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*'Agents of Change: Preparing for a
world where carbon has a price'*

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Agents of change

Thank you for the opportunity to speak today – I hope that I don't cause indigestion as you digest your lunch.

The theme today is "agents of change" and there has been debate this morning about how LNG is changing the market dynamics and the impact of regulation.

I think there is another change required. One where we as gas companies have an important role to play. I am talking about the necessary shift to the low-carbon, high technology, industry of the future.

Price of Carbon Today

In order to move towards this new future, we believe it is important that carbon is priced.

The balance of scientific evidence suggests that emitting carbon impacts the environment, and as economists would say "externalities should be priced".

Of course in some markets carbon already has a price – at close of business last night the EU Emissions Trading System (ETS) priced a tonne of carbon at 15 euros – and at 20 euros for 2008.

The ETS is a cap and trade system, and it has been a great achievement getting it set up and working. It is the largest cap and trade system in the world, it works across borders and it sets the pattern for a wider, long term agreement.

But it is not fully mature as the traders who work for me found out recently.... There were sharp movements in price as data about actual emissions was published – this tells me that we need better definitions and reporting, but it doesn't mean that the concept is wrong.

What we need now is more certainty on allocation to provide incentives for projects to reduce CO2 and certainly over a longer time period.

Before looking forward to the prospect of a global price of carbon I would like to quickly review the science.

Temperature Rise

This graph is familiar – it is the IPCC’s projections of a temperature rise of between 1.4 and 5.8 degrees centigrade this century. Although some dispute this, the consensus on the impact of human emissions is growing and consolidating.

Just to give you one piece of evidence for that statement – a review of 928 scholarly articles by the University of California recently found that not one disagreed with the consensus view – it would appear that there is a lot written to the contrary in the popular press but not in the academic literature.

Actual and projected emissions

There is also wide agreement that the extent of the temperature rise will be determined by the levels of greenhouse gases in the atmosphere which in turn are driven by the levels of emissions.

With the current rise in demand for energy, emissions will double by 2050. If you then look at what creates those emissions - 40% comes from producing power, whereas 20% comes from transport.

It is important for policy makers and the public to realise this piece of data – power is a bigger emitter than transport, and it is probably easier to do something about the associated emissions.

So – what can be done to avoid the higher emissions and the rises in temperature?

A growing number of experts and governments have concluded that we should stabilise the concentrations of CO₂ in the atmosphere in the range of 500 – 550 ppm over the next century – that should ensure that temperatures do not rise by more than 2 degrees C above the pre-industrial temperatures in the long run.

Stabilisation Trajectory

What then is the path towards stabilisation? We have supported research at Princeton University which has calculated the gap between the 'business as usual' case and the stabilisation trajectory – the triangle shown on this slide here.

Over 50 years the triangle adds up to 7 billion tonnes of carbon which have to be taken out of the equation.

Wedges

Sounds like a tall order doesn't it?

The magnitude of the problem leads some to "give up", but the work at Princeton broke the problem down into the different ways that you might save 1 billion tonnes by 2050, starting small and building up – each option is called a wedge.

Many potential wedges

The wedges cover a wide range of different ways to reduce carbon – to take a couple of examples:

- Applying known energy efficiency measures to all new buildings
- Running 2 billion cars at 60mpg instead of 30mpg
- Substituting natural gas for coal in 1400 gigawatts (GW) worth of power stations (I'll come back to that one!)
- Generate hydrogen power with carbon capture by building plants that produce 500 million tonnes of hydrogen from gas – using the hydrogen to produce carbon-free electricity while storing the CO₂ underground.

These options are available today – and there are more – so solving the problem does not require completely new technologies such as fusion or mirrors in space!

Of course the answer won't be to select each of these seven wedges and make them each account for exactly a billion tonnes of carbon by 2050.

These are indicative options – but they provide a ballpark idea of what is required.

Lessons from Princeton

So what does that set of calculations tell us?

What I take from this is that the problem can be solved and to do so requires different approaches and solutions – it is not a question of “either-or”. The technologies exist today and so do the mechanisms to make a difference.

And in terms of cost, the IPCC calculates that moving to a trajectory to stabilise emissions at 550ppm might only involve a reduction in global GDP of less than 0.5% in 2050. This is based on a scenario in which there is high economic growth, international co-operation, and market-oriented policies that encourage the least-cost technology options.

The other thing that is clear is that gas is part of the answer. And not just any part. It is the wedge which is already available at scale in the world today.

Gas is not just a building block of the low carbon future but arguably its cornerstone.

Renewables will not displace all fossil fuels by 2050. And of all the wedges, gas to power is the largest and most competitive today.

So we can defeat global warming and still have gas-fired power plants in 2100.

And in the short to medium term gas can achieve much more to move the world towards a low-carbon future than any measure taken in transport.

It is also clear that coal is a potential part of the answer – we can't presume that a low carbon future is a non-coal future – doubling the efficiency and quantity of coal power plants also saves a billion tonnes of carbon.

Towards a low-carbon future?

So we can see the shape of a low-carbon future. But how do we reach it?

Currently we have a situation in which everyone's doing something but no-one's doing enough.

Governments are taking measures to stimulate low-carbon technologies but are wary of damaging their national competitiveness.

Businesses are using eco-efficiency to cut costs and emissions – and also creating new low-carbon products and assets. But often they are waiting for government to take a lead.

Consumers – at least in the developed world - are becoming more informed about the climate and making green choices – hybrid cars, solar panels, micro-turbines. But this is not enough to move the dial by itself, especially given the rapid growth of consumption in the developing world.

Among **Investors**, there is an increasing focus on long-term environmental issues – and not just among specialist green or ethical investors. Goldman Sachs has said that – quote - “The companies that have potential for creating significant value are those that have the most strategic options available to embrace a low-carbon world.”

But again, there is a long way to go.

Making the first move

So, who makes the first move then?

As gas operators do we wait for policy-makers to provide new incentives – for example through a new and tougher Kyoto-style treaty?

Do we just follow the consumers? Or do we wait for investors to demand that we shift towards gas as part of preparing for a low-carbon economy?

The vital thing – for governments or companies – is to have the courage to make the first move. Because first moves are important – small actions can lead to major changes.

EC directive

Let me remind you of an example of such a chain reaction in the gas sector – this example takes us back 30 years.

After the oil price shocks of the early 70s, gas was deemed far too valuable to be used for power generation and a 1975 EC directive curtailed its use in the power sector.

But then in the late 1980s, it had become apparent that there was a plentiful supply of gas and that gas fired power generation offered environmental advantages over coal and nuclear.

So the directive was revised to allow gas to be used for power generation. That was a small step but it had dramatic consequences for gas.

This coincided with the drive to create a single market in energy for the EU. And this created the circumstances in which new power generating companies were able to build the cleanest, lowest cost, quickest completion power plants in the industry.

Several countries took full advantage of this trend. In the UK, it virtually doubled gas demand – displacing oil and coal. Gas soared from 2% to around 35% of the power generation sector – a sector once 80% dependent on coal.

It was good for the industry – the UK was the first market to deploy a gas fired power station with an operating efficiency of 60% - GE's H class turbine at BP's Baglan Bay Energy Park project.

Rising demand for gas-for-power drove the development of new projects in the North Sea, and changed the structure of the market in the UK.

It was good for consumers.

And it was good for the environment. It enabled the UK to meet its international environmental commitments under the 1992 Rio Convention.

The story was similar in Spain, gas-fired capacity grew by 30% per annum between 1990 and 2000.

Almost 10 GW of new capacity was installed underpinning the remarkable growth in the national economy and creating a demand pull for gas which has brought on new gas developments and supplies from a range of countries including Algeria, Egypt, Nigeria, Trinidad and the Middle East.

Taking the initiative

In some cases, companies take the initiative.

Right now in the drive for low carbon technologies, many companies are developing technologies and products that constitute first steps. There are hundreds of examples – but to take a few:

- GE's Eco-magination initiative includes wind and solar equipment and technologies that increase energy efficiency;
- DuPont has created a range of energy-efficient building materials;
- Toyota, Ford and others are developing hybrid cars;
- And I'm sure many companies represented here today have invested to minimise the environmental footprint of their activities;
- And in BP we have formed Alternative Energy, planning to invest \$8bn over 10 years in lower carbon power.

All of these are voluntary industry initiatives. They can be progressively encouraged by governments.

If that happens they will be progressively more attractive to investors and customers, and the momentum will be kept up.

A world where carbon has a price – say \$30

So looking at the climate change issue again, and thinking about the role of gas today, what would be an outcome that we might wish to see?

Let's imagine for a moment that we are already in the future where carbon has a cost attached to it – and in this chart, for argument's sake, we've made calculations at \$30 a tonne.

This chart shows what we estimate the relative costs of different forms of energy might then be and how they would have changed from today's – relatively unconstrained - world.

The impact on the competitive landscape for power generation in this scenario is dramatic.

You can see that the cost of CCGT goes up - but not by as much as coal. As a result, it becomes much more competitive with coal.

And wind and new technologies such as hydrogen power with carbon capture now feature strongly.

The emissions savings per unit aren't the same as for wind, solar or hydrogen. BUT – as I said - gas can provide emission reductions at massive scale and at low cost.

So the gas industry targeting power should have nothing to fear from a carbon price if that price is set within a robust system that does not create undue volatility.

Towards a world where carbon has a price?

Governments clearly have a role to play and I could debate the merits of different policy choices, but I want to concentrate on the areas within the control of gas industry leaders.

What can **we** do to help inspire policy-makers to create the low-carbon market that will benefit gas?

First, we can **invest** to create the capacity and infrastructure that policy helps to utilize – the pipelines that policy can help to fill, the LNG terminals that policy can approve, the gas-fired power stations that policy can promote as a lower carbon alternative to conventional coal and a lower risk alternative to nuclear.

It is up to us in this industry to demonstrate that gas is unique among the options for low-carbon energy in having a relatively low cost and being available at very large scale in the short to medium term.

And it is up to us to help create a marketplace that works, to show that gas can be a source of secure, low-carbon energy for decades to come.

Secondly, we can **innovate** to create new gas-oriented assets that provide an economically and environmentally attractive alternative.

In BP this includes not only CCGT plants but our plans for a gas-fed hydrogen power plant with carbon capture and storage – set to be Europe’s first.

This is a significant stepping stone to more widespread creation of hydrogen power from fossil fuel sources. But it does require a supportive policy framework.

Finally, we can **advocate** moving towards a new lower-carbon energy industry. We can speak out to say very clearly that industry does not want to be the problem, but the solution.

And that message should also go out to our consumers. We need to inform consumers about the potential for gas to reduce carbon emissions.

We need to make common cause with them, encouraging them to demand that governments encourage gas as well as nuclear and renewables.

There are many pressures for change today.

The media provides new evidence every day of the need for action. Popular pressure for change is growing. Energy security offers an additional spur to create alternatives. High oil prices provide another.

With so many forces leading towards a tipping point, the strong and united voice of the business community could prove decisive – making common cause with our customers, following the logic of the science and providing the much-needed stimulus for action.

Agents of change

So what are the conclusions?

First gas is part of the low-carbon future. We shouldn’t be afraid of carbon pricing as long as it is technology-neutral

Second, as an industry, we need to raise awareness of gas's low-carbon credentials as well as the importance of power compared with transport in reducing emissions.

Third we must speak out. The message must be clear. We want to move forward. We want to invest with confidence in new low carbon technologies. We can't do that if regulation continues to favour high carbon technologies or only a limited selection of lower carbon ones.

This generation of business leaders needs to bring about the greening of the energy industry.

We look to policy-makers for support.

And as the energy industry changes, we look to natural gas to be the natural leader.

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