Energy pathways - Setting a course to a sustainable energy future

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Thank you very much for inviting me to contribute to the World Oil and Gas Assembly today. It's a pleasure to be in Bangalore and to be back in India.

BP is very active here. We have some 2000 people in India working in businesses that range from exploring for hydrocarbons to lubricating cars and motorbikes, from solar power to software development. So it's great to be here and thank you for your welcome.

I think today's theme is spot on. "New realities and new challenges". That is certainly what we currently face in the energy industry. And there's not a better place to discuss them than in a country whose industry is growing so rapidly.

As well as growth and high technology, India also values tradition and experience. And I hope you agree that we will not overcome the new challenges we face by throwing overboard everything we have learned in the last 100 years.

This conference raises the question of whether the industry needs a "complete makeover" - or whether the current storms will pass and no change is required.

I believe the right approach lies between those two extremes. We cannot continue with 'business-as-usual' - but sudden and dramatic change at a time of rising demand are likely to put energy supplies at risk.

Our industry needs evolution rather than revolution. And if we're going to make that evolution happen in a sustainable, manageable way, we need to apply some basic business principles to the new challenges. I would pick out three as being particularly important.

First, we need to be as clear as possible about our objective – the destination. What do we expect the future energy landscape to look like? What will its main components be?

Second, we need to have a clear regulatory framework which enables business to invest with confidence to build such a future.

And third, we need to set out pathways towards the destination. At BP we think this approach is particularly important, especially when there is a continuing debate over targets and the regulatory framework.

The overall direction of travel is fairly clear and we can make progress if we identify the most important types of energy that are going to be needed, in different regions and sectors, in the short, medium and long term.

The approach of 'energy pathways' is also useful because it allows us to analyse the comparative benefits of different types of energy in different contexts and highlight the most efficient options.

1. Objectives

But before looking further at energy pathways, I want to look briefly at objectives and the regulatory framework.

In my view, we are looking to build a future energy industry which achieves four things:

First, and fundamentally, it has to meet the world's growing demand for energy.

Second, it has to meet that demand in a way that is environmentally sustainable;

Third, it has to provide security of supply, especially important in a world where there is a mismatch between where energy is consumed and where it is produced.

Fourth, it needs to provide energy that is affordable.

So the four goals are availability, sustainability, security and affordability.

According to BP's projections, we'll need up to 45% more energy in 2030 than we consume today. And we mustn't underestimate what it will take to achieve that. We'll need investment of more than $1 trillion a year for the next 20 years.

Does the recession alter those projections? I don't think so. The big picture is that the world is experiencing a dramatic growth in its economy as emerging economies like India industrialise. Energy demand rose by 5.6% here last year. And we have to see the recent downturn in that long-term context. Unless something really unexpected happens, the upward trend is set to continue.

And what about the types of energy that will be used in 2030? Certainly there will need to be changes in the energy mix. We need more low-carbon energy. And we need to use energy more efficiently. But what I take from our analysis at BP and the work of experts like the International Energy Agency, there are no silver bullets and we will need a wide range of energy types in 20 years time.

The share of renewable energy will certainly increase, but we have to be realistic about its contribution. As of today, all of the world's wind, solar, wave, tide and geothermal energy accounts for only around 1% of total consumption.

And that's even with the already impressive output of renewable energy facilities such as the JV solar plant that we operate with the Tata Group here in Bangalore. Every day that plant produces enough panels to light 10,000 Indian homes.

However, given the scale of demand and the practical challenges of scaling up renewable technologies, it is hard to see them accounting for much more than 5% of consumption in 2030.

Undoubtedly nuclear energy and biofuels will also have a role, and by 2030 we expect that carbon capture technology could be deployed at scale.

But there will still be a major role for hydrocarbons. If you look closely at the IEA's World Energy Outlook published last month, even in the scenario for major carbon emissions reduction over the next 20 years, they still foresee – and I quote - that "fossil fuels remain the dominant energy sources in 2030".

So in other words, we can have a sustainable energy future and significant volumes of fossil fuels. That's important. It's also reassuring because it would be impossible to fulfil the demand without hydrocarbons.

The good news is that the hydrocarbons are there to fulfill that role. We have enough

reserves to last for decades and reserve estimates are rising as we develop ways of unlocking both conventional and unconventional resources.

Finding oil and gas is getting more challenging. That's true - but it's not new. It's been getting more challenging ever since I've been in the business. However, experience shows that we can develop the technologies and the capabilities we need.

A good example is BP's recent discovery of the giant Tiber oil field in ultra-deep water in the Gulf of Mexico. This well was drilled to a depth of 9.5 km below the seabed – the world's deepest ever oil and gas well and a great example of how we continually challenge new frontiers in this industry - and how technology is continually opening up new potential.

The deepwater is a growing part of our business and I'm pleased that we're working with Reliance in exploring in the deepwater offshore India.

So although we can't know the precise shape of the industry two decades out, we can see that it will be a mix, using all the sources of energy that are available and competitive. Within the mix, there will also be a bias to forms of energy that provide energy security. That can either mean countries tapping more sources of domestic energy or building strong and reliable trans-national supply chains.

2. The right regulatory framework

Building such a future demands action both from businesses and policy-makers. We can provide the building blocks and tools - but we need to work within the architecture provided by governments. I can see two ways in which the current architecture can be strengthened.

First, with continuing pressure on supply, it's important to develop energy resources as efficiently as possible - I believe that means opening resources and markets up to greater competition. This naturally includes providing opportunities for international oil companies to offer expertise where relevant.

I am not saying that international oil companies have a monopoly on leading edge technology. They don't. Some local and national oil companies have built great capabilities - such as Reliance's and ONGC - and I also know from our experience that we have been able to add a lot of value through our technology and know how.

For example in Azerbaijan, where we have deployed leading edge real-time reservoir management techniques, or Russia where our business TNK-BP has doubled production in five years, or Iraq where we recently concluded an agreement with an aim to triple the production of the giant Rumaila field.

However it remains the case that access to a lot of the world's best resources is restricted. Today almost 80% of the world's oil resources are off limits to the technology and expertise that international oil companies can provide. I think that needs to change and I welcome moves like the transparent and open bidding process that India has used recently.

Competition has a transforming impact on any sector. Just look at Bangalore's IT industry. It is a great illustration of what can be achieved with the right environment. In BP, we have recently simplified our IT application development approach and now have just five strategic vendors globally – three of them are Indian companies and the other two are global companies that also operate from India.

In terms of the regulatory framework for energy, the other priority is of course climate change and the effort to limit greenhouse gas emissions.

We're meeting on the eve of the Copenhagen climate conference where, I am optimistic, a clearer framework will begin to emerge.

The big missing link at present is a global carbon price –one that applies equally to all carbon, whether from a smokestack or a tailpipe. Carbon pricing will make energy conservation more attractive and alternative energy more cost competitive. It will allow informed investment in fossil fuels and will encourage investment in the technology necessary to reduce the carbon they produce. Europe now has an emissions trading system. Plans for a US cap-and-trade system are before Congress. Australia also has a system under development. We now need moves at the global level to strengthen, extend, and ultimately link these systems.

Carbon pricing is the centrepiece of the framework, but it will need to be supplemented both by financial incentives and by regulation. These are needed to provide the extra impetus required to develop low-carbon technologies and encourage greater energy efficiency.

3. Pathways to the future

There is work to do in order to create a policy framework that provides more competitive access to resources and a clearer platform for a lower-carbon economy.

But even today, we can see the direction of travel. We know that the world is moving towards a future in which energy has to be more secure and more sustainable. At the same time, practicalities mean that certain types of energy are limited – as renewables are today – and others are plentiful – such as fossil fuels.

By mapping our objectives against what is realistically possible, we can see how different factors become important at different stages of the pathways.

In all circumstances and at all times, energy efficiency is both possible and sensible. The prize here is huge. For example, by far the most effective pathway to a lower-carbon transport industry is through making car engines more efficient. Better engine technology, combined with the increasing use of hybrids, offers potential efficiency gains of as much as 50% by 2030.

In the shorter term, advanced lubricants can also make a significant difference and that’s why I am pleased that BP’s Castrol business is the market leader in retail automotive lubricants here in India where car use is growing so rapidly.

Similar benefits can be achieved through better standards in building construction and electrical appliances. The McKinsey Global Institute suggests that energy use could be cut by more than a fifth by 2020 and 8 billion tonnes of greenhouse gases avoided through energy efficiency investments that would more than pay for themselves.

Looking at the power pathway, we believe it will increasingly make sense to use more natural gas for power. Gas is the fuel that offers the greatest potential to achieve the largest greenhouse gas reductions - at the lowest cost - in the shortest time - and all that by using technology that's available today. India with its large and growing gas reserves should be in a good place to begin to build a gas based economy and reduce its dependence on coal.

Gas is easily the cleanest burning fossil fuel. It's very efficient. Combined-cycle turbines, fuelled by natural gas, are quick and relatively cheap to build. Gas can also complement renewable energy - given the intermittency with which wind and solar power operate, gas-fired plants are ideal for providing the necessary swing capacity.

So a very important way that the world can deal with the issue of carbon is to move much more of its power generation to gas – especially as we can’t realistically expect to see clean coal technology deployed at scale before 2020.

I'm pleased to say that the world seems to be waking up to the advantages of natural gas. Last year gas consumption increased in both the OECD and non-OECD countries. It was the

only hydrocarbon to do this - and this in spite of the recession which dampened demand for all fuels.

The transport pathway is an area where we need to distinguish between options that are promising for the long-term and those that are practical for the near-term. For example, electric vehicles and hydrogen fuel cells will have a part to play in the long term. But today they face two big obstacles. They need massive new infrastructure and their electricity or hydrogen needs to be produced more sustainably. Electric vehicles are only as sustainable as the power that fuels them.

So over the next two decades we need other options. I've mentioned the part energy efficiency can play in the transport sector, but there is also a major role for advanced biofuels as a medium term means of delivering lower carbon or even zero carbon fuel. At BP we are investing significantly in advanced biofuels, such as sugarcane and lingo-cellulosic ethanol, that don't endanger food production or biodiversity, but do provide reductions in greenhouse gases of 80% or more.

Conclusion

In concluding, let me underline one further point. These are not issues on which we have endless time to deliberate. It matters what we do over the next 25 years. There is real benefit to deciding on the most cost-effective remedies now - such as promoting energy efficiency, using more gas for power and developing new biofuels for transport. These options make economic sense today and will not cost the world more than it can afford.

We can act now to support these developments, working with policy-makers at national and regional levels to make progress along the best energy pathways.

The consequences of failure would be serious. Without a credible and enduring framework, it would be impossible for industry to invest in maintaining and enhancing our energy supply.

As well as ensuring that we don't leave future generations with the prospect of rising sea levels, we need to ensure that we keep the lights on in the next decade.

It's a complex challenge but we will meet it if we keep certain principles in mind: clarity about objectives, clarity in the policy framework, and clarity about the course that we set to build tomorrow's energy landscape.

There is one final but very important factor that I haven't mentioned yet – and that is partnership. In BP we are very conscious that we can't do it all. We need to work with others who have different skills, different capabilities and different backgrounds. We work with NOCs. We work with academic experts. We work with governments. We work with civil society groups.

And on an international level, we also need to work together – north and south, east and west, government and business. That's why I'm delighted and honoured to have been able to join you today. And I look forward to working with you in the years to come as we address these new realities and build the industry of the future.

Thank you.