



[Reports](#)

[Statistical Review of World Energy 2003](#)

[Frontiers](#)

[Features and news](#)

[Speeches](#)

Climate change

Speaker: Lord Browne

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Venue: Institutional Investors Group, Gibson Hall, Bishopsgate, London

Title: Group Chief Executive, BP p.l.c.

Ladies and gentlemen, it's a great pleasure to be here and to have the chance to discuss the impact of concerns about the level of carbon in the atmosphere on businesses such as BP.

I'd like to thank the IIGCC and the Carbon Trust for giving us the opportunity to share some of our thinking.

The actual or perceived consequences of human activity on the global climate - what is generally called climate change - matter to BP because we're interested in the long term sustainability of what we do. We want to be able to continue to sustain our core activity - applying our skills and experience to produce and develop hydrocarbons.

The interest in sustainability is driven by our shareholders who are predominantly pension funds. They look for sustainability in their investments - companies capable of regenerating their activity and their ability to produce revenue and wealth on a long term basis.

Today's subject covers just one aspect of sustainability, but it is one of fundamental importance.

The detailed understanding of the causes and consequences of climate change is still provisional, of course. Modelling and analysis of the evidence continues but there is already a sufficient body of analysis to suggest that precautions need to be taken.

As a business we need to be able to respond to the concern now, even if significant uncertainty exists. We have to take the appropriate steps in order to ensure that our business remains sustainable.

That's our starting point.

It is now six years since we first acknowledged that precautionary action was necessary.

Over those six years the work we and many other companies have done has given us confidence that business does have a positive role to play in the process. And it has given us the confidence that the future of oil and gas is secure and sustainable.

We've shown that it is possible to reduce emissions of methane and CO₂ from our own operations - by eliminating waste and leaks and by applying

technology, for instance to eliminate the venting of methane.

We've found that an emissions trading system, which ensures that resources are applied in the right places, is the best way to keep costs down, and we've demonstrated that, far from being a cost burden, reducing emissions by eliminating waste can add value.

To focus our efforts, we set a target to reduce our own emissions to 10% below 1990 levels by 2010 in line with the spirit of the Kyoto Protocol.

We were able to meet that target by the end of 2001, 9 years ahead of plan, for three simple reasons.

Firstly, the aspiration resonated with the expectations of our staff. Doing something positive for the global environment generated enormous enthusiasm and creativity.

Secondly, through a combination of emission caps and allowance trading, reducing emissions became embedded within the business - the responsibility of everybody.

Thirdly, we found that efficiency and emission reduction was good business. So while some remained locked in a debate about predicting the cost of reductions, our staff were pursuing activities that added value. In fact within the first three years we added \$650M of value, for an investment of around \$20M.

So we've begun to build a track record of delivery.

Last year we updated our position, building on what had been achieved.

Scientific understanding, modelling and data collection had all progressed. The consensus of that work was that there is a need to stabilise atmospheric concentrations of green house gases before they begin to have a serious impact on the climate.

We therefore set ourselves a new internal performance target - to hold our net emissions, adjusted for portfolio changes, flat at the 2001 level.

We've set that target despite the fact that our oil and gas production is growing more rapidly than global demand.

We aim to meet that target through a combination of continued improvements in operational performance and through recognition of the reduction we are making in the emissions from the products we sell. That work continues and is producing good results.

Setting any target, of course, raises the question of the appropriate level at which to stabilise atmospheric concentrations of carbon. There is no definitive answer. Different modelling studies produce different answers.

Business always has to work in conditions of uncertainty - you can only plan on the basis of judgment and prudence.

In this case, based on our understanding of the range of the uncertainty around the scientific views, we've come to the judgment that to avoid serious impact upon societies or the environment it is necessary to stabilise atmospheric concentrations of greenhouse gases at around 500-550 parts per million. Today's level is around 370 ppm and has risen from pre-industrial levels of 280 ppm.

That range of 500-550 parts per million could shift as the scientific understanding improves, but it establishes a present day objective to which action can be directed.

Stabilisation in the range of 500-550 ppm could be achieved by balancing the growth in energy consumption driven by the world's growing population and rising living standards with moves to reduce the amount of carbon emitted.

Such a shift to a significantly lower carbon economy would require the removal by 2050 of a significant volume of carbon emissions.

Can that be achieved?

In principle the answer is yes.

There is no single solution - no magic bullet. But on the basis of practical steps, using technology which is either available now and which may be within reach, stabilisation on that timescale does seem to be an attainable goal.

Some very interesting work done at Princeton University has described what could be done in terms of a set of 'stabilisation wedges' summing up to 6 Giga Tonnes per annum of avoided emissions of carbon by 2050.

There are a series of technology options each of which could account for a 1GT wedge of that total. For example:

1. 1400 1GW generating plants, using natural gas rather than coal.
2. 700 1GW coal plants with carbon capture and storage.
3. 2 billion gasoline or diesel cars running at 60 mpg instead of 30 mpg.
4. A 70 fold increase in the current total wind energy capacity.
5. 1000 fold increase in photovoltaic capacity.
6. 700 1 GW nuclear plants, which represents a 4% per annum increase in nuclear capacity.

Of course, there are many uncertainties. The decisions which require changes in lifestyle may not always be acceptable. The technology of carbon sequestration or hydrogen distribution may be unattainable.

The development of a new generation of nuclear stations may raise unacceptable risks of proliferation and terrorism as well as raising again the question of nuclear waste disposal.

Developing countries don't have to pursue the same path of development which the industrialized world has been through. They could be incentivised to leapfrog to a completely new generation of technology.

The items I listed are simply options. Society could choose to do more or less of each one. And human ingenuity could add more options to the list over the next 50 years.

What is clear is that there is no one single solution not least because the problem has no single source.

The challenge affects all sectors. The source of greenhouse gases isn't just transportation which accounts for just 20% of the total. Industry contributes another 20%; the domestic and commercial sector around 25% and power generation another 35%. They all have to be tackled.

Many of the steps I've described require major investments.

If such steps are to be taken it is important to demonstrate the real value of taking a long term approach which transcends the gap in time between the costs of the investment and the delivery of the benefits. Political decisions are often taken on a very short term basis and the challenge is to demonstrate the benefits of the actions which need to be taken for the long term.

Taken as a whole, though, the point is that stabilisation in the range 500-550 ppm is possible, and with care could be achieved without disrupting economic growth.

The role of business is to transform the possibilities into reality. And that means being severely practical - undertaking very focused research and then experimenting with the different possibilities. The advantage of the fact that the energy business is now global is that international companies can both access knowledge around the world and can then apply it very quickly throughout their operations.

What does all this mean for us? What are the implications for a major oil and gas company - and what can we do to seize the business opportunities involved?

First, it demonstrates that oil and gas have sustainable futures.

Oil is a very effective transport fuel and recent technical innovations provide the opportunity to reduce the negative environmental impacts which might otherwise be involved. In Europe for instance, in the decade ending in 2005, oxides of nitrogen and sulphur, particulates and hydrocarbons emissions will all have been halved, with further significant reductions still to come.

Technical advance continues. Diesellisation, direct gasoline injection and hybridization all offer real potential for the improvement of the internal combustion engine.

So we continue to believe that oil has a very strong future as the principal source of energy for transportation.

In power generation, unless there are economic breakthroughs in clean coal technology, there will be a need to bring about a shift in favour of Natural Gas.

Gas is already widely accepted as the preferred clean fuel to meet the increasing demands for power. Total gas consumption could grow three fold by 2050.

We continue to develop our gas business globally and we see great potential to use gas to reduce emissions. Just to quote one example. Bringing additional natural gas to Northern China from the Kovytko field in East Siberia could reduce the growth in emissions by at least 60 mt of CO₂ each year and possibly by as much as 120 mt a year if coal fired plants are taken out of service.

Looking further ahead, the key to stabilisation will be the availability of competitive energy technologies.

To start with Hydrogen. Hydrogen is not a source of primary energy, but simply a clean energy carrier, which depends for its creation on some other form of primary energy. The Hydrogen Economy would need to be fueled by something else.

There are vast quantities of hydrogen in the world, but the very chemical reactivity that makes it so valuable as an energy carrier means that it has already naturally combined with other elements, such as oxygen in water, and carbon in natural gas.

To make hydrogen useful as an energy carrier we have to separate it from these basic elements, through electrolysis of water into hydrogen and oxygen, or through the reforming of natural gas.

Hydrogen could be made from renewable energy, but this looks likely to remain an expensive option for some time to come and our view is that reformation from Natural Gas represents the most viable short term source.

We already produce large quantities of hydrogen in our refining and petrochemical operations. The Grangemouth refinery, for instance, produces enough hydrogen to fuel 500,000 fuel cell vehicles and hydrogen is already an important tool in producing cleaner fuels.

Hydrogen is available and the key is to have hydrogen powered vehicles which are competitive in cost terms with conventional internal combustion engines. Of course, many issues still need to be resolved.

Is it, for instance, more effective to produce the hydrogen locally, or would it be more cost effective to have central production which would also create the potential to capture and store any CO₂?

That leads me to the next area, which is the possibility of capturing carbon from many sources, including power plants and storing it underground.

BP leads the joint industry Carbon Capture and Storage Project (CCP) that has attracted significant government support in both the US and Europe.

This involves work on the capture of carbon dioxide - pre and post combustion - and on its storage in ways which have demonstrable long term geological integrity.

The CCP project explores how we might radically reduce the costs of capturing and storing carbon in both new and existing facilities.

In addition to that project, we're working with Ford through the Carbon Mitigation Initiative at Princeton which links fundamental research into climate science and technology with the practical approach of 'learning by doing'.

And on that same practical basis, we're also preparing to develop one of the world's largest CO₂ storage projects at our Algerian In Salah gas field, in partnership with the state company Sonatrach. That facility will store 1.1 mt of CO₂ each year.

And then on the other side of the equation we've begun to look at demand and the opportunities created by structural or behavior changes in the way energy is consumed.

Buildings, for instance, account for at least a third of the emissions from the use of energy in the developed world.

We have a number of research projects underway on the efficiency of energy use including the possibility of creating zero emission buildings and the potential for greater use of passive renewables in building design - using the

natural flow of energy to heat and cool buildings.

Potentially that could provide a seventh strand - another contribution to the overall objective of stabilisation.

Given the long term nature of the challenge and the range of possibilities which are at different stages of research, development and application, it is clear that the creation of a market in emissions' reductions can play an very important role in ensuring that available resources are applied where they have the greatest impact.

Our experience is that the most effective trading systems have to be clear, responsive to learning and capable of delivering signals through both penalties and incentives.

I don't think we're likely to see the sudden emergence of a single global trading system - that would be comparable to the emergence of a single global currency - but I do think there would be value in the development of the existing European emissions trading scheme as a "strong" currency - with its strength reflecting the rigour with which it is applied.

A strong currency of that sort would enable all the many different fragmented activities and efforts to reduce emissions which are underway across the globe to be valued on a common basis.

Again, in that area we are working with the academic community to understand just what a really effective currency for emissions' reductions would look like.

To summarise then, there is a good case for cautious optimism.

Globally emissions continue to increase and on the base of the scientific evidence so far available there is a cause for concern and for precautionary action.

But the track record of experience - in BP and in many other companies - is that much can be done. If we can agree on the overall long term objective - the need to reduce emissions - we can begin to take the steps necessary - applying existing knowledge and technology and focusing research into areas where practical advances would make a real difference.

Our aspiration is to turn a threat and a risk into an opportunity. We believe the opportunity exists both to grow the long term future of our existing business - by supplying oil and gas and related products in a sustainable manner ... and to develop the business in ways which match the changing needs of our customers and our investors.

The world's need for energy continues to grow and we believe that oil and increasingly natural gas will remain the most significant sources of that energy for many decades to come.

Over time other sources such as solar power and hydrogen will become more important, and we are devoting appropriate resources to long term research and development in those areas and to the issue of carbon capture. In the last three years alone we have invested over \$125 million in that research work.

Ladies and Gentlemen, I know this is a subject of enormous interest and it is difficult to cover all the issues satisfactorily in such a short time.

I'd be delighted to take questions now and our team in Investor Relations and the staff working on these issues within BP would be very happy to talk to you and to explain our approach in more detail.

Thank you very much.

[▲ back to top](#)