Barcelona - El Prat Airport

2010 Environmental Management Report

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The airport’s environmental management is implemented and certified in accordance with the UNE-EN ISO 14001 standard, and is currently fully integrated into the airport’s overall management scheme.

The information presented herein is a summary of the airport’s environmental performance for 2010, and of its progress with respect to previous years. Also presented are improvement initiatives implemented to reduce the impact the airport’s presence has on its surroundings.

This environmental report includes an assessment of the Barcelona - El Prat Airport’s first complete year with its T1 terminal fully operational. This terminal, as well as its associated infrastructure, opened in June 2009. All of the environmental aspects associated with this change have been compiled, analyzed and incorporated into the existing environmental management plan in order to ensure that the new airport infrastructure is managed in keeping with the same environmental protection principles.

This report is a reflection of the daily work and efforts of everyone involved in making sure the airport provides the best service to its clients. This difficult job continues every day as we adopt all the measures required by the new demands placed on us by the society that we serve.
Company name

Company name: Aena
Center: Aeropuerto de Barcelona - El Prat
Address: Aeropuerto de Barcelona - El Prat Terminal T1
Dique Sur, 2ª planta
08820- El Prat de Llobregat
CIF: Q-2822001-J
CNAE: 63.23

The Barcelona - El Prat Airport belongs to the public company Aeropuertos Españoles y Navegación Aérea (Aena, Spanish Airports and Air Navigation), which was created by virtue of Article 82 of Law 4/1990, of 4 June, on General State Budgets for 1990. Aena enjoys its own legal personality independent of that of the state, full legal public and private capacity and its own patrimony.

Description of center

The airport is built on the Llobregat Delta and is located mainly within the locality of Prat de Llobregat, although it also extends into Sant Boi de Llobregat and Viladecans.

- Area: 1520.16 Ha
- Located 12 km away from the city of Barcelona
- It is operational 24 hours a day
- Two passenger terminals: T1 and T2 (A, B & C)
- One cargo terminal
- Three runways for takeoffs and landings

- Stated capacity of 64 movements/hr, though its processing capacity is 90 operations/hr
- 164 boarding gates (101 in T1 and 63 in T2)
- 73 jetways (43 in T1 and 30 in T2)
- 332 check-in counters (166 in T1 and 166 in T2)
- 15,315 parking spaces in T1 and 13,000 in T2
- Three handling operators (and two self-handling)
- Served by over 100 airlines
- Over 150 destinations (over 25 intercontinental)
- 29,209,595 passengers in 2010
- 277,832 aircraft movements in 2010
- 104,280 tons of cargo

Aena activity at the Barcelona - El Prat Airport

The scope of applicability of the environmental management system extends to the management and maintenance of the airport facilities and infrastructure and the airport services at the Barcelona - El Prat Airport (direct aspects).

These activities and services include:

- Generation of electricity in the event of an emergency
- Supply of electricity
■ Supply of water

■ Facility maintenance (electrical and water networks, air conditioning, electromechanical equipment, computer network, computer systems, fire prevention system, landscaping, etc.)

■ Facility improvements

■ Maintenance of waste water network

■ Aviation services and management of operational infrastructure

■ Firefighting and rescue services

■ Pick-up of waste

■ Administrative activities

■ Commercial activities

Many of these services and activities are not performed directly by Aena, but by companies contracted for that purpose. The technical services contracted are:

■ Maintenance and cleaning of airfield

■ Cleaning of facilities

■ Waste management

■ Maintenance of waste water network

■ Landscaping

■ Maintenance of various facilities

■ Wildlife control

■ Pest control

■ Maintenance of Aena vehicles

■ Maintenance of environmental management system

■ Environmental monitoring of contractors and concessionaires

In addition, there are other concessionaires engaged in activities at the airport. These include airlines, fuel suppliers, handling operators, stores, restaurants and car rental companies. These companies are beyond the scope of the environmental management system, although those aspects that may affect the airport’s environmental management (indirect aspects) are identified and tracked.
Aena, as a leader in providing air transport services through its airports and air navigation system, is aware of its commitment to society to protect the environment and to contribute to the sustainability of air transport, and doing so within a framework of safety, quality and efficiency.

In keeping with this responsibility, Aena has set as one of its goals that of excellence in the provision of the services assigned to it. To this end, and within the framework of the Spanish Strategy for Sustainable Development, Aena is mandated to apply those measures that allow for the sustainable development of air transport by weighing the social, environmental and financial costs and benefits to obtain a positive result for society.

Along these lines, Aena’s commitment to the environment has been under constant and continuous development, with the definition of a set of programs and actions and the progressive increase in the resources allocated so as to achieve its environmental goals. All of this is expressed in accordance with a constantly changing Environmental and Energy Policy that has taken root in our organization’s collective consciousness.

The environmental variable is likewise present in every aspect of our daily activities: planning, projects, construction and provision of services. By using suitable indicators, we can define preventive, protective, compensatory and corrective measures to minimize any potential impact from airport activities, air navigation and infrastructure development, thus ensuring higher levels of environmental quality, economic progress and the preservation of our natural assets.

In keeping with this environmental commitment, the implementation of new environmental management systems is being promoted at airport and air navigation centers. These systems are based on internationally recognized norms that allow for the obtaining of environmental certifications.

In particular, as part of our commitments under the Kyoto Protocol, we are striving to reduce greenhouse gas emissions by making the most of our energy resources and by phasing in the use of renewable energies as permitted by operational requirements.

This has all led Aena to establish a commitment for environmental excellence that meets social and environmental demands while ensuring the sustainable development of air transportation in keeping with the following principles:

- To respect and protect the environment as a central tenet in the management of those activities entrusted to Aena in the area of airports and air navigation, as well as in the development of aviation infrastructure and of commercial spaces and services.

- To make air travel compatible with preserving the environment such that today’s actions do not compromise the quality of life of future generations, thus promoting sustainable development.

- To establish procedures for learning of and updating the legal, environmental and energy requirements applicable to Aena’s activities and for complying with them.
To implement an Environmental Management System at each center that is compatible with this Environmental Policy, and which allows for the periodic definition of environmental goals and objectives, as well as for the systematic monitoring and evaluation of its level of compliance so as to assure constant improvement and the prevention of pollution.

To have available the information and resources necessary to propose and achieve constant improvement objectives involving energy efficiency as a cornerstone for reducing CO₂ emissions, as part of Aena’s strategy for sustainable development.

To promote actions intended to minimize sound levels and that allow for preserving the quality of life in neighborhoods near the airport.

To use the technical and economic means available to prevent the air pollution that may be associated with Aena’s activities, while minimizing chemical emissions and establishing suitable testing, monitoring and corrective mechanisms.

To promote the reuse, recycling and management of waste in a way that is environmentally friendly.

To streamline the consumption of energy and natural resources through energy efficiency and the gradual utilization of renewable energies.

To behave transparently with the public agencies, institutions and communities involved in Aena’s activity and to cooperate closely with them so as to prevent any potential environmental impact that may result from those activities associated with air transportation.

To inform all of Aena’s employees, contractors and concessionaires of its Environmental Policy and to make it available to our clients and to the rest of society.

To promote awareness in our staff through training programs on the importance of the correct conduct of their activities, encouraging their participation in achieving our goals.

To periodically revise the Environmental Policy to meet the organization’s new objectives, adapting it to new needs as they arise.

This system provides the framework for identifying and monitoring environmental aspects. The functions of an EMS include:

- Identifying the procedures necessary to implement the environmental policy
- Establishing the criteria, methods and resources to ensure its efficiency
- Obtaining and analyzing information on its results
- Implementing actions aimed at continuously improving the environmental management of its activities.

The EMS comprises the following key elements:

- Environmental policy
- EMS documentation:
  - Manual
  - Procedures
  - Technical instructions
  - Records
- Environmental management program
- Internal audits
- Management review
Structure of the Airport’s Environmental Department

- NOISE monitoring and control
- Monitoring of WATER quality
- Monitoring of AIR quality
- WASTE management
- Control of FLORA and FAUNA
- SAIM (Environmental Service and Information Office)
- Maintenance of EMS-Env. Management System
- Environmental monitoring-Monitoring of companies
An environmental aspect is defined as any element, product or service of the organization that may interact with the environment.

An environmental impact is any change in the environment, whether adverse or beneficial, produced by an environmental aspect.

Direct environmental aspects result from the activities or services provided by Aena at the Barcelona – El Prat Airport under normal operating conditions and associated with those activities or services that are directly controlled by Aena.

The direct significant aspects derived from the identification and evaluation of the activities in 2010 are as follows:

<table>
<thead>
<tr>
<th>Vector</th>
<th>Direct aspect</th>
<th>Associated impacts</th>
</tr>
</thead>
</table>
| Water                         | Total well water consumption  
Discharge of waste water from septic tank (airside power plant)  
Discharge of water to the DEPURBAIX treatment plant | Depletion of natural resources  
Resources allotted to maintenance of treatment plant and possible effects on quality of surface and ground water and the soil |
| Energy/natural resources      | Gasoline consumption  
Electricity consumption  
Electricity consumption in Terminal 2  
Electricity consumption T1 HVAC  
Electricity consumption (Lighting + Air Navig.)  
Natural gas consumption | Depletion of natural resources |
<table>
<thead>
<tr>
<th>Vector</th>
<th>Direct aspect</th>
<th>Associated impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Waste</strong></td>
<td>Generation of absorbents and oil soaked rags Generation of medical waste (Groups III and IV) Generation of urban waste Generation of aerosols Generation of used batteries Generation of used car batteries Generation of mineral oils Generation of urban waste Generation of used oil filters Generation of waste from the oil-water separators Generation of used paint cans</td>
<td>Incineration of waste Use of landfills Treatment of hazardous waste</td>
</tr>
</tbody>
</table>
Potential environmental aspects are those that are generated as a consequence of the activities carried out at the Barcelona - El Prat Airport outside of normal operating conditions resulting from emergency situations.

<table>
<thead>
<tr>
<th>Vector</th>
<th>Potential aspect</th>
</tr>
</thead>
</table>
| Water  | Jet A1 spill/fire from rupture/crack in fire hydrant network or integrity problems in pits or during aircraft refueling operations.  
Oily water leaks due to overload, crack/break of oil-water separators.  
Spill of hazardous material/waste |
| Soil   | Spill/Jet A1 leak from rupture / crack in fire hydrant network or integrity problems in pits, or during aircraft refueling operations  
Spill of hazardous material/waste  
Uncontrolled waste abandoned/dumped (airport construction) |
| Air    | Leaks of ozone depleting refrigerants and of gases that contribute to global warming |
| Waste  | Spill/Jet A1 leak from rupture / crack in fire hydrant network or integrity problems in pits, or during aircraft refueling operations  
Spill of hazardous material/waste  
Uncontrolled waste abandoned/dumped (airport construction) |

Indirect environmental aspects are those resulting from the activities, services and processes carried out by the concessionaires present at the Barcelona – El Prat Airport. These aspects are identified at the time the activity is started. The environmental monitoring plans imposed by Aena at the Barcelona – El Prat Airport are defined and their performance is subsequently tracked.

<table>
<thead>
<tr>
<th>Vector</th>
<th>Indirect aspect</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise</td>
<td>Noise pollution in the area of Gavà mar, Castelldefels</td>
<td>Nuisance that may affect the public’s health or wellbeing</td>
</tr>
</tbody>
</table>

Potential aspects are associated with risk situations. The most significant aspects in 2010 are shown below:

In addition to the indirect environmental aspects tracked through the environmental monitoring plans, Aena’s environmental department independently tracks the noise emissions resulting from all operations involving aircraft on takeoff and approach:
The table below shows the progress made toward the objectives specified for 2009-2010:

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Objective</th>
<th>Tracking</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>URBAN WASTE</td>
<td>RECYCLE 37% OF THE URBAN WASTE GENERATED AT THE AIRPORT (kg of waste recycled per year X 100 / total kg urban waste generated per year)</td>
<td>The recycling rate in 2010 was 33.5%. The goal was not achieved despite having improved the sorting of 3 out of 4 trash categories: paper, glass and packaging. The reduction in the pick-up of organic waste, especially in T2, had a large effect on the final figure. Corrective action: in 2011, the airport will focus the goal of sorting trash to that of improving the segregation of organic waste.</td>
<td>Not achieved</td>
</tr>
<tr>
<td></td>
<td><strong>Actions:</strong></td>
<td><strong>Actions:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Training/awareness of the sorting of trash, especially for restaurants, stores, cleaning personnel, offices.</td>
<td>- Daily tracking of sorting practices wherever trash is generated (T1). Monthly tracking of restaurant companies (T2).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Installation of 14 recycling bins in Terminal 1. (2nd phase)</td>
<td>- Installation of 14 recycling bins in Terminal 1. (2nd phase)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Pick-up of glass in restaurant areas (CCR). Upgrade of pneumatic rooms and review of pneumatic system operation.</td>
<td>- Pick-up of glass in restaurant areas (CCR). Upgrade of pneumatic rooms and review of pneumatic system operation.</td>
<td></td>
</tr>
<tr>
<td>WASTE WATER</td>
<td>REDUCE THE AMMONIUM AND KJELDAHL NITROGEN CONCENTRATION IN AIRPLANE SEWAGE WATER BY 50% (2007-2008 avg: Ammonium: 2,634mg/l; NTK: 2,504 mg/l)</td>
<td>The construction work is completed and the start-up tests are in progress. In the second quarter of 2011, with the plant operating normally, the verification analyses will be conducted to determine whether or not the objective has been achieved.</td>
<td>Completed Pending evaluation</td>
</tr>
<tr>
<td></td>
<td><strong>Actions 2009:</strong></td>
<td><strong>Actions 2009:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Design a water treatment system to reduce the ammonium pollutant load: 2,634mg/l; NTK: 2,504 mg/l, by at least 50%</td>
<td>- Draft technical specifications for the installation of a water treatment system (purifier)</td>
<td></td>
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<tr>
<td></td>
<td>- Award contract and construction work</td>
<td>- Award contract and construction work</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Actions 2010:</strong></td>
<td><strong>Actions 2010:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Installation</td>
<td>- Installation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Start-up and testing of the treatment system</td>
<td>- Start-up and testing of the treatment system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Analyze processed water at outlet of treatment system (holding tank) for final evaluation of objective</td>
<td>- Analyze processed water at outlet of treatment system (holding tank) for final evaluation of objective</td>
<td></td>
</tr>
</tbody>
</table>
## Goals and objectives

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Objective</th>
<th>Tracking</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IRRIGATION WATER USAGE</strong></td>
<td>REDUCE IRRIGATION WATER USAGE BY 10% (WITH RESPECT TO 2005-07 AVG) THROUGH SUSTAINABLE GARDENING</td>
<td>The project has, for now, been implemented along a section of road (T2). The total amount of irrigation water used in 2010 in the area of T2 (north well) dropped by 64% with respect to the 2005-07 average.</td>
<td>Completed</td>
</tr>
<tr>
<td></td>
<td>Phase 1- Prepare a basic study to determine the sustainable gardening directives to be used in the design and maintenance of the airport’s green areas.</td>
<td></td>
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<tr>
<td></td>
<td>Phase 2- Implement sustainable gardening at the airport (adapt areas and implement in T2).</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WATER CONSUMPTION</strong></td>
<td>REDUCE WATER USAGE IN COOLING TOWERS BY 2% (based on monthly consumption in towers in 2009-2010, prior to installation of osmosis)</td>
<td>The plant has been installed. It is estimated that water usage has gone down by 30%. The system will use non-drinking water. Verification of objective achievement is awaiting the collection of consumption data from May, June and July 2011.</td>
<td>Completed Pending evaluation</td>
</tr>
<tr>
<td></td>
<td>Actions: a) Analysis of consumption for climate control b) Award contract to reduce water consumption in cooling towers through installation of osmosis plant in the facility. c) Supply and install the osmosis plant. d) Analysis of final consumption.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ELECTRICITY CONSUMPTION</strong></td>
<td>REDUCE HVAC ELECTRICITY USAGE BY 2% IN T1</td>
<td>Installation of ambient sensors to improve climate control: action completed. Supply and installation of air curtains: action in progress.</td>
<td>In progress</td>
</tr>
<tr>
<td></td>
<td>Actions: a) Prepare project, award contract and install ambient sensors to record temperature and relative humidity in various areas of T1 and adapt climate control settings accordingly. b) Improve climate control. c) Prepare project, award contract and supply and install air curtains in public areas and boarding gates in T1. Better maintain indoor temperature.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspect</td>
<td>Objective</td>
<td>Tracking</td>
<td>Progress</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>PURCHASING</td>
<td>ESTABLISH ENVIRONMENTAL CRITERIA FOR THE PURCHASE OF OFFICE AND COMPUTER EQUIPMENT</td>
<td>The green purchasing criteria are being applied as per the voluntary requirements listed on the corresponding environmental requirements card.</td>
<td>Completed</td>
</tr>
<tr>
<td></td>
<td>Actions:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Gather data and draft an environmental criteria guide for the purchase of office materials and computer equipment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Present the guide.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Input criteria into an environmental requirements file and prepare the corresponding internal verification file to monitor for compliance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENERGY CONSUMPTION</td>
<td>REDUCE ELECTRICITY CONSUMPTION: Switch 8% of platform lights from bulbs to LEDs.</td>
<td>Consumption went from 40W (halogen bulb) to between 12 and 15W. Reduction in consumption and maintenance since the useful life of an LED is greater than that of a halogen bulb, a very important consideration in the operation of runway lighting.</td>
<td>Completed</td>
</tr>
<tr>
<td></td>
<td>Actions:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Supply and install LEDs in platform lights.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contract: “Upgrade aviation lights embedded in the ground at BNI to LED technology”.</td>
<td></td>
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</tr>
</tbody>
</table>
Environmental training at Barcelona Airport is designed to ensure that its personnel, especially those whose jobs can have environmental impacts, are aware of and exert control over the environmental aspects associated with their jobs.

All personnel who work at the airport must be aware of the importance of complying with the environmental policy. The goal of the training and awareness programs is to endow said personnel with the skills and proficiency required to achieve our commitment of continuous improvement.

In 2010, several training activities were carried out, including the following:

- Online environmental awareness module (taken by all Aena personnel at the Barcelona -El Prat Airport).
- SAOS II – General module.
- Workshop on the “Document requirements and PPT execution for complying with RD 105/2008 of 1 February on the regulation of the production and handling of construction and demolition waste”.
- European cities and regions day to improve air quality.
- Expansion of emissions trading markets for greenhouse gases.
- Technical user’s SIRBCN course exp.966/05.
- Efficient driving techniques.

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF ENVIRONMENTAL COURSES</td>
<td>6</td>
<td>17</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>TRAINING HOURS</td>
<td>174</td>
<td>136</td>
<td>85</td>
<td>139</td>
</tr>
<tr>
<td>PARTICIPANTS</td>
<td>291</td>
<td>239</td>
<td>207</td>
<td>691</td>
</tr>
</tbody>
</table>
The airport’s environmental management system is periodically subjected to audits to determine whether:

- It complies with the requirements of the ISO 14001:2004 Standard.
- The activities are in accordance with the specifications of the Barcelona – El Prat Airport’s environmental management system.
- It complies with existing environmental laws

Since 1998, the Barcelona Airport’s EMS has undergone 30 audits (both internal and external). The results of the latest audits attest to the maturity and efficient implementation of the airport’s environmental management system.
Electricity consumption

The electricity used at the Barcelona –El Prat Airport is supplied by an external utility company.

In addition, the Barcelona - El Prat airport has at its disposal several diesel-powered emergency generators that supply electricity to the airport in the event of an interruption in the external network.

With the opening of the T1, the electrical distribution structure was modified to adapt it to the airport’s new needs and requirements. The electricity is distributed along two lines:

- **SAE substation, CELA-CELT power plants (T2 area)**
- **SAO substation, CENAT power plant (T1 area)**

The total electricity consumed in 2009 was 193,953,980 kWh.

Of note was:

- **A 13% increase with respect to 2009 and 134% increase with respect to 2008.** This increased consumption is explained by the expanded airport facilities including, among others, a new terminal 1 and platform, several parking garages, new roads and the power plant (CEN).

As compensatory measures, the airport is incorporating energy-saving mechanisms into the facilities, some of which are included in the program’s objectives for 2010.

Actions taken or initiated in 2010:

- First phase of the plan to replace halogen lights with LEDs on the platform (initiative started in 2008).
- Reduced electricity usage through installation of reactive power compensation equipment in transformers.
- Implementation of SMP computer system to control lighting of runway signs during daylight hours (avoids use of lights in the daytime under good visibility conditions).
- Installation of ambient sensors to optimize electricity use by terminal climate control systems.

The Barcelona - El Prat Airport is currently designing a plan to record and monitor energy consumption (fuel and electricity) as a first step in the implementation of an energy efficiency monitoring system. To this end, the airport has designated a project leader (the energy manager) to head this process.
Natural gas consumption

Natural gas is used to fuel the operation of the HVAC boilers in Terminal 1, Terminal 2 and the Aena offices.

The boilers are used:

- To provide heating to the terminals and the Aena offices.
- To produce a portion of the hot water used in T1. The rest of the hot water in this terminal is produced through electric heaters and by solar thermal energy.

In 2010, the airport had 31 natural gas boilers with a nominal installed thermal output of 43.086 MW (27MW in T1 and 16.086 MW in T2).

In 2010, a total of 4,071,845 m³ of natural gas was consumed.

Of note was:

- Natural gas usage tripled with respect to the situation prior to the opening of T1.
- The increase in this consumption with respect to 2008 is proportional to the increase in the space requiring heating with the addition of the new terminal and office space.
- The increase in the terminal space and the reduction in the number of passengers with respect to 2008 led to a considerable increase in the natural gas consumption per passenger.

The following actions are being taken to reduce usage in Terminal 1:

- Installation of ambient temperature sensors in various areas of T1 (2010-2011).
- Installation of air curtains at boarding gates (2011).
ANNUAL CONSUMPTION OF NATURAL GAS FOR HEATING (m³)

ANNUAL CONSUMPTION OF NATURAL GAS FOR HEATING (m³) / PASSENGER
Environmental performance

Fuel consumption

Diesel and gasoline are used primarily to fuel Aena’s fleet of vehicles (152 in 2010) and to operate the emergency diesel generators located in the power plant.

In 2010, the Aena vehicles fleet consumed a total of 120,947 liters of diesel and gasoline.

The total amount of diesel used in the power plant was 75,699 liters.

Of note was:

- **Fuel consumption by vehicles:**
  - Total fuel consumption by Aena vehicles went down with respect to 2009’s figures.
  - A reduction in the fuel consumed per air traffic unit. Specifically, fuel consumption went from 0.48 liters per TU in 2009 to 0.40 liters in 2010. Possible causes of this include:
    - The airport held various training activities (twice, in 2007 and 2010) on efficient driving for Aena personnel holding a license to drive on the tarmac. The purpose of these theory-practical courses was to teach participants the driving techniques and habits that allow for reduced fuel consumption.
    - The purchase of more fuel-efficient vehicles.

- **Diesel consumption at the power plant:**
  - Diesel consumption by the emergency diesel generators dropped with respect to previous years. In 2010, there were no significant electricity outages, meaning that the generators were only used for testing purposes.
  - The increased consumption was due to an increase in the number of generators, stemming from the addition of the CENAT in mid-2009, with its five 7,200-Kw generators.
Environmental performance

ANNUAL DIESEL CONSUMPTION IN POWER PLANTS

ANNUAL DIESEL CONSUMPTION IN POWER PLANTS / AIR TRAFFIC UNIT
Water consumption

The water used at Barcelona - El Prat Airport is supplied internally from ground water aquifers (78% in 2010) and by the local water utility company (22% in 2010).

Total water consumption in 2010 was 1,200,105 m³.

Of note was:

- A 45% increase in consumption over 2009.

Possible causes:

- The entry into service of the cooling towers in Terminal 1.
- The lengthening of the water distribution network following the expansion of the airport.
- Tests of facilities and equipment.
- More irrigated landscaped areas.

- A relative increase in the usage of potable water versus non-potable water.

Causes:

- New water connections were made in the network of water supplied by the utility company.
- Environmental limits on the use of ground water.
- Usage in the cooling towers installed in T1.

The following steps are being taken to reduce water consumption:

- Installation of an osmosis plant to treat the water supplied to the cooling towers. This will allow for a 30% reduction in the amount of water used in this process (approximately between 20 and 25 thousand m³ annually), as well as for the use of non-potable water. Completed.

- Between 2008 and 2010, the Barcelona - El Prat Airport signed an agreement with the Universitat Politècnica de Catalunya’s School of Agricultural Engineering to conduct soil studies of the landscaped and potentially landscaped areas on the airport’s access roads and to establish sustainable landscaping guidelines for both the design of new spaces and for the maintenance of new and existing spaces.

This report was prepared and presented in 2010. The addition of these guidelines to the maintenance of landscaped areas will be phased in over the next few years.
Environmental performance

ANNUAL WATER CONSUMPTION (in m³)

ANNUAL WATER CONSUMPTION (liters/TU) / AIR TRAFFIC UNIT
ANNUAL WATER CONSUMPTION BY TYPE / AIR TRAFFIC UNIT
Environmental performance

Waste water treatment

The waste water generated in the various airport buildings and facilities is gathered in the airport’s waste water collection systems and sent to the city’s waste water network (with final treatment at the DEPURBAIX waste water treatment facility).

Note: in order to collect and treat the waste water from remote facilities - the airside power plant (CELA) and the adjoining lighting maintenance building - the airport has a compact treatment station with pre-treatment (primary decantation), biological treatment and secondary decantation.

The daily average discharged into the city network in 2010 was 1,789 m³.

The airport conducts quarterly analyses of the waste water discharged into the city network. The results of the analyses performed in 2010 are shown below:

<table>
<thead>
<tr>
<th>Quarterly analysis of the water discharged into the city's sewage network</th>
<th>26-Oct-10</th>
<th>20-Jul-10</th>
<th>30-Apr-10</th>
<th>15-Jan-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>u</td>
<td>7.41</td>
<td>7.88</td>
<td>7.66</td>
</tr>
<tr>
<td>SS (suspended solids)</td>
<td>mg/l</td>
<td>240</td>
<td>298</td>
<td>110</td>
</tr>
<tr>
<td>Decanted COD</td>
<td>mg/l</td>
<td>242</td>
<td>328</td>
<td>250</td>
</tr>
<tr>
<td>Non-decanted COD</td>
<td>mg/l</td>
<td>457</td>
<td>468</td>
<td>340</td>
</tr>
<tr>
<td>Soluble salts (cond. at 20°C)</td>
<td>µS/cm</td>
<td>3,940</td>
<td>4,895</td>
<td>4,650</td>
</tr>
<tr>
<td>Chlorides</td>
<td>mg/l</td>
<td></td>
<td>1,161</td>
<td>1,000</td>
</tr>
<tr>
<td>Organic and ammonium nitrogen</td>
<td>mg/l</td>
<td>106</td>
<td>120</td>
<td>110</td>
</tr>
<tr>
<td>Total phosphates</td>
<td>mg/l</td>
<td>8</td>
<td>9</td>
<td>9.8</td>
</tr>
<tr>
<td>Oil and grease</td>
<td>mg/l</td>
<td>&lt;10</td>
<td>22</td>
<td>3.8</td>
</tr>
<tr>
<td>Ammonium</td>
<td>mg/l</td>
<td>115</td>
<td>120</td>
<td>140</td>
</tr>
<tr>
<td>Nitrates</td>
<td>mg/l</td>
<td>&lt;0.1</td>
<td>&lt;5</td>
<td>&lt;2.5</td>
</tr>
<tr>
<td>Sulfates</td>
<td>mg/l</td>
<td>245</td>
<td>335</td>
<td>220</td>
</tr>
<tr>
<td>Dissolved sulfur</td>
<td>mg/l</td>
<td>6</td>
<td>10</td>
<td>&lt;0.4</td>
</tr>
<tr>
<td>Total sulfur</td>
<td>mg/l</td>
<td>7</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C</td>
<td>19</td>
<td>25.5</td>
<td>15.2</td>
</tr>
<tr>
<td>TOC</td>
<td>mg/l</td>
<td>142</td>
<td>141</td>
<td>62.2</td>
</tr>
</tbody>
</table>
Analysis of CELA water (treated)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>12-Nov-10</th>
<th>13-May-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH (at 25º)</td>
<td>u</td>
<td>6.9</td>
</tr>
<tr>
<td>SS (suspended solids)</td>
<td>mg/l</td>
<td>5</td>
</tr>
<tr>
<td>BOD</td>
<td>mg/l</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Non-decanted COD</td>
<td>mg/l</td>
<td>&lt;60</td>
</tr>
<tr>
<td>Soluble salts (cond. at 20ºC)</td>
<td>µS/cm</td>
<td>5,095</td>
</tr>
<tr>
<td>Total Kjeldahl Nitrogen (TKN)</td>
<td>mg/l</td>
<td>5</td>
</tr>
<tr>
<td>TOC</td>
<td>mg/l</td>
<td>12</td>
</tr>
<tr>
<td>Total phosphorus</td>
<td>mg/l</td>
<td>7.7</td>
</tr>
<tr>
<td>Oil and grease</td>
<td>mg/l</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Nitrates</td>
<td>mg/l</td>
<td>21</td>
</tr>
<tr>
<td>Temperature</td>
<td>ºC</td>
<td>19.7</td>
</tr>
</tbody>
</table>

Treatment of airplane sewage

In 2010, the airport installed a plant to process the waste water that is pumped from airplanes before it is discharged into the airport’s sewage network.

Specifically, this treatment will allow for a 50% reduction in the ammonium and Total Kjeldahl Nitrogen concentrations present in this water.
Monitoring of surface/ground water

Due to the airport’s location in the middle of the Llobregat Delta, the water table is located at surface level. The airfield is surrounded by a series of canals that capture the surface water and channel it to three pumping stations in El Remolar, La Ilia and La Roberta. In the event of heavy rainfall, the pumping equipment diverts the water outside the airport complex.

The tracking and monitoring of the quality of the water that flows through the Barcelona – El Prat Airport involves annual planning for the taking of surface, ground and waste water samples. The results of this testing reveal the conditions of the environment and, indirectly, the adequacy of the environmental controls in place at the airport.

The sample points are chosen taking into account:

- The dynamics of the water at the airport.
- The status and flow of activities at the airport.

Aena also has a water monitoring system at the Barcelona - El Prat Airport that allows for the periodic tracking of the piezometric levels of the surface aquifer and the ecological quality of the surface water.
Since the opening of the T1 Terminal, and to keep ground water from seeping into the lower floors of the new terminal (train station), the aquifer water is constantly being pumped. This water is channeled 1,200 m offshore through an underwater pipe.

The underwater pipe monitoring plan is sent to the Catalan Water Authority every year. This report contains the results of the analysis of the effluent (water pumped from the train station in the T1 Terminal) and of the discharge point (seawater), as well as a structural monitoring report on the pipe. The results of the analysis on the water pumped from the train station at the T1 Terminal, as required by the permit, were as follows:

<table>
<thead>
<tr>
<th>Monthly analysis</th>
<th>pH at 25 ºC</th>
<th>SS (mg/l)</th>
<th>Conductivity at 20 ºC (μS/cm)</th>
<th>N.d. COD (mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>8.22</td>
<td>30.0</td>
<td>25,500</td>
<td>&lt;40</td>
</tr>
<tr>
<td>March</td>
<td>7.29</td>
<td>18.0</td>
<td>45,200</td>
<td>69</td>
</tr>
<tr>
<td>April</td>
<td>7.25</td>
<td>21.0</td>
<td>45,400</td>
<td>90</td>
</tr>
<tr>
<td>May</td>
<td>7.25</td>
<td>13.0</td>
<td>47,300</td>
<td>70</td>
</tr>
<tr>
<td>June</td>
<td>7.38</td>
<td>22.0</td>
<td>43,200</td>
<td>86</td>
</tr>
<tr>
<td>July</td>
<td>7.38</td>
<td>16.0</td>
<td>43,200</td>
<td>114</td>
</tr>
<tr>
<td>August</td>
<td>6.95</td>
<td>16.0</td>
<td>47,500</td>
<td>&lt;750</td>
</tr>
<tr>
<td>September</td>
<td>6.95</td>
<td>16.0</td>
<td>47,500</td>
<td>&lt;750</td>
</tr>
<tr>
<td>October</td>
<td>7.20</td>
<td>14.0</td>
<td>51,100</td>
<td>99</td>
</tr>
<tr>
<td>November</td>
<td>7.39</td>
<td>27.0</td>
<td>50,100</td>
<td>105</td>
</tr>
<tr>
<td>December</td>
<td>7.15</td>
<td>10.0</td>
<td>50,500</td>
<td>138</td>
</tr>
</tbody>
</table>
Waste

The airport’s priorities in terms of the handling of waste are as follows:

- To promote good environmental practices so as to minimize the amount of waste generated from Aena’s activities.

- To monitor and track the waste generated by all airport activities (through the operational monitoring of activities and of Aena’s waste storage areas, and through the environmental monitoring of contractors and concessionaires) to ensure waste is properly sorted, collected and handled.

- To reduce all other waste generated at the airport. To achieve this goal, the Barcelona - El Prat Airport has:
  - 482 trash sorting containers (mainly for packaging, paper/cardboard, glass and organic waste).

Of note is:

A pneumatic waste collection system at the Barcelona - El Prat Airport’s T1 Terminal.

This system promotes separation at the point of origin for trash (packaging, paper/cardboard and organic) produced at the restaurants and shops within the airport’s T1 Terminal. The system has 50 boxes for the selective drop-off of waste, which is routed to one of 15 waste reception rooms distributed throughout the different floors of the terminal.

Selective drop-off points for paper and packaging in T1 and T2.

Selective drop-off containers in the T1 and T2 restaurants (packaging, glass and organic trash).

- 110 outdoor selective drop-off points (101 for paper/cardboard and 9 for packaging alongside landside and airside roads).
In addition, the airport has:

- **Waste sorting centers in T1.**

The logistics area in the T1 Terminal also has two waste sorting centers, CCR-A and CCR-B, that companies can use to drop off trash, packaging, paper/cardboard and glass.

- **Temporary Waste Transfer Plant (PTTR)**

This facility is available to both Aena personnel and to the companies that carry out activities at airport facilities and is intended to facilitate their handling of their trash.

The PTTR also serves as a drop-off and temporary storage point for the airport’s hazardous waste.

- Used drums with remains of hazardous materials
- Used batteries
- Used light bulbs
- Used mineral oils
- Absorbents and oil-soaked rags
- Waste from oil-water separators
- Low-volume hazardous waste: oil filters, aerosol cans, used paint cans, extinguishers, fuel purges (Jet A1) and other hazardous waste generated on a non-recurring basis.

**Generation of non-hazardous waste**

The efforts made in recent years at the Barcelona - El Prat Airport to promote segregation at the point of origin has resulted in 30-35% of this waste being sorted.

This continues to be one of the main objectives of the Environmental Management System.

In 2010, a total of 4,507,710 kg of non-hazardous waste was generated, of which 1,484,230 kg was deposited in the airport’s selective drop-off containers.

These figures reveal the following:

In percentage terms, 33% of the non-hazardous waste generated was recycled in 2010. This is 3% less than in 2009.

The first year after the opening of Terminal 1 saw the adoption of certain changes in how the pick-up of waste was handled, as well as the need for the concessionaires (especially restaurants) to get involved in the creation of a solid and effective system for picking up waste.

The response of everyone involved was more than satisfactory in terms of the glass, paper and packaging waste that is collected, since all three types of waste have seen their recycling numbers increase relative to the total amount of trash generated.

The waste handling figures for the Barcelona - El Prat Airport are shown below.
The 3% reduction with respect to 2009 was due to a reduction in the pick-up of organic trash. In 2011, the Barcelona - El Prat Airport will undertake, along with restaurant concessionaires, a series of actions aimed at increasing how much of this waste is sorted.
PERCENTAGE OF TRASH RECYCLED AT THE BARCELONA - EL PRAT AIRPORT

2002 2003 2004 2005 2006 2007 2008 2009 2010

% recycled

20 40 60 80 100

11% 17% 17% 28% 35% 31% 32% 36% 33%
The following table shows the amount of non-hazardous waste generated (in kg) at the Barcelona - El Prat Airport, broken down by type:

<table>
<thead>
<tr>
<th>Year</th>
<th>Other recyclable waste</th>
<th>Glass</th>
<th>Paper</th>
<th>Packaging</th>
<th>Organic</th>
<th>Rest</th>
<th>Total urban waste</th>
<th>Total waste recycled</th>
<th>% sorted (with respect to total trash generated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>15,820</td>
<td>-</td>
<td>171,230</td>
<td>-</td>
<td>-</td>
<td>2,733,834</td>
<td>2,920,884</td>
<td>187,050</td>
<td>6%</td>
</tr>
<tr>
<td>2002</td>
<td>47,773</td>
<td>40,100</td>
<td>222,190</td>
<td>11,394</td>
<td>-</td>
<td>2,512,457</td>
<td>2,833,914</td>
<td>321,457</td>
<td>11%</td>
</tr>
<tr>
<td>2003</td>
<td>65,894</td>
<td>75,600</td>
<td>356,896</td>
<td>31,148</td>
<td>-</td>
<td>2,501,846</td>
<td>3,031,384</td>
<td>529,538</td>
<td>17%</td>
</tr>
<tr>
<td>2004</td>
<td>65,449</td>
<td>80,700</td>
<td>390,225</td>
<td>37,250</td>
<td>-</td>
<td>2,753,970</td>
<td>3,327,594</td>
<td>573,624</td>
<td>17%</td>
</tr>
<tr>
<td>2005</td>
<td>57,620</td>
<td>83,830</td>
<td>555,695</td>
<td>64,430</td>
<td>296,308</td>
<td>2,681,040</td>
<td>3,738,923</td>
<td>1,057,883</td>
<td>28%</td>
</tr>
<tr>
<td>2006</td>
<td>115,500</td>
<td>97,580</td>
<td>559,710</td>
<td>113,620</td>
<td>547,490</td>
<td>2,717,690</td>
<td>4,151,590</td>
<td>1,433,900</td>
<td>35%</td>
</tr>
<tr>
<td>2007</td>
<td>85,030</td>
<td>88,980</td>
<td>546,970</td>
<td>268,590</td>
<td>577,480</td>
<td>3,542,990</td>
<td>5,110,040</td>
<td>1,567,050</td>
<td>31%</td>
</tr>
<tr>
<td>2008</td>
<td>77,810</td>
<td>105,260</td>
<td>531,140</td>
<td>381,260</td>
<td>482,590</td>
<td>3,300,060</td>
<td>4,878,120</td>
<td>1,578,060</td>
<td>32%</td>
</tr>
<tr>
<td>2009</td>
<td>69,930</td>
<td>116,100</td>
<td>659,050</td>
<td>307,600</td>
<td>461,590</td>
<td>2,903,320</td>
<td>4,517,590</td>
<td>1,614,270</td>
<td>36%</td>
</tr>
<tr>
<td>2010</td>
<td>72,570</td>
<td>166,480</td>
<td>786,580</td>
<td>309,240</td>
<td>149,360</td>
<td>3,023,480</td>
<td>4,507,710</td>
<td>1,484,230</td>
<td>33%</td>
</tr>
</tbody>
</table>
Part of the selective pick-up of waste at the Barcelona Airport is done by personnel from the private TRINJOVE Foundation (which encourages job and social placement for the disadvantaged), and with which Aena has a cooperation contract. Companies also take part in the collection, such as ARPAL, ECOEMBES and ECODRIO, as well as Catalonia’s own waste agency, which provides support through related awareness campaigns.
Hazardous waste

Hazardous waste at Barcelona Airport is handled mainly at Aena’s central temporary waste transfer station, which allows for proper monitoring of its handling, storage and volume. It also means that less waste is left in the airport complex proper while ensuring the correct separation of hazardous waste from ordinary urban waste.

In the handling of both hazardous and non-hazardous waste, emphasis is always placed on recovering or recycling the waste. Should the waste not be recoverable, the options available are physical-chemical treatments, inertization and, finally, landfilling, in keeping with existing regulations.

In 2010, a total of 62,834 kg of hazardous waste was generated.

Of note was:

- The amount of hazardous waste generated was similar to that for the previous year. Although the waste generated per traffic unit went down with respect to 2009, it was still in excess of 2 gr/TU, which is considerably higher than the amount in previous years.

![HAZARDOUS WASTE GENERATED kg](image)
In terms of the type of waste, and with respect to the previous year, it should be noted that in 2010, disused vehicles were discarded. Other than this, there was no other significant or relevant change either in the amounts or types of hazardous waste generated.

*Note: the hazardous waste listed in this report reflects the waste generated by Aena and that processed by contractors and concessionaires through Aena’s temporary waste transfer plant, meaning that any year-to-year fluctuations in the amounts generated may not reflect improved environmental management, but rather factors such as contractors or concessionaires taking their waste directly to external handlers without going through the temporary waste transfer plant.*
Noise emissions

The Barcelona – El Prat Airport monitors its noise emissions by way of the Noise Information System (SIR/BCN), which analyzes aviation-related noise pollution by using data obtained at thirteen fixed noise measuring terminals (NMT) and three mobile station.

The system has a central processor that gathers and analyzes information on flight paths and plans, along with the data supplied by the measuring terminals.

Each terminal samples noise levels several times a second. This information is processed, stored and transmitted to the processing unit. By using a threshold-based pattern recognition system and detection algorithms and correlating these with the paths of passing aircraft, the system can identify and pick out aviation noise from that produced by other sources, such as road or train traffic.

The noise measuring terminals are strategically located around the airport in areas likely to be affected by noise from approaching and departing aircraft. Their locations were selected so as to provide easily measurable ambient noise levels in their detection range, in keeping with the criteria set up by the CSAAB (Commission to Monitor the Expansion of the Barcelona – El Prat Airport).

The terminals are distributed as follows:

TMR-2: El Remolar Cultural Center – Ramon Llull St. s/n. EL PRAT DE LLOBREGAT
TMR-3: 25R runway, Barcelona Airport
TMR-4: 07L runway, Barcelona Airport
TMR-5: 25L runway, Barcelona Airport
TMR-6: 07R runway, Barcelona Airport
TMR-8: Gavà Mar Service Center – 55 Tellinai St. GAVÀ
TMR-9: Outer marker - PaseoMaritimo s/n. CASTELLDEFELS
TMR-10: Edumar School – 18 Granada St., CASTELLDEFELS
TMR-12: Castelldefels Town Hall – Plaza de la Iglesia, 1, CASTELLDEFELS
TMR-21: JaumeBalmes School- 20-30 RiuEbre St., EL PRAT DE LLOBREGAT
TMR-40: BallenaAlegre Campground- Autoría de Castelldefels km 12,5. VILADECANS
TMR-41: Bon Soleil School - Camino de la Pava 15. GAVÀ
TMR-42: Agricultural Park – Camino de las Filipinas s/n. VILADECANS
Noise levels were strictly monitored in 2010, both those referenced in the Barcelona - El Prat Airport's Environmental Impact Statement (EIS) (indices: day and night) as well as those required by Royal Decree 1367/2007 (indices: morning, afternoon and night). This information:

- Was sent periodically to various town halls and agencies.
- Was published on the Aena website, along with monthly reports on acoustic levels, aviation operations and adherence to flight paths.

In addition, since July 2010, the Barcelona - El Prat Airport has made available to the public an interactive noise map (WebTrak) that shows real-time information on noise levels and flight paths.

Likewise, a report on sound levels and aviation operations is prepared on a quarterly basis and presented to the CSAAB (Commission to Monitor the Expansion of Barcelona Airport). The report is sent to the Development and Environment Ministries every six months.

The degree of nuisance to the public resulting from multiple noise events over a given period of time is expressed in terms of LEQ (equivalent continuous level), which is divided into:

**Leq Total**
The equivalent continuous level is the sound level generated by all noise sources at the noise monitoring terminal at the time period in question.

**Leq Airplane**
The equivalent continuous level is the sound level that would have been generated at the noise monitoring terminal at the time period in question if there had been no noise other than that produced by airplanes.
The graph below shows the trend in average sound levels obtained with the SIR-BCN in the terminals outside the airport complex:

**ANNUAL COMPARISON 2006 - 2007 - 2008 - 2009 - 2010 Leq airplane day**

**ANNUAL COMPARISON 2006 - 2007 - 2008 - 2009 - 2010 Leq airplane night**
A comparison of the annual levels at the noise measuring terminals reveals that the levels recorded in 2010 exhibit only minor variations with respect to the levels from 2009, since the total number of operations in both years was very similar. There was a slight decrease in the daytime levels for terminals 8, 9, 10, 41 and 42, which are directly affected by the ELR configuration (daytime East preferential configuration), the use of which decreased by 5% from the previous year. In contrast, the daytime level for NMT-40 was greater than the previous year’s due to a 7% increase in the use of the WRL configuration (daytime West preferential configuration) in 2010. NMTs 2, 12 and 21, because of their location, are not subjected to overflying aircraft, and thus their analysis is not as direct. The nighttime levels revealed slight variations with respect to 2009. NMTs 40 and 42 recorded a slight increase (these NMTs are more sensitive to the WLL configuration, nighttime west preferential configuration). The remaining NMTs did not exceed an annual average of 40 dB(A).

The reduction in acoustic impact was due to a change in the preferential configurations in the use of the runways (change in the runway’s role), a change that was implemented on 26 October 2006.
Air quality at airport facilities

The Barcelona – El Prat Airport monitors both the emissions resulting from aviation activities and pollutant inhalation levels in municipalities surrounding the airport. The air quality is measured and monitored by using air quality control stations to record pollutant inhalation levels and by designing and implementing programs that track aircraft emissions and monitor the companies that carry out activities at the airport.

Inhalation values: tracking air quality at airport facilities

The Barcelona – El Prat Airport currently has four air quality monitoring stations, one located within the airport complex, and three in the following adjacent municipalities: El Prat de Llobregat, Gava and Viladecans (see map).

Note: No data were available from the station in El Prat de Llobregat in 2010 due to a change in the station’s location within the municipality. The station resumed operations on 1 January 2011.
The four current air quality monitoring stations record the pollutant inhalation values as well as the relevant weather parameters. The airport also conducts sampling campaigns to determine the inhalation levels for lead and benzene. The techniques utilized to measure the parameters analyzed in the measuring stations are shown below:

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>ANALYSIS TECHNIQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon monoxide (CO)</td>
<td>Non-dispersive infrared absorption</td>
</tr>
<tr>
<td>Nitrogen oxides (NOx)</td>
<td>Chemiluminescence</td>
</tr>
<tr>
<td>Sulfur dioxide (SO₂)</td>
<td>Ultraviolet fluorescence</td>
</tr>
<tr>
<td>Ozone (O₃)</td>
<td>Ultraviolet photometry</td>
</tr>
<tr>
<td>Suspended particles measuring less than 10 microns (PM₁₀)</td>
<td>Volumetric capture and gravimetric analysis</td>
</tr>
<tr>
<td>Suspended particles measuring less than 2.5 microns (PM₂.₅)</td>
<td>Volumetric capture and gravimetric analysis</td>
</tr>
<tr>
<td>Benzene (C₆H₆)</td>
<td>Volumetric capture, desorption and gas chromatography</td>
</tr>
</tbody>
</table>

The weather stations have sensors to measure wind speed and direction, humidity, temperature, solar and ultraviolet radiation, barometric pressure and rainfall. The data for these parameters are received at the central data management system, which has specialized hardware and software for handling and processing the validity of the information.

Once they are reviewed and pre-validated by the Environmental Department at the Barcelona - El Prat Airport, the atmospheric pollutant and weather data obtained are published by Catalonia’s Environmental and Sustainability Agency (DMAS).

The statistical calculation to evaluate the pollutant inhalation levels is carried out based on the criteria for the protection of human health specified by applicable regulations. The following table shows the average annual inhalation values for the pollutants sampled at the air quality monitoring stations.

<table>
<thead>
<tr>
<th></th>
<th>NO₂ µg/m³</th>
<th>PM₁₀ µg/m³</th>
<th>PM₂.₅ µg/m³</th>
<th>Pb µg/m³</th>
<th>C₆H₆ µg/m³ (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport</td>
<td>15.0</td>
<td>11.38</td>
<td>9.28</td>
<td>0.008</td>
<td>-</td>
</tr>
<tr>
<td>Viladecans</td>
<td>18.1</td>
<td>13.01</td>
<td>9.63</td>
<td>0.013</td>
<td>0.95</td>
</tr>
<tr>
<td>Gavà</td>
<td>11.4</td>
<td>9.34</td>
<td>7.97</td>
<td>0.009</td>
<td>1.12</td>
</tr>
</tbody>
</table>

(*) Value/figure corresponding to the average from the data obtained during the sampling/spot check campaign carried out in the month of July 2010
The graph below shows the trend in the inhalation levels for the pollutants sampled at the station located within the airport complex in 2010.
Average hourly NO$_2$ inhalation limit

Hourly limit for the protection of human health

NO$_2$ [µg/m$^3$] - Airport Station II
Environmental performance

![Graph showing CO [mg/m³] - Airport Station II from 1st January to 31st December. The graph indicates average hourly CO inhalation limits and the limit for the protection of human health.](image-url)
Nivel de inmision de ozono - máximo de las medias octohorarias del día

Valor Objetivo para la Protección de la Salud Humana

O₃ [μg/m³] - Estación Aeropuerto II

Ozone inhalation limit – maximum of average eight-hour daily readings

Objective value for the protection of human health
Environmental performance

PM10 [μg/m³] - Airport Station II

- Daily limit for the protection of human health
- Annual limit for the protection of human health
- Annual average

PM10 (μg/m³)

Daily limit for the protection of human health
Annual limit for the protection of human health
Annual average
PM2.5 (μg/m³) - Airport Station II

- PM2.5 (μg/m³)
- Annual average
- Annual limit for the protection of human health
As has been the case since 2008, in accordance with decrees 226/2006 and 152/2007, the Action Plan for Reducing NOx and Particulate Emissions, intended to improve air quality in the municipalities of Baix Llobregat, was prepared and presented to the Government of Catalonia. This plan sets out the steps required to reduce said pollutants, which are based on three courses of action:

- Optimizing aircraft operations on the ground
- Replacing diesel-driven ground service equipment (GSE) with electrically-powered equipment.
- Optimizing the use of auxiliary power units (APU) on aircraft

The implementation of this program allows for a gradual improvement in air quality through a reduction in the emissions of nitrogen oxides (NO, NO₂) and other atmospheric pollutants, such as carbon oxides (monoxide and carbon dioxide) and particulate matter (PM₁₀, PM₂.₅).
**CO₂ emissions produced by the combustion of natural gas in heating equipment**

The permit to emit greenhouse gases, in keeping with Law 1/2005 of 9 March, which regulates the market for the trading of greenhouse gas (GHG) emissions rights, includes a requirement to monitor and report GHG emissions for each trading period, in accordance with the criteria of the European decision that establishes the directives for monitoring and reporting GHG emissions.

The Barcelona - El Prat Airport has, since 14/12/2009, had a permit to emit greenhouse gases for the period from 2008 to 2012 from the following facilities:

- The natural gas combustion facility that provides heat (climate control) to Terminal 2 and the Aena offices at the Barcelona - El Prat Airport.

- The natural gas combustion facility that provides heat (climate control and part of the hot water) to Terminal 1 at the Barcelona - El Prat Airport.

The Barcelona - El Prat Airport joined the trading regime on 1 January 2010.

The year 2010 was thus the first year that the CO₂ emissions generated at the airport were monitored and reported, as required by law.

The airport has a Monitoring Plan for 2008 to 2012 that conforms to the criteria set out in Commission Decision 2007/589/EC of 18 July 2007. The plan is applicable to these facilities and involves the data gathering, recording in a database, preparation of reports, and verification and reporting of greenhouse gas emissions for the duration of the period in question.

For the 2008-2012 period, the Barcelona - El Prat Airport was assigned emission rights for 19,308 tons of CO₂.

In 2010, the airport emitted 8,788 tCO₂ from the combustion of natural gas for climate control.

The airport is developing several actions in 2011 intended to reduce these emissions.

**Wildlife control**

The Barcelona – El Prat Airport is located on the Llobregat Delta, an area it shares with the natural spaces included in the PEIN (Site of Natural Interest): the Ricarda-Ca l’Arana, the Remolar-Filipinas and the Murtra lagoon. The PEIN is a territorial plan developed by the Government of Catalonia as part of its spatial planning program and whose purpose is to provide basic protection to areas of ecological and scenic interest, without prejudice to the activities that are traditionally carried out in these areas.

Moreover, as Spain reported to the European Union in June 1994, various areas of the delta (Ricard-ca l’Arana, Remolar-Filipinas, the Prat shoreline, els Reguerons and Murtra) were declared special protection areas for birds (ZEPA in Spanish).
As it has every year since 1996, the Barcelona – El Prat Airport continued to carry out its wildlife control activity, which involves the use of birds of prey to control bird populations naturally. The aim is to keep the airport complex clear of birds, as well as to control any type of animal that could pose a hazard to ground equipment or airport facilities so as to ensure the safety of aircraft and related equipment. The falconry team is in direct contact with the control tower. Its work is basically one of prevention and anticipation, and involves a daily schedule for the systematic removal of wildlife from the airport.

This service offers advantages, such as not upsetting the ecosystem in place at the airport, not interfering with routine airport operations, and especially, a high reliability since, unlike other bird control methods, birds never grow accustomed to the presence of their natural predators.

The airport is also developing the second update to the Program to Manage the Risk of Bird Strikes (PIRCA in Spanish), whose aim is to minimize the risk of bird impacts with aircraft. The actions taken in 2009 include:

- Controlling plant growth in the airport to keep it from attracting birds dangerous to aircraft.
- The authorized capture and release of species that are potentially dangerous to air traffic, such as kestrels and buzzards. Over the course of 2009, two buzzards and 42 kestrels were captured, and in May, six chicks from the only nest found inside the airport complex were taken to the Torreferrussa Wildlife Center. A total of 37 individuals were fitted with metal rings provided by the Catalan Ornithological Institute (ICO), with 30 of the birds also being tagged with PVC rings provided by the Tagging Station at the Doñana Biological Station, which is the agency that coordinates special tagging within Spain. The birds captured were released in Sant Iscle de Vallalta in the region of Maresme, and in Manresa in the region of del Bages.

**Environmental monitoring of companies**

At the Barcelona – El Prat Airport, Aena has established directives and mechanisms for monitoring the environmental effects of the activities carried out by concessionaires and contractors at the airport.

The environmental monitoring of these activities is carried out through the Environmental Monitoring Plan (EMP), which is a document that every company must fill out prior to starting its activity and which describes all of its environmental impacts (i.e. a description of every environmental aspect: waste generation, product storage, equipment and vehicle maintenance, atmospheric emissions, noise generation, effects on ecosystems, flora and fauna, use of resources and various other aspects).

The environmental monitoring plans are approved by the Barcelona – El Prat Airport and are subject to subsequent tracking by personnel from the airport’s Environmental Department. The result of this monitoring is included in a follow-up report that contains information about the concessionaire’s/contractor’s environmental performance and the corrective, preventive and improvement actions proposed.
Concessionaires

Concessionary companies are those that are given operating rights for a certain period of time at airport facilities to carry out their activity. The most common such companies engage in commercial activities (restaurants, stores, car rental, etc.) and air transport and aircraft support and maintenance (fuel supply, cargo, handling, catering, etc.).

In 2010, 105 environmental monitoring activities were carried out involving 56 concessionaires.

The purpose of this monitoring is not only to track the companies’ behavior and their compliance with the airport’s environmental regulations, but also to establish regular contact with these companies, to raise awareness and to provide them with support in environmental matters so as to continuously improve the environmental management of the airport complex.

Along these lines, the airport is working in particular with restaurant concessionaires in an effort to have these companies sort the majority of the trash that is generated in their facilities.

As regards new concessionaires, the initial environmental tracking efforts provide more of an awareness and informational tool, rather than monitoring, and are intended to familiarize companies with the airport’s environmental infrastructure as well as with environmental regulations and specifications.

No. of CONCESSIONAIRES MONITORED / No. of EMP MONITORING ACTIVITIES
Contractors

External contractors carry out the construction or maintenance work that is awarded by Aena through public bidding processes. These contractors are monitored through periodic inspections (environmental tracking as part of the monitoring plan) to ensure proper environmental behavior and compliance with contractual environmental clauses.

In 2010, 324 environmental monitoring activities were conducted involving 90 contracted construction or service activities.

The number of tracking activities performed decreased with respect to 2009.

The reasons for this drop were:

- Fewer construction contracts were awarded.
- A reduction in the number of tracking activities with respect to 2009. The airport's Environmental Management System specifies that the periodicity of the monitoring activities for contractors is to be based on the potential impact of the activity, as well as on the environmental performance of the company carrying out the activity. In 2010, an average of 3.6 monitoring activities were performed per contract, in comparison to the 5.3 performed on average in 2009. This reduction is due to improved compliance with the requirements of the Environmental Monitoring Plans included as part of the construction or service contracts.
The improved compliance with the Environmental Monitoring Plan is evidenced by the increase in the average score of the Environmental Monitoring Reports, which assess the environmental performance of the companies during the conduct of activities at the airport.
SHORTENING DISTANCES. BRINGING PEOPLE CLOSER.