2023

ENVIRONMENTAL REPORT

adif

2023 ENVIRONMENTAL REPORT INDEX

APPENDICES

1. BRIEF INTRODUCTION OF THE COMPANY

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The public business entity Administrador de Infraestructuras Ferroviarias (hereinafter Adif) is a public body accountable to the Ministry of Transport and Sustainable Mobility and plays a key role in driving the railway sector, which has lead the railway to become the means of transport par excellence and has facilitated access to the infrastructure under equal conditions.

Pursuant to Art. 23 of the Railway Act (Law 38/2015[1]) and as laid down in the Royal Decree 2395/2004[2] of 30 December2004, approving the Statute of Adif thereunder, the following functions - among others - correspond to Adif:

- 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 exploitation of the assets owned, assigned or entrusted to it.
- 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.

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, 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's main lines of action

In recent years, Adif 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.

From this point of view, a strategy based on Corporate Responsibility and oriented towards Sustainable Development has been designed and deployed. It focuses on the safety of the railway system, on the development and management of a network capable of providing a reliable, integrated and competitive railway service, and on sustainability as a way of ensuring its companies financial viability and the generation of positive impacts, and of improving its ESG performance (environmental, social and corporate governance). The aim is to achieve

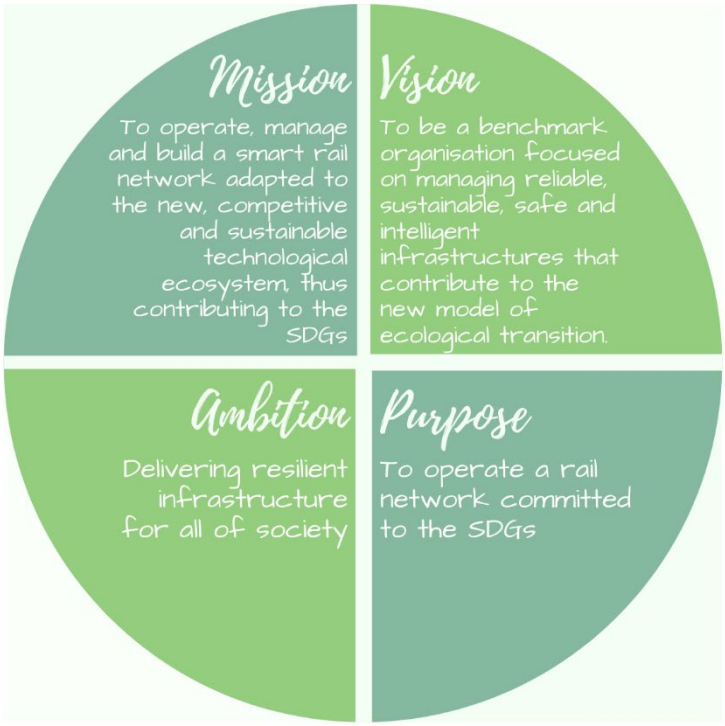
[1] Law 38/2015 of 29 September 2015 on the Rail Sector (BOE No. 234 of 30 September 2015) and its amendments.

[2] Royal Decree 2395/2004 of 30 December 2004 approving the Statute of Adif (BOE No. 315 of 31 December 2004).

maximum effectiveness and efficiency in the management of public resources.

Adif aims to contribute to specific sustainable development goals in accordance with the United 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 upholds the Entity's Vision and Mission.



It is important to point out that Adif does not have the competences to provide rail transport services, neither passenger nor freight, except for those inherent to its own activity.

Adif is constituted as a separate entity segregated from Adif-Alta Velocidad under Royal Decree-Law 15/2013 [3]. This Royal Decree led to the creation of Adif-Alta Velocidad and the modification of the purpose of the former Adif. It also provides for the possibility of entrusting Adif and Adif-Alta Velocidad - by signing the appropriate agreement - to carry out certain activities, which should provide for the financial compensation corresponding to each of the entities for the provision of the services entrusted. These include the management of traffic control systems and infrastructure capacity, maintenance, public safety and security, and corporate functions, such as environmental management.

[3] 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. COMPANY'S ENVIRONMENTAL STRATEGY

2- COMPANY'S ENVIRONMENTAL STRATEGY

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In 2019, a process of reviewing and updating the business strategy was carried out through the formulation of the 2030 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 and Sustainable Mobility, 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*

	2021	2022	2023
GHGs emissions reduction (t CO_{2eq})	7,250	7,591	11,675
Energy efficiency improvement (GWh equivalent)	52.86**	53.70	69.69

* Base year 2009.

** Data revised in relation to the Adif 2022 Environmental Report

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

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

The Code translates Adif'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'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, and it plays a key role regarding the technical and economic effort to modernise railway services from an environmental and service quality perspective.

Adif recognises 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, which was approved by the President of Adif and Adif-Alta Velocidad in 2019, is the highest-level document regarding Adif's commitment to environmental, in line with the Standard Procedure for the Management and Coordination of Environmental Activities (ADIF-PG-109-001-001-001).

Code of Ethics Commitments

1. Follow procedures and recommendations to reduce the environmental impact of activities.
2. Minimise the use of toxic, polluting, or hazardous materials by replacing them with safer alternatives.
3. Conserve energy and natural resources by using only what is necessary for work.
4. Reduce pollution by cutting down on waste, reusing, recycling, and protecting natural spaces.
5. Safeguard cultural heritage of historical value, particularly in relation to railway activities.
6. Share ideas and projects to improve work processes, focusing on environmental impact and cultural heritage, while raising awareness among colleagues.

Environmental Policy of Adif

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 we always 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. Achievethe 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.
4. 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 a sustainable public procurement.
5. Define internal procedures that guaranteeenvironmental protection and pollution prevention, during all operations phases of the life cycle ofrailway infrastructure and facilities, promoting the transition towards a circular economy that optimizes the use of resources.
6. Develop energy efficiency improvement plans that decrease energy consumption and reduce CO_2 emissions, both in construction, maintenance and operation of railway infrastructure and facilities.
7. Rationalize water consumption, as well as thegeneration of waste and wastewater, minimize the impact on soils, as well as recover those that have been contaminated, and adopt all technically and economically viable measures in order to reduce the impact from noise and vibrations.
8. Determine the environmental risk associated with threats and opportunities, delving especially into issues related to Resilience to Climate Change in all railway infrastructure and facilities.
9. Implement specific training and environmental awareness programs for operational, technical and managerial staff of all organizational units of Adif and Adif Alta Velocidad.
10. Promote commitment to the environment from Senior Management. Provide human, economic and material resources necessary to guarantee compliance with these commitments and to communicate publicly and regularly the results of their application for the sake of transparency.

*The president of Adif and Adif Alta Velocidad, February 2019

What is Expected from Adif?

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.

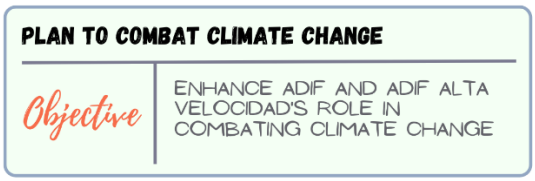
3. MAIN ACHIEVEMENTS

3- MAIN ACHIEVEMENTS

PLAN TO COMBAT CLIMATE CHANGE (PLCCC)

3-3

Adif and Adif-Alta Velocidad's PLCCC 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 means of transport which is environmentally friendly and which makes responsible use of resources.



The PLCCC 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. PLCCC replaces those.

The PLCCC 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:

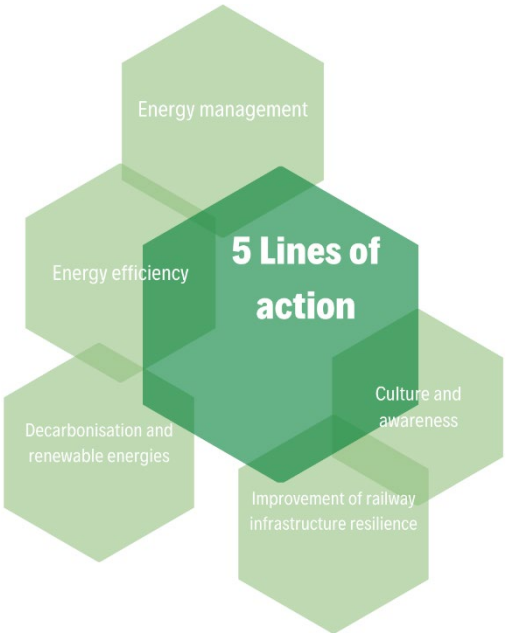


Figure 1. Lines of action of the PLCCC

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 PLCCC.

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

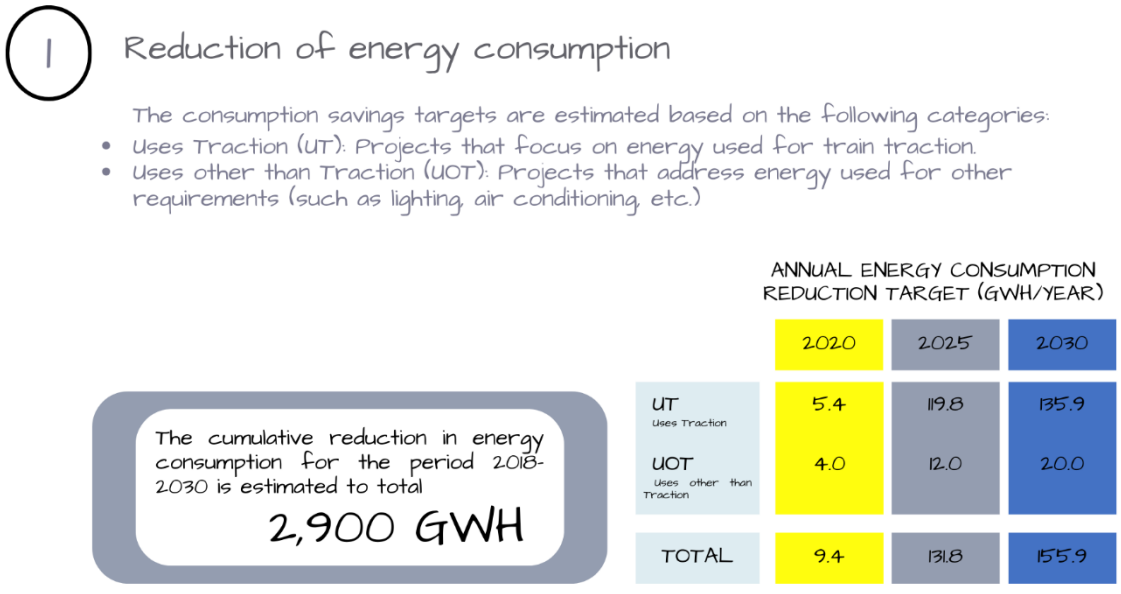
degree of implementation of the actions included in the PLCCC.

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 persued this objective since they joined the International Union of Railways (UIC) 2019 Climate Responsibility Pledge.

The PLCCC 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.

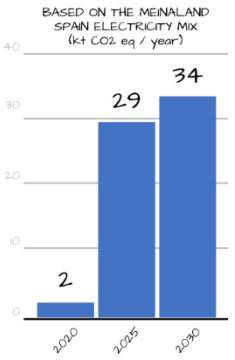
In addition, in 2022, ***a climate risk related to the adaptation of railway infrastructure to combat the adverse effects of climate change*** was identified and included in the Risk Map, both at Adif and Adif-Alta Velocidad level.

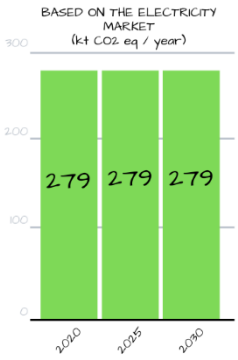
Adif and Adif-Alta Velocidad are preparing Adaptation Studies regarding the adverse effects of climate change of the entire railway network, through the implementation of a methodology developed to analyse the risk and adaptation to the effects of climate change in projects (internal standard NAG 4-0-0.0). In this methodology, a vulnerability analysis and a risk assessment are carried out for both the railway infrastructure components and the railway service. It identifies the impacts associated with different climate variables and their future projections. In this way, depending on the risks identified, measures of adaptation to be undertaken are proposed. These analyses are carried out with a triple time horizon: current time, in 30 years' time, and in 80 years' time.



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

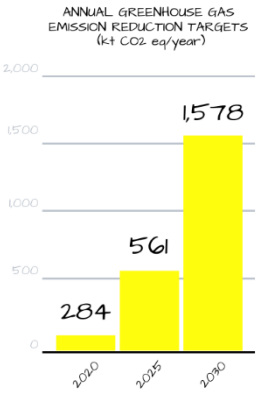
777 kt CO2 eq

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 PLCCC 2018-2030 (base year used for the quantification of targets: 2016).

Follow-up of the implementation of actions to combat climate change in Adif

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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 2023, a total of seven hundred and twenty 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 2023, within the framework of the successive energy saving and climate change plans, made it possible to avoid a total of 254,892 kt of CO_2 by 2023.

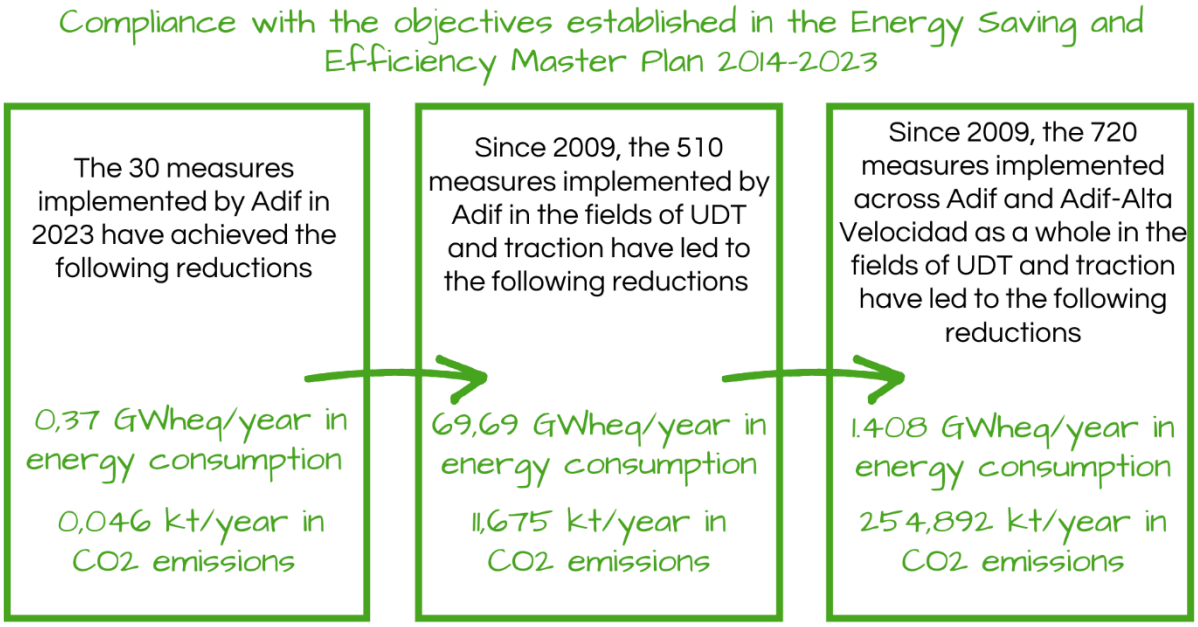


Figure 3. Reductions achieved with the implementation of actions to improve energy efficiency and to combat climate change in Adif and Adif-Alta Velocidad since 2009.

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.

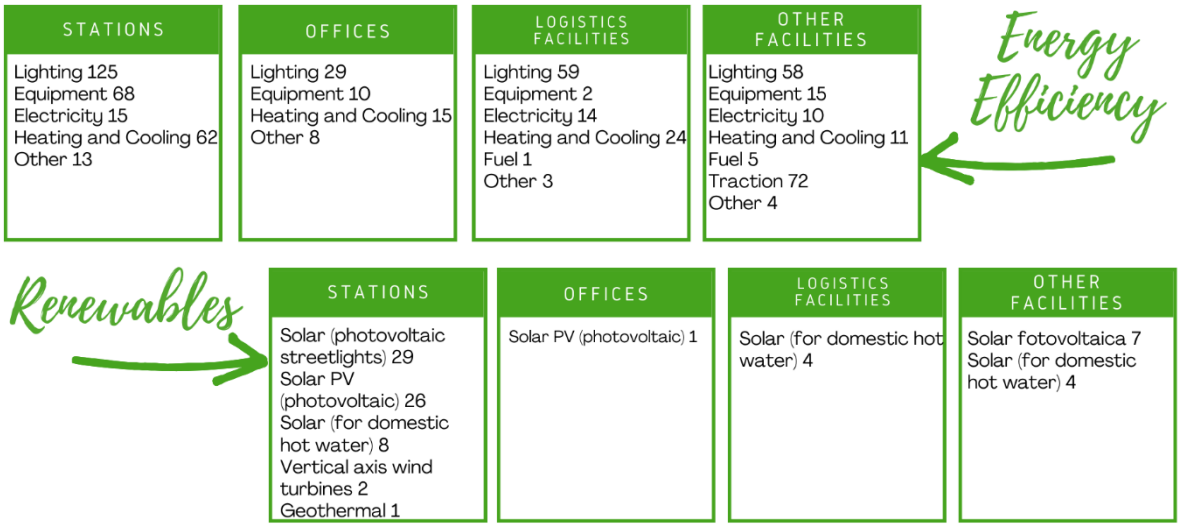


Figure 4. Actions carried out by 31 December 2023 within the framework of Adif and Adif-Alta Velocidad's Action Plan for Energy Saving-Efficiency and Renewable Energy Generation Systems.

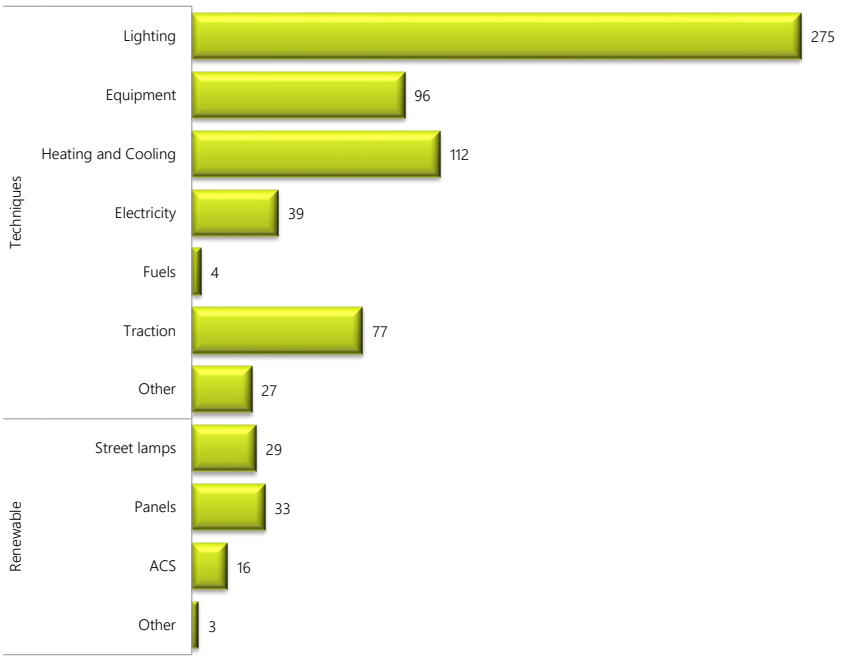
Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department, Environmental Sustainability and Fight against Climate Change Division

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

** Data for 2022 modified in relation to the 2022 Environmental Report.*

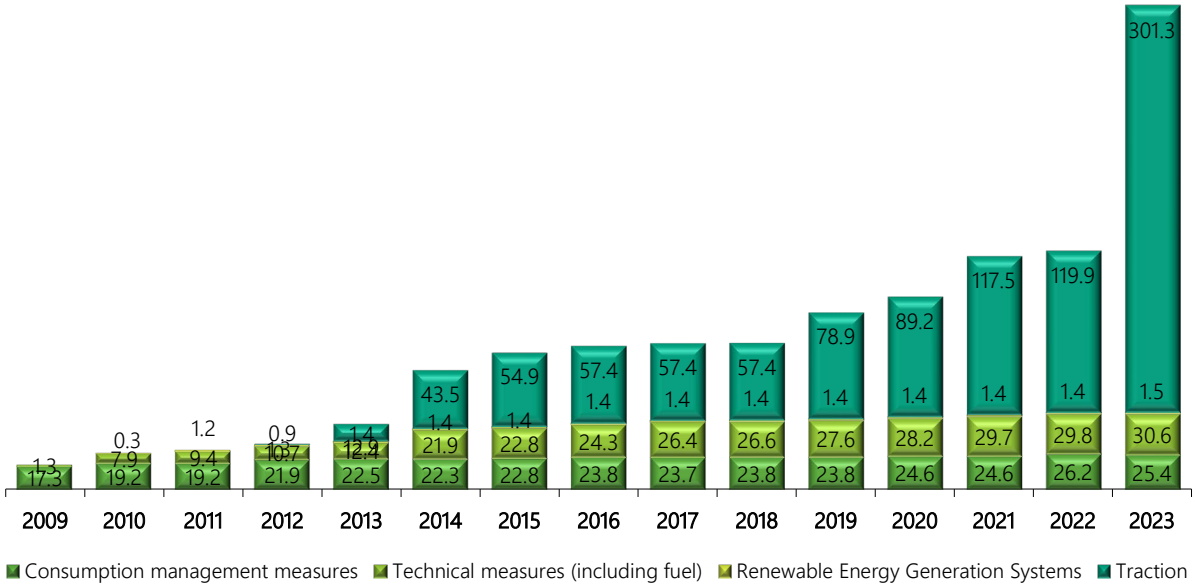
Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department, Environmental Sustainability and Fight against Climate Change Division

Chart 2. Energy saving and efficiency measures and renewable energy generation systems implemented between 2009-2023 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, Environmental Sustainability and Fight against Climate Change Division

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

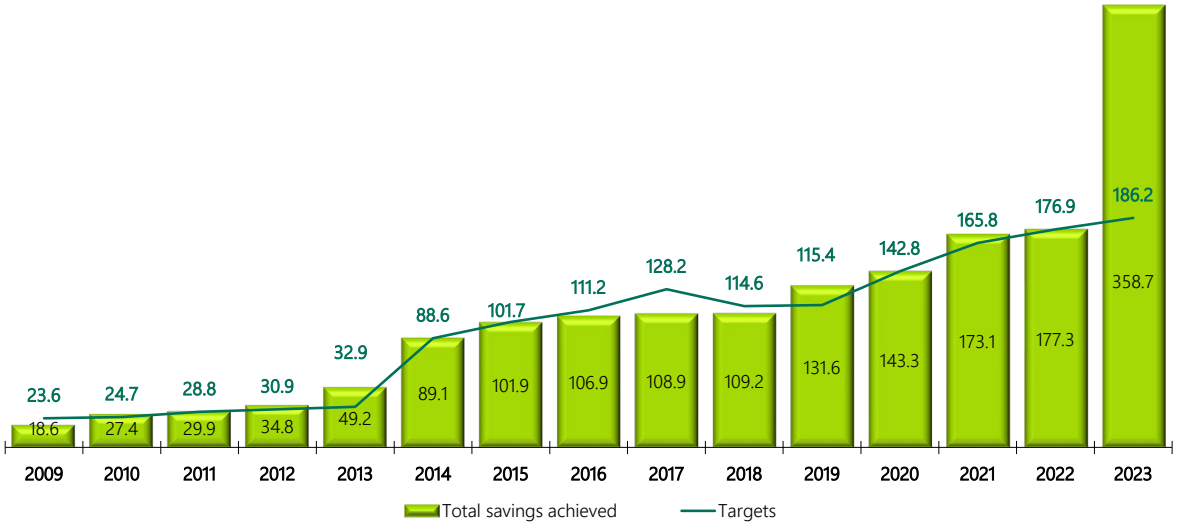


Management measures represent: fuel savings (fleet and generators renewal) and traction energy savings, as well as fleet management and electricity consumption management measures.

*** Data for 2009 and 2021 was modified in relation to the 2022 Environmental Report.*

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department, Environmental Sustainability and Fight against Climate Change Division

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)

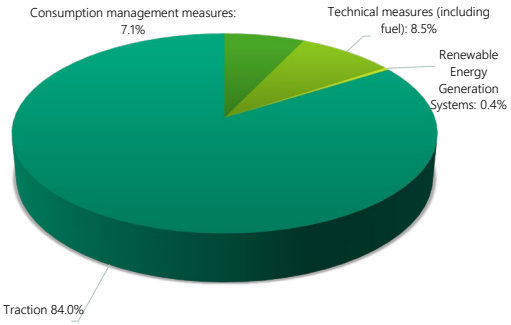


** Data for 2009 and 2021 was modified in relation to the 2022 Environmental Report.*

Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department, Environmental Sustainability and Fight against Climate Change Division

As of 31 December 2023, the main contribution of the different types of measures implemented to the annual savings in energy consumption achieved was due to traction measures (84.0%), followed by technical measures (8.5%), and consumption management measures (7.1%).

Chart 5. Percentages of annual savings in energy consumption achieved by the different types of measures implemented by 31 December 2023 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, Environmental Sustainability and Fight against Climate Change Division

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. Thirty-nine organisations participate in PRIME, including Adif.

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 punctuality, costs, resilience, sustainable development, environment, safety, etc.

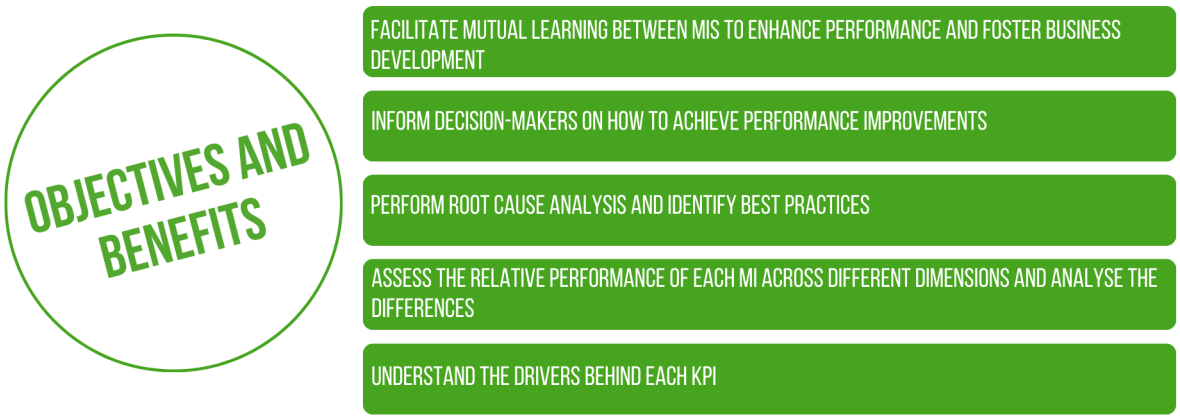


Figure 5. Objectives and benefits of PRIME.

The fourth benchmarking analysis is currently being prepared. For this purpose, 49 key performance indicators (KPIs) corresponding to different areas have been selected and their evolution between 2012 and 2019 has been analysed.

In the environment section, this fourth review focuses on two aspects:

- The influence of railway infrastructure managers on the effects and improvements of the environmental impact of railway.
- The direct environmental impact of its own activities.

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.

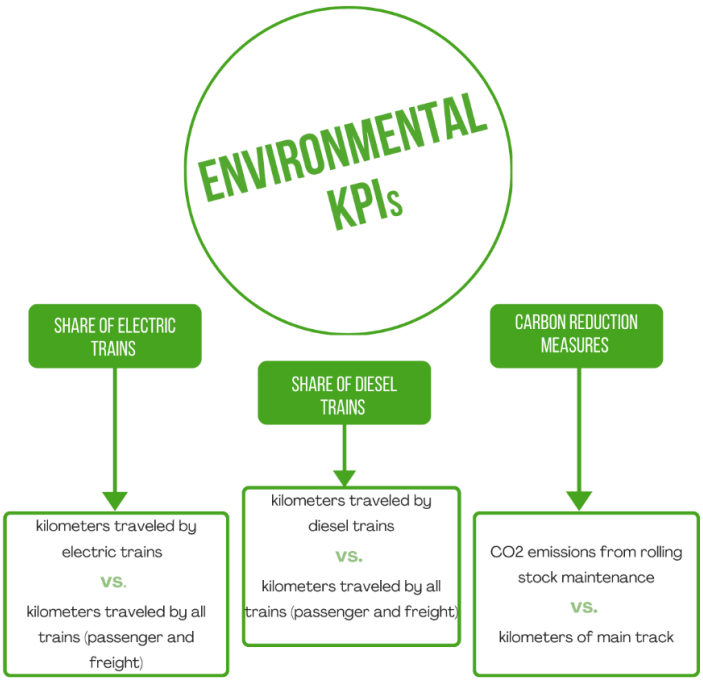


Figure 6. Selected environmental KPIs in the fourth PRIME benchmarking analysis (safety and environment pillar)

SUSTAINABLE DEVELOPMENT GOALS (SDGS) IN ADIF'S STRATEGY

Adif 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:

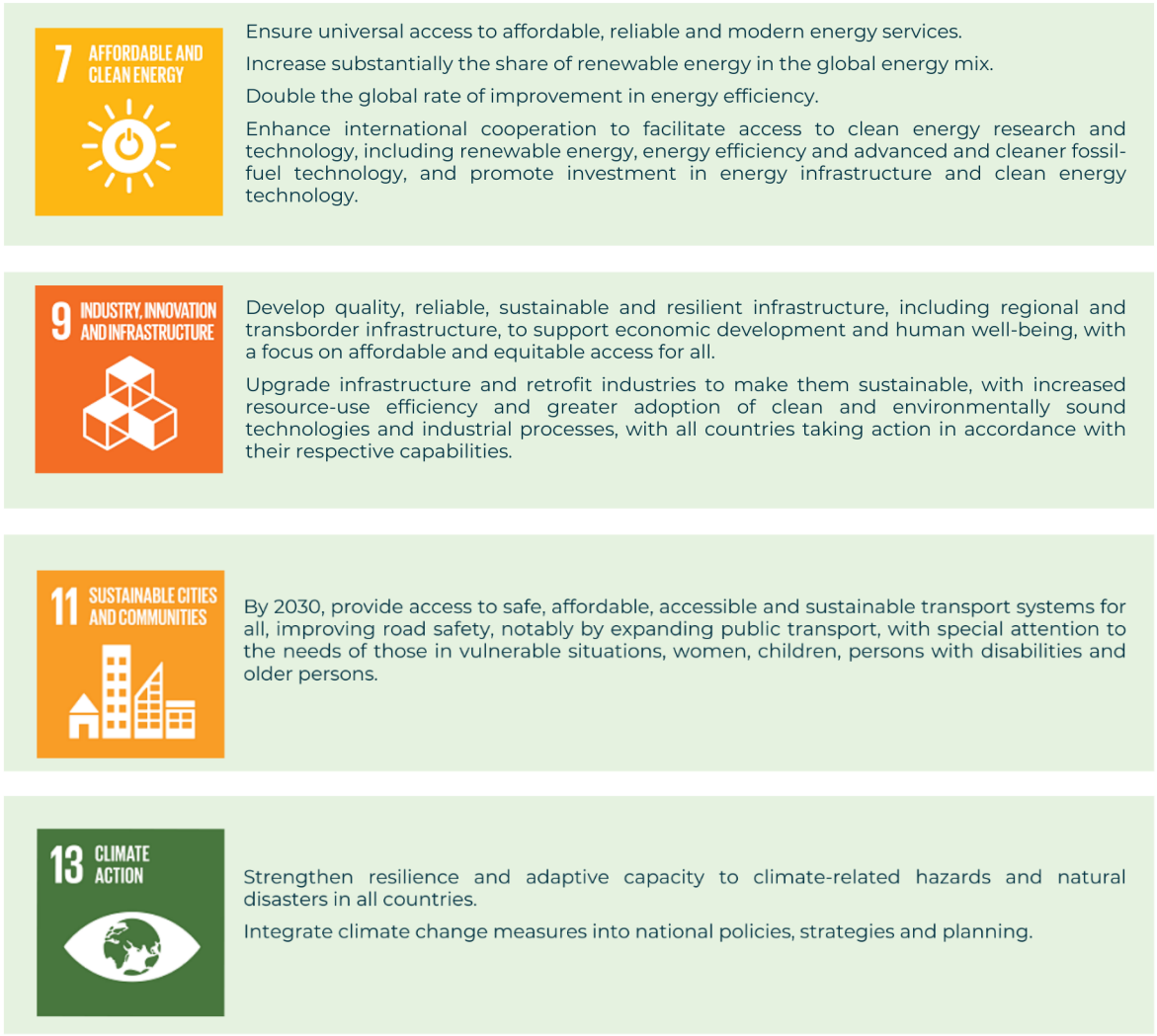


Figure 7. SDGs which are most impacted by the implementation of Adif's strategic initiatives

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

efficient management, and a positive impact on society across the 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.

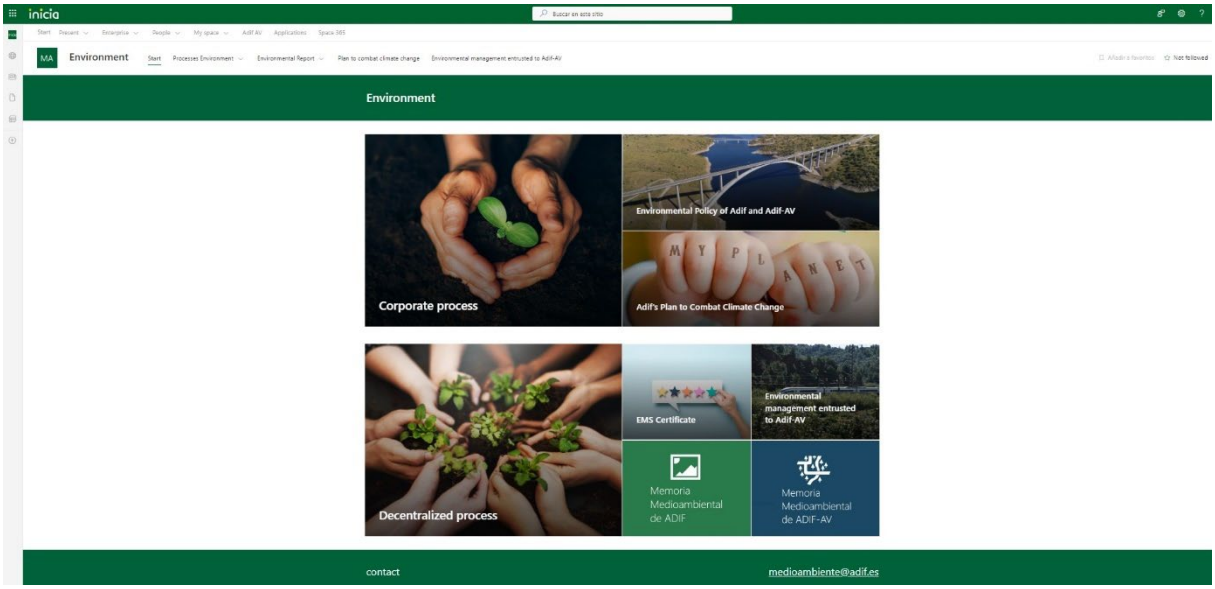
Adif and Adif-Alta Velocidad jointly obtained the highest score in three of the seven SDGs analysed: affordable and clean energy (SDG 7), sustainable cities and communities (SDG 11), and climate action (SDG 13).

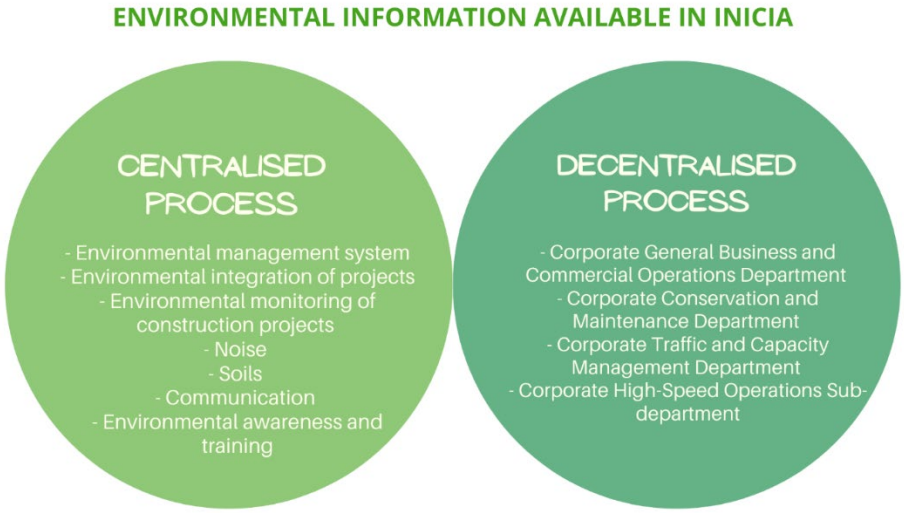
Adif and Adif-Alta Velocidad's performance reaches 74.00%, compared to an average sector performance of 42.38%

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.





FRAMEWORK COLLABORATION AGREEMENT BETWEEN RENFE OPERADORA AND ADIF 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.

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.
- To establish the objectives, define the terms and conditions of the Agreement, and coordinate and implement the resulting actions, a Joint Monitoring Committee has been set up.

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.

COLLABORATIONS, SPONSORSHIPS AND PARTICIPATION IN ENVIRONMENTAL WORKING GROUPS

In the period 2005-2023 Adif has sponsored the following events:

- The 8th, 9th, 10th, 12th, 13th and 14th editions of the Spanish National Environmental Congress (CONAMA), held in Madrid in 2006, 2008, 2010, 2014, 2016 and 2018, respectively. In these editions, in addition to setting up a stand, it participated in different Technical Conferences, Working Groups, and Sessions.
- *V, VI, VII and VIII Foro Nacional sobre Gestión Ambiental y Sostenibilidad* (5th, 6th, 7th and 8th National Forum on Environmental Management and Sustainability), organised by the Spanish Environmental Auditors and Verifiers National Association (ANAVAM).
- *XXII Congreso Español de Ornitología "Aves y ser Humano, una relación variable"* (22nd Spanish Ornithological Congress, "Birds and Humans, a variable relationship"), organised in December 2014 by SEO/BirdLife.

Adif 's Corporate Environmental Sub-Department is participating in four working groups related to environmental issues:

Organised by the Spanish Association for Standardisation (UNE):

- Technical Committee for Standardisation on Climate Change (CTN 216/GT 2). This working group is directly connected to the European Climate Change Adaptation Strategy, which calls for revising technical standards for energy, transport, and building/construction infrastructures to incorporate climate change adaptation requirements, as well as all relevant international ISO standards. Adif's participation in this group enables it to stay informed about the current status of these standards, the deadlines for each stage of their development, submit comments, and track the voting results from various countries involved in the approval process.
- Technical Committee for Standardisation on Circular Economy (CTN 323). This working group enables Adif to participate in and influence the standardisation aspects of the circular economy, including the development of guidelines, frameworks, guides, support tools, and horizontal requirements. The motivation behind the establishment of this working group stems from two main sources: the introduction of a new ISO standardisation area for developing universally applicable standards in the circular economy sector, and the formation of the Circular Economy Advisory Commission within UNE to coordinate essential actions in this domain.

Organised by the International Union of Railways (UIC):

- UIC REUSE working group - *Zero Waste Workshop* on materials reuse, circular economy, and zero waste. The objective of this working group is to provide a common platform in the railway sector to accelerate the transition to zero waste circularity by 2035.
- ERPC *Sustainable Procurement Working Group Meeting*, on sustainable public procurement. This working group aims to incorporate sustainable procurement throughout the supply chain, contributing to greater sustainability in the sector.

Since 2018, Adif has been a participating entity of the UN Global Compact, committed to complying with the Ten Principles of the Global Compact in the areas of Human

Rights, Labour Standards, Environment and Anti-Corruption.

Since 2019, Adif has been participating in the Sustainability and CSR Action Group for Public Enterprises, co-leading with ICO the collaborative platform for sustainability and CSR leadership in the public sector, coordinated by Forética. The aim is to advance corporate sustainability and contribute to achieving the 2030 Agenda.

It continues with the '*#apoyamoslosODS*' (#wesupporttheSDGs) campaign to disseminate the United Nations Sustainable Development Goals (SDGs) and has participated in the SDG Week, all in collaboration with the Spanish Global Compact Network, the driving force behind these initiatives.

It is worth highlighting that, since 2022, Adif-Alta Velocidad have collaborated in the Good Practices campaign launched by UN Global Compact Spain, participating in its internal and external dissemination through the Corporate Communication and Reputation Department.

4. ENERGY AND EMISSIONS

4- ENERGY AND EMISSIONS

ENERGY CONSUMPTION

Energy consumption in Adif's own activities

302-1

The primary energy consumption in Adif's operations consists of electrical energy sourced from the Peninsular Electricity System, which accounts for 72.4% of the total energy consumed in 2023. Diesel B usage (13.2%) is primarily for rail maintenance equipment, workshop shunting, auxiliary operations in terminals, and railway yards shunting.

According to the Fixed Assets Inventory, available from 31 December 2023, Adif has twenty-four (24) line diesel locomotives assigned to Infrastructure Maintenance, and one hundred and nine (109) shunting locomotives assigned to Logistics Services. It also has a rail vehicle (auscultation vehicle) for the metric gauge rail and another ultrasonic auscultation vehicle assigned to infrastructure maintenance.

In addition, other minor energy consumptions were recorded: diesel A and petrol in vehicle use (11.0%) and natural gas and diesel C in heating and domestic hot water generation (3.4%).

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

Type of energy	2017	2018	2019	2020	2021	2022	2023
Electrical power (kWh/year)	**123,715,809**	**108,120,336**	**107,076,365**	**99,084,342**	**101,872,982**	**101,884,023 ***	**98,746,196**
Uses Traction (UT)	14,393,740	3,617,969	3,555,696	154,842	121,101	293,117*	225,612
Uses Other than Traction (UOT)	109,322,069	104,502,367	103,520,669	98,929,500	101,751,881	101,590,906*	98,520,584
Diesel (l/year)	**6,042,259**	**6,147,271**	**6,963,874**	**4,785,760**	**4,641,973**	**3,795,659**	**3,226,989**
Diesel A Automotive	1,684,567	1,657,348	2,875,310	1,423,010	1,495,439	1,295,417	1,324,086
Diesel B Rail Maintenance	1,295,810	1,123,612	915,047	767,158	724,880	525,898	476,468
Diesel B Garage shunting	0	0	2,164	5,175	70	0	30
Diesel B Ancillary Terminal Operations	228,740	188,899	155,370	115,369	112,289	86,172	77,186
Diesel B Railway yards shunting	2,592,222	2,607,759	2,478,096	2,100,527	1,870,490	1,575,797	1,272,774
Diesel C Heating	240,920	569,653	537,887	374,521	438,805	312,375	76,445
Petrol (l/year)	**16,949**	**22,559**	**69,652**	**50,786**	**62,572**	**193,246**	**215,046**
Autogas (l/year)	**463**	**31**	**0**	**44**	**98**	**55**	**180**
Natural Gas (m^3/year)	**416,605***	**303,289***	**487,151***	**309,751***	**438,486**	**508,148**	**365,306**
Compressed natural gas (l/year)	**0**	**0**	**0**	**124**	**799**	**1,230**	**1,265**

** Data revised in relation to the 2022 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 in the year 2023 (% of total amount of energy consumed)

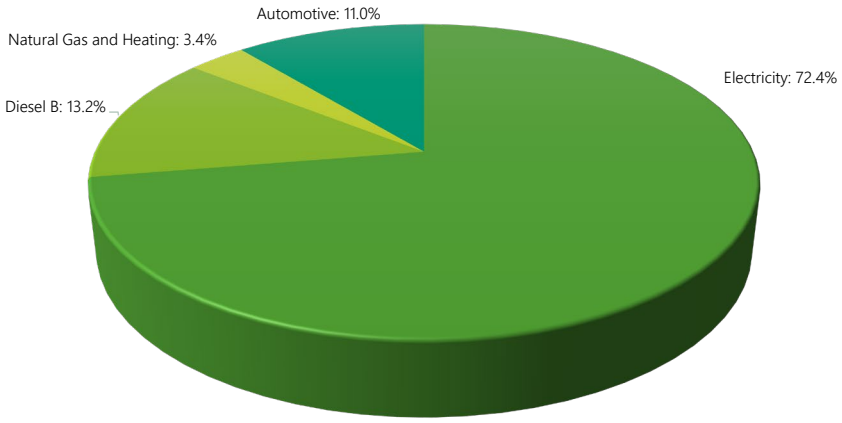


Table 3. Energy and fuel consumption recorded in our own activities (TJ/year)

Type of energy	2017	2018	2019	2020	2021	2022	2023
Electrical Power (TJ/year)	**445.38**	**389.23**	**385.47**	**356.70**	**366.74**	**366.78**	**355.49**
Uses Traction (UT)	51.82	13.02	12.80	0.56	0.44	1.06	0.81
Uses Other than Traction (UOT)	393.56	376.21	372.67	356.15	366.31	365.73	354.67
Diesel fuel (TJ/year)	**214.80**	**218.54**	**247.57**	**170.13**	**165.02**	**134.94**	**114.72**
Diesel A Automotive	59.89	58.92	102.22	50.59	53.16	46.05	47.07
Diesel B Rail Maintenance	46.07	39.94	32.53	27.27	25.77	18.70	16.94
Diesel B Garage shunting	0.00	0.00	0.08	0.18	0.00	0.00	0.00
Diesel B Ancillary Terminal Operations	8.13	6.72	5.52	4.10	3.99	3.06	2.74
Diesel B Railway yards shunting	92.15	92.71	88.10	74.67	66.50	56.02	45.25
Diesel C Heating	8.56	20.25	19.12	13.31	15.60	11.10	2.72
Petrol (TJ/year)	**0.55**	**0.73**	**2.26**	**1.65**	**2.03**	**6.27**	**6.98**
Autogas (TJ/year)	**0.011**	**0.001**	**0.000**	**0.001**	**0.002**	**0.001**	**0.004**
Natural Gas (TJ/year)	**15.93**	**11.59**	**18.62**	**11.74**	**16.57**	**19.20**	**13.75**
Compressed natural gas (TJ/year)	**0**	**0**	**0**	**0.001**	**0.007**	**0.011**	**0.011**
Total	676.67	620.10	653.92	540.22	550.37	527.20	490.95

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

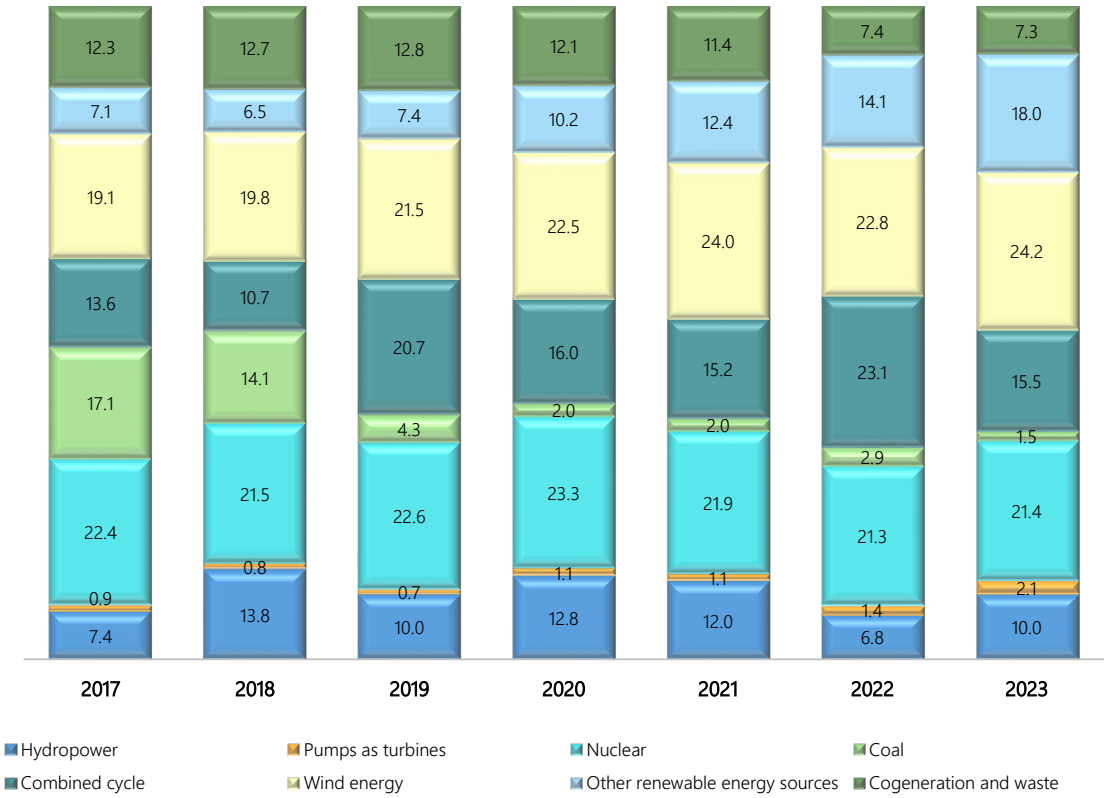
Origin of the energy in the Spanish Peninsular Electricity System

The electricity used is sourced from the Spanish Peninsular Electricity System, which in 2023 primarily derived from wind generation (24.2%), nuclear power (21.4%), other renewable sources (18.0%), combined cycle plants (15.5%), hydroelectric sources (10.0%), cogeneration and waste (7.3%).

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

! In 2023, hydro, wind and other renewable energy sources accounted for 52.2%, which is more than 30 percentage points higher than that of nuclear power.

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



** Data for 2022 was modified in relation to the 2022 Environmental Report*

Source: Red Eléctrica, Electricity System Data, 2024.

Primary energy consumption

302-2

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

In 2023, indirect primary energy consumed from non-renewable sources accounted for 694.63 TJ, compared to 147.17 TJ from renewable sources. These values are similar to those of the previous year.

It should be noted that, since 2019, Adif 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 2017-2023:

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

	2017	2018	2019	2020	2021	2022	2023
Coal	224.12	179.93	53.01	25.58	27.80	37.35	21.94
Natural gas and fuel oil	-	-	-	-	-	-	-
Combined cycle	178.25	136.54	255.18	204.62	211.44	294.27	225.49
Nuclear	293.58	274.36	278.60	297.98	304.04	272.02	311.50
Cogeneration and non-renewable waste	162.52	159.51	157.79	154.75	158.42	94.71	105.92
Pumps as turbines	11.80	10.21	8.63	14.07	14.91	18.35	29.78
Fossil resources	**870.27**	**760.56**	**753.22**	**697.00**	**716.62**	**716.69**	**694.63**
Hydropower	40.49	55.46	40.92	41.45	37.62	23.69	28.14
Wind energy	104.50	79.57	87.98	72.87	75.26	79.34	68.24
Solar energy (photovoltaic and thermal)	29.55	19.29	23.32	26.23	32.01	41.67	45.99
Other renewable energy sources	9.85	6.83	7.37	7.12	6.94	7.14	4.79
Renewable energy sources	**184.39**	**161.14**	**159.59**	**147.68**	**151.83**	**151.85**	**147.17**
Total	**1,054.65**	**921.70**	**912.80**	**844.67**	**868.45**	**868.54**	**841.80**

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
Total primary energy	1,285.94	1,152.57	1,181.25	1,028.20	1,052.08	1,028.96	977.26

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

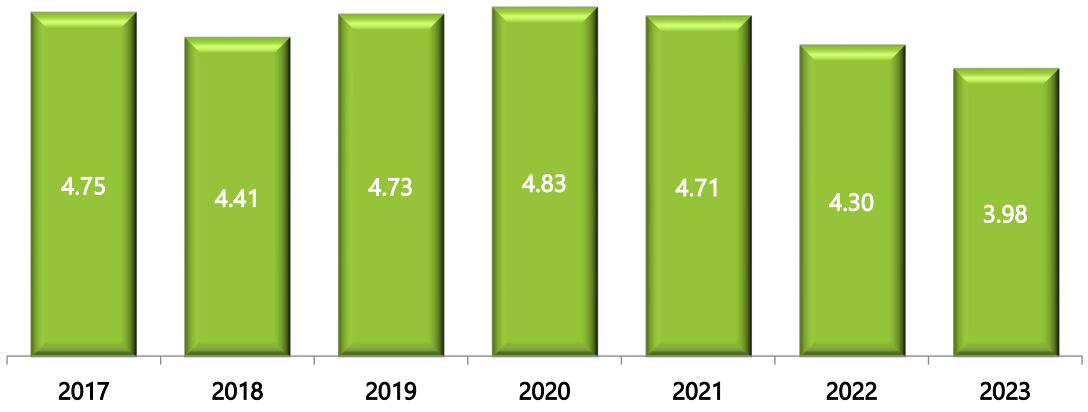
Final and primary energy intensity

302-3

The final and primary energy intensity – energy consumption (in MJ) per unit of production representing Adif'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.

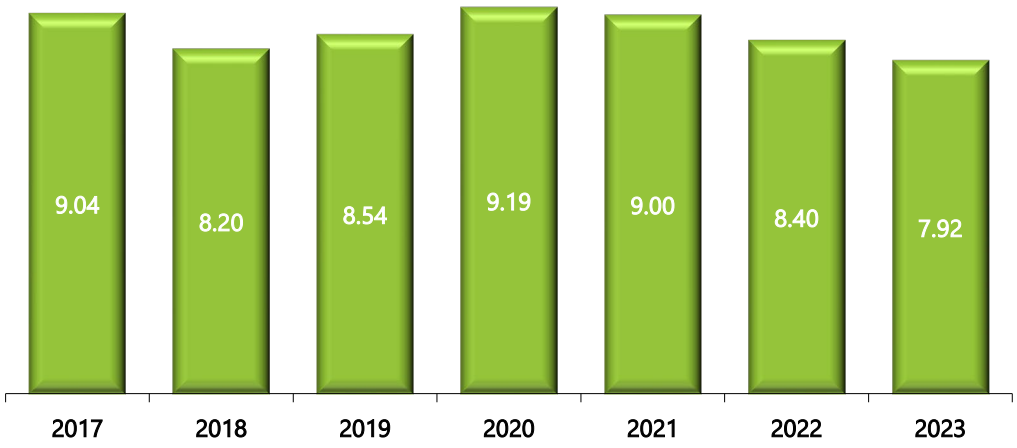
In 2023, Adif's final energy intensity was 3.98 MJ/train-km, which, despite a decrease (16.3%) compared to 2017, still reflects a very high energy dependency.

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



* Ratio between final energy consumption in Adif'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.

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

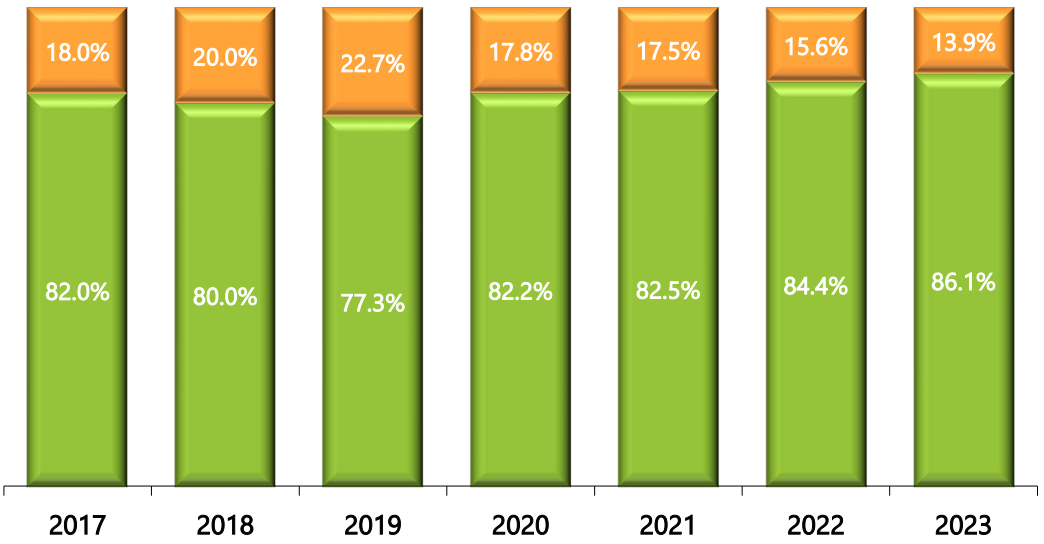


Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department.

! In 2023, Adif's primary energy intensity was 7.92 MJ per managed train-kilometre, a 5.7% reduction from the previous year. However, there is still a high dependence on energy consumption.

The primary energy intensity is significantly influenced by the contribution of renewable energies to the production of electricity in Spanish mainland electric system. In Adif, 86.1% of primary energy consumption is due to electricity consumption. Dependence on electricity has remained relatively constant from 2017 to 2023 (between 77.3% and 86.1%).

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



Source: 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'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:

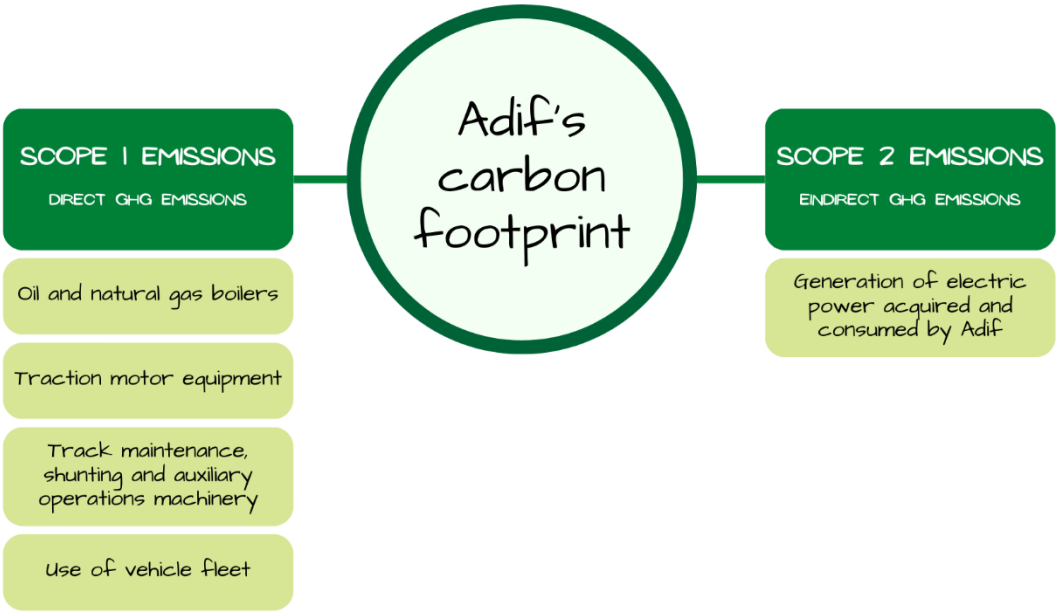


Figure 8. List of activities generating Scope 1 and 2 emissions.

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

Compound	2017	2018	2019	2020	2021	2022*	2023
Indirect emissions due to registered electricity consumption (Scope 2) (a)							
Carbon dioxide (CO_2)	31,918.68	23,627.54	18,202.98	-	-	-	-
Methane (CH_4)	2.39	2.46	2.50	-	-	-	-
Nitrous oxide (N_2O)	0.00	0.00	0.00	-	-	-	-
CO_2-equivalent (CO_{2eq})	31,985.60	23,696.48	18,272.92	12,246.82	12,021.01	14,569.42	9,874.62
Direct emissions from combustion plants (oil and natural gas boilers) (Scope 1) (b)							
Carbon dioxide (CO_2)	1,589.05	2,287.58	2,592.56	1,735.93	2,096.00	-	-
Methane (CH_4)	0.04	0.07	0.08	0.05	0.06	-	-
Nitrous oxide (N_2O)	0.01	0.01	0.01	0.01	0.01	-	-
CO_2-equivalent (CO_{2eq})	1,592.00	2,293.13	2,598.22	1,739.81	2,100.69	1,875.82	903.05
Direct emissions from rail maintenance, shunting and ancillary operations (Scope 1) (c)							
Carbon dioxide (CO_2)	10,375.04	9,879.13	8,947.71	7,530.41	7,273.12	-	-
Methane (CH_4)	0.61	0.58	0.52	0.44	0.40	-	-
Nitrous oxide (N_2O)	0.08	0.08	0.07	0.06	0.05	-	-
CO_2-equivalent (CO_{2eq})	10,413.85*	9,916.08	8,981.17	7,558.58	7,298.64	5,964.22	4,948.17
Direct emissions from vehicles used (Scope 1) (d)							
Carbon dioxide (CO_2)	4,282.06	4,225.70	7,397.62	3,696.67*	7,180.28	-	-
Methane (CH_4)	0.01	0.02	0.05	0.03	0.04	-	-
Nitrous oxide (N_2O)	0.12	0.12	0.22	0.11	0.12	-	-
CO_2-equivalent (CO_{2eq})	4,315.40*	4,258.85	7,456.95	3,727.00*	7,212.70	6,735.17	6,914.92
Total emissions from Adif's own activities							
Carbon dioxide (CO_2)	48,164.83	40,019.94	37,140.87	-	-	-	-
Methane (CH_4)	3.05	3.13	3.14	-	-	-	-
Nitrous oxide (N_2O)	0.21	0.22	0.30	-	-	-	-
CO_2-equivalent (CO_{2eq})	48,306.85*	40,164.55*	37,309.27	25,272.21*	28,633.05	29,144.63*	22,640.76
Scope 1 emissions							
CO_2-equivalent (CO_{2eq})	16,321.25*	16,468.07*	19,036.35	13,025.39*	16,612.04	14,575.21*	12,766.14
Scope 2 emissions							
CO_2-equivalent (CO_{2eq})	31,985.60	23,696.48	18,272.92	12,246.82	12,021.01	14,569.42	9,874.62

** Data revised in relation to the 2022 Environmental Report.*

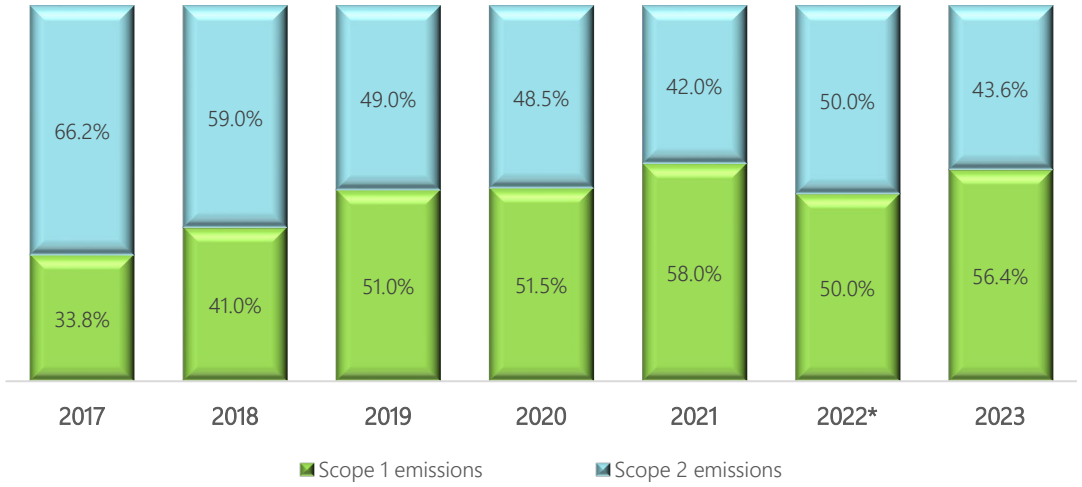
In calculating GHG emissions CO_2, CH_4 and N_2O, emissions have been considered, using the following equivalences: 1 for CO_2, 28 for CH4 and 265 for N2O. Equivalences used in the IPCC Fifth Assessment Report.

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

***!** Adif's Carbon Footprint decreased by over 22% in 2023 compared to the previous year.*

The decrease of the Carbon Footprint compared to 2022 is mostly due to the reduction of Scope 2 emissions.

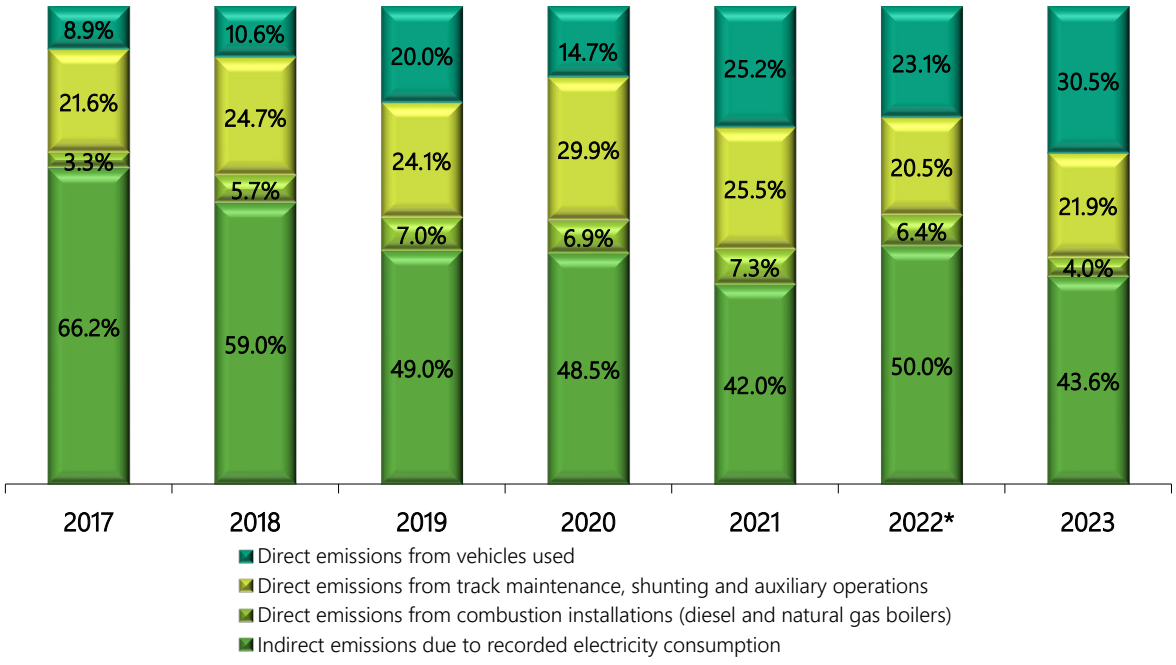
Chart 11. Scope 1 and 2 emissions of total GHG emissions (%)



** Data revised in relation to the 2022 Environmental Report.*

Within Scope 1, vehicle use, and rail maintenance, shunting, and auxiliary operations are the activities that generate the most direct GHG emissions.

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



** Data revised in relation to the 2022 Environmental Report.*

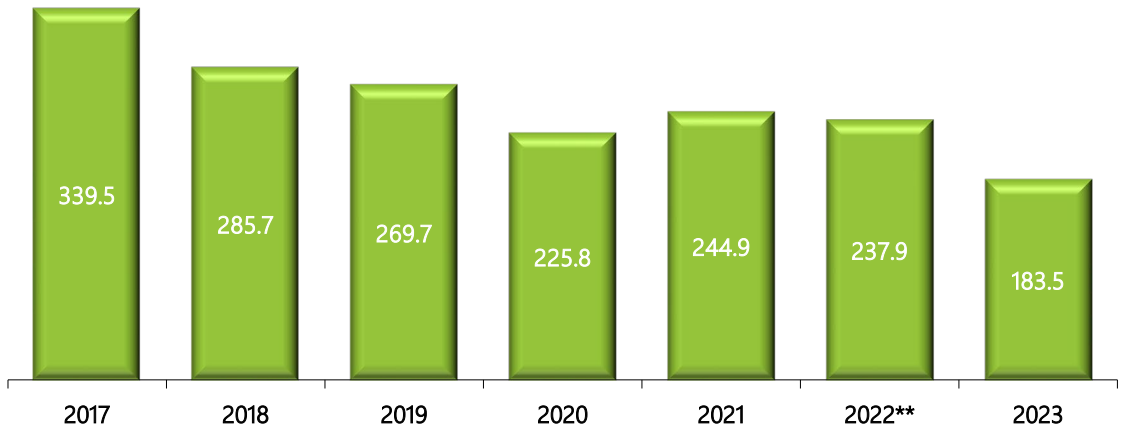
The intensity of GHG emissions (in t CO_{2eq}/million managed train-km) from our activities is an indicator that measures how dependent the company's growth is on GHG emissions. It also reflects the energy and environmental efficiency of the operations performed.

In the specific case of Adif's case, with GHG emissions from electricity consumption contributing 43.6%, this is also related to the reliance on fossil fuels in the generation structure of the mainland electricity sector.

! Between 2017 and 2023, Adif's GHG emissions intensity has been reduced by 46%.

This significant reduction is caused both by the entity's decrease in energy consumption, and by the greater contribution of renewable energies to the generation of electricity in the mainland system.

Chart 13. GHG emissions intensity* (t CO2-eq/million train-km managed)



-Ratio between total GHG emissions due to Adif's own activities (including indirect emissions due to recorded electricity consumption) and managed traffic train-km
*** Data revised in relation to the 2022 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 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's activities have the same sources as GHG emissions

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

Compound	2017	2018	2019	2020	2021	2022	2023
Indirect emissions due to registered electricity consumption (a)							
Carbon monoxide (CO)	15.59	12.08	9.45	9.68	10.52*	11.94*	8.40
Non-methane volatile organic compounds (NMVOCs)	2.33	2.04	2.07	2.17	2.48	2.41*	1.69
Nitrogen oxides NO_x (as NO_2)	54.70	36.12	28.72	21.31	20.70*	20.86*	14.68
Sulphur oxides SO_x (as SO_2)	41.93	26.86	11.92	5.05	3.63	3.73*	2.62
$PM_{2.5}$	2.08	1.48	1.16	1.12	1.20*	1.19*	0.84
PM_{10}	2.79	1.99	1.47	1.44	1.52*	1.50*	1.06
TSP	3.63	2.61	1.93	2.00	2.12	2.08*	1.46
Direct emissions from combustion plants (oil and natural gas boilers) (b)							
Carbon monoxide (CO) (f)	1.26	2.22	2.32	1.58	1.93	1.59	0.65
Non-methane volatile organic compounds (NMVOCs) (f)	0.54	0.67	0.81	0.54	0.69	0.66	0.37
Oxides of nitrogen NO_x (as NO_2) (f)	3.80	7.05	7.23	4.94	6.00	4.82	1.85
Sulphur oxides SO_x (as SO_2)	0.41	0.95	0.90	0.63	0.74	0.53	0.14
$PM_{2.5}$ (f)	0.17	0.37	0.36	0.25	0.29	0.21	0.06
PM_{10} (f)	0.19	0.43	0.42	0.29	0.34	0.25	0.07
TSP (f)	0.19	0.43	0.42	0.29	0.34	0.25	0.07
Direct emissions from rail maintenance, shunting, and auxiliary operations (c)							
Carbon monoxide (CO)	37.44	35.65	32.29	27.18	24.63	19.90	16.61
Non-methane volatile organic compounds (NMVOCs)	16.27	15.49	14.03	11.81	10.70	8.65	7.22
Nitrogen oxides NO_x (as NO_2)	183.36	174.61	158.15	133.10	120.60	97.45	81.35
Sulphur oxides SO_x (as SO_2)	0.07	0.07	0.06	0.05	0.05	0.04	0.03
$PM_{2.5}$	4.79	4.57	4.13	3.48	3.15	2.55	2.13
PM_{10}	5.04	4.80	4.35	3.66	3.31	2.68	2.24
TSP	5.32	5.06	4.59	3.86	3.50	2.83	2.36
Direct emissions from vehicles used (d)							
Carbon monoxide (CO)	12.93	13.69	28.91	17.06	19.49	40.37	44.23
Non-methane volatile organic compounds (NMVOCs)	2.27	2.32	4.47	2.45	2.71	4.40	4.76
Nitrogen oxides NO_x (as NO_2)	21.50	21.26	37.47	18.86	19.99	19.97	20.75
Sulphur oxides SO_x (as SO_2)	0.03	0.03	0.05	0.02	0.03	0.02	0.03
$PM_{2.5}$	1.88	1.85	3.21	1.59	1.67	1.45	1.48
PM_{10}	1.88	1.85	3.21	1.59	1.67	1.45	1.48
TSP	1.88	1.85	3.21	1.59	1.67	1.45	1.48
Total emissions from Adif's own activities							
Carbon monoxide (CO)	67.21	63.65	72.96	55.51*	56.57*	73.80*	69.90
Non-methane volatile organic compounds (NMVOCs)	21.41	20.53	21.38	16.97	16.59	16.12*	14.04
Nitrogen oxides NO_x (as NO_2)	263.36	239.05	231.57	178.21	167.30*	143.10*	118.62
Sulphur oxides SO_x (as SO_2)	42.44	27.91	12.93	5.75	4.43	4.32*	2.82
$PM_{2.5}$	8.92	8.27	8.87	6.44	6.32	5.40*	4.50
PM_{10}	9.90	9.07	9.44	6.98	6.85*	5.88*	4.84
TSP	11.02	9.96	10.15	7.73	7.62*	6.60*	5.37

* Reviewed data in relation to the 2022 Environmental Report.

(a) Estimated using recorded electricity consumption and air emissions data from generation facilities for the years 2005 to 2022, as provided by MITERD in 2024.

(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) Estimates 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 take into account the specifications of the different types of fuels.

In 2023, indirect emissions from generation plants, attributable to electricity consumption in Adif's own activities, were the main source of sulphur oxide emissions.

In 2023, direct emissions from rail maintenance, shunting, and auxiliary operations at Adif accounted for 51.4% of non-methane volatile organic compound emissions, 68.6% of nitrogen oxide emissions, and 47.2% of particulate emissions ($PM_{2.5}$). Direct emissions from the vehicles used were responsible for 63.3% of carbon monoxide emissions.

5. SUSTAINABLE USE OF RESOURCES AND CIRCULAR ECONOMY

5- SUSTAINABLE USE OF RESOURCES AND CIRCULAR ECONOMY

CONSUMPTION

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

Consumption of railway materials

3-3 | 301-1

The largest material consumption recorded at Adif comes from railway materials used in infrastructure maintenance, particularly sleepers, rails, and ballast.

Ballast, with a consumption of 955,317 t in 2023, represented 81.96% of the railway material consumed in infrastructure maintenance.

! The ballast is obtained from Adif-approved quarries with the relevant EIA and Restoration Plans

Next in importance, though significantly less, are concrete sleepers, with a consumption of 175,705 t, accounting for 15.07% of the total.

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

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Wooden sleepers										
Units	17,080	45,727	21,812	16,536	29,656	19,818	16,440	32,500	29,773	31,691
Total (t)	**999**	**2,675**	**1,276**	**967**	**1,735**	**1,159**	**962**	**2,600**	**1,742**	**1,854**
Concrete sleepers										
Bi-block (pieces)	4,193	4,439	9,379	165,830	166,264	659	1,377	5,550	220	0
Monoblock (pieces)	275,890	234,084	98,324			442,106	228,052	240,396	492,859	585,682
Total (Pieces)	280,083	238,523	107,703	165,830	166,264	442,765	229,429	245,946	493,079	585,682
Total (t)	**83,606**	**71,113**	**31,373**	**41,458**	**41,566**	**132,764**	**68,691**	**73,229**	**147,902**	**175,705**
Rail										
Rail 60 kg (m)	245,826	140,189	64,757	200,422	307,295	56,914	23,535	420,449	261,828	150,092
Rail 54 kg (m)	241,050	344,696	3,606,865			258,570	210,360	14,580	340,719	429,483
Rail 45 kg (m)	19,910	18,367	0			5,068	4,401		4,781	3,301
Total (m)	506,786	503,252	3,671,622	200,422	307,295	320,552	238,296	435,029	607,328	582,876
Total (t)	**28,894**	**28,141**	**201,447**	**10,622**	**16,287**	**17,815**	**13,135**	**26,046**	**34,640**	**32,707**
Silica ballast										
Silica ballast (m^3)	382,770	556,849	76,517	265,131	279,297	232,692	272,434	481,198	685,761	636,878
Total (t)	**593,294**	**863,116**	**118,602**	**742,367**	**782,032**	**360,672**	**422,273**	**721,797**	**1,028,642**	**955,317**
Total (t/year)	**706,792**	**965,045**	**352,698**	**795,414**	**841,620**	**512,410**	**505,061**	**823,671**	**1,212,925**	**1,165,583**

* Data revised in relation to the 2022 Environmental Report.

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.

Chart 14. Distribution of material consumption in infrastructure maintenance activities. Year 2023 (%)

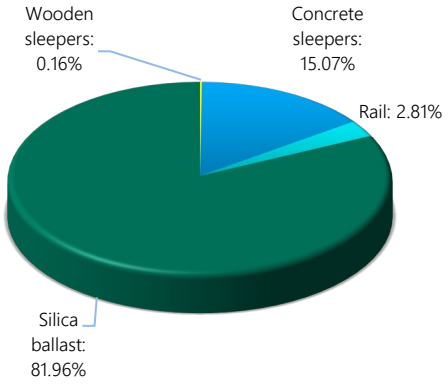


Table 9. Consumption of railway equipment during the construction of new railway lines

	2020	2021	2022	2023
Rail (t)	5,741*	228	4,923	4,887
Monoblock sleepers (units)	38,570	52,946	4,482	41,673
Bi-block sleepers (units)	4,094	7,115	1,497	30,504
Ballast (t)	0*	95,651*	25,500	133,864
Total (t) (a)	**18,131**	**113,186**	**32,067**	**157,354**

(a) Estimated assuming monoblock concrete sleepers with an average weight of 300 kg and bi-block concrete sleepers with an average weight of 200 kg.

** Data revised in relation to the 2022 Environmental Report.*

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

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

Consumption of hazardous substances

PCBs

Polychlorinated biphenyls (PCBs) are synthetic chlorinated substances used as dielectric oil in transformers, capacitors, and other electrical equipment, and they can also be found in plastic cable coatings.

No equipment containing PCBs was withdrawn in 2023. By the end of this year, **Adif** had 33,950 t of equipment that, according to current legislation, can continue to be used until the end of its useful life or until regulations change.

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 has inventoried a total of eleven (11) pieces of equipment in the stations managed by the Sub-Department of Passenger Stations.

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 these 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 2023*

Sub-Department of Passenger Stations	Stations	Equipment containing HCFCs (no.)	HCFC load (kg)
North-west	4	6	10.65
West	-	-	-
North	3	5	25.90
North-east	-	-	-
East	-	-	-
Centre	-	-	-
South-west	-	-	-
South	-	-	-
Total	**7**	**11**	**36.55**

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

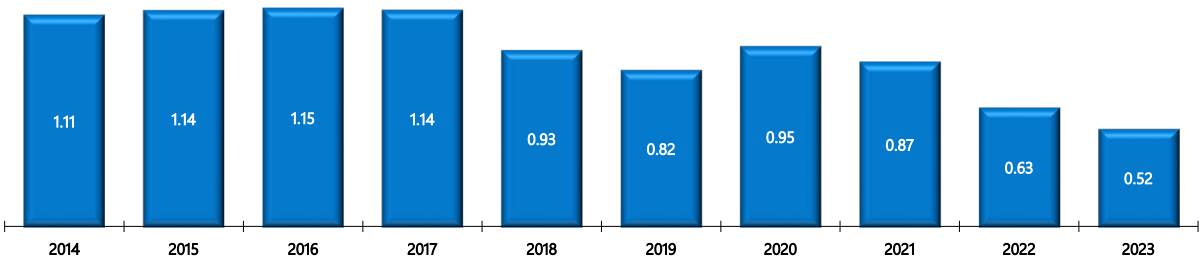
Source: Adif, Corporate Department of Safety, Processes, and Corporate Systems, Quality and Environment Area.

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.

Herbicide consumption per unit of surface area treated Adif railway surfaces has decreased by more than 17% 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, Technical Department, Sub-department of Resources; Adif, Corporate Conservation and Maintenance Department, Maintenance Department

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

Type of surface	2014*	2015	2016	2017	2018	2019	2020	2021**	2022	2023
Track treatments	184,963,667	199,751,200	60,196,500	193,350,000	216,930,000	213,278,014	199,284,679	279,534,100	160,540,686	174,830,706
Station and other surface treatments	26,470,184	65,066,298	100,955,416	101,203,577	113,085,756	94,475,878	92,851,040		112,894,670	158,555,193
Total	**211,433,851**	**264,817,498**	**161,151,916**	**294,553,577**	**330,015,756**	**307,753,892**	**292,135,719**	**279,534,100**	**273,435,356**	**333,385,899**

* These data only include the areas treated by the herbicide applicator in that year (SINTRA).

** No disaggregated information is available for the year 2021.

Source: Adif, Corporate Conservation and Maintenance Department, Technical Department, Sub-department of Resources; Adif, Corporate Conservation and Maintenance Department, Maintenance Department.

Table 12. Products used in herbicide treatments of railway surfaces

Product type	2014*	2015	2016	2017	2018	2019	2020	2021**	2022	2023
Liquid products (l)	234,517	299,736	184,390	330,567	304,385	246,327	269,828	242,595	168,765	166,981
Solid products (kg)	796	1,548	818	4,580	1,972	7,479	7,553		3,036	5,202
Total (l+kg)	**235,313**	**301,284**	**185,208**	**335,147**	**306,357**	**253,805**	**277,381**	**242,595**	**171,801**	**172,183**

* These data only include the areas treated by the herbicide applicator in that year (SINTRA).

** No disaggregated information is available for the year 2021.

Source: Adif, Adif, Corporate Conservation and Maintenance Department, Technical Department, Sub-department of Resources; Adif, Corporate Conservation and Maintenance Department, Maintenance Department.

Water consumption

303-1 | 303-5

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

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

In 2023, **Adif**´s annual water consumption from public networks was equivalent to the amount used in one year by the households of a town with 199 residents, similar to Torrejón de la Calzada (Madrid).

Adif´s annual water consumption accounts for 0.07% 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's own activities *

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Consumption water (m^3)	1,066,840	1,146,713	919,773	1,006,082	1,013,427	879,207	758,671	652,084	630,371	493,736

* Calculated from turnover and based on the average water prices in Spain from the INE (National Statistics Institute) series 2000-2014, 2016, 2018 and 2020. For the years 2015, 2017, 2019, 2021, 2022 and 2023 the average prices of 1.81, 1.96, 2.11, 2.25, 2.33 and 2.40 €/m^3 have been estimated based on the trend of the series 2000-2014, 2016, 2018 and 2020.

Source: Adif, Corporate Department of Finance and Management Control, 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

The public business entity Adif promotes the construction of new railway infrastructure and manages the maintenance of existing infrastructure throughout the mainland Spain. This includes work at passenger stations and logistics centres to support both passenger and freight traffic.

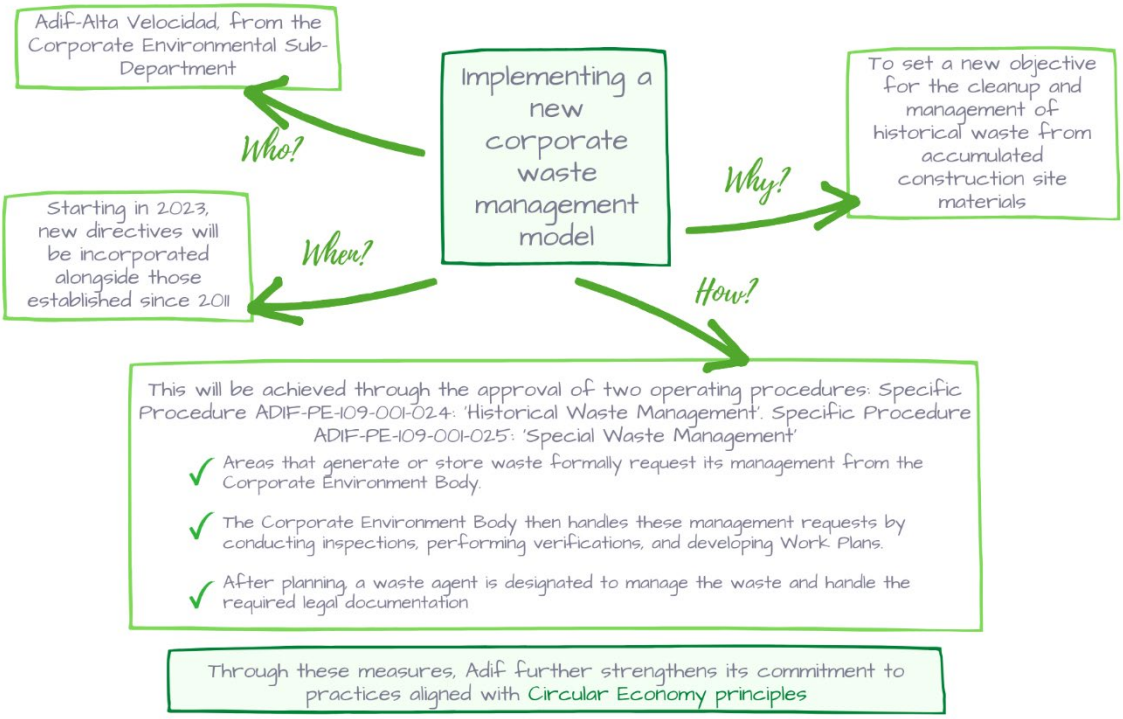
These activities generate a wide and variety of waste, including urban and domestic waste, commercial and industrial waste, and hazardous waste according to current legislation.

In line with Circular Economy principles, 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. Based on these internal procedures, in 2023, Adif has carried out disposal operations to third parties for the reuse of approximately 900 tonnes of concrete sleepers, 16 tonnes of rail, 4.7 tonnes of rail posts and about 30,000 units of railway components (including plates, clips, lag bolts, and washers).

New construction projects, along with works and maintenance activities that generate construction and demolition waste (CDW), are generally carried out by external contractors. According to specific regulations, this type of waste must be removed from the place of origin by these contractors. To ensure proper management, compliance with the environmental clauses included in the contracts is monitored.

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 from these activities is produced and managed by Adif.

Since 1 January 2011, the entity has been using a corporate hazardous waste management system designed to optimise the handling of this type of waste. This model centralises hazardous waste management within the Sub-department for the Environment, which is responsible for contracting authorised managers and transporters, coordinating collection activities, and handling the documentation required by the autonomous communities.



Alternatively, especially in the area of road infrastructure maintenance and renovation, a variety of surplus materials have traditionally been generated. The entity has effectively managed these materials as items suitable for reuse. However, Adif is currently undertaking a review of its processes to transition towards a circular economy and achieve more efficient and sustainable resources use in the railway sector. In this context, a detailed analysis has been conducted to distinguish between railway materials that are still suitable for reuse under current conditions and those that can no longer be reused within railway operations. The materials will be managed as waste in accordance with Law 7/2022 of 8 April on Waste and Contaminated Soil for a Circular Economy, as well as complementary and implementing legislation.

To address this situation effectively, from 2023, Adif's corporate waste management model has been expanded by the Corporate Environmental Sub-Department to include new directives through a Waste Agent. This extension enables the handling and management of historical waste with the help of authorised waste managers. These corporate directives also encompass waste generated from Adif's own activities such as rail and station cleaning, emptying and conditioning of warehouses, equipment renewal across the railway network, and removal of spillages from third parties. This new waste management model also aims to prevent unnecessary stockpiling and to 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.

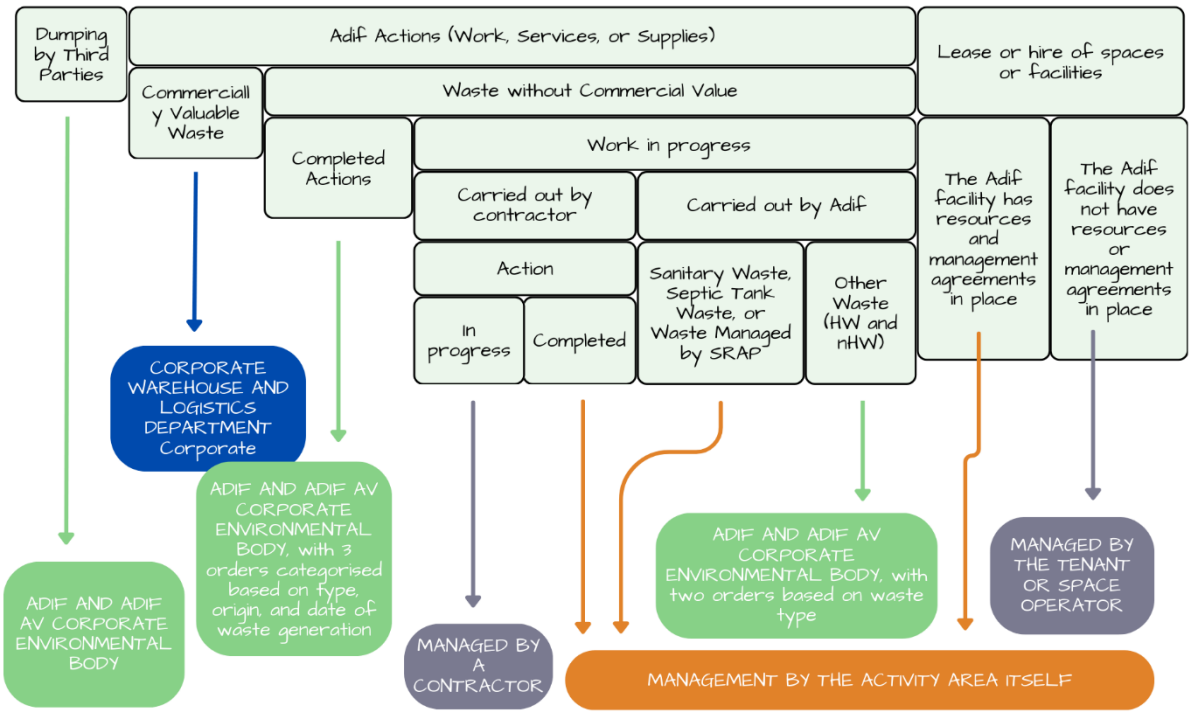
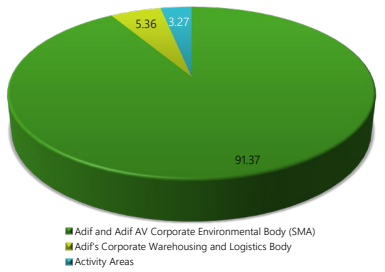


Figure 9. Internal waste management processes at Adif

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

Chart 16. Percentage of Total Tonnes Treated by Each Internal Waste Management Route at Adif. Year 2023



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

In 2023, Adif managed a total of 35,642.47 tonnes of waste, more than 91% of which was handled through corporate directives from the Corporate Environmental Sub-Department. Just over 4% of this total figure is hazardous waste (1,476.25 tonnes), while the remaining 96% is non-hazardous waste (34,166.22 tonnes). In terms of final destination, 99.6% of the total waste managed underwent final recovery treatment, with 98.1% of hazardous waste and 99.7% for non-hazardous waste.

In 2023, the management of concrete sleepers was predominant, accounting for 85.8% of the total waste. This was followed by metal waste from de-installations at 6.2% and wooden sleepers at 3.6%. These materials, along with third-party waste management, which accounts for 3.3% by weight, make up nearly 99% of the total waste managed by Adif in 2023.

Integration of the Waste Management Activity into the Management System

To regulate roles and responsibilities for managing the waste produced and to comply with the requirements, usage rules, and maintenance of the WSCs, the following procedures have been approved as of 2019 within the management system framework:

- General Procedure ADIF-PG-109-001-022 "Waste Management in **Adif** and Adif-Alta Velocidad"
- Specific Procedure ADIF-PE-109-001-022 "Centralised management of PR in **Adif** and Adif-Alta Velocidad".
- Technical Instruction ADIF-IT-109-001-021 "Use and maintenance of **Adif** and Adif-High Speed WSCs".
- Specific Procedure ADIF-PE-109-001-024 "Historic Waste Management"
- Specific Procedure ADIF-PE-109-001-025 "Special Waste Management"
- Specific Procedure ADIF-PE-109-001-026 "Management of waste with expected net commercial revenue".
- Specific Procedure ADIF-PE-504-003-001 "Disposal of railway products in warehouse".

In compliance with requirements outlined in section 8.1. Under the 'Planning and Operational Control requirements of the ISO 14001:2015 standard, the framework procedures regulating waste production and management at **Adif** and Adif-Alta Velocidad have been updated and revised since 2019. These procedures have been incorporated into the environmental section of the **Adif** and Adif-Alta Velocidad Management System, with the inclusion of those related to management of Historic and Special Waste in 2023.

Environmental Corporate Sub-department of **Adif** and Adif-AV, advisory body on waste management

The Environmental Corporate Sub-department also serves as an advisory body for **Adif** and Adif-AV on hazardous waste management. During 2023, 208 queries from the Activity Areas were addressed regarding characterisation, identification, and coding of waste, as well as the necessary storage conditions and documentation procedures for waste production and management. Additionally, work is done to provide information on relevant environmental legislation, including preparing reports on the applicability of new regulations affecting the activities of **Adif** and Adif-AV.

Management of waste produced by **Adif** in its own activities

Hazardous waste

The source of hazardous waste production at **Adif** comes from the maintenance and operation of railway infrastructures.

Centralised coordination from the Corporate Environment Body of **Adif** and Adif-Alta Velocidad

Under this model, in 2023, actions were undertaken involving the coordination of at least 14 management companies across mainland Spain, with the support of a Waste Agent. Waste management involved the processing of 174 new treatment contracts with waste managers and handling 884 documents related to shipments between the two entities.

While most hazardous waste management is handled through the corporate model, it is important to note that the Activity Areas also manage waste in a decentralised manner,

coordinating waste collection with final waste managers for certain types of waste.

In 2023, 90.71% of hazardous waste was managed through the corporate model, while the remaining 9.29% was handled in a decentralised manner by the Activity Areas.

Hazardous Waste Production and Management

Hazardous waste generated by Adif is stored in Waste Storage Centres (WSCs). As of 31 December 2023, there are a total of 56 centres on mainland Spain, from which waste is collected by authorised local waste managers who primarily carry out recycling and recovery treatments.

The WSCs are designed based on the actual waste generation needs at each location, with consistent technical specifications for use and maintenance. This ensures legal compliance for the storage of hazardous waste and proper execution of management tasks.

Figure 10. Waste Storage Centre (WSC) in Zaragoza

Each Hazardous Waste Storage Centre is managed by a person from the Activity Areas that generate waste, who coordinates constantly with the Environmental Corporate Sub-department. The WSCs are owned and maintained by the Activity Area.

A minimum of two hazardous waste removals per year carried out from the WSCs, in addition to any additional removals necessary for the proper operational maintenance of the WSCs. Hazardous waste produced sporadically at other locations on the railway network, which cannot be stored in the WSCs, is also removed.

In the case of hazardous waste produced by third parties at Adif or Adif-AV facilities, appropriate monitoring is conducted to ensure proper environmental management in accordance with the required environmental clauses, as well as the procedures and instructions in force.

In 2023, 133.8 tonnes of hazardous waste were generated as a result of Adif's activities, marking a 21.55% increase compared to previous year.

The amount of hazardous waste generated by Adif's own activities in 2023 represents just 0.047% of the total hazardous waste generated by the Services Sector in Spain in 2021*

* Latest available data. Statistics on waste generation in the services and construction sector. Year 2021. INE (2023)

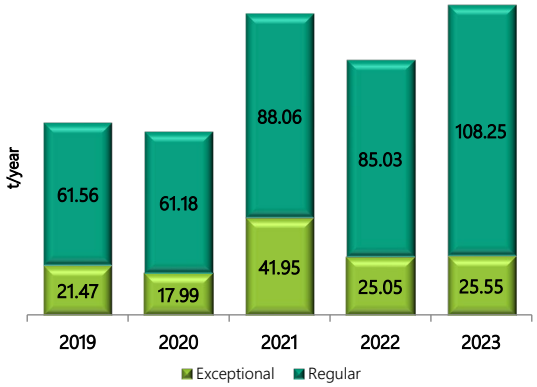
It is important to distinguish between waste generation from regular, routine activities and waste resulting from exceptional actions or the extraordinary maintenance or replacement of equipment, which occurs on an infrequent or periodic basis. Based on this, a distinction is made between regular hazardous waste production and exceptional production. In 2023, a total of 108.24 t was generated from normal activity (80.9%) and 25.55 t from exceptional production (19.1%).

Additionally, most of the hazardous waste (88.57%) was managed by the WSCs.

The following graph compares the production of hazardous waste at Adif over the last five years, distinguishing between waste generated from

normal activities and that from exceptional actions. In 2023, the exceptional production of hazardous waste aligns with historical norms, while the usual production has increased by 27.3% compared to 2022 levels.

Chart 17. Historical regular and exceptional waste generation production (t/year)

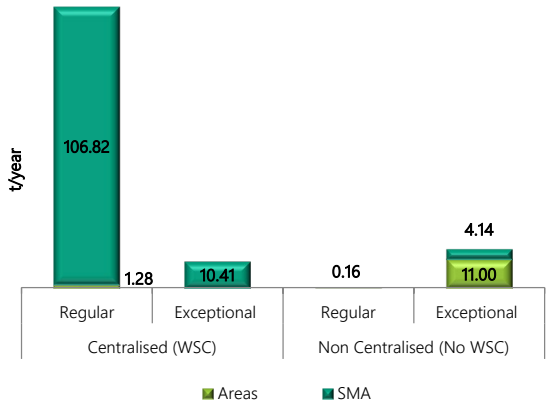


Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

The following graph shows the production of hazardous waste categorized by regular or exceptional production. It also differentiates between management carried out through the corporate model or by the Activity Areas and indicates whether the waste is removed from WSCs or other locations.

Only 0.16 tonnes of the regularly generated waste was collected from storage points other than WSCs (non-centralised collections), and this waste was from healthcare activities.

Chart 18. Distribution of centralised and non-centralised waste management (t/year). Year 2023

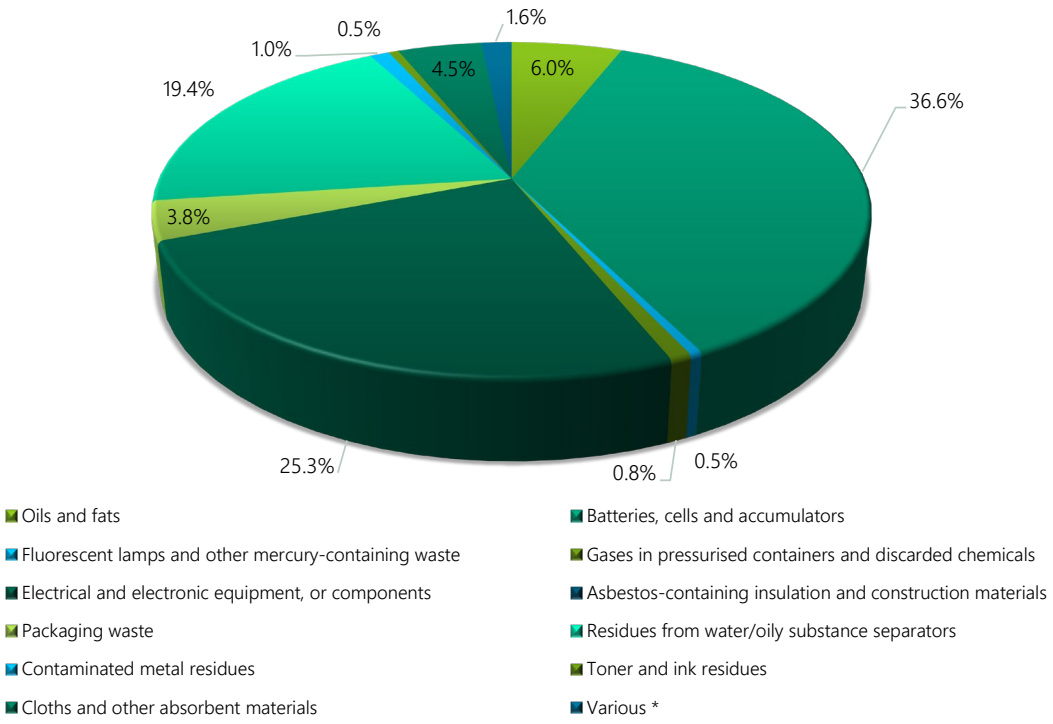


Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

In recent years, the amount of waste generated and managed in a decentralised manner by the business areas has been decreasing, and this trend is expected to continue due to the waste management model currently in place. A reduction in exceptional waste management is also anticipated in the coming years due to the implementation of a new exceptional waste management procedure.

In 2023, waste was generated in 19 out of the 24 categories used to describe Adif's waste generation. Batteries, cells and accumulators, and electrical and electronic material are the main types of waste generated, accounting for 61.9% of the total hazardous waste generated in 2023. The distribution by category shown in the following graph.

Chart 19. Distribution of hazardous waste generation by type of waste (%). Year 2023

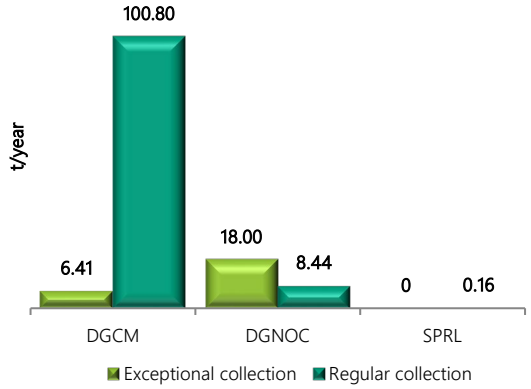


** Includes the sum of adhesive and sealant wastes, paints, contaminated soils, fuel residues, sanitary waste, oil filters and other vehicle maintenance waste, wastes containing hydrocarbons, solvents, and other unspecified waste.*
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

In 2023, waste was removed from 36 WSCs, with 25 managed by the Corporate Conservation and Maintenance Department and 11 by the Corporate Department of Business and Commercial Operations. The WSCs with the highest waste generation in 2023 were Valencia Fuente San Luis, Córdoba El Higuerón, San Roque, Albacete, Montcada, Zaragoza La Cartuja and Seville AB333.

The Corporate Conservation and Maintenance Department was the main producer of hazardous waste, representing 80.13% of the total hazardous waste produced in Adif. The following graph shows the distribution of waste generation by Corporate Department and the types of collection methods used.

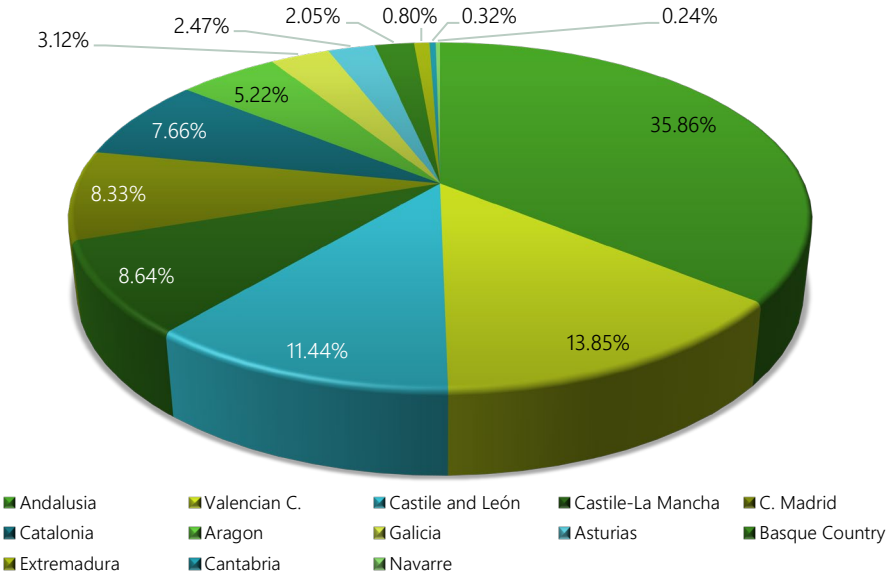
Chart 20. Distribution of hazardous waste generation in the different Adif areas (t/year). Year 2023



DGCM: Corporate Conservation and Maintenance Department.
DGNOC: Corporate General Business and Commercial Operations Department
SPRL: Occupational Risk Prevention Sub-department
Source: Adif-Alta Velocidad, Corporate Management, Corporate Environmental Sub-Department.

In 2023, waste was removed from 13 Autonomous Communities. Of the total hazardous waste, 78.12% was collected in five Autonomous Communities: *Andalusia, Valencian Community, Castile and León, Castile-La Mancha,* and the Community of Madrid with the distribution shown in the graph below.

Chart 21. Distribution of hazardous waste generation in the different Autonomous Communities (%). Year 2023



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

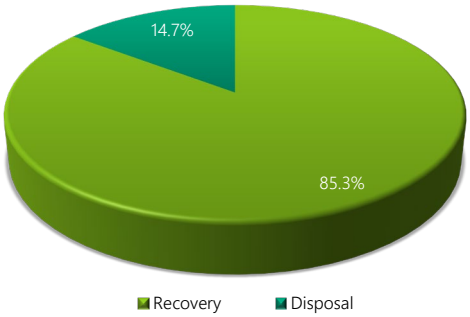
Disposal and treatment of hazardous waste

As for the disposal of the waste, waste managers are selected to provide the most appropriate final treatment for each type of waste.

As a second criterion, waste is transferred to collectors situated as close as possible from the storage centres, typically using collectors within the same Autonomous Community as the generation centres. During 2023, in the corporate management model, the average distance for transferring hazardous waste to the management centres was 215 km.

The following graph shows the percentage of hazardous waste that has been allocated for recovery and disposal out of the total amount managed.

Chart 22. Final treatment given to waste (%). Year 2023



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

Of the hazardous waste generated, 85.3% was allocated for recovery, while 14.7% was destined for disposal.

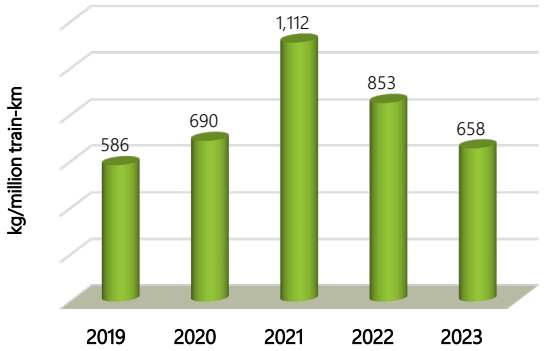
Waste management, thus, aligns with the hierarchy established by the Waste Framework Directive and Law 07/2022 on Waste and Contaminated Soils, with only waste that cannot be prepared for reuse, recycling, or recovery after prior treatment being sent to disposal facilities.

Intensity of hazardous waste generation

The intensity of hazardous waste generation from Adif's own activities is an eco-efficiency indicator that measures the relationship between activity growth and hazardous waste (HW) generation. PCBs, asbestos, and sanitary waste are not included in the calculation, as their generation is not considered related to the entity's own activities.

In 2023, the intensity of hazardous waste generation reached 658 kg/million train-km, which is 23% lower than previous year and comparable to the levels achieved in 2019 and 2020.

Chart 23. Intensity of hazardous waste generation (kg of waste/million managed train-km)



**Ratio of hazardous waste generated from Adif's own activities (excluding PCBs, asbestos, and sanitary waste) and managed traffic train-km*

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

Table 14. Hazardous waste generated by Adif in infrastructure maintenance and operation (t/year)

Type of waste	2015	2016	2017	2018	2019	2020	2021	2022	2023
Oils and fats	8.211	7.742	13.213	4.938	12.966	5.394	4.471	5.653	7.980
Batteries, cells and accumulators	16.329	25.290	31.409	32.022	37.742	29.705	16.329	25.290	31.409
Solvents	-	-	0.031	0.000	0.018	-	-	-	0.005
Machining emulsions and solutions	0.944	0.239	0.284	2.441	0.223	-	0.601	0.210	-
Oil filters	0.350	0.244	0.317	0.179	0.288	0.116	0.183	0.558	0.112
Fluorescent lamps and other mercury-containing waste	0.116	0.154	0.203	0.092	0.141	0.301	0.328	1.183	0.611
Gases in pressurised containers and discarded chemicals	0.066	0.147	0.186	0.722	0.700	2.021	0.463	1.073*	1.110
Sludge	-	-	-	0.032	0.077	-	-	-	-
Electrical and electronic equipment, or components	10.313	24.884	26.497	19.549	9.130	12.830	24.533	17.571	33.826
Asbestos-containing insulation and construction materials	45.203	0.363	3.172	1.194	0.258	1.594	-	5.325	-
Paints	0.120	0.208	0.078	0.173	0.134	0.050	0.176	0.313*	0.803
Hydrocarbon-contaminated waste	7.157	0.490	3.747	0.762	0.546	0.717	2.966	-	0.035
Adhesive and sealant waste	0.090	0.099	0.012	0.129*	0.129*	12.364	1.754	0.022	0.382
Packaging waste	2.623	3.435	2.899	3.356	2.683	1.909	3.137	3.877	5.027
Sanitary waste	0.252	0.254	0.256	0.160	0.263	0.690	0.745	0.276	0.156
Fuel residues	4.092	14.602	4.737	2.186	1.434	1.278	0.001	0.231	0.222
Residues from water/oily substance separators	27.418	24.232	53.507	17.562	6.284	4.156	10.187	10.832	25.895
Contaminated metal residues	2.968	2.882	1.263	1.103	2.210	2.189	0.900	1.583	1.402
Contaminated soils	0.280	0.064	0.150	0.100	-	-	27.429	0.005	0.290
Toner and ink residues	0.165	0.383	0.139	0.277	0.284	0.352	0.507	0.481	0.712
Transformers and capacitors containing PCBs	5.084	21.092	18.475	-	1.520	-	-	0.371	-
Cloths and other absorbent materials	5.100	6.012	3.889	5.789	5.922	3.502	5.466	3.043	6.053
Wooden sleepers	2.100	-	12.620	-	0.012	-	0.220*	-	-
Other	0.112	0.420	-	0.07	0.072	-	0.731*	0.014	0.181
Total	**139.093**	**133.236***	**177.084***	**92.836***	**83.036***	**79.168***	**130.002**	**110.080***	**133.798**

** Data revised in relation to the 2022 Environmental Report.*

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

Non-hazardous waste

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The production of this type of waste at Adif also originates from the maintenance and operation of railway infrastructure.

This group includes **commercial waste**, similar to urban waste, which is generated mainly in Adif's stations and logistic centres, as well as in administrative buildings and premises. For the management of this waste there are:

- Separate collection containers
- Paper and cardboard collection points in offices and internal premises
- Available bins for waste separation
- Temporary storage of specific waste

This waste is usually removed by the public cleaning or waste collection services or by waste managers authorised by the Autonomous Communities.

For the collection of this waste, a total of 1,016,300 euros in waste collection fees has been paid in 2023.

Table 15. Fees paid for waste collection (€/year)

	2017	2018	2019	2020	2021	2022	2023
Fees paid	800,394	845,230	919,194	1,004,841	925,515	922,487	1,016,300

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

The management of this type of waste is usually carried out by the cleaning contractors of commercial buildings and offices. However, there are cases in which they are withdrawn by Adif through specific orders from the producing areas.

On the other hand, there is **non-hazardous industrial** waste, which main types generated in Adif are: rail tracks and other metals, concrete sleepers, and bulky waste.

This type of material is generally produced by third parties, derived from construction and maintenance works and actions subject to the specific regulations for construction and demolition waste. To ensure proper management, compliance with the environmental clauses included in the contracts is monitored. However, some are managed through Adif's own orders when either Adif has directly carried out the activity or the contractor responsible for the original activity has, due to various circumstances, has not handled the management.

Centralised coordination from Adif's Corporate Warehousing and Logistics Body

Within non-hazardous industrial waste, there are specific categories that may hold commercial value and, thus, have a positive economic impact on Adif. For this reason, Adif's Warehousing and Logistics body coordinates a specific process for managing this type of waste, always through duly authorised managers.

In particular, this waste consists of metal waste, primarily from the de-installation of ferrous materials (mainly clean rail) and is classified under LoW codes of group 1704.

In 2023, a total of 1,911.18 tonnes were managed this way, 100% of it being treated through recovery.

In 2023, 62.37% of non-hazardous waste was managed by this corporate Warehouses and Logistics body, while the remaining 37.63% was

managed in a decentralised manner by the Activity Areas.

Overall, in 2023, a total of 3,064.15 tonnes of non-hazardous waste was generated by Adif activities. The recovery rate in this case exceeds 99%.

Table 16. Non-hazardous waste generated by Adif in infrastructure maintenance and operation (t/year)

Type of waste	2023
Concrete sleepers	1,068.48
Metals	1,937.98
Electrical and electronic equipment, or NP components	0.42
Comparable to urban waste	29.73
CDW	0.70
Bulky waste	26.84
Total	**3,064.15**

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

Historical waste management at Adif

Since the mid-2023, Adif has undertaken significant efforts to clear waste from its facilities across the railway network, primarily from old projects and completed works. This work is being managed under three specific commissions, fully coordinated by the Corporate Environmental Sub-Department, and represents a challenge that Adif has not previously undertaken.

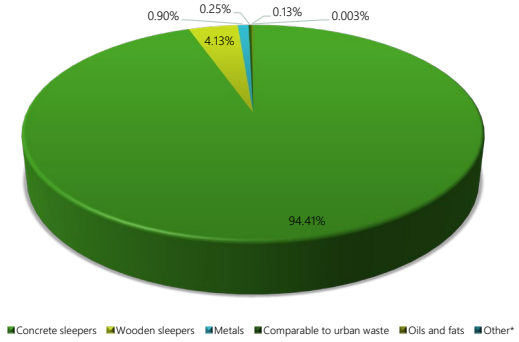
Thus, as of March 2023, a total of 35 such waste dumps have been cleaned up and managed. This represents a total volume of 31,269.19 tonnes of materials, which can be divided into the following categories:

Table 17. Waste generated by Adif during the cleaning of historical stockpiles from previous projects (t/year)

Type of waste	2023
Concrete sleepers	29,521.75
Wooden sleepers	1,292.40
Metals	282.00
Electrical and electronic equipment, or NP components	52.68
Electrical and electronic equipment, or components (RP)	0.24
Comparable to urban waste	78.36
Oils and fats	40.94
Construction and demolition waste (CDW)	0.80
Fluorescent lamps and other mercury-containing waste	0.02
Total	**31,269.19**

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

Chart 24. Waste generated by Adif during the cleaning of historical stockpiles from previous projects (%). Year 2023



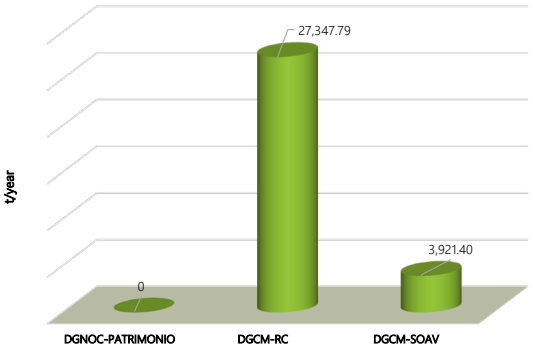
** Includes the total of Waste Electrical and Electronic Equipment or components (WEEE), Construction and Demolition Waste (CDW), and Fluorescent and other mercury-coating waste*

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

Hazardous waste from this type of action accounted for 4.26% of the total weight managed, including categories such as wood (sleepers), electrical and electronic material, oils and fats, and fluorescent waste.

The Corporate Conservation and Maintenance Department was the sole producer of this type of historical waste, with the Conventional Network area accounting for 87.46% of the total weight. The following graph shows the distribution of waste generation by Corporate Department and the types of collection methods used.

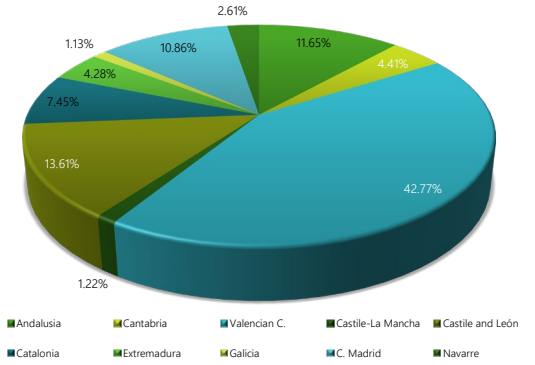
Chart 25. Distribution of historical waste generation in the different Adif areas (t/year) * Year 2023



DGCM-RC: Corporate Conservation and Maintenance Department. Conventional Network.
DGCM-SOAV: Corporate Conservation and Maintenance Department. High Speed Operations Sub-department.
DGNOC-Heritage: Corporate Business and Commercial Operations Department. Heritage.
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

In 2023, waste was removed from 10 Autonomous Communities. Four Autonomous Communities accounted for 78.89% of the total historical waste collected: Andalusia, Castile and León, the Community of Madrid and Valencian Community were the key regions involved, with the latter accounting for almost half of the total generation. This was specifically due to a crushing of several concrete sleeper stockpiles on the Sagunto-Caudiel section of the Sagunto-Teruel railway line.

Chart 26. Distribution of historical waste generation in the different Autonomous Communities (%). Year 2023



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

However, in terms of the number of stockpiles withdrawn, the Autonomous Communities of Andalusia (with 10) and Catalonia (with 8) together accounted for more than 50% of the total.

Waste disposal and treatment

Regarding the disposal of the waste, waste managers are selected to provide the most appropriate final treatment for each type of waste.

As a second criterion, waste is transferred to collectors situated as close as possible from the storage centres, typically using collectors within the same Autonomous Community as the generation centres.

The recovery rate for historical waste clean-up operations was 99.8%.

Just like with hazardous waste generated in infrastructure maintenance and operation activities, the management of historical waste aligns with the hierarchy established by the Waste Framework Directive and Law 07/2022 on waste and contaminated soils. Only waste that cannot be prepared for reuse, recycling or recovery after prior treatment is sent to disposal facilities.

Management of third-party waste dumping on Adif's property

Since mid-2023, the same orders that have enabled the Corporate Environmental Sub-Department to manage the cleanup of historical waste have also been used to coordinate, in a corporate manner, the removal and management of third-party spills. These spills, although not produced by the activities of this entity or its contractors, fall under Adif's responsibility (as holder) for removal since they are on its property and the legal producer cannot be identified.

In this regard, between June and December 2023, a total of 35 landfill sites along the railway network were cleaned up. More than 50% (18 sites) had associated administrative requirements, and 60% (21 stockpiles) were located on land maintained by the High-Speed Operations Sub-department.

The total volume managed in this area amounts to 1,175.33 tonnes of material, with the majority located in the Autonomous Communities of Castile and León (46.03%), Andalusia (24.73%), and Catalonia (10.35%).

The predominant category of waste found in these cases is mixed waste without hazardous components (accounting for 99.25% by weight). However, some materials could also be classified as hazardous waste, particularly asbestos cement remains. A total of 8.72 tonnes of these have been removed by accredited waste managers in compliance with the specific regulations for this type of waste.

ACTIONS IN THE CIRCULAR ECONOMY

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Adif's collaboration in the Spanish Circular Economy Strategy

Adif and Adif-AV 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 contributed to the development of the 1st Circular Economy Action Plan 2021-2023, which is part of this strategy, by providing six initiatives in the following areas: Consumption, Waste Management, Secondary Raw Materials Market, and Employment and Training.

The projects that were finally selected to be part of the 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. The consultancy exercise is ongoing until April 2024, during which work is being done to establish the foundations of the *Ecomilla* model, which will be implemented uniformly across all stations.

At the same time, 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 recently 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. During 2023, 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. Once it is in use, it will be monitored and updated based on the 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.

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

- Efficient management of surplus land from railway infrastructure works to promote the environmental recovery of degraded areas or its reuse in other projects.

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, prevention and planning are prioritised. However, if these measures are not feasible, surplus soil will be promoted for reuse in rehabilitating degraded surfaces, within Adif projects or nearby areas, in accordance with Order APM/107/2017. This approach contributes to savings and efficiency in the use of natural resources.

Within this framework, training and awareness-raising sessions will also be organised for site technicians, along with the dissemination of practical case studies.

» In 2023, 12.49% of the earth and rocks brought to the site came from the recovery of surplus material from other projects.

» 36.90% of the clean earth and rocks leftover from the works are reused in other projects or in the restoration of degraded areas.

- Measures to increase the reuse of topsoil on construction sites for restoration and landscape integration resulting from railway works.

The following principles are to be adopted depending on the execution phase of both railway infrastructure construction projects and the environmental monitoring programmes associated with them:

- At the beginning: Recover and stockpile the existing topsoil from all areas that will be occupied by the works, whether permanent or long-term basis.
- During implementation: Maintain topsoil stockpiles in a suitable condition for their conservation.
- At the end of the work: Reuse the collected topsoil for the restoration and landscape integration of temporarily occupied auxiliary areas and along the route slopes.

» In 94.93% of the area to be occupied, topsoil is recovered and stockpiled

» 94.91% of the topsoil is properly conserved

» In 92.95% of the area to be restored, topsoil has been spread beforehand

- 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.

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

Unique circular economy initiative: on-site management of concrete sleepers on the Sagunto-Caudiel section of the Sagunto-Teruel railway line

Between August and December 2023, Adif's Corporate Environmental Sub-Department, in coordination with the waste management company EMFESA, oversaw the recovery of 54,722 concrete sleepers (approximately 13,374 tonnes) that had been stockpiled along the railway section between Sagunto and Caudiel in the Valencian Community. These works involved setting up a crushing plant on-site, operated by the company *Transportes y Excavaciones Hermanos Espinosa, S.L.*, after transporting the material to three strategically prepared collection points: Torres-Torres, Algar, and La Masía.

Stages of producing recycled aggregate using a mobile plant

1. Primary demolition or pre-screening to minimise the size of materials entering the crushing equipment and to separate the ferrous components from the concrete. This 'pre-treatment' process is carried out using a demolition clamp in what is known as the primary demolition area.
2. Crushing is a mechanical process in which fragments of the sleepers are loaded by a rotating backhoe excavator into a self-propelled mobile crusher, which reduces their size to particle below 80 mm.
3. Sorting and cleaning, to achieve the final separation of the heterogeneous materials comprising the sleepers. An electromagnet is incorporated at the crusher's outlet to capture any metallic impurities still present in the aggregate, separating them from the rest for collection in designated areas.

Preventive and corrective measures

The grinding unit is equipped with a network of misting sprinklers at its outlet that keep the material moist, thereby minimising dust generation and its associated impact. Additionally, the tubs of loaded transport lorries are covered with tarpaulins, and the speed of mobile machinery and vehicles is limited to minimise dust and ensure safety.

Regarding noise and vibrations, the equipment has the required CE marking, which ensures the acoustic emissions are within the limits specified by legislation. As a preventive measure, maintaining the moving parts of the machinery in optimal condition, including the greasing, is considered a preventive measure.

Final destination

The resulting material has been stockpiled in the designated places for subsequent reuse in maintaining the service rails of the Sagunto-Teruel railway line. It remains at the disposal of the Head of the Maintenance Area of Valencia for its use in trackside restoration or station works.

Monitoring of compliance with circular economy objectives in the works outlined in the Recovery and Resilience Plan

The Regulation establishing the Recovery and Resilience Mechanism (RRM), a central element of the NEXT GENERATION EU Programme, stipulates that measures included in the Recovery and Resilience Plans must not cause significant harm to environmental objectives as defined in Article 17 of the Taxonomy Regulation.

The Spanish Recovery, Transformation, and Resilience Plan, approved in April 2021, includes investment of existing railway infrastructure and

the construction of new lines under components 3 and 6.

In accordance with the Taxonomy Regulation, the actions included in the Recovery and Resilience Plan must ensure that the activities undertaken by Adif do not have a significant negative impact on the environmental objectives outlined in the Taxonomy Regulation, which include "the transition to a circular economy, including waste prevention and recycling".

To achieve this transition to a circular economy, the Recovery and Resilience Plan stipulates, among other measures, that at least 70% of the construction and demolition waste generated (by weight) -excluding soil and stone waste without hazardous substances- should be prepared for reuse, recycling, and recovery. This includes backfilling operations where waste is used to replace other materials.

To ensure compliance with this environmental objective, Adif has developed a waste management monitoring system to identify actions that fall short of the 70% target, allowing for adjustments to meet the goal.

Monitoring begins before the construction starts with the analysis of the data from the project's Waste Management Study. Subsequently, at the start of the works, the data from the Waste Management Plan prepared by the contractor are analysed. Once the material execution of the work has begun, waste management monitoring sheets are prepared on a monthly basis to detect any deviations in the percentage of construction and demolition waste recovered. If deviations are detected, the necessary corrective measures are taken in order to achieve the objectives set.

The results of the monitoring of compliance with the 70% target value, obtained for Adif's works as of December 2023, are summarised in the following table:

Table 18. Number of works monitored and the amount of CDW generated/valued

Status	Number of monitored works	Generated CDW (T)	Recovered CDW (T)	% of CDW recovery
Ongoing	114	626,871	625,091	99.72%
Completed	44	102,634	96,833	94.35%

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

On-site assessment of CDW, environmental characterisation of the resulting materials and its use on site. Multimodal platform of La Llagosta

The construction project for the standard gauge connection to the Mediterranean corridor at La Llagosta multimodal platform in Barcelona province presents an opportunity to use construction and demolition waste, which has been previously recovered and is available in sufficient quantity from an earlier developed area.

This opportunity has been taken advantage of by the project, aligning it with the achievement of DNSH *(Do Not Significant Harm*) objectives as required by European Union standards. A key requirement in this respect is to achieve a recovery rate of 70% for Construction and Demolition Waste (CDW) by the end of the works. The actions outlined below are designed to ensure compliance with the DNSH objectives mentioned above.

As an initial step, the potential use of recycled materials has been assessed, including those

from the removal of ballast from existing tracks, demolition of bituminous pavements, and the demolition of concrete pavements and structures. This analysis shows that, after crushing, screening, and selection, they are suitable for reuse in earthworks and trench backfill.

This analysis has been accompanied by laboratory tests, which have enabled the environmental characterisation of the materials. This has been done with the ballast and the crushed material, allowing the determination that these materials are free of contamination and can therefore be used on site.

Subsequent pre-treatment has been carried out, consisting of crushing and screening. The treatment process has been adapted to the origin of the material and its end use.

Finally, regarding the destination of the resulting material, the removed bituminous mix is being used as embankment material. Both ballast lifting material and material from the demolition of concrete elements are used for the selected soil.

Figure 11. On-site CDW recovery operations

Figure 12. Ballast screening. A sprinkler irrigation system has been installed to minimise dust emission

The following table details the materials, quantities, and destinations of the recovered waste used on site.

Table 19. Reuse of materials

	Total Volume (m^3)	Volume according to use (m3)	Destination of use
Ballast	7,422	6,296	Selected Soil Platform, France Sector
		1,126	Selected Soil Platform, Barcelona Sector (Technical Scope)
Concrete	6,922	5,789	Selected Soil Platform, France Sector
		1,133	Selected Land Barcelona Sector Platform
Agglomerate	10,760	4,658	Selected Soil for Mango Routes
		6,102	Capping of Embankment on Axis-14 (Walls A-B and Wall 6)

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

As can be seen in the table, a 100% reuse rate has been achieved, thereby meeting the DNSH targets.

Throughout the process, the best practice hierarchy of impact mitigation has prevailed, preventing waste from needing to be managed off-site and allowing it to be used as a valuable construction material.

6. POLLUTION PREVENTION

6- POLLUTION PREVENTION

DISCHARGING

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The main discharges originating from Adif'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. Meanwhile, at the stations managed by the Corporate Department of Traffic and Capacity Management, work has continued to replace cesspits with connections to public sewerage networks and/or the installation of purification systems or septic tanks. Fees for sewerage, sanitation, and wastewater treatment amounted to €707,669.32 in 2023.

Table 20. Stations managed by Adif as of 31 December 2023

	Circulation and Capacity Management	Affiliation of Passenger Stations			Affiliation with Logistics Services			Affiliation of Urban Asset Manager	Affiliation with the Port Authority	Affiliation with the *Junta de Andalucía* (Regional Government of Andalusia)	Not assigned	Total number of stations
		Regional Rail Manager	Passenger Station Manager	Total	Logistics Services Manager	RAM Goods Manager	Total					
Centre	30	92	61	153	8	0	8	14	0	0	0	205
North-west	60	290	142	432	11	1	12	22	2	0	5	533
South	87	66	106	172	13	0	13	6	1	1	1	281
East	28	102	73	175	6	0	6	0	4	0	3	216
North-east	31	112	152	264	12	0	12	8	0	0	2	317
North	57	201	63	264	11	1	12	19	0	0	0	352
High-Speed Rail Lines	1	0	0	0	0	0	0	0	0	0	0	1
Total	**294**	**863**	**597**	**1460**	**61**	**2**	**63**	**69**	**7**	**1**	**11**	**1905**

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

Table 21. Treatment of discharges at Stations as of 31 December 2023

Sub-department of Operations	No. of stations with sewage treatment system, septic tank, or connection to the public sewage system
Centre	51
North-west	105
South	88
East	51
North-east	99
North	71
Total	**465**

Source: Adif, Corporate Passenger Stations Department

Table 22. Investments made by the Corporate Department of Traffic and Capacity Management in wastewater treatment, septic tanks and/or connections to public sewerage networks (€/year)

Autonomous Community	2014	2015	2016	2017*	2018*	2019	2020	2021	2022	2023
Andalusia	4,225	-	-	0	5,898.90	17,089.60	-	-	24,000.00	30,364.50
Aragon	-	3,856	-	-	-	-	-	-	-	
Castile-La Mancha	4,105	8,517	-	13,980.00	-	-	-	-	-	
Castile and León	-	-	-	0	3,326.08	4,633.00	5,118.96	-	-	
Catalonia	-	-	-	13,770.00	45,052.65	6,261.45	-	-	-	
Valencian Community	-	-	8,712	-	-	-	-	-	9,487.84	3,694.08
Extremadura	-	-	-	-	-	16,350.40	-	-	-	
La Rioja	17,005	-	-	-	1,457.55	2,550.00	1,279.74	-	-	
Total	**25,335**	**12,373**	**8,712**	**27,750.00**	**55,735.18**	**46,884.45**	**6,398.70**	**-**	**33,487.84**	**34,058.58**

Source: Adif, Corporate Passenger Stations Department

CONTAMINATED SOILS

3-3

There are sites where, due to historical activities, soils are contaminated. Depending on the levels of contamination in the soil or the sensitivity of the environment, the measures to be taken will vary. Thus, there are sites where **decontamination** projects are undertaken to improve soil characteristics until they no longer pose a risk to human health and ecosystems. At other sites, **environmental risk control** actions are undertaken to assess, based on land use and potential receptors, whether the site poses a risk and, if necessary, to determine whether decontamination projects should be implemented. Finally, there are sites where **environmental risk monitoring** is conducted to ensure that conditions remain stable, with contamination levels in the affected area within Adif's grounds staying within acceptable limits.

Additionally, action is also taken at sites where **accidents** have occurred or have the potential to pollute the soil. In these cases, urgent intervention is required to prevent further aggravation of the consequences. The key issue is usually to contain the spread of contamination to prevent it from reaching sensitive areas or from spreading rapidly to third parties, groundwater or surface water. Once the spill has been controlled, the soil and water must be decontaminated to ensure that they do not pose a medium- or long-term risk to human health or to the natural environment.

Legal framework and internal regulations

Title VIII of Law 7/2022 of 8 April on waste and contaminated soils for a circular economy contains the regulations on contaminated soils, a concept first introduced in the Spanish legal system by Law 10/1998 of 21 April on Waste[4]. In the

[4] Repealed by Law 22/2011 of 28 July 2011 on waste and contaminated soil. The latter is, in turn, repealed by the current Law 7/2022 of 8 April on waste and contaminated soils for a circular economy.

context of this Law, Royal Decree 9/2005[5] establishes the list of activities that could potentially pollute the soil, along with the criteria and standards for declaring soil as contaminated, without affecting the development regulations of the various Autonomous Communities. Based on this list of potentially soil-polluting activities, Adif has been undertaking a series of actions at its facilities concerning potentially contaminated soils related to historical contamination.

To protect groundwater, an amendment to the Public Hydraulic Domain Regulation [6] was approved in 2023. This amendment establishes regulations to safeguard groundwater from point source pollution (including spills, infiltrations, leachates, and poor practices). This amendment establishes the administrative procedure for declaring point source pollution of groundwater and for the restoration of polluted aquifers and sets generic reference values for groundwater quality.

The activity of ensuring legal environmental compliance concerning soil contamination falls under the 'Management Entrustment Agreement' between the public business entity Administrador de Infraestructuras Ferroviarias (Adif) and the public business entity ADIF-Alta Velocidad. This agreement entrusts ADIF-Alta Velocidad with the management of the following activities: ADIF-Alta Velocidad is responsible for executing activities of a material or technical nature [7], as approved by the Adif Board of Directors on 26 June 2019 [8]. This agreement supersedes previous agreements and entrustments made after the division of Adif and Adif-Alta Velocidad.

This activity includes planning and managing soil remediation affected by 'historical contamination' -defined as contamination occurring before 2005 in any facility owned by Adif and, for facilities managed by Adif but located on Renfe Operadora assets that have continued to operate since that date. It also encompasses the comprehensive management of environmental emergencies in Adif-owned facilities. Both functions include managing the decontamination of affected soil until certification of remediation completion is obtained from the competent authority, or until the risk from contamination is confirmed as eliminated.

The Corporate Environmental Sub-Department, in collaboration with the relevant activity areas, has developed a procedure and technical instructions to regulate the functions and responsibilities of Adif and Adif-Alta Velocidad in compliance with contaminated soil regulations, particularly Law 7/2022, with the ultimate aim of protecting soil, groundwater, and surface water. Both documents are part of the Adif and Adif-Alta Velocidad Strategic Plan 2030, under the Sustainability Pillar, Strategic Objective 3.- Recover nature and biodiversity: Ensure the protection of nature and implement measures to reverse ecosystem degradation and reduce pressure on biodiversity, in line with the 2030 Agenda for Sustainable Development [9]. These documents are the following:

- General Procedure ADIF-PG-109- 001-008: Contaminated Soil Management

[5] Royal Decree 9/2005 of 14 January, which establishes the list of potentially soil-polluting activities and the criteria and standards for declaring soil as contaminated.

[6] Royal Decree 665/2023 of 18 July amends the Regulation of the Public Hydraulic Domain (approved by Royal Decree 849/1986 of 11 April), the Regulation of the Public Administration of Water (approved by Royal Decree 927/1988 of 29 July), and Royal Decree 9/2005 of 14 January, which establishes the list of potentially soil-polluting activities and the criteria and standards for declaring contaminated soils.

[7] Activity included in Appendix 1 of the Convention. - Management assignment from the Public Business Entity Adif to the Public Business Entity Adif-Alta Velocidad for the execution of material and technical activities necessary for integrated environmental management. I.- Purpose and content of the material or technical activities entrusted. Section 1.3. Ensuring compliance with environmental regulations concerning soil contamination.

[8] 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.

[9]The 2030 Agenda for Sustainable Development, adopted by the UN General Assembly in September 2015.

– Technical Instruction ADIF-IT-109-001-005: Preparation and Submission of Preliminary Progress Reports / Progress Reports (PSR / PSI)

Furthermore, in accordance with the provisions of the aforementioned General Procedure, the **Contaminated Soil Management Plan 2023-2025** was approved in 2023 as a strategic planning and management tool for contaminated soil remediation. This plan establishes the type of actions to be carried out at each site. Depending on the type of actions, a distinction is made between:

1.-**Decontamination sites**, where a decontamination projects or actions are implemented with the objective of improving soil and groundwater characteristics to the point where they no longer pose a risk to human health and ecosystems.

2.-**Risk Control Sites**, where actions are taken to manage environmental risk and assess, based on land use and potential receptors, whether the site poses a risk. Based on this assessment, it is then determined whether decontamination actions are needed.

3.-**Risk Monitoring Sites**, which are subject to environmental monitoring to ensure that the situation remains stable and that the affected area within Adif's land maintains acceptable levels of contamination.

The Plan includes a **Control Programme** with the objective of monitoring the environmental condition of the subsoil at each site by tracking the evolution of contamination parameters. This allows for the assessment of which sites remain under control/monitoring and where decontamination actions need to be initiated.

For the period 2023-2025, the Plan outlines the objectives, forecasts actions, schedules visits, and details control and monitoring reports. It also specifies monitoring indicators and expenditure forecasts for each site based on its environmental condition, including soil and groundwater contamination levels and types, environmental sensitivity, risks to receptors and ecosystems, requirements from competent authorities, resource and budget availability, and site-specific activities.

Action on contaminated land

Soil characterisation and control work are carried out at various Adif to assess environmental status and, if necessary, implement decontamination actions. To this end, environmental monitoring programmes are established to detect and prevent changes in soil conditions.

Similarly, actions are taken in response to emergencies affecting the environment[10]. These emergencies involve leaks, spills, or discharges of substances that could affect the environment. A single point of contact and manager is designed for such incidents, regardless of the origin, to ensure an effective and prompt response. Once the emergency is over, decontamination, removal of hazardous waste, and environmental control and monitoring of the affected area must begin or continue, among other actions.

All these actions are carried out in collaboration with the various areas of activity within the company: Maintenance, Circulation, Stations, Logistics Services, Heritage, etc., work together to ensure that operations are not disrupted. This coordination sometimes affects both the possible solutions and the timing and effectiveness of the actions.

[10] According to ADIF-PE-108-003-A04-SC-551: Action in response to environmental emergencies.

Historical performances

In February 2008, the Adif Management Committee approved a Decontamination Plan for the period 2008-2012, aimed at planning and managing actions for facilities where potentially polluting activities had been conducted.

Renfe-Operadora and Adif also signed a "Collaboration Agreement on Soil Decontamination". It was signed in October 2008 to collaboratively address the necessary actions for installations active as of 1 January 2005, which were affected by historical pollution (i.e., pollution occurring before that date).

Actions related to historical contamination undertaken since 2005 can be summarised as follows:

- Preliminary Situation Reports (PSR) and Periodic Situation Reports (PSR), as required by Royal Decree 9/2005, are submitted in accordance with the established deadlines.
- Characterisation studies of potentially contaminated soils are conducted to determine the appropriate actions based on their environmental condition.
- Application of Royal Decree 9/2005 to cases of disposal of sites where activities considered as potentially soil-polluting have been conducted.
- Environmental control and monitoring of the sites, in order to oversee their environmental status and facilitate the early detection of incidents or new active sources, enabling the implementation of necessary corrective actions.
- Implementation of soil and groundwater remediation projects and the necessary actions for the environmental recovery of the site.

Additionally, containment and remediation actions have been carried out in response to accidents involving leaks, spillages, or illegal discharge of substances that could directly or indirectly affect the environment.

Actions undertaken in 2023

Throughout 2023, environmental actions were undertaken at 31 sites. These have been divided into two groups based on the actions performed. A set of indicators was chosen for each group to describe the work carried out.

Sites affected by environmental emergencies, which may impact soil and surface and/or groundwater, are described separately and are not included in the annual indicators monitoring.

Outline of actions

The actions taken at the various sites are determined based on the environmental conditions identified through control and monitoring. Based on these findings, needs are assessed to decide whether it is necessary to update or expand the characterisation studies, conduct an environmental risk assessment, and/or implement remediation projects.

In evaluating the degree of intervention required, applicable regulations and the requirements of various environmental authorities (such as regional ministries/departments, municipalities, hydrographic confederations, etc.) are taken into account.

The actions proposed at each site will also depend on its specific characteristics, such as concurrent activities, impact on rail traffic, ease of access, working hours, etc. In this respect, the constraints of the installations will limit, among other things, the number of sampling points (for investigations or monitoring plans) and the selection of the most appropriate remediation technique.

In addition to the above criteria, the work and its duration will also depend on factors such as the sensitivity of the environment, its current environmental condition, and the risk posed to potential receptors by the detected effects. Based on these factors, a 'prioritisation' of actions will be established, particularly for remediation efforts.

Considering all these factors, the actions undertaken in 2023 are categorised into two distinct situations[11]:

1.-Sites in Decontamination

2.-Sites under Risk Management

Conversely, a key milestone in the area of contaminated soils was the 'Proposal for additional action in soils affected by historical contamination' by the Management Committee on 7 February 2019. Additionally, the contract for the 'Design and Execution of Soil Decontamination Measures to Mitigate Environmental Risk' was formalised at the end of the year. This proposal aims to accelerate the decontamination process and improve the environmental quality of soil and groundwater at eleven sites with historical contamination. This will be achieved through the design and implementation of remediation actions, which have been previously approved by the relevant authorities, including the autonomous communities, municipalities, and/or hydrographic confederations. This contract was initiated in 2020 and has continued to be implemented in the subsequent years. The work undertaken, its results, and the new actions initiated are described in the following sections.

SOIL AND GROUNDWATER BIOREMEDIATION ACTIONS

In recent years, bioremediation efforts have been intensified at sites where conditions are due to hydrocarbon degradation by aerobic microorganisms, due to their characteristics and degree of subsoil contamination.

The aim of these biological treatments is to degrade organic pollutants, such as hydrocarbons, through the natural biological activity of microorganisms involved in their metabolic processes. It is a minimally invasive, environmentally friendly, and generally cost-effective technique. However, it has drawbacks, such as the difficulty in estimating the time required and controlling the speed of the process. Additionally, some compounds are resistant to bioremediation, and landfarming often requires large areas.

The pre-assessment of the minimum conditions favourable to biodegradation is initially conducted in the laboratory. This includes evaluating the presence of degrading microorganisms in the soil and groundwater, the type of oil and its biodegradability, and the type and quantity of nutrients needed to address deficiencies.

Landfarming techniques are used for soil decontamination at sites where there is sufficient space. These soils are placed in treatment areas with sufficient depth to allow natural oxygenation throughout the soil layer to be treated. They are kept under optimal conditions of humidity and nutrients (nitrogen, phosphorus, potassium) to support the growth of aerobic microorganisms that use pollutants (such as hydrocarbons) as carbon source. In their initial location, several metres below the surface, these soils would be severely limited access to oxygen and nutrients. Recent results from sites such as the Salamanca motor workshop and fuel supply facility (1,756 m^3 of soil was successfully treated) and the former fuel supply facility at the Villaverde integral maintenance base (514 m^3), indicate that the treatments are effective for diesel-type pollutants. Once the target levels have been reached, the treated soils are reused on-site as backfill material for the excavation void. Landfarming soil treatment continues in Salamanca.

[11] In 2023 there are no sites under Risk Monitoring (which involves environmental monitoring to ensure that the situation remains stable, with the affected area within Adif land maintaining acceptable levels of contamination).

Since mid-2021, landfarming bioremediation trials have been conducted at the former creosoting base in Andújar (Jaén), achieving a high level of efficiency in reducing TPH and PAH concentrations. Therefore, the Decontamination Project for the site, scheduled to begin in 2024, plans to use this technique for treating soils affected by creosote.

Bioremediation can also be applied to groundwater with low to moderate concentrations of dissolved hydrocarbons. The fact that the hydrocarbons are in solution facilitates their uptake by microorganisms. However, some limitations need to be considered, such as the amount of oxygen available at several metres depth, the availability of nutrients and, in some cases, the continuous input of hydrocarbons from the very soils that make up the aquifer. These limitations can be addressed by using nutrient additives, aeration systems with pumping, or oxygen-releasing additives.

In the last quarter of 2021, the injection of microbial biostimulants and the installation of oxygen-releasing devices began in the fuel supply area of Monforte de Lemos, following approval by the *Consellería de Medio Ambiente, Territorio e Vivenda* (Regional Ministry of Environment, Territory, and Housing). This action was based on the study by the University of Oviedo on 'Optimisation of bioremediation through microcosm study for the saturated zone of a land contaminated by hydrocarbons (Monforte de Lemos)', published in June 2021. Thanks to this bioremediation technique, the target levels for TPH and PAH were achieved in the sampling conducted in October 2022. As a result, the Regional Ministry approved the remediation of the soil in June 2023.

For hydrocarbon-affected soils, injecting biodegradable surfactants can release the hydrocarbons attached to soil particles, making them soluble and, thus, available to microorganisms in the groundwater. This technique has yielded favourable results at sites such as the motor workshop and former fuel supply facility in Miranda de Ebro (Burgos) and the fuel supply area of the *Campo Grande* station (Valladolid).

Finally, in the subsoil decontamination project of the former fuel supply area at the Algeciras (Cádiz) railway station, which began in November 2022 and continued throughout 2023, an oxidising solution based on hydrogen peroxide has been used for the chemical oxidation of the hydrocarbons in the subsoil, as well as to release oxygen that enhances the biodegradation activity of the native bacteria. The oxidant injections have been applied to both the excavated soil and on the excavation shaft. This technique, applied to excavated soil deposited in impermeable ponds, along with landfarming, has proved to be very effective in improving the environmental quality of the treated soil, achieving a 67.5% reduction in TPH concentration compared to the initial level.

Indicators of actions taken on contaminated land

This section describes the main environmental indicators of contaminated land and their evolution since 2012. In addition, this Report continues to monitor the indicators incorporated in 2019, measured retroactively since 2017, including the number of piezometers with free phase and total hydrocarbon thicknesses.

The evolution of the number of piezometers with free phase, shown in the table below, serves as an indicator of the environmental improvement of the sites. It corresponds to the number of piezometers that have had a free phase at any time during the year, out of all the visits conducted. Although this indicator is influences by the installation of new boreholes, it provides a general sense of the progress of all ongoing projects. The number of piezometers should tend to decrease if decontamination and control treatments are effective.

Table 23. Number of free phase piezometers

	2017	2018	2019	2020	2021	2022	2023
Free phase piezometers	130	110	90	131	162	165	160
Piezometers	559	548	567	607	687	747	762
Free phase piezometers/Piezometers	23%	20%	16%	22%	24%	22%	21%

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

The decrease in the number of piezometers with free phase between 2017 and 2019 demonstrates the effectiveness of the remediation systems implemented. In 2020 and 2021, there was a significant increase in the number of piezometers with free phase. This is mainly attributed to the installation of new boreholes in decontamination sites, particularly in areas where free-phase hydrocarbons were present, due to a new decontamination contract. In addition, this increase is attributed to two fuel leaks: one at the end of 2020 (at the A Coruña site), and another in mid-2021 (at the Fuencarral site). In 2022 and 2023 there is a slight decrease in the ratio of free-phase piezometers/piezometers, despite an increase in the overall number of piezometers at the sites. This indicates progress is the environmental improvement of these sites.

Similarly, the indicator of total hydrocarbon thicknesses in piezometers can provide insight into the overall improvement at the sites and the effectiveness of the treatments. This indicator, whose evolution is shown in the following table, is calculated by summing the thicknesses measured in all piezometers at each site, during the same visit. Since measurements can vary throughout the year due to rainfall and other factors, the highest values recorded during visits at each site are selected. The following table shows the relationship between the total hydrocarbon thicknesses and the number of piezometers with free phase.

Table 24. Total oil thicknesses (cm)

	2017	2018	2019	2020	2021	2022	2023
Total hydrocarbon thicknesses	3,883	2,067	1,868	2,230	3,260	2,684	1,969
Free phase piezometers	130	110	90	131	162	165	160
Total hydrocarbon thicknesses / free phase piezometers	29.87	18.79	20.76	17.02	20.12	16.27	12.30

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

Similar to the previous indicator, the decrease in cumulative thicknesses between 2017 and 2019 demonstrates the effectiveness of the remediation systems. Additionally, the increase in 2020 and 2021 is attributed to the installation of boreholes in the most affected areas of decontamination sites, where free-phase hydrocarbons were present, reflecting the early stages of the decontamination process. In addition, this indicator has been influenced by the aforementioned fuel leaks at the A Coruña and Fuencarral sites. Since 2022, there has been a decrease in both hydrocarbon thicknesses and in the ratio of hydrocarbon thicknesses to the number of piezometers with free-phase hydrocarbons. This is due to the repair of leaks and the effectiveness of remediation systems at sites such as Valladolid, Salamanca and Seville, among others, indicating a clearly positive trend at the sites where actions have been taken.

The sites included in 2023 [12] in each of the aforementioned groups - Decontamination and Risk Control - are listed below, with their actions described in more detail in the following section:

Decontamination Sites (16)

In 2020, new remediation actions were initiated as part of the new decontamination contract, and have continued in subsequent years, with sites that were previously under Risk Control or Monitoring being added to this group.

In 2023, the sites undergoing Decontamination were the following:

- A Coruña Fuel Supply Facility and workshops
- Former fuel supply facility at Algeciras (Cádiz)
- Former creosoted base at Andújar (Jaén)
- Fuel supply facility and former workshops in Badajoz
- Cerro Negro self-propelled equipment workshop (Madrid)
- Former fuel supply facility at El Portillo (Zaragoza)
- Fuencarral Fuel Supply Facility (Madrid)
- Fuel supply facility and maintenance workshop in Irun (Guipuzcoa)
- Fuel supply installation in Monforte de Lemos (Lugo)
- Ourense fuel supply facility and maintenance shop
- Motor material workshop and fuel supply installation in Salamanca
- Seville fuel supply installation
- Former fuel supply facility at Teruel
- Valladolid fuel supply facility
- Former fuel supply installation of the integral maintenance base of Villaverde (Madrid)
- Zafra fuel supply installation (Badajoz)

Risk Control Sites (15)

In 2023, the sites under Risk Control are as follows:

- Abroñigal fuel supply installation (Madrid)
- Alicante fuel supply facility
- Almeria fuel supply facility
- Bilbao Station (Vizcaya)
- Bilbao Freight Terminal (Vizcaya)
- Cartagena fuel supply installation (Murcia)
- Cordoba fuel supply facility
- Barcelona Morrot Logistics Centre
- Grenada Fuel Supply Facility and Maintenance Shops
- Huelva fuel supply facility
- Irún Goods Terminal (Gipuzkoa)
- Júndiz Goods Terminal (Álava)
- Motor material workshop and old fuel supply installation in Miranda de Ebro (Burgos)
- Valladolid Track Technology Centre (CTV)
- Vicálvaro fuel supply installation (Madrid)

[12] The sites managed jointly with Renfe-Operadora are (9): 1) Fuel supply installation and maintenance workshop in Irún; 2) Fuel supply installation and maintenance workshop in Ourense; 3) Fuel supply installation and workshop in A Coruña; 4) Former fuel supply installation in Villaverde (Madrid); 5) Cerro Negro self-propelled equipment workshop; 6) Motor workshop and fuel supply installation in Salamanca; 7) Motor workshop and former fuel supply installation in Miranda de Ebro (Burgos); 8) Fuel supply installation in Almería; 9) Fuel supply installation and maintenance workshops in Granada.

Risk Monitoring Sites

In 2023, there were no sites under Risk Monitoring.

Below is a set of indicators to help understand the process of the work at each group of sites.

Table 25. Evolution of key Environmental Indicators, 2012-2023. Sites undergoing Decontamination.

Sites under Decontamination	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
No. of sites	5	6	7	6	6	8	8	8	15	15	15	16
Fieldwork days	642	712	335	344	395	433	700	302	295	263.5*	424	693
No. of piezometers	165	177	199	197	235	319	329	315	500	561	615	639
No. of control points	1,963	1,838	1,849	1,848	3,560	2,961	3,037	2,960	4,187	7,780	7,121	6,258
No. of samples	318	194	303	185	310	222	301	319	610	711	499	601
Quantity of soil treated (t)	0	2,776	225	1,566	20	0	1,335	0	31.32	178.88	26.26	8.9
Volume of hydrocarbon water pumped (m^3)	36,113	18,031	11,595	13,513	10,237	3,530	17,997	13,223	17,619	14,630	14,173	20,669
Volume of hydrocarbon recovered (l)	5,596	2,307	1,766	4,274	3,120	1,744	8,856	5,050	6,894	8,892	13,388	15,821
Electricity consumption (kWh)	246,867	159,952	91,506	102,856	52,911	18,390	129,650	30,050	81,055	84,958	91,474	130,700
No. of reports (monitoring, projects, proposals, etc.)	16	15	13	8	11	14	13	11	27	49	53	62

*The decrease in working days is due to the outsourcing of environmental work at certain sites.
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Table 26. Evolution of key Environmental Indicators, 2012-2023. Risk Control Sites.

Risk Control Sites	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
No. of sites	17	17	18	21	21	22	22	21	18	15	15	15
No. of sites visited during the year	15	16	14	20	17	21	19	21	13	15	12	13
Fieldwork days	47	57	70	71	82	89	89	85	47.5	51	60.5	115
No. of piezometers	106	133	132	171	164	197	173	192	93	106	106	123
No. of control points	303	428	444	498	410	561	476	534	171	475	562	632
No. of samples analysed	131	149	164	290	263	218	177	232	173	285	295	302
Volume of hydrocarbon recovered (l)	183	580	1,199	68	55	595	367	206	4	0	0	0.05
No. of Reports (monitoring, projects, proposals for action, etc.)	15	19	16	24	20	24	20	25	17	28	25	27

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

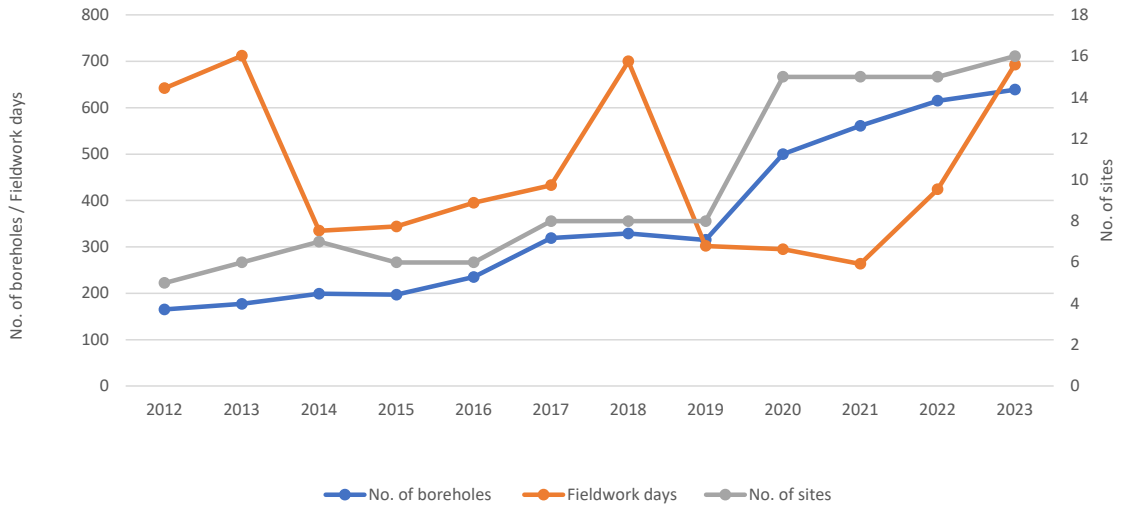
Table 27. Evolution of key Environmental Indicators, 2012-2023. Risk Monitoring Sites.

Risk Control Sites	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
No. of sites	2	-	3	4	4	2	2	3	1	1	1	0
Fieldwork days	31	-	38	18	41	18	64	36	1	15	22	0
No. of piezometers	45	-	68	78	87	43	46	60	14	20	26	0
No. of control points	68	-	72	78	81	66	353	332	0	2	92	0
No. of samples	67	-	75	45	101	37	44	57	0	4	18	0
Volume of water pumped (m^3)	-	-	-	0	7	2	0	0	0	0	0	0
Volume of hydrocarbon recovered (l)	-	-	0	0	1,810	1,845	489	0	0	-	0	0
No. of reports (monitoring, projects, proposals for action, etc.)	2	-	3	5	3	2	2	4	1	1	5	0

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

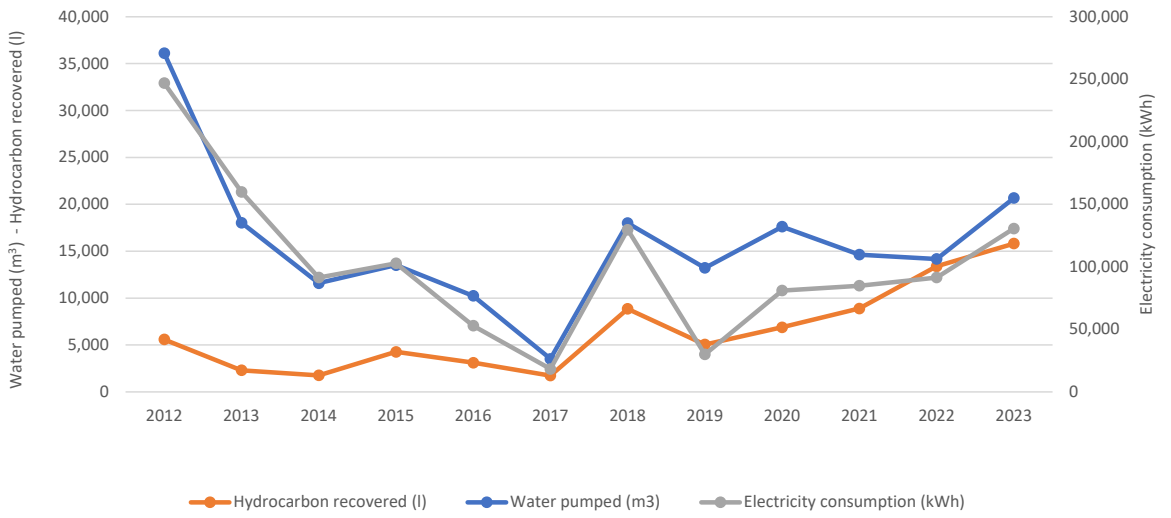
The following graphs show the evolution of the indicators:

Chart 27. Sites under Decontamination



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

Chart 28. Water pumped (m^3), hydrocarbon recovered (l), and electricity consumption (kWh) at sites under Decontamination



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

As mentioned above, environmental remediation actions have been initiated as part of the new soil decontamination contract. As a result, since 2020, some indicators have increased significantly, including the number of boreholes, the volume of hydrocarbon recovered, electricity consumption, and the number of reports, among others. This trend was even more pronounced in 2023, highlighting the increased amount of work carried out.

In 2021 and 2022, there was a decrease in the volume of hydrocarbon-affected water pumped compared to 2020. This decrease was primarily due to the Salamanca site, where one of the high-vacuum pumps was stopped in 2021, due to a reduction in the number of free-phase wells and the observed thicknesses of the free phase. Additionally, the volume of water pumped at this site was affected by a gradual lowering of the water table, which led to reduced pump flow rates. In 2023, however, the volume of hydrocarbon-affected water pumped increased at all sites, primarily due to pumping at the A Coruña, Fuencarral, Seville, and Valladolid sites. This is despite the fact that the other high-vacuum pump at the Salamanca site was scheduled to be stopped in September 2023, which highlights the increase in activity at the other sites.

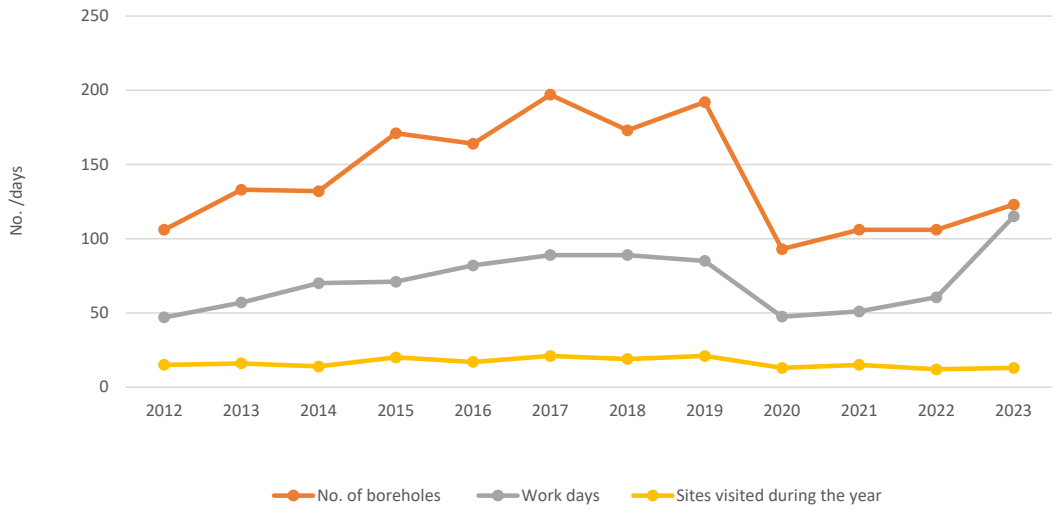
The volume of recovered hydrocarbon increased in 2021, primarily due to diesel oil leaks at the A Coruña and Fuencarral sites, which were subsequently recovered. In 2022, the increase was particularly due to creosote extractions at the Andújar site. In 2023, the largest volume of recovered hydrocarbons was recorded at the Andújar site, continuing the trend from the previous year, and at Valladolid, where a high-vacuum system was implemented. This system has proven to be very effective in extracting hydrocarbons.

In terms of the quantity of treated soils, 8.9 tonnes of impacted soils from the Salamanca site, were managed externally (at a landfill) in 2023.

Additionally, in 2023, the indicator for the surface area affected by free phase -measuring the largest affected area by at each site from all the visits during the year, with thicknesses greater than 1 mm- was introduced. This indicator will provide reliable information on the evolution of the extent of contamination plumes at the

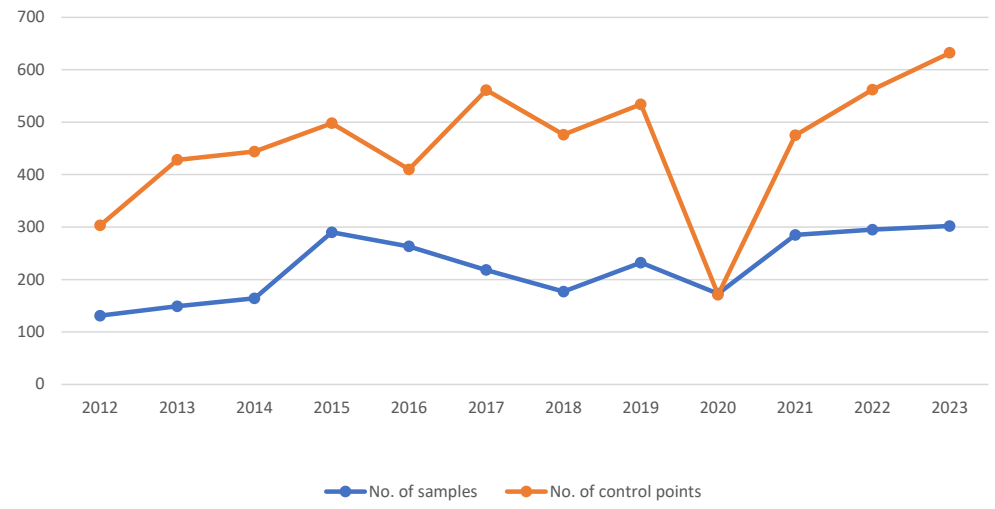
different sites and globally. In 2023, this area was almost 20,000 m^2.

Chart 29. Risk Control Sites



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

Chart 30. Number of monitoring points and number of samples at sites under Risk Monitoring

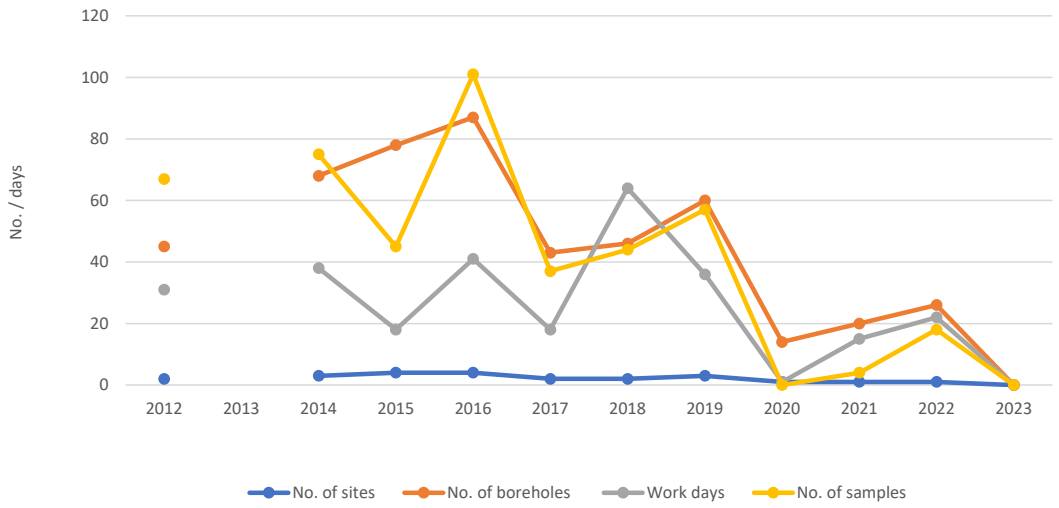


Source: Adif-Alta Velocidad, Corporate Management, Corporate Environmental Sub-Department.

The decrease in the number of sites under Risk Control since 2019 has led to a corresponding reduction in some indicators, such as the number of piezometers, control points, samples analysed, etc. However, in 2021, there was an upturn in these indicators, which continued in the following years due to intensified controls at sites such as Miranda de Ebro, Córdoba, and Cartagena, among others. This trend continued in 2023, mainly due to the increase in the number of sampling points in Granada, where characterisation has been extended.

In 2023, as mentioned earlier, there were no sites under Risk Monitoring, as El Portillo was moved to the group of sites undergoing Decontamination.

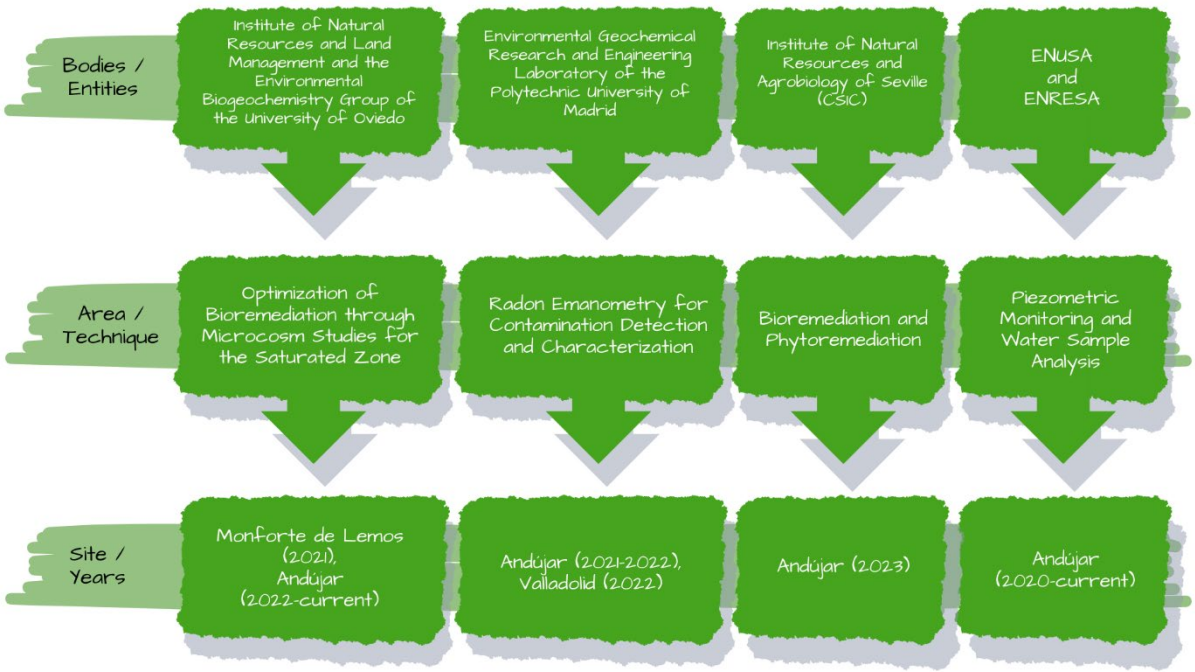
Chart 31. Risk Monitoring Sites



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

Collaborations

In soil decontamination, Adif has the following collaborations:



Communications

In 2023, 78 communications were received from or submitted to the relevant authorities regarding water and contaminated soils. Of the 19 communications received, 9 are requests for actions or documentation: for soil investigation (6), for Preliminary Soil Situation Reports (PSRs) (2), and for both (1). The remaining communications received are related to the PSRs submitted (6), the Environmental Risk Assessment conducted (1), and the submission of information (3).

Of the 59 communications sent to these administrations, 58 were for the submitting documentation, and 1 was a request for information. The documentation submitted included monitoring reports of decontamination projects/actions (39), PSRs/SR (9), decontamination projects and alternative studies (4), environmental risk characterisation and assessment reports (4) and analytical results (2).

Fourteen internal communications were also received and addressed promptly. These included requests for advice on contaminated soil in projects/facilities (4), PSRs (3), contractual clauses (2), external regulations (2), and communications on environmental emergencies (3).

It should be noted that all these communications –whether received or submitted– require the analysis and/or preparation of complex studies in areas such as contaminated water and soil investigation, environmental risk assessment, and remediation projects.

Sites under Decontamination

a.- A Coruña fuel supply facility and workshops

Between 2007 and 2008, the subsoil of the site was characterised, and hydrocarbons (TPH) were detected in soils and groundwater, with non-aqueous phase hydrocarbons present at several locations. An Environmental Monitoring Programme, an Environmental Risk Assessment, and a Decontamination Project were prepared for the site. The project began in November 2009 and involved excavating part of the contaminated soil; removing sources of contamination- such as the old diesel tank, pump house, separator, buried pipes, and the old heating tank; repairing the hydrocarbon-affected water treatment network; installing a new diesel storage and supply system; and operating two hydraulic barriers that use pneumatic pumping to extract hydrocarbon-affected water is extracted from the subsoil.

One of the hydraulic barriers is situated in the northern area where the pumps are located and has been in operation since 2010. The other barrier was situated in the southern part of the site, near the boundary with the neighbouring parcel, and ceased operation in 2016 when contamination levels fell below the target values.

In June 2020, at the request of the *Consellería de Medio Ambiente, Territorio e Vivenda de la Xunta de Galicia* (Galician Regional Government's Department of Environment, Territory, and Housing), a Proposal for Action was presented for the area around the pumps, where non-aqueous hydrocarbons have been recorded recurrently since 2010. This Proposal included the construction of new piezometers, Direct Push injections of surfactants to mobilise the retained non-aqueous phase, and the extraction of hydrocarbons and hydrocarbon-affected water by pumping. This Proposal was approved in October 2020, although its implementation has

been affected by a fuel line failure detected in November 2020. As a result of this failure, fuel leaked. However, since the spill point was located just upstream of the pumping area, it was possible to extract the leaked oil from the pumping points, thereby confining the impact to this area and preventing it from mitigating. Additionally, the actions taken in 2021, including the excavation of contaminated soils and installation of new pumping points at the source, effectively facilitated the extraction of the leaked fuel in this area.

In 2022, the pump area was still affected, although the thicknesses of oil and the quantity recovered had decreased significantly compared to 2021.

Hydrocarbon extraction work continued in 2022 and 2023 Most of the leaked fuel has been recovered, and the advance of the oil plume has been contained, preventing it from migrating beyond the area of the spill. The construction of the new A Coruña Intermodal Station affects the remediation system installations, so efforts are being coordinated to prevent potential damage to the piezometers and other underground infrastructures.

b.- Former fuel supply installation at Algeciras (Cádiz)

In 2007, a soil quality investigation at the former fuel supply facility in Algeciras revealed the presence of hydrocarbons (TPH) in both soils and groundwater, with non-aqueous phase hydrocarbons detected at several points. The historical activities of supplying diesel fuel to locomotives and maintaining workshop facilities have caused the site's contamination, primarily with diesel fuel and, to a lesser extent, by oils and greases. The clays in the soils have acted as a physical barrier to the vertical movement of the contaminants, and the high-water table has limited the vertical migration of the free phase.

Figure 13. Soil excavation. Algeciras.

In 2008, an Environmental Monitoring Programme was implemented at the site. An extension of the site characterisation was carried out, and work began on preparing an Environmental Risk Assessment and a Voluntary Recovery Project. This project focused on excavating and managing affected soils in a landfill and removing hydrocarbon and heavily hydrocarbon-affected water.

In December 2009, the *Consejería de Medio Ambiente de la Junta de Andalucía* (Andalusian Regional Ministry of the Environment) declared the site to be contaminated land, and in January 2010, it approved the Voluntary Reclamation Project. The work outlined in the Project was completed in the first half of 2010. However, non-aqueous phase hydrocarbons were detected in two piezometers near the workshop -outside the action area and in locations where no non-aqueous phase had previously been detected. This highlighted the need for additional corrective measures, as these represented a secondary source of contamination. In the following years, monitoring work and oil purging campaigns were conducted. However, this work had to be halted due to the risk of collapse of the old buildings on the site, as well as the safety and health concerns related to land occupation. The decommissioning of the facilities was completed in June 2019. However, as it was unable to demonstrate the recovery of the soils and groundwater at the site, the *Consejería de Medio Ambiente* (Regional Ministry of the Environment)

initiated a disciplinary procedure in July 2017, which resulted in a sanction.

Once the facilities had been decommissioned, a new characterisation and a Voluntary Recovery Project were completed. These were submitted for approval to the Regional Ministry of the Environment and Territorial Planning in May 2020 and, again in November 2020, when no response was received.

In April 2021, the Regional Ministry communicated that the submitted Reclamation Project was not approved. Since the land had been declared contaminated, a Decontamination Project was required instead of a Voluntary Reclamation Project, and the competent authority for its approval was the Algeciras City Council.

In accordance with this, a Subsoil Decontamination Project and an Environmental Risk Assessment were prepared and submitted for approval to the Algeciras City Council in December 2021. The implementation of the Project began in November 2022 and has been ongoing throughout 2023. This involves the removal of the non-aqueous phase of the oil and the excavation of the impacted soils for *in-situ* treatment. This treatment is performed through surface aeration and chemical oxidation, except for less affected soils, which are treated by aeration and natural attenuation. Three oxidant injection campaigns were carried out in 2023. Sampling of the treated soils, the remaining soil in the excavated pit, and the groundwater will be carried out in early 2024. Once the treatment of the soils is completed, the soils shall be used as backfill for the excavation void.

c- Former creosoted base at Andújar (Jaén)

The former creosoted base at Andújar was used for about ninety years (1906-1997) to treat railway sleepers with creosote. As a result of this activity, carried out by various entities/companies, creosote contaminated the surface soil, percolating down to water table. This affected groundwater quality due to dissolved pollutants and hydrocarbons in a dense non-aqueous phase.

In 2007, the tanks were dismantled, and the liquid creosote was removed and managed as waste. Soil and groundwater characterisations were carried out in 2008 and 2009. In 2010, the environmental diagnosis was extended, and both an Environmental Risk Assessment and an Environmental Recovery Project were carried out. As part of this Project and to prevent the non-aqueous phase creosote from leaving the site, a plastic barrier was constructed in 2011. Monitoring piezometers and extraction wells were also installed to pump out the creosote in the subsoil.

Upstream from the site is the former Andújar Uranium Plant. Given the possible presence of radioactive compounds in the groundwater intercepted by the plastic barrier, the Spanish Nuclear Safety Council (CSN) requested in November 2014 that Adif conduct a radiological characterisation of the water and creosote to determine whether the extracted waste should be managed as radioactive waste. Extractions were therefore halted in 2015 and 2016 until the CSN decided at the end of 2016 that they should not be treated as radioactive waste.

In 2016, the characterisation was further extended, providing a better understanding of the contamination sources and the behaviour of creosote in the subsoil.

Since 2017, creosote extraction and subsoil environmental quality monitoring have resumed, and the site characterization has been substantially extended. With the creosote plumes now more precisely defined, large-diameter extraction wells have been installed within the plumes, allowing for the capture and extraction of larger quantities of non-aqueous phase creosote.

In 2021 and 2022, the *laboratorio de Investigación e Ingeniería Geoquímica Ambienta*

(Environmental Geochemical Research and Engineering laboratory) of the Technical University of Madrid (UPM) conducted an emanometry study at the site. This study used radon concentration measurements in the air of the unsaturated soil zone as an indirect technique to detect and characterise contamination, based on radon's preferential distribution in the organic phase of the subsoil compared to the air or water phases. During these two years, five emanometry campaigns were conducted, which helped identify the affected areas.

Additionally, various tests have been conducted to assess the technical feasibility of potential soil treatments for the site, including Lefranc permeability, soil washing, laboratory thermal desorption, *in situ* chemical oxidation with hydrogen peroxide, laboratory cement stabilisation, surfactant injection, and landfarming. A geotechnical study has also been conducted to assess the stability of the soil excavation works on this site. In 2023, the Institute for Natural Resources and Agrobiology Sevilla (CSIC, Spanish National Research Council) conducted research on bioremediation and phytoremediation for treating these contaminated soils.

Figure 14. Pilot cells for landfarming. Andújar.

Based on the results of these tests, a Study of soil remediation alternatives and a Decontamination Project were prepared and presented to Andújar Town Council in March and October 2023, respectively. The study of alternatives evaluates viable options for the site -landfill management, containment, landfarming, and thermal desorption- based on criteria as best available techniques, environmental impact, facilities and site users, sustainability, eco-efficiency, and cost. The techniques that received the best evaluation and were therefore selected for the project are landfarming and landfill management. The project is expected to last 54 months and involves excavating approximately 14,000 m^3 of soil. Of this, 80% will be treated by landfarming, 20% will be managed in a landfill, and periodic creosote extractions will be carried out.

d- Badajoz fuel supply facility

Characterisation and remediation work began at the site in 2007, following the detection of hydrocarbon contamination in the subsoil. Initially, three non-aqueous phase oil plumes were identified at the former fuel supply points and in the area where the fuel had been displaced. In 2008, an Environmental Risk Assessment and a Voluntary Subsoil Remediation Project were prepared to address the non-aqueous phase hydrocarbons at the site and minimise risks to health and ecosystems. In 2010, the remediation system was put into operation. It consisted of two pieces of equipment for groundwater extraction using by high vacuum (bioslurping) and subsequent surface treatment with a physical separation system that included a decanter, a hydrocarbon separator, and an activated carbon filter.

In June 2015, after several months without detecting any free product, one of the high-vacuum units was shut down. The other unit was stopped in March 2016. The system was decommissioned in November 2017.

In the following years, monthly visits continued, including measurements of the water table and non-aqueous hydrocarbon phase, purging of accumulated hydrocarbons in piezometers, installation of absorption devices, and groundwater pumping at locations with high concentrations. Additionally, groundwater quality was monitored biannually.

Figure 15. Level measurement. General view of the site. Badajoz.

Since February 2018, residual non-aqueous phase oil has been detected only intermittently in some piezometers located in the area of the displaced loading point. Similarly, regarding TPH concentrations in groundwater, all piezometers have recorded levels below the target thresholds, except for some boreholes near the loading point, indicating that the impact is contained in this area.

In address this residual effect, in October 2021, Complementary Measures to the Decontamination Project for the site were prepared at the request and with the approval of both the *Confederación Hidrográfica del Guadiana* (Guadiana River Basin Authority) and the *Consejería para la Transición Ecológica y Sostenibilidad de la Junta de Extremadura* (Department for Ecological Transition and Sustainability of the Regional Government of Extremadura). These measures involve actions in the area of the loading point, including: the installation of new boreholes; surfactant infiltration to remove remaining hydrocarbons; pneumatic pumping to create a barrier and collect hydrocarbons mobilised by the surfactant; and intermittent manual pumping, as a complement to the permanent pumping. These Measures began in December 2021,

In April 2023, due to the extension works of the new the high-speed line platform, the pneumatic pumping and surfactant injection works were halted, and an *in situ* chemical oxidation test using activated sodium persulphate was conducted to assess the reduction in hydrocarbon concentrations through the oxidation of organic compounds. In the following months, several oxidant infiltration campaigns were conducted to enhance the removal of residual oil in the area of the loading point.

With the implementation of these Measures, a clear improvement in the environmental situation of the site is observed throughout 2022 and 2023. The measures will continue in 2024, and if the absence of non-aqueous phase at the site persists through several consecutive inspections, a sampling campaign of all the piezometers will be conducted, and the Environmental Risk Assessment will be updated to consider the site's decontamination as completed.

e- Cerro Negro self-propelled equipment workshop (Madrid)

The Cerro Negro self-propelled equipment workshop began its activity in the middle of the 20th century. Since then, several incidents have affected the site's soils and groundwater. Since 2007, various subsoil characterisation and environmental monitoring activities have been carried out. This work revealed significant oil contamination of soils and groundwater, as well as a substantial presence of oil in the non-aqueous phase.

In November 2008, the site's Environmental Monitoring Programme was established. Based on the results from the monitoring campaigns, corrective actions were designed and implemented in September 2009 to assess the impact and control the contamination plume. These actions involved extracting the supernatant hydrocarbons from the piezometers using a bailer purging and installing oil-eating microorganisms (oil eaters).

In 2010 and 2011, four new characterisation campaigns were conducted, which confirmed that both soils and groundwater were affected by high concentrations of hydrocarbons (TPH and PAH). The campaigns also measured

hydrocarbons in the non-aqueous phase in many of the installed piezometers. Two plumes were identified: one potentially generated by the overhead fuel tanks and the other by the fuel pumps at the entrance to the medium-distance workshop. The product causing the damage was identified as diesel fuel, used in the installations to supply locomotives as well as heating and hot water boilers.

To eliminate this non-aqueous hydrocarbon phase, a site decontamination project was developed in November 2011. The project involved installing new piezometers that function as extraction wells and skimmers.

At the end of 2015 and the beginning of 2016, a remediation and environmental protection project was carried out in the concreted area of the fuel pumps and access roads to the workshop. This project involved demolishing the existing concrete floor, excavating contaminated soil, installing new fuel supply points equipped with anti-spill trays, and laying a new concrete floor that integrated these trays.

In 2016, the scope of the Decontamination Project was reviewed to enhance the effectiveness of the corrective actions. To this end, the number of extraction points was increased, and some of the manual blowdowns were replaced by mechanical ones to improve oil recovery. In the following years, due to the continued presence of non-aqueous oil phases in some control/extraction points, these actions have continued.

In the second half of 2021, work was carried out to improve the internal tracks, and 26.88 t of surface soil affected by hydrocarbons were removed. In 2024, a project is planned to improve the discharge network and the discharge treatment system, which is expected to significantly enhance the environmental condition of the site.

f- Former fuel supply installation of El Portillo (Zaragoza)

In 2009, during construction work on the CaixaForum Zaragoza building, located west of the former *El Portillo* station site, a series of boreholes revealed signs of hydrocarbon contamination of the soil and groundwater. In 2010 and 2011, soil characterisation work was carried out on the CaixaForum site and its immediate surroundings. Subsequently, at the request of the Government of Aragon in July 2012, the initial characterisation was extended to include the entire railway land. The investigation concluded that there are two diesel contamination plumes on the site and several areas with impacted soils. It was also determined that there is an off-site contamination source of Adif. Similarly, an Environmental Risk Assessment was conducted, which determined that there were no unacceptable environmental risks for potential receptors, provided that the supernatant product was removed.

Based on the analysis of this documentation, the *Confederación Hidrográfica del Ebro* (Ebro River Basin Authority) initiated an administrative procedure in May 2014 to determine the extent of Adif's obligation to repair any contamination it may have caused in the waters of the alluvial aquifer of the Ebro in Zaragoza, due to a possible fuel leak from the former *El Portillo* facilities. The *Confederación Hidrográfica del Ebro* issued a decision requiring Adif to repair the diesel contamination in the subsoil of the old facilities, resulting from the railway activities conducted. In addition, it required Adif to decommission the fuel tank located beneath the elevated car park of the former station, to conduct a study to assess the quality of the soils adjacent to the decommissioned tank, and to submit a proposal for a groundwater monitoring and control programme, as well as a proposal for additional groundwater investigation.

In July 2014, a complementary environmental characterisation was carried out in the southern area of the site, and the aforementioned resolution of the *Confederación Hidrográfica del Ebro* was appealed, first administratively and then

in court. It was argued that there was no obligation to remediate the contamination on the grounds that the primary oil plume at the site originated from an external source (presumably a heating oil tank), and that the existing heating oil tank under the car park of the old station, which was disused and emptied in 2006, is not decisive in explaining the environmental situation at the site.

In 2015, the aforementioned fuel tank under the car park was removed, and a study of the soils adjacent to the tank was conducted. This study determined that the quality of the soils beneath the tank did not provide evidence of any significant leakage, and thus it could not be considered a source of a non-aqueous phase of diesel contributing to the aquifer.

The High Court of Justice of Aragon, in its ruling of 25 September 2019, dismissed Adif's appeal. Subsequently, in November 2020, Adif received a notice. In response to this, in January 2021 a Proposal for a Monitoring and Control Programme and a Proposal for Additional Groundwater Investigation to delineate the contamination plumes were submitted to the *Confederación Hidrográfica del Ebro*. In June of the same year, approval was received for both proposals, along with a request for information from the *Confederación Hidrográfica del Ebro*.

In compliance with this requirement, a Supplementary Investigation was initiated in October 2021, starting with the drilling of two of the seven planned boreholes. The remaining five boreholes, located on public roads, were drilled in March-April 2022, after receiving the necessary authorisations from Zaragoza City Council. Based on the results of this research, a Groundwater Environmental Recovery Project was drafted and presented to the Government of Aragon and the *Confederación Hidrográfica del Ebro* in October 2022. Subsequently, the Government of Aragon required the preparation of a Quantitative Risk Analysis in accordance with Royal Decree 9/2005. This analysis, submitted in March 2023, concluded that the condition detected in the facility's soils does not pose an unacceptable risk to the health of the receptors defined for both the current and future uses, whether on site or off site. In April, a response was received from the Government of Aragon stating that it was not appropriate to initiate a contaminated soil dossier. They requested compliance with the provisions of the *Confederación Hidrográfica del Ebro* and, once the remediation work was completed, the submission of the final report including the results carried out.

Throughout 2023, several meetings have been held with the *Confederación Hidrográfica del Ebro* to review the Environmental Recovery Project presented in October 2022. In accordance with what was agreed at these meetings, a new Project was submitted in November 2023 and is currently awaiting approval.

g- Fuencarral Fuel Supply Facility (Madrid)

An investigation into the quality of the subsoil in the Fuencarral fuel supply area was conducted in 2007. It revealed the presence of total hydrocarbons in soils and groundwater, as well as aromatic hydrocarbons in the groundwater. In 2008, an Environmental Risk Assessment and an Environmental Monitoring Programme for the site were developed to monitor the environmental condition of the subsoil. Since then, regular environmental monitoring has been conducted at the site, including environmental and site inspections, groundwater and free product measurements, purging, groundwater sampling, and the installation and removal of oil eaters.

In 2021, due to the detection of non-aqueous phase hydrocarbons at the site, characterisation work was initiated to model the existing environmental issues in the subsoil and, if necessary, to develop a remediation proposal. To this end, 15 boreholes were drilled between July and August 2021, with piezometers installed in the vicinity of the pump area. During the drilling of one of the boreholes, a fuel pipe ruptured,

causing fuel to leak into the ground. Immediately, action was taken to recover the leaked product.

In May 2022, an extension of the subsoil characterisation was completed, confirming the presence of non-aqueous phase hydrocarbons at the site. Work then began on preparing the Decontamination Alternatives Study and the Environmental Remediation Project.

In March 2023, a proposal for environmental restoration was submitted to the Regional Ministry of the Environment, Housing, and Agriculture. After analysing this proposal, the Regional Ministry issued two requests for information in May and December. These requests sought, among other things, a timetable of actions that included the delineation of the land affected by hydrocarbons, feasibility tests on potentially applicable clean-up techniques, and the preparation of a voluntary recovery project, as well as a Soil Situation Report on the fuel storage and supply activity.

In response to these requests, the Regional Ministry has been informed that the requested work will be carried out once the ongoing works in the area around the study site are completed.

h- Fuel supply facility and maintenance workshop at Irun (Basque Country)

This site presents a historical environmental issue due to the fuel spills in the vicinity of the old pump, as well as near the displaced loading point. This issue has been solved, as the old pump has been removed and anti-spill systems have been installed at the new pump and loading point.

An exploratory investigation of the site's subsoil was carried out in 2007. The results of this investigation indicated the need for a detailed assessment of the subsoil quality, which was subsequently conducted. As a result of this work, a series of environmental control measures were established, which have been in place since 2010. These measures include monitoring piezometric levels and the presence of hydrocarbons in the non-aqueous phase, purging hydrocarbons, and sampling groundwater and ambient air in the workshop.

Following a request from the Basque Government's Department of the Environment in 2014, the corrective actions at the site were modified. Passive skimmers were installed, and groundwater analyses were increased. These actions continued in the following years.

In June 2020, a new administrative requirement was received, requesting, among other things, that the implemented control actions be maintained and adapted based on the information obtained; that the groundwater analytical programme be extended; and that a Sanitation Action Plan be presented once the timeframe and scope of the entry of the high-speed railway's entry into the site are known.

In September 2020, a characterisation was conducted in the rear area of the workshop (formerly the fuel supply area) to gather information for preparing a Decontamination Project. Based on this characterisation, different soil remediation alternatives were assessed, considering not only technical, environmental, and economic criteria but also the need to ensure that the decontamination work was compatible with ongoing activities in the maintenance workshop and railway traffic.

In July 2022, a letter was received from the Department of Economic Development, Sustainability and Environment of the Basque Government, requesting quarterly monitoring of the site, an extension of the subsoil investigation, and the preparation of a revised Quantitative Risk Analysis and a Remediation Plan. This documentation was submitted in March 2023. Pending approval of the Plan by the Basque Government, quarterly checks are carried out at the site.

i- Fuel supply installation at Monforte de Lemos (Lugo)

Site characterisation work was carried out in 2007, revealing the presence of hydrocarbons in

the soils and groundwater in the fuel supply area. Subsequently, an Environmental Risk Assessment was carried out, which concluded that the effects did not pose an unacceptable risk to potential receptors. An Environmental Monitoring Programme was established at the site in 2008 to monitor the quality of the subsoil. During the environmental controls conducted in 2008 and 2009, non-aqueous phase hydrocarbons were detected in one of the piezometers. Due to the proximity of a channelled stream and its potential impact, corrective actions were initiated to remove the detected hydrocarbons. Additionally, environmental controls and complementary investigations were carried out.

In 2014, since the controls continued to detect non-aqueous phase hydrocarbons in one of the piezometers around the pumps, an Environmental Improvement Project for the subsoil was developed and approved by the *Consellería de Medio Ambiente* (Galician Department of the Environment). The aim was tp eliminate the non-aqueous phase supernatant. The project included 12 months of groundwater level monitoring, groundwater sampling, purging, manual extraction of hydrocarbons using a bailer, and installation of oil eaters. In addition, interventions were made at the site to prevent leakage from the hydrocarbon water network, and the supply area was delineated.

Corrective and control actions continued in the following years. In 2017, further improvements were made to the installation, including of the replacement of the old separator; the renovation of the fuel delivery pipes, and the cleaning and surface sealing of the manholes, troughs, spill trays and tank.

As the situation at the site remained affected, at the end of 2020, with the approval of both the *Consellería* and the *Confederación Hidrográfica del Miño-Sil (*Miño-Sil River Basin Authority), a new Proposal for Actions was initiated, which included a new Environmental Risk Assessment. The Proposal envisaged both actions to remove the non-aqueous phase, such as installing oil accumulation and recovery devices, and to reduce dissolved hydrocarbons through the injection of microbial biostimulants and the installation of oxygen-releasing devices. A study on optimisation of bioremediation at this site was commissioned with the University of Oviedo. Following the study's recommendations, biostimulant injections began in September 2021, and oxygen-releasing devices were installed.

These actions continued in 2022, and the results of the checks conducted showed that they were effective. Once the target levels had been met, groundwater sampling was conducted in October 2022 at all the piezometers on the site, and surface water sampling was performed in the Rioseco stream to certify the final state of the site following the environmental improvement work. The results confirmed that the site meets the quality criteria established in the reference standard.

Figure 16. Rioseco Stream. Monforte de Lemos.

In March 2023, a new Environmental Risk Assessment was prepared, concluding that the detected concentrations did not pose an unacceptable risk to human health or to the river ecosystem. The *Consellería de Medio Ambiente* was then requested to approve the completion of the environmental actions at the site. In June 2023, a letter was received from the Consellería de Medio Ambiente approving the reclamation of the site and establishing an annual control and monitoring plan for soil and groundwater quality.

j- Ourense Fuel Supply Facility and Maintenance Workshop

This site has a historical environmental issue due to the supply of fuel to locomotives, which has led to hydrocarbon contamination in the subsoil. The installation featured an aerial fuel tank, installed in 1979, along with several dispensers. Both the depot and the pumps were decommissioned in 2010.

Since 2007, environmental actions have been carried out at the site to address this environmental issue. In addition, in 2008 there was a diesel leak from a fuel pipe, which led to the preparation of a Recovery Project and an Environmental Risk Assessment, submitted to the *Consellería de Medio Ambiente, Territorio e Infraestructuras de la Xunta de Galicia* (Department of Environment, Territory and Infrastructures of the Xunta of Galicia).

From 2008 to 2013, environmental remediation work was carried out to restore the affected subsoil and prevent the movement of contaminated water to the homes downstream of the facility. The work involved operating of two hydraulic booms to capture water and oil using pneumatic pumping and high vacuum, as well as injecting water and surfactant solution to mobilise the oil trapped in the soil. These actions led to a substantial improvement in the environmental situation.

In 2014, after noting the absence of a non-aqueous phase, a Control Programme and an extended Environmental Risk Assessment were developed at the request of the Galician *Consellería de Medio Ambiente*. The assessment concluded that the impact on soils and groundwater did not pose an unacceptable risk to either the site's workers or residents in the downstream dwellings.

In the following years, environmental monitoring, groundwater sampling, level measurement, hydrocarbon extraction, and the installation of sorbents were carried out in piezometers where non-aqueous phase occasionally appeared.

In 2017, there was an accidental spillage of degraded oil into a piezometer well. Thanks to the Monitoring Programme, the spill was quickly detected, and most of it was recovered.

Figure 17. Spill line. Ourense.

Due to a worsening of the condition and at the request of the Regional Department, a Proposal for Actions was submitted in December 2019. This proposal included the removal of the non-aqueous phase through fortnightly pumping and the installation of absorbents, as well as the reduction of dissolved hydrocarbons in the groundwater via aeration and oxygenation of the aquifer (biosparging), chemical oxidation, and enhanced bioremediation with nutrients, oxygen, or other amendments. In February 2020, Regional Department approved this Proposal, and trials of these techniques began.

In 2020, there was an increase in disturbance at the site, which was attributed to the conduct of the test mentioned above. However, this trend continued into 2021 and 2022, making it necessary to consider further action in 2023. More intensive measures, such as continuous pumping or high-vacuum extraction, were ruled out because they would not significantly improve hydrocarbon extraction due to low yields and would entail a high environmental cost from increased energy consumption and waste generation. Therefore, in the first half of 2023, it is decided to make some improvements to the

point pumping system. In July, a pneumatic pumping system was installed at the four most affected points, operating daily for four hours in two cycles. Additionally, other wells are pumped on *ad-hoc* basis. These improvements have led to a significant reduction in pollution levels compared to the previous two years. However, since the presence of free phase is residual, the amount of recovered oil is very low.

k- Salamanca motor equipment workshop and fuel supply facility

In 2007, an investigation of the subsoil of the motor workshop facilities and the fuel supply area in Salamanca revealed that the soil was contaminated with total petroleum hydrocarbons (TPHs). Additionally, groundwater was found to contain non-aqueous phase products, high concentrations of TPHs, and aromatic hydrocarbons. Therefore, an Environmental Monitoring Programme was designed in 2008 to monitor the environmental situation of the site.

In 2009, a Decontamination Project was developed, and actions were taken to eliminate the active sources of pollution. In 2015 and 2016, the characterisation was extended, revealing changes in the environmental situation of the site. As a result, the Decontamination Project was modified, and an Environmental Risk Assessment was prepared (in November 2016). Possible sources of contamination, which were eliminated, were the former included the former heating oil storage and locomotive fuel supply areas, the old waste oil collection basin in the roundabout, and the access roads to the workshop.

The objectives of the Project are to remove non-aqueous phase oil detected in the subsoil and to treat soils that may be acting as secondary sources of groundwater contamination, reducing the risk to human health to acceptable levels. The selected treatment techniques are: selective soil excavation for treatment by landfarming or landfill management; recovery of the non-aqueous phase through pumping, soil aeration, and periodic purging; and surface cleaning using a biostimulatory agent and pressurised hot water.

New remediation work began in 2017. A modification of the treatment system was made due to the exceptional drought and rainy conditions, which caused a pronounced fluctuation in the water table and a greater accumulation of non-aqueous phase in wells with low water levels. Consequently, the system was changed to high vacuum and pumping to lower the groundwater level.

The high-vacuum system was brought into operation in May 2018. In November 2021, due to the reduction in the number of wells with non-aqueous phase and their apparent thicknesses, one of the two vacuum pumps was deactivated. In September 2023, the other bomb was stopped, and the equipment was decommissioned. In December 2023, three months after the removal of the equipment, no free phase was detected at the site.

As for the treatment of the soil by landfarming, a total of five batches, amounting to approximately 1,756 m^3, have been treated to levels of hydrocarbon concentration that permit their reuse on site as backfill material. In September 2023, selective soil excavation began in the area designated for treatment.

l- Seville fuel supply installation

This site has been under environmental monitoring since 2010 due to contamination in the subsoil resulting from the historical fuel supply activities for locomotives.

In 2017, an extension of the soil characterisation was carried out to delineate the area affected by non-aqueous phase oil and to determine whether the contamination area was contained within the site boundary and/or was extending from the nearby service station. The work ruled out the latter possibility and concluded that there was significant contamination of TPH C10-C40 (diesel fuel-associated range). Urgent measures were then implemented to contain the

contamination plume within the property boundaries and to improve the environmental status of the underlying aquifer.

A Voluntary Recovery Project was developed, which involved pneumatic pumping to create a hydraulic barrier to extract the supernatant hydrocarbons and to prevent their migration beyond Adif's property boundaries. The project also included occasional purges and the infiltration of surfactants to mobilise the hydrocarbons. This system became operational in December 2017.

In January 2021, a resolution was received from the *Delegación Territorial de Agricultura, Ganadería, Pesca y Desarrollo Sostenible en Sevilla* (Territorial Delegation of Agriculture, Livestock, Fisheries and Sustainable Development in Seville), approving the Voluntary Recovery Project with a series of conditions. Subsequently, in July 2021, a new communication was received from the Territorial Delegation requesting, among other things, that actions be taken in areas without piezometers connected to the pumping system; that a complementary soil characterisation study be conducted to delineate the impact in all directions; and that a Quantitative Risk Analysis be performed.

In compliance with the above, eight vapour collectors were installed in July and October 2021 for subsoil gas phase measurement. A Quantitative Risk Analysis was prepared in December 2021, which concluded that the condition detected in the site's soils did not represent an unacceptable risk for the potential receptors. However, it stipulated that all free-phase oil must be removed. In March 2022, the remediation system was expanded to include 20 new piezometers and 12 additional pumps. Following the extension of this system, there has been a significant improvement in the environmental conditions at the site throughout 2022 and 2023.

In October 2023, a request was received from the *Confederación Hidrográfica del Guadalquivir* for the submission of the following documentation, in accordance with the recent amendments to the *Reglamento del Dominio Público Hidráulico* (Spanish Regulations on the Public Water Domain): 1) Environmental characterisation and assessment study. 2) Quantitative Risk Analysis. 3) Voluntary decontamination project. 4) Results of sampling analysis.

m- Former fuel supply facility in Teruel

This site has been under environmental monitoring since 2002 due to subsoil contamination resulting from the historical activity of supplying fuel to railway rolling stock. The site had also had facilities belonging to other hydrocarbon logistics companies.

In 2016, the piezometric monitoring network of the old fuel supply facilities was replaced because road construction works had removed a large part of the piezometers. The hydrocarbon plume was delimited, and a Decontamination Project was drawn up and approved by the Department of Rural Development and Sustainability of the Government of Aragon in April 2018 and by the *Confederación Hidrográfica del Júcar* (Júcar Hydrographic Confederation) in June 2020.

The Project includes excavating the old hydrocarbon separator and the nearby affected soil, drilling boreholes to act as extraction points for the hydrocarbon pumping and creating injection points for surfactants to mobilise the hydrocarbon. It also provides for the injection of biostimulants once most of the non-aqueous phase has been removed from the soil.

Once the piezometric network was restored, and until the start of the remediation works, hydrocarbon extractions from the aquifer were carried out to contain the contamination.

Work on the project began in September 2020. Excavation work was carried out on the old oil separator and nearby land (31.2 tones managed as waste). Additionally, 19 piezometers were installed, and work began on surfactant infiltration and oil recovery by pumping.

In July 2023 a requirement was received from the *Confederación Hidrográfica del Júcar* requesting, among other matters, the submission of an annual report during the first quarter of each year. This report should include a summary of progress in hydrocarbon recovery, indicating the volume extracted and an estimate of the volume that remains to be extracted in the subsoil; as well as an assessment of the effectiveness of the remediation method used to date. If it is not possible to comply with method authorised by the *Confederación Hidrográfica del Júcar*, a proposal for a more effective alternative remediation system that ensures more immediate decontamination should be provided. In addition, it is required to increase the frequency of groundwater sampling at the piezometer near the River Turia to quarterly. It also noted that the remediation works will not be considered completed while there is a free phase and/or concentrations of pollutants above the generic intervention values specified by the 2023 amendment to the Regulation of the Public Hydraulic Domain.

n- Valladolid Fuel Supply Facility

An environmental investigation of the site's subsoil conducted in 2007 found that TPH contamination of soils and groundwater was associated with the fuel supply operations. An Environmental Monitoring Programme was implemented in 2008, establishing the need for regular visits to check water/hydrocarbon levels, as well as groundwater sampling.

In 2020, additional characterisation work was carried out in two campaigns, resulting in the installation of 20 new boreholes. This was achieved by delimiting the groundwater contamination plume to the north, south, and east. It remained to delineate the west-south-east direction of flow (preferential flow direction). In addition, pumping and Lefranc tests, along with high vacuum tests, were conducted to determine the dimensions and characteristics of the remediation equipment.

In November 2021, a new subsurface characterisation campaign was carried out, and six new boreholes were drilled, allowing for the delimitation of the contamination plume in the preferred direction of flow (west-southwest). Using data from successive campaigns, the Subsoil Environmental Recovery Project was developed (in March 2022). The objectives are to remove the hydrocarbon in the non-aqueous phase, improve the environmental quality of the subsoil, and eliminate the pollutant load from the impacted soils (secondary sources). Alternatively, a high vacuum system and a soil washing with surfactant were being considered.

In March 2022, the Project was presented to the *Consejería de Fomento y Medio Ambiente de la Junta de Castilla y León* (Department of Development and Environment of the Regional Government of Castilla and León). A response was received in May, requiring that the non-aqueous phase (waste) be removed from the site first, followed by an Environmental Risk Assessment and, if necessary, an Environmental Remediation Project. Following these guidelines, the implementation of the project began. Eleven new piezometers were drilled, civil works were completed, and the remediation module was installed and put into operation in December 2022. The treatment conducted throughout 2023 has been effective in reducing the pollutant load in the groundwater. However, the non-aqueous phase persists, and the groundwater quality still does not meet the reference values for total petroleum hydrocarbons established in the Regulations of the Public Hydraulic Domain. Therefore, the remediation system will continue in 2024.

Figure 18. Decontamination module. Valladolid.

ñ- Former fuel supply facility of the Villaverde integral maintenance base (Madrid)

This site has been under environmental monitoring since 2007 due to subsoil contamination resulting from the historical activity of supplying fuel to rolling stock.

In 2014, a Remediation Project for the site was developed at the request of the *Consejería de Medio Ambiente y Ordenación del Territorio* (Regional Ministry of the Environment and Territorial Planning). As part of this project, some old facilities were decommissioned, in particular a fuel tank with a capacity of 40 m^3, after cleaning, degassing, and waste management.

In October 2015, work began on the Remediation Project, which had been previously approved by the Regional Ministry. The project involved excavating the affected accessible soil (514 m^3), treating it through landfarming, and the recovering the hydrocarbon by periodically purging the piezometers. An Environmental Risk Assessment was conducted to establish the maximum admissible concentrations to be used as treatment targets.

Landfarming was completed in 2016, once the soil quality targets were met. Since then, environmental monitoring of the site has included measuring groundwater levels and non-aqueous phase thicknesses in the piezometers; recovering free product and hydrocarbonated water using pneumatic, electric, or manual pump (bailer); biannual analytical monitoring of the piezometric network; and installing/replacing disposable passive skimmers in part of the network.

In September 2021, a pneumatic pump was installed in a piezometer that had been accumulating significant thicknesses of hydrocarbon to enable continuous removal of this product. This piezometer is located in the most affected area since the start of the remediation (the old basin area) and is adjacent to the excavated section. Thanks to this pumping, the rate of hydrocarbon extraction has significantly improved. However, a residual effect remains in this area, which has become significantly more evident in the last months of 2023 due to the rise in the water table from high rainfall. Therefore, new actions will be assessed in 2024.

o- Zafra fuel supply facility (Badajoz)

In 2007, characterisation and remediation work began at the site after hydrocarbon contamination was detected in the subsoil. Initially, non-aqueous phase oil was detected in the area of the old, buried oil tank and its vicinity, as well as around the old oil depot. In 2008, an Environmental Risk Assessment and a Voluntary Remediation Project were prepared to reduce the identified impact to levels that do not pose a risk to human health or create an unacceptable environmental situation.

The remediation system, consisting of an abioslurping system and a surface treatment plant, was commissioned in 2010. A permeable barrier was installed downstream of the primary sources (fuel storage and supply area), followed by the installation of a pneumatic pumping system connected to the treatment plant. The system was operational until it was decommissioned in November 2013.

In 2014, nutrients and oxygen-releasing compounds were applied to support bioremediation and reduce dissolved

hydrocarbon concentrations. In 2015, the fuel storage facility was renovated, with the underground tank replaced by an above-ground tank housed in a concrete enclosure. Additionally, the floors that constituted a secondary source were removed.

In the following years, monthly visits continued, including measurements of the water table and non-aqueous hydrocarbon phase, purging of accumulated hydrocarbons in piezometers, installation of absorption devices, and groundwater pumping at locations with high concentrations. Additionally, groundwater quality was monitored biannually.

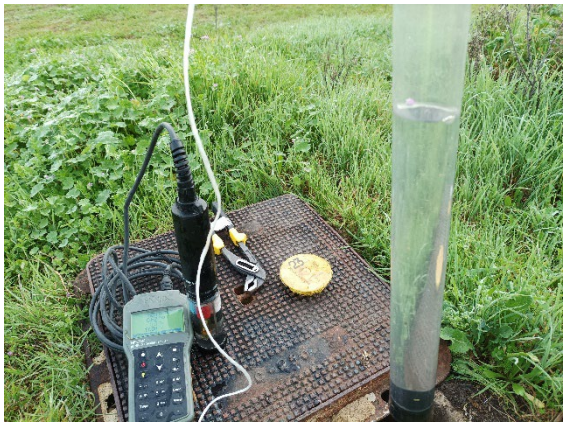


Figure 19. Measurement of groundwater levels and groundwater sampling using a bailer. Zafra.

Due to the persistence of residual hydrocarbons in the subsoil, Complementary Measures to the Decontamination Project for the site were developed in October 2021 at the request and with the approval of both the *Confederación Hidrográfica del Guadiana* (Guadiana River Basin Authority) and the *Consejería para la Transición Ecológica y Sostenibilidad de la Junta de Extremadura* (Department for Ecological Transition and Sustainability of the Regional Government of Extremadura). The measures focus on the piezometers where contamination persists and include the infiltration of surfactant to remove the remaining hydrocarbon, followed by manual pumping in the piezometers treated with surfactants after allowing the product to act. They were launched in February 2022.

A year later, in February 2023, tests/work began on the infiltration of an oxidising compound (activated sodium persulphate) to enhance the oxidation effect at locations with the highest concentrations of hydrocarbons.

At the end of May, after three consecutive months without the presence of non-aqueous phase in the piezometers, a complete groundwater sampling was carried out to assess the evolution of concentrations in all the piezometers of the site and to update the Environmental Risk Assessment. It concludes that the detected soil and groundwater impact does not pose an unacceptable risk to the health of the receptors, both on and off the site, for current and future uses. In addition, the results are compared with the generic reference values for groundwater quality established in the Regulations of the Public Hydraulic Domain. From this comparison it is concluded that all TPH C10-C40 concentrations detected at the perimeter points within the site are below the generic action value. Therefore, by the end of the year, both the Corporate Sustainability Department and the Guadiana River Basin Authority requested that the decontamination work on the site be completed within their respective areas of responsibility.

Environmental Risk Management Sites

In 2008, a Risk Control Programme was developed for Adif sites with soil and/or groundwater contamination, or those susceptible to such contamination due to ongoing or potential soil-polluting activities at these sites. The conceptual model was defined, and the design of the monitoring programme for each of the sites was established. This included defining the monitoring network's infrastructure, the parameters and frequency of monitoring, and the levels of environmental condition of the subsoil. Since then, this Monitoring Programme has been developed with objectives for each site:

- Monitoring the environmental situation of the subsoil by controlling the evolution of pollution parameters.
- Achieving an early detection of new episodes of subsoil contamination.
- Controlling the dispersion of pollutants, if present, to prevent their mobilisation beyond the facility's boundaries, including migration to surface waters.
- Update the assessment of environmental risks in the area surrounding the site, determining if there are any situations that pose a risk to the human health (workers or third parties) or to ecosystems, potential impacts on other resources, and significant changes that create or eliminate potential receptors, etc.
- Assessing the need to maintain control or, if necessary, initiate site decontamination actions.
- Complying with any requirements set by the relevant authorities of the Autonomous Communities and/or basin organisations.

Each monitoring campaign includes the following tasks: visual inspection of the facilities and site environment, measurement of the water table and presence of free product, purging of free product, if necessary, installation of hydrocarbon-absorbing devices as needed, groundwater sampling, and result analysis. The frequency and scope of work for each campaign are defined in the Monitoring Programme and reviewed after each visit.

In addition to the actions specified in the Control Programme, special controls and/or other work, such as the removal of contaminated soils, are carried out at some facilities, leading to significant improvements in the environmental quality of the sites.

The most significant work carried out at some of the sites under Environmental Risk Control is described below.

a- Cartagena fuel supply facility (Murcia)

Over the years, fuel supply operations at the Cartagena Station has impacted the soil and groundwater at the site. In 2007, a subsoil characterisation was conducted and, due to the detected effects, an Environmental Monitoring Programme was implemented. In 2011 a Remediation Project was developed and executed over the following years. It involved decommissioning the old storage facility (tank and pump house); excavating and managing the affected soils in the area where this facility was located and removing and managing the hydrocarbon-contaminated water. Additionally, to control the potential dispersion of residual pollutants, a drainage barrier was installed, featuring six control and/or extraction wells inside it and four wells along the northern boundary of the installation.

These actions did not cover the entire affected area. The rail area, where the old pumps were located, was inaccessible because the pumps needed to remain operational. Therefore, a Monitoring Programme was implemented in October 2015 to track the evolution of the remaining pollutant load and its potential mobilisation. This programme, which is still ongoing, involves recording groundwater and piezometric levels, extracting accumulated free product from wells and/or piezometers, checking the barrier, and sampling groundwater.

In 2021, site monitoring was reinforced, and the frequency was increased to quarterly monitoring instead of every four months. In February 2021, two new boreholes were drilled to the west of the site to extend the monitoring network downstream of the operational pump. The monitoring results show that the pollution load is steadily decreasing. Concentrations of TPHs above the reference level are not detected in any of the barrier wells or in the wells located near the northern boundary wall of the facility, downstream of the contaminated area. Residual effects from dissolved TPH are still observed near

the operational and decommissioned pumps, in the area between the tracks that was outside the scope of the Remediation Project. In 2024, the Environmental Risk Assessment will be updated and regular monitoring will continue.

b- Cordoba fuel supply facility

In 2007, an investigation into the quality of the subsoil at the El Higuerón station (Córdoba) fuel supply facility revealed the presence of total petroleum hydrocarbons (TPHs) in soils and groundwater. Therefore, an Environmental Monitoring Programme was launched at the site in November 2008 to assess the environmental quality of the subsoil.

In 2014 and in subsequent years, iridescence/non-aqueous phase liquids were detected at one of the control points near the pumps. Therefore, as part of the new soil decontamination contract, two campaigns were conducted in July 2021 and November 2022 to extend the site characterisation. Three boreholes to the south-west of the piezometer and another three to the south-east, to gain a more detailed understanding of the potential impact on the subsoil and groundwater around the piezometer and to provide information for the design of remediation actions if needed. From the investigation carried out in the south-west direction, no impacts on the soil or groundwater are evident. In the south-east direction, there is also no soil contamination, although a slight presence of polycyclic aromatic hydrocarbons above the intervention level was detected in the groundwater. Therefore, it can be concluded that the impact is localised around the piezometer located near the pumps and has not migrated downstream. Once the free phase has been removed at this point, an Environmental Risk Assessment will be carried out.

Figure 20. Purge of borehole in the rail area. Cordoba.

c -Motor material workshop and former fuel supply facility in Miranda de Ebro (Burgos)

This site has been under environmental monitoring since 2007 due to subsoil contamination resulting from the historical activities of fuel and lubricants supply and storage for rolling stock.

In 2010, the results of earlier environmental investigations were integrated, and the conceptual site model was developed. In 2014, an update of the environmental data was conducted, which concluded that while the environmental situation had improved significantly due to decreased pollutant concentrations, continued monitoring of the risk was necessary. Actions were taken to eliminate the sources, including degasification and cleaning of the old underground fuel tank, the management of the tank and the affected soil, and the repair and waterproofing of the industrial waste network's collectors.

In 2015, a new Environmental Monitoring and Improvement Programme was developed and implemented to meet a requirement from the *Confederación Hidrográfica del Ebro* (Ebro Hydrographic Confederation), which established new criteria and objectives for groundwater concentrations. In compliance with this programme, from 2016 onwards, groundwater was analysed quarterly for polycyclic aromatic hydrocarbons (PAHs) and annually for total petroleum hydrocarbons (TPHs). Skimmers were

installed, manual oil purges were conducted, and biostimulants were injected at the affected points to accelerate the site's environmental improvement. In November 2017, non-aqueous phase was no longer detected in the piezometers.

In 2019, in accordance with a new requirement from the *Confederación Hidrográfica del Ebro*, the Environmental Risk Assessment at the site was updated to establish the PAH concentrations below which the risk to the health of potential receptors is deemed acceptable. In September 2020, the *Confederación Hidrográfica del Ebro* established new target values for pollutant concentrations (PAH) in groundwater, in addition to those set in 2015, aligning with the target levels indicated in the 2019 Environmental Risk Assessment. Checks are now carried out every six months, and biostimulants are injected into the piezometers as needed.

Since 2017, no remediation target levels for PAHs have been exceeded in any of the analysed piezometer water samples. In the April 2023 campaign, the remediation target levels for total petroleum hydrocarbons (TPH aliphatic/aromatic) were not exceeded in any of the samples from the external network piezometers. However, there is a slight increase in the impact on two piezometers within of the inland network located near the area where an accidental spillage of heating oil occurred in September 2021.

In November 2023, a non-aqueous phase was detected in a piezometer located in the office and warehouse area. Organoleptically, this product is similar to heating oil and green in colour, possibly due to a breakdown in the underground piping of the boilers in the maintenance building in July 2023.

Figure 21. Discharge point to the watercourse. Miranda de Ebro.

Given this situation, it is necessary to continue with the environmental works outlined in the Environmental Monitoring and Improvement Programme in 2024 until the established remediation objectives are met.

Emergencies

In addition to sites with historical contamination, soil contamination can occasionally result from environmental emergencies on railway infrastructures managed by Adif, such as leaks or spills of substances.

The comprehensive management of these environmental emergencies involves overseeing the decontamination of the affected soil from the initial alert phase until the completed authority certifies the completion of decontamination, or the elimination of the contamination risk confirmed.

For managing of these emergencies, a contract has been formalised to provide emergency intervention services in the event of accidents affecting the environment, and a specific procedure has been established (ADIF-PE-108-003-A04-SC-551: 'Action in environmental emergencies').

Emergency decontamination measures

In the event of an emergency situation that could impact soils, an investigation/characterisation is conducted to assess the environmental status after the incident or accident. Decontamination

measures are defined and implemented, and control programmes are established if necessary.

During the year 2023, emergency actions have been carried out at the following sites[13]:

- Aranjuez (Madrid)
- Villamartín de Valdeorras (Ourense)

The installation featured an aerial fuel tank, installed in 1979, along with several dispensers.

- Fuentes de Oñoro (Salamanca), since 2021

a.- Emergency measures in Aranjuez (Madrid)

On 6 March, an emergency occurred at the exit of Aranjuez Station (Madrid). A Chamartín-Almería long-distance train ran over a switch, rupturing the railcar's fuel tank and causing an estimated 4,000 litres of diesel fuel to spill along the track. As a result of the train's speed, the fuel spillage extended over approximately 400 meters on track from the point of impact until the train came to a stop. Emergency personnel arrived on the scene immediately but were unable to recover the spilled fuel, which had been absorbed by the ground. No additional actions were taken due to the minimal impact on the soil and the fact that the railway environment is far from the potential receptors that could be affected by hydrocarbon contamination.

b.- Emergency measures in Villamartín de Valdeorras (Ourense)

On 23 August, seven wagons of a *Renfe Mercancías León Clasificación - Vigo Guixar* train carrying dangerous goods derailed at the exit of Vilamartín de Valdeorras station. Approximately 500 litres of hydraulic oil spilled from one of the containers. To contain and absorb the spil immediately, an earth ridge was created, and absorbents were spread over the affected area. Additionally, soil with organoleptic evidence of contamination was removed and disposed of as hazardous waste (157 tonnes) in a landfill. Soil samples were collected in the excavation pit to assess the quality of the remaining soil. An Environmental Risk Assessment was also conducted, and since no unacceptable risks were identified, the excavation pit was backfilled.

Figure 22. Backfilling of excavation pit. Ourense (environmental emergency).

c.- Measures monitoring at the Fuentes de Oñoro Railway Station (Salamanca)

On 20 June 2021, a locomotive pulling a convoy of freight wagons derailed. The derailment caused a breach in the base of the fuel tank, through which the diesel spilled onto the ground. The locomotive re-railed and came to a stop about 30 metres later. Diesel partially spilled over the 30 metres and continued to leak onto the ground at the stopping point. Most of the spilled fuel, estimated at between 3,000 and 3,500 litres, was released at the point where the locomotive stopped. After the accident, the locomotive was uncoupled from the convoy and parked on a siding track to the south of the station building.

A survey of the accident area was conducted, the conceptual model was defined, eight boreholes were drilled, and piezometers were installed, soil and water samples were collected, and a soil and groundwater characterisation were prepared. Monitoring and control of the condition involved sampling, level measurements, surfactant flushing, and pumped extractions. Additionally,

[13] Occasionally, it also addresses possible emergency situations that, after assessment, are found to be minor and do not require any external intervention.

an Environmental Risk Assessment was conducted, which concluded that the impact observed in the soils and water at the two discharge points from the accident does not pose an unacceptable risk for the identified receptors.

In 2022 and 2023, environmental monitoring of the site has continued with measurements at the installed piezometers and biannual groundwater sampling -one at high water (spring) and once during low water (late summer)- to track the evolution of concentrations across different seasons.

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 may primarily produce noise emissions in:

- Passenger stations, due to public address systems, train shunting, air conditioning in buildings, and vehicle movement in and out of parking areas.
- Freight terminals, due to train shunting, use of fixed and mobile auxiliary equipment, container handling, and the loading and unloading of goods.
- 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 means 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 (SRMs) and Noise Action Plans (NAPs) for major railway routes, defined as those railway sections with more than 30,000 trains/year.

SRMs 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.

SRMs 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 Ministry of Transport and Sustainable Mobility.

In this regard, in 2005, 2012, and 2017, the Ministry entrusted Adif with the preparation of the SRMs 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 SRMs and NAPs for state-owned railway sections managed by Adif and Adif-Alta Velocidad.

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

Table 28. Data from Phase I, II and III SRMs 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
SRM public information	BOE No. 99 of 24 April 2008	BOE No. 242 of 06 October 2016	BOE No. 262 of 03 October 2020
SRM 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 SRMs 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.

Regarding the construction of acoustic screens for these action plans, contracts were awarded in 2018 and 2019 for the preparation of construction projects for the acoustic screens specified in the Phase I and II action plans. These plans addressed the areas with the greatest impact and were divided into the following areas:

- Site: Area 1: Madrid and Castile-La Mancha.
- North: Area 2: Basque Country, Asturias, Aragon, and Castile and Leon.
- East:
  - Area 3A: Valencia and Castellon.
  - Area 3B: Tarragona.
  - Area 3C: Barcelona and Tarragona.
- South: Area 4: Madrid, Castile-La Mancha, and Andalusia.
- RAM Area 5: Asturias and Cantabria.

Once the projects in the Central, North and South areas were completed, tenders for the works in the Central and South areas were issued in 2022 and started in 2023. The tender for the North area and the adaptation of the projects in the East area are still pending and currently being prepared.

Regarding Phase IV of the SRMs 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 SRMs and NAPs for Phase IV. This phase will involve recalculating existing maps and updating situations that were not previously considered.

During 2023, this work will analyse 1,320 km of the railway network, divided into four geographical lots and 30 Strategic Map Units (UMES):

- Centre Lot: in blue
- North Lot: in red
- East Lot: in yellow
- South Lot: in green

Figure 23. Strategic Noise Maps of the major railway axes Phase IV. Railway sections with more than 30,000 circulations/year

This Phase IV SRMs will be the first to use 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:

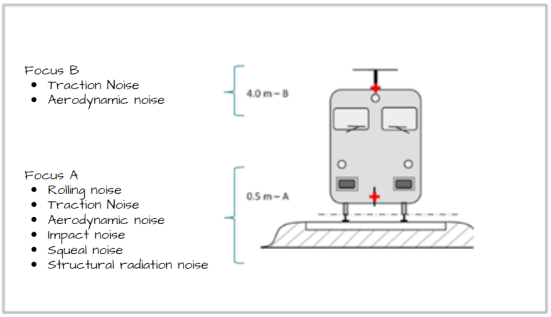


Figure 24. Factors contributing to the emission.

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 (such as severe discomfort and sleep disturbance).
- The new data model from the European Commission comes into force, which is mandatory for Spain, comes into effect. Its purpose is to ensure compliance with both the Noise and INSPIRE Directives in the provision of information related to Strategic Noise Maps and Action Plans.

Additionally, in line with Adif'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 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).
- *Agreement-Type of cooperation with administrations for noise mitigation measures (Model 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. (Technical Specification 03.305.010.5.) Pantallas Acústicas* (Acoustic Screens).

In January 2023, Adif published General Standard NAG 4-0-0.1, *Metodología para Estudios Acústicos* (Methodology for Acoustic Studies), which outlines the methodology for conducting acoustic studies related to the preparation of projects within the scope of the General Interest Railway Network (*Red Ferroviaria de Interés General,* RFIG), managed by Adif and Adif Alta Velocidad.

Similarly, during 2023, work began on drafting a new Standard to define the methodology for conducting vibration studies.

Vibrations are an environmental aspect whose analysis and prediction are 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.

Additionally, it is worth noting that during 2023, collaboration with MITERD took place on the revision of Royal Decree 1367/2007 of 19 October, which implements Law 37/2003 of 17 November

on Noise, with a focus on acoustic zoning, quality objectives, and acoustic emissions.

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

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

TRANSPORT OF DANGEROUS GOODS

The transport of dangerous goods on the network managed by Adif is governed by the requirements set out in 2013 Instrucción General nº 43 *Condiciones Generales de aplicación al Transporte de Mercancías Peligrosas por Ferrocarril* (General Instruction No. 43 General Conditions for the Transport of Dangerous Goods by Rail), *Royal Decree 412/2001*, Royal Decree 412/2001, and the Regulation concerning the International Carriage of Dangerous Goods by Rail.

To prevent potential risks, several restrictions are in place, including the following:

- Prohibition on operating on lines that pass through towns when alternative routes are available, except when loading or unloading in these towns.
- In general, parking facilities should not be planned at stations located in populated areas.
- In general, stops should not be scheduled in tunnels longer than 100 meters.

Table 29. Transport of dangerous goods on infrastructures managed by Adif (t/year)

Mode of transport	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Wagon	978,717	918,261	860,013	1,060,858	1,224,654	1,177,065	1,206,527	1,148,893	1,086,039	928,460
Container	656,490	637,811	606,609	654,424	571,712	583,393	534,054	597,106	507,514	424,690
Total	**1,635,207**	**1,556,072**	**1,466,622**	**1,715,282**	**1,796,366**	**1,760,458**	**1,740,581**	**1,745,999**	**1,593,553**	**1,353,150**

Source: Adif-Alta Velocidad, Corporate Safety and Self-Protection Department.

In 2019, the latest year for which official statistics are available, six accidents involving the transport of dangerous goods were recorded.

Table 30. Accidents involving the transport of dangerous goods on infrastructure managed by Adif

Year	Autonomous Community	Province	Collateral station(s)	Kilometric point	Goods involved	Features			
						T[1]	S[2]	P[3]	E[4]
2014	Basque Country	Guipúzcoa	Irun		Stabilised methyl acrylate	3	1	x	x
2014	Catalonia	Tarragona	Tarragona-Classificacio		Benzene	2	0		
2014	Andalusia	Huelva	La Nava de Huelva	79.9	Anhydrous ammonia	3	1		
2014	Madrid	Madrid			Refrigerated liquid carbon dioxide	3	0		
2014	Extremadura	Badajoz	Merida		Anhydrous ammonia	3	0		

Table 30. Accidents involving the transport of dangerous goods on infrastructure managed by Adif

Year	Autonomous Community	Province	Collateral station(s)	Kilometric point	Goods involved	Features			
						T[1]	S[2]	P[3]	E[4]
2014	Castile and León	Soria	Arcos de Jalón		Hydrogen peroxide in a stabilised aqueous solution containing more than 60% but not more than 70% hydrogen peroxide	3	0		
2014	Catalonia	Tarragona	Tarragona-Classificacio		Propylene oxide	2	1		
2014	Catalonia	Barcelona	Barcelona - Estacio de França		Sodium hydroxide solution Liquid alkylsulphonic acids or liquid arylsulphonic acids with not more than 5% free sulphuric acid	2	1		
2014	Basque Country	Guipúzcoa	Irun		o-Dichlorobenzene	3	1		x
2015	Castile and León	Burgos	Miranda de Ebro	1	Refrigerated liquid argon	3	0		
2015	Basque Country	Álava	Izarra	179.4	Refrigerated liquid argon	3	0		
2015	Catalonia	Lleida	Les Borges Blanques	0	Inorganic nitrates	2	0		x
2015	Basque Country	Vizcaya	Santurzi-*Puerto* (Port)		Sulphuric acid containing more than 51% acid	2	0		
2016	Extremadura	Badajoz	Badajoz	511.8	Anhydrous ammonia	3	0		
2016	Catalonia	Girona	Portbou		Hydrochloric acid	3			
2016	Madrid	Madrid	Madrid-Abroñigal		Sulphur dioxide	3			
2016	Madrid	Madrid	Madrid-Abroñigal		Refrigerated liquid argon	3	0		
2016	Basque Country	Vizcaya	Santurtzi	14	Refrigerated carbon dioxide	3	1		
2017	Catalonia	Tarragona	Tres Camins	266	Stabilised vinyl chloride	2	0		
2017	Catalonia	Girona	Portbou		Dichloropropenes	3			
2017	Castile and León	Avila	Sanchidrián	151	Refrigerated liquid argon	2	0		
2017	La Rioja	La Rioja	Agoncillo	67.25	Solid substance potentially hazardous to the environment	2	0		
2018	Andalusia	Huelva	Huelva-*Mercancías* (Freight)		Ammonia in an aqueous solution with a relative density between 0.880 and 0.957 at 15°C, containing more than 10% but not more than 35% ammonia.	3	0		
2018	Basque Country	Vizcaya	Santurtzi		Flammable liquid, N.O.S.	3	0		
2018	Catalonia	Tarragona	Mora la Nova		Animal or vegetable charcoal	4	0		
2019	Catalonia	Girona	Portbou		Petroleum distillates, N.O.S. or petroleum products, N.O.S	3			
2019	Castile and León	Valladolid	Tres Hermanos		Ammonia, anhydrous	3	0		
2019	Extremadura	Badajoz	Badajos		Ammonia, anhydrous	3	0		
2019	Catalonia	Girona	Riudellots		Nitric acid, other than red fuming nitric acid, containing more than 70 % nitric acid	3			
2019	Basque Country	Guipúzcoa	Pasaia		Refrigerated liquid argon	3	0		
2019	Andalusia	Seville	Seville-La Negrilla		Compressed hydrogen, refrigerated liquid nitrogen, propane, anhydrous ammonia, compressed oxygen	2	0		

Table 30. Accidents involving the transport of dangerous goods on infrastructure managed by Adif

Year	Autonomous Community	Province	Collateral station(s)	Kilometric point	Goods involved	Features			
						T[1]	S[2]	P[3]	E[4]

1 T: Type of accident

***Type 1**: A breakdown or accident where the vehicle or transport convoy is unable to proceed, but the container of dangerous goods remains intact and there has been no overturning or derailment.*

***Type 2**: As a result of the accident, the container has been damaged, overturned, or derailed, but there has been no leakage or spillage of the contents.*

***Type 3**: As a result of the accident the container has been damaged and there is leakage or spillage of the contents.*

***Type 4**: The container has sustained damage or caught fire, resulting in flaming leakage of its contents.*

***Type 5**: Explosion of the contents, destroying the container.*

2S: Emergency Situation

***Situation 0**: Accidents managed with the available resources that, even under the most adverse conditions, do not pose a risk to individuals not involved in the response, nor to the environment or property other than the road network where the accident occurred.*

***Situation 1**: Accidents that can be managed with available resources but require measures to protect people, property, or the environment from potential threats caused by the accident.*

***Situation 2** Accidents that require intervention resources, not covered by the CA Plan but provided by the State Plan, for their control and for implementing necessary measures to protect people, property, or the environment.*

***Situation 3**: Accidents classified as being of national interest and officially declared as such by the Ministry of the Interior.*

3P: Danger to the population

4E: Need for evacuation

Source: Ministry of the Interior, Directorate General for Civil Protection and Emergencies. Report on emergencies involving the transportation of dangerous goods by road and rail. Reports on Emergencies in the Transport of Dangerous Goods by Road and Rail: 2005-2006, 2007-2008, 2009-2010; Report for 2011; Year-on-Year Comparison for 2002-2011; and Three-Year Report on Emergencies by Road and Rail. Period: 2011-2013: Triennial report on emergencies in the transport of dangerous goods by road and rail. Period: 2014-2016: Annual report on emergencies in the transport of dangerous goods by road and rail. Period: 2017; Statistical analysis of emergencies in the transport of dangerous goods by road and rail in 2018 and in the period 2009-2018; Statistical analysis of emergencies in the transport of dangerous goods by road and rail in 2019 and in the period 2010-2019.

7. CONTRIBUTION TO BIODIVERSITY CONSERVATION

7- CONTRIBUTION TO BIODIVERSITY CONSERVATION

LAND USE

304-1

The active railway network managed by **Adif** spans a total length of 11,674.8 km. The total area occupied is estimated at 36,882 hectares, with the affected area potentially extending to 74,420 hectares.

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.

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

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** is **74,420 ha**, which includes the **36,882 ha** occupied by the platform, cuttings, and embankments.

Table 31. 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
Mixed Gauge Line (Iberian Gauge-International gauge)	16	32	100
Electrified double-track Iberian gauge line	16	32	64
Non-electrified double-track Iberian gauge line	14	32	64
Electrified single-track line	11	28	56
Non-electrified single-track line	9	28	56

(1) Including the sub-ballast and formation layer

(2) Including slopes, embankments, and other requirements

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 2023, some of the works carried out on the conventional network took place in areas belonging to the Natura 2000 Network. A total of 76 projects were carried out in these areas, representing 26.6% of all projects completed during this period.

In 2023, the conventional and metric gauge rail network in operation reached a length of 11,674.8 kilometres. Of these, nearly 1,108.4 kilometres run through Natura 2000 network areas, representing 9.5% of the conventional and metric gauge network.

Table 32. Length of lines managed by ADIF in Natura 2000 Network Sites

Autonomous Community	% of protected land	Adif length (km)*	Adif Natura 2000 Network length (km)	Adif % in Natura 2000 Network
Andalusia	29.3%	1,751.3	137.1	7.8%
Aragon	28.5%	856.8	49.5	5.8%
Cantabria	27.1%	280.7	15.8	5.6%
Castile and León	26.2%	1,947.2	240.3	12.3%
Castile-La Mancha	23.1%	870.2	45.1	5.2%
Catalonia	28.1%	1,171.7	80.2	6.8%
Foral Community of Navarre	27.1%	162.1	3.5	2.1%
Community of Madrid	39.8%	730.5	141.8	19.4%
Valencian Community	36.9%	639.7	60.6	9.5%
Extremadura	30.3%	724.9	178.2	24.6%
Galicia	11.1%	1054.5	68.6	6.5%
La Rioja	35.7%	187.6	15.3	8.2%
Basque Country	20.8%	455.5	48.4	10.6%
Principality of Asturias	25.2%	597.5	13.7	2.3%
Region of Murcia	20.3%	244.6	10.3	4.2%
Total		**11,674.8**	**1,108.4**	**9.5%**

* Length as reported in the tram system development document effective as of 31 December 2023.

Source: Nature Databank Ministry for Ecological Transition and the Demographic Challenge. Updated as of December 2022. Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

IMPACT MANAGEMENT IN NEW INFRASTRUCTURE DEVELOPMENT

3-3 | 304-2 | 308-2

The Ministry of Transport and Sustainable Mobility has delegated the approval of projects assigned to this public business entity to the president of Adif. Additionally, according to Adif'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 modifications to existing lines –including conditioning, improvement, remodelling, adaptation, and maintenance– can generate environmental impacts. These impacts must be 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's internal rules and recommendations, and, where applicable, with the EIS/EIR.

To ensure compliance with EIA legislation, all projects undergo screening. This determines whether they require an environmental impact assessment. 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.

! Adif carries out works to upgrade and improve the Iberian gauge network, which may be subject to EIS/EIR and environmental monitoring.

Table 33. Environmental supervision of Adif projects during the design phase (No. of reports/year)

	2018	2019	2020	2021	2022	2023*
Notes of Exemption from EIA Procedures	85	123	121	163	81	133
Environmental Compatibility Reports	84	120	121	163	81	133
Adequacy reports to EIA	9	10	15	24	14	20
Certificate of compliance with the EIA	8	12	7	10	11	7
Environmental review report	386	597	742	735	806	855
Total	**572**	**857**	**1006**	**1,095**	**993**	**1,148**
Environmentally completed projects	**102**	**145**	**143**	**197**	**106**	**160**
Documents Submitted for Review	**209**	**323**	**324**	**350**	**296**	**845**

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

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

Table 34. Environmental supervision of Adif projects in the construction phase (no. of reports/year)

	2018	2019	2020	2021	2022	2023
Environmental Suitability Reports	0	4	8	11	9	19
Notes of Exemption from EIA Procedures	28	41	35	38	17	30
Emergency construction works	38	33	33	24	11	12
Supplementary EIA/EIR Compliance Reports	0	0	0	1	*N/A*	*N/A*
EIA/EIR Compliance Reports for Modified Projects	0	0	0	4	8	1
Environmental Review Reports	0	7	6	17	23	32
Total	**66**	**85**	**82**	**95**	**68**	**94**

N/A: 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.

Adif undertakes projects that, due to their scale, are not subject to the EIA procedure. However, although these works do not involve the creation of new routes, the numerous maintenance tasks and smaller-scale projects on the railway infrastructure can collectively have an environmental impact that must be managed.

For this reason, environmental supervision of projects with EIS/EIR has been conducted by Environmental Site Managers since 2005. Since mid-2018, environmental supervision has also been extended to projects without EIS/EIR in the Conventional Network, through the appointment of Environmental Site Supervisors (ESS). This aims to ensure compliance with current environmental legislation and enhance environmental management in these projects.

To manage the environmental impacts of its activities, Adif identifies projects and actions that may have significant effects and conducts environmental monitoring and oversight of these activities.

Among the works subject to environmental monitoring are those that include a project and an Environmental Integration Annex. This annex outlines how to execute the work from an environmental perspective, detailing the surroundings and key environmental aspects to be considered. In these cases, the main objective of environmental monitoring is to ensure that the execution of the works complies with the provisions of this annex and the contracting specifications, and to assess the effectiveness of the planned measures.

However, a significant percentage of the works subject to this environmental monitoring system are emergency works. As such, they do not have projects developed according to internal procedures, which means that the potential environmental implications of these actions are not identified. In such situations, the Environmental Monitor advises the Site Management on the most relevant environmental issues and identifies the environmental aspects that may be significant.

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 of the relevant environmental authorities.

Figure 25. Organisation of environmental monitoring for projects not requiring EIS/EIR

In each of the works or actions, the ESS is responsible for overseeing and controlling environmental aspects, in line with Adif's internal environmental standards.

Environmental monitoring of works at Adif enables the assessment of:

- Complying with the conditions received from the different competent environmental bodies.
- Ensuring that the execution of the work adheres to the stipulations of the Environmental Integration Annex and internal procedures.

Table 35. Regulatory Reports on Environmental Monitoring of Projects with EIS/EIR (No. of Reports/Year)

	2018	2019	2020	2021	2022	2023
Periodic	28	37	32	33	53	72
Prior to the acceptance of the work	2	5	7	8	3	7
Parallel to the Site Layout Verification Report	0	4	3	15	13	12
Prior to the start of the works	0	9	4	17	15	9
Total	**30**	**55**	**46**	**73**	**84**	**100**

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

Monitoring the degree of environmental integration and compliance with established environmental objectives is jointly conducted by Adif and Adif-Alta Velocidad and is documented in the Adif-Alta Velocidad Environmental Report.

Table 36. Monitoring Reports for Projects Not Subject to EIA/EIR (No. of reports/year)

	2018	2019	2020	2021	2022	2023
No. of Active Projects with Environmental Monitoring	**30**	**85**	**118**	**139**	**165**	**175**
Initial reports	0	64	48	56	51	60
Monitoring reports	113	457	692	768	760	970
Periodic reports	0	33	45	47	47	45
Final reports	0	35	37	55	60	8
Total reports	**113**	**589**	**822**	**926**	**918**	**1,083**

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

DEVELOPMENT OF INTERNAL REGULATIONS FOR THE PROTECTION OF BIRDLIFE IN OVERHEAD CONTACT LINES

In line with our commitment to sustainability and considering Spain's rich natural heritage, Adif and Adif-Alta Velocidad published the NAE 121 ADIF Electrification Standard in June 2023. This standard, titled '*Medidas para la protección de la avifauna en la línea aérea de contacto*' (Measures for the protection of birdlife on the overhead contact line), represents a significant milestone at European level. It defines the risks to birdlife associated with overhead contact lines and

standardise the measures to mitigate these risks. This document has a strong preventive focus and holds the status of a Standard, making it mandatory for all projects undertaken by Adif-Alta Velocidad.

The purpose of this Standard is to establish a methodology for analysing the risks to birdlife associated with overhead contact lines and to propose the necessary protective measures for both direct current and alternating current lines. It includes a detailed analysis of the risk of collision, electrocution (with a classification of the most common configurations), entrapment, and general risks associated with the nesting of certain species on elements of the overhead contact line. It also includes a detailed description of the elements required for the effective implementation of corrective measures on the overhead contact line, tailored to various configurations.

Additionally, in August 2023, Adif and Adif-Alta Velocidad approved the Technical Instruction (ADIF-IT-301-001-LAC-20) *'Gestión de Electrocuciones de la Avifauna en la Línea Aérea de Contacto'* (Management of Electrocution of Birds on the Overhead Contact Line). This document outlines the procedures to be followed in cases of bird electrocution on the overhead contact line.

This Technical Instruction (TI), which focuses on corrective actions, outlines mechanisms for implementing measures to address electrocution in affected areas. It is unique in that it provides immediate action in response to an incident.

This TI begins with identifying the incident and determining the species involved. Depending on the protection status of the species and its habitat, a corrective area is established that is proportional to these factors.

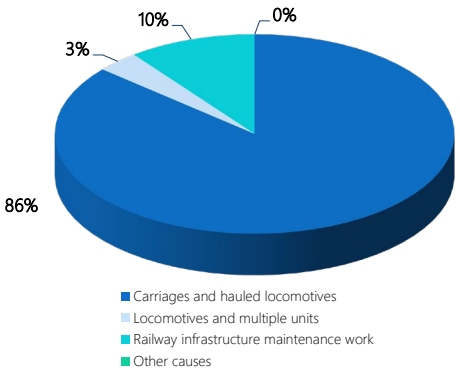
Figure 26. Correction of overhead contact line pole on Line 300 Madrid/Chamartín-Valencia

FIRE PREVENTION

3-3 | 308-2

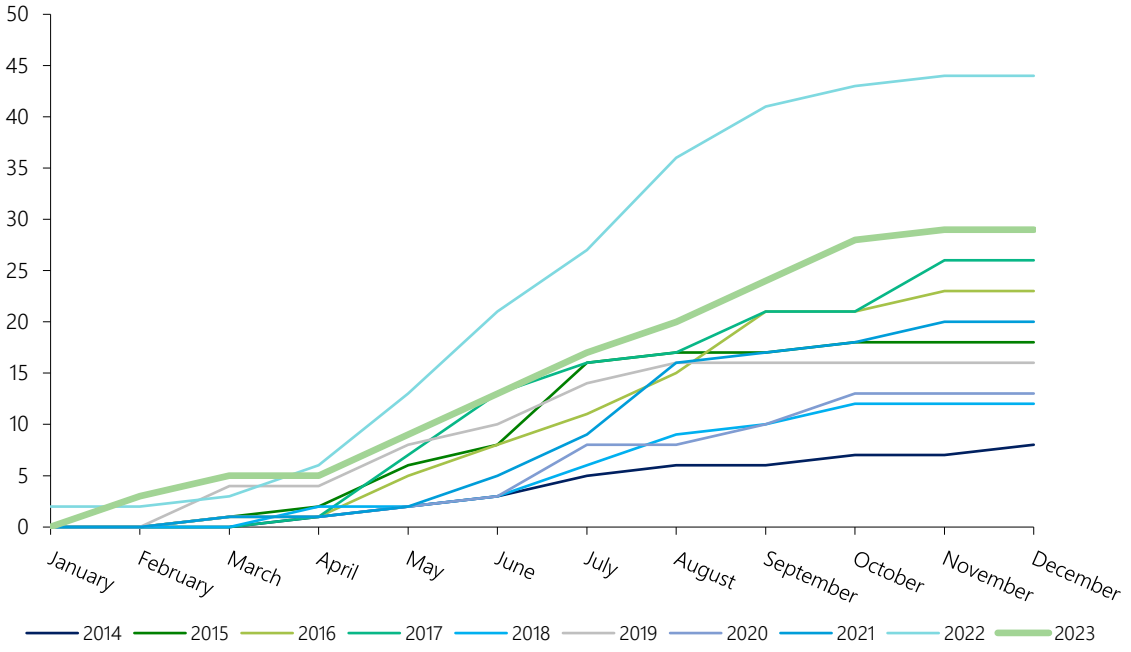
During 2023, twenty-nine (29) fires were recorded on the trackside of the conventional network, caused by faults in installations, locomotives, railway carriages, and maintenance work on the railway infrastructure. This represents a decrease compared to 2022, when 44 fires were recorded.

Chart 32. Presumed cause of the fire (%). Year 2023.



Source: Adif-Alta Velocidad, Corporate Traffic and Capacity Management Department

Chart 33. Fires on the trackside caused by trains and works. Monthly accumulated data (No.)



Source: Adif-Alta Velocidad, Corporate Traffic and Capacity Management Department

The measures and actions to prevent forest fires, along with complementary actions adopted in 2023, are defined in the *Plan of actions for the prevention and fight against forest fires* for 2023 approved by the Council of Ministers on 20 June 2023. This plan involves numerous ministerial departments, including the Ministry of Transport and Sustainable Mobility, which oversees the railway sector and to which Adif is attached.

Since 2006, Adif, in compliance with the provisions of Royal Decree-Law 11/2005[14] 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 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.

In 2022, Adif sent the draft of this Protocol to the following autonomous communities for review and signature: Aragon, the Government of Catalonia, the Valencian Community, Castile and

[14] Royal Decree-Law 11/2005 of 22 July 2005 approving urgent measures on forest fires (BOE no. 175, of 23 July 2005)

León, the Community of Madrid, Castile-La Mancha and Andalusia.

Figure 27. Fire protection measures on tracksides.

Specific measures for preventing the risk of forest fires at Adif are outlined in the current Fire Prevention Plan, which is effective from 2023 to 2024 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.

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.

Fire Prevention Actions included in the 2023-2024 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 and railway operators, or between Adif 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, 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'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 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.

GREENWAYS

304-1

By **1993**, Spain had over **7,600 km** of railway lines that no longer had train services or never did because construction was left unfinished.

This historically and culturally significant infrastructure holds great potential for reuse as ecotourism initiatives, aligning with modern social trends.

As of December 2023, over **3,450 km** of old railway tracks had been converted, or were in the process of being converted, into greenways.

In 1993, the Greenways Programme was launched with the goal of transforming former railway tracks into paths for pedestrians, cyclists, and hikers. Greenways are a tool for promoting a new culture of outdoor leisure, sport, and non-motorised mobility.

Promoted by the Ministry for Ecological Transition and the Demographic Challenge and coordinated nationally by the *Fundación de los Ferrocarriles Españoles* (Spanish Railway Foundation, FFE), the initiative currently involves collaboration from Adif, Adif-Alta Velocidad, and Renfe Operadora. This programme, which is part of the Green Fabric Plan, involves the active participation of autonomous communities, provincial councils, town councils, as well as cycling groups, environmentalists, and community groups.

The Greenways Programme connects natural spaces, cultural sites, and population centres through accessible, public corridors. In peri-urban areas, they serve as sports and recreational facilities, as well as providing a non-motorised mode of transportation between the periphery and the centre.

Greenways also serve as excellent catalysts for rural development by fostering a range of complementary services and facilities -such as restaurants, accommodation, bicycle and horse rentals, and eco-museums, among others- often

located in rehabilitated former railway stations. They promote job creation in the area, the rehabilitation of old buildings, and the development of commercial and leisure spaces that attract high-quality and eco-friendly tourism.

FOR MORE INFORMATION ABOUT THE GREENWAYS:
www.viasverdes.com

Figure 28. Montes de Hierro Greenway (Basque Country).

Source: www.viasverdes.com

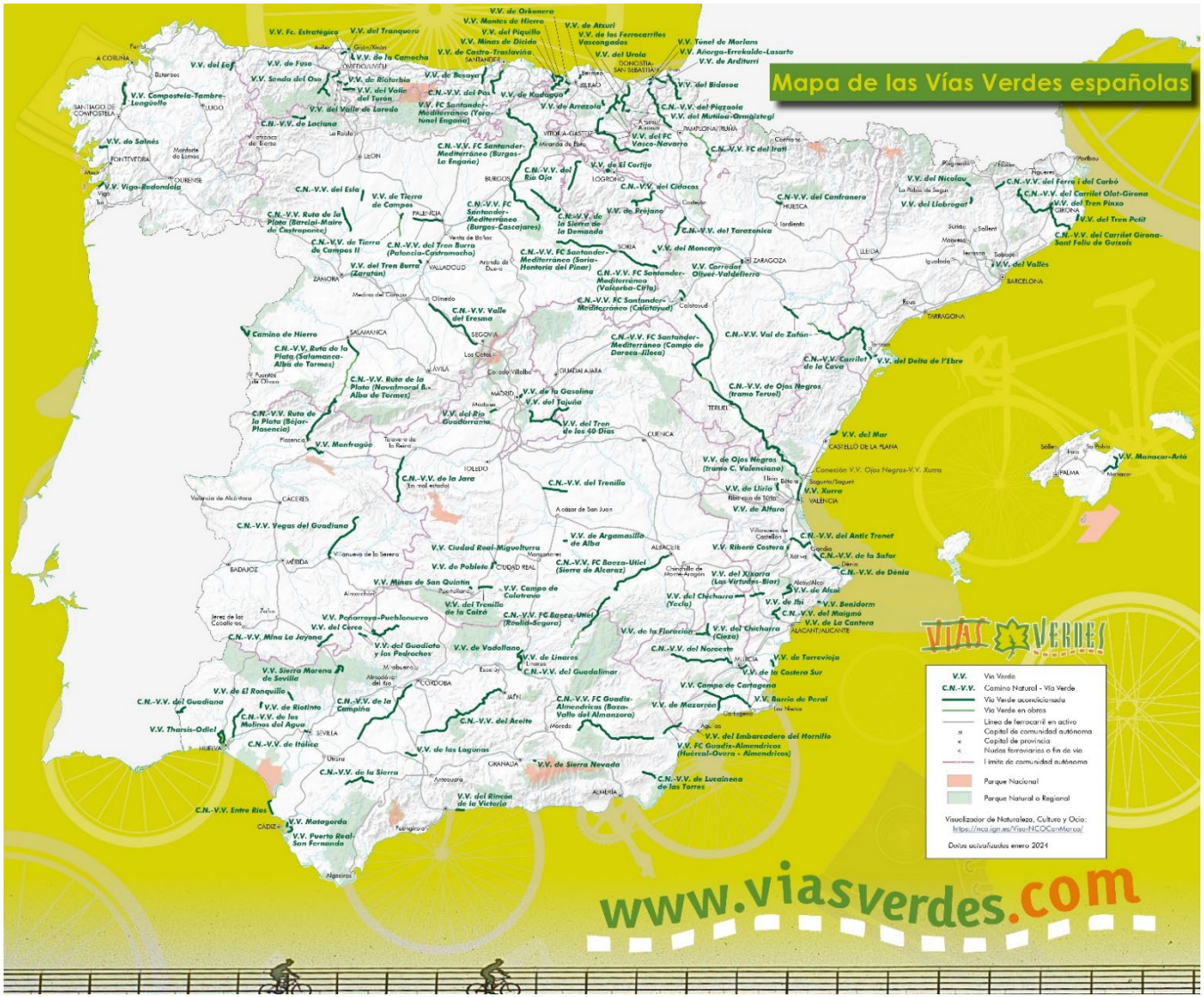


Figure 29. Map of Spanish Greenways (2023).

Source: Fundación de los Ferrocarriles Españoles (FFE), 2024.

Table 37. Number of greenways upgraded and under implementation as of December 2023

Autonomous Community	Conditioned	In progress	Total	Greenways in progress
Andalusia	26	1	27	CN-VV FC Baeza - Utiel (A. Ojanco-Villanueva)
Aragon	6	2	8	CN-VV Ojos Negros (Peracense-Santa Eulalia) CN-VV del Val de Zafán (Section 2)
Aragon-Navarra	1	0	1	
Asturias	8	0	8	
Cantabria	5	1	6	CN-VV FC Santander-Mediterráneo (Yera-Túnel Engaña)
Castile and León	17	2	19	CN-VV Ruta de la Plata (Navalmoral B.-Alba Tormes) CN-VV Tierra de Campos II
Castile and León-Extremadura	1	0	1	
Castile-La Mancha	8	1	9	Campo de Calatrava Greenway
Castile-La Mancha-Andalusia	1	0	1	
Catalonia	11	0	11	
Valencian Community	13	4	17	La Cantera Greenway Alfara Greenway CN-VV Ribera Costera (Section: Xátiva-Carcaixent) Ojos Negros Greenway - Xurra greenway connection
Extremadura	3	0	3	
Galicia	3	1	4	Compostela-Tambre-Lengüelle Greenway (T.M. Santiago_phase 1)
Galicia-Asturias	1	0	1	
Balearic Islands	1	0	1	
La Rioja	4	0	4	
Madrid	3	0	3	
Madrid- Castile-La Mancha	1	0	1	
Murcia	9	0	9	
Navarre	1	0	1	Irati CN-VV Extension
Navarre-Basque Country	3	0	3	
Basque Country	12	0	12	
Total	**138**	**12**	**150**	

** Temporary closure of the La Jara Greenway*

Source: Fundación de los Ferrocarriles Españoles, 2023.

Table 38. Kilometres of greenway supgraded and in progress by December 2023

Autonomous Community	In operation	In progress	Total	Greenways in progress
Andalusia	677.84	25.95	703.79	CN-VV FC Baeza - Utiel (A. Ojanco-Villanueva)
Aragon	213.92	28.49	242.41	CN-VV Ojos Negros (Peracense-Santa Eulalia) CN-VV del Val de Zafán (Section 2)
Aragon-Navarra	21.82	0.00	21.82	
Asturias	82.40	0.00	82.40	
Cantabria	67.20	3.06	70.26	CN-VV FC Santander-Mediterráneo (Yera-Túnel Engaña)
Castile and León	535.46	75.58	611.04	CN-VV Ruta de la Plata (Navalmoral B.-Alba Tormes) CN-VV Tierra de Campos II
Castile and León-Extremadura	65.59	0.00	65.59	
Castile-La Mancha	178.38	2.78	181.15	Campo de Calatrava Greenway
Castile-La Mancha-Andalusia	46.76	0.00	46.76	
Catalonia	225.88	0.00	225.88	
Valencian Community	210.94	25.38	236.31	La Cantera Greenway Alfara Greenway CN-VV Ribera Costera (Section: Xátiva-Carcaixent) Ojos Negros Greenway - Xurra greenway connection
Extremadura	95.04	0.00	95.04	
Galicia	42.92	2.62	45.54	Compostela-Tambre-Lengüelle Greenway (T.M. Santiago_phase 1)
Galicia-Asturias	11.43	0.00	11.43	
Balearic Islands	28.97	0.00	28.97	
La Rioja	81.36	0.00	81.36	
Madrid	22.24	0.00	22.24	
Madrid- Castile-La Mancha	66.65	0.00	66.65	
Murcia	189.29	0.00	189.29	
Navarre	6.39	50.38	56.77	Irati CN-VV Extension
Navarre-Basque Country	203.40	0.00	203.40	
Basque Country	162.71	0.00	162.71	
Total	**3,236.58**	**214.24**	**3,450.82**	

** Temporary closure of the Vía Verde de La Jara.*

Source: Fundación de los Ferrocarriles Españoles, 2023.

Notable prizes and distinctions awarded to the Greenways

- **UN Habitat International Award for Good Practices, 2000.**
- **WorldTravelMarket Award, 2003.**
- **Europa Nostra Award to Heritage Conservation, 2004.**
- ***III Premio Movilidad Sostenible* (3rd Sustainable Mobility Award)**. Delivered by the ConBici Coordinator. Coordinator of Bicycle Advocacy Users. September 2005
- **2nd European Greenways Award**. The Sierra Greenway (Cádiz - Seville) won this award, presented by the European Greenways Association. October 2005
- ***Tele Natura* 2006 International Television Festival on Nature Conservation and the Environment Award** for Best Spanish Production for the series on Greenways "Vive la Vía" (Live the Greenway)
- ***Premio Panda* Environmental Communication Award 2006,** awarded by the environmental organisation WWF-Adena for the Best Institutional Environmental Communication Initiative
- **Award from the Government of Andalusia,** to the *Fundación Vía Verde de La Sierra* (The Sierra Greenway Foundation) for the management carried out between 2000 and 2006
- **Best Regional Tourism Product Award**, awarded by the Government of Andalucia, to the Sierra Greenway.
- **CIUMED 2007 Award** from the Network for the Promotion of Medium-Sized Cities in South-Western Europe.
- **European Greenways Award 2007** to the Plazaola Greenway.
- **UN-Habitat International Award for Best Practices, 2008.** Finalist, making the Short List for the entry '*La transferencia de la Buena Práctica. Programa de Vías Verdes a otras regiones de España y del Mundo*' (The transfer of Best Practices: The Greenways Program to other regions in Spain and worldwide)
- **Via APIA 2008 award** for informational transparency from the *Asociación de Periodistas de Información Ambiental.* (Association of Environmental Information Journalists).
- **UN World Tourism Organization (UNWTO) Ulysses Prize Award 2009**
- **4th European Greenways Award,** 1st Prize awarded to the Sierra Greenway (Cádiz-Sevilla). 2009
- ***Premio de Turismo Responsabile Italiano e Turismo, Cultura e* UNESCO 2011**
- **5th European Greenways Award,** 1st prize awarded for '*Descubriendo los secretos de las vías verdes*' (Discovering the secrets of greenways) to the *Consorci Vies Verdes de Girona* in the category of "Exemplary Initiatives". 2011.
- **5th European Greenways Award,** 3rd prize awarded to the *Mancomunidad de la Vía Verde de La Jara* (Toledo) in the category of 'Exemplary Initiatives'. 2011.
- **6th European Greenways Award,** 2nd Prize awarded to the Sierra Greenway (Cádiz-Sevilla) in the 'Excellence' category. 2013.
- **6th European Greenways Award,** 3rd prize awarded to the FC Greenway. Vasco Navarro (Álava - Navarra) in the "Excellence" category. 2013.
- **6th European Greenways Award,** 2nd prize awarded to the Noroeste Greenway (Murcia) in the category of 'Exemplary Initiatives'. 2013.
- **7th European Greenways Award,** 2nd prize awarded to the Plazaola Greenway (Navarra) in the 'Excellence' category. 2015.
- 7th European Greenways Award, 3rd prize awarded to the Terra Alta Greenway (Tarragona) in the category 'Exemplary Initiatives'. 2015.
- **7Th European Greenways Award,** awarded the special prize to the *Maratón de Vías Verdes* for the Best Outdoor Tourism Product for Greenways, 2015.
- **INTUR Competition (International Inland Tourism Fair) *'Las 20 Mejores Experiencias Turísticas de Castilla y León'* (The 20 Best Tourism Experiences in Castile and León),** awarded to the experience proposed by *Vías Verdes* titled '*Vive Castilla y León a través de sus vías verdes, no lo olvidarás jamás*' (Experience Castile and León through its Greenways, You'll Never Forget It). 2016
- **Andalusia 2016 Tourism Awards**, awarded to the Sierra Greenway. 2016.
- ***Premio Avance* 2017 Award for Universal Accessibility**, awarded to the Sierra Greenway. 2017
- ***III Premio de Filambres Alhamilla*,** awarded to the Lucainena de las Torres Greenway. 2017.

- **8th European Greenways Award,** 1st prize awarded to the Sierra Greenway (Andalusia) in the category of 'Exemplary Initiatives'. 2017.
- **8th European Greenways Award,** 2nd prize awarded to Jaén's Green Corridor in the category of 'Exemplary Initiatives'. 2017.
- **8th European Greenways Award,** 3rd prize awarded to *Vía Compromiso* (Murcia) in the category of 'Exemplary Initiatives'. 2017.
- **9th European Greenways Award,** 3rd Prize awarded to the Montes de Hierro Greenway (Basque Country) in the category of 'Exemplary Initiatives'. 2019.
- **9th European Greenways Award,** 2nd prize awarded for the visual accessibility project to the *Consorci Vies Verdes de Girona*, in the category of 'Exemplary Initiatives'. 2019.
- **9th European Greenways Award,** awarded the special prize for the App *'Vías Verdes y Red Natura 2000'* (Greenways and Natura 2000 Network). 2015.
- **FiturNext Observatory 2020 Award**, recognition of *Vías Verdes* as a finalist initiative in 2020 for its high replicability and positive impact on local economic development.
- **10th European Greenways Award,** 3rd prize awarded to the Ojos Negros Greenway (Valencia Region Section) in the 'Excellence' category. 2021.
- **10th European Greenways Award,** 3rd prize awarded to *El camino natural Vía Verde Ferrocarril Vasco Navarro* (The Natural Path of the Ferrocarril Vasco Navarro Greenway) in the category 'Exemplary Initiatives'. 2021.
- ***Diario CÓRDOBA* Tourism Awards** to the greenways in Córdoba. 2022.
- **11th European Greenways Prize,** awarded the special prize for the 30th anniversary of the *Vías Verdes de la Fundación de Ferrocarriles* (Railway Foundation Greenways Program). 2023.

Creating a Greenway often involves rehabilitating old stations, which can accommodate a network of shops, restaurants, accommodation and even eco-museums.

These resorts are a key driver of development and job creation in the area where they are located, and they can attract quality and eco-friendly tourism.

Additionally, the stations are integral to the natural railway landscape, serving as reminders of the tracks' history and as unique identifiers that set them apart from other forms of communication.

GREEN STATIONS

304-1

Green stations are operational facilities that, due to their location near natural areas, serve as hubs for active and responsible tourism. One of its objectives is to promote access to natural areas of interest and greenways using more sustainable transportation methods, such as railway. In addition to being close to natural areas, the facilities must meet various functional and sustainability criteria, such as accessibility for people with reduced mobility, recycling bins, and water and energy-saving systems.

In 2010, nine Green Stations were established, culminating in the introduction of a Green Station sign or panel. The poster provided information

about the station as well as its natural and cultural surroundings.

Table 39. Stations, Natural Areas, and Connected Greenways (VV)

Station	Managing Body	Linked NA	Linked VV
Alcoy	Circulation	3	1
Fuente de Piedra	Circulation	3	
Ronda	Stations	4	
Castuera	Circulation	1	
Calahorra	Circulation	3	1
Calatayud	Stations	4	
Ribes de Fresser	Stations	3	
Ponferrada	Stations	2	
Puebla de Sanabria	Circulation	2	

** No new green stations have been implemented since 2011*

GREENWAYS AND PROTECTED NATURAL AREAS

304-3

Eighty-two (82) Greenways run near one hundred and sixty-five (165) Protected Natural Areas (PNA), located in thirteen (13) Autonomous Communities.

The total length of Greenways in protected natural areas is 2,285.93 km.

Table 40. Greenways and Protected Natural Areas

Greenway	Autonomous Community	Protected Natural Area	Protection status	Length (km)
El Ronquillo Greenway	Andalusia	Sierra de Aracena and Picos de Aroche	Site of Community Importance SCI (SPA/ SAC), Natural Park	9.23
Itálica Greenway	Andalusia	Bajo Guadalquivir	Site of Community Importance SCI (SPA/ SAC)	2.63
La Campiña Greenway	Andalusia	Lower Section of the Guadajoz River, Middle Section of the Guadalquivir River	Site of Community Importance SCI (SPA/ SAC)	91.93
Sierra Greenway	Andalusia	GuadaleteRiver, Peñón de Zaframagón, Chaparro de la Vega	Site of Community Importance SCI (SPA/ SAC), Natural Monument, Nature Reserve	36.03
Sierra Norte de Sevilla Greenway	Andalusia	Cerro del Hierro, Cascadas del Huesna, Sierra Norte, Sierra Norte de Sevilla	Area of Community Importance SCI (SPA/ SAC), Natural Monument, Natural Park	18.28
Molinos de Agua Greenway	Andalusia	Río Tinto, El Saltillo and Lomero Llano Ecological Corridor	Area of Community Importance SCI (SPA/ SAC), Peri-urban Park	33.21
Lucainena de las Torres Greenway	Andalusia	Sierra de Cabrera-Bedar	Site of Community Importance SCI (SPA/ SAC)	15.54
Rio Tinto Greenway	Andalusia	Rio Tinto Ecological Corridor, Río Tinto	Area of Community Importance SCI (SPA/ SAC), Protected Landscape	5.86
Olive Oil Greenway	Andalusia	Sierras Subbéticas, Sierra Subbética, Lagunas del Sur de Córdoba, Laguna Honda, Laguna del Chinche, Laguna del Conde or Salobral, Cueva de los Murciélagos (Cave of the Bats)	Area of Community Importance SCI (SPA/ SAC), Natural Monument, Nature Park, Nature Reserve	127.35
FC Baeza - Utiel Greenway (A. Ojanco-Villanueva)	Andalusia	Guadalimar River	Site of Community Importance SCI (SPA/ SAC)	25.95
FC Greenway. Guadix - Almendricos (Baza - Valle del Almanzora)	Andalusia	Sierra de Baza	Site of Community Importance SCI (SPA/ SAC), Natural Park	98.70
Guadalimar Greenway	Andalusia	Lower Section of the Guadalimar River and Upper Guadalquivir, Guadalimar River	Site of Community Importance SCI (SPA/ SAC)	15.32
Guadiana Greenway	Andalusia	Andévalo occidental, Guadiana River and Chanza Riverbank	Site of Community Importance SCI (SPA/ SAC)	16.68
Guadiato and Los Pedroches Greenway	Andalusia	Alto Guadiato	Site of Community Importance SCI (SPA/ SAC)	40.66
Litoral Greenway	Andalusia	Marismas de Isla Cristina, Marismas del Río Piedras and Flecha del Rompido	Site of Community Importance SCI (SPA/ SAC), Natural Site	48.92
Valle del Guadalhorce Greenway (**) under development	Andalusia	Guadalhorce, Fabalas and Pereilas Rivers	Site of Community Importance SCI (SPA/ SAC)	4.67

Table 40. Greenways and Protected Natural Areas

Greenway	Autonomous Community	Protected Natural Area	Protection status	Length (km)
Matagorda Greenway (Trocadero)	Andalusia	Bahía de Cádiz, Isla del Trocadero	Site of Community Importance SCI (SPA/ SAC), Natural Site, Natural Park	3.55
Puerto Real - San Fernando Greenway	Andalusia	Bay of Cadiz	Site of Community Importance SCI (SPA/ SAC), Natural Park	8.25
Tharsis Odiel Greenway	Andalusia	Estuario del Río Tinto, Marisma de El Burro, Marismas del Odiel	Site of Community Importance SCI (SPA/ SAC), Natural Site, Natural Park	29.75
Fuso Greenway	Asturias	Las Caldas Cave	Partial Nature Reserve	8.46
Senda del Oso Greenway	Asturias	Las Xanas Gorge, Las Ubiñas-La Mesa	Natural Monument, Natural Park	41.20
Valle de Turón Greenway	Asturias	Cuencas Mineras	Protected Landscape	12.96
Besaya Greenway	Cantabria	La Viesca	Area of Special Natural Interest	20.14
Pas Greenway	Cantabria	Pas River	Natura 2000 European Ecological Network Area	35.41
FC. Greenway Santander Mediterráneo (Yera Túnel Engaña)	Cantabria	Pas River, Montaña Oriental	Natura 2000 European Ecological Network Area	3.06
Camino de Hierro	Castile and León	Arribes del Duero	Natural Park	16.47
FC. Greenway Santander - Mediterraneo (Burgos - Cascajares de la Sierra)	Castile and León	Savinares del Arlanza-La Yecla	Natural Park	50.40
FC. Greenway Santander - Mediterráneo (Soria - Hontoria del Pinar)	Castile and León	Cañón del Río Lobos	Natural Park	66.68
FC. Greenway Santander-Mediterranean (Burgos-La Engaña)	Castile and León	Montes Obarenes-San Zadornil	Natural Park	105.60
Ruta de la Plata Greenway (Plasencia - Béjar)	Castile and León-Extremadura	Monte Valcorchero, Castañar de Gallego	Protected Landscape	65.59
La Jara Greenway (*)	Castile-La Mancha	Rincón del Torozo	Micro-reserve	51.77
Poblete Greenway	Castile-La Mancha	Maar de la Hoya del Mortero	Natural Monument	5.69
FC Greenway. Baeza - Utiel (Sierra de Alcaraz)	Castile-La Mancha	Ojos de Villaverde Lagoon	Nature Reserve	77.34
Trenillo de la Calzá Greenway	Castile-La Mancha	Macizo Volcánico de Calatrava (volcanic field)	Natural Monument	14.20
FC Baeza - Utiel (Reolid Segura) Greenway	Castile-La Mancha-Andalusia	Rumblar, Guadalén and Guadalmena river basins, Estrecho del Hocino, Sierras de Cazorla, Segura and las Villas, Guadalimar river	Area of Community Importance SCI (SPA/ SAC), Micro-reserve, Nature Reserve, Natural Park	46.76
Carrilet de la Cava Greenway	Catalonia	Les Illes de l`Ebre, Riberes i illes de l`Ebre	Reserva Natural de Fauna Salvaje, *Plan Especial de Protección* (Special Protection Plan, PEIN)	6.82
Baix Ebre Greenway Extension	Catalonia	Les Illes de l`Ebre, Riberes i illes de l`Ebre	Reserva Natural de Fauna Salvaje, *Plan Especial de Protección* (Special Protection Plan, PEIN)	4.20

Table 40. Greenways and Protected Natural Areas

Greenway	Autonomous Community	Protected Natural Area	Protection status	Length (km)
Carrilet Girona Greenway - Sant Feliù de Guíxols	Catalonia	Gavarres, les, Massís de les Cadiretes	Special Protection Plan (SPP)	39.43
Carrilet Olot Greenway - Girona	Catalonia	Volcà el Raco, Riu Fluvià, Riu Llémena, Zona Volcànica de la Garrotxa, Guilleries, les, Volcà de Sant Marc, Gavarres, les, Riberes del Baix Ter, Riu Brugent, Volcà del Puig Roig, Collsacabra, Volcà Montolivet	Partial Nature Reserve, Nature Park, *Plan Especial de Protección* (Special Protection Plan, PEIN)	57.58
Del Ferro i del Carbo Greenways (Iron and Carbo Greenway)	Catalonia	Riberes de l "Alt Ter	Special Protection Plan (SPP)	12.18
Llobregat Greenway	Catalonia	Serra de Picancel	Special Protection Plan (SPP)	6.38
Nicolau Greenway	Catalonia	Serra del Catllaràs, Serres del Cadí-Moixeró, Cadí-Moixeró	Natural Park, *Plan Especial de Protección* (Special Protection Plan, PEIN)	5.35
Tren petit Greenway	Catalonia	Castell-Cap Roig	Special Protection Plan (SPP)	6.54
Tren Pinxo Greenway	Catalonia	Gavarres, les, Riberes del Baix Ter, Rieres de Xuclà i Riudelleques	Special Protection Plan (SPP)	5.71
Val del Zafán - Baix Ebre Greenway	Catalonia	Serres de Pàndols-Cavalls, Ribera de l`Algars, Barrancs de Sant Antoni-Lloret-la Galera, Riberes i illes de l`Ebre, Aligars-Serra Fulletera, Les Illes de l`Ebre, Ports, els, Serres de Cardó-el Boix	Wildlife Nature Reserve, Partial Nature Reserve, *Plan Especial de Protección* (Special Protection Plan, PEIN)	82.55
L'Hospitalet de l'Infant playa Torn Greenway	Catalonia	Cap de Santes Creus-Litoral meridional tarragoní, Rojala-Platja del Torn	Special Protection Plan (SPP)	3.48
Ojos Negros Greenway and Xurra Greenway connection	Valencian Community	Sierra Calderona, La Costera	Municipal Natural Site, Natural Park	15.65
Alcoi Greenway	Valencian Community	Serpis, Racó de Sant Bonaventura-Canalons, Sierra Mariola, Cova Juliana, Sant Pasqual-Torretes, Carrascal de la Font Roja	Protected Landscape, Municipal Natural Site, Natural Park, Caves	21.77
La Safor Greenway	Valencian Community	Serpis	Protected Landscape	6.83
Llíria Greenway	Valencian Community	Turia	Natural Park	5.73
Ojos Negros Greenway (Valencian Community)	Valencian Community	La Esperanza, Sierra Calderona	Municipal Natural Site, Natural Park	75.56
Torrevieja Greenway	Valencian Community	Las Lagunas de la Mata-Torrevieja Natural Park, Lagunas de la Mata and Torrevieja	Wetlands, Natural Park	6.61
Antic Trenet Greenway	Valencian Community	Marjal y Estany de la Ribera Sur del Xuquer, Cova de Planxa, Cova de les Meravelles (Alzira)	Wetlands, Caves	26.21
Maigmó Greenway	Valencian Community	Serra del Maigmó and Serra del Sit, Geological K/T	Natural Monument, Protected Landscape	21.15

Table 40. Greenways and Protected Natural Areas

Greenway	Autonomous Community	Protected Natural Area	Protection status	Length (km)
		boundary, Capa Negra, in the municipal district of Agost		
Mar Greenway	Valencian Community	Avenc de Bellver	Caves	5.74
Xixarra Greenway	Valencian Community	Laguna y Saleros de Villena	Wetlands	15.87
Ribera Costera Greenway (Manuel Section)	Valencian Community	Les Salines	Municipal Natural Site	1.77
Ribera Costera Greenway (Section: Xátiva_Carcaixent)	Valencian Community	Les Salines	Municipal Natural Site	7.64
Compostela - Tambre - Lengüelle Greenway	Galicia	Tambre River	Protected Natura 2000 Network Area	28.42
Compostela Tambre Lengüelle Greenway (Santiago)_phase 1	Galicia	Tambre River	Protected Natura 2000 Network Area	10.67
Compostela Tambre Lengüelle Greenway (Santiago)_phase 2	Galicia	Tambre River	Protected Natura 2000 Network Area	10.67
Vigo - Redondela Greenway	Galicia	Enseada de San Simón	Protected Natura 2000 Network Area	5.29
Eo Greenway	Galicia-Asturias	Eo River	Protected Natura 2000 Network Area	11.43
El Cortijo Greenway	La Rioja	Groves and Riverbanks of the Ebro	Protected Natura 2000 Network Area	2.95
Préjano Greenway	La Rioja	Peñas de Arnedillo, Peñalmonte and Peña Isasa	Protected Natura 2000 Network Area	5.18
Cidacos Greenway	La Rioja	Peñas de Arnedillo, Peñalmonte and Peña Isasa	Protected Natura 2000 Network Area	33.70
Río Oja Greenway	La Rioja	Sierras de Demanda, Urbión, Cebollera y Cameros	Protected Natura 2000 Network Area	39.54
Río Guadarrama Greenway	Madrid	Middle Course of the Guadarrama River and its surroundings	Regional Park	5.78
Tajuña Greenway	Madrid- Castile-La Mancha	Axes of the Lower Courses of the Manzanares and Jarama Rivers	Regional Park	66.65
Mazarrón Greenway	Murcia	Sierra de las Moreras	Protected Landscape	13.83
Ferrocarril del Irati Greenway	Navarre	Cliffs of La Piedra and San Adrián, Foz de Lumbier	Nature Reserve	6.39
Bidasoa Greenway	Navarre-Basque Country	Aiako Harria, Cedar of Bértiz, Señorío de Bertiz	Natural Monument, Natural Park	41.57
FC Vasco - Navarro Greenway	Navarre-Basque Country	Aizkorri-Aratz, Izki, Lasia Ravine	Nature Reserve, Nature Park	97.15
Plazaola - Leitzaran Greenway	Navarre-Basque Country	Leizaran	Nature Reserve	64.68
Arditurri Greenway	Basque Country	Aiako Harria	Natural Park	12.12
Arrazola Greenway	Basque Country	Urkiola	Natural Park	4.92
Kadagua Greenway	Basque Country	Meatzaldea - Mining Area of Bizkaia	Protected Landscape	5.44
Ferrocarriles Vascongados Greenway	Basque Country	Magnolio de Bergara	Natural Monument	15.75

Table 40. Greenways and Protected Natural Areas

Greenway	Autonomous Community	Protected Natural Area	Protection status	Length (km)
Montes de Hierro Greenway	Basque Country	Meatzaldea - Mining Area of Bizkaia	Protected Landscape	39.05
FC Greenway. Basque - Navarre (Gipuzkoa Section)	Basque Country	Aizkorri-Aratz, Magnolio de Bergara, Secuoya del Parque de Monterron (Redwoods)	Natural Monument, Natural Park	27.60
Urola Greenway	Basque Country	Coastal Section Deba-Zumaia	Protected Landscape	40.17
Morlans Tunnel Greenway	Basque Country	Roble de Igara (Oak)	Natural Monument	1.99
Total Greenways in Protected Natural Areas: 82	**Total autonomous communities: 13**	**Total Protected Natural Areas: 165**		**Total km: 2,285.93**

Source: Fundación de los Ferrocarriles Españoles, 2023.

KEY ACHIEVEMENTS IN THE CONSTRUCTION OF STANDARD GAUGE LINES

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 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 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).

For activities that may have a significant environmental impact, an on-site environmental monitor is assigned to oversee environmental control and compliance with current environmental regulations during the works. This work involves producing periodic reports that are sent to Adif-Alta Velocidad's Corporate Environmental Sub-Department. Similarly, before work begins, an Initial Diagnosis Report (IDI) 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.

It is worth noting Adif's participation in discussion and knowledge forums focused on the protection of biodiversity in transport infrastructures:

- 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, aims to methodologically assess the ecosystem values provided by railway infrastructure.

Key actions for the protection of biodiversity

➢ Fauna

- **Amphibian rescue and relocation operations during the enhancement of the railway infrastructure between Zafra and Huelva**

Adif is currently undertaking different actions to improve the railway infrastructure between Zafra and Huelva. As part of these efforts, the track renewal project between Almonaster-Cortegana Station and La Aldea del Arroyo is underway.

During environmental monitoring of the project, a colony of amphibians was discovered in the longitudinal drainage around one of the tunnels on this railway line. Among the species detected were the Iberian painted frog (*Discoglossus galganoi*) and the Iberian newt (*Lissotriton boscai*), both of which are listed as wildlife species under special protection.

The location of the colony was incompatible with the planned works, so, in coordination with the Government of Andalusia (*Junta de Andalucía*), it was decided to capture and relocate the colony to a nearby site with the necessary ecological characteristics for its settlement.

On the mornings of October 10 and 11, 2023, the amphibian colony was captured and relocated to the 'Fuentecilla de Canaleja' site, located just 1.7 km from the work area. For the capture, torches, plastic containers, nets, and sterile gloves were used.

Figure 30. Specimen of the Iberian newt found in the tunnel

The specimens captured and relocated include the following species: Iberian newt (14), Spanish ribbed newt (4), common toad (3), Iberian painted frog (2), and Iberian waterfrog (4). It was observed that most of the specimens were found within the first 500-600 metres from the north portal of the tunnel, with fewer detected within the first 50 metres from the south portal. The result obtained has been satisfactory, ensuring the survival of the relocated specimens and

preventing potential harm before the work begins.

- Monitoring of the occupation of alternative nesting platforms for white storks

Renovation work on the Almoraima - Algeciras section of the Bobadilla - Algeciras line. Subsection from PK 3+100 to PK 6+800. *San Roque Mercancías* is part of the Informative Study for the Bobadilla-Algeciras line, specifically the Ronda-Algeciras section, which outlines the necessary actions to improve the existing conventional line between Ronda and Algeciras.

One of the environmental considerations for this project is the need to replace power lines that have white stork nests on their towers (a species listed as under Special Protection Regime). To minimise the impact on the species, 11 artificial nesting boxes were installed around the replaced power lines in the first phase (2018). In the second phase (2020), 8 additional nesting boxes were added to provide alternative nesting platforms for the species.

Figure 31. Occupancy of the nesting boxes installed in the second phase (2020)

This measure has been monitored by the Environmental Site Manager. In 2020, it was confirmed that 2 of the nesting sites were occupied by breeding pairs of storks. However, before the environmental review of the work (in April 2023), it eas confirmed that the number of occupied nest boxes had increased significantly. A total of 8 nest boxes were occupied by breeding pairs: 7 of the 11 nest boxes installed during the first phase (2018) and 1 of the 8 nest boxes installed during the second phase (2020). The effectiveness of these nesting boxes has therefore mitigated the impact on the white stork population established in this area.

During the monitoring work planned for the Exploitation Phase in the coming years, the occupancy of all the nest boxes will continue to be tracked.

➢ Flora and vegetation

- Plantations in community-managed forests

Improvements are being made to nearly all elements of the infrastructure on the Orense - Monforte de Lemos - Lugo section of the conventional line.

An important section of this railway route, approximately 18 km long, runs through the SAC Cañón del Sil (a Natura 2000 site), following the banks of both the Cabe and Sil rivers until the Sil flows into the Miño, just outside the protected area. This area is also designated as a Biosphere Reserve and is part of the 'Ribeira Sacra', which is a candidate for the UNESCO World Heritage List in 2025.

As a formal commitment to minimizing the impact on biodiversity and preserving the unique values of this area, best conservation practices have been planned and are being implemented. The work is being carried out from the existing railway platform to avoid the need for temporary construction roads. To achieve this, it was necessary to cut the track.

In addition to this approach, a compensation measure involves planting indigenous species to restore woodland areas, covering at least the

same area affected by the improvement work on the section.

As there are no suitable areas near the construction site for such reforestation, the Department of Environment, Territory, and Housing of the *Xunta de Galicia* (Government of Galicia) has collaborated to select several potential community-managed forests. Most of these areas have been affected by forest fires or, if applicable, have been deforested. Agreements have been made with the owners of these forests to plant approximately 55 hectares by January 2024.

The plantations have been carried out in the neighbouring community-managed forests of Monte Faro (Chantada), Teilán and Tuimil (Bóveda), Margaride de Lor (Quiroga), Parderrubias-Santa Olaia (A Merca), and Xestosa (Toén). A total of 32,595 trees have been planted, including 10,680 Spanish chestnut trees, 12,885 oak trees, and 9,030 pine trees.

Figure 32. Spanish chestnut tree plantations in Parderrubias (municipality of A Merca)

- Measures to protect the taxon *Astragalus devesae* species on the Ávila-Salamanca Conventional Line

As part of the construction project for the 2,000 V-3,000 V power supply system and the installation of fibre optic cables on the conventional network between Ávila and Salamanca, a thorough study of the potential presence of endangered plant species was conducted before the work began.

This study was conducted by a team of botanical experts who examined the areas where the work was to be carried out, aiming to identify any plant species that could be impacted by the project.

As a result of this work, a small colony of *Astragalus devesae* specimens was found 10 meters from the track. It is an endemic species classified as 'Critically Endangered' on the Red List and 'Endangered' according to the Protected Flora Catalogue of the Government of Castile and León[15].

In the summer of 2022, the colony was found near the railway line, and its location is a satellite of one of the four known populations of the species, situated just over 1 km away.

The colony was marked with a perimeter barrier to prevent any damage during the construction process. Subsequently, in coordination with the Government of Castile and León (Directorate General for Natural and Forestry Policy, Department of Environment, Housing, and Land Management), an ex-situ reproduction plan was developed, requesting the necessary authorizations for seed collection and subsequent plant production in a nursery.

Figure 33. Protection of the colony using a perimeter barrier

As a result of this Plan, the collected seeds were extracted, germinated, and incubated under controlled conditions in a laboratory. The overall germination rate for all treatments combined was 73.28% (with 650 out of 887 seeds sown successfully germinating).

[15] Decree 63/2007 of June 14, which establishes the Catalogue of Protected Flora of Castile and León.

Once germinated, the seedlings were transferred to containers filled with a mixture of arcosic sand, sourced from the immediate vicinity of the original population. This mixture was intended to provide essential elements for growth, such as micronutrients and inoculums for root nodules. The seedling trays were kept in the greenhouse for 10-14 weeks to maximize survival, during which 560 of the 650 seedlings remained alive.

In May 2023, 503 nursery-grown *Astragalus devesae* plants were relocated to 16 new colonies to reinforce the existing population. The newly established colonies have been monitored, and the following results have been obtained:

Table 41. Monitoring of *Astragalus devesae* plantings

	PLANTED SPECIMENS	LIVING SPECIMENS	SURVIVAL
Colony 1	32	13	40.6%
Colony 2	28	14	50.0%
Colony 3	14	10	71.4%
Colony 4	31	22	71.0%
Colony 5	17	14	82.4%
Colony 6	122	102	83.6%
Colony 7	39	25	64.1%
Colony 8	27	5	18.5%
Colony 9	14	4	28.6%
Colony 10	27	5	18.5%
Colony 11	12	0	0.0%
Colony 12	28	16	57.1%
Colony 13	41	23	56.1%
Colony 14	32	12	37.5%
Colony 15	13	11	84.6%
Colony 16	26	8	30.8%
TOTAL	**503**	**284**	**56.5%**

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

- Measures for controlling and eradicating invasive exotic species in **Adif** work sites

Aware of the problem caused by invasive alien species[16] and in accordance with **Adif** 's policy on the protection of biodiversity and ecosystems, numerous actions are being undertaken to prevent the proliferation of invasive alien species on construction sites.

The species being targeted are primarily Pampas grass (Cortaderia selloana), which is very abundant in the transport corridors in northern Spain. However, measures have also been taken against Tree of Heaven *(Ailanthus altissima*) and Spanish cane *(Arundo donax)*[17].

The implemented measures focus primarily on elimination treatments, including both mechanical and manual methods, as well as chemical treatments, to prevent the proliferation of the species. These actions are carried out outside the propagation period of the target species. Additionally, the plant material collected has been disposed of either by burying or shredding and then delivered to an authorized waste manager.

Figure 34. Emergency operations to remove *Cortaderia selloana* are being conducted due to serious structural damage detected in the overpasses at PPKK 458/927 and 460/693 on the 770 Santander-Oviedo line, located in the municipality of Val de San Vicente (Cantabria).

In the absence of technical references confirming their effectiveness, **Adif** and Adif-Alta Velocidad have initiated the creation of a 'Catalogue of Measures for the Eradication of Invasive Alien Species on Land Affected by Railway Infrastructure Works.' This catalogue, based on an initial review of strategies, action plans, and recommendations from public administrations (such as MITERD, Autonomous Communities, and

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

[17] *Arundo donax* is not considered an invasive species in the Iberian Peninsula.

other entities), characterizes all the treatments carried out.

During 2023, work was carried out to monitor the effectiveness of the various treatments. The treatments assessed are shown below:

Table 42. Assessment of Treatments for Invasive Alien Species

Section	Sub-section code and name		Type of track	*Cortaderia selloana*	*Ailanthus altissima*	*Arundo donax*
Line 770 Santander-Oviedo	SDONO52	Execution of the construction works for the comprehensive track renewal project on the Gijón-Laviana section of the narrow-gauge network in Asturias.	Conventional	X		
	SDON53	PP.KK. 458/927 y 460/693, en el T.M. Val de San Vicente (Cantabria)	Conventional	X		
	SDON36	Santander commuter train, between Reinosa and Santander	Conventional	X		
Line 520 Ciudad Real-Badajoz	SDOS08	Guadalmez-Cabeza de Buey	Conventional		X	
Line 52 Madrid-Cáceres-Mérida Badajoz	SDOS19	Remodelling of the stations of Plasencia and Cáceres	Conventional		X	
Chinchilla de Montearagón-Cartagena	SDOE31	El Reguerón-Riquelme	Conventional			X
	SDOE33	Cieza (PK 489+500 to 489+960)	Conventional			X

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

PRESERVATION OF ARCHAEOLOGICAL HERITAGE

Railway access to the Port of Sagunto

The work carried out as part of the construction of the new railway access to the Port of Sagunto has been characterized by various actions to protect archaeological and cultural heritage associated with the railway line's development.

In this regard, in addition to ongoing archaeological monitoring of all earthworks on site from 2020 to 2023, several specific interventions have been conducted to document and assess archaeological sites listed by the Corporate Heritage Department and identified during the preliminary route survey. An example is the archaeological excavation of the 'La Vinya Buida' site, which dates back to the Ibero-Roman period (1st century BC - 2nd century AD) and later Islamic occupation. The site includes materials and structures related to agricultural use from the 10th to 11th centuries. Notably, there is a sunken-base structure, a type of hut similar to those found in Neolithic settlements. It features an almost circular floor plan, posts to support the

roof, and is slightly sunken into the geological base. It is associated with several storage pits or silos, likely used for cereal. In some of these, a collection of ceramic pieces from the Islamic period has been found intact. (11th century). Another point of interest is the remains excavated at the 'Els Rolls II' site, which include movable and structural artifacts from the Iberian, Roman, and late Roman periods, significantly deteriorated by agricultural transformations over time.

However, the archaeological monitoring has also been highly effective in documenting previously unknown contexts, such as the necropolis at P.K. 1+400, where the remains of five individuals from the Islamic period were excavated and recovered.

Figure 35. Burial UE 5402 from P.K. 1+400

Alongside the preventive measures, a series of complementary actions were carried out at the excavated core of the Asset of Cultural Interest, as designated by the General Directorate of Heritage and Culture of the *Generalitat Valenciana*, located in Grau Vell, the former Iberian-Roman port. These efforts have included cleaning, reexcavation, expansion, consolidation, and musealization, aiming to substantially enhance this unique archaeological complex.

The Grau Vell site, or 'old port' of Sagunto, was extensively studied in the 1990s by the University of Valencia. The research revealed a residential and commercial port area with very complex infrastructure. Its foundation dates back to the Iberian period, before the Mediterranean colonization. However, it reached its peak during the Roman Empire. Various phases of building construction, paved roads, and even a large kiln potentially related to glassworking have been documented.

The significance of these findings, which form the core of the Archaeological Zone protected as an Asset of Cultural Interest (BIC), is the focus of the collaboration requested by the *Generalitat Valenciana* (Valencian Government) and addressed by the project.

The work has uncovered highly significant evidence from one of the Mediterranean's most important ports. Ancient sources indicate that it was located in Edetania, near the Palancia River, and was an excellent natural port that facilitated the export of Celtiberian products to the sea. Sagunto was a major market both internally and externally, as reflected by historians like Titus Livius. During the Roman period, it became a municipality and developed significant buildings. The port of Sagunto was better known through ancient texts than by its archaeological remains. However, the evidence recovered at Grau Vell has enabled for a more precise delineation of its extent, estimated at over one hundred hectares.

By the 7th century BC, it had a well-developed port, as indicated by a letter from that period found in Ampurias, which mentions the city. Around the turn of the Era, it was one of the principal ports on the eastern coast, surpassing even Denia (*Hemeroscopion*) and Cullera (*Portus Sucrone*), and comparable to the major port of Santa Pola (*Portus Ilicitanus*). Ancient texts reveal that the indigenous city was called Arse, and by the 1st century AD, significant public buildings such as the forum and theatre had been built. Its main exports to Rome included painted Iberian ceramics, noted by historians such as Pliny and satirists Martial and Juvenal in the 1st century AD. Additionally, high-quality figs were exported to

Rome in the 2nd century BC, as recorded by the legislator Cato.

The work carried out by Adif in this context has recovered a landmark in classical archaeology within the Valencian Community, preserving and making accessible a crucial historical asset that complements a major public project, such as the railway access to the current port of Sagunto.

Figure 36. Final status of the musealization and accessibility process, 2023.

8. RESPONSIBLE ENVIRONMENTAL MANAGEMENT

8- RESPONSIBLE ENVIRONMENTAL MANAGEMENT

ENVIRONMENTAL MANAGEMENT

The environment variable in Adif depends on four top-level Corporate Departments: Corporate Safety, Processes, and Corporate Systems Department, the Corporate Maintenance and Conservation Department, the Corporate Business and Commercial Operations Department, and the Corporate Traffic and Capacity Management Department, through their respective Sub-Departments and Heads of Division.

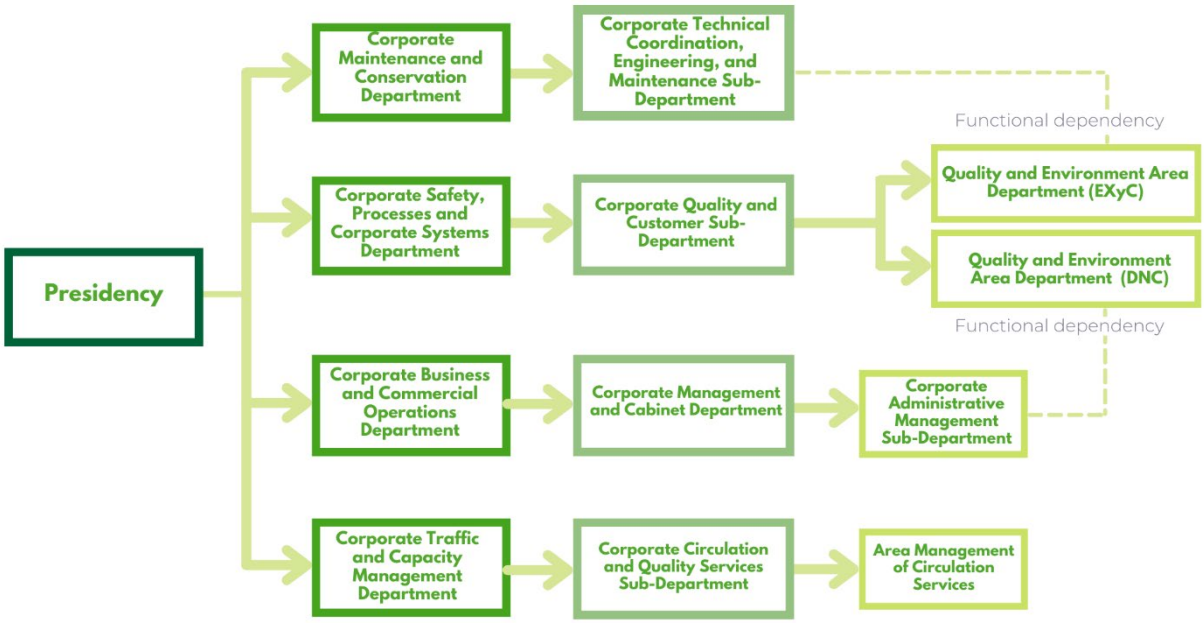


Figure 37. Extract from the organisational structure in force as of 31 December 2023

By resolutions of the President of Adif and the Managing Director of 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, 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.

By virtue of this assignment, 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, Adif-Alta Velocidad, and railway operations, ensuring environmental protection and compliance in the project, construction, maintenance, control, and profitability of railway infrastructure.

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 EMS.
- 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 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

Promoting commitments to continuous environmental improvement through the implementation, certification, and periodic auditing of management systems based on the ISO 14001 'Environmental Management Systems. Requirements with guidelines for its use' standard is one of the elements of the Environmental Policy of Adif and Adif-Alta Velocidad.

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 significantly expanded. As of 2023, the situation is as follows:

2023 Milestones

By the end of 2023, two hundred and four (204) Adif and Adif-Alta Velocidad centres had achieved environmental certification under ISO 14001.

Two out of every five conventional network* travellers use stations with environmental certification.

* at stations managed by Adif's Corporate Business and Commercial Operations Department

Table 43. ISO 14001 certification. Certifications obtained by Adif and Adif-Alta Velocidad as a whole

Scope	Outreach	Certificate
Adif	- Managing the maintenance of railway platforms, tracks, and facilities. - Operating passenger stations and freight logistics centres. - Management traffic in the RFIG. - Managing fuel depots.	AENOR GA-1999/0142-001/00
Adif-Alta Velocidad	- Controlling and monitoring compliance with the environmental conditions established in the EIS, in the Environmental Monitoring Plans, and requirements applicable to the construction of railway infrastructure and facilities. - Managing and coordinating the preparation of studies and projects for 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.

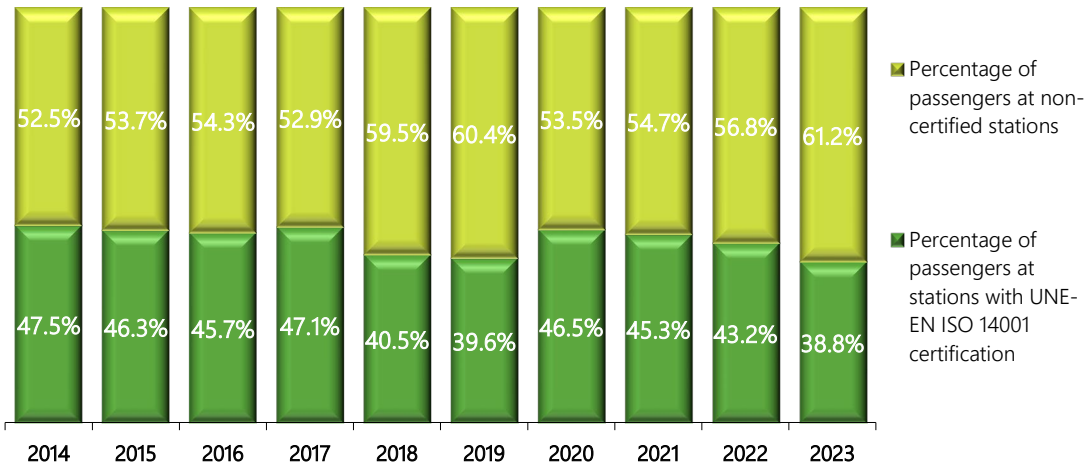
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

Figure 38. Zafra fuel supply facility

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 line of work, 38.77% of passengers use certified stations managed by Adif.

Chart 34. Relevance index of ISO 14001 certifications in passenger stations.



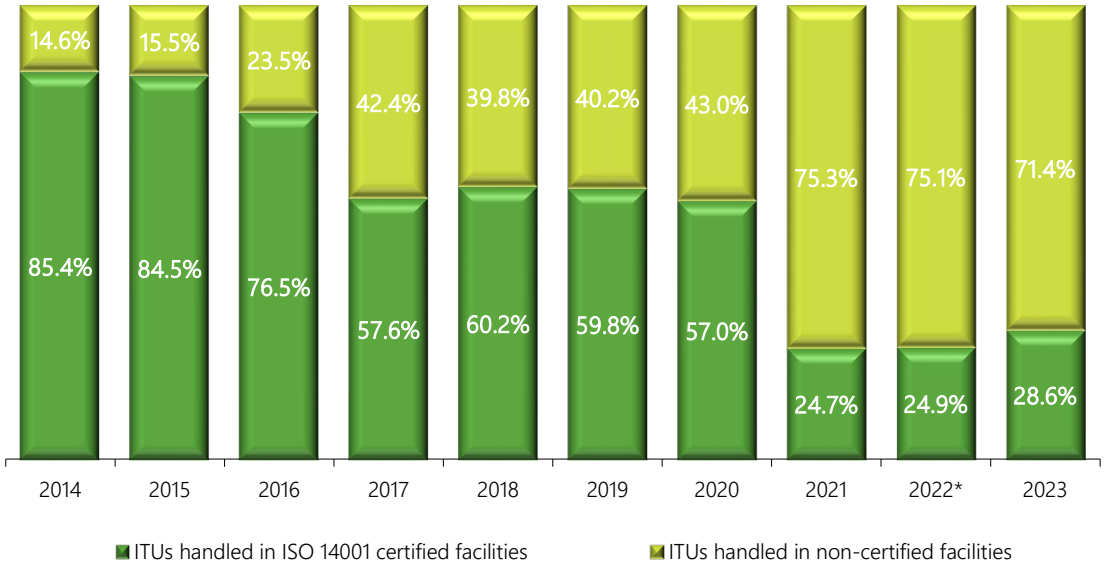
Source Adif, Corporate Safety, Processes and Corporate Systems Department, Corporate Quality and Customer Sub-Department.

Figure 39. Almorchón Logistics Facility (Badajoz)

In 2023:

- **Two out of every seven** Intermodal Transport Units (ITUs) handled at logistics services facilities are processed in one of the 9 ISO 14001 Environmentally Certified logistics facilities.
- Approximately **one in five** trains is handled at ISO 14001 Environmentally Certified logistics service facilities.
- Just over **four out of every six** litres of fuel are dispensed from certified tanks.

Chart 35. Relevance index of ISO 14001 certifications in logistics terminals.



* Data revised from the 2022 report

In 2021, five freight terminals were removed from the scope of ISO 14001 certification.

Source: Adif, Corporate Safety Department, Corporate Processes and Corporate Systems, 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.

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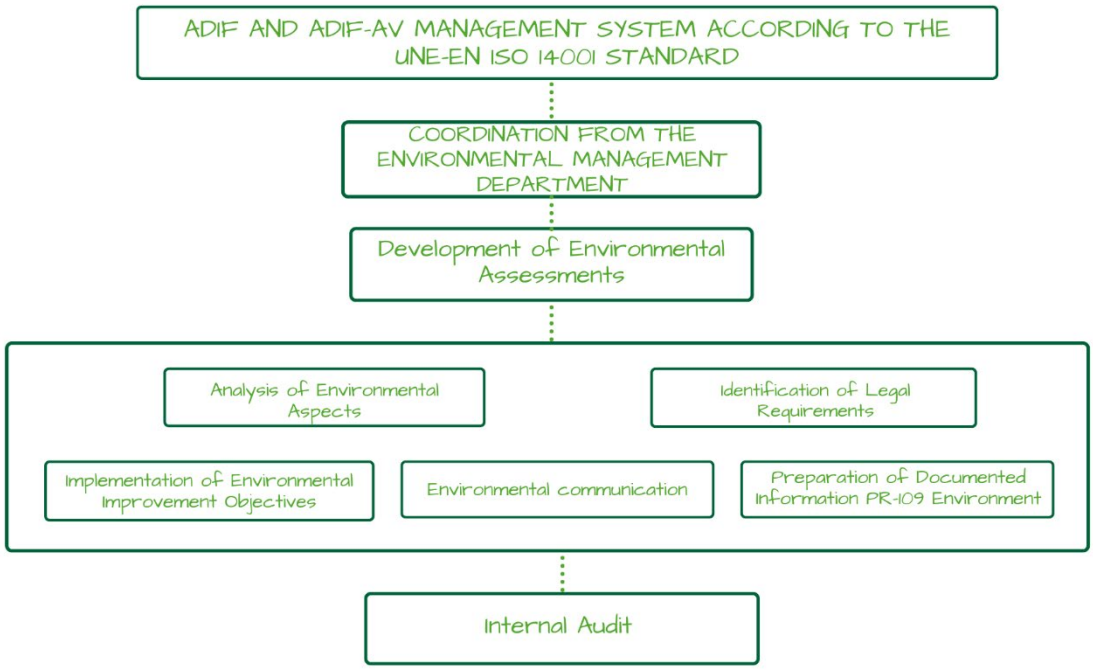


Figure 40. Centralised management of the EMS for Adif and Adif-Alta Velocidad

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).
- ADIF-IT-109-001-021. Use and Maintenance of Adif and Adif AV WSFs.

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 EMS. Tho 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 this context, there are Scope Sheets that identifying the activities conducted at passenger stations, logistics centres, fuel depots, maintenance bases, etc. Many of these sheets include facility plans, a list of activities and facilities with environmental impact, a description of the maintenance specialities operating at the facilities, and details on subcontracted activities, including control measures for the environmental aspects generated during these activities.

Additionally, Adif and Adif-Alta Velocidad are working to expand the certified scope so that it more comprehensively covers all the activities and facilities they manage. To this end, they are supported by preparing the Environmental Diagnoses for the facilities and/or processes to be incorporated. This work is coordinated by the Coprorate Environmental Sub-Department based on the needs identified by the various Activity Areas of Adif and Adif-Alta Velocidad.

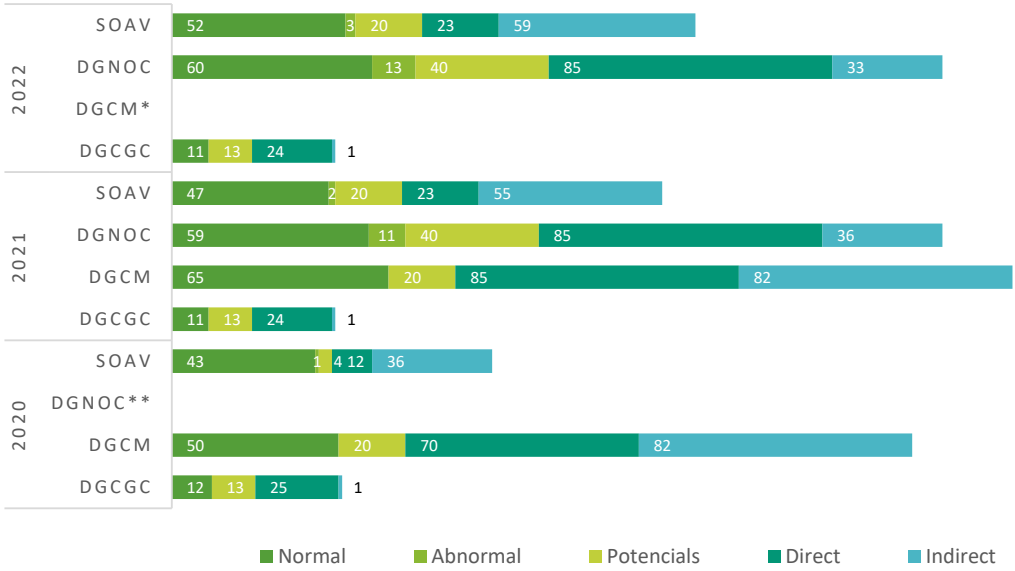
Environmental aspects resulting from activities carried out by Adif and Adif-Alta Velocidad

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, in 2023, it was not possible to determine the number of centres studied by the Corporate Conservation and Maintenance Department because data (for to the 2022 period) was not available at the time of analysis. Additionally, the increase in the number of centres assessed in 2022 by the Corporate Business and Commercial Operations Department is due to the expansion of the Management System's scope, specifically the addition of two new passenger stations (Elche AV and Palencia).

Chart 36. Typology of environmental aspects (2020-2022)



* Data not available for the DGCM in 2022
** Data not available for DGNOC in 2020

DGNOC: Corporate Business and Commercial Operations Department.

DGCM - RC: Corporate Conservation and Maintenance Department (Conventional Network).

DGCM - SOAV: Corporate Conservation and Maintenance Department (Corporate High-Speed Operations Sub-Department).

DGCGC: Corporate Traffic and Capacity Management Department.

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

In 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, paper, and water.
- In the Corporate Traffic and Capacity Management Department (DGCGC), the most significant aspect is the consumption of electrical energy, followed by toner waste generation and water consumption (which are typical of administrative activities).
- In the Corporate Business and Commercial Operations Department (DGNOC) the most significant aspects, depending on the type of centre, are as follows:
  - Stations: commercial waste, paper and cardboard waste, water consumption, plastic waste, and discharge of polluted water.
  - Depots: wastes such as contaminated absorbent materials, oil sludge, and soil contaminants.
  - Logistics services: water consumption, and electricity consumption.

Of particular relevance is the consumption of electrical energy, which is a key aspect across all areas. Measures should continue to be promoted to help reduce this consumption in the areas of Adif and Adif-Alta Velocidad. In this regard, it should be noted that several actions have been implemented to improve and increase efficiency as part of Adif's Plan to Combat Climate Change at Adif and Adif-Alta Velocidad. Likewise, the Corporate Environmental Sub-Department shall

plan the delivery of training sessions for the Activity Areas of Adif and Adif-Alta Velocidad, focusing on key issues such as systematic identification and assessment of aspects, implementation of new procedures, and results of internal audits, among others. During 2022-2023, environmental awareness training was conducted within the Corporate High-Speed Operations Sub-Department. Work is underway on a Welcome Pack for dissemination to contractors. That pack will include procedures, records, policies, and documentation from Adif and Adif-Alta Velocidad that are relevant to the execution of works.

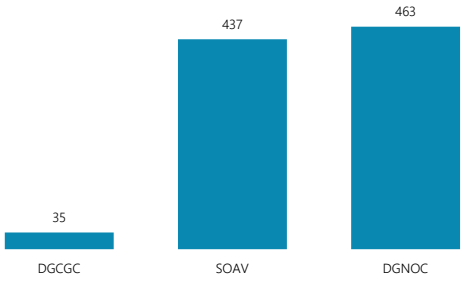
Finally, to enhance the management of potential environmental issues arising from emergencies during Adif and Adif-Alta Velocidad activities, a general system for handling minor environmental incidents has been established. This system provides common guidelines for action and analysis, to prevent or mitigate potential adverse environmental impacts and ensure an adequate and effective response.

Environmental performance in Adif and Adif-Alta Velocidad

The Corporate Environmental Sub-Department performs a joint analysis of environmental performance data (indicators) within the UNE-EN ISO 14001:2015 certified scope for Adif and Adif-Alta Velocidad, based on data provided by the heads of various Activity Areas: Corporate Business and Commercial Operations Department (DGNOC) and Corporate Traffic and Capacity Management Department (DGCGC), as well as data derived from the Environmental Performance in Facilities and Maintenance Activities of High-Speed Lines of the Corporate High-Speed Operations Sub-Department (SOAV). This year, no information is available from the Corporate Conservation and Maintenance Department (DGCM).

The following graph shows the distribution of the 935 environmental performance indicators reported for 2022 (the most recent year available) by Area of Activity, compared to 836 in 2021. This represents a 12% increase, despite the previously mentioned absence of indicators by the DGCM.

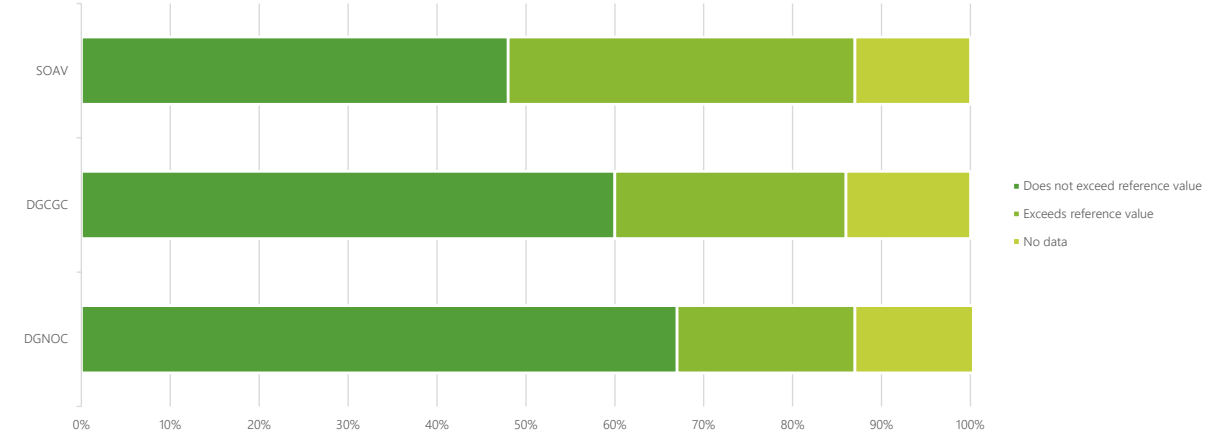
Chart 37. No. of indicators reported by Activity Area in 2022.



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

As outlined in procedure ADIF-PG-109-001-005, 'Operational Control and Environmental Performance 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 38. Percentage of compliance with the reference values by Activity Area in 2022.



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, with a high level of compliance with the reference values established for environmental aspects across all Activity Areas that reported information. While it is true that efforts should focus on addressing aspects where the reference value is exceeded and for which no generation information is available.

Legal requirements and other obligations applicable to activities conducted by Adif and 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 (Adif-Alta Velocidad).

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 2023 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 in 2023.
- 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 2023, 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. Once it is in use, it will be monitored and updated based on the identified needs.
- To 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).

- Improvement of 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. A total of 172 EIS works were monitored during 2023.
- Improvement of 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. By the end of the 2023, the document management platform was already in use. Regarding environmental monitoring at certified facilities, 75 visits were conducted in 2023, representing 95% of the planned schedule (exceeding the target value of 90%). The number of visits is slightly lower than in previous years because the new environmental monitoring contracts were incorporated in November 2023 and January 2024, respectively. During 2023, 56 works on High-Speed Lines were monitored, of which 6 were completed within the year. This resulted in 5 final reports and 1 single report being issued. 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 2023, the inventories of 11 maintenance bases have been updated in the Legislative Update Service, with 5 centres still to be updated. The first legislative bulletin 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 legionellosis (Published in *Inicia* in September 2023), has also been drafted.
- Improving 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 collected during 2023. 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.
- Improvement of 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, 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': a first draft has been prepared, revising the procedure's content to align it with the current system. It is pending approval by the Head of Division. 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. The changes are currently awaiting transfer to the relevant areas within Adif and Adif-Alta Velocidad for their assessment and comments. Regarding General Procedure ADIF-PG-109-001-004 'Minor Environmental Incidents', a new sheet has been drafted to address fauna entanglement and electrocution. The content of the rest of the minor environmental impact action sheets remains to be reviewed. As of the end of 2023, the Special Waste Procedure was still pending revision.

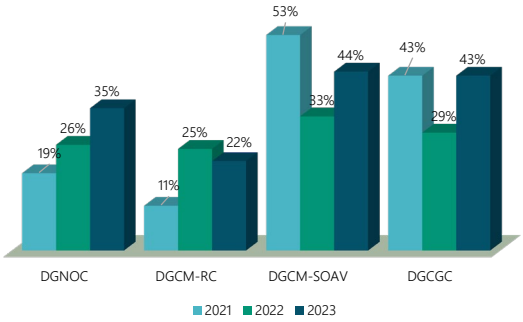
Of the nine targets proposed for Improving Environmental Performance during the 2023-2024 period, one has been completed, and eight are wither partially completed or in progress. At the end of 2023, the implementation percentage of the actions proposed to achieve these targets was 77%.

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.

Chart 39. Evolution of the percentage of audited centres relative to certified centres by Area of Activity in Adif and Adif-Alta Velocidad Internal Audit processes.



Source: Adif Alta Velocidad. Corporate Management. Corporate Environmental Sub-Department. Scope sheets for certified facilities and Internal Audits.

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. In this regard, we are working to ensure that the audited sample each year is approximately 30%, in order to complete the three-year certification cycle.

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 are shown below.

Table 44. Results of EMS audits according to ISO 14001 at Adif

	2016		2017		2018		2019		2020		2021		2022		2023	
	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. Int.	Aud. Ext.	Aud. Int.	Aud. Ext.
Non-conformities (No.)	41	5*	77	4	89	4	71*	2	-	0	80	4	53	2	82	21
Remarks (No.)	89	40**	89	24	120	75	165	57**	-	41	107	56	85	38	147	27
Audited headquarters (No.)	47	21	48	16	58	30	64	26	-	13	51	42	55	32	58	23
Certified sites (No.)	138	138	141	141	138	138	135	135	-	128	128	132	133	133	133	202
Certified sites that have been audited (%)	34	15	34	11	42	22	47	19	-	10	-	-	41	24	44	11

**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 findings detected are diverse in nature, reflecting the wide range of activities conducted by Adif and Adif-Alta Velocidad, and are generally related to operational activities. In addition, they are often closely associated with the presence of external agents at Adif and Adif-Alta Velocidad facilities (such as passengers, contractors, and operators).

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 2023, a total of 82 Non-conformities and 147 Observations were detected. Below is a breakdown of the total findings by section of the UNE-EN ISO 14001 Standard:

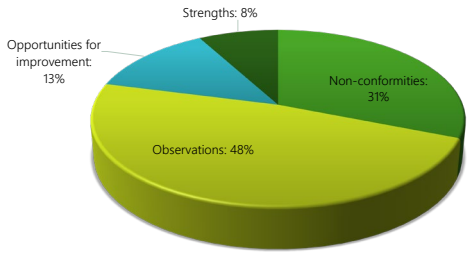
Chart 40. Breakdown of total findings detected by section of the ISO 14001 Standard during the Internal Audit process for Adif and Adif-Alta Velocidad.

Source: Adif Alta Velocidad. Corporate Management. Corporate Environmental Sub-Department. 2023 Internal Audit Statistical Results Report.

Of the total number of findings recorded, 216 (62.78%) are related to the Planning and Operational Control section. In this regard, the findings related to waste generation (such as identification and segregation) and regulatory compliance of existing installations (including control of commissioning, periodic reviews of low voltage installations, fire protection, and identification of thermal installations) are particularly noteworthy.

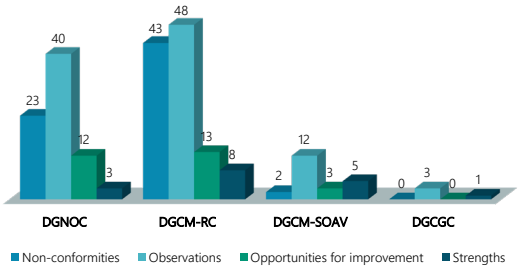
Below are the breakdowns of this category of findings by type and by Activity Area within Adif and Adif-Alta Velocidad.

Chart 41. Percentage of findings related to Planning and Operational Control by type in the Internal Audit process for Adif and Adif-Alta Velocidad.



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department. 2023 Internal Audit Statistical Results Report.

Chart 42. Breakdown of findings related to Planning and Operational Control by Area of Activity in the Internal Audit process of Adif and Adif-Alta Velocidad.



Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department. 2023 Internal Audit Statistical Results Report.

Below are the general conclusions from the 2023 External Audit of Adif and Adif-Alta Velocidad:

- Work should continue to refine the definition of the system's scope and update inventories of facilities in some Activity Areas.
- It is recommended to optimise shared workspaces to streamline the organisation of existing documentation and promote synergies between different areas.
- In relation to controlling and monitoring outsourced work, it is important to

highlight the effort made to draft detailed and specific environmental clauses for inclusion in future technical specifications.
- Finally, the collaboration and positive attitude of all staff involved in the audit process towards the proposed improvement opportunities must be highlighted.

Regarding the External Audit process of the Management System according to the UNE-EN ISO 14001 Standard for 2023, a total of 4 Non-conformities were detected, comprising 21 findings and 27 Observations:

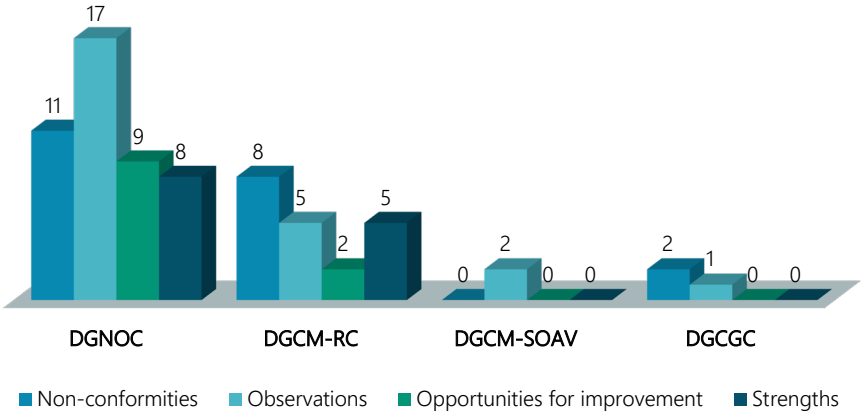
- 11 non-conformity findings and 17 observations pertain to the Corporate Business and Commercial Operations Department and are related to passenger stations, fuel depots, and logistics centres.
- 8 non-conformity findings and 7 observations correspond to the Corporate Conservation and Maintenance Department. Of these, 8 non-conformity findings and 5 observations are attributed to the to Corporate Conventional Network Operations Sub-Department and 2 observations are attributed to the Corporate High-Speed Operations Sub-Department.
- Two non-compliance issues and one observation are assigned to the Corporate Traffic and Capacity Management Department.

Below are the general conclusions from the 2023 External Audit of Adif and Adif-Alta Velocidad:

- Of the findings recorded in the Audit Report, 26% are non-conformities, 33% are observations, 19% are opportunities for improvement, and 22% are strengths.
- Two new centres have been added to the scope of certification under the UNE-EN ISO 14001:2015 Standard (Elche AV and Palencia Passenger Stations).
- Overall, the Environmental Management System is considered to be adequately implemented across the organization, except for the identified non-conformities. The focus remains on continuous improvement of processes and environmental performance, pollution prevention, and compliance with requirements.
- In its report, AENOR highlights the implementation of continuous improvement in the Management System as required by the Reference Standard, as well as the willingness of all those interviewed to demonstrate their involvement in and knowledge of the Management System.

The most frequent findings relate to requirements associated with legal and other obligations (point 6.1.3) and operational planning and control (point 8.1). Many of these findings concern the legalisation, periodic review, and correction of defects in existing installations, as well as the management of waste generated from activities.

Chart 43. Types of findings detected in the 2023 External Audit according to the UNE-EN ISO 14001 Standard, categorized by Activity Area.



DGNOC: Corporate Business and Commercial Operations Department.

DGCM - RC: Corporate Conservation and Maintenance Department (Conventional Network).

DGCM - SOAV: Corporate Conservation and Maintenance Department (Corporate High-Speed Operations Sub-Department).

DGCGC: Corporate Traffic and Capacity Management Department.

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

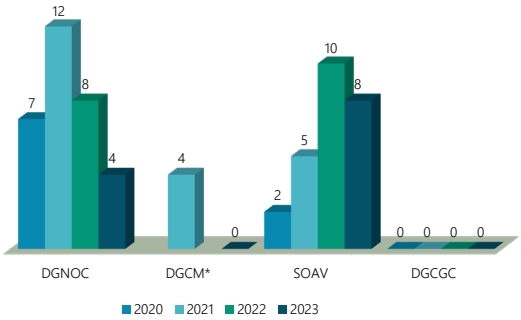
Minor environmental incidents

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 2023, compared to those recorded in previous years:

Chart 44. Minor environmental incidents at Adif and Adif-Alta Velocidad



* No information available from DGCM for 2020 and 2022

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, a total of 12 Minor Environmental Incidents occurred in 2023. These were

specifically in the Activity Areas of the Corporate Business and Commercial Operations Department (4) and the Corporate High-Speed Operations Sub-Department (8). No Minor Environmental Incidents were reported in the Corporate Traffic and Capacity Management Department or the Corporate Conservation and Maintenance Department (Conventional Network) for the year 2023.

The total number of recorded incidences decreased from 18 in 2022 to 12 in 2023. All recorded environmental incidents have been closed, representing 100% of the total incidents Generally, immediate corrective actions are taken. However, one incident remains under review for cause analysis and the application of 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).

The decrease in records may be attributed to the implementation of drills and/or questionnaires on incidents, which are part of the environmental awareness improvements across the various areas of Adif and Adif-Alta Velocidad.

However, among the recorded incidents, those related to *Legionella* detection (33%) and water consumption due to breaks or leaks (33%) stand out. Therefore, it is advisable to implement preventive measures to reduce the frequency of these incidents, such as executing the tasks specified in each centre's *Legionella* control plans, updating them if necessary, and conducting regular water consumption monitoring to detect leaks as soon as possible.

In any case, it is considered that none of the environmental incidents recorded during 2023 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 2023, the following conclusions can be drawn: within the Corporate Environmental Sub-Department, the highest number of relevant environmental reports in 2023 corresponds to environmental acoustics department, with 305 complaints related to noise and vibrations. Upon analysing data from other areas, it is noted that the Corporate Conservation and Maintenance Department (DGCM) has the second highest number of environmental reports, with 207 recorded. 66.13% of these reports correspond to complaints or claims about pruning, weeding, and issues concerning fauna or waste. The third highest number is 69 records of relevant environmental information from the Corporate Business and Commercial Operations Department (DGNOC). 67% of these records are

related to complaints from residents near passenger stations, primarily concerning noise and vibration issues.

Maintenance activities on High-Speed Lines

The Corporate Environmental Sub-Department oversees environmental control and monitoring of all facilities and activities associated with the maintenance of High-Speed Lines (HSL), managed by the Corporate High-Speed Operations Sub-Directorate, both within and outside ISO 14001 Certification. It is based on the following structure:

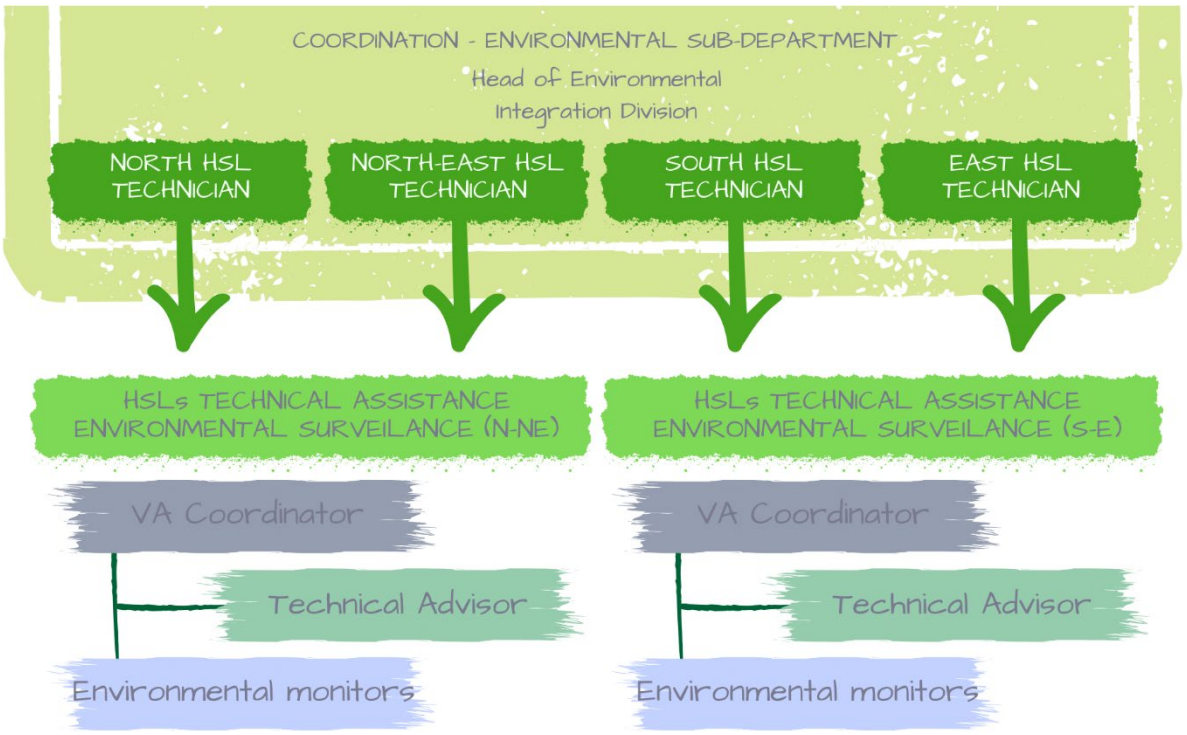


Figure 41. Organizational Structure of the Corporate Environmental Sub-Department for Environmental Control and Monitoring of Facilities and Activities Associated with the Maintenance of HSL.

This maintenance activity is divided into different specialities (Infrastructure and Track, Energy, Telecommunications, Signalling, and Protection and Safety Installations), which are handled by subcontracted companies. These activities generate a range of environmental aspects that must be controlled as part of their service provision for Adif.

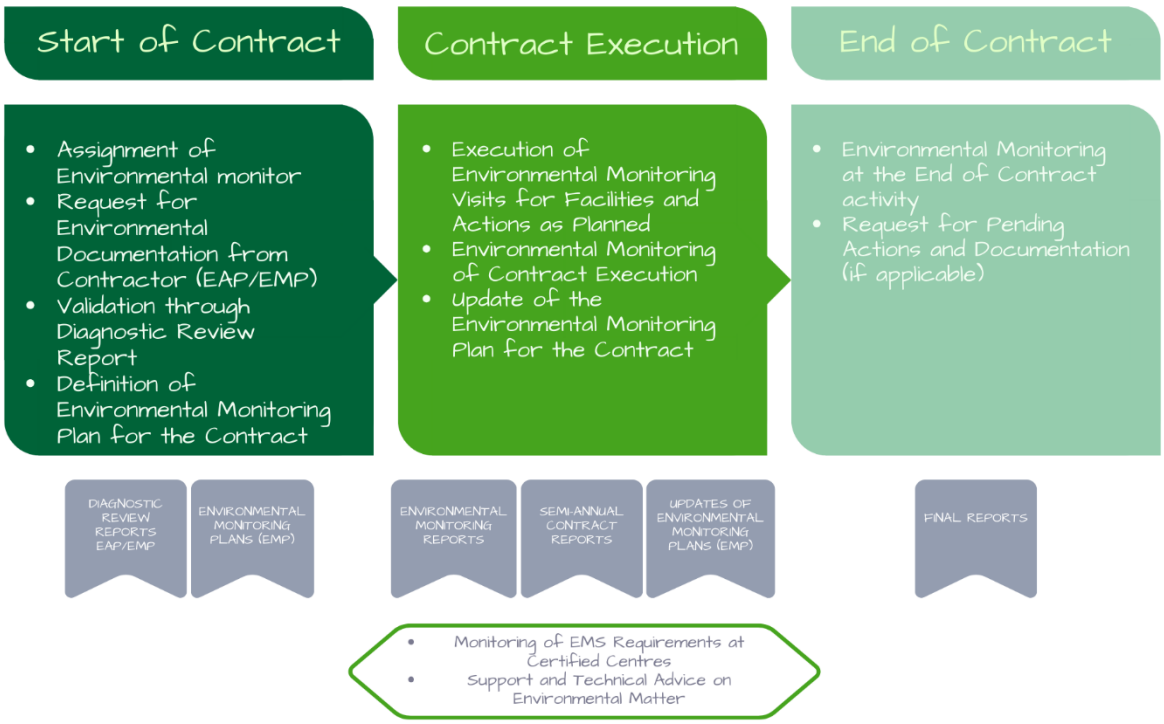


Figure 42. Phases of Environmental Control for HSL Maintenance Activities During the Contract Period with Contractors

The data relating to the environmental monitoring conducted during 2023 are shown below.

Table 45. Environmental control in HSL maintenance activities. Year 2023.

Typology	No. of facilities and actions subject to control	Visit	Reports
Maintenance bases	22	80	216
Electrical facilities	55	89	92
Technical facilities	175	277	326
Gauge changers	18	32	32
Tunnel maintenance facilities	10	23	29
CRC/CT/CELO	7	7	7
Total actions and associated facilities	**287**	**508**	**702**
Maintenance works	**56**	**-**	**6**

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

This meticulous environmental monitoring of HSL maintenance activities significantly contributes to maintaining the certification of the Adif and Adif-Alta Velocidad Management System according to the UNE-EN ISO 14001 Standard. It also helps improve the implementation of the system, enhances operational control of generated aspects, and thereby increases compliance with applicable environmental requirements.

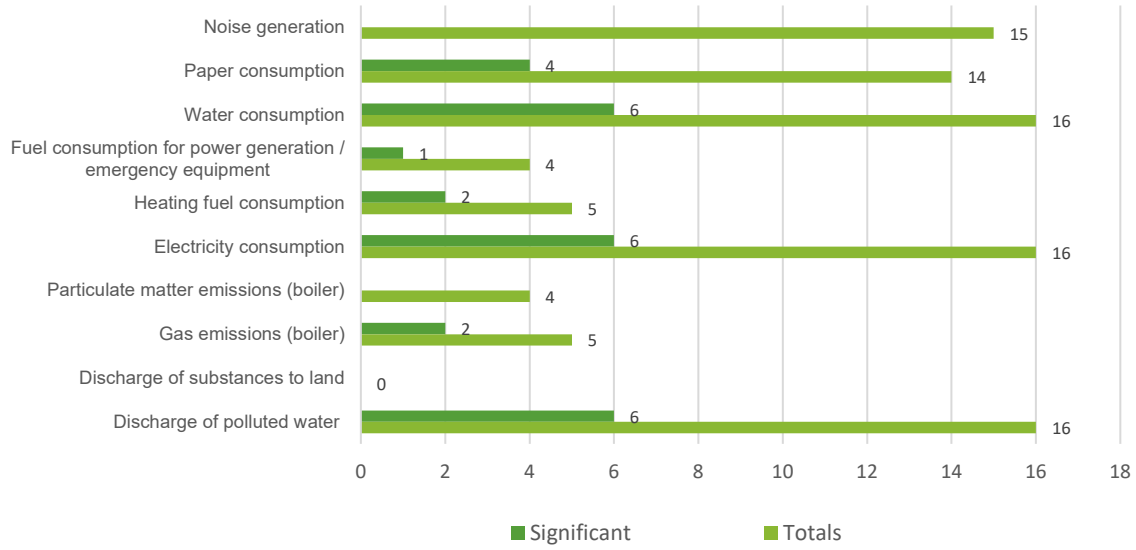
Figure 43. Activities coordinated by the Corporate Environmental Sub-Department to support the implementation and maintenance of the ISO 14001 Management System in the Certified Centres of the Corporate High-Speed Operations Sub-Department.

Within the scope of the Environmental Management System implemented for High-Speed Rail (HSLs) maintenance activities in 2023, the most frequently assessed significant aspects are related to consumption, including:

- Electricity Consumption: This issue often arises from either a lack of direct measurements in many cases or, in other instances, an increase in consumption.
- Water Consumption: This is primarily due to detected leaks or the refilling of the herbicide train.
- Discharge of Contaminated Water: This typically results from exceeding or nearing the parameters set by legal limits in the authorization or from lacking discharge authorization.

It is worth noting the decrease in the number of centres where paper consumption was deemed significant, dropping from 8 centres in 2022 to 4 centres in 2023.

Chart 45. Significant direct environmental aspects compared to total environmental aspects in the High-Speed Operations Branch. Year 2023



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

It is noteworthy that in 2023, assessments have included direct aspects related to abnormal situations arising from the management of historical waste.

It should also be noted that indirect aspects are the most relevant group identified, as they are generated by subcontracted companies, which Adif and Adif-Alta Velocidad can influence and/or control only to a limited extent. Note that work is being carried out on quantification for each year.

Additionally, to improve the management of potential aspects arising from possible environmental emergencies in Adif and Adif-Alta Velocidad activities, there is a general system in place for responding to minor environmental incidents. During 2023, a total of 10 incidents related to High-Speed Rail (LAV) maintenance were recorded and monitored for resolution. These incidents involved issues such as *Legionella* proliferation (31%), discharge of substances onto the ground (25%), water consumption (19%), and waste generation (13%), all attributed to inadequate maintenance of facilities and/or equipment.

In relation to monitoring and measuring environmental performance in HSLs maintenance activities, the Corporate Environmental Sub-Department periodically reviews indicators associated with direct and indirect environmental aspects (437 indicators in 2022, the the most recent year available). This is based on data from the Environmental Monitoring of 16 facilities (15 Maintenance Bases and 1 Technical Building) and the maintenance activities linked to these facilities within the High-Speed Lines of the Corporate High-Speed Operations Sub-Department (SOAV).

Furthermore, the Corporate Environmental Sub-Department conducts specific monitoring to ensure compliance with environmental legislation applicable to HSLs maintenance activities. Regarding the legal compliance for the year 2022 (assessed in 2023), a total of 2,531 requirements were evaluated. Of these, 8.93% are being managed by Adif and Adif-Alta Velocidad, representing a potential environmental risk if the necessary corrective actions are taken.

For the improvement of the EMS implemented in the maintenance activities of HSLs, 2 goals were

established in 2023 under the General Objective proposed by Adif and Adif-Alta Velocidad, aimed at improving Environmental Performance. These goals are detailed in the section on Planning Environmental Objectives at Adif and Adif-High Speed, and they consist of:

- Improving the environmental control in the certified activities of the Corporate High-Speed Operations Sub-Department.
- Improving the process of identifying legal requirements applicable to the certified scope of Adif and Adif-Alta Velocidad by updating of inventories of existing equipment and facilities in the scope of the Corporate High-Speed Operations Department.

In addition to the goals outlined in the General Objective proposed by Adif and Adif-Alta Velocidad, since 2023 work is underway on implementing 7 specific objectives to improve the EMS for maintenance activities on the HSLs as follows:

- Reduction in energy consumption (through the replacement of luminaires with LED lights) at the La Hiniesta High-Speed Maintenance Base (LAV-N).
- Refurbishment and relocation of the Hazardous Waste Collection Point at the Mora High-Speed Maintenance Base (LAV-S).
- Reduction of energy consumption, safety and energy efficiency (through the installation of astronomical clocks/timers and waterproofing of the roof of offices and warehouses) at the Hornachuelos High-Speed Maintenance Base (LAV-S).
- Improvement of the concrete pavement, access areas, and ground protection reinforcement of the Calatrava High-Speed Maintenance Base (LAV-S).
- Fencing of several plots of land to prevent illegal waste dumping on ADIF property in the area of the Gabaldón High-Speed Maintenance Base (LAV-E).
- Installation of a new clean point for non-hazardous waste in the storage area to improve access and increase the number of containers, allowing for better segregation of waste types at the Requena High-Speed Maintenance Base (LAV-E).
- Reduction of energy consumption and improvement in energy efficiency in the Lleida High-Speed Technical Building (including the operation of openings in walls to enhance lighting conditions, the replacement of luminaires with energy-efficient models, and the installation of a smart lighting sensor) (LAV-NE).

Detecting deviations and non-conformities, resolving them, and establishing immediate and corrective actions as needed are activities that help Adif and Adif-Alta Velocidad continuously improve the effectiveness of their Management System.

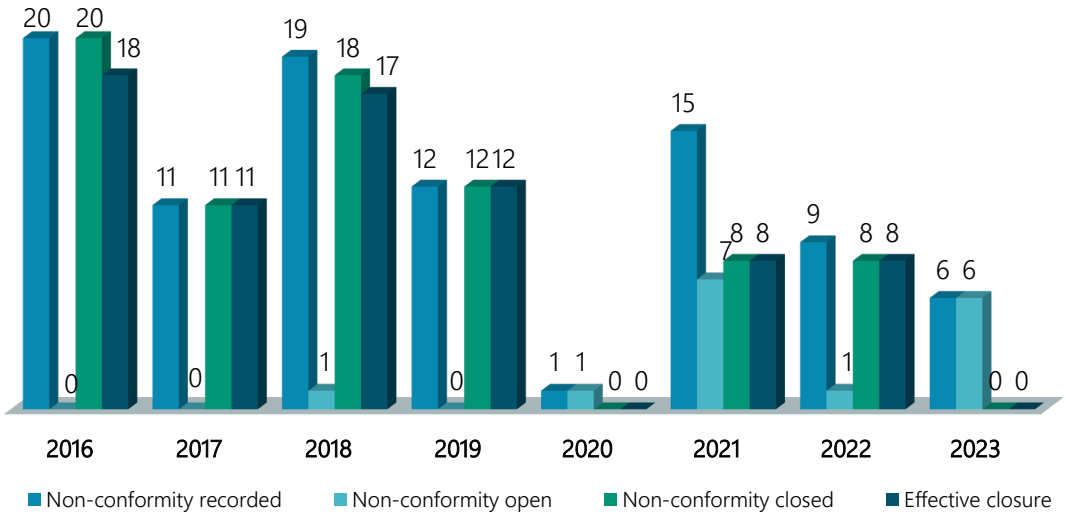
Figure 44. Calatrava High-Speed Maintenance Base

In the case of the Corporate High-Speed Operations Sub-Department coordinates these non-conformities, while their resolution falls under the responsibility of the Corporate Environmental Sub-Department, although their treatment is the responsibility of the Corporate High-Speed Operations Sub-Department. These non-conformities can arise from deviations detected during both internal and external audits

from issues identified through the monitoring of environmental aspects in the installations.

The following graph illustrates the historical trend in non-conformities recorded in the Management System of the Corporate High-Speed Operations Sub-Department, as per the UNE-EN ISO 14001:2015 standard. It also shows their status and the effectiveness of the actions taken by the organisation to address and resolve them.

Chart 46. Trend in Non-conformities registered in the Corporate High-Speed Operations Sub-Department as per ISO 14001 *



*Data for 2022 has been modified in relation to the 2022 Environmental Report, based on information available as of 1 January 2024.

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

Table 46. Percentage of non-conformity records closed per year according to ISO 14001 in the Corporate High-Speed Operations Sub-Department

2016	2017	2018	2019	2020	2021	2022*	2023
100.00%	100.00%	94.74%	100.00%	0.00%	53.33%	88.89%	0.00%

*Data revised in relation to the 2022 Environmental Report.

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

The key aspects derived from its analysis are detailed below:

- The year 2020 is not representative because, due to COVID-19 pandemic, Adif and Adif-Alta Velocidad's internal audit for 2020 was rescheduled to 2021, following the postponement of the external audit to the end of 2020.
- Most of the remaining open non-conformities are of more complex nature, related to the legalisation processes of installations. These non-conformities are subject to the procurement process for drafting and implementation a project, which is time-consuming. Typically, the resolution period for these non-conformities is over a year.

Activities related to the operation of passenger stations, freight logistics centres, and fuel depots

The operation of passenger stations, freight logistics centres, and fuel depots falls under the responsibility of the Corporate Business and Commercial Operations Department.

In 2023, the certification of the Palencia and Elche AV stations was verified according to the UNE-EN ISO 14001 Standard.

Similarly, following the completion of environmental diagnostic work –a phase before implementing the Environmental Management System– in new passenger stations. The forecast is to certify Villanueva de Córdoba los Pedroches and Guadalajara Yebes in 2024.

Regarding the operation of logistics centres, the increase in self-provided and risk-free facilities has resulted in a decrease in the number of certified centres in previous years, leaving 9 certified logistics centres in 2023.

Regarding the monitoring and measurement of the environmental performance of the Corporate Business and Commercial Operations Department in 2023, considering the various types of certified sites, the following conclusions can be drawn:

- Overall, in passenger stations, the implementation of the UNE-EN ISO 14001 Standard is considered quite advanced, indicating that the environmental impact management is highly optimised. This suggests that any potential increase in consumption is more likely related to an unusual or potential issue rather than misuse of the installation, making it more appropriate to address it through corrective actions. During 2023, consumption has been normalised on a per-1,000-passengers basis. The total number of passengers across all stations increased by 6% in 2023 compared to 2022.
- The main threat remains the loss of in-house staff, which makes it challenging to effectively monitor improvement actions and control consumption during incidents. The entry into force of the contract for external auxiliary and complementary services in the Passenger Stations Department covers all necessary services to optimise operations and ensure the smooth functioning of the stations. This also increases the on-site personnel coverage, improving the quality of services and passenger support, and partly addresses urgent staffing needs.
- The evolution of logistics centres, in terms of environmental performance is closely tied to the changes in the business model. The shift to the risk and risk-return model for facilities has increased the need to intensify the control of the companies operating these facilities. Environmental management in logistics terminals is shifting from typical facility monitoring with an environmental management system in place to a focus on legal compliance checks conducted by the various companies operating under the risk and reward model.
- The certification of fuel depots was a milestone for Adif, transforming them from sites traditionally seen as prone to environmental issues into areas with full environmental certification. In 2023, a total of 15 sites remained environmentally certified, representing 65% of existing depots. This includes not only tax warehouses but also sites in Almería, Valencia, and Murcia, which maintained their certifications despite being managed by RENFE, as Adif

continues to ensure legal compliance. Among the environmental aspects associated with fuel depots, the most significant impact is on soil and water. For this reason, since the UNE-EN ISO 14001 Standard was first implemented in these facilities, significant investment has been made in the supply areas, along with coordinated training for all diesel pumps.

To enhance the Management System in line with the UNE-EN ISO 14001 Standard, the following specific objectives were established for the Corporate Business and Commercial Operations Department in 2023:

- Improve operational control of significant environmental aspects, such as reducing the consumption of natural resources (water, electricity, and fuel) and minimising waste generation. Among its goals are intensifying the monitoring of water losses from installation breakages, implementing energy-saving and efficiency practices, conducting environmental awareness activities for personnel, installing automatic exterior doors, replacing lighting fixtures with energy-efficient ones, and optimising air conditioning and fire prevention systems.
- Regarding fuel depots and considering the main risks associated with these installations, prioritise the prevention of soil contamination and control of potential spillages. In 2023, improvements were made to the trays at the Vicálvaro and Huelva dispensing points. In 2024, plans are in place to upgrade the trays at various mobile points. These enhancements aim to strengthen environmental commitment in the certified depots and enhance pollution prevention at locations prone to potential pollution.

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 2023, **Adif** conducted a total of 31 environmental courses for 558 participants, amounting to 5,907 hours of training. 54% of the training courses were delivered online.

The course with the highest attendance was *'PG109 Actuaciones Incidencias Ambientales Menores CFV'* (PG109 Actions Minor Environmental Incidences CFV), delivered online, with a total of 376 participants (representing 65% of overall attendance).

Table 47. Number of participants in environmental courses in 2023

Name	Modality	Number of sessions
PG109 Actions Minor Environmental Incidents VTC (Virtual Training Centre)	E-learning	8
Environmental risk. CFV fuel dispenser	E-learning	4
Virtual classroom Environment	E-learning	1
CFV Environmental Awareness	E-learning	1
Climate Change and Circular Economy Expert	E-learning	1
Environmental Management System ISO 14001 CFV	E-learning	1
Environmental risk. Fuel pump	On site	1
Environmental Management and Prevention Representatives	On site	5
Sustainable Mobility Workshop	On site	1
International Fight Against Climate Change	On site	1
Waste management	On site	1
Discharges and Polluted Waters	On site	1
Atmospheric emissions	On site	1
TOTAL		27

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

Training for different areas and professional groups

During 2023, 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 99% for participant numbers and 107% for planned hours), compared to the target of 80%.

Notably, training for the personnel of the Corporate Conservation and Maintenance Department involved 408 participants and 3,617 hours, with the majority in the course *'PG109 Actuaciones Incidencias Ambientales Menores'* (PG109 Minor Environmental Incident Actions)

Table 48. Environmental training for management at Adif and Adif-Alta Velocidad in 2023

Scope	Average staff	Planned participation	Actual participations	Planned hours	Completed hours	Participant compliance (%)	Compliance with hours (%)
Department of the President's Office and Internal Audit	136	0	3	0	15	100	100
Corporate Department	216	1	3	6	18	300	300
Corporate People Management Department	662	2	30	16	363	1,500	2,269
Corporate Department Financial and Management Control	228	1	5	6	25	500	417
Corporate Department Construction	105	5	2	30	12	40	40
Corporate Department Conservation and Maintenance	5,231	472	408	4,204	3,617	86	86
Corporate Department Circulation and Capacity Management	3,890	6	53	617	1,348	883	218
Corporate Department Business and Commercial Operations	1,462	3	32	18	178	1,067	989
Corporate Department Strategic Planning and Projects	133	4	3	218	210	75	96
Corporate Department Security Corporate Processes and Systems	536	4	4	32	23	100	72
Adif-Alta Velocidad	276	18	12	122	80	67	66
Default*	0	46	3	276	18	7	7
TOTAL	**12,875**	**562**	**558**	**5,545**	**5,907**	**99**	**107**

* Includes staff who relocate during the year.

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

Table 49. Environmental training for professional groups at Adif and Adif-Alta Velocidad in 2023

Position	Average workforce	Planned participation	Actual participations	Planned hours	Completed hours	Participant compliance (%)	Compliance with hours (%)
Operational staff	8,060	489	440	3,919	3,802	90	97
Middle-level management	2,467	17	70	908	1,187	412	131
Support structure	1,220	8	35	436	837	438	192
Management structure	925	2	10	12	63	500	525
Default*	0	46	3	270	18	7	7
TOTAL	**12,672**	**562**	**558**	**5,545**	**5,907**	**99**	**107**

* Includes staff who relocate during the year.

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

ENVIRONMENTAL PROCESS MANAGEMENT

Responsible purchasing

3-3 | 308-1 | 308-2

! Adif has launched the Responsible Public Procurement Project to promote environmental objectives beyond just the procurement of works, services, or supplies.

Therefore, for each contracting process, Adif 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 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's contracting power to promote sustainable public procurement among its suppliers.

Adif 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 has defined the environmental criteria for assessing suppliers of goods, services, projects, and works submitted in its procurement processes.

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. 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 has established an Integrated Risk Management System. It is a set of policies, procedures, and practices that enables the identification, analysis, and management of risks associated with the activities of the two entities, providing a reasonable level of assurance for the achieving their objectives.

The scope of this management system includes, among other factors, the environmental risk. For Adif this pertains to non-compliance with current environmental regulations and, therefore, the potential for resulting sanctions.

To minimise and control the risk of environmental damage and non-compliance with environmental regulations, indicators have been established that focus on:

- The efficiency in the supervision of projects and works.
- The extension of the scope of environmental certification for Adif's activities.
- A thorough control of activities with the highest risk of soil contamination.

With this system, Adif meets the requirements for identifying environmental risks as outlined by the ISO 14001:2015 standard.

Environmental complaints procedure

3 | 308-2

Adif has a procedure in place to receive, document, and respond to complaints regarding noise generated by its activities.

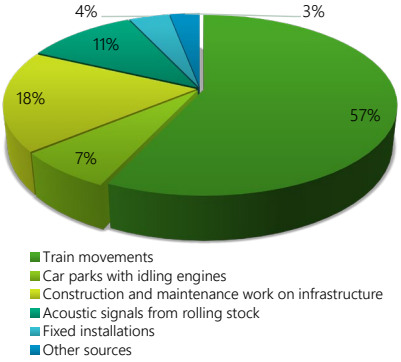
Environmental complaints received in 2023

In 2023, a total of two hundred and ninety-two (292) environmental complaints related to noise were received and addressed through the established communication methods.

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 47. Source of noise and vibration complaints in 2023 (%)



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

ENVIRONMENTAL EXPENDITURE AND INVESTMENTS

In 2023, Adif's environmental expenditure and investments amounted to over 38 million and 53 million euros, respectively.

Table 50. Expenditure on environmental protection (€)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A. Exploitation *	**9,485,044**	**13,504,724**	**13,464,240**	**13,155,882**	**19,814,720**	**22,522,967**	**23,603,947**	**24,162,205**	**21,413,895**	**38,777,693**
Corporate waste management	276,081	297,672	286,191	100,076	105,429	116,350	140,395	174,822	126,660	2,650,500
Corporate waste management**										566,381
Water treatment***	99,154	110,818	374,661	320,252	451,222	553,435	462,504	510,491	646,272	707,669
Noise and vibration	-	39,280	336,362	-	-	-	-	99,502	32,724	44,630
Environmental Management Systems and Specific Programmes	-	26,775	36,909	24,696	23,255	37,413	31,617	54,203	38,910	32,147
Environmental communication	21,226	21,226	20,994	20,994	0	32,931	14,113	40,454	23,377	27,830
Decontamination of contaminated soils or water	750,186	701,782	542,100	762,477	798,192	659,833	964,407	1,436,394	1,506,849	1,669,816
Fire prevention	8,338,397	12,307,171	11,867,023	11,927,387	18,426,048	21,094,901	21,863,771	21,476,195	18,665,404	32,849,019
Environmental monitoring of works on sites not subject to Environmental Impact Assessments (EIA)					10,574	28,104	22,388	55,889	33,257	40,427
Environmental monitoring of HSL maintenance activity							104,752	314,255	340,442	157,127
B. Investment	**55,694**	**394,334**	**288,677**	**332,486***	**665,389***	**5,397,175**	**8,835,338**	**33,279,101***	**11,911,260**	**53,631,010**
Water treatment	25,335	12,373	8,712	27,750	55,735	46,884	6,399	0	33,488	34,058
Noise and vibration	-	-	-	-	-	-	358,751	309,630	243,540	249,249
Energy saving	30,359	345,719	197,617	80,850	14,692	251,780	4,046,963	29,108,006	1,083,449	32,078,237
Environmental monitoring of works not subject to an EIA					309,482*	530,351	813,914	806,716	636,109	1,281,163
EIA Compliance		36,242	82,348	223,886	285,480	505,990	594,966	468,693	989,525	1,280,869
Projects		36,242	46,847	98,588	142,144	236,439	271,109	279,825	403,176 ****	417,814
Construction			35,501	125,298	143,336	269,551	323,857	188,868	586,349	863,055
Works						4,062,170	3,014,345	2,586,056	8,925,149	18,707,434

* Data revised with from the 2022 Report

** This item does not include fees paid for refuse collection

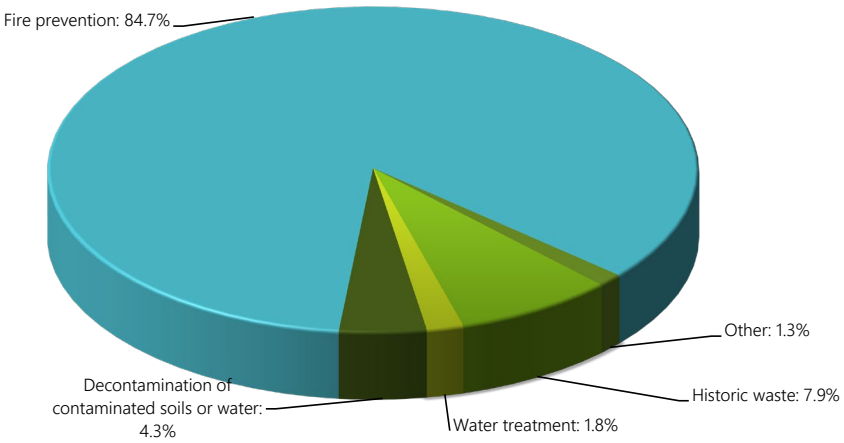
*** This item includes, among other things, sewage treatment charges and other related management costs

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

Source: Adif-Alta Velocidad, Corporate Management, Corporate Environmental Sub-Department; Adif-Alta Velocidad, Corporate Responsibility, Sustainability and Brand Sub-Department, Business Strategy Directorate, Corporate Strategic Planning and Projects Department, Environmental Sustainability and Combating Climate Change Division; 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.

84.7% of the operational environmental expenditure was allocated to fire prevention. 7.9% and 4.3% of the expenditure have been allocated to managing historic waste and decontaminating soil and water, respectively, as well as to treating water. The remaining 1.3% was allocated to waste management, noise and vibration prevention, environmental management systems, environmental communication, and environmental monitoring for works not subject to EIS, and activity for HSLs maintenance.

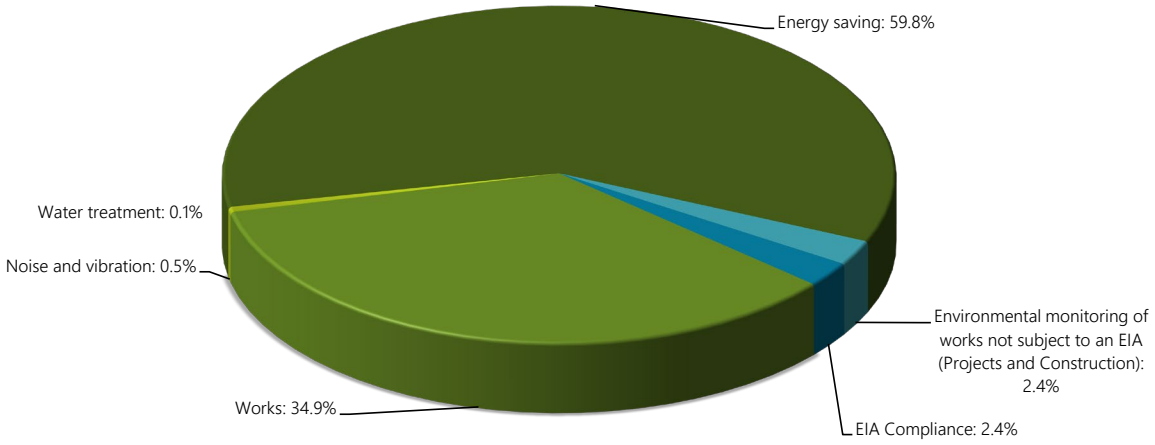
Chart 48. Expenditure on environmental protection in operation Year 2023



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

Regarding Adif's investments in environmental protection, the main expenditure is firstly on energy saving (59.8%), followed by works, which account for 34.9% of the total investment. The remainder has been allocated to EIS compliance measures (2.3%), environmental monitoring for works not subject to an EIS (2.4%), noise and vibrations (0.5%), and water treatment (0.1%).

Chart 49. Investments in environmental protection. Year 2023



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

Table 51. Environmental investments in the construction of new railway accesses for the year 2023 (€/year)

	Almería-Granada	Centre	Mediterranean Corridor	North-Northwest Corridor	Madrid-Cartagena Railway Axis	Madrid-Zaragoza-Barcelona-Fra. French	Medina del Campo-Salamanca-Fuentes de Oñoro	North-east	New Railway Access To Asturias	Other Actions In Conventional Network	Ourense-Monforte de Lemos-Lugo	Palencia-Santander	Seville-Cádiz	Total
Land preparation and landscape integration measures for the railway line and infrastructure	0	5,479	130,182	3,300	6,158	0	0	0	0	233,511	501,545	29,526	130,719	1,040,422
Adaptation and landscape integration measures for auxiliary construction elements	0	0	20,972	0	0	0	26,009	0	0	0	1,575,655	0	0	1,622,636
Noise protection	0	0	4,188,847	0	0	0	0	0	0	146,711	30,662	566,438	0	4,932,658
Wildlife protection	0	5,055	3,798	5,257	0	0	0	0	0	0	122,550	34,704	0	171,364
Archaeological protection	0	69,932	74,444	-4,729	0	0	0	0	0	55,983	81,483	78,651	0	355,763
Protection of water and soil quality	0	62,686	142,154	0	0	0	0	0	0	25,457	0	0	0	230,298
Waste management	2,769	145,104	2,793,801	78,894	29,087	0	53,803	1,262	0	3,505,927	2,098,648	653,492	0	9,362,787
Environmental monitoring of the works	0	0	0	7,131	0	0	0	0	0	231,063	0	0	0	238,194
Setting out	0	45,694	6,698	672	0	0	7,754	0	0	95,688	70,916	2,541	947	230,910
Air quality	0	0	55,557	0	0	0	0	0	0	10,502	0	0	0	66,060
Structures modified to comply with the EIS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Compensatory measures	0	0	226,767	0	0	0	0	0	0	0	79,151	0	0	305,917
Various	0	20,336	101,656	0	0	0	0	0	0	1,832	26,600	0	0	150,425
Total Environmental Measures (EM)	**2,769**	**354,287**	**7,744,876**	**90,525**	**35,245**	**0**	**87,567**	**1,262**	**0**	**4,306,676**	**4,587,209**	**1,365,351**	**131,667**	**18,707,434**
Total work	**2,016,484**	**19,420,218**	**70,999,417**	**12,017,059**	**1,009,164**	**0**	**1,768,341**	**4,405,388**	**6,161,203**	**68,295,023**	**107,746,571**	**14,884,756**	**10,198,570**	**318,922,193**
% EM	**0.14%**	**1.82%**	**10.91%**	**0.75%**	**3.49%**	**0.00%**	**4.95%**	**0.03%**	**0.00%**	**6.31%**	**4.26%**	**9.17%**	**1.29%**	**5.87%**

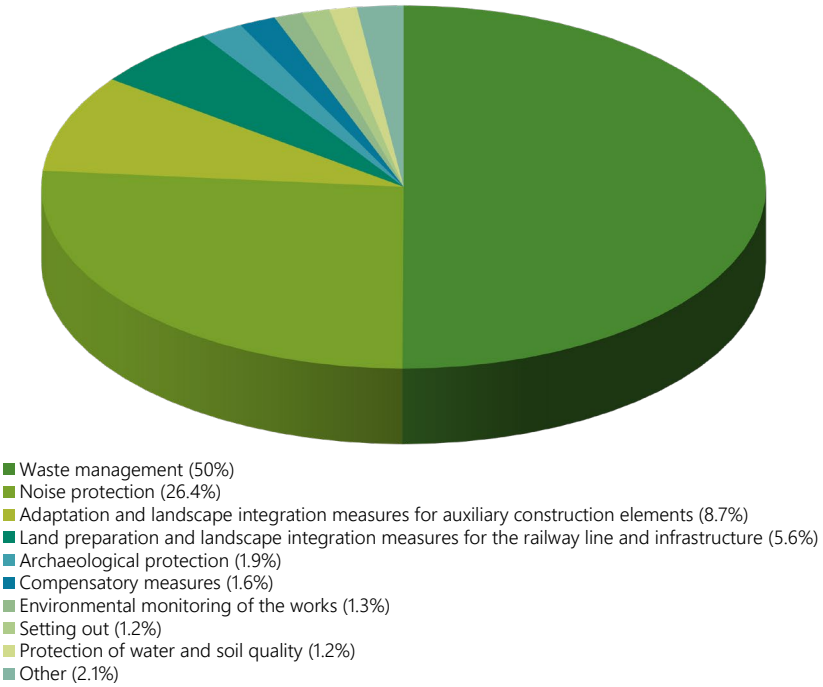
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

In the construction of new railway accesses, environmental investments in 2023 represented 5.87% 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 (over seven and a half million euros). Investment in this line represents 41.4% of the total investment in Spain.

Meanwhile, across the entire Spanish territory, environmental investments made in railway infrastructure construction were primarily allocated to waste management (50.0%), followed by noise protection measures (26.4%).

Chart 50. Construction of new railway access points. Allocation of environmental investments in 2023 (%)



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

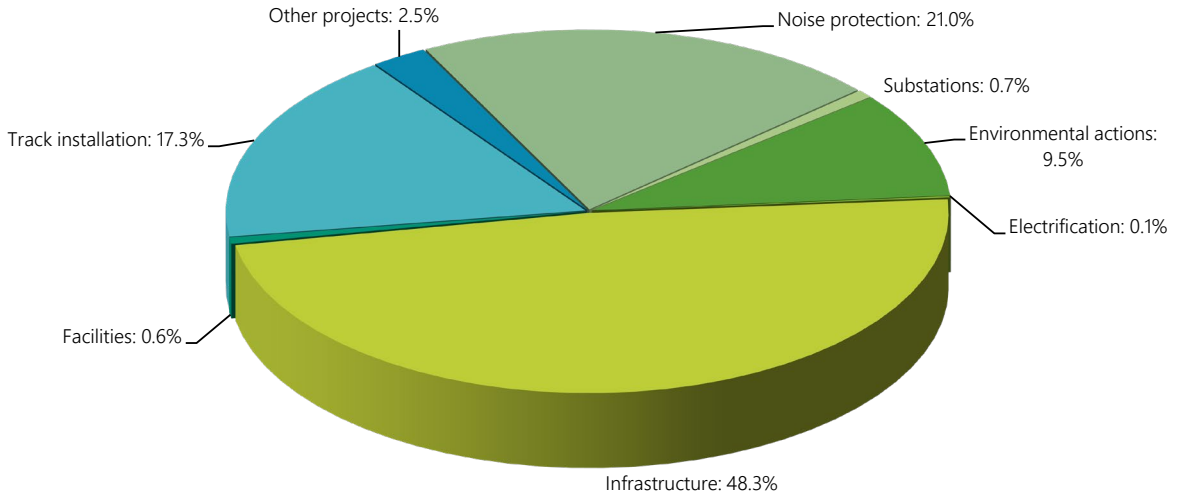
Regarding environmental investment by type of work, 48.3% was used in the construction of railway platforms in 2023. The remainder was primarily invested in noise protection (21.0%) and track installation (17.3%).

Table 52. Investment in environmental projects by type atAdif (€/year)

Type	2019	2020	2021	2022	2023
Environmental actions	-	-	-	-	1,777,717
Electrification	20,174	34,326	2,164	100,688	22,570
Infrastructure	3,265,369	2,064,932	1,356,529	5,293,176	9,042,396
Facilities	5,399	64,502	70,272	60,399	104,065
Track installation	331,267	319,761	281,332	2,058,598	3,236,267
Other projects	0	392,217	843,749	1,254,272	466,313
Noise protection	-	-	-	-	3,921,431
Substations	439,961	138,606	32,011	158,016	136,675
Total	**4,062,170**	**3,014,345**	**2,586,056**	**8,925,149**	**18,707,434**

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

Chart 51. Investment in environmental works by type in 2023 (%)



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

ENVIRONMENTAL COMPLIANCE

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In 2023, Adif faced thirty (30) administrative proceedings related to compliance with environmental regulations, covering water (3), trees and forests (4), fauna (1), forest fires (6), public cleanliness (4), and waste (12). Since 2010, 47.95% of the enforcement actions have resulted in penalty (70 out of 146), 30.14% ended without penalty (44 out of 146), and 21.92% are still unsolved (32 out of 146).

Of the enforcement actions opened since 2010, 23% are for alleged breaches of forest fire regulations, about 22% for waste, another 21% for water, approximately 9% for trees and forests and public cleanliness, and 8% for noise. A smaller number of enforcement actions have also been opened in relation to fauna, soil contamination, and cattle routes.

Of the penalties issued since 2010, 30% are for breaches of environmental regulations on forest fire prevention, 21% on water, 21% on waste, 11% on trees and forests, and the remainder for public cleanliness, noise, soil, cattle routes, and fauna.

Table 53. Cases and penalties for non-compliance with environmental regulations from 2010 to 2023

Breach-Related Matters at Adif	Active files		Sanctions	
	No.	%	No.	%
Water	30	20.55%	15	21.43%
Trees and forests	14	9.59%	8	11.43%
Fauna	4	2.74%	1	1.43%
Forest fires	34	23.29%	21	30.00%
Public cleanliness	14	9.59%	6	8.57%
Waste	33	22.60%	15	21.43%
Noise	12	8.22%	2	2.86%
Contaminated soils	3	2.05%	1	1.43%
Cattle routes	2	1.37%	1	1.43%
Total	**146**	**100.00%**	**70**	**100.00%**

Source: Adif, Corporate Legal Advisory Department, Corporate Litigation Sub-Department; Adif-Alta Velocidad, Corporate Directorate, Corporate Environmental Sub-Department.

Table 54. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breahced	Penalty
Water	2019	Occupation of the hydraulic public domain (DPH) area of the Bobadilla stream through the construction of passage structures and a breakwater, affecting both banks and the easement and police zone of the stream in Illescas (Toledo), without administrative authorisation or concession.	*Confederación Hidrográfica del Tajo* (Tagus Hydrographic Confederation)	Royal Legislative Decree 1/2001 of 20 July, approving the consolidated text of the Water Act	Pending

Table 54. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breahced	Penalty
Contaminated soils	2019	Soil contamination in the site known as El Hondón (Cartagena)	Department of Water, Agriculture, Livestock, Fisheries, and Environment of the Region of Murcia	Law 22/2011 of 28 July 2011 on waste and contaminated soils	Pending
Waste	2020	Dumping of soil in Monforte del Cid (Alicante)	Monforte del Cid Town Council	Municipal Regulation on Street Cleaning, Public Health, and Solid Waste Management, Monforte del Cid	Pending
Forest fires	2021	Failure to manage the plant biomass (scrub) and failure to cut the species listed in the Additional Provision (D.A.). 3rd (eucalyptus) on the railway tracks in San Sadurniño, within the public domain area.	Government of Galicia (*Xunta de Galicia*)	Law 3/2007 of 9 April on prevention and defence against forest fires in Galicia (Art. 20.bis.b)	Pending
Public cleanliness	2021	The cleaning and replacement of the fencing for the plots located on Jerez Street and González Byass Street, with cadastral references 723400/02/04/05, in Tomelloso (Ciudad Real).	Tomelloso Town Council	Legislative Decree 1/2010 of 18 May, which approves the consolidated text of the Law on Spatial Planning and Urban Activity (Art. 137).	Pending
Forest fires	2021	Failure to manage biomass to prevent fires on Plot 9012, Polygon 23, in the Municipality of Bóveda (Lugo).	Government of Galicia (*Xunta de Galicia*)	Law 3/2007 of 9 April on prevention and defence against forest fires in Galicia (Art. 3.3)	€500 fine
Public cleanliness	2021	Failure to keep ditches, conduits, and other areas of public works clear of branches and debris in Novelda, Serreta-Pol. 6 - Camino 9014 N	Novelda City Council	Citizen Coexistence Regulation (Art. 012.5)	€150 fine
Cattle routes	2021	Occupation of the livestock path of La Plata, in Guadalmez	Department of Sustainable Development, Regional Government of Castile-La Mancha	Law 9/2003, of March 20, on Cattle Routes in Castile-La Mancha (Art. 41. 3 a)	Pending
Water	2022	Construction of a wooden footbridge with access through the tunnel of the waterway between coordinates ETRS89 UTM H30 X:612599 Y:4667478 and X:612628 Y:4667499, intruding upon the public hydraulic domain of the Valdelafuente ravine, along with the installation of a fence in the buffer zone of the aforementioned watercourse, all without the authorization of the basin organization. Site: Casetas-Bilbao railway line. Municipality: Tudela (Navarra)	*Confederación Hidrográfica del Ebro* (Ebro Hydrographic Confederation)	Water Law (Art. 116.3)	Not applicable
Waste	2022	Railway sleepers deposited on plot 349 of polygon 2 in Ferreruela (Zamora)	Castile and León Regional Government (Junta de Castilla y León)	Law 22/2011 on Waste and Contaminated Soil (Art. 46.3.b)	Not applicable

Table 54. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breahced	Penalty
Water	2022	Piping of the bed of an unnamed stream for a length of 18 meters, construction of a concrete manhole, placement of breakwater stones at its outlet, and removal of sediment from the bed; installation of a metal pedestrian footbridge over the Las Navas del Rey stream and development of a path in the floodplain and buffer zones on the left bank of the stream; use of the easement areas on both banks for the placement of materials needed for the work; and construction of a stone breakwater in the buffer zone on the right bank of the Las Navas del Rey stream, as well as in the floodplain and buffer zones on the left bank of the unnamed stream, all without the required administrative authorization from this basin organization, in Polígono Las Navas, Cabezón de la Sal, in the municipality of Cabezón de la Sal (Cantabria).	*Confederación Hidrográfica del Cantábrico* (Cantabrian Hydrographic Confederation)	Water Lay (Art. 116.3.d and e)	Pending
Fauna	2022	Electrocution of a raptor on an electrical pole in a bird protection area designated for preventing electrocution. Places: Village of Bolaño, Concello da Gudiña (Ourense). Coordinates: UTM, ETRS89, X:643752, Y:4658936	Government of Galicia (*Xunta de Galicia*)	Law 5/2019 Natural Heritage and Biodiversity of Galicia (Art. 80.1.n)	Not applicable
Water	2022	Unauthorized construction of a concrete speed bump, approximately 6x4 meters in size, spanning the riverbed and extending a gravel road that provides access to agricultural plots from the DSA-662 road, in the municipality of Gomecello, Salamanca	*Confederación Hidrográfica del Duero* (Duero Hydrographic Confederation)	Water Law (116.3. d)	Pending
Waste	2022	Abandoned waste on plot 9013 in polygon 18 of the municipality of Socuéllamos (Ciudad Real).	Castile-La Mancha	Law 22/2011 on Waste and Contaminated Soil (Art. 46.3.c)	Pending
Waste	2022	Uncontrolled dumping of various types of waste in Plot 1, Polygon 42, Recinto 2, in the municipality of Albacete.	Castile-La Mancha	Law 22/2011 on Waste and Contaminated Soil (Art. 46.3.c)	Pending
Trees and forests	2022	Felling of trees in Camino Viejo, Municipality of Magaz de Pisuerga	Castile and León Regional Government (Junta de Castilla y León)	Law 3/2009 Law on Forestry of Castile and León (Art. 116)	Pending
Waste	2022	Depositing rubble and rubbish in an area near the Prado railway station in the Vilar de Barrio municipality, from the dismantling of the old offices used during the construction of the Madrid-Galicia high-speed rail line.	Government of Galicia (Xunta de Galicia)	Law 22/2011 on Waste and Contaminated Soil (Art. 46.3.c)	Pending
Forest fires	2022	Start a fire on the right embankment of the railway track in the direction of Ávila-Arévalo. The incident took place on the right-hand slope of the Ávila-Arévalo railway line, at coordinates X-363580; Y-4513840, in Tolbaños-Escalonilla (Ávila).	Castile and León Regional Government (Junta de Castilla y León)	Law 43/2003 of November 21 (Article 67.e), in conjunction with Article 9 of Order FYM/510/2013 of June 25, which regulates the use of fire.	Pending
Water	2022	Discharge of wastewater from the railway station toilets directly onto the ground, without impermeability measures, lacking the required authorization, and posing a clear risk of contaminating water quality and degrading the public water domain in the municipality of Cazalla de la Sierra (Seville)	*Confederación Hidrográfica del Guadalquivir* (Guadalquivir Hydrographic Confederation)	Water Law (Art. 116.3 g)	€400 fine

Table 54. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breahced	Penalty
Trees and forests	2022	Herbicide application on a section of the Ourense-Vigo railway line (managed by ADIF) in the municipality of Ribadavia (Ourense) caused damage to crops adjacent to the track. Failure to provide documentation	Government of Galicia (*Xunta de Galicia*)	Law 43/2002 on Plant Health (Art. 5.4 h and 55 g)	€9000 fine
Waste	2022	Dumping an abandoned combine harvester in the Palomar del Arroyo tunnel	Government of Aragon	Law 22/2011 on Waste and Contaminated Soil (Art. 54)	€200 fine
Noise	2022	Execution of works at the site located at CL Agustín de Foxa S/N, involving public roadwork conducted outside the legally established hours	Madrid City Council	Regulation for the Protection against Noise and Heat Pollution (Art. 47.2.c)	Not applicable
Forest fires	2022	In Paraje Roques del Llom (UTM coordinates 333763-4586429), in the municipality of Tarrés, and on forest land, the rural agents filed complaint D21-175-22 on 06/06/2022, because the medium voltage power line with conventional cables lacked the required fire prevention measures. Specifically, at KP 45.0, the conductors of the accompanying feeder are less than 3 meters horizontally from the branches of a tree.	Government of Catalonia (*Generalitat de Catalunya*)	Law 6/1988 of 30 March on Forests of Catalonia (Art. 74.2)	€450.76 fine
Forest fires	2022	In Paraje Lo Celleret (UTM coordinates 313645-4602380), in the municipality of Torregrossa and less than 500 meters from forest land, the rural agents filed complaint D23-36-22 on 08/06/2022, because the railway installation lacked the required fire prevention measures. Specifically, between UTM coordinates 313584-4602393 and 314635-4602255, the grassy vegetation in the safety zone has not been mowed.	Government of Catalonia (*Generalitat de Catalunya*)	Law 6/1988 of 30 March on Forests of Catalonia (Art. 74.2)	€450.76 fine
Forest fires	2022	In Paraje La Manreana (UTM coordinates 315252-4602189), in the municipality of Juneda and less than 500 meters from forest land, rural agents filed complaint D23-48-22 on 21/06/2022 because the railway installation lacked the required fire prevention measures. Specifically, between UTM coordinates 313584-4602189 and 316172-4602234, the grassy vegetation in the safety zone has not been mowed.	Government of Catalonia (*Generalitat de Catalunya*)	Law 6/1988 of 30 March on Forests of Catalonia (Art. 74.2)	€450.76 fine
Water	2022	Adif has begun work to reinforce eight points of the breakwater that protects the railway track in the section between the Sant Simó stream and the edge of the municipal district. This work, located between boundary markers M-17-58 and M-17-85 of the current demarcation, is being carried out without the necessary administrative title in the area of the public maritime-terrestrial domain within the municipal district of Mataró.	Coastal Demarcation in Catalonia	Law of July 28 on the Coast (Art. 90.2 c)	€4800 fine
Trees and forests	2023	Removal of vegetation cover during maintenance work on the C3 railway line, with some of this work being conducted outside the railway sector's public domain area, which is forest land.	Community of Madrid	Law 43/2003 of 21 November 2003 on Forestry (74.a)	Not applicable
Forest fires	2023	fire with reference number 2022360202, located in Bruñeiras, in the municipality of As Neves.	Government of Galicia (*Xunta de Galicia*)	Law 3/2007 of 9 April on the Prevention and Defence against Forest Fires of Galicia (LPDIFG) (Art. 20 bis, b)	Pending

Table 54. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breahced	Penalty
Trees and forests	2023	removal of vegetation cover during maintenance work on the C3 railway line, with some of this work being conducted outside the railway sector's public domain area, which is forest land. The cables were buried by digging a linear trench parallel to the tracks, located at UTM coordinates (ETRS 1989) 30 N X: 446383; AND: 4447475, next to this ditch and outside the public domain, there is an area of approximately 150 m^2 that has been levelled and used as a manoeuvring space for the machinery involved in the work.	Community of Madrid	Law 43/2003 of 21 November on Forests (Art. 67 h)	€420 fine
Water	2023	The occupation of the public hydraulic domain of the Barranco de las Cuatro Esquinas ravine involved various actions: constructing a three-span bridge over the ravine for widening the railway track and building a crossing over the ravine with two tubes, all without the mandatory administrative authorization from this basin organization.	*Confederación Hidrográfica del Ebro* (Ebro Hydrographic Confederation)	Legislative Royal Decree 1/2001 of July 20 (Art. 116.3 e), which approves the revised text of the Water Law, and 315 d of the Regulation of the Public Hydraulic Domain, approved by Royal Decree 849/1986, of 11 April	€2500 fine
Public cleanliness	2023	Failure to maintain rustic plots of land in a clean and healthy condition, thereby preventing fires or pest infestations that could affect neighboring plots.	Novelda City Council	Community Standards Ordinance	€150 fine
Public cleanliness	2023	Transversal drainage work with downstream channeling that flows into the station's track ditch crossing, which also needs to drain the EX-104 track ditch.	Extremadura Government (*Junta de Extremadura*)	Law 7/1995, of 27 April 1995, on Roads of Extremadura (Art. 45.4 and 45.6)	Pending
Waste	2023	Uncontrolled dumping of hazardous and non-hazardous waste on Plot 80, Polygon 2, in the 'Majuelos' natural site.	Castile and León Regional Government (*Junta de Castilla y León*)	Law 7/2022 of 8 April on Waste and Contaminated Land for a Circular Economy (Art. 109.1.b)	€1,600.80 fine
Trees and forests	2023	A crew from Seanto S.L. cutting down a country oak tree with a diameter of 40 cm and a height of 25 meters within the railway easement area. Lack authorisation	Government of Navarre	Law 13/1990 of 31 December 1990 on the Protection and Development of the Forest Heritage of Navarre (Art. 75.c)	€1,000 fine
Forest fires	2023	In the Paratge Torrent de Can Bargalló (UTM coordinates 405945-4591768), in the municipality of Sant Esteve Sesrovires, on forest land and during a high fire risk period, the rural agents filed complaint D20-287-22 on June 24, 2022. The complaint was due to a fire of 50 m^2 of brush caused by a fuse malfunction, which occurred because the base of the support was not cleared of vegetation.	Government of Catalonia (*Generalitat de Catalunya*)	Law 6/1988 of March 30 on Forestry of Catalonia (Art. 74.2 j) in relation to Decree 268/1996 of 23 July	€270.46 fine
Forest fires	2023	On 31 July 2020, at approximately 4:00 PM, in the area known as Casablanca, within the municipality of Cumbres Mayores (Huelva), a fire broke out in pastureland with abundant continuous grazing and Quercus trees, which facilitated the rapid spread of the fire across an area of 300.05 hectares	Andalusia Regional Government (*Junta Andalucía*)	Law 5/1999 of 29 June on the Prevention and Fight against Forest Fires (Art. 64.12)	Pending
Waste	2023	Uncontrolled dumping of various types of waste (such as tyres, rubble, building debris, paper sacks, plastic bags, wooden pallets, etc.) in areas not designated for their disposal and management.	Andalusia Regional Government (*Junta Andalucía*)	Law 7/2007 of 9 July on the Integrated Management of Environmental Quality (Art. 147.1.D)	€361.80 fine

Table 54. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breahced	Penalty
Forest fires	2023	Failure to implement appropriate safety measures due to inadequate maintenance and cleanliness of the railway easement area, which contributes to the spread of fires.	Government of Castile and León (*Junta Castilla y León*)	Law 3/2009 of 6 April on Forests of Castile and León (Art. 113 m)	Pending
Waste	2023	Collection of ballast at Las Cabras station, Plot 16, Polygon 6, and Plot 98, Enclosure 2 of Polygon 8, in the municipality of Zarza Capilla, resulting from the cleaning and maintenance of ditches along the K-317 and K-320 railway line.	Extremadura Government (*Junta de Extremadura*)	Law 7/2022, of 8 April, on waste and contaminated soils for a circular economy (Art 108.3.)	Pending
Forest fires	2023	Negligent maintenance of the railway overhead contact line leading to a forest fire. The location of the incident: Vía Férrea, km 103.1, coordinates X370000 Y4496157, in Herradón de Pinares-La Cañada (Navalgrande), Ávila.	Castile and León Regional Government (*Junta de Castilla y León*)	Law 43/2003 of 21 November (Art. 67 e), in conjunction with Article 9 of Order FYM/510/2013 of 25 June, which regulates the use of fire and establishes preventive measures for combating forest fires in Castile and León	Pending
Waste	2023	In the municipality of Torrijo del Campo (Teruel), a large number of tyres were found stored inside an old, dilapidated barn or hayloft	Government of Aragon	Law 7/2022 of 8 April on Waste and Contaminated Soils for a Circular Economy (Art. 108.4.b), in relation to Art. 108.3.c of the same law	€240 fine
Waste	2023	remnants of uralite were found at the same location as on 2 February 2021. Upon rechecking the location, it was observed that the boundaries of the plots containing the uralite have been modified in the Electronic Headquarters of the Cadastre. The updated data is as follows: Cadastral Ref: 14042A005090210000EW, Polígono 5 Parcela 9021	Andalusian Regional Government (*Junta de Andalucía*)	Law 7/2007 of 9 July on Integrated Environmental Quality Management (Art. 146.1.)	€3,607.20 fine
Trees and forests	2023	Clearing and abandonment of tree remnants in the streambed and the railway easement area of the Braña stream, in the locality of Outeiro, parish of San Xoan de Moeche, municipality of Moeche (A Coruña).	Galician Waters	Law 9/2010 of 4 November, on Water of Galicia (Art. 85 h)	Pending
Contaminated soils	2023	Storing manure in the same place for over three months without following preventive measures to guard against contamination risks and nuisance. On premises owned by Administrador de Infraestructuras Ferroviarias	Government of Catalonia (*Generalitat de Catalunya*)	Decree 153/2019 of 3 July on Soil Fertilisation and Livestock Waste Management (Art. 17).	Pending
Waste	2023	Dumping of rubble in the regional park of the middle basin of the river, TM Navalcarnero, Plot 9001, Polygon 9, camino del ferrocarril.	Navalcarnero Town Council	Law 7/2022, of 8 April, on waste and contaminated soils for a circular economy (Art 108.3.)	€1,200.60 fine, pending waste collection.
Waste	2023	The household waste containers at La Unión station were filled with palm tree prunings, leaving no space for garbage bags.	City Council of La Unión	Regulation on street cleaning, waste storage, collection, and disposal regarding solid waste and residues (Art. 9).	Pending
Waste	2023	The household waste containers at La Unión station were filled with palm tree prunings, leaving no space for garbage bags.	City Council of La Unión	Regulation on street cleaning, waste storage, collection, and disposal regarding solid waste and residues (Art. 9).	Pending

Table 54. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breahced	Penalty
Waste	2023	Storing a large amount of creosote-treated railway sleepers. At Ribadeo Feve Station.	Government of Galicia (*Xunta de Galicia*)	Commission Implementing Regulation (EU) 2022/1950 of 14 October 2022 renews the approval of creosote as an active substance in biocidal products of product-type 8, according to Regulation (EU) No 528/2012 of the European Parliament and of the Council (OJEU No 269 of 17/10/2022). Law 8/2008 of July 10 on Health in Galicia (Article 41.g)	Pending
Trees and forests	2023	Cutting down several trees on a plot of land next to the Renfe train station on Calle Francisco Cossi Ochoa in this city, without the necessary municipal authorization.	Puerto de Santa María Town Hall	Municipal Regulation for the Protection of Green Spaces (Art. 19.1)	Pending
Fauna	2023	Electrocution of an eagle owl, which appears to have been electrocuted with injuries to its left eye and wing, at the 'Casa Monteagudo' site, located at UTM coordinates X631813 Y4306973. The pole responsible for the electrocution had a horizontal structure and lacks insulation. Compensation is being sought for the electrocution of the owl.	Castile-La Mancha Regional Government (*Junta de Castilla-La Mancha*)	Law 9/1999 of 26 May 1999 on Nature Conservation	Pending
Water	2023	Penalty for encroaching on the public water domain along the Agost Greenway (Alicante)	*Confederación Hidrográfica del Júcar* (Júcar Hydrographic Confederation)	Water Law (Article 117 of the Consolidated Text), as well as Articles 315 to 318 of the Regulations on Public Hydraulic Domain	Pending
Waste	2023	Failure of the landowner at Carretera de Parla-Pinto 20 to maintain the property in a safe, healthy, and decent condition, as required by town planning regulations. The property is currently neglected, with waste and debris, and is not properly fenced, as the access gate is missing.	Parla City Council	Law 9/2001, of July 17, on Land Use in the Community of Madrid (Article 168.1)	Pending
Forest fires	2023	On the Via del AVE - Lavern (UTM coordinates 396456-4583712), in the municipality of Subirats and forest land, rural agents filed complaint D23-37-23 on 22/07/2023, noting that the railway installation was missing required fire prevention measures. In particular, the safety zone has not been cleared, leading to a fire covering 400 m^2 of bushes and forest grasses caused by the fall of incandescent material.	Government of Catalonia (*Generalitat de Catalunya*)	Law 6/1988 of March 30 on Forests of Catalonia (Article 74.2 j), in conjunction with Art. 6.2 of Decree 64/1995 of March 7, which establishes measures for the prevention of forest fires.	Pending
Forest fires	2023	In Paraje Riera Seca (UTM coordinates 430985-4596930), in the municipality of Santa Perpetua de Mogoda, and less than 500 meters from forest land, rural agents filed complaint D23-38-23 on 17/08/2023. The complaint notes that remains from brush clearing, which burned in a fire last summer, have been dumped in a field and have not been removed.	Government of Catalonia (*Generalitat de Catalunya*)	Law 6/1988 of March 30 on Forests of Catalonia (Article 74.2 j), in conjunction with Art. 6.2 of Decree 64/1995 of March 7, which establishes measures for the prevention of forest fires.	€270.46 fine
Forest fires	2023	Penalty for Waste Violations in Fonelas (Granada)	Andalusia Regional Government (*Junta Andalucía*)	Law 5/1999 of 29 June on the Prevention and Fight against Forest Fires (Art. 64.9)	Pending

Table 54. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breahced	Penalty
Waste	2023	Penalty for the use of toxic substances in the restoration of a bridge in Fonelas (Granada)	Andalusia Regional Government (*Junta Andalucía*)	Law 7/2022 of 8 April on waste and contaminated land for a circular economy (Art. 108.3.U)	Pending

** Information as of 1 January 2024.*
Source: Adif, Legal Advisory Department, Corporate Litigation Sub-Department; Adif-Alta Velocidad, Corporate Department, Corporate Environmental Department

9. ADIF'S CONTRIBUTION TO THE ENVIRONMENTAL SUSTAINABILITY OF TRANSPORT

9- ADIF'S CONTRIBUTION TO THE ENVIRONMENTAL SUSTAINABILITY OF TRANSPORT

ENERGY CONSUMPTION IN THE RAIL TRANSPORT SYSTEM WITHIN INFRASTRUCTURES MANAGED BY ADIF

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The energy used in the transmission system primarily comes from electricity generated by the Peninsular Electricity System (Electric Traction) and Diesel B (Diesel Traction).

Table 55. Fuel and energy consumption for traction in rail transport infrastructure managed by Adif.*

Type of energy	2017	2018	2019	2020	2021	2022	2023
Electrical energy (GWh/year)	1,406.73	1,400.98	1,413.70	1,223.78	1,262.35	1,333.69	1,354.31
Diesel B (million l/year)	87.84	90.80	89.37	61.82	53.34	51.50	46.83

* Includes traction-related energy consumption recorded by Adif and all railway operators.

Source: Adif-Alta Velocidad, Corporate Strategic Planning and Projects Department, Business Strategy Department, Corporate Responsibility, Sustainability, and Brand Sub-Department.

Table 56. Energy consumption for rail traction in Adif-managed infrastructure (TJ/year)

Type of energy	2017	2018	2019	2020	2021	2022	2023
Electric energy	5,064.23	5,043.51	5,089.34	4,405.63	4,544.48	4,801.30	4,875.52
Diesel B	3,122.74	3,227.84	3,177.04	2,197.63	1,896.33	1,830.68	1,664.68
Total	**8,186.96**	**8,271.36**	**8,266.37**	**6,603.25**	**6,440.81**	**6,631.98**	**6,540.20**

* Includes traction-related energy consumption recorded by Adif and all railway operators.

In 2023, electricity accounted for 74.5% of the total energy consumption of the infrastructures managed by Adif for traction use.

In addition to traction-related energy consumption in the rail transport system managed by Adif there are other energy uses, primarily for UDT, associated with Adif's own activities, which are detailed in the 'Energy and Emissions' chapter.

Approximately 89%* of the total energy consumed in the railway system managed by Adif is used for traction.

**in 2023*

Chart 52. Energy consumption for traction (TJ/year)

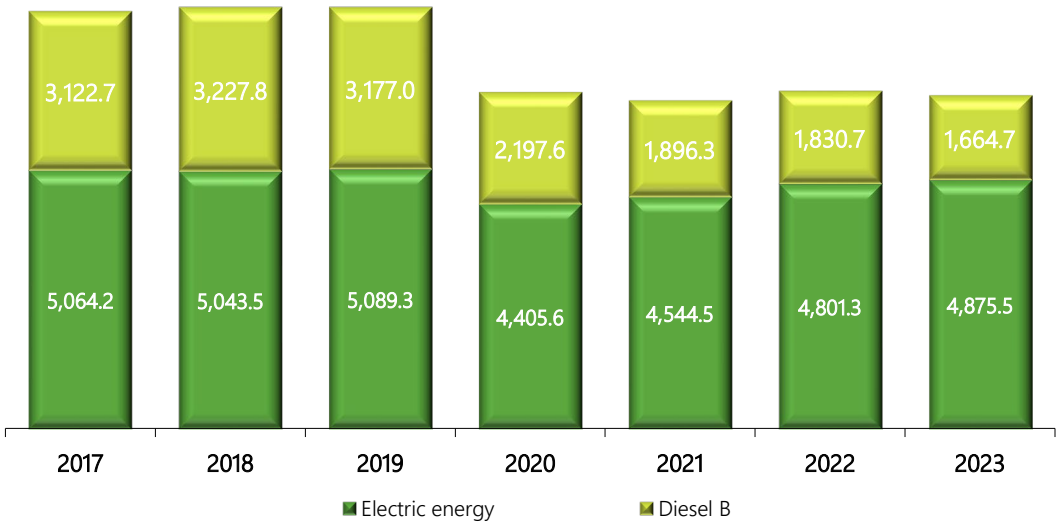


Table 57. Total energy consumption in the railway system managed by Adif (TJ/year)

Type of energy	2017	2018	2019	2020	2021	2022	2023
Energy consumption in Adif's own activities (a)*	676.67	620.10	653.92	540.22	550.37	527.20	490.95
Energy consumption for traction by operators	8,035.32	8,158.30	8,161.12	6,524.37	6,371.62	6,574.91	6,492.80
Energy consumption for purposes other than traction by operators (b)	413.95	413.56	360.15	343.72	333.83	343.03	334.03
Total	**9,125.94**	**9,191.95***	**9,175.19**	**7,408.31**	**7,255.82**	**7,445.13***	**7,317.77**

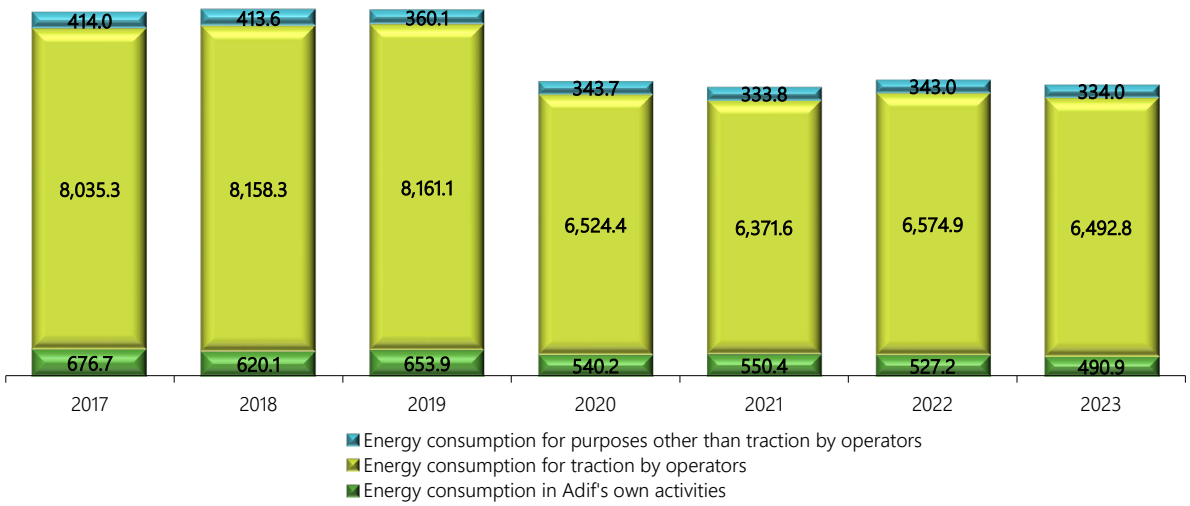
(a) Includes traction uses.

(b) Energy consumption for non-traction uses by Renfe Operadora and other minor operators on infrastructure managed by Adif-Alta Velocidad is minimal, so it is assumed that all energy consumption is on infrastructure managed by Adif (no data is available for other operators).

* Data revised in relation to the 2022 Environmental Report.

Source: Adif-Alta Velocidad, Corporate Strategic Planning and Projects Department, Business Strategy Department, Corporate Responsibility, Sustainability and Branding Department.

Chart 53. Total energy consumption in the railway system managed by Adif (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 (data for other operators is not available).

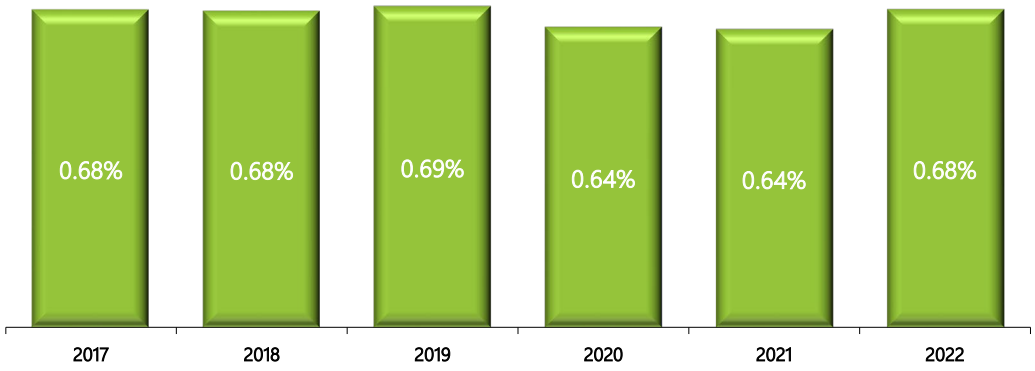
-Energy consumption in Adif's own operations includes traction use.

ENERGY CONSUMPTION OF THE RAIL TRANSPORT SYSTEM AS A PERCENTAGE OF SPAIN'S TOTAL

Final energy consumption in Spain in 2022 (the latest year for which information is available) recorded an increase of 1.1% compared to the previous year, although in the case of electrical energy it was a decrease of 1.5%

In 2022 (the latest year available), the rail transport system on infrastructure managed by **Adif** accounted for 0.22% of Spain's total final energy consumption and 0.68% of electricity consumption.

Chart 54. Electricity consumption by the rail transport system on Adif-managed infrastructure compared to Spain's total (%) *,**

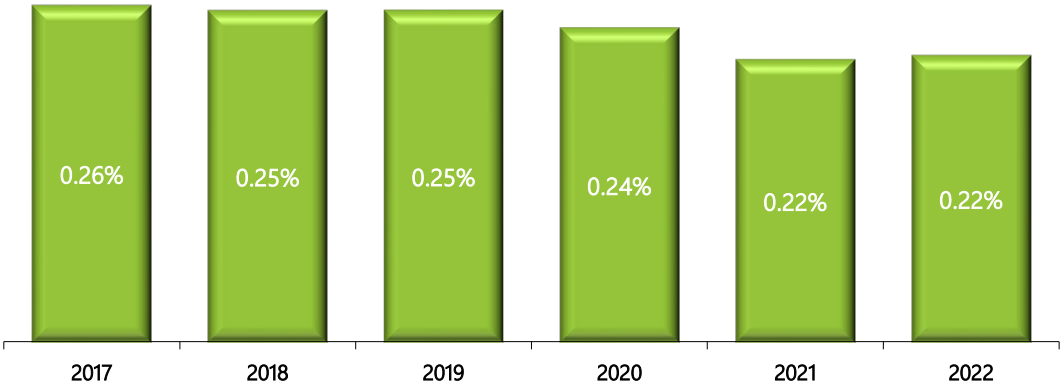


* Energy consumption for non-traction uses by Renfe Operadora and other minor operators on infrastructure managed by Adif-Alta Velocidad is very small. Therefore, it is assumed that all energy consumption occurs on infrastructure managed by Adif, as data for other operators' UDT energy consumption is not available.

** The latest year for which information is available is 2022.

Source: Prepared by the authors based on the final energy consumption balance, excluding non-energy uses, from Spain's Energy Balance 2022 (2024).

Chart 55. Final energy consumption by the rail transport system on Adif-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, as data on UDT energy consumption by other operators is not available.

** The latest year for which information is available is 2022.

Source: Prepared by the authors based on the final energy consumption balance, excluding non-energy uses, from Spain's Energy Balance 2022 (2024).

TRACTION ENERGY CONSUMPTION AS A PERCENTAGE OF TOTAL TRANSPORT ENERGY CONSUMPTION

The Transport Sector is a major energy consumer.

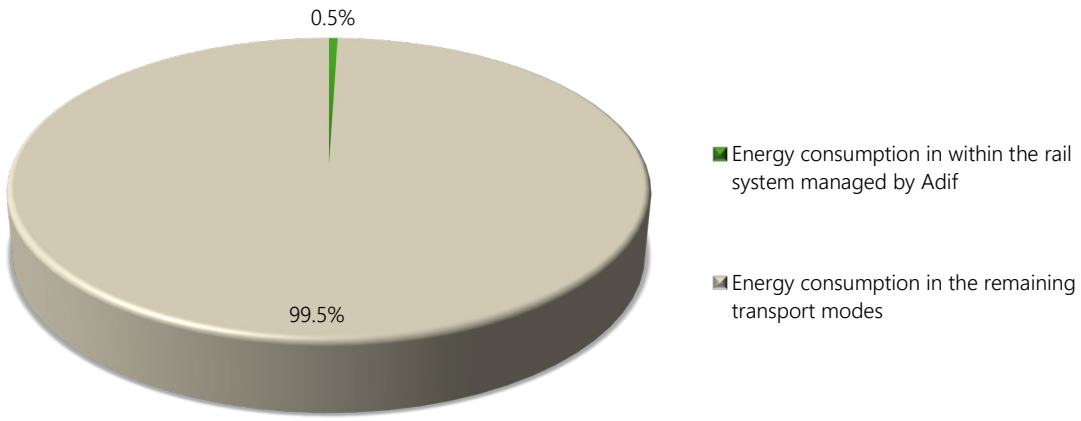
In 2022, the most recent year for which data is

available, 38.5% of Spain's final energy consumption was used by the road, rail, and air transport sectors.

In 2022, the rail transport system on infrastructure managed by **Adif**, which transported 3.0% of passengers* and 3.2% of freight, used only 0.5% of the final energy consumed by the transport sector in Spain.

**Excluding tourist trains that are not operated by Renfe.*

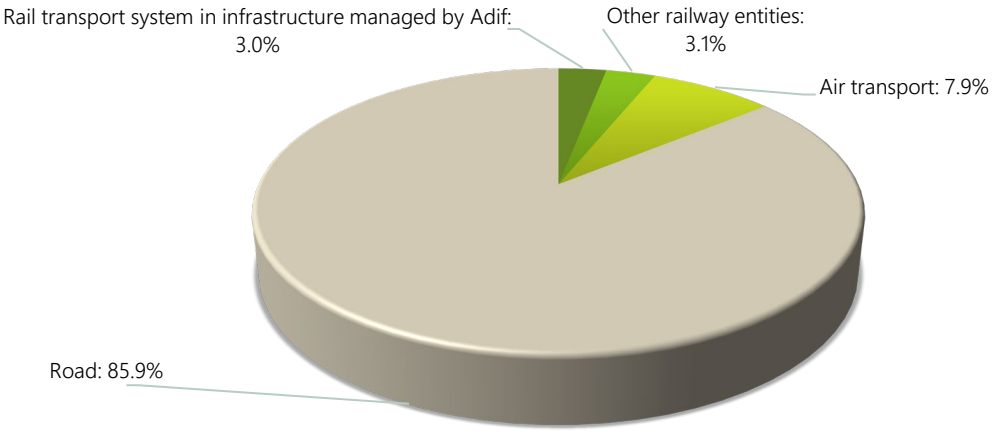
Chart 56. Traction energy consumption by the rail transport system on Adif-managed infrastructure compared to the overall transport sector in Spain. Year 2022 *



* 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 2022 (2024).

Chart 57. Passenger traffic distribution (%). Year 2022 *

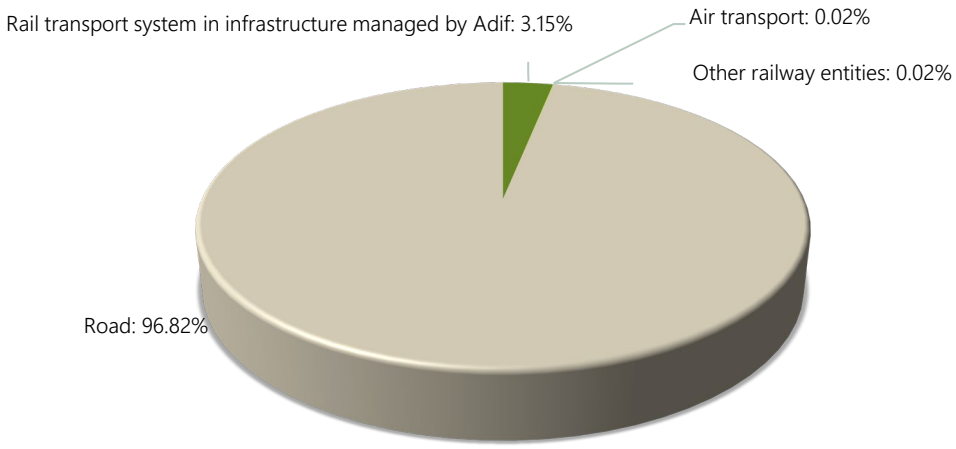


* Data for the most recent year available

For the rail transport system on infrastructure managed by Adif, only Renfe operators are considered. 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) 2024, Renfe Operadora

Chart 58. Distribution of freight traffic (%). Year 2022 *



* Data for the most recent year available

Source: Ministry of Transport and Sustainable Mobility. Transport and Logistics Observatory of Spain (OTLE) 2024, Renfe Operadora

TRACTION ENERGY CONSUMPTION PER TRANSPORT UNIT

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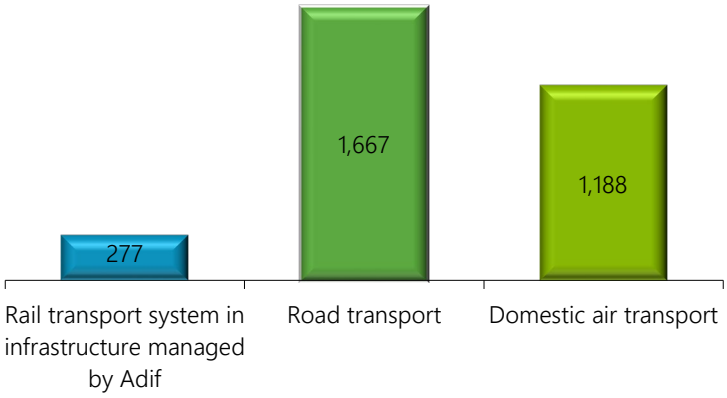
! In 2022, the specific traction energy consumption for the rail transport system on Adif-managed infrastructure was 277 kJ per transport unit.

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**-managed infrastructure uses **6.0 times less energy** than road transport and **4.3 times less** than air transport.

** Data for 2022. Trains operated by operators other than Renfe, 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 2022



* 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, ransport and Logistics Observatory of Spain (OTLE) 2024 and Ministry for the Ecological Transition and the Demographic Challenge (2024), Greenhouse Gas Emissions Inventory in Spain 1990-2022, and Adif-Alta Velocidad.

AIR EMISSIONS FROM TRACTION

305-1 | 305-2 | 305-3 | 305-7

Atmospheric emissions attributable to the rail transport system in infrastructures managed by Adif originate from electric and diesel traction.

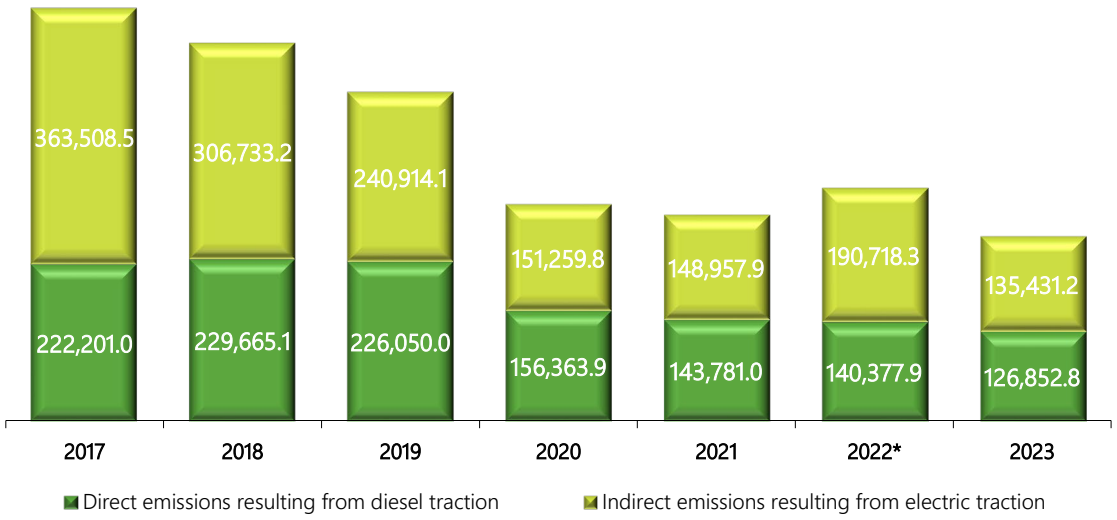
All electricity used for electric traction comes from the mainland electricity grid. The emissions generated are indirect, i.e. they do not occur during railway operations but originate from power generation plants

Indirect emissions from electricity consumption depend not only on the amount consumed but also on the generation mix of the Peninsular Electricity System.

Although electricity consumption for traction increased by 1.5% last year, direct GHG emissions decreased slightly (by 9.6%). This reduction is due to changes in the generation mix of the Peninsular Electricity System and a greater share of renewable energy sources.

In 2023, electricity accounted for 74.5% of Adif's total energy consumption for traction, resulting in indirect GHG emissions of 135,431.2 tons of CO_{2eq}.

Chart 60. GHG emissions from traction activities. Rail transport system on Adif-managed infrastructure (t of CO_2eq/year)



** Data revised with from the 2022 Report*

Table 58. Air emissions from traction in the rail transport system on Adif-managed infrastructure (t/year)

Compound	2017	2018	2019	2020	2021	2022	2023
Indirect emissions resulting from recorded electricity consumption							
Carbon dioxide (CO_2) (a)	362,936.26	306,155.17	240,329.78				
Methane (CH_4) (a)	20.41	20.62	20.85				
Nitrous oxide (N_2O) (a)	0.00	0.00	0.00				
Carbon monoxide (c)	177.24	156.56	124.72	119.62*	130.33*	156.35*	115.26
Non-methane volatile organic compounds (NMVOCs) (c)	26.49	26.49	27.29	26.75	30.73	31.52*	23.24
Oxides of nitrogen NO_x (as NO_2) (c)	621.97*	468.03	379.23	263.24*	256.56*	273.11*	201.34
Sulphur oxides SO_x (as SO_2) (c)	476.77	348.06	157.40	62.31	44.92*	48.83*	36.00
$PM_{2,5}$ (c)	23.69	19.24	15.36	13.87	14.87*	15.55*	11.47
PM_{10} (c)	31.70	25.81	19.38	17.82	18.89*	19.69+	14.52
TSPs (c)	41.30	33.85	25.54	24.66	26.21*	27.19*	20.05
CO_{2eq} (a)	363,508.49	306,733.20	240,914.10	151,259.82	148,957.86	190,718.27	135,431.23
Direct emissions resulting from diesel traction							
Carbon dioxide (CO_2) (b)	221,358.57	228,809.24	225,207.69	155,781.20	143,278.25		
Methane (CH_4) (b)	12.96	13.40	13.18	9.12	7.87		
Nitrous oxide (N_2O) (b)	1.76	1.81	1.79	1.24	1.07		
Carbon monoxide (CO) (d)	798.91	825.80	812.80	562.23	485.15	468.36	425.89
Non-methane volatile organic compounds (NMVOCs) (d)	347.19	358.88	353.23	244.34	210.84	203.54	185.08
Oxides of nitrogen NO_x (as NO_2) (d)	3,912.42	4,044.11	3,980.46	2,753.37	2,375.88	2,293.63	2,085.65
Sulphur oxides SO_x (como SO_2) (d)	1.49	1.54	1.52	1.05	0.91	0.88	0.80
$PM_{2,5}$ (d)	102.29	105.73	104.07	71.99	62.12	59.97	54.53
PM_{10} (d)	107.52	111.14	109.39	75.67	65.29	63.03	57.32
TSP (d)	113.49	117.31	115.46	79.87	68.92	66.53	60.50
CO_{2eq} (b) (c)	222,201.01	229,665.06	226,050.04	156,363.87	143,781.04	140,377.91*	126,852.76
Total emissions resulting from traction							
Carbon dioxide (CO_2)	**584,294.84**	**534,964.41**	**465,537.47**	**155,781.20**	**143,278.25**		
Methane (CH_4)	**33.37**	**34.02**	**34.04**	**9.12**	**7.87**		
Nitrous oxide (N_2O)	**1.76**	**1.82**	**1.79**	**1.24**	**1.07**		
Carbon monoxide (CO)	**976.16**	**982.36**	**937.52**	**681.85**	**615.48***	**624.70***	**541.14**
Non-methane volatile organic compounds (NMVOCs)	**373.68**	**385.36**	**380.52**	**271.08**	**241.57**	**235.06***	**208.32**
Nitrogen oxides NO_x (as NO_2)	**4,534.39**	**4,512.14**	**4,359.68**	**3,016.61***	**2,632.44***	**2,566.74***	**2,286.98**
Sulphur oxides SO_x (as SO_2)	**478.27**	**349.61**	**158.92**	**63.36**	**45.83**	**49.70***	**36.79**
$PM_{2.5}$	**125.98**	**124.97**	**119.43**	**85.86**	**76.99***	**75.52***	**66.00**
PM_{10}	**139.22**	**136.94**	**128.76**	**93.49**	**84.18***	**82.72***	**71.83**
TSP	**154.79**	**151.16**	**141.00**	**104.53**	**95.13***	**93.72***	**80.55**
CO_{2eq}	**585,709.50**	**536,398.26**	**466,964.14**	**307,623.69**	**292,738.90**	**331,096.18***	**262,284.00**

** Data modified with respect to the 2022 Report.*
(a) Source: Adif-Alta Velocidad, Corporate Strategic Planning and Projects Department, Business Strategy Department, Corporate Responsibility, Sustainability, and Brand Sub-Department.
(b) Source: Adif-Alta Velocidad, Corporate Strategic Planning and Projects Department, Business Strategy Department, Corporate Responsibility, Sustainability and Brand 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 2022, 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 1990-2022. Chapter 3: ENERGY (NFR 1A, 1B) (Ministry for Ecological Transition and Demographic Challenge, 2024).

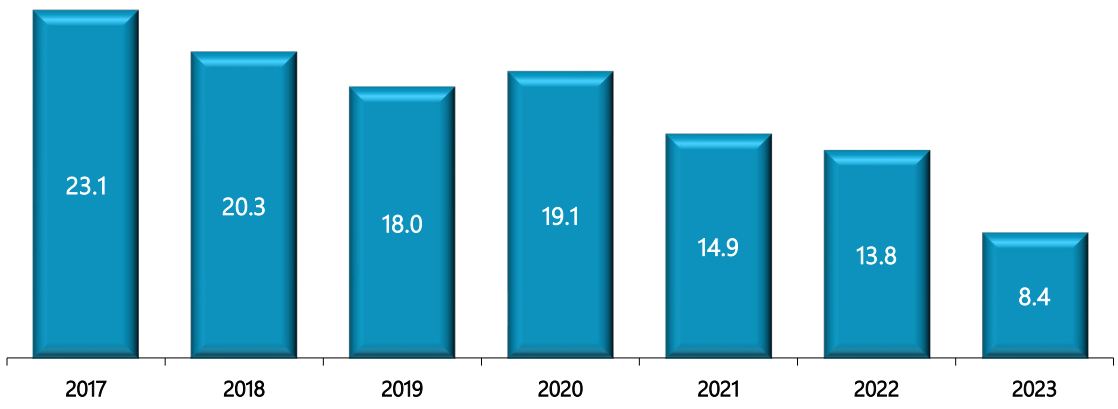
! In 2023, indirect emissions from electric traction at Adif were the main source of sulphur oxide emissions (97.8%).

In 2023, direct emissions from diesel traction accounted for 91.2% of nitrogen oxide emissions, 88.9% of non-methane volatile organic compound emissions, 78.7% of carbon monoxide emissions, 82.6% of particulate matter ($PM_{2,5}$) emissions, and 48.4% of GHG emissions.

GHG EMISSIONS PER TU

GHG emissions per TU for Adif fluctuate due to the electricity generation scheme in the peninsular system, as previously mentioned.

Chart 61. GHG emissions per TU. Rail transport system on Adif-managed infrastructure (g CO_{2eq}/TU) *, **



* Includes both direct emissions from diesel traction and indirect emissions from electric traction.

** Data revised with from the 2022 Report.

GHG EMISSIONS COMPARED TO THE TRANSPORT SECTOR

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 system on **Adif**-managed infrastructure emits 8 times less GHG than road transport and 6 times less than air transport.

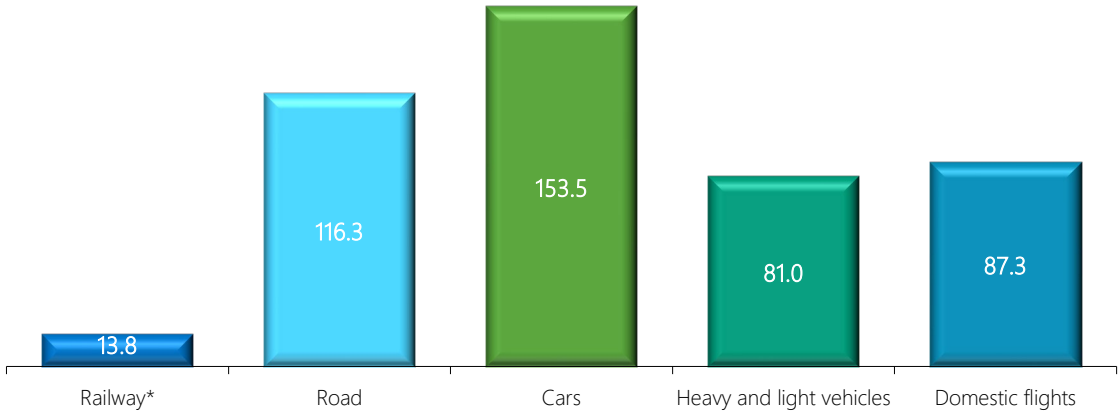
** Data for the year 2022*

Each transport unit that travels by train instead of by road saves 102.5 g of CO_{2eq} per km.

** Data for the year 2022*

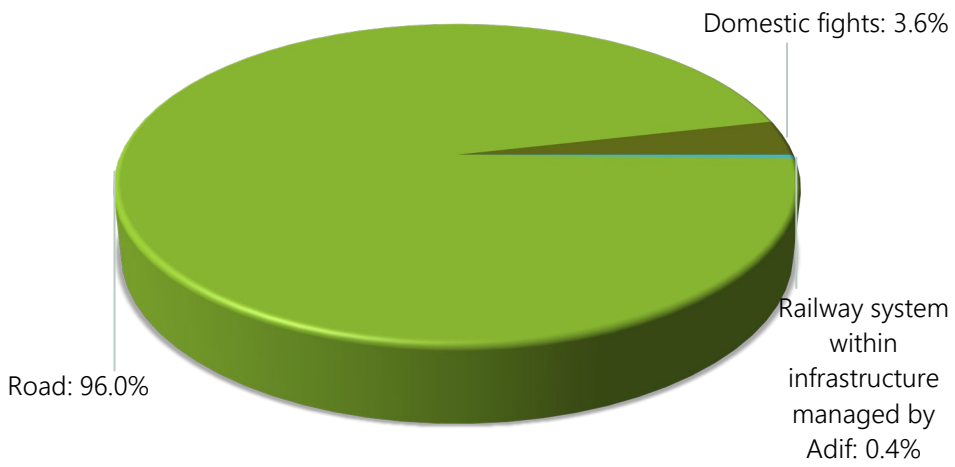
In 2022, the rail transport system on **Adif**-managed infrastructure, which handles 3.0% of passengers and 3.2% of freight, is responsible for less than 0.4% of the total GHG emissions from the transport sector in Spain.

Chart 62. GHG emissions per TU across different modes of transport (g CO2eq/TU). Year 2022 **



* The rail transport system on managed infrastructure includes emissions from Adif and the major operators. Trains operated by operators with less than 1% of the total traffic are not included.
** The comparison is based on 2022, 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), 2024; Ministry for the Ecological Transition and the Demographic Challenge (2023). Spain's GHG Emissions Inventory, 1990-2022; Renfe and Adif-Alta Velocidad

Chart 63. GHG emissions from freight and passenger transport in Spain (CO_{2eq} %). Year 2022 *



* 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), 2023; Greenhouse Gas Emissions Inventory of Spain 1990-2022, 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 59. External costs per unit for different modes of passenger transport. Data for EU-28* (€). Year 2016.

Cost component	Travellers (€ / 1.000 VKM)				Goods (€ / 1000 TKM)	
	Railway	Aircraft	Bus	Car	Railway	Lorry
Accidents	5.0	0.2	10.0	45.0	1.0	13.0
Air pollution	1.2	2.0	7.0	7.0	2.0	8.0
Climate change	0.5	22.0	5.0	12.0	0.6	5.0
Noise	9.0	2.0	3.0	6.0	6.0	5.0
Well-to-Tank	7.0	9.0	2.0	4.0	2.0	2.0
Damage to habitats	6.0	0.1	1.0	5.0	2.0	2.0
Congestion	0.0	0.0	9.0	49.0	0.0	9.0
Delay costs	0.0	0.0	8.0	42.0	0.0	8.0
Efficiency loss costs	0.0	0.0	1.0	7.0	0.0	1.0
Total high-level scenario for the EU-28 rail network without congestion	**28.7**	**35.3**	**28.0**	**79.0**	**13.6**	**35.0**

* 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.

*** Heavy commercial vehicles are included.

Source: European Commission, Directorate-General for Mobility and Transport, Essen, H., Fiorello, D., El Beyrouty, K.et al., Handbook on the external costs of transport - Version 2019 - 1.1, Publications Office, 2020, https://data.europa.eu/doi/10.2832/51388.

In 2022, external costs from passenger and freight rail transport on infrastructure managed by Adif totalled 610.9 million euros. Of this amount, 445.9 million euros were attributed to passenger transport and 165.0 million euros to freight transport.

Table 60. External costs of different passenger transport modes in Spain. Year 2022 (latest available data for all transport systems), excluding congestion costs (in million euros) *

Cost component	Travellers					Goods	
	Railway**	Adif Railway***	Aircraft****	Bus	Car	Railway	Lorry
Accidents	150.2	77.7	8.1	437.3	17,837.6	12.1	4,851.0
Air pollution	36.1	18.6	80.8	306.1	2,774.7	24.3	2,985.2
Climate change	15.0	7.8	888.4	218.7	4,756.7	7.3	1,865.8
Noise	270.4	139.8	80.8	131.2	2,378.4	72.8	1,865.8
Well-to-Tank	210.3	108.8	363.4	87.5	1,585.6	24.3	746.3
Damage to habitats	180.3	93.2	4.0	43.7	1,982.0	24.3	746.3
Total without congestion	**862.3**	**445.9**	**1,425.5**	**1,224.4**	**31,315.0**	**165.0**	**13,060.4**

* 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 (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 2020 Statistical Yearbook of the Ministry of Transport and Sustainable Mobility (2022) and the Spanish Transport and Logistics Observatory (OTLE) (2024)

The cost components vary widely between the different modes of transport.

In rail transport on infrastructure managed by Adif, the main external cost is noise (34.8%), followed by emissions from the well-to-tank cycle—emissions resulting from the extraction, processing, and transportation of the energy consumed by Adif (21.8%). External costs due to habitat damage (19.2%) and accidents (14.7%) 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 (50.7%), climate change (15.0%), and air pollution effects (13.3%). 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 2022 exceed **48 billion euros**, which represents **3.6% of GDP**. **72.5%** is due to passenger transport and **27.5%** is due to freight transport.

Additionally, congestion costs from road transport exceeded **18 billion euros**, or **1.4% of GDP**.

Chart 64. External costs of passenger and freight rail transport on infrastructure managed by Adif. Total costs for 2022: 610.9 million euros

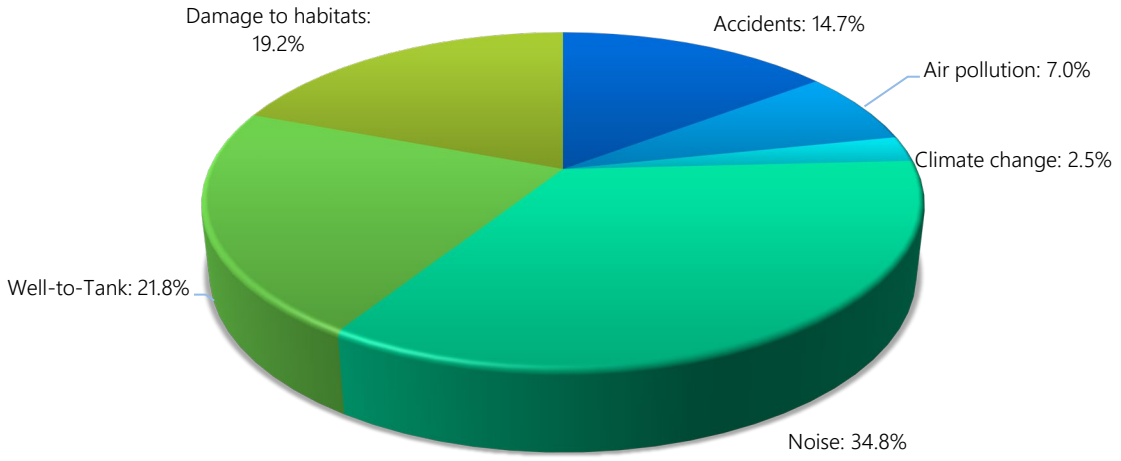


Chart 65. External costs of passenger and freight transport by road. Total costs for 2022: 45,599.8 million euros

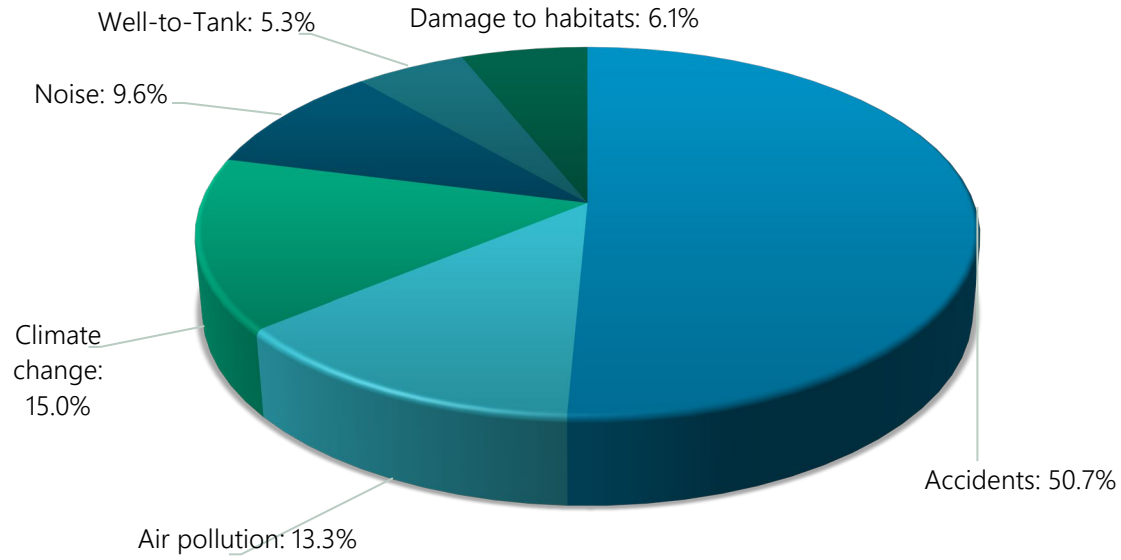
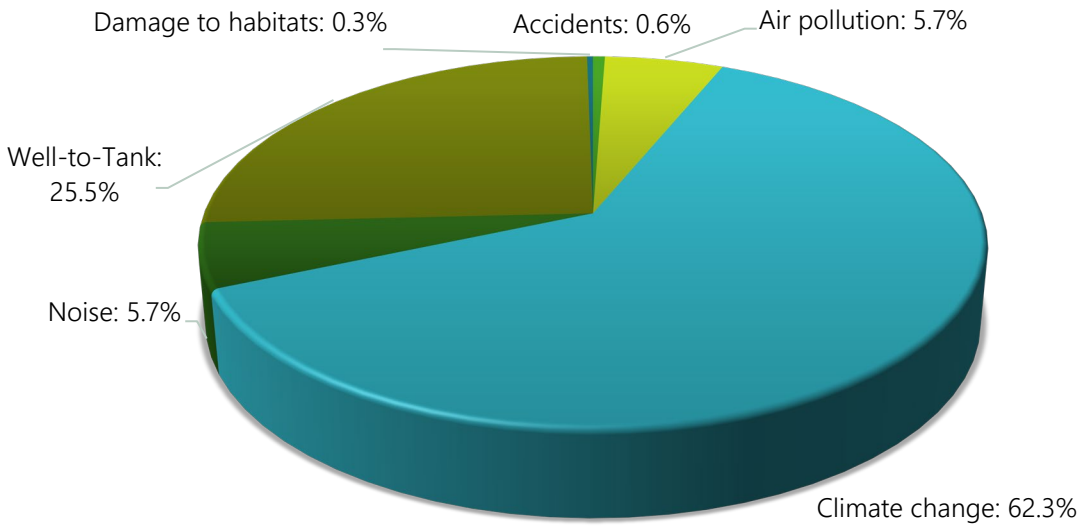


Chart 66. External costs of domestic air passenger transport. Total costs for 2022: 1,425.5 million euros



SAVINGS FROM EXTERNAL COSTS IN THE RAIL TRANSPORT SYSTEM ON INFRASTRUCTURE MANAGED BY ADIF

3-3

External costs per transport unit are lower for rail transport compared to other modes.

Savings from external costs in 2023 due to rail transport on infrastructure managed by **Adif** are estimated to be between 1.48 and 1.97 billion euros.

Table 61. Traffic recorded in the rail transport system on infrastructure managed by Adif (millions of VKM or TKM).

Type of energy	2017	2018	2019	2020	2021	2022*	2023
Freight and logistics (million TKM) **, *****	**10,467**	**10,753**	**10,431**	**8,956**	**10,174**	**10,503**	**15,389**
Travellers (million VKM)	**14,876**	**15,615**	**15,464**	**7,182**	**9,456**	**13,453**	**15,946**
Commuter trains***	8,048	8,318	8,368	4,448	5,391	7,073	7,932
Medium Distance****	2,258	2,279	2,168	1,003	1,412	2,599	4,200
Long Distance	4,570	5,017	4,928	1,732	2,653	3,781	3,814
Total (million TU)	**25,343**	**26,368**	**25,895**	**16,138**	**19,630**	**23,956**	**31,335**

* Reviewed data in relation to the 2022 Environmental Report.

** It is assumed that all recorded freight and logistics traffic is carried on infrastructure managed by Adif.

*** It is assumed that all recorded commuter traffic is carried on infrastructure managed by Adif. Trains operated by operators with less than 1% of the total traffic are not considered.

**** Includes traffic from conventional medium- and long-distance services.

***** Cross-border trains are not classified as freight trains

Source: Renfe Operadora and OTLE (2024)

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 62. Savings from external costs due to rail transport on infrastructure managed by Adif (million €/year), considering congestion costs only for commuter trains *

	Modal substitution hypothesis	2017	2018	2019	2020	2021	2022*	2023
Freight and logistics *	**100 % Lorry**	**226.45**	**235.41**	**230.15**	**196.63**	**237.97**	**259.61**	**392.23**
Travellers		**879.45**	**925.89**	**930.15**	**460.62**	**620.12**	**903.94**	**1,092.65**
Commuter trains	20% Bus	659.84	690.10	699.68	370.12	477.87	662.52	766.15
	80% Car							
Medium Distance**	20% Bus	91.53	93.51	89.63	41.25	61.88	120.37	200.60
	80% Car							
Long Distance	40% Aircraft***	128.08	142.28	140.84	49.25	80.37	121.05	125.91
	10% Bus							
	50% Car							
Total		**1,105.91**	**1,161.30**	**1,160.30**	**657.25**	**858.09**	**1,163.55**	**1,484.88**

* Data modified in relation to the 2022 Environmental Report.

** Includes traffic corresponding to medium distance and conventional long distance.

*** Considering domestic air transport.

Additionally, the following external costs due to congestion can be estimated for the modal substitution scenarios of freight and logistics, medium-distance, and high-speed long-distance transport:

Table 63. Additional savings from external costs due to congestion for freight and passenger transport on medium- and long-distance routes (million €/year).

	2017	2018	2019	2020	2021	2022	2023
Freight and logistics	**95.24**	**99.01**	**96.79**	**82.70**	**100.08**	**109.18**	**164.96**
Travellers	**210.95**	**225.98**	**220.70**	**87.30**	**136.91**	**233.99**	**320.47**
Medium Distance**	93.59	95.61	91.64	42.17	63.27	123.07	205.10
Long Distance	117.36	130.37	129.05	45.13	73.65	110.92	115.37
Total *	**306.19**	**324.98**	**317.49**	**170.00**	**236.99**	**343.17**	**485.42**

* Data modified in relation to the 2022 Environmental Report.

**Includes traffic corresponding to medium distance and conventional long distance.

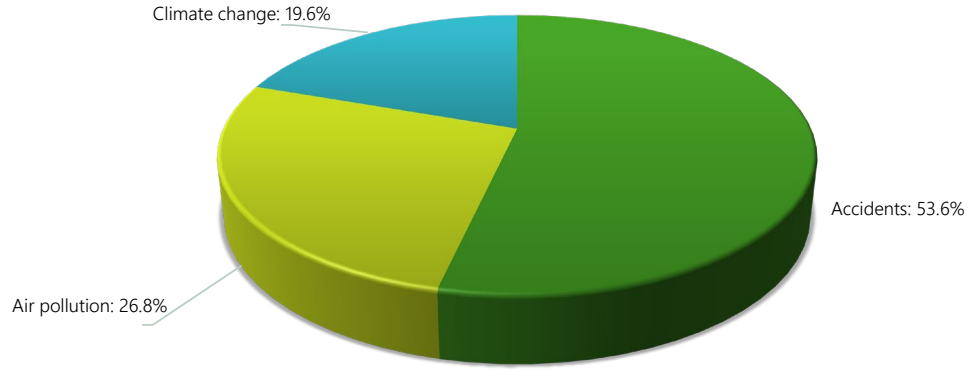
If marginal congestion costs are factored into all modal substitution scenarios, the external cost savings for rail transport on infrastructure managed by Adif in 2023 are 1.97 billion euros.

Table 64. Upper estimate of externality savings, including congestion costs, in all modal shift scenarios (million €/year)

	2017	2018	2019	2020	2021	2022*	2023
Total	1,412.09	1,486.29	1,477.79	827.25	1,095.09	1,506.72	1,970.31

* Data modified in relation to the 2022 Environmental Report.

Chart 67. Freight transport on infrastructure operated by Adif. Savings from external costs amount to 392.23 million euros in the year 2023 *, **



** Excluding the marginal costs of inter-city coordination.*
*** It is assumed that all recorded freight and logistics traffic is carried on infrastructure managed by Adif.*

Chart 68. Commuter services on infrastructure managed by Adif. Savings from external costs 766.15 million euros in the year 2023

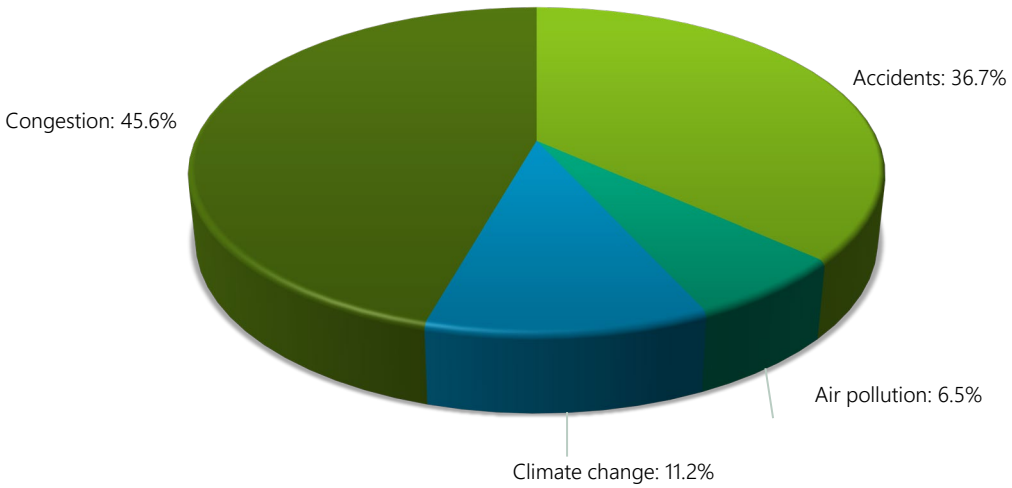
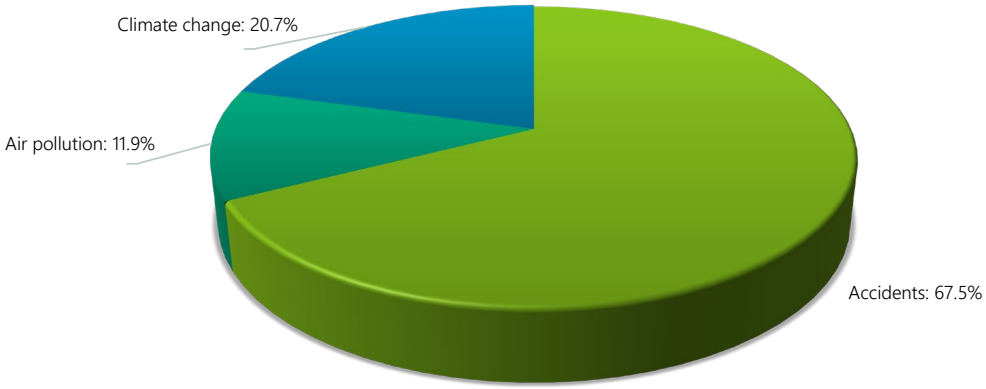
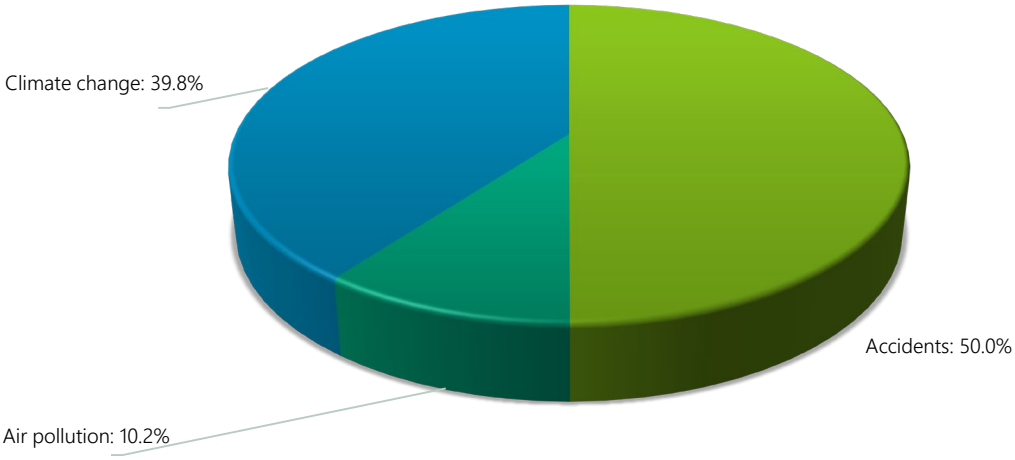


Chart 69. Medium-Distance services on infrastructures managed by Adif. Savings from external costs 200.60 million euros in 2023 *



** Excluding marginal inter-city congestion costs.*

Chart 70. Long Distance services on infrastructures managed by Adif. Savings from external costs 125.91 million euros in 2023 *



** Excluding marginal inter-city congestion costs.*

The main advantages of the rail transport system on infrastructure managed by Adif, compared to other modes of transport, are due to the following factors:

- Urban and interurban congestion contributes between 23.1% and 40.4% to the total external cost savings.
- Air pollution contributes between 9.8% and 12.6% to the total external cost savings.
- Accidents contribute between 36.2% and 46.7% to total external costs
- Climate change contributes between 13.6% and 17.6% to total external costs.

Chart 71. Distribution of external cost savings in the rail transport system managed by Adif. 1.48 billion euros in 2023

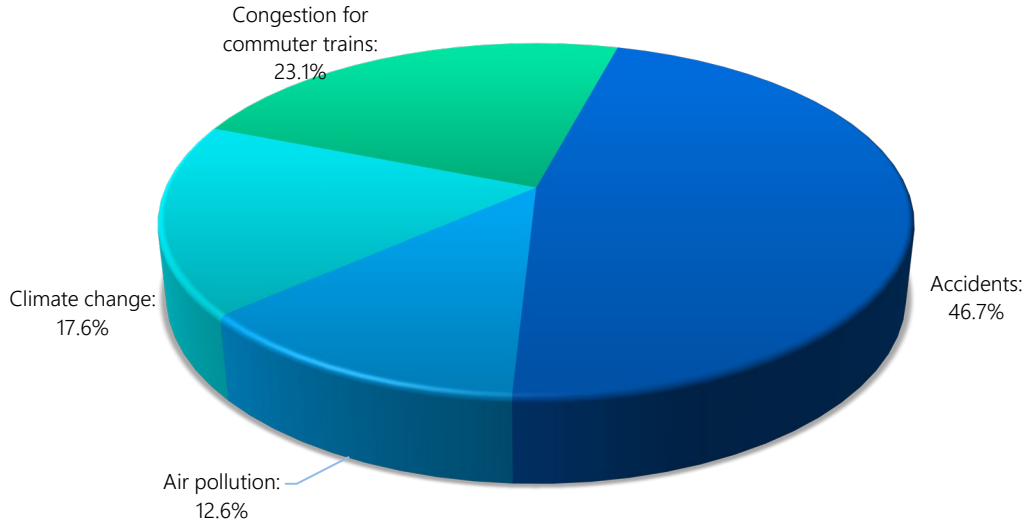
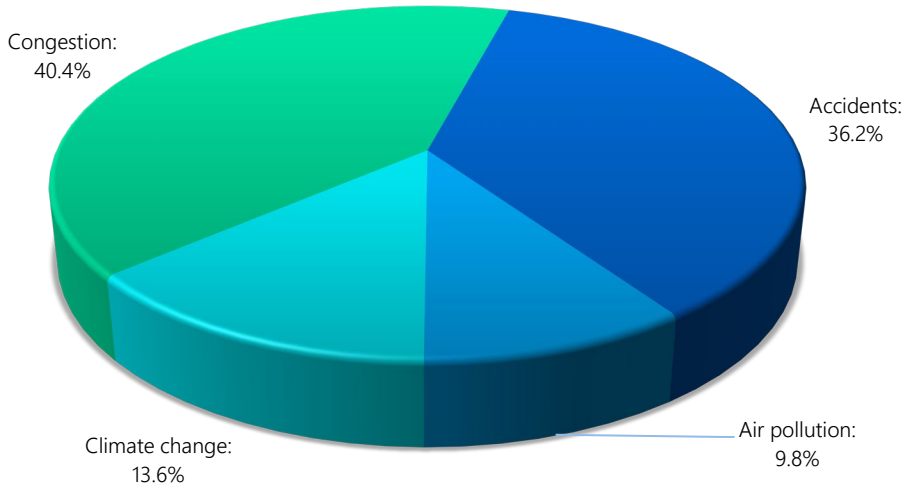


Chart 72. Distribution of external cost savings in the rail transport system managed by Adif. Total savings from external costs, considering congestion costs in all modal substitution scenarios, amounted to 1,970.31 million euros in 2023.



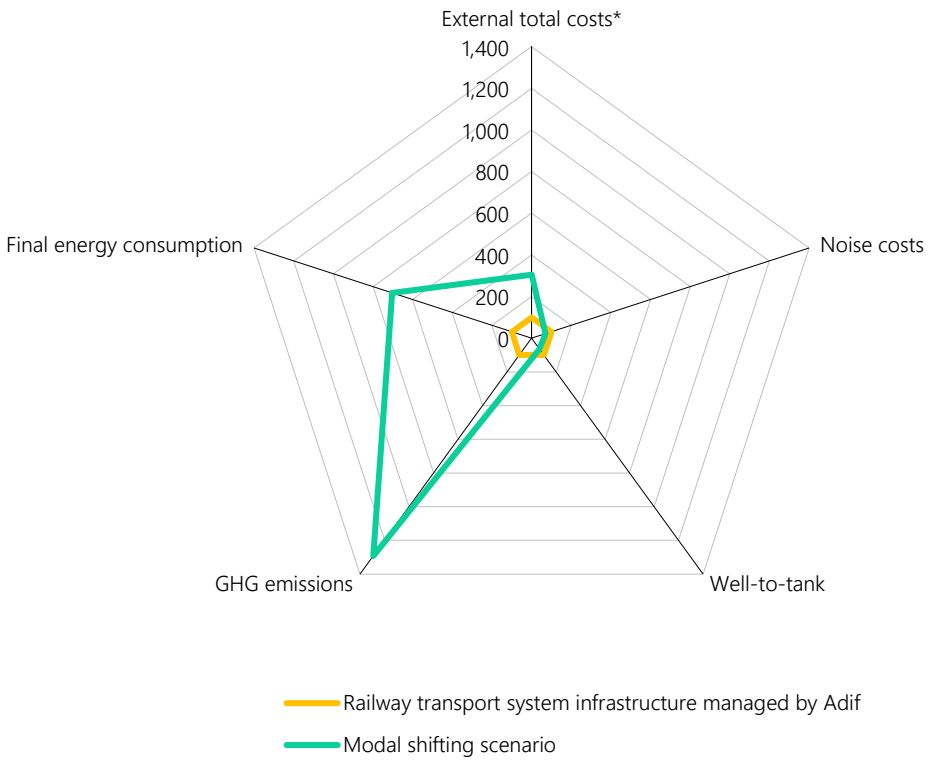
Likewise, Adif and Adif-Alta Velocidad have seized the arrival of Next Generation EU funds as an opportunity. Regarding the use of funds from the Recovery, Transformation, and Resilience Plan, of the 140 billion euros allocated to Spain by Europe, over 6 billion euros will be invested directly in the railway sector. Adif and Adif-Alta Velocidad will receive 5.874 billion euros for projects aimed at decarbonizing public transport with zero or low-emission vehicle fleets, promoting a modal shift towards rail for urban and metropolitan journeys, and developing European corridors, the trans-European transport network, and logistics intermodality. In this regard, Adif has developed, among other initiatives, Spain's first railway motorway services. In 2021, it signed protocols for the commissioning of the Algeciras-Zaragoza and Madrid-Valencia high-speed rail corridor. This is the largest stimulus package ever financed by the European Union.

RELATIVE ECO-EFFICIENCY OF THE RAIL TRANSPORT SYSTEM ON ADIF-MANAGED INFRASTRUCTURE

The contribution of the rail transport system in Adif-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 2023 has been assessed based on the following assumptions regarding modal substitution for the recorded traffic:

- Freight: 100% substitution by lorry.
- Commuter: 20% substitution by bus and 80% by car.
- Medium-distance: 20% substitution by bus and 80% by car.
- Long-distance: 40% substitution by air, 10% by bus and 50% by car.

Chart 73. Relative eco-efficiency of the rail transport system in Adif-managed infrastructure compared to modal substitution scenarios



* Considering congestion costs only in the commuter mode substitution scenario.

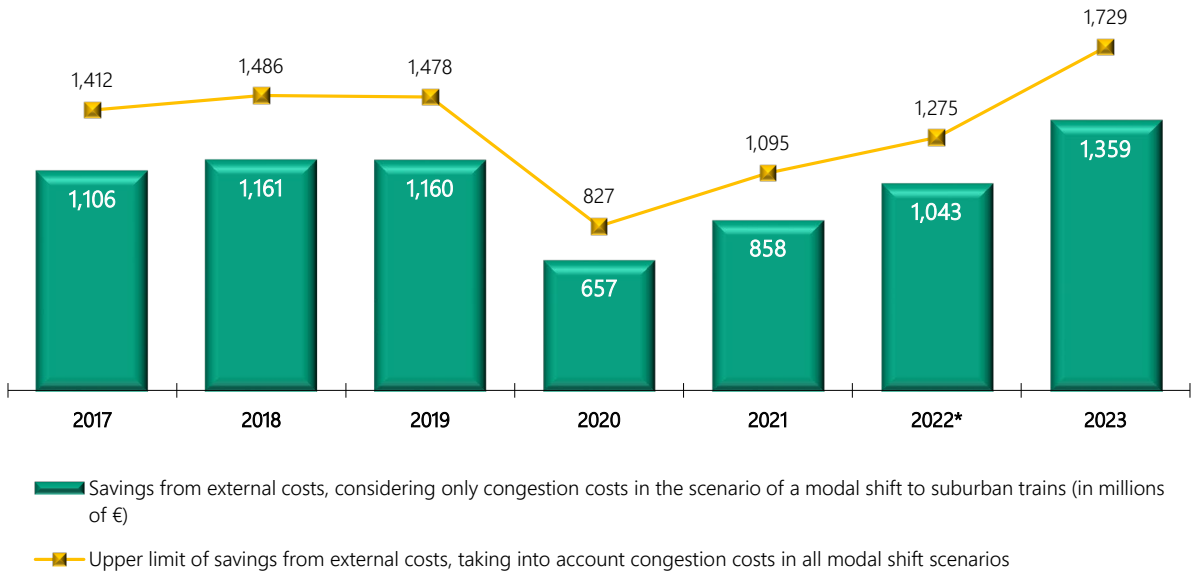
The relative eco-efficiency of the rail transport system in 2023, based on the modal substitution scenarios considered, is clearly illustrated through the eco-compass. This graphical representation includes five key indicators: three primary ones—total external costs, final energy consumption, and GHG emissions—and two secondary ones: noise externalities and well-to-tank emissions.

Contribution to the Sustainability of the Rail Transport System on Infrastructure Managed by Adif. 2023

The traffic recorded in 2023 on infrastructure managed by Adif, in relation to modal shift scenarios, has resulted in:

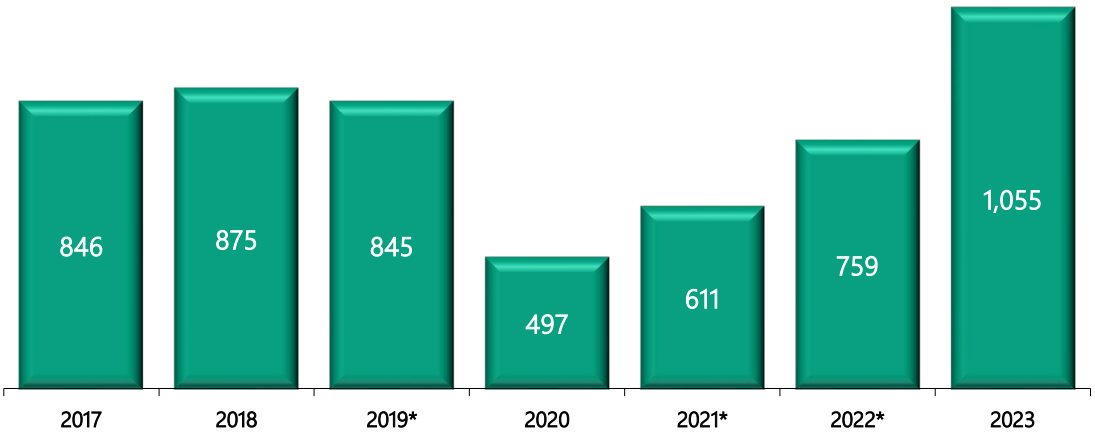
- Savings in external costs estimated at between 1.359 and 1.729 billion euros.
- A reduction in final energy consumption estimated at 1.055 thousand tonnes of oil equivalent (toe).
- A decrease in GHG emissions estimated at 3.13 million tonnes of CO2 equivalent.

Chart 74. Savings in externalities (million/year)*



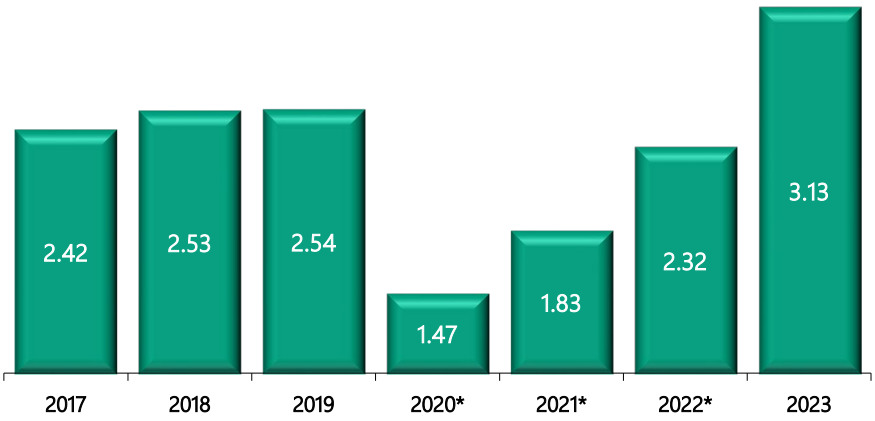
** Data modified in relation to the 2022 Environmental Report.*

Chart 75. Decrease in final energy consumption (thousands of tonnes of oil equivalent, toe)



** Data revised in relation to the 2022 Environmental Report.*

Chart 76. GHG emission reductions (million tonnes CO2eq)



** Data revised in relation to the 2022 Environmental Report.*

10. ABOUT THIS REPORT

10- ABOUT THIS REPORT

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The Environmental Report presented below 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 fulfills its commitment to report on the environmental aspects of its activities and the results achieved, marking the tenth year since the creation of Adif-Alta Velocidad, 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 in Spain.

Adif-Alta Velocidad was established on December 31, 2013, by Royal Decree-Law 15/2013[18], 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 context, Adif is responsible for the administration of the conventional and metric gauge networks, along with other associated activities. This includes managing assets, conventional network stations, and communication, among other things, that were not transferred to Adif-Alta Velocidad. Conversely, Adif-Alta Velocidad handles the construction and management of high-speed rail infrastructure, as well as other functions and infrastructure it has taken on, such as high-speed station operations, telecommunications, and energy activities.

Royal Decree-Law 15/2013 and related regulations[19] 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.

After segregation, Adif continues to uphold its previous commitments, including the publication of this Report, which, under the delegation

[18] 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)

[19] 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).

agreement[20], is prepared annually by Adif-Alta Velocidad. This Report has been published jointly for the two entities since 2005, and since the 2014 edition, as two separate documents.

In this Report, continuing the approach mentioned earlier, we present the data from Adif for the year 2023, marking the tenth year for which separate data are available for each entity. The time reference for many indicators includes annual information and data from 2014 and 2022, corresponding to the Adif entity.

CONTENT SELECTION

The content of this report has been selected based on the new materiality analysis conducted in 2022.

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.

A total of 29 relevant topics or issues were identified, organised into eleven categories across 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:

- Sustainable mobility
- Developing sustainable cities and communities

Of medium relevance are:

- Environmental protection
- Emission mitigation
- Energy consumption

In this new materiality analysis, social aspects have decreased in relevance due to the end of the COVID-19 health crisis, with a more balanced focus across the three areas. It should be noted that the overall result indicates a greater focus on environmental issues compared to the previous materiality analysis, although this area still lacks maturity. Governance and social issues are regarded as having higher materiality 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, 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

[20] Resolution of 9 July 2019 from the Public Business Entity Adif, publishing the management delegation agreement with the Public Business Entity Adif-Alta Velocidad for the execution of material or technical activities (Official State Gazette No. 189, 9 August 2019).

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** website (www.adif.es).

For more information and access, copies of this report are available from:

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)		2023 Adif Environmental Report	Pages	Omissions (2)	External verification (3)
GRI 2	General Disclosures				
2-27	Compliance with environmental legislation and regulations	Environmental compliance	190-197		✓
GRI 3	Material Topics				
3.3	Management of Material Topics	Company's environmental strategy	11-16		✓
		Plan to Combat Climate Change (PLCCC)	19-26		✓
		Consumption of railway materials	53-54		✓
		Waste	57-70		✓
		Circular economy actions	71-76		✓
		Discharging	79-80		✓
		Contaminated soils	80-92		✓
		Noise pollution	112-116		✓
		Management of impacts during the construction and operation of new infrastructure	123-125		
		Fire prevention	126-130		✓
		Outstanding actions during the construction of conventional gauge lines	142-147		✓
		Responsible purchasing	181-182		✓
		Environmental complaints procedure	182-183		✓
		Savings from external costs in the rail transport system on infrastructure managed by Adif.	217-221		✓
		About this report	227-229		✓

GRI 301	Materials				
301-1	Materials used by weight or volume	Consumption of railway materials	53-54		✓
301-2	Recycled inputs 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's own activities	37-38		✓
302-2	Energy consumption outside the organization	Primary energy consumption	40-41		✓
302-3	Energy intensity	Final and primary energy intensity	41-43		✓
302-4	Reduction of energy consumption	Monitoring the implementation of actions to combat climate change	22-26		✓
302-5	Reductions in energy requirements of products and services	Energy consumption in the rail transport system in infrastructures managed by Adif	201-203		✓
		Traction energy consumption per transport unit	206-207		✓
GRI 303	Water and effluents				
303-1	Interactions with water as a shared resource	Water consumption	56-57		✓ ✓
303-2	Management water discharge-related impacts	Discharging	79-80		✓

303-3	Water withdraw			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 operates in Spain where the discharge of waste water is subject to specific legislation, which it strictly complies with	79-80		✓
303-5	Water consumption	Water consumption	56-57		✓
GRI 304	**Biodiversity**				
304-1	304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.	Land use	121		✓
		Natural areas	122		✓
		Greenways	130-136		✓
		Green stations	136-137		✓
304-2	Significant impacts of activities, products and services on biodiversity	Natural areas	122		✓
		Management of impacts during the construction and operation of new infrastructure	123-125		✓
		Key highlights in the construction of conventional gauge lines	142-147		✓
304-3	Habitats protected or restored	Natural areas	122		✓
		Greenways and protected natural areas	137-142		✓
		Key highlights in the construction of conventional gauge lines	142-147		✓
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	44-47	✓
		Air emissions from traction	207-210	✓
		GHG emissions per TU	210	✓
		GHG emissions compared to the transport sector	211-212	✓
305-2	Energy indirect (Scope 2) GHG emissions	Carbon footprint	44-47	✓
		GHG emissions per TU	210	✓
		GHG emissions compared to the transport sector	211-212	✓
		Air emissions from traction	207-210	✓
305-3	Other indirect (Scope 3) GHG emissions	Air emissions from traction	207-210	✓
		GHG emissions per TU	210	✓
		GHG emissions compared to the transport sector	211-212	✓
305-4	GHG emissions intensity	Carbon footprint	44-47	✓
305-5	Reduction of GHG emissions	Monitoring the implementation of actions to combat climate change	22-26	✓
305-6	Emissions of ozone-depleting substances (ODS)	Substances that deplete the ozone layer	54-55	✓
305-7	Nitrogen oxides (NOx), sulphur oxides (SOx), and other significant air emissions	Other air emissions	47-49	✓
		Air emissions from traction	207-210	✓
GRI 306	**Effluents and Waste**			
306-1	Waste generation and significant waste-related impacts	Waste	57-70	✓
306-2	Management of significant waste-related impacts	Waste	57-70	✓
		Circular economy actions	71-76	✓
306-3	Generated waste	Waste	57-70	✓
306-4	Waste derived from disposal	Waste	57-70	✓
306-5	Waste directed to disposal	Waste	57-70	✓
GRI 308	**Supplier environmental assessment**			
308-1	New suppliers that were screened using environmental criteria.	Responsible purchasing	181-182	✓
308-2	Negative environmental impacts in the supply chain and actions taken	Responsible purchasing	181-182	✓
		Management of impacts during the construction and operation of new infrastructure	123-125	✓

	Noise pollution	112-116	✓
	Fire prevention	126-130	✓
	Environmental risk management	182-183	✓

(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	11-16		✓
	Voluntary initiatives	19-29		✓
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 (PLCCC)	19-16		✓
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** for environmental management and the promotion of sustainable mobility.	31		✓
Aspect: Noise and vibration				
LT7: Description of policies and programmes for noise management/abatement	Noise pollution	112-116		✓
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	153-155		✓
	Management of impacts during the construction and operation of new infrastructure	123-125		✓
	Outstanding actions during the construction of conventional gauge lines	142-147		✓

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 2023
	Strategic Plan 2030
	Adif Code of Ethics and Conduct
	Environment Policy (2019)
	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 2022 Environmental Report
	Adif Management Report for the Financial Years 2019, 2021, 2022, and 2023
	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, Corporate Coordination and Management Sub-Department
	Adif-Alta Velocidad, Corporate Traffic and Capacity Management Department
	Adif, Corporate Conservation and Maintenance Department, Corporate Maintenance Department
	Adif, Corporate Conservation and Maintenance Department, Corporate Technical Department, Operations and Warehousing Headquarters
	Adif, Corporate Conservation and Maintenance Department, Corporate Technical Department, Corporate Resources Sub-Department
	Adif, Corporate Security, Processes and Systems, Quality and Environment Area Department
	Adif, Corporate Finance and Management Control Department, Corporate Department of Economic Management and Financing, Corporate Accounting and Financial Information Sub-Department
	Adif, Corporate Finance and Management Control Department, Corporate Treasury and Accounting Department, Administration and Services Division.
	Adif, Track Area Management, Infrastructure and Track Sub-Department, Corporate Technical Department.
	Adif, Corporate Legal Advice Department, Corporate Litigations Sub-Department
	Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department
	Adif-Alta Velocidad, Corporate Safety and Self-Protection Department

	Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department, Environmental Sustainability and Fight against Climate Change Division
	Adif-Alta Velocidad, Corporate Technical Planning Sub-Department for Rail Assembly and Supplies
RENFE Operator	Energy and traffic data
Greenways	*Fundación de los Ferrocarriles Españoles* (Spanish Railways Foundation)
Transport sector data	Spanish Transport and Logistics Observatory (OTLE), 2024
	Ministry of Transport and Sustainable Mobility. Yearbook. Year 2014 to 2020
	Ministry of Public Works (2014). Transport and infrastructure. 2013 Annual Report
	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 (Observatory of the Spanish Railway)
Energy data	*Red Eléctrica.* Spanish Electricity System Data, 2024
	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 2024
	Ministry for the Ecological Transition and the Demographic Challenge. National Inventory of Emissions of Pollutants into the Atmosphere 1990-2022
	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.
Data on transport of dangerous goods and associated accidents	Ministry of the Interior, Directorate General for Civil Protection and Emergencies. Report on emergencies involving the transportation of dangerous goods by road and rail. Reports on Emergencies in the Transport of Dangerous Goods by Road and Rail: 2005-2006, 2007-2008, 2009-2010; Report for 2011; Year-on-Year Comparison for 2002-2011; and Three-Year Report on Emergencies by Road and Rail. Period: 2011-2013: Triennial report on emergencies in the transport of dangerous goods by road and rail. Period: 2014-2016: Annual report on emergencies in the transport of dangerous goods by road and rail. Period: 2017: Statistical analysis of emergencies in the transport of dangerous goods by road and rail for 2018 and the period 2009-2018; Statistical analysis of emergencies occurring in the transport of dangerous goods by road and rail in 2019 and the period 2009-2019.
Unit conversion	International Energy Agency / Natural Gas
Other sources	AENOR
	INE Insituto Nacional de Estadística (Spanish National Statistics Institute) Baseline data on water consumption, waste generation, and population
	IDAE *Instituto para la Diversidicación 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
ANAVAM	Spanish Environmental Auditors and Verifiers National Association
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)
CDW	Construction and Demolition Waste
CELO	Centro Logístico de Villa Verde (Villa Verde Logistics Centre)
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
CONAMA	Spanish National Environmental Congress
COP21	2015 United Nations Climate Change Conference or 21st International Conference on Climate Change It was held in Paris (France) in 2015. The result was the so-called Paris Agreement.
CRC	Centro de Regulación de la Circulación (Traffic Regulation Centre)
CSN	Spanish Nuclear Safety Council
CSR	Corporate Social Responsibility
CT	Center for High-Speed Rail Telecommunications and Backup in Villaverde
CTV	Rail Technology Centre
DGCM	Corporate Conservation and Maintenance Department
DGNOC	Corporate General Business and Commercial Operations Department
EIA	Environmental Impact Assessment
EIM	European Rail Infrastructure Managers
EIR	Environmental Impact Report
EIR	Environmental Impact Report
EIS	Environmental Impact Statement

EMS	Environmental Management System
ESS	Environmental Site Supervisor
FFE	Fundación de los Ferrocarriles Españoles (Spanish Railways Foundation)
FNEE	Fondo Nacional de Eficiencia Energética (Spanish National Energy Efficiency Fund)
Forética	Spanish leading organisation in sustainability and corporate social responsibility
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 (106 kWh)
ha	hectare (10,000 m2)
HCFCs	Hydrochlorofluorocarbons
HSL	High Speed Line
HW	Hazardous waste
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 (103 grams)
kJ	kilojoules (103 joules)
Kp	kilometre point
KPI	Key Performance Indicator
kt	kiloton
kWh	kilowatt-hour
l	Litres
L_{night}	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
µg	Micrograms
m^2	square metres
m^3	cubic metres
MITERD	Ministry for Ecological Transition and the Demographic Challenge
MJ	Megajoules (106 joules)
N2000	Natura 2000
N_2O	Nitrous oxide

NAP	Noise Action Plan
NMVOCs	Non-methane volatile organic compounds
NOx	Nitrogen oxide
NPA	Nature Protection Areas
PAH	Polycyclic Aromatic Hydrocarbon
PCBs	Polychlorinated biphenyls
PDLCCC	Climate Change Combat Master Plan
PLCCC	Plan to Combat Climate Change
PM_{10}	Fine particulate matter that are 10 microns or less
$PM_{2.5}$	Fine particulate matter that are 2.5 microns or less
PPK	Passengers per kilometre. Unit of measurement of passenger traffic corresponding to the transport of one passenger over a distance of one kilometre
PRIME	Platform of Rail Infrastructure Managers in Europe
PSR	Preliminary Situation Reports
PWR	Public Water Resources
Renfe	Red Nacional de los Ferrocarriles Españoles (National Network of Spanish Railways)
RFIG	Red Ferroviaria de Interés General (General Interest Railway Network)
SDGs	Sustainable Development Goals
SEO/BirdLife	Sociedad Española de Ornitología (Spanish Ornithological Society)
SICA	Sistema de Información sobre Contaminación Acústica (Noise Pollution Information System)
SMA	Corporate Environmental Sub-Department
SNM	Strategic Noise Map
SOAV	Corporate High-Speed Operations Sub-department
SOx	Sulphur oxides
SP 2030	Strategic Plan 2030
t	Tonnes
TPH	Total petroleum hydrocarbons
TPK	Tonne per kilometre Unit of measurement of freight transport which represents the transport of one tonne of goods over a distance of one kilometre
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 vkm
UIC	International Union of Railways / Union Internationale des Chemins de fer
UOT	Uses other than traction
VV	Greenway
WSF	Waste Storage Facilities

Consulnima
Consultoría e Ingeniería Ambiental

Verification Statement

ADIF 2023 Environmental Report

CONSULNIMA, Environmental Consulting and Engineering, has been engaged by ADIF, with the knowledge of its Management, to conduct an independent verification of the traceability of the data included in the ADIF 2023 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 10 'About this Report' of the ADIF 2023 Environmental Report.

The scope outlined by ADIF for the preparation of the ADIF 2023 Environmental Report is defined in Chapter 10, 'About this Report', under section 'Scope', of the aforementioned Report.

The preparation of the ADIF 2023 Environmental Report, along with its content, is the responsibility of ADIF'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 2023 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 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 10, 'About this Report', under section 'Access to Information', of the ADIF Environmental Report 2023.

Madrid, 1st of August 2024

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