alta Velocidad's own activities (including indirect emissions due to recorded electricity consumption) and managed traffic train-km.*

*** Data revised in relation to the 2023 Environmental Report*

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department

Since 2019, Adif-Alta Velocidad is committed to the Purchase of GoO certified Green Electricity for all electricity consumed in the rail system. This way, 100% of GHG emissions associated with electricity consumption can be considered zero (according to the electricity market).

The Guarantee of Origin (GoO) is an electronic certification issued by the National Commission for Markets and Competition that confirms the energy comes from renewable sources

OTHER AIR EMISSIONS

305-7

Emissions of acidifying substances, ozone precursors, and particulate matter into the atmosphere from Adif-Alta Velocidad´s activities have the same sources as GHG emissions.

Table 7. Emissions to the atmosphere derived from Adif-Alta Velocidad's own activities (t/year) *

Compound	2017	2018	2019	2020	2021	2022*	2023	2024
Indirect emissions due to registered electricity consumption (a)								
Carbon monoxide (CO)	18.47	17.61	14.15	14.91	15.76	21.19	21.88	17.37
Non-methane volatile organic compounds (NMVOCs)	2.78	3.00	3.13	3.37	3.73	4.28	3.44	2.73
Nitrogen oxides NO_x (as NO_2)	65.21	52.91	43.39	33.06	31.12	37.07	36.75	29.18
Sulphur oxides SO_x (as SO_2)	50.04	39.39	18.04	7.84	5.46	6.63	5.91	4.70
$PM_{2.5}$	2.47	2.16	1.75	1.73	1.80	2.08	1.89	1.50
PM_{10}	3.31	2.91	2.21	2.23	2.29	2.63	2.40	1.90
TSP	4.32	3.82	2.91	3.09	3.18	3.64	3.32	2.64
Direct emissions from combustion plants (oil and natural gas boilers) (b)								
Carbon monoxide (CO)	1.27	1.07	1.11	0.99	1.03	2.52	2.22	2.53
Non-methane volatile organic compounds (NMVOCs)	0.96	0.83	0.88	0.78	0.82	1.07	0.81	0.92
Nitrogen oxides NO_x (as NO_2)	3.32	2.74	2.84	2.52	2.63	7.61	6.90	7.86
Sulphur oxides SO_x (as SO_2)	0.07	0.04	0.03	0.02	0.02	0.82	0.84	0.96
$PM_{2.5}$	0.05	0.03	0.03	0.03	0.03	0.33	0.33	0.38
PM_{10}	0.05	0.03	0.03	0.03	0.03	0.39	0.39	0.44
TSP	0.05	0.03	0.03	0.03	0.03	0.39	0.39	0.44
Direct emissions from rail maintenance, shunting, and auxiliary operations (c)								
Carbon monoxide (CO)	6.73	6.46	6.96	6.20	6.48	7.02	6.56	19.02
Non-methane volatile organic compounds (NMVOCs)	2.92	2.81	3.02	2.69	2.82	3.05	2.85	8.27
Nitrogen oxides NO_x (as NO_2)	32.95	31.62	34.07	30.36	31.76	34.40	32.14	93.16
Sulphur oxides SO_x (as SO_2)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04
$PM_{2.5}$	0.86	0.83	0.89	0.79	0.83	0.90	0.84	2.44
PM_{10}	0.91	0.87	0.94	0.83	0.87	0.95	0.88	2.56
TSP	0.96	0.92	0.99	0.88	0.92	1.00	0.93	2.70
Direct emissions from vehicles used (d)								
Carbon monoxide (CO)	0.22	1.15	2.16	3.08	3.71	4.65	5.25	3.08
Non-methane volatile organic compounds (NMVOCs)	0.04	0.12	0.22	0.28	0.34	0.41	0.46	0.48
Nitrogen oxides NO_x (as NO_2)	0.46	0.54	0.71	0.58	0.68	0.68	0.71	0.24
Sulphur oxides SO_x (as SO_2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$PM_{2.5}$	0.04	0.04	0.04	0.02	0.02	0.01	0.01	0.00
PM_{10}	0.04	0.04	0.04	0.02	0.02	0.01	0.01	0.00
TSP	0.04	0.04	0.04	0.02	0.02	0.01	0.01	0.00
Total emissions from Adif-Alta Velocidad's own activities								
Carbon monoxide (CO)	**26.69**	**26.29**	**24.38**	**25.18**	**26.99**	**35.39**	**35.92**	**42.01**
Non-methane volatile organic compounds (NMVOCs)	**6.70**	**6.76**	**7.25**	**7.13**	**7.71**	**8.82**	**7.57**	**12.40**
Nitrogen oxides NO_x (as NO_2)	**101.93**	**87.81**	**81.01**	**66.53**	**66.19**	**79.76**	**76.50**	**130.43**
Sulphur oxides SO_x (as SO_2)	**50.13**	**39.44**	**18.08**	**7.88**	**5.49**	**7.46**	**6.77**	**5.69**
$PM_{2.5}$	**3.43**	**3.06**	**2.71**	**2.57**	**2.68**	**3.33**	**3.08**	**4.32**
PM_{10}	**4.31**	**3.85**	**3.22**	**3.11**	**3.21**	**3.98**	**3.68**	**4.91**
TSP	**5.37**	**4.81**	**3.97**	**4.02**	**4.15**	**5.03**	**4.66**	**5.79**

* Data revised in relation to the 2023 Environmental Report

(a) Estimated using recorded electricity consumption and air emissions data from generation facilities for the years 2005 to 2023 by MITERD in 2025.

(b) Estimated based on fuel consumption data (diesel C and natural gas) and emission factors from the EMEP/EEA Air Pollutant Emission Inventory Guidebook 2023. See Table 3.9 for NFR category 1.A.4.a. for liquid fuels and Table 3-8 for NFR category 1.A.4.a. for gaseous fuels.

(c) Estimated based on recorded fuel consumption (diesel B) and emission factors from the EMEP/EEA Air Pollutant Emission Inventory Guidebook 2023, Table 3.1, NFR Category 1.

(d) Estimated based on recorded fuel consumption (diesel A, gasoline, autogas, compressed natural gas) and emission factors for road transport from the EMEP/EEA air Pollutant Emission Inventory Guidebook 2023 and the Spanish Emission Inventory System, specifically for combustion in road transport. All of these consider the specifications of the different types of fuels.

In 2024, indirect emissions from generation plants, attributable to electricity consumption in Adif-Alta Velocidad´s own activities, were the main source of sulphur oxide emissions (82.6%).

In 2024, direct emissions from rail maintenance, shunting, and auxiliary operations at Adif-Alta Velocidad represented the main source of emissions of nitrogen oxides (71.4%), carbon monoxide (45.3%), particles with a diameter of less than 2.5 microns (56.4%) and non-methane volatile organic compounds (66.7%).

5. SUSTAINABLE USE OF RESOURCES AND CIRCULAR ECONOMY

5. SUSTAINABLE USE OF RESOURCES AND CIRCULAR ECONOMY

CONSUMPTION

! Adif-Alta Velocidad periodically calculates indicators related to its consumption of railway material, water, energy, and fuels

Consumption of railway materials

3-3 | 301-1

The main material consumption at Adif-Alta Velocidad is railway materials (such as sleepers, rail, and ballast) used in infrastructure maintenance operations.

Ballast, with a consumption of 408,546 t in 2024, accounted for 86.2% of the railway material used in infrastructure maintenance. It is sourced from quarries approved by Adif-Alta Velocidad that have the necessary Environmental Impact Studies and Restoration Plans.

Chart 14. Distribution of material consumption in infrastructure maintenance activities. Year 2024 (%)

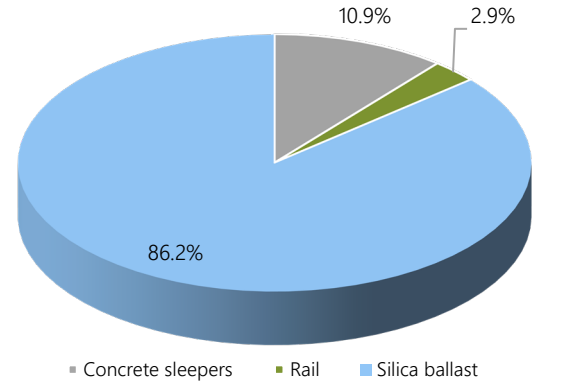


Table 8. Consumption of railway equipment in infrastructure maintenance operations *

	2015	2016	2017	2018	2019	2020	2022	2023	2024
Wooden sleepers									
Total (units)	24	-	-	-	-	-	81	-	8
Total (t)	1	-	-	-	-	-	5	-	0,5
Concrete sleepers									
Bi-block (units)	400	-	72	554	-	9,360	-	4,209	468
Monoblock (units)		-			66,621	45,372	101,100	12,737	172,503
Total (units)	400	-	72	554	66,621	54,732	101,100	16,946	172,971
Total (t)	100	-	18	139	19,986	15,484	30,330	4,663	51,845
Rail									
Rail 60 kg (m)	1,679	503	1,756	1,771	34,949	7,150	22,969	66,701	163,493
Rail 54 kg (m)		-			1,062	11,898	4,350	-	69,722
Rail 45 kg (m)		-				-	-	-	0
Total (m)	1,679	503	1,756	1,771	36,011	19,048	27,319	66,701	233,215
Total (t)	89	30	93	94	2,162	1,082	1,621	4,016	13,663
Silica ballast									
Total (m^3)	50,196	60,861	45,557	52,274	80,474	16,317	96,185	170,008	272,364
Total (t)	77,804	94,334	70,613	81,025	124,734	25,291	144,277	255,012	408,546
Total (t/ year)	**77,995**	**94,364**	**70,725**	**81,257**	**146,883**	**41,857**	**176,233**	**263,691**	**474,054**

** No consolidated data for the year 2021.*

Source Adif, Corporate Conservation and Maintenance Department, Technical Sub-Department, Operations and Stores Department; Adif, Rail Area Management, Infrastructure and Rail Deputy Sub-Department, Technical Sub-Department.

The construction of new railway infrastructure also involves significant consumption of railway equipment, with quantities varying widely depending on the construction phase.

Table 9. Rail consumption recorded during the construction of new high-speed lines (HSLs)

	2017	2018	2019	2020	2021	2022	2023	2024
Rail (t)	11,815	21,638	46,312*	26,049	6,327	4,905*	12,492	9,713
Monoblock sleepers (units)	91,181	213,324	228,136*	106,129	40,969	73,590*	77,472	114,778
Bi-block sleepers (units)	0	2,137	236,703	4,485	25,731	1,728	33,121	220
Ballast (t)	416,773	638,051	728,806	453,026	67,444	219,828*	244,599	12,449
Total (t)	**455,942**	**723,686**	**890,899***	**511,811**	**91,208**	**247,156***	**286,957**	**56,640**

** Data revised in relation to the 2023 Environmental Report.*

Source: Adif-Alta Velocidad, Corporate Technical Planning Sub-Department for Rail Assembly and Supplies.

Consumption of hazardous substances

Substances that deplete the ozone layer

305-6

Chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), which are regulated under Regulation 1005/2009 on substances that deplete the ozone layer, are used in existing stationary air conditioning and refrigeration equipment and systems.

Adif-Alta Velocidad has inventoried a total of fifteen (15) pieces of equipment in the stations managed by the Stations Sub-Department.

The use of such equipment is still permitted, albeit with some limitations. Equipment cannot be recharged with new CFCs and HCFCs. Regenerated or recycled HCFCs cannot be used for the maintenance or servicing of this equipment since 31 December 2014. HCFCs in air-conditioning and refrigeration equipment should be recovered during maintenance and servicing, or before dismantling, disposal, destruction, recycling, or reclamation.

Table 10. Inventory of equipment containing HCFCs as of 31 December 2024 *

Passenger Stations Sub-Department	Stations	Equipment containing HCFCs (no.)	HCFC load (kg)
North-west	-	-	-
West	-	-	-
North	-	-	-
North-east	1	1	6
East	-	-	-
Centre	-	-	-
South-west	-	-	-
South	1	14	46.82
Total	**2**	**15**	**52.82**

* Inventory corresponding to all stations managed by the Stations Sub-Department.

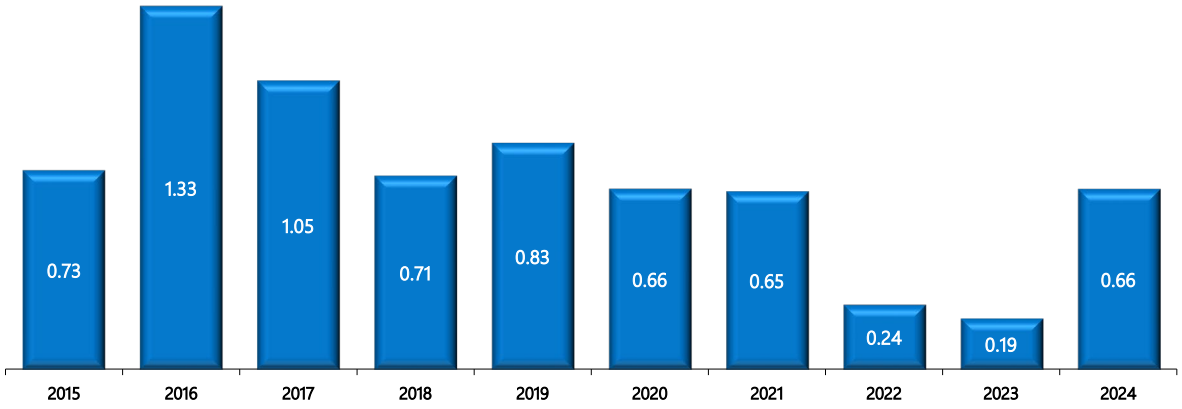
Source: Adif, Corporate Safety, Processes, and Corporate Systems Department, Quality and Environment Division.

Herbicide consumption

To prevent the growth of herbaceous plants that could affect traffic safety and to reduce the risk of fires along the tracksides, herbicide treatments are carried out periodically. These treatments are applied using automated irrigation systems on the tracks and in stations, as well as with autonomous mobile equipment in stations and other areas.

In the past year, the use of herbicides per unit of treated area on railway surfaces in Adif-Alta Velocidad has increased compared to the previous year.

Chart 15. Herbicide application rate on railway surfaces (application unit/m^2) *



* Unit = (l+kg)/10^3

Source: Adif, Corporate Conservation and Maintenance Department, Maintenance Department, Production Sub-Department

Table 11. Herbicide-treated railway surfaces (m^2)

Type of surface	2015	2016*	2017	2018	2019	2020	2021	2022	2023	2024
Track treatments	32,679,575	-	87,925,130	89,538,105	79,163,964	103,156,909	107,341,400	98,881,146	110,250,284	76,106,518
Station and other surface treatments	10,585	-	3,491,733	4,399,212	4,250,712	5,717,633	6,432,958	7,211,683	9,018,634	13,185,900
Total	**32,690,160**	**53,553,303**	**91,416,863**	**93,937,317**	**83,414,676**	**108,874,542**	**113,774,358**	**106,092,829**	**119,268,918**	**89,292,418**

* No separate information is available for track treatment versus the treatment of stations and other surfaces.

Source: Adif, Corporate Conservation and Maintenance Department, Maintenance Department, Production Sub-Department

Table 12. Products used in herbicide treatments of railway surfaces

Product type	2015	2016	2017	2018	2019	2020	2021*	2022	2023	2024
Liquid products (l)	23,636	71,038	88,548	64,352	63,990	71,807	-	23,984	20,549	56,394
Solid products (kg)	136	0	7,770	2,102	4,969	42	-	1,194	1,662	2,453
Total (l +kg)	**23,772**	**71,038**	**96,318**	**66,454**	**68,959**	**71,849**	**74,002**	**25,178**	**22,212**	**58,847**

* No differentiated information between liquid and solid products is available.

Source: Adif, Corporate Conservation and Maintenance Department, Maintenance Department, Production Sub-Department

Water consumption

303-1 | 303-5

The main water consumption in Adif-Alta Velocidad's activities is for sanitary purposes and facility cleaning. This water is primarily sourced from public water supply networks.

In addition, there is relatively minor consumption from wells, for which no quantitative information is available.

In 2024, **Adif-Alta Velocidad**'s annual water consumption from public networks was equivalent to the amount used in one year by the households of a town with 347 residents, similar to Almendral de la Cañada (Toledo).

Adif-Alta Velocidad's annual water consumption accounts for 0.0023 % of the volume of water lost due to leaks or breaks in public distribution networks across Spain.

Table 13. Consumption of mains water in Adif-Alta Velocidad's own activities *, ***

	2015	2016	2017**	2018	2019**	2020	2021**	2022**	2023**	2024
Water consumption (m^3)	115,224	109,472	155,326	32,698	26,679	15,697	17,350	14,991	11,419	16,192

** Calculated from turnover and based on the average water prices in Spain from the INE (National Statistics Institute) series 2000-2014, 2016, 2018, 2020 and 2022. For the years 2015, 2017, 2019, 2021, 2023 and 2024 the average prices of 1.81, 1.89, 1.96, 2.00, 2.03 and 2.03 €/m^3 have been estimated based on the trend of the series 2000-2014, 2016, 2018, 2020 and 2022.*

*** Data revised in relation to the 2023 Environmental Report.*

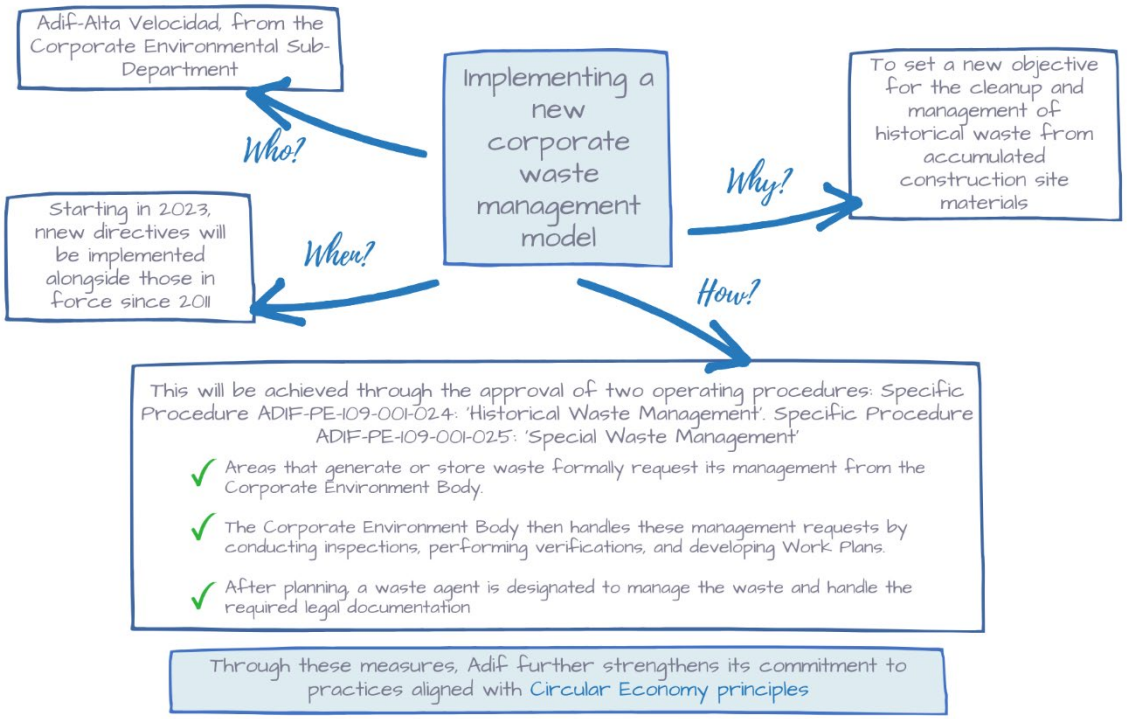
**** From 2018 onwards, a reallocation of assets has altered the accounting for water consumption.*

Source: Adif, Corporate Finance and Management Control Department, Economic Management and Financing Department, Sub-department of Fees and Tax Relations

WASTE

3-3 | 306-1 | 306-2 | 306-3 | 306-4 | 306-5

Adif carries out the activities related to the 'Comprehensive management of maintenance of operating lines owned by Adif-Alta Velocidad' and the 'Comprehensive management of stations assigned to Adif-Alta Velocidad' based on the 'Management delegation agreement between Adif-Alta Velocidad and *Administrador de Infraestructuras Ferroviarias* (Adif), in which Adif is entrusted with the management responsibilities. Adif oversees the execution of material or technical activities as approved by the Resolution of 10 January 2020, issued by the Presidency of Adif-Alta Velocidad.



Therefore, waste-generating maintenance activities related to Adif-Alta Velocidad owned infrastructure are managed by Adif. No waste management activities by Adif-Alta Velocidad were recorded in 2024. Nevertheless, Adif manages waste in accordance with a set of criteria based on a management model aligned with the principles of the Circular Economy:

- In all Adif projects, actions, services, and supplies consider reuse criteria for any surplus materials from the planning and definition phase onward. To this end, the organisation has internal procedures to ensure that reuse is carried out in accordance with current legislation, thereby minimising the risks associates with the improper use of railway materials beyond their intended purpose.
- Construction sites that generate construction and demolition waste (CDW) are generally managed by external contractors, who are responsible for removing the waste during the construction process. To ensure proper management, compliance

with the environmental clauses included in the contracts is monitored.

- As of 2021, Adif's corporate waste management model was expanded by the Environment Sub-Department, which had already been operating since 2011 in the specific area of hazardous waste. From 2023 onwards, new responsibilities were incorporated through a Waste Agent, enabling the company to address the complex task of cleaning up and managing both historical waste and third-party waste through authorised waste managers.
- This new waste management model also aims to prevent unnecessary accumulation and reduce environmental and safety risks. It requires that all waste generated from actions carried out under third-party contacts be managed by the contracting companies within the scope of these actions.

Commercial and municipal-like waste, primarily generated at Adif-Alta Velocidad's stations, logistics centres, and administrative buildings, is managed either by public cleaning services or waste collection services or by waste managers authorized by the regional governments.

For the collection of this waste, a total of 295,353.67 euros were paid in 2024 in waste collection fees, which were passed on to Adif-Alta Velocidad.

Table 14. Fees paid for waste collection (€/year)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Fees paid	219.145	118.212	234.752	276.727	260.604	260.006	254.080	244.068	277.786	296.842	295.353,67

Source: Adif, Corporate Finance and Management Control Department, Corporate Economic Management and Financing Department.

ACTIONS IN THE CIRCULAR ECONOMY

3-3 | 306-2

Adif-Alta Velocidad´s collaboration in the Spanish Circular Economy Strategy

Adif and **Adif-Alta Velocidad** have collaborated on the development of the Spanish Circular Economy Strategy 2030 prepared by the Ministry for Ecological Transition and the Demographic Challenge and approved by the Council of Ministers in June 2020.

They have also participated in defining the 1st Circular Economy Action Plan (CEAP) 2021-2023 and the 2nd CEAP 2024-2026, which are part of this Strategy, contributing to six initiatives in the areas of Consumption, Waste Management, the Secondary Raw Materials Market, and Employment and Training.

The projects that form part of this Action Plan are:

- ***Ecomilla*** **Project, a commitment to sustainable mobility in urban environments**

The aim is to create spaces in railway stations that promote sustainable urban multimodal transport. In April 2024, the consultancy exercise was completed, working to establish the foundations of the *Ecomilla* model to be implemented, ensuring consistency across all stations.

42 secure bicycle racks are being installed at Adif and **Adif-Alta Velocidad**, stations, allowing passengers to travel safely from their starting point to the station using a zero-emission means of transport.

The supply, installation, operation, and maintenance of more than 1,000 electric vehicle charging points, powered by renewable energy, across the car parks of 80 Adif and **Adif-Alta Velocidad** passenger stations has been awarded.

- **Creating a Catalogue of environmental criteria for the procurement of railway infrastructure**

To facilitate the inclusion of good environmental practices in public procurement processes and in line with the changes introduced by the new Public Sector Contracts Act, work is being conducted to prepare a Catalogue of environmental criteria. This Catalogue will address aspects such as lower environmental impact, savings and efficient use of water, energy, and materials, environmental life cycle costs, waste generation and management, the use of recycled or reused materials or ecological materials, increased use of renewable energy, and reductions in GHG emissions, carbon footprint. These criteria will be applied during the different phases of the public procurement process.

To this end, a working group has been established to define and review the environmental clauses of the Catalogue and to prepare a guide for its use. In 2024 the Catalogue of Clauses and the Guide to the Use were drafted and technically validated and are now waiting Legal Department approval. This review will be carried out on a case-by-case basis, incorporating as many clauses as possible from the catalogue into a series of pilot contracts. Once implemented, the catalogue will be monitored and updated in line with identified needs.

» The Catalogue outlines clauses by contract type (cross-cutting, services, supplies, projects, and works), categorised into four types: technical solvency and award criteria for the contractor selection phase, and technical specifications and special conditions of execution for the contract execution phase

- **Comprehensive programme for the social recovery of disused railway assets, creating value through entrepreneurial ventures or public service projects**

The aim of the programme is to encourage the reuse of these assets and buildings, integrating them back into the productive cycle.

» 26 properties that have been repossessed and leased under this programme

- **Effective management of surplus soil from construction sites (excavated natural material and topsoil) in conformity with the waste hierarchy principle**

Some projects promoted by Adif and Adif-Alta Velocidad generate large volumes of surplus soil that cannot be used in the project itself and are classified as construction and demolition waste if they cannot be managed on-site. In line with the waste hierarchy, waste generation will be prevented by promoting reuse, recovery, and enhanced recycling.

» 13.20% of natural material excavated from other construction sites or sourced from authorised recovery centres is reused on site as a substitute for raw materials

» On 97.2% of the area to be occupied, topsoil is recovered and stockpiled

» 92.45% of correctly preserved soil on site is reused in restoration work

» 8.93% of the natural material excavated, uncontaminated, is reused in the construction itself

» 47.82% of surplus, uncontaminated natural material is prepared for recovery and 13.5% is recovered by an authorised external manager

- **Valorisation through recycling of CDW**

Adif promotes the recovery of non-hazardous CDW (excluding natural excavated material) through recycling at the construction site, at another Adif construction site or, when this is not possible, by delivery to authorised recovery companies. On-site recovery of CDW offers multiple environmental advantages. However, under certain circumstances, this is not feasible, and delivery to authorised recovery companies is encouraged.

» 16.88% of non-hazardous CDW is recovered on site or at another ADIF site, and 76.07% is delivered to an authorised recovery manager

- **Review of the waste management model at Adif and Adif-Alta Velocidad**

Building on the positive experience since 2011 with centralised management of hazardous waste from Adif's own activities, this approach has now been extended to other waste streams and types.

The review of the model covers the management of the following types of waste:

- Historical: waste originating from the disposal of materials collected mainly from old construction sites prior to July 2020.
- Hazardous: originating from maintenance work (rather than construction work) carried out by Adif.
- Special: waste originating from maintenance work (not construction work) carried out by Adif, as well as waste derived from track and facility cleaning and third-party spills.
- On a temporary basis, any construction materials collected after July 2020 and before July 2022 that were not covered by the removal and management of waste in the execution contracts.

» 16.88% of non-hazardous CDW is recovered on site or at another ADIF site, and 76.07% is delivered to an authorised recovery manager

- **Promoting the use of sustainable materials and management techniques in railway stations.**

Station architecture projects will be encouraged to use sustainably managed materials and

techniques, based on the following requirements: the use of local materials, recycled materials, recyclable furniture and materials, and certification for any wood or forest products used.

» 14 projects have already been completed, with at least 10% of their material execution budget allocated to sustainable solutions

The following are some of these on-site actions that stand out for their contribution to the main environmental objectives defined in the Taxonomy Regulation (EU REGULATION 2020/852), and which by their nature deserve to be described in more detail.

Optimisation and protection of hydrogeological resources. New access channel to Valencia

The protection of the hydrogeological environment and the optimisation of water resources are becoming increasingly important in light of current climatic conditions, particularly in areas where water availability may be reduced by prolonged droughts and rising long-term average temperatures.

Aware of this, **Adif-Alta Velocidad** is implementing a range of practices to optimise the use of this vital resource, minimising consumption and promoting its reuse whenever possible.

A significant example is the construction works to underground the New Access Channel for High-Speed Rail Integration in Valencia. Their execution requires the extraction of large volumes of groundwater, which, if properly managed, can supply nearly all the water needed for the works.

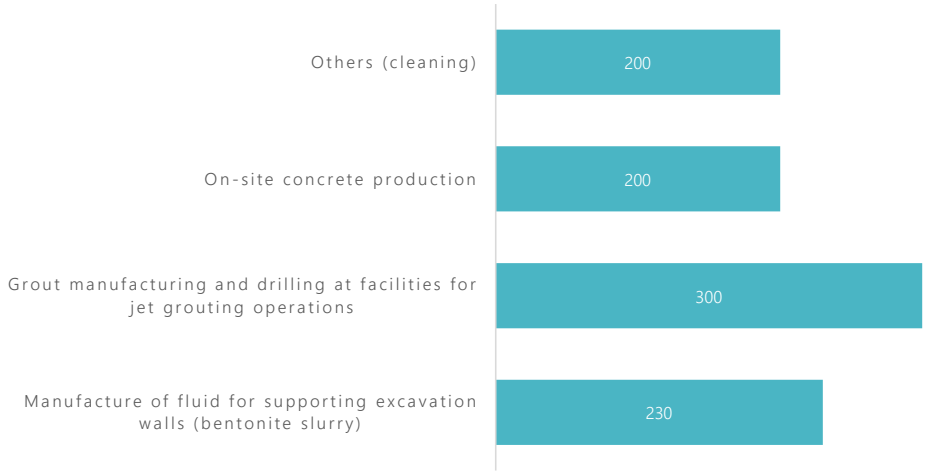
During 2024, the necessary infrastructure was installed to this end, consisting mainly of equipment to pump water from the groundwater table into a set of decanters, from which it is conveyed to a storage tank with a capacity of 332 m^3.

Figure 9. Aerial view of the water deposits and decanters installed next to the concrete plant

Once the corresponding analytical checks have been carried out, the water is reused in various construction processes and site installations that require it, and also for measures to minimise environmental impacts on the surroundings, such as watering and washing down the site roads and wheel-washing areas at the accesses points to mitigate dust and mud.

It is estimated that the implementation of these measures enabled the reuse of more than 28,000 m^3 of water from the groundwater table during 2024, equivalent to filling 11 Olympic-size swimming pools. This figure is expected to rise significantly in the upcoming years due to the increased production demand, which can be fully met through the reuse of extracted water.

Chart 16. Estimated water consumption (m^3/day)



Finally, it should be noted that since the start of the works, a piezometric network has been installed, enabling both qualitative and quantitative monitoring of potential changes in the groundwater table, as well as the effectiveness of the on-site protection measures, with no significant effects detected to date.

Reuse of bentonite waste in the works of the New Access Channel for the Integration of the High-Speed Railway in Valencia

As part of its continuous improvement in waste management, additional measures are adopted during the works that were not included in the original Construction Project. These measures are incorporated by the contractor into his Waste Management Plan, which serves as a living document that evaluates alternatives for the comprehensive management of waste generated.

An example of this can be found in the construction of the new access channel for the integration of high-speed rail in Valencia.

In this case, to excavate the tunnel, the works have been divided into watertight enclosures, allowing excavation below the groundwater table without the need to excessively lower it. To create these enclosures, plastic diaphragm walls were designed transversally to the tunnel, as originally planned in the concrete construction project.

Figure 10. Plastic plant operation (left) and bentonite slurry plant operation (right).

Plastic mortar is a mixture of cement, sand, water, and a proportion of bentonite. Bentonite is a fine-grained clay widely used in civil engineering for its swelling properties, which enable it to seal fissures and cracks in rocks, absorbing moisture to prevent tunnel or excavation collapse.

To reduce bentonite consumption, the bentonite that had been used and recycled on several occasions for the stabilisation of the ground during the excavation of the diaphragm walls was reused, once it was confirmed to meet the required technical specifications. In total, about 1,490 tonnes of bentonite slurry from the diaphragm wall construction were used in the construction of the plastic diaphragm walls.

This approach not only completely eliminated bentonite waste generation but also reduced water consumption, since 95% of the water used in mortar production came from the water contained in the bentonite slated for disposal.

Recovering this waste also avoided the use of external resources at the worksite, eliminating the need for raw material extraction, production, and transport, thereby fostering a circular economy.

Figure 11. Aerial view of the bentonite slurry deposits used during the construction of the slurry walls

Reuse of surplus soil and rock from the High-Speed Line Construction

One of Adif-Alta Velocidad's environmental goals is to minimise waste generation and to maximise the recovery of unavoidable waste, by implementing a sustainable economic model aimed at reducing its ecological footprint.

The construction of linear railway infrastructure, by its very nature, involves moving large volumes of soil and rock, which are primarily reused in the constructing the platform itself. Surpluses that do not meet the technical requirements for in situ reuse must be managed externally. For these surpluses, priority has been given in other projects, in the restoration of degraded areas, or by delivering them to authorised managers for recovery, thereby promoting a circular economy model.

During 2024, 11,427,218 m^3 of clean soil and rock generated during excavation were recovered for use in other land-deficient works and in the restoration of environmentally degraded areas, for ecological or agricultural recovery.

Examples include the restoration of old quarries or mine shafts near the worksite.

In the section of the High-Speed Railway through Alicante province, and as a result of the drainage improvement works around the Fuente la Higuera tunnel, the generation of approximately 550,000 m^3 of surplus soil was anticipated.

Figure 12. Backfilling work during the restoration of the mining void

In this case, after selecting the most environmentally sustainable alternative, most of the surplus material is being reused in the restoration of an old quarry near the site, to rehabilitate the land for cultivation.

In 2024, more than 180,000 m^3 of clean soil and rock were recovered for this purpose.

Figure 13. Mining pit levelled and conditioned to the level of the adjacent plots

Once the land has been prepared, levelled, ploughed, and enriched with organic matter, almond trees will be planted, completing the recovery of an area of over 70,000 m^2 – roughly equivalent to 10 football pitches.

Another example is found on the Palencia - Aguilar de Campo high-speed railway, specifically on the Palencia Norte - Amusco section. It is estimated that about 924,225 m^3 of surplus soil will be generated during the execution of the project, and part of this surplus was proposed for recovery in an abandoned mining site located just 500 m from the alignment under construction.

Figure 14. Condition of the quarry before work commenced

To this end, a restoration project was drawn up and the necessary permits obtained for backfilling and restoring the La Cerámica quarry in Monzón de Campos using soil from the construction site. By the end of 2024, a total of 360,414 m^3 of clean soil and rock had been recovered from this site.

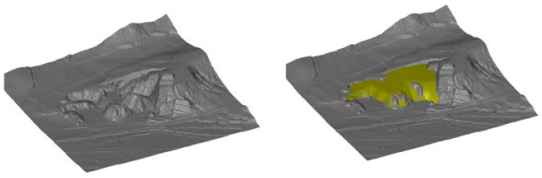


Figure 15. Soil landfill planned for the restoration of the quarry

This rehabilitation proposal aims to restore the affected land for agricultural use, reintegrating it into the environment, with a final rehabilitated area of 28,700 m^2, providing social benefits to residents of the nearby municipalities.

Figure 16. Current state of the quarry once filling with soil from the construction site has begun

In addition to recovering degraded areas and minimising waste, these actions – being close to the construction site – offer further environmental benefits by reducing transport-related nuisances, lowering the carbon footprint, and supporting the local economy through the restauration of agricultural use.

Recovery and reuse of Construction and Demolition Waste *in situ* during the execution of the Murcia-Almeria works of the Mediterranean Corridor

From the drafting phase of construction projects, the minimisation and reuse of construction and demolition waste (CDW) is set as a priority environmental objective. To this end, projects include, in line with the applicable regulations, a Waste Management Study that provides the basis for planning waste management. Once the work are underway, all improvement measures that

enable the most efficient and environmentally sustainable management of the waste generated are implemented.

Since the start of the works that make up the Mediterranean Corridor, as part of Adif-Alta Velocidad's commitment to achieving the DNSH (Do Not Significant Harm) objectives, a series of actions have been implemented to promote the recovery of Construction and Demolition Waste. These measures have ensured compliance with the established targets, reaching average reuse and recovery values of 90% by the end of 2024.

One of the most important of these actions is the installation of mobile crushing plants for the in-situ recovery of stone-based waste. This process produces a material that con be reused directly on site, thereby reducing the need for natural resources. Moreover, minimising the transport of these waste volumes significantly contribute to lowering the carbon footprint.

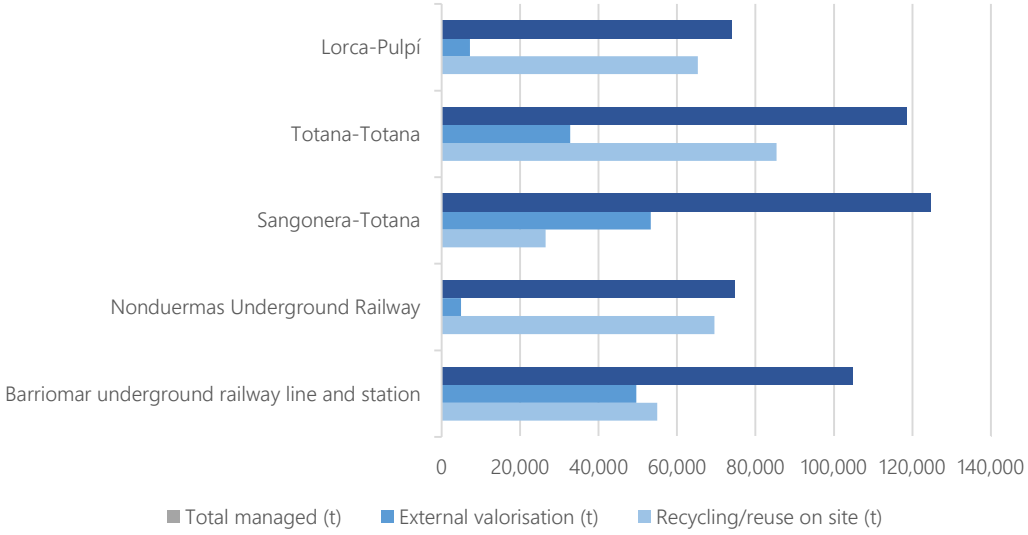
These plants have been deployed across different sections of the Mediterranean Corridor works, particularly in those involving demolition activities, where larger volumes of CDW are generated.

Figure 17. Crushing plant located on the Nonduermas Underground works

Figure 18. Recycled aggregates prepared for use on site

The graph below shows the absolute values (in tonnes) of reuse and recovery – both internal and external – of the total waste managed at source in different sections of the active platform of the Murcia-Almeria High-Speed Railway, part of the Mediterranean Corridor, where in situ crushing plants were installed during 2024:

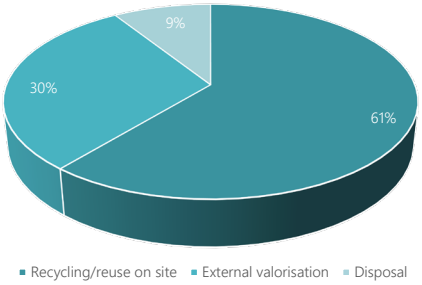
Chart 17. Treatment of waste managed by type of construction project (t)



As shown in the graph, recovery and reuse in situ in the mentioned works – largely driven by measures such as the installation of mobile crushing plants – resulted in the use of more than 300,000 tonnes of construction and demolition waste by December 2024. This represents 61% of the total waste managed in the aforementioned actions.

Promoting this type of measures also contributes to mitigating other environmental impacts, notably by reducing the carbon footprint through avoiding waste transport and by minimising the extraction of natural stone resources, thereby reducing the need to source raw materials from quarries.

Chart 18. Treatment of waste managed at the total number of construction sites (%)



Circular Economy in the works of the Basque Country High-Speed Line: Environmental benefits of reusing materials and resources

As part of **Adif-Alta Velocidad**'s commitment to applying the waste management hierarchy and the best available techniques, works are being carried out on the Bergara node, the most complex section of the "Y Vasca" route, where the railway must pass though the karstic Udalaitz massif – a major environmental and technical challange.

The construction works on the Mondragón – Elorrio – Bergara section (Sector 2) include the execution of the East Udalaitz and West Udalaitz tunnels (each over 4,600 m long) and the East

and West Karraskain tunnels (each over 500 m long).

The large volumes of surplus excavation material generated by these works make it necessary to allocate extensive areas for their final disposal, which carries environmental impacts in terms of land take in natural areas and greenhouse gases emissions.

The surplus excavation material expected for the entire construction project amounts to 1,040,888.16 m^3, of which approximately 766,802.64 m^3 come from the Udalaitz tunnels and 74,167.96 m^3 from the Karraskain tunnels, according to project data. Part of this surplus consists of high-quality limestone that can be used in concrete production. In this way, the project has valorised a total of 645,018.20 t of limestone, which has been processed into aggregate suitable for concrete manufacture, representing for 26.4% of the total excavated material. To this end, auxiliary facilities were set up near the southern portal of the Udalaitz tunnels, including a stone crushing and screening plant as well as a concrete batching plant.

In terms of circular economy, this has meant for the construction project the following:

- **Savings in raw materials**, consumption, mainly in concrete aggregates.
- **A reduction in the carbon footprint,** linked to the following activities: transporting excavation materials from the construction site tunnels to disposal sites, extracting raw materials at off-site plants, and transporting aggregates from external quarries.

Table 15. Summary of the data and emission savings generated

Activities	Cuantity (equivalent CO_2 kg)
Transfer of excavation material from the tunnel to the site surplus stockpiles.	51,002.87
Extraction of aggregate at an off-site plant	3,031,585.54
Transfer of concrete aggregate from external quarry to the construction site	86,704.89
Total saved	3,169,193.30

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

In addition, this action delivers substantial environmental benefits by minimising environmental impacts associated with raw material extraction and avoiding additional land take for the final disposal of surplus excavation material.

All these measures contribute to the achievement of several Sustainable Development Goals (SDGs) set out in the 2030 Agenda, namely:

- SDG 6. Clean water and sanitation
- SDG 13. Climate action
- SDG 15. Life on land

Figure 19. General view of East and West Udalaitz's tunnels during the construction phase (MEB worksite, Sector 2)

6. POLLUTION PREVENTION

6. POLLUTION PREVENTION

DISCHARGING

3-3 | 303-2 | 303-4

The main discharges originating from Adif-Alta Velocidad's activities are sanitary wastewater from the public toilets in the stations.

At busy stations, sanitary wastewater is directed to public sewage networks for treatment at existing wastewater treatment plants.

Fees for sewerage, sanitation, and wastewater treatment amounted to 17.733,60 euros in 2024.

Table 16. Stations managed by Adif-Alta Velocidad as of 31 December 2024

Operational Sub-Department/Sub-Department	Adif - Alta Velocidad	Circulation and Capacity Management	Passenger Stations	Total
Centre	1	1	4	**6**
North-west	0	3	7	**10**
South	0	0	7	**7**
East	0	0	4	**4**
North-east	1	0	5	**6**
North	0	0	3	**3**
HS line traffic management	0	4	16	**20**
Total	**2**	**8**	**46**	**56**

Source: Adif, Corporate Traffic and Capacity Management Department, Corporate Coordination and Management Sub-Department.

Table 17. Treatment of discharges at Stations, as of 31 December 2024

Sub-department of Operations	No. of stations with sewage treatment system, septic tank, or connection to the public sewage system
Centre	7
North-west	9
South	9
East	10
North-east	7
North	4
Total	**46**

Source: Adif, Corporate Passenger Stations Department.

Table 18. Investments made by the Corporate Traffic and Capacity Management Department in wastewater treatment, septic tanks and/or connections to public sewerage networks (€/year)

Autonomous Community	2021	2022	2023	2024
Andalusia	-	30,190.00	30,190.00	-
Valencian Community	9,997.77	-		-
Castile-La Mancha	23,927.75	-		-
Catalonia	-	107,350.12		-
Galicia	5,192.92	-		-
Total	**39,118.44**	**137,540.12**	**30,190.00**	**-**

Source: Adif, Corporate Passenger Stations Department.

CONTAMINATED SOILS

3-3

If contaminated soils are encountered during the execution of a project contracted by Adif-Alta Velocidad, the contractor must provide and plan all necessary resources for managing these soils, as stipulated in the construction project or its revised plans. In this aspect, requests for advice on the management of potentially contaminated soils in projects and on construction sites are received and answered.

In 2024, during the execution of high-speed line construction projects, the following environmental actions have been undertaken regarding potentially contaminated soils:

Characterisation of contaminated soils, environmental impact assessments, and the provision of engineering and environmental consultancy services for the execution of the standard gauge connection to the Mediterranean Corridor at the La Llagosta multimodal platform (Barcelona)

The new multimodal terminal at La Llagosta will feature a reception and dispatch yard with five parallel tracks, each over 750 meters long, equipped with mixed gauge and electrified at 3,000V. Additionally, the installation will include a four-track bundle for loading and unloading Unit Load Devices (ULDs) under a gantry crane, as well as another track for loading and unloading general merchandise.

Access to the terminal will also be improved with a standard gauge connection to the Mediterranean Corridor from the viaduct of the Barcelona-French border high-speed line, adaptations to mixed gauge between La Llagosta and the El Papiol-Mollet line, and a southern connection to the local train network.

Finally, to facilitate the operation of the terminal, several ULDs transfer, and storage platforms will be constructed, covering an area of approximately 12 hectares.

The development of the project requires clearing and levelling the existing surface to create a uniform platform.

The plot where the platform is to be built covers an area of approximately 202,500 m^2. Since the mid-1990s, the site has been occupied by a logistics platform primarily focused on the loading, unloading, and storage of vehicles. The area features an asphalt surface with various above-ground facilities, including warehouses, vehicle washes, maintenance and repair workshops, paint shops, lorry parks, offices, and fuel tanks. It also contains several underground installations, such as additional fuel tanks, hydrocarbon separators, and various types of piping. In addition to the plot initially investigated, the scope of the project was extended to another annexed plot to the west, towards Barcelona, on which there was a metallurgical industry (Smelting Sector) dismantled in 2024.

Characterisation work on the potentially contaminated soils affected by the multimodal platform construction project began in December 2022. Prior to the field investigation, most of the above-ground facilities on the site had been dismantled and the pavement had been removed from the western half of the site, while the eastern half, which was still in use, was paved and retained some vehicle washing and maintenance facilities. Underground facilities, such as pits or hydrocarbon separators, remain buried on site.

The field investigation revealed a central area of the site where the subsoil is affected by a diverse range of waste materials (such as rubble, wood, fabrics, and plastics). The waste is unevenly

distributed in terms of depth and thickness and has different characteristics compared to the rest of the site. This area is associated with the presence of a former uncontrolled landfill.

As a result, the site has been divided into the following sectors:

- France Sector: Corresponding to the NE part.
- Barcelona Sector: Corresponding to the SW part.
- Central Sector: Roughly corresponding to the area of the old landfill.
- Vías Mango Sector: Located to the SW of the Barcelona Sector, next to the Riera Seca.
- Foundry sector, SW of Vías Mango.

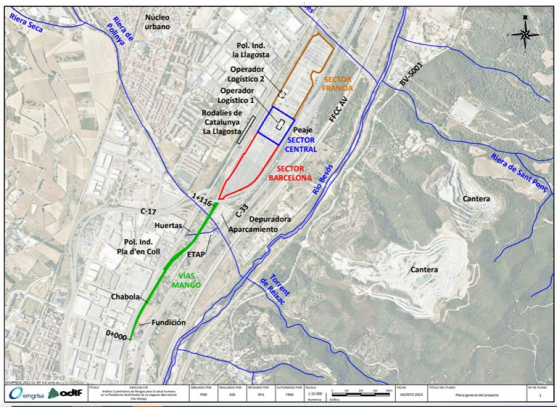


Figure 20. Distinct sectors at the La Llagosta site

The sampling campaign designed for characterising the subsoil and groundwater at the site included an initial inspection, test pits, piezometric soundings, geophysical prospecting (such as refraction seismic and electrical tomography), and waste characterisation in accordance with RD 646/2020 of 7 July, which regulates landfill waste disposal, as well as waste hazard testing.

The soil and groundwater samples obtained in the test pits and boreholes were analysed for the parameters included in RD 9/2005, total petroleum hydrocarbons (TPH) and heavy metals regulated in Catalonia (DL 1/2009, 21 July).

According to the research carried out, the subsoil of the study area is made up of the following levels:

LEVEL I+II+III: Superficial fill of brown or yellowish-brown clay or silty clay with fractured slate blocks and occasionally debris.

LEVEL IV: Residue. Clay fill with remains of plastics, fabrics, drums, bricks, pipes and rubble, black in colour and with a strong smell of hydrocarbons and organic matter. This level has only been observed in the Central Sector of the plot and has a heterogeneous distribution in terms of depth of occurrence and very variable recognisable thicknesses.

In this case, an uncontrolled dumping of various materials from construction sites, urban waste and industrial activities was deposited directly on the original topography, filling the hollow resulting from the extraction of aggregates and giving rise to an irregular mass of heterogeneous materials. In the mid-1990s, the area filled with waste and the surrounding area was covered with anthropic fill until it reached the current level and generated a large-scale levelling for the construction of the logistics platform. It appears from depths ranging between 0,70 and 3,60 m and continues up to a maximum depth of 6,10 m, with an average thickness of 2,20 m. It occupies an estimated area of 36,000 m^2, which represents 16,3% of the total area of the plot.

LEVEL V: Natural terrain. An alternation of brown or reddish-brown clays and coarse sands, occasionally with rounded boulders. This is an alluvial-colluvial formation associated with the flood plain of the River Besós.

Detected environmental impacts:

In general, there is little impact on the soils of the site, except in the Central Sector. The generalised presence of arsenic of geogenic origin has been detected in the fill materials that make up Level I+II+III. The soil in the Central Sector is contaminated with a variety of compounds, particularly hydrocarbons, which are present in most samples. Additionally, high concentrations of PCBs are associated with Layer IV samples, along with lead and other heavy metals.

No effects on groundwater have been detected, except in the Central Sector, where a core sample showed the presence of hydrocarbons associated with the hydrocarbon separator and on-site scrubbers.

Environmental risk assessment:

Based on the results of the investigation, which revealed pollutant concentrations exceeding the values set by RD 9/2005, there is a need to conduct a quantitative risk analysis (QRA) to assess whether these pollutants pose an unacceptable risk to current and future potential receptors.

The QRAs conducted at the site, in the Barcelona and France Sectors, before excavation, conclude that there is no unacceptable risk to human health from the assessed receptors, except for construction workers, for those at risk from direct contact with contaminated soil and inhalation of volatile substances.

Regarding the ACR carried out in the Central Sector, the condition detected in the soil and groundwater at the site does not pose an unacceptable risk to human health for those who will work at the future facilities planned for the site and for off-site receptors. In the case of construction workers, an unacceptable risk has been detected through the inhalation of vapours and particles in outdoor environments and the accidental ingestion and/or skin contact with affected soil; this will be managed by adopting protective measures through the use of the necessary PPE.

Excavation Plan and Environmental Supervision:

An excavation plan has been developed based on the research results, outlining the guidelines for the earthworks specified in the project. It is recommended to carry out selective excavation, segregating materials according to each defined decision unit. Additionally, provide stockpile areas for the excavated soil showing signs of disturbance, ensuring they are properly waterproofed and protected.

Additionally, the excavation plan outlines the criteria for the reuse or management of the excavated material. Excavated earth from surface layers (level I+II+III) can be reused on site as long as contaminant concentrations do not exceed the SSTL (Site Specific Target Levels) previously calculated. These levels represent the maximum values for which acceptable risk indices for human health are achieved. Land that is part of the natural terrain (level V) is unaffected.

In 2024, a specific selective excavation plan was drawn up for the Central Sector, given its particular characteristics. This excavation plan, like all documentation issued previously, has been validated by the Catalan Waste Agency.

Figure 21. General view of the site during the selective excavation phase

This document establishes that excavated surface fill (levels I+II+III) may be used in other areas of the plot within the conditions set out in the construction project and does not require any

treatment. Level IV excavated waste must be removed and managed, for the most part, as non-hazardous waste and deposited in a controlled non-special waste disposal site (Class II), in accordance with the waste characterisation carried out. In addition, within the Central Sector, six 3 x 3 m^2 grids have been defined in which the soil constituting level IV waste has been identified as hazardous waste and must be completely excavated and managed as such in a Class III controlled deposit.

Figure 22. Collection of waste from pile drilling at the foot of the machine

Selective excavation work, sampling of remaining soil and sorting of different types of excavated soils according to their destination, whether for reuse on site or externally managed disposal in landfill, have been supervised by the site's Environmental Management Department, in accordance with the excavation plan.

Soil that cannot be reused on site has been collected in waterproof basins and classified as waste to determine the type of landfill to which it should be sent. To this end, landfill acceptance tests and hazard analyses have been carried out on this soil. The results of the analyses indicate that most of these materials are classified as Non-Hazardous Waste and can be managed in Class II controlled deposits.

The excavation plan includes the need to check the remaining soil across the entire work area, both at the base and on the slopes of the excavation, as well as at the top of the embankment, in order to determine the condition of the site once the planned earthworks have been completed.

Figure 23. Sampling of remaining soil at the bottom of the excavation

In the last quarter of 2024, the underground facilities that still remained on site were dismantled. Environmental monitoring of the excavation was carried out to ensure compliance with the excavation plan and applicable waste regulations. Prior to the removal of the deposits and hydrocarbon separators, their contents were emptied. This was managed as hydrocarbonated water by an authorised manager. The extracted material has been collected separately and managed appropriately according to its nature (unaffected CDW from the sumps, deposits and separators affected by hydrocarbonated waters, impacted soil, etc.).

Figure 24. Dismantling of Logistics Operator 1

Foundry Sector

The western end of the site was occupied by a metalworking industry that was dismantled in 2024.

The layout of the shunting tracks is planned to be completed up to the edge of the site, along the foundry plot. This will require the construction of a retaining wall and an embankment on which the tracks will be laid. The rest of the site will remain unchanged from its current state. To carry out the project, a longitudinal excavation 0.50 m deep is planned along a strip along the north-western boundary of the plot.

Once the smelter was dismantled, an environmental characterisation of the subsoil and groundwater on the site was carried out by means of mechanical tests.

In general terms, the contamination detected in the subsoil of the site is fairly low, although some samples exceed the established limit values for heavy metals, PCBs and TPH. At most sampling points, the contamination is limited to the top layer, up to a depth of 0.30 m, associated with the fill level.

The condition detected in the groundwater at the site does not exceed the values defined by the Catalan Water Agency (QUASAR values) or those established in RD 665/2023 for any of the compounds analysed in the piezometers.

Figure 25. General view of the smelter site during drilling of the boreholes

It was recommended to remove the topsoil to a depth of at least 0.50 m, given that the problem is mainly associated with surface fill in an area of approximately 2,832 m^2.

The excavation planned in accordance with project requirements (green strip) complies with environmental recommendations (red lines) to a large extent, which has allowed for a significant reduction in the actual area of intervention, as can be seen in the following figure.

Figure 26. Material to be excavated for stockpiling

The excavated material has been collected on a waterproof sheet and classified as waste in order to determine its hazardousness and the type of landfill where it should be managed.

Similarly, a sample of the remaining soil has been taken to guarantee the quality of the final soil, and a qualitative risk analysis has been carried out, which concludes that there are no unacceptable risks to the health of potential exposed recipients.

Drafting the excavation plan and characterizing materials for the land affected by the remodelling and extension of the Júndiz logistics terminal in Vitoria-Gasteiz (Araba)

The remodelling and integral expansion project of the Júndiz logistics terminal involves land included in the inventory of soils that support or have supported activities or facilities potentially contaminating the soil from the Basque Country. Therefore, it was necessary to prepare an excavation plan and characterize the materials to be excavated, as well as to supervise the execution of the excavation plan and investigate the quality of the remaining soil.

The characterisation of the materials began with the collection of composite samples every 500 m^3. The parameters outlined in Annex II of Decree 49/2009 of 24 February for the characterisation of waste destined for landfill, and in Annex II of Royal Decree 646/2020 of 7 July which regulates waste disposal by landfill, were analysed to determine their external management.

Subsequently, for the materials characterised as inert, simple samples were taken by material type, with decision units established at 500 m^3. In this second characterisation, the parameters defined in Law 4/2015, of 25 June, for the *Valores Indicativos de Evaluación* A and B (Indicative Assessment Values, VIE-A and VIE-B) for the prevention and correction of soil contamination by the Basque Government, as well as total TPH (C6-C40), were analysed with the aim of reusing the materials on-site.

Figure 27. Execution of test pits for sample collection

Based on the results of these characterisations, the excavation and management of the materials are carried out.

Figure 28. Loading of lorries for the reuse of soil at authorised landfill sites

Additionally, and in accordance with the requirements of the Basque Government, the quality of the remaining soil in those cells with materials characterised as non-hazardous was certified.

Figure 29. Sampling of remaining soil

As a result of the excavation work carried out, the following types and quantities of materials have been removed from the site and disposed of:

- 308.80 tonnes of soil classified as inert waste
- 3,672.45 tonnes of soil classified as non-hazardous waste
- 20,848.37 tonnes of VIE-A soil
- 43.02 tonnes of mixed CDW
- 2,758.86 tonnes of asphalt and bituminous mixtures
- 16,510.82 tonnes of ballast
- 8,170.49 tonnes of concrete

Finally, 19,479 m^3 of materials that did not exceed the VIE-B values for the protection of human health established in Law 4/2015 for 'industrial use' or the value of 500 mg/kg of TPH, which is the reference level for considering soil to be disturbed, according to Article 3 of said Law, have been reused on the plot.

Execution of soil management services arising from the construction of the new Oural tunnel (Lugo) on the Monforte – Lugo section of line 800: A Coruña – León

As part of the planned improvements to the conventional rail network in Galicia, the following projects were proposed for the Ourense – Monforte – Lugo, with the aim of improving the reliability and competitiveness of this line, as well as modernising facilities and electrification to 25 kV AC, which will enable the connection of Lugo with the high-speed line in Ourense.

These works included the construction of a new tunnel in Oural, on the Monforte–Lugo section of line 800: A Coruña–León, with a length of 1,804 m, which will run parallel to the existing tunnel with a separation between the tunnel faces of approximately 25 m (work currently in progress).

In the construction project for this tunnel, the excavated materials were classified as inert and were to be used for the restoration of a quarry, in accordance with Order APM 1007/2007, of 10 October, on general rules for the recovery of natural materials excavated for use in filling operations and works other than those in which they were generated.

Nevertheless, the project acknowledges the presence of metal sulphides in materials similar to those that the tunnel will pass through. Therefore, in order to assess the potential danger of these materials, various studies were carried out to characterise them.

Initially, the Department of Soil Science and Agricultural Chemistry at the University of Santiago de Compostela (USC) conducted a characterisation study, which concluded that these materials had high levels of pyritic sulphur (S) and high oxidation capacity, in addition to other potentially hazardous elements.

Subsequently, EMGRISA was commissioned to carry out a study on the materials cut by the tunnel. This concluded that none of the samples analysed presented concentrations exceeding the admission limit values for inert waste landfills for any of the parameters analysed. The materials could therefore be classified as inert waste and, in accordance with the project, could be used for the restoration of the quarry.

For its part, the Water Commission of *Confederación Hidrográfica del Miño-Sil O.A.* issued, at the request of the Energy and Mines Service of the *Xunta de Galicia*, a document indicating the need to control the suitability of the material used to fill the quarry, for which at least one sample per 5,000 m^3 of material should be taken.

To this end, since July 2022, both the materials previously collected and those from the ongoing excavation have been sampled in decision units of 5,000 m^3 (which has involved sampling more than 40 units). These control samples (composite samples consisting of 20 subsamples each) were subjected to basic characterisation in accordance

with the parameters included in Annex II of Royal Decree 646/2020.

As a result of this control, seven (7) decision units (representing approximately 35,000 m^3) have been separated with values exceeding those permitted for inert waste landfills established by the aforementioned RD 646/2020.

This material was collected separately and divided into sixteen (16) sectors for characterisation by an external Accredited Inspection Body (AIB).

Figure 30. AIB sampling for basic characterization

At the same time, samples were also taken from the blocks of rock present in the stockpile (monoliths) in order to determine whether the materials forming the stockpile show different results depending on their grain size. In this way, if any fraction shows results suitable for management as inert waste, the cost of management could be reduced.

Figure 31. Sampling in blocks

The results of the basic characterisation carried out by the OCA on the granular material, in accordance with Annex II of Royal Decree 646/2020, determined that fifteen (15) of the sixteen (16) sectors exceeded the admission values for inert waste landfills and one complied with these values.

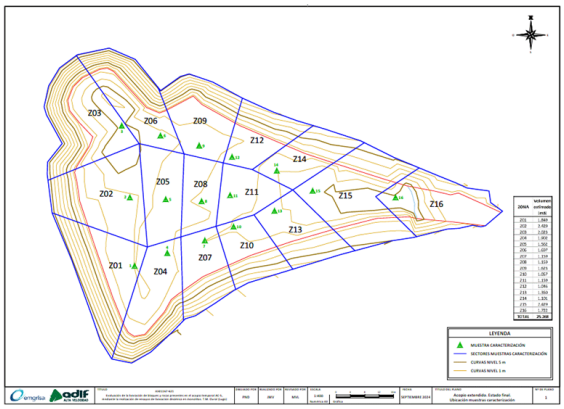


Figure 32. Sectors on which AIB sampling was carried out for basic characterisation

Furthermore, the results of dynamic leaching tests carried out on the monoliths determined their inert nature and their suitability for use as fill material in the quarry.

Figure 33. Screening of material for separation by size

Therefore, in October 2024, granular materials were separated from rock fragments larger than 150 mm by screening. In 2024, the following were managed:

- 21,847.89 tonnes of blocks and monolithic waste >150 mm as fill material in the quarry.
- 15,134.70 tonnes of granular material as non-hazardous waste with code LER 17 05 04, soil and stones other than those specified in code 17 05 03.

NOISE POLLUTION

3-3 | 308-2

Noise pollution is one of the adverse environmental effects of railway activity, with passenger and freight train movements being the primary sources of noise and vibration.

Additionally, the operation of infrastructures and facilities managed by Adif-Alta Velocidad may primarily produce noise emissions in:

- Passenger stations, due to public address systems, train shunting, train parking, air conditioning in buildings, and vehicle movement in and out of parking areas.
- Infrastructure maintenance operations carried out by mechanised rail equipment.
- Works and interventions in railway infrastructure.

Environmental noise is regulated by Directive 2002/49/EC on the Assessment and Management of Environmental Noise, which main provisions have been incorporated into Law 37/2003 of 17 November on Noise.

Law 37/2003, developed by Royal Decrees 1513/2005 and 1367/2007, regulates both the emission and immission of airborne noise and vibrations generated by modes of transport. It also establishes limitations on urban development and the need to adopt preventive and corrective measures to avoid or reduce damage to human health, property, or the environment resulting from noise pollution.

This Law, along with Royal Decree 1513/2005, which partially implements it, requires the preparation of Strategic Noise Maps (SNMs) and Noise Action Plans (NAPs) for major railway routes, defined as those railway sections with more than 30,000 trains/year.

SNMs are tools designed to assess the noise exposure of the population and identify receptors exposed to levels exceeding the Acoustic Quality Objectives (AQOs) established in the aforementioned legislation. As for the NAPs, these documents analyse various corrective measures that could be considered to achieve the AQOs.

SNMs and NAPs are reviewed and, if necessary, revised at least every five years.

Article 4 of Law 37/2003 outlines the powers for the preparation, public consultation, and approval of these documents. For Railway Infrastructures, these powers lie with the competent ministry, currently known as the Ministry of Transport and Sustainable Mobility.

In this regard, in 2005, 2012, and 2017, the Ministry entrusted Adif with the preparation of the SNMs and NAPs for each of the first three phases. The Ministry retained the authority for provisional approval, public consultation, and final approval of the documents, as well as for addressing any objections.

Since its creation, Adif-Alta Velocidad, has been responsible for drawing up the SNMs and NAPs for state-owned railway sections managed by Adif and Adif-Alta Velocidad.

The data from the completed SNMs and NAPs phases are summarised below:

Table 19. Data from Phase I, II and III SNMs and NAPs

Phase	Phase I	Phase II	Phase III
Developing period	2007-2010	2015-2017	2019-2022
Kilometres studied	685 km	1,456 km	1,277 km
Strategic Map Units	19	30	28
SNM public information	BOE No. 99 of 24 April 2008	BOE No. 242 of 06 October 2016	BOE No. 262 of 03 October 2020
SNM approval	Resolution of the Spanish Directorate General of Railways of the Ministry of Public Works, dated 31 May 2013	Resolution of the Deputy Directorate General for Railway Planning. BOE no. 206 of 28 July 2017	Resolution of the Deputy Directorate General for Railway Planning. BOE No. 64 of 16 March 2022
NAP Public information	BOE No. 286 of 28 November 2011	BOE No. 38 of 12 February 2018	BOE No. 117 of 17 May 2022
NAP Approval	Resolution of the Spanish Directorate General of Railways of the Ministry of Public Works, dated 31 May 2013	Resolution of the Deputy Directorate General for Railway Planning. BOE No. 235 of 28 September 2018	Resolution of the Deputy Directorate General for Railway Planning. BOE No 283 of 25 November 2022

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Information on the SNMs and NAPs is available in the Acoustic Pollution Information System of the Ministry for the Ecological Transition and the Demographic Challenge:

http://sicaweb.cedex.es

The measures outlined in the Noise Action Plans are preliminary proposals that will need further development and specification within the corresponding construction projects.

Consequently, since the approval of the documents, noise protection construction projects have been progressively drafted and implemented to define the noise barriers proposed in the action plans.

The following table summarises the status of these noise protection projects (NPPs):

Table 20. Construction projects for noise barriers resulting from noise action plans

Phase	Zone	Status
I and II Phases	Area nº. 1, central zone: Madrid and Castile-La Mancha	In progress
	Area nº. 2, northern zone: Basque Country, Asturias, Aragon and Castile and Leon	
	Area nº. 5, metre gauge network: Asturias and Cantabria.	
	Area nº. 3A, eastern zone: Valencia and Castellón	Writing in tender
	Area nº. 3B, east zone: Tarragona	In writing
	Area nº. 3C, eastern zone: Barcelona and Tarragona	
	Area nº. 4, southern zone: Madrid, Castile-La Mancha and Andalusia	Finished
III Phase	Area nº. 1, central zone: Madrid and Castile-La Mancha	In writing
	Area nº. 2, northern zone: Basque Country, Asturias, Aragon and Castile and Leon	
	Area Nº. 5, metre gauge network: Asturias and Cantabria	

Regarding Phase IV of the SNMs and NAPs, a Protocol was signed between MITMA and Adif-Alta Velocidad on 16 December 2021 for the development of this phase's works of the infrastructures managed by Adif and Adif-Alta Velocidad.

On 18 November 2022, contracts were awarded for the drafting of the SNMs and NAPs for Phase IV. This phase will involve recalculating existing maps and updating situations that were not previously considered.

This work was carried out in 2023 and throughout 2024, analysing 1,320 km of the railway network, divided into four geographical lots and 30 Strategic Map Units (SMUs):

- Centre Lot: in blue, 9 SMUs
- North Lot: in red, 9 SMUs
- East Lot: in yellow, 8 SMUs
- South Lot: in green, 4 SMUs

Figure 34. SMUs from the Strategic Noise Maps for major railway lines, Phase IV. Railway sections with more than 30,000 trains per year

The Phase IV Strategic Noise Maps were submitted for public consultation by the Ministry of Transport and Sustainable Mobility in May 2024 (BOE No. 128, of 27 May 2024) and formally approved by the same Ministry on 24 January 2025 (BOE No. 26, of 30 January 2025).

This Phase IV SNMs has been the first in which it has been used the European Union 's common calculation method for assessing industrial noise, aircraft noise, train noise, and road traffic noise, known as CNOSSOS-EU, in accordance with PCI 1319/2018 and PCM 80/2022.

The new CNOSSOS method defines two sources of railway noise, representing the railway line at two heights above ground - 0.5 and 4 metres, respectively - and outlines six types of railway noise generation phenomena applied to these sources, as illustrated in the following image:

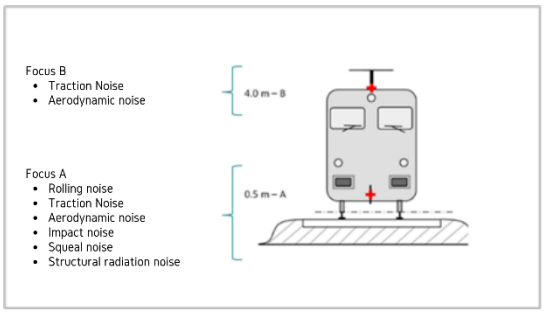


Figure 35. Factors contributing to the emission

To apply this method with quality assurance, Adif-Alta Velocidad conducted a study in 2020 and 2021 that involved the acoustic characterisation of both rolling stock and railway infrastructure, as well as defining the configuration parameters for the models. This work led to the publication of the *Guide for the Application of the CNOSSOS-EU Method in the modelling of noise produced by traffic on Adif and Adif-Alta Velocidad railway infrastructures.*

An updated version of the guide was published in November 2023 to include the characterisation of new rolling stock (OUIGO and IRYO trains), a new monoblock rail transfer function with super-soft damping, and clarifications on issues that had raised concerns since its March 2022 release (which concerns mainly related to the effects of squeal, aerodynamic noise, and speed trampling when approaching stations).

The most recent update to the guide can be downloaded from the Adif website in the Noise Pollution Management section: https://www.adif.es/gestion-de-contaminacion-acustica.

This Phase IV also introduces the following new features compared to previous phases:

- This will be the first phase to estimate the risk of adverse health effects from exposure to railway noise (severe discomfort, SD, and serious sleep disturbances, SSD). To this end, the formulas set out in Annex III of Royal Decree 1513/2005, as approved by *Order PCM/542/2021 of 31 May*, shall be applied, considering the noise levels in the buildings before and after the corrective measures outlined in Phase IV of the Plan.
- The new data model (DM) from the European Commission, which is mandatory for Spain, has come into force, which is mandatory for Spain. Its purpose is to ensure compliance with both the Noise and INSPIRE Directives (*Directive 2007/2/CE, Infrastructure for Spatial Information in Europe*), in the provision of information related to Strategic Noise Maps and Action Plans. This Directive has been transposed into Spanish law through *Law 14/2010 of 5 July, on geographical information infrastructure and services in Spain (LISIGE)*. For strategic noise mapping, the EPSG:3035 Lambert Azimuthal Equal Area (ETRS89-LAEA) system is used, which is the ETRS89 reference system extended for Europe.

Additionally, in line with Adif-Alta Velocidad´s Environmental Policy commitment to adopt all technically and economically feasible measures to reduce noise and vibration impact during the design, construction, and operation phases of railway infrastructures and facilities, the following reference guides have been prepared:

- *Catálogo de medidas de Protección frente al Ruido en Fase de Construcción* (Catalogue of Noise Protection Measures for the Construction Phase), to apply the best available technologies to minimise the noise nuisance associated with construction works.
- *Protocolo de Buenas Prácticas de Actuación Acústica en Obras no sometidas a Declaración de Impacto Ambiental (DIA)* (Protocol for Best Practices in Acoustic Management for Projects Not Subject to Environmental Impact Statement (EIS)). It defines the criteria to be followed by Adif-Alta Velocidad and by the awarded companies for the effective management in acoustic matters of all works that do not have an EIS.
- *Protocolo de Buenas Prácticas de Tratamiento de Ruido y Vibraciones en Situaciones de Explotación de Tráfico e Instalaciones Ferroviarias* (Protocol of Best Practices in Managing Noise and Vibration in Railway Traffic and Facility Operations).
- *Convenio-Tipo de cooperación con las administraciones para la adopción de medidas de mitigación del ruido.* (Standard Cooperation Agreement with Authorities for the Adoption of Noise Mitigation Measures).
- *Metodología para la realización de mediciones acústicas en obra* (Methodology for conducting acoustic construction sites).
- *Metodología para la determinación de actividades ruidosas en obra* (Methodology for identifying noisy activities on construction sites).
- *Especificación Técnica 03.305.010.5. Pantallas Acústicas* (Technical Specification 03.305.010.5. Acoustic Screens).
- *NAG 4-0-0.1 Metodología para Estudios Acústicos* (Methodology for Acoustic Studies), which outlines the methodology for conducting acoustic studies required for projects within the *Red Ferroviaria de Interés General (RFIG,*

General Interest Railway Network), managed by Adif and Adif-Alta Velocidad.

During 2024, a new standard has been drafted, *NAG 4-0-0.2 Metodología para Estudios Vibratorios* (Methodology for Vibration Studies), which will aim to define the basic methodology for conducting vibration studies.

Vibrations are an environmental aspect the analysis and prediction of which is more complex than for noise, and there is no established methodology for their modelling. The aim of this standard, which will be made available for public review before it enters into force, is to establish consistent criteria to serve as a reference in studies and provide minimum technical specifications for defining anti-vibration measures.

Likewise, it is worth mentioning the Environmental Diagnosis conducted at Adif-Alta Velocidad Stations and Facilities to identify all environmental aspects, including those related to noise, arising from both internal and external management.

Based on these diagnoses, plans are developed for environmental improvements and best practices to be implemented in various activities, with the ultimate goal of establishing an Environmental Management System.

Additionally, specific studies and measurements have been carried out to assess the noise situation and verify compliance with regulations in areas where issues have been identified.

In terms of R&D&I, acoustic measurements have been coordinated to assess the effectiveness of low barriers (mini and micro barriers).

For these low-height barriers to effectively attenuate noise, they must be installed close to the source.

The mini barrier tested is 1.35 m high, while the micro barrier is 0.70 m high. The reduced height allows for better integration of these corrective measures into the landscape compared to traditional noise barriers.

Figure 36. Testing of mini and micro acoustic barriers on the railway network

Finally, it should be noted that during 2024, two contracts were initiated for the acoustic monitoring of the corrective measures implemented on AV lines, in compliance with the Environmental Impact Statements issued.

The Environmental Impact Statements (EIS) provide for the implementation of an Environmental Monitoring Programme to monitor and control the impacts and effectiveness of the protective and corrective measures established, both in the environmental impact study and in the conditions of the Statement itself.

With regard to noise protection measures, the EISs generally require annual reports for three years, starting from the commissioning of the infrastructure, detailing the noise levels generated by the railway and the effectiveness of the corrective measures applied.

In this regard, the corresponding EISs consider the need to incorporate measurement campaigns during the infrastructure's operational phase, not only in areas where corrective measures have been necessary, but also in those where the expected immission levels are close to the quality objectives established in the corresponding condition. The results of the environmental monitoring programme should be used to determine, where appropriate, the need to supplement the mitigation measures implemented.

The two noise monitoring projects launched in 2024 correspond to the Bobadilla-Granada and Atocha-Torrejón de Velasco areas. The tenders were published on 7 June 2023 and 22 May 2024, respectively, and the awards on 11 September 2023 and 10 September 2024.

7. CONTRIBUTION TO BIODIVERSITY CONSERVATION

7. CONTRIBUTION TO BIODIVERSITY CONSERVATION

LAND USE

3-3 | 304-1

The active railway network managed by **Adif-Alta Velocidad** spans a total length of 3,981.4 km. The total area occupied is estimated at 12,741 hectares, with the affected area potentially extending to 37,093 hectares.

> ***!*** *The 1,051.78 km of active construction work for line construction in 2024 covers an area of 3,336 ha, with an impact zone of 10,518 ha*[4]

This assessment considers the average platform widths, the minimum width occupied by cuttings and embankments, and the average width of land affected (excluding expropriations) for the different types of roads listed in the following table:

> Railways are a more land-efficient mode of transport compared to roads. The land use per transport unit (in ha/unit) for railway infrastructure is 3.51 times less than that required for roads
>
> European Environment Agency. Indicator fact sheet.TERM 2002 08 EU + AC. Land take by transport infraestructure

> The area affected by the active railway network managed by **Adif-Alta Velocidad** is **37,093 ha**, which includes the **12,741 ha** occupied by the platform, cuttings, and embankments.
>
> The area affected by active construction throughout 2024 for the lines under construction is approximately **10,518 ha**, with over **3,336 ha** occupied by the platform, cuttings, and embankments.

In addition to the area occupied by the under construction and active network, **Adif-Alta Velocidad** also owns land used for railway enclosures, stations, housing, commercial premises, warehouses, docks, offices, and other buildings.

Table 21. Average occupancy widths and railway network widths (m)

Type of track	Platform width (1)	Minimum width, including cuttings and embankments	Impact width (2)
Electrified double-track international gauge line (AVE)	16	32	100
Electrified double-track Iberian gauge line	16	32	64
Mixed gauge line (Iberian Gauge width - International gauge width)	16	32	100

(1) Including the sub-ballast and formation layer.

(2) Including slopes, embankments, and other requirements.

[4] The length of active construction is calculated together for Adif and Adif-Alta Velocidad.

NATURAL AREAS

304-1 | 304-2 | 304-3

The Natura 2000 Network is a European ecological network dedicated to biodiversity conservation. It consists of Special Protection Areas (SPAs) established under the Habitats Directive and Special Protection Areas (SPAs) for Birds designated under the Birds Directive.

It aims to ensure the long-term survival of species and habitats in Europe to help halt the loss of biodiversity. It is the main tool for nature conservation in the European Union. Spain is one of the European Union countries with the largest area covered by the Natura 2000 Network, encompassing approximately 26% of its territory.

In 2024, some of the high-speed works carried out took place in areas belonging to the Natura 2000 Network. At that time, a total of 18 projects were underway, occupying this type of space, including 13 platform works and 12 superstructure works. This accounts for 12% of projects occupying space within the Natura 2000 Network.

Table 22. Natura 2000 Network works

	Plataform	Superstructure	Total
No. of Natura 2000 Network works	13	12	25
No. of active works	60	147	207
% if Natura Network works	**22%**	**8%**	**12%**

These occupations take the form of temporary occupations (construction roads, auxiliary facilities, etc.) and permanent occupations (railway lines and associated elements). Thus, temporary occupations for active construction works in Natura 2000 areas reached 5.4 ha in 2024. Occupations due to permanent elements in this type of area reached 83.3 ha. It should be noted that all these occupations took the form of platform works.

In 2024, the gauge rail network managed by Adif-Alta Velocidad in operation reached a length of 3,976.9 kilometres. Of these, more than 233 kilometres run through Natura 2000 areas, representing 5.9% of the rail network. These intersections are often achieved using large-scale structures (such as tunnels and viaducts), which helps minimise their impact on these areas during the operational phase. Approximately 40% of the high-speed rail lines that traverse Natura 2000 areas do so using these types of structures.

Table 23. Length of lines managed by Adif-Alta Velocidad in Natura 2000 Sites

Autonomous Community	% of protected land*	HSL length (km)**	HSL length in Natura 2000 Network (km)	% HSL in Natura 2000 Network	Length of protected land (km)	% HSL in Natura 2000 Network areas occupied by large-scale structures
Andalusia	29.3	487.7	32.8	6.7%	14.3	43.7%
Aragon	28.5	273.2	47.9	17.5%	11.0	22.9%
Castile and León	26.2	706.6	26.0	3.7%	8.0	30.8%
Castile-La Mancha	23.1	752.9	21.7	2.9%	4.0	18.6%
Catalonia	28.1	460.0	11.8	2.6%	6.5	54.9%
Community of Madrid	39.8	209.3	35.2	16.8%	32.5	92.3%
Valencian Community	36.9	391.2	1.8	0.5%	1.6	87.3%
Extremadura	30.3	328.2	38.2	11.6%	1.7	4.5%
Galicia	11.1	235.6	1.3	0.6%	1.0	75.8%
Principality of Asturias	25.2	24.0	11.4	47.5%	11.3	99.2%
Region of Murcia	20.3	86.1	5.6	6.5%	0.0	0.0
Basque Country	20.8	26.6	0.0	0.0%	0.0	0.0
Total		**3,981.4**	**233.8**	**5.9%**	**91.9**	**39.3%**

* Data updated as of December 2024.

** Prepared internally based on ADIF-Alta Velocidad mapping.

Source: Nature Data Bank. Ministry for Ecological Transition and Demographic Challenge. Data updated in December 2022. Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

FIRE PREVENTION

3-3 | 308-2

! Between 2013 and 2024, no fires were reported along the high-speed rail network's tracks.

The measures and actions to prevent forest fires, along with complementary actions adopted in 2024, are defined in the Plan of actions for the prevention and fight against forest fires for 2024 approved by the Council of Ministers on 18 June 2024. This plan involves numerous ministerial departments, including the Ministry of Transport and Sustainable Mobility, which oversees the railway sector and to which Adif-Alta Velocidad is attached.

Since 2006, Adif-Alta Velocidad, in compliance with the provisions of Royal Decree-Law 11/2005 of 22 July approving urgent measures on forest fires, has signed collaboration agreements with the Autonomous Communities. These agreements aim to develop joint actions for the prevention and, if necessary, extinguishing of forest fires in areas near the railway network.

In 2022, these Agreements were formalised as Protocols. This change reflects their role as declarations of intent, expressing the commitment of the parties to coordinate their respective responsibilities and undertake joint actions to prevent and extinguish forest fires in areas near the railway network within the RFIG.

Under these four-year protocols, Adif-Alta Velocidad also commits to implementing Self-Protection Plans designed to safeguard the integrity and conservation of its facilities and to mitigate the potential impacts of fires in forested areas or within the municipal perimeters through:

- The identification and assessment of fire risk areas
- The mechanical weed and debris removal programmes on roadside verges (irrigation campaigns included in maintenance programmes)
- Chemical treatment programme using a herbicide applicator train

Specific measures for preventing the risk of forest fires at Adif-Alta Velocidad are outlined in the current Fire Prevention Plan, which is effective from 2024 to 2025 and is updated periodically. This specific plan is developed within the framework of the Adif and Adif-Alta Velocidad Contingency Plan, as Appendix VII, and the *'Plan Director de Medidas Preventivas de Verano'* (Master Plan for Summer Preventive Measures), as well as the Contingency Plans of railway operations and the Appendix *'Manual de actuación en caso de perturbaciones de tráfico'* (Manual for action in case of traffic disruptions), agreed upon with Adif-Alta Velocidad.

The Fire Prevention Plan, developed in accordance with fire prevention regulations, identifies risks and risk areas, outlines preventive and corrective actions, and provides recommendations for typical cutting and welding operations, as well as the operation of hot shaft detectors. It is applicable throughout the RFIG, both on lines owned by Adif and Adif-Alta Velocidad.

Coordination between the Deputy Directorate of Network Management Centre H24, the areas of Adif and Adif-Alta Velocidad responsible for infrastructure maintenance and traffic management, and transport companies is essential in developing and monitoring of the Plan to minimise the risk of railway operation generating fires.

Figure 37. Fire protection measures on tracksides

Fire Prevention Actions included in the 2024-2025 Fire Prevention Plan for the road and its vicinity

- **Monitoring of train braking systems**

Ensure regular monitoring of the brake systems' condition and position and confirm that braking tests are properly conducted both at the origin of the train and at intermediate stations where materials are added.

- **Monitoring of rail work with ignition sources**

Identification in the Works Act; restrictions on work with ignition sources on the rail; and monitoring and communication of work involving ignition sources.

- **Monitoring of the proper functioning of Hot Box Detectors and Stuck Brake Detectors**

Monitoring the proper functioning of Hot Box Detectors (HCD) or Stuck Brake Detectors (SBD) installed in the infrastructure and taking regulatory action in response to alarms from either type of equipment.

- **Chemical and mechanical cleaning of track edges**

At stations and terminals: Identification and assessment of fire risk areas detected at stations; management of control of fire risk areas; and chemical and mechanical treatment of combustible materials on and near tracks.

On the track: identification and assessment of risk areas on the RFIG lines; chemical treatment using herbicide applicator trains; and mechanical weed control programs along the track margins.

- **Monitoring trains as they pass through stations**

Attention to passing trains and identification of any anomalies or signs of issues with their running gear, brakes and exhaust pipes (combustion engines).

- **Coordination and participation committees for railway operations**

Multi-conferences for coordinating and monitoring the Plan; meetings, multi-conferences, or communications between **Adif-Alta Velocidad** and railway operators, or between **Adif-Alta Velocidad** areas and train managers for Plan follow-up; and Dissemination of awareness campaigns.

On the other hand, the State Meteorological Agency (*Agencia Estatal de Meteorología*. AEMET), through an agreement with both entities, provides Adif and Adif-Alta Velocidad with updated weather forecast for each line. This allows for traffic restrictions on certain route locomotives and transports in the event of extreme weather risk (such as high temperatures and low humidity), to mitigate the risk of fires.

Regardless of the measures taken by Adif-Alta Velocidad, the railway track and the driving and

traffic management staff play a crucial role not only in detecting but also in extinguishing forest fires near the infrastructure. Thus, the track acts as a firebreak, and railway staff can often detect fires early, allowing Adif-Alta Velocidad's command posts and the H24 Network Management Centre to alert firefighting agencies of the various administrations.

Summer Preventive Measures Master Plan

From 1 June and 30 September each year, Adif-Alta Velocidad implements the Summer Master Plan for Preventive Measures, though it may be extended if circumstances warrant. It applies throughout the RFIG, covering both Adif-owned and Adif-Alta Velocidad lines, and aims to prevent fires on and around the track.

The Master Plan complements the Contingency Plan in its preventive measures, guidelines, measures, elements, and resources needed to manage seasonal risks and maintain service quality. It aims for active and coordinated collaboration among all parties involved in railway operation to prevent and address risks arising from adverse weather conditions.

The Master Plan outlines a series of preventive measures to be implemented by railway operators on rolling stock and infrastructure. Among the preventive measures for infrastructure, the plan includes special vigilance for maintenance work that creates ignition sources, as well as for the following:

- Preventive surveillance on routes with the highest fire risk
- Cleaning of tracksides and their facilities (including vegetation removal, clearing, cutting, and pruning)
- Herbicide application and chemical defoliation
- Construction of firebreaks

NOTABLE ACTIONS TAKEN DURING THE CONSTRUCTION OF HSLS

3-3 | 304-2 | 304-3

General aspects of biodiversity protection

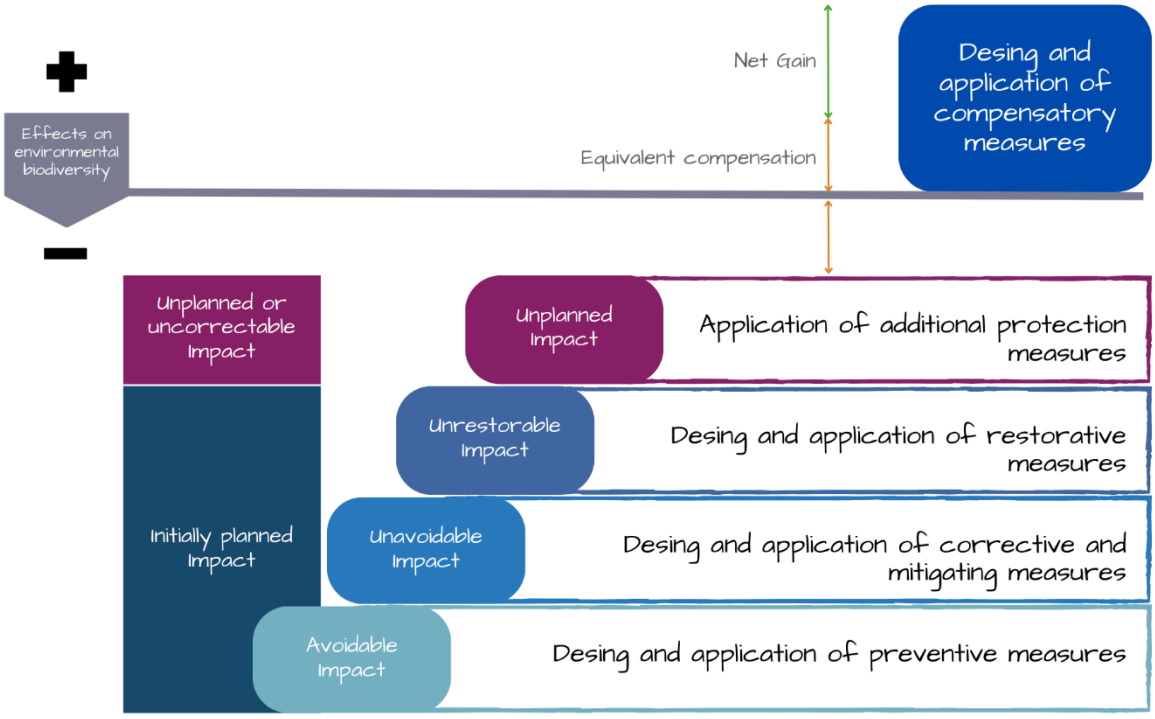
In terms of biodiversity protection, point 3 of Adif's environmental policy is noteworthy. Adif-Alta Velocidad aims to 'achieve the environmental integration of the railway while maintaining maximum respect for natural spaces and cultural and archaeological heritage, protecting biodiversity and ecosystems, preserving all their values and recovering those environments that may have been affected'.

> ***! All significant projects drafted by Adif and Adif-Alta Velocidad undergo a thorough analysis of their potential environmental impact, with particular attention to effects on unique species of fauna and flora, habitats of community interest, and protected natural areas***

Once priority areas have been identified early on, as required by the Adif's General Standard 'Type index and content of the environmental integration annex of projects' (NAG 3-0-1.0), a description of protected natural areas and other areas of interest (Natura 2000 Network, Protected Natural Areas, Habitats of Priority Interest, etc.) must be provided. This is to identify those potentially affected by the execution of the project and establish specific measures to ensure their protection.

Subsequently, the territory is classified into three categories: excluded areas, restricted areas, and eligible areas, as recommended by the PGI 6. 'Instructions and recommendations on environmental integration'. In excluded areas of higher quality and environmental sensitivity, the placement of any temporary or permanent installation is prohibited, except for those essential for the execution of the works, provided they are properly justified and, if required, have the necessary authorisations from the competent authority.

In addition, when work is conducted in a sensitive area, studies or assessments of fauna and flora are carried out before the start of the project to identify highly sensitive sites (such as nesting and breeding areas, resting and refuge areas, etc.). This allows for the implementation of necessary measures to minimise impact on biodiversity, always following the hierarchy of impact mitigation (prevention, correction, and compensation), according to the following schedule:



Thus, the new high-speed rail lines undergo an Environmental Impact Assessment (EIA) according to current regulations, which involves selecting corridors with the least impact on high-value environmental areas, thereby avoiding impacts in these areas.

During the construction phase, an Environmental Site Manager (ESM) is appointed to oversee and monitor environmental aspects of the construction work and ensure compliance with both the Environmental Impact Assessment (EIA) and current environmental regulations. This work is documented in regular reports that are provided to the environmental agencies. Similarly, before work begins, a Pre-Construction Report (PCR) is prepared to analyse the presence of priority areas and verify whether the project documentation includes the necessary measures and controls to minimize impacts on biodiversity.

Lastly, it is worth noting Adif and Adif-Alta Velocidad's participation in discussion and knowledge forums focused on the protection of biodiversity in transport infrastructures:

- 12th National Congress on Environmental Impact Assessment, held from 10 to 12 April in Vitoria. At this Congress, the paper *'Nuevas Metodologías para el Seguimiento del Efecto Barrera Sobre la Fauna Provocado por Infraestructuras Lineales'* (New Methodologies for Monitoring the Barrier Effect on Wildlife Caused by Linear Infrastructure) was presented, and the company participated in a round table discussion entitled *'Nuevos enfoques adaptados a nuevas exigencias: La integración de nuevas tecnologías'* (New approaches adapted to new requirements: The integration of new technologies) where environmental monitoring was addressed.
- The 'Group on Habitat Fragmentation Caused by Transport Infrastructures' fosters collaboration between government agencies, environmental organizations, and the scientific community to implement measures that prevent or mitigate the primary effects of transport infrastructure on fauna.
- ECOV4R (Ecosystem Evaluation for Railways), developed by the International Union of Railways (IUR), aims to methodologically assess the

ecosystem values provided by railway infrastructure. The development of this program has included applying the developed methodology to an area located on the Palencia – León high-speed rail line.

Noteworthy actions for the protection of biodiversity

Beyond the general framework and protection of biodiversity outlined above, the following section highlights specific facts and actions which, due to their nature, merit more detailed description.

➢ Fauna

The length of the High-Speed Rail [5] Lines completed by **Adif-Alta Velocidad** between January 2006 and December 2024 totals 2,211.68 km, with 505.75 km (22.9%) consisting of tunnels and viaducts that allow wildlife to pass through. In estimating this indicator, large-scale structures that cannot be used by wildlife are excluded, either because they pass through urban areas unsuitable for fauna or because they serve purposes incompatible with the movement of terrestrial species. Methodologically, when two parallel large-scale structures are present, only the shorter one is included in the calculation of the indicator Finally, it should be noted that despite having previous data, the attached table only shows the evolution over the last 10 years.

In the remaining sections of the route deemed non-permeable, especially in areas of high wildlife value, specific crossings for large animals (such as ungulates) are built, and cross-drainage structures are adapted for use by other wildlife. This includes enlarging purely hydraulic sections, creating dry sidebanks, and planting vegetation around the entrances and flanks and around the fins.

Table 24. Wildlife crossings *

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Wildlife-friendly cross-drainage structures (number)	911	978	1,010	1,091	1,140	1,157	1,216	1,274	1,282	1,285
Crossings specifically for ungulates (number)	193	205	205	236	258	263	284	289	290	291

* Data for each year accumulated from the beginning

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

[5] For this calculation, only new platform constructions have been considered, excluding urban sections.

These measures are complemented by the installation of a perimeter fence around the infrastructure, which restricts wildlife access to the track and guides animals towards the crossings The base of this fence is buried in areas of wildlife interest and includes a reinforcing mesh at the bottom to prevent small wildlife from accessing. Additionally, escape devices are installed in the fencing to help animals that may have entered the railway area to find their way out.

In addition, following the approval of Standard NAE 121 'Measures for the protection of birdlife in the LAC' and Technical Instruction ADIF-IT-301-001-LAC-20-F-01 'Management of Bird Electrocution in the CA', measures have been adopted to protect birds on catenary lines, both at the design stage, including preventive measures in areas of significant birdlife interest, and corrective measures when incidents occur. In this regard, since the approval of this standard, a total of two incidents of electrocution involving catenary have been reported on high-speed lines. Based on these incidents, a total of approximately 450 m of catenary and 11 supports have been corrected or are in the process of being corrected.

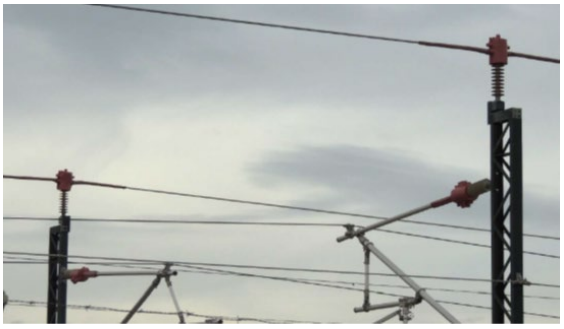


Figure 38. Detail of anti-electrocution elements installed after an accident on the Palencia-León high-speed line

- Construction of a Canadian-style crossing to prevent large trucks from accessing the Zamora-Ourense high-speed rail line

The incursion of wild ungulates into linear transport infrastructure poses significant traffic safety problems. This is particularly relevant in high-speed railway infrastructure, which is equipped with perimeter fencing to prevent these animals from accessing the danger zone.

However, certain configurations of railway infrastructure can create weak points that facilitate the entry. One such example is where the fenced railway infrastructure connects with unfenced branch lines leaving these sections vulnerable to intrusion.

To minimise the risk, Adif has constructed a cattle grid beneath the railway infrastructure at the Hiniesta maintenance base (Zamora), the first element of its kind to be implemented in railway infrastructure in Spain.

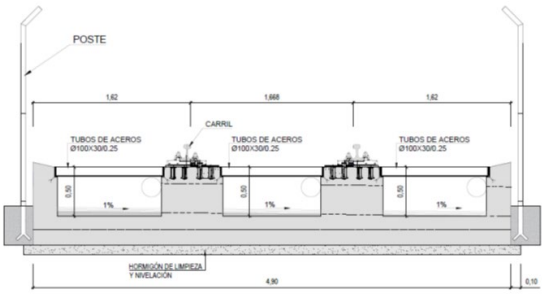


Figure 39. Cross-section of the Canadian crossing

The installation consists of an uncovered trench 30 cm deep and 1.70 m long, behind which the cattle grid itself is found. It measures 10 m long and 50 cm deep, with a tubular metal structure. In addition, the system is equipped with a sonic deterrent device, located at the entrance, with activates via an infrared motion detector that emits sounds when the presence of wildlife is detected near the Canadian fence.

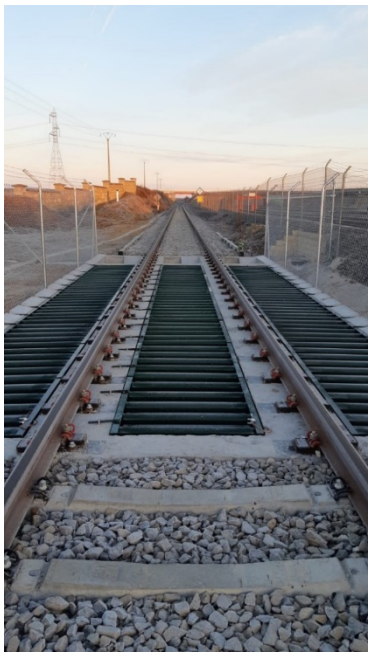


Figure 40. View of the completed Canadian crossing

- Measures to protect the populations of Greek tortoises (*Testudo graeca*) affected by the Mediterranean Corridor construction works

The construction of the Mediterranean High-Speed Corridor in the Murcia-Almería section passes through one of the few populations of Greek tortoises (*Testudo graeca*) in Spain. This species is listed as 'Vulnerable' in the *Catálogo Español de Especies Amenazadas* (Spanish Catalogue of Threatened Species) and as 'Endangered' in the *Catálogo Andaluz de Especies Amenazadas* (Andalusian Catalogue of Threatened Species).

It is a terrestrial, ectothermic species, meaning its periods of activity are dependent on the temperature. When temperatures drop (in late autumn) or become excessively high, this species takes refuge underground, where it undergoes aestivation and hibernation. These are, therefore, extremely critical periods for this species.

To minimise the impact on this species, Adif-Alta Velocidad has developed an Action Protocol, which includes the following tasks:

Before starting the construction work:

- Conduct an initial survey during a favourable period to determine the density of loggerhead tortoises in the various affected areas.
- In areas with medium or high turtle density, carry out rescue operations and relocate the tortoises to unaffected habitats with suitable conditions. Fence off the construction area to prevent relocated tortoises from returning.

In parallel with the construction work:

- Rescue any specimens that appear accidentally during the ongoing construction.

Both the Lorca-Pulpí and Pulpí-Vera projects carried out sampling and translocation operations in 2021, 2022 and 2023. During 2024, rescue operations continued for individuals that appeared by chance on the construction sites. In 2023, up to five turtles were rescued, while in 2024, three turtles were rescued from the site. These specimens were handed over to environmental agents to be released in a safe place, away from the construction site.

Figure 41. Spiny turtle specimens detected at the Murcia-Almería construction site

- Protection of endangered mammals in the vicinity of the Adif-Alta Velocidad construction works

The European mink (*Mustela lutreola*) is the most endangered mammal in Europe, with its population in Spain dwindling to just 143 individuals. This critical situation has led to the species being classified as 'Endangered' at the national level.

Adif-Alta Velocidad is developing some of its projects near the distribution area of this species. Therefore, in coordination with the competent authorities on endangered species protection, a series of measures and monitoring actions are being implemented, involving highly specialized personnel, aimed at minimising potential impacts on the species. The main work carried out in 2024 has primarily consisted of:

- Analysis of populations and construction site measures (biological pauses), in coordination with the governments of La Rioja, the Foral Community of Navarra, and the Foral Deputation of Álava.
- Study of populations and mobility associated with the platform project for connecting the Burgos-Vitoria Line with the integration of the railway into the city of Vitoria-Gasteiz, and assessment of the potential impact of construction activities on the European mink (*Mustela lutreola*) through monitoring in the Special Conservation Area (SCA) Zadorra. Two sampling campaigns were conducted between 2023 and 2024:
  - Campaign during the pre-breeding season of the species, in winter-spring (February-April 2023).
  - Campaign during the post-breeding period, in autumn (September-October 2023).
  - Campaign during the pre-breeding season of the species, in winter-spring (January-April 2024).

The monitoring work included a combination of live trapping (sampling 23 km of rivers with a total of 26 traps) and camera trapping campaigns (covering 50 km of the middle-upper Zadorra basin with 31 sampling points and a total of 37 cameras used), with substantial sampling efforts for both campaigns.

Figure 42. European mink captured in the Zadorra River area

During phototrapping carried out during the monitoring work, European mink was detected at 23 of the 31 sampling points, while seven individuals of the species were captured during the three trapping campaigns. In conclusion, it can be estimated that there are around 10 European mink in the entire study area (50 km).

The results obtained from this study made it possible to analyse the compatibility of European mink populations with the construction work, both in terms of reproductive success (proximity to the works) and mobility during the breeding season, concluding that the works were not affecting them.

- Protection of birds during the breeding season in the vicinity of the Adif-Alta Velocidad construction works

Adif-Alta Velocidad includes among its environmental commitments the environmental integration of the railway, maintaining the utmost respect for natural areas and cultural and archaeological heritage, and protecting biodiversity and ecosystems. In order to fulfil this commitment, a series of environmental controls are carried out and supervised by the Environmental Department. As mentioned above, these controls include the detection and, where appropriate, monitoring of possible impacts on wildlife, with particular attention being paid during the period of greatest sensitivity for wildlife species, which coincides with their breeding season.

A good example of this is the work carried out in the restoration of the 'Los Lanchares' quarry in the town of Hontoria (Segovia). On 14 February 2024, the site informed the Environmental Department of the possible presence of a nesting long-eared owl (*Asio otus*), with the incubation of four eggs being confirmed. After analysing the situation, the following measures were adopted:

- Strict marking of the breeding area
- Restrictions on soil movement in the vicinity of the nesting area and implementation of a total exclusion zone, both for access and for the movement of machinery and the spreading of soi
- No cleaning or clearing in the immediate vicinity of the nesting site during the breeding season, preferably until 15 July.
- No activities at night, given that this is the period of activity of the species under analysis
- Control and surveillance: supervision of the breeding season by weekly verification of the reproduction of the specimen (although this was finally carried out on a weekly basis), with remote visual monitoring using binoculars, in order to be able to draw conclusions on the compatibility of the construction activities (working distances) with the reproduction of the species

Both the female and the barn owl chicks were monitored on a weekly basis, first verifying the hatching of two of the eggs and then monitoring them until they left the nest in mid-June. Thus, after confirming the success of the species' reproductive process without any impact from the works, the decision was made to resume the pending works.

Figure 43. Location of the little owl's nest in the quarry undergoing restoration in Hontoria (Segovia)

- New methods for wildlife monitoring during the railway operation phase: Application in the Otero de Bodas Ecoduct

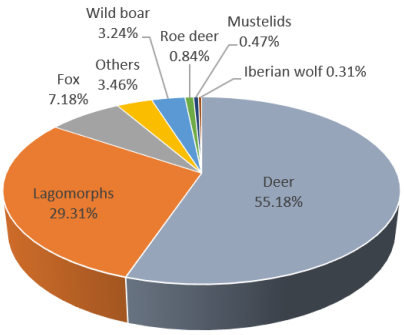
Adif-Alta Velocidad, in its ongoing efforts to develop and implement new methods to enhance Environmental Monitoring for wildlife protection, has introduced an innovative wildlife tracking system during the operational phase using video surveillance technology.

A video surveillance system has been installed to monitor wildlife on an ecoduct along the Zamora–Pedralba High-Speed Line, which is now in operation. It is an ecoduct measuring 135 metres wide by 78 metres long, located near the town of Otero de Bodas in the province of Zamora. Two infrared cameras, positioned to face each other, were installed to detect nocturnal movements, along with a dynamic DOME camera that tracks any detected movement. They continuously record using an automatic recording system that marks and logs events when movement is detected. Additionally, the system is interconnected, so when the infrared cameras detect movement, they send a signal to the DOMO camera to track it.

Figure 44. Infrared camera used in the video surveillance system

Since December 2022, monthly reviews of the recordings have been carried out, covering footage from 129 full days until December 2024. More than 3,800 events have been recorded, with 9 species identified (red deer, roe deer, wild boar, red fox, European badger, stone marten, European rabbit, Iberian hare, and Iberian wolf). Additionally, 6 broader taxonomic groups have been identified (lagomorphs, canids, mustelids, small mammals, birds y bats) but not specified down to the species level.

Figure 45. Percentage of records by species or group considered from November 2022 to December 2024 *



** For better visualization, the "Anthropic" category includes records of cars, people, and domestic animals, while the "Others" category includes records of birds, bats, unidentified canids, and small mammals*

In summary, excluding records included in the 'Anthropogenic' category (cars, people and domestic animals), almost 95% of the recorded events involve four species or taxonomic groups: deer (over 55%), lagomorphs (over 29%, primarily rabbits), foxes (over 7%) and wild boar (almost 3,5%). Notably, there have been over 6,600 deer recorded, which represents approximately 76% of the animals logged over these 129 days. This data yields an average of 51 deer records per day, with approximately 94% of these animals crossing the ecoduct.

Figure 46. Deer crossing the ecoduct

Figure 47. Iberian wolf detected by the video surveillance system

This underscores, on the one hand, the excellent connectivity (permeability) of the ecoduct, especially for stags, but also for other species. On the other hand, it confirms the effectiveness of this innovative surveillance system as a method for wildlife monitoring and highlights the potential of continuous tracking systems.

- Wildlife monitoring during the operational phase: Boadilla–Granada high-speed rail line

To assess the effectiveness of the biodiversity protection measures implemented during infrastructure construction, as well as to detect any residual impacts, systematic monitoring is carried out on high-speed lines once they enter into operation. Thus, in the spring 2024, wildlife monitoring began on the Boadilla – Granada high-speed line during its operational phase, with the first of three scheduled monitoring exercises now completed.

This work was conducted in accordance with the *Guía Metodología Básica para la realización de Seguimientos Faunísticos en Fase de Explotación de las Líneas de Alta Velocidad* (Basic Methodological Guide for Wildlife Monitoring During the Operational Phase of High-Speed Lines), which has been systematically applied by Adif and Adif-Alta Velocidad since 2012 and is implemented by a team of leading experts. The detailed objectives of applying this guide can be summarised as follows:

- To determine how wildlife use crossing structures (e.g., the extent of transit, frequency of crossings, effectiveness of measures, etc.).
- To assess the mortality caused by the infrastructure among different wildlife groups and evaluate the effectiveness of anti-mortality measures implemented on the line.
- To evaluate the risk of mortality for wildlife.
- To assess the effectiveness of fencing and escape devices in relation to wildlife.

Following the completion of this first sampling exercise, the results were analysed, with the following noteworthy findings:

- Effectiveness of cross-structures: the results highlighting their role in mitigating the barrier effect, showing that they are used by several wildlife species in the area. In smaller structures, 13 different species were recorded, with rabbits, foxes and badgers being the most frequent users. Other species of interest, such as polecats, martens, mongooses, and wildcats, were also detected. Monitoring on viaducts confirmed crossings by Eurasian otters, a species of high conservation interest for riparian ecosystems.
- Estimated mortality: few incidents were recorded, most of them in spring. It should be noted that trained dogs were used to search for carcasses during this season, which may have influenced the results obtained. Regarding bird movements across the infrastructure, a total of 13 species were recorded: eight birds of prey, one steppe species, one associated with aquatic environments, and two corvids.
- Escape devices: no evidence of use was detected, suggesting that they are underutilized by wildlife, in line with findings from previous studies.

Figure 48. Badger crossing an adapted transverse drainage structure

Figure 49. Pair of otters under the Arroyo Villano viaduct

- Project for compensatory measures for the Greek tortoise (Testudo graeca) in the Mediterranean High-Speed Corridor Construction, Murcia-Almería Section

The construction of the Mediterranean High-Speed Corridor in the Murcia-Almería section runs through one of the few populations of Greek tortoises (*Testudo graeca*) in Spain. This species is listed as 'Vulnerable' in the *Catálogo Español de Especies Amenazadas* (Spanish Catalogue of Threatened Species) and as 'Endangered' in the *Catálogo Andaluz de Especies Amenazadas* (Andalusian Catalogue of Threatened Species).

As part of the environmental assessment process this section of the Mediterranean High-Speed Corridor between Murcia and Almería, the environmental authority required the implementation of measures to mitigate the potential impacts of this infrastructure on the Greek tortoise.

To ensure that these measures scientifically robust and effective, in 2022 Adif-Alta Velocidad commissioned the Miguel Hernández University of Elche, a leading institution with experts on this species, to conduct fieldwork and studies. The results of this research have served as the basis for drafting and implementing the compensatory measures.

These studies are being conducted through several subprojects requiring intensive fieldwork, aimed at assessing: i) the distribution of the species, ii) patterns of population abundance and demographic structure, iii) spatial genetic

structure, iv) the health status of the species, v) practices related to keeping the Testudo graeca as a domestic animal, vi) loss of genetic diversity due to the release of domestic specimens and translocation between populations, vii) diseases, parasites, and intestinal endobiont communities in wild populations as a result of managing captive populations, viii) the impact of fires on population viability, ix) the effects of linear infrastructure on the species, and x) the effects of predation.

In 2024, the final phase of fieldwork was completed, with a particular focus on the Special Conservation Areas (ZEC Sierra de Cabrera-Bédar -ES6110005, ZEC Sierra del Alto de Almagro - ES6110011 and ZEC Sierras Almagrera, de los Pinos y el Aguilón -ES6110012). These protected areas play an essential role in the conservation of the species at the regional level.

At the end of 2024, work began on analysing the results obtained in the fieldwork. These results will be complied in the following documents:

- Assessment of the Greek Tortoise's Conservation Status
- Basis for Its Recovery in the Province of Almería

These documents will provide the foundation for drafting the Compensation Measures Project for the Greek Tortoise, which is being developed as a result of the construction of the Mediterranean High-Speed Corridor, Murcia - Almería section.

Figure 50. Specimens of spur-thighed tortoises captured for analysis of existing populations (left: population of "La Carrasca"; right: population of "El Cortijo del Aire").

➢ Flora

▪ Relocation of endemic species affected by the Murcia–Almería railway line works

Several works are currently underway on the Murcia–Almería line, which will form part of the Mediterranean Corridor, linking six countries (Spain, France, Italy, Slovenia, Croatia and Hungary) via a 3,600 km railway network, which will in turn connect with seven other major European corridors.

The south-eastern part of the peninsula is characterised by a combination of several factors that limit the development of flora. Among these factors, the scarcity of rainfall stands out, which in total does not reach 300 mm per year, with areas near Cape Gata receiving less than 150 mm. This scarcity of rainfall, combined with the high evapotranspiration in the area due to high temperatures and high insolation, makes this the driest area in Europe.

Furthermore, the lithological nature of the area, which is dominated by basic materials (limestone, dolomite, serpentine, gypsum-rich marl), is also a limiting factor for vegetation development. The soils are mostly xeric and poorly evolved.

These factors make the vegetation in the area similar to that found in sub-desert areas, with no tree layer and a sparse and scattered presence of shrubs, with annual herbaceous plants predominating.

During 2024, work continued on the protection and conservation of species of flora of interest that began in 2019. This work was carried out after the corresponding preliminary surveys, in accordance with the provisions of both the applicable Environmental Impact Statement and the authorisations received from the competent

biodiversity authority of the Regional Government of Andalusia.

Of particular note in 2024 is the relocation of 70 specimens of *Salsola paillosa* at the Níjar site. – Río Andarax, a species that forms part of the plant communities listed in Annex I of the Habitats Directive (92/43/EEC), classified as a 'vulnerable' species on the Andalusian red list and included under 'special protection' in Decree 23/2012, of 14 February, regulating the conservation and sustainable use of wild flora and fauna and their habitats.

These specimens were taken to a nursery located in the expropriated area of loan PR-3, alongside other specimens of the same species that had been previously relocated, where they will remain temporarily until they are moved to their final location in the restored area of landfill V-9. The extraction was carried out using manual methods, and the substrate of the planting hole was improved, and the plants were watered.

In addition, during 2024, two specimens of *Zizphus lotus* were relocated. This species is included in Priority Habitat No. 5220 of the Habitats Directive (92/43/EEC), 'Arborescent scrubland of Ziziphus' as a guideline species.

The transplants of protected plant species carried out during the 2024 campaign were as follows:

Specie	Number of samplings Translocation in 2024	Campaign/date of translocation
Salsola papillosa	70	25 of January of 2024 – 01 of January of 2024
Zizifus lotus	2	12 of November of 2024
TOTAL	**72**	

Figure 51. Loan PR-3. Temporary destination zone for specimens of *Salsola papillosa*

Figure 52. Extraction and preparation work for the transfer of *Salsola papillosa*

Transplantation of endemic species affected by the Murcia-Cartagena railway line works

During the works between Riquelme and Torrepacheco, part of the railway line between Murcia and Cartagena, it was necessary to transplant species included in the Regional Catalogue of Protected Wild Flora of the Region of Murcia. This section is linked to the natural region of Campo de Cartagena, running through large areas of agricultural land on both sides of the existing railway infrastructure.

During 2024, 84 specimens of *Ziziphus lotus* were transplanted. This species is listed as 'Vulnerable' in the Regional Catalogue of Protected Wild Flora of the Region of Murcia (Decree 50/2003, BORM No. 131) and included in habitat of Community interest 5220. With regard to the species *Chamaerops humilis*, considered to be of special interest in the Regional Catalogue of Protected Wild Flora of the Region of Murcia, two specimens directly affected by the works were transplanted.

The relocation work began with a survey prior to the start of soil movement within the project area. Once the presence of individuals of these species had been confirmed, the specimens to be transplanted were marked, taking into account both technical feasibility and the direct and unavoidable impact of the works.

The number of protected specimens transplanted in this section throughout 2024 is indicated below:

Specie	Number of samplings Translocations in 2024	Campaign/date of translocation
Chamaerops humillis	2	5 of March of 2024
Zizifus lotus	84	29 of February of 2024 – 25 of March of 2024
TOTAL	**86**	

The specimens have been transplanted to an area very close to their original location, around PK 36+100 within the expropriation limits. The transplanting work included the application of organic amendments and slow-release fertiliser, as well as the installation of a planting collar to collect irrigation water more efficiently, with protective stakes placed around the specimens. In addition to irrigation at planting, weekly maintenance irrigation has been carried out.

Figure 53. Transplantation to destination area of *Chamaerops humilis* and *Ziziphus lotus*

Figure 54. Irrigation and maintenance work on transplants in April 2024

Once these actions have been carried out, the progress of the specimens is being closely monitored. The transplants carried out have been found to be progressing favourably.

Figure 55. Status of *Ziziphus lotus* y *Chamaerops humilis* in June 2024

- Transplantation of urban trees during construction work on the Mediterranean High-Speed Corridor

Urban trees contribute to the creation of bioclimatic shelters, which play a key role in urban ecology by supporting sustainability and providing both environmental and social benefits. These benefits include improving the quality of life in urban areas and promoting citizens' health. Throughout 2024, the most significant urban tree transplants were carried out as follows:

Table 25. Transplants performed by species and date of translocation

Section	Species	Number of tree samplings Relocations in 2024	Height (m)	Date of relocation
IV-05	*Celtis australis*	24	5	February 20, 2024
	Phoenix dactylifera	2	12	March 17, 2024
	Phoenix canariensis	1	8	March 17, 2024
	Citrus aurantium	4	4	May 13, 2024
	Celtis australis	1	6	May 13, 2024
MuAl-21	*Washingtonia robusta*	24	6	January 29, 2024
		4	2,5	January 29, 2024
	Arecastrum romanzoffianum	4	6	January 29, 2024
	Phoenix canariensis	2	2,5	January 29, 2024
		9	2	January 29, 2024
	Pawlonia tomentosa	5	4	October 22, 2024
	Schinus terebenthifolius	30	3	October 22, 2024
	Tipuana tipu	2	3,5	June 3, 2024
		14	3,5	October 22, 2024
		3	3,5	September 18, 2024
MuAl-06	*Chamaerops humilis*	2	6	July 15, 2024
	Washingtonia robusta	32	6-14	July 15, 2024
	Washingtona filifera	20	7	July 15, 2024
	Phoenix dactylifera	7	8	July 15, 2024

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

The basic characteristics of the transplants included in the summary table are detailed below.

- New access channel for the integration of AV in the city of Valencia (Section IV-05)

The urbanization and remodelling work at the Valencia Joaquín Sorolla station will affect a large number of trees in the city of Valencia, both due to the temporary diversion of the high-speed rail line and the impact on the sewer system on Avenida Fernando Abril Martorell.

Twenty-four specimens of *Celtis australis* affected by the construction of the southern

sewer have been transferred to the Valencia City Council and deposited in a nursery. Two specimens of *Phoenix dactylifera* and one specimen of *Phoenix canariensis* have been transplanted at number 82 Avenida Fernando Abril Martorell, affected by the construction of the southern sewer.

Figure 56. Specimens of *Celtis australis* deposits in the nursery

On San Vicente Mártir Street, near Joaquín Sorolla Station, three *Citrus aurantium* trees have been transplanted to the station area, while another tree of the same species has been taken to a nursery. One *Celtis australis* tree from San Vicente Mártir Street has been transplanted in front of Joaquín Sorolla Station.

Figure 57. Specimens of *Phoenix dactylifera* and *Phoenix canariensis* transplanted to Fernando Abril Martorell Avenue

- Integration of the railway in Almería. Phase 2 (Section MuAl-21)

The work directly affects the urban tree population of the city of Almería, so in November 2023, we asked for permission to transplant the trees that were expected to be affected based on the inventory of trees affected by the work. In December 2023, a response was received from the city council indicating which trees were suitable for transplanting and which were not viable. For those trees that need to be felled, compensatory planting of the same number of trees has been planned, as indicated in the report issued by the Almería city council.

The specimens transplanted in 2024 have been placed in various green areas owned by the Almeria City Council. Specifically, 24 *Washingtonia robusta* specimens have been moved to Avenida de Torrecárdenas, 4 *Arecastrum romanzoffianum* specimens, 2 *Phoenix canariensis* specimens, four *Washingtonia robusta*, five *Pawlonia tomentosa* and nine *Phoenix canariensis* have been moved to the north and south of IKEA Park, while 19 *Tipuana tipu* and 30 *Schinus terebenthifolius* have been moved to the exhibition centre.

Figure 58. Transplants on Torrecárdenas Avenue

Figure 59. Transplants in the IKEA park

- Integration of the railway in Lorca. Platform and station (Section MuAl-06)

The planned actions for the integration of the railway in Lorca included the removal of several trees, for which the necessary authorisation was obtained from the competent regional ministry. After work began, and in collaboration with Lorca Town Council, this impact was reconsidered, which meant that two *Ulmus minor* trees, which the council had planned to protect by including them in the General Plan, would not be affected. After a more exhaustive study, it was found that some of the trees affected by the work could be transplanted.

The palm trees located in AFA 4, those next to the bullring, the three palm trees at the entrance to the railway warehouse and the two palm trees on Alameda de la Constitución have been transplanted. A total of 61 palm trees of species such as *Chamaerops humilis*, *Washingtonia robusta*, Washingtona filifera and *Phoenix dactylifera* have been moved to a nearby nursery until their final location is decided by the city council.

Figure 60. Location of the palm trees to be transplanted next to the bullring

Measures aimed at controlling and eradicating invasive alien species in Adif-Alta Velocidad

Invasive alien species are defined [6] as 'species introduced into or established in an ecosystem or habitat that is natural or semi-natural and that is an agent of change and a threat to native biological diversity, either through its invasive behaviour or through the risk of genetic contamination', and are one of the main causes of biodiversity loss worldwide.

The threat to biodiversity and associated ecosystem services posed by invasive alien species takes different forms that have serious effects on native species and on the structure and function of ecosystems: habitat alteration, predation and competition, disease transmission, replacement of native species in a significant proportion of their range, and hybridisation.

Aware of this problem and in accordance with Adif-Alta Velocidad's policy on the protection of biodiversity and ecosystems, numerous measures are being taken to prevent the proliferation of invasive alien species on the worksites.

The species being targeted are mainly pampas grass (*Cortaderia selloana*) and butterfly bush (*Buddleja davidii*), which are very abundant in transport corridors in the north of the peninsula.

The measures implemented focus primarily on elimination treatments, both mechanical and manual, as well as chemical treatments to ensure that the species does not proliferate. These actions are carried out outside the propagation period of the species targeted. In addition, the plant material obtained has been eliminated by burial or shredding and delivered to an authorised waste management company.

Figure 61. Removal of *Cortaderia selloana* from cleared slopes on the Mondragón-Elorrio-Bergara Sector 3 subsection

At the same time, given the lack of technical references that have proven to be effective, Adif and Adif-Alta Velocidad have promoted the creation of a 'Catalogue of measures for the eradication of invasive alien species on land affected by railway infrastructure works' which, based on an initial bibliographic compilation of strategies, action plans and measures/recommendations promoted by public administrations in the field of the environment (MITECO, autonomous communities and other entities), all the treatments carried out on both high-speed and conventional railways are characterised, and their effectiveness is monitored in order to obtain empirical data on best practices for eradicating invasive species on construction sites.

The creation of this catalogue is included as a specific objective in the Integrated Management System. To achieve this, four phases have been planned, with a total duration of 39 months. During 2024, work included in Phase III has been carried out, corresponding to the monitoring of the effectiveness of the different treatments. The treatments evaluated are shown below:

[6] According to the definition included in Law 42/2007 on natural heritage and biodiversity.

Table 26. Treatments characterised by invasive alien species

Section	Sub-section code and name	*Arundo donax*	*Ailanthus Altissima*	*Cortaderia selloana*	*Buddleja davidii*
Integration of the High-Speed Railway in Valencia	Castellbisbal-Murcia. Subsection: Font de Sant Lluis - Almussafes. Track and Electrification				
New Atocha Station Railway Complex	Extension of two tracks and a platform at Puerta de Atocha Station	X	X		
New access to Castellón port	New southern rail access to the port of Castellón. Section II	X			
Vitoria-Bilbao-San Sebastián	Atxondo-Abadiño			X	X
	Durango-Amorebieta			X	X
	Legutiano - Eskoriatza. Subsection II			X	X
	Mondragón-Elorrio-Bergara (Section 2)			X	X
	Mondragón-Elorrio-Bergara (Section 3)			X	X

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Thus, eradication work has been carried out on 5,060 m^2 of *Arundo donax*, 45,945 m^2 of *Buddleja davidii* and 36,591 m^2 of *Cortaderia selloana* through the application of various treatments.

Results of advisory, research and technological development services provided by CEDEX

In September 2022, Adif signed the order with CEDEX to carry out the work of 'Provision of advisory, research and technological development services in the different techniques of the railway and building systems'. This work includes the 'Evaluation of environmental restoration work on the viaducts of the Valladolid-Burgos-Vitoria high-speed rail line' and the 'Evaluation of environmental restoration work on loans, fillings and landfills of the Vitoria-Bilbao-San Sebastián high-speed rail line'.

This work aims to analyse the restoration work carried out on viaduct shadows, borrow pits and landfills in areas where, according to the data collected during the monitoring carried out, the results have not been as good as expected. The goal of this work is to get recommendations that can be used for future restoration work in these types of areas to make it more effective.

Throughout 2024, the final report on the 'Assessment of environmental restoration work on the viaducts of the Valladolid-Burgos-Vitoria high-speed rail line' was received, which included a series of recommendations to improve the results of the restoration of the viaduct shadow areas. In summary, these recommendations are as follows:

- Reduction of slope gradients to improve stability, thereby preventing the loss of topsoil and vegetation. In some cases, bioengineering techniques must be used.
- Proper control of the height of topsoil piles, their moisture content and analysis of samples from the piles prior to spreading.
- Establishment of a reference image for revegetation based on the climatic, lithological and potential vegetation

characteristics of the section or subsection of the HSL.

- Adaptive management of maintenance irrigation based on annual rainfall, soil moisture and soil quality. Especially in viaduct shadows, it is recommended to maintain the same maintenance irrigation for hydroseeding as that planned for plantations.
- Distribution of plantations in patches or stands that mimic the distribution of natural vegetation, as this can also promote the development of 'resource islands' for wildlife species.
- Depending on the estimated density of herbivores and the distribution of the plantations, consider the use of collective protection rather than individual protection, as the latter can limit the growth of species if not removed at the right time.
- Install general perimeter fencing during restoration work and subsequent demarcation in the most sensitive areas to prevent damage to the vegetation cover due to human activity.

Figure 62. Planting in monospecific stands of *Atriplex halimus* and *Rosmarinus officinalis* respectively on the VB-A62 viaduct and plant protectors in the shade of the viaduct

In addition, the document includes the following guidelines for selecting the plant and type of treatment based on height to board:

Table 27. Criteria for selecting the plant and type of treatment based on height to board

Height to board	Plant type	Treatment type	Observations
< 3,5 m	Ground cover herbs (seed from sowing/hydroseeding), preferably drought-resistant species.	Spreading topsoil, sowing or hydroseeding.	Depending on the final height of the board, revegetation may only be viable in the outer areas of the board, where there is some sunlight and moisture in the soil due to rainfall, as conditions in the central area may not be suitable for vegetation growth.
3,5 to 5 m	Herbaceous and woody shrubs (seed from sowing/hydroseeding).	Spreading topsoil, sowing or hydroseeding.	For species selection in general, it is recommended to choose those that are most resistant to drought. As for woody plants, those that are smaller and have a creeping habit are recommended.
5 to 10 m	Herbaceous plants, woody shrubs and bushes (any size).	Spread topsoil, sow or hydroseed1, dig holes and plant.	Although the selection of species will depend on the type of climate and soil, the viaduct will still have some influence on vegetation development. It is therefore recommended to use generalist species that are tolerant to water stress.
> 10 m	Herbaceous plants, woody shrubs, bushes and trees.	Spread topsoil, sow or hydroseed1, dig holes and plant.	It will depend on the type of climate and soil, but in general, species that are well adapted to sunny conditions are recommended, as shade will not be a limiting factor.

** The size of the holes should be proportional to the size of the plant, and at least twice the diameter of the root system horizontally and 1.5 times the depth of the roots vertically (CEDEX, 2008).*
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

The results and conclusions of the 'Assessment of environmental restoration actions in loans, landfills and dumpsites of the Vitoria-Bilbao-San Sebastián high-speed rail project' are expected in early 2025.

8. INTEGRATION OF HIGH-SPEED LINES INTO THE SURROUNDINGS

8. INTEGRATION OF HIGH-SPEED LINES INTO THE SURROUNDINGS

ENVIRONMENTAL INTEGRATION OF PROJECTS

3-3 | 304-2 | 308-2

The construction of railway infrastructure is one of the most environmentally significant activities. The length of active construction work in 2024 was 1,051.78 km.

The Ministry of Transport and Sustainable Mobility has delegated the approval of projects assigned to this public business entity to the president of Adif-Alta Velocidad. Additionally, according to Adif-Alta Velocidad´s Statute, this entity has the authority to oversee the projects it approves and to certify compliance with the EIS/EIR, if applicable.

Although each action has its own unique characteristics and circumstances the implementation of new railway lines—or some of their elements—as well as the necessary actions for the refurbishment, improvement, remodelling, adaptation, and maintenance of existing railway lines or elements, are likely to generate environmental impacts that are properly characterised, evaluated, and considered both during the planning and project drafting phases, as well as during the execution of the works. Thus, all necessary preventive, corrective, complementary, and compensatory measures to minimise the environmental impact of these infrastructures are planned and subject to ongoing control and monitoring.

All environmental integration appendices of the projects are reviewed to ensure compliance with current environmental regulations, Adif-Alta Velocidad´s internal rules and recommendations, and, where applicable, with the EIS/EIR.

To ensure compliance with Environmental Impact Assessment (EIA) legislation, all projects undergo screening. This determines whether they require an EIA. If this procedure is not required, an exemption note, and an environmental suitability report are issued as a preliminary step before approval.

For projects requiring an EIS/EIR, a validation document is issued after the review, correction, and supervision process (depending on the case: EIS/EIR compliance certificate or EIS/EIR adequacy report), as a prior and necessary step before the project can be approved.

Table 28. Environmental Supervision of Projects at Adif-Alta Velocidad (Number of Reports per Year) *

Type:	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Notes of exemption from Environmental Impact Assessment procedures	16	7	17	3	28	15	18	22	11	8	14
Environmental compatibility reports	12	5	8	3	28	15	18	22	11	8	14
Adequacy reports to EIA	31	40	25	28	48	24	13	28	30	58	68
Certificate of compliance with the EIA	12	10	0	9	26	17	18	12	12	11	7
Environmental review report	142	194	152	162	265	227	207	225*	296	417	373
Total	**214**	**256**	**202**	**205**	**395**	**298**	**274**	**309**	**360**	**502**	**476**
Environmentally completed projects	**nd**	**nd**	**39**	**40**	**100**	**54**	**49**	**62**	**53**	**77**	**89**
Documents submitted for review	**nd**	**nd**	**72**	**85**	**107**	**94**	**86***	**86**	**105**	**419**	**363**

* Total data from Adif, Corporate Conservation and Maintenance Department, Corporate Technical Department, Corporate Resources Sub-Department are not included

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

ENVIRONMENTAL MONITORING OF THE WORKS

3-3 | 304-2 | 308-2

To ensure compliance with the requirements set out in Environmental Impact Statements (EIAs) and Environmental Impact Reports (EIRs) as well as other regulations, and to prevent potential environmental impacts, Adif-Alta Velocidad implements a rigorous system of environmental monitoring and oversight for construction projects.

The main objective is to ensure and document that environmental actions, or those with potential environmental effects, comply with environmental legislation, internal environmental commitments, and the requirements outlined in EISs and EIRs, and other resolutions. Additionally, as part of this process, efforts are made to ensure that the work is carried out in accordance with the project and the conditions under which it was authorised. The effectiveness of the implemented measures is also assessed, and any necessary supplementary measures are recommended to the project management team if needed.

For projects subject to EISs or EIRs, this environmental monitoring process covers both the construction phase (for which an Environmental Site Manager, or ESM, is appointed) and the first three years following its completion/commissioning. During this period, specialised teams monitor the effectiveness of corrective measures, focusing primarily on wildlife, noise, and ecological-landscape restorations.

Figure 63. Organisation of Environmental Monitoring for projects requiring EIS/EIR

In each section of the various lines under construction, the Environmental Site Manager (ESM) is responsible for environmental monitoring and control, in line with the specifications derived from Adif-Alta Velocidad´s internal environmental standards.

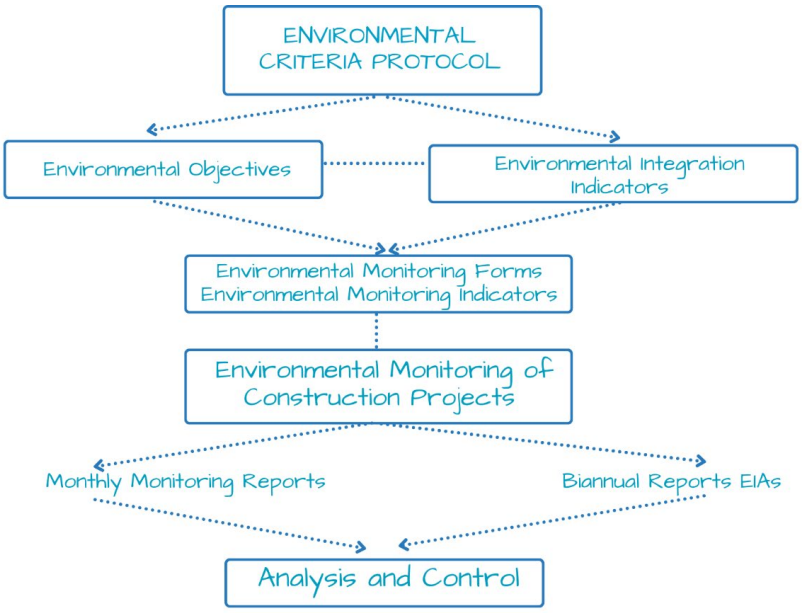


Figure 64. Procedure for environmental monitoring of construction projects

For projects not subject to EISs/EIRs and with lower environmental impact, only the construction phase is covered. For this purpose, the Corporate Environmental Sub-Department appoints an Environmental Site Inspector (ESI), who is responsible for implementing the preventive and corrective measures specified in the Construction Project and the contract documentation, as well as ensuring compliance with applicable environmental regulations.

During 2024, environmental monitoring was carried out for 62 active construction projects, resulting in 387 monitoring reports.

Table 29. Environmental oversight during the construction phase for modified projects, supplementary projects, and emergency works at Adif-Alta Velocidad (No./year)

Type:	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Environmental Review Reports (ERR)	36	31	44	77	68	17	42	56	52	63	62
EIA Compliance Reports for Modified Projects	26	26	27	54	58	18	33	47	41	48	54
Compliance Report to the EIS, Complementary Project	5	4	7	12	6	3	2	1	*na*	na	Na
Emergency construction works	0	3	6	5	1	1	3	6	4	5	7
Notes of exemption from Environmental Impact Assessment procedures	0	1	2	0	1	1	6	8	10	10	12
Environmental Suitability Reports	0	1	2	0	1	1	4	2	5	5	10
Total	**67**	**66**	**88**	**148**	**135**	**41**	**90**	**120**	**112**	**131**	**145**

na: not applicable (Under the current Public Procurement Act, processing complementary projects during the construction phase is no longer permitted)

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

Table 30. Environmental Monitoring Reports required by EIA during the construction phase (No. of reports/year)

Type of report	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Before work commences	32	57	11	32	12	41	39	29	46	41	50
Parallel to the site layout verification report	37	60	17	21	12	35	26	37	44	44	50
Periodic	247	286	333	352	225	248	412	241	286	362	412
Prior to the acceptance of the work	18	35	10	23	45	55	50	46	25	45	38
Addenda, summary reports, or other annual reports	0	1	0	0	0	0	0	7	1	0	1
Total	**334**	**439**	**371**	**428**	**294**	**379**	**527**	**360**	**402**	**492**	**551**

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Table 31. Environmental Monitoring Reports required by EIA in post-acceptance phase (No. of reports/year)

Type of report	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Landscape integration reports	14	7	4	3	10	11	13	7	5	1
Wildlife monitoring reports	1	4	5	5	1	2	4	7	7	5

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Table 32. Monthly Environmental Monitoring Reports for construction works as required by internal procedures (projects with EIA/EIR)

Type of report	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Monitoring reports	-	-	-	-	-	950	1,054	1,187	1,361	1,841
Monthly Average (No.)	97,3	88	106	76	87	79	88	99	113	154
Annual Total (No.)	1,168	1,058	1,272	910	1,041	950	1,054	1,187	1,361	1,841

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Table 33. Environmental Monitoring Reports for construction works as required by internal procedures (projects not requiring EIA/EIR)

Type of report	2018	2019	2020	2021	2022	2023	2024
Initial reports	5	5	5	6	34	23	17
Visit reports	65	39	94	264	317	296	387
Periodic	0	4	1	10	16	22	40
Final reports *	13	9	7	5	11	2	17
Annual total (No.)	83	57	107	285	378	343	461

* A single report is counted for short-term works (HSL maintenance).

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Environmental Objectives and Environmental Integration Indicators

Since 2005, the current Corporate Environmental Sub-Department has defined the systematic monitoring of environmental aspects in the construction of railway lines subject to EISs and the compliance with established environmental objectives. This system allows for:

- Synthesising and standardising information on key issues, making it comparable across different scales (sections, lines, overall).
- Assessing the results and progress made in relation to previously established priority objectives.
- Establishing new courses of action in a process of continuous improvement.
- Communicating and disseminating the results both internally and externally.

This monitoring is conducted based on common foundations and uniform criteria for all projects, which allows for the comparison of information obtained from each one. Consequently, this enables the drawing of overall conclusions and, where appropriate, the establishment of new measures or guidelines to enhance the environmental management to be implemented.

The indicator system currently in place is organised around two categories of indicators:

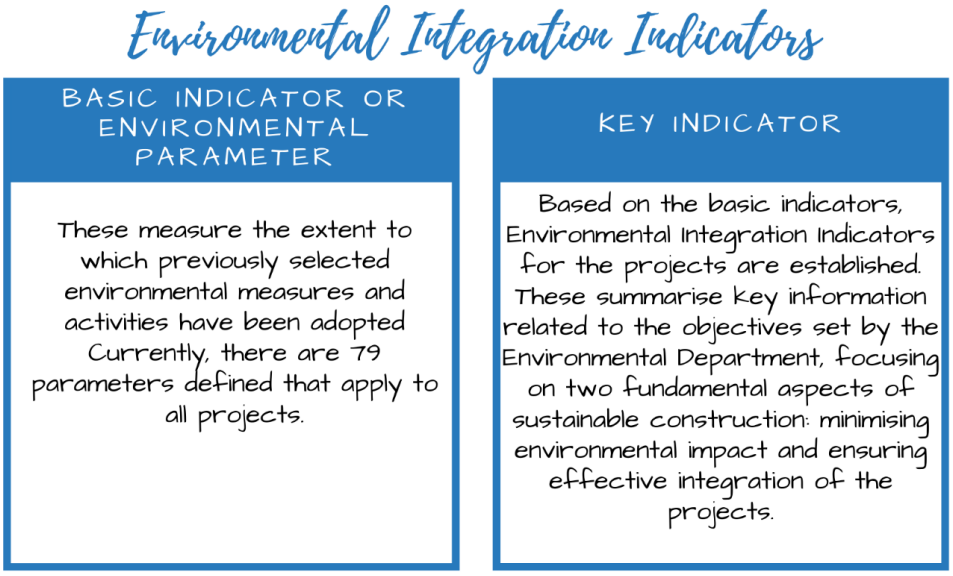


Table 34. Environmental Objectives and Environmental Integration Indicators

Environmental Objective	Environmental Integration Indicators
1.- Preserve the Natural Environment	– Minimise land use – Reduce encroachment on protected natural areas – Minimise impact on areas of high natural value
2.- Preserve Cultural Heritage	– Area occupied under archaeological supervision – Proper management of archaeological finds
3.- Preserve Soils	– Removal of topsoil from the construction area – Conservation of topsoil
4.- Preserve River Systems and Riparian Vegetation	– Fully restored riverbanks – Respect for natural river dynamics – Main rivers unaffected
5.- Prevent Pollution	– Suitable equipment for the collection and treatment of wastewater – Proper disposal in line with required standards – Effectiveness of noise control measures in residential areas – Effectiveness of measures to protect air quality
6.- Promote Circular Economy	– Reuse and optimisation of natural materials excavated during construction – Utilisation of surplus natural excavation materials – Recycling of construction and demolition waste
7.- Protect Wildlife	– Respect for sensitive periods of key species – Ensure infrastructure allows access for ungulates – Ensure infrastructure allows access for small and medium-sized animals – Proper fencing in areas with ungulates
8.- Restoration of the Environment with Ecological and Landscape Criteria	– Decommissioning and clearing of occupied land – Geomorphological re-shaping of occupied areas – Vegetation restoration of surfaces *

** Includes the following two basic indicators: Spreading topsoil on occupied areas and sowing and planting on affected areas.*

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Level of compliance with the established environmental objectives

304-1 | 304-2 | 304-3

This report presents the results of the environmental monitoring carried out during 2024 on all active works that have a significant impact on the territory, altering natural values and heritage elements. For this reason, these actions have been monitored by an Environmental Site Manager.

The scope of the environmental monitoring, the results of which are reflected in the key Environmental Integration indicators, primarily covers platform works, track and gauge changer assembly, as well as the construction of High-Speed Network Access Points (PAET) links, stations, and environmental actions. It also includes localised and complementary works related to previously executed platform projects, such as the construction of overpasses, emergency exits, and ventilation shafts, among others. All these actions have been promoted by Adif and Adif-AV.

The results of this monitoring reflect the values obtained for each of the mentioned Environmental Indicators, considering the total amount of active or completed work during the year, as well as its evolution over time compared to the average results of the previous nine years.

This type of analysis provides an overview of the level of environmental performance achieved in the works. It also highlights trends in relation to the priority environmental objectives, identifying aspects that require reinforcement in existing control mechanisms or the definition of new lines of action, within the framework of a continuous improvement process.

! The length of works monitored during the three four-month periods of 2024 was 1,051.78 km, of which 626.05 km corresponded to Platform works

Since the launch of Environmental Monitoring by lines, a total of 3,799 km of projects have been completed, 74,3 km of which were finished in 2024.

In 2024, 116 projects were monitored, five of which were completed during the year.

Table 35. Length of ongoing projects monitored for environmental purposes by quarter (km). Year 2024 *

	January – April	May – August	September – December
Bobadilla - Algeciras	1.30	1.30	1.30
Bobadilla - Granada	0.00	3.19	3.19
Centre	15.40	22.00	22.00
Córdoba - Málaga	8.45	8.45	8.45
Mediterranean Corridor	278.98	268.67	269.35
North-Northwest Corridor	35.63	84.14	92.76
Atlantic Corridor	5.57	5.57	5.57
Madrid-Cartagena Railway Corridor	17.75	17.75	17.75
Madrid - Extremadura	122.87	119.46	119.46
Madrid - Zaragoza - Barcelona - French border	9.31	9.78	9.78
Madrid - Castile-La Mancha - Valencian Community-Region of Murcia	19.53	19.53	19.53
Medina del Campo - Salamanca - Fuentes de Oñoro	1.49	1.49	1.49
North-east	40.03	40.03	40.03
New Railway Network in the Basque Country	45.47	45.81	45.81
New Railway Access to Asturias	1.97	1.97	1.97
New Railway Access to Galicia	20.55	20.55	20.55
New Railway Access to Northern and North-Western Spain	0.00	0.20	0.20
Other actions in Conventional Network	42.47	43.07	43.07
Ourense - Monforte de Lemos - Lugo	177.56	179.06	164.79
Palencia-Santander	88.92	108.35	108.35
Sevilla-Cádiz	6.63	6.63	6.63
Length of active projects for the quarter	**939.87**	**1,006.99**	**1,002.02**
Length of active projects for the year		**1,051.78**	

* To calculate lengths by quarter, the total is based on the sum of the lengths of projects that have been administratively active for at least one day within that quarter. Similarly, for annual length calculations, the total is based on the sum of the lengths of projects that have been administratively active for at least one day during the year 2024. As a result, some projects may be active in one quarter but not in another, depending on their start and end dates and the execution period.

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

Table 36. Length (km) of completed projects annually that have been subject to environmental monitoring

Line	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Almería - Granada	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6	-	**2.6**
Córdoba Málaga	19.9	30.7	-	-	17.9	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	**71.5**
Bobadilla-Granada	-	-	-	-	-	6.2	5.1	15.7	20.6	15.9	10.7	-	22.6	52.8	32.6	27	-	2.7	1.7	-	**213.6**
Madrid-Segovia-Valladolid	-	-	18.8	102.7	-	-	-	-	5.4	-	-	-	-	-	-	-	-	-	-	-	**126.9**
Madrid - Castile-La Mancha - Valencian Community-Region of Murcia	0.8	51.5	116.7	88.9	254.1	46.7	37.2	104.5	28.2	23.1	39.3	23.6	-	65.6	36.1	-	10.3	1	-	8.9	**936.5**
Madrid-Zaragoza-Barcelona-French border	9.6	16.6	38.1	20.3	19.6	40.4	25.2	11.1	3.4	10.4	10.3	-	-	0.4	2.6	78.7	1.2	0.3	10.9	-	**299.1**
New Railway Access to Galicia	-	-	-	-	5.3	57.1	24.7	-	-	60.2	-	32.6	119.6	75.7	53.1	209.4	13.8	0.1	-	-	**651.6**
New Railway Network in the Basque Country	-	-	-	-	-	5.2	2.5	3.5	11.3	5.6	8.4	-	-	-	5.4	5	5	4.9	-	2.6	**59.4**
New Railway Access to Asturias	-	-	-	-	-	-	34.4	4.9	16.5	-	-	0.5	-	-	4.3	-	49.2	-	16	-	**125.8**
Mediterranean Corridor	-	-	-	-	-	-	-	6.3	35.4	-	-	-	-	-	0.5	61.9	3	-	22	28.2	**157.3**
North-Northwest Corridor	-	-	-	-	-	-	14.5	87.7	63.1	14.6	191	32.1	36.5	-	24.8	39.2	1.6	-	-	-	**505.1**
Madrid-Centre	-	-	-	-	-	-	-	0.7	-	7.4	-	-	32	-	-	-	-	-	3	-	**43.1**
Madrid-Extremadura	-	-	-	-	-	-	-	36.2	24.2	37.3	8.5	-	-	21.5	27.5	95.1	68.9	60.2	-	34.7	**414.1**
North-east	-	-	-	-	-	-	-	-	2.8	-	-	-	-	-	-	-	11.1	-	5	-	**18.9**
Ourense-Monforte de Lemos - Lugo	-	-	-	-	-	-	-	-	-	-	-	-	-	8.6	-	-	-	14.2	18.6	-	**41.4**
Sevilla - Cádiz	-	-	-	-	-	-	-	-	-	-	-	-	-	26.4	-	-	-	-	-	-	**26.4**
Madrid-Cartagena Railway Axis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.5	0.5	-	-	-	-	**28**
Bobadilla - Algeciras	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.7	-	-	30.8	-	**47.5**
Other actions in Conventional Network	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.1	-	18.3	-	-	**22.4**
Madrid - Alcázar de San Juan - Jaén	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.1	-	-	-	-	**8.1**
Medina del Campo - Salamanca - Fuentes de Oñoro	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	**0.03**
Total	**30.3**	**98.8**	**173.6**	**211.9**	**296.9**	**155.6**	**146.6**	**270.6**	**210.9**	**174.5**	**268.2**	**88.8**	**210.7**	**251**	**214.4**	**545.7**	**164.1**	**101.7**	**110.6**	**74**	**3,799**

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department, Level of compliance with the established environmental objectives in High-Speed Lines construction, 2023 (June 2024).

Objective 1: Preserve the Natural Environment

Minimise land use (ha/km)

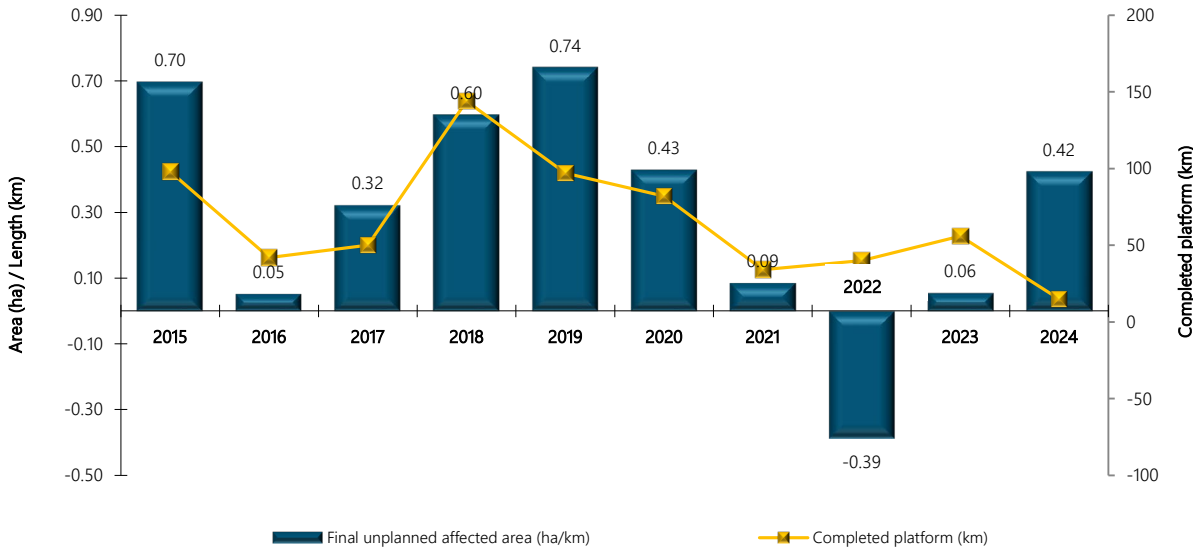
During the construction process, discrepancies were noted between the intended footprint specified in the plans (whether original or revised) and the actual area impacted during execution. The main cause is the use of different borrow pits and dump sites than those initially planned, along with the need to expand access routes and auxiliary facilities.

The following chart shows the length of completed platform work since 2015, along with the final unplanned affected area per kilometre of platform work completed each year.

In 2024, the overall discrepancy between the area finally occupied and that initially planned in the project was 0.424 ha/km of completed work, which is slightly higher than the average for the last ten years. However, once the works are completed, the affected land is duly restored, aiming to promote its environmental integration and minimise impacts on both the natural and social environment.

In 2022, the value for this indicator across all completed platform works was -0.386 hectares per kilometre. This exceptional situation was due to the completion of two projects on the Madrid-Extremadura HSL, where some of the auxiliary elements[7] outlined in the construction plans were not used.

Chart 19. Unplanned affected area (ha/km) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

[7] Auxiliary construction elements include borrow pits and earthfills, site access roads, and areas designed for auxiliary facilities (AFAs).)

Minimise Occupation on Protected Natural Areas (m^2/km)

Minimising the impact on protected Areas of High Environmental Value is a key indicator in the integration criteria for projects promoted by Adif and Adif-AV.

This environmental constraint is incorporated from the earliest planning stages and remains a key guideline during the drafting of construction projects and throughout the entire execution phase of the works. This strategy makes it possible to:

- Avoid or reduce the direct occupation of protected natural areas.
- Design routes and construction solutions that respect biodiversity and sensitive ecosystems.
- Apply effective corrective and environmental monitoring measures.

However, in some cases, the routes must bypass or even cross extensive protected areas, making it inevitable that certain areas will be occupied by auxiliary elements, especially in the case of large tunnels located on the edges of such areas. In these cases, the occupied area is kept to the minimum necessary, and all actions are carried out in coordination with the Autonomous Community and the Management Body of the corresponding Protected Natural Area.

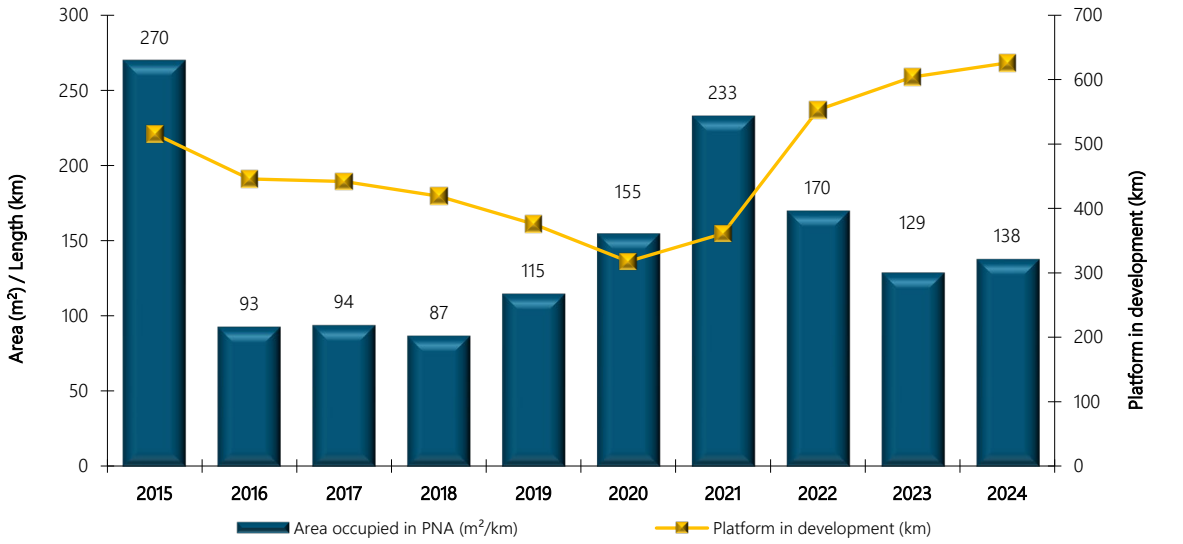
As shown in the graph, monitoring this indicator has made it possible to track the evolution of the average area occupied by auxiliary elements in Protected Natural Areas in relation to the length of the platform in active works over the last ten years. This indicator is calculated by adding up the areas of Protected Natural Areas occupied by auxiliary elements in active platform sub-sections and dividing by their total length.

In 2024, despite the significant increase in the average lengths of active works since 2021 (from 361 to 626 km), the value of this indicator has decreased substantially, falling from 233 to 138 m2 per kilometre of active platform work occupied in Protected Natural Areas, falling below the average recorded over the last decade.

In 2024, the total area occupied in Protected Natural Areas by auxiliary construction elements was 8.64 hectares.

With the exception of areas designated as permanent access for infrastructure services, all other occupied land is restored once the works are completed. Restoration is carried out using geomorphological remodelling and revegetation techniques with native species, applying ecological and landscape criteria to ensure the environmental integration of the affected areas, minimise visual and ecological impact, and promote the recovery of original ecosystems.

Chart 20. Average area occupied by auxiliary elements in PNA (m^2/km) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Minimise Occupation in Areas of High Natural Value (m^2/km)

The principle of minimising impact on legally protected areas during railway construction is also extended to other Areas of High Environmental Value

The following are considered Areas of High Environmental Value:

- Listed archaeological sites
- Lagoons, wetlands, and floodplains
- Rivers, streams, and channels with natural vegetation
- Areas with well-preserved and developed natural woodland
- Highly permeable recharge zones

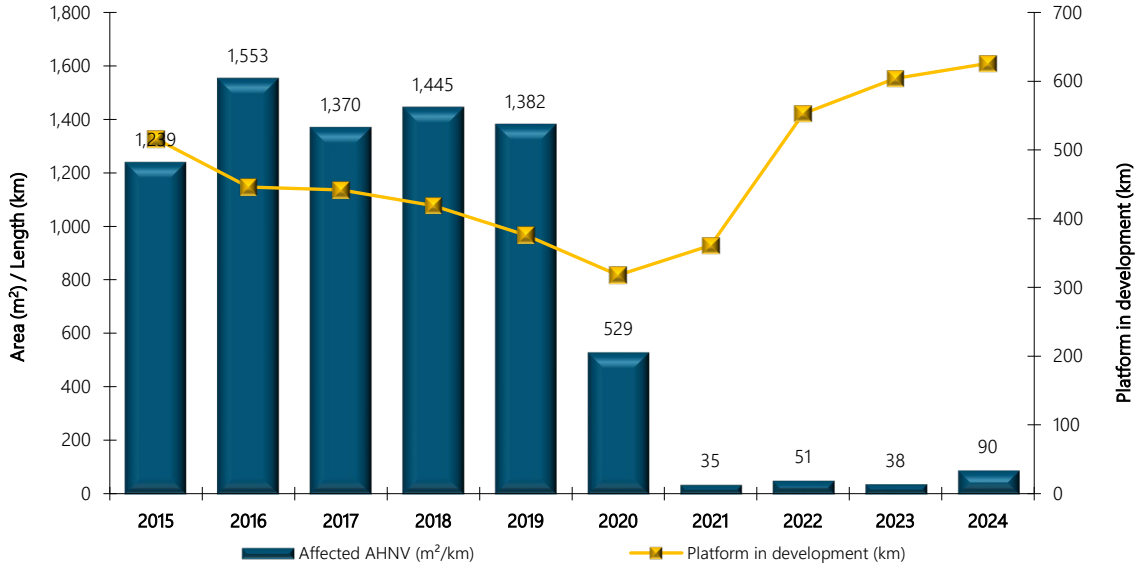
The following graph illustrates the ongoing platform length work over the past ten years, along with the area occupied by auxiliary elements per kilometre of platform under construction, for Areas of High Natural Value each year.

In 2024, the total Areas of High Environmental Value affected by the auxiliary elements required for the execution of works was 5,6 hectares, which equates to 90 square metres per kilometre of active platform work for that year.

This value, since 2021, reflects a low level of occupation of such spaces during infrastructure construction. In most cases, these areas involve occupation in areas of natural wooded vegetation or along watercourse margins, which are necessary for constructing viaducts. This type of occupation is generally carried out in coordination with the relevant River Basin Authority or the appropriate Environmental Administration.

Finally, it should be noted that, just as with the occupation of Protected Natural Areas, this surface is restored at the end of the project through geomorphological reshaping and revegetation with native species following ecological and landscape criteria.

Chart 21. Average area occupied by auxiliary elements in Areas of High Natural Value (m^2/km) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Objective 2: Preserve Cultural Heritage

Percentage of the area occupied by the works that is subject to archaeological monitoring and supervision (%)

Before commencing work on the construction site, surface surveys and preventive measures are carried out to detect any possible archaeological finds, as established by the relevant regional authority responsible for heritage matters.

These cultural heritage protection measures are implemented across the entire area to be occupied by the works (including the route and auxiliary elements). It is extremely rare to start work in areas where the possibility of archaeological finds has not been previously ruled out.

This approach ensures compliance with current regulations on historical heritage and allows infrastructure development to be reconciled with the conservation and enhancement of cultural heritage.

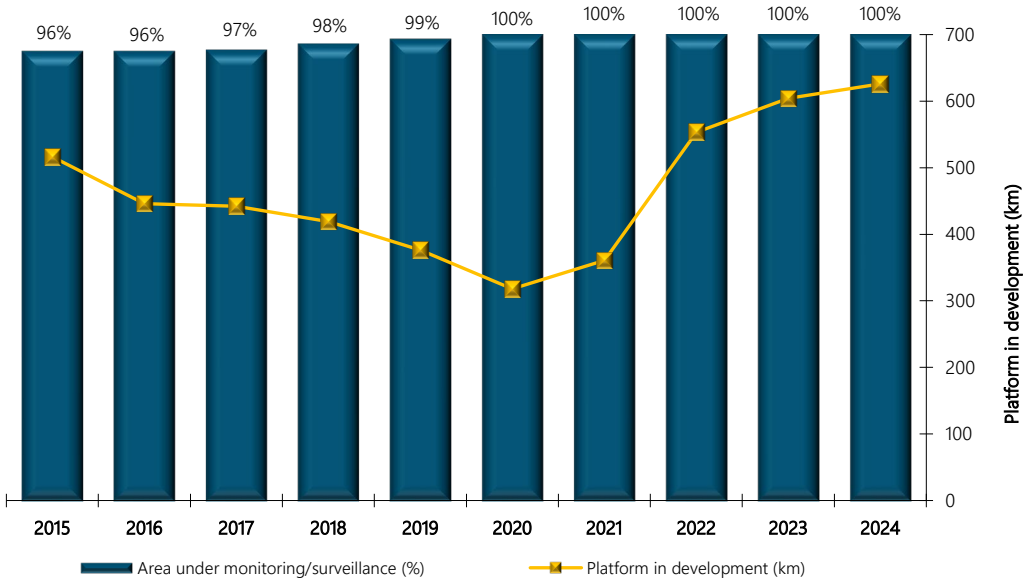
The following graph shows the length of ongoing platform work over the past ten years, along with the annual average percentage of the area under archaeological monitoring and supervision relative to the total area occupied by the works.

This year, 100% of the project area has been subjected to archaeological monitoring and the preventive measures prescribed by the Competent Authority, maintaining the same standard as in previous years.

Since the compliance value for the specified indicator is 100%, it can be concluded that archaeological monitoring in railway projects is a well-established and controlled practice by the project team. The trend has remained steady since monitoring began, with consistently high compliance percentages year after year.

This reflects the commitment of Adif and Adif-Alta Velocidad to protecting historical and cultural heritage, effectively integrating archaeological procedures into all phases of infrastructure development.

Chart 22. Percentage of occupied area under archaeological monitoring and supervision (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Implementation of required measures by the competent authority in the event of archaeological and palaeontological finds (%)

During the execution of the works, archaeological and/or palaeontological finds of varying significance may be encountered. From the moment they are discovered on site, work is carried out in collaboration with the Competent authority in matters of heritage, following the measures prescribed by that authority.

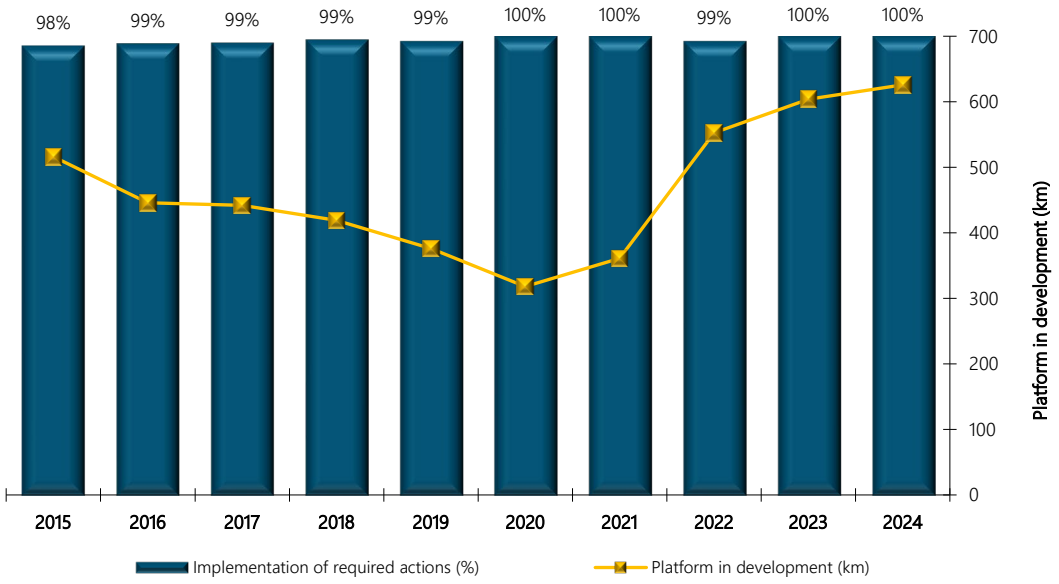
These actions may include: cataloguing and protecting the remains, followed by covering them, transferring the archaeological element to a suitable location, displaying the findings in a museum, or even modifying the layout of the infrastructure in exceptional situations where the find is of significant importance.

The following graph illustrates the platform lengths work over the past ten years, along with the average annual percentage of findings with no recorded incidents relative to the total registered findings.

! This indicator has consistently exhibited very high values from the outset of monitoring, reflecting the emphasis and importance placed on heritage preservation during the execution of the works.

It is worth noting that the number of discoveries accumulated during ongoing works in 2024 totals 470 new archaeological and palaeontological finds, with all necessary actions prescribed by the relevant authority being implemented.

Chart 23. Archaeological and palaeontological finds on which actions prescribed by the relevant authority have been implemented (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Objective 3: Preserve Soils

Area affected by works where topsoil is removed for subsequent use in restoration tasks (%)

Topsoil provides the physical, chemical, and biological support necessary for the existence and development of vegetation. This surface layer of soil plays a crucial role in the environmental integration of areas affected by construction work, as well as in their stabilisation and protection against erosion.

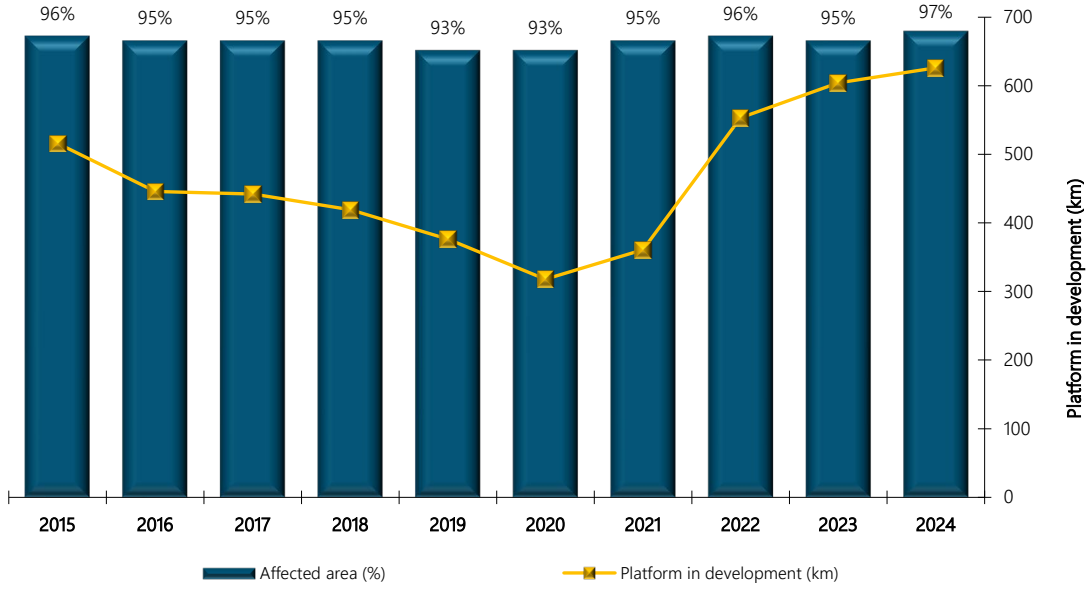
Given that it is considered a unique and slowly renewable natural resource, within the framework of Adif and Adif-Alta Velocidad´s commitments to environmental protection and biodiversity, all railway infrastructure construction projects, as well as the environmental monitoring programmes for these works, contemplate the recovery of the existing topsoil on all surfaces to be occupied by the works, as well as its collection and maintenance in good condition. This topsoil is subsequently reused in the soil and vegetation restoration tasks for the affected areas.

The following graph shows the length of ongoing platform work over the past ten years, along with the annual average percentage of surface area from which topsoil has been removed relative to the area occupied.

In 2024, 97% of the area affected by the works had the topsoil properly removed to ensure the correct restoration and landscape integration of the alignment and associated ancillary elements. This value remains more or less constant compared to previous years, with figures exceeding 90% in all cases.

The lowest values are found in sections that traverse areas with little topsoil, or where the topsoil is of poor quality or contaminated. In these situations, the decision is made not to remove topsoil from part of the surface. Instead, the deficiency is addressed either through amendments, organic or mineral, or by providing topsoil from external sources for use in restoration work.

Chart 24. Surface area of works from which topsoil is removed (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Topsoil volume retained for restoration in the works (%)

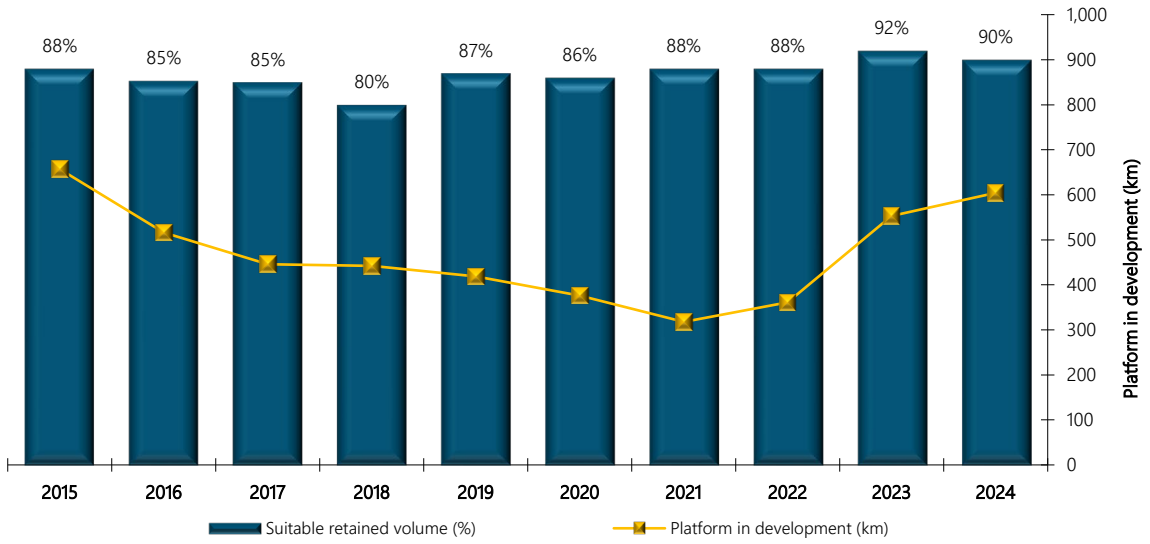
Just as important – if not more so – than removing soil at the start of the project for later reuse is its proper conservation during the period before it is spread in restoration works. Well-preserved soil retains its physical, chemical, and biological properties, enabling successful vegetation growth. This preservation is therefore key to ensuring the effectiveness of landscape integration measures and the recovery of the environment affected by the works.

The following graph shows the length of platform works in progress over the past ten years, together with the average annual percentage of topsoil volume maintained in suitable condition for restoration.

In 2024, the total volume of stripped topsoil in ongoing works amounted to 7,128,726 m^3, of which 90% was preserved for restoration. The remaining topsoil was discarded due to compaction, mixing with other materials, waterlogging, or simply because it had lost the properties necessary to support vegetation.

The soil conservation indicator for 2024 was slightly above the average recorded over the last decade, confirming a positive and sustained trend in the responsible management of this natural resource, which is essential for environmental restoration.

Chart 25. Topsoil volume retained for restoration in the works (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Objective 4: Preserve River Systems and Riparian Vegetation

Riverbanks fully restored after impact (%)

Riverbanks are considered fully restored when the conditions are returned to their state prior to the start of the work.

The integration of affected waterways into natural terrain must include, at least, the following actions:

- Geomorphological reconfiguration of the area following ecological and landscape criteria
- Complete removal of construction debris
- Spreading of topsoil
- Hydroseeding and/or plantings appropriate to the surrounding environment.

This indicator is only recorded for completed works to avoid the influence of the execution pace on the result obtained. It counts the number of waterways that have their riverbanks fully restored, according to the previous criteria, relative to the total number of affected waterways.

The following graph shows the length of completed platform work, as well as the evolution of this indicator over the past ten years during which it has been monitored.

As shown in the graph, riverbank restoration is a common and systematic practice in railway works. In most cases, works conclude with the full restoration of the affected riverbeds, in line with established ecological and landscape recovery criteria.

The specific cases where restoration has not been completed by the end of a project are generally due to interference with subsequent works still in progress. In such cases, full restoration is planned and scheduled within the following project, ensuring the continuity of environmental integration measures and the achievement of sustainability objectives.

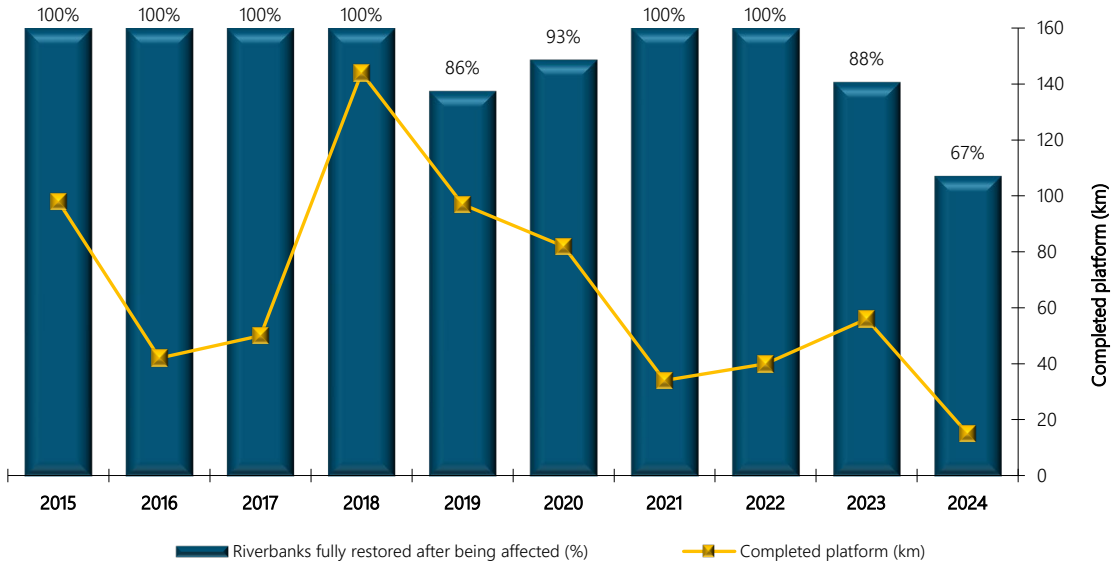
In 2024, six areas of altered watercourses were recorded among the completed works. Of these, some sections of the Zabaleta and Larrazabal streams (Bizkaia) remain pending restoration due to the continued use of temporary fords for other works in progress.

For the Zabaleta stream in particular, partial restoration of its banks has been completed, with

additional works scheduled once the biological shutdown period – established due to the presence of the European mink, a protected species – has ended.

In 2023, all the riversides were fully restored, except for the riverbanks of the Hozgarganta River (Cádiz). In this case, new actions are planned in Phase II of the track renovation project between Ronda and Algeciras, with full restoration expected upon the completion of all the planned actions.

Chart 26. Complete restoration of the affected area (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Structures over watercourses that preserve their river dynamics and associated habitats (%)

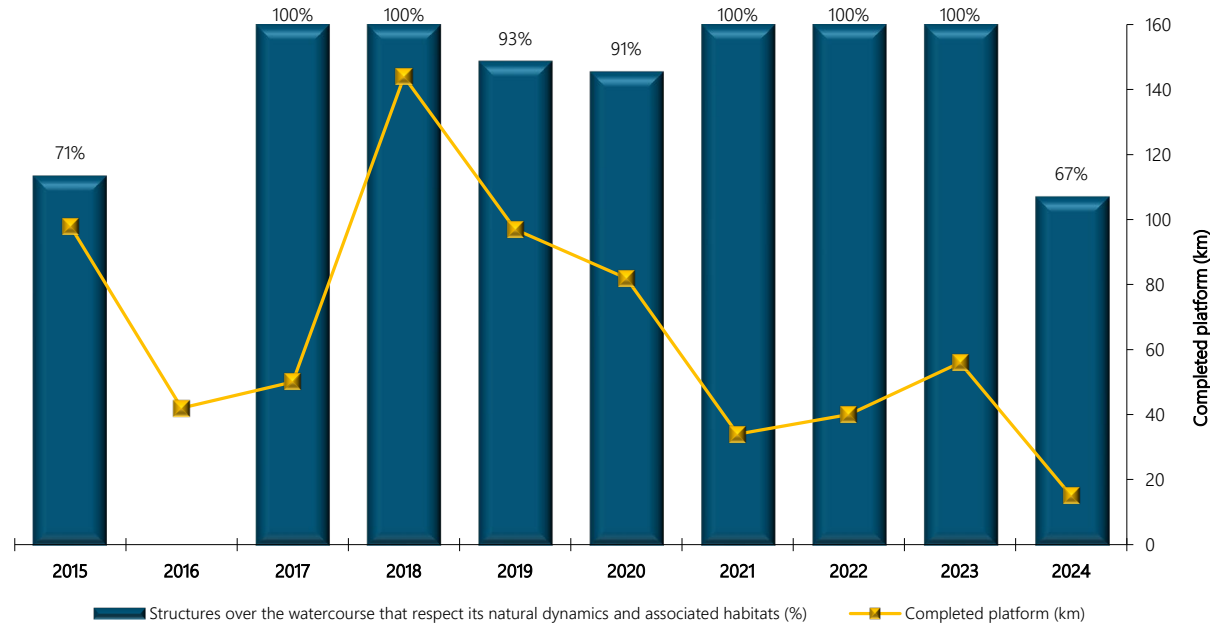
In the design and execution of railway infrastructure, one of the priority objectives is to minimise the impact on watercourses crossed by the route. To this end, criteria are applied that favour both the protection of the aquatic ecosystems and the conservation of ecological connectivity. The main measures adopted include:

- Preserving riverbanks as local ecological corridors, ensuring a minimum distance of five metres between the abutments of structures and the banks of the watercourse.
- Preventing permanent alterations of the hydraulic regime by designing viaducts and other structures without piers or elements within the watercourse.

These measures help preserve the natural functionality of watercourses and their surrounding environments, contributing to a more sustainable environmental integration of the infrastructure.

The evolution of the indicator over the last ten years is shown in the following graph:

Chart 27. Structures over watercourses with piers outside the watercourse and abutments more than 5 metres away (2015-2024) *



** In 2016, no projects involving viaducts over watercourses were completed.*

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

As part of the works completed in 2024, three viaducts were built over watercourses. Of these:

- Two viaducts were designed without piers within the watercourse, and their abutments were placed more than 5 metres away from it, in line with the environmental integration and hydrological protection criteria.
- The third viaduct, located in a semi-arid area of Spain, crosses a seasonal watercourse. While no piers were built within the watercourse, its abutments are located less than five metres from it.

Major rivers unaffected by infrastructure (%)

'Major rivers' are defined as those specified in Article 3 of the Water Framework Directive (Directive 2000/60/EC), and a river is considered unaffected when, after the completion of the project, it is restored and ecologically and aesthetically integrated as follows:

- No permanent straightening, diversion, or channelisation executed during the work.
- No piers within the watercourse.
- No abutments within 5 metres on either side of the watercourse.
- No permanent occupation due to the construction of the line

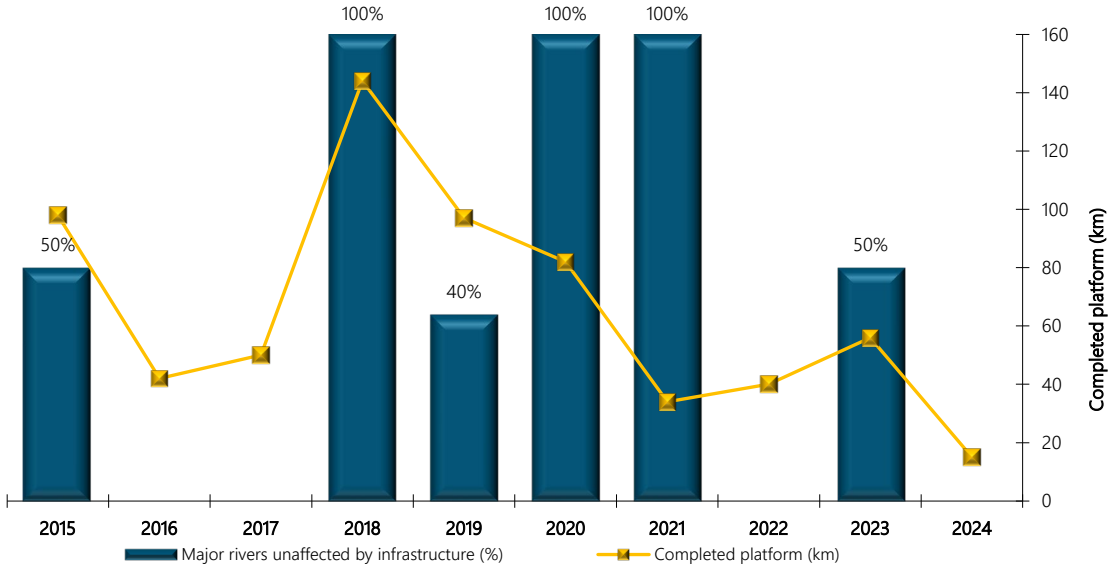
Below is a comparative graph for the last ten years that analyses the percentage of major rivers unaffected by infrastructure, based on the length of completed platform work.

In the works completed during 2024, no major rivers were crossed, which suggests that planning has generally succeeded in avoiding direct impacts on the most ecologically sensitive river environments.

In 2023, however, two major rivers were crossed during the execution of infrastructure works.

Among these, restoration on the banks of the Hozgarganta River remains pending. This situation is because additional actions from other projects still need to be undertaken in the river area. For this reason, full restoration of the riverbank is planned once all scheduled works in the area have been completed, thereby ensuring coordinated and appropriate intervention.

Chart 28. Major rivers unaffected by infrastructure (%) (2015 -2024) *



** In 2016, 2017, 2022 and 2024, no projects crossing 'major rivers' were completed.*

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Objective 5: Prevent Pollution

Areas properly equipped for the collection, treatment, or drainage of construction wastewater (%)

During the execution of the works, certain activities generate wastewater that must be properly managed to minimise environmental impact. These activities mainly include tunnel drilling, concrete mixing, machinery cleaning and maintenance, and the use of temporary facilities for construction personnel. The objective is to ensure that all areas where wastewater is generated are equipped with collection and treatment systems that are operational before the activity begins, allowing for subsequent reuse, specialised management, or discharge in compliance with legal limits.

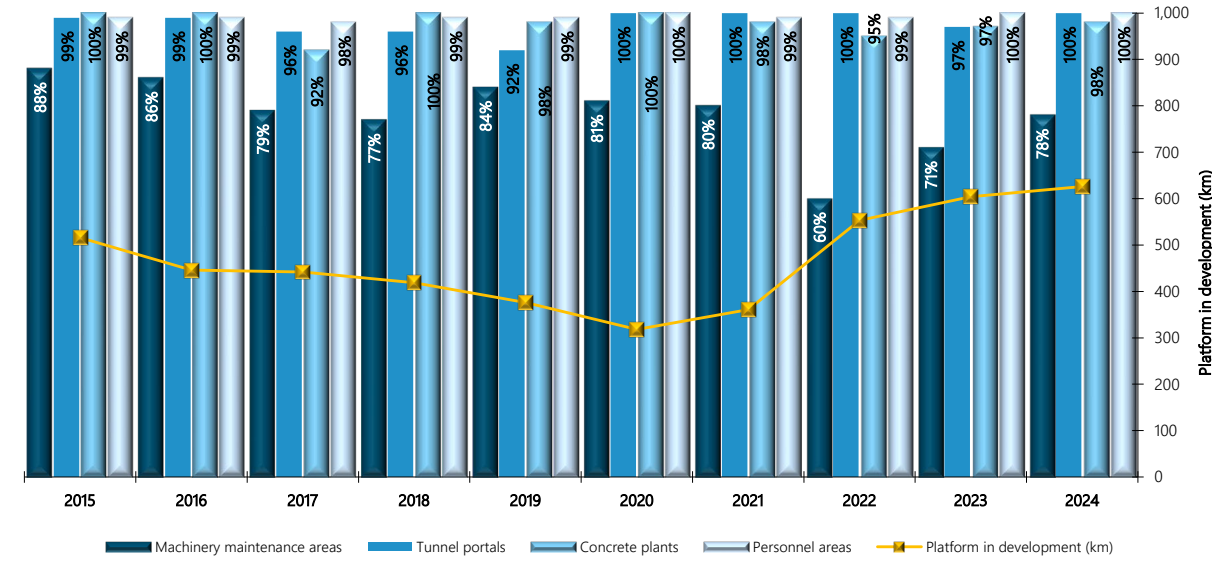
Monitoring of the indicator relating to wastewater management is carried out separately according to the source of the wastewater, allowing for a more accurate assessment of compliance with environmental requirements for each type of facility or activity. These categories considered are the following:

- Machinery maintenance areas,
- Tunnel portals,
- Concrete plants and similar facilities, and
- Personnel areas.

The following graph shows the results obtained in active projects over the last ten years, broken down by each of these sources. This information helps identify trends, levels of compliance, and

potential areas for improvement in the environmental management of projects.

Chart 29. Areas with proper water treatment facilities (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

In 2024, the parameters for water treatment at tunnel portals, concrete plants, and personnel areas remained stable, with compliance rates at or very close to 100%. The average result is considered positive, reflecting the proper implementation of control measures.

Regarding the elements evaluated, the following were considered to be properly managed: 50 machinery maintenance areas, 24 tunnel portals, 56 concrete plants or similar facilities, and 417 sanitary facilities in personnel areas. Only one concrete plant was identified as having deficiencies in its water treatment system.

For machinery maintenance areas, the deficiencies detected were exclusively related to maintenance performed outside fixed waterproofed surfaces, which could pose a risk of spillage onto the ground. However, in most cases, alternative measures were implemented, such as the use of mobile workshops, portable containment basins, or absorbent mats placed under engines. Although temporary, these solutions help minimise the environmental risk associated with these activities.

Discharge in accordance with the thresholds and analytical requirements set by the relevant authority (%)

In cases where treated wastewater is discharged as effluent into the Public Water Domain (DPH), prior authorisation must be obtained from the competent basin authority.

Once granted, the discharge is subject to specific monitoring to ensure that effluent characteristics comply with the conditions established in the authorisation.

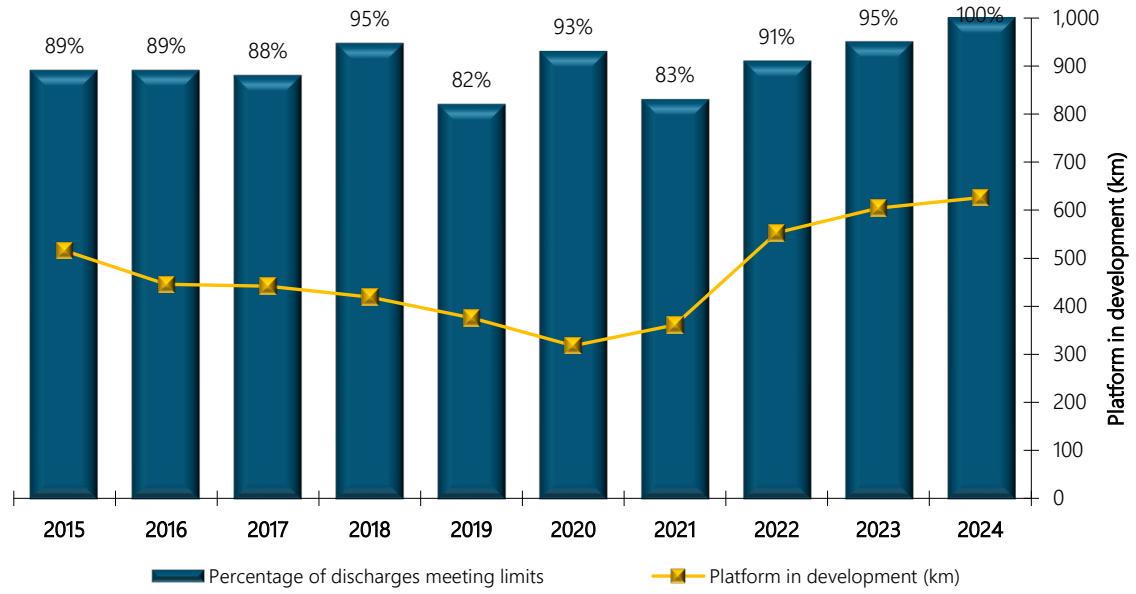
The following graph illustrates the length of active platform works over the past ten years, together with the average annual percentage of discharges whose parameters remained below the authorised maximum limits.

In 2024, 100% of treated wastewater discharged into public water bodies complied with the requirements set by the competent authority, improving on the results achieved in previous years.

This outcome reflects a positive evolution of treatment system performance, as well as the progress made in planning and environmental control associated with authorised discharges.

Historically, the main challenges in this area have been concentrated in so-called 'wet Spain', where the large volumes of water requiring treatment, combined with episodes of extraordinary rainfall, have occasionally led to treatment systems being undersized. Nevertheless, no significant effects have been recorded in receiving watercourses, confirming the effectiveness of the management measures implemented, even under demanding hydrological circumstances.

Chart 30. Discharges into public water bodies that meet the limits imposed by the competent authority (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Compliance with night-time curfews near inhabited areas (%)

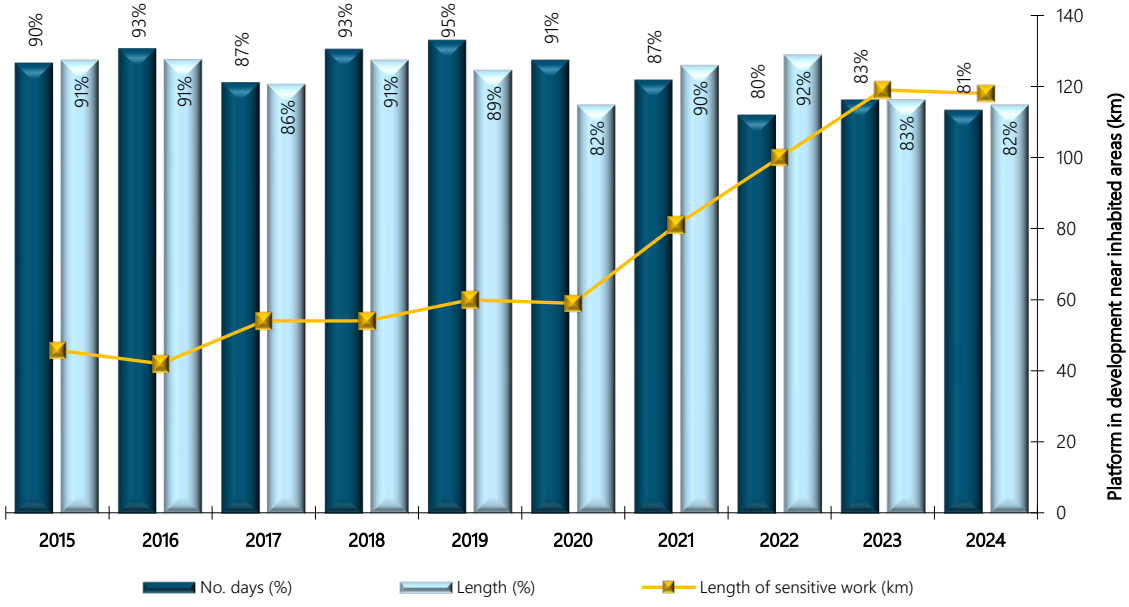
The conditions for carrying out construction work and noisy activities near residential areas consider both the Environmental Impact Reports and the acoustic quality standards set out in current legislation. In railway construction projects, necessary controls and preventive measures are put in place to minimise acoustic disturbances. However, the most effective approach is to avoid carrying out work at night in these areas.

The following graph illustrates the annual trend of this indicator for the length of active construction projects near residential areas over the past ten years.

The following graph shows that in 2024, 81% of the days and 82% of the length of the route complied with night-time curfews in residential areas, maintaining values similar to those recorded in the past two years. However, it should be noted that the length of active construction work in inhabited areas has increased significantly since 2021.

The decrease in the values for this indicator is typically linked to the execution of superstructure works, where night-time work is necessary to avoid disrupting the railway service operating in each area. It is worth noting that before carrying out these works, particularly in large towns, prior notification is given to the local council, and appropriate preventive and corrective measures are put in place to minimise acoustic disturbance.

Chart 31. Compliance with night-time curfews near inhabited areas (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Effectiveness of dust control measures (%)

Generally, during construction works, dust control measures are applied, such as watering roads used by vehicles and machinery, limiting their speed to 30 km/h, and covering the load areas of lorries transporting soil. In more specific cases, typically at concrete plants, conveyor belts are enclosed and sprinklers, among other supplementary measures, are installed to minimise particle dispersion.

This indicator estimates the percentage of open 'work sites' each quarter where dust control measures are effective. Annual results are

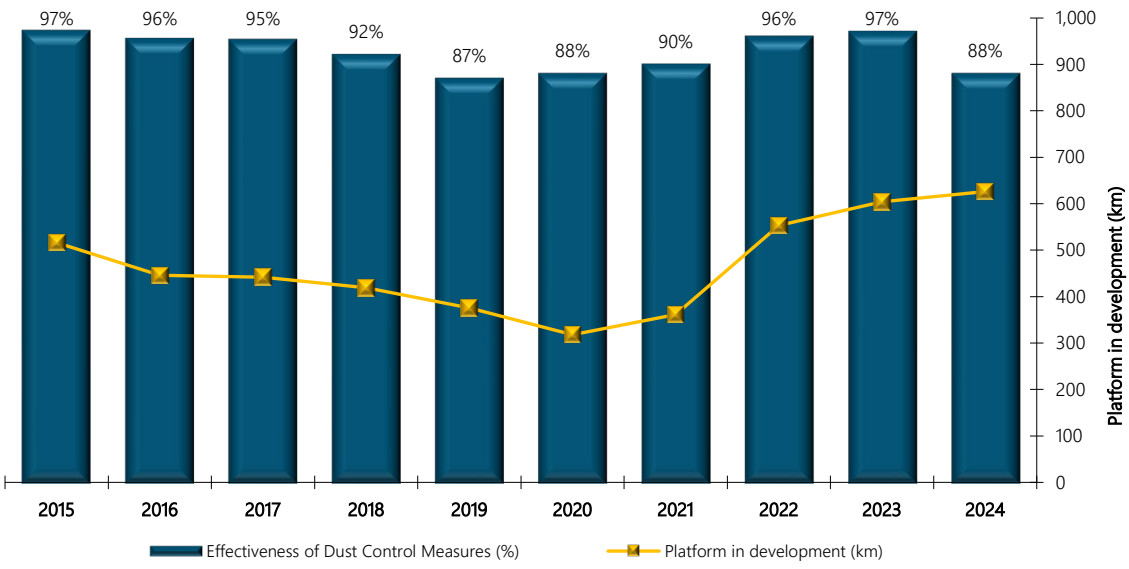
somewhat affected by the weather, with the least favourable values occurring during the driest months.

The following graph shows the average annual trend of this indicator for all active projects over the past ten years.

With regard to the indicator's performance trend, a slight decrease to 88% has been recorded, reaching levels similar to those observed in 2019 and 2020. However, irrigation measures and actions in areas where soil material is dumped continue to be widely implemented practices across all active worksites.

Conversely, in projects taking place in urban areas, dust and mud control measures are especially important. Overall, the projects directly affect 104.9 kilometres of streets in urban areas or access roads, and in 88% of this length, the impact from truck and machinery traffic is minimised through street sweepers, frequent watering, and other measures.

Chart 32. Effectiveness of dust control measures (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Objective 6: Promote Circular Economy

In line with the principles governing the circular economy, Adif and Adif-Alta Velocidad promote the efficient and responsible use of natural resources in their projects. This approach aims to minimise the negative impacts associated with the generation and management of waste in the environment, promoting its reduction, reuse and recycling.

In this way, both entities actively contribute to the fulfilment of the Sustainable Development Goals (SDGs) established in the 2030 Agenda, and in particular SDG 12: Responsible consumption and production.

The application of these principles is governed by a hierarchical order of priorities in waste management, which is as follows:

a) Prevention,

b) preparation for reuse,

c) recycling,

d) other forms of recovery, including energy recovery, and

e) disposal.

On the other hand, Order APM/1007/2017, of 10 October, establishes the general rules for the recovery of excavated natural materials, allowing their use in filling operations and in works other than those in which they were generated. This regulation facilitates the recovery of these materials, thus promoting sustainable practices in the field of construction. In accordance with this Order, excavated natural materials from construction and demolition works (such as soil, clay, silt, sand, gravel or stones) may be recovered in filling operations, restoration of degraded areas, conditioning of roads or livestock trails and in other construction works for specific purposes, provided that these materials are not mixed with other materials or objects or come from a contaminated or potentially contaminated site.

The results obtained in the management of excavated soil and non-hazardous construction and demolition waste during the 2024 financial year are presented below.

Use of uncontaminated natural excavated materials on site. Projects completed [8] in 2024 (%)

In projects involving significant volumes of excavated soil, and provided that technical conditions allow, priority is given to reusing the excavated material in the construction of the infrastructure itself, including the environmental restoration processes for the areas covered by the project.

In 2024, the methodology for calculating the volumes of soil used in railway works was updated in line with Law 7/2022, of 8 April, on waste and contaminated soil for a circular economy, ensuring compatibility with Order APM/1007/2017, of 10 October, on the recovery of natural materials excavated for use in filling operations and works other than those where they were generated, as well as Royal Decree 105/2008, of 1 February, regulating the production and management of construction and demolition waste.

Since in certain cases it has not been possible to process an APM Order for the rehabilitation of land affected by extractive activities, the restoration of degraded areas, or the refurbishment of roads or livestock trails within the works themselves, the methodology was

[8] This indicator is calculated for completed works, as it provides a complete picture of the material's life cycle. Considering the indicator during the construction phase could distort the representativeness of the values obtained. Excavations are usually the first actions to be undertaken, while filling and embankment formation are undertaken in later phases. Taking this into account, calculating this indicator for active works, when a proportion of these are in the early stages of execution, would skew the result towards an underestimation of the use of excavated material on site, a bias that would be corrected as the material is reused.

redefined to account for all soil used in the works for the stated purposes.

Thus, from 2024 onwards, the calculation of material used on site includes not only excavated material incorporated into the construction of the infrastructure itself (as has been the case until now), but also its use in restoring degraded areas or filling areas affected by extractive activities, provided that these actions are carried out in accordance with the construction or modified project.

This practice allows material management to be integrated into the construction cycle, optimises resources, reduces waste generation, and contributes to environmental restoration, in line with the principles of the circular economy and sustainable infrastructure development.

The systematic recording of this data began in 2022 as part of the environmental monitoring of the works, as shown in the following table:

Table 37. Reused natural excavated material

		2022	2023*	2024
Reused earth	%	62.1%	89.7%	8.9%
	m^3	2,229,524	2,518,353	272,273
Total excavated earth	m^3	3,589,950	2,807,783	3,050,107

** Soil use data updated with respect to the 2023 Environmental Report.*
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

In the works completed during 2024, the total volume of natural material excavated was 3.1 million m^3. Of this, 8.9% was reused in the construction of the infrastructure itself. The remainder was properly managed, either because it did not meet the technical quality requirements for reuse or because it was surplus to the soil balance (for example, in projects where tunnels and viaducts predominated).

In addition, 64.5% of the excavated soil that could not be reused was sent for recovery. Of this, 58.1% was recovered through the application of Order APM/1007/2017, of 10 October, while 6.4% was delivered to an authorised manager for recovery.

As a result, the soil used within the project together with that destined for recovery reached 73.4% of the total excavated volume in 2024, demonstrating a high level of resource utilisation in line with circular economy principles.

On-site recovery of natural materials external to the site (%)

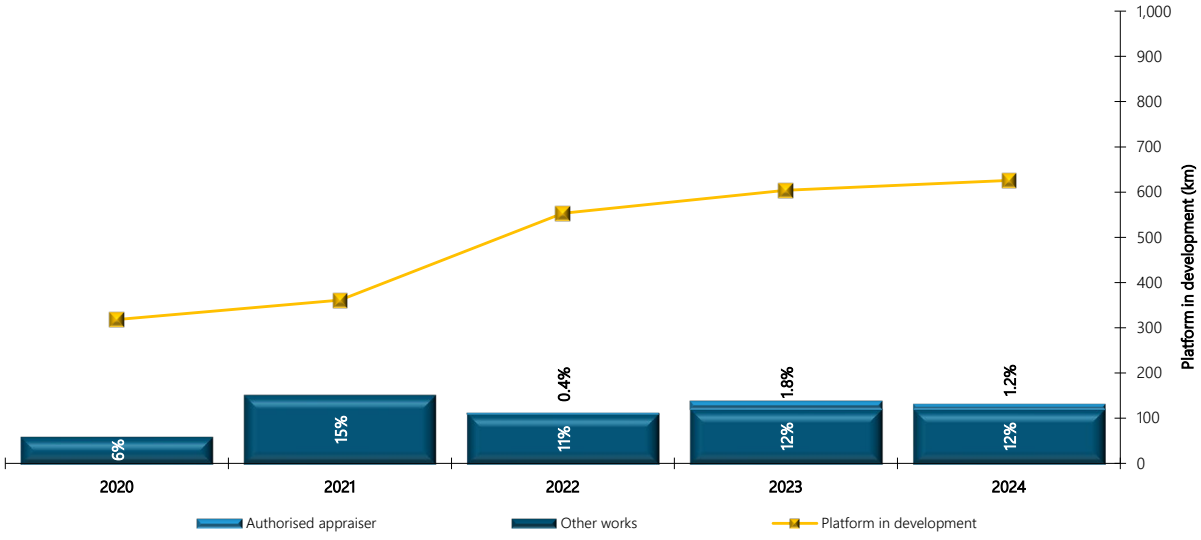
Frequently, when constructing the platform, it is necessary to source materials externally when there is a soil shortfall – either because the excavated material does not meet the required quality standards or because specific material types are needed (such as ballast or stone for breakwaters). Since the introduction of Order APM/1007/2017 of 10 October, which outlines general regulations for the recovery of natural excavated materials for use in filling operations and projects other than those from which they originated, Adif and Adif-Alta Velocidad have been encouraging the use of such materials from other projects or authorised recovery facilities. This aims to minimise the need for new land (mainly new borrow pits) and to promote Circular Economy practices and resource optimisation.

Given the introduction of the regulation, data recording on earth recovery under this Order was introduced in Adif and Adif-Alta Velocidad projects in 2020. However, it was not until 2022 that data recording was expanded to include earth recovered from authorised waste managers.

In 2024, the cumulative volume of natural material excavated from external sources that has entered active construction sites, from borrow pits or legalised quarries, and from valued soil, amounts to a total of 17.95 million m^3.

Of the total, 12% (2.16 million m^3) corresponded to surplus material from external sources, while 1.2% (210,324.35 m^3) came from authorised recovery managers. In total, reclaimed soil from external sources in Adif and Adif-AV projects amounted to 2.37 million m^3, representing 13% of all external soil used in the works. The remaining volume originated from borrow pits or legalised quarries.

Chart 33. On-site recovery of external earth (2020-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

As shown, although the data is still limited, the graph reflects a stabilisation in soil valuation indicators, which have become established as a good environmental practice in construction projects.

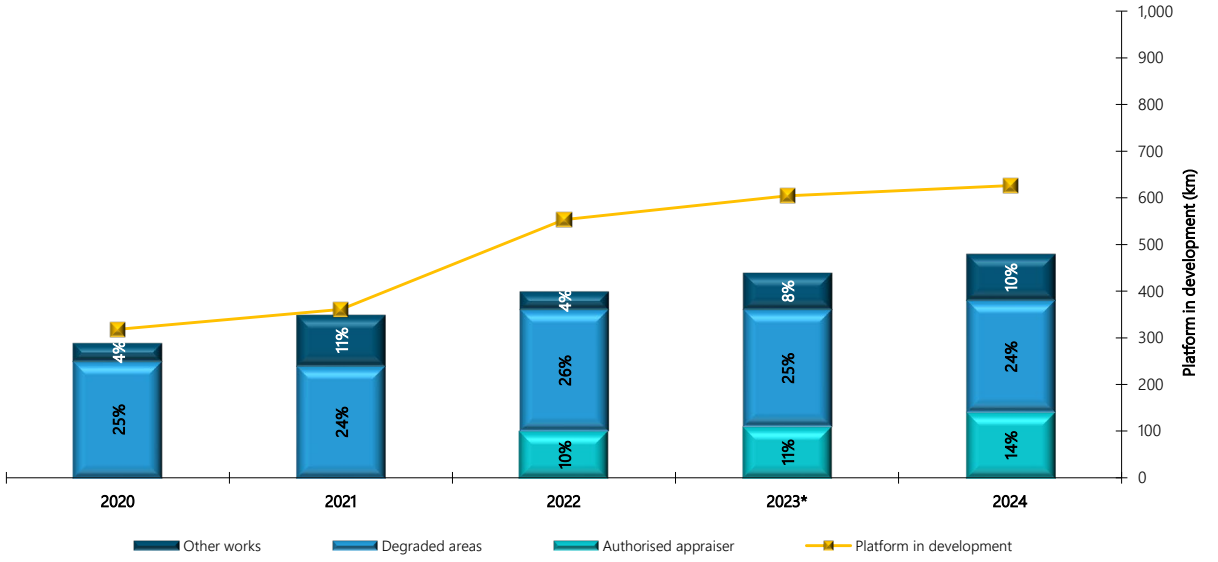
Recovery of surplus natural excavated material (%)

To minimise the use of new land, promote the Circular Economy, and optimise resources, Adif and Adif-Alta Velocidad prioritise the recovery of surplus soil when there is a surplus of soil from a construction project or when it does not meet the technical quality requirements for reuse in the project. In these cases, the priority destination for the soil is its recovery, either by delivering it to an authorised manager or, preferably, by applying the Order APM/1007/2017 of 10 October. This order sets out general regulations for the recovery of natural excavated materials for use in filling operations and other projects beyond those from which they originated. This means the earth is to be delivered for use in other construction projects or for the restoration of degraded areas.

When it is not possible to apply these recovery methods, the land is used for landfill in alternative disposal areas, always following the guidelines established by the competent environmental body of the corresponding autonomous community.

As indicated in previous sections, the systematic recording of data on soil valuation in accordance with Order APM/1007/2017 was implemented in Adif and Adif-Alta Velocidad´s projects in 2020. In 2022, monitoring was subsequently extended to include data on the transfer of soil to authorised recovery managers.

Chart 34. Utilisation of excavation surpluses (2020-2024)



** Data updated with respect to the 2023 Environmental Report.*

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

As illustrated in the graph, this indicator has increased progressively, becoming established as a good environmental practice in construction projects.

In 2024, the total accumulated volume of surplus soil in active works amounted to 22.75 million m^3. Of this total, 10% (2.3 million m^3) was recovered for use in other construction projects, while 24% (5.5 million m^3) was used for the restoration of degraded areas. In total, 34% of the surplus clean soil was recovered through the application of Order APM/1007/2017, of 10 October.

When it is not possible to apply this Order due to the lack of suitable sites, the soil is delivered to

authorised recovery managers. In this regard, during 2024, 3.1 million m^3 were delivered to such managers, representing 14% of the total.

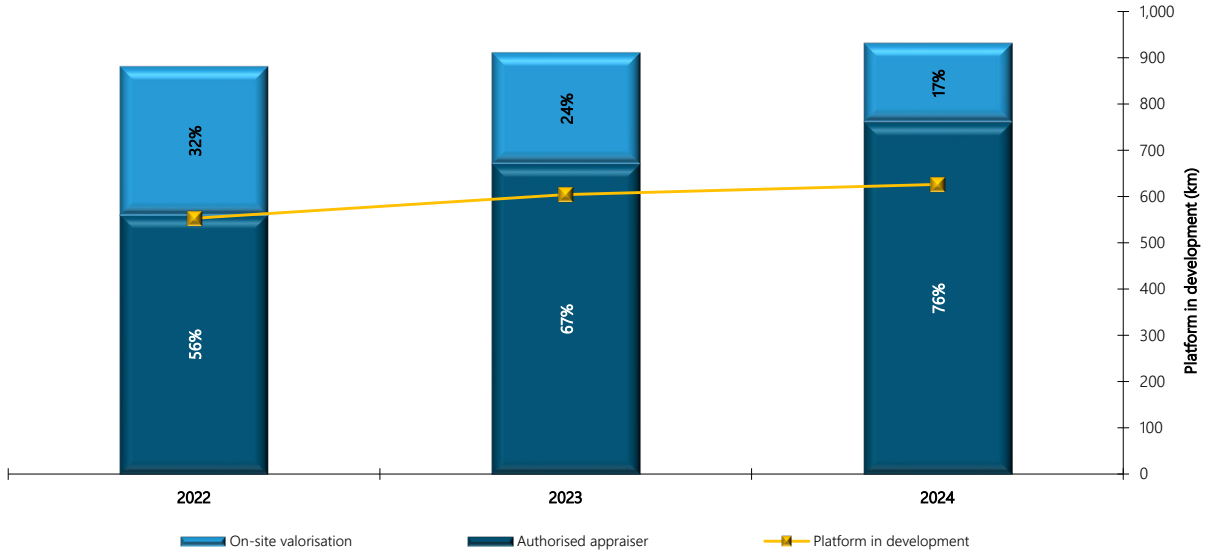
Overall, in 2024, 48% of the total volume of surplus natural excavated material was recovered, equivalent to 10.9 million m^3, reflecting significant progress in the implementation of practices aligned with the principles of the circular economy.

Recovery of Construction and Demolition Waste (%)

The recent Law 7/2022 of 8 April, concerning waste and contaminated soils for a circular economy, together with Adif and Adif-Alta Velocidad aims to ensure that at least 70% by weight of non-hazardous construction and demolition waste is prepared for reuse, recycling, and other forms of material recovery, including backfilling operations, excluding materials in their natural state as defined in category 17 05 04 (clean soil and stones) of the waste list. , reaching at least 70% by weight of those produced.

In 2022, the recording of the total weight and destination of non-hazardous Construction and Demolition Waste (CDW), excluding soil, generated by the works began. The following graph shows the percentages of non-hazardous CDW recovered in all works where environmental monitoring of environmental integration objectives is carried out.

Chart 35. Construction and demolition waste recovery (2022-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

As shown in the graph, the recovery of non-hazardous construction and demolition waste (CDW) has become established as a common practice on construction sites, reaching 93% recovery in 2024.

It should be noted that, within the project itself, 17% of the total construction and demolition waste (504,236 tonnes) has been recovered. These materials have mainly been reused as a base for site roads, for the adaptation of auxiliary facility areas, and as aggregate for concrete.

The methodology applied in these cases has relied primarily on treatment with authorised mobile crushing plants, which produce material with the appropriate grain size for its intended use. This on-site treatment offers significant

environmental benefits, as it not only promotes the circular economy, but also contributes to reduce the carbon footprint and mitigate climate change by avoiding the transport and external management of waste.

Finally, the remaining 7% of waste was delivered to authorised waste managers for disposal, ensuring compliance with current regulations.

Objective 7: Protect Wildlife

Compliance with construction restrictions that protect periods of high sensitivity for threatened or particularly vulnerable wildlife species (%)

During the construction phase, the key parameter for monitoring protective measures for wildlife is adherence to biological break periods, which are essential to prevent disturbances to certain protected wildlife species or species of special concern, especially during their breeding and nesting seasons. This generally involves bird species.

The following graph illustrates the estimated annual length of active construction subject to Biological Break periods and how this has changed over the past ten years. Furthermore, it represents the number of days and the length of construction where the established restriction periods are observed.

In 2024, compliance with activity restriction periods for wildlife reasons remains close to 100%. This high level of compliance is reflected both in the number of days respected and in the extent of the works where the established biological rest periods were applied.

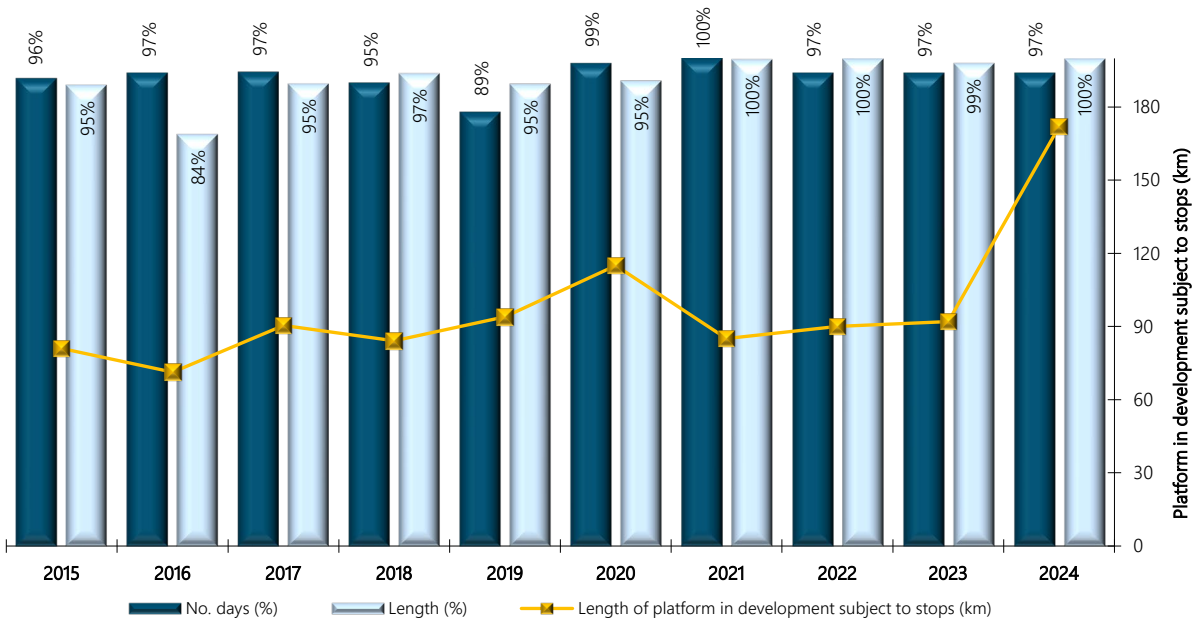
Furthermore, it should be noted that in 2024, the length of work subject to biological closure has reached 172 km, nearly double the figure recorded in 2023.

In general terms, and with very few exceptions, the temporary restrictions imposed on the execution of certain works due to the presence of sensitive fauna are being respected. This measure has become firmly established as a standard environmental practice across all construction sites.

The main challenge in adhering to biological break periods lies in interpreting and adapting the restrictions outlined in Environmental Impact Statements (EISs) to the realities of the construction work, as well as those imposed by the relevant authorities when unexpected sensitive species are detected during the construction.

To ensure the correct application of these measures, wildlife studies are conducted on the construction sites to verify the presence or absence of sensitive species that may inhabit the vicinity of the construction area. These studies enable protection measures to be adjusted to the ecological conditions of the area, preventing impacts during breeding periods and ensuring that construction activities are compatible with biodiversity conservation.

Chart 36. Compliance with wildlife-related activity restriction periods (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Permeability of infrastructure for wildlife passage – ungulates (No./km)

Isolation of wildlife populations and the barrier effect are among the most significant impacts of constructing linear infrastructure across the landscape. Therefore, designing wildlife-permeable structures is one of the most effective ways to mitigate this impact and promote ecological connectivity.

The indicator used to estimate permeability for ungulates is measured in terms of adequate wildlife crossings relative to the kilometres of the route where this group of fauna is present. In cases where the route passes through a tunnel or viaduct longer than half a kilometre in a natural environment, its length is considered equivalent to an embankment with two suitable wildlife crossings per kilometre of infrastructure.

Passages of suitable dimensions are those that meet the requirements set out in the 'Technical prescriptions for wildlife crossing and fence design (Second edition)'[9] from the Ministry of Agriculture, Food, and the Environment (2015).

From the project phase onwards, the number of structures required to achieve this ratio is determined, with their dimensions and characteristics specified to suit the species present in the area.

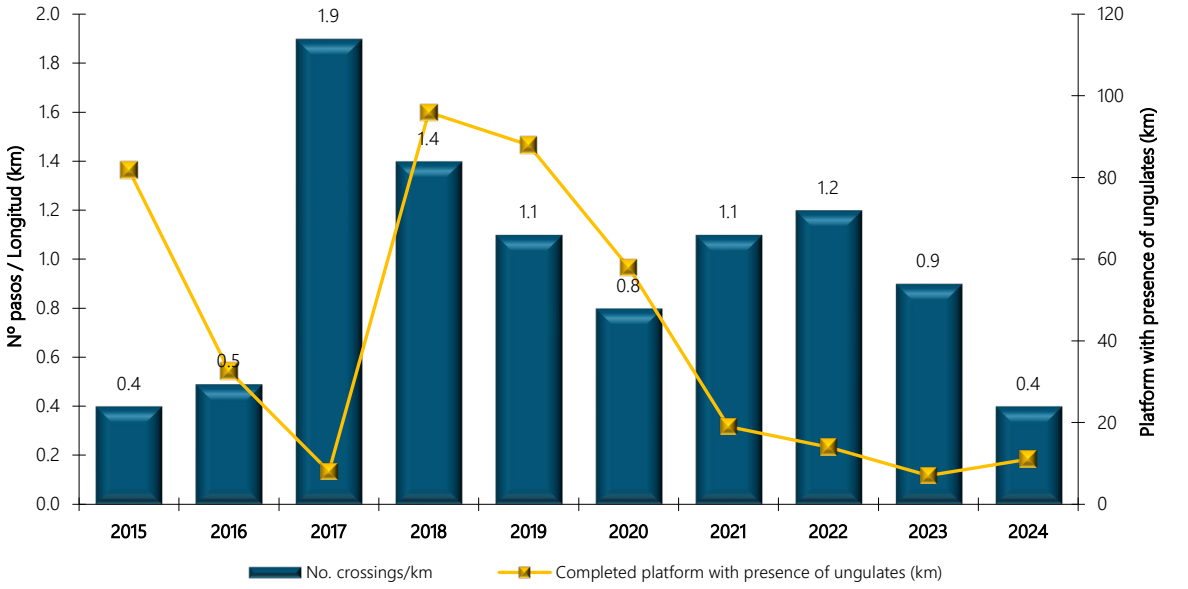
The following graph shows the evolution of the results obtained in completed platform works with the presence of ungulates from 2015 to 2024. Last year, works with a route length of 11 km were completed in areas where the presence of ungulates has been recorded. In addition, a specific wildlife crossing of suitable dimensions was constructed, and the length of permeable sections through tunnels and viaducts is 1.5 km.

After applying the corrections established for calculating the indicator, the resulting permeability value for ungulates is 0.4 crossings/km, which corresponds roughly to one

[9] This document also specifies minimum recommended densities according to the type of terrain crossed and the various wildlife groups. These densities range from one crossing per kilometre to one crossing every three kilometres, depending on the habitat and the wildlife interest in the area.

suitable passage every 2.5 km of route. This complies with the range of passage densities per kilometre recommended in the Ministry's Technical Specifications, noting that one of the two works contributing to this indicator traversed a highly anthropized area where the presence of ungulates is occasional.

Chart 37. Permeability of infrastructure for ungulates (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Permeability of infrastructure for wildlife passage – small and medium-sized species (No./km)

To ensure that drainage structures and other elements facilitate the passage and crossing of wildlife through the infrastructure, these structures are designed according to the recommendations outlined in the 'Technical prescriptions for wildlife crossing and fence design (Second edition)' from the Ministry of Agriculture, Food, and Environment (2015). The most common modifications are:

- Enlarging the drainage structure to make it more inviting to wildlife.
- Adding a dry side strip (pathway) to prevent animals from having to wade through the water in the drainage system.
- Ensuring a smooth transition at both ends between the base of the drainage structure and the surrounding terrain.

The indicator used to measure permeability for medium and small-sized wildlife is also expressed in terms of suitable passage units of suitable dimensions in relation to the length of the route. Similarly to ungulates, for routes that pass through a tunnel or viaduct longer than half a kilometre across natural terrain, the length is treated as equivalent to that of an embankment with two suitable crossings per kilometre. Furthermore, structures of this type shorter than half a kilometre are considered to provide one suitable crossing for wildlife. For this calculation, all completed platform works, whether urban or not, are included, regardless of their location[10].

[10] To calculate permeability for small- and medium-sized wildlife, completed works are excluded if they involve urban development, track renewals, overhead structures, or buildings.

Similarly to ungulates, the 'Technical prescriptions for wildlife crossing and fence design' recommend specific densities per kilometre for these structures, depending on the surrounding habitat and the area's importance as a biological connector. For small and medium-sized wildlife, a minimum density of one crossing per kilometre is recommended.

In 2024, the total length of completed routes in areas with wildlife was 14.8 km, including 1.5 km of tunnels and viaducts across natural terrain. In the remaining 13.3 km, three crossing structures with dimensions and features suitable for small and medium-sized animals were installed. Additionally, the crossing built for ungulates is also deemed suitable for these animals.

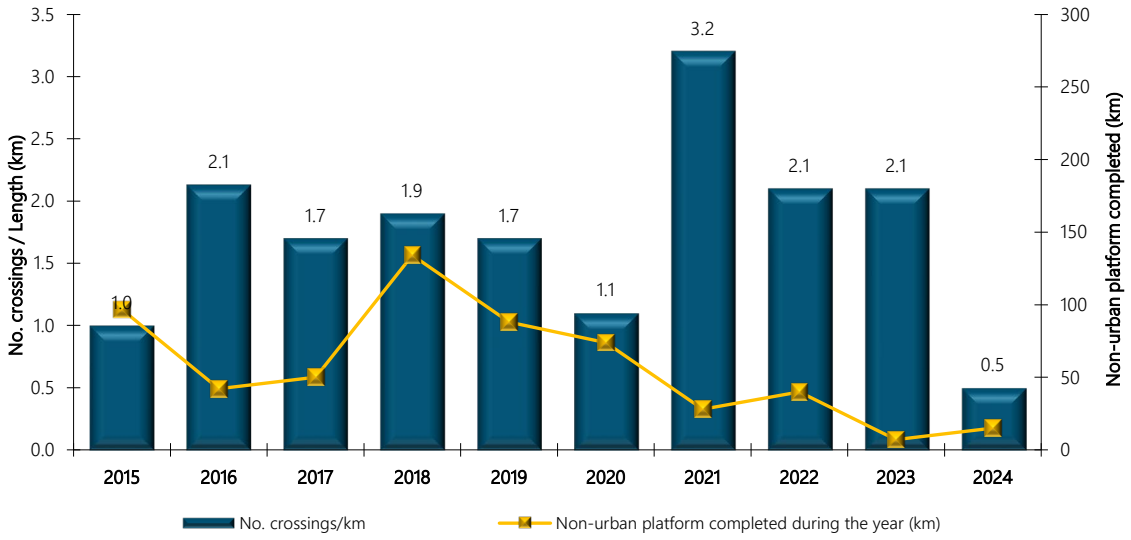
Calculating the indicator yields a permeability rate of 0.5 crossings per kilometre.

It should be noted that, of the three projects completed this year, one ran through a highly anthropized area where the presence of small- and medium-sized fauna is negligible. Likewise, another project primarily involved the expansion of the existing platform to connect the high-speed line with the conventional network, which limited the construction of new cross-structures to facilitate fauna movement.

The following graph illustrates the evolution of infrastructure permeability for small and medium-sized wildlife since 2015:

As explained above, due to the nature of one of the projects completed this year and the highly anthropized environment of another, the indicator decreased by 1.6 points.

Chart 38. Permeability of Infrastructure for small and medium-sized wildlife (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Fencing with mesh base buried in the ground (%)

The purpose of the fencing is to prevent medium-sized and large terrestrial vertebrates from accessing the track, thereby avoiding potential collisions that could compromise train safety. Furthermore, in areas where wild boars are present, the fencing must be buried in the ground to reinforce its effectiveness. This practice has been implemented in high-speed rail projects since 2006, and it has yielded very positive results. The most common method for installing this buried fencing involves attaching a second, finer mesh to the lower third of the standard fence and burying it in a trench 30-40 cm deep. This method not only improves the containment of wild boars, but also makes it more difficult for rabbits to access the interior of the enclosure.

This indicator is calculated exclusively from completed projects in the year when wild boar presence is estimated, using the following formula:

$$\frac{length\ of\ buried\ fencing\ in\ works\ where\ ungulates\ are\ present}{length\ of\ erected\ fencing\ in\ works\ where\ ungulates\ are\ present}$$

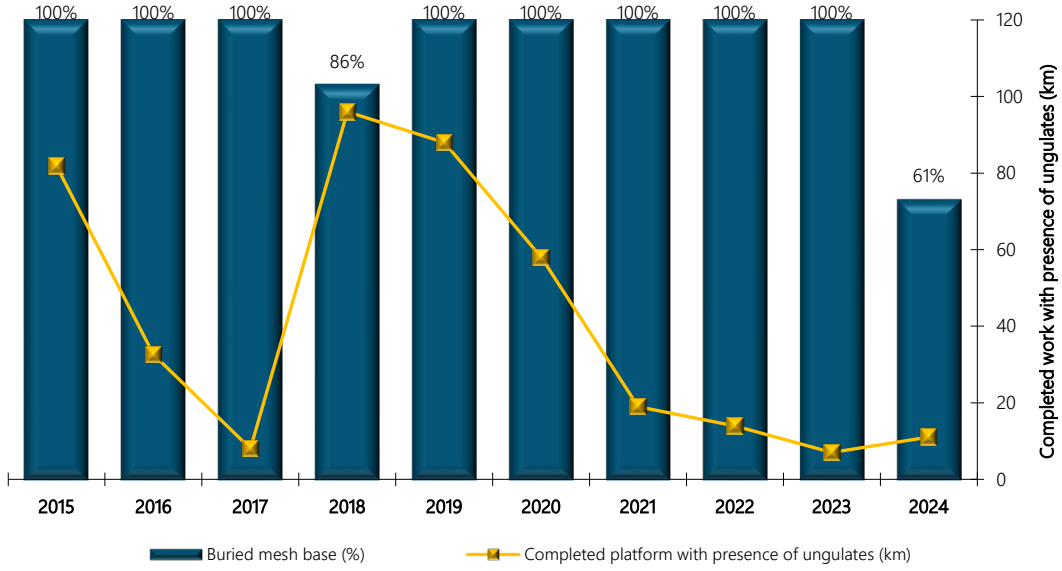
The following graph shows the percentage of compliance with this indicator since 2015.

In 2024, the indicator fell to 61% compliance. As in previous cases, this reduction is due to works crossing highly anthropized areas, where fence base reinforcements were not installed in the more urban sections.

With the exception of the data for 2018 and 2024, it can be observed that, in recent years, fence reinforcement has been implemented in all completed works where ungulates are present.

Furthermore, regardless of the presence of ungulates, 57 escape devices were installed in the fencing of projects completed in 2024 to facilitate the exit of animals that may have accidentally entered the track.

Chart 39. Fencing with buried mesh base (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Objective 8: Restoration of the Environment with Ecological and Landscape Criteria

The ultimate goal of the environmental restoration of a planned project is to restore, as much as possible, the original conditions of the affected site. To this end, the aim is to provide the area with physical and ecological stability which, together with natural regeneration processes, will facilitate its gradual integration into the environment.

In the case of linear infrastructure, the environmental restoration of an area or section is structured in two main phases:

1.- The removal of any temporary structures, clearing of the land, and preparation of the affected surfaces.

2.- The restoration of vegetation in all areas affected by the works, with the design considering the ecological and landscape characteristics of the surrounding environment.

Therefore, for the purposes of Environmental Monitoring, an area is considered properly restored if all phases of environmental integration have been completed. These phases are:

1.- Geomorphological conditioning according to ecological and landscape criteria.

2.- Spreading of topsoil on suitable surfaces.

3.- Seeding and/or planting with plant species.

Additionally, in areas occupied by auxiliary facilities, it is essential to dismantle and completely clean the temporarily occupied surface before proceeding with its restoration.

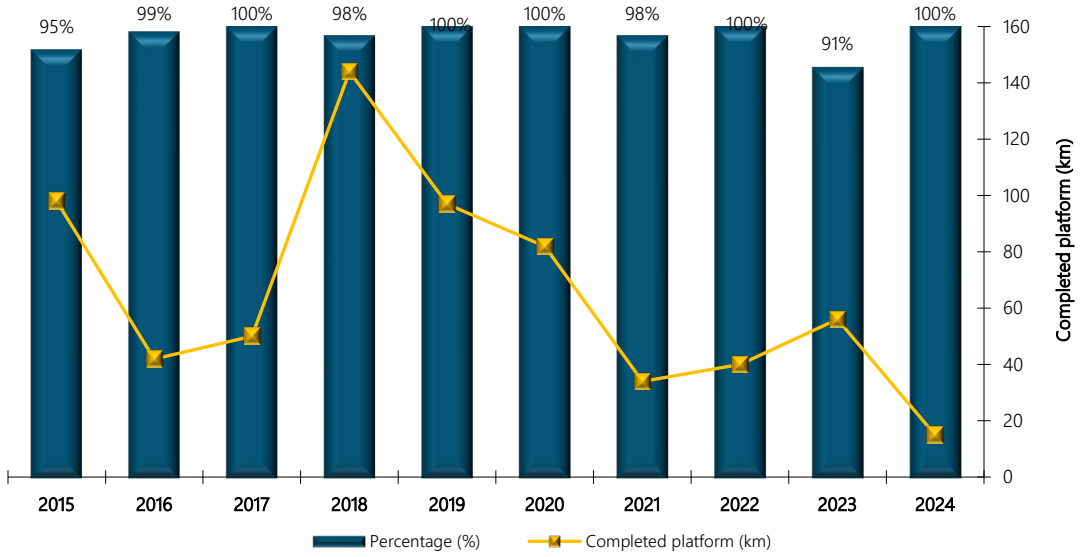
Decommissioning and cleaning of surfaces occupied by auxiliary structures (%)

Generally, the final information for each project is received prior to the handover of the project, which means that sometimes surfaces temporarily occupied by auxiliary installations still need to be dismantled and cleaned.

However, in the works completed during 2024, a total of 47,010 m^2 has been used for temporary auxiliary facilities. At the date of acceptance, 100% of this area has been completely dismantled and cleaned, thus complying with the requirements established for the proper environmental restoration of these areas.

Below is a graph illustrating the trend in compliance values for this indicator since 2015.

Chart 40. Decommissioning and cleaning of surfaces occupied by works auxiliary structures (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Geomorphological remodelling of the area following ecological and landscape criteria (%)

Proper geomorphological remodelling is essential for the successful final restoration of the project. The criteria for proper geomorphology are based on ecological and landscape principles. These ensure that temporarily occupied surfaces are restored to relief forms similar to their pre-existing conditions, and that final alignment surfaces are left loose with a geometry that supports the application of topsoil for establishing herbaceous, shrub, and/or tree cover.

A surface —whether part of the alignment or an auxiliary element— is considered properly remodelled, when it has a continuous topography, without edges or abrupt transitions, and, if there are slopes, they must have a gradient equal to or gentler than 3H:2V.

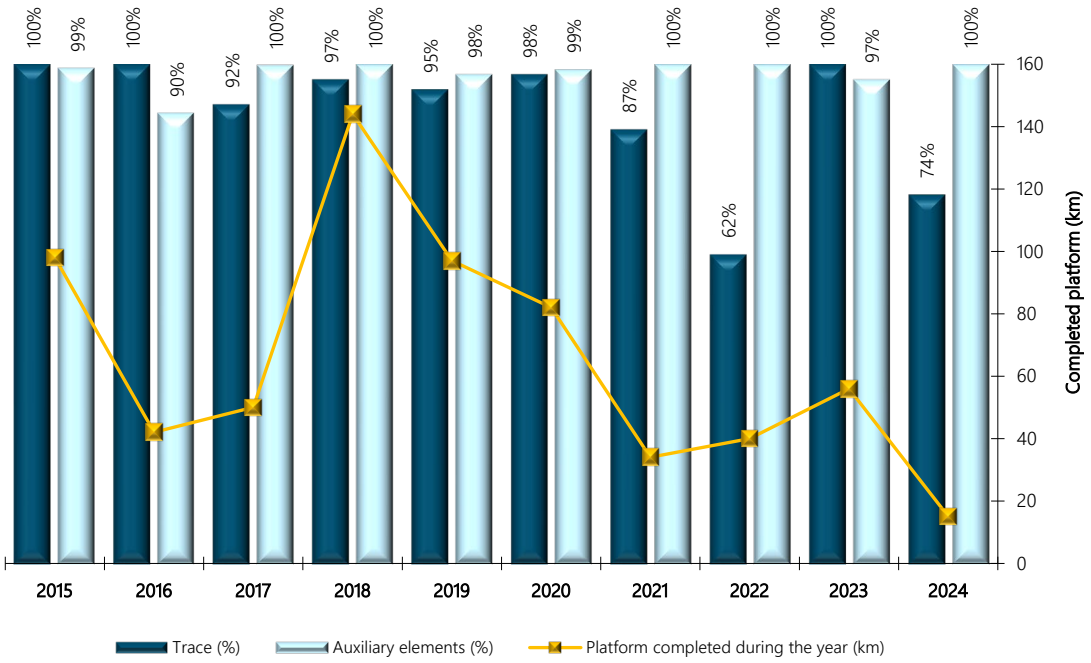
During 2024, the degree of compliance with the morphological suitability criteria on the slopes of the route reached 74%, representing an area of 191,756 m². The remaining 26% does not meet these criteria, mainly corresponding to cut slopes with gradients greater than 3H:2V.

However, this more vertical design of the clearings responds to the need to minimise the occupation of land by infrastructure, thus contributing to less alteration of the environment and optimisation of land use.

Of the total area that does not meet the established geomorphological criteria, 29.1% has undergone special bioengineering treatments for restoration, representing an area of 20,650 m².

By the end of 2024, the total area occupied by auxiliary construction elements in the five completed sections was 272.692 m². The entire area has been geomorphologically restored in accordance with ecological and landscape criteria, achieving 100% compliance.

Chart 41. Geomorphological remodelling of occupied surface area (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Vegetation restoration of surfaces (%)

To ensure the proper restoration of surfaces affected during the construction of High-Speed Rail projects, in areas that have been remodelled according to established ecological and landscape criteria, the following activities are planned:

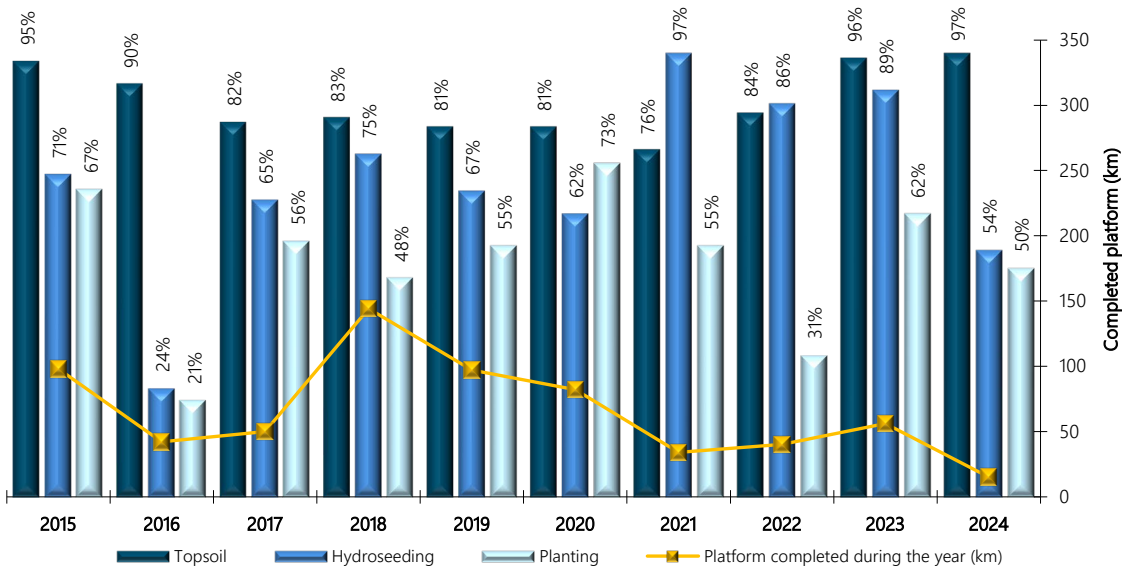
- Spreading of topsoil
- Hydroseeding
- Planting

Depending on the characteristics of the affected areas, different restoration methods are applied. Some areas may require only landform remodelling and, generally, the spreading of topsoil, and others in which, in addition to the above, seeding and planting of native species to promote ecological and landscape integration. The choice of one type of restoration over another usually depends on the intended end use for each plot.

It is important to note that while the percentage of topsoil spreading is based on the morphologically suitable surface, the percentages for hydroseeding and planting are calculated based on the area where topsoil has been applied. For this reason, hydroseeding or planting indicators may exceed, in percentage terms, those of spreading and topsoil.

Below, the completion percentages for the three environmental integration indicators, which cover the concepts previously detailed, are presented graphically:

Chart 42. Vegetation restoration of surfaces (%) (2015-2024)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Spreading of topsoil

During 2024, 97% of the geomorphologically correctly remodelled area was covered with topsoil, equivalent to 451,829 m² out of a total of 464,448 m². This figure represents a significant increase compared to previous years, when the percentage remained at around 80%, thus consolidating a positive trend in the application of ecological criteria in restoration.

The areas that still show deficiencies in the application of topsoil mainly correspond to cleared slopes and some areas associated with auxiliary facilities. On the cut slopes, spreading topsoil is avoided to reduce the risk of soil erosion into ditches before vegetation is established.

Hydroseeding and planting

A key aspect of the restoration is the replanting of areas affected by the construction, including both the railway platform slopes and the auxiliary elements. However, it should be noted that not all auxiliary surfaces receive this treatment, as some are returned to agricultural use or livestock farmers, where these types of techniques are not applied.

Overall, in the projects completed during 2024, the area suitable for replanting, which has been properly remodelled and covered with topsoil, amounts to 451,829 m². Of this, 54% has been hydroseeded, and 50% has been planted.

These values can be explained, in part, by the reversion of certain auxiliary areas to agricultural and livestock uses, which do not require additional revegetation measures beyond the spreading of soil. Likewise, the restrictions imposed by railway regulations must be considered, as they limit the planting of tree species in areas close to the infrastructure to avoid interference with railway traffic.

In total, throughout 2024, seeding or hydroseeding was carried out on 30.1 hectares, and 225,091 native plants were planted across 27 hectares.

All embankment slope surfaces, tunnel portals and false tunnels have been seeded and/or planted.

Regarding cut slopes, hydroseeding has been applied where topsoil has been spread. Likewise, special treatments have also been applied, such

as the installation of organic blankets, three-dimensional blankets, or geocells, in parts of the cut slopes where topsoil was not possible.

PRESERVATION OF ARCHAEOLOGICAL HERITAGE

The execution of high-speed rail projects is subject to strict procedures to ensure compliance with environmental legislation. When carrying out railway works subject to an Environmental Impact Assessment (EIA), it is also essential to safeguard the cultural heritage that may be affected. For Adif-Alta Velocidad, integrating heritage protection into the environmental process is not only a regulatory obligation (Law 21/2013, Directive 2011/92/EU), but also an opportunity to develop projects that respect historical and cultural identity, in line with the public administrations' responsibility for historical and cultural heritage protection in Spain.

The substantial increase in the number of railway projects in recent years has placed considerable demands on internal procedures for managing cultural heritage files, which fall under the responsibility of the Environment Sub-Department.

The aim is to ensure that Cultural Heritage consideration are incorporated in all of the Environmental Impact Assessment process, to maintain coordination with the competent heritage authorities, to define preventive, corrective and complementary measures for identifying cultural impacts, to supervise the implementation of the measures during execution, and to maintain complete records and traceability for future use and improved management.

Over the last five years, a team of more than 20 environmental work managers have supervised on-site environmental management, including heritage-related tasks, for 215 projects involving heritage files. These environmental site departments are coordinated by the Environmental Works Monitoring Area Management, with the support of a team of technicians specialising in Cultural Heritage.

Managing these files is complex, as it requires adapting to 17 different regional legislations in addition to national law, all within the context of the extensive earthworks involved in building a new high-speed rail infrastructure.

Heritage: more than just archaeology

Cultural heritage is not limited to monuments or archaeological sites; it also includes ethnographic, architectural, palaeontological, historical memory, railway and industrial heritage, cultural landscapes, traditions, and elements of symbolic value.

Figure 65. Photogrammetry of the 5th lock on the Manzanares Canal. Section: Pedro Bosh – Getafe

Figure 66. Press release on the restoration of railway parts

Figure 67. Civil War trenches. Connection works between the Madrid–Levante high-speed rail line and the Madrid–Barcelona high-speed rail line, Phase II

The procedure requires identifying and assessing cultural elements within the project's area of influence, determining potential impacts — whether direct, such as physical destruction, or indirect, such as changes to the visual or symbolic context — and proposing preventive, corrective, or compensatory measures. These may include preventive archaeological excavations, route adjustments, or conservation plans. To ensure proper oversight, archaeological monitoring of earthworks is generally carried out, complemented by a wide range of additional measures as determined by the competent authorities.

Figure 68. Projects for action at Atocha station with heritage control plans

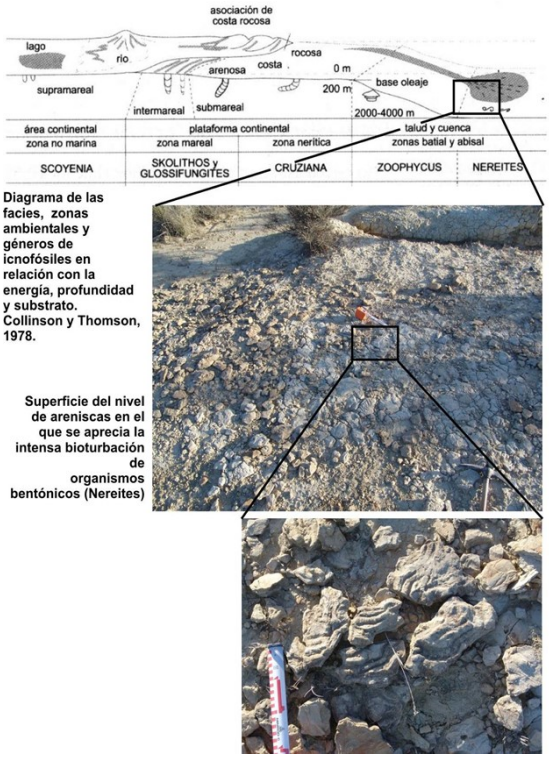


Figure 69. Identification of the seabed and its fossil remains. HSL Murcia – Almería

In many cases, regional governments or the Ministry of Culture, as the authorities responsible for heritage, require specific reports or make project authorisation conditional on the adoption of certain measures.

Before construction begins, during the project phase, specific and intensive surveys of the affected area are carried out. Their purpose is to ensure that elements are identified in advance, so that the competent authorities can issue the corresponding impact report. This report outlines the potential risks and establishes the control or minimisation measures that Adif must implement. Once received and analysed, it is incorporated into the project, ensuring that all necessary provisions are in place for correct execution during the construction phase.

In many cases, various complementary actions are incorporated into the monitoring of works, including graphic or historical documentation, characterisation through surveys, vertical archaeological analysis, and archaeological stripping. These measures enhance

understanding of each affected element in proportion to the severity of the impact.

Figure 70. Excavation of a historic road (11th-19th centuries) on the Madrid–Orense high-speed rail line, section: Lalín–Lalín

Excavations are rarely carried out in the area, as preliminary project work seeks to avoid areas of interest. On other occasions, even when construction is already underway, if unexpected elements appear, significant modifications are made to the projects in order to safeguard these elements.

Figure 71. Unique case of the Las Piletas deposits, on the Murcia–Almería high-speed rail line

Over the last five years, only 4.7% of the affected elements have required extensive excavation, reflecting a commitment to minimising impacts on cultural heritage, with conservation as the priority. Adif-Alta Velocidad systematically records all assets within its area of influence in dedicated control files, which are integrated into databases for proper management. These files document the affected element, the type of impact, the measures implemented, the administrative file with respect with the competent authority, and the relevant graphic and georeferenced documentation.

For proper coordination, periodic reports are prepared that not only enable effective internal supervision but are also shared with cultural and environmental authorities.

Integrating cultural heritage into railway projects with an EIS strengthens project legitimacy, reduces construction risks, and promotes sustainable development. This approach, aligned with the principle of 'do no significant harm' (DNSH), positions heritage as a strategic asset for railway development.

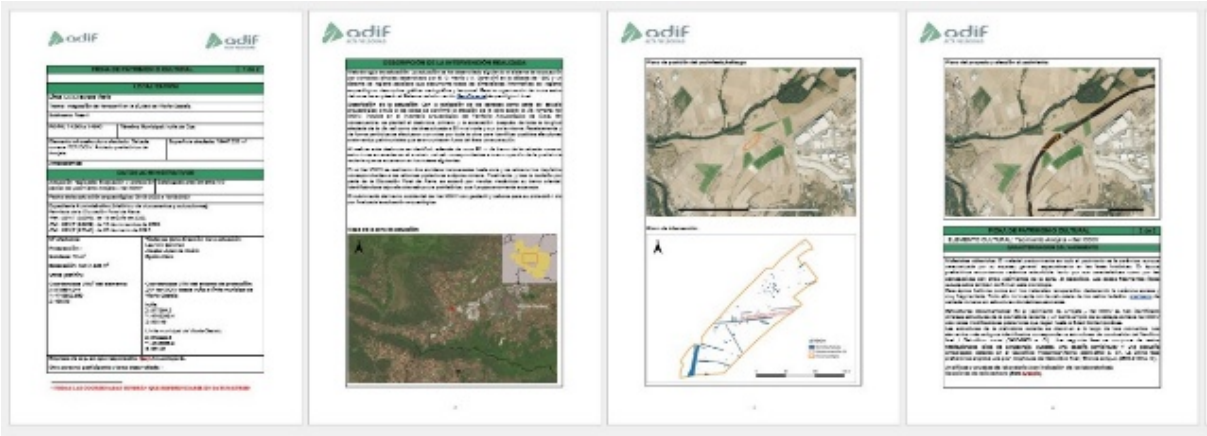


Figure 72. Cultural heritage record form template

9. RESPONSIBLE ENVIRONMENTAL MANAGEMENT

9. RESPONSIBLE ENVIRONMENTAL MANAGEMENT

ENVIRONMENTAL MANAGEMENT

The environmental aspect at Adif-Alta Velocidad is managed by the senior Corporate Department through the Corporate Environmental Sub-Department.

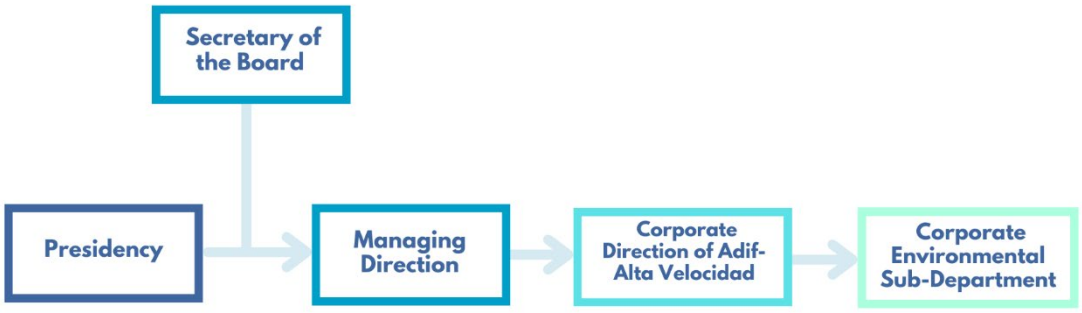


Figure 73. Extract from the organisational structure in force as of 31 December 2024

By resolutions of the President of Adif and the Managing Director Adif-Alta Velocidad dated 31 December 2013, these entities entrusted each other with the performance of certain tasks, stipulating that the terms and conditions of this entrustment would be set out in agreements signed between the two entities. In 2019, both entities signed a new management entrustment agreement for the execution of activities of a material or technical nature[11], under which Adif-Alta Velocidad is entrusted with providing, among others, the following services:

- Integrated environmental management.
- The drafting of supervision reports for conventional line projects.
- Advice on environmental sustainability, energy efficiency, and the fight against climate change.
- Management of the maintenance of operating lines owned by Adif in geographical areas where it does not have its own human resources to do it.
- The supply of energy for use other than traction.

The Corporate Environmental Sub-Department, part of the Corporate Management of Adif-Alta Velocidad, is responsible for directing the global environmental policy of Adif and Adif-Alta Velocidad. It coordinates and supervises its implementation in the organisational units and directly manages the environmental aspects linked to the interrelation between Adif and Adif-Alta Velocidad, and railway operations, ensuring environmental protection and compliance in the project, construction, maintenance, control, and profitability of railway infrastructure.

[11] Resolution of 9 July 2019 by the Public Business Entity Administrador de Infraestructuras Ferroviarias, publishing the management entrustment agreement to the Public Business Entity Adif-Alta Velocidad, for executing a material and technical activities. (BOE No. 189 of 08 August 2019).

The responsibilities assigned to the Corporate Environmental Sub-Department include:

- Ensuring the environmental suitability of projects and works developed by Adif and Adif-Alta Velocidad, both on high-speed and conventional lines.
- Managing issues related to noise, vibrations, soil contamination, and hazardous waste at both at Adif and Adif-Alta Velocidad.
- Handling environmental emergencies from the alarm phase, including those resulting from incidents and accidents related to train operations, machinery use, depots, fuel supply facilities, freight logistics facilities, stations, and other Adif-owned facilities.
- Enhancing the added value of Adif and Adif-Alta Velocidad services through the environmental variable by promoting certified environmental management systems.
- Managing corporate environmental information and serving as the Unit Responsible for Environmental Information within Adif and Adif-Alta Velocidad, in accordance with current legislation on freedom of access to environmental information. In this regard, developing and maintaining the essential environmental information systems (such as legal compliance, natural areas, environmental accounting, waste management, etc.) to respond to information requests from agencies, institutions, and stakeholders, as well as periodically preparing the Adif and Adif-Alta Velocidad Environmental Report.
- Institutionally representing Adif and Adif-Alta Velocidad before the competent environmental administrative bodies at state, regional, and local level, as well as holding representation in specialised international technical bodies such as EIM (European Rail Infrastructure Managers), UIC *(Union Internationale des Chemins de fer*), and CER (Community of European Railway).
- Analysing the impact of environmental legislative developments on Adif and Adif-Alta Velocidad at the European, national, and regional levels.
- Carrying out and coordinating the appropriate response of Adif and Adif-Alta Velocidad to complaints, reports, and administrative proceedings related to environmental issues.
- Preparing and updating internal environmental regulations for Adif and Adif-Alta Velocidad, as well as the environmental processes outlined in Adif and Adif-Alta Velocidad process map and environmental policy.
- Providing training and awareness courses on the organisation and management of environmental aspects at Adif and Adif-Alta Velocidad.
- Developing and implementing new environmental legal obligations related to public procurement, environmental risks, liability and/or other areas.

Adif-Alta Velocidad has a General Procedure ADIF-PG-109-001-001 for the Management and Coordination of Environmental Activities.

The Procedure outlines the responsibilities and individuals accountable for implementing various internal environmental management processes, ensuring:

- The optimisation of the economic management of resources by leveraging synergies between different areas of activity.
- The avoidance of divergent interpretations of the same problem by third parties.
- The reduction of risks derived from legal non-compliance, through the establishment of regulated guidelines for action and management control.

EMS CERTIFICATION

The first point in Adif and Adif-Alta Velocidad, Environmental Policy, revised in 2024, focuses on promoting improved environmental performance through the implementation, auditing, and periodic certification of its environmental criteria in line with the ISO 14001 standard, clearly defining responsibilities and internal tools for control and monitoring.

Since Adif was established in 2005, Renfe's environmental certification has been maintained, and the Management System has been enhanced. This certification resulted from the implementation of a certified Management System starting in 1999. Since then, both the scope of the environmental actions and the physical application of the system have been revised, which led to the following situation in 2024:

2024 Milestones

By the end of 2024, two hundred and one (201) Adif and Adif-Alta Velocidad centres had achieved environmental certification under ISO 14001.

Three out of every five conventional network* travellers use stations with environmental certification.

* at stations managed by Adif's Corporate Business and Commercial Operations Department

The coordination of the Management System for Adif and Adif-Alta Velocidad according to UNE-EN ISO 14001 Standard is the responsibility of the Corporate Environmental Body, in this case, the Adif-Alta Velocidad Corporate Environmental Sub-Department.

Table 38. ISO 14001 certification. Certifications obtained by Adif and Adif-Alta Velocidad as a whole

Scope	Outreach	Certificate
Adif	- Management of track alignment, tracks and railway facilities - Exploitation of passenger stations and logistics facilities for goods - Traffic administration and capacity management for the General Interest Railway Network - Management of fuel depots.	AENOR GA-1999/0142-001/00
Adif-Alta Velocidad	- Environmental management of works with Environmental Impact Statement in the construction of railway infrastructure and facilities - Management and coordination of report drafting and projects for the railway infrastructure and facilities - Centralized coordination of waste, contaminated soil and noise management carried out in the construction and operation activities of railway infrastructure and facilities	AENOR GA-1999/0142-002/00

* Following the segregation of Adif and Adif-Alta Velocidad, the EMS certificate was reorganised in 2015 to differentiate the two entities.

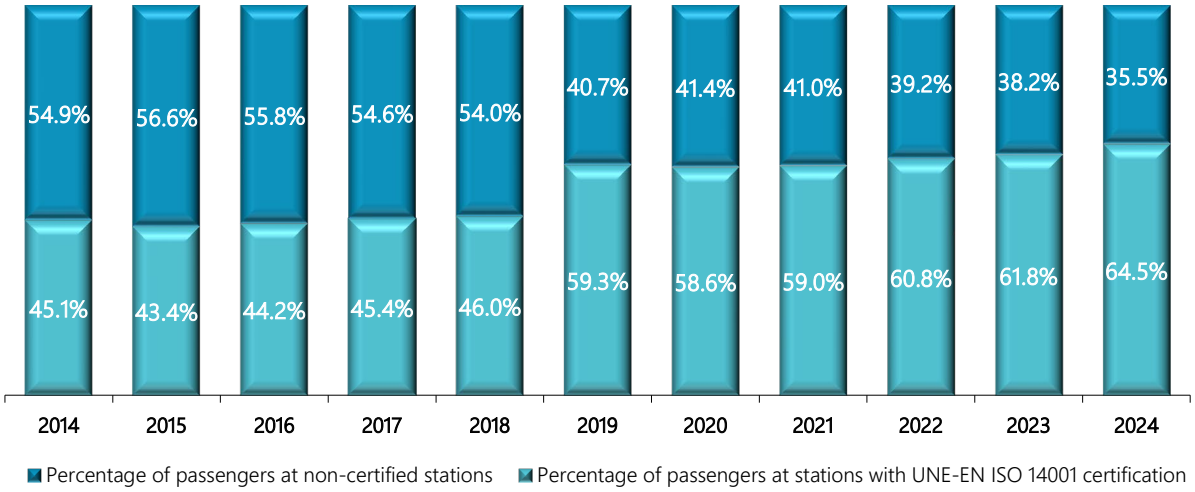
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Figure 74. Badajoz Station

This certification implies the integration of environmental considerations into the management of Adif and Adif-Alta Velocidad. It covers most operational activities with territorial distribution related to the maintenance and operation of railway infrastructure, where the most significant environmental impacts occur. In addition, environmental management guidelines are already being implemented at locations not yet covered by either of the two certificates, with the aim of including them in the near future.

! As a result of this approach, 64.5% of passengers use certified stations, a figure that has increased in recent years at stations managed by Adif-Alta Velocidad.

Chart 43. Relevance index of ISO 14001 certifications in passenger stations



Source Adif, Corporate Safety, Processes and Corporate Systems Department, Corporate Quality and Customer Sub-Department.

The coordination of the Management System for Adif and Adif-Alta Velocidad according to UNE-EN ISO 14001 Standard is the responsibility of the Corporate Environmental Body, in this case, the Adif-Alta Velocidad Corporate Environmental Sub-Department.

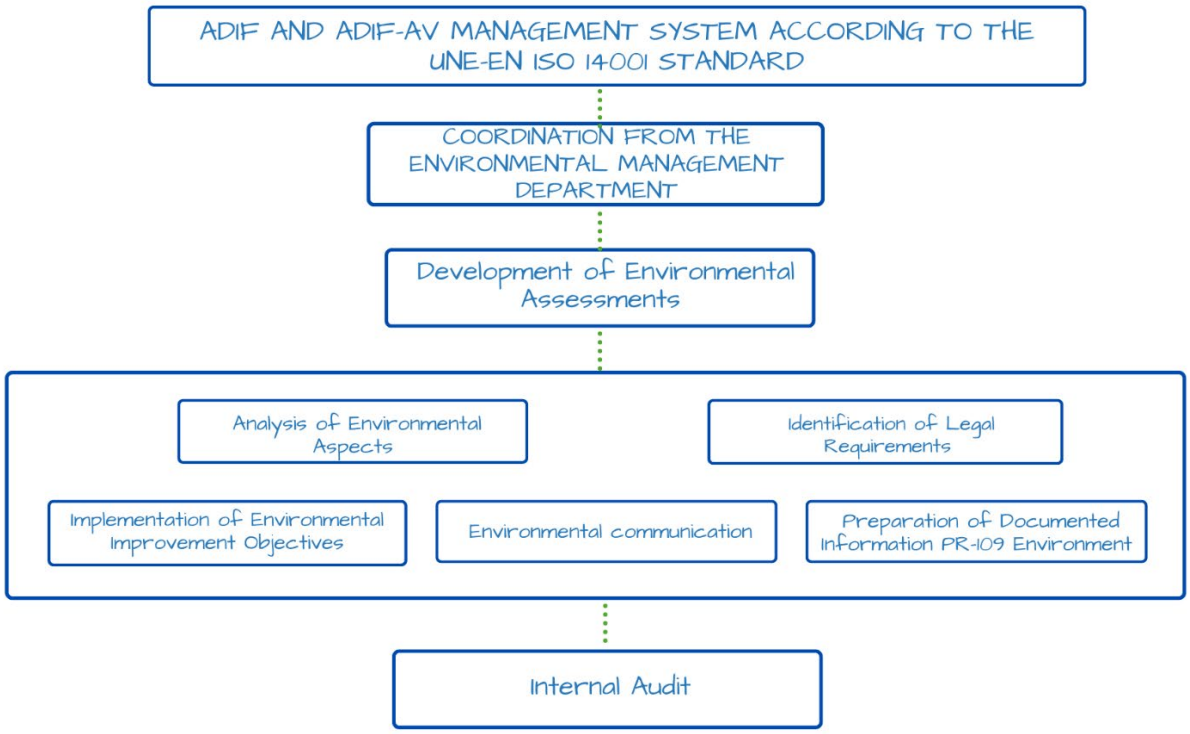


Figure 75. Centralised management of the EMS for Adif and Adif-Alta Velocidad

To support the implementation and development of the Adif and Adif-Alta Velocidad Management System in accordance with the UNE-EN ISO 14001 Standard, the following Documented Information is currently available within the framework of the Corporate Environmental Management Process:

Information documented within the framework of Process ADIF-PR-109-001-001 Corporate Environmental Management

To support the implementation and development of the Adif and Adif-Alta Velocidad Management System in accordance with the UNE-EN ISO 14001 Standard, the following Documented Information is currently available within the framework of the Corporate Environmental Management Process:

- ADIF-PG-109-001-001. General Procedure for Managing and Coordinating Environmental Activities.
- ADIF-PG-109-001-002. Identification and Evaluation of Environmental Aspects.
- ADIF-PG-109-001-003. Identification and Assessment of Environmental Requirements.
- ADIF-PG-109-001-004. Response to Minor Environmental Incidents.
- ADIF-PG-109-001-005. Operational Control and Monitoring and Measurement of Environmental Performance.
- ADIF-PG-109-001-006. Environmental Information Management.
- ADIF-PG-109-001-007. Development of Environmental Assessments.
- ADIF-PG-109-001-008. Contaminated Soil Management.
- ADIF-PG-109-001-022. Waste Management at Adif and Adif AV.
- ADIF-PE-109-001-002. Environmental Site Management.
- ADIF-PE-109-001-020. Environmental Integration of Projects.
- ADIF-PE-109-001-022. Centralised Hazardous Waste Management at Adif and Adif AV.
- ADIF-PE-109-001-023. Environmental Management: Maintenance and Operation of Installations and High-Speed Lines.
- ADIF-PE-109-001-024. Historical Waste Management at Adif and Adif-AV.
- ADIF-PE-109-001-025. Special Waste Management at Adif and Adif-AV.
- ADIF-IT-109-001-001. Identification of Accredited Fuel Dispensing Personnel.
- ADIF-IT-109-001-002. Regulation of the Scope of the Definition of the System according to UNE-EN ISO 14001.
- ADIF-IT-109-001-003. Notification of Opening and Closing of an Environmental Non-Conformity.
- ADIF-IT-109-001-004. Approval of the Environmental Management Plan for Works Subject to an EIS.
- ADIF-IT-109-001-005. Preparation and Submission of Preliminary Situation Reports / Progress Reports (PSR/PR).

Determination of the scope of the Adif and Adif-Alta Velocidad Management System

The UNE-EN ISO 14001 Standard requires determining the limits of applicability of the Environmental Management System. To this end, Adif and Adif-Alta Velocidad have established a documented system for the Regulation of the Definition of the Scope of the System. In accordance with this systematic approach, the Activity Areas of Adif and Adif-Alta Velocidad document the Scope Sheets for certified centres

within their responsibility, to define the applicable physical and organisational limits.

In the case of Adif-Alta Velocidad, certification according to the UNE-EN ISO 14001 standard focuses on activities undertaken by the Environmental Sub-directorate, specifically related to the environmental monitoring of projects subject to EIS and the Environmental Integration of Projects. As such, the audited centres include the headquarters of the Corporate Environmental Sub-Department, and the environmental control managed by Environmental Project Managers at various projects undergoing EIS.

Environmental aspects resulting from activities carried out by Adif and Adif-Alta Velocidad

Within the defined scope of the Environmental Management System, the various Activity Areas of Adif and Adif-Alta Velocidad identify the environmental aspects associated with their activities and services. In this context, once the Identification and Assessment of Environmental Aspects have been completed by the different Areas, the Corporate Environmental Sub-Department conducts a comprehensive study of the data. This ensures an optimal evaluation of the information at a global level, draws key conclusions from the process, and identifies any significant issues.

This process of uniformly Identifying Environmental Aspects for Adif and Adif-Alta Velocidad is complex due to the diverse range of activities conducted. Likewise, structural changes within the organisation further complicate the comparison of environmental aspects across different activity areas, as the restructuring alters the number of certified centres associated with the various Corporate Departments.

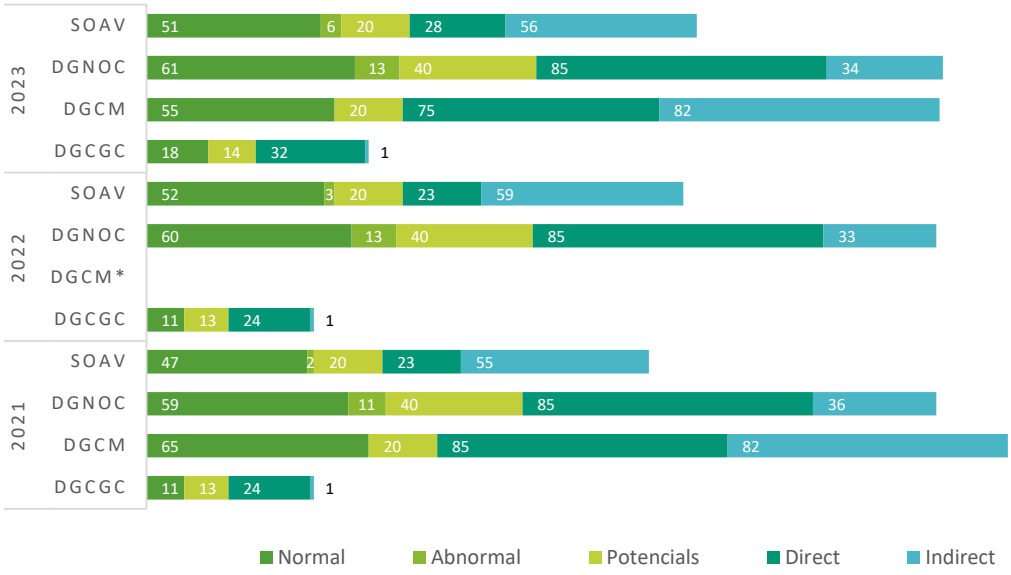
To promote consistency in Identification and Evaluation of Environmental Aspects, the Corporate Environmental Sub-Department is working to enhance coordination in these processes. This aims to optimise their control, analysing the information provided by the various Activity Areas of Adif and Adif-Alta Velocidad, as outlined in the General Procedure for Identification and Assessment of Environmental Aspects. It should be noted that the 2024 assessment (covering data for the 2023 period) analysed a total of 203 centres, compared to 92 assessed in 2022 (excluding DGCM centres). This overall comparison is not fully representative, as it does not include DGCM centres due to the late submission of the ADIF-PG-109-001-002-F-04 'Summary register of environmental aspects' form. The increase in the number of centres assessed in 2023 for the Corporate Business and Commercial Operations Department is due to the modification of the scope of the Management System, specifically the addition of two new passenger stations (Guadalajara-Yebes and Villanueva Córdoba).

In relation to projects subject to an Environmental Impact Statement (EIS), environmental aspects identified during the EIA process are considered, and the Environmental Impact Assessment of the Project outlines measures for environmental protection, including preventive, corrective, or compensatory actions. Therefore, the significance of these aspects is assessed using the methodology outlined in the Environmental Assessment Procedure, in line with current legislation. Thus, significant environmental aspects are those for which the EIS specifies particular requirements for environmental protection, through the reduction and/or mitigation of potential impacts. Operational controls are implemented for all significant environmental aspects. Since the significant environmental aspects fully align with the requirements outlined in the EIS for each project, the monitoring of compliance with these aspects, and thus their associated operational controls, is

reflected in the technical reports required by the respective EISs.

Finally, it is important to note that these environmental aspects are considered indirect, as they are addressed and managed through the management systems of the contracted companies providing technical assistance for the performance of the relevant tasks.

Chart 44. Typology of environmental aspects (2021-2023)



* Data not available for the DGCM in 2022

DGNOC: Corporate Business and Commercial Operations Department

DGCM: Corporate Conservation and Maintenance Department

SOAV: Corporate High-Speed Operations Sub-Department

DGCGC: Corporate Traffic and Capacity Management Department

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

In the assessment carried out in 2024 (covering data from 2023), the Direct Environmental Aspects most frequently assessed as significant in each of the analysed areas are as follows:

- In the centres of the Corporate High-Speed Operations Sub-Department (SOAV), the most significant aspects analysed by the Corporate Environmental Sub-Department are related to the consumption of electricity, water consumption and the discharge of contaminated water.
- In the Corporate Conservation and Maintenance Department (DGCM) are waste (72%), followed by road vehicle fuel consumption, water consumption and electricity consumption.
- In the Corporate Traffic and Capacity Management Department (DGCGC), the most significant aspect is waste (58%), followed by fuel consumption from road vehicles.
- In the Corporate Business and Commercial Operations Department (DGNOC) the most significant aspects, depending on the type of centre, are as follows:
  - Stations: waste (50%), water consumption and electricity consumption.
  - Depots: discharge of soil substances (27%), discharge of contaminated water and waste.

- Logistics services: electricity consumption (50%), water consumption and fuel consumption by container cranes and shunting locomotives.

As shown, the percentage of waste identified as direct aspect in the different Corporate Departments is highly representative, unlike in the Corporate High-Speed Operations Sub-Department, where it is addressed indirectly, as it is managed on behalf of contractors.

Conversely, consumption of resources such as water, energy, and fuel, as along with waste disposal, are the aspects most frequently identified as significant across centres. These aspects are consistent with the activity carried out in each type of centre.

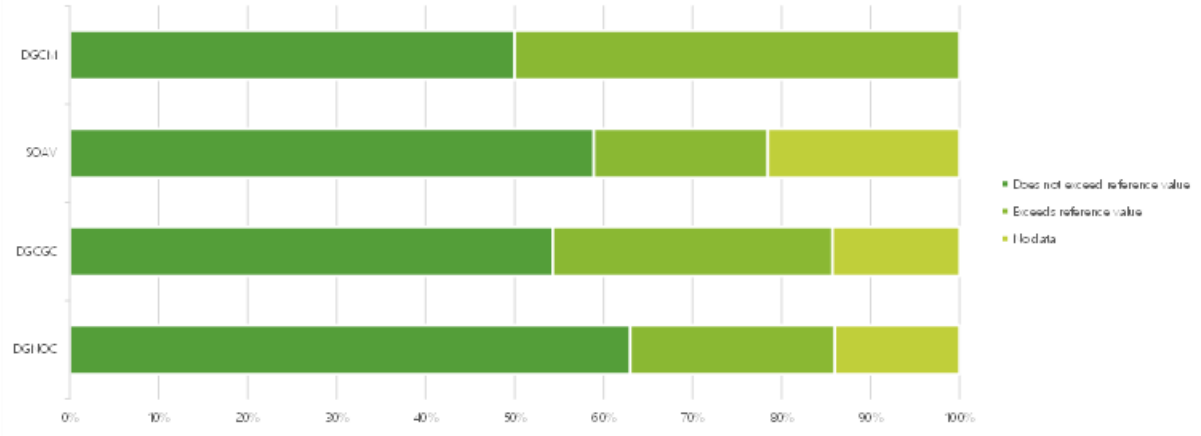
Electricity and water consumption are the most representative aspects in almost all areas. Measures should be considered to reduce this consumption at Adif and Adif-Alta Velocidad, and to ensure it is adequately monitored through actual readings.

In summary, to enhance the analysis of information and generate insights that support decision-making, all areas must identify and assess aspects consistently and in accordance with the methodology detailed in the procedure. Furthermore, a clear link must be maintained between the centres where aspects are identified and evaluated and the scope sheets documented in Adif and Adif-Alta Velocidad´s Management System.

Environmental performance in Adif and Adif-Alta Velocidad

As outlined in procedure ADIF-PG-109-001-005 Operational Control, Monitoring and Measurement, the Corporate Environmental Sub-Department is responsible for conducting an overall analysis of the information provided by each Activity Area, which is detailed below:

Chart 45. Percentage of compliance with the reference values by Activity Area in 2023



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

The overall analysis of Adif and Adif-Alta Velocidad´s environmental performance indicates positive progress, as values are decreasing in relation to compliance with reference values in most environmental aspects, across all areas, except GCM. Efforts should, however, be focused on addressing aspects showing the most unfavourable trends, including water consumption, waste generation, fuel consumption, noise generation, and emissions.

The reduction in the percentage of 'No data' compared to 2021 is particularly noteworthy, as it enhances data quality and enables a more reliable analysis of environmental performance over time.

Legal requirements and other obligations applicable to activities conducted by Adif y Adif-Alta Velocidad

Regarding the process of identifying and evaluating environmental requirements, each Activity Area of Adif and Adif-Alta Velocidad is responsible for updating, reviewing, and assessing compliance with applicable legal requirements related to the identified environmental aspects, as well as with additional commitments of the Management System. This is done in accordance with the documented procedures for Adif and Adif-Alta Velocidad in the General Procedure for Identification and Assessment of Environmental Requirements.

To support the process of identifying applicable environmental requirements, Adif and Adif-Alta Velocidad have a legislative update service that identifies legal requirements relevant to activities in municipalities with over 50,000 inhabitants. This service is managed and coordinated at the corporate level by the Corporate Environmental Sub-Department.

After identifying Environmental Requirements, each Activity Area performs an Environmental Requirements Assessment at least once a year, following the review of identified Environmental Aspects and whenever there is a regulatory change. Any non-compliances detected in this assessment are managed through the non-conformity tool, if necessary.

Planning Environmental Objectives at Adif and Adif-Alta Velocidad

To improve the Management System of Adif and Adif-Alta Velocidad an annual plan is defined for General Objectives in line with corporate policies and strategies (SP 2030). In addition, each Activity Area establishes and monitors its own plan of Specific Objectives aimed at improving significant environmental aspects and addressing other relevant issues within the implemented Management System.

At a general level, during 2024 the objective set by Adif and Adif-Alta Velocidad has been the Improvement of Environmental Performance by implementing measures that promote and reinforce environmental respect and reduce the negative impacts of operational activities. This objective is addressed through the following actions:

- Continue expanding the scope of environmental certification to include two new centres (Elche and Palencia Stations). The long-term goal is to achieve environmental certification for all Adif and Adif-Alta Velocidad work centres that have environmental impacts. This target comprises five actions, all of which were completed following the external audit process for certifying the proposed centres both in the 2023 period and in 2024.
- Leverage the potential of contracts with both entities to promote the achievement of environmental actions. To this end, the Corporate Environmental Sub-Department is coordinating a working group to develop a Catalogue of Environmental Clauses to be included in the contracting documents of both entities, along with a guide with indications for their use and dissemination to the various activity areas of Adif and Adif-Alta Velocidad. During 2024, the drafting and technical

validation of the Catalogue of Clauses and the Guide to the Use have been completed. It is only pending approval by the Legal Department. This review will be carried out on a case-by-case basis, incorporating as many clauses as possible from the catalogue into a series of pilot contracts. Once it is in use, it will be monitored and updated based on the identified needs.

- Enhance the environmental culture and awareness among Adif and Adif-Alta Velocidad staff, efforts are focused on monitoring and optimising the Environmental Training Plan established for the organisation's employees. The degree of compliance with the Training Plan at Adif and Adif-Alta Velocidad, for 2023 was 107%, exceeding the target of 80%. Note that the Environmental Training Plan is monitored on a bimonthly basis. Regarding the analysis of training activities corresponding for 2023, a total of 5,907 hours of environmental training was conducted, with 558 participants. Additionally, to enhance the existing information materials, a new edition of the Welcome Package for new maintenance contracts has been produced, along with new environmental awareness materials: a fire safety awareness poster (May 2023) and two water saving posters for facilities and offices (December 2023), World Environment Day (June 2024), ADR safety advisor poster (July 2024), World Soil Day (December 2024).
- Improve the Environmental Monitoring system during the execution of works not subject to EIS by Adif and Adif-Alta Velocidad. To this end, the end-of-work reports are monitored. During the 2024 period, 53 projects not subject to EIS were completed, of which 50 final reports have been issued and 3 final project reports are being drafted, pending due to workload, as of the target closing date.
- Improve the environmental control in the certified activities of the Corporate High-Speed Operations Sub-Department. To this end, a platform has been created for managing documentary evidence related to the operational control of identified environmental aspects, as well as the environmental control of certified facilities and works on the High-Speed Lines. The document management platform was already in use. Regarding environmental monitoring at certified facilities, 96 visits were conducted in 2024 and 290 environmental monitoring reports are issued. Furthermore, during 2024, 73 high-speed rail projects are monitored, of which 23 were completed during the year, with a total of 22 final reports issued. At the target date, one final project report is being drafted. Finally, the format of the environmental report has been improved by introducing a new visit report template in the latest Technical Assistance contracts.
- Improve the process of identifying legal requirements applicable to the certified scope of Adif and Adif-Alta Velocidad, by updating inventories of existing equipment and facilities within the Corporate High-Speed Operations Sub-Department. By the end of 2024, all certified centre inventories have been updated as part of the implementation of the new inventory template through Environmental Monitoring. The inventories of 11 maintenance bases were updated in the Legislative Update Service; the remaining inventories will be implemented in the application during 2025. In addition to the first legislative

official gazette, prepared in 2023 on the new requirements set out in Royal Decree 487/2022 of 21 June, which establishes the health requirements for the prevention and control of Legionnaire's disease, a second official gazette on fluorinated gases in electrical equipment was prepared and published in Inicia in February 2024. In May 2024, an official gazette was prepared and published on the new Regulation 2024/573 on Fluorinated Greenhouse Gases, which replaces the official gazette on fluorinated gases in electrical equipment, as these are now included in this new official gazette, incorporating the new requirements. In December 2024, the official gazette on the new Royal Decree 614/2024 was prepared and published, updating the requirements of the previous official gazette on the prevention and control of Legionnaire's disease.

- Improve the waste management model of Adif and Adif-Alta Velocidad. To this end, it is proposed to centralise the collection of various types and flows of waste through the Corporate Environmental Sub-Department and establish a centralised waste register based on the information in the Identification Documents. This register would include all information related to hazardous operational waste, as well as historical and special waste. Subsequently, the analysis and presentation of the data on waste production by different types (both hazardous and non-hazardous) from Adif and Adif-Alta Velocidad, as well as the annual centralised management reports for both for hazardous waste management and historical and special waste, are now available.
- Improve the contaminated soil management, for which the Contaminated Soil Management Plan 2023-2025 was developed and approved by the Corporate Environmental Sub-Department in May 2023. In addition, during 2024, an annual review of both the actions forecast and the objectives of the Contaminated Soil Management Plan 2023-2025, as well as the Monitoring Programme, is planned.
- Improvement of the Environmental Management documentation: the following procedures are scheduled for revision: ADIF-PE-109-001-023 'Maintenance and Operation of High-Speed Lines and Facilities': the content of the procedure has been revised to bring it into line with the current system, based on experience gained since its implementation. It is awaiting signature. With regards to the General Procedure ADIF-PG-109-001-002 'Identification and Evaluation of Environmental Aspects', work has been done to update the evaluation criteria tables and record formats. It has currently been agreed upon by all departments and is pending submission for review by the Quality and Customer Service Department. Regarding General Procedure ADIF-PG-109-001-004 'Minor Environmental Incidents', the content of the action sheets for minor environmental incidents has been revised and a new sheet has been drafted to address fauna entanglement and electrocution. It is currently a draft, pending submission to the relevant departments for review. The revised Special Waste Procedure has already been published.

Of the nine targets proposed for Improving Environmental Performance during the 2023-2024 period, five have been completed, and three are wither partially completed, with a high

percentage of implementation, although not completely finalised. They will be considered when defining the objectives for the 2025-2026 period.

Management System Audits in accordance with UNE-EN ISO 14001 Standard for Adif and Adif-Alta Velocidad

Environmental improvement actions within the Adif and Adif-Alta Velocidad Management System are controlled through internal and external audits, certification, and monitoring. From these, findings are generated that are considered for the continuous improvement of the system (including non-conformities, observations, and opportunities for improvement).

The Internal Audit process of the Environmental Management System according to ISO 14001 at Adif and Adif-Alta Velocidad is coordinated at the corporate level by the Corporate Environmental Sub-Department. For its implementation, it relies on the collaboration of an external consultancy with extensive experience in the railway sector, ensuring the highest possible level of impartiality throughout the audit process.

Internal audits must cover one-third of the sites in the certified area each year (ensuring that the entire certified area is audited over a 3-year cycle) and are, therefore, an excellent tool for Adif and Adif-Alta Velocidad to identify opportunities for improvement in the environmental field.

The external validation of the EMS Certification according to ISO 14001 Standard for Adif and Adif-Alta Velocidad, is conducted by the Certification Body AENOR.

The results from the audited centres associated with Adif-Alta Velocidad are shown below.

Table 39. Results of EMS audits according to ISO 14001 at Adif-Alta Velocidad

	2017		2018		2019		2020		2021		2022		2023		2024	
	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.t	Int. Aud.	Ext. Aud.
Non-conformities (No.)	0	0	0	0	2*	0	-	0	0	0	0	0	0	0	0	0
Remarks (No.)	1	4	1	1	4	3**	-	2	2	6	0	3	4	1	6	7
Audited headquarters (No.)	2	1	1	1	2	2	-	2	2	2	2	2	2	2	2	2
Certified sites (No.)	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	2
Certified sites that have been audited (%)	100	50	50	50	100	100	-	100	100	100	100	100	100	100	100	100

* One of which is common to Adif and Adif-Alta Velocidad

** Two of which are common to Adif and Adif-Alta Velocidad

Source: Adif-Alta Velocidad, Corporate Management, Corporate Environmental Sub-Department. 2023 External Audit Reports and External Audit Plans

! The results obtained in 2024 remain consistent with those from recent years of certification for Adif and Adif-Alta Velocidad, demonstrating that the management system is mature and well-established.

Detecting deviations and non-conformities from auditing processes or day-to-day monitoring of the Management System, and resolving them through immediate and corrective actions, when necessary, are activities that enable Adif and Adif-Alta Velocidad to continuously improve the effectiveness of its Management System.

Regarding the Internal Audit process of the Management System according to the UNE-EN ISO 14001 Standard for 2024, a total of Observations were detected. Below is a breakdown of the total findings by section of the UNE-EN ISO 14001 Standard:

Chart 46. Breakdown of Adif-Alta Velocidad total findings detected by section of the ISO 14001 Standard during the Internal Audit process for Adif and Adif-Alta Velocidad

Source: Adif Alta Velocidad. Corporate Management. Corporate Environmental Sub-Department. 2024 Internal Audit Statistical Results Report.

On the other hand, in 2024, no non-conformities were detected as a result of the external audit, and a total of seven observations were recorded in the management system in accordance with the UNE-EN ISO 14001 standard, three of which were related to operational planning and control.

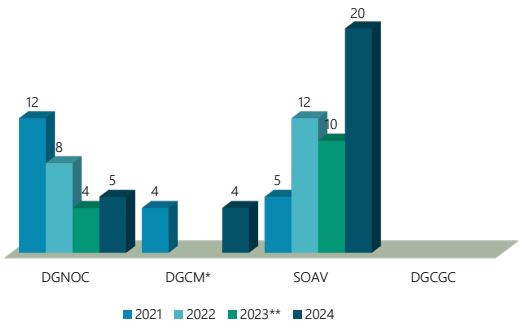
Minor environmental incidents

Among other activities related to the management control of the Environmental Management System at Adif and Adif-Alta Velocidad, the Corporate Environmental Sub-Department monitors Minor Environmental Incidents at corporate level, in accordance with General Procedure ADIF-PG-109-001-004 'Action against Minor Environmental Incidents'.

The Corporate Environmental Sub-Department conducts a joint analysis of Minor Environmental Incidents within the scope certified under the UNE-EN ISO 14001:2015 Standard for Adif and Adif-Alta Velocidad, using data provided by the heads of the different Activity Areas: Corporate Business and Commercial Operations Department, Corporate Conservation and Maintenance Department (Conventional Network), and Corporate Traffic and Capacity Management Department, as well as incidents occurring in the Facilities and Maintenance Activities of High-Speed Lines of the Corporate High-Speed Operations Sub-Department (SOAV).

The following figure shows the distribution of minor environmental incidents by Activity Area for the period 2024, compared to those recorded in previous years:

Chart 47. Minor environmental incidents at Adif and Adif-Alta Velocidad



* No information available from DGCM for 2022
*** Data revised in relation to the 2023 Environmental Report.*
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

According to these results and based on the documents provided by each of the aforementioned Activity Areas at Adif and Adif-Alta Velocidad total of 29 Minor Environmental Incidents occurred in 2024. These were specifically in the Activity Areas of the Corporate Business and Commercial Operations Department (5), in the Corporate Conservation and Maintenance Department (Conventional Network) (4) and the Corporate High-Speed Operations Sub-Department (20). No Minor Environmental Incidents were reported in the Corporate Traffic and Capacity Management Department for the year 2024.

The total number of incidents recorded has increased from 14 in 2023 to 29 in 2024. Closed environmental incidents account for 93% of all incidents recorded. In general, immediate corrective actions are implemented, although there are two incidents pending closure, pending documentary justification of the implementation of all proposed corrective measures.

In general, there has been an improvement in the information recorded in the Corporate Minor Environmental Incident Record Form (ADIF-PG-109-001-004-F-01).

Among the recorded incidents, the most notable are spills of substances onto the ground or into contaminated water due to breakage or failure of machinery, equipment, or facilities (41%), and water loss due to broken or leaking pipes (35%). Consequently, preventive measures are recommended to reduce the occurrence of such incidents.

In any case, it is considered that none of the environmental incidents recorded during 2024 had a significant impact on the environment.

Environmental communication in Adif and Adif-Alta Velocidad

In relation to the Communication process and in accordance with Law 27/2006, which regulates the right of access to environmental information, the Corporate Environmental Sub-Department serves as the point of contact for Adif and Adif-Alta Velocidad with environmental administrative bodies at community, state, regional, and local levels. It also manages interactions with individuals and official bodies that submit requests for information and/or demands for environmental actions. In this capacity, as the Unit Responsible for Environmental Information, it provides information, advice, and counselling on any environmental inquiries, ensuring prompt processing and resolution.

On the other hand, Adif and Adif-Alta Velocidad. have a general system in place for the managing and processing relevant environmental information. This system was developed by the Corporate Environmental Sub-Department in collaboration with all the Activity Areas of Adif and Adif-Alta Velocidad.

After analysing the relevant environmental reports collected by each area for 2024, the following conclusions can be drawn: within the Corporate Environmental Sub-Department, the highest number of relevant environmental communications recorded in 2024 corresponds to the environmental acoustics department, with 106 complaints relating to noise and vibrations.

ENVIRONMENTAL TRAINING

The Annual Training Plan of Adif and Adif-Alta Velocidad outlines the training scheduled for the year, tailored to the needs of the various operational areas. Among the subjects covered in this Plan is the environment.

Training activities

In 2024, Adif-Alta Velocidad held environmental courses for a total of 97 students, with a total of 1,350 hours. Fifty-seven per cent of the training courses were delivered via distance learning.

The course with the highest attendance was 'Riesgo Ambiental. Dispensa de Combustible CFV (Centro de Formación Virtual)' (Environmental risk. Fuel dispenser VTC), delivered online, which represents more than 52% of the shares held.

Table 40. Courses on the environment delivered in 2024

Name	Modality	No. of students
Waste management	In person	14
Environmental risk. Fuel dispenser	In person	4
Environmental risk. Fuel dispenser VTC (Virtual Training Centre)	E-learning	51
Expert in Climate Change and Circular Economy	E-learning	4
PG109 Minor Environmental Incidents VTC (Virtual Training Centre)	E-learning	8
Atmospheric emissions	In person	6
Spills and Contaminated Water	E-learning	10
TOTAL		**97**

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Training for different areas and professional groups

During 2024, the compliance with training plans by Adif and Adif-AV Activity Areas, as well as by professional groups, significantly exceeded the target value set for the evaluation of the effectiveness of the goal (compliance reached 219% for participant numbers and 147% for planned hours), compared to the target of 80%.

Notably, training for the personnel of the Corporate Conservation and Maintenance Department involved 1,397 participants and 8,472 hours, with the majority in the course 'PG109 Actuaciones Incidencias Ambientales Menores' (PG109 Minor Environmental Incidents)

Table 41. Environmental training for management at Adif and Adif-Alta Velocidad in 2024

Scope	Average Staff	Planned participation	Investments made	Scheduled hours	Hours worked	Participant compliance (%)	Hours worked (%)
General Secretariat Advisory Services and Procurement and Contracting	204	1	1	200	200	100	100
Corporate People Management Department	706	8	15	1,017	874	188	86
Corporate Finance and Management Control Department	230	3	2	600	400	67	67
Corporate Construction Department	126	3	5	212	224	167	106
Corporate Conservation and Maintenance Department	5,495	627	1,397	3,977	8,472	223	213
Corporate Traffic and Capacity Management Department	3,836	16	16	728	682	100	94
Corporate Business and Commercial Operations Department	1,494	8	21	259	326	263	126
Corporate Planning, Strategy and Project Management Department	146	1	1	5	10	100	200
Corporate Safety, Processes, and Corporate Systems Department	634	4	15	60	98	375	163
Adif-Alta Velocidad	263	6	7	1,200	818	117	68
TOTAL	**13,134**	**677**	**1,480**	**8,258**	**12,104**	**219**	**147**
External	-	0	99	0	602	100	100

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Table 42. Environmental training provided by professional groups at Adif and Adif-Alta Velocidad in 2024

Position	Average template	Planned participation	Investments made	Scheduled hours	Hours worked	Participant compliance (%)	Hours worked (%)
Operational staff	8,424	629	1,307	4,006	8,116	208	203
Intermediate control	2,450	32	126	2,211	2,148	394	97
Support structure	1,320	8	37	830	810	463	98
Management structure	940	8	10	1,211	1,030	125	85
TOTAL	**13,134**	**677**	**1,480**	**8,258**	**12,104**	**219**	**147**
External	-	0	99	0	602	100	100

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

ENVIRONMENTAL PROCESS MANAGEMENT

Responsible purchasing

3-3 | 308-1 | 308-2

! Adif-Alta Velocidad seeks to use public procurement as a tool to advance sustainability goals.

Therefore, for each contracting process, Adif-Alta Velocidad conducts a supplier selection process where suppliers must demonstrate their business solvency as well as their compliance with social and environmental requirements. Additionally, the contracting specifications detail the environmental prerequisites that suppliers must meet and be accredited before the respective contracts are awarded.

The environmental criteria used to select suppliers are based on the aforementioned solvency and award criteria, as well as other contract-related clauses such as technical specifications and special execution conditions. All these categories of criteria are outlined by the contracting authority in the contract documents and are made available to tenderers before they submit their bids.

In addition, the purchasing managers in the various Adif-Alta Velocidad departments must also include environmental obligations for contractors, considering maintenance activities, supplies, or services under contract. These environmental clauses should be tailored to the subject matter of the contract.

Since 2021, a specific working group, coordinated by the Corporate Environmental Sub-Department and including all the areas affected in the procurement process, particularly Purchasing and Contracting and the Legal Department, has been established to develop a catalogue of environmental clauses and criteria for inclusion in the various phases of the procurement process. These environmental criteria will be established by contract type (cross-cutting clauses, services, supplies, projects, and works) and will be made available to both the technical areas as well as to the contracting authorities.

These environmental clauses aim to go beyond legal compliance, leveraging Adif-Alta Velocidad´s contracting power to promote sustainable public procurement among its suppliers.

Adif-Alta Velocidad is developing a **Catalogue of Environmental Clauses** to be included in the various phases of the contracting process, incorporating environmental criteria into Public Procurement as required by the *Public Sector Contracts Act*.

Thus, clauses are defined at three levels:

- Requirements for tenderers in the design, preparation, and drafting phase of the contract and its specifications.
- Clauses to be used as evaluation criteria during the contractor selection phase.

Special conditions to be considered during the execution phase of the contract.

As a result of all this work, Adif-Alta Velocidad has defined the environmental criteria for assessing suppliers of goods, services, projects, and works submitted in its procurement processes.

[12] Law 9/2017 of 8 November on Public Sector Contracts, transposing into Spanish law Directives 2014/23/EU and 2014/24/EU of the European Parliament and Council, dated 26 February 2014 (BOE No. 272 9 November 2017).

The environmental criteria, related to the nature of the contract, cover waste and emissions, environmental management systems, works contracts, cleaning services, security services, consultancy and engineering services, project and works execution, maintenance services, food and catering services, courier and logistics, gardening, fleet vehicle supply, energy supply, works and office supply, and more.

Both the Catalogue of Clauses and the Guide to Use of the Catalogue have already been drafted and validated at a technically, pending only the approval of the Legal Department. This review will be conducted on a case-by-case basis, incorporating as many clauses as possible from the catalogue into a series of pilot contracts. Once it is in use, it will be monitored and updated based on the identified needs.

! The objective is to integrate environmental criteria at the appropriate stages of the procurement process (subject matter, solvency, assessment, and performance conditions), in a manner that aligns with the principles of public procurement: competition, freedom of access, transparency, non-discrimination, and equal treatment.

The procurement system in place allows for:

- To promote and encourage the procurement of environmentally friendly goods and services.
- To provide a reference for adapting purchasing processes to comply with environmental legal requirements.
- To provide technical support to suppliers and contractors on environmental risk prevention related to the procurement of goods and services and the execution of Works.

Environmental risk management

308-2

Adif-Alta Velocidad has established a Comprehensive Risk Management System based on the implementation of Action Plans with annual monitoring.

The scope of this system includes the management of environmental incidents that may give rise to administrative (or legal) proceedings, cause damage to the environment, and/or result in loss of trust, reputation, or economic resources. In Adif's case, the causes of such environmental incidents are related to inappropriate practices in the design, construction, and operation of the railway network.

To minimise and control environmental incidents, some indicators have been established that focus on:

- Non-compliant monitoring of Project Environmental Appendices.
- Environmental non-compliances opened by ESMs and ESSs on construction sites with or without an EIS.
- Environmental complaints.

In 2024, the following Action Plans have been implemented:

- Draft of new NAG 'Methodology for waste management studies' and establishment of a Working Group in the Regulatory Committee.
- Environmental diagnostics at stations and facilities to identify environmental aspects related to noise, derived from current management by own and third parties.
- Ensuring legal compliance with environmental regulations on soil contamination.
- Decontamination measures in emergencies.

With this system, Adif-Alta Velocidad meets the requirements for identifying environmental risks as outlined by the ISO 14001:2015 standard.

Management of environmental complaints about noise and vibrations

3-3 | 308-2

Adif-Alta Velocidad has a procedure in place to receive, document, and respond to complaints regarding noise generated by its activities.

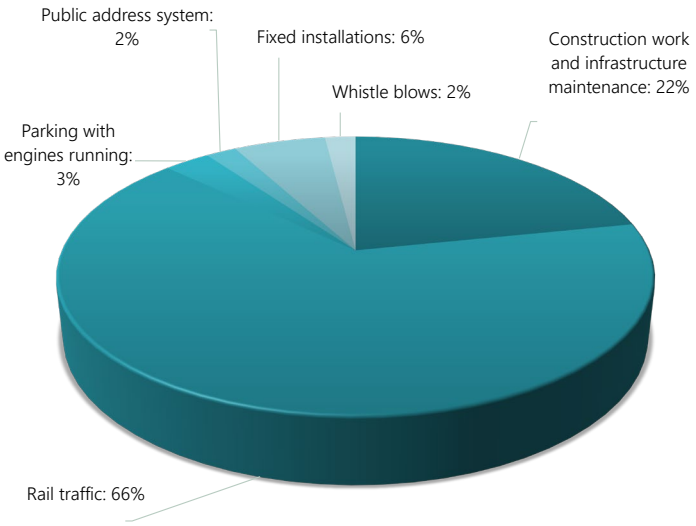
Environmental complaints received in 2024

In 2024, a total of one hundred six (106) environmental complaints related to noise were received and addressed through the established communication methods in Adif-Alta Velocidad lines.

Source: Adif-Alta Velocidad, Corporate Management, Corporate Environmental Sub-Department

According to the sources of the noise and vibration complaints, their distribution was as follows:

Chart 48. Source of noise and vibration complaints in 2024 (%)



Source: Adif-Alta Velocidad, Corporate Management, Corporate Environmental Sub-Department

ENVIRONMENTAL EXPENDITURE AND INVESTMENTS

In 2024, Adif-Alta Velocidad´s environmental expenditure and investments amounted to over 1.8 million and 8.6 million euros, respectively.

Table 43. Expenditure on environmental protection (€) ****

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
A. Exploitation	**2,940,970**	**3,341,729**	**1,113,321**	**1,240,144**	**2,691,823**	**3,194,439**	**3,356,086**	**3,284,965**	**5,506,997**	**1,843,543**
Waste *	37,469	36,003	27,413	26,822	44,819	80,171	88,645	135,153	0	0
Water purification **	24,425	95,076	8,981	3,751	13,398,40	22,038	24,809	32,553	22,240	17,734
Noise and vibrations	16,834	145,619	-	-	-	120,400	0	6,940	18,492	24,205
Environmental Management Systems and Specific Programmes	92,773	36,909	24,696	23,255	37,413	31,617	78,457	63,661	32,147	42,924
Environmental communication	10,613	10,497	10,497	0	16,466	7,057	20,227	9,660	9,660	15,910
Fire prevention	2,611,469	2,833,756	886,392	1,027,737	2,230,719	2,897,854	3,088,059	3,003,741	5,224,952	1,686,926
Environmental integration	52,023	90,020	76,838	76,838	32,016	0	0	0	0	0
Environmental monitoring of construction projects not subject to an EIS	95,363	93,849	78,504	81,741	316,991	35,303	55,889	33,257	42,379	-
Environmental control of herbicide treatment										55,844
B. Investment	**44,034,450**	**32,270,052**	**73,205,446**	**58,641,398**	**40,323,662**	**44,724,540**	**43,714,885**	**83,218,990**	**104,637,783**	**168,476,585**
Water purification	-	-	-	-	-	119,841	39,118	137,540	30,190	-
Noise and vibrations	-	-	-	-	-	156,703	115,627	90,933	132,008	117,193
Decontamination of contaminated soil or water	259,150	4,872,428	-	-	-	-	-	5,229,304	1,544,392	2,377,000
Energy savings	331,406	638,439	241,176	9,135	2,418,354	357,917	4,305,255	1,490,852	434,153	1,778,160
Fire prevention	-	-	-	-	-	-	-	-	-	-
Environmental monitoring of construction projects not subject to an EIS	-	-	-	-	50,896	161,610	291,576	222,553	379,010	461,714
Environmental monitoring of HSL maintenance activity	-	-	-	-	-	126,749	380,248	340,442	-	-
EIS compliance	1,706,316	1,234,663	1,696,924	1,309,799	2,354,577	2,305,592	2,212,376	2,447,026	3,552,892	3,941,356
Projects ***	36,000	94,239	121,070	144,313	300,810	313,175	321,890	454,650	548,943	461,780
Construction	1,670,316	1,140,424	1,575,854	1,165,486	2,053,767	1,992,417	1,890,486	1,992,376	3,003,949	3,479,576
Construction works	41,737,578	25,524,522	71,267,346	57,322,464	35,499,835	41,496,128	36,370,685	73,260,340	98,565,138	159,801,162

* This item does not include fees paid for refuse collection

** This item includes, among other things, sewage treatment charges and other related management costs

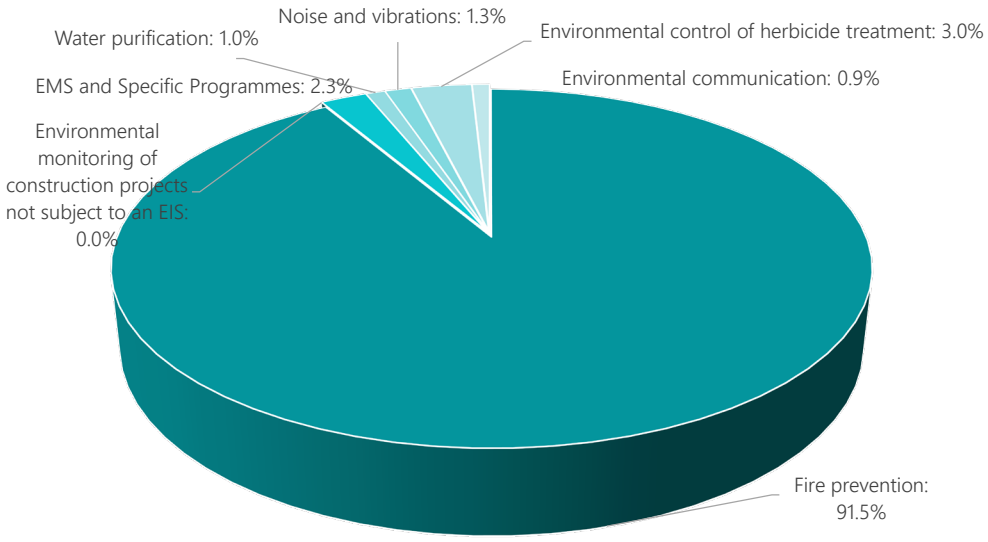
*** Total data from Adif, Corporate Maintenance and Upkeep Department, Corporate Technical Department, Corporate Resources Sub-Department are not included

**** Data *revised with from the 2023 Report*

Source: Adif-Alta Velocidad, Corporate Management, Corporate Environmental Sub-Department; Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department; Adif, Corporate Passenger Stations Department; Adif, Corporate Treasury and Accounting Department, Corporate Finance and Management Control Department, Administration and Services Division; Adif, Corporate Conservation and Maintenance Department, Corporate Technical Department, Corporate Resources Sub-Department; Adif Corporate Conservation and Maintenance Department, Corporate Maintenance Department; Adif-Alta Velocidad, Corporate Technical Planning Sub-Department for Rail Assembly and Supplies

91.5% of the operational environmental expenditure of Adif-Alta Velocidad was allocated to fire prevention and 3.0% of the expenditure has been allocated to environmental control of herbicide treatment. The remaining percentage was allocated to environmental management systems and specific programmes, water purification, noise and vibrations, and environmental communication.

Chart 49. Expenditure on environmental protection in operation. Year 2024



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Regarding Adif-Alta Velocidad´s investments in environmental protection, the main expenditure is firstly on works (94.9%). The rest has been allocated to EIS compliance, and, to a lesser extent, energy savings, decontamination of contaminated soil or water, environmental monitoring of construction projects not subject to an EIS, and noise and vibrations.

Chart 50. Investments in environmental protection. Year 2024

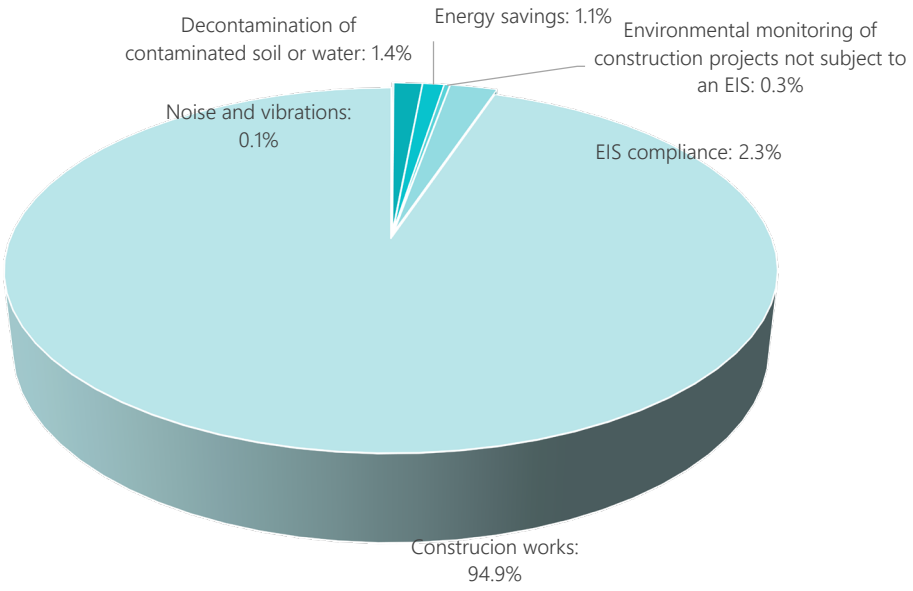


Table 44. Environmental investments in the construction of new railway accesses for the year 2024 (€/year)

	Bobadilla - Granada	Centre	Córdoba - Málaga	Mediterranean Corridor	North-Northwest Corridor	Atlantic Corridor	Madrid-Cartagena Railway Line	Madrid - Extremadura	Madrid - Zaragoza - Barcelona - French border	Madrid - Castile-La Mancha - Valencian Community -Region of Murcia	Medina del Campo - Salamanca - Fuentes de Oñoro	North- east	New Railway Network in the Basque Country	New Railway Access to Asturias	New Railway Access to Galicia	New Railway Access to Northern and North-Western Spain	Palencia-Santander	Sevilla-Cádiz	Total
Land conditioning and landscape integration measures for the railway line and infrastructure	168,242	69,244	1,686	2,646,833	577,558	205,118	182,109	2,110,919	13,922	438,918	0	1,776,288	1,506,191	861,499	218,065	0	2,667,357	0	13,443,947
Adaptation and measures for the integration of auxiliary construction elements into the landscape	0	310	10,953	1,035,591	150,095	1,641	11,234	801,432	0	32,408	45	1,625,060	982,343	0	153,916	152,093	8,687	0	4,965,809
Noise protection	0	51,984	0	16,470,089	704,478	10,797,263	0	620,619	11,661	1,634,172	0	0	63,310	0	189,937	0	139,556	0	30,683,069
Wildlife protection	2,537	0	0	8,722,100	3,329	19,630	0	5,024,637	0	0	0	19,070	418,523	27,271	144,329	0	4,770,304	0	19,151,731
Archaeological protection	85,737	126,127	0	1,191,091	52,925	118,140	125,967	1,011,435	238,623	11,553,796	1,415	446,116	98,836	4,642	106,943	0	922,158	0	16,083,951
Protection of water and soil quality	0	0	0	172,690	0	45,031	8,150	13,733	146,818	38,612	0	343,833	2,713,478	856,556	32,294	0	6,060	0	4,377,256
Waste management	79,108	1,322,898	29,645	16,815,703	773,440	176,830	850,379	3,813,879	1,575,313	4,134,798	6,909	230,549	4,186,928	88,757	366,449	0	1,461,303	0	35,912,889
Environmental monitoring of construction works	0	0	0	4,402	0	0	0	6,478	7,519	0	0	0	3,143	0	0	0	0	0	21,541
Stakeout	19,184	1,247	1,224	358,609	11,514	844	0	324,007	50,222	12,012	0	91,378	49,544	5,240	13,107	0	10,073	0	948,206
Air quality	0	0	0	86,072	0	0	0	-102,866	653	69,392	0	234,627	234,291	0	0	0	11,837	0	534,005
Structures modified to comply with the EIS	0	0	0	20,387,271	6,571	0	0	6,499,676	0	0	0	0	4,230,329	0	0	0	0	0	31,123,847
Compensatory measures	0	0	0	0	0	0	0	87,196	0	0	0	154,677	33,745	0	38,818	1,067,434	0	0	1,381,870
Various	0	32,233	0	620,475	12,481	204,137	0	41,460	0	9,291	0	225	252,739	0	0	0	0	0	1,173,041
Total Environment	**354,808**	**1,604,043**	**43,508**	**68,510,925**	**2,292,392**	**11,568,634**	**1,177,839**	**20,252,603**	**2,044,731**	**17,923,399**	**8,370**	**4,921,824**	**14,773,398**	**1,843,966**	**1,263,860**	**1,219,527**	**9,997,336**	**0**	**159,801,162**
Total Construction work	**1,798,937**	**575,253,840**	**4,618,262**	**607,820,104**	**33,071,279**	**57,356,050**	**31,829,014**	**150,136,995**	**118,660,395**	**142,464,286**	**289,299**	**147,853,427**	**152,369,934**	**20,255,901**	**68,248,896**	**1,219,527**	**123,584,943**	**1,408,594**	**2,238,239,682**
% Environment	**19.72%**	**0.28%**	**0.94%**	**11.27%**	**6.93%**	**20.17%**	**3.70%**	**13.49%**	**1.72%**	**12.58%**	**2.89%**	**3.33%**	**9.70%**	**9.10%**	**1.85%**	**100.00%**	**8.09%**	**0.00%**	**7.14%**

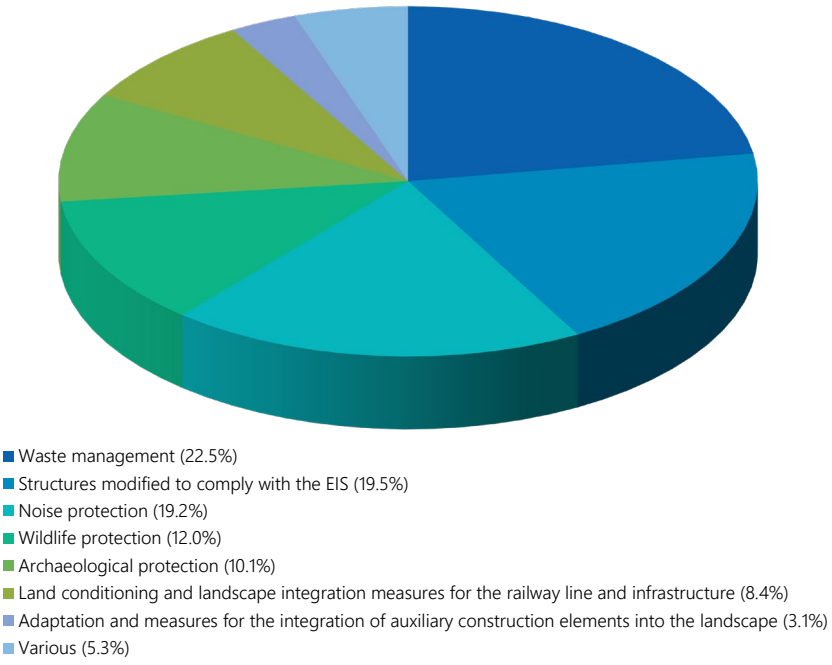
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

In the construction of new railway accesses, environmental investments in 2024 represented 7.14% of the total project certification amount. As shown in the table above, this investment varies significantly between different lines and is largely dependent on the stage of construction for each of the works. In absolute terms, this investment is influenced by the number of open works registered on each line and their level of activity.

The Mediterranean Corridor line is the one where the highest absolute environmental investments have been made (more than sixty-eight and a half million euros). The main environmental investments in this area are due to waste management (24.5% of total environmental investments) and structural modifications to comply with the EIS (29.8%).

Meanwhile, across the entire Spanish territory, environmental investments made in railway infrastructure construction were primarily allocated to waste management (22.5% of total certified environmental expenditure across all projects), structural modifications to comply with the Environmental Impact Statement (19.5%), noise protection (19.2%), and wildlife protection (12.0%).

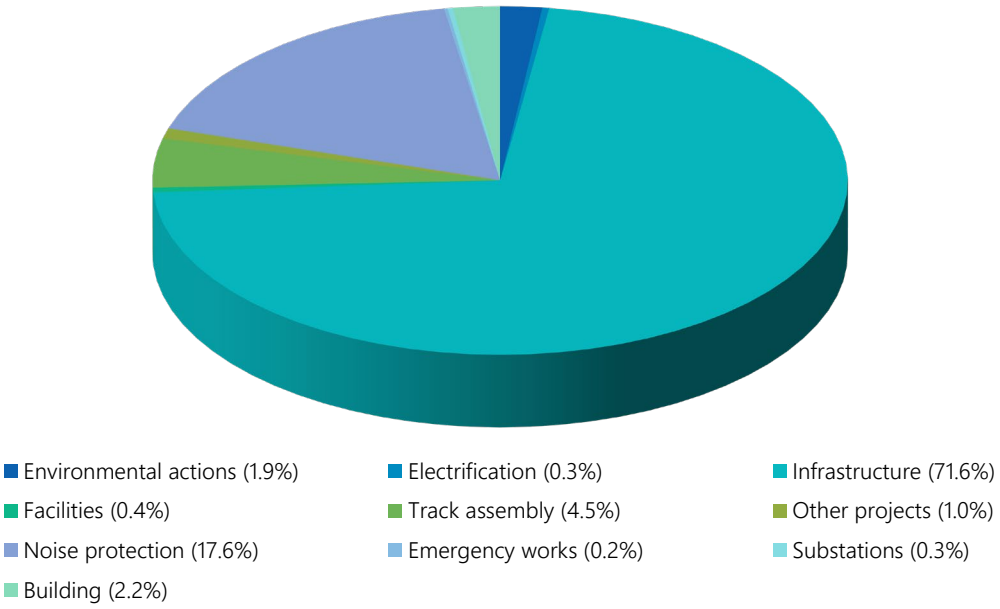
Chart 51. Construction of new railway access points. Allocation of environmental investments in 2024 (%)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

Regarding environmental investment by type of work, 71.6% was used in the construction of railway platforms in 2024. The remainder was primarily invested in noise protection (17.6%).

Chart 52. Investment in environmental works by type in 2024 (%)



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

Table 45. Investment in environmental projects by type (€/year)

Type	2016	2017	2018	2019	2020	2021	2022	2023	2024
Environmental actions	67,928	2,078,567	169,020	347,470	1,119,960	1,474,122	990,528	4,705,281	3,107,930
Building	259,585	29,631	49,471	34,969	66,228	48,560	667,869	3,105,869	3,470,741
Electrification	50,754	9,762	23,588	22,338	69,818	8,570	307,143	85,230	510,268
Infrastructure	19,363,632	62,417,823	53,169,833	31,374,618	31,833,358	27,160,734	63,195,045	74,068,558	114,455,096
Facilities	602,663	627,189	276,149	260,440	402,811	364,774	369,349	75,698	691,419
Track installation	1,601,264	2,015,506	1,381,583	1,360,074	2,221,585	961,384	803,194	789,130	7,265,761
Emergency works	-	-	-	-	-	-	-	-	267,414
Other projects	2,182,322	1,540,154	2,231,087	2,028,723	2,938,609	1,978,479	2,292,139	2,017,884	1,537,351
Noise protection	1,166,762	2,568,888	13,658	0	2,089,547	4,289,965	4,067,308	12,796,913	28,094,354
Substations	229,614	-20,175	8,074	71,101	753,260	84,040	567,764	920,575	400,830
Remote control systems	0	0	0	102	953	58	0	0	0
Total	**25,524,524**	**71,267,345**	**57,322,463**	**35,499,835**	**41,496,129**	**36,370,685**	**73,260,340**	**98,565,138**	**159,801,164**

Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

ENVIRONMENTAL COMPLIANCE

2-27

In 2024, Adif-Alta Velocidad has not been subject to any administrative proceedings related to compliance with environmental legislation, although there are two cases open since 2021, pending a possible sanction.

Table 46. Cases and penalties related to environmental regulations at Adif-Alta-Velocidad *

Nature of the violation	Year	Violation	Competent Authority	Regulations breached	Penalty
Water	2021	Diverting watercourses in the municipality of A Estrada	Government of Galicia (Xunta de Galicia)	Law 9/2010 of 4 November on Aguas de Galicia (Art. 85, d)	Pending
Fauna	2021	Operation of heavy machinery within a 1,000-metre radius of a pair of griffon vulture nests, in breach of the conditions stipulated in the issued permit.	Provincial Council of Vizcaya (Diputación de Vizcaya)	Legislative Decree 1/2014 of 15 April approving the consolidated text of the Basque Country Nature Conservation Act (Art. 75.3.h).	Pending

** Information as of 1 January 2025.*

Source: Adif, Legal Advisory Department, Corporate Litigation Sub-Department; Adif-Alta Velocidad, Corporate Department, Corporate Environmental Department

10. ADIF-ALTA VELOCIDAD'S CONTRIBUTION TO THE ENVIRONMENTAL SUSTAINABILITY OF TRANSPORT

10. ADIF-ALTA VELOCIDAD'S CONTRIBUTION TO THE ENVIRONMENTAL SUSTAINABILITY OF TRANSPORT

ENERGY CONSUMPTION IN THE RAIL TRANSPORT SYSTEM IN INFRASTRUCTURES MANAGED BY ADIF-ALTA VELOCIDAD

302-5

The energy used in the railway transport system managed by **Adif-Alta Velocidad** primarily comes from electricity generated by the Mainland Spain Electricity System (Electric Traction) and Diesel B (Diesel Traction).

Approximately **90.4%*** of the total energy consumed in the railway system managed by **Adif-Alta Velocidad** is used for traction.

**in 2024*

Table 47. Fuel and energy consumption for traction in rail transport infrastructure managed by Adif-Alta Velocidad

Type of energy	2017	2018	2019	2020	2021	2022	2023	2024
Electrical energy (GWh/year)	1,046.31	1,108.67	1,126.08	736.24	843.82	1,074.85	1,325.85	1,426.49
Diesel B (million l/year)	0.22	0.24	0.28	0.20	0.23	0.29	0.22	1.53

** Includes traction-related energy consumption recorded by Adif-Alta Velocidad and all railway operators*

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department.

Table 48. Energy consumption for rail traction in Adif-Alta Velocidad-managed infrastructure (TJ/year)

Type of energy	2017	2018	2019	2020	2021	2022	2023	2024
Electric energy	3,766.71	3,991.21	4,053.88	2,650.48	3,037.75	3,869.47	4,773.07	5,135.35
Diesel B	7.74	8.42	10.02	7.08	8.24	10.29	7.89	54.48
Total	3,774.45	3,999.63	4,063.90	2,657.55	3,045.99	3,879.76	4,780.96	5,189.83

** Includes traction-related energy consumption recorded by Adif-Alta Velocidad and all railway operators.*

In 2024, nearly all the energy consumed for traction purposes in infrastructures managed by **Adif-Alta Velocidad** was electric power.

In addition to traction-related energy consumption in the rail transport system managed by **Adif-Alta Velocidad** there are other energy uses, primarily for UDT, associated with **Adif-Alta Velocidad**'s own activities, which are detailed in the 'Energy and Emissions' chapter.

Chart 53. Energy consumption for traction (TJ/year)

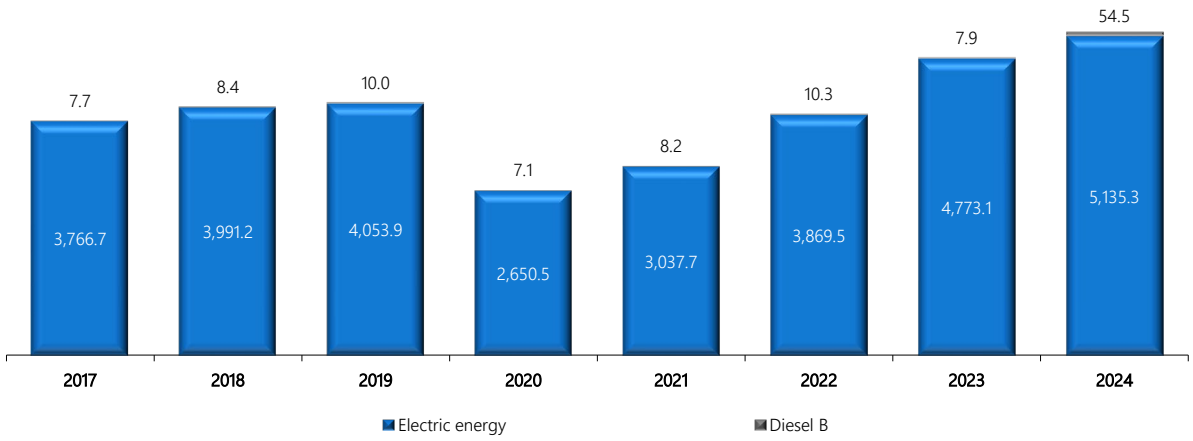


Table 49. Total energy consumption in the railway system managed by Adif-Alta Velocidad (TJ/year)

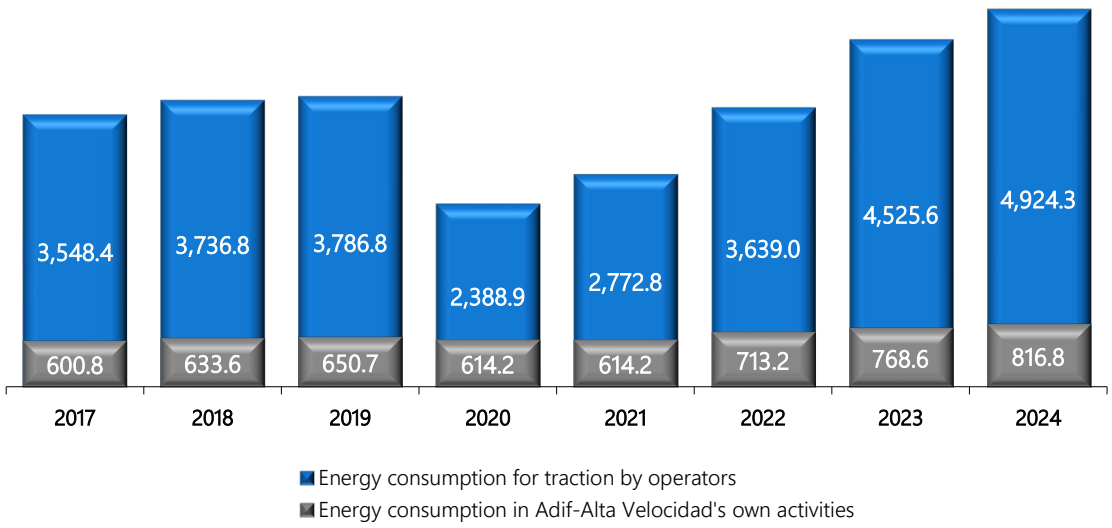
Type of energy	2017	2018	2019	2020	2021	2022	2023	2024
Energy consumption in Adif-Alta Velocidad´s own activities (a)	600.82	633.56	650.72	614.19	614.24	713.22	768.58	816.79
Energy consumption for purposes other than traction by operators (b)	3,548.37	3,736.83	3,786.78	2,388.93	2,772.79	3,638.96	4,525.62	4,924.32
Total	**4,149.19**	**4,370.38**	**4,437.51**	**3,003.12**	**3,387.03**	**4,352.18**	**5,294.20**	**5,741.11**

(a) Includes traction uses.

(b) Energy consumption for non-traction uses by Renfe Operadora and other operators on infrastructure managed by Adif-Alta Velocidad is minimal, so it is assumed that all energy consumption is on infrastructure managed by Adif.

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department

Chart 54. Total energy consumption in the railway system managed by Adif-Alta Velocidad (TJ/year) *



* Remarks:

- Electricity consumption for non-traction purposes by Renfe Operadora on infrastructure managed by Adif-Alta Velocidad is minimal, so it is assumed that all electricity consumption occurs on infrastructure managed by Adif.
- Energy consumption in Adif-Alta Velocidad's own operations includes traction use.

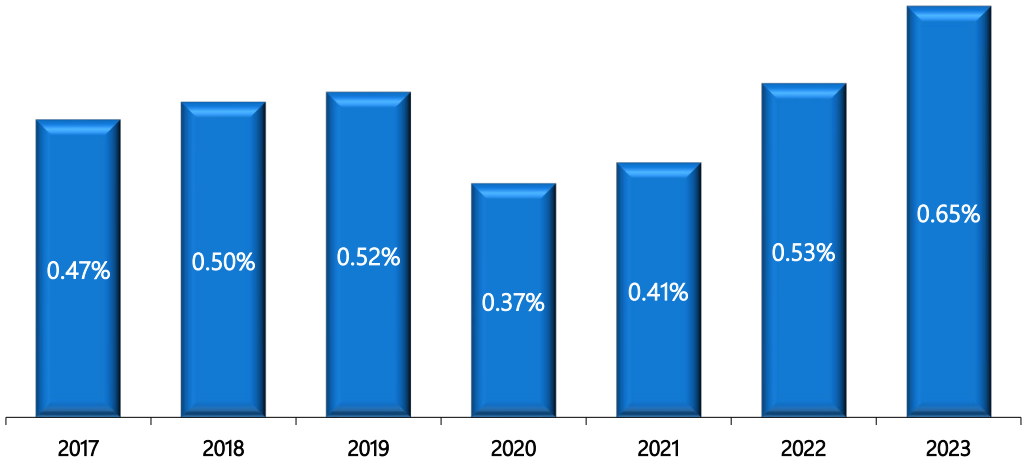
ENERGY CONSUMPTION OF THE RAIL TRANSPORT SYSTEM AS A PERCENTAGE OF SPAIN'S TOTAL

Final energy consumption in Spain in 2023 the latest year for which information is available) recorded an increase of 0.2% compared to the previous year, although in the case of electrical energy it was a decrease of 0.8%.

From 2017 to 2019, the final energy consumption and electric power usage of the railway transport system in the infrastructures managed by **Adif-Alta Velocidad** remained relatively constant compared to the national total for Spain. There was a noticeable decrease in 2020 and 2021 due to the pandemic.

In 2023 (the latest year available), the rail transport system on infrastructure managed by **Adif-Alta Velocidad** accounted for **0.16%** of Spain's total final energy consumption and **0.65%** of electricity consumption.

Chart 55. Electricity consumption by the rail transport system on Adif-Alta Velocidad-managed infrastructure compared to Spain's total (%) *, **

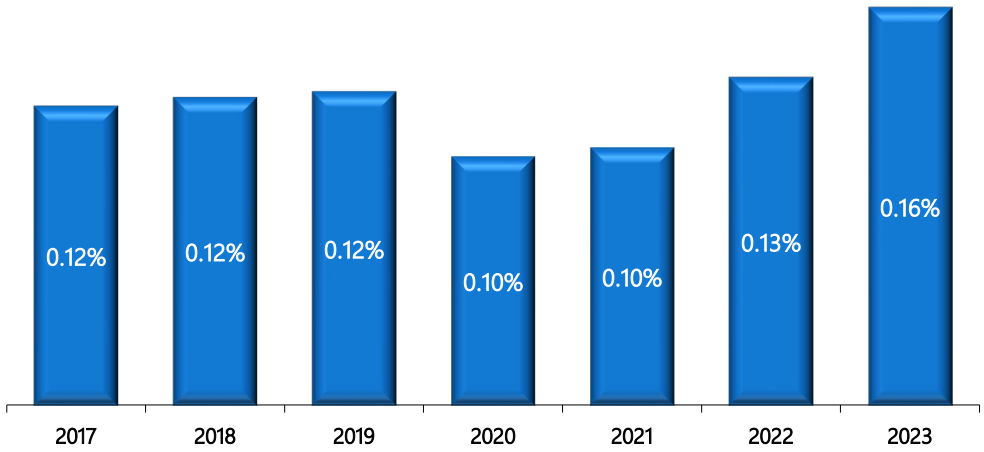


* Energy consumption for non-traction uses by Renfe Operadora and other minor operators on infrastructure managed by Adif-Alta Velocidad is very small. Therefore, it is assumed that all energy consumption occurs on infrastructure managed by Adif (data for other operators' UDT energy consumption is not available).

** The latest year for which information is available is 2023

Source: Prepared by the authors based on the final energy consumption balance, excluding non-energy uses, from Spain's Energy Balance 2023 (2025).

Chart 56. Final energy consumption by the rail transport system on Adif-Alta Velocidad-managed infrastructure compared to Spain (%) *, **



* Energy consumption for non-traction uses by Renfe Operadora on Adif-Alta Velocidad infrastructure is very small. Therefore, it is assumed that all energy consumption occurs on infrastructure managed by Adif.

** The latest year for which information is available is 2023

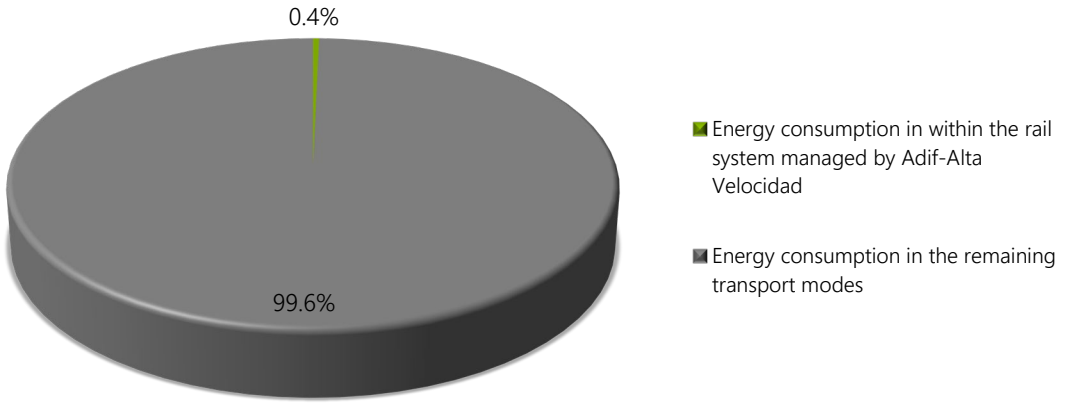
Source: Prepared by the authors based on the final energy consumption balance, excluding non-energy uses, from Spain's Energy Balance 2023 (2025).

TRACTION ENERGY CONSUMPTION AS A PERCENTAGE OF TOTAL TRANSPORT ENERGY CONSUMPTION

The Transport Sector is a major energy consumer. In 2023, the most recent year for which data is available, 38.4% of Spain's final energy consumption was used by the road, rail, and air transport sectors.

In 2023, the rail transport system on infrastructure managed by **Adif-Alta Velocidad**, which transported 2.5% of passengers, used only 0.4% of the final energy consumed by the transport sector in Spain.

Chart 57. Traction energy consumption by the rail transport system on Adif-Alta Velocidad-managed infrastructure compared to the overall transport sector in Spain. Year 2023 *, **

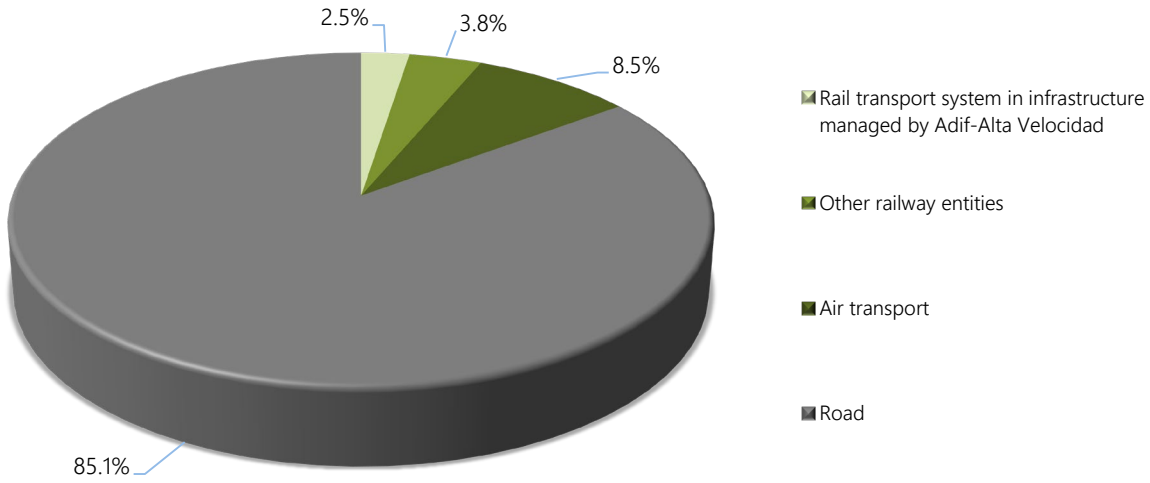


* Data for the most recent year available.

** In air transport, only domestic flights have been considered.

Source: Prepared by the authors based on the final energy consumption balance in Spain from the Energy Balance of Spain 2023 (2025)

Chart 58. Passenger traffic distribution (%). Year 2023 *, **



* Data for the most recent year available.

** For the rail transport system on infrastructure managed by Adif-Alta Velocidad: this includes the operators Renfe, Ouigo, and Iryo. Trains operated by other operators, which together account for less than 1% of total traffic, are not considered. In air transport, only domestic flights have been considered.

Source: Ministry of Transport and Sustainable Mobility; Transport and Logistics Observatory of Spain (OTLE) 2025, Renfe Operadora

TRACTION ENERGY CONSUMPTION PER TRANSPORT UNIT

302-5

In 2023 (the most recent year for which data is available), the specific traction energy consumption in the rail transport system managed by **Adif-Alta Velocidad** was 413 kJ per Transport Unit (TU).

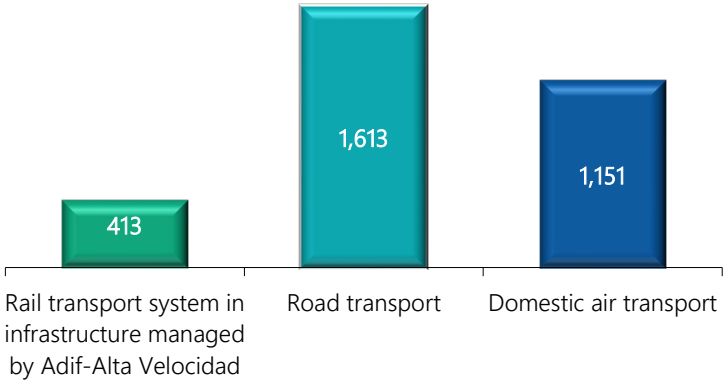
The energy efficiency, measured in terms of energy consumption per unit transported, of the rail transport system is far superior to that of other modes of transport, such as road or air.

To transport one unit, the rail transport system on **Adif-Alta Velocidad**-managed infrastructure uses 3.9 times less energy than road transport and 2.8 times less than air transport. *

** Data corresponding to 2022 (the most recent year for which data is available).*

Trains operated by operators other than Renfe, Ouigo and Iryo, which together account for less than 1% of total traffic, are not considered. In air transport, only domestic flights have been considered.

Chart 59. Energy consumption per Transport Unit (kJ/UT). Year 2023 *



* The most recent year for which data on energy consumption in road and air transport is available.

Source: Compiled based on the information and data from: Ministry of Transport and Sustainable Mobility, Transport and Logistics Observatory of Spain (OTLE) 2025 and Ministry for the Ecological Transition and the Demographic Challenge (2025), Greenhouse Gas Emissions Inventory in Spain 1990-2023 and Adif-Alta Velocidad.

AIR EMISSIONS FROM TRACTION

305-1 | 305-2 | 305-3 | 305-7

Atmospheric GHG emissions attributable to the rail transport system in infrastructures managed by **Adif-Alta Velocidad** originate from electric and diesel traction and, to a negligible extent, in diesel.

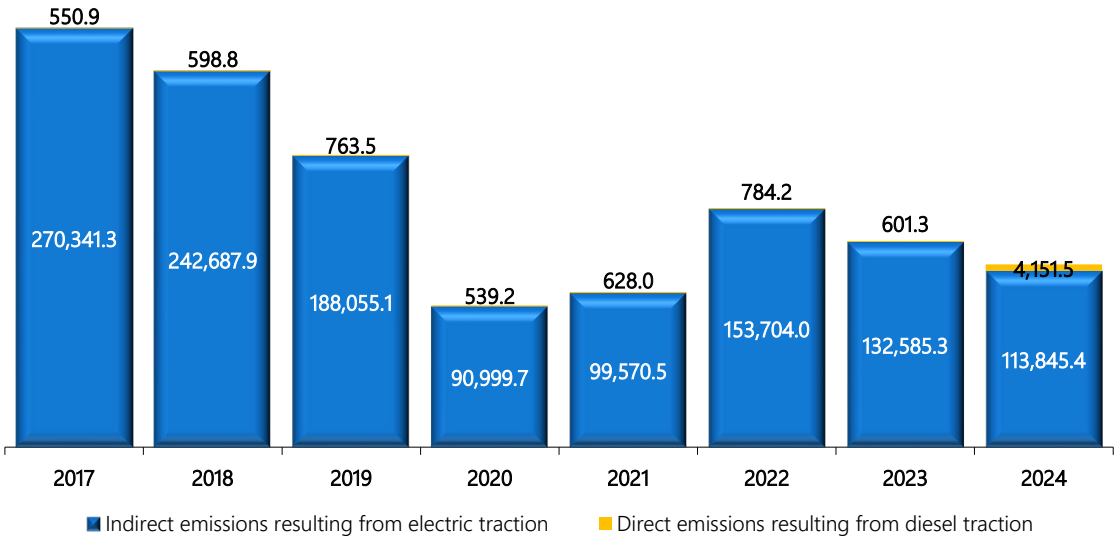
All electricity used for electric traction comes from the mainland electricity grid. The emissions generated are indirect, i.e. they do not occur during railway operations but originate from power generation plants

Indirect emissions from recorded electricity consumption depend not only on the amount consumed but also on the generation mix of the Mainland Spain Electricity System.

Thus, while there has been a 7.6% increase in electricity consumption for traction purposes in the last year, the corresponding indirect GHG emissions have decreased by 14.1%, due to changes in the generation mix of the Mainland Spain Electricity System.

In 2024, nearly all the energy consumed for traction purposes in infrastructures managed by **Adif-Alta Velocidad** was electric power (99.0%), lo which resulted in indirect greenhouse gas (GHG) emissions of 113,845.4 t of CO_2eq.

Chart 60. GHG emissions from traction activities. Rail transport system on Adif-Alta Velocidad-managed infrastructure (t of CO_2eq/year) *



** Data revised in relation to the 2023 Environmental Report*

Table 50. Air emissions from traction in the rail transport system on Adif-Alta Velocidad-managed infrastructure (t/year) *

Compound	2017	2018	2019	2020	2021	2022	2023	2024
Indirect emissions resulting from recorded electricity consumption								
Carbon dioxide (CO_2) (a)	269,947.43	242,277.75	-	-	-	-	-	-
Methane (CH_4) (a)	14.05	14.63	-	-	-	-	-	-
Nitrous oxide (N_2O) (a)	0.00	0.00	-	-	-	-	-	-
Carbon monoxide (CO) (c)	130.89	123.16	98.31	71.28	86.74	125.65	144.73	124.48
Non-methane volatile organic compounds (NMVOCs) (c)	19.70	20.96	21.74	16.09	20.54	25.38	22.78	19.59
Oxides of nitrogen NO_x (as NO_2) (c)	462.11	369.98	301.54	158.02	171.32	219.80	243.07	209.07
Sulphur oxides SO_x (as SO_2) (c)	354.62	275.44	125.38	37.49	30.03	39.31	39.12	33.64
$PM_{2,5}$ (c)	17.53	15.14	12.14	8.27	9.90	12.34	12.51	10.76
PM_{10} (c)	23.49	20.34	15.34	10.64	12.59	15.62	15.85	13.64
TSPs (c)	30.62	26.71	20.24	14.77	17.48	21.56	21.98	18.90
CO_2eq (a)	270,341.31	242,687.94	188,055.07	90,999.72	99,570.53	153,704.00	132,585.32	113,845.41
Direct emissions resulting from diesel traction								
Carbon dioxide (CO_2) (b)	548.83	596.60	-	-	-	-	-	-
Methane (CH_4) (b)	0.03	0.03	-	-	-	-	-	-
Nitrous oxide (N_2O) (b)	0.00	0.00	-	-	-	-	-	-
Carbon monoxide (CO) (d)	1.98	2.15	2.56	1.81	2.11	2.63	2.02	13.94
Non-methane volatile organic compounds (NMVOCs) (d)	0.86	0.94	1.11	0.79	0.92	1.14	0.88	6.06
Oxides of nitrogen NO_x (as NO_2) (d)	9.70	10.54	12.55	8.86	10.32	12.89	9.89	68.26
Sulphur oxides SO_x (as SO_2) (d)	0.004	0.004	0.005	0.003	0.00	0.00	0.00	0.03
$PM_{2,5}$ (d)	0.25	0.28	0.33	0.23	0.27	0.34	0.26	1.78
PM_{10} (d)	0.27	0.29	0.34	0.24	0.28	0.35	0.27	1.88
TSP (d)	0.28	0.31	0.36	0.26	0.30	0.37	0.29	1.98
CO_2eq (c) (b)	550.88	598.83	763.47	539.15	627.96	784.19	601.33	4,151.49
Total emissions resulting from traction								
Carbon dioxide (CO_2)	**270,496.26**	**242,874.35**	**-**	**-**	**-**	**-**	**-**	**-**
Methane (CH_4)	**14.08**	**14.67**	**-**	**-**	**-**	**-**	**-**	**-**
Nitrous oxide (N_2O)	**0.01**	**0.01**	**-**	**-**	**-**	**-**	**-**	**-**
Carbon monoxide (CO)	**132.87**	**125.32**	**100.88**	**73.09**	**88.85**	**128.28**	**146.74**	**138.42**
Non-methane volatile organic compounds (NMVOCs)	**20.56**	**21.90**	**22.85**	**16.88**	**21.46**	**26.52**	**23.66**	**25.65**
Nitrogen oxides NO_x (as NO_2)	**471.81**	**380.53**	**314.09**	**166.88**	**181.64**	**232.69**	**252.96**	**277.32**
Sulphur oxides SO_x (as SO_2)	**354.62**	**275.44**	**125.38**	**37.49**	**30.03**	**39.32**	**39.12**	**33.67**
$PM_{2.5}$	**17.78**	**15.41**	**12.47**	**8.50**	**10.17**	**12.67**	**12.77**	**12.54**
PM_{10}	**23.75**	**20.63**	**15.68**	**10.89**	**12.87**	**15.97**	**16.13**	**15.51**
TSP	**30.90**	**27.02**	**20.60**	**15.03**	**17.78**	**21.93**	**22.27**	**20.88**
CO_2eq	**270,892.20**	**243,286.77**	**188,818.55**	**91,538.87**	**100,198.50**	**154,488.19**	**133,186.64**	**117,996.90**

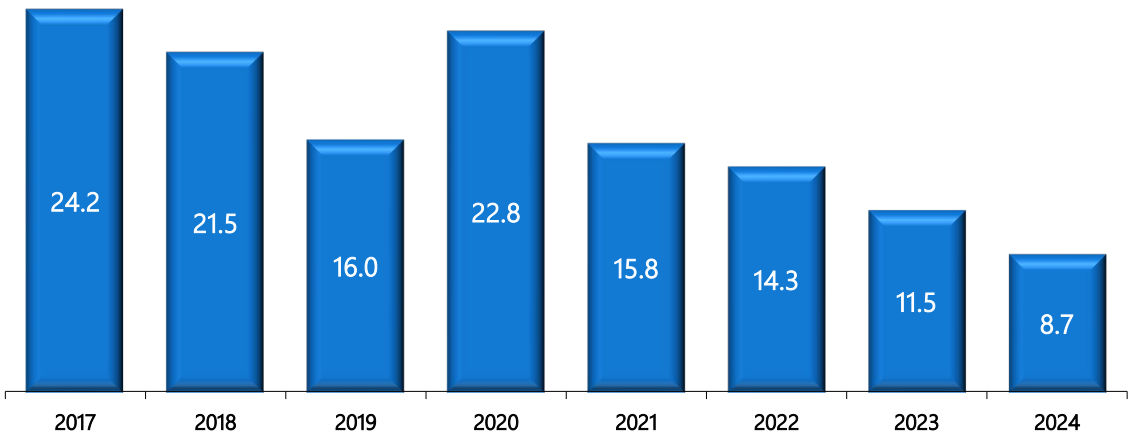
** Data revised in relation to the 2023 Environmental Report*
((a) Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department.
((b) Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department with additional elaboration based on the methodology used by this department.
(c) Estimated using recorded electricity consumption and air emissions data from generation facilities for 2005 to 2024, provided by the Ministry for Ecological Transition and the Demographic Challenge, 2024
(d) Estimated based on reported diesel fuel consumption and emission factors from the National Inventory of Emissions to the Atmosphere 1990-2023. Chapter 3: ENERGY (NFR 1A, 1B) (Ministry for Ecological Transition and Demographic Challenge, 2024).

GHG EMISSIONS PER TU

305-1 | 305-2 | 305-3

GHG emissions per TU for Adif-Alta Velocidad exhibit slight fluctuations, largely due to the electricity generation mix in the Mainland Spain System, as previously mentioned.

Chart 61. GHG emissions per TU. Rail transport system on Adif-Alta Velocidad-managed infrastructure (g of CO_2eq/UT) *, **



* Includes both direct emissions from diesel traction and indirect emissions from electric traction.

** Data revised in relation to the 2023 Environmental Report

GHG EMISSIONS COMPARED TO THE TRANSPORT SECTOR

305-1 | 305-2 | 305-3

In terms of GHG emissions, rail transport for both passengers and freight is more environmentally efficient than other modes of transport.

To transport one unit, the rail transport system on **Adif-Alta Velocidad**-managed infrastructure produces 9.7 times fewer GHGs than road transport, and over 7.3 times fewer than air transport*.

** Data for the year 2023*

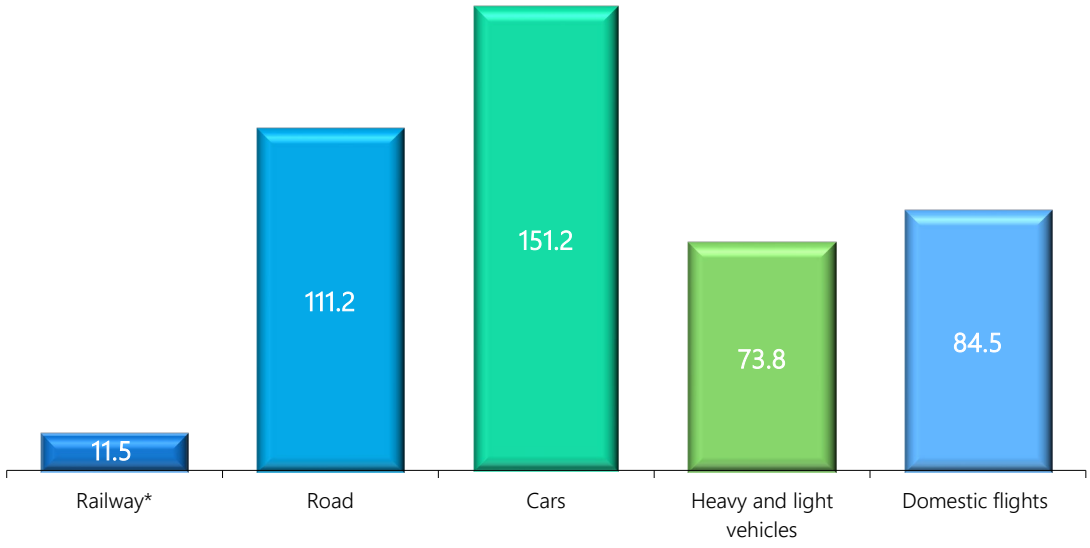
Each TU that travels by train instead of by road saves 99.7 g of CO_2eq per km*.

** Data for the year 2023*

The rail transport system on **Adif-Alta Velocidad**-managed infrastructure, which handles 2.5% of passengers is responsible for less than 0.2% of the total GHG emissions from the transport sector in Spain*.

** Data for the year 2023*

Chart 62. GHG emissions per TU across different modes of transport. Year 2023 (g of CO_2eq/UT) *, **

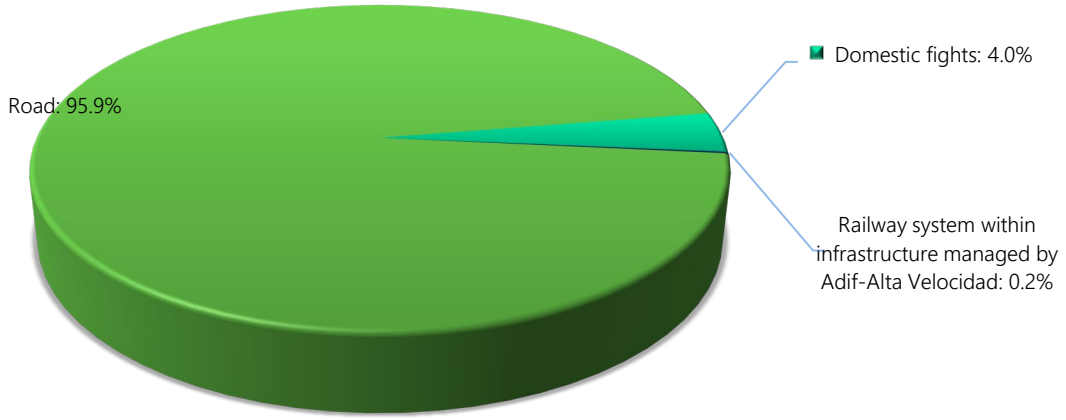


* The rail transport system on managed infrastructure includes emissions from Adif-Alta Velocidad and the major operators (trains operated by operators with less than 1% of the total traffic are not included).

** The comparison is based on 2023, the most recent year for which official data on GHG emissions and TU or different modes is available.

Source: Prepared based on information from: Ministry of Transport and Sustainable Mobility. Transport and Logistics Observatory of Spain (OTLE), 2025; Ministry for the Ecological Transition and the Demographic Challenge (2024). National Inventory of Greenhouse Gases (GHGs) 1990-2023; Renfe and Adif-Alta Velocidad

Chart 63. GHG emissions from freight and passenger transport in Spain. Year 2023 (% of CO_2eq)



* Data for the most recent year available.

Source: Prepared based on information from: Ministry of Transport and Sustainable Mobility, Statistical Yearbook 2019; Transport and Logistics Observatory of Spain (OTLE), 2025; National Inventory of Greenhouse Gases (GHGs) 1990-2023, Ministry for the Ecological Transition and the Demographic Challenge (2024); Renfe and Adif-Alta Velocidad.

EXTERNAL COSTS

Like any productive sector, the transport sector is associated with various externalities, the costs of which, beyond production expenses, are borne by society.

These external costs, primarily resulting from the sector's environmental impact, directly affect the sustainability of the system. The following assessment of the external costs for different modes of transport is based on the European Commission's and CE Delft's study, 'Handbook on the External Costs of Transport,' updated in 2020. This study provides a quantification of total external costs by country and transport mode for each of the EU-28 member states for the year 2016. It also includes an assessment of the average unit external costs (per vehicle-kilometre or per ton-kilometre) by cost component and transport mode for the EU-28 as a whole.

Importance of transport

As recognized in the Roadmap to a Single European Transport Area: Towards a competitive and resource efficient transport system [COM (2011) 144 final], the transport sector represents a significant part of the economy. In the EU, it directly employs nearly 10 million people and accounts for almost 5% of Gross Domestic Product (GDP). The challenge is to reduce dependence on oil without sacrificing efficiency or compromising mobility. To this end, the roadmap outlines the following targets for 2050, among others:

- Achieve a 50% modal shift from road to rail or inland waterways for medium interurban distances, for both passengers and freight.
- Complete the development of a European high-speed rail network. Triple the length of the existing high-speed rail network by 2030 while maintaining a dense rail network across all Member States. By 2050, rail should carry most of the medium-distance passenger transport.
- Connect all airports in the core network to the rail network, ideally through high-speed rail.
- Ensure that all major seaports are well-connected to the rail freight system.
- Achieve a 20% reduction in GHG emissions from the transport sector by 2030 and a 60% reduction by 2050, which implies a 70% reduction in oil consumption by 2050 compared to 2008 levels

In the TERM 2014 report: Transport indicators tracking progress toward environmental targets in Europe, the European Environment Agency (EEA) analyses the extent to which some of these targets have been achieved at the European level.

In 2012, GHG emissions from the transport sector at the European level decreased by 3.3%, with the most significant reductions occurring in road transport and international air travel. So far, progress on this indicator has been better than expected; however, emissions in 2012 are still 20.5% higher than they were in 1990.

Oil consumption in Europe decreased by approximately 4% in 2012 and 1.7% in 2013. These figures align with expectations; however, the EEA believes that much work remains to be done.

In the EU-28, road freight transport in 2012 still accounted for 75% of inland transport, while rail transport had stabilised, with figures only slightly higher than those in 2000. Rail passenger transport experienced a significant decline in many EU countries between 2008 and 2012, with reductions ranging from 6.2% in Spain to 19.8% in Greece.

In Spain...

From 2000 until the onset of the crisis in 2008, both passenger and freight transport grew notably and steadily, with annual averages of 2.4% and 3.9%, respectively. Despite this growth, road transport remained the dominant mode, accounting for 90.4% of domestic passenger traffic and 86.8% of freight transport in 2009.

Regarding rail passenger traffic, 29 million passengers used the Spanish Long Distance and High-Speed (Alta Velocidad Española, AVE) services in 2011. In 2011, nearly 27 million people travelled on Media Distancia services. In terms of rail freight transport, Spain has the lowest modal share among major EU countries and has also experienced the most significant decreases compared to these countries over the last decade. This share represents about 4% of the t-km in road transport, compared to the European average of 17%.

Intermodality is another key factor in providing effective service within a transport system. In rail transport, there is a significant lack of intermodal options. However, in certain corridors with high-speed rail, there is notable intermodality, particularly between conventional trains and high-speed trains at key network stations.

The transport sector accounts for the largest share of energy consumption in Spain, exceeding 40% of the total. Over the past five years, its growth has nearly doubled the average increase in the country's overall energy consumption. By mode of transport, road transport accounted for 65% of total energy consumption in 2011.

Rail transport is significantly more energy efficient and, with appropriate occupancy, can achieve lower emissions per unit of traffic compared to other modes—especially road transport, with a ratio of 1 to 3. This makes rail a more sustainable transportation alternative. However, freight traffic has declined over the past five years, and passenger traffic has been irregular, though showing a positive trend.

Source: European Commission (2011). Roadmap to a Single European Transport Area: Towards a competitive and resource efficient transport system [COM(2011) 144 final]
European Environment Agency (2014). TERM 2014: transport indicators tracking progress toward environmental targets in Europe
Ministry of Public Works (2012). Infrastructure, Transport, and Housing Plan (PITVI) 2012 - 2024.

Table 51. External costs per unit for different modes of passenger transport. Data for EU-28 * (€). Year 2016

Cost category	Passengers (€ / 1.000 PKM)			
	Rail	Aviation	Bus	Car
Accidents	5.0	0.2	10.0	45.0
Air pollution	1.2	2.0	7.0	7.0
Climate	0.5	22.0	5.0	12.0
Noise	9.0	2.0	3.0	6.0
Well-to-Tank	7.0	9.0	2.0	4.0
Habitat damage	6.0	0.1	1.0	5.0
Congestion**	0.0	0.0	9.0	49.0
Delay costs	0.0	0.0	8.0	42.0
Efficiency loss costs	0.0	0.0	1.0	7.0
Total high-level scenario for the EU-28 rail network without congestion	**28.7**	**35.3**	**28.0**	**79.0**

* EU-28 countries are included.

** Delay costs, which are used as a leading indicator of congestion, are primarily internal to the transport sector. Social efficiency loss costs address various aspects of externalities. However, when comparing different modes of transport, this separation of costs into internal and external categories is not relevant.

Source: European Commission (2020). Handbook on the external costs of transport. Delft, CE Delft, 2019.

In 2023, the external costs associated with passenger rail transport on the infrastructures managed by **Adif-Alta Velocidad** amounted to a total of 395.7 million euros.

The cost components vary widely between the different modes of transport.

In rail transport on infrastructure managed by **Adif-Alta Velocidad**, the main external cost is noise (31.4%), followed by emissions from the well-to-tank cycle—emissions resulting from the extraction, processing, and transportation of the energy consumed by **Adif-Alta Velocidad** (24.4%). External costs due to habitat damage (20.9%) and accidents (17.4%) are also relevant in this analysis

In domestic passenger air transport, the main external costs are climate change (62.3%) and well-to-tank emissions (25.5%).

In road transport, the most impactful mode, the main external costs are accidents (56.2%), al climate change (15.3%), and air pollution effects (9.5%). This does not include congestion costs, which are particularly significant for this mode and arise from delays and inefficient use of existing infrastructure.

The total external costs of transport in Spain in 2023 exceed **50 billion euros**, which represents **3.5% of GDP**. **72.4%** is due to passenger transport.

Additionally, congestion costs from road transport exceeded **24 billion euros**, or **1.7% of GDP.**

Table 52. External costs of different passenger transport modes in Spain. Year 2023 (latest available data for all transport systems), excluding congestion costs (in million euros) *

Cost category	Passengers				
	Rail **	Rail Adif-Alta Velocidad ***	Aviation ****	Bus	Car
Accidents	163.9	68.9	9.3	502.1	18,578.0
Air pollution	39.3	16.5	92.7	351.5	2,889.9
Climate	16.4	6.9	1,019.8	251.1	4,954.1
Noise	295.0	124.1	92.7	150.6	2,477.1
Well-to-Tank	229.5	96.5	417.2	100.4	1,651.4
Habitat damage	196.7	82.7	4.6	50.2	2,064.2
Total without congestion	**940.8**	**395.7**	**1,636.3**	**1,405.9**	**32,614.7**

* Costs updated based on CPI.
** Infrastructure managed by Adif and Adif-Alta Velocidad (excluding trains operated by operators with less than 1% of the total traffic).
*** Infrastructure managed by Adif-Alta Velocidad (excluding trains operated by operators with less than 1% of the total traffic).
**** Domestic air transport by air has been considered.
Source: Prepared by the authors, based on data published in the Statistical Yearbook of the Ministry of Transport and Sustainable Mobility (2023) and the Spanish Transport and Logistics Observatory (OTLE)

Chart 64. External costs of passenger rail transport on infrastructure managed by Adif-Alta Velocidad. Total costs for 2023: 395.7 million euros

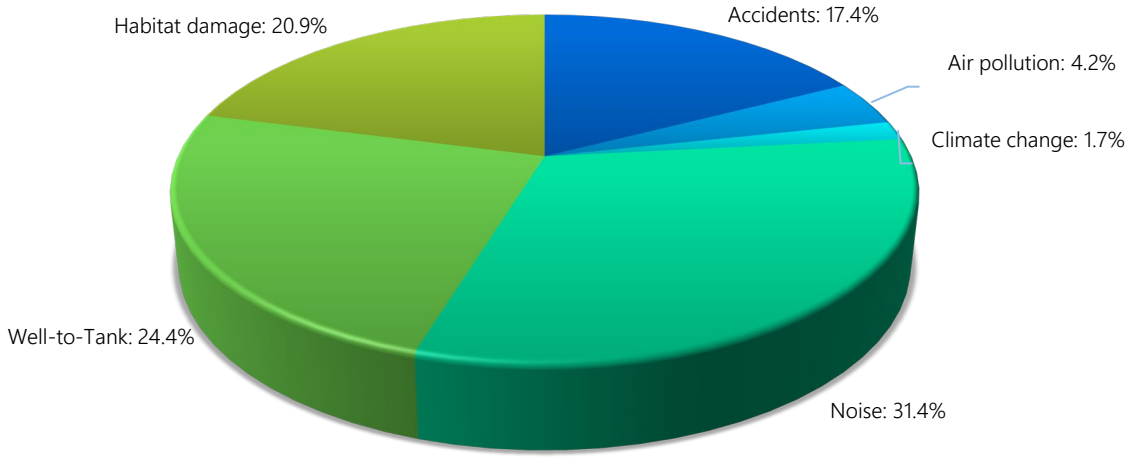


Chart 65. External costs of passenger transport by road Total costs for 2023: 32,614.7 million euros

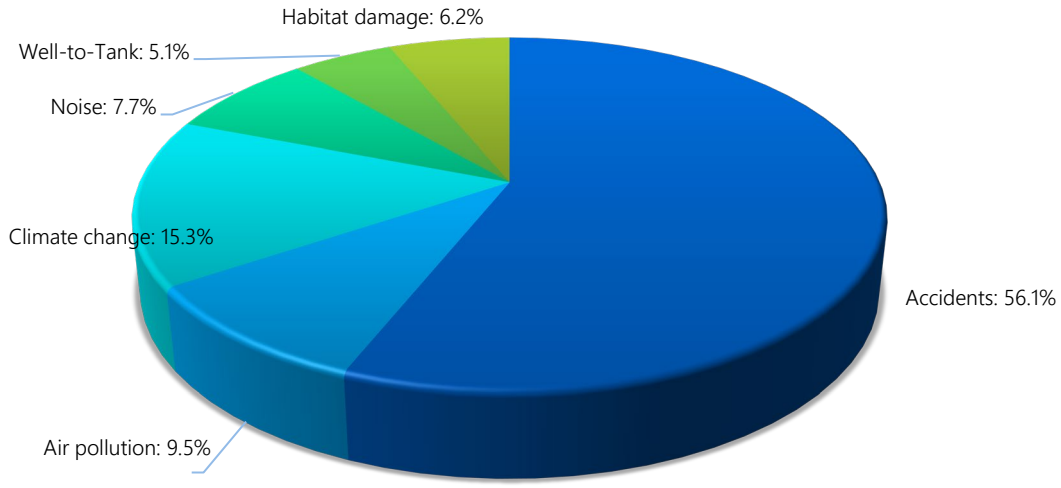
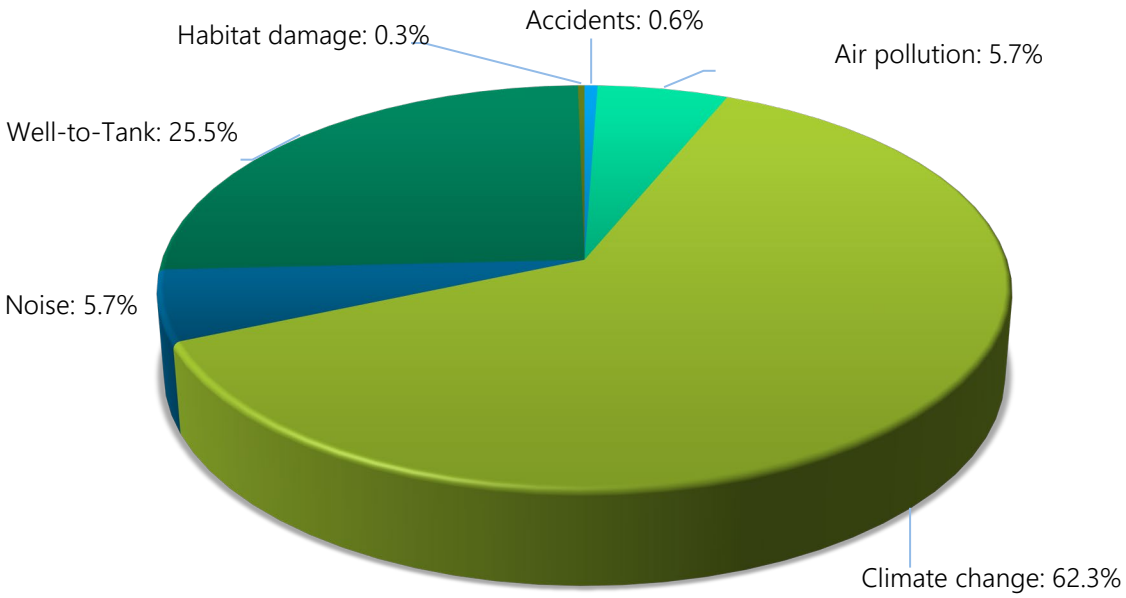


Chart 66. External costs of domestic air passenger transport. Total costs for 2023: 1,636.3 million euros



SAVINGS FROM EXTERNAL COSTS IN THE RAIL TRANSPORT SYSTEM ON INFRASTRUCTURE MANAGED BY ADIF-ALTA VELOCIDAD

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External costs per transport unit are lower for rail transport compared to other modes.

Savings from external costs in 2024, due to rail transport on infrastructure managed by **Adif-Alta Velocidad** are estimated to be between 485.07 y 938.49 million euros.

Table 53. Traffic recorded in the rail transport system on infrastructure managed by Adif-Alta Velocidad (millions of PKM or TKM)

Type of energy	2017*	2018	2019	2020	2021*	2022*	2023	2024
Freights and logistics **, *****	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Passengers	**11,185**	**11,316**	**11,807**	**4,006**	**6,354**	**10,817**	**11,576**	**13,518**
Commuter trains ***	0	0	0	0	0	0	0	0
Medium Distance ****	917	1,027	1,056	417	565	1,072	1,643	1,716
High-Speed	10,267	10,289	10,751	3,589	5,789	9,745	9,934	11,802
Total	**11,185**	**11,316**	**11,807**	**4,006**	**6,354**	**10,817**	**11,576**	**13,518**

* Data revised in relation to the 2023 Environmental Report

** It is assumed that all recorded freight and logistics traffic is carried on infrastructure managed by Adif.

*** It is assumed that all commuter services and tourist trains not operated by Renfe use infrastructures managed by Adif. Trains operated by operators with less than 1% of the total traffic are not considered.

**** Includes traffic related to High-Speed and Medium-Distance services.

***** Cross-border trains are not classified as freight trains

Source: Renfe Operadora and OTLE (2025).

The assessment of external costs savings is based on the methodology published and updated in 2020 by the European Commission, as detailed in the CE Delf document 'Handbook on the External Costs of Transport,' and assumes the modal substitution hypotheses listed in the following table:

Table 54. Savings from external costs due to rail transport on infrastructure managed by Adif-Alta Velocidad (million €/year)

	Modal substitution hypothesis	2017*	2018	2019	2020	2021*	2022*	2023	2024
Freights and logistics	100% Lorry	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Passengers		**324.93**	**333.90**	**350.92**	**119.24**	**200.17**	**361.65**	**406.41**	**485.07**
Commuter trains	20% Bus 80% Car	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Distance **	20% Bus 80% Car	37.19	42.14	43.66	17.16	24.78	49.66	78.46	84.30
High-Speed	40% Aviation *** 10% Bus 50% Car	287.74	291.76	307.26	102.08	175.38	311.99	327.95	400.77
Total		**324.93**	**333.90**	**350.92**	**119.24**	**200.17**	**361.65**	**406.41**	**485.07**

* Data revised in relation to the 2023 Environmental Report

** Includes traffic corresponding to High-Speed-Long Distance.

*** Considering domestic air transport.

Additionally, the following external costs due to congestion can be estimated for the modal substitution scenarios of medium-distance, and high-speed long-distance transport.

Table 55. Additional savings from external costs due to congestion for freight and passenger transport on Medium Distance and High-Speed-Long Distance (million euros/year)

	2017*	2018	2019	2020	2021*	2022*	2023	2024
Freights and logistics	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Passengers	**301.69**	**310.43**	**326.18**	**111.08**	**186.04**	**336.66**	**380.73**	**453.42**
Medium Distance **	38.03	43.09	44.64	17.55	25.34	50.78	80.22	86.19
High-Speed-Long Distance	263.66	267.34	281.55	93.53	160.70	285.88	300.51	367.23
Total	**301.69**	**310.43**	**326.18**	**111.08**	**186.04**	**336.66**	**380.73**	**453.42**

* Data revised in relation to the 2023 Environmental Report

** Includes traffic related to High-Speed and Medium-Distance services.

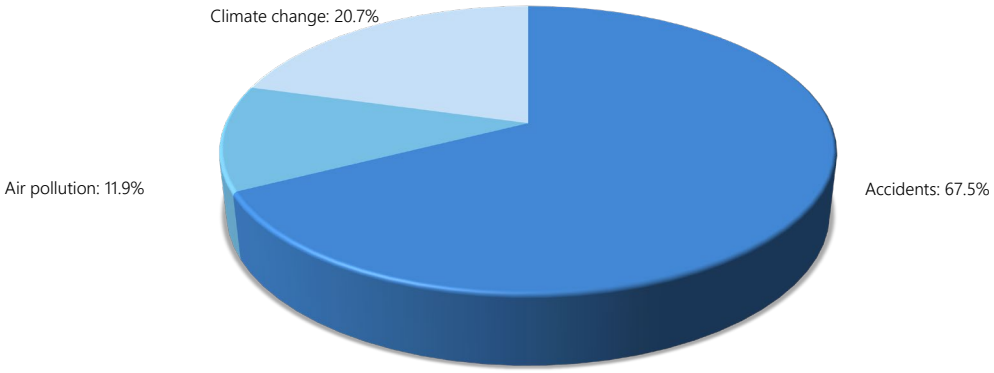
If congestion costs are factored into all modal substitution scenarios, the external cost savings for rail transport on infrastructure managed by Adif and Adif-Alta Velocidad, in 2024 are close to 938.49 million euros.

Table 56. Upper estimate of externality savings, including congestion costs, in all modal shift scenarios (million euros/year)

	2017*	2018	2019	2020	2021*	2022*	2023	2024
Total	626.62	644.33	677.10	230.32	386.21	698.31	787.14	938.49

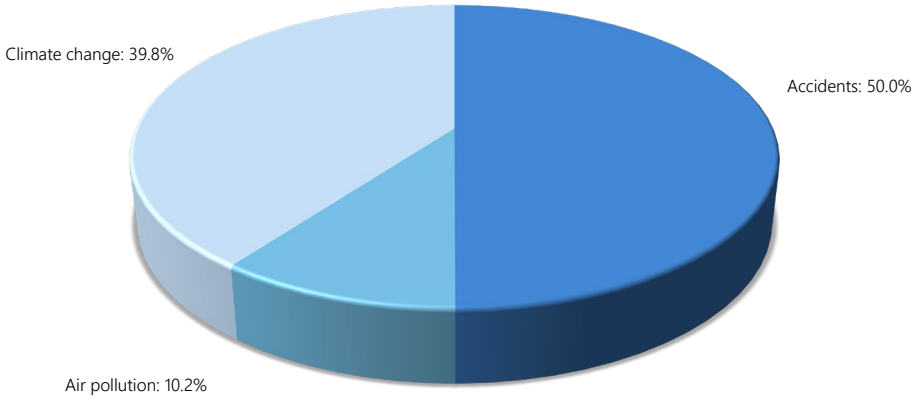
* Data revised in relation to the 2023 Environmental Report

Chart 67. Medium-Distance services on infrastructures managed by Adif-Alta Velocidad. Savings from external costs 84.30 million euros (year 2024) *



* Excluding marginal urban congestion costs.

Chart 68. High-Speed-Long-Distance services on infrastructures managed by Adif-Alta Velocidad. Savings from external costs 400.77 million euros (year 2024) *



* Excluding marginal urban congestion costs.

The main advantages of the rail transport system on infrastructure managed by **Adif-Alta Velocidad**, compared to other modes of transport, are due to the following factors:

- Interurban congestion contributes 41.5% to the total external cost savings.
- Air pollution contributes between 6.1% and 10.5% to the total external cost savings.
- Accidents contribute between 30.9% and 52.8 to total external costs
- Climate change contributes between 21.5% and 36.7% to total external costs.

Chart 69. Distribution of external cost savings in the rail transport system managed by Adif-Alta Velocidad. Total savings from external costs, excluding congestion costs: 485.07 million euros (year 2024)

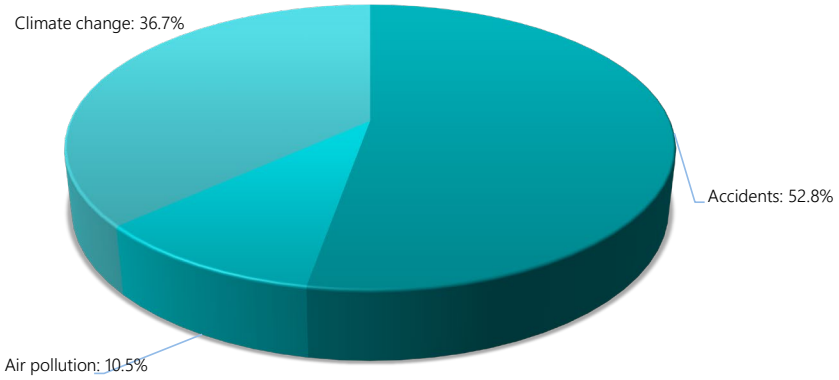
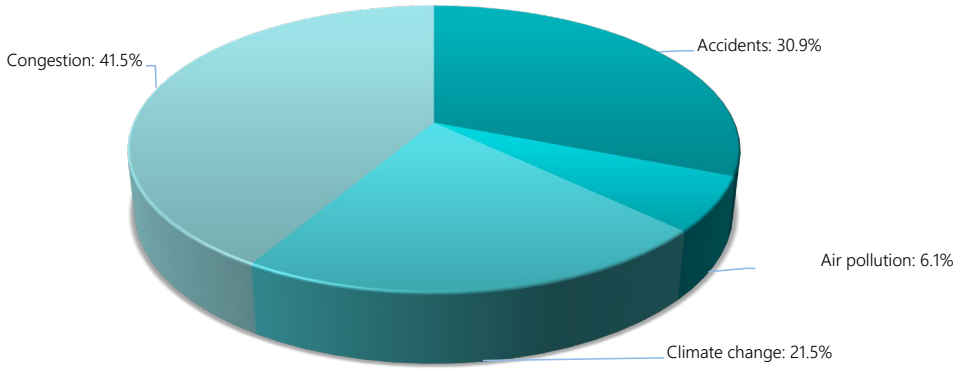


Chart 70. Distribution of external cost savings in the rail transport system managed by Adif-Alta Velocidad. Total savings from external costs, considering congestion costs in all modal substitution scenarios: 938.49 million euros (year 2024)



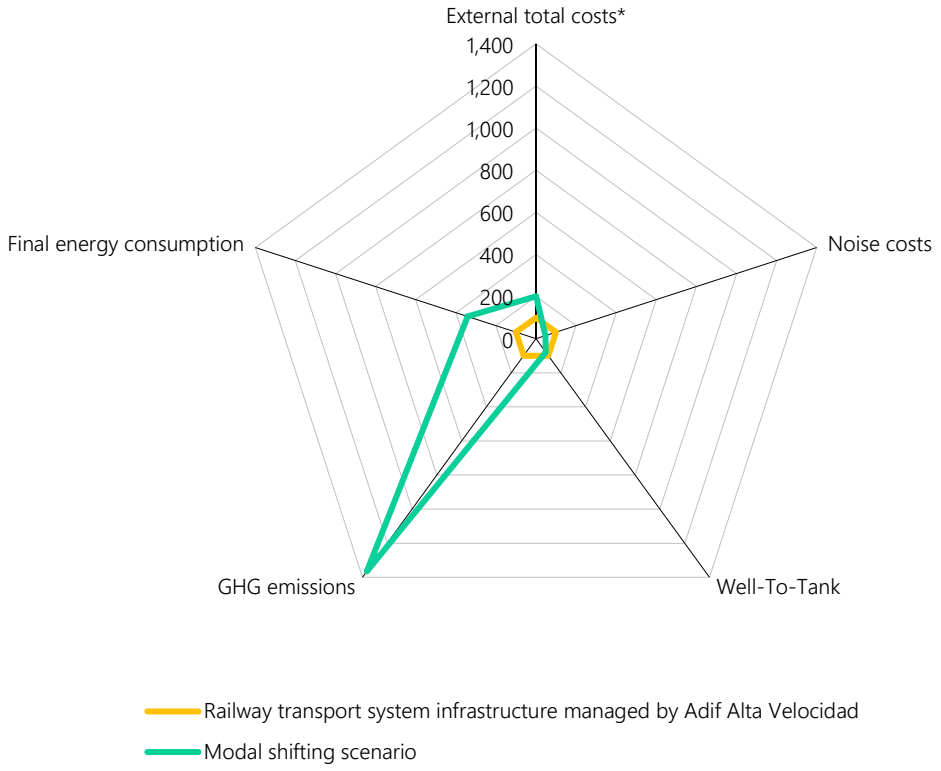
RELATIVE ECO-EFFICIENCY OF THE RAIL TRANSPORT SYSTEM ON ADIF-ALTA VELOCIDAD INFRASTRUCTURE

The contribution of the rail transport system in Adif-Alta Velocidad-managed infrastructure to environmental sustainability is based on three key elements: energy consumption, GHG emissions, and external costs.

The relative eco-efficiency of the rail transport system for the year 2024 has been assessed based on the following assumptions regarding modal substitution for the recorded traffic:

- Medium-Distance, including High-Speed-Medium Distance: 20% substitution by bus and 80% by car.
- High-Speed-Long-distance: 40% substitution by air, 10% by bus and 50% by car.

Chart 71. Relative eco-efficiency of the rail transport system in Adif-Alta Velocidad-managed infrastructure compared to modal substitution scenarios



* Excluding congestion costs.
** Prepared by us using the methodology from the 'Handbook on External Costs of Transport', DE Delft, 2020.

The relative eco-efficiency of the rail transport system in 2024, based on the modal substitution scenarios considered, is clearly illustrated through the eco-compass. This graphical representation includes five key indicators: three primary ones – total external costs, final energy consumption, and GHG emissions – and two secondary ones: noise externalities and well-to-tank emissions.

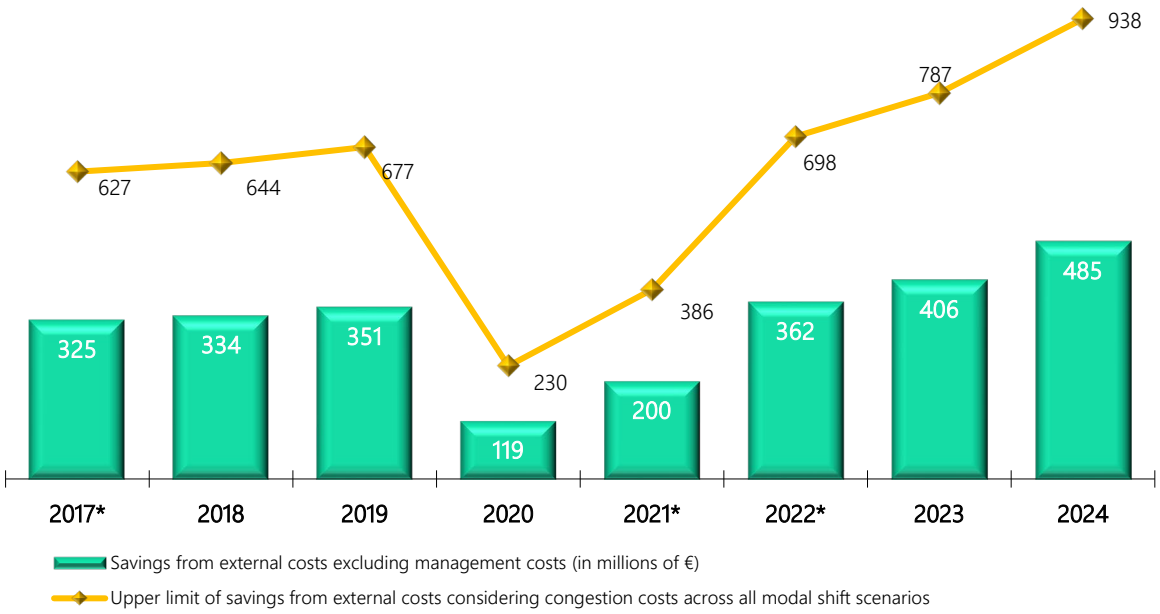
In the future, with the introduction of the new High-Speed Lines (HSL), relative eco-efficiency is expected to improve significantly.

Contribution to the Sustainability of the Rail Transport System on Infrastructure Managed by Adif-Alta Velocidad. 2024

The traffic recorded in 2024 on infrastructure managed by Adif-Alta Velocidad, in relation to modal shift scenarios, has resulted in:

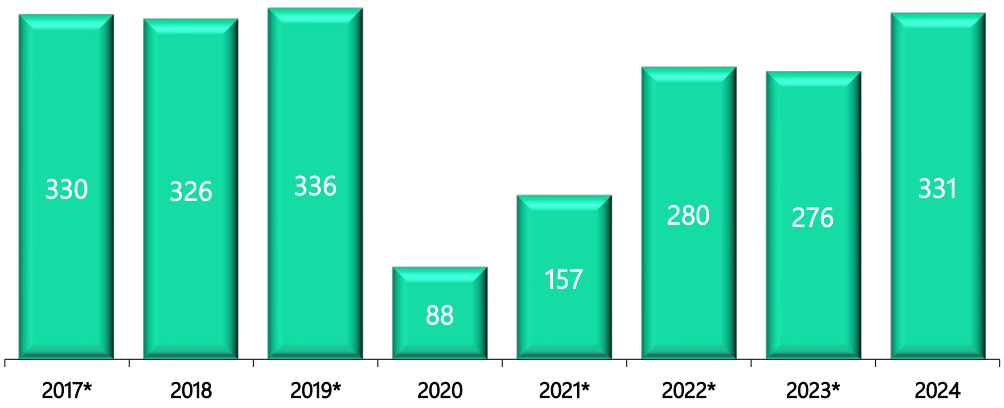
- Savings in external costs estimated at between 485 and 938 billion euros.
- A reduction in final energy consumption estimated at 289 thousand tonnes of oil equivalent (toe).
- A decrease in GHG emissions estimated at 1.29 million tonnes of CO2 equivalent.

Chart 72. Savings in externalities (million euros/year) *



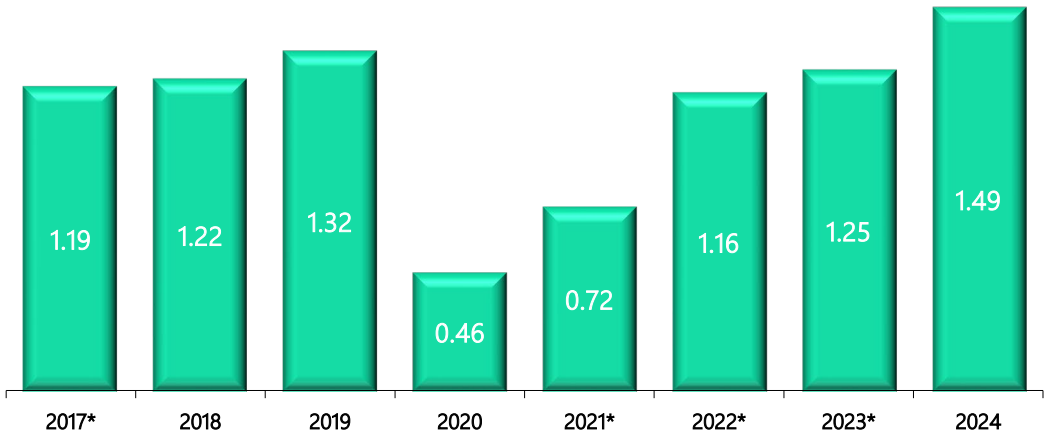
* Data revised in relation to the 2023 Environmental Report

Chart 73. Decrease in final energy consumption (thousands of toe)



* Data revised in relation to the 2023 Environmental Report

Chart 74. GHG emission reductions (million tonnes CO_2eq)



* Data revised in relation to the 2023 Environmental Report

11. ABOUT THIS REPORT

11. ABOUT THIS REPORT

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Adif-Alta Velocidad Environmental Report has been prepared according to the Global Reporting Initiative (GRI) guidelines outlined in the 2021 GRI Standards, which apply to environmental performance. "It includes detailed information on most of the indicators and content recommended in the guide, as shown in the GRI Content Index.

The following GRI documents were considered in preparing the Report:

- GRI 1: 2021 Principles
- GRI 2: 2021 General contents
- GRI 3: 2021 Material Themes
- GRI 300 Environmental Standards (2021)
- GRI (2006), GRI Logistics and Transportation Sector Supplement Pilot Version 1.0 Incorporating an abridged version of the GRI 2002 Sustainability Reporting Guidelines

With the presentation of this Report, Adif-Alta Velocidad fulfils its commitment to report on the environmental aspects of its activities and the results achieved, marking the eleventh year of operation as an independent entity from Adif, which was established as a spin-off for the high-speed infrastructure construction and management.

OUTREACH

This Report covers the environmental performance of all activities, products, and services developed by Adif-Alta Velocidad in Spain.

Adif-Alta Velocidad was established on 31 December 2013, by Royal Decree-Law 15/2013[13], which provided for the division of Adif into two public business entities based on principles of rationalisation, efficiency, and budgetary stability.

The spin-off, with retroactive accounting effects from 1 January 2013, resulted in the creation of Adif-Alta Velocidad and the amendment of the objectives of the former Adif.

In this new context, Adif-Alta Velocidad takes on, among other responsibilities, the construction and management of certain high-speed rail infrastructures, as well as other transferred infrastructures and functions, including high-speed station operations and activities related to telecommunications and energy. Meanwhile, Adif handles the management of the conventional and metre-gauge networks, along with other associated activities and, generally, the businesses not transferred to Adif-Alta Velocidad, such as heritage assets, conventional network stations, and international communication.

Royal Decree-Law 15/2013 and related regulations [14] allow for the delegation of certain activities between Adif and Adif-Alta Velocidad through the signing of appropriate agreements. These agreements must include financial compensation for each entity for the services provided, covering areas such as traffic control systems and infrastructure capacity management, maintenance, public safety and security, and corporate functions like environmental management.

Adif-Alta Velocidad produces this report annually, which was previously published jointly for both entities since 2005. From the 2014 Environmental Report onwards, it has been issued as two separate documents.

In this Report, continuing the approach mentioned earlier, we present the data from Adif-Alta Velocidad for the year 2024, marking the eleventh year for which separate data are available for each entity. The time reference for many indicators includes annual information and data from 2014 and 2024, corresponding to the Adif-Alta Velocidad entity.

The impact of the identified material issues occurs both within and outside the organization, and the organization directly contributes to this impact. For indicators measuring the externalities of transport (Chapter 10: Adif Alta-Velocidad's Contribution to the Environmental Sustainability of Transport), Adif-Alta Velocidad is also linked to the impact through its business relationships.

[13] Royal Decree Law 15/2013 of 13 December 2013 on the restructuring of the State-owned company 'Administrador de Infraestructuras Ferroviarias' (Adif) and other urgent economic measures (BOE No. 299 of 14 December 2013)

[14] Royal Decree 1044/2013 of 27 December, approving the Statute of the Public Business Entity Adif-Alta Velocidad (Official State Gazette No. 311, 28 December 2013).

CONTENT SELECTION

The content of this report has been selected based on the new materiality analysis conducted in 2024.

In this analysis, a list of relevant issues was first identified and then evaluated through a thorough review of various external sources, including reporting frameworks such as GRI, Law 11/2018, and sectoral papers. Additionally, information sources from the public sector and the railway sector have been considered. Based on this, an initial exploration of the dual approach to materiality was conducted, considering concepts such as financial materiality and impact materiality, through surveys with various stakeholders.

The relevant topics or issues were divided into eleven blocks, organised by Environmental, Social, and Governance areas. The results of the analysis were presented in a materiality chart.

As a result of applying the materiality principle, the following issues of high relevance to the environmental dimension were identified:

- Climate Change
- Water and Marine Resources

Of medium relevance are:

- Pollution
- Biodiversity and Ecosystems
- Resources and Circular Economy

It should be noted that the overall results indicate a stronger focus on environmental issues compared to the previous materiality analysis, although this area still lacks maturity. Governance and social issues are considered more material than environmental issues, despite the increasing regulatory requirements and legislative trends.

ASSURANCES OF ACCURACY AND VERACITY OF THE INFORMATION SUBMITTED/VERIFICATION

This Report contains information solely about the results directly attributable to Adif-Alta Velocidad, including the activities carried out and the products and services offered.

Where external sources are used, they are appropriately referenced to ensure traceability and verification.

The calculation of the various indicators and the presentation of their data generally follow the applicable technical protocols. In any case, the assumptions and estimates made, as well as the calculation methods used, are specified for each indicator where applicable.

To ensure the accuracy and reliability of the data and information presented, the Report has undergone a verification process by an independent verifier to confirm the traceability of the information before publication.

ACCESS TO INFORMATION AND QUERIES

This document is available to various stakeholders and the general public on the **Adif-Alta Velocidad**´s website (www.adifaltavelocidad.es).

For more information and access, copies of this report can be obtained by contacting:

Adif-Alta Velocidad
Corporate Management
Corporate Environmental Sub-Department
c/ Titan, 4-6
28045 Madrid (Spain)
Telephone: +34 915 40 38 08

APPENDICES

GRI STANDARD

This report has been prepared in accordance with the Comprehensive option of the GRI Standards.

GRI Standard (1)		2024 Adif-Alta Velocidad Environmental Report	Pages	Omissions (2)	External verification (3)
GRI 2	**General Disclosures**				
2-27	Compliance with laws and regulations	Environmental compliance	180		✓
GRI 3	**Material Topics**				
3.3	Management of material topics	Company's environmental strategy	5-9		✓
		Plan to Combat Climate Change (PCCC)	13-20		✓
		Green Bond	23		✓
		Consumption of railway materials	47-48		✓
		Waste	52-53		✓
		Actions in the Circular Economy	54-62		✓
		Discharging	65-66		✓
		Contaminated soils	67-74		✓
		Noise pollution	75-80		✓
		Land use	83		✓
		Fire prevention	86-88		✓
		Notable actions taken during the construction of HSLs	89-107		✓
		Environmental integration of projects	109-110		✓
		Environmental monitoring of the works	111-147		✓
		Responsible purchasing	169-170		✓
		Management of environmental complaints about noise and vibrations	171-172		✓
		Savings from external costs in the rail transport system on infrastructure managed by Adif-Alta Velocidad	201-204		✓
		About this report	212-215		✓

GRI 301	**Materials**				
301-1	Materials used by weight or volume	Consumption of railway materials	47-48		✓
301-2	Recycled input materials used	Used rails, sleepers, and ballast are reused, where possible, at other locations within the rail network		Used rails, sleepers, and ballast are reused where possible at other locations within the rail network, although this is not currently accounted for.	
301-3	Reclaimed products and their packaging materials			Given the characteristics of the organization, it is not appropriate.	
GRI 302	**Energy**				
302-1	Energy consumption within the organization	Energy consumption in Adif-Alta Velocidad's own activities	31-33		✓
302-2	Energy consumption outside of the organization	Primary energy consumption	34-35		✓
302-3	Energy intensity	Final and primary energy intensity	35-36		✓
302-4	Reduction of energy consumption	Monitoring the implementation of actions to combat climate change	16-20		✓
		Green Bond	23		✓
302-5	Energy consumption within the organization	Energy consumption in the rail transport system within infrastructures managed by Adif-Alta Velocidad	183-185		✓
		Traction energy consumption per Transport Unit	189		✓

GRI 303	**Water and Effluents**				
303-1	Interactions with water as a shared resource	Water consumption	51		✓ ✓
303-2	Management of water discharge-related impacts	Discharging	65-66		✓
303-3	Water withdrawal			Water consumption mainly comes from public water supply networks. In addition, there is relatively less consumption from well water. Currently, there is no methodology available to determine the amount of reused water distributed through the public networks from which it is supplied.	
303-4	Water discharge	Discharging Adif-Alta Velocidad operates in Spain where the discharge of wastewater is subject to specific legislation, which it strictly complies with	65-66		✓
303-5	Water consumption	Water consumption	51		✓
GRI 304	**Biodiversity**				
304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	Land use	83		✓
		Natural areas	84-85		✓
304-2	Significant impacts of activities, products and services on biodiversity	Natural areas	84-85		✓
		Environmental integration of projects	109-110		✓
		Environmental monitoring of the works	111-147		✓
		Notable actions taken during the construction of HSLs	89-107		✓

304-3	Habitats protected or restored	Natural areas	84-85		✓
		Notable actions taken during the construction of HSLs	89-107		✓
304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations			Information is not available, it will be included in future reports.	
GRI 305	**Emissions**				
305-1	Direct (Scope 1) GHG emissions	Carbon footprint	37-40		✓
		Air emissions from traction	190-192		✓
		GHG emissions per TU	193		✓
		GHG emissions compared to the transport sector	194-195		✓
305-2	Energy indirect (Scope 2) GHG emissions	Carbon footprint	37-40		✓
		Air emissions from traction	190-192		✓
		GHG emissions per TU	193		✓
		GHG emissions compared to the transport sector	194-195		✓
305-3	Other indirect (Scope 3) GHG emissions	Air emissions from traction	190-192		✓
		GHG emissions per TU	193		✓
		GHG emissions compared to the transport sector	194-195		✓
305-4	GHG emissions intensity	Carbon footprint	37-40		✓
305-5	Reduction of GHG emissions	Monitoring the implementation of actions to combat climate change	16-20		✓
		Green Bond	23		✓
305-6	Emissions of ozone-depleting substances (ODS)	Substances that deplete the ozone layer	49		✓
305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	Other air emissions	41-43		✓
		Air emissions from traction	190-192		✓
GRI 306	**Waste**				
306-1	Waste generation and significant waste-related impacts	Waste	52-53		✓
306-2	Management of significant waste-related impacts	Waste	52-53		✓
		Actions in the Circular Economy	54-62		✓

GRI 308	Supplier Environmental Assessment			
308-1	New suppliers that were screened using environmental criteria	Responsible purchasing	169-170	✓
308-2	Negative environmental impacts in the supply chain and actions taken	Responsible purchasing	169-170	✓
		Environmental integration of projects	109-110	✓
		Environmental monitoring of the works	111-147	✓
		Noise pollution	75-80	✓
		Fire prevention	86-88	✓
		Environmental risk management	180	✓
		Management of environmental complaints about noise and vibrations	171-172	✓

(1) List of material environmental aspects identified for **Adif-Alta Velocidad**, which are specific to the organization and relevant to its stakeholders.

(2) In exceptional cases where it is not possible to provide certain required information:

(a) Identify any omitted information.

(b) Explain the reasons for omission, including:

- Why a particular indicator from the GRI Standards does not apply.
- Information subject to confidentiality restrictions.
- Specific legal prohibitions.
- Measures planned to obtain missing data and the expected timeframe if data were unavailable at the time of reporting.

(3) All items mentioned in this list have been externally verified by independent personnel. The verification statement can be found in the appendices to the Report.

Sector-specific environmental performance indicators (GRI indicators for the transport and logistics sector)

Content	Description	Pages	Remarks	External verification (1)
Aspect: Fleet composition				
LT2: Significant environmental impacts of transportation of products, goods, and materials used in the organization's activities, as well as transporting personnel	Not applicable			
Aspect: Policy				
LT3: Description of policies and programmes on the management of environmental impacts, including: 1. Initiatives on sustainable transportation (e.g. hybrid vehicles); 2. Modal shift; and 3. Route planning	Company's environmental strategy	5-9		✓
	Plan to Combat Climate Change (PCCC)	19-22		✓
Aspect: Energy efficiency				
LT4: Description of initiatives to use renewable energy sources and to increase the energy efficiency.	Not applicable			
Aspect: Urban air pollution				
LT5: Description of initiatives to control urban air emissions in relation to road transport (e.g., use of alternative fuels, frequency of vehicle maintenance, driving styles, etc.).	Plan to Combat Climate Change (PCCC)	13-20		✓
	Green Bonds	23		✓
Aspect: Congestion				
LT6: Description of policies and programmes implemented to manage the impacts of traffic congestion (e.g., promoting off-peak distribution, percentage of delivery by modes of alternative transportation, etc.).	Framework collaboration agreement between Renfe Operadora and **Adif-Alta Velocidad** on environmental management and the promotion of sustainable mobility	27		✓
Aspect: Noise and vibration				
LT7: Description of policies and programmes for noise management/abatement	Noise pollution	75-80		✓
Aspect: Transport infrastructure development				
LT8: Description of the environmental impacts of the reporting organization transportation infrastructure assets and real estate that are subject to definition of financial control of the reporting organisation.	Environmental processes management	178-179		✓
	Environmental integration of projects	109-110		✓
	Environmental monitoring of the works	111-147		✓

	Notable actions taken during the construction of HSLs	89-107	✓

Indicators specified in: Global Reporting Initiative (GRI), (2021). GRI Logistics and Transportation Sector Supplement. Pilot Version 1.0 May 2006.

(1) All contents mentioned in this list have been externally verified by independent personnel. The verification statement can be found in the appendices to the Report.

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LIST OF SOURCES USED

Adif and Adif-Alta Velocidad data	Statute of Adif-Alta Velocidad
	Royal Decree-Law 15/2013, of 13 December, on the restructuring of the public business entity 'Administrador de Infraestructuras Ferroviarias' (Adif) and other urgent economic measures (BOE No. 299, 14 December 2013).
	Network Declaration 2014 to 2024
	Strategic Plan 2030
	Adif Code of Ethics and Conduct
	Environment Policy (2024)
	Addendum to the Management Agreement between Administrador de Infraestructuras Ferroviarias (Adif) and Adif-Alta Velocidad
	General Procedure for Managing and Coordinating Environmental Activities. ADIF-PG-109-001-001
	Adif 2005 to 2012 Environmental Reports
	Adif and Adif-Alta Velocidad 2013 Environmental Report
	Adif 2014 to 2023 Environmental Report
	Adif-Alta Velocidad 2018 Sustainability Report
	Adif Management Report for the Financial Years 2019, 2021, 2022, 2023 and 2024
	Royal Decree 1044/2013, of 27 December, approving the Statute of the Public Business Entity Adif-Alta Velocidad (BOE No. 311, 28 December 2013
	Adif, Corporate Financial and Management Control Department, Corporate Treasury and Accounting Department, Administration and Services Division
	Adif, Corporate Passenger Stations Department
	Adif, Corporate Traffic and Capacity Management Department, Coordination and Management Sub-Department
	Adif, Corporate Conservation and Maintenance Department, Maintenance Sub-Department
	Adif, Corporate Conservation and Maintenance Department, Technical Sub-Department, Operations and Stores Department
	Adif, Corporate Conservation and Maintenance Department, Technical Sub-Department, Corporate Resources Sub-Department
	Adif, Corporate Safety, Processes, and Corporate Systems Department, Quality and Environment Area
	Adif, Corporate Department of Finance and Management Control, Economic Management and Financing Department, Accounting and Financial Information Sub-Department
	Adif, Rail Area Management, Infrastructure and Rail Deputy Sub-Department, Technical Sub-Department.
	Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department
	Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department
	Adif, Legal Advisory Department, Corporate Litigation Sub-Department
	Adif, Corporate Finance and Management Control Department, Corporate Treasury and Accounting Department
RENFE Operato	Energy and traffic data
Transport sector data	Ministry of Transport and Sustainable Mobility. Yearbook. Year 2014 to 2020
	Law 38/2015 of 29 September on the railway sector (BOE No. 234, 30 September 2015)
	Royal Decree 61/2006, which sets out the specifications for petrol, diesel, fuel oil, and liquefied petroleum gases, and regulates the use of certain biofuels (BOE no. 41, 17 February 2006). Modified by: RD 1027/2006, RD 1088/2011, RD 1361/2011 and RD 290/2015
	EC Delft Handbook on the external costs of transport (2020)
	Observatorio del Ferrocarril en España, OTLE (Observatory of the Spanish Railway), 2025
Energy data	Red Eléctrica. Spanish Electricity System Data, 2025
	Ministry for the Ecological Transition and the Demographic Challenge, State Secretariat for Energy. Energy Balance of Spain 1990- 2023 (2024)

Emissions data	EEA (2023). EMEP/EEA air pollutant emission inventory guidebook 2023.
	IPCC Guide on National Greenhouse Gas Inventories (2006 and 2021 update)
	Ministry for the Ecological Transition and the Demographic Challenge. Inventory of Greenhouse Gas Emissions in Spain. 2024 Edition (1990-2022). March 2025
	Ministry for the Ecological Transition and the Demographic Challenge. National Inventory of Emissions of Pollutants into the Atmosphere 1990-2023
	Ministry for the Ecological Transition and the Demographic Challenge. Reports on the implementation of Law 1/2005 of 9 March 2005, which regulates the greenhouse gas emission allowance trading scheme.
Unit conversion	International Energy Agency / Natural Gas
Other sources	AENOR
	INE *Instituto Nacional de Estadística* (Spanish National Statistics Institute) Baseline data on water consumption, waste generation, and population
	IDAE *Instituto para la Diversificación y Ahorro de Energía* (Spanish Institute for the Diversification and Saving of Energy)
	Comisión Nacional del Mercado de Valores (Spanish National Securities Market Commission)

GLOSSARY

Adif	Administrador de Infraestructuras Ferroviarias
AEMET	Spanish Meteorological Office
AENOR	Spanish Association for Standardisation and Certification
AFA	Auxiliary Facilities Area
AHEV	Areas of High Environmental Value
AQO	Acoustic Quality Objectives
AVE	Alta Velocidad Española (high-speed rail service)
Benchmarking	It consists of taking comparators of products, services and work processes belonging to organisations, which demonstrate good practice in an area of interest, with the aim of transferring knowledge of good practices and their application
BOE	*Boletín Oficial del Estado* (Official State Gazette
CA	Contact Airline
CCCMP	Climate Change Combat Master Plan
CDW	Construction and Demolition Waste
CEDEX	Centro de Estudios y Experimentación de Obras Públicas
CER	Community of European Railway
CFC	Chlorofluorocarbons
CH_4	Methane
CN	Conventional Network
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2eq	Carbon dioxide equivalent. This measures Carbon Footprint in tonnes
CSIC	Spanish National Research Council
CSR	Corporate Social Responsibility
DNSH	Do Not Significant Harm
EGPs	Eligible Green Projects
EIA	Environmental Impact Assessment
EIM	European Rail Infraestructure Managers
EIS	Environmental Impact Statements
EMS	Environmental Management System
ESM	Environmental Site Manager
ESS	Environmental Site Supervisors
FNEE	*Fondo Nacional de Eficiencia Energética* (Spanish National Energy Efficiency Fund)
Forética	Spanish leading organisation in sustainability and corporate social responsibility
GBP	Green Bonds Principles
GDP	Gross Domestic Product
GHGs	Greenhouse Gases Those which contribute to global warming and, thus, to climate change
GoO	Renewable Guarantees of Origin
GRI	Global Reporting Initiative International. Agreement to design and establish a global framework for reporting on sustainability issues
GWh	Gigawatt hour (10^6 kWh)
GWheq	Gigawatt hour equivalent. A way of expressing electrical power in gigawatts (GW) so that all types of power stations (nuclear, thermal, renewable) can be compared in terms of useful electricity generated.
ha	hectare (10.000 m^2)
HCFC	Hydrochlorofluorocarbons
HSL	High Speed Line
ICMA	International Capital Market Association
IDAE	*Instituto para la Diversificación y Ahorro de la Energía* (Institute for Energy Diversification and Saving)
ISO 14001	UNE-EN-ISO 14001) International standard on environmental management systems
ITU	Intermodal Transport Unit

Kg	kilograms (10^3 gramos)
kJ	kilojoules (10^3 julios)
KPI	Key Performance Indicator
kt	kiloton
kWh	kilowatt-hour
l	Litres
LER	*Lista Europea de Residuos* (European Waste List)
Lnight	Equivalent continuous weighted equivalent sound pressure level, determined in the night period. It is measured in decibels, determined over a time interval. Definition given in Royal-Decree 1367/2007
m^2	square metres
m^3	cubic metres
MITERD	Ministry for Ecological Transition and the Demographic Challenge
MJ	Megajoules (10^6 julios)
N2000	Natura 2000
N_2O	Nitrous oxide
NAP	Noise Action Plans
NMVOC	Non-methane volatile organic compounds
NO_x	Nitrogen oxide
PCB	Polychlorinated biphenyls
PCCC	Plan to Combat Climate Change
PCR	Pre-Construction Report
PHD	Public Hydraulic Domain
pk	kilometre point
PKM	Passengers per kilometre. Unit of measurement of passenger traffic corresponding to the transport of one passenger over a distance of one kilometre
PM_{10}	Fine particulate matter that are 10 microns or less
$PM_{2,5}$	Fine particulate matter that are 2.5 microns or less
PNA	Protected Natural Areas
PRIME	Platform of Rail Infrastructure Managers in Europe
QRA	Quantitative Risk Analysis
RE	Red Eléctrica
Renfe	*Red Nacional de los Ferrocarriles Españoles* (National Network of Spanish Railways)
RFIG	*Red Ferroviaria de Interés General* (General Interest Railway Network
SDG	Sustainable Development Goals
SMU	Strategic Map Units
SNM	Strategic Noise Maps
SO_x	Sulphur oxides
SP2030	Strategic Plan 2030
SPA	Special Protection Areas
t	Tonnes
TKM	Tonne per kilometre. Unit of measurement of freight transport which represents the transport of one tonne of goods over a distance of one kilometre
toe	Tonne of oil equivalent
TSP	Total suspended particles
TU	Transport Unit Functional unit taken as a relative value to express quantitative data. Corresponds to the sum of TKM and PKM
UIC	*International Union of Railways* (Unión Internacional de Ferrocarriles)
UOT	Uses Other than Traction
WSC	Waste Storage Centre

Consulnima
Consultoría e Ingeniería Ambiental

Verification Statement

ADIF-ALTA VELOCIDAD 2024 Environmental Report

CONSULNIMA, Environmental Consulting and Engineering, has been engaged by ADIF-ALTA VELOCIDAD, with the knowledge of its Management, to conduct an independent verification of the traceability of the data included in the ADIF-ALTA VELOCIDAD 2024 Environmental Report. This Report has been prepared in accordance with the Sustainability Reporting Standards of the Global Reporting Initiative (GRI), as set out in the GRI Standards, applicable to environmental performance, and the sector-specific supplement 'Logistics and Transportation Sector Supplement Pilot Version 1.0' (2006), as detailed in Chapter 11 'About this Report' of the ADIF-ALTA VELOCIDAD 2024 Environmental Report.

The scope outlined by ADIF-ALTA VELOCIDAD for the preparation of the ADIF-ALTA VELOCIDAD 2024 Environmental Report is defined in Chapter 11, 'About this Report', under section 'Scope', of the aforementioned Report.

The preparation of the ADIF-ALTA VELOCIDAD 2024 Environmental Report, along with its content, is the responsibility of ADIF-ALTA VELOCIDAD's Management, which is also responsible for defining, adapting, and maintaining the management and internal control systems from which the information is derived.

CONSULNIMA has conducted an independent verification of the ADIF-ALTA VELOCIDAD 2024 Environmental Report by implementing audit protocols that enable relevant conclusions to be drawn regarding the traceability of the published data. To this end:

- Direct interviews were conducted with the organisation's personnel, and both internal and public documentation was reviewed as required.
- Documentary evidence supporting the data was cross-checked against the underlying documentation.
- The handling of the information, including calculations, transformations, and graphs, was verified.
- Sample-based analytical techniques were applied to those indicators that required this approach due to their importance and relevance.
- The structure and content of the sustainability indicators were reviewed for appropriateness in line with the latest available version of the GRI Standards, applicable to environmental performance, and the sector-specific supplement 'Logistics and Transportation Sector Supplement Pilot Version 1.0' (2006).

These procedures were applied to the sustainability indicators listed in the 'GRI Content Index', which is located in the 'Appendices' of the aforementioned Report.

The work was carried out by a team of sustainability specialists with extensive experience in reviewing such information.

Based on the verification process undertaken and the conclusions drawn, the Verification Statement is issued, summarising the results of the process.

Conclusion

During the verification process, no indications or evidence of significant deviations or omissions were found. Therefore, we confirm the accuracy of the information contained in the ADIF-ALTA VELOCIDAD 2024 Environmental Report.

Detailed information about this process is provided in the Verification Report, which is available to interested parties at the address provided in Chapter 11, 'About this Report', under section 'Access to Information', of the ADIF-ALTA VELOCIDAD Environmental Report 2024.

Madrid, 1st of August 2025

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