

Climate change and energy efficiency



Throughout 2008 climate change continued to be one of public opinion's main concerns all over the world. This can clearly be seen from the interest aroused by conversations at the Poznan conference, intended to smooth out the way towards success in negotiating an international commitment in Copenhagen 2009.

The financial crisis inevitably came very much to the fore at this conference, though the experts' unanimous opinion was that it is precisely when most efforts must be made in the fight



against Climate Change.

At Repsol YPF we are aware of this challenge. In 2002 we publicly formalised our position as regards climate change. To make this commitment a reality in 2003 we drew up and got under way our Carbon Plan, which we have updated this year to foster the deployment of our strategy in all our operations, setting a more ambitious goal for reducing greenhouse gas emissions.





Our objectives

Activities planned	Degree of progress 2008	2009 Objectives
Reduction of a million tons of CO _{2eq} in the 2005-2012 period in respect of the business as usual scenario.	Reduction of 166,837 t CO _{2eq} in 2008, exceeding the annual reduction target (150,000t) and reaching ahead of time the strategic goal of a million ton reduction over the 2005-2012 period.	Reduction of 235,000 tonnes in 2009 in respect to the business as usual scenario.
Verification of the inventory of greenhouse gases and directed actions for emissions reduction according to international standard ISO 14064.	Verification of the CO ₂ (1) inventory of the five refineries and the six petrochemical plants in Spain and Portugal, for the second year on running, and of the Ensenada Chemical plant in Argentina for the first time. This represents 52% of the company's total CO ₂ emissions. Verification of 79% of the CO ₂ reductions obtained in the year.	Extension of the scope of verification to other refining plants.
Programs and audits for improving energy efficiency.	Execution of energy efficiency programs in different businesses of the company. Execution of energy efficiency audits at different plants in the industrial refining and chemical centres, at exploration and production centres and at service centres.	Continuing to develop energy efficiency programs and audits.
R+D projects: CO ₂ capture and storage (CCS): geological storage.	Continuation of the costs study of the carbon capture and storage for different industrial units. Continuation of the participation in CASTOR (2) , CCP2 (3) and TOPCOMBI (4) projects.	Continuing with the assessment of costs of CCS for refineries in Spain. Development of CO ₂ storage methodologies. Continuing participating in CCS.
R+D projects: transformation of CO ₂ into biomass for energy use.	Participation in the SOST CO ₂ project for transformation of CO ₂ into biomass for energy use got under way. After the technological prospecting into uses and transformations of CO ₂ , both for use in enhanced hydrocarbon recovery and in transformation into products.	Continuing with exploratory developments for transformation of CO ₂ into biomass as part of the SOST CO ₂ project.

(1) As the rest of quantitative information included in this report, 100% of the CO₂ company's inventory has been verified externally. In addition, we applied a verification plan according to standard ISO 14064.

(2) CASTOR: Casablanca Storage.

(3) CCP2: Carbon Capture Project Phase 2.

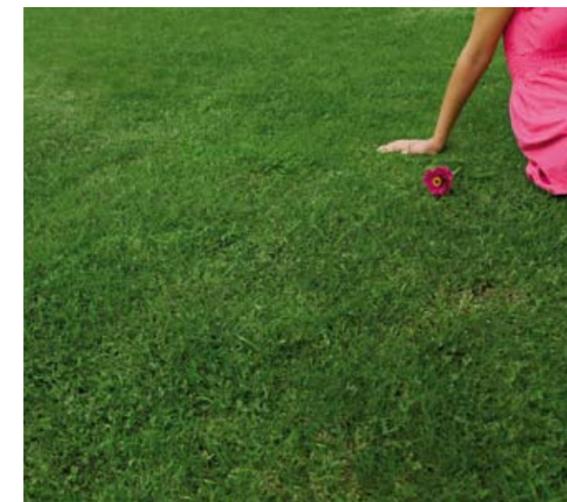
(4) TOPCOMBI: Towards Optimised Chemical Processes and New Materials by Combinatorial Science.

Recognitions

Our strategy against climate change is considered to be one of the most internationally advanced policies, through being the only company continuing for the third year running to be included among the three best firms in the Oil & Gas sector in the Climate Leadership Index (CLI). This index is drawn up each year from the results of the Carbon Disclosure Project (CDP), which analyses the strategies against climate change of the 30 best industrial companies of the Financial Times 500 (FT500).

To succeed in appearing in this index, we passed the assessment of ten key points in our business, such as investment in new technologies for the reduction of emissions, management and reporting of emission inventory, or investment in measures for savings and energy efficiency. For the second consecutive year we have obtained the top qualification in the climate change sector on the Dow Jones Sustainability Index World and Dow Jones Sustainability Index STOXX.

Our Corporate Responsibility Report 2007 was furthermore given third place in the Corporate Responsibility Reporting Awards, arranged by corporate register.com, in the category of best information about climate change.



HOW WE WORK

An integrated plan in all our activities

Strategic decisions on climate change and strategic lines of action are established at the highest level in the company's organisation hierarchy. Strategic lines are used as a basis for preparing the objectives and action plans in each area of our business.

To effectively involve all the employees at the company, annual reduction objectives for greenhouse gas emission are set, to form part of the objectives of members of staff in key positions for obtaining these reductions and whose compensation is subject to variable remuneration.

Since 2005 the Audit and Control Committee of the Board of Directors has also assumed the functions of identifying and steering the policy, directives and objectives in this area.

We have developed specific norms to put the approaches assumed into practice. In 2008 it is emphasized the procedures implemented in all the businesses affected by verification of emissions according to international norm ISO 14064, in order to guarantee the quality of the greenhouse gas inventories of the company's facilities.

Evolution of the international framework

The European Union passed an ambitious legislative package on climate change and energy which combined a 20% reduction in the emissions, an increase of up to 20% in the use of renewable energy and a 20% rise in the improvement of energy efficiency with 2020 as horizon.

We should also stress an achievement of the Poznan conference for having introduced (Appendix I) for the first time the new proposal by means of which developing countries have to reduce their emissions by 15-30% in respect of the business as usual scenario in 2020, the objectives of

the countries in Appendix I being a 25-40% reduction in respect of 1990.

The time that has elapsed with the present Protocol has enabled us to see more clearly what has to be improved to ensure an effective commitment helping to mitigate the effect of climate change at a reasonable cost.

The commitment direction of each of the signing countries needs to be more clearly defined, both for the ones in Appendix I and those not included in this. Apart from this, developing countries must point out how they will take the road towards reduction of emissions consistently with the commitments taken on by developed countries. Developed countries must quantify the technology to be transferred and the economic effort to be made to contribute to adaptation to climate change and the reduction in emissions in developing countries.

The new Protocol must continue to play a key role in the Clean Development Mechanism (CDM). Though this mechanism has indeed been criticised, among other reasons for its relative failure to promote development in some regions such as Africa and for the bureaucracy associated with processing the projects, it has over this time become an essential part of technology transfer and achievement of reductions in emissions.

To make sure that the CDM is a really effective instrument the transparency of decisions of the Executive Board must be increased, speeding up the process for approval of projects apart from improving the communication channels between the proponents and the United Nations.



INTERNAL OPINION

Ramón Álvarez-PedrosaDirector of Safety and Environment
Repsol YPF

Climate change forms part of our strategy

Repsol YPF has for some time been aware of the importance of the climate change challenge and vouches for this in its policy and strategy. There is a firm conviction at this company that success will reward firms that are able to respond to this challenge in the most efficient way, especially in sectors such as that of energy.

This conviction makes us regularly review mechanisms and tools already deployed at the company and we have thus recently made two important decisions. The first was to draw up a new Carbon and Energy Efficiency Plan to promote and coordinate all the action that the company takes in this field. The idea was to upgrade the objective set in 2005 for reduction of CO₂ emissions in our operations, after the partial objectives of 2005 to 2008 have been comfortably exceeded. This review was passed by the Company's Executive Committee in the persuasion that although this would mean an extra effort this is still an attainable target, since the resources required to achieve this will be mobilised.

The new goal is to cut down 2.5 million tons of CO₂ equivalent in the 2005–2013 period, as opposed to the initial objective of reducing the figure by one million tons in the 2005–2012 period.

Apart from this, in 2008 we increased the number of installations which have validated their emission inventories according to international standard ISO 14064, in order to give greater credibility to and guarantee the reliability of the figures published on the Company's carbon footprint. In 2008 the Ensenada petrochemical complex in Argentina verified its inventory of Greenhouse Gases according to this standard, this being the first facility in the whole of Latin America to do so.

In support of this strategy and its quantifiable results, in 2008 Repsol YPF was given clear recognition by the market. It is the only company that continues for the third year on running to appear among the three best firms in the Oil & Gas sector in the Climate Leadership Index (CLI). Repsol YPF was also given the top qualification in the climate change sector in the Dow Jones Sustainability Index in 2008.

On the technological side we continue to analyse the viability of applying technologies for capture and sequestration of CO₂ in our operations and industrial centres, both in the geological storage aspect and that of their transformation into biomass.

All of this makes us look to the future with optimism, committed to a task that incorporates a wide range of activities: improvement in the quality of inventories, search for opportunities to reduce emissions, optimisation of processes for improving their energy efficiency, investment in R+D and raising society's awareness. For this purpose we can rely on the efforts and enthusiasm of an organisation persuaded that this is the right direction to take.

EXTERNAL OPINION

Matthew BatesonManaging Director,
Energy and Climate World Business Council
for Sustainable Development

The business role in the transition towards a low carbon economy

2009 sees the convergence of two major challenges - the global economic crisis and the necessity for a new climate treaty in Copenhagen in December. Business cannot succeed in a society that fails and has a central role to play in resolving both of these challenges.

It is clear that to stimulate growth and aid recovery from the economic crisis the world needs a transformation to a low carbon economy. A recovery strategy based on high-carbon energy sources will not create the sustainable economic growth that the world needs – it will ultimately choke itself on rising hydrocarbon prices and a hostile physical environment created by climate change. There is no “business as usual” to which we can return.

It is equally clear that implementation of any climate treaty will require business to do what it does best – to innovate – and deliver the low carbon technology solutions needed.

Many of the low-carbon technology solutions that have the potential to significantly reduce global emissions already exist. According to the International Energy Agency, energy efficiency can account for more than 50% of the required emissions reductions and these technologies are available. But specific national policy responses are needed to support their rapid deployment and transfer. Other essential technologies, like carbon capture and storage, require funding to support their demonstration.

New technologies will also be needed. Governments need to facilitate the scale-up of research, development and demonstration of these clean energy technologies through new financial mechanisms and international cooperation. Partnerships between business, governments and academia will be essential to helping the world find and deliver these technologies.

Consequently, what is needed amounts to a new industrial revolution. This revolution will need to be clean, lean and mean. Clean –the technologies required will move us towards a low carbon future. Lean –we live in world of increasingly scarce resources - energy, water, carbon – and we need to learn to live within these parameters. And mean – there will be both winners and losers. Companies able to adapt and grasp the opportunities presented will grow. Those that cannot or will not could face extinction.

Milestone time line in climate change

		Repsol YPF Carbon Plan						New Repsol YPF Carbon Plan	
CARBON PLAN	Markets	The company gets ready to take part in the carbon markets <i>Publication of European Directive 87/93/EC on Emission Rights</i>	<i>Publication of the First National Association Plan (PNA)</i>	Joining the Carbon Natsource (GG CAP) Fund	Joining the Spanish Carbon Fund (FEC) Operations start in the European Climate Exchange (EXC)	<i>Publication of the Second National Assignment Plan (PNA)</i> First transactions with secondary ERCS carried out	Carrying out transactions with secondary Emission Reduction Credits (ERC) worth almost a million tons		
	CORE (1)	New approaches for systematic attempt to reduce emissions Introduction of carbon cost in the internal assessment of investment projects	Introduction of CORE (Catalogue of Opportunities for Emission Reduction)	Setting the objective for reduction of 1,000,000 tons CO2 eq. in 2005-2012	Reduction of 582,000 tons (annual objective 150,000 tons)	Reduction of 274,092 tons (annual objective 150,000 tons). Verification of 68% of the reduction according to ISO 14064.	Reduction of 166,837 t. CO2 eq. (annual objective 150,000 t.) Reassessment of strategic objective of 2.5 million tons CO2 eq. in 2005-2013 in respect of business as usual. Verification of 79% of the reduction according to ISO 14064.		
	MDL (2)					Approval by the CDM Executive Board of the United Nations of the procedure based on the project for recovery of flaring gas at La Plata complex (Argentina).			
	Energy efficiency					Performance of energy audits.	Approval of the first Repsol YPF energy efficiency plan.		
MILESTONES	2002	2003	2004	2005	2006	2007	2008	2009	
	Approval of the public position on Climate Change.	Creation of the Climate Change Unit.				Verification of the CO2 inventory of Refining and Chemicals in Spain and Portugal and directed actions for emissions reductions required for Spanish refining according to ISO 14064.	Verification of the inventory of the Ensenada chemical plant in Argentina according to international standard ISO 14064, this being the first installation in the whole of Latin America.		
RECOGNITION					<i>Best in class</i> in CLI in CLI (<i>Climate Leadership Index</i>)	<i>Best in class</i> in CLI Top assessment in climate change in <i>Dow Jones Sustainability Index</i>	<i>Best in class</i> in CLI Top assessment in climate change in <i>Dow Jones Sustainability Index</i>		
OPINION-CREATING		Vice-presidency of the climate change work group of ARPEL Joining the IPIECA climate change group.	Participation in the ARPEL workshop on cooperation in technological options for reduction of GHG (Rio de Janeiro, Brazil). Participation in the 10th Conference of Parties (COP-10) in Buenos Aires (Argentina).	Co-patronage and participation at the ARPEL Workshop on opportunities for flaring reduction in Latin America (Caracas, Venezuela) Participation in the 5th Congress on GHG markets of IETA in Madrid (Spain).	Repsol YPF assumes the presidency of the ARPEL work group on climate change for flaring reduction in Latin America (Guatemala).	Joining the Climate Protection endeavour of the United Nations World Climate Compact Participation in the work group of the Environment Foundation – BCSD- Publication of the document eCO2normia Launching of “12 Tips” as a campaign for raising awareness of staff.	Participation in the work group on Energy Saving and Efficiency of the Spanish Energy Club. Participation in the ARPEL Energy Efficiency Projects Team (EPEFEN). Involvement in F-20 forum, Challenges and Opportunities on Markets for Trade in Greenhouse Gas Emissions, of the 19th World Petroleum Congress.		

(1) CORE: Catalogue of Opportunities for Emissions Reduction. (2) CDM: Clean Development Mechanism.



New Carbon Plan

This new plan consolidates all the measures that we perform on carbon in a common program. This means that we have a similar procedure for analysing investments, identifying opportunities and assessing risks, and effective and coordinated usage of our mechanisms for reducing emissions and deploying energy efficiency actions.

The New Carbon Plan involves the following lines of action:

Action on the emission markets

Our activities on the emission markets concentrate mainly on regulated markets, voluntary markets and participation in carbon funds.

We take an active part in the international emission markets. In 2008 we continued to take intensive action on the markets as these matured; for example, the transaction with secondary Certified Emissions Reductions (CER) reached almost one million tons. The investment in Carbon Funds continued as set over recent years. These funds develop projects of Clean Development Mechanisms (CDM) in developing countries, investing

in energy efficiency initiatives, renewable energies, management of waste, change of fuels and others. In 2008 we should stress the company's participation in two initiatives undertaken in China through the Natsource Carbon Fund Greenhouse Gas Credit Aggregation Pool (GG-CAP): a project for industrial cogeneration in Chaochuan and another for hydroelectric generation which makes use of the Chenshui river current in Hunan province.

Catalogue of Emission Reduction Opportunities (CORE)

We have a Catalogue of Emission Reduction Opportunities (CORE), where all the company businesses actively contribute to identifying opportunities for reducing internal GHG emissions.

Clean Development Mechanism (CDM) Projects

We continue to undertake internal CDM projects and encourage their generation in external projects. These projects effectively contribute to technology transfer and knowledge. When generated internally, they also contribute to the reduction in consumption and improvement of energy efficiency.

In order to identify and develop CDM projects, we have established a process for sequential analysis which covers the identification of opportunities, their valuation through a feasibility analysis and a report on recommendations and their later processing as CDM.

Energy efficiency

Energy management systems The improvement in energy efficiency is a key management aspect at the company. We believe in the improvement of energy efficiency, which stems naturally from our carbon strategy. To take advantage of these opportunities, in 2008 we set up the organisational structure required for in-depth investigation of good management practices. The following objectives are pursued:

- Aligning management practices with those of the most advanced companies in the sector.
- Establishing minimum standards of management in the different businesses and areas of the company.
- Disseminating experiences and good practices.
- Integrating disperse initiatives and coordinating agents with impact on consumption.
- Contributing to deployment of the Carbon Strategy 2008–2012–2020.
- Improving the capacity to identify the potential for saving costs and materialising this.
- Quantifying current consumptions and improvements achieved.

Energy efficiency audits As part of the programs for energy efficiency in force in the different businesses of the company, energy efficiency audits are performed in order to reduce the specific consumptions of energy and detect any opportunities for savings. As a result of the audits recommendations are issued for improving energy efficiency, which foster the action plans.

During 2008 energy efficiency audits have been carried out in different plants at:

- Industrial refining centres in A Coruña, Cartagena and Petronor in Spain and La Plata and Luján de Cuyo in Argentina.
- Chemical plants in Puertollano and Tarragona in Spain and Ensenada in Argentina.
- Exploration and production installations in Vizcacheras, Barrancas and Los Perales in Argentina, in Barrancas in Venezuela and in Trinidad and Tobago.
- Petrol stations in Spain.

The sum of small improvements detected in these audits makes a significant contribution to the reduction of the company businesses' carbon footprint. In the refining and chemical facilities in Spain, we have identified opportunities for reducing energy consumption by around 7% in respect of current consumption.

Management of knowledge We opt for management of knowledge and foster the creation of communities of practice, which apart from being portals in which information can be shared, constitute a common work setting and a vehicle for different initiatives for management under way (planning and monitoring, methodologies, savings measures, communication, monitoring of consumptions, audits, resources for training, news, events, discussion forums, etc.). In 2008 we should underline the relaunching of the community of energy management practices of Refining Spain, and the progress made for bringing chemicals staff in Europe into this. In parallel, the Refining and Logistics unit in Argentina has worked on building its own community of practice, intended to be launched in 2009.

Another relevant measures is the constitution of energy efficiency work groups. In particular we should mention the creation of the group in the Petrochemical area in Spain in 2008, in order to promote the reduction of energy consumptions and emissions of CO₂ in this area.



A new challenge in emission reduction

We attained the strategic objective for emission reduction four years ahead of time and have set a new strategic target: a 2.5 million ton CO_{2eq} reduction in the 2005–2013 period in respect of the business as usual scenario.

In 2005 we set a reduction objective of one million tons of CO_{2eq} ptfor the 2005-2012 period over the business as usual scenario. As a result of all the measures taken in the Carbon Plan, we achieved an accumulated reduction of 1,022,929 tonnes CO_{2eq}.

Review of the reduction target

In view of the good results obtained, in 2008 we decided to reformulate the objective in order to set an ambitious target. The new strategic objective for reduction was set at 2.5 million tons CO₂ pt in the 2005-2013 period in respect of the business as usual scenario. This scenario

is calculated from the future emissions projection based on two scenarios: one with minimum emissions and other with maximum ones, taking into account internal and external determining factors. The annual objective established for 2009 is 235,000 tons of equivalent CO₂ reduction.

Determination of objectives according to the business as usual scenario

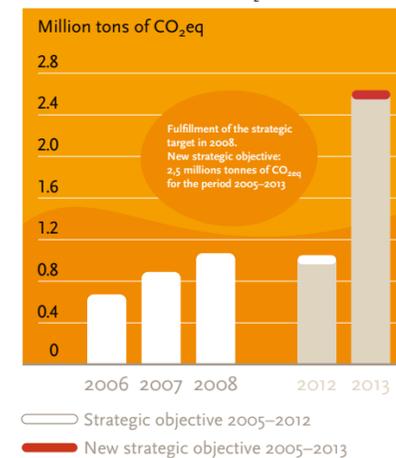
When we express an emission reduction target as compared with the business as usual scenario, what we take on is the commitment to achieve reductions of emission beyond any variations arising as a result of the external setting conditions or internal operating conditions. This means that as regards fulfilment of the objective only the effective reductions that have taken place seeking the reduction and which would otherwise not have existed are taken into consideration, not including the temporary reductions as a result of plant stoppages, maintenance of production centres, periods with lower production through unfavourable economic situations, etc.

For this reason there may be years in which the company's absolute emissions are increased even though the reductions of the reduction objective are at a maximum level.

This scenario is calculated making the forecast of future emissions on two different scenarios, one of minimum emissions and another of maximum emissions, taking into account assumptions of external setting conditions (economic activity scenario) and internal operation conditions (stoppages for maintenance, production scenario). That is, a low emission scenario considers a situation of low economic activity combined with the occurrence of different stoppages through operating problems, and a high emission-scenario considers a situation with high economic activity combined with a lack of operating problems enabling the plants to be run at full capacity. The business as usual scenario is set between both scenarios, taking into account the most likely and realistic situations.

The scenario is annually recalculated in the event of any change in the scope on which the emissions forecast is made (if there is a purchase of assets, sale of assets, assignment to third parties, among others), as laid down in GHG Protocol. Accounting and Reporting Standard of the World Business Council and its adaptation to the oil and gas sector according to Oil industry guidelines for informing of greenhouse gas emissions (IPIECA, OGP and API, December 2003).

REDUCTION IN TONS OF CO₂



Innovation and energy efficiency in petrol stations

In 2008 we carried out a worldwide pioneering and exemplary project at the Spanish petrol station unit, as part of the Executive Division of Marketing. As a result of this project the Innovación Carabanchel Petrol Station has just been opened in Madrid. This is a petrol station at which the latest technologies in safety, energy efficiency, water consumption, management, marketing and accessibility have been incorporated.

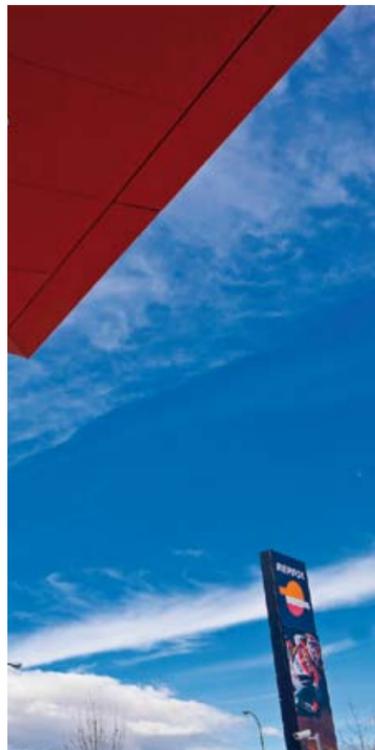
The project combines over forty initiatives, based on three main principles: teamwork, the search for optimum performance in the social and environmental areas and the greatest possible repercussion on brand image.

This project constitutes an exceptional platform for learning and it is hoped to help identify technologies that can be extended to the rest of the network of petrol stations. As regards energy efficiency, the following should be pointed out:

- Use of LED technology for lighting up different areas and items, including sign supports, information panels and posts.
- Electricity saving system which works by

balancing the phase lag between current and voltage by means of coil crossovers in the transformers controlling the load unbalance. This system can save up to 18% of the energy consumption at the petrol stations.

- Control for management of the energy system: lighting, air heating/cooling and cold store equipment. The technology means that the on and off operations can automatically be regulated (indoor and outdoor lighting, etc.) as well as the temperatures of the cold stores and air conditioning.
- Telemetry for controlling the time consumption of electricity. The information is sent via sms to a Web site. This system means that the electricity consumption can be reduced if the information output from it is used for improving the awareness of staff (up to 5% savings). It also means that energy efficiency plans can be established and the objectives set can be monitored.
- Photovoltaic and thermal solar panels are respectively used for producing electricity and hot water.



Our data

Direct emissions of greenhouse gases (1)

· Direct CO₂ emissions are found mainly at combustion installations and in refinery processes and in the exploration and production activities.

In 2008 the emissions dropped 3% in respect of 2007, mainly due to the

reduction programs implemented, the programmed stoppage at several plants in the Puertollano refinery, the stoppage at the olefins plant at the Tarragona refinery and, to a lesser extent, thanks to the disinvestments made.

· Methane emissions at the company stem mainly from fugitive emissions in

exploration and production activity.

In 2008 these emissions dropped 3% in respect of 2007, due mainly to the lower activity in Las Heras fields and to a lesser extent in Chubut Cañadón Seco, in Argentina.

Indirect emissions of greenhouse gases

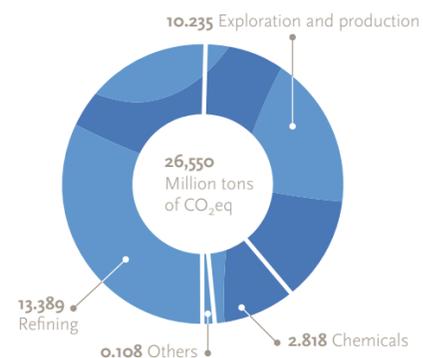
Apart from direct emissions, at Repsol YPF we annually report indirect emissions resulting from the company's own activity, but which stem from sources owned or controlled by third parties. Two basic types of indirect emissions fall into this category:

· Emissions associated with purchasing energy from abroad in the form of electricity or steam. In 2008 these emissions came to 2.02 million tons of CO₂eq. [EN16](#)]

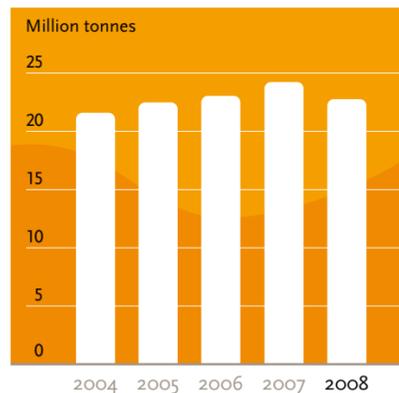


Sovereign Explorer rig, in the beginning of the drilling campaign in the Santos basin (Brazil).

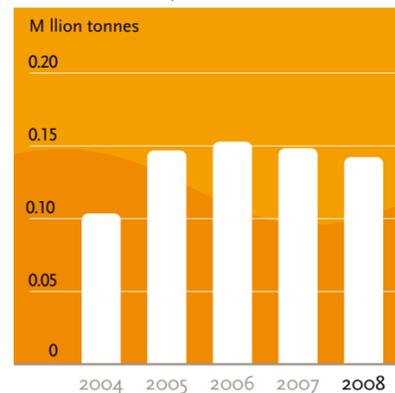
CO₂ EQUIVALENT EMISSIONS BY ACTIVITY



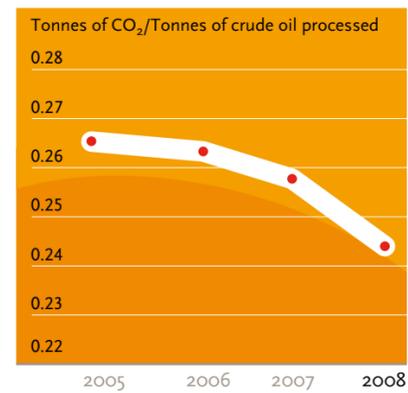
EVOLUTION OF DIRECT CO₂ EMISSIONS



EVOLUTION OF CH₄ EMISSIONS



EVOLUTION OF THE SPECIFIC CO₂ IN THE REFINING ACTIVITY



In order to be able to establish common bases for comparison over time, allowing us to determine the evolution of plants in Brønderslev (Denmark) and Polivar (Italy), the emissions of previous years have been adjusted according to the changes in the Company assets structures. The criteria for changing the base line are given in the "Petroleum industry guidelines for reporting greenhouse gas emissions" (API/PIECA/OGP). During 2008 disinvestments were made at several plants: chemical plants in Brønderslev (Denmark) and Polivar (Italy), exploration and production activities in Andina in Bolivia, logistics activity in Chile and petrol stations in Brazil, Chile and Ecuador. The inventories for 2008 and previous years have been adjusted eliminating the emissions stemming from the installations sold.

(1) Data according to operational control criteria. Further information in the section "Our results".



· Emissions from the manufacture and transport of hydrogen imported to the company's oil refineries and chemical plants. In 2008 a total number of 0.80 million tons of CO₂eq were emitted. [EN17](#)]

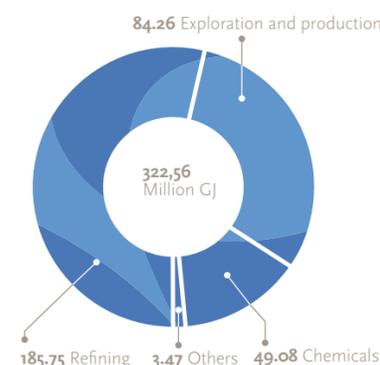
Emissions of marketed fuels

To extend the consolidation perimeter of our greenhouse gas inventory we are for the first time publishing the emissions stemming from usage of fuels. These emissions rose to 171 million tons in 2008.

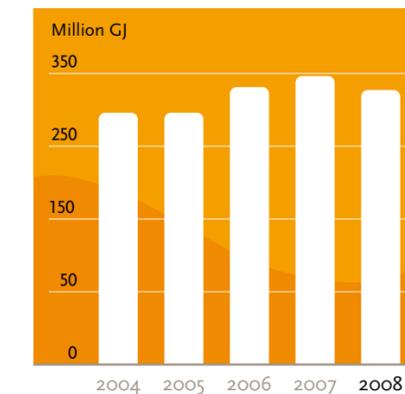
Energy consumption

The energy consumption at the company mainly takes place at the combustion installations at the refineries and at the exploration and production facilities. In 2008 the energy consumption dropped by 6% in respect of the previous year, due mainly to stoppages in the exploration and production activities in Chubut Cañadón Seco, in Argentina and at the olefin plant at the Tarragona refinery in Spain.

ENERGY CONSUMPTION BY ACTIVITY



EVOLUTION OF ENERGY CONSUMPTION





Technological developments

At Repsol YPF's Technology area we promote the diversification of our products through the production of less carbon-intensive biofuels and other green products, at the same time as implementing energy efficiency programs and seeking technological solutions for CO₂ capture and storage.

CO₂ capture and storage

Our research work has in the last few years moved forward in the field of CO₂ capture and storage, in particular in the evaluation of its potential for application in the company's production operations. The injection of CO₂ into hydrocarbon fields improves hydrocarbon recovery rate, apart from the advantages of its geological storage, with the aim of reducing emissions into the atmosphere. The use of CO₂ for improved recovery of hydrocarbons has been the

most commonly applied technology on a commercial scale in the last few years.

To develop these technologies we have joined different associations and consortiums, a prominent one being the work group at the International Energy Agency (IEA Greenhouse R&D Program) and others such as CO₂Net, CONCAWE, OGP and the Spanish CO₂ Technological Platform.

We also take part in the CCP2 (Carbon Capture Phase 2) project, along with

the main companies in the sector. This endeavour seeks the development of geological CO₂ storage methods in safe conditions respectful with the environment.

In 2008 we continued with the evaluation of technologies for capturing and storing CO₂ at refineries, as well as the associated costs. As part of CONCAWE we have taken part in the study of the feasibility of capture and geological storage of CO₂ at European refineries.

In addition, one also mention that we have taken part in the CASTOR project (Casablanca Storage) through the exploration and production area and our Chemicals and Technology areas are involved in the TOPCOMBI project (Towards Optimised Chemical Processes and New Materials by Combinatorial Science). Both projects involve tackling the development of technologies and methodologies applicable to the different stages of a CO₂ capture and storage project.

In the last quarter of 2008 we assessed participation in the Nanoglowa project whose aim is to carry out membrane technologies for capturing CO₂. The intention is to start to develop the project in the second half of 2009.



Transformation of CO₂ into biomass for energy use

Through participation in the CENIT SOST CO₂ project, we are contributing to developing technologies for capturing and sequestering CO₂ in the form of biomass for energy use. In this project we are going to work on comparing different types of systems for growing algae on scales larger than laboratory settings and on capturing CO₂ from each of these systems.

In addition, in 2008 we carried out a technological survey about the uses and transformations of CO₂ displaying both the use of improved recovery of hydrocarbons and the transformation of CO₂ in products with a view to opening up new technological lines enabling us to generate technological knowledge and business criteria.

ISO 14064: Making progress in the company's carbon footprint credibility

We are committed to ISO 14064 International standard verification of the CO₂ inventory and of the measures intended for reducing the company's emissions.

ISO standard 14064 details the specifications and tools necessary for designing, validating and verifying the inventories of GHG emissions in the whole organisation and in each of the projects. It furthermore states the procedure for quantifying, monitoring and informing about the reductions of GHG emissions carried out.

Adopting this standard gives credibility and transparency to Repsol YPF's carbon footprint figures, at the same time as improving the identification and management of risks and opportunities connected with GHG. It also guarantees credibility in the development of base lines at the facilities able to develop CDM projects.

In 2008 the inventories of the following facilities were verified, making up 52% of the inventory of the total CO₂ emissions of the company:

- The five refineries in Spain
- The six chemical plants in Spain and Portugal
- The Ensenada chemical plant in Argentina, which has been verified for the first time this year

Furthermore, 79% of the CO₂ reductions quantified in the year were verified in 2008.



Present in the debate: technical and scientific organisations

The search of joint solutions with public administrations and sector organisations is another of our strategic lines of action against climate change.



In 2008, along with a further 140 big international companies, we signed the Poznan Communiqué. This initiative comprehends a Cambridge University's Program for Industry and the Prince of Wales' Corporate Leaders' Group on Climate Change, and seeks specific measures for reducing GHG emissions, deforestation and the destruction of ecosystems. It pursues the creation of a sounder CO₂ emission market and promotes modifications in the development of CDMs in order for the reduction of greenhouse gases, the contribution to development and the transfer of technology to developing countries to be able take place more effectively.

Furthermore, as main sponsors of the World Petroleum Congress, we had a prominent participation in the panel on climate change and energy efficiency. This congress, held in Madrid, was attended by over 5,000 people, representing one thousand companies (including the biggest world oil companies) authorities from around twenty countries, major intentional agencies such as the International Energy Agency and the Organisation of Petroleum Exporting Countries, as well as other groups connected with the oil sector.

Collaboration with sector organisations and other institutions



Internacional Petroleum Industry Environmental Conservation Association (IPIECA).

IPIECA is the reference association in our industry, and has the aim of developing good environmental and safety practices in the oil and gas sector's operations.

For this reason we are an active member of IPIECA, where we participate in the work group on climate change, as well as in different work groups on matters to do with the emissions market, technical aspects involving verifications of emissions and development of the CDM, among others.



Regional Association of Oil and Natural Gas Companies in Latin America and the Caribbean (ARPEL).

ARPEL is the most important regional association promoting and facilitating development and integration in Latin America and the Caribbean, Repsol YPF being a member of this.

Over the last two years we have presided over the work group for climate change, where we work on aspects connected with reducing greenhouse gas emissions and the management of energy efficiency.



Spanish Energy Club.

In the energy efficiency field, in 2008 we took part in the energy savings and efficiency work group, whose aim is to draw up recommendations for improving energy efficiency in different sectors of the Spanish economy.



We sponsor a climate change energy efficiency award in secondary school in Spain

For Repsol YPF it is vital to spread the commitment to the fight against climate change in society and to bring about a debate in which imaginative ideas are provided to mitigate this. One of the best ways to disseminate this commitment is among younger people.

For this reason, we thus became sponsors of the San Viator award for research into Sciences and Humanities, which is one of the most important for Secondary Education and Higher School-Leavers' Qualification Mid-Level Training Schemes in Spain. This award, which was in its 14th edition in 2008, attempts to encourage its students' spirit of research and creativity, to give teachers the opportunity to provide a practical and experimental facet to their teaching work and help to gain greater recognition and

respect for education communities towards scientific work.

We specifically sponsor the Special Climate Change and Energy Efficiency Award. This award, as its conditions state, seeks to reward "the work best studying and carrying out a feasible project on energy efficiency in the school or family setting, leading to a reduction in CO₂ emissions, helping to fight against climate change".

234 secondary and primary schools from all over Spain took part in this event, involving nearly one thousand students and teachers. In June 2008, after closing the period for reception works, 292 of these had been received -151 in sciences and 141 in humanities.

The winning project in the category of climate change and energy efficiency consisted in building a solar cooker, using recycled materials with which the students built a parabolic sunlight collector. After

the proper mathematical calculations they determined the position of the parabola's focus, where they placed the different items to be heated. Finally the team of students got their different versions under way, experimentally checking the results.

The project is presented in a web format where the different stages involved in preparing the project can be seen in great detail. The prize winners were five 4th year basic education students at a Secondary Education School in Teruel. The jury had particular praise for their efforts to put into practice their knowledge of physics and mathematics in their syllabus to build a device that worked effectively.

Our data

	2004	2005	2006	2007	2008
Greenhouse gases					
CO ₂ (million tons)	21.633	23.116	23.776	24.296	23.541
CH ₄ (million tons)	0.104	0.146	0.152	0.148	0.143
CO ₂ eq (million tons)	23.819	26.190	26.964	27.403	26.550
Intensity of Refining emissions (Tons of CO ₂ eq/Tons of processed crude)	-	0.265	0.264	0.259	0.242
Energy consumption					
Fuels (million tons)	6.44	6.46	7.04	7.23	6.75
Electricity (10 ⁶ MWh)	3.70	3.84	3.70	3.88	3.74
Total energy consumption (10 ⁶ GJ)	294.25	294.54	324.49	344.53	322.56
Emissions of CO ₂ according to the shareholders' participation criteria (million tons) (a)					27.09
Indirect CO ₂ emissions (million tons) (b)					2.82
CO ₂ emissions stemming from products (million tons) (c)					171 (t)

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).

(t) The emission factors applied for calculating the emissions of CO₂ stemming from the products are based on the "Institute's Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry" of API (American Petroleum Institute).