

Environmental risks at Repsol

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Before broaching the subject we examine here, we must give our thanks for the kind invitation sent to IGREA (the Spanish Associated Risk Managers Initiative), of which Repsol is a member, to both the Consorcio de Compensación de Seguros and IGREA for having thought of Repsol in giving us the opportunity to portray the best outlook required to manage this type of risk in a changing environment based on our experience and sphere of activity.



As part of the risk management process and within its commitment to ongoing improvement, Repsol carries out both in-house and external auditing processes. Key to external auditing processes are the risk engineering visits by insurers. These visits represent one of the mechanisms that allow Repsol to keep in touch with industry best practices and implement improvements at facilities and in processes, thus reducing the risk of suffering an event with consequences for both safety and the environment, while at the same time they foster transparency and collaborative relations with insurers.

Discussing environmental risks in a company like Repsol means delving right into one of the most important subjects for a company in the energy sector. Due to the inherent nature of their activities, oil companies are exposed to a whole raft of risks of the environmental kind that have to be managed effectively and properly. To do this, a preliminary effort must be made to identify these risks, which is what will enable preventive measures to be designed and implemented to avoid them from happening and, where appropriate, to minimise the fallout from them if they occur. It is in this last case where the work of insurance managers takes on particular significance, since they are the people that have to find the most suitable mechanisms for covering these risks via the solutions that are offered by the insurance market.

The importance of environmental risk management is key to guaranteeing the long-term sustainability of a company. To illustrate how critical this is, we would cite as an example one of the most major environmental incidents in our industry, namely the spill which occurred in the Gulf of Mexico in 2010 in the drilling of the *Macondo* well. The consequences were disastrous: besides the unfortunate death of 11 people on the platform, the latter was a total loss, estimated at over 400 million dollars, and this did incalculable damage to the reputation of the companies involved which, by extension, affected the entire oil & gas sector. The environmental impact was equally high: some five million barrels of oil spilled into the sea, which caused the death of over 800,000 sea birds and roughly 1,000 dolphins that were found washed up along the shores of the Gulf of Mexico. The pelican population in the zone was cut by 12 % and both fishermen and tourism companies suffered big losses. Although the figures are still only provisional, in 2016 the company that operated the platform announced that the financial cost (including, among other things, cleaning and remedial costs, fines and damages for third parties, etc.) would be over 60 billion dollars before tax. The consequences of a catastrophic environmental incident can be dramatic for a company and can range from leading to its demise (as

could happen to a medium-sized company such as Repsol) to inflicting financial damage that is extremely hard to recover from, even before we consider reputational aspects, which would without a doubt be very hard hit.



Figure 1. Satellite image of oil spill in the Gulf of Mexico.
Source: NASA.

Although the example of the *Macondo* may be considered extreme, companies such as Repsol are, to a greater or lesser degree, exposed to risks of this kind. In Repsol's case the environmental risks it faces are essentially determined by the various activities pursued and the different places of operation. Repsol's activities, as an energy multinational, focus on the entire hydrocarbon value chain: from extracting the raw material (oil and gas), which is known as the Upstream or E&P business, through to manufacturing and marketing the whole range of derivative products, which is the Downstream business. Oil companies with both upstream and downstream activities are also referred to as integrated companies. With production of 700,000 barrels of oil equivalent per day (of which over two thirds is gas) and refining capacity (converting crude into marketable products such as petrol, aviation kerosene, gasoil/diesel, etc.) of 1,000,000 barrels per day, Repsol can be said to be a medium-sized oil company compared to the larger oil companies, known as majors.

Repsol's presence in the upstream business is worldwide (in over 20 countries), but it is more local on the downstream side, where the focus is mainly on the Iberian Peninsula and Peru, although it does market products in many other countries. After readjusting its portfolio over the past decade, culminating with the acquisition of the Canadian company Talisman Energy in 2015, Repsol has stepped up its upstream side and boosted its presence in OECD countries, while also having expanded both its offshore activity (oil and gas extraction and production out at sea) and non-conventional operations (hydraulic fracturing or "fracking" production).

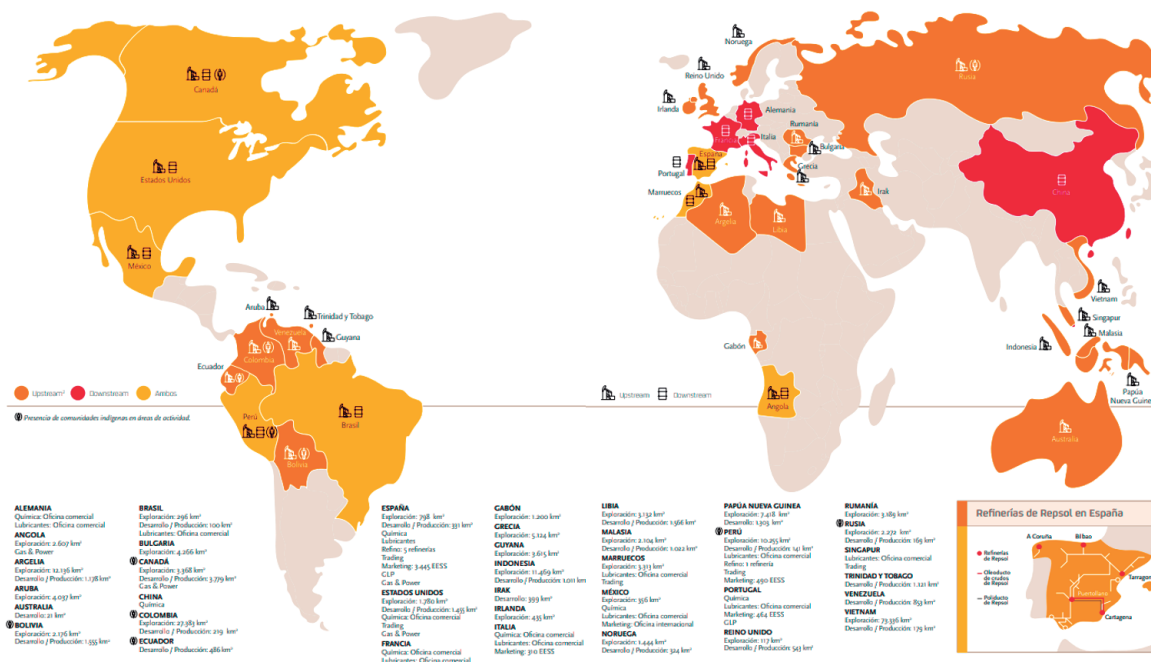


Figure 2. Repsol around the world.
Source: Repsol.

In line with the forecasts set out in the 2018-2020 strategy plan, Repsol has embarked on a very exciting course, which will represent laying the first stone in a sweeping transformation of the company's profile, with the acquisition of part of the low emission businesses (hydropower and gas-fired combined cycle plants) and the marketing division of Viesgo. Thanks to this acquisition, Repsol has fully committed itself to the electricity business with a portfolio of 750,000 customers and generating capacity of 2.9 GW, becoming the fifth largest electricity marketer in Spain. The medium-term objectives are ambitious: for 2025, our pledge to shareholders is to have lifted the customer base to 2.5 million, achieving a market share of over 5 % in the gas and electricity retail business. As a result of this deal Repsol has started the so-called energy transition. In the coming years, the company will become a multi-energy provider, with a special emphasis on using cleaner forms of energy in line with the commitments achieved in the Paris Agreement, implying a 40 % reduction in CO₂ intensity by 2040.

This variety of divisions and activities, in a constant state of evolution, combined with a presence in several different countries with different environmental regulations and legislation makes environmental risk management a complex and demanding activity, meaning that it is even more necessary (if possible) to ensure that the process of risk identification, prevention and mitigation works as optimally and efficiently as possible.

The environmental risk management process begins with risk identification. According to its activities, Repsol has to manage both environmental risks and environmental vectors, with the objective of minimising the impact that its operations have on its surroundings. In terms of environmental vectors, we will consider the water, atmosphere, raw materials or waste that are inevitably affected by the very act of engaging in our operations, without any extraordinary event needing to happen. By environmental risks, we refer to accidental and unforeseen scenarios that can cause damage to the environment. These are the significant risks from the standpoint of the insurance market.

In downstream activities, the main environmental risk lies in the potential occurrence of spills that can pollute the soil and the phreatic zone in operations that take place onshore and the sea in those that are undertaken at offshore terminals. The elements most likely to cause leakage of pollutants of the environment are pipes (mainly if they are buried, given the greater maintenance problems which they pose), the bottoms of storage tanks, pumps and drainage systems and, at offshore terminals, the loading and unloading arms for raw materials and products. The substances which have the biggest impact on the environment in the event of spillage are crude and diesel/gas-oil.

It is, however, in upstream activities where the greatest risk lies in terms of the seriousness of consequences and the economic impact. As we have said before, the occurrence of a blowout (*Macondo*) is without doubt the worst possible scenario that a company which pursues exploration and production activities with respect to hydrocarbons can face from the point of view of safety and the environment. From the environmental standpoint the economic impact would be heightened should the blowout take place in a zone that is rich in biodiversity.

With respect to risk prevention, Repsol has a health & safety and environmental policy which, as its main objective, seeks to pursue all activities while treating personal health & safety and environmental protection as essential values. To this end, criteria pertaining to safety and the environment are included in the entire life cycle of activities, thereby ensuring pro-active risk management to head off harm to both people and property and minimise the impact on the surroundings. Repsol's commitment to sustainability takes the form of a global sustainability plan which is framed around six core strands: climate change, people, safe operations, the environment, technological and ethical innovation, and transparency. As regards the environment, Repsol is committed to being part of the solution to climate change and to implementing efficient management of natural resources in such a way that only those which are indispensable to generating more efficient energy are used up, while having the smallest possible impact, thus ensuring that facilities are safe by means of appropriate risk management.

To minimise the impact of environmental vectors, Repsol uses the circular economy as the key lever. The circular economy is a new production model, whose purpose is to provide goods and services while at the same time reducing the consumption and wastage of resources and raw materials. The circular economy is part of a systematic change to supply chains and patterns of consumption that goes beyond waste prevention and reduction, benefitting

the economy as well as the environment. In this respect, Repsol has, within its sustainability plan, established different areas of circularity, such as redefining raw materials, using CO₂ to manufacture plastic products and using flows of external waste to feed refining processes, efficiency and innovation in processes, maximising the re-use of water, minimising dumping and enhancing energy efficiency, as well as attaching value to waste as a raw material, product or source of energy in projects such as reusing muddy substances from the sewage treatment plant in the petcoke unit or using potassium adipate as a fertiliser or developing more sustainable products such as wholly recyclable asphalt, among others.

Nevertheless, given that it is important to minimise the impact on environmental vectors so as to be compliant with the Paris Agreement, it is the environmental risks that stand to represent the biggest impact for the company in terms of long-term sustainability, due to the potential consequences in financial and reputational terms, which we will focus on from now on.

Environmental risk management cannot be understood in isolation and separately from safety risk management. Robust safety management minimises the likelihood and consequences of spills into the environment. To guarantee the safety of facilities, it is essential to manage process safety properly by implementing suitable design principles and good practices regarding engineering, maintenance and operation, so as to prevent the occurrence of incidents that can lead to the emission of hazardous substances. Process safety is based on four key pillars:

- The company's commitment to process safety. The company must ensure an appropriate culture of process safety, keeping up to standards, staff competence and the involvement of both management and all of the workers.
- Understanding hazards and risks. Companies that understand hazards and risks can allocate generally limited resources better and with optimal efficiency. This is why knowledge management in process safety is important to ensure that all hazards are identified and risks assessed.
- Risk management by running and maintaining processes satisfactorily, managing changes to processes in such a way as to ensure that the risk remains within tolerable margins, sustaining equipment integrity, ensuring the quality of materials, manufactured items and repairs, and making preparations to respond to any incidents that might happen.
- Learning from experience. Companies must learn from their own mistakes and those of others and convert them into opportunities for improving process security. To do this, they must have robust incident management and investigation systems, track key indicators and conduct audits within a system of continuous improvement.

As part of the risk management process, Repsol has established a set of measures called "safety barriers", which are designed to prevent a hazard materialising and provide protection or mitigate the consequences when the danger becomes a reality. These barriers can have physical safeguards (design, automatic emergency systems, active and passive protection mechanisms, etc.) or management safety measures (procedures, training, operational control, etc.). Although all the barriers are important in risk management, strictly from the standpoint of environmental risks those that are most helpful when it comes to preventing their materialisation are facility design, maintenance and inspections, in combination with risk monitoring as well as inventory isolation systems.

Among the aspects to consider during the facility design phase is the physical environment where equipment is going to be installed. Factors such as the permeability of the ground or the proximity to susceptible areas should be taken into account in the conceptual design so that the positioning of equipment and the choice of means of protection minimise environmental risks and the potential impact on the surroundings. Another key element is the selection of equipment and piping materials and ensuring that they are suitably resilient to corrosion. Crudes that are processed contain substances, such as sulphur or naphthenic acids, for example, which, in the pressure and temperature conditions in which facilities operate, are liable to cause corrosion. This is why proper design is vital to heading off the occurrence of spills.

Yet, on top of this, the weather conditions at the places where facilities are located, which are often close to marine environments or in rainy zones, together with the passing of time, work in favour of causing materials to deteriorate. It

is essential to have adequate maintenance and inspection schedules for equipment and piping which involve applying the most advanced inspection techniques on a suitably regular basis and make it possible both to know the state of facilities and to determine the useful life left, even for those that are hardest to access, such as underground piping or the bottoms of product storage tanks. Besides maintenance and inspection schedules, Repsol has early warning systems that monitor different process variables, including a network of piezometers at all the facilities that allow the early detection of spills and discharge before they cause an adverse effect in the environment.

If, in spite of all these measures, an unexpected spill should occur, it is essential to have inventory isolation systems that are properly designed and maintained to keep the amount of product that comes into contact with the environment to a minimum. Typical inventory isolation systems are the automatic remote isolation valves in process units and product storage areas; the quick disconnection systems on vessel loading and unloading arms which disconnect from the ship, thereby isolating the product and stopping it from reaching the environment when there is unexpected movement of the vessel due to swells or similar; the blow out preventers (BOPs) in boring wells and safety valves at production wells, which act by closing up when there is excess pressure to avoid any hydrocarbon substance from emerging onto the surface.



Figure 3. Fire extinction of the Deepwater Horizon drilling rig.
Source: US Coast Guard.

As part of the risk management process and within its commitment to ongoing improvement, Repsol carries out both in-house and external auditing processes. Key to external processes are the risk engineering visits by insurers. These visits represent one of the mechanisms that allow Repsol to keep in touch with industry best practices and implement improvements at facilities and in processes, thus reducing the risk of suffering an event with consequences for both safety and the environment, while at the same time they foster transparency and collaborative relations with insurers.

Additionally, in Spain, the government establishes various different controls relating to environmental risks via Integrated Environmental Authorisation (IEA, or AAI in Spanish). The IEA is an operating permit that is issued by the regional governments to industries or industrial establishments that pose a risk to the environment and in which a set of environmentally-related conditions are established in relation to pursuing activities or running facilities. The IEA determines the measures for avoiding or reducing the impact on environmental vectors and sets limits and controls which have to be adhered to. Associated with it is an environmental surveillance programme which includes continued monitoring of the focal points for emissions, controlling environmental impacts and notifying the government body of any anomalous incidents or situations that arise. Furthermore the competent authority conducts annual inspections to industrial plants to check on compliance with the limits and controls in the IEA and any serious failure to comply can lead to cessation of the activity until suitable measures have been implemented.

Despite the preventive and early warning mechanisms for spills and discharges, throughout history, numerous accidents have occurred in industry with serious consequences for the environment. This is why it is important to have adequate response plans in place when an emergency happens, something that is, moreover, a legal requirement in many countries. To cite just one example, in Spain the European Seveso III directive has been transposed by means of Royal Decree 840/2015 endorsing control measures for risks inherent to serious accidents involving hazardous substances. Besides this, Royal Decree 1196/2003 endorsing the basic civil protection guidelines on control and planning regarding the risk of serious accidents involving hazardous substances is also applied. These Royal Decrees oblige companies to have an in-house emergency plan for potential accident scenarios and have both human, and material and technical resources available to react to an emergency situation. In addition to this, local government establishes external emergency plans in conjunction with companies that are aimed at protecting the environment and nearby population centres.

Repsol has emergency plans that are structured over different organisational levels: locally, at the production plant, on a divisional level and across the entire company. In order to respond to an emergency the company has its own fire-extinguishing and spillage containment resources as well as personnel who are trained and regularly drilled via simulations. It also has mutual assistance agreements with companies that face similar risks that are established in the areas close to operational centres, as well as with companies that specialise in putting out major fires and containing large-scale marine spills.

After the risks have been discovered and identified, one of the most important tasks in any business organisation within the current social, geopolitical and financial environment is to manage them properly within acceptable parameters so that they help to provide a reasonable degree of security as regards achieving objectives.

Even though the management of more traditional risks, such as operating or regulatory risks, has been built into business management for several years now and has substantial specific gravity in corporate decision-making, there are other newer operating risks such as those affecting reputation or image, the adequate management, protection and identification of which has been greatly emphasized and progress made in this respect in recent years, given the major consequences and impact that they can have on the financial results of companies.

Although environmental risk management cannot be considered to be anything new in corporate risk management, it has been gaining in importance and relevance in recent times due, among other reasons, to more heightened social awareness about all the issues that affect the environment in which we live and the desire to preserve and not harm it in such a way that efficient management of natural resources can be

possible as well as minimising the environmental impact. All of this is allied to the growing concern about climate change and those activities that pose a risk of having an impact and being a cause of such change happening or accelerating.

As should be the case, Repsol shares this rising concern about proper management of and protection against environmental risks. Let us not forget that, given that it is one of the major companies in the oil and gas sector with a presence along the whole value chain, from exploration through to ultimate marketing, it is particularly aware as regards seeking to consume those resources that are essential to generating the most efficient energy with the least possible impact on the environment.

Reduction of CO₂e emissions (millions of tons)

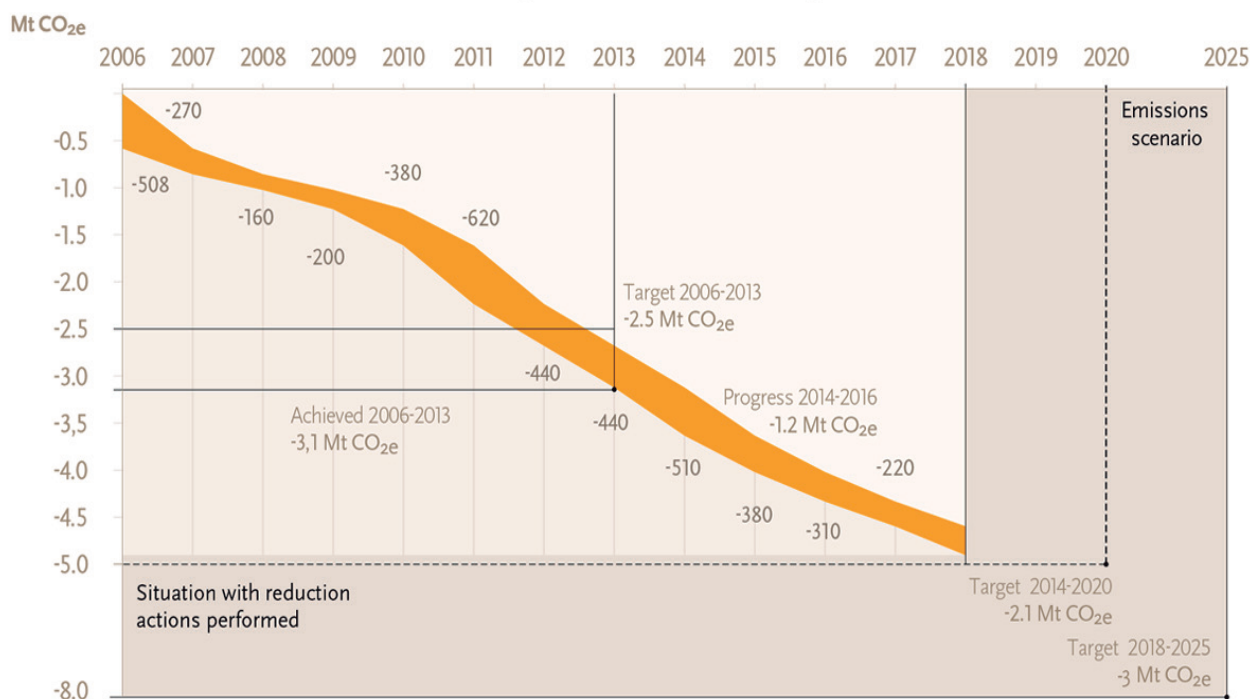


Figure 4. Reduction of CO₂ equivalent emissions at Repsol.
Source: Repsol.

Although, as we have seen, Repsol has numerous and significant safety measures and protection of all kinds to ensure that it goes about its activity safely, as with any business organisation that operates in the oil and gas sector, it cannot escape from the fact that, if any of these measures or protective efforts fails or simple human error appears, damage can occur in the course of its operations and activities that affects the environment.

For this reason, and as a way of mitigating the financial impact that events likely to cause damage of any kind can have on companies, including harm to the environment, Repsol has for some years now been working hard on managing risks to identify them and ascertain the risk that can reasonably be retained, and consequently the risk that it deems should be transferred to the insurance market. The aim of such management is, ultimately, to transfer to the insurance market the financial losses that these events cause when they materialize. To this end, and as a preliminary measure, on an in-house level, Repsol makes intensive efforts that are directed at identifying the environmental risks associated with its activities, as well as with the potential liability which each risk can give rise to, while trying to assess the potential financial impact in the best possible way.

Internal activity aimed at identifying risks and assessing their possible consequences is an in-house process that is constantly being revised so that we can work with the most reliable and up-to-date information, representing the cornerstone of appropriate and effective risk management. In the case of Repsol, given that it is a company operating in several countries, identifying and appraising risks by countries and divisions is essential to designing a global insurance programme as an efficient protection mechanism, which in turn allows major savings to be achieved for the company when taking out policies.

Once the environmental risks have been identified and their potential impact appraised, the next step in risk management is to define the risk policy that Repsol is prepared and wishes to take on. Defining this policy is highly important, since it determines what sums the company itself would bear in the event of a loss event.

In Repsol's case, risk retention is basically effected through its captive company. This is a subsidiary which insures a portion of Repsol's risks, enabling the aggregation of all the risk in the company's asset portfolio so as to make cover uniform and produce economies of scale and thereby achieve substantial enhancement of global risk management, as well as greater flexibility in the terms of cover that can be obtained from the insurance market.

Defining risk policy is a process that Repsol carries out on an annual basis (the activity carried out by the company can experience changes that might be significant when it comes to setting out such policy) and it reviews its risk policy to check on whether the risk retention it takes on via its captive company is still suitable. To perform this task and define its policy Repsol has actuarial reports that outside professionals draft annually and in which the range of risk is proposed that is to be retained by the captive company in line with expected loss. Risk retention through the captive company is a tool that helps Repsol obtain better cover conditions from the re-insurance market given that it reduces the risk transferred to the market.

Obviously, transferring risk to the market is also conditional upon the types of cover and capacity that are available in the market itself and by its situation. To provide an example, and to cite the main problems which Repsol has faced in transferring this risk with respect environmental liability insurance, we can point to the lack of coverage or very limited cover at a very high cost that the insurance market offers for offshore risks; the difficulty of obtaining reasonably priced cover for fracking activities and, generally, the very financial capacity offered by the insurance market, in the sense that it is sometimes impossible to buy higher compensation limits simply because there are no insurers that can provide that kind of capacity or else, if it is in fact available, it is offered by insurers at an exorbitant price. Similarly, in certain cases the response from the insurance market is not flexible enough to offer products or cover as required by law.

Moving on now to the mechanisms which Repsol has in its insurance programme for protecting against environmental risks, it should be noted that such protection is framed along separate lines, bearing in mind that environmental risk is nothing other than an event that can cause pollution to the soil, water or the air, implying that it can concern various different forms of cover.

Repsol achieves the first type of protection via the accident pollution and contamination guarantee in the general or business liability policy. This comes into play in those cases where the pollution is caused by a sudden, specific and identifiable event that has occurred during the policy term and which is obviously linked to or associated with the company's activity and production processes. The decisive element for this cover to be activated is therefore the accidental and sudden nature of the pollution event which is an attendant factor in many occurrences of this type. Thus, when a pollution event of this kind happens it will be this cover which firstly becomes effective and addresses, if not all, then most, of the harmful consequences which might have been triggered, including claims by third parties and legal defence costs should these arise.

To supplement the cover of environmental risks under the general liability policy, Repsol has also taken out an environmental insurance policy for explicit coverage of risks of this nature. Besides covering pollution events caused by Repsol's activity and production processes that are sudden and accidental, this policy also covers pollution events

that are both attributable to the company's activity and arise gradually. For this reason, and given that in certain cases both policies could come into effect, Repsol's environmental liability insurance has been taken out subject to conditions and limits that are different from those in the general liability policy, which is intended to optimise types of cover and costs.

Even though, as we have already said, both policies cover pollution events, they have clearly differentiated content as regards the benefits each of them offers. Thus, among other things, the environmental liability policy covers costs of prevention in relation to an immediate threat of environmental damage, as well as those on avoiding consequences when the environmental damage has already materialised. Even though some of these costs might also be covered under the accidental contamination or pollution policy, such as in those situations where a cost is incurred to avoid a claim from a third party, the cover offered by environmental liability insurance in such circumstances is more specific, given that it will also cover the cost of taking steps to remedy damage of a strictly environmental nature, such as restoring the flora and fauna affected by an event of this type.

One of the main new aspects of environmental insurance is the cover provided (though this is still limited) for managing the potential catastrophes caused by an event of this kind. This is a clear evidence of the close relationship that exists today between risk management and the perception that society has of the company.

With respect to environmental cover, in complying with the provisions of Environmental liability law 26/2007 of 23 October, Repsol has recently taken out an insurance policy as a financial guarantee to cover the environmental liability that is inherent to the activity it engages in as an operator.

As a third means of protecting against environmental risks, we are covered by exploration and production insurance and property damage insurance under the "extra operator costs" guarantee. This guarantee covers clean-up costs and containment expenses for an event that is associated with or caused by exploration and production activities or, in the case of the damage insurance, when this is attributable to a risk that causes property damage to Repsol's assets.

Thus cover for these expenses only becomes effective in those cases where a risk materialises that is covered by these insurance policies. To give an example, in the case of the exploration and production policy, if a well is out of control and causes product to leak out onto the ground, the cover will pay for clean-up costs for the pollution that has been brought about provided that it is an accidental and unexpected event. As is the case of Repsol's general liability insurance, the environmental liability policy has been taken out with conditions and limits that differ from the exploration and production and property damage insurance so as to optimise cover and costs.

Although the aim of Repsol's risk policy is to obtain the most cover available in the market to shield itself from catastrophic loss events, and it has substantially and progressively increased the limits and conditions in cover, the fact is that there is not sufficient capacity to reach the figures involved in major environmental incidents. Therefore, once again, this fact highlights the fundamental importance of the prevention and mitigation initiatives that have been described previously.

By way of a corollary, we point out that energy is the resource that is needed to develop the economy and the driver of the enhancement of the public's living conditions. The availability of energy must be compatible with the principles of efficiency, commitment to the environment, sustainability and accessibility/affordability. Evidently risk management at energy companies is a core priority and a necessary condition to contributing to such development. In fact, Repsol's ideal is to be a global energy company which creates value in a sustainable way to help society progress on the basis of innovation.

Heightening awareness is the responsibility of everybody, but companies have the obligation to incentivise and promote preventive management that minimises the fallout from any unfortunate event that might compromise people and settings in which we coexist. At Repsol, we try to set an example. Thus all the management committees open with reporting on safety and the environment as a clear premise for pursuing our activities.

Identifying, making uniform, aggregating and measurably consolidating risks is an essential factor to managing them properly. Within the company's risk map, there is no appetite whatsoever for this kind of risk and a multi-disciplinary assessment is made of the potential scenarios for the sake of preventive management of them.

Repsol has spent over thirty years providing the insurance market with risk engineering inspections and stands at the forefront in extending and applying industry recommendations to all of the company's assets.

Within our general strategy and for the purposes of mitigating the consequences of risks materialising, Repsol has been orienting its insurance policy towards increasing limits and coverage and identifying and updating new risks, as well as recognising the existing determinants, as with other forms of civil liability, that limit risk transfer to the insurance market, while at the same time stimulating the generation of opportunities for all of us who are stakeholders in the insurance value chain.