



2024

ENVIRONMENTAL REPORT



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About this report

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 led 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 38/2015¹) and as laid down in the Royal Decree 2395/2004² of 30 December 2004, 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 2030³ 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

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).

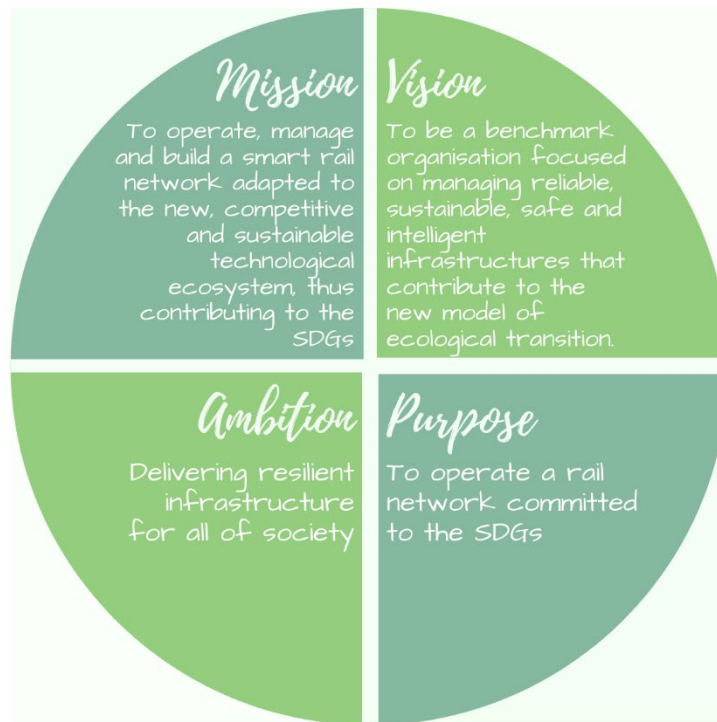
³ 2030 Agenda for Sustainable Development adopted by the UN General Assembly in September 2015.

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 maximum effectiveness and efficiency in the management of public resources.

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

! Adif aims to contribute to specific sustainable development goals in

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.

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.

Adif is constituted as a separate entity segregated from Adif-Alta Velocidad under Royal Decree-Law 15/2013⁴. 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

⁴ Royal Decree Law 15/2013 of 13 December 2013 on the restructuring of the State-owned company 'Administrador de Infraestructuras

Ferrovias' (Adif) and other urgent economic measures (BOE No. 299 of 14 December 2013).

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.

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

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

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

	2022	2023	2024
GHGs emissions reduction (t CO ₂ eq)	7,591	11, 542**	11,577
Energy efficiency improvement (GWh equivalent)	53.70	69.69	69.91

* Base year 2009.

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

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

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.

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.

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

Environmental Policy of Adif

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

* Revised in 2024

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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



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PLAN TO COMBAT CLIMATE CHANGE (PCCC)

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

PLAN TO COMBAT CLIMATE CHANGE

<i>Objective</i>	ENHANCE ADIF AND ADIF ALTA VELOCIDAD'S ROLE IN COMBATING CLIMATE CHANGE
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The PCCC takes advantage of the knowledge and experience acquired with the Energy Saving and Efficiency Master Plans that have been developed in **Adif** and Adif-Alta Velocidad since 2009. PCCC replaces those.

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

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

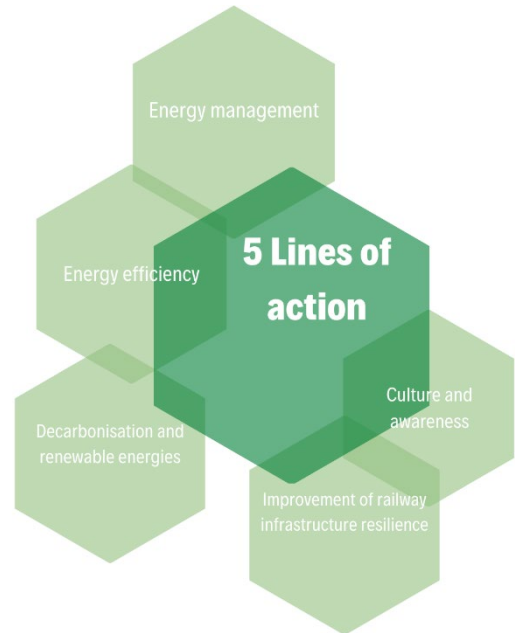


Figure 1. Lines of action of the PCCC

In addition, specific targets encompassing the aforementioned objectives.

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

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

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

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

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

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

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

1 Reduction of energy consumption

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

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

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

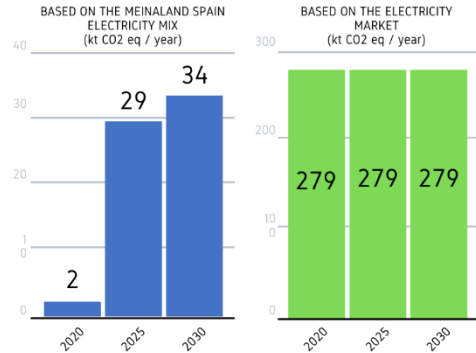
2,900 GWH

ANNUAL ENERGY CONSUMPTION REDUCTION TARGET (GWH/YEAR)

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

2 Reduction of GHG emissions

To define the GHG reduction target for the railway system, a dual calculation was made: one based on the mainland 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).

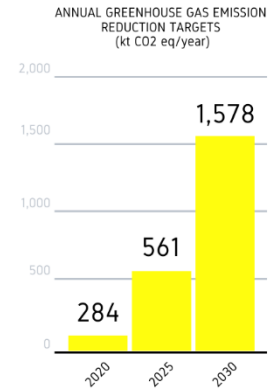


The cumulative emissions reduction by 2030 is projected to be

777 kt CO2 eq
BASED ON THE MAINLAND 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 | **12,000 kt CO2 eq**

BASED ON THE MAINLAND SPAIN ELECTRICITY MIX | BASED ON THE ELECTRICITY MARKET

PURCHASE OF GREEN ENERGY (GoO)

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3 Improvement of railway infrastructure resilience

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

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

4 Culture to combat climate change

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

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

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

Monitoring the implementation of actions to combat climate change

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

From 2009 to 2024, a total of seven hundred and thirty-two measures have been implemented in **Adif** and Adif-Alta Velocidad for energy saving

and efficiency, renewable energy generation systems, and the fight against climate change.

The set of actions carried out by **Adif** and Adif-Alta Velocidad between 2009 and 2024, within the framework of the successive energy saving and climate change plans, prevented the release of 213.883 kt of CO₂.

Compliance with the objectives established in the energy saving and climate change plans 2009-2024

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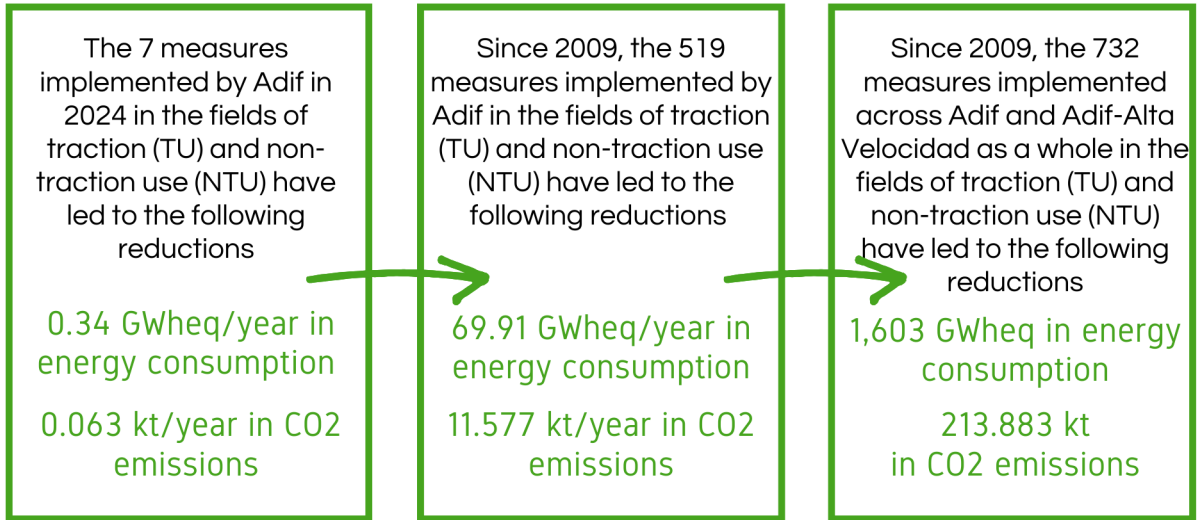


Figure 3. Reductions achieved with the implementation of actions to improve energy efficiency and to combat climate change in Adif and Adif-Alta Velocidad since 2009

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

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

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

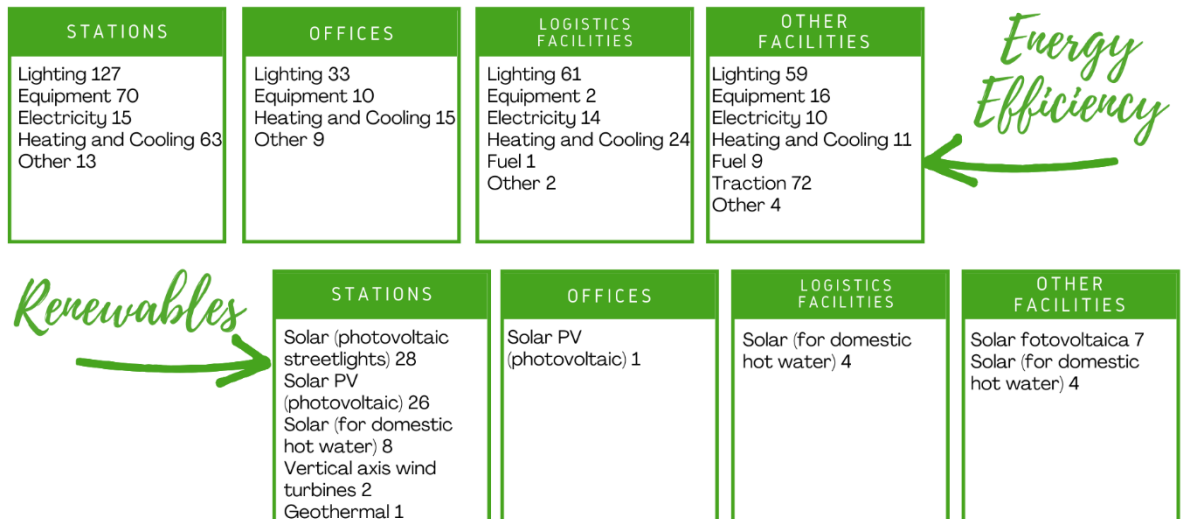
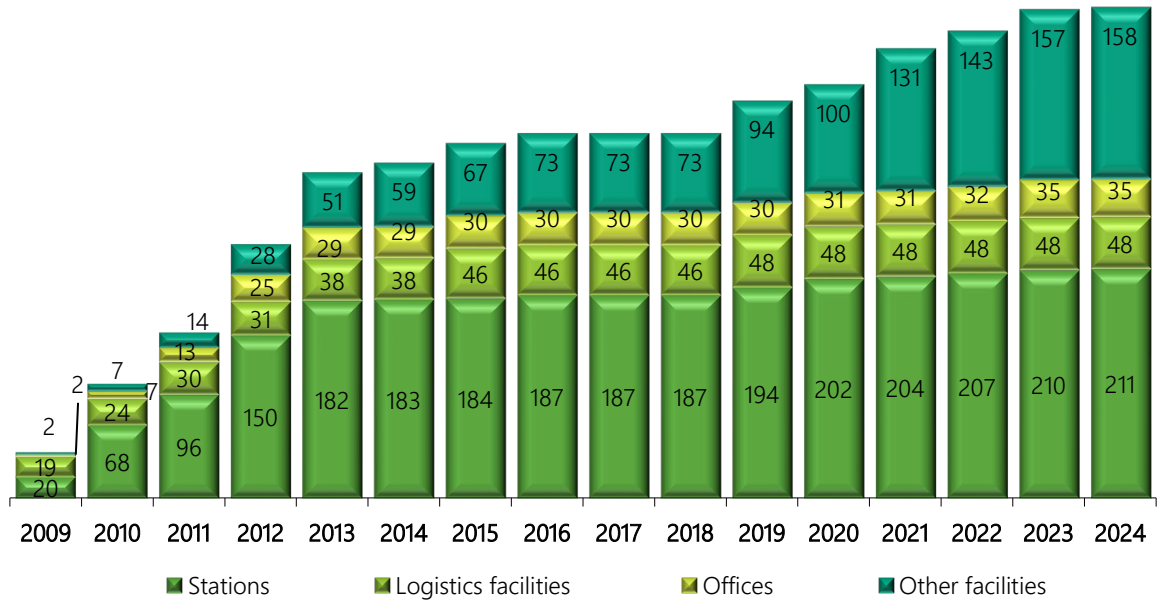


Figure 4. Actions carried out by 31 December 2024 within the framework of Adif and Adif-Alta Velocidad's Action Plan for Energy Saving-Efficiency and Renewable Energy Generation Systems

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

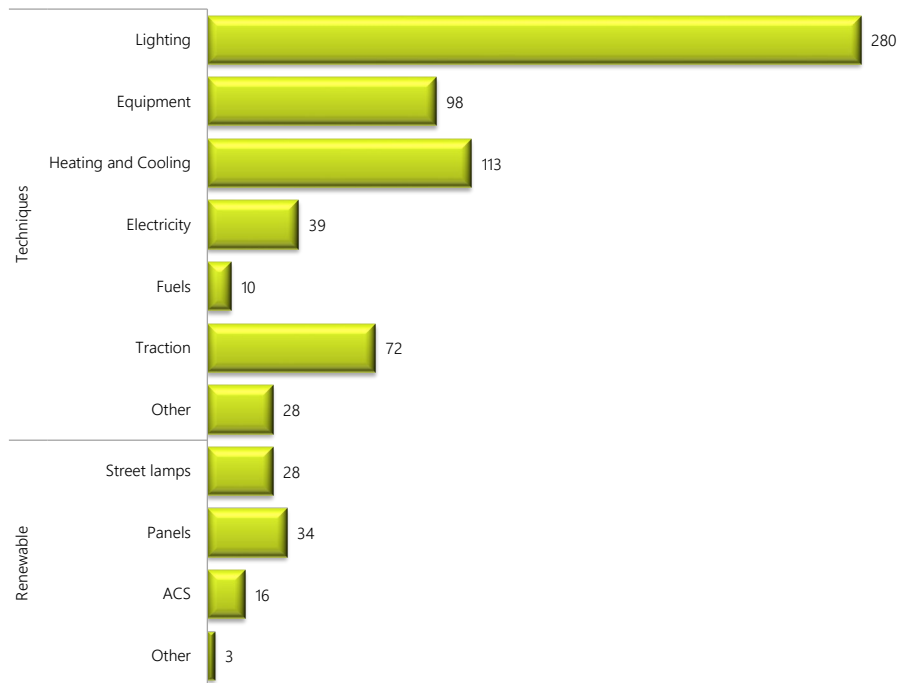
Chart 1. Facilities where technical or renewable measures have been implemented in Adif and Adif-Alta Velocidad (No. of facilities) *



* Data modified in relation to the 2023 Environmental Report.

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

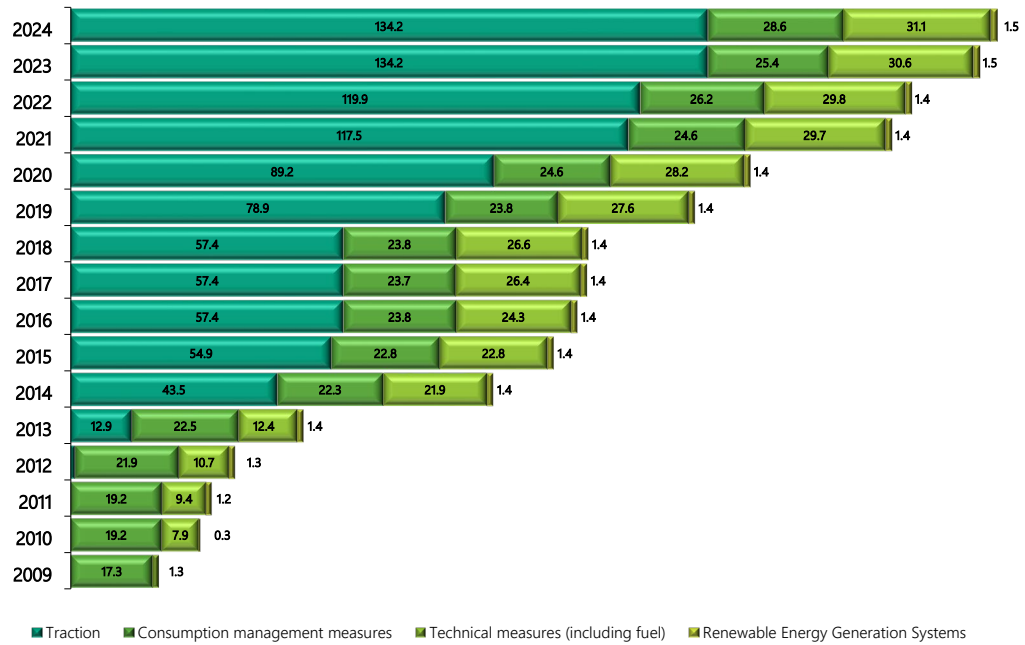
Chart 2. Energy saving and efficiency measures and renewable energy generation systems implemented between 2009-2024 in Adif and Adif-Alta Velocidad



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

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

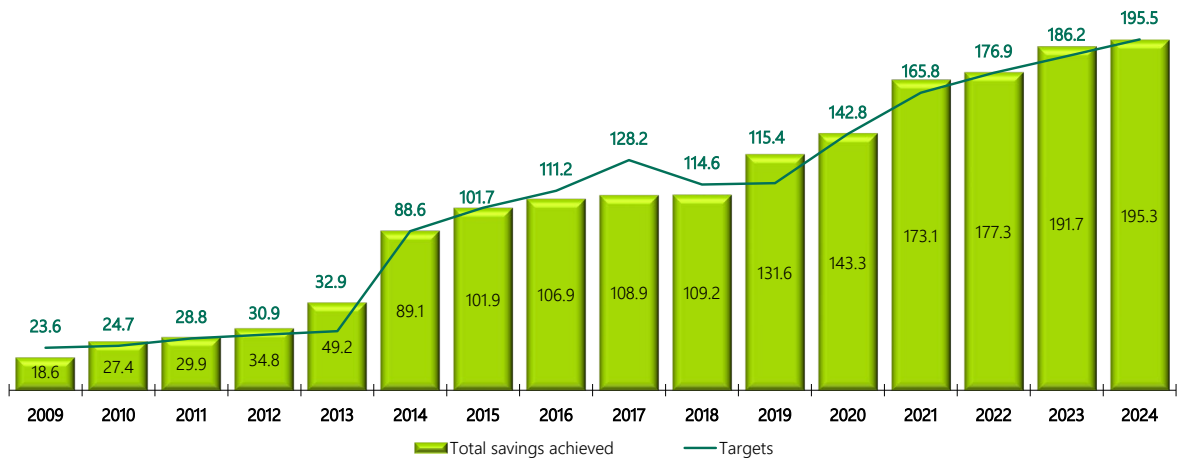


* Management measures represent: fuel savings (fleet and generators renewal) and traction energy savings, as well as fleet management and electricity consumption management measures.

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

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

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



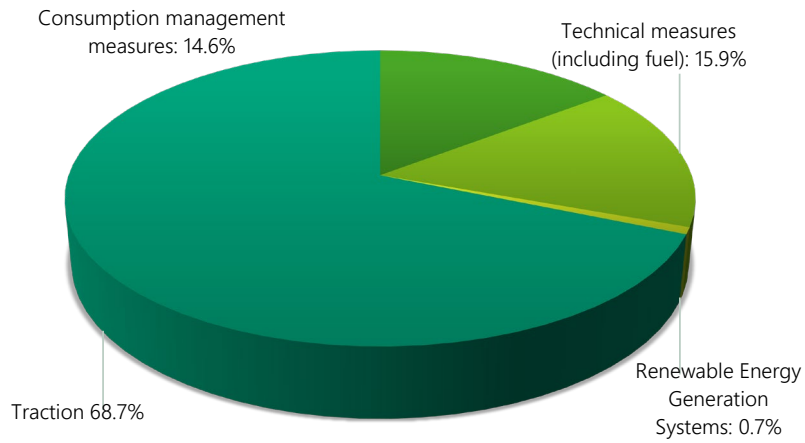
* Data for 2023 was modified in relation to the 2023 Environmental Report.

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

As of 31 December 2024, the main contribution of the different types of measures implemented to the annual savings in energy consumption achieved was due to traction measures (68.7%),

followed by technical measures (15.9%), and consumption management measures (14.6%).

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



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

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PRIME BENCHMARKING ANALYSIS

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

Periodic benchmarking analyses are among the tasks carried out within the framework of this

platform. These aim at providing a comprehensive view of actions on the railway network, so that infrastructure managers can exchange practices and actions and identify areas in which there is room for improvement.

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



THE EUROPEAN GREEN DEAL AIMS TO MAKE EUROPE CLIMATE-NEUTRAL BY 2050.



IN ACCORDANCE WITH THE EU'S SUSTAINABLE AND SMART MOBILITY STRATEGY:

- ALL TRANSPORT MODES NEED TO BECOME MORE SUSTAINABLE
- SUSTAINABLE TRANSPORT ALTERNATIVES SHOULD BE WIDELY AVAILABLE
- SCHEDULED COLLECTIVE TRAVEL OF UNDER 500 KM SHOULD BE CARBON-NEUTRAL BY 2030 WITHIN THE EU



RAIL NEEDS TO CONTINUE WITH FURTHER ELECTRIFICATION OF THE TRACK OR USING GREENER ALTERNATIVES TO DIESEL WHERE ELECTRIFICATION IS NOT POSSIBLE.

THE TEN-T CORE NETWORK IS TO BE ELECTRIFIED BY 2030, THE COMPREHENSIVE NETWORK BY 2050

Figure 5. Objectives of PRIME

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

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

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

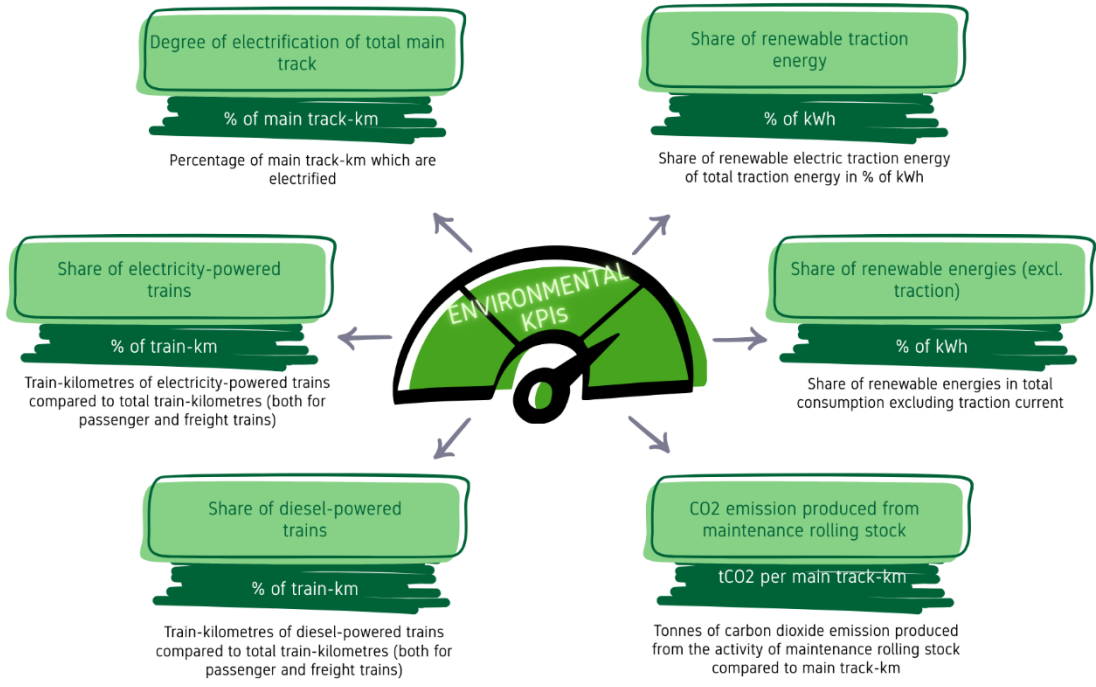


Figure 6. Selected environmental KPIS in PRIME

SUSTAINABLE DEVELOPMENT GOALS (SDGs) IN ADIF'S STRATEGY

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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:

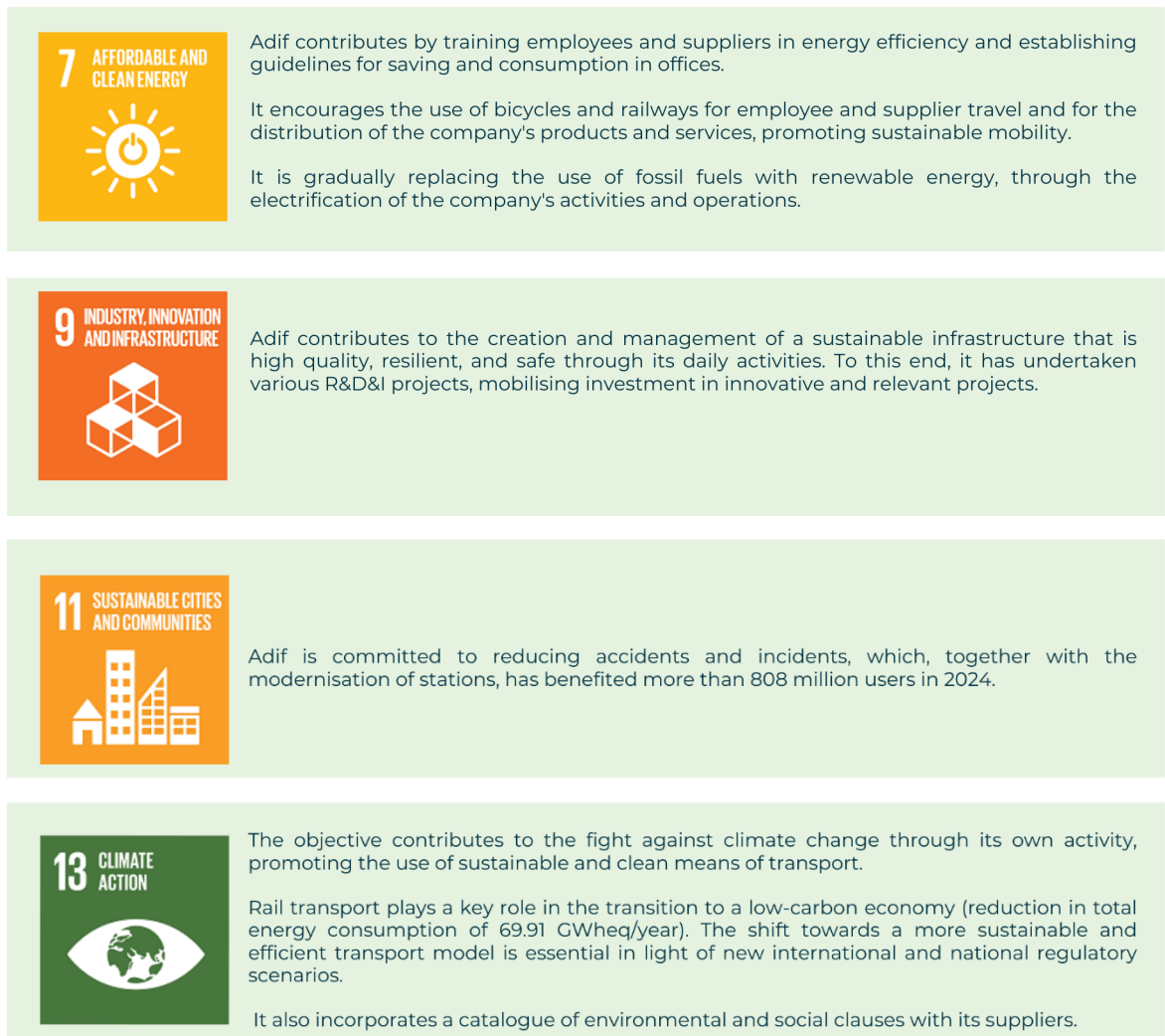


Figure 7. SDGs which are most impacted by the implementation of Adif's strategic initiatives

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

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society across three crucial pillars: social, environmental, and economic.

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

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

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

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

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

activities and implementing training on the SDGs, among other measures.

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

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

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

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

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

ADIF AND ADIF-ALTA VELOCIDAD INTERNAL COMMUNICATION PORTAL

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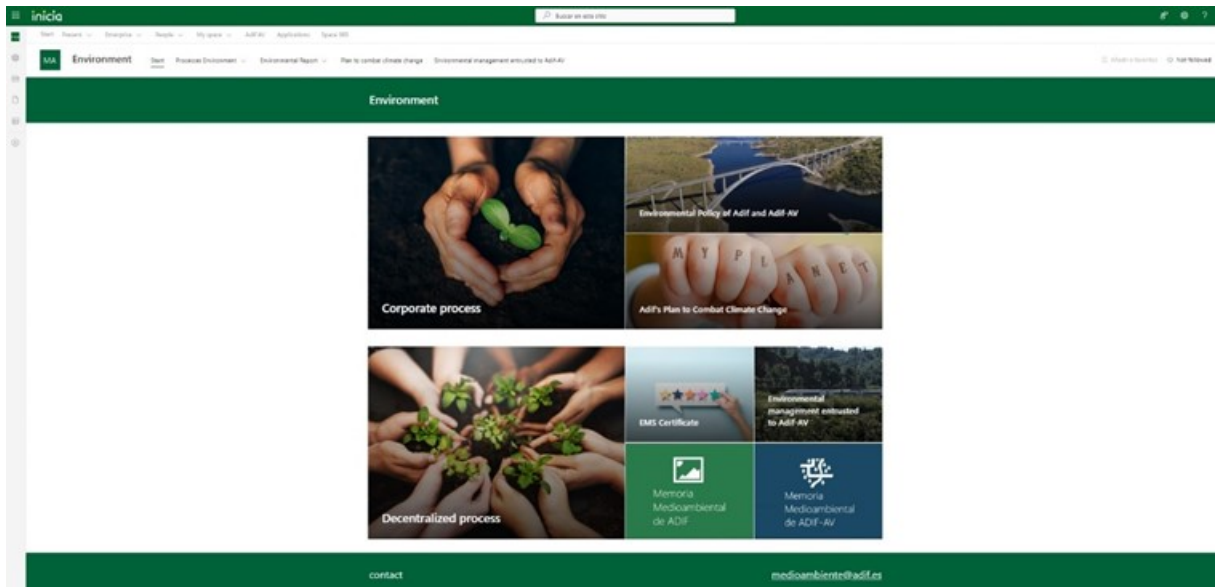
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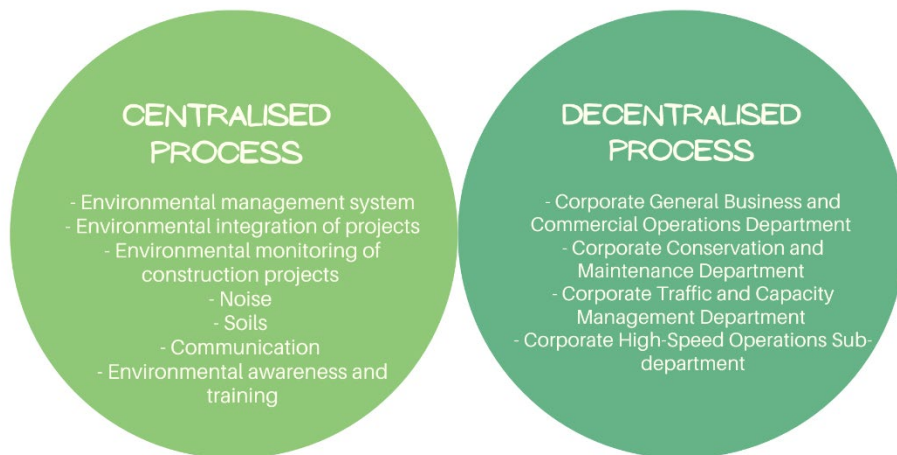
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In 2019, the Environment section was created in the *Inicia* corporate portal with the aim of improving internal communication and sharing corporate information on aspects related to the environment. In this way, the management and coordination of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

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



ENVIRONMENTAL INFORMATION AVAILABLE IN INICIA



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

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

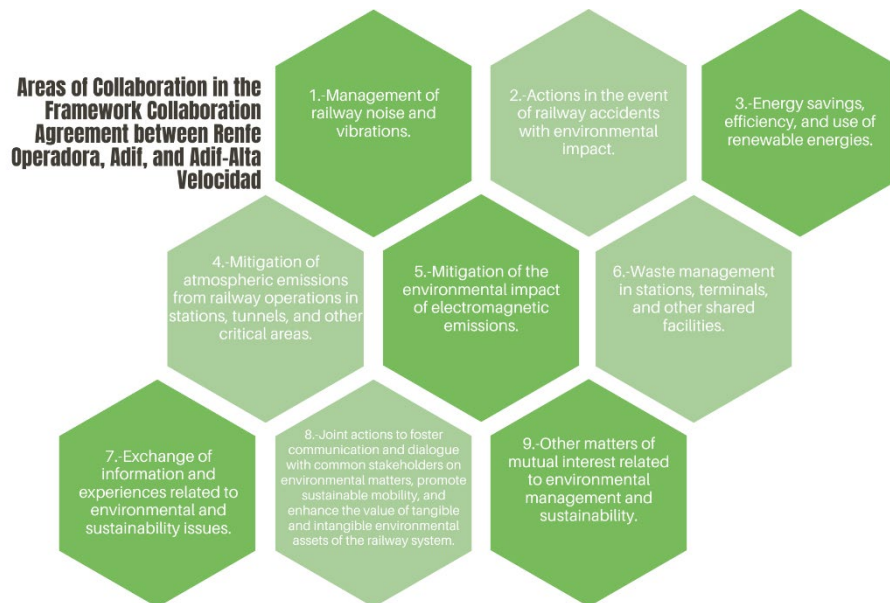
Since its separation from **Adif**, Adif-Alta Velocidad has upheld the commitments made under this agreement.

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

- Establishing a framework for cooperation between companies.

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

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



COLLABORATIONS, SPONSORSHIPS AND PARTICIPATION IN ENVIRONMENTAL WORKING GROUPS

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In the period 2005-2024 **Adif** has sponsored the following events:

- The 8th, 9th, 10th, 12th, 13th, 14th and 17th editions of the Spanish National Environmental Congress (CONAMA), held in Madrid in 2006, 2008, 2010, 2014, 2016, 2018 and 2024, respectively. In these editions, in addition to setting up a stand, it participated in different Technical Conferences, Working Groups, and Panels.
- *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 Working Group *ZERO WASTE II - Circular Economy best practice workshop for rail*, on material reuse, circular economy and zero waste. The main goals of the project are to highlight circular economy opportunities in rail, share knowledge collaboratively across the rail sector on best practices and strategies, and facilitate partnerships with the supply chain and other sectors.
- *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

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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 is continuing through 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 Global Compact Network Spain, the driving force behind these initiatives.

It is worth highlighting that, since 2022, **Adif** and 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

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The primary energy consumption in **Adif's** operations consists of electrical energy sourced from the Peninsular Electricity System, which accounts for 70.5% of the total energy consumed in 2024. Diesel B usage (11.6%) 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 2024, **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 (11.5%) and natural gas and diesel C in heating and domestic hot water generation (6.4%).

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

Type of energy	2017	2018	2019	2020	2021	2022	2023	2024
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	97,107,220
Uses Traction (UT)	14,393,740	3,617,969	3,555,696	154,842	121,101	293,117	225,612	72,439
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	97,034,780
Diesel (l/year)	6,042,259	6,147,271	6,963,874	4,785,760	4,643,973*	3,795,659	3,226,989	3,240,310
Diesel A Automotive	1,684,567	1,657,348	2,875,310	1,423,010	1,495,439	1,295,417	1,324,086	1,330,006
Diesel B Rail Maintenance	1,295,810	1,123,612	915,047	767,158	726,880*	525,898	476,468	537,453
Diesel B Garage shunting	0	0	2,164	5,175	70	0	30	0
Diesel B Ancillary Terminal Operations	228,740	188,899	155,370	115,369	112,289	86,172	77,186	75,594
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	968,968
Diesel C Heating	240,920	569,653	537,887	374,521	438,805	312,375	76,445	328,289
Petrol (l/year)	16,949	22,559	69,652	50,744*	62,572	193,246	215,046	239,763
Autogas (l/year)	463	31	0	44	98	55	180	0
Natural Gas (m³/year)	416,605	303,289	487,151	309,751	438,486	508,148	365,306	521,482
Compressed natural gas (l/year)	0	0	0	124	799	1,230	1,265	636

* Data revised in relation to the 2023 Environmental Report.

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

Chart 6. Distribution of energy consumption recorded in Adif in the year 2024 (% of total amount of energy consumed)

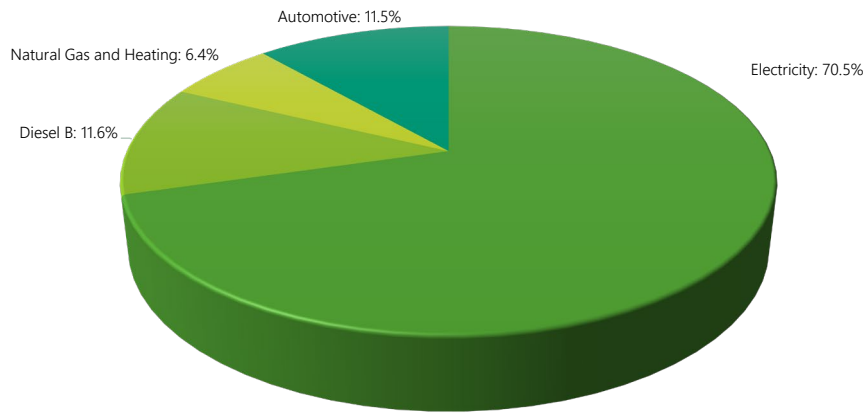


Table 3. Energy and fuel consumption recorded in our own activities (TJ/year)

Type of energy	2017	2018	2019	2020	2021	2022	2023	2024
Electrical Power (TJ/year)	445.38	389.23	385.47	356.70	366.74	366.78	355.49	349.59
Uses Traction (UT)	51.82	13.02	12.80	0.56	0.44	1.06	0.81	0.26
Uses Other than Traction (UOT)	393.56	376.21	372.67	356.15	366.31	365.73	354.67	349.33
Diesel (TJ/year)	214.80	218.54	247.57	170.13	165.09*	134.94	114.72	117.93
Diesel A Automotive	59.89	58.92	102.22	50.59	53.16	46.05	47.07	48.41
Diesel B Rail Maintenance	46.07	39.94	32.53	27.27	25.84*	18.70	16.94	19.56
Diesel B Garage shunting	0.00	0.00	0.08	0.18	0.00	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	2.75
Diesel B Railway yards shunting	92.15	92.71	88.10	74.67	66.50	56.02	45.25	35.27
Diesel C Heating	8.56	20.25	19.12	13.31	15.60	11.10	2.72	11.95
Petrol (TJ/year)	0.55	0.73	2.26	1.65	2.03	6.27	6.98	8.53
Autogas (TJ/year)	0.011	0.001	0.000	0.001	0.002	0.001	0.004	0.000
Natural Gas (TJ/year)	15.93	11.59	18.62	11.74	16.57	19.20	13.75	19.72
Compressed natural gas (TJ/year)	0	0	0	0.001	0.007	0.011	0.011	0.006
Total	676.67	620.10	653.92	540.22	550.37	527.20	490.95	495.77

* Data revised in relation to the 2023 Environmental Report.

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

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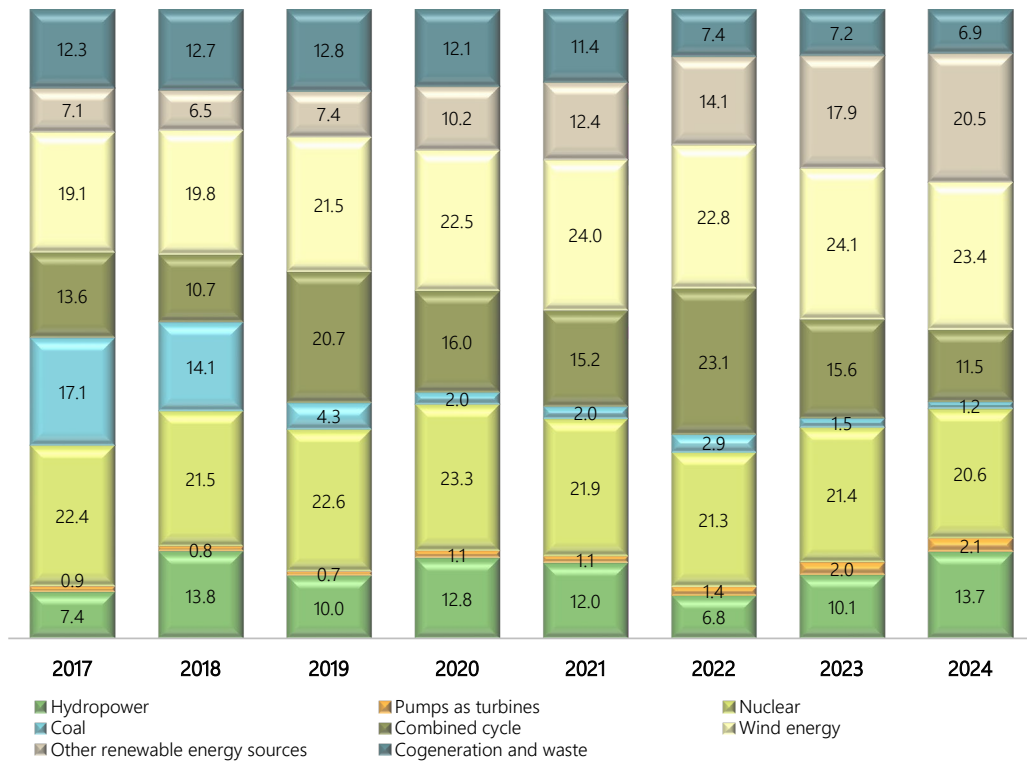
Origin of the energy in the Spanish Peninsular Electricity System

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

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

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

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



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

Source: Red Eléctrica, Electricity System Data, 2025.

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Primary energy consumption

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

In 2024, indirect primary energy consumed from non-renewable sources accounted for 683.09 TJ, compared to 144.73 TJ from renewable sources. These values are like 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 2017-2024:

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

	2017	2018	2019	2020*	2021	2022	2023	2024
Coal	224.12	179.93	53.01	25.66	27.80	37.35	21.94	18.70
Natural gas and fuel oil	-	-	-	-	-	-	-	0.00
Combined cycle	178.25	136.54	255.18	204.68	211.44	294.27	225.49	183.16
Nuclear	293.58	274.36	278.60	297.52	304.04	272.02	311.50	334.30
Cogeneration and non-renewable waste	162.52	159.51	157.79	154.66	158.42	94.71	105.92	112.54
Pumps as turbines	11.80	10.21	8.63	14.48	14.91	18.35	29.78	34.39
Fossil resources	870.27	760.56	753.22	697.00	716.62	716.69	694.63	683.09
Hydropower	40.49	55.46	40.92	41.52	37.62	23.69	28.14	34.20
Wind energy	104.50	79.57	87.98	72.86	75.26	79.34	68.24	58.93
Solar energy (photovoltaic and thermal)	29.55	19.29	23.32	26.38	32.01	41.67	45.99	47.30
Other renewable energy sources	9.85	6.83	7.37	6.92	6.94	7.14	4.79	4.30
Renewable energy sources	184.39	161.14	159.59	147.68	151.83	151.85	147.17	144.73
Total	1,054.65	921.70	912.80	844.67	868.45	868.54	841.80	827.82

* Data revised in relation to the 2023 Environmental Report.

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

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

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

	2017	2018	2019	2020*	2021*	2022	2023	2024
Total primary energy	1,285.94	1,152.57	1,181.25	1,028.19	1,052.15	1,028.96	977.26	974.01

* Data revised in relation to the 2023 Environmental Report.

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

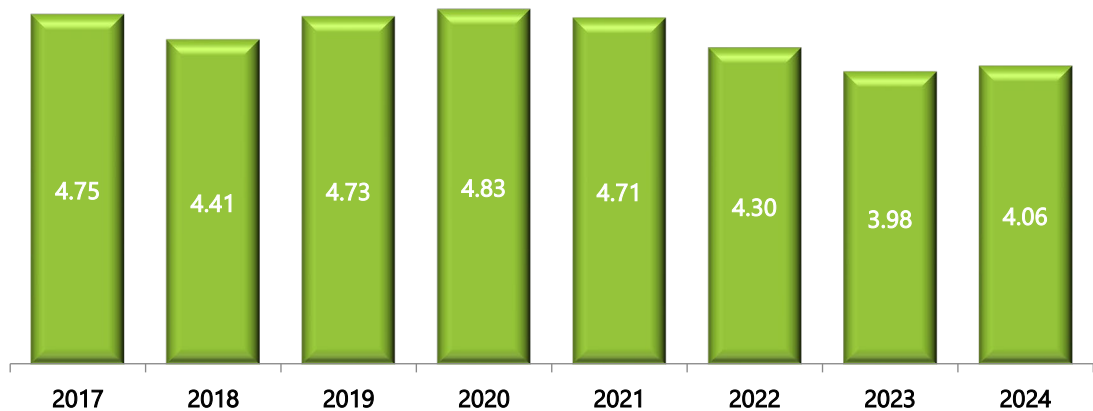
Final and primary energy intensity

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 2024, Adif's final energy intensity was 4.06 MJ/train-km, which, despite a decrease (14.7%) compared to 2017, still reflects a very high energy dependency.

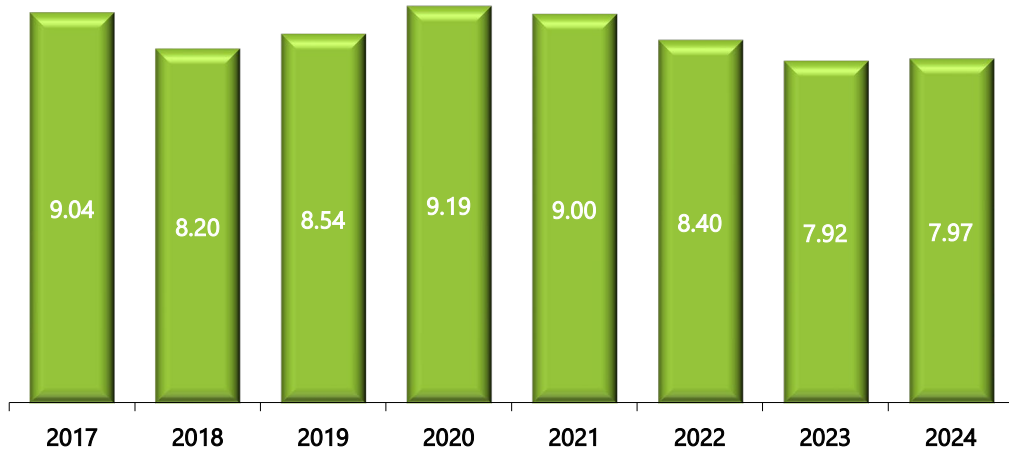
Chart 8. Final energy intensity (managed MJ/train-km)



* 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)



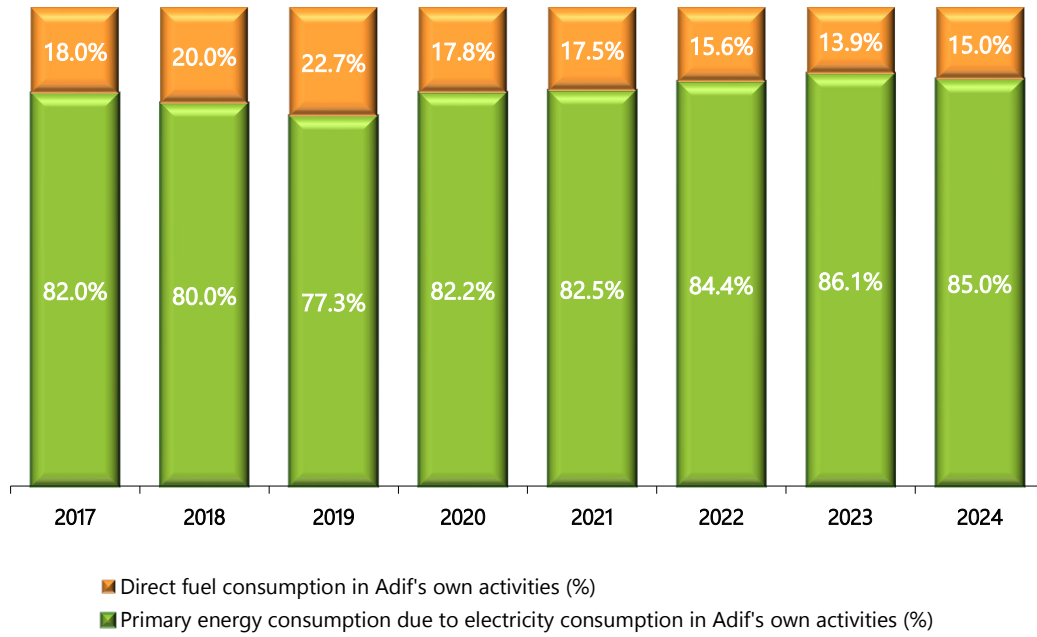
Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department.

! In 2024, Adif's primary energy intensity was 7.97 MJ per managed train-kilometre, a 0.6% more than the previous year, which indicates that a high dependency of energy consumption still exists.

Primary energy intensity is significantly influenced by the contribution of renewable energies to the production of electricity in Spanish mainland electric system. In Adif, 85.0% of primary energy consumption is due to electricity consumption. Dependence on electricity has remained relatively constant from 2017 to 2024 (between 77.3% and 86.1%).

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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.

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CARBON FOOTPRINT

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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:

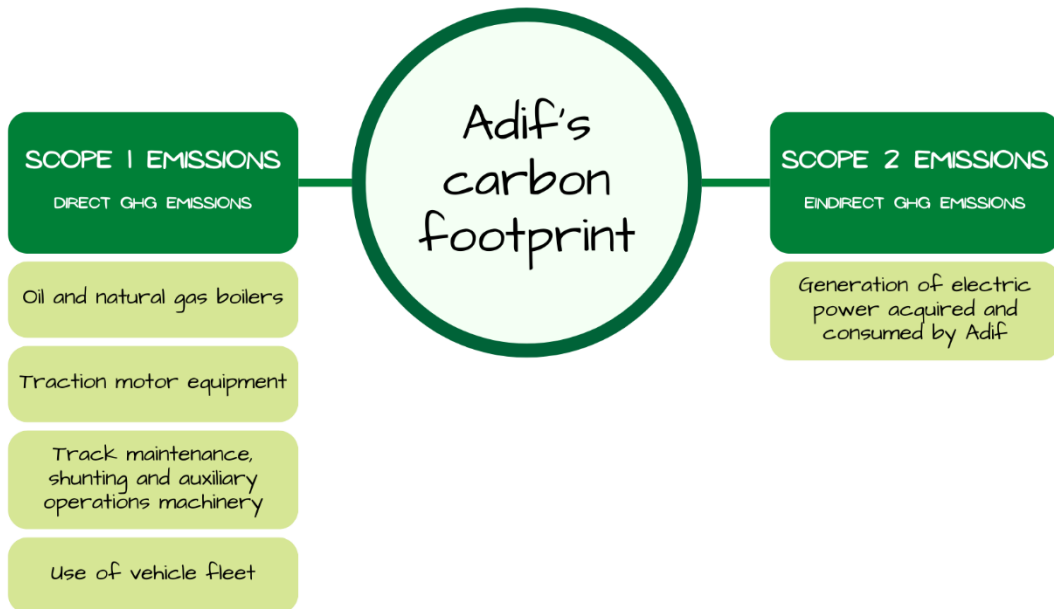


Figure 8. List of activities generating Scope 1 and 2 emissions

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

Compound	2017	2018	2019*	2020*	2021*	2022*	2023*	2024
Indirect emissions due to registered electricity consumption (Scope 2) (a)								
Carbon dioxide (CO ₂)	31,918.68	23,627.54	-	-	-	-	-	-
Methane (CH ₄)	2.39	2.46	-	-	-	-	-	-
Nitrous oxide (N ₂ O)	0.00	0.00	-	-	-	-	-	-
CO ₂ equivalent (CO ₂ eq)	31,985.60	23,696.48	17,881.75	12,246.82	12,021.01	14,569.42	9,874.62	7,749.96
Direct emissions from combustion plants (oil and natural gas boilers) (Scope 1) (b)								
Carbon dioxide (CO ₂)	1,589.05	2,287.58	-	-	-	-	-	-
Methane (CH ₄)	0.04	0.07	-	-	-	-	-	-
Nitrous oxide (N ₂ O)	0.01	0.01	-	-	-	-	-	-
CO ₂ equivalent (CO ₂ eq)	1,592.00	2,293.13	2,404.88	1,612.41	2,031.49	1,820.53	903.05	1,890.08
Direct emissions from rail maintenance, shunting and ancillary operations (Scope 1) (c)								
Carbon dioxide (CO ₂)	10,375.04	9,879.13	-	-	-	-	-	-
Methane (CH ₄)	0.61	0.58	-	-	-	-	-	-
Nitrous oxide (N ₂ O)	0.08	0.08	-	-	-	-	-	-
CO ₂ equivalent (CO ₂ eq)	10,413.85	9,916.08	9,618.78	8,102.77	7,340.82	5,933.29	4,953.37	4,292.13
Direct emissions from vehicles used (Scope 1) (d)								
Carbon dioxide (CO ₂)	4,282.06	4,225.70	-	-	-	-	-	-
Methane (CH ₄)	0.01	0.02	-	-	-	-	-	-
Nitrous oxide (N ₂ O)	0.12	0.12	-	-	-	-	-	-
CO ₂ equivalent (CO ₂ eq)	4,315.40	4,258.85	7,388.58	3,742.80	4,246.06	4,207.74	4,340.10	4,131.28
Total emissions from Adif's own activities								
Carbon dioxide (CO ₂)	48,164.83	40,019.94	-	-	-	-	-	-
Methane (CH ₄)	3.05	3.13	-	-	-	-	-	-
Nitrous oxide (N ₂ O)	0.21	0.22	-	-	-	-	-	-
CO ₂ equivalent (CO ₂ eq)	48,306.85	40,164.55	37,294.00	25,704.81	25,639.38	26,530.97	20,071.15	18,063.45
Scope 1 emissions								
CO ₂ equivalent (CO ₂ eq)	16,321.25	16,468.07	19,412.25	13,457.98	13,618.37	11,961.56	10,196.53	10,313.49
Scope 2 emissions								
CO ₂ equivalent (CO ₂ eq)	31,985.60	23,696.48	17,881.75	12,246.82	12,021.01	14,569.42	9,874.62	7,749.96

* Data revised in relation to the 2023 Environmental Report.

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

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 10% in 2024 compared to the previous year.

The decrease of the Carbon Footprint compared to 2023 is due to the reduction of Scope 2 emissions.

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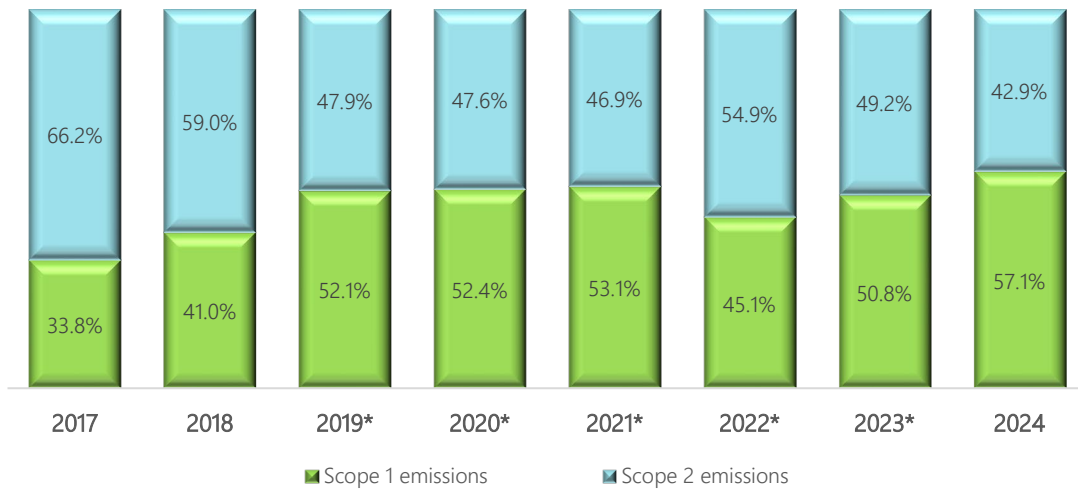
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Chart 11. Scope 1 and 2 emissions of total GHG emissions (%)

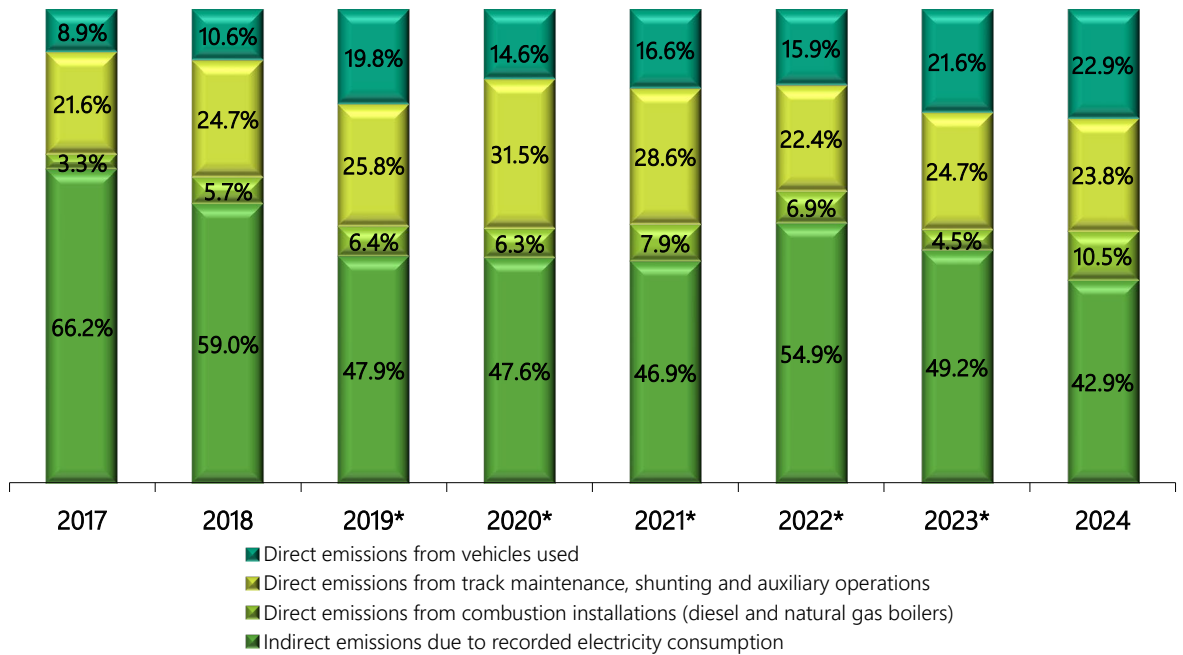


* Data revised in relation to the 2023 Environmental Report.

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 2023 Environmental Report.

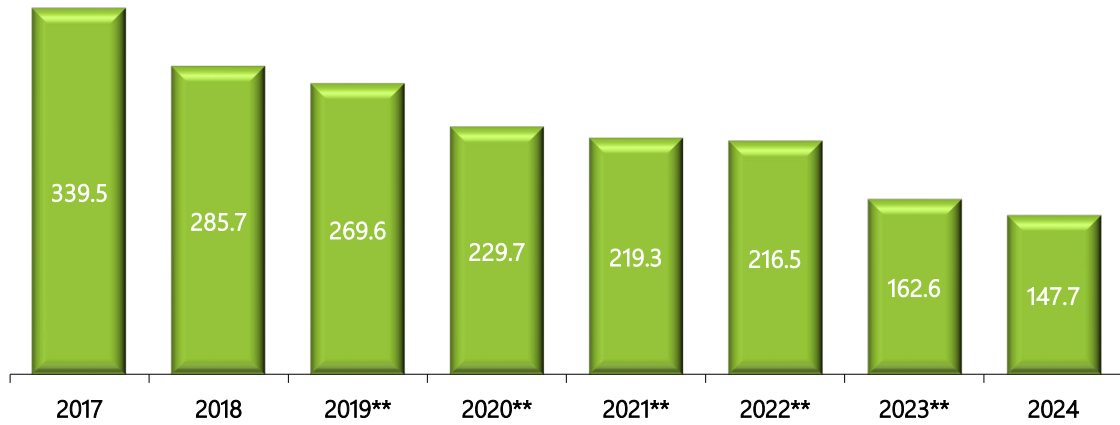
The intensity of GHG emissions (in t CO₂eq/million managed train-km) from our activities is an indicator that measures how dependent the company's growth is on GHG emissions. It also reflects the energy and environmental efficiency of the operations performed.

In Adif's case, with GHG emissions from electricity consumption contributing 42.9%, this is also related to the reliance on fossil fuels in the generation structure of the mainland electricity sector.

! Between 2017 and 2024, Adif's GHG emissions intensity has been reduced by 62.6%.

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 CO₂eq/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 2023 Environmental Report.

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

Since 2019, **Adif** 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

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OTHER AIR EMISSIONS

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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	2024
Indirect emissions due to registered electricity consumption (a)								
Carbon monoxide (CO)	15,48	12.01	9.35	9.59	10.47	11.91	10.78	8.47
Non-methane volatile organic compounds (NMVOCs)	2,33	2.04	2.07	2.17	2.48	2.41	1.70	1.33
Nitrogen oxides NO _x (as NO ₂)	54,64	36.08	28.67	21.27	20.68	20.83	18.10	14.23
Sulphur oxides SO _x (as SO ₂)	41,93	26.86	11.92	5.05	3.63	3.73	2.91	2.29
PM _{2.5}	2,07	1.48	1.15	1.11	1.20	1.17	0.93	0.73
PM ₁₀	2,78	1.98	1.46	1.43	1.52	1.48	1.18	0.93
TSP	3,62	2.61	1.92	1.99	2.11	2.04	1.64	1.29
Direct emissions from combustion plants (oil and natural gas boilers) (b)								
Carbon monoxide (CO)	1,26	2.22	2.32	1.58	1.93	1.59	0.65	1.68
Non-methane volatile organic compounds (NMVOCs)	0,54	0.67	0.81	0.54	0.69	0.66	0.37	0.69
Nitrogen oxides NO _x (as NO ₂)	3,80	7.05	7.23	4.94	6.00	4.82	1.85	5.12
Sulphur oxides SO _x (as SO ₂)	0,41	0.95	0.90	0.63	0.74	0.53	0.14	0.57
PM _{2.5}	0,17	0.37	0.36	0.25	0.29	0.21	0.06	0.23
PM ₁₀	0,19	0.43	0.42	0.29	0.34	0.25	0.07	0.27
TSP	0,19	0.43	0.42	0.29	0.34	0.25	0.07	0.27
Direct emissions from rail maintenance, shunting, and auxiliary operations (c)								
Carbon monoxide (CO)	37,44	35.65	32.29	27.18	24.64	19.90	16.61	14.39
Non-methane volatile organic compounds (NMVOCs)	16,27	15.49	14.03	11.81	10.71	8.65	7.22	6.25
Nitrogen oxides NO _x (as NO ₂)	183,36	174.61	158.15	133.10	120.69	97.45	81.35	70.46
Sulphur oxides SO _x (as SO ₂)	0,07	0.07	0.06	0.05	0.05	0.04	0.03	0.03
PM _{2.5}	4,79	4.57	4.13	3.48	3.16	2.55	2.13	1.84
PM ₁₀	5,04	4.80	4.35	3.66	3.32	2.68	2.24	1.94
TSP	5,32	5.06	4.59	3.86	3.50	2.83	2.36	2.04
Direct emissions from vehicles used (d)								
Carbon monoxide (CO)	12,93	13.69	28.91	17.06	19.49	40.37	44.23	25.84
Non-methane volatile organic compounds (NMVOCs)	2,27	2.32	4.47	2.45	2.71	4.40	4.76	4.23
Nitrogen oxides NO _x (as NO ₂)	21,50	21.26	37.47	18.86	19.99	19.97	20.75	15.99
Sulphur oxides SO _x (as SO ₂)	0,03	0.03	0.05	0.02	0.03	0.02	0.03	0.03
PM _{2.5}	1,88	1.85	3.21	1.59	1.67	1.45	1.48	1.24
PM ₁₀	1,88	1.85	3.21	1.59	1.67	1.45	1.48	1.24
TSP	1,88	1.85	3.21	1.59	1.67	1.45	1.48	1.24
Total emissions from Adif's own activities								
Carbon monoxide (CO)	67,10	63.58	72.87	55.41	56.54	73.77	72.27	50.38
Non-methane volatile organic compounds (NMVOCs)	21,41	20.53	21.38	16.97	16.60	16.12	14.04	12.51
Nitrogen oxides NO _x (as NO ₂)	263,30	239.01	231.52	178.16	167.37	143.07	122.05	105.80
Sulphur oxides SO _x (as SO ₂)	42,44	27.91	12.93	5.75	4.43	4.32	3.11	2.91
PM _{2.5}	8,91	8.26	8.86	6.43	6.31	5.38	4.60	4.05
PM ₁₀	9,89	9.07	9.43	6.97	6.85	5.85	4.96	4.37
TSP	11,01	9.95	10.14	7.73	7.62	6.57	5.54	4.84

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* Data revised in relation to the 2023 Environmental Report.

- (a) Estimated using recorded electricity consumption and air emissions data from generation facilities for the years 2005 to 2023 by MITERD in 2025.
- (b) Estimated based on fuel consumption data (diesel C and natural gas) and emission factors from the EMEP/EEA Air Pollutant Emission Inventory Guidebook 2023. See Table 3.9 for NFR category 1.A.4.a. for liquid fuels and Table 3-8 for NFR category 1.A.4.a. for gaseous fuels.
- (c) Estimated based on recorded fuel consumption (diesel B) and emission factors from the EMEP/EEA Air Pollutant Emission Inventory Guidebook 2023, Table 3.1, NFR Category 1.
- (d) Estimated based on recorded fuel consumption (diesel A, gasoline, autogas, compressed natural gas) and emission factors for road transport from the EMEP/EEA air Pollutant Emission Inventory Guidebook 2023 and the Spanish Emission Inventory System, specifically for combustion in road transport. All of these consider the specifications of the different types of fuels.

In 2024, indirect emissions from generation plants, attributable to electricity consumption in **Adif's** own activities, were the main source of sulphur oxide emissions (78.7%).

In 2024, direct emissions from rail maintenance, shunting, and auxiliary operations at **Adif**

accounted for 50.0% of non-methane volatile organic compound emissions, 66.6% of nitrogen oxide emissions, and 45.5% of particulate emissions (PM_{2.5}). Direct emissions from the vehicles used were responsible for 51.3% 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

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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 931,055 t in 2024, represented 84.17% 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 147,760 t, accounting for 13.36% of the total.

Table 8. Consumption of railway equipment in infrastructure maintenance operations

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Wooden sleepers										
Units	45,727	21,812	16,536	29,656	19,818	16,440	32,500	29,773	31,691	36,268
Total (t)	2,675	1,276	967	1,735	1,159	962	2,600	1,742	1,854	2,122
Concrete sleepers										
Bi-block (pieces)	4,439	9,379	165,830	166,264	659	1,377	5,550	220	0	4,243
Monoblock (pieces)	234,084	98,324			442,106	228,052	240,396	492,859	585,682	489,703
Total (Pieces)	238,523	107,703	165,830	166,264	442,765	229,429	245,946	493,079	585,682	493,946
Total (t)	71,113	31,373	41,458	41,566	132,764	68,691	73,229	147,902	175,705	147,760
Rail										
Rail 60 kg (m)	140,189	64,757	200,422	307,295	56,914	23,535	420,449	261,828	150,092	149,688
Rail 54 kg (m)	344,696	3,606,865			258,570	210,360	14,580	340,719	429,483	293,940
Rail 45 kg (m)	18,367	0			5,068	4,401		4,781	3,301	1,264
Total (m)	503,252	3,671,622	200,422	307,295	320,552	238,296	435,029	607,328	582,876	444,892
Total (t)	28,141	201,447	10,622	16,287	17,815	13,135	26,046	34,640	32,707	25,168
Silica ballast										
Silica ballast (m ³)	556,849	76,517	265,131	279,297	232,692	272,434	481,198	685,761	636,878	620,703
Total (t)	863,116	118,602	742,367	782,032	360,672	422,273	721,797	1,028,642	955,317	931,055
Total (t/year)	965,045	352,698	795,414	841,620	512,410	505,061	823,671	1,212,925	1,165,583	1,106,104

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.

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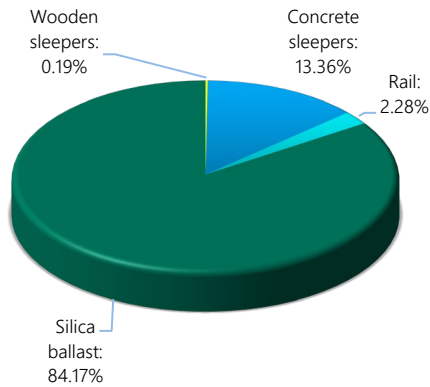
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Chart 14. Distribution of material consumption in infrastructure maintenance activities. Year 2024 (%)



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

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

	2021	2022	2023	2024
Rail (t)	228	4,568*	4,887	17,102
Monoblock sleepers (units)	52,946	2,020*	41,526*	45,235
Bi-block sleepers (units)	7,115	1,497	30,689*	6,833
Ballast (t)	95,651	10,500*	133,864	47,975
Total (t) (a)	113,186	15,974*	157,347*	80,014

(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 2023 Environmental Report.

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

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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.

In 2024, a transformer was decontaminated, and another transformer containing PCB was destroyed. At the end of 2024, Adif had PCB-containing equipment weighing 20.7 tonnes, which, in accordance with current legislation, may continue to be used.

Substances that deplete the ozone layer

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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.

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

Adif has inventoried a total of seven (7) pieces of equipment in the stations managed by the Passenger Stations Sub-Department.

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

Passenger Stations Sub-Department	Stations	Equipment containing HCFCs (no.)	HCFC load (kg)
North-west	2	2	2.30
West	-	-	-
North	3	5	25.90
North-east	-	-	-
East	-	-	-
Centre	-	-	-
South-west	-	-	-
South	-	-	-
Total	5	7	28.20

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

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

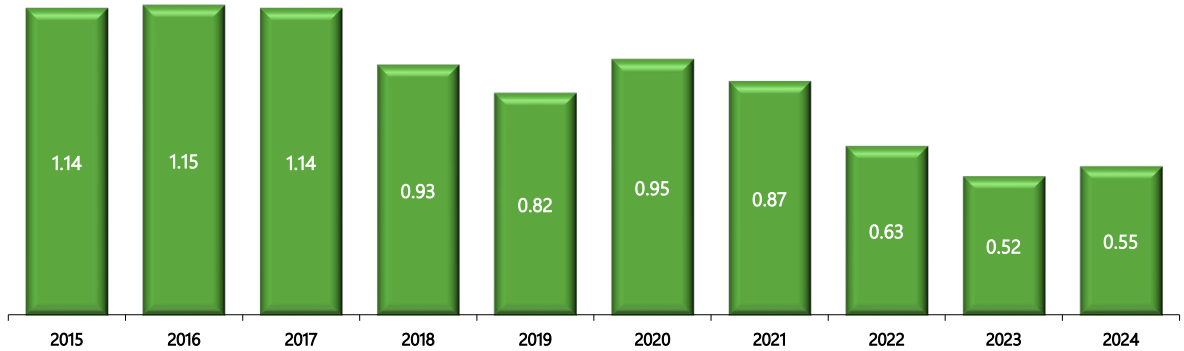
Herbicide consumption

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.

The use of herbicides per unit of treated area on railway surfaces in Adif has increased by 7% compared to the previous year.

Chart 15. Herbicide application rate on railway surfaces (application unit/m²) *



* Unit = (l+kg).10⁻³

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

Table 11. Herbicide-treated railway surfaces (m²)

Type of surface	2015	2016	2017	2018	2019	2020	2021*	2022	2023	2024
Track treatments	199,751,200	60,196,500	193,350,000	216,930,000	213,278,014	199,284,679		160,540,686	174,830,706	146,477,154
Station and other surface treatments	65,066,298	100,955,416	101,203,577	113,085,756	94,475,878	92,851,040	279,534,100	112,894,670	158,555,193	161,838,775
Total	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	308,315,929

* No disaggregated information is available for the year 2021.

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

Table 12. Products used in herbicide treatments of railway surfaces

Product type	2015	2016	2017	2018	2019	2020	2021*	2022	2023	2024
Liquid products (l)	299,736	184,390	330,567	304,385	246,327	269,828		168,765	166,981	166,787
Solid products (kg)	1,548	818	4,580	1,972	7,479	7,553	242,595	3,036	5,202	3,622
Total (l+kg)	301,284	185,208	335,147	306,357	253,805	277,381	242,595	171,801	172,183	170,409

* No disaggregated information is available for the year 2021.

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

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Water consumption

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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 2024, **Adif's** annual water consumption from public networks was equivalent to the amount used in one year by the households of a town with 16,715 residents, similar to Churriana de la Vega (Granada).

Adif's annual water consumption accounts for 0.11 % 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 *

	2015	2016	2017**	2018	2019**	2020	2021**	2022**	2023**	2024
Consumption of water (m ³)	1,146,713	919,773	1,040,185	1,013,427	945,504	758,671	733,594	763,406	584,366	780,932

* Calculated from turnover and based on the average water prices in Spain from the INE (National Statistics Institute) series 2000-2014, 2016, 2018, 2020 and 2022. For the years 2015, 2017, 2019, 2021, 2023 and 2024 the average prices of 1.81, 1.89, 1.96, 2.00, 2.03 and 2.03 €/m³ have been estimated based on the trend of the series 2000-2014, 2016, 2018, 2020 and 2022.

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

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

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WASTE

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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.

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.

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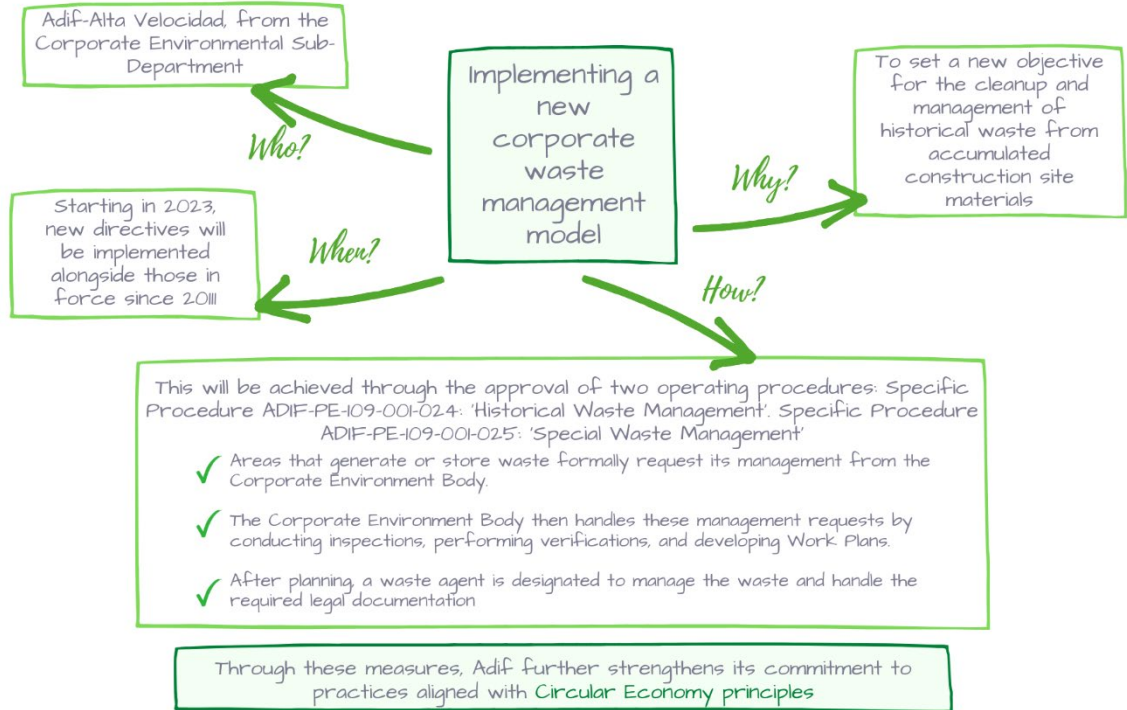
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Alternatively, especially in the area of road infrastructure maintenance and renovation, a variety of surplus materials have traditionally been generated. The entity has effectively managed these materials as items suitable for reuse. However, **Adif** 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.

In order to provide adequate support for this situation, since 2021, **Adif's** corporate waste management model has been expanded by the Corporate Environmental Sub-Department, effectively incorporating new directives through a Waste Agent since 2023. 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.

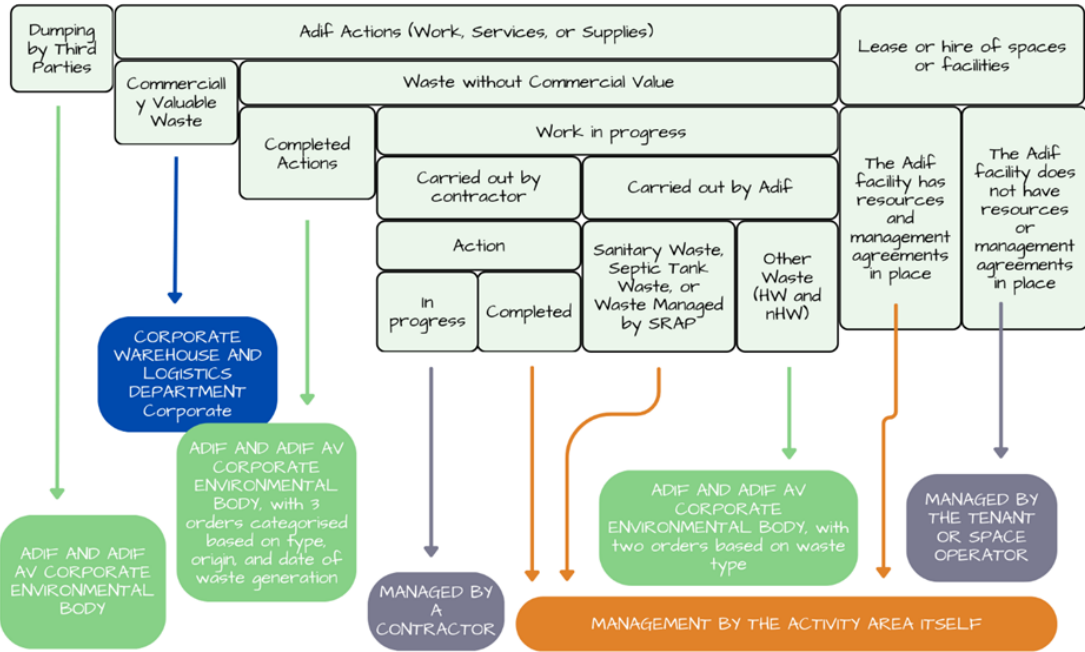
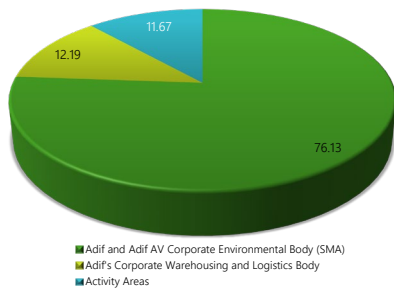


Figure 9. Internal waste management processes at Adif

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 2024



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

concrete sleepers, which accounts for almost 75%, followed by metal waste from dismantling operations with 14.5% and wooden sleepers with 7.7%. These materials, together with the management of construction and demolition waste, which accounts for almost 2% by weight, make up almost 99% of the total waste managed by **Adif** in 2024.

In this current context, during 2024, a total of 72,984.95 tonnes of waste were managed by **Adif**, with more than 76% of this being removed through corporate orders from the Corporate Environmental Sub-Department. Just over 8% of this total figure corresponds to hazardous waste (5,851.42 tonnes), while the remaining 92% is non-hazardous waste (67,133.53 tonnes). In terms of final destination, 99.9% of the total waste managed underwent final recovery treatment.

In terms of the types of waste managed in 2024, the overall figure highlights the management of

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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 the requirements set out in section '8.1. Operational Planning and Control' of the ISO 14001:2015 standard, since 2019, these framework procedures governing waste production and management at **Adif** and Adif-Alta Velocidad have been updated and revised, incorporating them into the environmental section of the **Adif** and Adif-Alta Velocidad Management System. **Adif** and Adif-Alta Velocidad's General Waste Management Procedure was revised in 2024 and is now ready for approval.

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 2024, 252 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 being done to provide information on relevant environmental legislation, including report on the applicability of new regulations impacting **Adif** and Adif-AV's activities.

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 Unit of **Adif** and Adif-Alta Velocidad

Under this model, in 2024, actions were undertaken involving the coordination of at least 13 management companies across mainland Spain, with the support of a Waste Agent. Waste management involved the processing of 121 new treatment contracts with waste managers and

handling 982 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,

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

In 2024, 97.41% of hazardous waste (excluding maintenance waste) was managed through the

Production and Management of Hazardous Waste generated by Adif

Hazardous waste generated by **Adif** is stored in Waste Storage Centres (WSCs). As of 31 December 2024, there are a total of 55 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) Málaga Los Prados

Each 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

corporate management model, while the remaining 2.59% was managed in a decentralised manner by the Activity Areas.

environmental management in accordance with the required environmental clauses, as well as the procedures and instructions in force.

In 2024, as a result of **Adif** 's activities, 160.7 tonnes of hazardous waste were managed, representing an 20.12% increase over the previous year.

The amount of hazardous waste generated by **Adif**'s own activities in 2024 represents just 0.056% 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 (2024)

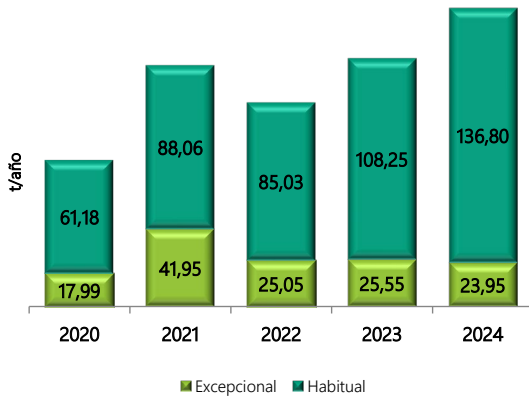
It is important to distinguish between waste generated during regular, routine activities and waste resulting from exceptional activities, extraordinary maintenance or replacement of equipment, which occur only occasionally. Based on this, a distinction is made between regular hazardous waste production and exceptional production. In 2024, a total of 136.8t were generated from regular activities (85.1%) and 23.95t from exceptional production (14.9%).

Additionally, most of the hazardous waste (76.34%) 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 2024, the exceptional production of hazardous waste aligns with historical norms, while the usual production has increased by 26.3% compared to 2023 levels.

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

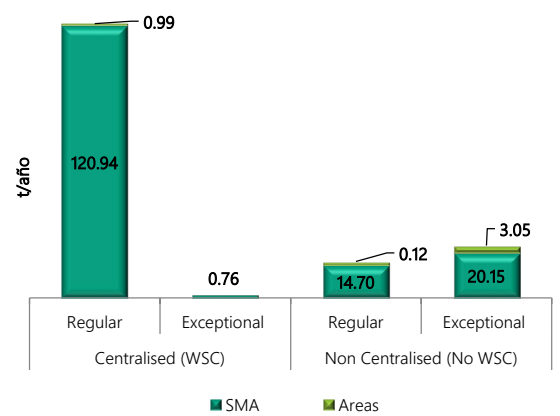


Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

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.

A total of 14.82 tonnes of routine waste were generated from storage points other than WSCs (non-centralised collection), corresponding to healthcare activities.

Chart 18. Distribution of centralised and non-centralised waste management (t/year). Year 2024

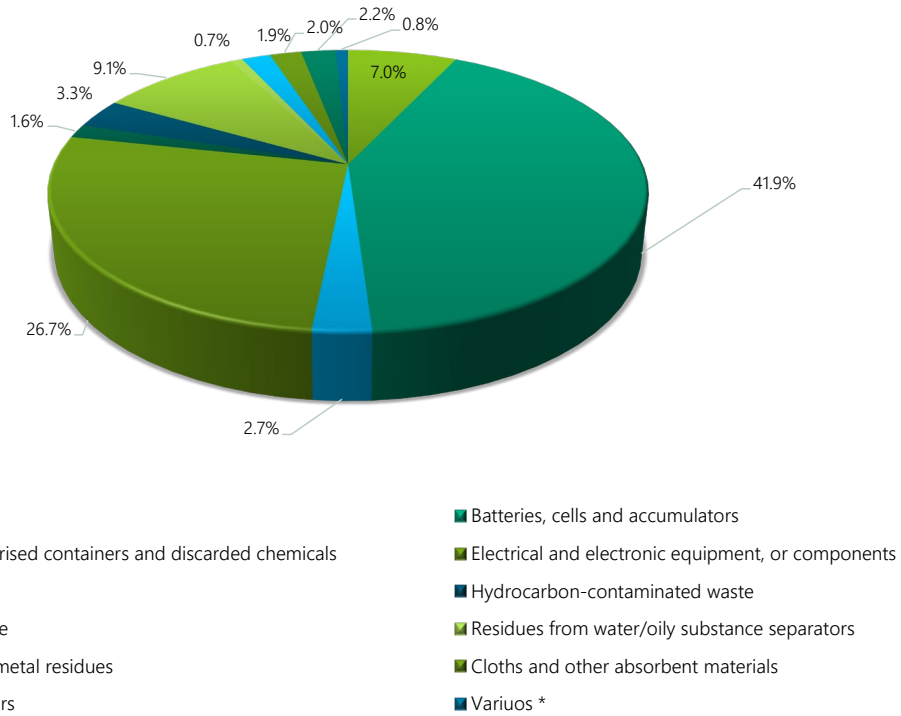


Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

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 2024, 22 out of the 24 waste categories used to describe Adif's waste generation were created. The main types -batteries, cells, and accumulators, and electrical and electronic equipment- accounted for 68.6% of total hazardous waste. The breakdown by category is presented in the following graph.

Chart 19. Distribution of hazardous waste generation by type of waste (%). Year 2024



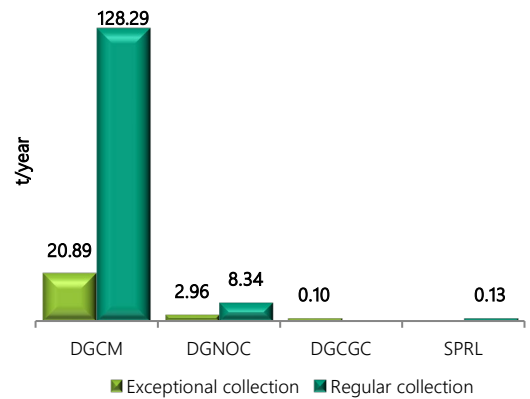
* Includes the sum of solvents, oil filters, fluorescent lamps and other mercury-containing waste, asbestos-containing insulation and construction materials, adhesive and sealant waste, sanitary waste, fuel residues, contaminated soils, toner and ink residues, transformers and capacitors containing PCBs and other unspecified waste.

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

In 2024, waste was removed from 32 WSCs, with 26 being then managed by the Corporate Conservation and Maintenance Department and the remaining 6 by the Corporate Department of Business and Commercial Operations. The WSCs with the highest waste generation in 2024 were Zaragoza La Cartuja, Málaga Los Prados, Montcada, Córdoba El Higuero and Albacete.

The Corporate Conservation and Maintenance Department was the main producer of hazardous waste, representing 92.8% 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 2024



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

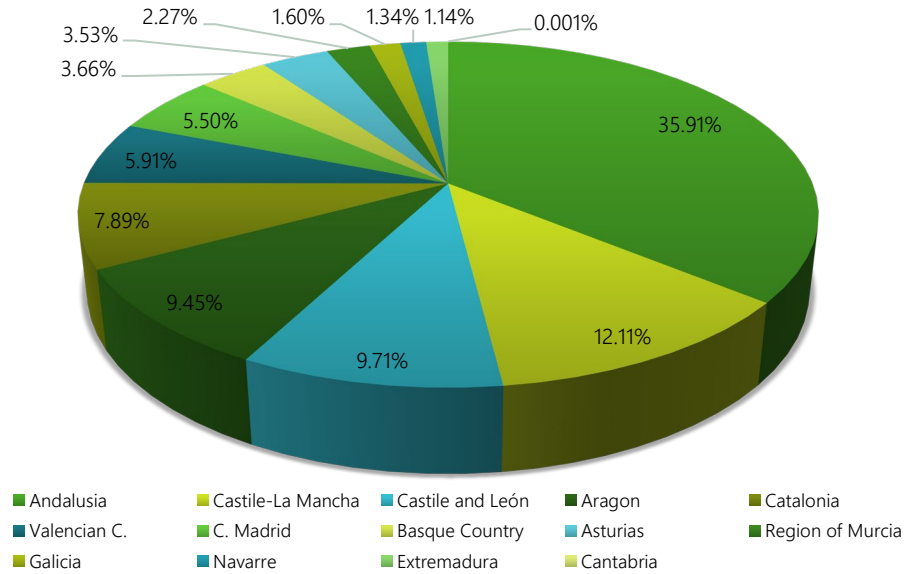
In 2024, waste was removed from 14 autonomous communities. Of the total hazardous waste, 75.1% was collected in five autonomous communities: Andalusia, Castile-La Mancha, Castile and León,

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Aragon, and Catalonia with the distribution shown in the graph below.

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Chart 21. Distribution of hazardous waste generation in the different autonomous communities (%). Year 2024



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

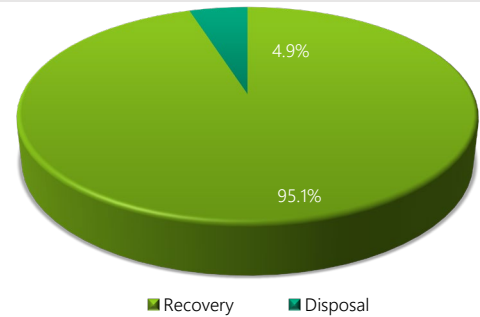
Disposal and treatment of hazardous waste

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 2024, in the corporate management model, the average distance for transferring hazardous waste to the management centres was 206km.

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 2024



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

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Of the hazardous waste generated, 95.1% was allocated for recovery, while 4.9% was destined for disposal.

Waste management, thus, aligns with the hierarchy established by the Waste Framework

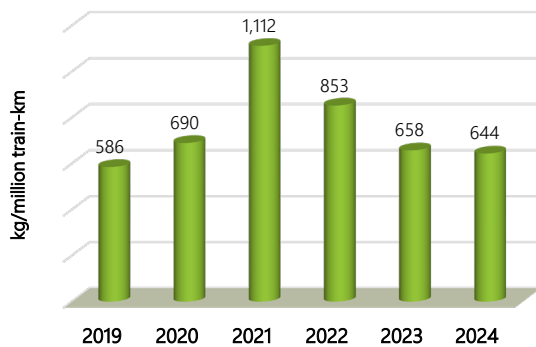
Intensity of hazardous waste generation

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 2024, the intensity of hazardous waste generation reached 644 kg/million train-km, which is 2% lower than previous year.

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.

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 Traffic and Capacity Management Department, Coordination and Management Sub-Department.

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

Type of waste	2016	2017	2018	2019	2020	2021	2022	2023	2024
Oils and fats	7.742	13.213	4.938	12.966	5.394	4.471	5.653	7.98	11.298
Batteries, cells and accumulators	25.29	31.409	32.022	37.742	29.705	45.204*	57.459*	48.996*	67.352
Solvents	-	0.031	0	0.018	-	-	-	0.005	0.191
Machining emulsions and solutions	0.239	0.284	2.441	0.223	-	0.601	0.21	-	-
Oil filters	0.244	0.317	0.179	0.288	0.116	0.183	0.558	0.112	0.417
Fluorescent lamps and other mercury-containing waste	0.154	0.203	0.092	0.141	0.301	0.328	1.183	0.611	1.039
Gases in pressurised containers and discarded chemicals	0.147	0.186	0.722	0.7	2.021	0.463	1.073*	1.11	4.297
Sludge	-	-	0.032	0.077	-	-	-	-	-
Electrical and electronic equipment, or components	24.884	26.497	19.549	9.13	12.83	24.533	17.571	33.826	42.979
Asbestos-containing insulation and construction materials	0.363	3.172	1.194	0.258	1.594	-	5.325	-	0.012
Paints	0.208	0.078	0.173	0.134	0.05	0.176	0.313	0.803	1.29
Hydrocarbon-contaminated waste	0.49	3.747	0.762	0.546	0.717	2.966	-	0.035	2.52
Adhesive and sealant waste	0.099	0.012	0.129	0.129	12.364	1.754	0.022	0.382	0.055
Packaging waste	3.435	2.899	3.356	2.683	1.909	3.137	3.877	5.027	5.373
Sanitary waste	0.254	0.256	0.16	0.263	0.69	0.745	0.276	0.156	0.128
Fuel residues	14.602	4.737	2.186	1.434	1.278	0.001	0.231	0.222	0.826
Residues from water/oily substance separators	24.232	53.507	17.562	6.284	4.156	10.187	10.832	25.895	14.58
Contaminated metal residues	2.882	1.263	1.103	2.21	2.189	0.9	1.583	1.402	1.19
Contaminated soils	0.064	0.15	0.1	-	-	27.429	0.005	0.29	0.427
Toner and ink residues	0.383	0.139	0.277	0.284	0.352	0.507	0.481	0.712	0.227
Transformers and capacitors containing PCBs	21.092	18.475	-	1.52	-	-	0.371	-	0.04
Cloths and other absorbent materials	6.012	3.889	5.789	5.922	3.502	5.466	3.043	6.053	2.978
Wooden sleepers	-	12.62	-	0.012	-	0.220	-	-	3.268
Other	0.42	-	0.07	0.072	-	0.731	0.014	0.181	0.228
Total	133.236	177.084	92.836*	83.036*	79.168	130.002	110.080*	133.798	160.715

* Data revised in relation to the 2023 Environmental Report.

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

Finally, regarding hazardous waste generated by railway infrastructure maintenance in 2024, it is worth highlighting, due to the unique nature of its origin, the materials derived from construction and demolition work that, under specific circumstances, were not managed under standard construction waste procedures. In these

cases, a specific agreement had to be arranged by Adif, keeping this waste outside the usual construction and demolition legislation. Under these circumstances, during 2024, Adif managed 1.337,43 tonnes of creosote-treated wooden sleepers, fully valorising them in 100% of cases.

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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 1,334,507.80 euros in waste collection fees was paid in 2024.

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

	2017	2018	2019	2020	2021	2022	2023	2024
Fees paid	800,394	845,230	919,194	1,004,841	925,515	922,487	1,016,300	1,334,507.80

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 other construction and demolition 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 agreements 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 Unit

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 unit coordinates a specific process for managing this type of waste, always through duly authorised managers.

More specifically, 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 2024, a total of 8,898.69 tonnes were managed this way, 100% of which were treated through recovery.

In 2024, 55.34% of non-hazardous waste was managed by this corporate Warehouses and Logistics unit, while the remaining 44.64% was handled by the Activity Areas in a decentralised manner.

Overall, in 2024, a total of 16,080.57 tonnes of non-hazardous waste derived from Adif's 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	2024
Concrete sleepers	7,121.9
Metals	8,902.46
Electrical and electronic equipment or components NHW	2.20
Stone	17.424
Similar to urban waste	0.38
Separable fractions	6.32
Pruning debris and plant waste	2.44
Construction and demolition waste	23.11
Voluminous	4.30
Other	0.037
Total	16,080.57

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

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Historical waste management at Adif

Since 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, in 2024, a total of 152 waste storage sites of this type were cleaned up and managed, representing a total material volume of 54,129.21 tonnes, which is detailed by categories below:

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

Type of waste	2024
Concrete sleepers	47,488.58
Wooden sleepers	4,260.73
Batteries, cells and accumulators	1.10
Separable fractions SF	236.50
Gases in pressurised containers and discarded chemicals	0.97
Metals	1,711.84
Contaminated metal waste	23.94
Tyres	0.20
Electrical and electronic equipment or components (NHW)	91.19
Electrical and electronic equipment or components (HW)	34.76
Insulation and construction materials containing asbestos	0.01
Contaminated packaging waste	0.31
Pruning waste and vegetable waste	0.50
End-of-life vehicles	3.96
Similar to urban waste	2.7
Adhesive and sealant waste	0.42
Construction and demolition waste (CDW)	269.13
Fluorescent and other mercury waste	0.15
Voluminous	2.21
Total	54,129.21

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

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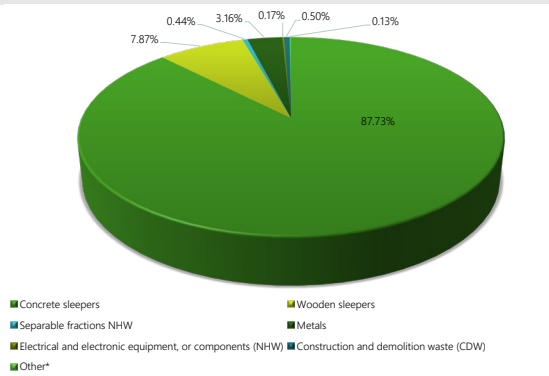
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Chart 24. Waste generated by Adif during the cleaning of historical stockpiles from previous projects (%). Year 2024



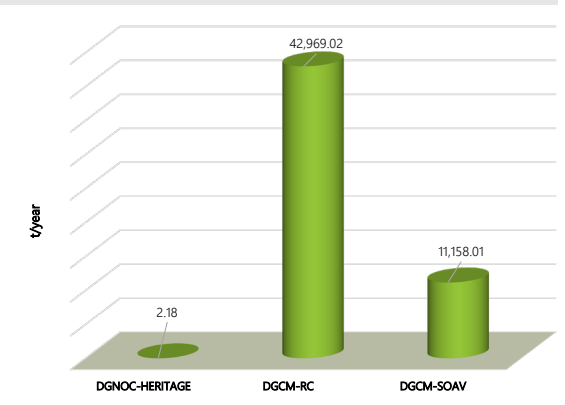
* Includes the sum of waste batteries, cells and accumulators, gases in pressurised containers and discarded chemicals, contaminated metal waste, tyres, electrical and electronic equipment or components (hw), insulation and construction materials containing asbestos, contaminated packaging waste, pruning waste and vegetable waste, end-of-life vehicles similar to urban waste, adhesive and sealant waste, fluorescent and other mercury waste, and voluminous.

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

Hazardous waste from this type of action accounted for 7.98% of the total weight managed, including categories such as wood (sleepers), electrical and electronic material, and contaminated metal waste.

The Corporate Conservation and Maintenance Department was the main producer of this type of historical waste, with the Conventional Network area accounting for 79.38% of the total weight. The following graph shows the distribution of waste generation by Corporate Department.

Chart 25. Distribution of historical waste generation in the different Adif areas (t/year). Year 2024



DGCRC: Corporate Conservation and Maintenance Department. Conventional Network.

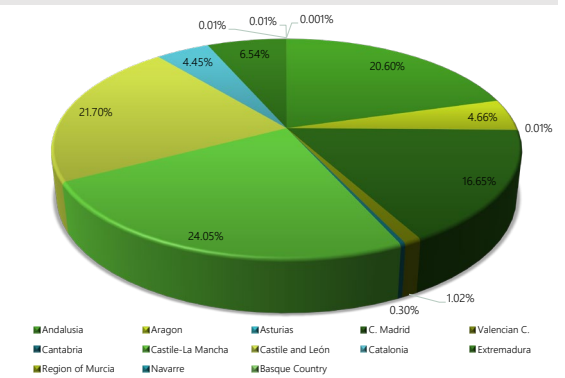
DGCM-SOAV: Corporate Conservation and Maintenance Department. Corporate High-Speed Operations Sub-Department.

DGNOC-Heritage: Corporate Business and Commercial Operations Department. Heritage.

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

In 2024, waste was collected from 13 autonomous communities. Four of these – Andalusia, Castile and León, Castile-La Mancha and the Community of Madrid – accounted for 83.01% of the total historical waste, with the first three alone representing over 20%.

Chart 26. Distribution of historical waste generation in the different autonomous communities (%). Year 2024



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

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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 99.97%.

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, in 2024, a total of 85 landfill sites along the railway network were cleaned up. More than 30% (26 sites) had associated administrative requirements, and 80% (67 stockpiles) were located on land maintained by the High-Speed Operations Sub-department.

The total volume managed in this area amounts to 1,277.03 tonnes of material, with the majority located in the autonomous communities of Galicia (34.37%), Murcia (15.87%), the Community of Madrid and Castilla La Mancha (11.92% and 11.57%, respectively).

The main category of waste found in these cases is construction and demolition waste (88.44% by weight). Some hazardous waste materials were also found, notably fibre cement debris, of which a total of 29.6 tonnes were removed by duly accredited waste management companies in

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.

compliance with specific regulations for this type of waste. In addition, voluminous, pneumatic, and urban-type waste were also identified.

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

The projects that form part of this Action Plan are:

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

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

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

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

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

To facilitate the inclusion of good environmental practices in public procurement processes and in

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

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



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

- **Comprehensive programme for the social recovery of disused railway assets, creating**

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value through entrepreneurial ventures or public service projects

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

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

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

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

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

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

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

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

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

- **Valorisation through recycling of CDW**

Adif promotes the recovery of non-hazardous CDW (excluding natural excavated material) through recycling at the construction site, at another **Adif** construction site or, when this is not

possible, by delivery to authorised recovery companies. On-site recovery of CDW offers multiple environmental advantages. However, under certain circumstances, this is not feasible, and delivery to authorised recovery companies is encouraged.

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

- **Review of the waste management model at Adif and Adif AV**

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

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

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

➤➤➤ In 2024, 99.89% of waste is sent for recovery operations

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

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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.

Circular Economy Actions: recovery of wooden railway sleepers

In 2024, the management of creosote-treated wooden sleeper waste increased significantly, with a total of 5.601,43 tonnes removed compared to 1.292,4 tonnes in 2023. This improvement was driven by an accelerated cleanup of old waste, as well as **Adif** assuming responsibility for waste from maintenance work that had previously not been managed by contractors.

The main concern with wooden sleepers, particularly older ones, is their treatment with creosote – a substance long used to protect wood from moisture, fungi and insects – which can be harmful to health. Creosote is toxic and potentially carcinogenic, posing risks of skin irritation, respiratory problems, and even long-term effects through contact or inhalation.

These materials are no longer used in new construction or renovation projects. The issue

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.



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

now arises from residual elements generated during the dismantling of old infrastructure.

In any case and considering the specific characteristics of this waste in terms of its composition and hazardous nature, **Adif** has carried out special monitoring of its treatment, which in 100% of cases has been based on recovery operations.

Energy recovery from waste

More than 98% of the total weight of creosote-treated wooden sleeper waste has been sent to energy recovery in facilities with the due administrative authorisation for incineration.

Prior to this, the sleepers underwent a specific treatment consisting of a machining process to reduce the wood blocks to a size suitable for incineration furnaces.

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

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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 monthly to detect any deviations in the percentage of construction and demolition waste recovered. If deviations are detected, the necessary corrective measures are taken 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 2024, are summarised in the following table:

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

Number of monitored works	Generated CDW (t)	Recovered CDW (t)	% of CDW recovery
119	877,164.13	869,689.48	99.14%

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

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 Traffic

and Capacity Management Department, 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 863,341.29 euros in 2024.

Table 19. Stations managed by Adif as of 31 December 2024

	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	31	92	61	153	8	0	8	14	0	0	0	206
North-west	63	291	141	432	11	1	12	22	2	0	5	536
South	88	66	106	172	13	0	13	6	1	1	2	283
East	29	101	74	175	6	0	6	0	4	0	3	217
North-east	31	112	152	264	12	0	12	8	0	0	2	317
North	57	201	63	264	13	1	14	19	0	0	0	354
High-Speed Rail Lines	0	0	0	0	0	0	0	0	0	0	0	0
Total	299	863	597	1,460	63	2	65	69	7	1	12	1,913

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

Table 20. Treatment of discharges at Stations as of 31 December 2024

Operations Sub-department	No. of stations with sewage treatment system, septic tank, or connection to the public sewage system
Centre	52
North-west	105
South	88
East	51
North-east	100
North	71
Total	467

Source: Adif, Corporate Passenger Stations Department

Table 21. Investments made by the Corporate Traffic and Capacity Management Department in wastewater treatment, septic tanks and/or connections to public sewerage networks (€/year)

Autonomous community	2015	2016	2017*	2018*	2019	2020	2021	2022	2023	2024
Andalusia	-	-	0	5,898.90	17,089.60	-	-	24,000.00	30,364.50	-
Aragon	3,856	-	-	-	-	-	-	-	-	-
Castile-La Mancha	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	-	-	-	1,457.55	2,550.00	1,279.74	-	-	-	-
Total	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

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CONTAMINATED SOILS

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There are sites where, due to activities that have historically taken place there, the soil is potentially 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 location poses an unacceptable 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 Waste⁵. In the context of this Law, Royal Decree 9/2005⁶ 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 Regulation⁷ 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

⁵ 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.

⁶ 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.

⁷ 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.

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activities: Adif-Alta Velocidad is responsible for executing activities of a material or technical nature⁸, as approved by the Adif Board of Directors on 26 June 2019⁹. 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,' which is 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. These documents are the following:

- General Procedure ADIF-PG-109- 001-008: Contaminated Soil Management
- Technical Instruction ADIF-IT-109-001-005: Preparation and Submission of Preliminary Progress Reports / Situation Reports (PSR / SR)

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.

⁸ 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.

⁹ 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.

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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 environment¹⁰. These emergencies are associated with leaks, spills, or discharges of substances that could affect the environment. Therefore, an effective and immediate response must be guaranteed. Once

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 (SR), as required by Royal Decree 9/2005, are submitted in accordance with the established deadlines.
- Characterisation studies of potentially contaminated soils are conducted to

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.

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, 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.

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

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In 2024, environmental actions were planned and carried out at 31 locations. These were classified into two groups, according to the type of action undertaken. A group of indicators were selected for each group to describe the implemented works.

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, river basin authorities, etc.) are considered.

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

Works have also been carried out in locations affected by environmental emergencies. These are described separately and are not included in the annual indicators monitoring.

be established, particularly for remediation efforts.

Considering all these factors, the actions undertaken in 2024¹¹ are classified into two distinct situations¹²:

1.- Sites under **Decontamination**, where remediation projects or actions are carried out to improve subsurface conditions until they no longer pose a risk to human health or ecosystems.

2.- Sites **under Risk Management**, where an assessment is carried out – based on soil use and potential receptors – to determine whether the situation at the location poses a risk. Depending on the outcome, decontamination projects or actions may then be implemented.

A key milestone regarding 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

¹¹ The sites jointly managed with Renfe-Operadora are (9): 1) Fuel supply facility and workshops in A Coruña; 2) Fuel supply facility in Almería; 3) Self-propelled vehicle workshop in Cerro Negro; 4) Fuel supply facility and maintenance workshops in Granada. 5) Fuel supply facility and maintenance workshop in Irún; 6) Engine workshop and former fuel supply facility in Miranda de Ebro (Burgos); 7) Fuel supply facility and maintenance workshop in Ourense; 8) Engine workshop

and fuel supply facility in Salamanca; 9) Former fuel supply facility in Villaverde (Madrid).

¹² In 2024 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).

actions, which have been previously approved by the relevant authorities. This agreement was initiated in 2020, and it is still in full force and

effect since then. The work carried out, 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 (2,452.7 m³ of soil was successfully treated) and the former fuel supply facility at the Villaverde integral maintenance base (514 m³), 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 (at the end of 2024, the treatment area will be extended to include one of the plots).

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. In 2024, *landfarming* trials will be carried out with the addition of various local amendments to make the remediation process more efficient, such as pruning waste, slurry and sewage sludge, among others.

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 depths of several meters, 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 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. As a result, the Regional Ministry approved the remediation of the soil in June 2023. In 2024, these techniques were applied at the sites in Salamanca, Miranda de Ebro, Sevilla, Badajoz, and Zafra. Notably, the last two sites showed excellent results, with only residual concentrations of diluted TPH, and decontamination works are expected to be completed next year.

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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. With this technique favourable results were achieved in locations such as Miranda de Ebro and Valladolid.

At the Algeciras site, as part of the Decontamination Plan for the subsurface initiated in 2022, an oxidative injection of hydrogen peroxide was conducted to chemically oxidise underground hydrocarbons and release oxygen, thereby stimulating the biodegradation of native bacteria. When applied to excavated soil deposited on waterproof basin, this technique – combined with landfarming – proved to be highly efficient in improving soil quality. In 2024, 1,720 tonnes of soil were treated using this method, which will subsequently be used to backfill the excavation pit.

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Indicators of actions taken on contaminated land

This section describes the main environmental indicators of contaminated land:

- Since 2012: **number of sites, number of field workdays, number of piezometers, number of control points, number of samples, amount of soil managed, volume of hydrocarbonated water pumped, volume of hydrocarbon recovered,**

electricity consumption, and number of reports.

- Since 2017: **number of piezometers with free phase and total hydrocarbon thickness in piezometers.**
- Since 2023: **area affected by free phase.**
- Since 2024: **soil treated in situ.**

Table 22. Evolution of the main environmental indicators 2012-2024

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
No. of sites	24	23	28	31	31	32	32	32	34	31	31	31	31
Under decontamination	5	6	7	6	6	8	8	8	15	15	15	16	15
Under risk control	17	17	18	21	21	22	22	21	18	15	15	15	16
Under risk monitoring	2		3	4	4	2	2	3	1	1	1	0	0
No. field workdays	720	769	443	433	518	540	853	423	344	330	507	808	1,792
No. of piezometers	316	310	399	446	486	559	548	567	607	687	747	762	813
No. of control points	2,334	2,266	2,365	2,424	4,051	3,588	3,866	3,826	4,358	8,257	7,775	6,890	8,398
No. of samples	516	343	542	520	674	477	522	608	783	1,000	812	903	827
Amount of soil managed (t)	0	2,776	225	1,566	20	0	1,335	0	31	179	26	9	3,027
Volume of hydrocarbonated water pumped (m³)	36,296	18,611	12,794	13,581	10,299	4,127	18,364	13,429	17,623	14,630	14,173	20,669	38,577
Volume of hydrocarbon recovered (l)	5,779	2,887	2,965	4,342	3,175	4,149	11,068	5,745	6,898	8,892	13,388	15,821	15,786
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	132,445
No. of reports (monitoring, projects, proposals, etc.)	33	34	32	37	34	40	35	40	45	78	83	89	70
Free-phase piezometers – [Number]	NQ	NQ	NQ	NQ	NQ	130	110	90	131	162	165	160	190
Total hydrocarbon thickness – [Centimetres]	NQ	NQ	NQ	NQ	NQ	3,883	2,067	1,868	2,230	3,260	2,684	1,969	2,026
Area affected with free phase (m²)	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ	22,821	22,144
Soil treated <i>in situ</i> (t)	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ	2,259

NQ: Indicator not quantified

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

The graphs below show the evolution of the main environmental indicators:

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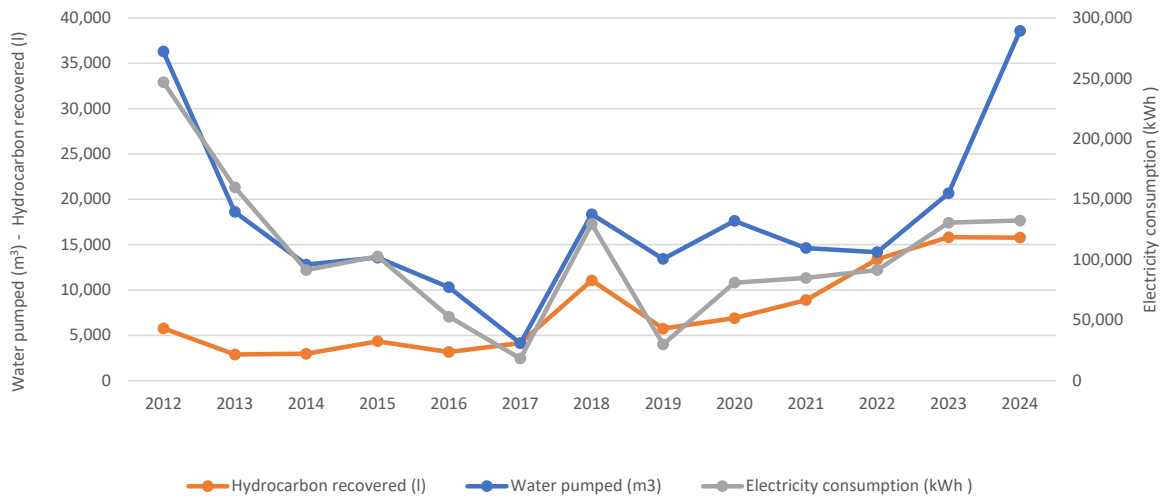
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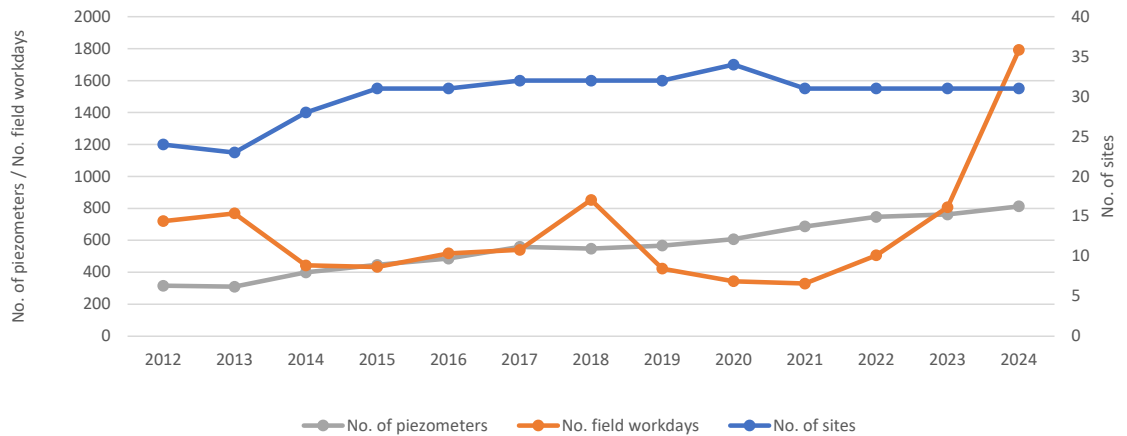
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Chart 27. Evolution of water pumped (m³), hydrocarbon recovered (l) and electricity consumption (kWh)



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

Chart 28. Evolution of number of surveys, days of fieldwork and number of locations



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

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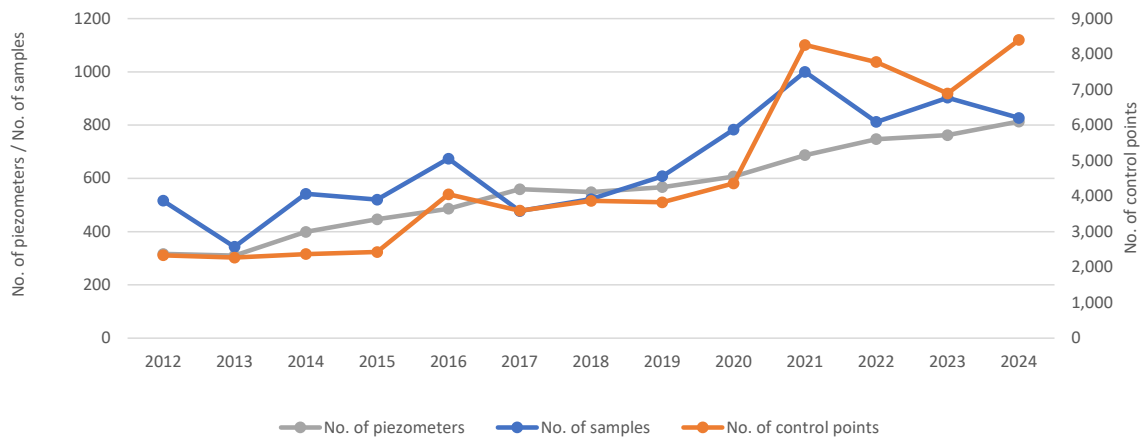
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Chart 29. Evolution of number of surveys, number of samples and number of control points



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

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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 piezometers and monitoring points, the volume of hydrocarbon recovered, electricity consumption, and the number of reports, among others, highlighting the increased in the work carried out. However, these figures are expected to decrease as the ongoing projects are completed.

An important indicator of the work carried out is the **volume of hydrocarbons recovered** from the subsoil. This indicator increased significantly in 2021, mainly due to two diesel leak incidents at the A Coruña and Fuencarral sites, which were subsequently recovered; in 2022 and 2024, increases were driven by creosote extractions at the Andújar site; and in 2023, by the commissioning of the high-vacuum system at Valladolid.

The following table shows the significant volumes of creosote extracted at the Andújar site in recent years, reflecting the increased frequency of extractions and the growing number of extraction points, particularly from large-diameter wells.

Table 23. Volume of creosote recovered in Andújar (l) *

Year	Creosote (l)
2012	293
2013	495
2014	828
2017	366
2018	270
2019	155
2020	905
2021	2,060
2022	8,164
2023	4,959
2024	11,740

* No data available for 2015 and 2016

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

The evolution of the number of piezometers with free phase, shown in the table below, serves as an indicator of the environmental improvement at the sites. It presents the number of piezometers that recorded a free phase at any time during the year, relative to the total number of visits conducted. Although this indicator is influenced by the installation of new boreholes, it provides a general overview of the progress of all ongoing projects. If decontamination and control treatments are effective, the number of piezometers is expected to decrease.

Table 24. Number of free phase piezometers

	2017	2018	2019	2020	2021	2022	2023	2024
Free phase piezometers	130	110	90	131	162	165	160	190
Piezometers	559	548	567	607	687	747	762	813
Free phase piezometers/Piezometers	23%	20%	16%	22%	24%	22%	21%	23%

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

The decrease in the number of piezometers with free phase between 2017 and 2019 proves the effectiveness of the remediation systems implemented. In 2020 and 2021, the number of piezometers with free phase increased significantly, mainly due to the installation of new boreholes in decontamination sites, particularly in areas where free-phase hydrocarbons were present, as part of 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, the number of free-phase piezometers remains virtually unchanged, leading to a slight decrease in the ratio of free-phase piezometers to total piezometers, which indicates progress in improving environmental conditions at these sites. In 2024, the number of free-phase piezometers is expected to increase, mainly at Andújar and, to a lesser extent, at Fuencarral and

Valladolid. The total number of piezometers will also increase, including at the previously mentioned sites as well as Irún and Granada, with the ratio of free-phase piezometers exceeding that recorded in the previous year.

Similarly, the indicator of total hydrocarbon thicknesses in piezometers provides an insight into overall site improvement and the effectiveness of treatments. This indicator, the evolution of which 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 25. Total oil thicknesses (cm)

	2017	2018	2019	2020	2021	2022	2023	2024
Total hydrocarbon thicknesses	3,883	2,067	1,868	2,230	3,259.9	2,684	1,969	2,026
Free phase piezometers	130	110	90	131	162	165	160	190
Total hydrocarbon thicknesses / free phase piezometers	29.87	18.79	20.76	17.02	20.12	16.27	12.30	10.66

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

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Similar to the previous indicator, the decrease in cumulative thicknesses between 2017 and 2019 demonstrates the effectiveness of the remediation systems. The subsequent increase in 2020 and 2021 can be 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. This indicator was also influenced by the aforementioned fuel leaks at the A Coruña and Fuencarral sites. From 2022 to 2023, both the thicknesses and the average thicknesses (hydrocarbon thickness/number of piezometers with free phase) decreased, reflecting the repair of leaks and the effectiveness of remediation systems at sites such as Valladolid, Salamanca, and Seville, among others. This confirms a clear positive trend at the sites where action is being taken. In 2024, although the number of free-phase piezometers increased significantly, the total hydrocarbon thickness registered only a slight increase, leading to a decrease in average thickness and, thus, continuing the positive trend observed in previous years.

From 2023 onwards, the indicator for the area affected by free phase has been recorded, corresponding to the largest area affected by free phase at each site visited during the year, considering thicknesses greater than 1 mm. This

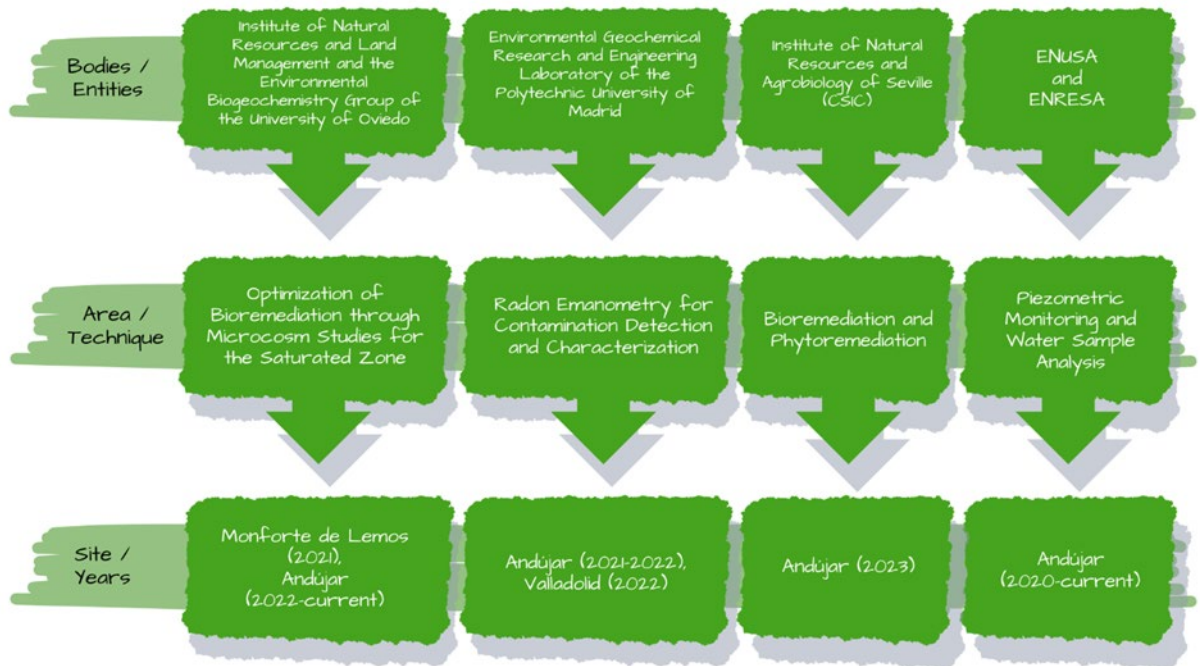
indicator provides reliable information on the evolution of contamination plumes across sites. In 2023, the affected area was approximately 22,800 m². In 2024, it decreased slightly to 22,143.9 m².

In terms of externally managed soil, 8.9 tonnes of impacted soil from the Salamanca site were disposed of in landfill in 2023. In 2024, a total of 3,027.28 tonnes of contaminated soil were managed in landfill, primarily from the Salamanca and, to a lesser extent, Andújar sites (soil containing fibre cement).

In 2024, landfarming treatment of excavated soil is already underway or scheduled to begin at several sites, including Algeciras, Salamanca and Andújar. These actions involve the on-site treatment of significant volumes of impacted soil, thereby considerably reducing the amount of waste managed in landfills. For this reason, a new indicator, called soil treated on site, was introduced in 2024. This indicator quantifies the amount of contaminated soil excavated in remediation projects and treated on site (e.g., through landfarming), allowing its reuse to backfill excavation pits and/or for other project-defined purposes (e.g., embankment construction). In 2024, 2,259.22 tonnes of soil were treated on site (measured at the completion of the treatment process), a quantity lower than that managed externally (3,027.28 t).

Collaborations

In soil decontamination, **Adif** has the following collaborations:



Communications

In 2024, 70 communications were received from or submitted to the relevant authorities regarding water and contaminated soils. Of the 16 communications received, 7 are requests for actions or documentation: for soil investigation qualitative risk assessment and/or decontamination project (5) and Preliminary Situation Reports /Situation Reports (PSR/SR) (2). The remaining communications received are related with the decontamination projects submitted (5); approval of the restoration carried out (1); and submission of information (3).

Of the 54 communications sent to these administrations, all of them were for the submitting documentation. The documentation submitted included monitoring reports of decontamination projects/actions (34), environmental risk characterisation and assessment reports (4), control reports (3), analytical results (3), registration notes (3),

PSR/SR (2), decontamination projects (2), reports (2) and environmental emergency communications (1).

Twenty-two internal communications were also received and addressed promptly. These included requests for advice (17), and communications on environmental emergencies (5). Requests for advice have concerned: contaminated soil in projects/facilities (7), contaminated soil in relation to the Madrid Nuevo Norte project (5), contractual clauses (2), regulations (2) and PSR/SR (1).

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 \(15\)](#)

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In 2020, with the new decontamination contract, new remediation actions started at sites that were under Control or Risk Monitoring.

In 2024, the sites undergoing Decontamination were the following:

- A Coruña fuel supply facility and workshops
- Former fuel supply facility at Algeciras (Cádiz)
- Former creosoting base at Andújar (Jaén)
- Fuel supply facility and former workshops in Badajoz
- Cerro Negro self-propelled equipment workshop (Madrid)
- Former fuel supply facility in El Portillo (Zaragoza)
- Fuencarral fuel supply facility (Madrid)
- Fuel supply facility and maintenance workshop in Irún (Guipuzcoa)
- Ourense fuel supply facility and maintenance shop
- Locomotive workshop and fuel supply facility in Salamanca
- Seville fuel supply facility
- Former fuel supply facility in Teruel
- Valladolid fuel supply facility
- Former fuel supply facility at the integrated maintenance base in Villaverde (Madrid)
- Zafra fuel supply facility (Badajoz)

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.

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.

In 2024, the remediation works led to a significant reduction in the affected area, with the

monitoring conducted in December recording the lowest level since the beginning of the remediation.



Figure 11. Remediation module

Conversely, during the construction of the new A Coruña Intermodal Station, several piezometers in the remediation system were damaged and will be replaced in 2025.

b.- Former fuel supply facility 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.

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

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authority for its approval was the Algeciras City Council¹³.

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. In 2024, TPH concentrations above the reference values persisted in some locations, making it necessary to continue with soil and water treatment measures.

c- Former creosoting 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 (NSC) 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 Ambiental* (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. This study made it possible to identify areas that were not affected.

¹³ According to Art 5 of the Decree 18/2025 of 27 of January, in which the regulation that regulates the applicable legal framework of polluted soils gets passed.

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 2023-2024, 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 12. Landfarming preparation. 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 Council¹⁴ 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 involves excavating approximately 14,000 m³ 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.

In September of 2024 the Decontamination Project was approved by Andújar Council, and its execution began with the excavation of contaminated soil and its distribution in landfarming piles. Additionally, to improve the efficiency of the remediation, landfarming trials continued, with the addition of local amendments, such as pruning waste, slurry, and sewage sludge, among others.

d- Fuel supply facility and former workshops in Badajoz

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

¹⁴ The approval of the Decontamination Project is under the competence of Andújar Council, according to Art 5 of the Decree

18/2025 of 27 of January, in which the regulation that regulates the applicable legal framework of polluted soils.

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concentrations. Additionally, groundwater quality was monitored twice a year.

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.

To 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 expansion works of the new high-speed line platform, pneumatic pumping and surfactant injection works were halted, and several oxidant infiltration campaigns were carried out to reinforce the removal of residual hydrocarbons in the loading mouth area, resulting in a clear improvement in site conditions.

In 2024, free phase was not detected in any of the piezometers at the site. Nevertheless, to promote the biodegradation of the remaining TPH concentrations in the soil, two biostimulants application campaigns were carried out, and

oxygen-releasing devices were installed to enhance aerobic conditions.

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.

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

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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. Furthermore, 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 the upcoming years, because of the persistence of the hydrocarbon non-aqueous phase in some control/extraction points, the corrective actions will continue. The adaptation of the sewerage network and sewerage treatment system is pending, which will greatly contribute to the environmental improvement of the location.

f- Former fuel supply facility in 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 Aragon¹⁵, 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*. Both proposals were approved.

A Supplementary Investigation was initiated in October 2021, beginning 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 submitted to the Government of Aragon and the *Confederación Hidrográfica del Ebro* in October 2022. Subsequently, the Government of Aragon requested the preparation of a Quantitative Risk Assessment. Submitted in March 2023, this assessment concluded that the soil condition at the facility do not pose an unacceptable risk to the defined receptors under current and future uses. In April, a response was received from the Government of Aragon stating that initiating a contaminated soil dossier was not appropriate. They requested compliance with the provisions of the *Confederación Hidrográfica del Ebro* and, upon completion of the remediation work, the submission of a final report detailing the results.



Figure 13. Level measuring. El Portillo

In November 2023 and September 2024, revised revisions of the Groundwater Environmental Recovery Project were submitted in accordance with the requirements of the *Confederación Hidrográfica del Ebro*. While awaiting approval, monthly purges, quarterly environmental monitoring, and biannual underwater sampling are conducted.

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

¹⁵ Sentence 000517/2019 of section 2nd of the Administrative Chamber of the High Court of Justice of Aragon.

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. Therefore, in March 2023, an environmental recovery proposal 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, delimitation of the land affected by hydrocarbons, feasibility tests on potentially applicable remediation techniques, preparation of a voluntary recovery project, and submission of a Soil Status Report on fuel storage and supply activities.

In response to these requests, at the end of 2023 and during 2024, the investigation was extended to include eight soil pits and 17 boreholes with piezometer installation – 11 in the fuel supply area and six in the former storage area. Additionally, feasibility trials of the potentially applicable remediation techniques were conducted.



Figure 14. Conducting a night-time drilling. Fuencarral

All these works, as well as the environmental controls and periodical purges, have been conditioned by the construction works executed at the location.

h- Fuel supply facility and maintenance workshop at Irún (Guipuzcoa)

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).

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Figure 15. Drilling conduction. Irún

In July 2022, a new administrative injunction was received, requesting quarterly monitoring of the site, expansion of the subsurface investigation, revision of the Qualitative Risk Assessment, and the preparation of a Remediation Plan. In compliance with this injunction, in March 2023, an Environmental Recovery Project was submitted, which was approved in June 2024 subject to a set of conditions that were addressed during the second half of 2024: 1) Expand the investigation to define the non-aqueous phase. 2) Identify and characterize the existing hazardous waste. 3) Update the Qualitative Risk Assessment to account for lead concentrations exceeding the industrial B- IEV limits detected in the exploratory investigation. 4) Update the project, if needed. 5) Report the works carried out to the administration and obtain its position regarding them.

i- Ourense fuel supply facility and maintenance workshop

This site has a long-standing environmental issue resulting from fuel supply operations for locomotives, which led to hydrocarbon contamination in the subsoil. The facility included an above-ground 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 undertaken at the site to address this environmental issue. Additionally, in 2008, a diesel leak from a fuel pipe prompted the

preparation of a Recovery Project and an Environmental Risk Assessment, which were 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 contaminated water from reaching homes downstream of the facility. The work included the operation of two hydraulic booms to capture water and oil using pneumatic pumping and high vacuum, as well as the injection of water and surfactant solution to mobilise oil trapped in the soil. These actions resulted in a substantial improvement of 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 soil and groundwater did not pose an unacceptable risk to either the site's workers or residents of downstream dwellings.

In the following years, environmental monitoring was conducted, including groundwater sampling, level measurements, hydrocarbon extraction, and the installation of sorbents in piezometers where non-aqueous phase occasionally appeared.

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

In response to a worsening of the conditions and at the request of the Regional Department, a Proposal for Actions was submitted in December 2019. This proposal included fortnightly pumping to remove the non-aqueous phase and the installation of absorbents, as well as measures to reduce dissolved hydrocarbons in the groundwater through aquifer aeration and

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oxygenation (biosparging), chemical oxidation, and enhanced bioremediation with nutrients, oxygen, or other amendments. The Regional Department approved this proposal in February 2020, and trials of these techniques were then initiated.

In 2020, site disturbance increased, which was attributed to the tests mentioned above. This trend continued through 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, as they would not significantly improve hydrocarbon recovery due to low yields and would entail a high environmental cost in terms of energy consumption and waste generation. Therefore, in the first half of 2023, improvements were made 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 were pumped on an *ad-hoc* basis. These improvements resulted in a significant reduction in pollution levels compared to the previous two years. However, since the presence of free phase is now residual, the amount of recovered oil remains very low.



Figure 16. Bailer. Ourense.

At the end of 2024, a new improvement was implemented, consisting of the injection of surfactant into the affected area to facilitate the desorption of residual hydrocarbons, and the installation of slow-release oxygen to prompt the natural biostimulation of native subsurface

bacteria and, consequently, the biodegradation of the hydrocarbons. The effects of these actions will be evaluated in 2025.

j- Locomotive workshop and fuel supply facility in Salamanca

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.



Figure 17. Excavation. Salamanca

The high-vacuum system was brought into operation in May 2018. In November of 2021, one of the two vacuum pumps was deactivated, and in September 2023, the other one was also shot down and the equipment dismantled. Regarding landfarming soil treatment, a total of five soil- around 1.756 m³ –were treated until the hydrocarbon concentrations allowed their reuse as backfill material. In 2024, biostimulant injections were applied to promote the degradation of remaining hydrocarbons. A total of 2,868.4 t of carbon-containing deposits were managed at the landfill, and one of the soil lots was spread for treatment via landfarming, with subsequent use as refilling material.

k- Seville fuel supply facility

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 Assessment be performed.

In accordance with the above, in the second half of 2021, eight underground gas-phase measurement vapour samplers were installed, and a Quantitative Risk Assessment was conducted. The latter concluded that the soil conditions at the site did not pose an unacceptable risk to 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 this expansion, and thanks to the application of surfactant and biostimulant injections, a significant improvement in the site's

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environmental conditions was achieved, reaching in 2024 the best results since the start of the remediation.

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 Assessment. 3) Voluntary decontamination project. 4) Results of sampling analysis. This information was submitted in March 2024.

I- 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, which had been largely removed due to road construction works, was reinstalled. 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 River Basin Authority) 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 request was received from the *Confederación Hidrográfica del Júcar* requesting, among other things, 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 from the subsoil; as well as an assessment of the effectiveness of the remediation method. In the event that the requirements authorised by the *Confederación Hidrográfica* cannot be met, a proposal for a more efficient alternative remediation system. In addition, the frequency of groundwater sampling at the piezometer near the River Turia must be increased to quarterly. It was also noted that the remediation works will not be considered complete while are free-phase hydrocarbons remain and/or pollutant concentrations exceed the generic intervention values specified in the 2023 amendment to the Regulation of the Public Hydraulic Domain.

With the goal of increasing the efficiency of the hydrocarbon extraction, in accordance with the request of the *Confederación Hidrográfica*, monthly purges of the piezometers were initiated in May 2024 using portable high-vacuum equipment.

m- 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, 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, whose objectives are the removal of hydrocarbons in the non-aqueous phase and the elimination of the contaminant load from the affected 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 and 2024 has been effective in reducing the pollutant load in the groundwater. However, the non-aqueous phase persists, and the groundwater quality does not yet meet the reference values for total petroleum hydrocarbons established in the Regulations of the Public Hydraulic Domain. Therefore, active

treatment will continue in 2025, as planned in the Project.



Figure 18. Water extraction from railways. Valladolid

n- Former fuel supply facility at the integrated maintenance base in Villaverde (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, including a fuel tank with a capacity of 40 m³.

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 m³), 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;

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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 one of the most affected piezometers located in the former bottom tray area, resulting in a noticeable improvement in the hydrocarbon extraction rate. Nonetheless, residual contamination persists in this area, which became particularly evident during the last months of 2023 and throughout 2024, due to rising phreatic levels caused by heavy rainfall.

ñ- 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 unacceptable risks.

The remediation system, consisting of a bioslurping 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.

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.

After three consecutive months without the presence of a non-aqueous phase in the piezometers, a complete groundwater sampling was carried out to assess the evolution of concentrations in all the piezometers at the site and to update the Qualitative Risk Assessment. The latter concluded that the soil and groundwater contamination detected does not pose an unacceptable risk. In addition, the results obtained were compared with the generic groundwater quality reference values established in the Public Water Domain Regulations. The

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comparison concluded that all TPH concentrations detected at the perimeter points within the site are below the generic intervention value. Therefore, at the end of 2023, the Corporate Sustainability Department and the *Confederación Hidrográfica del Guadiana* were asked to declare the decontamination work at the site complete within the scope of their respective competences.

In January and February 2024, two injunctions from the Corporate Sustainability Department, requesting, among other matters, the investigation of the remaining soil and the update of the Qualitative Risk Assessment.

With the goal of reducing TPH concentrations, biostimulants injections were applied and oxygen-release devices were installed in March and July 2024. Subsequently, and to comply with the administrative injunctions, an investigation on the remaining soil was conducted, along with the groundwater sampling, to update the Qualitative Risk Assessment.

Environmental Risk Control Sites (16)

In 2024, the sites under Risk Control are as follows:

- Abroñigal fuel supply facility (Madrid)
- Alicante fuel supply facility
- Almeria fuel supply facility
- Bilbao Station (Vizcaya)
- Bilbao Freight Terminal (Vizcaya)
- Cartagena fuel supply facility (Murcia)
- Cordoba fuel supply facility
- Granada fuel supply facility and Maintenance Workshop
- Huelva fuel supply facility
- Irún Goods Terminal (Gipuzkoa)
- Jándiz Goods Terminal (Álava)
- Locomotive workshop and old fuel supply facility in Miranda de Ebro (Burgos)
- Fuel supply facility at Monforte de Lemos (Lugo)
- Barcelona Morrot Logistics Centre
- Valladolid Track Technology Centre (TTC)
- Vicálvaro fuel supply facility (Madrid)

In 2008, a Risk Control Programme was developed 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.
- Updating 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

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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.

Throughout 2023 and 2024, quarterly checks continued, confirming the presence of hydrocarbons in the pump area and in the untreated area. In any case, the results of these checks indicate that the contamination is under control at the site.

b- Cordoba fuel supply facility

In 2007, an investigation into the quality of the subsoil at the El Higuera 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. The investigation

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detected the presence of polycyclic aromatic hydrocarbons slightly above the groundwater intervention level in the southeast direction.

In the groundwater sampling conducted in December 2024, all control points showed TPH concentration below the detection limit, indicating that the site is operating under standard conditions.

c- Locomotive workshop and old 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 2014, measures were taken to eliminate sources of contamination, including the degassing and cleaning of the old underground fuel tank and the subsequent management, of the tank and the affected soil, as well as the repair and waterproofing of the industrial waste collection network.

In 2015, a new Environmental Monitoring and Improvement Programme was developed and implemented to meet a requirement from the *Confederación Hidrográfica del Ebro* (CHE), which established new criteria and objectives for concentrations in groundwater. In compliance with this Programme, from 2016 onwards, analytical monitoring of groundwater for polycyclic aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPHs) was carried out. 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 compliance with a new requirement from the CHE, the Qualitative Risk Assessment (QRA) was updated. In September 2020, the CHE established new target values for pollutant concentrations (PAHs) in groundwater, in

addition to those of 2015, in line with those indicated as target levels in the 2019 QRA. The injection of biostimulants continued.

Since 2017, the remediation target levels for PAHs have not been exceeded in any of the water samples from the piezometers analysed. In the April 2023 campaign, the target levels for TPH were also not exceeded in the piezometers of the external network. However, there was a slight increase in the contamination in two piezometers of the internal network located in the area where an accidental heating oil spill 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.

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. These works have eliminated the hydrocarbons at the control points. However, reference values are still exceeded at some points, and therefore some new injections will be carried out.

d- Fuel supply facility 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

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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 to 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.

In March 2023, a new Qualitative Risk Assessment was carried out, which concluded that the concentrations detected did not pose an unacceptable risk to human health or the river ecosystem. As a result, the Regional Ministry of the Environment was asked to complete the environmental measures at the site. In response to this request, in June 2023, an official letter was received from the Regional Ministry approving the recovery of the site and establishing an annual control and monitoring plan for soil and groundwater quality.

The 2024 control concluded that the site continues to operate under standard conditions.

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 with a potential impact on soils and/or water on Adif's infrastructure, urgent intervention is required to prevent the consequences from worsening. Immediate action must be taken to stop the spread of the contamination and prevent it from reaching sensitive areas or locations that could facilitate a rapid migration to subsurface, surface or groundwater, or nearby plots. Once the spill is contained, it should be assessed whether an investigation is needed to determine the environmental status, whether decontamination measures should be implemented, and/or whether environmental risk control programs should be established, ensuring in all cases that there is no risk to human health or the natural environment.

During 2024, emergency actions have been taken at the following sites¹⁶:

- Seville fuel supply facility
- Ataquines substation (Valladolid)
- Bilbao freight terminal (Vizcaya)
- Area surrounding Ourense station
- Jimena de la Frontera (Córdoba)

And the actions of previous years have continued in:

- Fuentes de Orono's station; emergency in 2021
- Vilamartin de Valdeorras' station, emergency in 2023

a.- Emergency action in Seville fuel supply facility

On 4 April, during the fuel supply operation to a motor vehicle, a spill of occurred over the ballast through the loading hopper of the opposite side

of the supply. Once the spill was detected and the funnel of the loafing hopper was removed, fuel began to spill on the supply side. However, it was contained using the anti-spill trays connected to a hydrocarbon separator.

Because a remediation project was already underway at the site, the piezometers near the spill point were measured on the same day, and no hydrocarbons were detected in the samples. Subsequently, during 2024, environmental monitoring of these piezometers continued alongside the ongoing remediation project, without the need for additional measures.

b.- Emergency response at the Bilbao freight terminal (Vizcaya)

On 22 October, an accidental fuel spill occurred due to the breakage of one corner of a locomotive fuel tank in Bilbao Freight Terminal. The locomotive was manoeuvring, leaving a trail of fuel until the spill was detected. Once the incident was identified, firefighters went to the site, contained the spill, absorbed the fuel, and placed a tray to contain any remaining fuel inside the tank. After the operations were completed, the waste was managed by an authorised waste management company.

c.- Emergency actions taken at the Ataquines substation (Valladolid)

In November 2023, copper was stolen from the power transformers of the Ataquines Substation, causing the spillage of 5,250 l of insulating oil contained inside them. Once the spill was detected, the affected soil was excavated for proper waste management, and the excavation hole was backfilled.

¹⁶ Occasionally, it also addresses possible emergency situations that, after assessment, are found to be minor and do not require any external intervention.

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Figure 19. Ataquines Substation (Valladolid)

In May 2024, staff at the substation detected oil in the facility well located downstream of the spill point. The well was purged, and the contaminated water was stored in GRG tanks for its subsequent management. Following this intervention, between June and July, 12 soundings with piezometer installations were carried out to define and monitor the contamination plume. As a result, hydrocarbon contamination was detected in the soil and groundwater of the well and three external piezometers. Afterwards, 4 environmental risk control campaigns – comprising measurements and purges – were conducted through 2024, showing a significant reduction in contamination. Therefore, this line of action will continue. Once the free-phase hydrocarbons are eliminated, a complete groundwater survey will be conducted to support the subsequent implementation of a Qualitative Risk Assessment.

d.- Emergency works in the area surrounding Ourense station (Galicia)

On 25 November, a diesel spill occurred from a vehicle near Ourense Station while it was manoeuvring through a banked curve after refuelling. The fuel spilled along several meters of track and could not be recovered, and the vehicle continued to Monforte de Lemos, where it was immobilised. The most likely cause of the accident was determined to be overfilling of the fuel tank.

e.- Emergency measures in Jimena de la Frontera (Córdoba)

On 21 December, a spill of grease and oil was detected along a path at Jimena de la Frontera Station, where stockpiles of sleepers and railway

materials were stored, as along with five barrels full of grease and oil – two of which had spilled. The police determined that the incident was an act of vandalism. Immediate measures were taken to remove the affected soil and manage it as waste.

f.- Measures taken in Fuentes de Oñoro (Salamanca)

On 20 June 2021, a freight locomotive derailed, causing a fuel spill from its tank, estimated at 3,000-3,500 l. An immediate inspection of the affected area was conducted, the conceptual site model was developed, eight boreholes were drilled with piezometer installations, and soil and groundwater characterization, as well as a Qualitative Risk Assessment were performed. The latter determined that the contamination detected in both the soil and groundwater from the spill did not pose an unacceptable risk for the identified receptors.



Figure 20. Groundwater sampling, Fuentes de Oñoro, Salamanca

In the following years, Qualitative Risk controls continued, detecting some increases in the effects of the disturbance. Nevertheless, during the most recent control conducted in 2024, TPH concentrations in groundwater remained below the Generic Intervention Value specified by regulations. A new control is scheduled for the first quarter of 2025 to confirm these results.

g.- Measures taken in Vilamartín de Valdeorras (Ourense)

On 23 August 2023, seven wagons of a hazardous goods train derailed at the exit of Vilamartín de Valdeorras Station, resulting in a spill of 500 l of hydraulic oil. To immediately contain and absorb the spill, an earthen berm was constructed, and absorbents were applied over the affected area. In addition, soil showing organoleptic signs of contamination was excavated and managed as hazardous waste in a

landfill (157 t). Soil samples were taken from the excavation to assess the quality of the remaining soil. A Qualitative Risk Assessment was also carried out, and, since no unacceptable risks were identified for the present and future uses of the site, the excavation was backfilled.

The Department of Environment and Climate Change was informed of the emergency and the actions taken in August 2024. In November 2024, the Department issued a resolution approving the soil remediation carried out.

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NOISE POLLUTION

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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, train parking, 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 modes of transport. It also establishes limitations on urban development and the need to adopt preventive and corrective measures to avoid or reduce damage to human health, property, or the environment resulting from noise pollution.

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

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

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

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

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

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

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

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Table 26. Data from Phase I, II and III SNMs and NAPs

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

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

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

<http://sicaweb.cedex.es>

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

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

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

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Table 27. Construction projects for noise barriers resulting from noise action plans

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

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

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

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

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



Figure 21. SMUs from the Strategic Noise Maps for major railway lines, Phase IV. Railway sections with more than 30,000 trains per year

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

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

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

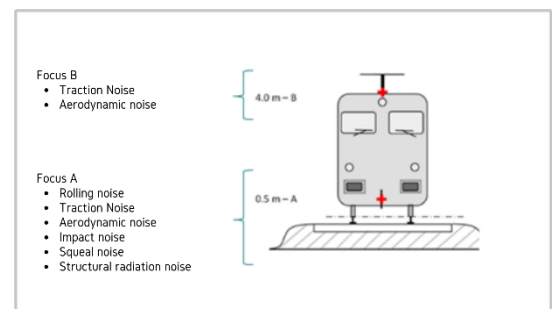


Figure 22. Factors contributing to the emission

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

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infrastructure, as well as defining the configuration parameters for the models. This work led to the publication of the *Guide for the Application of the CNOSSOS-EU Method in the modelling of noise produced by traffic on Adif and Adif-Alta Velocidad railway infrastructures*.

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

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

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

- This will be the first phase to estimate the risk of adverse health effects from exposure to railway noise (severe discomfort, SD, and serious sleep disturbances, SSD). To this end, the formulas set out in Annex III of Royal Decree 1513/2005, as approved by *Order PCM/542/2021 of 31 May*, shall be applied, considering the noise levels in the buildings before and after the corrective measures outlined in Phase IV of the Plan.
- The new data model (DM) from the European Commission, which is mandatory for Spain, has come into force, which is mandatory for Spain. Its purpose is to ensure compliance with both the Noise and INSPIRE Directives (*Directive 2007/2/CE, Infrastructure for Spatial Information in Europe*), in the provision of information related to

Strategic Noise Maps and Action Plans. This Directive has been transposed into Spanish law through *Law 14/2010 of 5 July, on geographical information infrastructure and services in Spain (LISIGE)*. For strategic noise mapping, the EPSG:3035 Lambert Azimuthal Equal Area (ETRS89-LAEA) system is used, which is the ETRS89 reference system extended for Europe.

Additionally, in line with **Adif'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).
- *Convenio-Tipo de cooperación con las administraciones para la adopción de*

medidas de mitigación del ruido. (Standard Cooperation Agreement with Authorities for the Adoption of Noise Mitigation Measures).

- *Metodología para la realización de mediciones acústicas en obra* (Methodology for conducting acoustic construction sites).
- *Metodología para la determinación de actividades ruidosas en obra* (Methodology for identifying noisy activities on construction sites).
- *Especificación Técnica 03.305.010.5. Pantallas Acústicas* (Technical Specification 03.305.010.5. Acoustic Screens)
- *NAG 4-0-0.1 Metodología para Estudios Acústicos* (Methodology for Acoustic Studies), which outlines the methodology for conducting acoustic studies required for projects within the *Red Ferroviaria de Interés General (RFIG, General Interest Railway Network)*, managed by **Adif** and Adif Alta Velocidad.

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

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

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

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

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

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

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

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



Figure 23. Testing of mini and micro acoustic barriers on the railway network

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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.

Currently, legislation provides different criteria to classify an event involving the transport of hazardous goods as an accident:

- National criterion established in the Basic Guideline for Civil Protection Planning in the event of accidents involving the transport of dangerous goods by road and rail (*Royal Decree 387/1996 of March*

1) (hereinafter referred to as the Basic Guideline for Civil Protection Planning).

- National criterion set out in *Royal Decree 929/2020*, of 27 October, on railway operational safety and interoperability.

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

Mode of transport	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
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	33,164
Container	656,490	637,811	606,609	654,424	571,712	583,393	534,054	597,106	507,514	424,690	30,105
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	63,269

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

The following is a summary of the main events that took place in 2024:

Table 29. Accidents related to the transport of dangerous goods on infrastructure managed by Adif

Date	Location	Train origin/destination	A.V.	Hazardous materials contained in A.V.	Description	Cause	Affected operator	Type of accident
16-jan.	San Cristóbal Industrial	VICALVARO-MERCANCIAS to PUERTOLLANO REFINERIA	2	UN 1280 Propylene oxide (highly flammable liquid substance)	Train split consisting of two locomotives and 27 carriages, between two carriages (3rd and 4th) with DD.GG. due to a broken traction hook. The driver resolves the problem and resumes the journey.	Rolling stock failure	RENFE MERCANCIAS	1
18-mar.	Between Quero and Villacañas	PUERTOLLANO - REFINERIA to TARRAGONA-MERCADERIES	1	UN 1010 Stabilised butadiene (flammable gas, liable to spontaneous violent reaction)	Train triggers overload alarm when passing through a track impact detector (TID) on an axle of a flatcar with DD.GG. The affected car is segregated at Villacañas station, where it is set aside at the disposal of the railway company; the rest of the train continues its way.	Operational human factor.	RENFE MERCANCIAS	1

Table 29. Accidents related to the transport of dangerous goods on infrastructure managed by Adif

Date	Location	Train origin/destination	A.V.	Hazardous materials contained in A.V.	Description	Cause	Affected operator	Type of accident
22-mar.	Casetas	CONSTANTÍ to TORRELAVEGA	1	UN 1010 Stabilised butadiene (flammable gas, liable to spontaneous violent reaction)	Broken wheel and part of the steering gear affected on a wagon with DD.GG. The affected wagon is segregated at Casetas station, where it is set aside at the disposal of the TS.	Rolling stock failure	RENFE MERCANCIAS	1
16-apr.	Grisén	ZARAGOZA-PLAZA to MADRID - ABRONIGAL	1	UN 1951 Liquid argon (refrigerated liquefied gas, asphyxiant)	Train travelling with side door open on the control panel of a container with DD.GG. The driver is informed. The driver stops at the next station, where he closes the door and continues the journey.	Operational human factor. Train formation	RENFE MERCANCIAS	1
29-apr.	Between Fuente de Piedra and Antequera Santa Ana Aguja km 50.4	MADRID-ABRONIGAL to ALGECIRAS	1	UN 2187 Refrigerated liquid carbon dioxide (refrigerated liquefied gas, asphyxiant)	Train travelling with side door open on the control panel of a container with DD.GG. The driver is informed. The driver closes the door and continues the journey.	Operational human factor. Train formation	RENFE MERCANCIAS	1
17-may.	Grisén	TARRAGONA-MERCADERIES to VICALVARO-MERCANCIAS	1	UN 1010 Stabilised butadiene (flammable gas, liable to spontaneous violent reaction)	Train running with flat tyres on one carriage, empty and uncleaned. The affected carriage and the adjacent carriage, both empty and uncleaned, are segregated at Grisén station, where they are set aside at the disposal of the railway undertaking. The affected carriage and the adjacent carriage, both empty and uncleaned, are segregated at Grisén station, where they are set aside at the disposal of the TS.	Rolling stock failure	RENFE MERCANCIAS	1
27-may.	Between Villamartin de Valdeorras and a Rua-Petin	LEÓN-CLASIFICACIÓN	1	UN 1824 Sodium hydroxide solution (corrosive or slightly corrosive substance)	Train stopped between Villamartin de Valdeorras and A Rua Petin station due to a brake failure in a carriage (air leak in semi-coupling), with DD.GG., located in 4th place in the train. The train is assisted to A Rua de Petin station, where railway personnel repair the fault (replacement of air passage valve) and the journey continues.	Rolling stock failure	RENFE MERCANCIAS	1
6-jun.	Between Caldes de Malavella and Macanet-Massanes	PORTBOU to CONSTANTÍ	1	UN 2055 Stabilised styrene monomer (flammable liquid, liable to spontaneous violent reaction)	Train triggers alarm when passing through hot axle detector (HAD) due to very hot axle on a flatcar with DD.GG. that had previously triggered a hot axle alarm. The driver is informed. The driver stops the train to identify the affected car and reports smoke. The railway undertaking orders the train to be withdrawn from service as it does not have the means to remove the affected carriage	Rolling stock failure	RENFE MERCANCIAS	1
3-jul.	Between Bif. Arcade and Pontevedra	VIGO-GUIXAR to LEÓN - CLASIFICACIÓN	1	UN 1824 Sodium hydroxide solution (corrosive substance)	Train stopped on track II between Bif. Arcade and Pontevedra due to brake system problems (breakage of the automatic brake pipe (ABP) on a flatcar with DD.GG.). The driver isolated the car and continued to Pontevedra station, where the train was taken out of service to repair the affected car.	Rolling stock failure	RENFE MERCANCIAS	1

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Date	Location	Train origin/destination	A.V.	Hazardous materials contained in A.V.	Description	Cause	Affected operator	Type of accident
22-aug.	Between La Gineta and Socuéllamos	ESCOMBRERAS to BABILAFUENTE	2	UN 1965 Mixture of hydrocarbons (flammable gas)	Train triggers consecutive alarms due to hot axles on two carriages loaded with DD.GG. After the first alarm, in accordance with the Railway Traffic Regulations (RTR), the driver stops the train for inspection. Finding no abnormalities, he continues the journey. After the second alarm, the railway undertaking decides to take the train out of service at Socuéllamos station.	Rolling stock failure	RENFE MERCANCIAS	1
17-oct.	Between El Reguerón and Riquelme - Sucina	VICALVARO-MERCANCIAS to ESCOMBRERAS	1	UN 1965 Mixture of liquefied hydrocarbon gases, N.O.S. (flammable gas)	Train split due to breakage of a traction element (flange) on a carriage (empty, having previously contained DD.GG.). The driver proceeds to couple the affected carriage to the flange of the adjacent carriage.	Rolling stock failure	RENFE MERCANCIAS	1
22-oct.	Calatayud	MADRID-ABROÑIGAL to IRUN	1	UN 1779 Formic acid (corrosive or slightly corrosive and flammable substance)	The driver requests to be taken out of service at Calatayud station to check the train for possible air loss in the brakes. After checking the train (20 carriages), he reports that six carriages have a fault in the automatic brake pipe (ABP), had previously contained DD.GG. The train is taken out of service.	Rolling stock failure	RENFE MERCANCIAS	1
24-oct.	Between Martorell Central and Sant Sadurní d'Anoia	MONTORNES-BUTANO to TARRAGONA-MERCADERIES	1	UN 1965 Mixture of hydrocarbons (flammable gas)	Train running with a rear carriage bogie (empty, having previously carried passengers and luggage) from which sparks are coming due to a possible seized axle. The train is pulled over so that the driver can check the condition of the affected bogie. The driver reports that he has correctly positioned the carriage isolation switch and is ready to resume the journey.	Operational human factor. Train formation	RENFE MERCANCIAS	1
28-oct.	Between Cambrils and Rifa	TARRAGONA-MERCADERIES to PUERTOLLANO - REFINERIA	1	UN 2398 METHYL-TERT-BUTYL (highly flammable liquid substance)	Train reports impact alarm on track in a tanker car with DD.GG. Train returns to its origin.	Rolling stock failure	MEDWAY	1
20-nov.	Between El Reguerón and Riquelme - Sucina	ESCOMBRERAS to MADRID-SANTA CATALINA	1	UN 1965 Mixture of hydrocarbons (flammable gas)	Fire in a tank car with DD.GG. due to a seized brake. Firefighters responded. The tank was not damaged, only the wheel set of the car. The affected car was segregated.	Rolling stock failure	RENFE MERCANCIAS	1
23-nov.	Huelva - Mercancías	VICALVARO-MERCANCIAS to HUELVA-MERCANCIAS	2	UN 1965 Mixture of hydrocarbons (flammable gas)	After receiving the train at its destination, it is observed that two tank wagons (empty, having previously contained DD.GG.), have their loading/unloading valves open, with no apparent leakage. The refinery is informed so that personnel can be dispatched to close the valves.	Operational human factor	RENFE MERCANCIAS	1
11-jan.	Barcelona-Morrot	BARCELONA-MORROT to LÍMITE ADIF-LFPSA	0	---	Deraiment of two wagons without DD.GG.	Operational human factor. Train formation	RENFE MERCANCIAS	2
23-jun.	Medina del Campo	---	0	---	Deraiment of a wagon without DD.GG. during manoeuvres on service tracks due to ordering forward movement without removing the anti-derailment wedge.	Operational human factor	CAPTRAIN ESPAÑA SAU	2
2-jul.	Between San Juan del Puerto and Niebla	HUELVA-MERCANCIAS to VICALVARO-MERCANCIAS	2	UN 1965 Mixture of liquefied hydrocarbon gases N.O.S. (flammable gas)	Train stopped between San Juan del Puerto and Niebla stations due to a collision with the overhead line, damaging the upper part of two of the tank wagons carrying DD.GG. The train was assisted to San Juan del Puerto, where it was taken out of service.		RENFE MERCANCIAS	2

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Date	Location	Train origin/destination	A.V.	Hazardous materials contained in A.V.	Description	Cause	Affected operator	Type of accident
5-aug.	Between Llerena and Cazalla-Constantina	VILLAFRANCA DE LOS BARROS to HUELVA-MERCANCIAS	0	---	Three locomotives derailed on a siding at Guadalcanal station due to a fault in the facilities. The unaffected part of the train was rescued and taken to El Fresnal station.	Failure of installations. Track equipment.	RENFE MERCANCIAS	2
31-oct.	Between Madrid-Chamartín and Alcalá de H.-Ariza	CONSTANTIN to MADRID-ABROÑIGAL	0	---	Derailed of 11 carriages without DD.GG. on board upon entering Matillas station, due to rolling stock failure (detachment of a component).	Rolling stock failure	RENFE MERCANCIAS	2
13-dec.	León-Clasificación	ZARAGOZA-PLAZA to LEÓN - CLASIFICACION	0	---	Derailed of a wagon without DD.GG. that was part of a cut-off section, because of its incorrect immobilisation.	Operational human factor. Traffic operations during manoeuvres	RENFE MERCANCIAS	2
19-dec.	Between Aznalcázar-Pilas and Carrión de los Céspedes	VICALVARO-MERCANCIAS to HUELVA-MERCANCIAS	1	UN 1965 Mixture of hydrocarbons (flammable gas)	Collision with an obstacle (vehicle close to the track) within the clearance gauge, causing damage to the first tank wagon of the train (empty, having previously contained DD.GG.).	Failure of others. Intruders	RENFE MERCANCIAS	2
24-jul.	Between Girona-Mercaderies and Girona	GRANOLLERS-CENTRE to PORTBOU	1	UN 1033 Methyl ether (flammable gas)	Container, empty and uncleaned, catches fire because of collision with objects detached from the catenary. The fire service intervenes, and traffic is cut off for more than 3 hours.	---	RENFE MERCANCIAS	4

The column "A.V." shows the number of vehicles affected with dangerous goods.

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.

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

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LAND USE

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The active railway network managed by **Adif** spans a total length of 11,672.7 km. The total area occupied is estimated at 36,875 hectares, with the affected area potentially extending to 74,412 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 infrastructure

The area affected by the active railway network managed by **Adif** is **74,412 ha**, which includes the **36,875 ha** occupied by the platform, cuttings, and embankments.

Table 30. 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

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

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

In 2024, some of the works carried out on the conventional network took place in areas belonging to the Natura 2000 Network. A total of 116 projects were carried out in these areas, representing 23.3% of all projects completed during this period.

These occupations include temporary uses (construction roads, auxiliary facilities, etc.) and permanent uses (railway lines and associated infrastructure). In 2024, temporary occupations for active construction works in Natura 2000 areas amounted to 1.5 ha, while occupations due to permanent elements in such areas reached 4.7 ha. It should be noted that all these occupations involved conventional network platform works.

In 2024, the conventional and metric-gauge rail network in operation reached a length of 11,672.3 kilometres, of which nearly 1,108.4 kilometres pass through Natura 2000 network areas, representing 9.5% of the conventional and metric-gauge network.

Table 31. 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	28.9%	1,751.3	137.1	7.8%
Aragon	21.9%	856.8	49.5	5.8%
Cantabria	25.5%	280.7	15.8	5.6%
Castile and León	20.1%	1,947.2	240.3	12.3%
Castile-La Mancha	20.6%	870.2	45.1	5.2%
Catalonia	29.9%	1,171.7	80.2	6.8%
Foral Community of Navarre	27.0%	162.1	3.5	2.1%
Community of Madrid	39.8%	730.5	141.8	19.4%
Valencian Community	26.8%	639.7	60.6	9.5%
Extremadura	22.4%	724.9	178.2	24.6%
Galicia	11.7%	1051.9	68.6	6.5%
La Rioja	35.7%	187.6	15.3	8.2%
Basque Country	20.6%	455.5	48.4	10.6%
Principality of Asturias	26.9%	597.5	13.7	2.3%
Region of Murcia	14.8%	244.6	10.3	4.2%
Total		11,672.3	1,108.4	9.5%

* Prepared internally based on Adif mapping

Source: Nature Data Bank. Ministry for Ecological Transition and Demographic Challenge. Data updated in December 2024.

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IMPACT MANAGEMENT IN NEW INFRASTRUCTURE DEVELOPMENT

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

	2018	2019	2020	2021	2022	2023	2024
Notes of Exemption from EIA Procedures	85	123	121	163	81	133	83
Environmental Compatibility Reports	84	120	121	163	81	133	83
Adequacy reports to EIA	9	10	15	24	14	20	33
Certificate of compliance with the EIA	8	12	7	10	11	7	0
Environmental review report	386	597	742	735	806	855	590
Total	572	857	1,006	1,095	993	1,148	789
Environmentally completed projects	102	145	143	197	106	160	116
Documents Submitted for Review	209	323	324	350	296	845	607

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

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

Table 33. Environmental supervision of Adif projects in the construction phase (no. of reports/year)

	2018	2019	2020	2021	2022	2023	2024
Environmental Suitability Reports	0	4	8	11	9	19	20
Notes of Exemption from EIA Procedures	28	41	35	38	17	30	37
Emergency construction works	38	33	33	24	11	12	22
Supplementary EIA/EIR Compliance Reports	0	0	0	1	N/A	N/A	N/A
EIA/EIR Compliance Reports for Modified Projects	0	0	0	4	8	1	0
Environmental Review Reports	0	7	6	17	23	32	45
Total	66	85	82	95	68	94	45

*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.*

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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.

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Figure 24. 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 34. Regulatory reports on environmental monitoring of projects with EIS/EIR (No. of reports/year)

	2018	2019	2020	2021	2022	2023	2024
Periodic	28	37	32	33	53	72	85
Prior to the acceptance of the work	2	5	7	8	3	7	7
Parallel to the Site Layout Verification Report	0	4	3	15	13	12	15
Prior to the start of the works	0	9	4	17	15	9	14
Total	30	55	46	73	84	100	121

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 35. Monitoring reports for projects not subject to EIA/EIR (No. of reports/year)

	2018	2019	2020	2021	2022	2023	2024
No. of Active Projects with Environmental Monitoring	30	85	118	139	165	175	159
Initial reports	0	64	48	56	51	60	55
Monitoring reports	113	457	692	768	760	963*	1,275
Periodic reports	0	33	45	47	47	44*	55
Final reports	0	35	37	55	60	7*	42
Total reports	113	589	822	926	918	1,074	1,427

* Data revised in relation to the 2023 Environmental Report.

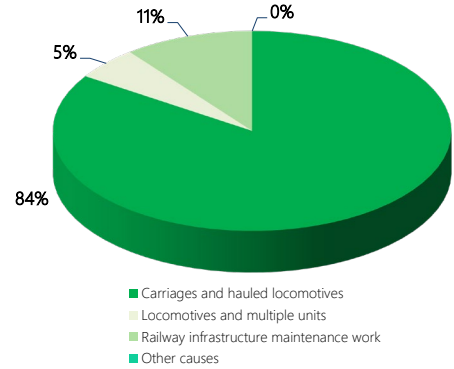
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

FIRE PREVENTION

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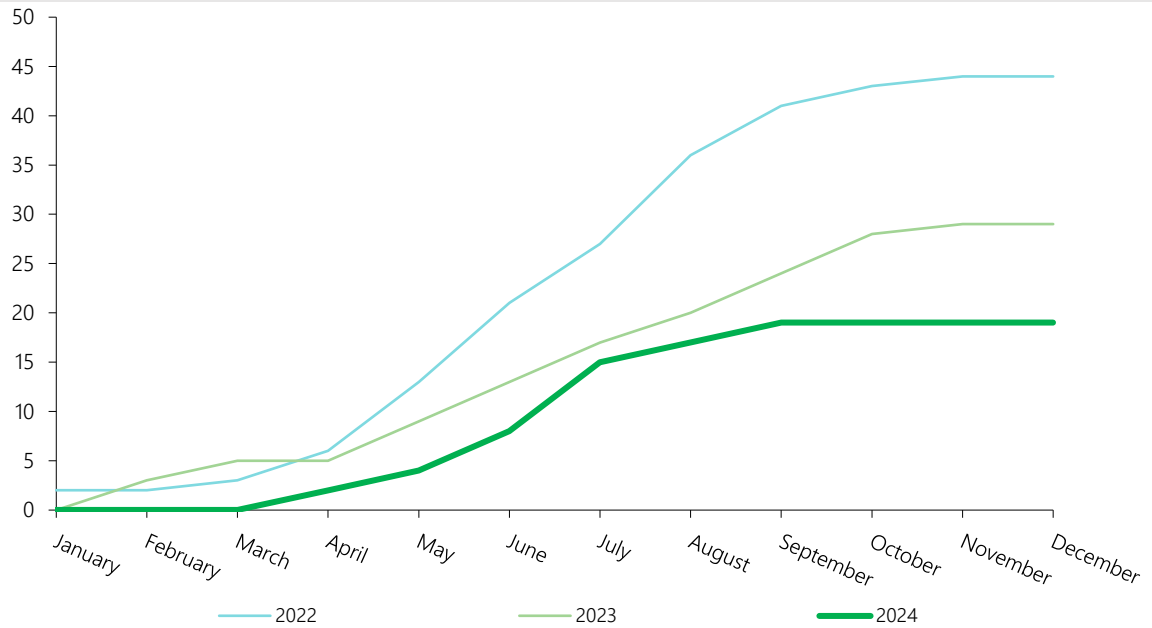
During 2024, nineteen (19) fires were recorded on the trackside of the conventional network, caused by faults in installations, locomotives, railway carriages, and maintenance work on the railway infrastructure. This represents a decrease compared to 2023, when 29 fires were recorded.

Chart 30. Presumed cause of the fire (%). Year 2024



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

Chart 31. 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 2024, are defined in the *Plan of actions for the prevention and fight against forest fires for 2024* approved by the Council of Ministers on 18 June 2024. This plan involves numerous ministerial departments, including the Ministry of Transport

and Sustainable Mobility, which oversees the railway sector and to which **Adif** is attached.

Since 2006, **Adif**, in compliance with the provisions of Royal Decree-Law 11/2005¹⁷ of 22 July approving urgent measures on forest fires, has signed collaboration agreements with the

¹⁷ Royal Decree-Law 11/2005 of 22 July 2005 approving urgent measures on forest fires (BOE no. 175, of 23 July 2005)

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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 an herbicide applicator train



Figure 25. Fire protection measures on trackside

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

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.

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

❖ Monitoring of train braking systems

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

❖ Monitoring of rail work with ignition sources

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

❖ Monitoring of the proper functioning of Hot Box Detectors and Stuck Brake Detectors

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

❖ Chemical and mechanical cleaning of track edges

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

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

❖ Monitoring trains as they pass through stations

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

❖ Coordination and participation committees for railway operations

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

Conversely, the Spanish 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.

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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

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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 2024, over **3,500 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 26. Llobregat Greenway (Catalonia)

Source: www.viasverdes.com

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Table 36. Number of greenways upgraded and under implementation as of December 2024

Autonomous community	Conditioned	In progress	Total	Greenways in progress
Andalusia	26	1	27	Railway Baeza - Utiel NT-GW (A. Ojanco-Villanueva del Arzobispo)
Aragon	6	2	8	Ojos Negros Greenway - NT (Peracense-Santa Eulalia) Val de Zafán Greenway - NT (Alcañiz-Valdealgofra)
Aragon-Navarra	1	0	1	
Asturias	8	0	8	
Cantabria	5	1	6	Railway Santander-Mediterráneo NT-GW (Yera-Túnel Engaña)
Castile and León	16	2	18	Ruta de la Plata Greenway -NT (Navalmoral B.-Alba Tormes) Tierra de Campos II Greenway -NT (Cuenca de Campos-Medina de Rioseco)
Castile and León-Extremadura	1	0	1	
Castile-La Mancha	10	0	10	
Castile-La Mancha-Andalusia	1	0	1	
Catalonia	11	1	12	Val de Zafán Greenway (Section 3)
Valencian Community	16	1	17	Ribera Costera GW (Xàtiva-Carcaixent)
Extremadura	3	0	3	
Galicia	3	1	4	Compostela-Tambre-Lengüelle Greenway (Municipality of Santiago, Sionlla- tunnel 2 and Ramelle- Viaduct over the Tambre River Sections)
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	1	2	Extension of the Irati NT-GW (Valle Egüés-Lumbier and Liédena-L.P. Zaragoza)
Navarre-Basque Country	3	0	3	
Basque Country	11	0	11	
Total	141	10	151	

* Temporary closure of the La Jara Greenway

Source: Fundación de los Ferrocarriles Españoles, 2024

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Table 37. Kilometres of greenway supgraded and in progress by December 2024

Autonomous community	In operation	In progress	Total	Greenways in progress
Andalusia	677.84	25.95	703.79	Railway Baeza - Utiel NT-GW (A. Ojanco-Villanueva del Arzobispo)
Aragon	213.92	28.49	242.41	Ojos Negros NT-GW (Peracense-Santa Eulalia) Val de Zafán NT-GW (Alcañiz-Valdealgofa)
Aragon-Navarra	21.82	0.00	21.82	
Asturias	82.40	0.00	82.40	
Cantabria	67.20	3.06	70.26	Railway Santander-Mediterráneo NT-GW (Yera-Túnel Engaña)
Castile and León	534.26	75.58	609.84	Ruta de la Plata NT-GW (Navalmoral B.-Alba Tormes) Tierra de Campos II NT-GW (Cuenca de Campos-Medina de Rioseco)
Castile and León-Extremadura	65.59	0.00	65.59	
Castile-La Mancha	183.48	0.00	183.48	
Castile-La Mancha-Andalusia	46.76	0.00	46.76	
Catalonia	225.88	35.45	261.33	Val de Zafán Greenway (Section 3)
Valencian Community	228.59	7.64	236.23	Ribera Costera GW (Xàtiva-Carcaixent)
Extremadura	95.04	0.00	95.04	
Galicia	42.92	5.76	48.68	Compostela-Tambre-Lengüelle Greenway (Municipality of Santiago, Sionlla- tunnel 2 and Ramelle- Viaduct over the Tambre River Sections)
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	45.43	51.82	Extension of the Irati NT-GW (Valle Egüés-Lumbier and Liédena-L.P. Zaragoza)
Navarre-Basque Country	254.11	0.00	254.11	
Basque Country	135.11	0.00	135.11	
Total	3,281.25	227.36	3,508.61	

* Temporary closure of the Vía Verde de La Jara.

Source: Fundación de los Ferrocarriles Españoles, 2024

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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 Andalusia, 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 Alhambilla*, awarded to the Lucainena de las Torres Greenway. 2017

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- **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 Vías 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 Award**, awarded the special prize for the 30th anniversary of the *Vías Verdes de la Fundación de Ferrocarriles* (Railway Foundation Greenways Program). 2023.
- Recognition of the Spanish Railway Foundation for its contribution to promoting cycling. Network of Cities and Territories for Cycling. 2024
- Finalist in two categories of the II Accessibility Awards for promoting accessible tourism for all. CRFM IMSERSO Salamanca 2024

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.

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GREEN STATIONS

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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 38. Stations, Natural Areas, and Connected Greenways *

Station	Managing Unit	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

Seventy (70) Greenways run near one hundred and forty-two (142) Protected Natural Areas (PNA), located in fourteen (14) autonomous communities.

The total length of Greenways in protected natural areas is 2,221.88 km.

Table 39. Greenways and Protected Natural Areas

Greenway	Autonomous community	Protected Natural Area	Protection status	Length (km)
El Ronquillo Greenway	Andalusia	Sierra de Aracena y 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
Campiña Greenway	Andalusia	Tramo Inferior del Río Guadajoz, Río Guadalquivir - Tramo medio	Site of Community Importance SCI (SPA/SAC)	91.93
Sierra Greenway	Andalusia	Río Guadalete, Peñón de Zaframagón, Chaparro de la Vega	Site of Community Importance SCI (SPA/SAC), Natural Monument, Nature Reserve	36.03
Sierra Morena de Sevilla Greenway	Andalusia	Cerro del Hierro, Cascadas del Huesna, Sierra Norte, Sierra Norte de Sevilla	Site of Community Importance SCI (SPA/SAC), Natural Monument, Natural Park	18.28
Molinos del Agua Greenway	Andalusia	El Saltillo y Lomero Llano	Periurban Park	33.21
Lucaína de las Torres Greenway	Andalusia	Sierra de Cabrera-Bedar	Site of Community Importance SCI (SPA/SAC)	15.54
Vía Verde de Río Tinto Greenway	Andalusia	Corredor Ecológico del Río tinto, Río Tinto	Site of Community Importance SCI (SPA/SAC), Protected Landscape	5.86
Aceite Greenway	Andalusia	Sierras Subbéticas, Sierra Subbética, Lagunas del Sur de Córdoba, Laguna Honda, Laguna del Chinche, Laguna del Conde o Salobral, Cueva de los Murciélagos	Site of Community Importance SCI (SPA/SAC), Natural Monument, Natural Park, Nature Reserve	127.35
Railway Guadix - Almedricos (Baza - Valle del Almanzora) Greenway	Andalusia	Sierra de Baza	Site of Community Importance SCI (SPA/SAC), Natural Park	98.70
Guadalimar Greenway	Andalusia	Tramo Inferior del Río Guadalimar y Alto Guadalquivir, Río Guadalimar	Site of Community Importance SCI (SPA/SAC)	15.31
Guadiana Greenway	Andalusia	Andévalo occidental, Río Guadiana and Ribera de Chanza	Site of Community Importance SCI (SPA/SAC)	16.68
Guadiato y 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 y Flecha del Rompido	Site of Community Importance SCI (SPA/SAC), Natural Site	48.91

Table 39. Greenways and Protected Natural Areas

Greenway	Autonomous community	Protected Natural Area	Protection status	Length (km)
Matagorda (Trocadero) Greenway	Andalusia	Bahía de Cádiz, Isla del Trocadero	Site of Community Importance SCI (SPA/SAC), Natural Site, Natural Park	3.55
Tharsis Odiel Greenway	Andalusia	Estuario del Río Tinto, Marisma de El Burro, Marismas del Odiel	Site of Community Importance SCI (SPA/SAC), Natural Site, Nature Reserve	29.75
Fuso Greenway	Principality of Asturias	Cueva de las Caldas	Partial Nature Reserve	8.46
Senda del Oso Greenway	Principality of Asturias	Desfiladero de las Xanas, Las Ubiñas-La Mesa	Natural Monument, Natural Park	41.20
Valle de Turón Greenway	Principality of Asturias	Cuencas Mineras	Protected Landscape	12.96
Besaya Greenway	Cantabria	La Viesca	Natural Area of Special Interest	20.14
Pas Greenway	Cantabria	Río Pas	European Ecological Network Natura 2000 Area	35.41
Railway Santander Mediterráneo (Yera Túnel Engaña) Greenway	Cantabria	Montaña Oriental	European Ecological Network Natura 2000 Area	3.06
Camino de Hierro Greenway	Castile and León	Arribes del Duero	Natural Park	16.47
Railway Santander - Mediterráneo (Burgos - Cascajares de la Sierra) Greenway	Castile and León	Sabinares del Arlanza-La Yecla	Natural Park	50.40
Railway Santander - Mediterráneo (Soria - Hontoria del Pinar) Greenway	Castile and León	Cañón del Río Lobos	Natural Park	66.68
Railway. Santander-Mediterráneo (Burgos-La Engaña) Greenway	Castile and León	Montes Obarenes-San Zadornil	Natural Park	112.45
Ruta de la Plata (Plasencia - Béjar) Greenway	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
Railway Baeza - Utiel (Sierra de Alcaraz) Greenway	Castile-La Mancha	Laguna de los Ojos de Villaverde	Nature Reserve	77.34
Trenillo de la Calzá Greenway	Castile-La Mancha	Macizo Volcánico de Calatrava	Natural Monument	14.20
Railway Baeza - Utiel (Reolid Segura) Greenway	Castile-La Mancha - Andalusia	Cuencas del Rumber, Guadalén y Guadalmena, Estrecho del Hocino, Sierras de Cazorla, Segura y las Villas	Site of Community Importance SCI (SPA/SAC), Micro-reserve, Natural Park	46.76
Carrilet Girona - Sant Feliù de Guíxols Greenway	Catalonia	Les Gavarres, Massís de les Cadiretes	Special Protection Plan (SPP)	39.43
Carrilet Olot - Girona Greenway	Catalonia	Collsacabra, Les Guillerries, Riu Brugent, Riu Fluvià, Riu Llémena, Volcà de Sant Marc, Volcà del Puig Roig, Volcà el	Partial Nature Reserve, Natural Park, Special Protection Plan (SPP)	57.58

Table 39. Greenways and Protected Natural Areas

Greenway	Autonomous community	Protected Natural Area	Protection status	Length (km)
		Raco, Volcà Montolivet, Zona Volcànica de la Garrotxa		
Ferro i del Carbo Greenway	Catalonia	Riberes de l'Alt Ter	Special Protection Plan (SPP)	12.18
Llobregat Greenway	Catalonia	Serra de Picancel	Special Protection Plan (SPP)	6.37
Nicolau Greenway	Catalonia	Serra del Catllaràs, Serres del Cadí-Moixeró, Cadí-Moixeró	Natural Park, Special Protection Plan (SPP)	5.35
Tren Petit Greenway	Catalonia	Castell-Cap Roig	Special Protection Plan (SPP)	6.54
Tren Pinxo Greenway	Catalonia	Riberes del Baix Ter, Rieres de Xuclà i Riudelleques	Special Protection Plan (SPP)	5.71
Val del Zafán Greenway	Catalonia	Serres de Pàndols-Cavalls, Ribera de l'Algars, Barrancs de Sant Antoni-Lloret-la Galera, Aligars-Serra Fulletera, Les Illes de l'Ebre, Els Ports, Serres de Cardó-el Boix	Wildlife Nature Reserve, Partial Nature Reserve, Special Protection Plan (SPP)	82.55
Val de Zafán (Section 3) Greenway	Catalonia	Delta de l'Ebre, Riberes i illes de l'Ebre, Serra de Montsià	Natural Park, Special Protection Plan (SPP)	35.45
Ojos Negros Greenway Xurra connection	Valencian Community	La Costera	Municipal Natural Area	16.08
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 Area, Natural Park, Caves	21.77
Llíria Greenway	Valencian Community	Turia	Natural Park	5.73
Ojos Negros (Valencian Community) Greenway	Valencian Community	La Esperanza, Sierra Calderona	Municipal Natural Area, Natural Park	75.56
Torreveija Greenway	Valencian Community	Parque Natural Lagunas de La Mata-Torreveija, Lagunas de la Mata y Torreveija	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 y Serra del Sit, Geological K/T boundary, Capa Negra, in the municipal district of Agost	Natural Monument, Protected Landscape	21.15
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	Valencian Community	Les Salines	Municipal Natural Area	1.77
Compostela-Tambre-Lengüelle Greenway	Galicia	Río Tambre	Natura 2000 Protected Area	28.42
Vigo - Redondela Greenway	Galicia	Enseada de San Simón	Natura 2000 Protected Area	5.29
Eo Greenway	Galicia- Principality of Asturias	Río Eo	Natura 2000 Protected Area	11.43
El Cortijo Greenway	La Rioja	Sotos y Riberas del Ebro	Natura 2000 Protected Area	2.95

Table 39. Greenways and Protected Natural Areas

Greenway	Autonomous community	Protected Natural Area	Protection status	Length (km)
Préjano Greenway	La Rioja	Peñas de Arnedillo, Peñalmonete y Peña Isasa	Natura 2000 Protected Area	5.18
Río Oja Greenway	La Rioja	Sierras de Demanda, Urbión, Cebollera y Cameros	Natura 2000 Protected Area	39.54
Río Guadarrama Greenway	Community of Madrid	Curso Medio del Río Guadarrama y su entorno	Regional Park	5.78
Tajuña Greenway	Community of Madrid - Castile-La Mancha	Ejes de los Cursos Bajos de los Ríos Manzanares y Jarama	Regional Park	66.65
Mazarrón Greenway	Region of Murcia	Sierra de las Moreras	Protected Landscape	13.83
Railway Irati Greenway	Navarra	Acantilados de la Piedra y San Adrián, Foz de Lumbier	Nature Reserve	38.51
Bidasoa Greenway	Navarra- Basque Country	Cedro de Bértiz, Señorío de Bértiz	Natural Monument, Natural Park	41.57
Railway Vasco - Navarro Greenway	Navarra- Basque Country	Aizkorri-Aratz, Izki, Barranco de Lasia, Izki, Secuoya del Parque de Monterron	Nature Reserve, Natural Park, Natural Monument	133.73
Plazaola - Leizaran Greenway	Navarra- Basque Country	Leizaran, Sequoia del Palacio de Diputación	Nature Reserve, Natural Monument	78.81
Arditurri Greenway	Basque Country	Aiako Harria	Natural Park	12.12
Arrazola Greenway	Basque Country	Urkiola	Natural Park	4.92
Kadagua Greenway	Basque Country	Meatzaldea - Zona Minera de Bizkaia	Protected Landscape	5.44
Ferrocarriles Vascongados Greenway	Basque Country	Magnolio de Bergara	Natural Monument	15.75
Urola Greenway	Basque Country	Tramo Litoral Deba-Zumaia	Protected Landscape	40.17
Túnel de Morlans Greenway	Basque Country	Roble de Igara	Natural Monument	1.99
Total GW in PNA: 70	Total autonomous communities: 14	Total PNA: 140		Total km: 2,221.88

Source: *Fundación de los Ferrocarriles Españoles, 2024*

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KEY ACHIEVEMENTS IN THE CONSTRUCTION OF STANDARD GAUGE LINES

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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), according to the following schedule:

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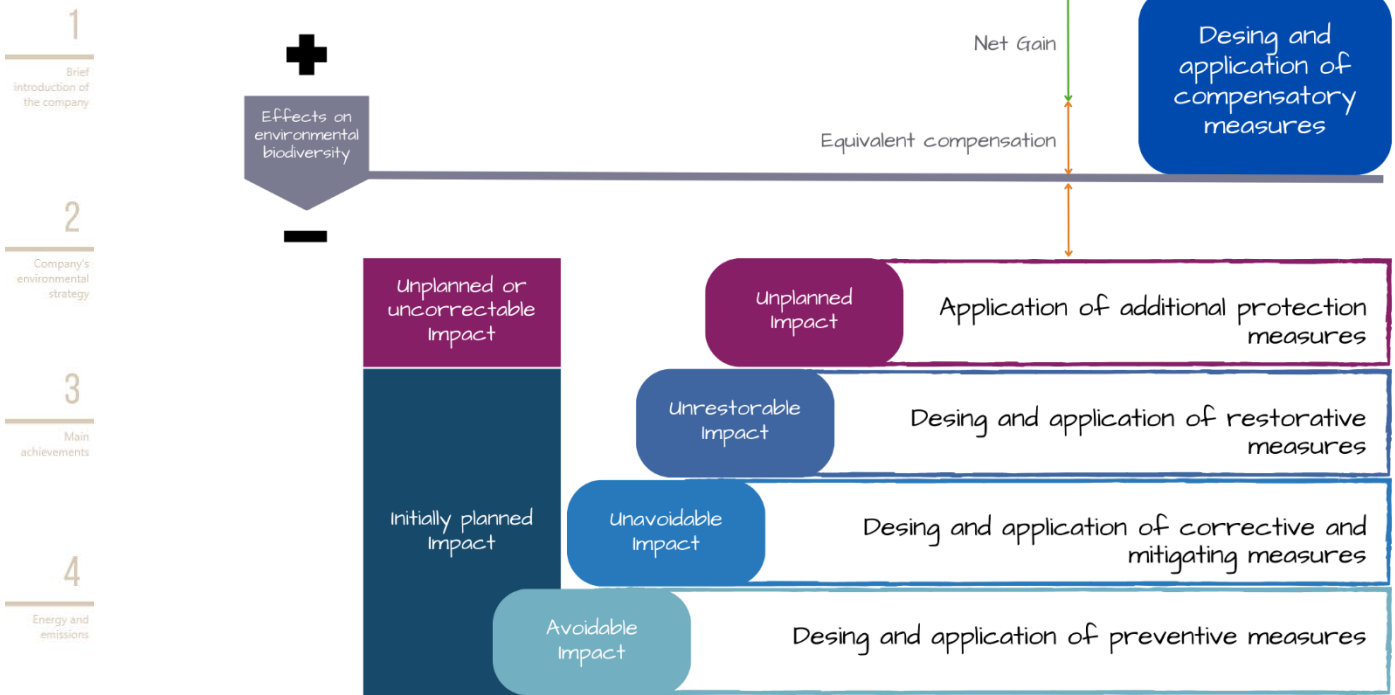
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For activities that may have a significant environmental impact, an on-site environmental monitor is assigned to oversee environmental control and compliance with current environmental regulations during the works. This work involves producing periodic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

- 12th National Congress on Environmental Impact Assessment held from 10 to 12 April in Vitoria. At this Congress, the paper 'Medidas de Protección y Reproducción "Ex Situ" de Flora Amenazada' (Ex Situ Protection and Reproduction Measures for Threatened Flora. Taxon Astragalus

Devesae) was presented, and the company participated in a round-table discussion entitled 'Nuevos enfoques adaptados a nuevas exigencias: La integración de nuevas tecnologías' (New approaches adapted to new requirements: The integration of new technologies), where environmental monitoring was addressed.

- The 'Group on Habitat Fragmentation Caused by Transport Infrastructures' fosters collaboration between government agencies, environmental organizations, and the scientific community to implement measures that prevent or mitigate the primary effects of transport infrastructure on fauna.
- ECOV4R (Ecosystem Evaluation for Railways), developed by the International Union of Railways, aims to methodologically assess the ecosystem values provided by railway infrastructure.

In addition, following the approval of Standard NAE 121 'Medidas para la protección de la avifauna en la LAC' (Measures for the protection

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of birdlife in the LAC) and Technical Instruction ADIF-IT-301-001-LAC-20-F-01 'Gestión de Electroclusiones de Avifauna en la LAC' (Management of Bird Electrocutation in the LAC), measures have been implemented for to protect birds on catenary lines. These measures apply both in the design phase, including preventive actions in areas of high bird interest, and corrective actions when incidents occur. In this regard, since the approval of this standard, a total of 21 electrocution incidents involving catenary have been reported. Based on these incidents, approximately 6.5 km of catenary and 132 supports have been corrected or are in the process of being corrected.



Figure 28. Anti-electrocution devices installed after an incident on the Madrid-Zaragoza-Portbou line

Key actions for the protection of biodiversity

➤ Fauna

- Rescue and relocation of amphibians during comprehensive infrastructure renovation work between Guillarei and *Valença do Minho*

Adif is currently undertaking various actions to improve the railway infrastructure in the Northwest Operations Sub-Directorate. As part of these actions, the comprehensive infrastructure and track renovation project between Guillarei and *Valença do Minho* is being carried out.

During environmental monitoring of the works, the presence of Iberian newts (*Lissotriton boscai*) was detected in the ditches running beneath the existing pergola in the municipality of Tuy. As the works required the removal of the right-hand ditch, several specimens of Iberian newts.

In order to safeguard the specimens in this ditch, the individuals were relocated to the left-hand

ditch, which presented similar characteristics but was not affected by the works.

On 22 April 2024, after verifying the water quality in the receiving ditch and under the supervision of the local Environmental Officer, the existing specimens were captured and relocated. A total of five passes were carried out, resulting in the capture and transfer of 121 Iberian newts.

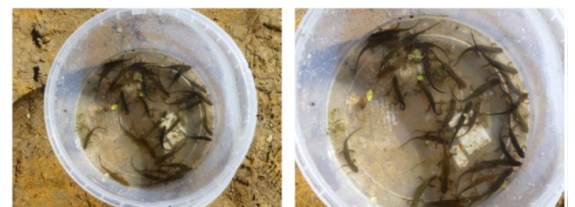


Figure 29. Specimens captured in the second sweep

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

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

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

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

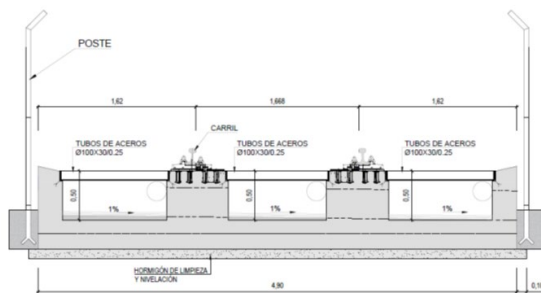


Figure 30. Cross-section of the Canadian crossing

➤ Flora and vegetation

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

Aware of the problem caused by invasive alien species¹⁸ and in line with **Adif's** policy on the protection of biodiversity and ecosystems, numerous actions are being undertaken to prevent their proliferation on construction sites.

The main species being targeted are Pampas grass (*Cortaderia selloana*), and butterfly bush (*Buddleja davidii*), which are particularly abundant

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



Figure 31. View of the completed Canadian crossing

along transport corridors in the north of the peninsula.

The implemented measures focus primarily on eradication treatments, using both mechanical and manual methods, as well as chemical treatments, to prevent the spread of these species. These interventions are scheduled outside the propagation periods of the target

¹⁸ According to the definition included in Law 42/2007 on natural heritage and biodiversity.

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species. Additionally, the plant material collected is either buried or shredded and subsequently delivered to an authorized waste manager.



Figure 32. Specimens of *Cortaderia selloana* and *Buddleja davidii* in the vicinity of the conventional network construction site

In the absence of technical references confirming their effectiveness, **Adif** and Adif-Alta Velocidad have initiated the development of a catalogue of measures for the eradication of invasive alien

species on land affected by railway infrastructure works (*Catálogo de medidas para la erradicación de especies exóticas invasoras en terrenos afectados por las obras de infraestructuras ferroviarias*). This catalogue, based on an initial review of strategies, action plans, and recommendations from public administrations (such as MITERD, Autonomous Communities, and other entities), provides a detailed characterization of all the treatments carried out.

In 2024, work was carried out to monitor the effectiveness of the different treatments, which are listed below:

Table 40. Assessment of Treatments for Invasive Alien Species

Section	Subsection	Treatment	<i>Cortaderia selloana</i>	<i>Buddleja davidii</i>
Villanova – San Juan de Nieva Line	K.P. 10/230 and K.P. 12/273, AFA	Clearing and chemical treatment		X
	K.P. 10/230 and K.P. 12/273, AFA	Clearing and chemical treatment	X	
Pravia Gijón Line	Santiago del Monte station	Railway line closure	X	

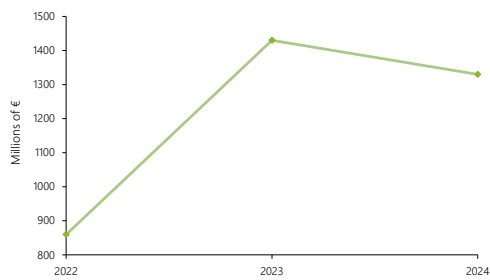
Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department

PRESERVATION OF ARCHAEOLOGICAL HERITAGE

Old tracks and new times

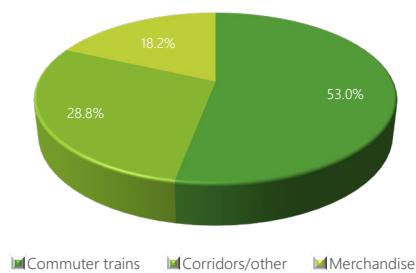
The conventional rail network has undergone significant development and improvement in recent years, driven by a substantial increase in investment in infrastructure upgrades. Over the past **five years**, investment has risen significantly, with a shift in focus from high-speed rail to the conventional and commuter networks. In 2022, a historic volume of contracts was awarded, followed in 2023 by record investment in the conventional network. In 2024, the most notable allocations were directed towards the Northwest corridor, commuter services, and freight operations.

Chart 32. Railway investment in Spain: evolution and distribution (2022-2024)



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

Chart 33. Distribution of conventional investment (Adif, 2024)



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

Alongside this investment, there has been a huge increase in demand for actions related to environmental compliance, including the protection of cultural heritage. To ensure that

railway works respect, preserve, and integrate elements of cultural heritage in a sustainable manner, in line with national and international regulations, **Adif** maintains a dedicated Environmental Works Surveillance (EWS) team. Coordinated by the Environment Sub-Department, this team of 30 EWS staff oversees the management of various environmental aspects of the works, including heritage-related issues.

The management of these aspects along lines in operation differs significantly from those of new construction projects. Firstly, many of these lines are very old, built long before any Cultural Heritage legislation was enacted. There are no specific studies of their surroundings, making it difficult to identify potential heritage issues.

Secondly, many of these structures along these lines are already classified as heritage sites. A considerable amount of material associated with the traditional use of the earliest railway lines – from the mid-19th to the early 20th century – is still preserved along these routes, including water tanks, gauges, switch points, turntable plates, weighbridges, among others, which are now considered industrial heritage and must be preserved. Furthermore, numerous buildings associated with the infrastructure are also heritage sites. Some are exceptional examples of railway architecture, while others, more modest, reflect the historical lifestyle of a railway that contributed to the country’s development and progress. Stations, halts, huts, bridges, tunnels, and other structures – many now abandoned – still define the current network, and their conservation poses challenges for the integration of new technologies and needs.

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A century-long leap forward

Updating the conventional network is a key strategic challenge in adapting existing infrastructure to the demands of modern rail traffic. This process involves a series of technical and structural interventions aimed at improving speed, safety, sustainability, and interoperability.

Firstly, the conventional network has structural deficiencies due to its age and because it was originally designed to meet standards applicable at the time. Comprehensive renovation of the track superstructure – including rails, sleepers, ballast – along with the rectification of alignments to reduce sharp curves and improve turning radii, and the reinforcement of bridges and tunnels to support heavier loads and provide greater clearance, will directly affect the subsoil and the historic structures themselves.



Figure 33. Recent work on the Tosés Tunnel, Gerona

Moreover, to accommodate modern trains, lines must be electrified according to the standard system, and electrical substations and catenary systems must be upgraded. Likewise, replacing analogue systems with digital technologies is essential to ensure safe and efficient rail operations. The gradual implementation of the European Rail Traffic Management System (ERTMS), replacing the traditional ASFA (Automatic Brake and Signal Warning) system, will improve traffic management and increase line capacity. Centralising traffic control through Traffic Control Centres (TCCs) and automatic systems is also paramount. In many cases, and over long distances, these actions require the excavation of trenches or the preparation of foundations for cabinets and huts. In such

instances, it is essential that the heritage services of the competent authorities carry out assessments to determine appropriate prevention and mitigation measures. While some areas may be exempted from archaeological obligations following impact assessments, a significant proportion will require preventive archaeological monitoring and control of soil movements. In many cases, administrations will also require updated information to issue the necessary impact reports, which entails conducting preliminary surveys or heritage impact studies to determine the specific risks involved.



Figure 34. Night-time monitoring in the Córdoba-Seville terrestrial telecommunications improvement project. Surroundings of the archaeological prevention zone at the Peñaflor site

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Figure 35. Archaeological monitoring and control of archaeological excavations for a 34 km trench from Espeluy to Jaén for the installation of communications cables, passing alongside the site of the Iberian-Roman city of Cástulo

Special attention should be given to historic stations and buildings, some of which have been specifically listed, while many others are protected more generally as part of the industrial heritage inventory. These structures often require upgrades to meet current needs, including rising platforms up to standard heights, improving accessibility (lifts, ramps, and visual and acoustic signage), and automating interlocking systems. Such measures also facilitate the circulation of longer trains or trains with double compositions.



Figure 36. Work around the seven-peaked halt, a protected feature, under monitoring and control permit from the Ministry of Culture. Cercedilla-Cotos line

Rail freight transport is a key pillar of the commercial and freight mobility strategy. New proposals include increasing the gauge to accommodate high-cube containers (P400), electrifying industrial sidings, and constructing sidings of at least 750 metres long. Adif is actively committed to enhancing connections with ports, logistic hubs, and industrial centres, which is also essential for promoting intermodal transport.



Figure 37. Intervention in the ancient Iberian-Roman port of Sagunto for rail access to the current port

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Heritage protection

Working in environments of such historical significance, and with limited prior documentation, requires close coordination from the project design phase onward with the relevant authorities, whether the Ministry of Culture, regional governments, or local authorities.

The planning, design, execution, and operation of railway works must incorporate strategies to preserve, protect, and integrate cultural heritage directly or indirectly affected by the projects. This approach establishes a series of good practices aimed at ensuring compatibility between railway development and the conservation of cultural heritage.

Between 2020 and 2024, more than 160 works involving archaeological activities were carried out, with a high proportion of catalogued or protectable elements – over 300 in total – of which only 2% required comprehensive archaeological intervention.

To this end, **Adif's** internal control systems seek to ensure that procedures are in place to prevent, reduce, or compensate for impacts on cultural assets, promote the enhancement of railway, archaeological, and architectural heritage, among others, and reconcile respect for historical and cultural values without hindering the development of railway infrastructure.

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 Conservation and Maintenance 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.

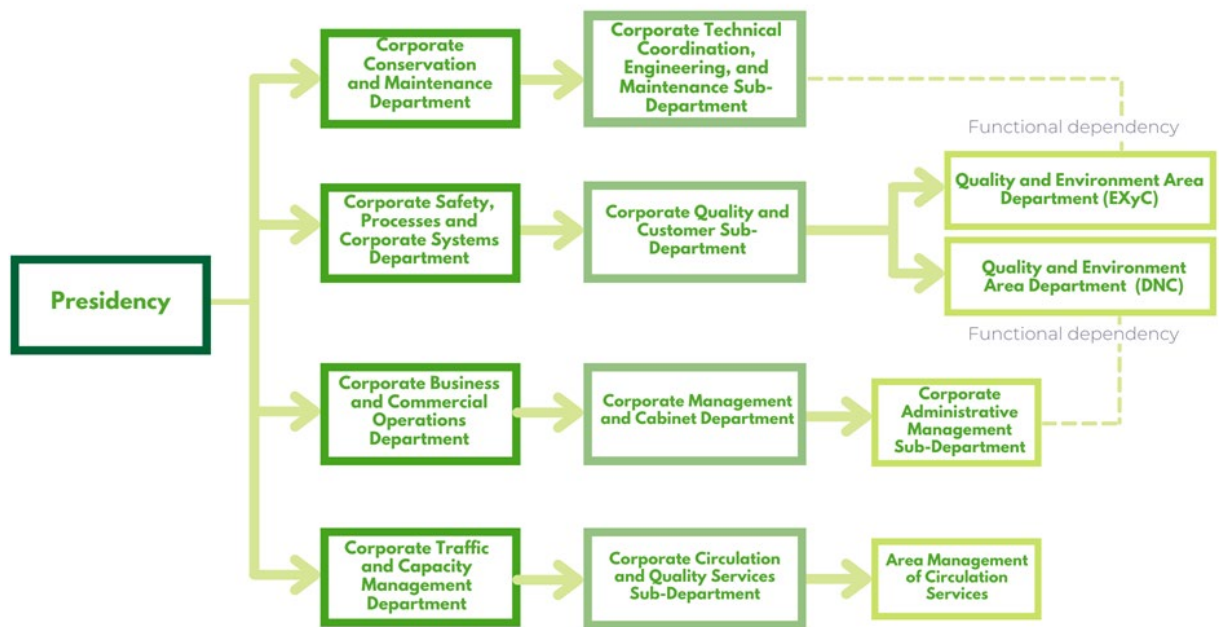


Figure 38. Extract from the organisational structure in force as of 31 December 2024

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.

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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:

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- The optimisation of the economic management of resources by leveraging synergies between different areas of activity.
- The avoidance of divergent interpretations of the same problem by third parties.
- The reduction of risks derived from legal non-compliance, through the establishment of regulated guidelines for action and management control.

EMS CERTIFICATION

The first point in **Adif** and Adif-Alta Velocidad Environmental Policy, revised in 2024, focuses on promoting improved environmental performance through the implementation, auditing, and periodic certification of its environmental criteria in line with the ISO 14001 standard, clearly defining responsibilities and internal tools for control and monitoring.

Since **Adif** was established in 2005, Renfe's environmental certification has been maintained, and the Management System has been enhanced. This certification resulted from the implementation of a certified Management System starting in 1999. Since then, both the scope of the environmental actions and the

physical application of the system have been revised, which led to the following situation in 2024:

2024 Milestones

By the end of 2024, two hundred and one (201) Adif and Adif-Alta Velocidad centres had achieved environmental certification under ISO 14001.

Three out of every seven conventional network* travellers use stations with environmental certification.

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

Table 41. ISO 14001 certification. Certifications obtained by Adif and Adif-Alta Velocidad as a whole

Scope	Outreach	Certificate
Adif	<ul style="list-style-type: none"> - Management of track alignment, tracks and railway facilities - Exploitation of passenger stations and logistics facilities for goods - Traffic administration and capacity management for the General Interest Railway Network - Management of fuel depots. 	AENOR GA-1999/0142-001/00
Adif-Alta Velocidad	<ul style="list-style-type: none"> - Environmental management of works with Environmental Impact Statement in the construction of railway infrastructure and facilities - Management and coordination of report drafting and projects for the railway infrastructure and facilities - Centralized coordination of waste, contaminated soil and noise management carried out in the construction and operation activities of railway infrastructure and facilities 	AENOR GA-1999/0142-002/00

* Following the segregation of Adif and Adif-Alta Velocidad, the EMS certificate was reorganised in 2015 to differentiate the two entities.

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



Figure 39. Supply deposits in Valencia

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.

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As a result of this line of work, 42.54% of passengers use certified stations managed by Adif.

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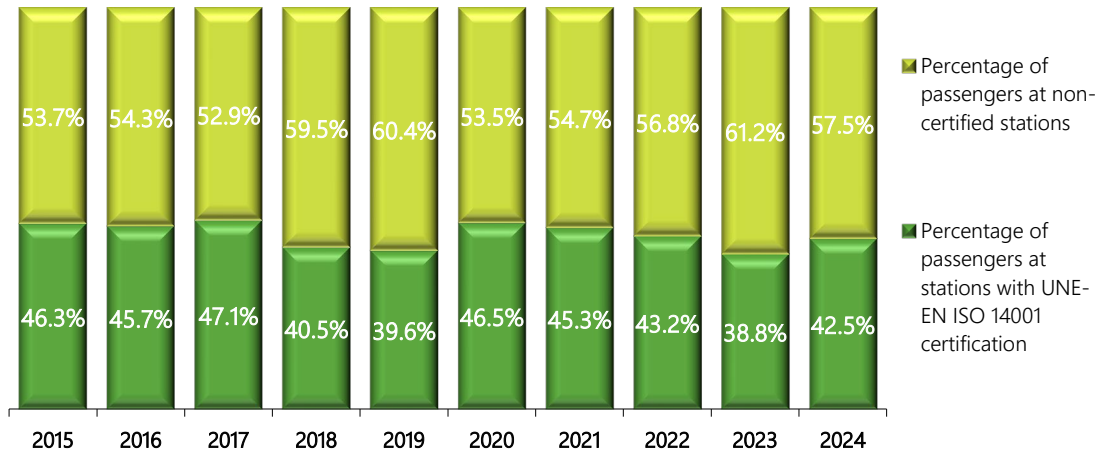
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Chart 34. Relevance index of ISO 14001 certifications in passenger stations



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

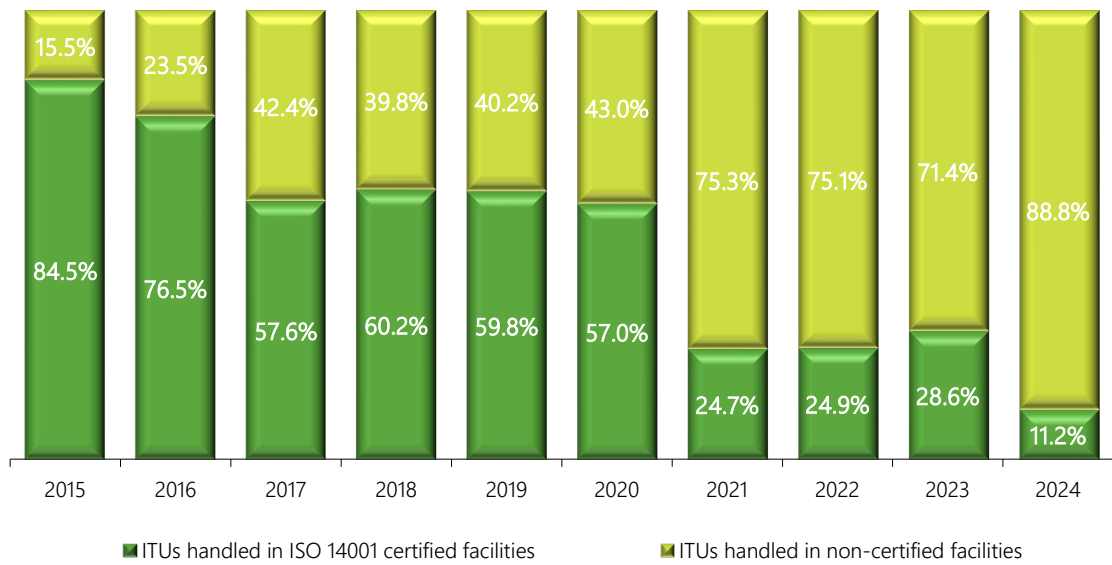


Figure 40. Almorchón Logistics Facility (Badajoz)

In 2024:

- **One out of every nine** Intermodal Transport Units (ITUs) handled at logistics services facilities are processed in one of the 4 ISO 14001 Environmentally Certified logistics facilities.
- Approximately **one in twelve** 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



In 2024, five freight terminals were removed from the scope of ISO 14001 certification.

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

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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 Unit, in this case, the Adif-Alta Velocidad Corporate Environmental Sub-Department.

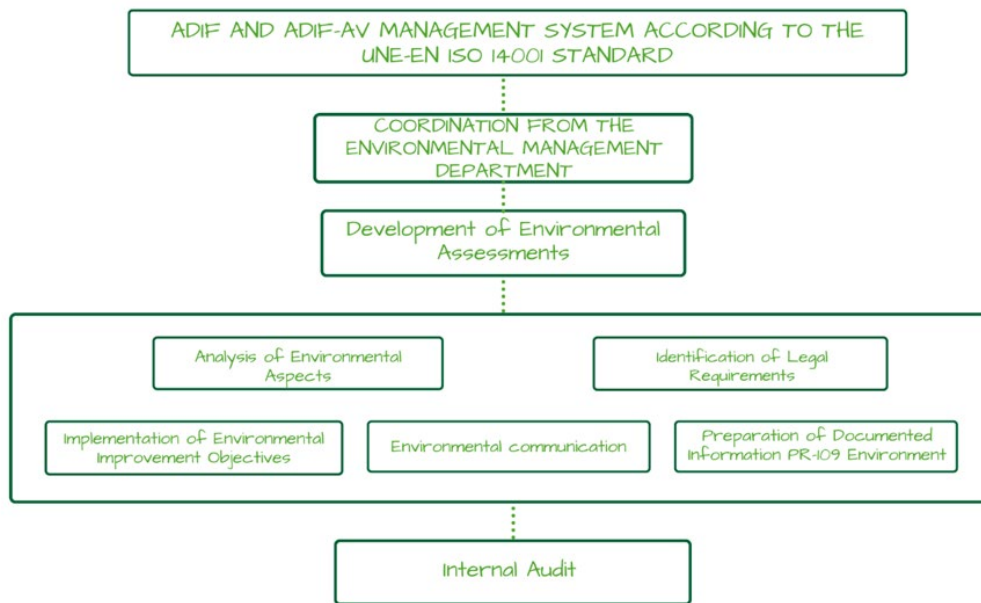


Figure 41. Centralised management of the EMS for Adif and Adif-Alta Velocidad

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:

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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

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The UNE-EN ISO 14001 Standard requires determining the limits of applicability of the EMS. To this end, **Adif** and Adif-Alta Velocidad have established a documented system for the Regulation of the Definition of the Scope of the System. In accordance with this systematic approach, the Activity Areas of **Adif** and Adif-Alta Velocidad document the Scope Sheets for certified centres within their responsibility, to define the applicable physical and organisational limits. In this context, there are Scope Sheets that identify 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

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.

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 Corporate Environmental Sub-Department based on the needs identified by the various Activity Areas of **Adif** and Adif-Alta Velocidad.

To promote consistency in Identification and Evaluation of Environmental Aspects, the Corporate Environmental Sub-Department is working to enhance coordination in these processes. This aims to optimise their control, analysing the information provided by the various Activity Areas of **Adif** and Adif-Alta Velocidad, as outlined in the General Procedure for Identification and Assessment of Environmental Aspects. It should be noted that the 2024 assessment (covering data for the 2023 period) analysed a total of 203 centres, compared to 92 assessed in 2022 (excluding DGCM centres). This overall comparison is not fully representative, as it does not include DGCM centres due to the late submission of the ADIF-PG-109-001-002-F-04 'Summary register of environmental aspects' form. The increase in the number of centres assessed in 2023 for the Corporate Business and Commercial Operations Department is due to the modification of the scope of the Management System, specifically

the addition of two new passenger stations (Guadalajara-Yebes and Villanueva Córdoba).

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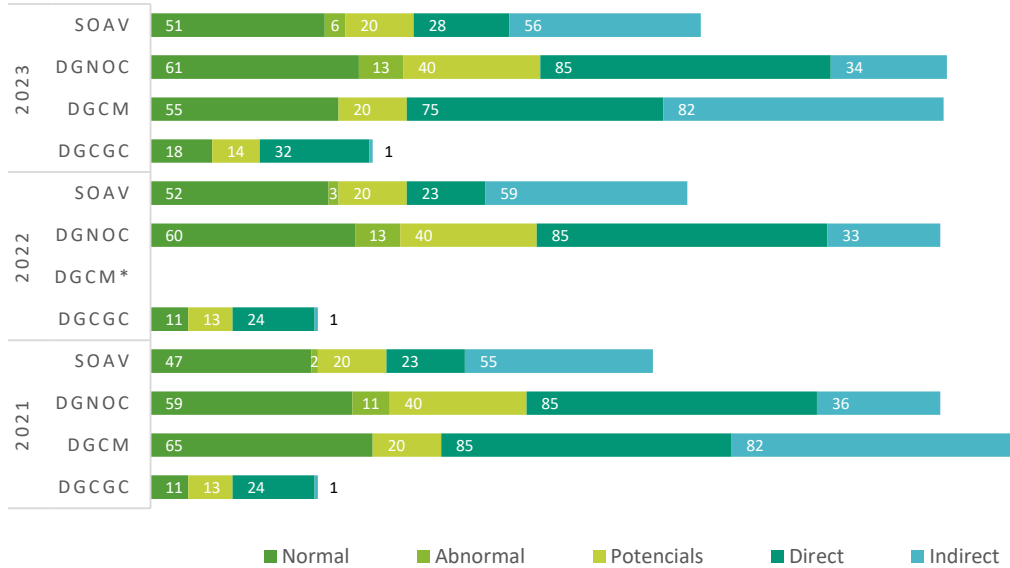
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Chart 36. Typology of environmental aspects (2021-2023)



* Data not available for the DGCM in 2022

DGNOC: Corporate Business and Commercial Operations Department

DGCM: Corporate Conservation and Maintenance Department

SOAV: Corporate High-Speed Operations Sub-Department

DGCGC: Corporate Traffic and Capacity Management Department

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

In the assessment carried out in 2024 (covering data from 2023), the Direct Environmental Aspects most frequently assessed as significant in each of the analysed areas are as follows:

- In the centres of the Corporate High-Speed Operations Sub-Department (SOAV), the most significant aspects analysed by the Corporate Environmental Sub-Department are related to the consumption of electricity, water consumption and the discharge of contaminated water.
- In the Corporate Conservation and Maintenance Department (DGCM) are waste (72%), followed by road vehicle fuel consumption, water consumption and electricity consumption.
- In the Corporate Traffic and Capacity Management Department (DGCGC), the

most significant aspect is waste (58%), followed by fuel consumption from road vehicles.

- In the Corporate Business and Commercial Operations Department (DGNOC) the most significant aspects, depending on the type of centre, are as follows:
 - o Stations: waste (50%), water consumption and electricity consumption.
 - o Depots: discharge of soil substances (27%), discharge of contaminated water and waste.
 - o Logistics services: electricity consumption (50%), water consumption and fuel consumption by container

cranes and shunting locomotives.

As shown, the percentage of waste identified as direct aspect in the different Corporate Departments is highly representative, unlike in the Corporate High-Speed Operations Sub-Department, where it is addressed indirectly, as it is managed on behalf of contractors.

Conversely, consumption of resources such as water, energy, and fuel, as along with waste disposal, are the aspects most frequently identified as significant across centres. These aspects are consistent with the activity carried out in each type of centre.

Electricity and water consumption are the most representative aspects in almost all areas. Measures should be considered to reduce this consumption at **Adif** and Adif-Alta Velocidad and to ensure it is adequately monitored through actual readings.

In summary, to enhance the analysis of information and generate insights that support decision-making, all areas must identify and assess aspects consistently and in accordance with the methodology detailed in the procedure. Furthermore, a clear link must be maintained between the centres where aspects are identified and evaluated and the scope sheets documented in Adif and Adif-Alta Velocidad's Management System.

Environmental performance in Adif and Adif-Alta Velocidad

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 (DGNOG), Corporate Conservation and Maintenance Department (DGCM) 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).

The following graph shows the distribution of the 980 environmental performance indicators reported for 2023 (the most recent year available) by Area of Activity, compared to 935 in 2022. This represents a 5% increase.

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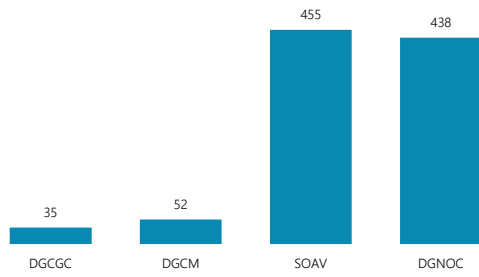
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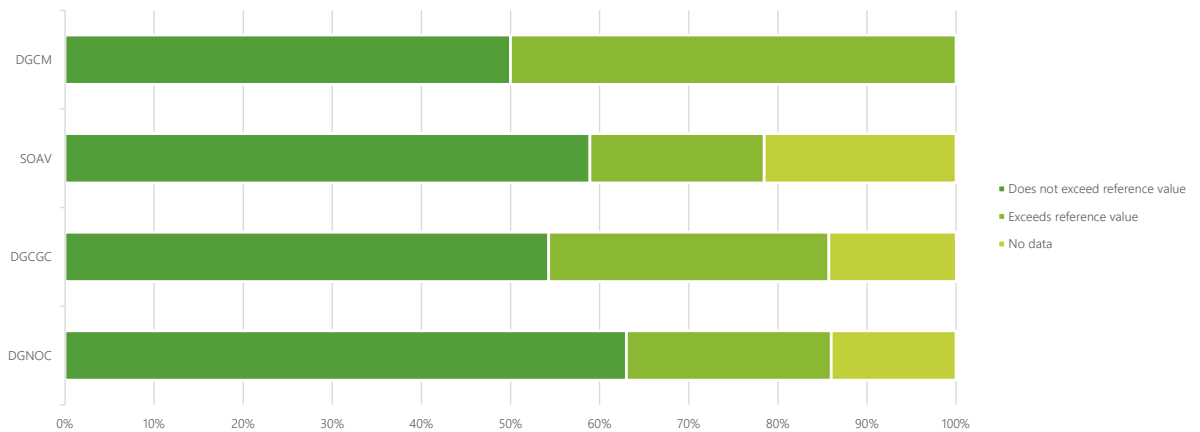
Chart 37. No. of indicators reported by Activity Area in 2023



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 assessment 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 2023



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

The overall analysis of **Adif** and Adif-Alta Velocidad's environmental performance indicates positive progress, as values are decreasing in relation to compliance with reference values in most environmental aspects, across all areas, except GCM. Efforts should, however, be focused on addressing aspects showing the most unfavourable trends, including water consumption, waste generation, fuel

consumption, noise generation, and emissions. The reduction in the percentage of 'No data' compared to 2021 is particularly noteworthy, as it enhances data quality and enables a more reliable analysis of environmental performance over time.

Legal requirements and other obligations applicable to activities conducted by Adif 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 2024 the objective set by **Adif** and Adif-Alta Velocidad has been the Improvement of Environmental Performance by implementing measures that promote and reinforce environmental respect and reduce the negative impacts of operational activities. This objective is addressed through the following actions:

- Continue expanding the scope of environmental certification to include two new centres (Elche and Palencia Stations). The long-term goal is to achieve environmental certification for all **Adif** and Adif-Alta Velocidad work centres that have environmental impacts. This target comprises five actions, all of which were completed following the external audit process for certifying the proposed centres both in the 2023 period and in 2024.

- Leverage the potential of contracts with both entities to promote the achievement of environmental actions. To this end, the Corporate Environmental Sub-Department is coordinating a working group to develop a Catalogue of Environmental Clauses to be included in the contracting documents of both entities, along with a guide with indications for their use and dissemination to the various activity areas of **Adif** and Adif-Alta Velocidad. During 2024, the drafting and technical validation of the Catalogue of Clauses and the Guide to the Use have been completed. It is only pending approval by the Legal Department. This review will be carried out on a case-by-case basis, incorporating as many clauses as possible from the catalogue into a series of pilot contracts. Once it is in use, it will be monitored and updated based on the identified needs.
- Enhance the environmental culture and awareness among **Adif** and Adif-Alta Velocidad staff, efforts are focused on monitoring and optimising the Environmental Training Plan established for the organisation's employees. The degree of compliance with the Training

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Plan at **Adif** and Adif-Alta Velocidad for 2023 was 107%, exceeding the target of 80%. Note that the Environmental Training Plan is monitored on a bimonthly basis. Regarding the analysis of training activities corresponding for 2023, a total of 5,907 hours of environmental training was conducted, with 558 participants. Additionally, to enhance the existing information materials, a new edition of the Welcome Package for new maintenance contracts has been produced, along with new environmental awareness materials: a fire safety awareness poster (May 2023) and two water saving posters for facilities and offices (December 2023), World Environment Day (June 2024), ADR safety advisor poster (July 2024), World Soil Day (December 2024).

- Improve the Environmental Monitoring system during the execution of works not subject to EIS by **Adif** and Adif-Alta Velocidad. To this end, the end-of-work reports are monitored. During the 2024 period, 53 projects not subject to EIS were completed, of which 50 final reports have been issued and 3 final project reports are being drafted, pending due to workload, as of the target closing date.
- Improve the environmental control in the certified activities of the Corporate High-Speed Operations Sub-Department. To this end, a platform has been created for managing documentary evidence related to the operational control of identified environmental aspects, as well as the environmental control of certified facilities and works on the High-Speed Lines. The document management platform was already in use. Regarding environmental monitoring at certified facilities, 96 visits were conducted in

2024 and 290 environmental monitoring reports are issued. Furthermore, during 2024, 73 high-speed rail projects are monitored, of which 23 were completed during the year, with a total of 22 final reports issued. At the target date, one final project report is being drafted. Finally, the format of the environmental report has been improved by introducing a new visit report template in the latest Technical Assistance contracts.

- Improve the process of identifying legal requirements applicable to the certified scope of **Adif** and Adif-Alta Velocidad by updating inventories of existing equipment and facilities within the Corporate High-Speed Operations Sub-Department. By the end of 2024, all certified centre inventories have been updated as part of the implementation of the new inventory template through Environmental Monitoring. The inventories of 11 maintenance bases were updated in the Legislative Update Service; the remaining inventories will be implemented in the application during 2025. In addition to the first legislative official gazette, prepared in 2023 on the new requirements set out in Royal Decree 487/2022 of 21 June, which establishes the health requirements for the prevention and control of Legionnaire's disease, a second official gazette on fluorinated gases in electrical equipment was prepared and published in *Inicia* in February 2024. In May 2024, an official gazette was prepared and published on the new Regulation 2024/573 on Fluorinated Greenhouse Gases, which replaces the official gazette on fluorinated gases in electrical equipment, as these are now included in this new official gazette, incorporating the new requirements. In December

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2024, the official gazette on the new Royal Decree 614/2024 was prepared and published, updating the requirements of the previous official gazette on the prevention and control of Legionnaire's disease.

- Improve the waste management model of **Adif** and Adif-Alta Velocidad. To this end, it is proposed to centralise the collection of various types and flows of waste through the Corporate Environmental Sub-Department and establish a centralised waste register based on the information in the Identification Documents. This register would include all information related to hazardous operational waste, as well as historical and special waste. Subsequently, the analysis and presentation of the data on waste production by different types (both hazardous and non-hazardous) from **Adif** and Adif-Alta Velocidad, as well as the annual centralised management reports for both for hazardous waste management and historical and special waste, are now available.
- Improve the contaminated soil management, for which the Contaminated Soil Management Plan 2023-2025 was developed and approved by the Corporate Environmental Sub-Department in May 2023. In addition, during 2024, an annual review of both the actions forecast and the objectives of the Contaminated Soil Management Plan 2023-2025, as well as the Monitoring Programme, is planned.

- Improvement of the Environmental Management documentation: the following procedures are scheduled for revision: ADIF-PE-109-001-023 'Maintenance and Operation of High-Speed Lines and Facilities': the content of the procedure has been revised to bring it into line with the current system, based on experience gained since its implementation. It is awaiting signature. With regards to the General Procedure ADIF-PG-109-001-002 'Identification and Evaluation of Environmental Aspects', work has been done to update the evaluation criteria tables and record formats. It has currently been agreed upon by all departments and is pending submission for review by the Quality and Customer Service Department. Regarding General Procedure ADIF-PG-109-001-004 'Minor Environmental Incidents', the content of the action sheets for minor environmental incidents has been revised and a new sheet has been drafted to address fauna entanglement and electrocution. It is currently a draft, pending submission to the relevant departments for review. The revised Special Waste Procedure has already been published.

Of the nine targets proposed for Improving Environmental Performance during the 2023-2024 period, five have been completed, and three are wither partially completed, with a high percentage of implementation, although not completely finalised. They will be considered when defining the objectives for the 2025-2026 period.

Management System Audits in accordance with UNE-EN ISO 14001 Standard for Adif and Adif-Alta Velocidad

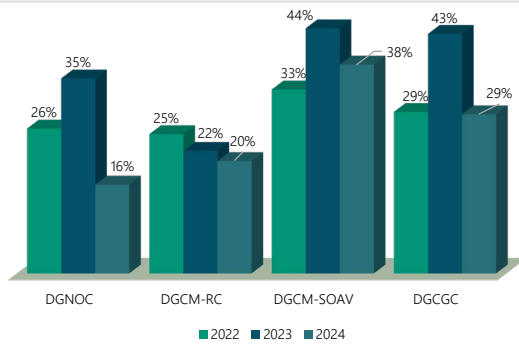
Environmental improvement actions within the **Adif** and Adif-Alta Velocidad Management

System are controlled through internal and external audits, certification, and monitoring.

From these, findings are generated that are considered for the continuous improvement of the system (including non-conformities, observations, and opportunities for improvement).

The Internal Audit process of the Environmental Management System according to ISO 14001 at Adif and Adif-Alta Velocidad is coordinated at the corporate level by the Corporate Environmental Sub-Department. For its implementation, it relies on the collaboration of an external consultancy with extensive experience in the railway sector, ensuring the highest possible level of impartiality throughout the audit process.

Chart 39. Evolution of the percentage of audited centres relative to certified centres by Area of Activity in Adif 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%, 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 42. Results of EMS audits according to ISO 14001 at Adif

	2017		2018		2019		2020		2021***		2022		2023		2024	
	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.	Int. Aud.	Ext. Aud.
Non-conformities (No.)	77	4	89	4	71*	2	-	0	80	4	53	2	82	21	66	18
Remarks (No.)	89	24	120	75	165	57**	-	41	107	56	85	38	147	27	120	67
Audited headquarters (No.)	48	16	58	30	64	26	-	13	51	42	55	32	58	23	48	26
Certified sites (No.)	141	141	138	138	135	135	-	128	128	132	133	133	133	202	202	199
Certified sites that have been audited (%)	34	11	42	22	47	19	-	10	40	32	41	24	44	11	24	13

* One of which is common to Adif and Adif-Alta Velocidad

** Two of which are common to Adif and Adif-Alta Velocidad

*** Data for 2021 was modified in relation to the 2023 Environmental Report

Source: Adif-Alta Velocidad, Corporate Management, Corporate Environmental Sub-Department. 2023 External Audit Reports and External Audit Plans

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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 2024, a total of 66 non-conformities and 120 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

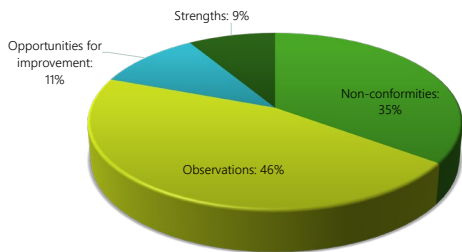


Source: Adif Alta Velocidad. Corporate Management. Corporate Environmental Sub-Department. 2024 Internal Audit Statistical Results Report.

Of the total findings recorded, 160 (53.33%) correspond to the Planning and Operational Control section. Within this section, the main deviations were in fire protection, accounting for 23.21%, followed by findings related to air conditioning in the centres at 19.64%, low-voltage systems at 14.29%, and Legionnaire's disease control at 12.50%.

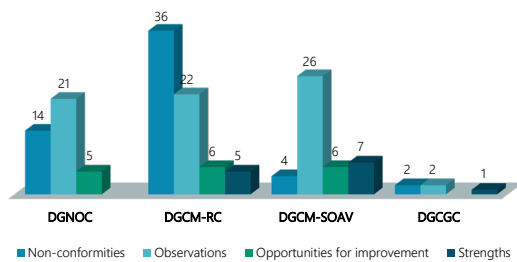
Below are the breakdowns of this category of findings by type and by Activity Area within Adif and Adif-Alta Velocidad.

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. 2024 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. 2024 Internal Audit Statistical Results Report.

Secondly, non-conformities related to 'Emergency preparedness and response' stand out in 2024, accounting for 10.61% of non-conformities.

Thirdly, non-conformities associated with 'Legal requirements' account for 3.03%.

Below are the general conclusions from the 2024 Internal Audit of Adif and Adif-Alta Velocidad:

- During 2024, all areas demonstrated leadership in raising awareness among all Adif and Adif-Alta Velocidad staff, both internal and external.
- During 2024, there was a decrease in findings related to the definition of the scope of the system, falling from 5.01% in 2023 to 2.00% in 2024.
- The organisation effectively addresses its risks and opportunities by integrating management with its global strategic policies and plans. However, environmental management should be integrated into the different areas, as the context and activities carried out are slightly different.
- As in previous years, the area of operational planning and control continues to account for the highest number of findings, representing 53.33% of the total findings identified.
- Once again, the work carried out by all internal and external staff at Adif and Adif-Alta Velocidad deserves recognition, as they have been highly cooperative throughout the audit process, maintaining a constructive approach and a positive attitude towards the proposed opportunities for improvement.

Regarding the External Audit process of the Management System according to the UNE-EN ISO 14001 Standard for 2024, a total of two non-conformities were detected, comprising 18 findings and 67 Observations:

- 8 non-conformity findings and 24 observations relate to the Corporate Business and Commercial Operations Department and concern passenger stations, fuel depots, and logistics centres.

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- 10 non-conformity findings and 30 observations correspond to the Corporate Conservation and Maintenance Department. Out of these, 10 non-conformity findings and 18 observations are attributed to the Corporate Conventional Network Operations Sub-Department, and 12 observations are attributed to the Corporate High-Speed Operations Sub-Department.
- 5 observations are related to the Corporate Traffic and Capacity Management Department.
- The remaining observations are generic to the Management System.

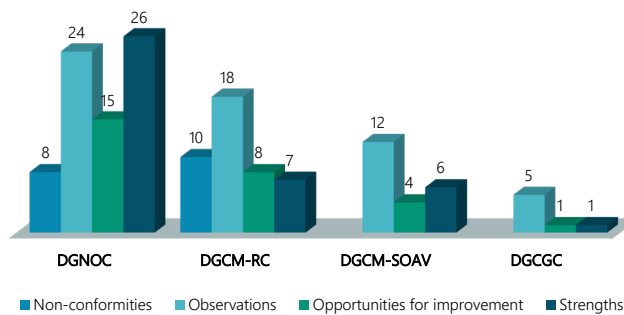
Below are the general conclusions from the 2024 External Audit of **Adif** and Adif-Alta Velocidad:

- Overall, the Environmental Management System is 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 prove their involvement in and knowledge of the Management System, the development of detailed and comprehensive environmental impact reports for certified and non-certified facilities under JACMA (EXyC) management, as well as the management of the company's historical waste at its facilities.
- The sections of the UNE-EN ISO 14001:2015 standard with the highest number of findings are section 8.1 'Operational Planning and Control' (representing 25% of findings) and section 6.1.3 'Legal and Other Requirements' (accounting for 22% of findings).

Chart 43. Types of findings detected in the 2024 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).

DGGCG: Corporate Traffic and Capacity Management Department.

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

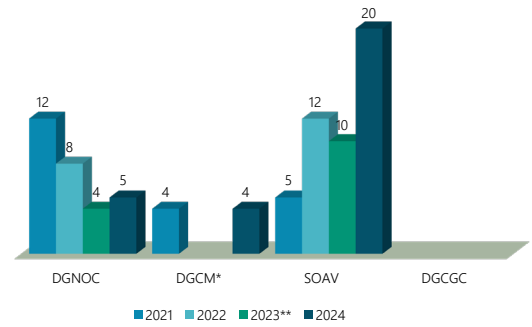
Minor environmental incidents

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 2024, compared to those recorded in previous years:

Chart 44. Minor environmental incidents at Adif and Adif-Alta Velocidad



* No information available from DGCM for 2022

** Data revised in relation to the 2023 Environmental Report

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

According to these results and based on the documents provided by each of the aforementioned Activity Areas at **Adif** and Adif-Alta Velocidad, a total of 29 Minor Environmental Incidents occurred in 2024. These were specifically in the Activity Areas of the Corporate Business and Commercial Operations Department (5), in the Corporate Conservation and Maintenance Department (Conventional Network) (4) and the Corporate High-Speed Operations Sub-Department (20). No Minor Environmental Incidents were reported in the Corporate Traffic and Capacity Management Department for the year 2024.

The total number of incidents recorded has increased from 14 in 2023 to 29 in 2024. Closed environmental incidents account for 93% of all incidents recorded. In general, immediate corrective actions are implemented, although there are two incidents pending closure, pending documentary justification of the implementation of all proposed corrective measures.

In general, there has been an improvement in the information recorded in the Corporate Minor Environmental Incident Record Form (ADIF-PG-109-001-004-F-01).

Among the recorded incidents, the most notable are spills of substances onto the ground or into contaminated water due to breakage or failure of machinery, equipment, or facilities (41%), and

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water loss due to broken or leaking pipes (35%). Consequently, preventive measures are recommended to reduce the occurrence of such incidents.

In any case, it is considered that none of the environmental incidents recorded during 2024 had a significant impact on the environment.

Environmental communication in Adif and Adif-Alta Velocidad

In relation to the Communication process and in accordance with Law 27/2006, which regulates the right of access to environmental information, the Corporate Environmental Sub-Department serves as the point of contact for **Adif** and Adif-Alta Velocidad with environmental administrative bodies at community, state, regional, and local levels. It also manages interactions with individuals and official bodies that submit requests for information and/or demands for environmental actions. In this capacity, as the Unit Responsible for Environmental Information, it provides information, advice, and counselling on any environmental inquiries, ensuring prompt processing and resolution.

On the other hand, **Adif** and Adif-Alta Velocidad have a general system in place for the managing and processing relevant environmental information. This system was developed by the Corporate Environmental Sub-Department in collaboration with all the Activity Areas of **Adif** and Adif-Alta Velocidad.

After analysing the relevant environmental reports collected by each area for 2024, the following conclusions can be drawn: within the Corporate Environmental Sub-Department, the highest number of relevant environmental communications recorded in 2024 corresponds to the environmental acoustics department, with 289 complaints relating to noise and vibrations.

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:

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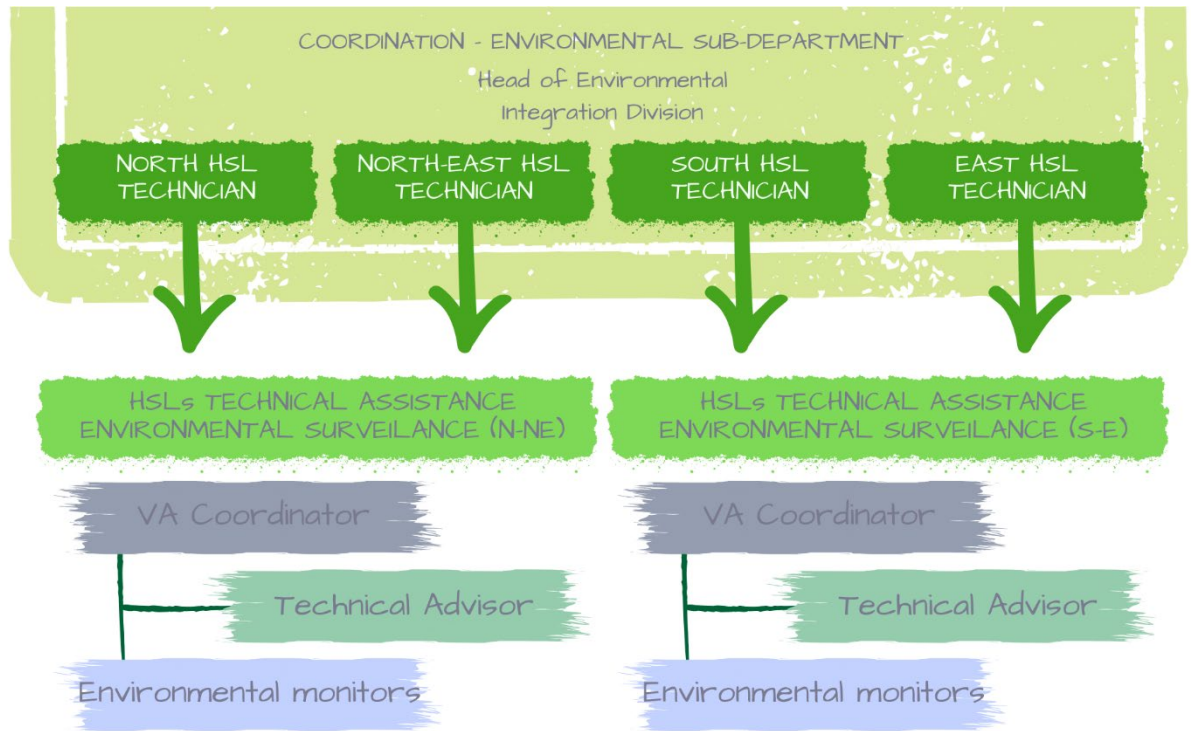


Figure 42. Organizational Structure of the Corporate Environmental Sub-Department for Environmental Control and Monitoring of Facilities and Activities Associated with the Maintenance of HSL

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.

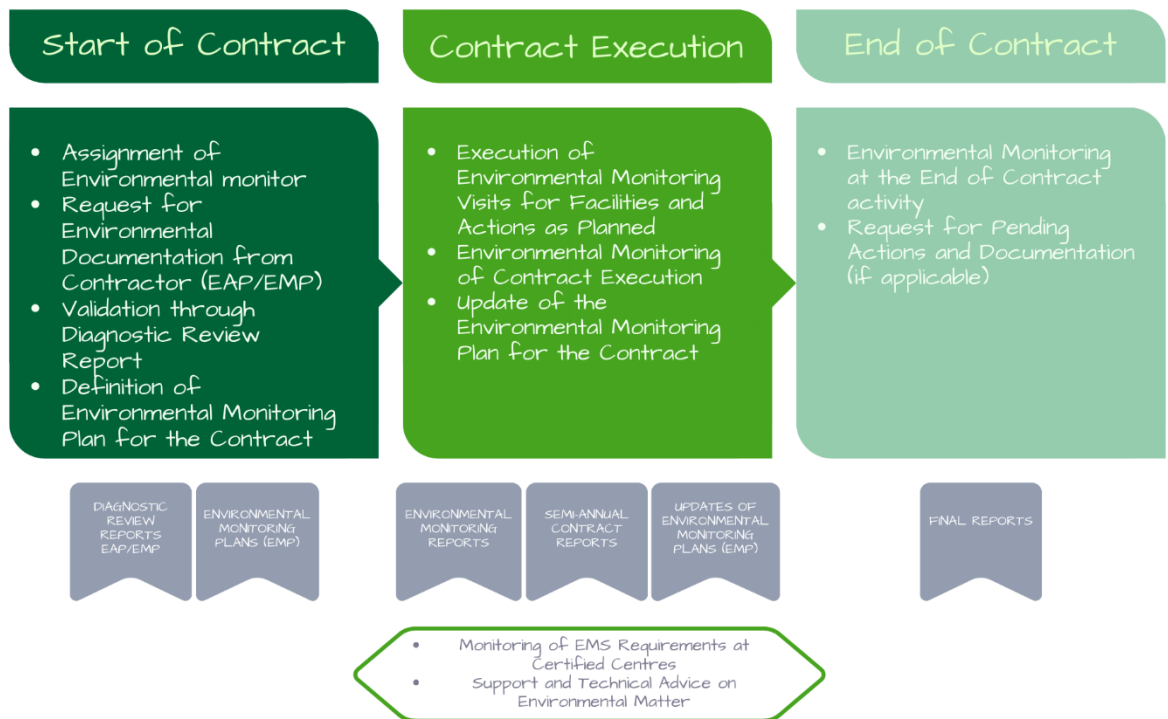


Figure 43. Phases of Environmental Control for HSL Maintenance Activities During the Contract Period with Contractors

The data relating to the environmental monitoring conducted during 2024 is shown below.

Table 43. Environmental control in HSL maintenance activities. Year 2024

Typology	Number of installations and actions	Visits	Reports
Maintenance bases	25	108	310
Electrical substations	59	107	108
Technical buildings	215	430	460
Changing tables	19	55	55
Tunnel maintenance centres / Underground structures	14	27	33
TCC/ TC/ LC	6	8	6
Maintenance activities	21	37	37
Actions	7	3	3
Total	366	775	1,012

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 44. 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

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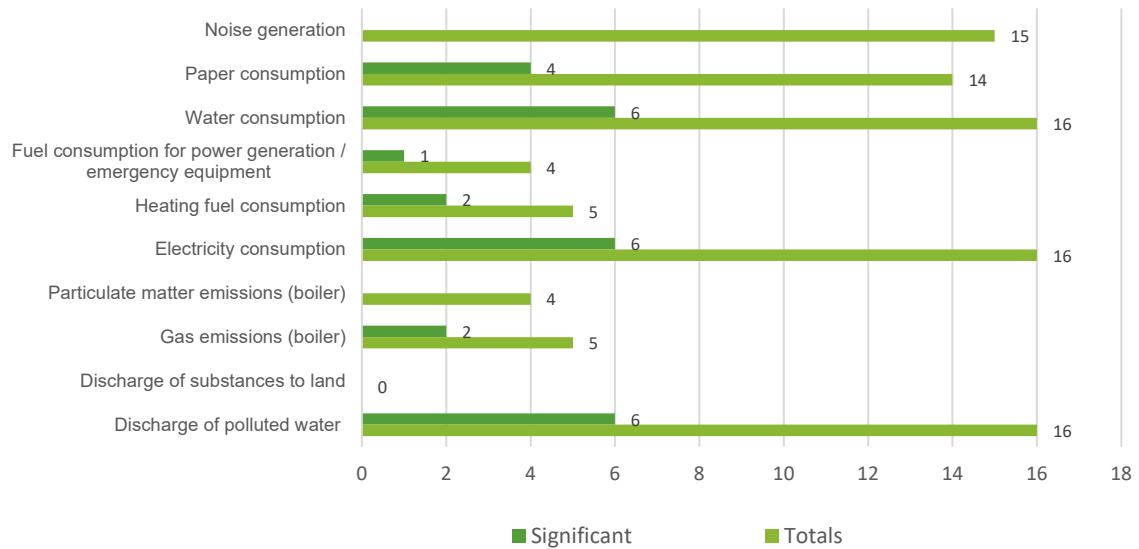
Within the scope of the Environmental Management System implemented for High-Speed Rail (HSLs) maintenance activities in 2023, the most frequently assessed significant aspects are related to consumption, including:

- 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 (HSLs) maintenance were recorded and monitored for resolution. These incidents involved issues such as Legionnaire's disease 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-

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Department periodically reviews indicators associated with direct and indirect environmental aspects (437 indicators in 2022, 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, for the 2023-2024 period, 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 2024 work is underway on implementing 14 specific

objectives to improve the EMS for maintenance activities on the HSLs as follows:

- Improve outdoor storage facilities at the Antequera Maintenance Base (HSL-S).
- Reduce energy consumption and improve energy efficiency at the Lleida Technical Building (HSL-NE).
- Reduce water consumption at the Lleida Technical Building (HSL-NE).
- Construct of a recycling centre for energy contracts/temporary contracts, to separate the existing one with the road and diversion contract, at the Hornachuelos Maintenance Base (HSL-S).
- Improve waste identification and classification (from waste similar to MSW from worker maintenance on the tracks) at the Clean Point at the Olmedo Maintenance Base (HSL-N).
- 70% reduction in contaminated soil waste at the La Hiniesta Maintenance Base (HSL-N).
- Improve energy efficiency, with a 2% reduction in office consumption, at the Calatrava Maintenance Base (HSL-S).
- Reduce damaged pavement and other waterproofed surfaces to protect the soil from contamination, at the Brihuega Maintenance Base (HSL-NE).
- Define at least one objective per year from stakeholders, through the creation of a suggestion box at the Calatayud Maintenance Base (HSL-NE).
- Reduce electricity consumption through the installation of solar panels and the replacement of lighting at the Sant Feliu Maintenance Base (HSL-NE).
- Connect the base to the public water network to have greater control over

consumption and reduce the risk of contamination by Legionnaire's disease at the Vilafranca Maintenance Base (HSL-NE).

- Improve the maintenance and cleaning of heating equipment at the Villarrubia Maintenance Base (HSL-E).
- Reduce waste generation in clearing and pruning work at the Villada Maintenance Base (HSL-N).
- Save energy in interior lighting in bathrooms at the Villada Maintenance Base (HSL-N).

Detecting deviations and non-conformities, resolving them, and implementing immediate and corrective actions as needed are activities that help **Adif** and Adif-Alta Velocidad continuously improve the effectiveness of their Management System.



Figure 45. 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.

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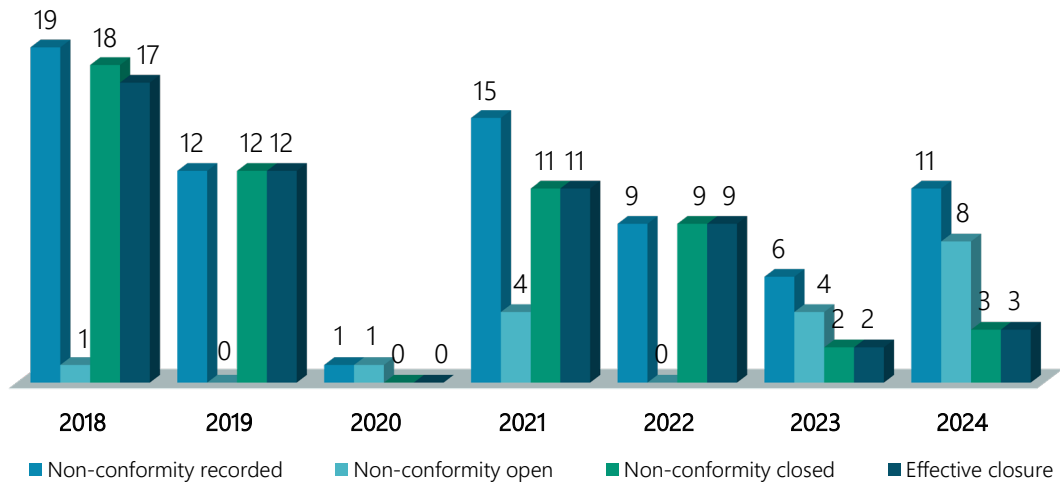
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Chart 46. Trend in non-conformities registered in the Corporate High-Speed Operations Sub-Department as per ISO 14001 *



- Data for 2021, 2022 and 2023 has been modified in relation to the 2023 Environmental Report, based on information available as of 1 January 2025.

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

Table 44. Percentage of non-conformity records closed per year according to ISO 14001 in the Corporate High-Speed Operations Sub-Department

2018	2019	2020	2021*	2022*	2023*	2024
94.74%	100.00%	0.00%	73.33%	100%	33.33%	27.27%

* Data revised in relation to the 2023 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.

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Activities related to the operation of passenger stations, freight logistics centres, and fuel depots

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The activities related to the operation of passenger stations and freight logistics centres and the management of fuel deposits in 2024 corresponded to the Corporate Business and Commercial Operations Department.

In 2024, the certification of the Guadalajara Yebes and Villanueva de Córdoba los Pedroches stations was verified in line with the UNE-EN ISO 14001 standard.

Similarly, to increase the scope of the certification, environmental assessments have been requested to both the Zaragoza Plaza and Vigo Urzaiz stations, with work scheduled to begin in 2025.

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, reducing the number of certified logistics centres to four in 2024.

Regarding the monitoring and measurement of the environmental performance of the Corporate Business and Commercial Operations Department in 2024, 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 2024, consumption has been normalised on a per-1,000-passengers basis. The total number of passengers across all stations increased more than 9% in 2024 compared to 2023.
- 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 2024, 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.

- In 2025, the certifications for the deposits located at the stations in Almería, Granada, and Alicante will remain in place. In the case of Almería, the location has been changed due to station works. Therefore, it is not expected to return to service at the original site. In Alicante, the depots have been deregistered for tax purposes. Finally, the Granada depots are expected to return to service at a later date, replacing the one currently in use at RENFE facilities.
- Among the environmental aspects associated with fuel depots, the most significant impact is on soil and water. For this reason, since the implementation of the UNE-EN ISO 14001 Standard in these facilities, significant investment has been made in the supply areas, along with coordinated training for all diesel pump operators.

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 2024:

- 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 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.

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ENVIRONMENTAL TRAINING

The Annual Training Plan of **Adif** and Adif-Alta Velocidad outlines the training scheduled for the year, tailored to the needs of the various

operational areas. Among the subjects covered in this Plan is the environment.

Training activities

In 2024, **Adif** conducted a total of 56 environmental courses for 1,573 participants, amounting to 12,646 hours of training. 61.5% 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 783 participants (representing 50% of overall attendance).

Table 45. Number of students per course and type of training in environmental courses taught in 2024

Name	Modality	Number of students
PG109 Minor Environmental Incidents VTC (Virtual Training Centre)	E-learning	783
Environmental Awareness PO GDCM CFV	E-learning	470
Environmental risk. VTC fuel waiver	E-learning	188
Environmental Awareness VTC	E-learning	20
Environmental Management Prevention Officers	E-learning	20
ISO 14001 Environmental Management System VTC	E-learning	3
Spills and Contaminated Water	E-learning	22
Waste and Contaminated Soil	E-learning	3
Waste management	In person	23
Expert in Climate Change and Circular Economy	In person	16
Atmospheric emissions	In person	13
Awareness Environmental Management System P. Oper.	In person	8
Environmental risk. Fuel dispenser	In person	4
TOTAL		1,573

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

Training for different areas and professional groups

During 2024, the compliance with training plans by **Adif** and Adif-AV Activity Areas, as well as by professional groups, significantly exceeded the target value set for the evaluation of the effectiveness of the goal (compliance reached 219% for participant numbers and 147% for planned hours), compared to the target of 80%.

Notably, training for the personnel of the Corporate Conservation and Maintenance Department involved 1,397 participants and 8,472 hours, with the majority in the course 'PG109 Actuaciones Incidencias Ambientales Menores' (PG109 Minor Environmental Incidents)

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Table 46. Environmental training for management at Adif and Adif-Alta Velocidad in 2024

Scope	Average Staff	Planned participation	Investments made	Scheduled hours	Hours worked	Participant compliance (%)	Hours worked (%)
General Secretariat Advisory Services and Procurement and Contracting	204	1	1	200	200	100	100
Corporate People Management Department	706	8	15	1,017	874	188	86
Corporate Finance and Management Control Department	230	3	2	600	400	67	67
Corporate Construction Department	126	3	5	212	224	167	106
Corporate Conservation and Maintenance Department	5,495	627	1,397	3,977	8,472	223	213
Corporate Traffic and Capacity Management Department	3,836	16	16	728	682	100	94
Corporate Business and Commercial Operations Department	1,494	8	21	259	326	263	126
Corporate Planning, Strategy and Project Management Department	146	1	1	5	10	100	200
Corporate Safety, Processes, and Corporate Systems Department	634	4	15	60	98	375	163
Adif-Alta Velocidad	263	6	7	1,200	818	117	68
TOTAL	13,134	677	1,480	8,258	12,104	219	147
External	-	0	99	0	602	100	100

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

Table 47. Environmental training provided by professional groups at Adif and Adif-Alta Velocidad in 2024

Position	Average template	Planned participation	Investments made	Scheduled hours	Hours worked	Participant compliance (%)	Hours worked (%)
Operational staff	8,424	629	1,307	4,006	8,116	208	203
Intermediate control	2,450	32	126	2,211	2,148	394	97
Support structure	1,320	8	37	830	810	463	98
Management structure	940	8	10	1,211	1,030	125	85
TOTAL	13,134	677	1,480	8,258	12,104	219	147
External	-	0	99	0	602	100	100

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

ENVIRONMENTAL PROCESS MANAGEMENT

Responsible purchasing

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! 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.

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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 technical level, pending only the approval of the Legal Department. This review will be conducted on a case-by-case basis, incorporating as many clauses as possible from the catalogue into a series of pilot contracts. Once it is in use, it will be monitored and updated based on the identified needs.

! The objective is to integrate environmental criteria at the appropriate stages of the

Environmental risk management

308-2

Adif has established a Comprehensive Risk Management System based on the implementation of Action Plans with annual monitoring.

The scope of this system includes the management of environmental incidents that may give rise to administrative (or legal) proceedings, cause damage to the environment, and/or result in loss of trust, reputation, or economic resources. In **Adif's** case, the causes of such environmental incidents are related to inappropriate practices in the design, construction, and operation of the railway network.

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.

To minimise and control environmental incidents, some indicators have been established that focus on:

- Non-compliant monitoring of Project Environmental Appendices.
- Environmental non-compliances opened by ESMs and ESSs on construction sites with or without an EIS.
- Environmental complaints.

In 2024, the following Action Plans have been implemented:

- Draft of new NAG 'Methodology for waste management studies and establishment of a Working Group in the Regulatory Committee.

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- Environmental diagnostics at stations and facilities to identify environmental aspects related to noise, derived from current management by own and third parties.
- Ensuring legal compliance with environmental regulations on soil contamination.

- Decontamination measures in emergencies.

With this system, **Adif** meets the requirements for identifying environmental risks as outlined by the ISO 14001:2015 standard.

Management of environmental complaints about noise and vibrations

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Adif has a procedure in place to receive, document, and respond to complaints regarding noise generated by its activities.

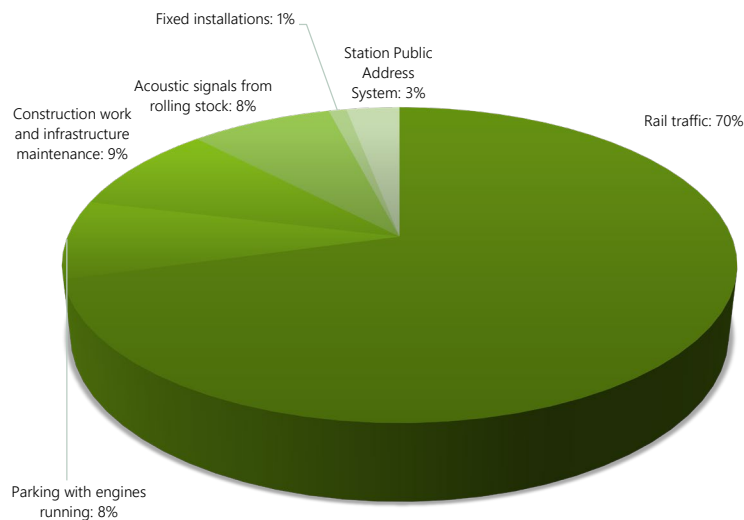
Environmental complaints received in 2024

In 2024, a total of two hundred and eighty-nine (289) environmental complaints related to noise were received and addressed through the established communication methods in **Adif** lines.

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

According to the sources of the noise and vibration complaints, their distribution was as follows:

Chart 47. Source of noise and vibration complaints in 2024 (%)



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

ENVIRONMENTAL EXPENDITURE AND INVESTMENTS

In 2024, **Adif's** environmental expenditure and investments amounted to over 44 million and 39 million euros, respectively.

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Table 48. Expenditure on environmental protection (€) ****

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
A. Exploitation	13,504,724	13,464,240	13,155,882	19,814,720	22,522,967	23,603,947	24,162,205	21,413,895	45,008,316	44,452,545
Corporate waste management	297,672	286,191	100,076	105,429	116,350	140,395	174,822	126,660	2,650,500	6,179,762
Non-corporate waste management *	-	-	-	-	-	-	-	-	566,381	13,740
Water purification **	110,818	374,661	320,252	451,222	553,435	462,504	510,491	646,272	707,669	863,341
Noise and vibrations	39,280	336,362	-	-	-	-	99,502	32,724	44,630	57,206
Environmental Management Systems and Specific Programmes	26,775	36,909	24,696	23,255	37,413	31,617	54,203	38,910	32,147	42,924
Environmental communication	10,613	10,497	10,497	0	16,466	7,057	20,227	9,660	9,660	15,910
Decontamination of contaminated soil or water	701,782	542,100	762,477	798,192	659,833	964,407	1,436,394	1,506,849	1,669,816	1,724,687
Fire prevention	12,307,171	11,867,023	11,927,387	18,426,048	21,094,901	21,863,771	21,476,195	18,665,404	39,111,789	34,304,994
Environmental monitoring on construction sites not subject to EIS	-	-	-	10,574	28,104	22,388	55,889	33,257	40,427	-
Environmental control of herbicide treatment	-	-	-	-	-	-	-	-	-	46,638
Environmental monitoring of HSL maintenance activity	-	-	-	-	-	104,752	314,255	340,442	157,127	1,203,343
B. Investment	394,334	288,677	332,486	665,389	5,397,175	8,835,338	33,279,101	11,911,260	53,631,010	39,356,800
Water purification	12,373	8,712	27,750	55,735	46,884	6,399	0	33,488	34,058	-
Noise and vibrations	-	-	-	-	-	358,751	309,630	243,540	249,249	300,081
Energy savings	345,719	197,617	80,850	14,692	251,780	4,046,963	29,108,006	1,083,449	32,078,237	412,382
Environmental monitoring of construction projects not subject to an EIS	-	-	-	309,482	530,351	813,914	806,716	636,109	1,281,163	2,214,581
EIS compliance	36,242	82,348	223,886	285,480	505,990	594,966	468,693	989,525	1,280,869	1,304,917
Projects***	36,242	46,847	98,588	142,144	236,439	271,109	279,825	403,176	417,814	351,892
Construction	-	35,501	125,298	143,336	269,551	323,857	188,868	586,349	863,055	953,025
Construction works	-	-	-	-	4,062,170	3,014,345	2,586,056	8,925,149	18,707,434	35,124,839

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* This item does not include fees paid for refuse collection

** This item includes, among other things, sewage treatment charges and other related management costs

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

**** Data revised with from the 2023 Report

Source: Adif-Alta Velocidad, Corporate Management, Corporate Environmental Sub-Department; Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department; Adif, Corporate Passenger Stations Department; Adif, Corporate Treasury and Accounting Department, Corporate Finance and Management Control Department, Administration and Services Division; Adif, Corporate Conservation and Maintenance Department, Corporate Technical Department, Corporate Resources Sub-Department; Adif, Corporate Conservation and Maintenance Department, Corporate Maintenance Department.

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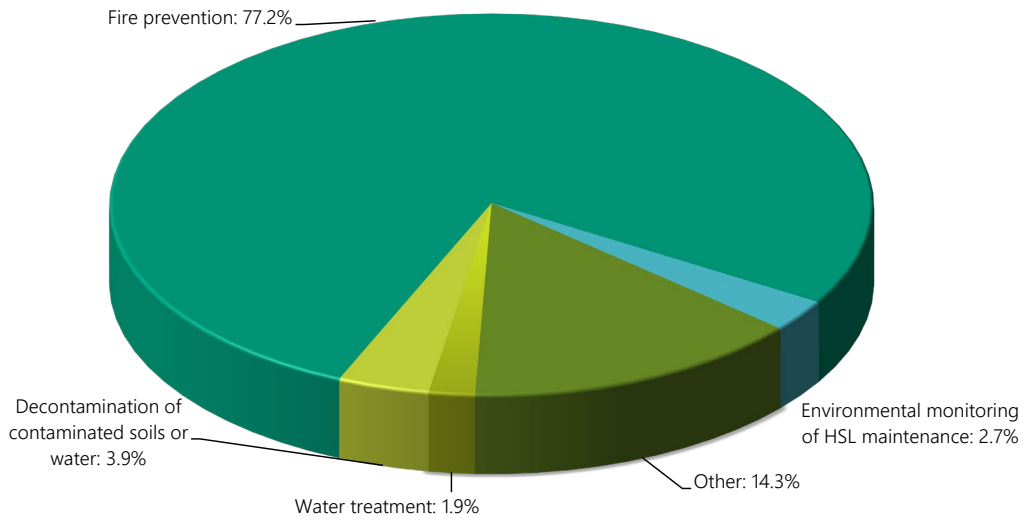
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77.2% of the operational environmental expenditure was allocated to fire prevention. 3.9% and 2.7% of the expenditure has been allocated to the decontamination of contaminated soil or water and to environmental monitoring of HSL maintenance activities, respectively, and 1.9% to water treatment. The

remaining 14.3% was allocated to the management of historic waste, noise and vibration prevention, environmental management systems, environmental communication and environmental control of herbicide treatment.

Chart 48. Expenditure on environmental protection in operation. Year 2024

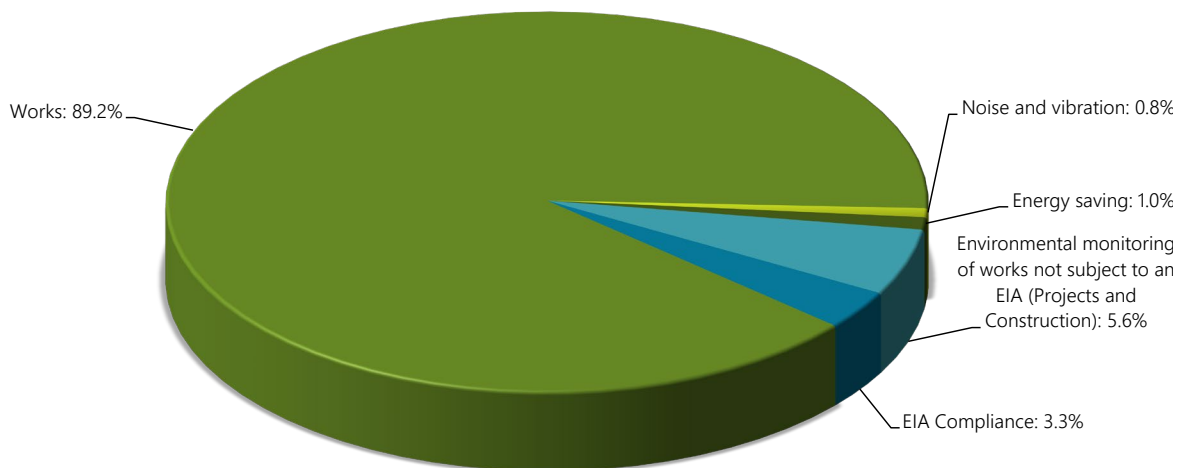


Source: Adif-Alta Velocidad, Corporate Department, Corporate Environmental Sub-Department.

Regarding Adif's investments in environmental protection, the main expenditure is firstly on works (89.2%). The rest has been allocated to environmental monitoring measures for works

not subject to an EIS (5.6%), compliance with the EIS (3.3%), noise and vibrations (0.8%) and energy saving (1.0%).

Chart 49. Investments in environmental protection. Year 2024



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

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Table 49. Environmental investments in the construction of new railway accesses for the year 2024 (€/year)

	Bobadilla - Algeciras	Site	Mediterranean Corridor	North-Northwest Corridor	Madrid-Cartagena Railway Line	Madrid-Zaragoza-Barcelona-French border	Medina del Campo-Salamanca-Fuentes de Oñoro	North-east	Other Conventional Network Activities	Ourense-Monforte de Lemos-Lugo	Palencia-Santander	Sevilla-Cádiz	Total
Land conditioning and landscape integration measures for the railway line and infrastructure	0	120,519	601,133	171,467	0	15,462	1,181	0	93,827	412,635	27,507	142,130	1,585,861
Adaptation and measures for the integration of auxiliary construction elements into the landscape	0	0	540,248	0	0	0	548	0	49,863	1,263,673	300,207	1,970	2,156,508
Noise protection	0	65,727	7,013,996	0	0	0	0	0	91,775	127	222,060	0	7,393,685
Wildlife protection	2,375	23,793	40,455	13,963	0	0	19	0	6,707	246,790	40,089	0	374,191
Archaeological protection	10,233	276,162	68,994	17,344	0	1,769,601	171	0	491,820	57,545	99,872	11,868	2,803,609
Protection of water and soil quality	0	1,281	464,949	2,287	0	968	0	0	29,397	0	6,567	0	505,448
Waste management	1,371	3,109,261	10,276,700	301,605	0	15,274	71,330	18,314	2,922,289	2,241,196	191,707	92,736	19,241,785
Environmental monitoring of construction works	0	0	0	-116	0	0	0	0	64,756	10,455	0	0	75,096
Stakeout	2,713	19,505	6,303	684	0	31,364	4,587	0	269,612	131,456	32,121	1,290	499,635
Air quality	0	0	229,447	0	0	0	0	0	39,157	0	0	0	268,605
Structures modified to comply with the EIS	0	0	0	0	0	0	0	0	0	0	0	0	0
Compensatory measures	0	0	0	0	0	0	0	0	0	67,637	0	0	67,637
Various	2,907	29,828	6,542	0	0	23,324	0	0	6,281	83,898	0	0	152,780
Total Environment	19,598	3,646,075	19,248,768	507,234	0	1,855,993	77,836	18,314	4,065,483	4,515,413	920,130	249,994	35,124,839
Total Construction work	112,186	68,005,743	116,980,675	34,502,921	973,003	540,403,762	951,755	7,500,921	70,260,849	112,782,595	19,456,002	5,814,123	977,744,535
% Environment	17.47%	5.36%	16.45%	1.47%	0.00%	0.34%	8.18%	0.24%	5.79%	4.00%	4.73%	4.30%	3.59%

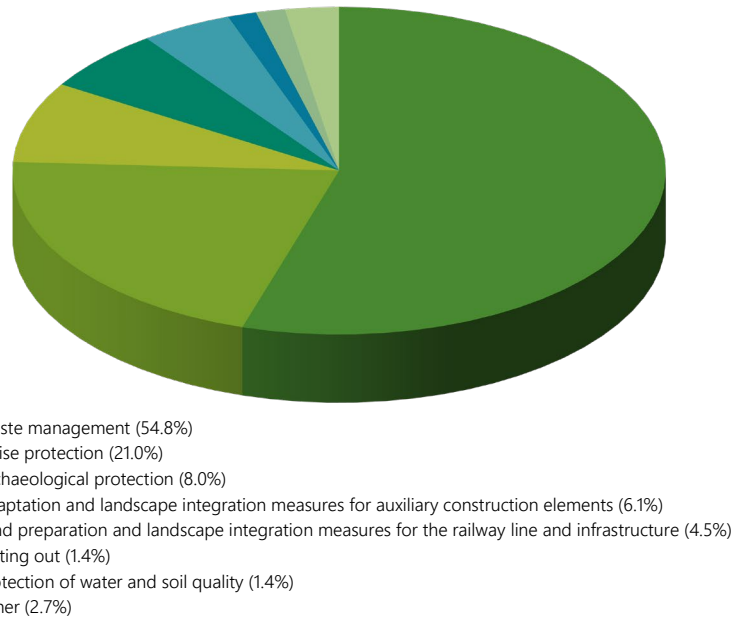


In the construction of new railway accesses, environmental investments in 2024 represented 3.59% of the total project certification amount. As shown in the table above, this investment varies significantly between different lines and is largely dependent on the stage of construction for each of the works. 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 nineteen million euros). Investment in this line represents 54.8% 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 (54.8%), followed by noise protection measures (21.0%).

Chart 50. Construction of new railway access points. Allocation of environmental investments in 2024 (%)



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

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Regarding environmental investment by type of work, 45.1% was used in the construction of railway platforms in 2024. The remainder was

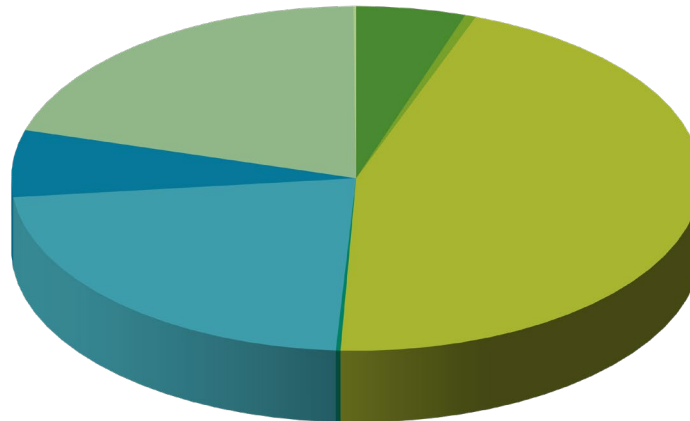
primarily invested in noise protection (20.4%) and track installation (22.3%).

Table 50. Investment in environmental projects by type at Adif (€/year)

Type	2019	2020	2021	2022	2023	2024
Environmental actions	-	-	-	-	1,777,717	1,801,936
Electrification	20,174	34,326	2,164	100,688	22,570	181,801
Infrastructure	3,265,369	2,064,932	1,356,529	5,293,176	9,042,396	15,831,719
Facilities	5,399	64,502	70,272	60,399	104,065	76,693
Track installation	331,267	319,761	281,332	2,058,598	3,236,267	7,833,548
Other projects	0	392,217	843,749	1,254,272	466,313	2,203,010
Noise protection	-	-	-	-	3,921,431	7,148,957
Substations	439,961	138,606	32,011	158,016	136,675	47,175
Total	4,062,170	3,014,345	2,586,056	8,925,149	18,707,434	35,124,839

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

Chart 51. Investment in environmental works by type in 2024 (%)



- Environmental actions (5.1%)
- Electrification (0.5%)
- Infrastructure (45.1%)
- Facilities (0.2%)
- Track installation (22.3%)
- Other projects (6.3%)
- Noise protection (20.4%)
- Substations (0.1%)

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

ENVIRONMENTAL COMPLIANCE

2-27

In 2024, **Adif** faced twenty (20) administrative proceedings related to compliance with environmental regulations, covering water (5), trees and forests (1), forest fires (9), waste (4) and cattle routes (1). Since 2010, 48.22% of the enforcement actions have resulted in penalty (81 out of 168), 33.33% ended without penalty (56 out of 168), and 18.45% are still unsolved (31 out of 168).

Of the enforcement actions opened since 2010, 27.38% are for alleged breaches of forest fire regulations, about 22.62% for waste, another 19.64% for water, approximately 9.52% for trees and forests and 7.14% for public cleanliness and 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, 32.10% are for breaches of environmental regulations on forest fire prevention, 18.52% on water, 23.46% on waste, 12.35% on trees and forests, and the remainder for public cleanliness, noise, soil, cattle routes, and fauna.

Table 51. Cases and penalties for non-compliance with environmental regulations from 2010 to 2024

Breach-Related Matters at Adif	Active files		Sanctions	
	No.	%	No.	%
Water	33	19.64%	15	18.52%
Trees and forests	16	9.52%	10	12.35%
Fauna	4	2.38%	1	1.23%
Forest fires	46	27.38%	26	32.10%
Public cleanliness	12	7.14%	6	7.41%
Waste	38	22.62%	19	23.46%
Noise	12	7.14%	2	2.47%
Contaminated soils	4	2.38%	1	1.23%
Cattle routes	3	1.79%	1	1.23%
Total	168	100.00%	81	100.00%

Source: Adif, Corporate Legal Advisory Department, Corporate Litigation Sub-Department; Adif-Alta Velocidad, Corporate Directorate, Corporate Environmental Sub-Department.

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Table 52. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breached	Penalty
Contaminated soils	2017	Soil contamination in the area of the former creosote workshop at the Andújar railway station	Andújar Town Council / Administrative Court No. 1 (Jaén)	Law 22/2011, of 28 July, on waste and contaminated soil. Law 26/2007, of 23 October, on Environmental Liability.	Pending
Waters	2018	Hydrocarbon spill at workshops in Lugo	Xunta de Galicia	Law 7/1992, of 24 July, on River Fishing in Galicia Law 7/1992, of 24 July, on River Fishing in Galicia	Pending
Waters	2019	Occupation of the DPH area of the Bobadilla stream through the construction of crossing works and breakwaters in the easement and police zone of the aforementioned stream, on both banks, in Illescas (Toledo), without authorisation or administrative concession.	Confederación Hidrográfica del Tajo	Royal Legislative Decree 1/2001, of 20 July, approving the revised text of the Water Act	Pending
Contaminated soils	2019	Soil contamination in the area known as El Hondón (Cartagena)	Department of Water, Agriculture, Livestock, Fisheries and the Environment of the Region of Murcia	Law 22/2011, of 28 July, on waste and contaminated soil	Pending
Fauna	2020	Rabbit burrows and tunnels on the embankments of the railway line between Vadollano and Linares-Baeza stations in the municipality of Linares were filled with cement.	Regional Government of Andalusia	Law 8/2003, of 28 October, on Wild Flora and Fauna in Andalusia	Pending
Waters	2020	Overturned wagons that had derailed in the municipality of Sobradelo (Ourense)	Confederación Hidrográfica del Miño-Sil	Royal Legislative Decree 1/2001, of 20 July, approving the revised text of the Water Act	Pending
Forest fires	2021	Do not manage plant biomass (scrub) and do not cut species listed in Annex 3 (eucalyptus) on the San Sadurniño railway tracks on land included in the public domain.	Xunta de Galicia	Law 3/2007, of 9 April, on the prevention and defence against forest fires in Galicia (Art. 20.bis.b)	Pending
Public cleaning	2021	Cleaning and replacement of fencing on plots located on Calle Jerez and Calle González de Byass, cadastral references 723400/02/04/05 in Tomelloso (Ciudad Real).	Tomelloso Town Council	Legislative Decree 1/2010, of 18 May, approving the revised text of the Law on Land Use Planning and Urban Development (Art. 137)	Pending
Waste	2022	Uncontrolled deposits of various types of waste in Enclosure 2, Plot 1, Polygon 42 of the municipality of Albacete	Mancha Regional Government	Law 22/2011 on Waste and Contaminated Soil (Art. 46.3.c)	Pending
Wooded areas and mountains	2022	Tree felling in Camino Viejo, municipality of Magaz de Pisuerga	Castile and Leon Regional Government	Law 3/2009 Law on Forests of Castile and León (Art. 116)	Pending
Public cleaning	2023	Transverse drainage work with downstream channelling that flows into the station's culvert, which also must drain the EX-104 road itself.	Board of Extremadura	Law 7/1995, of 27 April, on Roads in Extremadura (Art. 45.4 and 45.6)	Pending
Forest fires	2023	Failure to take appropriate safety measures due to lack of maintenance and cleaning of the railway right-of-way, which facilitates the spread of fires.	Castile and Leon Regional Government	Law 3/2009, of 6 April, on Forests in Castile and León (Art. 113 m)	Pending

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Table 52. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breached	Penalty
Forest fires	2023	Negligent maintenance of railway catenary causing a forest fire. Location of the incident Railway, km 103.1, coordinates X370000 Y4496157, in Herradón de Pinares-La Cañada (Navalgrande), in (Ávila)	Castile and Leon Regional Government	Law 43/2003, of 21 November (Art. 67 e) in relation to Art. 9 of Order FYM/510/2013, of 25 June, regulating the use of fire and establishing preventive measures for fighting forest fires in Castile and León.	Pending
Waste	2023	The containers intended for household waste had been filled with palm tree pruning, leaving no space for rubbish bags, at La Unión station.	Union Town Hall	Ordinance on street cleaning, storage, collection and final disposal of waste and solid residues (Art. 9)	Pending
Fauna	2023	Electrocution of a barn owl, presumably electrocuted, with bleeding in the left eye and left wing, in the area known as 'Casa Monteagudo' at coordinates UTM X631813 Y4306973. The pole that caused the electrocution is horizontal and uninsulated. Claim for the value of the electrocuted owl.	Castile-La Mancha Regional Government	Law 9/1999, of 26 May, on Nature Conservation	Pending
Waste	2023	Breach of the duty of ownership of the land located on the Parla-Pinto 20 road to maintain it in a safe, healthy, clean and tidy condition as required by urban planning regulations (as it is in a state of neglect, unclean and overgrown, with waste and rubble and not properly fenced off, as the access gate to the fence is missing).	Parla Town Council	Law 9/2001, of 17 July, on Land in the Community of Madrid (Art. 168.1)	Pending
Forest fires	2024	At the site of the former mineral loading and unloading station of Las Mallas, near the town centre of Niebla, Huelva, in Polígono 26, Plot 9023, in the municipal district, a forest fire has broken out, caused by contact between one or more eucalyptus branches and the power lines running parallel to the Huelva-Seville railway line. The area affected covers 0.05 hectares, burning scrubland and some eucalyptus trees.	Regional Government of Andalusia Department of Sustainability, Environment and Blue Economy	Article 64.6 of Law 5/1999, of 29 June, on the Prevention and Control of Forest Fires.	Pending
Livestock trails	2024	Unauthorised occupation of the 'Vereda de Villagordo' livestock trail, consisting of deposits of soil approximately 0.75 metres high and 50 metres long, within the boundaries of public livestock land.	Department of Sustainability, Environment and Blue Economy, Regional Office in Jaén	Article 21.3.E) of Law 3/1995, of 23 March, on Livestock Trails, for "e) The carrying out of unauthorised works or installations of a temporary nature on livestock trails".	Pending
Waters	2024	Breach of conditions B.1.2 and B.1.3 of discharge authorisation V/32/00555 granted by resolution of this River Basin Authority, by exceeding the emission limit values for cadmium and nickel (condition B.1.3) and by exceeding the discharge point flow rate (condition B.1.2) all of this on 07/11/2024, causing damage to public water resources at Venda da Capela, in the municipality of Vilariño de Conso (Ourense).	Department of Agriculture, Livestock, Fisheries and Sustainable Development, Regional Government of Andalusia	Article 101 of the Water Act (Consolidated Text approved by Royal Legislative Decree 1/2001, of 20 July; Official State Gazette of 24 July). Article 251 of the Public Water Domain Regulations (R.D.P.H.) approved by Royal Decree 849/1986 of 11 April (Official State Gazette of 30 April).	Pending

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Table 52. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breached	Penalty
Forest fires	2024	Failure to comply with the provisions of Article 20.bis.b of Law 3/2007, of 9 April, and failure to manage plant biomass (shrubs) or cut additional terrestrial species (eucalyptus) on the railway tracks that run through the municipality of Culleredo between the parishes of Orro and Veiga on land included in the public domain.	Xunta de Galicia	Article 50.2.1 of Law 3/2007, of 9 April, in relation to Article 20.bis.b of said law	€500
Wooded areas and mountains	2024	Unauthorised tree felling, Paraje la Llana, Zalla municipality	Department of Natural Environment and Agriculture, Provincial Council of Bizkaia	Provincial Regulation 3/1994, of 2 July, on Forests and the Administration of Protected Natural Areas	Compensation €1,445.71 + Penalty €1,202.03
Waste	2024	Maintaining a stockpile of manure for more than three months in the same place without complying with preventive measures against the risks of contamination from leaks and nuisance. Specifically, report A33GC-36-23, dated 18 June 2023, accompanied by report 18-700-23, dated 18 June 2023, completed by officers with professional identification numbers (NIP) 1082 and 1617 of the Rural Police Force, states that on the date indicated, on the property 25150:0:0:12:9050:6 in Juneda, owned by the Railway Infrastructure Administrator, with Tax Identification Number Q2801660H, there is a concentration of manure in the form of temporary storage. The fertiliser material violates existing regulations on temporary storage.	Generalitat de Catalunya Departament d'Acció Climàtica Alimentació i Agenda Rural Serveis Territorials a Lleida	Article 17 of Decree 153/2519, of 3 July, on the management of soil fertilisation and livestock manure and the approval of the action programme in vulnerable areas in relation to nitrate pollution from agricultural sources, in relation to sections 1 and 2 of Annex 2.2 of the same Decree.	€3,001
Waste	2024	Deposits, mainly from households, degrading the environment and the visual landscape (wood, sanitary ware, plastics, construction and demolition waste (CDW), as well as electrical and electronic equipment (WEEE).	Geserlocal Ayto Alsasua	Art. 108.3.c) of Law 7/2022, of 8 April, on waste and contaminated soil for a circular economy.	€2,001
Waters	2024	Execution, without the necessary administrative authorisation, of works and labour on public land, consisting of the replacement of a transverse drainage structure ODT with a composite section - a pipe 1.50 m in diameter and an arch 2.00 m wide by 1.45 m high - with pipes 2.00 m in diameter; along the course of the unnamed stream -code number 2010990000-, a tributary of the Valdeazogues river on the left bank, on plot 9009 of polygon 1 of the municipal district of Chillón (Ciudad Real); reference point for its geographical location in WGS84 UTM coordinates: 30S 336788 4285984.	Confederación Hidrográfica del Guadiana	Article 116.3 d) of the Consolidated Text of the Water Law RDL.1/2001 of 20 July	€400

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Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breached	Penalty
Forest fires	2024	Causing a forest fire by dropping incandescent parts from a train onto the grass next to the railway track, burning 17 hectares. The incident took place on the Madrid-Irún railway line at km 117.	Ávila Regional Office, Regional Environment Service	Law 3/2009, of 6 April, on Forests in Castile and León, classified as MINOR, as defined in Article 67(e) of Law 43/2003, of 21 November, in relation to Article 9 of Order FYM/510/2013, of 25 June, which regulates the use of fire and establishes preventive measures for fighting forest fires in Castile and León.	Pending
Waste	2024	On 7 September 2021, officers from the National Police Unit assigned to the Autonomous Community of Andalusia inspected the site 'FFCC Alta Velocidad Polígono 9 Parcela 9002' in the municipality of Almodóvar del Río (Córdoba). After inspecting the area, a dump consisting of rubble and mainly asbestos (hazardous waste) was observed.	Regional Office in Córdoba, Department of Sustainability and the Environment	Article 46.3.O) of Law 22/2011, of 28 July, on Waste and Contaminated Soil, for "o) The commission of any of the offences indicated in section 2 of very serious offences when, due to their low amount or entity, they do not deserve this classification.". In relation to Article 46.2.C) of the aforementioned legal text, "The uncontrolled abandonment, dumping or disposal of hazardous waste".	€3,000
Forest fires	2024	Penalty for failing to rectify deficiencies in active fire protection installations at the Villanueva de Córdoba-Los Pedroches station (Córdoba) Penalty for failing to rectify deficiencies in active fire protection installations at the Villanueva de Córdoba-Los Pedroches station (Córdoba)	Department of Economy, Finance and European Funds Department of Industry, Energy and Mines of the Regional Government of Andalusia	Article 22. Periodic inspections of Royal Decree 513/2017, of 22 May, approving the Regulation on fire protection installations. Second transitional provision of Royal Decree 513/2017, of 22 May. Application of these Regulations to equipment or systems already installed. Fourth transitional provision of Royal Decree 513/2017, of 22 May. First inspection of existing installations	Pending
Forest fires	2024	Disciplinary proceedings for fire on land adjacent to railway line	Livestock, Rural Affairs and the Environment Directorate-General for the Natural Environment and Landscape of La Rioja	Art. 87.M.BIS Art. 88.2 (Law 2/1995, of 10 February, on the Protection and Development of the Forest Heritage of La Rioja) Art. 7.1.E (Order STE/23/2023 of 27 April on the prevention and control of forest fires in the Autonomous Community of La Rioja).	€1,000 + Firefighting costs €9,073.52
Waste	2024	Debris. Accumulation.	Department of Sustainable Development Deputy Department of the Environment of the Provincial Delegation of Cuenca	Law 7/2022, of 8 April, on waste and contaminated soil for a circular economy ('BOE' No. 85, of 09/04/2022) consisting of "abandonment, including littering, dumping and uncontrolled management of any type of non-hazardous waste without seriously endangering human health or causing serious damage or deterioration to the environment." Classified in Article 108.3.c) of the aforementioned Law.	Pending
Forest fires	2024	Inadequate maintenance of vegetation causing fire	Ávila Regional Office Regional Environment Service	Law 3/2009, of 6 April, on Mountains in Castile and León, classified as MINOR, as defined in Article 67.e) of Law 43/2003, of 21 November.	Pending

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Table 52. Cases and penalties related to environmental regulations at Adif

Nature of the violation	Year	Violation	Competent Authority/Court	Regulations breached	Penalty
Waste	2024	Uncontrolled waste dumping	Provincial Delegation for Sustainable Development in Albacete of the Regional Ministry of Sustainable Development of the Regional Government of Castile-La Mancha	Art. 108.3.c) of Law 7/2022, of 8 April, on waste and contaminated soil for a circular economy.	Pending
Forest fires	2024	No herbicide has been applied.	Direcció General de Boscos i Gestió del Medi Generalitat de Catalunya	l'article 74.2 j) de la Llei 6/1988, de 30 de març, forestal de Catalunya l'article 6.2 del Decret 64/1995, de 7 de març article 75 de la Llei 6/1988, de 30 de març, forestal de Catalunya	Pending
Waters	2024	Repair work on a bridge over the Arroyo de la Fuente Yuncos stream (Toledo)	Confederación Hidrográfica del Tajo	Article 116.3 d) of Royal Legislative Decree 1/2001 of 20 July, approving the revised text of the Water Law and classified as Minor in Article 315 c) of the Public Domain Regulations of 11 April 1986.	Pending
Forest fires	2024	Fire in Juneda	Generalitat de Catalunya Direcció General de Boscos i Gestió del Medi	l'article 74.2 j) de la Llei 6/1988, de 30 de març, forestal de Catalunya en relació amb l'article 6.2 del Decret 64/1995, de 7 de març, pel qual s'estableixen mesures de prevenció d'incendis forestals, qualificada de lleu per l'article 75 de la Llei 6/1988, de 30 de març, forestal de Catalunya.	Pending
Waters	2024	Due to construction work, a water collector is being touched without authorisation and modifications are being made.	Barcelona Metropolitan Area	77 d) of the Metropolitan Wastewater Discharge Regulations	Pending
Forest fires	2024	Fire prevention measures	Generalitat de Catalunya Direcció General de Boscos i Gestió del Medi	l'article 74.2 j) de la Llei 6/1988, de 30 de març, forestal de Catalunya en relació amb l'article 6.2 del Decret 64/1995, de 7 de març	Pending
Waste	2024	Uncleaned plot of land	Chinchilla de Montearagón Town Council	Art. 116.3 e) of the Consolidated Text of the Water Law and 315 d) of the Public Water Domain Regulations.	Pending

* Information as of 1 January 2025

Source: Adif, Legal Advisory Department, Corporate Litigation Sub-Department; Adif-Alta Velocidad, Corporate Department, Corporate Environmental Department

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9. ADIF'S CONTRIBUTION TO THE ENVIRONMENTAL SUSTAINABILITY OF TRANSPORT



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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 53. Fuel and energy consumption for traction in rail transport infrastructure managed by Adif *

Type of energy	2017	2018	2019	2020	2021	2022	2023	2024
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	1,335.52
Diesel B (million l/year)	87.84	90.80	89.37	61.82	53.34	51.50	46.83	42.26

* Includes traction-related energy consumption recorded by Adif and all railway operators.

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

Table 54. Energy consumption for rail traction in Adif-managed infrastructure (TJ/year)

Type of energy	2017	2018	2019	2020	2021	2022	2023	2024
Electric energy	5,064.23	5,043.51	5,089.34	4,405.63	4,544.48	4,801.30	4,875.52	4,807.88
Diesel B	3,122.74	3,227.84	3,177.04	2,197.63	1,896.33	1,830.68	1,664.68	1,502.21
Total	8,186.96	8,271.36	8,266.37	6,603.25	6,440.81	6,631.98	6,540.20	6,310.09

* Includes traction-related energy consumption recorded by Adif and all railway operators.

In 2023, electricity accounted for 76.2% 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 2024

Chart 52. Energy consumption for traction (TJ/year)

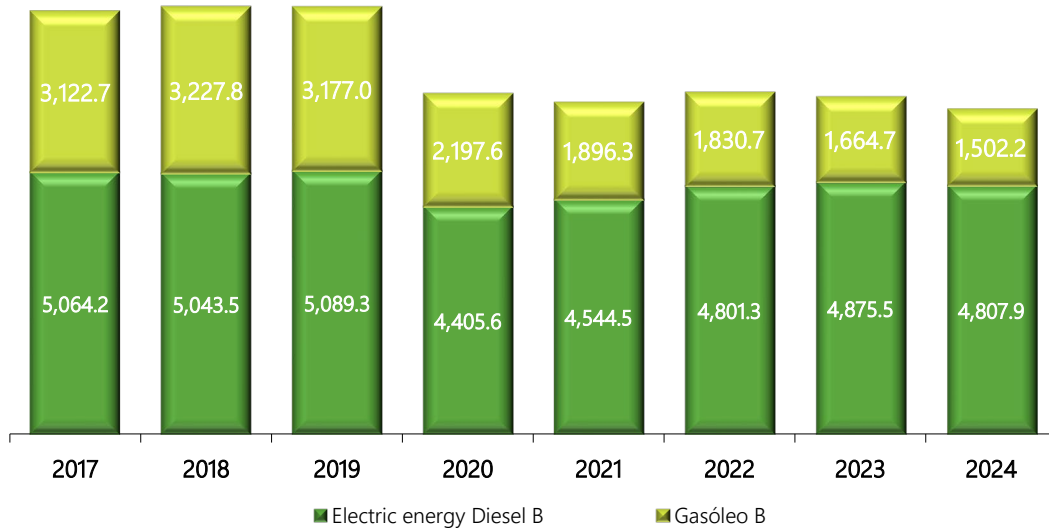


Table 55. Total energy consumption in the railway system managed by Adif (TJ/year)

Type of energy	2017	2018	2019	2020	2021	2022	2023	2024
Energy consumption in Adif's own activities (a)*	676.67	620.10	653.92	540.22	550.44*	527.20	490.95	495.77
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	6,310.57
Energy consumption for purposes other than traction by operators (b)	413.95	413.56	360.15	343.72	333.83	343.03	334.03	330.59
Total	9,125.94	9,191.95	9,175.19	7,408.31	7,255.89*	7,445.13	7,317.77	7,136.93

(a) Includes traction uses.

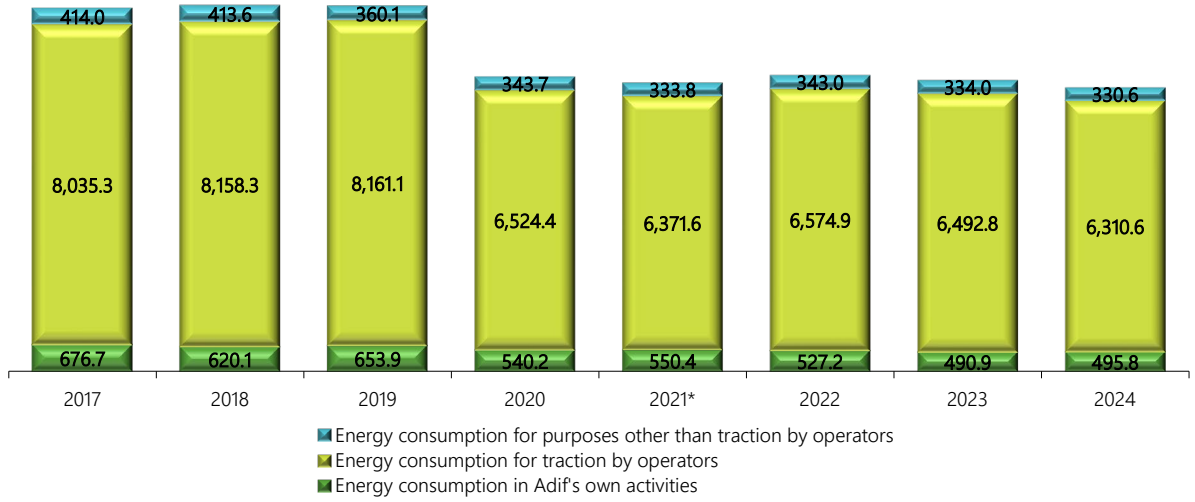
(b) Energy consumption for non-traction uses by Renfe Operadora and other minor operators on infrastructure managed by Adif-Alta Velocidad is minimal, so it is assumed that all energy consumption is on infrastructure managed by Adif (no data is available for other operators).

* Data revised in relation to the 2023 Environmental Report

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

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Chart 53. Total energy consumption in the railway system managed by Adif (TJ/year)



* Data revised in relation to the 2023 Environmental Report

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

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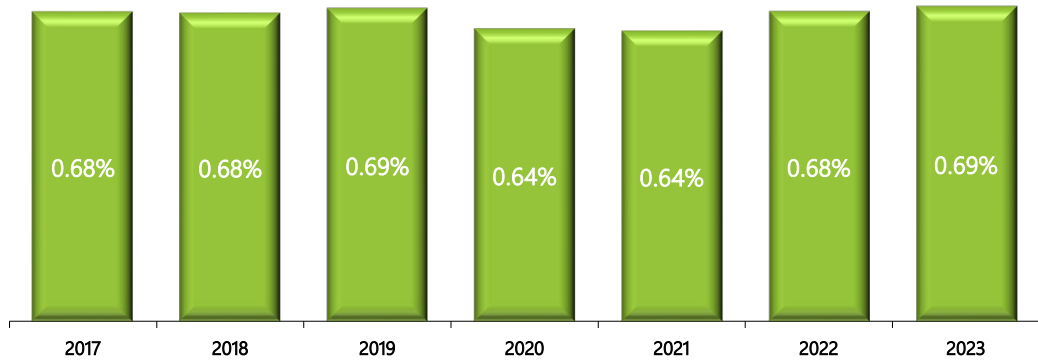
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ENERGY CONSUMPTION OF THE RAIL TRANSPORT SYSTEM AS A PERCENTAGE OF SPAIN'S TOTAL

Final energy consumption in Spain in 2023 (latest year for which information is available) recorded an increase of 0.2% compared to the previous year, although in the case of electrical energy it was a decrease of 0.8%.

In 2023 (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 0.69% 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 2023.

Source: Prepared by the authors based on the final energy consumption balance, excluding non-energy uses, from Spain's Energy Balance 2023 (2025).

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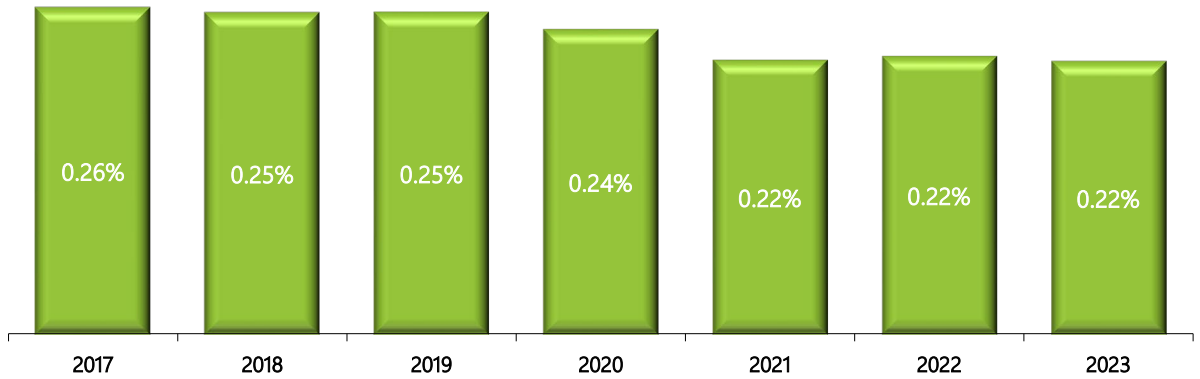
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Chart 55. Final energy consumption by the rail transport system on Adif-managed infrastructure compared to Spain (%) *, **



* 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 2023.

Source: Prepared by the authors based on the final energy consumption balance, excluding non-energy uses, from Spain's Energy Balance 2023 (2025).

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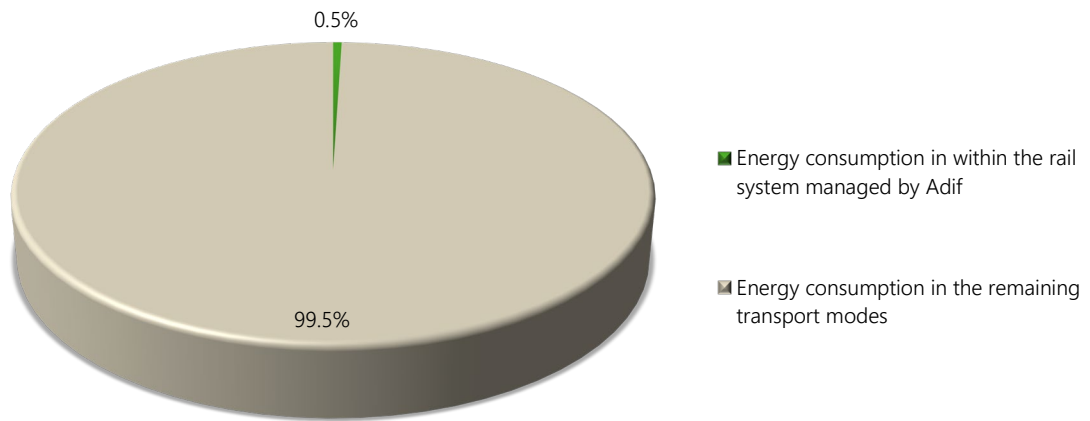
TRACTION ENERGY CONSUMPTION AS A PERCENTAGE OF TOTAL TRANSPORT ENERGY CONSUMPTION

The Transport Sector is a major energy consumer. In 2023, the most recent year for which data is available, 38.4% of Spain's final energy consumption was used by the road, rail, and air transport sectors.

In 2023, the rail transport system on infrastructure managed by **Adif**, which transported 3.5% of passengers* and 4.5% 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.*

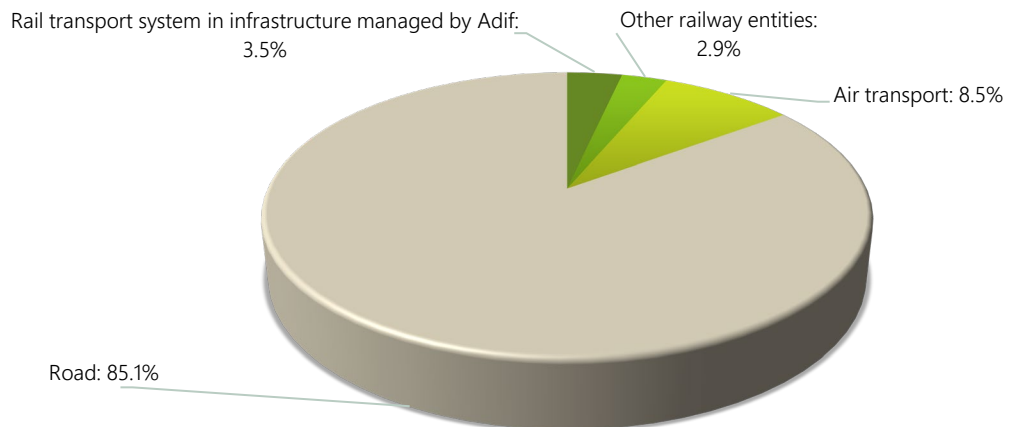
Chart 56. Traction energy consumption by the rail transport system on Adif-managed infrastructure compared to the overall transport sector in Spain. Year 2023 *



* Data for the most recent year available In air transport, only domestic flights have been considered.

Source: Prepared by the authors based on the final energy consumption balance in Spain from the Energy Balance of Spain 2023 (2025).

Chart 57. Passenger traffic distribution (%). Year 2023 *



* 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) 2025, Renfe Operadora

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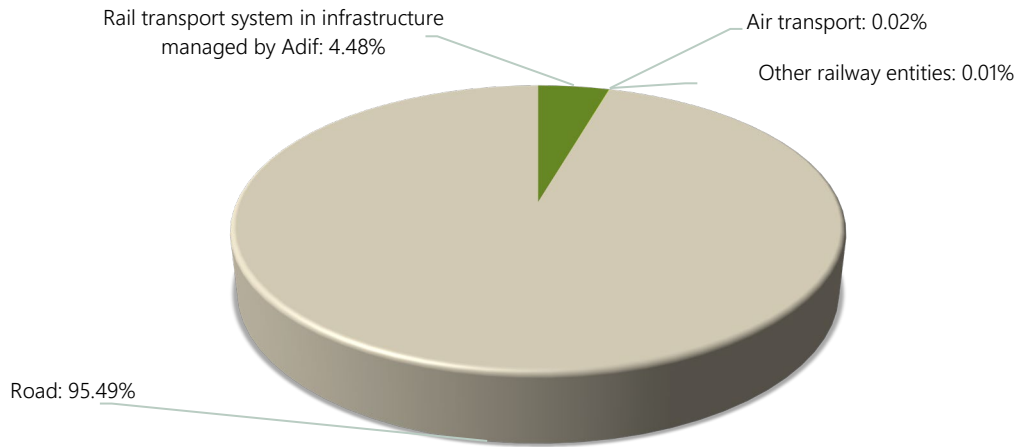
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Chart 58. Distribution of freight traffic (%). Year 2023 *



* Data for the most recent year available.

Source: Ministry of Transport and Sustainable Mobility. Transport and Logistics Observatory of Spain (OTLE) 2025, Renfe Operadora

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TRACTION ENERGY CONSUMPTION PER TRANSPORT UNIT

302-5

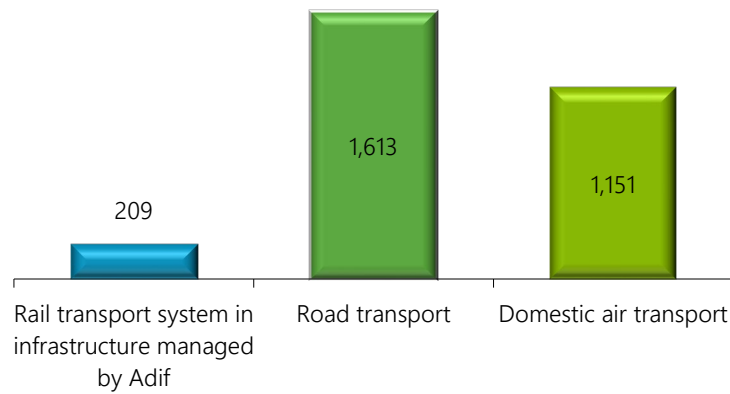
! In 2023, the specific traction energy consumption for the rail transport system on Adif-managed infrastructure was 209 kJ per Transport Unit.

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 **7.7 times less energy** than road transport and **5.5 times less** than air transport.

** Data for 2023. 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 2023 *



* The most recent year for which data on energy consumption in road and air transport is available.

Source: Compiled based on the information and data from: Ministry of Transport and Sustainable Mobility, Transport and Logistics Observatory of Spain (OTLE) 2025 and Ministry for the Ecological Transition and the Demographic Challenge (2025), Greenhouse Gas Emissions Inventory in Spain 1990-2023 and Adif-Alta Velocidad.

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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.

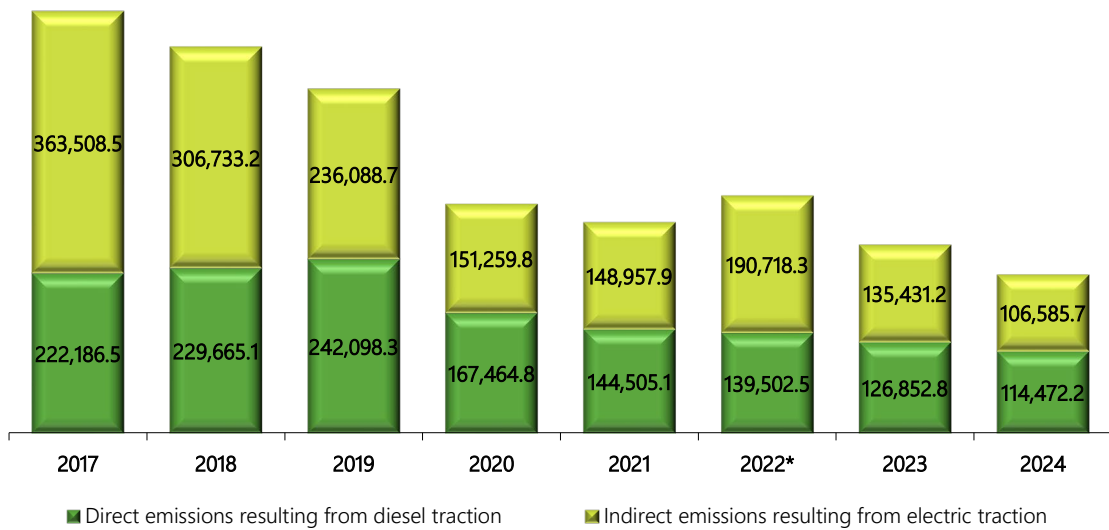
All electricity used for electric traction comes from the mainland electricity grid. The emissions generated are indirect, i.e. they do not occur during railway operations but originate from power generation plants.

Indirect emissions from electricity consumption depend not only on the amount consumed but also on the generation mix of the Peninsular Electricity System.

Thus, while there has been a slight decrease in electricity consumption for traction purposes over the last year, of 0.01%, the corresponding direct GHG emissions have been reduced (9.3%). This reduction is due to changes in the generation mix of the Peninsular Electricity System and a greater share of renewable energy sources.

In 2024, electricity accounted for 76.2% of **Adif**'s total energy consumption for traction, resulting in indirect GHG emissions of 106,585.73 tons of CO₂eq.

Chart 60. GHG emissions from traction activities. Rail transport system on Adif-managed infrastructure (t of CO₂eq/year)



* Data revised in relation to the 2023 Environmental Report

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Table 56. Air emissions from traction in the rail transport system on Adif-managed infrastructure (t/year) *

Compound	2017	2018	2019	2020	2021	2022	2023	2024
Indirect emissions resulting from recorded electricity consumption								
Carbon dioxide (CO ₂) (a)	362,936.26	306,155.17	-	-	-	-	-	-
Methane (CH ₄) (a)	20.41	20.62	-	-	-	-	-	-
Nitrous oxide (N ₂ O) (a)	0.00	0.00	-	-	-	-	-	-
Carbon monoxide (c)	175.98	155.64	123.42	118.48	129.76	155.90	147.83	116.54
Non-methane volatile organic compounds (NMVOCs) (c)	26.49	26.49	27.29	26.75	30.73	31.49	23.27	18.34
Oxides of nitrogen NO _x (as NO ₂) (c)	621.29	467.53	378.56	262.65	256.29	272.73	248.29	195.74
Sulphur oxides SO _x (as SO ₂) (c)	476.78	348.06	157.40	62.31	44.92	48.78	39.96	31.50
PM _{2.5} (c)	23.57	19.13	15.24	13.74	14.81	15.31	12.78	10.07
PM ₁₀ (c)	31.58	25.71	19.25	17.69	18.83	19.38	16.19	12.77
TSPs (c)	41.16	33.76	25.41	24.55	26.15	26.75	22.45	17.70
CO ₂ eq (a)	363,508.49	306,733.20	236,088.67	151,259.82	148,957.86	190,718.27	135,431.23	106,585.73
Direct emissions resulting from diesel traction								
Carbon dioxide (CO ₂) (b)	221,358.57	228,809.24	-	-	-	-	-	-
Methane (CH ₄) (b)	12.96	13.40	-	-	-	-	-	-
Nitrous oxide (N ₂ O) (b)	1.76	1.81	-	-	-	-	-	-
Carbon monoxide (CO) (d)	798.91	825.80	812.80	562.23	485.15	468.36	425.89	384.32
Non-methane volatile organic compounds (NMVOCs) (d)	347.19	358.88	353.23	244.34	210.84	203.54	185.08	167.02
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	1,882.09
Sulphur oxides SO _x (como SO ₂) (d)	1.49	1.54	1.52	1.05	0.91	0.88	0.80	0.72
PM _{2.5} (d)	102.29	105.73	104.07	71.99	62.12	59.97	54.53	49.21
PM ₁₀ (d)	107.52	111.14	109.39	75.67	65.29	63.03	57.32	51.72
TSP (d)	113.49	117.31	115.46	79.87	68.92	66.53	60.50	54.60
CO ₂ eq (b) (c)	222,186.53	229,665.06	242,098.26	167,464.79	144,505.13	139,502.47	126,852.76	114,472.19
Total emissions resulting from traction								
Carbon dioxide (CO₂)	584,294.84	534,964.41	-	-	-	-	-	-
Methane (CH₄)	33.37	34.02	-	-	-	-	-	-
Nitrous oxide (N₂O)	1.76	1.82	-	-	-	-	-	-
Carbon monoxide (CO)	974.89	981.44	936.23	680.71	614.91	624.26	573.72	500.86
Non-methane volatile organic compounds (NMVOCs)	373.68	385.36	380.52	271.09	241.57	235.03	208.35	185.36
Nitrogen oxides NO_x (as NO₂)	4,533.72	4,511.64	4,359.01	3,016.02	2,632.17	2,566.36	2,333.94	2,077.83
Sulphur oxides SO_x (as SO₂)	478.27	349.61	158.92	63.36	45.83	49.66	40.75	32.22
PM_{2.5}	125.86	124.86	119.31	85.73	76.93	75.27	67.31	59.28
PM₁₀	139.09	136.84	128.64	93.36	84.12	82.41	73.51	64.49
TSP	154.65	151.07	140.87	104.42	95.07	93.28	82.95	72.29
CO₂eq	585,695.01	536,398.26	478,186.93	318,724.61	293,462.99	330,220.75	262,284.00	221,057.92

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* Data revised in relation to the 2023 Environmental Report

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

(b) Source: Adif-Alta Velocidad, Corporate Planning, Strategy and Project Management Department, Corporate Business Strategy Department, Corporate Responsibility, Sustainability and Branding Sub-department with additional elaboration based on the methodology used by this department.

(c) Estimated using recorded electricity consumption and air emissions data from generation facilities for 2005 to 2023, provided by the Ministry for Ecological Transition and the Demographic Challenge, 2025

(d) Estimated based on reported diesel fuel consumption and emission factors from the National Inventory of Emissions to the Atmosphere 1990-2023. Chapter 3: ENERGY (NFR 1A, 1B) (Ministry for Ecological Transition and Demographic Challenge, 2025).

! In 2024, indirect emissions from electric traction at Adif were the main source of sulphur oxide emissions (97.8%).

In 2024, direct emissions from diesel traction accounted for 90.6% of nitrogen oxide emissions, 90.1% of non-methane volatile organic compound emissions, 76.7% of carbon monoxide emissions, 83.0% of particulate matter (PM_{2,5}), and 51.8% of GHG emissions.

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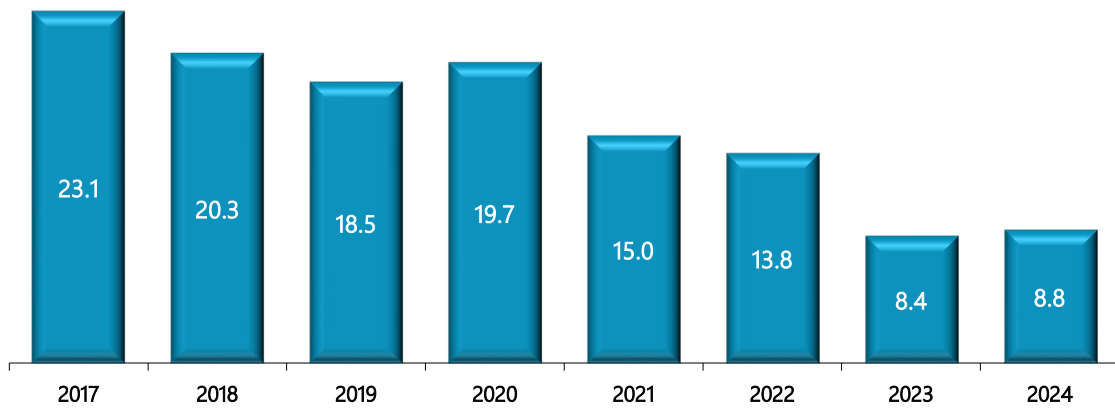
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GHG EMISSIONS PER TU

305-1 | 305-2 | 305-3

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 CO₂eq/TU) *, **



* Includes both direct emissions from diesel traction and indirect emissions from electric traction

** Data revised in relation to the 2023 Environmental Report

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GHG EMISSIONS COMPARED TO THE TRANSPORT SECTOR

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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 13 times less GHG than road transport and 10 times less than air transport.

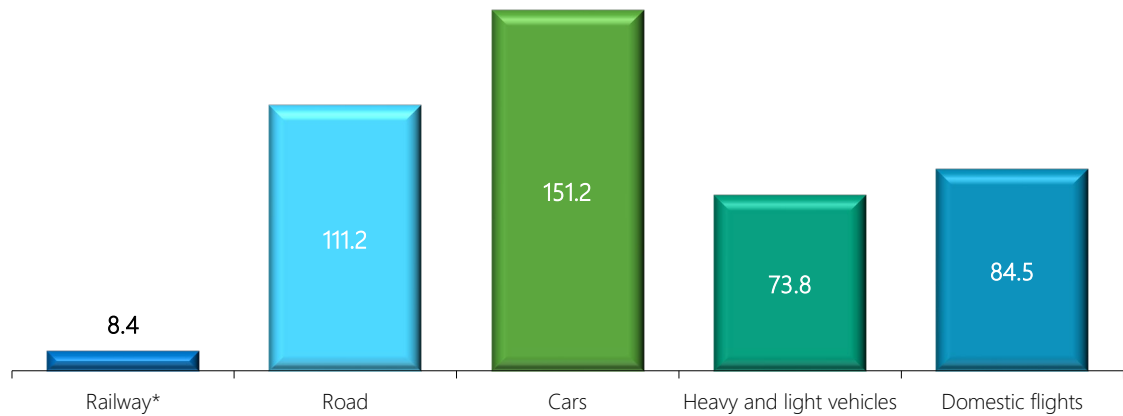
** Data for the year 2023*

Each transport unit that travels by train instead of by road saves 102.8 g of CO₂eq per km.

** Data for the year 2023*

In 2023, the rail transport system on **Adif**-managed infrastructure, which handles 3.5% of passengers and 4.5% of freight, is responsible for less than 0.3% 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 2023 **



* 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 2023, the most recent year for which official data on GHG emissions and TU or different modes is available.

Source: Prepared based on information from: Ministry of Transport and Sustainable Mobility. Transport and Logistics Observatory of Spain (OTLE), 2025; Ministry for the Ecological Transition and the Demographic Challenge (2024). National Inventory of Greenhouse Gases (GHGs) 1990-2023; Renfe and Adif-Alta Velocidad

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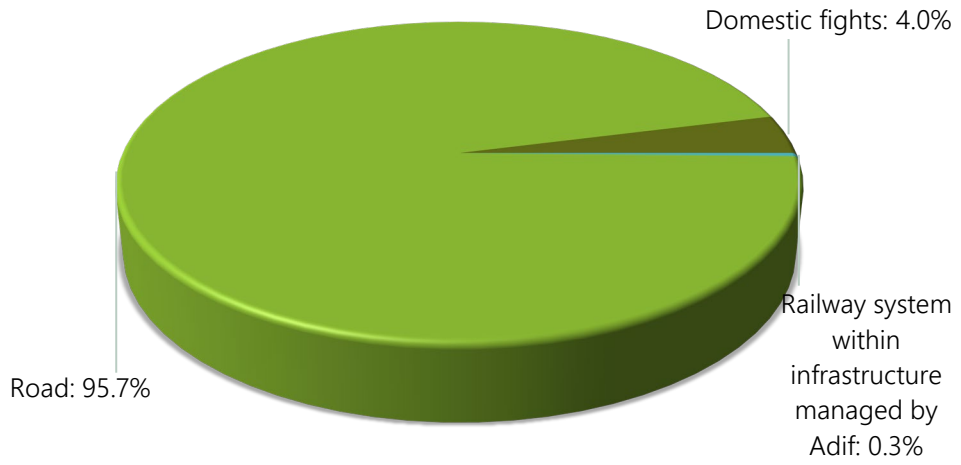
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Chart 63. GHG emissions from freight and passenger transport in Spain (% CO₂eq). Year 2023 *



* Data for the most recent year available.

Source: Prepared based on information from: Ministry of Transport and Sustainable Mobility, Statistical Yearbook 2019; Transport and Logistics Observatory of Spain (OTLE), 2025; National Inventory of Greenhouse Gases (GHGs) 1990-2023, Ministry for the Ecological Transition and the Demographic Challenge (2024); Renfe and Adif-Alta Velocidad.

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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.

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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 57. External costs per unit for different modes of passenger transport. Data for EU-28 * (€). Year 2016

Cost category	Passengers (€ / 1.000 PKM)				Freights (€ / 1000 TKM)	
	Rail	Aviation	Bus	Car	Rail	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	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
Habitat damage	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 Beyrouly, 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 2023, external costs from passenger and freight rail transport on infrastructure managed by Adif totalled 794.3 million euros. Of this

amount, 545.0 million euros were attributed to passenger transport and 249.3 million euros to freight transport.

Table 58. External costs of different passenger transport modes in Spain. Year 2023 (latest available data for all transport systems), excluding congestion costs (in million euros) *

Cost category	Passengers					Freights	
	Rail **	Rail Adif ***	Aviation ****	Bus	Car	Rail	Lorry
Accidents	163.9	95.0	9.3	502.1	18,578.0	18.3	5,080.4
Air pollution	39.3	22.8	92.7	351.5	2,889.9	36.7	3,126.4
Climate	16.4	9.5	1,019.8	251.1	4,954.1	11.0	1,954.0
Noise	295.0	170.9	92.7	150.6	2,477.1	110.0	1,954.0
Well-to-Tank	229.5	132.9	417.2	100.4	1,651.4	36.7	781.6
Habitat damage	196.7	113.9	4.6	50.2	2,064.2	36.7	781.6
Total without congestion	940.8	545.0	1,636.3	1,405.9	32,614.7	249.3	13,677.9

* 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 Statistical Yearbook of the Ministry of Transport and Sustainable Mobility (2023) and the Spanish Transport and Logistics Observatory (OTLE) (2025)

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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 (35.4%), followed by emissions from the well-to-tank cycle-emissions resulting from the extraction, processing, and transportation of the energy consumed by **Adif** (21.4%). External costs due to habitat damage (19.0%) and accidents (14.3%) 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 (13.4%). This does not include congestion costs, which are particularly significant for this mode and arise

from delays and inefficient use of existing infrastructure.

The total external costs of transport in Spain in 2023 exceed **50 billion euros**, which represents **3.5% of GDP**. **72.4%** is due to passenger transport and **27.6%** is due to freight transport.

Additionally, congestion costs from road transport exceeded **24 billion euros**, or **1.7% of GDP**.

Chart 64. External costs of passenger and freight rail transport on infrastructure managed by Adif. Total costs for 2023: 794.3 million euros

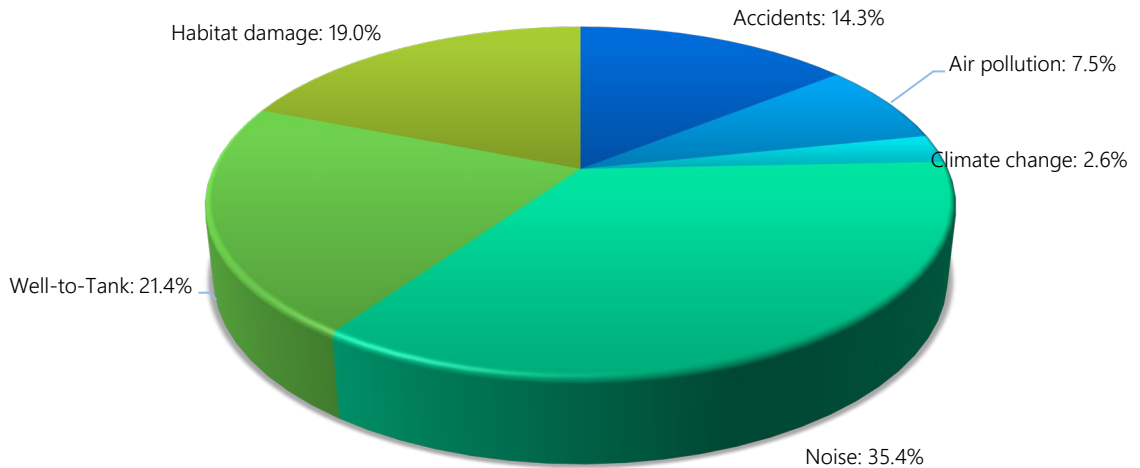


Chart 65. External costs of passenger and freight transport by road. Total costs for 2023: 47,698.5 million euros

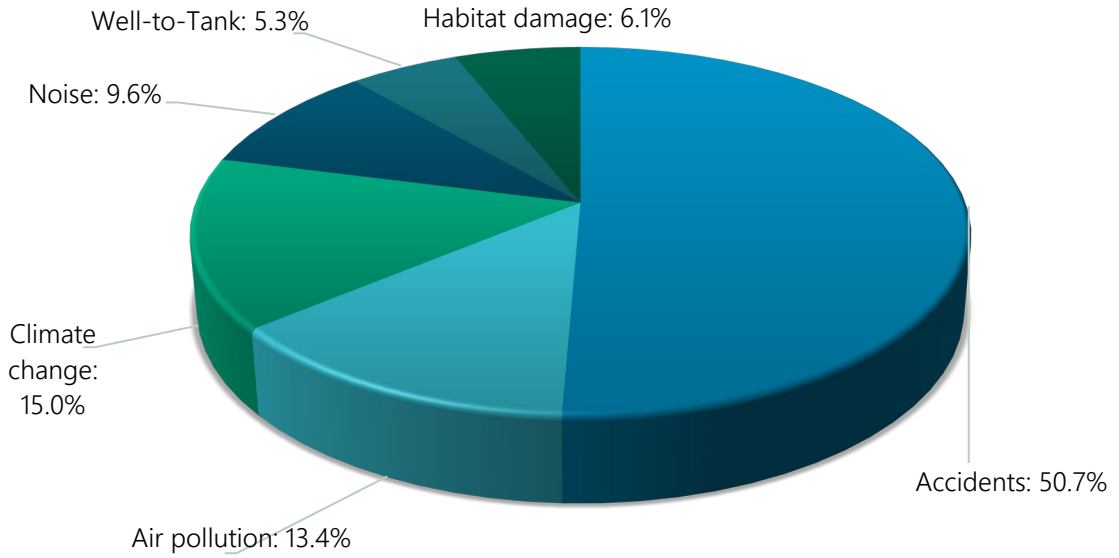
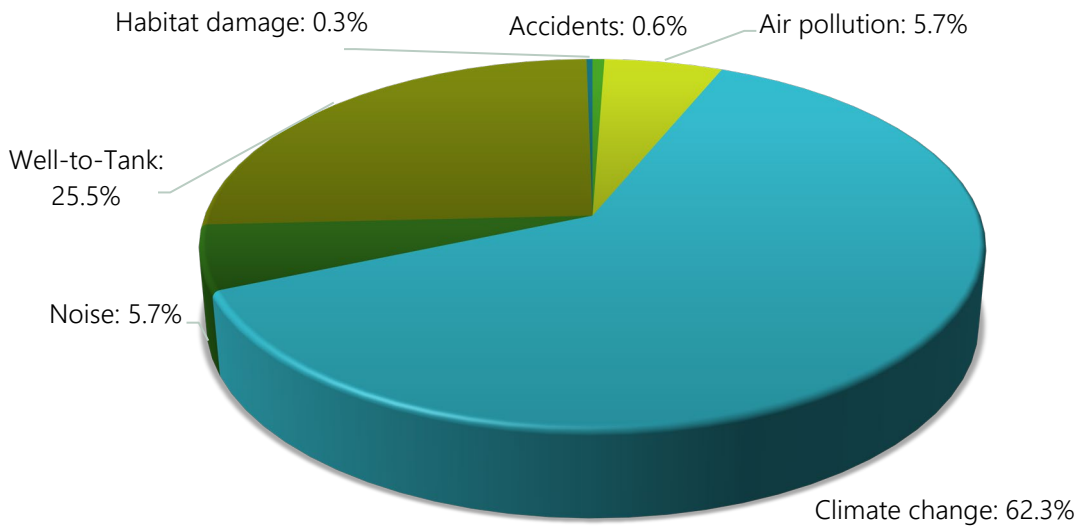


Chart 66. External costs of domestic air passenger transport. Total costs for 2023: 1,636.3 million euros



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SAVINGS FROM EXTERNAL COSTS IN THE RAIL TRANSPORT SYSTEM ON INFRASTRUCTURE MANAGED BY ADIF

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External costs per transport unit are lower for rail transport compared to other modes.

Savings from external costs in 2024 due to rail transport on infrastructure managed by Adif are estimated to be between 1.37 and 1.80 billion euros.

Table 59. Traffic recorded in the rail transport system on infrastructure managed by Adif (millions of PKM or TKM)

Type of energy	2017	2018	2019	2020	2021	2022	2023	2024
Freights and logistics (million TKM) *, ****	10,467	10,753	10,431	8,956	10,174	10,503	15,389	9,299
Passengers (million PKM)	14,876	15,615	15,464	7,182	9,456	13,453	15,946	15,935
Commuter trains**	8,048	8,318	8,368	4,448	5,391	7,073	7,932	7,994
Medium Distance***	2,258	2,279	2,168	1,003	1,412	2,599	4,200	4,302
Long Distance	4,570	5,017	4,928	1,732	2,653	3,781	3,814	3,639
Total (million TU)	25,343	26,368	25,895	16,138	19,630	23,956	31,335	25,234

* 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 (2025)

The assessment of external costs savings is based on the methodology published and updated in 2020 by the European Commission, as detailed in the CE Delf document 'Handbook on the External

Costs of Transport,' and assumes the modal substitution hypotheses listed in the following table:

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Table 60. 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	2024
Freights and logistics *	100% Lorry	226.45	235.41	230.15	196.63	237.97	259.61	392.23	243.77
Passengers		879.45	925.89	930.15	460.62	620.12	903.94	1,092.65	1,129.07
Commuter trains	20% Bus	659.84	690.10	699.68	370.12	477.87	662.52	766.15	794.17
	80% Car								
Medium Distance*	20% Bus	91.53	93.51	89.63	41.25	61.88	120.37	200.60	211.31
	80% Car								
Long Distance	40% Aviation**								
	10% Bus	128.08	142.28	140.84	49.25	80.37	121.05	125.91	123.58
	50% Car								
Total		1,105.91	1,161.30	1,160.30	657.25	858.09	1,163.55	1,484.88	1,372.84

* 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 61. 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	2024
Freights and logistics*	95.24	99.01	96.79	82.70	100.08	109.18	164.96	102.52
Passengers	210.95	225.98	220.70	87.30	136.91	233.99	320.47	329.30
Medium Distance*	93.59	95.61	91.64	42.17	63.27	123.07	205.10	216.06
Long Distance	117.36	130.37	129.05	45.13	73.65	110.92	115.37	113.24
Total	306.19	324.98	317.49	170.00	236.99	343.17	485.42	431.81

* 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 2024 are 1.80 billion euros.

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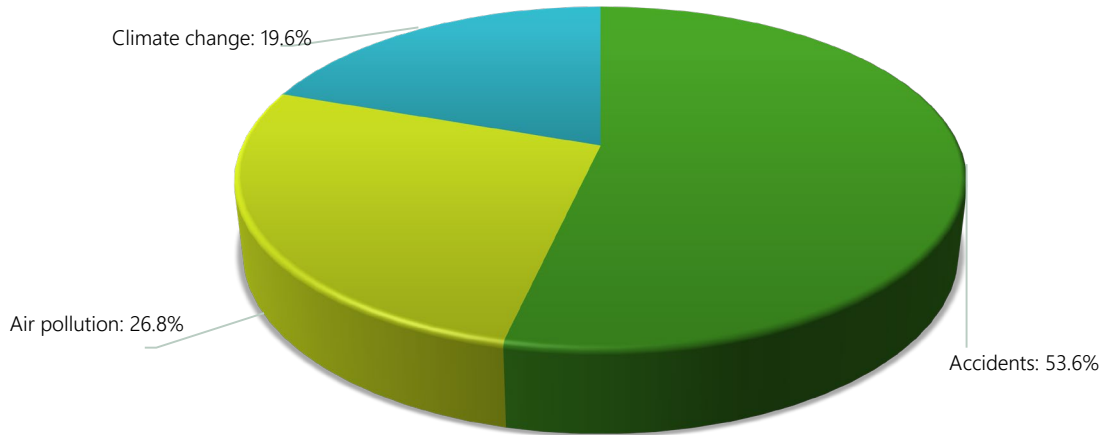
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Table 62. Upper estimate of externality savings, including congestion costs, in all modal shift scenarios (million €/year)

	2017	2018	2019	2020	2021	2022	2023	2024
Total	1,412.09	1,486.29	1,477.79	827.25	1,095.09	1,506.72	1,970.31	1,804.65

Chart 67. Freight transport on infrastructure operated by Adif. Savings from external costs: 243.77 million euros in the year 2024
*, **



* Excluding marginal interurban congestion costs.

** 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: 794.17 million euros in the year 2024

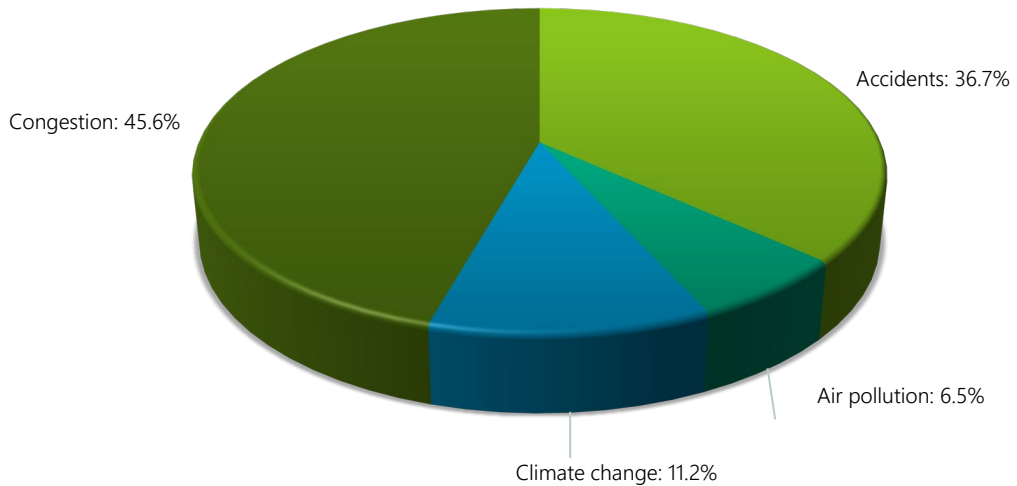
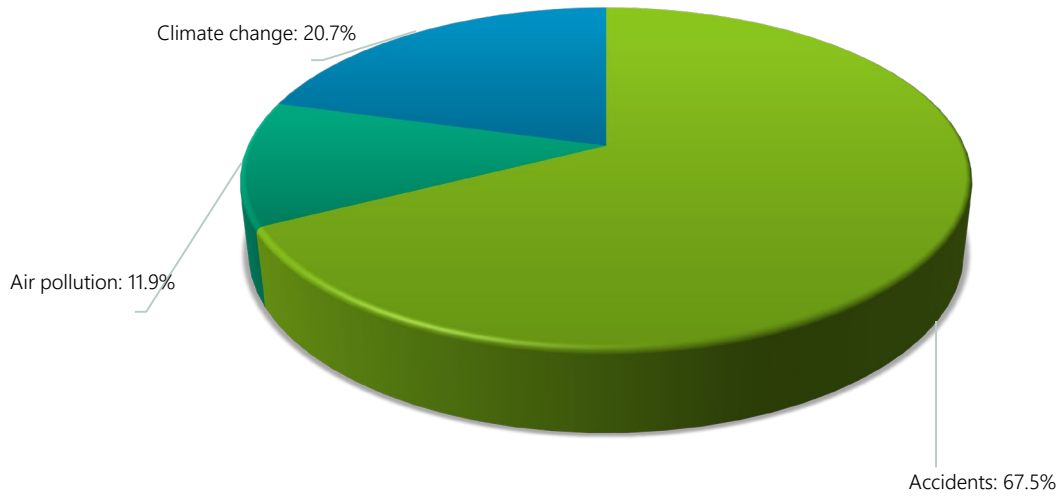
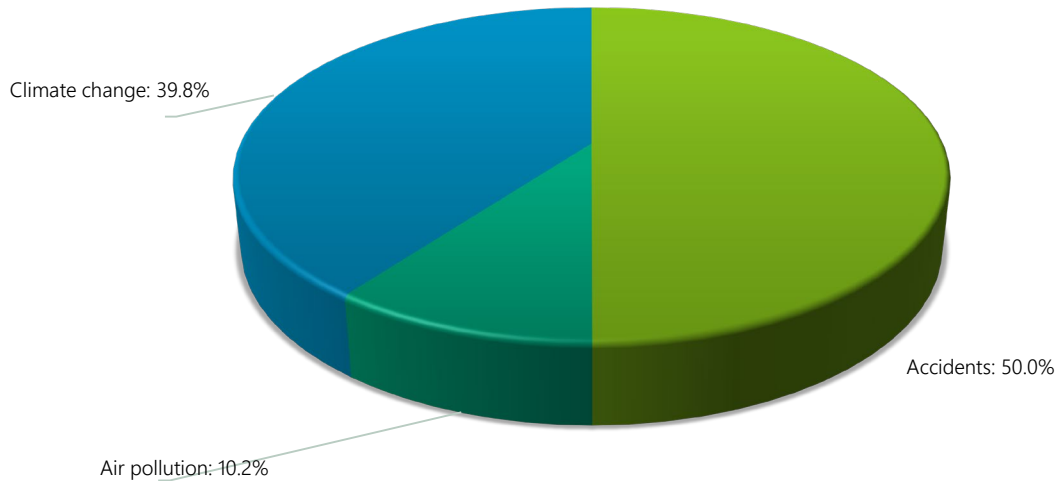


Chart 69. Medium-Distance services on infrastructures managed by Adif. Savings from external costs: 211.31 million euros in the year 2024 *



* Excluding marginal interurban congestion costs.

Chart 70. Long Distance services on infrastructures managed by Adif. Savings from external costs: 123.58 million euros in the year 2024 *



* Excluding marginal interurban 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 25.8% and 41.9% to the total external cost savings.
- Air pollution contributes between 8.7% and 11.1% to the total external cost savings.
- Accidents contribute between 36.0% and 46.0% to total external costs.
- Climate change contributes between 13.5% and 17.2% to total external costs.

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Chart 71. Distribution of external cost savings in the rail transport system managed by Adif. Total savings from external costs, considering only in commuter: 1,372.84 million euros in 2024

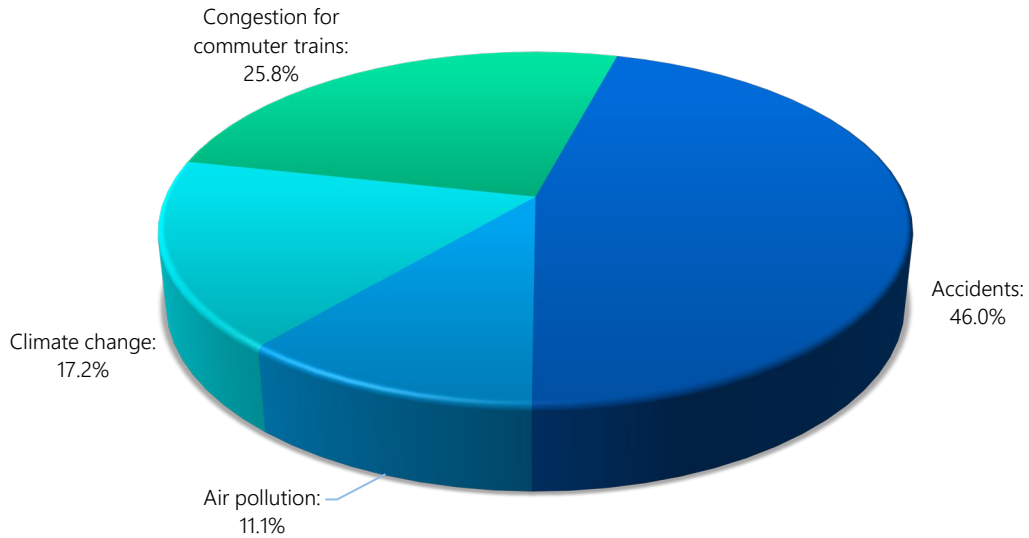
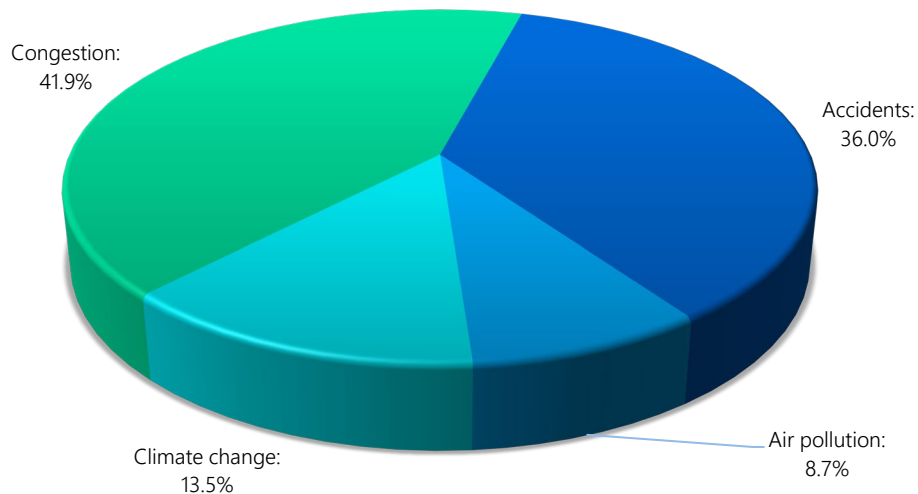


Chart 72. Distribution of external cost savings in the rail transport system managed by Adif. Total savings from external costs, considering congestion costs in all modal substitution scenarios: 1,804.65 million euros in 2024



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

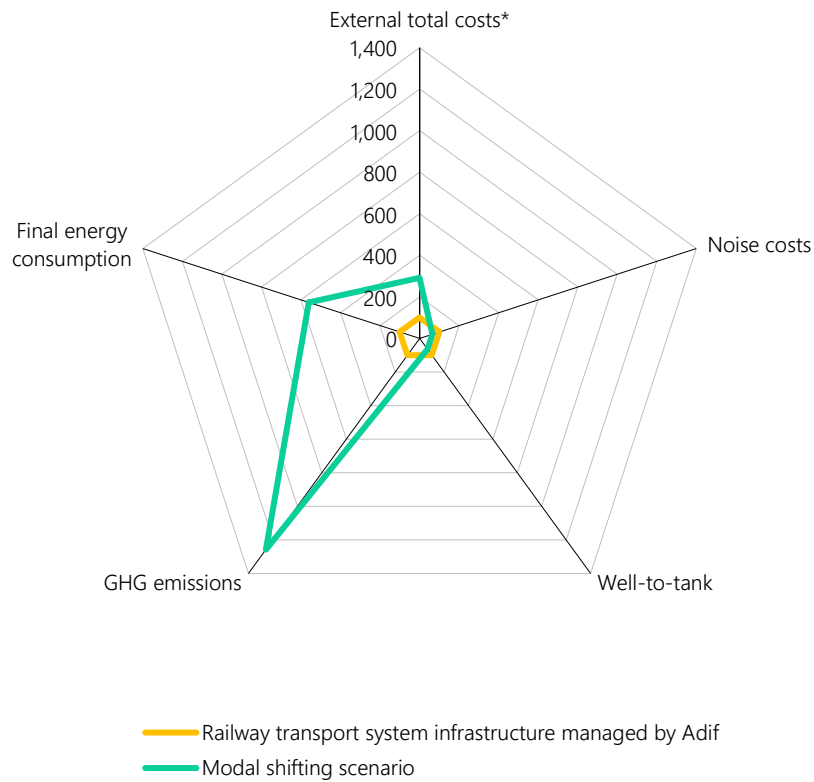
and metropolitan journeys, and developing European corridors, the trans-European transport network, and logistics intermodality. In this regard, **Adif** has developed, among other initiatives, Spain's first railway motorway services. In 2021, it signed protocols for the commissioning of the Algeciras-Zaragoza 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 2024 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. Prepared by us using the methodology from the 'Handbook on External Costs of Transport', DE Delft, 2020.

The relative eco-efficiency of the rail transport system in 2024, based on the modal substitution scenarios considered, is clearly illustrated through the eco-compass. This graphical

representation includes five key indicators: three primary ones – total external costs, final energy consumption, and GHG emissions – and two

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secondary ones: noise externalities and well-to-tank emissions.

Contribution to the Sustainability of the Rail Transport System on Infrastructure Managed by Adif. 2024

The traffic recorded in 2024 on infrastructure managed by Adif, in relation to modal shift scenarios, has resulted in:

- Savings in external costs estimated at between 1.373 and 1.805 billion euros.
- A reduction in final energy consumption estimated at 785 thousand tonnes of oil equivalent (toe).
- A decrease in GHG emissions estimated at 2.56 million tonnes of CO2 equivalent.

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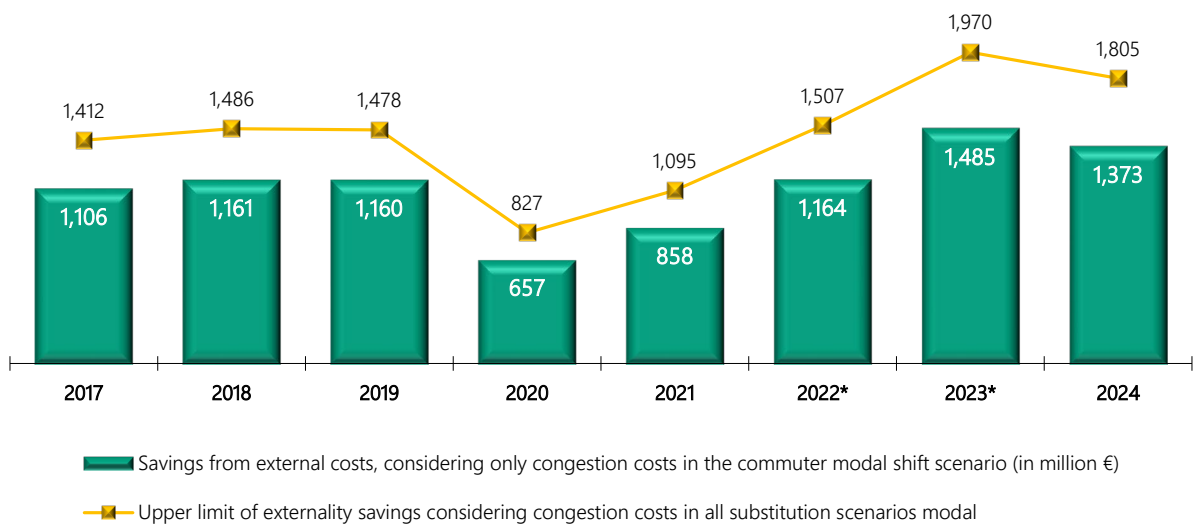
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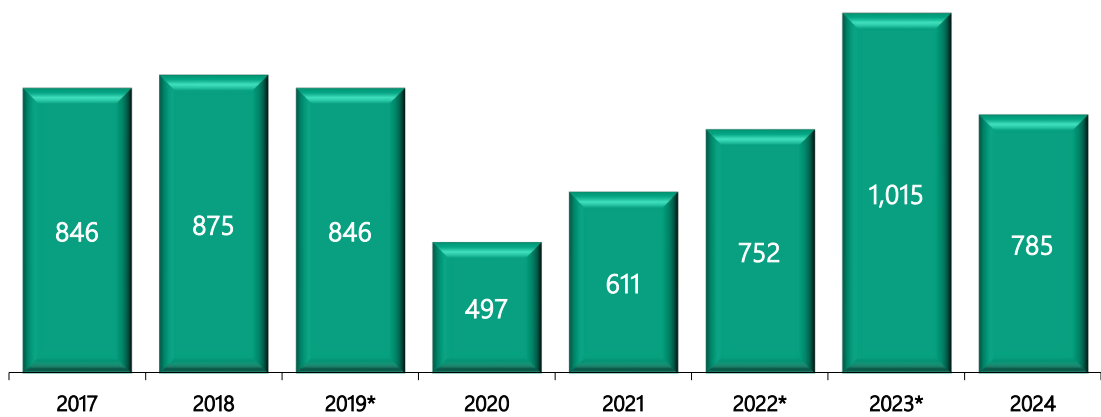
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Chart 74. Savings in externalities (million euros/year) *



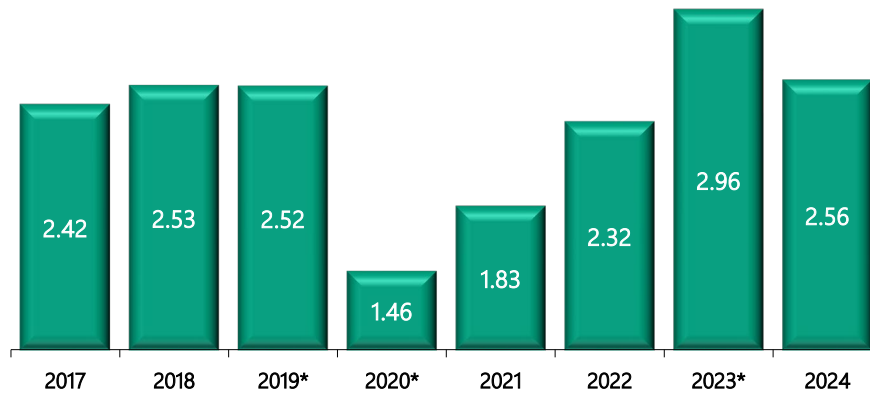
* Data revised in relation to the 2023 Environmental Report

Chart 75. Decrease in final energy consumption (thousands of toes)



* Data revised in relation to the 2023 Environmental Report

Chart 76. GHG emission reductions (million tonnes CO₂eq)



* Data revised in relation to the 2023 Environmental 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** fulfils its commitment to report on the environmental aspects of its activities and the results achieved, marking the eleventh year since the creation of Adif-Alta Velocidad, which was established as a spin-off for the high-speed infrastructure construction and management.

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OUTREACH

This Report covers the environmental performance of all activities, products, and services developed by **Adif** in Spain.

Adif-Alta Velocidad was established on 31 December 2013, by Royal Decree-Law 15/2013¹⁹, 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, which 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 regulations²⁰ 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 agreement²¹, 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 2024, marking the eleventh year for which separate data are available for each entity. The time reference for many indicators includes annual information and data from 2015 and 2024, corresponding to the **Adif** entity.

¹⁹ 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)

²⁰ 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).

²¹ 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).

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CONTENT SELECTION

The content of this report has been selected based on the new materiality analysis conducted in 2024.

In this analysis, a list of relevant issues was first identified and then evaluated through a thorough review of various external sources, including reporting frameworks such as GRI, Law 11/2018, and sectoral papers. Additionally, information sources from the public sector and the railway sector have been considered. Based on this, an initial exploration of the dual approach to materiality was conducted, considering concepts such as financial materiality and impact materiality, through surveys with various stakeholders.

The relevant topics or issues were divided into eleven blocks, organised by Environmental, Social, and Governance areas. The results of the analysis were presented in a materiality chart.

As a result of applying the materiality principle, the following issues of high relevance to the environmental dimension were identified:

- Climate Change
- Water and Marine Resources

Of medium relevance are:

- Pollution
- Biodiversity and Ecosystems
- Resources and Circular Economy

It should be noted that the overall results indicate a stronger focus on environmental issues compared to the previous materiality analysis, although this area still lacks maturity. Governance and social issues are considered more material than environmental issues, despite the increasing regulatory requirements and legislative trends.

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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 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.

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ACCESS TO INFORMATION AND QUERIES

This document is available to various stakeholders and the general public on the **Adif's** website (www.adif.es).

For more information and access, copies of this report can be obtained by contacting:

Adif-Alta Velocidad
Corporate Management
Corporate Environmental Sub-Department
c/ Titan, 4-6
28045 Madrid (Spain)
Telephone: +34 915 40 38 08

APPENDICES



GRI STANDARD

This report has been prepared in accordance with the Comprehensive option of the GRI Standards.

GRI Standard (1)	2024 Adif Environmental Report	Pages	Omissions (2)	External verification (3)
GRI 2	General Disclosures			
2-27	Compliance with laws and regulations	Environmental compliance	191-196	✓
GRI 3	Material Topics			
3.3	Management of material topics	Company's environmental strategy	5-9	✓
		Plan to Combat Climate Change (PCCC)	13-20	✓
		Consumption of railway materials	47-48	✓
		Waste	52-66	✓
		Actions in the Circular Economy	67-70	✓
		Discharging	73-74	✓
		Contaminated soils	75-109	✓
		Noise pollution	108-112	✓
		Land use	119	✓
		Impact management in new infrastructure development	122-124	✓
		Fire prevention	125-128	✓
		Key achievements in the construction of standard gauge lines	140-144	✓
		Responsible purchasing	181-183	✓
		Management of environmental complaints about noise and vibrations	183	✓
		Savings from external costs in the rail transport system on infrastructure managed by Adif	218-222	✓
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GRI 301		Materials		
301-1	Materials used by weight or volume	Consumption of railway materials	47-48	✓
301-2	Recycled input materials used	Used rails, sleepers, and ballast are reused, where possible, at other locations within the rail network		Used rails, sleepers, and ballast are reused where possible at other locations within the rail network, although this is not currently accounted for.
301-3	Reclaimed products and their packaging materials			Given the characteristics of the organization, it is not appropriate.
GRI 302		Energy		
302-1	Energy consumption within the organization	Energy consumption in Adif's own activities	31-32	✓
302-2	Energy consumption outside of the organization	Primary energy consumption	34-35	✓
302-3	Energy intensity	Final and primary energy intensity	35-37	✓
302-4	Reduction of energy consumption	Monitoring the implementation of actions to combat climate change	16-20	✓
302-5	Reductions in energy requirements of products	Energy consumption in the rail transport system within infrastructures managed by Adif	199-201	✓
		Traction energy consumption per Transport Unit	206	✓
GRI 303		Water and Effluents		
303-1	Interactions with water as a shared resource	Water consumption	51	✓
				✓
303-2	Management of water discharge-related impacts	Discharging	73-74	✓

				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.
303-3	Water withdrawal			
303-4	Water discharge	Discharging Adif operates in Spain where the discharge of wastewater is subject to specific legislation, which it strictly complies with	73-74	✓
303-5	Water consumption	Water consumption	51	✓
GRI 304 Biodiversity				
304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	Land use	119	✓
		Natural areas	120-121	✓
		Greenways	129-134	✓
		Green stations	135	✓
304-2	Significant impacts of activities, products and services on biodiversity	Natural areas	120-121	✓
		Impact management in new infrastructure development	122-124	✓
		Key achievements in the construction of standard gauge lines	140-144	✓
304-3	Habitats protected or restored	Natural areas	120-121	✓
		Greenways and Protected Natural Areas	136-139	✓
		Key achievements in the construction of standard gauge lines	140-144	✓
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	38-41	✓
		Air emissions from traction	207-209	✓
		GHG emissions per TU	210	✓
		GHG emissions compared to the transport sector	211-212	✓
305-2	Energy indirect (Scope 2) GHG emissions	Carbon footprint	38-41	✓
		Air emissions from traction	207-209	✓
		GHG emissions per TU	210	✓
		GHG emissions compared to the transport sector	211-212	✓
305-3	Other indirect (Scope 3) GHG emissions	Air emissions from traction	207-209	✓
		GHG emissions per TU	210	✓
		GHG emissions compared to the transport sector	211-212	✓
305-4	GHG emissions intensity	Carbon footprint	38-41	✓
305-5	Reduction of GHG emissions	Monitoring the implementation of actions to combat climate change	16-20	✓
305-6	Emissions of ozone-depleting substances (ODS)	Substances that deplete the ozone layer	49	✓
305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	Other air emissions	42-44	✓
		Air emissions from traction	207-209	✓
GRI 306 Waste				
306-1	Waste generation and significant waste-related impacts	Waste	52-66	✓
306-2	Management of significant waste-related impacts	Waste	52-66	✓
		Actions in the Circular Economy	67-70	✓
306-3	Waste generated	Waste	52-66	✓
306-4	Waste diverted from disposal	Waste	52-66	✓
306-5	Waste directed to disposal	Waste	52-66	✓
GRI 308 Supplier Environmental Assessment				
308-1	New suppliers that were screened using environmental criteria	Responsible purchasing	181-183	✓
308-2	Negative environmental impacts in the supply chain and actions taken	Responsible purchasing	181-183	✓
		Impact management in new infrastructure development	122-124	✓
		Noise pollution	108-112	✓

Fire prevention	125-128	✓
Environmental risk management	182-183	✓
Management of environmental complaints about noise and vibrations	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:	Company's environmental strategy	5-9		✓
1. Initiatives on sustainable transportation (e.g. hybrid vehicles);	Plan to Combat Climate Change (PCCC)	13-20		✓
2. Modal shift; and				
3. Route planning				
Aspect: Energy efficiency				
LT4: Description of initiatives to use renewable energy sources and to increase the energy efficiency.	Not applicable			
Aspect: Urban air pollution				
LT5: Description of initiatives to control urban air emissions in relation to road transport (e.g., use of alternative fuels, frequency of vehicle maintenance, driving styles, etc.).	Plan to Combat Climate Change (PCCC)	13-20		✓
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 on environmental management and the promotion of sustainable mobility	26		✓
Aspect: Noise and vibration				
LT7: Description of policies and programmes for noise management/abatement	Noise pollution	108-112		✓
Aspect: Transport infrastructure development				
	Environmental processes management	183-185		✓
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.	Impact management in new infrastructure development	122-124		✓
	Key achievements in the construction of standard gauge lines	140-144		✓

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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Adif and Adif-Alta Velocidad data	Statute of Adif-Alta Velocidad
	Royal Decree-Law 15/2013, of 13 December, on the restructuring of the public business entity 'Administrador de Infraestructuras Ferroviarias' (Adif) and other urgent economic measures (BOE No. 299, 14 December 2013).
	Network Declaration 2014 to 2024
	Strategic Plan 2030
	Adif Code of Ethics and Conduct
	Environment Policy (2024)
	Addendum to the Management Agreement between Administrador de Infraestructuras Ferroviarias (Adif) and Adif-Alta Velocidad
	General Procedure for Managing and Coordinating Environmental Activities. ADIF-PG-109-001-001
	Adif 2005 to 2012 Environmental Reports
	Adif and Adif-Alta Velocidad 2013 Environmental Report
	Adif 2014 to 2023 Environmental Report
	Adif Management Report for the Financial Years 2019, 2021, 2022, 2023 and 2024
	Royal Decree 1044/2013, of 27 December, approving the Statute of the Public Business Entity Adif-Alta Velocidad (BOE No. 311, 28 December 2013).
	Adif, Corporate Financial and Management Control Department, Corporate Treasury and Accounting Department, Administration and Services Division
	Adif, Corporate Passenger Stations Department
	Adif, Corporate Traffic and Capacity Management Department, Coordination and Management Sub-Department
	Adif-Alta Velocidad, Corporate Traffic and Capacity Management Department
	Adif, Corporate Conservation and Maintenance Department, Maintenance Sub-Department
	Adif, Corporate Conservation and Maintenance Department, Technical Sub-Department, Operations and Stores Department
	Adif, Corporate Conservation and Maintenance Department, Technical Sub-Department, Corporate Resources Sub-Department
	Adif, Corporate Safety, Processes, and Corporate Systems Department, Quality and Environment Area
	Adif, Corporate Department of Finance and Management Control, Economic Management and Financing Department, Accounting and Financial Information Sub-Department
	Adif, Corporate Finance and Management Control Department, Corporate Treasury and Accounting Department
	Adif, Rail Area Management, Infrastructure and Rail Deputy Sub-Department, Technical Sub-Department.
	Adif, Legal Advisory Department, Corporate Litigation 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	
Adif-Alta Velocidad, Corporate Technical Planning Sub-Department for Rail Assembly and Supplies	

RENFE Operator	Energy and traffic data
Greenways	<i>Fundación de los Ferrocarriles Españoles</i> (Spanish Railways Foundation)
Transport sector data	Spanish Transport and Logistics Observatory (OTLE), 2025 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) <i>Observatorio del Ferrocarril en España</i> (Observatory of the Spanish Railway)
Energy data	<i>Red Eléctrica</i> . Spanish Electricity System Data, 2025 Ministry for the Ecological Transition and the Demographic Challenge, State Secretariat for Energy. Energy Balance of Spain 1990- 2023 (2024)
Emissions data	EEA (2023). EMEP/EEA air pollutant emission inventory guidebook 2023. IPCC Guide on National Greenhouse Gas Inventories (2006 and 2021 update) Ministry for the Ecological Transition and the Demographic Challenge. Inventory of Greenhouse Gas Emissions in Spain. 2024 Edition (1990-2022). March 2025 Ministry for the Ecological Transition and the Demographic Challenge. National Inventory of Emissions of Pollutants into the Atmosphere 1990-2023 Ministry for the Ecological Transition and the Demographic Challenge. Reports on the implementation of Law 1/2005 of 9 March 2005, which regulates the greenhouse gas emission allowance trading scheme.
Unit conversion	International Energy Agency / Natural Gas
Other sources	AENOR INE <i>Instituto Nacional de Estadística</i> (Spanish National Statistics Institute) Baseline data on water consumption, waste generation, and population IDAE <i>Instituto para la Diversificación y Ahorro de Energía</i> (Spanish Institute for the Diversification and Saving of Energy) <i>Comisión Nacional del Mercado de Valores</i> (Spanish National Securities Market Commission)

GLOSSARY

Adif	Administrador de Infraestructuras Ferroviarias
AEMET	Spanish Meteorological Office
AENOR	Spanish Association for Standardisation and Certification
AFA	Auxiliary Facilities Area
ANAVAM	Spanish Environmental Auditors and Verifiers National Association
AQO	Acoustic Quality Objectives
ASFA	Automatic Brake and Signal Warning
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	<i>Boletín Oficial del Estado</i> (Official State Gazette)
CCCMP	Climate Change Combat Master Plan
CDW	Construction and Demolition Waste
CEAP	Circular Economy Action Plan
CELO	Logistics Centre
CER	Community of European Railway
CFC	Chlorofluorocarbons
CH₄	Methane
CN	Conventional Network
CO	Carbon monoxide
CO₂	Carbon dioxide
CO₂eq	Carbon dioxide equivalent. This measures Carbon Footprint in tonnes
CONAMA	Spanish National Environmental Congress
CSN	Spanish Nuclear Safety Council
CSR	Corporate Social Responsibility
DGCM	Corporate Conservation and Maintenance Department
DGNOC	Corporate Business and Commercial Operations Department
EIA	Environmental Impact Assessment
EIM	European Rail Infrastructure Managers
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	<i>Fondo Nacional de Eficiencia Energética</i> (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 (10 ⁶ kWh)
GWheq	Gigawatt hour equivalent. A way of expressing electrical power in gigawatts (GW) so that all types of power stations (nuclear, thermal, renewable) can be compared in terms of useful electricity generated.
ha	hectare (10.000 m ²)
HCFC	Hydrochlorofluorocarbons
HSL	High Speed Line
HW	Hazardous waste
IDAE	<i>Instituto para la Diversificación y Ahorro de la Energía</i> (Institute for Energy Diversification and Saving)
ISO 14001	(UNE-EN-ISO 14001) International standard on environmental management systems
ITU	Intermodal Transport Unit
K.P.	kilometre point
kg	kilograms (10 ³ gramos)
kJ	kilojoules (10 ³ julios)
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
m²	square metres
m³	cubic metres
µg	Micrograms
MITERD	Ministry for Ecological Transition and the Demographic Challenge
MJ	Megajoules (10 ⁶ julios)

N2000	Natura 2000
N₂O	Nitrous oxide
NAP	Noise Action Plans
NMVOG	Non-methane volatile organic compounds
NO_x	Nitrogen oxide
PAH	Polycyclic Aromatic Hydrocarbon
PBE	Public Business Entity
PCB	Polychlorinated biphenyls
PCCC	Plan to Combat Climate Change
PHD	Public Hydraulic Domain
PKM	Passengers per kilometre. Unit of measurement of passenger traffic corresponding to the transport of one passenger over a distance of one kilometre
PM₁₀	Fine particulate matter that are 10 microns or less
PM_{2,5}	Fine particulate matter that are 2.5 microns or less
PNA	Protected Natural Areas
PRIME	Platform of Rail Infrastructure Managers in Europe
PSR	Preliminary Progress Reports
Renfe	Red Nacional de los Ferrocarriles Españoles (National Network of Spanish Railways)
RFIG	Red Ferroviaria de Interés General (General Interest Railway Network)
SDG	Sustainable Development Goals
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
SO_x	Sulphur oxides
SP 2030	Strategic Plan 2030
t	Tonnes
TC	Center for High-Speed Rail Telecommunications and Backup in Villaverde
TCC	Traffic Control Centres
TKM	Tonne per kilometre. Unit of measurement of freight transport which represents the transport of one tonne of goods over a distance of one kilometre
TPH	Total petroleum hydrocarbons
TSP	Total suspended particles
TTC	Track Technology Centre

TU	Transport Unit Functional unit taken as a relative value to express quantitative data. Corresponds to the sum of TKM and PKM
UIC	International Union of Railways / Union Internationale des Chemins de fer
UOT	Uses other than traction
VV	Greenway
WSC	Waste Storage Centre

Verification Statement

ADIF 2024 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 2024 Environmental Report. This Report has been prepared in accordance with the Sustainability Reporting Standards of the Global Reporting Initiative (GRI), as set out in the GRI Standards, applicable to environmental performance, and the sector-specific supplement 'Logistics and Transportation Sector Supplement Pilot Version 1.0' (2006), as detailed in Chapter 10 'About this Report' of the ADIF 2024 Environmental Report.

The scope outlined by ADIF for the preparation of the ADIF 2024 Environmental Report is defined in Chapter 10, 'About this Report', under section 'Scope', of the aforementioned Report.

The preparation of the ADIF 2024 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 2024 Environmental Report by implementing audit protocols that enable relevant conclusions to be drawn regarding the traceability of the published data. To this end:

- Direct interviews were conducted with the organisation's personnel, and both internal and public documentation was reviewed as required.
- Documentary evidence supporting the data was cross-checked against the underlying documentation.
- The handling of the information, including calculations, transformations, and graphs, was verified.
- Sample-based analytical techniques were applied to those indicators that required this approach due to their importance and relevance.
- The structure and content of the sustainability indicators were reviewed for appropriateness in line with the latest available version of the GRI Standards, applicable to environmental performance, and the sector-specific supplement 'Logistics and Transportation Sector Supplement Pilot Version 1.0' (2006).

These procedures were applied to the sustainability indicators listed in the 'GRI Content Index', which is located in the 'Appendices' of the aforementioned Report.

The work was carried out by a team of sustainability specialists with extensive experience in reviewing such information.

Based on the verification process undertaken and the conclusions drawn, the Verification Statement is issued, summarising the results of the process.

Conclusion

During the verification process, no indications or evidence of significant deviations or omissions were found. Therefore, we confirm the accuracy of the information contained in the ADIF 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 2024.

Madrid, 1st of August 2025

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