

innovation

Commitment

• Contribute to sustainable competitiveness and value creation through innovation practices.

Lines of Action

- Coordinate strategy and global policy on innovation.
- Foster innovation opportunities within priority business areas.
- Promote a culture of innovation among employees.
- Use the instruments of innovation to develop and apply new solutions to business challenges.
- Establish an innovation communication policy.

2012 Milestones

- Organized the 1st Edition of the Ferrovial Innovation Awards to recognize the employees' most innovative ideas
- Participated in innovation assistance programs at a national (INNPACTO, INNPRONTA), regional (ETORGAI in the Basque Country) and European level (7th Framework Program, LIFE, ICT).
- Developed a system of satellite toll payment and launched the seventh collaborative project with MIT.
- Participated in the Pasion>ie and IBM SmartCamp initiatives.
- Joined the Cotec Foundation.
- Launched the corporate intranet innovation channel.

2013 Goals

- Promote an external program of innovative ideas to meet the challenges of intelligent infrastructures.
- Boost innovation training via the Corporate University, to support the identification and development of new business opportunities, and to explore new practices for managing innovation.
- Define a program to identify and analyze innovative third-party solutions to the company's strategic challenges.
- Development of innovation projects in priority areas.

	2012	2011	2010	Chg. 12/11
Investment in innovation (€ M)	32.6*	51.2	45.0	-36.3%

*This figure includes 769,000 euro corresponding to Ferrovial's collaboration with MIT, which is accounted for as R&D&i and community investment.

Ferrovial identifies innovation as a strategic tool for addressing the global challenges facing the world of infrastructures. In 2012 the company redoubled its efforts in this area, focused on developing its vision of intelligent infrastructure.

Major challenges exist in infrastructure management (growing urban populations, congestion and pollution problems, energy efficiency issues, sustainability, etc.). Ferrovial therefore pursues constant and systematic innovation as a key to tackling these challenges and creating wealth in a sustainable fashion.

Innovation is not only a tool for improving productivity and competitiveness, but a key source of value creation for all its stakeholders and society at large. With this in mind, it has established its corporate strategy and launched an action plan based on:

- Customer focus.
- Emphasis on implementing solutions.
- Collaboration with industry, the public sector, universities and entrepreneurs, based on an open innovation model.
- Improvements to the innovation process.

Ferrovial pursues its innovation policy through an open innovation model. This involves creating an open process and ecosystem for partners to enhance innovation through the exchange of ideas outside the organization.

Aware of the importance of managing the innovation programs in all areas of the company and making the most of synergies, Ferrovial has created the Global Innovation Group with representatives from all company's business lines. Its mission is to develop the innovation strategy and to contribute toward consolidating the culture of innovation. The Ferrovial Innovation Awards were held in 2012 to recognize those employees who, above and beyond their normal work, have shown an interest in contributing new solutions and sharing them with the organization.

Ferrovial has defined seven areas of interest in innovation on which it focuses its efforts: energy efficiency, intelligent cities, waste recycling, water, innovative construction, toll roads and airports. Its aim is to position itself as a benchmark in Spain and around the world in the development of intelligent infrastructure products and services.

Ferrovial managed 81 innovation projects in 2012, with total investment in 32.6 million euro. Among them is the development of a system of satellite tolls that provide a new model of toll road services. It has also registered more than 100 patents to protect its intellectual property in strategic areas of research. In addition, Ferrovial is a member of various organizations and participates in major public and private innovation initiatives worldwide, where it promotes an exchange of experience and best practices among experts in the field.

Innovation strategy

Innovation strategy covers three levels:

1. Common system of control to establish the open innovation model and tackle the challenges of the future.
2. An innovation community that seeks to identify relevant individuals and to foster an appropriate cultural climate.
3. The resources required: information, finance, ecosystems and programs to support the model.

Ferrovial uses an open innovation model that maintains an ecosystem which includes both the Ferrovial employees and partners/collaborators: the public authorities, public and private research centers, large companies, entrepreneurs and start-ups.

In terms of governance of the innovation process, each business line has an innovation manager who is responsible for establishing R&D and Innovation policies, allocating human and material resources as required, safeguarding and exploiting the results, and representing Ferrovial in dealings with R&D&i organizations and forums.

In 2012 the Global Innovation Group, which brings together the innovation managers of the business units, together with the key human resources managers, held a series of meetings to coordinate the existing programs, and provide a boost to new global initiatives such as the Ferrovial Innovation Awards.

Among the resources it has available, Ferrovial runs two of its own Competitiveness Centers (management of assets and intelligent transport systems), aimed at optimizing process management by identifying best practices and developing partnership projects.

The company also has two cutting-edge R&D&i departments: one dealing with water treatment (treatment of urban and industrial waste water and desalination via inverse osmosis) within its Cadagua construction subsidiary; and the other with waste management (controlled landfill processes, leachate treatment and recovery of materials and energy from waste) within the services company Cespa. Both also work closely with other research centers. Other companies in the group, such as Ferrosfer, Amey, HAH and 407 ETR, carry out this innovation activity in their own R&D&i departments.

In addition, the company has technical offices (Ferrovial Agroman, Cintra, etc.) that support its innovation

strategy by designing and developing new technologies and processes, or by establishing partnerships with other research centers.

In 2010 Ferrovial created the Center for Intelligent Infrastructure Innovation (CI3), based on a “Triple Helix” organizational model in which private enterprise, universities and the public sector participate to create a natural ecosystem for open innovation.

Ferrovial Agroman and Ferrosfer have renewed their R&D management system, designed in accordance with the UNE 166002:2006 standard, as certified by AENOR. This system ensures the highest technical quality and profitability for the company’s projects, while guaranteeing transparency in all R&D&i activities.

Innovation areas

Ferrovial concentrates its efforts on developing technologies applied to infrastructure construction, transportation, municipal services, water, energy efficiency and environmental sustainability, in order to position itself as a national and international benchmark for the development of products and services based on the concept of intelligent infrastructures.

The company has established seven areas of interest in innovation, in response to the challenges facing its business units:

- **Energy efficiency:** With the aim of reducing GHG emissions, helping to reduce energy costs and anticipating future regulations, projects are being developed in maintenance, auditing and energy efficiency optimization for buildings, reducing power consumption in public lighting, and expert energy management systems.
- **Waste recycling:** In response to concerns regarding climate change and environmental sustainability, projects are underway to recover energy from waste, both as a partial substitute for conventional fossil fuels and as a solution to treat or eliminate the growing volumes of waste generated by the consumer society, as well as recovering materials from this waste.
- **Intelligent cities:** Projects are underway as part of the integrated municipal services model, based on operational excellence, service quality and environmental sustainability. The aim is to satisfy the innovation needs of the city of the future, with public-private partnerships that can reduce costs and improve the quality of life for

urban populations, while guaranteeing sustainable economic development.

- **Toll roads:** By applying the latest technologies to infrastructures and vehicles, projects are being developed focused on: research using complex algorithms to operate managed lanes; deployment of lighter and more secure architectures for processing operational and financial data; remote management of toll plazas through applications in mobile devices; prototype toll systems using GPS and mobile user interfaces; control of the management of critical assets; and the study of the elasticity of mobility.
- **Water:** As part of the incorporation of novel technologies in this area, new water treatment processes and improvements to existing ones are being developed for projects related to energy and process optimization, both in the field of seawater desalination via inverse osmosis and waste water purification.
- **Innovative construction:** A package of projects developing technologies, processes and products to improve the productivity and environmental sustainability of construction activity in all of its areas.



Wind turbine, Barickano, Spain

Ferrovial Innovation Awards

Aware that innovation can be generated in any part of the company, in 2012 Ferrovial organized the Ferrovial Innovation Awards. With the slogan “zuritanken”, a combination of the Swahili term “nzuri”, which means “good” and the Swedish term “tanken”, or “idea”, employees worldwide were invited to offer solutions to the four challenges set, one for each business area.

The company wanted to recognize those innovative ideas that could be implemented and were designed to increase process productivity and efficiency, improve the company’s competitiveness and/or can generate new business opportunities. The aim was also to reward those employees who, above and beyond their day-to-day work, have an interest in contributing new solutions and sharing them with the organization.

The factors considered in selecting and evaluating the proposals (though not all had to be present) were that they should be new, attractive for the business, feasible in application and with a high potential impact.

The juries were made up of the Management Committees of the business units, which determined the best idea in each challenge, in accordance with the criteria. These ideas in turn entered the final phase in which the Ferrovial Management Committee chose the winner.

Over 500 proposals were received during the two months’ application period, of which 15% came from groups, thus demonstrating the level of collaboration between the company’s employees. In fact, the winning idea, “Power Floor: Not a Step Wasted” came from a group of four professionals from different company divisions: Amey, Ferrovial Services and Heathrow Airport Holdings.

Throughout 2013 pilot trials will be run on the ideas of the finalists and winners. There will also be feasibility studies on the more than 500 that were sent to assess their possible implementation.

The eight finalists for each of the challenges were as follows:

Services challenge: social initiatives for local service contracts.

- AmeyInSociety.org: the social face of Amey. Reconcile Amey’s social initiatives with the needs of the communities in which it operates through a collaborative platform.
- Teaching skills to people with disabilities. Position the company as a benchmark for the job integration of the disabled through the creation of a professional skills center.

Toll Road challenge: increase toll road revenues.

- GSM technology for automatic tolls. Make toll collection easier on toll roads using a payment system based on mobile technology.
- Cintra, leader in road safety. Position Cintra as a leader in road safety and increase positive user experience.

Construction challenge: new methods in the area of construction.

- Allocation App: One-click document management. Use time more efficiently when managing project documentation through a smartphone application.
- Laying rail track without an auxiliary track. Develop a technology that reduces costs and time and increases safety when laying rail track.

Airport challenge: improve the passenger experience.

- Power Floor - Not a Step Wasted. Creation of an intelligent floor surface that captures each passenger step at Heathrow Airport to generate energy and for use as a platform for analyzing information.
- Mobile chair for babies. Objective: To make it easier for parents with babies traveling alone to pass through the security checkpoint by using a mobile chair.

Agreements and collaboration

Massachusetts Institute of Technology (MIT)

In line with its open innovation strategy, in late 2010 Ferrovial signed a five-year agreement with the Massachusetts Institute of Technology (MIT) to work together on research projects aimed at transforming cities and developing the infrastructure of the future. Currently work is being done by groups of researchers from MIT working in coordination with workers from the Ferrovial business. The average duration of each project is two years, with total accumulated investment of more than two million dollars.

The six projects in collaboration with MIT launched in 2011 continued through 2012 and met with their targets for the year. One more project was launched in the water innovation area, headed up by Cadagua, called the “Energy Optimization of Reverse Osmosis Seawater Desalination Plants”.

As well as the three projects that the Services business unit is working on with MIT, Ferrovial Services extended its collaboration in 2012 through an agreement with the Senseable City Lab to innovate in the integrated services or intelligent cities model. Specifically, this involves various projects such as CityEye, which provides data from sensors that at the same time can be used as indicators for service provision and for interactive applications with individuals; or Basurcambio, which will be a marketplace for citizens’ involvement in the reuse of materials from waste collection points.

Universities and institutions

Among the universities with which the group’s companies have concluded agreements are

Spain:

- Center for Intelligent Infrastructure Innovation (CI3)
- Politécnica University of Madrid
- Tecnalia Technological Center
- University of Cantabria (Waste Management)
- LEITAT Technological Center
- Alcalá de Henares University (CB)
- Politécnica University of Catalonia
- CeDint Research Center for Smart Buildings and Energy Efficiency

- Autónoma University of Madrid
- University of Murcia
- University of Zaragoza
- Center for Environmental and Technological Energy Research
- Carlos III University of Madrid
- Institut Quimic de Sarriá
- Girona University
- Valladolid University
- Granada University
- CIEMAT

Europe:

- University of Surrey (UK)
- Aston University (UK)
- Fraunhofer University (Germany)
- University of Luxembourg (Luxembourg)
- Alexandra Institute (Denmark)
- University of Limerick (Ireland)
- Pro-Akademia Innovation Center (Poland)
- AALTO University (Finland)
- Center For Research And Technology Hellas (Greece)
- University of Birmingham (UK)
- University of Manchester (UK)
- Newcastle University (UK)

USA and Canada:

- Massachusetts Institute of Technology
- University of Texas

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In 2012 Ferrovial became a member of Cotec, a foundation rooted in business whose mission is to contribute toward Spain's development through the promotion of technological innovation in companies and Spanish society as a whole.

Cotec has the following objectives: promotion of a technological culture and innovative attitudes, analysis of the effects of innovation, and institutional presence.

Through the Innovation and Processes Division, Ferrovial participates in the three committees that organize the Foundation's activities:

- Innovation Bases Committee
- Innovation Management Committee
- Innovation Effects Committee

Support for entrepreneurs

In 2012 Ferrovial collaborated for the first time on the regional IBM SmartCamp in Spain. This initiative is part of IBM's Global Entrepreneur program, which aims to help start-ups and entrepreneurs to put into practice their projects and business ideas.

The winner in 2012 in Spain out of over 50 pre-selected candidates was PanamNav, a mobile solution that checks the geographical position of smartphone users to ensure secure payment transactions.

IBM SmartCamp provides participants with an opportunity to network and receive advice and support from venture capital businesses, local and international investors, industry executives and prestigious entrepreneurs.

In 2012, Ferrovial once more worked on the second "Pasion>ie, pasión por innovar y emprender" initiative that Accenture Spain and the IE Business School launched to create links between the "innovation community" and business in order to develop innovative projects that can contribute to economic and social development, within three categories: the city of the future; the health service of the future; and the retail distribution of the future.

After the initial selection, the 2nd Forum of Advisers of Pasion>ie will make a further selection of projects in order to choose the finalists. These will form part of a mentoring plan in which Ferrovial will take part. On May 8, 2013 the projects will be presented at the IE Business School's Investors' Day to investors from Spain and around the world.

Training in innovation and communication

Ferrovial has its own Summa Corporate University with a training program providing courses that range from specific training in creativity and innovation to the generation of new business opportunities and the development of the capacity of executives to innovate. This is done through workshops on the creative resolution of problems, and plans such as the Executive Management and Global Management Programs.

The Executive Management Program is based on study of business management methodologies via analysis of the various ways of approaching entrepreneurial management, its procedures and activities, looking at the entire entrepreneurial process from the identification of business opportunities through to the development of a business plan.

The Global Management Program is designed for executives who answer to the top level of the organization. It aims to extend their knowledge of change management in the organization and increase their skills, with the aim of maximizing the innovation and transformation capacity of their business areas. The program's innovation module includes an elevator sales pitch competition, consisting of a role play in which each participant tries to convince experts in innovation and risk capital innovation that the value proposal they present is the best.

In 2012 Ferrovial launched the new innovation channel on the intranet. This initiative is linked to the company's aim to boost innovation and is a meeting point where innovation strategy can be shared through knowledge of the policies, initiatives, news, projects, events and experiences of the projects underway.

Public innovation support programs

In 2012 Ferrovial participated in innovation support programs at a national (the INNPACTO, INNPRONTA, run by the Ministry of Economy and Competitiveness), regional (ETORGAI in the Basque Country) and EU level (the EU's 7th Framework Program, LIFE, ICT).

Specifically, in 2012 a start was made on the following projects that had received approval:

TEDS4BEE is a project that is part of the European Commission's "ICT Policy Support Program". The project demonstrates systems that can help energy efficiency in buildings where the EMMOS software is to be installed (pilot buildings in Spain, Portugal, the United Kingdom, Poland, Italy and Serbia). In this project, Ferrovial Services heads up a consortium formed by 12 participants, with CIB being the technical coordinator. The project will be developed from 2013 to 2015.

PRENDE is a project in the national INNPACTO program. It consists of designing an information and services platform that boosts efficient energy use in large city neighborhoods. A pilot management model will be launched in a Madrid neighborhood. It will deploy advanced communication media together with contracting and management tools that use the Internet and mobile devices. The PRENDE consortium is headed up by Ferrovial Agroman and Ferconsa, with CIB as the **project's technical coordinator**.

DINTRANS is another project in the INNPACTO program. Its aim is to research the structural behavior of transitions between ballast and plates in high-speed rail track. The DIANTRANS consortium is headed up by Ferrovial Agroman, with the participation of ADIF, the University of Cantabria and CIB.

ECODIS is a project in the ETORGAI program run by the regional government of the Basque Country, in which Ferrovial Servicios participates as a partner. Grants for activities in 2012 have been awarded.



Cespa has also presented two proposals for the European Commission's LIFE program on the environment and sustainable cities; and Ferrovial Agroman two further proposals for the 7th Framework Program in ecological labeling of roads and energy efficiency in urban buildings and infrastructure. As of the end of 2012, a decision on acceptance of the proposals is still pending.

In 2012 the execution of projects awarded in previous years belonging to the European Commission's 7th Framework Program continued. As part of the FOTsis project, on-site trials have been carried out on online services applied to traffic on toll roads. These trials will be carried out in 2013 by the Greek concessionaire Nea Odos, in which Cintra has a stake. The Center for Intelligent Infrastructure Innovation (CIB) has worked together with AMEY on the OUTSMART project in five European cities. The aim of the project is to define pilot services and Internet applications that optimize and improve the sustainability of urban areas. Work has been done on IT services that can promote the use of public transportation and non-polluting transportation in the city of Birmingham.

The development of the first phase of the CIUDAD 2020 project has also been completed. This is an initiative that is part of the CDTI INNPRONTA Program. Ferrovial Agroman, Ferconsa, CIB and the University of Alcalá participate in the project, which is headed up by INDRA. It develops innovative actions for creating efficient and sustainable cities. The project was presented at the Congress on Green Cities and Sustainability in Malaga.