

# Sustainable energy and climate change

In June 2009 the company approved a new Strategy on Carbon and New Energy Sources, which brings together all of the programmes that the company has already been carrying out to meet the challenge of providing a responsible energy supply, and establishes new action plans.

## Update on 2009 objectives



### Planned activities

Reduction of 2.5 million metric tons of CO<sub>2</sub> equivalent from 2005 to 2013 with respect to the *business as usual* scenario.

Verification, according to the ISO 14064 standard, of the greenhouse gas (GHG) inventory and the actions to reduce these emissions.

Programmes and audits for improving energy efficiency.

R&D project: CO<sub>2</sub> capture and storage (CCS).  
Geological storage.

R&D project: Turning CO<sub>2</sub> into biomass for energy use.

### Degree of progress 2009

Reduction of 204,334 metric tons of CO<sub>2</sub> equivalent compared to the 235,000 metric tons planned as the annual objective. The reduction accumulated during the 2006-2009 period amounts to 1,227,263 metric tons of CO<sub>2</sub> equivalent (49% of the total strategic objective for 2005-2013).

Expanding the scope of ISO 14064 verification of the GHG emission inventory at the La Pampilla (Peru) refinery and the reduction actions involving the other refining activities in (Argentina and Peru). With this new scope, the company has already carried out 53% of its annual CO<sub>2</sub> inventory and 100% of the CO<sub>2</sub> reductions quantified in 2009 and verified according to this standard.

Approval of the company's new Energy Efficiency Policy.  
Implementation of energy efficiency programmes in different Repsol YPF businesses.

Carried out energy efficiency audits at the plants of seven industrial refining centres worldwide, four chemical centres in Spain, Argentina and Portugal, three exploration and production facilities in Argentina and 100 service stations in Spain.

Completion of the studies on CO<sub>2</sub> capture costs for the Muskiz and Puertollano (Spain) refineries, including study of different technologies. Subsoil structures identified that could be safely used for the geological storage of CO<sub>2</sub> at regional level. Participation in the NanoGLOWA and TOPCOMBI projects.

Development of methodologies, execution of studies and construction of facilities as part of the SOST CO<sub>2</sub> project (see case study).

# Evolution of the international framework

In December 2009, the 15th United Nations Summit on Climate Change (COP15) took place in Copenhagen.



The document finally agreed, the Copenhagen Accord, was drafted by Brazil, China, the USA, India and South Africa and was accepted as a political agreement by most countries. However, since it was not agreed by the 193 United Nations Member States, it could not be considered a legally binding agreement. The most important aspects of the Copenhagen Accord are:

- Acceptance of the scientific view that postulates that, in order to prevent the most harmful effects of climate change, the rise in global temperatures should remain below 2° C.
- The commitment of countries included in Appendix I of the United Nations Framework Convention on Climate Change to implement, individually or jointly, quantified emission reduction objectives. These countries undertake to strengthen the obligations they assumed during the 2008-2012 period.
- The countries not included in Appendix I will implement emission reduction actions known as Nationally Appropriate Mitigation Actions (NAMA). These actions will be monitored, verified and reported.

The negotiations on a binding United Nations legal framework will continue in 2010 and will focus on the principles

of the Copenhagen Accord, as well as agreement on the quantified emission reduction objectives. The European Commission, meanwhile, is promoting a series of measures to increase energy efficiency and mitigate climate change. In this regard, the Climate and Energy Package approved in December 2008 represents a crucial legal framework and decisive step forward towards promoting and developing renewable energy sources. Among other measures,

it contains the European directive on the promotion of the use of energies from renewable sources, which sets the objective of 20% of total consumption being provided by renewable energies by 2020, with binding commitments for each of the EU Member States.

## Repsol YPF signs the Copenhagen Communiqué

The Copenhagen Communiqué on Climate Change was an appeal by 960 international companies calling on the world's political leaders to reach an ambitious, effective and fair agreement at the 2009 Summit on Climate Change (COP15).

This communiqué was aimed at establishing the following guidelines, among others, in the agreement to be signed in December:

- A long-term plan to reduce the emission of greenhouse gases between 2013 and 2050.

- A commitment on the part of developed countries to reduce their emissions more than the global average.
- A commitment on the part of developing countries to reduce their emissions in line with their responsibilities and possibilities.





## **Our response: Strategy on Carbon and New Energy Sources**

This new strategy brings together the activities carried out in different areas and businesses of the company, until now managed independently, grouping them in a single monitoring system controlled by the Executive Committee, which leverages synergies and establishes common guidelines. It is also the most suitable action framework for launching and developing new ideas relating to the challenges of sustainable energy and climate change.

The strategy's areas of action include the contents of the Carbon Plan previously developed by the company while also establishing new actions plans. It is based around five main pillars: energy efficiency, carbon markets, biofuels, CO<sub>2</sub> capture and storage and new energy sources.



## Energy efficiency

### What we do

Our energy efficiency strategy aims to reduce both CO<sub>2</sub> emissions and operating costs. In accordance with the Energy Efficiency Policy approved in 2009, we have boosted our efforts to rationalize energy use in order to ensure our energy management systems are in line with the latest standards.

Our strategy is based on a threefold long-term objective: to identify and constantly update the existing savings potential, to establish quantified energy efficiency objectives and to ensure that these objectives are achieved. To this end, a corporate Energy Management System has been implemented.

The identification of energy saving potential, which involves methods such as audits and energy studies, orients the objectives and action plans set. The monitoring of action plans and the degree to which objectives are met is carried out using energy consumption and efficiency indicators specially developed for this purpose.

### 2009 results and 2010 objectives

We approved Repsol YPF's Energy Efficiency Policy.

We carried out energy audits at seven refineries in Spain, Argentina and Peru; four chemical plants in Spain, Argentina and Portugal; more than 100 service stations in Spain; and we started up an audit program in four hydrocarbon reservoirs in Argentina. During 2010 we will continue with the development of energy efficiency programs and audits.



## Carbon markets

### What we do

The strategy for our emission rights portfolio encompasses activities in emission markets focusing on regulated markets, markets within international mechanisms and participation in carbon funds. We are also continuing to develop internal Clean Development Mechanism (CDM) projects and collaborating in external projects. These contribute to technology and knowledge transfer and, when generated internally, also help to reduce consumption, improve energy efficiency and achieve GHG emission reduction objectives. In order to identify and develop internal CDM projects, we have implemented a sequential analysis process (Emission Reduction Opportunities Catalogue) that involves identifying reduction opportunities, evaluating these by means of feasibility studies, recommendations reports and subsequent development of these as CDMs.

### 2009 results and 2010 objectives

The company has considerably increased its actions in emission markets. The volume of our European Union Allowance (EUA) and Certified Emission Reduction (CER) operations grew in 2009, partly due to structured operations that have added value to the group's position.

In terms of external CDM projects identified in developing countries, one of the most important is the acquisition of CERs to be generated between January 2010 and March 2013 by means of a landfill site gas recovery project in São Jose dos Campos (Brazil). In 2010, the company will increase its participation in external CDMs in order to offset compliance costs in regulated markets.



## Biofuels

### What we do

Repsol YPF has 15 years of experience in biofuel research, development and marketing, which has made us a major biofuel distributor worldwide and an active player in the development of advanced biofuels.

We have been EU leaders in including ethyl tert-butyl ether (ETBE) from bioethanol in gasoline and we add biodiesel to conventional diesel, amply fulfilling all our regulatory obligations. The action plan for the biofuel strategy includes carrying out major research work with companies, universities, R&D centres and government bodies to develop second-generation biofuels.

### 2009 results and 2010 objectives

In 2009, Repsol YPF distributed 98,000 metric tons of bioethanol equivalent in gasoline and 376,000 metric tons of biodiesel, accounting for approximately 3.3% of total fuel sales. Our objective for 2010 is to distribute one million metric tons of biodiesel.

In partnership with Renault, we have designed a new BioDiesel e+30 for light vehicles and, in collaboration with Iveco España and FCC, Biodiesel B15 and B30 for heavy vehicles.

In terms of R&D&I, we must highlight our participation in the Research Project for the Promotion of Biodiesel in Spain (PIIBE), developed by the National Strategic Consortium in Technical Research (CENIT), and the vegetable oil co-processing tests conducted at the Puertollano refinery.



## CO<sub>2</sub> Capture and Storage (CCS)

### What we do

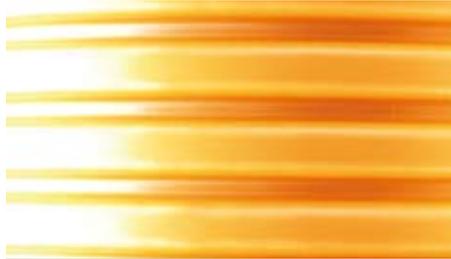
CCS consists of capturing CO<sub>2</sub> from a source, compressing, transporting and injecting it into subterranean geological structures in order to effectively confine it over a long period of time or transform it into biomass and chemical compounds.

Repsol YPF's main objective in terms of CCS is to evaluate the projects that have the greatest potential within our operations and implement them whenever technically and financially viable.

### 2009 results and 2010 objectives

In 2009 we completed a study on CO<sub>2</sub> capture costs for the Muskiz and Puertollano refineries, with an analysis of different technologies. We also identified subsoil structures that could be safely used for the geological storage of CO<sub>2</sub> at regional level. In terms of prospection and technology monitoring, we have carried out an in-depth study into membrane technology for CO<sub>2</sub> capture and how this could be used in Repsol YPF's processes. With regard to joint projects, we took part in the European projects NanoMembranes Against Global Warming (NanoGLOWA) and Towards Optimised Chemical Processes and New Materials by Combinatorial Science (TOPCOMBI), and in the SOST CO<sub>2</sub> project carried out by the CENIT.

In 2010 we will carry out studies on CO<sub>2</sub> capture at the Cartagena refinery, transport technologies, use of CCS technology in the Upstream business and basin-level subsoil studies.



## New energy sources

### New transport vectors

### What we do

Our objective is to be a leader in energy supply for transport over the long term too, and so in 2009 we carried out studies on automotive vehicle technologies looking ahead to 2020 and 2030, which will help us to position our company well with respect to new hybridisation and vehicle electrification technologies. We also signed an agreement with the Basque Energy Agency to create an electric vehicle charging network in the Basque Country.

We promoted automotive LPG or Autogas, the most widely used alternative fuel in the world, by adapting our service stations and by signing agreements with vehicle manufacturers, governments and companies to supply LPG to their fleets.

### 2009 results and 2010 objectives

By the end of 2009, 39 of our service stations had been adapted to supply Autogas in Spain, 54 in Portugal and more than 130 inhouse client self-service facilities, and this number will grow thanks to the agreements signed with the Madrid City Council to supply Autogas to the mobile intensive surveillance units (ISU) of the Municipal Emergency and Civil Rescue & Protection Service (SAMUR), with the Confederación Nacional de Autoescuelas (National Confederation of Driving Schools) and Chevrolet, among others.

The technical and economic feasibility of the charging network project will be evaluated in 2010. Other interesting initiatives on methodologies for evaluating charging points are underway at the Repsol Technology Centre and the car park at the company's future headquarters.



### Renewables

### What we do

Our analysis of energy models in the broadest sense and the role of renewables in the future energy scenario leads in to considering possible diversification strategies in our energy mix. Although energy from fossil sources will continue to predominate at world level, it will do so alongside substantial growth in energy from renewable sources, which is also heavily supported as a result of the commitments taken on by many countries to tackle energy and climate changes challenges.

### 2009 results and 2010 objectives

In 2009, we carried out the technology prospection studies *The future of energy technologies until 2030* and *Repsol YPF's position on renewable technologies*, which enable us to analyse and identify the synergies between new renewable energy sources and the activities of the operations, products and services of our current businesses. At the end of 2009, Repsol YPF had 300 MW of installed wind and mini hydraulic energy capacity through our interest in Gas Natural SDG-Unión Fenosa, with renewable power generation capacity of 627 GWh. In 2010 we will undertake new technology development projects to integrate renewables into our activities, making up the first ever specific renewable energy technology portfolio. In relation to this, Repsol YPF plans to launch the SolarGas energy solution in 2010, which promotes the use of LPG to back up solar power.

# Our emission reduction objective

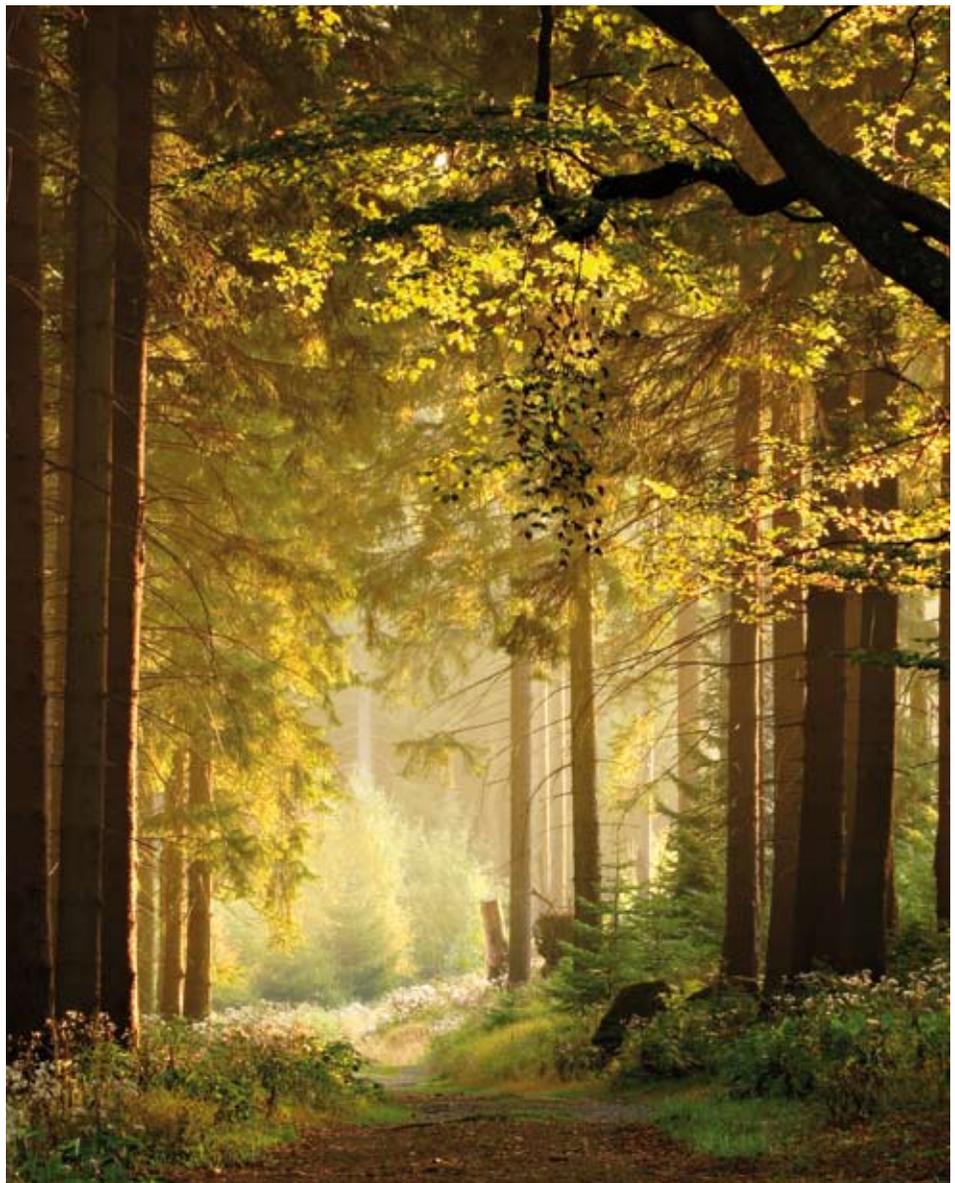
We set annual emission reduction targets linked to meeting the strategic objective, and these are approved by the company's Executive Committee. They form part of the annual targets set for Repsol YPF employees, whose salaries fluctuate according to their success in achieving these goals.

We achieved our previous strategic emission reduction objective of one million metric tons of CO<sub>2</sub> for the 2005-2012 period four years ahead of time in 2008. For this reason, we have set a new strategic goal: to cut 2.5 million metric tons of CO<sub>2</sub> equivalent during the 2005-2013 period with respect to the *business as usual* scenario.

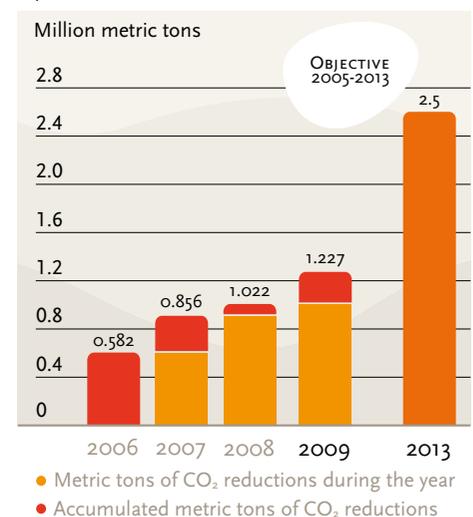
In 2009 we continued to reduce CO<sub>2</sub> emissions. However, the market situation during the year enabled us to implement all the planned reduction actions. Overall, we have achieved a reduction of 204,334 metric tons CO<sub>2</sub> equivalent over the past year, 13% less than the objective set (235,000 metric tons).

With the reductions we achieved in 2009, the accumulated result of all the actions put in place between 2006 and 2009 stands at 1,227,263 metric tons of CO<sub>2</sub> equivalent (49% of the total strategic objective for 2005-2013).

It is important to note that 100% of our CO<sub>2</sub> reductions in 2009 were verified according to the ISO 14064 standard, an improvement over the previous year, when 79% of total reductions were verified.



**ACCUMULATED REDUCTION OF CO<sub>2</sub> EQUIVALENT EMISSIONS**



# Our position on climate change

Repsol YPF shares society's concerns about the effects of human activity on the climate.

Despite some doubts about the scale of these impacts in the future, Repsol YPF believes in erring on the side of caution by limiting the atmospheric emissions of greenhouse gases (GHG) from its operations and products, using sustainability criteria including technological and economic feasibility.

Repsol YPF has stated its willingness to collaborate with the governments of countries where it operates to help ensure compliance with international commitments under the Kyoto Protocol and subsequent ones, and to provide constructive help in drafting new regulations. For many years our company has placed great focus on such efforts and maintains its commitment to the future through specific initiatives designed to help limit the impact of its operations and the use of its products. These actions are encompassed in Repsol YPF's Strategy on Carbon and New Energy Sources (ESCANER):

- Direct reduction of GHG emissions, mainly by improving the energy efficiency of our production operations.
- Support for and implementation of market-based instruments that optimise the costs of complying with emission reduction commitments. Repsol YPF is committed to consolidating Clean Development Mechanisms (CDM) as an efficient means of achieving emission reduction targets, while also contributing to technology transfer and countries' sustainable development.
- Development and marketing of improved fuels and biofuels for transport purposes to help our clients travel more efficiently while causing lower global GHG emissions.
- To research and demonstrate the potential of new technologies that could help to reduce the impact of energy production and use on the climate, such as CO<sub>2</sub>



capture and storage, the next generation of biofuels made from non-food raw materials, or future vehicles and energies for transport.

We at Repsol YPF firmly believe that technological innovation and development are essential to ensuring reliable and sustainable energy supplies over the long term. Climate change is a global problem and Repsol YPF is fully committed to doing its part to face up to the challenge this poses.

## Energy efficiency policy

“Repsol YPF pledges to use energy efficiently in its facilities and activities in order to preserve natural resources, reduce atmospheric emissions and help to offset the effects of climate change.

The company's Management will lead and promote energy efficiency programmes, ensuring that the organization works in line with the principles established within this policy.

Repsol YPF will establish objectives and goals for improving energy efficiency and reducing corresponding greenhouse gas emissions. In order to achieve these objectives, Management will ensure that all necessary information and resources are available.

Repsol YPF will ensure ongoing improvements in the use of energy resources over the entire lifecycle of both its facilities and activities, thereby optimizing process technology and

design, as well as operations at its facilities.

Repsol YPF will comply with all applicable legal requirements, and will also work to adapt its operating procedures and facilities to any legal changes that may arise, and will set common management standards in terms of energy efficiency for all its departments and all countries in which it operates.

In order to promote greater awareness among interested parties, Repsol YPF will provide them with reliable and transparent information on its energy consumption, related greenhouse gas emissions and improvement actions it has undertaken.

Repsol YPF believes that everyone involved with its activities has a responsibility to 'comply with and ensure compliance with' this policy.”

# Case studies



## Studies on energy integration in process units

Processing in petrochemical plants involves heating the hydrocarbons in various stages so that physical and chemical processes needed to produce fuels take place, and this generates excess heat that can be used to heat other colder currents, thereby making maximum possible use of the energy generated during the process.

We carry out studies into energy integration at units that are already operative, because their design becomes less than optimal over time. In some cases, these studies have enabled plants to increase their production capacity in processes limited by furnace or cooling capacity.

One of these studies was recently carried out on an atmospheric distillation unit at A Coruna's refinery. Following introduction of the changes recommended in mid-2009, the study predicts annual energy savings of 4,210 metric tons of fuel and savings in greenhouse gas emissions of 12,840 metric tons of CO<sub>2</sub> per year.



## Edison Plan in service stations

In 2009, we introduced a plan for energy efficiency and sensible energy use at all the Repsol network service stations in Spain, called the Edison Plan. Preliminary studies show that implementing best practices will allow us to reduce normal energy consumption by up to 10%. These savings join those resulting from the introduction of new technologies identified at our Carabanchel Innovation Station pilot project (Madrid).

The Edison Plan involves an investment programme including putting more efficient lighting systems and other power saving devices into place.

An ongoing communication campaign is also underway to raise awareness among service station staff about the importance of saving energy, as well as a regular inspection plan to check the measures adopted are being properly followed.

The implementation of the Edison Plan in 2010 will cost €7.5 million. This initiative is backed by Spain's Ministry of Industry and is being subsidized by the Institute for the Diversification and Saving of Energy (IDAE).



## BioDiesel e+30 test in a Renault light vehicle

Renault Spain and the Repsol Technology Centre have worked together for 24 months on a project to study the use of biodiesel and ensure consumers the best adaptations in engine and fuel technologies.

An exclusive package of Biodiesel e+30 additives was designed and specific Repsol lubricating oils were used in the project.

A total of 105 vehicles were used in the test and 500,000 km were covered using a range of modalities and engine technologies. Drivers' perceptions of aspects such as acceleration, noise and recovery were evaluated, as well as any possible incidents caused by the fuel.

This collaboration led to a car manufacturer, in this case Renault, expressly recommending the use of a Repsol YPF fuel for the first time in its vehicles.



### Electrical vehicle charging network

Repsol shares society's concerns and is working to develop new energies and technologies for transport. Our objective is to maintain our leading position in supplying fuel for transport, based on criteria of profitability and sustainability. In particular, we are focusing on collaborating with technology development initiatives in the fields of electric and hybrid vehicles, contributing our human, technical and logistics resources, and our experience in the transport sector.

In this context, in October 2009, Repsol YPF and the Basque Energy Agency (EVE) signed an agreement to jointly develop an electric vehicle charging network in the Basque Country. Once the agreement was signed, a steering committee and technical group were created to monitor the activities carried out within this project.

The agreement sets out an initial study phase to analyse the viability of possible electric vehicle battery charging systems and the most appropriate sites. The following stage involves specifying the technical specifications of the electric vehicle charging points and setting up a business plan to evaluate the technical and economic feasibility of the project and, finally, introducing and operating the charging point network in the Basque Country.



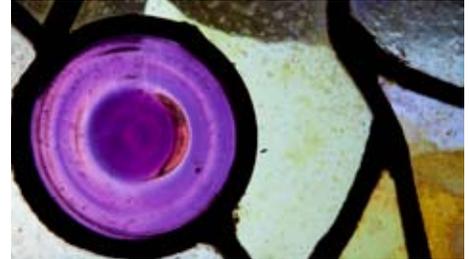
### Co-processing of vegetable oils at refineries

The objective of this project is to prove the technical viability of biofuel production (diesel and liquefied petroleum gas) at industrial scale, by co-processing vegetable oils in conventional refining units. The information produced will allow us to establish the right kind of regulatory framework to mass market these biofuels before the summer of 2010.

Repsol YPF is carrying out this project in collaboration with the Ministry of Science and Innovation, the University of Castilla-La Mancha (UCLM), the Institute for the Diversification and Saving of Energy (IDAE) and the Centre for Energy, Environment and Technology Research (CIEMAT). It forms part of the government's Plan E and has been allocated 2,143,000, subsidised by the European Regional Development Fund (FEDER) and other administrations.

The first industrial test has been carried out at the Puertollano refinery, co-processing nearly 400 m<sup>3</sup> of refined soybean oil. The results bear out the predictions resulting from experimental testing at pilot plant scale at the Repsol Technology Centre, with no additional technical difficulties found during the unit's operations. The renewable product obtained, 'green diesel', has excellent properties: high cetane value, low density and low sulphur content.

In 2010, Repsol YPF will conduct a second industrial test aimed at optimising operating factors and energy consumption.



### CCS collaboration projects

- European Project for NanoMembranes Against Global Warming (NanoGLOWA): Repsol YPF is working to develop polymers for manufacturing CO<sub>2</sub> capture membranes.
- European Project Towards Optimised Chemical Processes and New Materials by Combinatorial Science (TOPCOMBI): in 2009 we completed development of a system for separating and purifying CO<sub>2</sub> from natural gas and helped to develop a CO<sub>2</sub> pressure-swing adsorption system (PSA).
- CENIT project for new sustainable industrial uses of CO<sub>2</sub> (SOST CO<sub>2</sub>): in 2009 we worked on developing methodologies to select algae species, classify the biomass generated and to build reactors to cultivate them. We studied cultivating new fast-growing plant species in greenhouses; and we started to build a facility to measure net CO<sub>2</sub> flows between biomass and the environment.

# Our results



Panoramic view of the Tarragona coastline at sunset from the Casablanca platform (Spain).

## Direct greenhouse gas emissions<sup>(1)</sup>

### CO<sub>2</sub> emissions

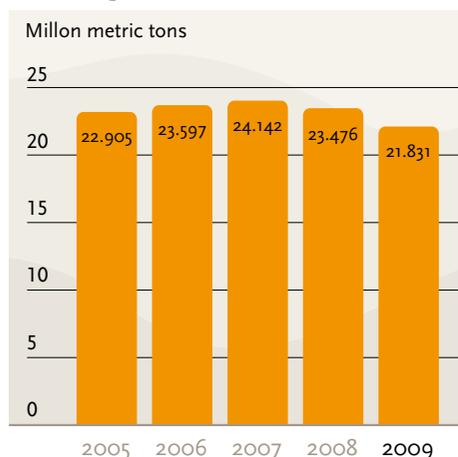
These emissions are produced mainly in combustion facilities and refining processes, as well as during exploration and production activities. In 2009, CO<sub>2</sub> emissions dropped 7%, mainly as a result of reduced refining and chemical activity in

Spain and Portugal and, to a lesser extent, to the reduction programmes implemented. However, refinery-specific CO<sub>2</sub> emissions rose by 2% as a result of lower fuel consumption optimization caused by reduced activity in this business.

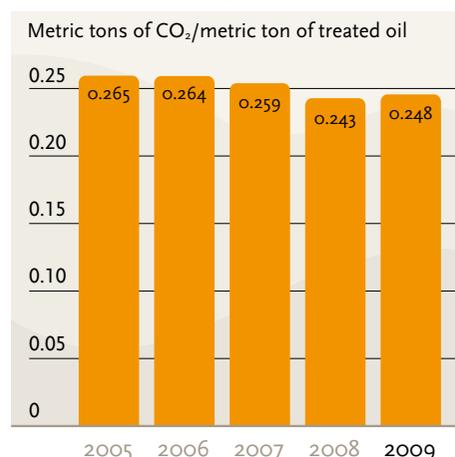
### Methane (CH<sub>4</sub>) emissions

These emissions stem mainly from exploration and production activities. In 2009, methane emissions dropped more than 3% due mainly to the decrease in vented gas at Rincón de los Sauces (Argentina) and production in Block 16 (Ecuador).

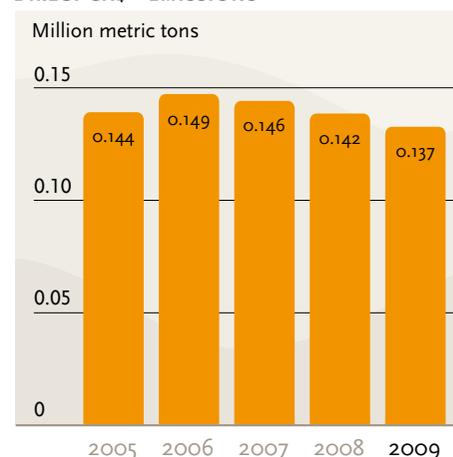
#### DIRECT CO<sub>2</sub><sup>(2)</sup> EMISSIONS



#### EVOLUTION OF SPECIFIC CO<sub>2</sub> IN REFINING ACTIVITIES



#### DIRECT CH<sub>4</sub><sup>(2)</sup> EMISSIONS



(1) Data according to operating control criteria. For further information, see the "Our data" section.

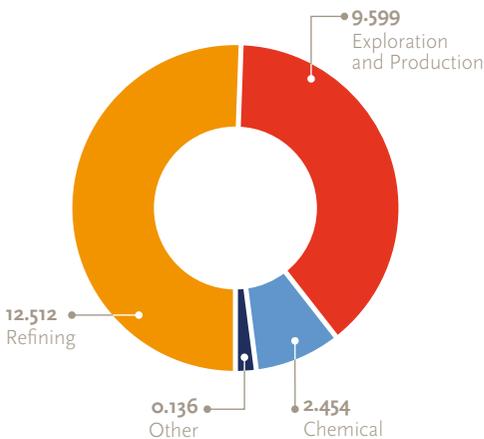
(2) In order to establish common bases for comparison over time, making it possible to determine the evolution of greenhouse gas emissions, the previous year's emissions have been adjusted in line with changes in the company's asset structure. The baseline change criteria are included in the oil industry guidelines for greenhouse gas reporting (API/IPIECA/OGP). No divestments were made in 2009. In the second half of 2008 we sold off the exploration and production activities of Andina in Bolivia and service stations in Ecuador, so the inventories for 2008 and previous years have been adjusted to remove the emissions from the facilities sold.

## Indirect greenhouse gas emissions

In addition to our direct emissions, we also annually report indirect emissions, which are caused by the company's activities but stem from sources owned or controlled by third parties. There are two basic types of indirect emissions within this category:

- Those related to the energy purchased externally in the form of electricity or steam, which in 2009 accounted for 1.77 million metric tons of CO<sub>2</sub> equivalent.
- Those stemming from the manufacture and transport of hydrogen imported by the company's oil refineries and chemical plants, which in 2009 totaled 0.78 million metric tons of CO<sub>2</sub> equivalent.

**CO<sub>2</sub> EMISSIONS BY ACTIVITY**  
Million metric tons



## Emissions from the fuels we market

Emissions associated with the use of fuels we market rose to 148 million metric tons in 2009<sup>(3)</sup>.

## Energy consumption

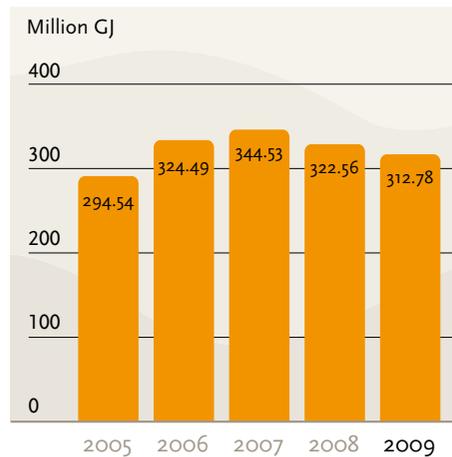
Most energy consumption in our company takes place in refinery combustion facilities and exploration and production facilities.

Energy consumption dropped by 3% in 2009 due primarily to lower refining and

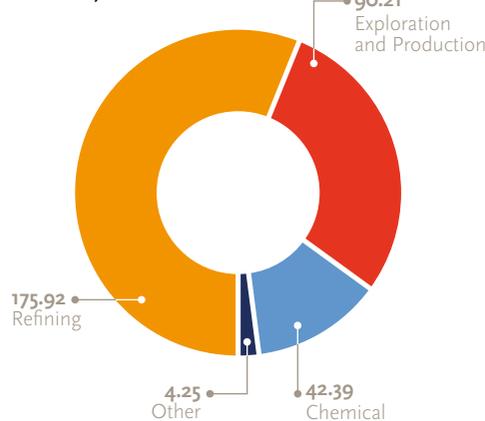
chemical activities in Spain and Portugal. 93 % of the company's total consumption is direct (from its own sources) and 7% is indirect (through the purchase of electricity and/or steam from third parties).

(3) The emission factors used to calculate emissions from the use of the fuels we market are those produced by the American Petroleum Institute (API) in its Compendium of Greenhouse Gas Emissions Methodologies.

**EVOLUTION OF ENERGY CONSUMPTION**



**ENERGETIC CONSUMPTION BY ACTIVITY**  
Million GJ



## Biofuels

The reduction in gasoline demand in 2009 led to a reduction in the amount of bioethanol distributed, although still in line with previous years, in which Repsol YPF

## Progress in verifying our emissions

Repsol YPF's adoption of the ISO 14064 standard lends transparency to our greenhouse gas (GHG) inventory figures, while also making it easier to identify and manage GHG-related risks and opportunities. It also guarantees credibility in developing baselines at facilities where Clean Development Mechanism (CDM) projects could be developed.

In 2009, Repsol YPF extended the scope of the ISO 14064 GHG emission inventory verification to cover the La Pampilla (Peru) refinery and reduction actions involving its other refining activities (Argentina and Peru). In total, 53% of the company's annual inventory of CO<sub>2</sub> and 100% of CO<sub>2</sub> reductions quantified in 2009 have been verified according to this standard.

In addition to the La Pampilla refinery, in 2009 we also verified the emissions generated by Repsol YPF's five refineries in Spain (A Coruña, Puertollano, Tarragona, Cartagena and Muskiz). Verification was also carried out at Repsol YPF's five chemical plants in Spain (Tarragona, Puertollano, Dynasol in Santander, General Química in Álava and Polidux in Huesca), as well as at the Sines (Portugal) and Ensenada (Argentina) plants. The verification process, carried out by external organizations, provides our stakeholders with certified data on the amounts of CO<sub>2</sub> emitted.

was the leader in incorporating bioethanol into gasolines in the form of ethyl tert-butyl ether (ETBE), to a level in excess of its legal obligations.

With regard to biodiesel, we fulfilled the new obligations set in 2009 thanks to the work done in previous years, in which our aim was to ensure product quality and properly equip our facilities.

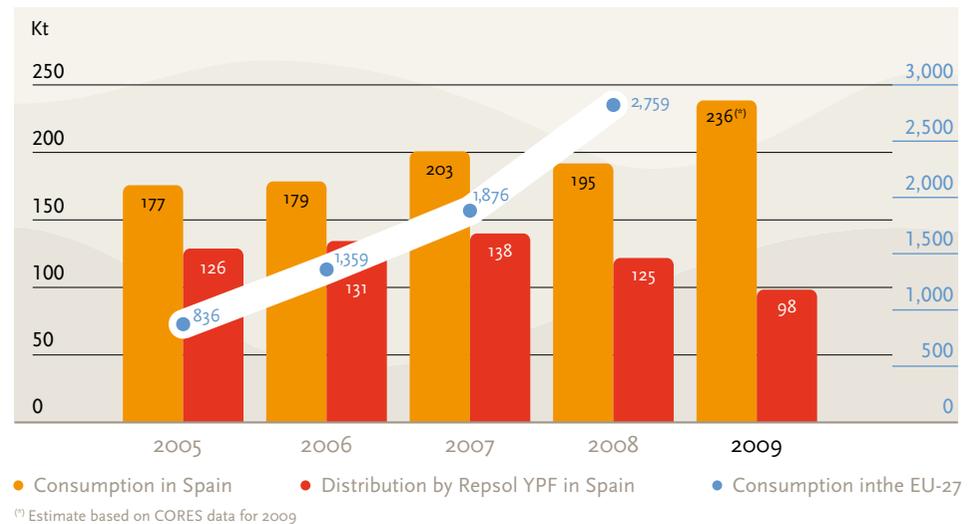
### Awards 2009

- For the fourth year running, Repsol YPF got the highest score in the sector in relation to climate change on the Dow Jones Sustainability Index World and Dow Jones Sustainability Index STOXX.
- Repsol also received the Emissions Tracking Carbon Verification Leaders Award 2010 presented by the Environmental Investment Organization (EIO) in recognition of the information provided on its greenhouse gas emissions.

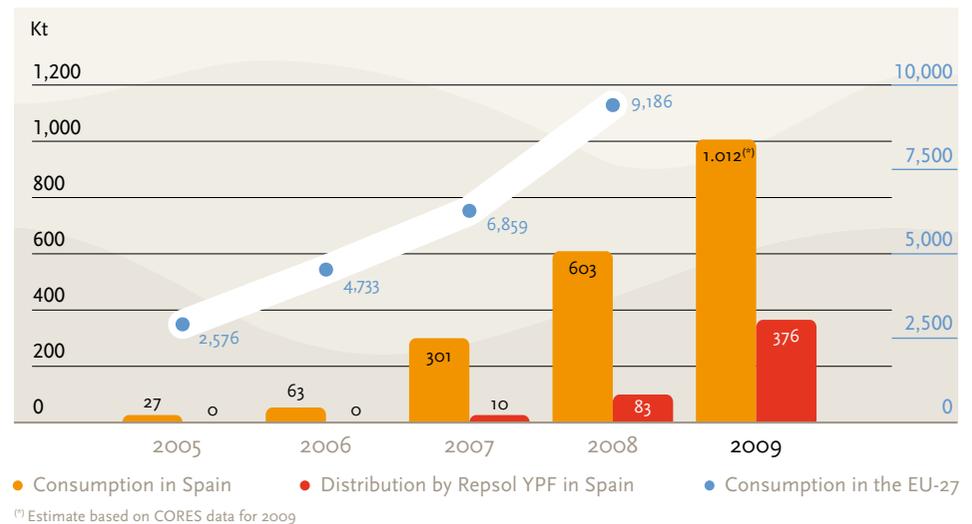
## External participation

- Internacional Petroleum Industry Environmental Conservation Association (IPIECA): we are a member of the Climate Change Working Group and various task forces on issues related to emission markets, emission verification, reduction of greenhouse gas (GHG) emissions, reduction of flared gas and development of Clean Development Mechanism (CDM) projects.
- Regional Association of Oil and Gas Companies in Latin America and the Caribbean (ARPEL): in 2008 and 2009 we chaired the Climate Change Working Group. We also took part in the work carried out by the Energy Efficiency Project Team (EPEFEN).

### BIOETANOL



### BIODIESEL



- Spanish Energy Club: in 2009 we participated in the Energy Efficiency Working Group, which made recommendations for improving energy efficiency within different sectors of the Spanish economy.
- Standardisation Committee AEN/CTN 216 of the Spanish Standardisation Association: in 2009 we participated in Working Group 5, which drafted the UNE 216501 standard for energy audits.
- Spanish Standardisation Association: In 2009 we participated in Working Group 5, which drafted the UNE 216501 standard for energy audits.
- International Energy Agency (IEA) – GHG R&D Programme (CCS): we took part in the Executive Committee and CO<sub>2</sub> technical monitoring and verification group.
- Conservation of Clean Air and Water in Europe (CONCAWE): in 2009 we participated in the CCS task force, which continued with studies on using CO<sub>2</sub> capture and storage at European refineries.
- International Association of Oil and Gas Producers: In 2009 we continued our participation in the CCS task force, which made recommendations on CO<sub>2</sub> storage directive legislation.
- Spanish CO<sub>2</sub> Technology Platform participated in and headed the governing council, management group and technical capture and storage groups. In 2009 we worked mainly on developing the CO<sub>2</sub> storage directive and transposing this into Spanish legislation.

## Our data

As a general rule, we include the 100% of data for subsidiaries in which Repsol YPF has a majority holding and/or operational responsibility (control). In addition, greenhouse gas emissions also included the emissions produced by companies in proportion to the number of shares held by Repsol YPF in each one (a), and the indirect emissions associated with the energy purchased from third parties and other relevant indirect emissions (b) and emissions associated with the use of our products (c).

We also follow the Petroleum industry guidelines for reporting greenhouse gas emissions, developed by API (American Petroleum Institute), IPIECA (International Petroleum Industry Environmental Conservation Association) and OGP (International Association of Oil and Gas Producers).

	2005	2006	2007	2008	2009
<b>Emission of greenhouse gases</b> <span style="float: right;">Million metric tons</span>					
CO <sub>2</sub>	22.905	23.597	24.142	23.476	21.831
CH <sub>4</sub>	0.144	0.149	0.146	0.142	0.137
CO <sub>2</sub> eq	25.931	26.736	27.211	26.466	24.701
Intensity of refinery emissions (metric tons of CO <sub>2</sub> eq./metric tons of treated oil)	0.265	0.264	0.259	0.243	0.248
<b>Energy consumption</b>					
Fuels (million metric tons) <sup>(4)</sup>	6.46	7.04	7.23	6.75	6.25
Electricity (10 <sup>6</sup> MWh)	3.84	3.7	3.88	3.74	3.10
Total energy consumption (10 <sup>6</sup> GJ)	294.54	324.49	344,53	322.56	312.78
<b>Biofuels</b>					
Distribution of bioethanol (kt)	126	131	138	125	98
Distribution of biodiesel (kt)	0	0	10	83	376

(4) The figure includes 1.37 million metric tons of natural gas consumed.

	2009
Emissions of CO <sub>2</sub> according to the shareholders' participation criteria (million metric tons) <sup>(5)</sup> (a)	25,022
Indirect CO <sub>2</sub> emissions (million metric tons) (b)	2,55
CO <sub>2</sub> emissions stemming from products (million metric tons) (c)	148

(5) Errata: The data related to the emissions of CO<sub>2</sub> according to the shareholders' participation criteria published in the Spanish version of the CRR 2009 has been modified from 32,878 million metric tons to 25,022 million metric tons.

## Objectives 2010



### Planned activities

Reduction of 2.5 million metric tons of CO<sub>2</sub> equivalent.

Verification according to the ISO 14064 standard.

Improvement in energy efficiency.

Distribution of renewable components in our fuels.

Second-generation biofuels research.

Capture and storage of CO<sub>2</sub> (CCS).

Transformation of CO<sub>2</sub> into biomass for energy use.

Electrification of transport: agreement with the Basque Energy Agency (Ente Vasco de la Energía – EVE).

Integrating renewables into our activities.

### Objectives

Reduction of 273,000 metric tons in 2010, as part of the strategic reduction objective for the period 2005-2013 with respect to the *business as usual* scenario.

Extend ISO 14064 verification to other corporate GHG inventory activities and reduction actions.

Continue the development of energy efficiency programmes and audits.

Distribution of one million metric tons of biodiesel.

Second industrial test for obtaining 'green diesel' from a hydrodesulphurisation refinery unit.

Cultivation of microalgae crops at pilot plant scale at a refinery.

Studies on CO<sub>2</sub> capture at the Cartagena refinery, CO<sub>2</sub> transport technologies, application of CCS technologies to the Upstream business and subsoil studies.

Continue the participation in the SOST CO<sub>2</sub> project.

Evaluation of the technical and economic viability of the project.

Creation of a specific renewable energy technology portfolio.